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Originating Organization WSDOT Development Division, Standard Plans Unit	

**Remarks and Instructions**

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**Instructions**

- Replace Cover page with **new Cover page** provided.
- Remove **pages 3 ~ 13** from your current manual.
- Insert **pages 3 ~ 13**.
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Please contact **Bill Berens** at **360-705-7256** or <mailto:berensb@wsdot.wa.gov> with comments, questions, or suggestions for improvement to the manual.

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Approved By



Signature

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**Washington State  
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# **Standard Plans**

M 21-01

August 1, 2016

**Engineering and Regional Operations**  
Development Division, Design Office

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M-9.50-02	Bicycle Lane Symbol Layout	6/24/14	
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M-15.10-01	Crosswalk Layout	2/6/07	
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M-20.10-02	Longitudinal Marking Patterns	6/3/11	
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M-20.50-02	Longitudinal Marking Substitution with RPM's	6/3/11	
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M-24.60-04	Symbol Markings Miscellaneous	6/24/14	2 Sheets
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M-40.20-00	Guide Post Placement Interchanges	10/12/07	
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M-40.50-00	Guide Post Placement Bridges	9/20/07	
M-40.60-00	Guide Post Placement Miscellaneous	9/20/07	

# Contents

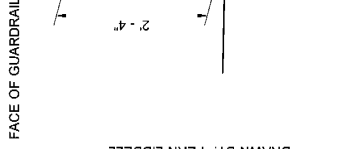
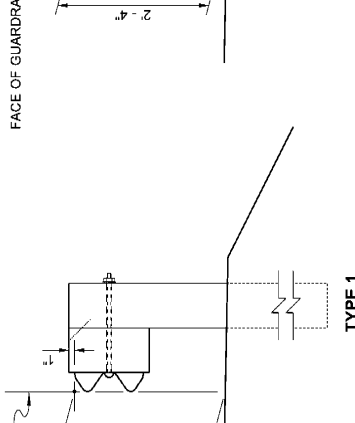
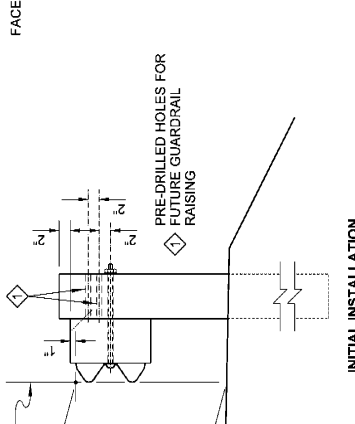
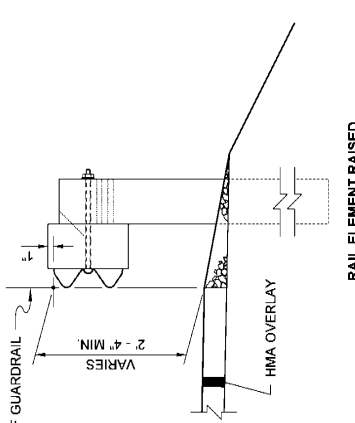
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<b>Plan No.</b>	<b>Plan Title</b>	<b>Publication Approval Date</b>	
M-60.10-01	Shoulder Rumble Strip Type 1 for Divided Highways	6/3/11	4 Sheets
M-60.20-02	Shoulder Rumble Strip, Types 2, 3, and 4, for Undivided Highways	6/27/11	2 Sheets
M-65.10-02	Centerline Rumble Strip	5/11/11	2 Sheets
M-80.10-01	Traffic Letter and Numeral Applications	6/3/11	2 Sheets
M-80.20-00	Traffic Letters and Numerals (High Speed Roadways)	6/10/08	
M-80.30-00	Traffic Letters and Numerals (Low Speed Roadways)	6/10/08	

