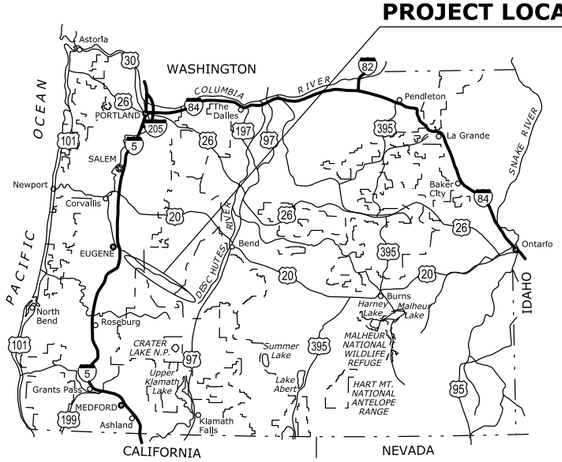
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | A.1 |

# U. S. DEPARTMENT OF TRANSPORTATION
# FEDERAL HIGHWAY ADMINISTRATION

**PROJECT LOCATION**



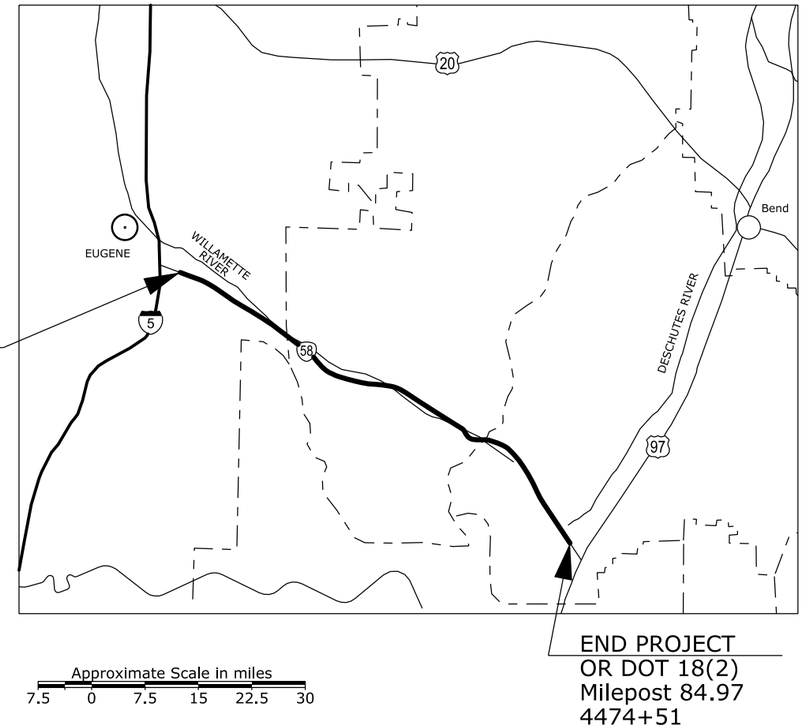

**OREGON KEY MAP**

PLANS FOR PROPOSED PROJECT

OR DOT 18(2)

# OR58:
# FIX-IT CORRIDOR CULVERTS

LANE COUNTY & KLAMATH COUNTY
OREGON
LENGTH 82.24 MILES




**SECTION INDEX**



*See Sheet A.2 for Index to Sheets*

**TYPE OF CONSTRUCTION:**

*Construction: Grading, drainage, surfacing*

**SPECIFICATION:**

*Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-14*

PLANS PREPARED BY:

wsp

PLANS PREPARED FOR:

**U.S. DEPARTMENT OF TRANSPORTATION**
**FEDERAL HIGHWAY ADMINISTRATION**

WESTERN FEDERAL LANDS HIGHWAY DIVISION
VANCOUVER, WASHINGTON

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

***APPROVED:***

BRENT L COE
Digitally signed by BRENT L COE
Date: 2022.09.07 11:54:37 -07'00'

*DATE*

Chief of Engineering,
Western Federal Lands Highway Division

PROJECT MANAGER
M. MILLER

Designed by: B. Roche 04/2019 Checked by: C. Pot 04/2019

24 August 2022 6:03 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802A01.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | A.2 |

Designed by: | Checked by: | --/---- | --/----

# INDEX TO SHEETS



*NOTE:*
*The following sheets are intentionally not included in the plan set: E.5, E.6, E.8, E.9, E.10, E.11, E.17, E.20, E.22, E.28, E.54, E.55, E.57, H.17, and H.18.*

**INDEX TO SHEETS**

| | |
|---|---|
| Δ | total central angle |
| Δc | curve central angle |
| Ø | diameter |
| θs | spiral central angle |
| abut. | abutment |
| ADT | average daily traffic |
| AH | ahead |
| AOP | aquatic organism passage |
| appr. | approach |
| BK | back |
| BM | bench mark |
| BP | balance point |
| br. | bridge |
| brg. | bearing |
| cc or c. to c. | center to center |
| ℄ | centerline |
| clr. | clear |
| CMP | corrugated metal pipe |
| col. | column |
| conc. | concrete |
| conn. | connection |
| constr. jt. | construction joint |
| cont. | continuous |
| CS | point of curve to spiral |
| ctrs. | centers |
| CUFT | cubic foot (feet) |
| culv. | culvert |
| CUYD | cubic yard(s) |
| D | diameter |
| DHV | design hourly volume |
| dia. | diameter |
| diag. | diagonal |
| diaph. | diaphragm |
| dist. | distance |
| drwg(s). | drawing(s) |
| E | east |
| e | superelevation rate |
| El. 94.16 ft | elevation with number |
| elev. | elevation |
| emb. | embankment |
| EP | edge of pavement |
| EQ or eq. | equation |
| ER | edge of road |
| EW | edge of water |
| exc. | excavation |
| exp. jt. | expansion joint |
| fin. | finish |
| flg. | flange |
| ft2 | square foot |
| ft3 | cubic foot (feet) |
| ftg. | footing |
| ga. | gage (gauge) |
| galv. | galvanized |
| hdwl. | headwall |
| hex. | hexagon |
| HW | high water |
| ID | inside diameter |
| jt. | joint |
| L | length of curve |
| lam. | lamination |
| lat. | latitude |
| Ln | Lane |
| LNFT | linear foot (feet) |
| long. | longitudinal |
| LPSM | lump sum |
| Ls | length of spiral |
| lt. or LT | left |
| LW | low water |

| | |
|---|---|
| M.L. | main line |
| M.P. | mile post |
| matl. | material |
| max. | maximum |
| MGAL | thousand gallon |
| min. | minimum |
| mon. | monument |
| N | north |
| NC | normal crown |
| o. c. | on center |
| o. to o. | out to out |
| OD | outside diameter |
| OG | original ground |
| PC | point of curve |
| PCC | point of compound curve |
| PCS | point of curve to spiral |
| PI | point of intersection |
| pl. | plate |
| POC | point on curve |
| POS | point on spiral |
| POT | point on tangent |
| PS | point of tangent to spiral |
| PSC | point of spiral to curve |
| PST | point of spiral to tangent |
| PT | point of tangent |
| pvmt. | pavement |
| R | radius |
| R. | range |
| R/W | right-of-way |
| Rd | Road |
| rdwy. | roadway |
| reinf. | reinforcement |
| reqd. | required |
| rt. or RT | right |
| rte. | route |
| S | south |
| SADT | seasonal average daily traffic |
| SC | point of spiral to curve |
| sec. | section |
| shldr. | shoulder |
| SLRY | slurry unit |
| spa. | spacing, spaces or spaced |
| SQFT | square foot |
| SQYD | square yard |
| SRS | point of spiral to reverse spiral |
| SS | point of spiral to spiral (no curve) |
| ST | point of spiral to tangent |
| STA, Sta. | station |
| std. | standard |
| stgr. | stringer |
| stiff. | stiffener |
| struc. | structural |
| STS | point of spiral to tangent spiral |
| sym. | symmetrical |
| T | tangent distance |
| T. | township |
| TBM | temporary bench mark |
| thd. | thread |
| TS | point of tangent to spiral |
| Ts | tangent distance (spiraled curve) |
| typ. | typical |
| V | design speed |
| vph | vehicles per hour |
| VPI | vertical point of intersection |
| W | west |
| WQ | water quality |
| yd2 | square yard |
| yd3 | cubic yard(s) |

## NOTE:

1. Other symbols used in the plans will be shown in a legend on the appropriate plan sheet.

National Boundary

State Boundary

County Boundary

City Boundary

Township or Range Line

Section Line

Section Corner (Found, Projected)

¼ Section Line

¼ Section Corner (Found, Projected)

1/16 Section Line

1/16 Section Corner (Found, Projected)

Property Line w/Found Property Corner

Parcel Number

National Park Boundary

National Forest Boundary

National Wildlife Refuge Boundary

BLM Lands Boundary

Indian Reservation Boundary

Existing Roadway (Road, Paved, Gravel)

Railroad

Trail

Fiber Roll or Wattle

Silt Fence

Intermittent Drainage or Small Creek

Large Creek or River

Lake, Pond or Reservoir; Marshland

Spring or Seep

Treeline; Individual Trees

Material Source; Bore Hole; Test Pit

Spot Elevation; Coordinate Grid Tick

Above Ground Tank; Underground Tank

Boulder; Well; Satellite Dish; Grave

Cooking Grate; Garbage Can; Picnic Table

Flagpole; Fire Hydrant

Gas & Water Meter; Gas & Water Valve

Control Point (Terrestrial and GPS); Jump Hub

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | A.3 |

North Arrow

| | EXISTING | PROPOSED |
|---|---|---|
| Slope Stake Limits | Top of Cut / Toe of Fill / Transition | |
| Construction limits | | |
| Fence | | |
| Gate with Fence | | |
| Cattleguard | | |
| Guardrail | | |
| Concrete Barrier | | |
| Retaining Wall | | wall face |
| Signs (single, double post; portable) | | |
| Delineators | | |
| Pipe Culvert (arrow shows flow) | | |
| Pipe Culvert with End Section | | |
| Pipe Culvert with Headwall | | |
| Pipe Culvert with Drop Inlet | | |
| Box Culvert | | |
| Underdrain | | |
| Overhead/Above Ground Utilities | | |
| Underground Utilities | | |

*FM = force main, FO = fiber optic, G = gas, IRR = irrigation, O = oil, P = power, SA = sanitary sewer, SD = storm drain, SS = storm sewer, STEAM = steam, T = telephone, TV = CATV, W = water*

Poles (Power, Telephone, Joint Use, Light, Support w/Anchor)

Miscellaneous Utility Features

*EM = electric meter, T = telephone pedestal, TV = CATV pedestal, UP = transformer or junction box, WF = water fountain*

Building

Right-of-Way Line with Monument

Permanent Easement

Construction Easement — *- no symbol -*

Riprap

*NO SCALE*

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY DETAIL

# PLAN SYMBOLS AND ABBREVIATIONS

DETAIL APPROVED FOR USE 11/2001

REVISED: 9/2005 1/2007 10/2009 10/2014

DETAIL W101-1

NPS PMIS NO.: XXXXX DRAWING NO.: XXX-XXXXX

16 May 2022 9:44 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802A03.dgn [USC]

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | A.4 |

**BEGIN PROJECT OR DOT 18(2)**
*OR58 Milepost 2.73*
*132+97*
*43°58'43.6" N*
*122°57'42.5" W*

**END PROJECT OR DOT 18(2)**
*OR58 Milepost 84.97*
*4474+51*
*43°20'46.3" N*
*121°46'16.1" W*

EUGENE
SUTHERLIN
OAKRIDGE
GLIDE
ROSEBURG
BEND
LA PINE

5
38
58
20
97
138

MILE 10
MILE 20
MILE 30
MILE 40
MILE 50
MILE 60
MILE 70
MILE 80

Dexter Reservoir
Lookout Pt. Lake
Hills Creek Lake
Waldo Lake
Davis Lake
Odell Lake
Crescent Lake

OR58

Lane County
Douglas County
Deschutes County
Klamath County

N

Scale in miles
5 2.5 0 5 10

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.05.19 17:02:41 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**VICINITY MAP**

Designed by: --/---- Checked by: --/----
1/1/0001 12:00:00 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219314\Border.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | A.5 |

# CULVERT INDEX

| CULVERT ID | MILEPOINT | STATION | LATITUDE | LONGITUDE | NORTHING | EASTING |
|---|---|---|---|---|---|---|
| D034723 | 2.73 | 136+84 | 43°58'43.61"N | 122°57'42.46"W | 852,194.01 | 4,273,320.03 |
| D027825 | 13.07 | 683+76 | 43°54'29"N | 122°46'52.44"W | 825,076.36 | 4,320,128.97 |
| D027828 | 13.56 | 708+56 | 43°54'28.44"N | 122°46'18.8"W | 824,952.67 | 4,322,589.57 |
| D027832 | 13.93 | 728+76 | 43°54'32.6"N | 122°45'52.6"W | 825,322.32 | 4,324,517.86 |
| D027833 | 14.03 | 733+51 | 43°54'31.95"N | 122°45'46.21"W | 825,244.02 | 4,324,984.03 |
| D027842 | 15.51 | 812+13 | 43°53'57.95"N | 122°44'31.76"W | 821,655.74 | 4,330,339.65 |
| D034741 | 17.29 | 904+61 | 43°53'6.19"N | 122°42'56.71"W | 816,230.79 | 4,337,157.92 |
| D027990 | 26.27 | 1380+27 | 43°48'45.03"N | 122°34'52.61"W | 788,885.58 | 4,371,941.78 |
| D027992 | 26.60 | 1397+89 | 43°48'35.14"N | 122°34'33.43"W | 787,850.39 | 4,373,323.36 |
| D028033 | 31.47 | 1655+45 | 43°45'27.68"N | 122°31'56.56"W | 768,593.17 | 4,384,361.94 |
| D028041 | 33.54 | 1761+05 | 43°44'52.8"N | 122°30'22.54"W | 764,895.68 | 4,391,174.69 |
| D028044 | 33.65 | 1770+13 | 43°44'50.92"N | 122°30'10.3"W | 764,683.65 | 4,392,068.91 |
| D028045 | 33.79 | 1777+72 | 43°44'48.25"N | 122°30'0.8"W | 764,397.15 | 4,392,759.10 |
| D028047 | 36.73 | 1933+09 | 43°44'4.64"N | 122°26'48.38"W | 759,649.85 | 4,406,776.67 |
| D028050 | 37.31 | 1963+62 | 43°43'46"N | 122°26'16.46"W | 757,709.02 | 4,409,075.90 |
| D028051 | 37.56 | 1976+80 | 43°43'45.69"N | 122°25'58.53"W | 757,646.92 | 4,410,391.21 |
| D028052 | 37.68 | 1983+18 | 43°43'45.87"N | 122°25'49.88"W | 757,650.68 | 4,411,026.38 |
| D028053 | 37.89 | 1994+49 | 43°43'47"N | 122°25'34.8"W | 757,739.56 | 4,412,136.01 |
| D028071 | 40.92 | 2154+13 | 43°43'40.56"N | 122°22'3.17"W | 756,735.15 | 4,427,655.93 |
| D028074 | 41.50 | 2184+46 | 43°43'30.58"N | 122°21'24.05"W | 755,660.86 | 4,430,505.38 |
| D034764 | 41.58 | 2189+54 | 43°43'30.11"N | 122°21'17.36"W | 755,602.50 | 4,430,994.93 |
| D034765 | 41.811 | 2200+93 | 43°43'26.48"N | 122°21'3.08"W | 755,211.95 | 4,432,035.60 |
| D028076 | 41.91 | 2207+49 | 43°43'21.9"N | 122°20'57.7"W | 754,740.06 | 4,432,420.43 |
| D028077 | 42.01 | 2211+24 | 43°43'20.64"N | 122°20'53.27"W | 754,605.19 | 4,432,742.70 |
| D028078 | 42.12 | 2217+50 | 43°43'20.47"N | 122°20'44.26"W | 754,573.48 | 4,433,403.44 |
| D028082 | 42.50 | 2237+16 | 43°43'13.33"N | 122°20'19.9"W | 753,811.40 | 4,435,176.05 |
| D028086 | 43.26 | 2277+42 | 43°42'57.28"N | 122°19'31.37"W | 752,108.24 | 4,438,703.71 |
| D028088 | 43.43 | 2286+95 | 43°42'54.41"N | 122°19'19.61"W | 751,799.49 | 4,439,560.60 |
| D028090 | 43.54 | 2293+18 | 43°42'52.56"N | 122°19'11.84"W | 751,599.17 | 4,440,127.31 |
| D028091 | 43.74 | 2302+27 | 43°42'47.92"N | 122°19'1.07"W | 751,112.32 | 4,440,907.39 |
| D028094 | 43.99 | 2315+68 | 43°42'46.32"N | 122°18'43.29"W | 750,922.08 | 4,442,209.93 |
| D028095 | 44.06 | 2318+76 | 43°42'45.65"N | 122°18'38.87"W | 750,847.56 | 4,442,532.48 |
| D028100 | 44.36 | 2334+96 | 43°42'41.5"N | 122°18'17.87"W | 750,394.55 | 4,444,065.80 |
| D028107 | 44.96 | 2366+45 | 43°42'33.89"N | 122°17'36.22"W | 749,557.84 | 4,447,107.09 |
| D028108 | 45.03 | 2370+47 | 43°42'32.2"N | 122°17'31.19"W | 749,379.11 | 4,447,473.22 |
| D028109 | 45.35 | 2387+26 | 43°42'21.34"N | 122°17'14.1"W | 748,253.13 | 4,448,704.55 |
| D028124 | 46.75 | 2460+03 | 43°41'36.33"N | 122°15'54.44"W | 743,572.34 | 4,454,458.18 |
| D028127 | 46.89 | 2468+93 | 43°41'32.44"N | 122°15'46.37"W | 743,166.10 | 4,455,042.59 |
| D028128 | 47.07 | 2478+19 | 43°41'26.14"N | 122°15'37.2"W | 742,514.76 | 4,455,703.22 |
| D028130 | 47.46 | 2498+90 | 43°41'13.39"N | 122°15'15.62"W | 741,190.83 | 4,457,261.28 |
| D028131 | 47.57 | 2503+82 | 43°41'10.97"N | 122°15'9.69"W | 740,936.87 | 4,457,691.54 |
| D028132 | 47.80 | 2516+49 | 43°41'4.6"N | 122°14'54.89"W | 740,269.32 | 4,458,765.07 |
| D028137 | 49.41 | 2601+15 | 43°39'54.71"N | 122°13'58.31"W | 733,107.52 | 4,462,774.92 |
| D028139 | 49.99 | 2631+17 | 43°39'30.09"N | 122°13'39.44"W | 730,587.11 | 4,464,110.75 |
| D028142 | 50.30 | 2650+00 | 43°39'19.22"N | 122°13'17.9"W | 729,454.47 | 4,465,670.76 |
| D028158 | 53.56 | 2819+48 | 43°38'7.96"N | 122°10'3.93"W | 721,952.22 | 4,479,783.50 |
| D028159 | 53.69 | 2826+24 | 43°38'7.27"N | 122°9'55.44"W | 721,869.83 | 4,480,406.40 |
| D028160 | 53.76 | 2829+97 | 43°38'8.68"N | 122°9'50.88"W | 722,005.80 | 4,480,744.04 |
| D028161 | 53.83 | 2833+89 | 43°38'10.76"N | 122°9'46.48"W | 722,210.42 | 4,481,071.82 |
| D028163 | 53.95 | 2838+95 | 43°38'10.81"N | 122°9'38.76"W | 722,203.45 | 4,481,639.86 |
| D028186 | 57.77 | 3042+11 | 43°36'48.96"N | 122°6'16.05"W | 713,627.26 | 4,496,384.05 |
| D028188 | 57.96 | 3050+94 | 43°36'55.46"N | 122°6'8.16"W | 714,274.50 | 4,496,977.17 |
| D028238 | 64.27 | 3385+90 | 43°35'6.49"N | 122°0'1.45"W | 702,743.40 | 4,523,750.35 |
| D028273 | 84.68 | 4463+32 | 43°20'58.7"N | 121°46'28.5"W | 615,929.65 | 4,582,266.92 |

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.05.19 17:02:41 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**CULVERT LOCATION LISTING**

Designed by: --/---- Checked by: --/----

3/21/2022 7:57:38 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802A05.dgn

# SUMMARY OF QUANTITIES

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | B.1 |

| AMEND | Line Item No. | Pay Item Number | Pay Item Description | Unit | Sheet and Description | | | | | | | | | | Estimated Quantities | Remarks and/or Determination of Estimated Quantity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | SECTION C | SECTION D | SECTION E | SECTION F | SECTION H | SECTION I | SECTION J | | | - | | |
| | | | | | TYPICAL SECTIONS | ROADWAY PLANS | DRAINAGE | EROSION CONTROL | TEMPORARY TRAFFIC CONTROL | PERMANENT TRAFFIC CONTROL | REVEGETATION | | | ALLOWANCE | Bid Schedule | |
| | A0020 | 15101-0000 | MOBILIZATION | LPSM | | | | | | | | | | | ALL | |
| | A0040 | 15201-0000 | CONSTRUCTION SURVEY AND STAKING | LPSM | | | | | | | | | | | ALL | |
| | A0060 | 15301-0010 | CONTRACTOR QUALITY CONTROL AND ASSURANCE | LPSM | | | | | | | | | | | ALL | |
| | A0080 | 15401-0000 | CONTRACTOR TESTING | LPSM | | | | | | | | | | | ALL | |
| | A0100 | 15501-0000 | CONSTRUCTION SCHEDULE | LPSM | | | | | | | | | | | ALL | |
| | A0120 | 15701-0000 | SOIL EROSION CONTROL (BYPASS PUMPING) | LPSM | | | | All | | | | | | | ALL | |
| | A0140 | 15701-0000 | SOIL EROSION CONTROL (TEMPORARY WATER MANAGEMENT) | LPSM | | | | All | | | | | | | ALL | |
| | A0160 | 15705-1400 | SOIL EROSION CONTROL, FIBER ROLL | LNFT | | | | 13,941 | | | | | | 2,789 | 16,730 | |
| | A0180 | 15706-0200 | SOIL EROSION CONTROL, CHECK DAM | EACH | | | | 193 | | | | | | 39 | 232 | |
| | A0200 | 15706-1000 | SOIL EROSION CONTROL, INLET PROTECTION | EACH | | | | 7 | | | | | | 3 | 10 | |
| | A0220 | 15706-1600 | SOIL EROSION CONTROL, STABILIZED CONSTRUCTION EXIT | EACH | | | | 5 | | | | | | 5 | 10 | |
| | A0240 | 20101-0000 | CLEARING AND GRUBBING | ACRE | 1.5 | | | | | | | | | 0.5 | 2.0 | |
| | A0260 | 20301-1200 | REMOVAL OF HEADWALL | EACH | | | 1 | | | | | | | | 1 | |
| | A0280 | 20301-1400 | REMOVAL OF INLET | EACH | | | 2 | | | | | | | | 2 | |
| | A0300 | 20301-2000 | REMOVAL OF PIPE END SECTION | EACH | | | 4 | | | | | | | 1 | 5 | |
| | A0320 | 20302-1200 | REMOVAL OF GUARDRAIL | LNFT | | 1,857 | | | | | | | | 186 | 2,043 | |
| | A0340 | 20310-1000 | PLUG, EXISTING PIPE | EACH | | | 2 | | | | | | | | 2 | |
| | A0360 | 20425-1000 | DITCH, EXCAVATION (REGRADING) | LNFT | | | 30 | | | | | | | 5 | 35 | |
| | A0380 | 20702-0100 | GEOTEXTILE FILTER, CLASS 1, TYPE A (NONWOVEN) | SQYD | | | 769 | | | | | | | 77 | 846 | |
| | A0400 | 25101-0100 | PLACED RIPRAP, METHOD A, CLASS 1 | CUYD | | | 193 | | | | | | | 20 | 213 | |
| | A0420 | 25101-0200 | PLACED RIPRAP, METHOD A, CLASS 2 | CUYD | | | 3 | | | | | | | 1 | 4 | |
| | A0440 | 25101-0300 | PLACED RIPRAP, METHOD A, CLASS 3 | CUYD | | | 24 | | | | | | | 3 | 27 | |
| | A0460 | 25101-0400 | PLACED RIPRAP, METHOD A, CLASS 4 | CUYD | | | 17 | | | | | | | 3 | 20 | |
| | A0480 | 30201-2000 | ROADWAY AGGREGATE, METHOD 2 | CUYD | 545 | | | | | | | | | 65 | 610 | |
| | A0500 | 30302-1000 | DITCH RECONDITIONING | LNFT | | | 370 | | | | | | | 37 | 407 | |
| | A0520 | 40301-0000 | ASPHALT CONCRETE PAVEMENT | TON | 615 | | | | | | | | | 60 | 675 | |
| | A0540 | 60102-0000 | CONCRETE (PAVED END SLOPE) | SQYD | | | 218 | | | | | | | 22 | 240 | |
| | A0560 | 60103-0580 | CONCRETE, HEADWALL FOR DOUBLE 18-INCH PIPE CULVERT | EACH | | | 1 | | | | | | | | 1 | |
| | A0580 | 60201-0400 | 12-INCH PIPE CULVERT | LNFT | | | 20 | | | | | | | 4 | 24 | |
| | A0600 | 60201-0600 | 18-INCH PIPE CULVERT | LNFT | | | 488 | | | | | | | 98 | 586 | |
| | A0620 | 60201-0800 | 24-INCH PIPE CULVERT | LNFT | | | 373 | | | | | | | 75 | 448 | |

MileStone: Sign-Off
Date Completed: In Progress
Report Date: 08/25/22

# SUMMARY OF QUANTITIES

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | B.2 |

| AMEND | Line Item No. | Pay Item Number | Pay Item Description | Unit | Sheet and Description | | | | | | | | | | Estimated Quantities | Remarks and/or Determination of Estimated Quantity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | SECTION C | SECTION D | SECTION E | SECTION F | SECTION H | SECTION I | SECTION J | | | - | | |
| | | | | | TYPICAL SECTIONS | ROADWAY PLANS | DRAINAGE | EROSION CONTROL | TEMPORARY TRAFFIC CONTROL | PERMANENT TRAFFIC CONTROL | REVEGETATION | | | ALLOWANCE | Bid Schedule | |
| | A0640 | 60201-0900 | 30-INCH PIPE CULVERT | LNFT | | | 533 | | | | | | | 107 | 640 | |
| | A0660 | 60201-1000 | 36-INCH PIPE CULVERT | LNFT | | | 252 | | | | | | | 50 | 302 | |
| | A0680 | 60201-1200 | 48-INCH PIPE CULVERT | LNFT | | | 97 | | | | | | | 20 | 117 | |
| | A0700 | 60201-2000 | 96-INCH PIPE CULVERT | LNFT | | | 191 | | | | | | | 38 | 229 | |
| | A0720 | 60210-0600 | END SECTION FOR 18-INCH PIPE CULVERT | EACH | | | 4 | | | | | | | | 4 | |
| | A0740 | 60210-0800 | END SECTION FOR 24-INCH PIPE CULVERT | EACH | | | 1 | | | | | | | | 1 | |
| | A0760 | 60210-0900 | END SECTION FOR 30-INCH PIPE CULVERT | EACH | | | 10 | | | | | | | | 10 | |
| | A0780 | 60403-0000 | INLET (ODOT TYPE "G-2") | EACH | | | 4 | | | | | | | | 4 | |
| | A0800 | 60403-0000 | INLET (ODOT TYPE "D") | EACH | | | 3 | | | | | | | | 3 | |
| | A0820 | 60602-0900 | PIPE ANCHOR ASSEMBLY, 36-INCH | EACH | | | 3 | | | | | | | | 3 | |
| | A0840 | 60703-0000 | CLEANING CULVERTS IN PLACE | LNFT | | | 495 | | | | | | | 99 | 594 | |
| | A0860 | 60706-0000 | CLEANING DRAINAGE STRUCTURE | EACH | | | 1 | | | | | | | 1 | 2 | |
| | A0880 | 60707-0300 | LINING 18-INCH PIPE CULVERT | LNFT | | | 665 | | | | | | | 133 | 798 | |
| | A0900 | 60707-0500 | LINING 24-INCH PIPE CULVERT | LNFT | | | 583 | | | | | | | 117 | 700 | |
| | A0920 | 60707-0600 | LINING 30-INCH PIPE CULVERT | LNFT | | | 272 | | | | | | | 55 | 327 | |
| | A0940 | 60707-0700 | LINING 36-INCH PIPE CULVERT | LNFT | | | 164 | | | | | | | 33 | 197 | |
| | A0960 | 60901-2100 | CURB, ASPHALT, 4-INCH DEPTH | LNFT | | | 60 | | | | | | | 12 | 72 | |
| | A0980 | 61701-4550 | GUARDRAIL SYSTEM MGS, TYPE 2, CLASS A WOOD POSTS | LNFT | | 1,345 | | | | | | | | 135 | 1,480 | |
| | A1000 | 61702-0000 | TERMINAL SECTION (BURIED IN BACKSLOPE) | EACH | | 3 | | | | | | | | | 3 | |
| | A1020 | 61702-1500 | TERMINAL SECTION, TYPE MGS TANGENT | EACH | | 1 | | | | | | | | | 1 | |
| | A1040 | 61702-1600 | TERMINAL SECTION, TYPE MGS FLARED | EACH | | 4 | | | | | | | | | 4 | |
| | A1060 | 61707-4000 | STRUCTURE TRANSITION RAILING, MGS SYSTEM | LNFT | | 21 | | | | | | | | | 21 | |
| | A1080 | 62201-0250 | DUMP TRUCK, 10 CUBIC YARD MINIMUM CAPACITY | HOUR | | | | | | | | | | 200 | 200 | |
| | A1100 | 62201-0950 | WHEEL LOADER, 3 CUBIC YARD MINIMUM RATED CAPACITY | HOUR | | | | | | | | | | 200 | 200 | |

MileStone: Sign-Off
Date Completed: In Progress
Report Date: 08/25/22

# SUMMARY OF QUANTITIES

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | B.3 |

| AMEND | Line Item No. | Pay Item Number | Pay Item Description | Unit | Sheet and Description | | | | | | | | | | Estimated Quantities | Remarks and/or Determination of Estimated Quantity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | SECTION C | SECTION D | SECTION E | SECTION F | SECTION H | SECTION I | SECTION J | | | - | | |
| | | | | | TYPICAL SECTIONS | ROADWAY PLANS | DRAINAGE | EROSION CONTROL | TEMPORARY TRAFFIC CONTROL | PERMANENT TRAFFIC CONTROL | REVEGETATION | | | ALLOWANCE | Bid Schedule | |
| | A1120 | 62201-2700 | CRANE, TRUCK MOUNTED, 90 TON MINIMUM CAPACITY, 180 FOOT MINIMUM BOOM, WITH DRAGLINE BUCKET AND 10 FOOT DOZER TRACK DRAG | HOUR | | | | | | | | | | 70 | 70 | |
| | A1140 | 62201-3400 | HYDRAULIC EXCAVATOR, 1 CUBIC YARD MINIMUM CAPACITY WITH THUMB ATTACHMENT | HOUR | | | | | | | | | | 200 | 200 | |
| | A1160 | 62201-3750 | CHAIN SAW | HOUR | | | | | | | | | | 300 | 300 | |
| | A1180 | 62301-0000 | GENERAL LABOR (TREE REMOVAL, SLOPE IMPROVEMENTS) | HOUR | | 300 | | | | | | | | | 300 | |
| | A1200 | 62510-2000 | SEEDING, HYDRAULIC METHOD | ACRE | | 1.7 | | | | | | | | 0.3 | 2.0 | |
| | A1220 | 62515-3000 | MULCHING, HYDRAULIC METHOD, BONDED FIBER MATRIX | ACRE | | 1.7 | | | | | | | | 0.3 | 2.0 | |
| | A1240 | 62630-0350 | PLANTINGS, TREES, BALLED AND BURLAPPED | EACH | | | | | | | 29 | | | 5 | 34 | |
| | A1260 | 62901-0000 | ROLLED EROSION CONTROL PRODUCT | SQYD | | | | 2,313 | | | | | | 347 | 2,660 | |
| | A1280 | 63309-0100 | DELINEATOR, TYPE 1 (CULVERT ID MARKER) | EACH | | | 108 | | | | | | | | 108 | |
| | A1300 | 63316-1000 | REMOVE AND RESET SIGN | EACH | | | | | | 1 | | | | 1 | 2 | |
| | A1320 | 63401-0500 | PAVEMENT MARKINGS, TYPE C, SOLID | LNFT | | | | | | 2,414 | | | | 241 | 2,655 | |
| | A1340 | 63501-2000 | TEMPORARY TRAFFIC CONTROL, TRAFFIC SIGNAL SYSTEM (AUTOMATED FLAGGER ASSISTANCE DEVICE) | LPSM | | | | | All | | | | | | ALL | |
| | A1360 | 63502-0100 | TEMPORARY TRAFFIC CONTROL, ARROW BOARD, TYPE A | EACH | | | | | 1 | | | | | 1 | 2 | |
| | A1380 | 63502-0500 | TEMPORARY TRAFFIC CONTROL, BARRICADE TYPE 2 | EACH | | | | | 4 | | | | | 4 | 8 | |
| | A1400 | 63502-0600 | TEMPORARY TRAFFIC CONTROL, BARRICADE TYPE 3 | EACH | | | | | 4 | | | | | 4 | 8 | |
| | A1420 | 63502-1050 | TEMPORARY TRAFFIC CONTROL, TUBULAR MARKER | EACH | | | | | 407 | | | | | 41 | 448 | |
| | A1440 | 63502-1300 | TEMPORARY TRAFFIC CONTROL, DRUM | EACH | | | | | 80 | | | | | 8 | 88 | |
| | A1460 | 63502-2000 | TEMPORARY TRAFFIC CONTROL, PORTABLE CHANGEABLE MESSAGE SIGN | EACH | | | | | 6 | | | | | | 6 | |
| | A1480 | 63502-2100 | TEMPORARY TRAFFIC CONTROL, CRASH CUSHION | EACH | | | | | 4 | | | | | | 4 | |

MileStone: Sign-Off
Date Completed: In Progress
Report Date: 08/25/22

# SUMMARY OF QUANTITIES

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | B.4 |

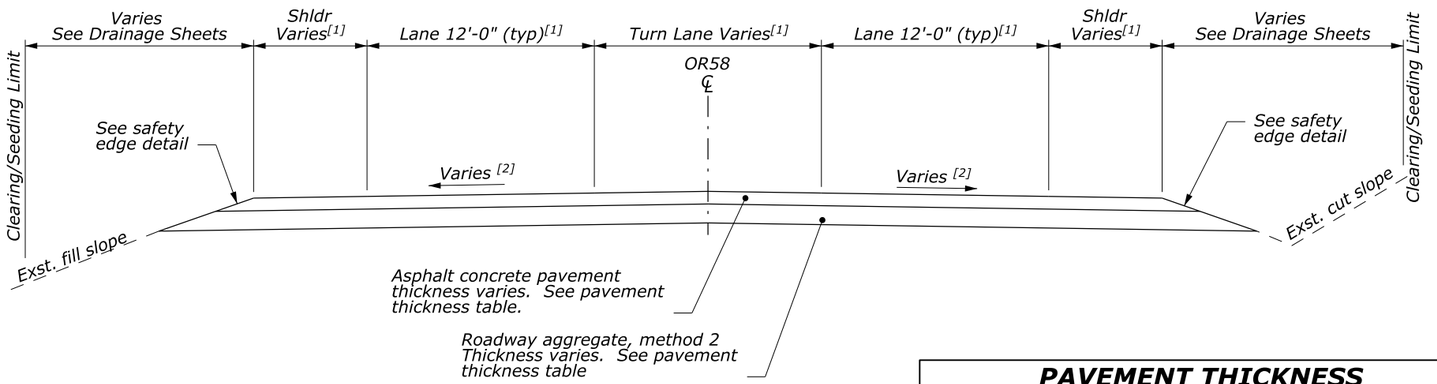
| AMEND | Line Item No. | Pay Item Number | Pay Item Description | Unit | Sheet and Description | | | | | | | | | | Estimated Quantities | Remarks and/or Determination of Estimated Quantity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | SECTION C | SECTION D | SECTION E | SECTION F | SECTION H | SECTION I | SECTION J | | | - | | |
| | | | | | TYPICAL SECTIONS | ROADWAY PLANS | DRAINAGE | EROSION CONTROL | TEMPORARY TRAFFIC CONTROL | PERMANENT TRAFFIC CONTROL | REVEGETATION | | | ALLOWANCE | Bid Schedule | |
| | A1500 | 63503-0400 | TEMPORARY TRAFFIC CONTROL, CONCRETE BARRIER | LNFT | | | | | 1,000 | | | | | 200 | 1,200 | |
| | A1520 | 63504-1000 | TEMPORARY TRAFFIC CONTROL, CONSTRUCTION SIGN | SQFT | | | | | 1,131 | | | | | 12 | 1,143 | |
| | A1540 | 63506-0500 | TEMPORARY TRAFFIC CONTROL, FLAGGER | HOUR | | | | | 2,592 | | | | | 260 | 2,852 | |
| | A1560 | 63507-0700 | TEMPORARY TRAFFIC CONTROL, TRAFFIC CONTROL SUPERVISOR | DAY | | | | | 240 | | | | | | 240 | |
| | A1580 | 64703-3010 | MITIGATION, ROCK WEIR | EACH | | | 36 | | | | | | | 5 | 41 | |
| | A1600 | 64703-6000 | MITIGATION, FISH PASSAGE BOULDER | EACH | | | 27 | | | | | | | 4 | 31 | |
| | A1620 | 64703-7000 | MITIGATION, BAFFLE | EACH | | | 27 | | | | | | | 4 | 31 | |
| | A1640 | 64704-1000 | MITIGATION, STREAMBED MATERIAL | CUYD | | | 83 | | | | | | | 13 | 96 | |

MileStone: Sign-Off
Date Completed: In Progress
Report Date: 08/25/22

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | C.1 |

## TRENCH PAVING LENGTH

| CULVERT ID | MILE POINT | LENGTH (ft) [5] |
|---|---|---|
| D027828 | 13.56 | 11 |
| D027842 | 15.51 | 17 |
| D027990 | 26.27 | 13 |
| D027992 | 26.60 | 13 |
| D028033 | 31.47 | 11 |
| D028044 | 33.65 | 13 |
| D028045 | 33.79 | 11 |
| D028071 | 40.92 | 13 |
| D028074 | 41.50 | 13 |
| D034765 | 41.811 | 11 |
| D028077 | 42.01 | 11 |
| D028078 | 42.12 | 13 |
| D028086 | 43.26 | 11 |
| D028090 | 43.54 | 11 |
| D028094 | 43.99 | 11 |
| D028100 | 44.36 | 11 |
| D028107 | 44.96 | 11 |
| D028108 | 45.03 | 13 |
| D028109 | 45.35 | 13 |
| D028127 | 46.89 | 11 |
| D028128 | 47.07 | 13 |
| D028131 | 47.57 | 14 |
| D028132 | 47.80 | 14 |
| D028158 | 53.56 | 13 |
| D028273 | 84.68 | 11 |

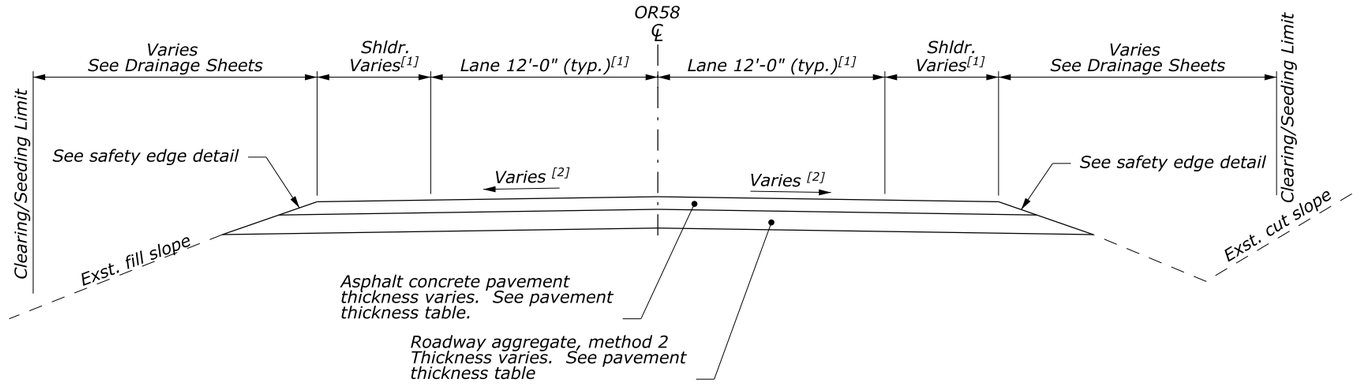



## TYPICAL SECTION

(Locations with Turn Lane)

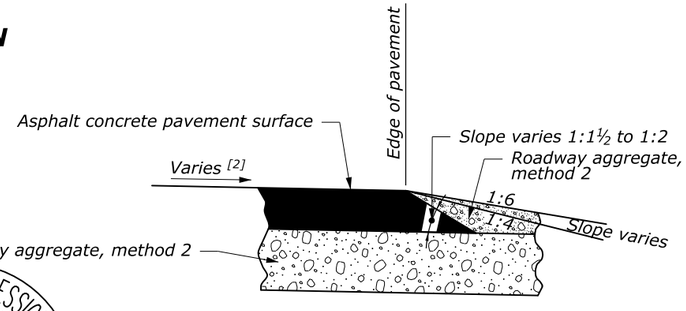
## PAVEMENT THICKNESS

| Location | Asphalt Concrete Pavement (in) | Roadway Aggregate, Method 2 (in) |
|---|---|---|
| MP 2.73 to MP 70.00 | 9[3] | 16 |
| MP 70.00 to MP 84.97 | 8[4] | 10 |




## TYPICAL SECTION

(Two-lane Sections and Approach Roads)




## SAFETY EDGE

### FOOTNOTE:

[1] Roadway cross sectional widths vary by culvert location. Match existing widths.

[2] Match existing roadway cross slope.

[3] Three 3" lifts. Apply tack coat between lifts

[4] Bottom lift: 3", middle lift: 3", top lift: 2" Apply tack coat between lifts

[5] Paving length is equal to trench width at pavement surface, measured perpendicular to the culvert. See sheet E.61 for additional street cut details.

REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.08.30 12:21:10 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

**TYPICAL SECTIONS**

Designed by: -/---- Checked by: -/----

3/21/2022 8:00:08 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802C01.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.1 |

## ITEM 20101-0000
## CLEARING AND GRUBBING

| CULVERT ID | MILEPOINT | AREA | |
|---|---|---|---|
| | | LEFT OF CENTERLINE | RIGHT OF CENTERLINE |
| | | SQFT | SQFT |
| D034723 | 2.73 | 0 | 457 |
| D027825 | 13.07 | 392 | 504 |
| D027828 | 13.56 | 563 | 339 |
| D027832 | 13.93 | 355 | 290 |
| D027833 | 14.03 | 388 | 313 |
| D027842 | 15.51 | 4965 | 930 |
| D034741 | 17.29 | 0 | 1940 |
| D027990 | 26.27 | 1156 | 288 |
| D027992 | 26.60 | 978 | 299 |
| D028033 | 31.47 | 448 | 304 |
| D028041 | 33.54 | 419 | 834 |
| D028044 | 33.65 | 280 | 451 |
| D028045 | 33.79 | 346 | 455 |
| D028047 | 36.73 | 331 | 440 |
| D028050 | 37.31 | 1386 | 232 |
| D028051 | 37.56 | 41 | 267 |
| D028052 | 37.68 | 316 | 228 |
| D028053 | 37.89 | 240 | 782 |
| D028071 | 40.92 | 1572 | 701 |
| D028074 | 41.50 | 1442 | 293 |
| D034764 | 41.58 | 0 | 83 |
| D034765 | 41.811 | 0 | 486 |
| D028076 | 41.91 | 278 | 224 |
| D028077 | 42.01 | 392 | 298 |
| D028078 | 42.12 | 878 | 201 |
| D028086 | 43.26 | 231 | 324 |
| (See Above for Continuation) | | | |

| CULVERT ID | MILEPOINT | AREA | |
|---|---|---|---|
| | | LEFT OF CENTERLINE | RIGHT OF CENTERLINE |
| | | SQFT | SQFT |
| D028088 | 43.43 | 366 | 541 |
| D028090 | 43.54 | 309 | 347 |
| D028091 | 43.74 | 1462 | 584 |
| D028094 | 43.99 | 255 | 714 |
| D028095 | 44.06 | 811 | 698 |
| D028100 | 44.36 | 373 | 493 |
| D028107 | 44.96 | 538 | 529 |
| D028108 | 45.03 | 1090 | 1903 |
| D028109 | 45.35 | 197 | 711 |
| D028124 | 46.75 | 295 | 312 |
| D028127 | 46.89 | 1087 | 299 |
| D028128 | 47.07 | 270 | 644 |
| D028130 | 47.46 | 585 | 445 |
| D028131 | 47.57 | 431 | 575 |
| D028132 | 47.80 | 711 | 1072 |
| D028137 | 49.41 | 1025 | 1106 |
| D028139 | 49.99 | 411 | 698 |
| D028142 | 50.30 | 401 | 711 |
| D028158 | 53.56 | 208 | 603 |
| D028159 | 53.69 | 551 | 635 |
| D028160 | 53.76 | 0 | 828 |
| D028161 | 53.83 | 110 | 254 |
| D028163 | 53.95 | 3950 | 0 |
| D028186 | 57.77 | 470 | 462 |
| D028188 | 57.96 | 329 | 324 |
| D028238 | 64.27 | 965 | 516 |
| D028273 | 84.68 | 1232 | 627 |
| | SUBTOTALS (SQFT) | 35,829 | 28,594 |
| | TOTAL (SQFT) | 64,423 | |
| | **TOTAL (ACRE)** | **1.5** | |

## TYPICAL SECTION QUANTITIES

| | ITEM NO. | 30201-2000 | 40301-0000 |
|---|---|---|---|
| | DESCRIPTION | ROADWAY AGGREGATE METHOD 2 | ASPHALT CONCRETE PAVEMENT |
| | UNIT | CUYD | TON |
| CULVERT ID | MILEPOINT | | |
| D027828 | 13.56 | 28.2 | 31.7 |
| D027842 | 15.51 | 43.7 | 49.1 |
| D027990 | 26.27 | 21.2 | 23.8 |
| D027992 | 26.60 | 30.2 | 33.9 |
| D028033 | 31.47 | 22.3 | 25.0 |
| D028044 | 33.65 | 23.1 | 26.0 |
| D028045 | 33.79 | 18.5 | 20.8 |
| D028071 | 40.92 | 25.9 | 29.1 |
| D028074 | 41.50 | 21.2 | 23.8 |
| D034765 | 41.811 | 2.2 | 2.7 |
| D028077 | 42.01 | 17.9 | 20.1 |
| D028078 | 42.12 | 25.2 | 28.3 |
| D028086 | 43.26 | 17.4 | 19.5 |
| D028090 | 43.54 | 17.9 | 20.1 |
| D028094 | 43.99 | 21.7 | 24.4 |
| D028100 | 44.36 | 16.3 | 18.3 |
| D028107 | 44.96 | 15.8 | 17.7 |
| D028108 | 45.03 | 19.3 | 21.6 |
| D028109 | 45.35 | 19.3 | 21.6 |
| D028127 | 46.89 | 16.8 | 18.9 |
| D028128 | 47.07 | 20.5 | 23.1 |
| D028131 | 47.57 | 22.1 | 24.9 |
| D028132 | 47.80 | 22.8 | 25.6 |
| D028158 | 53.56 | 23.1 | 26.0 |
| D028273 | 84.68 | 6.1 | 9.8 |

| | | |
|---|---|---|
| **TOTAL** | **519** | **586** |

REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.08.30 12:21:10 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

**TABULATION OF PLAN QUANTITIES**

-/---
Checked by:
-/---
Designed by:
8/29/2022 6:46:22 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802D01.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.2 |

## ROADWAY QUANTITIES

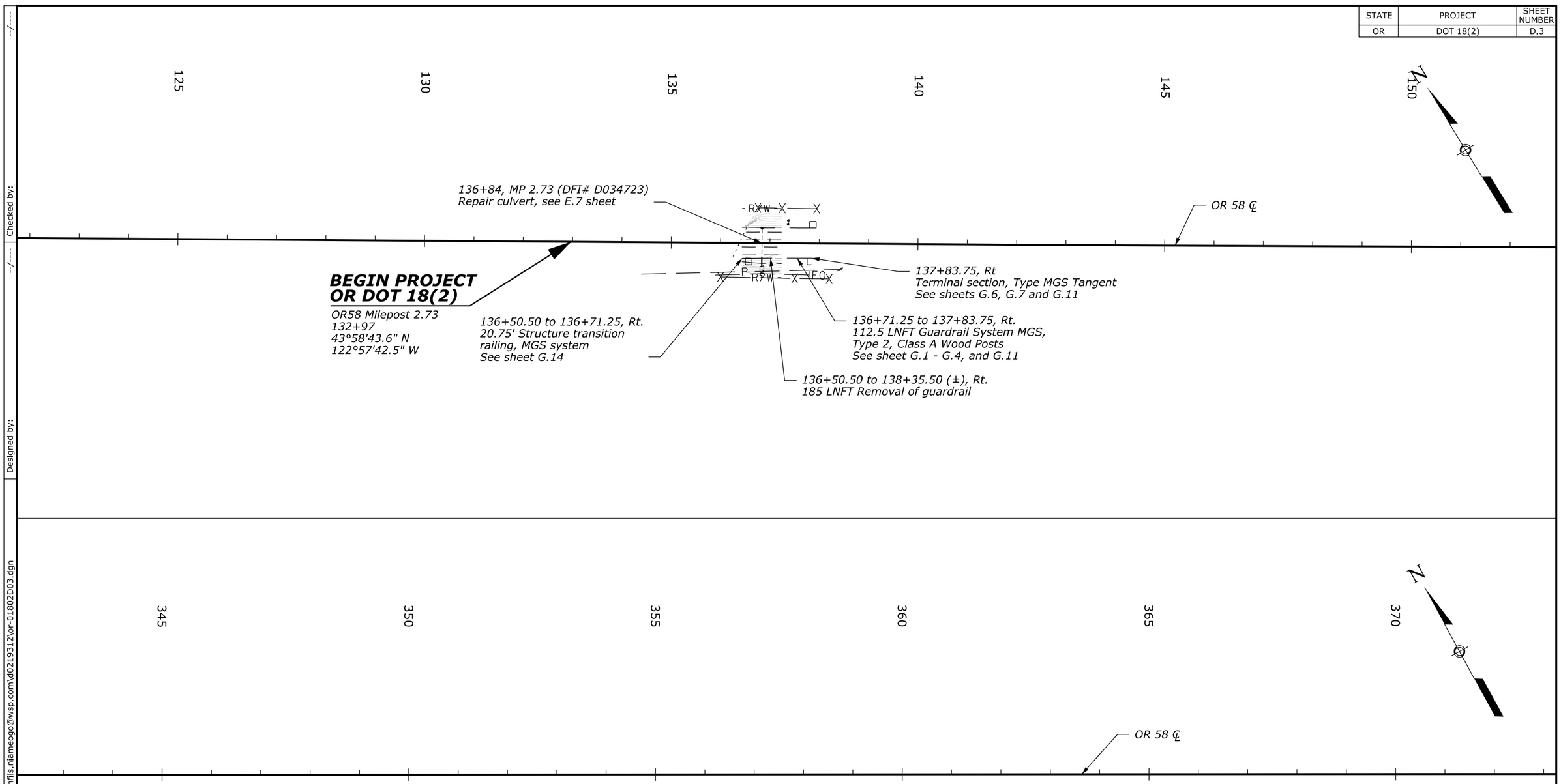
| Item No. | | 20302-1200 | 61701-4550 | 61702-0000 | 61702-1500 | 61702-1600 | 61707-4000 |
|---|---|---|---|---|---|---|---|
| CULVERT ID | MILE POINT | REMOVAL OF GUARDRAIL | GUARDRAIL SYSTEM MGS, TYPE 2, CLASS A WOOD POSTS | TERMINAL SECTION (BURIED IN BACKSLOPE) | TERMINAL SECTION, TYPE MGS TANGENT | TERMINAL SECTION, TYPE MGS FLARED | STRUCTURE TRANSITION RAILING, MGS SYSTEM |
| Unit | | LNFT | LNFT | EACH | EACH | EACH | LNFT |
| D034723 | 2.73 | 185 | 112.5 | | 1 | | 20.75 |
| D027842 | 15.51 | 200 | 162.5 | | | 1 | |
| D034741 | 17.29 | 150 | 25 | 1 | | | |
| D027990 | 26.27 | 315 | 275 | | | 1 | |
| D027992 | 26.60 | 200 | 200 | | | | |
| D028071 | 40.92 | 85 | | 1 | | | |
| D034765 | 41.811 | 75 | | 1 | | | |
| D028078 | 42.12 | 120 | 82.5 | | | 1 | |
| D028094 | 43.99 | 127 | 87.5 | | | 1 | |
| D028130 | 47.46 | | | | | | |
| D028131 | 47.57 | | | | | | |
| D028132 | 47.80 | 200 | 200 | | | | |
| D028142 | 50.30 | | | | | | |
| D028158 | 53.56 | 200 | 200 | | | | |
| D028238 | 64.27 | | | | | | |
| **Total** | | **1857** | **1345** | **3** | **1** | **4** | **21** |

REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.08.30 12:21:10 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

**TABULATION OF PLAN QUANTITIES**

Designed by: --/---- Checked by: --/----

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.3 |



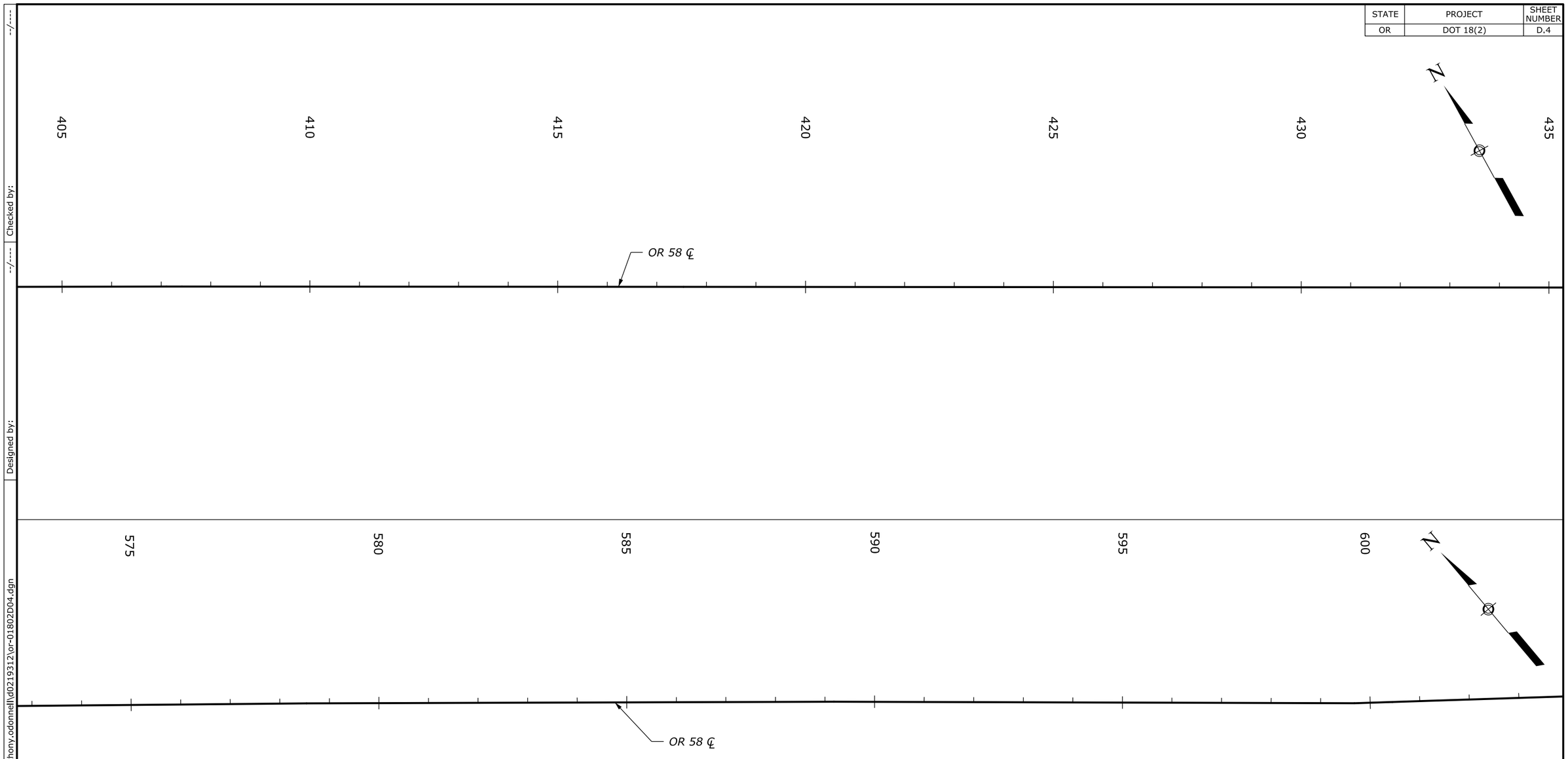

REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

Scale in feet
100 50 0 100 200 300

**OR58**
**122+00 to 152+00**
**343+00 to 373+00**

Designed by:
Checked by:
-/----
-/----

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.4 |




Designed by:

Checked by:

-/----

-/----

-/----

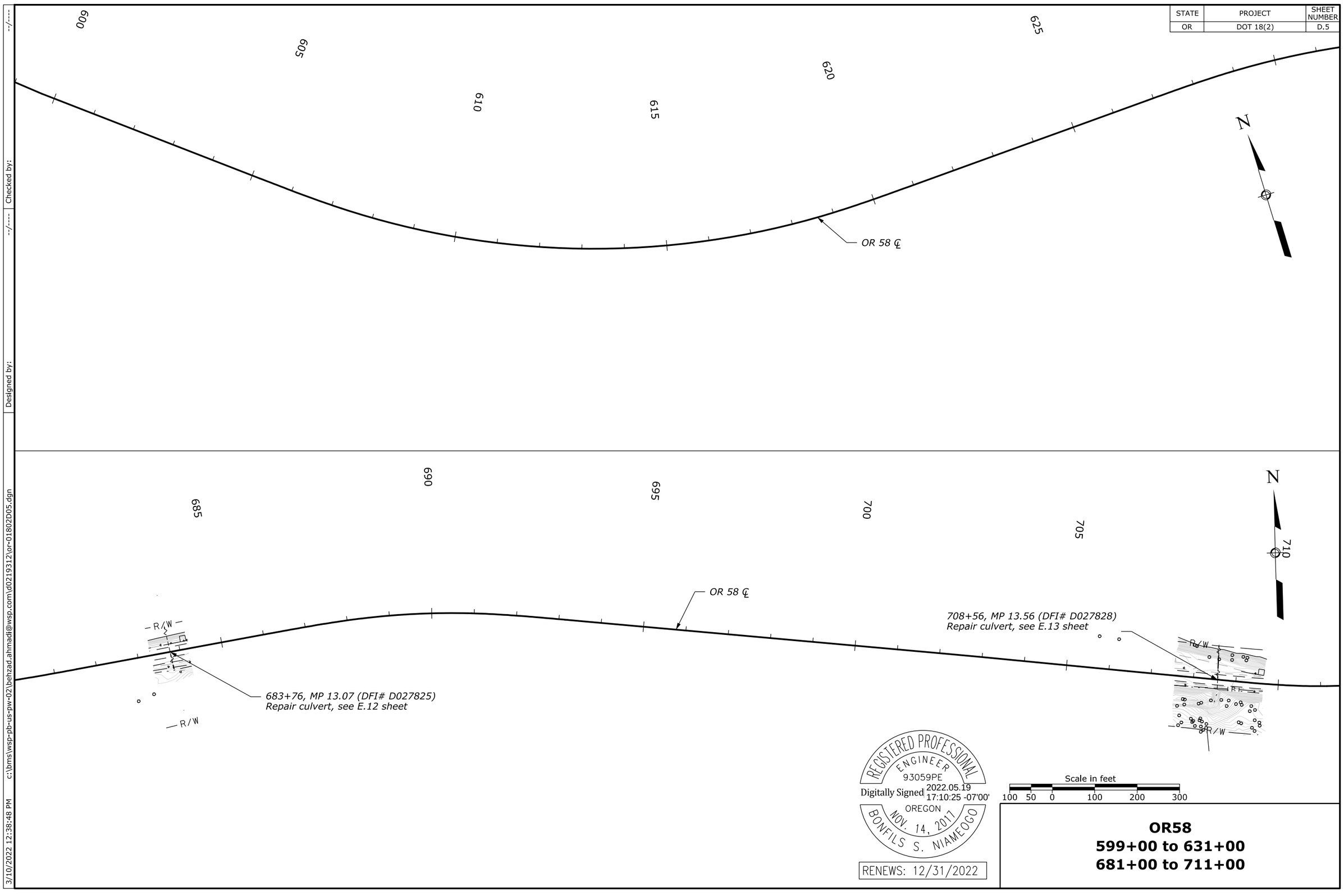
3/10/2022 12:38:35 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802D04.dgn

REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

Scale in feet
100 50 0 100 200 300

**OR58**
**405+00 to 435+00**
**573+00 to 603+00**

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.5 |




REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

Scale in feet
100 50 0 100 200 300

**OR58**
**599+00 to 631+00**
**681+00 to 711+00**

Designed by: --/---
Checked by: --/---
3/10/2022 12:38:48 PM c:\bms\wsp-pb-us-pw-02\behzad.ahmadi@wsp.com\d0219312\or-01802D05.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.6 |

720 725 730 735 740 745

R/W

OR 58 ℄

728+76, MP 13.93 (DFI# D027832)
Repair culvert, see E.14 sheet

733+51, MP 14.03 (DFI# D027833)
Repair culvert, see E.14 sheet

N

805 810 815 820 825 830

811+17.00 to 812+79.50, Lt.
162.5 LNFT Guardrail System MGS,
Type 2, Class A Wood Posts
See sheet G.1 - G.4, G.11 and G.13

811+17.00 to 813+17.00 (±), Lt.
200 LNFT Removal of guardrail

812+79.50, Lt.
Terminal section, Type MGS Flared
See sheet G.15

812+13, MP 15.51 (DFI# D027842)
Replace culvert, see E.15 sheet

OR 58 ℄

N

REGISTERED PROFESSIONAL ENGINEER
93059PE
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

Digitally Signed 2022.05.19 17:10:25 -07'00'

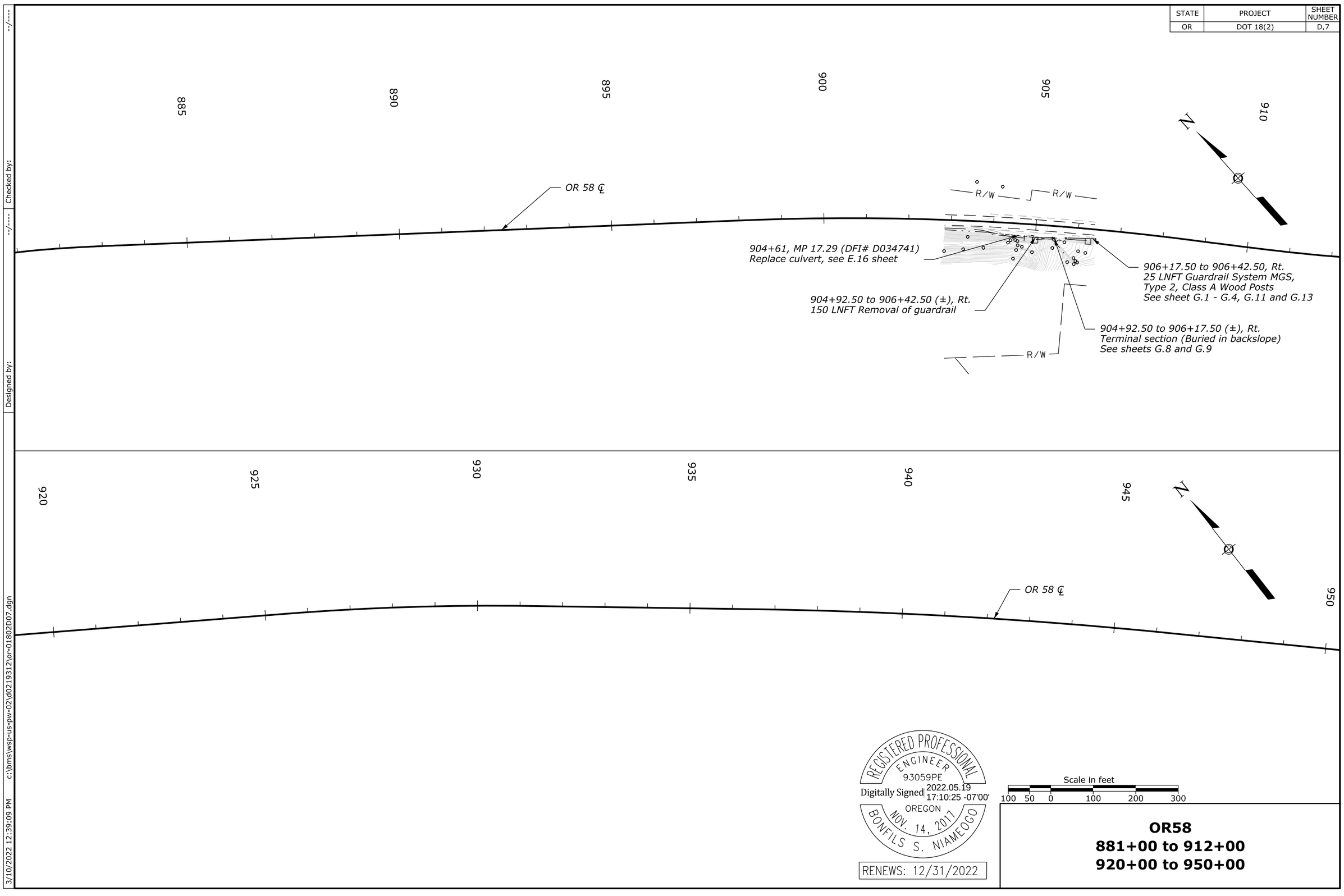
Scale in feet
100 50 0 100 200 300

**OR58**
**717+00 to 748+00**
**803+00 to 834+00**

Designed by: -/---- Checked by: -/----

3/10/2022 12:38:59 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802D06.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.7 |




REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

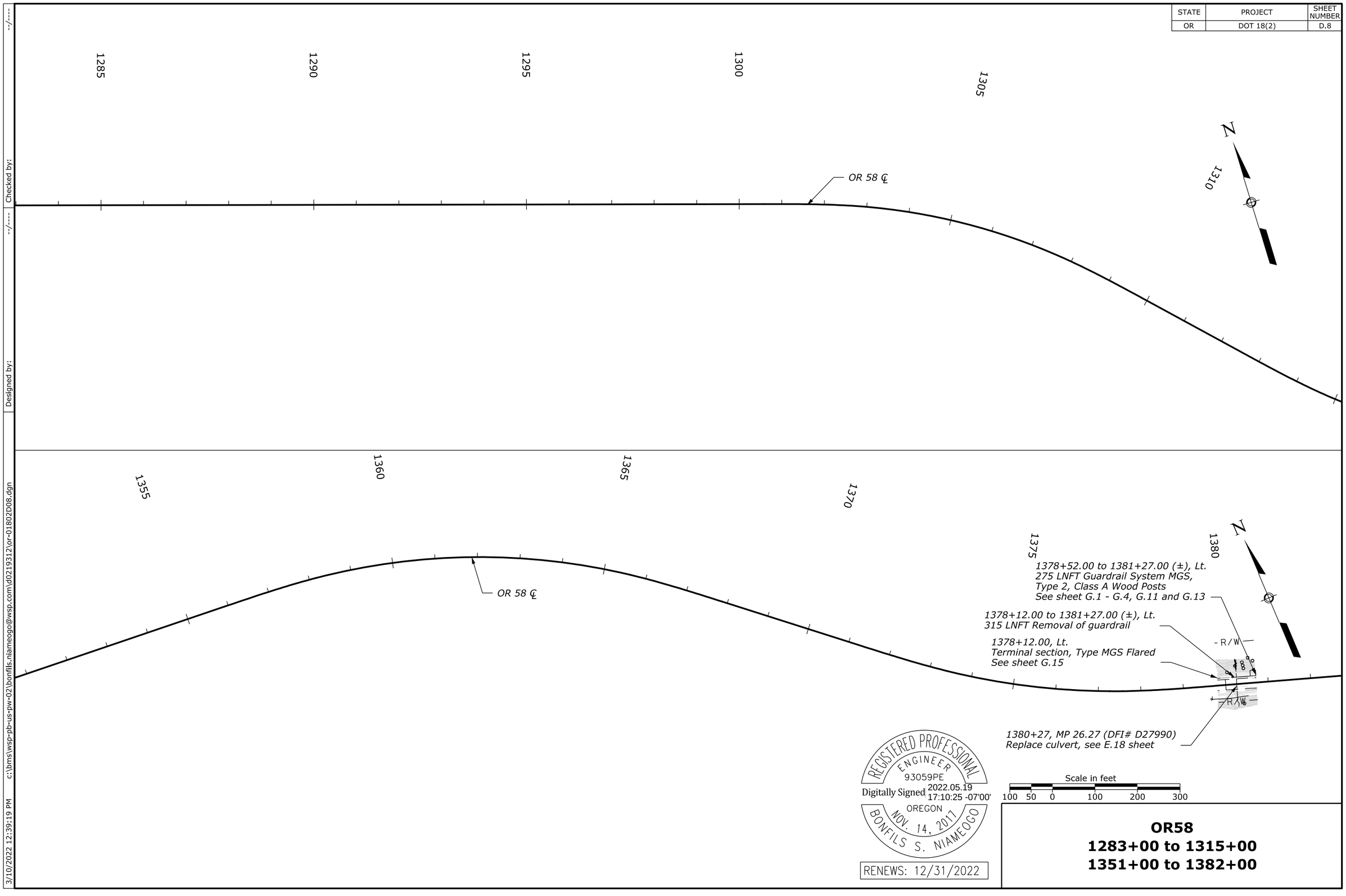
Scale in feet
100 50 0 100 200 300

**OR58**
**881+00 to 912+00**
**920+00 to 950+00**

Designed by: -/---- Checked by: -/----

3/10/2022 12:39:09 PM c:\bms\wsp-us-pw-02\d0219312\or-01802D07.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.8 |




REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

**OR58**
**1283+00 to 1315+00**
**1351+00 to 1382+00**

Designed by: -/----
Checked by: -/----
3/10/2022 12:39:19 PM c:\bms\wsp-pb-us-pw-02\bonfils.niameogo@wsp.com\d0219312\or-01802D08.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.9 |

1390

1395

1396+88.00 to 1398+88.00, Lt.
200 LNFT Guardrail System MGS,
Type 2, Class A Wood Posts
See sheet G.1 - G.4, G.11 and G.13

1400

R/W

1396+88.00 to 1398+88.00 (±), Lt.
200 LNFT Removal of guardrail

1397+89, MP 26.60 (DFI# D027992)
Replace culvert, see E.19 sheet

1405

1410

1415

OR 58 ℄

N

1420

1425

1430

1435

1440

1445

OR 58 ℄

1450

N

Scale in feet
100 50 0 100 200 300

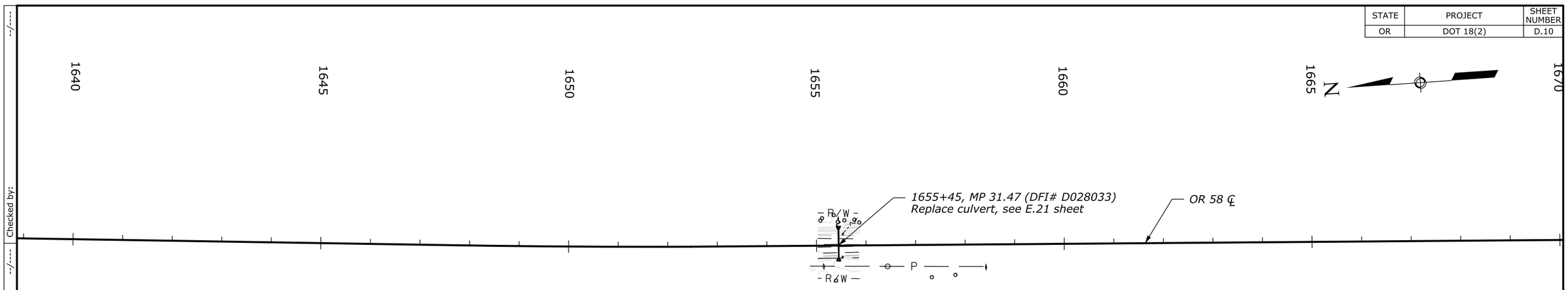
REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

**OR58**
**1390+00 to 1422+00**
**1424+00 to 1451+00**

Designed by: --/---- Checked by: --/----

3/10/2022 12:39:29 PM c:\bms\wsp-pb-us-pw-02\wsp_anthony.odonnell\d0219312\or-01802d09.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.10 |




*Intentionally Left Blank*

Scale in feet
100 50 0 100 200 300

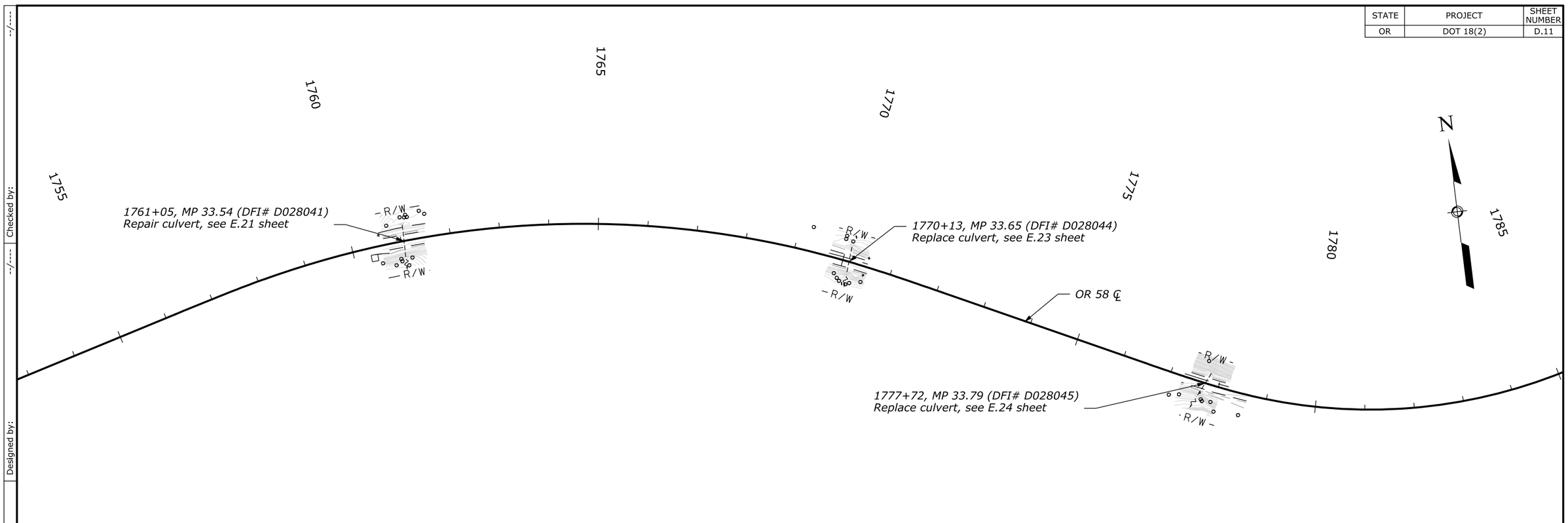
REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

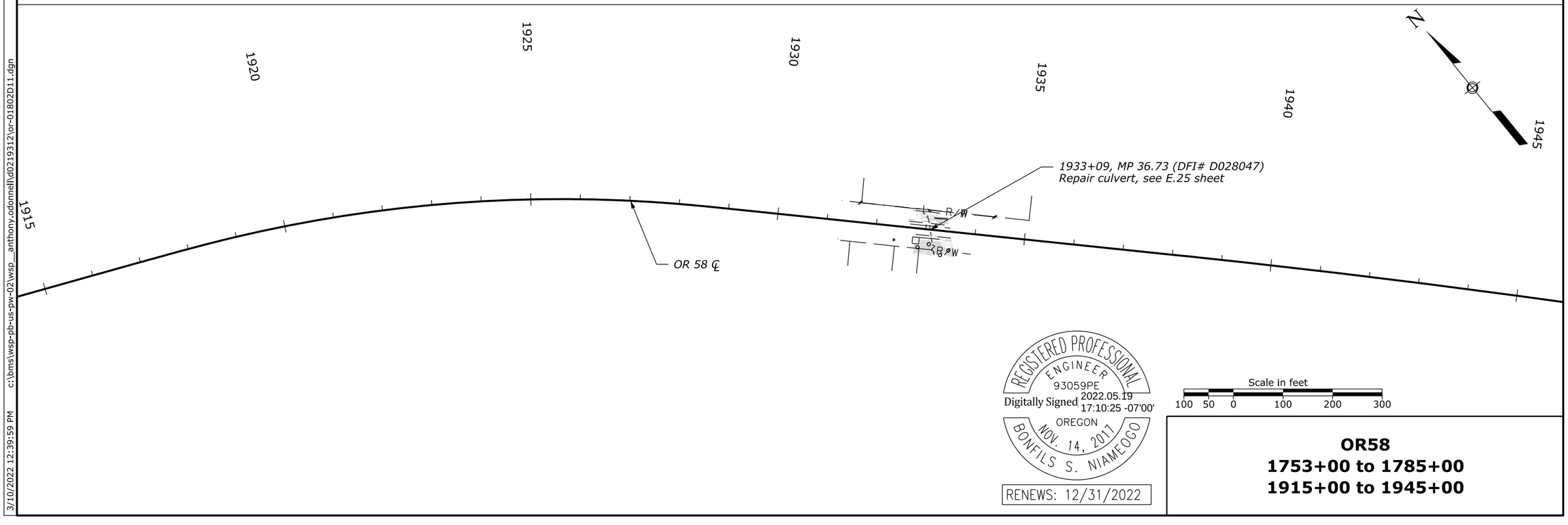
**OR58**
**1639+00 to 1670+00**

Designed by: --/---- Checked by: --/----

3/10/2022 12:39:37 PM c:\bms\wsp-pb-us-pw-02\wsp_anthony.odonnell\d0219312\or-01802D10.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.11 |




REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

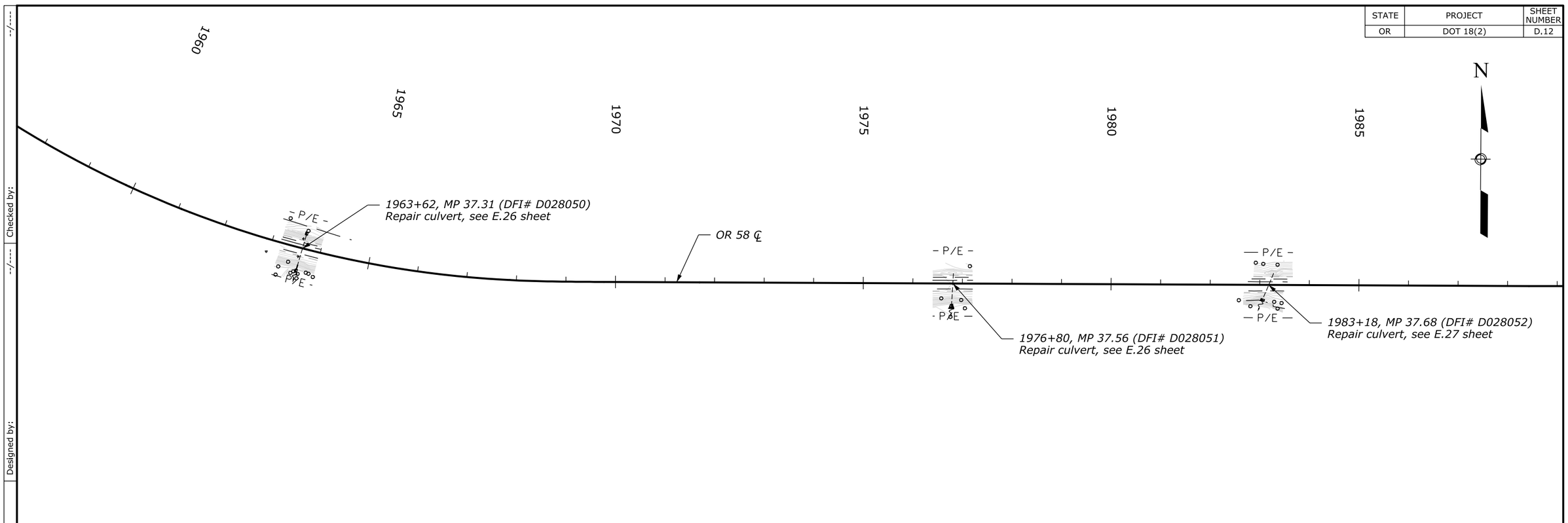
Scale in feet
100 50 0 100 200 300

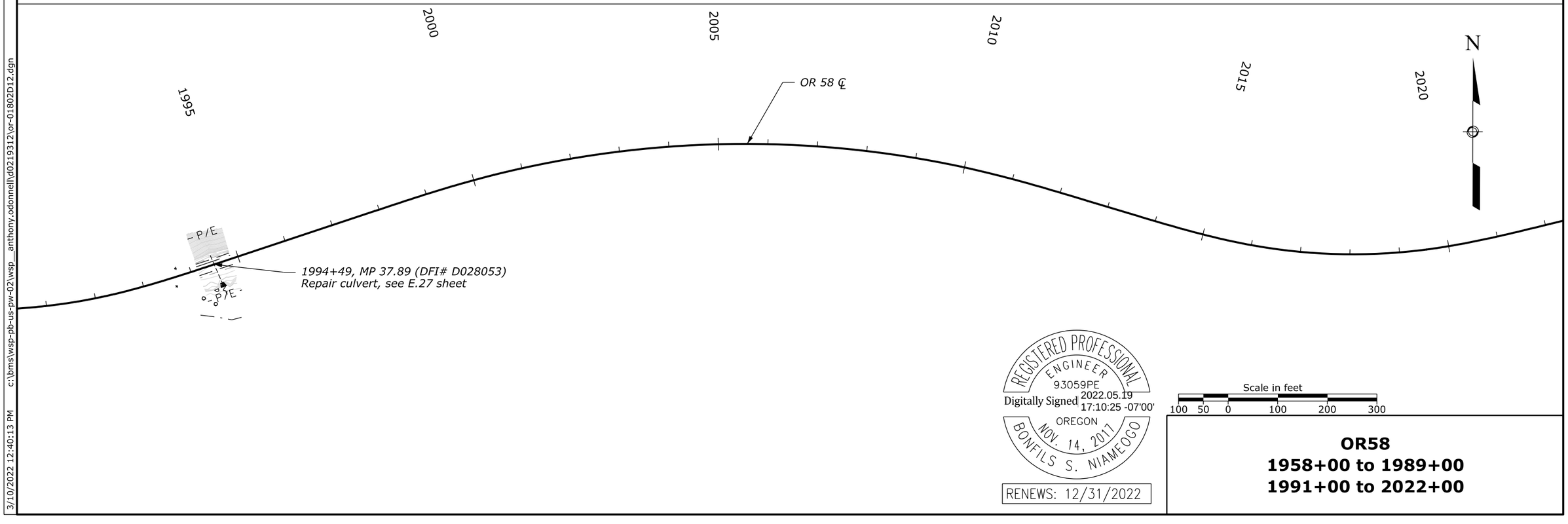
**OR58**
**1753+00 to 1785+00**
**1915+00 to 1945+00**

Designed by: | Checked by: | --/---- | --/----

3/10/2022 12:39:59 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802D11.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.12 |



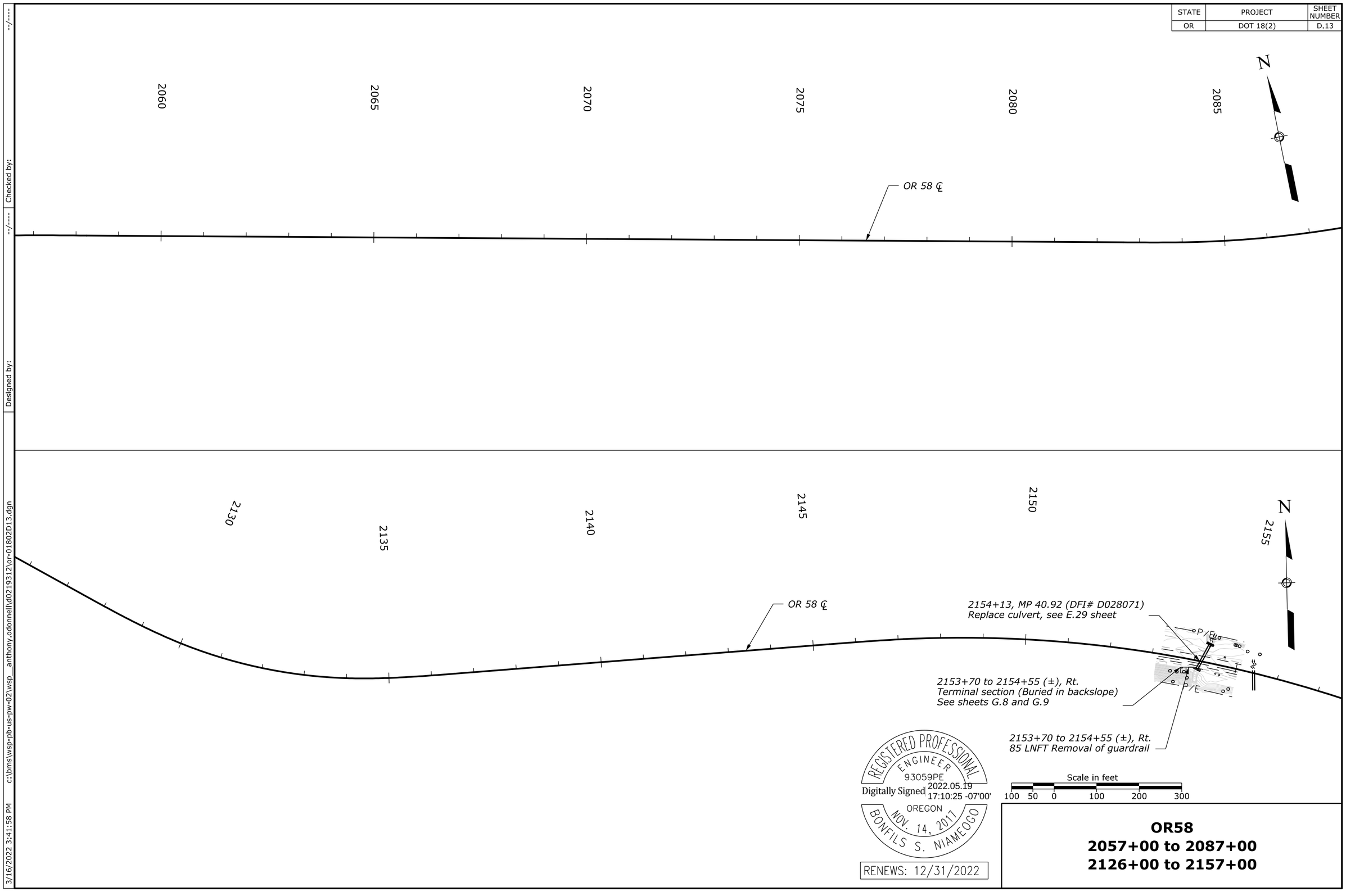

REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

Scale in feet
100 50 0 100 200 300

**OR58**
**1958+00 to 1989+00**
**1991+00 to 2022+00**

Designed by:
--/---
Checked by:
--/---
3/10/2022 12:40:13 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802012.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.13 |



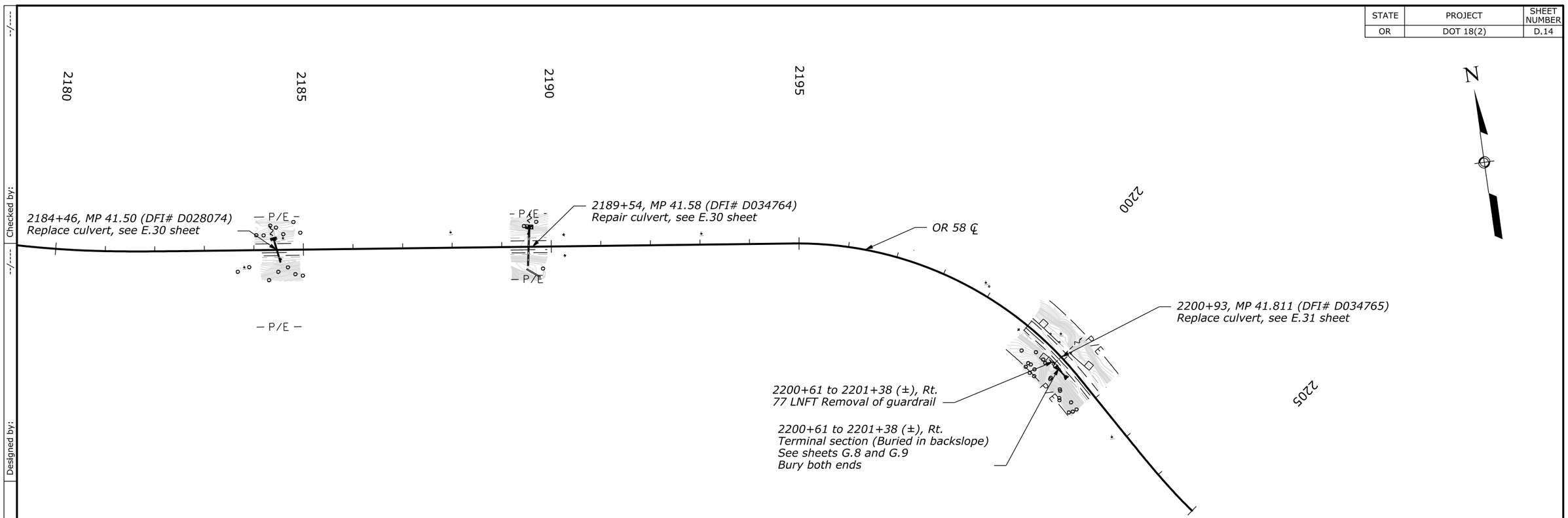

REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

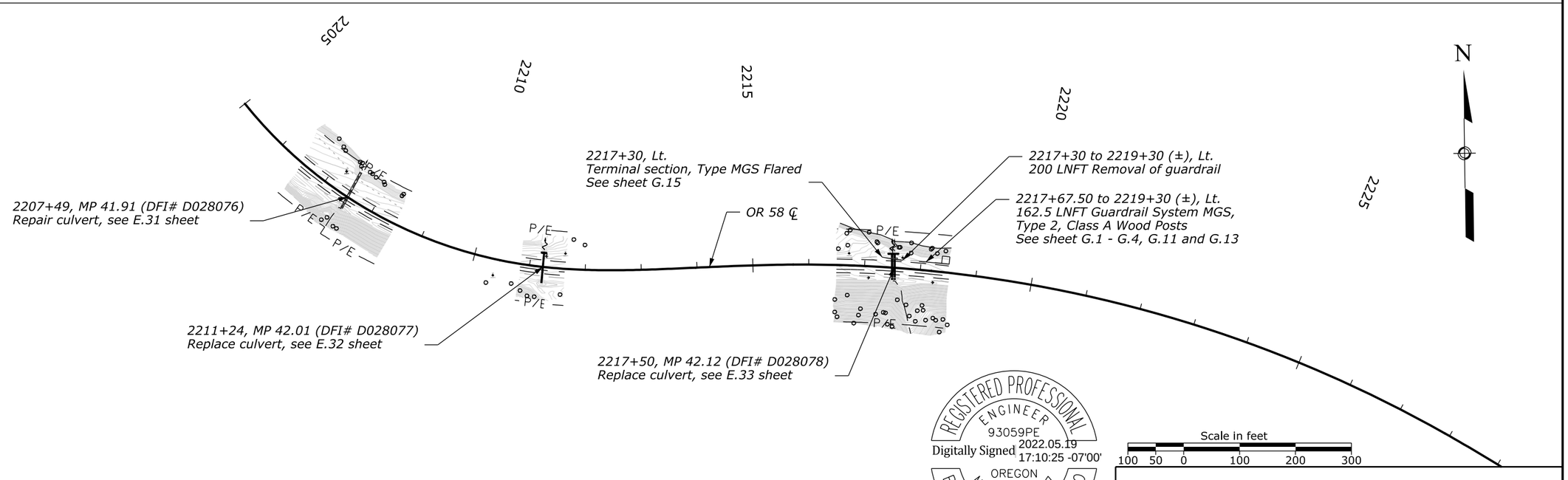
**OR58**
**2057+00 to 2087+00**
**2126+00 to 2157+00**

Designed by: | Checked by: | --/---- | --/----

3/16/2022 3:41:58 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802D13.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.14 |




REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

Scale in feet
100 50 0 100 200 300

**OR58**
**2180+00 to 2205+00**
**2205+00 to 2229+00**

Checked by:
Designed by:
3/16/2022 3:42:09 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802D14.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.15 |

2225 2230 2235 2240 2245 2250

N

OR 58 ℄

P/E

P/E

2237+16, MP 42.50 (DFI# D028082)
Repair culvert, see E.34 sheet

2265 2270 2275 2280 2285 2290

N

OR 58 ℄

2277+42, MP 43.26 (DFI# D028086)
Replace culvert, see E.34 sheet

P/E

P/E

2286+95, MP 43.43 (DFI# D028088)
Repair culvert, see E.35 sheet

P/E

P/E

2293+18, MP 43.54 (DFI# D028090)
Replace culvert, see E.35 sheet

P/E

P/E

REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.08.30 12:21:10 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO

RENEWS: 12/31/2022

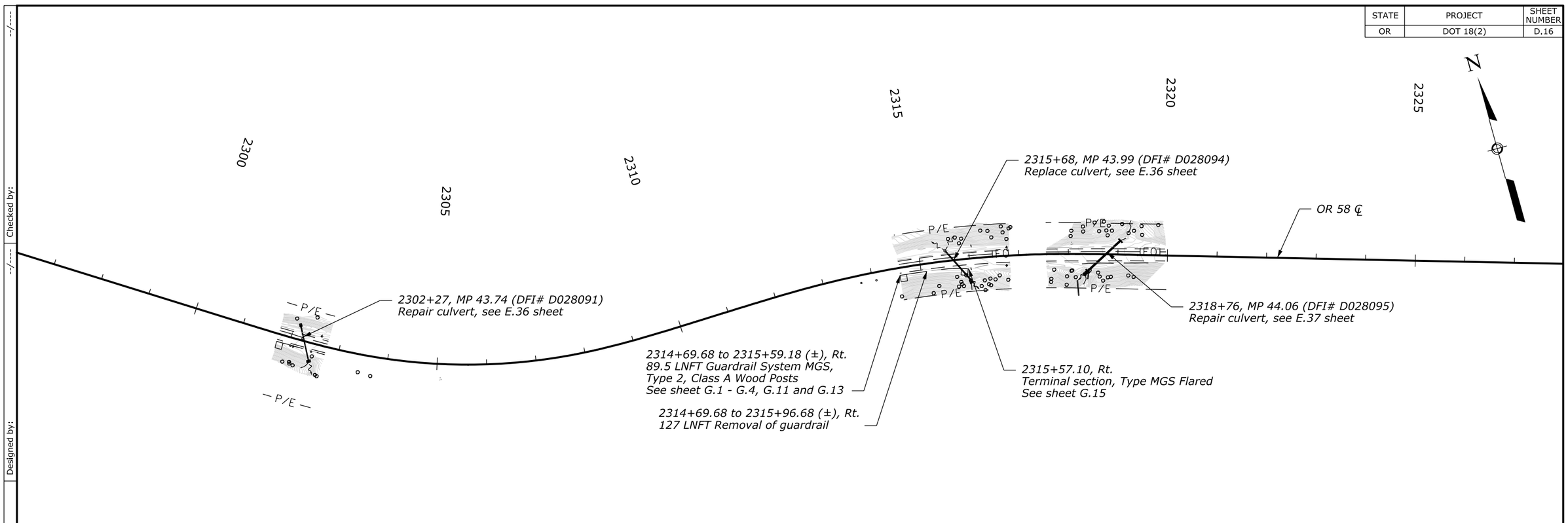
Scale in feet
100 50 0 100 200 300

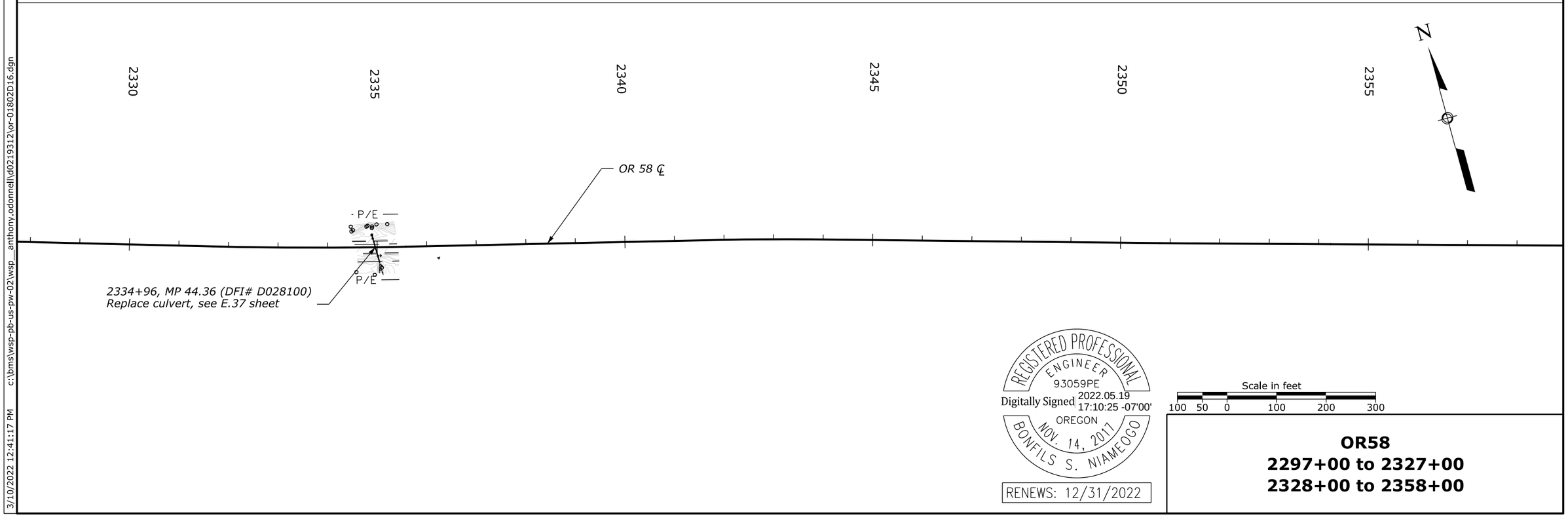
**OR58**
**2223+00 to 2255+00**
**2263+00 to 2394+00**

Designed by: | Checked by: | -/--- | -/---

8/29/2022 6:47:05 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802D15.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.16 |



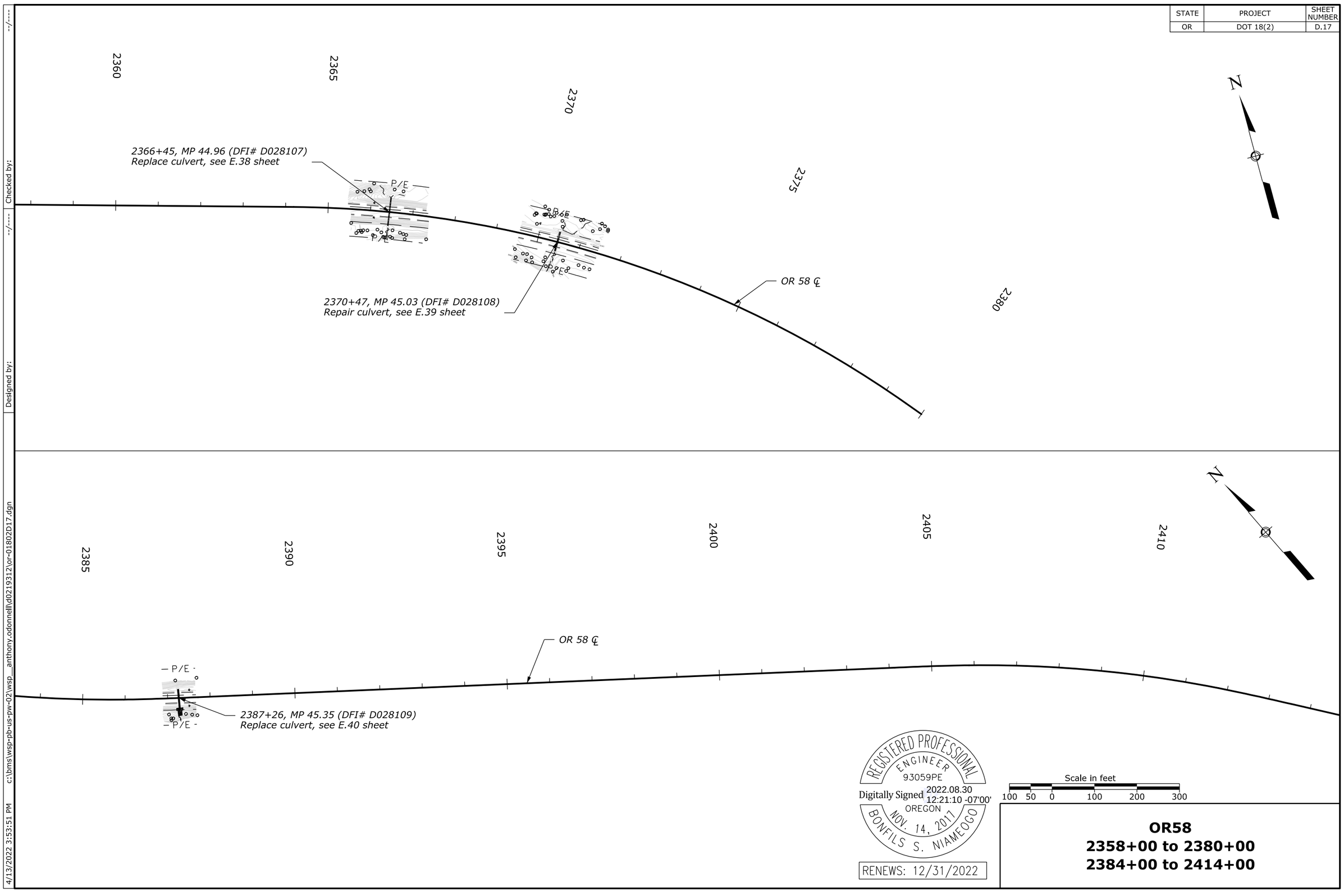

REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

Scale in feet
100 50 0 100 200 300

**OR58**
**2297+00 to 2327+00**
**2328+00 to 2358+00**

Checked by: -/----
Designed by: -/----
3/10/2022 12:41:17 PM c:\bms\wsp-pb-us-pw-02\wsp_anthony.odonnell\d0219312\or-01802d16.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.17 |

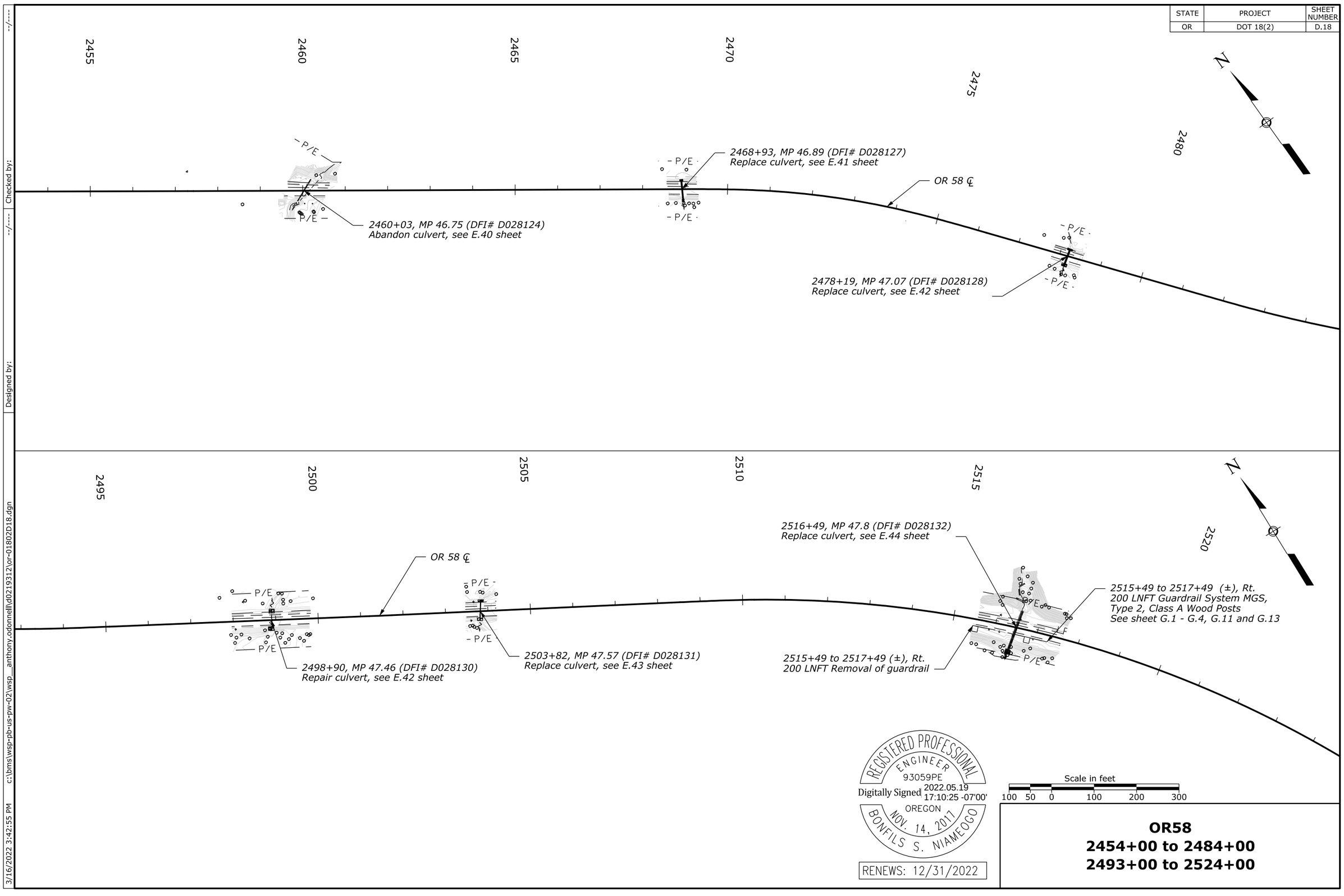



REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.08.30 12:21:10 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

**OR58**
**2358+00 to 2380+00**
**2384+00 to 2414+00**

Checked by: -/---
Designed by: -/---
4/13/2022 3:53:51 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802D17.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.18 |



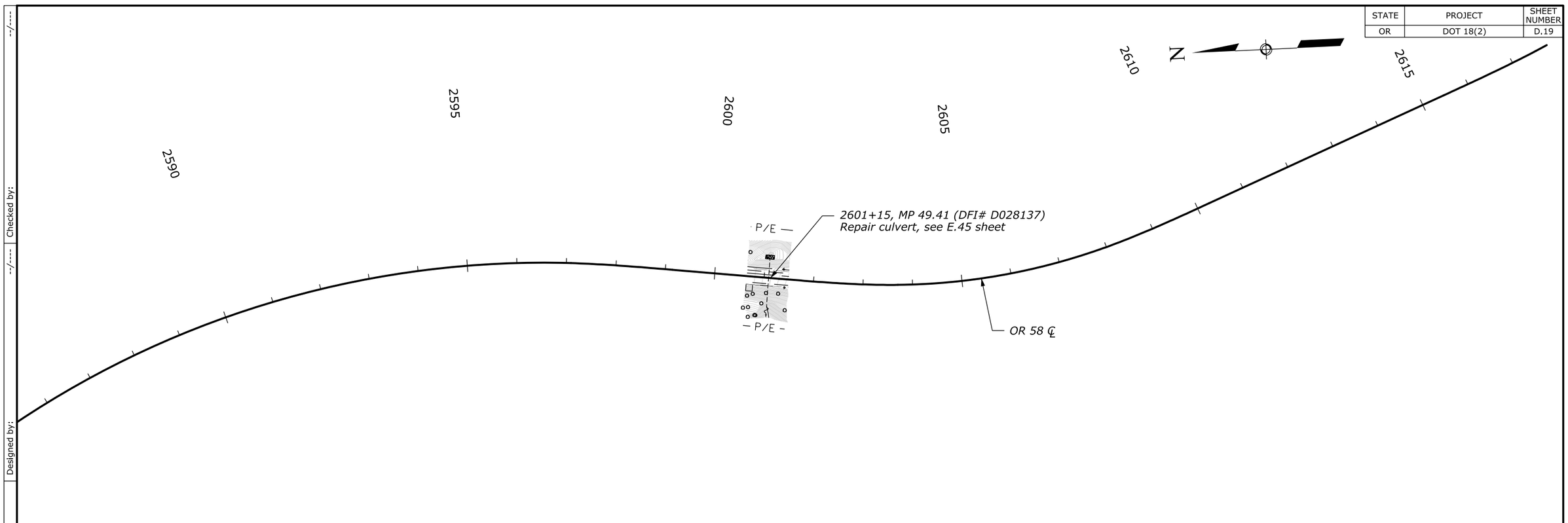

REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

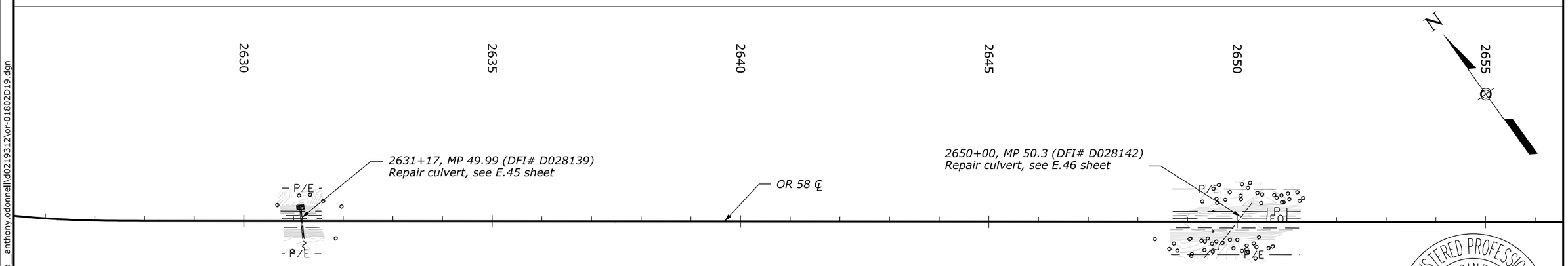
Scale in feet
100 50 0 100 200 300

**OR58**
**2454+00 to 2484+00**
**2493+00 to 2524+00**

Designed by: --/---- Checked by: --/----
3/16/2022 3:42:55 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802D18.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.19 |




REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

Scale in feet
100 50 0 100 200 300

**OR58**
**2586+00 to 2617+00**
**2626+00 to 2656+00**

Designed by: --/---- Checked by: --/----

3/10/2022 12:41:58 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802D19.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.20 |

2815 2820 2825 2830 2835 2840 2845

P/E

2819+48, MP 53.56 (DFI# D028158)
Replace culvert, see E.47 sheet

OR 58 ℄

2818+48 to 2820+48(±), Rt.
200 LNFT Guardrail System MGS,
Type 2, Class A Wood Posts
See sheet G.1 - G.4, G.11 and G.13

2818+48 to 2820+48(±), Rt.
200 LNFT Removal of guardrail

2826+24, MP 53.69 (DFI# D028159)
Repair culvert, see E.48 sheet

2829+97, MP 53.76 (DFI# D028160)
Repair culvert, see E.49 sheet

2833+89, MP 53.83 (DFI# D028161)
Repair culvert, see E.50 sheet

2838+95, MP 53.95 (DFI# D028163)
Repair culvert, see E.51 sheet

N

2845 2850 2855 2860 2865 2870

OR 58 ℄

N

REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

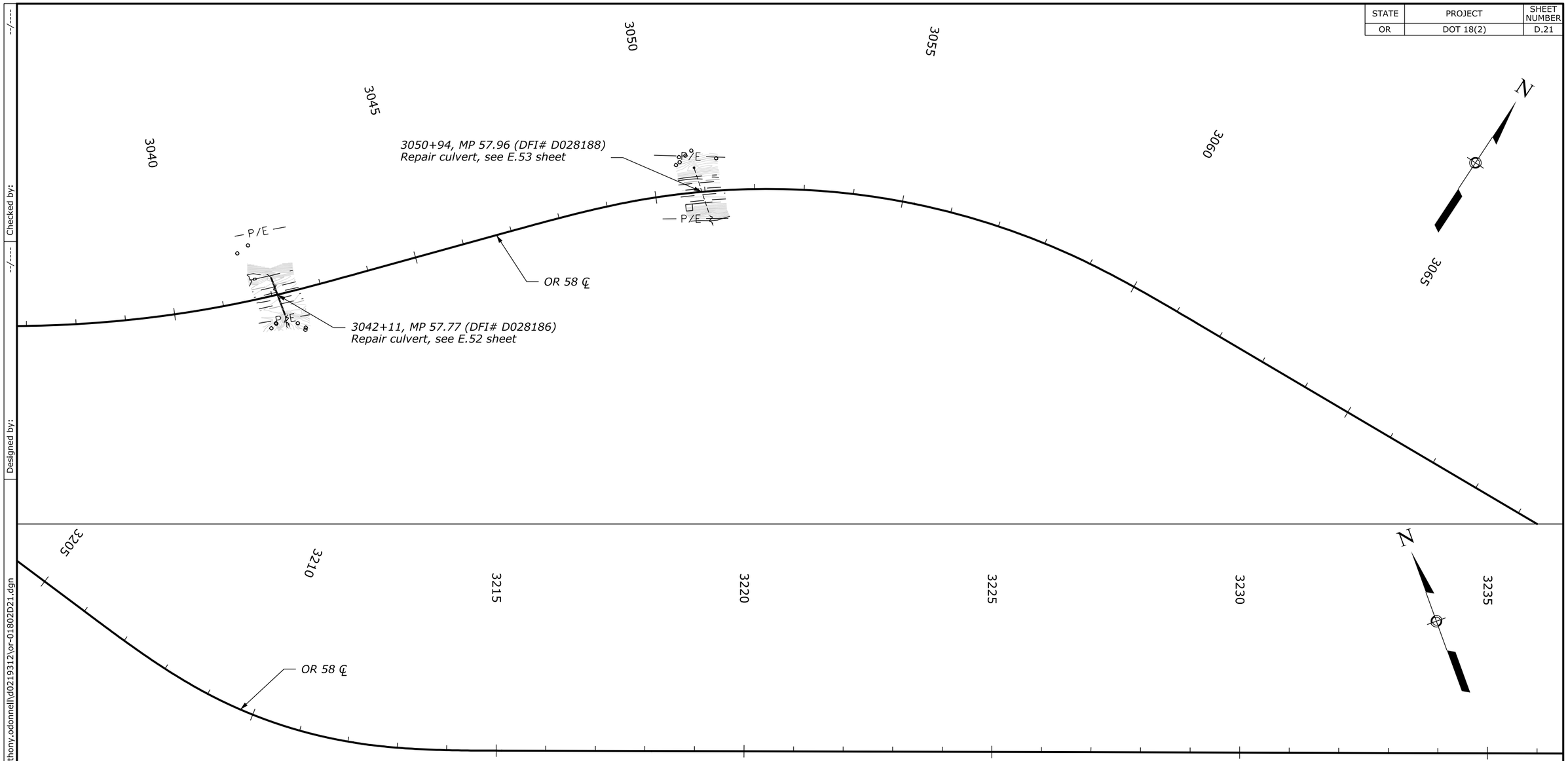
Scale in feet
100 50 0 100 200 300

**OR58**
**2814+00 to 2846+00**
**2843+00 to 2873+00**

Designed by: --/---- Checked by: --/----

3/10/2022 12:42:12 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802D20.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.21 |




REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

Scale in feet
100 50 0 100 200 300

**OR58**
**3037+00 to 3069+00**
**3205+00 to 3236+00**

Designed by:
Checked by:
-/----
-/----

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.22 |

3330 3335 3340 3345 3350 3355 3360

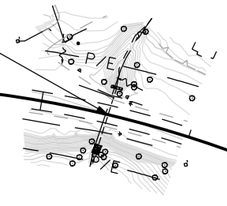
OR 58 ℄

N

3365 3370 3375 3380 3385 3390 3395

OR 58 ℄

3385+90, MP 64.27 (DFI# D028238)
Repair culvert, see E.56 sheet




N

REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

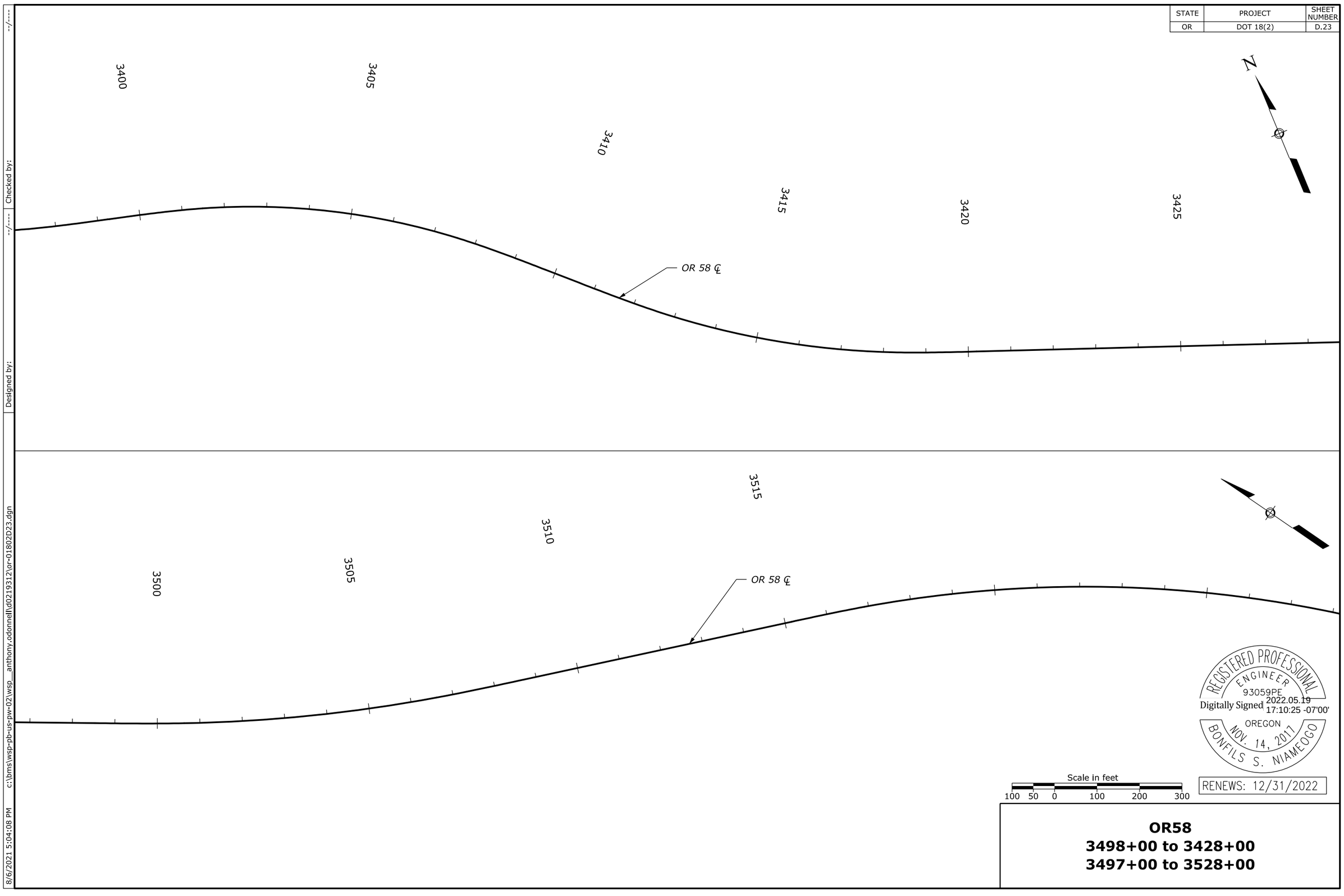
Scale in feet
100 50 0 100 200 300

**OR58**
**3330+00 to 3361+00**
**3365+00 to 3396+00**

Designed by: | Checked by: | -/---- | -/----

3/10/2022 12:42:38 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802022.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.23 |




Designed by: --/---
Checked by: --/---
8/6/2021 5:04:08 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802D23.dgn

Scale in feet
100 50 0 100 200 300

REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO

RENEWS: 12/31/2022

**OR58**
**3498+00 to 3428+00**
**3497+00 to 3528+00**

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.24 |

3535
3540
3545
3550
3555
3560

N

OR 58 ℄

3710
3715
3720
3725
3730
3735
3740

N

OR 58 ℄

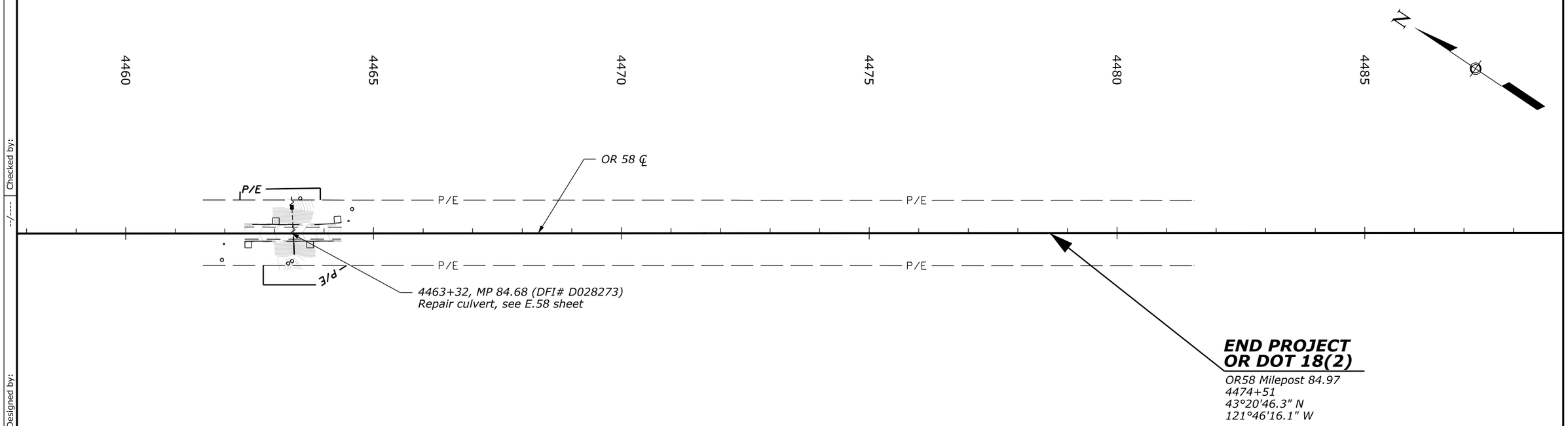
Scale in feet
100 50 0 100 200 300

REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
RENEWS: 12/31/2022

**OR58**
**3532+00 to 3564+00**
**3710+00 to 3741+00**

Checked by: --/----
Designed by: --/----
c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802D24.dgn
3/16/2022 3:44:02 PM

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.25 |




Scale in feet

100 50 0 100 200 300

REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.19 17:10:25 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO

RENEWS: 12/31/2022

**OR58**
**4458+00 to 4488+00**

Designed by: Checked by: -/---- -/----

3/10/2022 12:43:12 PM c:\bms\wsp-us-pw-02\d0219312\or-01802D25.dgn

Project: OR58: Fix-It Corridor Culverts
Date of field work: November 2019 – December 2020
Date of Adjustment: November 2019 – July 2020

Project Units: International Feet
Coordinate System: Oregon South SPCS NAD83 (2011)
Vertical Datum: Orthometric elevations based on the NAVD88 GEOID 12A

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.26 |

| POINT NUMBER | STATION | OFFSET [1] | STATE PLANE COORDINATES | | | GEO COORDINATES | | | | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | NORTH | EAST | ELEVATION | LATITUDE | LONGITUDE | ELLIPSOID HEIGHT | COMBINED FACTOR | |
| 19105 | 131+34.38 | -36.110 | 852523.537 | 4272850.091 | 501.020 | 43°58'46.722986" N | 122°57'49.017951" W | 424.011 | 0.99997463 | 5/8" IR W/FHWA ALUM CAP |
| 19106 | 137+12.93 | 38.570 | 852154.371 | 4273301.763 | 497.748 | 43°58'43.210010" N | 122°57'42.695100" W | 420.737 | 0.99997454 | 5/8" IR W/FHWA ALUM CAP |
| 19146 | 1762+52.44 | -20.130 | 764868.946 | 4391341.159 | 1094.780 | 43°44'52.575402" N | 122°30'20.268540" W | 1020.024 | 0.99989696 | 5/8" IR W/FHWA ALUM CAP |
| 20300 | 2517+07.84 | 22.510 | 740200.844 | 4458780.479 | 2196.266 | 43°41'03.929322" N | 122°14'54.662104" W | 2123.623 | 0.99983362 | 5/8" IR W/FHWA ALUM CAP |
| 20301 | 2515+76.52 | 22.840 | 740291.279 | 4458686.835 | 2194.249 | 43°41'04.803008" N | 122°14'55.961993" W | 2121.6 | 0.99983375 | 5/8" IR W/FHWA ALUM CAP |
| 20302 | 2511+30.08 | 46.590 | 740542.860 | 4458325.018 | 2184.069 | 43°41'07.212583" N | 122°15'00.956711" W | 2111.397 | 0.99983435 | 5/8" IR W/FHWA ALUM CAP |
| 20303 | 2508+80.20 | -32.600 | 740737.636 | 4458151.223 | 2176.731 | 43°41'09.100010" N | 122°15'03.376945" W | 2104.048 | 0.99983478 | 5/8" IR W/FHWA ALUM CAP |
| 20304 | 2504+14.15 | -25.170 | 740956.675 | 4457739.755 | 2167.944 | 43°41'11.177901" N | 122°15'09.038186" W | 2095.235 | 0.99983529 | 5/8" IR W/FHWA ALUM CAP |
| 20305 | 2501+66.28 | 24.260 | 741033.372 | 4457498.903 | 2162.666 | 43°41'11.885452" N | 122°15'12.337353" W | 2089.942 | 0.99983558 | 5/8" IR W/FHWA ALUM CAP |
| 20306 | 2499+51.64 | -23.550 | 741179.805 | 4457334.746 | 2158.815 | 43°41'13.297446" N | 122°15'14.612810" W | 2086.081 | 0.99983582 | 5/8" IR W/FHWA ALUM CAP |
| 20307 | 2498+14.50 | -24.550 | 741247.600 | 4457215.536 | 2157.799 | 43°41'13.942222" N | 122°15'16.254265" W | 2085.058 | 0.9998359 | 5/8" IR W/FHWA ALUM CAP |
| 20308 | 2480+44.04 | -21.900 | 742340.104 | 4455855.777 | 2124.719 | 43°41'24.448313" N | 122°15'35.069355" W | 2051.891 | 0.99983795 | 5/8" IR W/FHWA ALUM CAP |
| 20309 | 2478+03.06 | -24.790 | 742530.207 | 4455707.650 | 2122.165 | 43°41'26.294724" N | 122°15'37.139445" W | 2049.328 | 0.99983815 | 5/8" IR W/FHWA ALUM CAP |
| 20310 | 2468+71.39 | -27.150 | 743190.173 | 4455046.827 | 2104.656 | 43°41'32.674217" N | 122°15'46.321047" W | 2031.787 | 0.99983927 | 5/8" IR W/FHWA ALUM CAP |
| 20311 | 2464+79.59 | -21.730 | 743411.034 | 4454723.168 | 2102.178 | 43°41'34.787778" N | 122°15'50.788870" W | 2029.289 | 0.99983949 | 5/8" IR W/FHWA ALUM CAP |
| 20312 | 2460+26.81 | 24.660 | 743633.446 | 4454326.060 | 2094.901 | 43°41'36.901313" N | 122°15'56.256772" W | 2021.988 | 0.99983993 | 5/8" IR W/FHWA ALUM CAP |
| 20313 | 2458+29.83 | -42.600 | 743801.746 | 4454203.580 | 2089.066 | 43°41'38.537667" N | 122°15'57.971876" W | 2016.146 | 0.99984028 | 5/8" IR W/FHWA ALUM CAP |
| 20314 | 2387+74.90 | -24.540 | 748231.584 | 4448760.494 | 1992.382 | 43°42'21.139047" N | 122°17'13.332057" W | 1919.172 | 0.99984683 | 5/8" IR W/FHWA ALUM CAP |
| 20315 | 2383+13.93 | 30.980 | 748495.675 | 4448377.811 | 1995.786 | 43°42'23.666079" N | 122°17'18.617687" W | 1922.559 | 0.99984679 | 5/8" IR W/FHWA ALUM CAP |
| 20316 | 2370+52.60 | 57.610 | 749314.015 | 4447447.108 | 1966.312 | 43°42'31.550105" N | 122°17'31.524384" W | 1893.048 | 0.99984856 | 5/8" IR W/FHWA ALUM CAP |
| 20317 | 2370+22.94 | -37.330 | 749411.193 | 4447468.138 | 1967.153 | 43°42'32.514111" N | 122°17'31.266432" W | 1893.89 | 0.99984856 | 5/8" IR W/FHWA ALUM CAP |
| 20318 | 2368+70.14 | -39.210 | 749484.330 | 4447331.378 | 1964.792 | 43°42'33.207381" N | 122°17'33.149334" W | 1891.523 | 0.9998487 | 5/8" IR W/FHWA ALUM CAP |
| 20319 | 2365+58.71 | -24.500 | 749589.909 | 4447034.099 | 1970.902 | 43°42'34.187036" N | 122°17'37.226720" W | 1897.619 | 0.99984846 | 5/8" IR W/FHWA ALUM CAP |
| 20320 | 1778+24.58 | 28.590 | 764314.607 | 4392800.617 | 1103.675 | 43°44'47.446782" N | 122°30'00.210301" W | 1028.929 | 0.99989628 | 5/8" IR W/FHWA ALUM CAP |
| 20321 | 1777+15.04 | 33.110 | 764356.196 | 4392697.337 | 1097.465 | 43°44'47.833054" N | 122°30'01.630480" W | 1022.718 | 0.9998966 | 5/8" IR W/FHWA ALUM CAP |
| 20322 | 1770+34.99 | 22.460 | 764663.498 | 4392091.291 | 1095.093 | 43°44'50.724179" N | 122°30'09.984781" W | 1020.341 | 0.99989685 | 5/8" IR W/FHWA ALUM CAP |
| 20323 | 1769+07.98 | -34.880 | 764764.482 | 4391994.747 | 1099.750 | 43°44'51.698450" N | 122°30'11.332607" W | 1024.998 | 0.99989668 | 5/8" IR W/FHWA ALUM CAP |
| 20324 | 1767+19.68 | -42.680 | 764829.176 | 4391813.757 | 1098.094 | 43°44'52.294451" N | 122°30'13.818775" W | 1023.341 | 0.99989679 | 5/8" IR W/FHWA ALUM CAP |
| 20325 | 1765+25.56 | -33.920 | 764860.445 | 4391618.123 | 1094.537 | 43°44'52.556953" N | 122°30'16.493509" W | 1019.782 | 0.99989697 | 5/8" IR W/FHWA ALUM CAP |
| 20326 | 1760+50.84 | 20.550 | 764819.507 | 4391141.658 | 1092.828 | 43°44'52.040072" N | 122°30'22.969614" W | 1018.071 | 0.99989703 | 5/8" IR W/FHWA ALUM CAP |
| 20327 | 2347+36.44 | 23.440 | 750038.664 | 4445266.021 | 1976.788 | 43°42'38.243479" N | 122°18'01.425438" W | 1903.428 | 0.99984837 | 5/8" IR W/FHWA ALUM CAP |
| 20328 | 2345+57.15 | 21.840 | 750089.170 | 4445093.981 | 1976.136 | 43°42'38.705655" N | 122°18'03.782106" W | 1902.768 | 0.99984842 | 5/8" IR W/FHWA ALUM CAP |
| 20329 | 2345+82.09 | -30.020 | 750132.248 | 4445132.135 | 1979.060 | 43°42'39.139121" N | 122°18'03.275348" W | 1905.694 | 0.9998483 | 5/8" IR W/FHWA ALUM CAP |
| 20330 | 2344+15.01 | 20.990 | 750128.796 | 4444957.470 | 1977.955 | 43°42'39.067935" N | 122°18'05.651960" W | 1904.581 | 0.99984835 | 5/8" IR W/FHWA ALUM CAP |
| 20331 | 2335+53.12 | -29.970 | 750390.707 | 4444135.270 | 2000.806 | 43°42'41.479279" N | 122°18'16.920964" W | 1927.398 | 0.99984737 | 5/8" IR W/FHWA ALUM CAP |
| 20332 | 2334+74.03 | 24.820 | 750357.156 | 4444045.122 | 1996.055 | 43°42'41.128802" N | 122°18'18.138268" W | 1922.644 | 0.99984758 | 5/8" IR W/FHWA ALUM CAP |
| 20333 | 2319+27.52 | -26.860 | 750843.638 | 4442575.527 | 1927.570 | 43°42'45.619135" N | 122°18'38.286422" W | 1854.102 | 0.99985106 | 5/8" IR W/FHWA ALUM CAP |
| 20334 | 2318+47.20 | 27.070 | 750814.552 | 4442483.320 | 1925.361 | 43°42'45.312244" N | 122°18'39.533058" W | 1851.89 | 0.99985115 | 5/8" IR W/FHWA ALUM CAP |
| 20335 | 2316+22.07 | 25.630 | 750868.479 | 4442267.415 | 1921.510 | 43°42'45.798612" N | 122°18'42.488019" W | 1848.03 | 0.99985136 | 5/8" IR W/FHWA ALUM CAP |
| 20336 | 2313+93.07 | 21.270 | 750901.149 | 4442043.637 | 1918.909 | 43°42'46.073381" N | 122°18'45.543902" W | 1845.421 | 0.9998515 | 5/8" IR W/FHWA ALUM CAP |

NOTE:
1. To precisely check distances between points as measured on the ground, inverse the state plane coordinates and divide the computed distance by a mean combined factor of the two points.

