2024 OREGON STANDARD DRAWINGS

Standard Distribution
Date of Issue: January 2024

William L. Woods 2024.01.29 14:08:51 -08'00'

William Lee Woods, PE
Senior Standards Engineer

This is the January 2024 release of the 2024 Oregon Standard Drawings.

For ODOT Projects, the details in the standard drawings will be effective on the **June 1, 2024** bid opening where these drawings are called for in the project plans.

These drawings are for use with projects using the **2024 Oregon Standard Specifications.**

The drawing "effective date" is located below the title block on each Standard Drawing. The bid opening date of a project should be in the effective date window of the drawings. This will ensure the correct drawings are being used on the projects.

Electronic PDF files with the effective date for each drawing are on the web at:

http://www.oregon.gov/ODOT/Engineering/Pages/Standards.aspx

Each standard drawing has a corresponding Standard Drawing Reports that contains useful information for the designer as well as updates that occur on the drawing. The link to the report is the title of the specific drawing on the webpage.

The following Standard Drawings were updated for the January 2024 release:

Drawing Number	Comment
RD100	
RD101	
RD322	
RD324	
RD420	
RD438	
RD442	
RD443	
RD444	
RD451	
RD471	
RD501	
RD502	

Drawing Number	Comment
RD702	
RD780	
RD781	
RD782	
RD900	
RD901	
BR115	
BR165	
BR200	
BR207	
BR208	
BR226	
BR275	New Drawing
BR500	
BR705	
BR709	
BR820	
TM223	Title Change
TM226	New Drawing
TM302	
TM303	
TM450	
TM460	
TM462	
TM470	
TM472	
TM485	
TM601	
TM630	
TM650	
TM652	
TM655	
TM670	
TM680	
TM842	

OREGON STANDARD DRAWINGS 2024
NUMBERS AND REVISION DATES

DRAWING NUMBER	REVISION DATE
RD100	1/2024
RD101	1/2024
RD110	
RD115	
RD120	
RD130	
RD140	
RD150	
RD160	
RD170	
RD250	
RD254	
RD255	
RD258	
RD262	
RD266	
RD270	
RD274	
RD278	
RD282	
RD286	
RD300	
RD302	
RD304	
RD306	
RD308	
RD310	
RD312	
RD316	
RD317	
RD318	
RD319	
RD320	
RD321	
RD322	1/2024
RD324	1/2024
RD325	
RD326	
RD327	
RD328	
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RD420	1/2024
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RD438	1/2024
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RD442	1/2024
RD443	1/2024
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RD581	
RD590	
RD595	
RD596	
RD602	
RD610	
RD615	
RD700	
RD701	

OREGON STANDARD DRAWINGS 2024
NUMBERS AND REVISION DATES

DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE
RD702	1/2024	RD952		BR230	
RD705		RD960		BR233	
RD706		RD1000		BR236	
RD707		RD1005		BR240	
RD710		RD1006		BR241	
RD711		RD1010		BR242	
RD715		RD1015		BR245	
RD720		RD1030		BR246	
RD721		RD1031		BR250	
RD722		RD1032		BR253	
RD725		RD1033		BR256	
RD730		RD1040		BR260	
RD735		RD1045		BR263	
RD740		RD1050		BR266	
RD745		RD1055		BR270	
RD750		RD1060		BR273	
RD770		RD1065		BR275	1/2024
RD771		RD1070		BR285	
RD780	1/2024	RD1140		BR286	
RD781	1/2024			BR290	
RD782	1/2024			BR291	
RD810		BR115	1/2024	BR300	
RD815		BR133		BR310	
RD820		BR135		BR321	
RD825		BR136		BR325	
RD830		BR139		BR330	
RD832		BR140		BR335	
RD835		BR141		BR340	
RD840		BR145		BR350	
RD845		BR157		BR360	
RD900	1/2024	BR165	1/2024	BR365	
RD901	1/2024	BR175		BR375	
RD902		BR182		BR400	
RD904		BR190		BR405	
RD905		BR191		BR410	
RD906		BR195		BR415	
RD908		BR200	1/2024	BR420	
RD909		BR203		BR422	
RD910		BR206		BR425	
RD912		BR207	1/2024	BR430	
RD913		BR208	1/2024	BR435	
RD916		BR209		BR440	
RD920		BR212		BR445	
RD922		BR214		BR500	1/2024
RD930		BR216		BR505	
RD932		BR220		BR520	
RD936		BR221		BR525	
RD938		BR222		BR550	
RD940		BR223		BR705	1/2024
RD950		BR226	1/2024	BR706	

OREGON STANDARD DRAWINGS 2024
NUMBERS AND REVISION DATES

DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE
BR707		TM462	1/2024	TM621	
BR708		TM466		TM622	
BR709	1/2024	TM467		TM623	
BR730		TM470	1/2024	TM624	
BR740		TM471		TM625	
BR750		TM472	1/2024	TM626	
BR751		TM482		TM627	
BR760		TM485	1/2024	TM628	
BR800		TM492		TM629	
BR805		TM493		TM630	1/2024
BR820	1/2024	TM500		TM631	
BR825		TM501		TM635	
BR830		TM502		TM650	1/2024
BR835		TM503		TM651	
BR840		TM504		TM652	1/2024
BR841		TM505		TM653	
BR970		TM515		TM654	
BR971		TM516		TM655	1/2024
BR972		TM517		TM656	
		TM520		TM657	
		TM521		TM658	
TM200		TM530		TM670	1/2024
TM201		TM531		TM671	
TM204		TM539		TM672	
TM206		TM547		TM675	
TM211		TM551		TM676	
TM212		TM560		TM677	
TM220		TM561		TM678	
TM221		TM570		TM679	
TM222		TM571		TM680	1/2024
TM223	1/2024	TM575		TM681	
TM224		TM576		TM687	
TM225		TM577		TM688	
TM226	1/2024	TM600		TM689	
TM230		TM601	1/2024	TM690	
TM231		TM602		TM691	
TM232		TM606		TM693	
TM233		TM607		TM694	
TM240		TM608		TM695	
TM300		TM609		TM696	
TM301		TM610		TM697	
TM302	1/2024	TM611		TM698	
TM303	1/2024	TM612		TM800	
TM450	1/2024	TM614		TM810	
TM452		TM615		TM820	
TM453		TM616		TM821	
TM454		TM617		TM822	
TM456		TM618		TM830	
TM457		TM619		TM831	
TM460	1/2024	TM620		TM832	

OREGON STANDARD DRAWINGS 2024
NUMBERS AND REVISION DATES

DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE
TM833					
TM840					
TM841					
TM842	1/2024				
TM843					
TM844					
TM845					
TM850					
TM851					
TM852					
TM853					
TM854					
TM855					
TM860					
TM861					
TM862					
TM870					
TM871					
TM880					

2024 OREGON STANDARD DRAWINGS INDEX

- A -

- B -

- C -

-D-

-E-

-F-

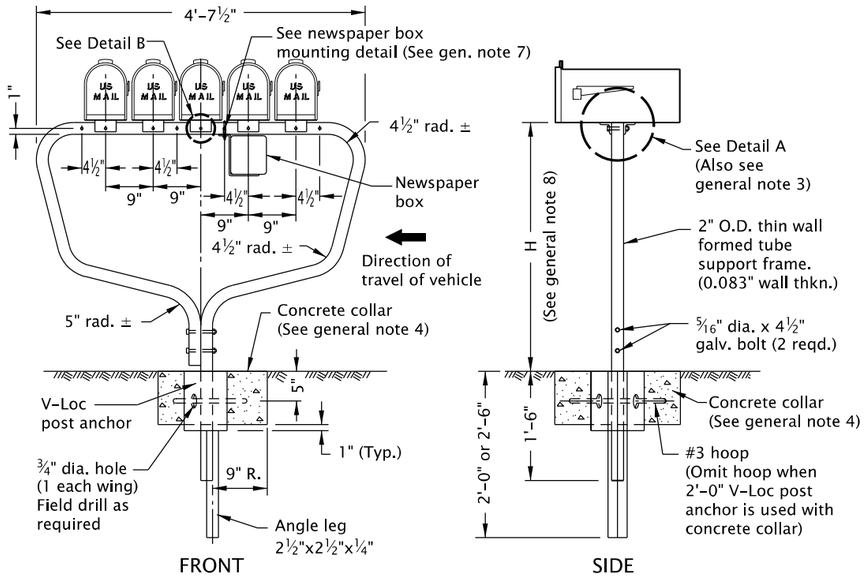
-M-

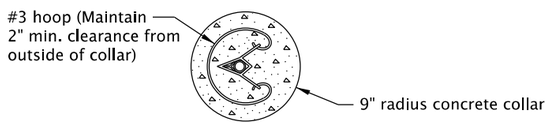
-P-

-R-

-S-

-W-

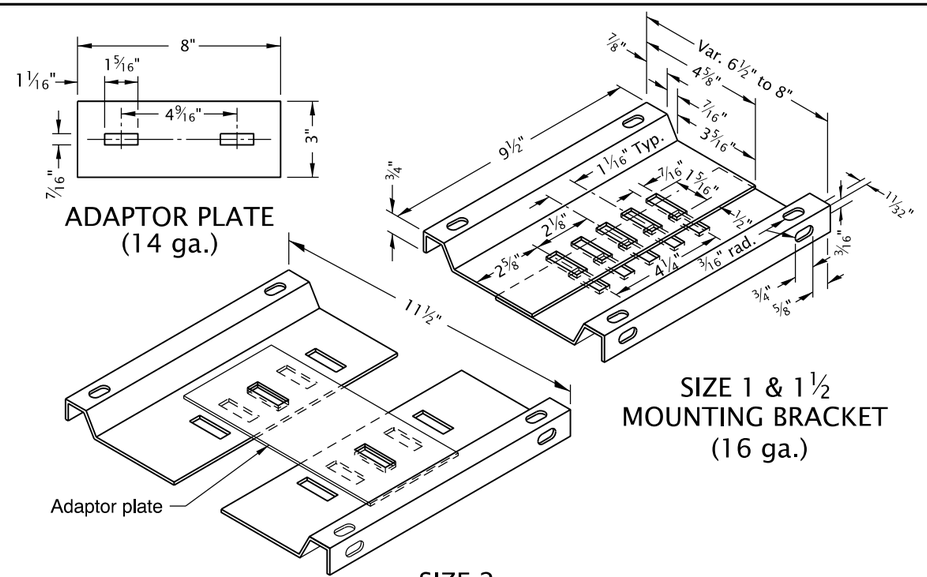


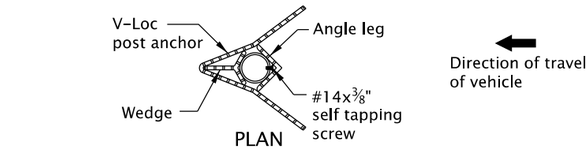


CONCRETE COLLAR
(See general note 4)

MULTIPLE SUPPORT

(Supports 5 standard (Sizes 1 & 1½) mailboxes or 4 large (Size 2) mailboxes)





Direction of travel of vehicle

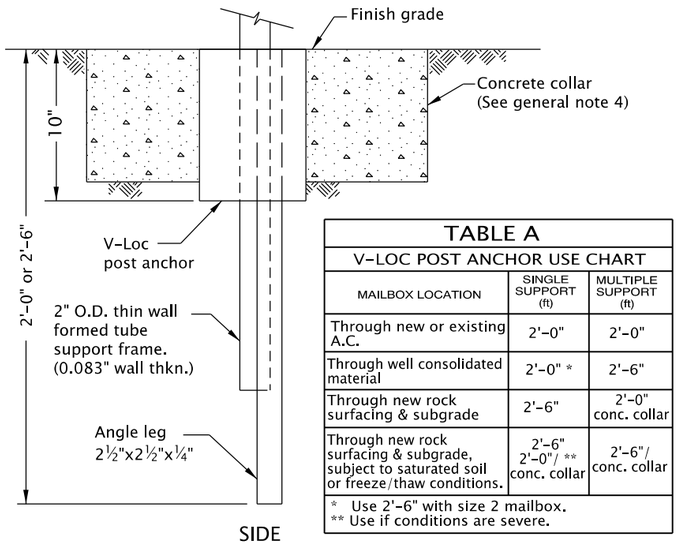


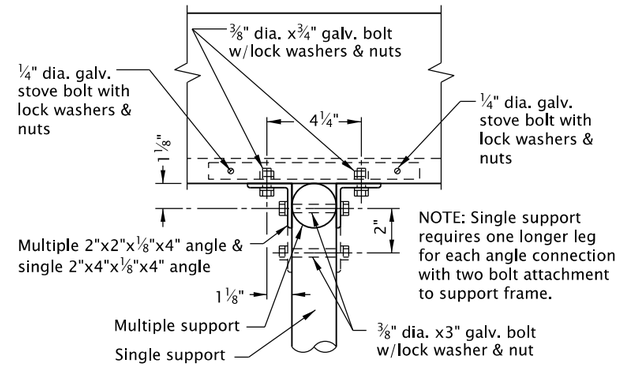
TABLE A

V-LOC POST ANCHOR USE CHART

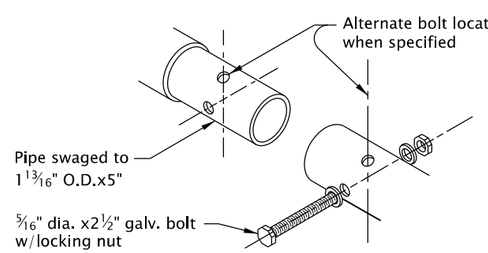
MAILBOX LOCATION	SINGLE SUPPORT (ft)	MULTIPLE SUPPORT (ft)
Through new or existing A.C.	2'-0"	2'-0"
Through well consolidated material	2'-0" *	2'-6"
Through new rock surfacing & subgrade	2'-6"	2'-0" conc. collar
Through new rock surfacing & subgrade, subject to saturated soil or freeze/thaw conditions.	2'-6" 2'-0"/ ** conc. collar	2'-6"/ conc. collar

* Use 2'-6" with size 2 mailbox.
** Use if conditions are severe.

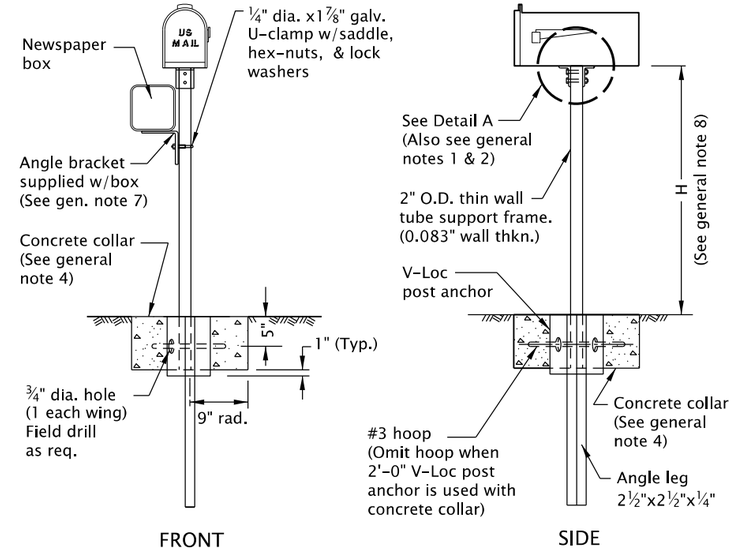
POST MOUNTING SOCKET



DETAIL A



DETAIL B



SINGLE SUPPORT

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Angle connections to be parallel to traffic flow for Size 2 mailbox mounted on single post.
2. All holes in the tube support frame are to be predrilled by the manufacturer.
3. Size 2 mailbox mounted on a multiple support requires 2 each ⅜" dia. x⅝" galv. bolts with lock washers and nuts to attach the adaptor plate to the mounting bracket. The unit will then require 4 angle connections to attach to the formed tube support frame. See Detail A.
4. Provide concrete collar when any of the following conditions exist:
   a) when required in Table A
   b) when required by project plans
   c) as directed by the Engineer

   Concrete collar, when required, to be poured in place after V-Loc post anchor has been installed, level and plumb. Do not excavate below bottom of V-Loc post anchor. Care shall be taken that no concrete is placed within anchor.
5. Other proprietary products available as listed in ODOT's QPL.
6. For mailbox installation locations, see Std. Dwg. RD101 and project plans.
7. For Newspaper Box Mounting Detail, see Std. Dwg. RD101.
8. Mounting height (H) shall be from 41″ Min. to 45″ Max. (42" nominal), measured from vehicle driving surface.
9. See project plans for detail not shown.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

MAILBOX SUPPORT

2024

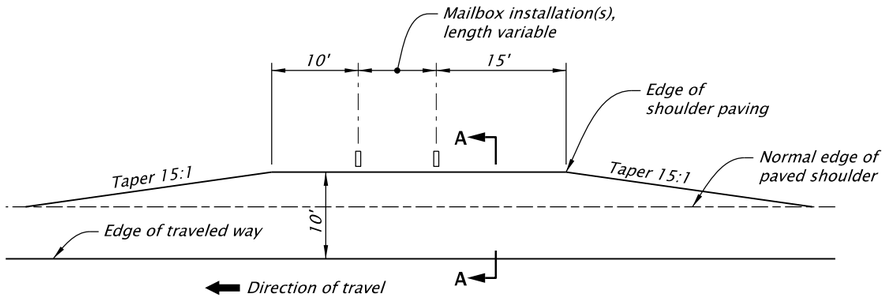
DATE	REVISION DESCRIPTION
12-2023	REVISED NOTES AND DETAILS

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **RD100**

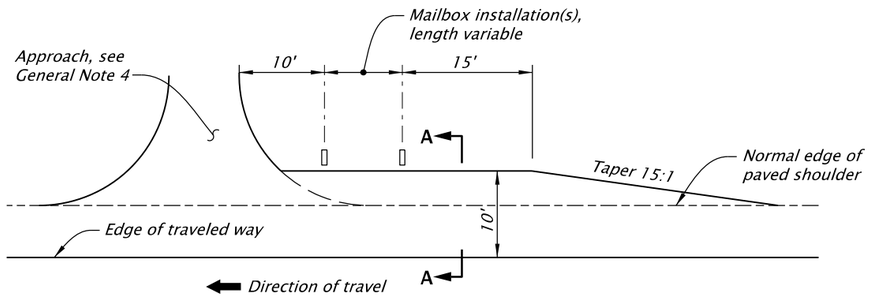
19-JAN-2024

RD100.dgn

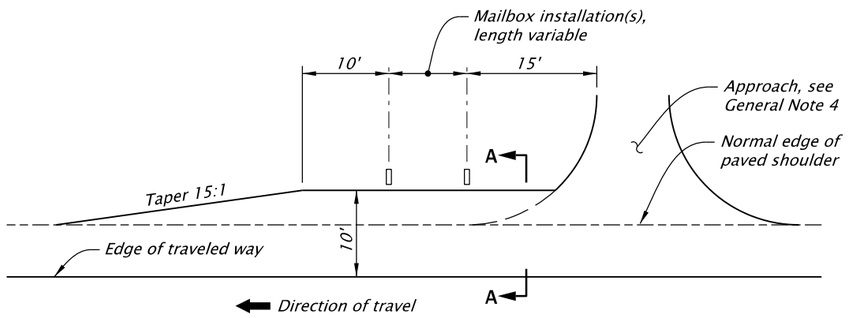
Effective Date: June 1, 2024 - November 30, 2024



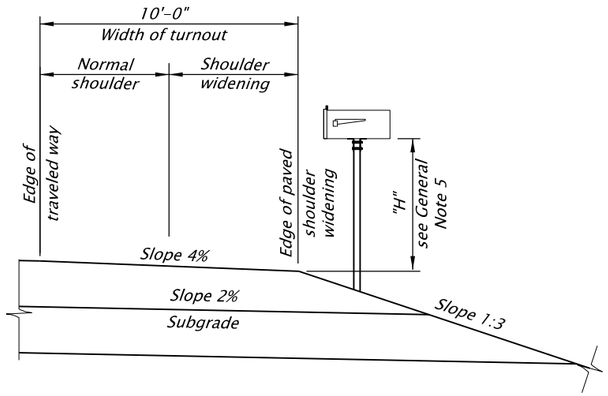
MAILBOX SERVICE TURNOUT



MAILBOX SERVICE TURNOUT BEFORE APPROACH

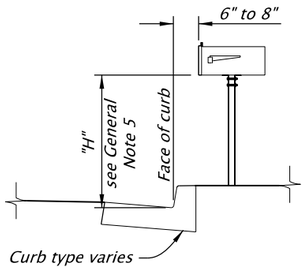


MAILBOX SERVICE TURNOUT AFTER APPROACH

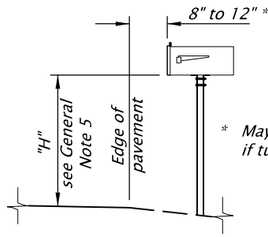


INSTALLATION AT MAILBOX TURNOUT

SECTION A-A



CURBED SECTION



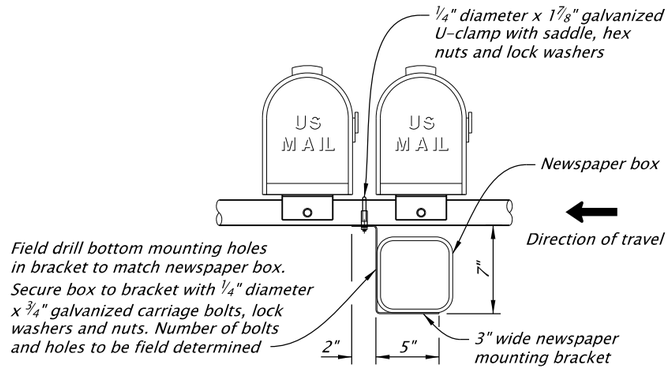
NON-CURBED SECTION

TYPICAL MAILBOX INSTALLATIONS

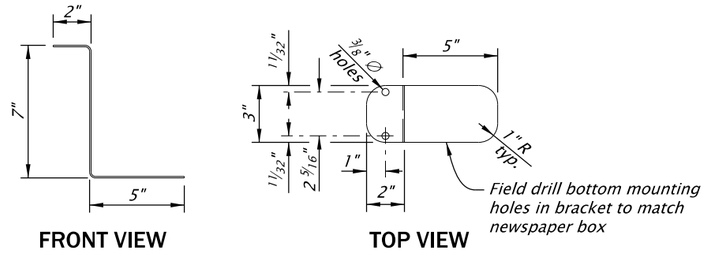
TYPICAL MAILBOX SUPPORT SPACING

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *All holes in the tube support frame are to be predrilled by the manufacturer.*
2. *Other proprietary products available as listed in ODOT's QPL.*
3. *For mailbox support details, see Std. Dwg. RD100.*
4. *For approach details, see Std. Dwg. RD715.*
5. *Mounting height ("H") shall be from 41 inches minimum to 45 inches maximum (42 inches nominal), measured from vehicle driving surface.*
6. *See project plans for details not shown.*



NEWSPAPER BOX MOUNTING DETAIL



NEWSPAPER BOX MOUNTING BRACKET

(14 ga.)

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

MAILBOX INSTALLATION

2024

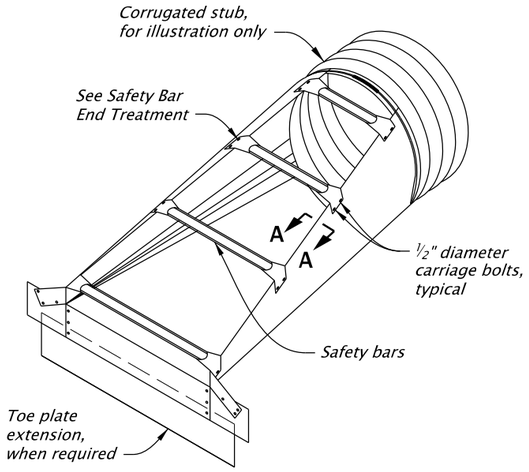
DATE	REVISION DESCRIPTION
01-2024	REVISED NOTES AND DETAILS, UPDATED DRAWING CAD STANDARDS

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **RD101**

Effective Date: June 1, 2024 - November 30, 2024

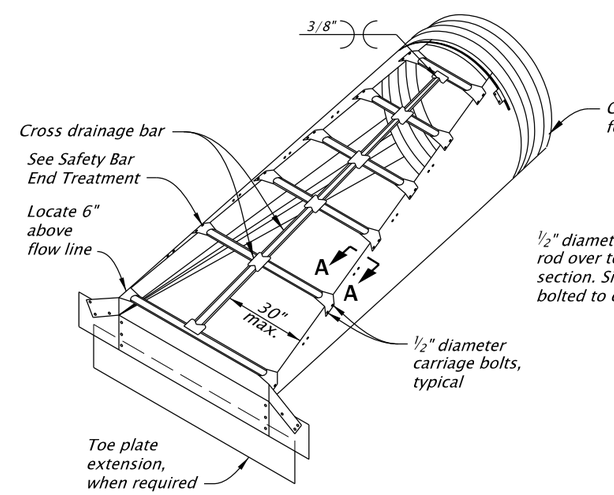
19-JAN-2024

RD101.dgn



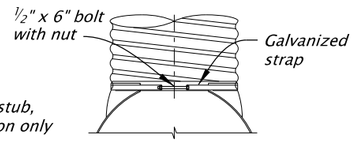
PARALLEL DRAINAGE STRUCTURE

Use with single pipe installations 30" diameter or larger.
Use with multiple pipe installations 15" diameter or larger.



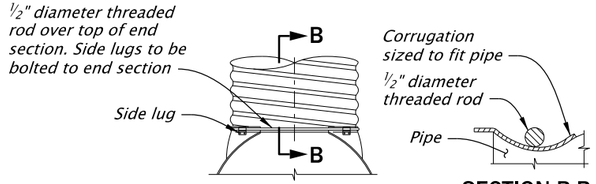
CROSS DRAINAGE STRUCTURE

Use with pipe installations 36" diameter and larger



TYPE 1 CONNECTOR

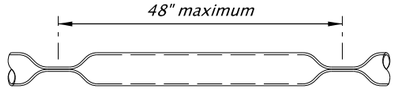
Through 24" diameters



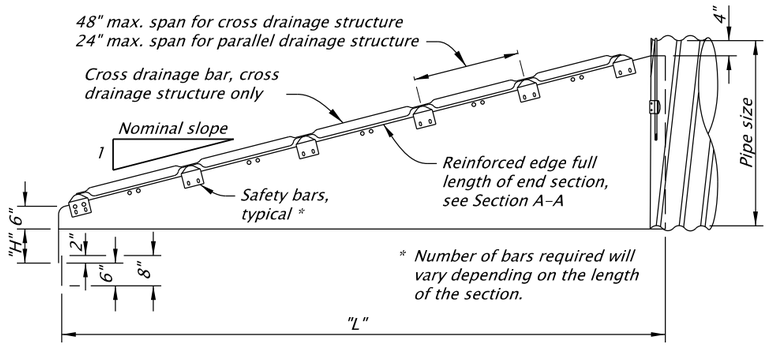
SECTION B-B

TYPE 2 CONNECTOR

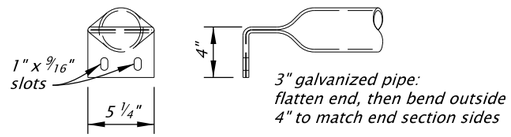
For 30" and larger diameters



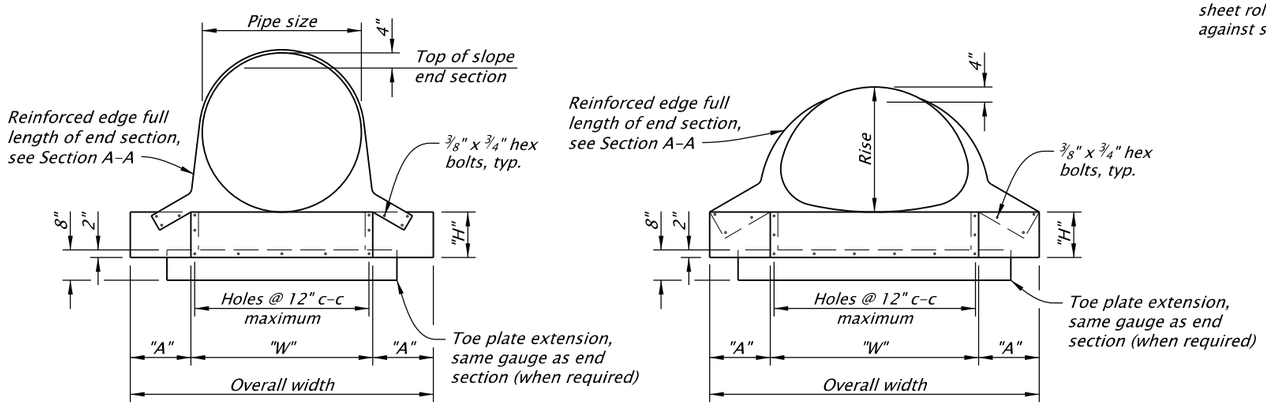
CROSS DRAINAGE BAR



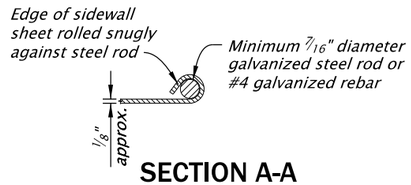
PARALLEL AND CROSS DRAINAGE SIDE ELEVATION



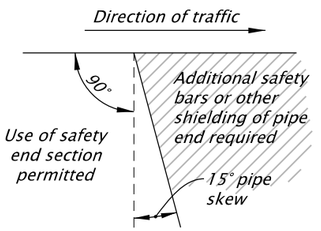
SAFETY BAR END TREATMENT



SAFETY END SECTION FRONT VIEWS



SECTION A-A



LOCATION DIAGRAM

GENERAL NOTES FOR ALL DETAILS THIS SHEET:

1. *For round pipes with diameters 24 inches or less use Type 1 connector. All arch pipes equivalent round diameter, and round pipes over 24 inch diameter use Type 2 connector.*
2. *Toe plate extensions are to be the same minimum thickness as end section. Dimensions shall be overall width less 6 inches by 8 inches high.*
3. *Cross drainage and safety bars shall be 3 inch diameter Schedule 40 galvanized steel pipe.*
4. *Slotted holes for safety bar attachment shall be provided for all end sections.*
5. *Cross-sectional dimensions of attaching pipe may vary with different materials.*
6. *Open ends of pipes normally require a site specific design, and may require special treament (slope ends, culvert embankment protection, paved end slopes, safety end sections, or other measures). See special details or Standard Drawings as called for on plans.*
7. *See Std. Dwg. RD317 for culvert embankment protection and riprap pads (when required).*

STEEL END SECTIONS FOR CIRCULAR PIPES

PIPE DIAMETER (In)	METAL THICK (MIN.) (In/Gage)	DIMENSIONS (Inches)					
		A	H	W	OVERALL WIDTH	L	
						SLOPE 1:4	SLOPE 1:6
15	0.064/16	8	6	21	37	20	30
18	0.064/16	8	6	24	40	32	48
21	0.064/16	8	6	27	43	44	66
24	0.064/16	8	6	30	46	56	84
30	0.109/12	12	9	36	60	80	120
36	0.109/12	12	9	42	66	104	156
42	0.109/12	16	12	48	80	128	192
48	0.109/12	16	12	54	86	152	228
54	0.109/12	16	12	60	92	176	264
60	0.109/12	16	12	66	98	200	300

STEEL END SECTIONS FOR ARCH PIPES

EQUIVALENT ROUND DIAMETER	SPAN ***	RISE ***	METAL THICK (MIN.) (In/Gage)	DIMENSIONS (Inches)					
				A	H	W	OVERALL WIDTH	L	
								SLOPE 1:4	SLOPE 1:6
18	21	15	0.064/16	8	6	27	43	20	30
21	24	18	0.064/16	8	6	30	46	32	48
24	28	20	0.064/16	8	6	34	50	40	60
30	35	24	0.079/14	12	9	41	65	56	84
36	42	29	0.109/12	12	9	48	72	76	114
42	49	33	0.109/12	16	12	55	87	92	138
48	57	38	0.109/12	16	12	63	95	112	168
54**	64	43	0.109/12	16	12	70	102	132	198
60**	71	47	0.109/12	16	12	77	109	148	222
72**	83	57	0.109/12	16	12	89	121	188	282

** *Requires two cross drainage bars.*
*** *See General Note 5.*

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

SAFETY END SECTION FOR METAL PIPE

2024

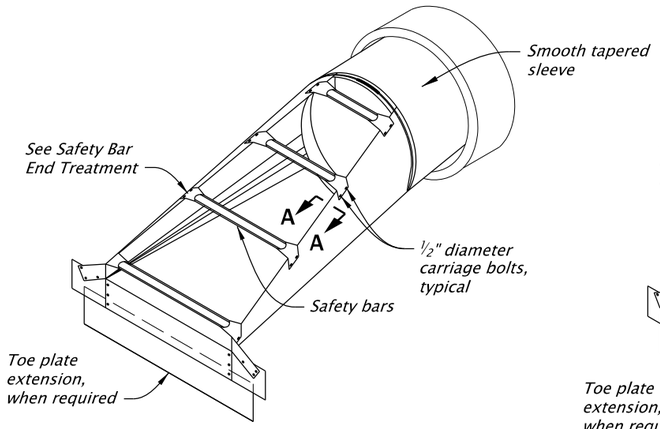
DATE	REVISION DESCRIPTION
01-2023	REVISED DETAILS AND NOTES
01-2024	REDRAWN TO CAD STANDARDS, REVISED DETAILS, TABLES AND NOTES

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **RD322**

Effective Date: June 1, 2024 - November 30, 2024

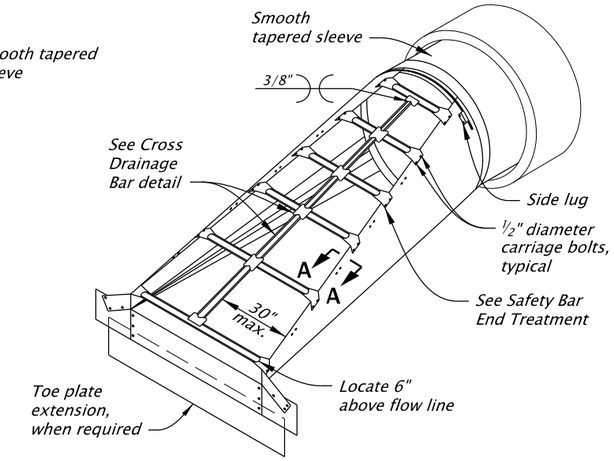
19-JAN-2024

RD324.dgn



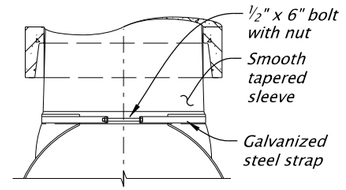
PARALLEL DRAINAGE STRUCTURE

Use with single pipe installations 30" diameter or larger.
Use with multiple pipe installations 15" diameter or larger.



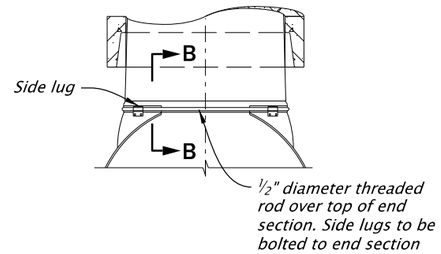
CROSS DRAINAGE STRUCTURE

Use with pipe installations 36" diameter and larger



TYPE 1 CONNECTOR

Through 24" diameter



TYPE 2 CONNECTOR

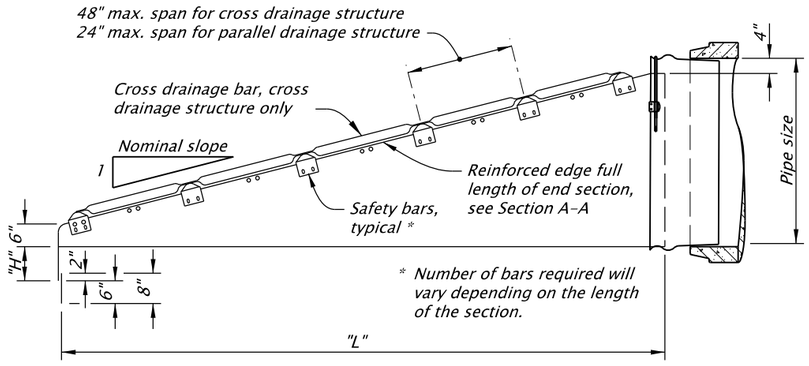
For 30" and larger diameters

GENERAL NOTES FOR ALL DETAILS THIS SHEET:

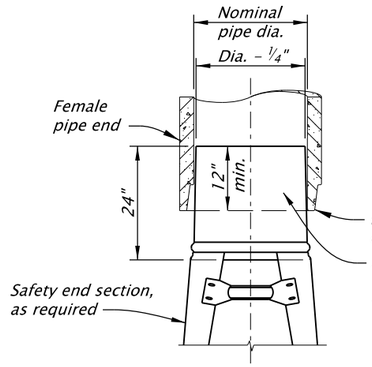
1. *For round pipes with diameters 24 inches or less use Type 1 connector. All arch pipes equivalent round diameter, and round pipes over 24 inch diameter use Type 2 connector.*
2. *Toe plate extensions are to be the same minimum thickness as end section. Dimensions shall be overall width less 6 inches by 8 inches high.*
3. *Cross drainage and safety bars shall be 3 inch diameter Schedule 40 galvanized steel pipe.*
4. *Slotted holes for safety bar attachment shall be provided for all end sections.*
5. *Open ends of pipes normally require a site specific design, and may require special treament (slope ends, culvert embankment protection, paved end slopes, safety end sections, or other measures). See special details or Standard Drawings as called for on plans.*
6. *See Std. Dwg. RD317 for culvert embankment protection and riprap pads (when required).*

STEEL END SECTIONS FOR CIRCULAR PIPES

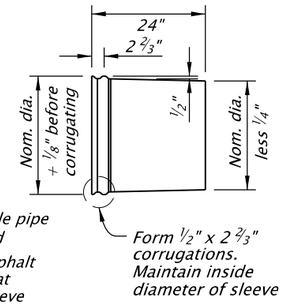
PIPE DIAMETER (In)	METAL THICK (MIN.) (In/Gage)	DIMENSIONS (Inches)					
		A	H	W	OVERALL WIDTH	L	
						SLOPE 1:4	SLOPE 1:6
15	0.064/16	8	6	21	37	20	30
18	0.064/16	8	6	24	40	32	48
21	0.064/16	8	6	27	43	44	66
24	0.064/16	8	6	30	46	56	84
30	0.109/12	12	9	36	60	80	120
36	0.109/12	12	9	42	66	104	156
42	0.109/12	16	12	48	80	128	192
48	0.109/12	16	12	54	86	152	228
54	0.109/12	16	12	60	92	176	264
60	0.109/12	16	12	66	98	200	300



PAPRALLEL AND CROSS DRAINAGE SIDE ELEVATION



PLAN

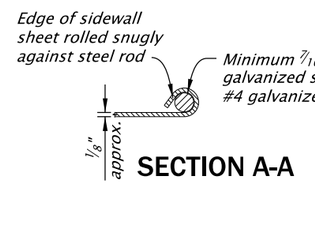


NOTE: Metal to be smooth galvanized steel in accordance with AASHTO M218.
0.079" (14 ga.) minimum thickness up to 18" diameter
0.109" (12 ga.) minimum thickness over 18" diameter

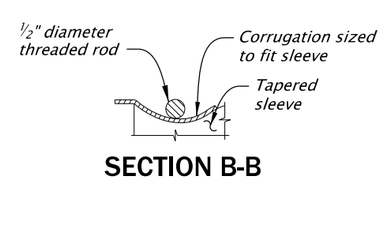
SMOOTH TAPERED SLEEVE

SMOOTH TAPERED SLEEVE DETAIL

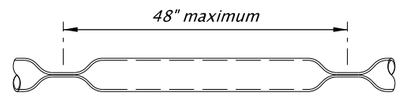
For attaching steel safety end sections to concrete pipe



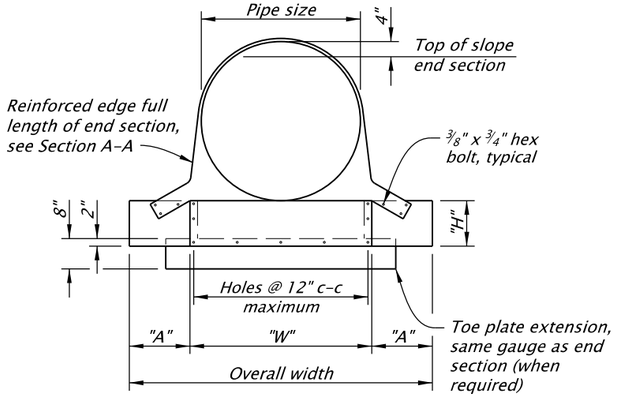
SECTION A-A



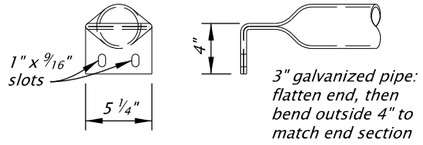
SECTION B-B



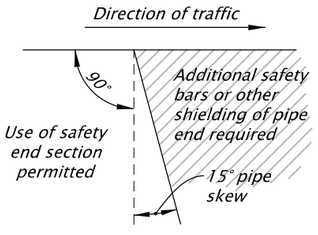
CROSS DRAINAGE BAR



SAFETY END SECTION FRONT VIEW



SAFETY BAR END TREATMENT



LOCATION DIAGRAM

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

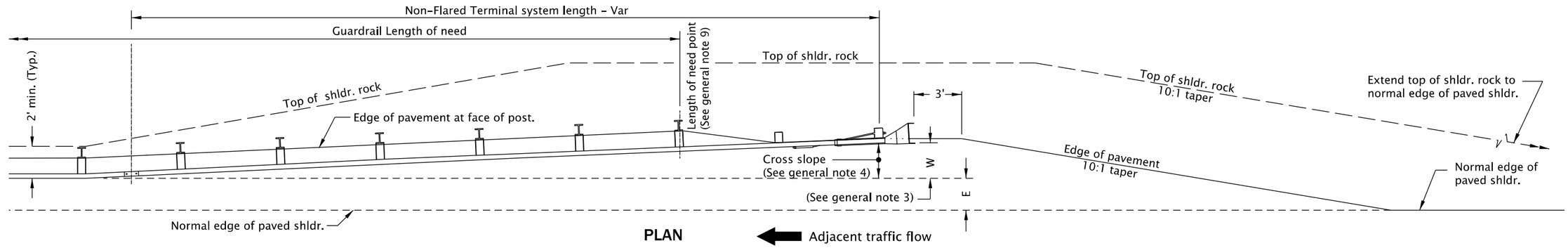
SAFETY END SECTION FOR CONCRETE, PVC, HDPE AND POLYPROPYLENE PIPE

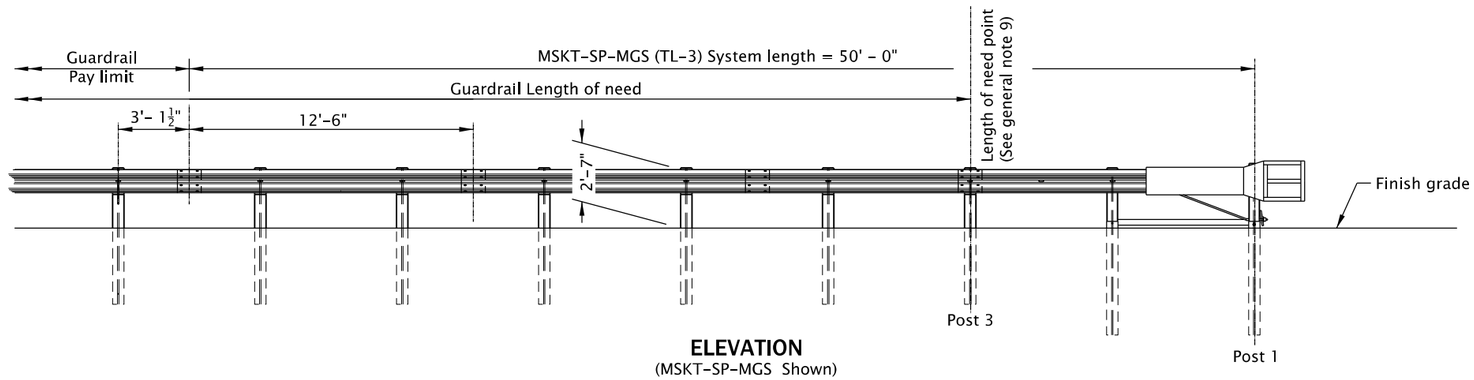
2024

DATE	REVISION DESCRIPTION
01-2023	REVISED DETAILS AND NOTES
01-2024	REDRAWN TO CAD STANDARDS, REVISED DETAILS AND NOTES

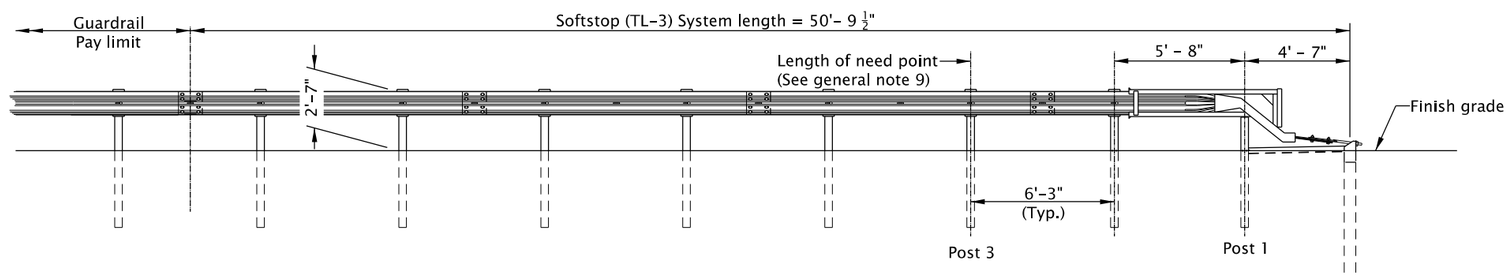
CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **RD324**