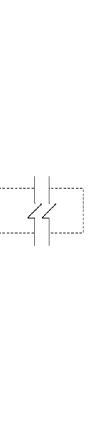
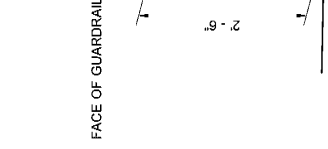
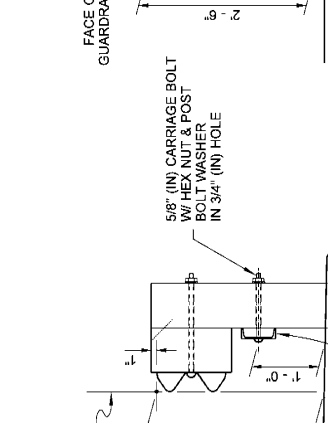
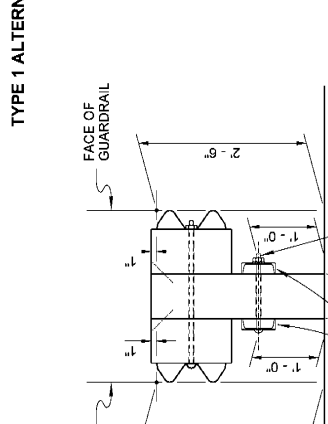
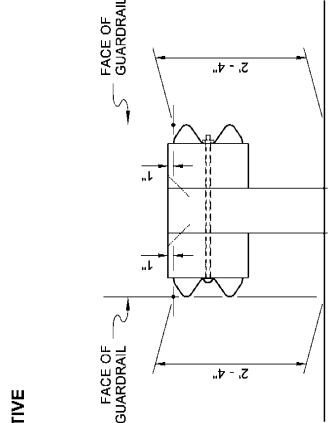
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- NOTES**
- When required by the Contract, a Snow Load Post Washer shall be used on the backside of the post (in lieu of the 1 3/4" (in) Post Bolt Washer) and a Snow Load Rail Washer shall be placed on the face side of Beam Guardrail Types 1 and 2. Snow Load Rail Washers shall not be installed on terminals.
  - Rail Washers, also called "Snow Load Rail Washers", are not required on new installation, except as called for in Note 1. Unnecessary Rail washers need not be removed from existing installations, except those on posts 2 through 8 of a BCT installation shall be removed.
  - Beam Guardrail post spacing for Types 1 through 4 shall be 6' - 3" on centers.
  - Timber blocks shall be toe-nailed to the post with a 16d galvanized nail to prevent block rotation.
  - For post and block details, see **Standard Plan C-1b**.
  - When "Beam Guardrail Type - \_\_\_ Ft. Long Post" is specified in the Contract, the post length shall be stamped with numbers, 1 1/2" (in) min. high and 3/4" (in) wide at the location where the letter "H" is shown in the ASSEMBLY DETAIL. For wood post applications, the letter shall be stamped to a minimum depth of 1/4" (in). For steel post applications, the letter shall be legible after the post is galvanized. After post installation, it shall be the Contractor's responsibility to ensure the stamped numbers remain visible.
  - Existing posts shall not be raised. Replace posts as necessary to achieve required guardrail height.
  - Holes shall be located on approaching traffic side of web.



