2024 OREGON STANDARD DRAWINGS

Standard Distribution
Date of Issue: Jan 2025

William Woods 2025.02.03 13:07:12 -08'00'

William Woods, PE
Senior Standards Engineer

This is the January 2025 release of the 2024 Oregon Standard Drawings.

For ODOT Projects, the details in the standard drawings will be effective on the **June 1, 2025** 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 2025 release:

Drawing Number	Comment
RD548A	
RD548B	
RD900	
RD901	
RD902	
RD904	
RD905	
RD906	
RD908	
RD909	
RD910	
RD912	
RD913	
RD916	
RD920	
RD922	

Drawing Number	Comment
RD930	
RD932	
RD936	
RD938	
RD940	
RD950	
RD952	
RD960	
BR203	
BR207	
BR216	
BR220	
BR230	
BR233	
BR250	
BR270	
BR273	
BR286	
BR291	
TM454	
TM457	
TM470	
TM471	Discontinued Drawing
TM472	Discontinued Drawing
TM482	
TM485	
TM493	
TM607	
TM615	
TM622	
TM628	
TM676	
TM694	
TM700	New Drawing
TM701	New Drawing
TM702	New Drawing

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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RD332	
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RD408	
RD409	
RD410	
RD412	
RD415	
RD416	
RD417	
RD419	
RD420	1/2024
RD421	
RD435	
RD436	
RD437	
RD438	7/2024
RD440	
RD442	1/2024
RD443	1/2024
RD444	1/2024
RD445	
RD450	
RD451	1/2024
RD470	
RD471	1/2024
RD472	
RD473	
RD474	
RD481	
RD482	
RD484A	7/2024
RD484B	7/2024
RD490A	7/2024
RD490B	7/2024
RD490C	7/2024
RD490D	7/2024
RD490E	7/2024
RD490F	7/2024
RD490G	7/2024
RD490H	7/2024
RD500	
RD501	1/2024
RD502	7/2024
RD503	
RD505	
RD510	
RD515	
RD516	
RD520	
RD526	
RD530	
RD535	
RD536	
RD545	7/2024
RD546	7/2024
RD548A	1/2025
RD548B	1/2025
RD550	
RD560	
RD570	

OREGON STANDARD DRAWINGS 2024
NUMBERS AND REVISION DATES

DRAWING NUMBER	REVISION DATE
RD575	
RD576	
RD580	
RD581	
RD590	
RD595	
RD596	
RD602	
RD610	
RD615	
RD700	
RD701	
RD702	1/2024
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RD1140	
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BR200	1/2024
BR203	1/2025
BR206	
BR207	1/2025
BR208	1/2024
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BR375	
BR400	
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BR410	
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BR420	
BR422	

OREGON STANDARD DRAWINGS 2024
NUMBERS AND REVISION DATES

DRAWING NUMBER	REVISION DATE
BR425	
BR430	
BR435	
BR440	
BR445	
BR500	1/2024
BR505	
BR520	
BR525	
BR550	
BR705	1/2024
BR706	
BR707	
BR708	
BR709	1/2024
BR730	
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TM233	
TM240	7/2024
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TM301	
TM302	1/2024
TM303	1/2024
TM450	7/2024
TM452	7/2024
TM453	
TM454	1/2025
TM456	
TM457	1/2025
TM460	7/2024
TM462	1/2024
TM466	7/2024
TM467	7/2024
TM470	1/2025
TM471	Discontinued 1/2025
TM472	Discontinued 1/2025
TM482	1/2025
TM485	1/2025
TM492	
TM493	1/2025
TM500	
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TM676	1/2025
TM677	
TM678	7/2024
TM679	
TM680	1/2024
TM681	
TM687	
TM688	
TM689	
TM690	
TM691	

OREGON STANDARD DRAWINGS 2024
NUMBERS AND REVISION DATES

DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE
TM693					
TM694	1/2025				
TM695					
TM696					
TM697					
TM698					
TM700	1/2025				
TM701	1/2025				
TM702	1/2025				
TM800	7/2024				
TM810					
TM820					
TM821					
TM822					
TM830	7/2024				
TM831					
TM832					
TM833					
TM840					
TM841	7/2024				
TM842	1/2024				
TM843					
TM844					
TM845					
TM850					
TM851					
TM852					
TM853					
TM854					
TM855					
TM860					
TM861					
TM862					
TM870					
TM871					
TM880					

2024 OREGON STANDARD DRAWINGS INDEX

-F-

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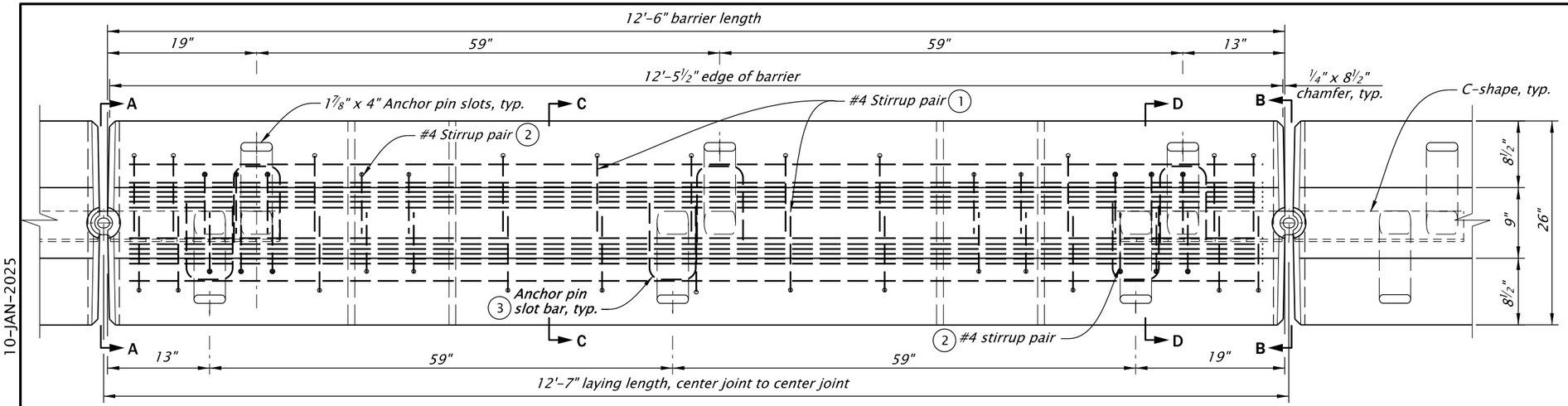
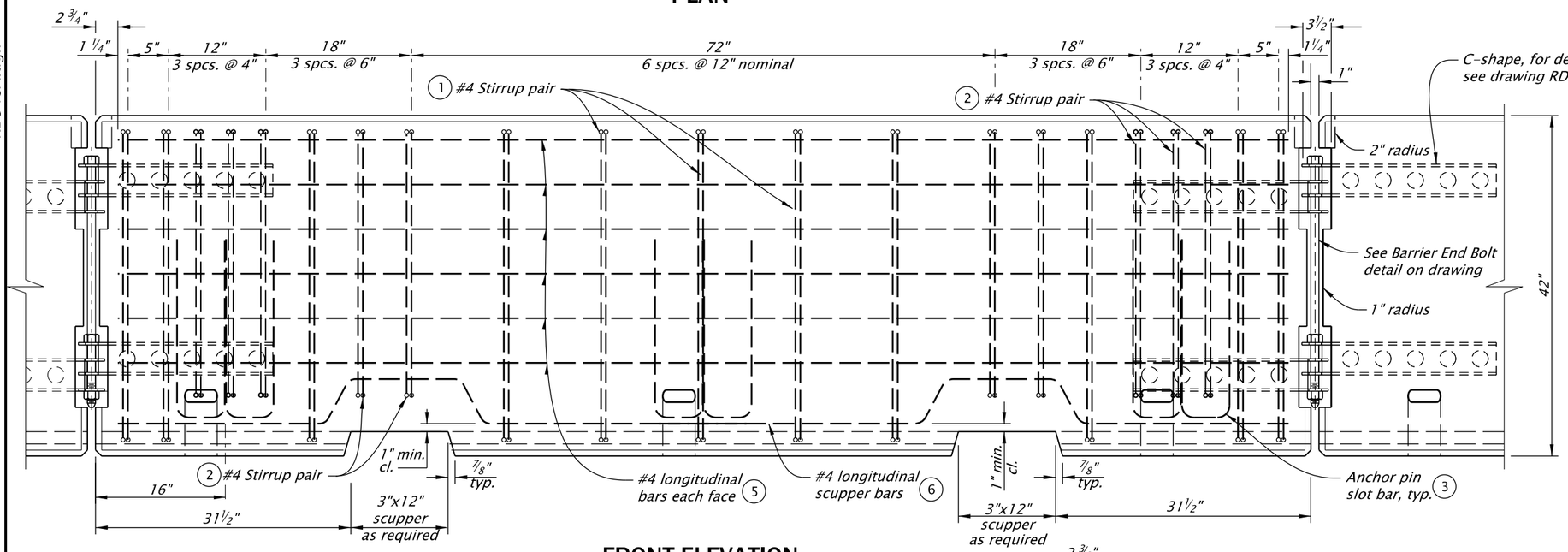
-W-

10-JAN-2025

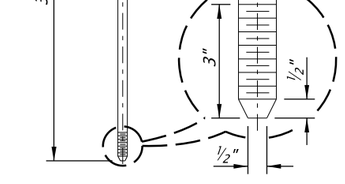
RD548A.dgn



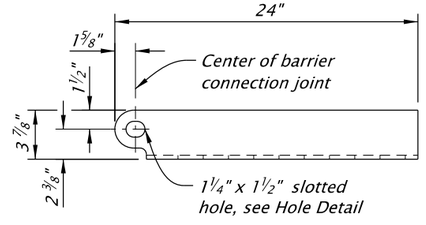
PLAN



FRONT ELEVATION

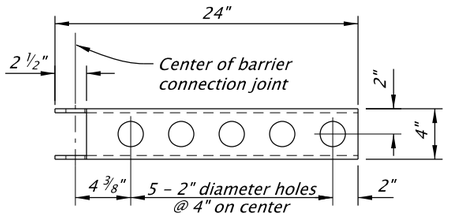


BARRIER END BOLT



PLAN

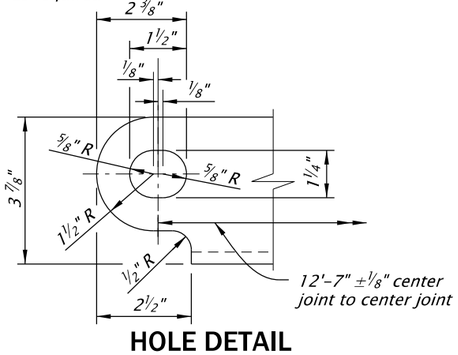
Cut from 5/16" thick steel plate
(See General Note 5 for casting instructions)



ELEVATION

Perforated C-shape

C-SHAPE DETAIL



HOLE DETAIL

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *All reinforcing steel shall conform to ASTM A706 or AASHTO M31 (ASTM A615) Grade 420. All bars shall be full length as shown and shall be placed 2 inches clear of the nearest face of concrete unless shown otherwise.*
2. *All structural steel including fasteners shall be hot-dip galvanized after fabrication.*
3. *Normal use of precast tall median barrier is restricted to curves with radii greater than 770 feet.*
4. *Chamfer all edges 3/4-inch, typical.*
5. *Perforated C-shape shall be placed in location shown to a tolerance of 3/32-inch.*
6. *Estimated barrier weight is 8,070 pounds per 12 foot 6 inch unit length, estimated vertical backed barrier weight is 6,550 pounds.*
7. *Narrow base shoulder barrier to be used only at locations with backfill behind barrier as shown on plans.*
8. *See drawing RD548B for additional reinforcing details.*

ACCOMPANIED BY DWGS.:
RD548B

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

OREGON STANDARD DRAWINGS

PRECAST TALL (42") CONCRETE BARRIER WITH MODIFIED REINFORCING

SHEET 1 OF 2

2024

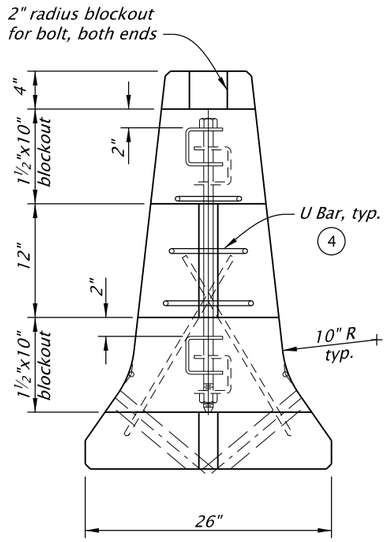
DATE	REVISION DESCRIPTION
06-2024	CREATED NEW DRAWING
01-2025	REVISED REBAR FOR SLOT CONFLICTS

CALC. BOOK NO. N/A

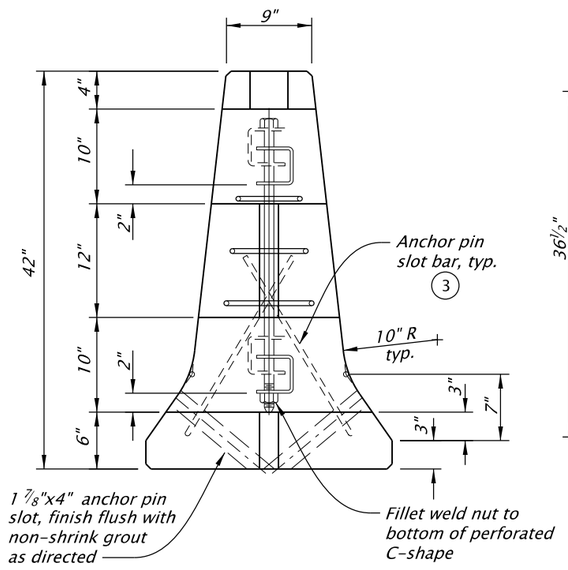
SDR DATE 10-JAN-2025

RD548A

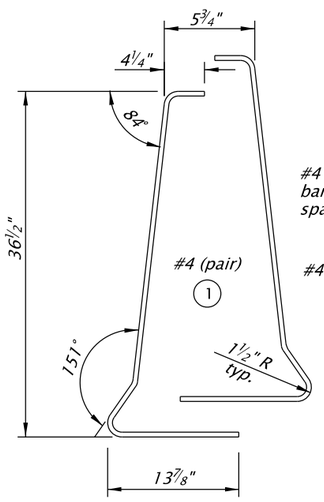
Effective Date: June 1, 2025 - November 30, 2025



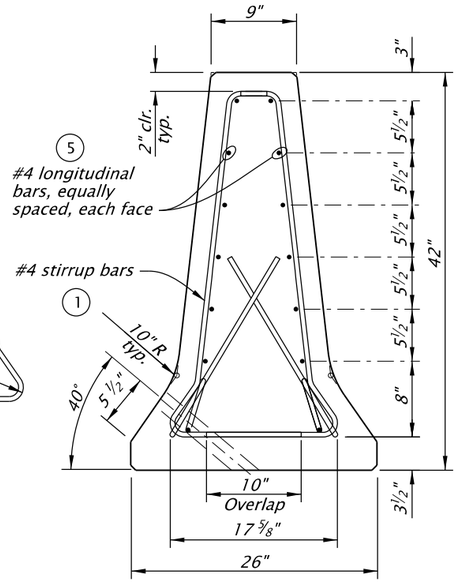
END VIEW A-A



END VIEW B-B



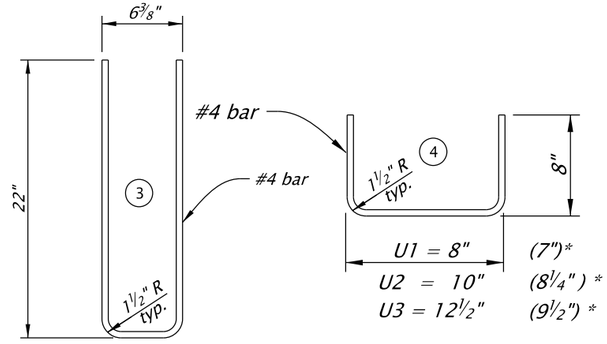
STIRRUP BAR A
Quantity = 11 stirrup pairs



SECTION C-C

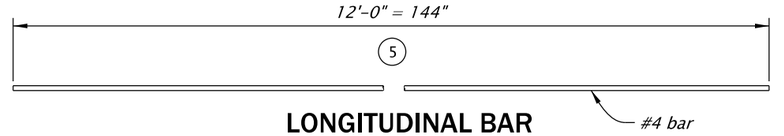
GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *For General Notes for all details on this sheet, see drawing RD548A.*

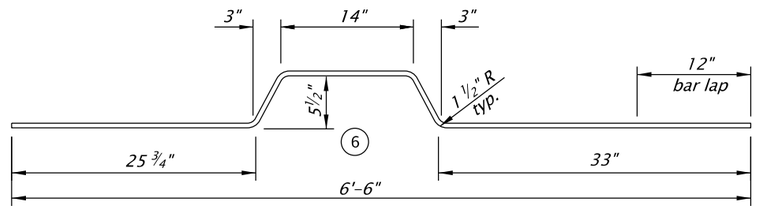


PIN SLOT BAR
Quantity = 6 bars

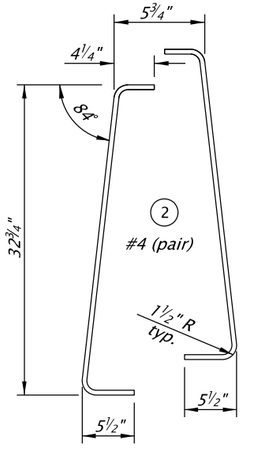
U-BAR
** Vertical back barrier*
Quantity = 2 each bar size



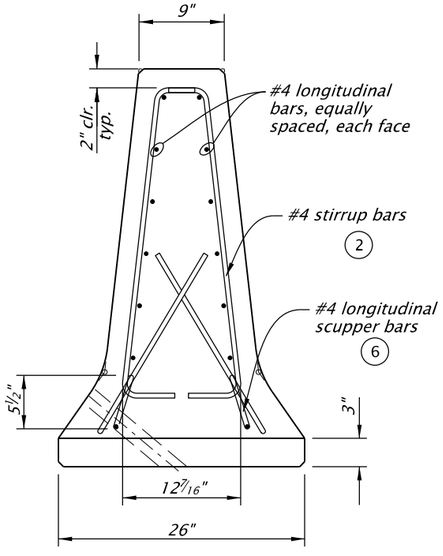
LONGITUDINAL BAR
Quantity = 12 bars



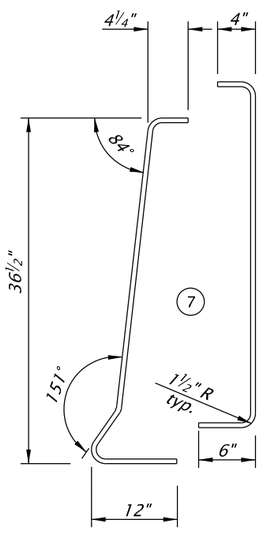
LONGITUDINAL SCUPPER BAR
Quantity = 4 bars



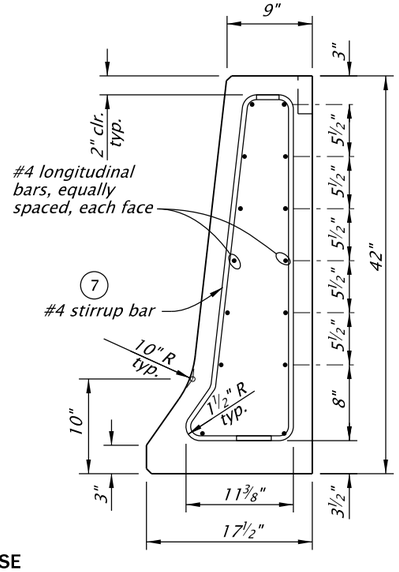
STIRRUP BAR B
Quantity = 10 stirrup pairs



SECTION D-D



STIRRUP BAR NARROW BASE



TALL NARROW BASE SHOULDER BARRIER
(No pin slots required)

ACCOMPANIED BY DWGS.:
RD548A

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OREGON STANDARD DRAWINGS

PRECAST TALL (42") CONCRETE BARRIER WITH MODIFIED REINFORCING

SHEET 2 OF 2

2024

DATE	REVISION DESCRIPTION
06-2024	CREATED NEW DRAWING
01-2025	REVISED REBAR FOR SLOT CONFLICTS

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD548B**

Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

RD900.dgn

CURB RAMP INDEX	
STANDARD DRAWING NUMBER	STANDARD DRAWING 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 Accesible Route Island*
RD908	*Detectable Warning Surface Placement For Rail*
RD909	*Detectable Guide Strip Placement at Bike Ramps*
RD910	*Perpendicular Curb Ramp*
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	*Combination Curb Ramp*
RD932	*Combination Curb Ramp*
RD936	*Combination Curb Ramp*
RD938	*Combination Curb Ramp Single Ramp*
RD940	*Blended Transition Curb Ramp Single Ramp*
RD950	*End of Walk Curb Ramp*
RD952	*End of Walk Curb Ramp*
RD960	*Unique Curb Ramp*

LEGEND:

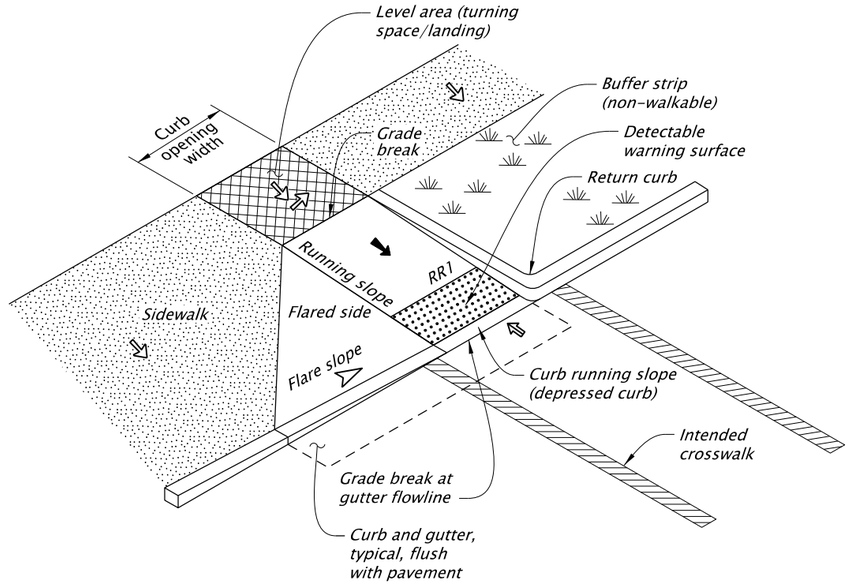
- *Marked or intended crossing location*
- *Sidewalk or other traversable surface*
- *Detectable warning surface (DWS)*
- *Level area (Turning space/landing)*
- *Cross slope 1.5% maximum*
  (Maximum 2.0% finished surface slope)
  (Normal sidewalk cross slope)
- *Running slope 4.0% maximum*
  (Maximum 4.9% finished surface slope)
- *Running slope 7.5% maximum*
  (Maximum 8.3% finished surface slope)
- *Counter slope 4.0% maximum ascending or descending*
  (Maximum 5.0% finished surface slope)
  Slope as required for drainage
- *Flare slope*
  (Maximum 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, maximum 5.0% finished gutter flow slope

SY = Stop or Yield, maximum 2.0% finished gutter flow slope



TYPICAL CURB RAMP SYSTEM COMPONENTS

(PERPENDICULAR TYPE SHOWN)

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OREGON STANDARD DRAWINGS

CURB RAMP COMPONENTS AND LEGEND

2024

DATE	REVISION DESCRIPTION
11-2023	REVISED LEGEND
01-2025	UPDATED CAD STANDARDS

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD900**

Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

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 through 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.*

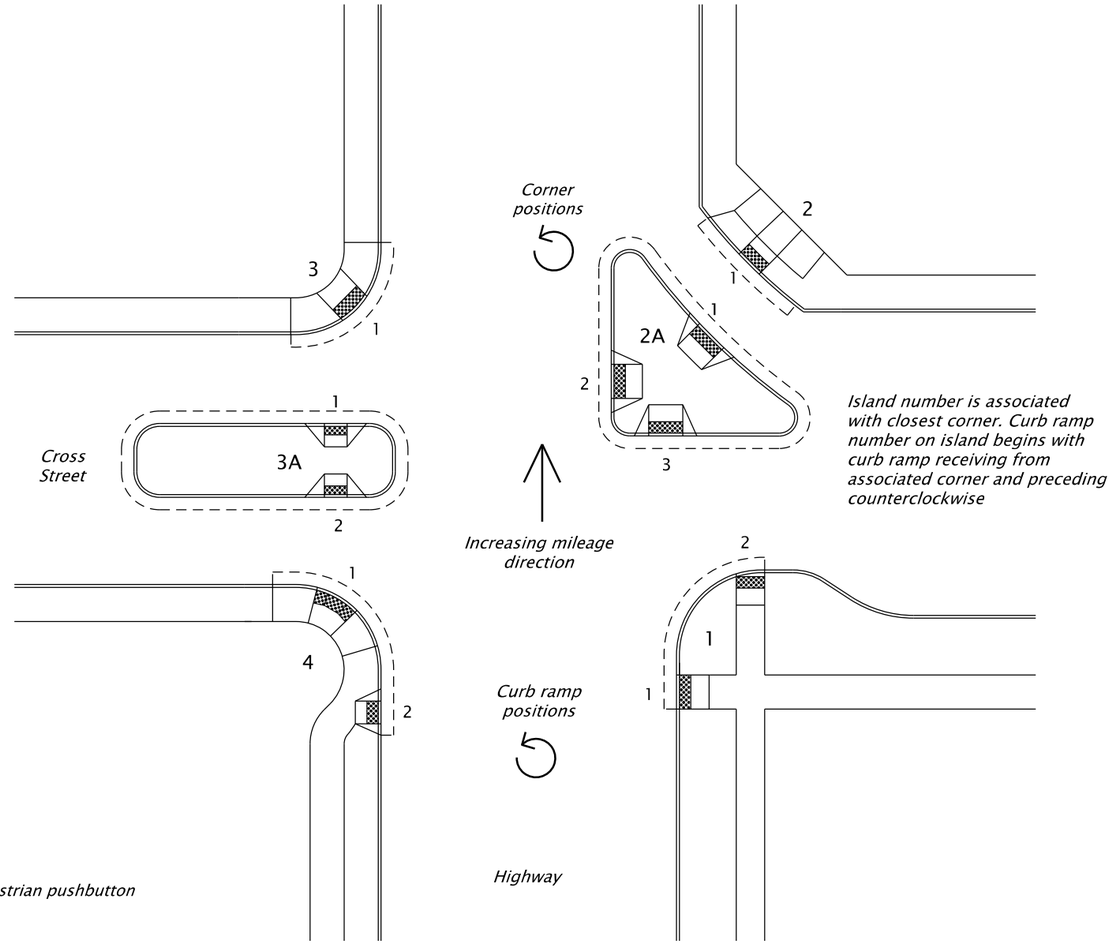
Example:

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 counterclockwise 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 counterclockwise 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

FOR ADDITIONAL RAMP AND RAMP RUN NUMBERING CONVENTIONS, SEE ODOT EXHIBIT A

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*
- *Crosswalk Closure Support*

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

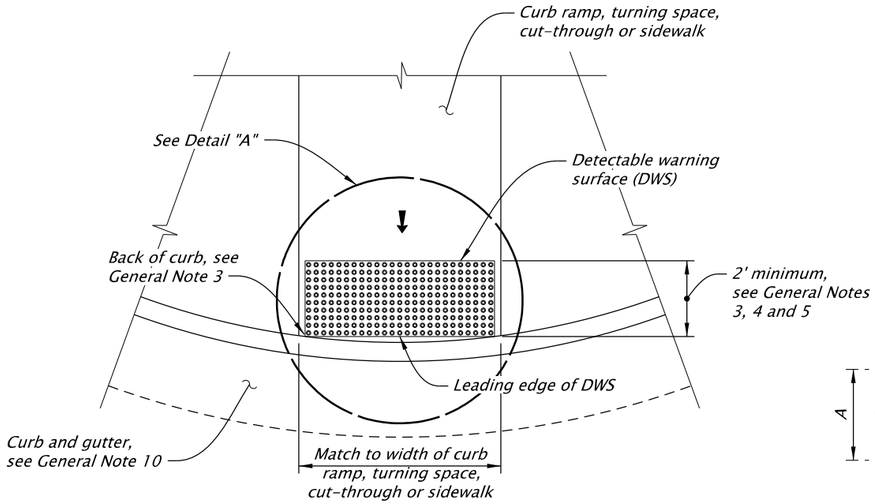
CURB RAMP LEGEND AND CORNER IDENTIFICATION

2024

DATE	REVISION DESCRIPTION
12-2023	REVISED NOTES
01-2025	UPDATED CAD STANDARDS

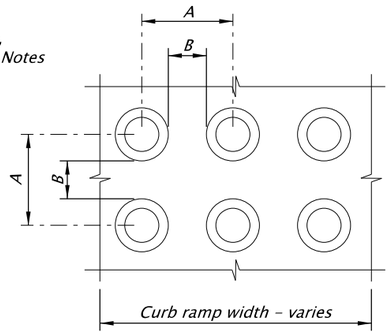
CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD901**

Effective Date: June 1, 2025 - November 30, 2025

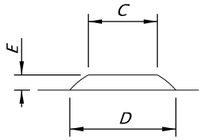


DETECTABLE WARNING SURFACE DETAIL

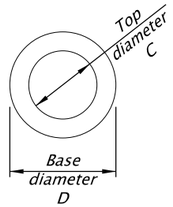
TRUNCATED DOME SIZE/SPACING DIMENSIONS					
	A	B	C	D	E
MINIMUM (IN.)	1.60	0.65	0.45	0.90	0.20
MAXIMUM (IN.)	2.40	--	0.91	1.40	0.20



TRUNCATED DOME SPACING



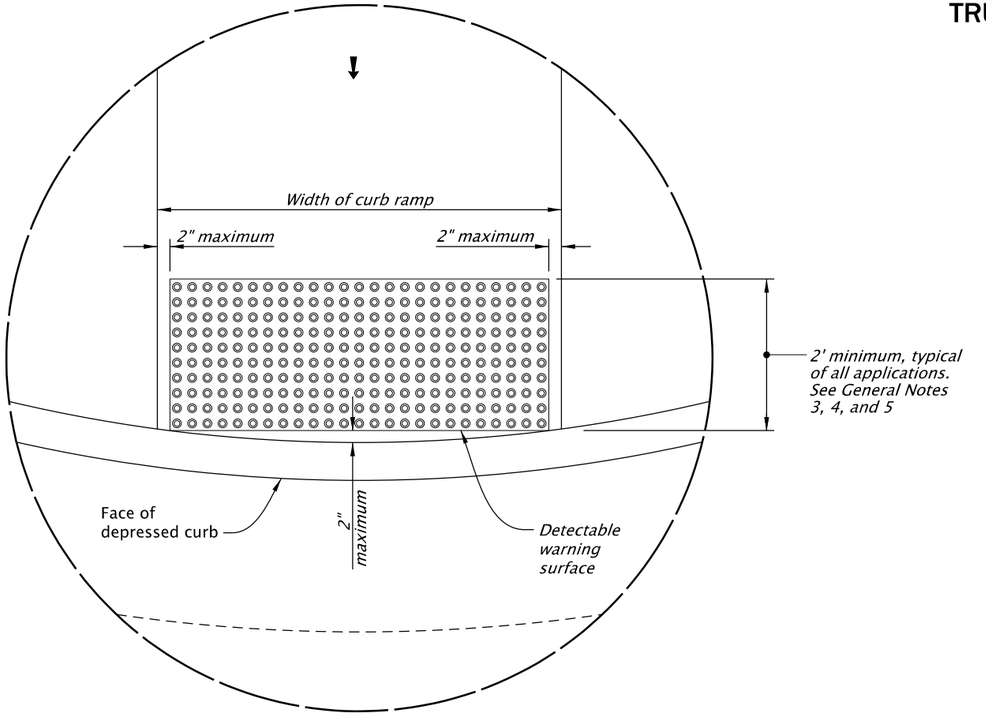
SIDE VIEW



TOP VIEW

TRUNCATED DOME

TRUNCATED DOME DETAILS



DETAIL "A"

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Detectable warning surface details and locations are based on applicable ODOT Standards.*
2. *See project plans for details not shown. See drawings RD700 and RD701 for curbs.*
3. *The detectable warning surface shall extend the full width of the curb ramp opening, shared use path, blended transition, turning space, or other roadway entrance as applicable. A gap of up to 2 inches on each side of the detectable warning surface is permitted (measured at the leading edge of the detectable warning surface panel as shown in Detail "A").*
4. *Detectable warning surface shall be placed at the back of curb for a minimum depth of 2 feet in the direction of pedestrian travel at curb ramps that are adjacent to traffic. Detectable warning surface may be radial or rectangular, but must comply with the truncated dome size and spacing standards. Detectable warning surface may be cut to meet necessary shape as shown in plans. Detectable warning surface across a grade break is prohibited. Place abutting panels within1/4-inch of each other and install anchors, as specified by manufacturers, along cut edge.*
5. *Color to be safety yellow, if no color specified in construction note. Alternative colors require a design exception on or along state highways.*
6. *Detectable warning surface shall be used in the following locations:*
   a) *Curb ramps at street crossings*
   b) *Crossing islands (Accessible Route Islands)*
   c) *Rail crossings*
7. *Where public transportation stations (rail, bus, etc.) use platform boarding, detectable warning surface shall be placed along the full edge length of the station, when not protected by platform screens or guards. See drawing RD908.*
8. *Detectable warning surface shall not be used on the following locations:*
   a) *End of sidewalk transitions that are not at a crosswalk. See drawings RD950, RD952 and RD960.*
   b) *Driveways, unless constructed with curb return or are signalized.*
   c) *Parking lots, access aisles and passenger loading zones where curb ramp does not lead to vehicular way.*
9. *Where no curb is present, the detectable warning surface shall be placed at the edge of the roadway.*
10. *On or along state highways, curb and gutter is required at curb ramps.*

LEGEND:

Detectable warning surface

Cross slope 1.5% maximum
(Maximum 2.0% finished surface slope)
(Normal sidewalk cross slope)

Running slope 7.5% maximum
(Maximum 8.3% 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

DETECTABLE WARNING SURFACE DETAILS

2024

DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD902**

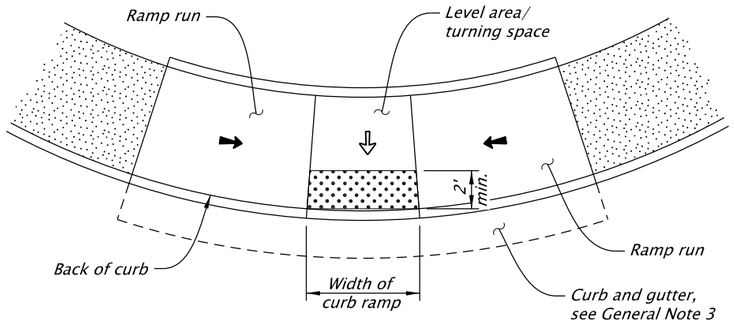
Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

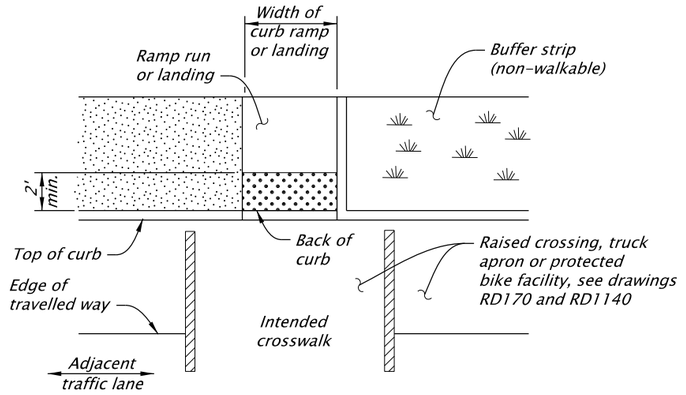
RD902.dgn

10-JAN-2025

RD904.dgn



PARALLEL CURB RAMP



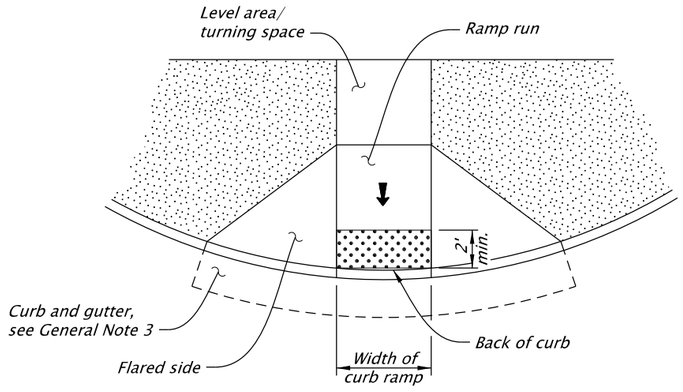
RAISED CROSSING, TRUCK APRON OR PROTECTED BIKE FACILITY

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

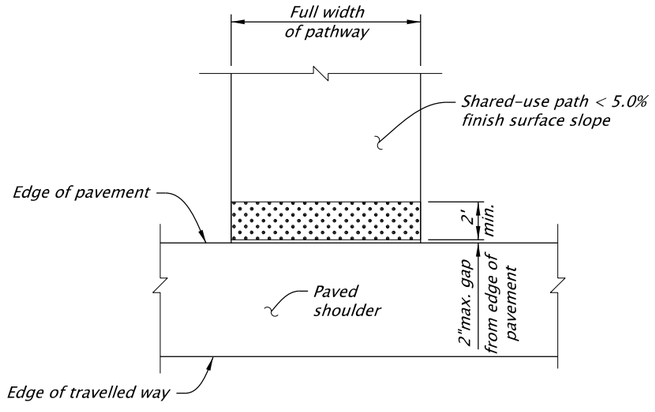
1. *Detectable warning surface details and locations are based on applicable ODOT Standards.*
2. *See project plans for details not shown. See drawings RD700 and RD701 for curbs. See drawing RD902 for detectable warning surface installation details.*
3. *On or along state highways, curb and gutter is required at curb ramps.*
4. *Detectable warning surface placement for perpendicular ramps vary as shown.*

LEGEND:

- *Marked or intended crossing location*
- *Sidewalk*
- *Detectable warning surface*
- *Cross slope 1.5% maximum (Maximum 2.0% finished surface slope) (Normal sidewalk cross slope)*
- *Running slope 7.5% maximum (Maximum 8.3% finished surface slope)*



PERPENDICULAR CURB RAMP
GRADE BREAK IN FRONT OF CURB



SHARED-USE PATH CONNECTION OR CURBLESS WALKWAY

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

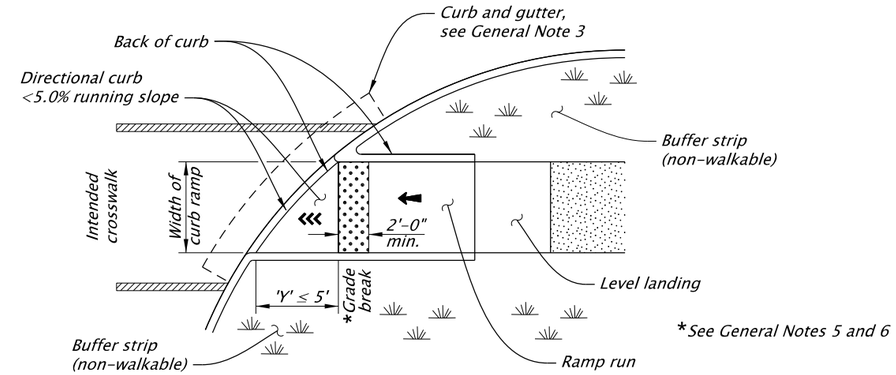
DETECTABLE WARNING SURFACE PLACEMENT FOR CURB RAMPS

2024

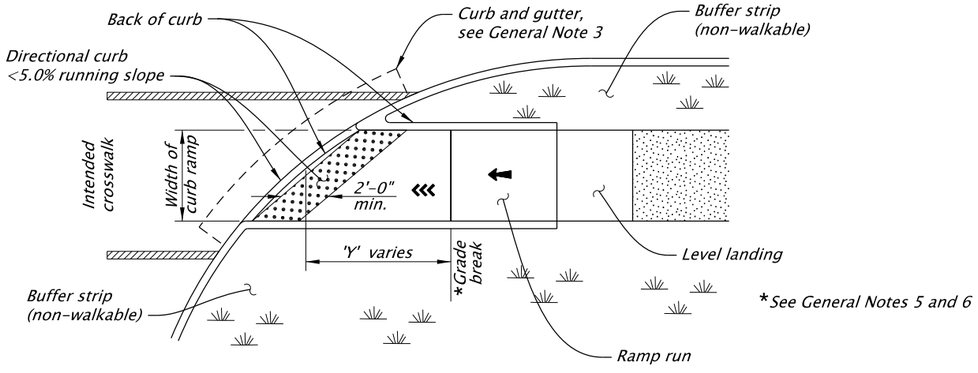
DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD904**

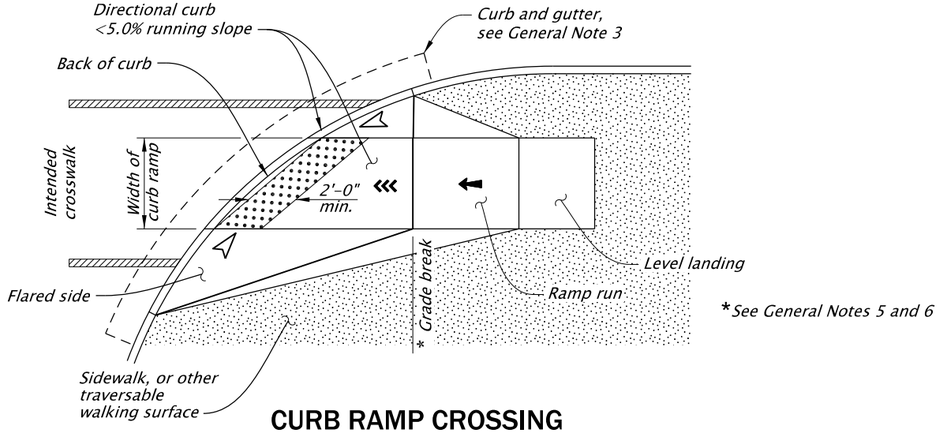
Effective Date: June 1, 2025 - November 30, 2025



CURB RAMP CROSSING
GRADE BREAK ≤ 5 FEET FROM BACK OF CURB



CURB RAMP CROSSING
GRADE BREAK > 5 FEET FROM BACK OF CURB



CURB RAMP CROSSING
DIRECTIONAL CURB WITH FLARED CONSTRUCTION

GENERAL NOTES FOR ALL DETAILS THIS SHEET:

1. *Detectable warning surface details and locations are based on applicable ODOT Standards.*
2. *See project plans for details not shown. See drawings RD700 and RD701 for curbs. See drawing RD902 for detectable warning surface installation details.*
3. *On or along state highways, curb and gutter is required at curb ramps.*
4. *Detectable warning surface placement for perpendicular ramps vary as shown.*
5. *Detectable warning surface placement across the grade break is prohibited.*
6. *Where the 'Y' distance is greater than 5 feet anywhere in front of ramp run grade break, the detectable warning surface placement shall be placed at the back of curb line.*

LEGEND:

- *Marked or intended crossing location*
- *Sidewalk*
- *Detectable warning surface*
- *Running slope 7.5% maximum (Maximum 8.3% finished surface slope)*
- *Flare slope (Maximum 10.0% finished surface slope)*
- *Running slope 4.0% maximum (Maximum 4.9% finished surface slope)*

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

OREGON STANDARD DRAWINGS

DETECTABLE WARNING SURFACE PLACEMENT FOR DIRECTIONAL CURBS

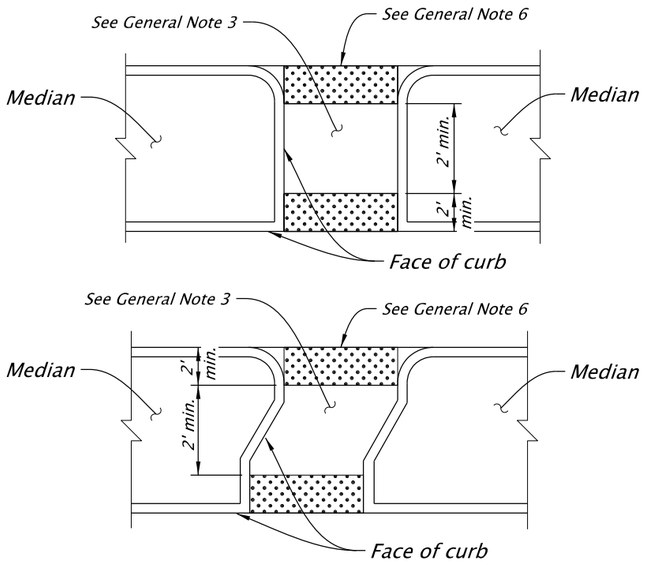
2024

DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

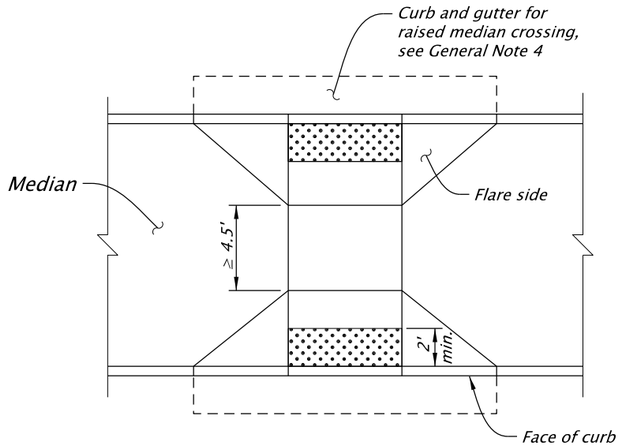
CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD905**

Effective Date: June 1, 2025 - November 30, 2025

RD905.dgn 10-JAN-2025

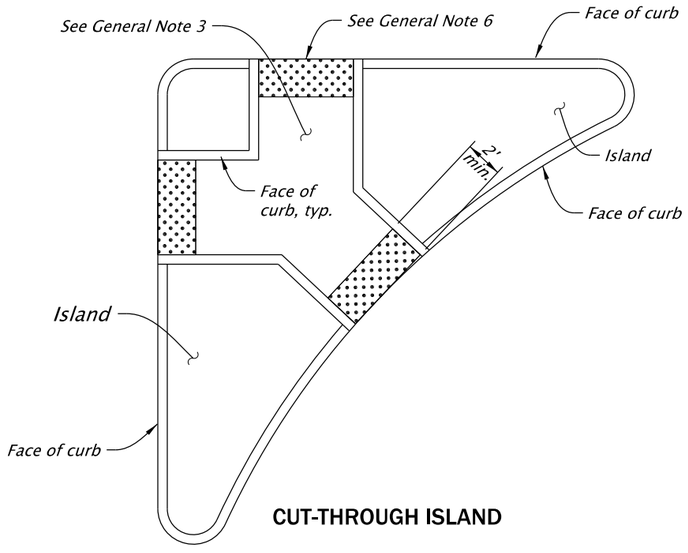


CUT-THROUGH

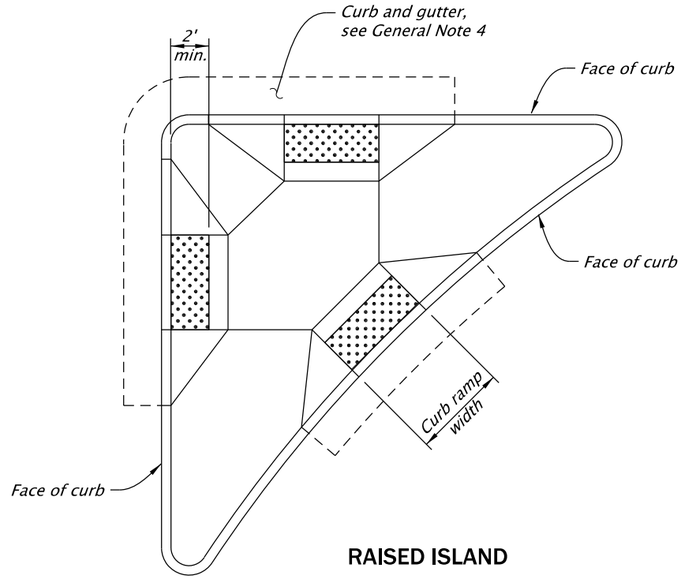


RAISED MEDIAN

MEDIAN CROSSING



CUT-THROUGH ISLAND



RAISED ISLAND

CHANNELIZATION ISLAND

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Detectable warning surface details and locations are based on applicable ODOT Standards.*
2. *See project plans for details not shown. See drawings RD700 and RD701 for curbs. See drawings RD710 and RD711 for accessible route island. See drawing RD902 for detectable warning surface installation details.*
3. *Detectable warning surfaces shall be separated by a 2-foot minimum length of walkway without detectable warnings. Site conditions normally require a project specific design. See project plans for details not shown. Omit detectable warning surfaces if less than 2 feet.*
4. *On or along state highways, curb and gutter is required at curb ramps.*
5. *Details intended for pedestrian route only. For protected bike lanes on multi-use paths, see project plans for specific details.*
6. *Where the island has no depressed curb, the detectable warning surface shall be placed at the edge of roadway. Detectable warning surface shall be full width where radial return curbs are installed.*

LEGEND:

Detectable warning surface

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

OREGON STANDARD DRAWINGS

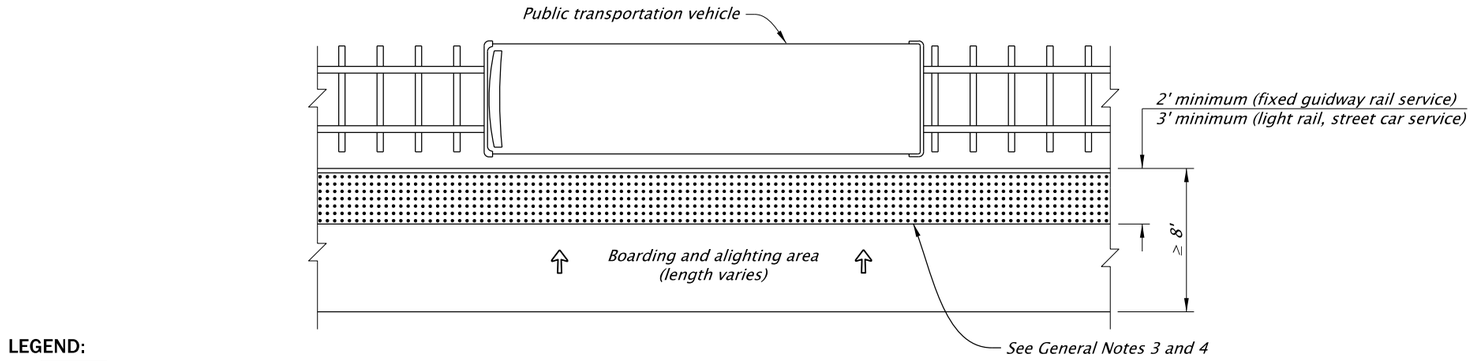
DETECTABLE WARNING SURFACE PLACEMENT FOR ACCESSIBLE ROUTE ISLAND

2024

DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD906**

Effective Date: June 1, 2025 - November 30, 2025

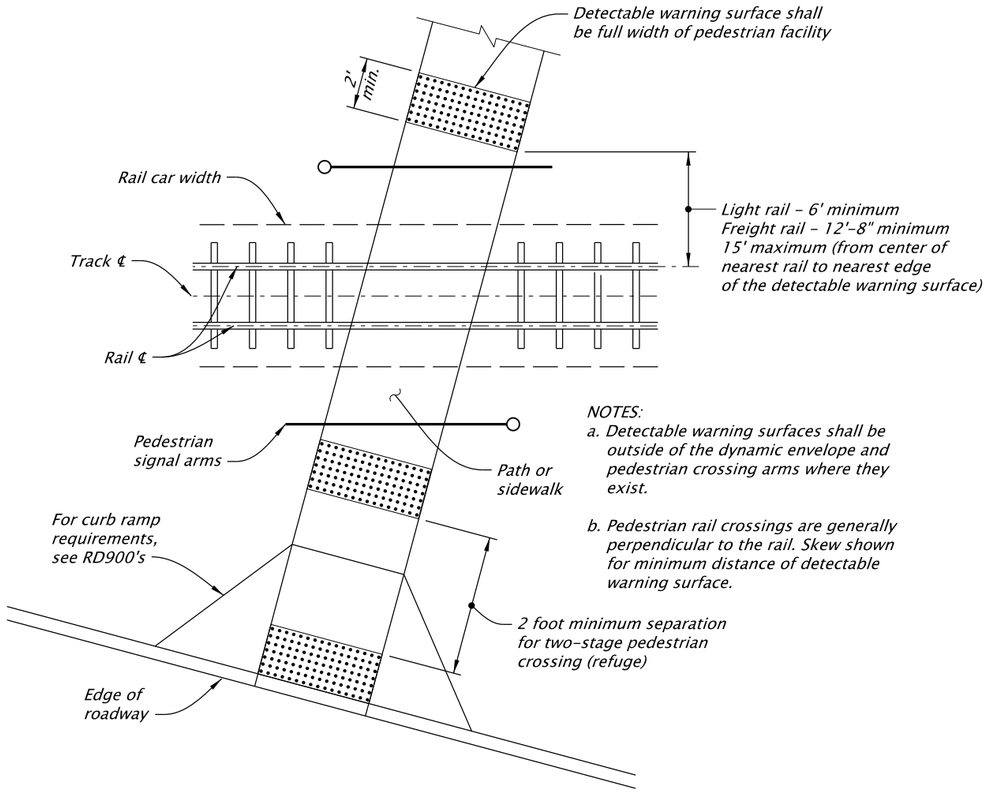


LEGEND:

Detectable warning surface

Cross slope 1.5% maximum
(Maximum 2.0% finished surface slope)

PUBLIC TRANSPORTATION STATION
RAIL OR TRANSIT SERVICE

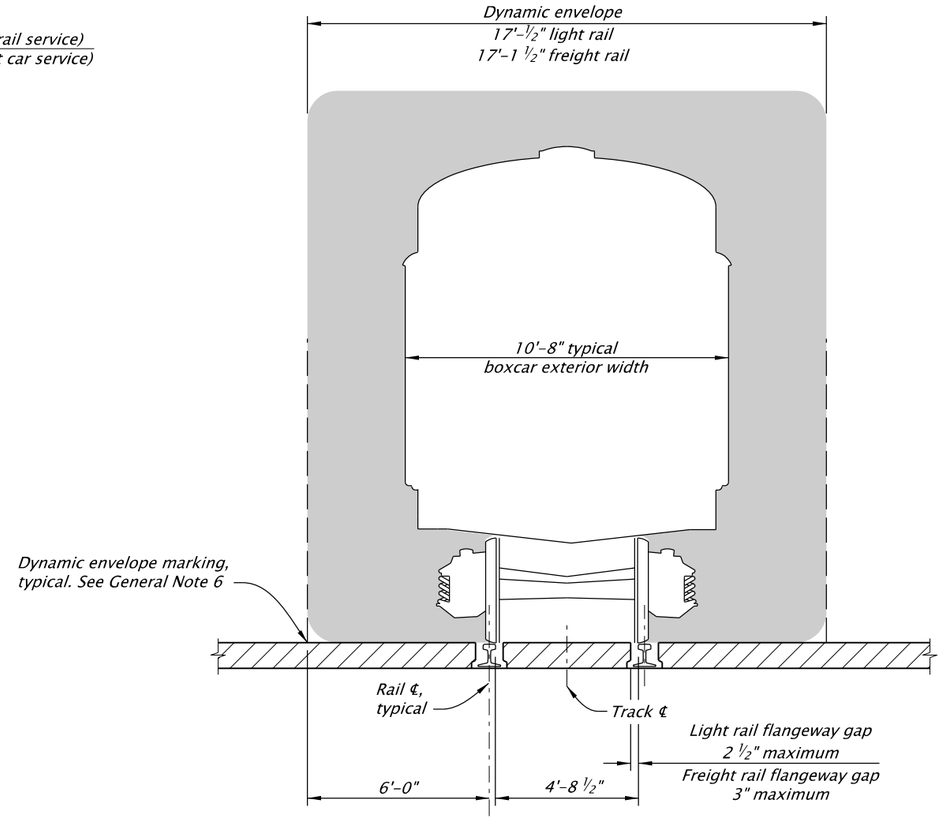


NOTES:

a. Detectable warning surfaces shall be outside of the dynamic envelope and pedestrian crossing arms where they exist.

b. Pedestrian rail crossings are generally perpendicular to the rail. Skew shown for minimum distance of detectable warning surface.