Effective Date: June 1, 2024 - November 30, 2024

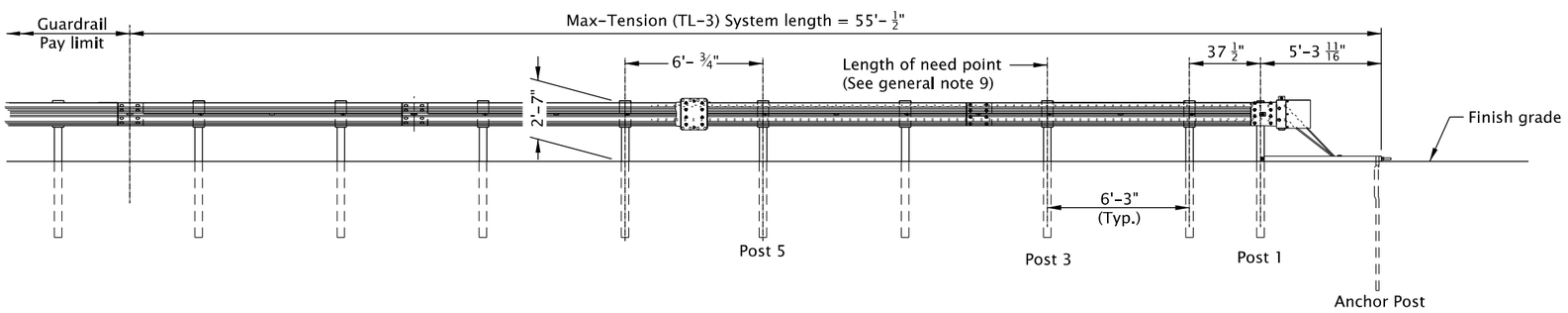




ELEVATION
(MSKT-SP-MGS Shown)



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 standard drawing(s) for details not shown. See project plans for details not shown. See Std. Dwg. RD701 for drainage curbs, where required. E=2' or as shown on project plans.
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 crashworthy terminal flared or non-flared. Paving of widened shldr. to the face of posts on both ends of guardrail runs is required. See Std. Dwgs. RD443 and RD444.
6. Provide guardrail terminal from ODOT's QPL. Install according to manufacturer's recommendations (post count varies). Provide shop drawings to Engineer.
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.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

MIDWEST GUARDRAIL SYSTEM NON-FLARED ENERGY-ABSORBING TERMINAL

2024

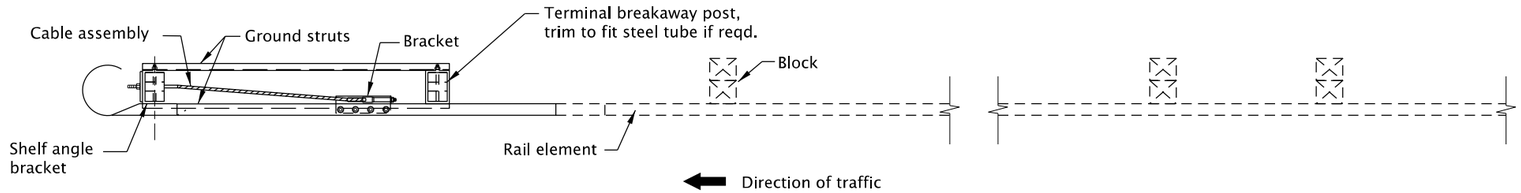
DATE	REVISION DESCRIPTION

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **RD420**

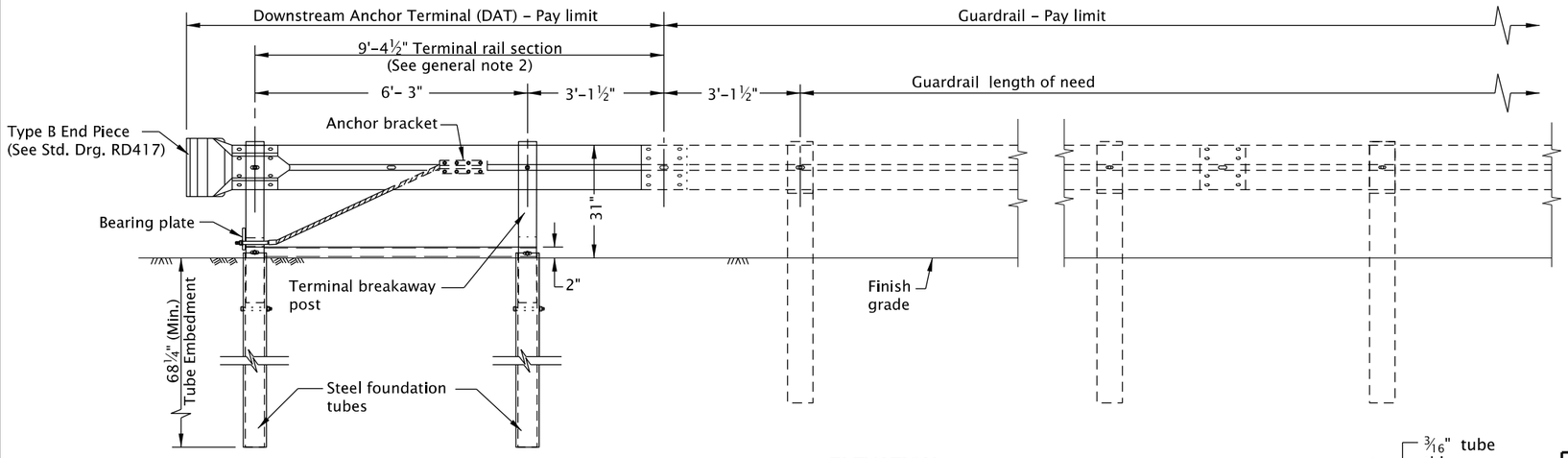
19-JAN-2024

RD420.dgn

Effective Date: June 1, 2024 - November 30, 2024



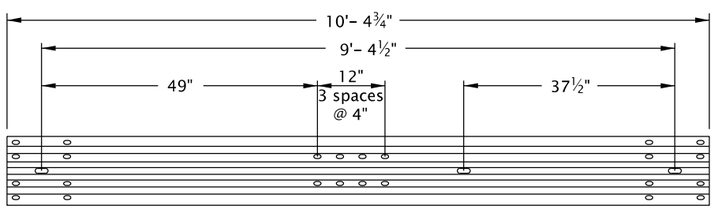
PLAN



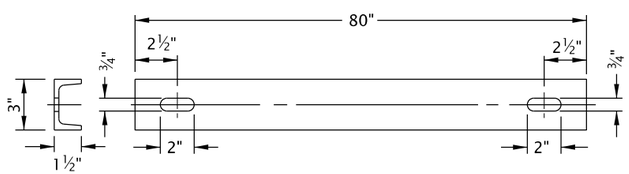
ELEVATION

DOWNSTREAM ANCHOR TERMINAL (DAT)

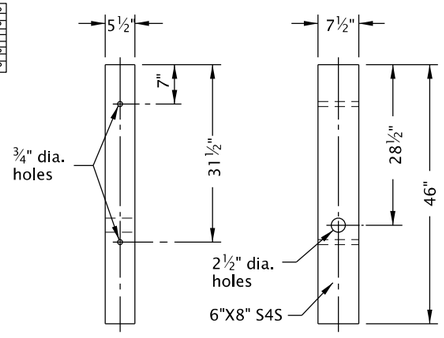
(See general note 1)



TERMINAL RAIL ELEMENT

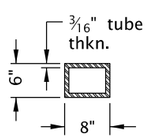


CHANNEL STRUT

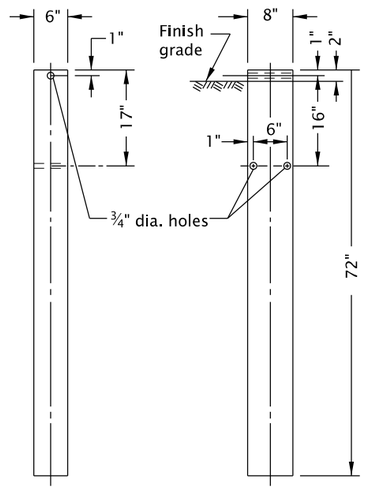


FRONT **SIDE**

TERMINAL BREAKAWAY POST

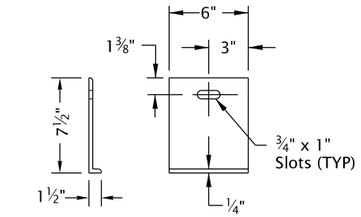


TOP

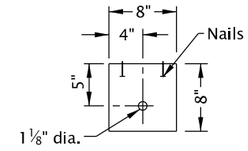


FRONT **SIDE**

STEEL FOUNDATION TUBE

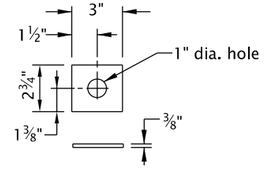


SHELF ANGLE BRACKET



NOTE: Drive nails and bend over to prevent plate rotation

BEARING PLATE



END PLATE

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 standard drawing(s) 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.
7. See Std. Dwg. RD417 for Type B End Piece.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

MIDWEST GUARDRAIL SYSTEM DOWNSTREAM ANCHOR TERMINAL (DAT)

2024

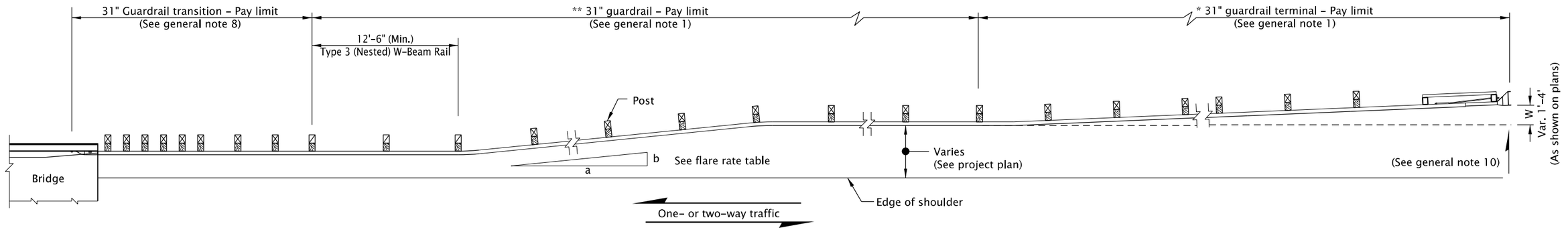
DATE	REVISION DESCRIPTION
09-2023	REVISED NOTES

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **RD438**

Effective Date: June 1, 2024 – November 30, 2024

19-JAN-2024

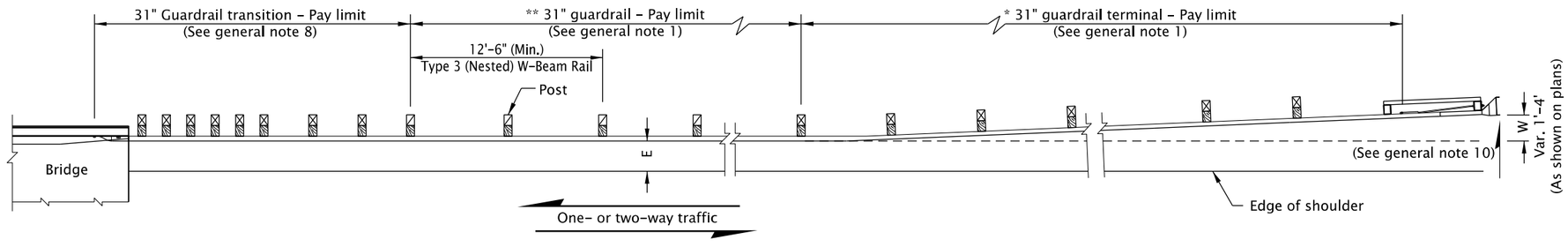
RD438.dgn



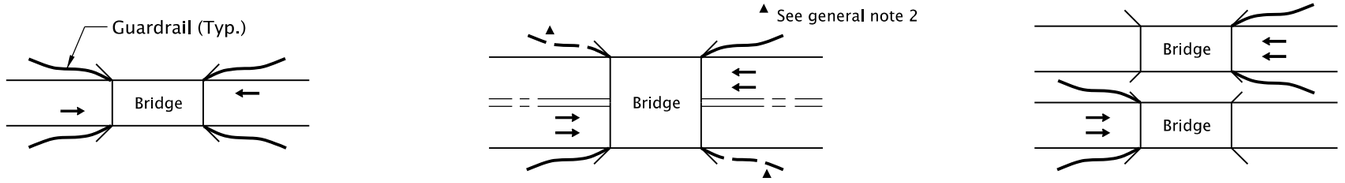
NARROW BRIDGE ON ONE OR TWO-WAY TRAFFIC

* Provide from ODOT's QPL.
Install according to manufacturer's instruction.

** Length of need calculation will determine quantity of Type 2A required.



ONE OR TWO-WAY TRAFFIC



TWO LANE | MULTILANE | MULTILANE

LOCATIONS AT BRIDGE ENDS (MINIMUM SHOWN)

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

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate standard drawing(s) for details not shown.
   See dwg. no. RD482 for Type 3 (Nested) W-Beam details.
2. Guardrail at indicated positions is required for protection at bridge ends.
   Additional guardrail is to be installed as required by guardrail warrant and fastened to bridge.
3. Face of guardrail at locations shown above must match face of bridge curb or bridge rail on structure without curb.
4. Trailing ends (Freeway, multilane and similar one-way facilities) not exposed to opposing traffic:
   (a) Guardrail terminals, use a Downstream Anchor Terminal (DAT) (RD438), Type B end piece and do not flare.
   (b) At bride ends, omit transition guardrail & Type 3 guardrail. Use bridge connection (Bridge drawing BR236) and guardrail as required in plans.
5. Rail expansion slots to be provided at bridge end connections.
   See dwg. no. RD412 "MIDWEST GUARDRAIL SYSTEM INSTALLATION AT BRIDGE DECK EXPANSION JOINT" details and notes.
6. Where bridges employ guardrail in lieu of handrail or vehicular barriers, adjacent connecting guardrail runs shall be the same type.
7. (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 re-tightening as required to be done 30 days after initial installation.
8. See project plans for details not shown. For transition guardrail detail and installation limits at bridge ends, see applicable bridge drawings.
9. "W" distance is measured from face of guardrail at end post, exclusive of end piece.
10. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 1V : 10H when the guardrail is within 12'-0" from the edge of the shoulder. Paving of widened shoulder to face of posts in both ends of guardrail runs is required.
11. Wood or steel post. Wood post shown.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

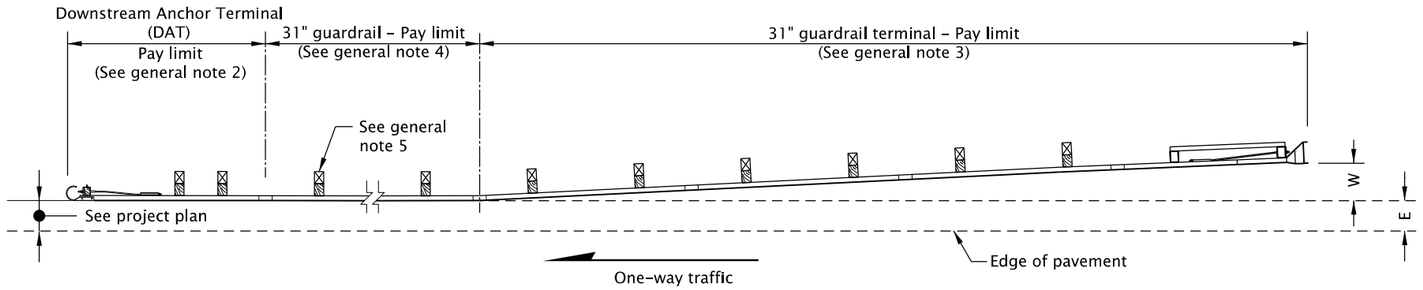
MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS AT BRIDGE ENDS

2024

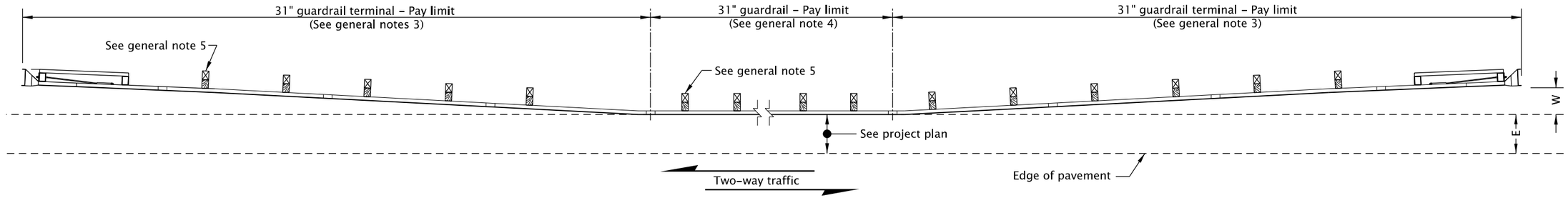
DATE	REVISION DESCRIPTION
12-2021	REVISED NOTES
12-2023	REVISED DETAILS AND NOTES

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **RD442**

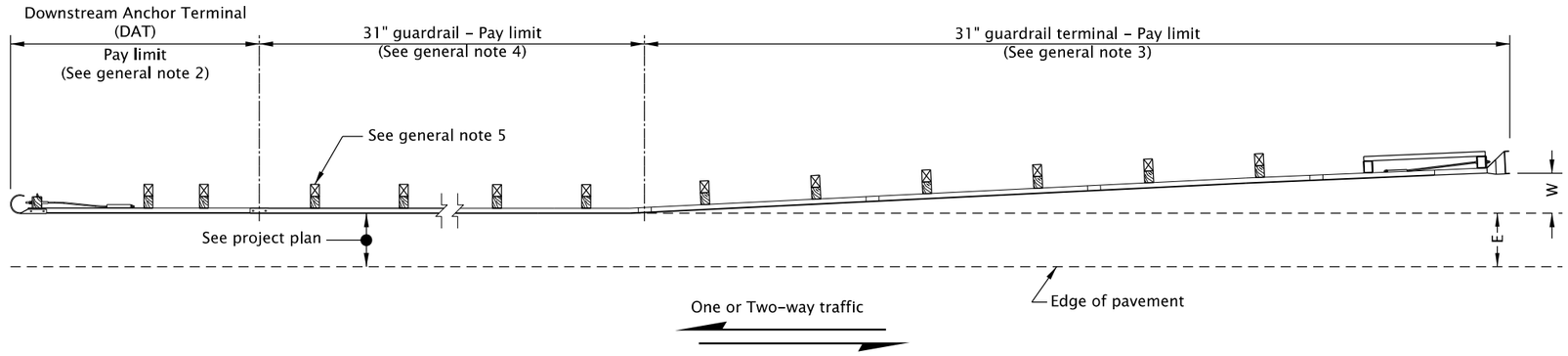
Effective Date: June 1, 2024 - November 30, 2024



ONE-WAY TRAFFIC



TWO-WAY TRAFFIC



ONE OR TWO-WAY TRAFFIC

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate guardrail standard drawing(s) for details not shown.
2. Where a crashworthy terminal is not required, use a Downstream Anchor Terminal (DAT). See Std. Dwg. RD438.
3. For terminal type and details, see project plans and applicable drawings.
4. For additional details not shown on this plan, refer to Std. Dwg. RD407.
5. Wood or steel post. Wood post shown.
6. Guardrail Non-flared terminal shall be installed with a min. 1 foot offset ensuring that the end piece is entirely off normal shldr.
7. On two way two lane highways, both ends of guardrail runs shall be provided with a crashworthy terminal flared or non-flared. Paving of widened shldr. to the face of posts on both ends of guardrail runs is required. See Std. Dwgs. RD420, and RD444.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR EMBANKMENTS

2024

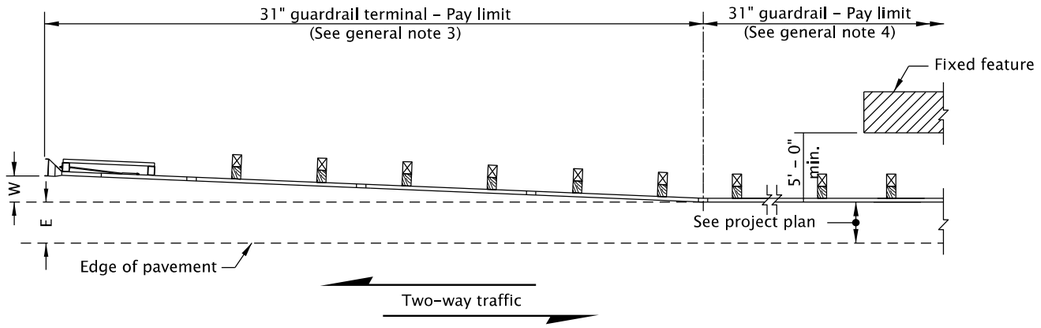
DATE	REVISION DESCRIPTION
12-2023	REVISED NOTES AND DETAILS

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **RD443**

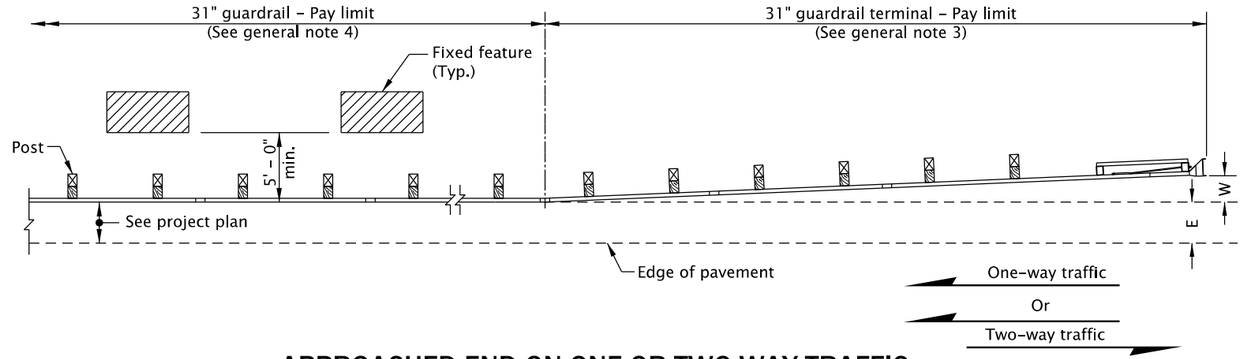
Effective Date: June 1, 2024 – November 30, 2024

19-JAN-2024

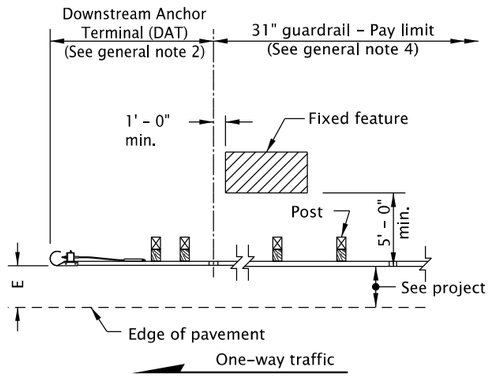
RD443.dgn

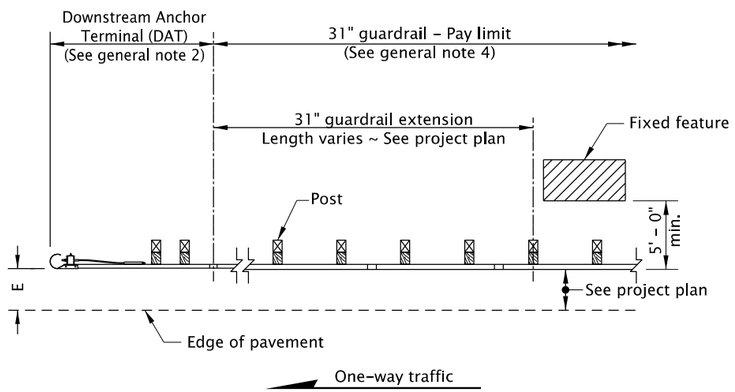


TRAILING END TWO-WAY TRAFFIC



APPROACHED END ON ONE OR TWO-WAY TRAFFIC





TRAILING END ONE-WAY TRAFFIC

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate guardrail standard drawing(s) for details not shown.
2. Where a crashworthy terminal is not required, use a Downstream Anchor Terminal (DAT). See Std. Dwg. RD438.
3. For terminal type and details, see project plans and applicable drawings.
4. For additional details not shown on this plan, refer to Std. Dwg. RD407.
5. Wood or steel post. Wood post shown.
6. Guardrail Non-flared terminal shall be installed with a min. 1 foot offset ensuring that the end piece is entirely off normal shldr.
7. On two way two lane highways, both ends of guardrail runs shall be provided with a crashworthy terminal flared or non-flared. Paving of widened shldr. to the face of posts on both ends of guardrail runs is required. See Std. Dwgs. RD420, and RD443.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR FIXED OBJECTS

2024

DATE	REVISION DESCRIPTION
12-2023	REVISED NOTES AND DETAILS

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **RD444**

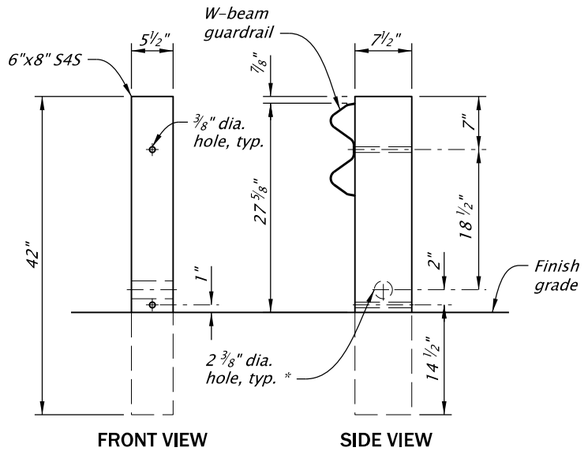
19-JAN-2024

RD444.dgn

Effective Date: June 1, 2024 - November 30, 2024

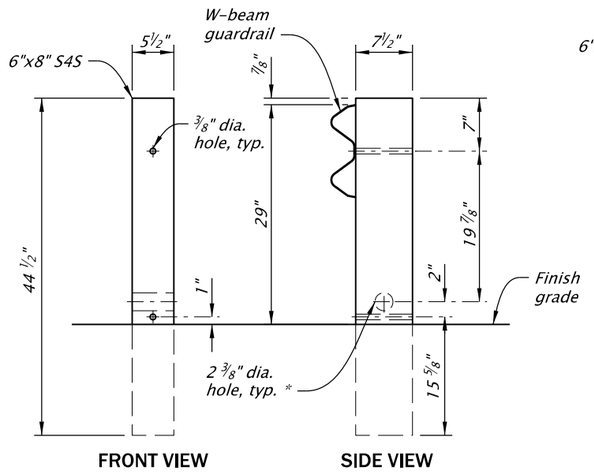
19-JAN-2024

RD451.dgn



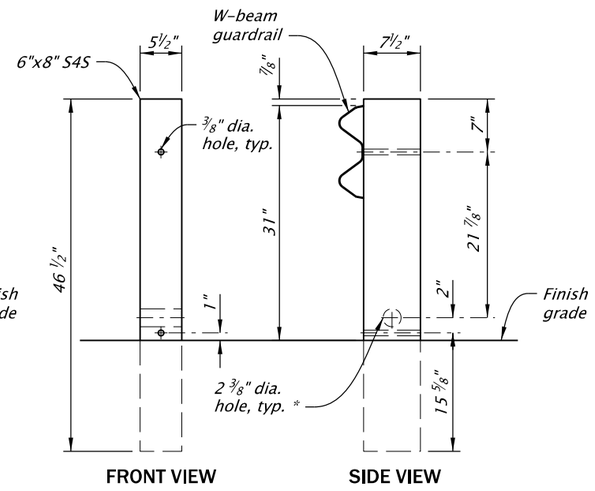
TOP OF RAIL HEIGHT 27⅝"

This detail is retained for maintenance purposes only. Do not use for new construction.



TOP OF RAIL HEIGHT 29"

This detail is retained for maintenance purposes only. Do not use for new construction.



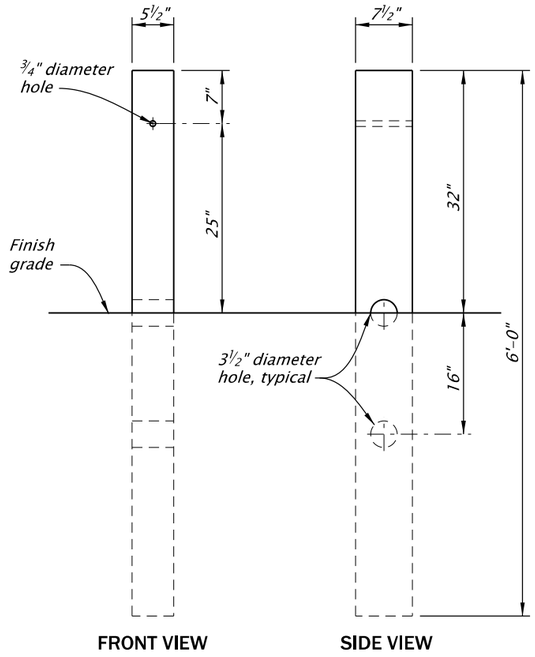
TOP OF RAIL HEIGHT 31"

W-BEAM WOOD BREAKAWAY POSTS

* 2" standard pipe in end post only, 2 ⅜" diameter hole

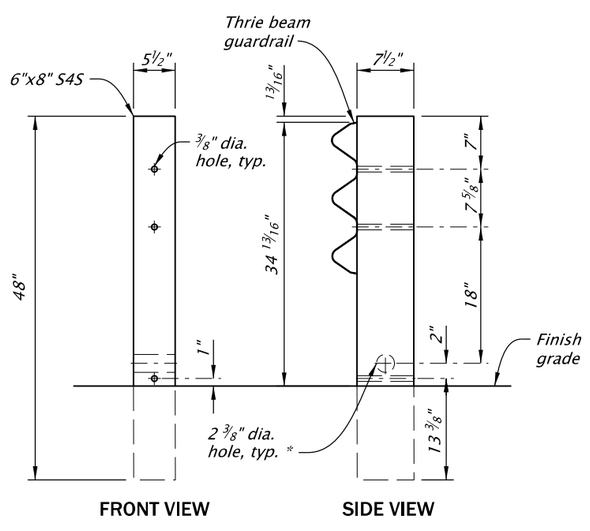
GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *See appropriate guardrail standard drawing(s) for details not shown.*
2. *Use only 6"x8" S4S wood posts, trim to fit steel tube if required.*

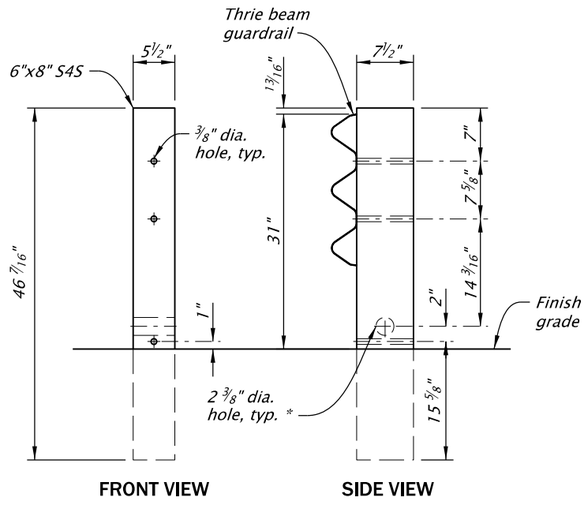


TOP OF RAIL HEIGHT 31"

CONTROLLED RELEASE TERMINAL (CRT) POST



TOP OF RAIL HEIGHT 35" (NOMINAL)



TOP OF RAIL HEIGHT 31"

THRIE BEAM WOOD BREAKAWAY POSTS

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

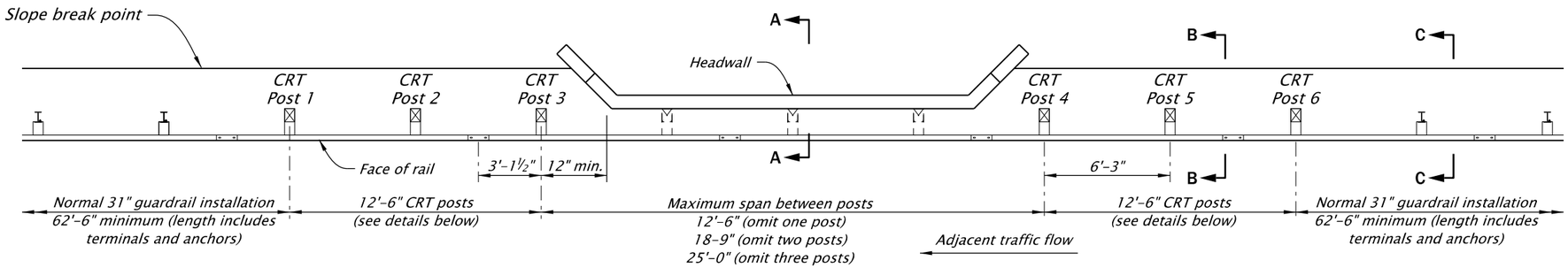
WOOD BREAKAWAY POSTS

2024

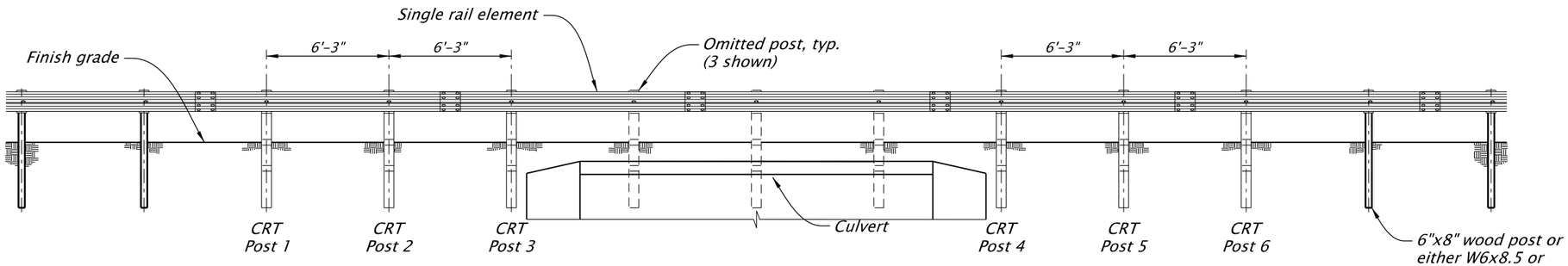
DATE	REVISION DESCRIPTION
12-2023	ADDED CRT POST, UPDATED DRAWING CAD STANDARDS

CALC. BOOK NO. N/A | SDR DATE ~~19-JAN-2024~~ | **RD451**

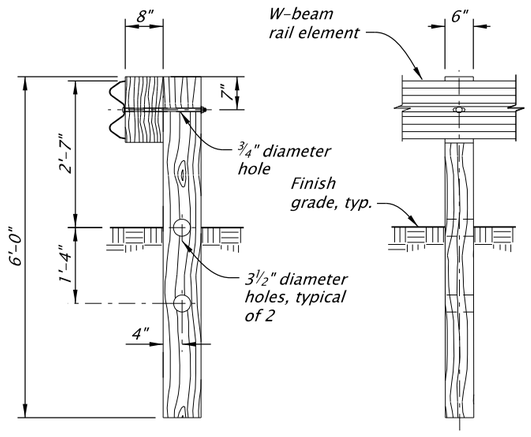
Effective Date: June 1, 2024 – November 30, 2024



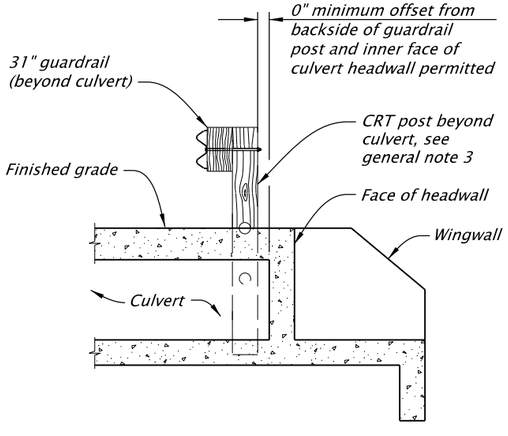
PLAN



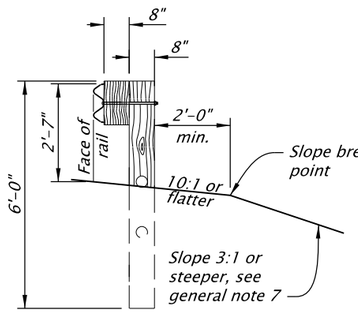
ELEVATION



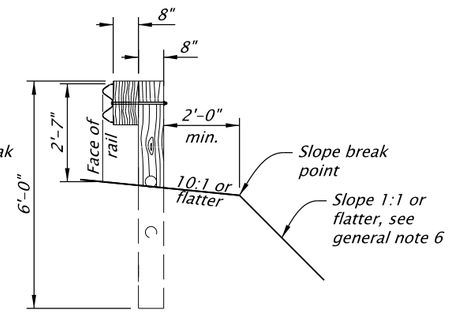
CONTROLLED RELEASING TERMINAL (CRT) POST DETAIL



SECTION A-A



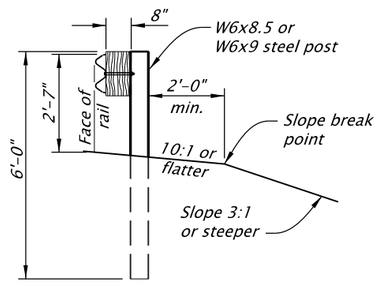
SPAN WITH HEADWALLS



SPAN WITHOUT HEADWALLS

SECTION B-B

(CRT post shown)



SECTION C-C

(Steel post shown)

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *See appropriate guardrail standard drawing(s) 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 foot span of W-beam guardrail.*
3. *Controlled Releasing terminal (CRT) post to be wood only.*
4. *Guardrail shall be lapped in the direction of adjacent traffic.*
5. *Install at least 62'-6" (10 post spacings) of tangent Type 31 guardrail from CRT Post 3 and CRT Post 4 before starting a taper or radius rail guardrail.*
6. *Install at least 62'-6" (10 post spacings) of Type 31 guardrail upstream and downstream from CRT posts 1 and CRT post 6. Length includes terminals and anchors.*
7. *Grading requirements for spans without headwalls must begin at least 43'-9" (7 post spacings) before CRT Post 3, extend through the obstruction area, and end at least 43'-9" (7 post spacings) after CRT Post 4.*
8. *Grading requirements for spans with headwalls must extend 43'-9" (7 post spacings) minimum upstream and downstream from CRT Post 3 and CRT Post 4.*

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

MIDWEST GUARDRAIL SYSTEM OVER LOW-FILL CULVERTS OMITTED POST

2024

DATE	REVISION DESCRIPTION
06-2023	REVISED DETAILS AND NOTES, TITLE CHANGE
12-2023	REVISED DETAILS AND NOTES

CALC. BOOK NO. N/A

SDR DATE 19-JAN-2024

RD471

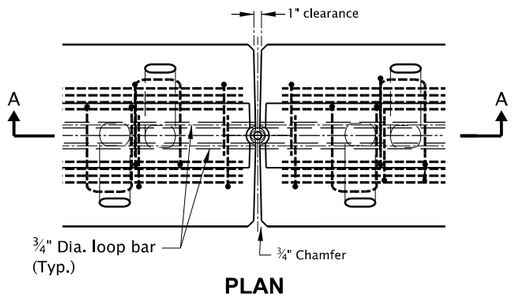
Effective Date: June 1, 2024 - November 30, 2024

19-JAN-2024

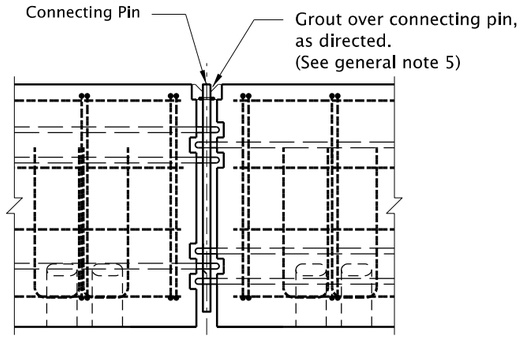
RD471.dgn

19-JAN-2024

RD501.dgn

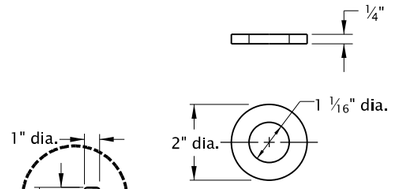


PLAN

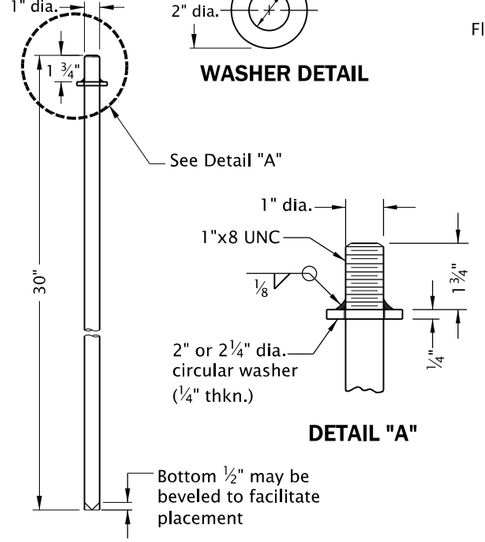


SECTION A-A

PIN AND LOOP CONNECTION

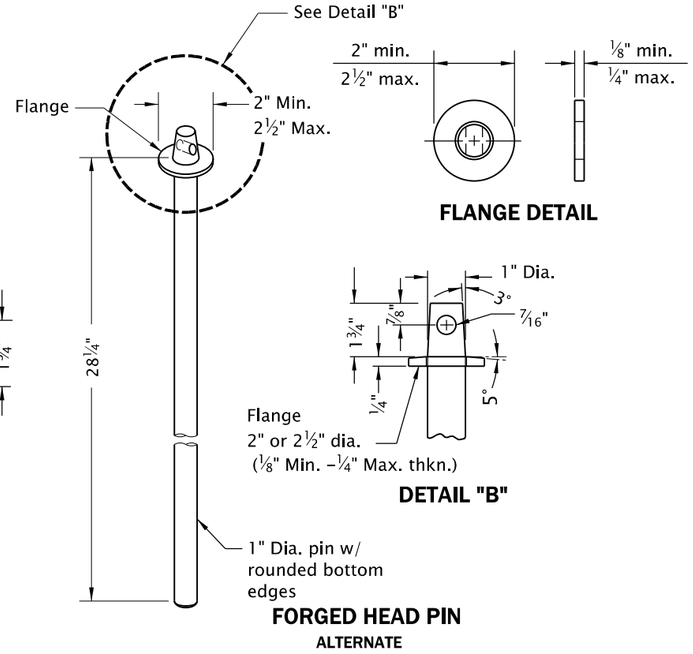


WASHER DETAIL



WELDED WASHER PIN

DETAIL "A"



FORGED HEAD PIN
ALTERNATE

FLANGE DETAIL

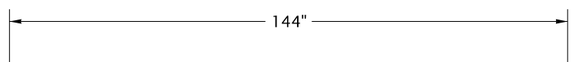
DETAIL "B"

CONNECTING PIN ASSEMBLY DETAIL

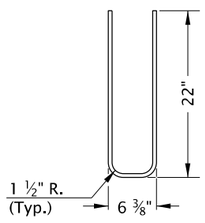
NOTE: Washer shall be forged as integral part of pin or shall be welded as shown.

