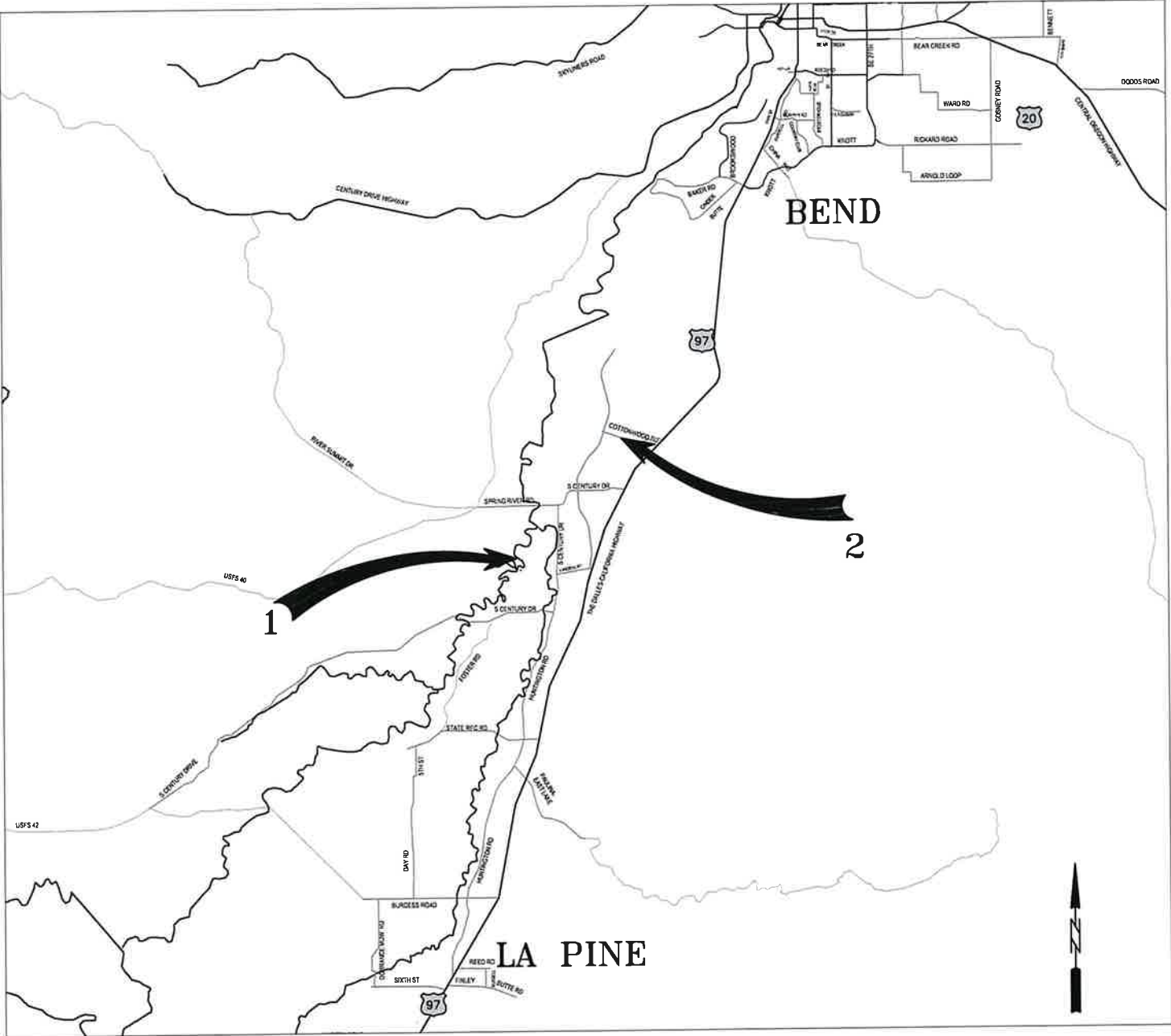


DESCHUTES COUNTY ROAD DEPARTMENT
PLANS FOR
2022 GUARDRAIL IMPROVEMENTS
JAN 2022

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	COVER SHEET
2	SITE MAPS
3	PLAN AND DETAILS SOLAR DR, SUNRIVER
4	PLAN AND DETAILS COTTONWOOD RD, SUNRIVER



VICINITY MAP and SITE NUMBER
NOT TO SCALE

LEGEND

	EXIST. MAILBOXES
	EXISTING SIGN
	TREE
	WATER MANHOLE
	SEWER MANHOLE
	WATER GATE VALVE
	WATER METER
	WATER MAINLINE
	EXIST. UTILITY POLE
	EXIST. OVERHEAD POWER LINE
	TELEPHONE UTILITY
	BARBED WIRE FENCE
	PROPERTY BOUNDARY APPROX.
	EXISTING CENTERLINE OF ROAD
	EXISTING EDGE OF ROAD
	RAILROAD

GENERAL NOTES:

ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED UNDER CONTRACT SHALL, EXCEPT AS OTHERWISE STATED IN THIS CONTRACT'S SPECIAL PROVISIONS, BE CONSTRUCTED IN ACCORDANCE WITH THE "OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION", REVISED 2021 EDITION.

IT IS THE CONTRACTORS RESPONSIBILITY TO RE-ESTABLISH, PER OREGON REVISED STATUTES, ALL SURVEY MONUMENTS DISTURBED OR DESTROYED BY THIS WORK. THIS INCLUDES MONUMENTS NOT SHOWN IN THESE PLANS, WHICH ARE DISCOVERED DURING THE COURSE OF CONSTRUCTION. IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY ELEVATIONS OF SIDE SHOT MONUMENTS FOR USE AS TEMPORARY BENCH MARKS AND SET TEMPORARY BENCH MARKS OR ADDITIONAL HORIZONTAL CONTROL AS NEEDED.

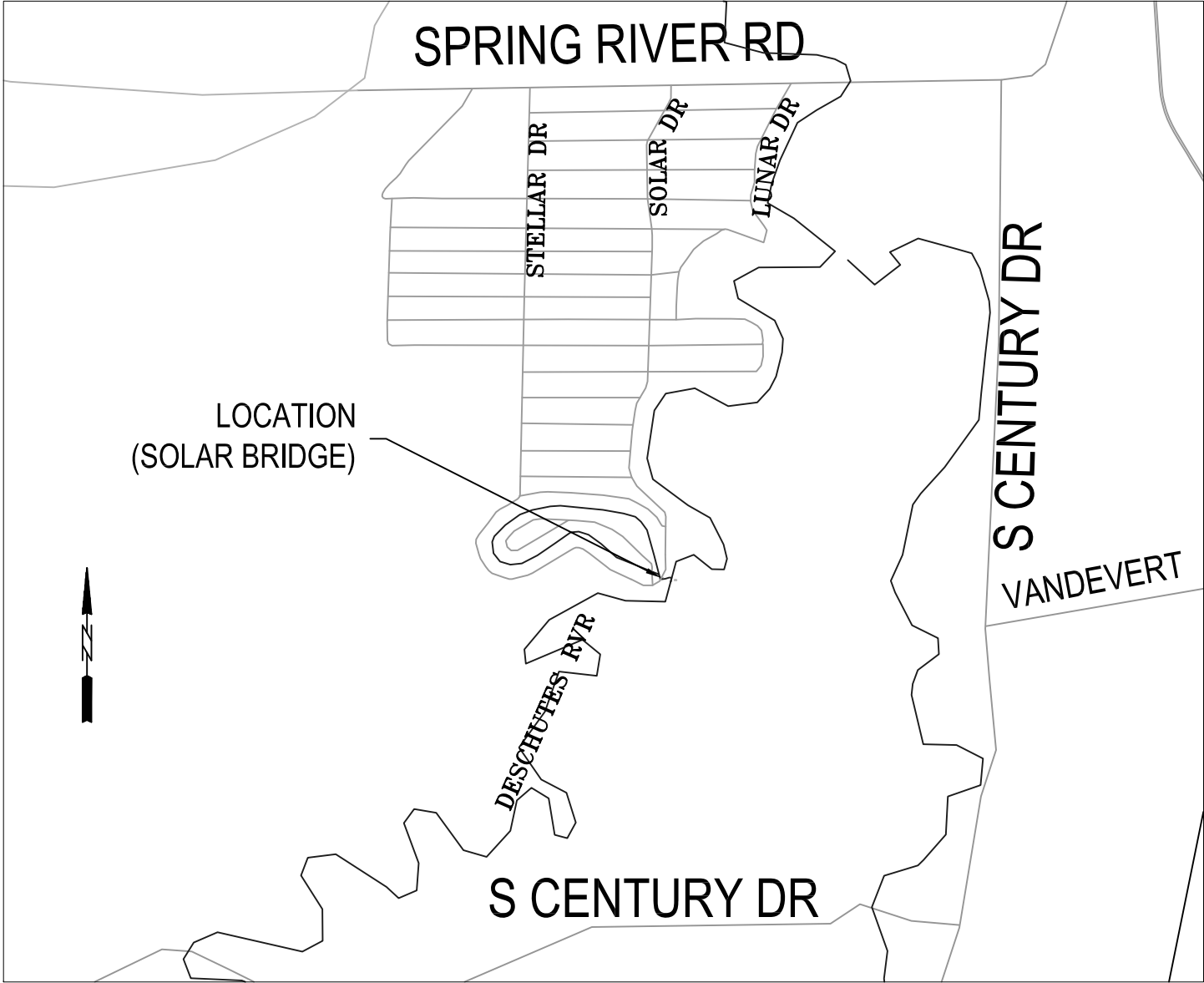
NO UTILITIES HAVE BEEN
LOCATED FOR THIS DESIGN

ATTENTION:
Oregon Law Requires You To Follow Rules
Adopted By The Oregon Utility Notification
Center. Those Rules Are Set Forth In
OAR 952-001-0001 Through OAR 952-001-0100
You May Obtain Copies Of The Rules By Calling
The Center At 811

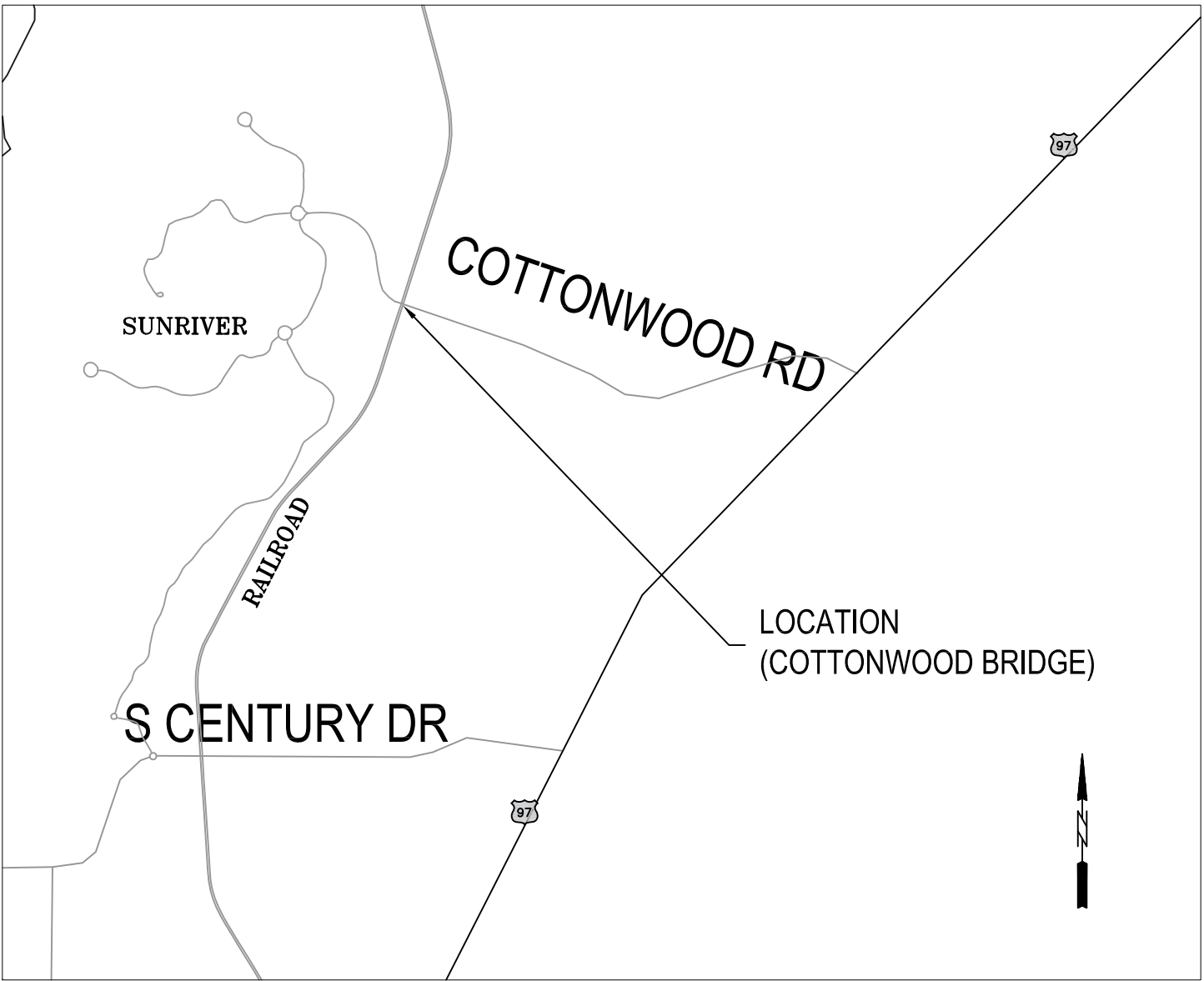
ODOT STANDARD DRAWING NO.

BR203	Transition Type "F" Concrete Rail to Guardrail
BR233	Thrie-Beam Rail and Transition
DET3283	Type "F" Concrete Rail Retrofit of Existing Parapet Rail
RD400	Guardrail and Metal Median Barrier
RD402	Midwest Guardrail System Types
RD403	Midwest Guardrail System Wood Post and Block
RD404	Midwest Guardrail System Steel Post and Block
RD405	Guardrail and Metal Median Barrier Parts
RD407	Midwest Guardrail System (W-Beam)
RD409	Thrie Beam Guardrail
RD415	Guardrail and Metal Median Barrier Parts
RD416	Midwest Guardrail System Standard Hardware
RD417	Midwest Guardrail System End Sections
RD419	Midwest Guardrail System Grading for Terminals
RD420	Midwest Guardrail System Non-Flared Energy-Absorbing Terminal
RD451	Wood Breakaway Posts
RD471	Midwest Guardrail System Over Low-Fill Culverts
RD481	Midwest Guardrail System Height Conversion
TM850	2-Lane, 2-Way Roadways

		DESCHUTES COUNTY ROAD DEPARTMENT	
		61150 S.E. 27TH STREET BEND, OR. 97702	
		PHONE: 541-388-6581	FAX: 541-388-2719
2022 GUARDRAIL IMPROVEMENTS			
		2-4-2022	
COUNTY ENGINEER		DATE	
		02.09.22	
ROAD DEPT DIRECTOR		DATE	
TITLE PAGE		SHEET NO. 1 OF 4	




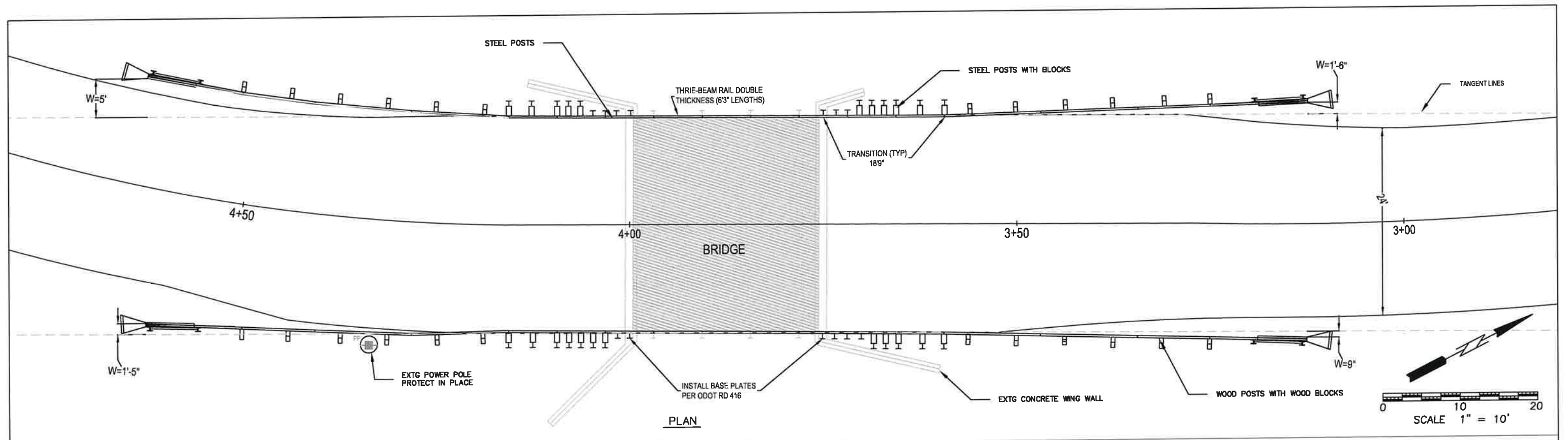
1-SOLAR DR
T20 R11 Sec18
43.83696N, -121.46538W



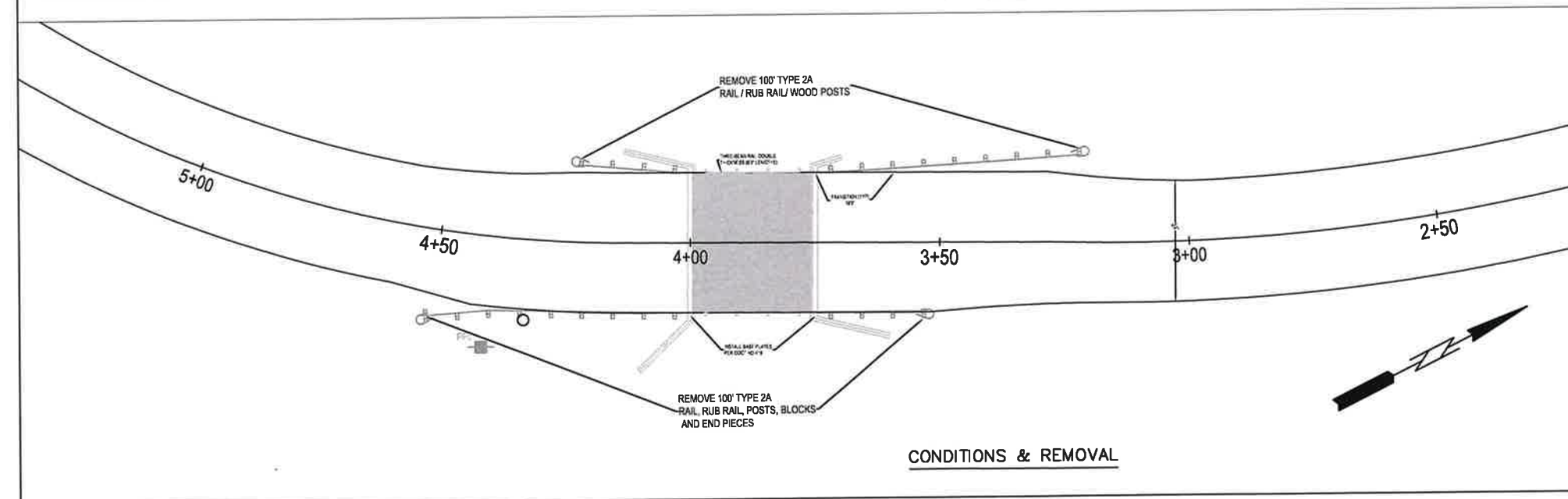
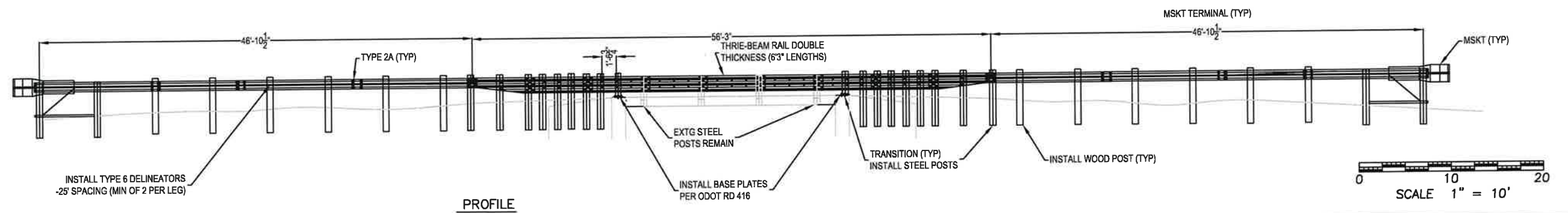
2-COTTONWOOD RD
T19 R11 Sec28
43.89374N, -121.41566W

SITE MAPS
NOT TO SCALE

	 <div>DESCHUTES COUNTY ROAD DEPARTMENT 61150 S.E. 27TH STREET BEND, OR. 97702 <small>PHONE: 541-388-6581 FAX: 541-388-2719</small></div>	
	2022 GUARDRAIL IMPROVEMENTS	
	DRAFTER: T. WILSON DATE: 12/13/21	
	REVIEWED BY: C. SMITH DATE: 12/13/21	
SITE MAP		SHEET NO. 2 OF 4



- NOTES:
1. RAIL HEIGHT ON BRIDGE IS 27". GRADUALLY INCREASE THE HEIGHT TO 31" AT RAIL ENDS PER RD481
 2. DRILL BOTTOM HOLES ON ALL EXTG BRIDGE POSTS TO ACCOMMODATE TYPE 4 RAIL
 3. FOR THRIE BEAM AND TRANSITIONS SEE BR233 & RD404 FOR DETAILS NOT SHOWN
 4. ENERGY ABSORBING END TREATMENT MUST BE MASH TEST LEVEL 3 COMPLIANT AND FROM ODOT QPL



RENEWS: JUNE 30, 2022



DESCHUTES COUNTY ROAD DEPARTMENT

61150 S.E. 27TH STREET
BEND, OR. 97702

PHONE: 541-388-6581

FAX: 541-388-2719

2022 GUARDRAIL IMPROVEMENTS

DRAFTER: T. WILSON

DATE: 12/13/21

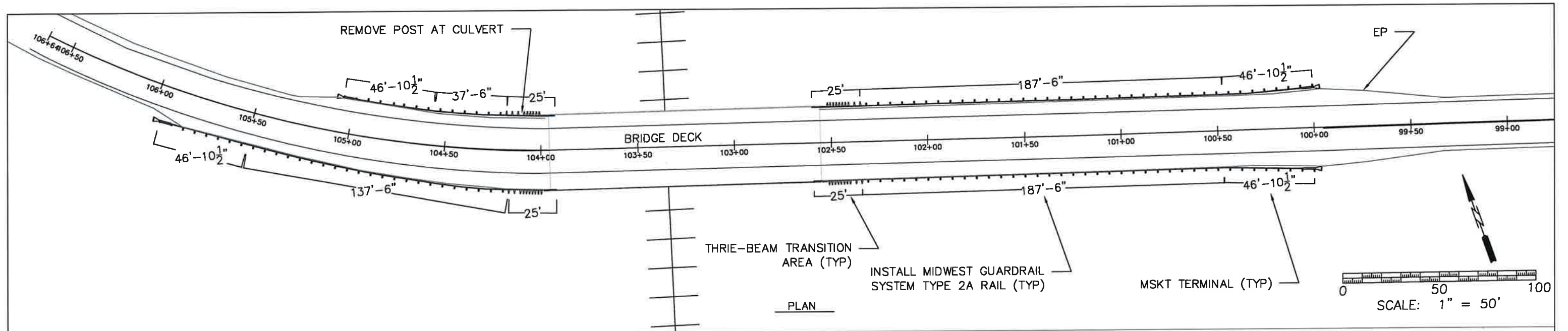
REVIEWED BY: C. SMITH

DATE: 12/13/21

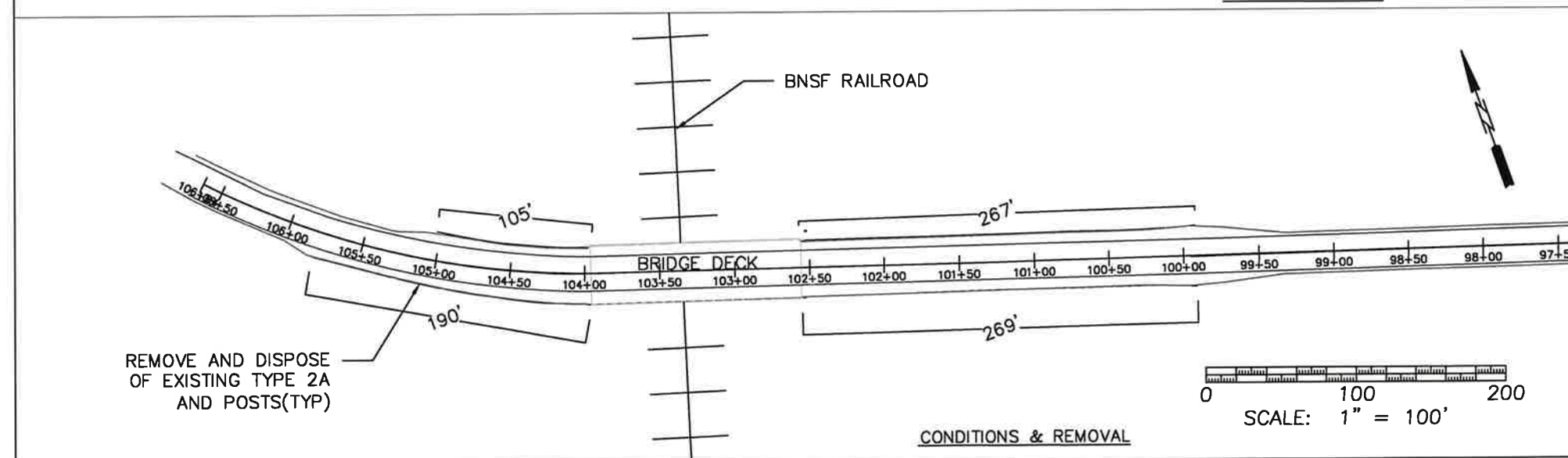
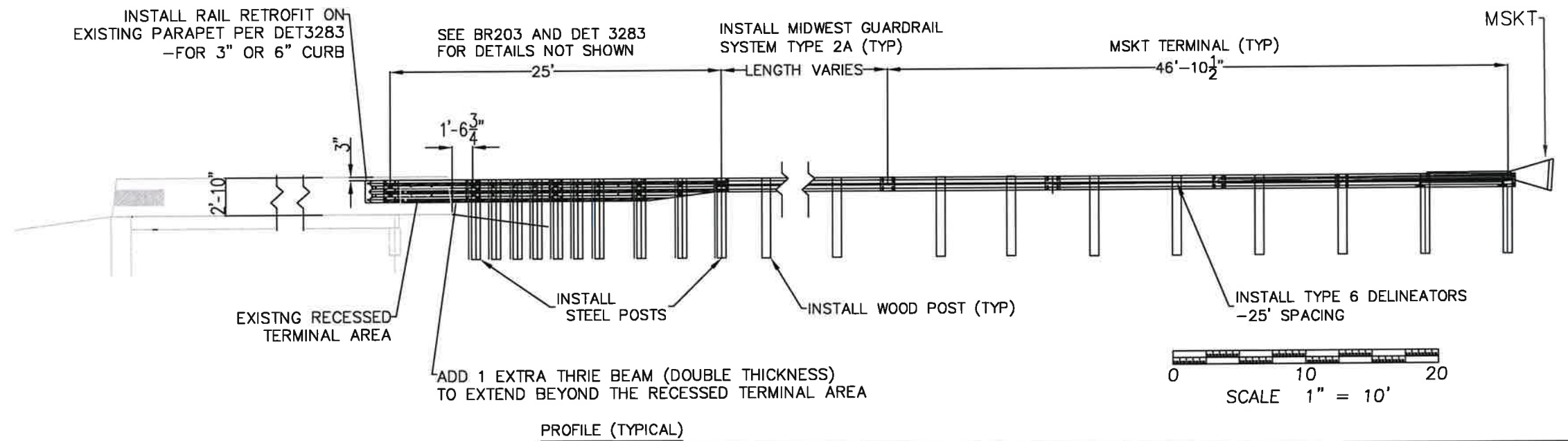
SOLAR DR - PLAN

SHEET NO.