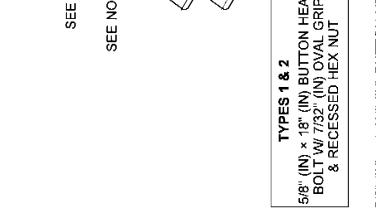
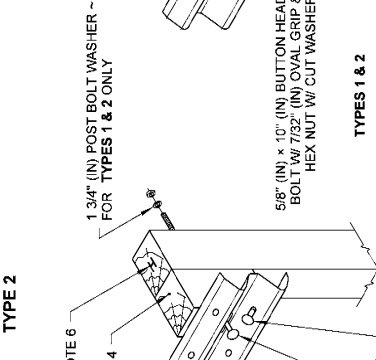
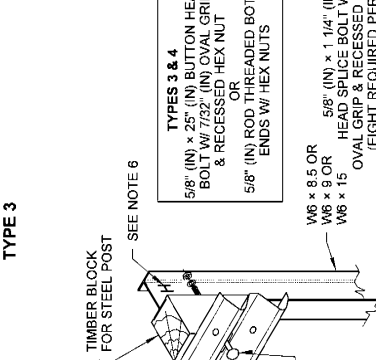
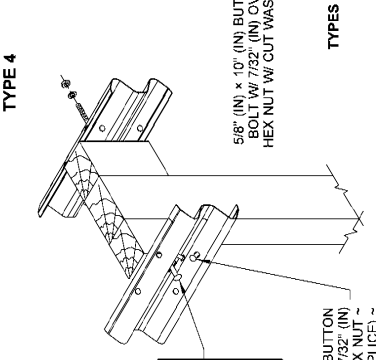
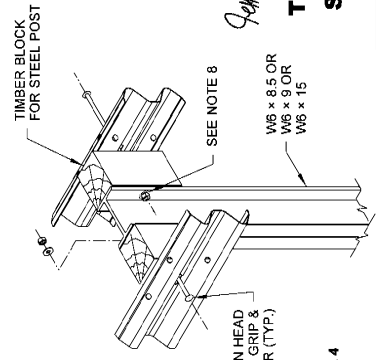
- TYPE 1**
- TYPE 2**
- TYPE 3**
- TYPE 4**
- TYPE 1 ALTERNATIVE**
- RAIL ELEMENT RAISED**



**BEAM GUARDRAIL  
TYPES 1 - 4 (W-BEAM)  
STANDARD PLAN C-1**

SHEET 1 OF 2 SHEETS

Approved for Publication  
 Carpenter, Jeff  
 Jun 12 2016 11:53 AM  
 STATE DESIGN ENGINEER  
 Washington, State Department of Transportation



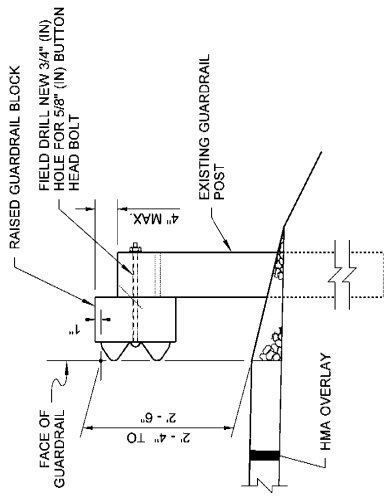
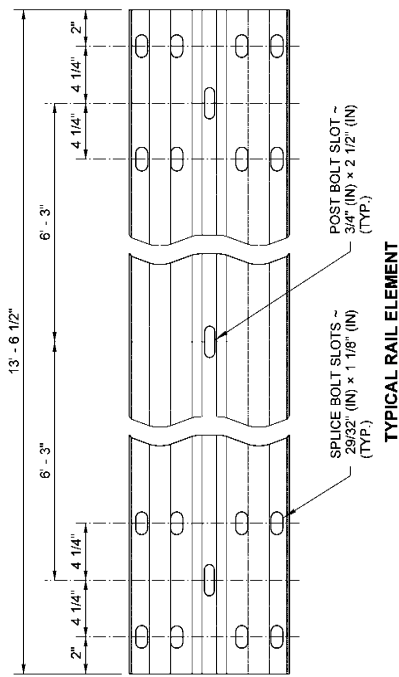
**STEEL POST**  
ALL MOUNTING AND SPLICE HARDWARE SAME AS FOR TIMBER POST EXCEPT AS NOTED