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.05.19 17:02:41 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY

EXPIRES: 12/31/2024

FOOTNOTE:
[1] Negative offsets are left of centerline. Positive offsets are right of centerline.

**SURVEY CONTROL TABLES**

**Sheet 1 of 5**

-/----
Checked by:
-/----
Designed by:
3/21/2022 6:37:16 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802D26.dgn

Project: OR58: Fix-It Corridor Culverts
Date of field work: November 2019 – December 2020
Date of Adjustment: November 2019 – July 2020

Project Units: International Feet
Coordinate System: Oregon South SPCS NAD83 (2011)
Vertical Datum: Orthometric elevations based on the NAVD88 GEOID 12A

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.27 |

| POINT NUMBER | STATION | OFFSET[1] | STATE PLANE COORDINATES | | | GEO COORDINATES | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | NORTH | EAST | ELEVATION | LATITUDE | LONGITUDE | ELLIPSOID HEIGHT | COMBINED FACTOR | DESCRIPTION |
| 20337 | 2303+72.82 | 24.490 | 751002.879 | 4441030.176 | 1911.903 | 43°42'46.861023" N | 122°18'59.370039" W | 1838.378 | 0.99985187 | 5/8" IR W/FHWA ALUM CAP |
| 20338 | 2302+23.84 | 20.400 | 751077.968 | 4440898.762 | 1908.148 | 43°42'47.574313" N | 122°19'01.181146" W | 1834.618 | 0.99985208 | 5/8" IR W/FHWA ALUM CAP |
| 20339 | 2293+65.19 | 27.350 | 751533.491 | 4440170.997 | 1874.884 | 43°42'51.916176" N | 122°19'11.222928" W | 1801.326 | 0.99985387 | 5/8" IR W/FHWA ALUM CAP |
| 20340 | 2291+90.56 | 34.260 | 751609.380 | 4440016.993 | 1871.015 | 43°42'52.632464" N | 122°19'13.341875" W | 1797.451 | 0.99985409 | 5/8" IR W/FHWA ALUM CAP |
| 20341 | 2277+25.38 | -24.490 | 752155.548 | 4438682.515 | 1823.535 | 43°42'57.738554" N | 122°19'31.670520" W | 1749.923 | 0.9998566 | 5/8" IR W/FHWA ALUM CAP |
| 20342 | 2275+25.51 | -25.370 | 752271.771 | 4438519.915 | 1815.027 | 43°42'58.851150" N | 122°19'33.918587" W | 1741.409 | 0.99985706 | 5/8" IR W/FHWA ALUM CAP |
| 20343 | 1657+65.28 | 35.000 | 768398.519 | 4384319.997 | 1040.163 | 43°45'25.753022" N | 122°31'57.063162" W | 965.42 | 0.99990121 | 5/8" IR W/FHWA ALUM CAP |
| 20344 | 1655+30.99 | 36.480 | 768632.450 | 4384332.903 | 1036.946 | 43°45'28.065821" N | 122°31'56.964708" W | 962.203 | 0.99990148 | 5/8" IR W/FHWA ALUM CAP |
| 20345 | 1647+11.99 | -46.770 | 769443.132 | 4384474.217 | 1032.139 | 43°45'36.103912" N | 122°31'55.307712" W | 957.408 | 0.99990211 | 5/8" IR W/FHWA ALUM CAP |
| 20346 | 1645+92.57 | 41.790 | 769569.645 | 4384396.119 | 1033.609 | 43°45'37.334316" N | 122°31'56.413444" W | 958.879 | 0.9999021 | 5/8" IR W/FHWA ALUM CAP |
| 20347 | 1438+66.93 | -23.470 | 785760.476 | 4376566.768 | 965.550 | 43°48'15.300897" N | 122°33'48.505031" W | 890.866 | 0.99991357 | 5/8" IR W/FHWA ALUM CAP |
| 20348 | 1435+98.03 | 39.660 | 785898.018 | 4376327.239 | 964.380 | 43°48'16.600582" N | 122°33'51.816626" W | 889.693 | 0.9999137 | 5/8" IR W/FHWA ALUM CAP |
| 20349 | 1424+57.87 | -44.370 | 786643.753 | 4375462.611 | 960.979 | 43°48'23.752717" N | 122°34'03.854732" W | 886.281 | 0.99991424 | 5/8" IR W/FHWA ALUM CAP |
| 20350 | 1420+94.22 | -36.150 | 786691.455 | 4375097.953 | 956.618 | 43°48'24.134747" N | 122°34'08.842167" W | 881.913 | 0.99991447 | 5/8" IR W/FHWA ALUM CAP |
| 20351 | 1398+09.22 | -39.190 | 787859.049 | 4373308.186 | 976.971 | 43°48'35.225184" N | 122°34'33.636629" W | 902.232 | 0.9999141 | 5/8" IR W/FHWA ALUM CAP |
| 20352 | 1396+22.08 | -53.830 | 788034.548 | 4373241.609 | 977.771 | 43°48'36.941610" N | 122°34'34.603648" W | 903.03 | 0.99991416 | 5/8" IR W/FHWA ALUM CAP |
| 20353 | 1380+33.27 | -22.720 | 788910.890 | 4371958.248 | 988.352 | 43°48'45.279270" N | 122°34'52.397617" W | 913.576 | 0.99991411 | 5/8" IR W/FHWA ALUM CAP |
| 20354 | 1378+15.82 | -25.420 | 788983.338 | 4371754.172 | 988.990 | 43°48'45.944466" N | 122°34'55.204600" W | 914.209 | 0.99991412 | 5/8" IR W/FHWA ALUM CAP |
| 20355 | 1371+63.02 | 32.110 | 789272.560 | 4371170.227 | 992.114 | 43°48'48.656549" N | 122°35'03.264426" W | 917.317 | 0.99991412 | 5/8" IR W/FHWA ALUM CAP |
| 20356 | 1370+79.24 | -36.630 | 789379.288 | 4371151.196 | 981.977 | 43°48'49.705608" N | 122°35'03.560127" W | 907.179 | 0.99991466 | 5/8" IR W/FHWA ALUM CAP |
| 20357 | 1352+54.94 | 34.010 | 789976.201 | 4369486.127 | 948.954 | 43°48'55.189128" N | 122°35'26.465699" W | 874.114 | 0.99991654 | 5/8" IR W/FHWA ALUM CAP |
| 20358 | 1351+00.62 | 43.560 | 789977.843 | 4369331.522 | 950.752 | 43°48'55.167220" N | 122°35'28.574270" W | 875.909 | 0.99991645 | 5/8" IR W/FHWA ALUM CAP |
| 20359 | 1295+68.24 | 28.750 | 792747.736 | 4364673.256 | 948.840 | 43°49'21.360856" N | 122°36'33.039917" W | 873.892 | 0.99991799 | 5/8" IR W/FHWA ALUM CAP |
| 20360 | 1293+12.14 | 21.850 | 792828.208 | 4364430.034 | 948.456 | 43°49'22.094852" N | 122°36'36.384240" W | 873.505 | 0.99991805 | 5/8" IR W/FHWA ALUM CAP |
| 20361 | 940+88.67 | -33.360 | 813926.450 | 4340030.469 | 940.872 | 43°52'44.185583" N | 122°42'16.672812" W | 865.387 | 0.99993013 | 5/8" IR W/FHWA ALUM CAP |
| 20362 | 938+78.39 | -29.300 | 814060.167 | 4339867.386 | 943.666 | 43°52'45.463303" N | 122°42'18.946746" W | 868.176 | 0.99993007 | 5/8" IR W/FHWA ALUM CAP |
| 20363 | 927+49.45 | -32.690 | 814764.053 | 4338981.763 | 960.892 | 43°52'52.181939" N | 122°42'31.287805" W | 885.383 | 0.99992966 | 5/8" IR W/FHWA ALUM CAP |
| 20364 | 924+87.35 | 20.510 | 814867.462 | 4338734.733 | 966.396 | 43°52'53.138493" N | 122°42'34.696803" W | 890.883 | 0.99992945 | 5/8" IR W/FHWA ALUM CAP |
| 20365 | 905+54.02 | 30.730 | 816108.581 | 4337260.862 | 986.847 | 43°53'05.006878" N | 122°42'55.262156" W | 911.295 | 0.9999292 | 5/8" IR W/FHWA ALUM CAP |
| 20366 | 904+03.66 | -55.540 | 816276.650 | 4337217.376 | 987.182 | 43°53'06.654769" N | 122°42'55.916442" W | 911.626 | 0.99992928 | 5/8" IR W/FHWA ALUM CAP |
| 20367 | 883+51.33 | 21.970 | 817549.194 | 4335600.874 | 987.499 | 43°53'18.794969" N | 122°43'18.442627" W | 911.9 | 0.99993001 | 5/8" IR W/FHWA ALUM CAP |
| 20368 | 884+04.40 | -20.730 | 817548.283 | 4335668.983 | 988.101 | 43°53'18.803817" N | 122°43'17.512557" W | 912.503 | 0.99992998 | 5/8" IR W/FHWA ALUM CAP |
| 20369 | 819+65.64 | 19.400 | 820949.311 | 4330655.739 | 1015.023 | 43°53'51.061068" N | 122°44'27.189290" W | 939.28 | 0.99993068 | 5/8" IR W/FHWA ALUM CAP |
| 20370 | 819+74.72 | -53.400 | 820984.785 | 4330719.951 | 1011.398 | 43°53'51.428243" N | 122°44'26.325583" W | 935.654 | 0.99993088 | 5/8" IR W/FHWA ALUM CAP |
| 20371 | 811+88.60 | 39.940 | 821663.522 | 4330333.915 | 1014.163 | 43°53'58.026914" N | 122°44'31.844177" W | 938.418 | 0.99993115 | 5/8" IR W/FHWA ALUM CAP |
| 20372 | 813+11.01 | -97.490 | 821569.042 | 4330489.815 | 1009.316 | 43°53'57.135390" N | 122°44'29.681119" W | 933.557 | 0.99993133 | 5/8" IR W/FHWA ALUM CAP |
| 20373 | 733+66.54 | -18.890 | 825268.856 | 4325007.540 | 799.518 | 43°54'32.205027" N | 122°45'45.895661" W | 723.572 | 0.99994355 | 5/8" IR W/FHWA ALUM CAP |
| 20374 | 731+04.51 | 24.780 | 825273.108 | 4324741.922 | 784.193 | 43°54'32.176122" N | 122°45'49.524291" W | 708.24 | 0.99994429 | 5/8" IR W/FHWA ALUM CAP |
| 20375 | 729+67.60 | 24.870 | 825297.683 | 4324607.244 | 778.079 | 43°54'32.382779" N | 122°45'51.372417" W | 702.122 | 0.99994459 | 5/8" IR W/FHWA ALUM CAP |
| 20376 | 729+13.82 | -18.520 | 825350.048 | 4324562.154 | 776.982 | 43°54'32.887697" N | 122°45'52.007468" W | 701.022 | 0.99994467 | 5/8" IR W/FHWA ALUM CAP |

NOTE:
1. To precisely check distances between points as measured on the ground, inverse the state plane coordinates and divide the computed distance by a mean combined factor of the two points.

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.05.19 17:02:41 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

FOOTNOTE:
[1] Negative offsets are left of centerline. Positive offsets are right of centerline.

**SURVEY CONTROL TABLES**

**Sheet 2 of 5**

Project: OR58: Fix-It Corridor Culverts
Date of field work: November 2019 – December 2020
Date of Adjustment: November 2019 – July 2020

Project Units: International Feet
Coordinate System: Oregon South SPCS NAD83 (2011)
Vertical Datum: Orthometric elevations based on the NAVD88 GEOID 12A

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.28 |

| POINT NUMBER | STATION | OFFSET[1] | STATE PLANE COORDINATES | | | GEO COORDINATES | | ELLIPSOID HEIGHT | COMBINED FACTOR | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | NORTH | EAST | ELEVATION | LATITUDE | LONGITUDE | | | |
| 20377 | 708+42.31 | -32.860 | 824997.599 | 4322582.681 | 713.636 | 43°54'28.878872" N | 122°46'18.906938" W | 637.651 | 0.99994745 | 5/8" IR W/FHWA ALUM CAP |
| 20378 | 706+27.52 | -36.430 | 825027.631 | 4322369.967 | 717.986 | 43°54'29.118361" N | 122°46'21.822663" W | 641.994 | 0.99994726 | 5/8" IR W/FHWA ALUM CAP |
| 20379 | 683+97.93 | -22.430 | 825123.095 | 4320147.669 | 705.145 | 43°54'29.464171" N | 122°46'52.203445" W | 629.087 | 0.9999479 | 5/8" IR W/FHWA ALUM CAP |
| 20380 | 682+87.38 | 62.470 | 825022.162 | 4320051.534 | 705.366 | 43°54'28.441888" N | 122°46'53.478605" W | 629.309 | 0.99994782 | 5/8" IR W/FHWA ALUM CAP |
| 20381 | 612+81.91 | 35.890 | 826988.011 | 4313499.614 | 714.207 | 43°54'46.076699" N | 122°48'23.682925" W | 637.943 | 0.99994852 | 5/8" IR W/FHWA ALUM CAP |
| 20382 | 610+91.72 | 29.990 | 827063.480 | 4313321.455 | 708.391 | 43°54'46.773272" N | 122°48'26.144238" W | 632.121 | 0.99994884 | 5/8" IR W/FHWA ALUM CAP |
| 20383 | 2597+74.74 | 19.340 | 733441.059 | 4462817.046 | 2399.101 | 43°39'58.008350" N | 122°13'57.834094" W | 2326.772 | 0.99982108 | 5/8" IR W/FHWA ALUM CAP |
| 20384 | 2601+14.63 | 17.140 | 733104.123 | 4462776.082 | 2419.881 | 43°39'54.672886" N | 122°13'58.296467" W | 2347.557 | 0.99981995 | 5/8" IR W/FHWA ALUM CAP |
| 20385 | 2631+33.88 | -18.600 | 730575.382 | 4464134.673 | 2524.039 | 43°39'29.979844" N | 122°13'39.106598" W | 2451.843 | 0.99981394 | 5/8" IR W/FHWA ALUM CAP |
| 20386 | 2633+65.62 | -27.780 | 730447.716 | 4464328.290 | 2525.055 | 43°39'28.758630" N | 122°13'36.437412" W | 2452.872 | 0.99981384 | 5/8" IR W/FHWA ALUM CAP |
| 20387 | 2648+69.76 | 19.070 | 729532.638 | 4465522.973 | 2534.560 | 43°39'19.965550" N | 122°13'19.932667" W | 2462.466 | 0.99981302 | 5/8" IR W/FHWA ALUM CAP |
| 20388 | 2650+52.38 | -20.010 | 729457.909 | 4465694.134 | 2535.604 | 43°39'19.262385" N | 122°13'17.583920" W | 2463.521 | 0.99981294 | 5/8" IR W/FHWA ALUM CAP |
| 20389 | 2818+83.82 | 19.810 | 721938.266 | 4479664.422 | 3288.427 | 43°38'07.800331" N | 122°10'05.543663" W | 3217.335 | 0.99977404 | 5/8" IR W/FHWA ALUM CAP |
| 20390 | 2815+43.51 | 25.840 | 721993.030 | 4479328.489 | 3268.804 | 43°38'08.275003" N | 122°10'10.125870" W | 3197.692 | 0.99977499 | 5/8" IR W/FHWA ALUM CAP |
| 20391 | 2823+90.27 | 19.000 | 721849.939 | 4480163.753 | 3317.197 | 43°38'07.026295" N | 122°09'58.730831" W | 3246.134 | 0.99977263 | 5/8" IR W/FHWA ALUM CAP |
| 20392 | 2826+22.38 | 20.910 | 721839.789 | 4480400.104 | 3330.525 | 43°38'06.972497" N | 122°09'55.514655" W | 3259.476 | 0.99977199 | 5/8" IR W/FHWA ALUM CAP |
| 20393 | 2828+00.86 | 46.590 | 721858.401 | 4480587.324 | 3337.570 | 43°38'07.193049" N | 122°09'52.974240" W | 3266.532 | 0.99977166 | 5/8" IR W/FHWA ALUM CAP |
| 20394 | 2830+30.54 | 32.190 | 721980.066 | 4480791.465 | 3348.252 | 43°38'08.434535" N | 122°09'50.231603" W | 3277.227 | 0.9997712 | 5/8" IR W/FHWA ALUM CAP |
| 20395 | 2832+67.59 | 46.520 | 722094.050 | 4481000.111 | 3358.043 | 43°38'09.601038" N | 122°09'47.425610" W | 3287.031 | 0.99977078 | 5/8" IR W/FHWA ALUM CAP |
| 20396 | 2834+10.31 | -24.450 | 722223.720 | 4481091.409 | 3368.666 | 43°38'10.899410" N | 122°09'46.219316" W | 3297.66 | 0.99977032 | 5/8" IR W/FHWA ALUM CAP |
| 20397 | 2838+28.80 | -28.210 | 722260.631 | 4481517.747 | 3391.310 | 43°38'11.347461" N | 122°09'40.432666" W | 3320.33 | 0.99976925 | 5/8" IR W/FHWA ALUM CAP |
| 20398 | 2840+86.45 | 39.750 | 722094.125 | 4481720.590 | 3399.582 | 43°38'09.742972" N | 122°09'37.629860" W | 3328.612 | 0.9997688 | 5/8" IR W/FHWA ALUM CAP |
| 20399 | 2853+58.38 | -21.160 | 721357.603 | 4482757.353 | 3470.560 | 43°38'02.672711" N | 122°09'23.335715" W | 3399.635 | 0.99976512 | 5/8" IR W/FHWA ALUM CAP |
| 20400 | 2855+54.66 | 42.080 | 721186.600 | 4482872.608 | 3479.831 | 43°38'01.006595" N | 122°09'21.722755" W | 3408.912 | 0.99976461 | 5/8" IR W/FHWA ALUM CAP |
| 20401 | 3041+87.99 | -39.280 | 713624.741 | 4496361.693 | 4328.894 | 43°36'48.927118" N | 122°06'16.357381" W | 4258.561 | 0.99972125 | 5/8" IR W/FHWA ALUM CAP |
| 20402 | 3042+46.00 | 41.520 | 713611.924 | 4496460.312 | 4327.677 | 43°36'48.819208" N | 122°06'15.013677" W | 4257.347 | 0.9997213 | 5/8" IR W/FHWA ALUM CAP |
| 20403 | 3048+82.35 | -47.550 | 714149.194 | 4496817.228 | 4340.731 | 43°36'54.192254" N | 122°06'10.302479" W | 4270.42 | 0.99972088 | 5/8" IR W/FHWA ALUM CAP |
| 20404 | 3050+61.27 | 25.210 | 714219.142 | 4496998.189 | 4334.554 | 43°36'54.917190" N | 122°06'07.861103" W | 4264.25 | 0.9997212 | 5/8" IR W/FHWA ALUM CAP |
| 20405 | 3055+60.27 | 26.700 | 714462.276 | 4497421.227 | 4336.199 | 43°36'57.398034" N | 122°06'02.174445" W | 4265.913 | 0.99972122 | 5/8" IR W/FHWA ALUM CAP |
| 20406 | 3056+93.97 | -26.100 | 714553.374 | 4497532.306 | 4340.381 | 43°36'58.318593" N | 122°06'00.688332" W | 4270.1 | 0.99972105 | 5/8" IR W/FHWA ALUM CAP |
| 20407 | 3061+80.81 | -47.790 | 714636.274 | 4498018.719 | 4342.701 | 43°36'59.228970" N | 122°05'54.098532" W | 4272.437 | 0.99972097 | 5/8" IR W/FHWA ALUM CAP |
| 20408 | 3062+74.93 | 28.430 | 714564.803 | 4498116.490 | 4340.309 | 43°36'58.541619" N | 122°05'52.751089" W | 4270.047 | 0.99972106 | 5/8" IR W/FHWA ALUM CAP |
| 20409 | 3217+06.21 | 31.980 | 711152.291 | 4509567.586 | 4923.168 | 43°36'26.971344" N | 122°03'16.245465" W | 4853.217 | 0.99969202 | 5/8" IR W/FHWA ALUM CAP |
| 20410 | 3217+69.97 | -51.150 | 711208.452 | 4509656.028 | 4931.744 | 43°36'27.542154" N | 122°03'15.057691" W | 4861.797 | 0.99969163 | 5/8" IR W/FHWA ALUM CAP |
| 20411 | 3222+31.61 | -63.510 | 711061.444 | 4510093.805 | 4946.217 | 43°36'26.170622" N | 122°03'09.071176" W | 4876.283 | 0.99969089 | 5/8" IR W/FHWA ALUM CAP |
| 20412 | 3221+58.13 | 26.990 | 711001.702 | 4509993.708 | 4945.694 | 43°36'25.562332" N | 122°03'10.416449" W | 4875.756 | 0.99969089 | 5/8" IR W/FHWA ALUM CAP |
| 193000 | 4480+63.54 | -25.100 | 614521.175 | 4583267.347 | 4631.547 | 43°20'44.937441" N | 121°46'14.666439" W | 4561.455 | 0.99968142 | 5/8" IR W/FHWA ALUM CAP |
| 193001 | 4477+75.83 | 25.910 | 614731.689 | 4583064.708 | 4633.523 | 43°20'46.986184" N | 121°46'17.451956" W | 4563.432 | 0.99968136 | 5/8" IR W/FHWA ALUM CAP |
| 193002 | 4464+52.56 | -29.160 | 615861.283 | 4582373.253 | 4607.602 | 43°20'58.038709" N | 121°46'27.041913" W | 4537.515 | 0.99968276 | 5/8" IR W/FHWA ALUM CAP |
| 193003 | 4462+03.10 | 23.510 | 616039.096 | 4582190.543 | 4599.425 | 43°20'59.767396" N | 121°46'29.551261" W | 4529.339 | 0.99968318 | 5/8" IR W/FHWA ALUM CAP |

NOTE:
1. To precisely check distances between points as measured on the ground, inverse the state plane coordinates and divide the computed distance by a mean combined factor of the two points.

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.05.19 17:02:41 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

FOOTNOTE:
[1] Negative offsets are left of centerline. Positive offsets are right of centerline.

**SURVEY CONTROL TABLES**

**Sheet 3 of 5**

-/----
Checked by:
-/----
Designed by:
3/21/2022 6:37:26 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802D28.dgn

Project: OR58: Fix-It Corridor Culverts
Date of field work: November 2019 – December 2020
Date of Adjustment: November 2019 – July 2020

Project Units: International Feet
Coordinate System: Oregon South SPCS NAD83 (2011)
Vertical Datum: Orthometric elevations based on the NAVD88 GEOID 12A

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.29 |

| POINT NUMBER | STATION | OFFSET [1] | STATE PLANE COORDINATES | | | GEO COORDINATES | | | | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | NORTH | EAST | ELEVATION | LATITUDE | LONGITUDE | ELLIPSOID HEIGHT | COMBINED FACTOR | |
| 193004 | 3815+12.29 | 24.060 | 668209.864 | 4545421.442 | 4673.265 | 43°29'29.175602" N | 121°54'59.100155" W | 4603.507 | 0.99969049 | 5/8" IR W/FHWA ALUM CAP |
| 193005 | 3813+26.50 | 27.440 | 668321.065 | 4545272.567 | 4676.159 | 43°29'30.248924" N | 121°55'01.145121" W | 4606.412 | 0.99969038 | 5/8" IR W/FHWA ALUM CAP |
| 193006 | 3758+53.29 | -21.500 | 672036.059 | 4541318.035 | 4710.292 | 43°30'06.272875" N | 121°55'55.648999" W | 4640.534 | 0.99968975 | 5/8" IR W/FHWA ALUM CAP |
| 193007 | 3756+75.80 | 21.260 | 672172.505 | 4541196.761 | 4709.706 | 43°30'07.599891" N | 121°55'57.325984" W | 4639.948 | 0.99968981 | 5/8" IR W/FHWA ALUM CAP |
| 193008 | 3731+09.69 | 21.930 | 674608.117 | 4540391.486 | 4732.552 | 43°30'31.517060" N | 121°56'08.817717" W | 4662.811 | 0.9996894 | 5/8" IR W/FHWA ALUM CAP |
| 193009 | 3728+36.85 | -44.650 | 674888.794 | 4540381.780 | 4743.088 | 43°30'34.287295" N | 121°56'09.014713" W | 4673.35 | 0.99968898 | 5/8" IR W/FHWA ALUM CAP |
| 193010 | 3543+69.92 | -39.890 | 692171.854 | 4534738.453 | 4847.905 | 43°33'24.004768" N | 121°57'29.670418" W | 4778.203 | 0.9996892 | 5/8" IR W/FHWA ALUM CAP |
| 193011 | 3542+72.82 | 29.880 | 692263.395 | 4534661.037 | 4847.079 | 43°33'24.895467" N | 121°57'30.743308" W | 4777.376 | 0.99968927 | 5/8" IR W/FHWA ALUM CAP |
| 193012 | 3520+94.65 | 28.940 | 694242.568 | 4533812.261 | 4835.071 | 43°33'44.294614" N | 121°57'42.738130" W | 4765.373 | 0.99969048 | 5/8" IR W/FHWA ALUM CAP |
| 193013 | 3519+29.13 | -37.070 | 694413.368 | 4533760.806 | 4841.364 | 43°33'45.972474" N | 121°57'43.477404" W | 4771.667 | 0.99969024 | 5/8" IR W/FHWA ALUM CAP |
| 193014 | 3511+28.39 | 23.840 | 694935.059 | 4533147.303 | 4843.067 | 43°33'51.018553" N | 121°57'51.932940" W | 4773.368 | 0.99969033 | 5/8" IR W/FHWA ALUM CAP |
| 193015 | 3509+79.96 | -28.000 | 695074.639 | 4533074.934 | 4845.337 | 43°33'52.384472" N | 121°57'52.948922" W | 4775.639 | 0.99969026 | 5/8" IR W/FHWA ALUM CAP |
| 193016 | 3503+05.54 | 25.830 | 695521.516 | 4532566.539 | 4847.677 | 43°33'56.709715" N | 121°57'59.959641" W | 4777.977 | 0.9996903 | 5/8" IR W/FHWA ALUM CAP |
| 193017 | 3501+55.91 | -30.580 | 695673.906 | 4532518.415 | 4840.971 | 43°33'58.206312" N | 121°58'00.649471" W | 4771.272 | 0.99969067 | 5/8" IR W/FHWA ALUM CAP |
| 193018 | 3407+96.32 | 24.720 | 701666.269 | 4525649.157 | 4838.116 | 43°34'56.184403" N | 121°59'35.392779" W | 4768.392 | 0.9996928 | 5/8" IR W/FHWA ALUM CAP |
| 193019 | 3405+21.02 | -31.970 | 701875.176 | 4525460.676 | 4839.882 | 43°34'58.214237" N | 121°59'38.003866" W | 4770.158 | 0.99969278 | 5/8" IR W/FHWA ALUM CAP |
| 193020 | 3402+65.36 | -28.830 | 701990.786 | 4525227.611 | 4844.774 | 43°34'59.314854" N | 121°59'41.198048" W | 4775.048 | 0.99969259 | 5/8" IR W/FHWA ALUM CAP |
| 193021 | 3400+33.90 | 26.600 | 702012.786 | 4524990.338 | 4845.263 | 43°34'59.490273" N | 121°59'44.426713" W | 4775.533 | 0.99969257 | 5/8" IR W/FHWA ALUM CAP |
| 193022 | 3385+51.24 | -40.120 | 702768.631 | 4523724.113 | 4844.954 | 43°35'06.730796" N | 122°00'01.812229" W | 4775.215 | 0.99969284 | 5/8" IR W/FHWA ALUM CAP |
| 193023 | 3383+36.08 | -54.280 | 702862.448 | 4523522.691 | 4851.972 | 43°35'07.621619" N | 122°00'04.571464" W | 4782.231 | 0.99969254 | 5/8" IR W/FHWA ALUM CAP |
| 193024 | 3374+58.03 | -30.190 | 703048.542 | 4522660.803 | 4840.584 | 43°35'09.306599" N | 122°00'16.325962" W | 4770.832 | 0.99969314 | 5/8" IR W/FHWA ALUM CAP |
| 193025 | 3372+40.30 | -29.440 | 703098.404 | 4522448.858 | 4838.527 | 43°35'09.761387" N | 122°00'19.217514" W | 4768.772 | 0.99969325 | 5/8" IR W/FHWA ALUM CAP |
| 193026 | 3344+82.24 | 20.250 | 703812.841 | 4519790.567 | 4854.522 | 43°35'16.343180" N | 122°00'55.507322" W | 4784.74 | 0.99969272 | 5/8" IR W/FHWA ALUM CAP |
| 193027 | 3342+59.90 | 19.110 | 703934.618 | 4519602.780 | 4859.955 | 43°35'17.512195" N | 122°00'58.088530" W | 4790.172 | 0.99969251 | 5/8" IR W/FHWA ALUM CAP |
| 193028 | 358+84.23 | -28.450 | 841205.126 | 4292574.468 | 674.548 | 43°57'00.634954" N | 122°53'14.962059" W | 597.753 | 0.99995915 | 5/8" IR W/FHWA ALUM CAP |
| 193029 | 361+47.49 | -33.400 | 841083.375 | 4292807.926 | 675.871 | 43°56'59.498780" N | 122°53'11.724686" W | 599.08 | 0.99995901 | 5/8" IR W/FHWA ALUM CAP |
| 193030 | 405+75.53 | -34.260 | 838963.099 | 4296695.341 | 666.525 | 43°56'39.658600" N | 122°52'17.786711" W | 589.803 | 0.99995815 | 5/8" IR W/FHWA ALUM CAP |
| 193031 | 410+40.67 | -39.330 | 838743.952 | 4297105.759 | 670.445 | 43°56'37.609973" N | 122°52'12.094544" W | 593.731 | 0.99995782 | 5/8" IR W/FHWA ALUM CAP |
| 193032 | 422+60.57 | -61.280 | 838175.942 | 4298185.576 | 676.042 | 43°56'32.304223" N | 122°51'57.122172" W | 599.348 | 0.99995721 | 5/8" IR W/FHWA ALUM CAP |
| 193033 | 424+80.29 | -59.970 | 838069.025 | 4298377.534 | 673.837 | 43°56'31.302306" N | 122°51'54.458331" W | 597.146 | 0.99995725 | 5/8" IR W/FHWA ALUM CAP |
| 193034 | 425+70.13 | 31.150 | 837945.906 | 4298412.415 | 672.197 | 43°56'30.096636" N | 122°51'53.934267" W | 595.508 | 0.99995724 | 5/8" IR W/FHWA ALUM CAP |
| 193035 | 429+08.99 | 48.500 | 837767.573 | 4298701.076 | 667.217 | 43°56'28.416654" N | 122°51'49.921760" W | 590.534 | 0.99995737 | 5/8" IR W/FHWA ALUM CAP |
| 193036 | 595+46.16 | -43.520 | 828041.969 | 4312123.734 | 705.491 | 43°54'56.106770" N | 122°48'42.869127" W | 629.174 | 0.99994957 | 5/8" IR W/FHWA ALUM CAP |
| 193037 | 597+66.82 | 34.280 | 827840.148 | 4312242.107 | 702.490 | 43°54'54.146656" N | 122°48'41.176481" W | 626.179 | 0.99994959 | 5/8" IR W/FHWA ALUM CAP |
| 193038 | 581+00.20 | 42.930 | 828904.923 | 4310960.263 | 701.936 | 43°55'04.308384" N | 122°48'59.084041" W | 625.581 | 0.99995027 | 5/8" IR W/FHWA ALUM CAP |
| 193039 | 577+99.44 | 50.130 | 829091.616 | 4310724.708 | 702.722 | 43°55'06.087065" N | 122°49'02.371571" W | 626.359 | 0.99995034 | 5/8" IR W/FHWA ALUM CAP |
| 193040 | 1922+04.65 | -46.810 | 760400.364 | 4405971.344 | 1263.837 | 43°44'11.866144" N | 122°26'59.584516" W | 1189.263 | 0.99988689 | 5/8" IR W/FHWA ALUM CAP |
| 193041 | 1924+51.03 | -33.730 | 760247.778 | 4406169.525 | 1267.347 | 43°44'10.405106" N | 122°26'56.837376" W | 1192.776 | 0.99988666 | 5/8" IR W/FHWA ALUM CAP |
| 193042 | 1929+15.66 | -32.550 | 759935.737 | 4406519.481 | 1271.318 | 43°44'07.404494" N | 122°26'51.972961" W | 1196.752 | 0.99988632 | 5/8" IR W/FHWA ALUM CAP |
| 193043 | 1932+14.00 | -22.340 | 759716.825 | 4406722.472 | 1273.825 | 43°44'05.289621" N | 122°26'49.139427" W | 1199.262 | 0.9998861 | 5/8" IR W/FHWA ALUM CAP |

NOTE:
1. To precisely check distances between points as measured on the ground, inverse the state plane coordinates and divide the computed distance by a mean combined factor of the two points.

FOOTNOTE:
[1] Negative offsets are left of centerline. Positive offsets are right of centerline.

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.05.19 17:02:41 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**SURVEY CONTROL TABLES**

**Sheet 4 of 5**

Designed by: -/---- Checked by: -/----
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Project: OR58: Fix-It Corridor Culverts
Date of field work: November 2019 – December 2020
Date of Adjustment: November 2019 – July 2020

Project Units: International Feet
Coordinate System: Oregon South SPCS NAD83 (2011)
Vertical Datum: Orthometric elevations based on the NAVD88 GEOID 12A

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | D.30 |

| POINT NUMBER | STATION | OFFSET[1] | STATE PLANE COORDINATES | | | GEO COORDINATES | | | | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | NORTH | EAST | ELEVATION | LATITUDE | LONGITUDE | ELLIPSOID HEIGHT | COMBINED FACTOR | |
| 193044 | 1960+24.16 | 35.370 | 757767.733 | 4408739.052 | 1285.104 | 43°43'46.506755" N | 122°26'21.064297" W | 1210.567 | 0.99988466 | 5/8" IR W/FHWA ALUM CAP |
| 193045 | 1963+41.22 | 21.730 | 757675.334 | 4409046.862 | 1281.671 | 43°43'45.664790" N | 122°26'16.843983" W | 1207.138 | 0.99988479 | 5/8" IR W/FHWA ALUM CAP |
| 193046 | 1976+70.63 | 22.480 | 757605.532 | 4410375.911 | 1263.522 | 43°43'45.278913" N | 122°25'58.725526" W | 1189.01 | 0.99988564 | 5/8" IR W/FHWA ALUM CAP |
| 193047 | 1978+88.99 | 23.410 | 757604.950 | 4410594.264 | 1260.763 | 43°43'45.322927" N | 122°25'55.752223" W | 1186.254 | 0.99988577 | 5/8" IR W/FHWA ALUM CAP |
| 193048 | 1982+65.02 | 20.980 | 757607.995 | 4410970.294 | 1256.229 | 43°43'45.438636" N | 122°25'50.633107" W | 1181.727 | 0.99988599 | 5/8" IR W/FHWA ALUM CAP |
| 193049 | 1984+80.68 | 25.350 | 757603.972 | 4411185.958 | 1256.578 | 43°43'45.448004" N | 122°25'47.695334" W | 1182.081 | 0.99988597 | 5/8" IR W/FHWA ALUM CAP |
| 193050 | 1991+33.97 | 24.290 | 757620.353 | 4411842.072 | 1266.395 | 43°43'45.758968" N | 122°25'38.766724" W | 1191.912 | 0.99988552 | 5/8" IR W/FHWA ALUM CAP |
| 193051 | 1994+14.16 | 31.210 | 757683.886 | 4412119.482 | 1270.018 | 43°43'46.449316" N | 122°25'35.009365" W | 1195.541 | 0.99988538 | 5/8" IR W/FHWA ALUM CAP |
| 193052 | 2066+77.08 | 32.340 | 757872.958 | 4419229.358 | 1515.904 | 43°43'49.920015" N | 122°23'58.257473" W | 1441.64 | 0.99987378 | 5/8" IR W/FHWA ALUM CAP |
| 193053 | 2067+86.99 | -37.000 | 757918.553 | 4419351.044 | 1511.605 | 43°43'50.397469" N | 122°23'56.614613" W | 1437.345 | 0.99987401 | 5/8" IR W/FHWA ALUM CAP |
| 193054 | 2068+81.83 | 38.960 | 757824.929 | 4419428.503 | 1510.023 | 43°43'49.490379" N | 122°23'55.530979" W | 1435.766 | 0.99987404 | 5/8" IR W/FHWA ALUM CAP |
| 193055 | 2129+62.39 | -45.790 | 756902.389 | 4425262.709 | 1500.788 | 43°43'41.679949" N | 122°22'35.807479" W | 1426.737 | 0.9998741 | 5/8" IR W/FHWA ALUM CAP |
| 193056 | 2130+33.52 | 38.620 | 756796.826 | 4425294.419 | 1502.990 | 43°43'40.644638" N | 122°22'35.343501" W | 1428.941 | 0.99987395 | 5/8" IR W/FHWA ALUM CAP |
| 193057 | 2131+21.91 | -31.610 | 756833.656 | 4425401.301 | 1503.222 | 43°43'41.031945" N | 122°22'33.899428" W | 1429.177 | 0.99987396 | 5/8" IR W/FHWA ALUM CAP |
| 193058 | 2133+60.22 | 25.370 | 756732.033 | 4425623.035 | 1509.358 | 43°43'40.077564" N | 122°22'30.849295" W | 1435.323 | 0.99987362 | 5/8" IR W/FHWA ALUM CAP |
| 193059 | 2136+10.77 | -30.600 | 756787.046 | 4425874.099 | 1505.336 | 43°43'40.676266" N | 122°22'27.447573" W | 1431.317 | 0.99987384 | 5/8" IR W/FHWA ALUM CAP |
| 193060 | 2154+04.87 | -35.650 | 756783.390 | 4427670.999 | 1538.410 | 43°43'41.036595" N | 122°22'02.979746" W | 1464.464 | 0.99987227 | 5/8" IR W/FHWA ALUM CAP |
| 193061 | 2154+40.83 | 27.820 | 756713.524 | 4427692.055 | 1538.199 | 43°43'40.351375" N | 122°22'02.671830" W | 1464.255 | 0.99987225 | 5/8" IR W/FHWA ALUM CAP |
| 193062 | 2155+36.91 | -30.410 | 756746.540 | 4427799.472 | 1541.200 | 43°43'40.701026" N | 122°22'01.219258" W | 1467.26 | 0.99987212 | 5/8" IR W/FHWA ALUM CAP |
| 193063 | 2183+80.14 | 34.300 | 755657.462 | 4430421.832 | 1590.080 | 43°43'30.523233" N | 122°21'25.184050" W | 1516.245 | 0.9998693 | 5/8" IR W/FHWA ALUM CAP |
| 193064 | 2184+58.84 | -23.580 | 755704.855 | 4430507.254 | 1585.091 | 43°43'31.009898" N | 122°21'24.035297" W | 1511.259 | 0.99986956 | 5/8" IR W/FHWA ALUM CAP |
| 193065 | 2187+97.16 | -30.940 | 755669.074 | 4430843.760 | 1590.313 | 43°43'30.730245" N | 122°21'19.442800" W | 1516.493 | 0.9998693 | 5/8" IR W/FHWA ALUM CAP |
| 193066 | 2189+53.53 | -26.110 | 755644.378 | 4430998.239 | 1591.974 | 43°43'30.520189" N | 122°21'17.332044" W | 1518.159 | 0.99986921 | 5/8" IR W/FHWA ALUM CAP |
| 193067 | 2193+03.03 | -22.140 | 755595.943 | 4431344.388 | 1599.904 | 43°43'30.117623" N | 122°21'12.604458" W | 1526.101 | 0.99986881 | 5/8" IR W/FHWA ALUM CAP |
| 193068 | 2198+82.69 | -23.220 | 755417.789 | 4431898.934 | 1612.496 | 43°43'28.479657" N | 122°21'05.000422" W | 1538.697 | 0.99986813 | 5/8" IR W/FHWA ALUM CAP |
| 193069 | 2200+59.36 | -32.490 | 755294.476 | 4432034.416 | 1614.477 | 43°43'27.291631" N | 122°21'03.118672" W | 1540.681 | 0.99986798 | 5/8" IR W/FHWA ALUM CAP |
| 193070 | 2202+82.22 | 23.920 | 755073.985 | 4432107.238 | 1619.003 | 43°43'25.130381" N | 122°21'02.060832" W | 1545.209 | 0.99986766 | 5/8" IR W/FHWA ALUM CAP |
| 193071 | 2207+21.30 | -37.130 | 754780.659 | 4432427.078 | 1625.069 | 43°43'22.303833" N | 122°20'57.617953" W | 1551.283 | 0.99986724 | 5/8" IR W/FHWA ALUM CAP |
| 193072 | 2210+39.43 | 28.870 | 754591.430 | 4432686.269 | 1634.529 | 43°43'20.491881" N | 122°20'54.032199" W | 1560.749 | 0.9998667 | 5/8" IR W/FHWA ALUM CAP |
| 193073 | 2211+62.78 | -27.440 | 754628.506 | 4432816.781 | 1633.873 | 43°43'20.886415" N | 122°20'52.266433" W | 1560.097 | 0.99986675 | 5/8" IR W/FHWA ALUM CAP |
| 193074 | 2216+71.53 | -21.590 | 754622.260 | 4433324.186 | 1645.764 | 43°43'20.935248" N | 122°20'45.356282" W | 1572.001 | 0.99986618 | 5/8" IR W/FHWA ALUM CAP |
| 193075 | 2217+66.85 | -19.160 | 754613.204 | 4433419.928 | 1649.355 | 43°43'20.866667" N | 122°20'44.050045" W | 1575.594 | 0.99986601 | 5/8" IR W/FHWA ALUM CAP |
| 193076 | 2234+31.98 | -22.740 | 753964.397 | 4434941.209 | 1686.177 | 43°43'14.790847" N | 122°20'23.143817" W | 1612.45 | 0.99986396 | 5/8" IR W/FHWA ALUM CAP |
| 193077 | 2236+94.75 | -27.100 | 753856.817 | 4435172.389 | 1691.874 | 43°43'13.778732" N | 122°20'19.964237" W | 1618.153 | 0.99986364 | 5/8" IR W/FHWA ALUM CAP |
| 193078 | 2286+14.16 | 22.460 | 751782.140 | 4439476.519 | 1853.830 | 43°42'54.222240" N | 122°19'20.750663" W | 1780.247 | 0.99985499 | 5/8" IR W/FHWA ALUM CAP |
| 193079 | 2287+60.08 | -23.670 | 751797.672 | 4439628.895 | 1860.668 | 43°42'54.408347" N | 122°19'18.680917" W | 1787.09 | 0.99985467 | 5/8" IR W/FHWA ALUM CAP |
| 193080 | 2283+76.00 | 24.910 | 751828.555 | 4439242.395 | 1848.285 | 43°42'54.630223" N | 122°19'23.951631" W | 1774.694 | 0.99985527 | 5/8" IR W/FHWA ALUM CAP |

NOTE:
1. To precisely check distances between points as measured on the ground, inverse the state plane coordinates and divide the computed distance by a mean combined factor of the two points.

FOOTNOTE:
[1] Negative offsets are left of centerline. Positive offsets are right of centerline.

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.05.19 17:02:41 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY

EXPIRES: 12/31/2024

**SURVEY CONTROL TABLES**

**Sheet 5 of 5**

Designed by: -/---- Checked by: -/----

3/21/2022 6:37:36 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802D30.dgn

Note: The quantities shown hereon are approximate and are subject to field adjustments.

# TABULATION OF DRAINAGE QUANTITIES

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.1 |

| PAY ITEM NUMBER | | | 20301 -1200 | 20301 -1400 | 20301 -2000 | 20310 -1000 | 20425 -1000 | 20702 -0100 | 25101 -0100 | 25101 -0200 | 25101 -0300 | 25101 -0400 | 30302 -1000 | 60102 -0000 | 60103 -0580 | 60201 -0400 | 60201 -0600 | 60201 -0800 | 60201 -0900 | 60201 -1000 | 60201 -1200 | 60201 -2000 | 60210 -0600 | 60210 -0800 | 60210 -0900 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Culvert ID | SHEET NO. | ESTIMATED MAXIMUM COVER | REMOVAL OF HEADWALL | REMOVAL OF INLET | REMOVAL OF PIPE END SECTION | PLUG, EXISTING PIPE | DITCH, EXCAVATION (REGRADING) | GEOTEXTILE FILTER, CLASS 1, TYPE A (NONWOVEN) | PLACED RIPRAP, METHOD A, CLASS 1 | PLACED RIPRAP, METHOD A, CLASS 2 | PLACED RIPRAP, METHOD A, CLASS 3 | PLACED RIPRAP, METHOD A, CLASS 4 | DITCH RECONDITIONING | CONCRETE (PAVED END SLOPE) | CONCRETE, HEADWALL FOR DOUBLE 18-INCH PIPE CULVERT | 12-INCH PIPE CULVERT | 18-INCH PIPE CULVERT | 24-INCH PIPE CULVERT | 30-INCH PIPE CULVERT | 36-INCH PIPE CULVERT | 48-INCH PIPE CULVERT | 96-INCH PIPE CULVERT | END SECTION FOR 18-INCH PIPE CULVERT | END SECTION FOR 24-INCH PIPE CULVERT | END SECTION FOR 30-INCH PIPE CULVERT | REMARKS See below for numbered notes | DESIGNER NOTES |
| | 0 | FEET | EACH | EACH | EACH | EACH | LNFT | SQYD | CUYD | CUYD | CUYD | CUYD | LNFT | SQYD | EACH | LNFT | LNFT | LNFT | LNFT | LNFT | LNFT | LNFT | EACH | EACH | EACH | | |
| D034723 | E7 | 4 | | | | | | | | | | | | 5 | | 20 | | | | | | | | | | 7 | |
| D027825 | E12 | 3 | | | | | | | | | | | | 12 | | | | 10 | | | | | | | | | |
| D027828 | E13 | 1 | | | | | | | | | | | | | | | 30 | | | | | | | | | 7, 8 | |
| D027832 | E14 | 4 | | | | | | 6 | 2 | | | | | | | | 20 | | | | | | | | | 8 | |
| D027833 | E14 | 3 | | | | | | 11 | 2 | | | | | | | | | | | | | | | | | 8 | |
| D027842 | E15 | 14 | | | | | | 34 | | | 16 | | | | | | | | | | | 191 | | | | 7, 8, 11 | |
| D034741 | E16 | | | | | | | 6 | 4 | | | | | 10 | | | 150 | | | | | | | | | 7, 8 | |
| D027990 | E18 | 2 | | | | | | | | | | | | 10 | | | | | 86 | | | | | | | 7 | |
| D027992 | E19 | 4 | | | | | | 8 | 4 | | | | | 16 | | | | | 87 | | | | | | | 7, 8 | |
| D028033 | E21 | 1 | | | | 1 | | 9 | 4 | | | | | | | | 58 | | | | | | | | | 7, 8 | |
| D028041 | E21 | 6 | | | | | | 23 | | | 4 | | | 5 | | | 10 | | | | | | | | | 7, 8 | |
| D028044 | E23 | 4 | | | | | | 8 | 4 | | | | | 16 | | | | | 55 | | | | | | | 7, 8 | |
| D028045 | E24 | 5 | | | | | | 16 | 7 | | | | | 6 | | | | 59 | | | | | | | | 7, 8 | |
| D028047 | E25 | 3 | | | | | | 9 | 4 | | | | | | | | | 22 | | | | | | | | 7, 8 | |
| D028050 | E26 | 10 | | | | | | 6 | 4 | | | | 100 | 5 | | | 10 | | | | | | | | | 7, 8 | |
| D028051 | E26 | 9 | | | | | | 16 | | | | 6 | 80 | 5 | | | | | | | | | | | | 8 | |
| D028052 | E27 | 6 | | | | | | 7 | | | | 4 | | 16 | | | | | | | | | | | | 8 | |
| D028053 | E27 | 4 | | | | | | 7 | 2 | | | | | 12 | | | | | | | | | | | | 8 | |
| D028071 | E29 | 4 | | | | | | 33 | 12 | | | | | | | | | | 154 | | | | | | 2 | 7, 8 | |
| D028074 | E30 | 3 | | | | | | 12 | 5 | | | | | 8 | | | | | 58 | | | | | | | 7, 8 | |
| D034764 | E30 | 8 | | | | | | 4 | 4 | | | | | 6 | | | | 20 | | | | | | | | 7 | |
| D034765 | E31 | | | | | | | 9 | 4 | | | | | 10 | | | 20 | | | | | | | | | 7, 8 | |
| D028076 | E31 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | |
| D028077 | E32 | | | | | | | 13 | 2 | | | | | 6 | | | | 62 | | | | | | | | 7, 8 | |
| D028078 | E33 | 2 | | | | | 30 | 21 | 5 | | | | | 10 | | | | | | 96 | | | | | | 7, 8 | |
| D028082 | E34 | 3 | | | | | | 15 | 5 | | | | | | | | 20 | | | | | | | | | 7, 8 | |
| D028086 | E34 | 3 | | | | | | 6 | 4 | | | | | | | | 44 | | | | | | | | | 7, 8 | |
| D028088 | E35 | 11 | | | | | | 6 | 4 | | | | | 10 | | | | | | | | | | | | 7, 8 | |
| D028090 | E35 | 7 | | | | | | 10 | 3 | | | | | | | | 57 | | | | | | | | | 7, 8 | |
| D028091 | E36 | 8 | | | | | | 10 | 4 | | | | 40 | 10 | | | 10 | | | | | | 2 | | | 7, 8 | |
| D028094 | E36 | 5 | | 1 | | | | 5 | 3 | | | | | | | | | 77 | | | | | | 1 | | 6, 7, 8 | |
| D028095 | E37 | 3 | | | | | | 13 | 8 | | 4 | | 40 | | | | | 10 | | | | | | | | 7, 8 | |
| D028100 | E37 | 6 | | 1 | | | | | | | | | | | | | | 57 | | | | | | | | 6, 7, 8 | |
| D028107 | E38 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | |
| CUMULATIVE TOTAL | | | 0 | 2 | 0 | 1 | 30 | 323 | 100 | 0 | 24 | 10 | 260 | 178 | 0 | 20 | 429 | 317 | 354 | 182 | 0 | 191 | 2 | 1 | 2 | | |

NOTE:

1. Steel pipe culvert minimum wall thickness is the larger of 0.064" or the thickness required by the fill height table. See sheet E.68 for fill height table
2. Aluminized steel pipe culvert minimum wall thickness is the larger of 0.06" or the thickness required by the fill height table (steel). See sheet E.68 for fill height table
3.See sheet E.69 for concrete fill height table
4. Plastic pipe is not allowed when final installation is exposed. Furnish metal end sections for all plastic pipe including those specified with bevels. See sheet E.70 for acceptable cell class.
5. See sheet E.59 for ODOT "G-2" inlets.
6. See sheet E.75 for ODOT "D" inlets.
7. See sheet E.60 for pipe culvert bedding
8. See sheet E.64 for placed riprap at culvert outlets
9. See sheet E.62 for paved sloped ends for metal pipe.
10. See sheet E.65 for paved sloped ends for concrete pipe.
11. See sheet E.63 for riprap headwall at outlet

8/2021 Designed by: YH,PD 6/2021 Checked by: J. Field

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29-Aug-2022 7:53 AM

Note: The quantities shown hereon are approximate and are subject to field adjustments.

# TABULATION OF DRAINAGE QUANTITIES

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.2 |

| PAY ITEM NUMBER | | | 60403 -0000 | 60403 -0000 | 60602 -0900 | 60703 -0000 | 60706 -0000 | 60707 -0300 | 60707 -0500 | 60707 -0600 | 60707 -0700 | 60901 -2100 | 62303 -1000 | 63309 -0100 | 64703 -3010 | 64703 -6000 | 64703 -7000 | 64704 -1000 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Culvert ID | SHEET NO. | ESTIMATED MAXIMUM COVER | INLET (ODOT TYPE "G-2") | INLET(ODOT TYPE "D") | PIPE ANCHOR ASSEMBLY, 36-INCH | CLEANING CULVERTS IN PLACE | CLEANING DRAINAGE STRUCTURE | LINING 18-INCH PIPE CULVERT | LINING 24-INCH PIPE CULVERT | LINING 30-INCH PIPE CULVERT | LINING 36-INCH PIPE CULVERT | CURB, ASPHALT, 4-INCH DEPTH | SPECIAL LABOR, HIRED TECHNICAL SERVICES(MAINLINE VIDEO INSPECTION) | DELINEATOR, TYPE 1 (CULVERT ID MARKER) | MITIGATION, ROCK WEIR | MITIGATION, FISH PASSAGE BOULDER | MITIGATION, BAFFLE | MITIGATION, STREAMBED MATERIAL | SKEW ANGLE | Allowable Pipe Material (See key below) | REMARKS See below for numbered notes | DESIGNER NOTES |
| | 0 | FEET | EACH | EACH | EACH | LNFT | EACH | LNFT | LNFT | LNFT | LNFT | LNFT | LPSM | EACH | EACH | EACH | EACH | CUYD | | | | |
| D034723 | E7 | 4 | | | | | | | | | | | | 2 | | | | | 0°24'13.4" | HDPE | | |
| D027825 | E12 | 3 | | | | | | | 78 | | | | | 2 | | | | | 2°35'30.3" | A, AS | 10 | |
| D027828 | E13 | 1 | | | | | | 79 | | | | | | 2 | | | | | 3°5'53" | C | 10 | |
| D027832 | E14 | 4 | 1 | | | 50 | | | | | | | | 2 | | | | | 0°4'59.5" | A, AS | | |
| D027833 | E14 | 3 | 1 | | | 49 | | | | | | | | 2 | | | | | 0°51'26" | | 9 | |
| D027842 | E15 | 14 | | | | | | | | | | | | 2 | 36 | 27 | 27 | 77 | 15°41'56.4" | A, AS | 9 | |
| D034741 | E16 | | | | | | | | | | | | | 2 | | | | | | DIP | 9 | |
| D027990 | E18 | 2 | | | 3 | | | | | | | | | 2 | | | | | 0°50'25" | C (A for Flume) | 10 | Class V |
| D027992 | E19 | 4 | | | | | | | | | | | | 2 | | | | | 1°19'11.7" | DIP | 10 | |
| D028033 | E21 | 1 | | | | | | | | | | | | 2 | | | | | 0°17'30" | C | 10 | |
| D028041 | E21 | 6 | | | | | | 66 | | | | | | 2 | | | | | 4°29'25.7" | C | 10 | |
| D028044 | E23 | 4 | | | | | | | | | | | | 2 | | | | | 4°52'48.2" | A, AS | 9 | |
| D028045 | E24 | 5 | | | | | | | | | | | | 2 | | | | | 14°43'33.8" | C | 10 | |
| D028047 | E25 | 3 | | | | | | | | | | | | 2 | | | | | 14°33'6.8" | C | 10 | |
| D028050 | E26 | 10 | | | | 72 | | | | | | | | 2 | | | | | 1°50'41.4" | C | 10 | |
| D028051 | E26 | 9 | | | | | | 62 | | | | | | 2 | | | | | 3°18'23" | | 10 | Class V |
| D028052 | E27 | 6 | | | | | | 57 | | | | | | 2 | | | | | 22°35'21.1" | | 10 | |
| D028053 | E27 | 4 | | | | | | 61 | | | | | | 2 | | | | | 5°26'37.5" | | 10 | |
| D028071 | E29 | 4 | | | | | | | | | | | | 2 | | | | | 17°17'5" | A, AS | 9 | |
| D028074 | E30 | 3 | | | | | | | | | | | | 2 | | | | | 15°40'43.5" | A, AS | 9 | |
| D034764 | E30 | 8 | | | | | | | 83 | | | | | 2 | | | | 2 | 2°30'17.7" | A, AS | 9 | |
| D034765 | E31 | | | | | | | | | | | | | 2 | | | | | 0°23'35.1" | DIP | 9 | |
| D028076 | E31 | 3 | | | | | | | 73 | | | | | 2 | | | | | 4°35'32.4" | | | |
| D028077 | E32 | | | | | | | | | | | | | 2 | | | | | 0°48'52.2" | DIP | 9 | |
| D028078 | E33 | 2 | | | | | | | | | | | | 2 | | | | | 2°59'45.4" | DIP | 9 | |
| D028082 | E34 | 3 | | | | | | 85 | | | | | | 2 | | | | | 2°2'13.5" | C | | |
| D028086 | E34 | 3 | 1 | | | | | | | | | | | 2 | | | | | 1°52'28.9" | A, AS | 10 | Class V |
| D028088 | E35 | 11 | | | | | | 67 | | | | | | 2 | | | | | 15°32'0.5" | | 10 | |
| D028090 | E35 | 7 | | | | | | | | | | | | 2 | | | | | 0°5'21.7" | A, AS | | |
| D028091 | E36 | 8 | | | | | | 72 | | | | | | 2 | | | | | 28°13'56.4" | A, AS | 9 | |
| D028094 | E36 | 5 | | 1 | | | | | | | | | | 2 | | | | | 35°14'19.3" | A, AS | | |
| D028095 | E37 | 3 | | | | | | | | | | | | 2 | | | | | 46°4'28.7" | A, AS | | |
| D028100 | E37 | 6 | 1 | | | | | | | | | | | 2 | | | | | 15°7'29.3" | A, AS | | |
| D028107 | E38 | 5 | | | | | | | 67 | | | | | 2 | | | | | 1°4'25.7" | | | |
| CUMULATIVE TOTAL | | | 4 | 1 | 3 | 171 | 0 | 549 | 301 | 0 | 0 | 0 | 0 | 68 | 36 | 27 | 27 | 79 | | | | |

NOTE:

1. Steel pipe culvert minimum wall thickness is the larger of 0.064" or the thickness required by the fill height table. See sheet E.68 for fill height table
2. Aluminized steel pipe culvert minimum wall thickness is the larger of 0.06" or the thickness required by the fill height table (steel). See sheet E.68 for fill height table
3. See sheet E.69 for concrete fill height table
4. Plastic pipe is not allowed when final installation is exposed. Furnish metal end sections for all plastic pipe including those specified with bevels. See sheet E.70 for acceptable cell class.
5. See sheet E.59 for ODOT "G-2" inlets.
6. See sheet E.75 for ODOT "D" inlets.
7. See sheet E.60 for pipe culvert bedding
8. See sheet E.64 for placed riprap at culvert outlets
9. See sheet E.62 for paved sloped ends for metal pipe.
10. See sheet E.65 for paved sloped ends for concrete pipe.
11. See sheet E.63 for riprap headwall at outlet

Allowable Pipe Material

| | |
|---|---|
| A | Aluminum |
| AS | Aluminized steel |
| C | Concrete |
| GS | Galvanized steel |
| P | Plastic |
| HDPE | High Density Poly Ethylene |
| DIP | Ductile Iron Pipe |
| (blank) | Any appropriate material |
| x/__ | Any appropriate material except __ |

8/2021

Note: The quantities shown hereon are approximate and are subject to field adjustments.

# TABULATION OF DRAINAGE QUANTITIES

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.3 |

J. Field

6/2021 Checked by:

YH,PD

Designed by:

| PAY ITEM NUMBER | | | 20301 -1200 | 20301 -1400 | 20301 -2000 | 20310 -1000 | 20425 -1000 | 20702 -0100 | 25101 -0100 | 25101 -0200 | 25101 -0300 | 25101 -0400 | 30302 -1000 | 60102 -0000 | 60103 -0580 | 60201 -0400 | 60201 -0600 | 60201 -0800 | 60201 -0900 | 60201 -1000 | 60201 -1200 | 60201 -2000 | 60210 -0600 | 60210 -0800 | 60210 -0900 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Culvert ID | SHEET NO. | ESTIMATED MAXIMUM COVER | REMOVAL OF HEADWALL | REMOVAL OF INLET | REMOVAL OF PIPE END SECTION | PLUG, EXISTING PIPE | DITCH, EXCAVATION (REGRADING) | GEOTEXTILE FILTER, CLASS 1, TYPE A (NONWOVEN) | PLACED RIPRAP, METHOD A, CLASS 1 | PLACED RIPRAP, METHOD A, CLASS 2 | PLACED RIPRAP, METHOD A, CLASS 3 | PLACED RIPRAP, METHOD A, CLASS 4 | DITCH RECONDITIONING | CONCRETE (PAVED END SLOPE) | CONCRETE, HEADWALL FOR DOUBLE 18-INCH PIPE CULVERT | 12-INCH PIPE CULVERT | 18-INCH PIPE CULVERT | 24-INCH PIPE CULVERT | 30-INCH PIPE CULVERT | 36-INCH PIPE CULVERT | 48-INCH PIPE CULVERT | 96-INCH PIPE CULVERT | END SECTION FOR 18-INCH PIPE CULVERT | END SECTION FOR 24-INCH PIPE CULVERT | END SECTION FOR 30-INCH PIPE CULVERT | REMARKS See below for numbered notes | DESIGNER NOTES |
| | 0 | FEET | EACH | EACH | EACH | EACH | LNFT | SQYD | CUYD | CUYD | CUYD | CUYD | LNFT | SQYD | EACH | LNFT | LNFT | LNFT | LNFT | LNFT | LNFT | LNFT | EACH | EACH | EACH | | |
| PREVIOUS SHEET: | | 153 | | 2 | | 1 | 30 | 323 | 100 | | 24 | 10 | 260 | 178 | | 20 | 429 | 317 | 354 | 182 | | 191 | 2 | 1 | 2 | | |
| D028108 | E39 | 1 | | | | | | | | | | | | | | | 10 | | | | | | | | | 7 | |
| D028109 | E40 | 4 | | | | | | 12 | 3 | | | | | 5 | | | | | | 50 | | | | | | 6, 7, 8 | |
| D028124 | E40 | 2 | | | | 1 | | | | | | | | | | | | | | | | | | | | | |
| D028127 | E41 | 1 | | | | | | 7 | 4 | | | | | 5 | | | 49 | | | | | | | | | 7, 8 | |
| D028128 | E42 | | | | | | | 21 | 8 | | | | | | | | | | 48 | | | | | | 2 | 7, 8 | |
| D028130 | E42 | 3 | | | 2 | | | 8 | 19 | | | | | | | | | | 20 | | | | | | 2 | 7, 8 | |
| D028131 | E43 | 3 | | | | | | 26 | 11 | | | | | | | | | | 49 | | | | | | 2 | 8 | |
| D028132 | E44 | 10 | 1 | | | | | 21 | 10 | | | | | 16 | 1 | | | | | | 97 | | | | | 7, 8 | |
| D028137 | E45 | 22 | | | | | | 42 | 6 | | | | | | | | | | | | | | | | | 8 | |
| D028139 | E45 | 7 | | | | | | 12 | 2 | | | | | | | | | | | | | | 2 | | | 8 | |
| D028142 | E46 | 8 | | | 2 | | | | | | | | 30 | | | | | | | | | | | | 2 | | |
| D028158 | E47 | 3 | | | | | | 16 | 6 | | | | | | | | | | 52 | | | | | | | 6, 7, 8 | |
| D028159 | E48 | 6 | | | | | | 24 | 9 | | | | | | | | | | | 20 | | | | | | 7, 8 | |
| D028160 | E49 | 9 | | | | | | 20 | 3 | | | 7 | | | | | | | | | | | | | | 8 | |
| D028161 | E50 | 28 | | | | | | | | | | | | | | | | | 10 | | | | | | | | |
| D028163 | E51 | 4 | | | | | | | | | | | | | | | | 10 | | | | | | | | 7, 8 | |
| D028186 | E52 | 4 | | | | | | | | | | | | | | | | 20 | | | | | | | | 7 | |
| D028188 | E53 | 11 | | | | | | | | | | | 80 | | | | | | | | | | | | | | |
| D028238 | E56 | 13 | | | | | | 213 | 12 | | | | | | | | | | | | | | | | | 8 | |
| D028273 | E58 | 12 | | | | | | 24 | | 3 | | | | 14 | | | | 36 | | | | | | | | 7, 8 | |
| PROJECT TOTAL | | | 1 | 2 | 4 | 2 | 30 | 769 | 193 | 3 | 24 | 17 | 370 | 218 | 1 | 20 | 488 | 383 | 533 | 252 | 97 | 191 | 4 | 1 | 10 | | |

NOTE:

1. Steel pipe culvert minimum wall thickness is the larger of 0.064" or the thickness required by the fill height table. See sheet E.68 for fill height table
2. Aluminized steel pipe culvert minimum wall thickness is the larger of 0.06" or the thickness required by the fill height table (steel). See sheet E.68 for fill height table
3. See sheet E.69 for concrete fill height table
4. Plastic pipe is not allowed when final installation is exposed. Furnish metal end sections for all plastic pipe including those specified with bevels. See sheet E.70 for acceptable cell class.
5. See sheet E.59 for ODOT "G-2" inlets.
6. See sheet E.75 for ODOT "D" inlets.
7. See sheet E.60 for pipe culvert bedding
8. See sheet E.64 for placed riprap at culvert outlets
9. See sheet E.62 for paved sloped ends for metal pipe.
10. See sheet E.65 for paved sloped ends for concrete pipe.
11. See sheet E.63 for riprap headwall at outlet

R:\USPDX100\Projects2\80498_WFLHD_IDIQ\20F000001_804982_FixItCulverts_Phi1\Hydraulics\Design

29-Aug-2022 7:53 AM

Note: The quantities shown hereon are approximate and are subject to field adjustments.

# TABULATION OF DRAINAGE QUANTITIES

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.4 |

| PAY ITEM NUMBER | | | 60403 -0000 | 60403 -0000 | 60602 -0900 | 60703 -0000 | 60706 -0000 | 60707 -0300 | 60707 -0500 | 60707 -0600 | 60707 -0700 | 60901 -2100 | 62303 -1000 | 63309 -0100 | 64703 -3010 | 64703 -6000 | 64703 -7000 | 64704 -1000 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Culvert ID | SHEET NO. | ESTIMATED MAXIMUM COVER | INLET (ODOT TYPE "G-2") | INLET(ODOT TYPE "D") | PIPE ANCHOR ASSEMBLY, 36-INCH | CLEANING CULVERTS IN PLACE | CLEANING DRAINAGE STRUCTURE | LINING 18-INCH PIPE CULVERT | LINING 24-INCH PIPE CULVERT | LINING 30-INCH PIPE CULVERT | LINING 36-INCH PIPE CULVERT | CURB, ASPHALT, 4-INCH DEPTH | SPECIAL LABOR, HIRED TECHNICAL SERVICES(MAINLINE VIDEO INSPECTION) | DELINEATOR, TYPE 1 (CULVERT ID MARKER) | MITIGATION, ROCK WEIR | MITIGATION, FISH PASSAGE BOULDER | MITIGATION, BAFFLE | MITIGATION, STREAMBED MATERIAL | SKEW ANGLE | Allowable Pipe Material (See key below) | REMARKS<br>See below for numbered notes | DESIGNER NOTES |
| | 0 | FEET | EACH | EACH | EACH | LNFT | EACH | LNFT | LNFT | LNFT | LNFT | LNFT | LPSM | EACH | EACH | EACH | EACH | CUYD | | | | |
| PREVIOUS SHEET: | | 154 | 4 | 1 | 3 | 171 | | 549 | 301 | | | | | 68 | 36 | 27 | 27 | 79 | | | | |
| D028108 | E39 | 1 | | | | | | 47 | | | | | | 2 | | | | | 0°39'51.4" | A, AS | | |
| D028109 | E40 | 4 | | 1 | | | | | | | | | | 2 | | | | | 2°49'58.8" | A, AS | 9 | |
| D028124 | E40 | 2 | | | | | | | | | | | | 2 | | | | | 31°29'50.3" | | | |
| D028127 | E41 | 1 | | | | | | | | | | | | 2 | | | | | 5°3'21.5" | C | 10 | |
| D028128 | E42 | | | | | | | | | | | | | 2 | | | | | 4°46'42.1" | DIP | | |
| D028130 | E42 | 3 | | | | | | | | 50 | | | | 2 | | | | | 4°13'52.2" | A, AS | | |
| D028131 | E43 | 3 | | | | | | | | | | | | 2 | | | | | 4°43'51.6" | A, AS | | |
| D028132 | E44 | 10 | | | | | | | | | | | | 2 | | | | | 8°5'14.8" | C | 10 | |
| D028137 | E45 | 22 | | | | | | | 99 | | | | | 2 | | | | | 0°33'17.5" | | | |
| D028139 | E45 | 7 | | | | | | 69 | | | | | | 2 | | | | | 5°38'13.3" | | | |
| D028142 | E46 | 8 | | | | | | | | 108 | | | X | 2 | | | | | 37°35'54.3" | | | |
| D028158 | E47 | 3 | | 1 | | | | | | | | | | 2 | | | | | 18°39'47.8" | A, AS | | |
| D028159 | E48 | 6 | | | | | | | | | | | | 2 | | | | | 29°46'30.1" | C | | |
| D028160 | E49 | 9 | | | | | | | 85 | | | | | 2 | | | | 3 | 20°0'26.7" | | 10 | |
| D028161 | E50 | 28 | | | | | | | | 114 | | | | 2 | | | | | 11°25'49.1" | C | | |
| D028163 | E51 | 4 | | | | 160 | | | | | | | | 2 | | | | 1 | | A, AS | 9 | |
| D028186 | E52 | 4 | | | | | | | | | | | | 2 | | | | | 7°0'57" | A, AS | | |
| D028188 | E53 | 11 | | | | | 1 | | 98 | | | 60 | X | 2 | | | | | 13°5'52.4" | | | |
| D028238 | E56 | 13 | | | | | | | | | 164 | | X | 2 | | | | | 4°19'34.7" | | | |
| D028273 | E58 | 12 | | | | | | | | | | | | 2 | | | | | 2°45'59.9" | C | 10 | |
| PROJECT TOTAL | | | 4 | 3 | 3 | 331 | 1 | 665 | 583 | 272 | 164 | 60 | All | 108 | 36 | 27 | 27 | 83 | | | | |

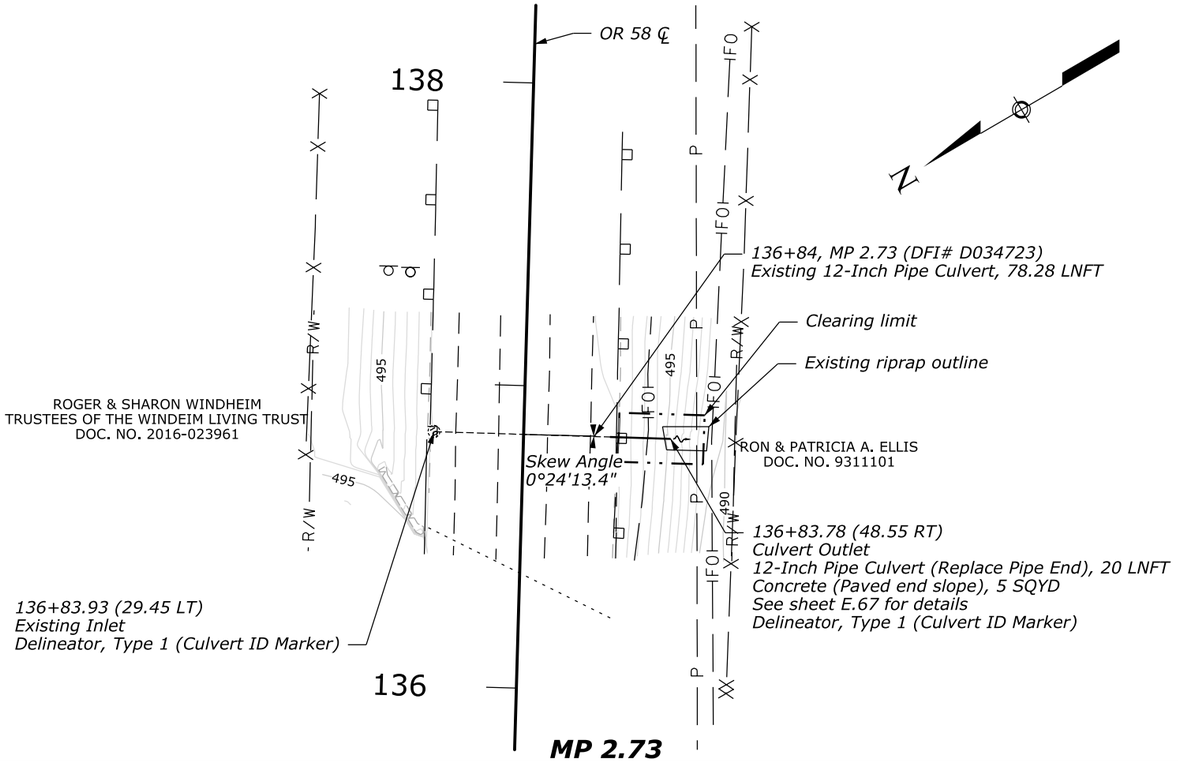
NOTE:

1. Steel pipe culvert minimum wall thickness is the larger of 0.064" or the thickness required by the fill height table. See sheet E.68 for fill height table
2. Aluminized steel pipe culvert minimum wall thickness is the larger of 0.06" or the thickness required by the fill height table (steel). See sheet E.68 for fill height table
3. See sheet E.69 for concrete fill height table
4. Plastic pipe is not allowed when final installation is exposed. Furnish metal end sections for all plastic pipe including those specified with bevels. See sheet E.70 for acceptable cell class.
5. See sheet E.59 for ODOT "G-2" inlets.
6. See sheet E.75 for ODOT "D" inlets.
7. See sheet E.60 for pipe culvert bedding
8. See sheet E.64 for placed riprap at culvert outlets
9. See sheet E.62 for paved sloped ends for metal pipe.
10. See sheet E.65 for paved sloped ends for concrete pipe.
11. See sheet E.63 for riprap headwall at outlet

Allowable Pipe Material

| | |
|---|---|
| A | Aluminum |
| AS | Aluminized steel |
| C | Concrete |
| GS | Galvanized steel |
| P | Plastic |
| HDPE | High Density Poly Ethylene |
| DIP | Ductile Iron Pipe |
| (blank) | Any appropriate material |
| x/ | Any appropriate material except |

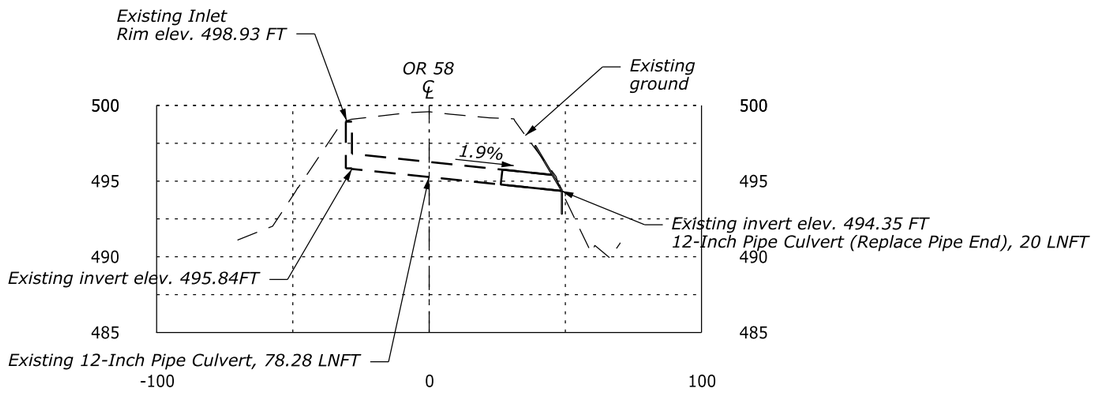
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.7 |




**MP 2.73**

Scale in feet

25 12.5 0 25 50 75




**MP 2.73**

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**136+84, MP 2.73 (DFI# D034723)**
**CULVERT**
**PLAN AND PROFILE**

Designed by: Checked by:

3/10/2022 12:52:14 PM C:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802E07.dgn

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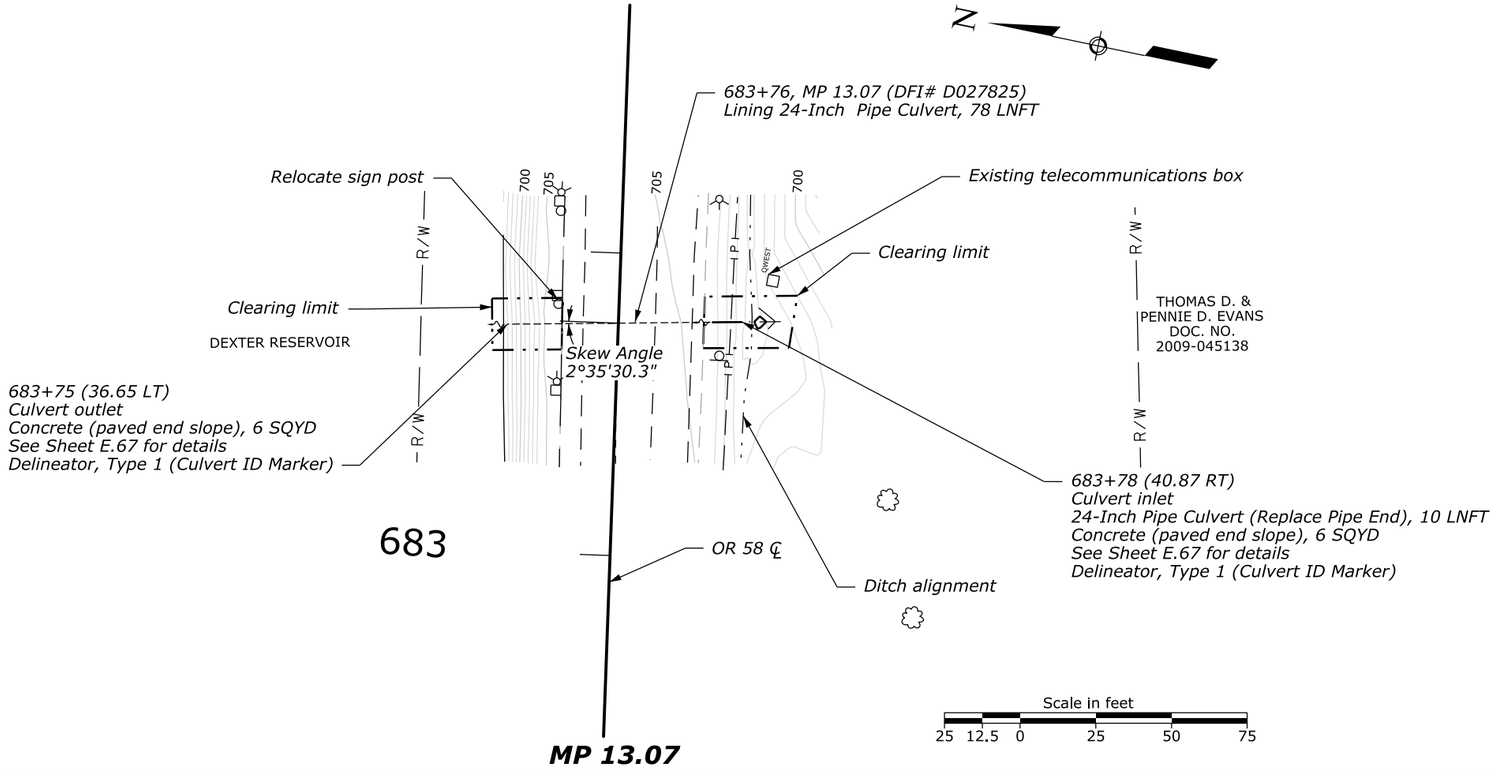
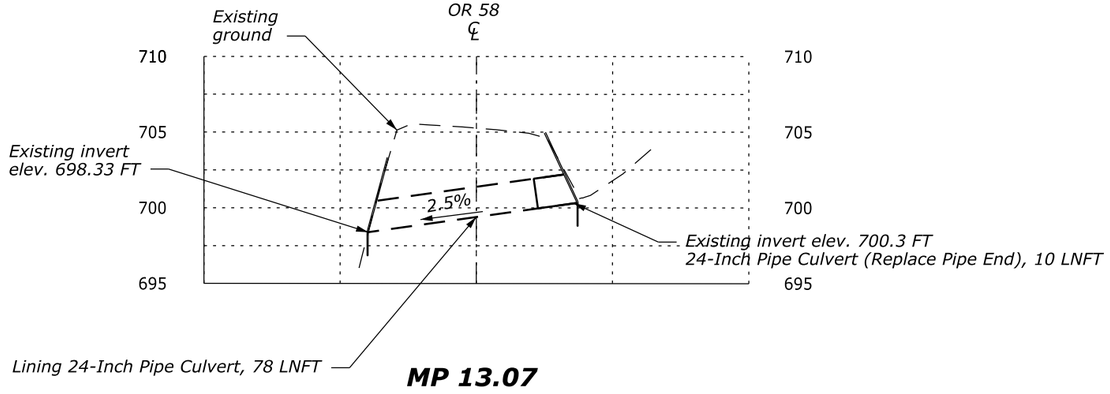



**NOTE:**
*Underground communications line exists in the vicinity of this culvert. Protect and support exst. line as needed during construction*

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98999PE
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OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**683+76, MP 13.07 (DFI# D027825)**
**CULVERT**
**PLAN AND PROFILES**

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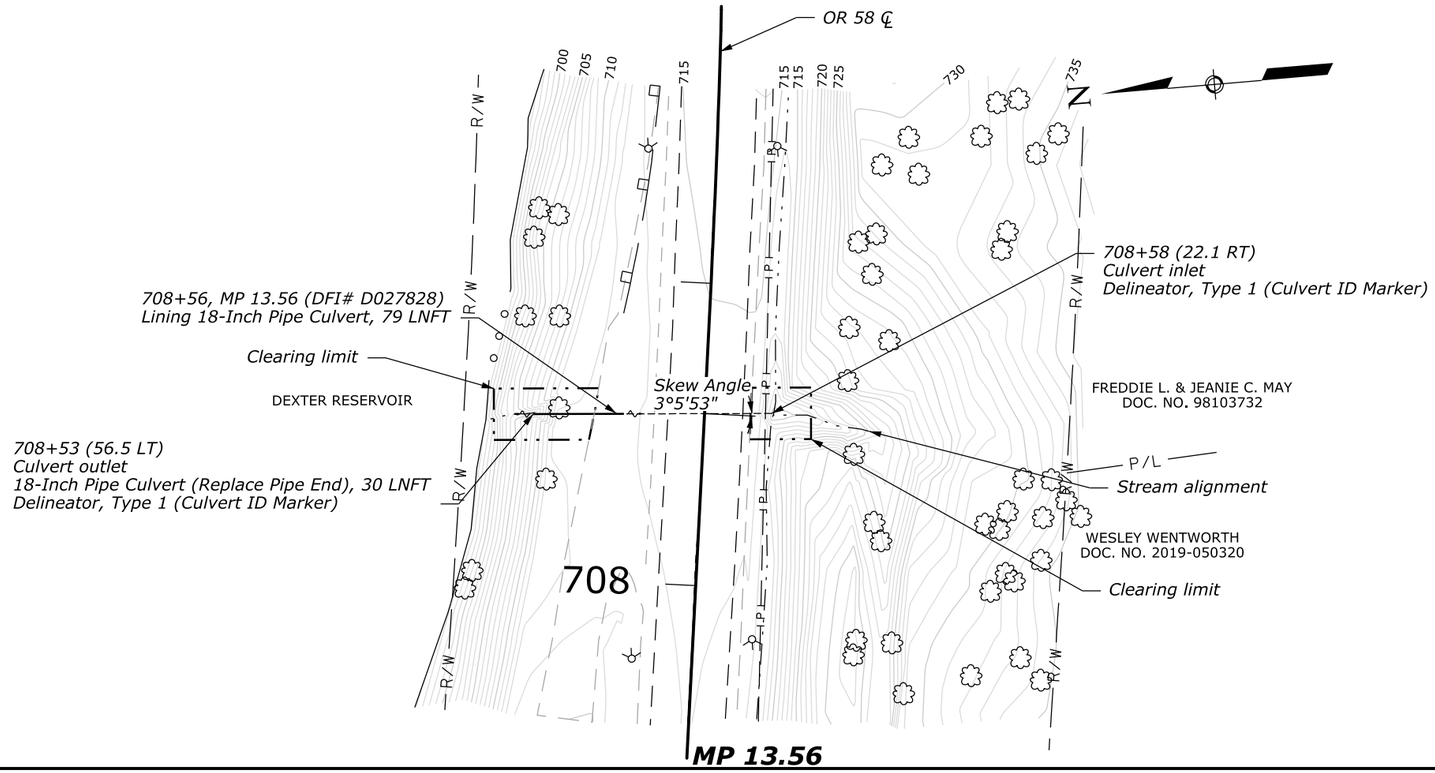


**NOTE:**
*Underground communications line exists in the vicinity of this culvert. Protect and support exst. line as needed during construction*

Scale in feet
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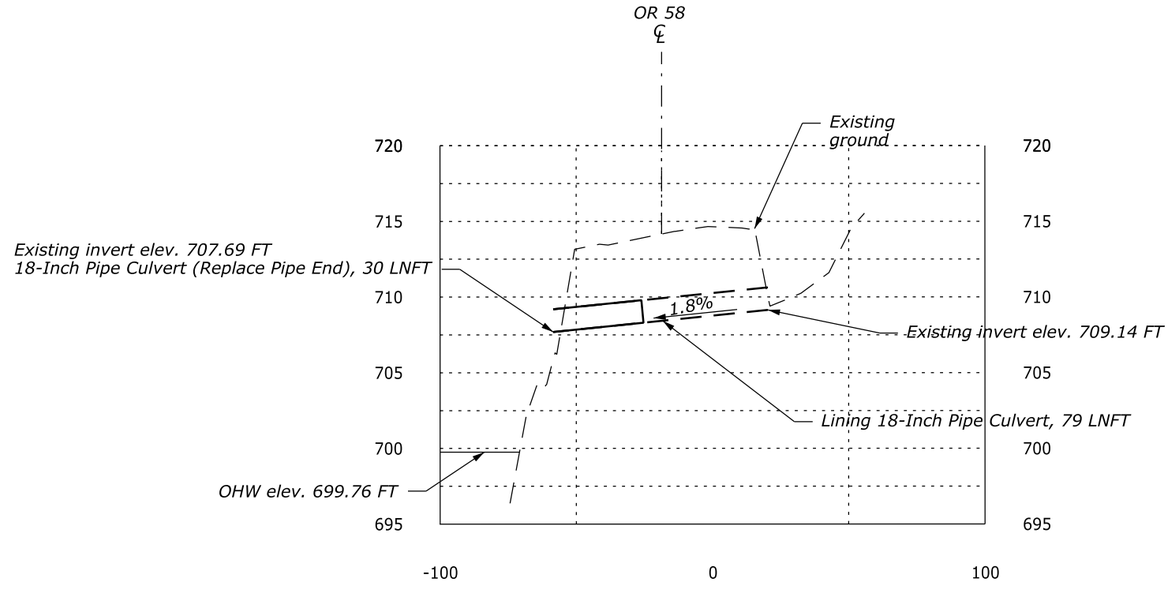


REGISTERED PROFESSIONAL ENGINEER
98999PE
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OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**708+56, MP 13.56 (DFI# D027828)**
**CULVERT**
**PLAN AND PROFILES**

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| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
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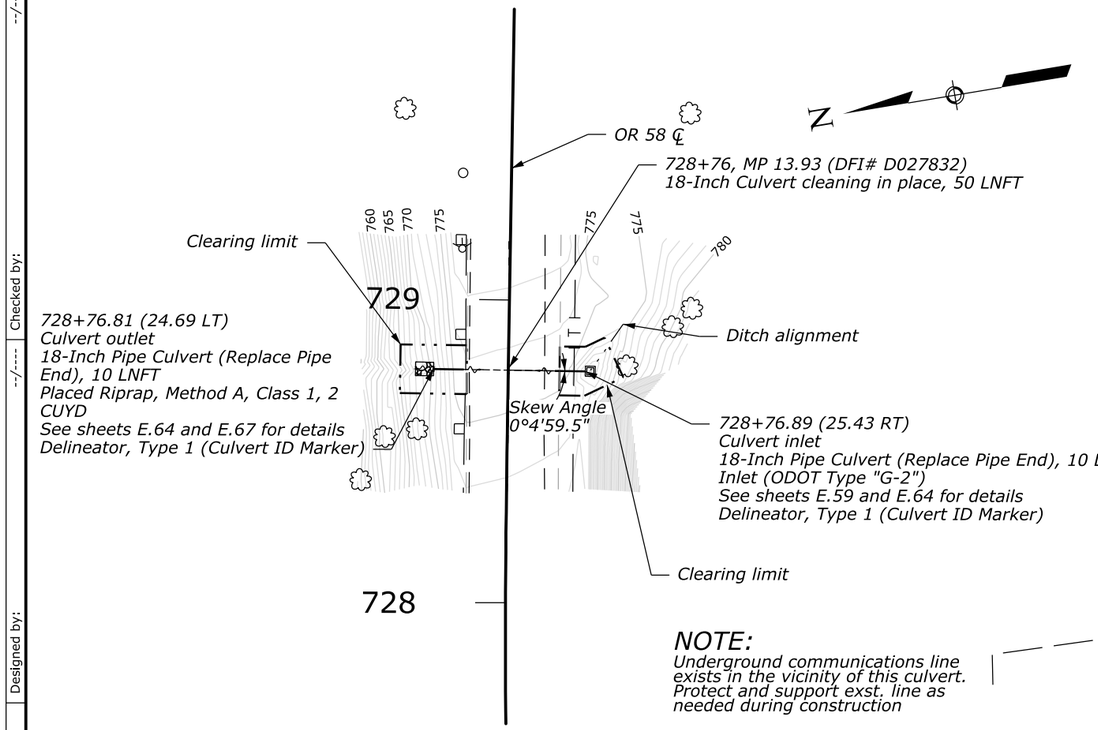


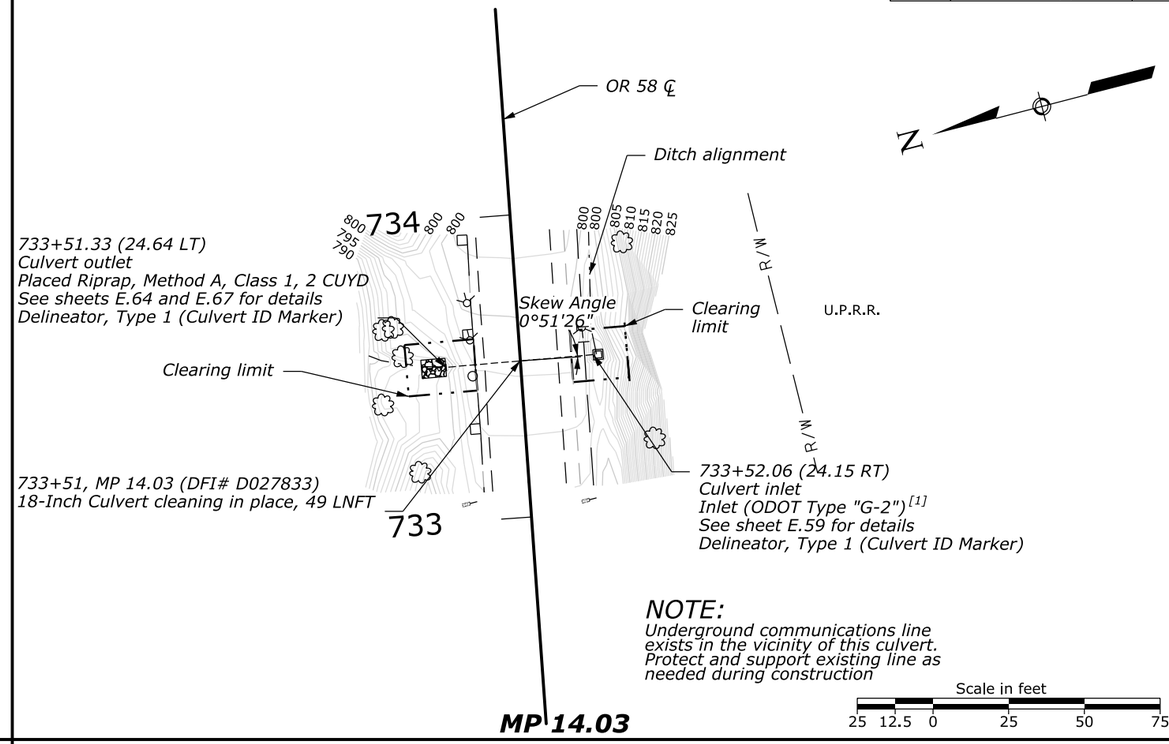


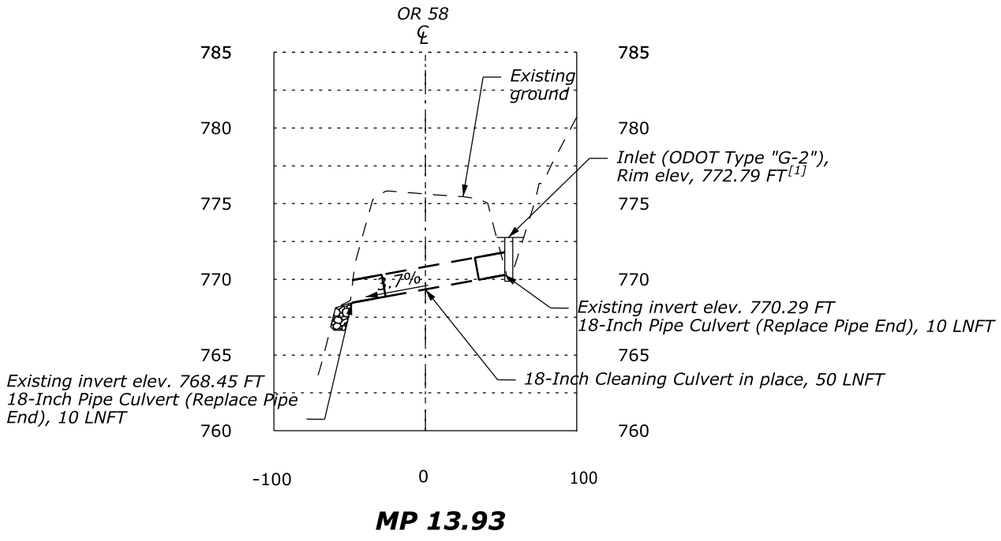


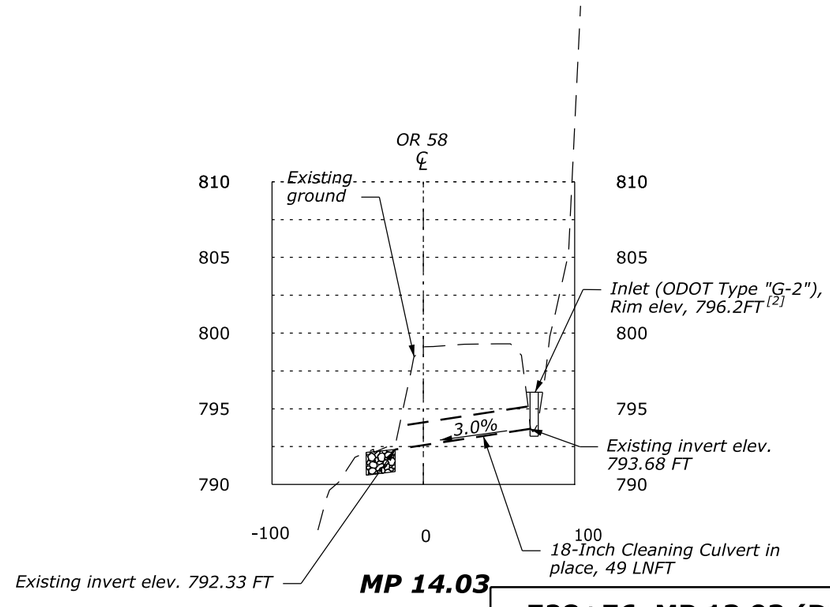


REGISTERED PROFESSIONAL ENGINEER
98999PE
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OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

FOOTNOTE:
[1] Select borrow to fill the gap between inlet and existing ground upto the inlet rim.

FOOTNOTE:
[1] Trim the inlet of pipe before connecting the inlet structure.
[2] Select borrow to fill the gap between inlet and existing ground upto the inlet rim.

**728+76, MP 13.93 (DFI# D027832) & 733+51, MP 14.03 DFI# D027833)**
**CULVERT**
**PLAN AND PROFILE**

Designed by: -/---- Checked by: -/----
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| STATE | PROJECT | SHEET NUMBER |
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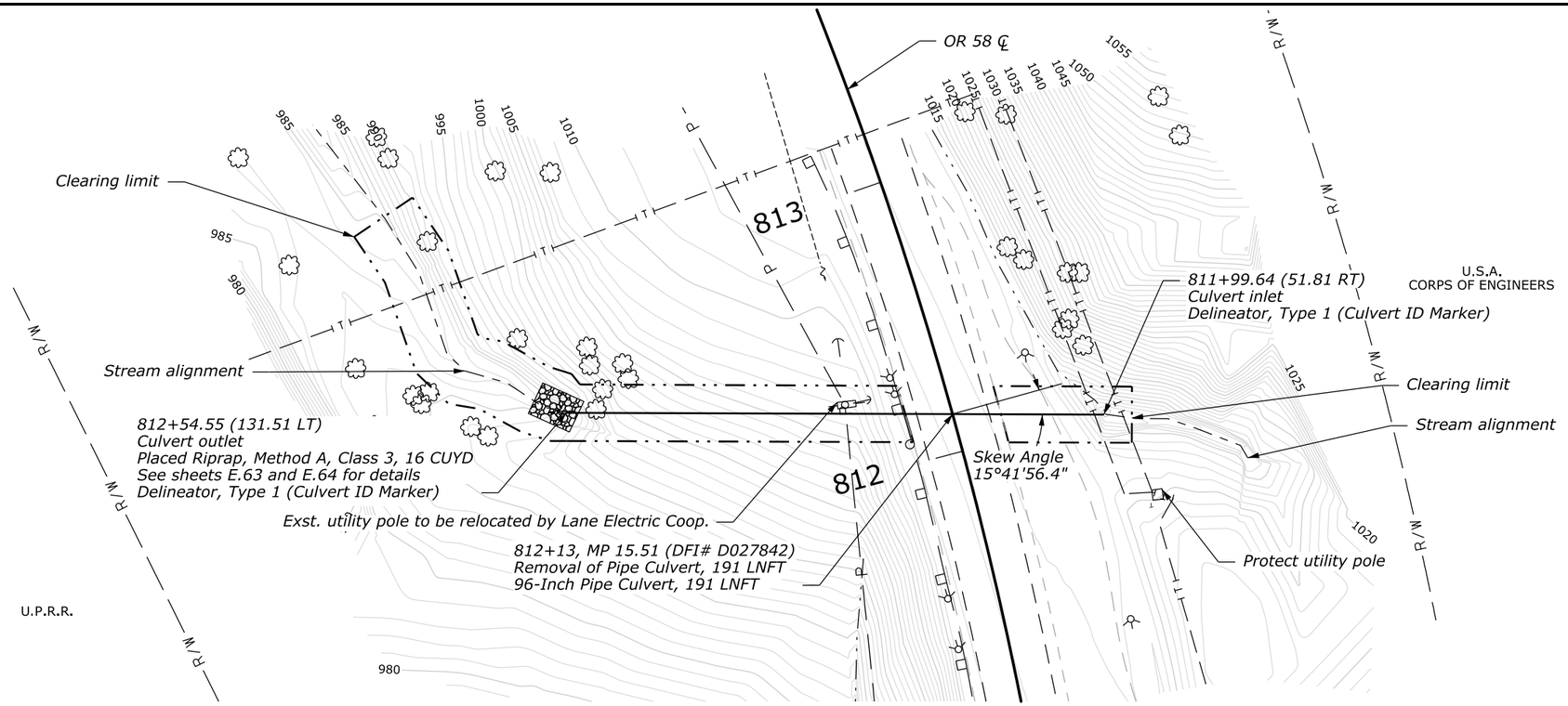


**MP 15.51**

N

**NOTE:**
*Underground communications line exists in the vicinity of this culvert. Protect and support exst. line as needed during construction*

Scale in feet
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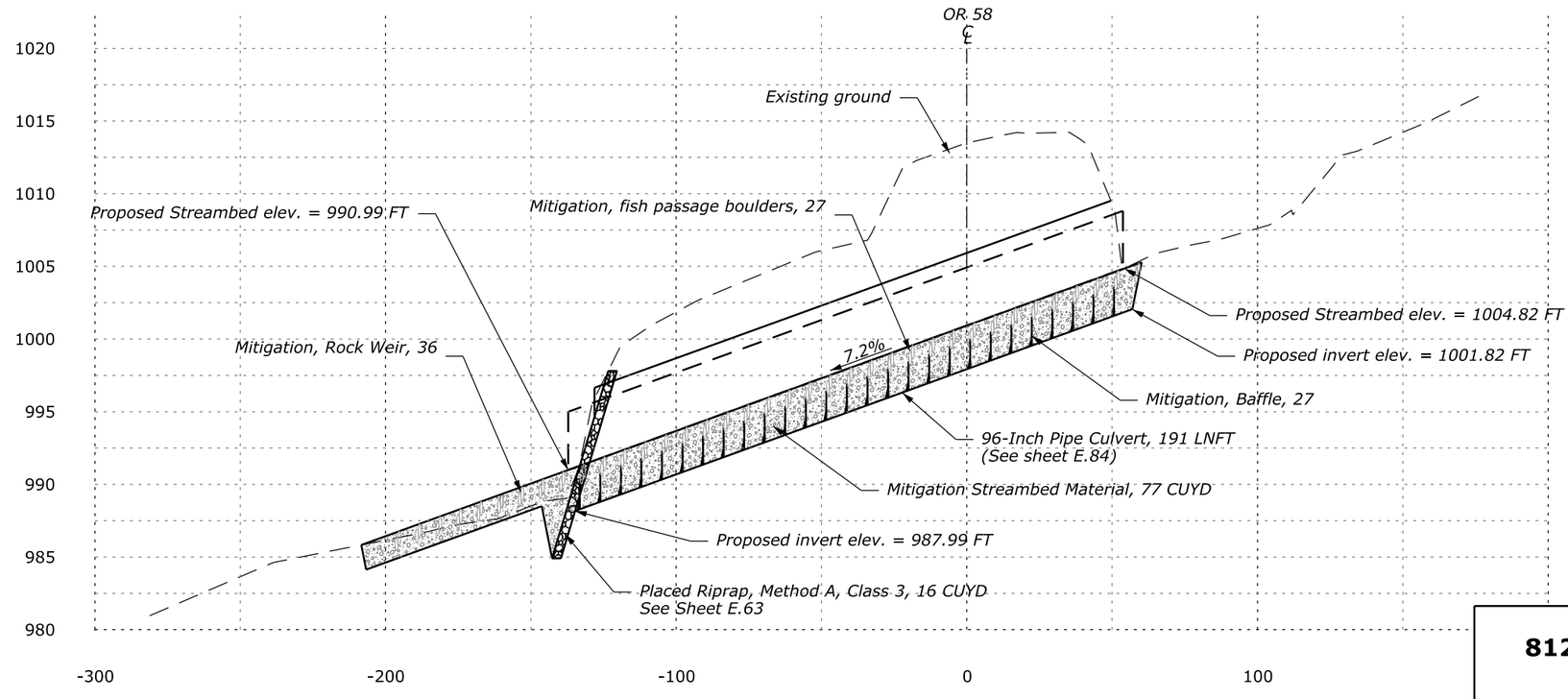


**MP 15.51**

**NOTE:**
*Mitigation details on E.84, E.85, and E.86.*

REGISTERED PROFESSIONAL ENGINEER
98999PE
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OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**812+13, MP 15.51 (DFI# D027842)**
**AOP CULVERT**
**PLAN AND PROFILE**

Designed by: -/---- Checked by: -/----

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| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
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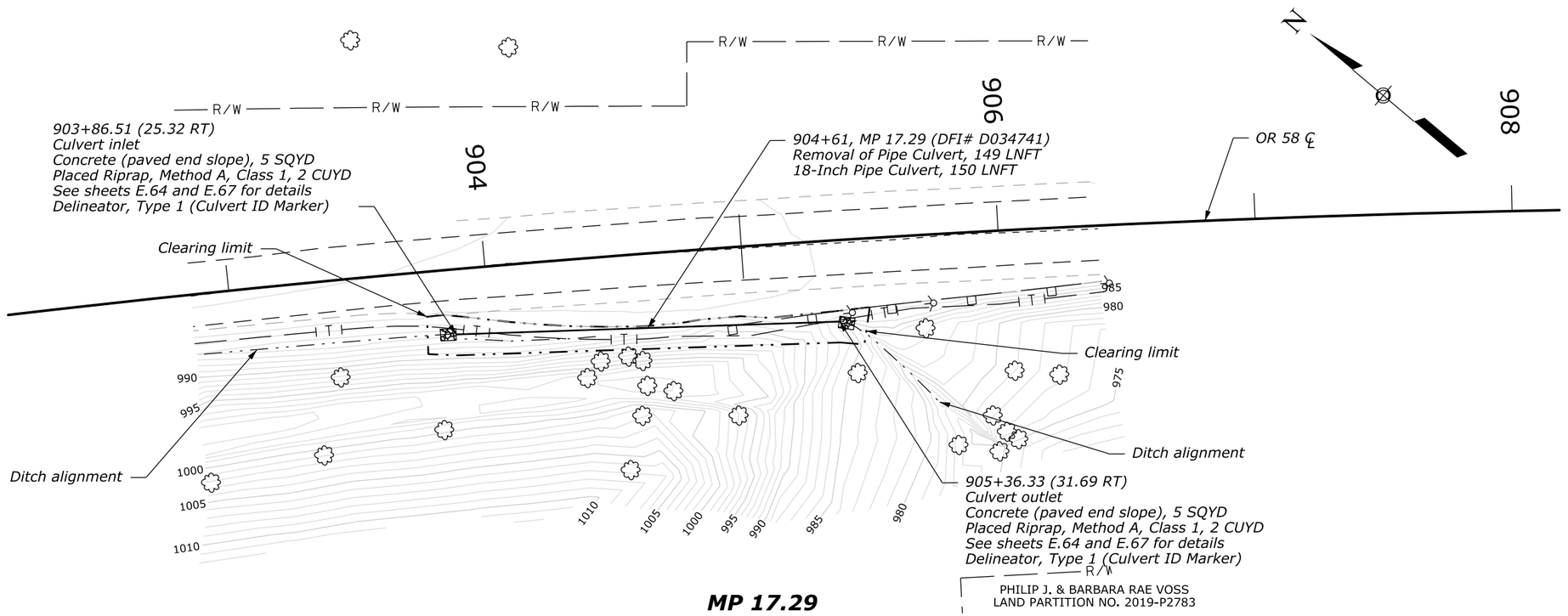
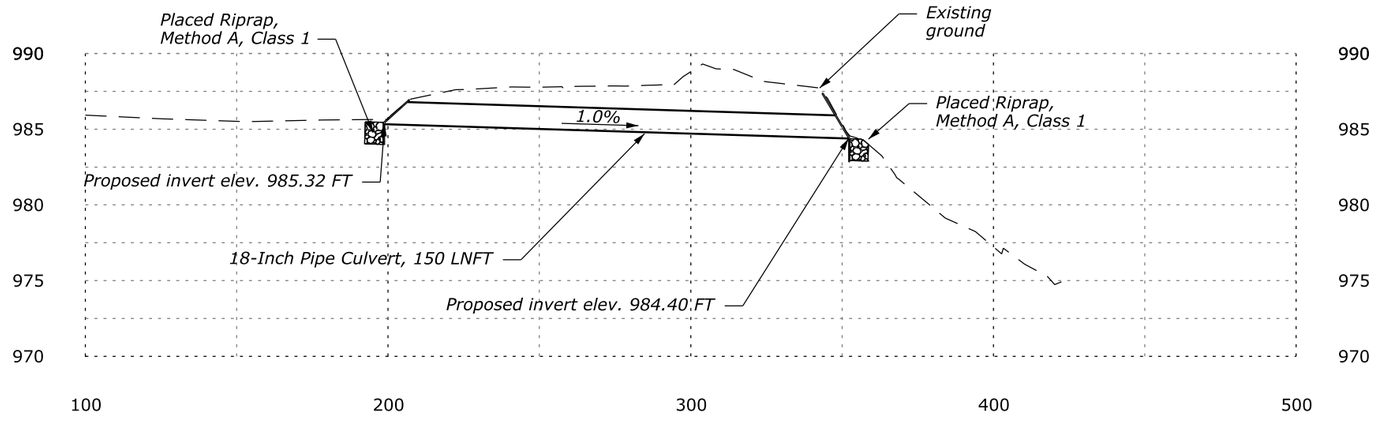



**MP 17.29**




**MP 17.29**

REGISTERED PROFESSIONAL ENGINEER
98999PE
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OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

# 904+61, MP 17.29 (DFI# D034741)
# CULVERT
# PLAN AND PROFILE

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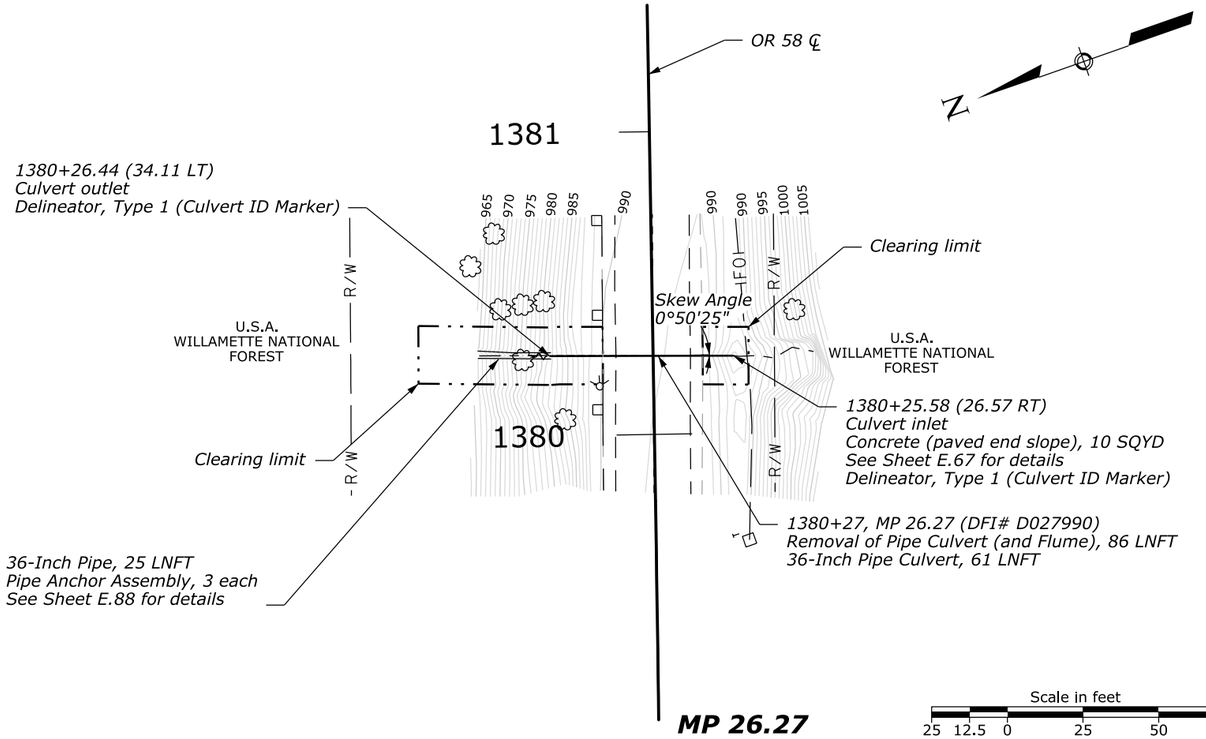


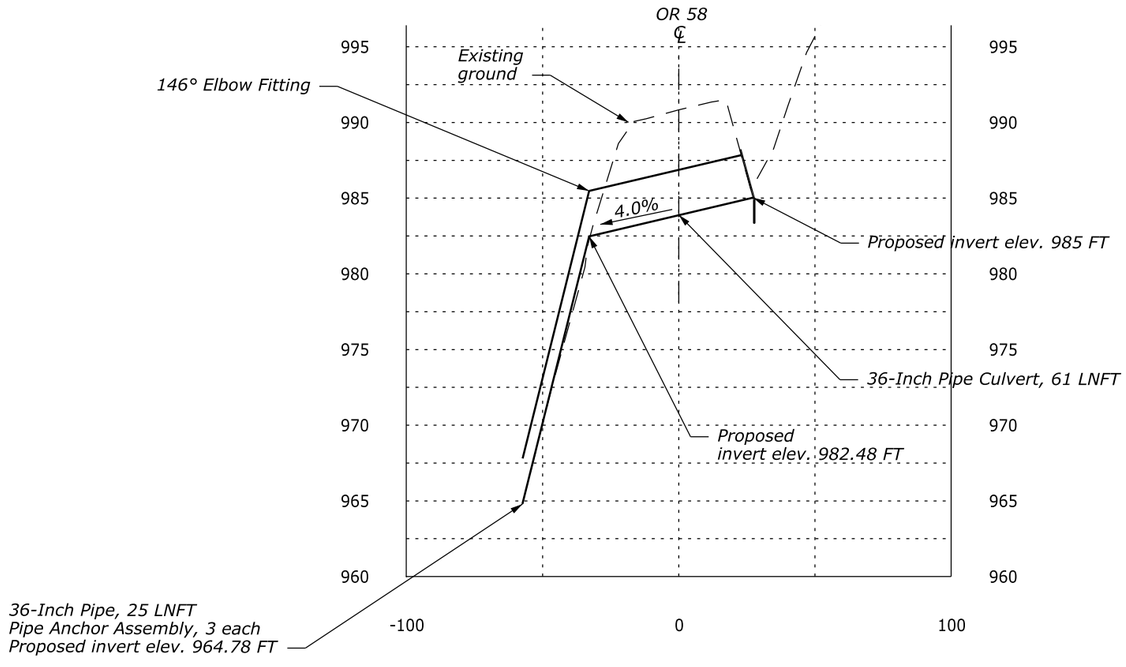


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98999PE
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OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**1380+27, MP 26.27 (DFI# D027990)**
**CULVERT**
**PLAN AND PROFILE**

Designed by: --/---- Checked by: --/----

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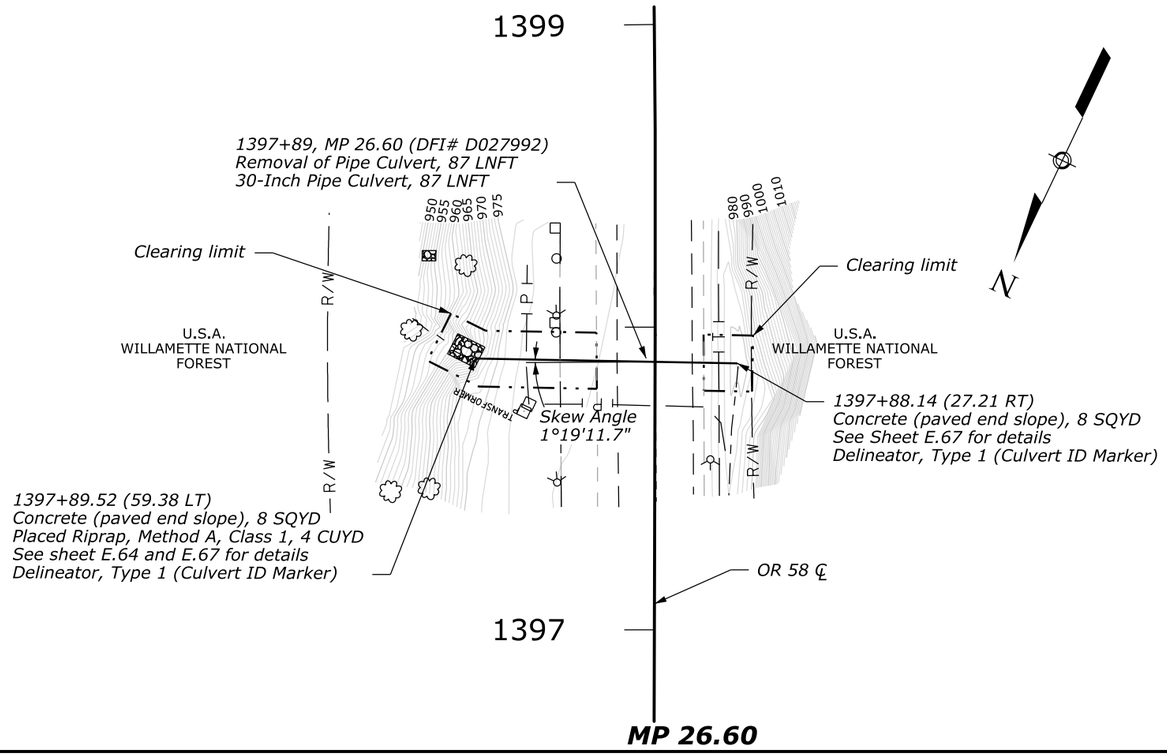