3 OF 4



- NOTES:
1. SEE OREGON STANDARD DRAWINGS FOR DETAILS NOT SHOWN.
 2. INSTALL SNOWLOAD WASHERS ON POSTS AND RAILS PER RD416
 3. ENERGY ABSORBING END TREATMENT MUST BE MASH TEST LEVEL 3 COMPLIANT AND FROM ODOT QPL



RENEWS: JUNE 30, 2022



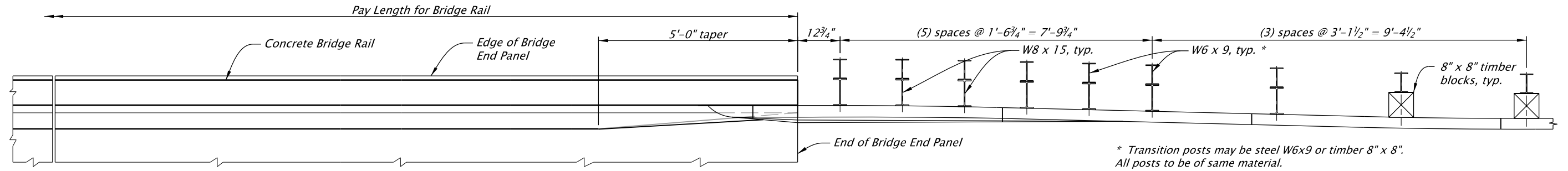
DESCHUTES COUNTY ROAD DEPARTMENT
61150 S.E. 27TH STREET
BEND, OR. 97702
PHONE: 541-388-6581 FAX: 541-388-2719

2022 GUARDRAIL IMPROVEMENTS

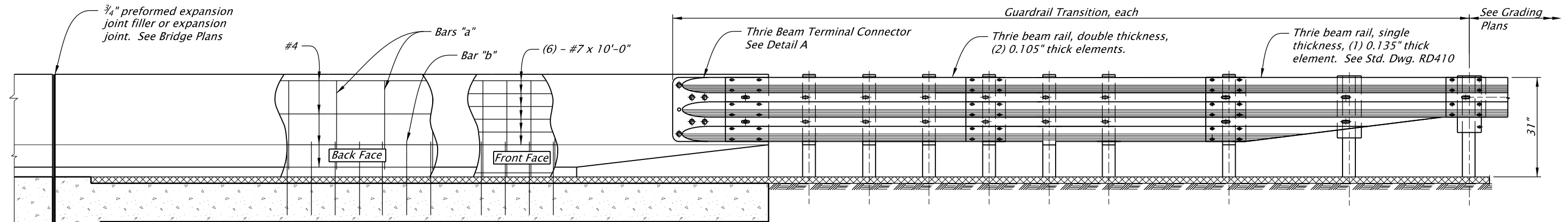
DRAFTER: T. WILSON DATE:12/13/21
REVIEWED BY: C. SMITH DATE:12/13/21

COTTONWOOD RD - PLAN

SHEET NO.
4 OF 4

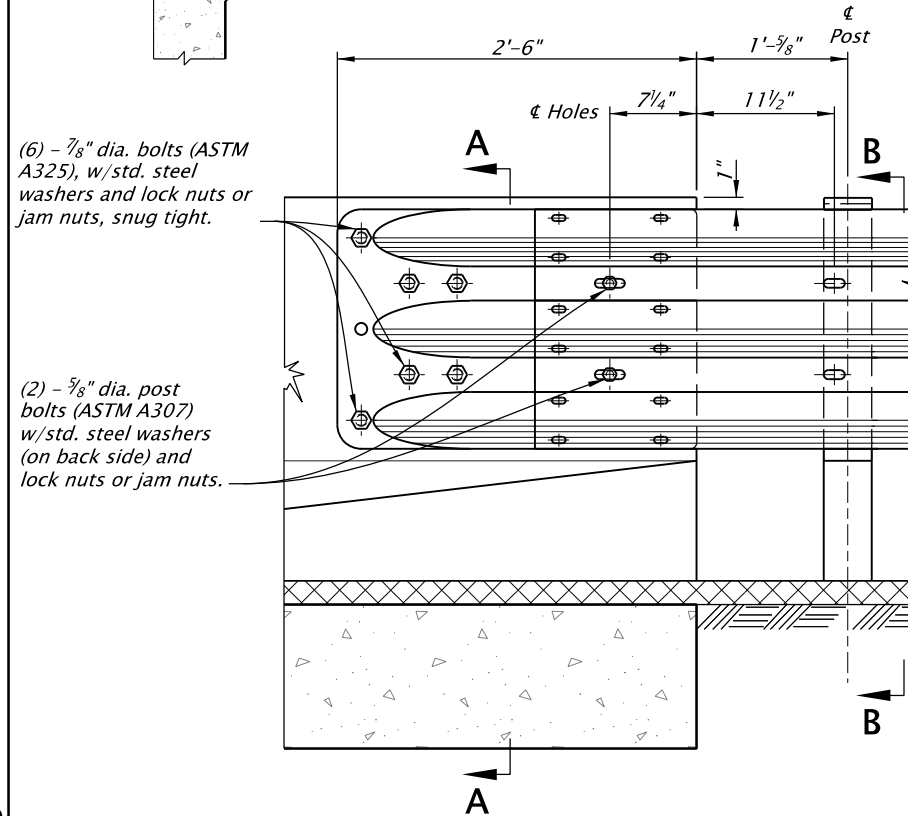


PLAN

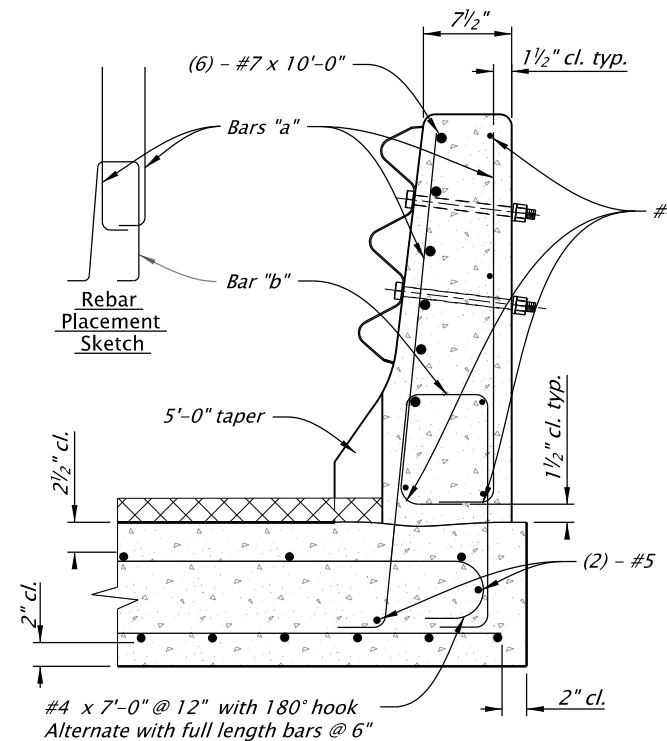


ELEVATION

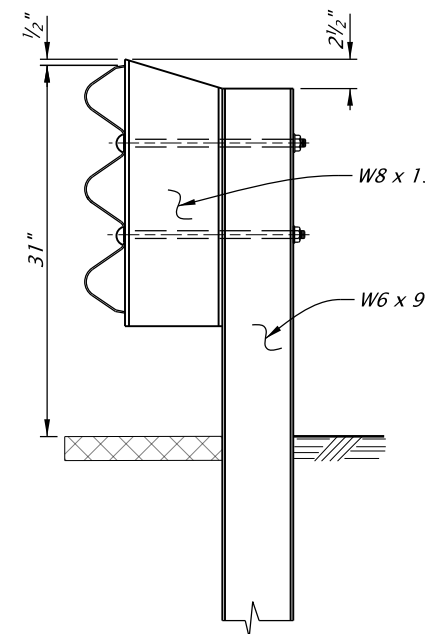
NOTE:
Drill horizontal bolt holes (bolt dia. + 1/8") in hardened concrete with low-impact rotary drill. Cut bolts after installation so they extend 3/4" max. beyond nut. Grind smooth and cold galvanize.



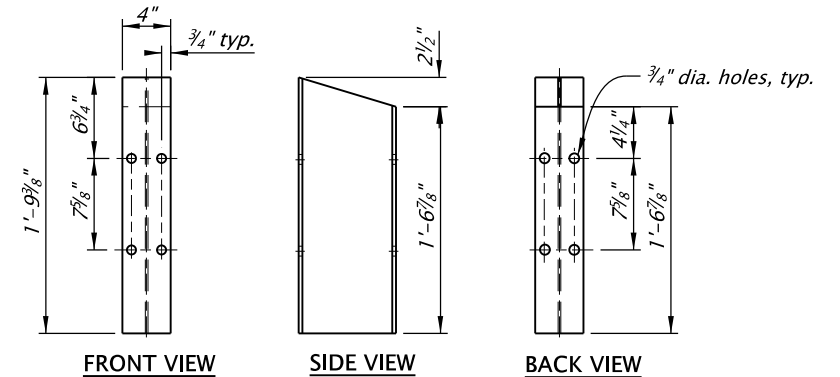
DETAIL A



SECTION A-A



SECTION B-B

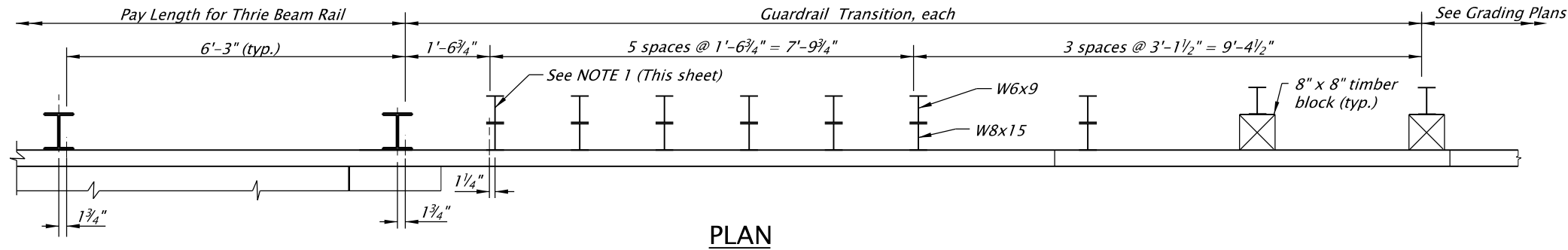


THRIE BEAM BLOCK (W8 x 15)

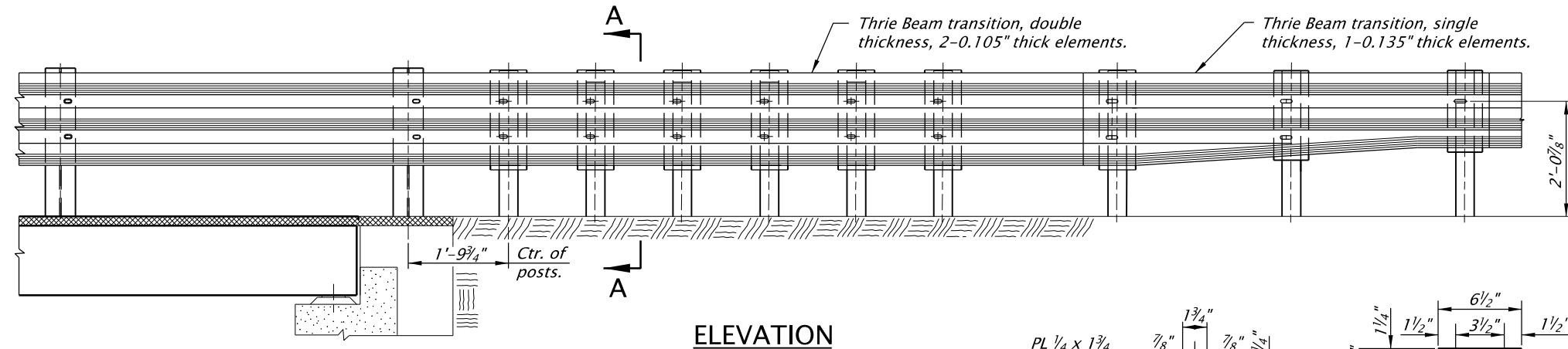
GENERAL NOTES:
Provide steel for wide-flange posts conforming to AASHTO M183 (ASTM A36). Hot dip galvanize after fabrication.

Accompanied by dwgs. BR165, BR200, RD410 and RD482

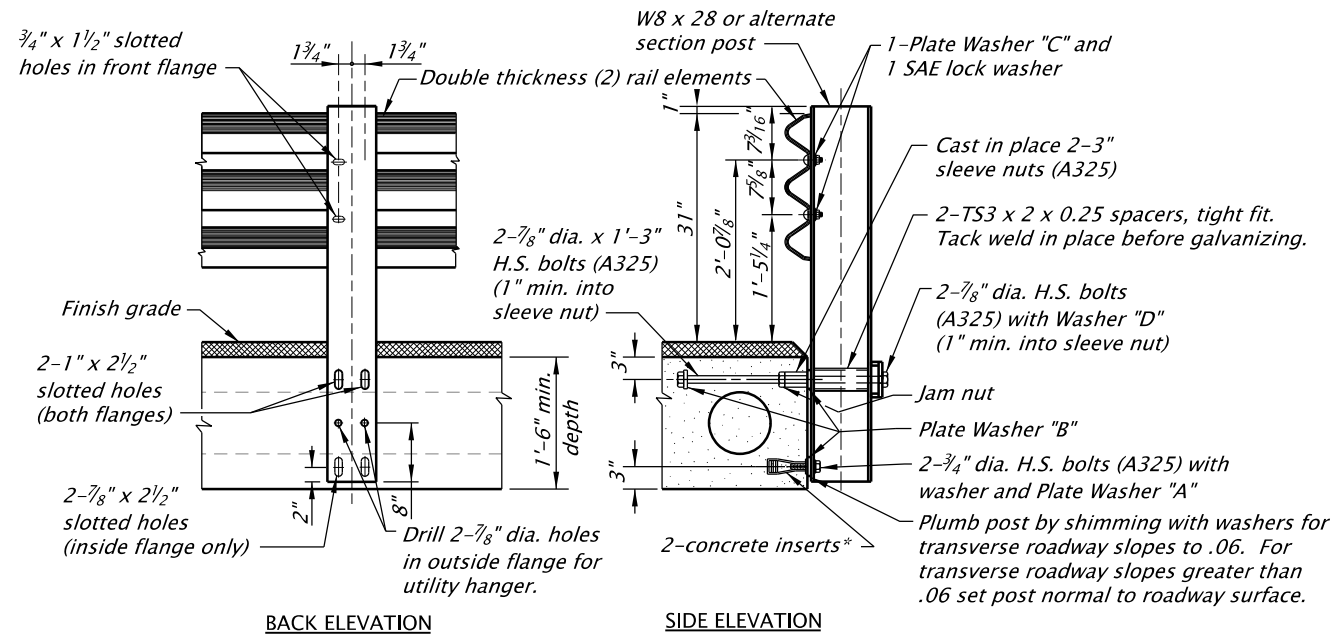
CALC. BOOK NO. -		SDR DATE: 20-April-2018	
<p>The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.</p>		NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
		OREGON STANDARD DRAWINGS	
		TRANSITION TYPE "F"	
		CONCRETE RAIL TO	
		GUARDRAIL	
		2021	
DATE		REVISION DESCRIPTION	
10/2020		Update: Changed RD480 to RD482	
-		-	
-		-	
-		-	



PLAN



ELEVATION



BACK ELEVATION

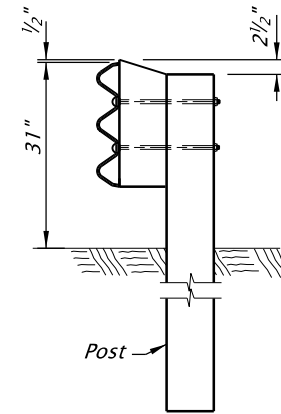
SIDE ELEVATION

POST DETAILS: SIDE MOUNT

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

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

***CONCRETE INSERTS**
Hot-dip galvanized expanded coil concrete inserts with closed-back ferrule threaded to receive 3/4" dia., Gr36 (ASTM A307)
Minimum insert length= 4 1/2"
Minimum safe working load in tension= 4000 lbs.



SECTION A-A

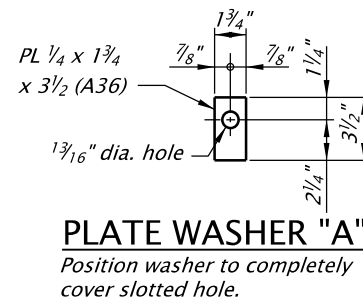


PLATE WASHER "A"
Position washer to completely cover slotted hole.

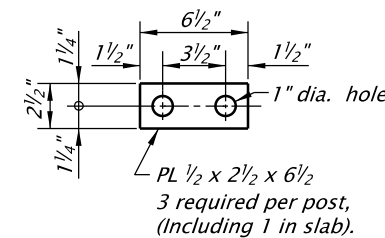


PLATE WASHER "B"
3 required per post, (Including 1 in slab).

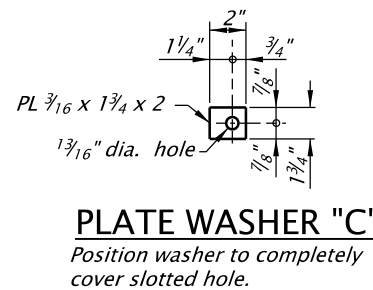
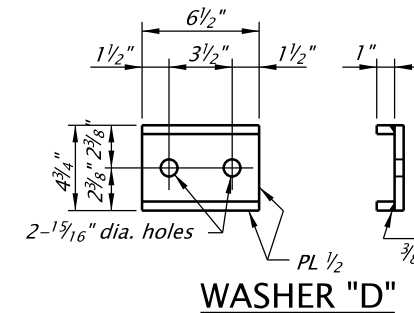


PLATE WASHER "C"
Position washer to completely cover slotted hole.



WASHER "D"
Position washer to completely cover slotted hole.

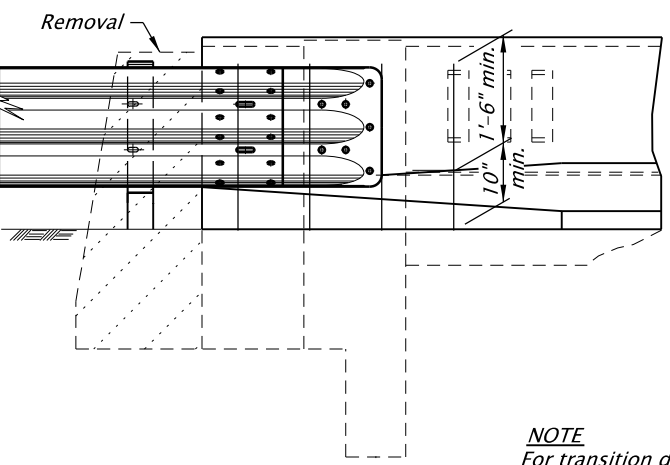
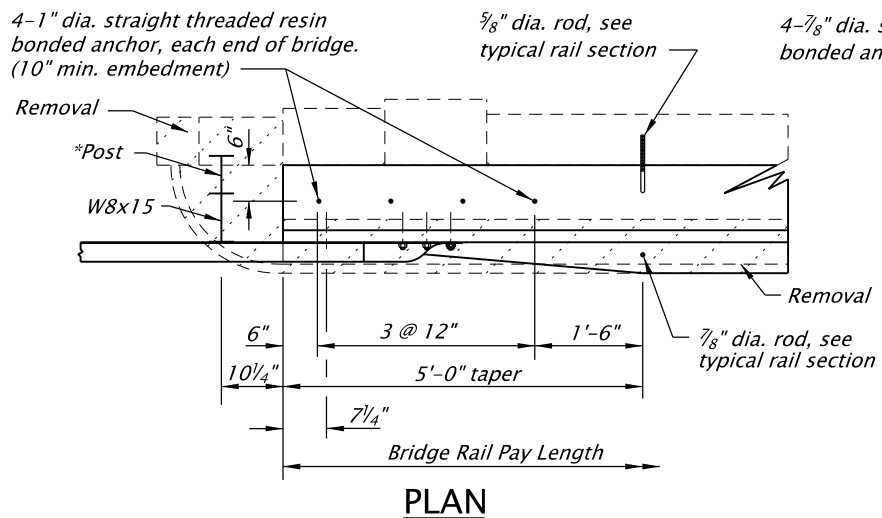
GENERAL NOTES
Provide steel posts and plates conforming to AASHTO Specification M183 (ASTM A36), unless noted otherwise.
Provide anchor bolts conforming to ASTM A325. (AASHTO M164).
Provide guardrail hardware as shown on Std. Dwgs. RD405 and RD410.
Hot dip galvanize all structural steel and hardware 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 \pm 0.001 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 dwgs. BR203, RD405, RD410, RD480

CALC. BOOK NO. _____	SDR DATE: 20-April-2018
<i>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 consulting a Registered Professional Engineer.</i>	NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications
	OREGON STANDARD DRAWINGS
	THRIE-BEAM RAIL AND TRANSITION
	2021
	DATE REVISION DESCRIPTION
-	-
-	-
-	-
-	-
-	-

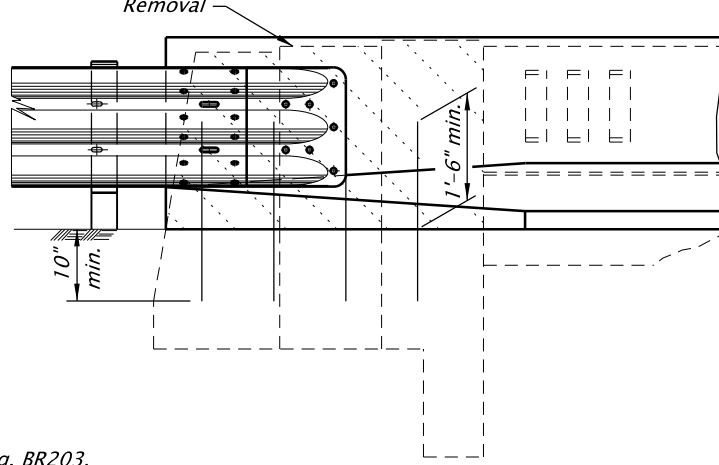
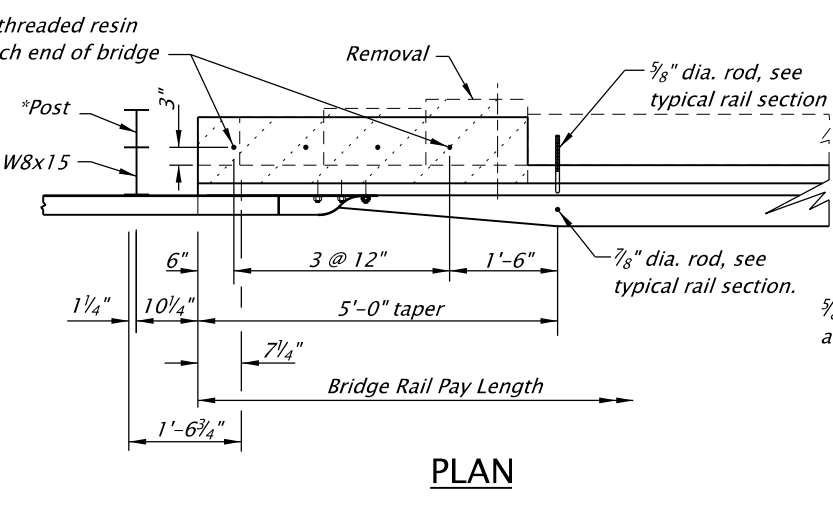
det3283.dgn 03-2017

DET3283

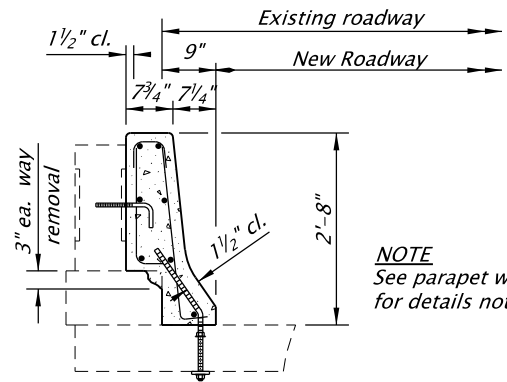


ELEVATION
TRANSITION RAIL DETAIL
For Existing Parapet with 1'-6" Curb

NOTE
For transition details not shown, see dwg. BR203.
Remove existing rail over end post to elevation top of deck.
*See dwg. BR203 (NOTE 3 and SECTION D-D)

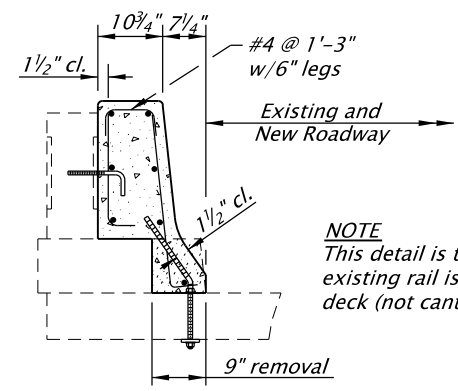


ELEVATION
TRANSITION RAIL DETAIL
For Existing Parapet with 3" or 6" Curb



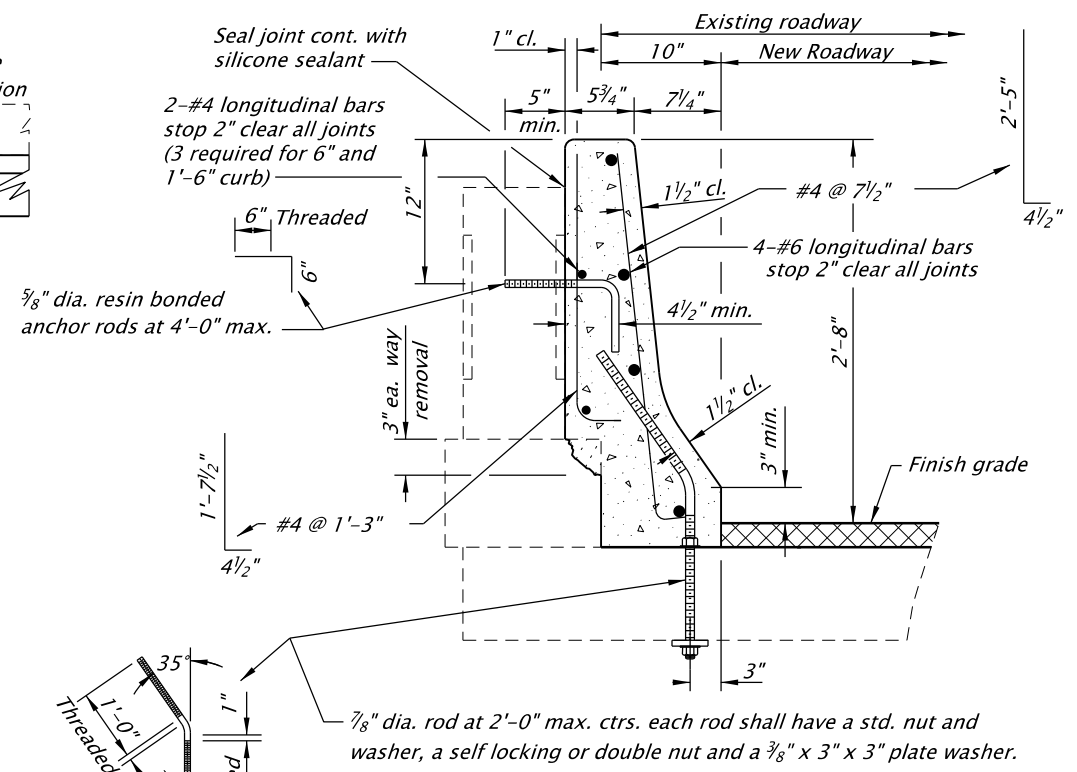
EXISTING PARAPET with 6" CURB

NOTE
See parapet with 3" curb for details not shown.