AT-GRADE RAIL CROSSING



RAIL TRACK SECTION VIEW

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Detectable warning surface details and locations are based on applicable ODOT Standards.
2. See project plans for details not shown. See drawing RD902 for detectable warning surface installation details.
3. Place detectable warning surface along the full length of the rail station, when not protected by screens or guards on raised platforms, sidewalk, and street level boarding areas.
4. Place detectable warning surface along the full length of the transit station, when not protected by screens or guards on raised platforms and sidewalk boarding areas.
5. Detectable warning surfaces shall be outside of the dynamic envelope.
6. Dynamic envelope shall be clear of all fixed obstructions unless otherwise shown on Rail Crossing Order.

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

OREGON STANDARD DRAWINGS

DETECTABLE WARNING SURFACE PLACEMENT FOR RAIL

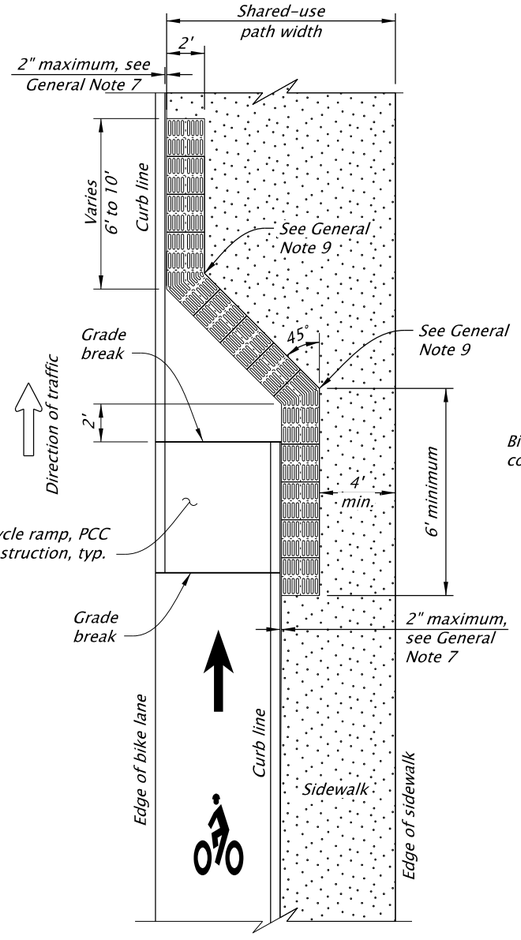
2024

DATE	REVISION DESCRIPTION
01–2025	UPDATED CAD STANDARDS

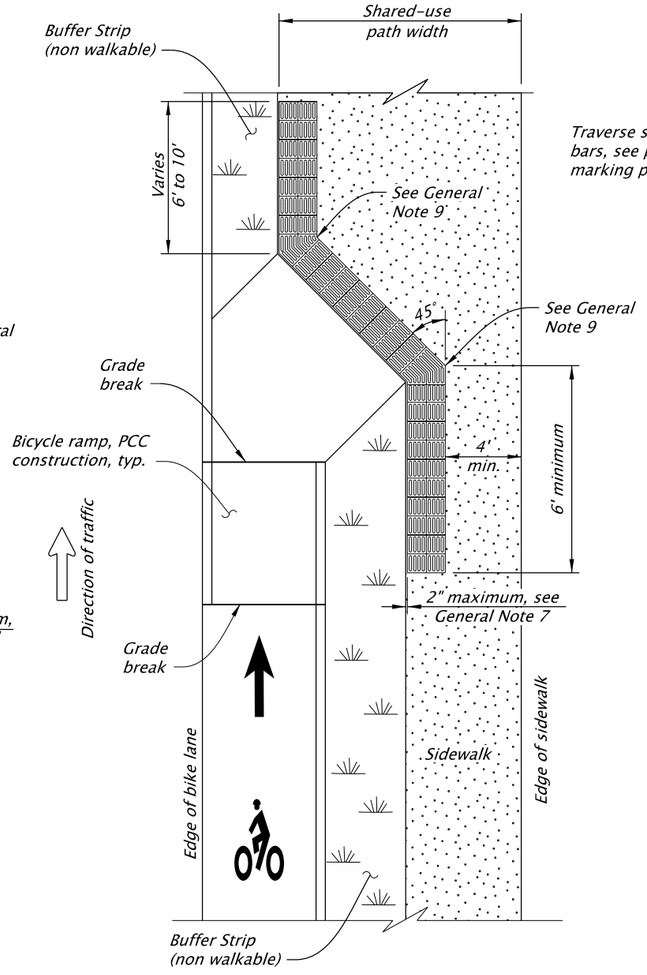
CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD908**

10–JAN–2025
RD908.dgn

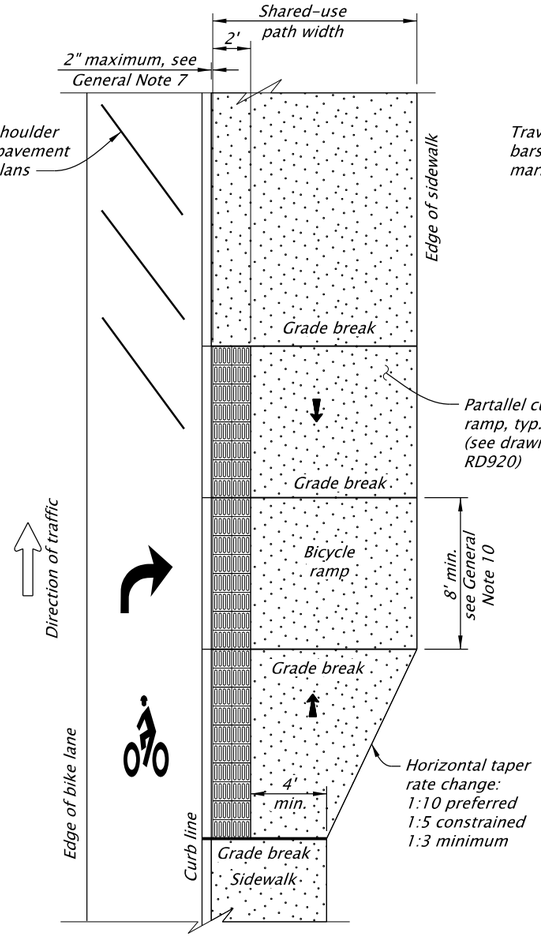
RD909.dgn 10-JAN-2025



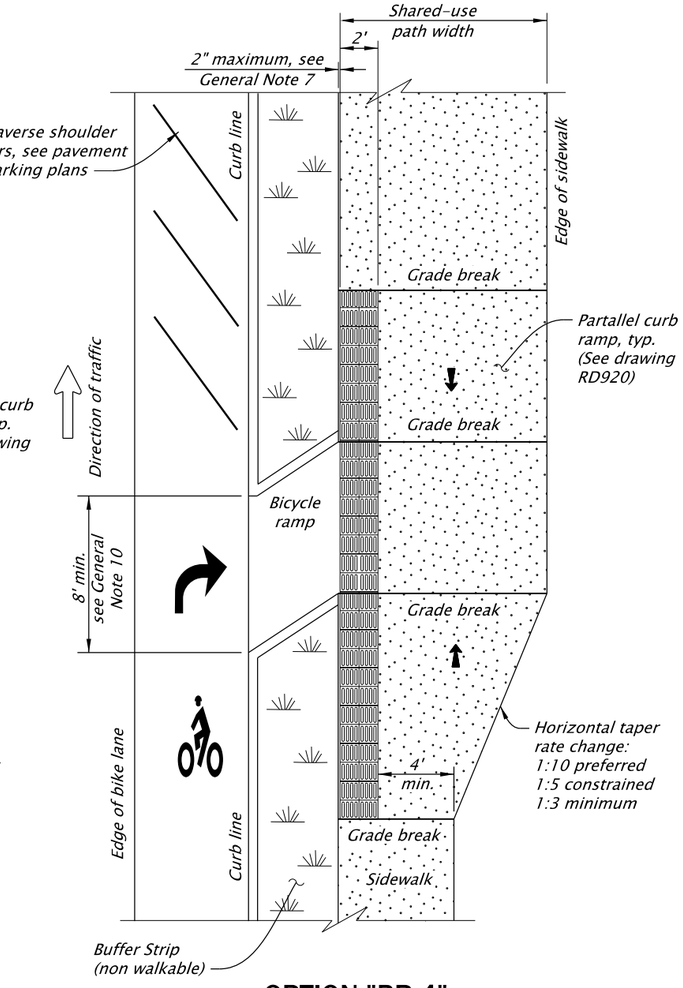
OPTION "BR-1"
BICYCLE LANE DROP TO CURB LINE SIDEWALK



OPTION "BR-2"
BICYCLE LANE DROP TO SEPARATED SIDEWALK



OPTION "BR-3"
BICYCLE LANE PARALLEL RAMP APPROACH



OPTION "BR-4"
BICYCLE LANE ANGLED RAMP APPROACH

LEGEND:

Detectable guide strip

Sidewalk

Running slope 7.5% maximum
- Maximum 8.3% finished surface slope

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Bicycle ramp details are based on applicable ODOT Standards. If curb ramp serves both bicycles and pedestrians, do not use this drawing. See drawing RD902.*
2. *See project plans for details not shown. See drawings RD700 and RD702 for curbs. See drawings RD720 and RD721 for sidewalks. See drawing RD920 for parallel curb ramp details. See drawing RD1140 for separated bike lanes. See drawing TM500 for transverse shoulder bars details*
3. *Site conditions normally require a project specific design. See project plans for details not shown.*
4. *Curb ramps for shared use paths intersecting a roadway shall be full width of path, excluding flares.*
5. *Detectable guide strip color shall be blue if no color specified. Color shall be contrasting to the surrounding area, light on dark, or dark on light. Blue markings are reserved for accessibility features. Alternative colors require a design exception on or along state highways.*
6. *Agency review and approval required for detectable guide strip products.*
7. *Detectable guide strip shall be placed a maximum of 2 inches from the edge of the sidewalk.*
8. *Place abutting panels within 1/4-inch of each other and install anchors, as specified by manufacturers, along cut edge.*
9. *Miter panels at 45 degree angle. Detectable guide strips may be cut to meet necessary shape as shown with long bar orientation as illustrated.*
10. *When a curb ramp is used to provide bicycle access from a roadway to a sidewalk, the curb ramp opening will be greater than or equal to 8 feet wide.*

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

OREGON STANDARD DRAWINGS

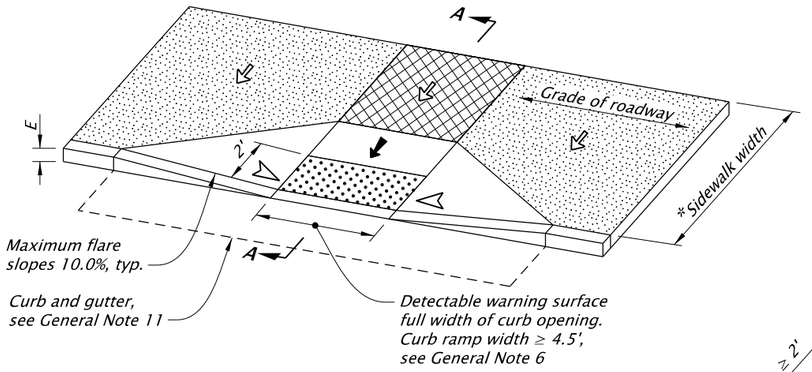
DETECTABLE GUIDE STRIP PLACEMENT AT BIKE RAMPS

2024

DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

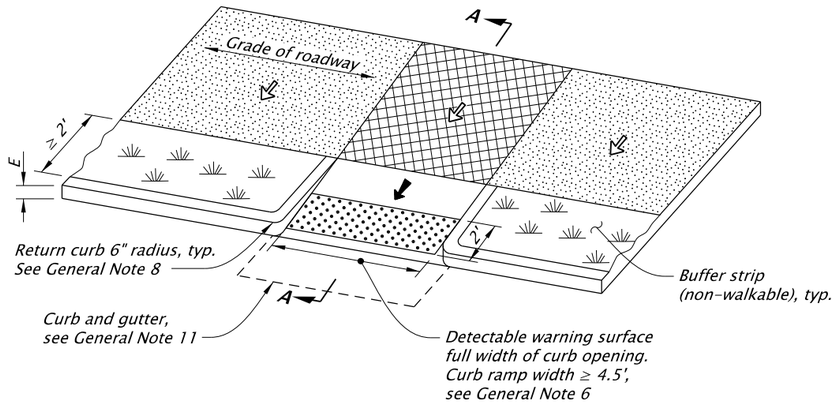
CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD909**

Effective Date: June 1, 2025 - November 30, 2025

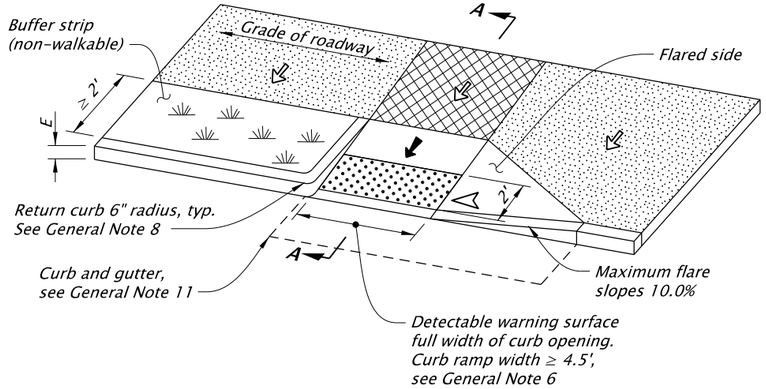


PERPENDICULAR CURB RAMP DETAIL

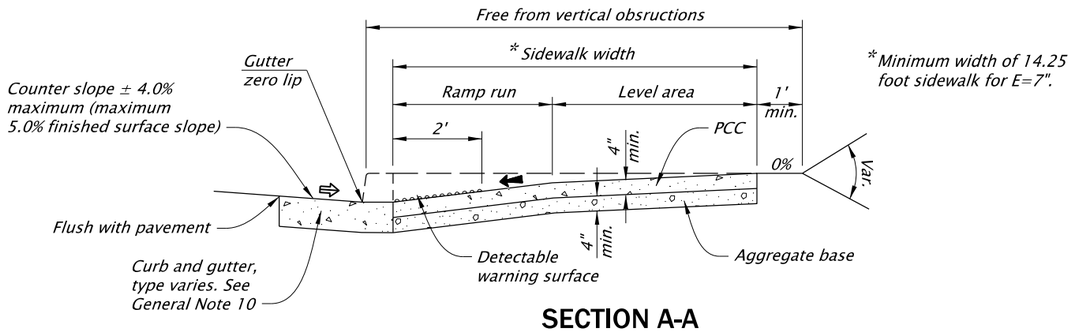
(Use "Parallel Curb Ramp Detail" or "Combination Curb Ramp Detail" when required turning space cannot be obtained)



PERPENDICULAR CURB RAMP THROUGH BUFFER STRIP



PERPENDICULAR CURB RAMP WITH SINGLE FLARE



*Minimum width of 14.25 foot sidewalk for E=7".

SECTION A-A

LEGEND:

- *Sidewalk*
- *Detectable warning surface (DWS)*
- *Level area (Turning space/landing)*
  Unobstructed 4.5' x 4.5'
  With obstruction 4.5' x 5.5' (longer dimension in direction of pedestrian street crossing).
  For the purposes of this application, a maximum 2.0% finished surface slope (for drainage) measured perpendicular in two directions is considered level.
- ⇦ *Cross slope 1.5% maximum (Maximum 2.0% finished surface slope) (Normal sidewalk cross slope)*
- ⬅ *Running slope 7.5% maximum (Maximum 8.3% finished surface slope)*
- ⇦ *Counter slope 4.0% maximum ascending or descending (Maximum 5.0% finished surface slope) Slope as required for drainage*
- ◁ *Flare slope (Maximum 10.0% finished surface slope)*

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Curb ramp details are based on applicable ODOT standards.*
2. *See project plans for details not shown. See drawings RD700 and RD701 for curbs. See drawings RD720 and RD721 for sidewalks. See drawings RD902 through RD908 for detectable warning surface installation details. See drawings RD912 through RD916 for curb ramp placement options.*
3. *Site conditions normally require a project specific design. See project plans for details not shown.*
4. *Tooled dummy joints are required at all curb ramp slope break lines. See drawing RD722.*
5. *Curb ramp slopes shown are relative to the true level horizon (zero bubble).*
6. *Place detectable warning surface at the back of curb for a minimum depth of 2 feet in the direction of pedestrian travel full width of curb ramp opening that is adjacent to traffic.*
7. *Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.*
8. *Return curb may be provided in lieu of flared slope only if protected from traverse travel by softscape, see drawing RD721. Return curb shall not reduce width of approaching sidewalk.*
9. *Curb ramps for shared use paths intersecting a roadway shall be full width of path, excluding flares. When a curb ramp is used to provide bicycle access from a roadway to a sidewalk, the curb ramp opening will be greater than or equal to 8 feet wide. See drawings RD904 and RD909 for additional details.*
10. *Place an inlet at upstream side of curb ramp or perform other approved design mitigation. Check the gutter flow depth at curb ramp locations to assure that the design flood does not overtop the back of sidewalk.*
11. *On or along state highways, curb and gutter is required at curb ramps. Curb and gutter shall be flush with the adjacent pavement.*

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

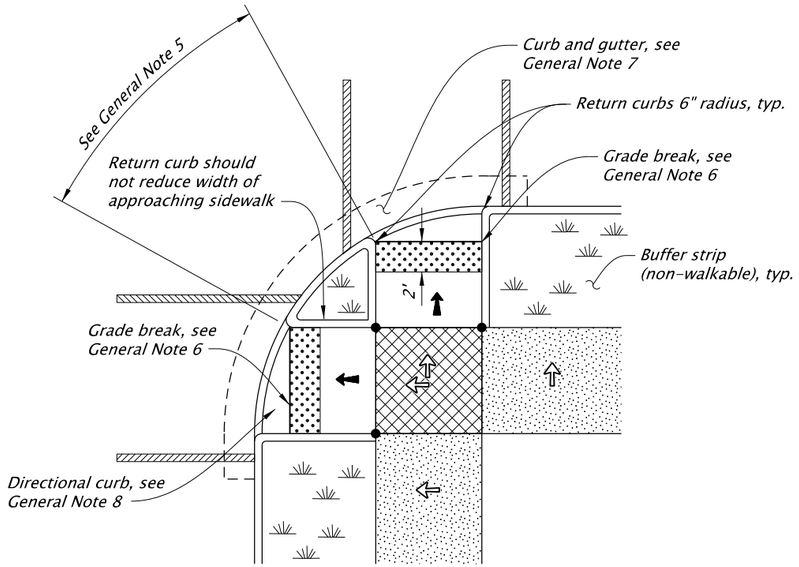
PERPENDICULAR CURB RAMP

2024

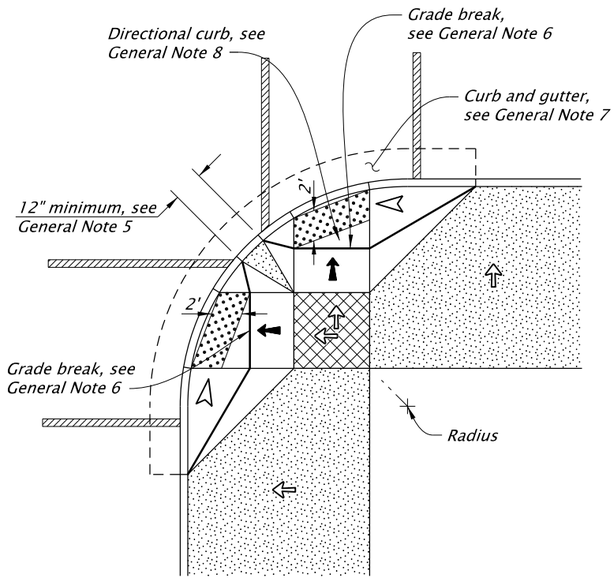
DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD910**

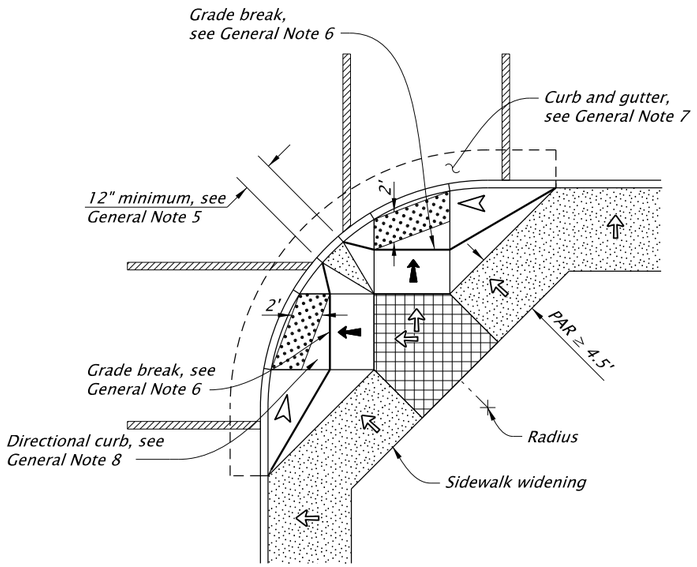
Effective Date: June 1, 2025 - November 30, 2025



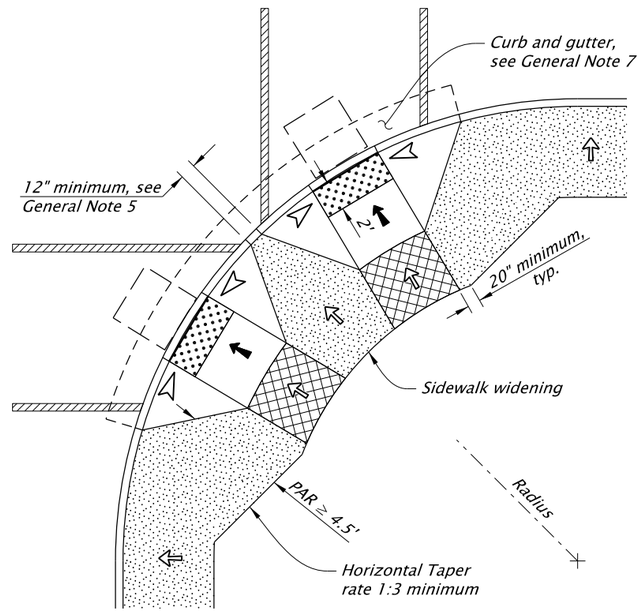
WITH LANDSCAPED BUFFER STRIP
OPTION "PR-1"



FOR WIDE SIDEWALKS
OPTION "PR-2"



FOR NARROW SIDEWALKS
OPTION "PR-3"



FOR NARROW SIDEWALKS
OPTION "PR-4"

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Curb ramp details are based on applicable ODOT standards.*
2. *See project plans for details not shown. See drawings RD700 and RD 701 for curbs. See drawings RD720 and RD721 for sidewalks. See drawing RD910 for perpendicular curb ramp details. See drawings RD902 through RD908 for detectable warning surface installation details.*
3. *Tooled dummy joints are required at all curb ramp slope break lines. See drawing RD722.*
4. *Curb ramp slopes shown are relative to the true level horizon (zero bubble).*
5. *When two curb ramps are immediately adjacent, the curb exposure (E) between the adjacent side flare may range between 3-inch and full design exposure.*
6. *Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.*
7. *On or along state highways, curb and gutter is required at curb ramps. Curb and gutter shall be flush with the adjacent pavement.*
8. *Directional Curb and depressed curb with running slope less than 5.0% finished surface slope in the direction of pedestrian travel. See drawing RD905.*

LEGEND:

- *Marked or intended crossing location*
- *Sidewalk*
- *Detectable warning surface (DWS)*
- *Level area (Turning space/landing)*
  Unobstructed 4.5' x 4.5'
  With obstruction 4.5' x 5.5' (longer dimension in direction of pedestrian street crossing).
  For the purposes of this application, a maximum 2.0% finished surface slope (for drainage) measured perpendicular in two directions is considered level.
- *Cross slope 1.5% maximum*
  (Maximum 2.0% finished surface slope)
  (Normal sidewalk cross slope)
- *Running slope 4.0% maximum*
  (Maximum 4.9% finished surface slope)
- *Running slope 7.5% maximum*
  (Maximum 8.3% finished surface slope)
- *Flare slope*
  (Maximum 10.0% finished surface slope)
- *4'x4' clear space*
- PAR *Pedestrian Access Route*
- *Zero curb exposure*

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

PERPENDICULAR CURB RAMP

2024

DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD912**

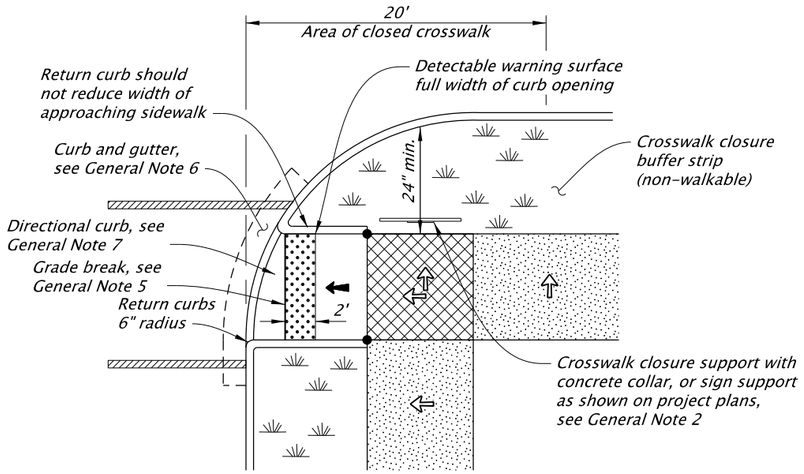
10-JAN-2025

RD912.dgn

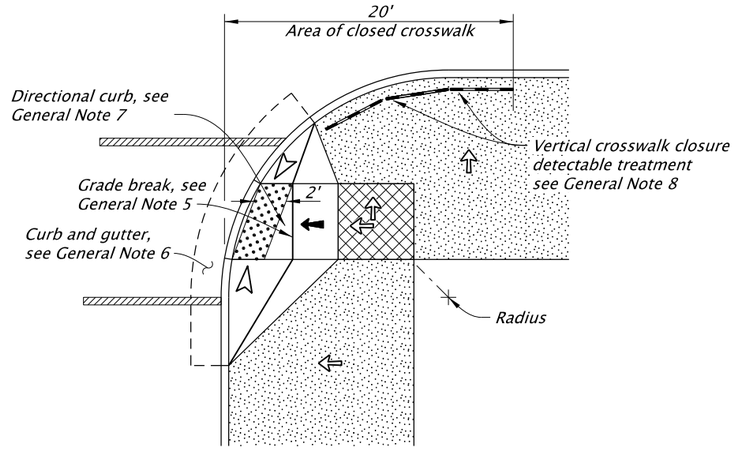
Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

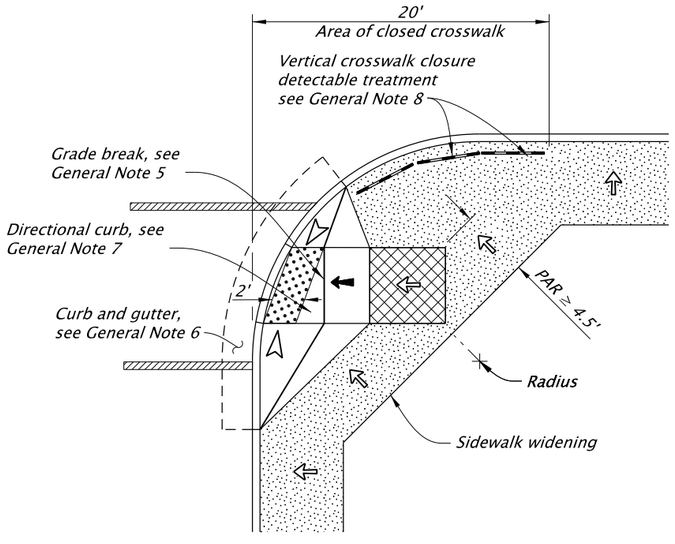
RD913.dgn



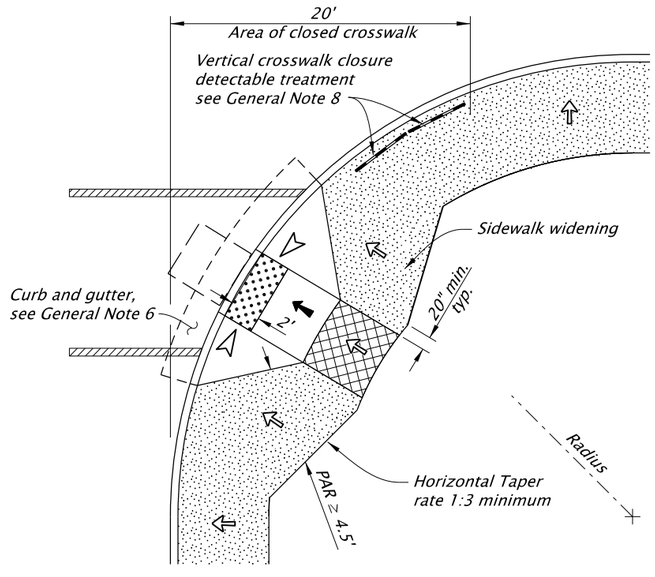
CROSSWALK CLOSURE WITH LANDSCAPE BUFFER STRIP OPTION "PR-5"



CROSSWALK CLOSURE FOR WIDE SIDEWALK OPTION "PR-6"



CROSSWALK CLOSURE FOR NARROW SIDEWALK OPTION "PR-7"



CROSSWALK CLOSURE OPTION "PR-8"

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Curb ramp details are based on applicable ODOT standards.*
2. *See project plans for details not shown. See drawings RD700 and RD 701 for curbs. See drawings RD720 and RD721 for sidewalks. See drawing RD910 for perpendicular curb ramp details. See drawings RD902 through RD908 for detectable warning surface installation details. See drawing TM240 for crosswalk closure details. See drawing RD100 for concrete collar details.*
3. *Tooled dummy joints are required at all curb ramp slope break lines. See drawing RD722.*
4. *Curb ramp slopes shown are relative to the true level horizon (zero bubble).*
5. *Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.*
6. *On or along state highways, curb and gutter is required at curb ramps. Curb and gutter shall be flush with the adjacent pavement.*
7. *Directional Curb and depressed curb with running slope less than 5.0% finished surface slope in the direction of pedestrian travel. See drawing RD905.*
8. *Install crashworthy vertical crosswalk closure detectable treatment approved by road authority.*

LEGEND:

- *Marked or intended crossing location*
- *Sidewalk*
- *Detectable warning surface (DWS)*
- *Level area (Turning space/landing)*
  Unobstructed 4.5' x 4.5'

  With obstruction 4.5' x 5.5' (longer dimension in direction of pedestrian street crossing).

  For the purposes of this application, a maximum 2.0% finished surface slope (for drainage) measured perpendicular in two directions is considered level.
- *Cross slope 1.5% maximum*
  (Maximum 2.0% finished surface slope)
  (Normal sidewalk cross slope)
- *Running slope 7.5% maximum*
  (Maximum 8.3% finished surface slope)
- *Flare slope*
  (Maximum 10.0% finished surface slope)
- *4'x4' clear space*
- PAR *Pedestrian Access Route*
- *Zero curb exposure*

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

PERPENDICULAR CURB RAMP WITH CLOSURE

2024

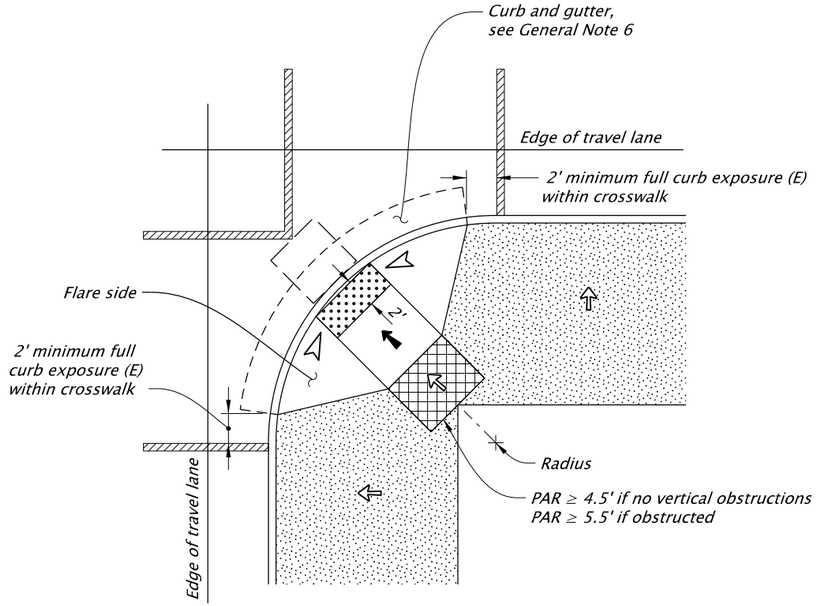
DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD913**

Effective Date: June 1, 2025 - November 30, 2025

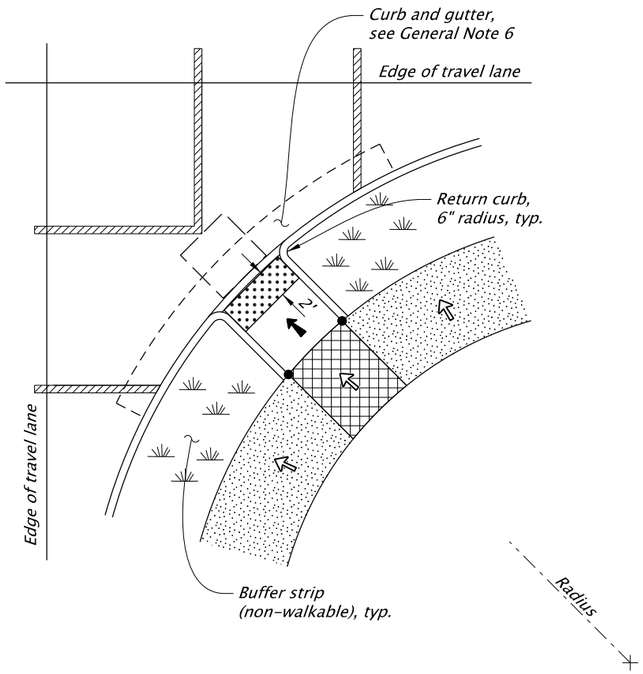
10-JAN-2025

RD916.dgn



DIAGONAL CURB RAMP FOR WIDE SIDEWALKS OPTION "PR-9"

(Use only when site constraints prohibit installing two curb ramps and both crosswalks are open)



DIAGONAL CURB RAMP WITH LANDSCAPED BUFFER STRIPS OPTION "PR-10"

(Use only when site constraints prohibit installing two curb ramps and both crosswalks are open)

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Curb ramp details are based on applicable ODOT standards.*
2. *See project plans for details not shown. See drawings RD700 and RD701 for curbs. See drawings RD720 and RD721 for sidewalks. See drawing RD910 for perpendicular curb ramp details. See drawings RD902 through RD908 for detectable warning surface installation details.*
3. *Tooled dummy joints are required at all curb ramp slope break lines. See drawing RD722.*
4. *Curb ramp slopes shown are relative to the true level horizon (zero bubble).*
5. *Only use curb ramp options allowed by jurisdiction. Single ramps require design exception on or along state highways.*
6. *On or along state highways, curb and gutter is required at curb ramps. Curb and gutter shall be flush with the adjacent pavement.*

LEGEND:

- *Marked or intended crossing location*
- *Sidewalk*
- *Detectable warning surface (DWS)*
- *Level area (Turning space/landing)*
  Unobstructed 4.5' x 4.5'
  With obstruction 4.5' x 5.5' (longer dimension in direction of pedestrian street crossing).
  For the purposes of this application, a maximum 2.0% finished surface slope (for drainage) measured perpendicular in two directions is considered level.
- *Cross slope 1.5% maximum*
  (Maximum 2.0% finished surface slope)
  (Normal sidewalk cross slope)
- *Running slope 7.5% maximum*
  (Maximum 8.3% finished surface slope)
- *Flare slope*
  (Maximum 10.0% finished surface slope)
- *4'x4' clear space*
- PAR *Pedestrian Access Route*
- *Zero curb exposure*

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

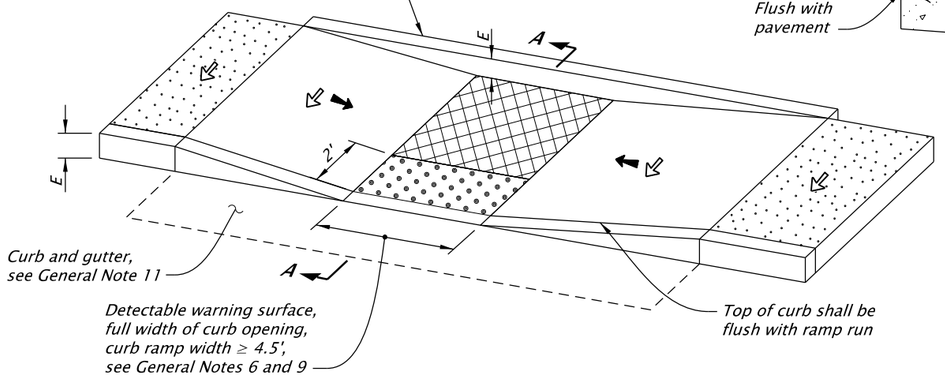
PERPENDICULAR CURB RAMP SINGLE RAMP

2024

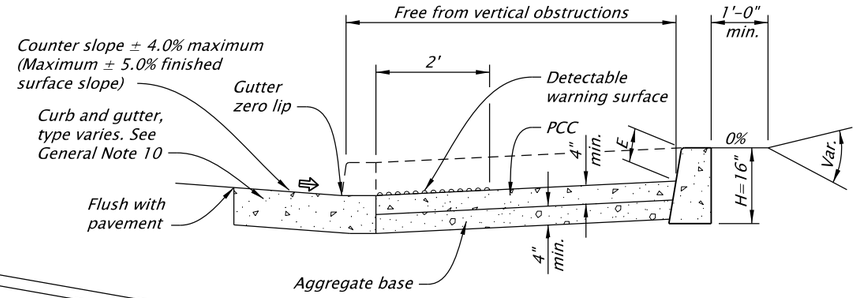
DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD916**

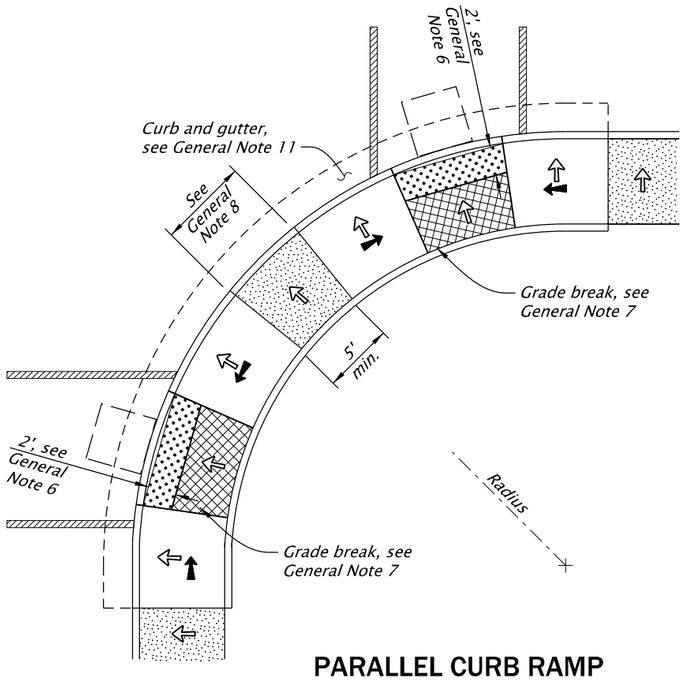
Effective Date: June 1, 2025 - November 30, 2025



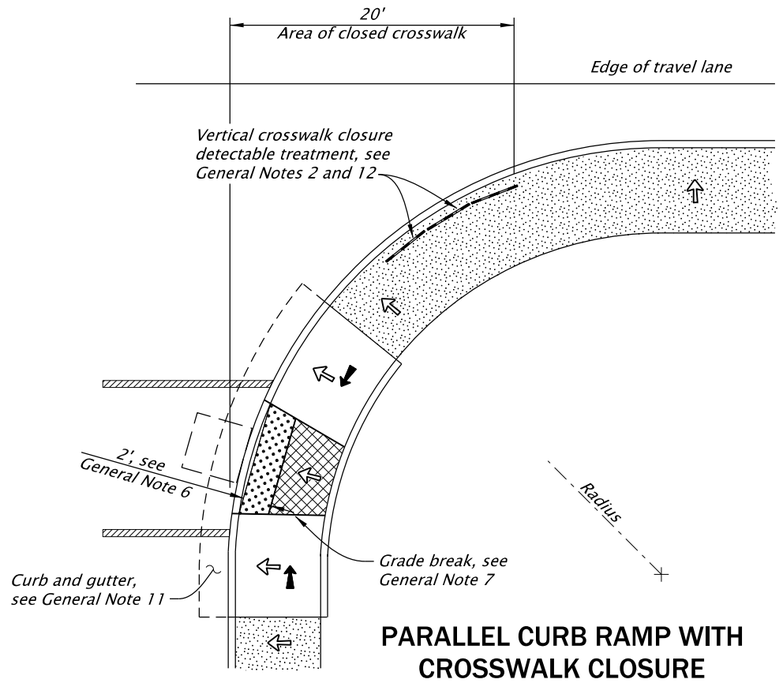
PARALLEL CURB RAMP DETAIL



SECTIONA-A



PARALLEL CURB RAMP OPTION "PL-1"



PARALLEL CURB RAMP WITH CROSSWALK CLOSURE OPTION "PL-2"

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Curb ramp details are based on applicable ODOT Standards.*
2. *See drawings RD700 and RD701 for curbs. See drawings RD720 and RD721 for sidewalks. See drawings RD902 through RD908 for detectable warning surface installation details. See drawing TM240 for crosswalk closure detail.*
3. *Site conditions normally require a project specific design. See project plans for details not shown.*
4. *Tooled dummy joints are required at all curb ramp grade break lines, see drawing RD722.*
5. *Curb ramp slopes shown are relative to the true level horizon (zero bubble).*
6. *Place detectable warning surface at the back of curb for a minimum depth of 2 feet in the direction of pedestrian travel full width of curb ramp opening that is adjacent to traffic.*
7. *Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.*
8. *When two ramp runs are immediately adjacent, the curb exposure (E) between the adjacent side may range between 3 inches and full design exposure.*
9. *Curb ramps for shared use paths intersecting a roadway shall be full width of path, excluding flares. When a curb ramp is used to provide bicycle access from a roadway to a sidewalk, the curb ramp opening will be greater than or equal to 8 feet wide. See drawing RD909 for additional details.*
10. *Place an inlet at upstream side of curb ramp or perform other approved design mitigation. Check the gutter flow depth at curb ramp locations to assure that the design flood does not overtop the back of sidewalk.*
11. *On or along state highways, curb and gutter is required at curb ramps. Curb and gutter shall be flush with the adjacent pavement.*
12. *Install crashworthy vertical crosswalk closure detectable treatment approved by road authority.*

LEGEND:

- *Sidewalk*
- *Detectable warning surface (DWS)*
- *Level area (Turning space/landing)*
  Unobstructed 4.5' x 4.5'

  With obstruction 4.5' x 5.5' (longer dimension in direction of pedestrian street crossing).