Scale in feet
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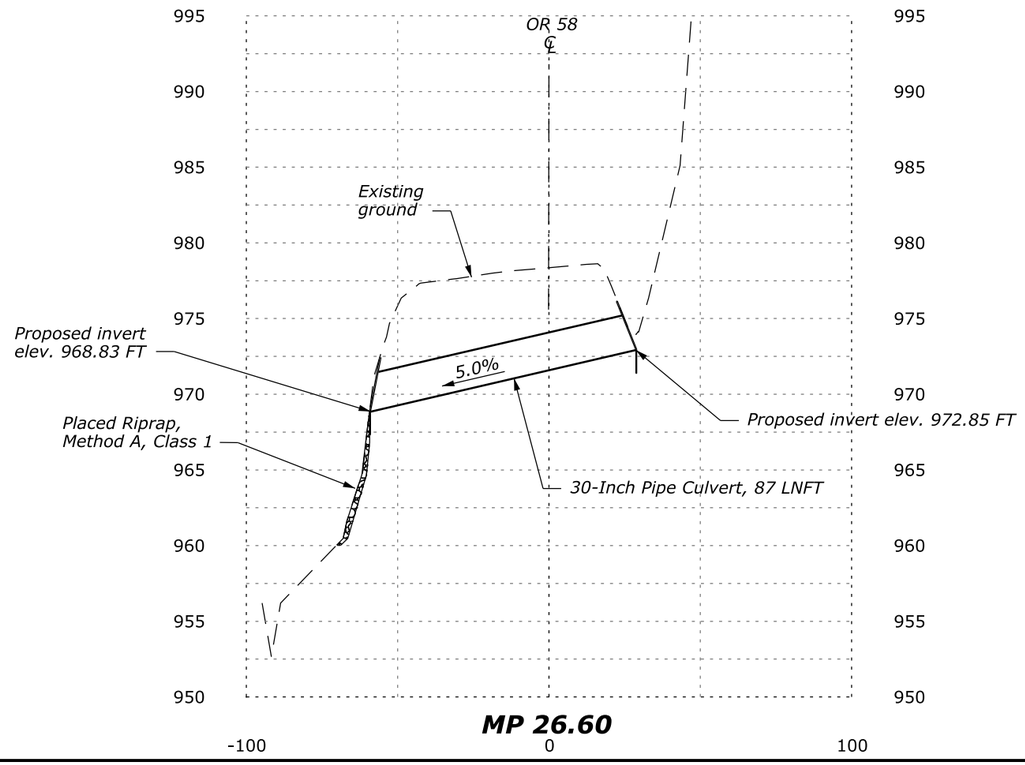


REGISTERED PROFESSIONAL ENGINEER
98999PE
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OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**1397+89, MP 26.60 DFI# D027992)**
**CULVERT**
**PLAN AND PROFILE**

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| STATE | PROJECT | SHEET NUMBER |
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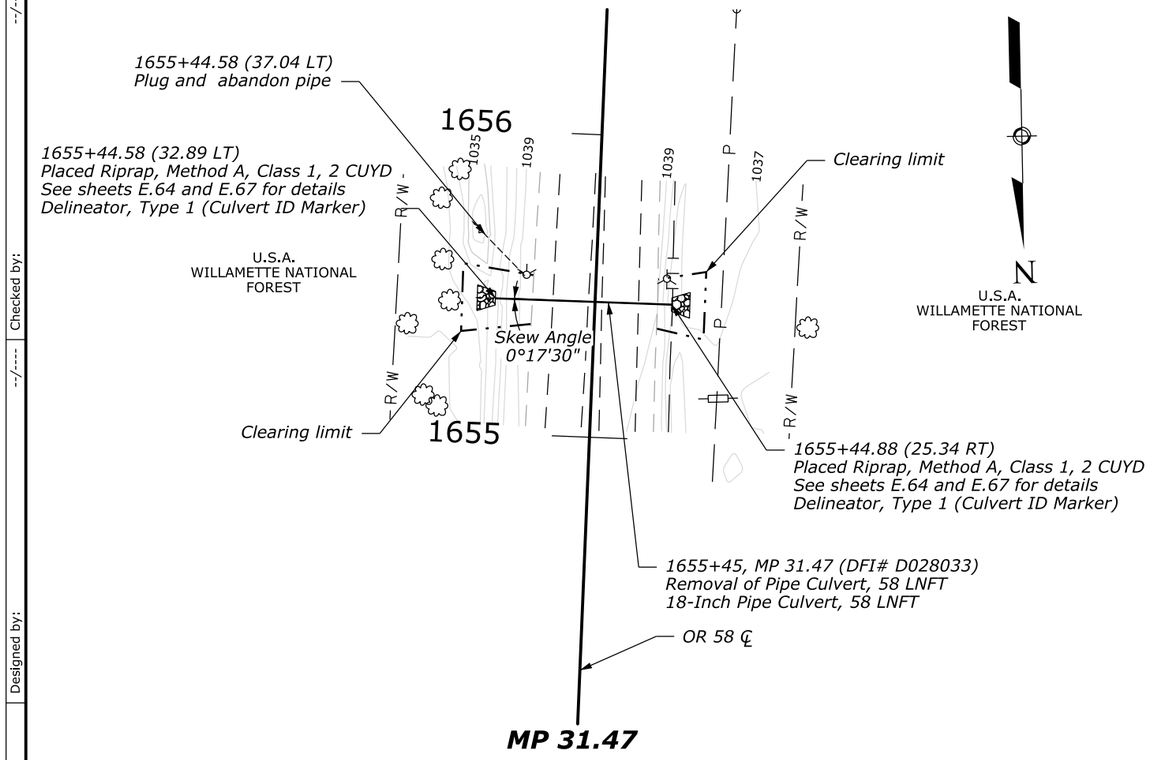


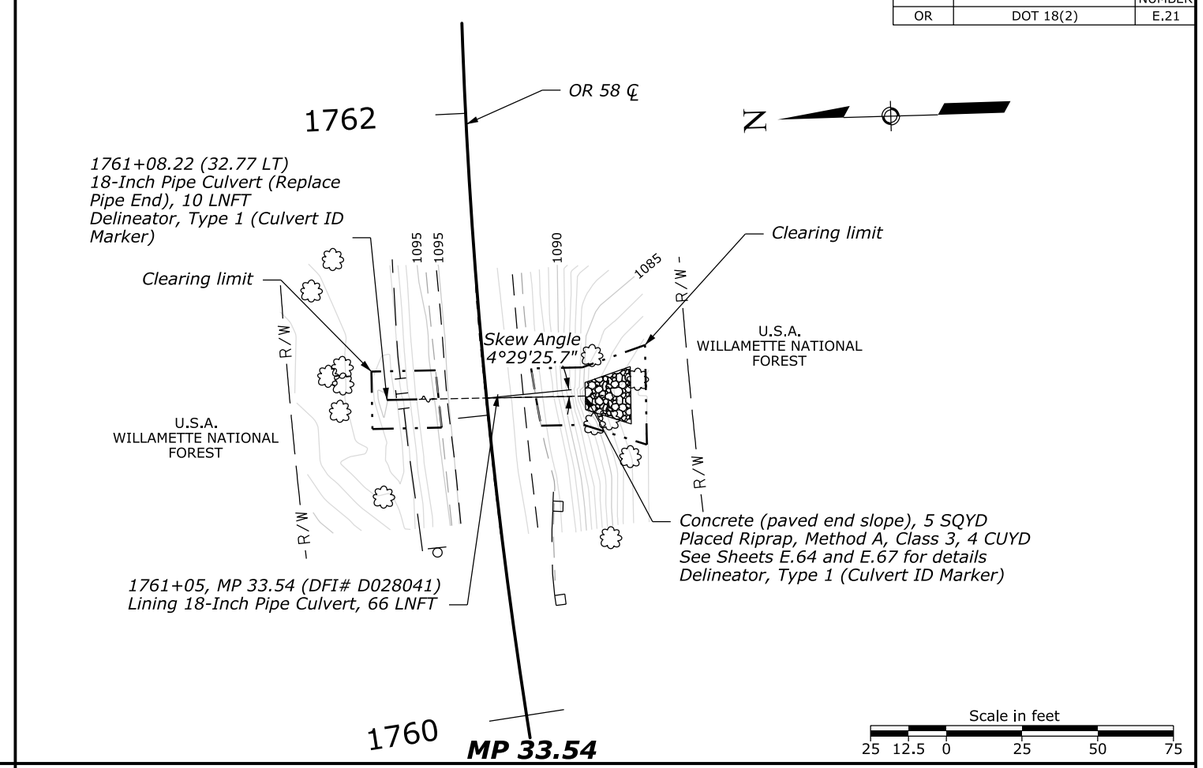


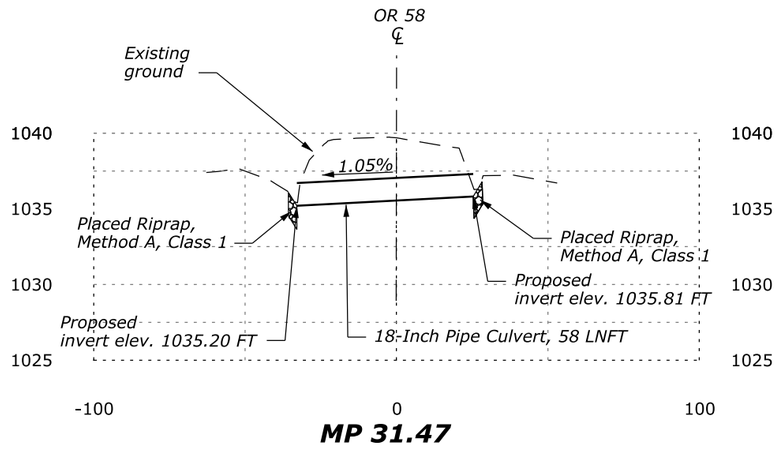


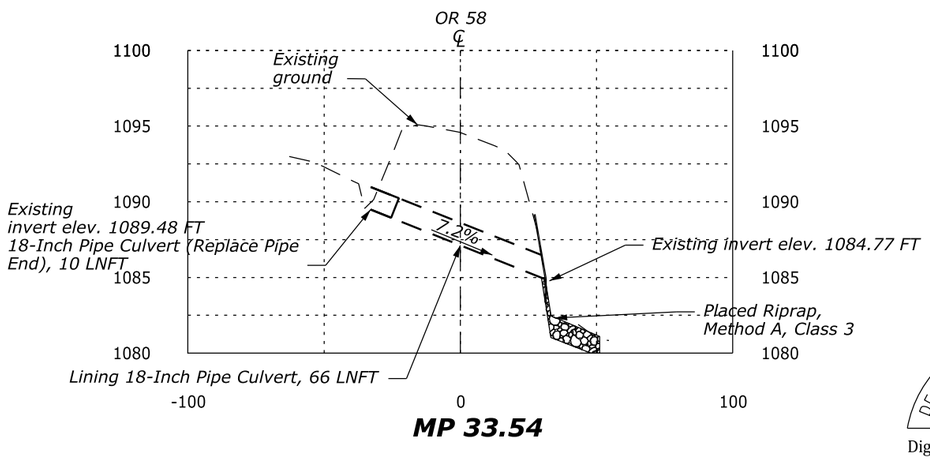


REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**1655+45, MP 31.47 DFI# D028033) &**
**1761+05, MP 33.54 (DFI# D028041)**
**CULVERT**
**PLAN AND PROFILE**

Designed by: -/---- Checked by: -/----

| STATE | PROJECT | SHEET NUMBER |
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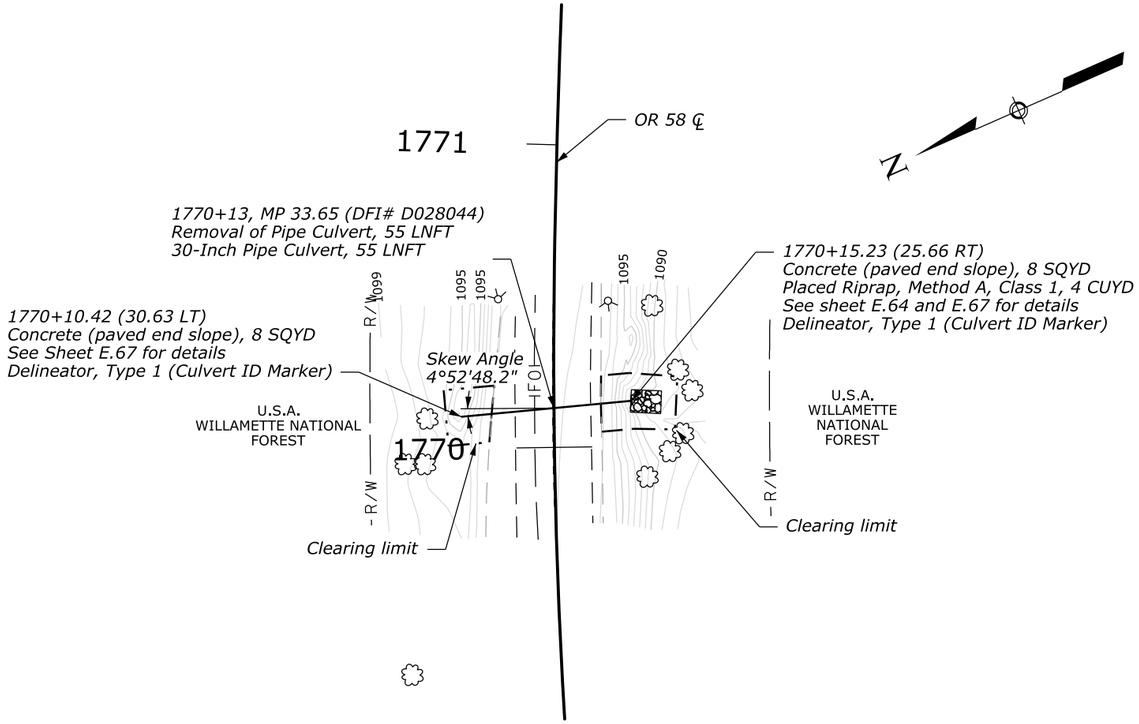
| OR | DOT 18(2) | E.23 |







Scale in feet

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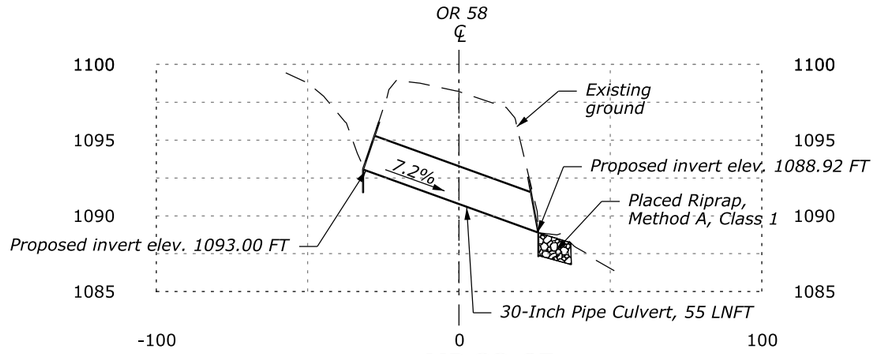
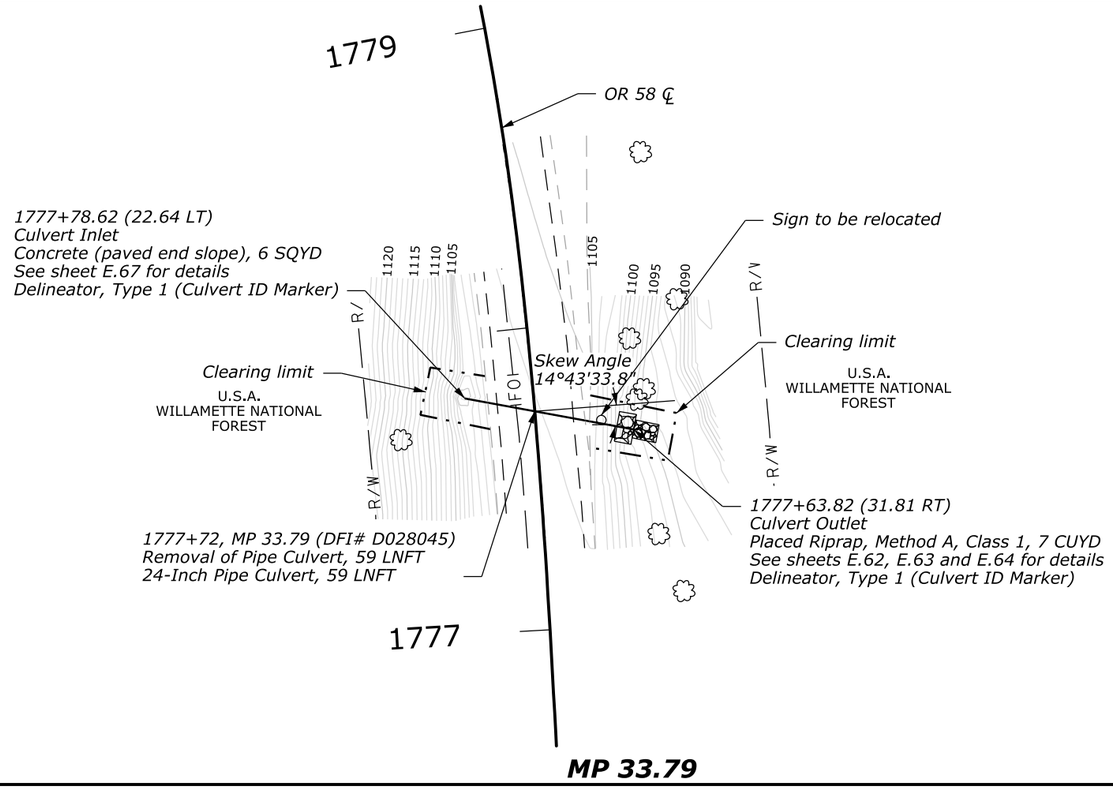



REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

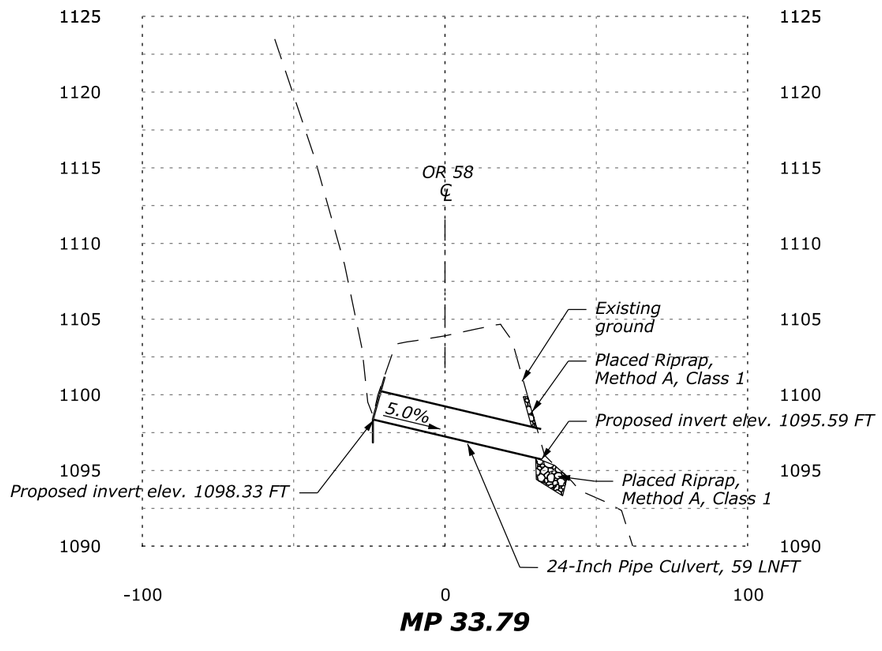
**1770+13, MP 33.65 (DFI# D028044)**
**CULVERT**
**PLAN AND PROFILE**

Designed by: --/---
Checked by: --/---
3/21/2022 6:45:52 AM C:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802E23.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.24 |




**MP 33.79**




**MP 33.79**

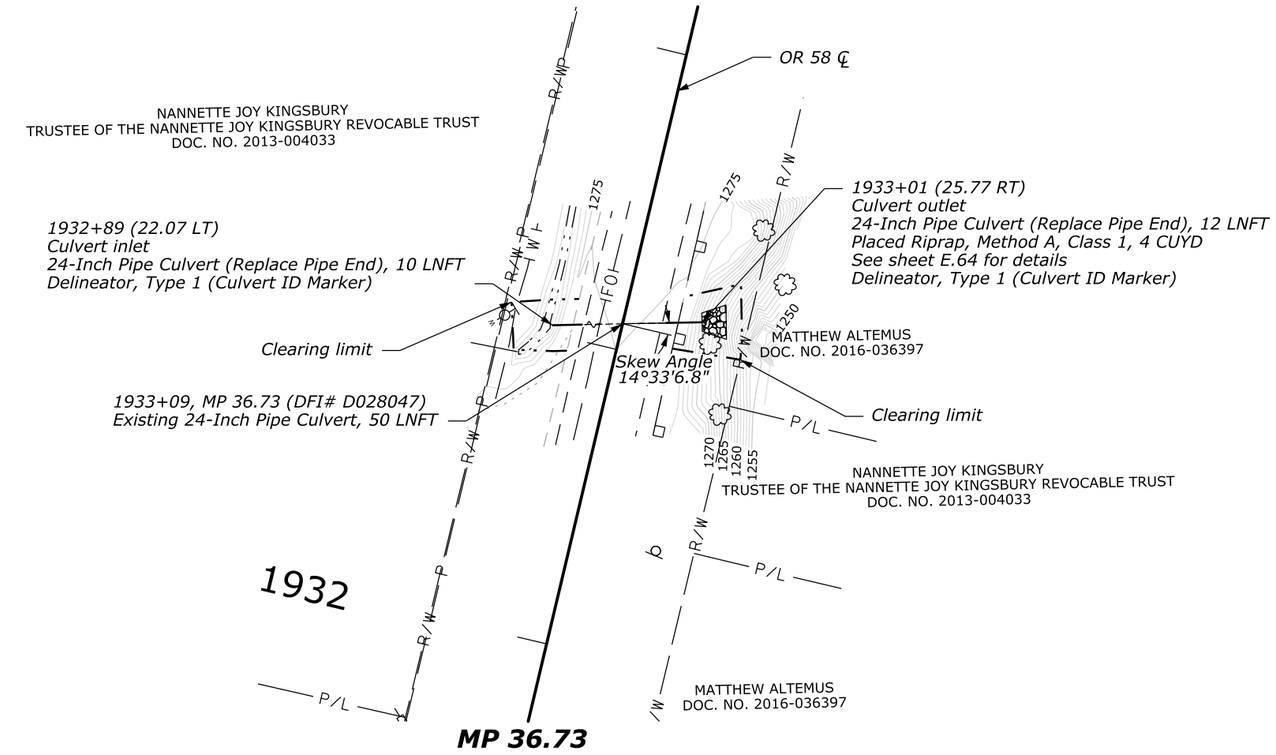
Scale in feet

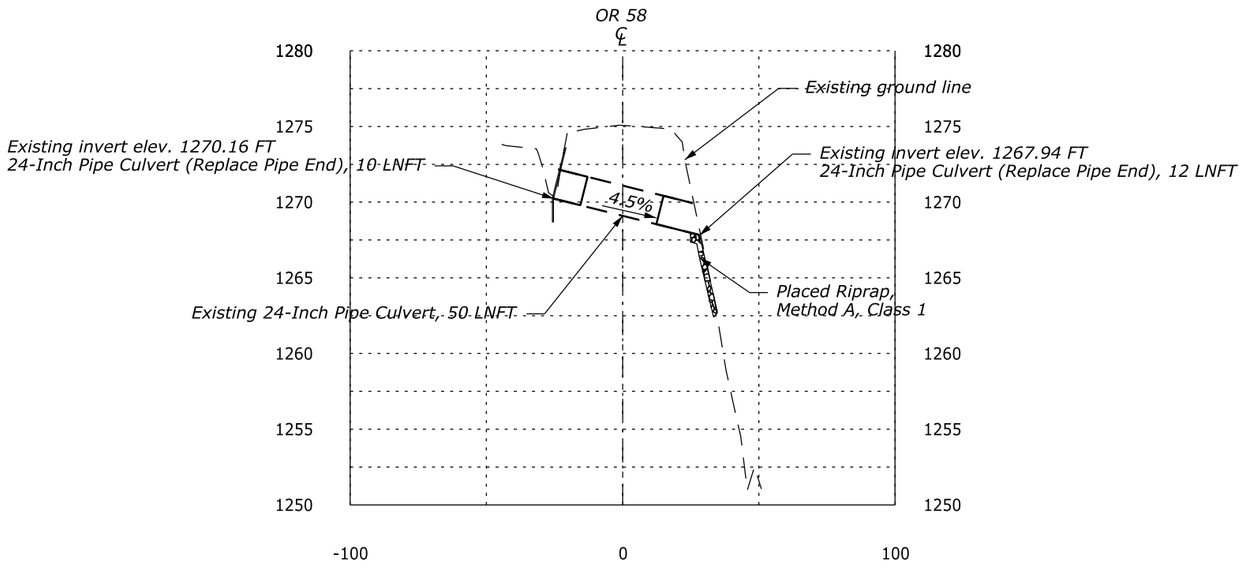
25 12.5 0 25 50 75

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**1777+72, MP 33.79 (DFI# D028045)**
**CULVERT**
**PLAN AND PROFILE**

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.25 |




MP 36.73

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98999PE
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OREGON
MARCH 08, 2022
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**1933+09, MP 36.73 (DFI# D028047)**
**CULVERT**
**PLAN AND PROFILE**

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| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
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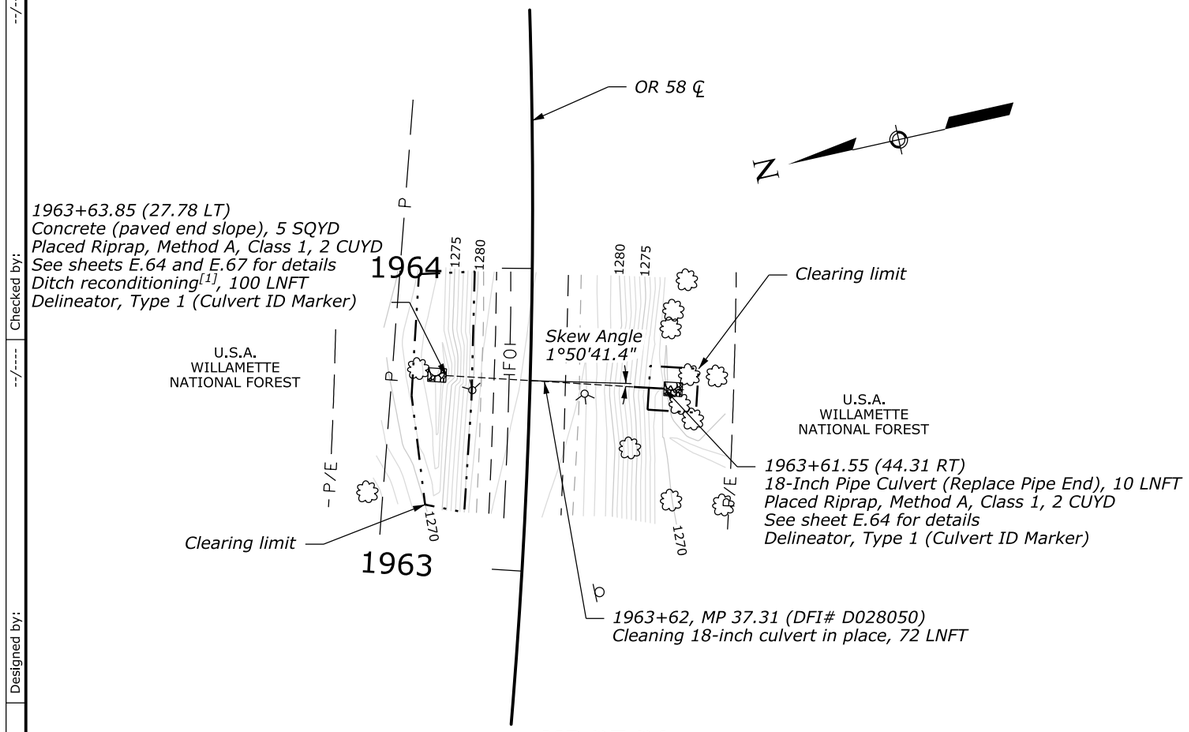
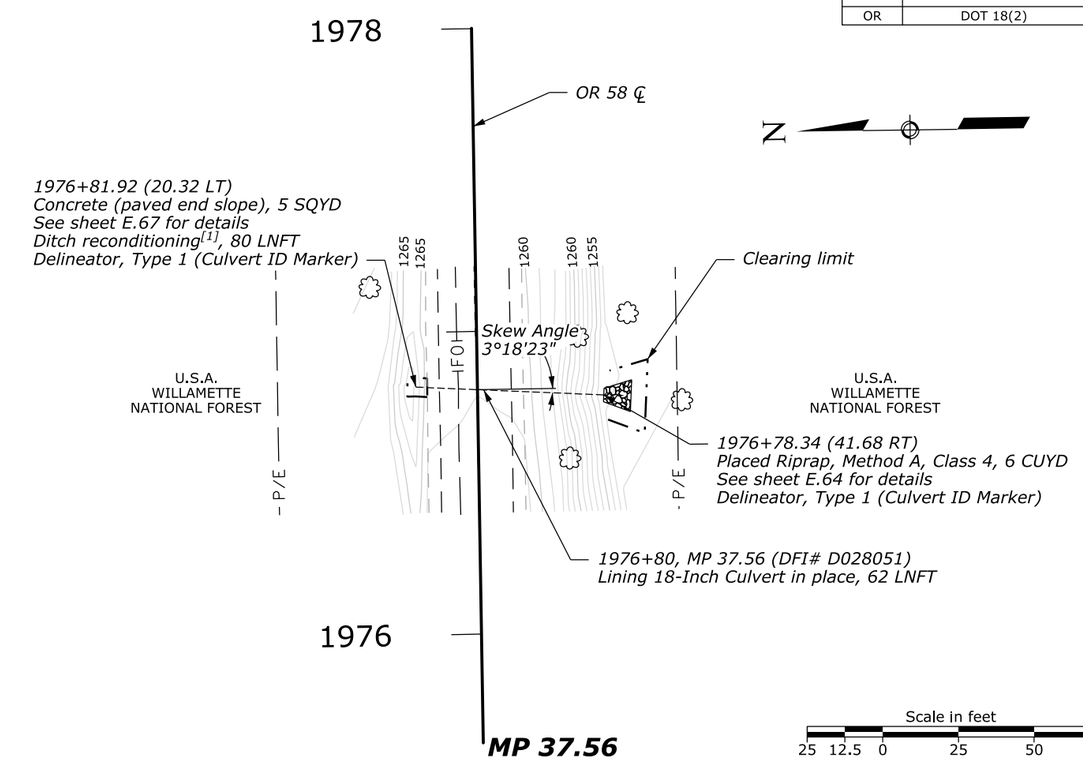
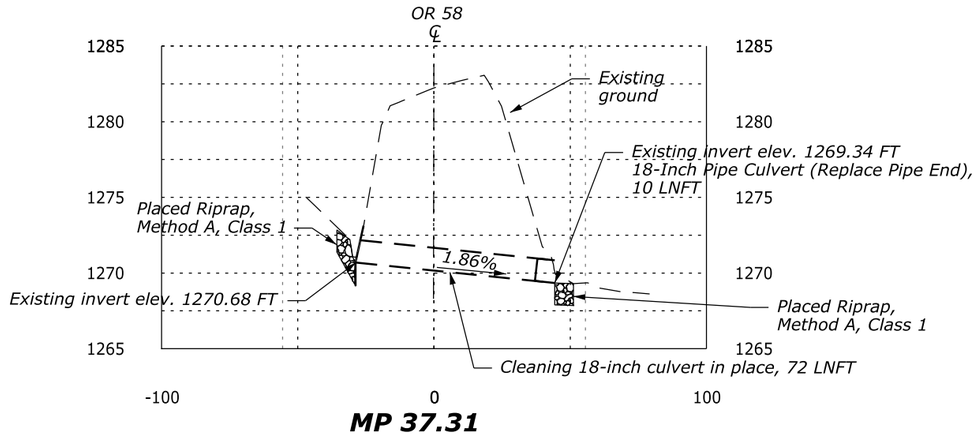



**MP 37.31**

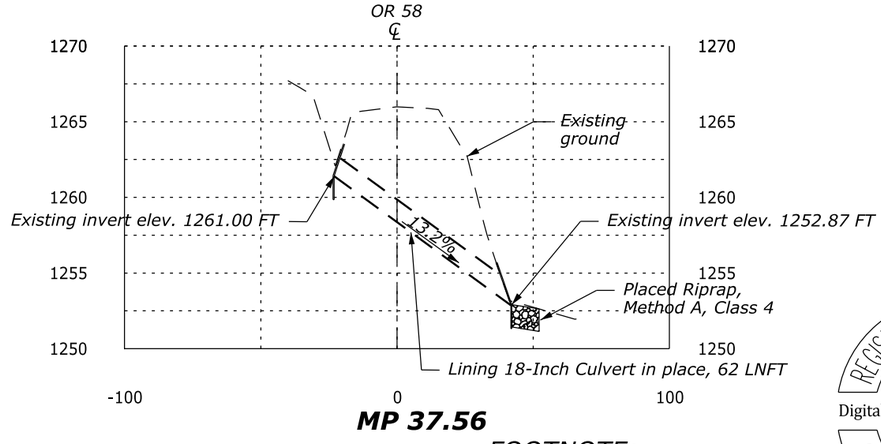



**MP 37.56**

Scale in feet
25 12.5 0 25 50 75




**MP 37.31**




**MP 37.56**

*FOOTNOTE:*
*[1] Perform ditch reconditioning beginning at the culvert end and extending upstream along the ditch flowline for the distance provided.*

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**1963+62, MP 37.31 (DFI# D028050) &**
**1976+80, MP 37.56 (DFI# D028051)**
**CULVERT**
**PLAN AND PROFILE**

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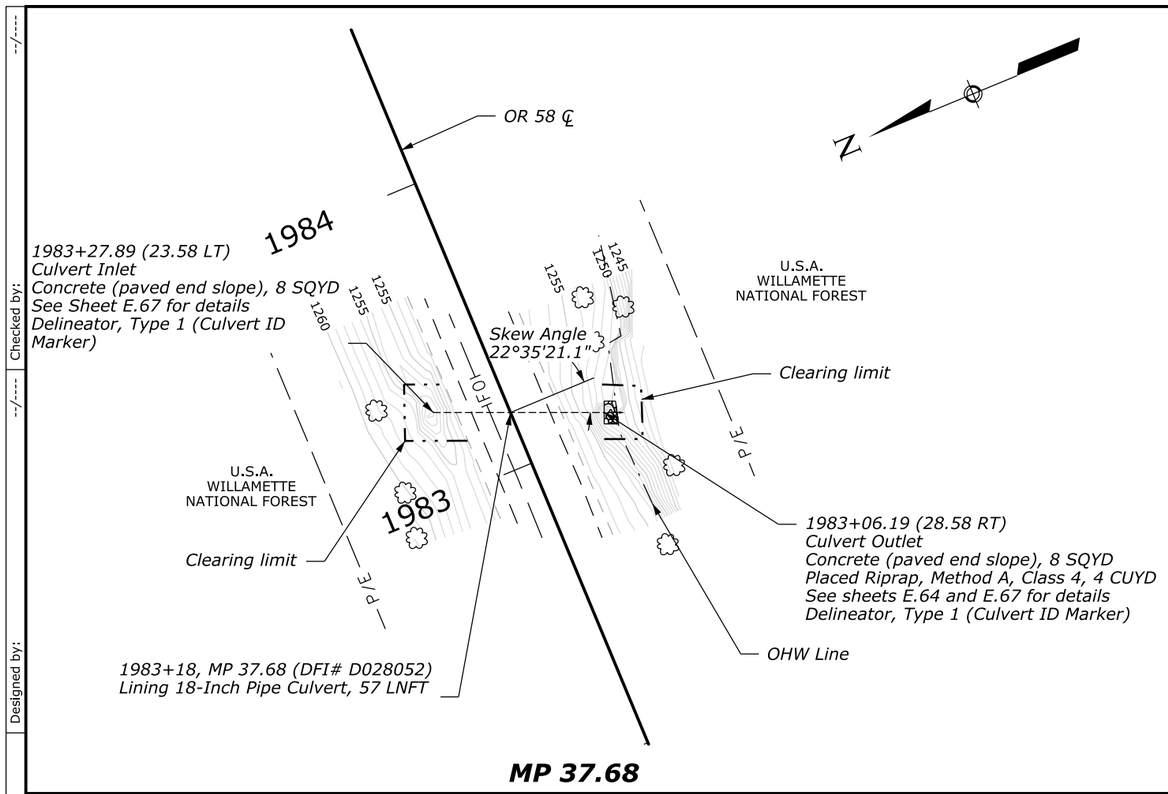
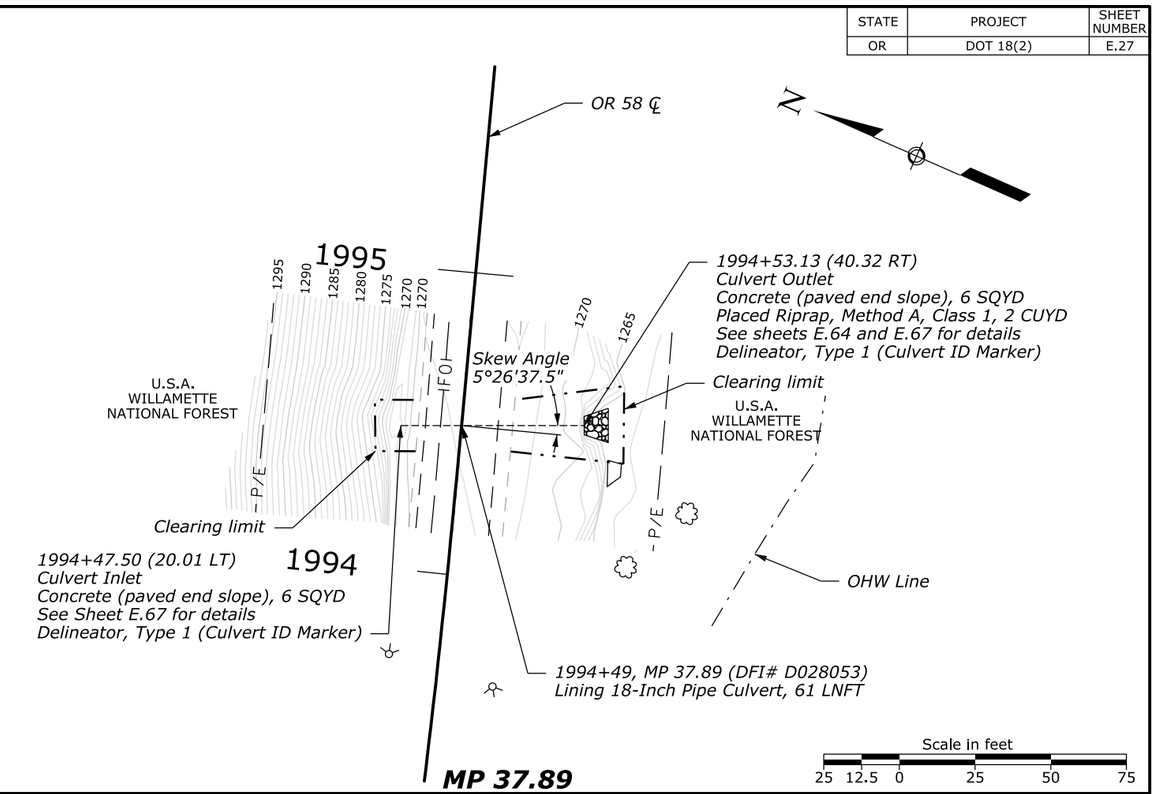
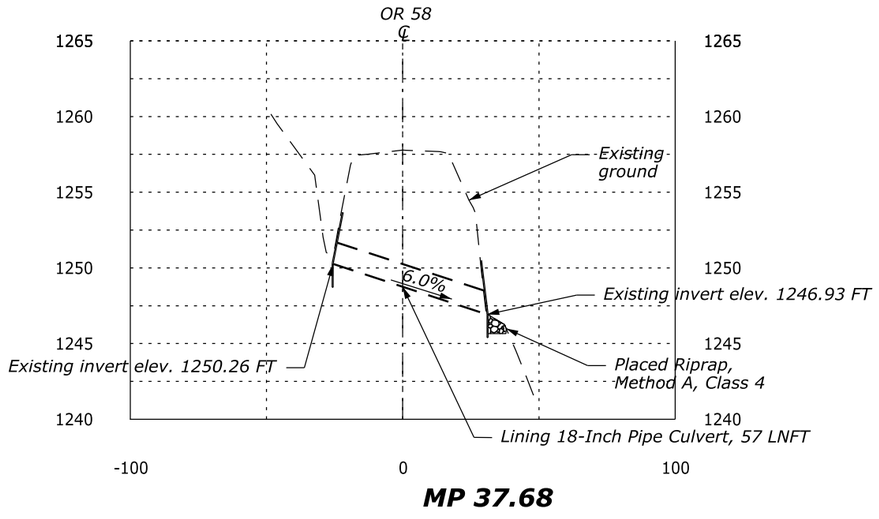
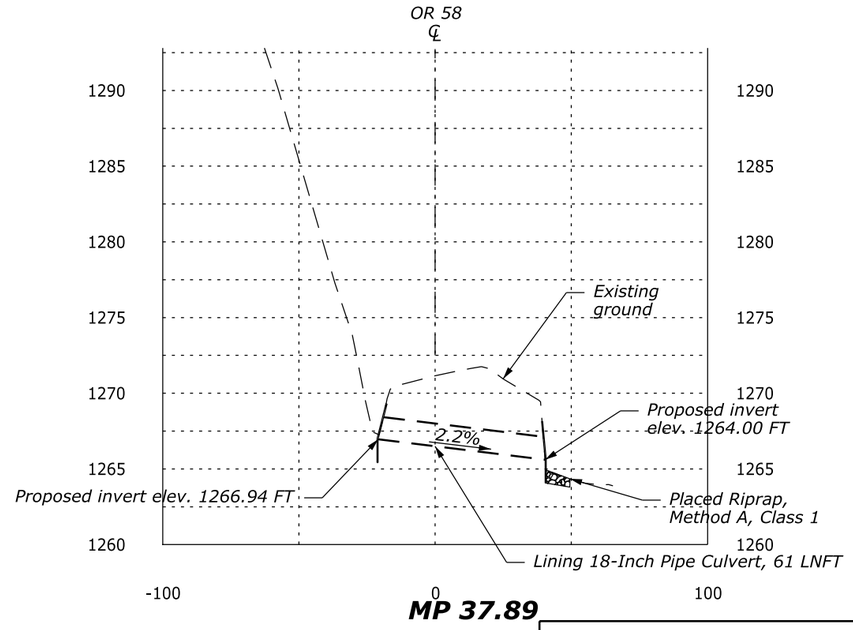
3/4/2022 4:23:44 PM C:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802E26.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.27 |




REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**1983+18, MP 37.68 (DFI# D028052) &**
**1994+49, MP 37.89 (DFI# D028053)**
**CULVERT**
**PLAN AND PROFILE**

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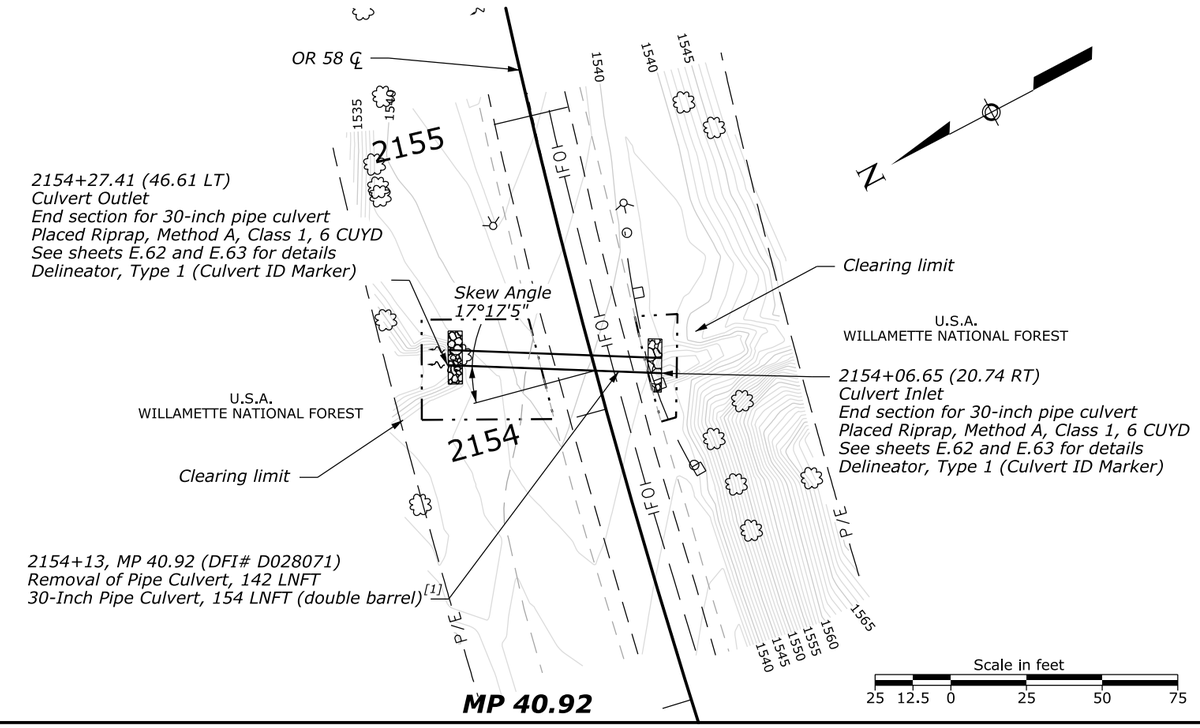
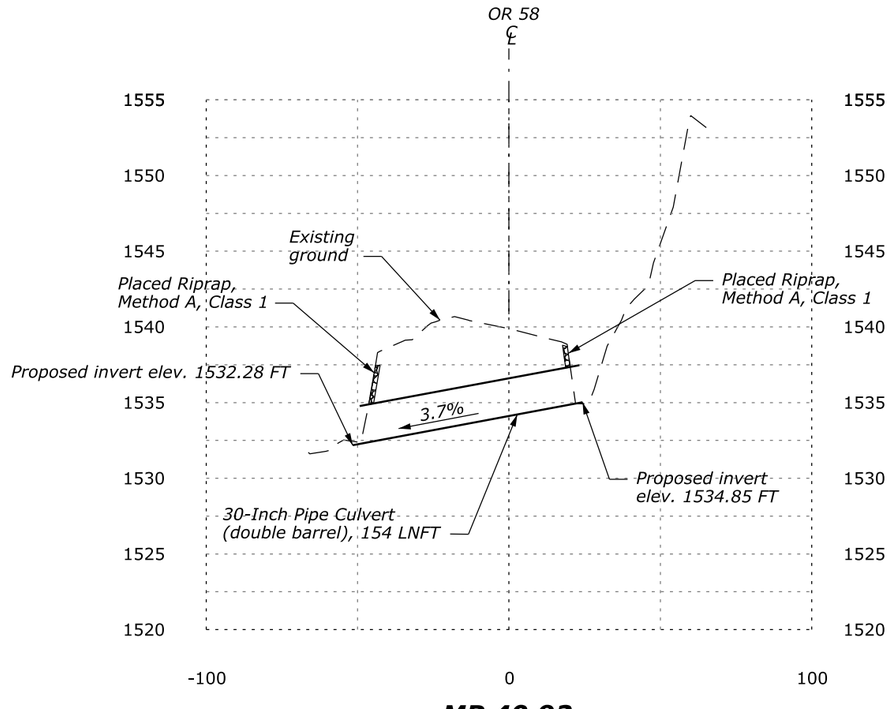
4/13/2022 10:49:07 AM C:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802E27.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.29 |




**MP 40.92**




**MP 40.92**

*FOOTNOTE:*
*[1] Extend Culvert 3 LNFT at Inlet to Stabelize Bank.*

REGISTERED PROFESSIONAL ENGINEER
98999PE
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OREGON
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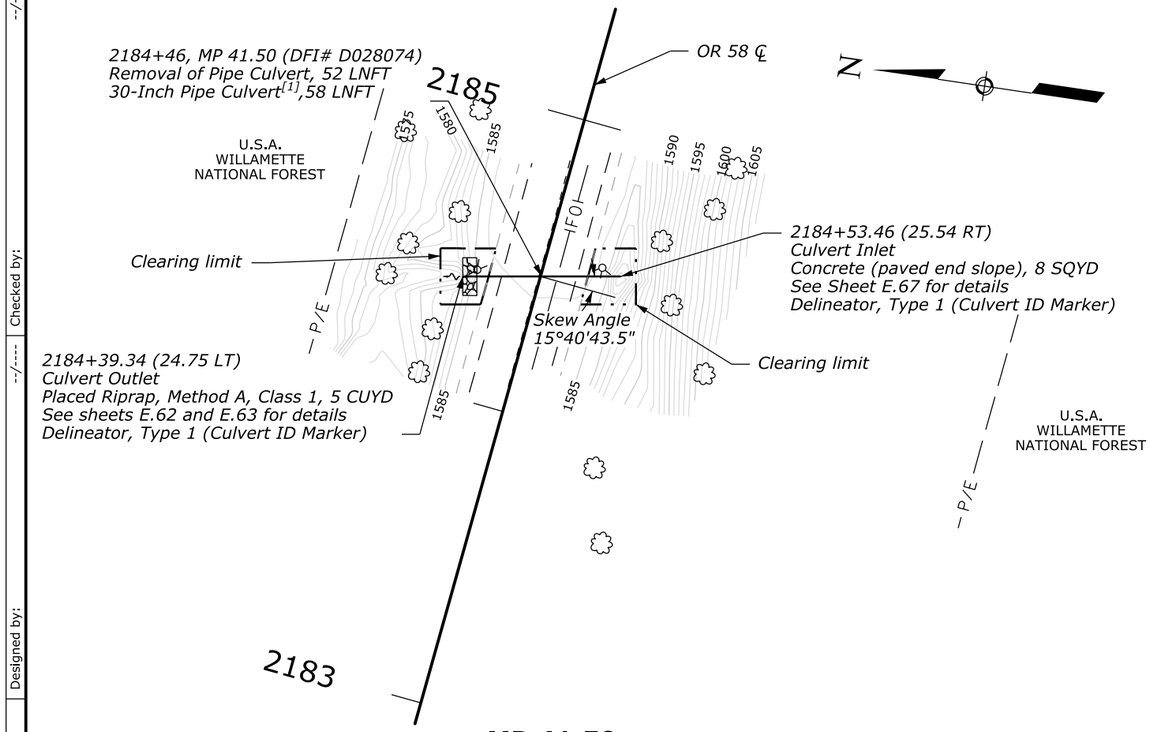
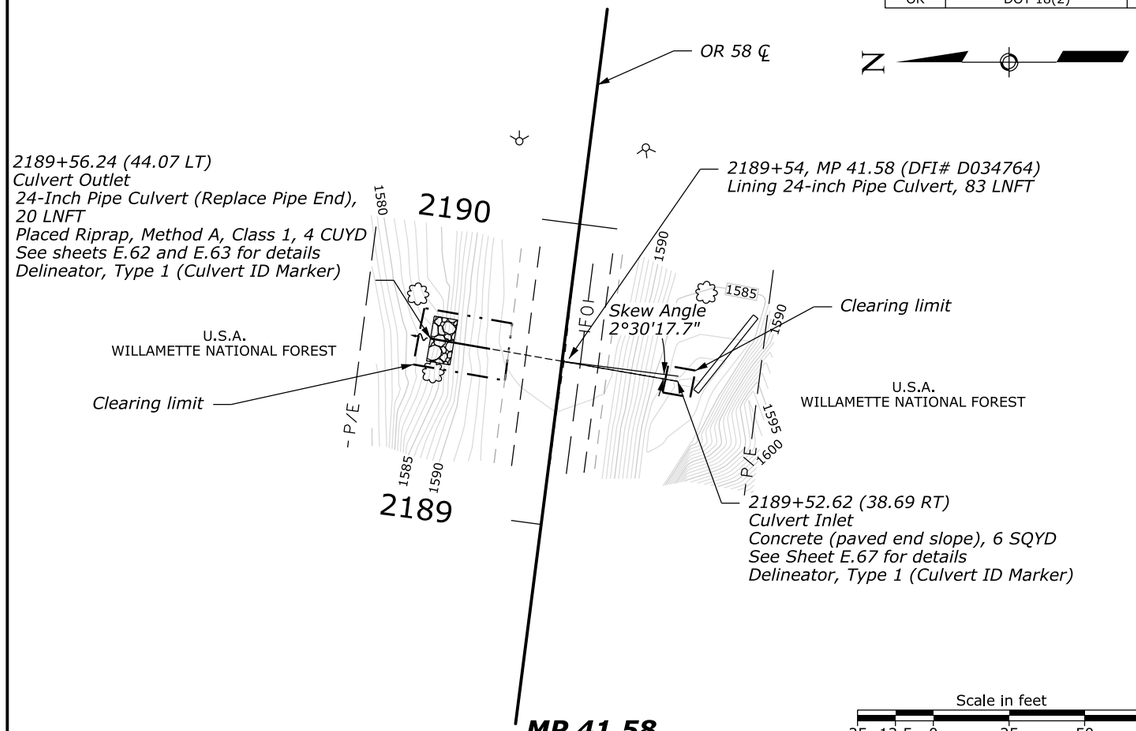
**2154+13, MP 40.92 (DFI# D028071)**
**CULVERT**
**PLAN AND PROFILE**

Designed by: --/---- Checked by: --/----
3/4/2022 4:24:02 PM C:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802E29.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.30 |

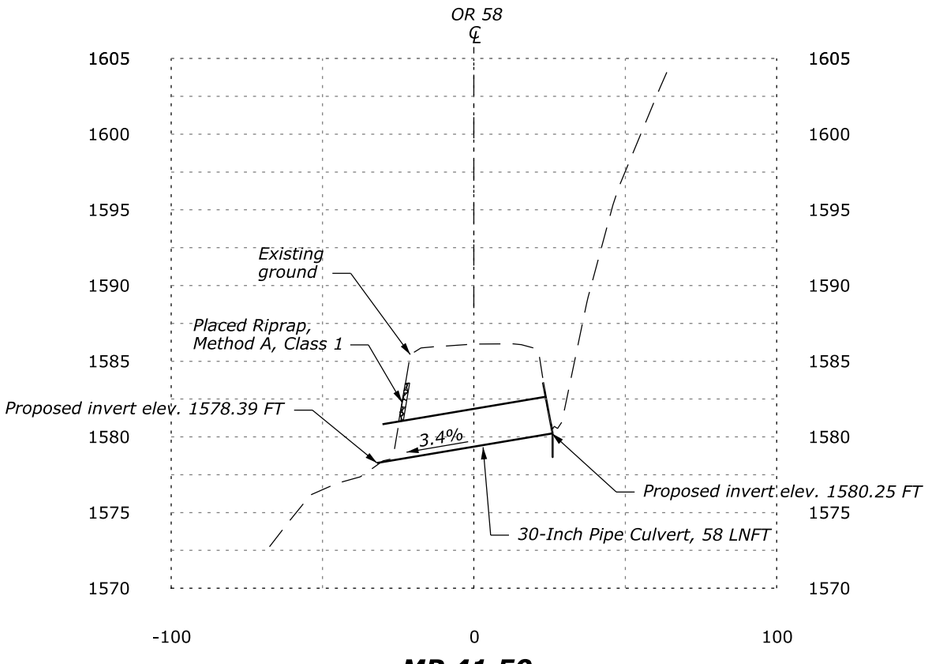



**MP 41.50**



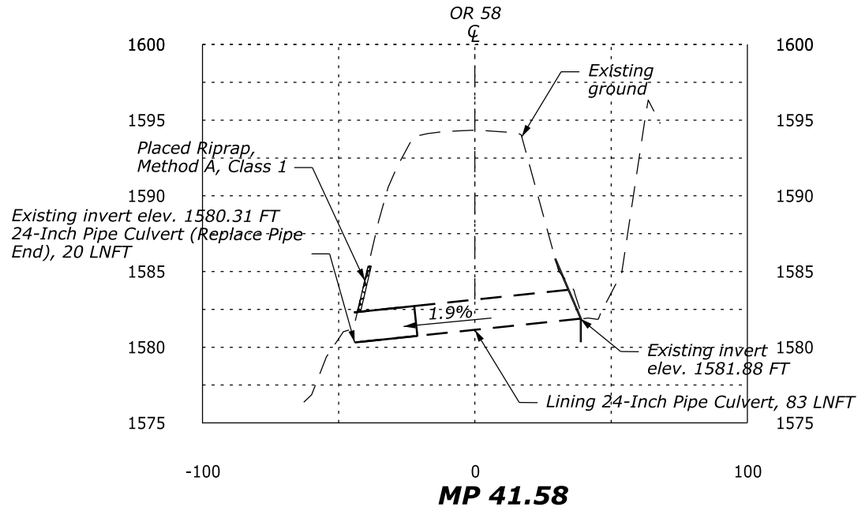

**MP 41.58**

Scale in feet
25 12.5 0 25 50 75




**MP 41.50**

*FOOTNOTE:*
*[1] Proposed Pipe is extended 6' at the outlet beyond the exsiting pipe.*



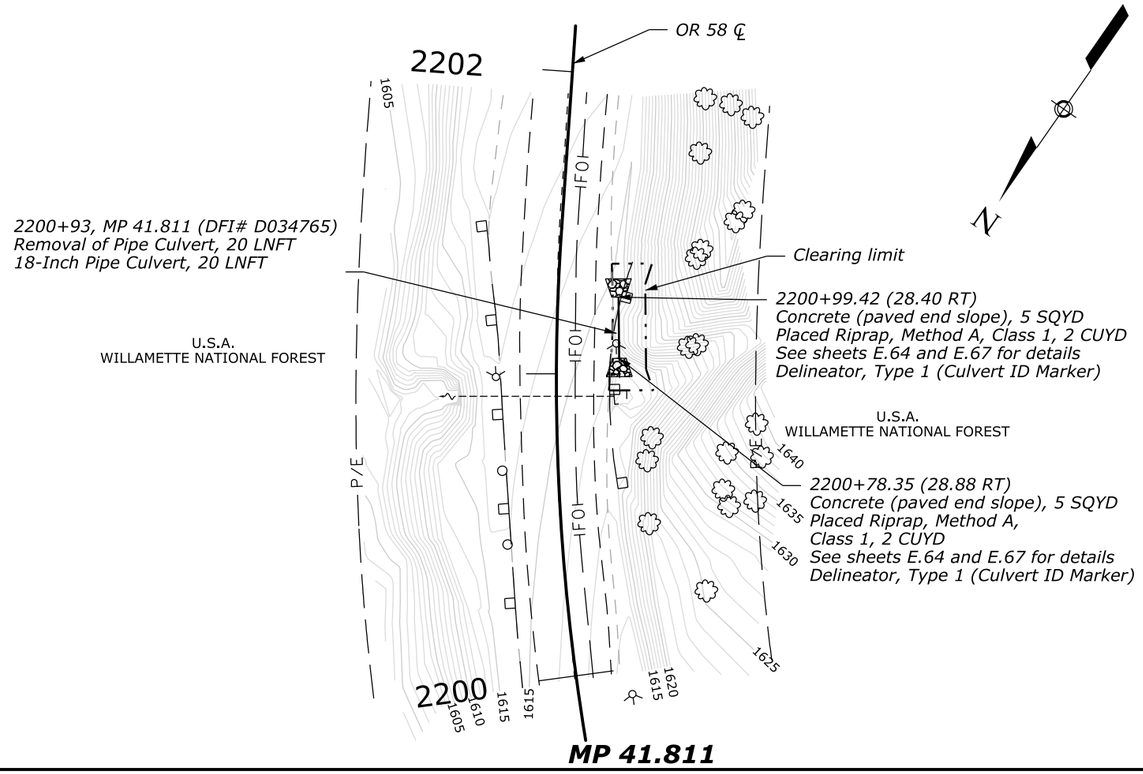

**MP 41.58**

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

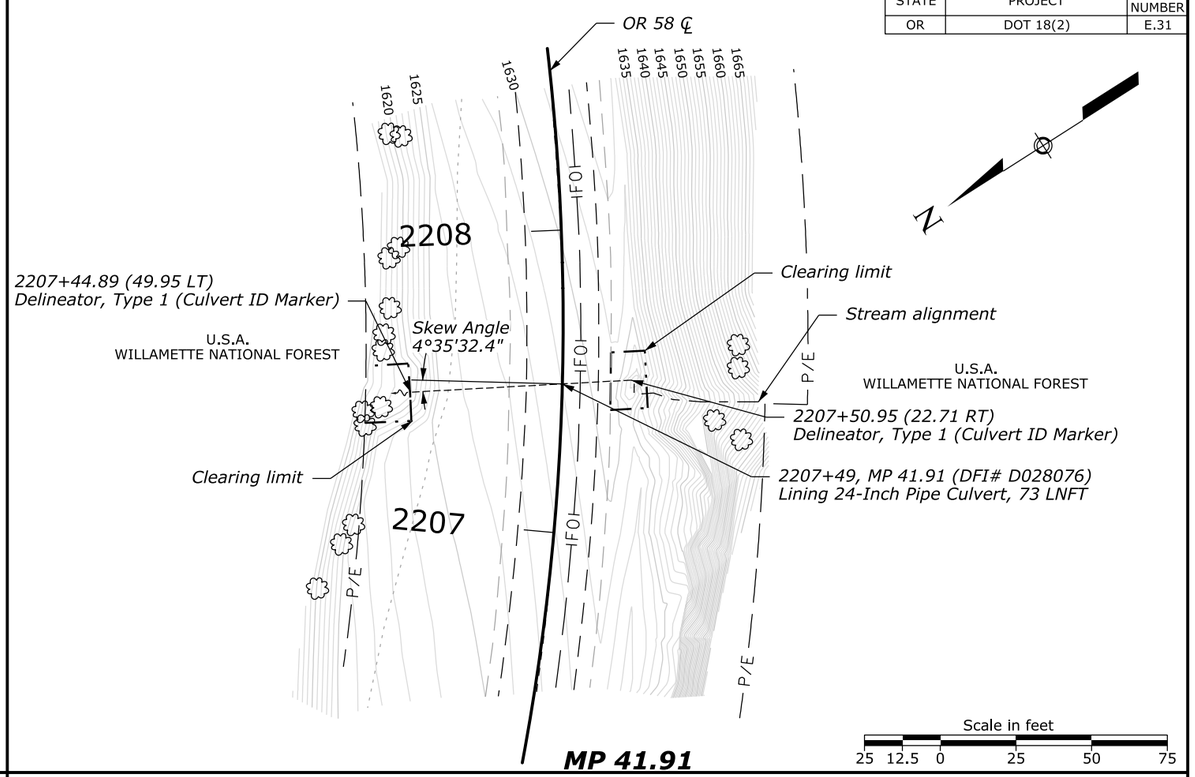
**2184+46, MP 41.50 (DFI# D028074) &**
**2189+54, MP 41.58 (DFI# D034764)**
**CULVERT**
**PLAN AND PROFILE**

Designed by: --/---- Checked by: --/----
3/21/2022 4:23:34 PM C:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802E30.dgn

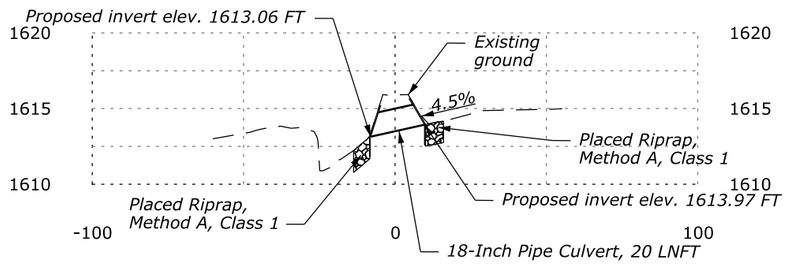
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.31 |



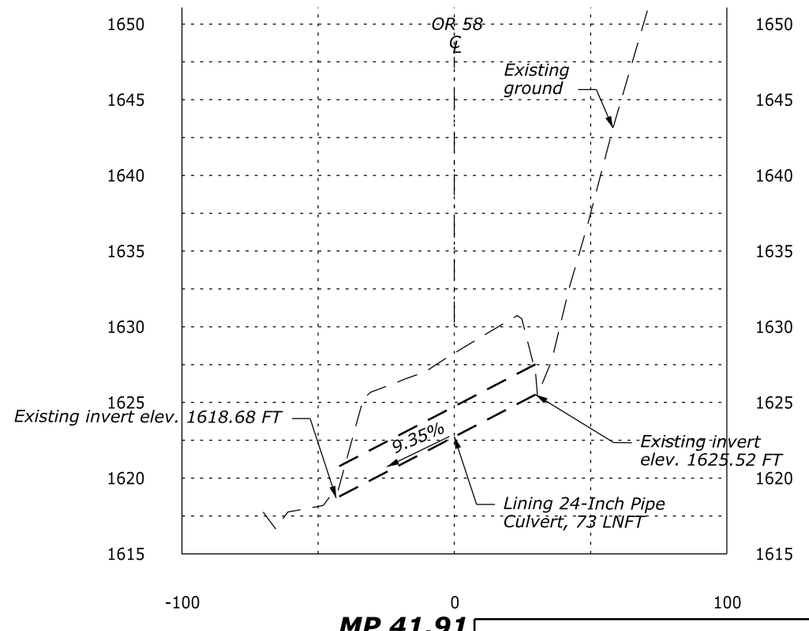

**MP 41.811**




**MP 41.91**




**MP 41.811**




**MP 41.91**

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
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EXPIRES: 12/31/2024

# 2200+93, MP 41.81 (DFI# D034765) & 2207+49, MP 41.91 (DFI# D028076) CULVERT PLAN AND PROFILE

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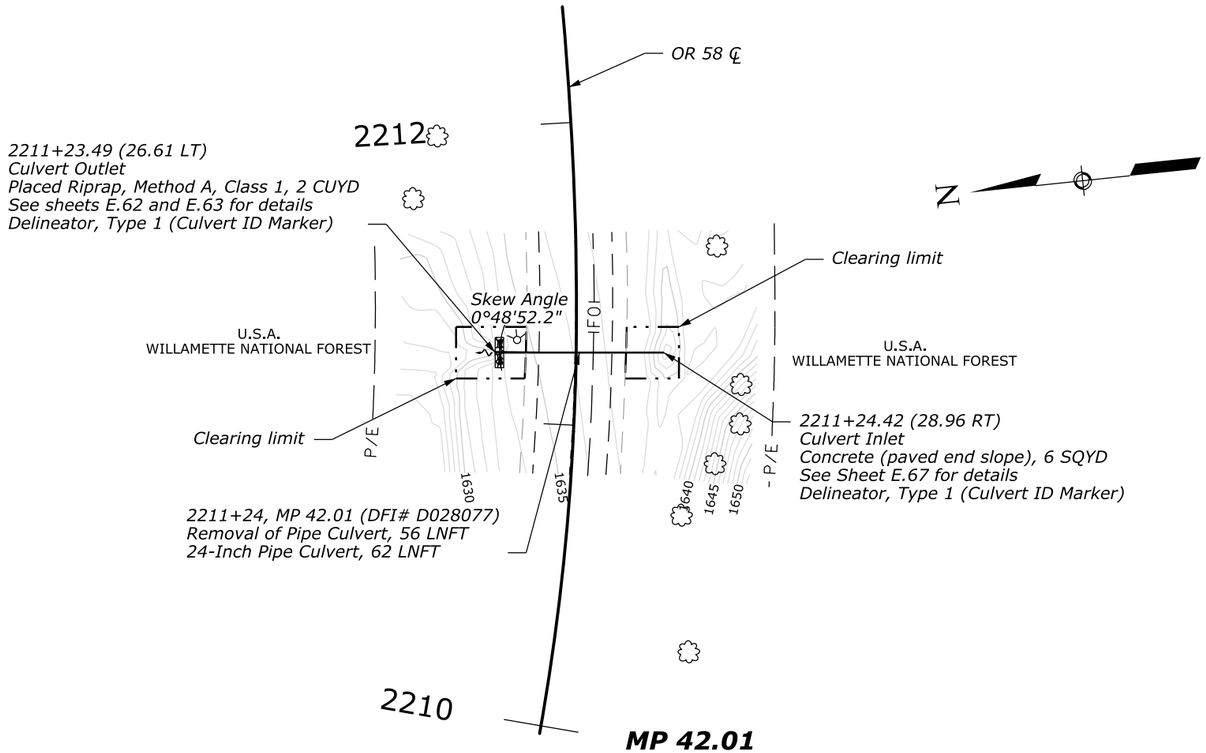
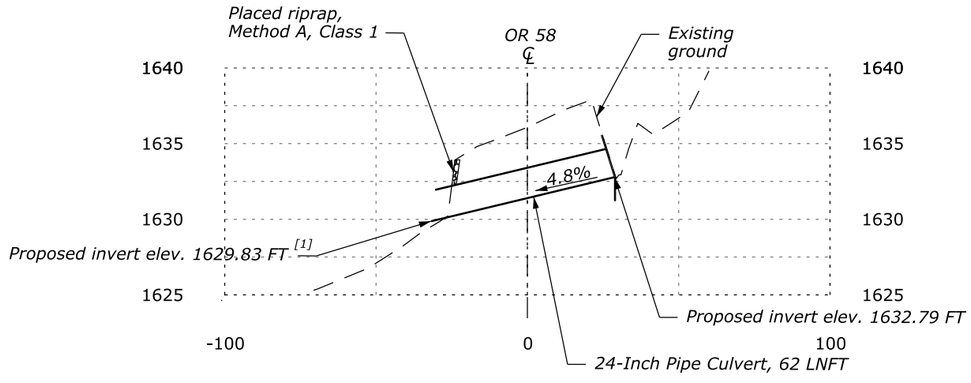
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.32 |




Scale in feet

25 12.5 0 25 50 75




MP 42.01

REGISTERED PROFESSIONAL ENGINEER
98999PE
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OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

FOOTNOTE:
[1] Proposed Pipe is extended 6 Ft at the outlet beyond the existing pipe.

**2211+24, MP 42.01 (DFI# D028077)**
**CULVERT**
**PLAN AND PROFILE**

Designed by: --/---- Checked by: --/----

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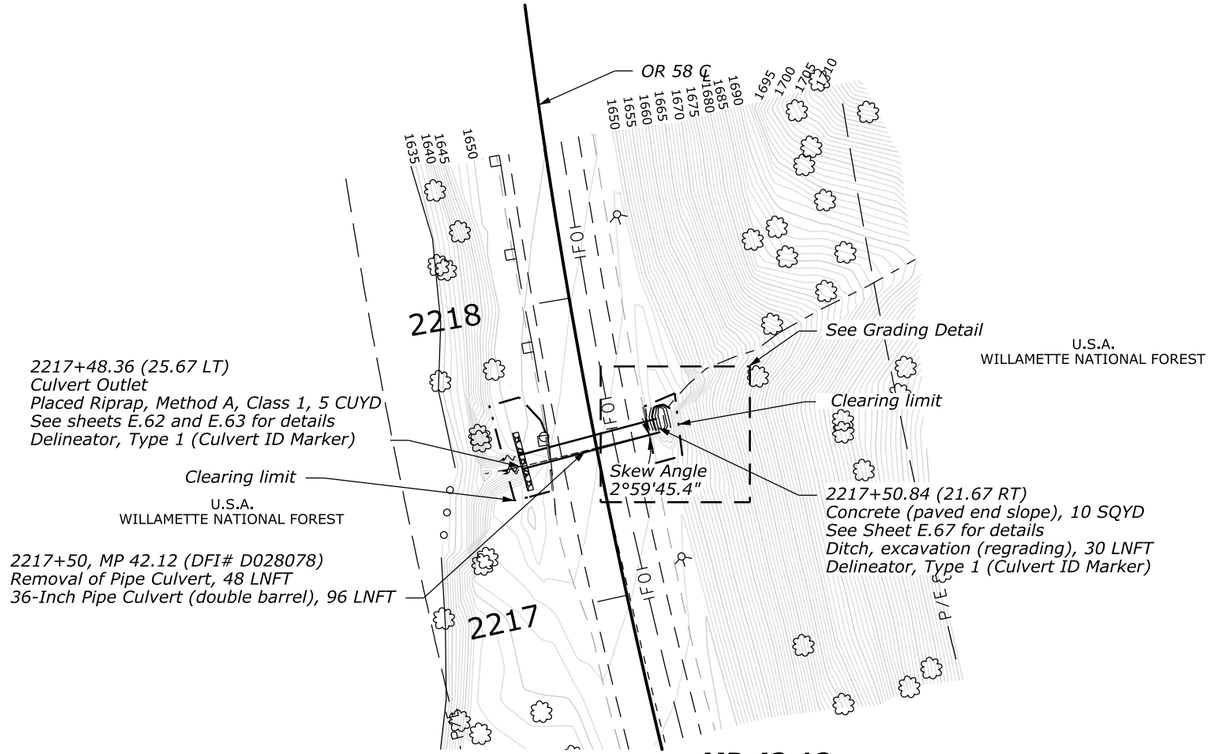
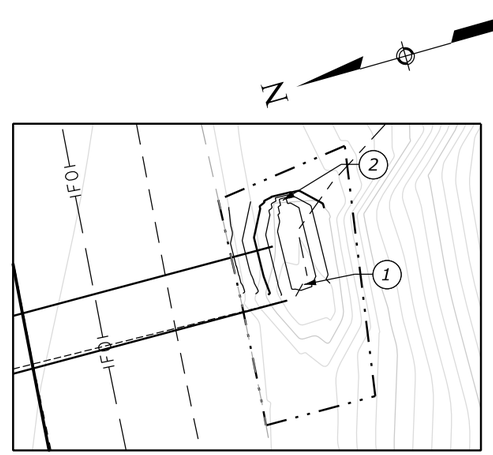
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.33 |

| GRADING POINTS | | | |
|---|---|---|---|
| Point | Northing | Easting | Elev. |
| (1) | *754572.18* | *4433401.66* | *1641.90* |
| (2) | *754571.95* | *4433408.52* | *1641.90* |

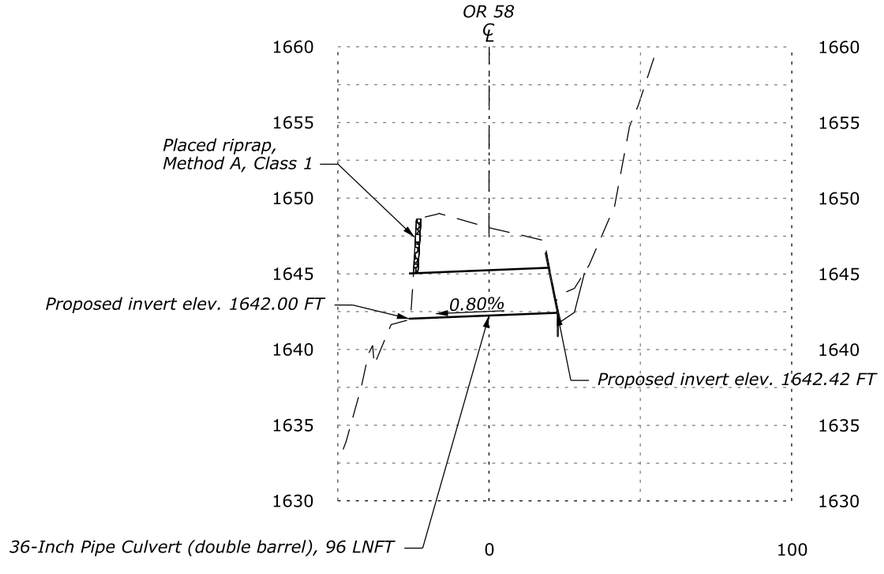



**MP 42.12**




**GRADING DETAIL**

Scale in feet
25 12.5 0 25 50 75




**MP 42.12**

REGISTERED PROFESSIONAL ENGINEER
98999PE
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OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**2217+50, MP 42.12 (DFI# D028078)**
**CULVERT**
**PLAN AND PROFILE**

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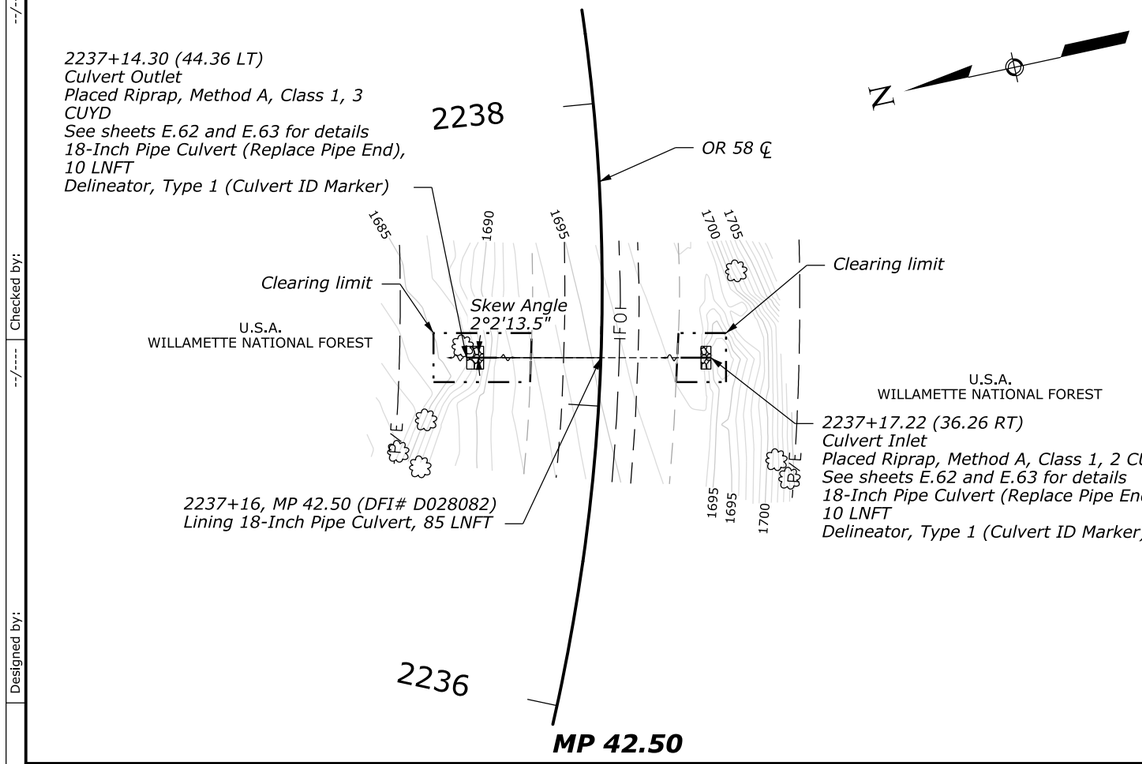
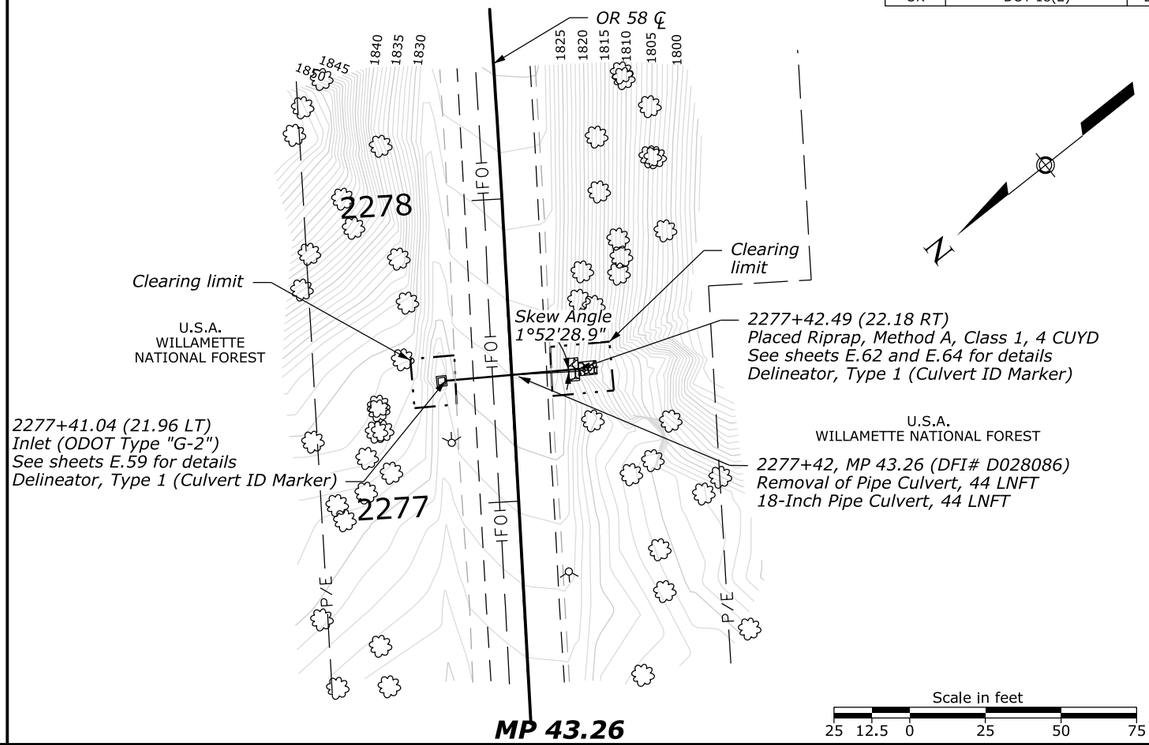
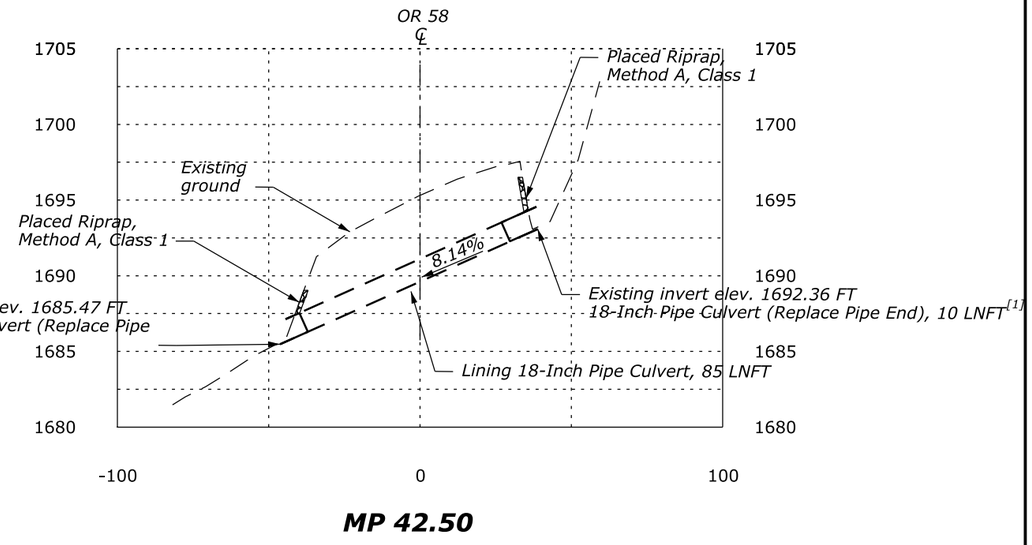
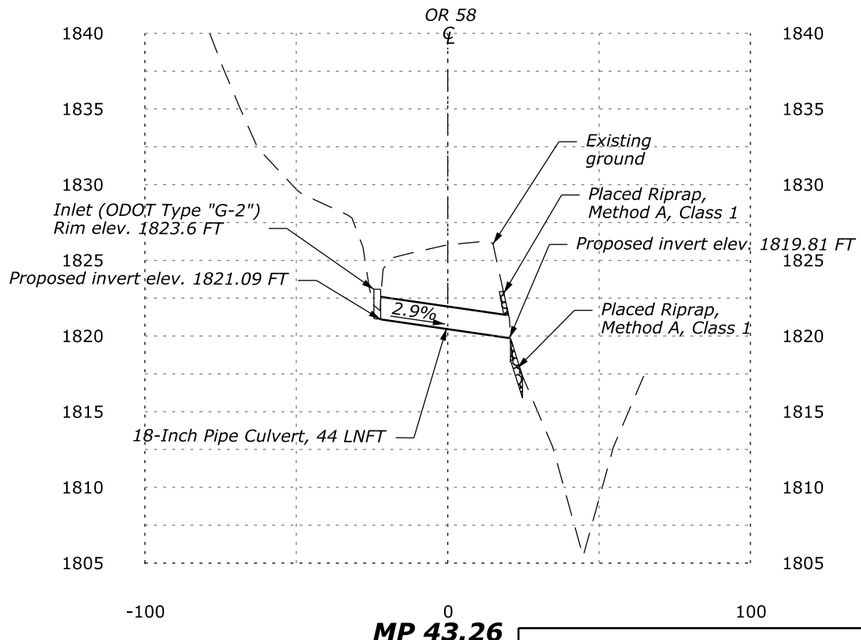
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.34 |




*FOOTNOTE:*

*[1] Extend the inlet and outlet section of the pipe 3 LNFT to stabilize the bank*

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SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**2237+16, MP 42.50 (DFI# D028082) &**
**2277+42,MP 43.26 (DFI# D028086)**
**CULVERT**
**PLAN AND PROFILE**

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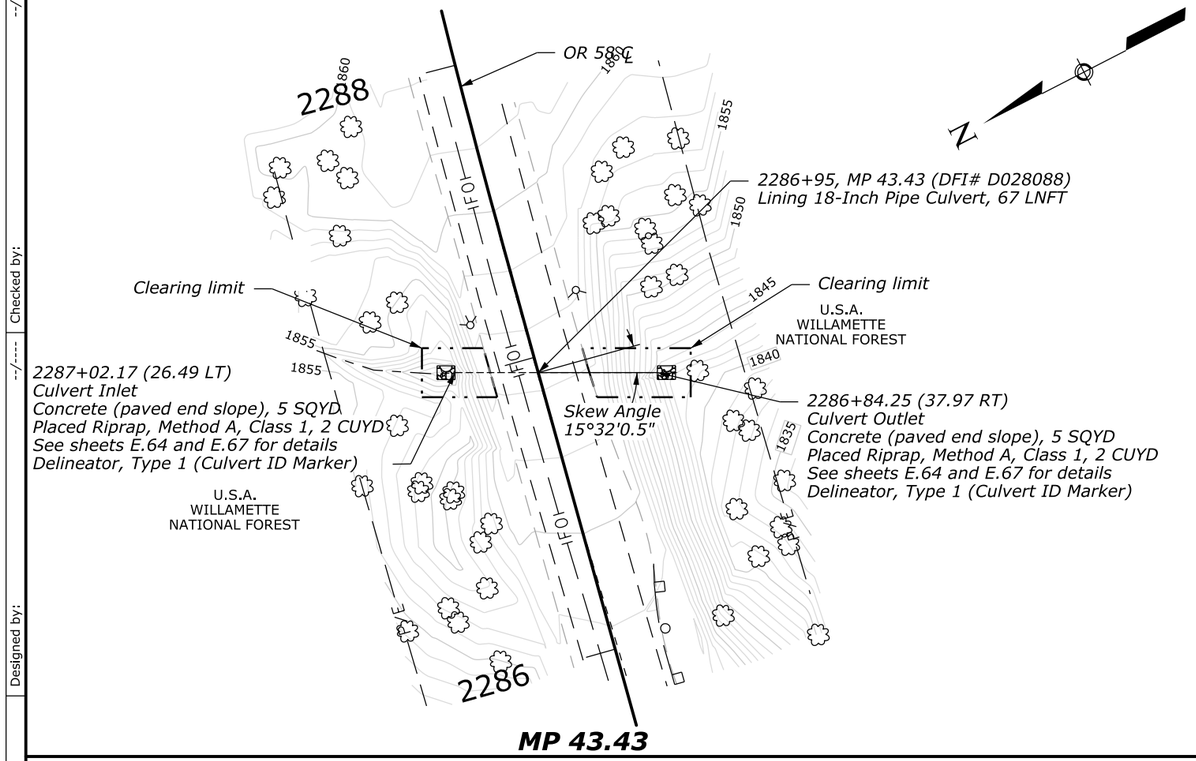
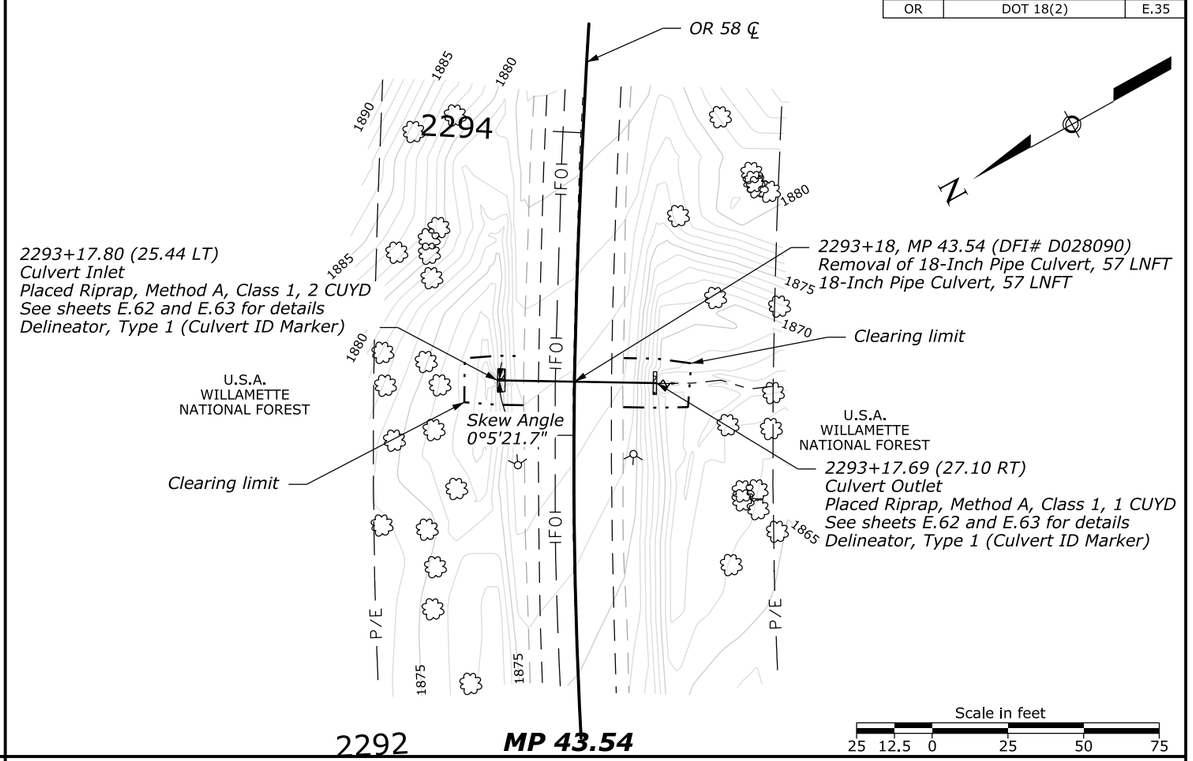
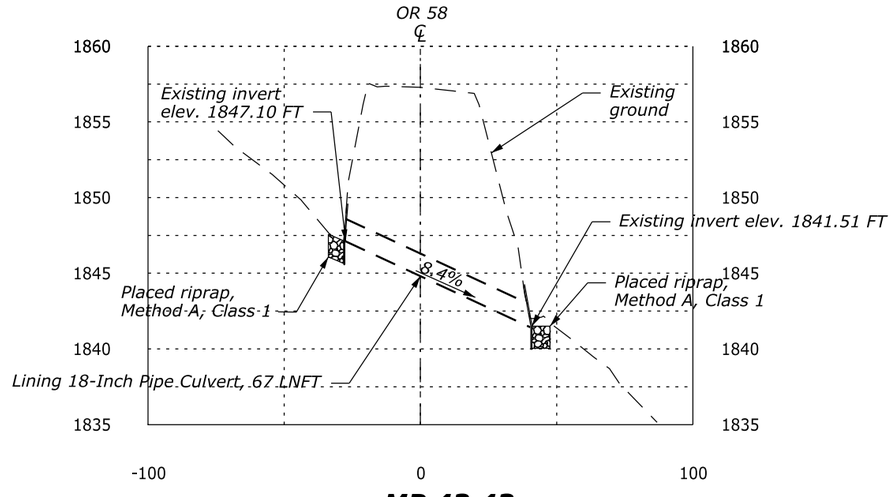
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.35 |



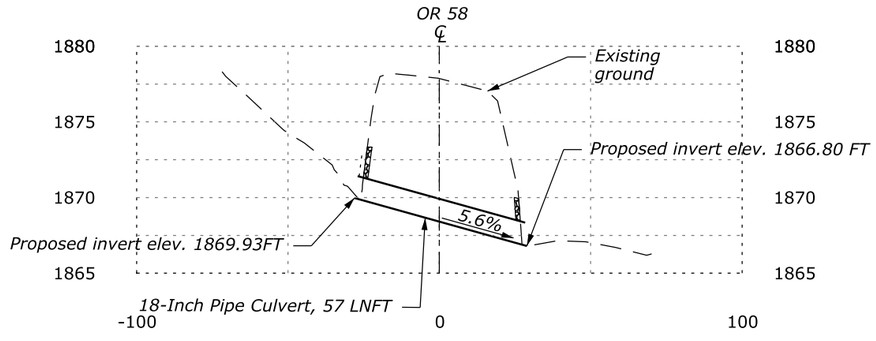

**MP 43.43**




**MP 43.54**




**MP 43.43**




**MP 43.54**

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**2286+95, MP 43.43 (DFI# D028088) &**
**2293+18, MP 43.54 (DFI# D028090)**
**CULVERT**
**PLAN AND PROFILE**

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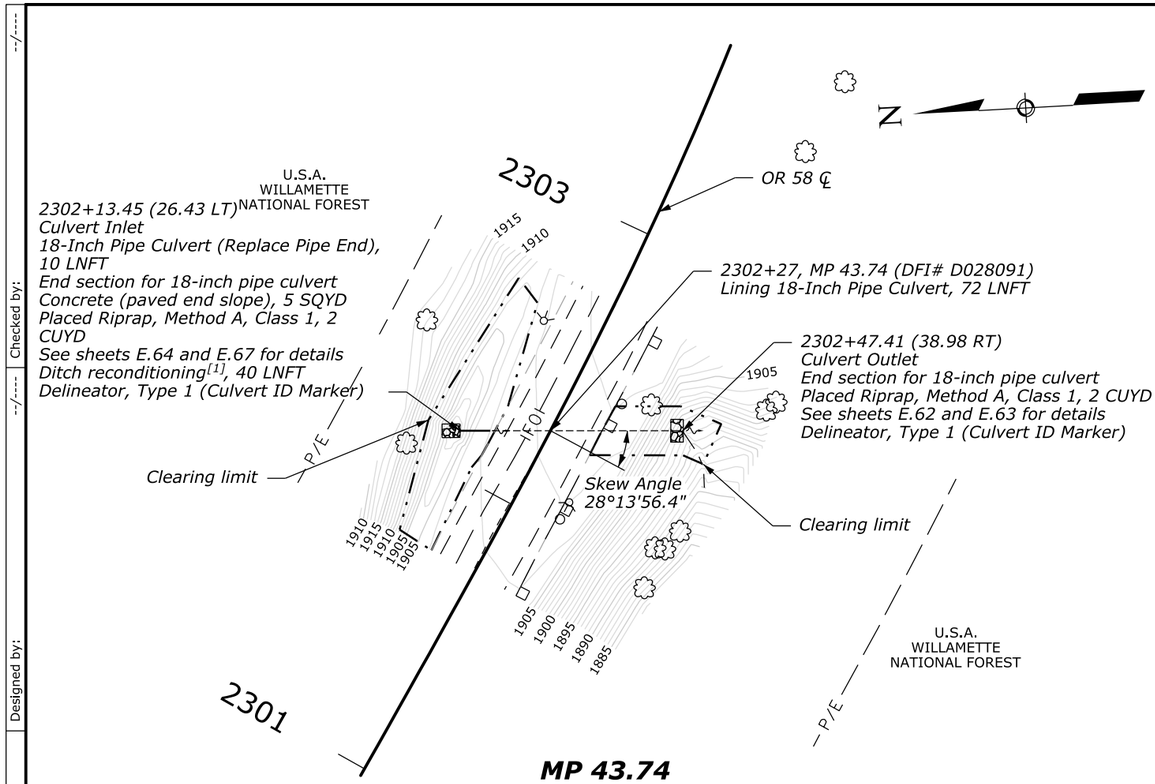
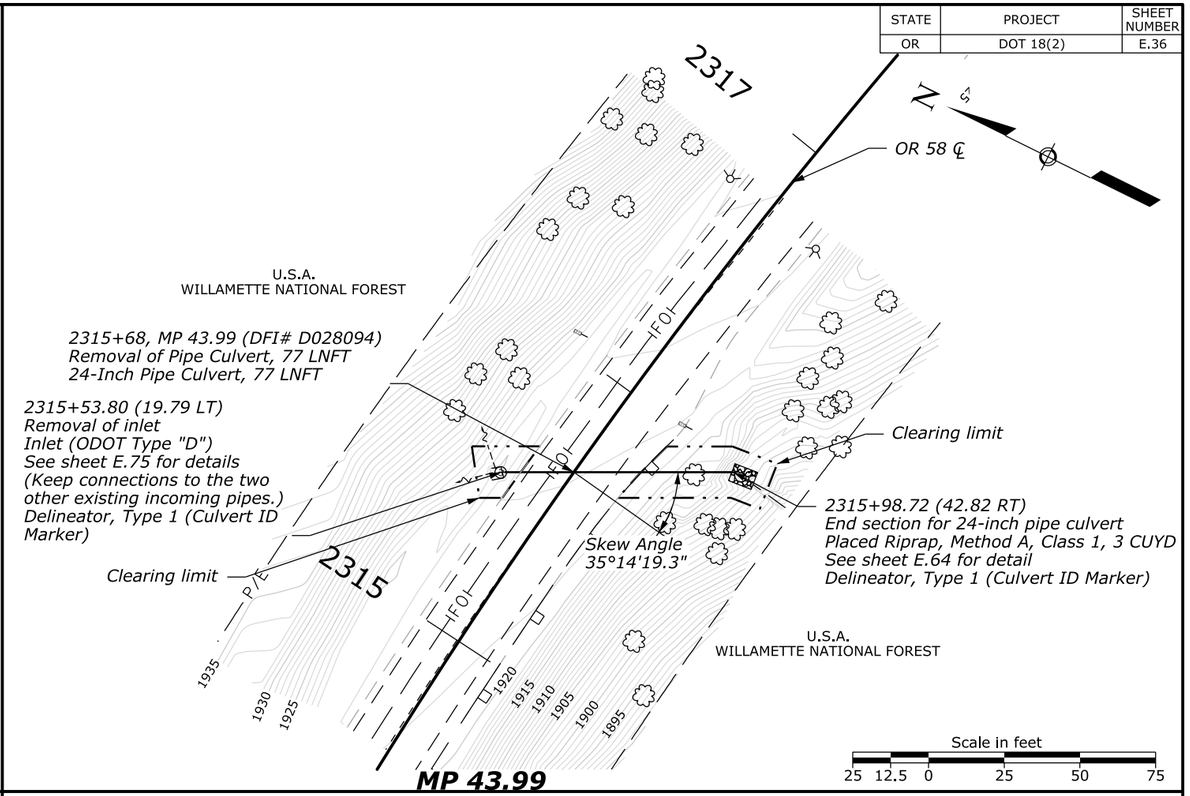
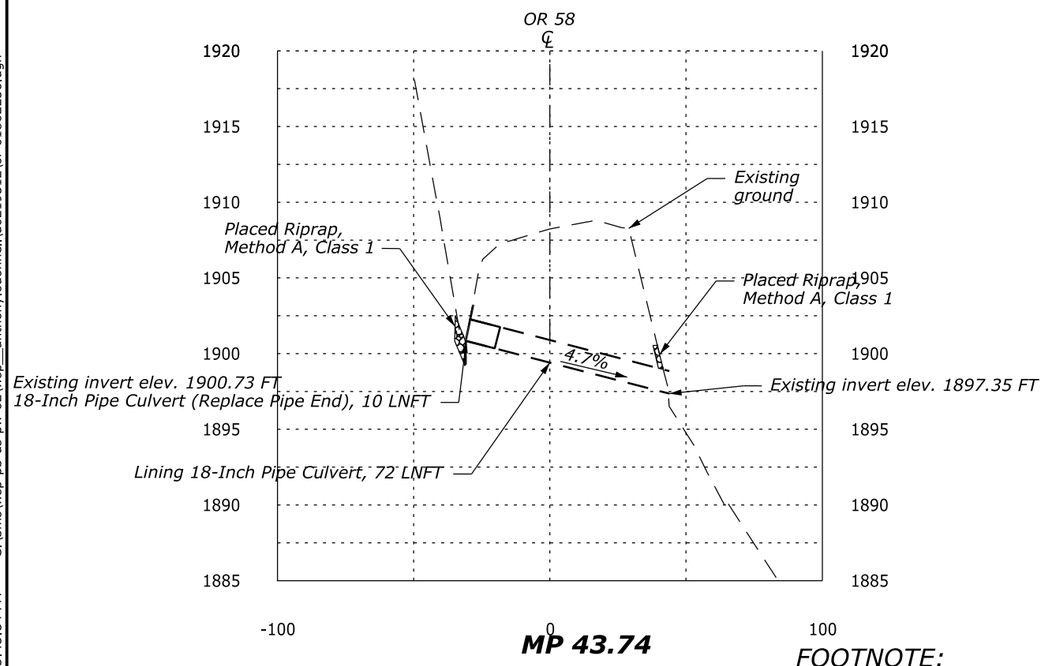
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.36 |

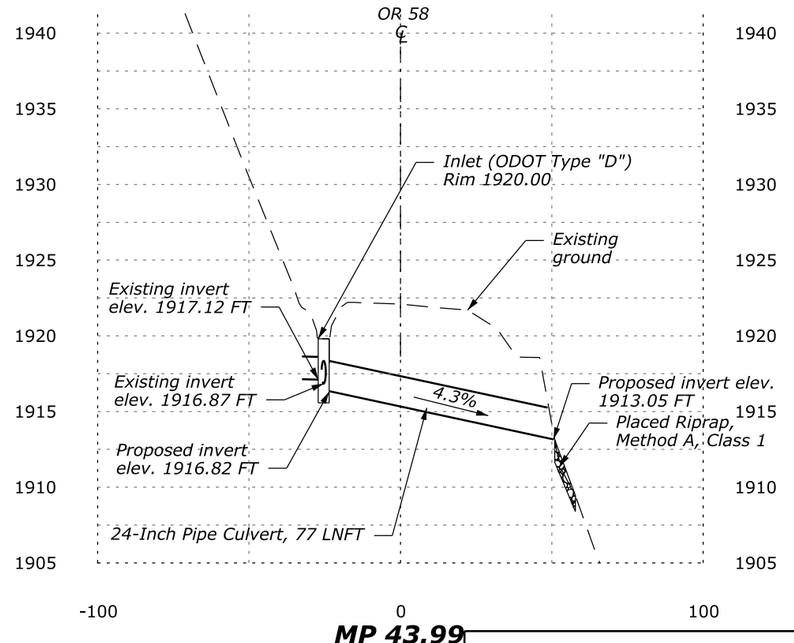



FOOTNOTE:

[1] Perform ditch reconditioning beginning at the culvert end and extending along the ditch flowline for the distance shown.



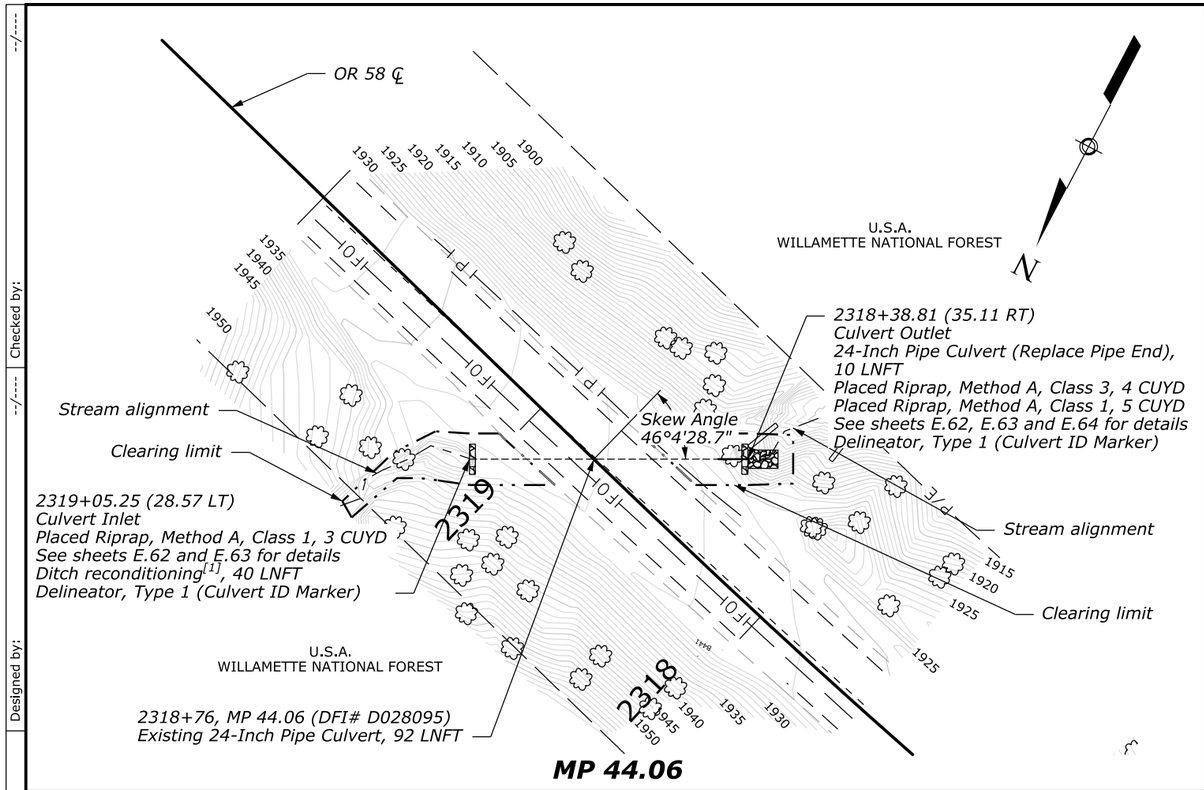

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

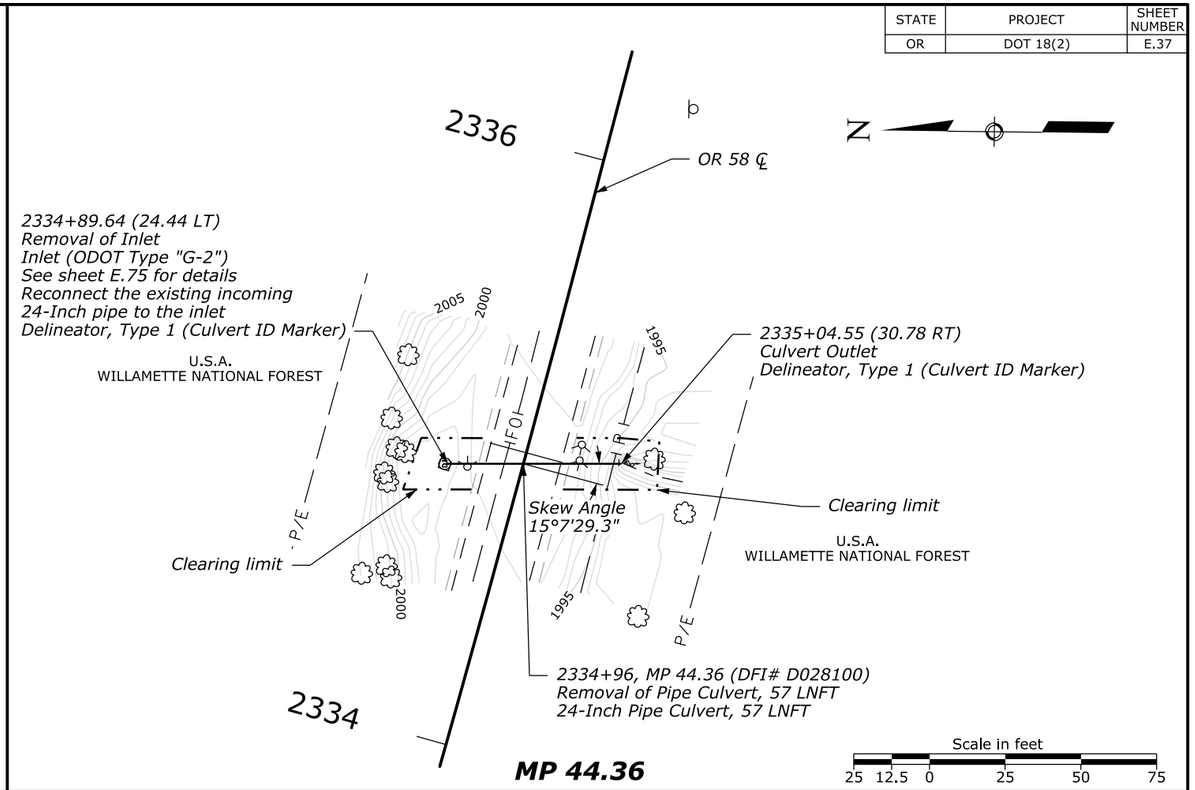
**2302+27, MP 43.74 (DFI# D028091) & 2315+68, MP 43.99 (DFI# D028094) CULVERT PLAN AND PROFILE**

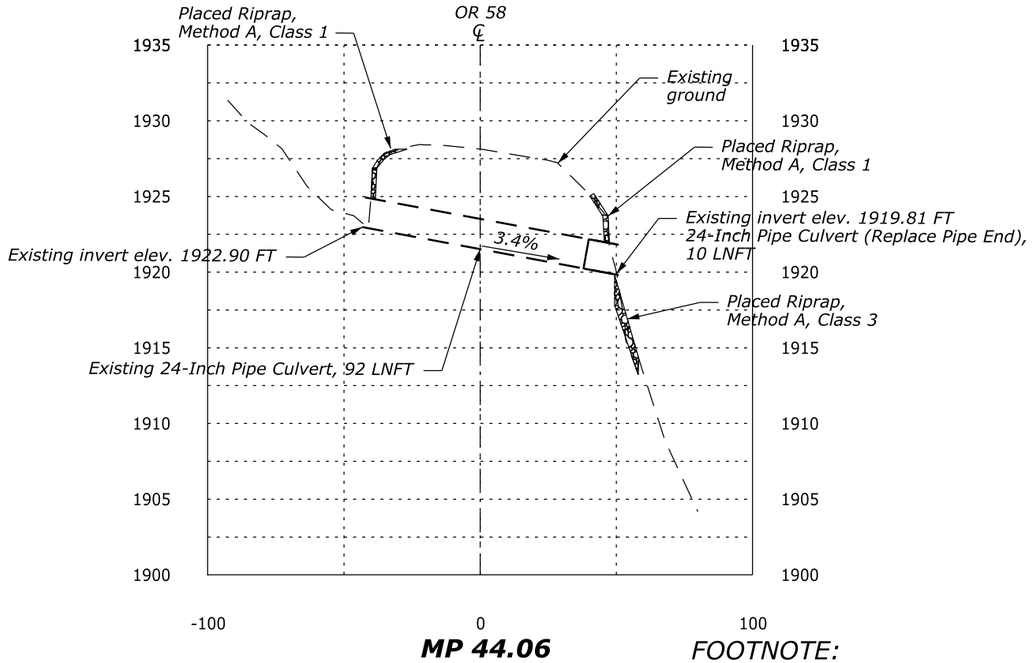
Designed by: -/---- Checked by: -/----

8/30/2021 3:45:34 PM C:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802E36.dgn

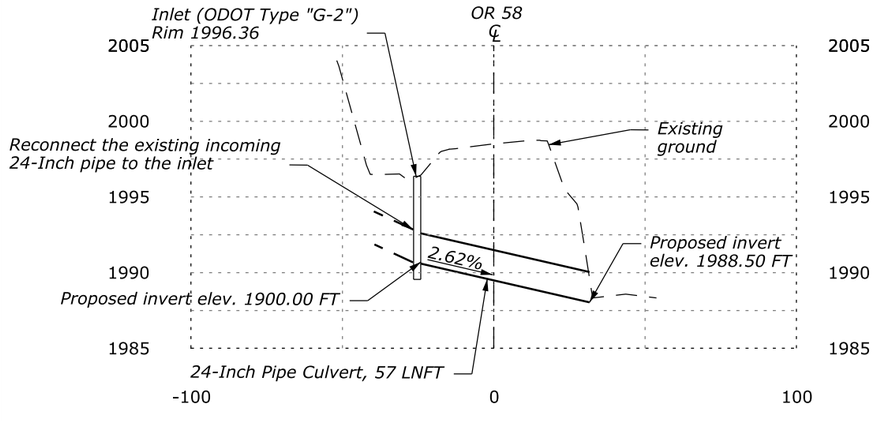
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.37 |




FOOTNOTE:
[1]Perform ditch reconditioning beginning at the culvert end and extending along the ditch flowline for the distance shown.




REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**2318+76, MP 44.06 (DFI# D028095) &**
**2334+96, MP 44.36 (DFI# D028100)**
**CULVERT**
**PLAN AND PROFILE**

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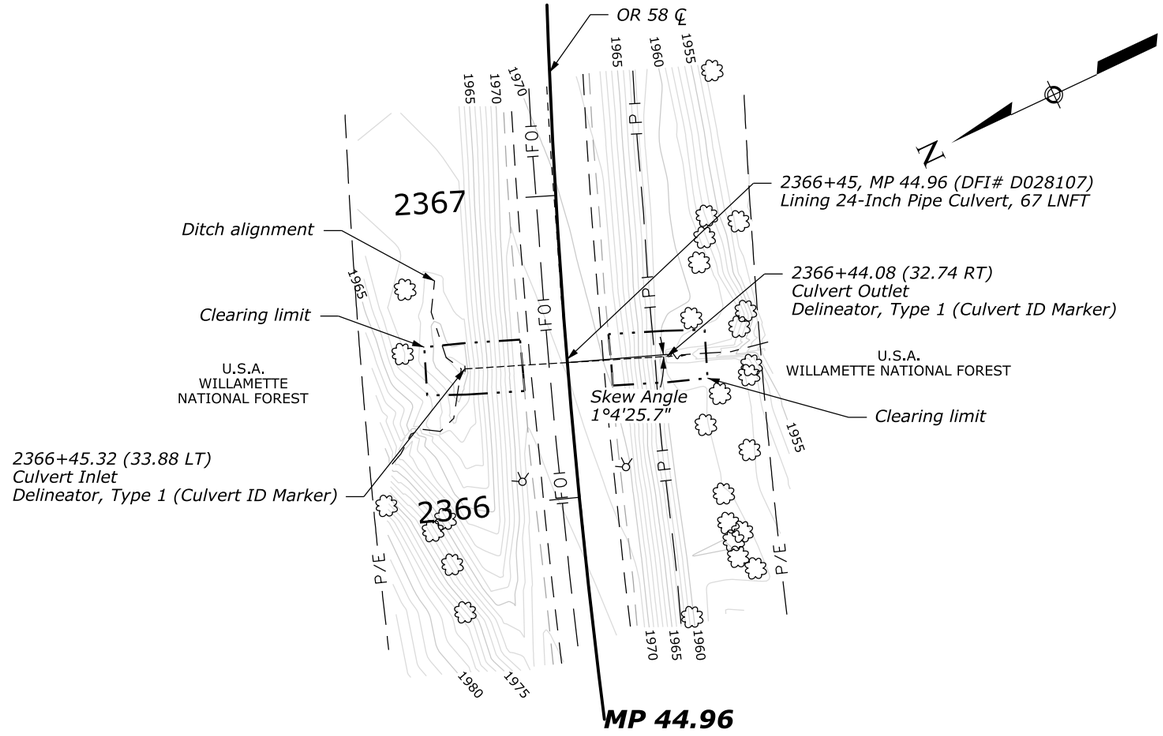
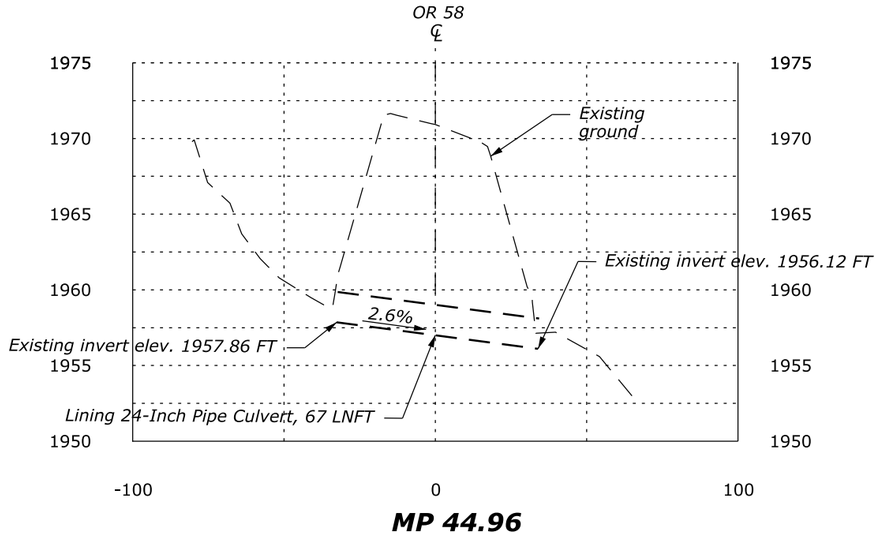
8/30/2021 3:45:43 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802E37.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.38 |




Scale in feet
25 12.5 0 25 50 75

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OREGON
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**2366+45, MP 44.96 (DFI# D028107)**
**CULVERT**
**PLAN AND PROFILE**

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4/13/2022 10:50:19 AM c:\bms\wsp-pb-us-pw-02\wsp__yonas.habtemichael\d0219312\or-01802E38.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
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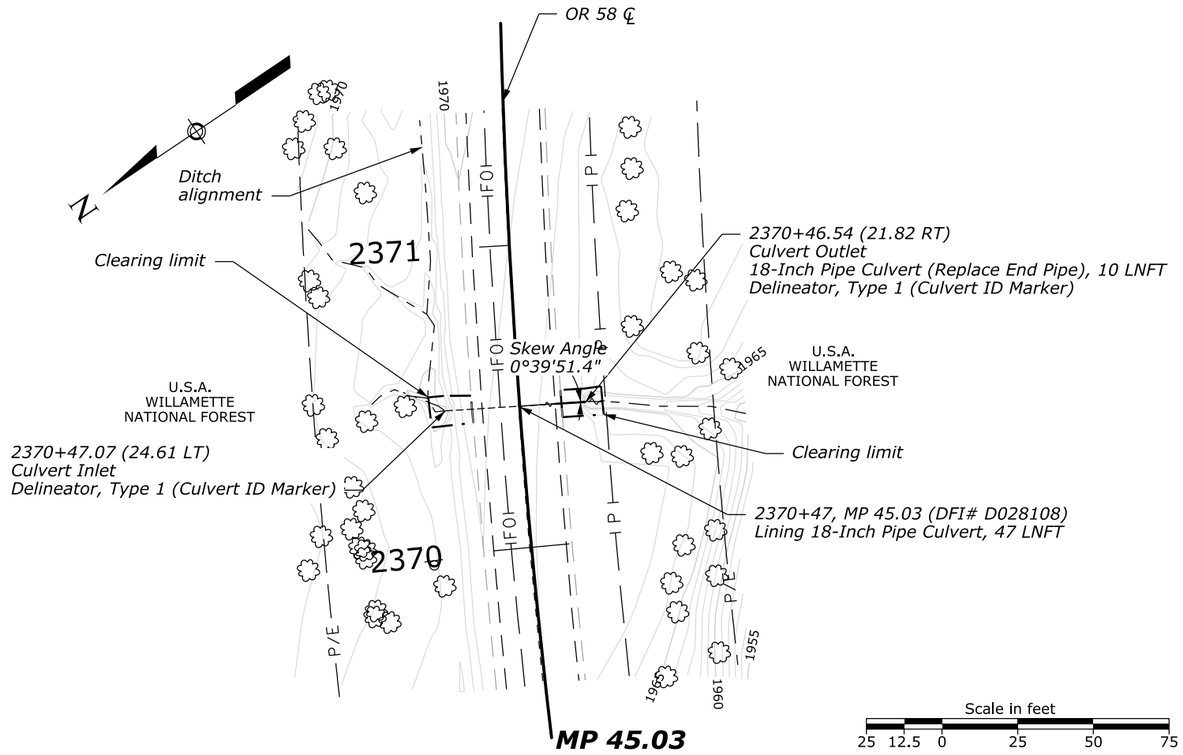


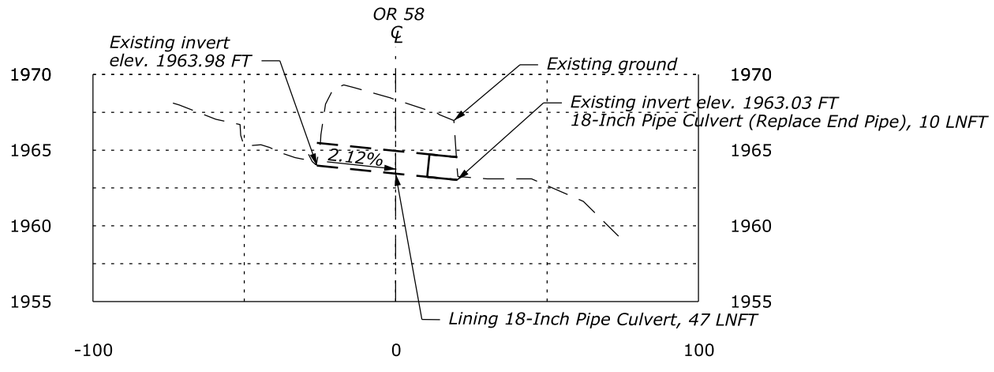


**MP 45.03**

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98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
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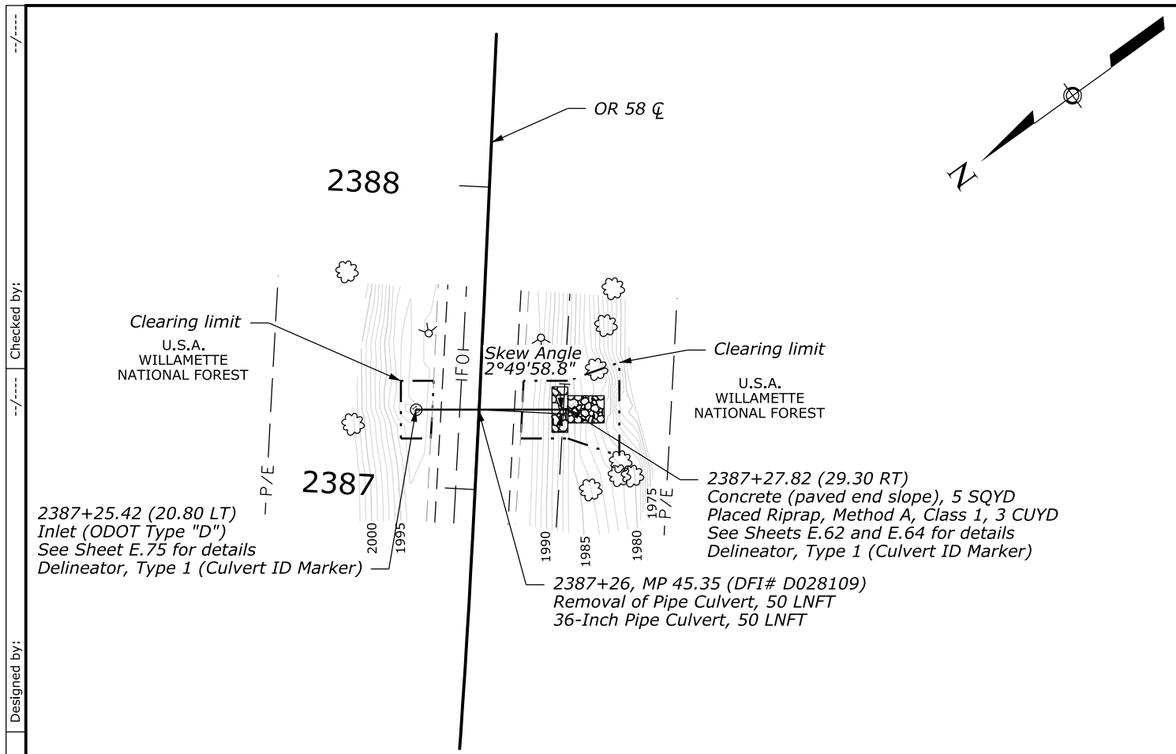
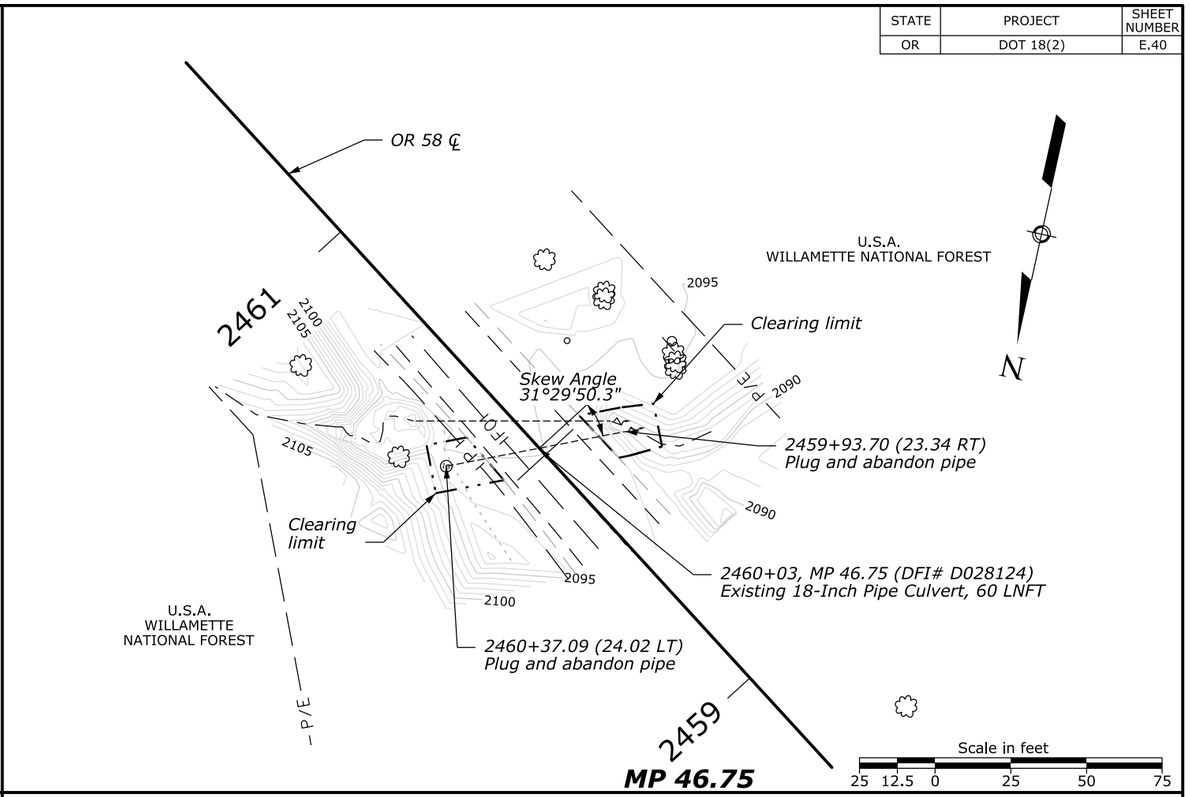
EXPIRES: 12/31/2024

**2370+47, MP 45.03 (DFI# D028108)**
**CULVERT**
**PLAN AND PROFILE**

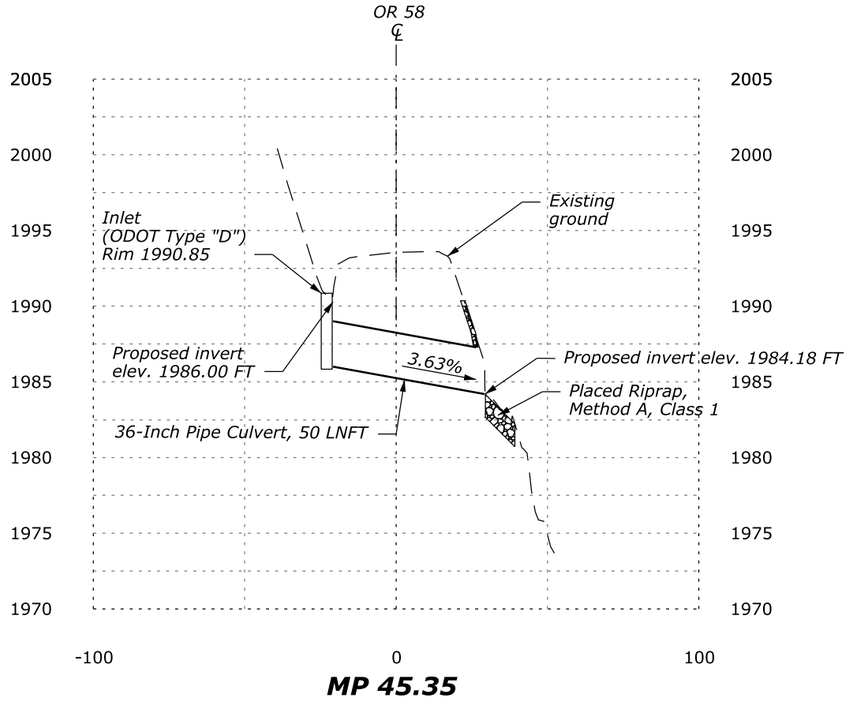
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.40 |



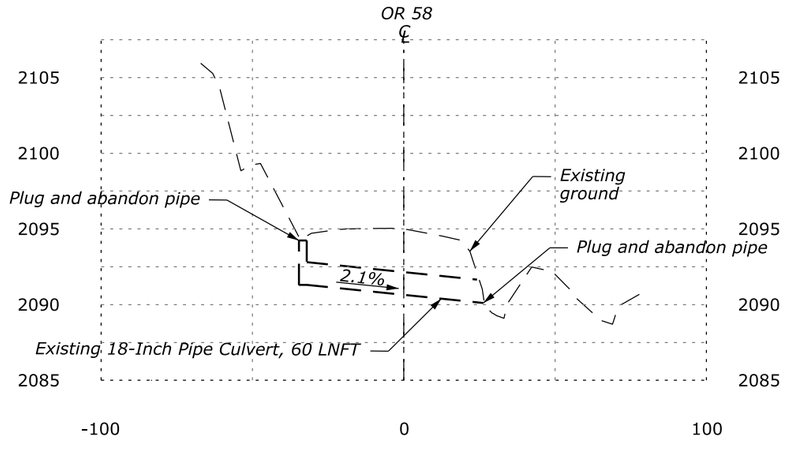

**MP 45.35**




**MP 46.75**




**MP 45.35**




**MP 46.75**

REGISTERED PROFESSIONAL ENGINEER
98999PE
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OREGON
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**2387+26, MP 45.35 (DFI# D028109) &**
**2460+03, MP 46.75 (DFI# D028124)**
**CULVERT**
**PLAN AND PROFILE**

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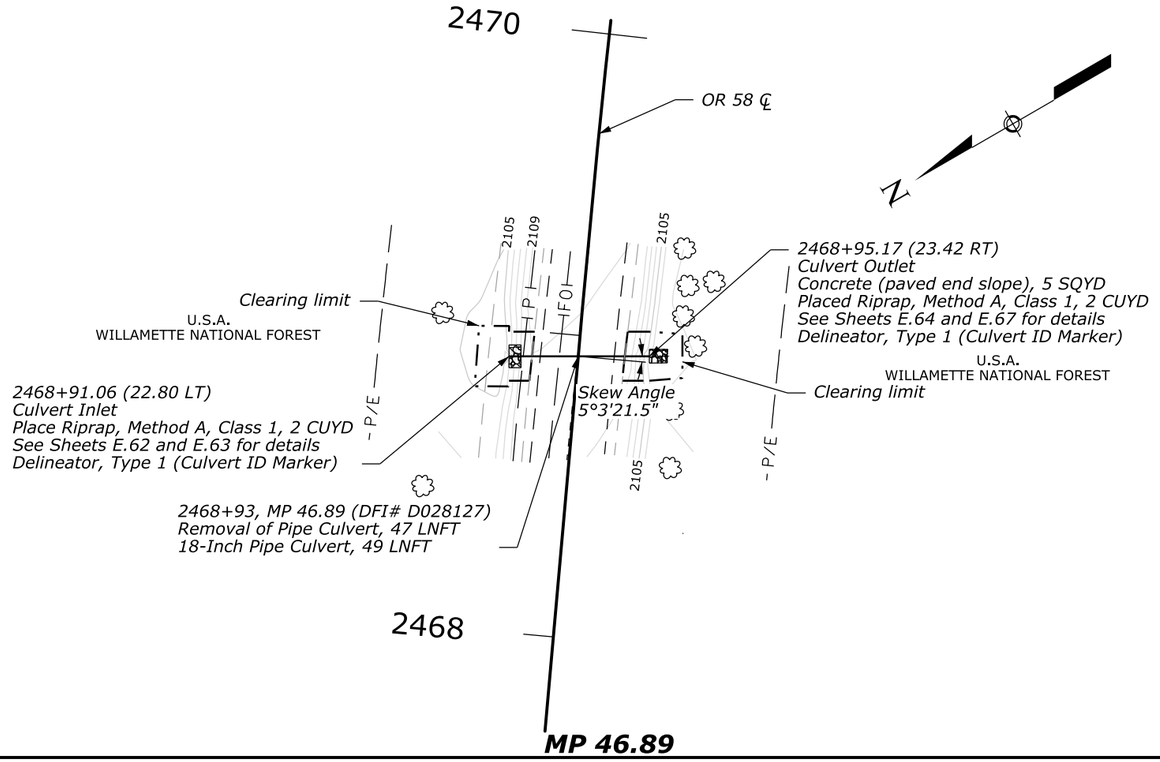
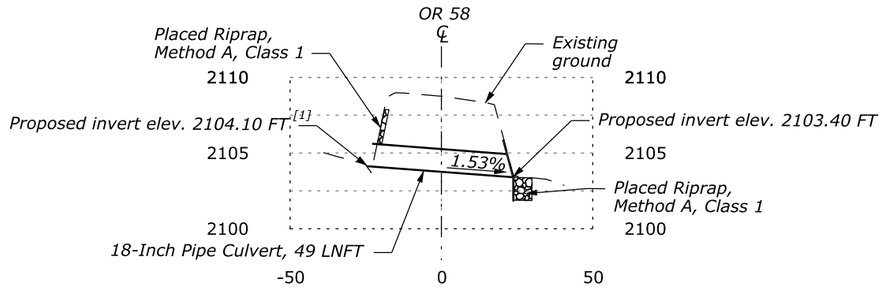
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.41 |




Scale in feet

25 12.5 0 25 50 75




**MP 46.89**

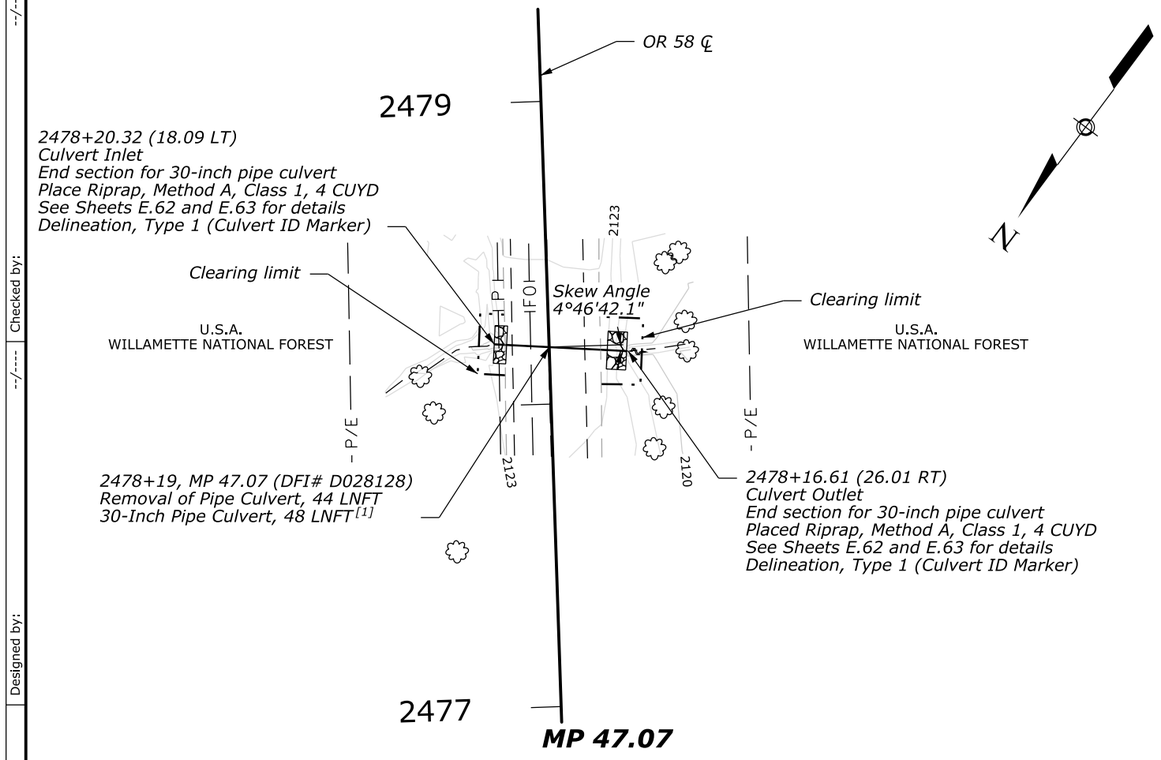
REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

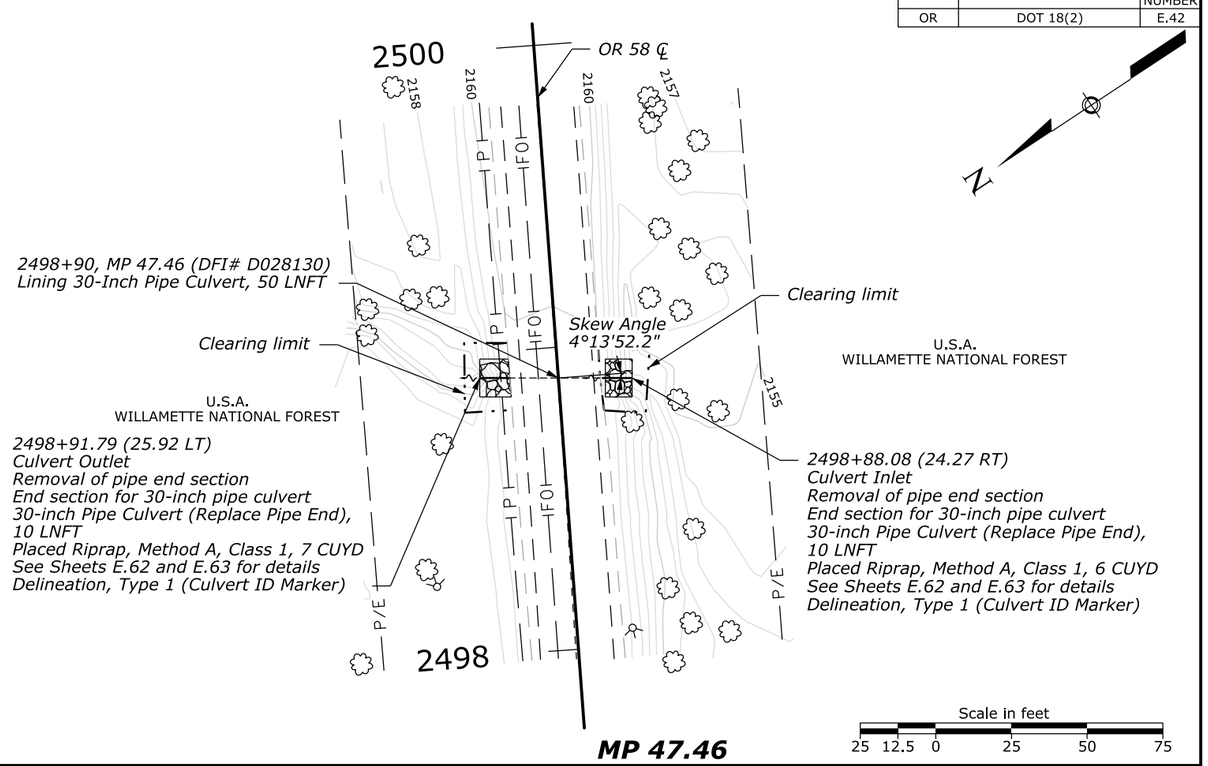
*FOOTNOTE:*
*[1] Proposed Pipe is extended 2 LNFT at the inlet beyond the existing pipe.*

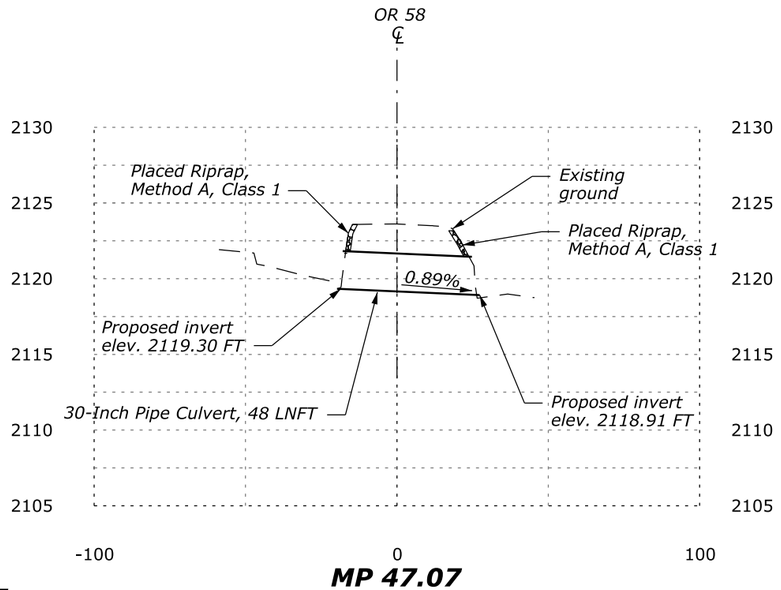
**2468+93, MP 46.89 (DFI# D028127)**
**CULVERT**
**PLAN AND PROFILE**

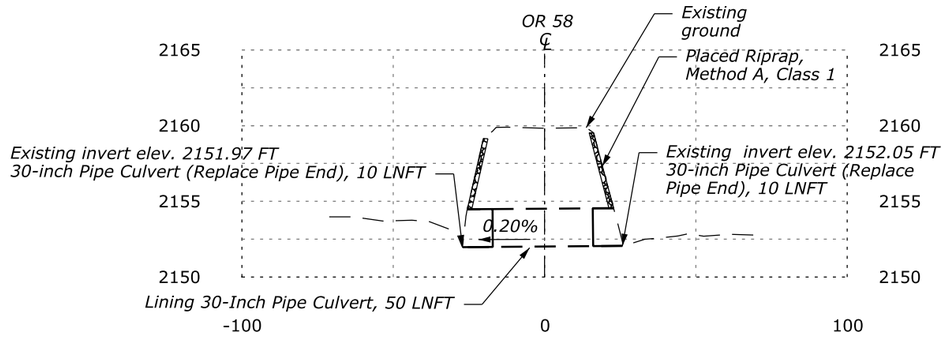
Designed by: -/---- Checked by: -/----
8/30/2021 3:46:41 PM c:\bms\wsp-pb-us-pw-02\behzad.ahmadi@wsp.com\d0219312\or-01802E41.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.42 |




REGISTERED PROFESSIONAL ENGINEER
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OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

*FOOTNOTE:*

[1] *Proposed Pipe is extended 2 LNFT at inlet and outlet beyond the existing pipe.*

**2478+19, MP 47.07 (DFI# D028128) &**
**2498+90, MP 47.46 (DFI# D028130)**
**CULVERT**
**PLAN AND PROFILE**

Designed by: --/---- Checked by: --/----
3/17/2022 3:35:27 PM c:\bms\wsp-pb-us-pw-02\behzad.ahmadi@wsp.com\d0219312\or-01802E42.dgn

| STATE | PROJECT | SHEET NUMBER |
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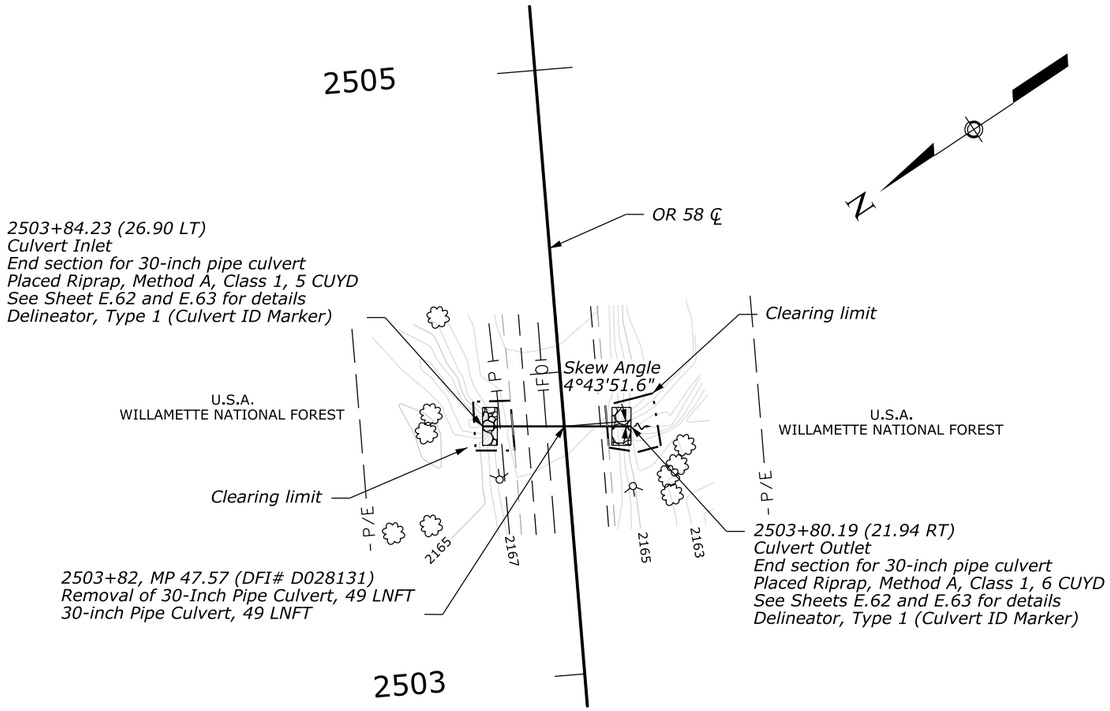
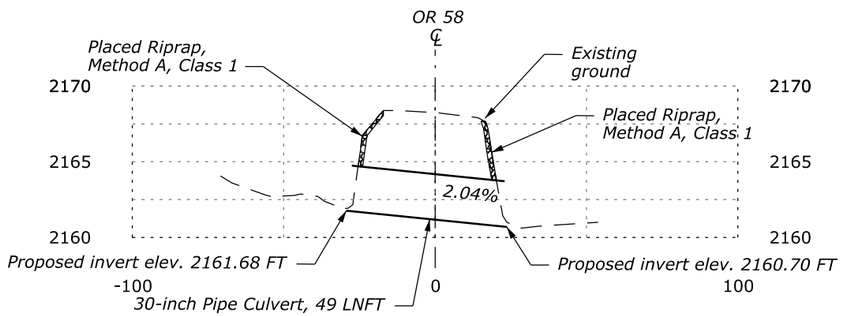
| OR | DOT 18(2) | E.43 |




Scale in feet

25 12.5 0 25 50 75




MP 47.57

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**2503+82, MP 47.57 (DFI# D028131)**
**CULVERT**
**PLAN AND PROFILE**

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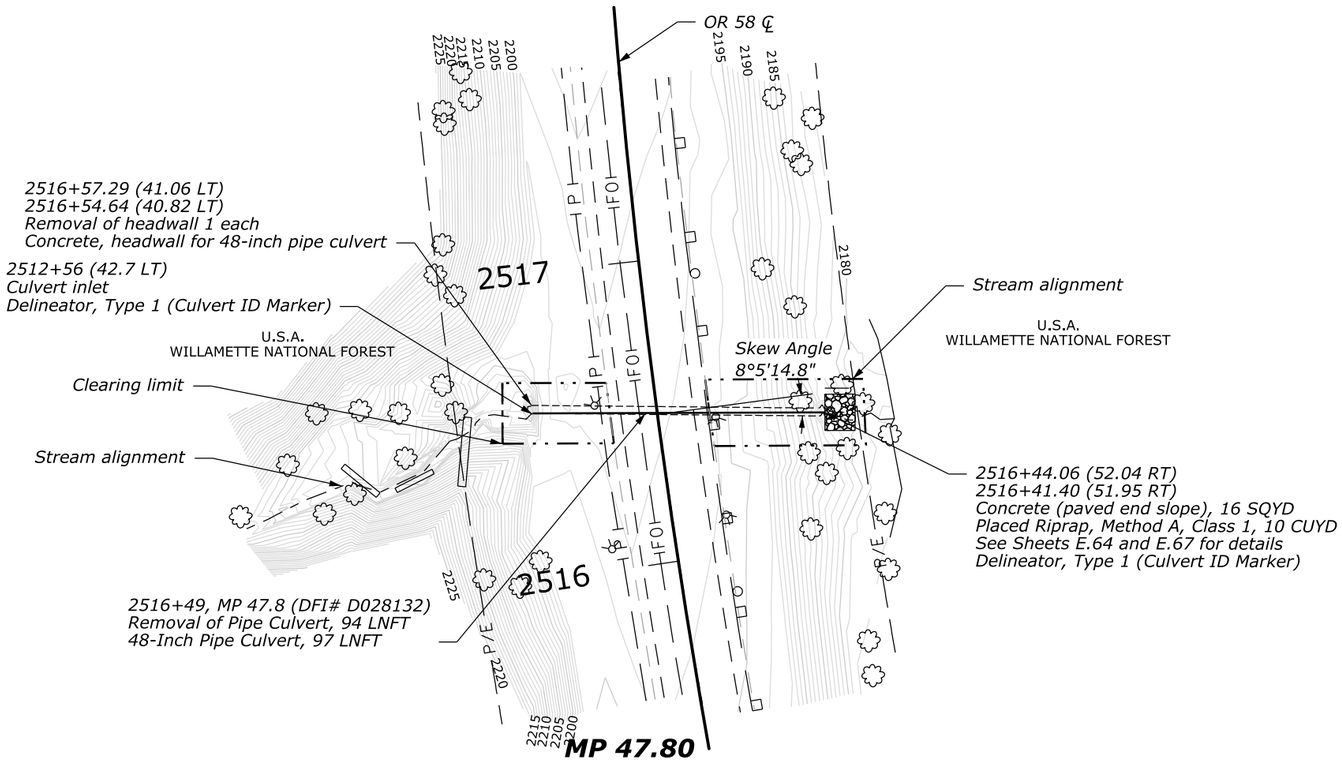
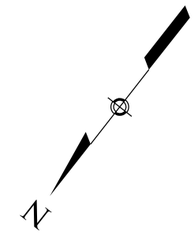
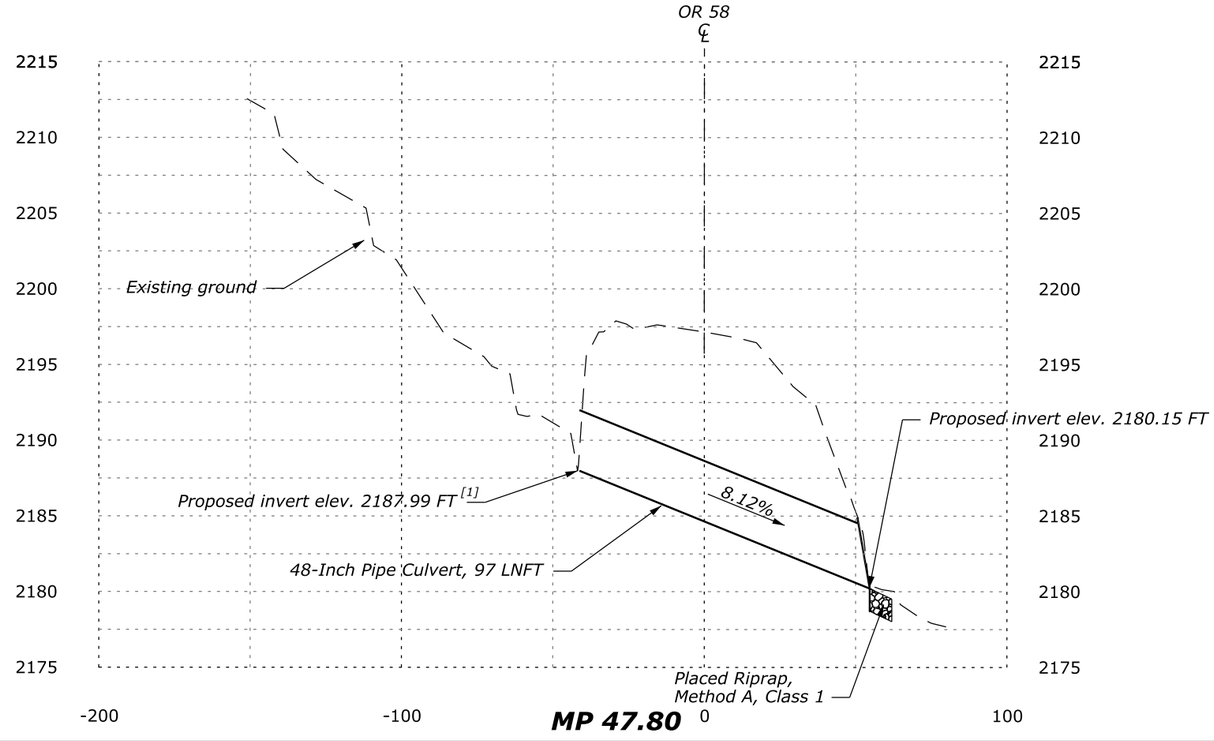
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.44 |




Scale in feet
25 12.5 0 25 50 75




*FOOTNOTE:*
*[1] Proposed pipe is extended 3 LNFT at the inlet beyond the existing pipe.*

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
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EXPIRES: 12/31/2024

**2516+49, MP 47.8 (DFI# D028132)**
**CULVERT**
**PLAN AND PROFILE**

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3/21/2022 6:49:33 AM c:\bms\wsp-pb-us-pw-02\behzad.ahmadi@wsp.com\d0219312\or-01802E44.dgn

| STATE | PROJECT | SHEET NUMBER |
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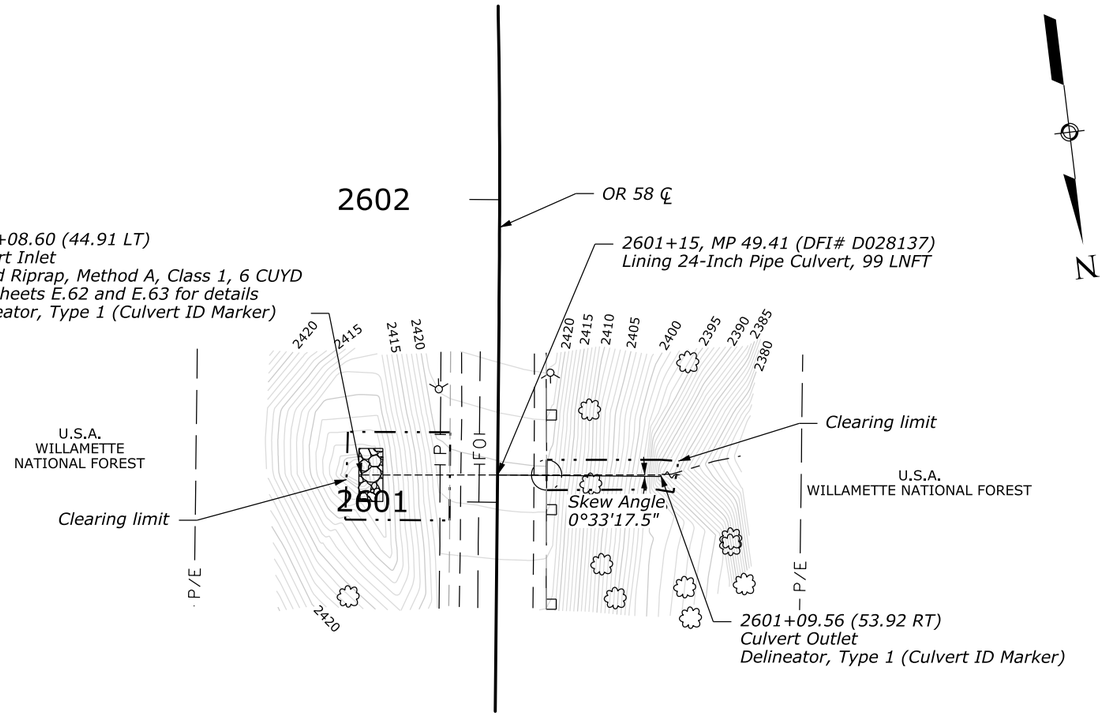
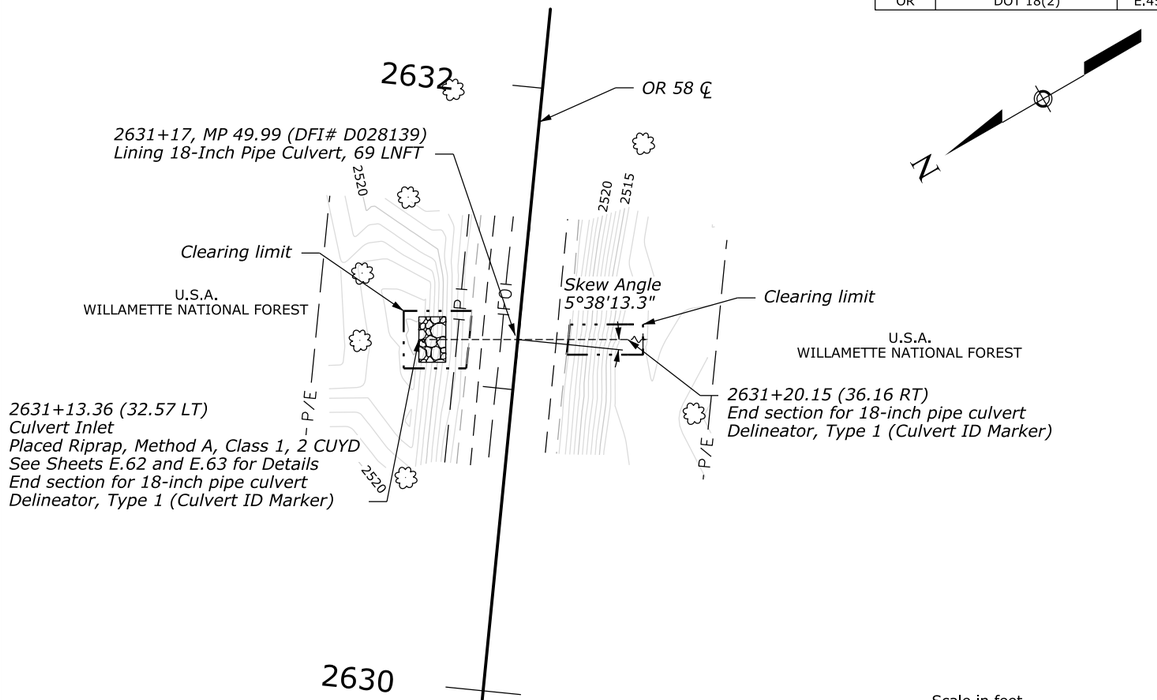
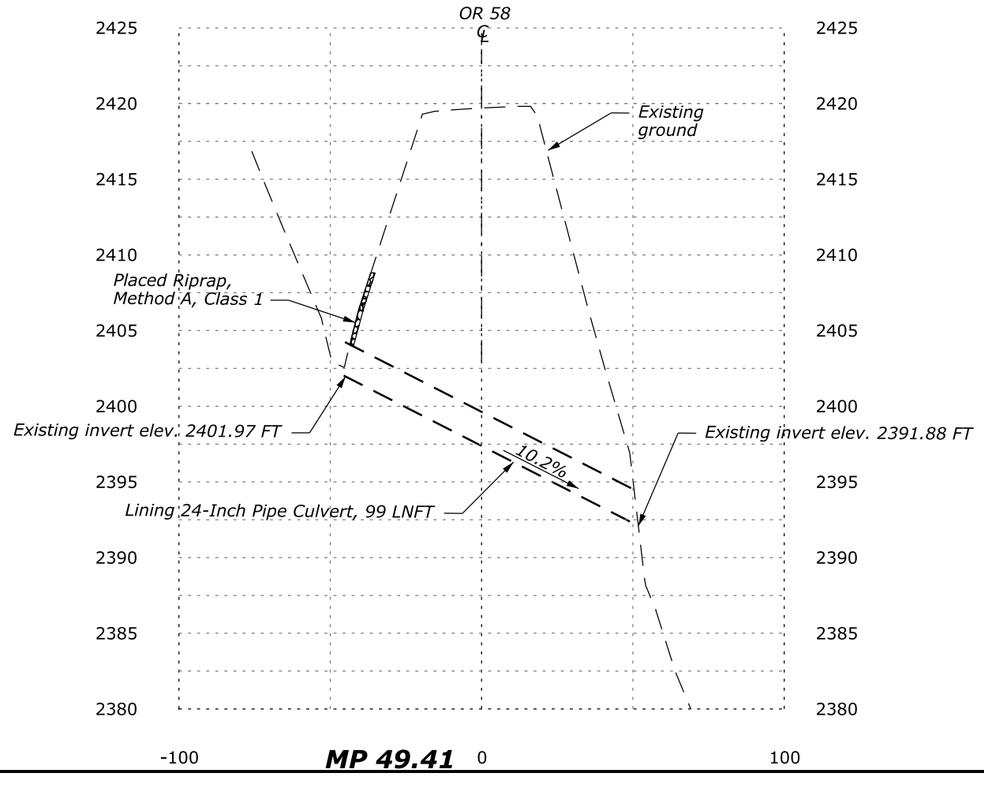



**MP 49.41**

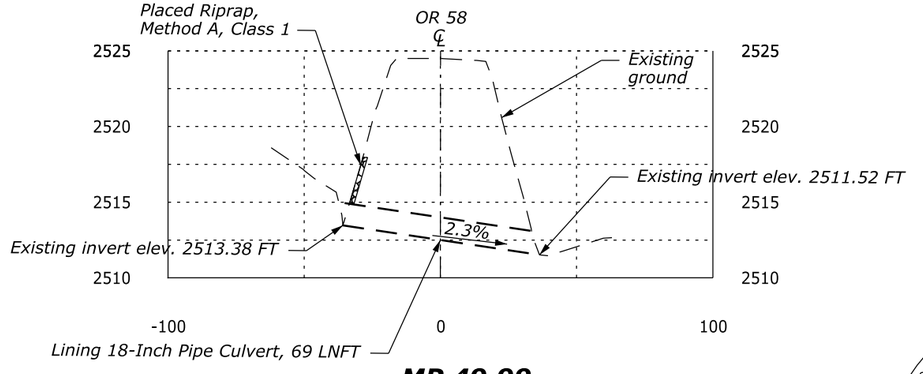



**MP 49.99**

Scale in feet
25 12.5 0 25 50 75




**MP 49.41**




**MP 49.99**

REGISTERED PROFESSIONAL ENGINEER
98999PE
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OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

# 2601+15, MP 49.41 (DFI# D028137) & 2631+17, MP 49.99 (DFI# D028139) CULVERT PLAN AND PROFILE

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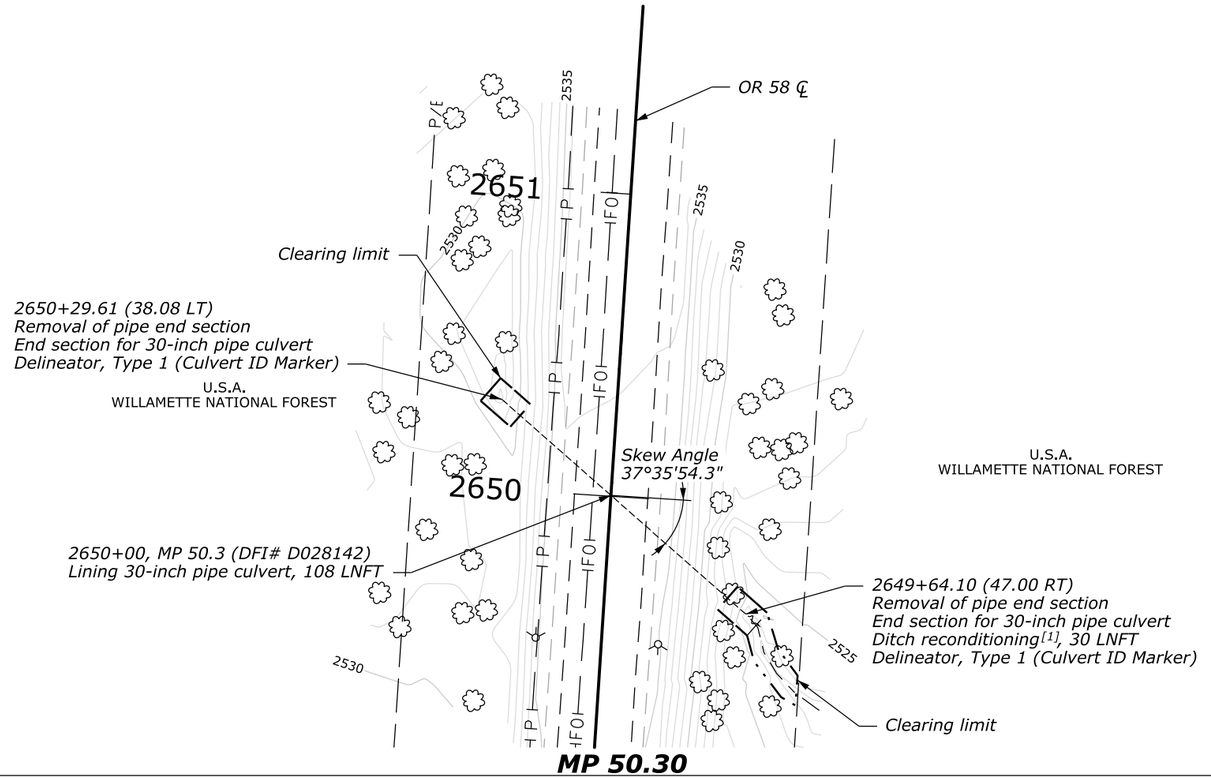
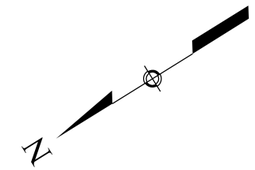
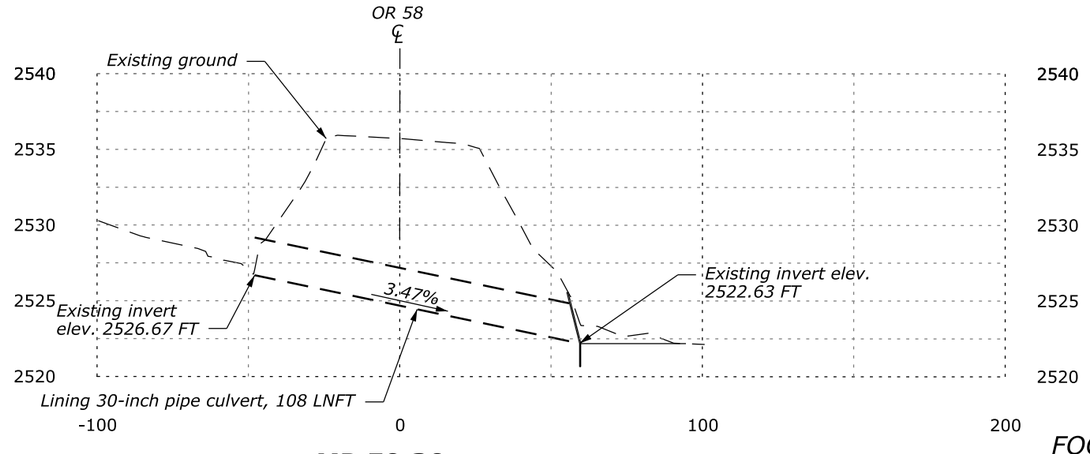



Scale in feet

25 12.5 0 25 50 75




FOOTNOTE:

[1] Perform ditch reconditioning beginning at the culvert end and extending along the ditch flowline for the distance shown.

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98999PE
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OREGON
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EXPIRES: 12/31/2024

**2650+00, MP 50.3 (DFI# D028142)**
**CULVERT**
**PLAN AND PROFILE**

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| STATE | PROJECT | SHEET NUMBER |
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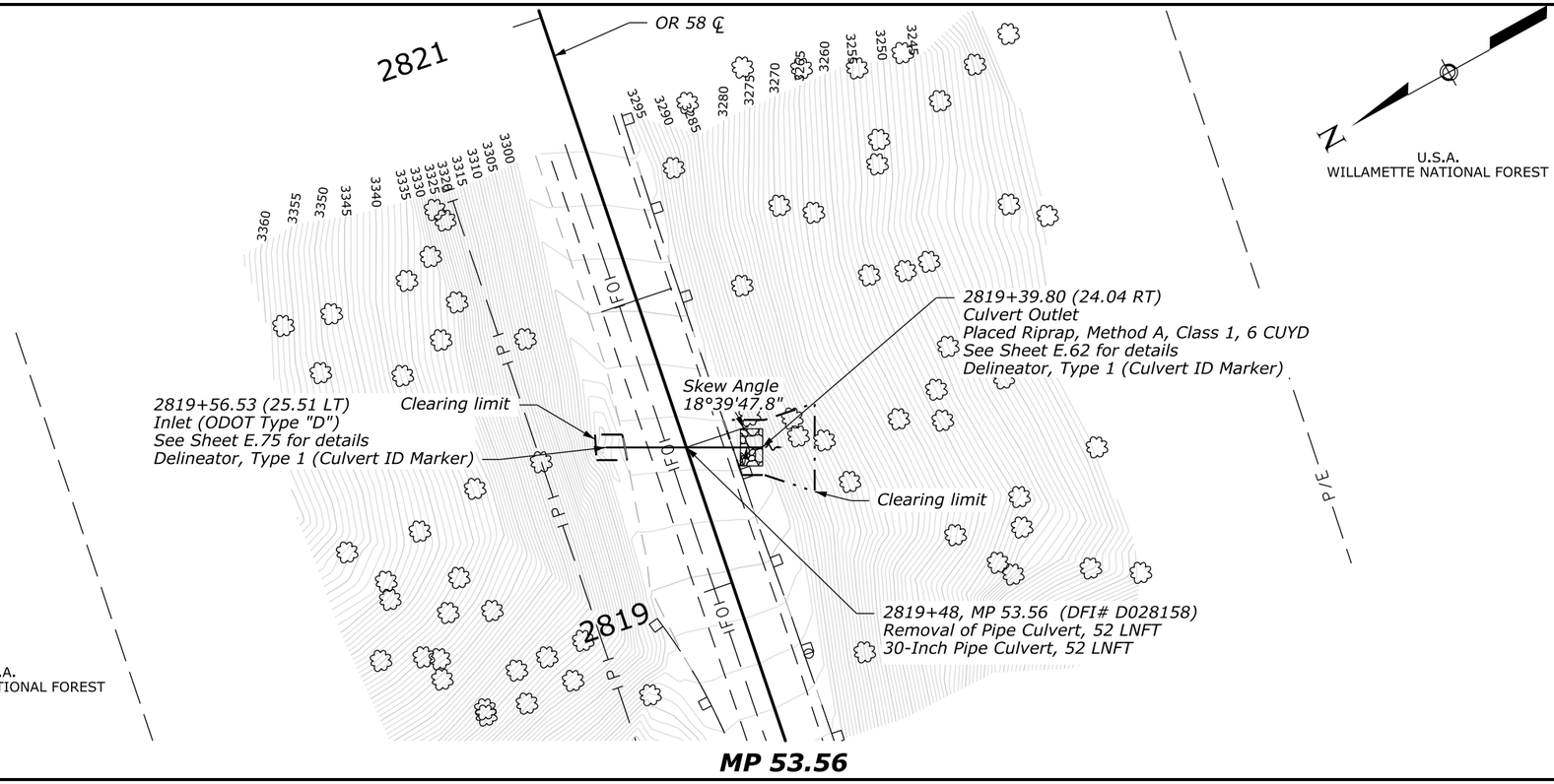
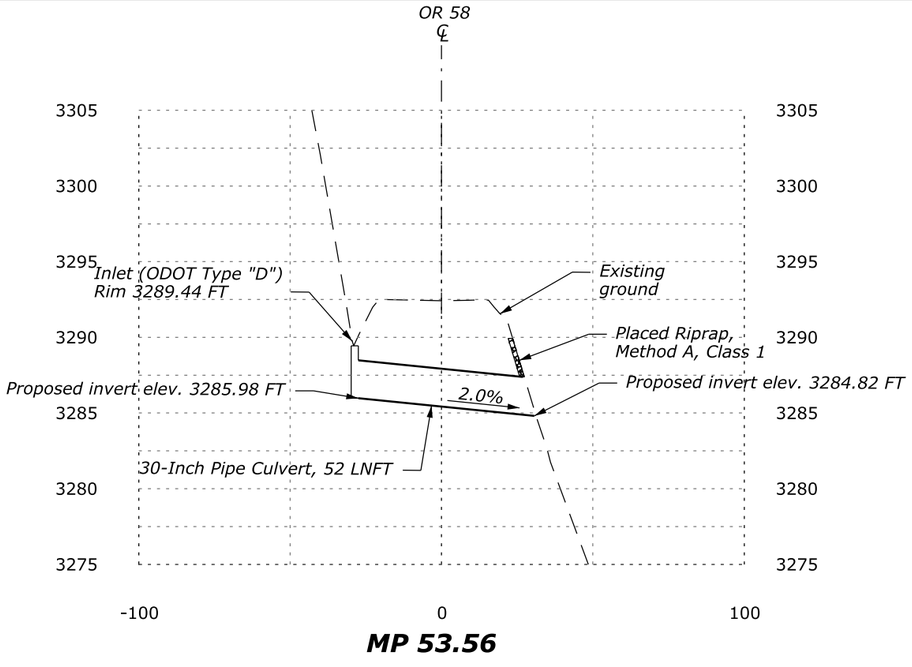



Scale in feet

25 12.5 0 25 50 75

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OREGON
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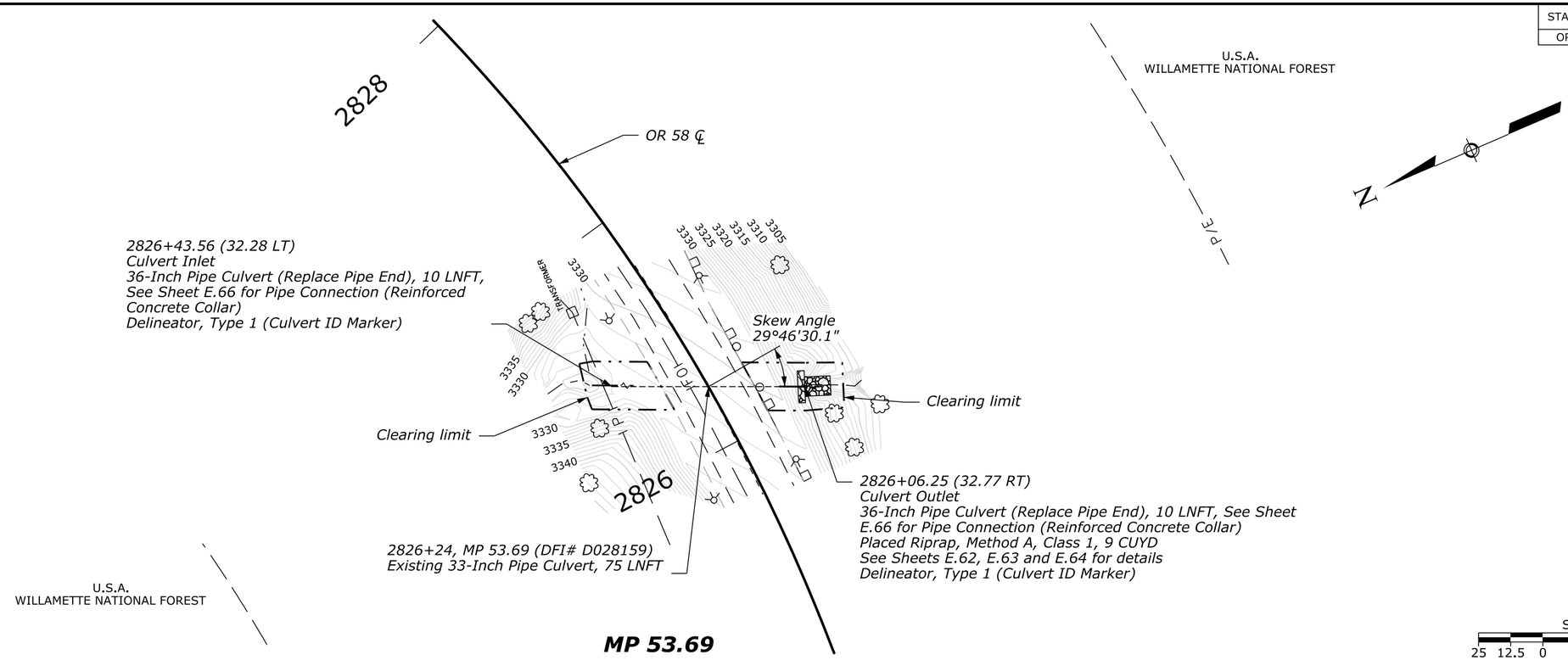
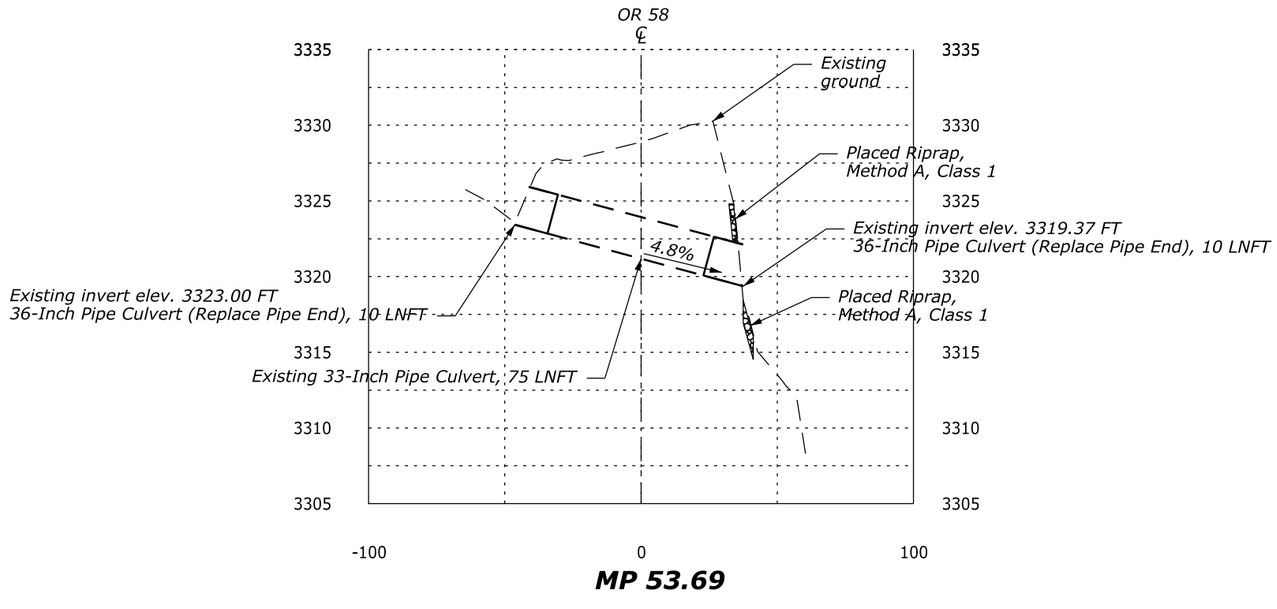
**2819+48, MP 53.56 (DFI# D028158)**
**CULVERT**
**PLAN AND PROFILE**

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.48 |

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OREGON
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EXPIRES: 12/31/2024

**2826+24, MP 53.69 (DFI# D028159)**
**CULVERT**
**PLAN AND PROFILE**

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| STATE | PROJECT | SHEET NUMBER |
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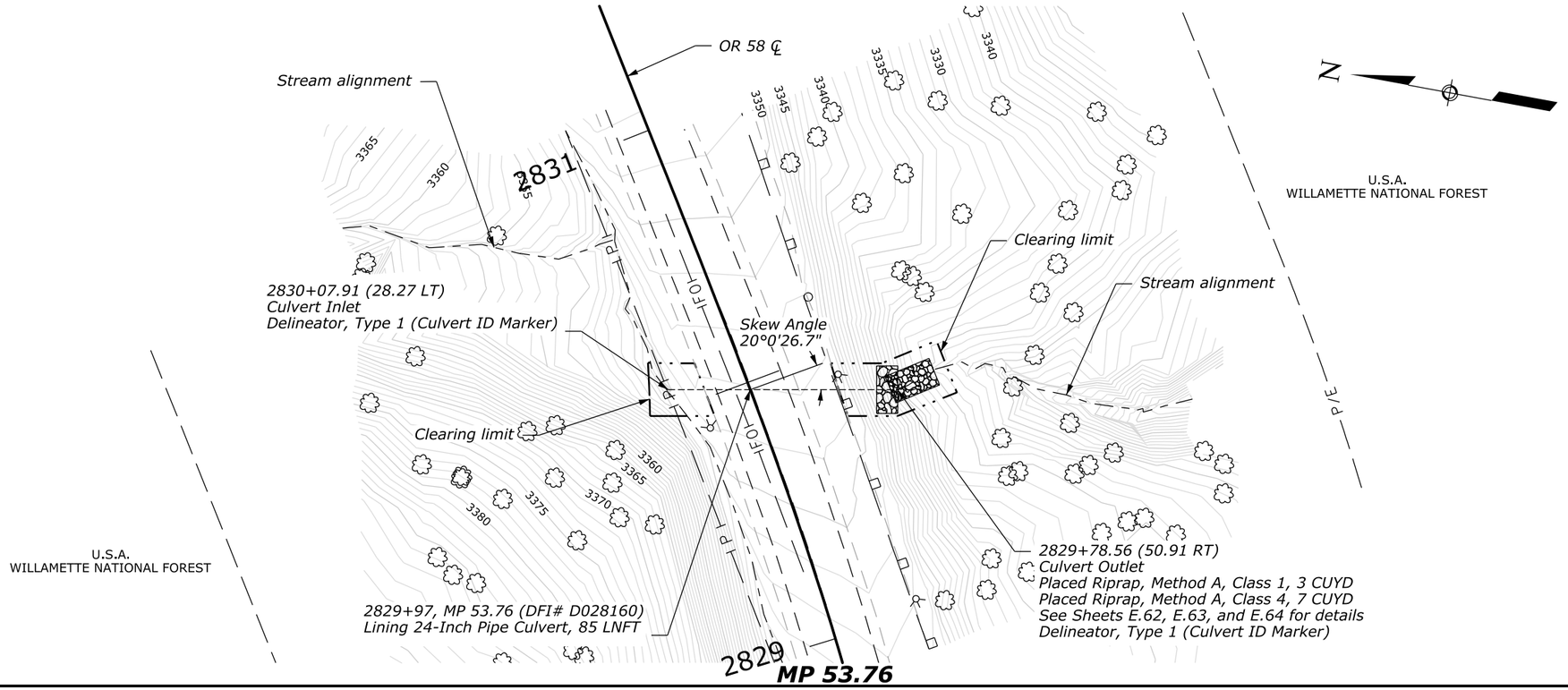


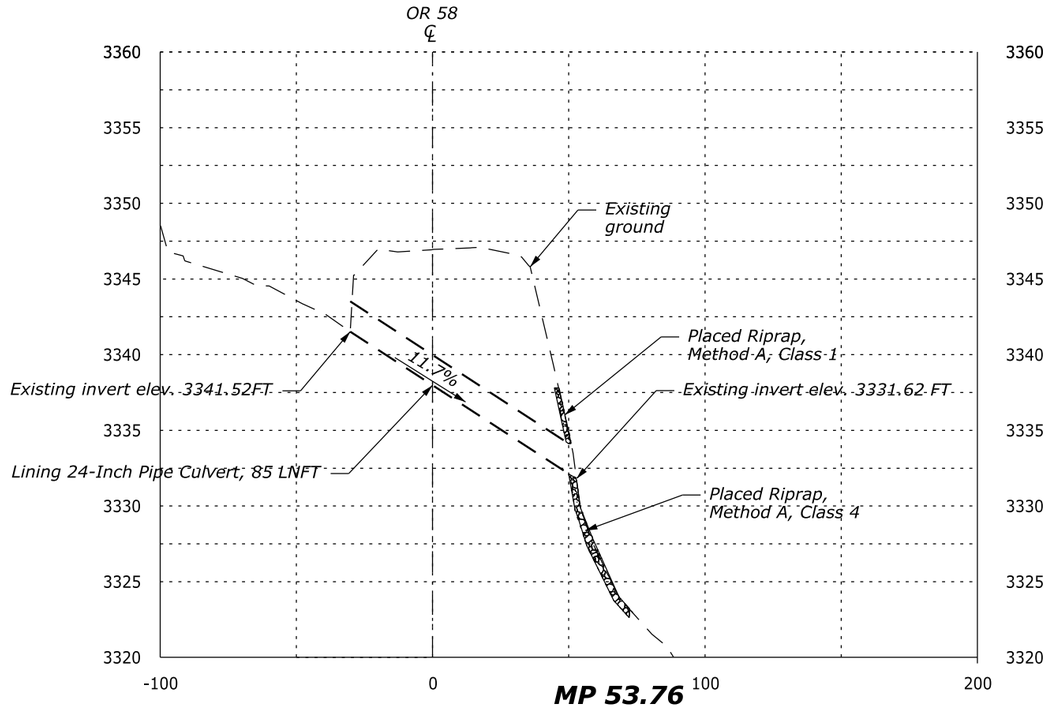


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OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**2829+97, MP 53.76 (DFI# D028160)**
**CULVERT**
**PLAN AND PROFILE**

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| STATE | PROJECT | SHEET NUMBER |
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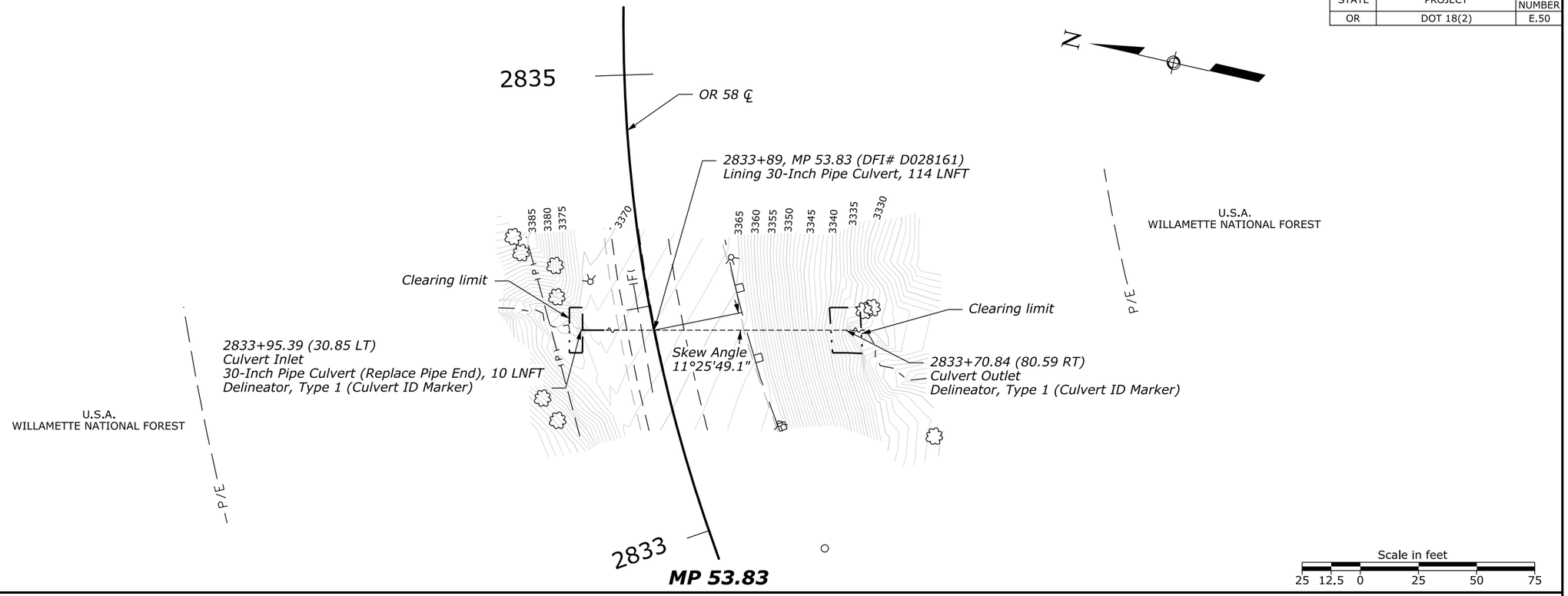


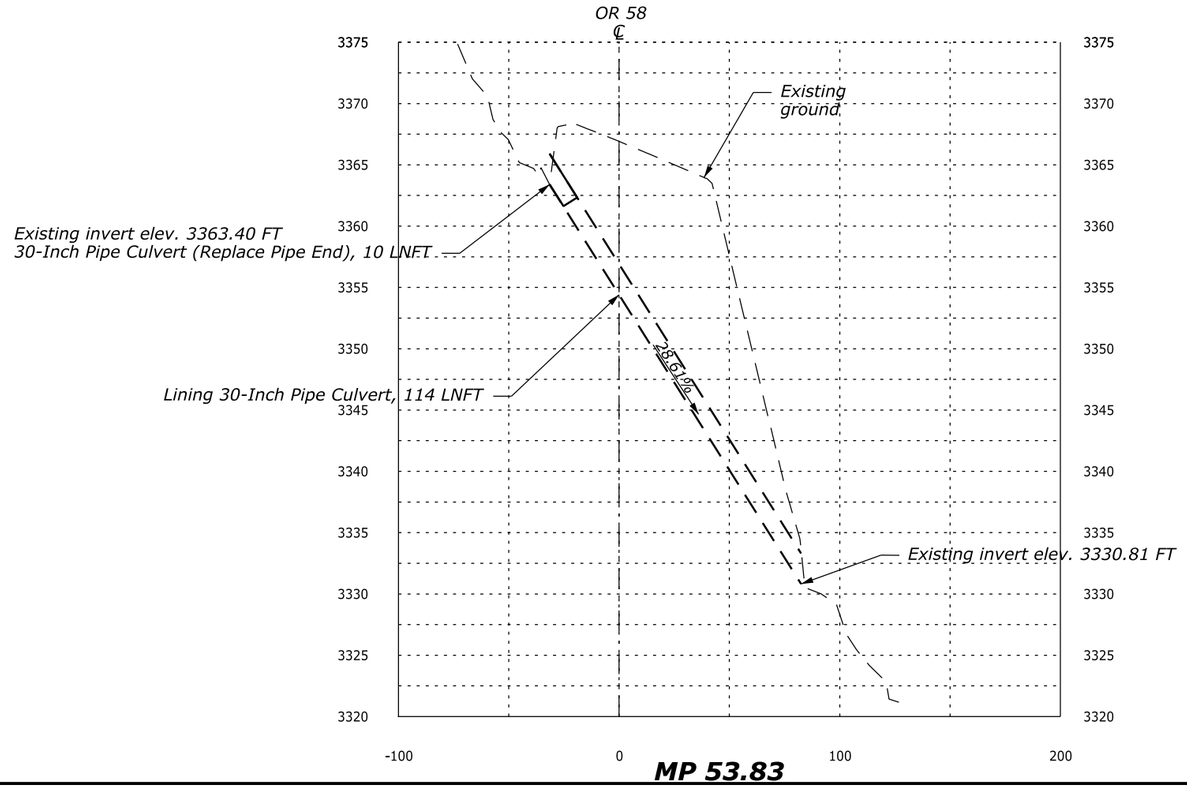


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MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**2833+89, MP 53.83 (DFI# D028161)**
**CULVERT**
**PLAN AND PROFILE**

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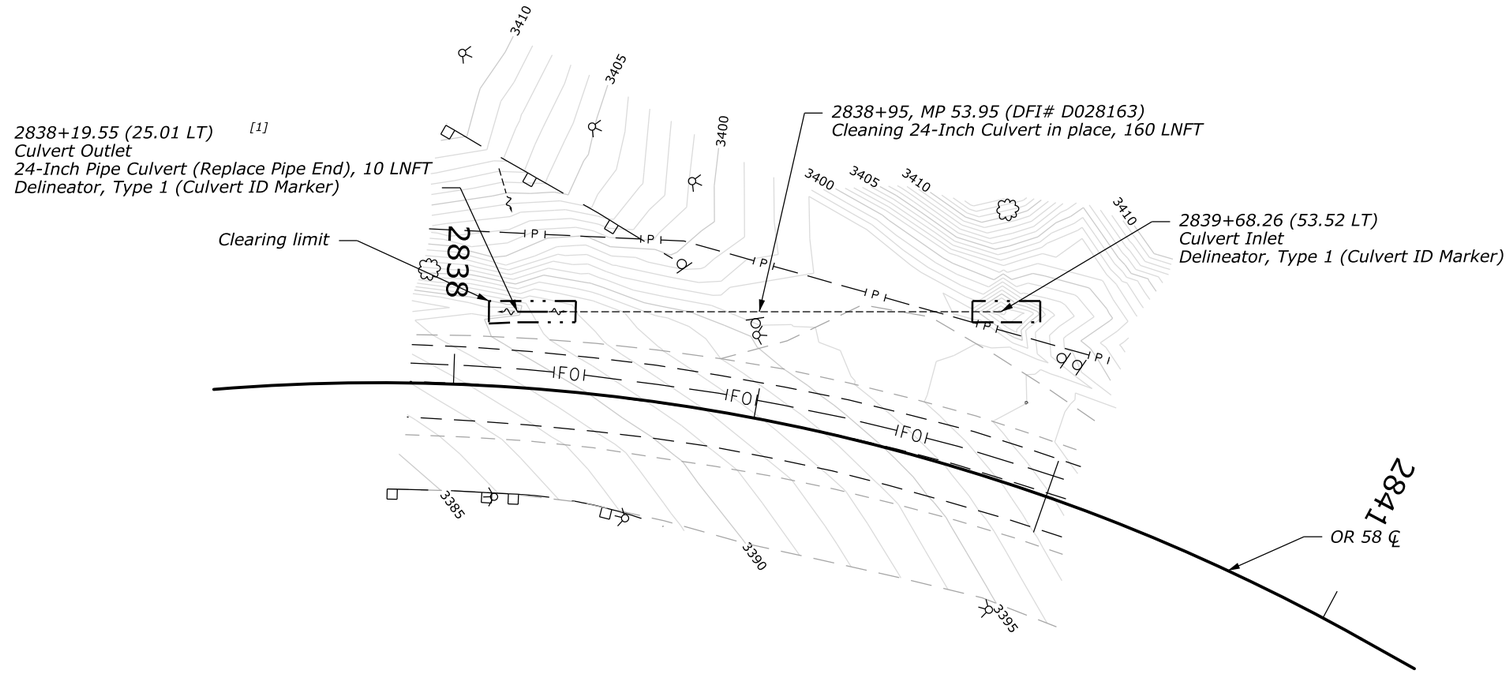
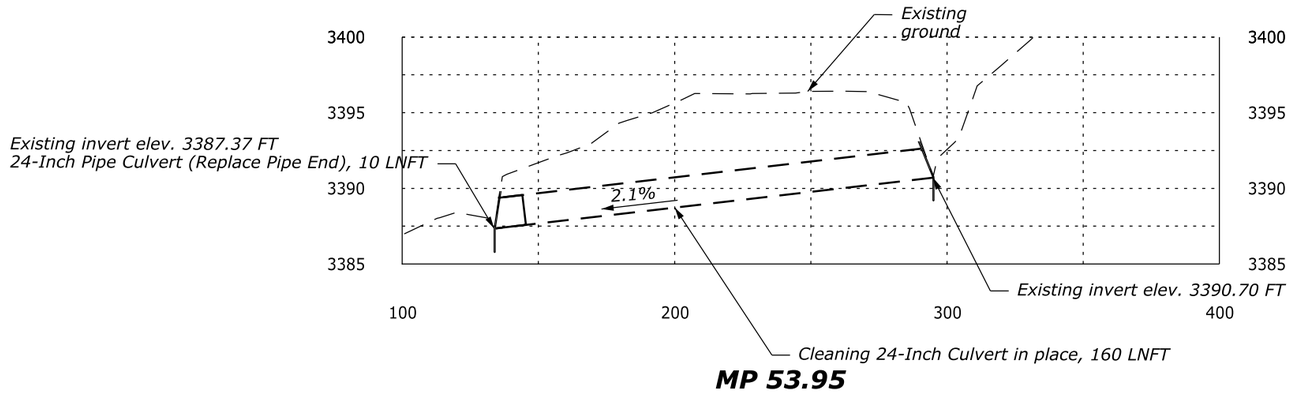
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.51 |




***MP 53.95***




Scale in feet
25 12.5 0 25 50 75




***MP 53.95***

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98999PE
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OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
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*FOOTNOTE:*
*[1] Perform ditch reconditioning beginning at the culvert end and extending along the ditch flowline for the distance shown.*

**2838+95, MP 53.95 (DFI# D028163)**
**CULVERT**
**PLAN AND PROFILE**

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| STATE | PROJECT | SHEET NUMBER |
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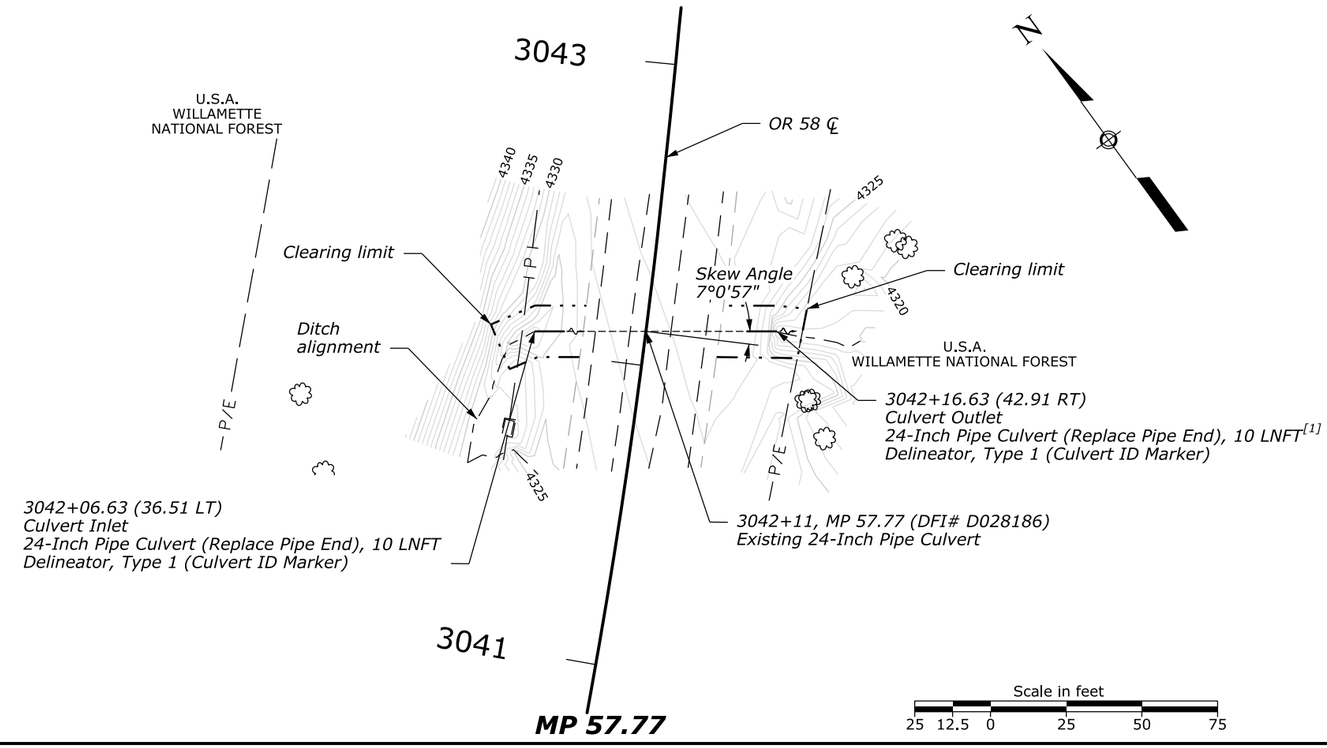


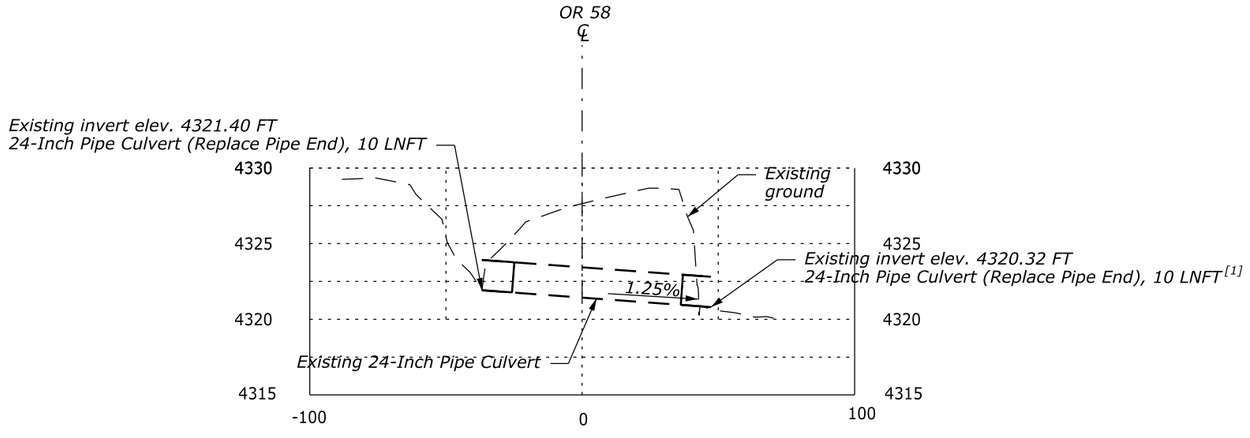


**MP 57.77**

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*FOOTNOTE:*

*[1] In addition to replacing 4 LNFT of existing pipe, extend the End Section of Pipe 6 LNFT to Stabilize the Bank.*

**3042+11, MP 57.77 (DFI# D028186)**
**CULVERT**
**PLAN AND PROFILE**

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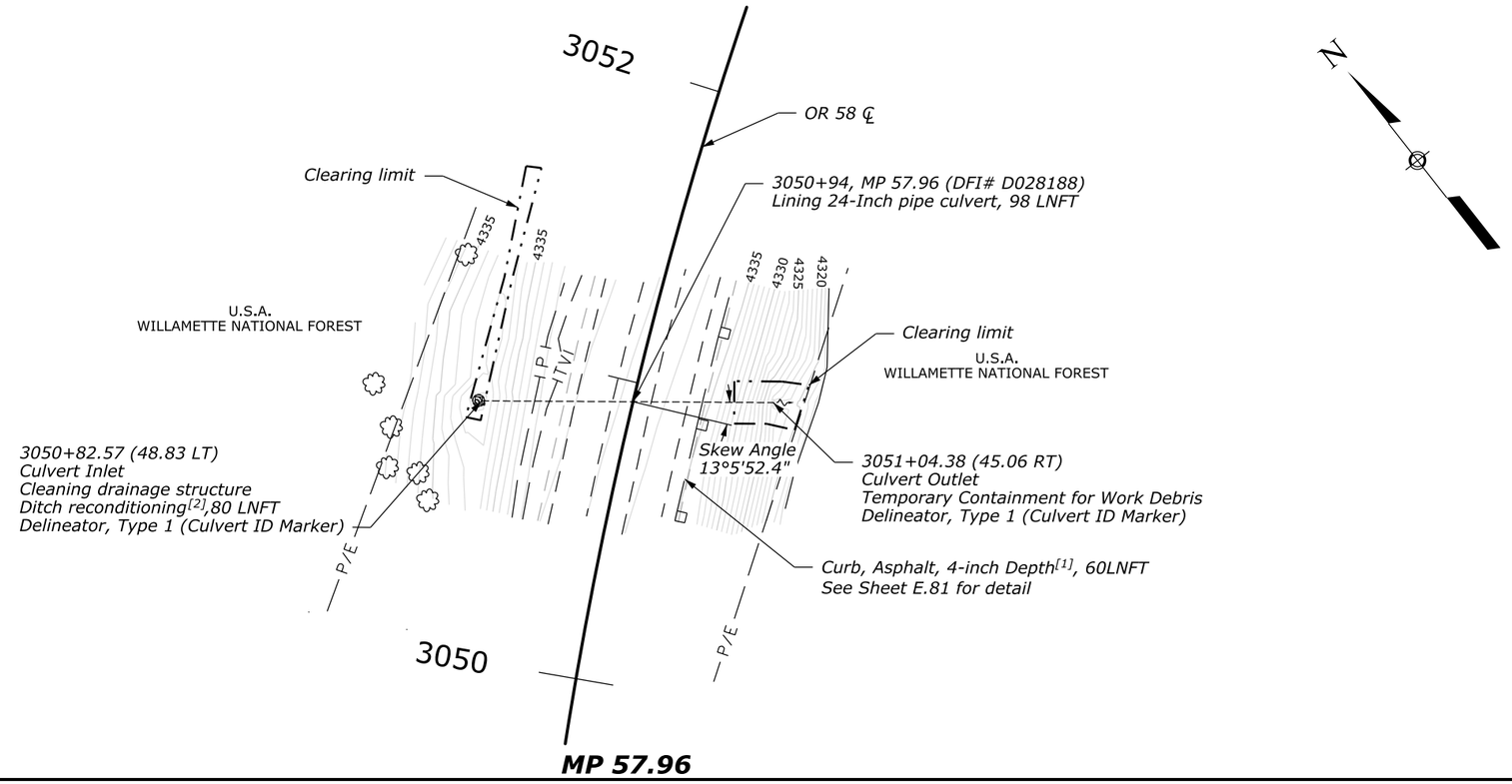
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.53 |

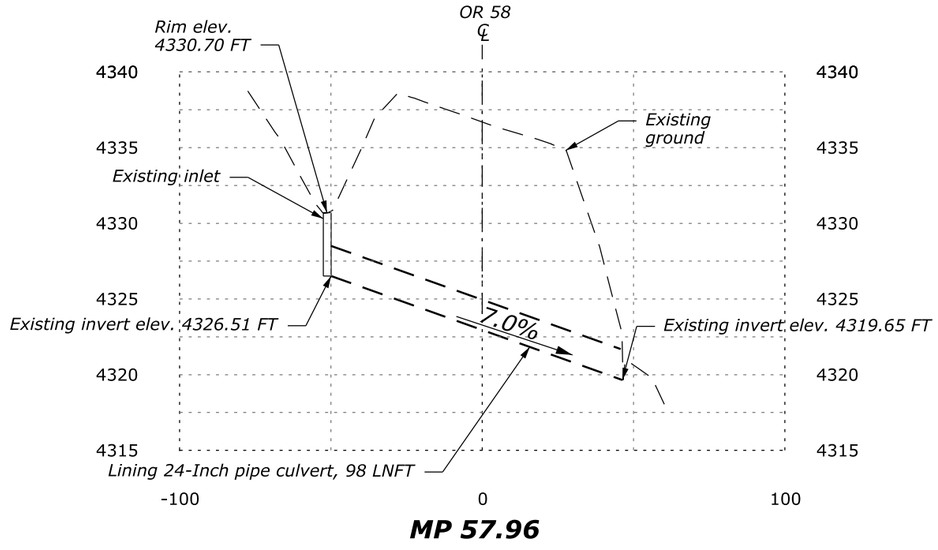






Scale in feet

25 12.5 0 25 50 75




MP 57.96

## FOOTNOTE:

[1] Begin station 3050+68.26 (22.26 RT), end station 3051+29.18 (22.07 RT).

[2] Perform ditch reconditioning beginning at the culvert end and extending along the ditch flowline for the distance shown.

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**3050+94 MP 57.96 (DFI# D028188)**
**CULVERT**
**PLAN AND PROFILE**

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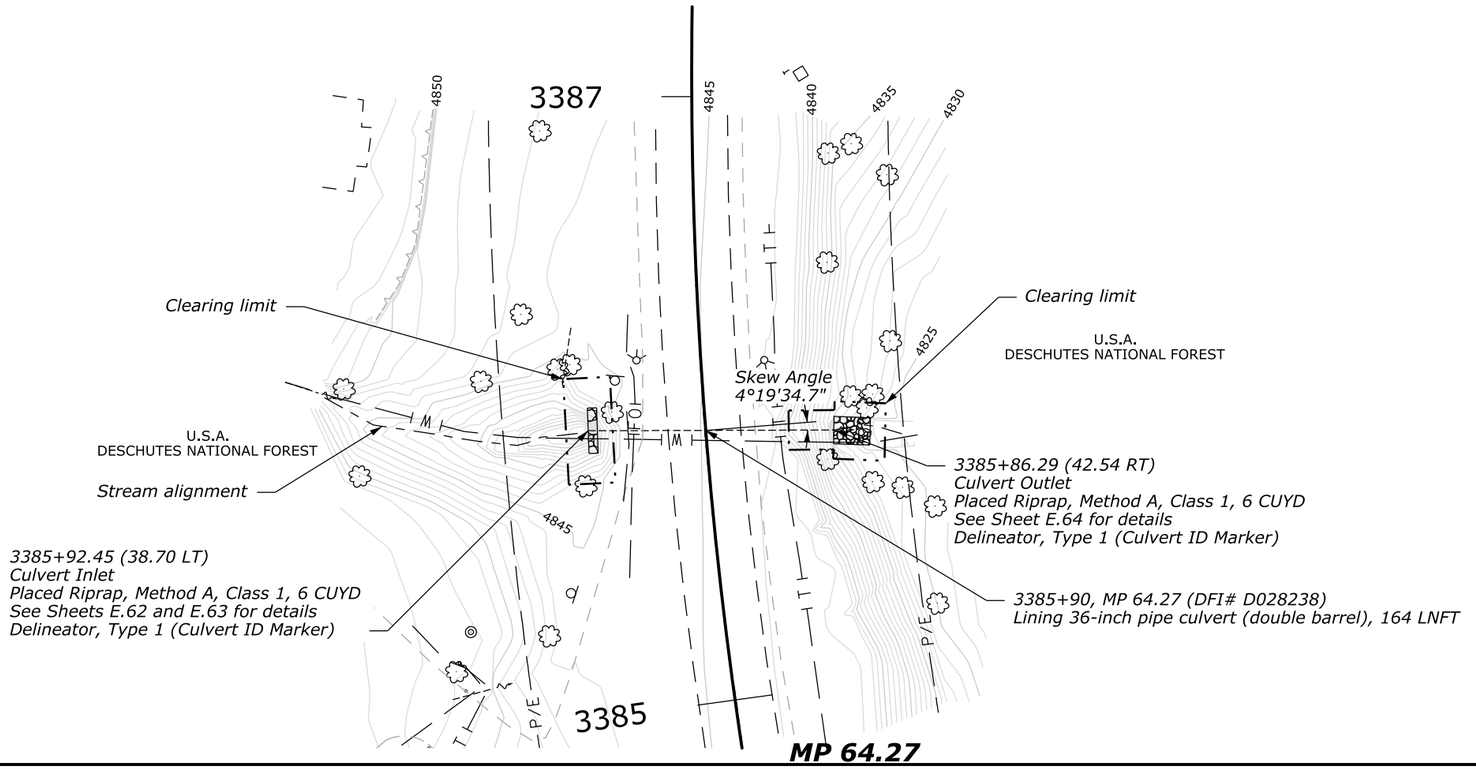
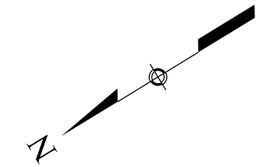
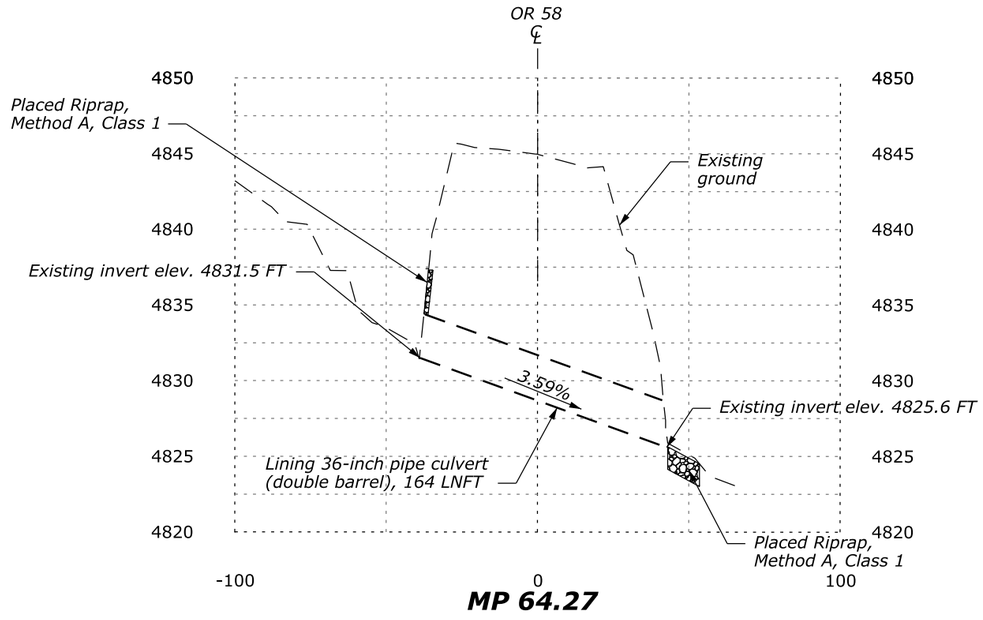
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.56 |




Scale in feet
25 12.5 0 25 50 75

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MARCH 08, 2022
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**3385+90, MP 64.27 (DFI# D028238)**
**CULVERT**
**PLAN AND PROFILE**

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| STATE | PROJECT | SHEET NUMBER |
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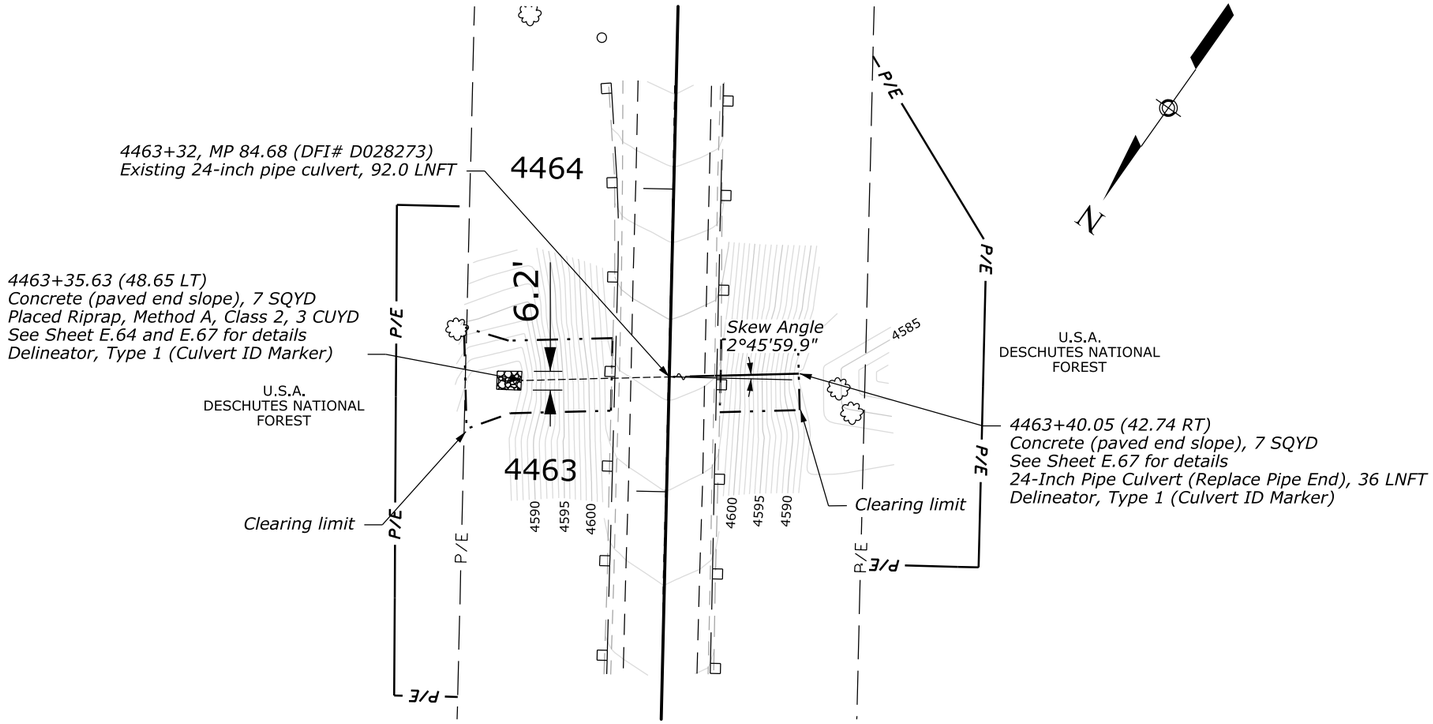
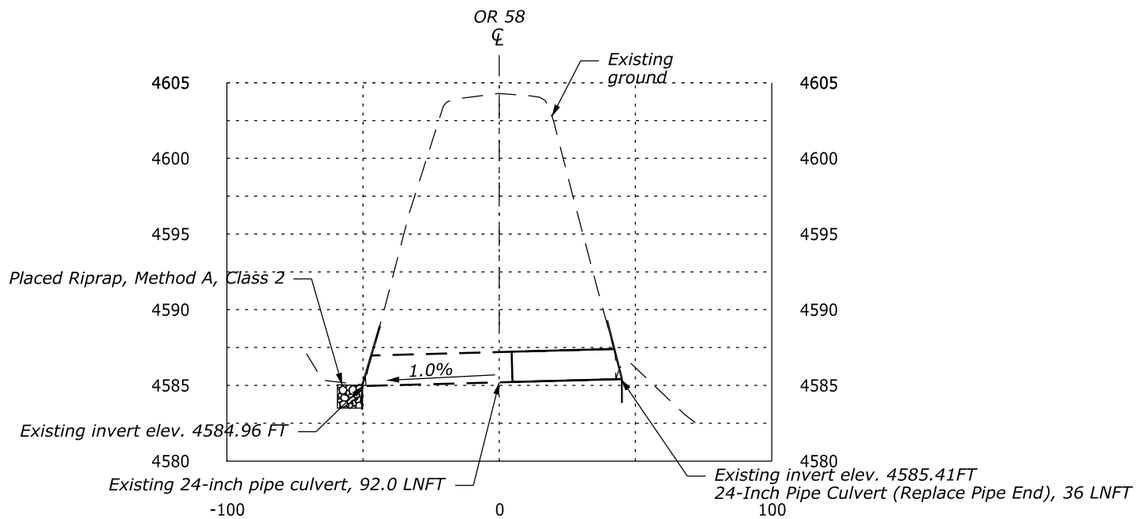
| OR | DOT 18(2) | E.58 |




**MP 84.68**




**MP 84.68**

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**4463+32, MP 84.68 (DFI# D028273)**
**CULVERT**
**PLAN AND PROFILE**

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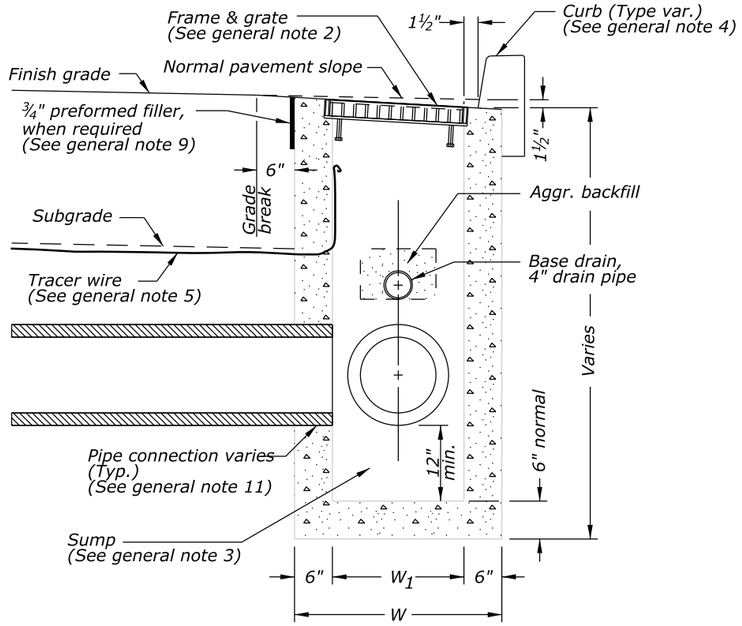
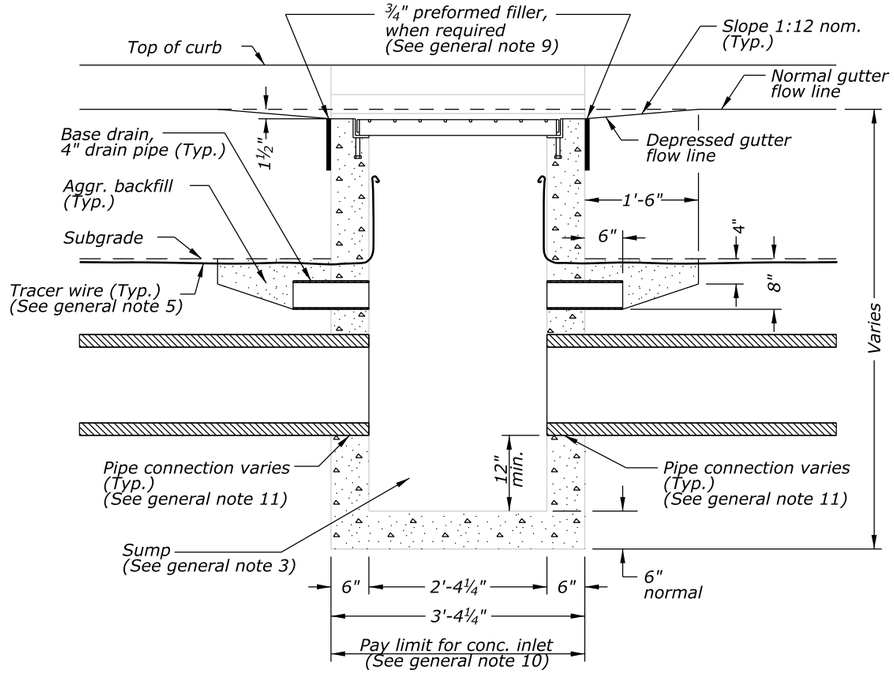
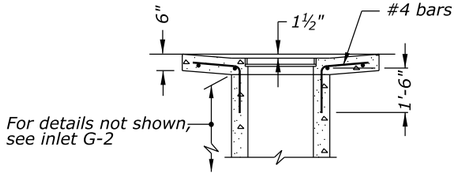
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.59 |




SECTION B - B



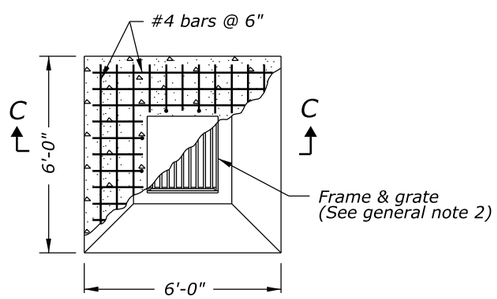

SECTION A - A




SECTION C-C

NOTE:

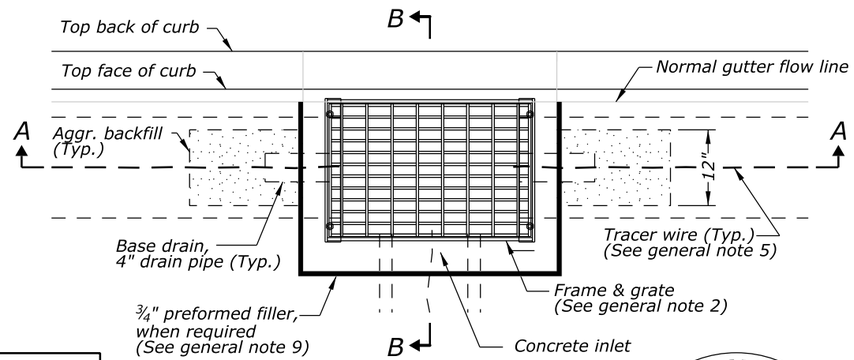
All reinforcement to be placed 2" clear of nearest face of concrete unless shown or noted otherwise




PLAN

TYPE G-2MA

| TABLE A | | |
|---|---|---|
| INLET TYPE | W | $W_1$ |
| G-1 | 2'-8⅞" | 1'-8⅞" |
| G-2, G-2M, G-2MA | 3'-3⅜" | 2'-3⅜" |




PLAN

TYPE G-1, G-2, G-2M

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Where precast inlets are used as an alternate to cast-in-place inlets, a 4" compacted leveling bed of sand or ¼"-0 crushed aggregate shall be provided. All precast inlets shall conform to requirements of ASTM C913.
2. Graphics show G-1 inlet with Type 2 grate. See Table A for inlet dimensions.
   Type 1 grate allowed only in locations not subject to bicycle or pedestrian use.
   For frame and grate details, see sheet E.76.
3. Provide sump for inlets shown on plans.
4. For curb details, see sheets E.80 & E.81.
5. See sheet E.77 for tracer wire details, or approved alternate.
6. Max. pipe diameter varies with pipe material.
7. Location, elevation, diameter, slope, and number of pipe(s) varies, see project plans.
8. All concrete shall be commercial grade concrete.
9. ¾" preformed filler (in concrete pavement or gutter only) to extend through thickness of concrete.
10. See sheet E.78 for gutter transition section, when curb and gutter are required.
11. See sheet E.79 for pipe to structure connections.

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DRAWING BASED ON OREGON STANDARD DRAWING RD364

# CONCRETE INLETS
# ODOT TYPE G-1, G-2, G-2M, AND G-2MA

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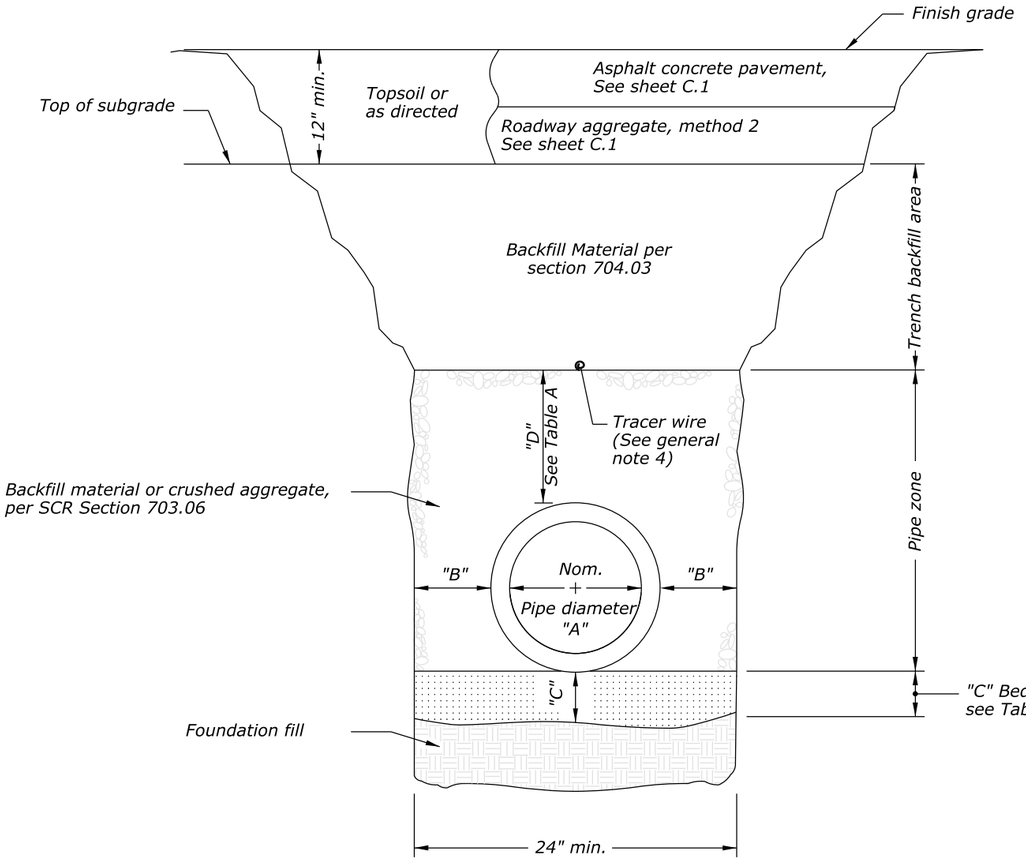
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.60 |



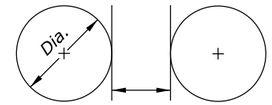

## TABLE A

| "A" (in) | "B" (in) | "C" (in) | "D"* (in) |
|---|---|---|---|
| 18 | 18 | 6 | 12 |
| 21 | 16 | 6 | 12 |
| 24 | 18 | 6 | 12 |
| 30 | 18 | 6 | 12 |
| 36 | 24 | 6 | 14 |
| 42 | 24 | 6 | 14 |
| 48 | 24 | 6 | 14 |
| 54 | 24 | 6 | 14 |
| 60 | 24 | 6 | 14 |
| 66 | 24 | 6 | 14 |
| 72 | 24 | 6 | 14 |

*"D" can be zero for ductile iron pipes

For pipes over 72" diameter, see general note 3.

### MULTIPLE INSTALLATIONS




| DIAMETER | MIN. SPACE BETWEEN PIPES |
|---|---|
| Up to 48" | 24" |
| 48" to 72" | One half (½) dia. of pipe |

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GENERAL NOTES FOR ALL DETAILS:

1. Surfacing of paved areas shall comply with street cut, see sheet E.61.
2. For pipe installation in embankment areas where the trench method will not be used and the pipe is ≥ 36" diameter, increase dimension "B" to nominal pipe diameter.
3. Pipes over 72" diameter are structures, and are not applicable to this drawing. See E.87 for pipes over 72" diameter.
4. Tracer wire required Metal Detection or Ground Penetrating Radar. For more info, go to website at https://www.fhwa.dot.gov/utilities/utilityrelo/4.cfm

DRAWING BASED ON OREGON STANDARD DRAWING RD300

# TRENCH BACKFILL, BEDDING, PIPE ZONE AND MULTIPLE INSTALLATIONS

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| STATE | PROJECT | SHEET NUMBER |
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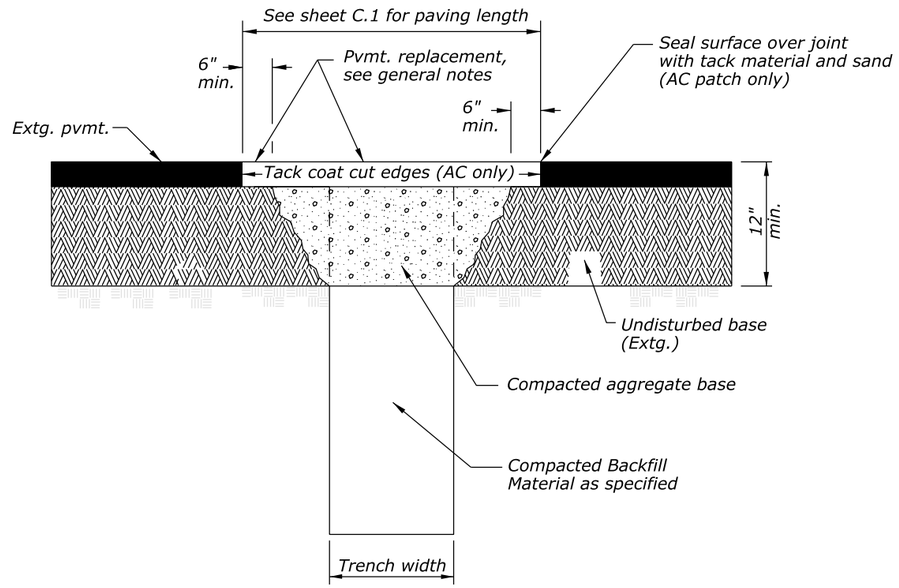


*GENERAL NOTES FOR ALL DETAILS:*

1. *All existing AC or PCC pavement shall be sawcut prior to repaving.*
2. *See sheet C.1 for pavement section. See sheet H.14 for temporary paving, is required.*

*DRAWING BASED ON OREGON STANDARD DRAWING RD302*

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OREGON
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# STREET CUT

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| STATE | PROJECT | SHEET NUMBER |
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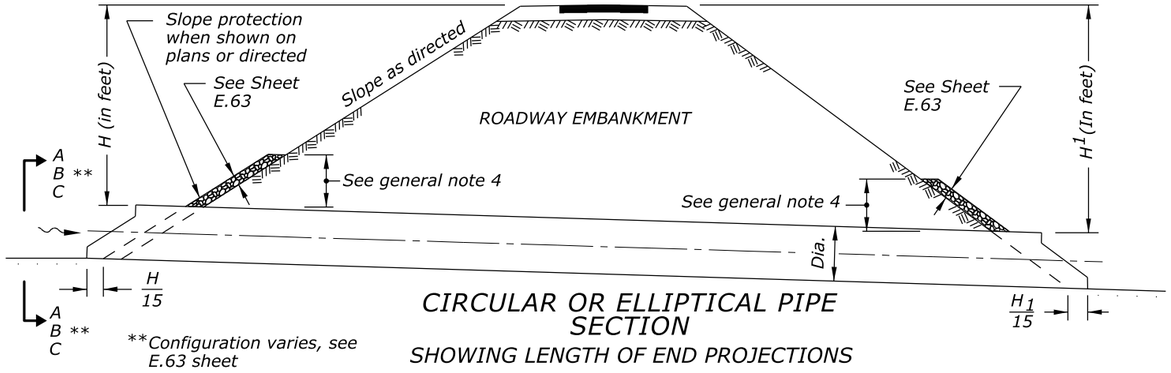
| OR | DOT 18(2) | E.62 |




**Configuration varies, see E.63 sheet

CIRCULAR OR ELLIPTICAL PIPE SECTION
SHOWING LENGTH OF END PROJECTIONS

## CIRCULAR OR ELLIPTICAL PIPE

CORRUGATED (Dimension in inches)

| SIZE | X | Y |
|---|---|---|
| 12 to 36 | 4 * | 0 |
| 42 | 8 * | 8 * |
| 48 | 8 * | 8 * |
| 54 | 8 * | 8 * |
| 60 | 8 * | 8 * |
| 66 | 12 | 12 |
| 72 | 12 | 12 |
| 78 | 12 | 12 |
| 84 | 16 | 16 |

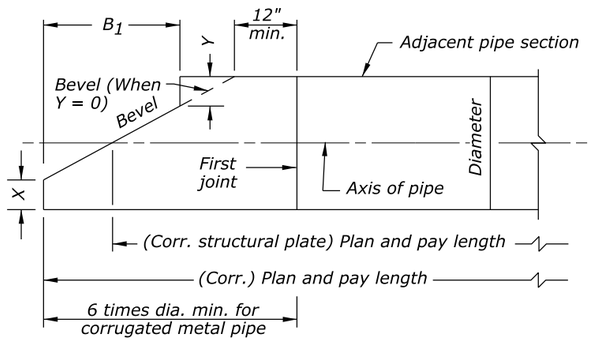
Slopes as directed.

* 0 when used with paved end slope.

CORRUGATED STRUCTURAL PLATE (Dimension in inches)

| SIZE | $B_1$ | | | ALTERNATE - 1 | | | | | | ALTERNATE - 2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | X | | | Y | | | X & Y | | |
| | SLOPES | | | SLOPES | | | SLOPES | | | SLOPES | | |
| | 1:1.5 | 1:2 | 1:3 | 1:1.5 | 1:2 | 1:3 | 1:1.5 | 1:2 | 1:3 | 1:1.5 | 1:2 | 1:3 |
| 60 | 72 | 72 | 96 | 5 | 11 | 13 | 7 | 13 | 15 | 6 | 12 | 15 |
| 66 | 72 | 72 | 96 | 7 | 15 | 17 | 11 | 16 | 18 | 10 | 16 | 17 |
| 72 | 72 | 96 | 144 | 11 | 13 | 11 | 13 | 13 | 13 | 12 | 12 | 12 |
| 78 | 72 | 72 | 144 | 13 | 20 | 15 | 17 | 22 | 16 | 16 | 22 | 16 |
| 84 | 72 | 96 | 144 | 17 | 17 | 17 | 19 | 19 | 19 | 18 | 18 | 18 |
| 90 | 72 | 96 | 144 | 19 | 20 | 20 | 23 | 22 | 22 | 22 | 22 | 22 |
| 96 | 96 | 96 | 192 | 15 | 23 | 16 | 17 | 25 | 17 | 16 | 24 | 17 |
| 102 | 96 | 96 | 168 | 18 | 26 | 23 | 20 | 29 | 24 | 19 | 28 | 23 |
| 108 | 96 | 96 | 168 | 20 | 29 | 25 | 23 | 31 | 26 | 22 | 30 | 26 |
| 114 | 96 | 168 | 168 | 23 | 15 | 29 | 26 | 16 | 30 | 25 | 28 | 29 |
| 120 | 96 | 168 | 216 | 26 | 17 | 23 | 29 | 19 | 25 | 28 | 18 | 24 |
| 126 | 96 | 168 | 216 | 30 | 20 | 26 | 32 | 22 | 28 | 31 | 22 | 28 |
| 132 | 144 | 168 | 216 | 17 | 23 | 29 | 19 | 25 | 31 | 18 | 24 | 30 |
| 138 | 144 | 192 | 288 | 19 | 20 | 20 | 23 | 22 | 22 | 22 | 22 | 22 |
| 144 | 144 | 144 | 240 | 23 | 35 | 31 | 25 | 37 | 32 | 24 | 36 | 32 |
| 150 | 144 | 192 | 288 | 25 | 26 | 26 | 29 | 28 | 28 | 28 | 28 | 28 |
| 156 | 144 | 192 | 288 | 29 | 29 | 29 | 31 | 31 | 31 | 30 | 30 | 30 |
| 162 | 144 | 192 | 288 | 31 | 32 | 32 | 35 | 34 | 34 | 34 | 34 | 34 |
| 168 | 168 | 168 | 264 | 26 | 41 | 40 | 29 | 43 | 41 | 28 | 42 | 40 |
| 174 | 168 | 168 | 288 | 30 | 44 | 39 | 32 | 46 | 40 | 31 | 46 | 40 |
| 180 | 168 | 192 | 288 | 42 | 41 | 41 | 43 | 43 | 43 | 42 | 42 | 42 |

For elliptical pipe increase X and Y dimensions by percent of ellipse.




STEP BEVEL
LONGITUDINAL SECTION
CIRCULAR OR ELLIPTICAL PIPE

GENERAL NOTES FOR ALL DETAILS:

1. All dimensions are subject to necessary tolerances to meet manufacturer's requirements for plate arrangements.
2. See sheet E.60 for installation details.
3. All embankment slopes to be warped where required to provide end projections as shown.
4. Minimum elevation of top of riprap at inlet and outlet is one diameter (D) or one foot higher than design headwater or tailwater elevation respectively whichever is greater.
5. Slope protection required for hydraulic installations. See sheet E.63.
6. $\frac{H}{15}$ and $\frac{H1}{15}$ only applicable for non-hydraulic applications.
7. Cross-sectional dimensions may vary with different materials.
8. Full bevel cuts are not recommended for multiple radius shaped pipes.
9. For pipes with skew no.'s 50, 70, 110 or 130, omit the top step (Y). (For skew diagram, see sheet E.66).
10. See sheet E.63 for culvert embankment protection and riprap pads (When reqd.).
11. If culvert is PVC, or HDPE then exposed end section shall be metal pipe material and connected with water tight bands

DRAWING BASED ON OREGON STANDARD DRAWING RD316

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# SLOPED ENDS FOR METAL PIPE

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| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.62A |

## COUPLING BANDS FOR METAL PIPE CULVERT [1]

| CORRUGATION SIZE [2] INCHES | ROUND PIPE DIAMETER INCHES | PIPE ARCH SPAN × RISE INCHES | MINIMUM BAND WIDTH (INCHES) | | |
|---|---|---|---|---|---|
| | | | ANNULAR CORRUGATED BANDS [3] | HELICALLY CORRUGATED BANDS [4] | SEMI-CORRUGATED BANDS [5] |
| 1½ × ¼ | underdrain [6] | - | 10.5 | 7 | 10.5 |
| 2⅔ × ½ | 12 to 36 | 17 × 13 to 42 × 29 | 7 | 12 | |
| | 42 to 72 | 49 × 33 to 83 × 57 | 10.5 | 12 | |
| | 78 to 84 | - | 10.5 | 12 | 10.5 |
| 3 × 1 | 36 to 72 | 60 × 46 to 81 × 59 | 12 | 14 | 10.5 |
| | 78 to 144 | 87 × 64 to 142 × 91 | 12 | 14 | 10.5 |
| 5 × 1 | 36 to 72 | 60 × 46 to 81 × 59 | 20 | 22 | |
| | 78 to 144 | 87 × 64 to 142 × 91 | 20 | 22 | |

[1] Fabricate annular, helical and semi-corrugated type coupling bands from the same metal as the connecting pipe. Provide coupling bands not more than 3 nominal sheet thicknesses thinner than the thickness of the pipe to be connected, and no thinner than 0.052 inch for steel or 0.048 inch for aluminum. Fasten coupling bands with the following diameter of bolt:
⅜" for 18" round culvert (21" × 15" pipe arch) or less
½" for 21" round culvert (24" × 18" pipe arch) or more

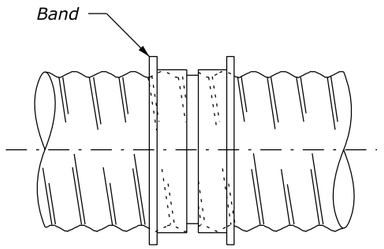
[2] For helically corrugated pipe with rerolled ends, the nominal corrugations size refers to the dimension of the end corrugation in the pipe.

[3] Use annular corrugated bands with pipes having annular corrugations or with helical pipe having rerolled end to form annular corrugations. A 10.5 inch band is acceptable on pipe ends rerolled with 2⅔" × ½" corrugations. A 12 inch band is acceptable on pipe ends rerolled with 3" × 1" pipe corrugations.

[4] Use helical corrugated bands with pipes having helically corrugated ends.

[5] The minimum band widths shown for 3" × 1" and 5" × 1" corrugated sizes apply to 2⅔" × ½" corrugations on rerolled pipe ends.

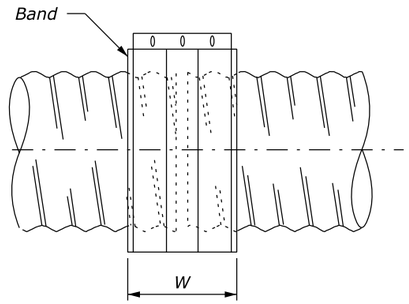
[6] Smooth sleeve-type couplers and flat bands may be used for pipe diameters of 12" or less. Use a matching metal having a nominal thickness of not less than 0.040 inch for steel, or 0.036 inch for aluminum, or a plastic with an equivalent strength to metal.




SLEEVE JOINT

Smoother sleeve with center stop.
Stab type joint

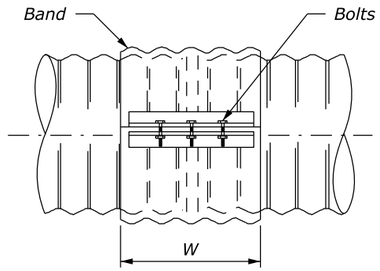
**SMOOTH SLEEVE BAND**



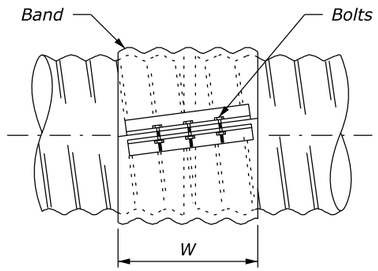

**FLAT BAND**

### NOTE:

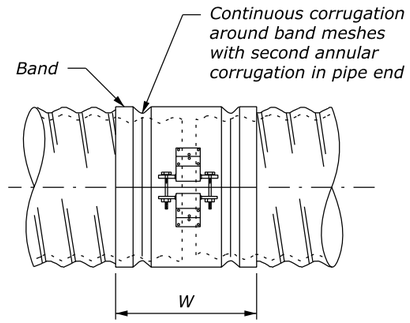
1. Watertight pipe joints are not required unless specified in the Special Contract Requirements.
2. Other types of coupling bands or fastening devices that comply with the joint performance criteria of AASHTO Standard specifications for Highway Bridges, Division II Section 26 may be used.