EXISTING PARAPET with 1'-6" CURB

NOTE
This detail is to be used where the existing rail is fully supported by the deck (not cantilevered).




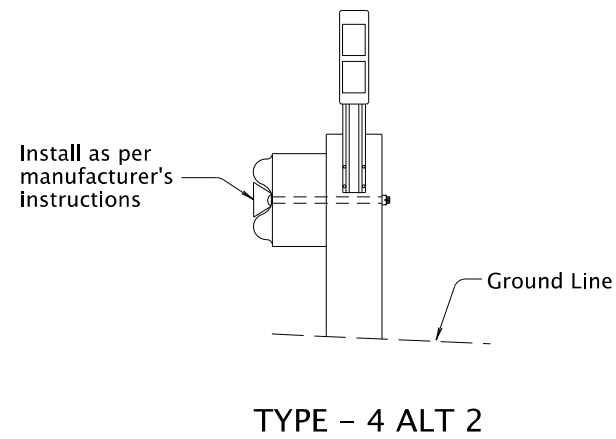
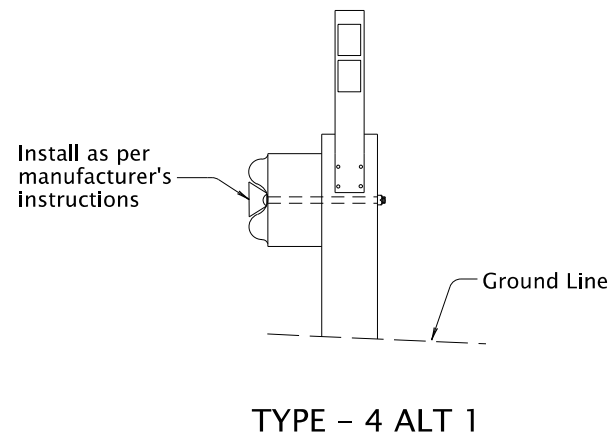
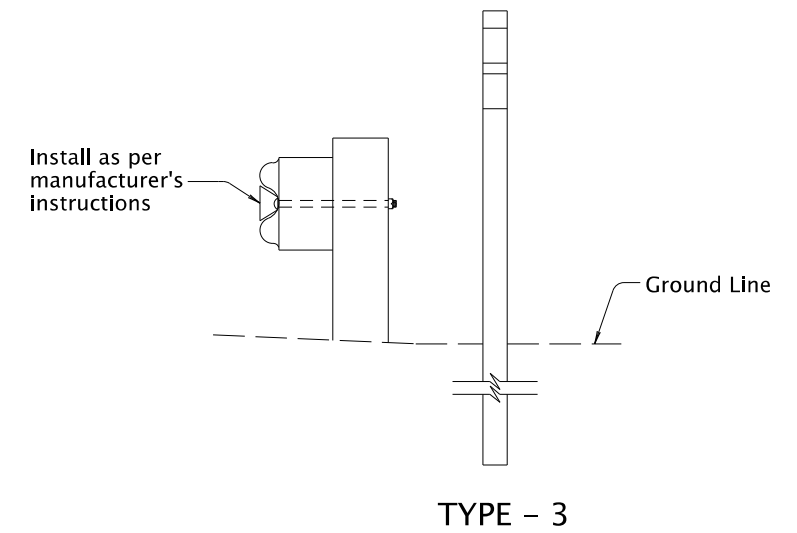
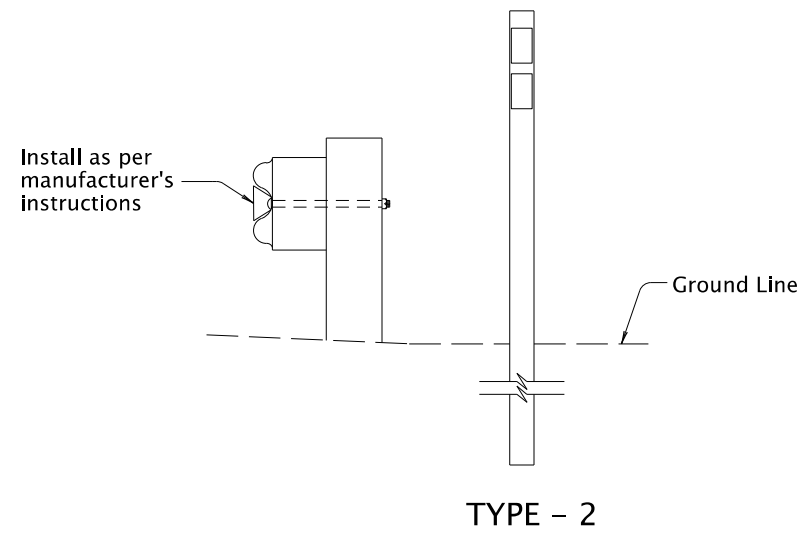
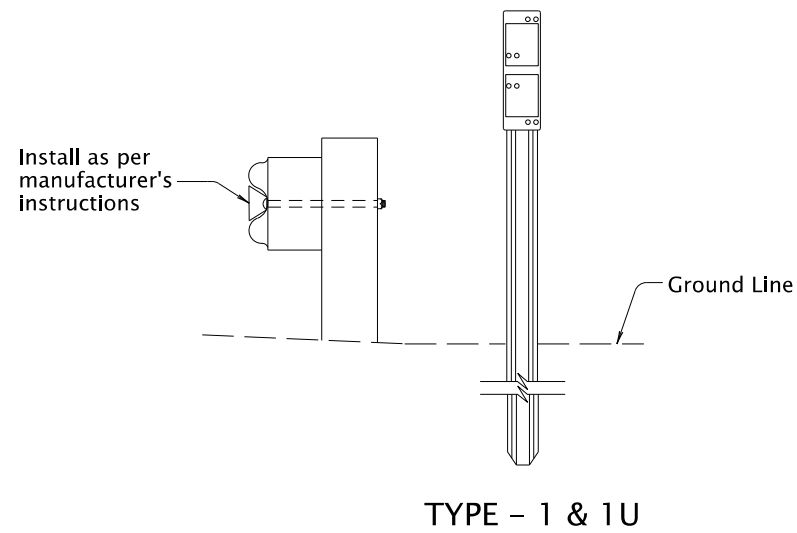
EXISTING PARAPET with 3" CURB

NOTE
See dwg. BR200 for details and reinforcing dimension details not shown.
Place anchor rods 9"± each side all joints and add one extra anchor rod each side each joint.
Drill (rod dia. + 1/8") dia. holes for thru anchor rods with low-impact rotary drill.
For concrete depth 10" or more (or when directed by the engineer) resin bonded anchor rods may be used. Nuts and washers are not required for resin bonded anchors.

GENERAL NOTES
Provide all reinforcing steel conforming to ASTM Specification A706, or AASHTO M31 (ASTM A615) Grade 60. Place all bars 1 1/2" clear of the nearest face of concrete unless shown otherwise.
Provide all concrete Class 3300-1 1/2 or 3/4 unless shown otherwise.
Provide all structural steel conforming to AASHTO M183 (ASTM A36).
Provide all anchors rods conforming to AASHTO M314, Gr36 (ASTM A307).
Provide and install resin bonded anchors according to ODOT Specification 00535.
Hot-dip galvanize all structural steel, anchor rods and hardware after fabrication.
Roughen, clean and saturate all surfaces with water immediately prior to concrete placement.
Field verify existing dimensions before fabrication of anchors.
Equally space scoring joints between open or expansion joint and Type "B" joints at bents (see dwg. BR200).

Accompanied by dwgs. BR200, BR203

<i>The selection and use of this detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.</i>	 OREGON DEPARTMENT OF TRANSPORTATION TECHNICAL SERVICES DETAILS	
	TYPE "F" CONCRETE RAIL RETROFIT OF EXISTING PARAPET RAIL	DETAIL NO. DET3283



Instructions to Designer:
"Butterfly" delineators supplement delineators Type 1 through 4.
Use the appropriate detail images on project plans and delete
the remainder.

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

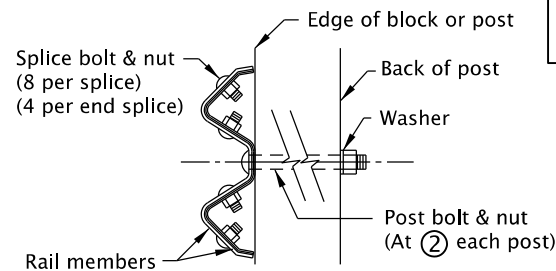


OREGON DEPARTMENT OF TRANSPORTATION
TECHNICAL SERVICES
DETAILS

TYPE 6 DELINEATOR
INSTALLATION DETAILS

DETAIL NO.

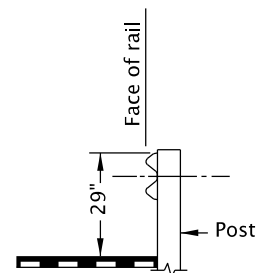
DET4540



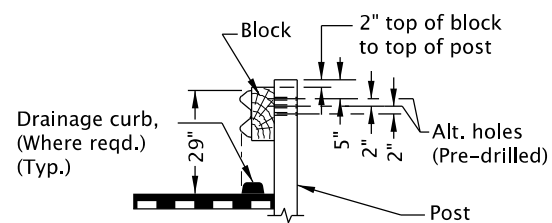
- NOTES:**
1. When required by the plans, post bolts to extend beyond the tightened nuts within limits of $\frac{1}{4}$ " to $\frac{1}{2}$ ".
 2. When steel posts are used see "APPURTENANCES" for modified bolt detail, Std. Dwg. RD415.
 3. All post bolt threads to be set after assembly for wrench removal only.

FITTINGS

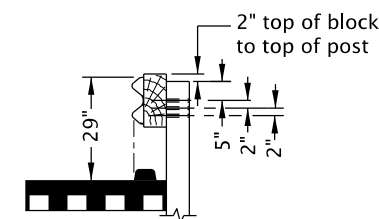
- NOTES:**
1. Rail height measured from final paved surface at face of rail to top of rail (Typ. all types).
 2. Final paved surfacing to extend to face of post.
 3. Drainage curb alignment same as face of guardrail.



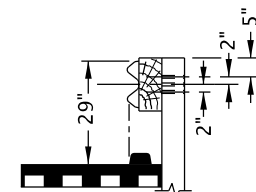
**TYPE 1
GUARDRAIL**
(Use restricted to
non-roadway applications)



INITIAL INSTALLATION



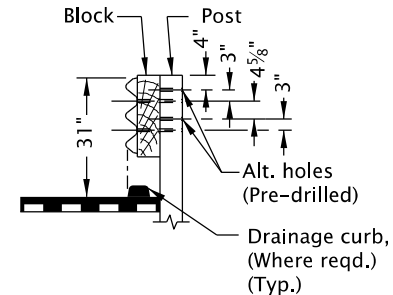
FUTURE ADJUSTMENT



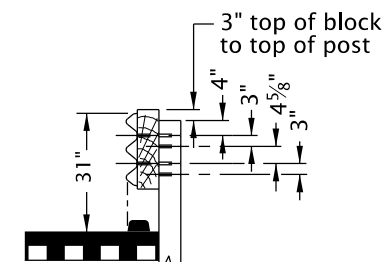
ALTERNATE INITIAL INSTALLATION OR FUTURE ADJUSTMENT

TYPES 2A & 3 GUARDRAIL

(See general note 2)
(For Type 3 use double thickness (2) rail elements)

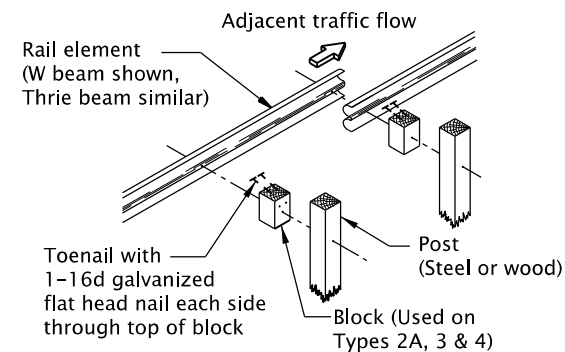


INITIAL INSTALLATION



RAIL AFTER OVERLAY (Adjust as shown)

TYPE 4 GUARDRAIL



ASSEMBLY DETAILS (RELATION OF PARTS)

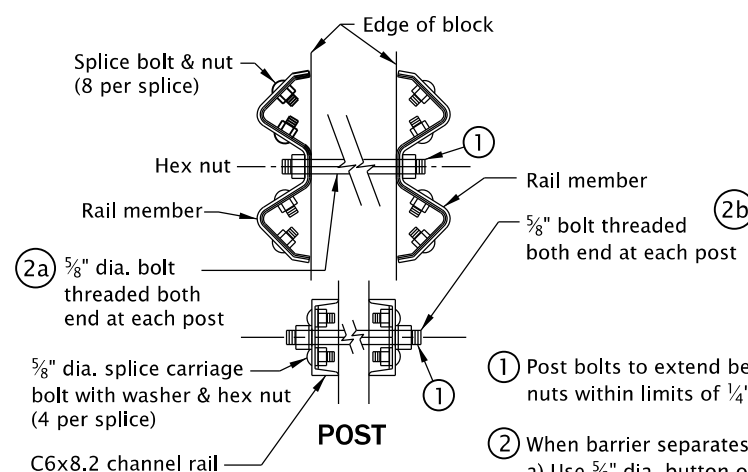
TABLE OF POST SPACING

TYPE	1	2A	3	4
SPACING	12'-6"	6'-3"	3'-1 1/2"	6'-3"

NORMAL RAIL ELEMENT DATA

Type	Rail	Effective Lengths	Thkn. *
1, 2A, 3	W beam	6.25', 12.5', 25'	0.105" & 0.135"
4	Thrie beam	6.25', 12.5', 25'	0.105" & 0.135"

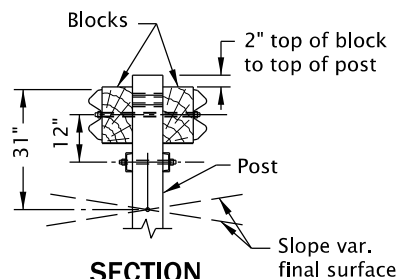
* Base metal thkn. nom. (Before galv.)



NOTE:
Median barrier post spacing 6'-3".
See end construction for variations.

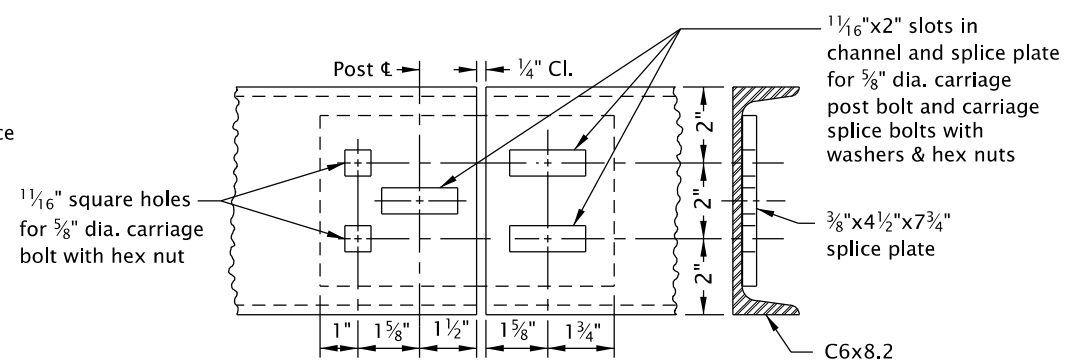
- 1 Post bolts to extend beyond the tightened nuts within limits of $\frac{1}{4}$ " to $\frac{1}{2}$ ".
- 2 When barrier separates to double post mounting:
a) Use $\frac{5}{8}$ " dia. button or alternate bolt with washer and hex nut.
b) Use $\frac{5}{8}$ " dia. carriage bolt with washer and nut.

METAL MEDIAN BARRIER

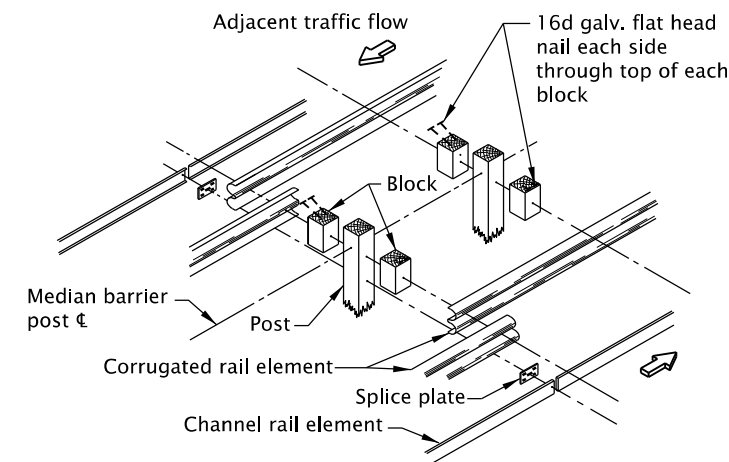


SECTION (See "Guardrail" details and general note 2)

NOTE:
Clearance to be $1\frac{1}{16}$ " at rail splice for bridge expansion joints.

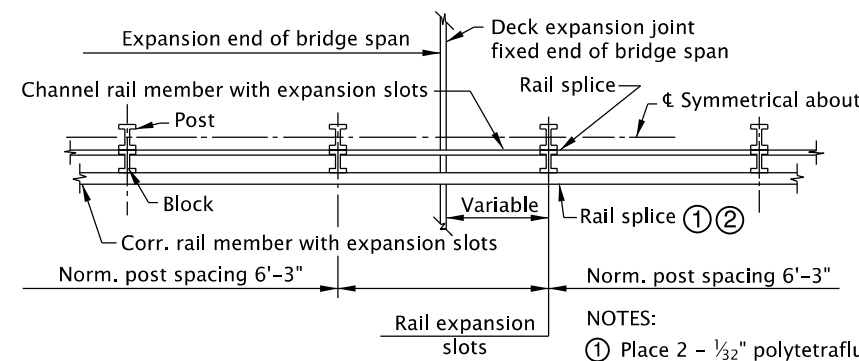


CHANNEL RAIL AND SPLICE PLATE (METAL MEDIAN BARRIER)



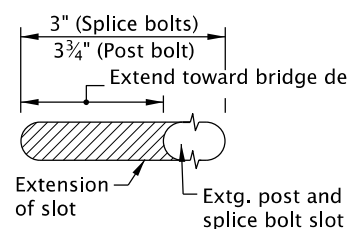
ASSEMBLY DETAILS (RELATION OF PARTS)

NOTE:
THIS DRAWING IS RETAINED FOR MAINTENANCE PURPOSES.
DO NOT USE FOR NEW CONSTRUCTION.

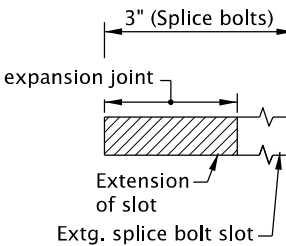


PLAN

- NOTES:**
- 1 Place 2 - $\frac{1}{32}$ " polytetrafluoroethylene (TFE) sheets between corrugated rail members. The sheets shall be $12\frac{1}{2}$ " x 1'-7".
 - 2 Adjust nuts to provide a sliding fit and set threads to prevent loosening.



CORRUGATED RAIL



CHANNEL RAIL AND SPLICE PLATE

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate guardrail standard drawing(s) for details not shown.
2. Use "Alternate Initial Installation", at bridge ends (See Std. Dwg. RD440), adjacent to P.C.C. pvmt. for temporary guardrail, to match existing guardrail, for Type 1 rail or as directed.
3. See Std. Dwg. RD701 for drainage curbs, where required.
4. Lap guardrail in direction of adjacent traffic.

CALC. BOOK NO. N/A

SDR DATE 13-JAN-2020

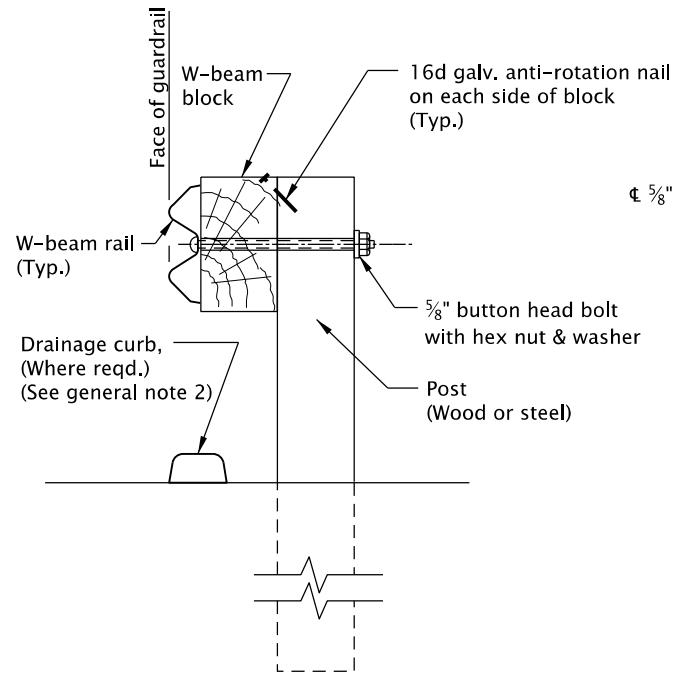
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS GUARDRAIL AND METAL MEDIAN BARRIER (29" RAIL HEIGHT)

2021

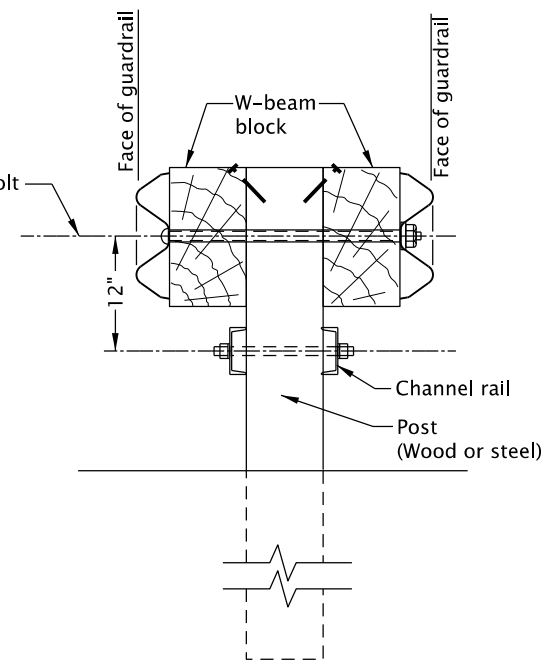
DATE	REVISION	DESCRIPTION

METAL MEDIAN BARRIER/SHOULDER GUARDRAIL INSTALLATION AT BRIDGE DECK EXPANSION JOINT

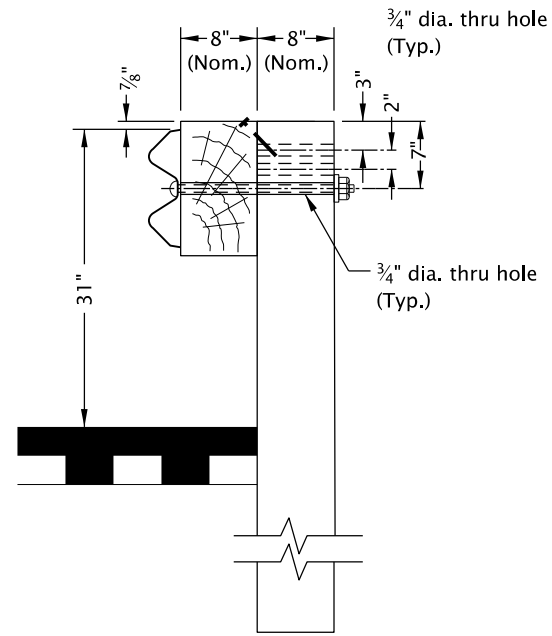


TYPES 2A & 3
(For Type 3 use double thickness (2) rail elements)

W-BEAM GUARDRAIL



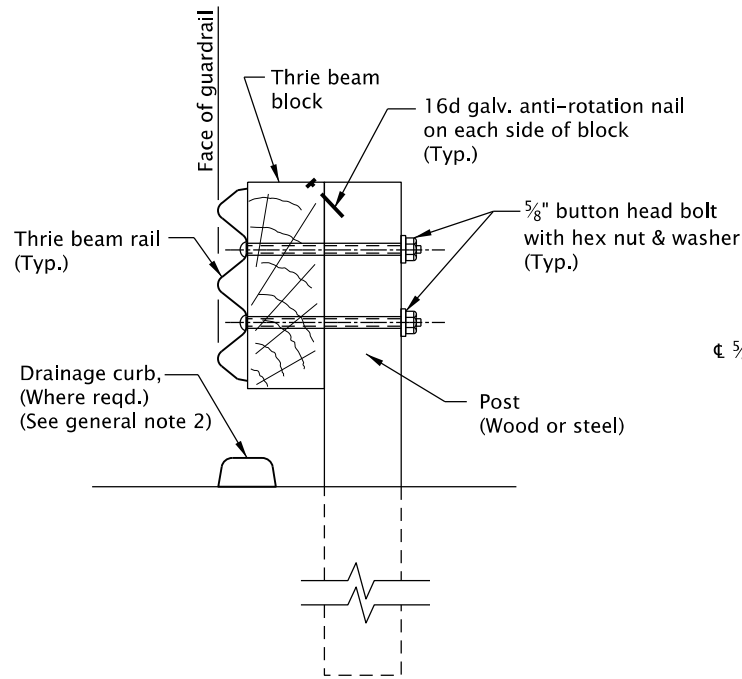
METAL MEDIAN BARRIER
(DOUBLE SIDED W/ CHANNEL RAIL)
(See general note 3)