  For the purposes of this application, a maximum 2.0% finished surface slope (for drainage) measured perpendicular in two directions is considered level.
- *4'x4' clear space*
- ⇦ *Cross slope 1.5% maximum (Maximum 2.0% finished surface slope) (Normal sidewalk cross slope)*
- ⬅ *Running slope 7.5% maximum (Maximum 8.3% finished surface slope)*
- ⇦ *Counter slope 4.0% maximum ascending or descending (Maximum 5.0% finished surface slope) (Slope as required for drainage)*

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

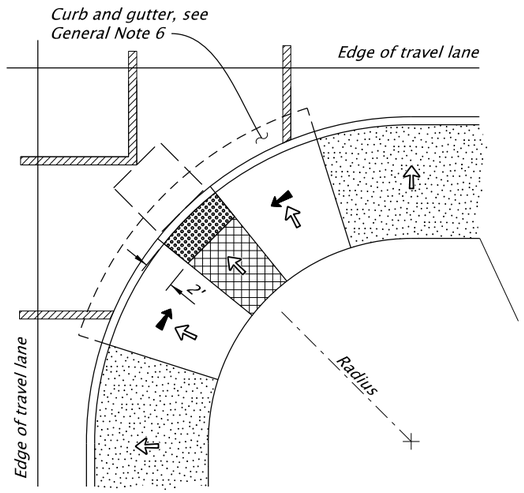
PARALLEL CURB RAMP

2024

DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

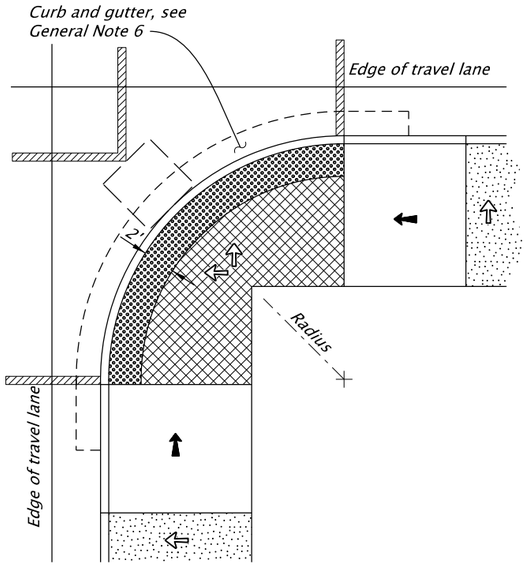
CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD920**

Effective Date: June 1, 2025 - November 30, 2025



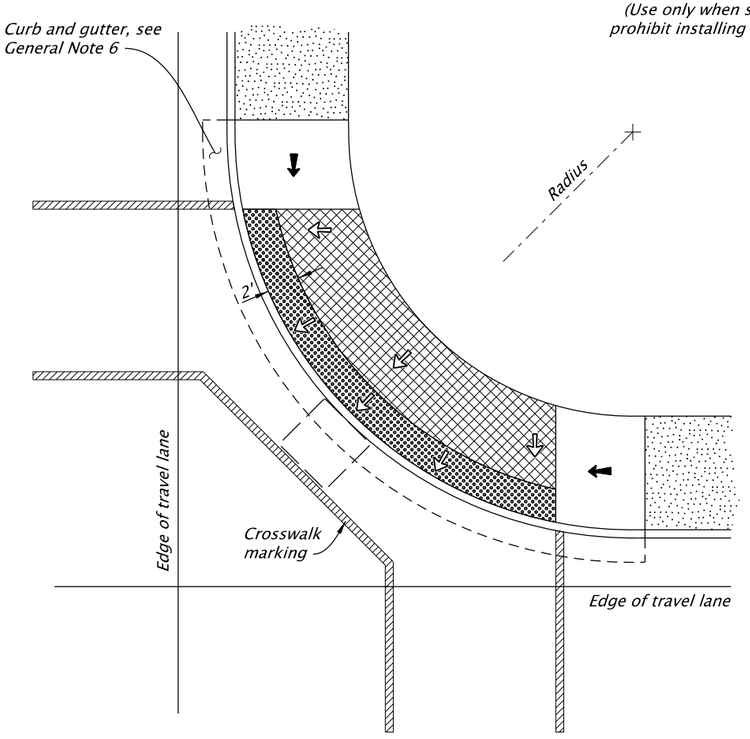
DIAGONAL PARALLEL CURB RAMP OPTION "PL-3"

(Use only when site constraints prohibit installing two curb ramps and both crosswalks are open)



DEPRESSED CURB RAMP SMALL RADIUS OPTION "PL-4"

(Use only when site constraints prohibit installing two curb ramps)



DEPRESSED CURB RAMP LARGE RADIUS OPTION "PL-5"

(Use only when site constraints prohibit installing two curb ramps)

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Curb ramp details are based on applicable ODOT Standards.*
2. *See project plans for details not shown. See drawings RD700 and RD701 for curbs. See drawings RD720 and RD721 for sidewalks. See drawings RD902 through RD908 for detectable warning surface installation details. See drawing RD920 for parallel curb ramp details.*
3. *Tooled dummy joints are required at all curb ramp slope break lines. See drawing RD722.*
4. *Curb ramp slopes shown are relative to the true level horizon (zero bubble).*
5. *Place an inlet at upstream side of curb ramp or perform other approved design mitigation. Check the gutter flow depth at curb ramp locations to assure that the design flood does not overtop the back of sidewalk.*
6. *On or along state highways, curb and gutter is required at curb ramps. Curb and gutter shall be flush with the adjacent pavement.*
7. *Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.*
8. *Only use curb ramp options allowed by jurisdiction. Single ramps requires design exception on or along state highways.*

LEGEND:

- *Marked or intended crossing location*
- *Sidewalk*
- *Detectable warning surface (DWS)*
- *Level area (Turning space/landing)*
  Unobstructed 4.5' x 4.5'

  With obstruction 4.5' x 5.5' (longer dimension in direction of pedestrian street crossing).

  For the purposes of this application, a maximum 2.0% finished surface slope (for drainage) measured perpendicular in two directions is considered level.
- *Cross slope 1.5% maximum*
  (Maximum 2.0% finished surface slope)
  (Normal sidewalk cross slope)
- *Running slope 7.5% maximum*
  (Maximum 8.3% finished surface slope)
- *4'x4' clear space*

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

PARALLEL CURB RAMP SINGLE RAMP

2024

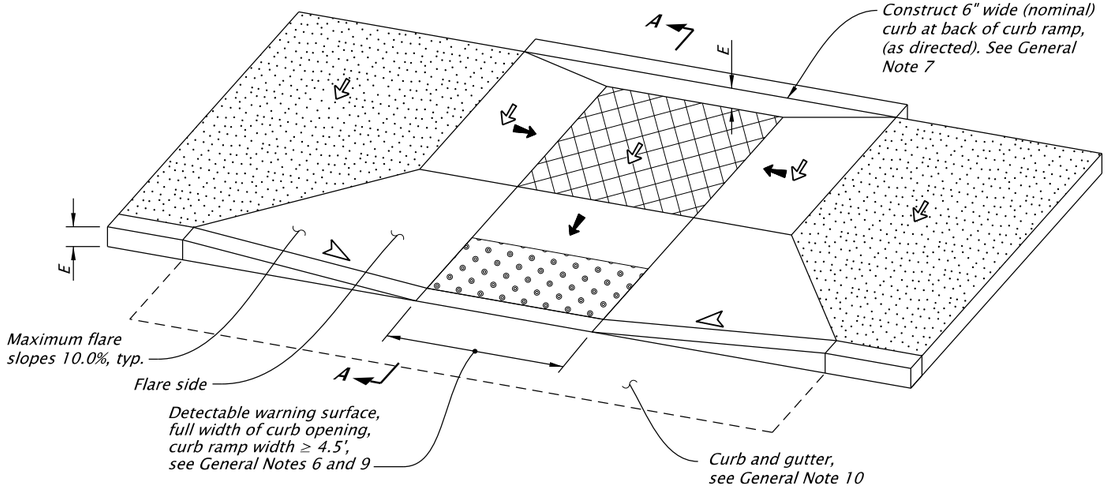
DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

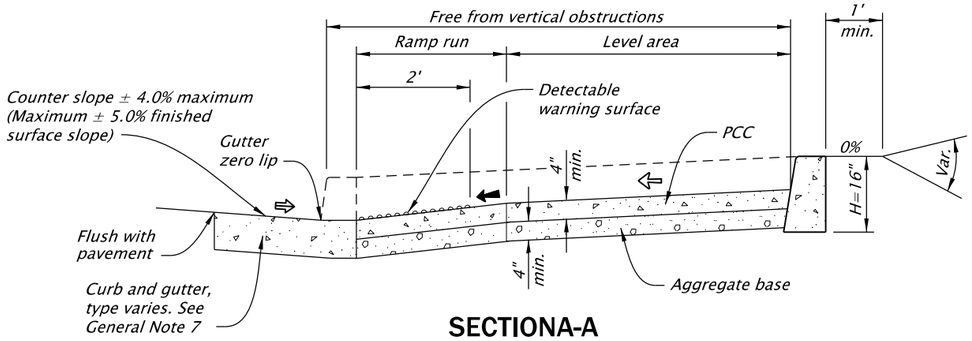
CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD922**

Effective Date: June 1, 2025 - November 30, 2025

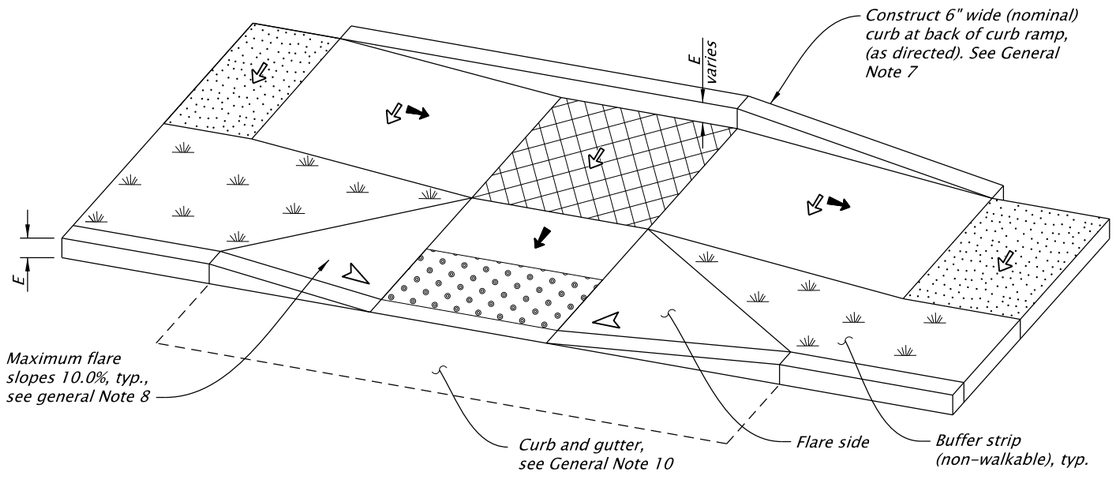
10-JAN-2025

RD922.dgn





SECTIONA-A



COMBINATION CURB RAMP DETAILS

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Curb ramp details are based on applicable ODOT Standards.*
2. *See project plans for details not shown. See drawings RD700 and RD701 for curbs. See drawings RD720 and RD721 for sidewalks. See drawings RD902 through RD908 for detectable warning surface installation details.*
3. *Site conditions normally require a project specific design. See project plans for details not shown.*
4. *Tooled dummy joints are required at all curb ramp slope break lines. See drawing RD722.*
5. *Curb ramp slopes shown are relative to the true level horizon (zero bubble).*
6. *Place detectable warning surface at the back of curb for a minimum depth of 2 feet in the direction of pedestrian travel, full width of curb ramp opening that is adjacent to traffic.*
7. *Place an inlet at upstream side of curb ramp or perform other approved design mitigation. Check the gutter flow depth at curb ramp locations to assure that the design flood does not overtop the back of sidewalk.*
8. *Return curb may be provided in lieu of flared slope only if protected from traverse travel by softscape, see drawing RD721. Return curb shall not reduce width of approaching sidewalk.*
9. *Curb ramps for shared use paths intersecting a roadway shall be full width of path, excluding flares. When a curb ramp is used to provide bicycle access from a roadway to a sidewalk, the curb ramp opening will be greater than or equal to 8' feet wide. See drawing RD909 for additional details.*
10. *On or along state highways, curb and gutter is required at curb ramps. Curb and gutter shall be flush with the adjacent pavement.*
11. *Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.*

LEGEND:

- *Sidewalk*
- *Detectable warning surface (DWS)*
- *Level area (Turning space/landing)*
  Unobstructed 4.5' x 4.5'
  With obstruction 4.5' x 5.5' (longer dimension in direction of pedestrian street crossing).
  For the purposes of this application, a maximum 2.0% finished surface slope (for drainage) measured perpendicular in two directions is considered level.
- *Cross slope 1.5% maximum (Maximum 2.0% finished surface slope) (Normal sidewalk cross slope)*
- *Running slope 7.5% maximum (Maximum 8.3% finished surface slope)*
- *Counter slope 4.0% maximum ascending or descending (Maximum 5.0% finished surface slope) Slope as required for drainage*
- *Flare slope (Maximum 10% 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

COMBINATION CURB RAMP

2024

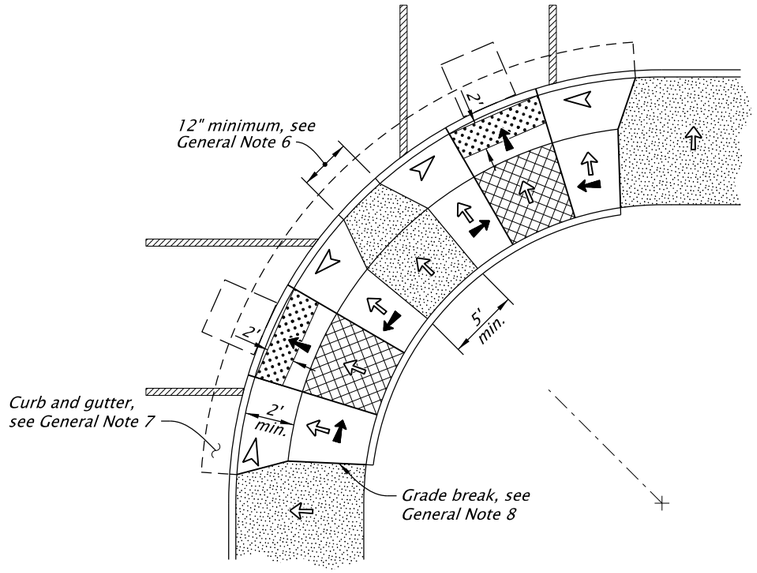
DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD930**

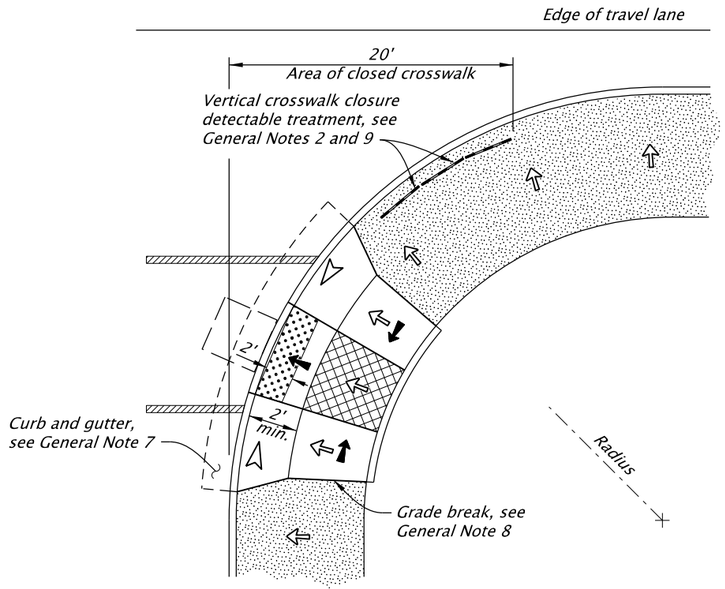
Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

RD930.dgn



COMBINATION CURB RAMP OPTION "CC-1"



COMBINATION CURB RAMP WITH CROSSWALK CLOSURE OPTION "CC-2"

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Curb ramp details are based on applicable ODOT Standards.*
2. *See project plans for details not shown. See drawings RD700 and RD701 for curbs. See drawings RD720 and RD721 for sidewalks. See drawings RD902 through RD908 for detectable warning surface installation details. See drawing RD930 for combination curb ramp details. See drawing TM240 for crosswalk closure detail.*
3. *Site conditions normally require a project specific design. See project plans for details not shown.*
4. *Tooled dummy joints are required at all curb ramp slope break lines. See drawing RD722.*
5. *Curb ramp slopes shown are relative to the true level horizon (zero bubble).*
6. *When two curb ramps are immediately adjacent, the curb exposure (E) between the adjacent side flares may range between 3 inches and full design exposure.*
7. *On or along state highways, curb and gutter is required at curb ramps. Curb and gutter shall be flush with the adjacent pavement.*
8. *Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.*
9. *Install crashworthy vertical crosswalk closure detectable treatment approved by road authority.*

LEGEND:

- *Marked or intended crossing location*
- *Sidewalk*
- *Detectable warning surface*
- *Level area (Turning space/landing)*
  Unobstructed 4.5' x 4.5'

  With obstruction 4.5' x 5.5' (longer dimension in direction of pedestrian street crossing).

  For the purposes of this application, a maximum 2.0% finished surface slope (for drainage) measured perpendicular in two directions is considered level.
- *Cross slope 1.5% maximum*
  (Maximum 2.0% finished surface slope)
  (Normal sidewalk cross slope)
- *Running slope 7.5% max.*
  (Maximum 8.3% finished surface slope)
- *Flare slope*
  (Maximum 10% finished surface slope)
- *4'x4' clear space*

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

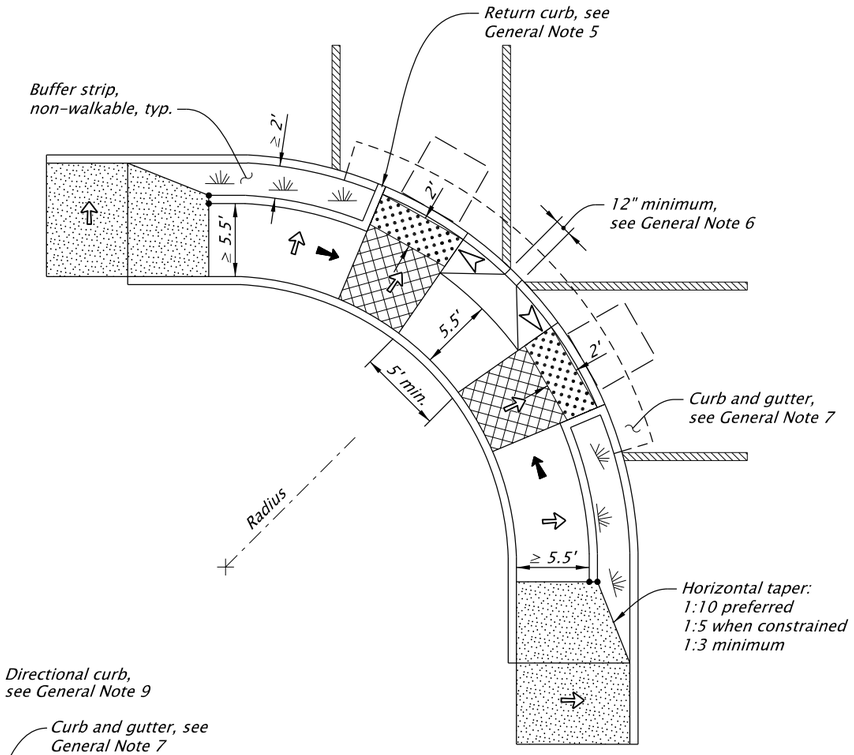
COMBINATION CURB RAMP

2024

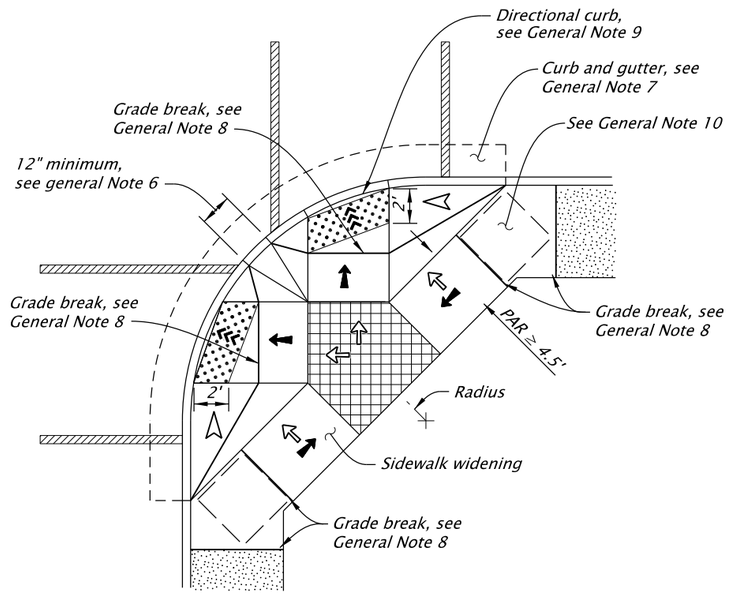
DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD932**

Effective Date: June 1, 2025 - November 30, 2025



COMBINATION CURB RAMP WITH LANDSCAPE BUFFER STRIP OPTION "CC-3"



FOR NARROW SIDEWALKS OPTION "CC-4"

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Curb ramp details are based on applicable ODOT Standards.*
2. *See project plans for details not shown. See drawings RD700 and RD701 for curbs. See drawings RD720 and RD721 for sidewalks. See drawings RD902 through RD908 for detectable warning surface installation details. See drawing RD930 for combination curb ramp details.*
3. *Tooled dummy joints are required at all curb ramp grade break lines. See drawing RD722.*
4. *Curb ramp slopes shown are relative to the true level horizon (zero bubble).*
5. *Return curb may be provided in lieu of flared slope only if protected from traverse travel by softscaping, see drawing RD721. Return curb shall not reduce width of approaching sidewalk.*
6. *When two curb ramps are immediately adjacent, the curb exposure (E) between the adjacent side flares may range between 3 inches and full design exposure.*
7. *On or along state highways, curb and gutter is required at curb ramps. Curb and gutter shall be flush with the adjacent pavement.*
8. *Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.*
9. *Directional curb and depressed curb with running slope less than 5.0% finished surface slope in the direction of travel. See drawing RD905.*
10. *Contiguous surface shall be planar and free of all grade breaks.*

LEGEND:

- *Marked or intended crossing location*
- *Sidewalk*
- *Detectable warning surface (DWS)*
- *Level area (Turning space/landing)*
  Unobstructed 4.5' x 4.5'
  With obstruction 4.5' x 5.5' (longer dimension in direction of pedestrian street crossing).
  For the purposes of this application, a maximum 2.0% finished surface slope (for drainage) measured perpendicular in two directions is considered level.
- *Zero curb exposure*
- *Running slope 4.0% maximum (Maximum 4.9% finished surface slope)*
- *Cross slope 1.5% maximum (Maximum 2.0% finished surface slope) (Normal sidewalk cross slope)*
- *Running slope 7.5% maximum (Maximum 8.3% finished surface slope)*
- *Flare slope (Maximum 10% finished surface slope)*
- *4'x4' clear space*
- PAR *Pedestrian Access Route*

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

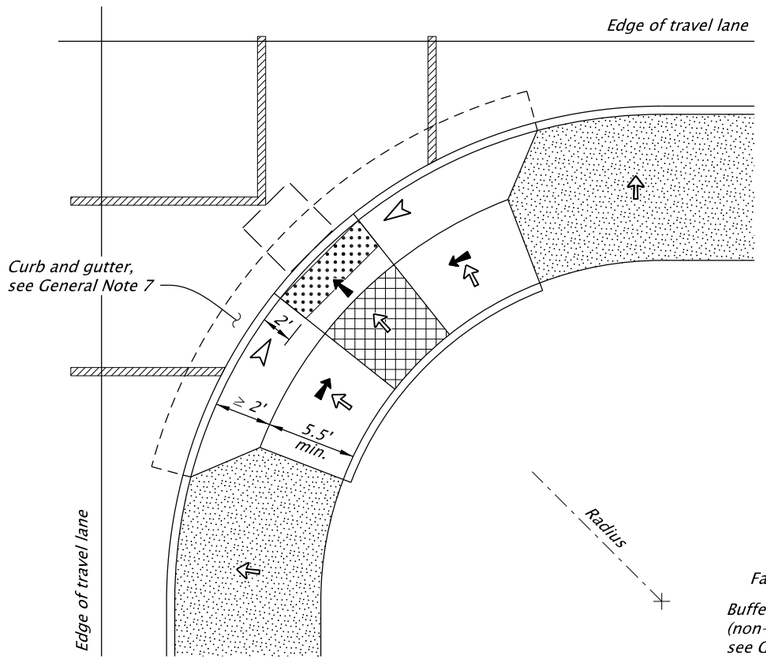
COMBINATION CURB RAMP

2024

DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

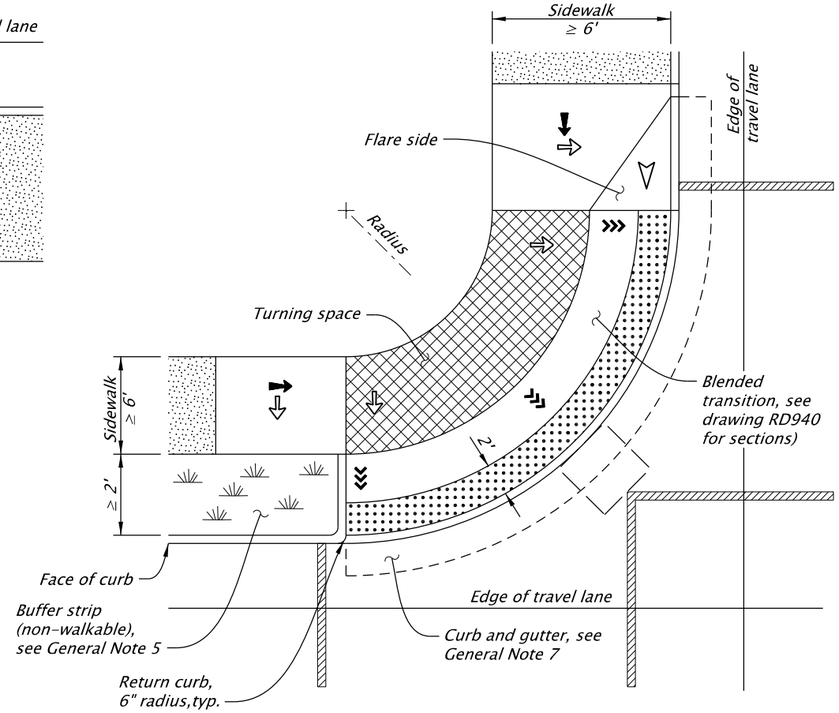
CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD936**

Effective Date: June 1, 2025 - November 30, 2025



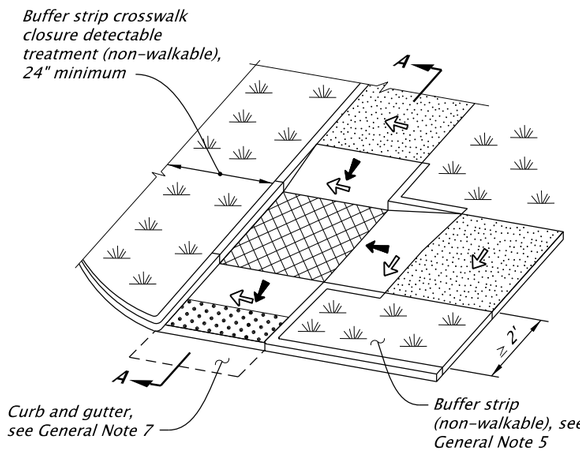
DIAGONAL COMBINATION CURB RAMP OPTION "CC-10"

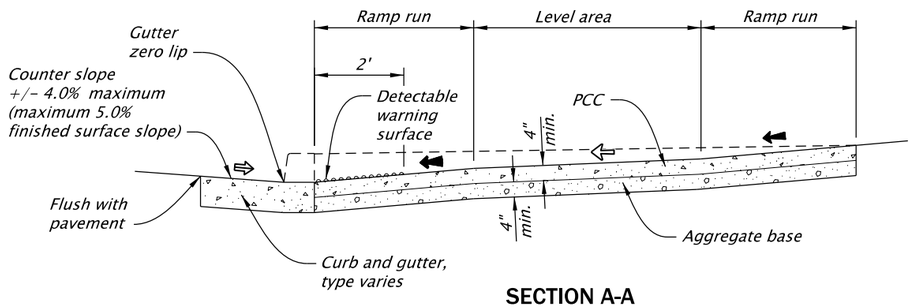
(Use only when site constraints prohibit installing two curb ramps and both crosswalks are open)



BLENDED TRANSITION COMBINATION CURB RAMP OPTION "CC-11"

(Use only when site constraints prohibit installing two curb ramps)
(Do not use with closed crosswalk at corner)





SECTION A-A

DIRECTIONAL COMBINATION CURB RAMP OPTION "CC-12"

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Curb ramp details are based on applicable ODOT Standards.*
2. *See project plans for details not shown. See drawings RD700 and RD701 for curbs. See drawings RD720 and RD721 for sidewalks. See drawings RD902 through RD908 for detectable warning surface installation details. See drawing RD930 for combination curb ramp details.*
3. *Tooled dummy joints are required at all curb ramp slope break lines. See drawing RD722.*
4. *Curb ramp slopes shown are relative to the true level horizon (zero bubble).*
5. *Return curb may be provided in lieu of flared slope only if protected from traverse travel by softscape. See drawing RD721. Return curb shall not reduce width of approaching sidewalk.*
6. *Only use curb ramp options allowed by jurisdiction. Single ramps require design exception on or along state highway.*
7. *On or along state highways, curb and gutter is required at curb ramps. Curb and gutter shall be flush with the adjacent pavement.*
8. *Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.*

LEGEND:

- *Marked or intended crossing location*
- *Sidewalk*
- *Detectable warning surface (DWS)*
- *Level area (Turning space/landing)*
  Unobstructed 4.5' x 4.5'
  With obstruction 4.5' x 5.5' (longer dimension in direction of pedestrian street crossing).
  For the purposes of this application, a maximum 2.0% finished surface slope (for drainage) measured perpendicular in two directions is considered level.
- *Cross slope 1.5% maximum*
  (Maximum 2.0% finished surface slope)
  (Normal sidewalk cross slope)
- *Running slope 4.0% maximum*
  (Maximum 4.9% finished surface slope)
- *Running slope 7.5% maximum*
  (Maximum 8.3% finished surface slope)
- *Counter slope 4.0% maximum ascending or descending*
  (Maximum 5.0% finished surface slope)
  Slope as required for drainage
- *Flare slope*
  (Maximum 10.0% finished surface slope)
- *4'x4' clear space*

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

COMBINATION CURB RAMP SINGLE RAMP

2024

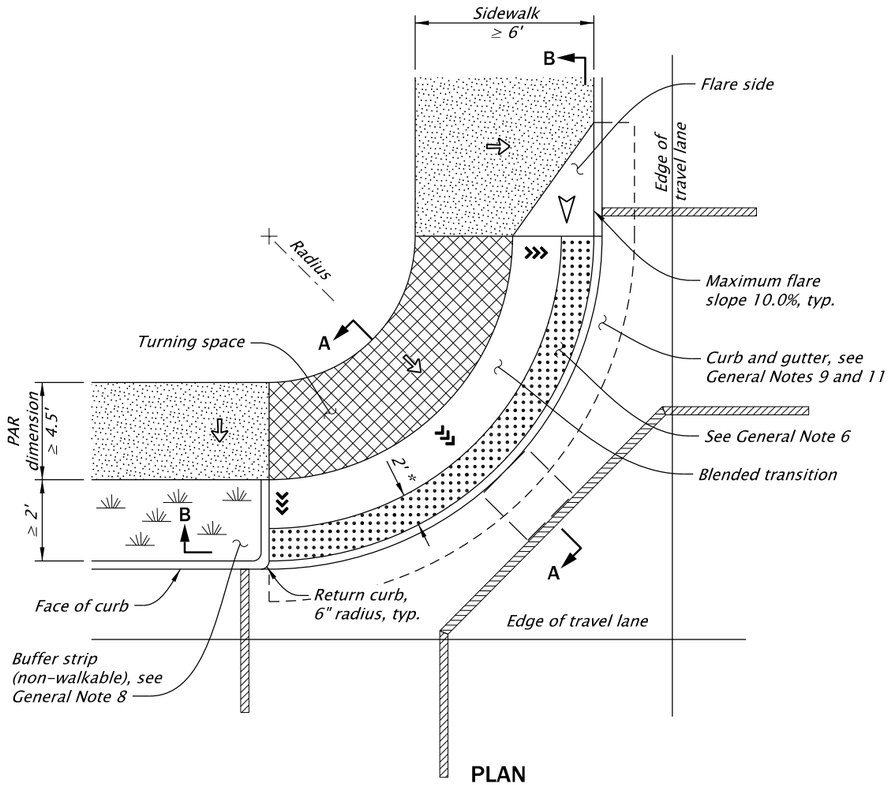
DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD938**

10-JAN-2025

RD938.dgn

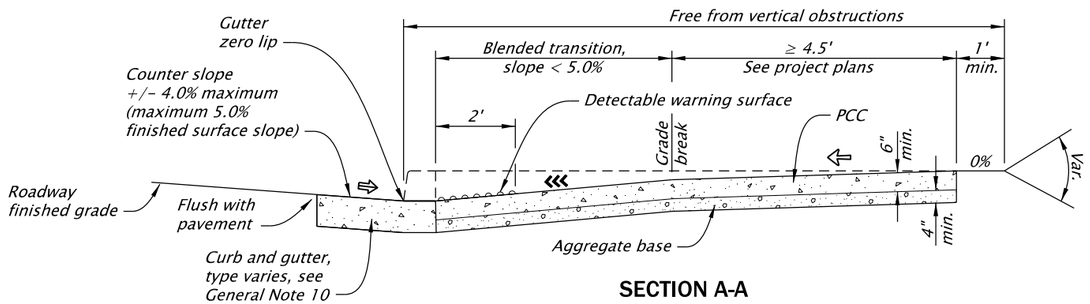
Effective Date: June 1, 2025 - November 30, 2025



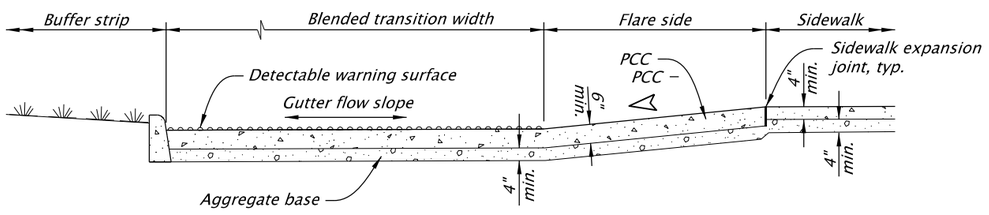
PLAN

DIAGONAL BLENDED TRANSITION CURB RAMP

(Do not use with closed crosswalk at corner)



SECTION A-A



SECTION B-B

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Curb ramp details are based on applicable ODOT Standards.*
2. *See project plans for details not shown. See drawings RD700 and RD701 for curbs. See drawings RD720 and RD721 for sidewalks. See drawings RD902 through RD908 for detectable warning surface installation details.*
3. *Site conditions normally require a project specific design. See project plans for details not shown.*
4. *Tooled dummy joints are required at all curb ramp slope break lines. See drawing RD722.*
5. *Curb ramp slopes shown are relative to the true level horizon (zero bubble).*
6. *Place detectable warning surface at the back of curb for a minimum depth of 2 feet in the direction of pedestrian travel full width of curb ramp opening that is adjacent to traffic.*
7. *Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.*
8. *Return curb may be provided in lieu of flared slope only if protected from traverse by softscape, see drawing RD721. Return curb shall not reduce width of approaching sidewalk.*
9. *Curb ramps for shared use paths intersecting a roadway shall be full width of path, excluding flares. When a curb ramp is used to provide bicycle access from a roadway to a sidewalk, the curb ramp opening will be greater than or equal to 8 feet wide.*
10. *Place an inlet at upstream side of curb ramp or perform other approved design mitigation. Check the gutter flow depth at curb ramp locations to assure that the design flood does not overtop the back of sidewalk.*
11. *On or along state highways, curb and gutter is required at curb ramps. Curb and gutter shall be flush with the adjacent pavement.*
12. *Only use curb ramp options allowed by jurisdiction. Single ramp requires design exceptions on or along state highways.*

LEGEND:

- *Marked or intended crossing location*
- *Sidewalk*
- *Detectable warning surface (DWS)*
- *Level area (Turning space/landing)*
  - *Unobstructed 4.5' x 4.5'*
  - *With obstruction 4.5' x 5.5' (longer dimension in direction of pedestrian street crossing).*
  - *For the purposes of this application, a maximum 2.0% finished surface slope (for drainage) measured perpendicular in two directions is considered level.*
- *Cross slope 1.5% maximum (Maximum 2.0% finished surface slope) (Normal sidewalk cross slope)*
- *Running slope 4.0% maximum (Maximum 4.9% finished surface slope)*
- *Counter slope 4.0% maximum ascending or descending (Maximum 5.0% finished surface slope) Slope as required for drainage*
- *Flare slope (Maximum 10.0% finished surface slope)*
- *4'x4' clear space*

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

BLENDED TRANSITION CURB RAMP SINGLE RAMP

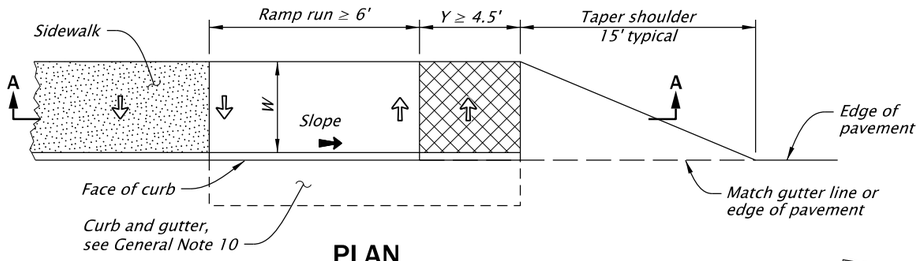
2024

DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

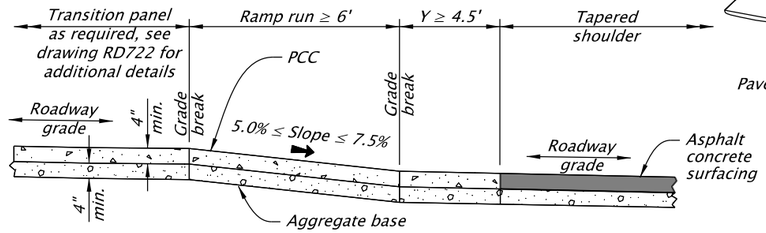
CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD940**

10-JAN-2025

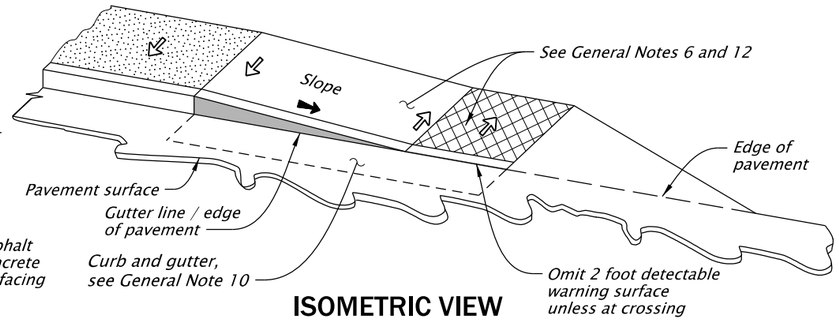
RD950.dgn



PLAN

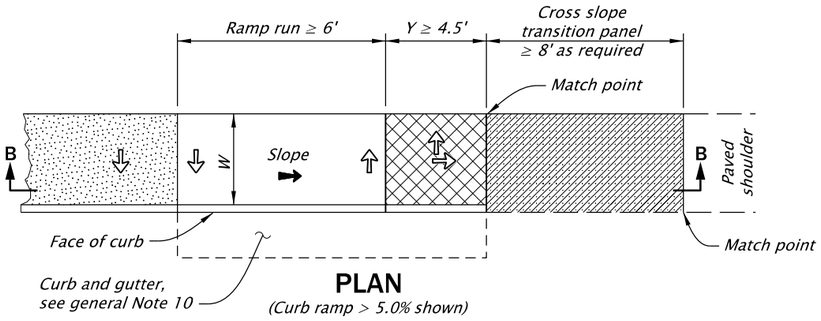


SECTION A-A

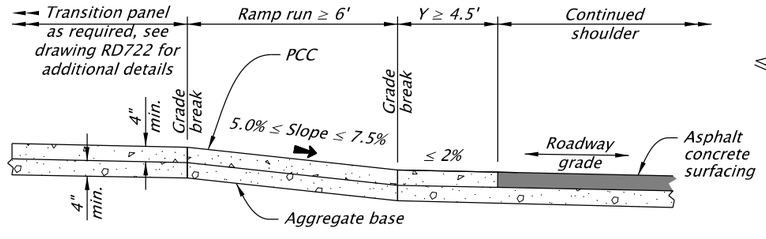


ISOMETRIC VIEW

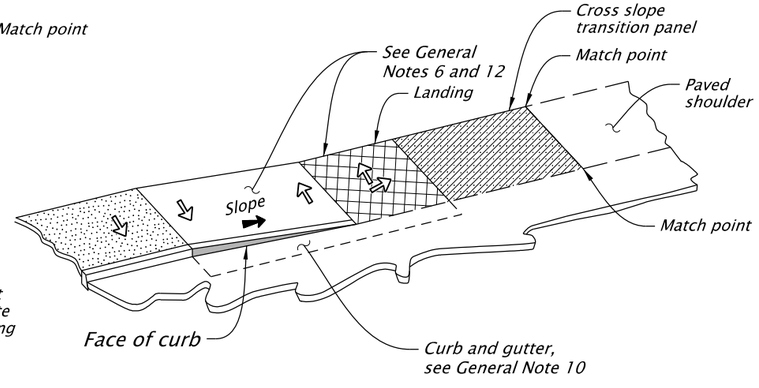
TAPER OPTION "EW-1"



PLAN
(Curb ramp > 5.0% shown)



SECTION B-B



ISOMETRIC VIEW

SHOULDER OPTION "EW-2"

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Curb ramp details are based on applicable ODOT Standards.*
2. *See project plans for details not shown. See drawings RD700 and RD701 for curbs. See drawings RD720 and RD721 for sidewalks. See drawing RD722 for transition panel details. See drawings RD902 through RD908 for detectable warning surface installation details.*
3. *Site conditions normally require a project special design. See project plans for details not shown.*
4. *Tooled dummy joints are required at all curb ramp grade break lines, See drawing RD722.*
5. *Curb ramp slopes shown are relative to the true level horizon (zero bubble).*
6. *Place detectable warning surface (DWS) as directed when end of walk ramp coincides with a crosswalk. Install a 2-foot minimum depth DWS full width of pedestrian way, in the direction of pedestrian travel entering the crosswalk at the edge of the roadway.*
7. *Place an inlet at upstream side of curb ramp or perform other approved design mitigation. Check the gutter flow depth at curb ramp locations to assure that the design flood does not overtop the back of sidewalk.*
8. *When a shared use path terminates, the curb ramp shall be the full width of the path, the turning space "Y" dimension should be minimum 8 feet wide to enable bicycles to ride from ramp to shoulder.*
9. *Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.*
10. *On or along state highways, curb and gutter is required at curb ramps. Curb and gutter shall be flush with the adjacent pavement.*
11. *All end of sidewalk options can be used for curved or tangent roadway sections. Superelated roadways require site specific details.*
12. *When the slope of the ramp run is greater than or equal to 5.0 percent, a minimum landing space of 4.5 feet x 4.5 feet with a 1.5 percent maximum slope (2.0 percent finished surface) is required at the bottom of the curb ramp. See Section A-A and Section B-B.*

LEGEND:

Sidewalk

Transition panel

Level area (Turning space/landing)
Unobstructed 4.5' x 4.5'

With obstruction 4.5' x 5.5' (longer dimension in direction of pedestrian street crossing).

For the purposes of this application, a maximum 2.0% finished surface slope (for drainage) measured perpendicular in two directions is considered level.