**TIMBER POST**  
ALL MOUNTING AND SPLICE HARDWARE SAME AS FOR TIMBER POST EXCEPT AS NOTED

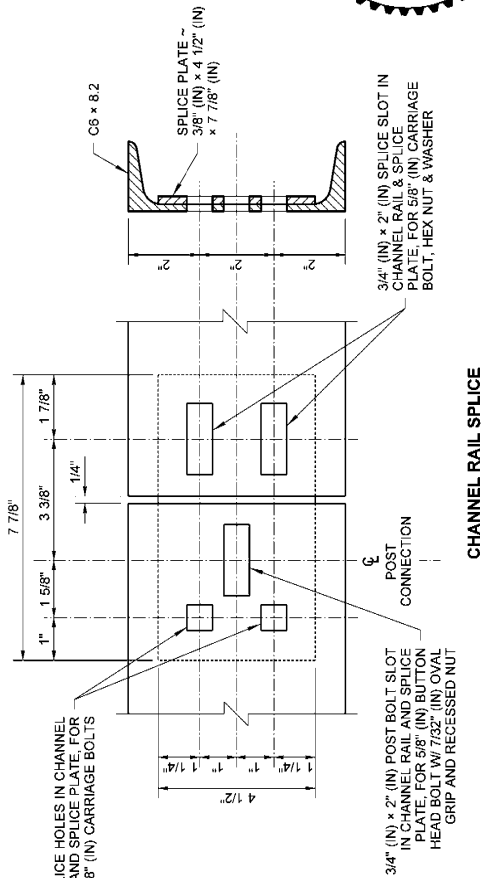
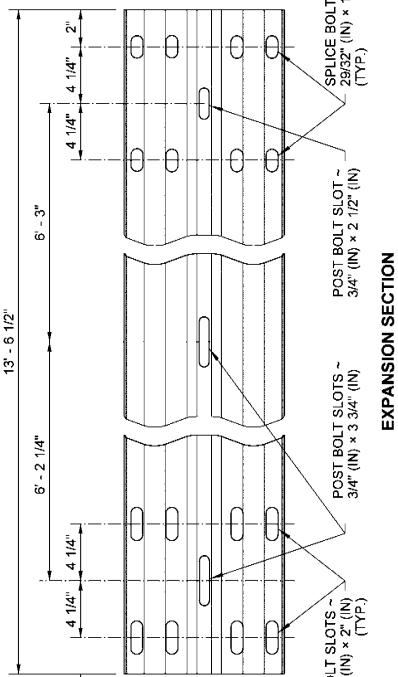
**ASSEMBLY DETAIL TYPE 3 AND 4**

**ASSEMBLY DETAIL TYPE 1 AND 2**





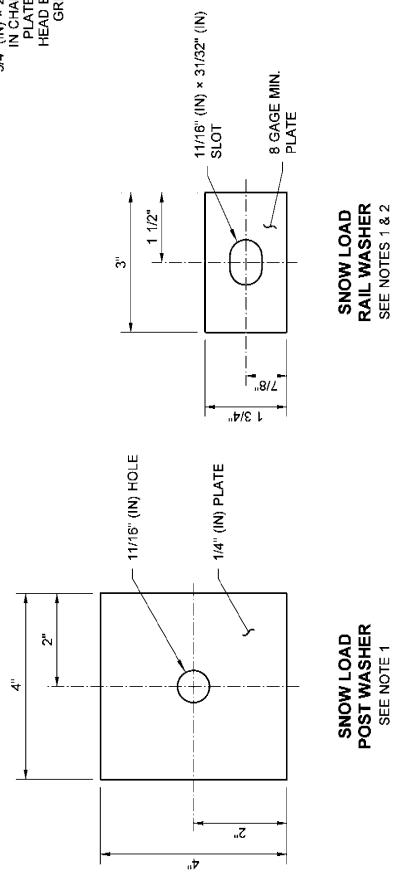
**BEAM GUARDRAIL RAISING FOR HMA OVERLAYS**