TYPICAL INSTALLATION

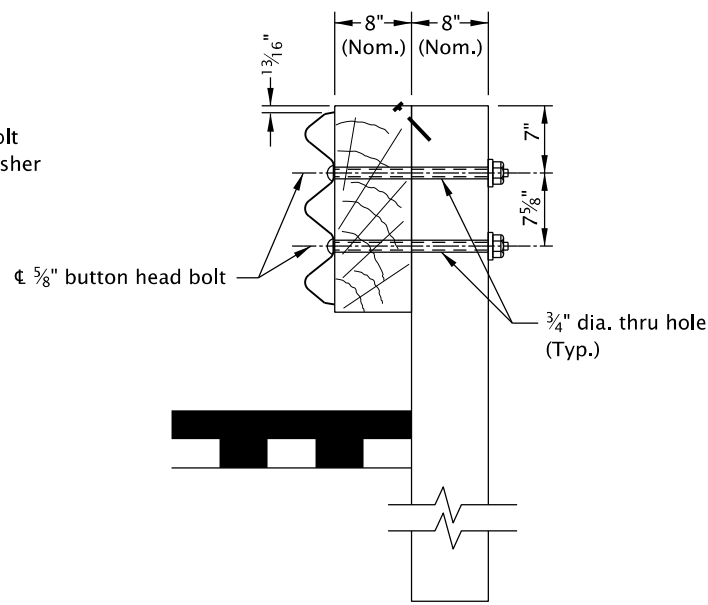
W-BEAM GUARDRAIL ASSEMBLY

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



TYPE 4 & 4 TRANSITION

THRIE BEAM GUARDRAIL

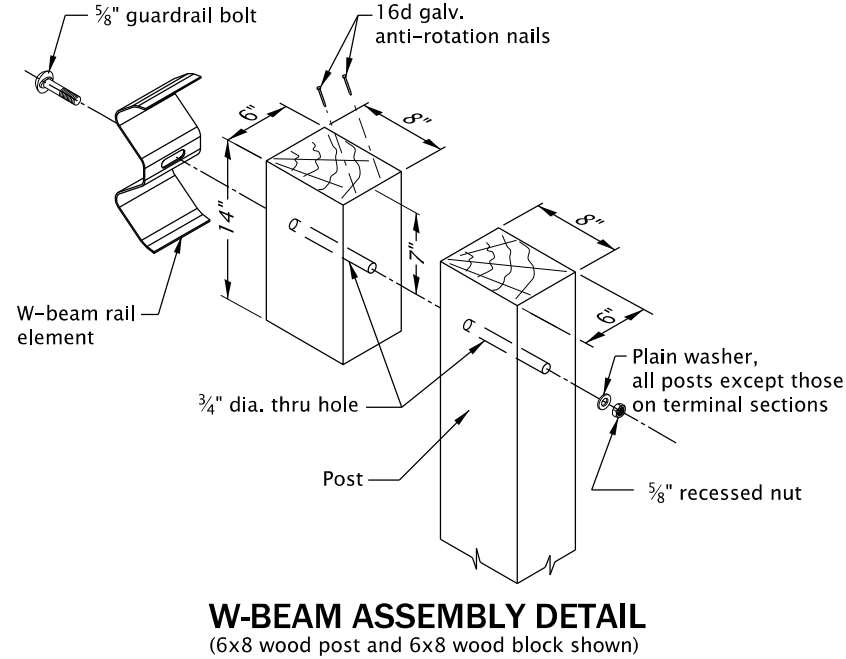
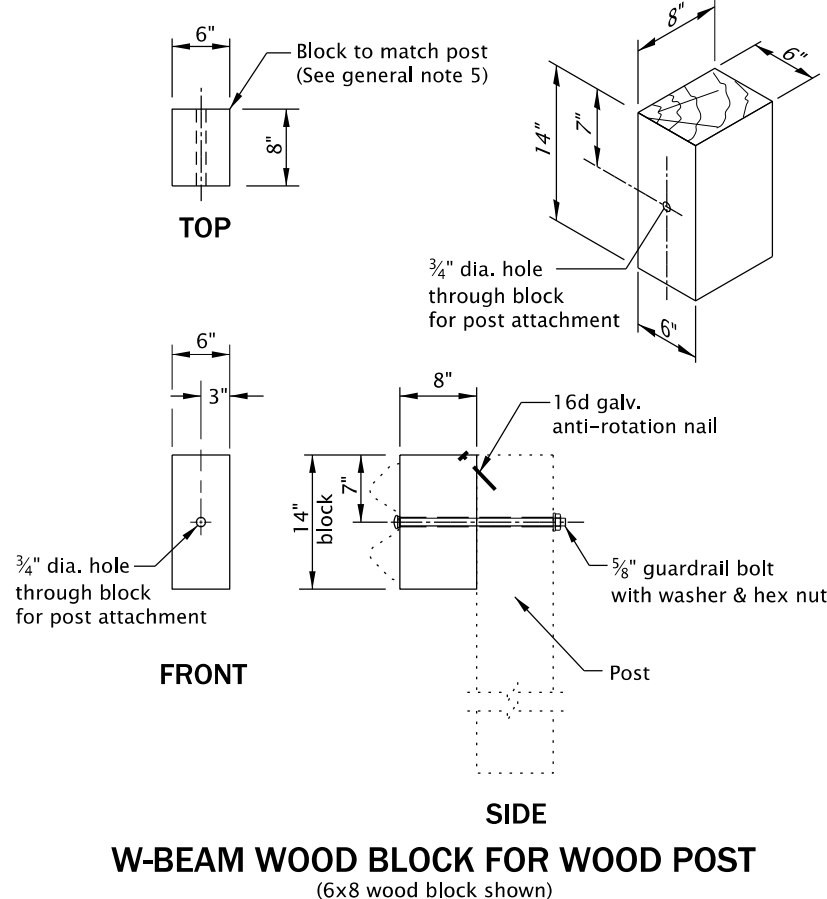
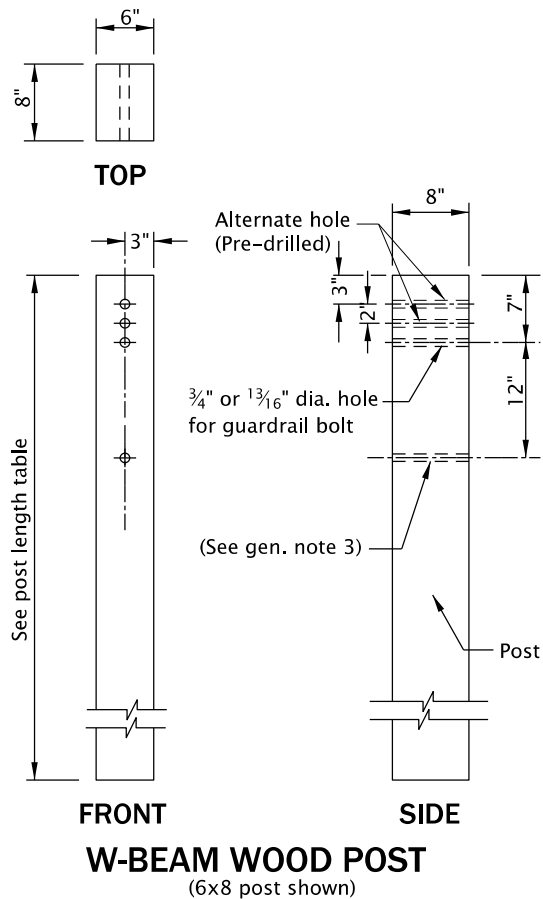


INITIAL INSTALLATION

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

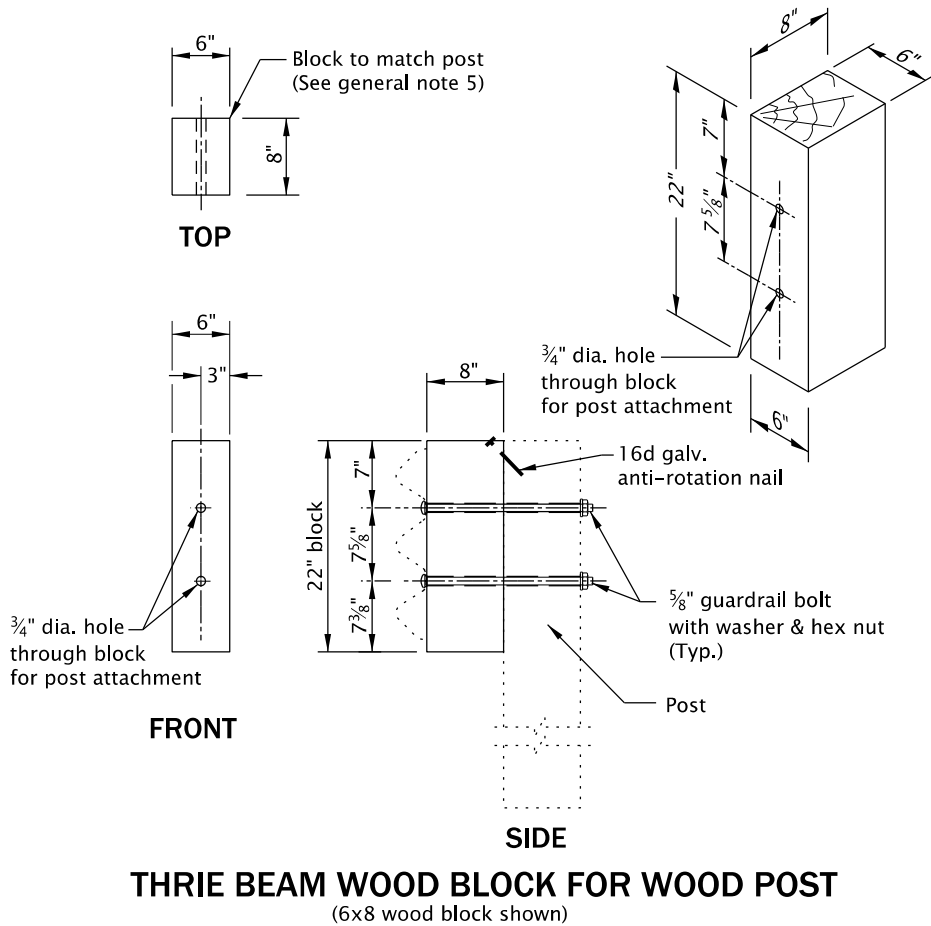
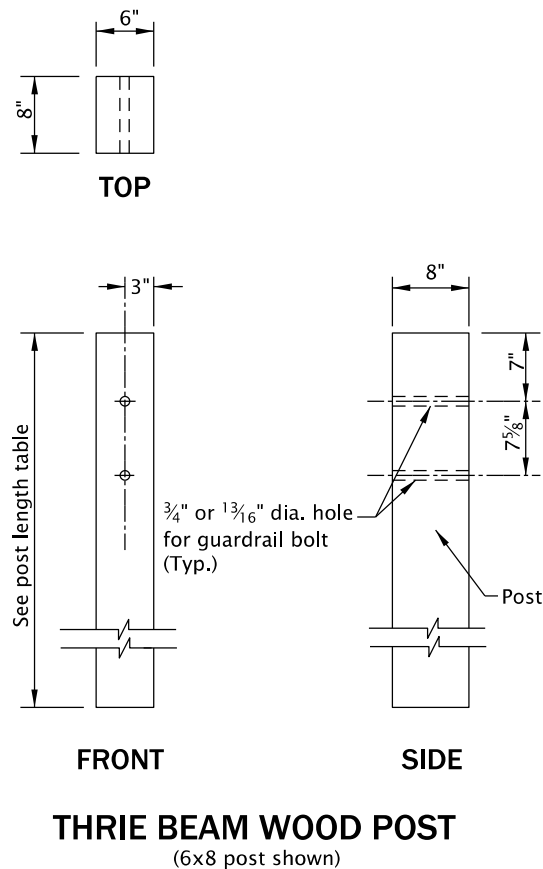
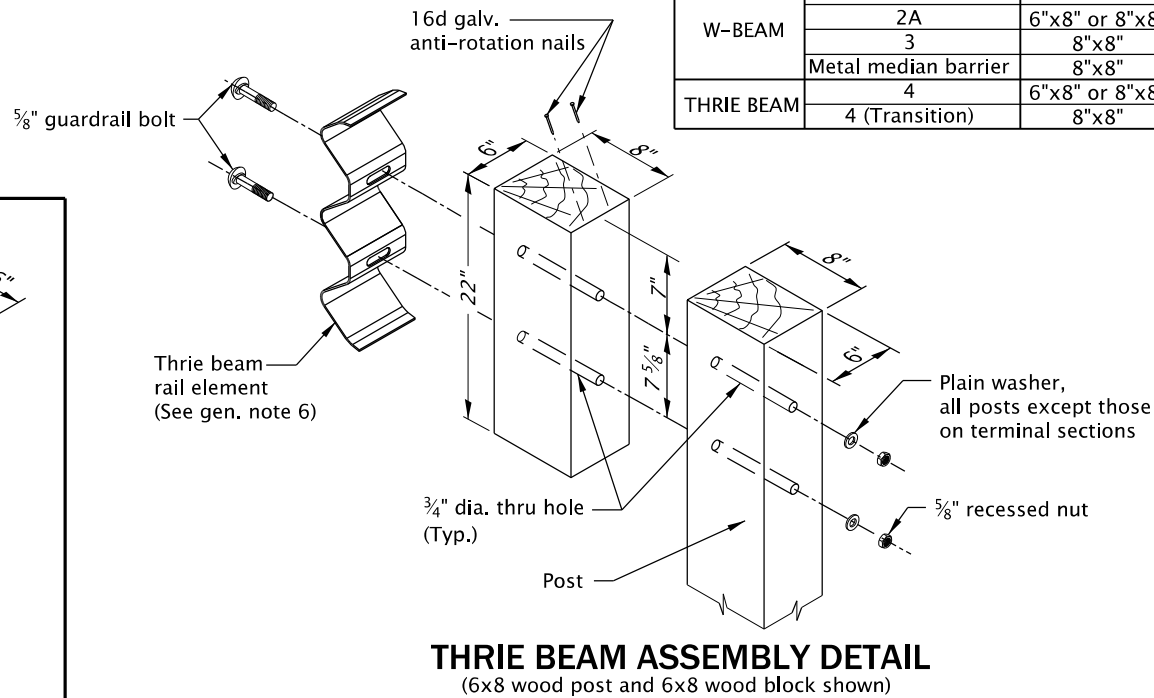
1. See appropriate guardrail standard drawing(s) for details not shown.
2. When required by the plans, Drainage curb alignment same as face of guardrail.
3. Orient post bolts with the button head located on the side nearest the traffic lane.
The bolt's threaded portion is not permitted to extend beyond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

CALC. BOOK NO. N/A		SDR DATE 19-JUL-2021	
<i>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 consulting a Registered Professional Engineer.</i>		NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
		OREGON STANDARD DRAWINGS	
		MIDWEST GUARDRAIL SYSTEM TYPES	
		2021	
		DATE	REVISION DESCRIPTION
		07-2021	REVISED DETAILS & NOTES



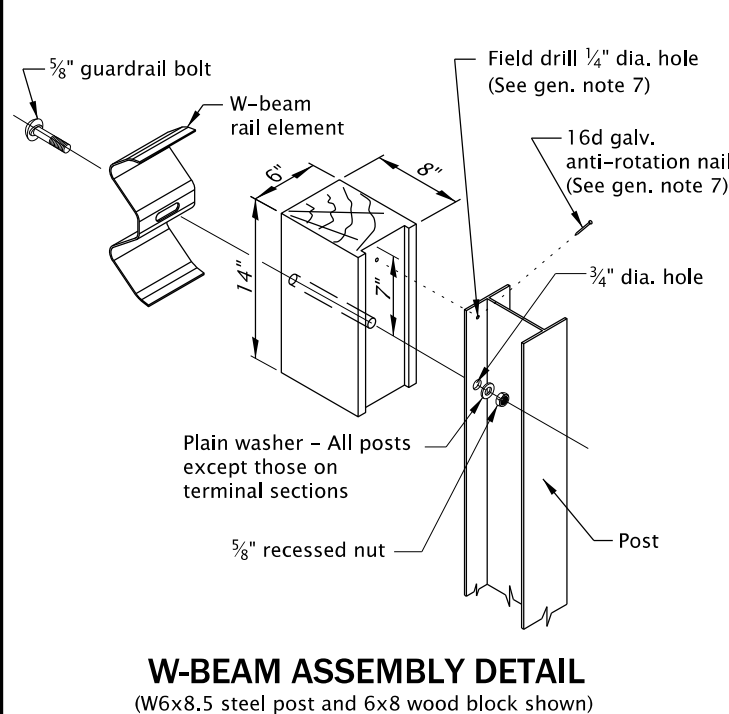
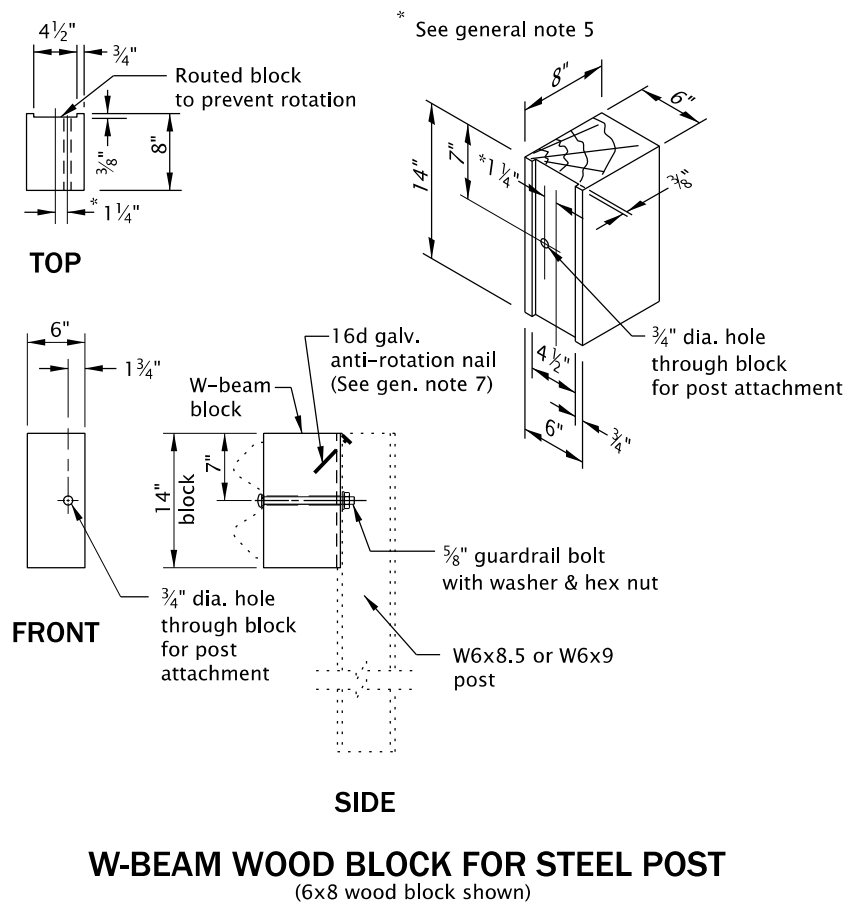
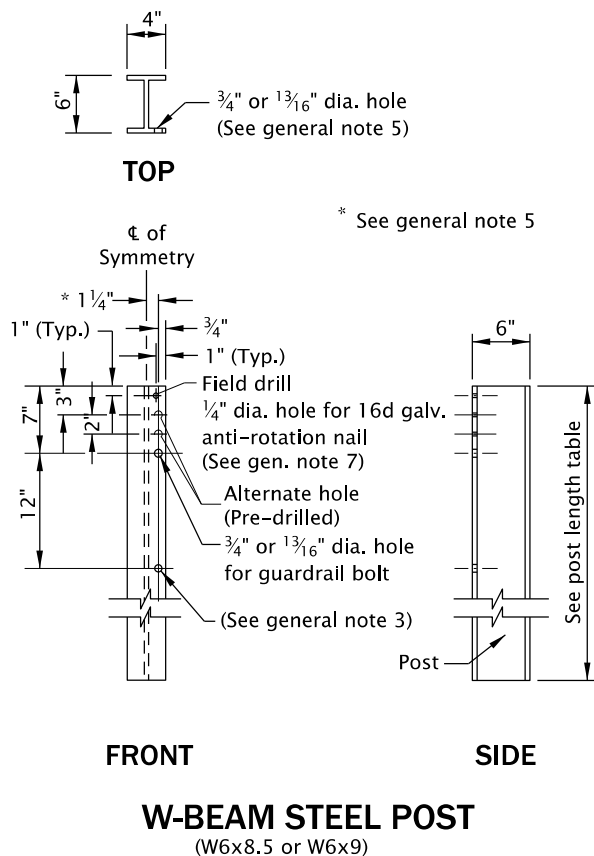
- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:
1. See appropriate guardrail standard drawing(s) for details not shown.
 2. See Bridge Dwgs. for bridge transition guardrail post and block requirements.
 3. Lowest hole(s) required only when channel rail is to be installed. Drill 12" below top 3/4" or 1 3/16" hole(s) used.
 4. Dimensions shown are for nominal posts and blocks.
 5. Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.
 6. When required by the plans, nested thrie beam wood post shall be 8"x8".
 7. Wood block shall be toe-nail to the post with 2 - 16d galvanized nails in top of block to prevent block rotation.

GUARDRAIL WOOD POST TABLE				
	GUARDRAIL TYPE	POST SIZE	POST LENGTH	POST SPACING
W-BEAM	2A	6"x8" or 8"x8"	6'-0"	6'-3"
	3	8"x8"	6'-0"	3'-1 1/2"
	Metal median barrier	8"x8"	6' 6"	6'-3"
THRIE BEAM	4	6"x8" or 8"x8"	7'-0"	6'-3"
	4 (Transition)	8"x8"	6'-0"	3'-1 1/2"



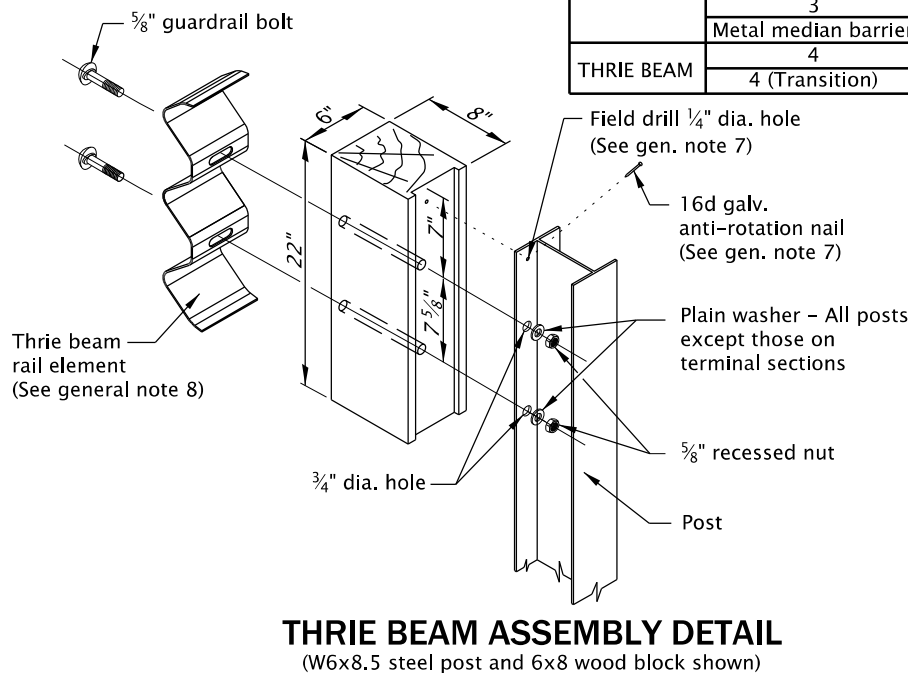
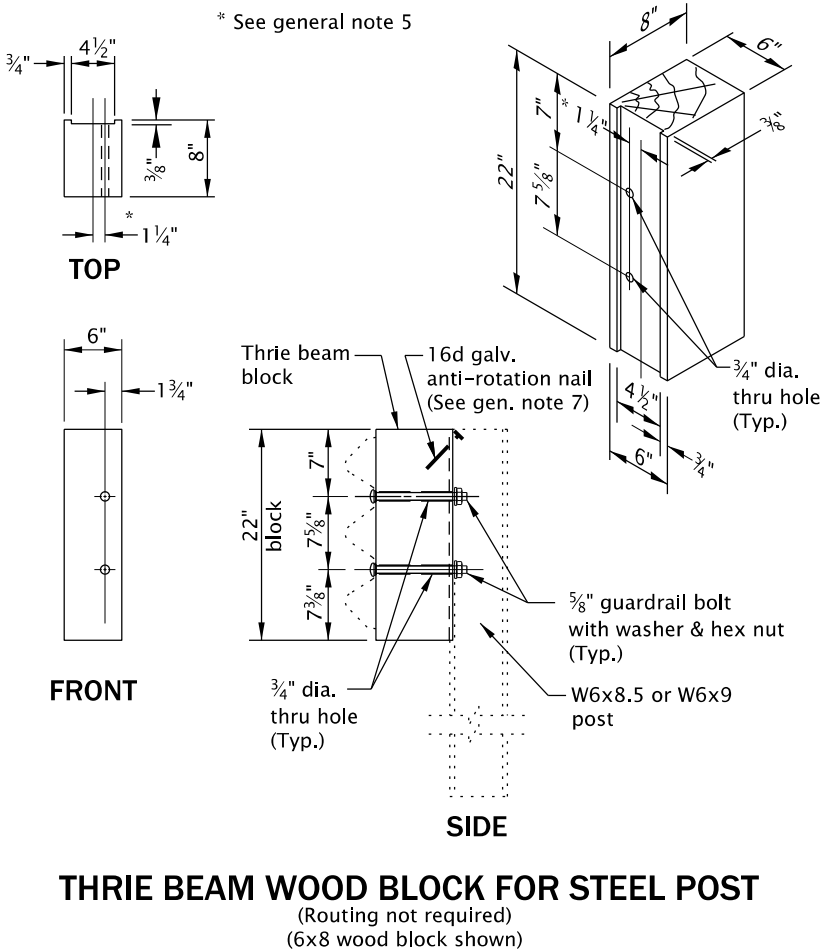
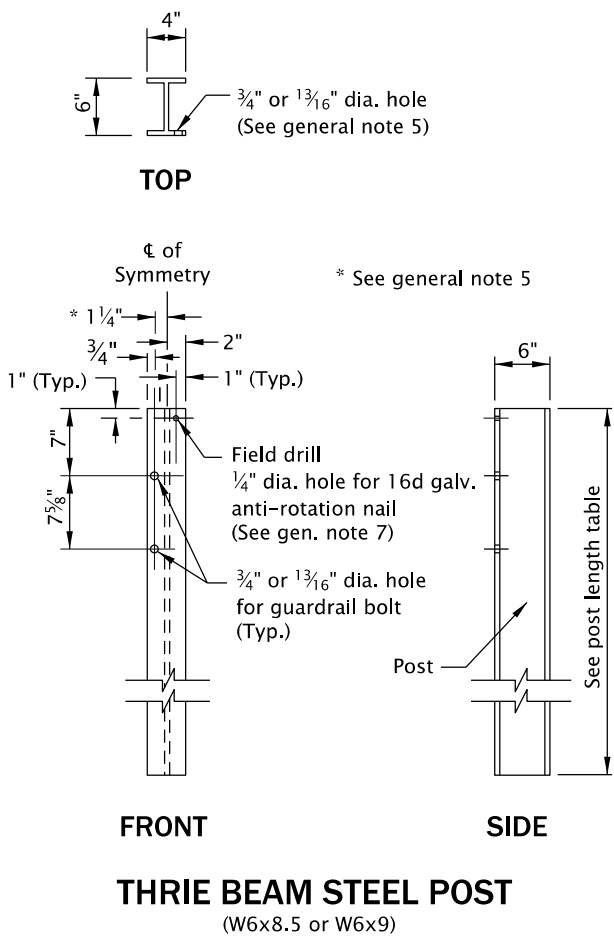
THRIE BEAM ASSEMBLY DETAIL
(6x8 wood post and 6x8 wood block shown)

CALC. BOOK NO. N/A		SDR DATE 19-JUL-2021	
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		OREGON STANDARD DRAWINGS	
		MIDWEST GUARDRAIL SYSTEM	
		WOOD POST AND BLOCK	
		2021	
		DATE	REVISION DESCRIPTION
		07-2021	REVISED DETAIL AND NOTES



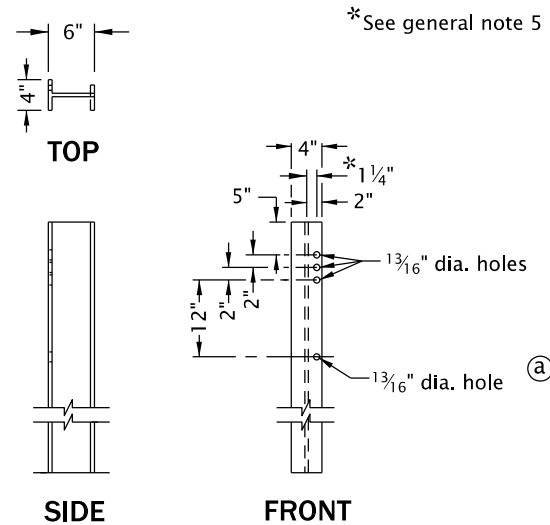
- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:
1. See appropriate guardrail standard drawing(s) for details not shown.
 2. See Bridge Dwgs. for bridge transition guardrail post and block requirements.
 3. Lowest hole(s) required only when channel rail is to be installed. Drill 12" below top 3/4" hole(s) used.
 4. Dimensions shown are for nominal posts and blocks.
 5. Steel posts are shifted to accommodate bolt holes. Holes may be on left, right, or both sides of web. Attach blockouts to steel posts using bolt holes on approaching traffic side of post web.
 6. Wood routed blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.
 7. Blocks shall be routed when steel posts are used to prevent rotation. Or, anti-rotation holes and 16d galvanized nails shall be used instead of routing the blocks.
 8. When required by the plans, nested thrie beam steel post shall be W6x9 and a maximum of 3'-1 1/2" on center.