Cross slope 1.5% maximum
(Maximum 2.0% finished surface slope)
(Normal sidewalk cross slope)

Running slope 7.5% maximum
(Maximum 8.3% finished surface slope)

W *New construction sidewalk width. See contract plans for dimension.*

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

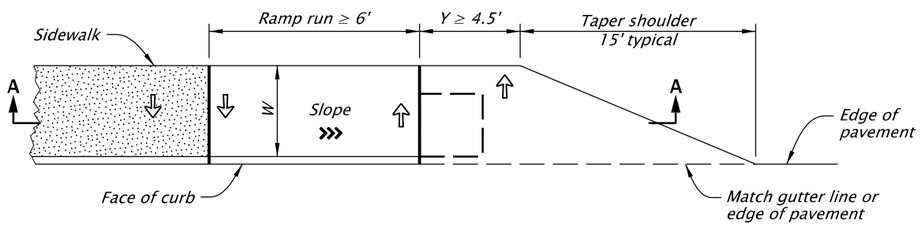
END OF WALK CURB RAMP

2024

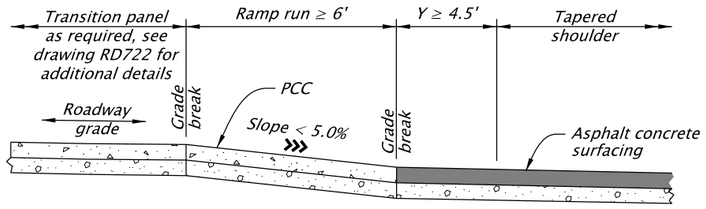
DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD950**

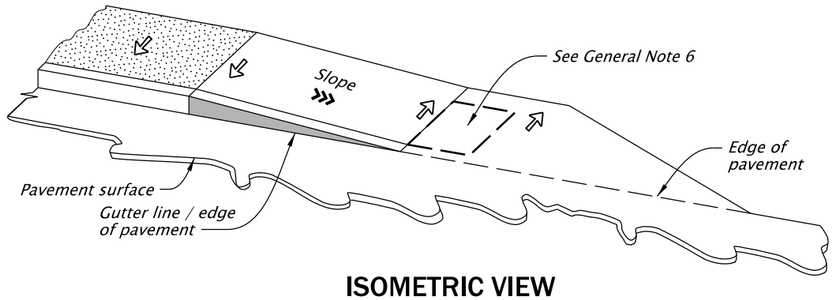
Effective Date: June 1, 2025 - November 30, 2025



PLAN

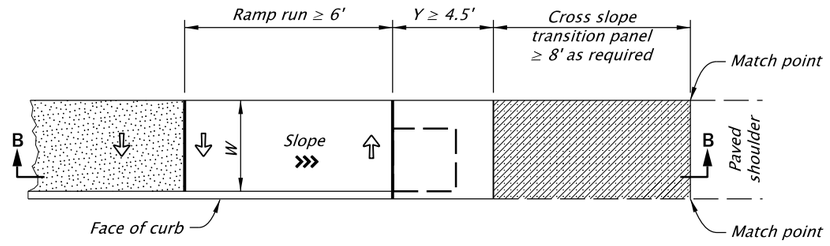


SECTION A-A

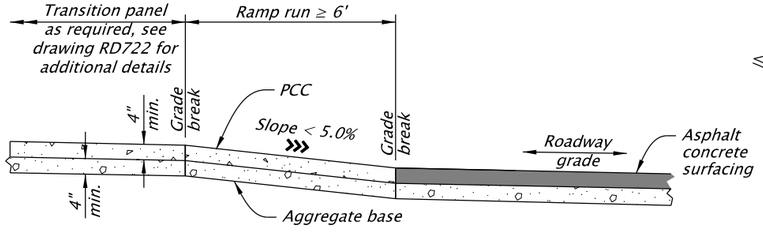


ISOMETRIC VIEW

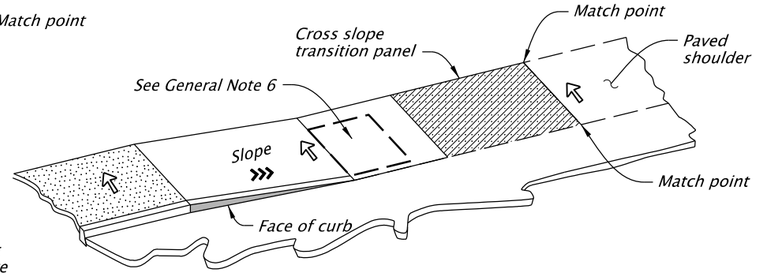
BLENDED TRANSITION TAPER OPTION "EW-3"



PLAN



SECTION B-B



ISOMETRIC VIEW

BLENDED TRANSITION SHOULDER OPTION "EW-4"

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Curb ramp details are based on applicable ODOT Standards.*
2. *See project plans for details not shown. See drawings RD700 and RD701 for curbs. See drawings RD720 and RD721 for sidewalks. See drawing RD722 for transition panel details. See drawings RD902 through RD908 for detectable warning surface installation details.*
3. *Site conditions normally require a project special design. See project plans for details not shown.*
4. *Tooled dummy joints are required at all curb ramp grade break lines. See drawing RD722.*
5. *Curb ramp slopes shown are relative to the true level horizon (zero bubble).*
6. *Place detectable warning surface (DWS) as directed when end of walk ramp coincides with a crosswalk. Install a 2-foot minimum depth DWS full width of pedestrian way, in the direction of pedestrian travel entering the crosswalk at the edge of the roadway.*
7. *Place an inlet at upstream side of curb ramp or perform other approved design mitigation. Check the gutter flow depth at curb ramp locations to assure that the design flood does not overtop the back of sidewalk.*
8. *When a shared use path terminates, the curb ramp shall be the full width of the path, the turning space Y dimension should be minimum 8 feet wide to enable bicycles to ride from ramp to shoulder.*
9. *Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.*
10. *All end of sidewalk options can be used for curved or tangent roadway sections. Superelated roadways require site specific details.*

LEGEND:

- *Sidewalk*
- *Transition panel*
- *Detectable warning surface (DWS)*
- *Cross slope 1.5% maximum (Maximum 2.0% finished surface slope) (Normal sidewalk cross slope)*
- *Running slope 4.0% maximum (Maximum 4.9% finished surface slope)*
- W — *New construction sidewalk width. See contract plans for dimension.*
- *4'x4' clear space*

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

END OF WALK CURB RAMP

2024

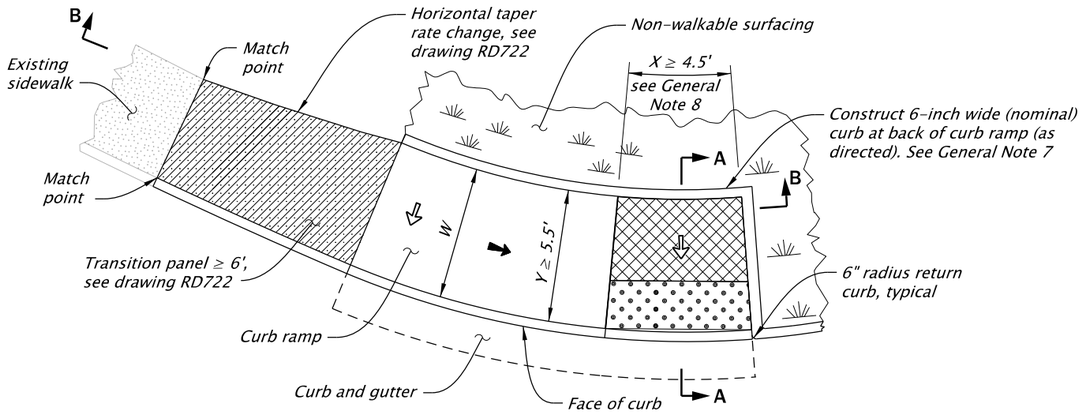
DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD952**

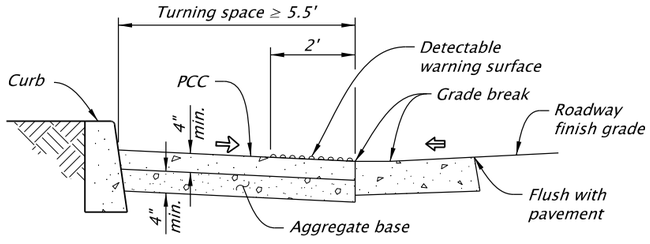
Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

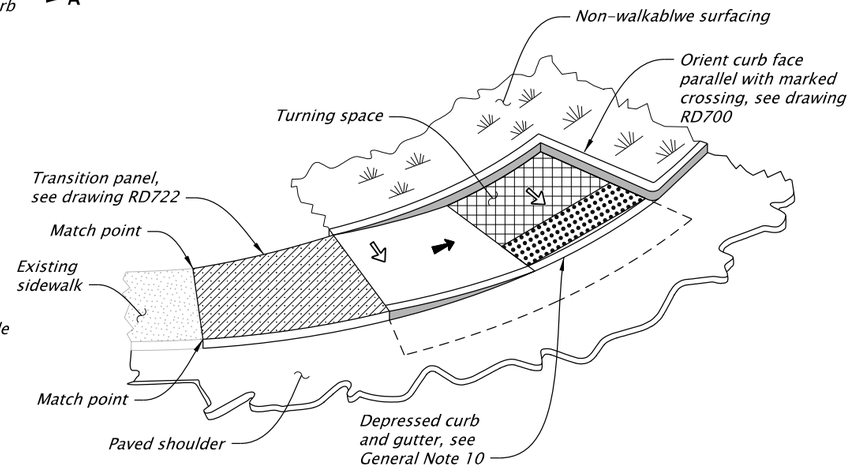
RD952.dgn



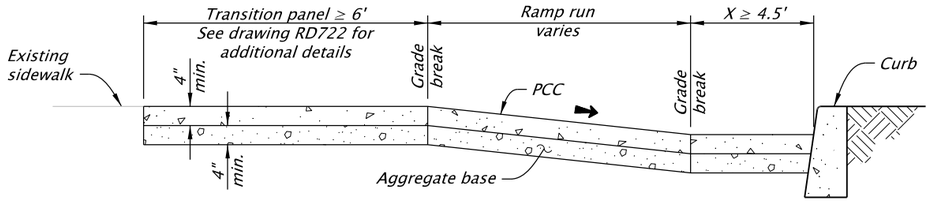
PLAN



SECTION A-A



ISOMETRIC VIEW



SECTION B-B

CURBED OPTION

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Curb ramp details are based on applicable ODOT applicable Standards.*
2. *See project plans for details not shown. See drawings RD700 and RD701 for curbs. See drawings RD720 and RD721 for sidewalks. See drawing RD722 for transition panel details. See drawings RD902 through RD908 for detectable warning surface installation details. See drawing RD920 for parallel curb ramp details.*
3. *Site conditions normally require a project special design. See project plans for details not shown.*
4. *Tooled dummy joints are required at all curb ramp grade break lines. See drawing RD722.*
5. *Curb ramp slopes shown are relative to the true level horizon (zero bubble).*
6. *Place detectable warning surface at the back of curb for a minimum depth of 2 feet in the direction of pedestrian travel, full width of curb ramp opening, that is adjacent to traffic.*
7. *Place an inlet at upstream side of curb ramp or perform other approved design mitigation. Check the gutter flow depth at curb ramp locations to assure that the design flood does not overtop the back of sidewalk.*
8. *When a shared use path terminates, the curb ramp shall be the full width of the path, the turning space X dimension should be minimum 8 feet wide to enable bicycles to ride from ramp to shoulder.*
9. *Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.*
10. *On or along state highways, curb and gutter is required at curb ramps. Curb and gutter shall be flush with the adjacent pavement.*
11. *Unique curb ramp option can be used for curved or tangent roadway sections. Superelevated roadways require a site specific detail.*

LEGEND:

- *Sidewalk*
- *Transition panel*
- *Detectable warning surface (DWS)*
- *Level area (Turning space/landing)*
  Unobstructed 4.5' x 4.5'
  With obstruction 4.5' x 5.5' (longer dimension in direction of pedestrian street crossing).
  For the purposes of this application, a maximum 2.0% finished surface slope (for drainage) measured perpendicular in two directions is considered level.
- W *New construction sidewalk width. See contract plans for dimension.*
- ⇦ *Cross slope 1.5% maximum (Maximum 2.0% finished surface slope) (Normal sidewalk cross slope)*
- ⇦ *Counter slope 4.0% maximum ascending or descending (Maximum 5.0% finished surface slope) Slope as required for drainage*
- ⬅ *Running slope 7.5% maximum (Maximum 8.3% 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

UNIQUE CURB RAMP

2024

DATE	REVISION DESCRIPTION
01-2025	UPDATED CAD STANDARDS

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **RD960**

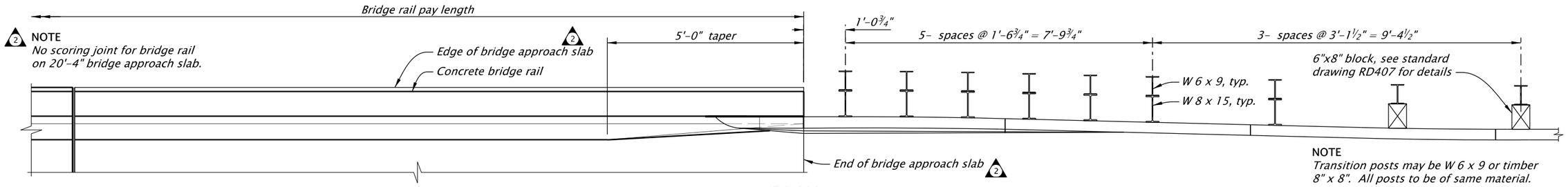
10-JAN-2025

RD960.dgn

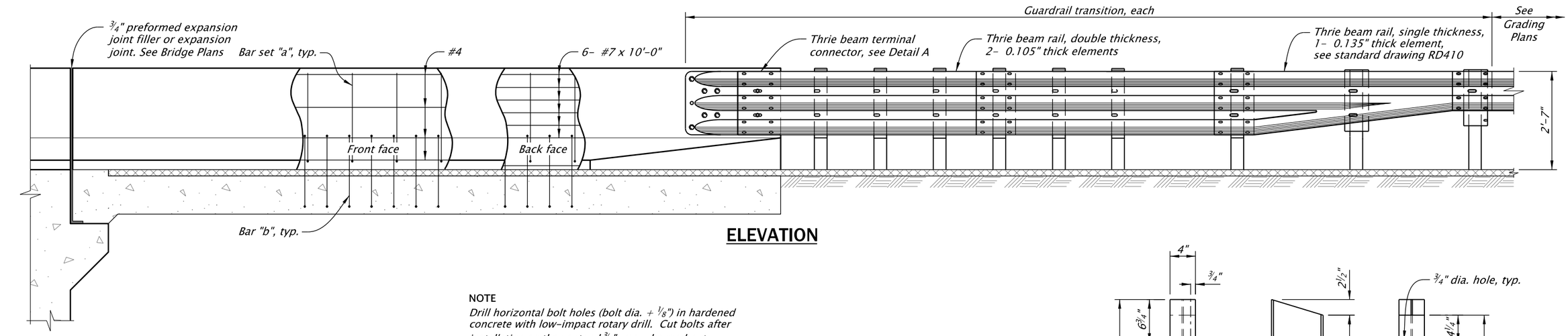
Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

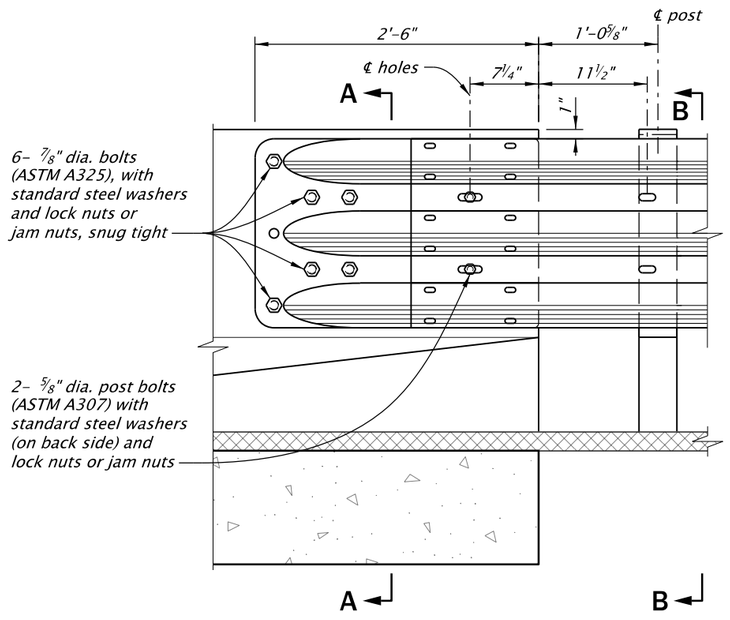
BR203.dgn



PLAN



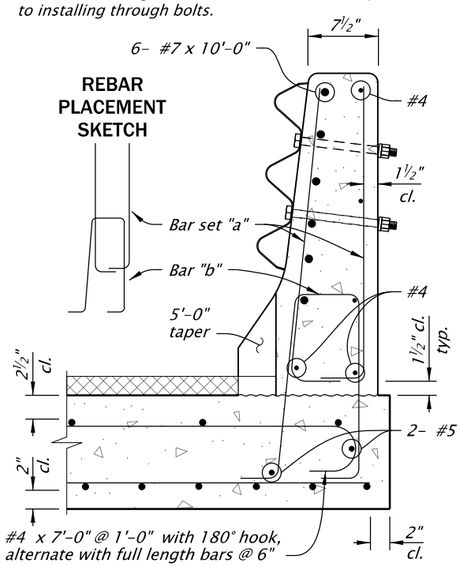
ELEVATION



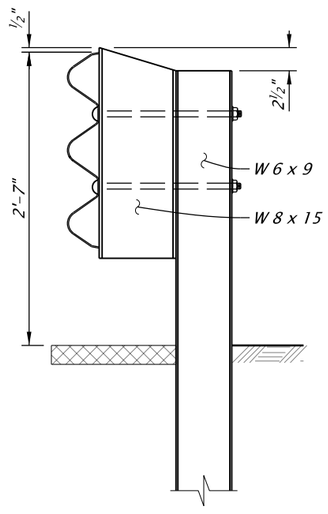
DETAIL A

NOTE
Drill horizontal bolt holes (bolt dia. + 1/8") in hardened concrete with low-impact rotary drill. Cut bolts after installation so they extend 3/4" max. beyond nut. Grind smooth and cold galvanize.

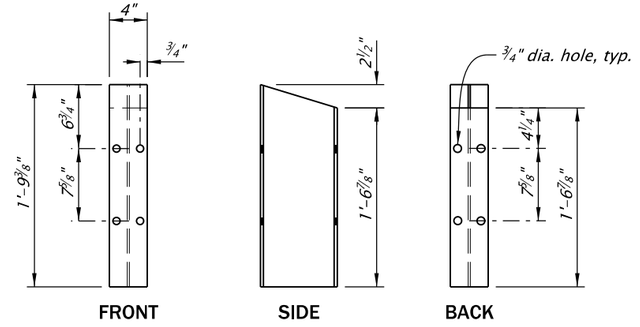
Contractor's option (or similar) to use greased PVC sleeves for through bolts. Remove PVC sleeves prior to installing through bolts. 3



SECTION A-A



SECTION B-B



THRIE BEAM BLOCK (W 8 x 15)

GENERAL NOTES
Provide steel for wide-flange posts conforming to AASHTO M183 (ASTM A36).

Hot dip galvanize after fabrication. 1 2

Accompanied by drawings BR165, BR200, 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

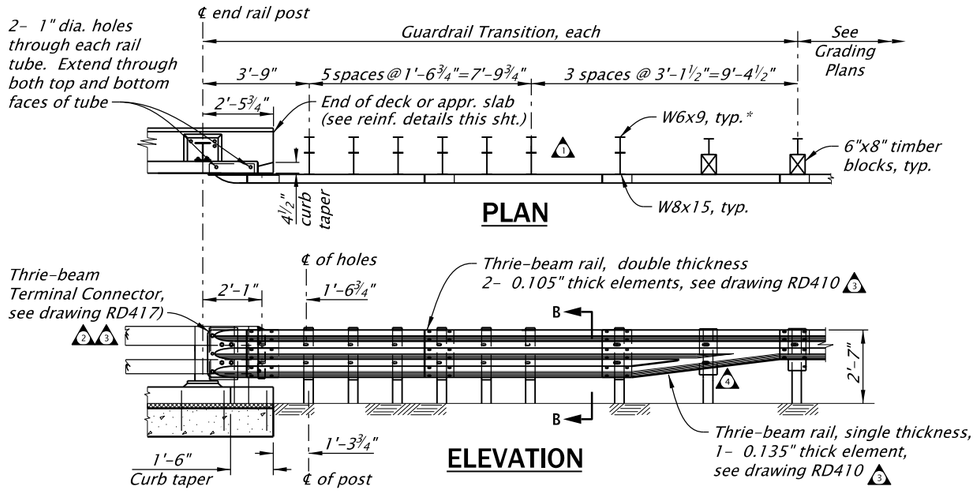
TRANSITION TYPE "F" CONCRETE RAIL TO GUARDRAIL

2024

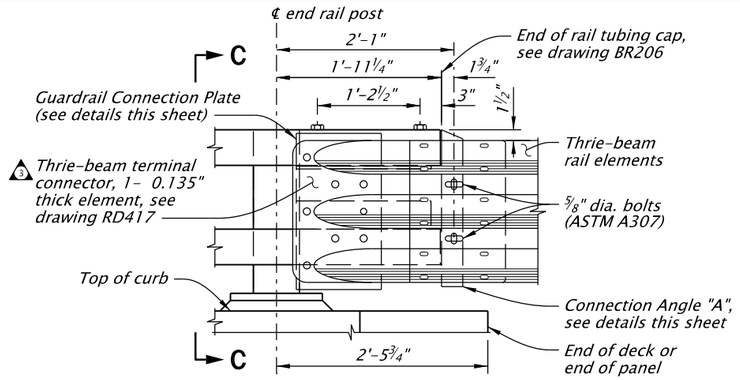
	DATE	REVISION DESCRIPTION
1	10-2020	Update: Changed RD480 to RD482
2	01-2023	Revised accompanied by dwg references, General text revisions.
3	01-2025	Added contractor option note; CAD standards updates

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **BR203**

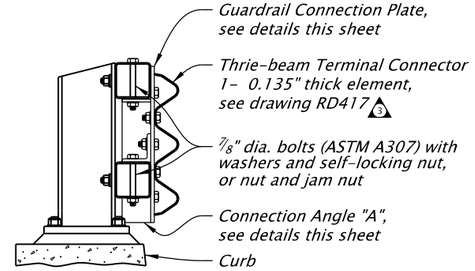
Effective Date: June 1, 2025 - November 30, 2025



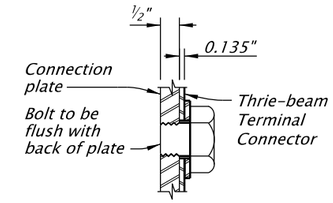
* Transition posts may be steel W6x9 or timber 8"x 8". All posts to be of same material. See drawing BR203 "Thrie-beam Block" for details.



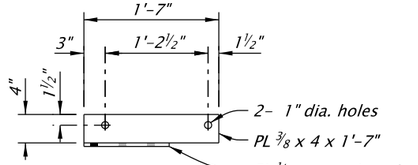
ELEVATION: TRANSITION CONNECTION



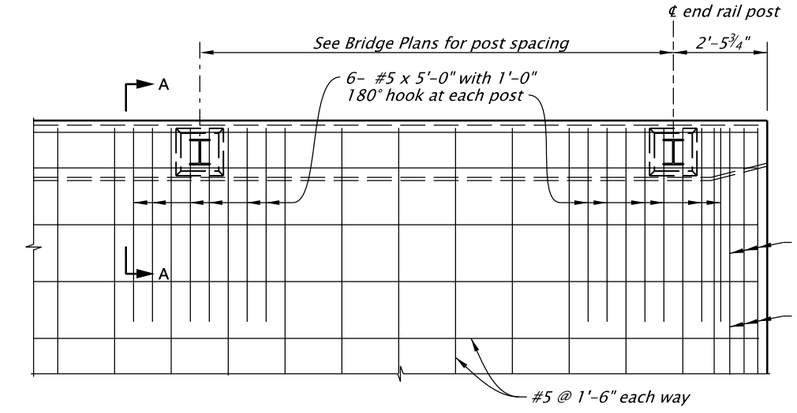
SECTION C-C



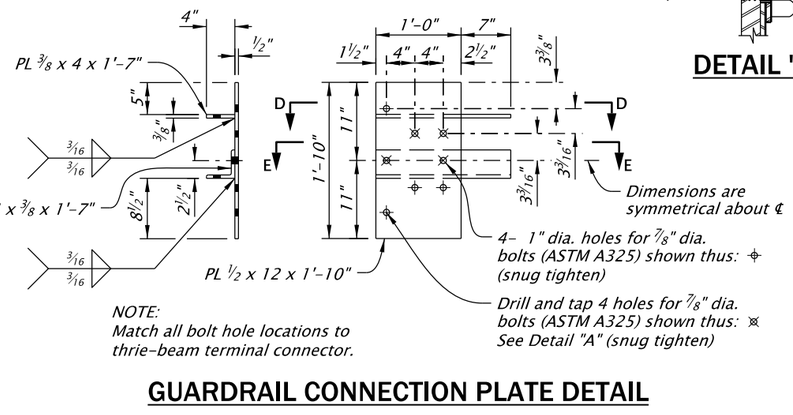
DETAIL "A"



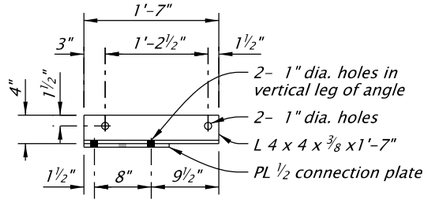
SECTION D-D



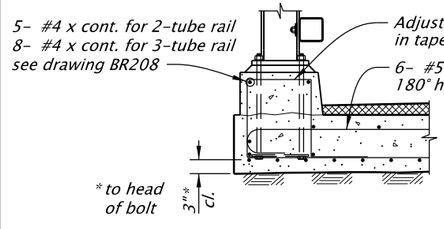
⚠1 APPROACH SLAB TOP REBAR AT RAIL POSTS



GUARDRAIL CONNECTION PLATE DETAIL



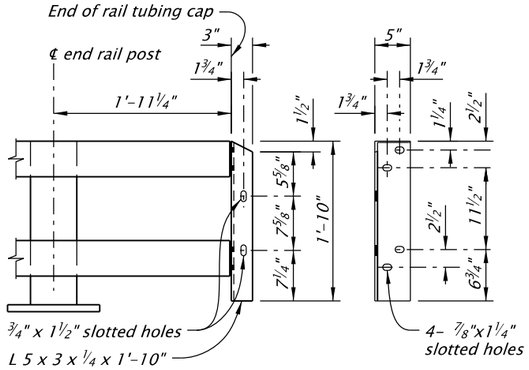
SECTION E-E



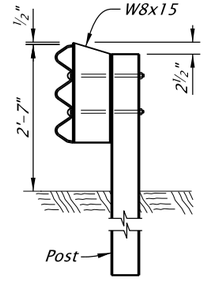
SECTION A-A

NOTES: ⚠1
For approach slab reinforcement not shown, see project plans.

For rail and curb details not shown, see drawing 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 ⚠3 ACCOMPANIED BY DWGS.:
BR203, BR206, RD401, RD402, RD407, RD408, RD417, RD412

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

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.

OREGON STANDARD DRAWINGS

2-TUBE CURB MOUNT RAIL TRANSITION

2024

DATE	REVISION DESCRIPTION
01-2023	Revised accompanied by dwg references, General text revisions.
01-2024	General text revisions.
07-2024	General text revisions.
01-2025	Thrie-beam transition revised; CAD standards updates

CALC. BOOK NO. 4057 & 4058 | SDR DATE 10-JAN-2025 | **BR207**

Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

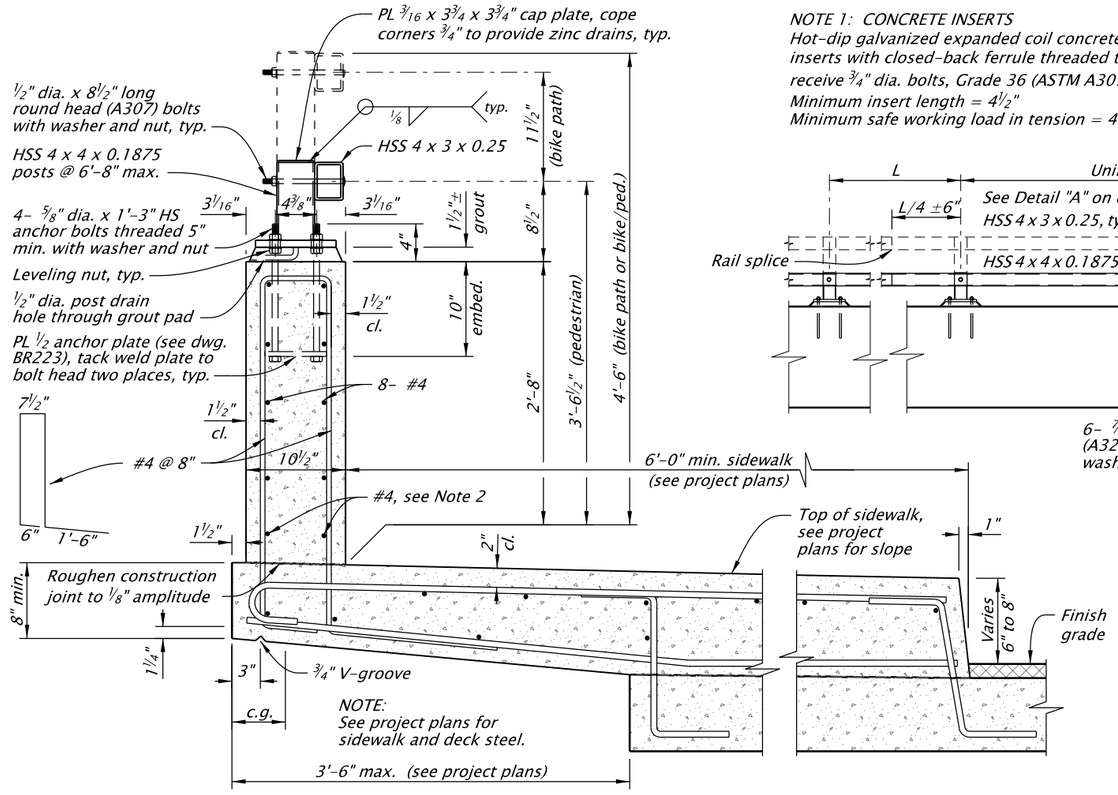
BR207.dgn

10-JAN-2025

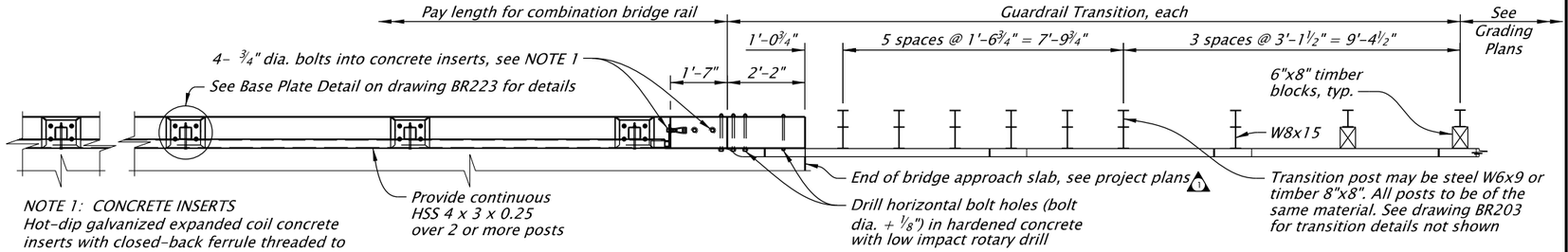
BR216.dgn

ESTIMATED QUANTITIES

		3'-6½" rail	4'-6" rail
Concrete Volume	(ft³/ft)	2.26	2.26
Reinforcement Weight	(lbs/ft)	23.39	23.39
Structural Steel Weight	(lbs/ft)	18.0	30.0
Total Rail Weight	(lbs/ft)	357	369
Center of Gravity	(cg, ft)	0.572	0.581



TYPICAL RAIL SECTION

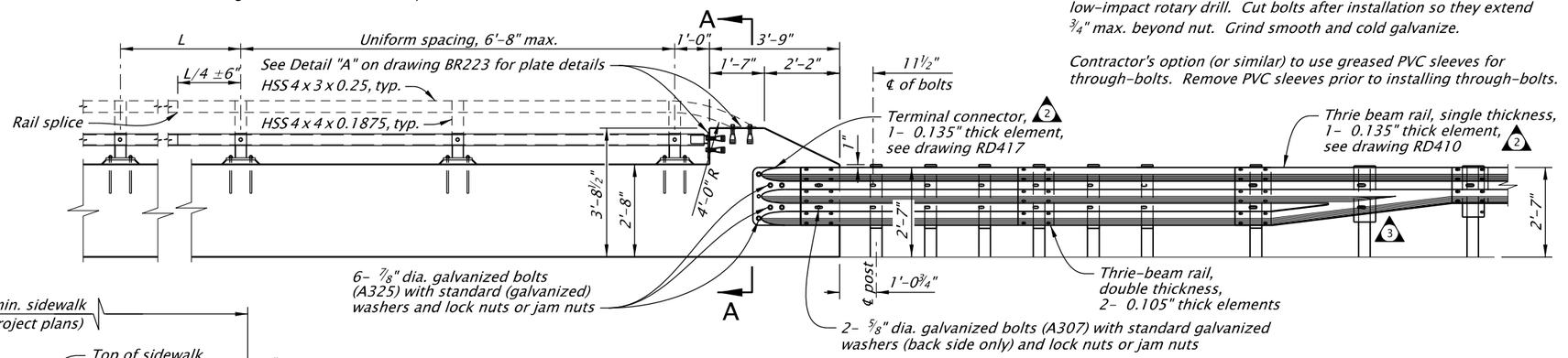


NOTE 1: CONCRETE INSERTS
Hot-dip galvanized expanded coil concrete inserts with closed-back ferrule threaded to receive 3/4" dia. bolts, Grade 36 (ASTM A307).
Minimum insert length = 4 1/2"
Minimum safe working load in tension = 4000 pounds

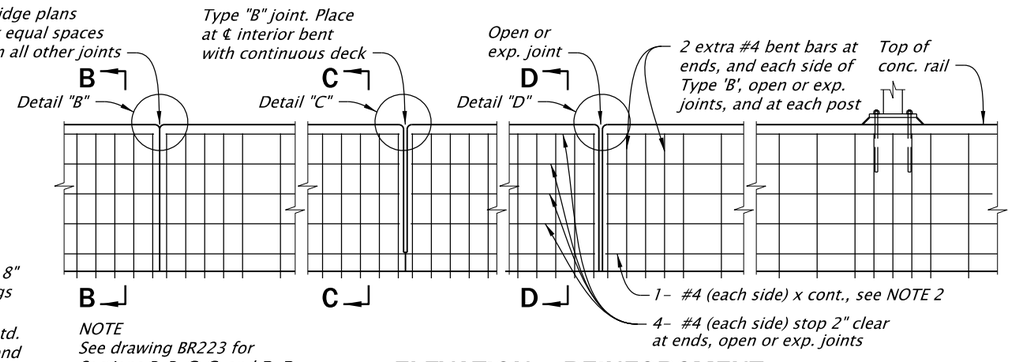
PLAN: TRANSITION RAIL DETAIL

NOTES:
Drill horizontal holes (bolt dia. + 1/8") in hardened concrete with low-impact rotary drill. Cut bolts after installation so they extend 3/4" max. beyond nut. Grind smooth and cold galvanize.

Contractor's option (or similar) to use greased PVC sleeves for through-bolts. Remove PVC sleeves prior to installing through-bolts.



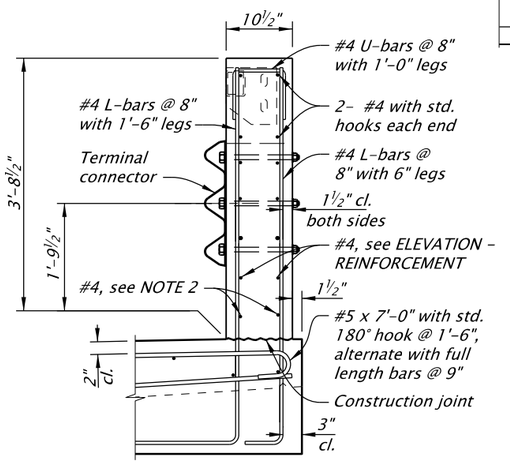
ELEVATION: TRANSITION RAIL DETAIL



NOTE 2
Continuous through scoring joints, stop 2" clear at ends and open or expansion joints.

NOTE
See drawing BR223 for Sections B-B, C-C, and D-D; and Details A, B, C, and D .

ELEVATION - REINFORCMENT



SECTION A-A

GENERAL NOTES:
Provide steel tubing conforming to ASTM A500, Grade B, A501 or A618.

Provide reinforcing steel conforming to ASTM A706, or AASHTO M31 (ASTM A615) Grade 60. Splice #4 bars 1'-4" min.

Provide concrete Class 3300 - 1 1/2 or 3/4.

Provide steel posts and plates conforming to AASHTO M183 (ASTM A36) unless otherwise noted.

Provide high strength anchor bolts (Grade 105) according to Oregon Standard Specification 02560.30 (b).

Construct rail (posts and parapet) normal to grade in the longitudinal direction and vertical in the transverse direction.

Hot-dip galvanize structural steel including fasteners after fabrication. Provide Galvanize-Control Silicon posts and horizontal rail steel tubing according to Oregon Standard Specification 02530.70. Tap nuts and inserts 0.021" oversize after galvanizing in accordance with ASTM A563.

Use 4'-6" height for bikeways when called for on project plans.

Accompanied by dwgs. BR203, BR223, RD401, RD402, RD407, RD408, RD410 2, RD417 2, 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

SIDEWALK MOUNTED COMBINATION BRIDGE RAIL

2024

DATE	REVISION DESCRIPTION
01-2023	Revised accompanied by dwg references, General text revisions.
07-2024	General text revisions.
01-2025	Thrie-beam transition revised; CAD standards updates

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | BR216

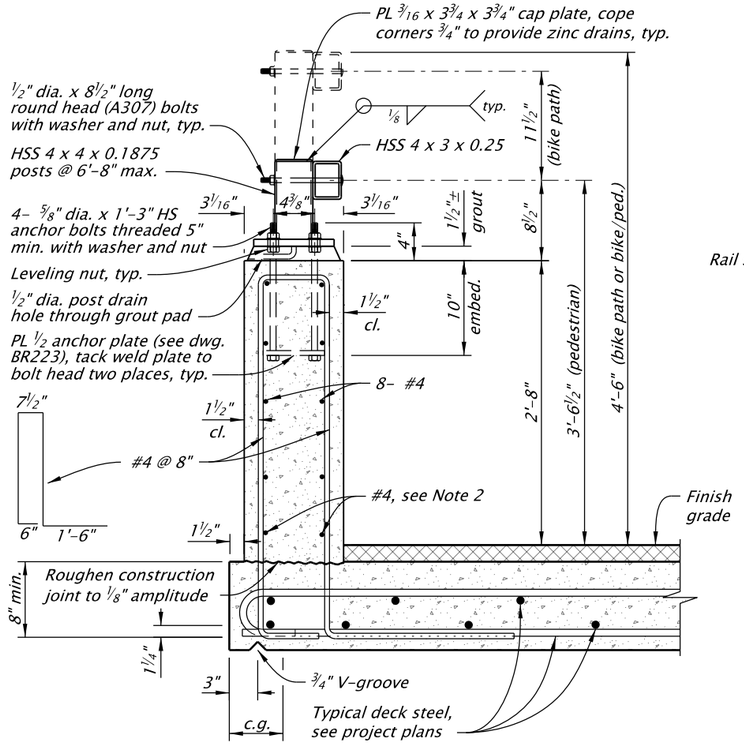
Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

BR220.dgn

ESTIMATED QUANTITIES

		3'-6½" rail	4'-6" rail
Concrete Volume	(ft³/ft)	2.26	2.26
Reinforcement Weight	(lbs/ft)	23.39	23.39
Structural Steel Weight	(lbs/ft)	18.0	30.0
Total Rail Weight	(lbs/ft)	357	369
Center of Gravity	(cg, ft)	0.572	0.581



TYPICAL RAIL SECTION

GENERAL NOTES:
Provide steel tubing conforming to ASTM A500, Grade B, A501 or A618.

Provide reinforcing steel conforming to ASTM A706, or AASHTO M31 (ASTM A615) Grade 60. Splice #4 bars 1'-4" min.

Provide concrete Class 3300 - 1½ or ¾.

Provide steel posts and plates conforming to AASHTO M183 (ASTM A36) unless otherwise noted.

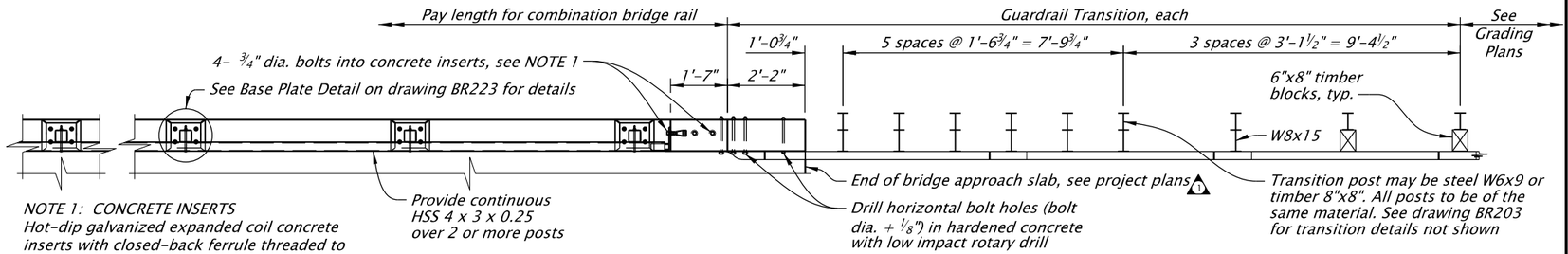
Provide high strength anchor bolts (Grade 105) according to Oregon Standard Specification 02560.30 (b).

Construct rail (posts and parapet) normal to grade in the longitudinal direction and vertical in the transverse direction.

Hot-dip galvanize structural steel including fasteners after fabrication. Provide Galvanize-Control Silicon posts and horizontal rail steel tubing according to Oregon Standard Specification 02530.70. Tap nuts and inserts 0.021" oversize after galvanizing in accordance with ASTM A563.

Use 4'-6" height for bikeways when called for on project plans.

Provide High Strength anchor bolts (Grade 105) according to Oregon Standard Specification 02560.30 (b).

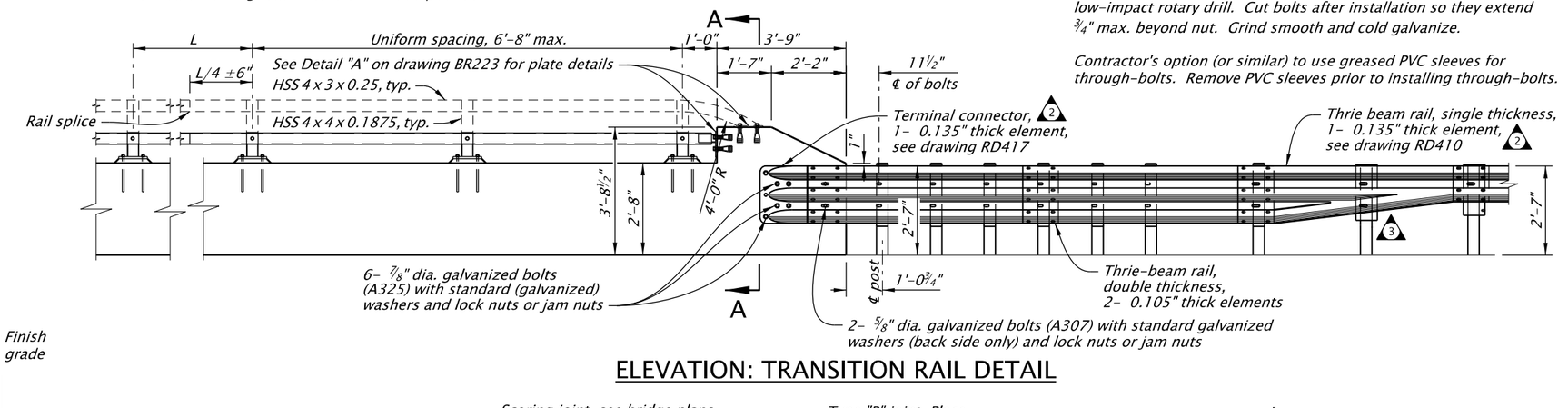


NOTE 1: CONCRETE INSERTS
Hot-dip galvanized expanded coil concrete inserts with closed-back ferrule threaded to receive ¾" dia. bolts, Grade 36 (ASTM A307).
Minimum insert length = 4½"
Minimum safe working load in tension = 4000 pounds

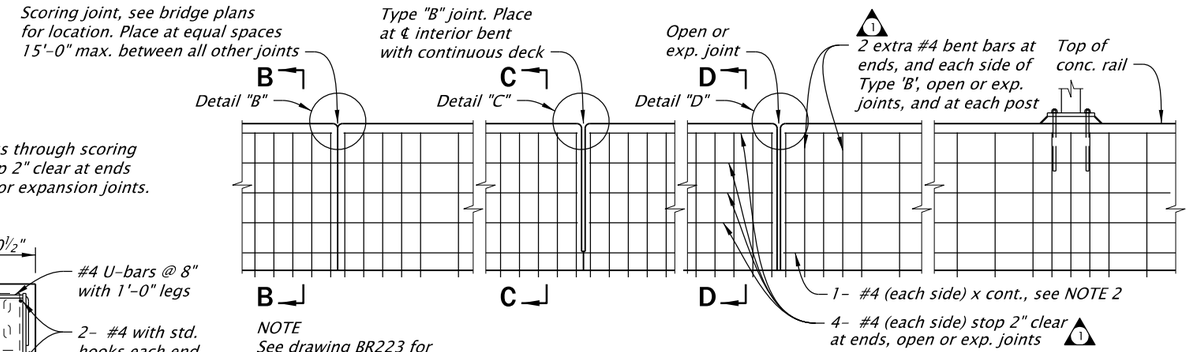
PLAN: TRANSITION RAIL DETAIL

NOTES:
Drill horizontal holes (bolt dia. + 1/8") in hardened concrete with low-impact rotary drill. Cut bolts after installation so they extend ¾" max. beyond nut. Grind smooth and cold galvanize.

Contractor's option (or similar) to use greased PVC sleeves for through-bolts. Remove PVC sleeves prior to installing through-bolts.



ELEVATION: TRANSITION RAIL DETAIL



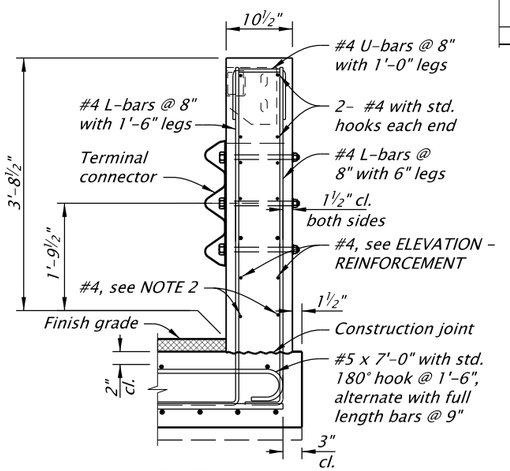
NOTE 2
Continuous through scoring joints, stop 2" clear at ends and open or expansion joints.

NOTE
See drawing BR223 for Sections B-B, C-C, and D-D; and Details A, B, C, and D .

ELEVATION - REINFORCMENT

2

Accompanied by drawings BR203, BR223, RD401, RD402, RD407, RD408, RD410, RD417, RD412



1 SECTION A-A

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

FLUSH MOUNTED COMBINATION BRIDGE RAIL

2024

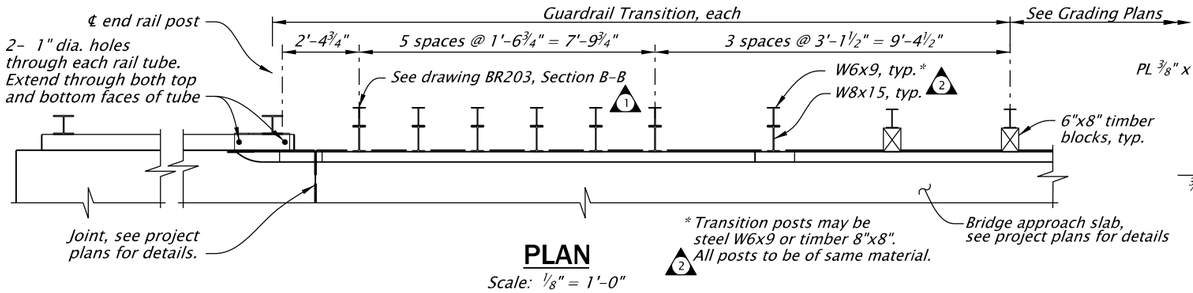
DATE	REVISION DESCRIPTION
01-2023	Revised accompanied by dwg references, General text revisions.
07-2024	General text revisions.
01-2025	Thrie-beam transition revised; CAD standards updates

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | BR220

Effective Date: June 1, 2025 - November 30, 2025

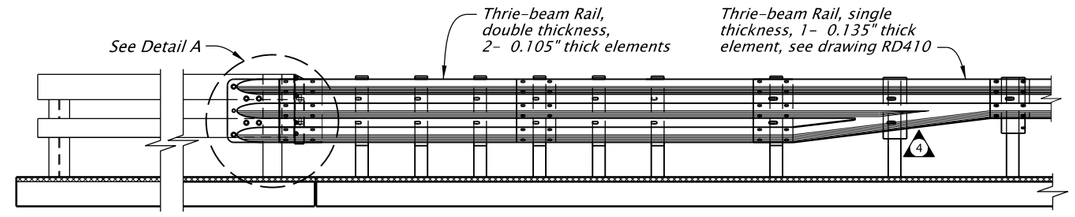
10-JAN-2025

BR230.dgn



PLAN

Scale: ⅛" = 1'-0"



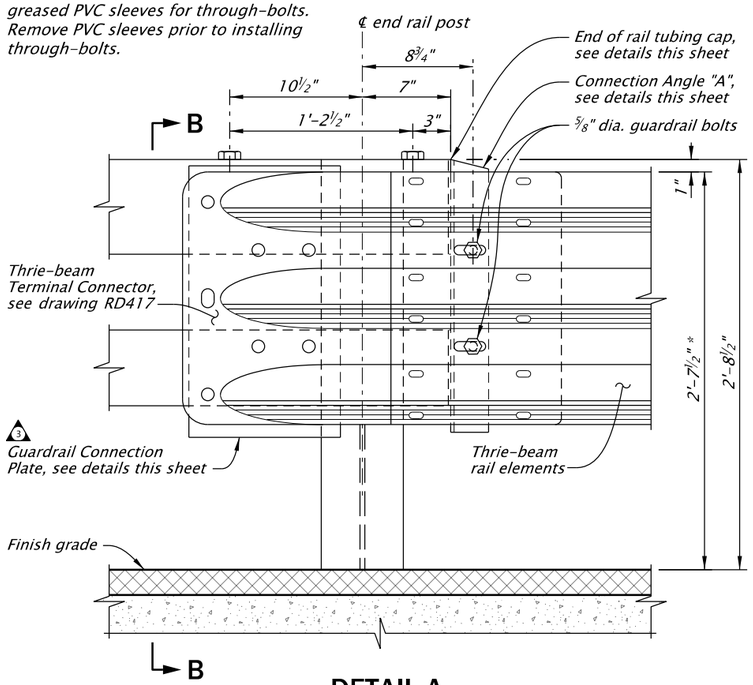
ELEVATION

Scale: ⅛" = 1'-0"

NOTES:

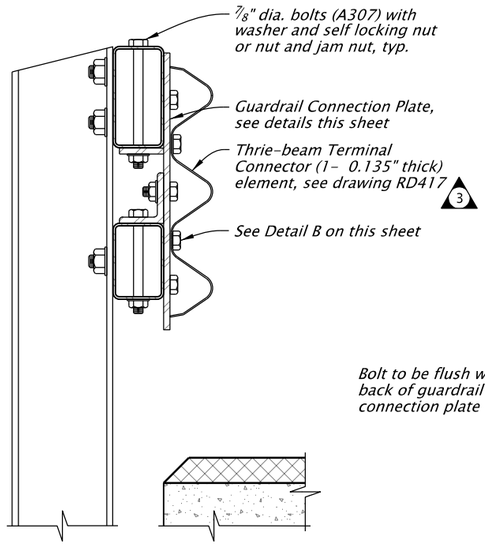
Drill horizontal holes (bolt dia. + ⅛") in hardened concrete with low-impact rotary drill. Cut bolts after installation so they extend ¾" max. beyond nut. Grind smooth and cold galvanize.

Contractor's option (or similar) to use greased PVC sleeves for through-bolts. Remove PVC sleeves prior to installing through-bolts.