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

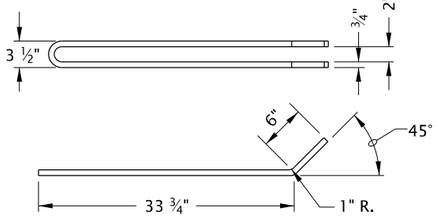
1. *See Std. Dwg. RD500 for details not shown. See Std. Dwg. RD502 for new permanent installations barrier anchoring details (when being anchored). See Std. Dwgs. RD515 and RD516 for concrete barrier that is maintained for use in temporary installations.*
2. *All reinforcement shall be full length as shown and shall be 2 inches clear of nearest face of concrete, unless otherwise shown.*
3. *Narrow base shoulder barrier to be used only at locations with backfill behind barrier as shown on plans.*
4. *Temporary concrete barrier to be precast concrete median barrier with pin and loop assembly. See Std. Dwg. RD502.*
5. *Concrete grout for grouting over pins, pinning holes or grouting of scuppers shall be portland cement grout, weak in strength and of thick consistency, as directed.*
6. *All pins, bolts, dowels, loop bars, and connectors shall be hot-dip galvanized after fabrication.*
7. *The reinforcing steel details for the "Narrow Base Shoulder Barrier" are the same as those shown for the 24 inch wide barrier except for the stirrup bars. See "Narrow Base Shoulder Barrier Stirrup" Detail.*
8. *Connecting pin head designs vary among different manufacturers. Pin designs that are shaped differently than those shown in the details are acceptable, if the bearing surface is within the minimum and maximum widths specified.*



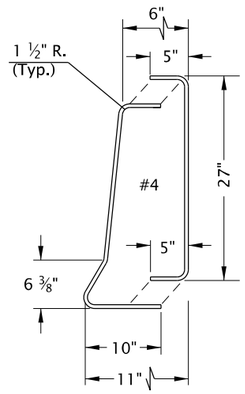
#4 LONGITUDINAL BAR



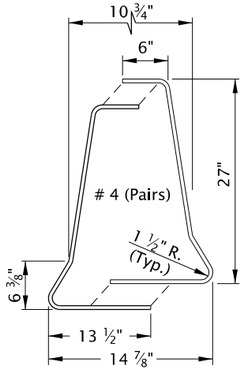
#4 PIN SLOT BAR
(When required)



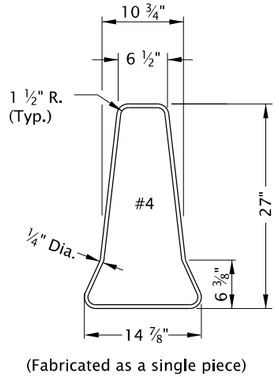
#4 LOOP BAR DETAIL



NARROW BASE
SHOULDER BARRIER STIRRUP "S"
(#4 Rebar)



ALTERNATE



(Fabricated as a single piece)

STANDARD

MEDIAN BARRIER STIRRUP "M"
(#4 Rebar)

REINFORCING STEEL BENDING DIAGRAM

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

32" CONCRETE BARRIER TYPE "F" PRECAST REINFORCING

2024

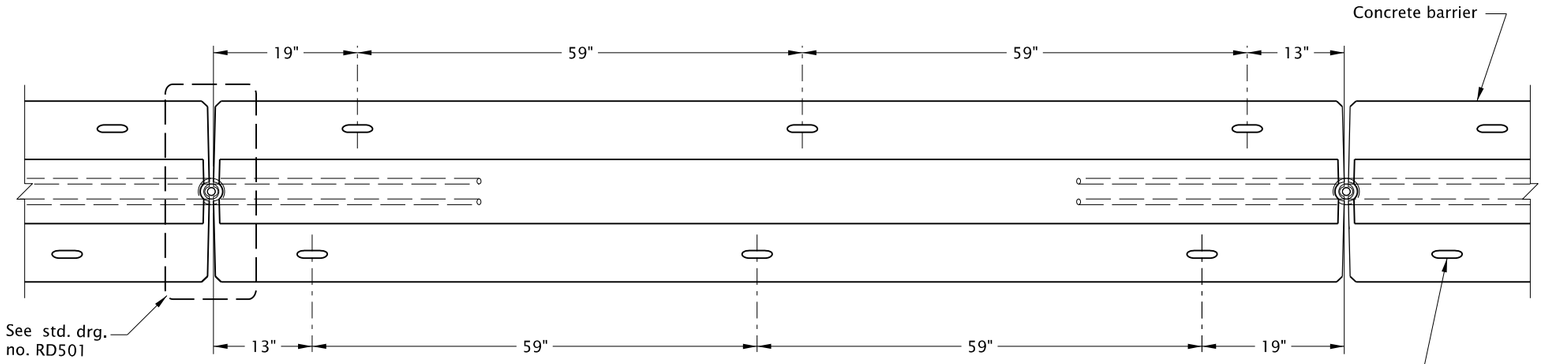
DATE	REVISION DESCRIPTION
01-2021	NEW DRAWING CREATED
07-2021	GENERAL ANNOTATION CLEANUP
06-2023	REVISED DETAILS AND NOTES
12-2023	GENERAL ANNOTATION CLEANUP

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **RD501**

Effective Date: June 1, 2024 - November 30, 2024

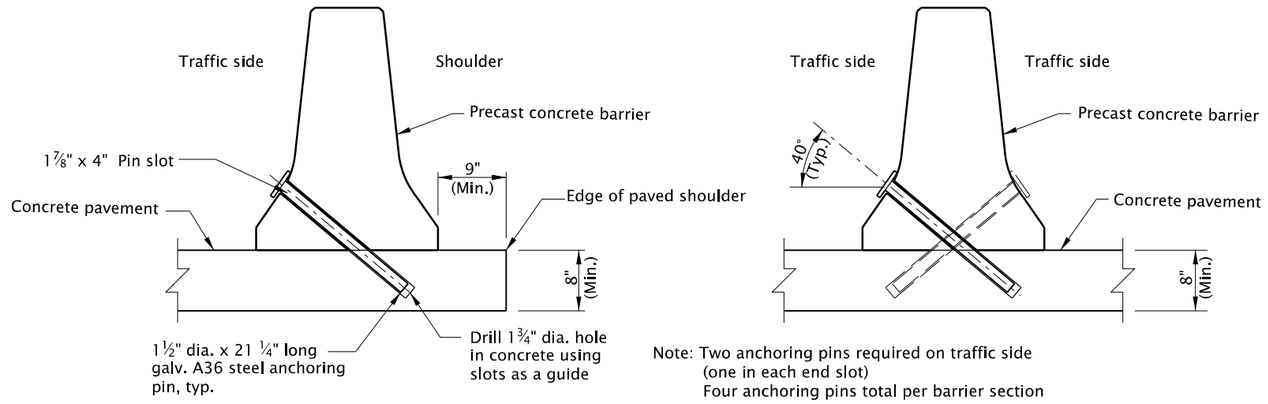
19-JAN-2024

RD502.dgn



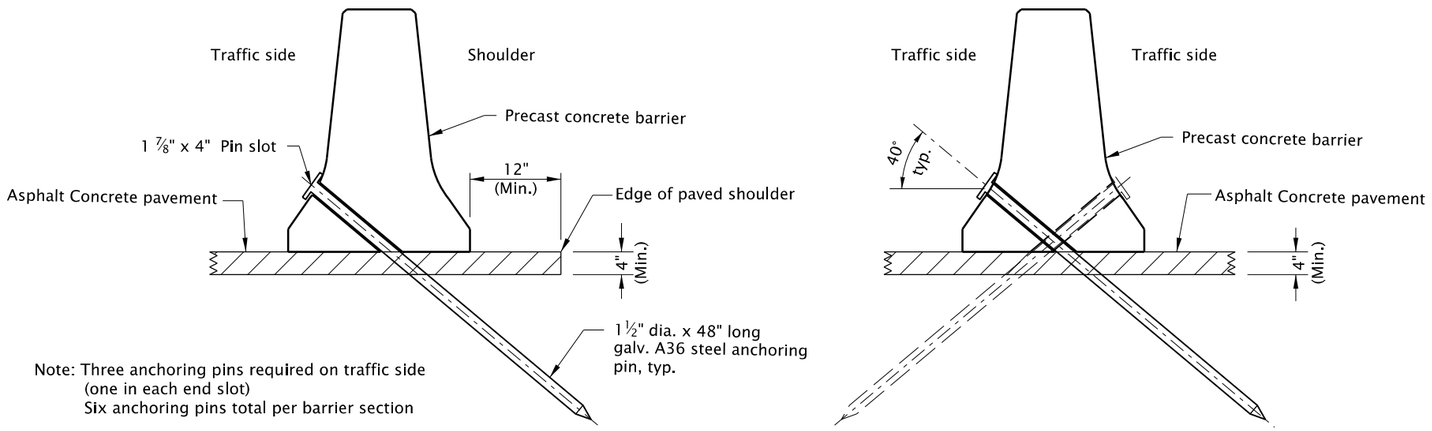
PLAN

CONCRETE BARRIER ANCHORING PIN LOCATIONS



Note: Two anchoring pins required on traffic side
(one in each end slot)
Four anchoring pins total per barrier section

CONCRETE ANCHORING PIN DETAILS



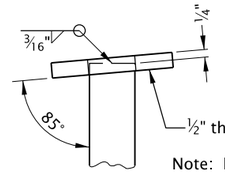
Note: Three anchoring pins required on traffic side
(one in each end slot)
Six anchoring pins total per barrier section

ASPHALT ANCHORING PIN DETAILS

METHODS OF SECURING CONCRETE BARRIER TO ROADWAY

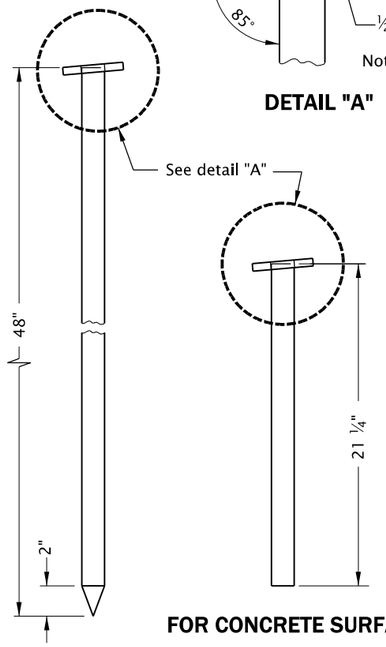
GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *This drawing applies to new permanent installations of concrete barrier (when being anchored) to the roadway. See Std. Dwgs. RD515 and RD516 for concrete barrier that is maintained for use in temporary installations. See Std. Dwgs. RD500 and RD501 for details not shown.*
2. *Concrete grout for grouting over pins, pinning holes or grouting of scuppers shall be portland cement grout, weak in strength and of thick consistency, as directed.*
3. *All pins, bolts, dowels, loop bars, and connectors shall be hot-dip galvanized after fabrication.*



DETAIL "A"

Note: If desired, the plate may be welded top and bottom for applications where the pin will be pulled out later, such as in temporary installations.



FOR ASPHALT SURFACE

FOR CONCRETE SURFACE

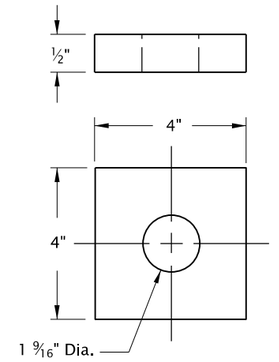


PLATE WASHER DETAIL

ANCHORING PIN ASSEMBLY DETAIL

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

SECURING 32" TYPE "F" AND TALL 42" PRECAST CONCRETE BARRIER TO THE ROADWAY

2024

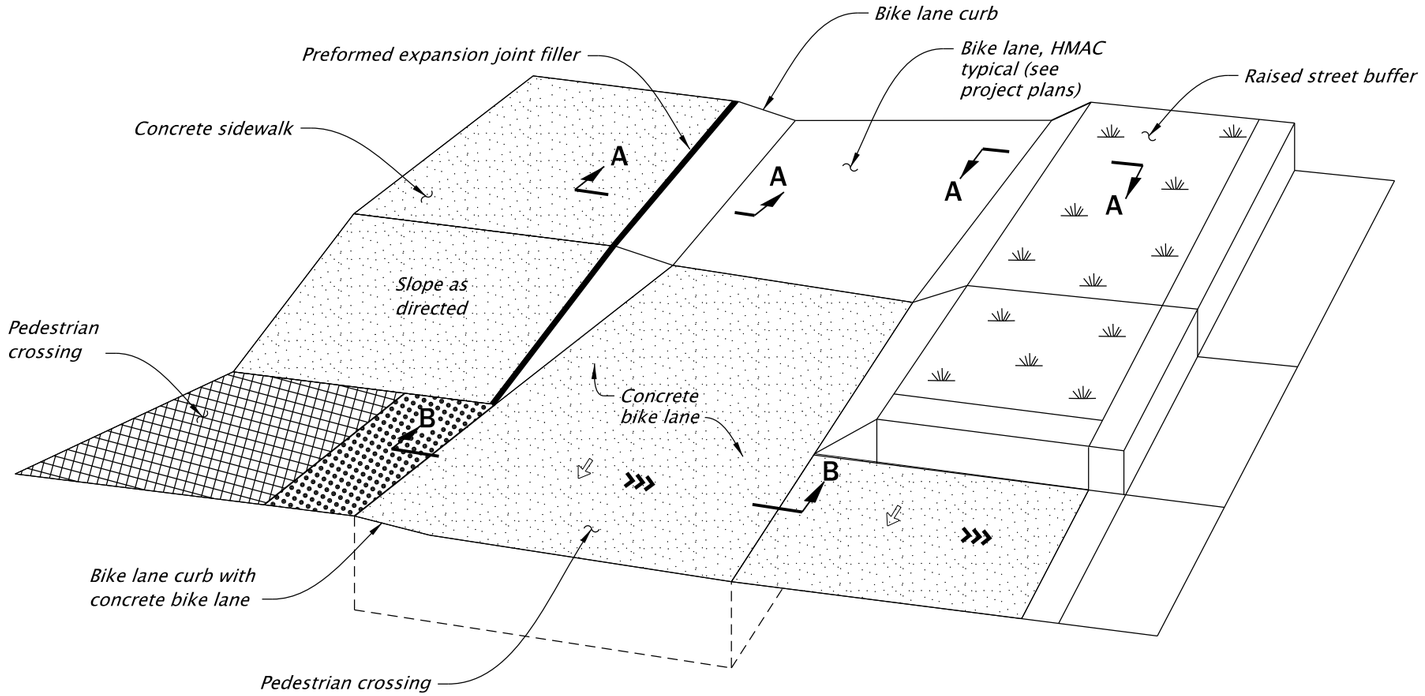
DATE	REVISION DESCRIPTION
10-2020	NEW DRAWING CREATED
01-2022	REVISED NOTES
01-2023	TITLE CHANGE
06-2023	REVISED NOTES AND DETAILS
12-2023	REVISED NOTES AND DETAILS

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **RD502**

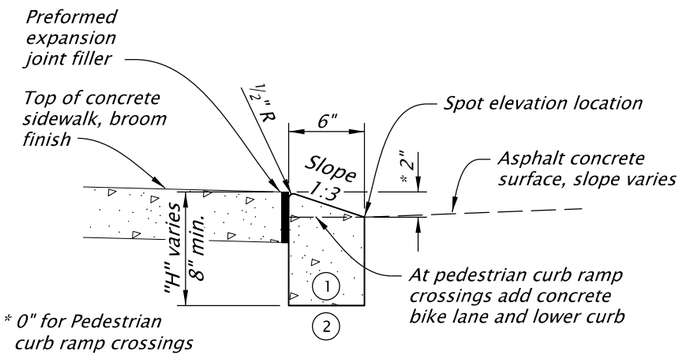
Effective Date: June 1, 2024 – November 30, 2024

19-JAN-2024

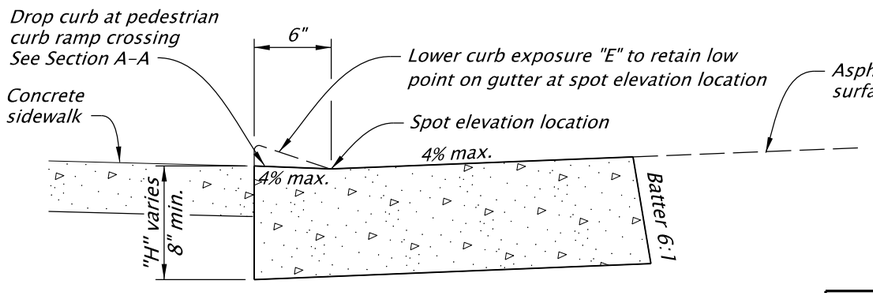
RD702.dgn



BIKE LANE CURB WITH CONCRETE BIKE LANE ISOMETRIC VIEW



SECTION A-A
BIKE LANE CURB
(Where shown on plans)



SECTION B-B
BIKE LANE CURB WITH CONCRETE BIKE LANE
(Where shown on plans)

1. *Control joints cut at 15' intervals, minimum 2" depth*
2. *Place a minimum of 6" approved granular base at 95% MPD (¾" Minus crushed granular)*

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Bike Lane Curb details are based on applicable ODOT Standards.*
2. *Lower bike lane curb at all curb ramp pedestrian crossings.*
3. *Bike lane curb may continue across driveways or be lowered per curb ramps. See project plans.*
4. *On separated bike lanes (where bike lane is apart from road shoulder), gutter pan shall not end in bike lane.*
5. *On or along state highways, where curb and gutter is required at curb ramps, add concrete bike lane to bike lane curb at curb ramps and at inlets.*
6. *Omit preformed expansion joint filler at curb ramps and where landscaping is adjacent to curb.*
7. *Transition between curb styles to connect curbs of different exposures "E". Transition length shall be 3' for each 1" difference in "E" unless specified in project plans.*
8. *Check the gutter flow depth to assure that the design flood does not spread across more than 2-feet of the bike lane and does not overtop the back of sidewalk at curb ramps. Place inlet in curb at low points and at upstream side of curb ramps or perform other approved design mitigation. Transition to standard curb on each side of inlet by lowering bike lane. See dwg. no. RD367.*
9. *Dimensions adjacent to radii are measured to the point of intersection of curb surfaces.*
10. *See dwg. nos. RD720 and RD727 for monolithic curb and sidewalk details. See dwg. nos. RD900 series for curb ramp details. See dwg. no. RD1140 for layout of separated bike lane crossings details.*

LEGEND:

- *Sidewalk or other traversable surface*
- *Detectable warning surface (DWS)*
- *Level area (turning space/landing)*
- *Running slope, 4.0% maximum. (Maximum 4.9% finished surface slope)*
- *Cross slope 1.5% maximum (Maximum 2.0% finished surface slope)*

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

BIKE LANE CURBS

2024

DATE	REVISION DESCRIPTION
12-2021	NEW DRAWING CREATED
10-2023	REVISED NOTE

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **RD702**

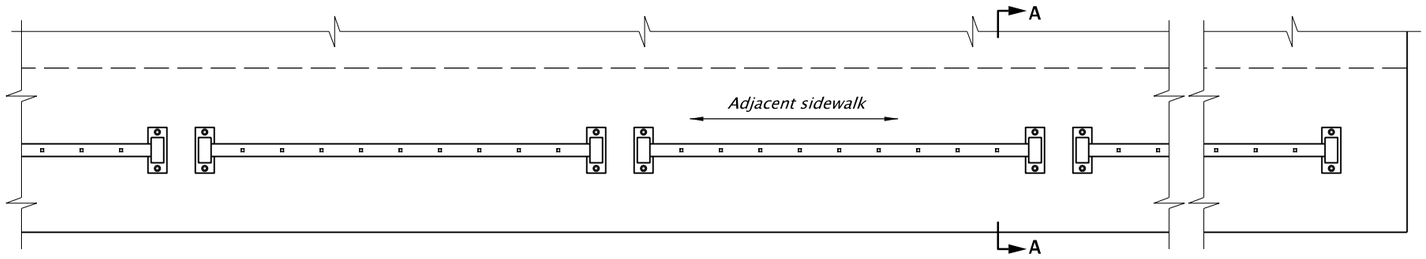
Effective Date: June 1, 2024 - November 30, 2024

19-JAN-2024

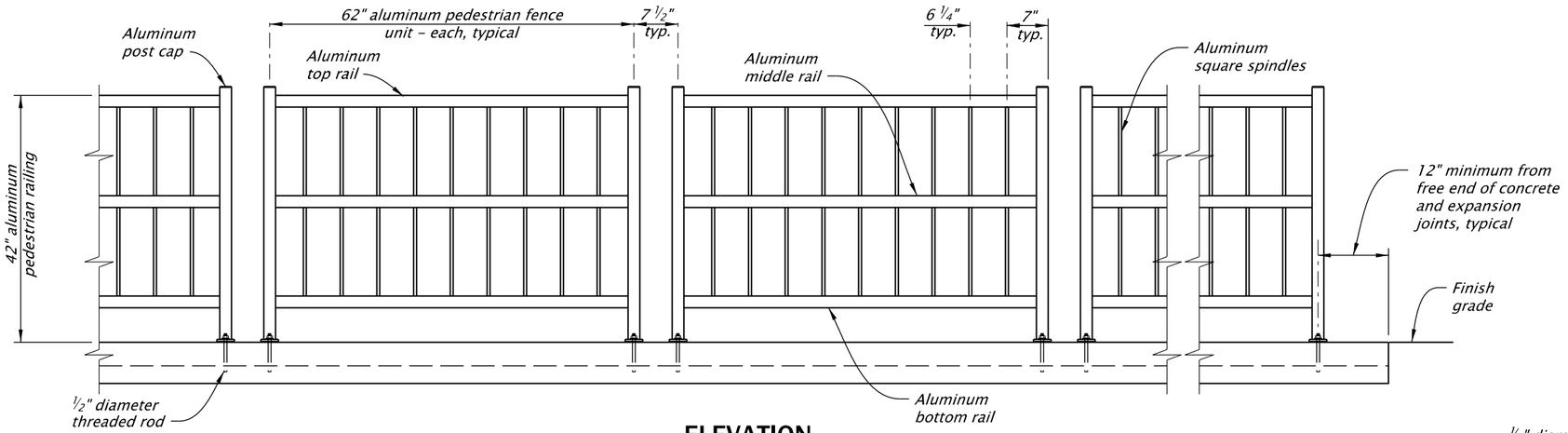
RD780.dgn

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

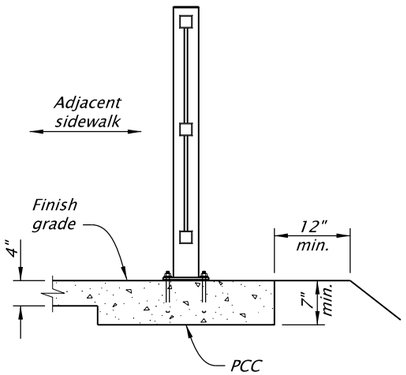
1. *See Std. Dwgs. RD781 and RD782 for details not shown.*
2. *Structure varies, see project plans.*
3. *All concrete shall be commercial grade concrete.*
4. *See project plans for details not shown.*
5. *10 inch minimum required between threaded rod and outer edge of concrete footing.*



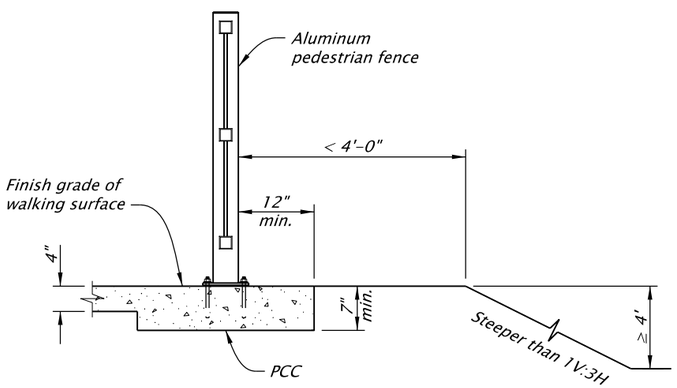
PLAN



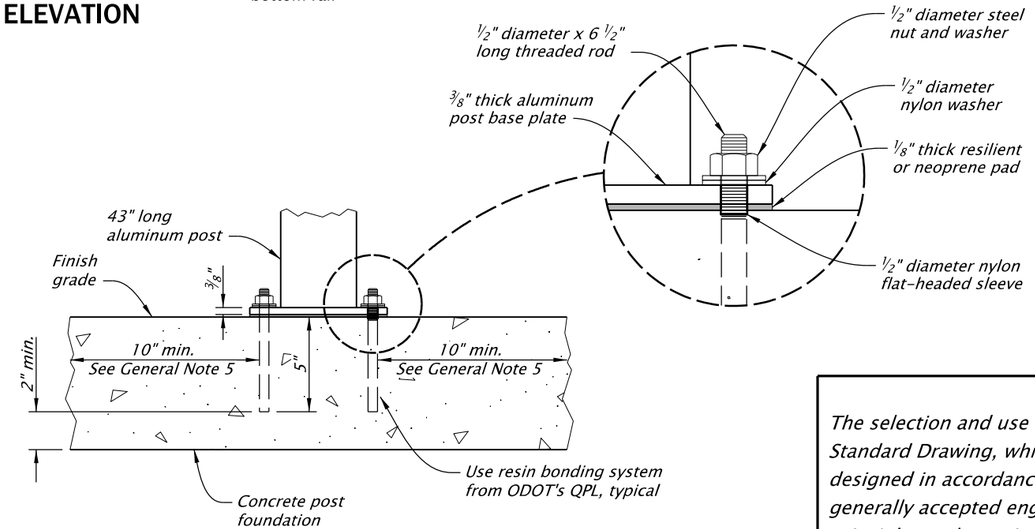
ELEVATION



SECTION A-A



WHEN PEDESTRIAN FENCE IS REQUIRED FOR WALKING SURFACES



POST BASE PLATE BOLT DOWN ANCHOR

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

ALUMINUM PEDESTRIAN FENCE (MASH, TL-2)

2024

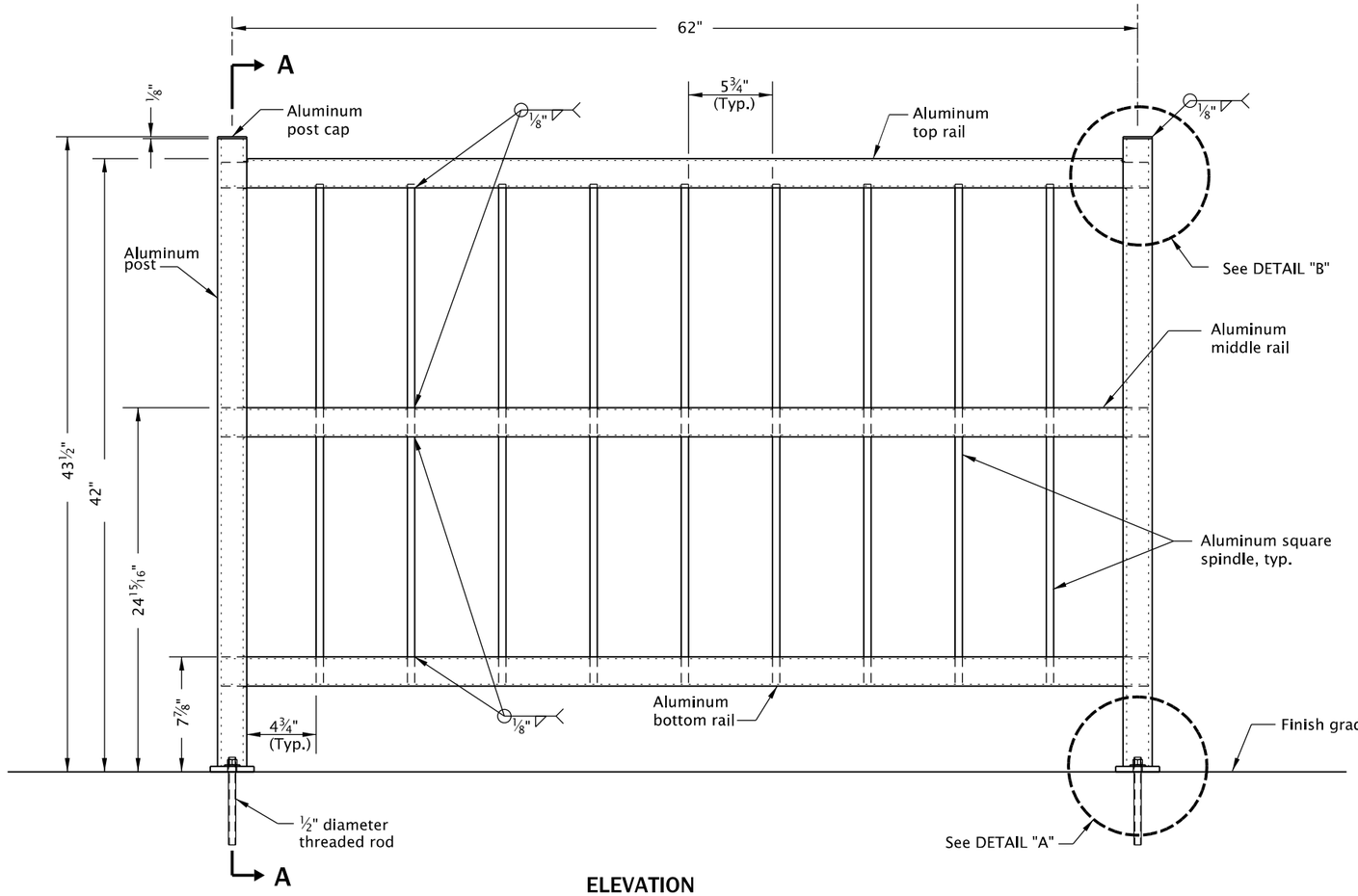
DATE	REVISION DESCRIPTION
07-2020	NEW DRAWING CREATED
07-2021	REVISED DETAILS AND NOTES
01-2023	REVISED NOTE
12-2023	REVISED DETAILS AND NOTES, UPDATED CAD DRAWING STANDARDS

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **RD780**

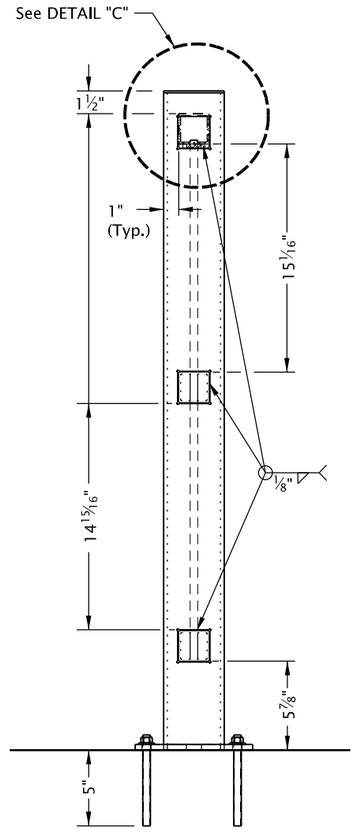
Effective Date: June 1, 2024 - November 30, 2024

19-JAN-2024

RD781.dgn

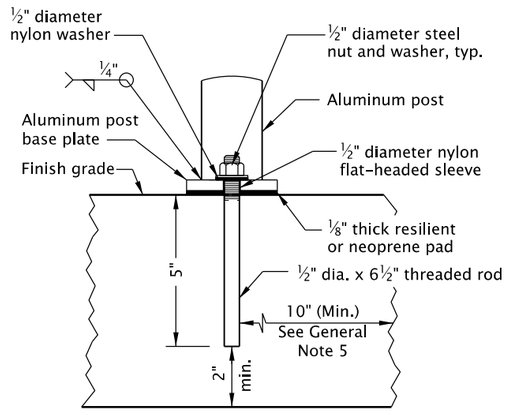


ELEVATION

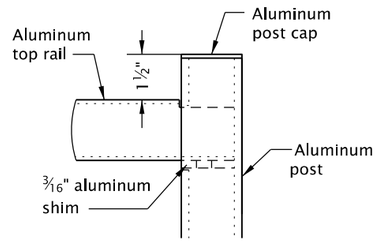


SECTION A-A

ALUMINUM PEDESTRIAN FENCE UNIT DETAILS



DETAIL "A"



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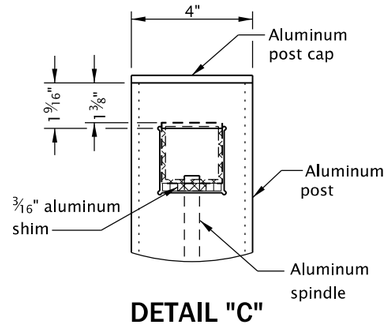


DETAIL "C"

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See Std. Dwgs. RD780 & RD782 for details not shown.
2. Structure varies, see project plans.
3. All concrete shall be commercial grade concrete.
4. See project plans for details not shown.
5. 10 inch minimum required between threaded rod and outer edge of concrete footing.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

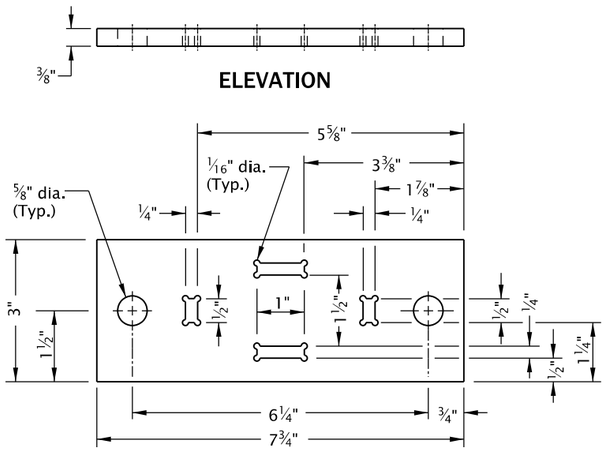
ALUMINUM PEDESTRIAN FENCE UNIT DETAILS

2024

DATE	REVISION DESCRIPTION
07-2020	NEW DRAWING CREATED
07-2021	REVISED DETAILS AND NOTES
01-2024	REVISED DETAIL A NOTE

CALC. BOOK NO. N/A | SDR DATE ~~19-JAN-2024~~ | **RD781**

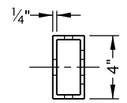
Effective Date: June 1, 2024 - November 30, 2024



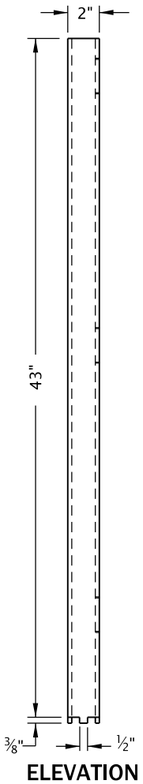
ELEVATION

PLAN

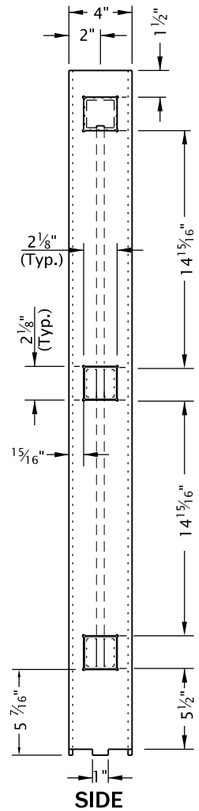
ALUMINUM POST BASE PLATE



TOP



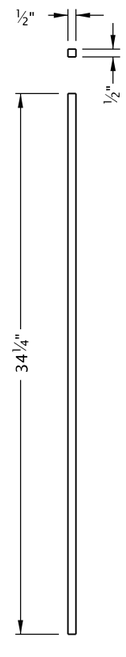
ELEVATION



SIDE

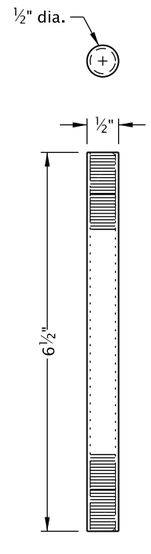
ALUMINUM POST

(2"X4"X¼" - 43" LONG)



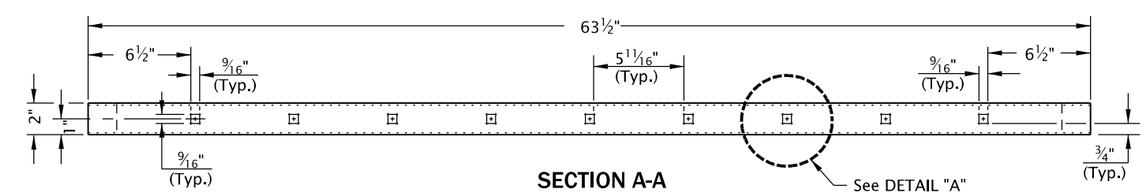
ALUMINUM SPINDLE

(½"X½" SQUARE - 32⅛" LONG)

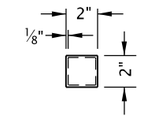


THREADED ROD

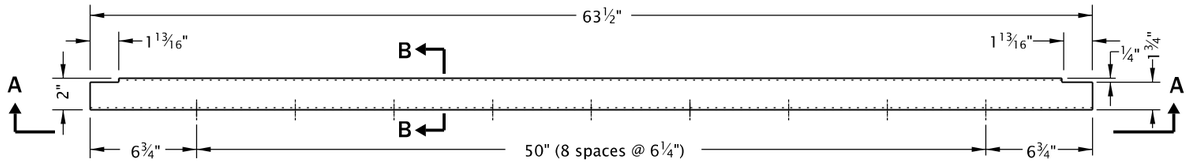
(½" DIAMETER UNC - 6½" LONG)



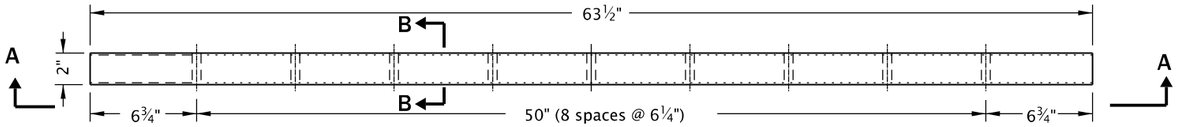
SECTION A-A



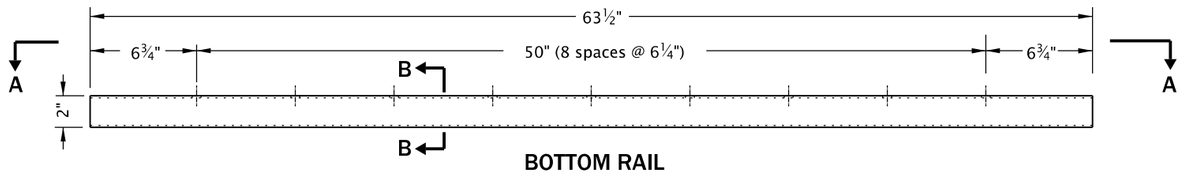
SECTION B-B



TOP RAIL

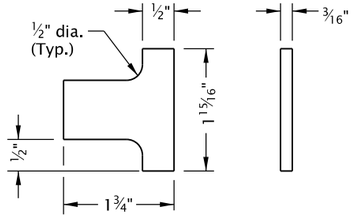


MIDDLE RAIL

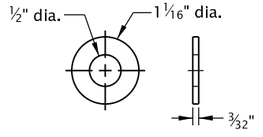


BOTTOM RAIL

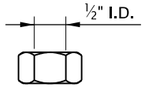
ALUMINUM RAIL ELEVATION



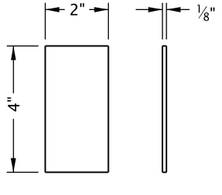
ALUMINUM SHIM



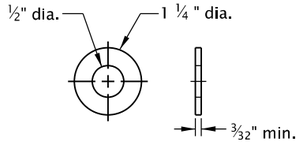
STEEL FLAT WASHER



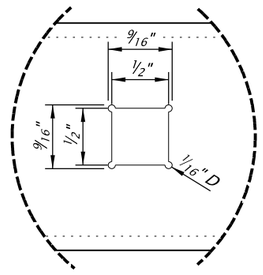
STEEL NUT



ALUMINUM POST CAP



NYLON WASHER



DETAIL "A"

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See Std. Dwg. RD780 for details not shown.
2. All aluminum welds should follow the aluminum design standard manual 2010 by using 5356 filler material.
3. All concrete shall be commercial grade concrete.
4. Structure varies, see project plans for details not shown.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

ALUMINUM PEDESTRIAN FENCE COMPONENT DETAILS

2024

DATE	REVISION DESCRIPTION
07-2020	NEW DRAWING CREATED
07-2021	REVISED DETAILS AND NOTES
01-2024	REVISED DETAILS AND NOTES

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **RD782**

Effective Date: June 1, 2024 - November 30, 2024

19-JAN-2024

RD782.dgn

19-JAN-2024

RD900.dgn

CURB RAMP INDEX

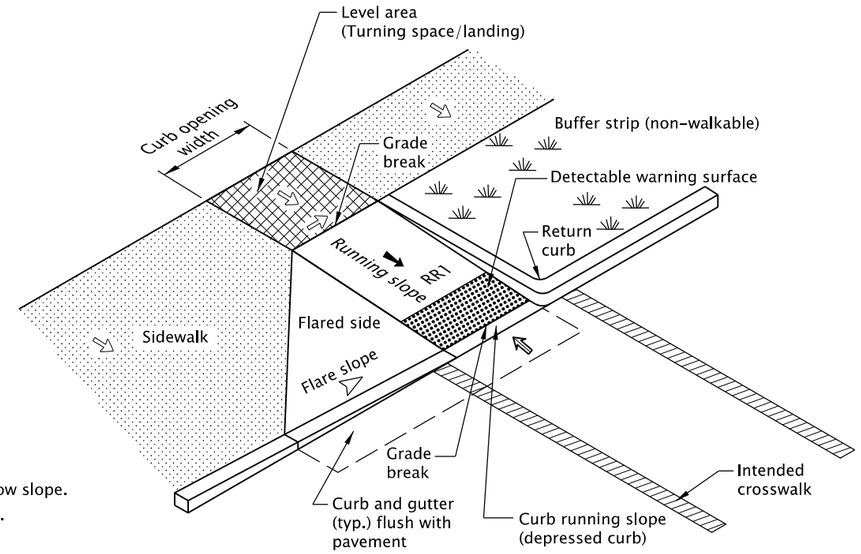
STD. DWG. NO.	STD. DWG. TITLE
RD900	Curb Ramp Components And Legend
RD901	Curb Ramp Legend And Corner Identification
RD902	Detectable Warning Surface Details
RD904	Detectable Warning Surface Placement For Curb Ramps
RD905	Detectable Warning Surface Placement For Directional Curbs
RD906	Detectable Warning Surface Placement For Accessible Route Island
RD908	Detectable Warning Surface Placement For Rail
RD909	Detectable Guide Strip Placement At Bike Ramps
RD910, RD912	Perpendicular Curb Ramp
RD913	Perpendicular Curb Ramp With Closure
RD916	Perpendicular Curb Ramp Single Ramp
RD920	Parallel Curb Ramp
RD922	Parallel Curb Ramp Single Ramp
RD930, RD932 & RD936	Combination Curb Ramp
RD938	Combination Curb Ramp Single Ramp
RD940	Blended Transition Curb Ramp Single Ramp
RD950 & RD952	End Of Walk Curb Ramp
RD960	Unique Curb Ramp

LEGEND:

- Marked or intended crossing location
- Sidewalk or other traversable surface
- Detectable warning surface (DWS)
- Level area (Turning space/landing)
- Cross slope 1.5% max. (Max. 2.0% finished surface slope) (Normal sidewalk cross slope)
- Running slope 4.0% max. (Max. 4.9% finished surface slope)
- Running slope 7.5% max. (Max. 8.3% finished surface slope)
- Counter slope 4.0% max. ascending or descending (Max. 5.0% finished surface slope) Slope as required for drainage
- Flare slope (Max. 10.0% finished surface slope)
- 4'x4' clear space
- RR1 Ramp Run Position 1

INTERSECTION CONDITION TYPES

MB = Midblock, less than or equal to roadway grade finished gutter flow slope.
SU = Signalized or Uncontrolled, max. 5.0% finished gutter flow slope.
SY = Stop or Yield, max. 2.0% finished gutter flow slope.



TYPICAL CURB RAMP SYSTEM COMPONENTS

(PERPENDICULAR TYPE SHOWN)

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

CURB RAMP COMPONENTS AND LEGEND

2024

DATE	REVISION DESCRIPTION
07-2020	NEW DRAWING CREATED
07-2021	REVISED DETAILS AND NOTES
01-2022	REVISED LEGEND
11-2023	REVISED LEGEND

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **RD900**

Effective Date: June 1, 2024 - November 30, 2024

19-JAN-2024

RD901.dgn

Linear Referencing Method (LRM) Number
Use ODOT FACS-STIP web based application, turn on layers Roadside > ADA Corners and ADA Ramps
to see LRM and corner position number of curb ramps inventoried. Select "Identify Features" and click on Map Position to see Information.

This is a code to identify the intersection on a specific state highway.
There is a four part format for the code: Highway Number; Highway Suffix; Roadway ID, Mileage Type.

1) The Highway Number is a 3 digit number (not the route number) assigned to all state highways by ODOT.
   Valid numbers are 001-493.

2) Highway Suffix is a letter format assigned to frontage roads and connections to identify the unique connection, for example AA or AB.
   Use the Identify Features tool on the ODOT FACS-STIP web based application, Road Network layer > Hwy Network-Colored layer for visual reference. Select "Identify Features" and click on Map Position to see Information.
   If the intersection is not located on a connection use 00 for the code.

3) Roadway ID is a one letter code used to identify alignment. There are two possible letter codes; "I" for increasing mile point direction and "D" for decreasing mile point direction.
   For most highways, the "I" direction is south and east. Note I-5 does not follow this rule. Generally "I" will be used.
   When there is a separated highway there will be an "I" roadway and a "D" roadway.
   Check the Digital Video Log to be sure of the direction.

4) Mileage Type is used when there are multiple locations of the same mile point on a section of highway.
   Overlay lapping mileage is listed as "z" mileage.