GUARDRAIL STEEL POST TABLE				
GUARDRAIL TYPE	POST SIZE	POST LENGTH	POST SPACING	
W-BEAM	2A	W6x9 or W6x8.5	6'-6" or 6'-0"	6'-3"
	3	W6x9 or W6x8.5	6'-6"	3'-1 1/2"
	Metal median barrier	W6x9 or W6x8.5	6'-6"	6'-3"
THRIE BEAM	4	W6x9 or W6x8.5	7'-0"	6'-3"
	4 (Transition)	W6x9	6'-9"	3'-1 1/2"

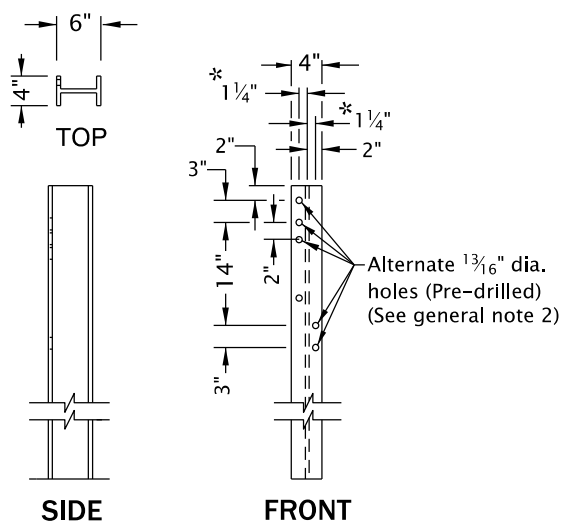


CALC. BOOK NO. N/A		SDR DATE 19-JUL-2021	
<i>The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.</i>		NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
		OREGON STANDARD DRAWINGS	
		MIDWEST GUARDRAIL SYSTEM STEEL POST AND BLOCK	
		2021	
		DATE	REVISION DESCRIPTION
		07-2021	REVISED DETAILS AND NOTES

STEEL



TYPE 2A, 3 OR METAL MEDIAN BARRIER



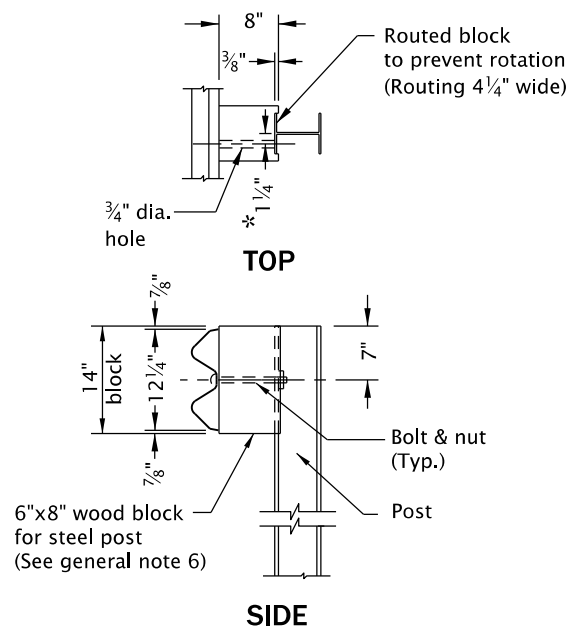
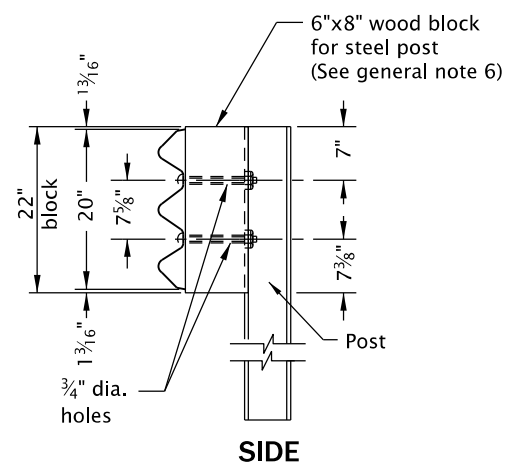
TYPE 4 OR TYPE 4 (TRANSITION) POST

(a) Lowest hole(s) required only where channel rail is to be installed. Drill 12" below top 13/16" hole(s) used. (See general note 3)

GUARDRAIL POST TABLE

GUARDRAIL TYPE	POST SIZE		POST LENGTH	
	WOOD	STEEL *	WOOD	STEEL
1	6"x8" or 8"x8"	—	6'-0"	—
2A	6"x8" or 8"x8"	W6x9 or W6x8.5	6'-0"	6'-6" or 6'-0"
3	8"x8"	W6x9 or W6x8.5	6'-0"	6'-6"
Metal median barrier	8"x8"	W6x9 or W6x8.5	6' 6"	6'-6"
4	6"x8" or 8"x8"	W6x9 or W6x8.5	7'-0"	7'-0"
4 (Transition)	8"x8"	W6x9 or W6x8.5	6'-0"	6'-9"

POSTS

TYPE 2A, 3 OR METAL MEDIAN BARRIER
WOOD BLOCK FOR STEEL POST

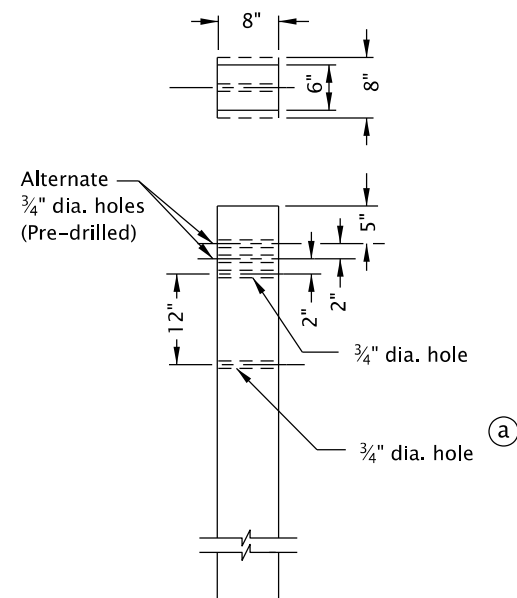
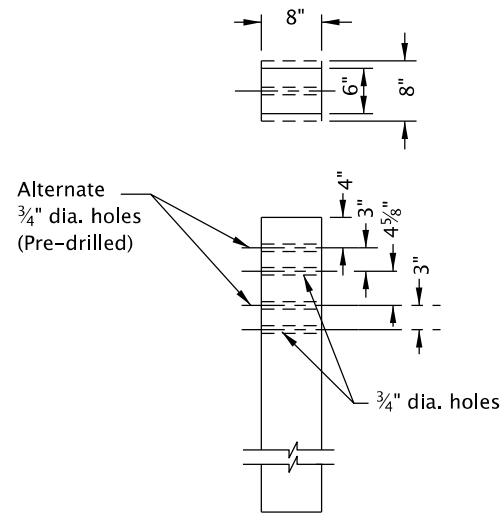
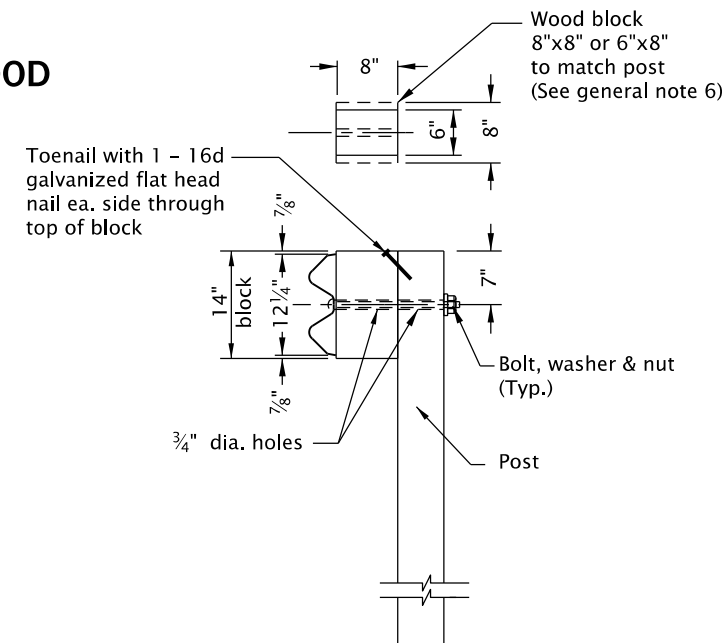
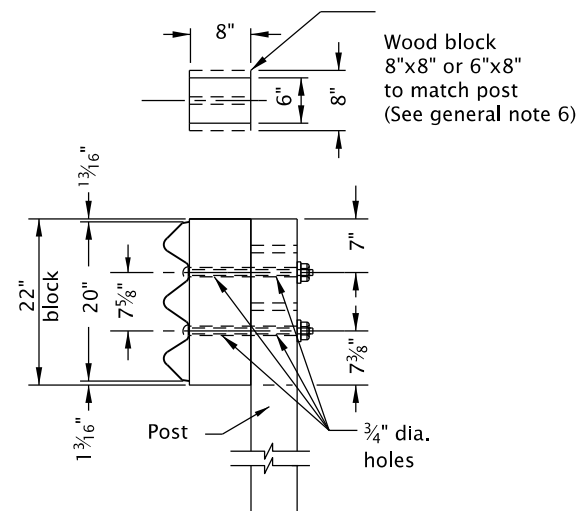
TYPE 4 OR TYPE 4 (TRANSITION) BLOCK

(Routing not required)

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

- See appropriate guardrail standard drawing(s) for details not shown.
- See Bridge Dwgs. for bridge transition guardrail post & block requirements. Multiple holes are not required in bridge transition rail posts.
- Posts and blocks to be pre-drilled for the intended guardrail installation.
- Post and block dimensions are nominal.
- Steel posts are shifted to accommodate bolt holes. Holes may be on left, right, or both sides of web.
- Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.

WOOD

TYPE 1, 2A, 3 OR
METAL MEDIAN BARRIERTYPE 4 OR TYPE 4 (TRANSITION)
POSTTYPE 2A, 3 OR
METAL MEDIAN BARRIER

TYPE 4 OR TYPE 4 (TRANSITION) BLOCK

NOTE:
THIS DRAWING IS RETAINED FOR MAINTENANCE PURPOSES.
DO NOT USE FOR NEW CONSTRUCTION.

CALC. BOOK NO. N/A

SDR DATE 13-JAN-2020

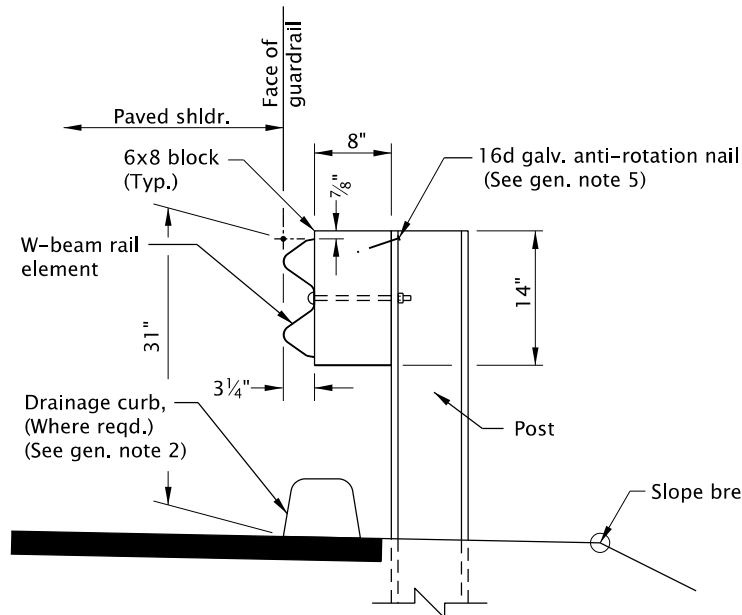
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

GUARDRAIL AND METAL MEDIAN BARRIER PARTS (29" RAIL HEIGHT)

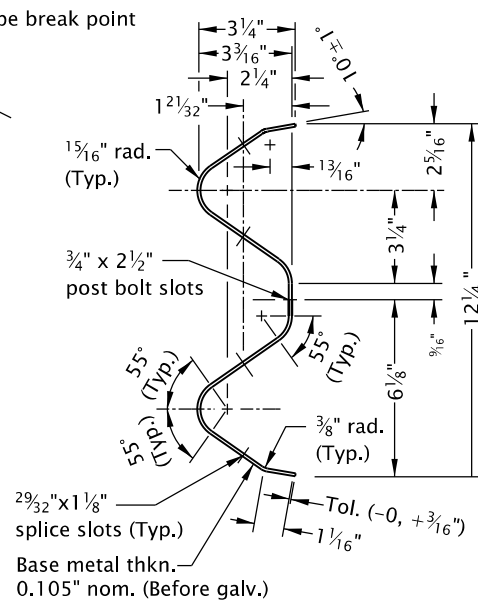
2021

DATE	REVISION	DESCRIPTION

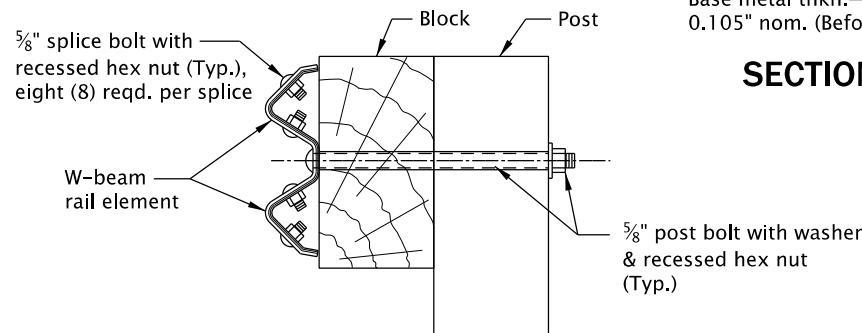


TYPICAL SECTION
(Steel post shown)

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



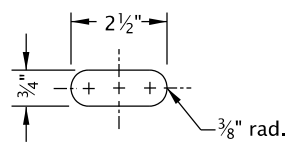
SECTION THRU RAIL ELEMENT



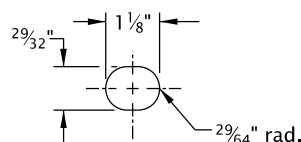
FITTINGS

NOTES:

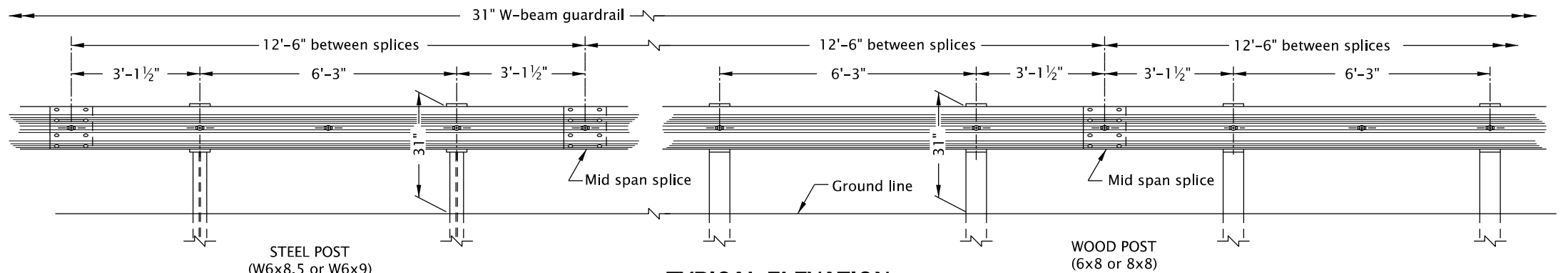
- When required by the plans, post bolts to extend beyond the tightened nuts within limits of 1/4" to 1/2".
- All post bolt threads to be set after assembly for wrench removal only.



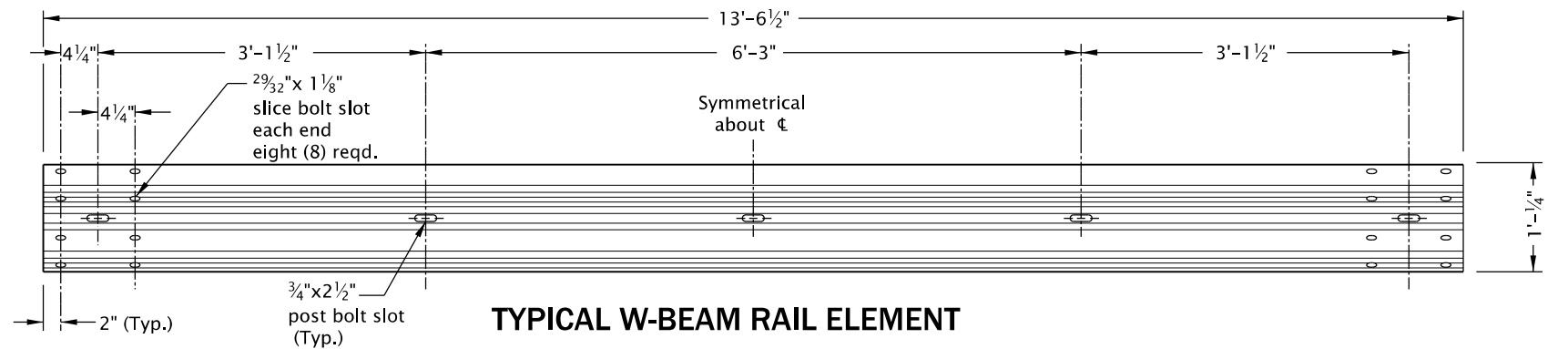
POST BOLT SLOT



SPLICE BOLT SLOT



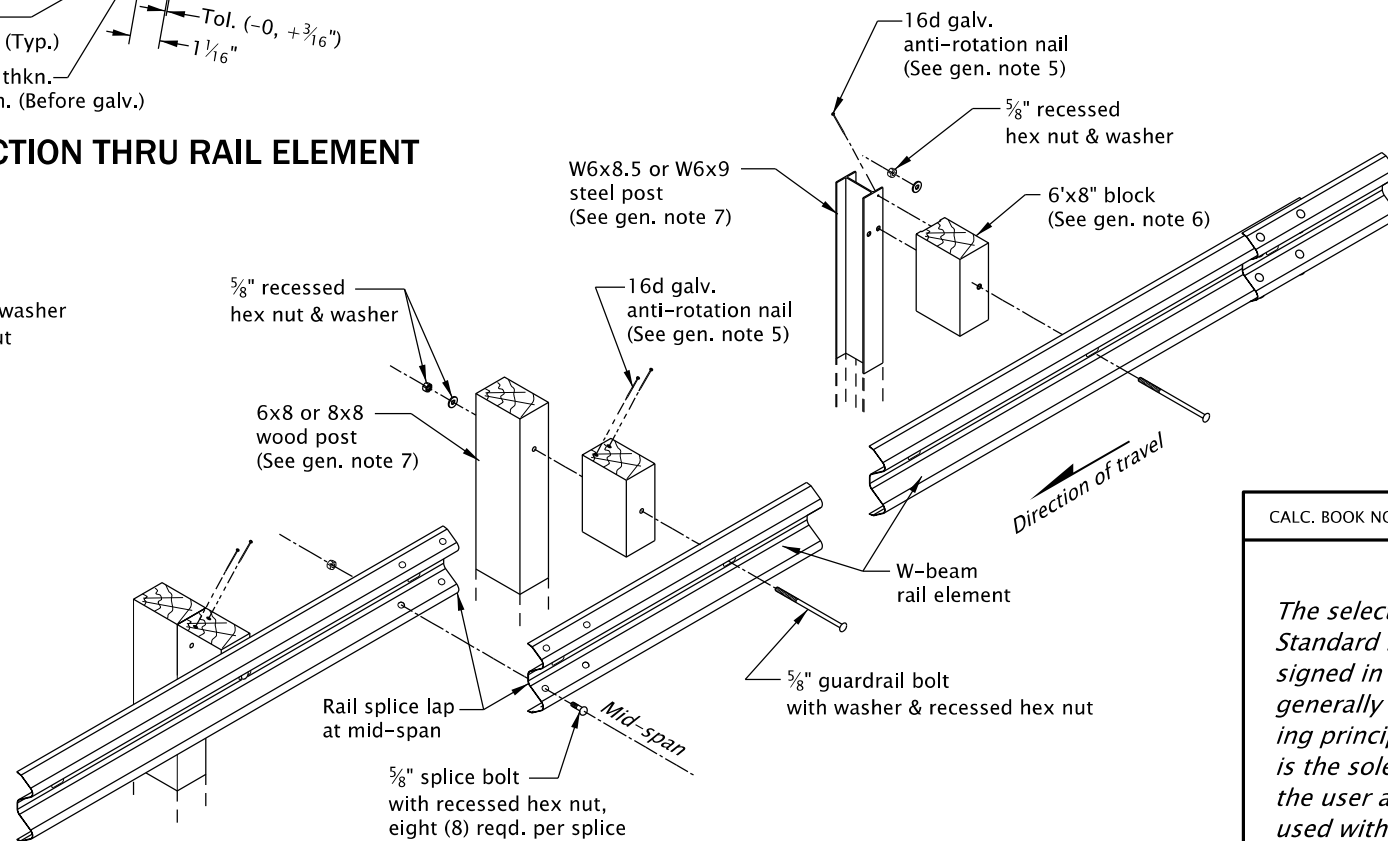
TYPICAL ELEVATION



TYPICAL W-BEAM RAIL ELEMENT

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

- See appropriate guardrail standard drawing(s) for details not shown.
- When required by the plans, drainage curb alignment same as face of guardrail.
- Lap guardrail in direction of adjacent traffic.
- Final paved surfacing to extend to face of post. Rail height measured from final paved surface at face of rail to top of rail (typ. all types). 1" ± tolerance.
- Blocks shall be toe-nailed to prevent rotation when wood posts are used (see Std. Dwg. RD403). Blocks shall be rounded or toe-nailed when steel posts are used to prevent rotation (see Std. Dwg. RD404).
- Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.
- All posts for guardrail run shall be of the same type: wood or steel.
- For guardrail installed on radii of 150' or less (5' min. radius) use rail elements pre-curved to industry standard. Install "Radius Identification Plate".



W-BEAM ASSEMBLY DETAILS

CALC. BOOK NO. **N/A**

SDR DATE **19-JUL-2021**

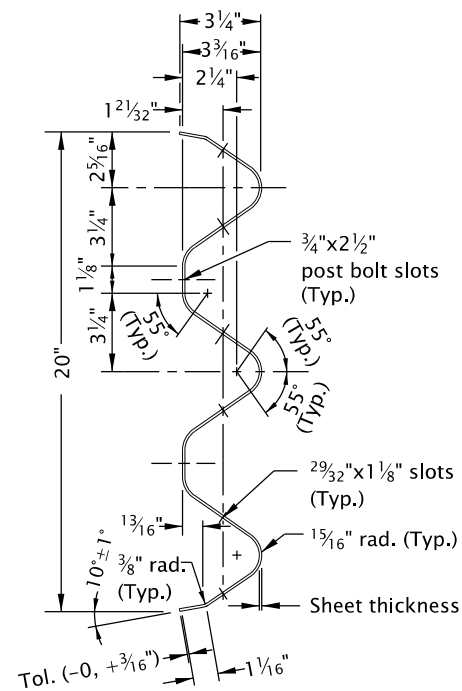
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
W-BEAM

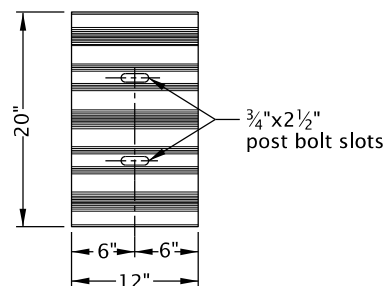
2021

DATE	REVISION	DESCRIPTION
07-2021	REVISED DETAILS AND NOTES	

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 consulting a Registered Professional Engineer.

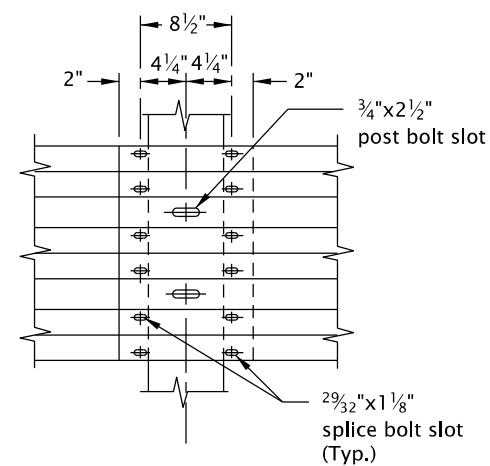


SECTION THRU RAIL ELEMENT

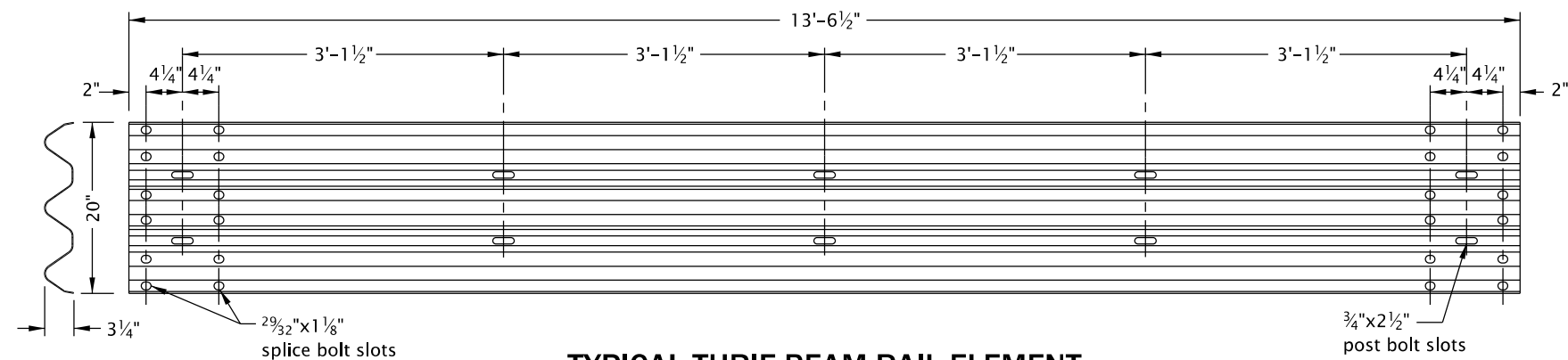
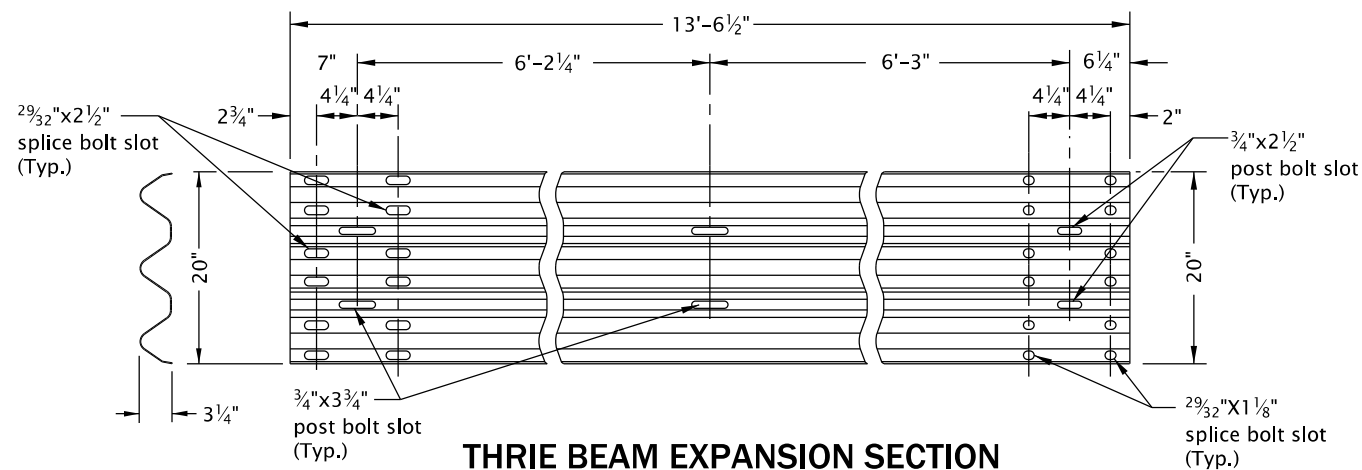