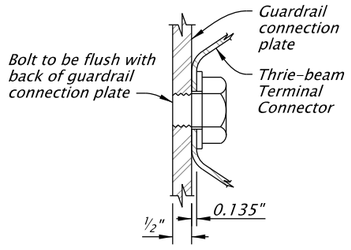
DETAIL A

Scale: 1" = 1'-0"



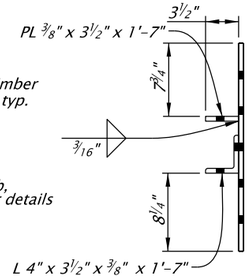
SECTION B-B

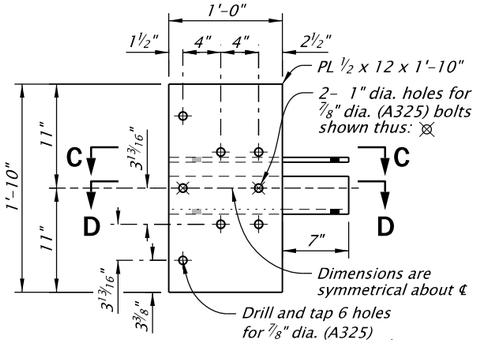
Scale: 1" = 1'-0"



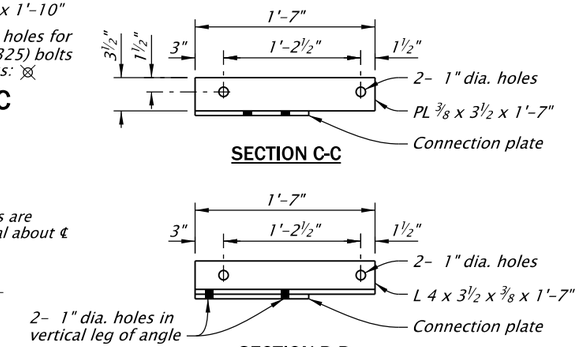
DETAIL B

Scale: 3" = 1'-0"



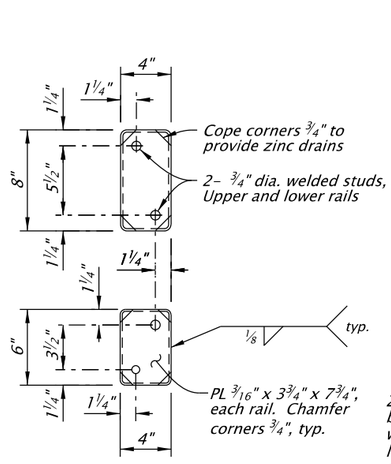


PLAN



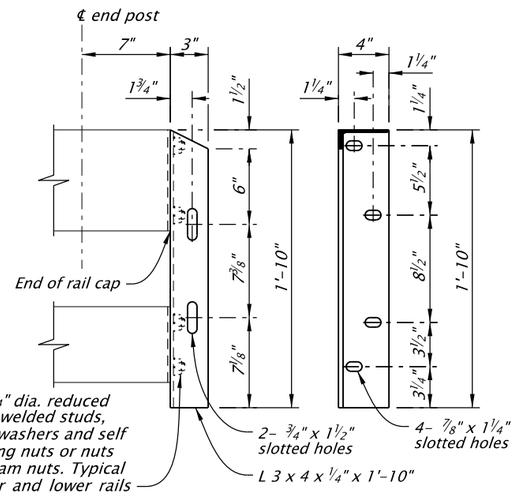
GUARDRAIL CONNECTION PLATE DETAILS

Scale: 1" = 1'-0"



UPPER AND LOWER RAILS

Scale: 1" = 1'-0"



CONNECTION ANGLE "A"

Scale: 1" = 1'-0"

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

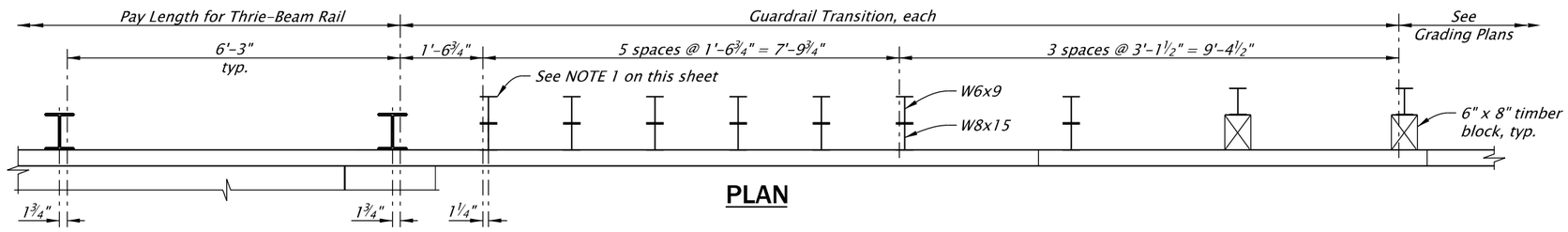
2-TUBE SIDE MOUNT RAIL TRANSITION

2024

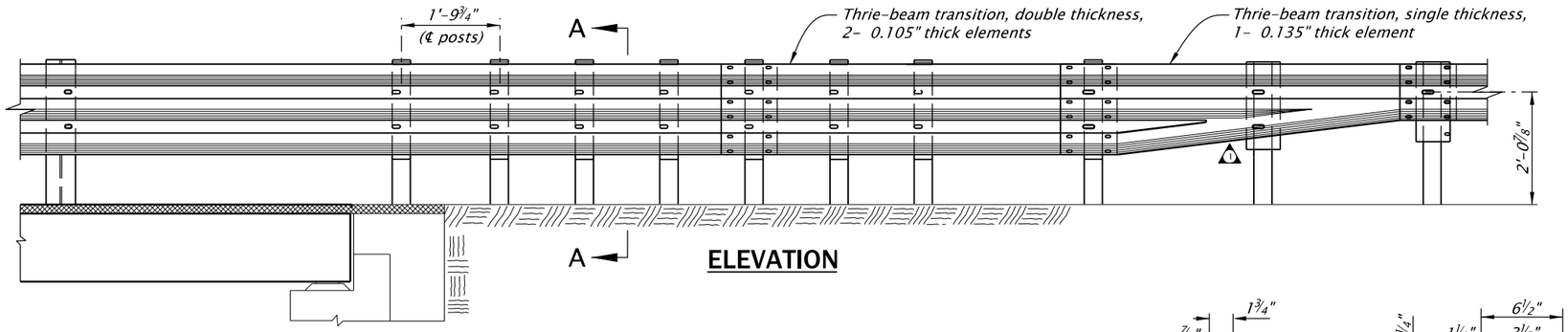
	DATE	REVISION DESCRIPTION
4	09-2020	Updated section note and removed note 3.
5	01-2022	Replaced timber block with W8x15 to be consistent to BR203.
6	07-2024	General text revisions.
7	01-2025	Thrie-beam transition revised: CAD standards updates

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **BR230**

Effective Date: June 1, 2025 - November 30, 2025



PLAN



ELEVATION

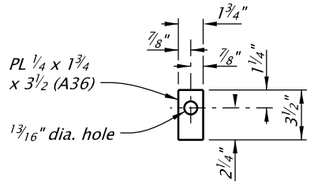


PLATE WASHER "A"

Position washer to completely cover slotted hole.

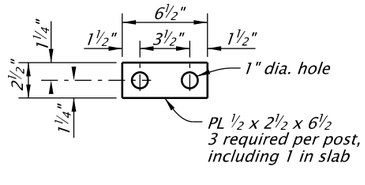


PLATE WASHER "B"

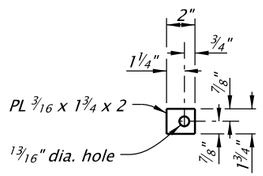
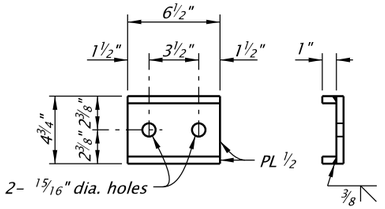
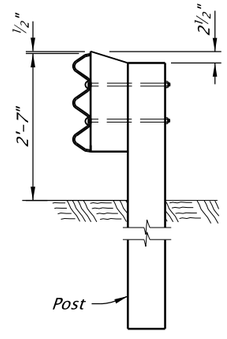


PLATE WASHER "C"

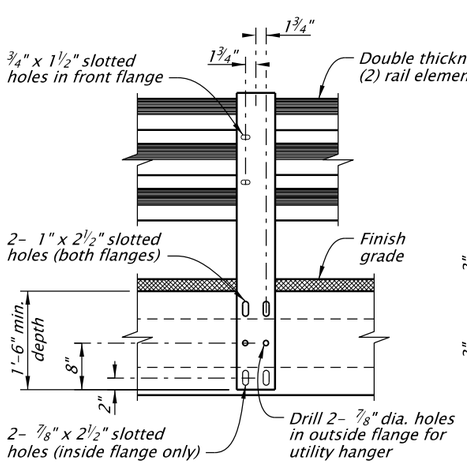
Position washer to completely cover slotted hole.



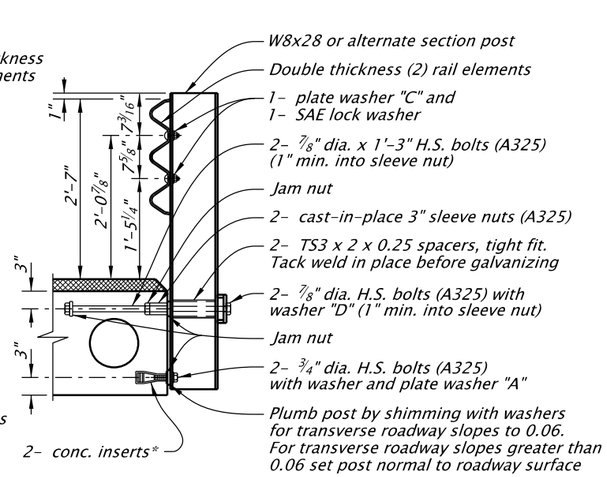
WASHER "D"



SECTION A-A



BACK ELEVATION



SIDE ELEVATION

POST DETAILS: SIDE MOUNT

NOTE
Field ream bolt holes in double thickness rail at splice locations. Repair damaged coating according to Specifications.

** CONCRETE INSERTS*

Hot-dip galvanized expanded coil concrete inserts with closed-back ferrule threaded to receive ¾" dia., Grade 36 (ASTM A307) .

Minimum insert length= 4½"
Minimum safe working load in tension= 4000 lbs.

NOTE 1
Transition posts may be steel W6x9 or timber 8"x 8".
All posts to be of same material.
See drawing BR203 for Thrie-Beam blockouts.

GENERAL NOTES
Provide steel posts and plates conforming to AASHTO Specification M183 (ASTM A36), unless noted otherwise.

Provide anchor bolts conforming to ASTM A325 (AASTHO M164).

Provide guardrail hardware as shown on Std. Dwgs. RD405 and RD410.

Hot dip galvanize all structural steel and hardware after fabrication.

Fabricate railing to the horizontal and vertical alignment of the structure. Install posts normal to grade. When wearing surface thickness varies due to beam camber and/or superelevation, vary rail post lengths to provide uniform rail height.

Tap nuts and inserts 0.0021 $^{+0.01}_{-0.00}$ oversize after galvanizing in accordance with ASTM A563.

Tighten upper high strength post bolts 1/6 turn past snug tight condition. Tighten lower high strength post bolts 1/3 turn past snug tight condition.

Do not use this rail for 12" thick slab.

Accompanied by drawings BR203, RD405, RD410, RD480.

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

THRIE-BEAM RAIL AND TRANSITION

2024

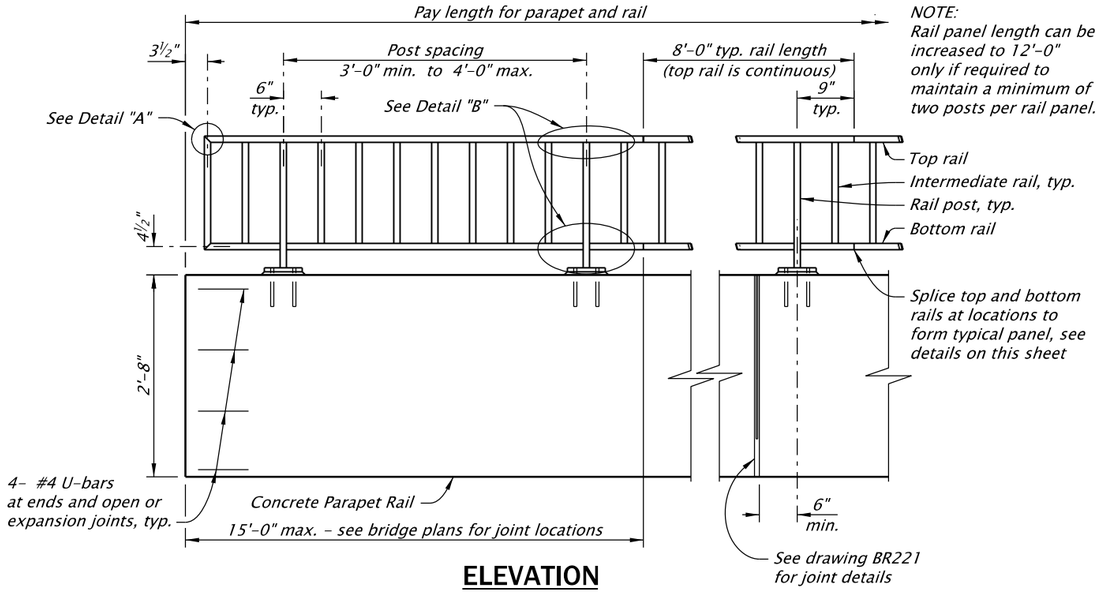
DATE	REVISION DESCRIPTION
1 01-2025	Thrie-beam transition revised; CAD standards updates

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **BR233**

Effective Date: June 1, 2025 - November 30, 2025

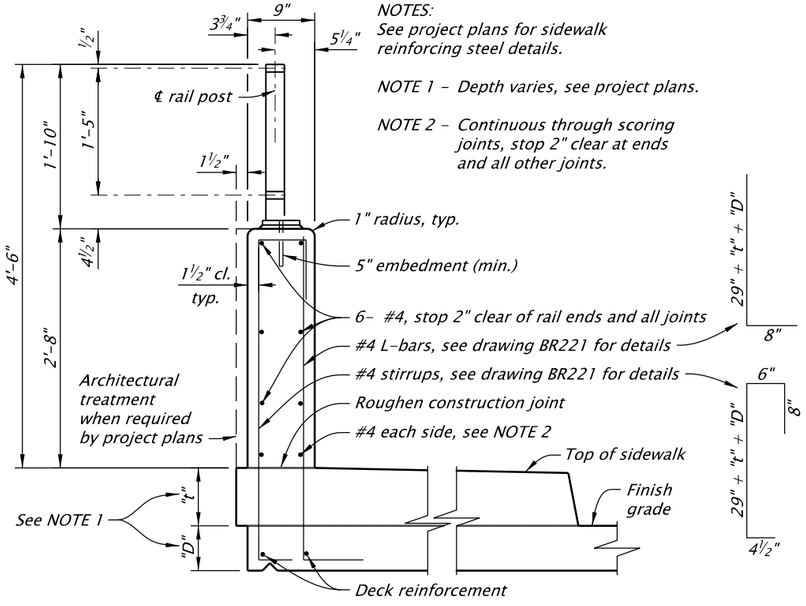
10-JAN-2025

BR233.dgn



NOTE:
Rail panel length can be increased to 12'-0" only if required to maintain a minimum of two posts per rail panel.

ELEVATION

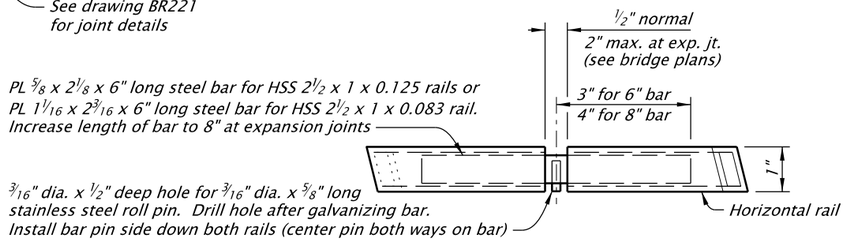


NOTES:
See project plans for sidewalk reinforcing steel details.

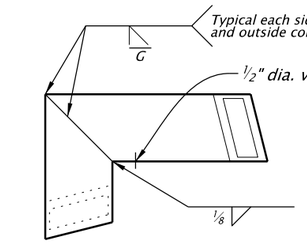
NOTE 1 - Depth varies, see project plans.

NOTE 2 - Continuous through scoring joints, stop 2" clear at ends and all other joints.

TYPICAL SECTION

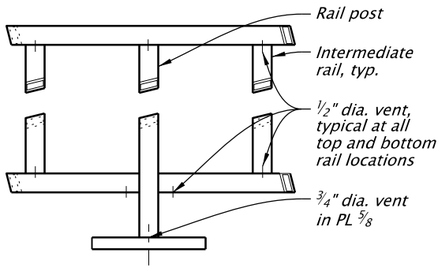


RAIL SPLICE

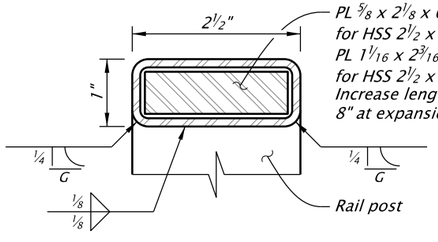


RAIL END NOTE:
Miter joints top and bottom rail members. Weld and grind smooth.

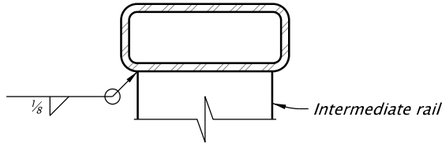
DETAIL "A"



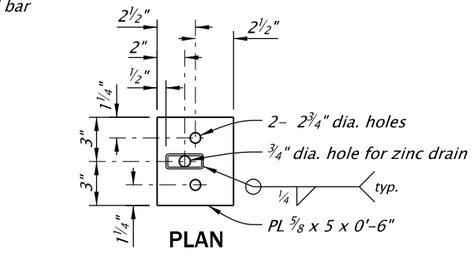
DETAIL "B"



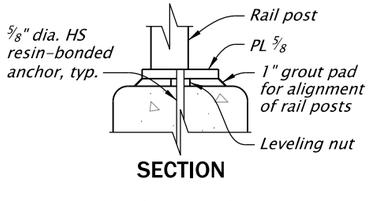
RAIL POST WELD



INTERMEDIATE VERTICAL RAIL WELD



PLAN



SECTION

BASE PLATE DETAIL

GENERAL NOTES
Provide rectangular structural steel tubing conforming to Oregon Standard Specification 02810.20.

Provide HSS 2½ x 1 x 0.125 (11 gauge) for rail posts.

Provide HSS 2½ x 1 x 0.083 (14 gauge) or HSS 2½ x 1 x 0.125 (11 gauge) for horizontal, intermediate, and end vertical rails.

Provide all other structural steel conforming to AASHTO M183 (ASTM A36).

Hot-dip galvanize all structural steel including fasteners after fabrication.

Provide Galvanize-Control silicon according to Oregon Standard Specification 02530.70.

Provide Class 3300- 1½ or ¾ concrete.

Provide all reinforcing steel conforming to AASHTO M31 (ASTM A615), Grade 60 or A706.

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

Construct steel railing and concrete parapet conforming to the horizontal and vertical alignment of the structure. Construct rail posts and parapet normal to grade in the longitudinal direction and vertical in the transverse direction.

Provide and install high strength resin bonded anchors (AASHTO M314, Grade 36, ASTM A307) according to Oregon Standard Specification 00535 and manufacturer's directions.

Tighten anchor nuts by the turn-of-the-nut method with a nut rotation of 60° turn from a snug tight condition.

Provide continuous top horizontal rail elements over a minimum of two posts unless shown otherwise on the detail plans. Provide a minimum of two rail posts per rail panel.

Locate reinforcing steel in parapet prior to drilling to eliminate conflicts.

Accompanied by drawing BR221.

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

OREGON STANDARD DRAWINGS

PEDESTRIAN RAIL ON SIDEWALK MOUNTED CONCRETE PARAPET

2024

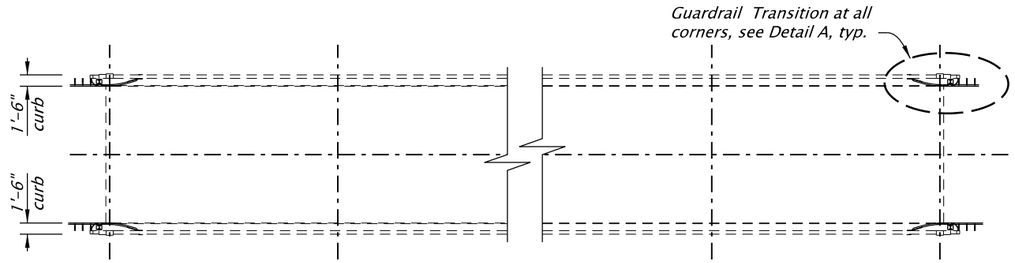
DATE	REVISION DESCRIPTION
01-2025	CAD standards updates

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | BR250

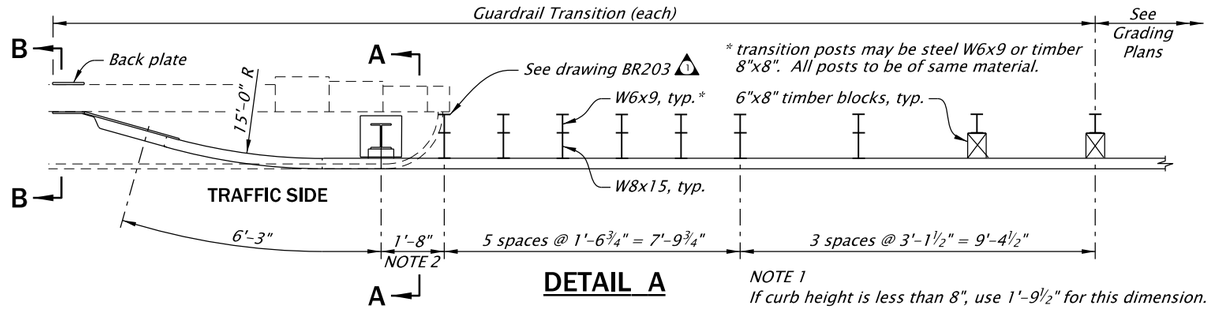
Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

BR250.dgn



PLAN

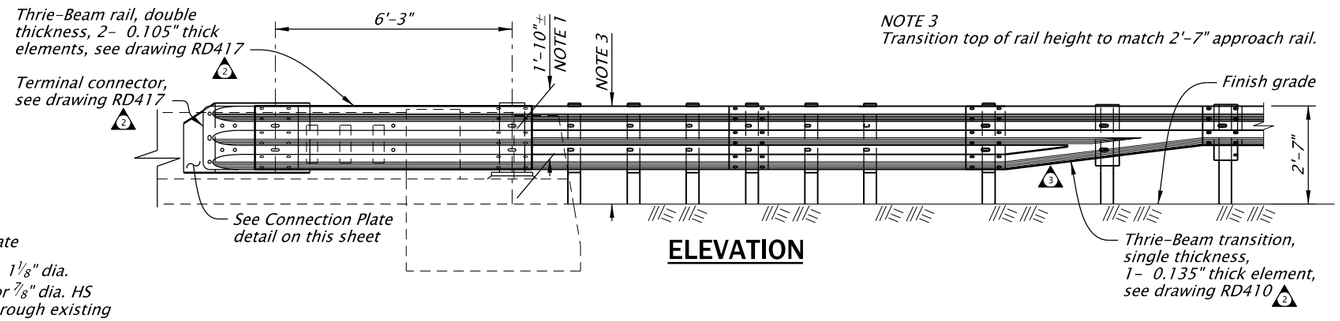


DETAIL A

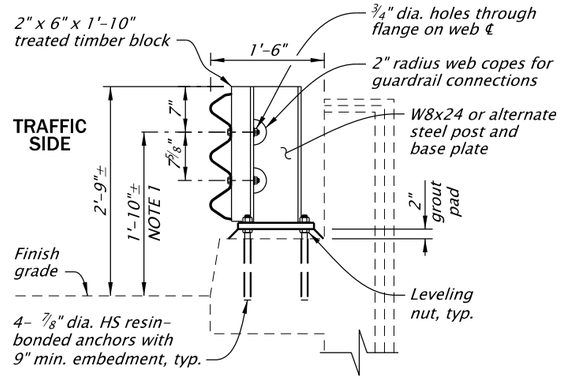
NOTE 1
If curb height is less than 8", use 1'-9½" for this dimension.

NOTE 2
Maintain first post spacing as shown. Consider alternative attachment details to the bridge rail end (i.e. partial curb and end block removal or addition of a new end block).

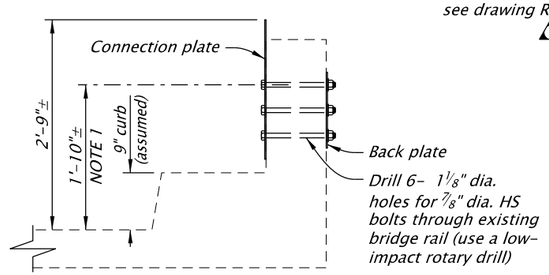
NOTE 3
Transition top of rail height to match 2'-7" approach rail.



ELEVATION



SECTION A-A



SECTION B-B

GENERAL NOTES:
Provide non-epoxy grout for the 2" nominal grout pads as noted in Section 02080.

Provide structural steel conforming to AASHTO Specification M183 (ASTM A36).

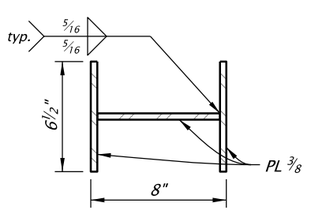
Provide all H.S. bolts conforming to AASHTO M164 (ASTM A325).

Provide and install HS resin-bonded anchors (Grade 105) according to ODOT Specification 00535.

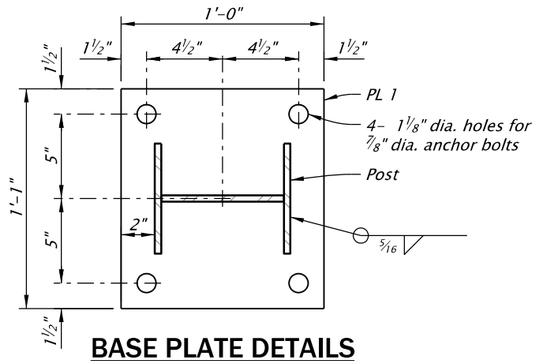
Hot-dip galvanize all anchor rods, washers, and nuts after fabrication.

Hot-dip galvanize all connection plate bolts, plates, and washers after fabrication of plates.

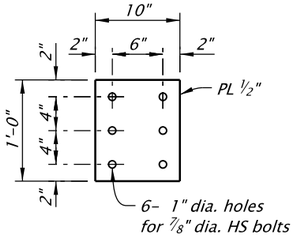
Field verify before fabrication.



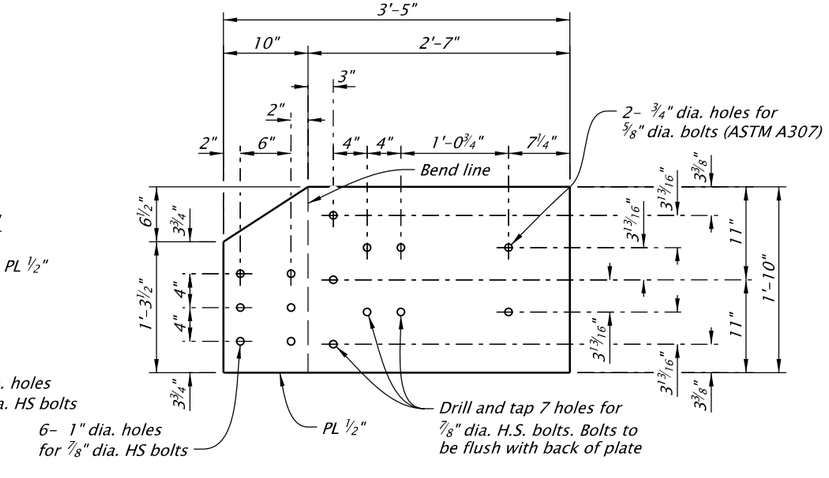
ALTERNATE POST



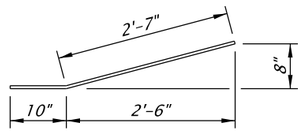
BASE PLATE DETAILS



BACK PLATE



DEVELOPED VIEW: CONNECTION PLATE



CONNECTION PLATE BEND DETAILS

Accompanied by drawings BR203, RD405, RD410, RD417

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

OREGON STANDARD DRAWINGS

RAIL TRANSITION FROM FLEX BEAM RAIL TO CURB AND PARAPET RAIL

2024

DATE	REVISION DESCRIPTION
1 01-2022	Modified detail note text; removed (NOTE 3 and Section D-D) notation.
2 07-2024	General text revisions.
3 01-2025	Thrie-beam transition revised; CAD standards updates

CALC. BOOK NO. N/A

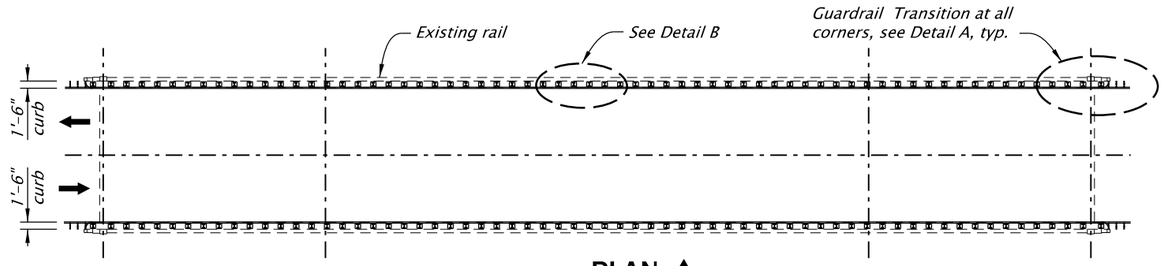
SDR DATE 10-JAN-2025

BR270

Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

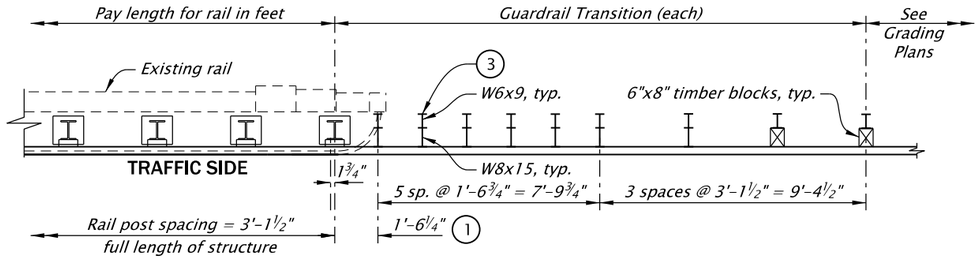
BR270.dgn



PLAN (3)

NOTES TO DESIGNER:

1. Check Structural capacity of the existing curb and deck for anchorage.
2. Check structural capacity of the existing bridge deck overhang.

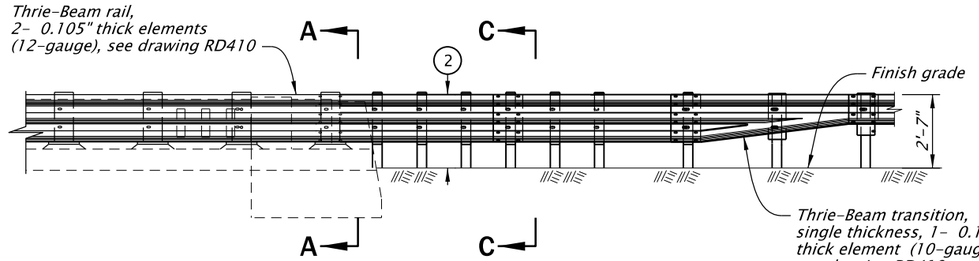


DETAIL A (3)

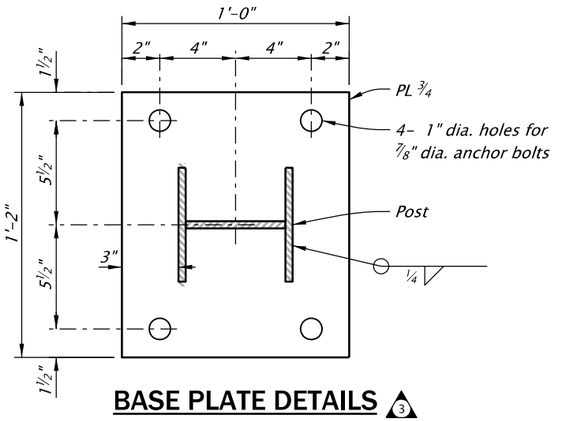
(1) Maintain first post spacing as shown. Consider alternative attachment details to the bridge rail end (i.e. partial curb and end block removal or addition of a new end block).

(2) Transition top of rail height to match 2'-7" approach rail.

(3) Transition posts may be steel W6x9 or timber 8"x8". All posts to be of same material.



ELEVATION (3)

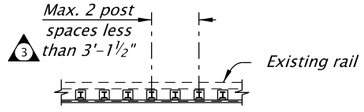


SECTION A-A (3)

SECTION B-B

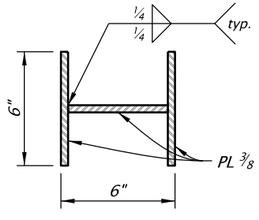
NOTES: (3)
Maintain post spacing at 3'-1 1/2" full length of structure.

A maximum of 2 non-standard post spaces may be used to adjust the rail installation to match structure length.

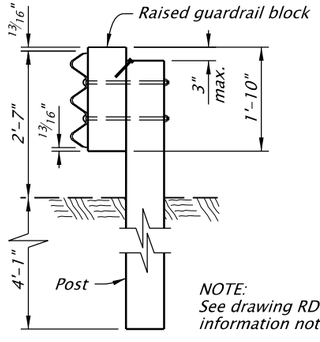


DETAIL B

BASE PLATE DETAILS (3)



ALTERNATE POST (3)



NOTE:
See drawing RD409 for information not shown.

SECTION C-C (3)

(3) GENERAL NOTES:
Rail designed and crash tested to meet MASH TL-3 requirements.

Transition designed to meet MASH TL-3.

Provide non-epoxy grout for the 1 1/2" nominal grout pads in Section 02080.

Provide and install High Strength resin bonded anchors (Grade 105) according to ODOT Specification 00535.

Provide structural steel posts and plates according to Oregon Standard Specification 2810.20. Provide steel posts and plates conforming to ASTM A572 Grade 50.

Hot-dip galvanize all posts, anchor rods, washers, and nuts be after fabrication.

Field verify dimensions before fabrication.

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.

Accompanied by drawings RD409, RD410. (3) (1)

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

THRIE-BEAM RAIL RETROFIT FOR CURB AND PARAPET RAIL CONNECTION DETAILS (3)

2024

	DATE	REVISION DESCRIPTION
1	07-2024	General text revisions.
2	01-2025	Thrie-beam transition revised: CAD standards updates
3	07-2025	Redrawn to reflect TR# 615131-01.

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **BR273**

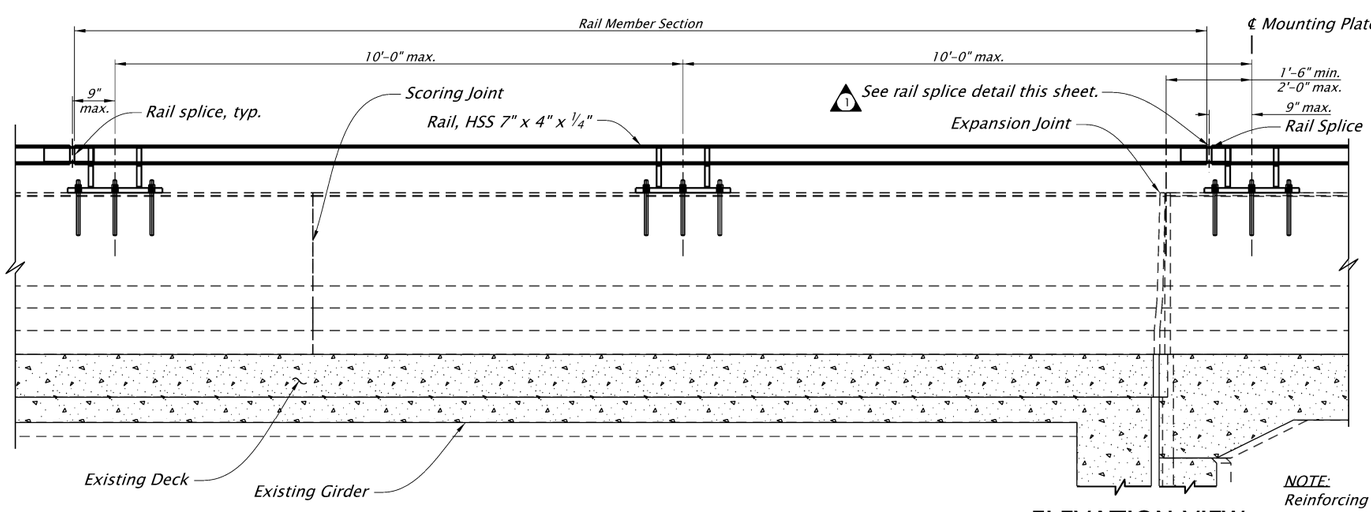
Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

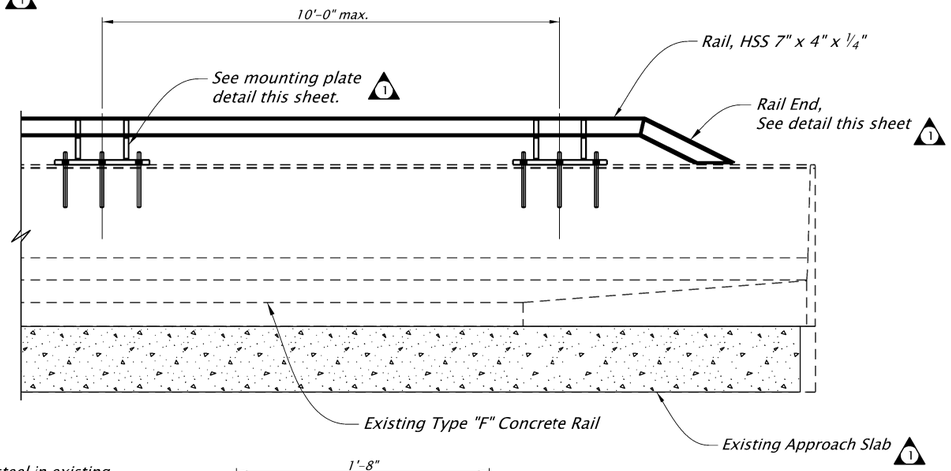
BR273.dgn

10-JAN-2025

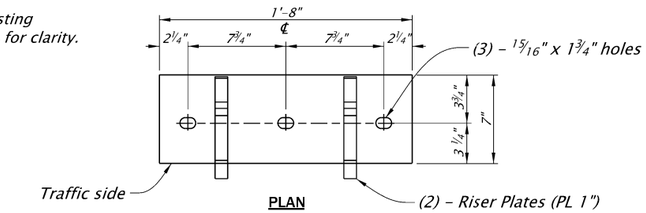
BR286.dgn



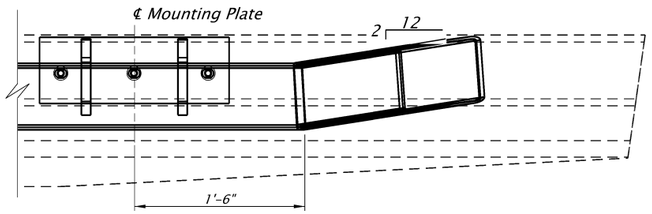
ELEVATION VIEW
Scale: 3/8"=1'-0"



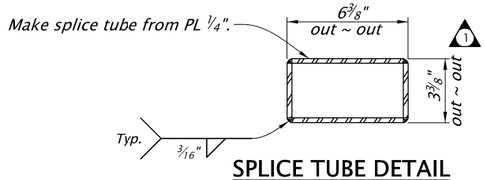
NOTE:
Reinforcing steel in existing components not shown for clarity.



PLAN

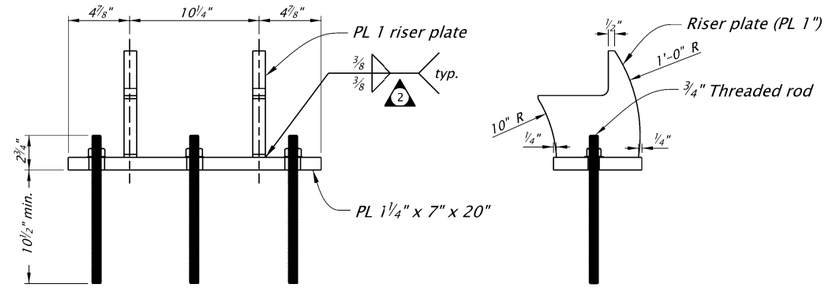


PLAN



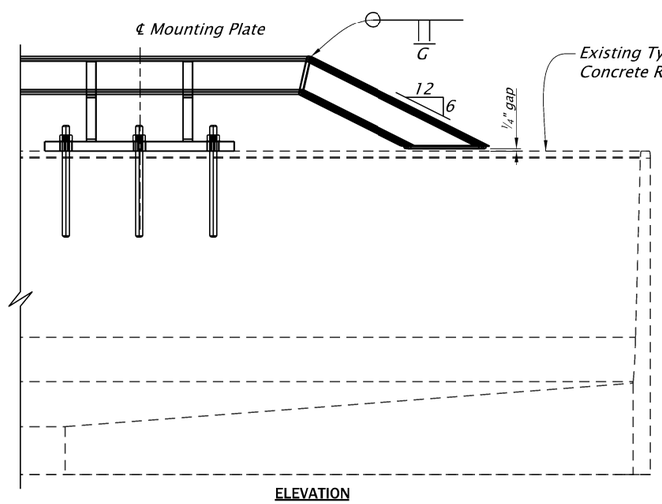
SPLICE TUBE DETAIL
Scale: 3"=1'-0"

NOTE:
Grind all edges prior to galvanizing to ensure proper fit.



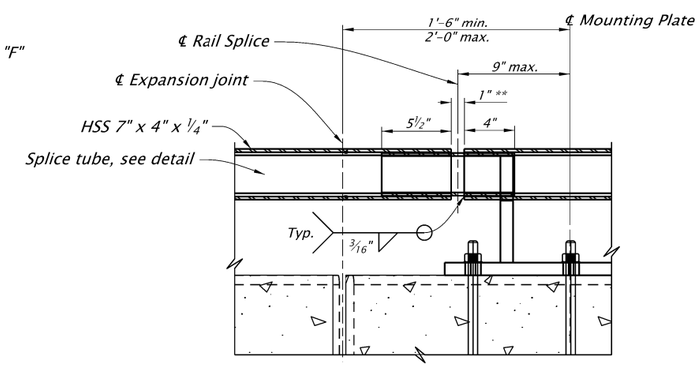
ELEVATION SIDE VIEW

MOUNTING PLATE DETAIL
Scale: 1"=1'-0"



ELEVATION

RAIL END DETAIL
Scale: 3/4"=1'-0"



RAIL SPLICE DETAIL
Scale: 1"=1'-0"

NOTE:
** 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 Splice Tube.

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 RECTANGULAR TUBE RETROFIT SHEET 2 OF 2

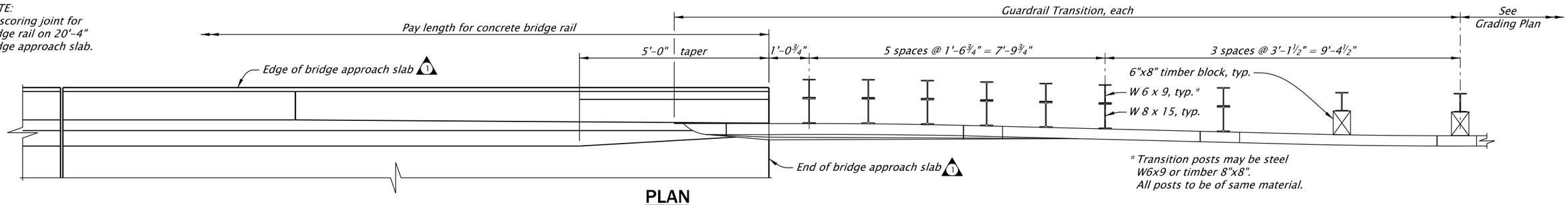
2024

	DATE	REVISION DESCRIPTION
1	07-2021	Note changes, CAD edits
2	01-2025	Weld correction

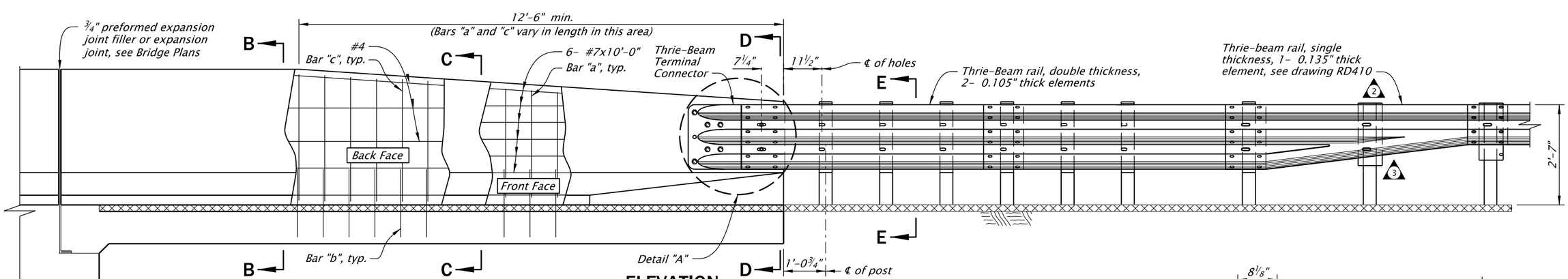
CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **BR286**

Effective Date: June 1, 2025 - November 30, 2025

NOTE:
No scoring joint for bridge rail on 20'-4" bridge approach slab.



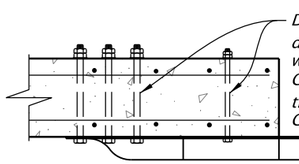
PLAN



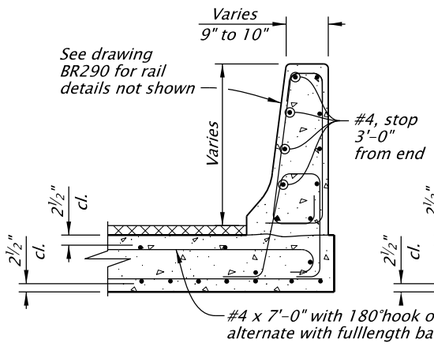
ELEVATION

NOTES:
Drill horizontal holes (bolt dia. + 1/8") in hardened concrete with low-impact rotary drill. Cut bolts after installation so they extend 3/4" max. beyond nut. Grind smooth and cold galvanize.

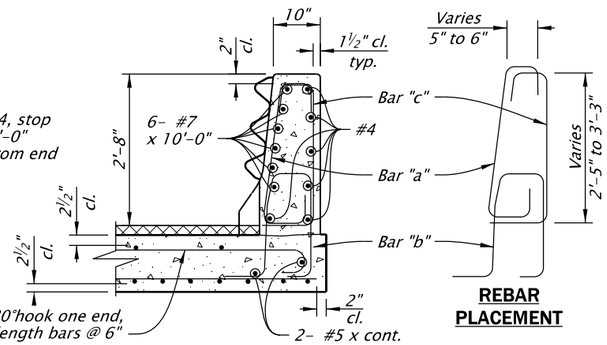
Contractor's option (or similar) to use greased PVC sleeves for through-bolts. Remove PVC sleeves prior to installing through-bolts.



SECTION A-A

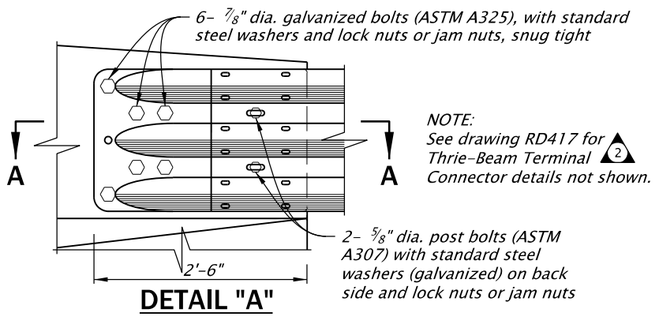


SECTION C-C



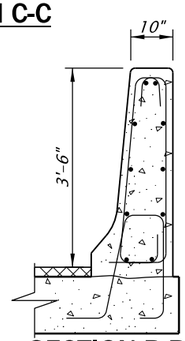
SECTION D-D

REBAR PLACEMENT



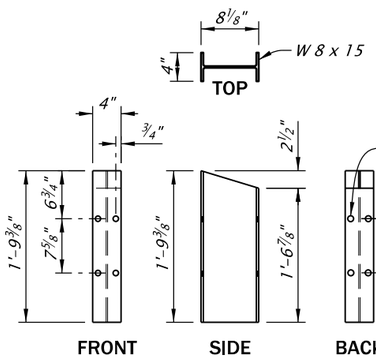
NOTE:
See drawing RD417 for 2 Thrie-Beam Terminal Connector details not shown.