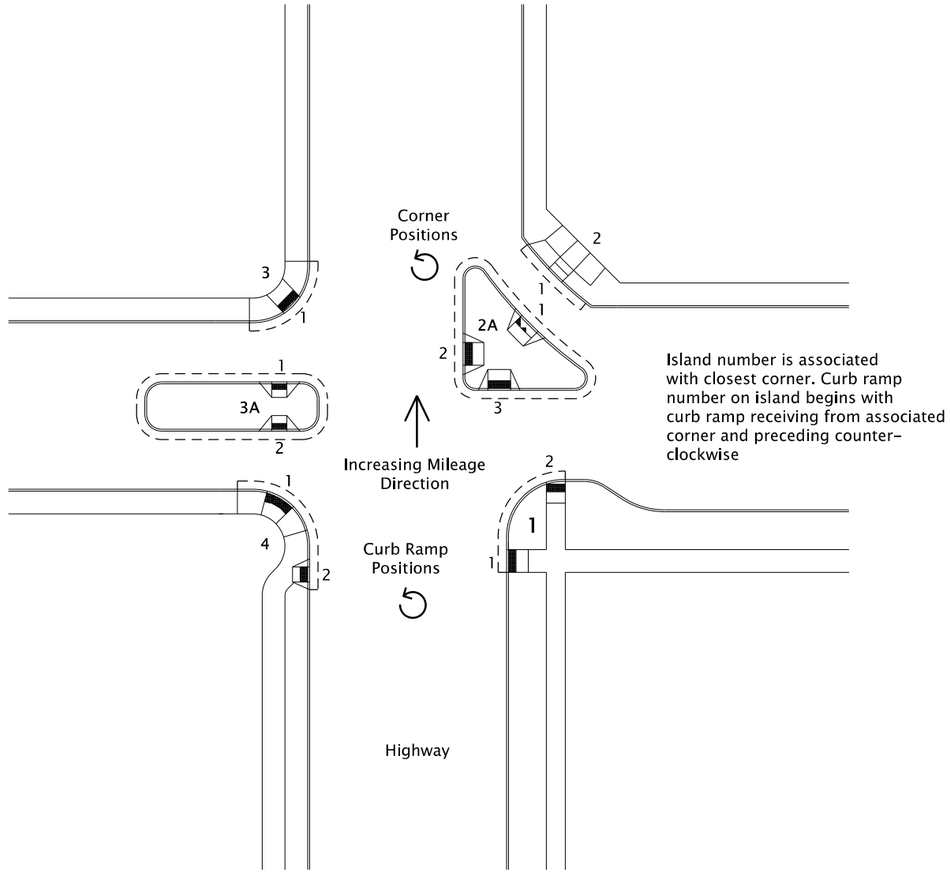
Example

228	00	I	00
Hwy No.	Suffix	ID	Type

Milepoint of an intersection is based on the mile point of the center of the intersection listed to the hundredth of a mile.

Corner Position is based on traveling in the increasing mile point direction, beginning with the first corner on the right and proceeding counter-clockwise around the intersection, numbering consecutive 1 through the end of corners. An "A" is added to the number for an island. For example an island between corner positions 1 and 2 and is closer to corner 2 has a corner position number of 2A (See corner position and curb ramp position diagram).

Curb Ramp Position is a number given to each curb ramp beginning with Corner Position 1. The first curb ramp encountered in the increasing mile point direction is number ramp 1. Then proceeds counter-clockwise around the corner, numbering in consecutive order.
Proceed following the pedestrian route and in Corner Position Number order (see corner position and curb ramp position diagram).



CORNER POSITION AND CURB RAMP POSITION DIAGRAM

(See ODOT Exhibit A for additional ramp and ramp run numbering conventions.)

STANDARD ABBREVIATION FOR CURB RAMP DETAILS

FG	=	Finish Grade (Elevation ft.) i.e. FG XXX.XX'
TFC	=	Top Face of Curb (Elevation ft.)
TBC	=	Top Back of Curb (Elevation ft.)
BFC	=	Bottom Face of Curb (Elevation ft.)
gtr.	=	Gutter (Elevation ft.)
GS	=	Gutter Slope (%), i.e. X.X%
E	=	Curb Exposure (Inch), i.e. X"
CS	=	Counter Slope on gutter pan (%)
RRN	=	Ramp Run Number, i.e. RRX
cl.sp.	=	Clear Space
TS	=	Turning Space
XS	=	Cross Slope
LA	=	Level Area
DWS	=	Detectable Warning Surface
PAR	=	Pedestrian Access Route

LEGEND:

- Fire Hydrant
- Gas Valves Box
- Inlet
- Sanitary Manhole
- Storm Manhole
- Pole Anchor
- Pole Base
- Pedestrian Pedestal
- Pedestrian Pushbutton
- Sign on a Post
- Traffic Signal Junction Box
- Utility Pole
- Utility Vault
- Water Meter
- Water Valve
- Cross Walk Barricade

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All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

CURB RAMP LEGEND AND CORNER IDENTIFICATION

2024

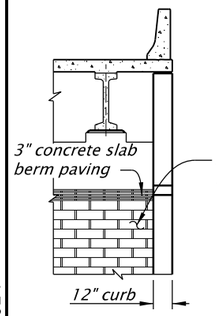
DATE	REVISION DESCRIPTION
07-2020	NEW DRAWING CREATED
09-2021	REVISED NOTES
12-2023	REVISED NOTES

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **RD901**

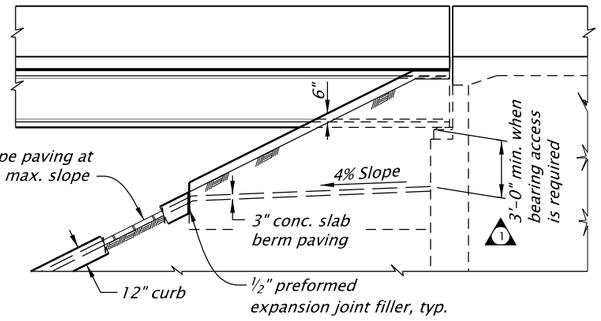
Effective Date: June 1, 2024 - November 30, 2024

01-JAN-2024

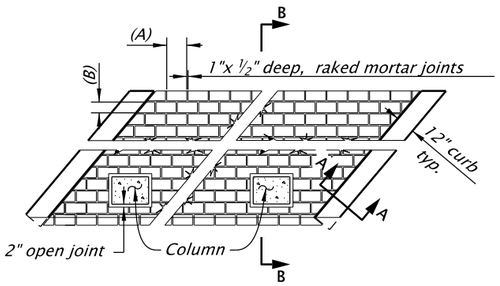
BR115.dgn



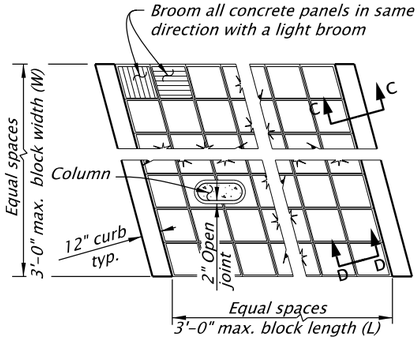
PARTIAL TRANSVERSE ELEVATION



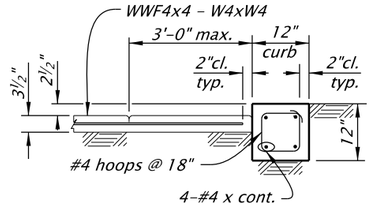
PARTIAL ELEVATION: CASE 1



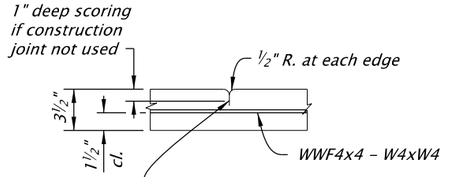
PRECAST BLOCK ALTERNATIVE PLAN



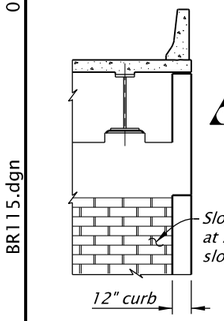
CAST-IN-PLACE ALTERNATE PLAN



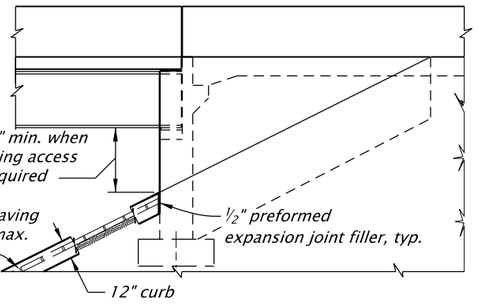
SECTION C-C



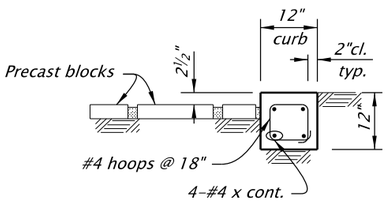
SECTION D-D



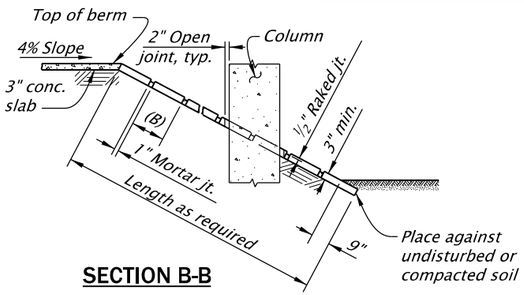
PARTIAL TRANSVERSE ELEVATION



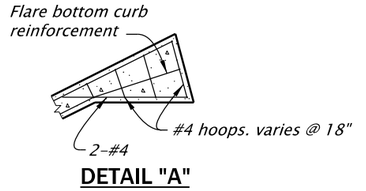
PARTIAL ELEVATION: CASE 2



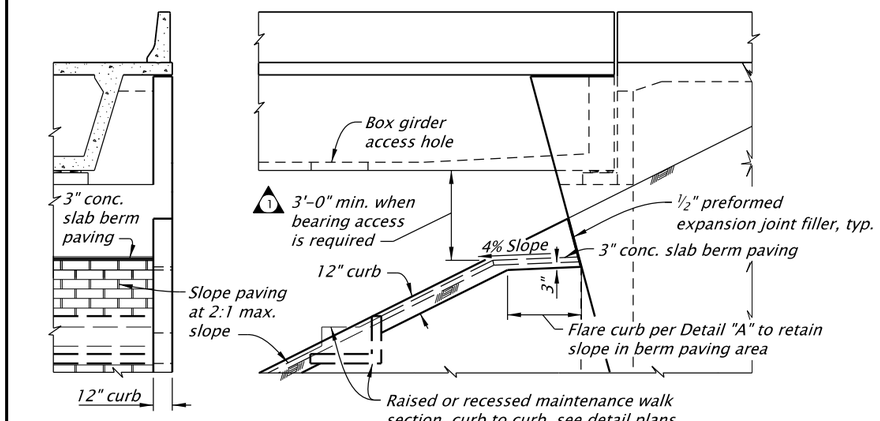
SECTION A-A



SECTION B-B



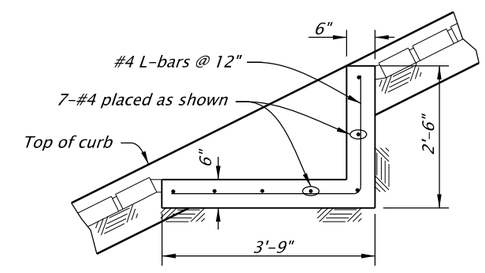
DETAIL "A"



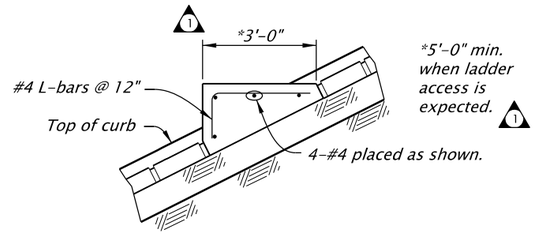
PARTIAL TRANSVERSE ELEVATION

PARTIAL ELEVATION: CASE 3

PRECAST BLOCKS
Blocks may vary in size from 8" to 18" wide (B) by 16" to 36" long (A).
Provide the width to length ratio within the range of B/A = 0.33 to 0.50 with minimum thickness of 3".
Cast or cut odd blocks at job site.
Use hardrock or lightweight concrete. Minimum design strength in 28 days of 1500 psi.



RECESSED MAINTENANCE WALK SECTION



RECESSED MAINTENANCE WALK SECTION

CAST-IN-PLACE BLOCKS
Blocks may vary in size up to a maximum of 3'-0" in length (L) and width (W).
Provide the width to length ratio within the range of W/L = 0.5 to 1.0.
Blocks may be cast-in-place individually, in rows, or all simultaneously.
Each block shall have a full depth construction joint or 1" deep scored joint between each adjacent block or curb.

GENERAL NOTES

Provide all reinforcing steel according to ASTM Specification A706, or AASHTO M31 (ASTM A615), Grade 60. Use the following splice lengths unless shown otherwise:

Bar Size		#3	#4	#5
Splice Length	Uncoated	1'-0"	1'-4"	1'-8"
	Epoxy Coated	1'-5"	1'-10"	2'-4"

Provide all welded steel wire fabric according to AASHTO M55 (ASTM A185) or AASHTO M221 (ASTM A497). Place all fabric edge laps with no less than one mesh in width.
Place all bars and fabric as shown.
Construct all berm slabs with 3" deep cast-in-place unreinforced concrete.
Provide precast blocks or cast-in-place concrete panels for slope paving.
Use same size blocks at any bridge site.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

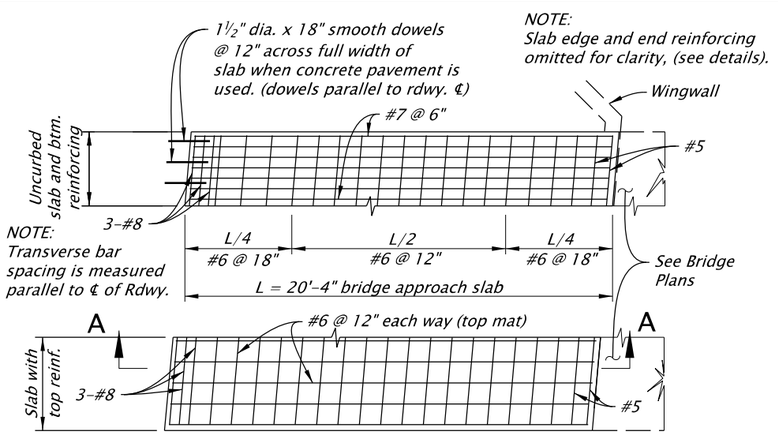
SLOPE PAVING

2024

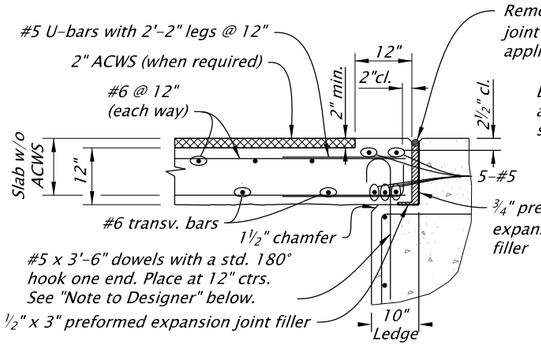
DATE	REVISION DESCRIPTION
1 01-2024	General text revisions

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **BR115**

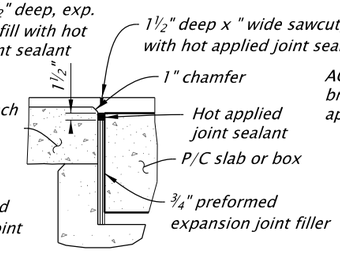
Effective Date: June 1, 2024 - November 30, 2024



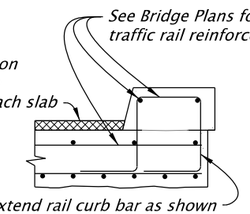
1 PLAN - TYPICAL APPROACH SLAB



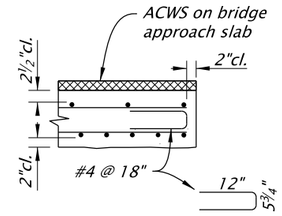
1 TYPICAL BRIDGE END DETAIL WITHOUT EXPANSION JOINT BLOCKOUT



1 JOINT DETAIL with SLABS or BOXES DETAIL "A"



1 CURB EDGE DETAIL



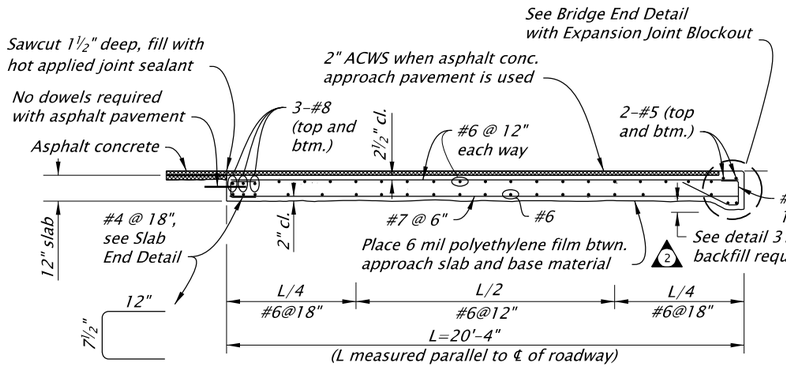
1 UNCURBED EDGE DETAIL

GENERAL NOTES:

1. See Project Plans for bridge rail, median barrier, and/or guardrail transition details.
2. Bridge approach slab designed for HL-93 loading according to AASHTO LRFD Bridge Design Specifications with an allowance of 25 psf for present wearing surface and 25 psf for future wearing surface (Span = 17'-4").
3. Provide Class HPC 4500 - 1 or 1½ concrete.
4. Provide reinforcing steel conforming to AASHTO Specification M31 (ASTM A615) Gr. 60 or A706. Place steel 2" clear of nearest face of concrete unless shown otherwise. Use the following splice lengths unless shown otherwise:

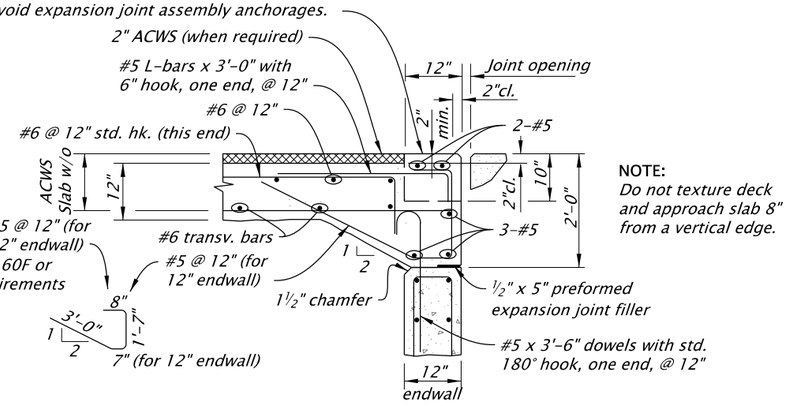
Bar Size		3	4	5	6	7	8	9	10	11
Splice Length	Uncoated	1'-4"	1'-6"	1'-11"	2'-3"	2'-7"	3'-0"	3'-4"	3'-9"	4'-2"
	Epoxy Coated	1'-8"	2'-3"	2'-10"	3'-4"	3'-11"	4'-5"	5'-0"	5'-8"	6'-3"

5. Provide ¾" chamfer at all top transverse concrete edges (each end of approach slab and each end of bridge).
6. Longitudinal construction joints are allowed only when permitted by the Engineer or when shown on the Project Plans.
7. When a longitudinal construction joint is permitted, locate joint on a lane line.
8. Provide dowels conforming to AASHTO Specification M31 (ASTM A615) .
9. Use the details on this sheet unless shown otherwise on the Project Plans.
10. Flare approach slab as required. Maintain bottom longitudinal bars spacing requirements at midspan.
11. Support top and bottom mat reinforcing steel at 3'-0" max. centers each way. Use #4 C-bars with 8" legs, or approved bar support chairs for top mat.
12. For additional reinforcing bars needed in the approach slab, see bridge rail and transition drawings in project plans.



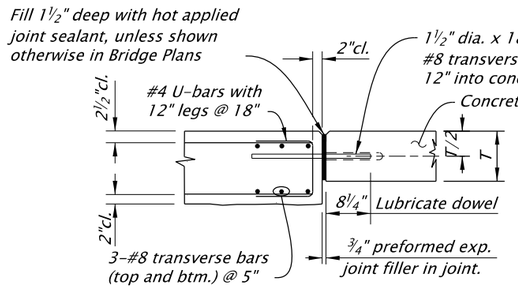
1 SECTION A-A

Typical blockout for expansion joint assembly (each side of joint) unless shown otherwise on Project Plans. Space bars in blockout to avoid expansion joint assembly anchorages.

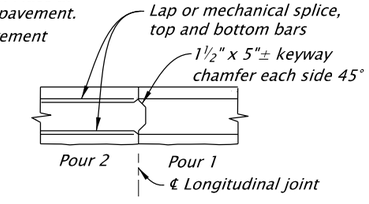


NOTE: *Do not texture deck and approach slab 8" from a vertical edge.*

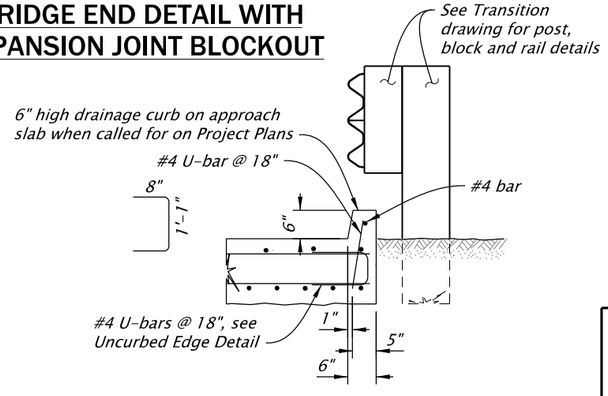
1 BRIDGE END DETAIL WITH EXPANSION JOINT BLOCKOUT



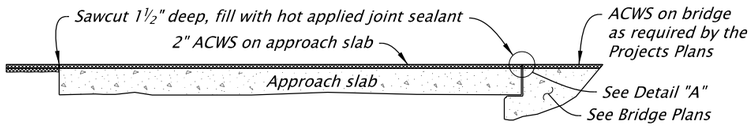
1 SLAB END DETAIL



LONGITUDINAL JOINT DETAIL



1 DRAINAGE CURB EDGE DETAIL



1 APPROACH SLAB WITH ASPHALT PAVEMENT ON BRIDGE

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

BRIDGE APPROACH SLAB

2024

DATE	REVISION DESCRIPTION
07-2020	Changed end panel to approach slab, Removed 30'-4" length; CAD updates
01-2024	General text revisions

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **BR165**

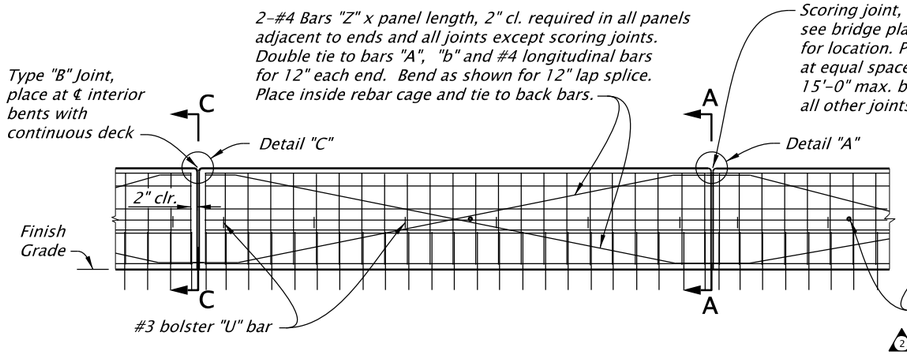
Effective Date: June 1, 2024 - November 30, 2024

01-JAN-2024

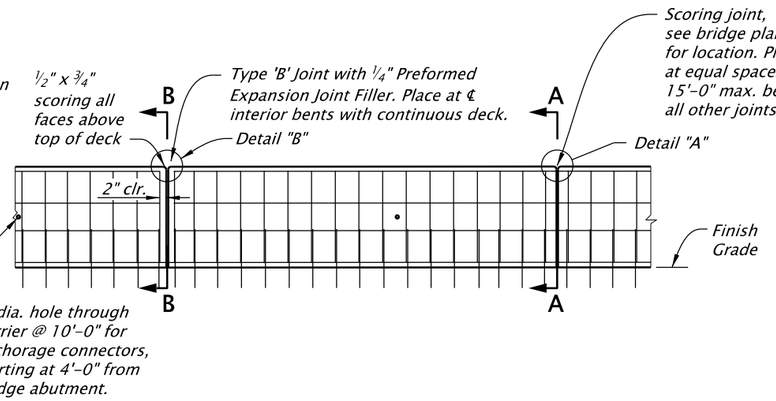
BR165.dgn

01-JAN-2024

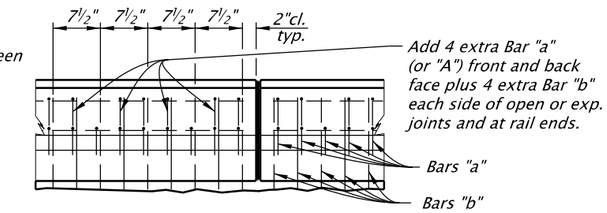
BR200.dgn



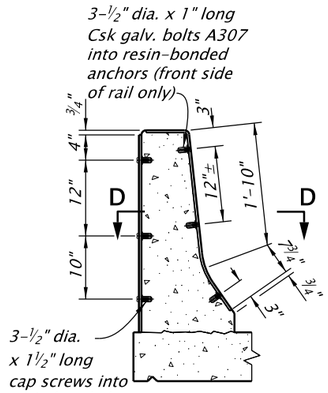
ELEVATION: CONCRETE BRIDGE RAIL (SLIP FORMED)



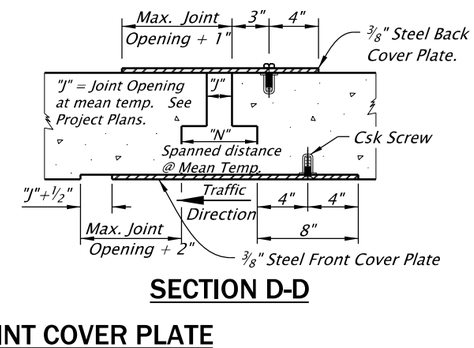
ELEVATION: CONCRETE BRIDGE RAIL (FIXED FORMS)



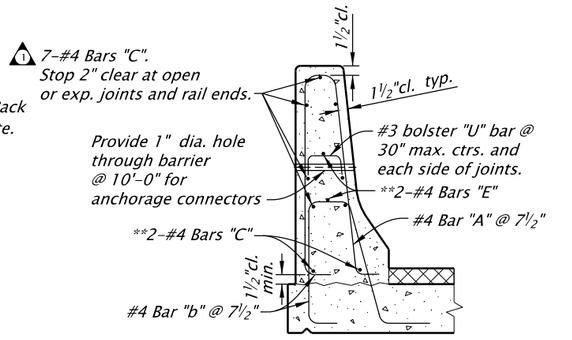
PLAN: BARS AT OPEN OR EXPANSION JOINTS AND RAIL ENDS



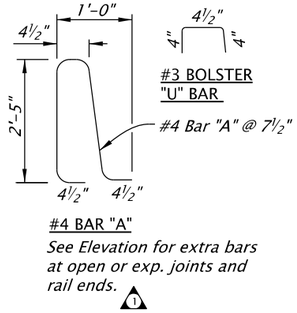
NOTE:
Details shown are general details only and should be modified as needed to fit specific project requirements.



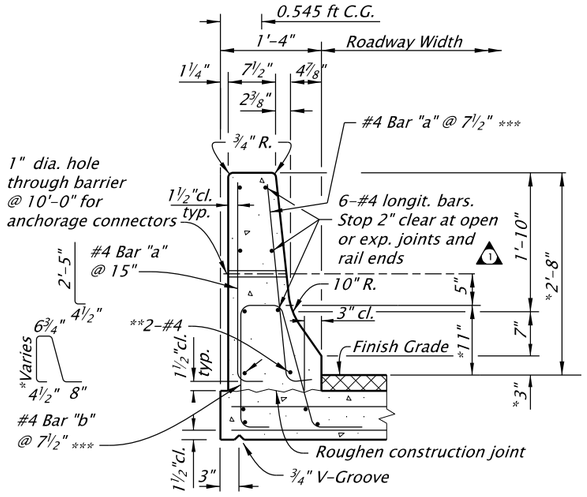
SECTION D-D



TYPICAL SECTION (SLIP FORMED)



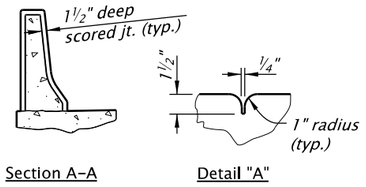
#4 BAR "A"
See Elevation for extra bars at open or exp. joints and rail ends. 1



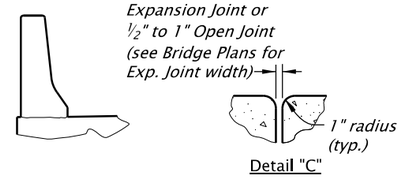
TYPICAL SECTION (FIXED FORMS)

EXPANSION JOINT COVER PLATE

(When Required by Bridge Plans)



SCORING JOINT DETAIL (SLIP-FORMED) (FIXED FORMS)

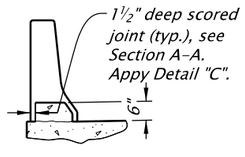


OPEN OR EXPANSION JOINT DETAIL

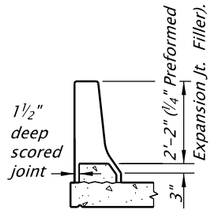
ESTIMATED QUANTITIES

		2'-8" Ht.	1" added Ht.
	Concrete	2.23 ft.³/ft.	0.11 ft.³/ft.
Fixed Forms	Bars "a" & longit.	10.81 #/ft.	———
Slip Formed	Bars "A", "C" & "E"	14.83 #/ft.	———

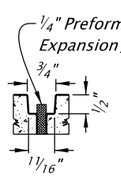
Bar weight assume scoring joints at 15'-0" ctrs.

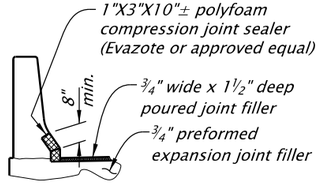


TYPE "B" JOINT DETAIL (SLIP-FORMED)



TYPE "B" JOINT DETAIL (FIXED FORMS)





Use when water drains towards rail and no deck joint seal is used. Use joint fillers for length of joint opening "J"+6".

DETAIL "D"

NOTES:
* *Place top of parapet 2'-8" above finish grade. Increase dimensions marked thus (*) by depth of ACWS.* 1
** *Continuous thru scoring and Type 'B' joints, stop 2" clear at ends and open or exp. joints.*
See dwg. BR203 for rail on approach slab.
*** *See PLAN: BARS AT OPEN OR EXPANSION JOINTS AND RAIL ENDS.*

GENERAL NOTES:
Rail designed and crashed tested to meet NCHRP 350 TL-4 requirements.
Provide all reinforcing steel conforming to ASTM A706 or AASHTO M31 (ASTM A615) Grade 60.
Place all bars 2" clear of the nearest face of concrete unless shown otherwise.
Provide Class 3300 - 1½ or ¾ concrete.
Provide steel cover plates conforming to AASHTO M183 (ASTM A36). Hot dip galvanize after fabrication.
At skewed bents up to 20° make joints parallel to the bent center line. For skews greater than 20° make joints normal to rail.

ACCOMPANIED BY DWGS.:
BR203

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

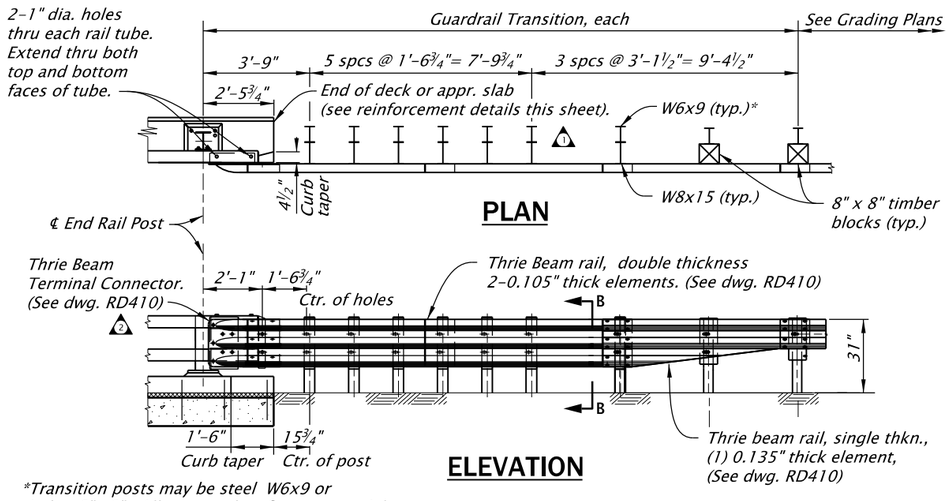
TYPE "F" CONCRETE RAIL

2024

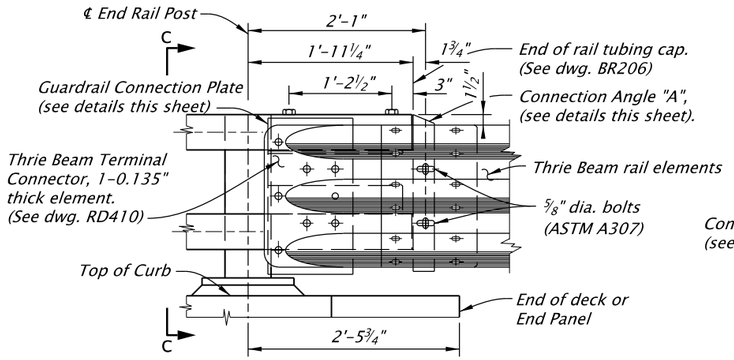
DATE	REVISION DESCRIPTION
01-2023	Revised notes and rebar callouts.
01-2024	General text revisions.

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **BR200**

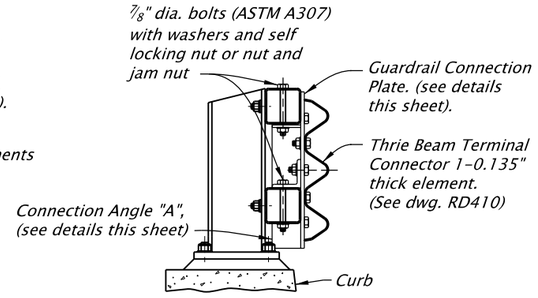
Effective Date: June 1, 2024 - November 30, 2024



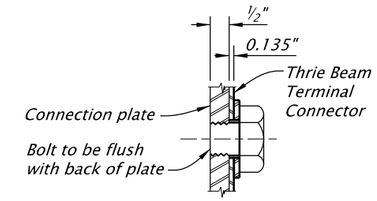
*Transition posts may be steel W6x9 or timber 8"x 8". All posts to be of same material. For details see dwg. BR203 "Thrie Beam Block"



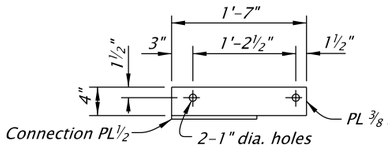
ELEVATION: TRANSITION CONNECTION



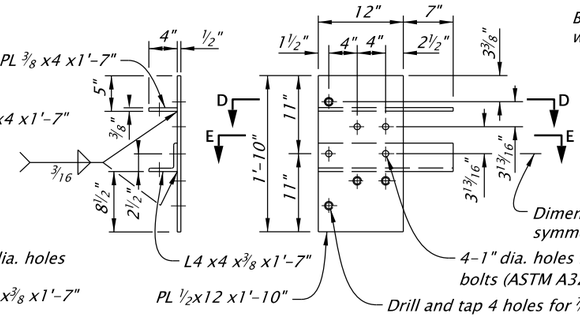
SECTION C-C



DETAIL "A"

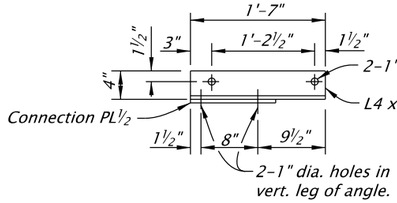


SECTION D-D

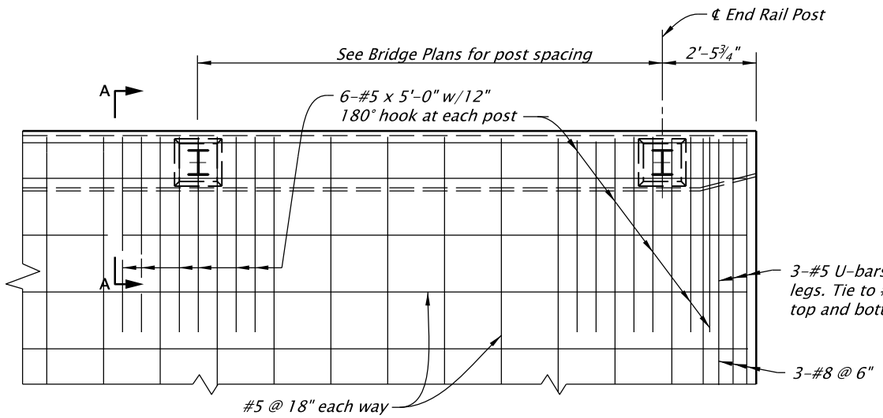


NOTE:
Verify all bolt hole locations to match Thrie Beam terminal connector.

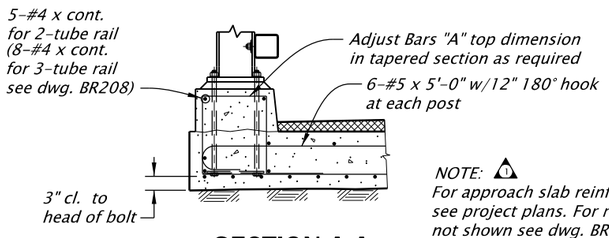
GUARDRAIL CONNECTION PLATE DETAIL



SECTION E-E

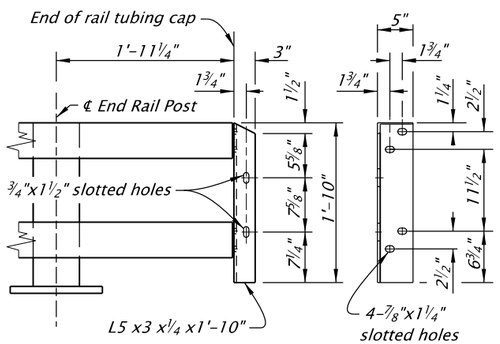


⚠1 APPROACH SLAB TOP REBAR AT RAIL POSTS

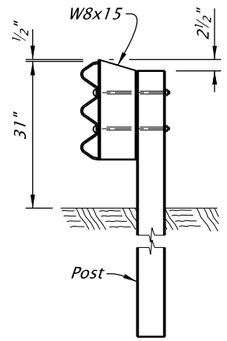


SECTION A-A

NOTE: ⚠1
For approach slab reinforcement not shown see project plans. For rail and curb details not shown see dwg. BR206 or BR208.



CONNECTION ANGLE "A"



SECTION B-B

GENERAL NOTES
Rail designed and crash tested to meet NCHRP 350 TL-4 requirements.
Provide steel plates and wide-flange posts conforming to AASHTO M183 (ASTM A36).

⚠1 ACCOMPANIED BY DWGS.:
BR203, BR206, RD401, RD402, RD407, RD408, RD410, RD412

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

2-TUBE CURB MOUNT RAIL TRANSITION

2024

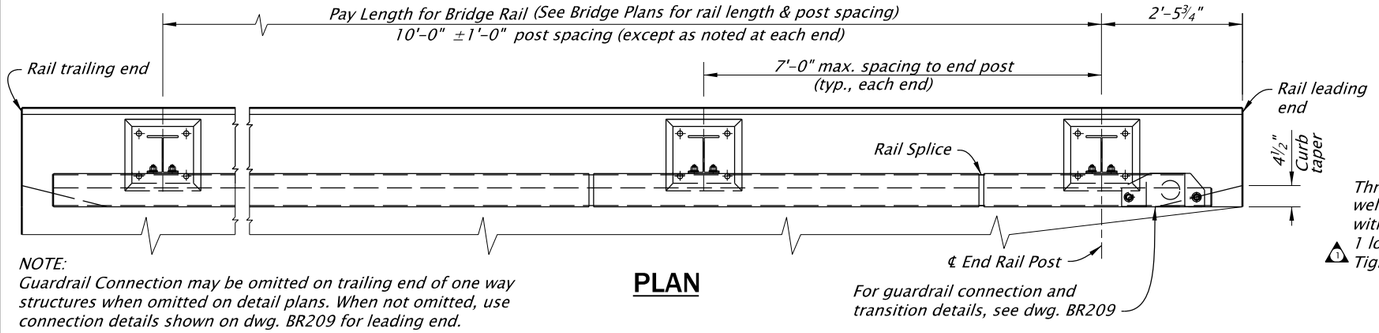
DATE	REVISION DESCRIPTION
⚠2 01-2023	Revised accompanied by dwg references, General text revisions.
⚠3 01-2024	General text revisions.

CALC. BOOK NO. 4057 & 4058 | SDR DATE 19-JAN-2024 | **BR207**

Effective Date: June 1, 2024 - November 30, 2024

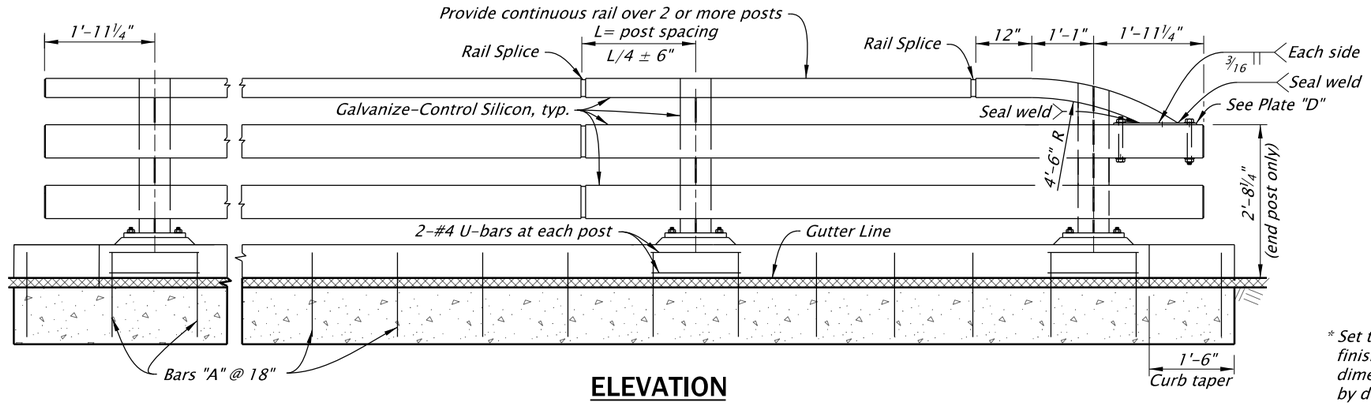
01-JAN-2024

BR208.dgn

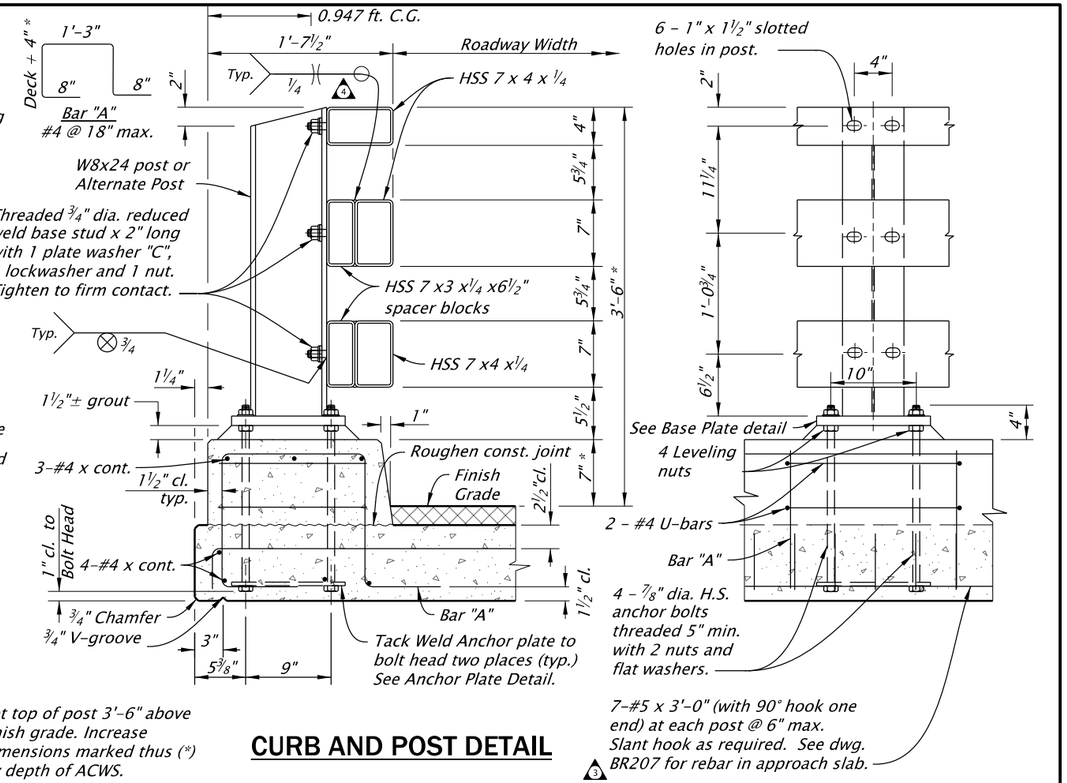


NOTE:
Guardrail Connection may be omitted on trailing end of one way structures when omitted on detail plans. When not omitted, use connection details shown on dwg. BR209 for leading end.

PLAN

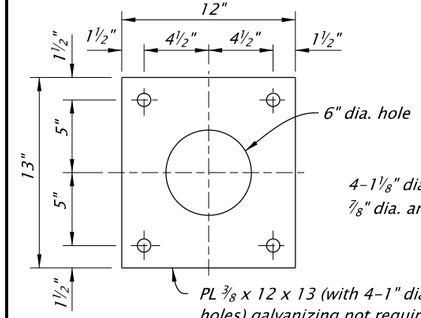


ELEVATION

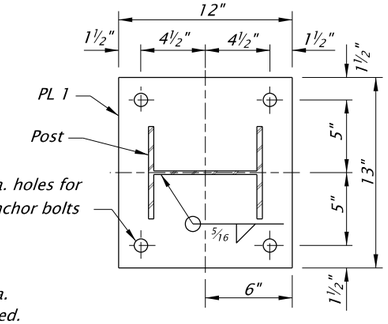


* Set top of post 3'-6" above finish grade. Increase dimensions marked thus (*) by depth of ACWS.