THRIE BEAM BACK-UP PLATE

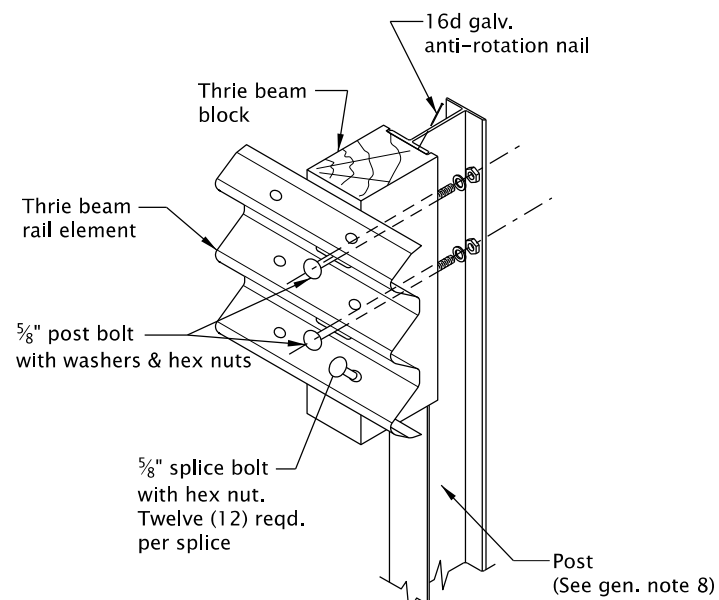
(For detail not shown, see "Section Thru Rail Element")



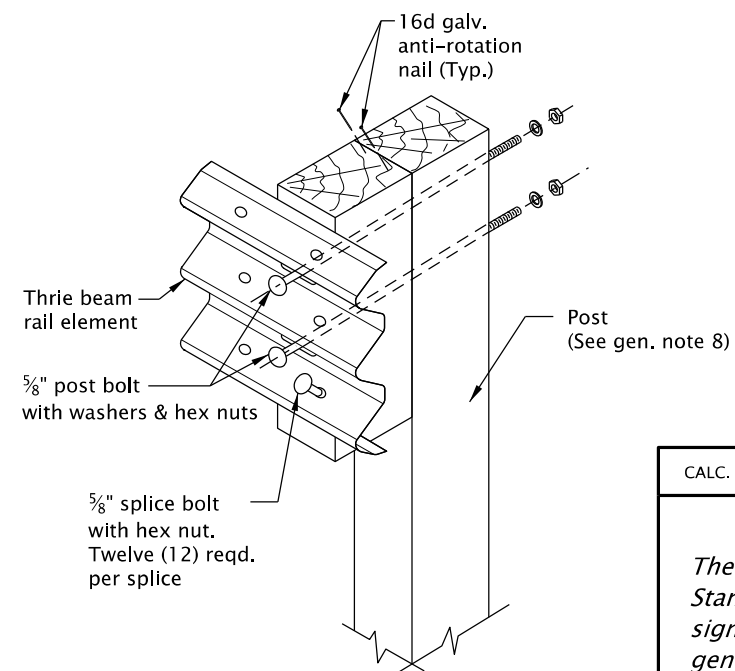
THRIE BEAM SPLICE

TYPICAL THRIE-BEAM RAIL ELEMENT
(12'-6" length shown)

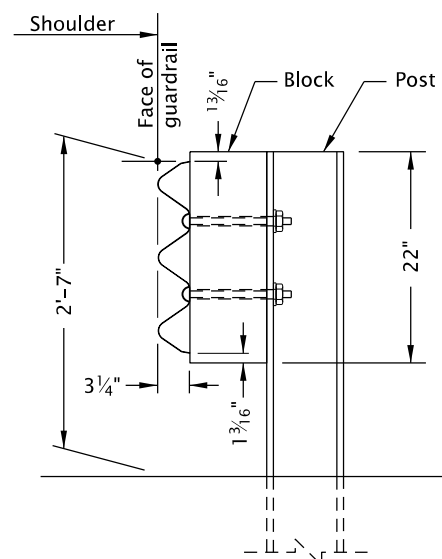
THRIE BEAM EXPANSION SECTION



STEEL POST ASSEMBLY



WOOD POST ASSEMBLY



TYPICAL SECTION

(Steel post shown)

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate guardrail standard drawing(s) for details not shown.
2. Lap guardrail in direction of adjacent traffic.
3. Hole layout per manufacturer with appropriate post and block.
4. Final paved surfacing to extend to face of post. Rail height measured from final paved surface at face of rail to top of rail (Typ. all types). 1" \pm tolerance.
5. Wood block shall be toe-nailed to the post with 2 - 16d galvanized nails in top of block to prevent block rotation.
6. Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.
7. All posts for guardrail run shall be of the same type: wood or steel.
8. When required by the plans, nested thrie beam post shall be 8x8 wood or W6x9 steel.

CALC. BOOK NO. N/A

SDR DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

THRIE BEAM GUARDRAIL

2021

DATE REVISION DESCRIPTION

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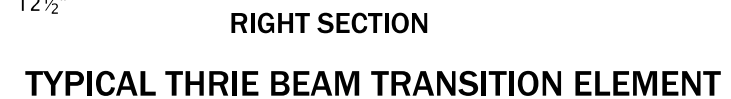


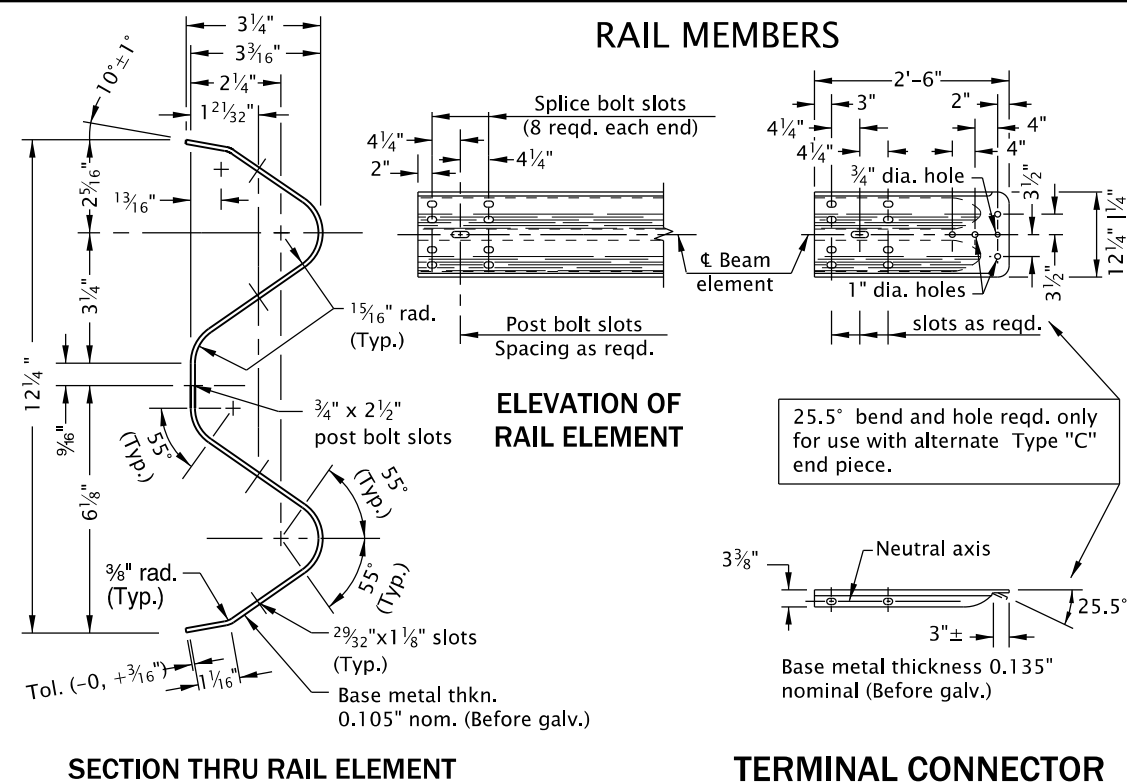
Technical drawing of a splice assembly. The drawing shows a side view of a splice with various dimensions and components labeled.

Dimensions and Labels:

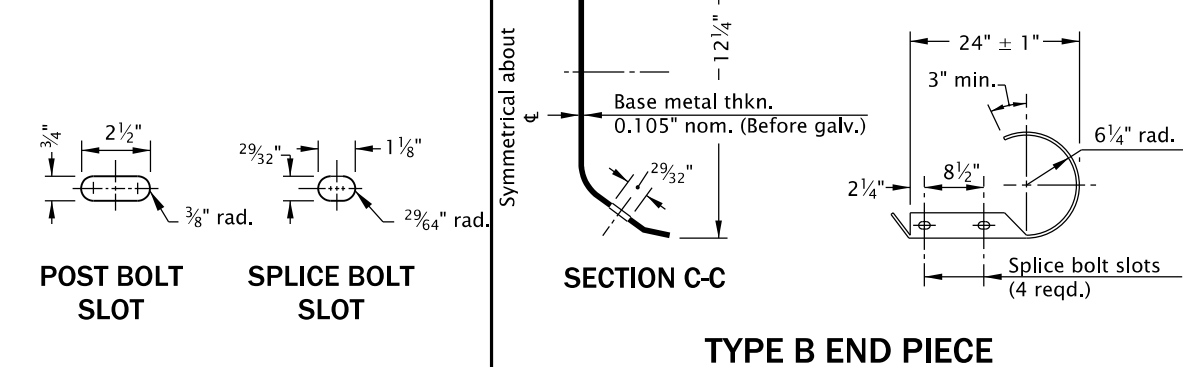
- Overall length: $7'-3\frac{1}{2}"$
- Distance from left end to center of splice: $6'-3"$
- Distance from center of splice to right end: $3'-1\frac{1}{2}"$
- Distance from left end to splice start: $3'-1\frac{1}{2}"$
- Distance from splice end to right end: $3'-1\frac{1}{2}"$
- Material: 10 ga. galv.
- Splice bolt slot (Typ.): $29\frac{3}{32}" \times 1\frac{1}{8}"$
- Post bolt slot (Typ.): $\frac{3}{4}" \times 2\frac{1}{2}"$
- Vertical dimensions on the right: $20"$, $7\frac{5}{8}"$
- Horizontal dimensions at the bottom: $12\frac{1}{2}"$, $4\frac{1}{4}"$, $4\frac{1}{4}"$, $2"$, $3\frac{1}{4}"$
- Vertical dimension on the left: $12\frac{1}{4}"$
- Horizontal dimension on the left: $3\frac{1}{4}"$

SYMMETRICAL THRIE BEAM TRANSITION ELEMENT

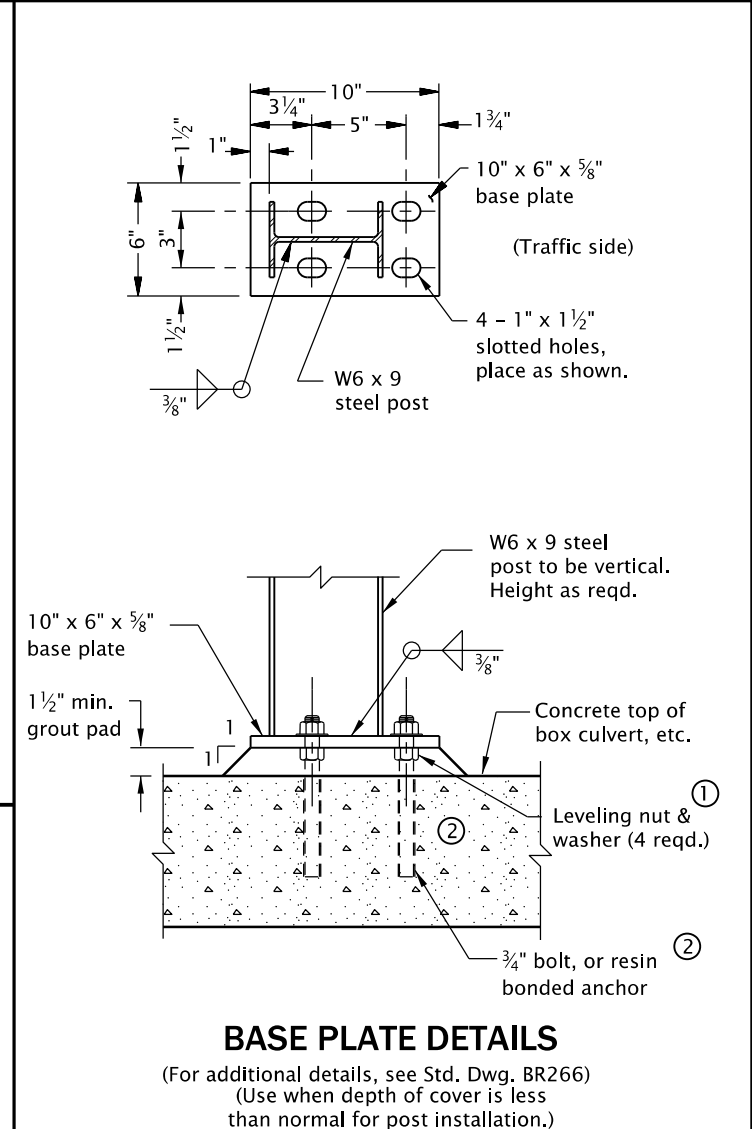
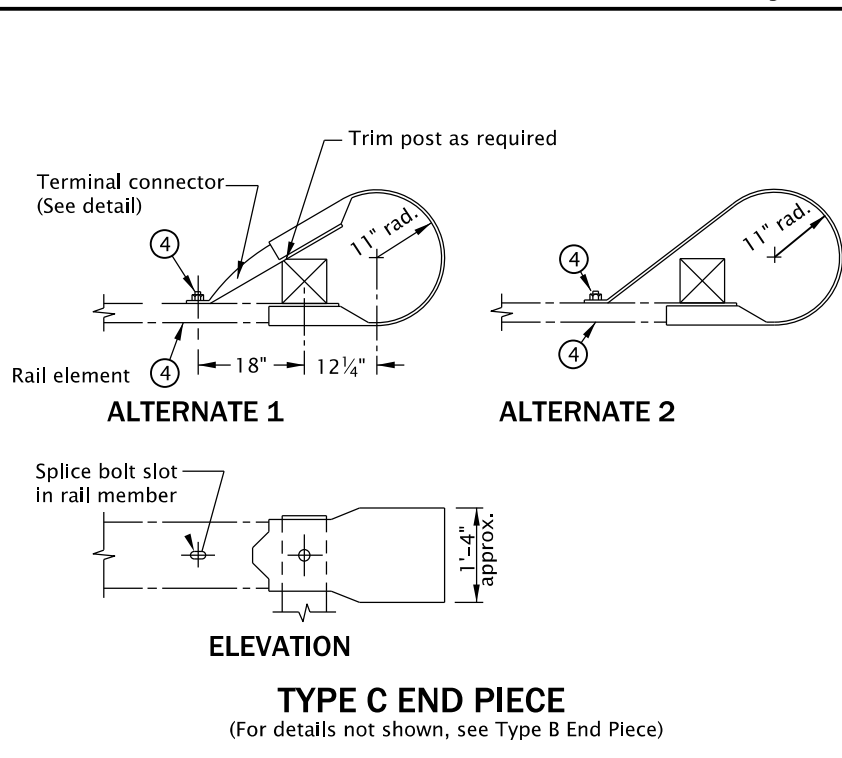
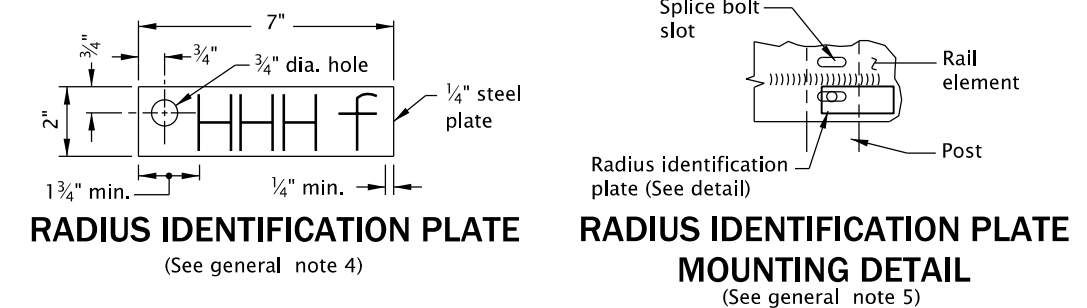
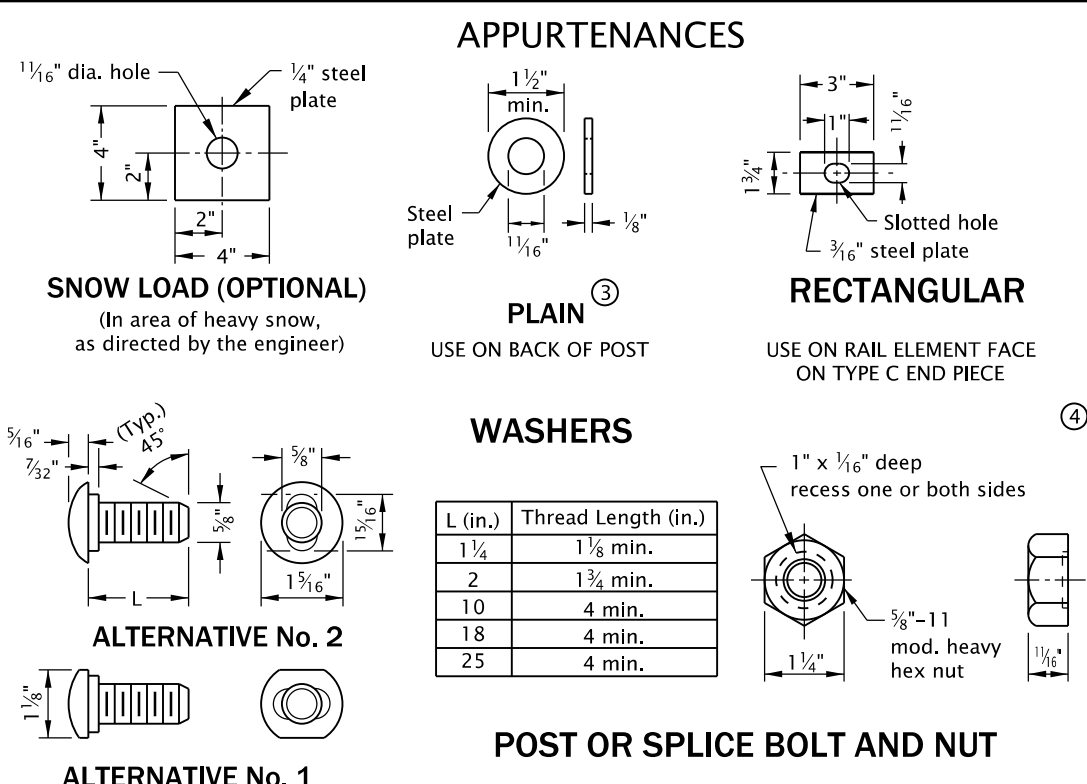
RD410



- NOTES:
- For guardrail installed on radii of 150' or less (5' min. radius) use rail elements pre-curved to industry standard. Install "Radius Identification Plate" (See detail right).
 - Effective length of rail sections shall be 12'-6".



- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:
- See appropriate guardrail standard drawing(s) for details not shown.
 - For details of guardrail connections to structural handrails, see special details or Standard Drawings as called for on plans.
 - All indicated welds shall attain the full strength of the section welded.
 - Radius dimensions, in feet to the nearest 0.5 foot, shall be placed on the plate with a raised weld bead replacing the letters "HHH", shown on the Radius Identification Plate detail. Digits shall be 1 1/2" min. height and 3/4" max. width. Plate shall be galvanized after placement of digits.
 - The guardrail radius identification plate is to be mounted on the back side of the rail element with the lowest splice bolt nearest the P.C. of the guardrail radius.



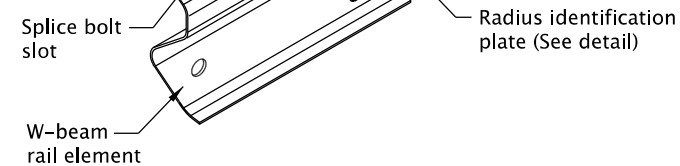
- NOTES:
- Furnished & installed by structure contractor when shown on structure plans.
 - 6" min. penetration into concrete slabs other than bridge decks. Cast in place or core and install using approved resin bonding system.
 - Not required if "Snow Load" washer option is used.
 - Use rectangular washer under bolt head and nut on Type C End Piece as shown.
- NOTES: THIS DRAWING IS RETAINED FOR MAINTENANCE PURPOSES. DO NOT USE FOR NEW CONSTRUCTION.

CALC. BOOK NO. <u>N/A</u>	SDR DATE <u>13-JAN-2020</u>
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS	
GUARDRAIL AND METAL MEDIAN BARRIER PARTS (29" RAIL HEIGHT)	
2021	
DATE	REVISION DESCRIPTION

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 consulting a Registered Professional Engineer.



$\frac{5}{8}$ " GUARDRAIL POST/SPICE BOLT (BUTTON HEADED)



SNOW LOAD [®] RAIL WASHER



BOLT DIMENSION TABLE

Length (L) (in.)	Thread Length (T) (in.)
1¼	1⅛ min.
2	1¾ min.
10	4 min.
18	4 min.
25	4 min.



BASE PLATE DETAILS

(For additional details, see Std. Dwg. BR266)
(Use when depth of cover is less
than normal for post installation.)

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate guardrail standard drawing(s) for details not shown.
2. For details of guardrail connections to structural handrails, see special details or Standard Drawings as called for on plans.
3. All indicated welds shall attain the full strength of the section welded.
4. Radius dimensions, in feet to the nearest 0.5 foot, shall be placed on the plate with a raised weld bead replacing the letters "HHH", shown on the Radius Identification Plate detail. Digits shall be $1\frac{1}{2}$ " min. height and $\frac{3}{4}$ " max. width. Plate shall be galvanized after placement of digits.
5. The guardrail radius identification plate is to be mounted on the back side of the rail element with the lowest splice bolt nearest the P.C. of the guardrail radius.
6. When required by the plans, a Snow Load Post Washer shall be used on the backside of the post and a Snow Load Rail Washer shall be placed on rail element face. Snow Load Rail Washers shall not be installed on terminals.

SUPPLEMENTARY NOTES:

- (a) Not required if Snow Load Post washer option is used.
- (b) Use rectangular Snow Load Rail washer under bolt head and nut on Type C End Piece as shown.
- (c) Furnished & installed by structure contractor when shown on structure plans.
- (d) 6" min. penetration into concrete slabs other than bridge decks.
Cast in place or core and install using approved resin bonding system.

CALC. BOOK NO. N/A

SDR DATE 13-JAN-2020

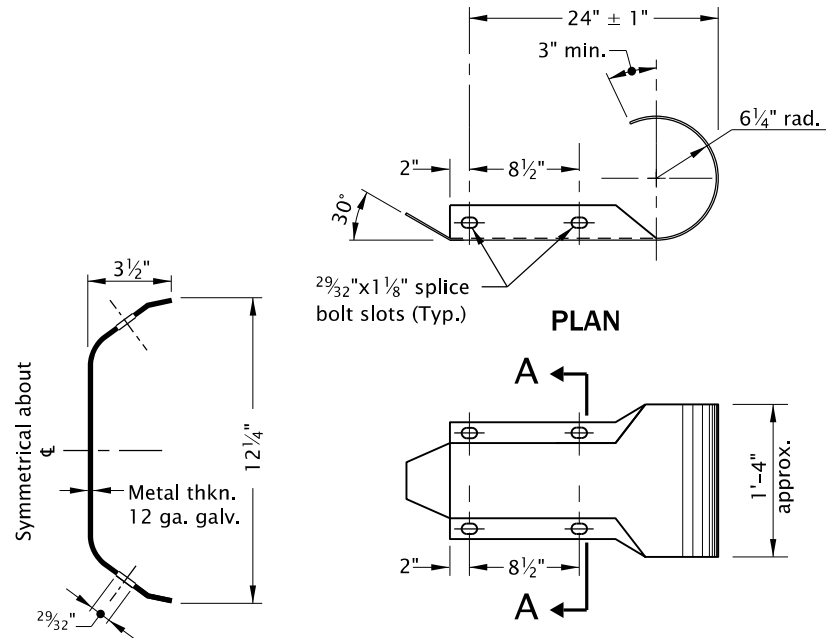
NOTE:	All material and workmanship shall be in accordance with the current Oregon Standard Specifications
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OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
STANDARD HARDWARE
(NUTS, BOLTS, WASHERS AND MISC.)