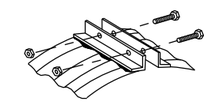

SIDE VIEW



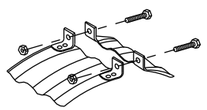

SIDE VIEW



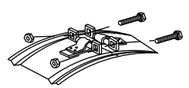

SIDE VIEW



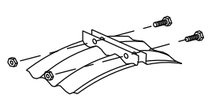
Band Angle



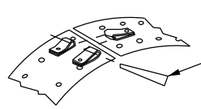
Oval Lug



Bar & Strap

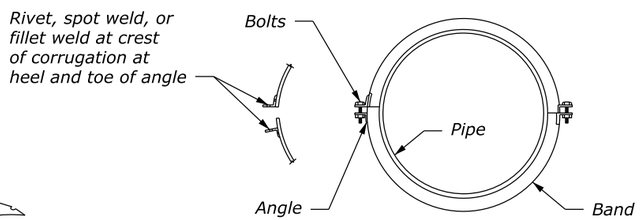


Integral Flange




Wedge and Strap

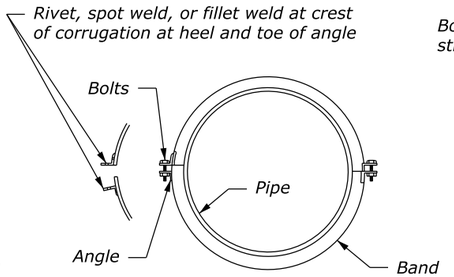
**STANDARD BAND CONNECTIONS**




END VIEW

Second angle connection optional to 42" diameter, required above 42" diameter

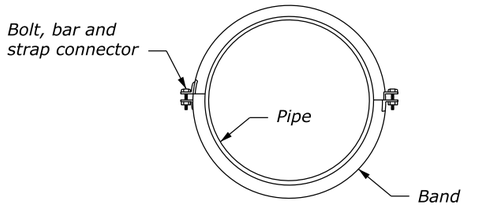
**ANNULAR BAND**




END VIEW

Second angle connection optional to 42" diameter, required above 42" diameter

**HELICAL BAND**




END VIEW

**SEMI-CORRUGATED BAND**

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
OFFICE OF FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

# METAL PIPE CULVERT COUPLING BAND

STANDARD APPROVED FOR USE 12/1993
REVISED: 4/1994 6/2005

STANDARD 602-2

Designed by: -/---- Checked by: -/----

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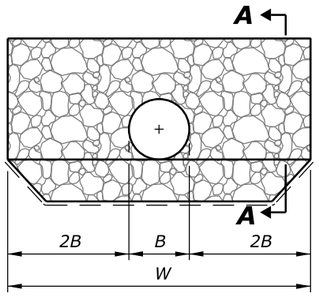
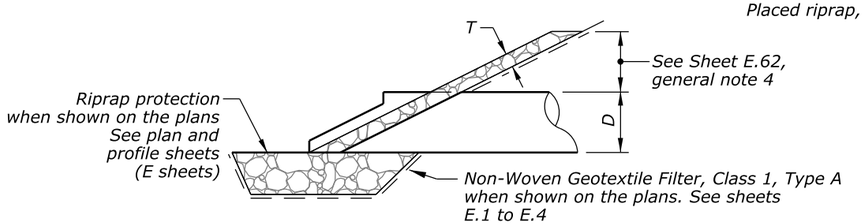
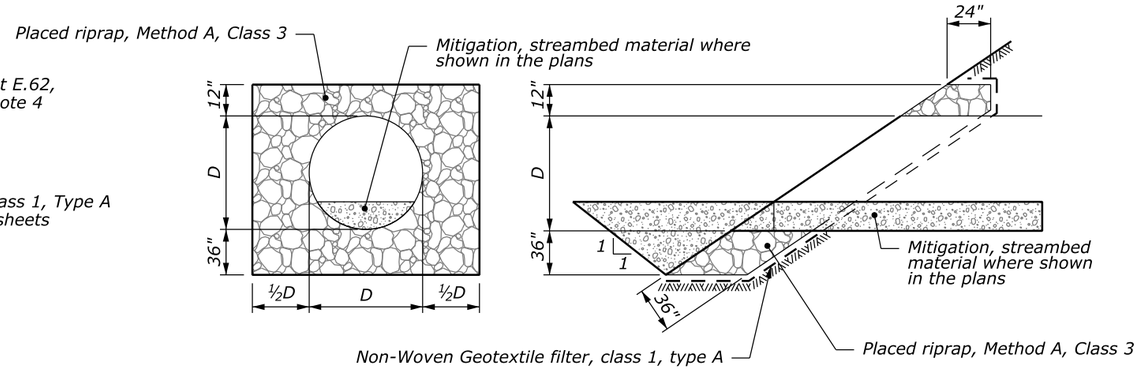
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.63 |



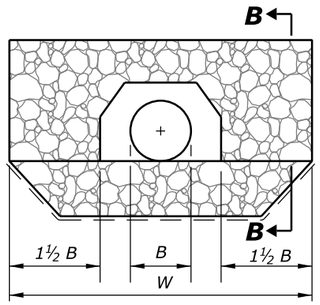



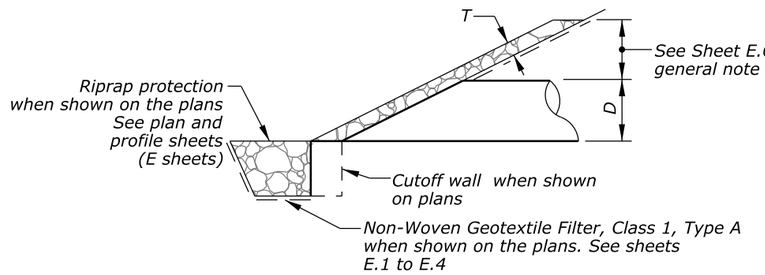

SECTION A-A

SLOPED OR PROJECTING END




SLOPED OR PROJECTING END WITH STREAMBED MATERIAL

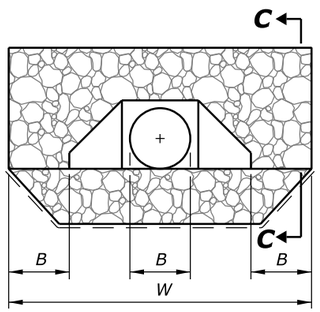


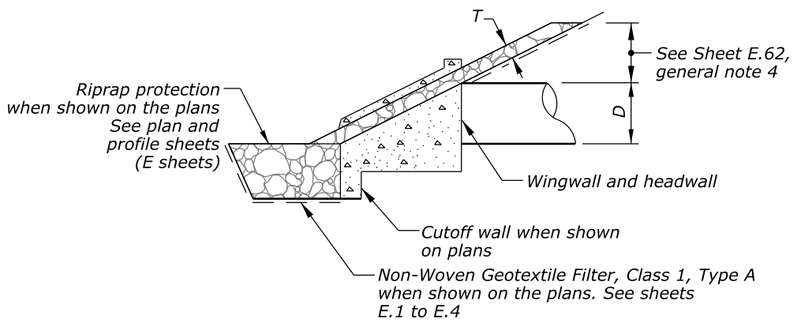




SECTION B-B

SLOPED END WITH SLOPE PAVING

| Riprap Class | T |
|---|---|
| 1 | 18 inches |
| 2 | 24 inches |
| 3 | 36 inches |




SECTION C-C

HEADWALL AND WINGWALLS

B = Diameter of circular barrel or span of arch pipe, box, or open-bottom arch.
D = Diameter of circular barrel or rise of arch pipe, box, or open-bottom arch.
T = Thickness of Embankment Protection

EMBANKMENT PROTECTION

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

GENERAL NOTES FOR ALL DETAILS:

1. See Sheet E.72 for installation details.

DRAWING BASED ON OREGON STANDARD DRAWING RD317

# CULVERT EMBANKMENT PROTECTION AND RIPRAP PADS

Designed by: Checked by: -/---- -/----

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| STATE | PROJECT | SHEET NUMBER |
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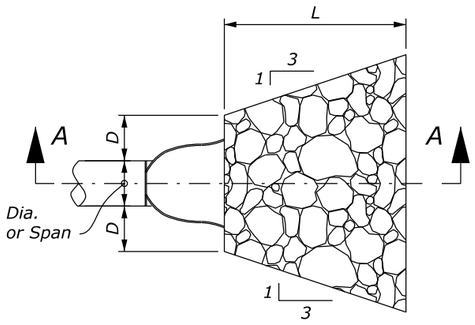
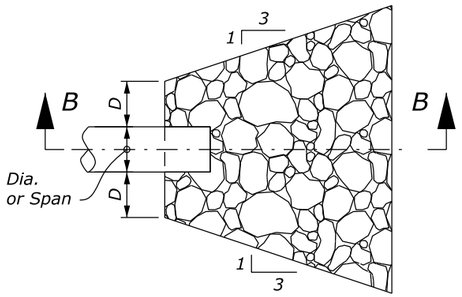
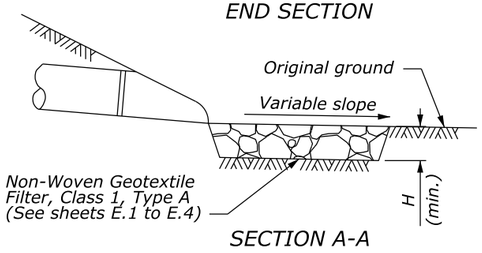



PLAN VIEW



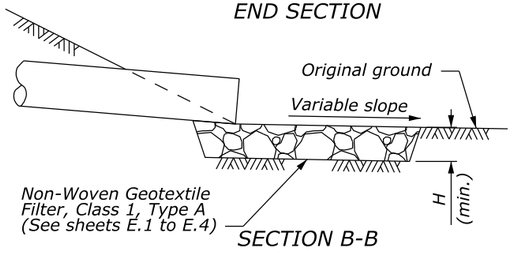

PLAN VIEW

CULVERT WITH STANDARD END SECTION



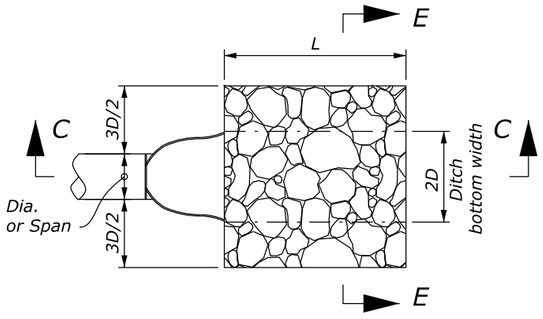

SECTION A-A

CULVERT WITHOUT STANDARD END SECTION

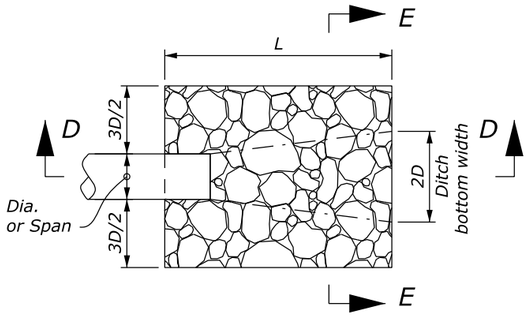



SECTION B-B

## PROTECTIVE APRON AT CULVERT OUTLET WITHOUT DITCH

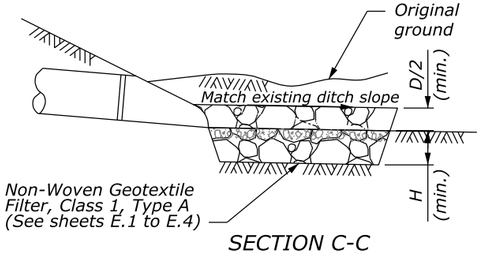



PLAN VIEW



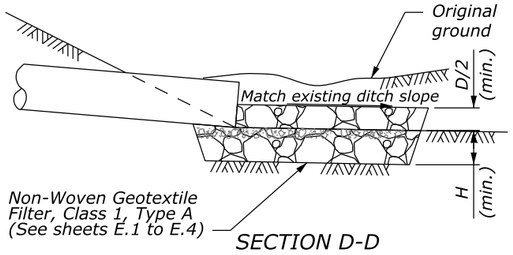

PLAN VIEW

CULVERT WITH STANDARD END SECTION

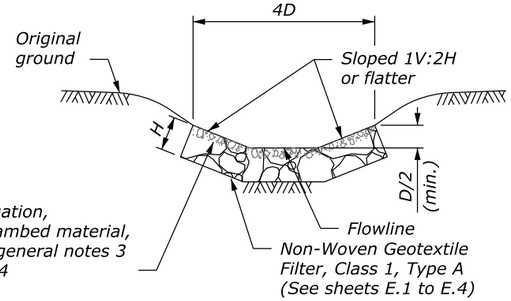



SECTION C-C

CULVERT WITHOUT STANDARD END SECTION




SECTION D-D




SECTION E-E

## PROTECTIVE APRON AT CULVERT OUTLET WITH DITCH

### NOTE:

1. Use for aprons serving culverts with slopes less than 10%.
2. Furnish Non-Woven Geotextile Filter, Class 1, Type A.
3. Add 5" of mitigation, streambed material top dressing to the riprap section at the following culverts: MP 13.56, MP 15.51, MP 37.68, MP 41.50, MP 41.58, MP 41.91, MP 42.12, MP 44.06, MP 44.36, MP 44.96, MP 45.03, MP 46.75, MP 47.07, MP 53.69, MP 53.76, MP 53.83, MP 53.95, and MP 57.77.
4. Match top of mitigation, streambed material to the flowline.

| RIPRAP CLASS | L (APRON LENGTH) |
|---|---|
| 1 | 4D |
| 2 | 4D |
| 3 | 5D |
| 4 | 6D |
| 5 | 7D |
| 6 | 8D |

D = Diameter of circular barrel or rise of arch pipe, box, or open-bottom arch.
L = Length of the Riprap Apron (see plan views)
H = Height (thickness) of the Riprap Apron (See section views)

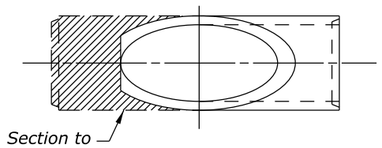
REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

# PLACED RIPRAP AT CULVERT OUTLETS

Designed by: --/---- Checked by: --/----
11/30/2020 2:05:57 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802E76.dgn

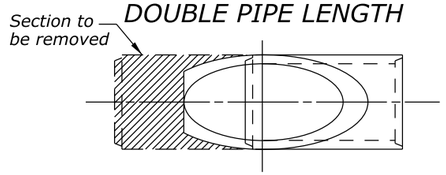
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.65 |

## CASE 1
## SINGLE PIPE LENGTH



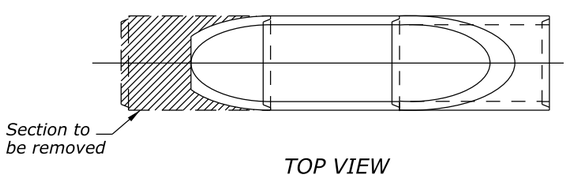

TOP VIEW

## CASE 2
## DOUBLE PIPE LENGTH

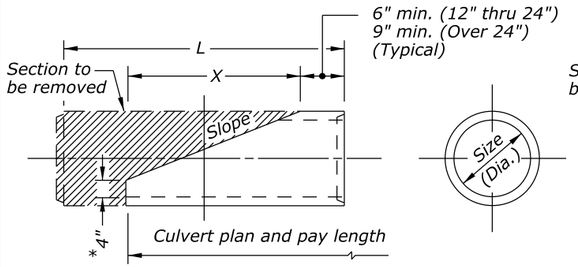



TOP VIEW

## CASE 3
## TRIPLE PIPE LENGTH



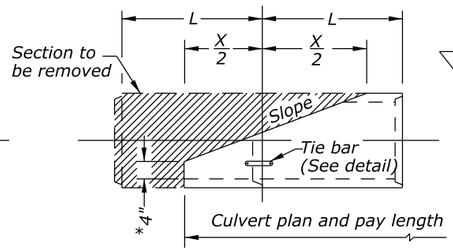

TOP VIEW



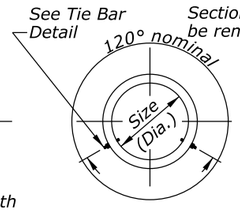

SIDE VIEW



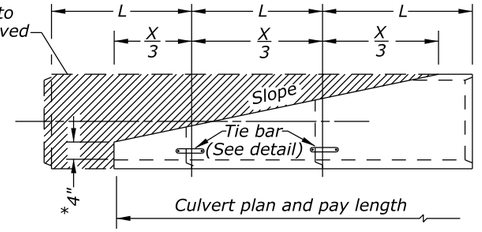

END VIEW (CASE 1)




SIDE VIEW




END VIEW (CASE 2 & 3)




SIDE VIEW

* 0 when used with paved end slope.

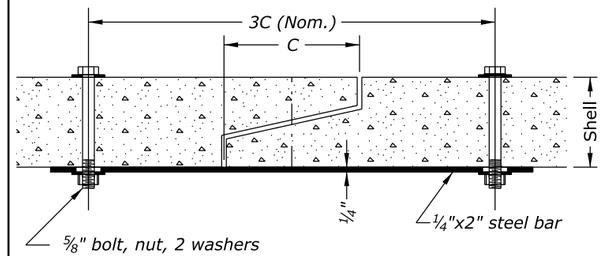
NOTE:
Sloped ends shall be made from minimum Class III concrete pipe.
"X" Values shown are for vertical dimension at bottom of sloped end = 0.

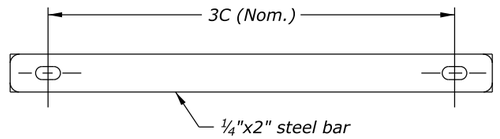
## TABLE A

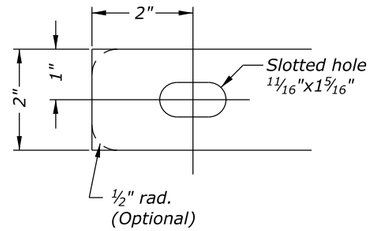
| SIZE (Diameter) | SLOPE | | | | | | | | | | | | | | | | | | | | SIZE (Diameter) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1:1.5 | | | 1:2 | | | 1:2.5 | | | 1:3 | | | 1:4 | | | | 1:6 | | | | |
| | X | CASE 1 L (Min.) | CASE 2 L (Min.) | X | CASE 1 L (Min.) | CASE 2 L (Min.) | X | CASE 1 L (Min.) | CASE 2 L (Min.) | X | CASE 1 L (Min.) | CASE 2 L (Min.) | X | CASE 1 L (Min.) | CASE 2 L (Min.) | CASE 3 L (Min.) | X | CASE 1 L (Min.) | CASE 2 L (Min.) | CASE 3 L (Min.) | |
| DIMENSION IN INCHES | | | | | | | | | | | | | | | | | | | | | |
| 12 | 18 | 36 | 36 | 24 | 36 | 36 | 30 | 48 | 36 | 36 | 72 | 36 | 48 | 72 | 36 | | 72 | 90 | 48 | | 12 |
| 15 | 22.5 | 36 | 36 | 30 | 48 | 36 | 37.5 | 72 | 36 | 45 | 72 | 36 | 60 | 72 | 36 | | 90 | | 72 | | 15 |
| 18 | 27 | 48 | 36 | 36 | 48 | 36 | 45 | 72 | 36 | 54 | 72 | 36 | 72 | 90 | 48 | | 108 | | 72 | | 18 |
| 21 | 31.5 | 48 | 36 | 42 | 72 | 36 | 52.5 | 72 | 36 | 63 | 90 | 48 | 84 | | 72 | | 126 | | 90 | | 21 |
| 24 | 36 | 48 | 36 | 48 | 72 | 36 | 60 | 90 | 48 | 72 | 90 | 48 | 96 | | 72 | | 144 | | 90 | | 24 |
| 27 | 40.5 | 72 | 36 | 54 | 72 | 36 | 67.5 | 90 | 48 | 81 | | 72 | 108 | | 72 | | 162 | | | 72 | 27 |
| 30 | 45 | 72 | 36 | 60 | 90 | 48 | 75 | | 48 | 90 | | 72 | 120 | | 90 | | 180 | | | 72 | 30 |
| 33 | 49.5 | 72 | 36 | 66 | 90 | 48 | 82.5 | | 72 | 99 | | 72 | 132 | | 90 | | 198 | | | 90 | 33 |
| 36 | 54 | 72 | 36 | 72 | 90 | 48 | 90 | | 72 | 108 | | 72 | 144 | | 90 | | 216 | | | 90 | 36 |
| 42 | 63 | 90 | 48 | 84 | | 72 | 105 | | 72 | 126 | | 90 | 168 | | | 72 | 252 | | | 90 | 42 |
| 48 | 72 | 90 | 48 | 96 | | 72 | 120 | | 90 | 144 | | 90 | 192 | | | 90 | 288 | | | | 48 |
| 54 | 81 | | 72 | 108 | | 72 | 135 | | 90 | | | | 216 | | | 90 | 324 | | | | 54 |

DRAWING BASED ON OREGON
STANDARD DRAWING RD318

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024




NOTES:

1. All bolts, nuts and washers to be galvanized.
2. Tie bar to be galvanized after fabrication.
3. "C" is tongue length.
4. Install 2 tie bars at each joint (See end view, Case 2 & 3).

## TIE BAR DETAIL

GENERAL NOTES FOR ALL DETAILS:

1. For dimensions indicated by letter, see Table A.

2. See sheet E.63 for culvert embankment protection and riprap pads (When reqd.).

# SLOPED ENDS FOR CONCRETE PIPE

Designed by: Checked by: -/---

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| STATE | PROJECT | SHEET NUMBER |
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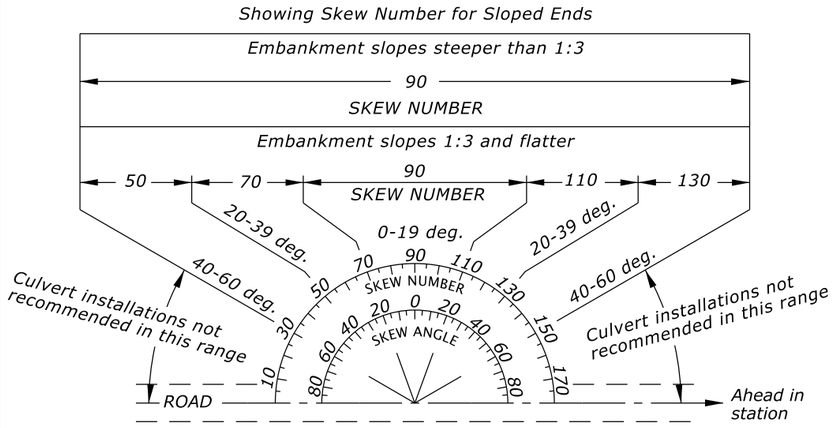
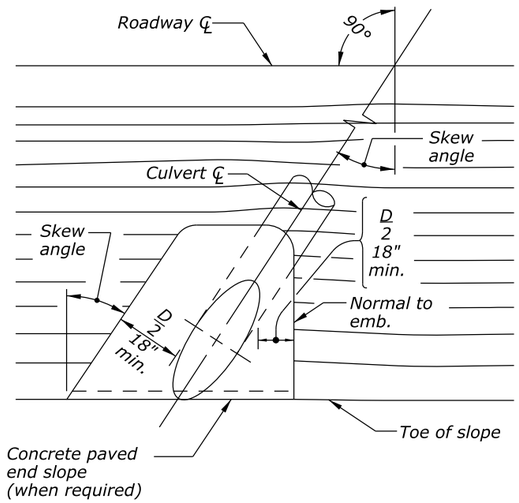
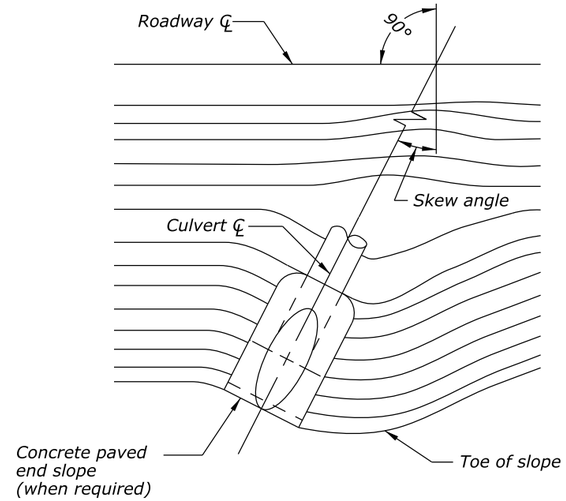



SKEW DIAGRAM



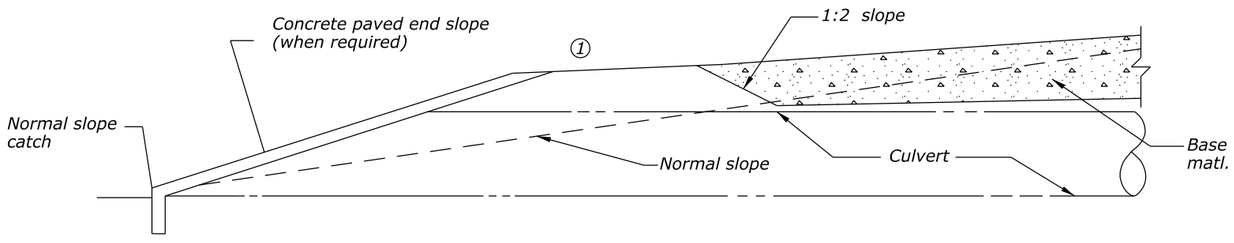

TYPICAL SKEW PLAN



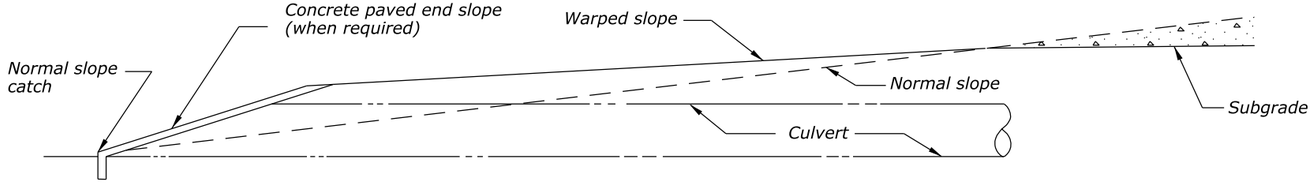

(Where shown on plans)
Contour embankment slope to match paved end slope

ALTERNATE SKEW PLAN

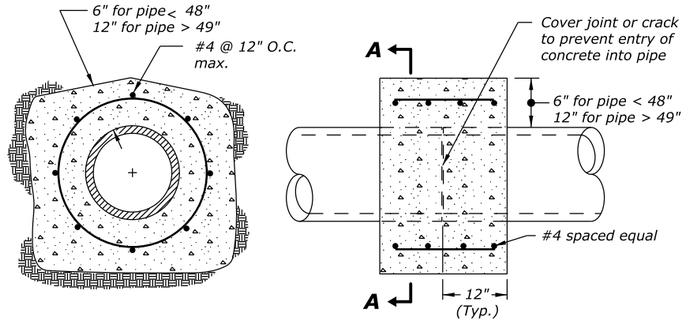
① Modification when nature of installation would result in an adverse slope from subgrade to top of the paved end slope.




INSERT




EMBANKMENT SLOPE WARPING DETAILS
(Warp 100' each side of culvert)




**SECTION A-A** **PLAN**

REINFORCED CONCRETE COLLAR

GENERAL NOTES FOR REINFORCED CONCRETE COLLAR:

1. All concrete shall be minor concrete according to section 601.
2. End all reinforcing 3" clear of ground, forms or top surface, unless otherwise shown.
3. Trowel finish top surface of saddle, and cradle.
4. Reinforcement shall be # 4 vertical & horizontal bars as shown.
5. See E.60 for trench backfill, bedding, etc.
6. See E.77 for tracer wire details (When required).
7. Pipe over 72" diameter are structures, and are not applicable to this drawing.

*GENERAL NOTES:*

*1. All embankment slopes to be warped where required to provide end projections as shown.*

*2. See sheet E.63 for culvert embankment protection and riprap pads (When reqd.).*

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*DRAWING BASED ON OREGON STANDARD DRAWING RD319*

# MISCELLANEOUS CULVERT DETAILS

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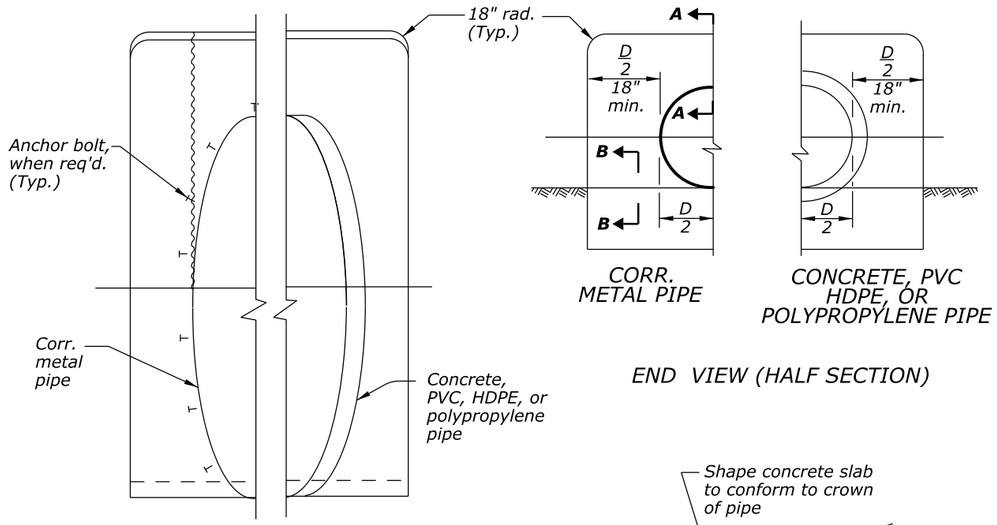
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.67 |

# CIRCULAR PIPE CULVERT




TOP VIEW

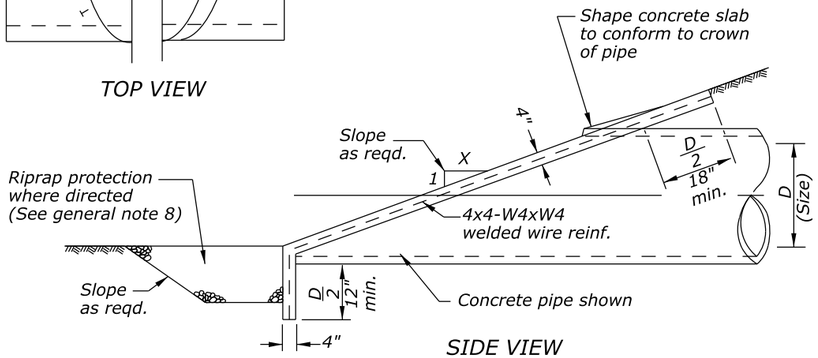



CORR. METAL PIPE




CONCRETE, PVC HDPE, OR POLYPROPYLENE PIPE

END VIEW (HALF SECTION)

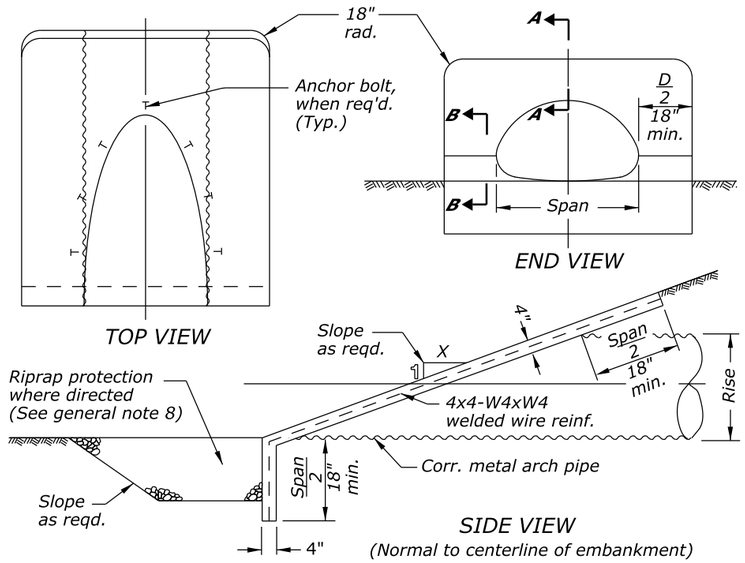



SIDE VIEW

| PAVED END SLOPE AREA TABLE | | | | | | |
|---|---|---|---|---|---|---|
| Nominal Pipe Diameter (Inches) | PAVED END SLOPE AREA SQUARE FEET | | | | | |
| | 1:3 SLOPE | | 1:4 SLOPE | | 1:6 SLOPE | |
| | Circular Pipe | Arch Pipe | Circular Pipe | Arch Pipe | Circular Pipe | Arch Pipe |
| 12 | 23 | -- | 26 | -- | 32 | -- |
| 15 | 26 | 23 | 32 | 27 | 41 | 34 |
| 18 | 30 | 26 | 35 | 30 | 44 | 38 |
| 21 | 33 | 30 | 39 | 35 | 51 | 45 |
| 24 | 37 | 33 | 44 | 39 | 57 | 51 |
| 30 | 47 | 39 | 55 | 46 | 72 | 61 |
| 36 | 56 | 53 | 67 | 63 | 88 | 83 |
| 42 | 76 | 67 | 90 | 80 | 119 | 107 |
| 48 | 98 | 90 | 117 | 108 | 155 | 144 |
| 54 | 124 | 114 | 148 | 137 | 196 | 184 |
| 60 | 164 | 137 | 197 | 165 | 264 | 221 |

(1) Areas for multiple installations are as shown on the plans.

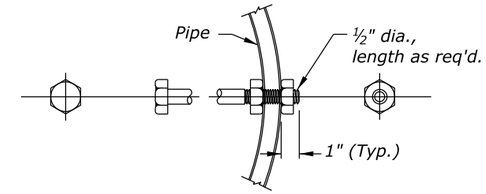
# ARCH PIPE CULVERT




TOP VIEW

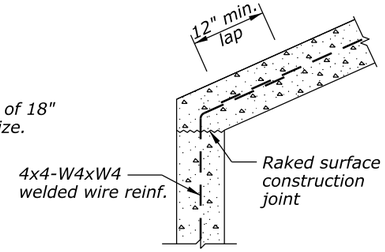
END VIEW

SIDE VIEW
(Normal to centerline of embankment)

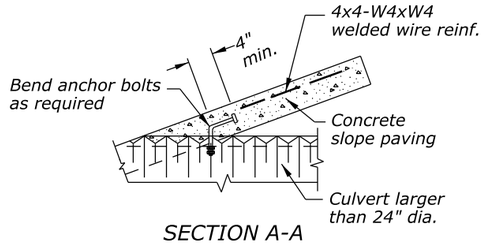



## ANCHOR BOLT DETAILS

Anchor bolts to be ASTM A307 galv., equally spaced at a max. of 18" centers around entire perimeter at end of pipes over 24" size.
Not required for concrete pipe.




SECTION B-B




SECTION A-A

GENERAL NOTES FOR ALL DETAILS:

1. When rock is encountered, cut off wall depth $\frac{D}{2}$ or $\frac{span}{2}$ may be reduced to rock line but not less than 12".
2. When using pervious bedding and backfill, provide piping plug per Section 602.03.
3. For multiple pipe installations, see sheet E.60.
4. All exposed conc. edges shall be chamfered ¾" unless noted otherwise. Slope paving surface variations shall not exceed ⅜" in 10' .
5. All metal reinforcement shall be placed 1½" clear of nearest face of concrete unless shown or noted otherwise.
6. All concrete shall be minor concrete according to section 601.
7. See sheet E.63 for culvert embarkment protection and riprap pads (When reqd.).

DRAWING BASED ON OREGON STANDARD DRAWING RD320

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# PAVED END SLOPE FOR CULVERTS 60" MAXIMUM PIPE SIZE

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.68 |

# ALLOWABLE FILL HEIGHT TABLE FOR CORRUGATED CIRCULAR PIPE

## ALUMINUM HELICAL

| DIAMETER (In.) | 1½"x¼" MINIMUM COVER (Ft.) | 1½"x¼" LOCK SEAM SPECIFIED THICKNESS (In.) .060 MAXIMUM COVER (Ft.) | 1½"x¼" LOCK SEAM SPECIFIED THICKNESS (In.) 0.075 MAXIMUM COVER (Ft.) | 2⅔"x½" MINIMUM COVER (Ft.) | 2⅔"x½" LOCK SEAM SPECIFIED THICKNESS (In.) .060 MAXIMUM COVER (Ft.) | .075 MAXIMUM COVER (Ft.) | .105 MAXIMUM COVER (Ft.) | .135 MAXIMUM COVER (Ft.) | .164 MAXIMUM COVER (Ft.) | 2⅔"x½" MINIMUM COVER (Ft.) | 3"x1" MINIMUM COVER (Ft.) | 3"x1" LOCK SEAM SPECIFIED THICKNESS (In.) .060 MAXIMUM COVER (Ft.) | .075 MAXIMUM COVER (Ft.) | .105 MAXIMUM COVER (Ft.) | .135 MAXIMUM COVER (Ft.) | .164 MAXIMUM COVER (Ft.) | 3"x1" MINIMUM COVER (Ft.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 1.0 | 100 | 100 | | | | | | | | | | | | | | |
| 8 | 1.0 | 100 | 100 | | | | | | | | | | | | | | |
| 10 | 1.0 | 100 | 100 | | | | | | | | | | | | | | |
| 12 | | | | 1.0 | 100 | 100 | 100 | | | 1.0 | | | | | | | |
| 15 | | | | 1.0 | 100 | 100 | 100 | | | 1.0 | | | | | | | |
| 18 | | | | 1.0 | 84 | 100 | 100 | | | 1.0 | | | | | | | |
| 21 | | | | 1.0 | 72 | 90 | 100 | | | 1.0 | | | | | | | |
| 24 | | | | 1.0 | 63 | 78 | 100 | 100 | 100 | 1.0 | | | | | | | |
| 30 | | | | 1.0 | | 63 | 88 | 100 | 100 | 1.0 | 1.0 | 57 | 72 | 100 | 100 | | 1.0 |
| 36 | | | | 1.0 | | 52 | 73 | 94 | 100 | 1.0 | 1.5 | 48 | 60 | 84 | 100 | | 1.0 |
| 42 | | | | 1.5 | | | 63 | 81 | 99 | 1.0 | 1.5 | 41 | 52 | 72 | 97 | | 1.0 |
| 48 | | | | 1.5 | | | 55 | 71 | 86 | 1.0 | 1.5 | 36 | 45 | 63 | 84 | 100 | 1.0 |
| 54 | | | | 1.5 | | | 48 | 63 | 77 | 1.0 | 1.5 | 32 | 40 | 56 | 75 | 88 | 1.0 |
| 60 | | | | 1.5 | | | | 52 | 65 | 1.0 | 1.5 | 28 | 36 | 50 | 67 | 80 | 1.0 |
| 66 | | | | 1.5 | | | | | 53 | 1.5 | 1.5 | 26 | 33 | 46 | 61 | 72 | 1.0 |
| 72 | | | | 1.5 | | | | | 43 | 1.5 | 1.5 | 24 | 30 | 42 | 56 | 66 | 1.0 |
| 78 | | | | | | | | | | | 1.5 | | 28 | 39 | 52 | 61 | 1.0 |
| 84 | | | | | | | | | | | 1.5 | | | 36 | 48 | 57 | 1.0 |
| 90 | | | | | | | | | | | 1.5 | | | 33 | 45 | 53 | 1.0 |
| 96 | | | | | | | | | | | 1.5 | | | 31 | 42 | 50 | 1.5 |
| 102 | | | | | | | | | | | 1.5 | | | | 39 | 47 | 1.5 |
| 108 | | | | | | | | | | | 1.5 | | | | 37 | 44 | 1.5 |
| 114 | | | | | | | | | | | 1.5 | | | | | 40 | 1.5 |
| 120 | | | | | | | | | | | 1.5 | | | | | 36 | 1.5 |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

## STEEL HELICAL

| DIAMETER (In.) | 1½"x¼" MINIMUM COVER (Ft.) | 1½"x¼" LOCK SEAM SPECIFIED THICKNESS (In.) .064 MAXIMUM COVER (Ft.) | 2⅔"x½" MINIMUM COVER (Ft.) | 2⅔"x½" WELDED OR LOCK SEAM SPECIFIED THICKNESS (In.) .064 MAXIMUM COVER (Ft.) | .079 MAXIMUM COVER (Ft.) | .109 MAXIMUM COVER (Ft.) | .138 MAXIMUM COVER (Ft.) | .168 MAXIMUM COVER (Ft.) | 2⅔"x½" MINIMUM COVER (Ft.) | 3"x1" and 5"x1" MINIMUM COVER (Ft.) | 3"x1" and 5"x1" WELDED OR LOCK SEAM SPECIFIED THICKNESS (In.) .064 MAXIMUM COVER (Ft.) | .079 MAXIMUM COVER (Ft.) | .109 MAXIMUM COVER (Ft.) | .138 MAXIMUM COVER (Ft.) | .168 MAXIMUM COVER (Ft.) | 3"x1" and 5"x1" MINIMUM COVER (Ft.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 1.0 | 100 | | | | | | | | | | | | | | | |
| 8 | 1.0 | 100 | | | | | | | | | | | | | | | |
| 10 | 1.0 | 100 | | | | | | | | | | | | | | | |
| 12 | | | 1.0 | 100 | 100 | 100 | | | | | | | | | | | |
| 15 | | | 1.0 | 100 | 100 | 100 | | | | | | | | | | | |
| 18 | | | 1.0 | 100 | 100 | 100 | | | | | | | | | | | |
| 21 | | | 1.0 | 100 | 100 | 100 | | | | | | | | | | | |
| 24 | | | 1.0 | 100 | 100 | 100 | | | | | | | | | | | |
| 30 | | | 1.0 | 83 | 100 | 100 | | | | | | | | | | | |
| 36 | | | 1.0 | 69 | 86 | 100 | 100 | 100 | 1.0 | 1.0 | 79 | 99 | 100 | | | | 1.0 |
| 42 | | | 1.5 | 59 | 74 | 100 | 100 | 100 | 1.0 | 1.0 | 68 | 85 | 100 | | | | 1.0 |
| 48 | | | 1.5 | 52 | 65 | 91 | 100 | 100 | 1.0 | 1.5 | 59 | 74 | 100 | 100 | | | 1.0 |
| 54 | | | 1.5 | | 57 | 80 | 100 | 100 | 1.0 | 1.5 | 53 | 66 | 93 | 100 | | | 1.0 |
| 60 | | | | | | 72 | 93 | 100 | 1.0 | 1.5 | 47 | 59 | 83 | 100 | | | 1.0 |
| 66 | | | | | | | 85 | 100 | 1.0 | 1.5 | 43 | 54 | 76 | 98 | | | 1.0 |
| 72 | | | | | | | 78 | 95 | 1.0 | 1.5 | 39 | 49 | 69 | 89 | 100 | | 1.0 |
| 78 | | | | | | | | 84 | 1.0 | 1.5 | 36 | 45 | 64 | 82 | 100 | | 1.0 |
| 84 | | | | | | | | 73 | 1.0 | 1.5 | 34 | 42 | 59 | 77 | 94 | | 1.0 |
| 90 | | | | | | | | | | 1.5 | 31 | 39 | 55 | 71 | 88 | | 1.0 |
| 96 | | | | | | | | | | 1.5 | | 37 | 52 | 67 | 82 | | 1.0 |
| 102 | | | | | | | | | | 1.5 | | 35 | 49 | 63 | 77 | | 1.5 |
| 108 | | | | | | | | | | 1.5 | | | 46 | 59 | 73 | | 1.5 |
| 114 | | | | | | | | | | 1.5 | | | 44 | 56 | 69 | | 1.5 |
| 120 | | | | | | | | | | 1.5 | | | 41 | 53 | 66 | | 1.5 |
| 126 | | | | | | | | | | 2.0 | | | | 51 | 62 | | 2.0 |
| 132 | | | | | | | | | | 2.0 | | | | 49 | 60 | | 2.0 |
| 138 | | | | | | | | | | 2.0 | | | | 46 | 57 | | 2.0 |
| 144 | | | | | | | | | | 2.0 | | | | | 55 | | 2.0 |

5"x1", these values shown can be increased, (See general note 9)

*GENERAL NOTES FOR ALL TABLES:*

1. *Maximum height of cover is greatest vertical distance from top of pipe to finish grade.*
2. *Minimum height of cover is least vertical distance from top of pipe to subgrade.*
3. *Pipes with diameters greater than 72" must be reviewed by the CO.*
4. *Pipes with maximum cover greater than those shown in the Tables shall be approved by the CO.*
5. *For multiple pipe installations, see sheet E.60.*
6. *Heavy solid line denotes boundary between minimum cover requirements.*
7. *For minimum thickness, see AASHTO M197, M218, and M274.*
8. *5"x1" corrugation can be used as an alternate for 3"x1" corrugation. Maximum fill height for 3"x1" can be increased by up to 12% over values shown for pipe size 54" and larger.*

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SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**FILL HEIGHT TABLES FOR ALUMINUM & STEEL CORRUGATED PIPE**

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# ALLOWABLE FILL HEIGHTS FOR CIRCULAR CONCRETE PIPE

## HS 25 - 44 LIVE LOAD

| PIPE DIAMETER (INCHES) | REINFORCED PIPE | | | | | |
|---|---|---|---|---|---|---|
| | CLASS III | | CLASS IV | | CLASS V | |
| | MINIMUM COVER (Feet) | MAXIMUM COVER (Feet) | MINIMUM COVER (Feet) | MAXIMUM COVER (Feet) | MINIMUM COVER (Feet) | MAXIMUM COVER (Feet) |
| 15 | 1.5 | 18 | 1.0 | 27 | 0.5 | 42 |
| 18 | 1.5 | 18 | 1.0 | 27 | 0.5 | 42 |
| 21 | 1.5 | 17 | 1.0 | 27 | 0.5 | 42 |
| 24 | 1.5 | 17 | 1.0 | 27 | 0.5 | 42 |
| 27 | 1.5 | 17 | 1.0 | 27 | 0.5 | 41 |
| 30 | 1.5 | 17 | 1.0 | 27 | 0.5 | 41 |
| 33 | 1.5 | 17 | 1.0 | 27 | 0.5 | 41 |
| 36 | 1.5 | 17 | 1.0 | 26 | 0.5 | 41 |
| 42 | 1.5 | 17 | 1.0 | 26 | 0.5 | 41 |
| 48 | 1.5 | 16 | 1.0 | 26 | 0.5 | 41 |
| 54 | 1.5 | 16 | 1.0 | 26 | | |
| 60 | 1.5 | 16 | 1.0 | 26 | | |
| 66 | 1.5 | 16 | 1.0 | 26 | | |
| 72 | 1.5 | 16 | 1.0 | 25 | | |

*GENERAL NOTES FOR ALL TABLES ON THIS SHEET:*

*1. Maximum height of cover is greatest vertical distance from top of pipe to finish grade.*

*2. Minimum height of cover is least vertical distance from top of pipe to subgrade.*

*3. For multiple pipe installations, see Sheet. E.60.*

*DRAWING BASED ON OREGON STANDARD DRAWING RD386*

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SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**FILL HEIGHT TABLE FOR CIRCULAR CONCRETE PIPE**

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.70 |

| PIPE | SOLID WALL PVC | | |
|---|---|---|---|
| DIAMETER (Inches) | MINIMUM COVER (Feet) | MAXIMUM COVER (Feet) | REMARKS |
| 4 | 2.0 | 40 | ASTM D 3034 SDR35 (46 psi stiffness) |
| 6 | 2.0 | 40 | |
| 8 | 2.0 | 40 | |
| 10 | 2.0 | 40 | |
| 12 | 2.0 | 40 | |
| 15 | 2.0 | 40 | |
| 18 | 2.0 | 40 | ASTM F 679 (46 psi stiffness) |
| 21 | 2.0 | 40 | |
| 24 | 2.0 | 40 | |
| 27 | 2.0 | 40 | |
| 30 | 2.0 | 40 | |
| 33 | 2.0 | 40 | |
| 36 | 2.0 | 40 | |
| 42 | 2.0 | 40 | |
| 48 | 2.0 | 40 | |

| PIPE | PROFILE WALL PVC | | |
|---|---|---|---|
| DIAMETER (Inches) | MINIMUM COVER (Feet) | MAXIMUM COVER (Feet) | REMARKS |
| 4 | 2.0 | 40 | ASTM F 794 Series 46 (46 psi stiffness) |
| 6 | 2.0 | 40 | |
| 8 | 2.0 | 40 | |
| 10 | 2.0 | 40 | |
| 12 | 2.0 | 40 | |
| 15 | 2.0 | 40 | |
| 18 | 2.0 | 40 | |
| 21 | 2.0 | 40 | |
| 24 | 2.0 | 40 | |
| 27 | 2.0 | 40 | |
| 30 | 2.0 | 40 | |
| 33 | 2.0 | 40 | |
| 36 | 2.0 | 40 | |
| 39 | 2.0 | 40 | |
| 42 | 2.0 | 40 | |
| 45 | 2.0 | 40 | |
| 48 | 2.0 | 40 | |

| PIPE | SOLID WALL PVC | | |
|---|---|---|---|
| DIAMETER (Inches) | MINIMUM COVER (Feet) | MAXIMUM COVER (Feet) | REMARKS |
| 14 | 2.0 | 41 | AWWA C905 DR 32.5 (57 psi stiffness) |
| 16 | 2.0 | 41 | |
| 18 | 2.0 | 41 | |
| 20 | 2.0 | 41 | |
| 24 | 2.0 | 41 | |
| 30 | 2.0 | 41 | |
| 36 | 2.0 | 41 | |
| 42 | 2.0 | 41 | |
| 48 | 2.0 | 41 | |

| PIPE | SOLID WALL PVC | | |
|---|---|---|---|
| DIAMETER (Inches) | MINIMUM COVER (Feet) | MAXIMUM COVER (Feet) | REMARKS |
| 14 | 1.0 | 46 | AWWA C905 DR 26 (115 psi stiffness) |
| 16 | 1.0 | 46 | |
| 18 | 1.0 | 46 | |
| 20 | 1.0 | 46 | |
| 24 | 1.0 | 46 | |
| 30 | 1.0 | 46 | |
| 36 | 1.0 | 46 | |

| PIPE | SOLID WALL PVC | | |
|---|---|---|---|
| DIAMETER (Inches) | MINIMUM COVER (Feet) | MAXIMUM COVER (Feet) | REMARKS |
| 14 | 1.0 | 48 | AWWA C905 DR 25 (129 psi stiffness) |
| 16 | 1.0 | 48 | |
| 18 | 1.0 | 48 | |
| 20 | 1.0 | 48 | |
| 24 | 1.0 | 48 | |
| 30 | 1.0 | 48 | |
| 36 | 1.0 | 48 | |
| 42 | 1.0 | 48 | |
| 48 | 1.0 | 48 | |

| PIPE | SOLID WALL PVC | | |
|---|---|---|---|
| DIAMETER (Inches) | MINIMUM COVER (Feet) | MAXIMUM COVER (Feet) | REMARKS |
| 14 | 1.0 | 61 | AWWA C905 DR 21 (224 psi stiffness) |
| 16 | 1.0 | 61 | |
| 18 | 1.0 | 61 | |
| 20 | 1.0 | 61 | |
| 24 | 1.0 | 61 | |
| 30 | 1.0 | 61 | |
| 36 | 1.0 | 61 | |

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MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

*GENERAL NOTES FOR ALL TABLES:*

1. *Maximum height of cover is greatest vertical distance from top of pipe to finish grade.*
2. *Minimum height of cover is least vertical distance from top of pipe to subgrade.*
3. *For multiple pipe installations, see E.60 sheet.*

*DRAWING BASED ON OREGON STANDARD DRAWING RD388*

# FILL HEIGHT TABLES FOR PVC PIPE

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| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.71 |

| PIPE | CORRUGATED HDPE | |
|---|---|---|
| DIAMETER (Inches) | MINIMUM COVER (Feet) | MAXIMUM COVER (Feet) |
| 12 | 2.0 | 29 |
| 15 | 2.0 | 30 |
| 18 | 2.0 | 27 |
| 24 | 2.0 | 24 |
| 30 | 2.0 | 21 |
| 36 | 2.0 | 23 |
| 42 | 2.0 | 22 |
| 48 | 2.0 | 22 |
| 60 | 2.5 | 21 |

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MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

*GENERAL NOTES FOR ALL TABLES:*

1. *Maximum height of cover is greatest vertical distance from top of pipe to finish grade.*
2. *Minimum height of cover is least vertical distance from top of pipe to subgrade.*
3. *For multiple pipe installations, see E.60 sheet.*
4. *Heavy solid line denotes boundary between minimum cover requirements.*

*DRAWING BASED ON OREGON STANDARD DRAWING RD390*

# FILL HEIGHT TABLE FOR CORRUGATED HDPE PIPE

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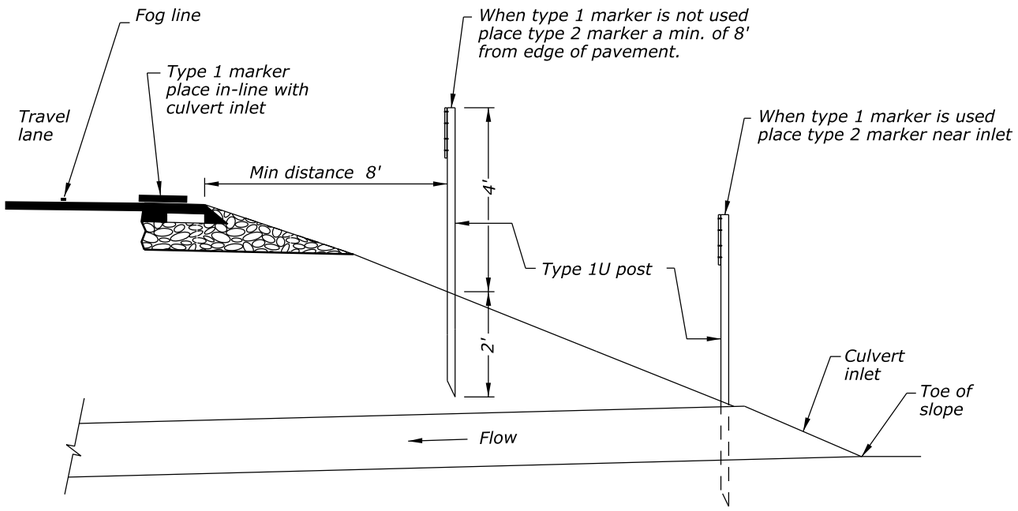
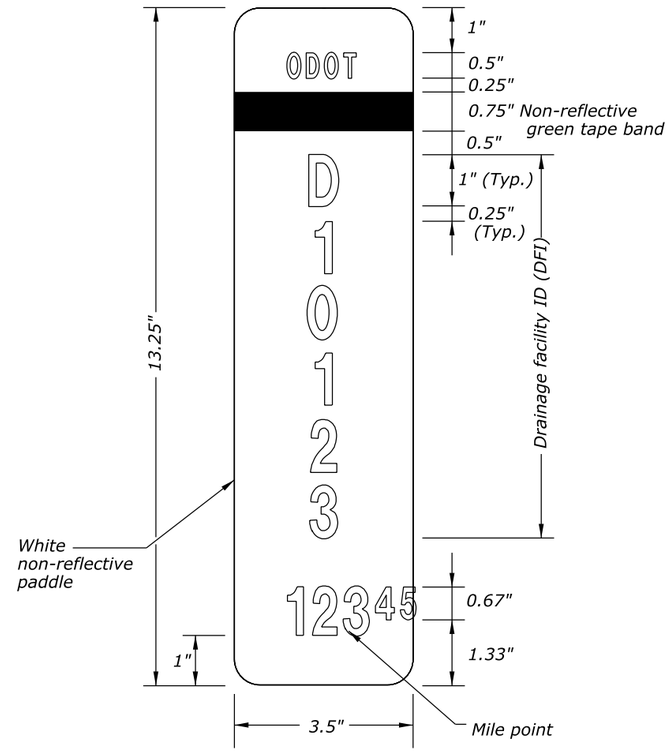
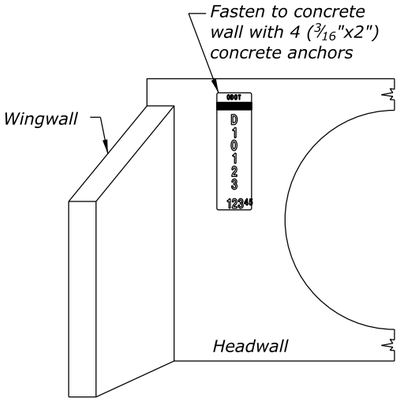
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.72 |



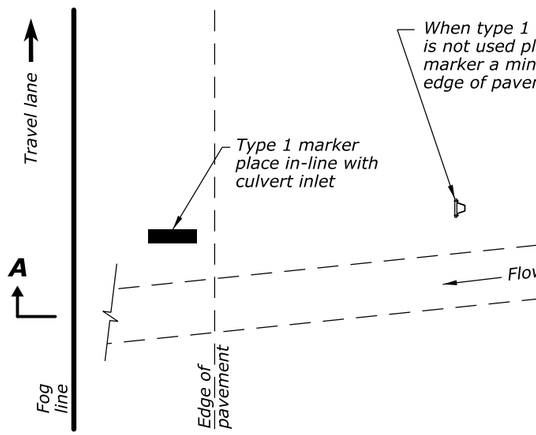

SECTION A-A



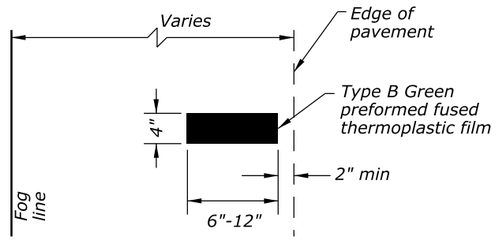

TYPE 2 MARKER



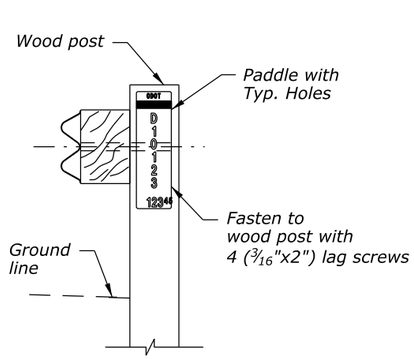

CONCRETE HEADWALL INSTALLATION




TYPE 1 & 2 MARKERS INSTALLATION DETAIL




TYPE 1 MARKER




WOOD POST GUARDRAIL INSTALLATION

GENERAL NOTES FOR ALL DETAILS:

1. See sheet E.73 for Target detail and notes for paddle.
2. See sheet E.73 for 'Steel Posts' detail for mounting to Type 1U steel post.
3. See sheet E.74 for Type 1U steel post dimensions and details.
4. Letters and numbers are type C font in non-reflectorized black.
5. Do not mount paddle to any other highway signing post.
6. Place Type 1 marker on inlet edge of the pavement directly in line with the inlet.
7. Do not place Type 1 marker over fog line or in the travel lane.
8. Install Type 2 culvert markers parallel to travel lane.
9. Place Type 2 culvert markers so they are not noticed or conspicuous to traffic.
10. Where three or more culverts are within 50' of each other place Type 1 marker or Type 2 marker at the first culvert and the last culvert only.

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# CULVERT ID MARKER

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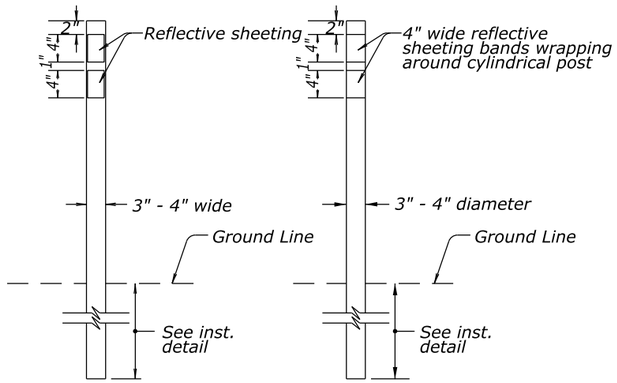
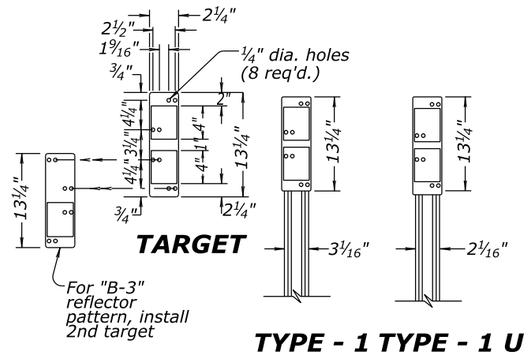
| OR | DOT 18(2) | E.73 |



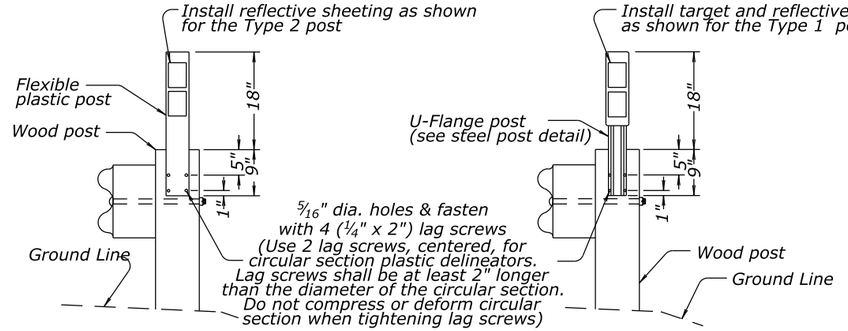

**TYPE - 2** **TYPE - 3**

## FLEXIBLE PLASTIC POSTS




**TYPE - 1 TYPE - 1 U**

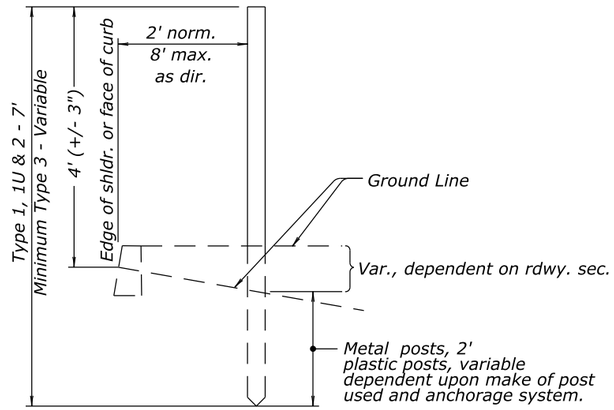
## STEEL POSTS



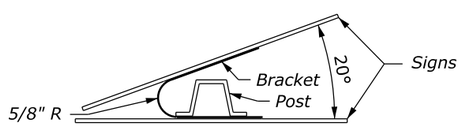

**ALTERNATE 1** **ALTERNATE 2**

**TYPE - 4**

## GUARDRAIL AREAS (WITH WOOD POSTS)




## INSTALLATION DETAIL




Use a bracket for each mounting hole.

## BRACKET ASSEMBLY

*NOTES:*

*POST:*
Galv. steel, nominal weight Type 1, 2 lb/ft, Type 1 U, 1.12 lb/ft.

See sheet E.74 for steel post dimensions and details.

*TARGET:*
Aluminum sheet, nominal thickness .050". Fasten to post with⅝" dia. aluminum blind rivets and washers.

For "B-3" reflector pattern, top target shall overlap bottom target.

*REFLECTORS:*
3" x 4" reflective sheeting unless otherwise shown. (3 1/2"x 4" reflective sheeting is an acceptable alternate unless otherwise shown.)
Acrylic prismatic reflectors acceptable on Type 1, 1 U, 2 and 4 posts and Type 5 barrier mounts.
Place required number in sequence from top of target.

*GENERAL NOTES:*

1. At guard rail locations the delineators are to be installed behind the rail and shall be located adjacent to guard rail posts as shown for Type 4 Delineators.
2. Install all delineators with reflectors facing adjacent oncoming traffic.
3. Offset delineators an additional 4' in areas of heavy snow removal operations.
4. Backside Delineators may be used in frequently snow plowed areas where use of snow poles is not justified. When Backside Delineators are specified, substitute "W-1" and "W-2" with "W-1B" and "W-2B" respectively, on Type 1 steel posts. Do not install Backside Delineators on one-way sections of roadway, freeways and ramps, or on radius sections.

## REFLECTOR PATTERN TABLE

| | Color Type | Color Of Reflector And Target Or Post | Number Of Reflectors | Color Of Reflector And Target Or Post On Backside | Number Of Reflectors On Backside |
|---|---|---|---|---|---|
| Standard Pattern | "W-1" | White | 1 | Not Applicable | Not Applicable |
| | "W-2" | White | 2 | | |
| | "Y-1" | Yellow | 1 | | |
| | "Y-2" | Yellow | 2 | | |
| | "B-1" | Blue | 1 | | |
| | "B-2" | Blue | 2 | | |
| | "B-3" | Blue | 3 | | |
| | "R-1" | Red | 1 | | |
| | | | | | |
| Backside Pattern | "W-1B" | White | 1 | White | 2 |
| | "W-2B" | White | 2 | White | 2 |

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# DELINEATORS (CULVERT ID MARKERS)

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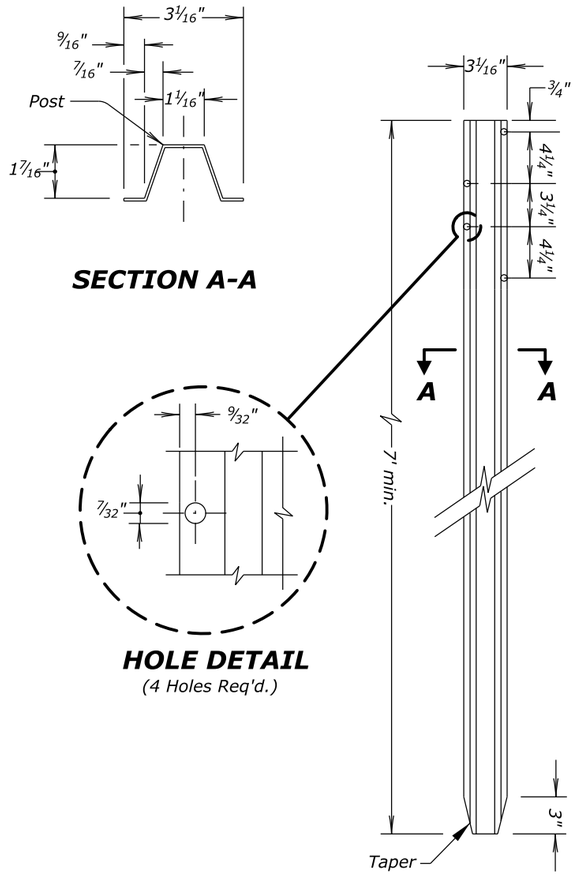
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.74 |



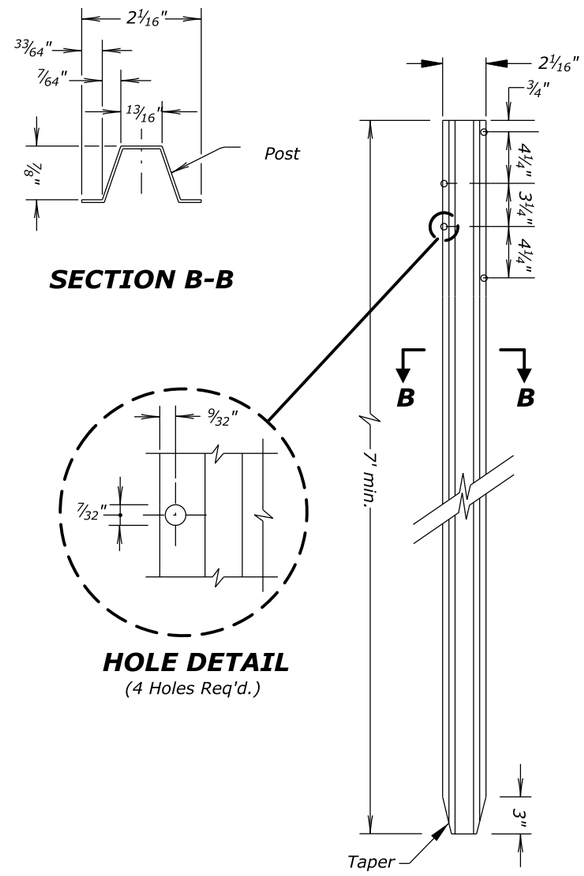

**SECTION A-A**

**HOLE DETAIL**
*(4 Holes Req'd.)*

*Notes:*

*1. Galv. steel, nominal weight 2 lb. per ft.*

## TYPE - 1 STEEL POST DIMENSIONS




**SECTION B-B**

**HOLE DETAIL**
*(4 Holes Req'd.)*

*Notes:*

*1. Galv. steel, nominal weight 1.12 lb. per ft.*

## TYPE - 1 U STEEL POST DIMENSIONS

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*DRAWING BASED ON OREGON STANDARD DRAWING TM571*

# DELINEATORS (CULVERT ID MARKERS) STEEL POST DETAILS

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| STATE | PROJECT | SHEET NUMBER |
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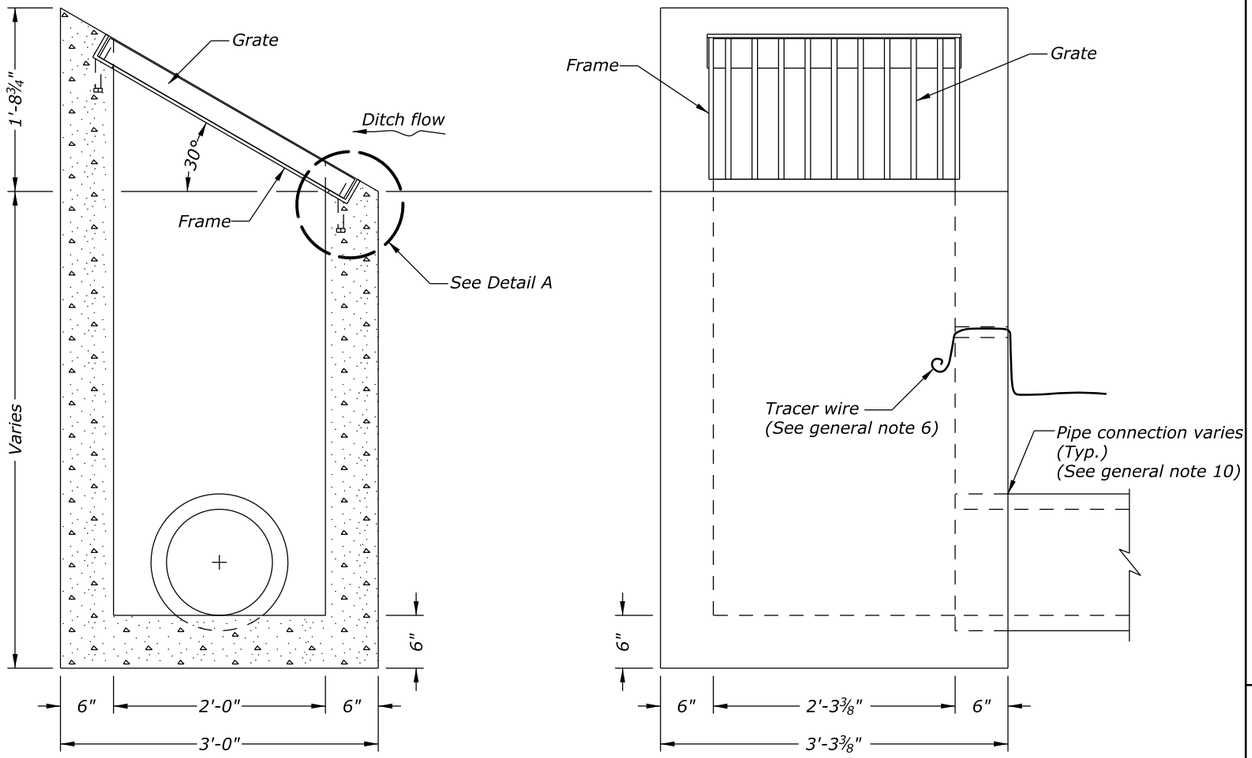
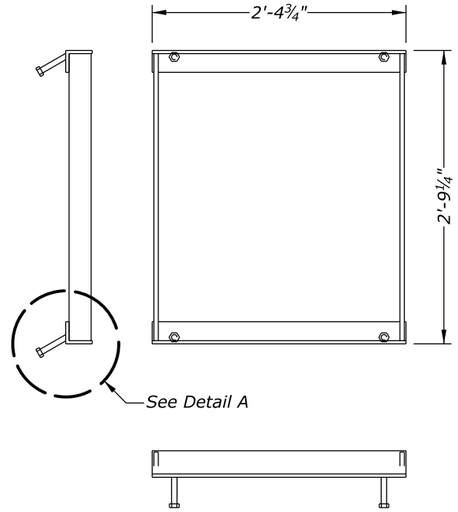
| OR | DOT 18(2) | E.75 |



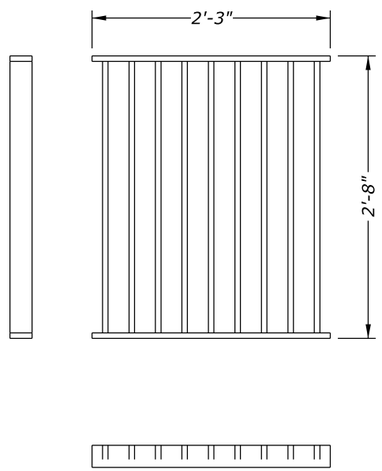

**SECTION A - A**



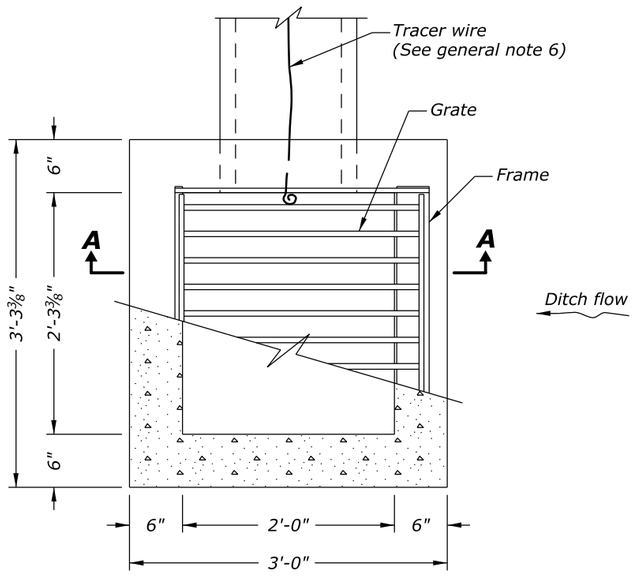

**ELEVATION**



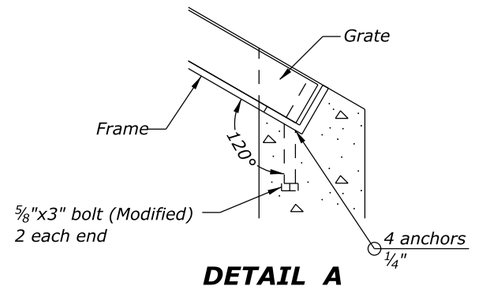

**G-2 FRAME**
*(See general note 2)*




**G-2 GRATE (TYPE 1)**
*(See general note 2)*




**PLAN**




**DETAIL A**
*(Anchor bolt modication, see general note 2)*

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *All concrete shall be commercial grade concrete.*
2. *For frame & grate details not shown, see sheet E.76.*
   *Modify anchor bolt attachment to frame as shown in Detail A.*
   *G-2 (Type 2) grates may be used if approved by the engineer.*
3. *Catch basin, frame, and grates shall meet H20 loading.*
4. *Provide sump only when shown on plans, and allowed by jurisdiction. For sump details, see sheet E.59.*
5. *⅝" cross bars shall be flush with the grate surface and may be fillet welded, resistance welded or electroforged to bearing bars.*
6. *See sheet E.77 for tracer wire details, or approved alternate.*
7. *Max. pipe diameter varies with pipe material.*
8. *Do not use in locations where inlet can be struck by an errant vehicle, or provide shielding of inlet.*
9. *Inlet base may be cast-in-place or precast. Where precast inlet base is used as an alternate, a 4" compacted leveling bed of sand or ¼"-0 crushed aggregate shall be provided.*
   *All precast inlets shall conform to requirements of ASTM C913.*
10. *See sheet E.79 for pipe to structure connections.*
11. *Location, elevation, diameter, slope, and number of pipe(s) varies, see project plans.*

*DRAWING BASED ON OREGON STANDARD DRAWING RD370*

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# DITCH INLET
# ODOT TYPE D

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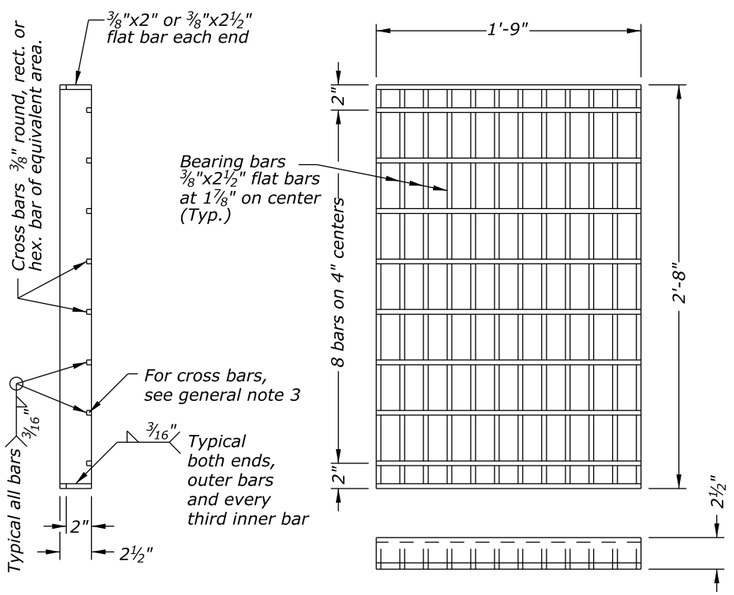
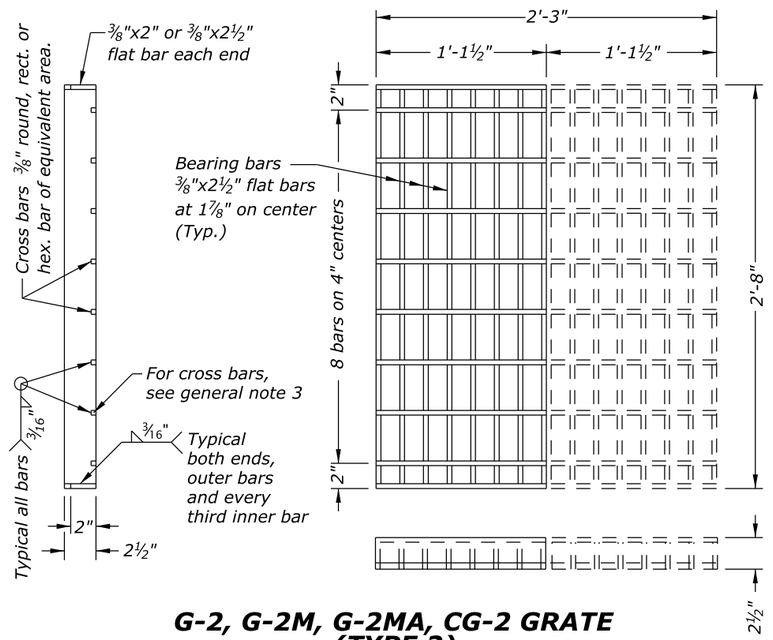
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.76 |



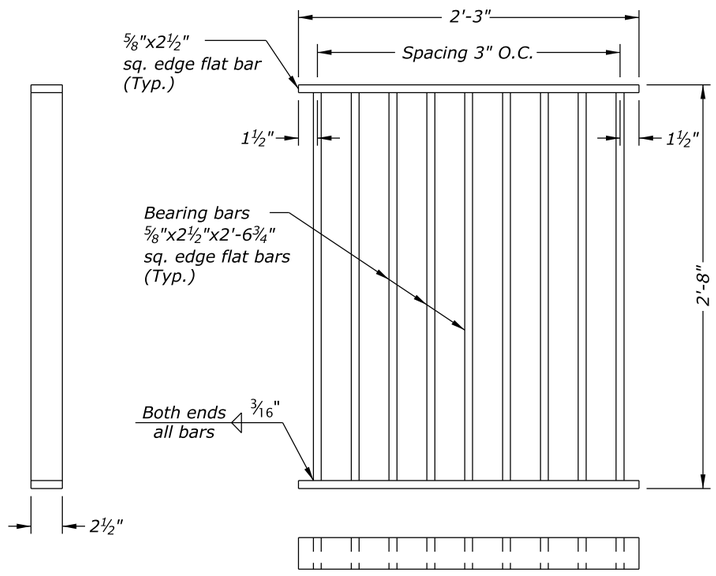

## G-1, CG-1 GRATE (TYPE 2)

*(Bicycle-safe)*



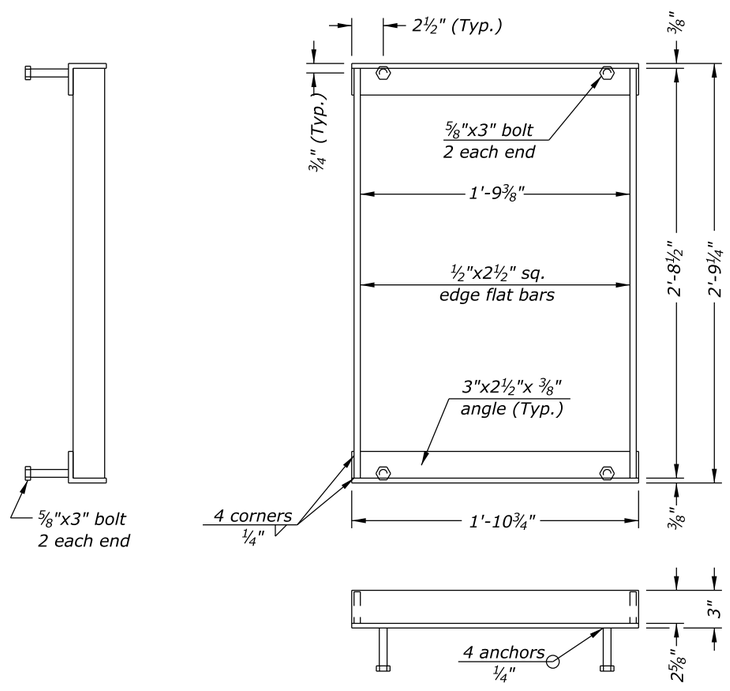

## G-2, G-2M, G-2MA, CG-2 GRATE (TYPE 2)

*(Bicycle-safe)*
*(2 grates required per inlet, as shown)*

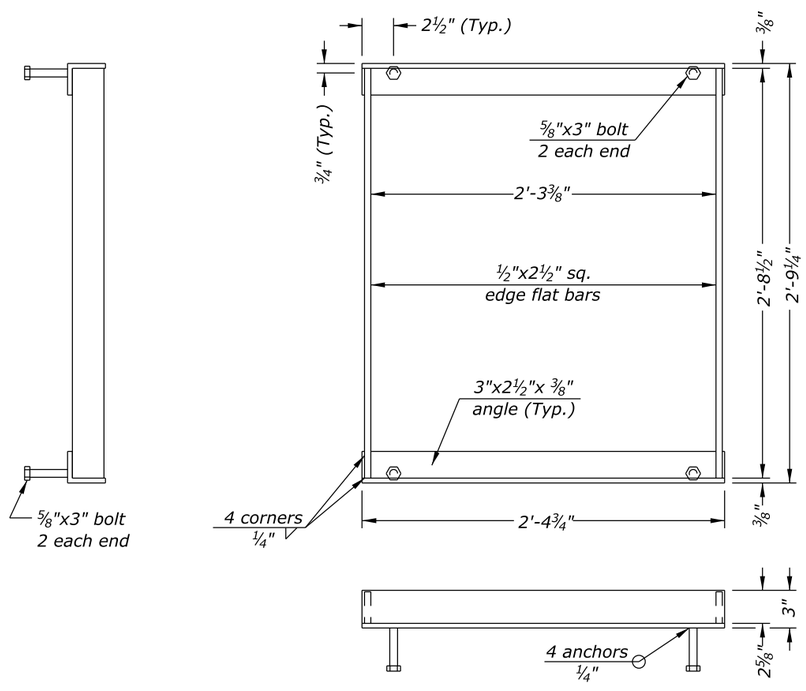



## G-2, G-2M, G-2MA, CG-2 GRATE (TYPE 1)

*(See general note 2)*




## G-1, CG-1 FRAME




## G-2, G-2M, G-2MA, CG-2 FRAME

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *For inlet details, see appropriate inlet standard drawing(s).*
2. *Type 1 grate allowed only in locations not subject to bicycle or pedestrian use.*
3. *3/8" cross bars shall be flush with the top of grate surface and may be fillet welded, resistance welded or electroforged to bearing bars.*
4. *Hot dip galvanize after fabrication.*

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*DRAWING BASED ON OREGON STANDARD DRAWING RD365*

**FRAMES & GRATES FOR CONCRETE INLETS**

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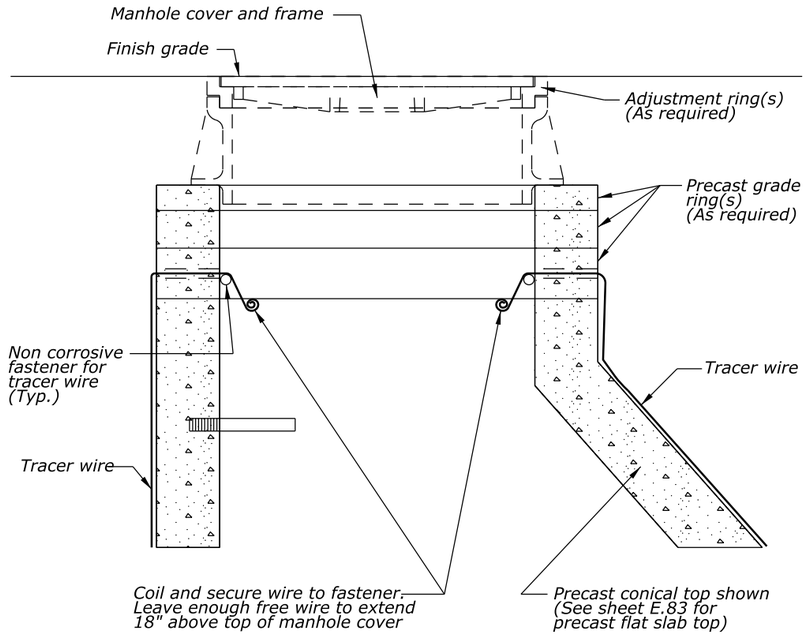
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.77 |




## DETAIL "A"
## TRACER WIRE

*(See general note 5)*

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *All precast products shall conform to requirements of ASTM C478.*
2. *Standard precast manhole section diameter shall be 48". Use 42" if specified by the CO.*
3. *See sheet E.82 for pipe to manhole connections.*
4. *Adjust 24" maximum.*
5. *All connecting pipes shall have a tracer wire, or approved alternate. Place tracer wire directly over pipe centerline and on top of the pipe zone material.*
6. *See sheet E.83 for details not shown.*
7. *Max. pipe diameter varies with pipe material.*

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*DRAWING BASED ON OREGON STANDARD DRAWING RD336*

**MANHOLE DETAILS**

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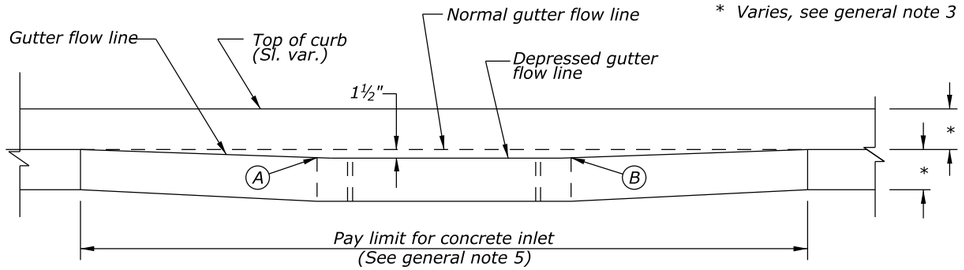
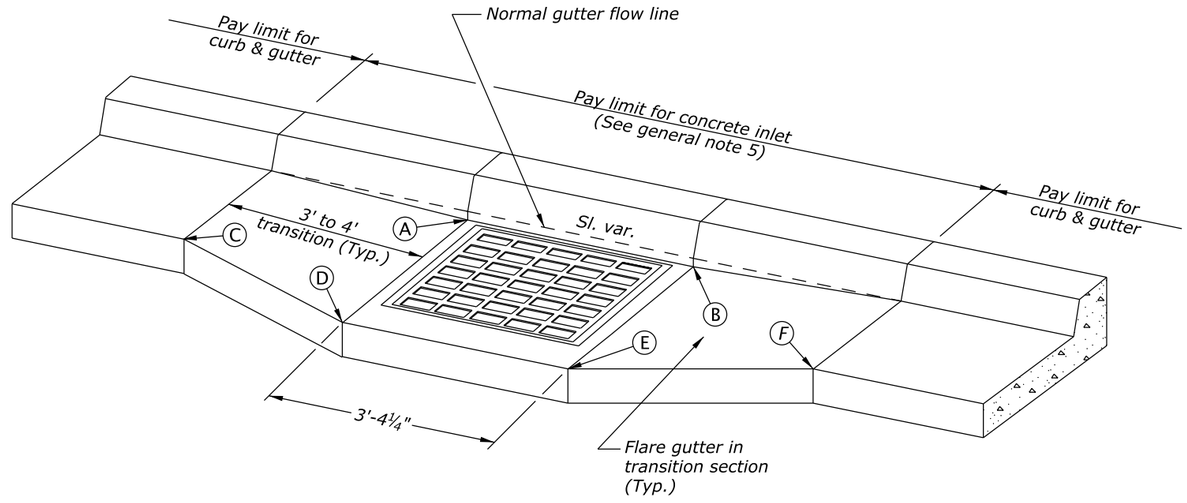
|---|---|---|
| OR | DOT 18(2) | E.78 |

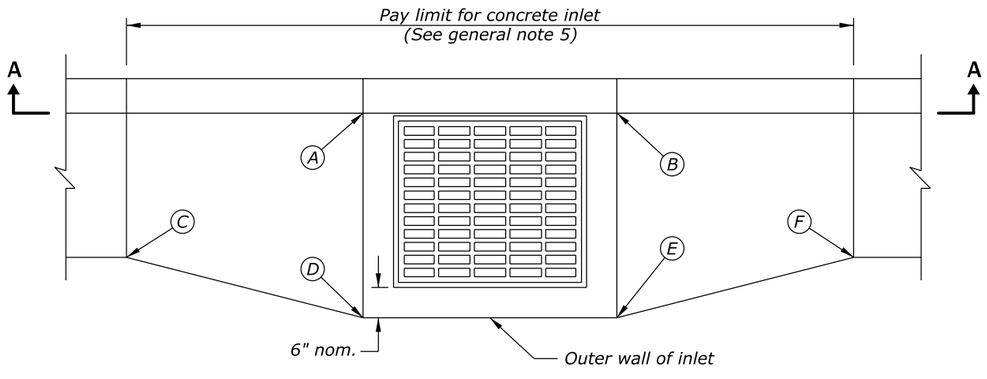
*NOTES:*
*1. Provide 1½" local depression at points A & B.*
*2. Match normal pvmt. grade at points C, D, E & F.*
*3. Vary transition section slopes to match above points.*




* Varies, see general note 3

**SECTION A-A**




**PLAN VIEW**

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

*1. For inlet details, see appropriate inlet standard drawing(s).*

*2. For frame and grate details, see sheet E.76.*

*3. For curb details, see sheets E.80 & E.81.*

*4. All concrete shall be minor concrete according to Section 601.*

*5. Pay limit for inlet is expanded when curb and gutter are monolithic.*

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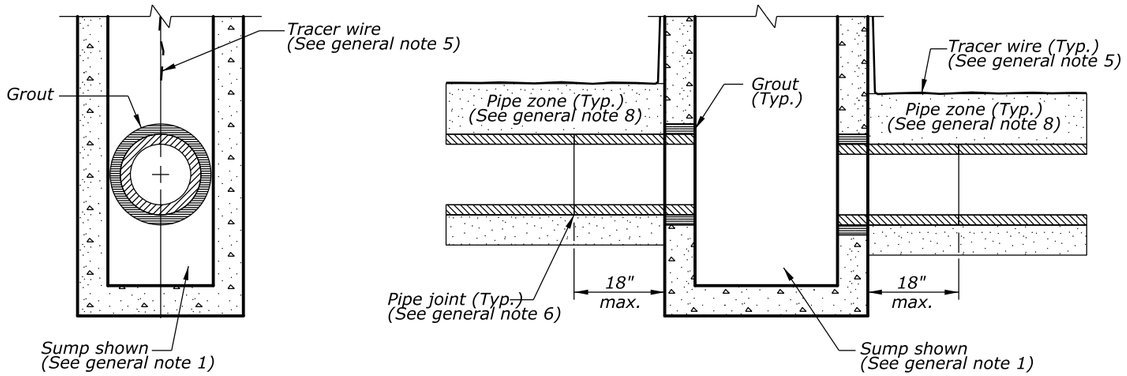
*DRAWING BASED ON OREGON STANDARD DRAWING RD363*

**GUTTER TRANSITION AT INLET**

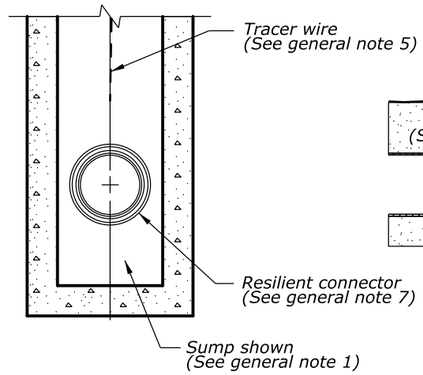
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.79 |



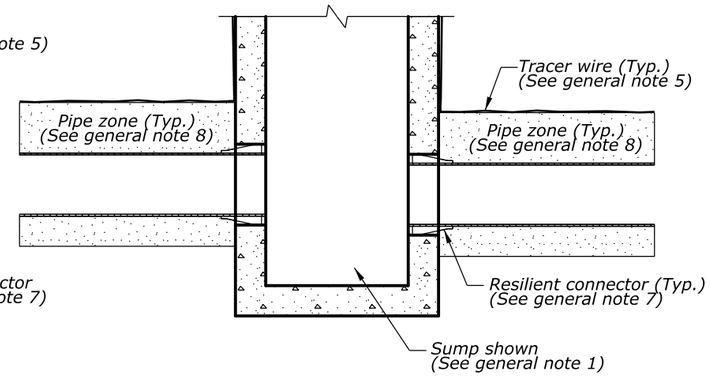

**SECTION B-B**



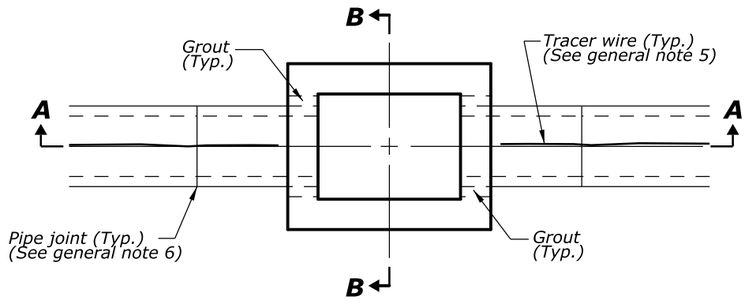

**SECTION A-A**




**SECTION D-D**

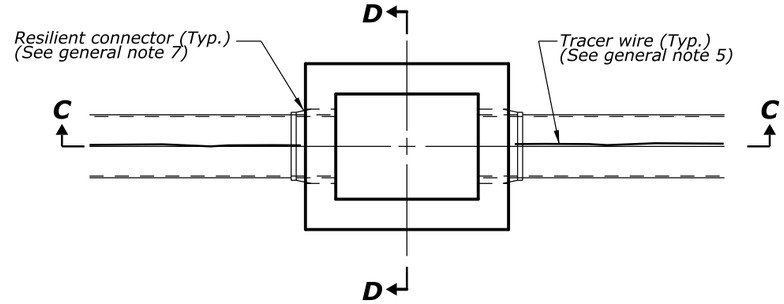



**SECTION C-C**




**PLAN**

**CONNECTION OF RIGID PIPE TO STRUCTURE**




**PLAN**

**CONNECTION OF FLEXIBLE PIPE TO STRUCTURE**

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *See sheets E.59 & E.76 for inlet details not shown.*
2. *See appropriate standard sheets or special project details for other similar structures.*
3. *Location, elevation, diameter, slope, and number of pipe(s) varies, see project plans.*
4. *Max. pipe diameter varies with pipe material.*
5. *All connecting pipes shall have a tracer wire, or approved alternate. See Sheet E.77 for tracer wire details.*
6. *When rigid pipe is used, the connecting pipe shall have a flexible, gasketted and unrestrained joint within 18" of manhole wall. Joint type varies with manufacturer.*
7. *When flexible pipe is used, install resilient connectors conforming to requirements of ASTM C923.*
8. *Pipe zone varies, see sheet E.60.*

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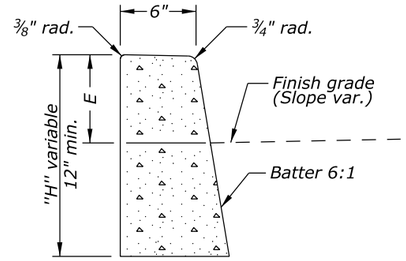
**PIPE TO STRUCTURE CONNECTIONS**

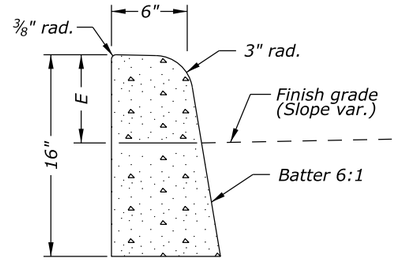
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.80 |




O.D.O.T. & City of Portland Standard "H"=16"

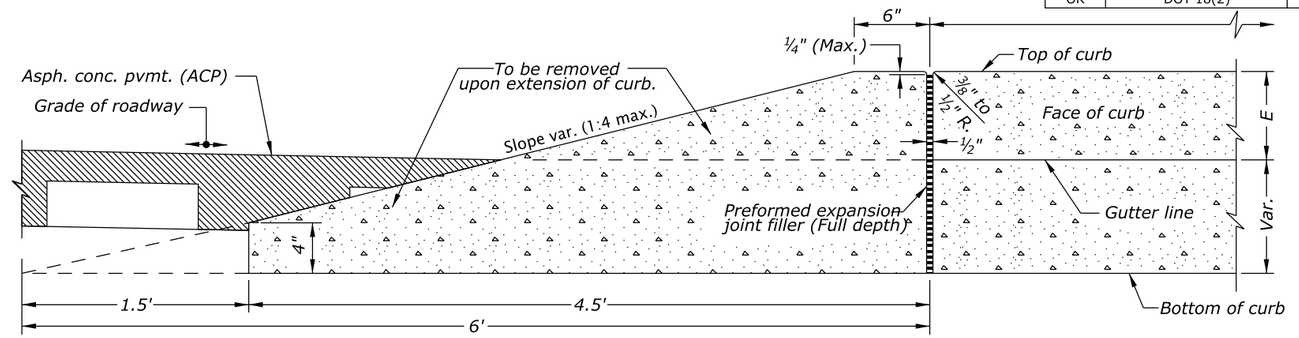
## STANDARD CURB

(See general note 9)

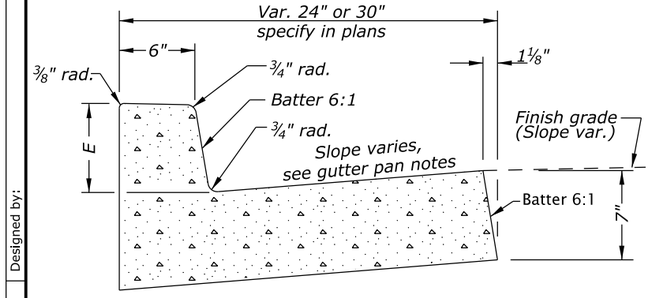



## MOUNTABLE CURB

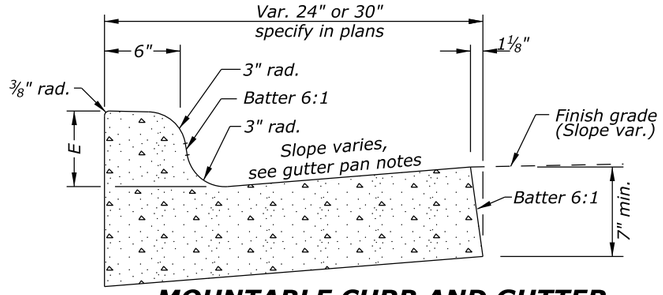
(See general note 9)




## CURB ENDING DETAIL




## CURB AND GUTTER




## MOUNTABLE CURB AND GUTTER

*GUTTER PAN NOTES:*

*Slope 5.0% normal.*

*Slope 4.0% max. at curb ramps.*

*Vary slope as reqd. for drainage. Vary where shown on plans, and allowed by jurisdiction.*

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *Curb exposure "E" = 6" to 9", as measured vertically from flowline to highest point on curb. Vary as shown on plans or as directed. Standard "E"=7".*
2. *Const. curb expansion joints at 200' maximum spacing, and at points of tangency, and at ends of each driveways.*
3. *Const. curb contraction joints at 15' maximum spacing, and at ends of each inlet and curb ramp.*
4. *Transitions shall be used to connect curbs of different exposures "E". ("E" Is the total vertical dimension of those curb surfaces having a slope of 1:1 or steeper). Minimum desirable transition length shall be 20' for each 1" difference in "E".*
5. *Tops of all curbs shall slope toward the roadway at 1.5% max. (Max. 2.0% finished surface slope), unless otherwise shown, or as directed.*
6. *Dimensions are nominal, vary to conform with curb machine approved by the CO.*
7. *Dimensions adjacent to radii are measured to the point of intersection of curb surfaces.*
8. *For drainage curbs, see sheet E.81.*

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*DRAWING BASED ON OREGON STANDARD DRAWING RD700*

**CURBS**

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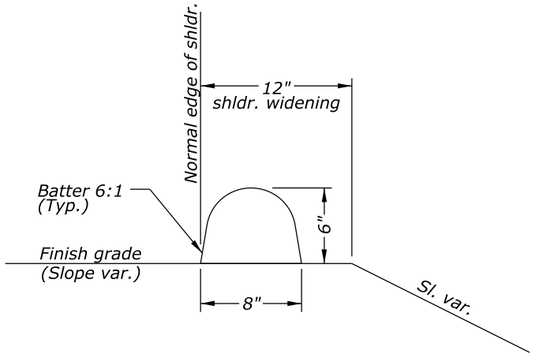
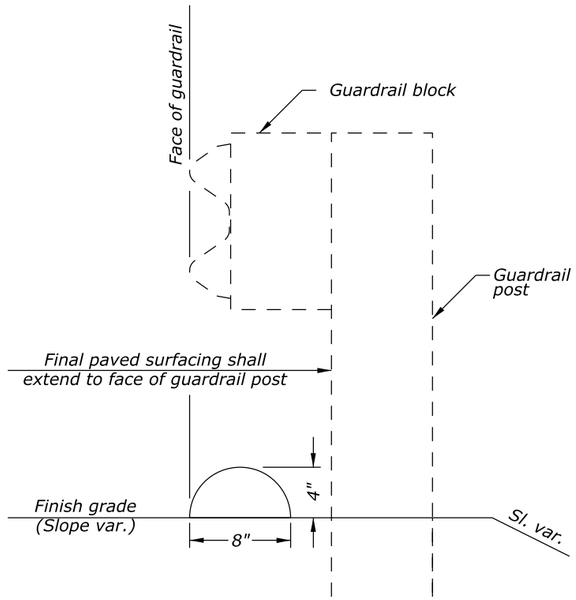
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.81 |




## ASPHALT CONCRETE

## DRAINAGE CURBS

(See general note 4)




## ASPHALT CONCRETE

## DRAINAGE CURBS UNDER GUARDRAIL

(See general note 4)

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *For PCC drainage curbs, construct curb expansion joints at 200' maximum spacing, and at points of tangency.*
2. *For PCC drainage curbs, construct curb contraction joints at 15' maximum spacing.*
3. *Dimensions are nominal, vary to conform with curb machine approved by the engineer.*
4. *When bonding to dense graded ACP, apply joint sealant between surfaces.*
5. *When drainage curb is required, curb alignment shall be the same as face of guardrail, as shown above. When a run of drainage curb, or any part thereof, is placed under guardrail, curb height shall be 4".*
6. *For other curb types, see sheet E.80.*

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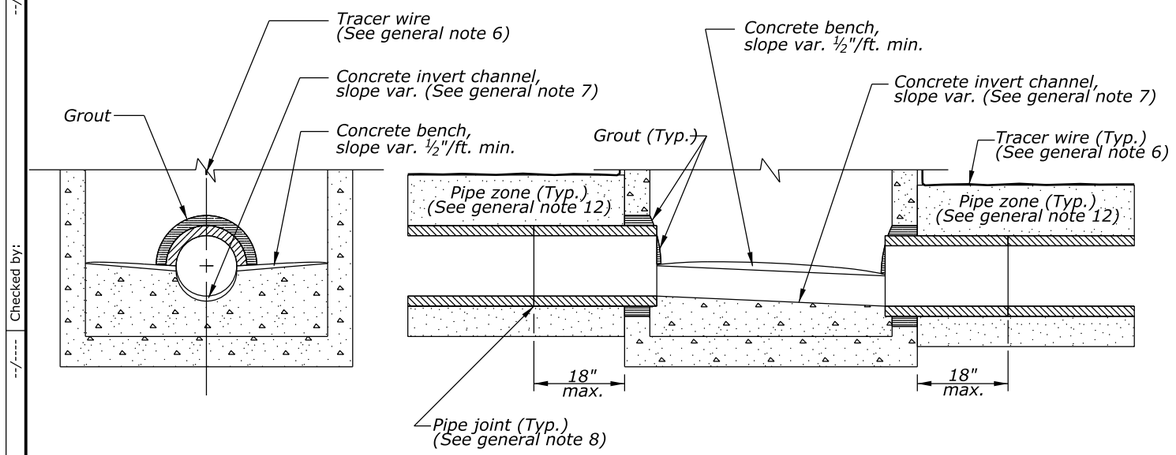
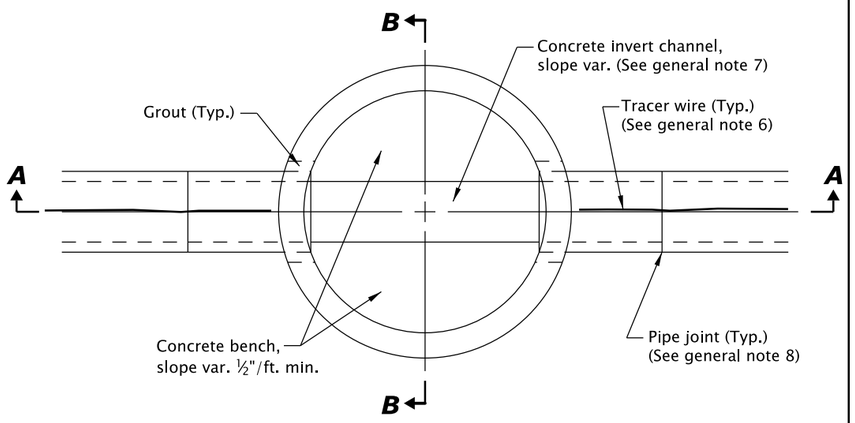
**DRAINAGE CURBS**

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.82 |

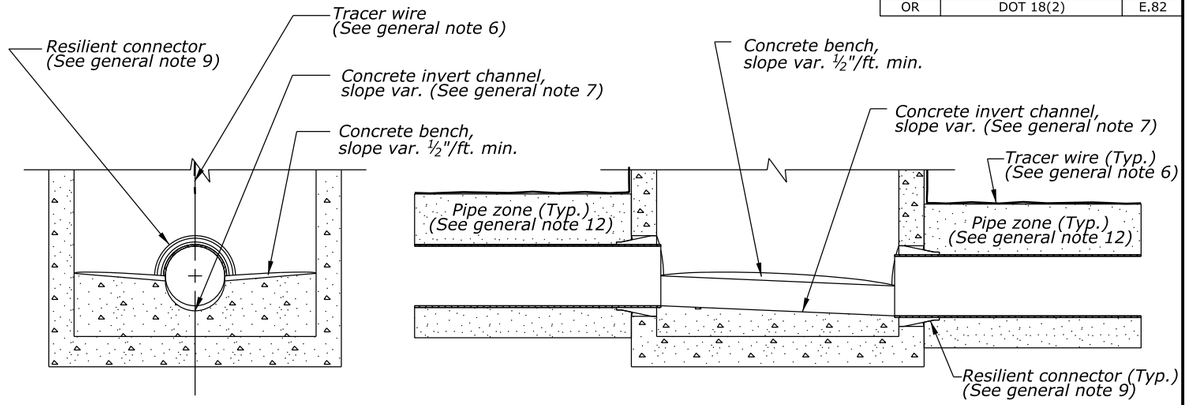



**SECTION B-B** **SECTION A-A**

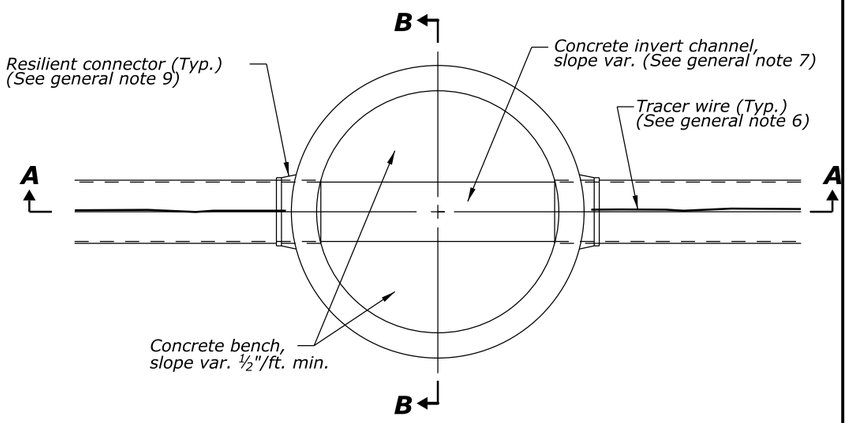



**PLAN**

## CONNECTION OF RIGID PIPE TO MANHOLE




**SECTION B-B** **SECTION A-A**




**PLAN**

## CONNECTION OF FLEXIBLE PIPE TO MANHOLE

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *All precast sections shall conform to requirements of ASTM C478.*
2. *Manhole base sections may be precast or cast-in-place.*
3. *All concrete shall be commercial grade concrete.*
4. *Location, elevation, diameter, slope, and number of pipe(s) varies, see project plans.*
5. *Max. pipe diameter varies with pipe material.*
6. *All connecting pipes shall have a tracer wire, or approved alternate. See sheet E.69 for tracer wire details.*
7. *Invert channels shall be constructed to provide smooth slopes and radii to outlet pipe.*
8. *When rigid pipe is used, the connecting pipe shall have a flexible, gasketted and unrestrained joint within 18" of manhole wall. Joint type varies with manufacturer.*
9. *When flexible pipe is used, install resilient connectors conforming to requirements of ASTM C923.*
10. *See sheets E.83 & E.77 for details not shown.*
11. *See sheet E.77 for manhole steps details.*
12. *Pipe zone varies, see sheet E.60.*

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*DRAWING BASED ON OREGON STANDARD DRAWING RD345*

# PIPE TO MANHOLE CONNECTIONS

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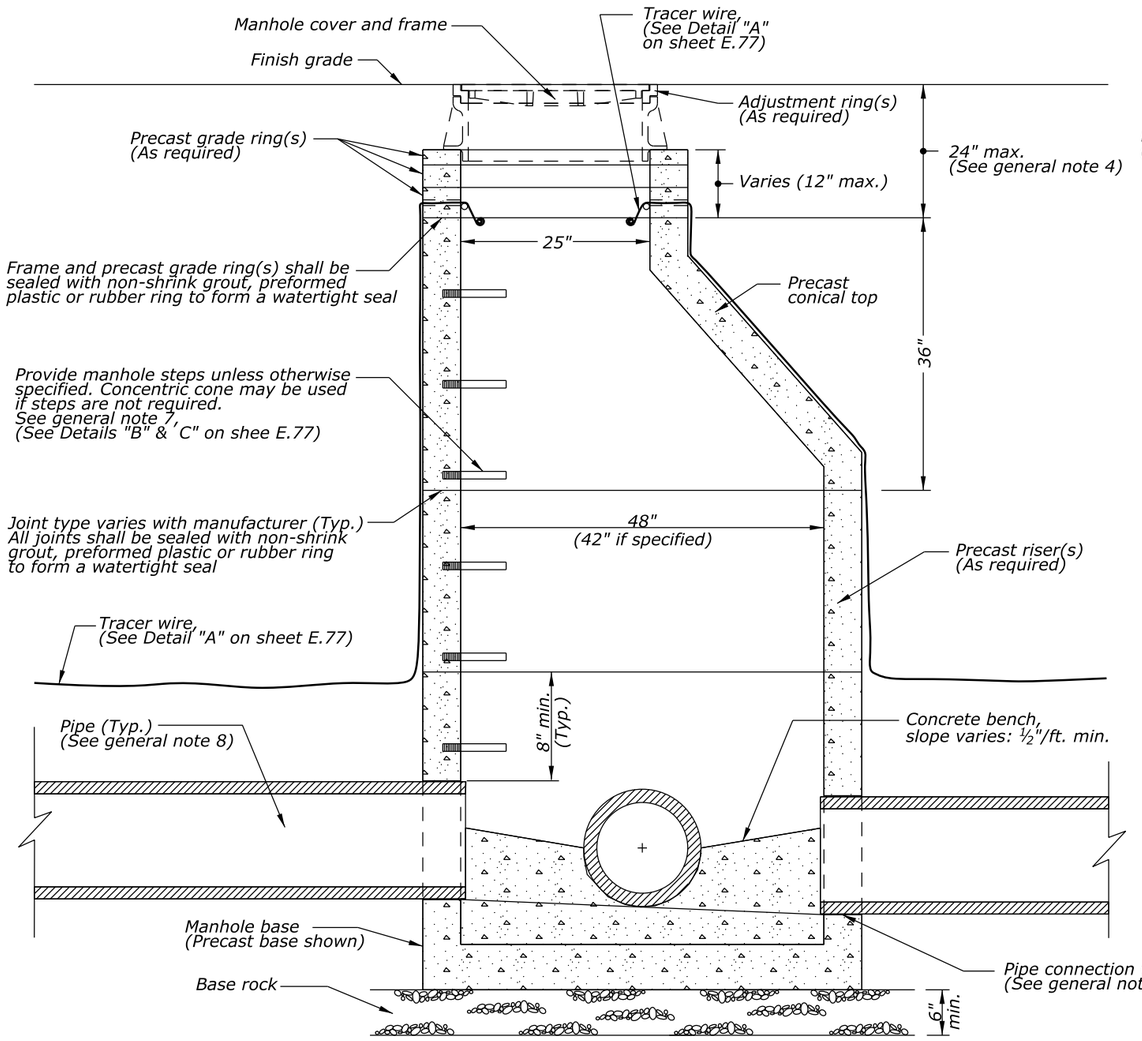
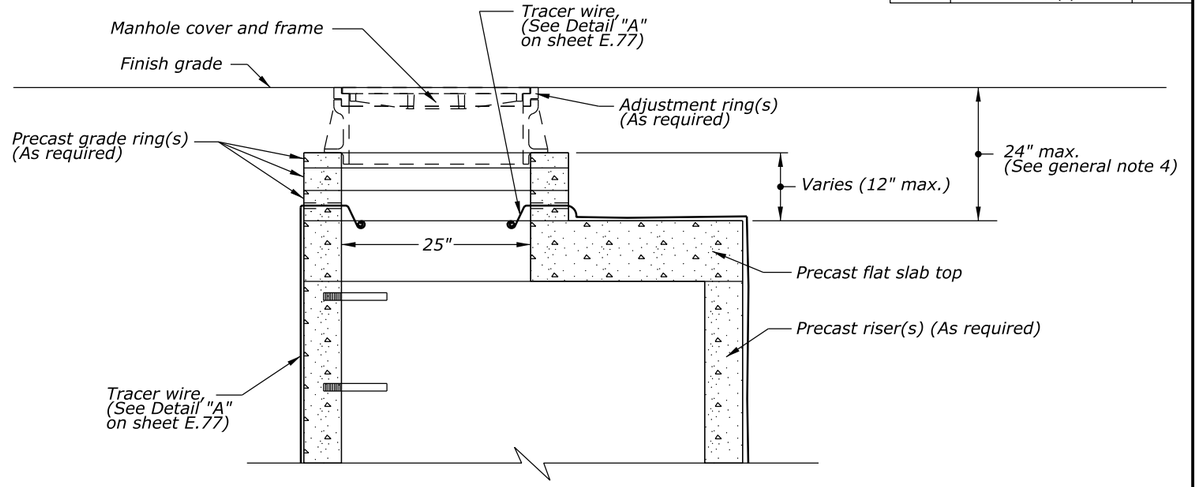
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.83 |




***MANHOLE WITH PRECAST CONICAL TOP***




***MANHOLE WITH PRECAST FLAT SLAB TOP***

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *All precast products shall conform to requirements of ASTM C478.*
2. *Standard precast manhole section diameter shall be 48".*
3. *See sheet E.82 for pipe to manhole connections.*
4. *Adjust 24" maximum.*
5. *All connecting pipes shall have a tracer wire, or approved alternate.*
6. *See sheet E.77 for manhole steps.*
7. *See sheet E.77 for details not shown.*
8. *Max. pipe diameter varies with pipe material.*
9. *Location, elevation, diameter, slope, and number of pipe(s) varies, see project plans.*

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*DRAWING BASED ON OREGON STANDARD DRAWING RD335*

**STORM SEWER MANHOLE**

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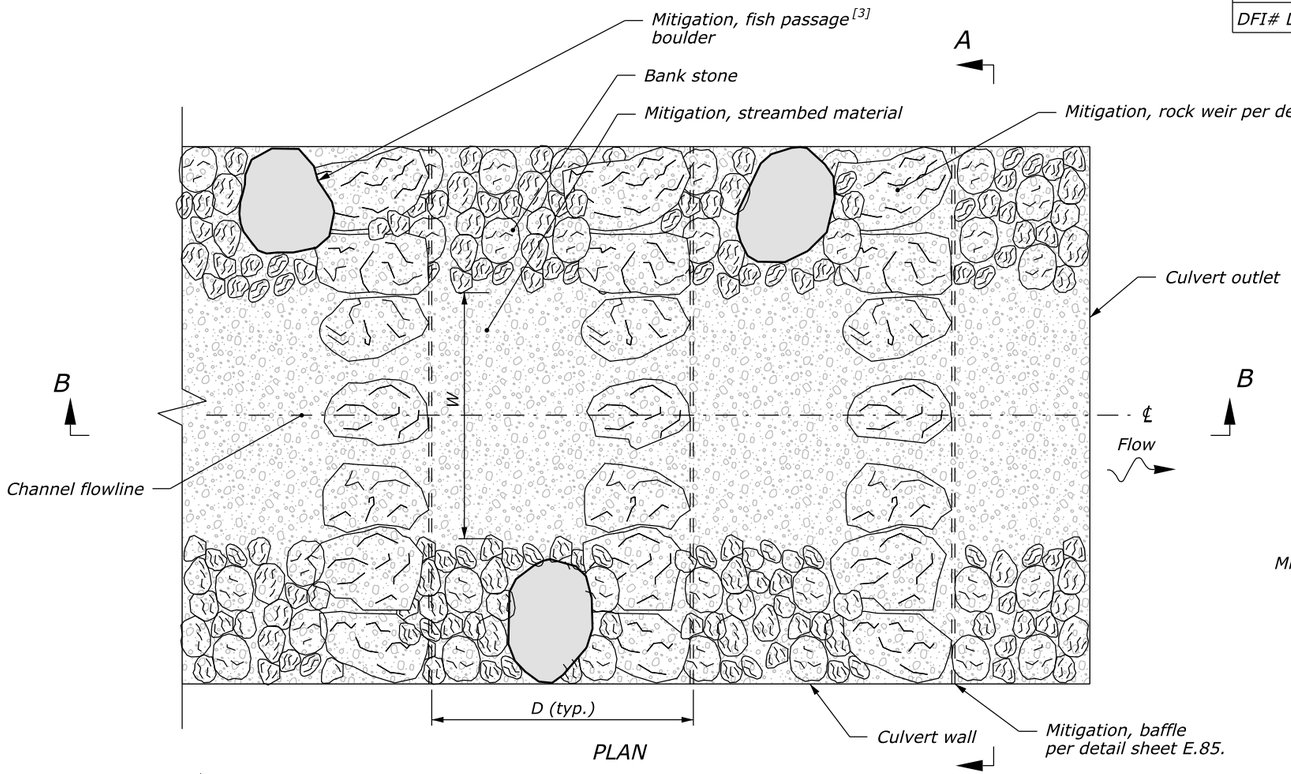
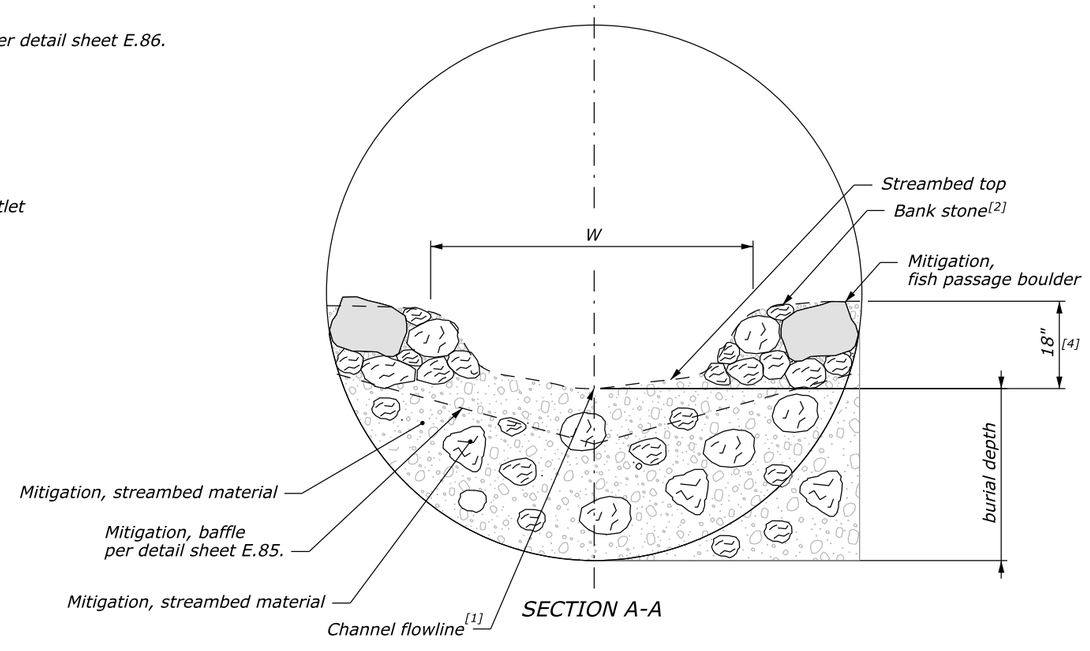
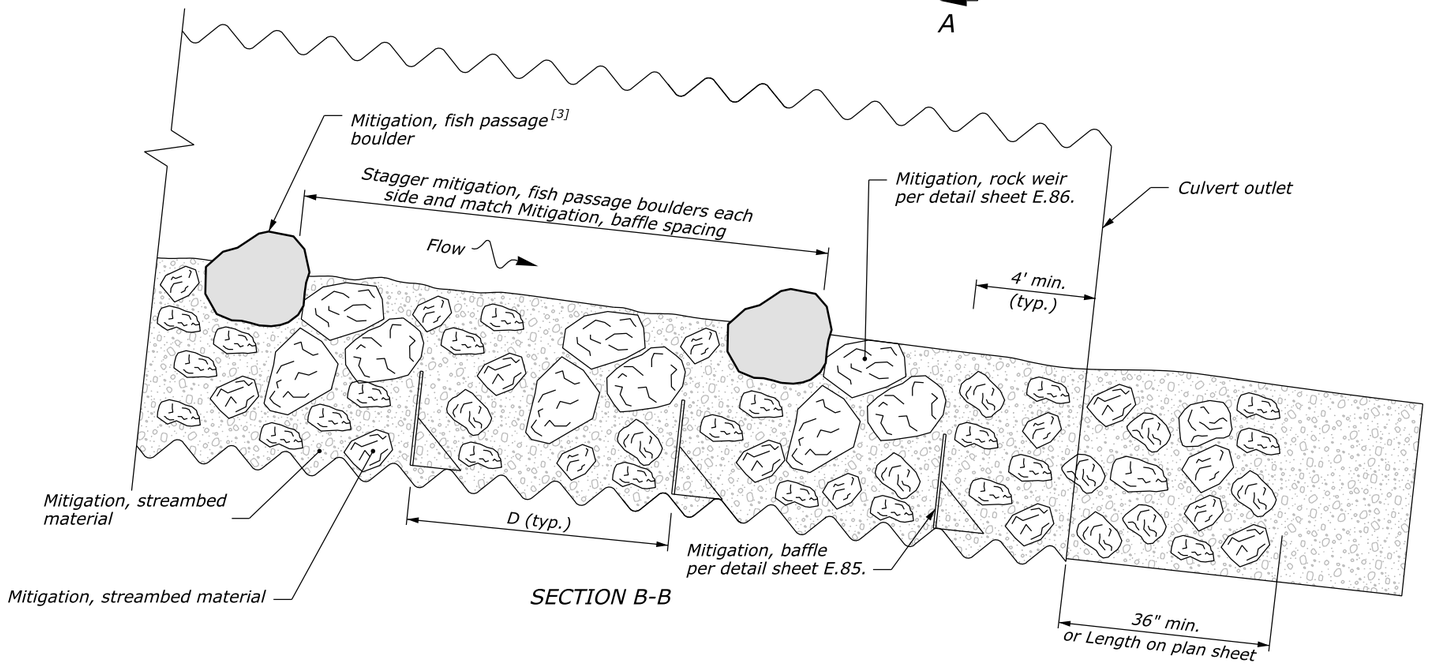
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.84 |

## INFILL INFORMATIONAL QUANTITIES

| LOCATION | D (ft) | W (ft) | FISH PASSAGE BOULDER DIAMETER (in) |
|---|---|---|---|
| DFI# D027842 (MP 15.51) | 7.52 | 6 | 12 |




## NOTE:

1. See special contract requirements for mitigation, streambed material gradations.
2. Stagger in-channel fish passage boulder within the culvert span.

## FOOTNOTE:

[1] Slope streambed aggregate towards flowline to ensure parabolic shape.

[2] Construct well defined banks with bank stone and streambed sediment where listed in the infill quantities table.

[3] Embed fish passage boulders within active channel ¾ smallest dimension.

[4] 18-inches or as specified on plan sheet.