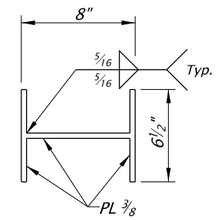
CURB AND POST DETAIL



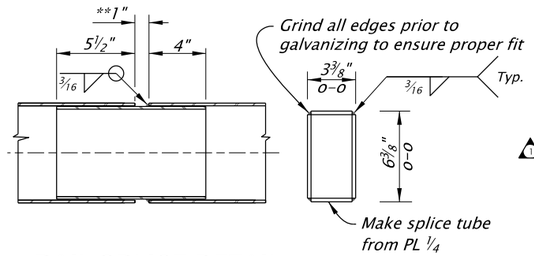
ANCHOR PLATE DETAIL



BASE PLATE DETAIL



ALTERNATE POST



RAIL SPLICE DETAIL

**1" gap unless noted otherwise on detail plans. Provide a Rail Splice in panel that has a deck expansion joint. If more than 2" movement needed, increase length of inner member.

GENERAL NOTES:

1. Rail designed and crash tested to meet MASH TL-4 requirements. Transition designed to meet MASH TL-3.
2. Provide structural tubing, steel posts and plates according to Oregon Standard Specification 2810.20. Provide steel posts and plates conforming to ASTM A572 Grade 50.
3. Provide High Strength anchor bolts (Grade 105) according to Oregon Standard Specification 02560.30 (b). Tighten top and leveling nuts for the base plate ¼ turn past snug tight.
4. Fabricate steel studs with material, welding and inspection according to AWS D1.1.
5. Provide reinforcing steel conforming to ASTM A706 or AASHTO M31 (ASTM A615) Grade 60.
6. Provide concrete Class 3300 - 1½ or ¾
7. Construct railing conforming to the horizontal and vertical alignment of the structure. Install posts normal to grade in longitudinal direction and vertical in transverse direction.
8. Payment for the railing will include compensation for furnishing and installing the necessary guardrail connection plates and terminal connectors.
9. Hot-dip galvanized structural steel including fasteners after fabrication, except as noted. Provide Galvanize-Control Silicon according to Oregon Standard Specification 02530.70.

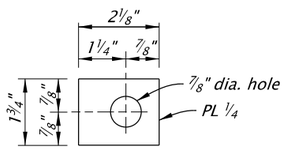
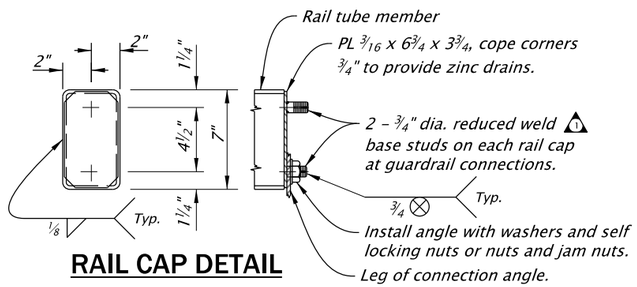
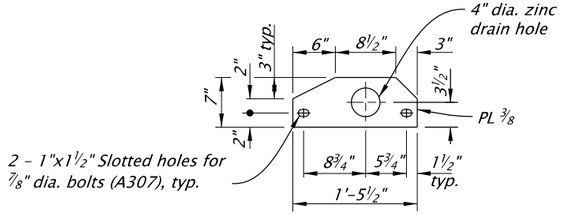


PLATE WASHER "C"



RAIL CAP DETAIL



PLAN

PLATE "D"

ACCOMPANIED BY DWGS.:
BR207, BR209

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

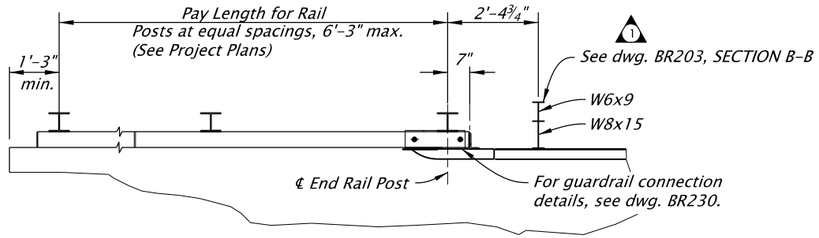
3-TUBE CURB MOUNT RAIL

2024

	DATE	REVISION DESCRIPTION
1	12-2020	Modified detail note text; added General Note 4; CAD updates
2	01-2022	Modified General Note 4, removed "Clause 7" notation.
3	01-2023	Revised general notations.
4	01-2024	Revised weld callout.

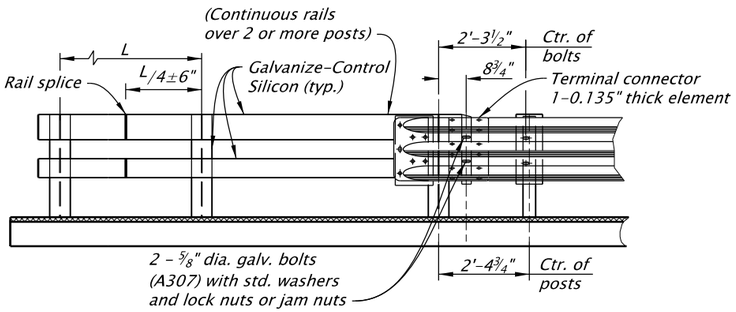
CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **BR208**

Effective Date: June 1, 2024 - November 30, 2024

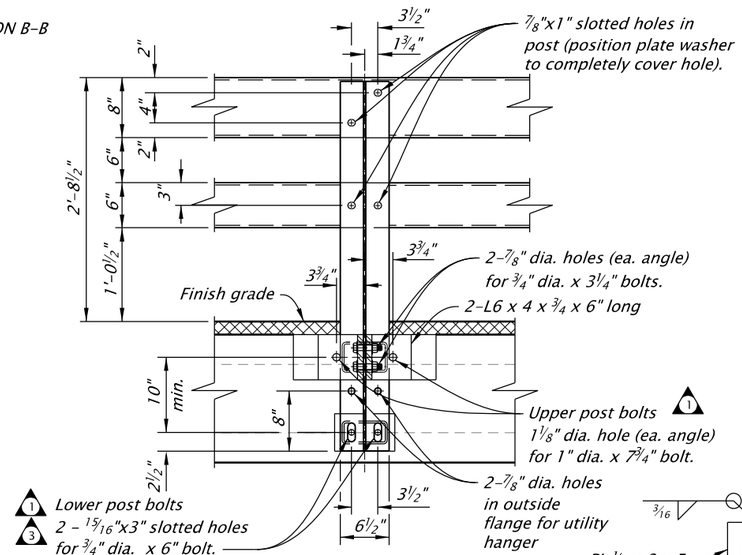


NOTE:
Guardrail Connection may be omitted on exit end of one way structures when omitted on detail plans.

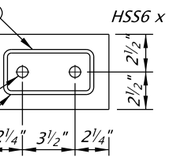
PLAN



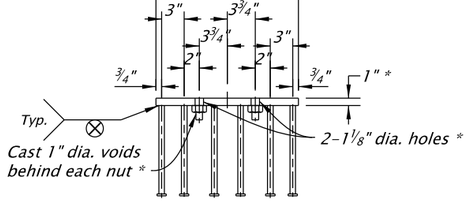
ELEVATION



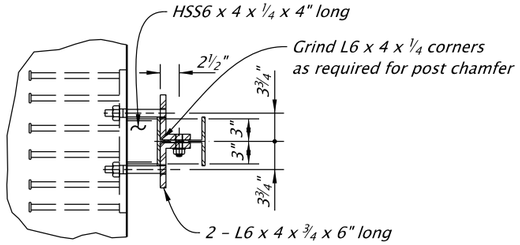
SECTION A-A



SECTION AT RAIL POST

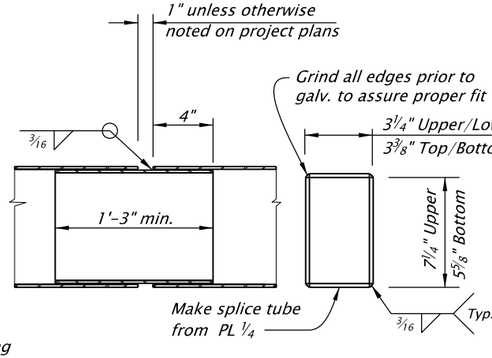


PLAN

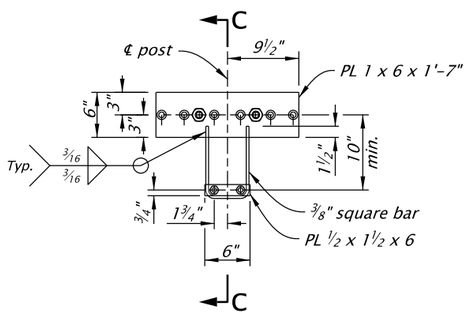


*Plug or block off holes and threaded area during casting of slabs.

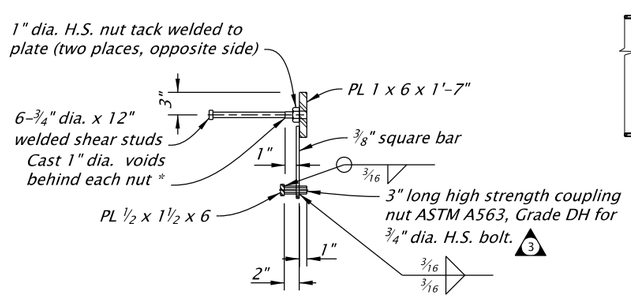
SECTION B-B



RAIL SPLICE DETAILS



ANCHOR DEVICE



SECTION C-C

GENERAL NOTES

1. Provide structural tubing according to Oregon Standard Specification 2810.20.
2. Provide structural steel shapes and plates conforming to AASHTO Specification M183 (ASTM A36) unless otherwise noted.
3. Provide bolts conforming to AASHTO Specification M164 (ASTM A325) unless otherwise noted.
4. Fabricate steel studs with material, welding and inspection according to AWS D1.5. 1 2
5. Construct rail normal to slab in both the longitudinal and the transverse directions. When wearing surface thickness varies due to beam camber and/or superelevation, vary rail post lengths to provide uniform rail height. Field verify post lengths before fabrication.
6. Hot-dip galvanize structural steel including fasteners after fabrication. Provide Galvanize-Control Silicon posts and horizontal rail steel tubing according to ODOT Specification 02530.70. Tap nuts 0.021+0.01- 0.00 oversize after galvanizing in accordance with ASTM A563.
7. Tighten upper post bolts 180° turn past snug tight condition and lower post bolts 120° turn past snug tight condition. 1
8. Estimated rail mass (for slab design) is 72 lb. per linear foot.
9. Do not use this rail for 12" and Slab No. 9 of the 15" Std. Precast Slabs.

ACCOMPANIED BY DWGS.:
BR203, BR230

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

2-TUBE SIDE MOUNT RAIL

2024

DATE	REVISION DESCRIPTION
1 12-2020	Modified detail note text; changed General Notes 4 & 7; CAD updates
2 01-2022	Modified General Note 4, removed "Section 7" notation.
3 01-2024	Revised hole diameters

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **BR226**

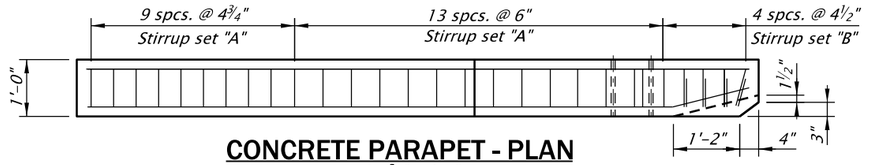
01-JAN-2024

BR226.dgn

Effective Date: June 1, 2024 - November 30, 2024

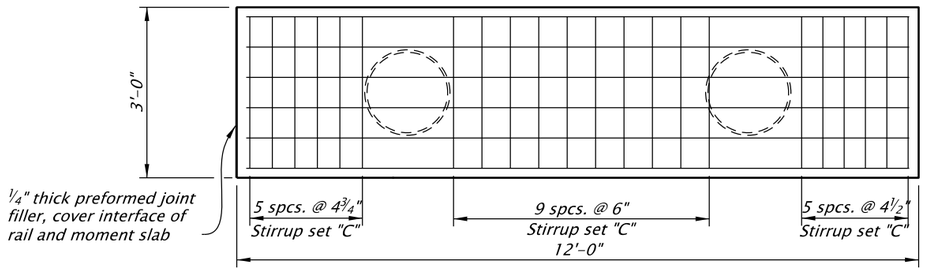
01-JAN-2024

BR275.dgn



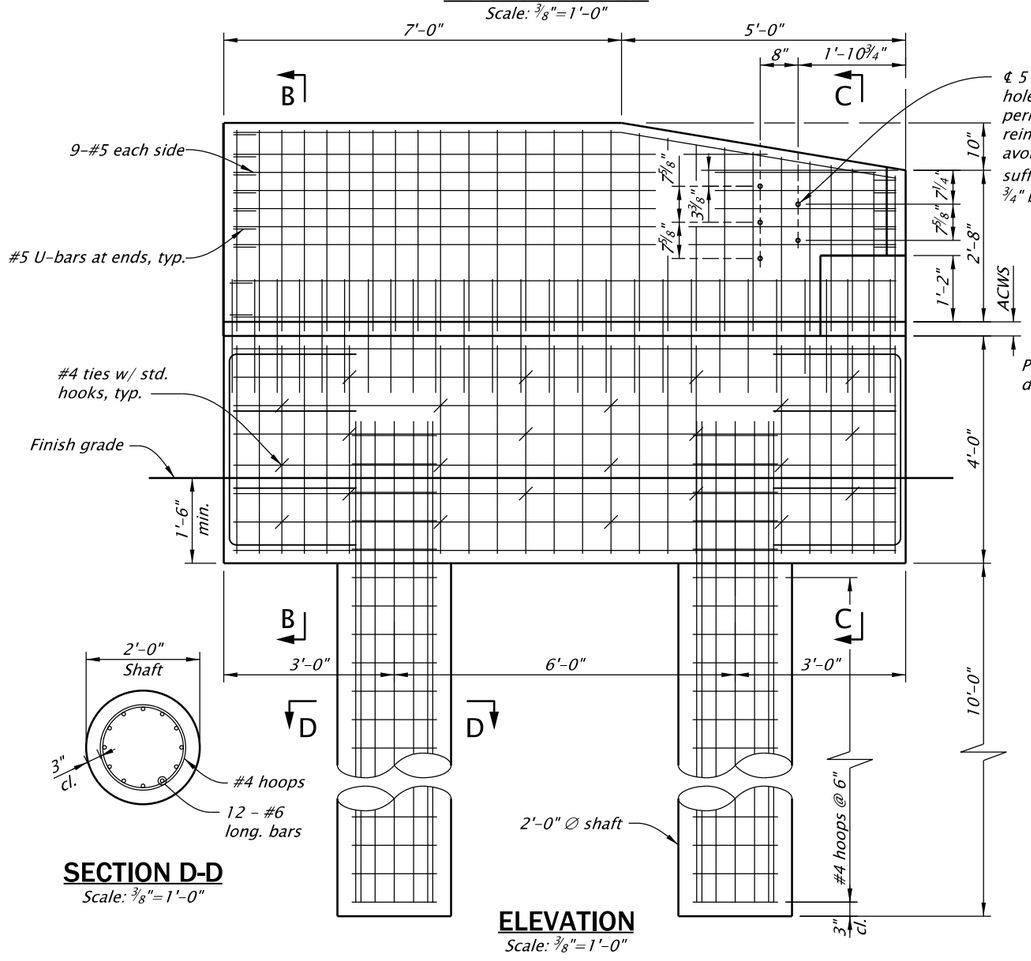
CONCRETE PARAPET - PLAN

Scale: ⅜"=1'-0"



PIER CAP - PLAN

Scale: ⅜"=1'-0"

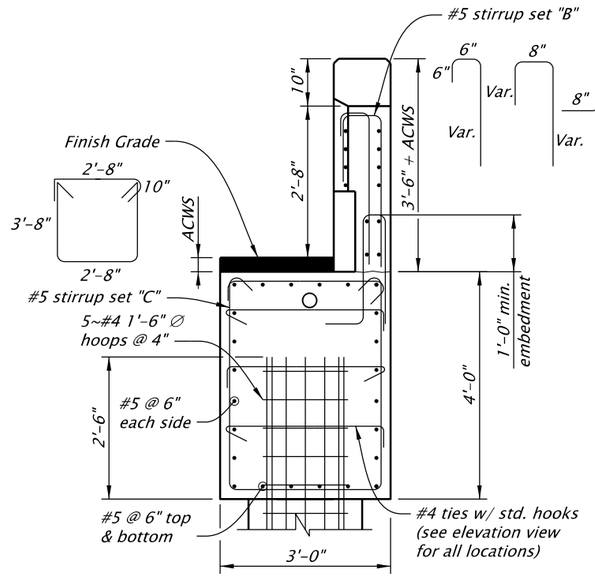


ELEVATION

Scale: ⅜"=1'-0"

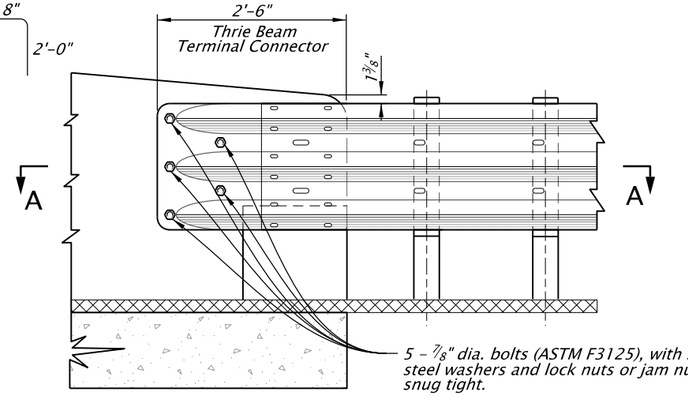
SECTION D-D

Scale: ⅜"=1'-0"



SECTION C-C

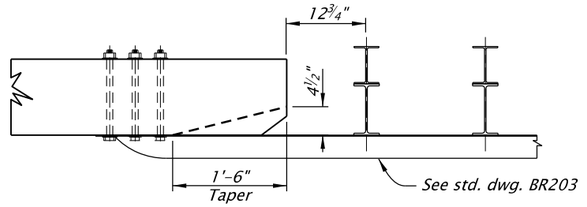
Scale: ⅜"=1'-0"



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.

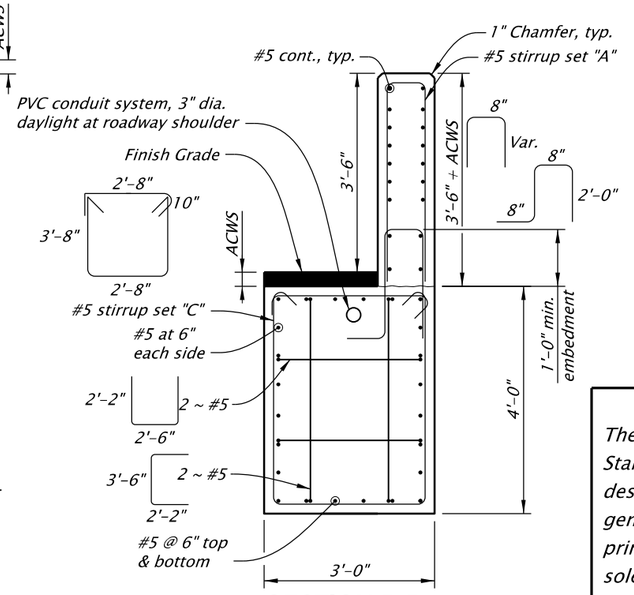
THRIE BEAM TERMINAL CONNECTION

Scale: ½"=1'-0"



SECTION A-A

Scale: ½"=1'-0"



SECTION B-B

Scale: ⅜"=1'-0"

GENERAL NOTES:
Rail buttress evaluated to meet MASH TL-4 requirements. This rail can be used for speeds of 45 mph and greater when a TL-3 rated guardrail transition is used.

Required bar clearance from nearest face of concrete:
Rail - 1½"
Shaft cap - 2"
Shaft - 3"

NOTE TO DESIGNER:
The assumed non-cohesive soil friction angle is 26°, the bulk weight is 100 pcf and fully saturated.

ACCOMPANIED BY DWGS.:
BR203, BR222

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

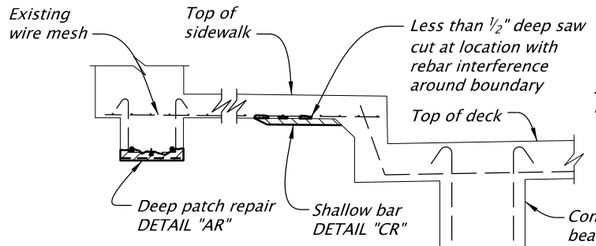
RAIL BUTTRESS, 42 INCH

2024

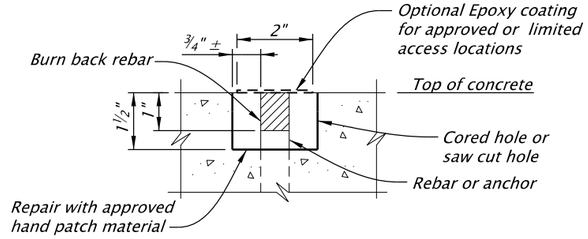
DATE	REVISION DESCRIPTION

CALC. BOOK NO. 7564 | SDR DATE 19-JAN-2024 | **BR275**

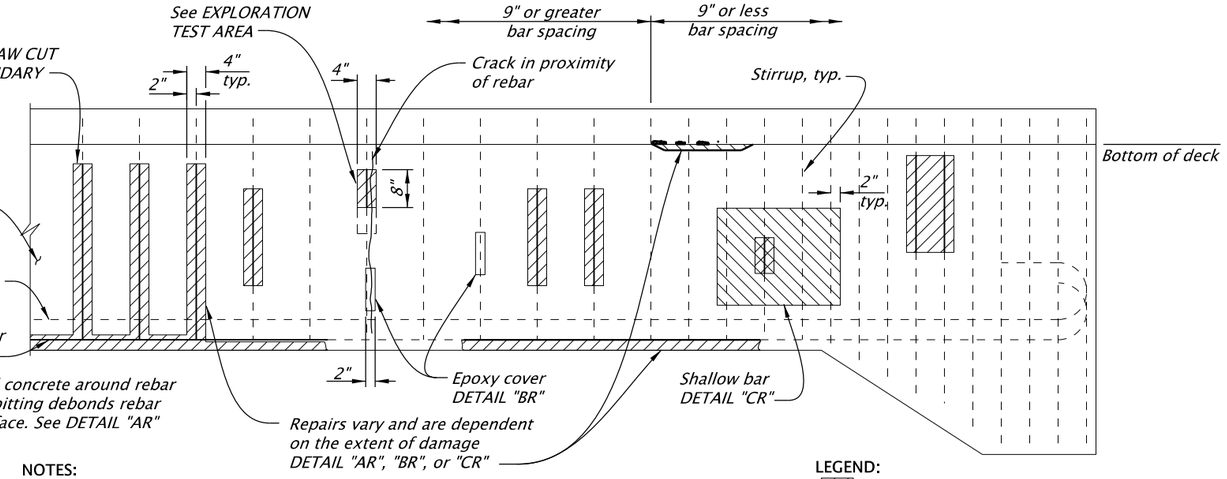
Effective Date: June 1, 2024 - November 30, 2024



SIDEWALK SECTION



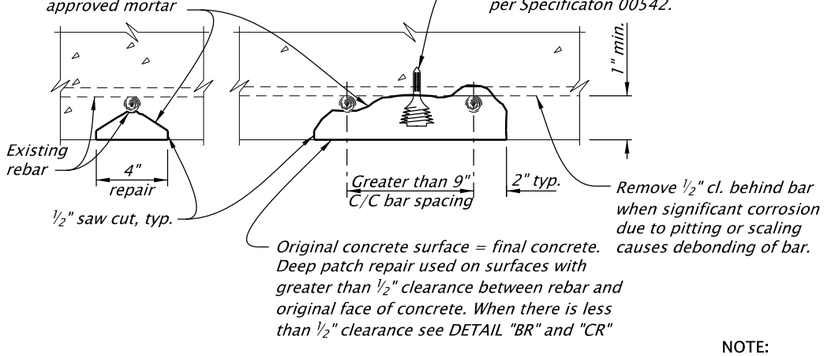
② SHALLOW REBAR / ANCHOR



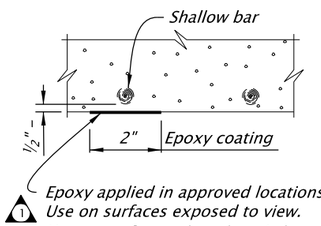
BEAM ELEVATION

NOTES:
- *Elevation and section is representative of the types of repairs and does not show exact locations.*
- *Bottom of deck or walkway horizontal repairs are similar to representative beam vertical surface repairs.*
- *Reinforcing bar repair see Standard Drawing BR505.*
- *Blast clean both concrete surface and rebar per Specification Subsection 00542.46 (1235.43) before restoring concrete cover. Blast clean prior to application for epoxy or mortar buildup.*

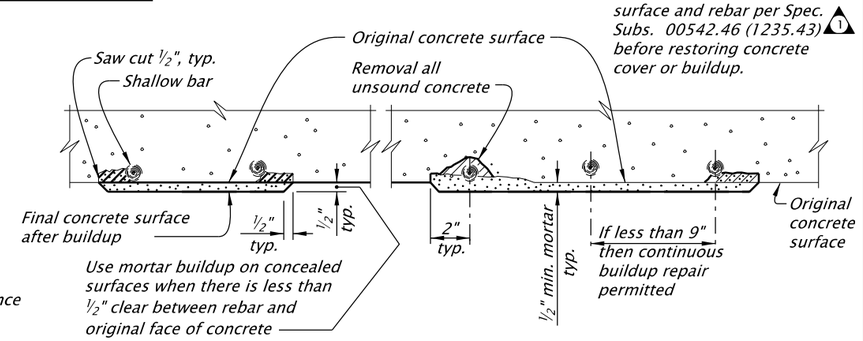
LEGEND:
- *Remove unsound concrete area*
- *Mortar buildup area*



DETAIL "AR" - DEEP PATCH REPAIR

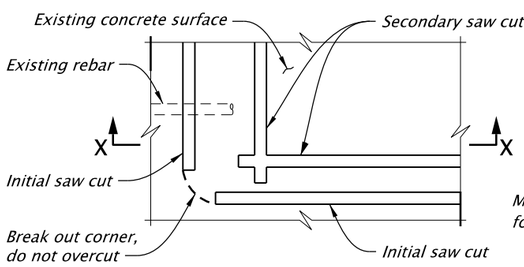


DETAIL "BR" - SHALLOW BAR WITH EPOXY COATING



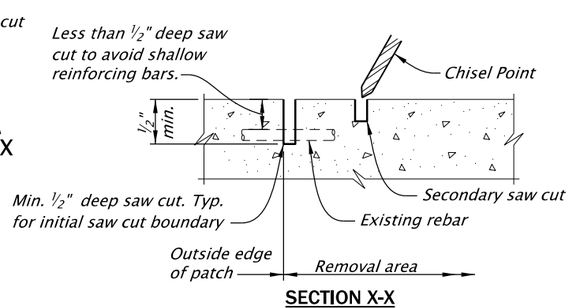
DETAIL "CR" - SHALLOW BAR WITH MORTAR BUILDUP

NOTE:
Blast clean both concrete surface and rebar per Spec. Subs. 00542.46 (1235.43) before restoring concrete cover or buildup. ①



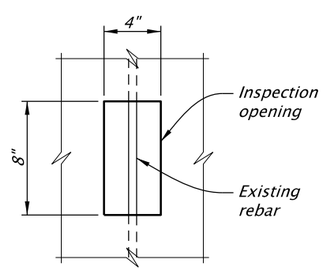
PLAN

NOTE:
Optional saw cut procedure to prevent spalling of sound concrete outside of initial saw cut boundary. See Spec. Subs. 00542.42 (1235.42)



SECTION X-X

SAWCUT BOUNDARY



NOTE:
For locations that are questionable to the extent of rebar corrosion damage

EXPLORATION TEST AREA

Accompanied by dwg. BR505

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

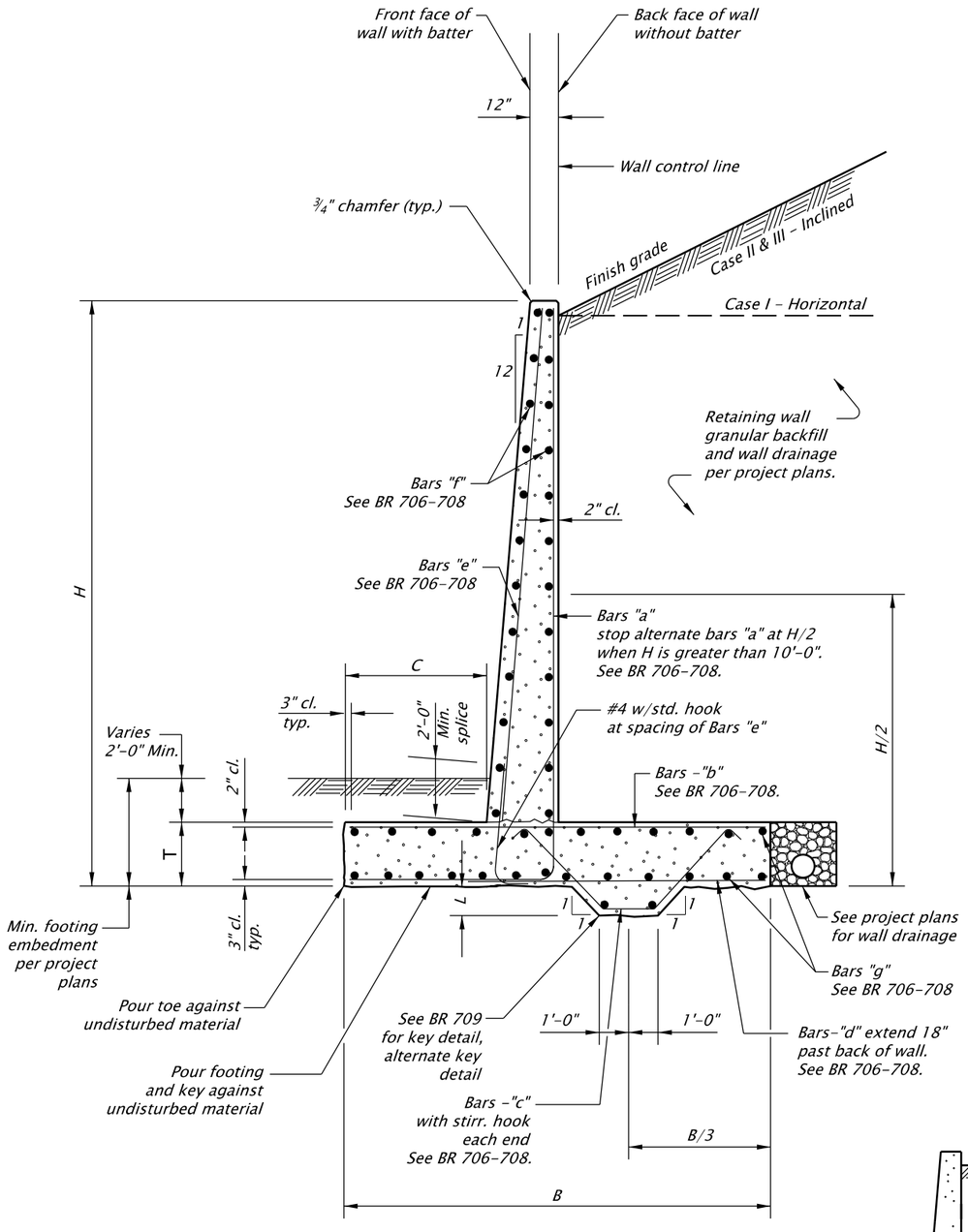
CONCRETE REPAIR

2024

DATE	REVISION DESCRIPTION
⚠ 07-2020	Updated Specifications
⚠ 01-2024	Added shallow rebar/anchor detail and general text revisions

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **BR500**

Effective Date: June 1, 2024 - November 30, 2024



CROSS - SECTION
NONE

GENERAL NOTES:

1. Cast-in-Place Semi-Gravity Standard Retaining Wall is designed in accordance with the AASHTO LRFD Bridge Design Specifications - seventh edition (including 2016 interim revisions) and the ODOT Geotechnical Design Manual (GDM), 2016.
2. Cast-in-Place Semi-Gravity Standard Retaining Wall design is based on the following soil properties:

   Backfill & Retained Soil: Soil angle of internal friction = 34°; Soil Cohesion = 0 psf; Soil weight = 125 pcf

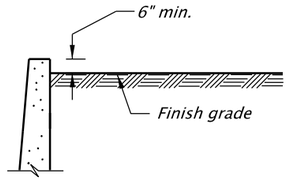
   Foundation Soil: Soil angle of internal friction = 30°; Soil cohesion = 0 psf
3. The internal stability and external stability design for overturning and sliding stability is addressed in the standard design. Overall stability, bearing resistance and settlement are addressed in site specific design.
4. Cast-in-Place Semi-Gravity Standard Retaining Wall is not designed for traffic barrier vehicular collision load or hydrostatic or seepage forces.
5. See Project Plans for drainage details.
6. Provide Class 4000 structural concrete.
7. Provide reinforcing steel according to ASTM Specification A706, or AASHTO M31 (ASTM A615) Grade 60. Use the following splice lengths unless shown otherwise:

Reinforcing Splice Lengths (Class B) Grade 60 f'c = 4.0 ksi									
Bar Size	#3	#4	#5	#6	#7	#8	#9	#10	#11
Uncoated	1'-0"	1'-4"	1'-8"	2'-0"	2'-6"	3'-3"	4'-1"	5'-2"	6'-4"

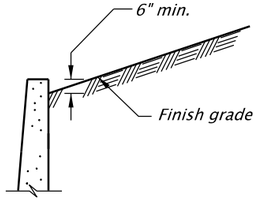
   Increase all splice lengths 30% for horizontal or nearly horizontal bars so placed that more than 12" of fresh concrete is cast below the bar.

   Splice reinforcing steel at alternate bars, staggered at least one splice length or as far as possible, unless shown otherwise.
8. Place bars 2" clear of the nearest face of concrete unless shown otherwise.
9. If not shown, place expansion joints through wall stem at intervals not to exceed 90'-0" and contraction joints through wall stem at joint intervals not to exceed 30'-0". Transverse construction joints in footing are acceptable providing clean and roughened surface and continuous reinforcement through the joint.
10. Perform shear key excavation with care to provide key dimensions indicated. Remove loose material and pour concrete against undisturbed foundation soil in the footing and key excavation.
11. Do not backfill wall until all trenching that may be necessary in front of wall is backfilled and compacted, and compacted toe fill is in place to top of subgrade.
12. For intermediate wall heights that are between the wall height values given in the wall data tables, use the tabular data for the next higher wall height. For intermediate values of seismic lateral wall coefficient, kh, use tabular data for the next higher kh.
13. See Project Plans for required footing embedment.
14. See Project Plans for architectural treatment, if required. Increase concrete cover on reinforcement as required to provide architectural treatment.

Accompanied by drawings - BR706, BR707, BR708 and BR709



CASE I: Horizontal Backfill with 250 PSF Surcharge. See BR 706.



Inclined Backfill
CASE II: 3H:1V. See BR 707.
CASE III: 2H:1V. See BR 708.

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All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

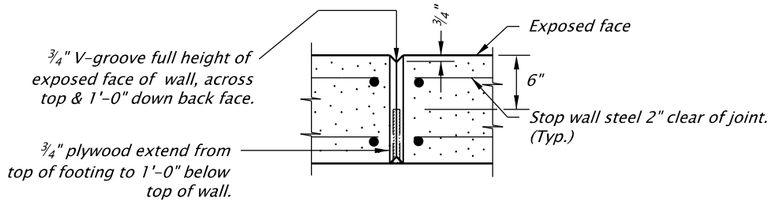
STANDARD RETAINING WALL CAST-IN-PLACE SEMI-GRAVITY FRONT FACE BATTER

2024

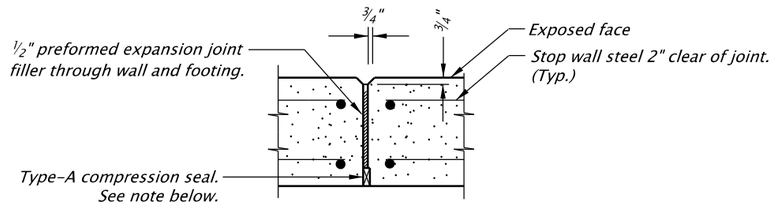
DATE	REVISION DESCRIPTION
01-2024	Revised notes 7,9

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **BR705**

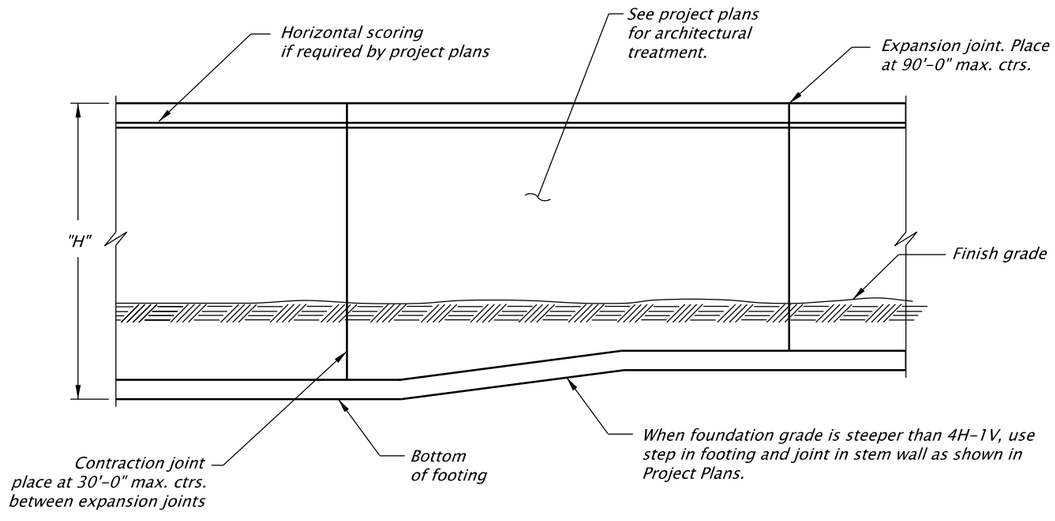
Effective Date: June 1, 2024 - November 30, 2024



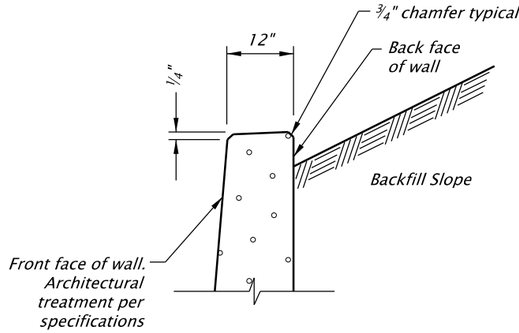
CONTRACTION JOINT
(without scoring)



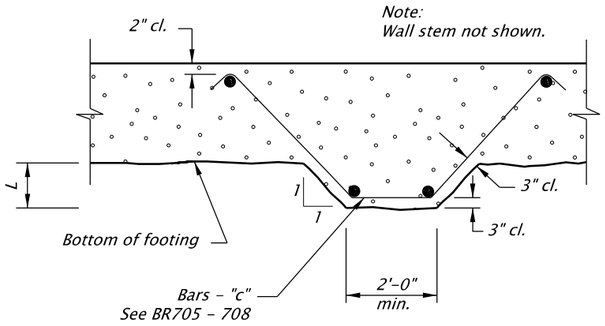
EXPANSION JOINT
(without scoring)



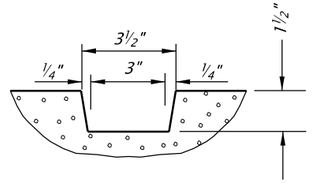
LONGITUDINAL JOINT VIEW
NONE



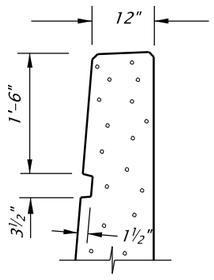
WALL TOP DETAIL



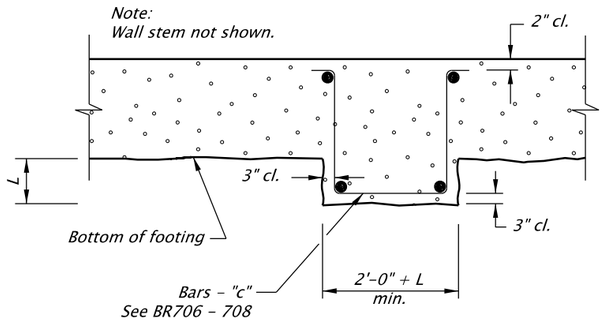
KEY DETAIL



TYPICAL SCORING



HORIZONTAL SCORING
(If shown on project plans)



ALTERNATE KEY DETAIL

NOTES:
Type-A Compression Joint Seal.

1. Install in accordance with manufacturer's recommendations from top of wall to top of footing.

2. See drg. BR139 for nominal size, joint and installation width.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

STANDARD RETAINING WALL CAST-IN-PLACE SEMI-GRAVITY JOINTS AND DETAILS

2024

DATE	REVISION DESCRIPTION
01-2024	Note edit

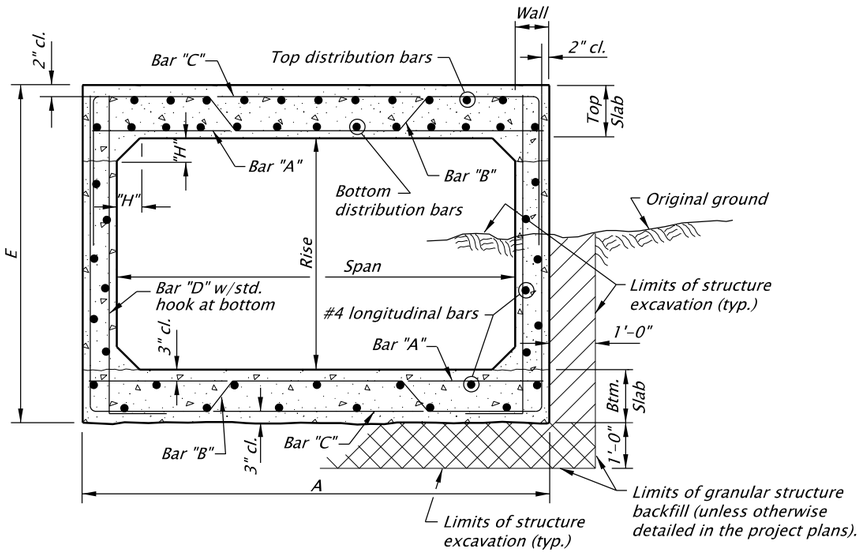
CALC. BOOK NO. 6402, 6406, 6407 | SDR DATE 19-JAN-2024 | **BR709**

Effective Date: June 1, 2024 - November 30, 2024

19-JAN-2024

BR709.dgn

SIZE		FILL	QUANTITY PER L.F.		DIMENSIONS						"A" BARS			"B" BARS								"C" BARS						B and C BARS	"D" BARS			#4 DIST. BARS		#4 LONG WALLS	#4 LONG BOTTOM SLAB	DESIGN FACTORED NET BRNG. PRESS.
SPAN	RISE		CONC.	STEEL	A	E	H	TOP SLAB	BOT. SLAB	WALL	SIZE	SPC	LENGTH	SIZE	SPC	TOP			BOTTOM			SIZE	SPC	TOP		BOTTOM		F	SIZE	SPC	LENGTH	TOP	BOTTOM			
																LENGTH	G	K	LENGTH	G	K			LENGTH	G	LENGTH	G									
FT	FT	FT	C.Y.	LBS.																																KSF
6	4	0-2	0.82	105	7'-6"	6'-0"	9"	12"	12"	9"	#5	10"	7'-2"	#4	10"	11'-2"	1'-9"	1'-11"	18'-10"	5'-7"	1'-11"	#4	10"	10'-8"	1'-9"	18'-4"	5'-7"	7'-2"	#4	10"	6'-3"	8	10	16	10	3.50
6	4	2-10	0.68	97	7'-6"	5'-6"	9"	9"	9"	9"	#5	10"	7'-2"	#4	10"	11'-0"	1'-9"	1'-11"	17'-7"	5'-1"	1'-11"	#4	10"	10'-8"	1'-9"	17'-4"	5'-1"	7'-2"	#4	10"	5'-9"	5	5	16	10	1.05
6	4	10-20	0.68	125	7'-6"	5'-6"	9"	9"	9"	9"	#6	8"	7'-2"	#4	8"	11'-0"	1'-9"	1'-11"	17'-7"	5'-1"	1'-11"	#4	8"	10'-8"	1'-9"	17'-4"	5'-1"	7'-2"	#4	8"	5'-9"	5	5	16	10	1.20
6	4	20-30	0.75	198	7'-6"	5'-9"	9"	9"	12"	9"	#6	8"	7'-2"	#4	8"	11'-0"	1'-9"	1'-11"	18'-4"	5'-4"	1'-11"	#7	8"	15'-0"	3'-11"	17'-10"	5'-4"	7'-2"	#4	8"	6'-0"	5	5	16	10	1.83
6	4	30-40	1.00	224	8'-0"	6'-3"	9"	12"	15"	12"	#5	8"	7'-8"	#5	8"	12'-7"	2'-2"	2'-2"	20'-0"	5'-10"	2'-2"	#7	8"	15'-6"	3'-11"	19'-4"	5'-10"	7'-8"	#4	8"	6'-6"	6	6	20	12	2.51
6	6	0-2	0.93	130	7'-6"	8'-0"	9"	12"	12"	9"	#5	9"	7'-2"	#4	9"	11'-2"	1'-9"	1'-11"	22'-10"	7'-7"	1'-11"	#4	9"	10'-8"	1'-9"	22'-4"	7'-7"	7'-2"	#4	9"	8'-3"	9	9	24	10	3.13
6	6	2-10	0.79	118	7'-6"	7'-6"	9"	9"	9"	9"	#5	9"	7'-2"	#4	9"	11'-0"	1'-9"	1'-11"	21'-7"	7'-1"	1'-11"	#4	9"	10'-8"	1'-9"	21'-4"	7'-1"	7'-2"	#4	9"	7'-9"	5	5	20	10	0.98
6	6	10-20	0.79	139	7'-6"	7'-6"	9"	9"	9"	9"	#6	8"	7'-2"	#4	8"	11'-0"	1'-9"	1'-11"	21'-7"	7'-1"	1'-11"	#4	8"	10'-8"	1'-9"	21'-4"	7'-1"	7'-2"	#4	8"	7'-9"	5	5	20	10	1.12
6	6	20-30	0.86	217	7'-6"	7'-9"	9"	9"	12"	9"	#4	6"	7'-2"	#4	6"	11'-0"	1'-9"	1'-11"	22'-4"	7'-4"	1'-11"	#6	6"	12'-5"	2'-7"	21'-10"	7'-4"	7'-2"	#4	6"	8'-0"	5	5	24	10	1.76
6	6	30-40	1.00	274	7'-6"	8'-3"	9"	12"	15"	9"	#4	6"	7'-2"	#4	6"	11'-2"	1'-9"	1'-11"	23'-6"	7'-10"	1'-11"	#7	6"	15'-0"	3'-11"	22'-10"	7'-10"	7'-2"	#4	6"	8'-6"	5	5	24	12	2.41



TYPICAL SECTION
NONE

GENERAL NOTES:

1. Box Culverts are designed in accordance with AASHTO LRFD Bridge Design Specifications - 6th edition, the ODOT Bridge Design and Drafting Manual (BDDM), and the ODOT Geotechnical Design Manual (GDM, 2013).