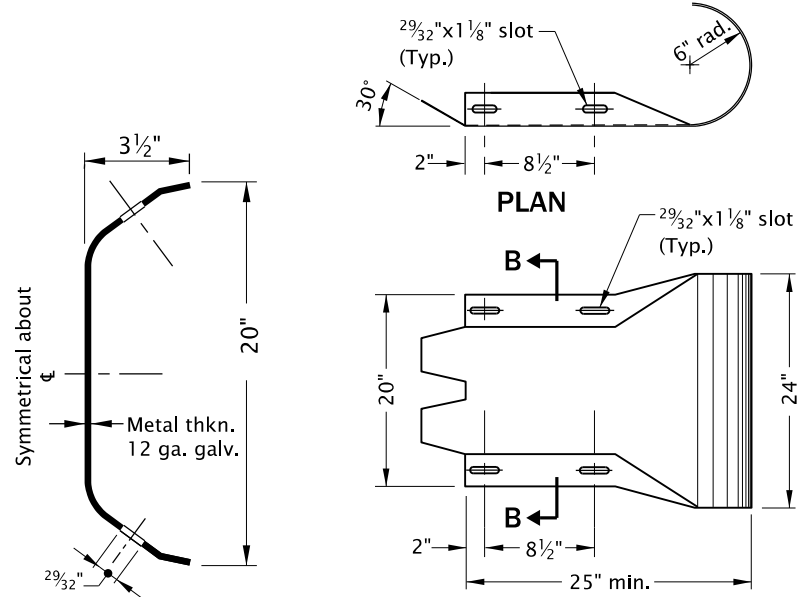
2021

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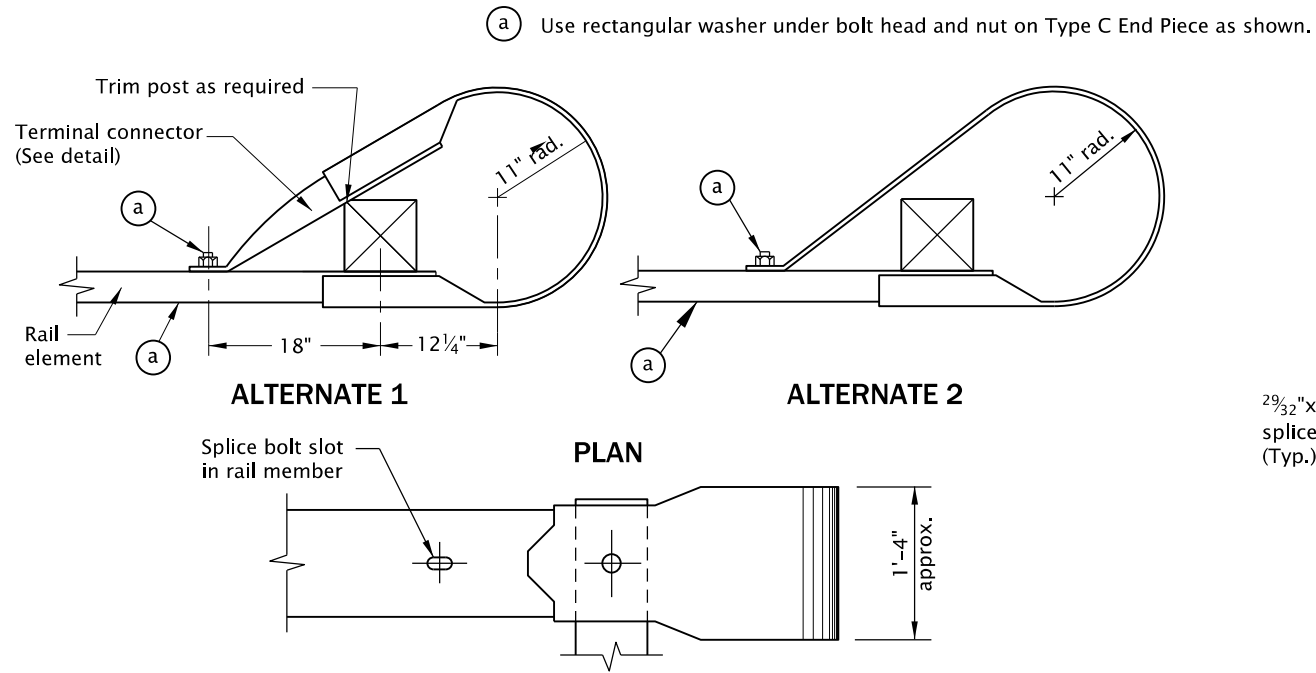
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



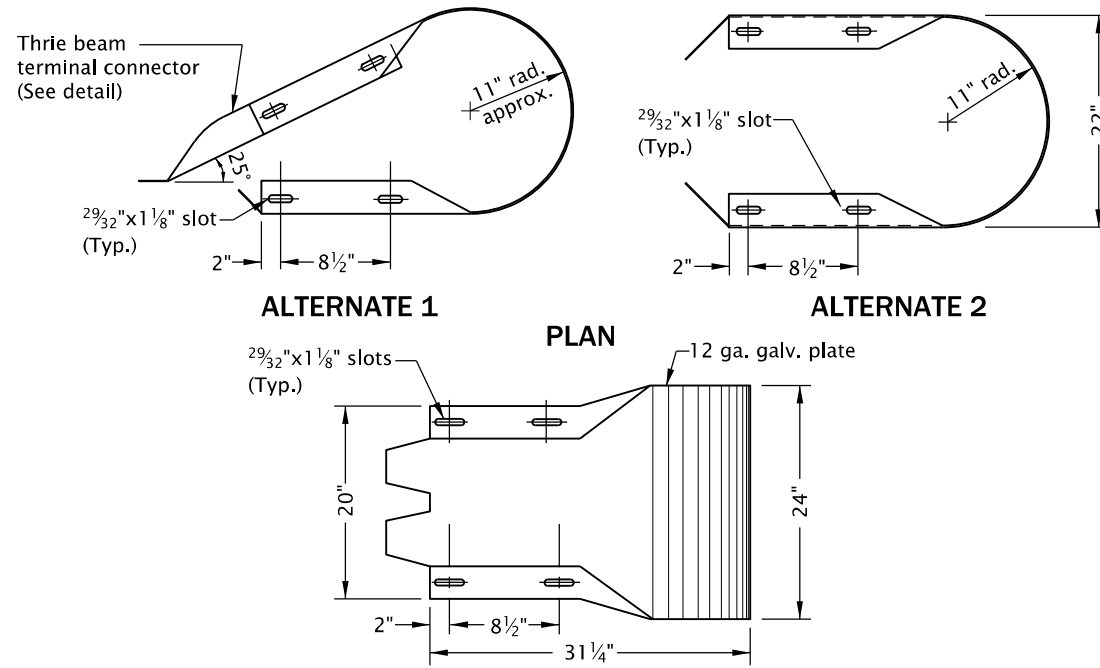
SECTION A-A
W-BEAM TYPE B END PIECE



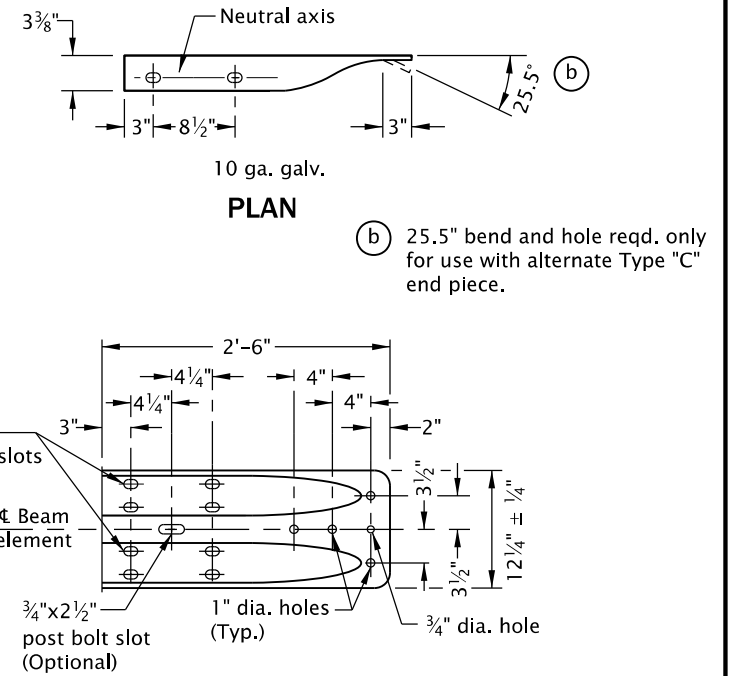
SECTION B-B
THRIE BEAM TYPE B END PIECE



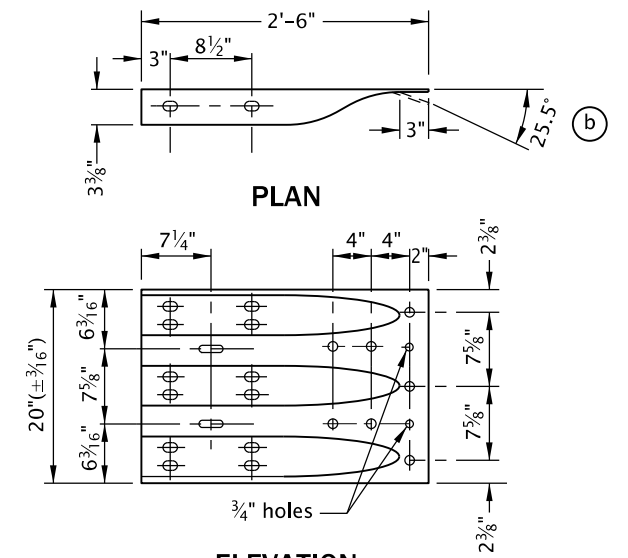
W-BEAM TYPE C END PIECE
(For details not shown, see Type B End Piece)



THRIE BEAM TYPE C END PIECE



W-BEAM TERMINAL CONNECTOR



THRIE BEAM TERMINAL CONNECTOR

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate guardrail standard drawing(s) for details not shown.
2. For details of guardrail connections to structural handrails, see special details or Standard Drawings as called for on plans.

CALC. BOOK NO. N/A

SDR DATE 13-JAN-2020

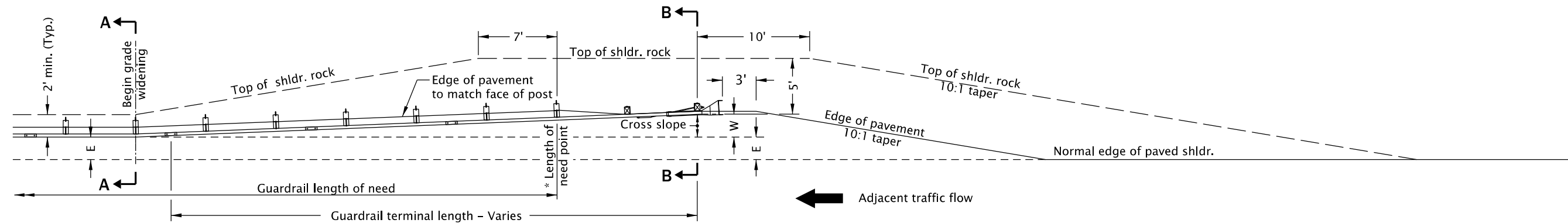
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
END SECTIONS

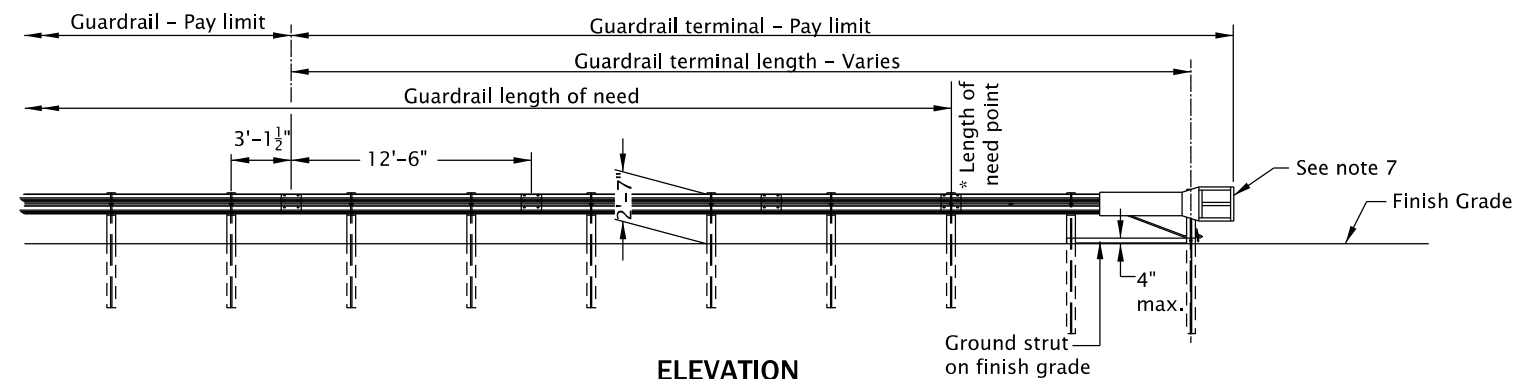
2021

DATE	REVISION	DESCRIPTION

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 consulting a Registered Professional Engineer.

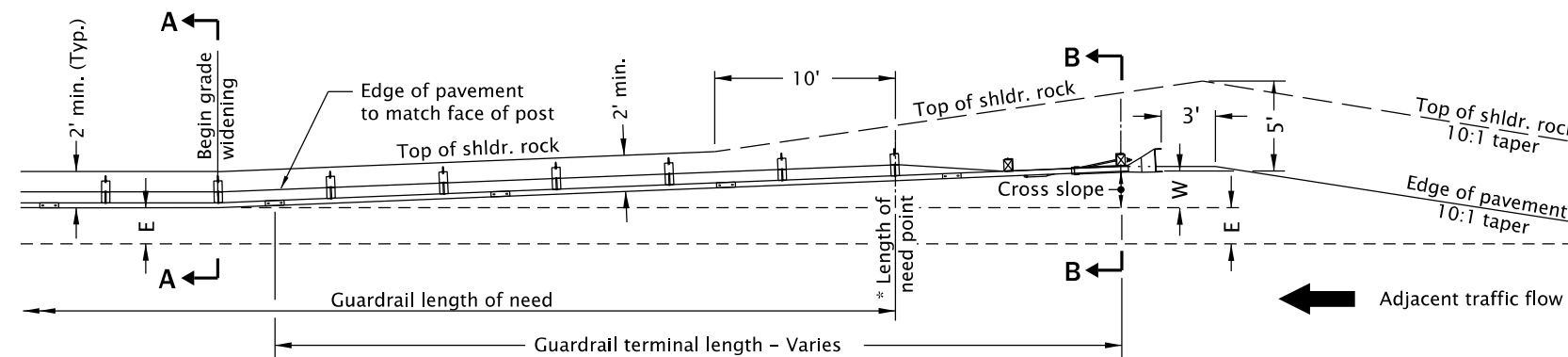


PLAN

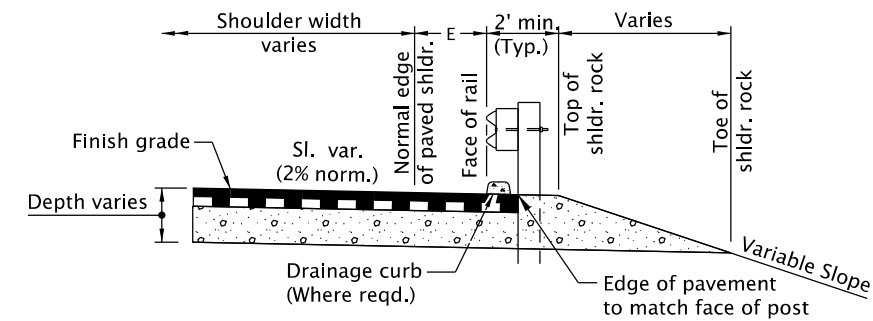


ELEVATION

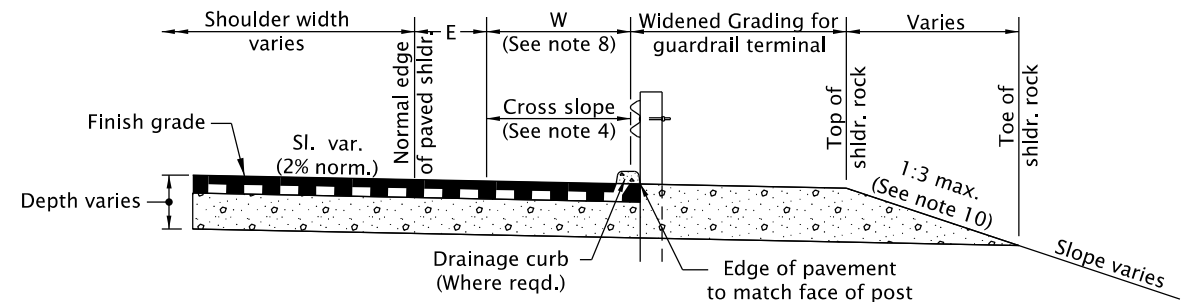
PREFERRED GRADING



ALTERNATIVE GRADING



SECTION A-A



SECTION B-B

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Use details shown as a general guide since manufacturer's details may vary. Install a guardrail terminal system that meets MASH requirements per manufacturer's recommendations. Ensure that guardrail terminal meets appropriate test level for the project.
2. See appropriate guardrail standard drawing(s) for details not shown. See project plans for details not shown. See Std. Dwg. RD701 for drainage curbs, where required. E=2' or as shown on project plans.
3. Guardrail Non-flared terminal shall be installed with a minimum 1 foot offset ensuring that the end piece is entirely off normal shoulder.
4. Cross slope to match adjacent roadway cross slope (preferred). If required, maximum shoulder slope 10% for guardrail widening. If required, maximum grade break at normal edge of shoulder 8%.

5. On two way two lane highways, both ends of guardrail runs shall be provided with a terminal flared or non-flared. Paving of widened shoulder to the face of posts on both ends of guardrail runs is required.
6. Provide guardrail terminal from ODOT's QPL. Install according to manufacturer's recommendations (post count varies). Provide shop drawings to Engineer.
7. Install a reflectorized object marker on head of every guard rail terminal with "W" 4 feet or less according to manufacturer's recommendations.
8. "W" distance is measured to face of guardrail at end post, exclusive of end piece.
9. Length of need post location varies by manufacturer.
10. 1:4 slope or flatter preferable, 1:3 maximum.

CALC. BOOK NO. N/A

SDR DATE 19-JUL-2021

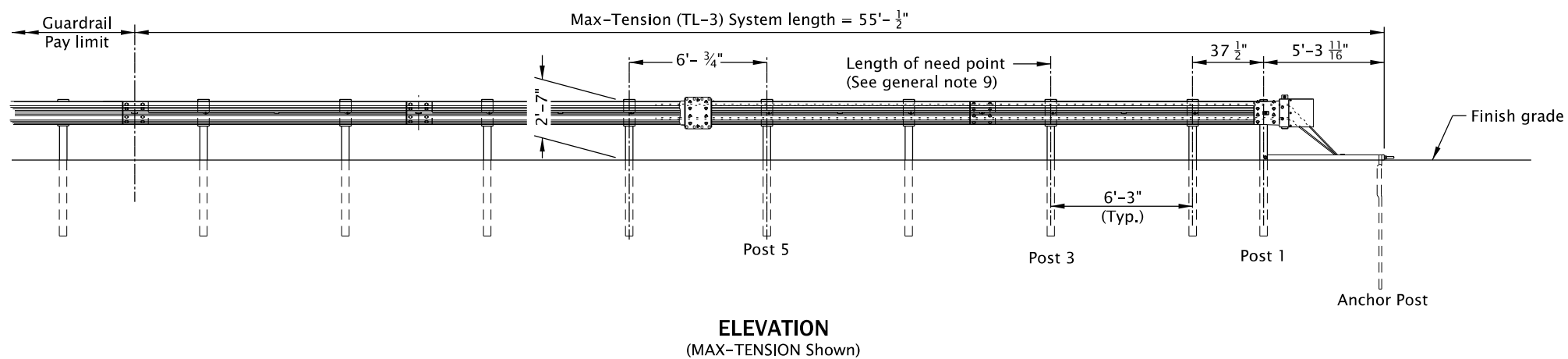
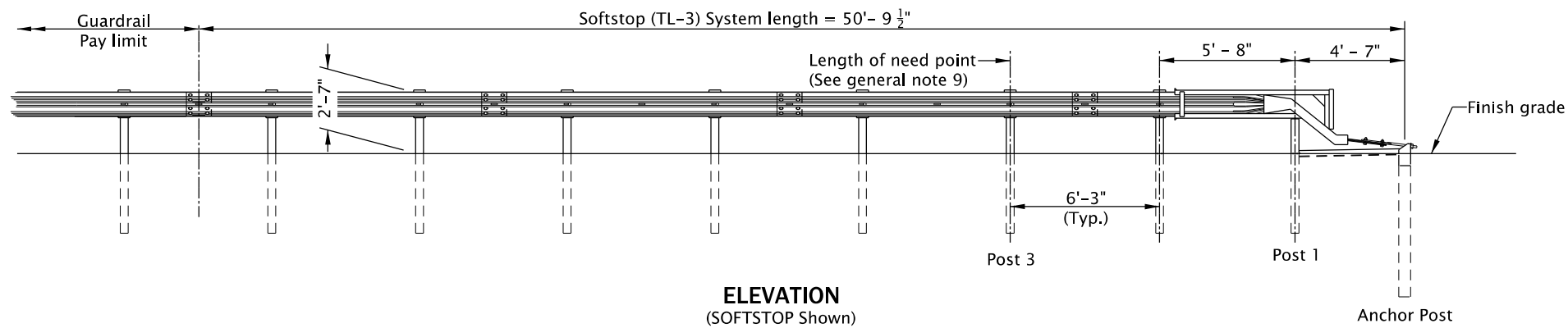
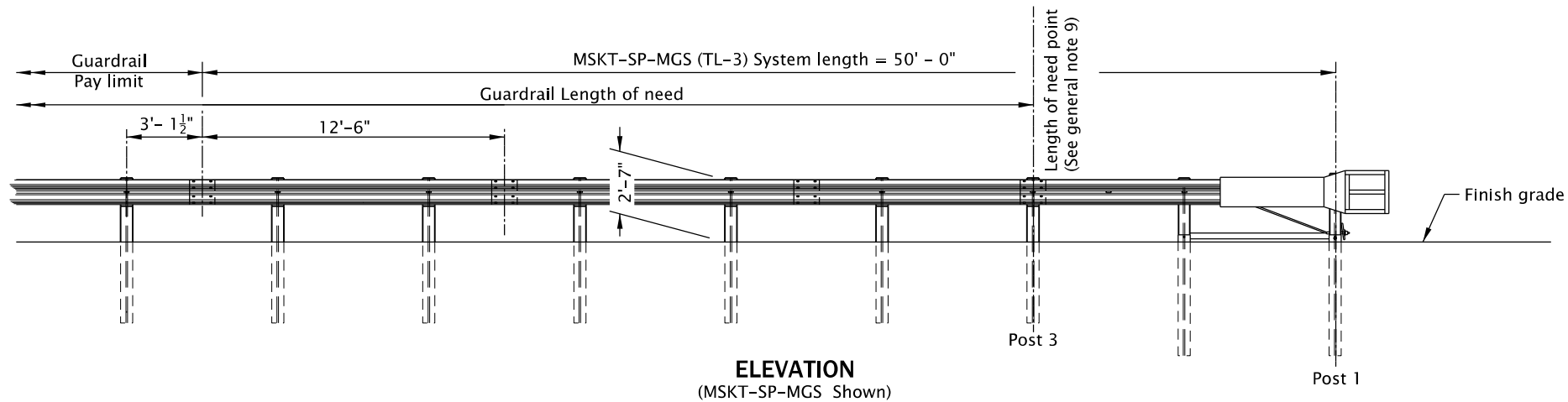
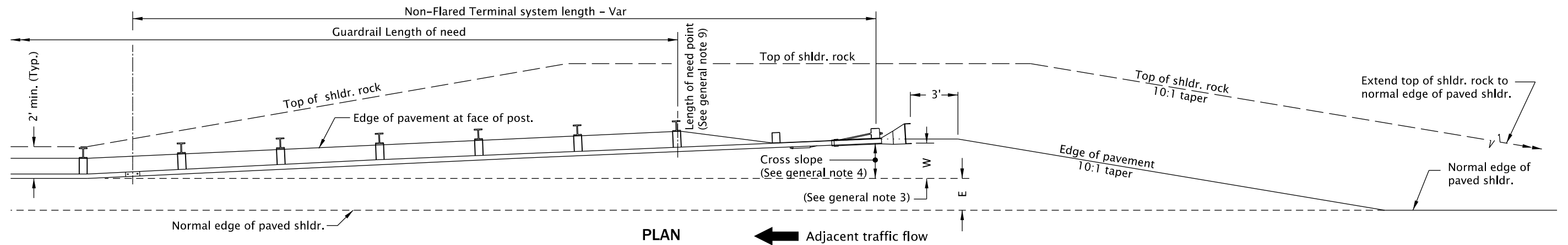
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
GRADING FOR TERMINALS

2021

DATE	REVISION	DESCRIPTION
07-2021	REVISED NOTES	

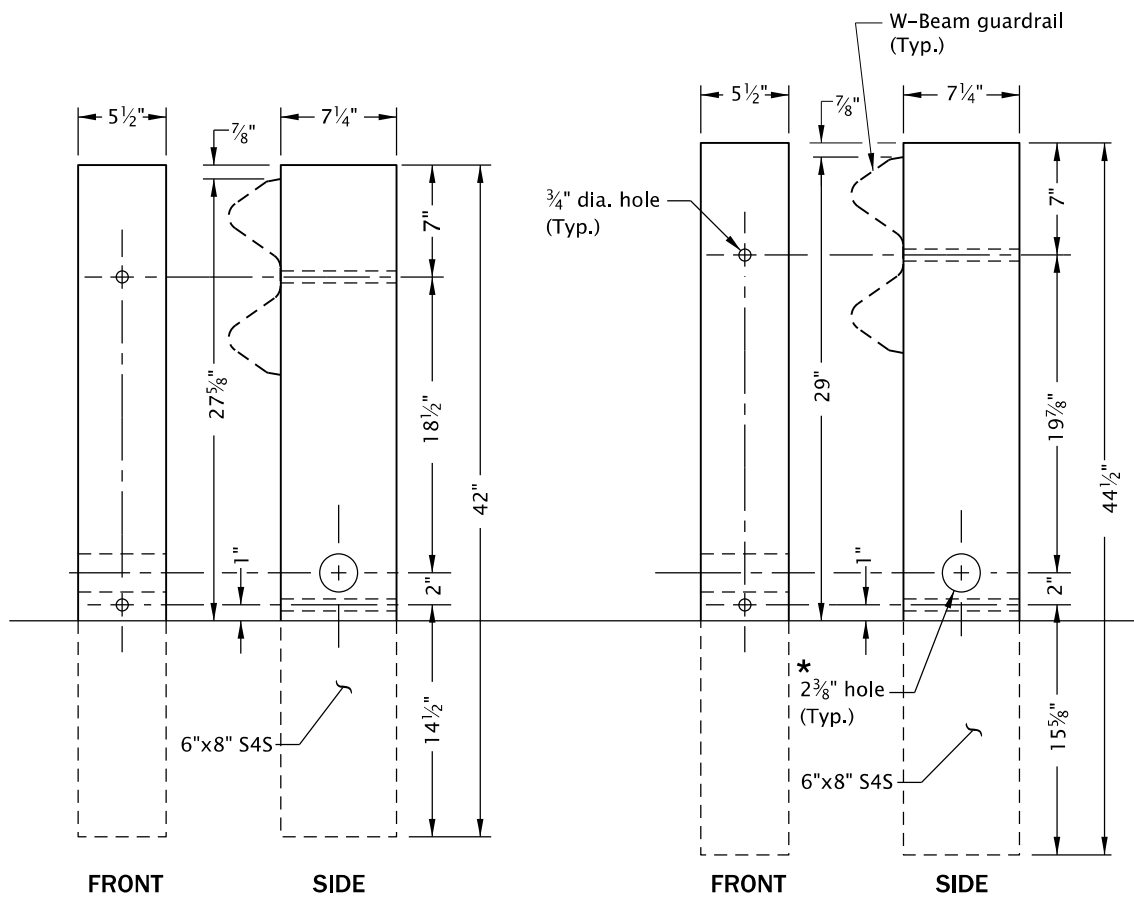
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



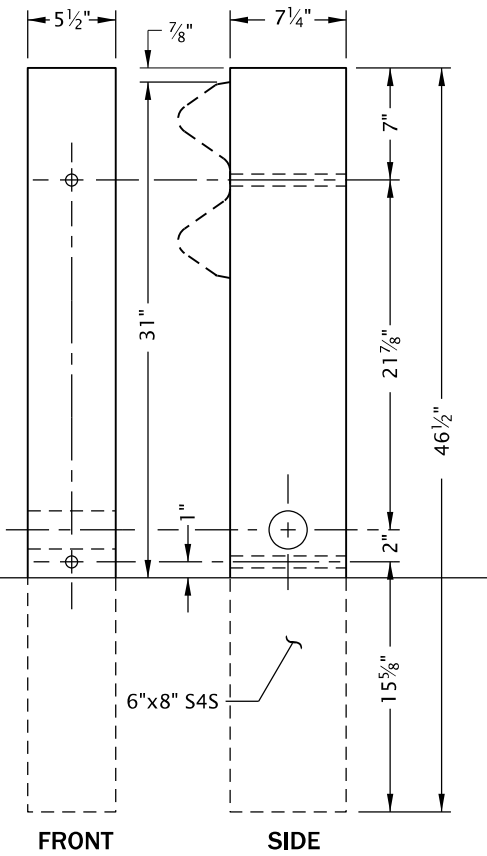
GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Use details shown as a general guide since manufacturer's details may vary. Install a guardrail terminal system that meets MASH requirements per manufacturer's recommendations. Ensure that guardrail terminal meets appropriate test level for the project.
2. See appropriate guardrail standard drawing(s) for details not shown. See project plans for details not shown. See Std. Dwg. RD701 for drainage curbs, where required. E=2' or as shown on project plans.
3. Guardrail Non-flared terminal shall be installed with a min. 1 foot offset ensuring that the end piece is entirely off normal shldr.
4. Cross slope to match adjacent roadway cross slope (preferred). If required, maximum shoulder slope 10% for guardrail widening. If required, maximum grade break at normal edge of shoulder 8%.
5. On two way two lane highways, both ends of guardrail runs shall be provided with a terminal flared or non-flared. Paving of widened shldr. to the face of posts on both ends of guardrail runs is required.
6. Provide guardrail terminal from ODOT's QPL. Install according to manufacturer's recommendations (post count varies). Provide shop drawings to Engineer.
7. Install a reflectorized object marker on head of every guard rail terminal with "W" 4 feet or less according to manufacturer's recommendations.
8. "W" distance is measured to face of guardrail at end post, exclusive of end piece.
9. Length of need post location varies by manufacturer.