DETAIL "A"

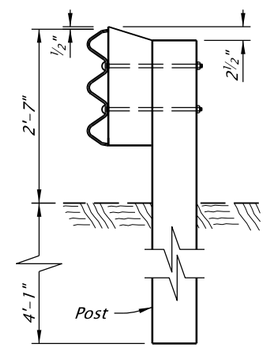


SECTION B-B

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



THRIE BEAM BLOCK (W 8 x 15)



SECTION E-E

1 Accompanied by drawings BR290, RD401, RD402, RD407, RD408, RD410, RD412, RD417

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

TRANSITION TYPE "F" CONCRETE RAIL, 42 INCH TO GUARDRAIL

2024

DATE	REVISION DESCRIPTION
01-2023	Revised accompanied by dwg references, General text revisions.
07-2024	General text revisions.
01-2025	Thrie-beam transition revised: CAD standards updates

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **BR291**

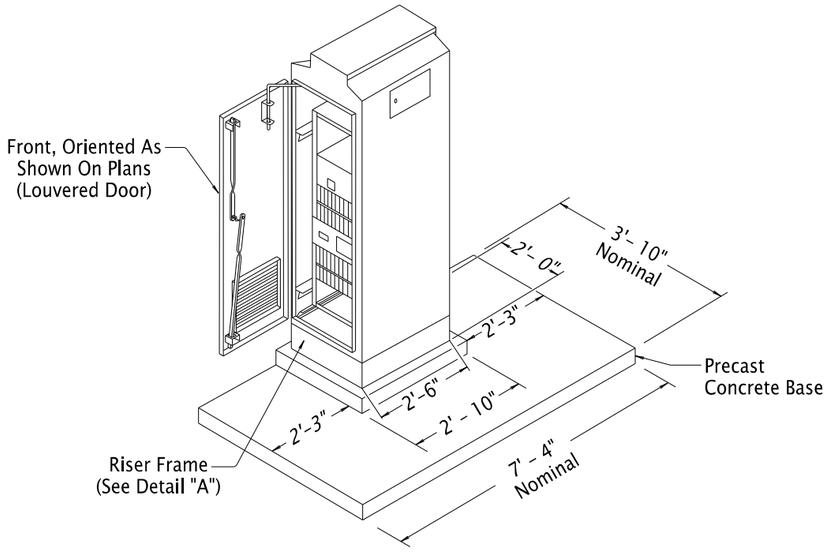
10-JAN-2025

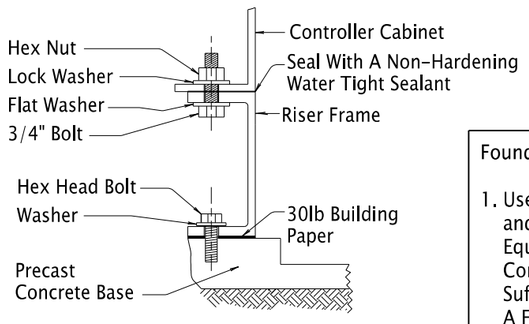
BR291.dgn

Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

TM454.dgn

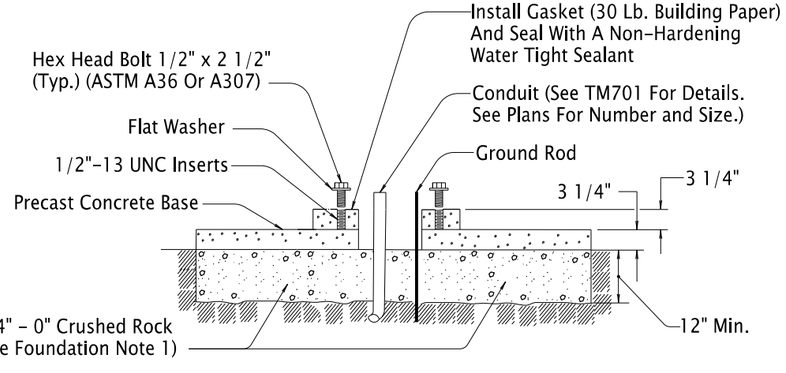




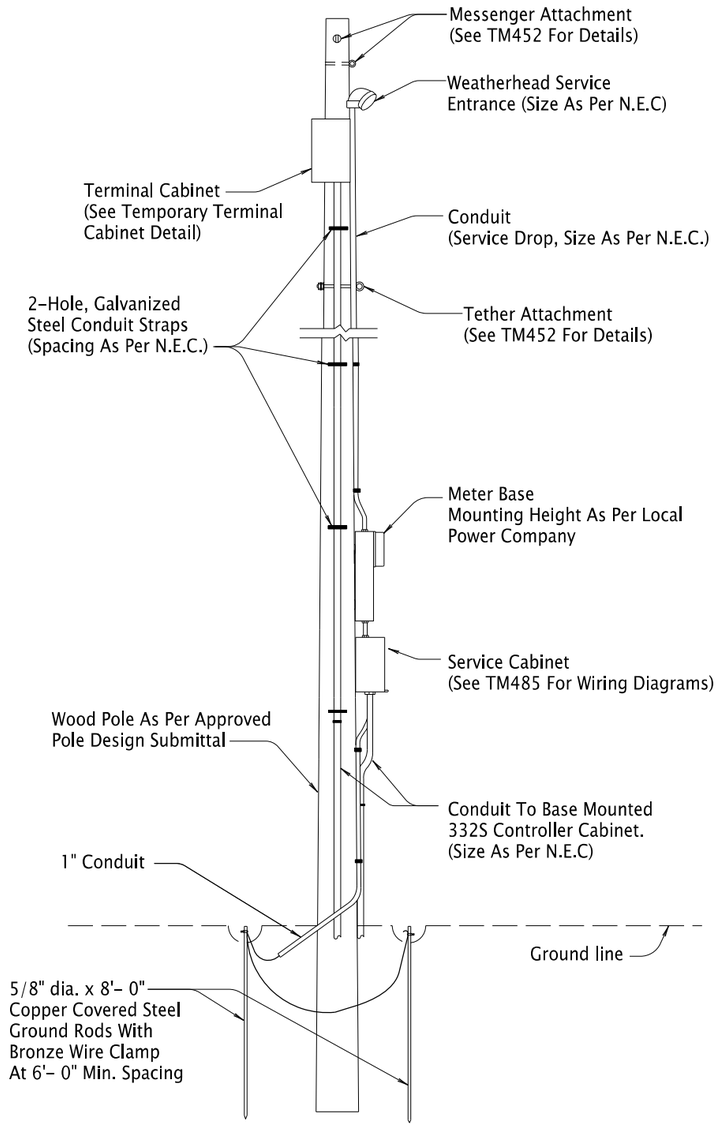
DETAIL "A"
RISER FRAME CONNECTION

Foundation Note:

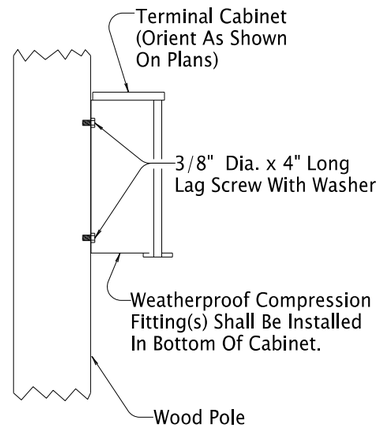
1. Use Materials According To 00640.10 and 00640.16. Use Compaction Equipment Suitable For Area And Compact Each Six Inch Layer With Sufficient Coverage To Produce A Firm Unyielding Surface.



TEMPORARY CONTROLLER CABINET FOUNDATION
(Model 332, 334, And 340 Cabinets)



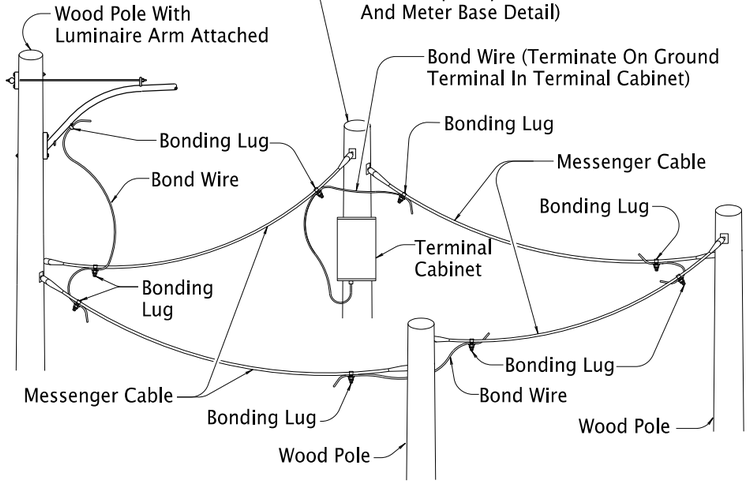
TEMPORARY SERVICE CABINET AND METER BASE



Terminal Cabinet General Notes:

1. Install The Number Of Terminal Blocks Needed For The Circuits. Evenly Distribute All The Terminal Blocks Among The Mounting Brackets.
2. Terminate Only One Wire In Each Termination Point. Use Additional Terminals With A Factory Jumper Between The Terminals If Additional Taps Are Necessary.
3. Label The Marking Strip In The Terminal Cabinet With The Wire Number And/Or Letter As Coded In The Controller Cabinet Terminal Block. Use Only Mechanically Printed Labels.

TEMPORARY TERMINAL CABINET



TEMPORARY GROUNDING/BONDING

General Notes:

1. All Screws, Bolts, Nuts And Washers Shall Be Type 304 Or 316 Stainless Steel Or Galvanized Unless Noted Otherwise.
2. Bolts And Screws Shall Have Hex Or Square Heads. Allen Head Fasteners Not Allowed.
3. Conduit Mounted On Wood Poles/Posts May Be Liquid Tight Flex Conduit.

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

TEMPORARY CONTROLLER CABINET, SERVICE CABINET, METER BASE, & TERMINAL CABINET

2024

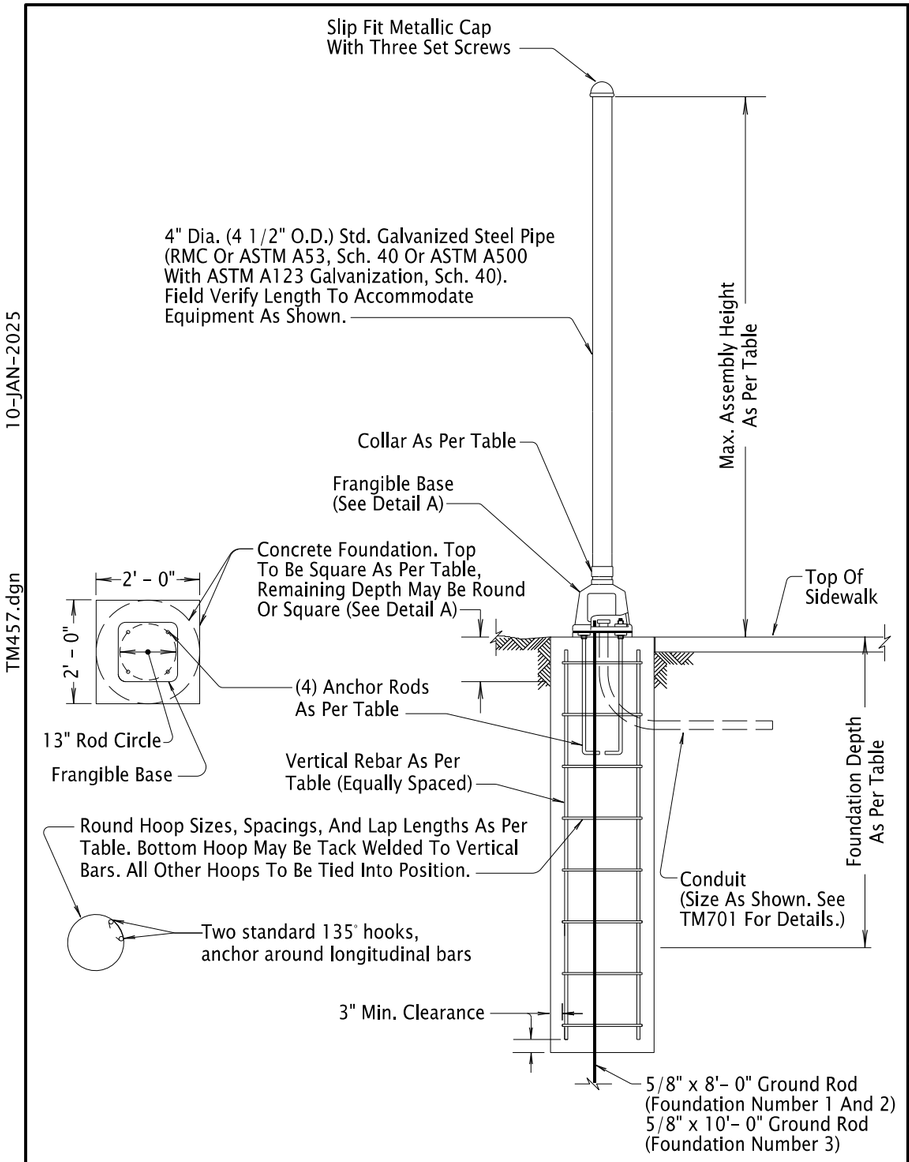
DATE	REVISION DESCRIPTION
07-2023	ADDED POLE DESIGN SUBMITTAL INFO, DRAFTING REVISIONS, CHANGED NOTE 1.
01-2025	UPDATED STANDARD DRAWING REFERENCES

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **TM454**

Effective Date: June 1, 2025 - November 30, 2025

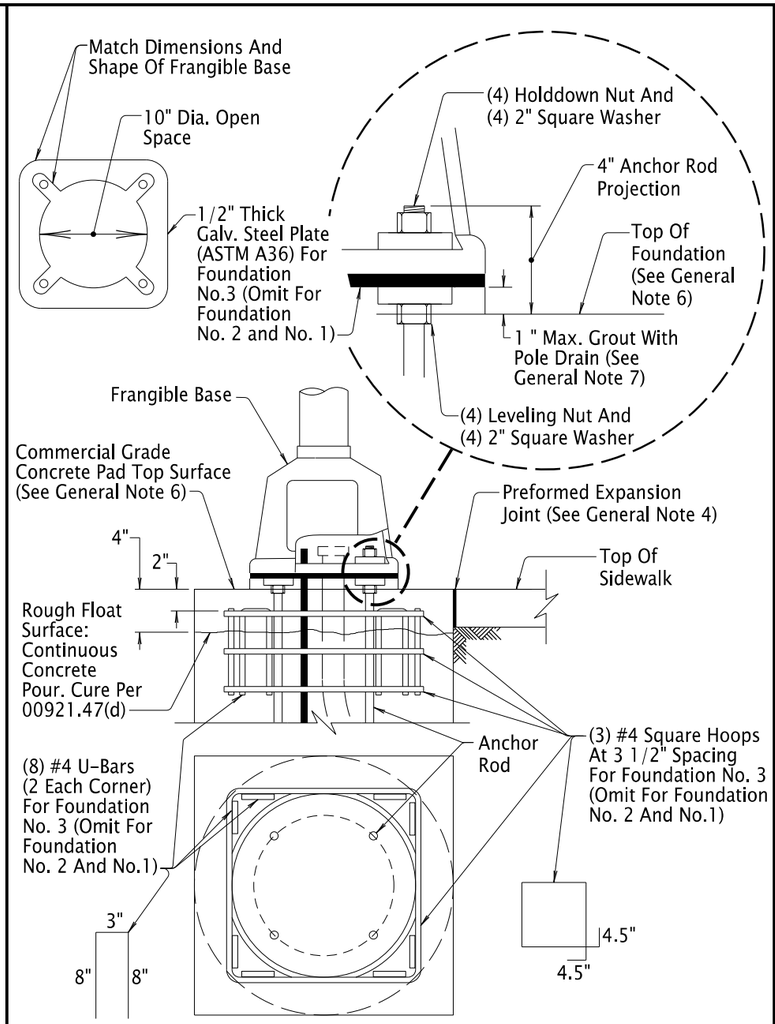
10-JAN-2025

TM457.dgn



Pedestal Foundation Number	Max. Assembly Height	Foundation Depth	Depth of Square Foundation	Anchor Rods (ASTM F 1554 Grade 36)	Reinforcing Steel			Collar
					Vertical Rebar	Hoop Size & Spacing	Hoop Lap Length	
1	6' - 0"	2' - 0"	4"	3/4" x 18" x 4" (6" Thread)	N/A	N/A	N/A	N/A
2	10' - 0"	3' - 0"	4"					
3	20' - 6"	8' - 0"	12"	1" x 36" x 4" (6" Thread)	8-#6	#4-12"	6" with 2 hooks	Req'd

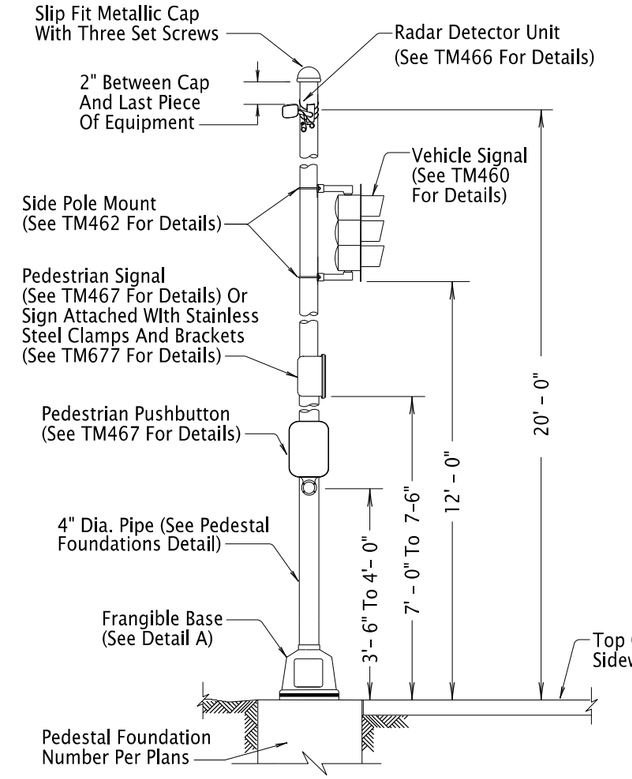
PEDESTAL FOUNDATIONS



DETAIL A - FRANGIBLE BASE

General Notes:

1. All Bolts, Nuts And Washers To Conform To 02560.20 And Be Galvanized Steel According To 02560.40 Unless Noted Otherwise.
2. All Anchor Rods To Be Galvanized Steel Conforming To 02560.30.
3. All Pole Entrances Containing Wiring To Be Smooth.
4. Install 1/4" Thick Preformed Expansion Joint Filler Around Footing In Sidewalk Areas.
5. The Entire Foundation To Be Located On A Single Plane With Less Than 2% Slope. The Flat Edge(s) Of The Foundation May Be Adjacent To The Turn Space, Back Of Walk, Or A Curb Ramp Grade Break Line.
6. Install Commercial Grade Concrete Pad Above Rough Float Surface With Top Surface Matching Sidewalk Grade And Less Than 1/4 " Vertical Exposure From Adjacent Grade. Clean Rough Float Surface Prior To Placing Fresh Concrete By Removing All Scum, Laitance, Loose Gravel, And Sediment. Pour During Sidewalk Installation After Installing Pipe And Appurtenances.
7. Non-Shrink High Early Strength Grout (Non-Ferrous) with 3/4" Diameter Pole Drain And A Minimum Strength of 5000 psi. Do Not Use Footing Concrete.



Notes:

1. Equipment Shown In the Assembly Detail Is An Example Of The Equipment That May Be Mounted. Install Equipment As Shown.
2. See TM492 For Ramp Meter Pedestal Mounting Details.
3. See TM493 For RRFB Pedestal Mounting Details.

TRAFFIC SIGNAL PEDESTAL ASSEMBLY

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

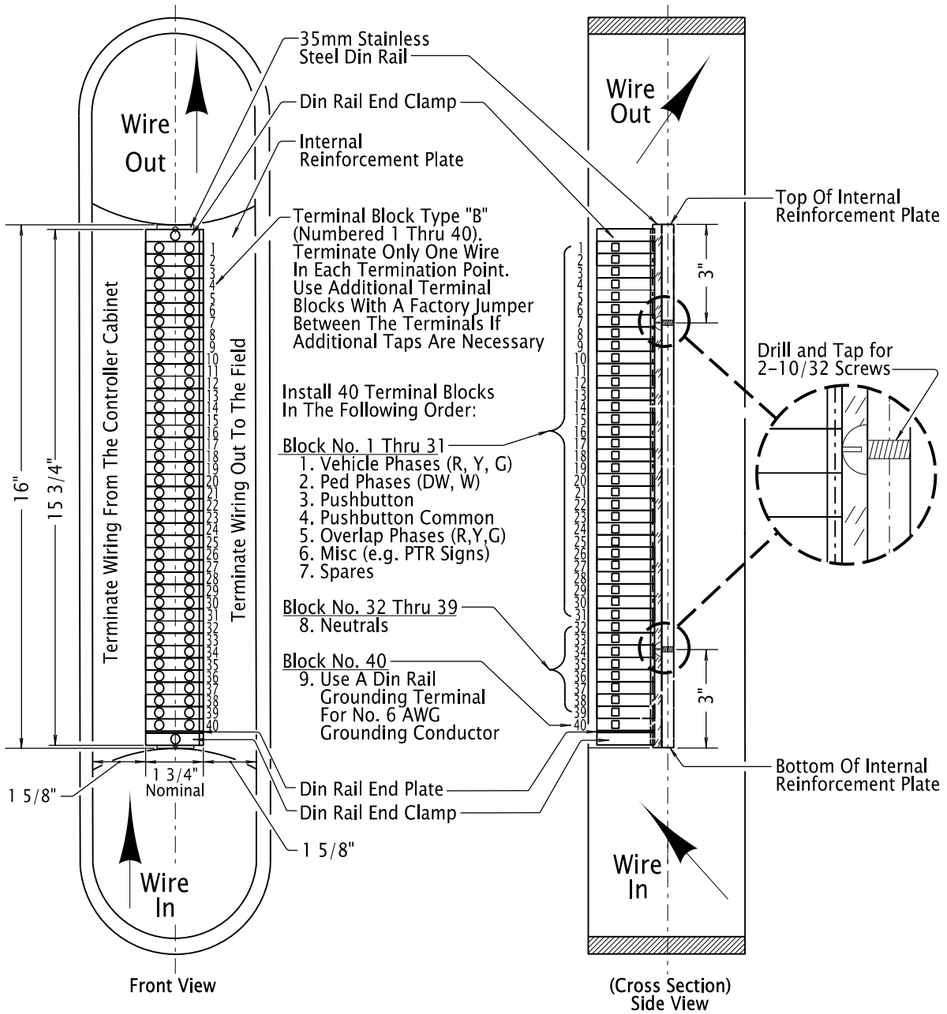
PEDESTAL FOUNDATION AND TRAFFIC SIGNAL ASSEMBLY

2024

DATE	REVISION DESCRIPTION
01-2021	UPDATED ALL ANCHOR ROD DETAILS. CORRECTED STD. DWG. REFERENCE
07-2022	COMPLETE REDESIGN OF FOUNDATION AND INSTALLATION PROCEDURE
07-2023	NOTE 5 - CHANGED TO 2% SLOPE. ADDED RMC AS PIPE OPTION. MINOR TEXT CHANGES FOR CLARITY.
01-2025	TYPO CORRECTION. UPDATED STANDARD DRAWING REFERENCES

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **TM457**

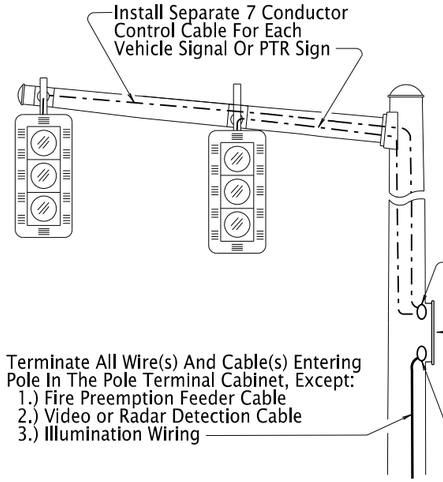
Effective Date: June 1, 2025 - November 30, 2025

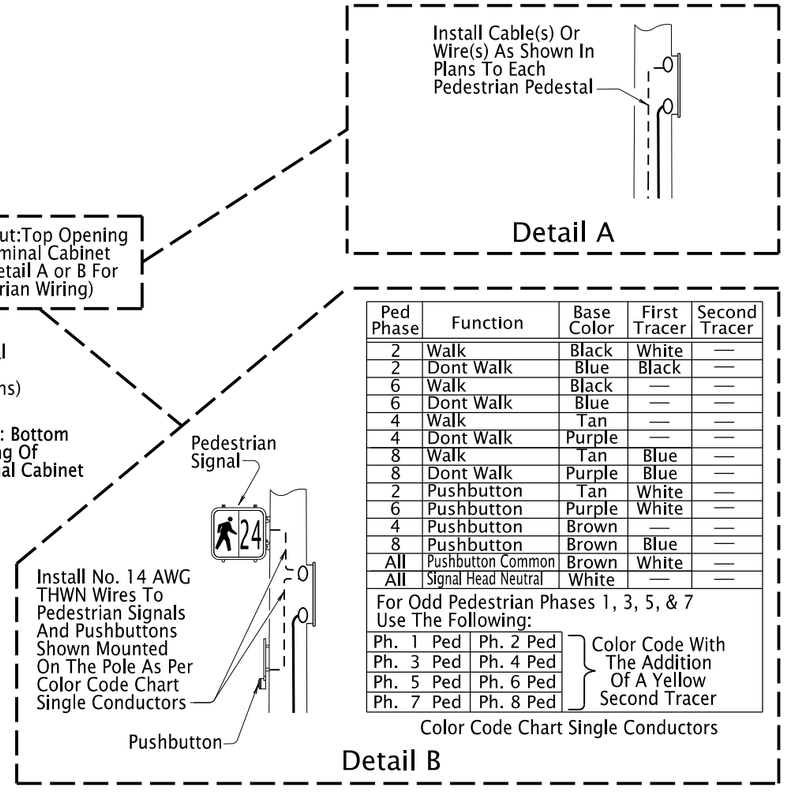


DIN RAIL, TERMINAL BLOCKS, & WIRING IN POLE RECESSED TERMINAL CABINET

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





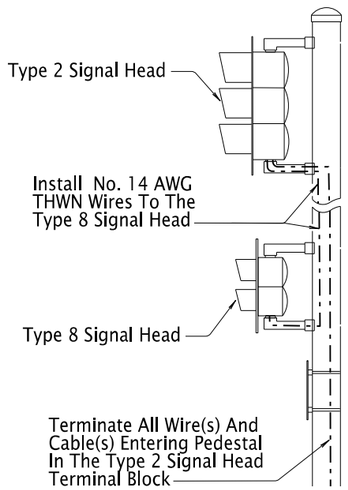
Ped Phase	Function	Base Color	First Tracer	Second Tracer
2	Walk	Black	White	—
2	Dont Walk	Blue	Black	—
6	Walk	Black	—	—
6	Dont Walk	Blue	—	—
4	Walk	Tan	—	—
4	Dont Walk	Purple	—	—
8	Walk	Tan	Blue	—
8	Dont Walk	Purple	Blue	—
2	Pushbutton	Tan	White	—
6	Pushbutton	Purple	White	—
4	Pushbutton	Brown	—	—
8	Pushbutton	Brown	Blue	—
All	Pushbutton Common	Brown	White	—
All	Signal Head Neutral	White	—	—

For Odd Pedestrian Phases 1, 3, 5, & 7 Use The Following:

Ph. 1 Ped	Ph. 2 Ped	Color Code With The Addition Of A Yellow Second Tracer
Ph. 3 Ped	Ph. 4 Ped	
Ph. 5 Ped	Ph. 6 Ped	
Ph. 7 Ped	Ph. 8 Ped	

Color Code Chart Single Conductors

WIRE & CABLE IN POLES



WIRE & CABLE IN RAMP METER PEDESTALS

General Notes:

1. See TM701 For Additional Wire/Cable Installation Requirements That Apply To All Electrical Systems.
2. Install All Wire And Cable Between Terminal Blocks Without Splicing.
3. Mark Phase Number Or Identification On All Cable In Junction Boxes, Terminal Cabinets, Service Cabinets, & Controller Cabinets With Permanent Tags. Overlaps Shall Be Labeled (OLA, OLB, OLC, OLD).
4. Mark Phase Number & Function Or Identification On All Wires Terminated In Controller Cabinet And Terminal Cabinet With Permanent Tags. Overlaps Shall Be Labeled (OLA, OLB, OLC, OLD).
5. Leave Slack In Each Wire And Cable As Follows:
   A.) 6 Feet In The First Junction Box Nearest The Controller Cabinet
   B.) 6 Feet In Controller Cabinet And Service Cabinet
6. At Existing Installations Re-wire And Re-label New And Existing Control Cables And Wires, In All Junction Boxes, Terminal Cabinets, Service Cabinets, And Controller Cabinets.

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
07-2024	ADDED GEN. NOTE 3, ADDED PED COLOR CODE, ADDED FACTORY JUMPERS
01-2025	MOVED GENERAL ELECTRICAL CONTENT TO TM701. REFORMATTED CONTENT

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **TM470**

10-JAN-2025

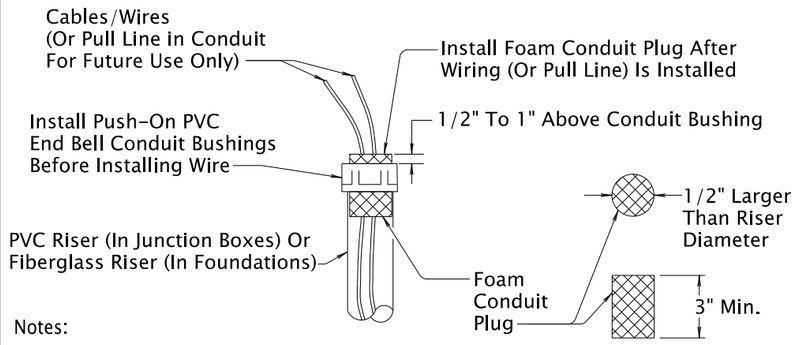
TM470.dgn

Effective Date: June 1, 2025 - November 30, 2025

Type Of Conduit	Minimum Cover From Top of Finished Surface (Use Permit Depth If Greater Than These)	
	Roadway & Shoulders	Other Areas
Metallic	24"	18"
Non-Metallic	30"(See Note 2)	18"

Notes:
1.) Additional Cover Depth May Be Necessary Near Foundations And Junction Boxes To Accommodate The Minimum Radius ("R") Of The Conduit Elbow. See "Conduit Elbow", "Conduit Installation In Foundations" And "Conduit Installation In Junction Boxes" Details For More Information.
2.) For Non-Metallic Conduit Under Roadway & Shoulders Installed Horizontally Into Fiber Optic Hand Hole As Per TM472, The Minimum Cover Depth Is 24 Inches.

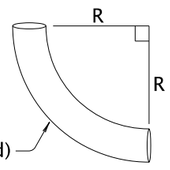
MINIMUM COVER FROM FINISHED SURFACE



Notes:

1.) Ream Conduit Ends To Remove Rough Edges And Burrs
2.) Temporarily Plug Or Cap Conduit Ends At All Times To Keep Debris Out

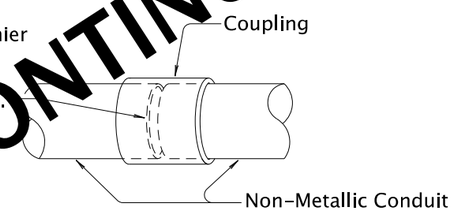
CONDUIT ENDS AND BUSHINGS



Standard Factory Fiberglass Bend
(No Crimping, Flattening, Field
Manipulation, Or Cutting In The Field)

Conduit Diameter	R (min.)
1 1/2"	10"
2"	12"
2 1/2"	15"
3"	18"

CONDUIT ELBOWS

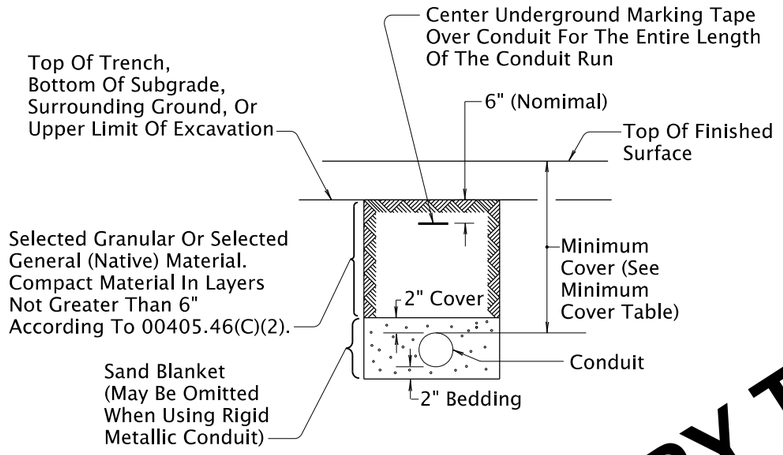


Make Cuts Square And True So
Conduit Ends Fit Together For Thier
Full Circumference. Use Solvent
Weld To Connect Conduit As Per
Manufacturer's Recommendation.

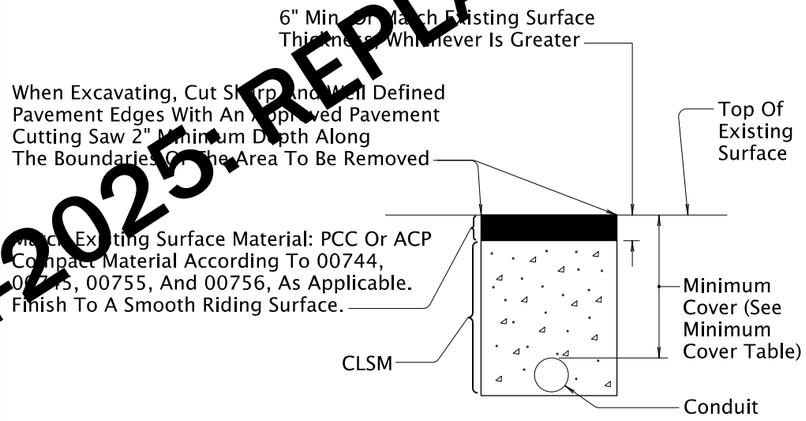
Notes:

1.) Slip Joints, Running Threads Or Reducing Couplings Not Allowed. Use The Same Size Conduit For The Entire Length, Outlet To Outlet.

CONDUIT COUPLINGS



UNSURFACED AREAS
(new roadway prior to paving, shoulders, under sidewalk, landscaped areas, etc.)

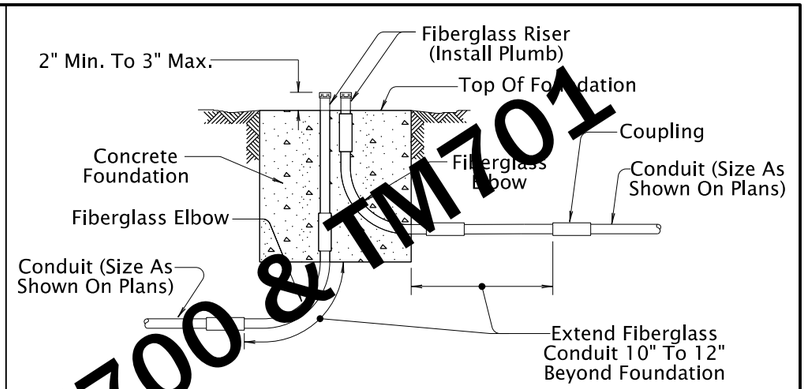


EXISTING PAVED AREAS

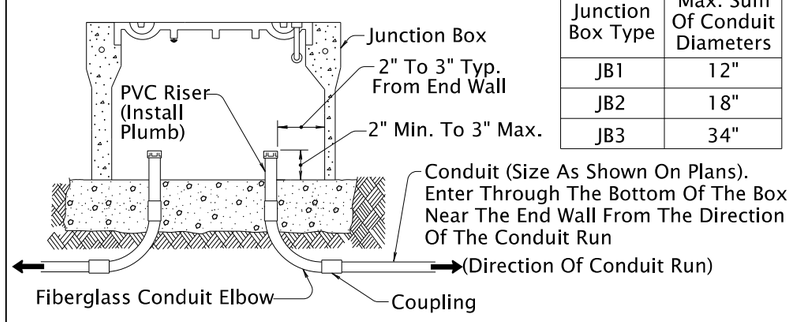
Trenching & Backfill Notes:

1. Excavate According To 00960.40. In Areas To Be Paved Or Landscaped, Place All Conduit Before Paving Or Landscaping.
2. Hold Trench Width To A Practical Minimum
3. Do Not Backfill Trenches Until Inspected By The Engineer
4. Furnish Backfill Materials According To 00960.10

CONDUIT OPEN TRENCH EXCAVATION & BACKFILL



CONDUIT INSTALLATIONS IN FOUNDATIONS
(Applicable for Pole, Pedestal, Post, Service Cabinet and Controller Cabinet Foundations)



Junction Box Type	Max. Sum Of Conduit Diameters
JB1	12"
JB2	18"
JB3	34"

CONDUIT INSTALLATION IN JUNCTION BOXES

General Notes:

1. Install Non-Metallic Conduit Unless Otherwise Shown. Conduit Runs Shall Be Continous Between Any Pole, Junction Box, Or Cabinet.
2. Install Conduit By Open Trench Method, Horizontal Directional Drilling, Or As Shown
3. Conduit Runs Shown On Plans Are For Bidding Purposes Only. Locations May Be Changed To Avoid Obstructions.
4. Larger Conduit Than Specified May Be Used At The Option And Cost Of The Contractor If Max. Sum Of Conduit Diameters In Junction Box Is Not Exceeded.

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

TRENCHING & CONDUIT INSTALLATION

2024

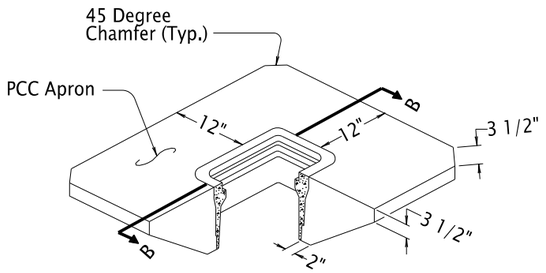
DATE	REVISION DESCRIPTION
01-2021	ADDED NOTE 1 TO "MINIMUM COVER FROM FINISHED SURFACE" DETAIL
07-2024	ADDED NOTE 2 TO "MINIMUM COVER FROM FINISHED SURFACE" DETAIL

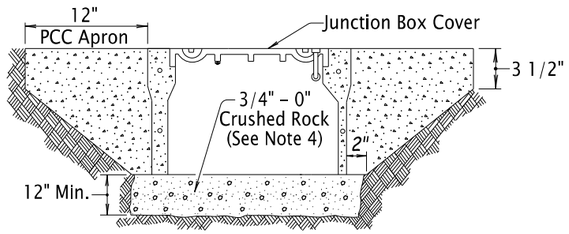
CALC. BOOK NO. N/A | SDR DATE 12-JUL-2024 | **TM471**

12-JUL-2024

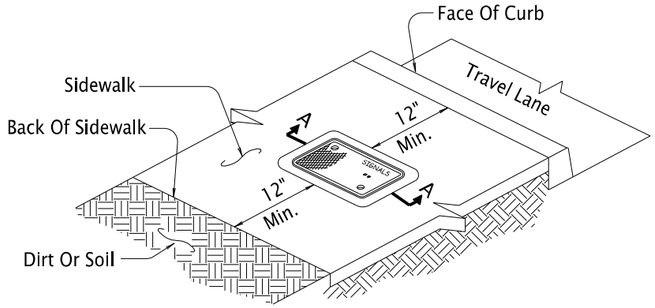
TM471.dgn

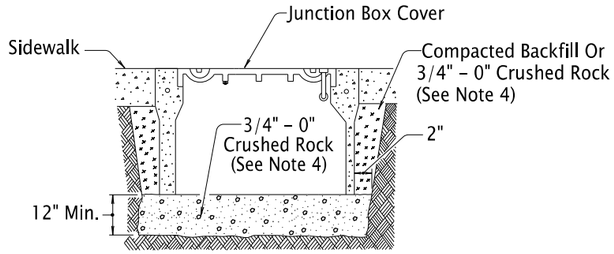
Effective Date: June 1, 2025 - November 30, 2025





SECTION B–B

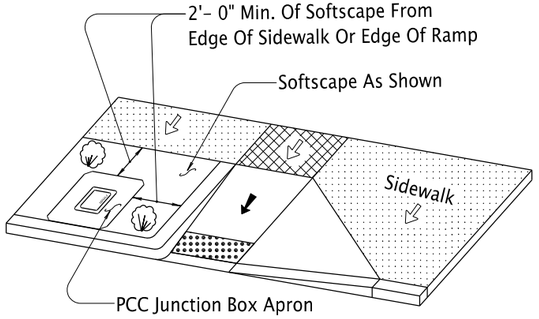




SECTION A–A

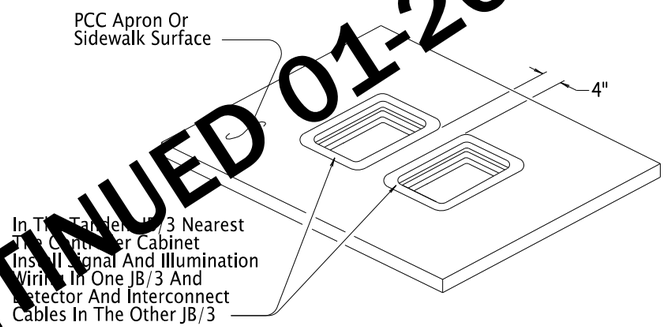
JUNCTION BOX INSTALLATION IN PCC SIDEWALK

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

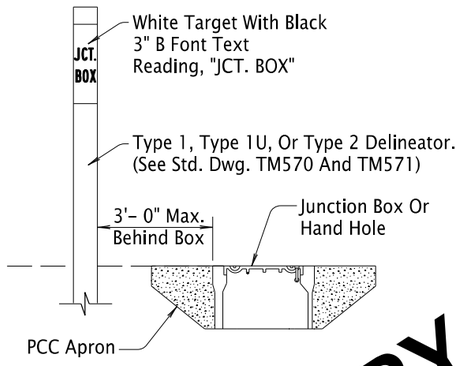


JUNCTION BOX INSTALLATION IN UNSURFACED AREA

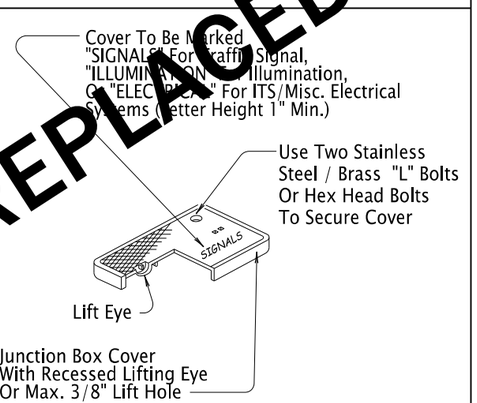
(This Detail Only Applicable for Junction Boxes Located In Incidental Travel Areas; Gravel Shoulders Behind Guardrail, Etc. Do Not Install In Travel Lanes, Paved Shoulders, Or Other Areas Exposed To Traffic.)



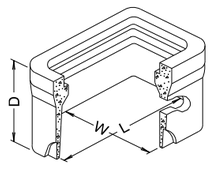
TANDEM JB/3A JUNCTION BOX DETAILS



DELINEATION OF JUNCTION BOX & HAND HOLE IN UNSURFACED AREA



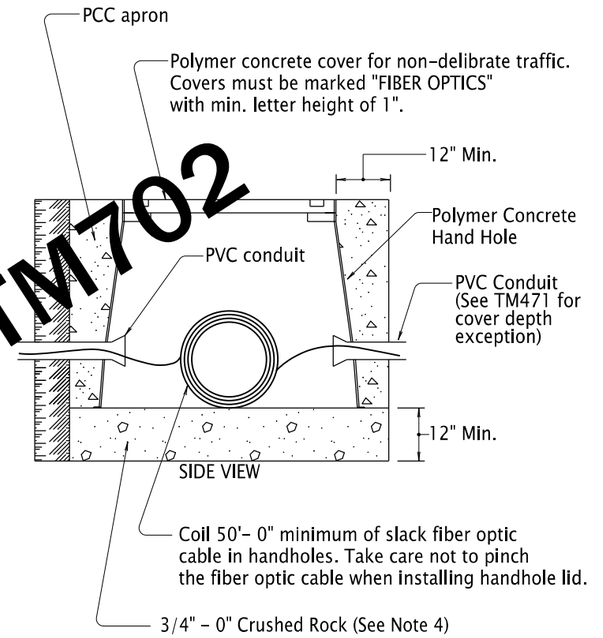
JUNCTION BOX COVER DETAILS

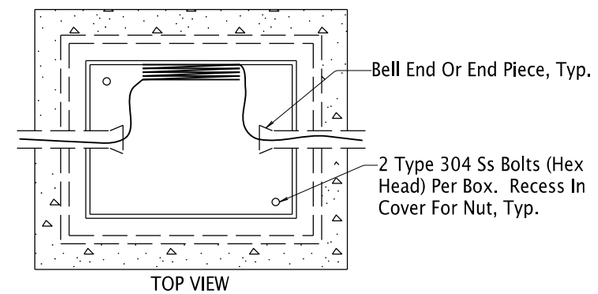


Type*	L	W	D
JB1	17"	10"	12"
JB2	22"	12"	12"
JB3	30"	17"	12"
HH–1	24"	30"	24"
HH–2	30"	48"	24"
HH–3	30"	48"	36"

*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

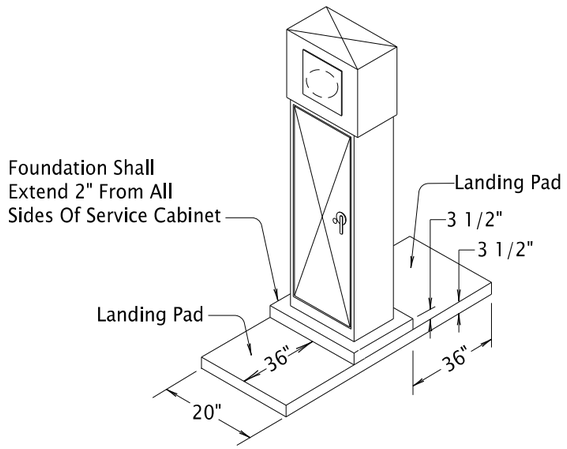
DATE	REVISION DESCRIPTION
07–2022	ADDED NEW MARKING (ILLUMINATION & ELECTRICAL) FOR JB COVER
01–2024	CHANGED DIMENSION FOR JB DELINEATION
07–2024	CHANGED SOFTSCAPE MIN. FROM 3' TO 2'. ADDED HAND HOLE CONDUIT NOTE

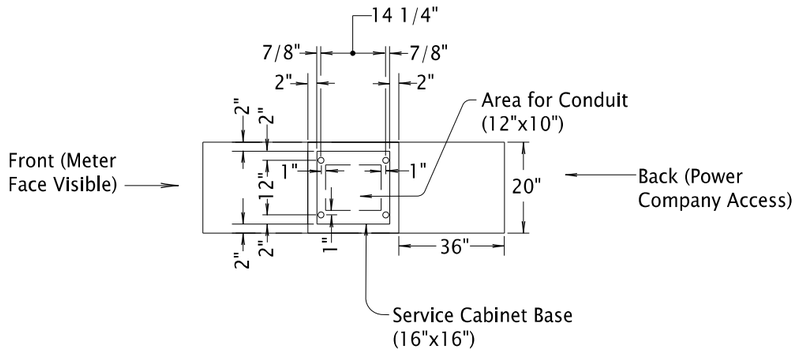
CALC. BOOK NO. N/A | SDR DATE 12-JUL-2024 | **TM472**

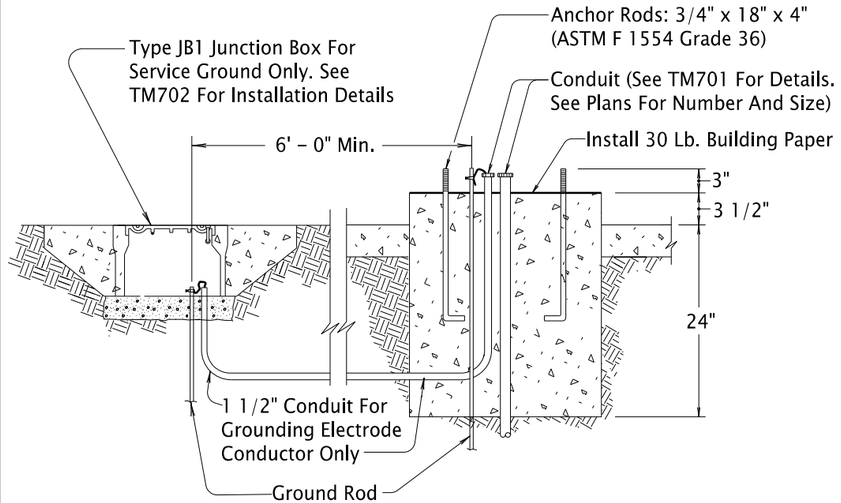
Effective Date: June 1, 2025 – November 30, 2025

10-JAN-2025

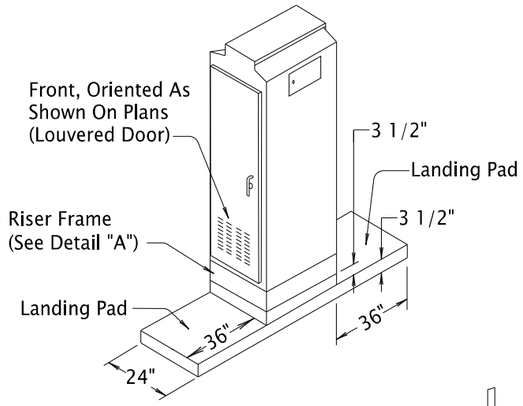
TM482.dgn





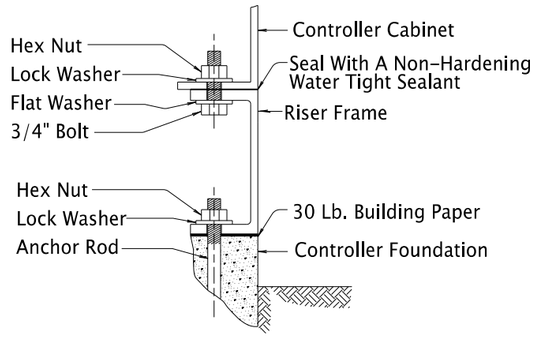


BASE MOUNTED SERVICE CABINET FOUNDATION

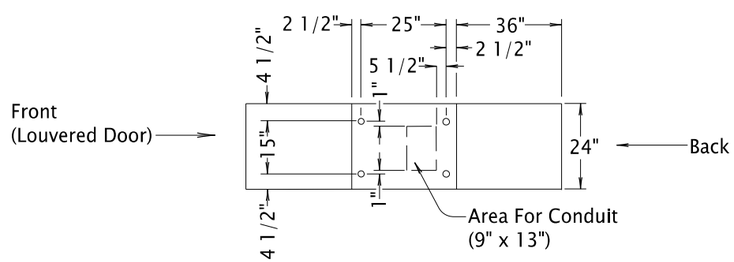


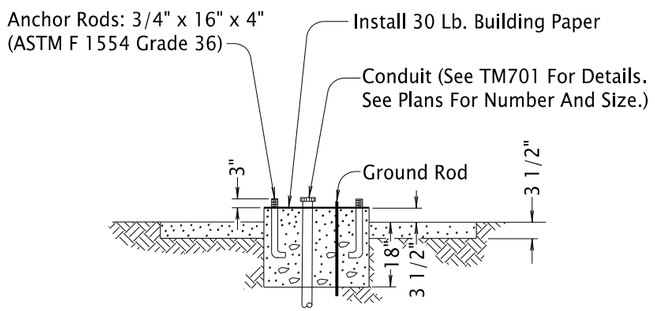
General Notes:

1. All Screws, Bolts, Nuts And Washers Shall Be Galvanized Steel Unless Noted Otherwise.
2. Bolts And Screws Shall Have Square Or Hex Heads. Allen Fasteners Not Allowed.
3. Type 304 Or 316 Stainless Steel Or Galvanized Steel May Be Used For Mounting Cabinet To Riser Frame.
4. Provide A 3/4" Chamfer On All Exposed Concrete Edges.