2. Box culverts are designed for the following loads:

   Live Load: HL-93 live load
   Live Load Surcharge: 2 ft live load surcharge
   Earth Load:
   - 125 pcf moist unit weight vertical earth load
   - 135 pcf saturated unit weight vertical earth load
   - Lateral earth pressure including compaction induced lateral earth pressure using Peck and Mesri method per the GDM: assumes backfill peak soil friction angle of 34 degrees, compacted backfill unit weight of 125 pcf, and backfill compacted with hand-operated vibratory roller (combined operational weight plus dynamic or centrifugal force not greater than 5,000 lbs), operated within a distance of 0.2ft from the culvert wall.

   Water: 62.4 pcf; culvert modeled completely full and completely empty
   Future Wearing Surface allowance: 25 psf

3. Design is applicable for soils with a subgrade modulus between 50 lb/in^3. and 1000 lb/in^3.

4. Provide reinforcing steel according to ASTM Specification A706, or AASHTO M31 (ASTM A615) Grade 60. Use the following splice lengths unless shown otherwise:

Reinforcing Splice Lengths (Class B) Grade 60 fc=3.3 ksi							
Bar Size	#3	#4	#5	#6	#7	#8	#9
Uncoated	1'-0"	1'-4"	1'-8"	2'-0"	2'-9"	3'-7"	4'-6"

5. See Project Plans for additional corrosion protection measures, if required.

6. Place bars 2" clear of the nearest face of concrete unless shown otherwise.

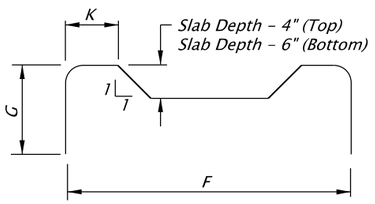
7. Splice bar "B" (top) with bar "B" (bottom) and bar "C" (top) with bar "C" (bottom). Bars "A" and "C" alternate with bar "B".

8. Provide Class 3300 - 1 1/2 or 3/4 concrete for all cast-in-place box culvert concrete.

9. Do not place and compact backfill until top slab concrete has reached design strength.

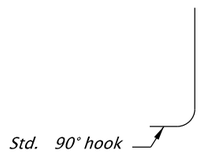
10. See Standard Drawing BR800 for wingwall and apron details when required.

11. For box culvert with fill heights in more than one range, use the box culvert for the highest height except for box culverts with fill heights in the 0'-2' and 2'-10' range, use the box culvert for the 0'-2' fill.



BAR "B"

BAR "C"



BAR "D"

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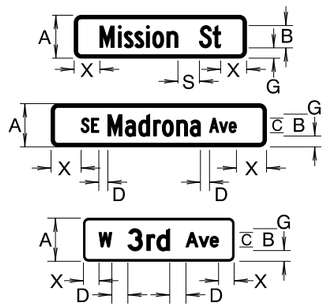
OREGON STANDARD DRAWINGS
CAST-IN-PLACE CONCRETE BOX CULVERTS GENERAL DETAILS 6 x 4 and 6 x 6
2024

DATE	REVISION DESCRIPTION
01-2021	Label dImension H
01-2024	Changed span size from ; to 6

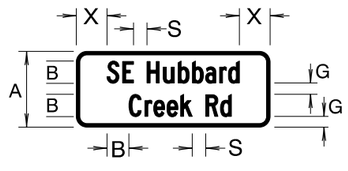
CALC. BOOK NO. 6402, 6406, 6407 | SDR DATE 19-JAN-2024 | **BR820**

Effective Date: June 1, 2024 - November 30, 2024

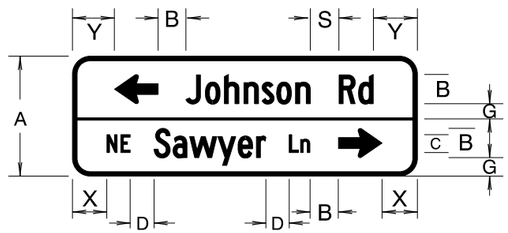
19-JAN-2024
BR820.dgn



LEGEND EXAMPLES FOR STREET NAME SIGNS



STACKED LEGEND FOR STREET NAME SIGN
(GROUND-MOUNTED)



STACKED LEGEND FOR STREET NAME SIGN
(MAST ARM MOUNTED)

Notes: If 12"C font on mast arm mounted sign yields signs larger than 21 square feet, the 10" Alternate may be used.

White border and legend on mast-arm signs are to be ASTM Type IX retroreflective sheeting. Borders shall be flush with edge of sign. Dividers, where used, shall be same width as border.

New Projects: Include mast-arm signs on Signing Plans.

Existing Poles: Perform pole analysis prior to adding or enlarging signs.

STREET NAME SIGN DETAILS

	A	A*	B	C	D**	E	F	G	G*
GROUND-MOUNTED SIGN (2-3 LANE HWYS)	12"	15"	6"	4"	2½"	1"	1½"	3"	5"
GROUND-MOUNTED SIGN (4+ LANES AND 40 MPH OR LESS)	12"	15"	6"	4"	2½"	1"	1½"	3"	5"
GROUND-MOUNTED SIGN (4+ LANES AND > 40 MPH)	15"	18"	8"	5"	3⅛"	1"	1½"	3½"	6"
GROUND-MOUNTED SIGN (LOCAL ROAD, 25 MPH OR LESS)	9"	12"	5"	3"	1⅞"	½"	1½"	2"	4"
MAST ARM MOUNTED SIGN *** (12" STANDARD)	21"	24"	12"	8"	5"	1"	3"	4½"	7½"
MAST ARM MOUNTED SIGN (10" ALTERNATE)	21"	21"	10"	6"	3¾"	1"	3"	5½"	7"
STACKED LEGEND SIGN (GROUND-MOUNTED)	21"	24"	6"	N/A	N/A	1"	3"	3"	4"
STACKED LEGEND SIGN *** (MAST ARM MOUNTED)	30"	33"	8"	5"	3⅛"	1"	3"	3½"	5"

E = BORDER WIDTH
F = BORDER RADIUS
H = LETTER HEIGHT
S = SPACE BETWEEN WORDS
X = 1/2 OF REMAINING SPACE
* = USE FOR TEXT INCLUDING LOWER-CASE g, j, p, q and y
** = MINIMUM SIZE; CAN BE LARGER TO MATCH STANDARD HIGHWAY SIGN'S D3-1
*** = SIGNS EXCEEDING THE MAXIMUM SIGN HEIGHT "Z" COLUMN OF THE MAST ARM STREET NAME SIGN MOUNT DETAIL ON TM679 WILL REQUIRE STRUCTURAL ANALYSIS OF THE MAST ARM AND POLE.

SERIES (FONT)				
	B	C	D	E
S	.531 H	.625 H	.836 H	1.00 H

SPACING BETWEEN WORDS

X-Dimension should be approximately the same dimension as the letter Height (H). At a minimum the X-Dimension shall be no less than one-half the letter height (1/2 H)

Sign examples shown here are not drawn to scale, but to illustrate the layout of the legend items.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

STREET NAME SIGN LAYOUT

2024

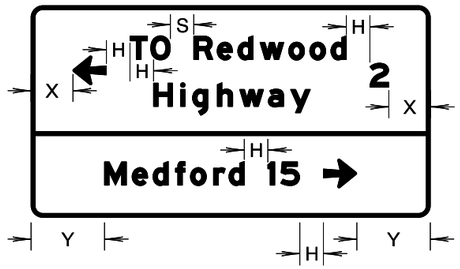
DATE	REVISION DESCRIPTION
01-2024	MOVED DIRECTIONAL SIGN CONTENT TO NEW STD DWG TM226
01-2024	ADDED STREET SIGN EXAMPLE AND EDITED DIMENSION TABLE

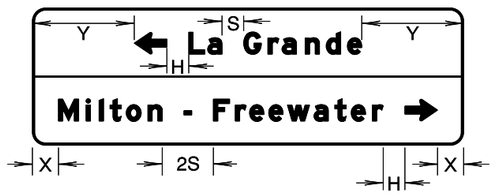
CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **TM223**

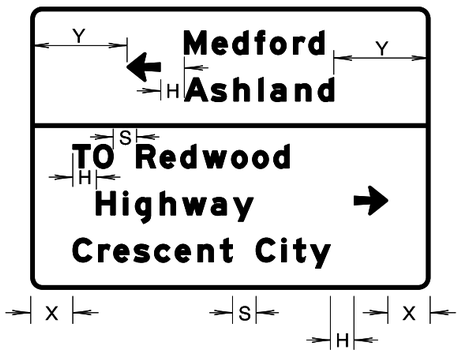
Effective Date: June 1, 2024 - November 30, 2024

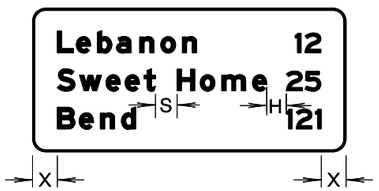
19-JAN-2024

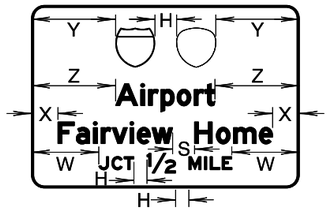
TM223.dgn

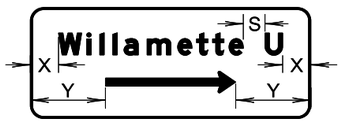


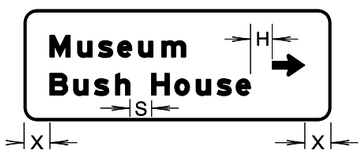






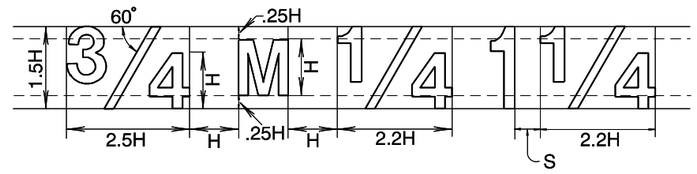






Vertically center arrow between lines of legend.

DIRECTIONAL SIGN DETAILS



FRACTIONAL LAYOUT

SERIES (FONT)				
	B	C	D	E
S	.531 H	.625 H	.836 H	1.00 H

SPACING BETWEEN WORDS

H = Letter Height
S = Space between words
W,X,Y & Z = ½ of remaining space

X-Dimension should be approximately the same dimension as the letter Height (H). At a minimum the X-Dimension shall be no less than one-half the letter height (1/2 H)

Sign examples shown here are not drawn to scale, but to illustrate the layout of the legend items.

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All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

CONVENTIONAL ROADS DIRECTIONAL SIGN LAYOUT

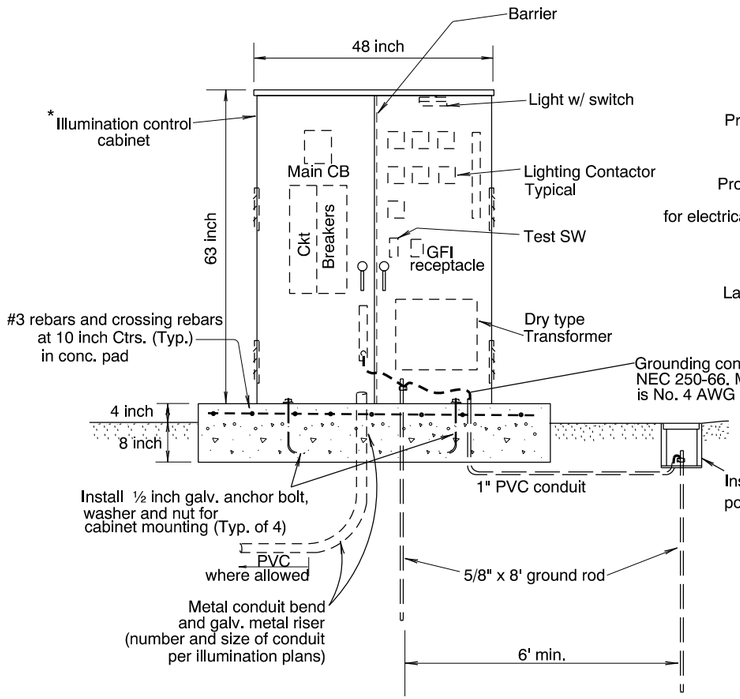
2024

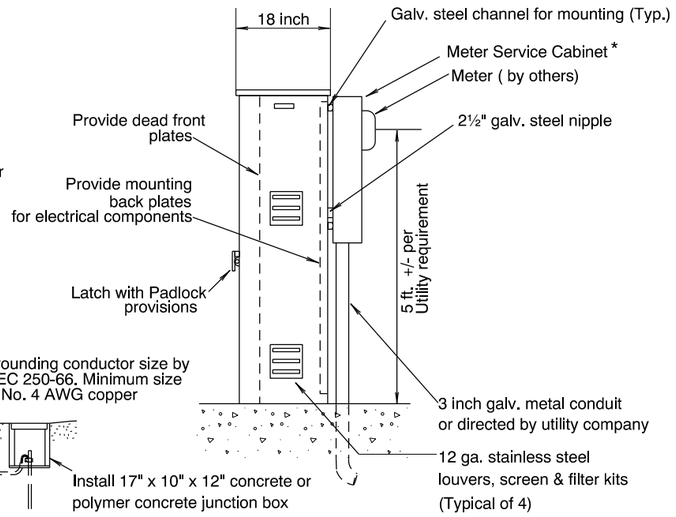
DATE	REVISION DESCRIPTION
01-2024	SEPARATED MATERIAL FROM TM223
01-2024	EDITED CONTENT ON TWO SIGNS

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **TM226**

Effective Date: June 1, 2024 - November 30, 2024

PAD-MOUNT ILLUMINATION CONTROL CABINET





PAD MOUNT ILLUMINATION CABINET

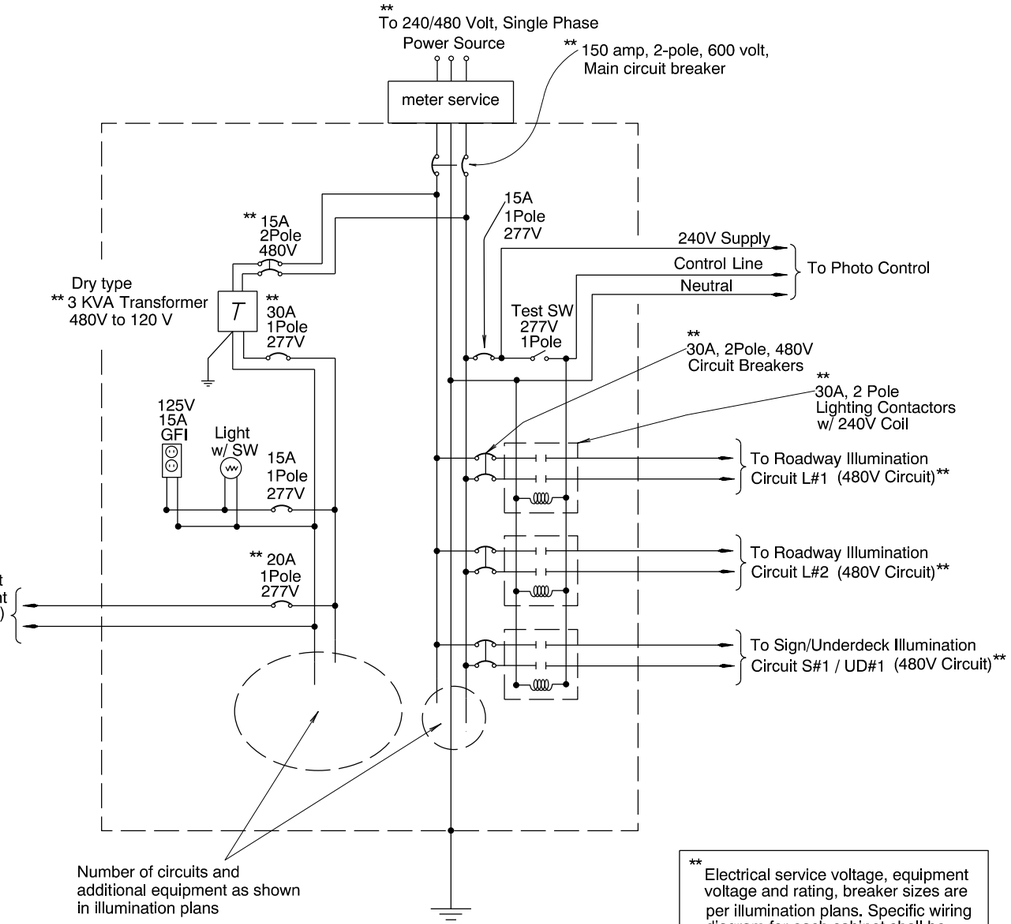
No Scale

* Meter base, cabinet & all electrical components shall meet or exceed voltage requirements & short circuit rating of the specified illumination system.

GENERAL NOTES

- Pad-mount illumination cabinet can be used when
  1. Electrical service has 480 V and/or 3 phase system, or
  2. Main CB is larger than 100 amp, or
  3. The number of branch circuits is six or more, or
  4. Dry type Transformer is installed inside the cabinet, or
  5. More room inside the cabinet is desirable for additional equipment and wiring.
- Pad-mount illumination control cabinet shall be NEMA 3R, with hinged double door, 3 point lockable vault handles and stainless steel hardware.
- Control cabinet formed with 10 gage pregalvanized metal, or 12 gage stainless steel. It shall be powder coated to match Federal Standard 595C color # 26440 (Light Gull Gray). (Painting is not required on stainless steel cabinets.)
- Deadfronts may be fabricated from code thickness galvanized sheet metal or type 304 or 316 stainless steel. Provide stainless steel, turn-and-fold style, dead front latches. (min. 2 per panel)
- All electrical components shall be per ODOT Standards and as shown in illumination plans.
- Install copper buss bars for main and branch circuits.
- All internal wiring, except field wires, shall be done by a U.L. listed facility.
- Cabinet size is nominal. Engineer to verify before ordering.
- For electrical service, coordinate with Utility co. and satisfy all utility requirements.
- Meter service cabinet formed with stainless steel 304, NEMA 3R, UL 67 listed, 600 V, 200 amp with natural finish and test/bypass provision (124 TBSS or approved equal)
- C/T cabinet may be required for bigger electrical service such as 250 amp, 277/480 volt, 3 phase.
- Install cabinet in safe location from vehicle traffic, or provide protection such as barrier, guardrail or (2) 4 ft. metal pole barrier

CB = Circuit Breaker
Ckt = Circuit
GFI = Ground Fault Interupt
SW = Switch
C/T = Current Transformer



WIRING DIAGRAM
SERVICE & CONTROL CABINETS

** Electrical service voltage, equipment voltage and rating, breaker sizes are per illumination plans. Specific wiring diagram for each cabinet shall be shown in illumination plans and checked by Engineer.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

PAD-MOUNT ILLUMINATION CONTROL CABINET

2024

DATE	REVISION DESCRIPTION
01-2024	REMOVED PE CONTROL WITH NOTE

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **TM302**

19-JAN-2024

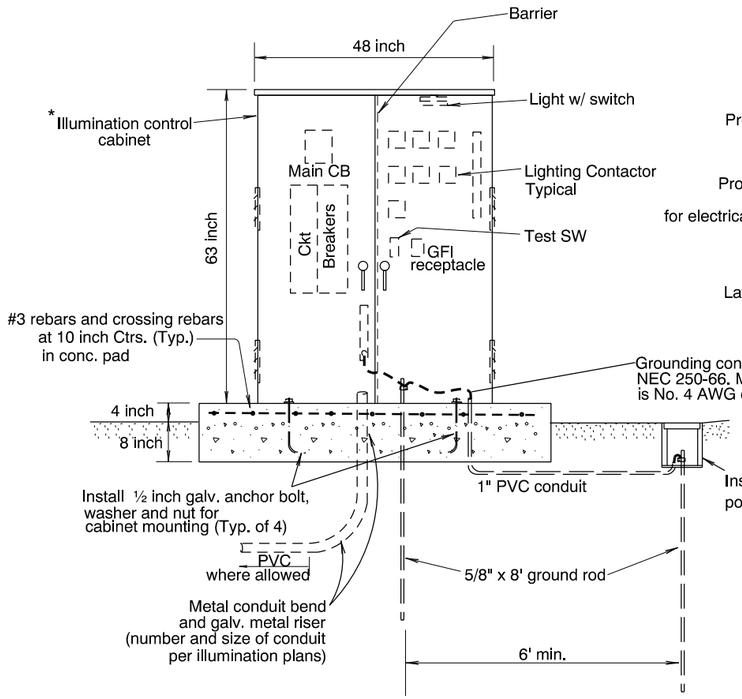
TM302.dgn

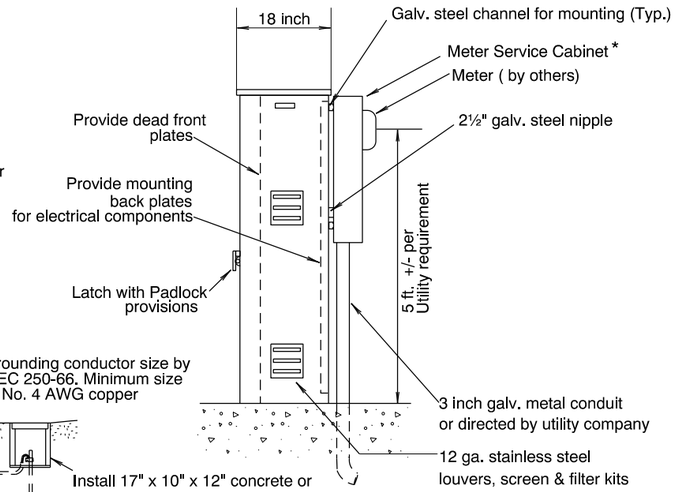
Effective Date: June 1, 2024 - November 30, 2024

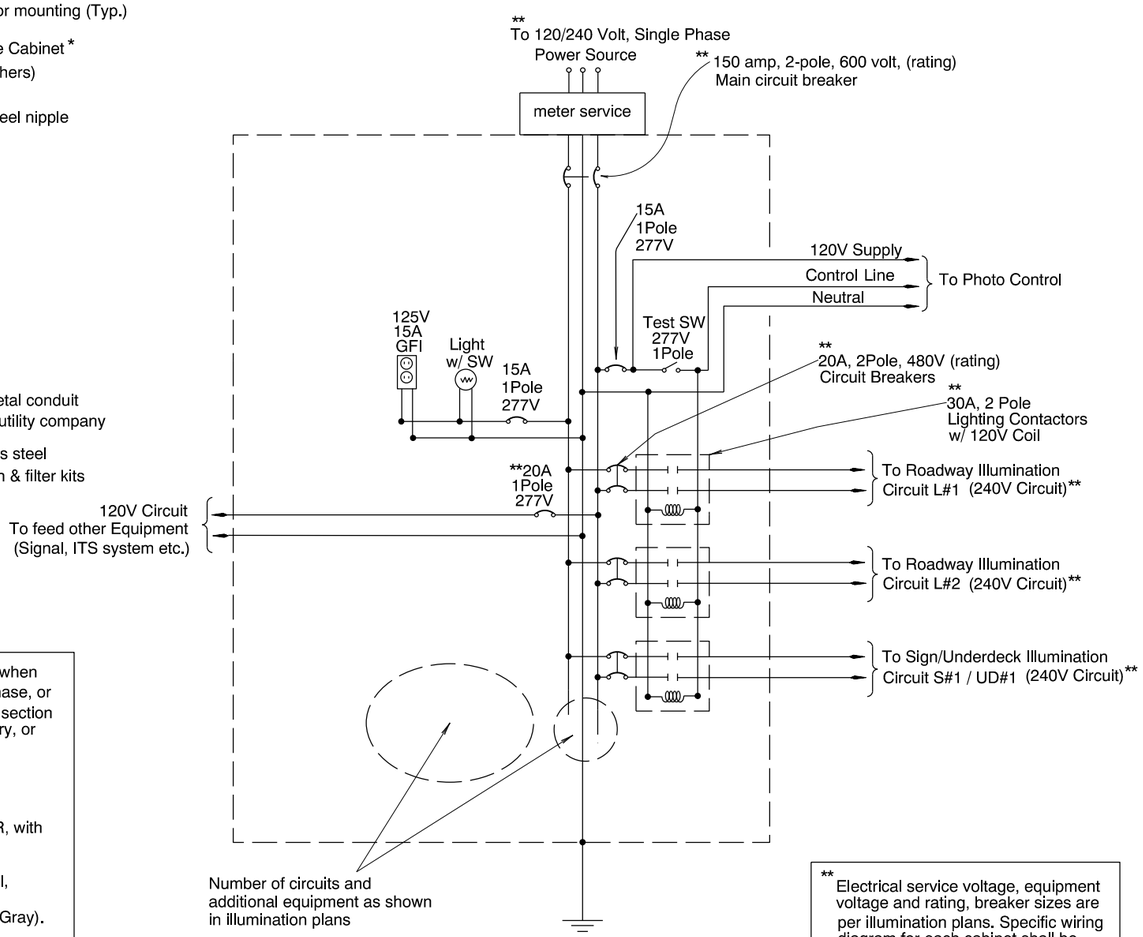
19-JAN-2024

TM303.dgn

120/240 V PAD-MOUNT ILLUMINATION CONTROL CABINET

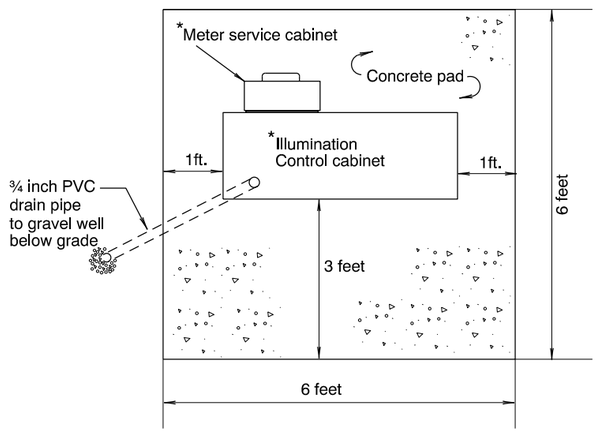






WIRING DIAGRAM
120/240 V SERVICE & CONTROL CABINETS

** Electrical service voltage, equipment voltage and rating, breaker sizes are per illumination plans. Specific wiring diagram for each cabinet shall be shown in illumination plans and checked by Engineer.



PAD MOUNT ILLUMINATION CABINET
No Scale

* Meter base, cabinet & all electrical components shall meet or exceed voltage requirements & short circuit rating of the specified illumination system.

GENERAL NOTES

- 120/240 volt pad-mount illumination cabinet can be used when
  1. New electrical service provides 120/240 volt single phase, or
  2. Illumination system is for small/medium size highway section and interchange, so 480 volt circuits are not necessary, or
  3. Main CB is larger than 100 amp, or
  4. The number of branch circuits is six or more, or
  5. More room inside the cabinet is desirable for additional equipment and wiring.
- Pad-mount illumination control cabinet shall be NEMA 3R, with hinged double door, 3 point lockable vault handles and stainless steel hardware.
- Control cabinet formed with 10 gage pregalvanized metal, or 12 gage stainless steel. It shall be powder coated to match Federal Standard 595C color # 26440 (LIght Gull Gray). (Painting is not required on stainless steel cabinets.)
- Deadfronts may be fabricated from code thickness galvanized sheet metal or type 304 or 316 stainless steel. Provide stainless steel, turn-and-fold style, dead front latches. (min. 2 per panel)
- All electrical components shall be per ODOT Standards and as shown in illumination plans.
- Install copper buss bars for main and branch circuits.
- All internal wiring, except field wires, shall be done by a U.L. listed facility.
- Cabinet size is nominal. Engineer to verify before ordering.
- For electrical service, coordinate with Utility co. and satisfy all utility requirements.
- Meter service cabinet formed with stainless steel 304, NEMA 3R, UL 67 listed, 600 V, 200 amp with natural finish and test/bypass provision (124 TBSS or approved equal)
- C/T cabinet may be required for bigger electrical service.
- Install cabinet in safe location from vehicle traffic, or provide protection such as barrier, guardrail or (2) 4 ft. metal pole barrier

CB = Circuit Breaker
Ckt = Circuit
GFI = Ground Fault Interupt
SW = Switch
C/T = Current Transformer

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

120/240 V PAD-MOUNT ILLUMINATION CONTROL CABINET

2024

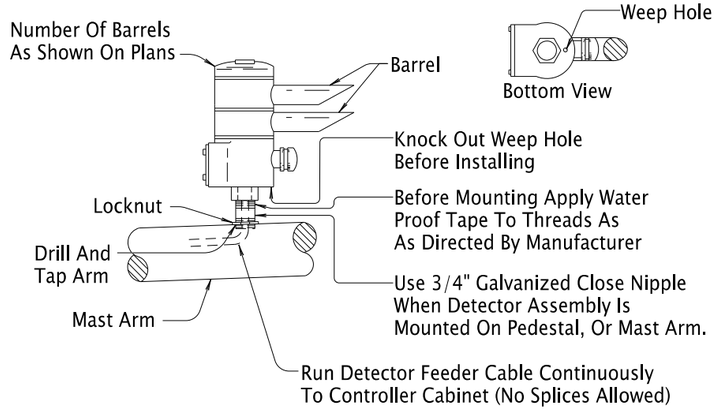
DATE	REVISION DESCRIPTION
01-2024	REMOVED PE CONTROL WITH NOTE

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **TM303**

Effective Date: June 1, 2024 - November 30, 2024

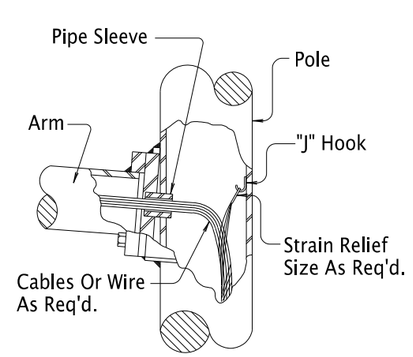
19-JAN-2024

TM450.dgn



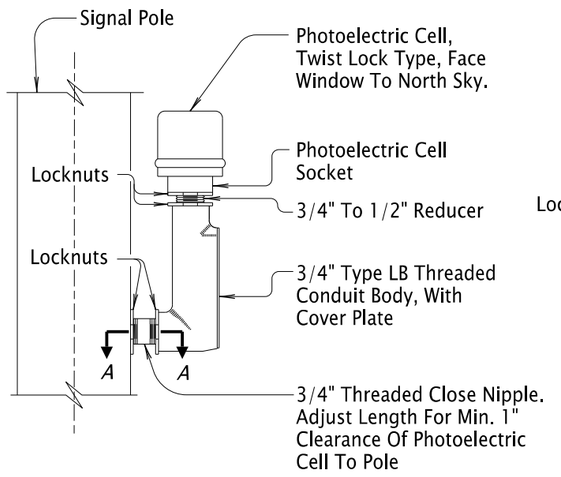
DETAIL "A" FIRE PREEMPTION INSTALLATION

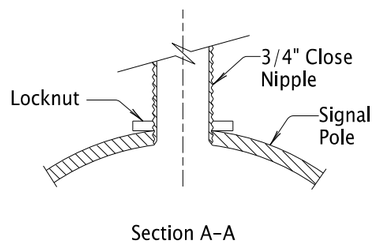
Emitter Units For Vehicles Provided By Others



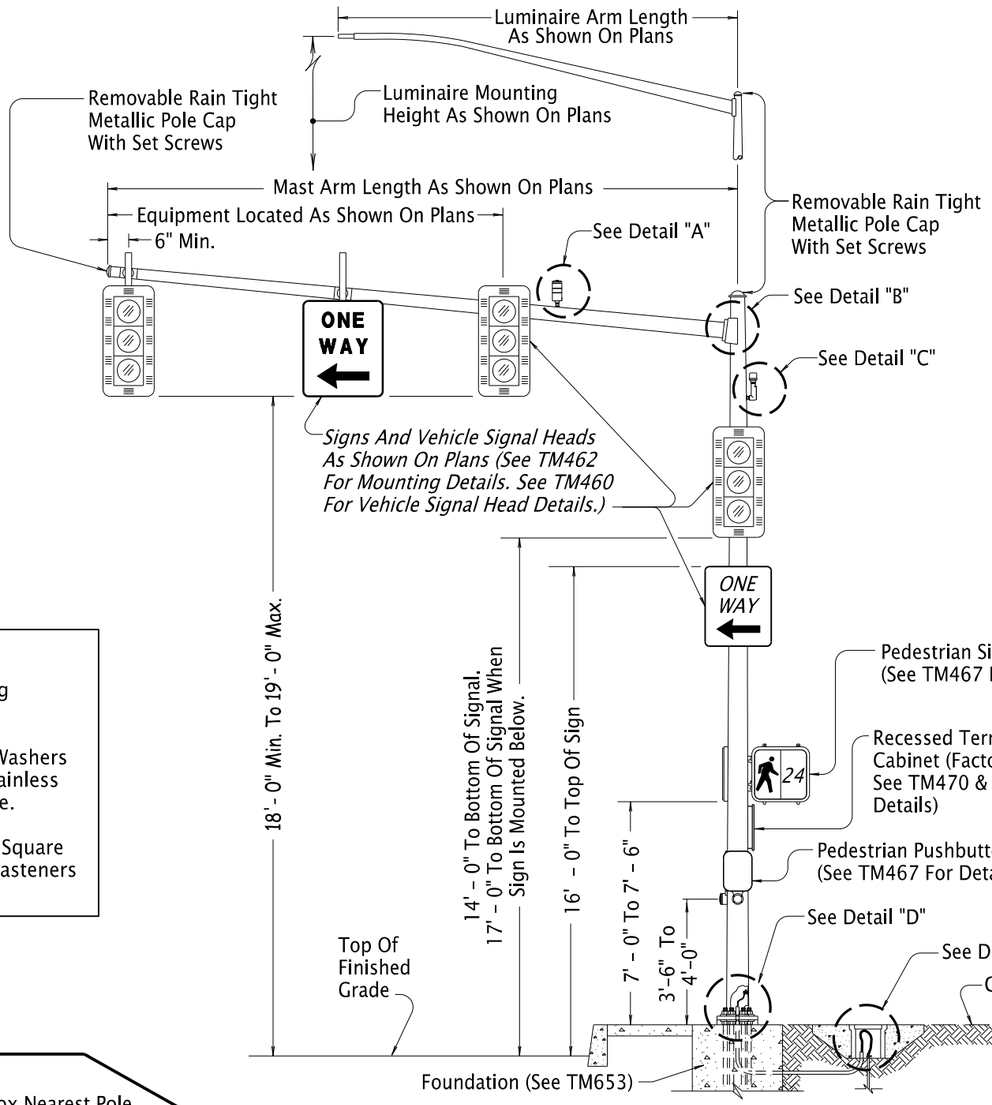
DETAIL "B" MAST ARM CONNECTION

Preinstalled "J" Hooks In Poles For Wire Compression
Strain Relief Devices (Cable Grips) At All Access
Entrances For Luminaire & Signal Arms.

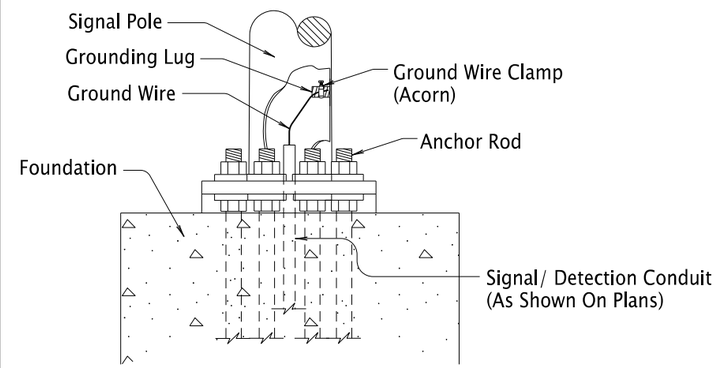




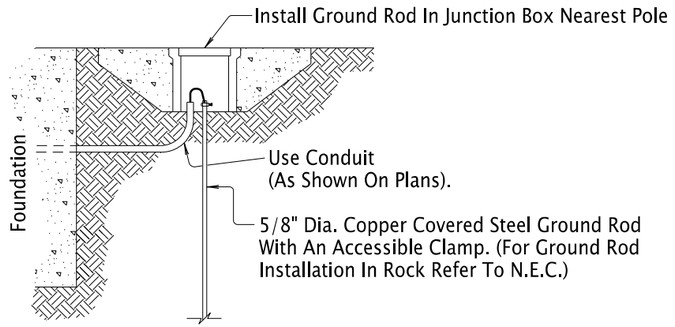
DETAIL "C" PHOTOELECTRIC CELL INSTALLATION



MAST ARM POLE



DETAIL "D" INTERIOR GROUND INSTALLATION



DETAIL "E" GROUND ROD INSTALLATION

Not Applicable For Structure Mounted Poles. See Specifications.

General Notes:

1. All Pole Entrances Containing Wiring Shall Be Smooth.
2. All Screws, Bolts, Nuts And Washers Shall Be Type 304 Or 316 Stainless Steel Unless Noted Otherwise.
3. Bolts And Screws Shall Have Square Or Hex Heads. Allen Head Fasteners Not Allowed.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

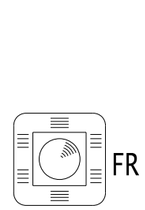
MAST ARM POLE DETAILS

2024

DATE	REVISION DESCRIPTION
01-2021	CORRECTED STD. DWG. REFERENCE
07-2023	ADDED STD. DWG. REFERENCE
01-2024	MINOR TEXT REVISION FOR CONSISTENCY

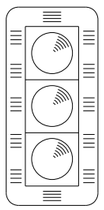
CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **TM450**

Effective Date: June 1, 2024 - November 30, 2024

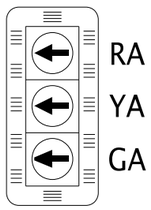


TYPE 1R
Red Flashing Beacon

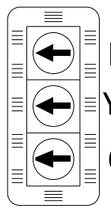
TYPE 1Y
Yellow Flashing Beacon



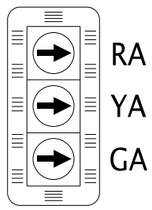
TYPE 2
Standard



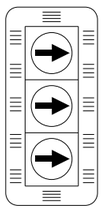
TYPE 3L
Protected Left Turn



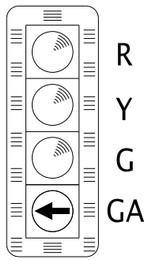
TYPE 3LCF
Protected / Permitted Left Turn



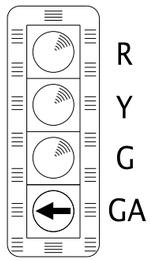
TYPE 3R
Protected Right Turn



TYPE 3RCF
Protected/Permitted Right Turn

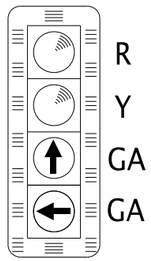


TYPE 4
Spilt Phase Only

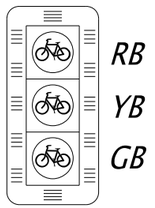


TYPE 7
Rail Preemption Only

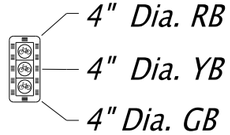
TYPE 8
Ramp Meter Only



TYPE 9
Split Phase Only



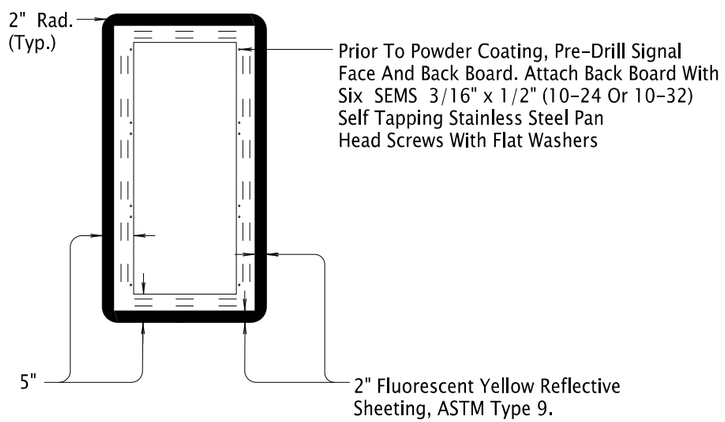
TYPE 12
Bike



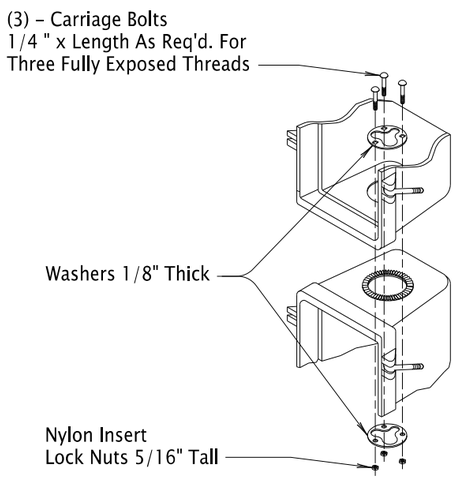
TYPE 12M
Mini Nearside Bike

Color Indications All Indications Are 12" Diameter Unless Otherwise Shown	
R	Red Circular Ball
Y	Yellow Circular Ball
G	Green Circular Ball
RA	Red Arrow
YA	Yellow Arrow
GA	Green Arrow
FYA	Flashing Yellow Arrow
FR	Flashing Red Circular Ball
FY	Flashing Yellow Circular Ball
RB	Red Bike Symbol
YB	Yellow Bike Symbol
GB	Green Bike Symbol

VEHICLE SIGNAL HEAD DESIGNATIONS AND LENS ARRANGEMENT



BACKBOARD



VEHICLE HEAD ASSEMBLY

General Notes:

1. All Screws, Bolts, Nuts And Washers Shall Be Type 304 Or 316 Stainless Steel Unless Noted Otherwise.
2. Bolts And Screws Shall Have Square Or Hex Heads Unless Otherwise Noted. Allen Head Fasteners Not Allowed.
3. Assemble The Heavy Duty Polycarbonate Vehicle Signal, Visor, And Backboard With Bolted Connections, Stainless Steel Reinforcing Strips And Stainless Steel Plates.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

VEHICLE SIGNAL DETAILS

2024

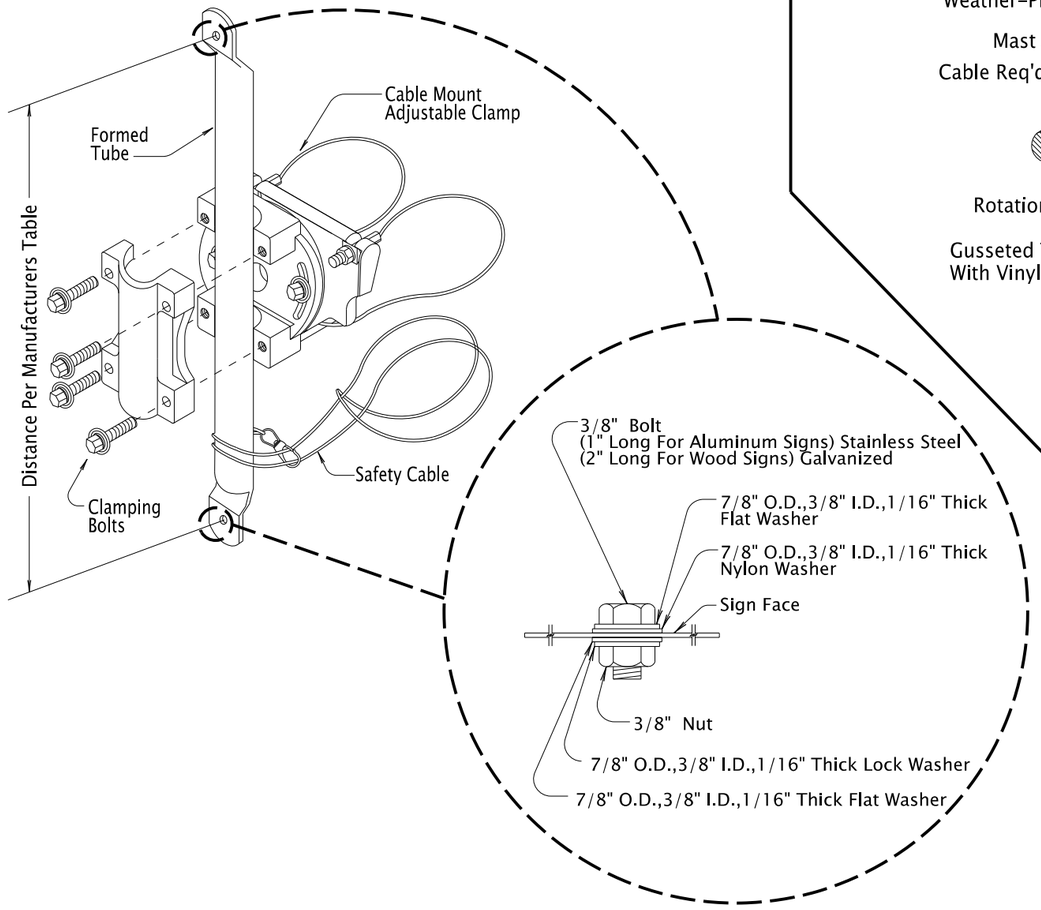
DATE	REVISION DESCRIPTION
01-2024	ADDED TYPE 12 AND 12M. REMOVED TYPE 3LBF, 5, 6L, AND 10.