CALC. BOOK NO. <u>N/A</u>		SDR DATE <u>19-JUL-2021</u>	
<i>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 consulting a Registered Professional Engineer.</i>		NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
		OREGON STANDARD DRAWINGS	
		MIDWEST GUARDRAIL SYSTEM NON-FLARED ENERGY-ABSORBING TERMINAL	
		2021	
		DATE 07-2021	REVISION DESCRIPTION REVISED NOTES



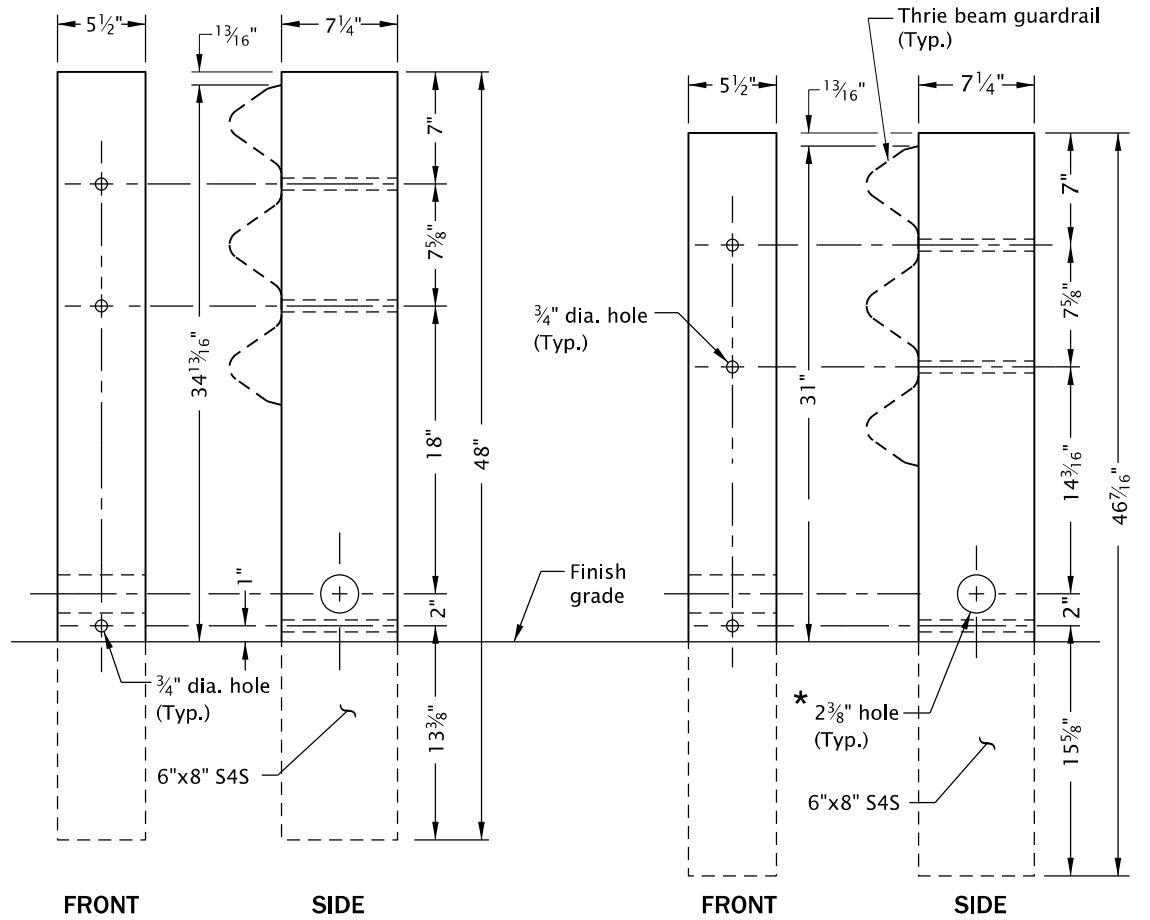
TOP OF RAIL
HEIGHT 29"



TOP OF RAIL
HEIGHT 31"

* 2" std. pipe in end post only, 2 3/8" dia.hole

W-BEAM WOOD BREAKAWAY POST



TOP OF RAIL
HEIGHT 35" (Nom.)

TOP OF RAIL
HEIGHT 31"

THRIE BEAM WOOD BREAKAWAY POST

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

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

CALC. BOOK NO. N/A

SDR DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

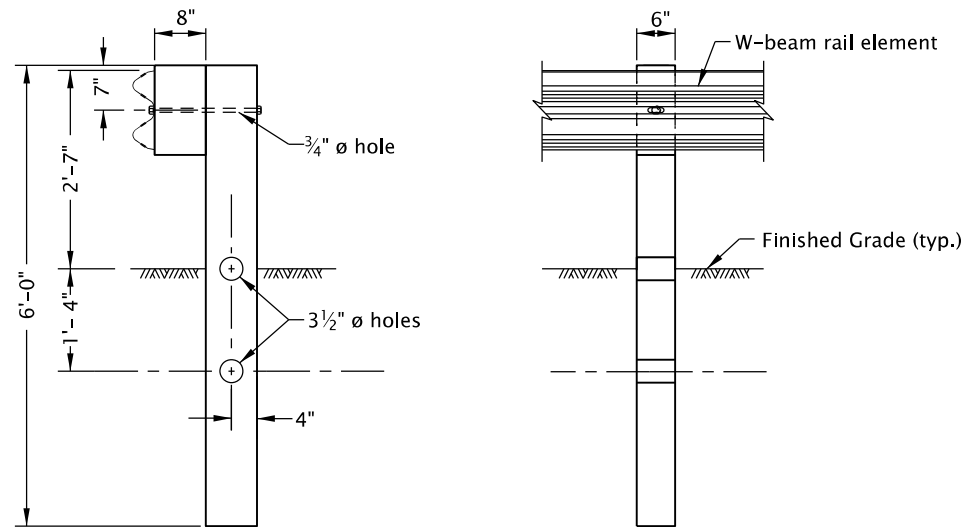
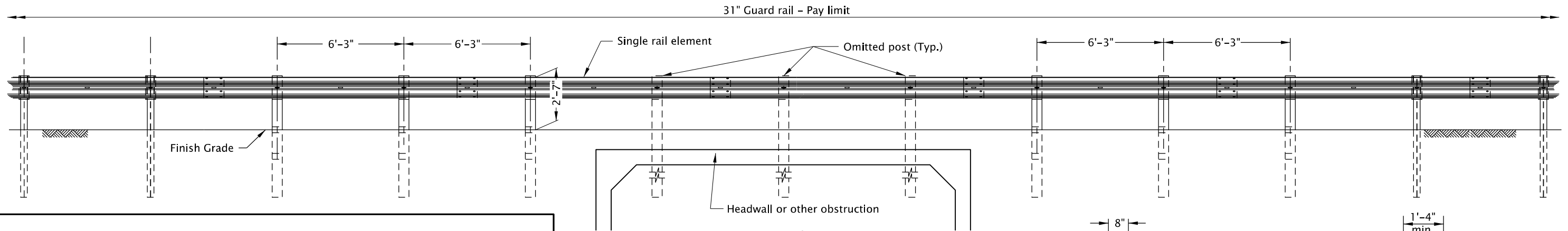
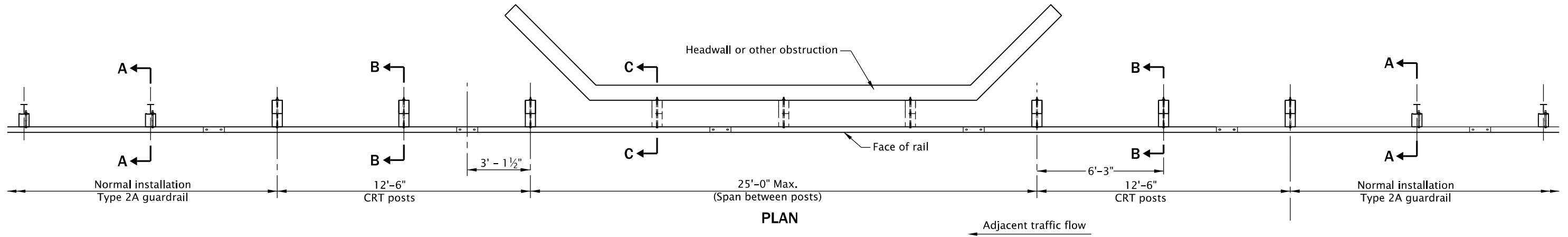
OREGON STANDARD DRAWINGS

WOOD BREAKAWAY POSTS

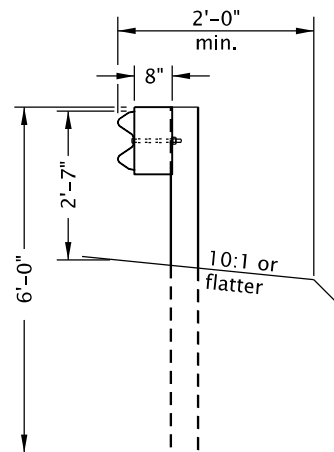
2021

DATE	REVISION	DESCRIPTION

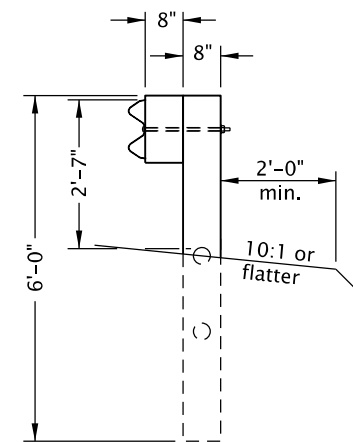
rd471.dgn 20-JUL-2020



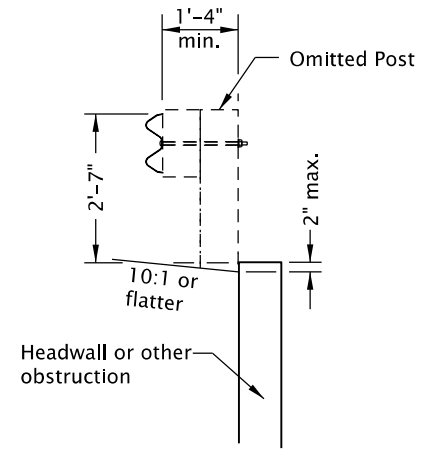
CONTROLLED RELEASING TERMINAL (CRT)
POST DETAIL



SECTION A-A
(Steel or Wood Post)



SECTION B-B
CRT Post



SECTION C-C
Omitted Post

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

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

CALC. BOOK NO. N/A

SDR DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
OVER LOW-FILL CULVERTS

2021

DATE	REVISION	DESCRIPTION

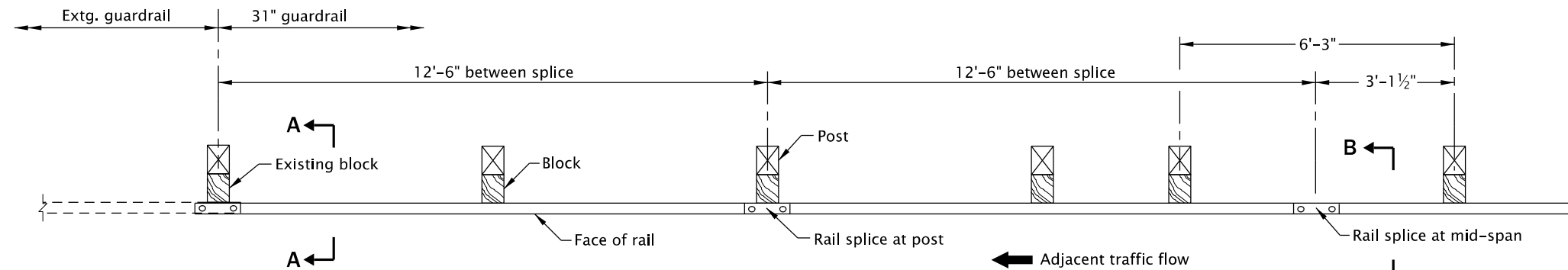
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

Effective Date: December 1, 2021 - May 31, 2022

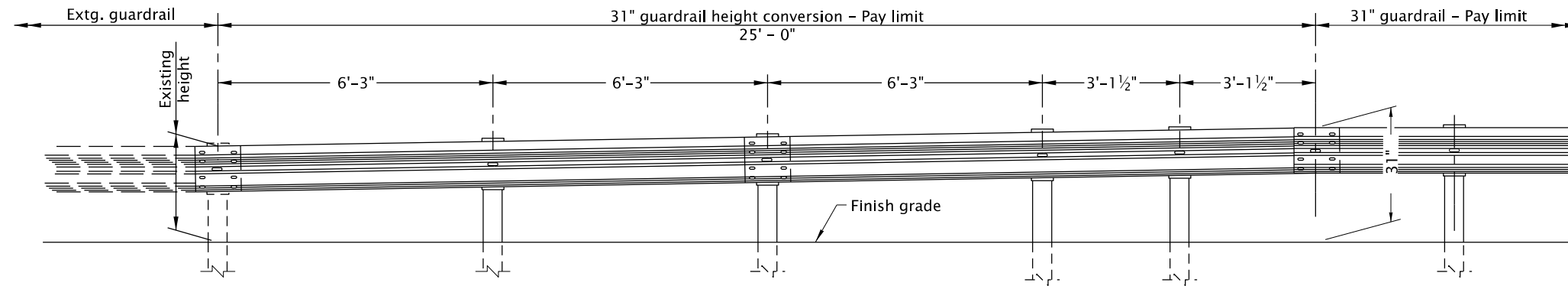
RD471

rd481.dgn 20-JUL-2020

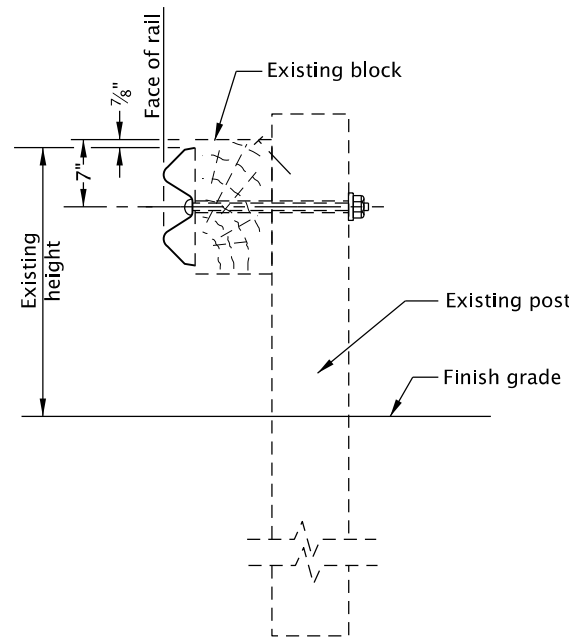
RD481



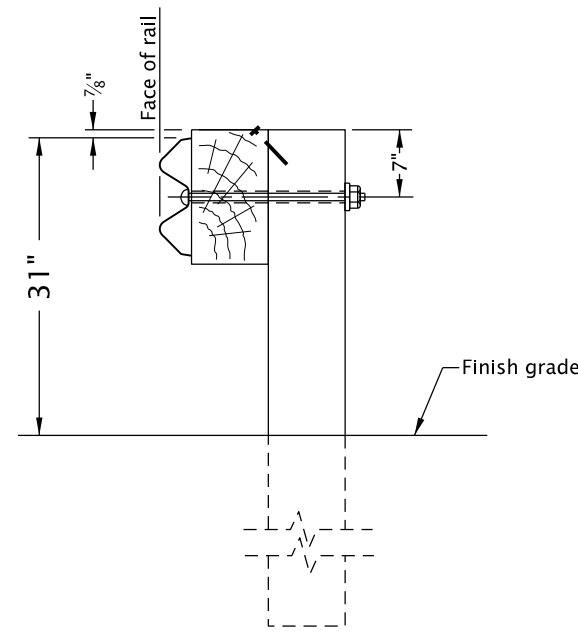
PLAN
(Wood post shown)



ELEVATION



SECTION A-A



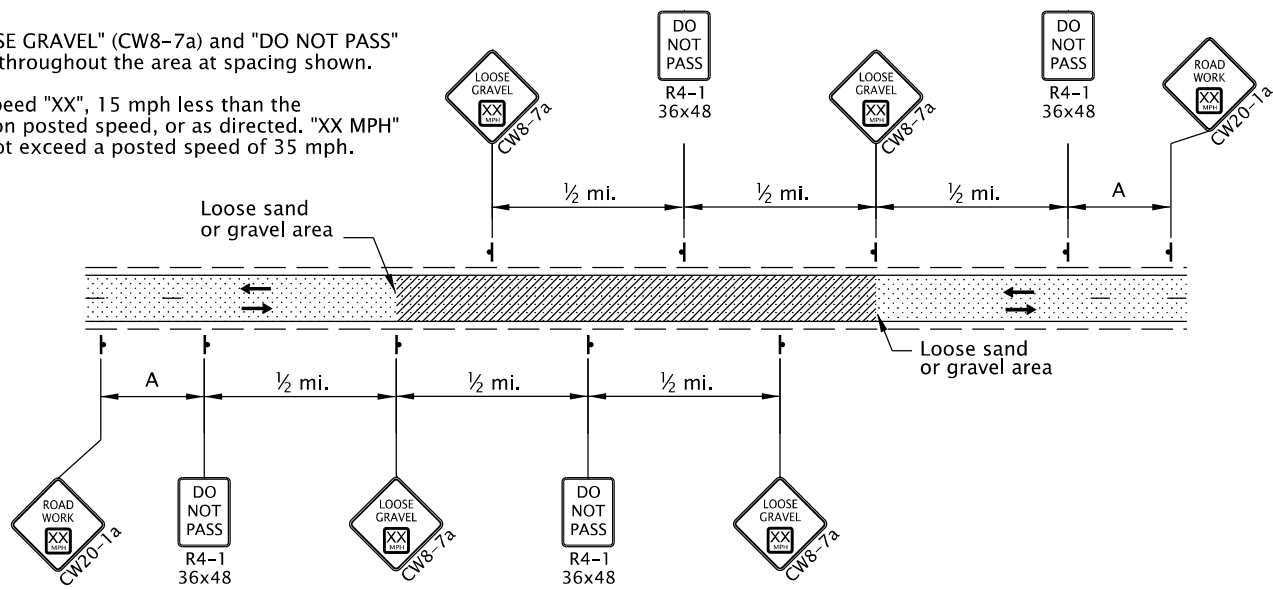
SECTION B-B

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate guardrail standard drawing(s) for details not shown.
2. When required by the plans, drainage curb alignment same as face of guardrail. See Std. Dwg. RD701 for drainage curbs
3. Lap guardrail in direction of adjacent traffic.
4. Guardrail shoulder installation shown, metal median barrier installation similar.
5. Final paved surfacing to extend to face of post. Rail height measured from final paved surface at face of rail to top of rail (Typical all types). 1"± tolerance.
6. Wood block shall be toe-nailed to the post with 2 - 16d galvanized nails in top of block to prevent block rotation.
7. Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.
8. All posts for guardrail run shall be of the same type: wood or steel.

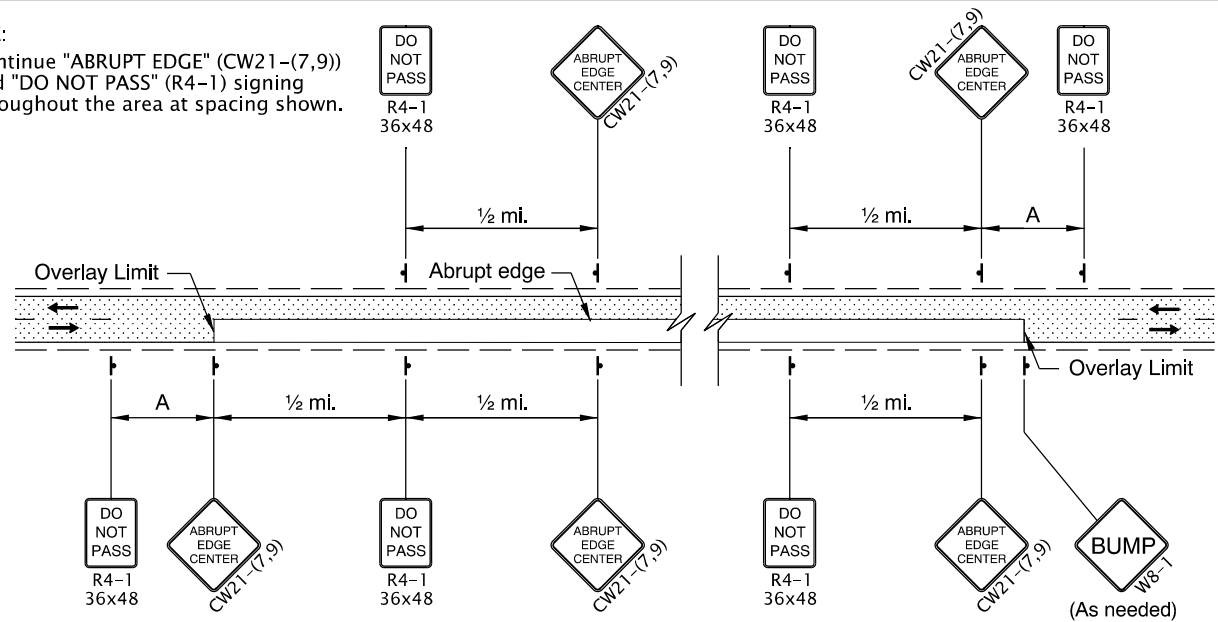
CALC. BOOK NO. <u>N/A</u>		SDR DATE <u>13-JAN-2020</u>	
<i>The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.</i>		NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
		OREGON STANDARD DRAWINGS	
		MIDWEST GUARDRAIL SYSTEM HEIGHT CONVERSION	
		2021	
		DATE	REVISION DESCRIPTION

- NOTE:
- Continue "LOOSE GRAVEL" (CW8-7a) and "DO NOT PASS" (R4-1) signing throughout the area at spacing shown.
 - Use advisory speed "XX", 15 mph less than the pre-construction posted speed, or as directed. "XX MPH" placard shall not exceed a posted speed of 35 mph.



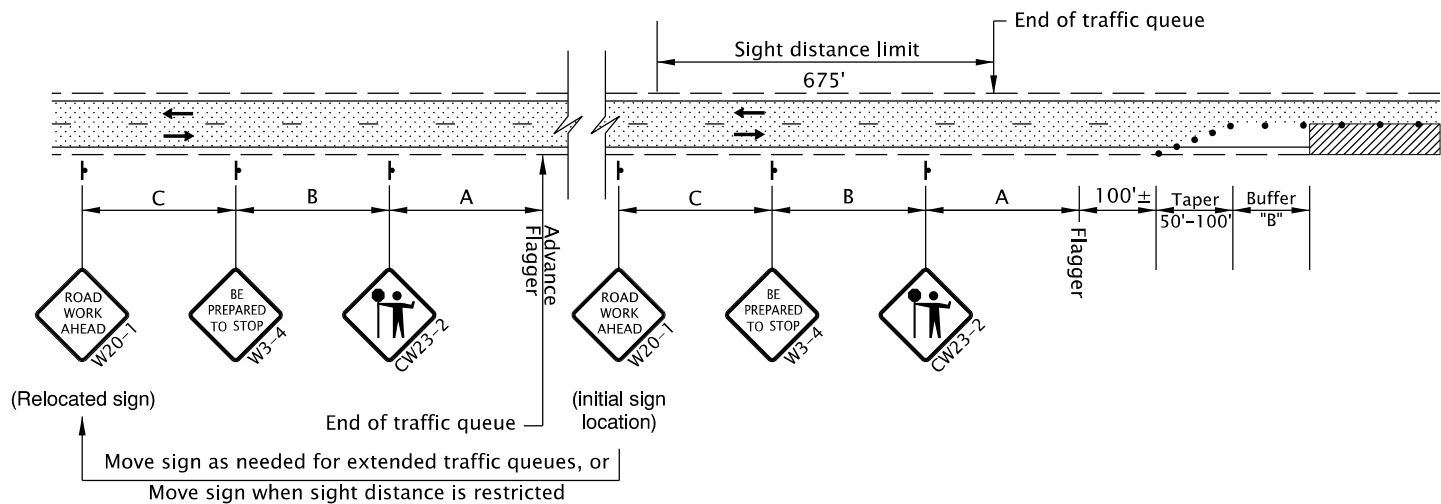
2-Lane, 2-Way Roadway
LOOSE GRAVEL IN ROADWAY SIGNING

- NOTE:
- Continue "ABRUPT EDGE" (CW21-(7,9)) and "DO NOT PASS" (R4-1) signing throughout the area at spacing shown.



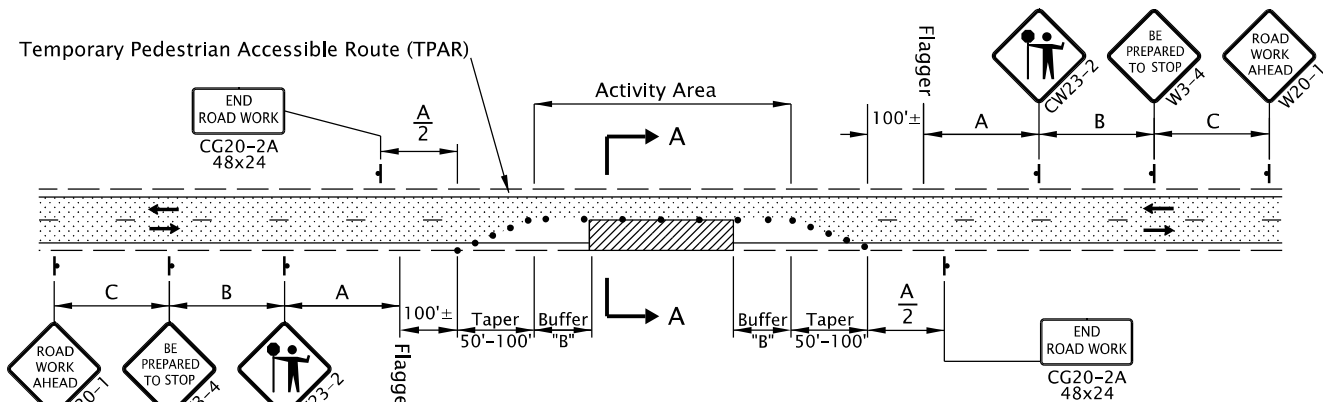
2-Lane, 2-Way Roadway
OVERLAY AREA SIGNING

- NOTES:
- Place Advance Flagger and additional signing when traffic queues extend beyond initial warning signing OR when sight distance is restricted.
 - Relocate initial "ROAD WORK AHEAD" (W20-1) sign in advance of additional "BE PREPARED TO STOP" (W3-4) and Flagger Ahead (CW23-2) signs, as shown.
 - Place additional Tubular Markers for Flagger and Advance Flagger Stations according to FLAGGER STATION DELINEATION detail.



ADVANCE FLAGGER FOR EXTENDED TRAFFIC QUEUES

- NOTE:
- When using pilot cars with flaggers to control traffic during paving operations, the Tubular Marker spacing along centerline may be increased to 200' within the Activity Area, as shown or as directed.
 - Include "WAIT FOR FLAGGER" (CR4-23) signs mounted on Type II Barricade located approx. 50' before each Flagger.
 - Coordinate and control pedestrians movements through the TPAR using Flaggers, other TCM, or as directed. When the existing shoulder is greater than or equal to 4' wide, provide a minimum of 4' of width for the TPAR.



2-Lane, 2-Way Roadway
ONE LANE CLOSURE

GENERAL NOTES FOR ALL DETAILS:

- The "FLAGGER" (CW23-2) symbol sign shall be used only in conjunction with the "BE PREPARED TO STOP" (W3-4) sign.
- Cover existing passing zone signing, as directed.
- Install temporary striping as required.
- To determine Taper Length ("L") and Buffer Length ("B"), use the "MINIMUM LENGTHS TABLE" shown on Dwg. No. TM800.
- To determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Dwg. No. TM800.
- Install a "BICYCLES ON ROADWAY" (CW11-1) sign in advance of the closure when a bike lane is closed, or when the shoulder is closed and bikes are expected.
- At night, flagger stations shall be illuminated according to the FLAGGER STATION LIGHTING DELINEATION detail on Dwg No. TM800.

- To be accompanied by Dwg. Nos. TM820 & TM821.

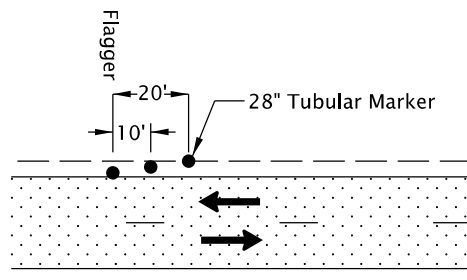
- 28" Tubular Markers on 20' max. spacing for flagger tapers and stations

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

- UNDER TRAFFIC
- UNDER CONSTRUCTION
- CONSTRUCTION UNDER TRAFFIC

NOTE:

- Use a minimum of 3 tubular markers in shoulder taper on 10' spacing for flagger station delineation.



FLAGGER STATION DELINEATION

CALC. BOOK NO. _ _ _ _ N/A _ _ _ _

SDR DATE _ _ _ _ 01-JUL-2020 _ _ _ _

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

2-LANE, 2-WAY ROADWAYS

2021

DATE	REVISION	DESCRIPTION