Jeff Peterson  
 Practicing, LEED (BD) Design  
 Jun 30 2016 7:50 AM

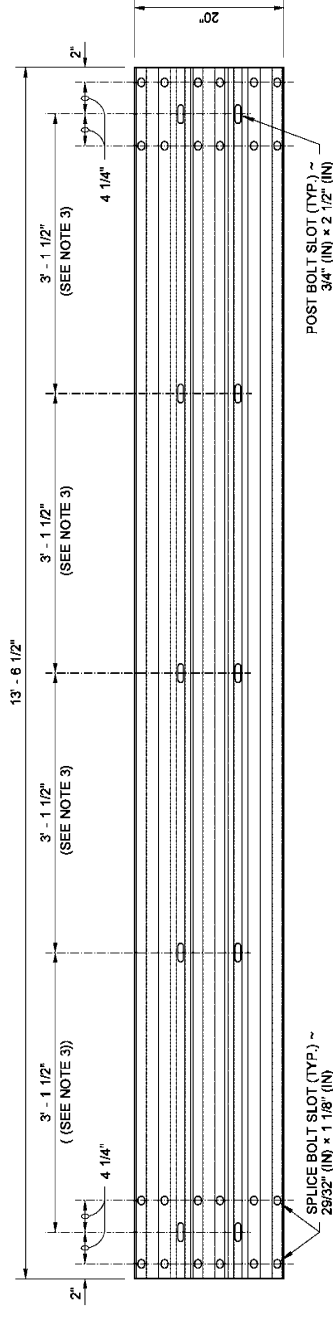
**BEAM GUARDRAIL TYPES 1 - 4 (W-BEAM) STANDARD PLAN C-1**  
 SHEET 2 OF 2 SHEETS

**APPROVED FOR PUBLICATION**  
 Carpenter, Jeff  
 Jun 12 2016 11:53 AM  
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 Washington, State Department of Transportation

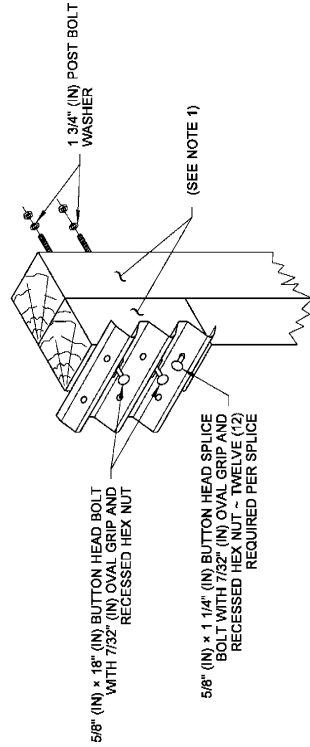
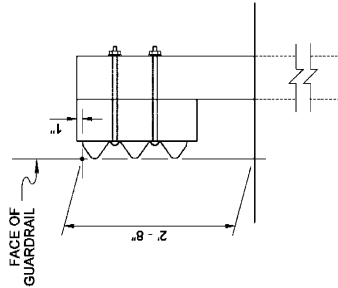


**NOTES**

- Type 10 post shall be 6 x 8 timber, OR either W6 x 9, or W6 x 8.5 steel. Type 11 post shall be 10 x 10 timber or W6 x 15. For additional details see **Standard Plan C-1b**.
- Type 10 guardrail post spacing shall be 6' - 3" on center. Type 11 shall be a maximum of 3' - 1 1/2" on center.
- Spacing may vary depending on application. See **Standard Specification Section 9-16.3(1)** for rail element requirements.



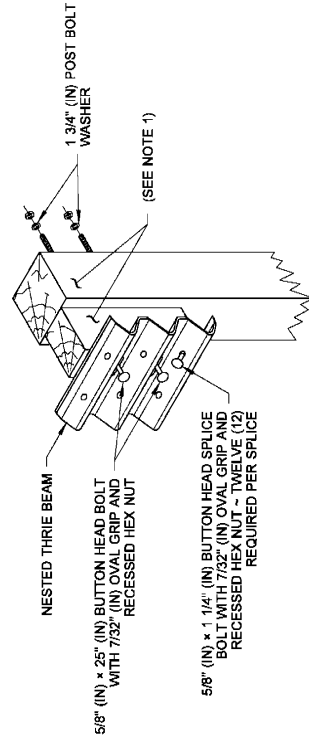
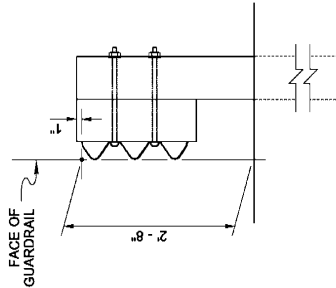
**TYPICAL RAIL ELEMENT**