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **TM460**

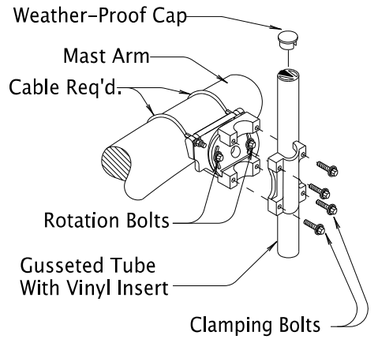
Effective Date: June 1, 2024 - November 30, 2024

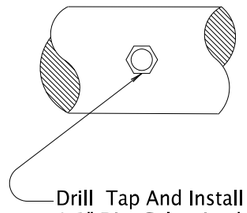
19-JAN-2024

TM462.dgn

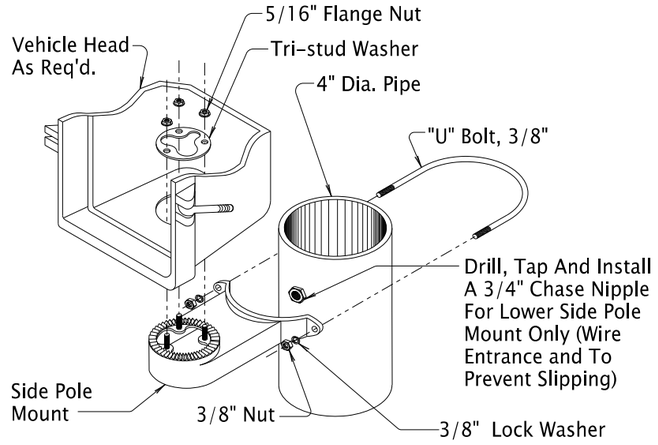


SIGN BRACKET (TYPE "B",MAST ARM/POLE INSTALLATION)



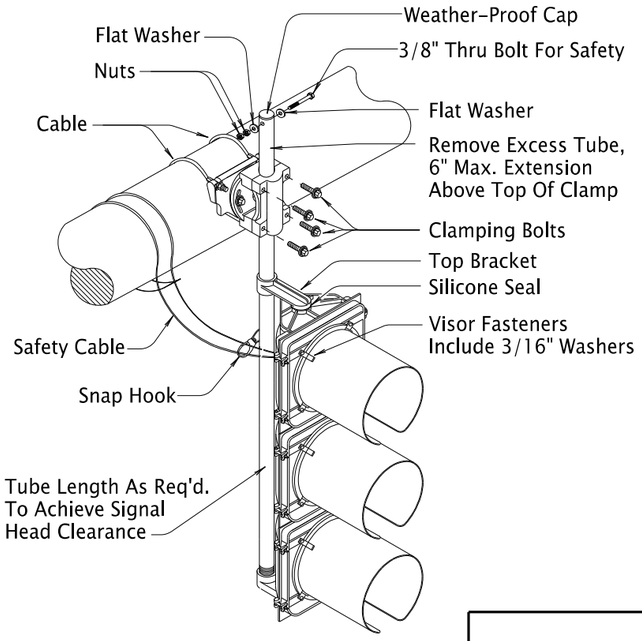


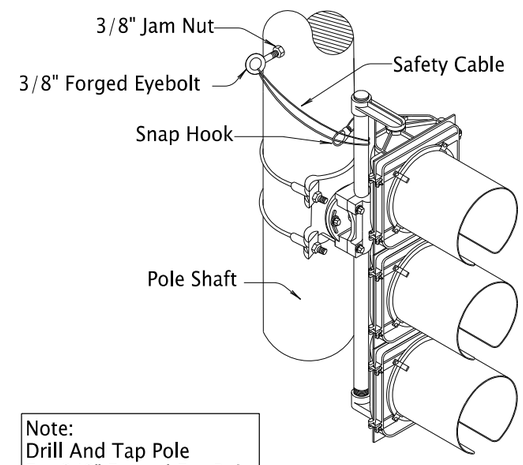
VEHICLE SIGNAL MAST ARM INSTALLATION



4" SIDE POLE MOUNT INSTALLATION

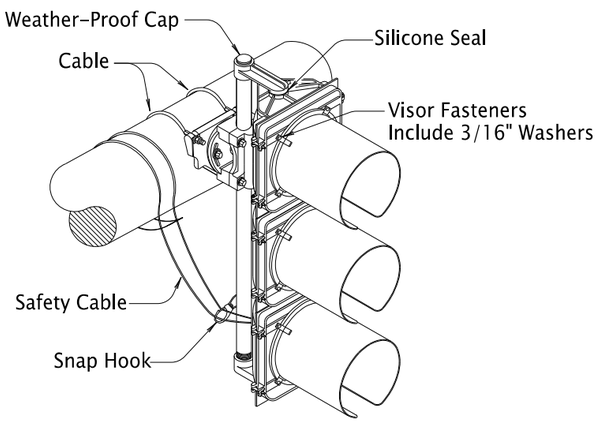
(For Mounting Signal Heads to Pedestal Pipe)





Note:
Drill And Tap Pole For 3/8" Forged Eye Bolt

POLE SHAFT INSTALLATION



MOUNTING VEHICLE SIGNAL BETWEEN BRACKET ARMS

NOTE:

This Detail Can Be Applied To Any Signal Head Configuration. If The Extension Between The Center Line Of The Mast Arm And The Top Bracket Exceeds 18" Consult Engineer For Guidance.

MOUNTING VEHICLE SIGNAL ABOVE BRACKET ARMS

General Notes:

1. All Screws, Bolts, Nuts And Washers Shall BeType 304 Or 316 Stainless Steel Unless Noted Otherwise.
2. Bolts And Screws Shall Have Square Or Hex Heads. Allen Head Fasteners Not Allowed.
3. Follow Manufacturers Recommendations For Installation.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

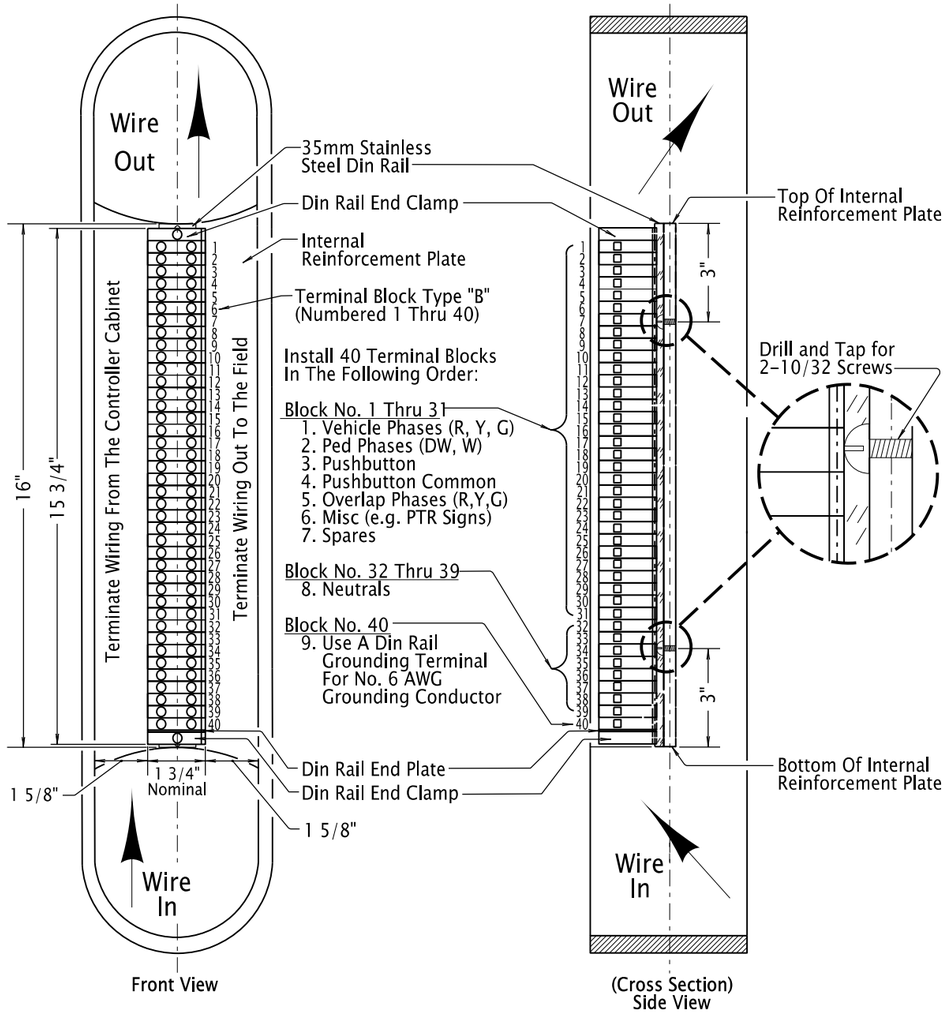
VEHICLE SIGNAL BRACKET & SIGN BRACKET (TYPE B) DETAILS

2024

DATE	REVISION DESCRIPTION
01-2024	MINOR TEXT REVISION FOR CONSISTENCY

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **TM462**

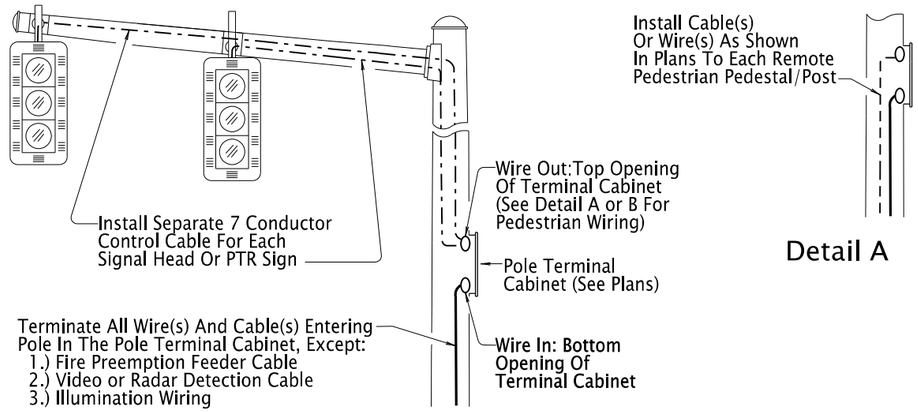
Effective Date: June 1, 2024 - November 30, 2024



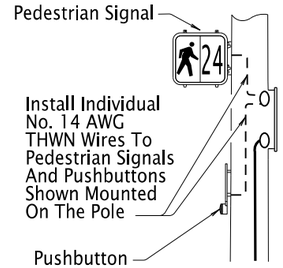
DIN RAIL, TERMINAL BLOCKS, & WIRING IN POLE RECESSED TERMINAL CABINET

7 CONDUCTOR CONTROL CABLE			PEDESTRIAN PHASES	VEHICLE PHASES	SIGNAL HEAD TYPES			
CONDUCTOR NUMBER	BASE COLOR	FIRST TRACER	1 Pedestrian Phase	1 Vehicle Phase	6L or 3LBF	4L, 5, or 7	1R, 1Y, 2, 3L, 3LCF, 3U,3R, 4, 9, 12, or 12M	10
1	WHITE	—	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL
2	BLACK	—	WALK	YELLOW	YELLOW	YELLOW	YELLOW	YELLOW
3	RED	—	DONT WALK	RED	RED	RED	RED	RED 1
4	ORANGE	—	P.B. COMMON	SPARE	FLASHING YELLOW	TURN YELLOW	SPARE	RED 2
5	GREEN	—	PUSHBUTTON	GREEN	GREEN	GREEN	GREEN	SPARE
6	BLUE	—	SPARE	SPARE	SPARE	TURN GREEN	SPARE	SPARE
7	WHITE	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE

COLOR CODE CHART CONTROL CABLE



Detail A

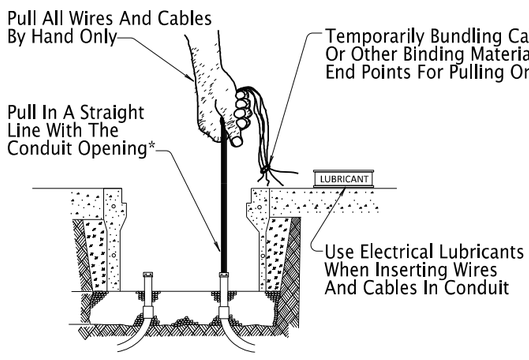


Detail B

WIRE & CABLE IN POLES

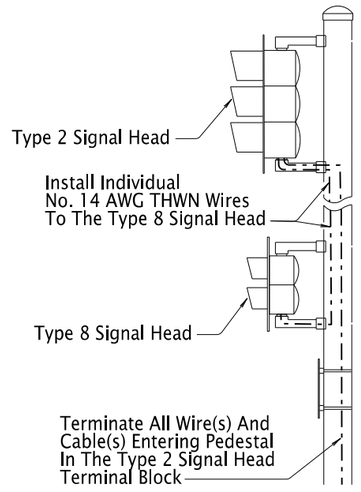
General Notes:

1. Install All Wire And Cable Between Terminal Blocks Without Splicing.
2. Mark Phase Number/Identification On All Cable In Junction Boxes, Terminal Cabinets, Service Cabinets, And Controller Cabinets With Permanent Tags. Use Handheld Labeler (Brady IDXPERT With XC-1500-580-WT-BK Tags Or Approved Equal). Wiring For Overlaps Shall Be Labeled (OLA,OLB,OLC,OLD).
3. Install No. 16 AWG TFFN Orange Base With Blue Tracertone Wire In All Conduits As A Locate Wire. Leave Slack As Required In General Note 5 And Install A Wire Nut. Do Not Join Multiple Locate Wires Under A Common Wire Nut Unless Otherwise Shown.
4. Tape The Ends Of Unsued Conductors With Insulated Vinyl Plastic Tape.
5. Leave Slack In Each Wire And Cable As Follows:
   A.) 2 Feet In Junction Boxes And Poles
   B.) 6 Feet In The First Junction Box Nearest The Controller Cabinet
   C.) 6 Feet In Controller Cabinet And Service Cabinet
6. Install Polyethylene Pull Line In All Conduits Noted On The Plans For Future Use (No Wires/Cables In Conduit). Leave 6 Feet Of Slack Pull Line.
7. At Existing Installations The Contractor Is Responsible For The Re-wiring And Re-numbering Of New And Existing Control Cables, In All Junction Boxes, Terminal Cabinets, Service Cabinets, And Controller Cabinets.



* Use A Pulley Device To Achieve A Straight Line If Pulls Are Made With Poles Or Controller Cabinets In Place

WIRE & CABLE IN CONDUITS



WIRE & CABLE IN RAMP METER PEDESTALS

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

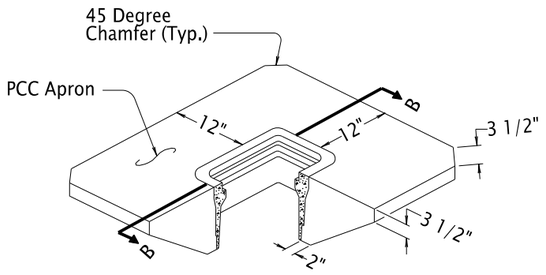
WIRE & CABLE INSTALLATION

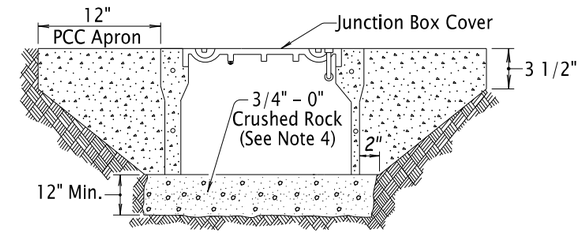
2024

DATE	REVISION DESCRIPTION
01-2024	REVISED SIGNAL HEAD TYPES IN COLOR CODE CHART CONTROL CABLE DETAIL

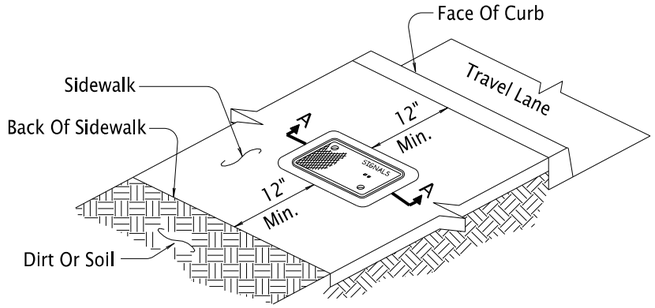
CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **TM470**

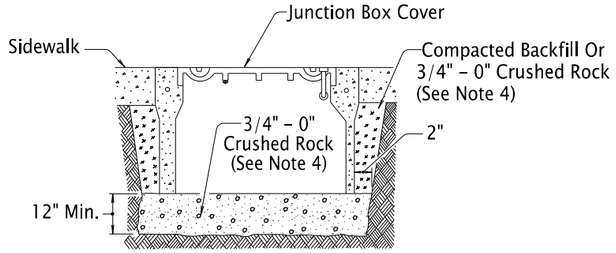
Effective Date: June 1, 2024 - November 30, 2024





SECTION B-B

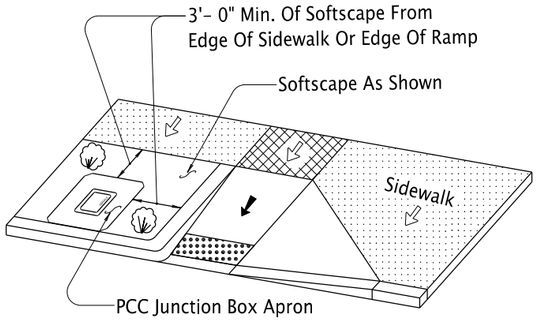




SECTION A-A

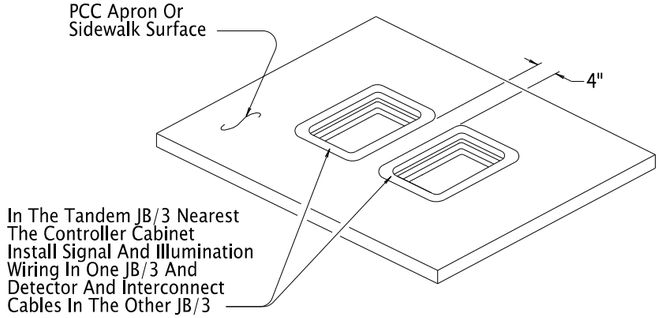
JUNCTION BOX INSTALLATION IN PCC SIDEWALK

(This Detail Only Applicable for Junction Boxes Located In Flat Areas Of Sidewalks. Do Not Install In Slopes Of Ramps Or Driveways)

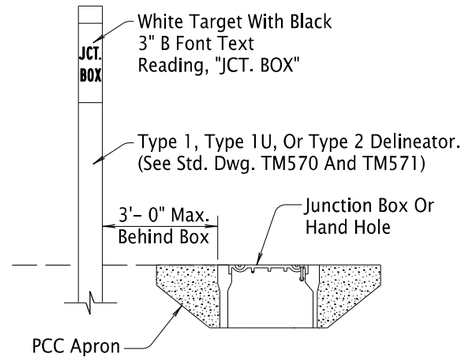


JUNCTION BOX INSTALLATION IN UNSURFACED AREA

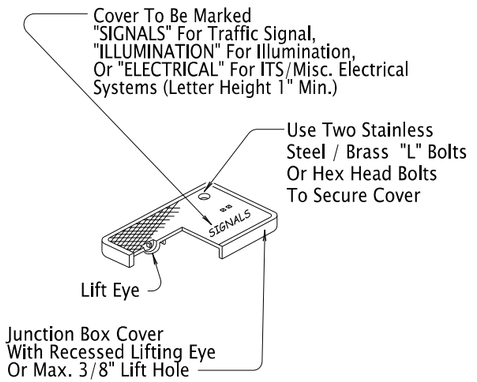
(This Detail Only Applicable for Junction Boxes Located In Incidental Travel Areas; Gravel Shoulders, Behind Guardrail, Etc. Do Not Install In Travel Lanes, Paved Shoulders, Or Other Areas Exposed To Traffic.)



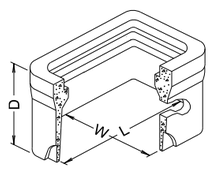
TANDEM JB/3A JUNCTION BOX DETAILS



DELINEATION OF JUNCTION BOX & HAND HOLE IN UNSURFACED AREA



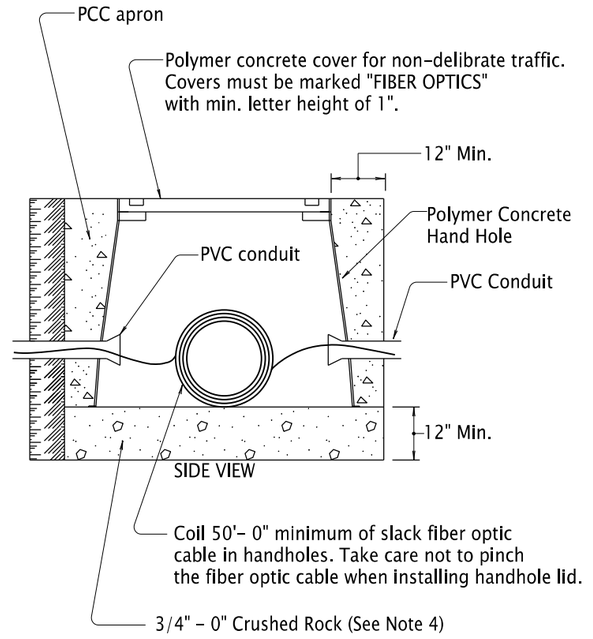
JUNCTION BOX COVER DETAILS

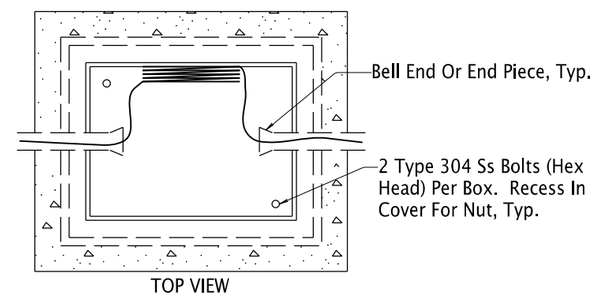


Type*	L	W	D
JB1	17"	10"	12"
JB2	22"	12"	12"
JB3	30"	17"	12"
HH-1	24"	30"	24"
HH-2	30"	48"	24"
HH-3	30"	48"	36"

*Junction Box Or Handhole
Type As Shown On Plans

DIMENSION TABLE





FIBER OPTIC CABLE HAND HOLE INSTALLATION

GENERAL NOTES:

1. Install Top of Junction Box And Hand Hole Flush With The Sidewalk, Surrounding Grade, Or Top Of Curb. For Hand Holes Installed In The Roadway Or Shoulder, Leave The Top Of The Hand Hole 1/2" Below The Pavement Surface.
2. Install Junction Boxes And Hand Holes At The Approximate Locations Shown, Or If Not Shown, No More Than 300 Feet Apart For Junction Boxes And No More Than 1000 Feet Apart For Hand Holes.
3. More Junction Boxes And Hand Holes Than Specified May Be Installed To Facilitate The Work At The Option And Cost Of The Contractor
4. Use Materials According To 00640.10 and 00640.16. Use Compaction Equipment Suitable For Area And Compact Each Six Inch Layer With Sufficient Coverages To Produce A Firm Unyielding Surface. Do Not Install Conductors Until Surface Has Been Constructed.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

JUNCTION BOXES/HAND HOLES

2024

DATE	REVISION DESCRIPTION
07-2022	ADDED NEW MARKING (ILLUMINATION & ELECTRICAL) FOR JB COVER
01-2024	CHANGED DIMENSION FOR JB DELINEATION

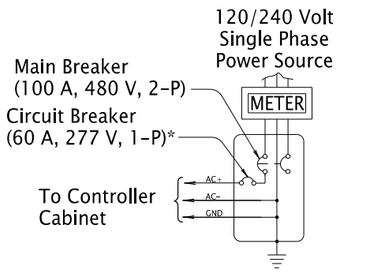
CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **TM472**

Effective Date: June 1, 2024 - November 30, 2024

19-JAN-2024

TM485.dgn

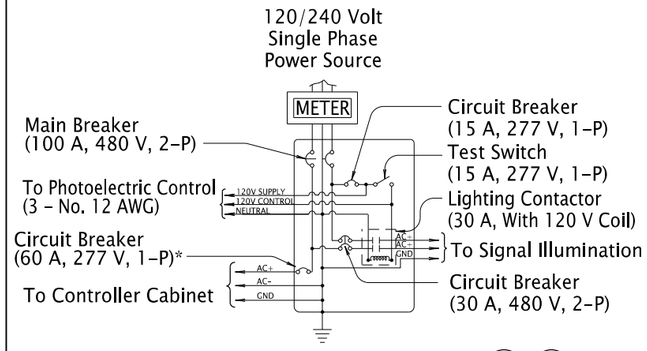
* When installing the service cabinet for an RRFB use a 20 A, 277 V, 1-P circuit breaker



SERVICE CABINET WIRING: (BMC) (SC)

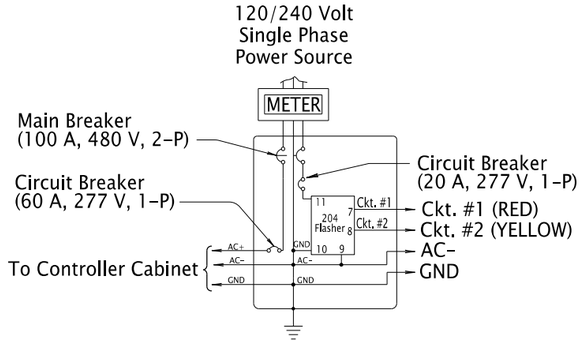
(Signal System)

* When installing the service cabinet for an RRFB use a 20 A, 277 V, 1-P circuit breaker



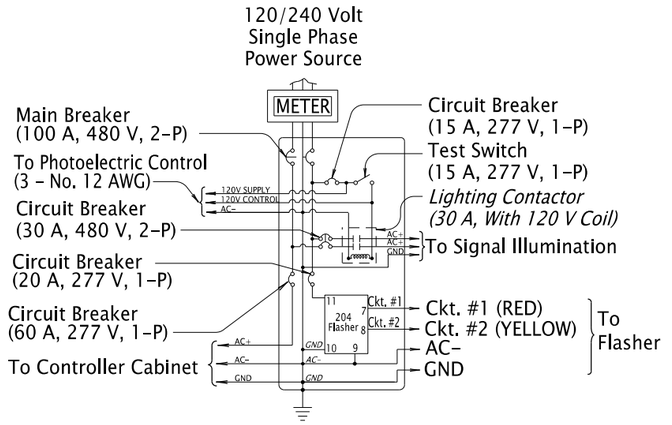
SERVICE CABINET WIRING: (BMCL) (SCL)

(Signal + Illumination System)



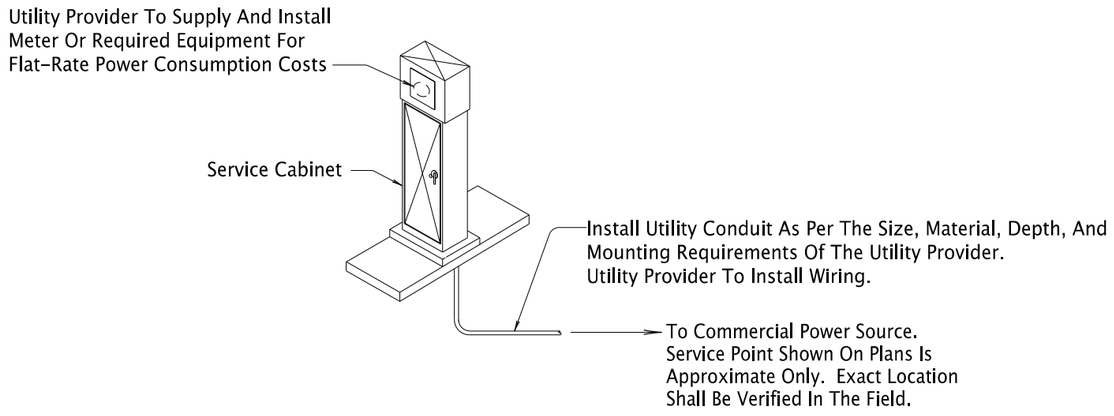
SERVICE CABINET WIRING: (BMCF)

(Signal + Flashing Beacon System)



SERVICE CABINET WIRING: (BMC FL)

(Signal + Flashing Beacon + Illumination System)



UTILITY PROVIDER DETAILS

General Notes:

1. Notify Utility Before Making Any Connections To Utility Poles.
2. Service Cabinet Shall Have A Solid Copper Neutral Bus And The Number And Size Of Switches Or Circuit Breakers As Shown. Service Cabinet Can Accommodate A Maximum Of 10 Circuit Breakers.
3. Wiring Connections To The Terminal Screws On The Circuit Breakers And Contactors Shall Make Full Contact Under The Screw Head.
4. Circuit Breakers Shall Be UL489 Listed, Unenclosed, Molded Case Bolt-On Type With End Conductor Terminals Suitable For Surface Mounting In The Cabinet On A False Back Or Bracket.
5. Label Circuit Breakers And Equipment With An Engraved Permanent Label On The Dead Front Panel To Indicate The Circuit Controlled.
6. Fill Out Manufacturer Provided Arc Flash Stickers Using A Permanent Handheld Labeler (Brady IDXPERT with XC-1500-580-WT-BK Tags Or Approved Equal).

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

SERVICE CABINET WIRING DETAILS

2024

DATE	REVISION DESCRIPTION
07-2023	REVISED SERVICE CABINET WIRING TITLES, ADDED NOTE 6.
01-2024	ADDED NOTE FOR RRFB 20 AMP BREAKER IN BMC & BMCL DETAILS

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **TM485**

Effective Date: June 1, 2024 - November 30, 2024

Post & Stub	Hinge Data							Base Plate Data									Footing Data		Min. Footing Depth			Max. Footing Slope	
Depth & Mass/ft	Hinge ℄t1	Slip ℄t2	A	B	C	Hinge Bolts		Base ℄t3	D	E	F	G	Bolt				Stub Length	V bars	2'-0" dia.	3'-0" dia.	4'-0" dia.	Rise per ft. "Y"	Grade
						Dia.	Length						dia.	"T1" Torque	"T2" Torque	Length							
W6 x 9	3/8"	3/8"	4"	7/8"	2¼"	3/4"	2"	1"	4¼"	3/4"	8½"	10"	5/8"	150 ft.-lb.	50 ft.-lb.	4¼"	2'-0"	#4	4'-9"	—	—	12"	1V:1.00H
W6 x 12	3/8"	3/8"	4"	7/8"	2¼"	3/4"	2"	1"	4½"	3/4"	8½"	10"	5/8"	150 ft.-lb.	50 ft.-lb.	4¼"	2'-4"	#5	5'-6"	—	—	11 1/4"	1V:1.07H
W6 x 15	3/8"	1/2"	6"	1¼"	3½"	7/8"	2½"	1"	6¼"	7/8"	8½"	10¼"	3/4"	280 ft.-lb.	70 ft.-lb.	4½"	2'-8"	#6	6'-6"	—	—	7 1/4"	1V:1.66H
W8 x 18	1/2"	1/2"	5¼"	1¼"	2¾"	7/8"	2½"	1⅜"	5½"	7/8"	11¾"	1'-1½"	3/4"	280 ft.-lb.	70 ft.-lb.	5"	3'-0"	#7	8'-0"	6'-6"	—	8 1/2"	1V:1.41H
W8 x 21	1/2"	5/8"	5¼"	1¼"	2¾"	1"	2¾"	1⅜"	6"	1"	11¾"	1'-1¾"	7/8"	450 ft.-lb.	80 ft.-lb.	5¼"	3'-4"	#8	8'-9"	7'-0"	—	7 1/2"	1V:1.60H
W10 x 22	1/2"	5/8"	5¾"	1½"	2¾"	1"	2¾"	1⅜"	6"	1"	1'-1½"	1'-3½"	7/8"	450 ft.-lb.	80 ft.-lb.	5¼"	3'-8"	#8	10'-3"	7'-9"	6'-6"	7 1/2"	1V:1.60H
W10 x 26	1/2"	5/8"	5¾"	1½"	2¾"	1⅛"	3"	1⅜"	7"	1⅛"	1'-1½"	1'-3¾"	1"	680 ft.-lb.	90 ft.-lb.	5½"	4'-0"	#9	11'-0"	8'-9"	7'-3"	6 3/8"	1V:1.88H
W12 x 26	1/2"	5/8"	6½"	1½"	3½"	1⅛"	3"	1½"	7"	1⅛"	1'-3½"	1'-5¾"	1"	680 ft.-lb.	90 ft.-lb.	5¾"	4'-4"	#10	12'-3"	9'-6"	8'-0"	6 3/8"	1V:1.88H
W12 x 30	1/2"	5/8"	6½"	1½"	3½"	1¼"	3"	1½"	8"	1¼"	1'-3½"	1'-6"	1⅛"	840 ft.-lb.	100 ft.-lb.	5¾"	4'-8"	#11	13'-3"	10'-6"	8'-9"	5 3/8"	1V:2.23H
W14 x 30	1/2"	5/8"	6¾"	1½"	3¾"	1¼"	3"	1½"	8"	1¼"	1'-5½"	1'-8"	1⅛"	840 ft.-lb.	100 ft.-lb.	5¾"	5'-0"	#11	13'-9"	10'-9"	9'-0"	5 1/2"	1V:2.18H

Notes:
1. *See TM635 for placement of signs.*
2. *See TM600 for Additional details and bolting procedures.*

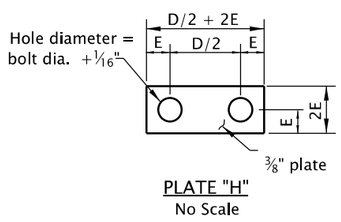
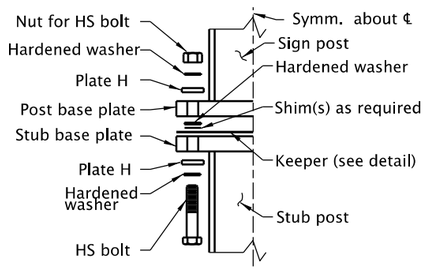
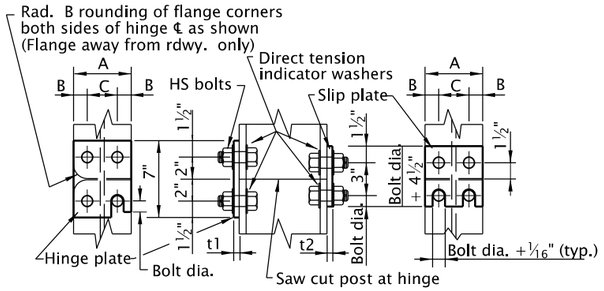


PLATE "H"
No Scale

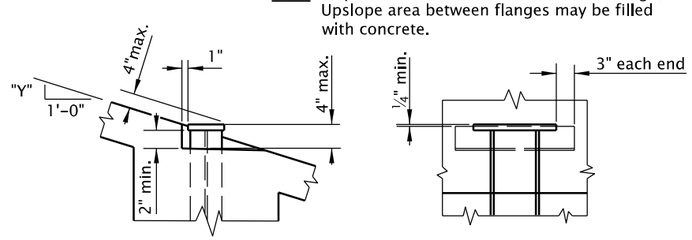


BASE ASSEMBLY DETAIL
No Scale

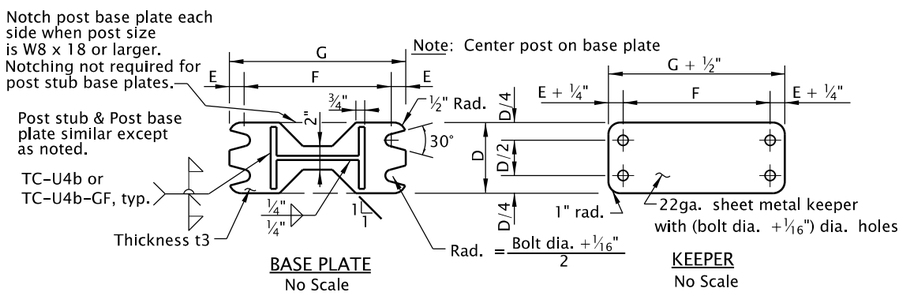


POST HINGE DETAILS
No Scale

Note: Slope bottom of recess cavities for drainage. Upslope area between flanges may be filled with concrete.

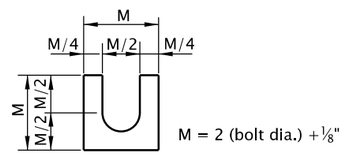


BASE PLATE RECESS FOR SIDE SLOPE INSTALLATIONS
No Scale



BASE PLATE
No Scale

KEEPER
No Scale



BRASS SHIM DETAIL

Provide 2 @ 0.012" thick and 2 @ 0.032" thick at each bolt.

Accompanied by Std. Dwgs. TM220, TM600, TM635, TM675

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

MULTI-POST BREAKAWAY SIGN SUPPORTS DETAILS

2024

DATE	REVISION DESCRIPTION
01-2024	ADDED "TYP." AND ADDED FILLET WELD ON BEVELED SIDE OF BASE PLATE WELD.

CALC. BOOK NO. 1493 | SDR DATE 19-JAN-2024 | **TM601**

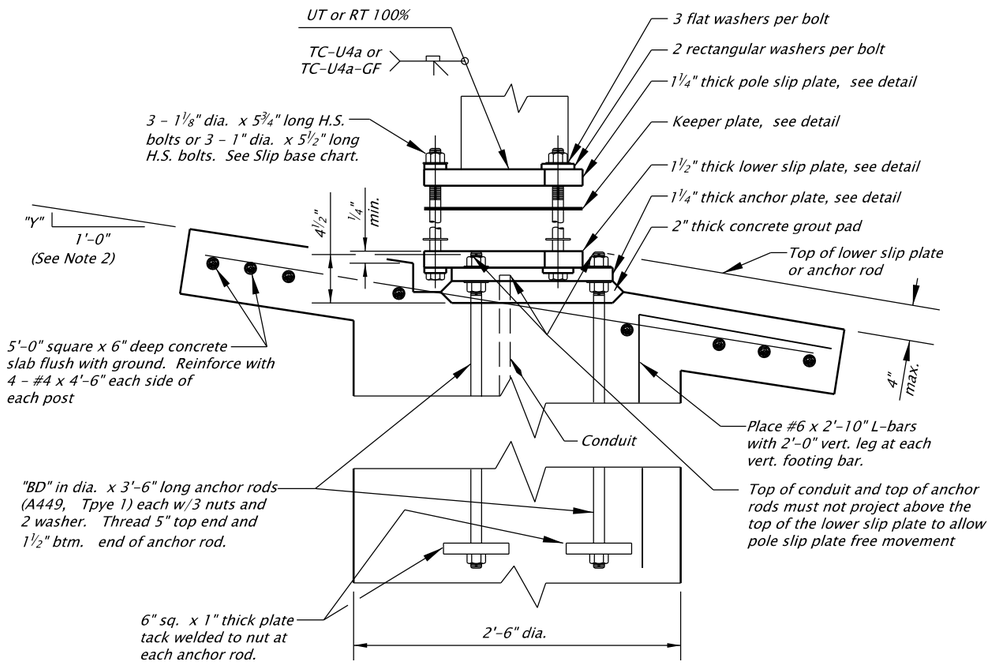
19-JAN-2024

TM601.dgn

Effective Date: June 1, 2024 - November 30, 2024

19-JAN-2024

TM630.dgn



SLIP BASE DETAILS

No Scale

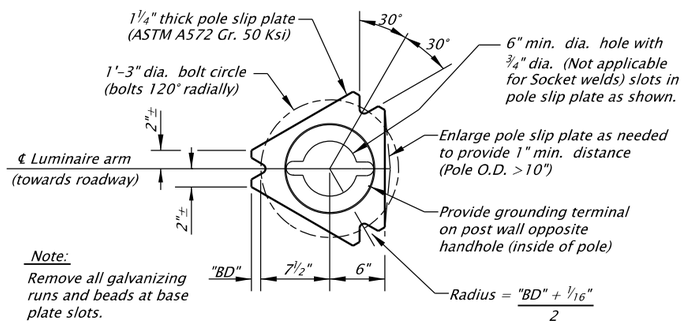
SLIP BASE CHART					
Bolt or Anchor rod "BD"	No. of Luminaire arms		Torque ft-lbs		Footing Depth
	1	2	"T_1"	"T_2"	
1"	"BL" ≤ 50'	"BL" ≤ 40'	700	90	8'-0"
1⅛"	"BL" > 50'	"BL" > 40'	850	100	8'-6"

Notes:
1. "BL" shall not exceed 55' for single luminaire arm poles. "BL" shall not exceed 45' for double luminaire arm poles. Top of rods must not project above top of lower slip plate.
2. The maximum slope rise "Y" is 2.50 inches per foot and a grade of 1V:4.80H.
3. The assumed cohesive soil minimum undrained shear strength, c, is 600 psf. The assumed non-cohesive soil friction angle is 25 degrees, the bulk weight is 100 pcf, and fully saturated.
4. Engineer of Record shall confirm site specific conditions satisfy the assumed soil parameters and satisfy the slope requirements. If conditions are not satisfied, Engineer of Record must adjust the shaft design as needed.

SLIP BASE BOLTING PROCEDURE (see 00962.46(j)(2)(b)

1. Erect pole on an anchor assembly using 3 flat washers and 2 rectangular washers per bolt along with the keeper plate. Place 1 flat washer and the keeper plate between the pole base plate and the anchor plate.
2. Adjust anchor rod leveling nuts as required to rake pole.
3. Tighten high strength bolts to "T_1" ft-lbs torque.
4. Loosen each bolt and retighten to "T_2" ft-lbs torque. DO NOT OVERTIGHTEN!
5. Burr bolt threads at junction with nut using a center punch.

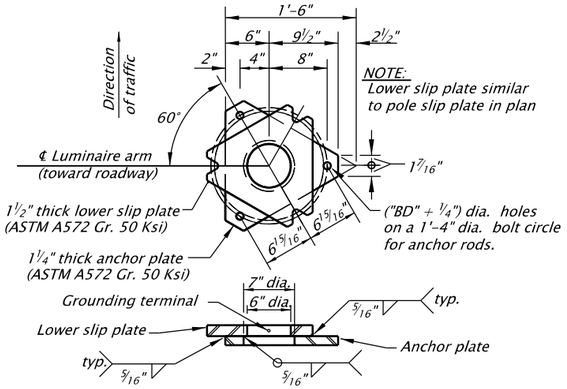
NOTE:
Tightening of slip base bolts shall not be done without an inspector present.



Note:
Remove all galvanizing runs and beads at base plate slots.