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Not to scale

**SIMULATED STREAM CULVERT TREATMENT (WITH MITIGATION, BAFFLES)**

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| STATE | PROJECT | SHEET NUMBER |
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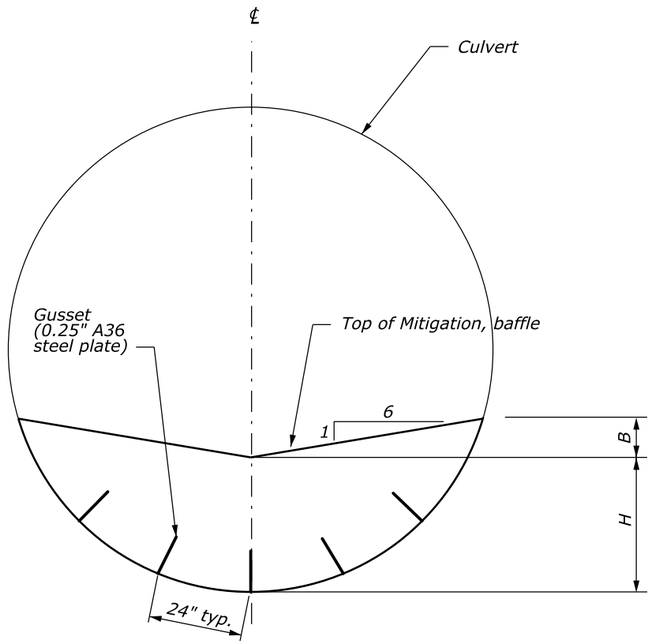
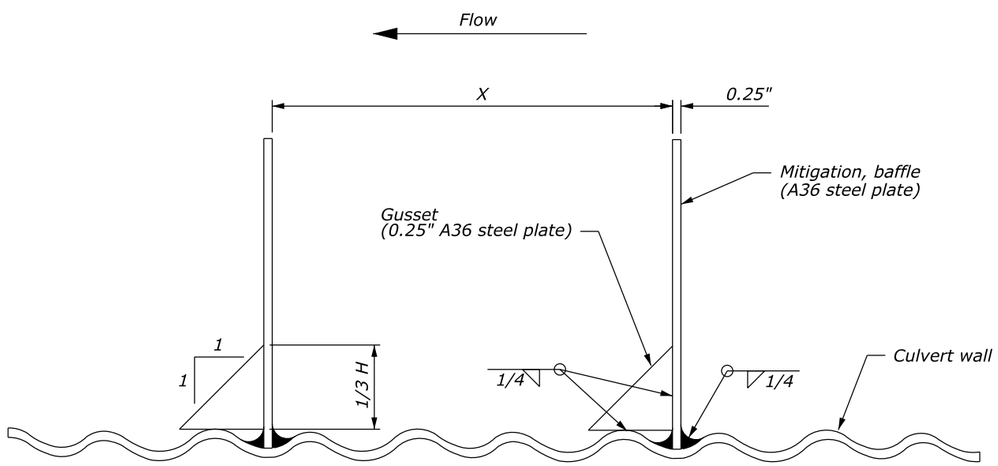



## MITIGATION, BAFFLE CROSS-SECTION




## PLATE AND CONNECTOR DETAIL

**MITIGATION, BAFFLE**

| LOCATION | Mitigation, Baffle (no.) | B (in) | H (in) | X Max. (in) |
|---|---|---|---|---|
| MP 15.51 | 27 | 6 | 24 | 96 |
| | | | | |

NOTE:

1. Hot dip galvanized baffles and gussets.
2. Apply two coats zinc paint to all welds.
3. X dimension may be varied +/- 6 inches as needed for locating Mitigation, baffles in corrugation valleys or away from plate seems (X= distance between baffle).
4. Dimensions without units are inches.
5. H is the height of the baffle, and B is the height of the weir.

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# CULVERT MITIGATION, BAFFLE DETAILS

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| STATE | PROJECT | SHEET NUMBER |
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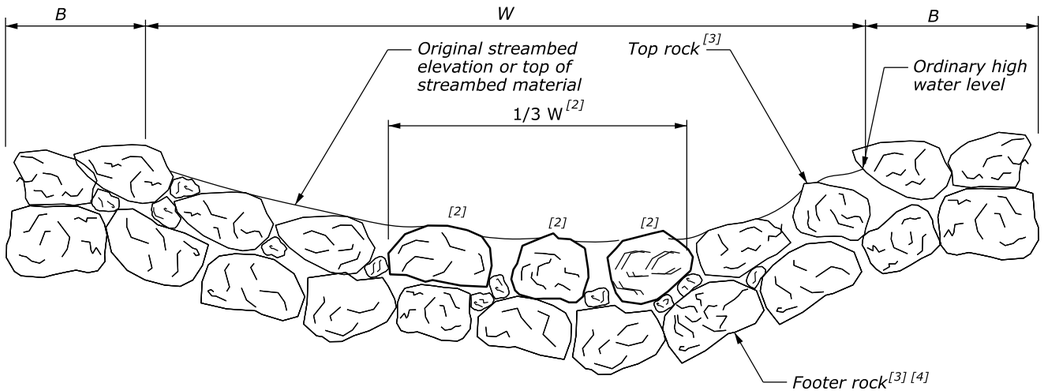
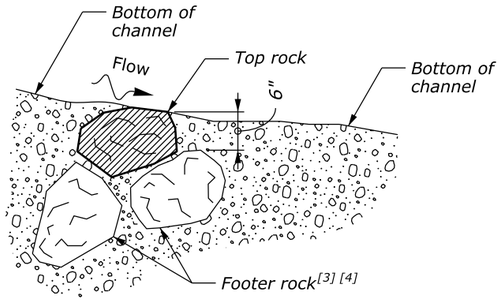
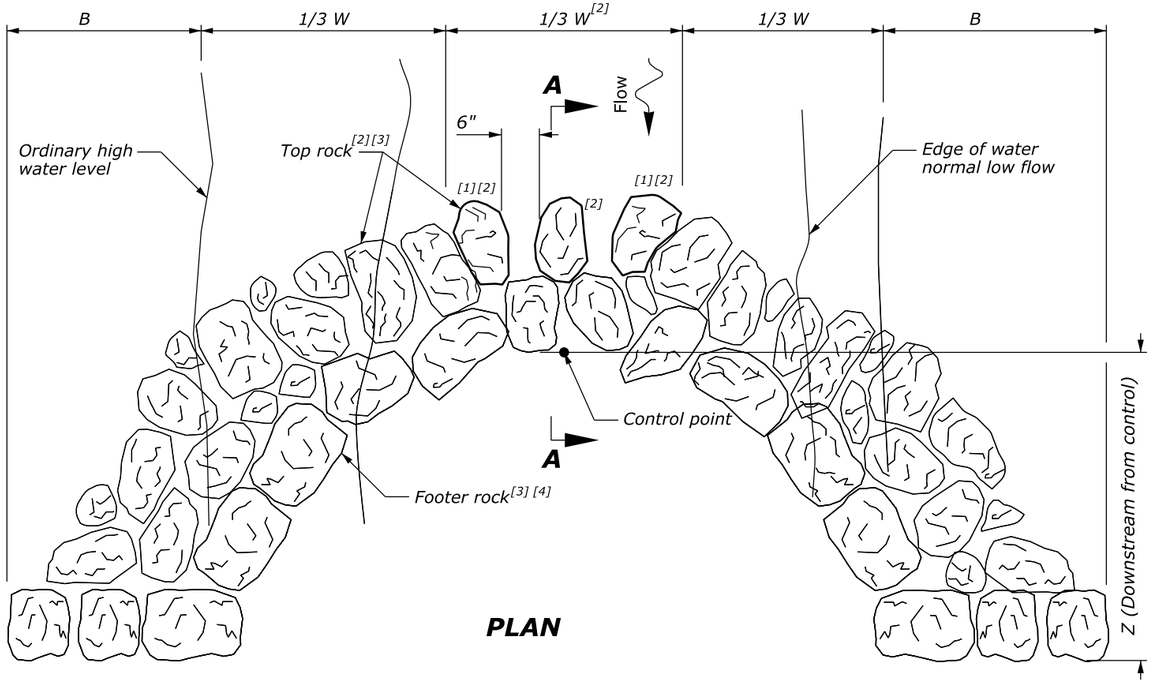



**ELEVATION**

| MITIGATION, ROCK WEIR INFORMATION | | | | |
|---|---|---|---|---|
| LOCATION | W (ft) | B (ft) | Z (ft) | TOP ROCK AND FOOTER ROCK DIAMETER (in) |
| D027842 (Inside Culvert) | 6 | 1 | 0 [5] | 12±4 |
| D027842 (Outside Culvert) | 7 | 2 | 2 | 12±4 |




**SECTION A-A**




**PLAN**

*NOTE:*

1. *Dimensions not labeled are in inches.*

*FOOTNOTE:*

[1] *Orient top rocks to deflect water towards center of stream.*

[2] *Space top rocks in center 1/3 only.*

[3] *Fill voids in top rock and footer rock with specified streambed material.*

[4] *Place footer rocks close together to create a tightly packed and stable foundation for the top rocks.*

[5] *Align footer rocks flush against Mitigation, baffles inside culvert.*

Not to scale

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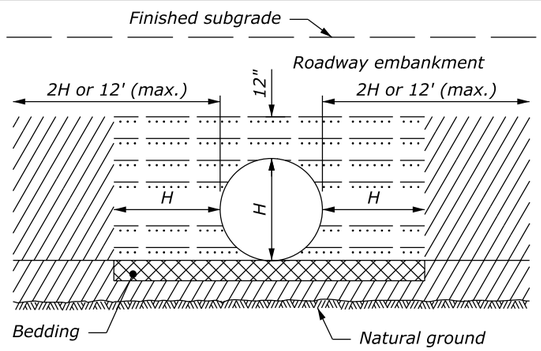
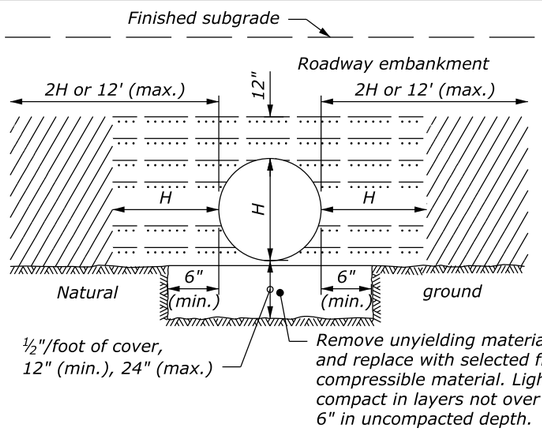
**MITIGATION, ROCK WEIR DETAIL**

Designed by: James Neighorn 04/2022
Checked by: Ninh Phan 06/2022

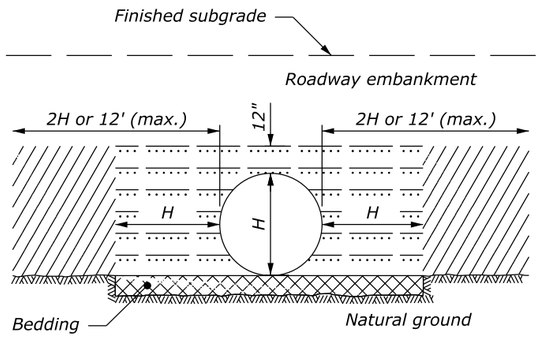
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.87 |



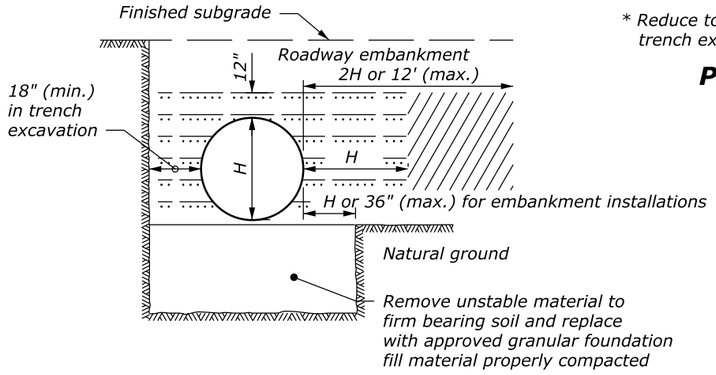

**ABOVE NATURAL GROUND**



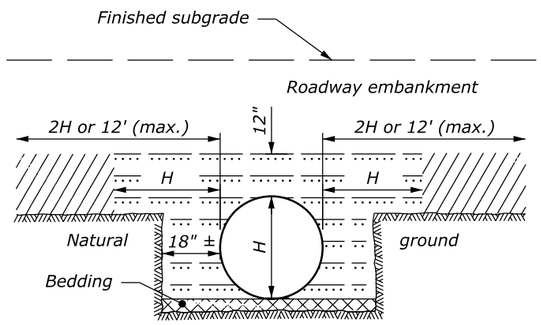

**ON UNYIELDING MATERIAL**



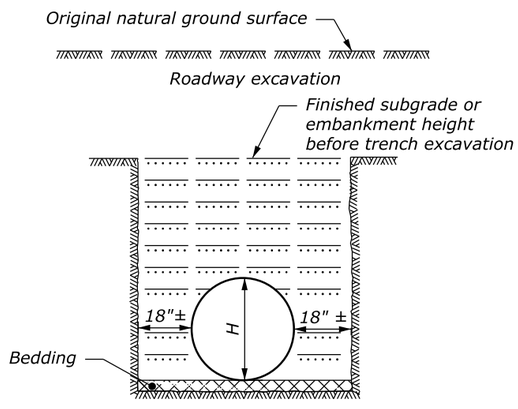

**ON NATURAL GROUND**




**ON UNSTABLE MATERIAL**




**ABOVE AND BELOW NATURAL GROUND**

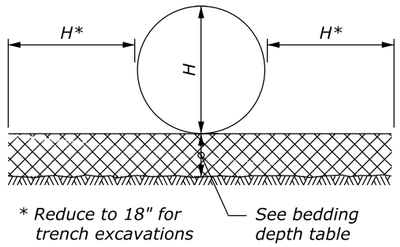



**BELOW NATURAL GROUND OR TRENCH EXCAVATION IN EMBANKMENT**

## LEGEND:

- Bedding material (uncompacted)
- Embankment material placed in layers not exceeding 6" compacted depth.
- Compacted backfill material placed in layers not exceeding 6" compacted depth; or lean concrete backfill in accordance with Section 614.
- Impermeable backfill material.

| BEDDING DEPTH | |
|---|---|
| PIPE SIZE (H) | DEPTH |
| > 54" | 6" |




**PIPE BEDDING**

## NOTE:

1. When directed, camber pipe culverts upward from a chord through the inlet and outlet inverts an ordinate amount equal to 1% of the pipe length. Develop camber on a parabolic curve. If the midpoint elevation on the parabolic curve as designed exceeds the elevation of the inlet invert, reduce the amount of camber or increase the pipe culvert gradient.
2. H equals the diameter of all round pipe culverts or the rise dimension of all pipe arch culverts.
3. See Section 704 for bedding and backfill requirements.

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# METAL AND PLASTIC PIPE CULVERT BEDDING

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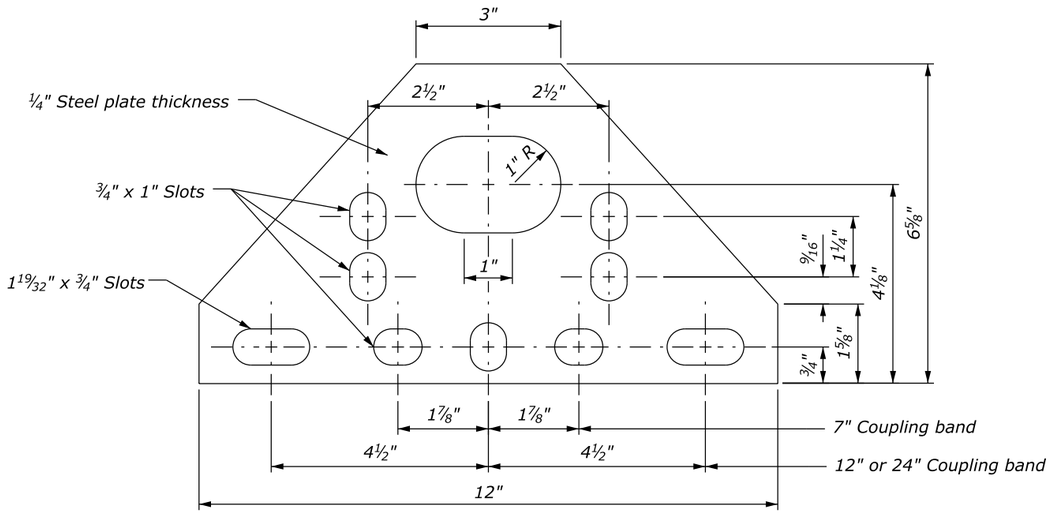
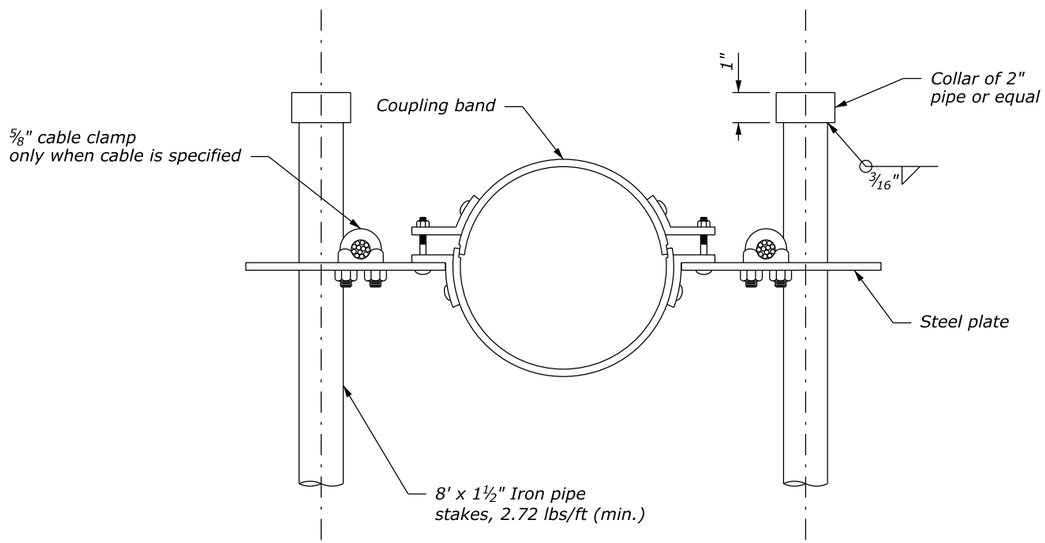
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.88 |




Measure length of coupling band parallel to the centerline of the pipe

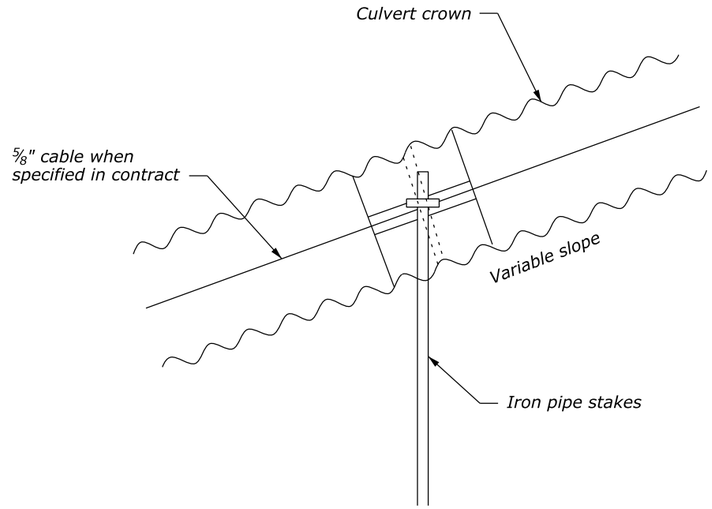
***STEEL PLATE***




***ANCHOR ASSEMBLY***

## *NOTE:*

1. *All pipe stakes and hardware to be galvanized after fabrication.*
2. *Approved alternative pipe anchor assemblies may be used.*
3. *Place slope anchor assemblies on 20' max. centers on slopes 20% or greater.*
4. *Plate material to be ASTM A36. Galvanize after fabrication.*




***METAL PIPE ASSEMBLY***

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**PIPE ANCHOR ASSEMBLY**

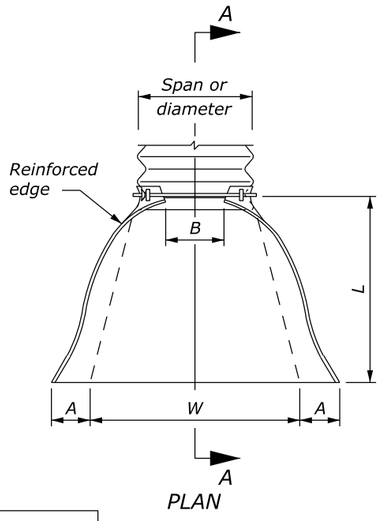
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.89 |

## END SECTIONS FOR ROUND PIPE CULVERT

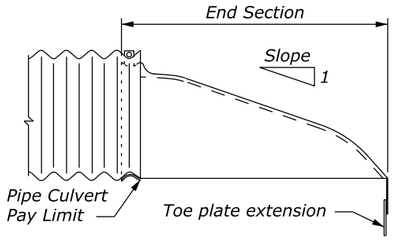
| PIPE SIZE DIAMETER INCHES | METAL THICKNESS | | | | DIMENSIONS INCHES | | | | | SLOPE Approx. |
|---|---|---|---|---|---|---|---|---|---|---|
| | STEEL | | ALUMINUM | | | | | | | |
| | INCHES | GAGE | INCHES | GAGE | A (min) | B (max) | H (min) | L (±2") | W (max) | |
| 12 | 0.064 | 16 | 0.060 | 16 | 5 | 7 | 6 | 21 | 44 | 2¼ |
| 15 | 0.064 | 16 | 0.060 | 16 | 6 | 8 | 6 | 26 | 52 | 2¼ |
| 18 | 0.064 | 16 | 0.060 | 16 | 7 | 10 | 6 | 31 | 58 | 2⅛ |
| 21 | 0.064 | 16 | 0.060 | 16 | 8 | 12 | 6 | 36 | 66 | 2⅛ |
| 24 | 0.064 | 16 | 0.060 | 16 | 9 | 13 | 6 | 41 | 72 | 2⅛ |
| 30 | 0.079 | 14 | 0.075 | 14 | 11 | 16 | 8 | 51 | 88 | 2⅛ |
| 36 | 0.079 | 14 | 0.075 | 14 | 13 | 19 | 9 | 60 | 105 | 2 |
| 42 | 0.109 | 12 | 0.105 | 12 | 15 | 25 | 10 | 69 | 122 | 2⅛ |
| 48 | 0.109 | 12 | 0.105 | 12 | 17 | 29 | 12 | 78 | 131 | 2 |
| 54 | 0.109 | 12 | 0.105 | 12 | 17 | 33 | 12 | 84 | 143 | 2 |
| 60 | 0.109 | 12 | 0.105 | 12 | 17 | 36 | 12 | 87 | 157 | 1⅞ |
| 66 | 0.109 | 12 | 0.105 | 12 | 17 | 39 | 12 | 87 | 162 | 1⅝ |
| 72 | 0.109 | 12 | 0.105 | 12 | 17 | 44 | 12 | 87 | 169 | 1½ |
| 78 | 0.109 | 12 | 0.105 | 12 | 17 | 48 | 12 | 87 | 178 | 1⅜ |
| 84 | 0.109 | 12 | 0.105 | 12 | 17 | 52 | 12 | 87 | 184 | 1⅓ |
| 90 | 0.109 | 12 | 0.105 | 12 | 17 | 58 | 12 | 87 | 188 | 1¼ |
| 96 | 0.109 | 12 | 0.105 | 12 | 17 | 58 | 12 | 87 | 197 | 1⅛ |

## END SECTIONS FOR PIPE ARCH CULVERT

| PIPE SIZE SPAN × RISE INCHES | EQUI-VALENT DIAM. (INCHES) | METAL THICKNESS | | | | DIMENSIONS INCHES | | | | | SLOPE Approx. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | STEEL | | ALUMINUM | | | | | | | |
| | | INCHES | GAGE | INCHES | GAGE | A (min) | B (max) | H (min) | L (±2") | W (max) | |
| 17 × 13 | 15 | 0.064 | 16 | 0.060 | 16 | 7 | 9 | 6 | 19 | 30 | 2½ |
| 21 × 15 | 18 | 0.064 | 16 | 0.060 | 16 | 7 | 10 | 6 | 23 | 36 | 2½ |
| 24 × 18 | 21 | 0.064 | 16 | 0.060 | 16 | 8 | 12 | 6 | 28 | 42 | 2½ |
| 28 × 20 | 24 | 0.064 | 16 | 0.060 | 16 | 9 | 14 | 6 | 32 | 48 | 2½ |
| 35 × 24 | 30 | 0.079 | 14 | 0.075 | 14 | 10 | 16 | 8 | 39 | 60 | 2½ |
| 42 × 29 | 36 | 0.079 | 14 | 0.075 | 14 | 12 | 18 | 9 | 46 | 75 | 2½ |
| 49 × 33 | 42 | 0.109 | 12 | 0.105 | 12 | 13 | 21 | 12 | 53 | 85 | 2½ |
| 57 × 38 | 48 | 0.109 | 12 | 0.105 | 12 | 18 | 26 | 12 | 63 | 90 | 2½ |
| 60 × 46 | 54 | 0.109 | 12 | 0.105 | 12 | 18 | 34 | 12 | 70 | 102 | 2 |
| 64 × 43 | 54 | 0.109 | 12 | 0.105 | 12 | 18 | 30 | 12 | 70 | 102 | 2 |
| 66 × 51 | 60 | 0.109 | 12 | 0.105 | 12 | 18 | 33 | 12 | 77 | 116 | 1½ |
| 71 × 47 | 60 | 0.109 | 12 | 0.105 | 12 | 18 | 33 | 12 | 77 | 114 | 1½ |
| 73 × 55 | 66 | 0.109 | 12 | 0.105 | 12 | 18 | 36 | 12 | 77 | 126 | 1½ |
| 77 × 52 | 66 | 0.109 | 12 | 0.105 | 12 | 18 | 36 | 12 | 77 | 126 | 1½ |
| 81 × 59 | 72 | 0.109 | 12 | 0.105 | 12 | 18 | 39 | 12 | 77 | 138 | 1½ |
| 83 × 57 | 72 | 0.109 | 12 | 0.105 | 12 | 18 | 39 | 12 | 77 | 138 | 1½ |
| 87 × 63 | 78 | 0.109 | 12 | 0.105 | 12 | 20 | 38 | 12 | 77 | 148 | 1½ |
| 95 × 67 | 84 | 0.109 | 12 | 0.105 | 12 | 20 | 34 | 12 | 87 | 162 | 1½ |
| 103 × 71 | 90 | 0.109 | 12 | 0.105 | 12 | 20 | 38 | 12 | 87 | 174 | 1½ |
| 112 × 75 | 96 | 0.109 | 12 | 0.105 | 12 | 20 | 40 | 12 | 87 | 174 | 1½ |




PLAN

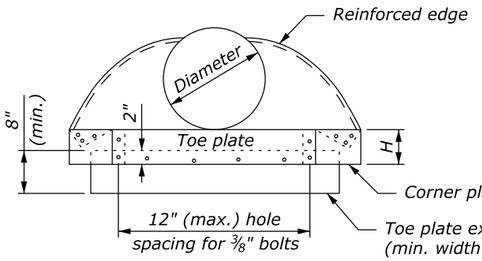



SECTION A-A

**ROUND OR PIPE ARCH CULVERT**

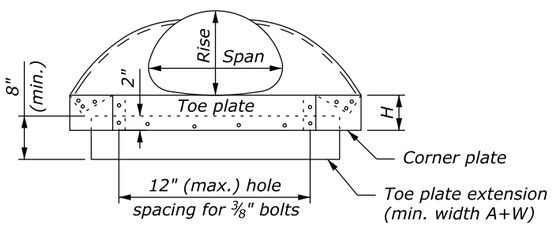
### NOTE:

1. Variations in design and dimensions are permitted to allow for manufacturer's standards.
2. Fabricate the diameter of the end section of Design B to match the inside diameter of the concrete pipe culvert.
3. Design C may be used in lieu of design A for all metal pipe culvert sizes. Coupling bands may be any acceptable type for the pipe culvert specified.
4. Fabricate multiple piece bodies with lap seams tightly joined by ⅜" rivets or bolts. Fabricate end section center panels for 60" and larger diameter pipe and equivalent pipe arch from 0.138 inch steel or 0.135 inch aluminum.
5. On end section center panels for 66" and larger equivalent pipe arch provide 2½" × 2½" × ¼" angle reinforcement bolted or riveted under the center panel seam.
6. Supplement the reinforced edges of end sections for 60" and larger diameter pipe and 66" and larger equivalent pipe arch with 2½" × 2½" × ¼" stiffener angles attached with bolts or rivets.
7. Fabricate connector section, corner plate and toe plate extensions from the same metal thickness as the panel body. Use toe plate extension where shown on the plans.
8. Warp embankment slopes to match the slope of the flared end sections.



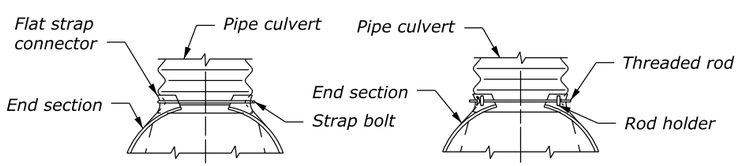

ELEVATION

**ROUND PIPE CULVERT**




ELEVATION

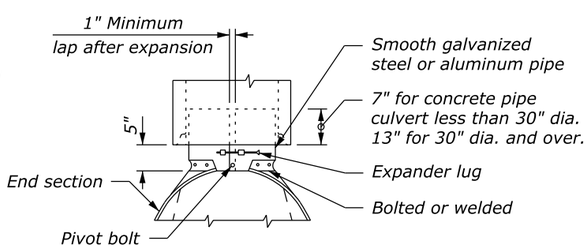
**PIPE ARCH CULVERT**



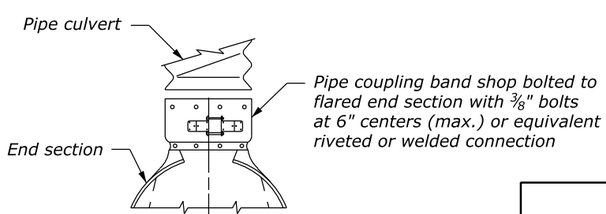

For 12" thru 24" round pipe and 17" × 13" thru 28" × 20" pipe arch

For 30" thru 60" round pipe and 35" × 24" thru 66" × 51" pipe arch

**DESIGN A**
**CONNECTION TO ANNULAR CORRUGATED METAL PIPE**




**DESIGN B**
**CONNECTION TO CONCRETE PIPE INLET END**




For all sizes of round pipe and pipe arch

**DESIGN C**
**CONNECTION TO METAL PIPE OR OUTLET END OF CONCRETE PIPE**

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
OFFICE OF FEDERAL LANDS HIGHWAY

FLH STANDARD

# METAL END SECTIONS

STANDARD APPROVED FOR USE 12/1993
REVISED: 4/1994 6/2005
DRAFT: 10/2007

STANDARD 602-4

Designed by: -/---- Checked by: -/----

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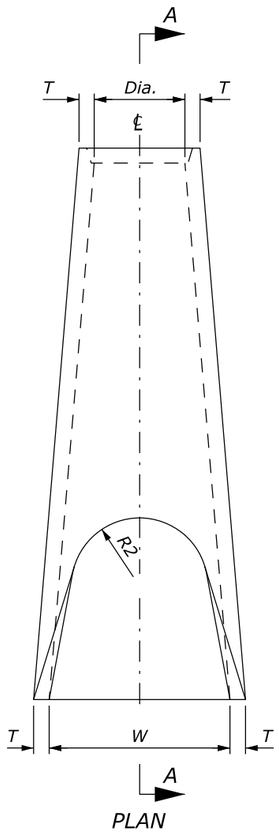
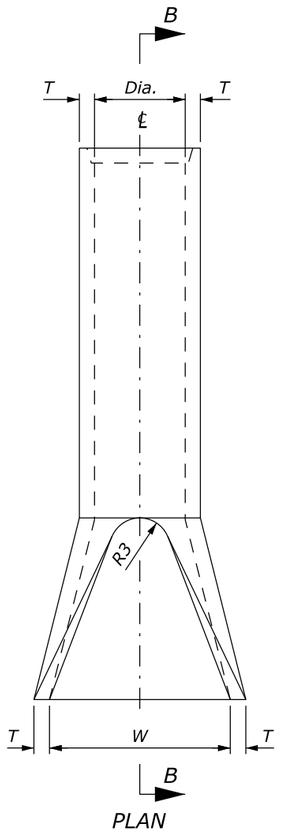
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | E.90 |



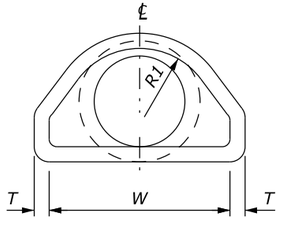




## NOTE:

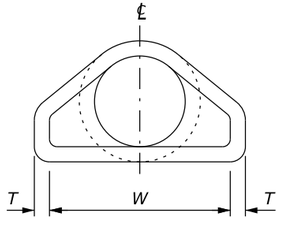
1. *Variations in design and dimensions are permitted to allow for manufacturer's standards.*
2. *Fabricate the outlet end section with a groove end and the inlet end section with a tongue end.*
3. *Warp embankment slopes to match the slope of the flared end section.*

## END SECTIONS FOR ROUND PIPE CULVERT

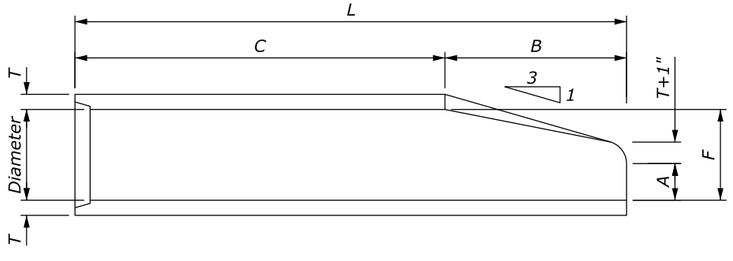
| PIPE SIZE DIAMETER INCHES | DIMENSIONS INCHES | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | T | A | B | C | L | W | F | R1 | R2 | R3 |
| 12 | 2 | 4 | 24 | 48⅞ | 72⅞ | 24 | 13 | 10⅛ | 9 | 4 |
| 15 | 2¼ | 6 | 27 | | 73 | 30 | 16 | 12½ | 11 | 6 |
| 18 | 2½ | 9 | 27 | | 73 | 36 | 19 | 15½ | 12 | 7½ |
| 21 | 2¾ | 9 | 36 | | 73 | 42 | 22 | 16½ | 13 | 5 |
| 24 | 3 | 9½ | 43½ | | 73½ | 48 | 25 | 16¾ | 14 | 8 |
| 27 | 3¼ | 10½ | 48 | 25½ | 73½ | 54 | 28 | -- | 14½ | 9 |
| 30 | 3½ | 12 | 54 | 19¾ | 73¾ | 60 | 31 | 18½ | 15 | 8 |
| 33 | 3¾ | 13½" | 59½ | 37½ | 96 | 66 | 34 | 23¾ | 17½ | 9 |
| 36 | 4 | 15 | 63 | | 96 | 72 | 37 | 23¼ | 20 | 11 |
| 42 | 4½ | 21 | 63 | | 96 | 78 | 43 | -- | 22 | 11 |
| 48 | 5 | 24 | 72 | | 96 | 84 | 49 | -- | 22 | 12 |



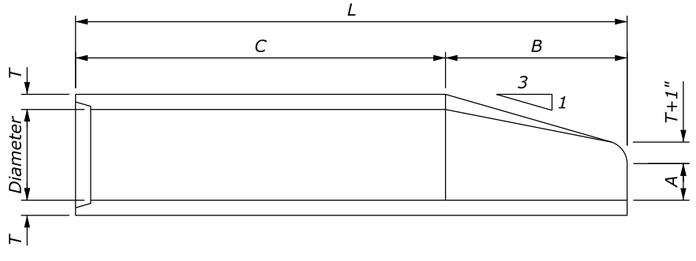

ELEVATION




ELEVATION




SECTION A-A




SECTION B-B

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
OFFICE OF FEDERAL LANDS HIGHWAY

FLH STANDARD

# CONCRETE END SECTION FOR ROUND PIPE

| STANDARD APPROVED FOR USE 12/1993 | STANDARD |
|---|---|
| REVISED: 4/1994 6/2005 | 602-3 |

Designed by: Checked by: -/---- -/----

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| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | F.1 |

## EROSION CONTROL QUANTITIES

| Item No. | | 15705-1400 | 15706-0200 | 15706-1000 | 62901-0000 | 15701-0000 | 15701-0000 | 15706-1600 |
|---|---|---|---|---|---|---|---|---|
| CULVERT ID | MILE POINT | SOIL EROSION CONTROL, FIBER ROLL | SOIL EROSION CONTROL, CHECK DAM | SOIL EROSION CONTROL, INLET PROTECTION | ROLLED EROSION CONTROL PRODUCT | SOIL EROSION CONTROL (BYPASS PUMPING) | SOIL EROSION CONTROL (TEMPORARY WATER MANAGEMENT) | SOIL EROSION CONTROL, STABILIZED CONSTRUCTION EXIT |
| Unit | | LNFT | EACH | EACH | SQYD | LPSM | LPSM | EACH |
| D034723 | 2.73 | 197.5 | 1 | 1 | 20.5 | | | |
| D027825 | 13.07 | 276.6 | 5 | | 16.2 | | | |
| D027828 | 13.56 | 269.0 | 6 | | 23.2 | | ✓ | |
| D027832 | 13.93 | 229.4 | 3 | | 19.4 | | | |
| D027833 | 14.03 | 243.0 | 2 | | 22.8 | | | |
| D027842 | 15.51 | 464.0 | 6 | | 193.9 | | ✓ | 1 |
| D034741 | 17.29 | 283.0 | 5 | | 89.5 | | | |
| D027990 | 26.27 | 233.4 | 6 | | 49.7 | | | |
| D027992 | 26.6 | 277.0 | 5 | | 35.4 | | | |
| D028033 | 31.47 | 306.0 | 3 | | 25.3 | | | |
| D028041 | 33.54 | 282.0 | 2 | | 57.2 | | | |
| D028044 | 33.65 | 146.0 | 4 | | 22.9 | | | |
| D028045 | 33.79 | 226.0 | 3 | | 34.0 | ✓ | | |
| D028047 | 36.73 | 200.0 | 3 | | 22.6 | | | |
| D028050 | 37.31 | 217.0 | 2 | | 14.0 | | | |
| D028051 | 37.56 | 294.0 | 3 | | 30.4 | | | |
| D028052 | 37.68 | 233.5 | 1 | | 35.4 | | | |
| D028053 | 37.89 | 221.0 | 2 | | 19.8 | | | |
| D028071 | 40.92 | 222.0 | 3 | | 68.2 | | | |
| D028074 | 41.5 | 236.0 | 6 | | 23.4 | | | |
| D034764 | 41.58 | 312.7 | 2 | | 47.7 | | | |
| D034765 | 41.81 | 134.0 | 4 | | 27.3 | | | |
| D028076 | 41.91 | 314.6 | 5 | | 42.5 | | ✓ | |
| D028077 | 42.01 | 255.0 | 4 | | 23.3 | | | |
| D028078 | 42.12 | 329.8 | 3 | | 41.3 | | ✓ | |
| D028082 | 42.5 | 300.0 | 4 | | 38.0 | | | |
| D028086 | 43.26 | 211.3 | 5 | | 16.0 | ✓ | | |

## EROSION CONTROL QUANTITIES (CONTINUED)

| Item No. | | 15705-1400 | 15706-0200 | 15706-1000 | 62901-0000 | 15701-0000 | 15701-0000 | 15706-1600 |
|---|---|---|---|---|---|---|---|---|
| CULVERT ID | MILE POINT | SOIL EROSION CONTROL, FIBER ROLL | SOIL EROSION CONTROL, CHECK DAM | SOIL EROSION CONTROL, INLET PROTECTION | ROLLED EROSION CONTROL PRODUCT | SOIL EROSION CONTROL (BYPASS PUMPING) | SOIL EROSION CONTROL (TEMPORARY WATER MANAGEMENT) | SOIL EROSION CONTROL, STABILIZED CONSTRUCTION EXIT |
| Unit | | LNFT | EACH | EACH | SQYD | LPSM | LPSM | EACH |
| D028088 | 43.43 | 230.1 | 3 | | 28.8 | | | |
| D028090 | 43.54 | 312.5 | 6 | | 19.8 | | | |
| D028091 | 43.74 | 338.0 | 3 | | 24.0 | | | |
| D028094 | 43.99 | 391.0 | 3 | 1 | 30.8 | | | |
| D028095 | 44.06 | 341.0 | 3 | | 45.2 | | ✓ | |
| D028100 | 44.36 | 231.0 | 3 | 1 | 25.4 | | | |
| D028107 | 44.96 | 255.0 | 6 | | 40.1 | | | |
| D028108 | 45.03 | 247.0 | 3 | | 56.1 | | | |
| D028109 | 45.35 | 246.5 | 2 | 1 | 48.4 | | | |
| D028124 | 46.75 | 296.0 | 3 | 1 | 22.8 | ✓ | | |
| D028127 | 46.89 | 236.8 | 5 | | 15.4 | | | |
| D028128 | 47.07 | 196.0 | 5 | | 13.2 | | | |
| D028130 | 47.46 | 169.0 | 4 | | 16.4 | ✓ | | |
| D028131 | 47.57 | 164.0 | 5 | | 18.7 | ✓ | | |
| D028132 | 47.8 | 287.4 | 3 | | 47.4 | | ✓ | |
| D028137 | 49.41 | 355.0 | 3 | | 125.9 | | | |
| D028139 | 49.99 | 248.1 | 2 | | 45.7 | | | |
| D028142 | 50.3 | 267.7 | 3 | | 20.1 | | ✓ | |
| D028158 | 53.56 | 244.7 | 5 | 1 | 47.0 | | | |
| D028159 | 53.69 | 267.6 | 0 | | 46.1 | | | |
| D028160 | 53.76 | 306.5 | 6 | | 62.5 | | ✓ | |
| D028161 | 53.83 | 370.3 | 3 | | 78.0 | | | |
| D028163 | 53.95 | 0.0 | 4 | | 154.8 | | | 1 |
| D028186 | 57.77 | 278.0 | 2 | | 37.7 | | | |
| D028188 | 57.96 | 218.2 | 3 | 1 | 29.2 | | | |
| D028238 | 64.27 | 247.4 | 4 | | 53.1 | | ✓ | |
| D028273 | 84.68 | 282.0 | 3 | | 100.6 | | | 1 |
| **Total** | | **13941** | **193** | **7** | **2313** | **All** | **All** | **5** |

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.05.23 13:37:53 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**TABULATION OF EROSION CONTROL QUANTITIES**

Designed by: --/---- Checked by: --/----

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| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | F.2 |

Designed by: --/---- Checked by: --/----

## *EROSION AND SEDIMENT CONTROL GENERAL NOTES:*

*The construction, adjustment, maintenance, and upgrading of these Erosion and Sediment Control measures is the responsibility of the contractor for the duration of the project to comply with Section 157 of the Special Contract Requirements and FP14*

*Erosion and Sediment Control measures shown on this plan are for anticipated site conditions. Adjust or upgrade these measures for unexpected storm events to ensure that sediment and sediment-laden water does not leave the site.*

*Construct in such a manner so as to ensure that sediment and sediment-laden water does not enter the roadway or drainage system, or violate applicable water standards.*

*Install measures within the right-of-way unless directed otherwise.*

*Graphic symbols are approximate. Place Erosion Control measures as required or directed by CO.*

*Note: Areas bounded by temporary orange fence denote protected no work areas such as trees, wetlands, cultural resources, etc.*

REGISTERED PROFESSIONAL ENGINEER
98999PE
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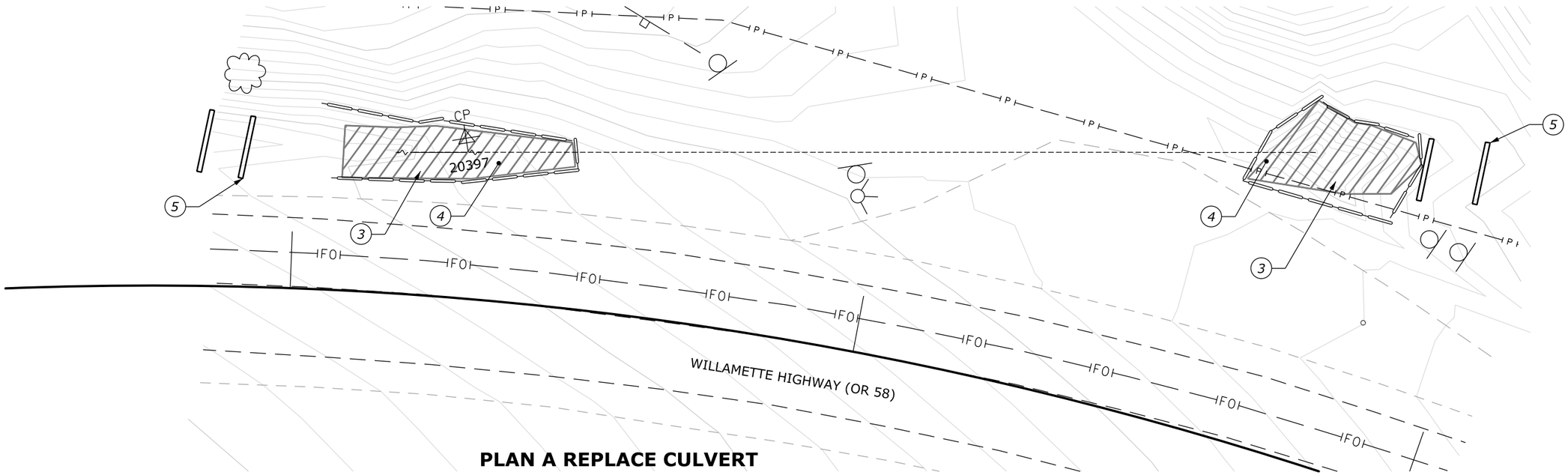
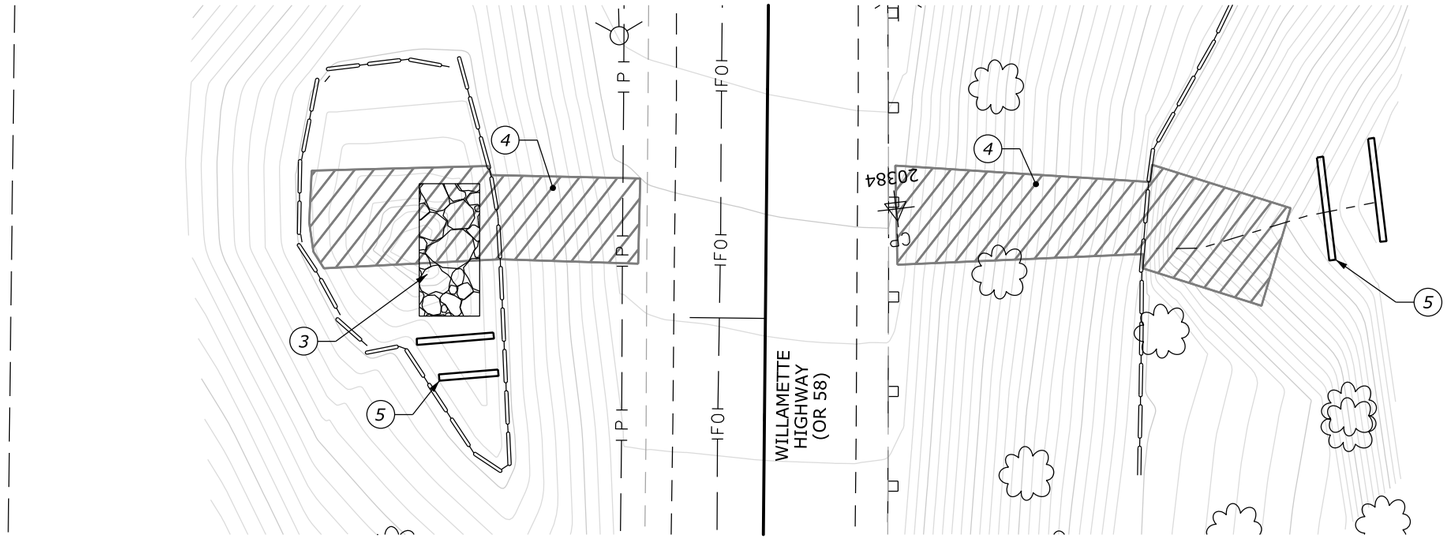
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**EROSION CONTROL GENERAL NOTES**

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | F.3 |




**PLAN A REPLACE CULVERT PARALLEL TO OR58**




**PLAN B REPAIR CULVERT CROSSING OR58**

## *NOTES:*

1. *Use Plan A as typical erosion and sediment control set for replacing culverts that are parallel to highway OR58, and Plan B for repairing culverts crossing highway OR58.*
2. *Place inlet protection for the culverts with inlets. See sheets F.10 and F.11.*
3. *Soil Erosion Control, Temporary Water Management. See Sheet F.9 for Temporary Wate Management culvert list and F.8 for details.*
4. *Place rolled erosion control product type 4 on excavated and disturbed areas. Permanent seeding and ground-cover to be completed post-construction. Seeding to be done based on ODFW and Lane County weed control authority recommendations.*
5. *Place check dams upstream and downstream of culvert inside the ditch, channel, or stream. See sheet F.5 for details.*

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

Scale in feet
10 5 0 10 20 30

| ***LEGEND*** | |
|---|---|
| *DEVICE* | *SYMBOL* |
| *Fiber roll or compost sock (where indicated)* | |
| *rolled erosion control product* | |
| *Check dam* | |
| *Inlet protection* | |

**TYPICAL EROSION CONTROL PLAN A and B**

Designed by: --/---- Checked by: --/----

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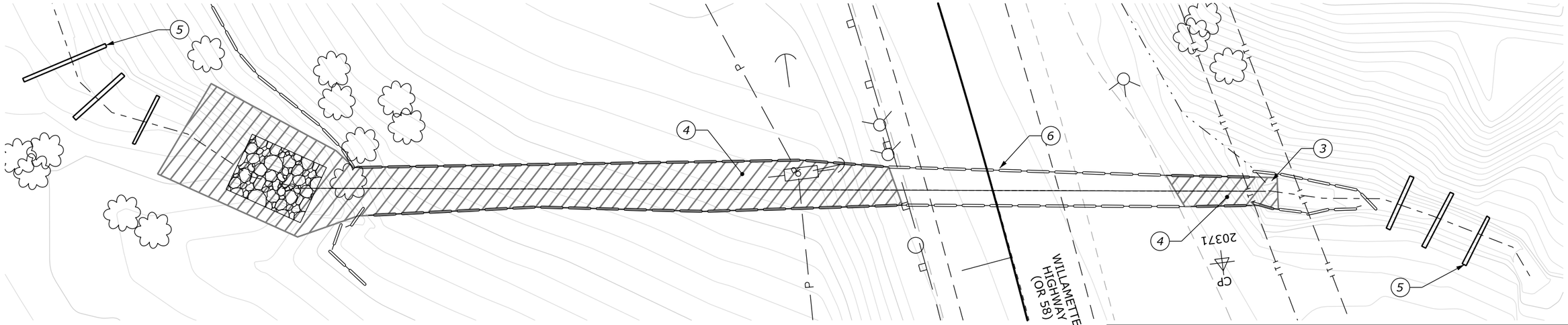
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | F.4 |




**PLAN C REPLACE CULVERT CROSSING OR58**

## NOTES:

1. *Use Plan C as typical erosion and sediment control set for replacing culverts that are crossing highway OR58, and Plan D for repairing culverts parallel to highway OR58.*
2. *Place inlet protection for the culverts with inlets. See sheets F.10 and F.11.*

(3) *Soil Erosion Control, Temporary Water Management. See Sheet F.9 for Temporary Water Management culvert list and F.8 for details.*

(4) *Place rolled erosion control product type 4 on excavated and disturbed areas. Permanent seeding and ground-cover to be completed post-construction. Seeding to be done based on ODFW and Lane County weed control authority recommendations.*

(5) *Place check dams upstream and downstream of culvert inside the ditch, channel, or stream. See sheet F.5 for details.*

(6) *Place fiber roll on half of the road surrounding the excavating area, for replacing the other half of the culvert place fiber roll on the other half of the road surrounding the excavating area.*


**PLAN D REPAIR CULVERT PARALLEL TO OR58**

Scale in feet

10 5 0 10 20 30

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY

EXPIRES: 12/31/2024

| LEGEND | |
|---|---|
| DEVICE | SYMBOL |
| Fiber roll or compost sock (where indicated) | |
| rolled erosion control product | |
| Check dam | |
| Inlet protection | |

**TYPICAL EROSION CONTROL PLAN C and D**

Designed by: --/---- Checked by: --/----

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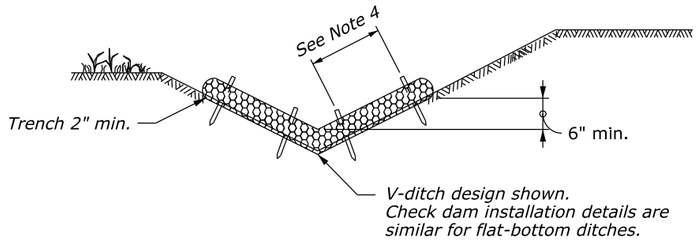
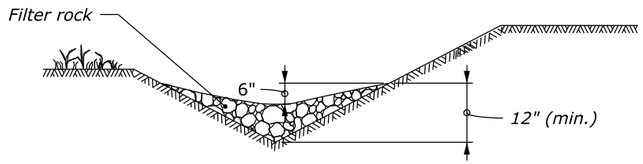
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | F.5 |



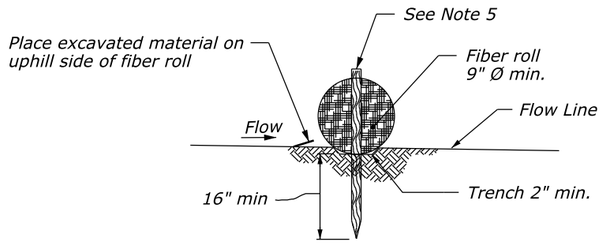

CROSS SECTION



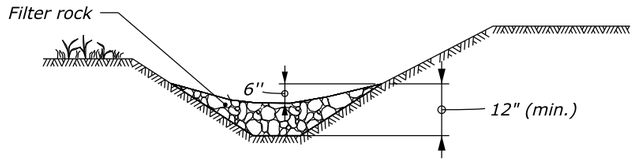

V-DITCH
CROSS SECTION

## NOTE:

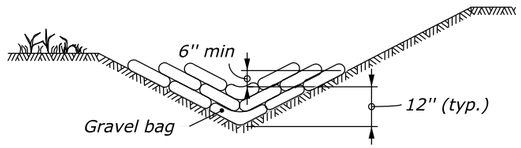
1. Check dams of fiber rolls, filter rock, or gravel bags may be used as approved by the CO, to meet the functional requirements of the check dam device.
2. Repair all rills or gullies and properly compact prior to installation.
3. Install check dams in ditches perpendicular to the flowline.
4. Stake fiber rolls in place with 1⅛" x 1⅛" wood stakes. Drive stakes at each end of the fiber roll and at 2' (max) spacing.
5. Drive stakes into undisturbed soil of trench bottom 16" (min). Expose stakes 2" (min.) above top of fiber roll.
6. Provide sufficient length to prevent water from flowing around the ends of the fiber roll.
7. Adjust check dam spacing based on site-specific conditions.



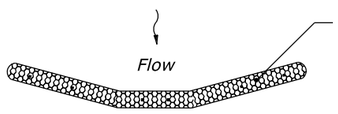

FIBER ROLL
STAKING DETAIL




FLAT-BOTTOM DITCH
CROSS SECTION




CROSS SECTION




PLAN

| FIBER ROLL CHECK DAM SPACING* (See Note 7) | |
|---|---|
| DITCH GRADE | CHECK DAM SPACING (max.) (ft) |
| 2% | 150 |
| 3% | 100 |
| 4% | 80 |
| 5% | 60 |

* Spacing calculated based on 9" Ø min sediment log. Do not use sediment log check dams on ditch grades steeper than 5%.

**FIBER ROLL CHECK DAM**

| RIPRAP CHECK DAM SPACING (See Note 7) | |
|---|---|
| DITCH GRADE | CHECK DAM SPACING (max.) (ft) |
| 2% | 150 |
| 3% | 100 |
| 4% | 80 |
| 5% | 60 |
| 6% | 50 |

**RIPRAP CHECK DAM**

| GRAVEL BAG CHECK DAM SPACING* (See Note 7) | |
|---|---|
| DITCH GRADE | CHECK DAM SPACING (max.) (ft) |
| 2% | 150 |
| 3% | 100 |
| 4% | 80 |
| 5% | 60 |
| 6% | 50 |

* Do not use gravel bag check dams on ditch grades steeper than 6%

**GRAVEL BAG CHECK DAM**

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.05.23 13:37:53 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

NO SCALE

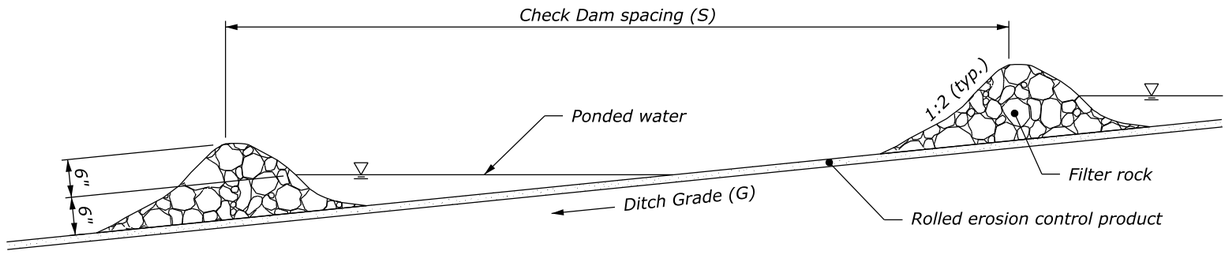
**CHECK DAM**

Designed by: --/---- Checked by: --/----

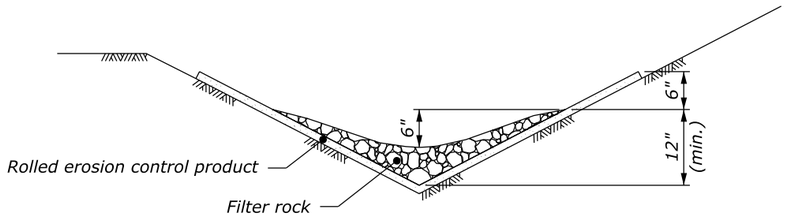
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | F.6 |

## NOTE:

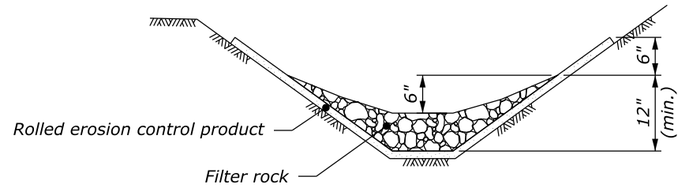
1. *Repair all rills or gullies and properly compact prior to installation.*
2. *Install check dams in ditches perpendicular to the flowline.*
3. *Adjust check dam spacing based on site-specific conditions.*




*PROFILE VIEW*




*CROSS SECTION*
*V-DITCH*




*CROSS SECTION*
*FLAT-BOTTOM DITCH*

| *FILTER ROCK CHECK DAM SPACING (See Note 3)* | |
|---|---|
| *DITCH GRADE (G)* | *MAX. CHECK DAM SPACING (S) (FT)* |
| *7%* | *40* |
| *8% and 9%* | *30* |
| *≥10%* | *20* |

## *FILTER ROCK CHECK DAM WITH ROLLED EROSION CONTROL PRODUCT*

*NO SCALE*

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY DETAIL

# CHECK DAM WITH ROLLED EROSION CONTROL PRODUCT

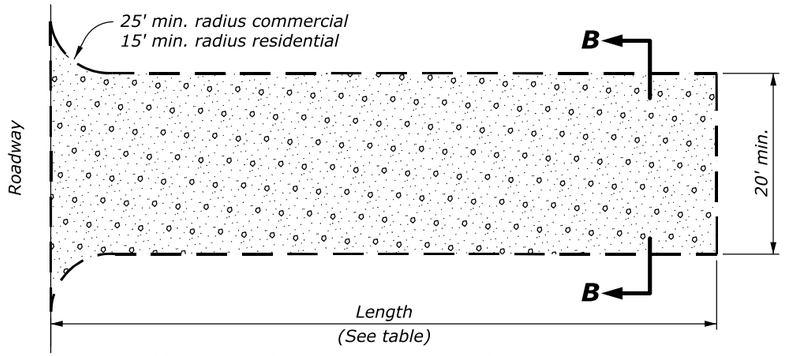
DETAIL APPROVED FOR USE --/----
REVISED: 7/2016

DETAIL
W157-16

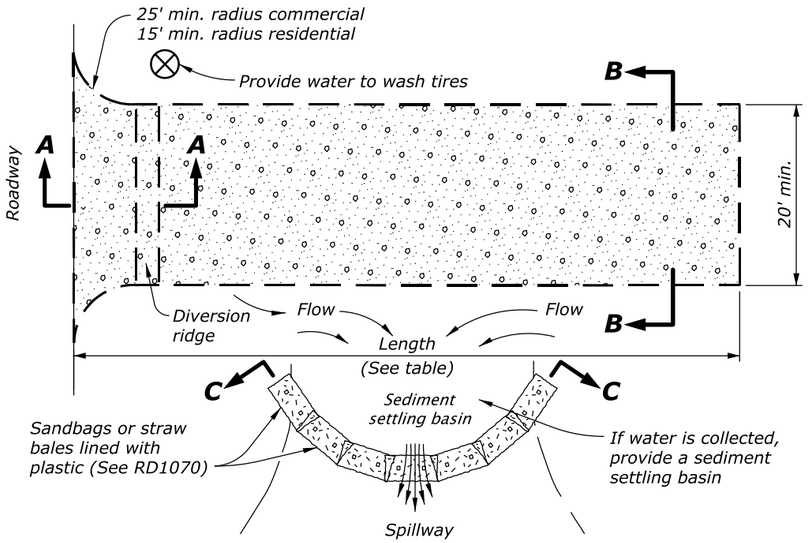
Designed by: --/---- Checked by: --/----

8/11/2021 3:42:21 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\OR-01802F06.dgn

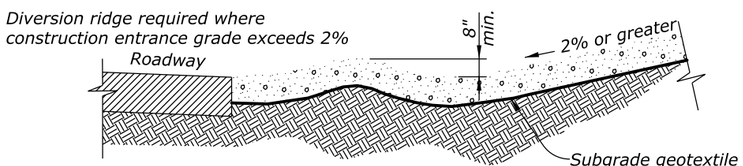
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | F.7 |



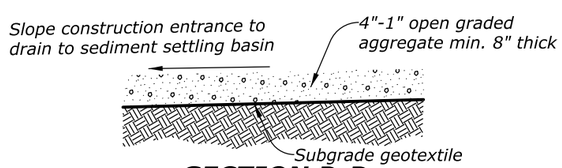

**CONSTRUCTION ENTRANCE - TYPE 1**
NOT TO SCALE



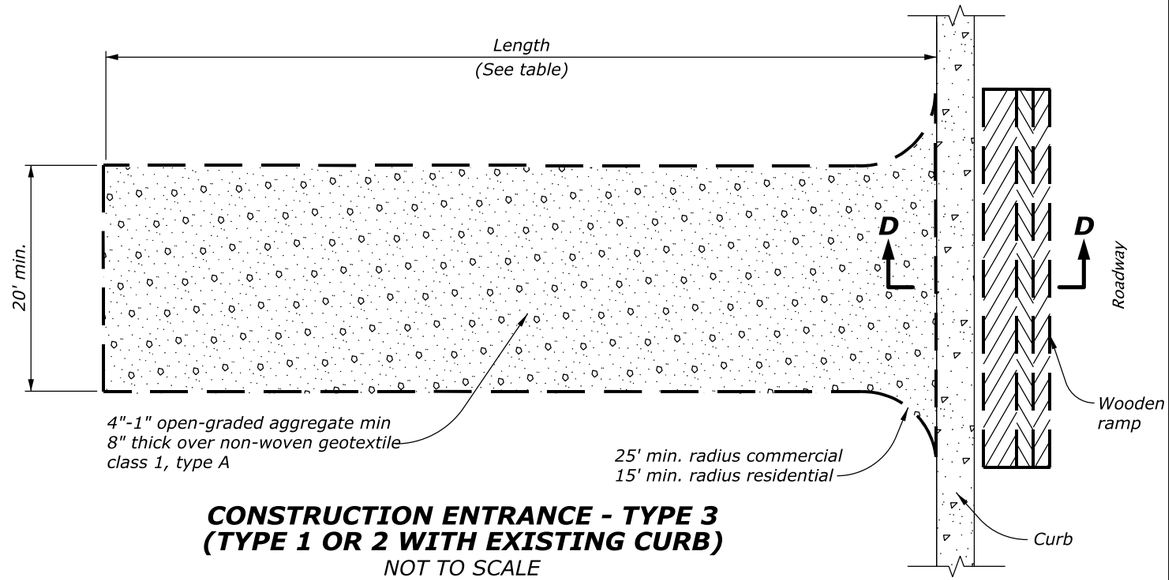

**CONSTRUCTION ENTRANCE - TYPE 2**
NOT TO SCALE



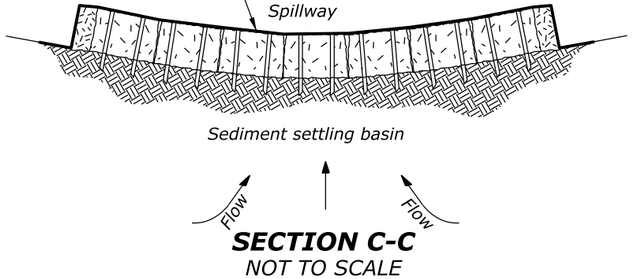

**SECTION A-A**
NOT TO SCALE



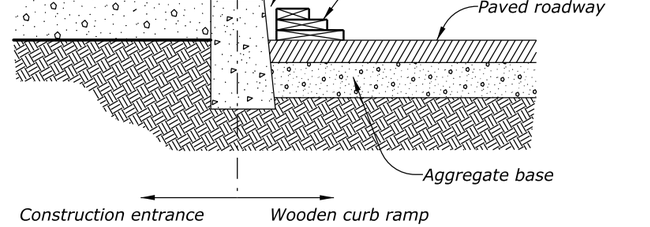

**SECTION B-B**
NOT TO SCALE




**CONSTRUCTION ENTRANCE - TYPE 3**
**(TYPE 1 OR 2 WITH EXISTING CURB)**
NOT TO SCALE




**SECTION C-C**
NOT TO SCALE




**WOODEN CURB RAMP SECTION D-D**
NOT TO SCALE

*NOTES:*

1. *Install Soil Erosion Control, Stabilized Construction Exit when the culvert work requires the installation equipment to leave the pavement and/or shoulder gravel.*
2. *The Type 1 entrance is a simple entrance without a diversion ridge or settling basin.*
3. *The wooden ramp may be used on either Type 1 or Type 2 entrances in situations where there is curb and the curb is not removed for the construction entrance.*

| CONSTRUCTION ENTRANCE TABLE MINIMUM LENGTH | |
|---|---|
| Length (FT) | Area Of Exposed Soil (Acre) |
| 20 | 0.25 |
| 50 | 0.25 < A < 1.0 |
| 100 | A > 1.0 |

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

*DRAWING BASED ON OREGON STANDARD DRAWING RD1000*

**SOIL EROSION CONTROL, STABILIZED CONSTRUCTION EXIT**

Designed by: --/---- Checked by: --/----
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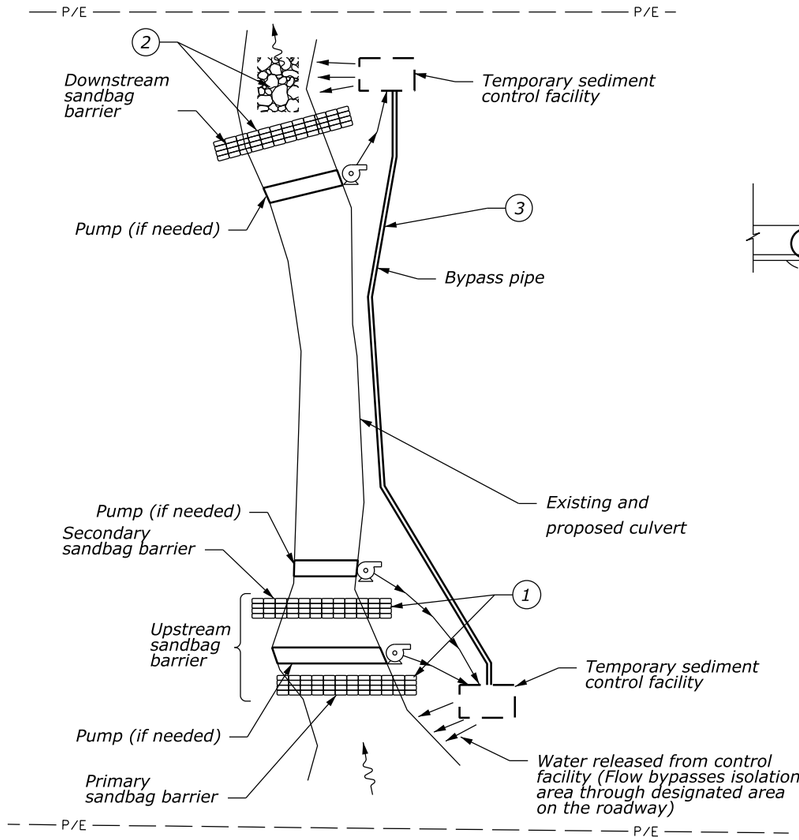
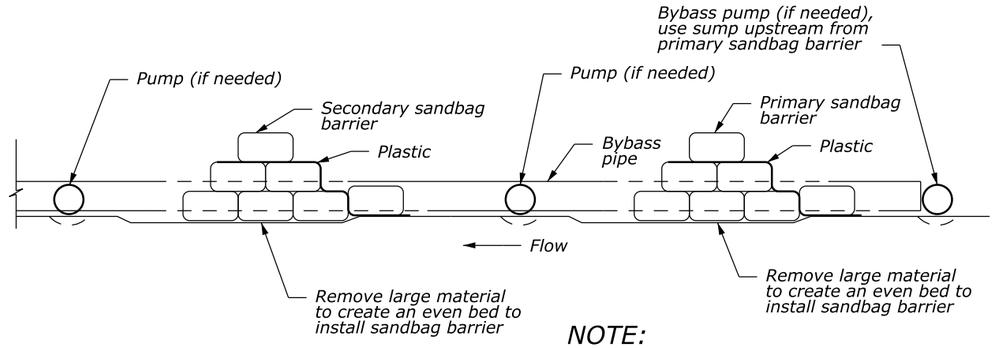
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | F.8 |




**SYSTEM LAYOUT DETAIL**

Not to scale




*NOTE:*

1. *Width and depth of sandbag barrier will vary depending on site and stream flow conditions.*

**SECTION A-A**

Not to scale

## *FULL ISOLATION NOTES:*

① *Isolating the work site upstream: Install single primary sandbag barrier across the stream channel. If Needed, install secondary sandbag barrier. Downstream: Install sandbag barrier.*

② *Install sandbag barrier and energy dissipator pad downstream from work area. Location to be set based on topography and easements available.*

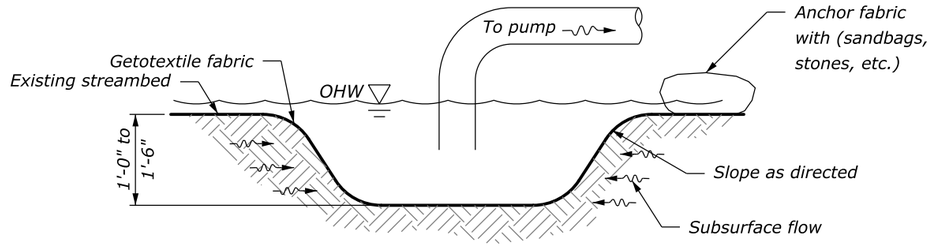
③ *Size the temporary water management facility based on site conditions. Route water around work area using pipe (preferred), pump or combination. The discharge table for culverts that require bypass are provided in sheet F.9. The appropriate table can be used to estimate the size of the bypass pump.*

④ *Water seeping through the primary barrier and contained by the secondary barrier shall be returned to an area up stream of the sandbag barrier to a temporary settling basin or other approved location.*

⑤ *Provide adequate sediment control measures during dewatering of the work area to insure sediment laden water does not leave the site.*

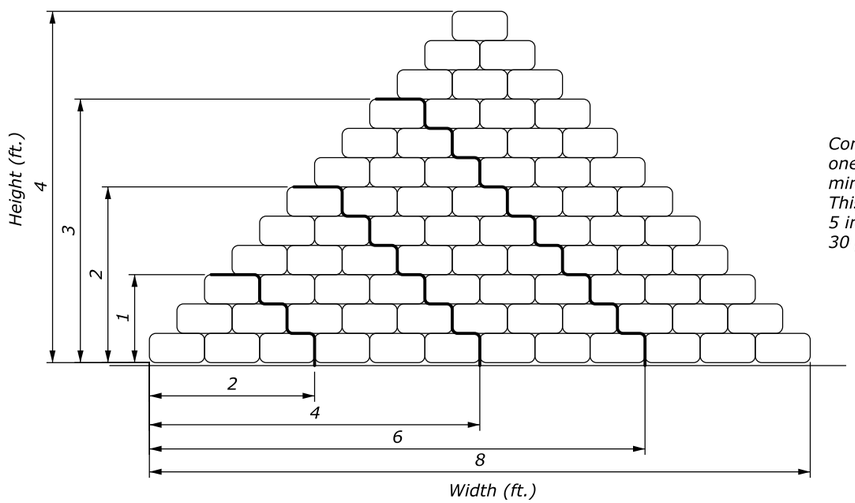
## *GENERAL NOTES:*

1. *The Temporary Water Management Facility shown on this plan is the minimum requirements for anticipated site conditions. During the construction periods, this facility shall be upgraded for unexpected storm events and to insure that sediment and sediment-laden water does not leave the site.*
2. *Remove all Temporary Water Management features and restore site as per plans and specifications.*




**SUMP DETAIL**

Not to scale




**SANDBAG FOOTPRINT**

Not to scale

*Construct the sandbag barrier twice as wide as its height (e.g., a one foot high wall would have a base width of 2 feet). This is the minimum width-to-height ratio for constructing a sandbag barrier. This is based on each bag having a placed dimension of about 4 to 5 inches high by 9 to 10 inches wide by 14 inches long. This is a 30 pound bag of dry sand.*

*The estimated number of bags needed for 100 linear feet of barrier that is twice as wide as its height is:*

| Height (ft) | # bags |
|---|---|
| 1 | 600 |
| 2 | 1700 |
| 3 | 3000 |
| 4 | 5500 |

## *LEGEND:*

- *Energy dissipator*
- *Sediment control facility*
- *Sump pump*
- *Sandbag barrier line*

REGISTERED PROFESSIONAL ENGINEER
98999PE
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OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**SOIL EROSION CONTROL (TEMPORARY WATER MANAGEMENT)**

Designed by: --/---- Checked by: --/----

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| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | F.9 |

| No. | DFI No. | Mile Post | AVERAGE DAILY DISCHARGE IN CUBIC FEET PER SECOND | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | JULY | | | AUGUST | | | SEPTEMBER | | | OCTOBER | | |
| | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 1 | D027828 | MP 13.56 | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.03 | 0.01 | 0.00 |
| 2 | D027842 | MP 15.51 | 0.06 | 0.04 | 0.03 | 0.04 | 0.02 | 0.01 | 0.05 | 0.02 | 0.01 | 0.15 | 0.03 | 0.01 |
| 3 | D027853 | MP 17.67 | 0.31 | 0.18 | 0.13 | 0.21 | 0.10 | 0.08 | 0.17 | 0.11 | 0.08 | 0.39 | 0.23 | 0.13 |
| 4 | D028076 | MP 41.91 | 0.25 | 0.15 | 0.11 | 0.17 | 0.08 | 0.06 | 0.13 | 0.09 | 0.06 | 0.32 | 0.18 | 0.11 |
| 5 | D028095 | MP 44.06 | 0.13 | 0.08 | 0.06 | 0.09 | 0.04 | 0.03 | 0.07 | 0.05 | 0.03 | 0.16 | 0.10 | 0.06 |
| 6 | D028102 | MP 44.54 | 0.23 | 0.13 | 0.10 | 0.16 | 0.07 | 0.06 | 0.12 | 0.08 | 0.06 | 0.29 | 0.17 | 0.10 |
| 7 | D028132 | MP 47.80 | 0.08 | 0.05 | 0.04 | 0.06 | 0.03 | 0.02 | 0.04 | 0.03 | 0.02 | 0.11 | 0.06 | 0.04 |
| 8 | D028160 | MP 53.76 | 3.34 | 2.47 | 1.87 | 2.35 | 1.81 | 1.37 | 1.81 | 1.28 | 0.95 | 1.90 | 1.43 | 1.10 |
| 9 | D028189 | MP 58.02 | 31.40 | 23.26 | 17.58 | 22.10 | 17.03 | 12.86 | 17.03 | 12.04 | 8.96 | 17.92 | 13.48 | 10.33 |
| 10 | D028190 | MP 58.16 | 2.21 | 1.64 | 1.24 | 1.55 | 1.20 | 0.90 | 1.20 | 0.85 | 0.63 | 1.26 | 0.95 | 0.73 |
| 11 | D028238 | MP 64.27 | 37.34 | 27.66 | 20.90 | 26.27 | 20.25 | 15.29 | 20.25 | 14.32 | 10.66 | 21.31 | 16.02 | 12.28 |
| 12 | D028239 | MP 64.60 | 2.09 | 1.55 | 1.17 | 1.47 | 1.13 | 0.85 | 1.13 | 0.80 | 0.60 | 1.19 | 0.90 | 0.69 |
| 13 | D028240 | MP 64.62 | 0.28 | 0.21 | 0.16 | 0.20 | 0.15 | 0.11 | 0.15 | 0.11 | 0.08 | 0.16 | 0.12 | 0.09 |
| 14 | D028256 | MP 66.61 | 0.12 | 0.09 | 0.06 | 0.08 | 0.06 | 0.05 | 0.06 | 0.04 | 0.03 | 0.07 | 0.05 | 0.04 |

| No. | DFI No. | Mile Post | AVERAGE DAILY DISCHARGE IN GALLONS PER MINUTE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | JULY | | | AUGUST | | | SEPTEMBER | | | OCTOBER | | |
| | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 1 | D027828 | MP 13.56 | 5.1 | 3.1 | 2.3 | 3.1 | 1.7 | 1.1 | 4.2 | 1.7 | 0.9 | 13.1 | 2.4 | 1.0 |
| 2 | D027842 | MP 15.51 | 26.9 | 16.2 | 11.9 | 16.1 | 8.7 | 5.8 | 21.9 | 8.9 | 4.7 | 68.9 | 12.6 | 5.2 |
| 3 | D027853 | MP 17.67 | 140.5 | 81.9 | 59.9 | 95.2 | 46.0 | 35.7 | 74.5 | 49.2 | 35.7 | 176.4 | 102.2 | 59.4 |
| 4 | D028076 | MP 41.91 | 112.6 | 65.7 | 48.1 | 76.3 | 36.9 | 28.6 | 59.7 | 39.4 | 28.7 | 141.4 | 82.0 | 47.6 |
| 5 | D028095 | MP 44.06 | 58.8 | 34.3 | 25.1 | 39.9 | 19.3 | 14.9 | 31.2 | 20.6 | 15.0 | 73.9 | 42.8 | 24.9 |
| 6 | D028102 | MP 44.54 | 102.8 | 60.0 | 43.9 | 69.7 | 33.7 | 26.1 | 54.5 | 36.0 | 26.2 | 129.1 | 74.8 | 43.5 |
| 7 | D028132 | MP 47.80 | 38.0 | 22.2 | 16.2 | 25.7 | 12.4 | 9.6 | 20.1 | 13.3 | 9.7 | 47.7 | 27.6 | 16.1 |
| 8 | D028160 | MP 53.76 | 1497.1 | 1109.0 | 838.2 | 1053.5 | 812.2 | 613.2 | 812.2 | 574.1 | 427.3 | 854.6 | 642.5 | 492.5 |
| 9 | D028189 | MP 58.02 | 14093.9 | 10439.9 | 7891.4 | 9917.9 | 7645.7 | 5772.7 | 7645.7 | 5404.2 | 4022.4 | 8044.9 | 6049.0 | 4636.6 |
| 10 | D028190 | MP 58.16 | 990.9 | 734.0 | 554.8 | 697.3 | 537.6 | 405.9 | 537.6 | 380.0 | 282.8 | 565.6 | 425.3 | 326.0 |
| 11 | D028238 | MP 64.27 | 16757.5 | 12412.9 | 9382.7 | 11792.3 | 9090.6 | 6863.6 | 9090.6 | 6425.5 | 4782.6 | 9565.3 | 7192.2 | 5512.8 |
| 12 | D028239 | MP 64.60 | 936.5 | 693.7 | 524.4 | 659.0 | 508.0 | 383.6 | 508.0 | 359.1 | 267.3 | 534.6 | 401.9 | 308.1 |
| 13 | D028240 | MP 64.62 | 125.8 | 93.2 | 70.4 | 88.5 | 68.2 | 51.5 | 68.2 | 48.2 | 35.9 | 71.8 | 54.0 | 41.4 |
| 14 | D028256 | MP 66.61 | 51.8 | 38.3 | 29.0 | 36.4 | 28.1 | 21.2 | 28.1 | 19.9 | 14.8 | 29.6 | 22.2 | 17.0 |

*FOOTNOTE:*

*[1] 5 Percent Exceedance Disharge (Average daily discharge expected to be exceeded 2 days each month.)*

*[2] 25 Percent Exceedance Disharge (Average daily discharge expected to be exceeded 8 days each month.)*

*[3] 50 Percent Exceedance Disharge (Average daily discharge expected to be exceeded 16 days each month.)*

*NOTE:*

1. *In-water work period extends from 1 July through 31 October.*
2. *Listed discharges are surface water from the upstream watershed. The estimated discharges are based on StreamStats. Discharges in the subject watershed may differ.*

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**TEMPORARY WATER MANAGEMENT CONCEPT TABLES**

Designed by: --/---- Checked by: --/----

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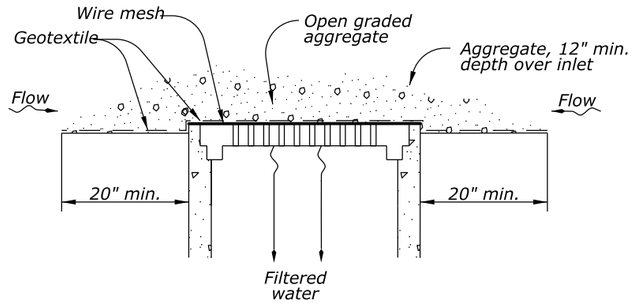
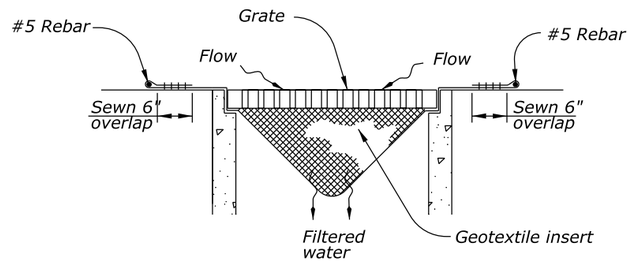
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | F.10 |



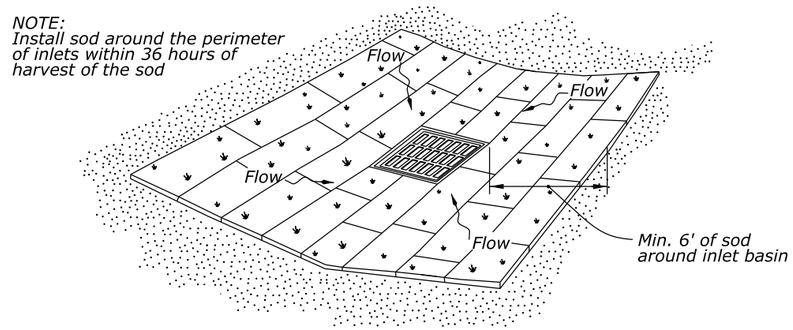

## GEOTEXTILE/WIRE MESH/AGGREGATE - TYPE 2

NOT TO SCALE



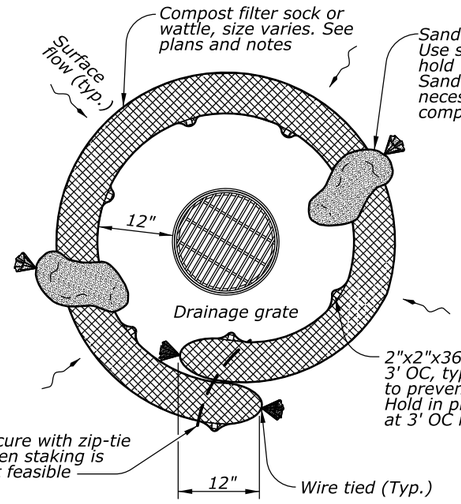

## PREFABRICATED FILTER INSERT - TYPE 3

NOT TO SCALE

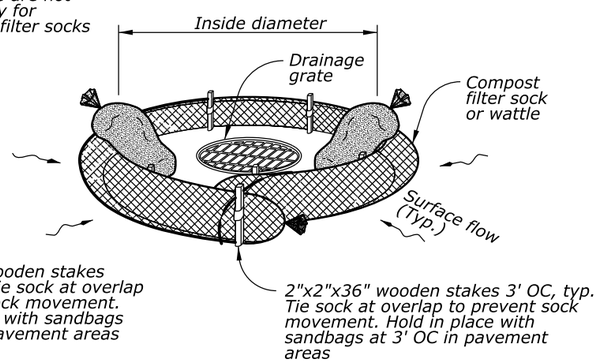



## SOD PROTECTION - TYPE 6

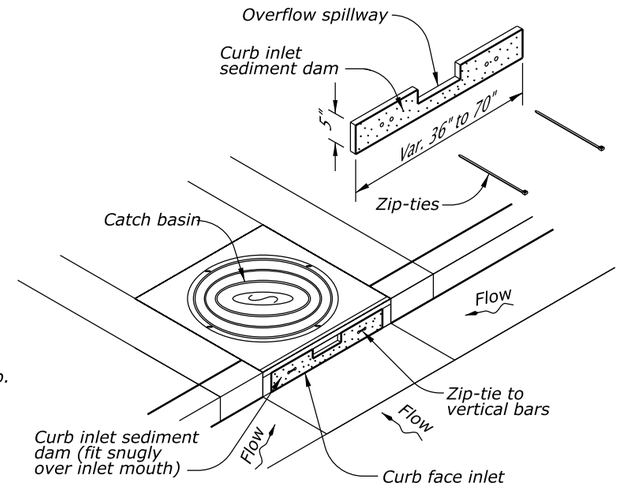
NOT TO SCALE




## AREA DRAIN PLAN

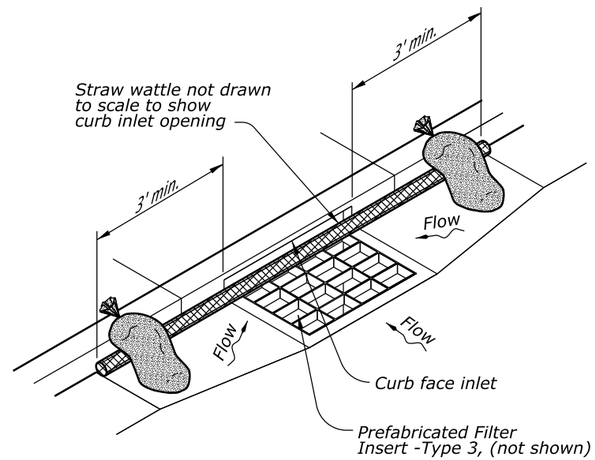



## AREA DRAIN PERSPECTIVE VIEW



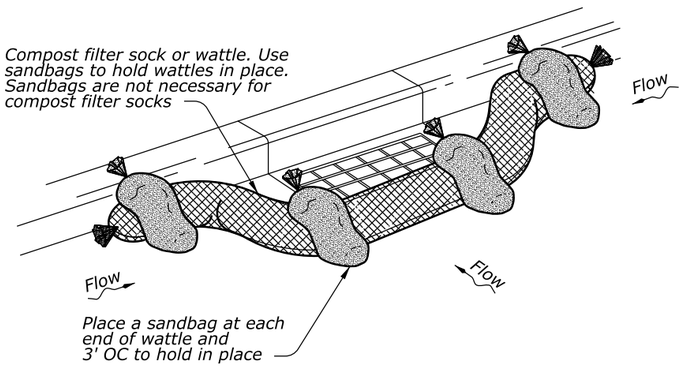

## CURB INLET SEDIMENT DAM - TYPE 10

NOT TO SCALE




## WATTLE BARRIER WITH FILTER INSERT - TYPE 11

NOT TO SCALE




## CURB INLET PERSPECTIVE VIEW
## COMPOST FILTER SOCK OR WATTLE - TYPE 7

NOT TO SCALE

NOTES:
Type 2 - Geotextile/wire mesh/aggregate
Place the wire mesh over the grate.
Place sediment fence geotextile over the wire mesh and perimeter area around structure.
Install aggregate over the geotextile fabric.

Type 3 - Prefabricated filter inserts
Install prefabricated filter inserts according to the plans, special provisions, and manufacturer recommendations.
Prefabricated inserts with provisions for overflow are allowed only when accompanied by additional BMP's to prevent the potential of sediments entering project storm systems.
Field fabricated inserts are not allowed.

Type 7 - Compost filter sock
Drive 2"x2" wood stakes a minimum of 6" into ground and flush with the top of the sock.
Overlap ends of sock per manufacturers recommendations (12"min., 36" max.).
Use 8" to 12" dia sock on curbside in traffic areas.

(Type 7 cont.)
Use 12" to 18" dia sock in non-traffic areas or areas where the larger socks can be used safely.
use synthetic mesh socks for temporary installations.

Type 10 - Curb inlet sediment dam
Fit curb inlet sediment dam snugly into inlet mouth. Curb inlet sediment dam is required for use with inlet filter insert where at-grade inlet grate and curb inlet are combined at a catch basin.

Type 11 - Wattle barrier with filter insert
Install prefabricated filter insert per Type 3 detail.
Install wattles over opening and 36" to each side of opening tight against curb. Adjust wattle to force storm water to flow through filter insert or wattle prior to leaving the site.
Adjust, replace or modify the inlet protection as needed to prevent sediment laden water from entering the catch basin.

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DRAWING BASED ON OREGON STANDARD DRAWING RD1010

# EROSION CONTROL DETAILS
# INLET PROTECTION
# TYPE 2, 3, 6, 7, 10 AND11

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| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
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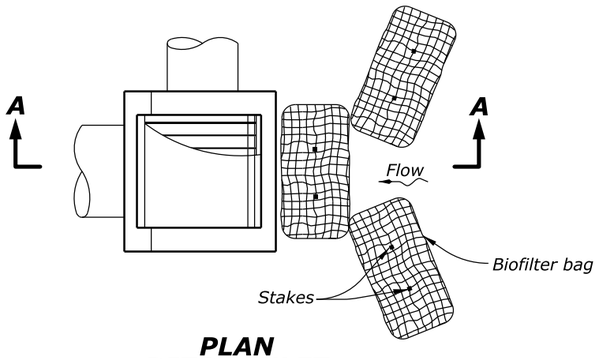
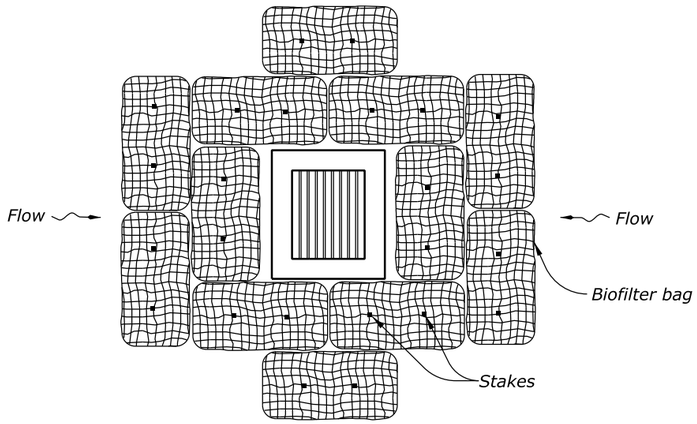
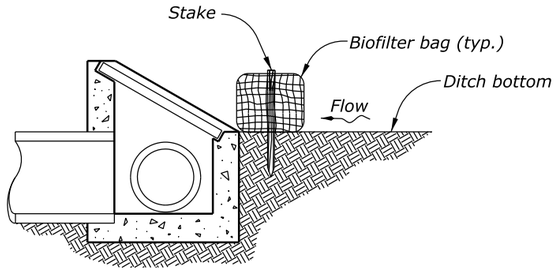


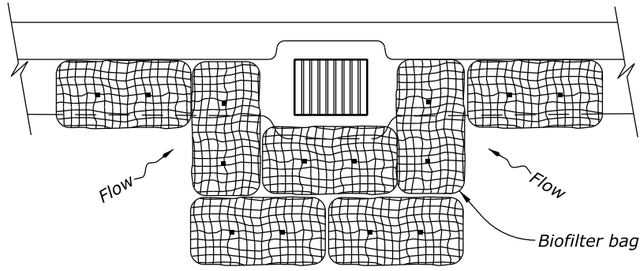

**PLAN**
**DITCH INLET**




**PLAN**
**AREA DRAIN**




**SECTION A-A**
**DITCH INLET**




**PLAN**
**CATCH BASIN**

## BIOFILTER BAGS - TYPE 4

NOT TO SCALE

NOTES:
1. Stake biofilter bags with 2"x2"x36" wood stakes, and use a minimum 2 stakes per bag. Drive stakes a minimum of 6" into the ground and flush with the top of the bags.
2. Omit stakes when bags are placed on pavement surface.
3. Overlap all bag joints 6".
4. Biofilter bags used on active roadways are easily displaced and made ineffective if struck by vehicles. If struck by a cyclist, falls with injury could result. On active roadways alternative inlet protection should be considered.

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DRAWING BASED ON OREGON STANDARD DRAWING RD1015

**EROSION CONTROL**
**DETAILS**
**INLET PROTECTION**
**TYPE 4**

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| STATE | PROJECT | SHEET NUMBER |
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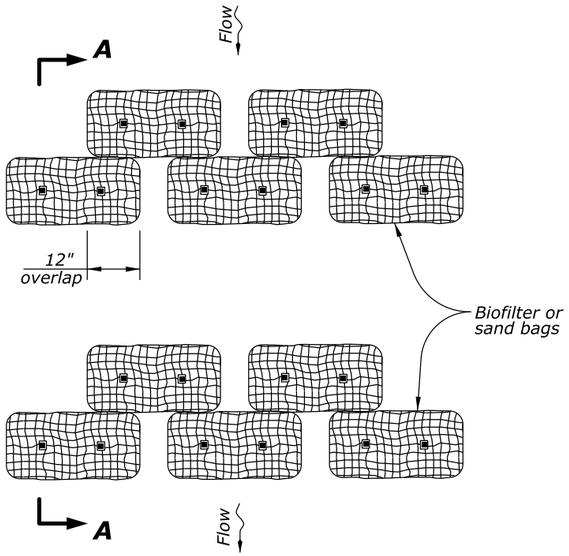
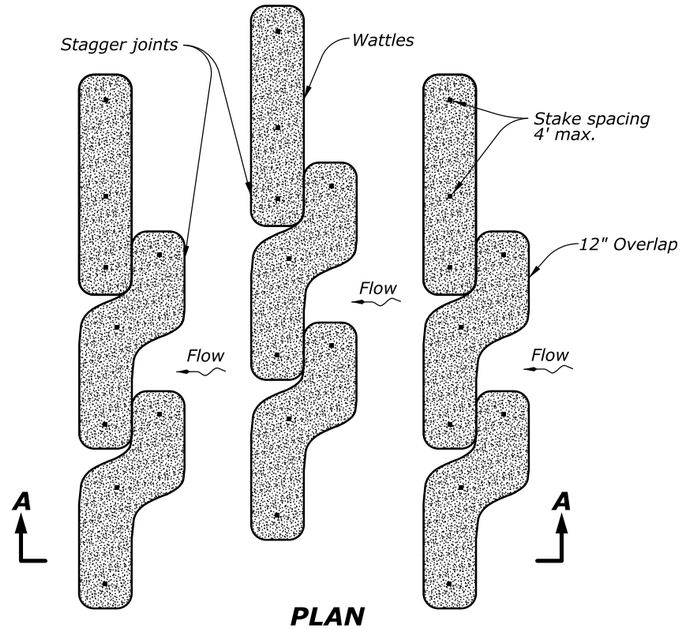
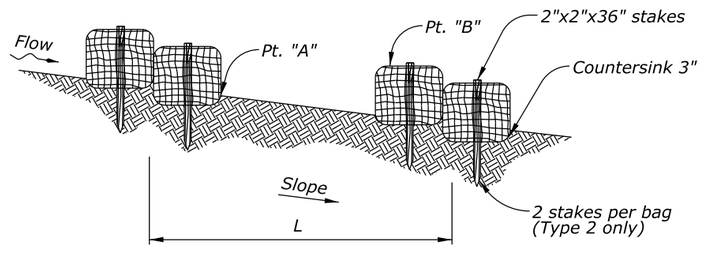



**PLAN**



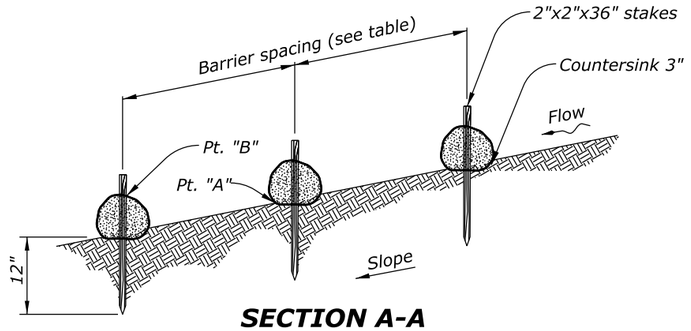

**PLAN**




**SECTION A-A**

## BIOFILTER BAG / SAND BAG BARRIER - TYPE 2 AND 4

NOT TO SCALE




**SECTION A-A**

## FIBER ROLL BARRIER - TYPE 3

NOT TO SCALE

NOTES:
1. For Type 2 barrier, drive stakes flush with top of bag and into undisturbed ground a min. of 12". Omit stakes if bags are placed on paved surface.
2. For Type 2 and Type 4 barriers, space bags (L) so that the elevation of point "A" is less than or equal to the elevation of point "B".

Type 2 - Biofilter bags
Type 3 - Wattles
Type 4 - Sand bags

**BARRIER SPACING**

INSTALL PARALLEL ALONG CONTOURS AS FOLLOWS

| % SLOPE | % SLOPE | MAXIMUM SPACING ON SLOPE |
|---|---|---|
| 10% Flatter | 1:10 or Flatter | 300' |
| 10 >% ≥ 15 | 10 > X ≥ 7.5 | 150' |
| 15 >% ≥ 20 | 7.5 > X ≥ 5 | 100' |
| 20 >% ≥ 30 | 5 > X ≥ 3 | 50' |
| Steeper than 30% | Steeper than 1:3 | 25' |

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DRAWING BASED ON OREGON STANDARD DRAWING RD1030

# EROSION CONTROL DETAILS SEDIMENT BARRIER TYPE 2, 3 AND 4

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| STATE | PROJECT | SHEET NUMBER |
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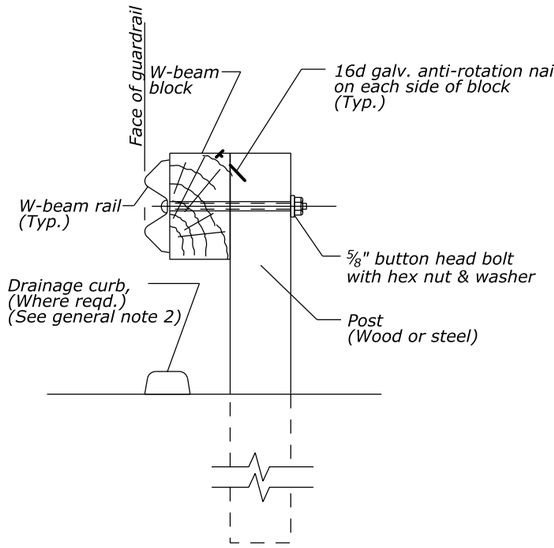
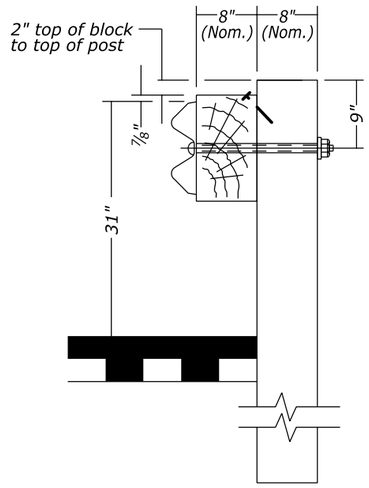
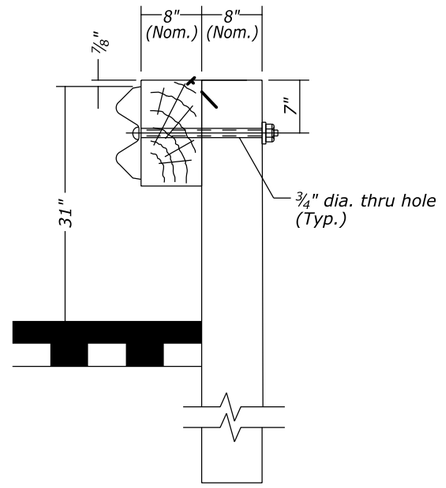



**TYPE 2A**

**W-BEAM GUARDRAIL**



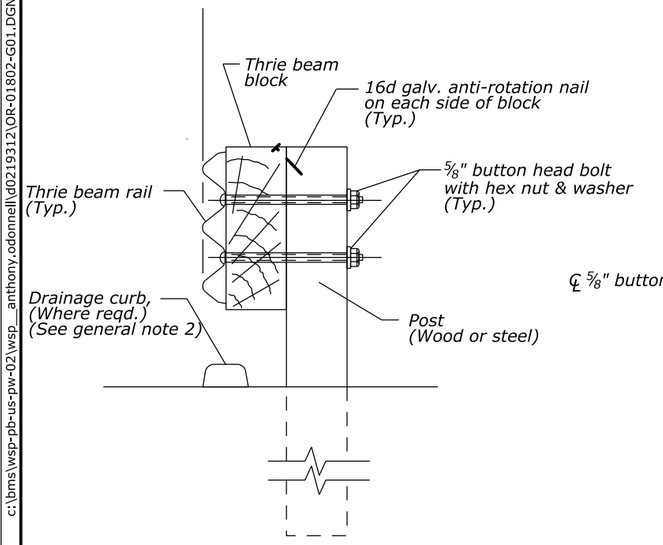

**ALTERNATE INSTALLATION**



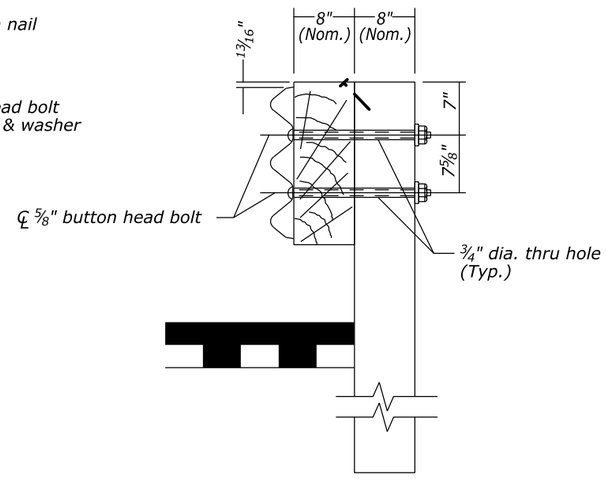

**TYPICAL INSTALLATION**

**W-BEAM GUARDRAIL ASSEMBLY**

| NORMAL RAIL ELEMENT DATA | | | |
|---|---|---|---|
| TYPE | RAIL | EFFECTIVE LENGTHS | GAUGE |
| 2A | W-beam | 6.25', 12.5', 25' | 10 & 12 |
| 4 TRANSITION | Thrie beam | 6.25' | 10 & 12 |




**TYPE 4 & 4 TRANSITION**




**INITIAL INSTALLATION**

**THRIE BEAM GUARDRAIL**

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *See appropriate guardrail detail sheets for details not shown.*
2. *When required by the plans, Drainage curb alignment same as face of guardrail.*
3. *Orient post bolts with the button head located on the side nearest the traffic lane. The bolt's threaded portion is not permitted to extend beyond limits of ¼" to ½" from the face of the tightened nut; trim the treated portion as needed.*
4. *Lap guardrail in direction of adjacent traffic.*
5. *Final paved surfacing to extend to face of post. Rail height measured from final paved surface at face of rail (Typical all types). 1"± tolerance.*
6. *Wood block shall be toe-nailed to the post with 2 - 16d galvanized nails in top of block to prevent block rotation.*
7. *Wood blocks shown. Blocks of an approved alternate material may be used.*
8. *Existing posts shall not be raised. Replace posts as necessary to achieve required guardrail height.*

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EXPIRES: 12/31/2022

*DRAWING BASED ON OREGON STANDARD DRAWING RD402*

**GUARDRAIL SYSTEM MGS, TYPE 2, CLASS A WOOD POSTS DETAIL**

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| STATE | PROJECT | SHEET NUMBER |
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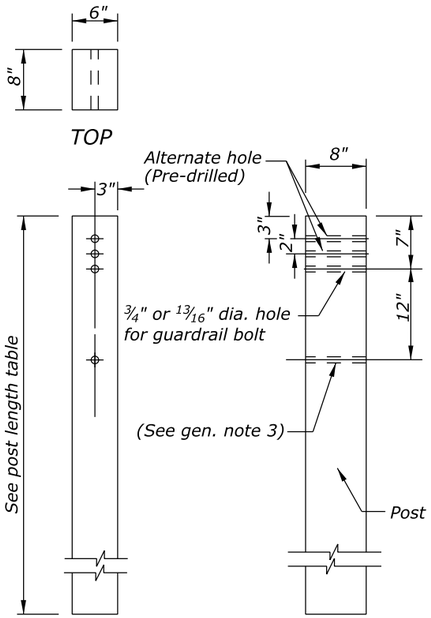
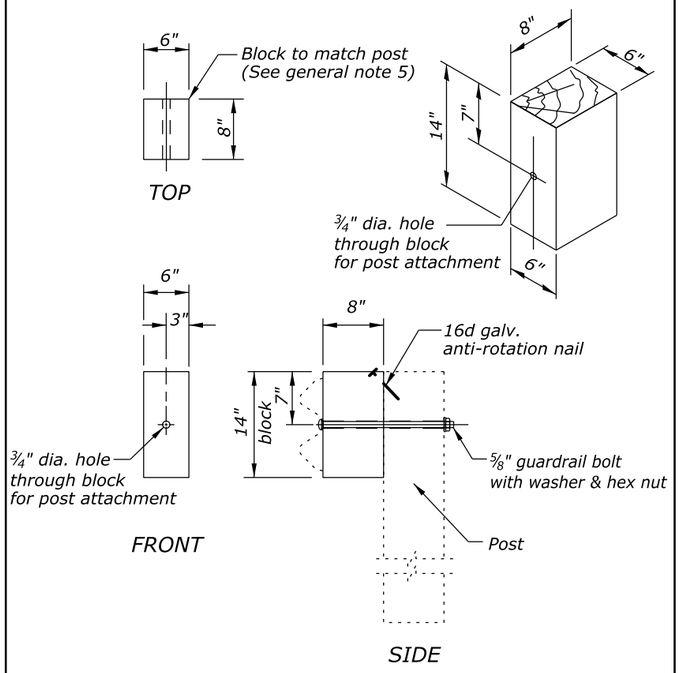
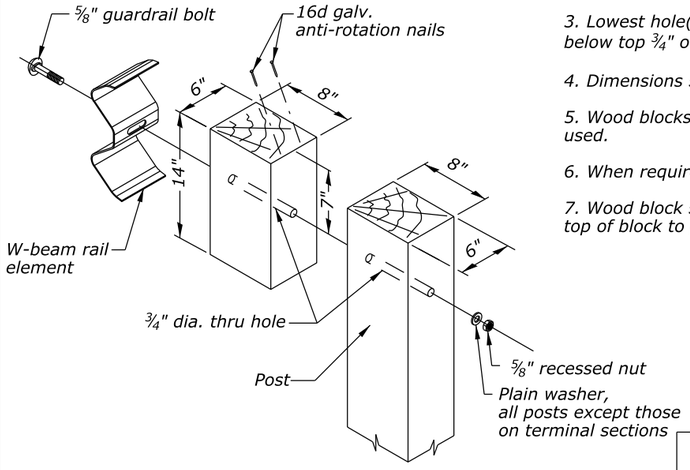



## W-BEAM WOOD POST
(6x8 post shown)




## W-BEAM WOOD BLOCK FOR WOOD POST
(6x8 wood block shown)



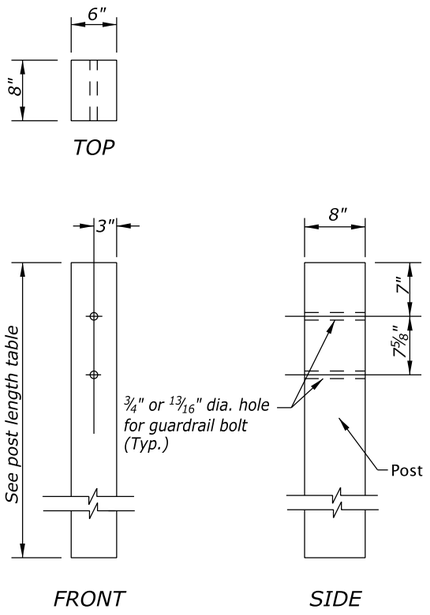

## W-BEAM ASSEMBLY DETAIL
(6x8 wood post and 6x8 wood block shown)

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

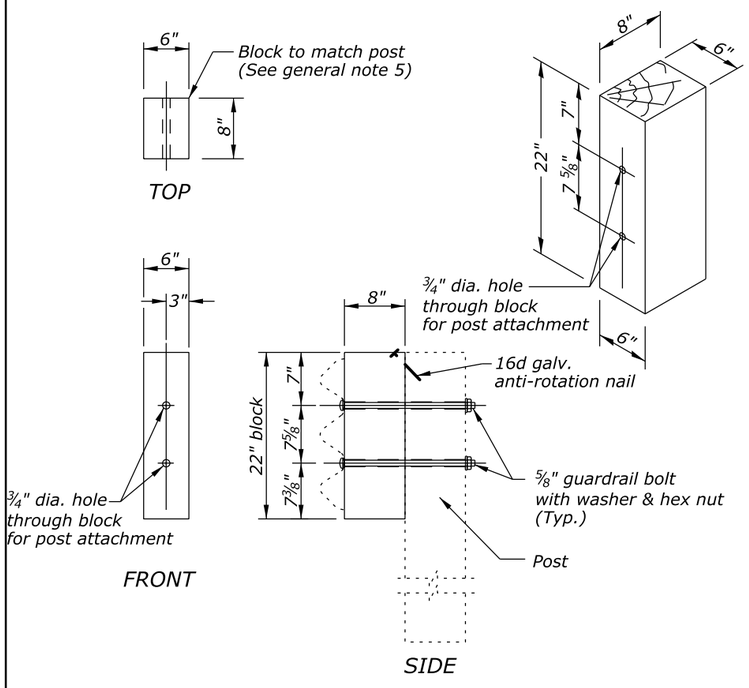
1. See appropriate guardrail detail sheets for details not shown.
2. See sheet G.14 for bridge transition guardrail post and block requirements.
3. Lowest hole(s) required only when channel rail is to be installed. Drill 12" below top ¾" or 13/16" hole(s) used.
4. Dimensions shown are for nominal posts and blocks.
5. Wood blocks shown. Blocks of an approved alternate material may be used.
6. When required by the plans, nested thrie beam wood post shall be 8"x8".
7. Wood block shall be toe-nail to the post with 2 - 16d galvanized nails in top of block to prevent block rotation.

*GUARDRAIL WOOD POST TABLE*

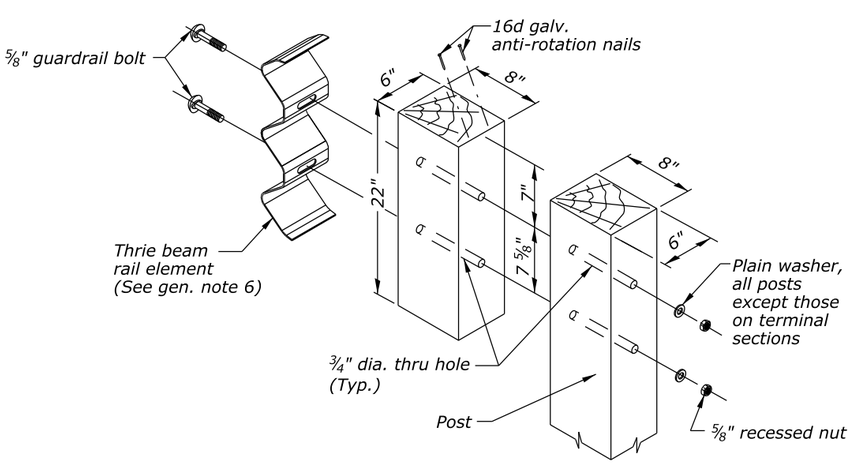
| | GUARDRAIL TYPE | POST SIZE | POST LENGTH | POST SPACING |
|---|---|---|---|---|
| W-BEAM | 2A | 6"x8" or 8"x8" | 6'-0" | 6'-3" |
| | 3 | 8"x8" | 6'-0" | 3'-1½" |
| | Metal median barrier | 8"x8" | 6' 6" | 6'-3" |
| THRIE BEAM | 4 | 6"x8" or 8"x8" | 7'-0" | 6'-3" |
| | 4 (Transition) | 8"x8" | 6'-0" | 3'-1½" |




## THRIE BEAM WOOD POST
(6x8 post shown)




## THRIE BEAM WOOD BLOCK FOR WOOD POST
(6x8 wood block shown)




## THRIE BEAM ASSEMBLY DETAIL
(6x8 wood post and 6x8 wood block shown)

*DRAWING BASED ON OREGON STANDARD DRAWING RD403*

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# GUARDRAIL SYSTEM MGS, TYPE 2, CLASS A WOOD POSTS WOOD POST AND BLOCK DETAIL

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| STATE | PROJECT | SHEET NUMBER |
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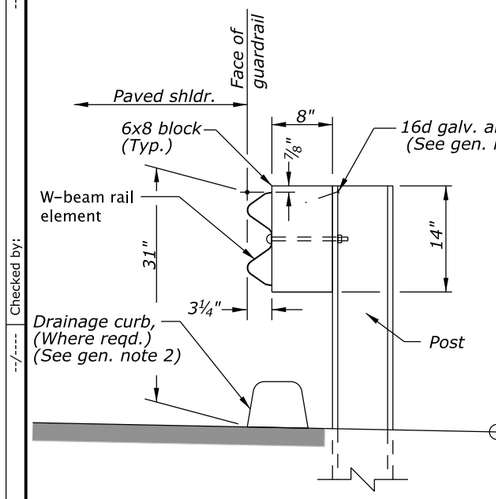
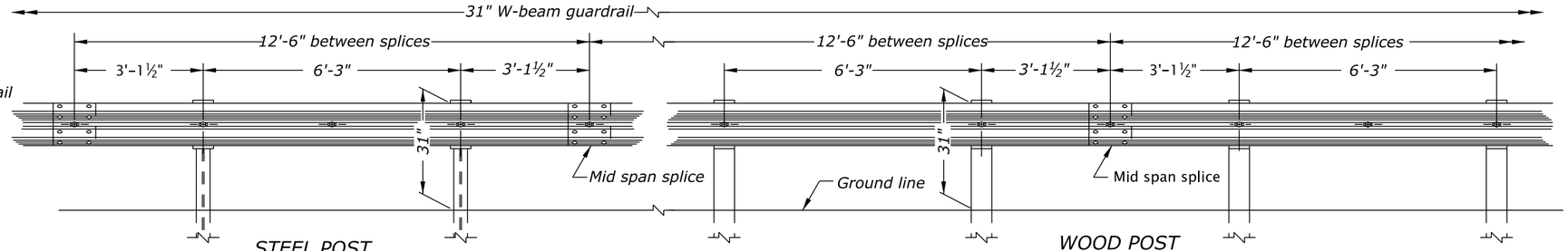
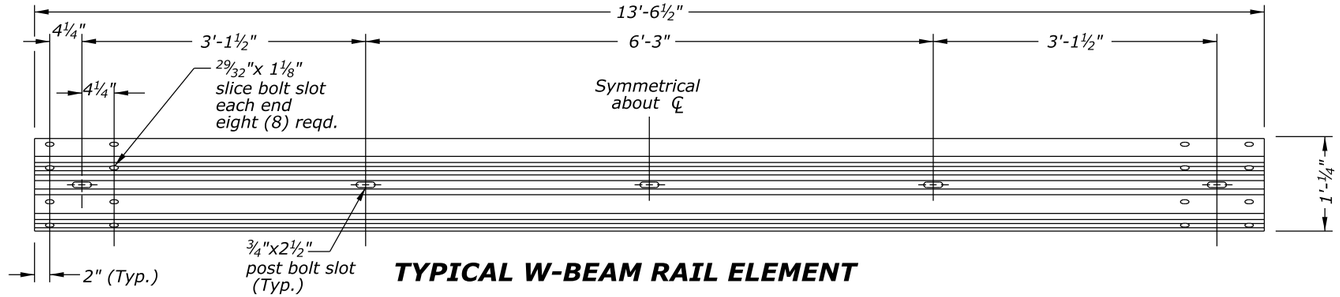



**TYPICAL SECTION**
*(Steel post shown)*

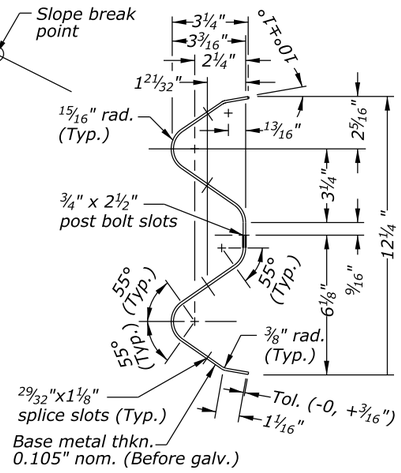



**TYPICAL ELEVATION**

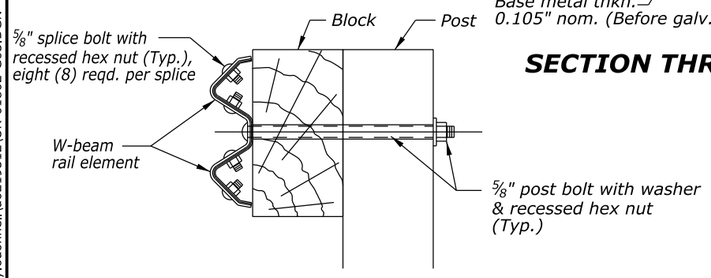



**TYPICAL W-BEAM RAIL ELEMENT**

| NORMAL RAIL ELEMENT DATA | | |
|---|---|---|
| *Type* | *Effective Lengths* | *Thkn. (Galv.)* |
| *2A, 3* | *6.25', 12.5', 25'* | *10 ga. & 12 ga.* |




**SECTION THRU RAIL ELEMENT**

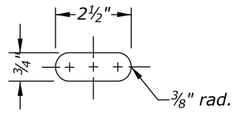



*FITTINGS*

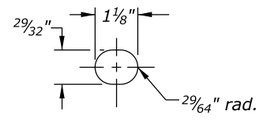
*NOTES:*

a. *When required by the plans, post bolts to extend beyond the tightened nuts within limits of ¼" to ½".*

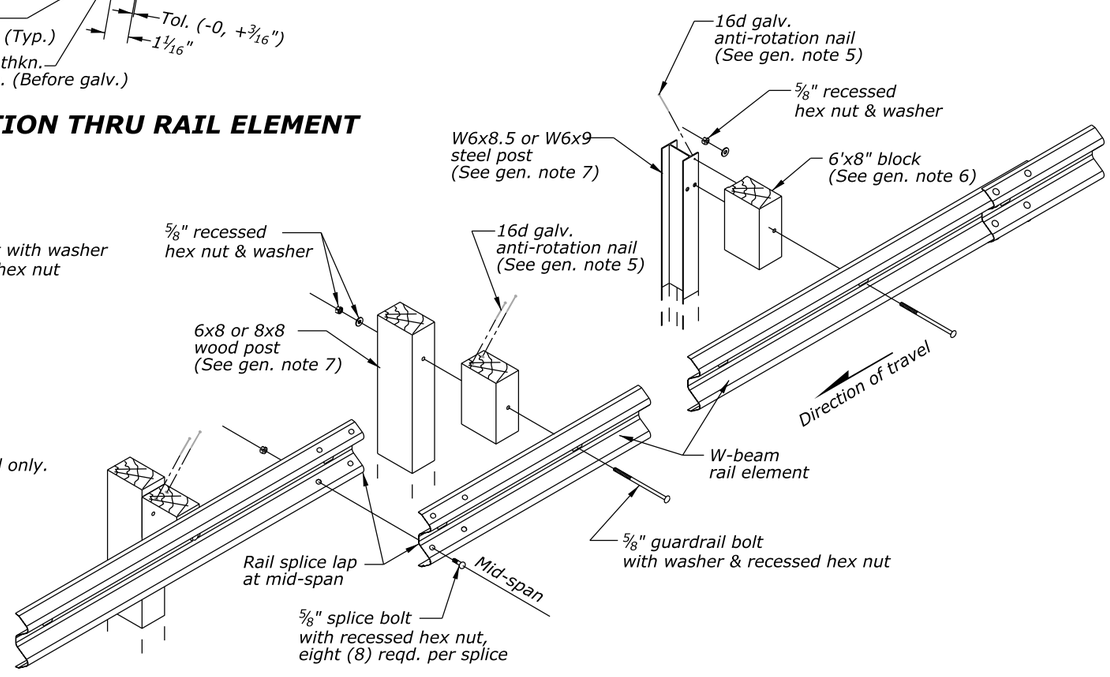
b. *All post bolt threads to be set after assembly for wrench removal only.*




**POST BOLT SLOT**




**SPLICE BOLT SLOT**




**W-BEAM ASSEMBLY DETAILS**

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *See appropriate guardrail detail sheets for details not shown.*
2. *When required by the plans, drainage curb alignment same as face of guardrail.*
3. *Lap guardrail in direction of adjacent traffic.*
4. *Final paved surfacing to extend to face of post. Rail height measured from final paved surface at face of rail to top of rail (typ. all types). 1" ± tolerance.*
5. *Blocks shall be toe-nailed to prevent rotation when wood posts are used (see sheet G.2).*
6. *Wood blocks shown. Blocks of an approved alternate material may be used.*
7. *All posts for guardrail run shall be of the same type: wood or steel.*
8. *For guardrail installed on radii of 150' or less (5' min. radius) use rail elements pre-curved to industry standard. Install "Radius Identification Plate".*

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*DRAWING BASED ON OREGON STANDARD DRAWING RD407*

# GUARDRAIL SYSTEM MGS, TYPE 2, CLASS A WOOD POSTS W-BEAM DETAIL

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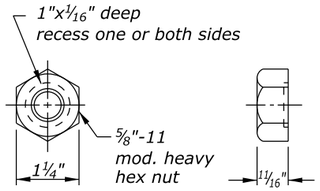
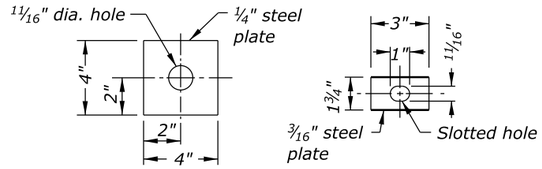
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | G.4 |

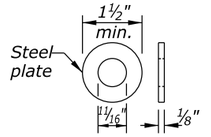



**5/8" DIA. RECESSED HEX NUT**




**SNOW LOAD POST WASHER**

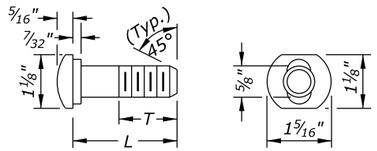
**SNOW LOAD RAIL WASHER** (b)



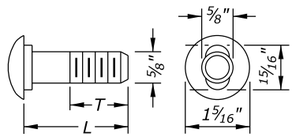

**PLAIN WASHER** (a)

Use on back of post.