**RAIL ASSEMBLY**

**WOOD POST ASSEMBLY**

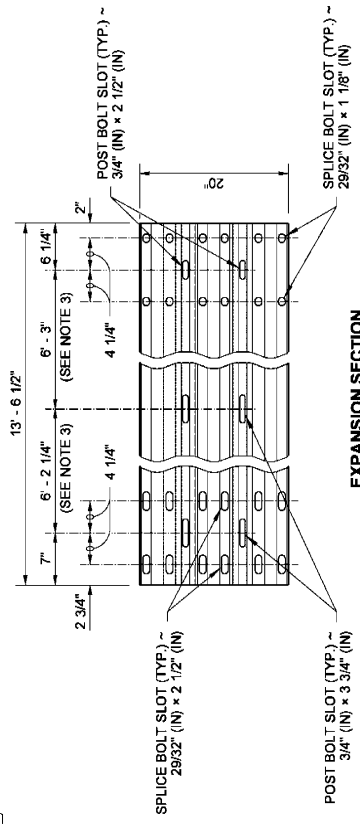
**TYPE 10**



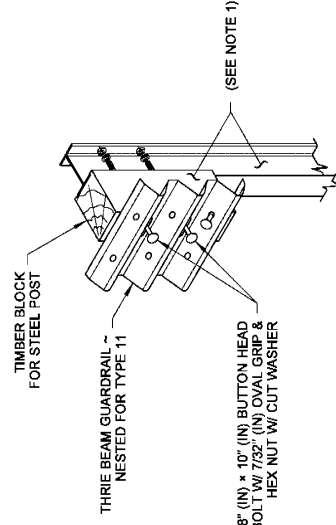
**RAIL ASSEMBLY**

**WOOD POST ASSEMBLY**

**TYPE 11**



**EXPANSION SECTION**



Patrick Barry, Ed  
 July 14 2015 7:07 AM  
 C-3387

**BEAM GUARDRAIL (THRIE BEAM)**

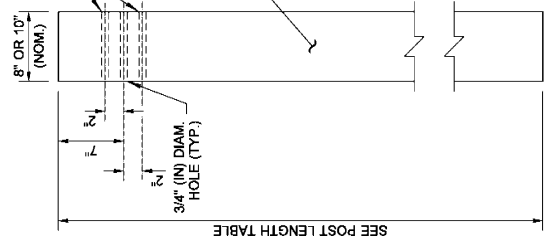
**STANDARD PLAN C-1a**

SHEET 1 OF 1 SHEET

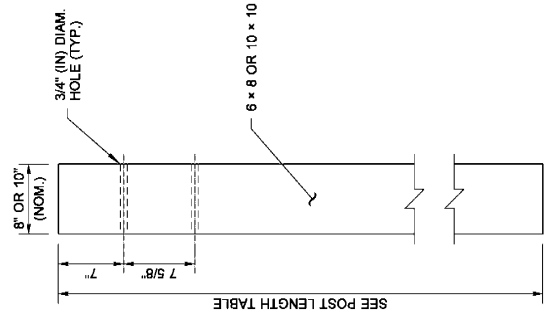
APPROVED FOR PUBLICATION  
 Carpenter, Jeff  
 Jul 14 2015 11:30 AM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