PLAN - POLE SLIP PLATE - SLIP BASE POLE

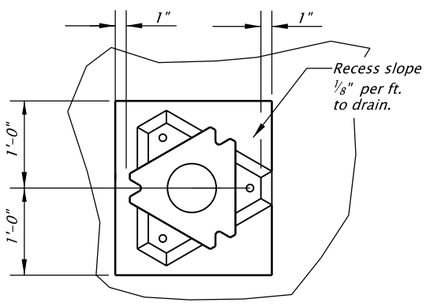
No Scale



NOTE:
Lower slip plate similar to pole slip plate in plan

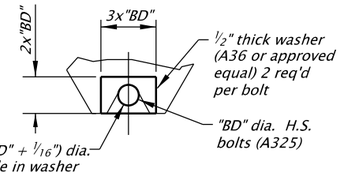
ANCHOR PLATE ASSEMBLY - SLIP BASE POLE

No Scale



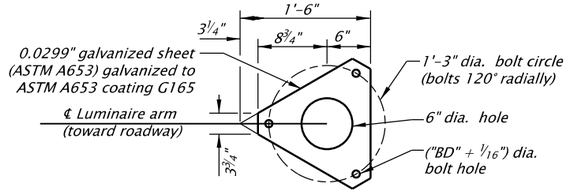
ANCHOR PLATE RECESS - SLIP BASE POLE

No Scale



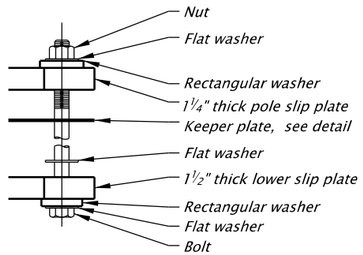
RECTANGULAR WASHER DETAIL

No Scale



KEEPER PLATE - SLIP BASE POLE

No Scale



BOLT ASSEMBLY DETAIL

No Scale

Accompanied by dwgs. TM629, TM631

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

SLIP BASE LUMINAIRE SUPPORTS BASE PLATE & FOOTING DETAILS

2024

DATE	REVISION DESCRIPTION
07-2021	UPDATED TO THE LRFD AND MOVED FIXED BASE DETAILS TO TM631
01-2024	CONDUIT AND ANCHOR ROD SLIP PLATE CLEARANCE CLARIFIED

CALC. BOOK NO. 7481 | SDR DATE 19-JAN-2024 | **TM630**

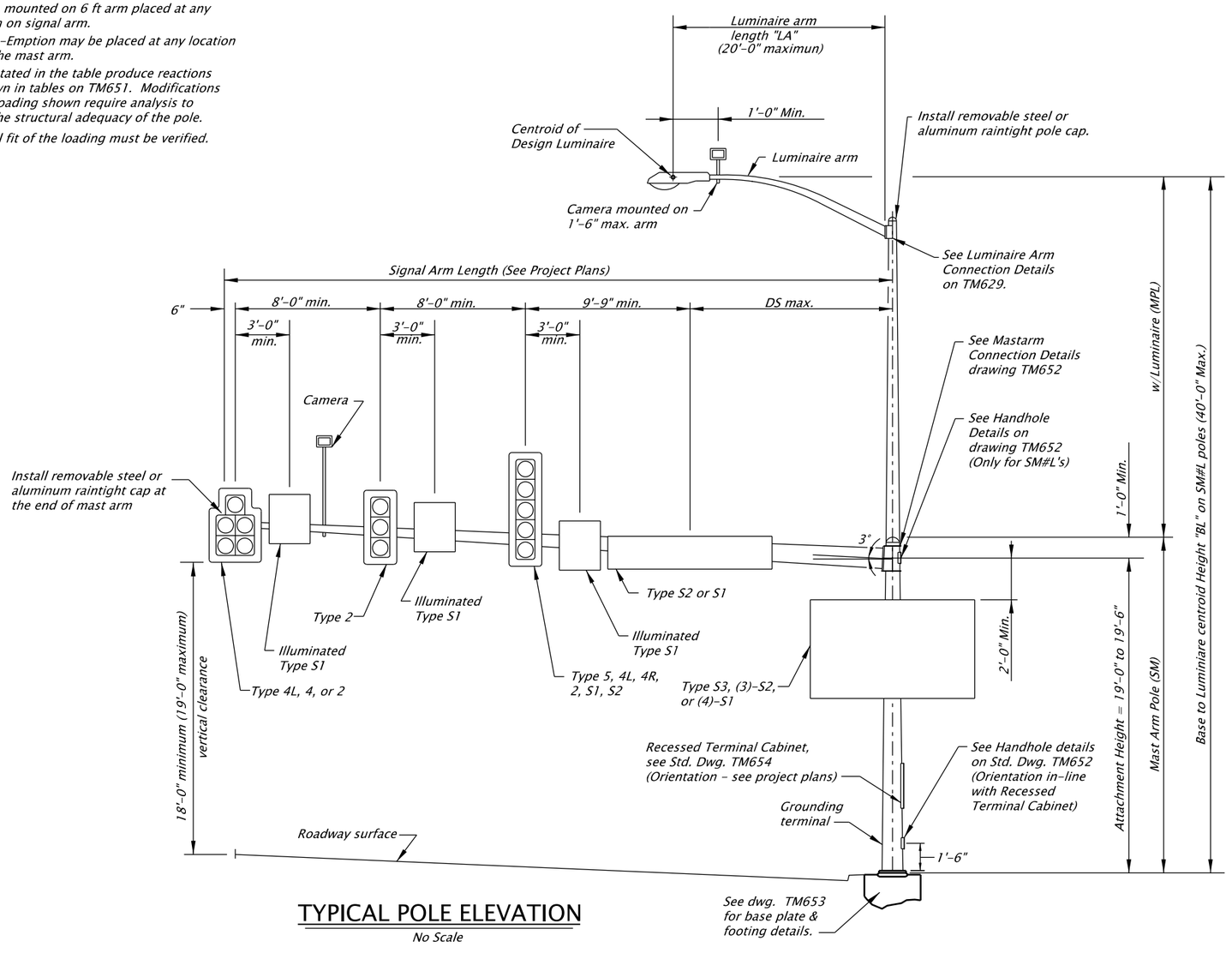
Effective Date: June 1, 2024 - November 30, 2024

STANDARD SIGNAL ARM LOADS							
Signal Pole Type	Signal Arm Length	Signals			Sign		DS Max. for S2
		4L Qty.	2 Qty.	5 * Qty.	S1 Qty.	S2 * Qty.	
SM1 or SM1L	15'	1	0	1	2	0	N/A
SM2 or SM2L	20'	1	1	1	3	0	N/A
	25'	1	1	1	3	0	
SM3 or SM3L	30'	1	1	1	3	1	9'-1"
	35'	1	1	1	3	1	
SM4 or SM4L	40'	1	2	1	4	1	11'-1"
	45'	1	2	1	4	1	
SM5 or SM5L	50'	1	2	1	4	1	21'-1"
	55'	1	2	1	4	1	

* – Load location is the closest sign or signal of that type to the vertical post.

1. Camera mounted on 6 ft arm placed at any location on signal arm.
2. Fire Pre-Emption may be placed at any location along the mast arm.
3. Loads stated in the table produce reactions as shown in tables on TM651. Modifications to the loading shown require analysis to verify the structural adequacy of the pole.
4. Physical fit of the loading must be verified.

SIGNAL ARMS DEFLECTION		
Signal Arm Length "SA"	Allowable Dead Load Deflection	Allowable Total Load Deflection
15' or less	0.01"SA"	0.05"SA"
20'	2½"	12"
25'	3½"	15"
30'	5"	21"
35'	7"	29"
40'	9½"	38"
45'	1'-½"	48"
50'	1'-4"	60"
55'	1'-8"	74"

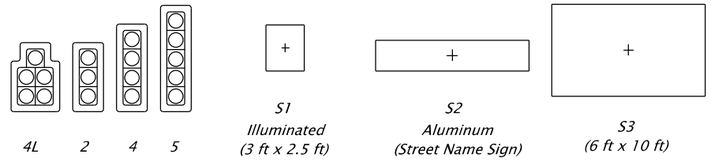


TYPICAL POLE ELEVATION

No Scale

VERTICAL POST LOADS								
Description	Maximum Centerline Elevation	Height (Each)	Width (Each)	Depth (Each)	Area Front (sq. ft)	Area Side (sq. ft)	Area Bottom (sq. ft)	Weight 0" Ice (lbs)
2-Ped. Push Buttons	3'-6"	7¾"	5"	3⅜"	0.27	0.18	0.12	3.0
Controller Cabinet	5'-9"	46"	24"	22"	7.67	7.03	3.67	300
2-Pedestrian Signals	8'-3½"	18¾"	19"	19"	2.47	2.47	2.51	25.0
Terminal Cabinet	10'-9"	18⅛"	6¾"	8⅜"	0.85	1.05	0.39	25.0
Guide Sign (S3)	15'-0"	72"	120"	8⅜"	60.0	1.00	1.67	395
Photoelectric Cell	38'-4"	2¼"	3¼"	3¼"	0.05	0.05	0.07	5.0

1. Physical fit of the loading must be verified.



SIGNAL POLE APPURTENANCE TYPES

APPURTENANCE LOADS				
Type	Area Front (sq. ft)	Area Side (sq. ft)	Area Bottom (sq. ft)	Weight 0" Ice (lbs)
4L	12.4	6.61	3.64	145
2	8.67	6.61	1.95	85.0
4	11.0	8.49	1.95	97.0
5	13.3	10.36	1.95	142
S1	7.50	2.38	1.72	71.0
S2	21.0	0.00	1.67	105

Accompanied by dwgs. TM651, TM652, TM653, TM654, TM679

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

TRAFFIC SIGNAL SUPPORT GENERAL DETAILS & DESIGN CRITERIA

2024

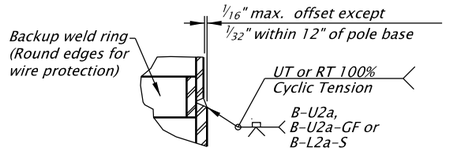
DATE	REVISION DESCRIPTION
07-2020	REPLACED HUB WITH RECESSED TERMINAL CABINET AND ADDED
	ACCOMPANIED BY DRAWING TM654
01-2024	ADDED ORIENTATION TO RECESSED TERMINAL CABINET AND HANDHOLE
	ORIENTATION WAS BY SIGNAL DESIGNER

CALC. BOOK NO. 5301 | SDR DATE 19-JAN-2024 | **TM650**

Effective Date: June 1, 2024 - November 30, 2024

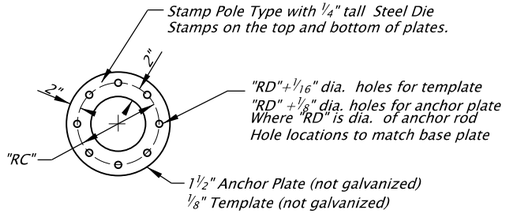
19-JAN-2024

TM650.dgn



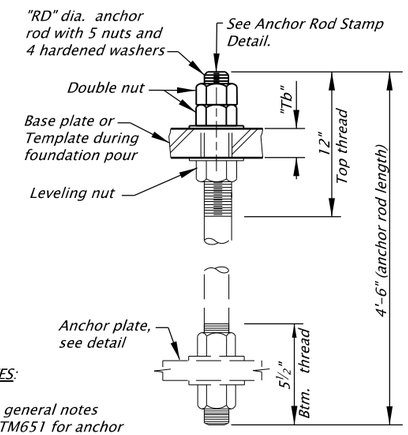
POLE AND ARM SPLICE WELD DETAILS

No Scale



ANCHOR PLATE AND TEMPLATE DETAIL

No Scale



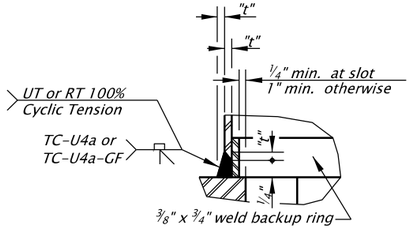
NOTES:

- See general notes on TM651 for anchor rod tightening.
- "Tb" determined by manufacturer.

ANCHOR ROD DETAIL

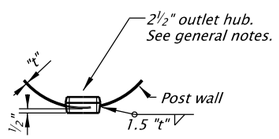
No Scale

Anchor Rods and Base Plate Data		
Mastarm Pole Type	RD Rod Diam.	RC Rod Circle
SM1	1 1/4"	16 1/2"
SM2, SM1L	1 1/2"	17"
SM3, SM2L	1 1/2"	20"
SM4, SM3L	1 3/4"	22"
SM5, SM4L	1 3/4"	23"
SM5L	2"	23 1/2"



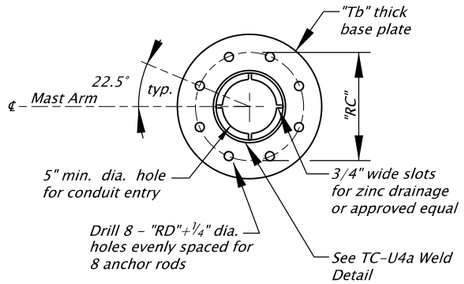
TC-U4a WELD DETAIL

No Scale



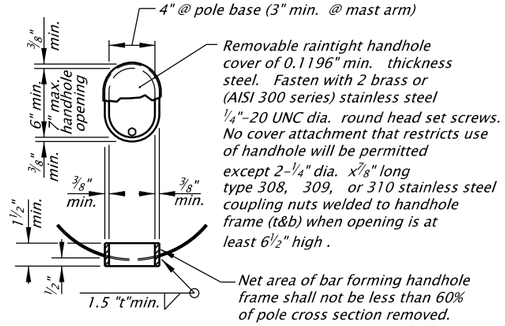
HUB WELD DETAIL

No Scale



PLAN - BASE PLATE

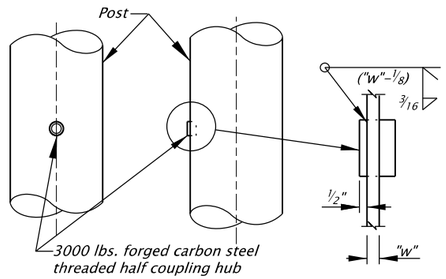
No Scale



HANDHOLE DETAIL

No Scale

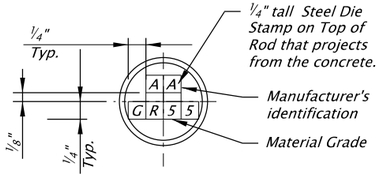
Mast arm Connection				
Signal Arm Lengths	N Number	D Bolt Diam.	BC Bolt Circle	V Bolt Spacing
15'	4	1"	9 1/2"	——
20', 25'	4	1 1/4"	14"	——
30', 35'	4	1 1/2"	15 1/2"	——
40', 45'	8	1"	——	5"
50', 55'	8	1 1/4"	——	6"



3000 lbs. forged carbon steel threaded half coupling hub (threads oriented to the outside of post) by "Bonney Forge", "Phoenix Forge" or approved equal. Inside edge of conduit hub shall be smooth

HUB WELD DETAIL

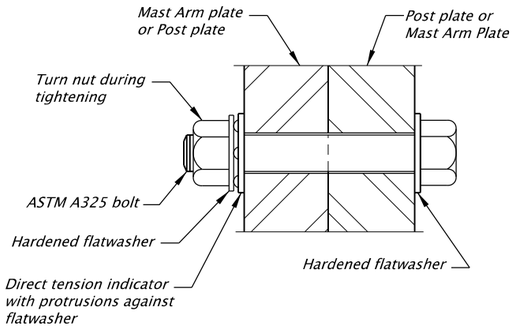
No Scale



Note: The end of each anchor rod shall be color coded yellow.

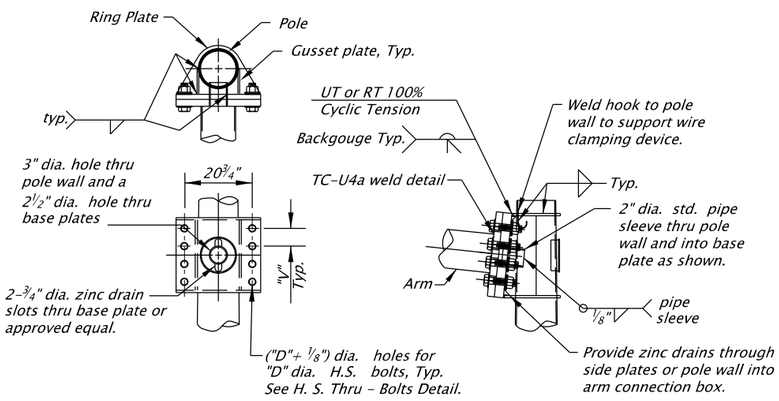
ANCHOR ROD STAMP DETAIL

No Scale



H.S. THRU - BOLTS

No Scale



8 BOLT ARM CONNECTION DETAILS

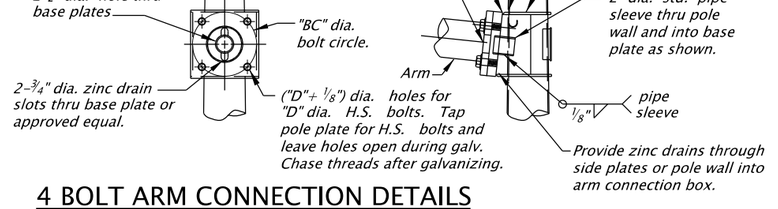
No Scale

ARM CONNECTION NOTES:

Gusset plates are 1/4" min. thickness.

Ring plates are 3/8" min. thickness.

See general notes on TM651 for bolt tightening.



4 BOLT ARM CONNECTION DETAILS

No Scale

Accompanied by dwgs. TM650, TM651, TM653, TM654

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

TRAFFIC SIGNAL SUPPORTS STEEL DETAILS

2024

DATE	REVISION DESCRIPTION
07-2020	ADDED ACCOMPANIED BY DRAWING TM654
01-2024	REMOVED STRAIN POLE TYPES FROM TABLE

CALC. BOOK NO. 5301 | SDR DATE 19-JAN-2024 | **TM652**

Effective Date: June 1, 2024 - November 30, 2024

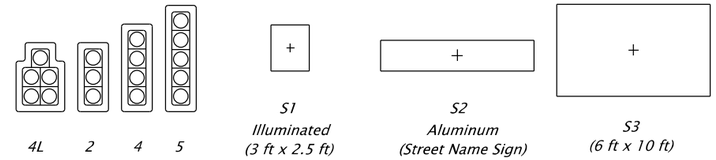
STANDARD SIGNAL ARM LOADS									DEFLECTIONS
Signal Pole Type	Signal Arm Length	Signals			Sign			DS Max. for S2 *	Estimated "defl" End of Arm
		4L Qty.	2 Qty.	5 * Qty.	S1 Qty.	S2 * Qty.	Horz. Blank		
SM6L	60', 65'	1	2	1	4	1	58'-0"	21'-1"	2'-9"
SM7L	70', 75'	1	2	1	4	1	68'-0"	21'-1"	3'-9"

* – Load location is the closest sign or signal of that type to the vertical post.

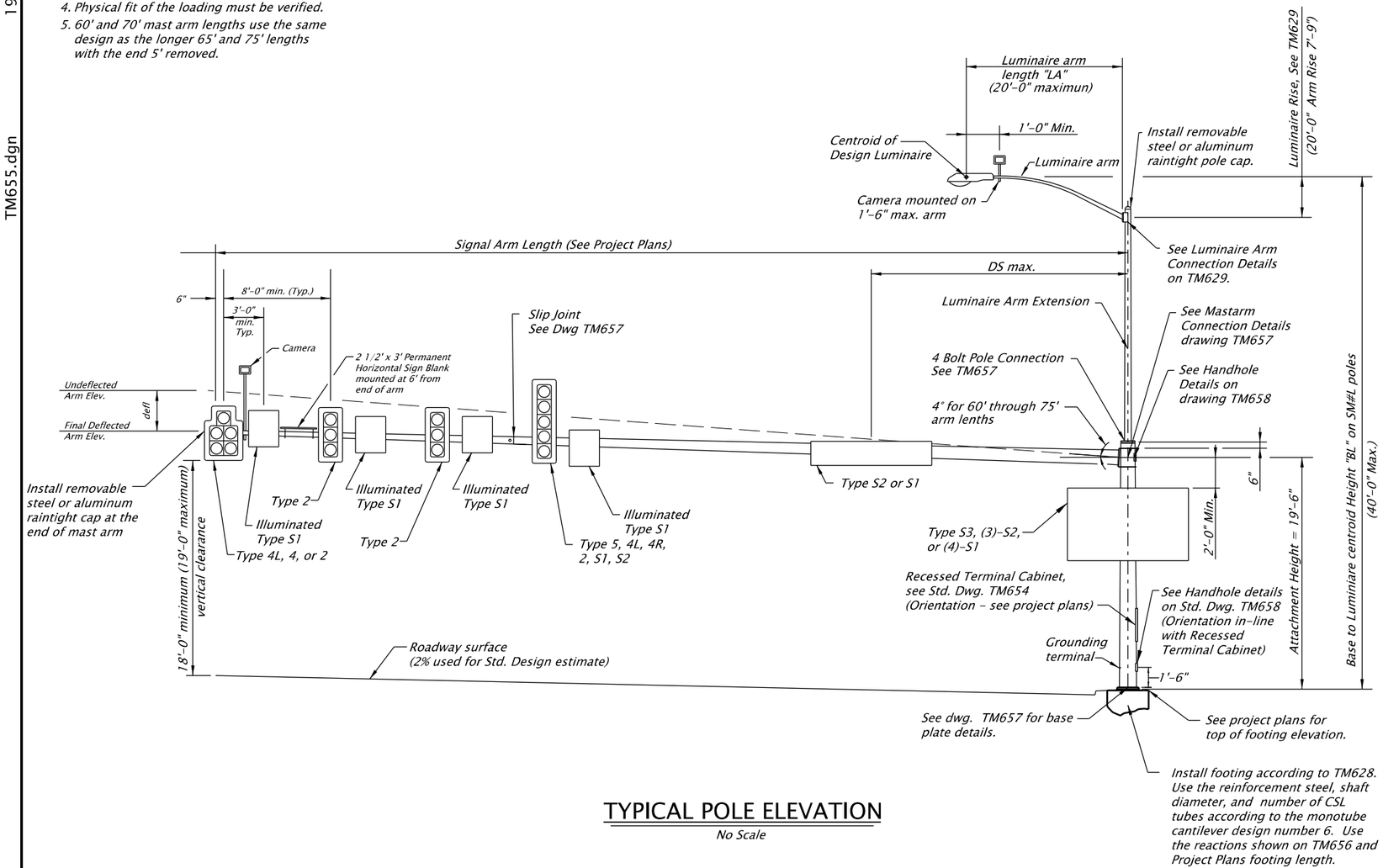
1. Camera mounted on 6 ft arm placed at any location on signal arm.
2. Fire Pre-Emption may be placed at any location along the mast arm.
3. Modifications to the loading shown require analysis to verify the structural adequacy of the pole.
4. Physical fit of the loading must be verified.
5. 60' and 70' mast arm lengths use the same design as the longer 65' and 75' lengths with the end 5' removed.

VERTICAL POST LOADS								
Description	Maximum Centerline Elevation	Height (Each)	Width (Each)	Depth (Each)	Area Front (sq. ft)	Area Side (sq. ft)	Area Bottom (sq. ft)	Weight 0" Ice (lbs)
2-Ped. Push Buttons	3'-6"	7 3/4"	5"	3 3/8"	0.27	0.18	0.12	3.0
Controller Cabinet	5'-9"	46"	24"	22"	7.67	7.03	3.67	300
2-Pedestrian Signals	8'-3 1/2"	18 3/4"	19"	19"	2.47	2.47	2.51	25.0
Terminal Cabinet	10'-9"	18 1/8"	6 3/4"	8 3/8"	0.85	1.05	0.39	25.0
Guide Sign (S3)	15'-0"	72"	120"	8 3/8"	60.0	1.00	1.67	395
Photoelectric Cell	38'-4"	2 1/4"	3 1/4"	3 1/4"	0.05	0.05	0.07	5.0

1. Physical fit of the loading must be verified.



SIGNAL POLE APPURTENANCE TYPES



TYPICAL POLE ELEVATION

No Scale

APPURTENANCE LOADS				
Type	Area Front (sq. ft)	Area Side (sq. ft)	Area Bottom (sq. ft)	Weight 0" Ice (lbs)
4L	12.4	6.61	3.64	145
2	8.67	6.61	1.95	85.0
4	11.0	8.49	1.95	97.0
5	13.3	10.36	1.95	142
S1	7.50	2.38	1.72	71.0
S2	21.0	0.00	1.67	105
Horz. Blank	1.72	2.38	7.50	45.0
Signal Camera	1.64	2.55	0	60
Lum. Camera	0.65	1.42	0	25

Accompanied by dwgs. TM654, TM656, TM657, TM658, TM628

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

TRAFFIC SIGNAL 60' THROUGH 75' MAST ARM SUPPORTS GENERAL DETAILS & DESIGN CRITERIA

2024

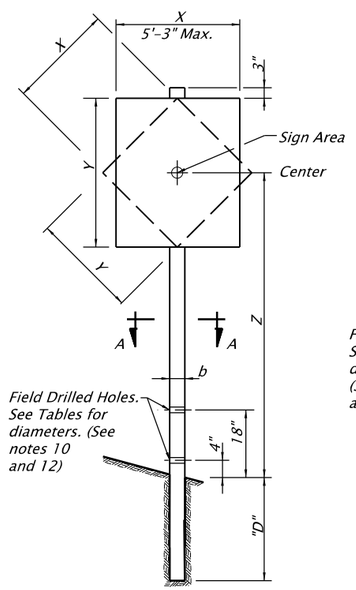
DATE	REVISION DESCRIPTION
07-2022	ADDED DRAWING TM656 BASE REACTIONS AND CLARIFIED
	DRAWING TM628 TABLE DETAIL REQUIREMENTS
01-2024	ADDED ORIENTATION TO RECESSED TERMINAL CABINET AND HANDHOLE
	ORIENTATION WAS BY SIGNAL DESIGNER

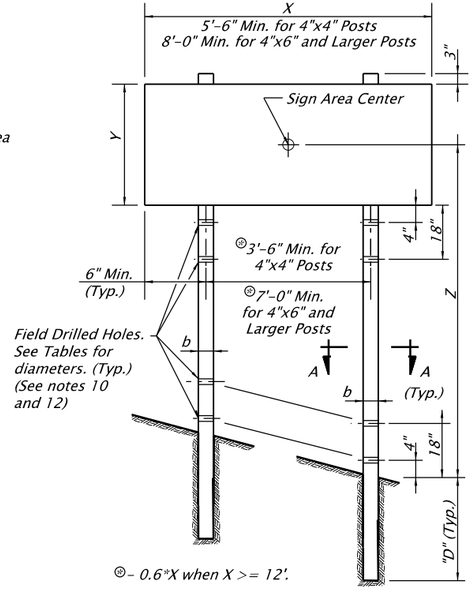
CALC. BOOK NO. 7088 | SDR DATE 19-JAN-2024 | **TM655**

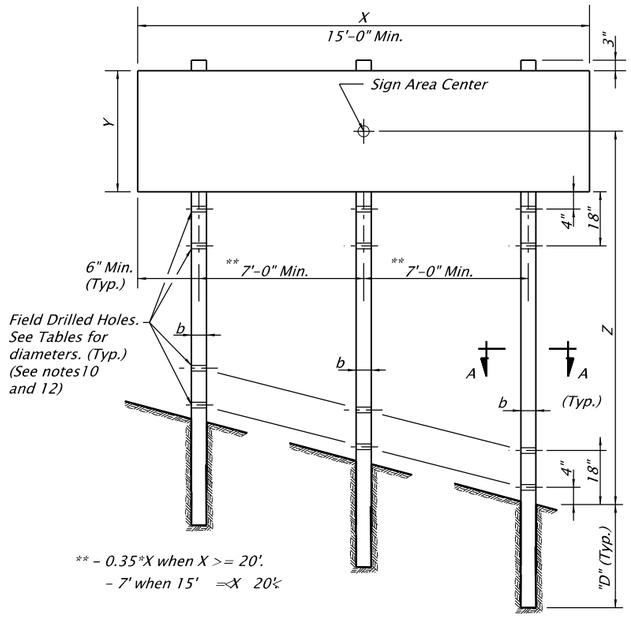
Effective Date: June 1, 2024 - November 30, 2024

19-JAN-2024

TM655.dgn







ELEVATION

No scale

		(X * Y * Z) in ft³ - Maximum												Field Drilled Hole Diameters	Post Embedment Depth "D"
		3 Second Gust Wind Speed (TM671)													
		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"	77	154	165	231	62	124	132	186	56	112	120	168	Not Req'd	4' - 0"
	4" x 6"	162	324	347	486	130	260	278	390	117	234	250	351	1½"	5' - 0"
	6" x 6"	270	540	578	810	216	432	462	648	195	390	417	585	2"	5' - 0"
	6" x 8"	494	988	1058	1482	395	790	846	1185	356	712	762	1068	3"	7' - 0"

PERMANENT WOOD POST TABLE **

* - Linear Interpolate X*Y*Z 3 post values for signs greater than 15' and less than 20'.

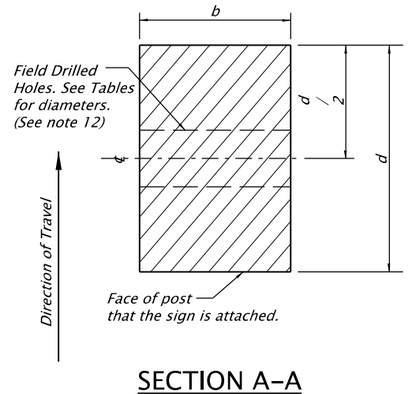
** - See note 8

		(X * Y * Z) in ft³ - Maximum												Field Drilled Hole Diameters	Post Embedment Depth "D"
		3 Second Gust Wind Speed (TM671)													
		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 9



SECTION A-A

No scale

General Notes:

1. Wood posts are available in the following commercial lengths: 12', 14', 16', 18', 20', 22', 24', 26'.
2. Material shall be Douglas Fir No. 1 and according to Section 02110.40.
3. For horizontal and vertical clearances of permanent signs refer to TM200 and of temporary signs refer to TM822.
4. Wood post design in accordance with the 5th Edition 2009 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.
5. Use the 3 second gust wind speeds shown on TM671 for the site specific sign location.
6. General design parameters are Kz = 0.87, SIF (duration factor) = 1.6, Cd (sign) = 1.20, and G = 1.14.
7. The sign width to sign height or sign height to sign width ratio shall not exceed 5.0.
8. Permanent signing uses an Ir = 0.71 for a recurrence interval of 10 years.
9. Temporary signing uses an Ir = 0.45 for a recurrence interval of 1.5 years.
10. Posts protected by barrier or guardrail do not require field drilled holes.
11. 4" x 4" posts should not be used in snow plow areas.
12. Field treat drilled holes according to 02190.30.

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 selected general backfill meeting the requirements of 00330.13.
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.

Accompanied by dwgs. TM200, TM671, TM822

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

WOOD POST SIGN SUPPORTS

2024

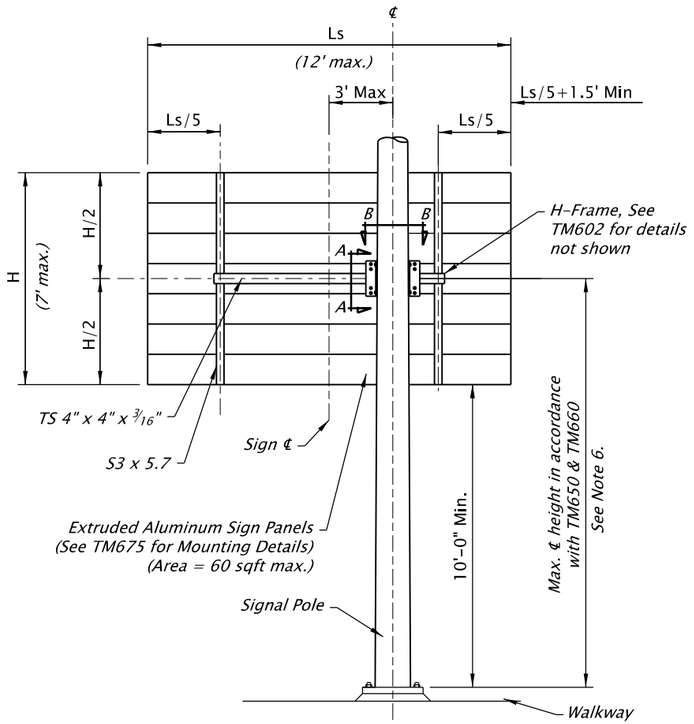
DATE	REVISION DESCRIPTION
01-2022	ADDED 3'-6" MINIMUM SPACING FOR 4"x4" POSTS AND 8'-0" MINIMUM
	SIGN WIDTHS FOR 4"x6" AND LARGER POSTS
01-2024	ADDED TO FIELD TREAT HOLES ACCORDING TO 02190.30

CALC. BOOK NO. 5850 | SDR DATE 19-JAN-2024 | **TM670**

Effective Date: June 1, 2024 - November 30, 2024

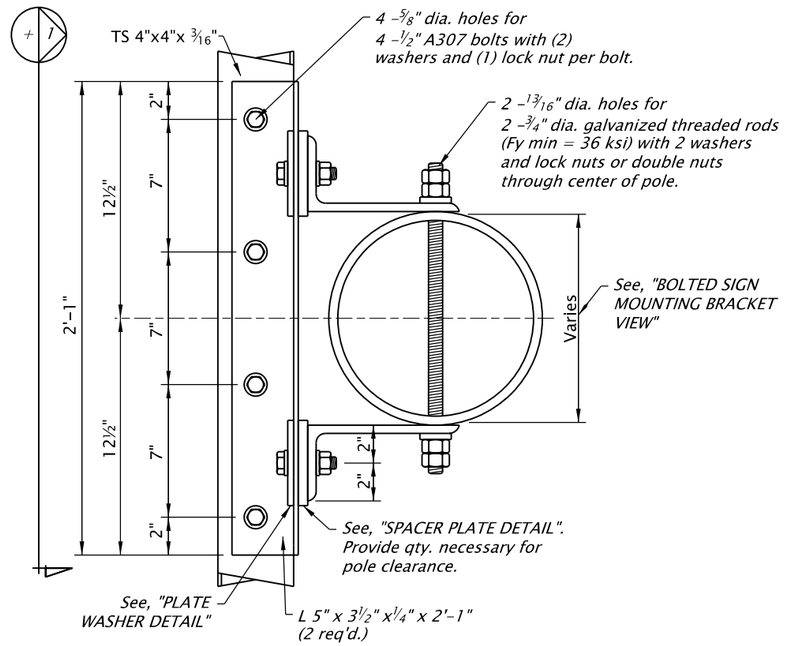
19-JAN-2024

TM670.dgn



SIGNAL POLE MOUNT ELEVATION

No Scale



SECTION B-B

No Scale

GENERAL NOTES:

1. *High strength bolts shall conform to ASTM specification A325. All other bolts shall conform to ASTM specification A307.*
2. *Structural steel shall conform to ASTM A36.*
3. *All steel and bolts shall be hot-dip galvanized after fabrication.*
4. *Surfaces of holes drilled in poles shall be galvanized according to ASTM A780.*
5. *Maximum sign size is 60 sq. ft. for this signal pole mount.*
6. *Any signal pole intended to support one of these mounts must first be analyzed to determine if the load-bearing capacity is sufficient to support this extra load.*
7. *Structural tubing shall conform to ASTM specification A500, Grade "B" or A501.*
8. *Cantilever sign to meet lateral clearance requirements and must be kept entirely within the Right-of-Way.*
9. *Field check pole diameters at mounting heights and cut upper and lower attachment plates to fit.*

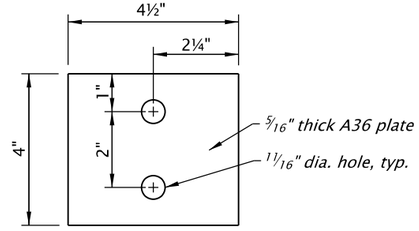
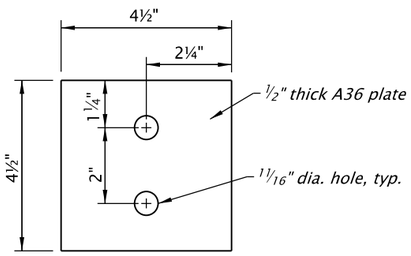


PLATE WASHER DETAIL

No Scale



SPACER PLATE DETAIL

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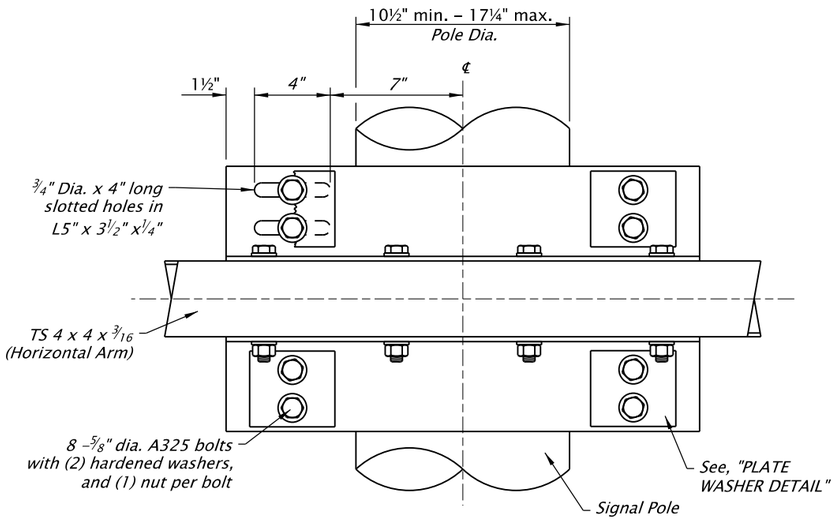
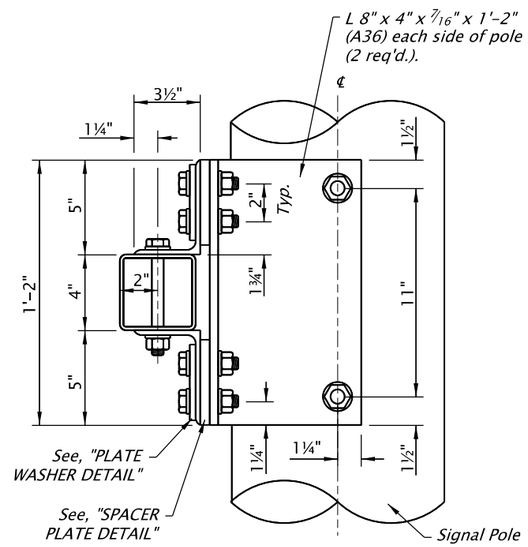


1/+ BOLTED SIGN MOUNTING BRACKET VIEW

No Scale



SECTION A-A

No Scale

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All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

SIGNAL POLE MOUNTS

2024

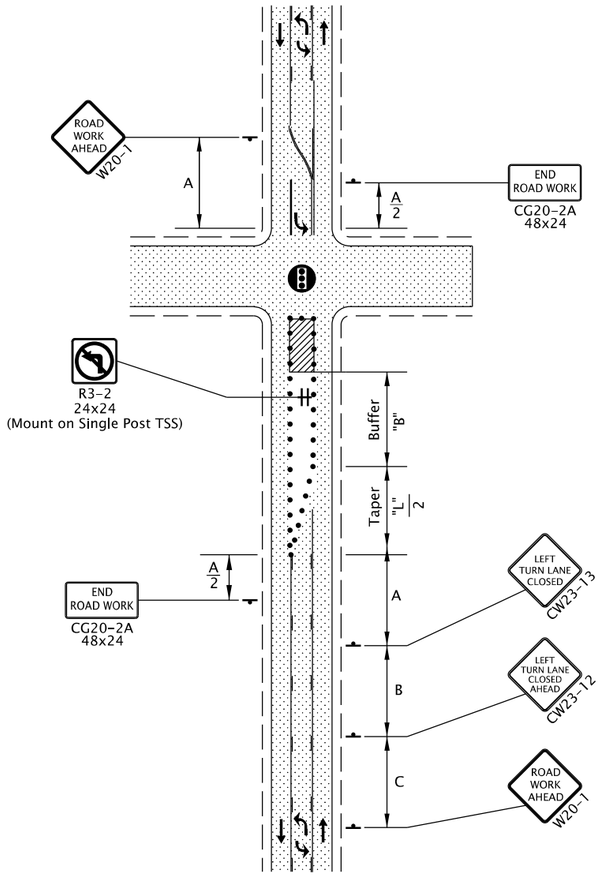
DATE	REVISION DESCRIPTION
01-2024	SPACE PLATE DIMENSION WAS 1", SECTION B-B LENGTH WAS 2'-0", AND PLATE
	HOLE DIAMETER WAS 13/16"

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **TM680**

19-JAN-2024

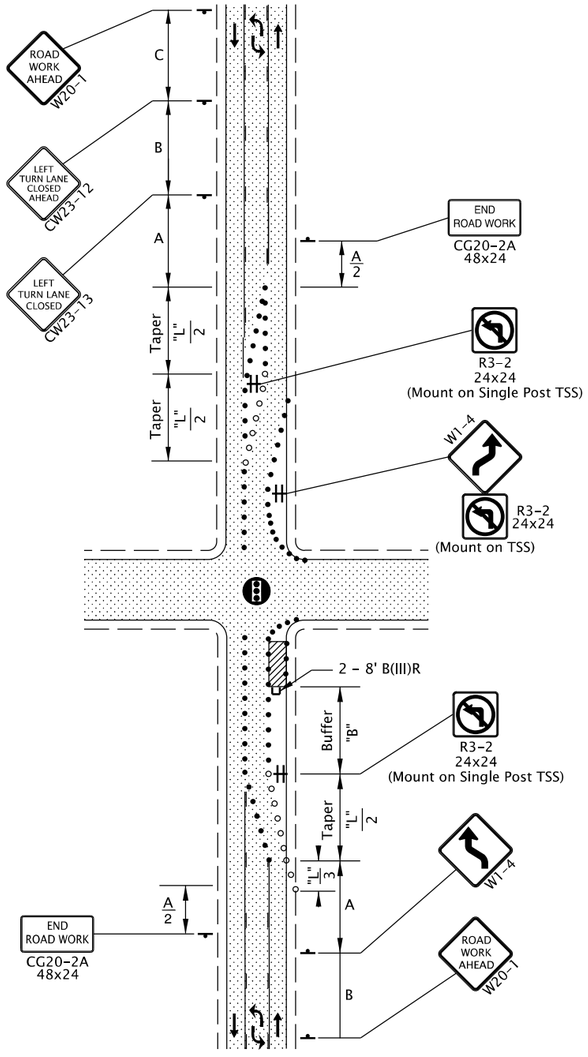
TM680.dgn

Effective Date: June 1, 2024 - November 30, 2024



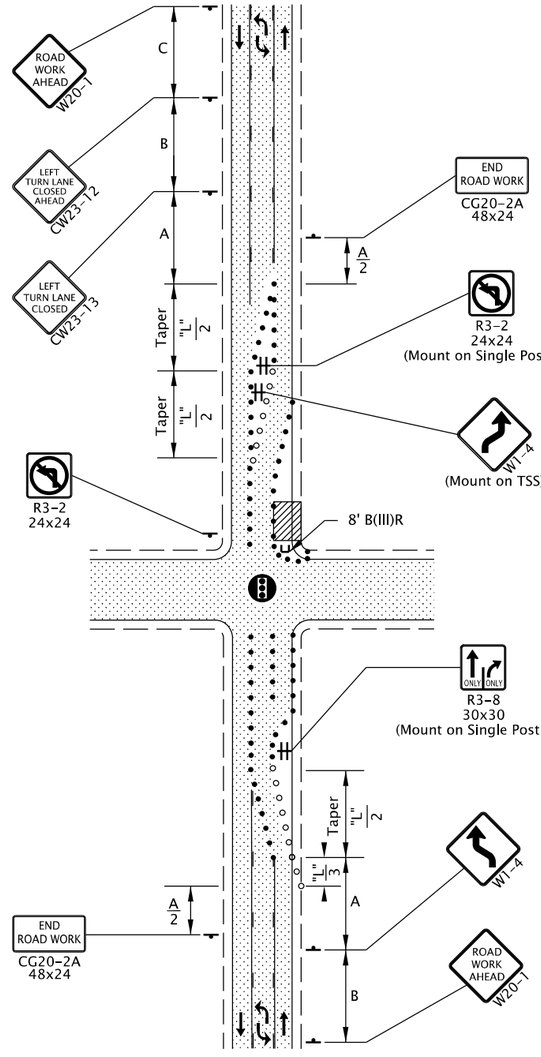
2-Lane, 2-Way Roadway With Left Turn Median

LEFT TURN MEDIAN CLOSURE



2-Lane, 2-Way Roadway With Left Turn Median

RIGHT LANE CLOSURE, NEAR SIDE



2-Lane, 2-Way Roadway With Left Turn Median

RIGHT LANE CLOSURE, FAR SIDE

GENERAL NOTES FOR ALL DETAILS:

- Additional Traffic Control Measures (TCM) may be required for all legs of the intersection.
- To determine Taper Length ("L") and Buffer Length ("B") shown on this sheet, use the "MINIMUM LENGTHS TABLE" on Dwg. TM800.
- Taper length of "L" for through lane shifting tapers may be used for higher speed roads.
- Taper length of "L"/2 for center turn lane closure may be used in areas with a high number of accesses within the work zone.
- When a through road intersects within the work zone, place a "ROAD WORK AHEAD" (W20-1) sign in advance of the intersection at sign spacing A.
- To determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Dwg. TM800.
- Place channelizing devices around intersection radii, business accesses, and driveways at 10' spacing.
- Tubular markers may be used in lane closure tapers where the posted speed is 40 mph or less.
- 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.
- Signal timing adjustments determined by Engineer.
- To be accompanied by Dwg. Nos. TM820 & TM821.

Signal

28" Tubular Markers
See TCD Spacing Table on TM800 for max. spacing

Temp. Plastic Drums
See TCD Spacing Table on TM800 for max. spacing

UNDER TRAFFIC

UNDER CONSTRUCTION

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OREGON STANDARD DRAWINGS

SIGNALIZED INTERSECTION DETAILS

2024

DATE	REVISION DESCRIPTION

CALC. BOOK NO. N/A | SDR DATE 19-JAN-2024 | **TM842**

Effective Date: June 1, 2024 - November 30, 2024