*Use in area of heavy snow, as directed by the engineer (See general note 5)*




**ALTERNATIVE No. 1**




**ALTERNATIVE No. 2**

*BOLT DIMENSION TABLE*

| Length (L) (in.) | Thread Length (T) (in.) |
|---|---|
| 1 1/4 | 1 1/8 min. |
| 2 | 1 3/4 min. |
| 10 | 4 min. |
| 18 | 4 min. |
| 25 | 4 min. |

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *See appropriate guardrail detail sheets for details not shown.*
2. *All indicated welds shall attain the full strength of the section welded.*
3. *Radius dimensions, in feet to the nearest 0.5 foot, shall be placed on the plate with a raised weld bead replacing the letters "HHH", shown on the Radius Identification Plate detail. Digits shall be 1 1/2" min. height and 3/4" max. width. Plate shall be galvanized after placement of digits.*
4. *The guardrail radius identification plate is to be mounted on the back side of the rail element with the lowest splice bolt nearest the P.C. of the guardrail radius.*
5. *When required by the plans, a Snow Load Post Washer shall be used on the backside of the post and a Snow Load Rail Washer shall be placed on rail element face. Snow Load Rail Washers shall not be installed on terminals.*

*SUPPLEMENTARY NOTES:*

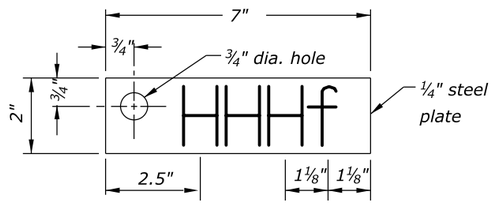
(a) *Not required if Snow Load Post washer option is used.*

(b) *Use rectangular Snow Load Rail washer under bolt head and nut on Type C End Piece as shown.*

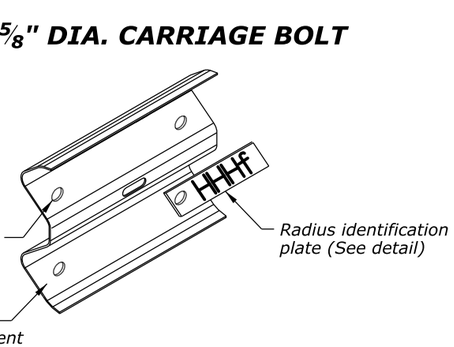
(c) *Furnished & installed by structure contractor when shown on structure plans.*

(d) *6" min. penetration into concrete slabs other than bridge decks. Cast in place or core and install using approved resin bonding system.*

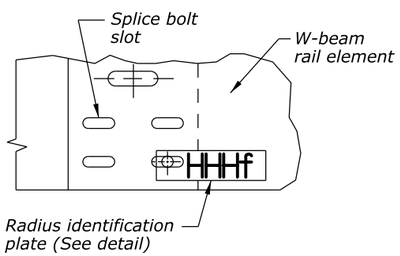
## 5/8" GUARDRAIL POST/SPICE BOLT (BUTTON HEADED)




**RADIUS IDENTIFICATION PLATE**
*(See general note 3)*




**5/8" DIA. CARRIAGE BOLT**







**RADIUS IDENTIFICATION PLATE MOUNTING DETAIL**
*(See general note 4)*

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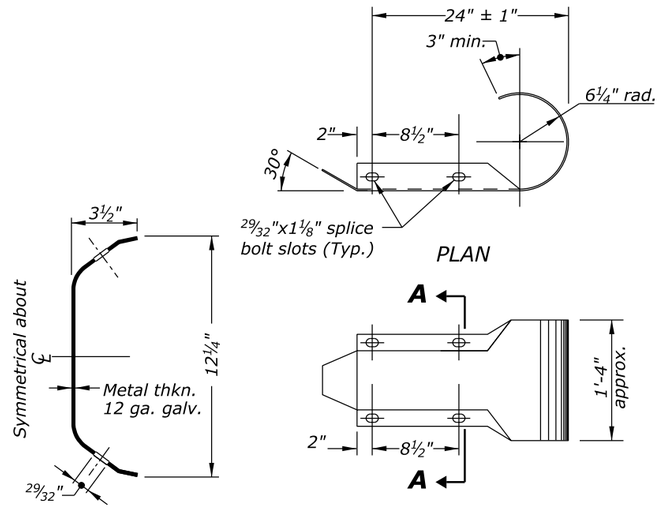
*DRAWING BASED ON OREGON STANDARD DRAWING RD416*

**GUARDRAIL SYSTEM MGS, TYPE 2, CLASS A WOOD POSTS STANDARD HARDWARE DETAILS**

Designed by: | Checked by: | -/---- | -/----

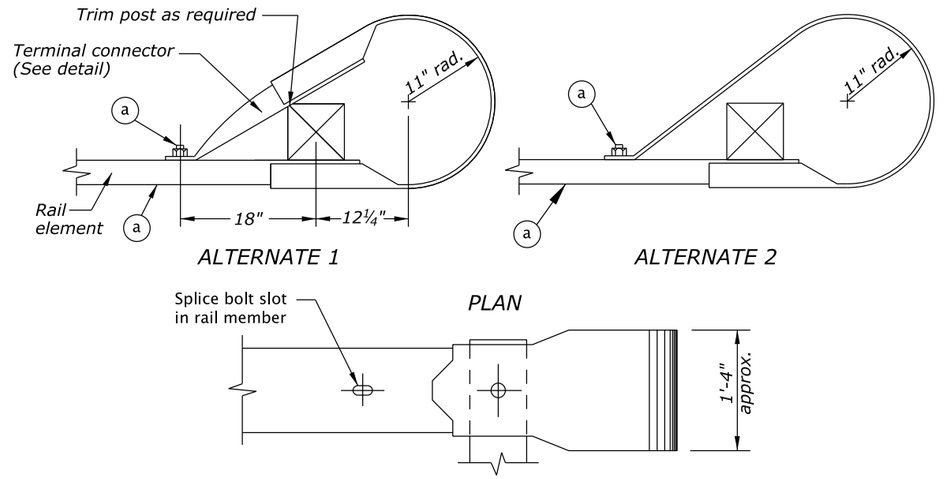
1/1/0001 12:00:00 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\OR-01802-G04.DGN

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | G.5 |




SECTION A-A ELEVATION

## W-BEAM TYPE B END PIECE

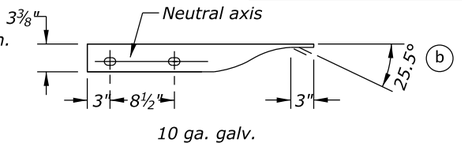



ELEVATION

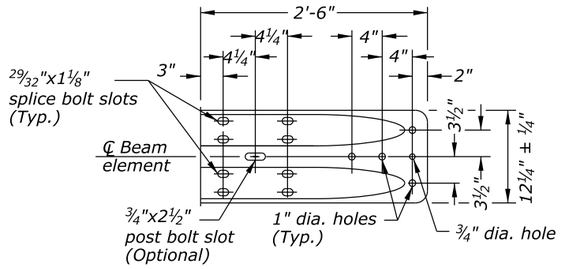
## W-BEAM TYPE C END PIECE

(For details not shown, see Type B End Piece)

ⓐ Use rectangular washer under bolt head and nut on Type C End Piece as shown.

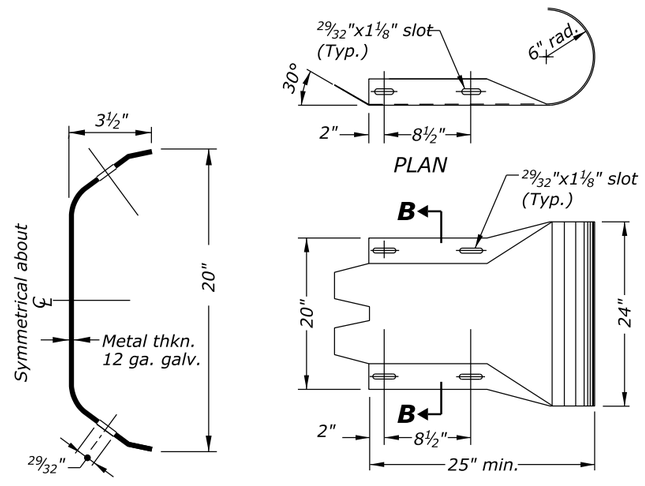



ⓑ 25.5" bend and hole reqd. only for use with alternate Type "C" end piece.



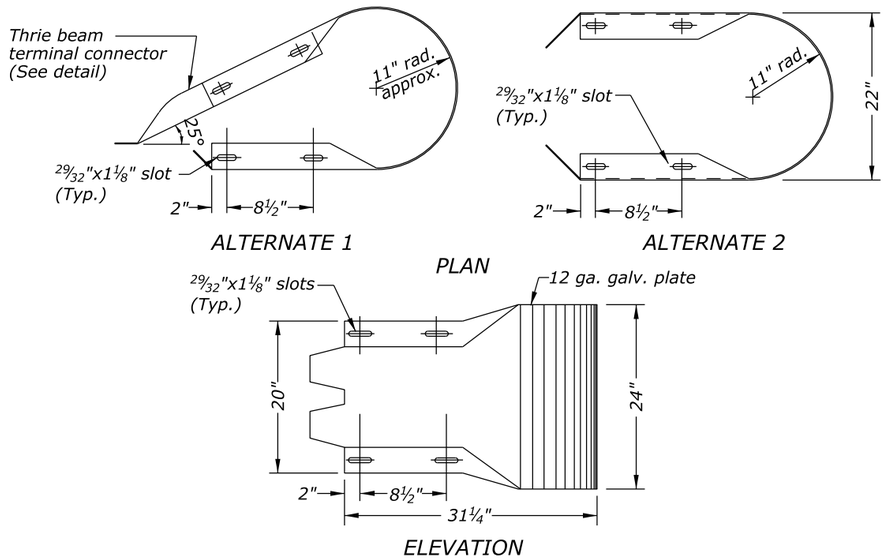

ELEVATION

## W-BEAM TERMINAL CONNECTOR



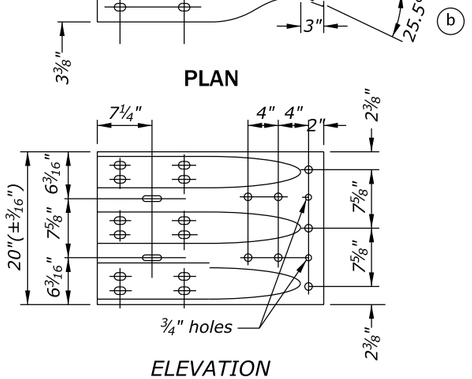

SECTION B-B ELEVATION

## THRIE BEAM TYPE B END PIECE




ELEVATION

## THRIE BEAM TYPE C END PIECE




ELEVATION

## THRIE BEAM TERMINAL CONNECTOR

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate guardrail detail sheets for details not shown.

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DRAWING BASED ON ODOT STANDARD DRAWING RD417

# GUARDRAIL SYSTEM MGS, TYPE 2, CLASS A WOOD POSTS END SECTION DETAILS

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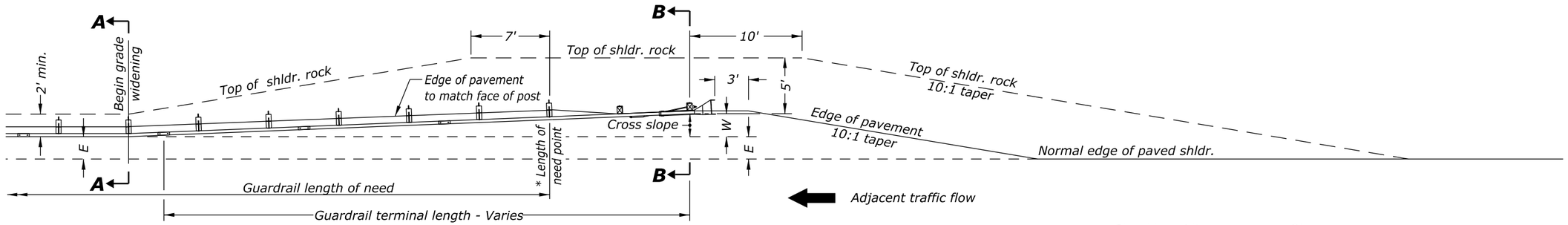
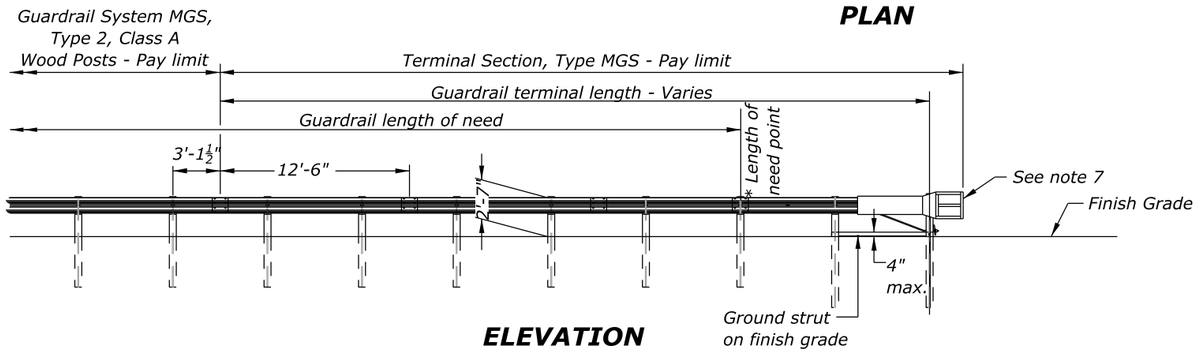
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | G.6 |

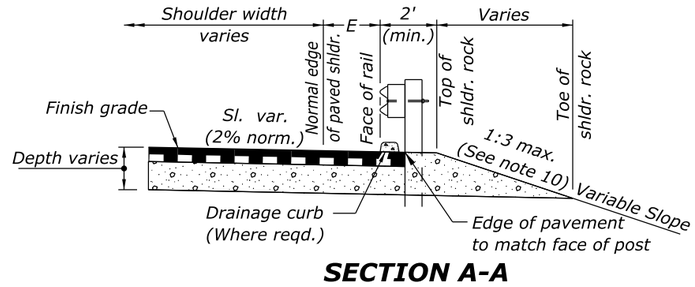



## PLAN



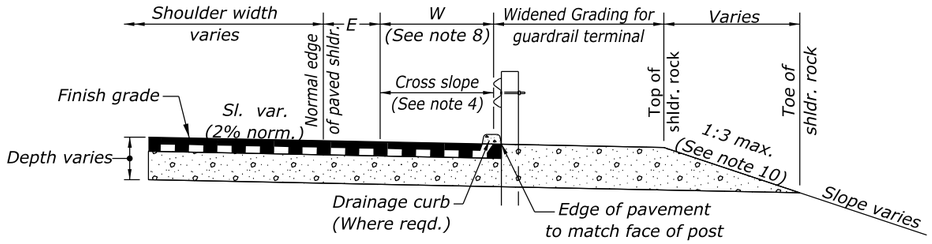

## ELEVATION

* See note 6 and 9

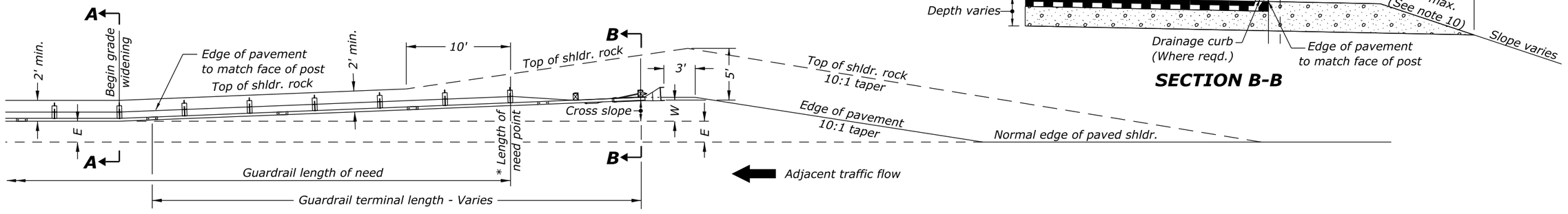



## SECTION A-A

## PREFERRED GRADING




## SECTION B-B




## ALTERNATIVE GRADING

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *Use details shown as a general guide since manufacturer's details may vary. Install a guardrail terminal system that meets MASH requirements per manufacturer's recommendations. Ensure that guardrail terminal meets appropriate test level for the project.*
2. *See appropriate guardrail detail sheets for details not shown. See project plans for details not shown.*
3. *Guardrail Non-flared terminal shall be installed with a min. 1 foot offset ensuring that the end piece is entirely off normal shldr.*
4. *Cross slope to match adjacent roadway cross slope (preferred). If required, maximum shoulder slope 10% for guardrail widening. If required, maximum grade break at normal edge of shoulder 8%.*
5. *On two way two lane highways, both ends of guardrail runs shall be provided with a terminal flared or non-flared. Paving of widened shldr. to the face of posts on both ends of guardrail runs is required.*
6. *Install terminal according to manufacturer's recommendations (post count varies). Provide shop drawings to CO.*
7. *Install a reflectorized object marker on head of every guard rail terminal with "W" 4 feet or less according to manufacturer's recommendations.*
8. *"W" distance is measured to face of guardrail at end post, exclusive of end piece.*
9. *Length of need post location varies by manufacturer.*
10. *1:4 slope or flatter preferable, 1:3 max.*

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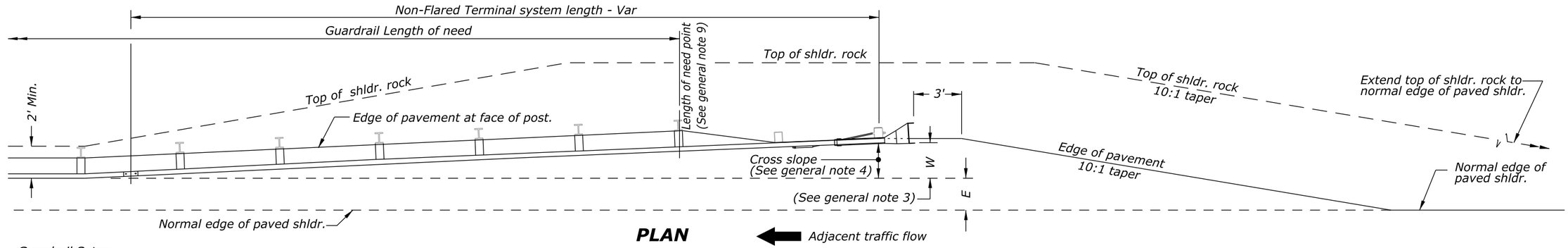
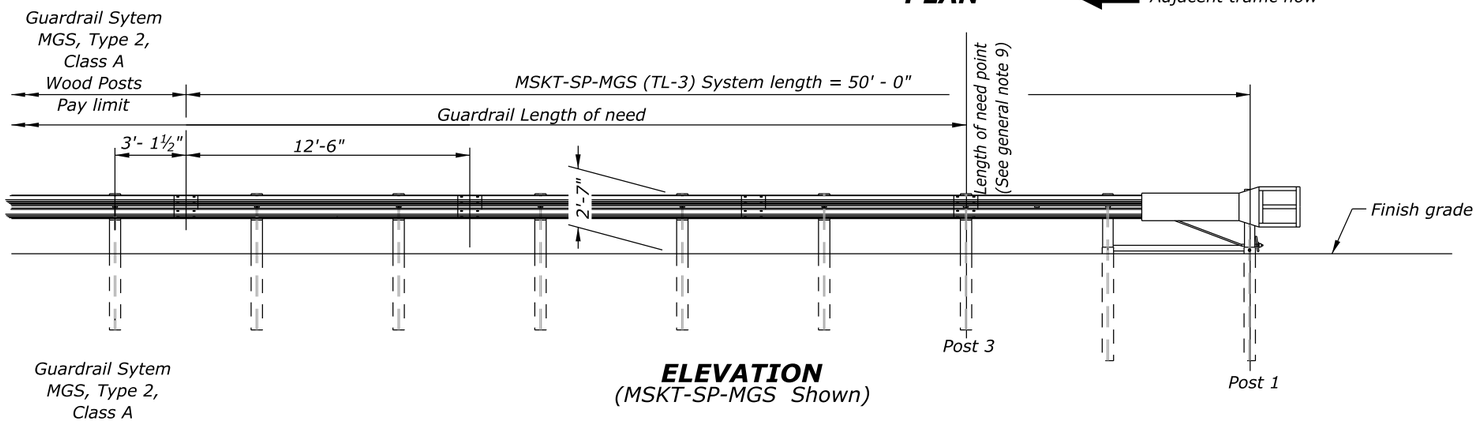
*DRAWING BASED ON OREGON STANDARD DRAWING RD419*

# TERMINAL SECTION, TYPE MGS (TANGENT OR FLARED) GRADING DETAILS

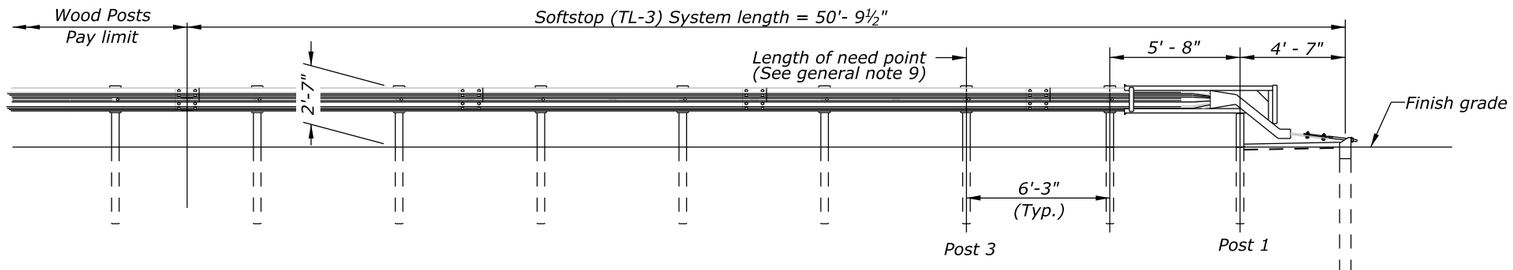
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | G.7 |



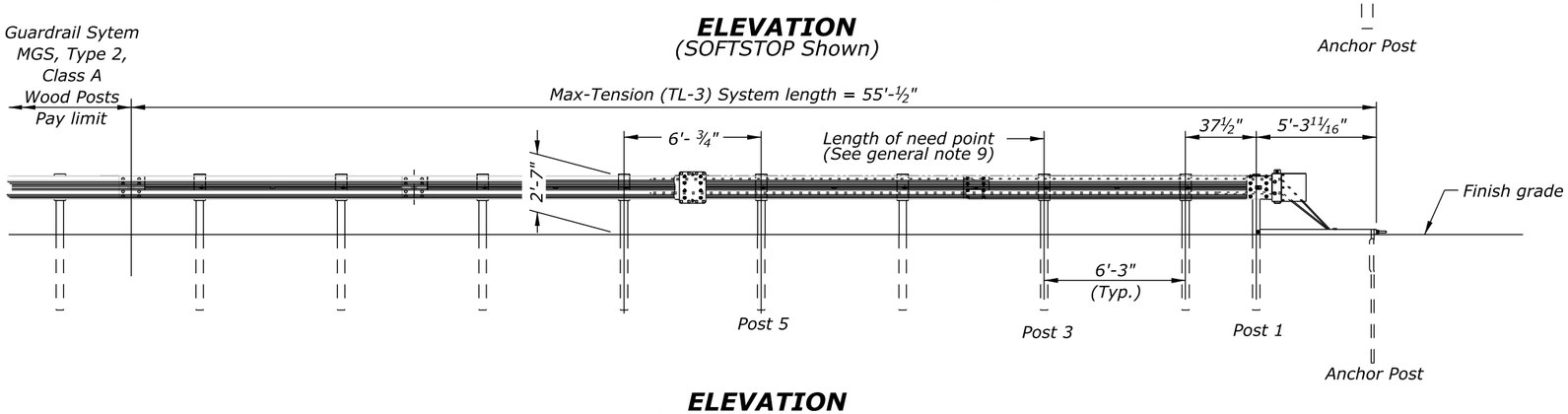

**PLAN** ← Adjacent traffic flow




**ELEVATION**
(MSKT-SP-MGS Shown)




**ELEVATION**
(SOFTSTOP Shown)




**ELEVATION**
(MAX-TENSION Shown)

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *Use details shown as a general guide since manufacturer's details may vary. Install a guardrail terminal system that meets MASH requirements per manufacturer's recommendations. Ensure that guardrail terminal meets appropriate test level for the project.*
2. *See appropriate guardrail detail sheets for details not shown. See project plans for details not shown.*
3. *Guardrail Non-flared terminal shall be installed with a min. 1 foot offset ensuring that the end piece is entirely off normal shldr.*
4. *Cross slope to match adjacent roadway cross slope (preferred). If required, maximum shoulder slope 10% for guardrail widening. If required, maximum grade break at normal edge of shoulder 8%.*
5. *On two way two lane highways, both ends of guardrail runs shall be provided with a terminal flared or non-flared. Paving of widened shldr. to the face of posts on both ends of guardrail runs is required.*
6. *Install terminal according to manufacturer's recommendations (post count varies). Provide shop drawings to CO.*
7. *Install a reflectorized object marker on head of every guard rail terminal with "W" 4 feet or less according to manufacturer's recommendations.*
8. *"W" distance is measured to face of guardrail at end post, exclusive of end piece.*
9. *Length of need post location varies by manufacturer.*

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# TERMINAL SECTION, TYPE MGS TANGENT DETAIL

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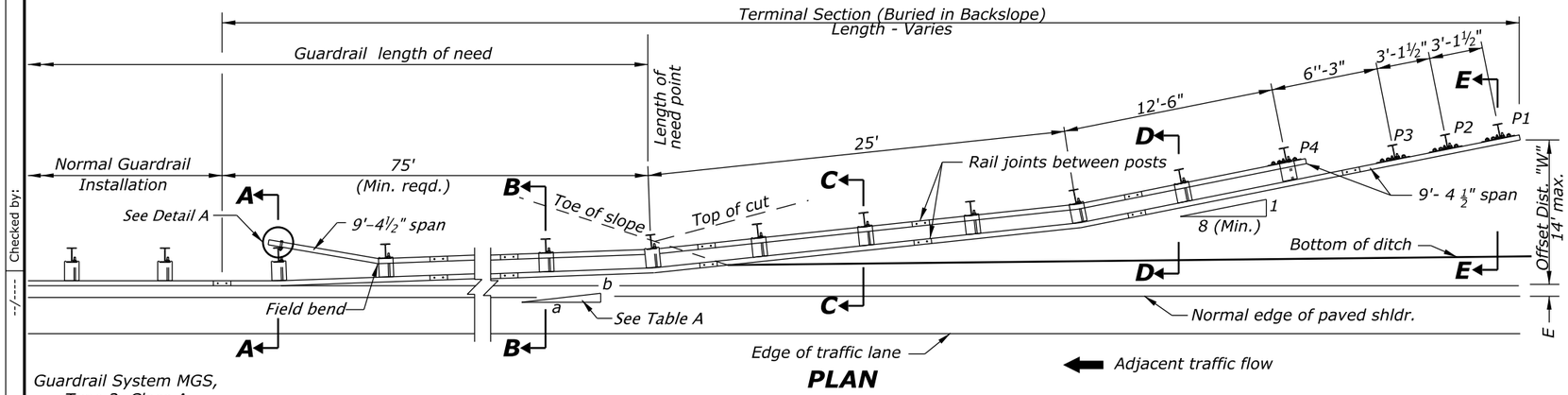
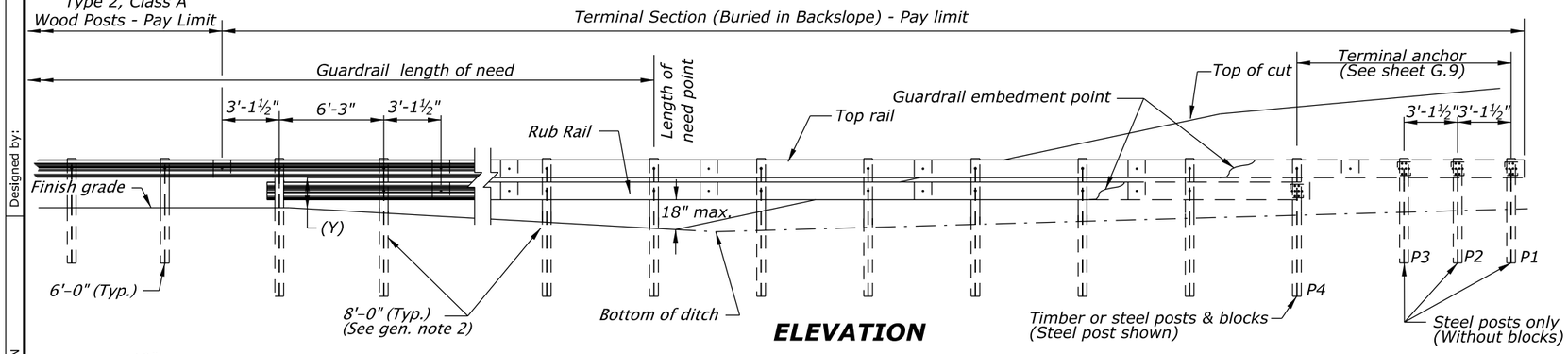
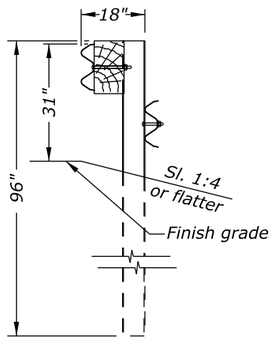
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | G.8 |



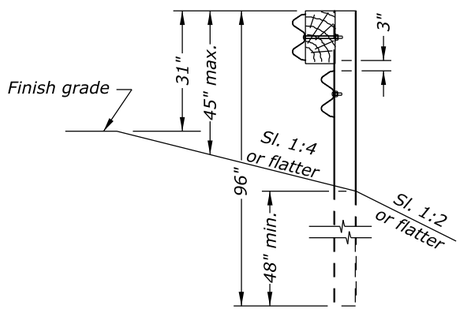

**PLAN**



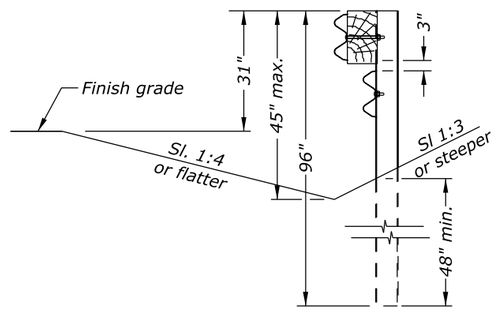

**ELEVATION**



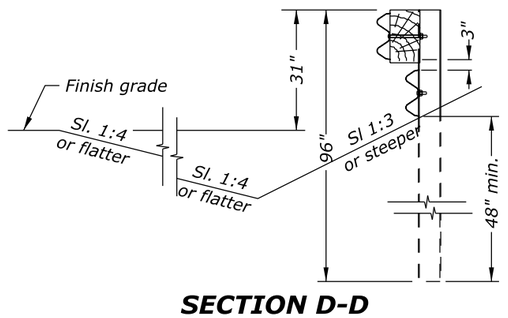

**SECTION A-A**



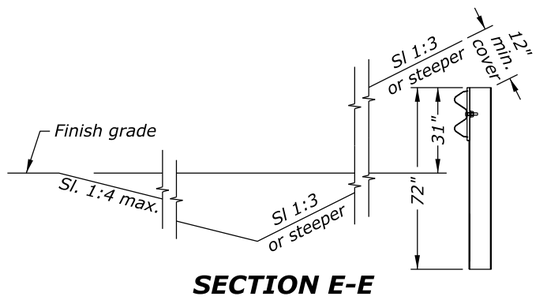

**SECTION B-B**



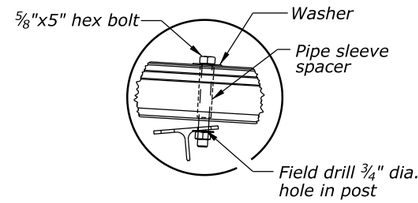

**SECTION C-C**




**SECTION D-D**




**SECTION E-E**




**DETAIL "A"**

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *See sheet G.9 for Buried-in-backslope terminal anchorage parts. See appropriate guardrail detail sheets for additional details not shown.*
2. *On two way, two lane highways, both ends of guardrail runs shall be provided with a flared or non-flared terminal if not buried, as detailed on plans.*
3. *Eight foot long guardrail post required when connected to rub rail.*
4. *The flare rate of the guardrail may be increased after crossing the ditch bottom to shorten the length of the terminal.*
5. *Trailing ends (freeways, multilane and similar one-way facilities) not exposed to opposing traffic:*
   *(a) Guardrail terminals, use a Downstream Anchor Terminal (DAT) (sheet G.10), Type B end piece and do not flare.*
   *(b) At bridge ends, omit Transition Guardrail & Type 3 guardrail and substitute the normal required guardrail.*
6. *(a) All bolts except adjustment bolts shall be drawn tight on rails and components on initial installation.*
   *(b) Final tightness check on rail and component bolts and retightening as required to be done 30 days after initial installation.*
7. *Bend the downstream end of the bottom rail to the backside of the post and bolt to post.*
8. *Field drilled steel posts are allowed for bottom rail element. Use zinc rich paint to coat field drilled holes in posts or rail elements. Galvanizing required for plate and hardware.*
9. *Hold the top guardrail element constant with the typical barrier installation. Go up stream 1 post and add a bottom rail element under the standard guardrail element when the bottom of the top guardrail element exceeds 18 inch, at any point of the slope, point (Y) elevation view. Slope both elements down to maintain a maximum height of 45 inch in front of the toe of slope if the top of installation exceeds 45 inch from the ground, at any point in the installation.*
10. *Use in established slopes. Do not build a mound to use Buried-in-backslope terminal. Do not use the Buried-in-backslope terminal in locations where the backslope is flatter than 3:1, and there is no ditch or a narrow shallow ditch and the toe of slope is within 20 ft of the travel lane.*

**TABLE A**

| FLARE RATE a : b | POSTED SPEED (MPH) |
|---|---|
| 15:1 | 70 |
| 14:1 | 60 |
| 12:1 | 55 |
| 11:1 | 50 |
| 10:1 | 45 |
| 9:1 | 40 or less |

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# TERMINAL SECTION (BURIED IN BACKSLOPE) DETAIL

Designed by: Checked by: -/---- -/----

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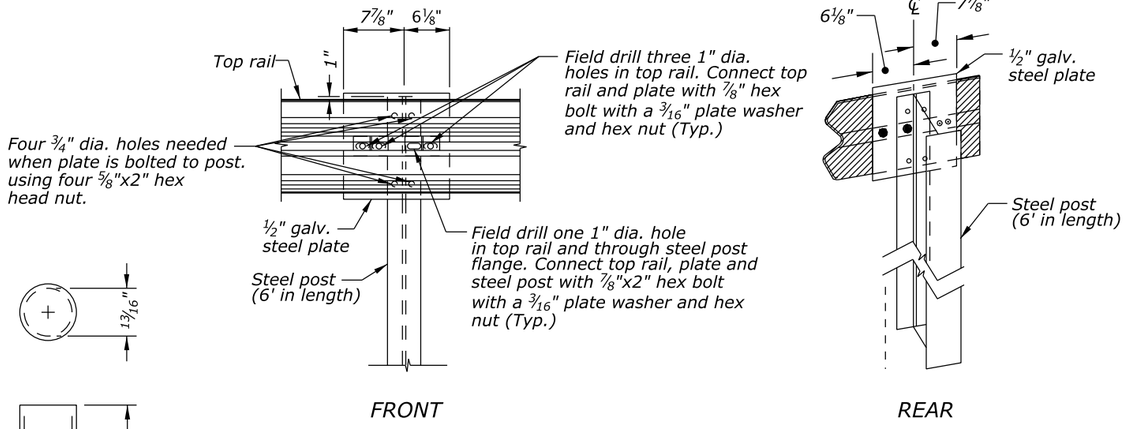
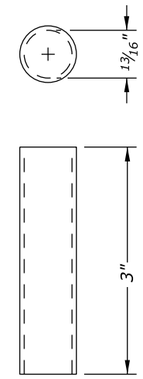
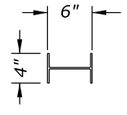
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | G.9 |



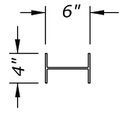

## TOP RAIL ANCHOR POST/PLATE ATTACHMENT




## PIPE SLEEVE SPACER



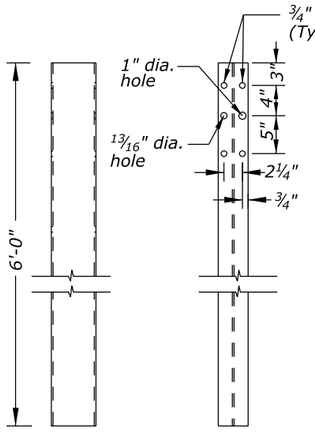

TOP VIEW




TOP VIEW




TOP VIEW




SIDE FRONT
6' - 0" LENGTH
(Post 1-3)

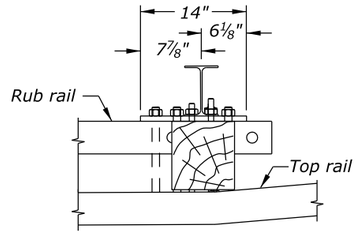



SIDE FRONT
8' - 0" LENGTH
(Post 4)

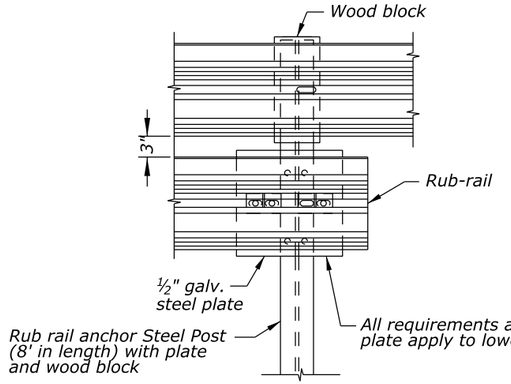



SIDE FRONT
8' - 0" LENGTH

## WIDE-FLANGE STEEL POST
(W6 x 9 or W6 x 8.5)




PLAN

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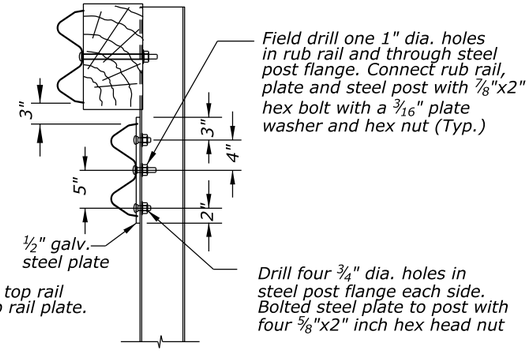
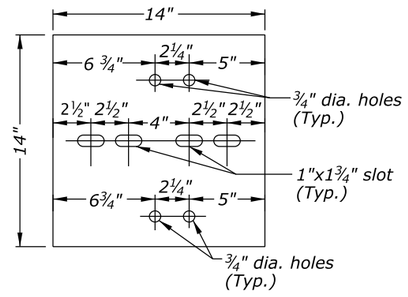



SIDE

## RUB RAIL ANCHOR POST/PLATE ATTACHMENT

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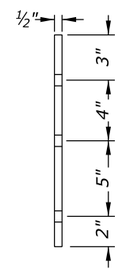
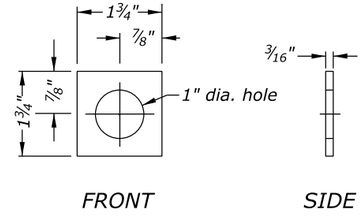



SIDE




FRONT SIDE

## PLATE WASHER

## BURIED IN BACKSLOPE STEEL ANCHOR PLATE

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET*

1. *See appropriate guardrail detail sheets for details not shown.*
2. *Use ½" steel plate meeting requirements of ASTM A36.*
3. *Galvanizing required for plate and hardware.*
4. *Use zinc rich paint to coat field drilled holes.*
5. *Hex head bolts are ASTM A307.*

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*DRAWING BASED ON OREGON STANDARD DRAWING RD437*

# TERMINAL SECTION, TYPE MGS (BURIED IN BACKSLOPE) ANCHOR PARTS DETAILS

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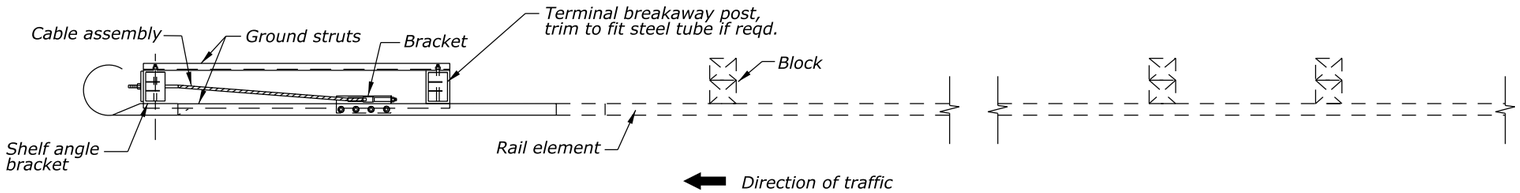
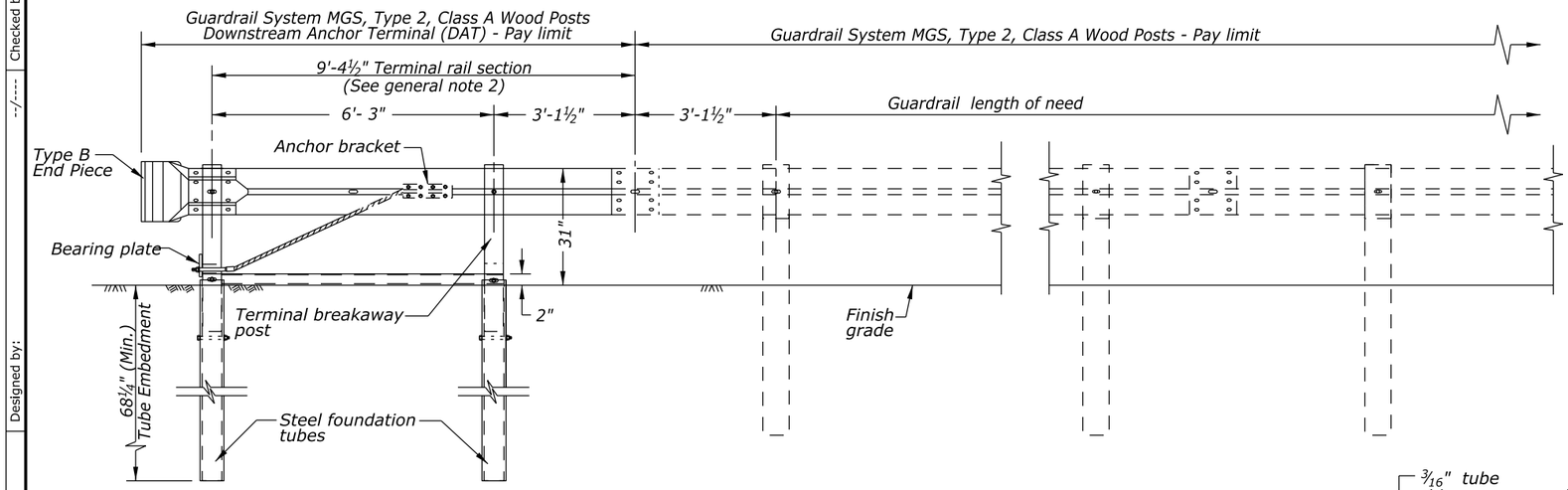


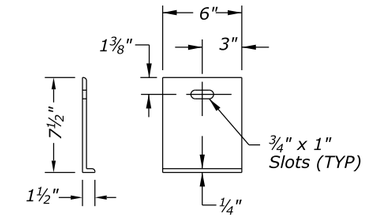

**PLAN**



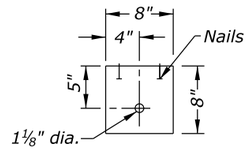

*ELEVATION*

**DOWNSTREAM ANCHOR TERMINAL (DAT)**

*(See general note 1)*

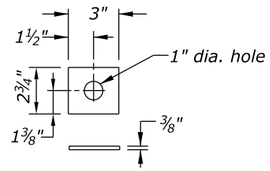



**SHELF ANGLE BRACKET**

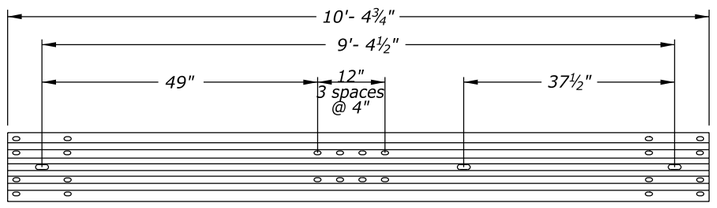



*NOTE: Drive nails and bend over to prevent plate rotation*

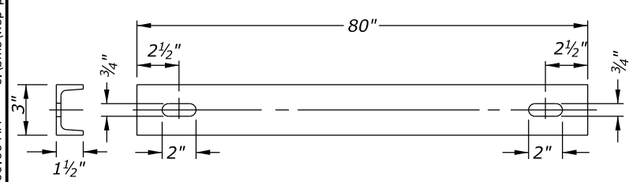
**BEARING PLATE**



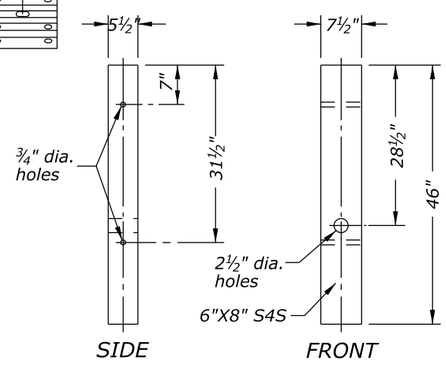

**END PLATE**



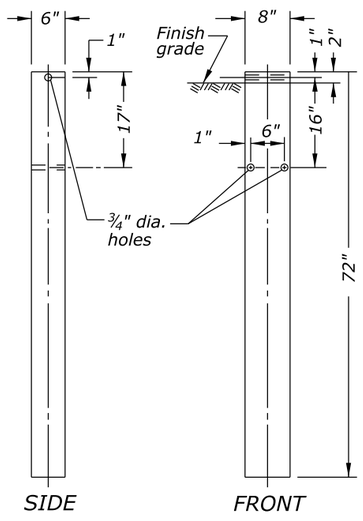

**TERMINAL RAIL ELEMENT**



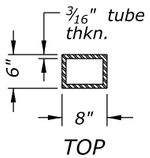

**CHANNEL STRUT**




**TERMINAL BREAKAWAY POST**




**STEEL FOUNDATION TUBE**




*TOP*

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *Downstream Anchor Terminal (DAT) shall be used on the end of guardrail run, when located outside the horizontal clearance area of opposing traffic or when crashworthy terminal is not required.*
2. *See appropriate guardrail detail sheets for additional details not shown.*
3. *The rail section at the end post is supported by the Shelf Angle Bracket. The rail element is not attached to the end post.*
4. *The foundation tubes shall not project more than 3¾" above the finished grade.*
5. *All hardware for Downstream Anchor Terminal (DAT) shall be ASTM A307 unless otherwise shown.*
6. *If a mow strip is required with the Downstream Anchor Terminal (DAT) installation the leave-out area around the steel foundation tubes and the two channel struts may be omitted. This will require a full pour at the foundation tubes.*

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*DRAWING BASED ON OREGON STANDARD DRAWING RD438*

**GUARDRAIL SYSTEM MGS, TYPE 2, CLASS A WOOD POSTS DOWNSTREAM ANCHOR TERMINAL DETAILS**

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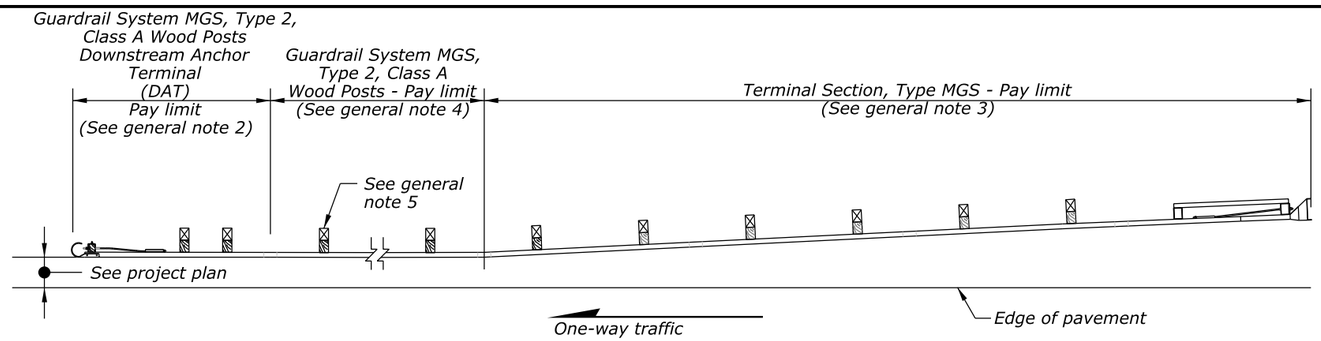
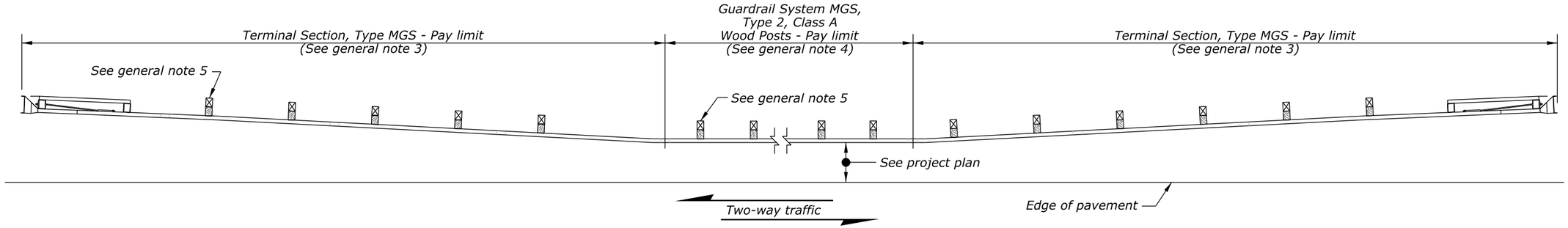
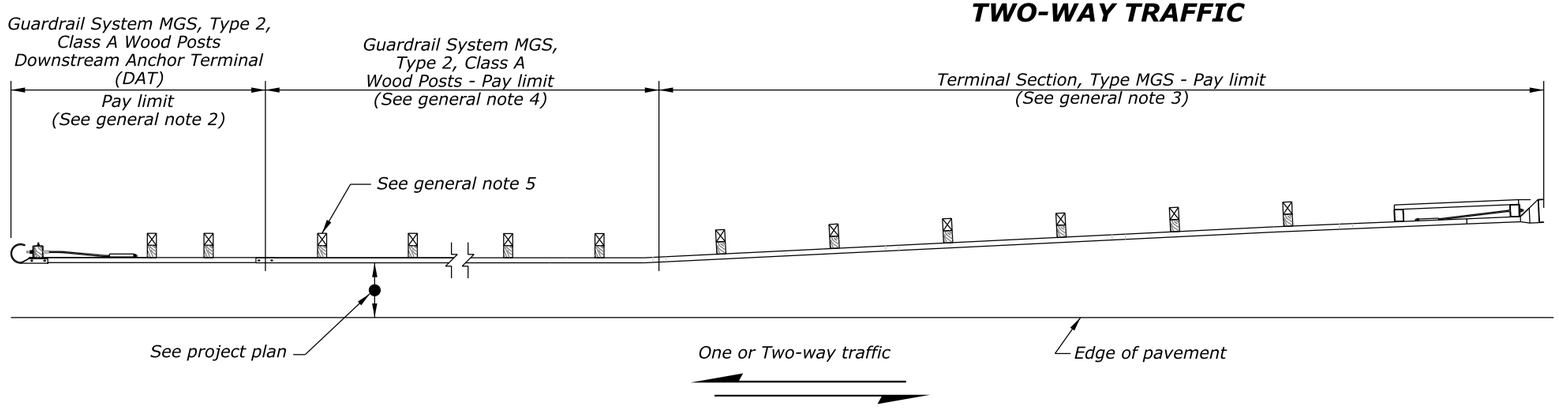



**ONE-WAY TRAFFIC**




**TWO-WAY TRAFFIC**




**ONE OR TWO-WAY TRAFFIC**

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *See appropriate guardrail detail sheets for details not shown.*
2. *Where a crashworthy terminal is not required, use a Downstream Anchor Terminal (DAT). See sheet G.10.*
3. *For terminal type and details, see project plans and applicable sheets.*
4. *For additional details not shown on this plan, refer to sheet G.3.*
5. *Wood or steel post. Wood post shown.*

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*DRAWING BASED ON OREGON STANDARD DRAWING RD443*

**GUARDRAIL SYSTEM MGS, TYPE 2, CLASS A WOOD POSTS TYPICAL LAYOUTS FOR EMBANKMENT**

| STATE | PROJECT | SHEET NUMBER |
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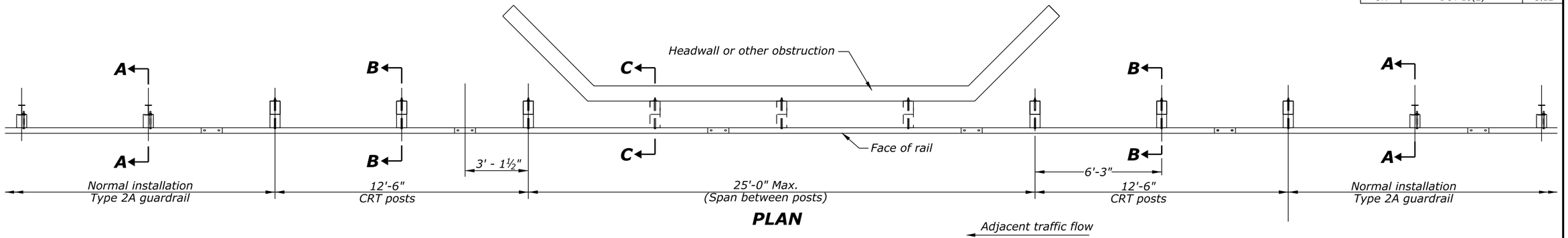
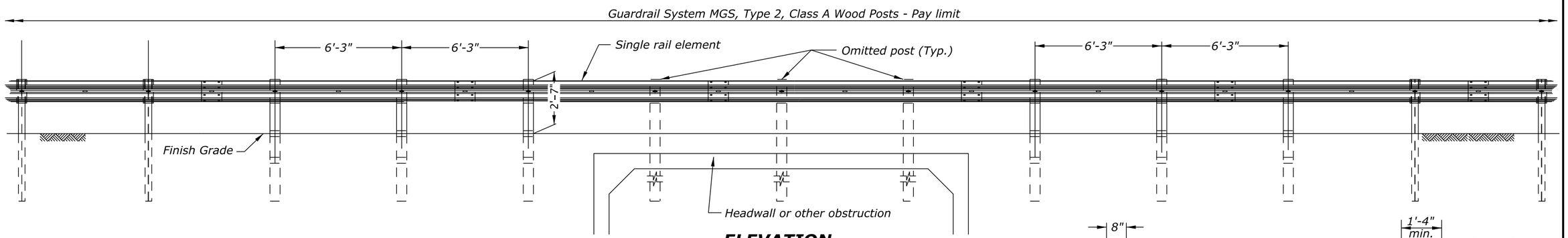
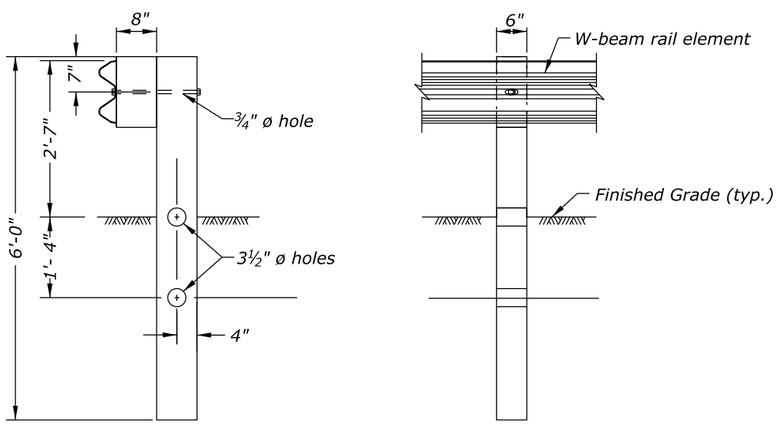



**PLAN**

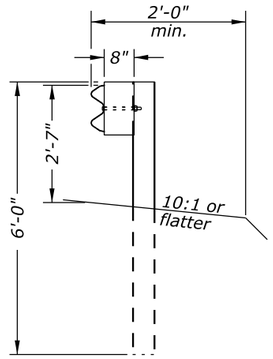
Adjacent traffic flow



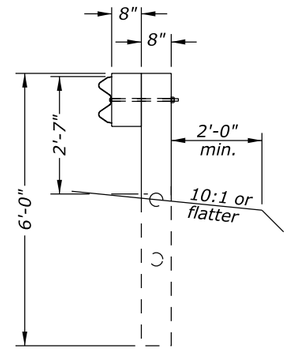

**ELEVATION**



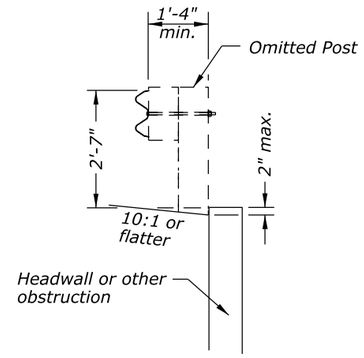

**CONTROLLED RELEASING TERMINAL (CRT) POST DETAIL**




**SECTION A-A**
(Steel or Wood Post)




**SECTION B-B**
CRT Post




**SECTION C-C**
Omitted Post

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *See appropriate guardrail detail sheets for details not shown.*
2. *Only those posts required to span the obstacle shall be eliminated. A maximum of three posts may be eliminated within a 25' span of W-beam guardrail.*
3. *CRT post to be wood only*
4. *Guardrail shall be lapped in the direction of adjacent traffic.*

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*DRAWING BASED ON OREGON STANDARD DRAWING RD471*

**GUARDRAIL SYSTEM MGS, TYPE 2, CLASS A WOOD POSTS OVER LOW-FILL CUVLERTS**

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| STATE | PROJECT | SHEET NUMBER |
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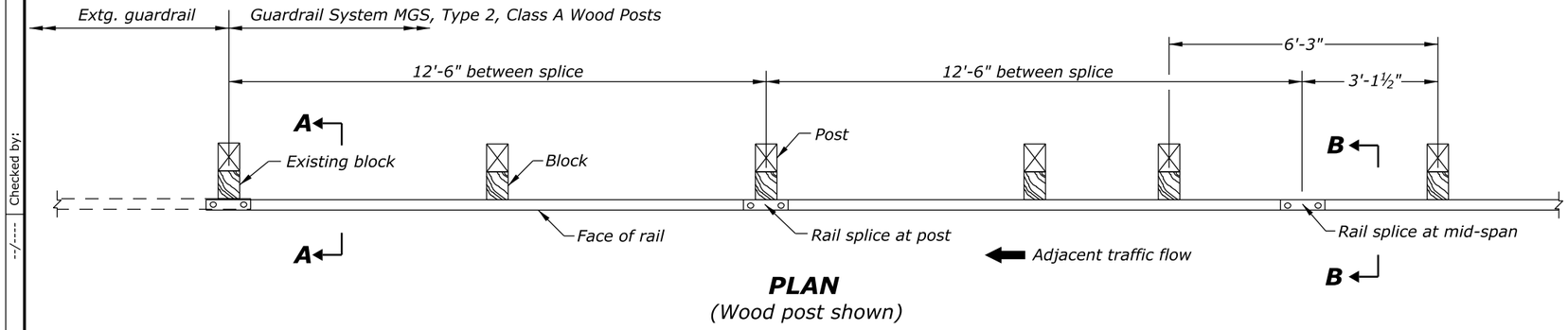
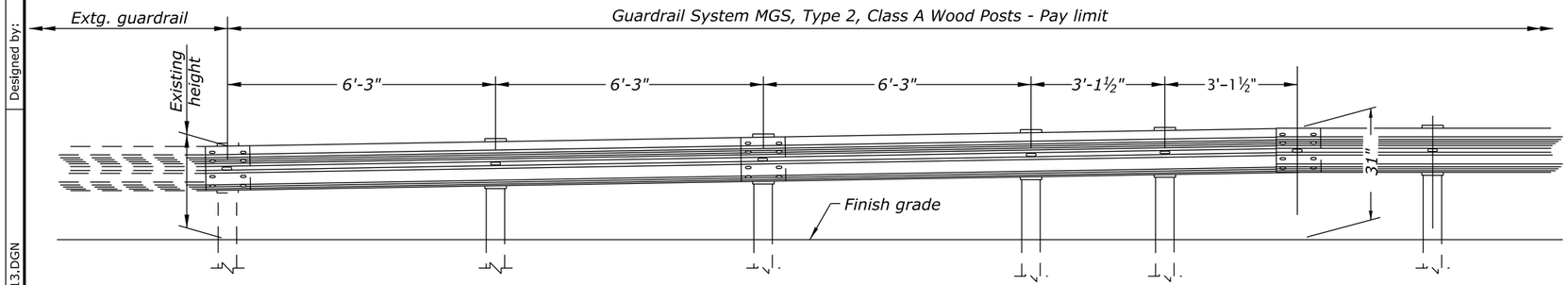
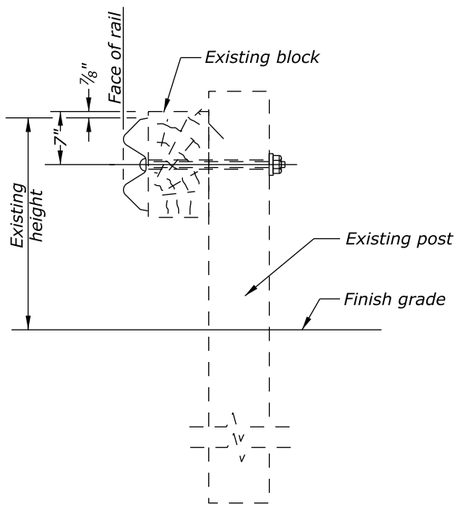



***PLAN***
*(Wood post shown)*

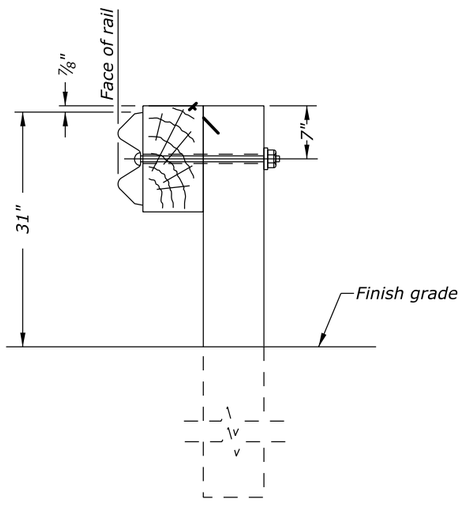



*EXISTING POST*

***ELEVATION***




***SECTION A-A***




***SECTION B-B***

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *See appropriate guardrail detail sheets for details not shown.*
2. *When required by the plans, drainage curb alignment same as face of guardrail. See sheet E.81 for drainage curbs*
3. *Lap guardrail in direction of adjacent traffic.*
4. *Guardrail shoulder installation shown, metal median barrier installation similar.*
5. *Final paved surfacing to extend to face of post. Rail height measured from final paved surface at face of rail to top of rail (Typical all types). 1"± tolerance.*
6. *Wood block shall be toe-nailed to the post with 2 - 16d galvanized nails in top of block to prevent block rotation.*
7. *Wood blocks shown. Blocks of an approved alternate material may be used if approved by the CO. See ODOT's QPL.*
8. *All posts for guardrail run shall be of the same type: wood or steel.*

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*DRAWING BASED ON OREGON STANDARD DRAWING RD481*

**GUARDRAIL SYSTEM MGS, TYPE 2, CLASS A WOOD POSTS HEIGHT CONVERSION**

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
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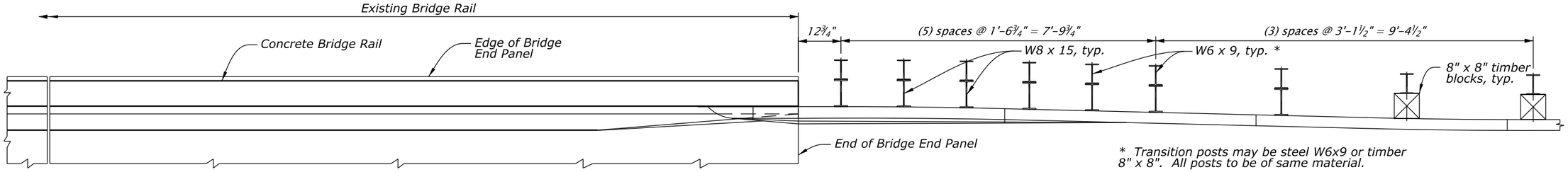
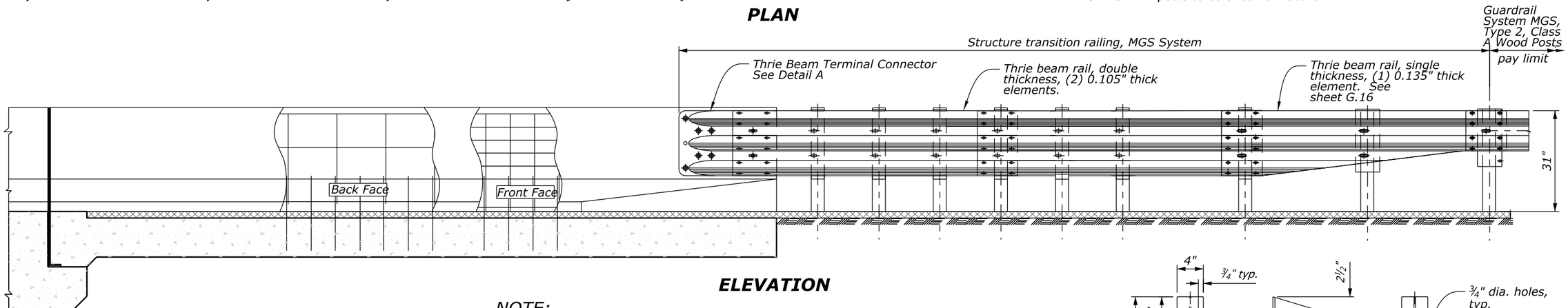
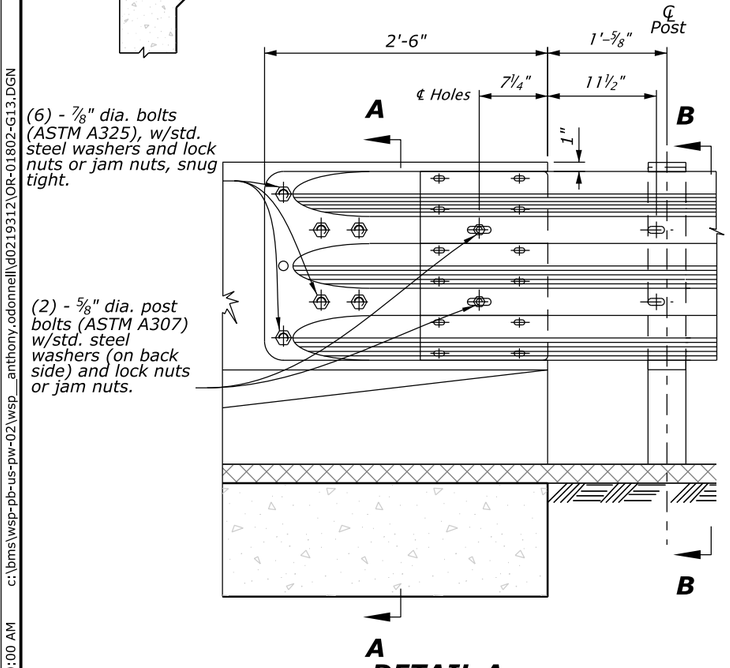



* Transition posts may be steel W6x9 or timber 8" x 8". All posts to be of same material.

**PLAN**



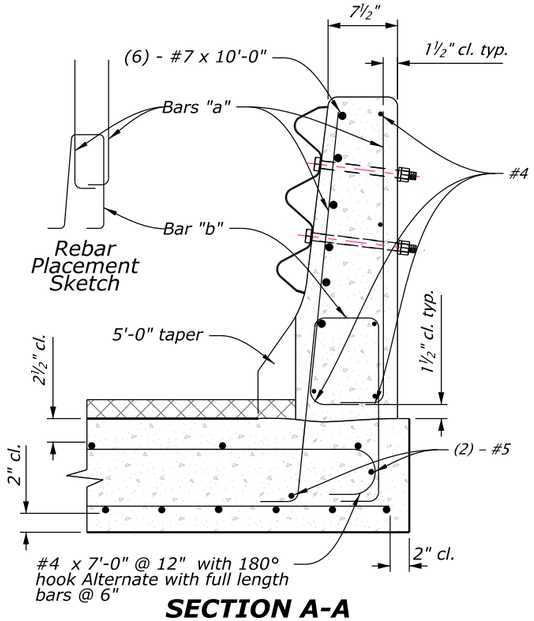

**ELEVATION**



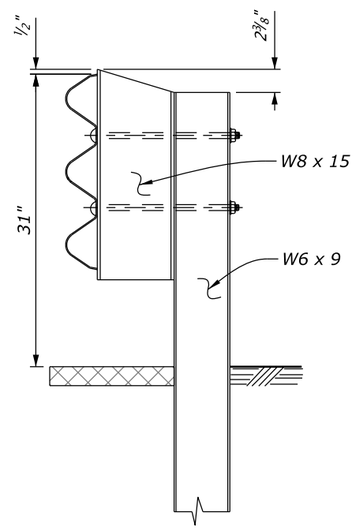

**DETAIL A**

## NOTE:

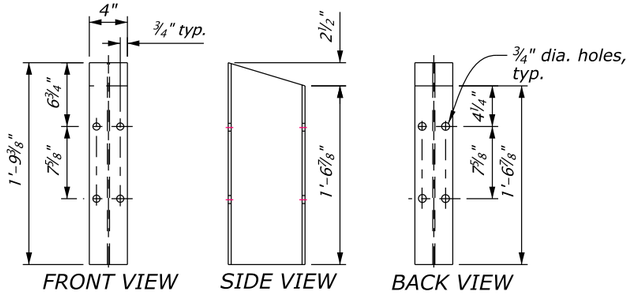
Drill horizontal bolt holes (bolt dia. + ⅛") in hardened concrete with low-impact rotary drill. Cut bolts after installation so they extend ¾" max. beyond nut. Grind smooth and cold galvanize.




**SECTION A-A**




**SECTION B-B**




**THRIE BEAM BLOCK (W8 x 15)**

## GENERAL NOTES:

Provide steel for wide-flange posts conforming to AASHTO M183 (ASTM A36).
Hot dip galvanize after fabrication.

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DRAWING BASED ON OREGON STANDARD DRAWING BR203

# STRUCTURE TRANSITION RAILING, MGS SYSTEM DETAIL

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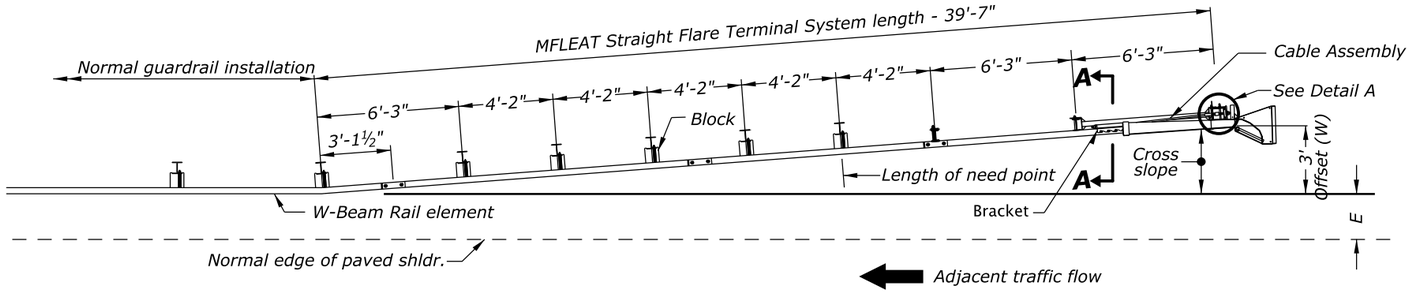
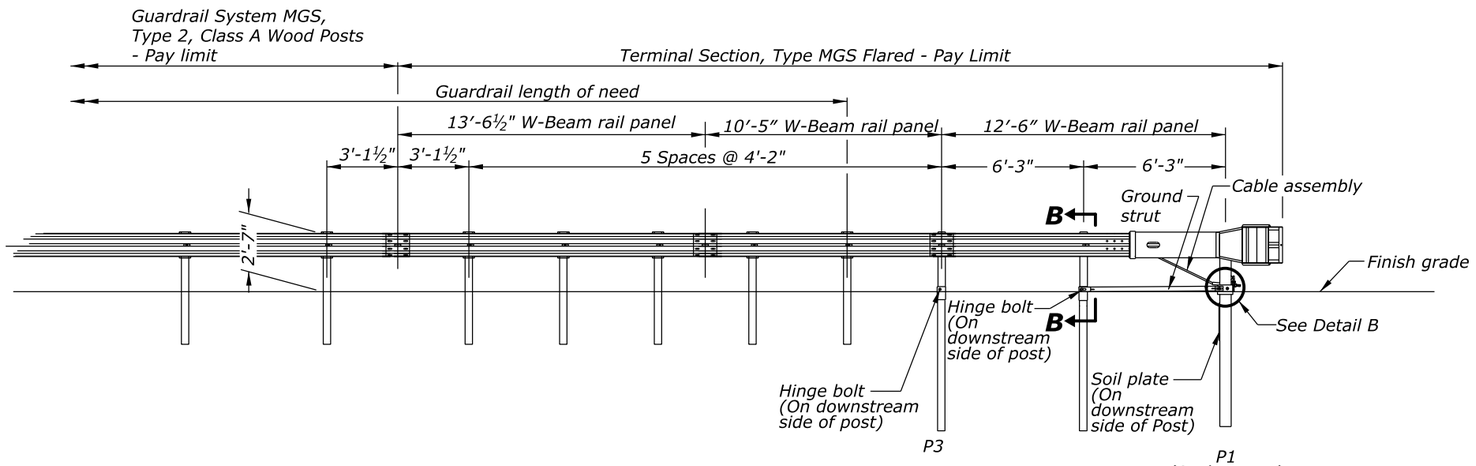
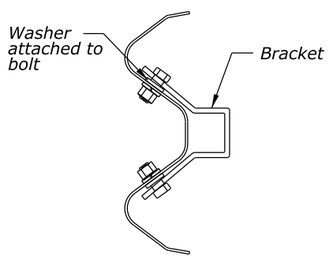


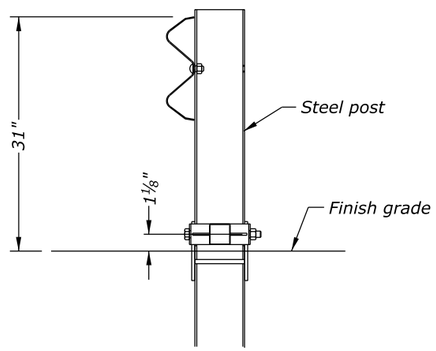

**PLAN**



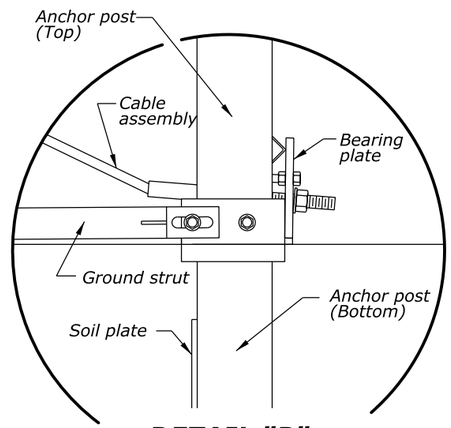

**ELEVATION**



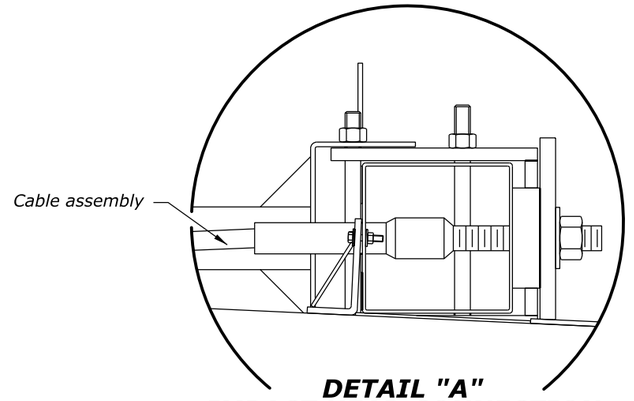

**SECTION A-A**
**ANCHOR BRACKET**




**SECTION B-B**
**POST #2**




**DETAIL "B"**
**ANCHOR POST CONNECTION**




**DETAIL "A"**
**IMPACT HEAD CONNECTION**

## GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Use details shown as a general guide since manufacturer's details may vary. Install a guardrail terminal system that meets MASH requirements per manufacturer's recommendations. Ensure that guardrail terminal meets appropriate test level for the project.*
2. *See appropriate guardrail detail sheets for details not shown. See project plans for details not shown.*
3. *Cross slope to match adjacent roadway cross slope (preferred). If required, maximum shoulder slope 10% for guardrail widening. If required, maximum grade break at normal edge of shoulder 8%.*
5. *Paving of widened shldr. to the face of posts on both ends of guardrail runs is required.*
6. *Install terminal according to manufacturer's recommendations (post count varies). Provide shop drawings to CO.*
7. *Install a reflectorized object marker on head of every guard rail terminal*
8. *"W" distance is measured to face of guardrail at end post, exclusive of end piece.*
9. *Length of need post location varies by manufacturer.*

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OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
EXPIRES: 12/31/2022

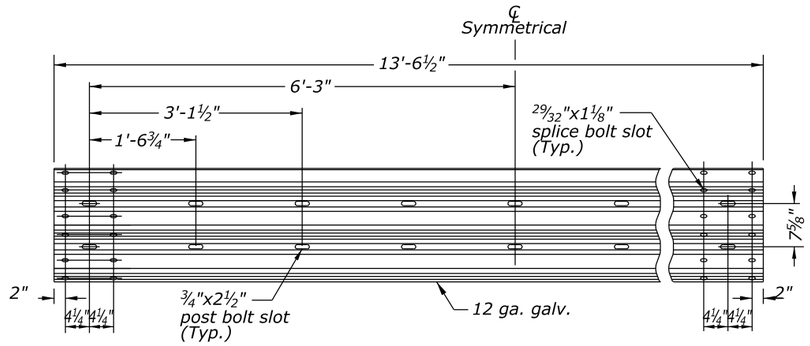
*DRAWING BASED ON OREGON STANDARD DRAWING RD421*

# TERMINAL SECTION, TYPE MGS FLARED DETAIL

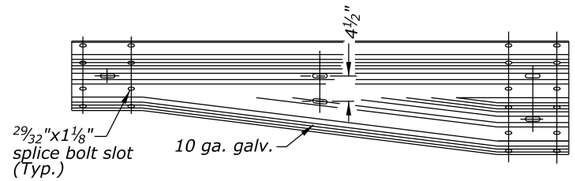
Designed by: --/---- Checked by: --/----

1/1/0001 12:00:00 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\OR-01802-G13.DGN

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | G.16 |

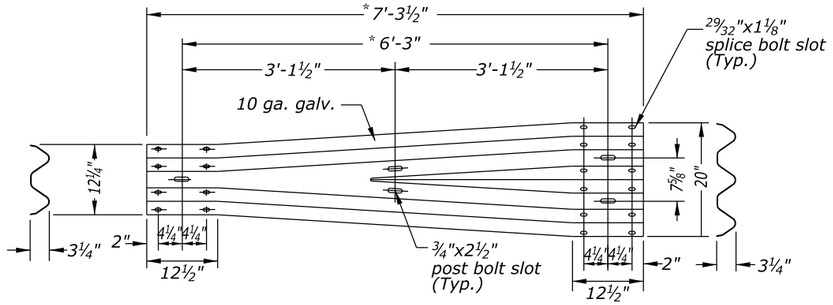



## THRIE BEAM RAIL ELEMENT
## ¼ POST SPACING
*(12'-6" section shown)*

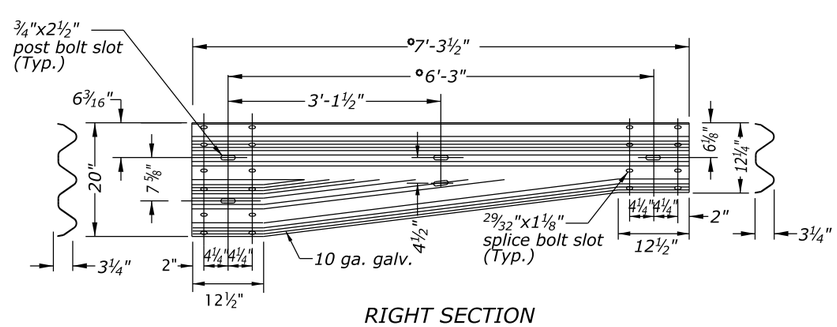



## LEFT SECTION
*(Reverse of right section)*

❁ See general note 4




## SYMMETRICAL THRIE BEAM TRANSITION ELEMENT
*(Left section shown, right section reversed)*




*RIGHT SECTION*

## TYPICAL THRIE BEAM TRANSITION ELEMENT

REGISTERED PROFESSIONAL ENGINEER
93059PE
Digitally Signed 2022.05.23 13:43:08 -07'00'
OREGON
NOV. 14, 2017
BONFILS S. NIAMEOGO
EXPIRES: 12/31/2022

*GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:*

1. *See appropriate guardrail standard drawing(s) for details not shown.*
2. *See appropriate bridge standard drawing(s) for transition guardrail detail and installation limits at bridge ends.*
3. *All rail sections shall be lapped in the direction of adjacent traffic.*
4. *Slot layout per manufacturer with appropriate post and block.*

*DRAWING BASED ON OREGON STANDARD DRAWING RD410*

# GUARDRAIL STANDARD DRAWING
# THRIE BEAM GUARDRAIL TRANSITION

Designed by: Checked by: -/---- -/----

H-Detail Legend
H.8 CONCRETE BARRIER LAYOUT
H.11 2-Lane, 2-Way Roadway ONE LANE CLOSURE
H.12A 4-LANE, 2-WAY ROADWAY SHOULDER CLOSURE
H.12B 4-LANE, 2-WAY ROADWAY SHOULDER CLOSURE W/ BARRIER
H.13 3-LANE, 2-WAY ROADWAY ONE LANE CLOSURE, CROSSOVER
H.16 USING TWO AFAD, 2-LANE, 2-WAY ROADWAY, ONE LANE CLOSURE

| | | | | | | | | | Item No. ---> | 63501-2000 | 63502-0100 | 63502-0500 | 63502-0600 | 63502-1050 | 63502-1300 | 63502-2100 | 63503-0400 | 63504-1000 | 63506-0500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Item Description ---> | TEMPORARY TRAFFIC CONTROL, TRAFFIC SIGNAL SYSTEM (AUTOMATED FLAGGER ASSISTANCE DEVICE) | TEMPORARY TRAFFIC CONTROL, ARROW BOARD, TYPE A | TEMPORARY TRAFFIC CONTROL, BARRICADE TYPE 2 | TEMPORARY TRAFFIC CONTROL, BARRICADE TYPE 3 | TEMPORARY TRAFFIC CONTROL, TUBULAR MARKER | TEMPORARY TRAFFIC CONTROL, DRUM | TEMPORARY TRAFFIC CONTROL, CRASH CUSHION | TEMPORARY TRAFFIC CONTROL, CONCRETE BARRIER | TEMPORARY TRAFFIC CONTROL, CONSTRUCTION SIGN | TEMPORARY TRAFFIC CONTROL, FLAGGER |
| CULVERT DFI No. | MP | TRAFFIC CONTROL TYPE | H.8 | H.11 | H.12A | H.12B | H.13 | H.16 | | LPSM | EACH | EACH | EACH | EACH | EACH | EACH | LNFT | SQFT | HOUR |
| D034723 | 2.73 | Lane Closure w/ Crossover | | | | | X | | | | 1 | | 4 | 94 | 32 | 2 | 500 | 144 | |
| D027825 | 13.07 | Lane Closure w/ Crossover | | | | | X | | | | (*) | | (*) | (*) | (*) | | | (*) | |
| D027828 | 13.56 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | 4 | | 122 | 24 | 2 | 500 | 457 | 48 |
| D027832 | 13.93 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D027833 | 14.03 | One lane Closure with Flaggers | | X | X | | | X | | (*) | | | | 86 | (*) | | | 266 | 48 |
| D027842 | 15.51 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 384 |
| D034741 | 17.29 | Shoulder Closure | | | | X | | | | | | | | 70 | 24 | | | 208 | |
| D027990 | 26.27 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D027992 | 26.60 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 80 |
| D028033 | 31.47 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028041 | 33.54 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028044 | 33.65 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028045 | 33.79 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028047 | 36.73 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028050 | 37.31 | Shoulder Closure | | | X | | | | | | | | | 35 | | | | 56 | |
| D028051 | 37.56 | One lane Closure with Flaggers | | X | X | | | X | | (*) | | | | (*) | (*) | | | (*) | 48 |
| D028052 | 37.68 | One lane Closure with Flaggers | | X | X | | | X | | (*) | | | | (*) | (*) | | | (*) | 64 |

(*) Reuse from previous stage

*See Sheet H.2 for Continuation*

REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.05.19 17:02:41 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**TABULATION OF TEMPORARY TRAFFIC CONTROL QUANTITIES**

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | H.2 |

H-Detail Legend
H.8 CONCRETE BARRIER LAYOUT
H.11 2-Lane, 2-Way Roadway ONE LANE CLOSURE
H.12A 4-LANE, 2-WAY ROADWAY SHOULDER CLOSURE
H.12B 4-LANE, 2-WAY ROADWAY SHOULDER CLOSURE W/ BARRIER
H.13 3-LANE, 2-WAY ROADWAY ONE LANE CLOSURE, CROSSOVER
H.16 USING TWO AFAD, 2-LANE, 2-WAY ROADWAY, ONE LANE CLOSURE

| | | | | | | | | | Item No. ---> | 63501-2000 | 63502-0100 | 63502-0500 | 63502-0600 | 63502-1050 | 63502-1300 | 63502-2100 | 63503-0400 | 63504-1000 | 63506-0500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Item Description ---> | TEMPORARY TRAFFIC CONTROL, TRAFFIC SIGNAL SYSTEM (AUTOMATED FLAGGER ASSISTANCE DEVICE) | TEMPORARY TRAFFIC CONTROL, ARROW BOARD, TYPE A | TEMPORARY TRAFFIC CONTROL, BARRICADE TYPE 2 | TEMPORARY TRAFFIC CONTROL, BARRICADE TYPE 3 | TEMPORARY TRAFFIC CONTROL, TUBULAR MARKER | TEMPORARY TRAFFIC CONTROL, DRUM | TEMPORARY TRAFFIC CONTROL, CRASH CUSHION | TEMPORARY TRAFFIC CONTROL, CONCRETE BARRIER | TEMPORARY TRAFFIC CONTROL, CONSTRUCTION SIGN | TEMPORARY TRAFFIC CONTROL, FLAGGER |
| CULVERT DFI No. | MP | TRAFFIC CONTROL TYPE | H.8 | H.11 | H.12A | H.12B | H.13 | H.16 | | LPSM | EACH | EACH | EACH | EACH | EACH | EACH | LNFT | SQFT | HOUR |
| D028053 | 37.89 | One lane Closure with Flaggers | | X | X | | | X | | (*) | | | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028071 | 40.92 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028074 | 41.50 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D034764 | 41.58 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D034765 | 41.81 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028076 | 41.91 | One lane Closure with Flaggers | | X | X | | | X | | (*) | | | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028077 | 42.01 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028078 | 42.12 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028082 | 42.50 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028086 | 43.26 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028088 | 43.43 | One lane Closure with Flaggers | | X | X | | | X | | (*) | | | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028090 | 43.54 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028091 | 43.74 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028094 | 43.99 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028095 | 44.06 | One lane Closure with Flaggers | | X | X | | | X | | (*) | | | | (*) | (*) | (*) | (*) | (*) | 64 |
| D028100 | 44.36 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028107 | 44.96 | One lane Closure with Flaggers | | X | X | | | X | | (*) | | | | (*) | (*) | (*) | (*) | (*) | 64 |
| D028108 | 45.03 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028109 | 45.35 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028124 | 46.75 | One lane Closure with Flaggers | | X | X | | | X | | (*) | | | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028127 | 46.89 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028128 | 47.07 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028130 | 47.46 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028131 | 47.57 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028132 | 47.80 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 64 |
| D028137 | 49.41 | One lane Closure with Flaggers | | X | X | | | X | | (*) | | | | (*) | (*) | (*) | (*) | (*) | 64 |
| D028139 | 49.99 | One lane Closure with Flaggers | | X | X | | | X | | (*) | | | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028142 | 50.30 | One lane Closure with Flaggers | | X | X | | | X | | (*) | | | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028158 | 53.56 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |
| D028159 | 53.69 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | (*) | (*) | (*) | (*) | (*) | 48 |

(*) Reuse from previous stage

*See Sheet H.3 for Continuation*

REGISTERED PROFESSIONAL ENGINEER
98999PE
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OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**TABULATION OF TEMPORARY TRAFFIC CONTROL QUANTITIES**

Designed by: -/---- Checked by: -/----
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H-Detail Legend
H.8 CONCRETE BARRIER LAYOUT
H.11 2-Lane, 2-Way Roadway ONE LANE CLOSURE
H.12A 4-LANE, 2-WAY ROADWAY SHOULDER CLOSURE
H.12B 4-LANE, 2-WAY ROADWAY SHOULDER CLOSURE W/ BARRIER
H.13 3-LANE, 2-WAY ROADWAY ONE LANE CLOSURE, CROSSOVER
H.16 USING TWO AFAD, 2-LANE, 2-WAY ROADWAY, ONE LANE CLOSURE

| | | | | | | | | | Item No. ---> | 63501-2000 | 63502-0100 | 63502-0500 | 63502-0600 | 63502-1050 | 63502-1300 | 63502-2100 | 63503-0400 | 63504-1000 | 63506-0500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Item Description ---> | TEMPORARY TRAFFIC CONTROL, TRAFFIC SIGNAL SYSTEM (AUTOMATED FLAGGER ASSISTANCE DEVICE) | TEMPORARY TRAFFIC CONTROL, ARROW BOARD, TYPE A | TEMPORARY TRAFFIC CONTROL, BARRICADE TYPE 2 | TEMPORARY TRAFFIC CONTROL, BARRICADE TYPE 3 | TEMPORARY TRAFFIC CONTROL, TUBULAR MARKER | TEMPORARY TRAFFIC CONTROL, DRUM | TEMPORARY TRAFFIC CONTROL, CRASH CUSHION | TEMPORARY TRAFFIC CONTROL, CONCRETE BARRIER | TEMPORARY TRAFFIC CONTROL, CONSTRUCTION SIGN | TEMPORARY TRAFFIC CONTROL, FLAGGER |
| CULVERT DFI No. | MP | TRAFFIC CONTROL TYPE | H.8 | H.11 | H.12A | H.12B | H.13 | H.16 | | LPSM | EACH | EACH | EACH | EACH | EACH | EACH | LNFT | SQFT | HOUR |
| D028160 | 53.76 | Lane Closure w/ Crossover | | | | | X | | | | (*) | | (*) | (*) | (*) | | | (*) | |
| D028161 | 53.83 | Lane Closure w/ Crossover | | | | | X | | | | (*) | | (*) | (*) | (*) | | | (*) | |
| D028163 | 53.95 | Shoulder Closure | | | | X | | | | | | | | | (*) | (*) | | (*) | |
| D028186 | 57.77 | Lane Closure w/ Crossover | | | | | X | | | | (*) | | (*) | (*) | (*) | | | (*) | |
| D028188 | 57.96 | Lane Closure w/ Crossover | | | | | X | | | | (*) | | (*) | (*) | (*) | | | (*) | |
| D028238 | 64.27 | One lane Closure with Flaggers | | X | X | | | X | | (*) | | | | | (*) | (*) | | (*) | 48 |
| D028273 | 84.68 | One lane Closure with Flaggers | X | X | | | | X | | (*) | | (*) | | | (*) | (*) | (*) | (*) | 32 |
| | | | | | | | | | | ALL | 1 | 4 | 4 | 407 | 80 | 4 | 1000 | 1131 | 2592 |

(*) Reuse from previous stage

| ITEM 63502-2000<br>TEMPORARY TRAFFIC CONTROL, PORTABLE CHANGEABLE MESSAGE SIGN | | |
|---|---|---|
| LOCATION | QUANTITY (EACH) | REMARKS |
| Interstate 5 - NB and SB | 2 | Locate as directed |
| US97 - NB and SB | 2 | Locate as directed |
| OR58 - EB and WB in Advance of Work Zone | 2 | Locate as directed |
| TOTAL | 6 | |

| ITEM 63507-0700<br>TEMPORARY TRAFFIC CONTROL, TRAFFIC CONTOL SUPERVISOR | | |
|---|---|---|
| DESCRIPTION | QUANTITY (DAY) | REMARKS |
| Assumed throughout construction | 240 | |
| TOTAL | 240 | |

REGISTERED PROFESSIONAL ENGINEER
98999PE
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OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**TABULATION OF TEMPORARY TRAFFIC CONTROL QUANTITIES**

Designed by: -/---- Checked by: -/----
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| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | H.4 |

| TAPER TYPES & FORMULAS | |
|---|---|
| TAPER | FORMULA |
| Merging (Lane Closure) | "L" |
| Shifting | "L"/2 or ½"L" |
| Shoulder Closure | "L"/3 or ⅓"L" |
| Flagging (See sheet H.11) | 50' - 100' |
| Downstream (Termination) | Varies (See Drawings) |

★ *Use Pre-Construction Posted Speed to select the Speed from the Tables below:*

| TEMPORARY BARRIER FLARE RATE TABLE | |
|---|---|
| ★SPEED (mph) | MINIMUM FLARE RATE |
| ≤ 30 | 8:1 |
| 35 | 9:1 |
| 40 | 10:1 |
| 45 | 12:1 |
| 50 | 14:1 |
| 55 | 16:1 |
| 60 | 18:1 |
| 65 | 19:1 |
| 70 | 20:1 |

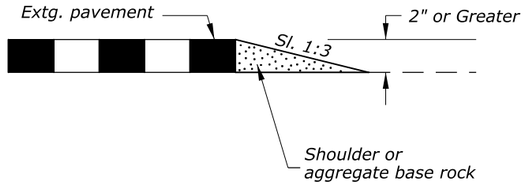
| MINIMUM LENGTHS TABLE | | | | | |
|---|---|---|---|---|---|
| | "L" VALUE FOR TAPERS (ft) | | | | BUFFER "B" (ft) |
| ★SPEED (mph) | W = Lane or Shoulder Width being closed or shifted | | | | |
| | W ≤ 10 | W = 12 | W = 14 | W = 16 | |
| 25 | 105 | 125 | 145 | 165 | 75 |
| 30 | 150 | 180 | 210 | 240 | 100 |
| 35 | 205 | 245 | 285 | 325 | 125 |
| 40 | 265 | 320 | 375 | 430 | 150 |
| 45 | 450 | 540 | 630 | 720 | 180 |
| 50 | 500 | 600 | 700 | 800 | 210 |
| 55 | 550 | 660 | 770 | 880 | 250 |
| 60 | 600 | 720 | 840 | 960 | 285 |
| 65 | 650 | 780 | 910 | 1000 | 325 |
| 70 | 700 | 840 | 980 | 1000 | 365 |
| FREEWAYS | | | | | |
| 55 | 1000 | 1000 | 1000 | 1000 | 250 |
| 60 | 1000 | 1000 | 1000 | 1000 | 285 |
| 65 | 1000 | 1000 | 1000 | 1000 | 325 |
| 70 | 1000 | 1000 | 1000 | 1000 | 365 |

NOTES:
- *For Lane closures where W < 10', use "L" value for W = 10'.*
- *For Shoulder closures where W < 10', use "L" value for W = 10' or calculate "L" using formula, for Speeds ≥ 45: L = WS, Speeds < 45: L = S W/60, S = Speed, W=Width*

| TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE | | | | |
|---|---|---|---|---|
| ★ SPEED (mph) | Sign Spacing (ft) | | | Max. Channelizing Device Spacing (ft) |
| | A | B | C | |
| 20 - 30 | 100 | 100 | 100 | 20 |
| 35 - 40 | 350 | 350 | 350 | 20 |
| 45 - 55 | 500 | 500 | 500 | 40 |
| 60 - 70 | 700 | 700 | 700 | 40 |
| Freeway | 1000 | 1500 | 2640 | 40 |

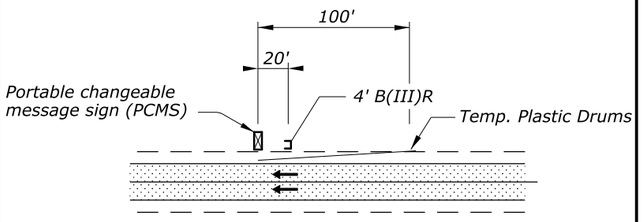
NOTES:
- *Place traffic control devices on 10 ft. spacing for intersection and access radii.*
- *When necessary, sign spacing may be adjusted to fit site conditions. Limit spacing adjustments to 30% of the "A" dimension for all speeds.*

NOTES:
- *When paved shoulders adjacent to excavations are less than four feet wide protect longitudinal abrupt edge as shown.*
- *Use aggregate wedge when abrupt edge is 2 inches or greater.*



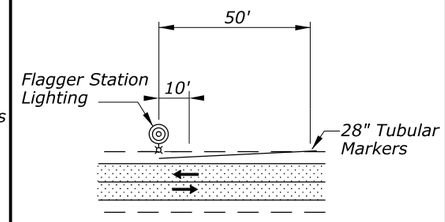

## EXCAVATION ABRUPT EDGE

NOTES:
- *Install PCMS beyond the outside shoulder, when possible.*
- *Use the appropriate type of barricade panels for PCMS location.*
  *Right shoulder, use Type B(III)R*
  *Left shoulder, use Type B(III)L*
- *Use six drums in shoulder taper on 20' spacing. The drums and barricade may be omitted when PCMS is placed behind a roadside barrier.*
- *Detail as shown is used for trailered and non-crashworthy components of:*
  - *Portable Traffic Signals*
  - *Smart Work Zone Systems*



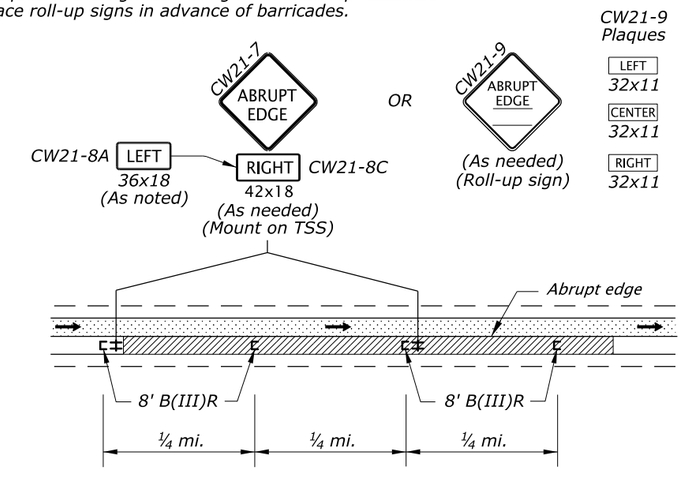

## PORTABLE CHANGEABLE MESSAGE SIGN (PCMS) INSTALLATION

NOTES:
- *Install Flagger Station Lighting beyond the outside shoulder, where practical.*
- *Use six tubular markers in shoulder taper on 10' spacing.*
- *Place cart / generator / power supply off of the shoulder, as far as practical.*




## FLAGGER STATION LIGHTING DELINEATION

NOTES:
- *Abrupt edges may be created by paving, operations, excavations or other roadway work. Use abrupt edge signing for longitudinal abrupt edges of 1 inch or greater.*
- *If the excavation is located on left side of traffic, replace the 8' B(III)R barricades with 8' B(III)L barricades and replace the "RIGHT" (CW21-8C) riders with "LEFT" (CW21-8A) riders.*
- *Continue signing and other traffic control devices throughout excavation area at spacings shown.*
- *If roll-up signs are used, attach the correct (CW21-9) plaques to the sign face using hook and loop fasteners. Place roll-up signs in advance of barricades.*




## TYPICAL ABRUPT EDGE DELINEATION

GENERAL NOTES FOR ALL TCP DRAWINGS:
- *Signs and other Traffic Control Devices (TCD) shown are the minimum required.*
- *Place a barricade approx. 20' ahead of all Arrow boards, Type A.*
- *Arrows shown in roadway are directional arrows to indicate traffic movements.*
- *All signs are 48" x 48" unless otherwise shown. Use flourescent orange sheeting for the background of all temporary warning signs.*
- *All diamond shaped warning signs mounted on barrier sign supports shall be 36" by 36".*
  *All other signs mounted on barrier sign supports shall not exceed 12 sq. ft. in total sign area.*
- *Low speed highways have a pre-construction posted speed of 40 mph or less. High speed highways have a pre-construction posted speed of posted speed 45 mph or higher.*
- *Do not locate sign supports in locations designated for bicycle or pedestrian traffic.*
- *Combine drawing details to complete temporary traffic control for each work activity.*
- *See sheets H.6 and H.7 for additional details.*
- *TSS= Temporary Sign Support.*
- *See sheet H.5 for temporary barricade notation shown on other details.*

*Temp. Plastic Drums See TCD Spacing Table for max. spacing.*

*28" Tubular Markers See TCD Spacing Table for max. spacing.*

*UNDER TRAFFIC*

*UNDER CONSTRUCTION*

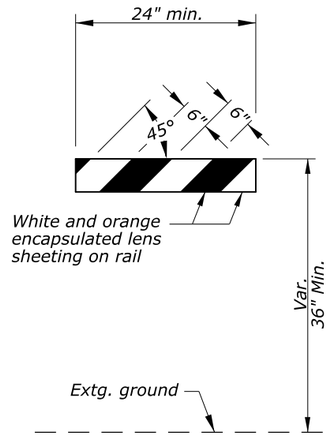
*DRAWING BASED ON OREGON STANDARD DRAWING TM800*

REGISTERED PROFESSIONAL ENGINEER
84294PE
Digitally Signed 2021.09.21 07:54:07 -07'00'
OREGON
JULY 13, 2010
BRIAN WALLACE ROCHE
EXPIRES: 12/31/2022

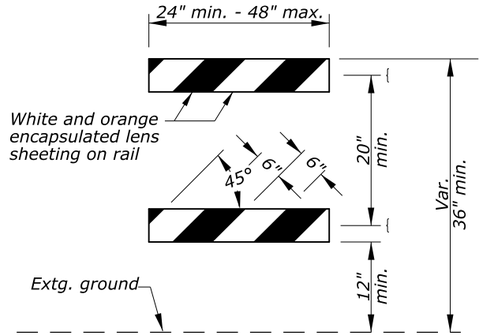
# TRAFFIC CONTROL TABLES, ABRUPT EDGE AND PCMS DETAILS

Designed by: Checked by:
9/16/2020 7:30:56 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802H04.dgn

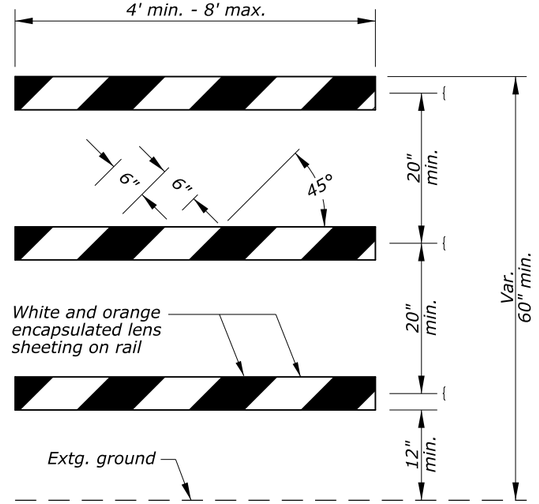
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | H.5 |




TYPE I




TYPE II




TYPE III

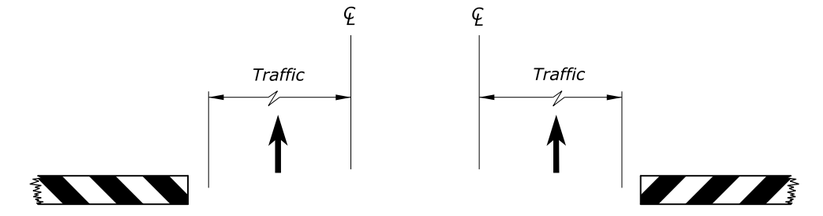
*BARRICADE RAIL LAYOUT*

GENERAL NOTES FOR ALL DETAILS:

- *Sandbags (approximately 25 lb sack filled with sand) may be placed on lower frame to provide additional ballast.*
- *Ballast shall not extend above bottom rail or be suspended from barricade.*
- *For rails less than 36" long, 4" wide stripes shall be used.*
- *Rails must be 8" min. to 12" max. in height.*
- *Use barricades from ODOT Qualified Products List (QPL).*
- *Use 4' Type III barricades where horizontal space is limited.*
- *Do not block bike lanes or shoulders unless the facility is properly closed and signed.*
- *Do not place barricades in sidewalks unless sidewalk is closed and a temporary pedestrian accessible route (TPAR) is signed according to the TCP. See Sheet H.12.*

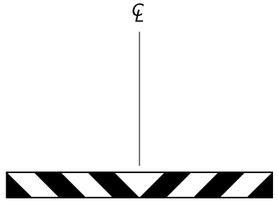
NOTES:

- *Markings for barricade rails shall slope downward at an angle of 45° in the direction traffic is to pass.*
- *Where a barricade extends entirely across a roadway, it is desirable that the stripes slope downward in the direction toward which traffic must turn in detouring.*
- *Where both right and left turns are provided for, slope the chevron striping downward in both directions from the center of the barricade.*
- *For full roadway closures, the C or LR barricade may be used. Extend barricades completely across roadway unless access is required for local road users.*

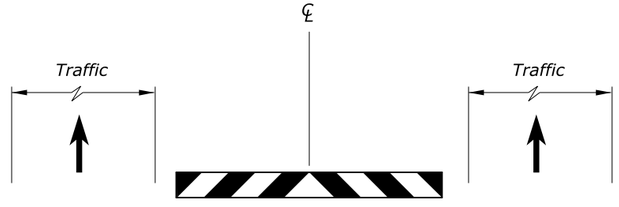



*LT. SIDE - L*
*(For approaching traffic)*

*RT. SIDE - R*
*(For approaching traffic)*

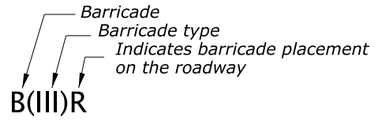



*CLOSED - C*
*(For approaching traffic)*




*LT. / RT. - LR*
*(For approaching traffic)*

*DIAGRAM FOR BARRICADE PLACEMENT AND SLOPE MARKING*




*BARRICADE NOTATION*

*DRAWING BASED ON OREGON STANDARD DRAWING TM820*

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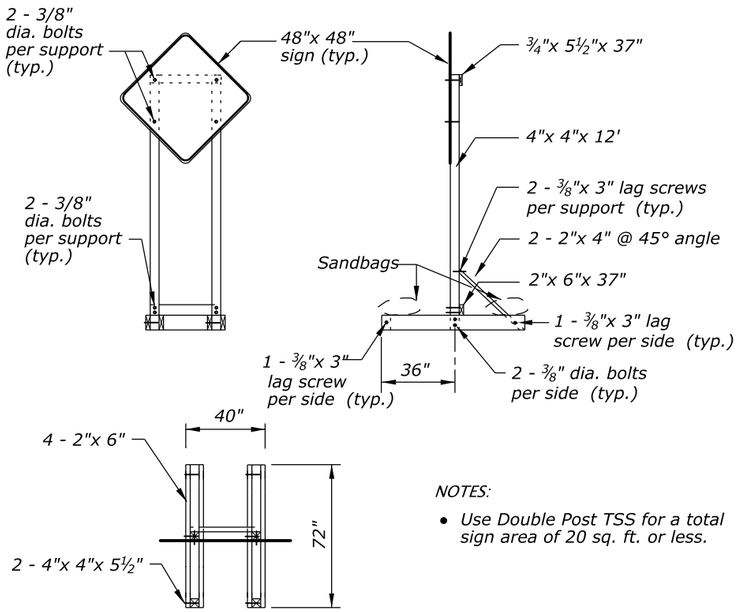
EXPIRES: 12/31/2022

**TRAFFIC CONTROL**
**TEMPORARY BARRICADE DETAILS**

Designed by: -/---- Checked by: -/----

9/2/2020 11:14:30 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802H05.dgn

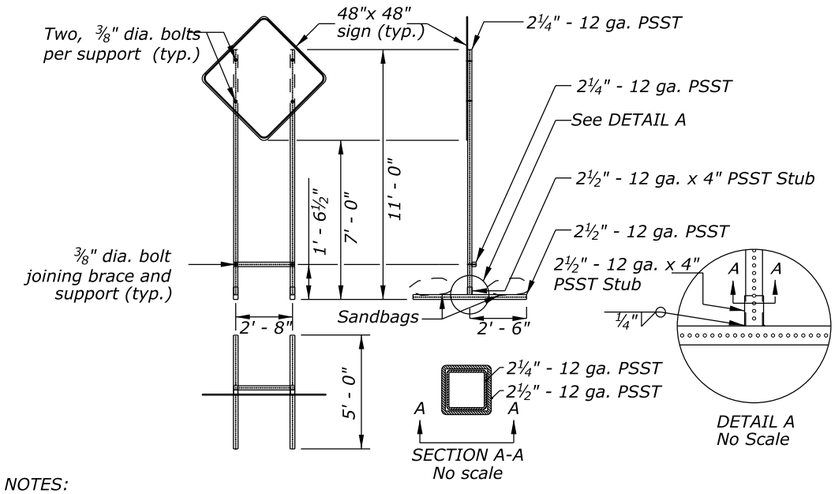
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | H.6 |




NOTES:

- Use Double Post TSS for a total sign area of 20 sq. ft. or less.

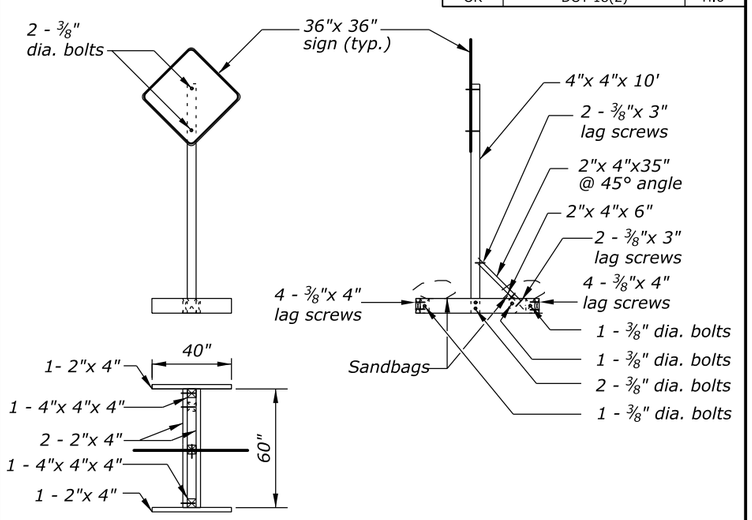
## DOUBLE POST DETAIL




NOTES:

- Use PSST TSS's for a total sign area of 16 sq. ft. or less.
- All members shall have a minimum yield stress of 50 ksi.
- Galvanize steel according to ASTM A653 with coating designation G90. Remove Galvanizing from steel before welding. Repair Galvanizing according to ASTM A780.
- Use A325 Bolts or equivalent.
- 2¼" - 12 ga. PSST to extend entire length inside of the 2½" - 12 ga. x 4" PSST Stub.
- Do not use bolt to secure 2¼" PSST inside of the 2½" - 12 ga. x 4" PSST Stub.
- Weld steel according to American Welding Society (AWS) D.1.1.

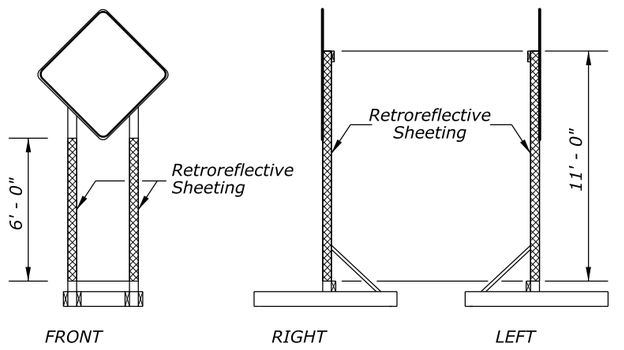
## PERFORATED STEEL SQUARE TUBE (PSST) DETAIL



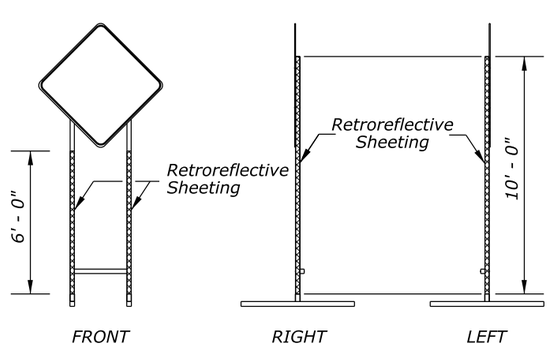

NOTES:

- Use Single Post TSS for a total sign area of 12 sq. ft. or less.
- Use Single Post TSS for mounting "Business Access" (CG20-11) signs. Do not mount signs on Type II or III Barricades.

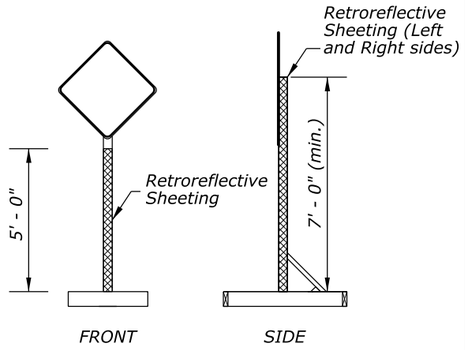
## SINGLE POST DETAIL




DOUBLE POST




PERFORATED STEEL SQUARE TUBE (PSST)




SINGLE POST

TEMPORARY SIGN SUPPORT GENERAL NOTES:

- DO NOT TIP OVER TSS AT ANY TIME.
- Do not locate TSS's in locations that block pedestrian/bicycle traffic.
- For wooden TSS's, use either Douglas Fir or Hem Fir, which is surfaced four sides (S4S) and free of heart center (FOHC).
- See "Temporary Sign Placement" detail on sheet H.7 for sign installation heights.
- Do not place or stack ballast more than 24" above the ground.
- When sign is inconsistent with current work zone conditions, cover sign: or turn sign 90 degrees away from approaching traffic. Remove TSS from roadway when signing is not needed for more than 3 days.
- Place a minimum of 50 lbs of sandbags on each of the four TSS supports legs. (25 lb. max per bag) (min. 100 lbs per side of each TSS).
- See sheet H.15 for flag board mounting detail.

NOTES:

- Apply flourescent orange, ANSI Type VIII or IX retroreflective sheeting to TSS posts, as shown, for all temporary signs, except "STOP" and "DO NOT ENTER". For "STOP" and "DO NOT ENTER" signs, used red ANSI Type III or IV retroreflective sheeting on the TSS posts.
- Apply sign post retroreflectivity to each TSS post facing front; and to the left and right sides of the TSS, as shown. Use 3" wide sheeting for wood post TSS's. Use 2" wide sheeting for PSST TSS's.
- Sheeting may be applied directly to post material; or applied to a rigid, lightweight substrate, then securely attached to the posts.

## SIGN POST REFLECTIVE SHEETING PLACEMENT

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JULY 13, 2010
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EXPIRES: 12/31/2022

DRAWING BASED ON OREGON STANDARD DRAWING TM821

# TRAFFIC CONTROL TEMPORARY SIGN SUPPORTS

Designed by: -/---- Checked by: -/----

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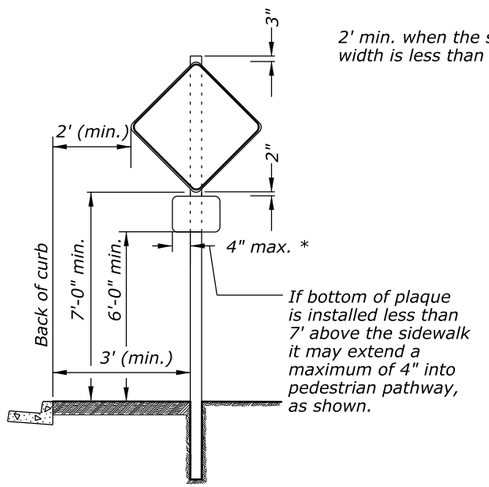
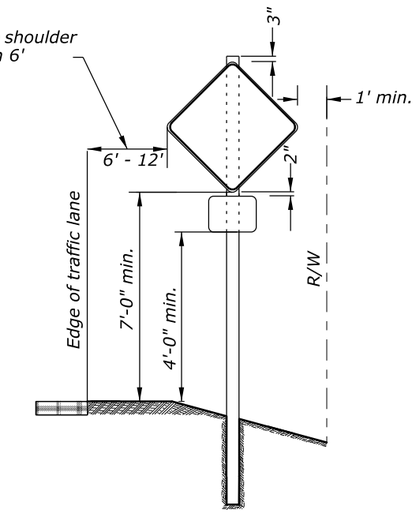
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | H.7 |

NOTES:

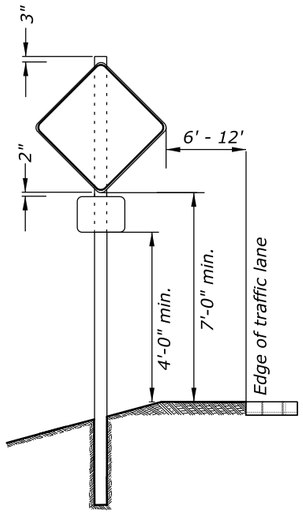
- Do not block bicycle lanes, sidewalks, or TPAR's with sign supports. Maintain minimum widths for these facilities according TCP Design Manual, MUTCD, ADA, or as directed.
- To be accompanied by Sheet H.19 and H.20




URBAN AREAS WITH CURB/SIDEWALK

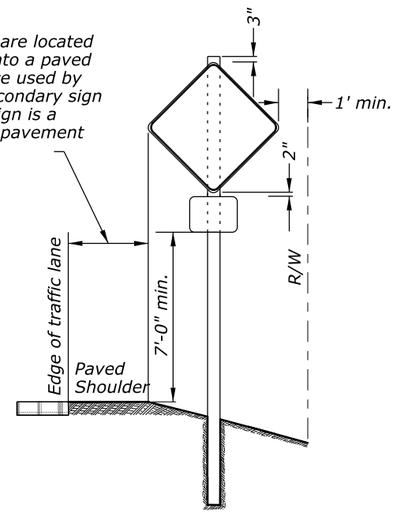



RURAL AREAS



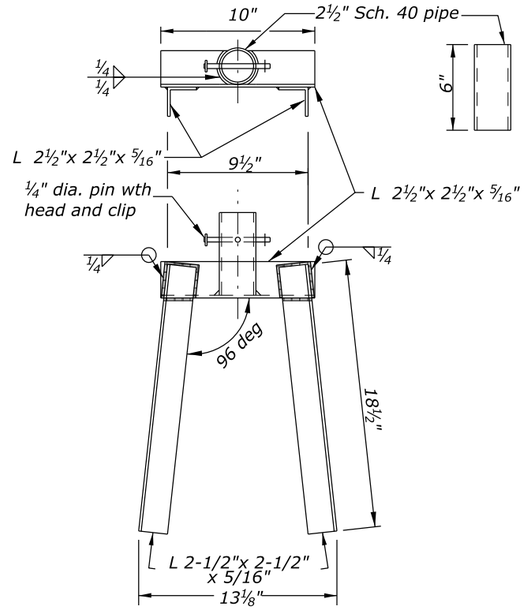

DIVIDED HIGHWAY/FREEWAY MEDIANS
NO CURB/SIDEWALK

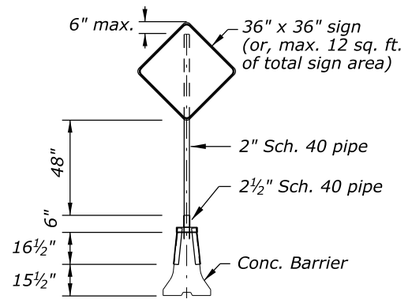
Where temporary signs are located adjacent to or intrude into a paved shoulder or other surface used by bicycle traffic, install secondary sign (plaque) so bottom of sign is a minimum of 7'0" above pavement surface, as shown.




RURAL OR URBAN AREAS - CURB OR NO CURB
BICYCLES ON SHOULDER

## TEMPORARY SIGN PLACEMENT




NOTES:

- Drill additional holes so sign can be rotated 90 degrees and pinned when not in use.
- All structural steel shall conform to ASTM A36.
- Support fits both 32" and 42" tall "F" barrier.
- Use for supporting a maximum 12 sq. ft. of total sign area.
- Place support at connection between two concrete barrier sections.
- Weld steel according to American Welding Society (AWS) D.1.1.
- Do not use clipped signs.
- Follow manufacturer recommendation when installing signs on barrier other than concrete.