STEEL POST ASSEMBLY

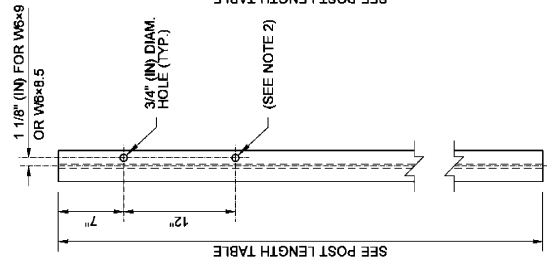
TYPES 10 AND 11



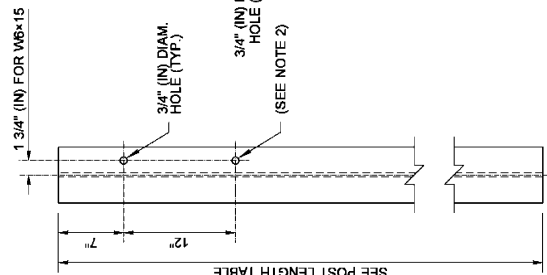
W-BEAM



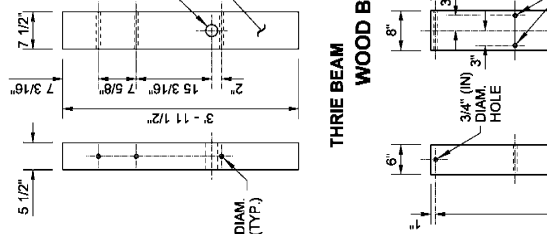
THRIE BEAM



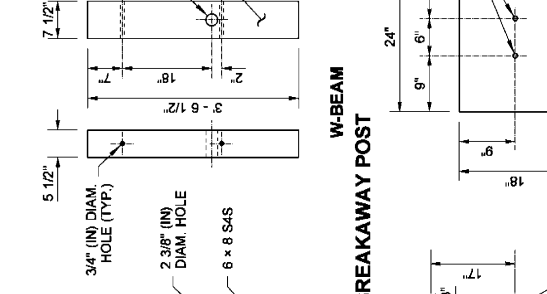
W-BEAM



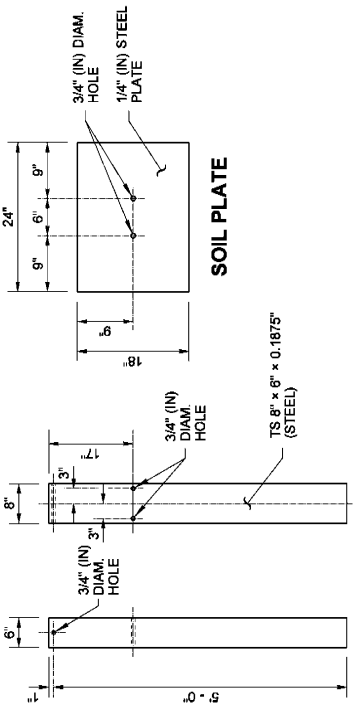
THRIE BEAM



THRIE BEAM



W-BEAM



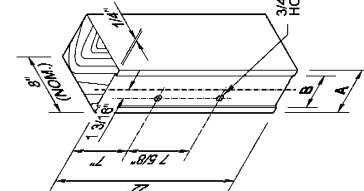
SOIL PLATE

FOUNDATION TUBE

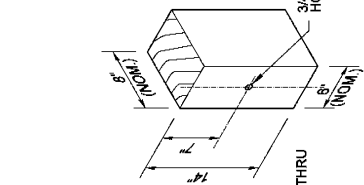
POST LENGTH TABLE	GUARDRAIL TYPE	LENGTH
	1 through 4 & 31	6' - 0"
	10 or 11	6' - 6"

POST	A	B
WB x 9	6"*	4 1/4"
WB x 15	8"*	6 1/4"
WB x 6.5	8"*	6 1/4"

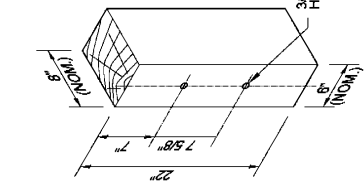
\* NOMINAL (NOM.)