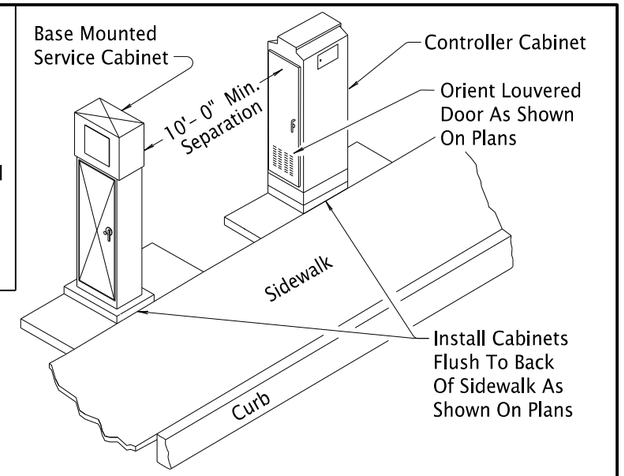
DETAIL "A"
RISER FRAME CONNECTION



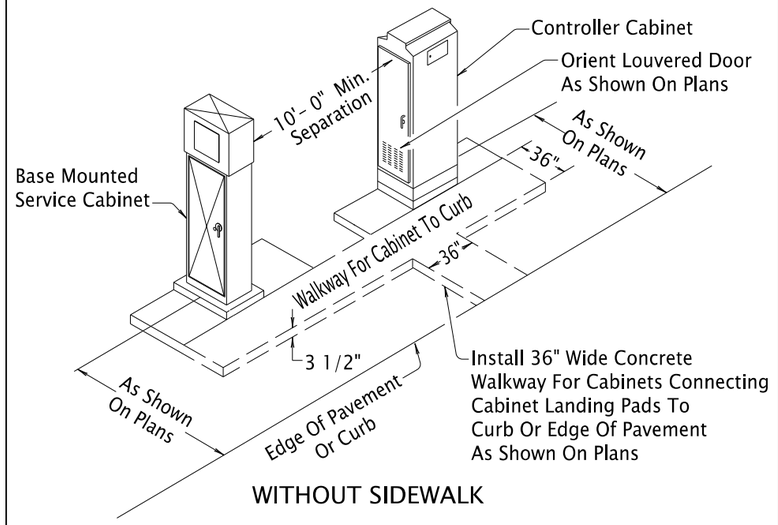


CONTROLLER CABINET FOUNDATION DETAILS

(Model 332S, 332, 334, And 340 Cabinets)



WITH SIDEWALK



WITHOUT SIDEWALK

CABINET FOUNDATION LOCATIONS

Note: Verify Base Mounted Service Cabinet Location And Meter Placement Is Acceptable To Local Power Company

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

CONTROLLER CABINET & SERVICE CABINET FOUNDATION DETAILS

2024

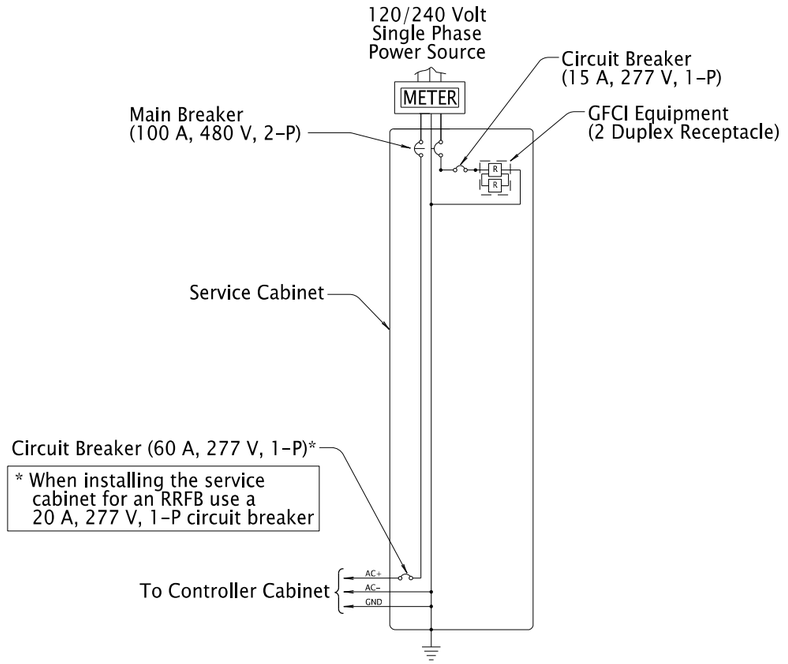
DATE	REVISION DESCRIPTION
01-2021	UPDATED ALL ANCHOR ROD DETAILS
01-2025	UPDATED STANDARD DRAWING REFERENCES

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **TM482**

Effective Date: June 1, 2025 - November 30, 2025

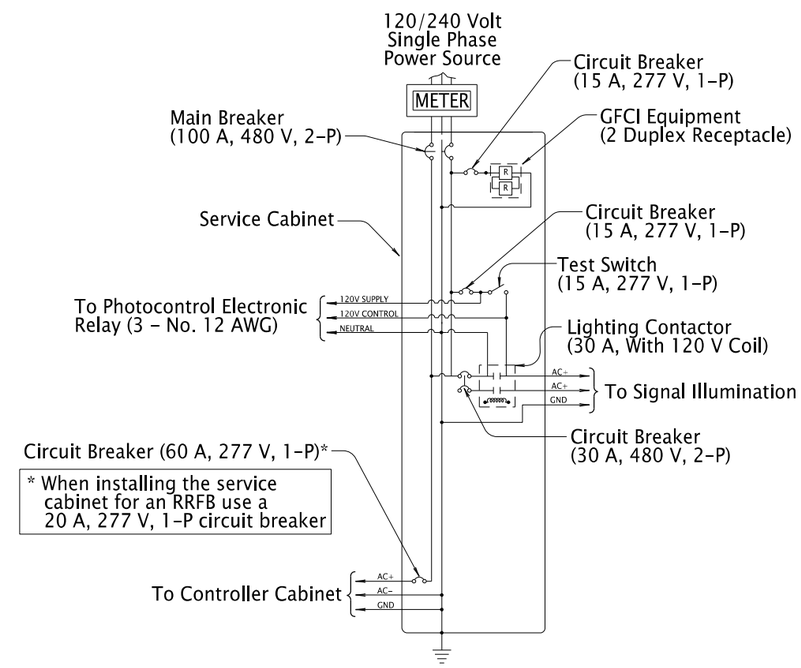
10-JAN-2025

TM485.dgn



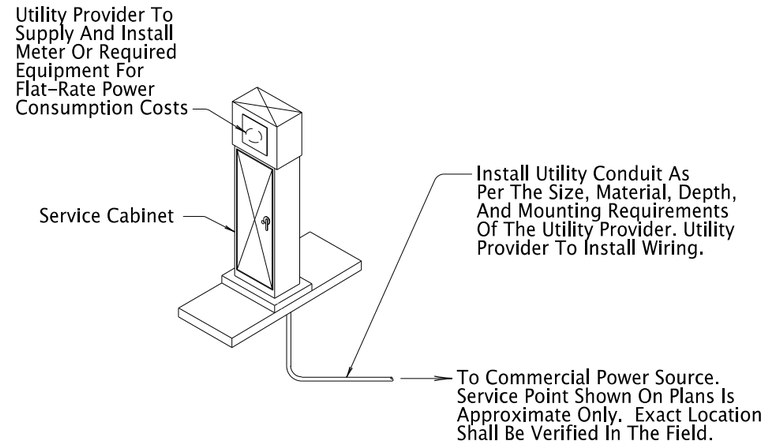
SERVICE CABINET WIRING: (BMC) (SC)

(Signal System)

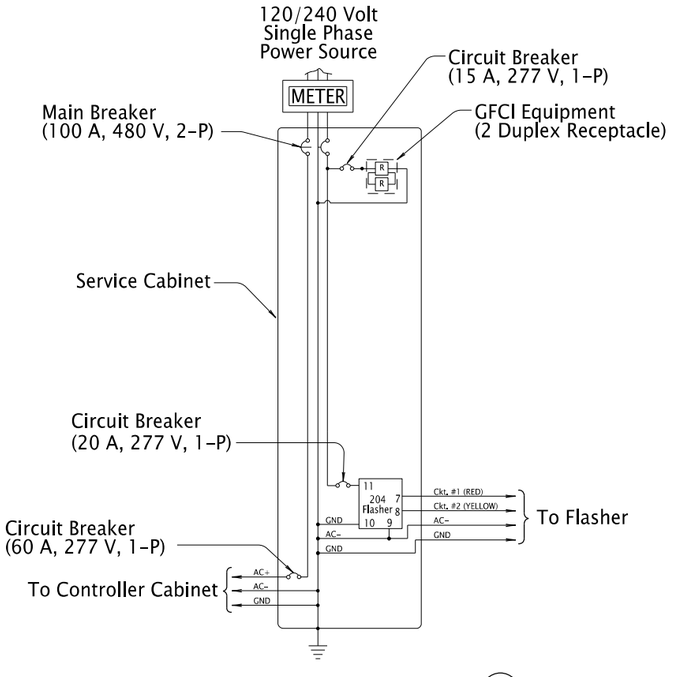


SERVICE CABINET WIRING: (BMCL) (SCL)

(Signal + Illumination System)

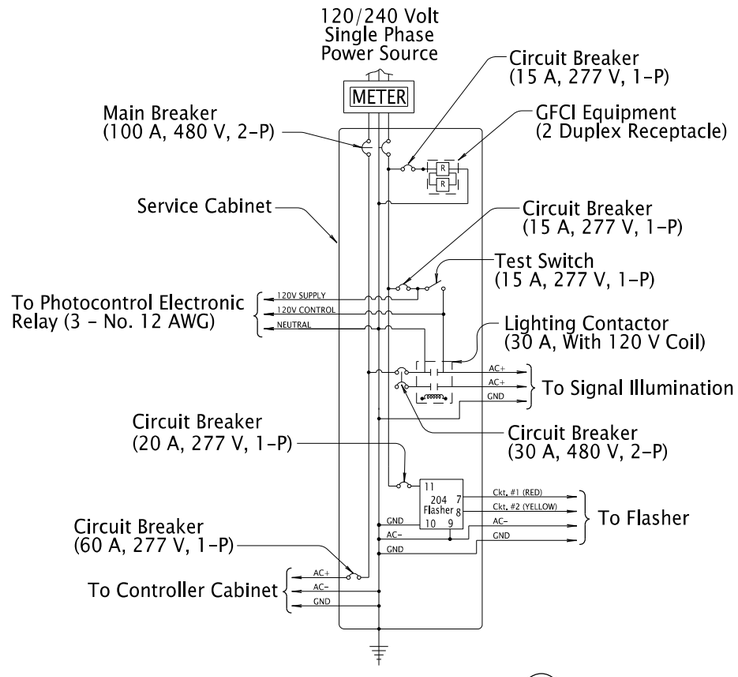


UTILITY PROVIDER DETAILS



SERVICE CABINET WIRING: (BMCF)

(Signal + Flashing Beacon System)



SERVICE CABINET WIRING: (BMC FL)

(Signal + Flashing Beacon + Illumination System)

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

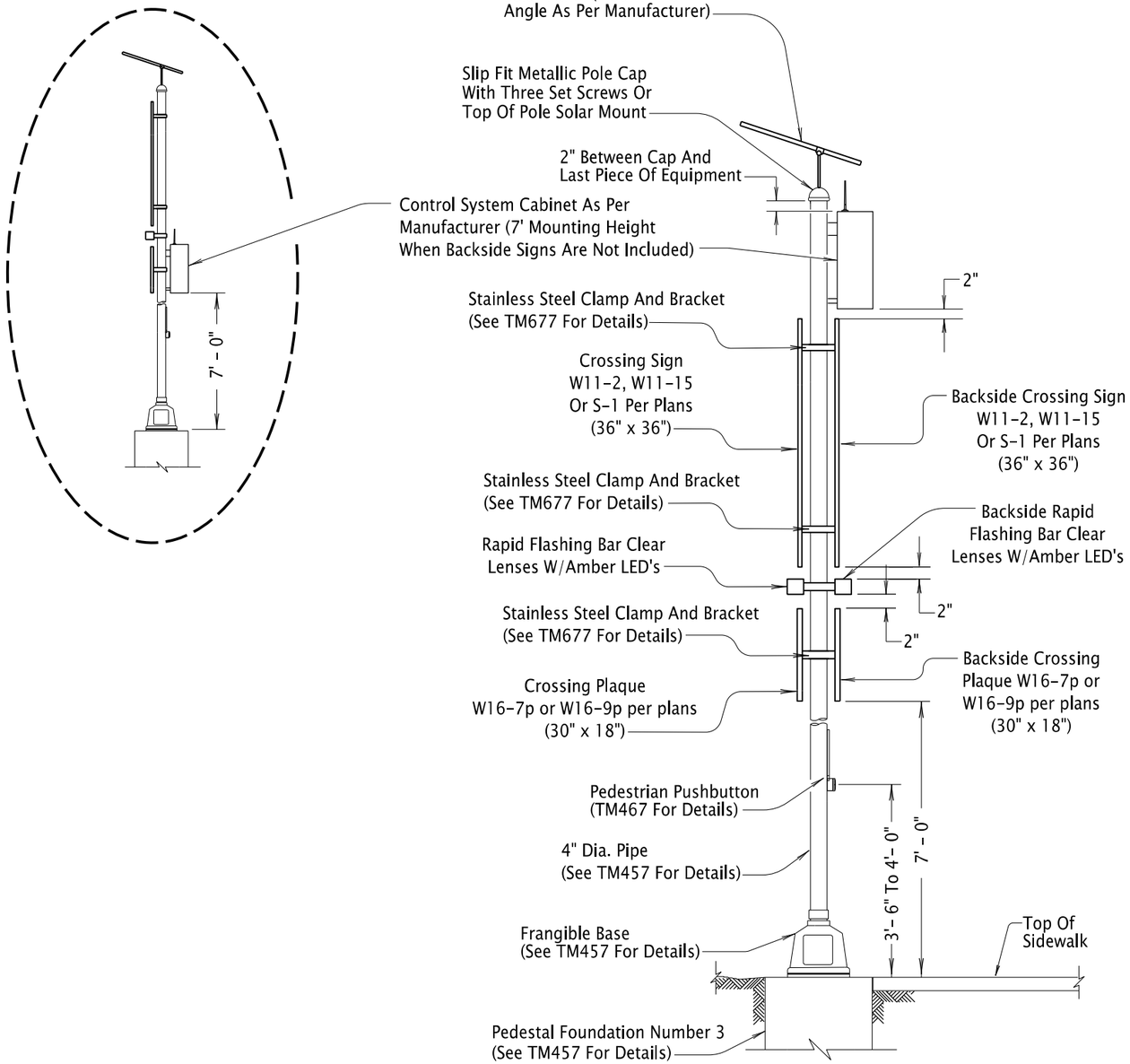
DATE	REVISION DESCRIPTION
07-2023	REVISED SERVICE CABINET WIRING TITLES, ADDED NOTE 6.
01-2024	ADDED NOTE FOR RRFB 20 AMP BREAKER IN BMC & BMCL DETAILS
07-2024	MINOR TEXT REVISIONS FOR UNIFORMITY
01-2025	ADDED GFCI EQUIPMENT TO SERVICE CABINET. REFORMATTED FOR CLARITY

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **TM485**

Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

TM493.dgn

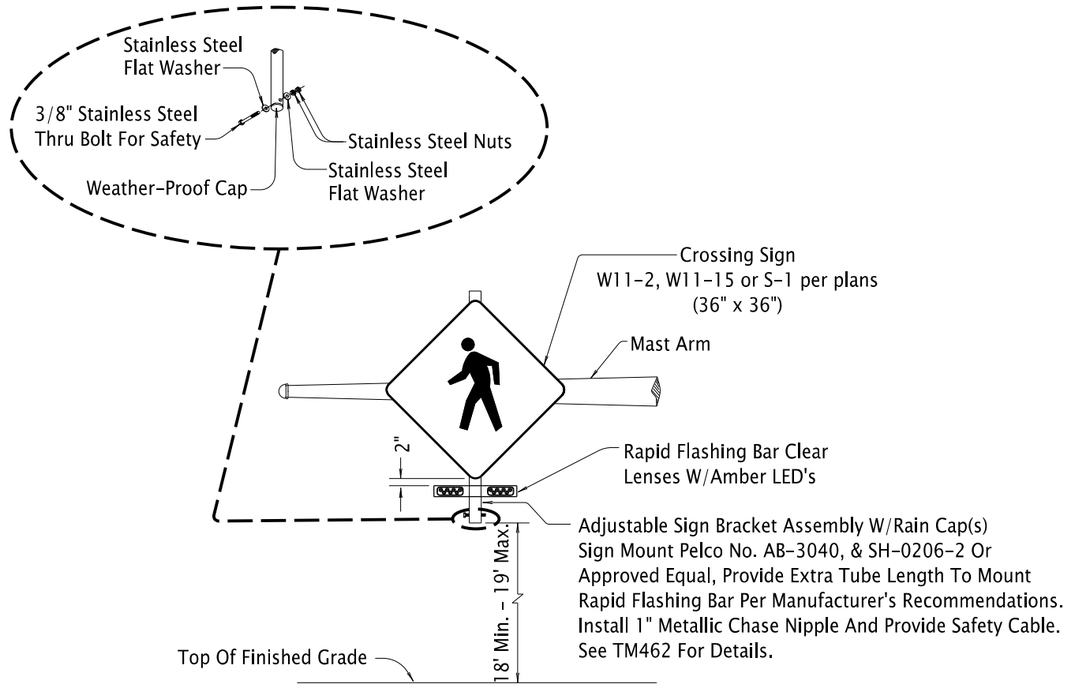


Note:

1. Equipment Shown In The Assembly Detail Is An Example Of The Equipment That May Be Mounted. Install Equipment As Shown.

2. Equipment Mounting Details Shown Are Also Applicable When Mounting Equipment To A Large Signal Pole.

RECTANGULAR RAPID FLASHING BEACON PEDESTAL ASSEMBLY
(Use Green Sheet Listed Items Only)



RECTANGULAR RAPID FLASHING BEACON MAST ARM ASSEMBLY
(Use Green Sheet Listed Items Only)

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

RECTANGULAR RAPID FLASHING BEACON (RRFB) ASSEMBLIES

2024

DATE	REVISION DESCRIPTION
07-2022	NEW DRAWING
07-2023	MINOR TEXT CHANGES FOR CLARITY
01-2025	CORRECTED TYPO

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **TM493**

Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

TM607.dgn

GENERAL NOTES:

Standard Truss Type VMS Bridges are designed in accordance with AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals 4th edition, 2001 and 2002 interim revisions.

Basic wind speed (3 second gust) used for sign bridge design is 110 mph. G = 1.14, I_r = 1.0 (50 year recurrence interval) and Exposure C were used for design. C_D= 1.7 was used for the VMS.

Material for square hollow structural sections (HSS) members shall be ASTM A500 Grade B, or ASTM A500 Grade C.

The design Type One VMS sign mass is 4250 lbs (not including W 6 x 15 support arms and walkway). The design sign is "XL" feet from the left End Truss and "XR" feet from the right End Truss. The bridge has been designed for all possible positioning of the sign on the span. The sign is to be positioned in coordination with Traffic/ITS designer. Chord end connection plates and truss field splice plates shall conform to ASTM A709, Grade 50 or ASTM A572, Grade 50.

Notch toughness of all structural steel members and plates greater than ½" thick shall conform to Zone 2 non-fracture critical requirements of ASTM A709.

All other structural steel shall conform to ASTM A36, or A992.

High strength bolts shall conform to ASTM A325, Type 1.

Nuts for high strength bolts shall be heavy hex and conform to ASTM A563 Grade DH, with supplementary requirements "S1" and "S2".

Bolts and rods connecting galvanized steel members to aluminum members shall meet the requirements of ASTM A193 Class 2 Grade B8M. Nuts used with A193 bolts shall be heavy hex, and shall meet the requirements of ASTM A194 Grade 8M with supplementary requirement "S1". Use a stainless steel flatwasher and double nut at each bolt.

Hardened steel washers shall conform to ASTM F436, Type 1. Use washers under turning element in tightening unless otherwise specified.

Final elevations shall be field verified prior to the fabrication of the end truss members and footing reinforcement.

All fasteners, except mechanically galvanized direct tension indicator (DTI) washers, shall be hot-dip galvanized (except stainless steel and non-ferrous fasteners).

All structural steel shall be hot-dip galvanized after fabrication, unless noted otherwise.

The silicon content of the base metal shall be in the ranges of 0.0% to 0.06% or 0.13% to 0.25% for all hot-dip galvanized steel, unless noted otherwise. The maximum carbon equivalent (CE) is 0.40% for the base metal. Use the AWS D1.1 CE formula. Preheat according to AWS D1.5 Annex F using the hydrogen control method and high degree of restraint when the carbon equivalent (CE) of the steel exceeds 0.40%.

All H.S. bolts shall be considered slip critical and tightened according to 00930.40(d)(2)a, unless noted otherwise. Design slip resistance for bolts shall conform to the Bolt Specifications for Class C slip coefficient = 0.33.

Selection of the End Truss Posts shall be based on the larger "HP" in the case of unequal post heights. All End Truss Posts shall be the same cross section. This Standard Truss Type VMS Bridge has been designed for both equal and unequal post heights.

This Standard Truss Type VMS Bridge has been designed for the stated loading only. No additional signs or additional loadings are permitted. Other uses and loadings shall be considered non-standard, and are outside the scope of this design.

Welded splices in posts or chords and welds connecting posts or chords to base connection plates shall be full penetration welds as shown on Dwgs.# TM608 and TM609.

Root gap for T-Y-K tubular connections welds shall not exceed 1/16".

Fabrication drawings shall show the weight of all parts.

Conduit diameters shown on plans are nominal or trade sizes.

Wherever possible truss member centerlines shall intersect at a common work point, unless shown otherwise on these standards. Where it is not possible to line up member centerlines at a common work point, the maximum allowable centerline eccentricity is 2 inches.

Verify that tops of pedestals are level and at correct elevations, prior to vertical end truss installation.

A preconstruction meeting is recommended to make sure the contractor understands ODOT requirements and that ODOT understands the contractor's plan.

If a 20 minute rolling traffic stop is used to install the overhead sign support truss bridge, the rolling stop shall meet the following requirements:

a) Verify (prior to span truss lift) adequate crane capacity and boom length to perform complete installation from side of road.
b) Set crane(s) on side of road and do not re-set crane during lift.
c) Verify (prior to span truss lift) that lifting equipment and lifting points meet requirements of plans.
d) Verify (prior to span truss lift) that vertical end trusses are at the correct elevations, plumb, and that the (hole to hole) distance between the two end trusses matches the span truss (hole to hole) length.
e) Pre-assemble span truss within reach of crane(s).
f) Rig lift before beginning rolling stop.
g) Make sure all required tools and hardware are on site.
h) Do not resume traffic until span truss to saddle bolts are at least snug tight.
i) Rolling stops shall be at night and shall conform to the Special Provisions.
j) Follow all required safety procedures.

If required, installation of temporary guard rail or temporary barrier should preceed any other work involving the construction of the footing.

Use single self locking nuts or double nuts on non-high strength (H.S.) bolts, unless otherwise shown or specified.

See Dwg.# TM608 for typical high strength bolt connection.

At ends of square HSS, welding shall be carried continuously around corners, with corners fully built up and all weld starts and stops within flat faces. Perform magnetic particle testing of areas within 2 inches of welds prior to pickling, and report findings to ODOT. If cracks are found, do not galvanize until directed to do so. Perform a detailed 100% visual inspection of the entire structure after galvanizing.

Prior to galvanizing, the fabricator shall assemble the span truss and measure the camber and the horizontal span distance between the four centers of the outside slotted saddle holes, in the presence of the ODOT inspector. With the span truss resting on its side and the camber in the horizontal direction, a string line shall be used to check the camber. The allowable variation from required camber at shop assembly is -0% to +25%. The length between the saddle holes shall be measured using a steel tape or other approved measuring method and shall have an allowable variation of -1/8" to +1/8".

FOUNDATION NOTES:

Provide shoring for each footing if required.

Top surface of concrete pedestal (including area under base plate and around anchor bolts) shall be floated and troweled to a flat and level surface. This surface shall not vary more than 1/8" from a horizontal plane. Provide a ¾" chamfer on all exposed edges of the pedestal.

All concrete shall be Class 4000 - ¾" structural concrete.

Place bars 2 inches clear of the nearest face of concrete, unless shown otherwise.

Concrete shall be placed using a tremie when free fall exceeds 4'-0". Cold joints shall be cause for rejection of the foundation, except between footing and pedestal.

All reinforcing steel shall conform to ASTM A706 or A615 Gr. 60.

Anchor rods shall conform to ASTM F1554, Gr. 55, with supplementary requirements "S2" that includes grade and manufacturer's identification and "S4".

Anchor rod washers shall conform to ASTM F436.

Anchor rod nuts shall conform to ASTM A563 Grade DH with supplementary requirements "S1" and "S2".

Anchor rod template, temporary support members, and anchor plate shall conform to ASTM A36.

Anchor rods shall be hot-dip galvanized full length.

Where the footing of a Std. Truss Type VMS Bridge interferes with guard rail posts the depth of footing may be increased to the maximum shown on Dwg.# TM611, or concrete barrier may be used instead of guard rail, or guard rail posts may be attached to footing in accordance with Dwg.# BR266. All buried steel shall be coated for immersion exposure with an approved product from the qualified products for structural coatings. Prepare and coat surfaces according to Section 00594 of Oregon Standard Specifications.

The elevation and location of anchor rods is critical. Use survey techniques to verify the elevation, location, and orientation of anchor bolt groups prior to placement of foundation concrete.

CONSTRUCTION PROCEDURE AND SEQUENCE:

1. Construct foundation according to plans. Verify elevation, location and orientation of anchor bolts. Steel templates shall be used to accurately locate and hold the anchor rods plumb and in proper alignment. Hole diameter in template shall be the nominal bolt diameter plus 1/16". This template shall be in place during concrete placement and shall remain in place for a minimum of 24 hours after the concrete placement has been complete. Out of position anchor rods and anchor rods greater than 1:40 out of plumb are cause for rejection of the foundation. Bending of anchor rods to straighten or move them into position, or alterations of the base plate shall not be permitted and are cause for rejection of the foundation and/or post weldment. See Template Detail on Dwg.#TM610.
2. After 7 days min. of spread footing concrete cure time (excluding days when the surrounding temperature is below 40° Fahrenheit for over 4 hours) and when tests indicate that the concrete has reached full design strength (100%), the pedestal pour may begin. The post erection may begin after 7 days of concrete cure time of the pedestal and when test indicate that the concrete pedestal has reached full design strength (100%).
3. Install bearing nuts on anchor rods. Level the bearing nuts. Install hardened flat washers above bearing nuts.
4. Use crane to lift end truss onto anchor rods. Maintain crane connection as a safety measure until post installation is 100% complete. No grout shall be used under the base plate. Install hardened flat washers above base plate.
5. Generously apply approved bolting lubricant (Castrol Stick Wax or approved equal) to the top nut bearing surface and internal threads, and install nut on anchor rods to snug tight condition. Snug tight is defined as the condition when all plies are in firm contact and can usually be obtained by the full effort of a worker on a 12 inch long wrench or a few impacts of an impact wrench. Several passes may be required to obtain uniform tightness.
6. Tighten bearing nuts upward against base plate in a similar manner, to assure a uniform snug tight condition. Assure that the hole to hole span distance between saddles at opposite ends of the sign bridge matches the hole to hole span distance between opposite ends of the span truss. The end trusses may be up to ½" out of plumb to help accommodate construction tolerances and temperature effects. Adjust bearing nut as required and repeat snug tightening.
7. Mark position of each anchor rod and top nut with a felt tip pen so subsequent nut rotation can be verified. Rotate all top nuts an additional 1/6 turn in two passes (1/12 turn per pass).
8. Assemble VMS bridge span truss field splices and fully tighten high strength connection bolts according to Section 00930.40(d)(2)(a) of the Standard Specifications and Special Provisions.
9. Verify positions of saddles relative to VMS bridge chord end connections.
10. Assemble vertical VMS mounts, VMS, and span together. Provide adequate time for engineer to inspect the bolt tightening on the assembly in accordance with 00930.40(e) and tighten or replace bolts as required prior to lifting assembly.
11. Verify VMS, mounts, and span truss total weight before lifting. Lift the VMS and span truss using one or two cranes as required to meet the following conditions. A qualified person shall be in charge of the lifting operation. VMS and span truss shall be lifted at four equally loaded lift points, see TM606. Extreme care must be used when lifting the assembly the first time to make sure that it does not rotate from the eccentric VMS load.
12. Lift the VMS and span truss assembly into position on the saddles.
13. Install H.S. saddle bolts and tighten according to Section 00930.40(d)(2)(a).

WALKWAY NOTES:

Grating shall be welded steel grating with 1½" x 1/8" bearing bars spaced at 1 3/16" centers and ¼" x ¼" nominal square cross bars (or equivalent) spaced at 4" centers. Steel plates and bars including grating elements shall conform to ASTM A36 or approved equal.

Rail members and post brackets shall be structural steel tubing conforming to ASTM Specification A500, Grade A or B.

Grating may be spliced at an interior support by welding 1/8" x 1½" bars to ends of bearing bars across full width of grating and bolting bars together with ¼" dia. bolts at 12 inch maximum centers.

Top of walkway grating shall not be more than 6 inches below the threshold into the VMS cabinet.

Walkway contractor to verify prior to fabrication that walkway, grating and rails do not interfere with VMS door or VMS housing. No gaps greater than 1 inch between walkway rails, grating and toe board, and VMS housing are allowed.

All bolts, including U-bolts, shall conform to ASTM Specification A307, unless otherwise noted.

Accompanied by dwgs. TM606, TM608, TM610, TM611, TM612

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 TRUSS TYPE VMS BRIDGE 50' TO 167' SPAN RANGE NOTES

2024

DATE	REVISION DESCRIPTION
01-2022	UPDATED SILICON CONTENT RANGES AND AWS D1.5 ANNEX G TO ANNEX F
01-2025	CONCRETE WAS CLASS 3600 - ¾" CLASSIFIED AS A STRUCTURAL ITEM

CALC. BOOK NO. 5014/6133 | SDR DATE 10-JAN-2025 | **TM607**

Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

TM615.dgn

GENERAL NOTES:

Standard Truss Type Sign Bridges are designed in accordance with AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals 4th edition, 2001 and 2002 interim revisions.

Basic wind speed (3 second gust) used for sign bridge design is 110 mph. G = 1.14, Ir = 1.0 (50 year recurrence interval) and Exposure C were used for design.

Material for square HSS members shall be ASTM A500 Grade B, or ASTM A500 Grade C.

18"x18"x5/8" square tubes shall be fabricated from $\frac{5}{8}$" thick ASTM A572 Gr. 50 plate according to the detail shown on TM620.

The maximum design sign area for Standard Sign Bridge Trusses (based on 9'-0" primary sign height plus 2'-6" exit secondary sign heights, above and below primary sign for a maximum total sign height of 14'-0") is shown on Dwg.# TM614. The maximum design length extends over the full width of the possible travel lanes and shoulders.

The signs are to be positioned horizontally in coordination with Traffic Plans and vertically as shown on Dwg.# TM614.

Chord end connection plates and truss field splice plates shall conform to ASTM A709, Grade 50 or ASTM A572, Grade 50.

Notch toughness of all structural steel members and plates greater than $\frac{1}{2}$" thick shall conform to Zone 2 non-fracture critical requirements of ASTM A709.

All other structural steel shall conform to ASTM A36, or A992.

High strength bolts shall conform to ASTM A325, Type 1.

Nuts for high strength bolts shall be heavy hex and conform to ASTM A563 Grade DH, with supplementary requirements "S1" and "S2".

Hardened steel washers shall conform to ASTM F436, Type 1. Use washers under turning element in tightening unless otherwise specified.

Final elevations shall be field verified prior to the fabrication of the end truss members and footing reinforcement.

All fasteners, except mechanically galvanized direct tension indicator (DTI) washers, shall be hot-dip galvanized (except stainless steel and non-ferrous fasteners).

All structural steel shall be hot-dip galvanized after fabrication, unless noted otherwise.

The silicon content of the base metal shall be in the ranges of 0.0% to 0.06% or 0.13% to 0.25% for all hot-dip galvanized steel, unless noted otherwise. The maximum carbon equivalent (CE) is 0.40% for the base metal. Use the AWS D1.1 CE formula. Preheat according to AWS D1.5 Annex F using the hydrogen control method and high degree of restraint when the carbon equivalent (CE) of the steel exceeds 0.40%.

All H.S. bolts shall be considered slip critical and tightened according to 00930.40(d)(2)a, unless noted otherwise. Design slip resistance for bolts shall conform to the Bolt Specifications for Class C slip coefficient = 0.33.

Selection of the End Truss Posts shall be based on the larger "HP" in the case of unequal post heights. All End Truss Posts shall be the same cross section. This Standard Truss Type Sign Bridge has been designed for both equal and unequal post heights.

This Standard Truss Type Sign Bridge has been designed for the stated loading only. No additional signs or additional loadings are permitted. Other uses and loadings shall be considered non-standard, and are outside the scope of this design.

Welded splices in posts or chords and welds connecting posts or chords to base connection plates shall be full penetration welds as shown on Dwgs.# TM616 and TM617.

Root gap for T-Y-K tubular connections welds shall not exceed $\frac{1}{16}$".

Fabrication drawings shall show the weight of all parts.

Where ever possible truss member centerlines shall intersect at a common work point, unless shown otherwise on these Standards. Where it is not possible to line up member centerlines at a common work point, the maximum allowable centerline eccentricity is 2 inches.

Verify that tops of pedestals are level and at correct elevations, prior to vertical end truss installation.

A preconstruction meeting is recommended to make sure the contractor understands ODOT requirements and that ODOT understands the contractor's plan.

If a 20 minute rolling traffic stop is used to install the overhead sign support truss bridge, the rolling stop shall meet the following requirements:

a) Verify (prior to span truss lift) adequate crane capacity and boom length to perform complete installation from side of road.
b) Set crane(s) on side of road and do not re-set crane during lift.
c) Verify (prior to span truss lift) that lifting equipment and lifting points meet requirements of plans.
d) Verify (prior to span truss lift) that vertical end trusses are at the correct elevations, plumb, and that the (hole to hole) distance between the two end trusses matches the span truss (hole to hole) length.
e) Pre-assemble span truss within reach of crane(s).
f) Rig lift before beginning rolling stop.
g) Make sure all required tools and hardware are on site.
h) Do not resume traffic until span truss to saddle bolts are at least snug tight.
i) Rolling stops shall be at night and shall conform to the Special Provisions.
j) Follow all required safety procedures.

If required, installation of temporary guard rail or temporary barrier should preceed any other work involving the construction of the footing.

Use single self locking nuts or double nuts on non-high strength (H.S.) bolts, unless otherwise shown or specified.

See Dwg.# TM616 for typical high strength bolt connection.

At ends of square HSS, welding shall be carried continuously around corners, with corners fully built up and all weld starts and stops within flat faces. Perform magnetic particle testing of areas within 2 inches of welds prior to pickling, and report findings to ODOT. If cracks are found, do not galvanize until directed to do so. Perform a detailed 100% visual inspection of the entire structure after galvanizing.

Prior to galvanizing, the fabricator shall assemble the span truss and measure the camber and measure the horizontal span distance between the four centers of the outside slotted holes in the presence of the ODOT inspector. With the span truss resting on its side and the camber in the horizontal direction, a string line shall be used to check the camber. The allowable variation from required camber at shop assembly is -0% to +25%. The length between saddle holes shall be measured using a steel tape, or other approved measuring method, and shall have an allowable variation of -1/8" to +1/8".

FOUNDATION NOTES:

Provide shoring for each footing if required.

Top surface of concrete pedestal (including area under base plate and around anchor bolts) shall be floated and troweled to a flat and level surface. This surface shall not vary more than $\frac{1}{8}$" from a horizontal plane. Provide a $\frac{3}{4}$" chamfer on all exposed edges of the pedestal.

All concrete shall be Class 4000 - $\frac{3}{4}$" structural concrete.

Place bars 2 inches clear of the nearest face of concrete, unless shown otherwise.

Concrete shall be placed using a tremie when free fall exceeds 4'-0". Cold joints shall be cause for rejection of the foundation, except between footing and pedestal.

All reinforcing steel shall conform to ASTM A706 or A615 Gr. 60.

Anchor rod washers shall conform to ASTM F436.

Anchor rods shall conform to ASTM F1554, Gr. 55, with supplementary requirements "S2" that includes grade and manufacturer's identification and "S4".

Anchor rod nuts shall conform to ASTM A563 Grade DH with supplementary requirements "S1" and "S2".

Anchor rod template, temporary support members, and anchor plate shall conform to ASTM A36.

Anchor rods shall be hot-dip galvanized full length.

The elevation and location of anchor rods is critical. Use survey techniques to verify the elevation, location, and orientation of anchor bolt groups prior to placement of foundation concrete.

Provide 1 -2 inch dia. rigid electrical conduit at each end of bridge as shown on Dwg. # TM617 and as directed. Extend sign support end of conduit to the center of the lower hand hole. If luminaries are not required, extend the other end of the conduit into the nearest illumination circuit junction box and identify conduit by attaching a tag which says "future sign lighting". Install "pull string" in conduit for future use. Install conduit cap on each end. When luminaries are required, extend the other end of conduit per Project Plans.

Where the footing of a Std. Truss Type Sign Bridge interferes with guard rail posts the depth of footing may be increased to the maximum shown on Dwg.# TM619, or concrete barrier may be used instead of guard rail, or guard rail posts may be attached to footing in accordance with Dwg.# BR266. All buried steel shall be coated for immersion exposure with an approved product from the qualified products for structural coatings. Prepare and coat surfaces according to Section 00594 of Oregon Standard Specifications.

CONSTRUCTION PROCEDURE AND SEQUENCE:

1. Construct foundation according to plans. Verify elevation, location and orientation of anchor bolts. Steel templates shall be used to accurately locate and hold the anchor rods plumb and in proper alignment. Hole diameter in template shall be the nominal bolt diameter plus $\frac{1}{16}$". This template shall be in place during concrete placement and shall remain in place for a minimum of 24 hours after the concrete placement has been complete. Out of position anchor rods and anchor rods greater than 1:40 out of plumb are cause for rejection of the foundation. Bending of anchor rods to straighten or move them into position, or alterations of the base plate shall not be permitted and are cause for rejection of the foundation and/or post weldment. See Template Detail on Dwg.# TM620.
2. After 7 days min. of spread footing concrete cure time (excluding days when the surrounding temperature is below 40° Fahrenheit for over 4 hours) and when tests indicate that the concrete has reached full design strength (100%), the pedestal pour may begin. The post erection may begin after 7 days of concrete cure time of the pedestal and when test indicate that the concrete pedestal has reached full design strength (100%).
3. Use crane to lift end truss onto anchor rods. Maintain crane connection as a safety measure until post installation is 100% complete. No grout shall be used under the base plate. Install hardened flat washers above base plate.
4. Install bearing nuts on anchor rods. Level the bearing nuts. Install hardened flat washers above bearing nuts.
5. Generously apply approved bolting lubricant (Castrol Stick Wax or approved equal) to the top nut bearing surface and internal threads, and install nut on anchor rods to snug tight condition. Snug tight is defined as the condition when all plies are in firm contact and can usually be obtained by the full effort of a worker on a 12" long wrench or a few impacts of an impact wrench. Several passes may be required to obtain uniform tightness.
6. Tighten bearing nuts upward against base plate in a similar manner, to assure a uniform snug tight condition. Assure that the hole to hole span distance between saddles at opposite ends of the sign bridge matches the hole to hole span distance between opposite ends of the span truss. The end trusses may be up to $\frac{1}{2}$" out of plumb to help accommodate construction tolerances and temperature effects. Adjust bearing nut as required and repeat snug tightening.
7. Mark position of each anchor rod and top nut with a felt tip pen so subsequent nut rotation can be verified. Rotate all top nuts an additional 1/6 turn in two passes (1/12 turn per pass).
8. Assemble sign bridge span truss and fully tighten high strength connection bolts according to Section 00930.40(d)(2)(a) of the Standard Specifications and Special Provisions.
9. Verify positions of end truss saddles relative to sign bridge chord end connections.
10. Assemble vertical sign mounts, signs, and span together. Provide adequate time for engineer to inspect the bolt tightening on the assembly in accordance with 00930.40(e) and tighten or replace bolts as required prior to lifting assembly.
11. Verify signs, sign mounts, and span truss total weight before lifting. Lift the signs and span truss using one or two cranes as required to meet the following conditions. A qualified person shall be in charge of the lifting operation. Signs and span truss shall be lifted at four equally loaded lift points, see TM606. Extreme care must be used when lifting the assembly the first time to make sure that it does not rotate from the eccentric sign loads.
12. Lift the signs and span truss assembly into position on the saddles.
13. Install H.S. saddle bolts and tighten according to Section 00930.40(d)(2)(a).

LUMINAIRE NOTES:

1. Hubs, hand holes, grounding terminals, hook and foundation conduit shall always be installed for possible future use. Luminaires, luminaire support arms and luminaire support channels noted on Dwg.# TM618 should only be provided when luminaires are required (see Project Plans).
2. Conduit diameters shown on plans are nominal or trade sizes.

Accompanied by dwgs. TM614, TM616, TM617, TM618, TM619, TM620

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 TRUSS TYPE SIGN BRIDGE 50' TO 167' SPAN RANGE NOTES

2024

DATE	REVISION DESCRIPTION
01-2022	UPDATED SILLCON CONTENT RANGES AND AWS D1.5 ANNEX G TO ANNEX F
01-2025	CONCRETE WAS CLASS 3600 - ¾" CLASSIFIED AS A STRUCTURAL ITEM

CALC. BOOK NO. 5071/6134 | SDR DATE 10-JAN-2025 | **TM615**

Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

TM622.dgn

GENERAL NOTES:

Standard Monotube Cantilever Sign Support Structures are designed in accordance with AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals 1st edition, 2015 and interim revisions thru 2017.

Basic wind speed (3 second gust) used for Extreme I Limit State is 145 mph. G = 1.14, 1700 year recurrence interval, fatigue importance factor I_f = 1.0 and Exposure C were used for design.

The maximum design sign area for the Standard Monotube Cantilever Sign Support Structure is shown on Dwg. TM621. The design sign panel and mounting members weigh 5 pounds per square foot. The design luminaire including mounting channels weighs 20 pounds per linear foot. The design luminaire wind loading area including mounting channels is 1 square foot per linear foot, has rectangular flat side shapes, is as long as the design sign, and the resulting projected area is not part of the maximum sign area. The sign lengths for structure design 1 is 25 feet, for structure designs 2 and 3 are 22 feet, for structural designs 4 through 6 are 17 feet, and for structural designs 7 through 8 are 9 feet.

The allowable variation from field verified working drawing camber is -0% to +25%, post length is -0" to +3", and overall length "LA" is -1/8" to +1/8". The maximum offset of the arm 3/4" square bar from straight shall be +1/8" to -1/8" on each member. These lengths shall be measured prior to galvanizing using a steel tape or other approved measuring method.

The VMS design loads include 100 pounds per linear foot applied from center of vertical post to end of arm for the weight of a walkway along with a 500 pound concentrated live load. The design walkway wind loading area is 1.0 square feet per linear foot, extends from center of vertical post to end of arm, and the resulting projected area is not part of the maximum sign area. VMS dimensions and design loads are shown on TM621.

Snow and ice loads are not included in the design loads. The Engineer shall evaluate the design in regions of heavy snow or ice accumulations.

The signs are to be positioned horizontally as shown on Project Data for Std. Monotube Cantilever Sign Support Sheet and vertically as shown on Dwg. TM621.

Material for circular tube sections shall be ASTM A53 Grade B; ASTM A500 Grade B or C; ASTM A501 Grade A or B; or API 5L PSL2 Grade B, X42, X42M, X52, and X52M. All other structural steel shall conform to ASTM A572 Grade 50, or A992, unless noted otherwise.

Bend tube using induction heating methods in accordance with TPA-IBS-98, "Recommended Standards for Induction Bending of Pipe and Tube."

Notch toughness of all structural steel members and plates greater than 1/2" thick shall conform to Zone 2 fracture critical requirements of ASTM A709.

High strength bolts shall conform to ASTM A325, Type 1. Nuts for high strength bolts shall be heavy hex and conform to ASTM A563 Grade DH, with supplementary requirements "S1" and "S2". Hardened steel washers shall conform to ASTM F436, Type 1. Use washers under turning element in tightening unless otherwise specified.

Bolts connecting galvanized steel members to aluminum members shall meet the requirements of ASTM A193 Class 2 Grade B8M. Nuts used with A193 bolts shall be heavy hex and shall meet the requirements of ASTM A194 Grade 8M with supplementary requirement "S1". Use a stainless steel flat washer and double nut at each bolt.

Final elevations shall be field verified prior to fabrication of the post members and footing reinforcement.

All fasteners, except mechanically galvanized direct tension indicator (DTI) washers, shall be hot-dip galvanized (except stainless steel and non-ferrous fasteners). All structural steel shall be hot-dip galvanized after fabrication, unless noted otherwise.

The silicon content of the base metal shall be in the ranges of 0.0% to 0.06% or 0.13% to 0.25% for all hot-dip galvanized steel, unless noted otherwise.

All H.S. bolts shall be considered slip critical and tightened according to Section 00930.40(d)(2)a, unless noted otherwise. Design slip resistance for bolts shall conform to the Bolt Specifications for Class C slip coefficient = 0.33.

This Standard Monotube Cantilever Sign Support has been designed for the stated loading only. No additional signs or additional loadings are permitted. Other uses and loadings shall be considered non-standard, and are outside the scope of this design.

Splices in posts or arms and welds connecting posts or arms to base connection plates shall be full penetration welds as shown on Dwg. TM623.

Fabrication drawings shall show the weight of all parts.

Verify that top of pedestal is level and at correct elevation, prior to post installation.

Install sign mounts and sign on fully erected structure. Do not install sign until after support structure erection and bolt tightening is 100% complete.

A preconstruction meeting is recommended to make sure the contractor understands ODOT requirements and that ODOT understands the contractor's plan.

Use self locking nuts on non-high strength (H.S.) bolts, unless otherwise shown or specified.

See Dwg. TM623 for typical high strength bolt connection.

If a 20 minute rolling traffic stop is used to install the overhead sign support arm, the rolling stop shall meet the following requirements:

- *a) Verify (prior to arm lift) adequate crane capacity and boom length to perform complete installation from side of road.*
- *b) Set crane on side of road and do not re-set crane during lift.*
- *c) Verify (prior to lift) that lifting equipment and lifting points meet requirements of plans.*
- *d) Verify (prior to lift) that base plate is level and at the correct elevation.*
- *e) Rig lift before beginning rolling stop.*
- *f) Make sure all required tools and hardware are on site.*
- *g) Do not resume traffic until all arm to post connection bolts are at least snug tight.*
- *h) Support arm with crane until arm connection bolt tightening is 100% complete.*
- *i) Another rolling stop will be required to install the sign onto the arm.*
- *j) Rolling stops shall be at night and shall conform to the Special Provisions.*
- *k) Follow all required safety procedures.*

FOUNDATION NOTES:

Foundation type shall be as shown on Project Plans. Spread footing details are shown on Dwg. TM627 and drilled shaft details are shown on Dwg. TM628.

Provide shoring for the footing if required. Installation of temporary guardrail or barrier should precede any other work involving the construction of the footing.