## CONCRETE BARRIER SIGN SUPPORT

REGISTERED PROFESSIONAL ENGINEER
84294PE
Digitally Signed 2021.09.21 07:54:07 -07'00'
OREGON
JULY 13, 2010
BRIAN WALLACE ROCHE
EXPIRES: 12/31/2022

DRAWING BASED ON OREGON STANDARD DRAWING TM822

**TRAFFIC CONTROL**
**TEMPORARY SIGN SUPPORTS**

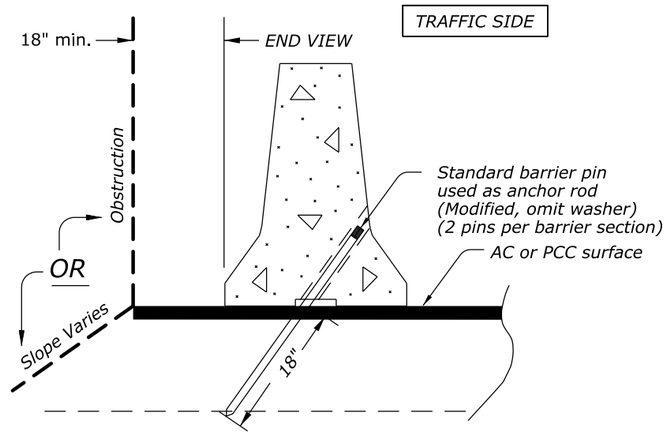
Designed by: --/--- Checked by: --/---

9/2/2020 11:14:58 AM c:\dms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802H07.dgn

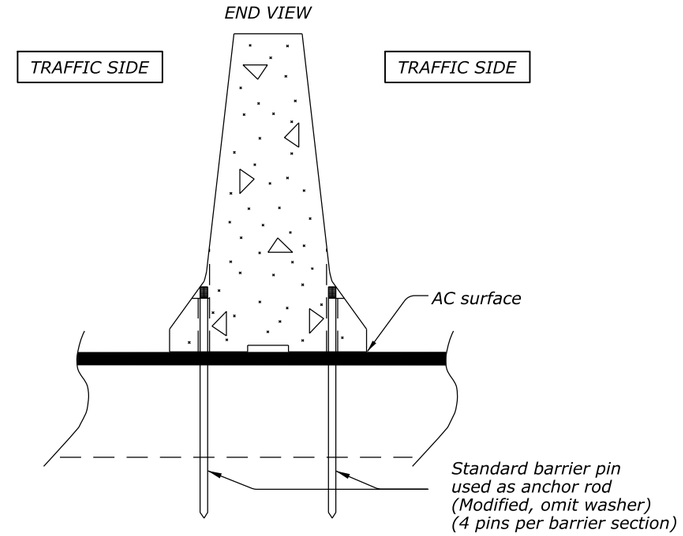
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | H.8 |

*NOTES:*

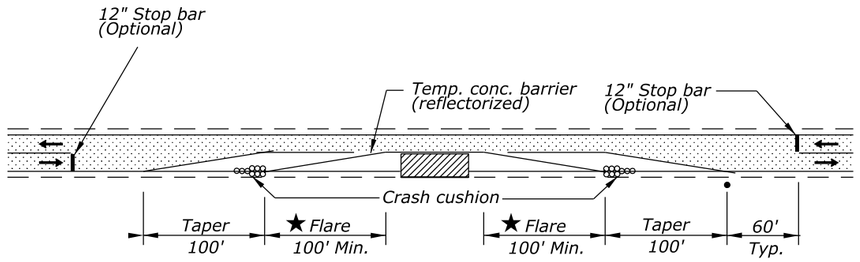
- *Excavation height greater than 3 feet requires proper backslope based on angle of repose, or shoring as directed.*



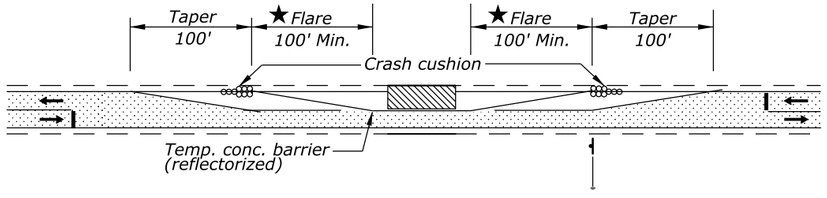

**SECURING TEMPORARY CONCRETE BARRIER (Shoulder Installation)**




**SECURING TEMPORARY TALL CONCRETE BARRIER (Median Installation)**




**STAGE 1 - CONCRETE BARRIER WORKZONE LAYOUT**




**STAGE 2 - CONCRETE BARRIER WORKZONE LAYOUT**

*28" Tubular Markers*
*See TCD Spacing Table on Sheet H.4 for max. spacing.*

UNDER TRAFFIC

UNDER CONSTRUCTION

REGISTERED PROFESSIONAL ENGINEER
84294PE
JULY 13, 2010
BRIAN WALLACE ROCHE
Digitally Signed 2021.09.21 07:54:07 -07'00'
OREGON

EXPIRES: 12/31/2022

*DRAWING BASED ON OREGON STANDARD DRAWING TM830*

**TRAFFIC CONTROL**
**TEMPORARY CONCRETE BARRIER**
**AND RUMBLE STRIP DETAILS**

Designed by: --/---- Checked by: --/----

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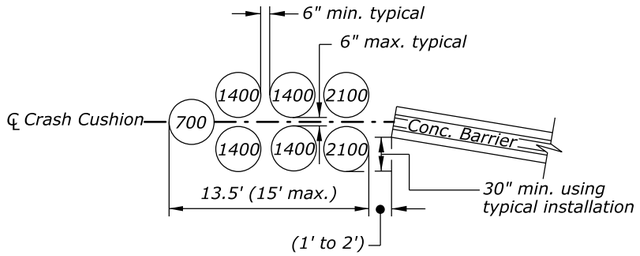
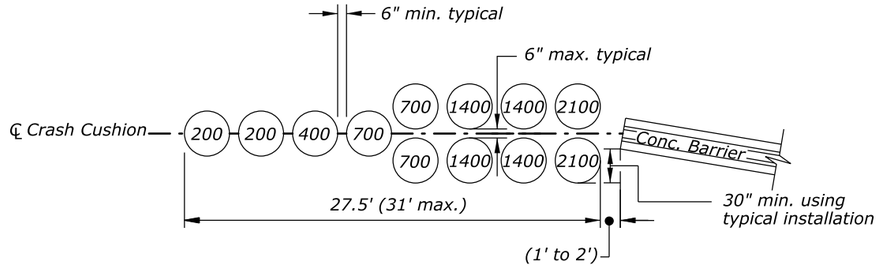
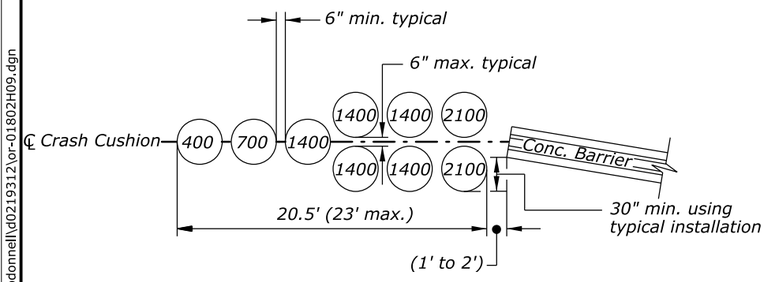


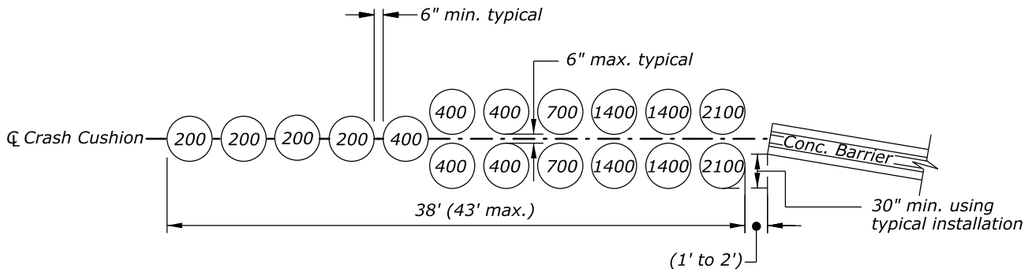

***35 mph LAYOUT***




***55 mph LAYOUT***

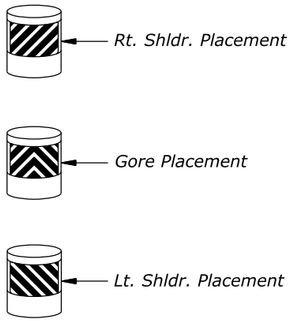



***45 mph LAYOUT***




***70 mph LAYOUT***

***(Single Barrier)***
***CRASH CUSHION LAYOUTS***




***OBJECT MARKERS***

*GENERAL NOTES FOR ALL DETAILS:*

- *Use the appropriate layout configuration based on the pre-construction posted speed, as approved by the CO.*
- *For posted speeds not shown, use the next higher speed for Crash cushion selection.*
- *Use Crash cushion from the QPL. Typical outside diameter of each module is 36".*
- *Typical Crash cushion layouts shown. Layouts may vary by both speed and manufacturer. Number shown within each module is mass of dry sand in pounds.*
- *Final alignment of Crash cushion will be established in the field, as directed. At locations where vibrations and surface slopes may cause modules to shift, modules shall be anchored to prevent movement according to manufacturer's instructions and as approved by the engineer.*
- *The leading module of each Crash cushion shall be delineated with the appropriate object marker, as shown above.*
- *The object marker shall be 1/16" thick aluminum sheeting approx. 24" wide, 30" deep, and covered with yellow encapsulated lens sheeting. Black stripes 5" wide shall be silk-screened on the sheeting at a 45° slope and with 4" space between stripes.*
- *In cold climates, mix sand with 5% rock salt by weight to prevent freezing.*
- *See sheet H.10 for additional details.*

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JULY 13, 2010
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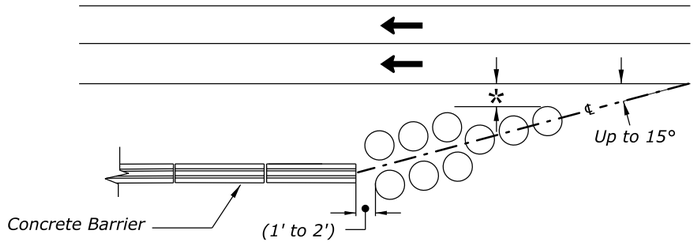
EXPIRES: 12/31/2022

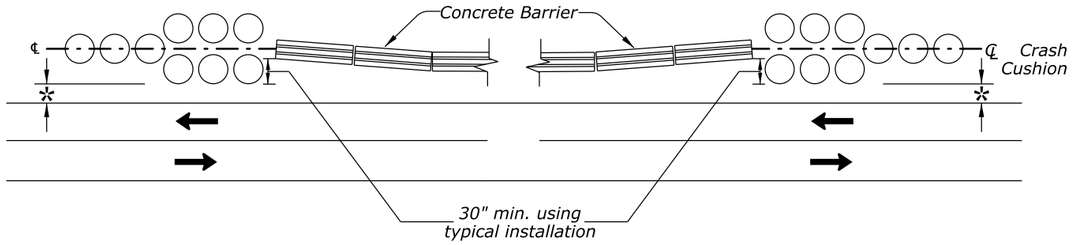
*DRAWING BASED ON OREGON STANDARD DRAWING TM831*

**TRAFFIC CONTROL**
**CRASH CUSHION**

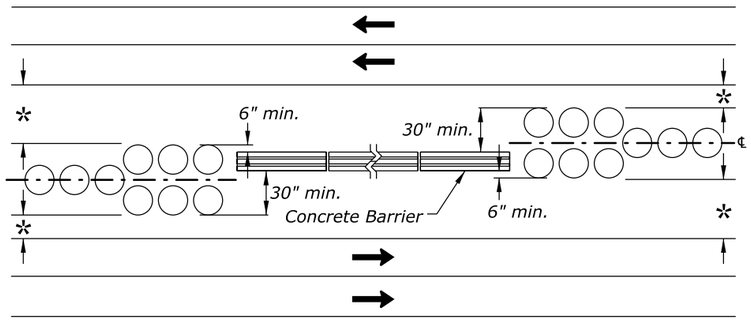
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | H.10 |




## DIVIDED HIGHWAY OR ONE-WAY ROADWAY
## Angled Installation




## TWO-WAY ROADWAY
## Typical Installation

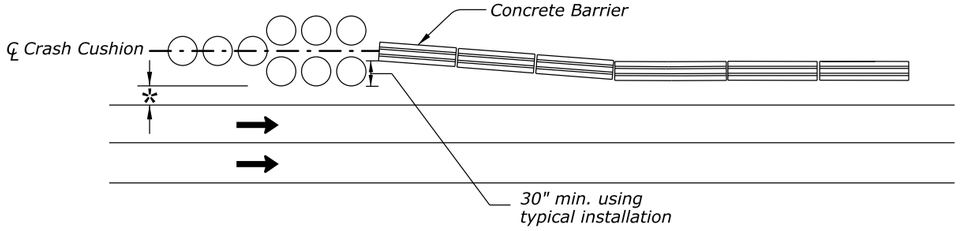



## DIVIDED HIGHWAY
## Typical Installation

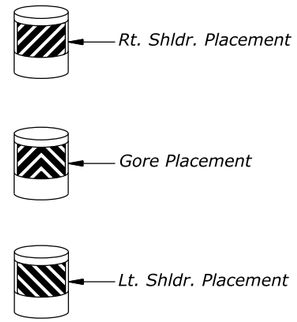
NOTES:

- Use the One-Way Roadway Typical Installation for each barrier terminal when the available width in median does not allow for the installation of the Divided Highway Typical Installation.

* Minimum 2', otherwise maximize the distance from the traveled way to the Crash cushion.




## ONE-WAY ROADWAY
## Typical Installation




## OBJECT MARKERS

GENERAL NOTES FOR ALL DETAILS:

- Use the appropriate layout configuration based on the pre-construction posted speed, as approved by the CO.
- Use Crash cushion from the QPL. Typical outside diameter of each module is 36".
- Crash cushion layout shown is a typical layout. Layouts may vary by both speed and manufacturer.
- Divided or One-Way Crash cushion layouts may be oriented toward oncoming traffic at angles up to 15°.
- Final alignment of Crash cushion will be established in the field, as directed. At locations where vibrations and surface slopes may cause modules to shift, modules shall be anchored to prevent movement according to manufacturer's instructions and as approved by the engineer.
- In cold climates, mix sand with 5% rock salt by weight to prevent freezing.

REGISTERED PROFESSIONAL ENGINEER
84294PE
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OREGON
JULY 13, 2010
BRIAN WALLACE ROCHE
EXPIRES: 12/31/2022

DRAWING BASED ON OREGON STANDARD DRAWING TM833

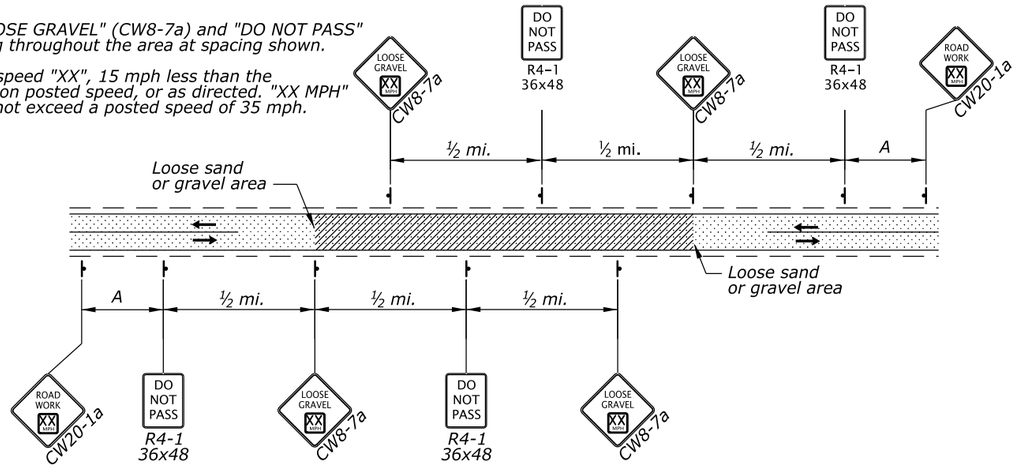
# TYPICAL INSTALLATIONS CRASH CUSHION

# TRAFFIC CONTROL CRASH CUSHION

Designed by: -/---
Checked by: -/---
c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802H10.dgn
9/2/2020 11:15:25 AM

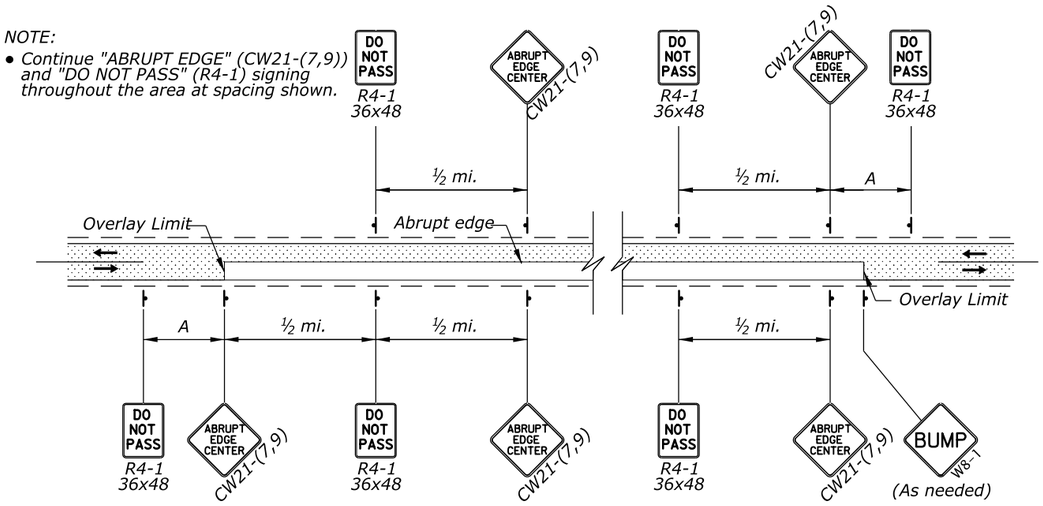
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | H.11 |

NOTE:
- Continue "LOOSE GRAVEL" (CW8-7a) and "DO NOT PASS" (R4-1) signing throughout the area at spacing shown.
- Use advisory speed "XX", 15 mph less than the pre-construction posted speed, or as directed. "XX MPH" placard shall not exceed a posted speed of 35 mph.



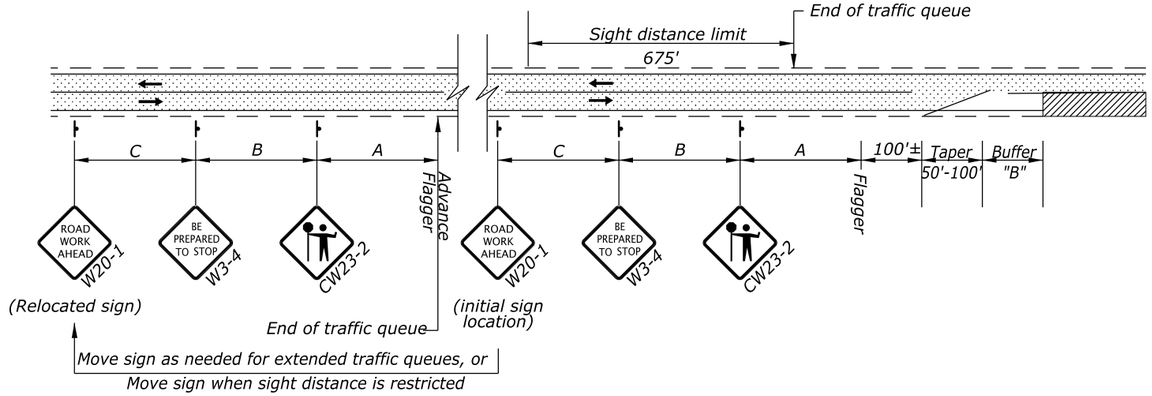

## 2-Lane, 2-Way Roadway
## LOOSE GRAVEL IN ROADWAY SIGNING

NOTE:
- Continue "ABRUPT EDGE" (CW21-(7,9)) and "DO NOT PASS" (R4-1) signing throughout the area at spacing shown.



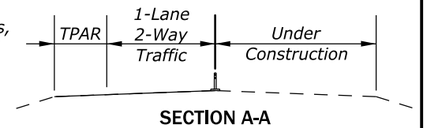

## 2-Lane, 2-Way Roadway
## OVERLAY AREA SIGNING

NOTES:
- Place Advance Flagger and additional signing when traffic queues extend beyond initial warning signing OR when sight distance is restricted.
- Relocate initial "ROAD WORK AHEAD" (W20-1) sign in advance of additional "BE PREPARED TO STOP" (W3-4) and Flagger Ahead (CW23-2) signs, as shown.
- Place additional Tubular Markers for Flagger and Advance Flagger Stations according to FLAGGER STATION DELINEATION detail.

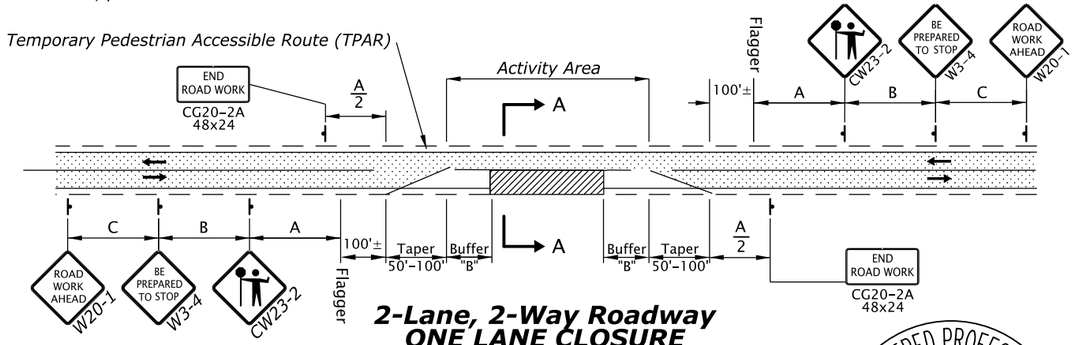



## ADVANCE FLAGGER FOR EXTENDED TRAFFIC QUEUES

NOTE:
- When using pilot cars with flaggers to control traffic during paving operations, the Tubular Marker spacing along centerline may be increased to 200' within the Activity Area, as shown or as directed.
- Include "WAIT FOR FLAGGER" (CR4-23) signs mounted on Type II Barricade located approx. 50' before each Flagger.
- Coordinate and control pedestrians movements through the TPAR using Flaggers, other TCM, or as directed. When the existing shoulder is greater than or equal to 4' wide, provide a minimum of 4' of width for the TPAR.




SECTION A-A




## 2-Lane, 2-Way Roadway
## ONE LANE CLOSURE

GENERAL NOTES FOR ALL DETAILS:
- The "FLAGGER" (CW23-2) symbol sign shall be used only in conjunction with the "BE PREPARED TO STOP" (W3-4) sign.
- Cover existing passing zone signing, as directed.
- Install temporary striping as required.
- To determine Taper Length ("L") and Buffer Length ("B"), use the "MINIMUM LENGTHS TABLE" shown on sheet H.4.
- To determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on sheet H.4.
- Install a "BICYCLES ON ROADWAY" (CW11-1) sign in advance of the closure when a bike lane is closed, or when the shoulder is closed and bikes are expected.
- At night, flagger stations shall be illuminated according to the FLAGGER STATION LIGHTING DELINEATION detail on sheet H.4.
- See sheets H.3 and H.4 for additional details

28" Tubular Markers on 20' max. spacing for flagger tapers and stations

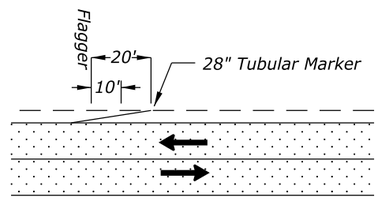
28" Tubular Markers See TCD Spacing Table on sheet H.4 for max. spacing.

UNDER TRAFFIC

UNDER CONSTRUCTION

CONSTRUCTION UNDER TRAFFIC

NOTE:
- Use a minimum of 3 tubular markers in shoulder taper on 10' spacing for flagger station delineation.




## FLAGGER STATION DELINEATION

REGISTERED PROFESSIONAL ENGINEER
84294PE
Digitally Signed 2021.09.21 07:54:07 -07'00'
OREGON
JULY 13, 2010
BRIAN WALLACE ROCHE
EXPIRES: 12/31/2022

DRAWING BASED ON OREGON STANDARD DRAWING TM850

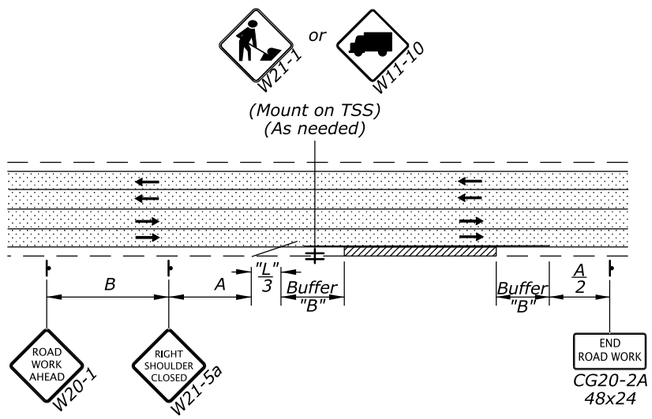
# TRAFFIC CONTROL
# 2-LANE, 2-WAY ROADWAYS

Designed by: -/---- Checked by: -/----

9/2/2020 11:15:49 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802H11.dgn

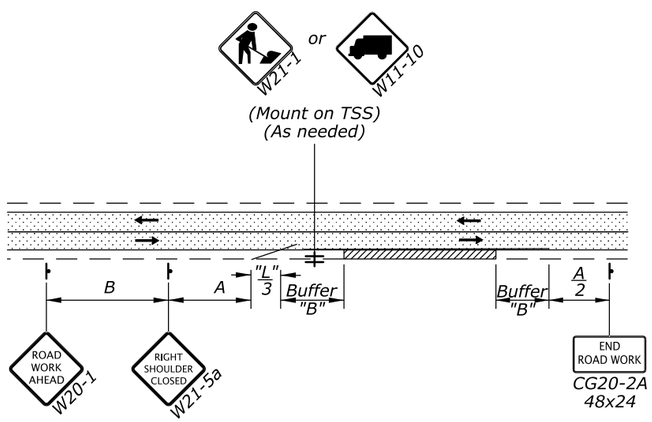
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | H.12 |

*NOTE:*
- *For left shoulder work, place TCD to close the left shoulder. Use "LEFT SHOULDER CLOSED" (W21-5a) sign.*

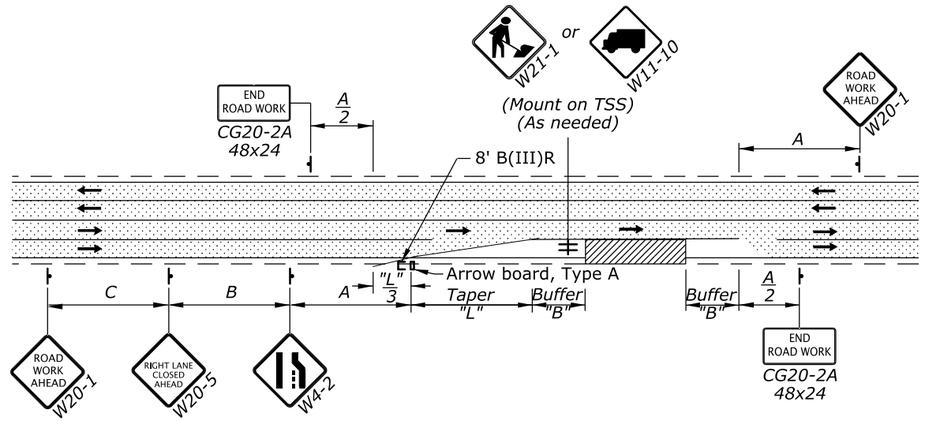



*4-LANE, 2-WAY ROADWAY*
***SHOULDER CLOSURE***

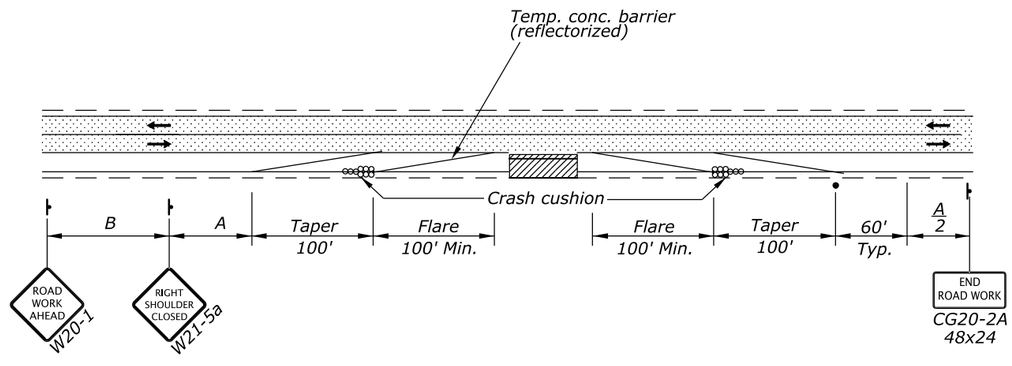
*NOTE:*
- *For left shoulder work, place TCD to close the left shoulder. Use "LEFT SHOULDER CLOSED" (W21-5a) sign.*



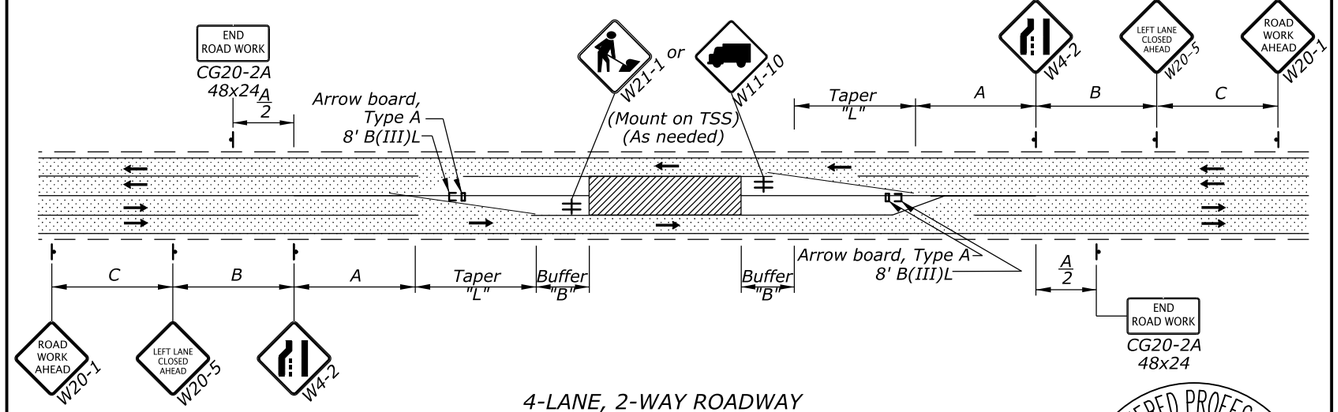

*2-LANE, 2-WAY ROADWAY*
***SHOULDER CLOSURE***




*4-LANE, 2-WAY ROADWAY*
***EXTERIOR LANE CLOSURE***




*2-LANE, 2-WAY ROADWAY*
***SHOULDER CLOSURE WITH CONCRETE BARRIER***




*4-LANE, 2-WAY ROADWAY*
***INTERIOR LANE CLOSURE***

- *Install temporary striping as directed.*
- *Signing and other TCD shown to be installed in conjunction with the work areas, shall move with the work areas.*
- *To determine Taper Length ("L") and Buffer Length ("B"), use the "MINIMUM LENGTHS TABLE" on Sheet H.4.*
- *To determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Sheet H.4.*
- *Channelization devices may be placed at 10' spacing around the Work Area for emphasis or if the area is exposed to traffic on both sides simultaneously.*
- *Install a "BICYCLES ON ROADWAY" (CW11-1) sign in advance of the closure when a bike clane is closed, or when the shoulder is closed and bikes are expected.*
- *See sheets H.6 and H.7 for additional details.*

*28" Tubular Markers*
*See TCD Spacing Table on Sheet H.4 for max. spacing.*

*Temp. Plastic Drums*
*See TCD Spacing Table on Sheet H.4 for max. spacing.*

*UNDER TRAFFIC*

*UNDER CONSTRUCTION*

REGISTERED PROFESSIONAL ENGINEER
84294PE
Digitally Signed 2021.09.21 07:54:07 -07'00'
OREGON
JULY 13, 2010
BRIAN WALLACE ROCHE
EXPIRES: 12/31/2022

*DRAWING BASED ON OREGON STANDARD DRAWING TM851*

# TRAFFIC CONTROL NON-FREEWAY MULTI-LANE SECTIONS

Designed by: -/---- Checked by: -/----
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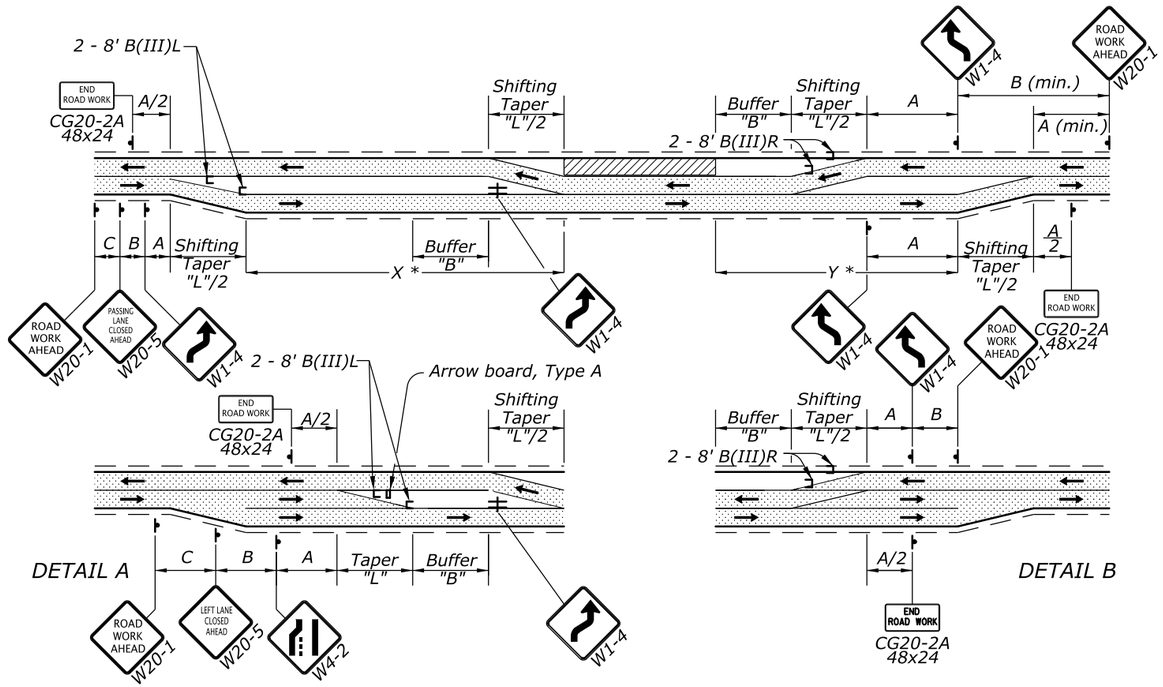
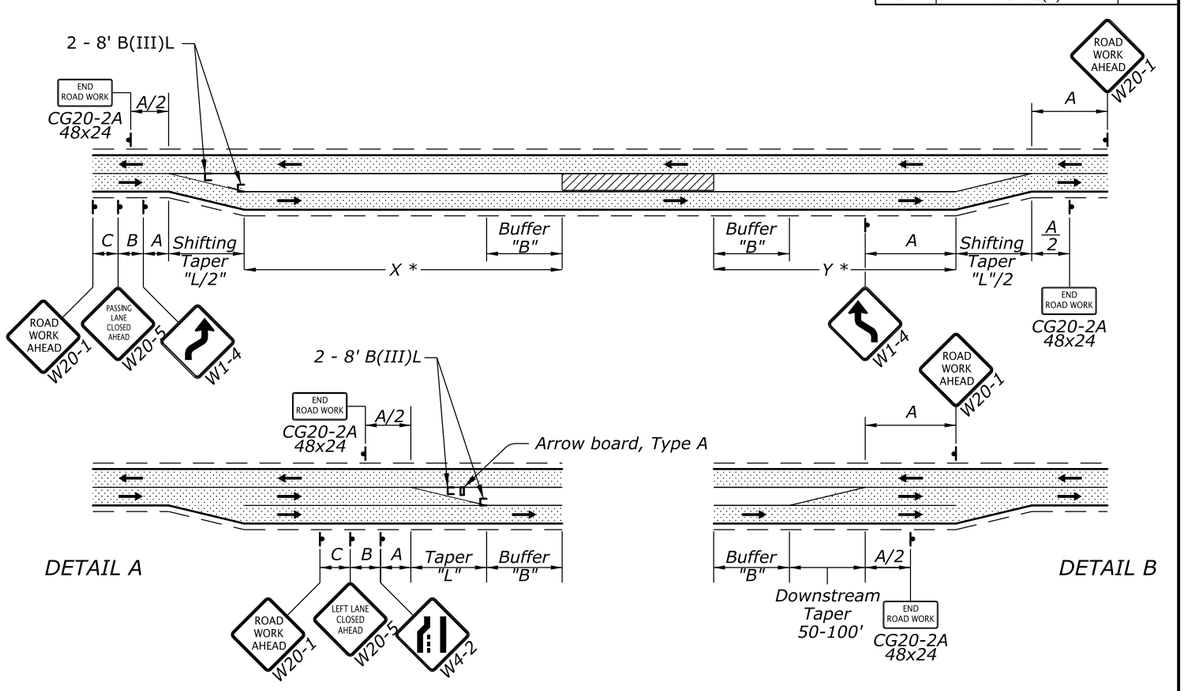
9/17/2020 1:42:32 PM

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | H.13 |



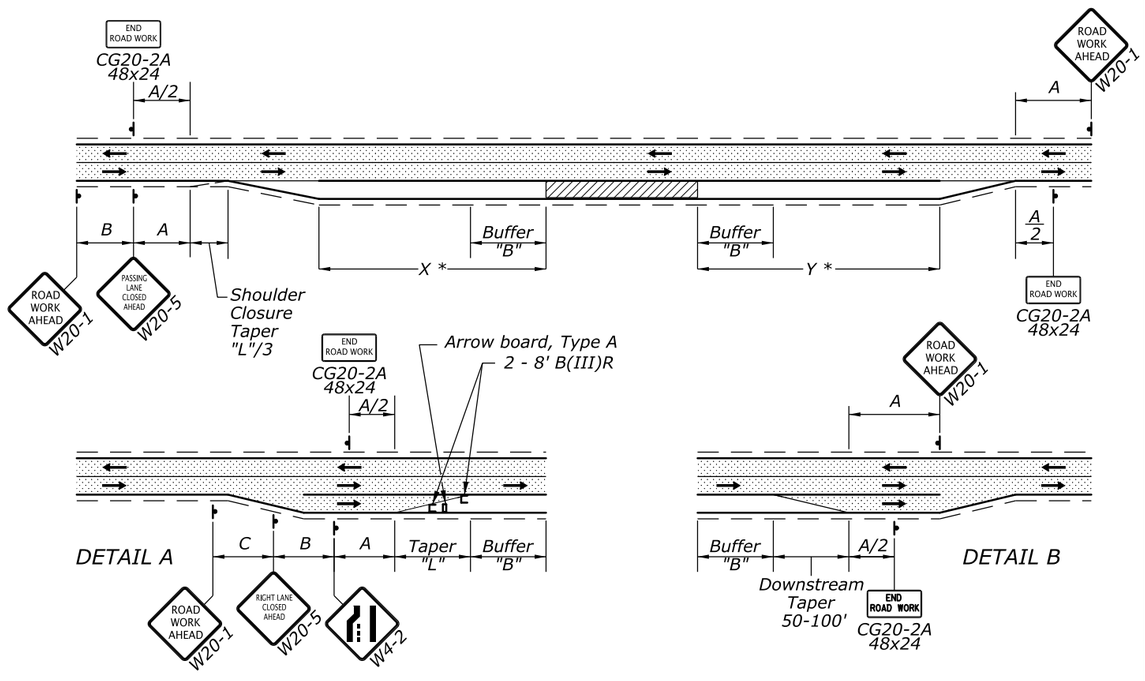

* If X(or Y) is greater than 1 mile
Detail A(or B) may be used.

*3-LANE, 2-WAY ROADWAY*
***ONE LANE CLOSURE, CROSSOVER***




* If X(or Y) is greater than 1 mile
Detail A(or B) may be used.

*3-LANE, 2-WAY ROADWAY*
***ONE LANE CLOSURE***




* If X(or Y) is greater than 1 mile
Detail A(or B) may be used.

*3-LANE, 2-WAY ROADWAY*
***PASSING LANE CLOSURE***

*GENERAL NOTES FOR ALL DETAILS:*

- *Install temporary striping as directed.*
- *Signing and other TCD shown to be installed in conjuction with the work areas, shall move with the work areas.*
- *To determine Taper Length ("L") and Buffer Length ("B"), use the "MINIMUM LENGTHS TABLE" on Sheet H.4.*
- *Cover all applicable existing passing lane signing prior to installing TCD.*
- *Install Type III barricades in closed lanes at ¼ mile intervals.*
- *When passing is allowed in opposing lanes, restrict passing with double yellow centerline and appropriate signing as directed.*
- *Channelization devices may be placed on 10' around the Work Area for emphasis or if the area is to exposed to traffic on both sides simultaneously.*
- *Install a "BICYCLES ON ROADWAY" (CW11-1) sign in advance of the closure when a bike lane is closed, or when the shoulder is closed and bikes are expected.*
- *To determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Sheet H.2.*
- *When the length of the area under construction is less than 600 ft. use a DOUBLE REVERSE CURVE (W24-1) sign in place of the first REVERSE CURVE (W1-4) sign in each direction.*

*28" TUBULAR MARKERS See TCD Spacing Table on Sheet H.2 for max. spacing.*

*TEMP. PLASTIC DRUMS See TCD Spacing Table on Sheet H.2 for max. spacing.*

*UNDER TRAFFIC*

*UNDER CONSTRUCTION*

REGISTERED PROFESSIONAL ENGINEER
84294PE
Digitally Signed 2021.09.21 07:54:07 -07'00'
OREGON
JULY 13, 2010
BRIAN WALLACE ROCHE

EXPIRES: 12/31/2022

*DRAWING BASED ON OREGON STANDARD DRAWING TM853*

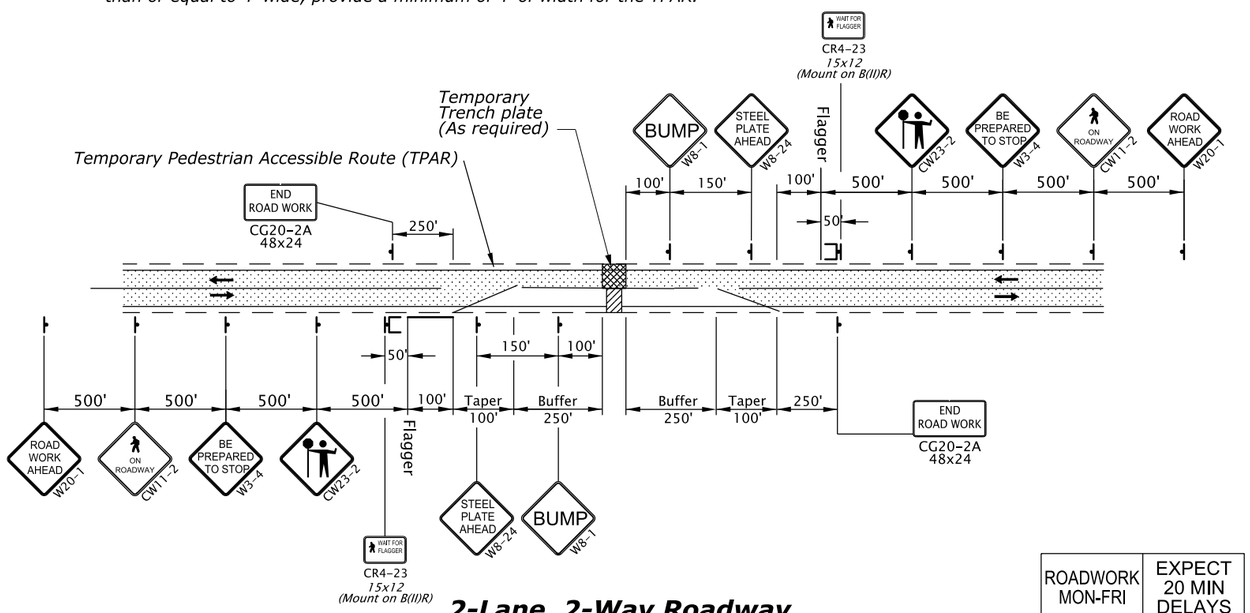
**TRAFFIC CONTROL**
**NON-FREEWAY MULTI-LANE SECTIONS**

Designed by: -/---- Checked by: -/---- -/----

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | H.14 |

## NOTE:

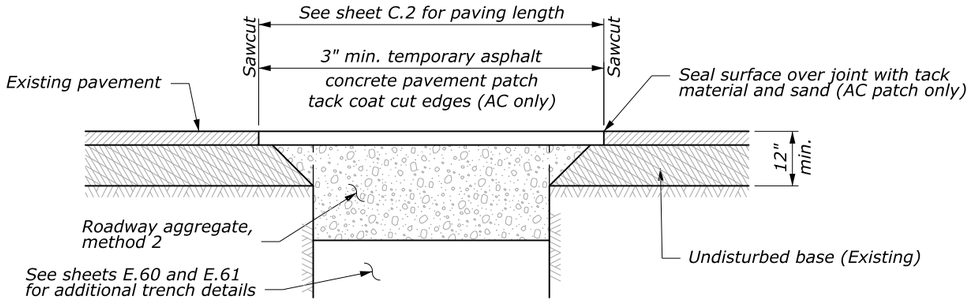
- *When using pilot cars with flaggers to control traffic during paving operations, the Tubular Marker spacing along centerline may be increased to 200' within the Activity Area, as shown or as directed.*
- *Include "WAIT FOR FLAGGER" (CR4-23) signs mounted on Type II Barricade located approx. 50' before each Flagger.*
- *Coordinate and control pedestrians movements through the TPAR using Flaggers, other traffic control measures, or as directed. When the existing shoulder is greater than or equal to 4' wide, provide a minimum of 4' of width for the TPAR.*




## 2-Lane, 2-Way Roadway ONE LANE CLOSURE WITH TEMPORARY TRENCH PLATE

| ROADWORK MON-FRI | EXPECT 20 MIN DELAYS |
|---|---|

PORTABLE CHANGEABLE MESSAGE SIGN
*(Suggested Message During One Lane Closures)*
*(Locate As Directed)*
*(Multiple moved may be required)*




## TEMPORARY TRENCH BACKFILL[1]

## NOTE:

1. *Use temporary steel trench plating capable of carrying at least MS-18 loading when 16 ft. horizontal clearance cannot be maintained using standard staged construction. Use pilot cars to pace traffic across steel plates at speeds less than 35 mph.*
2. *Once roadway work begins, work continuously to complete installations until all traffic lanes can be reopened to traffic on travel lanes with Asphalt Conc. Pvmt. (ACP) wearing course.*
3. *Adjust traffic control devices and delineation as trench work progresses across the roadway.*
4. *Flag driveways and street connections within the work zone as directed.*
5. *This sheet to be accompanied by sheets H.4, H.5, H.6 and H.11.*
6. *Schedule of Bid Items estimate provides quantities for two active work sites only.*
7. *Use temp. pedestrian accessibility route (TPAR) shown on sheet H.11, 2-Lane, 2-Way roadway one lane closure.*
8. *Mount signs on Temporary Sign Supports (TSS) unless otherwise noted.*

## SEQUENCE OF WORK:

1. *Stop & hold traffic at each end of temp. work zone using flagger control.*
2. *Prior to allowing traffic to pass through the work zone, place a temp. trench plate bridging the gap when temp. travel lane & shoulder pavement for travel is less than 16-feet.*
3. *Allow all traffic to clear in both directions before stopping traffic for next sequence.*
4. *Repeat this sequence until roadway street cut is patched at the end of each daily work shift.*
5. *When temp. asphalt patches are used, post a single ROUGH ROAD sign at each end of temp. patch series.*
6. *Install temp. removable tape across finish grade asphalt pavement patches. Match extg. stripe color, width & striping pattern.*

*Under Traffic*

*Under Construction*

*Sign mounted on B(II)R*

*28" Tubular Markers on 20' max. spacing for flagger tapers and stations*

*28" Tubular Markers See TCD Spacing Table on sheet H.4 for max. spacing.*

## FOOTNOTE:

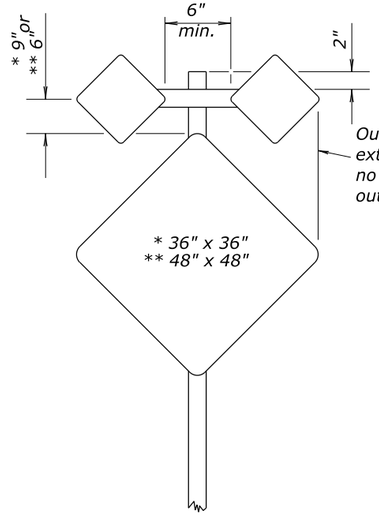
[1] *Temporary trench paving is intended for use when final paving cannot be completed in the same shift as culvert replacement work. Traffic will be allowed on the temporary asphalt concrete patch for up to 30 calendar days.*

REGISTERED PROFESSIONAL ENGINEER
84294PE
Digitally Signed 2021.09.21 07:54:07 -07'00'
OREGON
JULY 13, 2010
BRIAN WALLACE ROCHE
EXPIRES: 12/31/2022

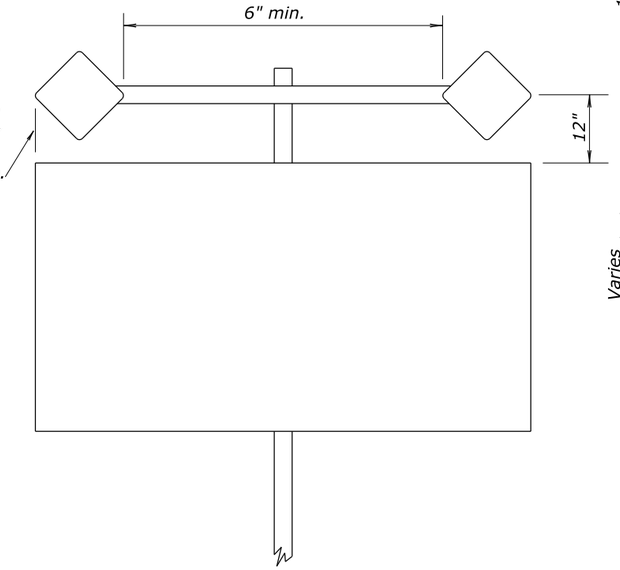
# TRAFFIC CONTROL
# 2-LANE, 2-WAY ROADWAY, ONE LANE CLOSURE WITH TRENCH PLATE

Designed by: | Checked by: | --/---

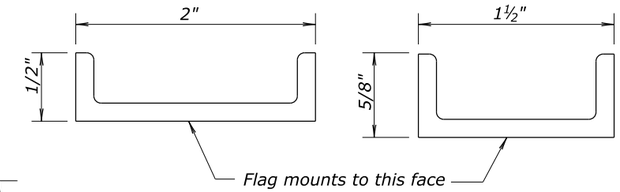
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | H.15 |



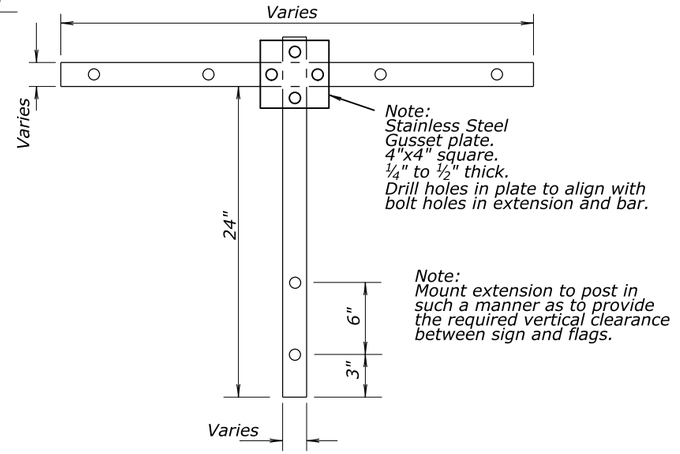

**WARNING**




**REGULATORY OR GUIDE SIGN (1 POST)**

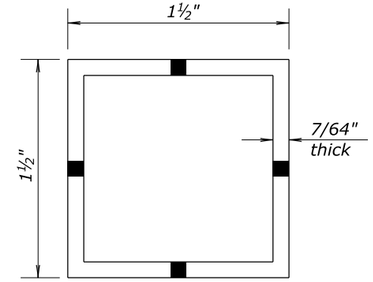



**C" CHANNELS**

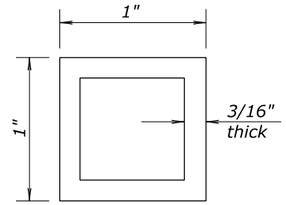



**"C" CHANNEL WITH EXTENSION**

Note:
All mounting holes (to post and to flags) are to be 7/16" diameter.
Use ⅜" x 3" lag bolts to mount bar to wood post.
Use manufacturer recommended fasteners to mount bar to metal post.
Mount flag(s) to bar using ⅜" drive rivets.

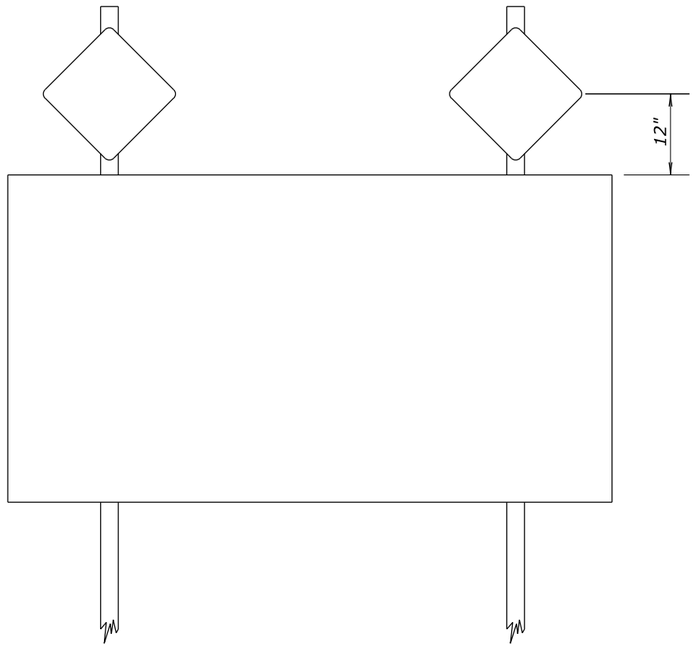



**SQUARE TUBING**

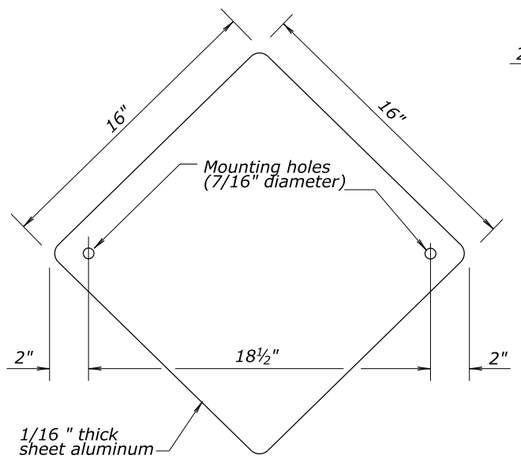



**SQUARE TUBING**

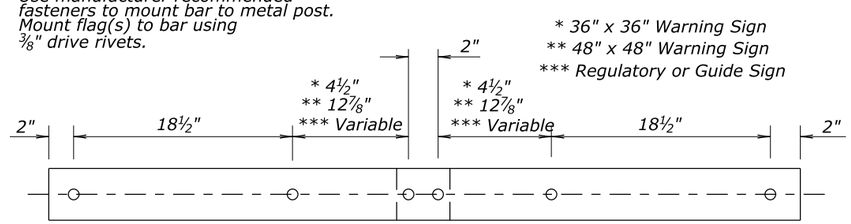
**OPTIONAL MOUNTING BAR MATERIALS**




**GUIDE SIGN (2-POSTS)**




**FLAG DETAILS**




**MOUNTING BAR DETAIL**

REGISTERED PROFESSIONAL ENGINEER
84294PE
Digitally Signed 2021.09.21 07:54:07 -07'00'
OREGON
JULY 13, 2010
BRIAN WALLACE ROCHE

EXPIRES: 12/31/2022

DRAWING BASED ON OREGON STANDARD DRAWING TM204

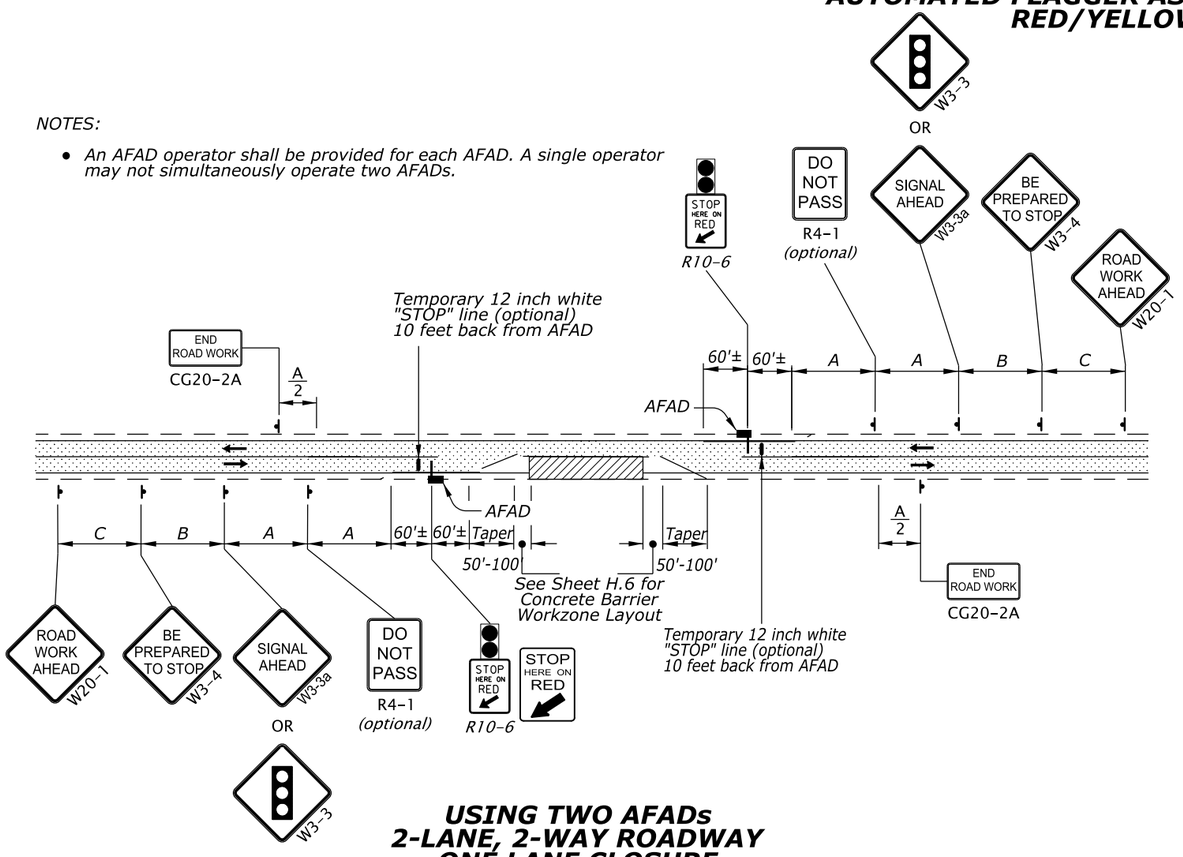
# FLAG BOARD MOUNTING DETAILS

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | H.16 |

# AUTOMATED FLAGGER ASSISTANCE DEVICE (AFAD)
# RED/YELLOW LENS AFAD

*NOTES:*

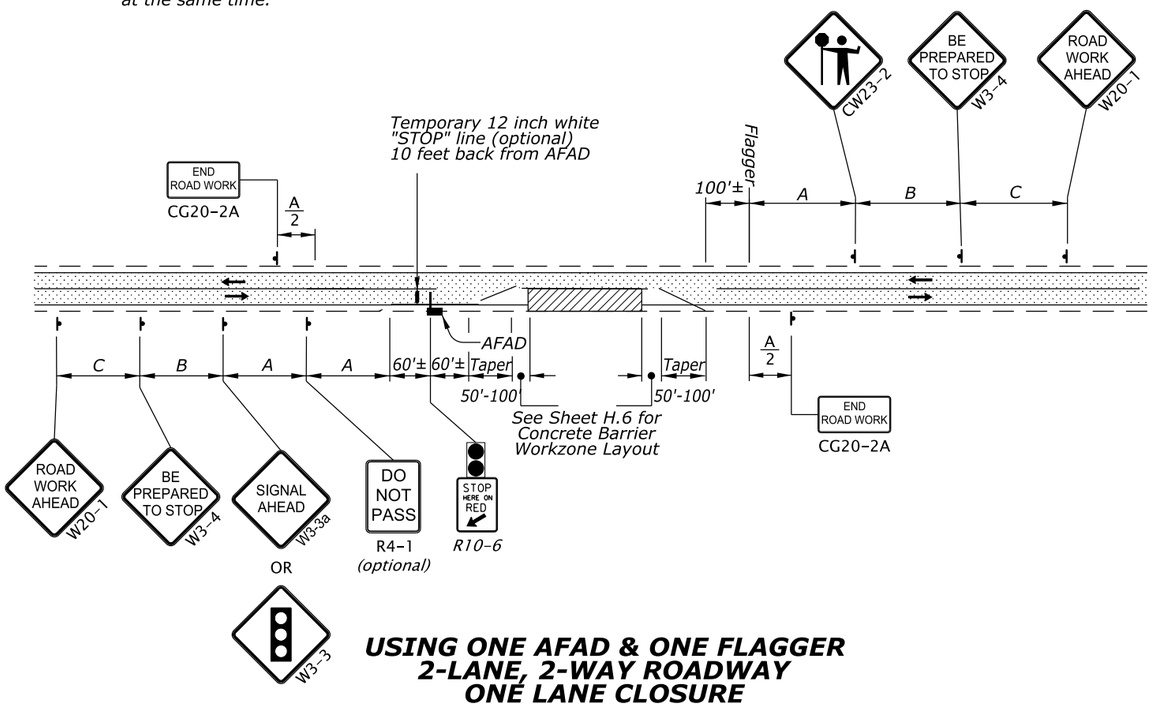
- *An AFAD operator shall be provided for each AFAD. A single operator may not simultaneously operate two AFADs.*




## USING TWO AFADs
## 2-LANE, 2-WAY ROADWAY
## ONE LANE CLOSURE

*NOTES:*

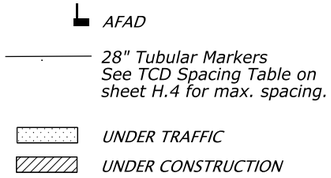
- *The AFAD operator shall not flag traffic and operate an AFAD at the same time.*

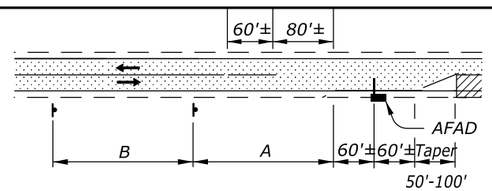



## USING ONE AFAD & ONE FLAGGER
## 2-LANE, 2-WAY ROADWAY
## ONE LANE CLOSURE

*GENERAL NOTES FOR ALL DETAILS:*

- *Flagger station shall be delineated according to "FLAGGER STATION" detail shown on sheet H.4.*
- *Bottom of lens housing shall be a minimum of 7 ft. above surface when mounted on shoulder and at least 17 ft. above any portion of the travel lane.*
- *The gate arm shall cover at least one half of the approaching vehicle travel lane.*
- *Signing and other TCD installed in conjunction with the work area, shall move with the work area.*
- *Use 1/3 "L" taper for shoulder closure, where necessary.*
- *For Taper Length ("L") and Buffer Length ("B") shown on this sheet, use the "MINIMUM LENGTHS TABLE" shown on sheet H.4.*
- *The AFAD operator shall be a certified flagger who has been trained in the operation of the AFAD in use.*
- *Operator shall operate AFAD from a designated area. Designated area should maintain visual presence of the AFAD and should be at least 50' away from the AFAD and have an escape route available for the operator.*
- *Remove existing striping and install temporary striping as required.*
- *See "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on sheet H.4 for sign spacing A, B, and C.*
- *Cover existing passing lane signing (as directed by the CO)*
- *When extended traffic queues develop during AFAD operations, protect traffic by providing advance flaggers(s) and signing according to the "Extended Traffic Queues Detail" shown on sheet H.9.*
- *When AFAD is not in use for less than one work shift, turn off AFAD, or switch YELLOW lens to flashing mode, and cover or remove all accompanying signing.*
- *When AFAD is not in use for longer than one work shift, remove AFAD and all accompanying signing from the roadway.*
- *Do not use the AFAD to control more than one lane of approaching traffic.*
- *Use temporary pavement markings or a white portable rumble strip for temporary stop line. Remove temporary stop line when AFAD is no longer in use.*
- *Tubular markers along centerline placed in advance of AFAD to first sign are optional, unless the DO NOT PASS sign is used.*



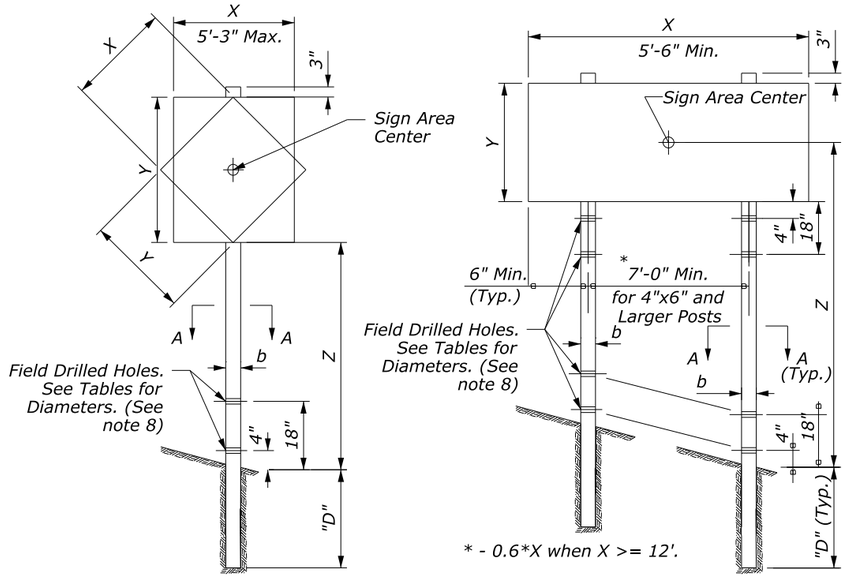

## OVER-DIMENSIONAL VEHICLE ACCOMMODATION DETAIL

REGISTERED PROFESSIONAL ENGINEER
84294PE
Digitally Signed 2021.09.21 07:54:07 -07'00'
OREGON
JULY 13, 2010
BRIAN WALLACE ROCHE
EXPIRES: 12/31/2022

*DRAWING BASED ON OREGON STANDARD DETAIL DET4700*

**AUTOMATED FLAGGER ASSISTANCE DEVICE (AFAD) DETAILS**

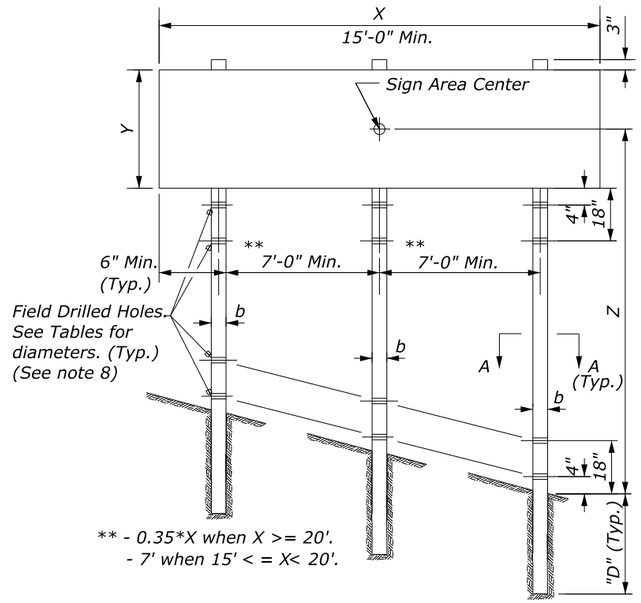
| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | H.19 |







**ELEVATION**
*No scale*

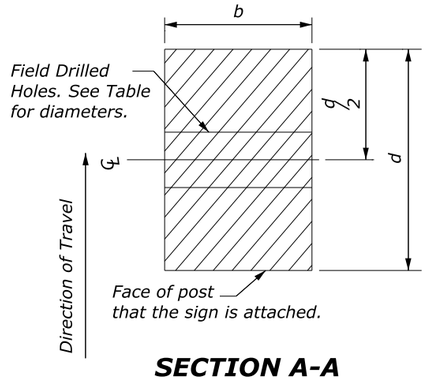



## NOTE:

1. *Wood posts are available in the following commercial lengths: 12', 14', 16', 18', 20', 22', 24', 26'.*
2. *Furnish Douglas Fir No. 1 wood posts in accordance with the SCRs.*
3. *Wood post design in accordance with the 5th Edition 2009 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.*
4. *Use the 3 second gust wind speeds shown on sheet H.20 for the site specific sign location.*
5. *General design parameters are Kz = 0.87, SIF (duration factor) = 1.6, Cd (sign) = 1.20, and G = 1.14.*
6. *The sign width to sign height or sign height to sign width ratio shall not exceed 5.0.*
7. *Temporary signing uses an Ir = 0.45 for a recurrence interval of 1.5 years.*
8. *Posts protected by barrier or guardrail do not require field drilled holes.*
9. *Do not use 4" x 4" posts in snow plow areas.*

## Post Embedment Installation:

1. *Excavate the hole at least 12" larger in diameter than the diagonal dimension of the post. Maintain at least 6" of space around the edges of the post to accomodate compaction equipment.*
2. *Align the post in the hole to a vertical position.*
3. *The space around the wood post shall be backfilled to finished ground surface.*
4. *Backfill with material meeting the requirements of section 704.03.*
5. *Place in layers not greater than 6 inches.*
6. *Solidly ram and tamp the layers into the excavation area around the post.*
7. *Dampen during placement if too dry to compact properly.*
8. *Replace and finish the surface around the post to match the surrounding surface.*




**SECTION A-A**
*No scale*

| | | ( X * Y * Z ) in ft 3 - Maximum | | | | | | | | | | | | Field Drilled Hole Diameters | Post Embedment Depth "D" |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 3 Second Gust Wind Speed (sheet H.20) | | | | | | | | | | | | | |
| | | 85 MPH | | | | 95 MPH | | | | 105 and 110 MPH | | | | | |
| | | Number of Posts | | | | Number of Posts | | | | Number of Posts | | | | | |
| | | 1 | 2 | 3* X=15' | 3* X ≥20' | 1 | 2 | 3* X=15' | 3* X ≥20' | 1 | 2 | 3* X=15' | 3* X ≥20' | | |
| POST SIZE b x d | 4" x 4" | 122 | 244 | 261 | 366 | 98 | 196 | 210 | 294 | 88 | 176 | 188 | 264 | Not Req'd | 4' - 0" |
| | 4" x 6" | 257 | 514 | 550 | 771 | 205 | 410 | 439 | 615 | 185 | 370 | 396 | 555 | 1½" | 5' - 0" |
| | 6" x 6" | 426 | 852 | 912 | 1278 | 341 | 682 | 730 | 1023 | 308 | 616 | 660 | 924 | 2" | 5' - 0" |
| | 6" x 8" | 779 | 1558 | 1669 | 2337 | 624 | 1248 | 1337 | 1872 | 563 | 1126 | 1206 | 1689 | 3" | 7' - 0" |

**TEMPORARY WOOD POST TABLE****

* - Linear Interpolate X*Y*Z 3 post values for signs greater than 15' and less than 20'.
** - See note 7

REGISTERED PROFESSIONAL ENGINEER
84294PE
OREGON
JULY 13, 2010
BRIAN WALLACE ROCHE
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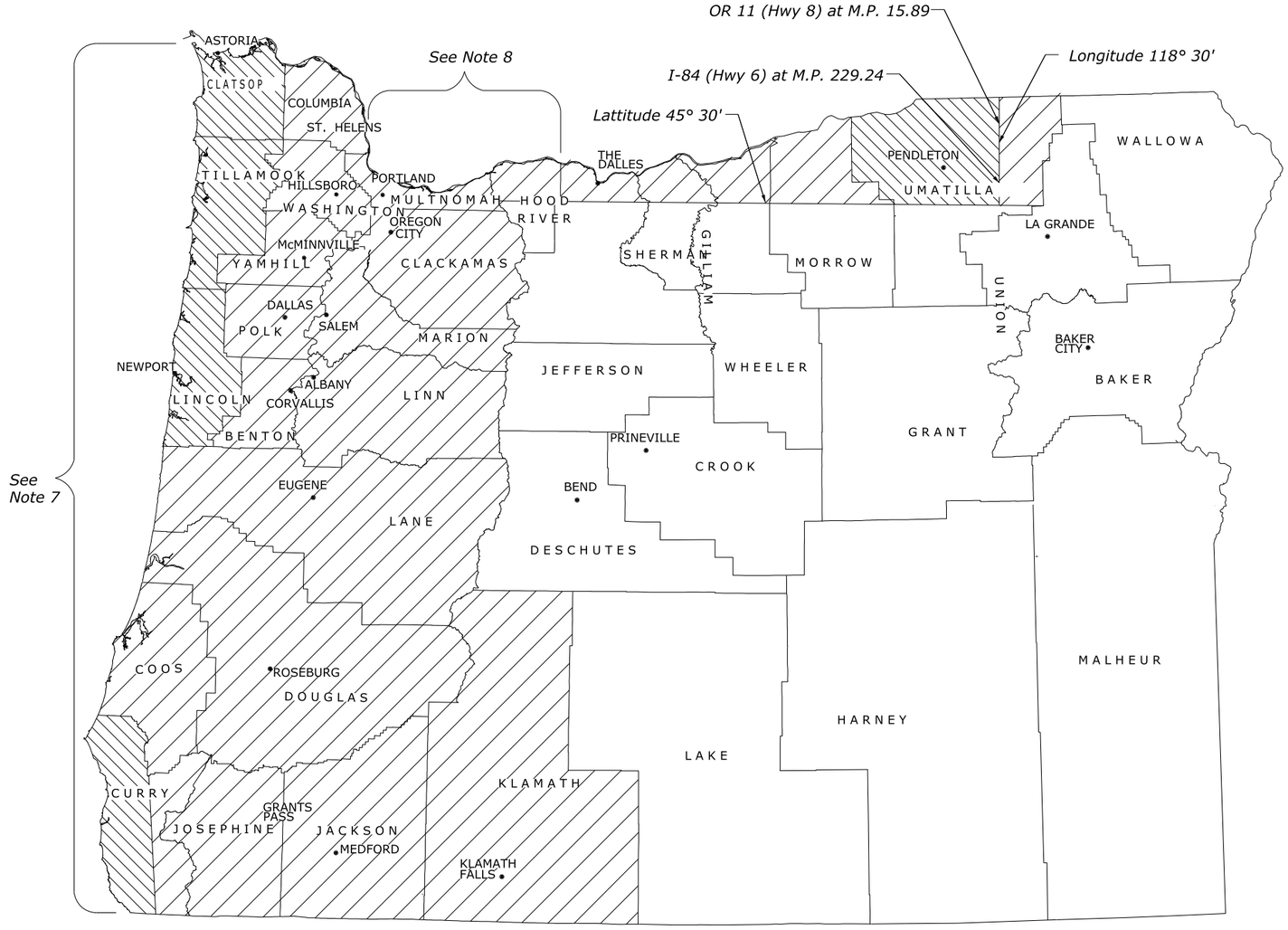
EXPIRES: 12/31/2022

*DRAWING BASED ON OREGON STANDARD DRAWING TM670*

**WOOD POST SIGN SUPPORT**

Designed by: -/---- Checked by: -/----
5/3/2021 12:01:10 PM C:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\OR-01802H19.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | H.20 |




## NOTES

1. *The wind velocity map as shown is adapted from AASHTO 2001 4th Edition - "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals", Appendix C, Figure C-3 and Section 3, Figure 3-2. It uses the wind speed map shown in Figure 1609 of the 2007 Oregon Structural Code to account for locations in the State with special wind regions.*
2. *The wind velocities shown above are 3-Second Gust wind velocities.*
3. *The Exposure Catagory is C.*
4. *The mean recurrence interval is 50-Years.*
5. *Mountanious terrain, gorges, and ocean promontories are classified as special wind regions and shall be examined for unusual wind conditions.*
6. *The Interval Height (Kz) is 30 ft.*
7. *All areas with full exposure to ocean winds shall be designated 110 mph areas.*
8. *Areas in Multnomah and Hood River counties with full exposure to Columbia River Gorge winds shall be designated 110 mph areas.*
9. *Localities may have adopted wind speed higher than shown on this map. Those higher wind speed shall be used.*

REGISTERED PROFESSIONAL ENGINEER
84294PE
Digitally Signed 2021.09.21 07:54:07 -07'00'
OREGON
JULY 13, 2010
BRIAN WALLACE ROCHE

EXPIRES: 12/31/2022

***No Scale***

**3 SECOND GUST WIND SPEED MAP**

Designed by: -/---- Checked by: -/---- -/----

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| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | I.1 |

## ITEM 63401-0500
## PAVEMENT MARKINGS, TYPE C, SOLID

| LOCATION | CULVERT DFI NO. | DESCRIPTION/LEGEND | LENGTH PER PLANS (LNFT) |
|---|---|---|---|
| MP 13.56 | D027828 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 44 |
| MP 15.51 | D027842 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 56 |
| MP 26.27 | D027990 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 52 |
| MP 26.60 | D027992 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 52 |
| MP 31.47 | D028033 | (4) 4" solid yellow lines and (2) 4"solid white edge lines | 66 |
| MP 33.65 | D028044 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 52 |
| MP 33.79 | D028045 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 44 |
| MP 40.92 | D028071 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 60 |
| MP 41.50 | D028074 | (1) 4" solid yellow lines, (1) 4" dashed yellow line and (2) 4"solid white edge lines | 43 |
| MP 42.01 | D028077 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 44 |
| MP 42.12 | D028078 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 60 |
| MP 43.26 | D028086 | (1) 4" solid yellow lines, (1) 4" dashed yellow line and (2) 4"solid white edge lines | 36 |
| MP 43.54 | D028090 | (1) 4" solid yellow lines, (1) 4" dashed yellow line and (2) 4"solid white edge lines | 36 |
| MP 43.99 | D028094 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 44 |
| MP 44.36 | D028100 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 44 |
| MP 44.96 | D028107 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 44 |
| MP 45.03 | D028108 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 52 |
| MP 45.35 | D028109 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 52 |
| MP 46.89 | D028127 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 44 |
| MP 47.07 | D028128 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 52 |
| MP 47.57 | D028131 | (1) 4" solid yellow lines, (1) 4" dashed yellow line and (2) 4"solid white edge lines | 46 |
| MP 47.80 | D028132 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 56 |
| MP 53.56 | D028158 | (2) 4" solid yellow lines and (2) 4"solid white edge lines | 52 |
| MP 84.68 | D028273 | (1) 4" solid yellow lines, (1) 4" dashed yellow line and (1) 4"solid white edge lines | 32 |
| | | SUBTOTAL - PLAN LENGTH | 1163 |
| | | **TOTAL - 2 COATS** | **2326** |

## ITEM 63316-1000, REMOVE AND RESET SIGN

| LOCATION | CULVERT DFI NO. | MUTCD CODE | DESCRIPTION/LEGEND | QUANTITY (EACH) |
|---|---|---|---|---|
| MP 33.79 | D028045 | W3-5 | Speed reduced ahead 45 (arrow symbol) | 1 |
| | | | **TOTAL** | **1** |

*NOTE:*

1. *See sheets I.2 - I.6 for permanent signing and pavement marking details.*

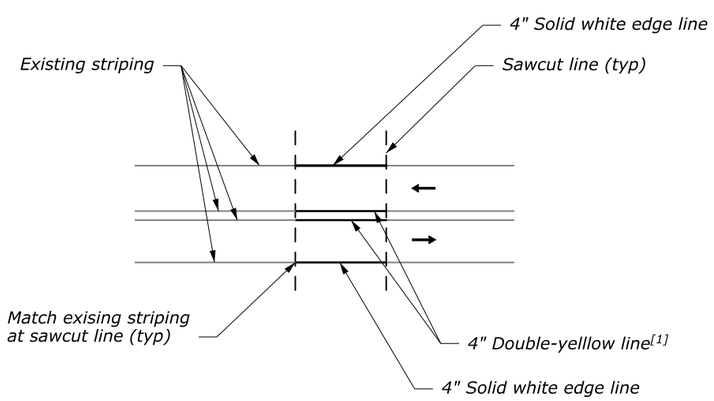
REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

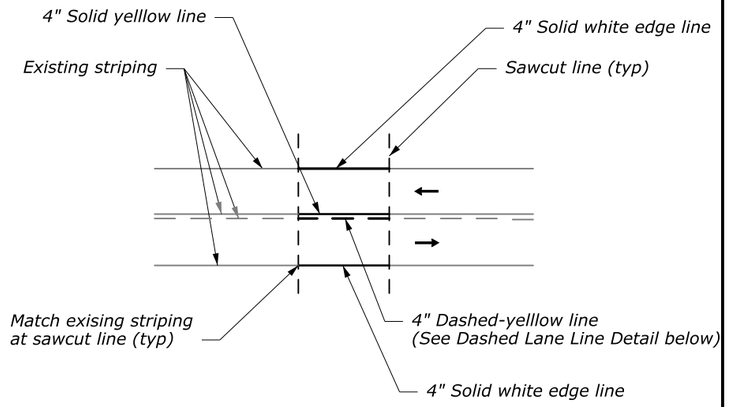
**TABULATION OF PERMANENT TRAFFIC CONTROL QUANTITIES**

Designed by: --/---- Checked by: --/----

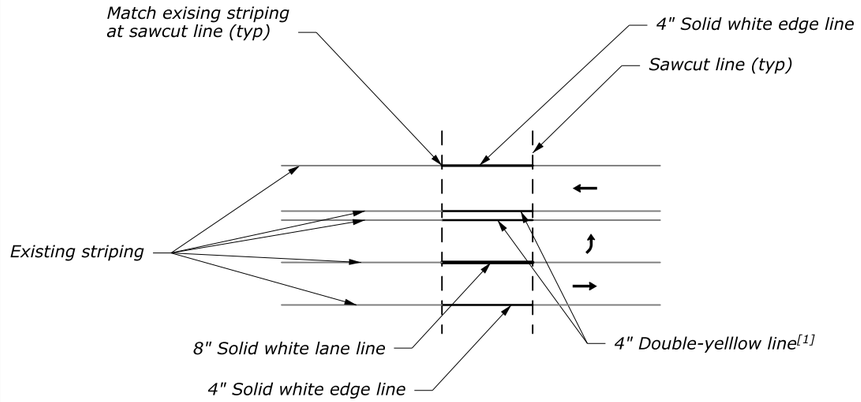
8/24/2022 10:34:21 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\OR-01802I01.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | I.2 |

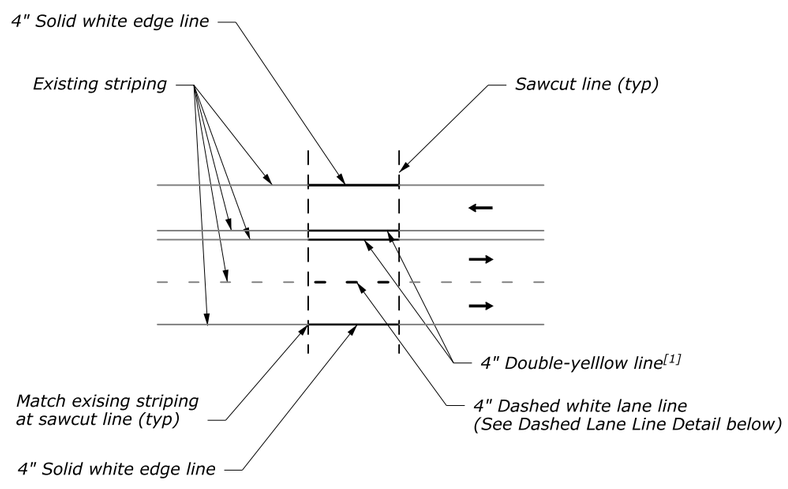


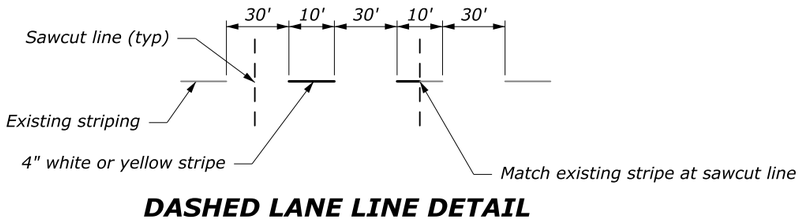

## TYPICAL TWO LANE SECTION



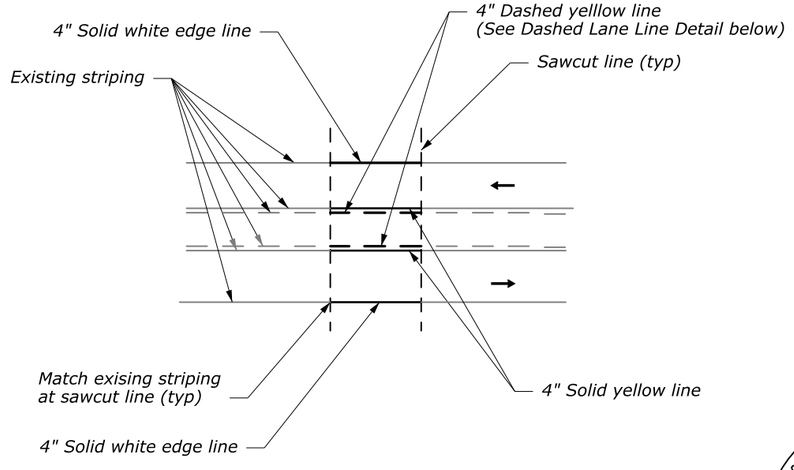

## TYPICAL LEFT TURN LANE SECTION




## TYPICAL THREE LANE SECTION




## DASHED LANE LINE DETAIL




## TYPICAL STRIPED MEDIAN SECTION

REGISTERED PROFESSIONAL ENGINEER
84294PE
Digitally Signed 2021.09.21 07:54:07 -07'00'
OREGON
JULY 13, 2010
BRIAN WALLACE ROCHE
EXPIRES: 12/31/2022

*FOOTNOTE:*

*[1] See sheet I.6, details D and ND for spacing between lines. Match existing striping configuration.*

# PAVEMENT MARKING DETAILS

Designed by: | Checked by: | -/---- | -/----

4/27/2021 8:53:43 AM c:\bns\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\OR-01802I02.dgn

| STATE | PROJECT | SHEET NUMBER |
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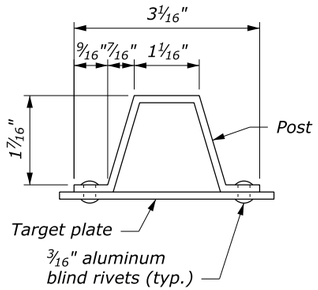
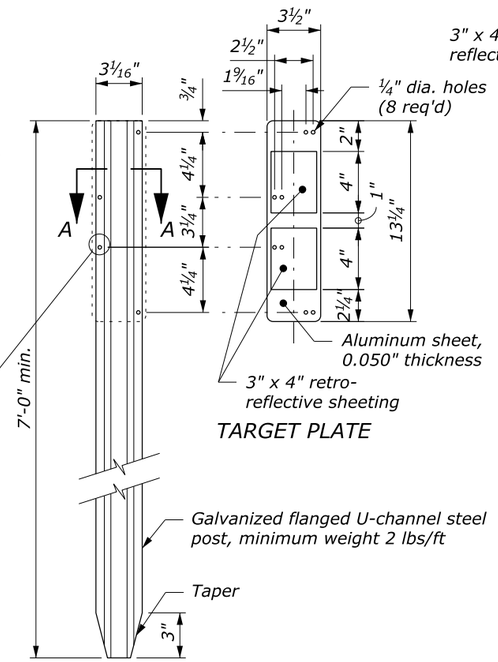
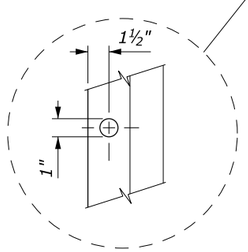



SECTION A-A

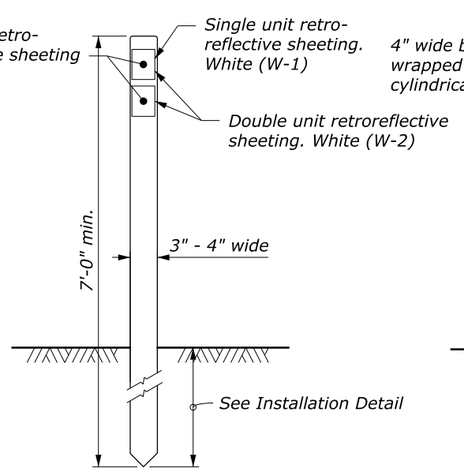



TARGET PLATE

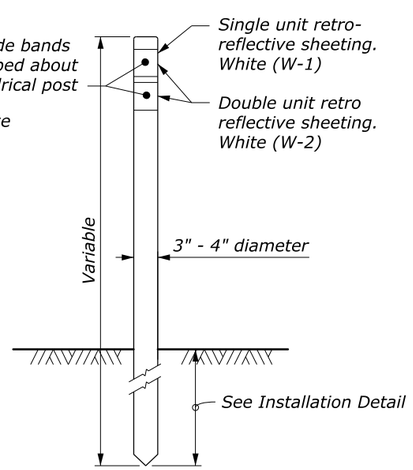
OREGON TYPE 1




HOLE DETAIL
(4 REQUIRED)

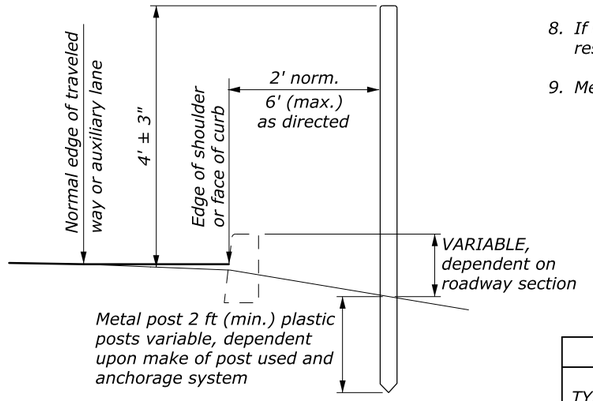



OREGON TYPE 2

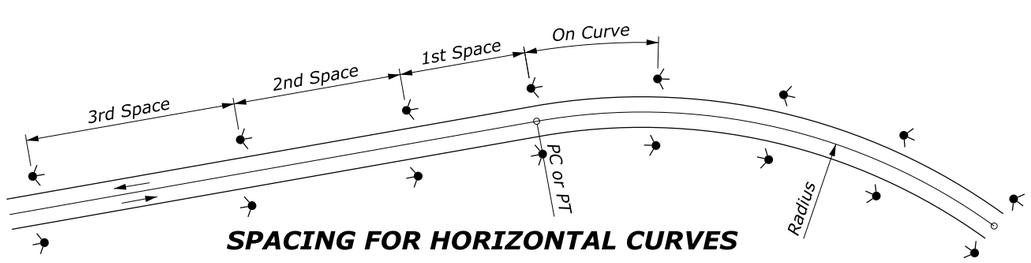



OREGON TYPE 3

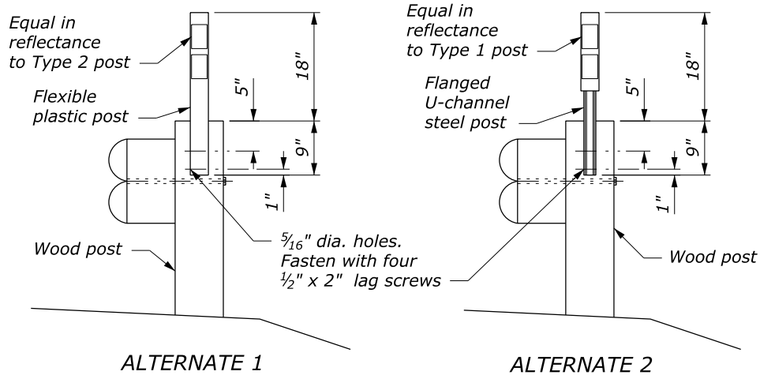
## FLEXIBLE PLASTIC POSTS




## TYPICAL INSTALLATION




## SPACING FOR HORIZONTAL CURVES




ALTERNATE 1

ALTERNATE 2

OREGON TYPE 4

## PLASTIC OR STEEL POST INSTALLATION WITH BEAM TYPE GUARDRAIL

### NOTE:

1. *Place delineators nearly opposite each other on horizontal curves.*
2. *Install all delineators with reflectors facing adjacent on-coming traffic.*
3. *Install delineators behind the rail at guardrail locations.*
4. *Offset delineators a minimum distance of 4 feet in areas of heavy snow removal operations.*
5. *On roads with less than 500 ADT, use delineators only for situations such as sharp vertical or horizontal curves, or other undesirable geometrics exist.*
6. *Vary the post spacing up to ¼ of the spacing shown to clear driveways, cross roads, intersections or ramps. Eliminate the post if the variation is exceeded.*
7. *When the contract does not provide for the construction of the ultimate pavement, allow for the thickness of base and pavement to be placed later when establishing the elevation of the traffic delineators.*
8. *If horizontal and vertical curves are combined, use the more restrictive spacing.*
9. *Measure spacing along the shoulder or face of curb.*

**HORIZONTAL CURVES**

| RADIUS OF CURVE | SPACING ON EACH SIDE OF ROADWAY IN FEET | | | |
|---|---|---|---|---|
| | ON CURVE | IN ADVANCE OF & BEYOND CURVE | | |
| | | 1st SPACE | 2nd SPACE | 3rd SPACE |
| ≥ 5800 | 300 | 300 | 300 | 300 |
| 2900 to < 5800 | 230 | 300 | 300 | 300 |
| 2000 to < 2900 | 160 | 300 | 300 | 300 |
| 1500 to < 2000 | 130 | 260 | 300 | 300 |
| 1200 to < 1500 | 110 | 220 | 300 | 300 |
| 960 to < 1200 | 100 | 200 | 300 | 300 |
| 820 to < 960 | 90 | 180 | 270 | 300 |
| 640 to < 820 | 80 | 160 | 240 | 300 |
| 480 to < 640 | 70 | 140 | 210 | 300 |
| 340 to < 480 | 60 | 120 | 180 | 300 |
| 250 to < 340 | 50 | 100 | 150 | 300 |
| 170 to < 250 | 40 | 80 | 120 | 240 |
| 110 to < 170 | 30 | 60 | 90 | 180 |
| ≤ 110 | 20 | 40 | 60 | 120 |

**REFLECTOR DETAILS**

| TYPE | REFLECTOR & TARGET/ POST COLOR | NUMBER OF REFLECTORS | USAGE AND SPACING |
|---|---|---|---|
| W-1 | White | 1 | Max. tangent spacing: 400' each side |
| | | | Intersections (tapers and widening): 100' |
| | | | See Horizontal Curves table for variations |
| W-2 | White | 2 | Intersection Radius: 3 min. @ 50' |
| | | | Lane Reduction: 3 min @ 100' |

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY DETAIL

# OREGON DELINEATORS

DETAIL APPROVED FOR USE --/----

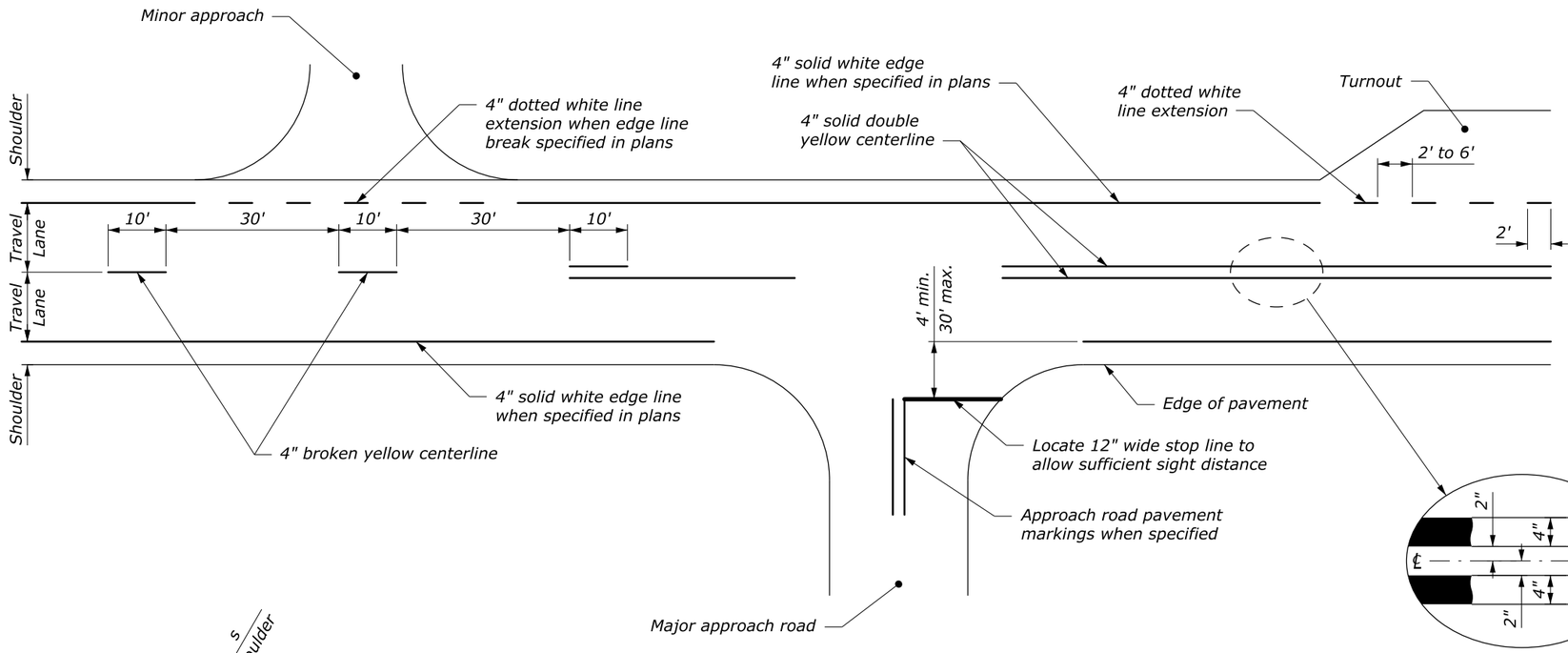
REVISED: 11/2014

DETAIL W633-70

Designed by: --/---- Checked by: --/----

7/19/2016 11:01:36 AM C:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\OR-01802103.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | I.4 |




## NOTE:

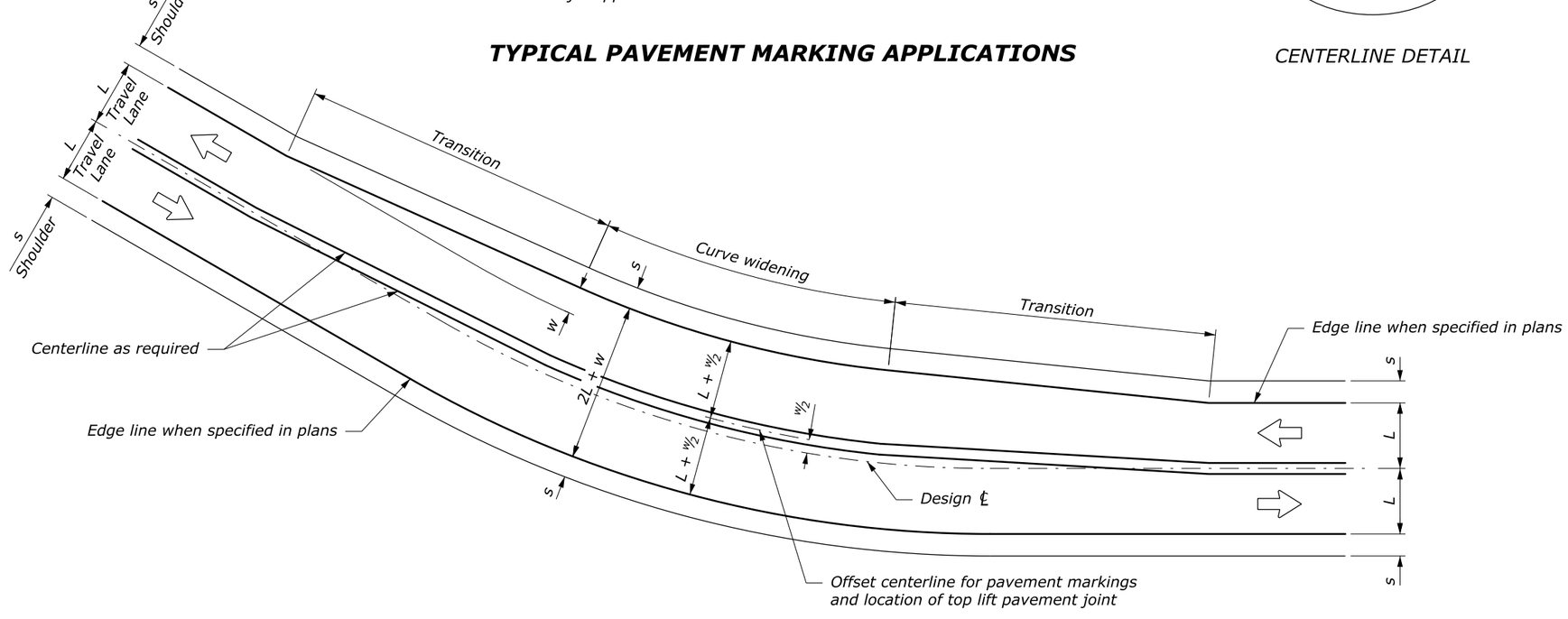
1. *Place edge line pavement markings at asphalt/concrete curb interface when curb is present.*
2. *Paint centerline pavement markings on curves with curve widening "w" to achieve equal lane widths within the roadway. Maintain a constant shoulder width "s" throughout the curve widening area. See staking details for curve widening transition locations.*
3. *Typical pavement marking widths are shown. Use wider pavement markings when specified on the plans or when required by the maintaining agency.*




Increase spacing between parallel lines when specified in the plans or when required by the maintaining agency

CENTERLINE DETAIL

## TYPICAL PAVEMENT MARKING APPLICATIONS




## CENTERLINE MODIFICATION FOR CURVES WITH WIDENING APPLIED ON INSIDE

*See Note 2 for treatment of curves when widening "w" is split equally on both sides of centerline*

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY DETAIL

# LINEAR PAVEMENT MARKINGS

| DETAIL APPROVED FOR USE 10/2007 | DETAIL |
|---|---|
| REVISED: 10/2012 | W634-2 |

-/---
Checked by:
-/---
Designed by:
6/28/2016 12:46:25 PM C:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\OR-01802I04.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
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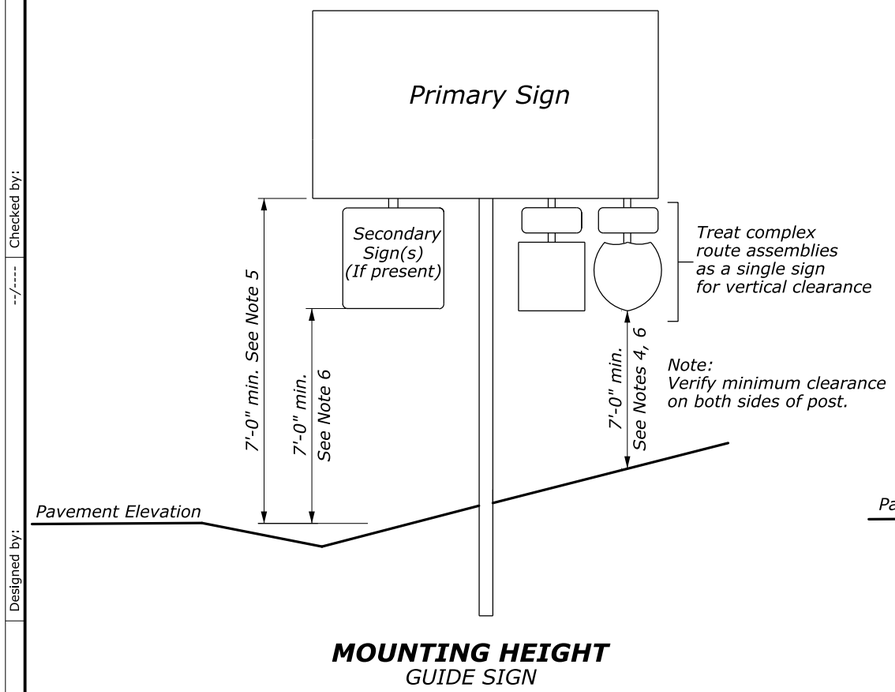
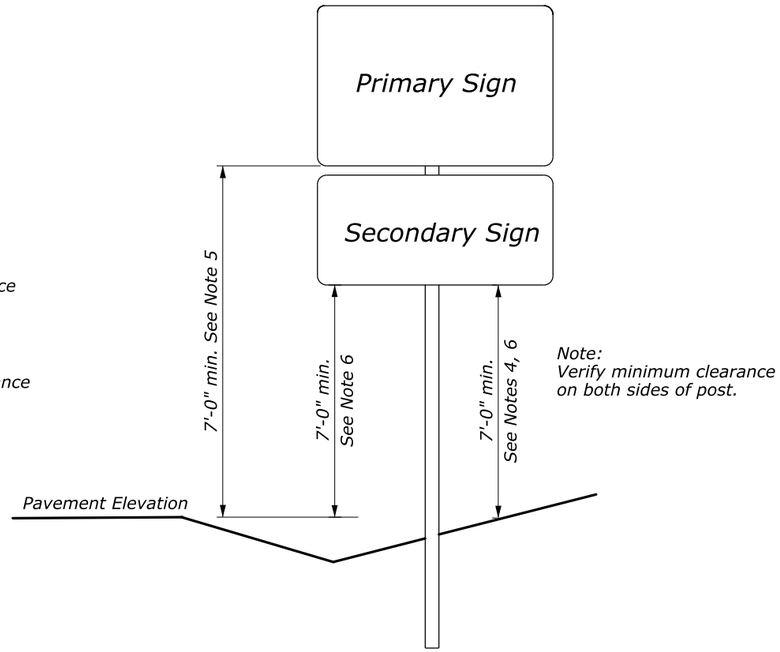



**MOUNTING HEIGHT**
*GUIDE SIGN*




**MOUNTING HEIGHT**
*ALL OTHER SIGNS*

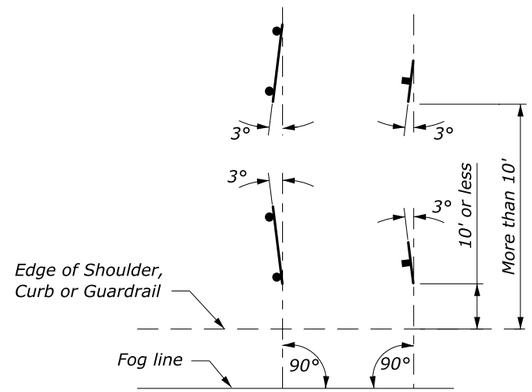
## *GENERAL INSTALLATION NOTES:*

a. *Mounting heights should not be more than 3 inches more than the minimum heights shown, where practical.*

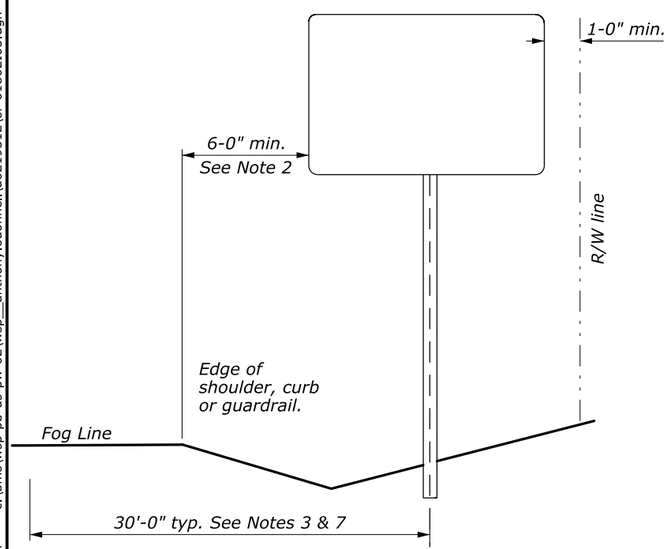
b. *2" vertical spacing between all signs.*

## *NOTE:*

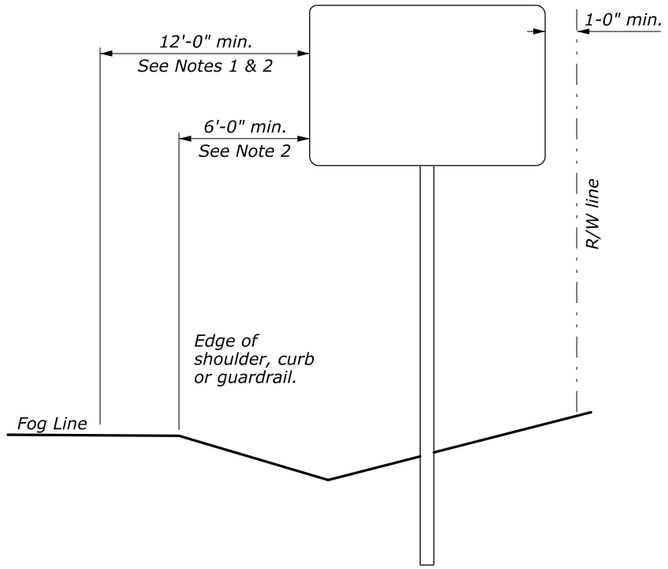
1. *6' minimum if behind barrier.*
2. *2' minimum if restricted R/W.*
3. *20' for ramp terminals.*
4. *8' minimum if bicycle path underneath.*
5. *8' minimum if secondary signs attached.*
6. *5' minimum if outside clearzone, in rural areas and no pedestrians underneath.*
7. *For multi-post installations measure distance from post closest to roadway.*




**SIGN PLACEMENT**




**LATERAL OFFSET**
*GUIDE SIGNS*




**LATERAL OFFSET**
*ALL OTHER SIGNS*

REGISTERED PROFESSIONAL ENGINEER
84294PE
Digitally Signed 2021.09.21 07:54:07 -07'00'
OREGON
JULY 13, 2010
BRIAN WALLACE ROCHE
EXPIRES: 12/31/2022

**SIGN INSTALLATION DETAILS**

Designed by: -/---- Checked by: -/----

9/24/2020 6:01:19 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802105.dgn

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | I.6 |

W

4" WHITE LINE

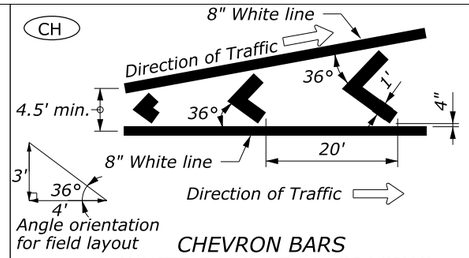
W-2

8" WHITE LINE

Y

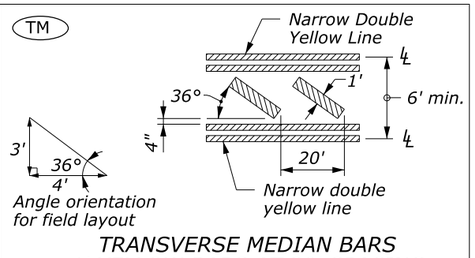
4" YELLOW LINE

CH



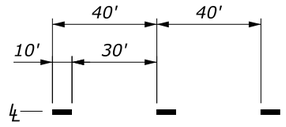

CHEVRON BARS
1' WHITE BARS AT 20' SPACING

TM



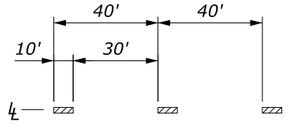

TRANSVERSE MEDIAN BARS
1' YELLOW BARS AT 20' SPACING

WB



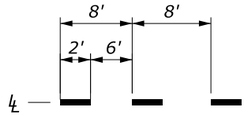

4" WHITE BROKEN LINE

YB



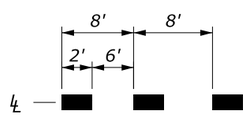

4" YELLOW BROKEN LINE

WD



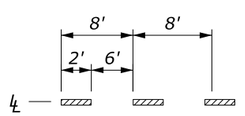

4" WHITE DOTTED LINE
For lane extensions

WD-2



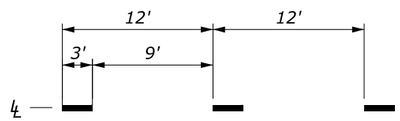

8" WHITE DOTTED LINE
For lane extensions and bike lane extensions

YD



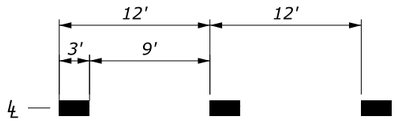

4" YELLOW DOTTED LINE
For lane extensions

DLL



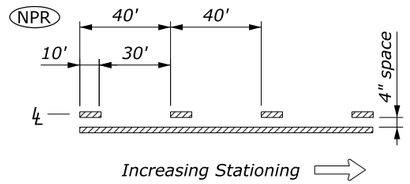

4" WHITE DOTTED LANE LINE
For lane lines in acceleration/deceleration lanes

DLL-2



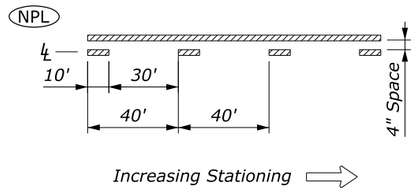

8" WHITE DOTTED LANE LINE
For lane lines in drop lanes

NPR



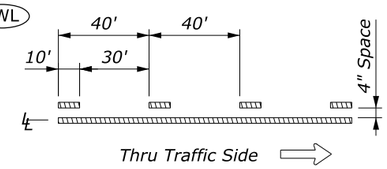

NO-PASS RIGHT
4" YELLOW LINES

NPL



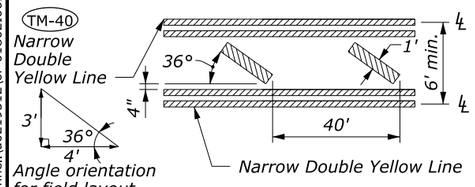

NO-PASS LEFT
4" YELLOW LINES

TWL



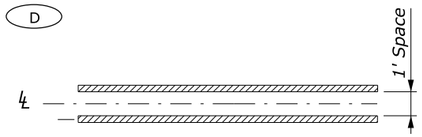

TWO-WAY LEFT TURN
4" YELLOW LINES

TM-40



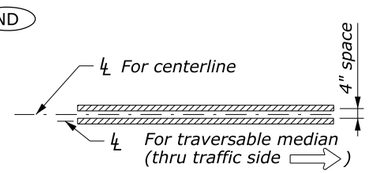

TRANSVERSE MEDIAN BARS
1' YELLOW BARS AT 40' SPACING
For use at painted medians where distance between left turn refuges exceeds 200'

D




DOUBLE NO-PASS
TWO 4" YELLOW LINES

ND

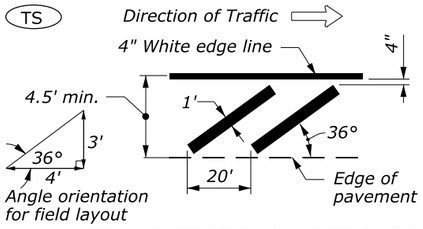



NARROW DOUBLE NO-PASS
TWO 4" YELLOW LINES

NDW

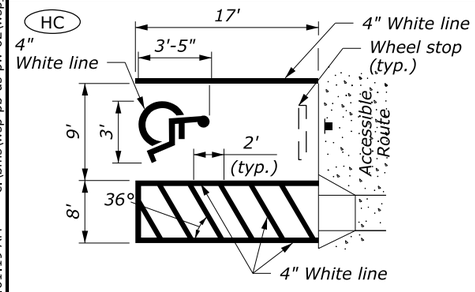

NARROW DOUBLE NO-LANE CHANGE
TWO 4" WHITE LINES

TS



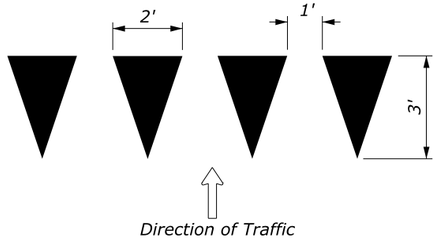

TRANSVERSE SHOUDLER BARS
1' WHITE BARS AT 20' SPACING

HC



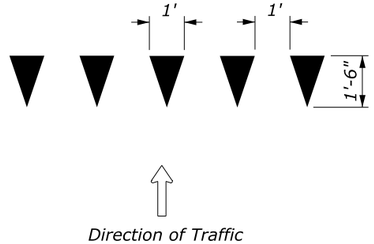

DISABLED PARKING DETAIL (WHITE)

YLD




YIELD LINE (WHITE)

BYLD




BICYCLE YIELD LINE (WHITE)

REGISTERED PROFESSIONAL ENGINEER
84294PE
Digitally Signed 2021.09.21 07:54:07 -07'00'
OREGON
JULY 13, 2010
BRIAN WALLACE ROCHE
EXPIRES: 12/31/2022

LEGEND:

Direction of Traffic, Increasing Stationing or Thru Traffic Side

Lane line dimensions are shown on the striping plans

NO SCALE

**PAVEMENT MARKING STANDARD DETAIL BLOCKS**

-/---- Checked by:
-/---- Designed by:
9/24/2020 6:01:19 AM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\or-01802106.dgn

| Culvert ID | Milepoint | Tree Removals | | | | Tree Plantings[2] |
|---|---|---|---|---|---|---|
| | | 6-18" DBH[1] | | >18" DBH[1] | | Item 62630-0350 |
| | | Removals (EACH)[3] | Species | Removals (EACH)[3] | Species | Plantings, Trees, Balled and Burlapped (EACH) |
| D027828 | 13.56 | 0 | | 1 | fir | 1 |
| D027842 | 15.51 | 1 | fir | 2 | fir | 3 |
| D027990 | 26.27 | 0 | | 1 | maple | 1 |
| D028041 | 33.54 | 1 | maple | 2 | 2 cedar | 3 |
| D028047 | 36.73 | 1 | fir | 0 | | 1 |
| D028050 | 37.31 | 3 | 2 fir, 1 cedar | 0 | | 3 |
| D028076 | 41.91 | 2 | alder | 0 | | 2 |
| D028082 | 42.50 | 1 | cedar | 0 | | 1 |
| D028095 | 44.06 | 0 | | 1 | cedar | 1 |
| D028100 | 44.36 | 0 | | 1 | cedar | 1 |
| D028094 | 43.99 | 1 | fir | 0 | | 1 |
| D028109 | 45.35 | 0 | | 2 | cedar | 2 |
| D028132 | 47.80 | 2 | 1 alder, 1 fir | 0 | | 2 |
| D028142 | 50.30 | 2 | 1 alder, 1 cedar | 0 | | 2 |
| D028158 | 53.56 | 1 | fir | 1 | fir | 2 |
| D028163 | 53.95 | 1 | fir | 0 | | 1 |
| D028238 | 64.27 | 1 | fir | 1 | fir | 2 |
| | | | | | **Total** | **29** |

*FOOTNOTE:*

*[1] DBH = Diameter at breast height*

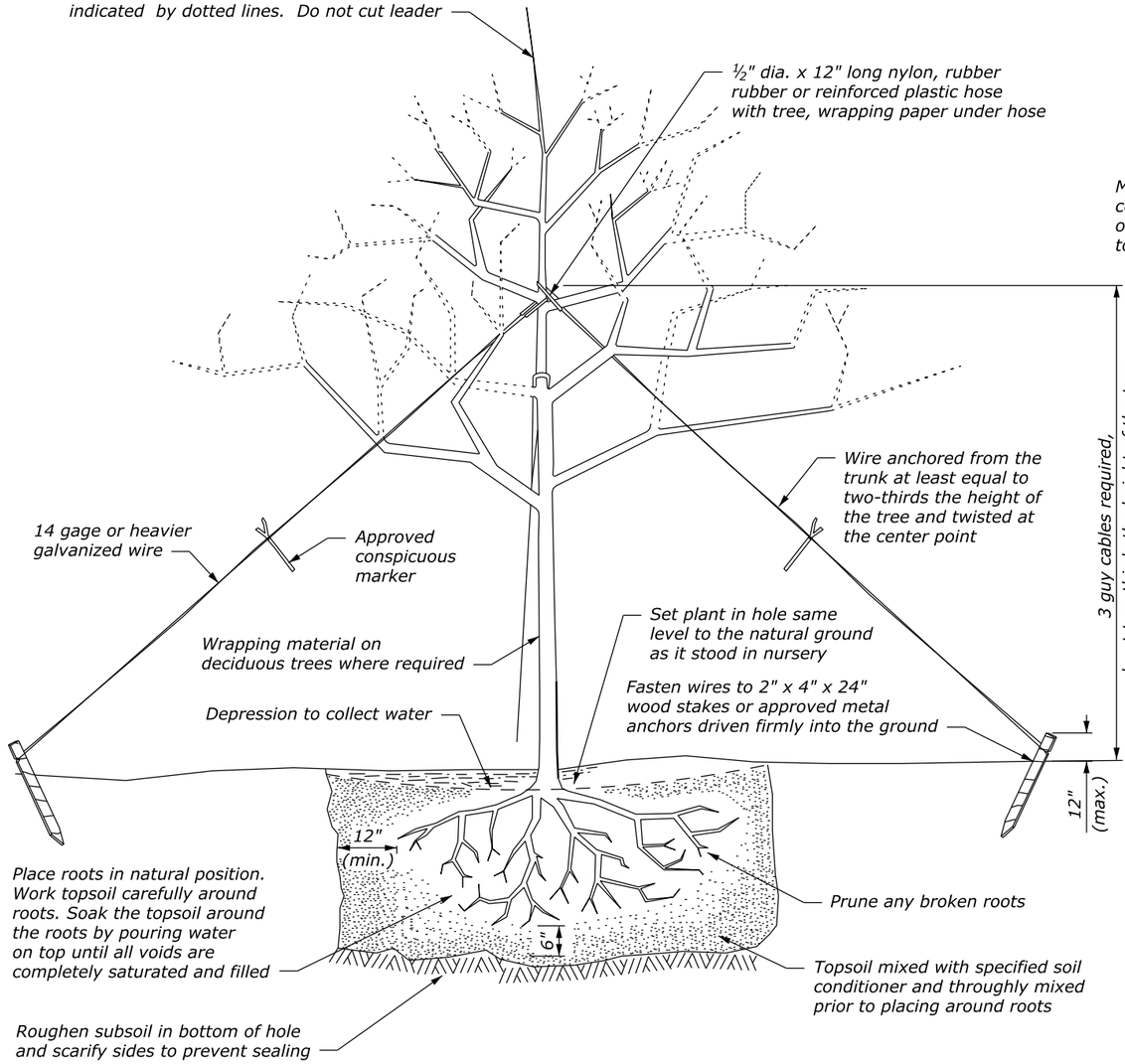
*[2] Provide tree plantings which match the species of the tree removed:*
*Douglas fir - (Pseudotsuga menziesii)*
*Red alder - (Alnus rubra)*
*Western red cedar - (Thuja plicata)*
*Big-leaf maple - (Acer macrophyllum)*

*[3] Quantities shown for information only.*

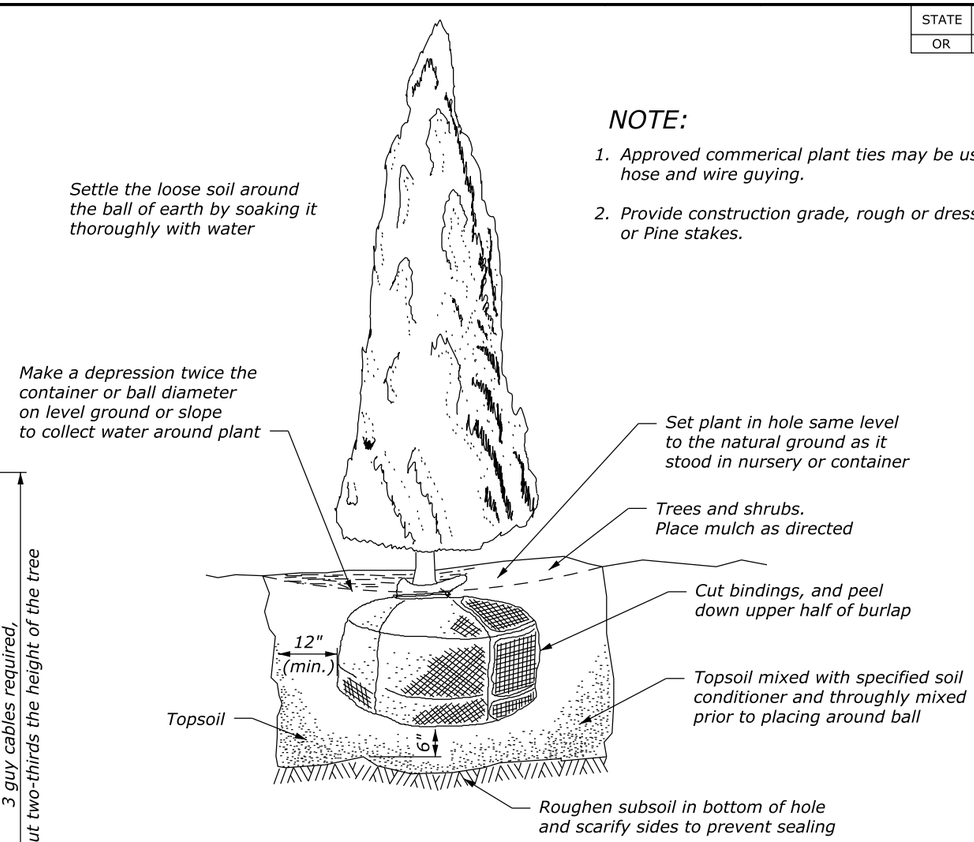
REGISTERED PROFESSIONAL ENGINEER
98999PE
Digitally Signed 2022.08.30 11:55:25 -07'00'
OREGON
MARCH 08, 2022
SARAH HOPE LINGLEY
EXPIRES: 12/31/2024

**TABULATION OF REVEGETATION QUANTITIES**

| STATE | PROJECT | SHEET NUMBER |
|---|---|---|
| OR | DOT 18(2) | J.2 |



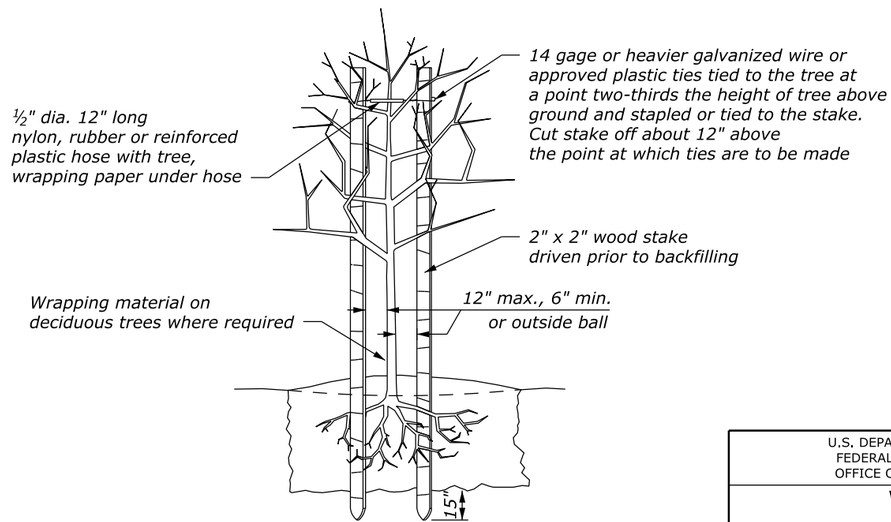

## METHOD OF PLANTING BARE ROOT TREES AND SHRUBS AND METHOD OF GUYING DECIDUOUS TREES OVER 12' AND CONIFERS OVER 4'




## METHOD OF PLANTING CONTAINER OR BALLED AND BURLAPPED TREES AND SHRUBS

### NOTE:

1. Approved commerical plant ties may be used in lieu of hose and wire guying.
2. Provide construction grade, rough or dressed Douglas Fir or Pine stakes.




## METHOD OF STAKING DECIDUOUS TREES UNDER 12'

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
OFFICE OF FEDERAL LANDS HIGHWAY

WFLHD DETAIL

# TREES AND SHRUBS PLANTING METHODS

DETAIL APPROVED FOR USE 12/2006
REVISED:

DETAIL
W626-1

Designed by: --/---- Checked by: --/----
7/26/2021 3:56:44 PM c:\bms\wsp-pb-us-pw-02\wsp__anthony.odonnell\d0219312\OR-01802l02.dgn