Top surface of concrete pedestal (including area under base plate and around anchor bolts) shall be floated and troweled to a flat and level surface. This surface shall not vary more than 1/8" from a horizontal plane. Provide a 3/4" chamfer on all exposed edges of the pedestal.

Concrete for spread footings shall be Class 4000 - 3/4" structural concrete. Concrete for drilled shafts shall be as noted on Dwg. TM628.

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

Concrete shall be placed using a tremie when free fall exceeds 4'-0". Cold joints shall be cause for rejection of the foundation, except between footing and pedestal and top of drilled shaft.

All reinforcing steel shall conform to ASTM A706 or A615 Gr. 60, unless shown otherwise.

Anchor rods shall conform to ASTM F1554, Gr. 55, with supplementary requirements "S2" that includes grade and manufacturer's identification and "S4". Anchor rod washers shall conform to ASTM F436. Anchor rod nuts shall conform to ASTM A563 Grade DH with supplementary requirements "S1" and "S2".

Anchor rod template, temporary support members, and anchor plate shall conform to ASTM A36.

Anchor rods shall be hot-dip galvanized full length.

Provide 1 -2" dia. rigid electrical conduit as shown on Dwgs. TM627 & TM628 and as directed. Extend sign support end of conduit to the center of the lower hand hole. If luminaires are not required, extend the other end of the conduit into the nearest illumination circuit junction box and identify conduit by attaching a tag which says "future sign lighting". Install "pull string" in conduit for future use. Install conduit cap on each end. When luminaires are required, extend the sign support end of conduit per Project Plans.

The elevation and location of anchor rods are critical. Use survey techniques to verify the elevation, location, and orientation of anchor bolt groups prior to placement of foundation concrete.

Where the footing of a Cantilever Monotube Sign Support interferes with guard rail posts, the depth of footing may be increased to the maximum shown on Dwg. TM627, or concrete barrier may be used instead of guard rail, or guard rail posts may be attached to footing in accordance with Dwg. BR266. All buried steel shall be coated for immersion exposure with an approved product from the qualified products for structural coatings (http://www.odot.state.or.us/tsconstruction/). Prepare and coat surfaces according to Section 00594 of Oregon Std. Specifications for Construction.

CONSTRUCTION PROCEDURE AND SEQUENCE:

1. *Construct foundation according to plans. Verify elevation, location and orientation of anchor bolts. Steel template, shown on Dwg. TM626, shall be used to accurately locate and hold the anchor rods plumb and in proper alignment. This template shall be in place during concrete placement and shall remain in place for a minimum of 24 hours after the concrete placement has been completed. Out of position anchor rods and anchor rods greater than 1:40 out of plumb are cause for rejection of the foundation. Bending of anchor rods to straighten or move them into position, or alterations of the base plate shall not be permitted and are cause for rejection of the foundation and/or post weldment.*
2. *Pedestal pour may begin after spread footing concrete has satisfied Section 00540.52. The post erection may begin after concrete has satisfied Section 00540.52.*
3. *Install bearing nuts on anchor rods. Level the bearing nuts. Install hardened flat washers above bearing nuts.*
4. *Use crane to lift post onto anchor rods. Maintain crane connection as a safety measure until post installation is complete. No grout shall be used under the base plate. Install hardened flat washers above base plate.*
5. *Generously apply an approved lubricant for galvanized fasteners from the QPL to the top nut bearing surface and internal threads, and install nut on anchor rods to snug tight condition. Snug tight is defined as the condition when all plies are in firm contact and can usually be obtained by the full effort of a worker on a 12 inch long wrench or a few impacts of an impact wrench. Several passes may be required to obtain uniform tightness.*
6. *Tighten bearing nuts upward against base plate in a similar manner, to assure a uniform snug tight condition.*
7. *Mark position of each anchor rod and top nut with a felt tip pen so subsequent nut rotation can be verified. Rotate all top nuts an additional 1/6 turn in two passes (1/12 turn per pass).*
8. *Lift the arm into position using a crane. Lubricate arm connection bolts with an approved lubricant for galvanized fasteners from the QPL. Maintain crane support during tightening.*
9. *Evenly tighten arm connection bolts to a snug tight condition, and then fully tension arm connection bolts according to Section 00930.40(d)(2)a.*

LUMINAIRE NOTES:

Hubs, handholes, grounding terminals, hook and foundation conduit shall always be installed for possible future use. Luminaires, luminaire support arms and luminaire support channels noted on Dwgs. TM624 & TM625 should only be provided when luminaires are required (See Project Plans).

Conduit diameters shown on plans are nominal or trade sizes.

WALKWAY NOTES:

Grating shall be welded steel grating with 1 1/2" x 1/8" bearing bars spaced at 1 3/16" centers and 1/4" x 1/4" nominal square cross bars (or equivalent) spaced at 4" centers. Steel plates and bars including grating elements shall conform to ASTM A36 or approved equal.

Rail members and post brackets shall be structural steel tubing conforming to ASTM Specification A500, Grade A or B.

Grating may be spliced at an interior support by welding 1/8" x 1 1/2" bars to ends of bearing bars across full width of grating and bolting bars together with 1/4" dia. bolts at 12 inch maximum centers.

Top of walkway grating shall not be more than 6 inches below the threshold into the VMS cabinet.

Walkway contractor to verify prior to fabrication that walkway, grating and rails do not interfere with VMS door or VMS housing. No gaps greater than 1 inch between walkway rails, grating and toe board, and VMS housing are allowed. Walkways shall be installed on the structure by the manufacturer to verify physical fit and approved before galvanizing.

All bolts, including U-bolts, shall conform to ASTM Specification A307, unless otherwise noted.

Accompanied by dwgs. TM621, TM623, TM624, TM625, TM626, TM627, TM628, TM690, TM691

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

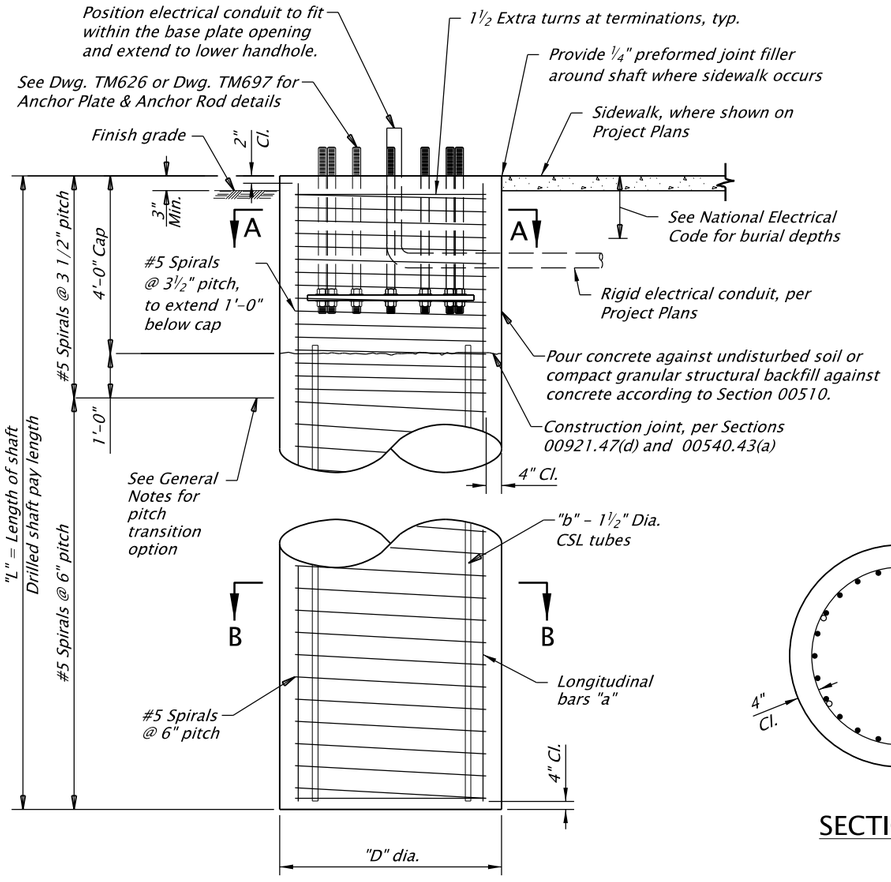
STD. MONOTUBE SIGN/VMS CANTILEVER NOTES

2024

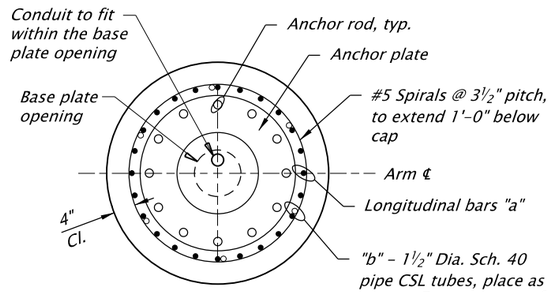
DATE	REVISION DESCRIPTION
07-2020	ADDED 3/4" BAR TOLERANCE, WALKWAY FIT-UP, X42M AND X52M
01-2025	CONCRETE FOR SPREAD FOOTINGS WAS CLASS 3600 - 3/4" CLASSIFIED AS A STRUCTURAL ITEM

CALC. BOOK NO. 6921-6930, 6974 | SDR DATE 10-JAN-2025 | **TM622**

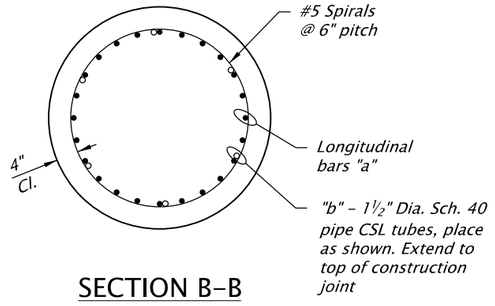
Effective Date: June 1, 2025 - November 30, 2025



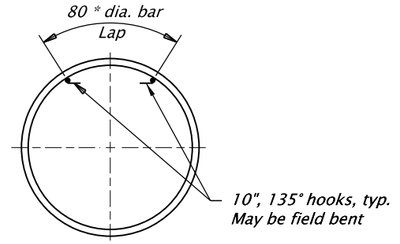
ELEVATION



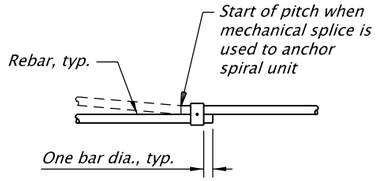
SECTION A-A



SECTION B-B

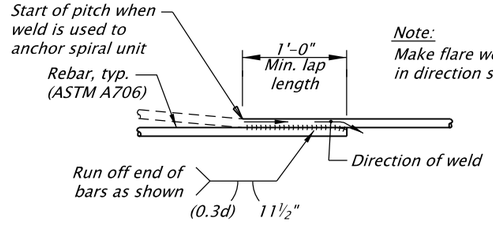


LAPPED SPLICE



MECHANICAL SPLICE

(Not allowed for ASTM A82 spirals)



WELDED SPLICE

SPIRAL SPLICE DETAIL

No Scale

GENERAL NOTES:

Use ASTM A706 for all welded splices, except ASTM A615 Grade 60, ASTM A82 or ASTM A496 may be used if copies of the chemical composition analysis are submitted and approved as weldable by the Engineer.

Anchor spirals at each end or discontinuity with one extra turn and a splice to itself as shown. Where permitted on plans, provide closed hoops conforming to the requirements of this detail.

Securely tie CSL tubes to reinforcement.

Use temporary casing as required. Permanent casing not permitted.

Cap concrete shall be Class 4000 - ¾" structural concrete. Remainder of shaft shall be Class 4000 - ⅜" structural drilled shaft concrete without air entrainment and with 8 ½" ± 1 ½" slump.

Contractor shall field verify elevations prior to installation.

The transition between the 3 1/2" to 6" pitches may use two separate spiral cages with 1½ horizontal turns at the start and end of each cage and the lapped splice details between the cages.

Note:
The base plate reactions shown in the table are worst case Extreme I and Service I loads. Engineer of Record to specify shaft depth and confirm shaft design for local soil conditions based on a site specific geotechnical study and loads shown in table. If shaft size or reinforcement shown in table are not adequate for local soil conditions, Engineer of Record must adjust the shaft design accordingly.

The shafts designs shown in table were based on an analysis to encompass worst case soil conditions by applying Extreme I loads to the top of shaft and analyzing below ground shaft forces using Brom's method for two different soil types. The assumed cohesive soil minimum undrained shear strength, c, is 600 psf. The assumed non-cohesive soil friction angle is 25 degrees and bulk weight is 100 pcf.

DRILLED SHAFT DETAILS

No Scale

Monotube Cantilever Design No.	Monotube VMS/Sign Bridge Design No.	Reinf. Steel "a"	Shaft Dia. "D"	No. of CSL Tubes "b"	Reaction At Base Plate (Factored) Axial (lb)	Shear (lb)	Moment (ft-lb)	Torsion (ft-lb)	Reaction At Base Plate (Service) Axial (lb)	Shear (lb)	Moment (ft-lb)	Torsion (ft-lb)
1	-	30 - #9	5'-0"	6	22,600	26,200	839,000	672,000	20,500	10,100	384,000	259,000
2	-	30 - #9	5'-0"	6	28,100	20,000	784,200	707,000	25,500	8,500	501,200	279,000
3	-	30 - #9	5'-0"	6	18,400	19,600	622,000	517,000	16,700	7,700	293,000	204,000
4	-	30 - #9	5'-0"	6	21,800	13,200	500,800	430,000	19,800	5,200	339,200	169,000
5	-	30 - #9	5'-0"	6	16,900	13,400	431,600	357,000	15,300	5,300	222,000	140,000
6	-	24 - #9	4'-6"	5	12,800	12,300	381,000	240,000	11,600	4,900	171,000	94,000
7	-	24 - #9	4'-6"	5	13,000	7,200	268,000	222,000	11,800	2,800	181,000	87,000
8	-	20 - #9	4'-0"	5	7,800	5,600	170,000	110,000	7,100	2,200	86,000	44,000
9	-	30 - #9	5'-0"	6	26,900	26,500	884,000	745,000	24,400	10,500	498,000	294,000
-	1	30 - #9	5'-0"	6	36,800	40,700	952,600	396,000	33,400	27,000	449,600	156,000
-	2	30 - #9	5'-0"	6	28,500	30,300	754,700	252,000	25,900	17,900	343,500	99,500
-	3	30 - #9	5'-0"	6	23,200	22,900	592,300	128,700	21,100	12,100	261,700	51,000

Accompanied by dwgs. TM621, TM622, TM623, TM624, TM625, TM626, TM627

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

STD. MONOTUBE SIGN/VMS SUPPORT DRILLED SHAFT DETAILS

2024

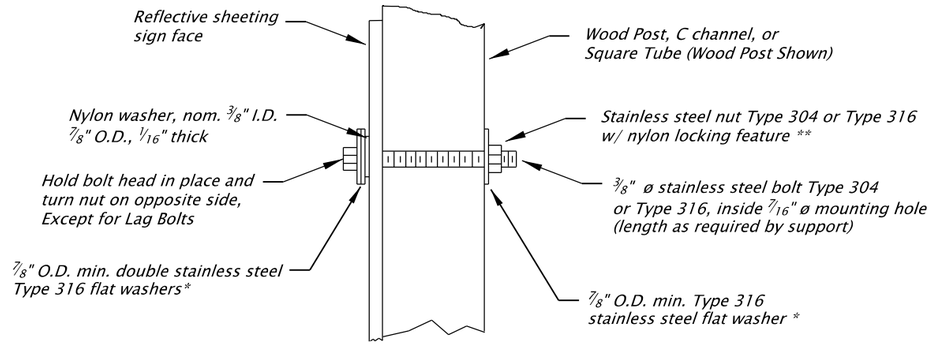
DATE	REVISION DESCRIPTION
01-2021	CHANGED CONDUIT NOTE
01-2022	SLUMP WAS 8" +/- ½"
07-2022	ADDED SPIRAL TIE NOTES AND CONDUIT BASE PLATE NOTE
01-2025	CAP CONCRETE WAS CLASS 3600 - 3/4" CLASSIFIED AS A STRUCTURAL ITEM
	AND ADDED "STRUCTURAL DRILLED SHAFT CONCRETE"

CALC. BOOK NO. 6921-6930, 6969-6972, 6974 _ _ _ | SDR DATE 10-JAN-2025 | **TM628**

Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

TM628.dgn

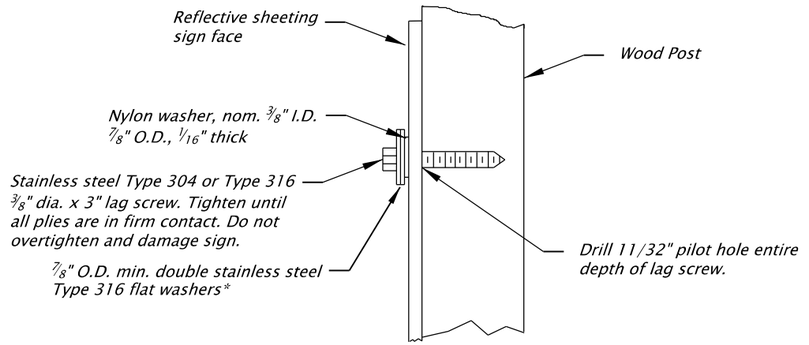


Note:
1)When signs are placed on opposing sides of post, 3/8" x 3" stainless steel Type 304 or Type 316 lag screws can be used instead of through bolt.
2) Use nylon and stainless steel washers when signs are placed on both sides of post.
3) Burr threads at junction with nut when locknuts are not used.
4) Post bolts to extend beyond the tightened nuts within the limits of 1/4" to 1".

** Stainless steel bonded sealing washer with neoprene layer is an acceptable substitue*

*** Acceptable substitute for nylon locking nuts:*
Stainless steel TRI-LOC® Top Lock Locknut

SIGN ATTACHMENT DETAIL



** Stainless steel bonded sealing washer with neoprene layer is an acceptable substitue*

Note: This optional detail is to be used only when specified on a project.

OPTIONAL WOOD POST LAG SCREW 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

SIGN ATTACHMENTS

2024

DATE	REVISION DESCRIPTION
07-2020	ADDED OPTIONAL LAG SCREW DETAIL
01-2025	ADDED STAINLESS STEEL TO ALL HARDWARE AND REMOVED ANCO PIN-LOC

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **TM676**

Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

TM694.dgn

GENERAL NOTES:

Standard Monotube VMS/Sign Bridge Structures are designed in accordance with AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals 1st edition, 2015 and interim revisions thru 2017.

Basic wind speed (3 second gust) used for Extreme I Limit State is 145 mph. G = 1.14, 1700 year recurrence interval, fatigue importance factor I_f = 1.0 and Exposure C were used for design.

The maximum design sign area for the Standard Monotube VMS/Sign Bridge Structure is shown on Dwg. TM693. The design sign panel and mounting members weigh 5 pounds per square foot. The design luminaire including mounting channels weighs 20 pounds per linear foot. The design luminaire wind loading area including mounting channels is 1 square foot per linear foot, has rectangular flat side shapes, is as long as the design sign, and the resulting projected area is not part of the maximum sign area. Drag coeffcient C_d used for signs is 1.20, for a maximum length/width ration of 5.0.

The allowable variation from field verified working drawing camber is -0% to +25%, post length is -0" to +3", top span length "S" is -1/4" to +1/4", span length between centers of base plates is -1/4" to +1/4", and the vertical distance between base plates "DBP" is -1/4" to +1/4". Verify that the span length between base plates is within ± 1/2" of the field surveyed span length between centers of anchor rod clusters. The two opposing diagonal distance tolerances measured from 1'-6" below the start of the bend to 6" above the higher baseplate shall be -1/2" to +1/2". The maximum offset of the arm 3/4" square bar from straight shall be +1/8" to -1/8" on each member. The frame lengths shall be measured prior to galvanizing using a steel tape or other approved measuring method.

Drag coeffcient C_d used for VMS is 1.70, and for the walkway is 1.20. The VMS design loads include 100 pounds per linear foot applied from center to center of vertical posts for the weight of a walkway along with a 500 pound concentrated live load. The design walkway wind loading area is 1.0 square feet per linear foot, extends from center to center of vertical posts, and the resulting projected area is not part of the maximum sign area. VMS dimensions and design loads are shown on TM693. The walkway vertical mounts and the VMS vertical mounts are separate.

Snow and ice loads are not included in the design loads. The Engineer shall evaluate the design in regions of heavy snow or ice accumulations.

The signs are to be positioned horizontally as shown on Project Data for Std. Monotube VMS/Sign Bridge Sheet and vertically as shown on Dwg. TM693.

Material for circular tube sections shall be ASTM A53 Grade B; ASTM A500 Grade B or C; ASTM A501 Grade A or B; or API 5L PSL2 Grade B, X42, X42M, X52, and X52M. All other structural steel shall conform to ASTM A572 Grade 50, or A992, unless noted otherwise.

Bend tube using induction heating methods in accordance with TPA-IBS-98, "Recommended Standards for Induction Bending of Pipe and Tube."

Notch toughness of all structural steel members and plates greater than 1/2" thick shall conform to Zone 2 fracture critical requirements of ASTM A709.

High strength bolts shall conform to ASTM A325, Type 1. Nuts for high strength bolts shall be heavy hex and conform to ASTM A563 Grade DH, with supplementary requirements "S1" and "S2". Hardened steel washers shall conform to ASTM F436, Type 1. Use washers under turning element in tightening unless otherwise specified.

Bolts connecting galvanized steel members to aluminum members shall meet the requirements of ASTM A193 Class 2 Grade B8M. Nuts used with A193 bolts shall be heavy hex and shall meet the requirements of ASTM A194 Grade 8M with supplementary requirement "S1". Use a stainless steel flat washer and double nut at each bolt.

Final elevations shall be field verified prior to fabrication of the post members and footing reinforcement.

All fasteners, except mechanically galvanized direct tension indicator (DTI) washers, shall be hot-dip galvanized (except stainless steel and non-ferrous fasteners). All structural steel shall be hot-dip galvanized after fabrication, unless noted otherwise.

The silicon content of the base metal shall be in the ranges of 0.0% to 0.06% or 0.13% to 0.25% for all hot-dip galvanized steel, unless noted otherwise.

All H.S. bolts shall be considered slip critical and tightened according to Section 00930.40(d)(2)a, unless noted otherwise. Design slip resistance for bolts shall conform to the Bolt Specifications for Class C slip coefficient = 0.33.

This Standard Monotube VMS/Sign Bridge has been designed for the stated loading only. No additional signs or additional loadings are permitted. Other uses and loadings shall be considered non-standard, and are outside the scope of this design.

Splices in posts or arms and welds connecting posts or arms to base connection plates shall be full penetration welds as shown on Dwg. TM623.

Fabrication drawings shall show the weight of all parts.

Verify that top of pedestal is level and at correct elevation, prior to post installation. Install sign mounts and sign on fully erected structure. Do not install sign until after support structure erection and bolt tightening is 100% complete.

A preconstruction meeting is recommended to make sure the contractor understands ODOT requirements and that ODOT understands the contractor's plan.

Use self locking nuts on non-high strength (H.S.) bolts, unless otherwise shown or specified. See Dwg. TM623 for typical high strength bolt connection.

If a 20 minute rolling traffic stop is used to install the overhead sign support arm, the rolling stop shall meet the following requirements:

- *a) Verify (prior to arm lift) adequate crane capacity and boom length to perform complete installation from side of road.*
- *b) Set crane on side of road and do not re-set crane during lift.*
- *c) Verify (prior to lift) that lifting equipment and lifting points meet requirements of plans.*
- *d) Verify (prior to lift) that vertical end posts are at correct elevations, plumb, and that the distance between the field splices at each post matches the horizontal arm length.*
- *e) Rig lift before beginning rolling stop.*
- *f) Make sure all required tools and hardware are on site.*
- *g) Do not resume traffic until all arm to post connection bolts are at least snug tight.*
- *h) Support arm with crane until arm connection bolt tightening is 100% complete.*
- *i) Another rolling stop will be required to install the sign onto the arm.*
- *j) Rolling stops shall be at night and shall conform to the Special Provisions.*
- *k) Follow all required safety procedures.*

FOUNDATION NOTES:

Foundation type shall be as shown on Project Plans. Spread footing details are shown on Dwg. TM627 and drilled shaft details are shown on Dwg. TM628.

Provide shoring for the footing if required. Installation of temporary guardrail or barrier should precede any other work involving the construction of the footing.

Top surface of concrete pedestal (including area under base plate and around anchor bolts) shall be floated and troweled to a flat and level surface. This surface shall not vary more than 1/8" from a horizontal plane. Provide a 3/4" chamfer on all exposed edges of the pedestal.

Concrete for spread footings shall be Class 4000 - 3/4" structural concrete. Concrete for drilled shafts shall be as noted on Dwg. TM628.

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

Concrete shall be placed using a tremie when free fall exceeds 4'-0". Cold joints shall be cause for rejection of the foundation, except between footing and pedestal and top of drilled shaft.

All reinforcing steel shall conform to ASTM A706 or A615 Gr. 60, unless shown otherwise.

Anchor rods shall conform to ASTM F1554, Gr. 55, with supplementary requirements "S2" that includes grade and manufacturer's identification and "S4". Anchor rod washers shall conform to ASTM F436. Anchor rod plate washers shall conform to ASTM A572 Grade 50. Anchor rod nuts shall conform to ASTM A563 Grade DH with supplementary requirements "S1" and "S2".

Anchor rod template, temporary support members, and anchor plate shall conform to ASTM A36.

Anchor rods shall be hot-dip galvanized full length.

Provide 1 -2" dia. rigid electrical conduit as shown on Dwgs. TM627 & TM628 and as directed. Extend sign support end of conduit to the center of the lower hand hole. If luminaires are not required, extend the other end of the conduit into the nearest illumination circuit junction box and identify conduit by attaching a tag which says "future sign lighting". Install "pull string" in conduit for future use. Install conduit cap on each end. When luminaires are required, extend the sign support end of conduit per Project Plans.

The elevation and location of anchor rods are critical. Use survey techniques to verify the elevation, location, and orientation of anchor bolt groups prior to placement of foundation concrete.

Where the footing of a Standard Monotube VMS/Sign Bridge Structure interferes with guard rail posts, the depth of footing may be increased to the maximum shown on Dwg. TM627, or concrete barrier may be used instead of guard rail, or guard rail posts may be attached to footing in accordance with Dwg. BR266. All buried steel shall be coated for immersion exposure with an approved product from the qualified products for structural coatings (http://www.odot.state.or.us/tsconstruction/). Prepare and coat surfaces according to Section 00594 of Oregon Std. Specifications for Construction.

CONSTRUCTION PROCEDURE AND SEQUENCE:

1. *Construct foundation according to plans. Verify elevation, location and orientation of anchor rods. A steel template, shown on Dwg. TM697, shall be used to accurately locate and hold the anchor rods plumb and in proper alignment. This template shall be in place during concrete placement and shall remain in place for a minimum of 24 hours after the concrete placement has been completed. Submit anchor rod survey information before final fabrication. Out of position anchor rods and anchor rods greater than 1:40 out of plumb are cause for rejection of the foundation. Bending of anchor rods to straighten or move them into position, or alterations of the base plate shall not be permitted and are cause for rejection of the foundation and/or post weldment.*
2. *Pedestal pour may begin after spread footing concrete has satisfied Section 00540.52. The post erection may begin after concrete has satisfied Section 00540.52.*
3. *Install bearing nuts on anchor rods. Level the bearing nuts. Install hardened flat washers above bearing nuts.*
4. *Use crane to lift post onto anchor rods. Maintain crane connection as a safety measure until post installation is complete. No grout shall be used under the base plate. Install hardened flat washers above base plate.*
5. *Generously apply an approved lubricant for galvanized fasteners from the QPL to the top nut bearing surface and internal threads, and install nut on anchor rods to snug tight condition. Snug tight is defined as the condition when all plies are in firm contact and can usually be obtained by the full effort of a worker on a 12 inch long wrench or a few impacts of an impact wrench. Several passes may be required to obtain uniform tightness.*
6. *Tighten bearing nuts upward against base plate in a similar manner, to assure a uniform snug tight condition.*
7. *Lift the arm into position using a crane. Lubricate arm connection bolts with an approved lubricant for galvanized fasteners from the QPL. Maintain crane support during tightening.*
8. *Evenly tighten arm connection bolts to a snug tight condition, and then fully tension arm connection bolts according to Section 00930.40(d)(2)a.*
9. *Verify all bearing nuts and top nuts are snug tight. Mark position of each anchor rod and top nut with a felt tip pen so subsequent nut rotation can be verified. Rotate all top nuts an additional 1/6 turn in two passes (1/12 turn per pass).*

LUMINAIRE NOTES:

Hubs, handholes, grounding terminals, hook and foundation conduit shall always be installed for possible future use. Luminaires, luminaire support arms and luminaire support channels noted on Dwgs. TM624 & TM625 should only be provided when luminaires are required (See Project Plans).

Conduit diameters shown on plans are nominal or trade sizes.

WALKWAY NOTES:

Grating shall be welded steel grating with 1 1/2" x 1/8" bearing bars spaced at 1 3/16" centers and 1/4" x 1/4" nominal square cross bars (or equivalent) spaced at 4" centers. Steel plates and bars including grating elements shall conform to ASTM A36 or approved equal.

Vertical posts shall be structural steel tubing conforming to ASTM Specification A500, Grade A or B.

Grating may be spliced at an interior support by welding 1/8" x 1 1/2" bars to ends of bearing bars across full width of grating and bolting bars together with 1/4" dia. bolts at 12 inch maximum centers.

All bolts, including U-bolts, shall conform to ASTM Specification A307, unless otherwise noted.

Cable shall be 3/8" dia. zinc coated 7-strand wire rope conforming to A475, Class A, with a minimum breaking strength of 11,500 lbs.

Walkways shall be installed on the structure by the manufacturer to verify physical fit and approved before galvanizing.

Accompanied by dwgs. TM627, TM628, TM693, TM695, TM696, TM697

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

STD. MONOTUBE VMS/SIGN BRIDGE NOTES

2024

DATE	REVISION DESCRIPTION
07-2020	ADDED 3/4" BAR TOLERANCE, WALKWAY FIT-UP, X42M, AND X52M.
01-2025	CONCRETE FOR SPREAD FOOTINGS WAS CLASS 3600 - 3/4" CLASSIFIED AS A STRUCTURAL ITEM

CALC. BOOK NO. 6969-6972 | SDR DATE 10-JAN-2025 | **TM694**

Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

TM700.dgn

	Minimum Cover From Top of Finished Surface (Use Permit Depth If Greater Than These)	
Type Of Conduit	Roadway & Shoulders	Other Areas
Metallic	24"	18"
Non-Metallic	30"(See Note 2)	18"

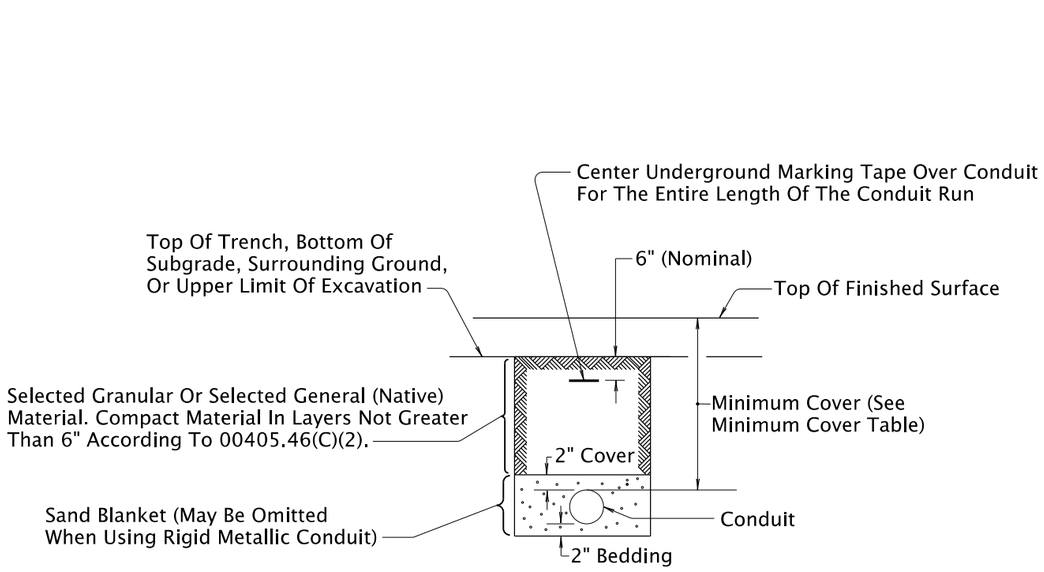
Notes:
1. Additional Cover Depth May Be Necessary Near Foundations And Junction Boxes To Accommodate The Minimum Radius ("R") Of The Conduit Elbow. See TM701 For More Information.

2. For Non-Metallic Conduit Under Roadway & Shoulders Installed Horizontally Into Fiber Optic Hand Hole As Per TM702, The Minimum Cover Depth Is 24 Inches.

MINIMUM COVER FROM FINISHED SURFACE

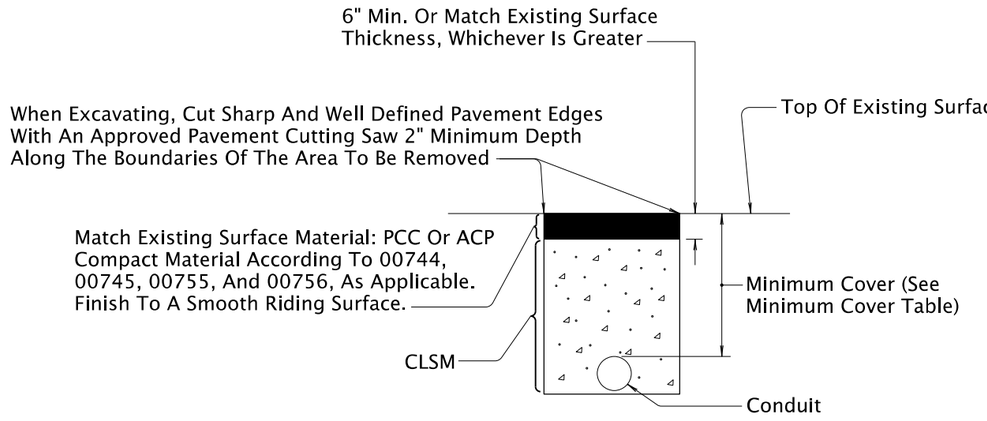
General Notes:

1. Install Conduit By Open Trench Method, Horizontal Directional Drilling, Or As Shown
2. Conduit Runs Shown On Plans Are For Bidding Purposes Only. Locations May Be Changed To Avoid Obstructions.
3. Excavate According To 00960.40. In Areas To Be Paved Or Landscaped, Place All Conduit Before Paving Or Landscaping.
4. Hold Trench Width To A Practical Minimum
5. Do Not Backfill Trenches Until Inspected By The Engineer
6. Furnish Backfill Materials According To 00960.10



CONDUIT OPEN TRENCH EXCAVATION & BACKFILL

UNSURFACED AREAS (new roadway prior to paving, shoulders, under sidewalk, landscaped areas, etc.)



CONDUIT OPEN TRENCH EXCAVATION & BACKFILL

EXISTING PAVED AREAS

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

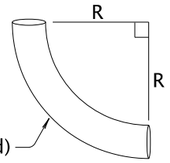
GENERAL CONDUIT TRENCHING

2024

DATE	REVISION DESCRIPTION
01-2025	NEW DRAWING (CONTENT FROM RETIRED TM471)

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **TM700**

Effective Date: June 1, 2025 - November 30, 2025

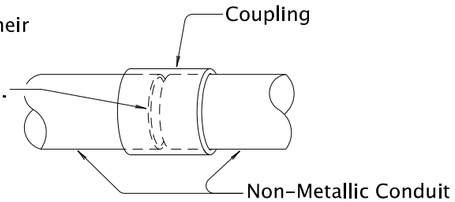


Standard Factory Fiberglass Bend
(No Crimping, Flattening, Field
Manipulation, Or Cutting In The Field)

Conduit Diameter	R (min.)
1 1/2"	10"
2"	12"
2 1/2"	15"
3"	18"

CONDUIT ELBOWS

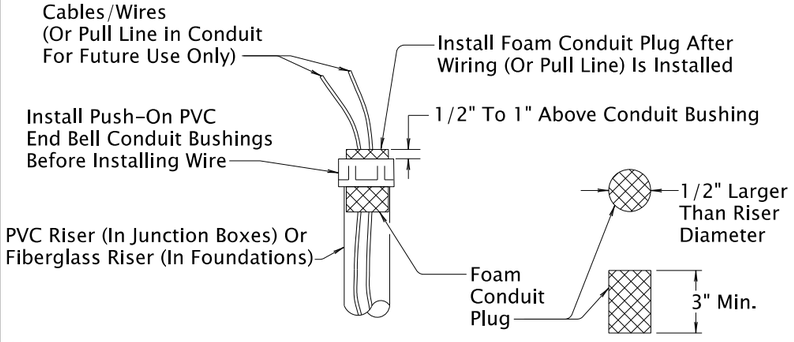
Make Cuts Square And True So
Conduit Ends Fit Together For Their
Full Circumference. Use Solvent
Weld To Connect Conduit As Per
Manufacturer's Recommendation.



Notes:

1. Slip Joints, Running Threads Or Reducing Couplings Not Allowed. Use The Same Size Conduit For The Entire Length, Outlet To Outlet.

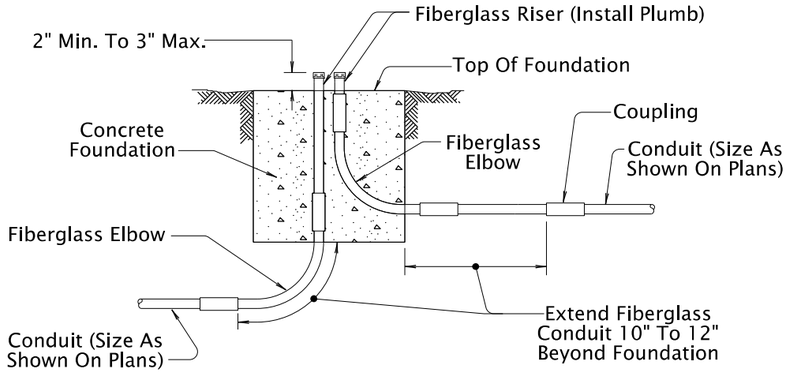
CONDUIT COUPLINGS



Notes:

1. Ream Conduit Ends To Remove Rough Edges And Burrs
2. Temporarily Plug Or Cap Conduit Ends At All Times To Keep Debris Out

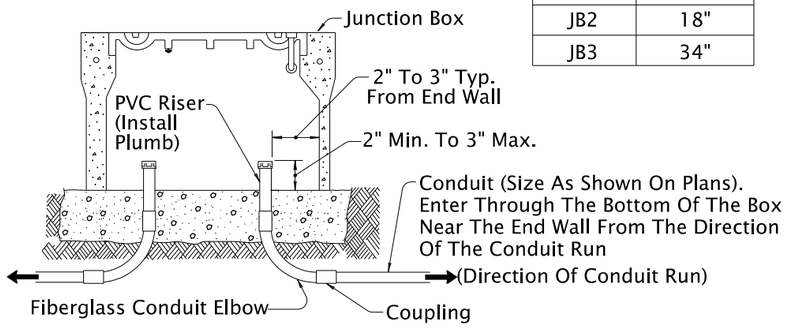
CONDUIT ENDS AND BUSHINGS



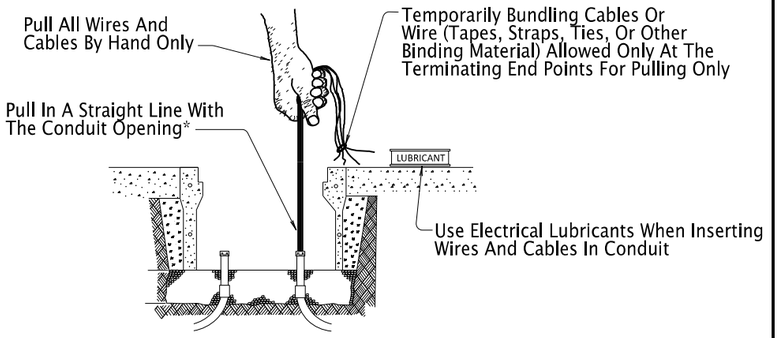
CONDUIT INSTALLATIONS IN FOUNDATIONS

(Applicable for Pole, Pedestal, Service Cabinet and Controller Cabinet Foundations)

Junction Box Type	Max. Sum Of Conduit Diameters
JB1	12"
JB2	18"
JB3	34"



CONDUIT INSTALLATION IN JUNCTION BOXES



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

WIRE & CABLE INSTALLATION IN CONDUITS

Wire & Cable Installation General Notes:

1. See TM470 For Additional Wire/Cable Installation Requirements That Apply To Specification Section 00990 Bid Items.
2. Label Wires And Cables With Permanent Tags As Shown Or Directed. Use Handheld Labeler (Brady M210 Label Maker With Vinyl B-595 Tape) Unless Otherwise Shown.
3. Install No. 16 AWG TFFN Orange Base With Blue Tracertone Wire In All Conduits As A Locate Wire. Leave Slack As Shown Or Directed And Install A Wire Nut. Do Not Join Multiple Locate Wires Under A Common Wire Nut Unless Otherwise Shown.
4. Tape The Ends Of Unused Conductors With Insulated Vinyl Plastic Tape.
5. Leave A Minimum Of 2 Feet Slack In Each Wire And Cable In Junction Boxes, Poles, Cabinets Unless Otherwise Shown.
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.

Conduit Installation General Notes:

1. Install Non-Metallic Conduit Unless Otherwise Shown. Conduit Runs Shall Be Continuous Between Any Pole, Junction Box, Or Cabinet.
2. Larger Conduit Than Specified May Be Used At The Option And Cost Of The Contractor If Max. Sum Of Conduit Diameters In Junction Box Is Not Exceeded.

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

GENERAL CONDUIT & WIRE/CABLE INSTALLATION

2024

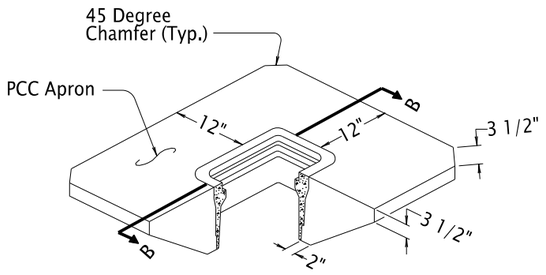
DATE	REVISION DESCRIPTION
01-2025	NEW DRAWING (CONTENT FROM RETIRED TM470 & TM471)

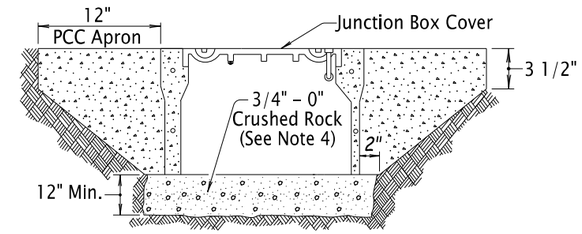
CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **TM701**

Effective Date: June 1, 2025 - November 30, 2025

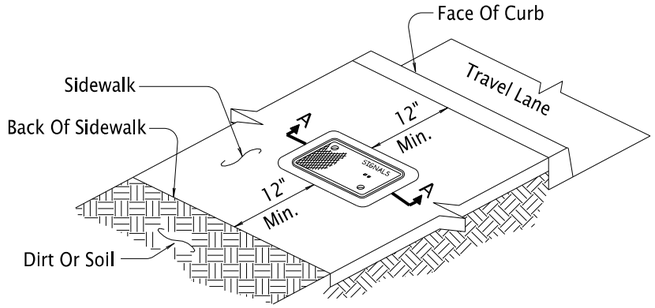
10-JAN-2025

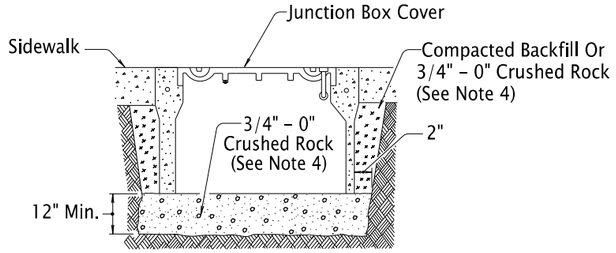
TM701.dgn





SECTION B-B

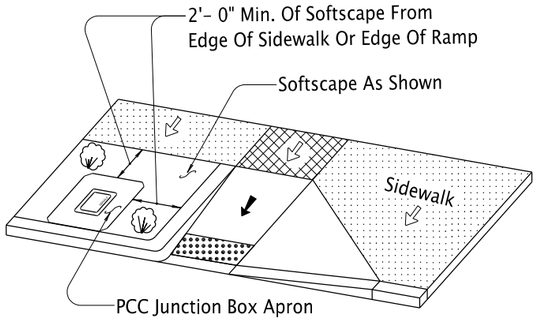




SECTION A-A

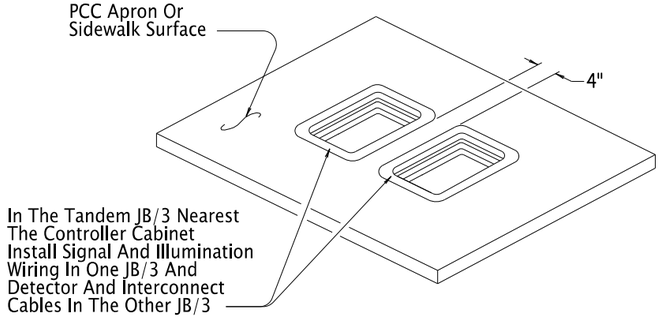
JUNCTION BOX INSTALLATION IN PCC SIDEWALK

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

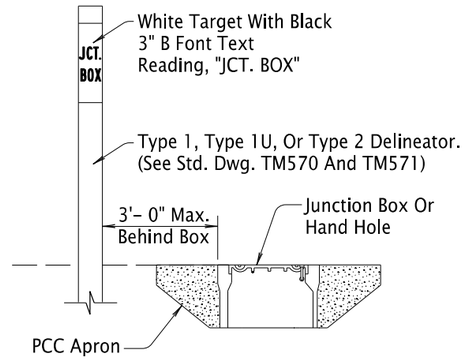


JUNCTION BOX INSTALLATION IN UNSURFACED AREA

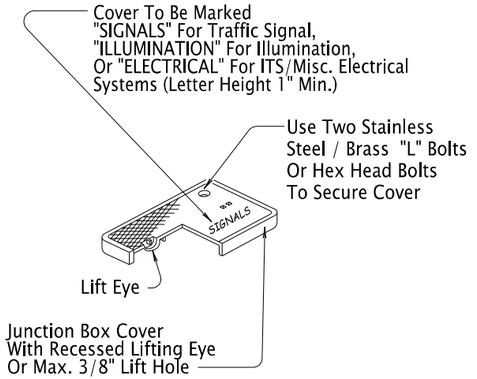
(This Detail Only Applicable for Junction Boxes Located In Incidental Travel Areas; Gravel Shoulders, Behind Guardrail, Etc. Do Not Install In Travel Lanes, Paved Shoulders, Or Other Areas Exposed To Traffic.)



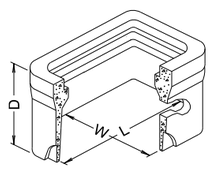
TANDEM JB/3A JUNCTION BOX DETAILS



DELINEATION OF JUNCTION BOX & HAND HOLE IN UNSURFACED AREA



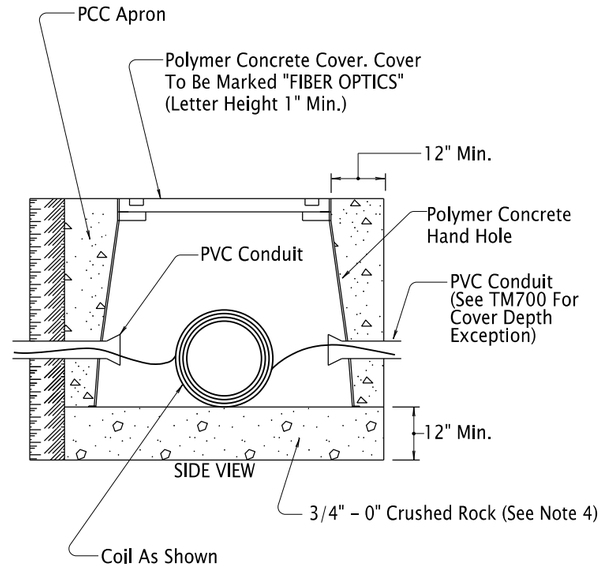
JUNCTION BOX COVER DETAILS

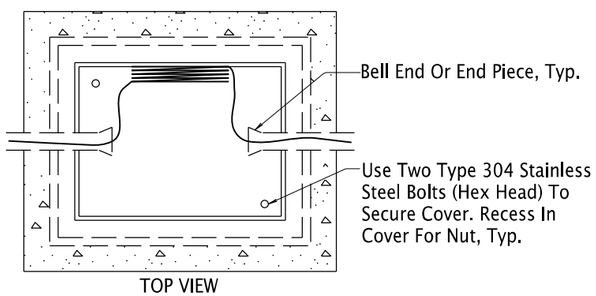


Type*	L	W	D
JB1	17"	10"	12"
JB2	22"	12"	12"
JB3	30"	17"	12"
HH-1	24"	30"	24"
HH-2	30"	48"	24"
HH-3	30"	48"	36"

*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 Coverage 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

GENERAL JUNCTION BOX/HAND HOLE INSTALLATION

2024

DATE	REVISION DESCRIPTION
01-2025	NEW DRAWING (CONTENT FROM RETIRED TM472)

CALC. BOOK NO. N/A | SDR DATE 10-JAN-2025 | **TM702**

Effective Date: June 1, 2025 - November 30, 2025

10-JAN-2025

TM702.dgn