THRIE BEAM WOOD BLOCK FOR STEEL POST



W-BEAM WOOD BLOCK FOR WOOD POST



THRIE BEAM WOOD BLOCK FOR WOOD POST



Barry, Ed  
Jul 14 2015 7:12 AM

**BEAM GUARDRAIL POSTS AND BLOCKS**  
**STANDARD PLAN C-1b**

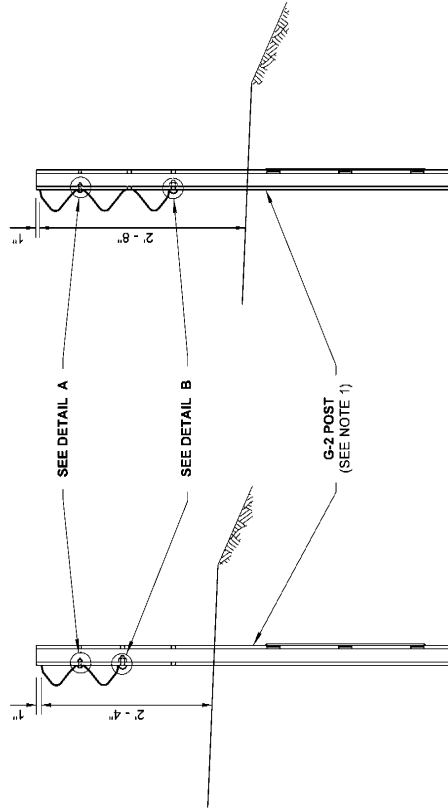
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION:  
Carpenter, Jeff  
Jul 14 2015 11:29 AM

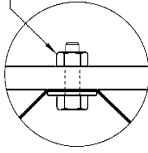
STATE DESIGN ENGINEER  
Washington, State Department of Transportation

**NOTES**

- 1. For post details see **Standard Plan C-1b**.

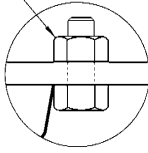


5/16" (IN) DIAM. x 1 1/2" (IN) HEX HEAD BOLT WITH HEX NUT AND 1 3/4" (IN) SQUARE x .135" (IN) WASHER



**DETAIL A**

1/2" (IN) DIAM. x 1 1/2" (IN) HEX HEAD BOLT WITH HEX NUT. GUARDRAIL RESTS ON TOP OF BOLT



**DETAIL B**

**TYPE 20**

**TYPE 21**



*Jeff Peterson*  
Peterson, Jeff (HO Design)  
Jun 30 2016 9:48 AM

**BEAM GUARDRAIL**

**STANDARD PLAN C-1c**

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
 Carpenter, Jeff  
 Jun 12 2016 11:54 AM

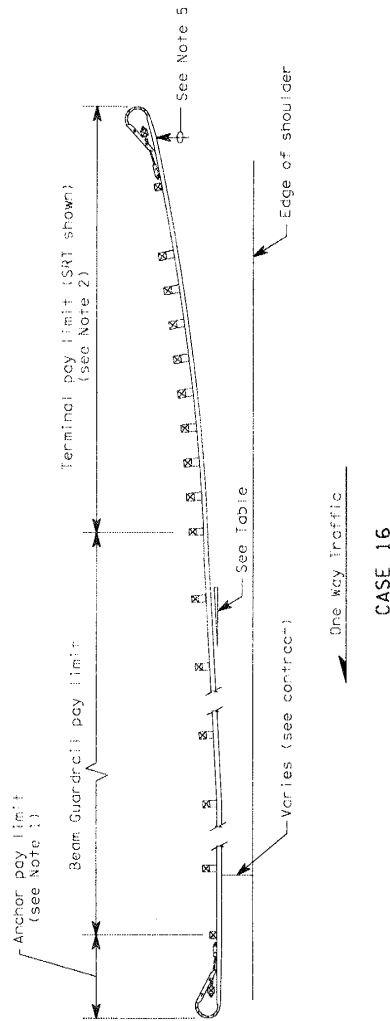
STATE DESIGN ENGINEER



Washington State Department of Transportation

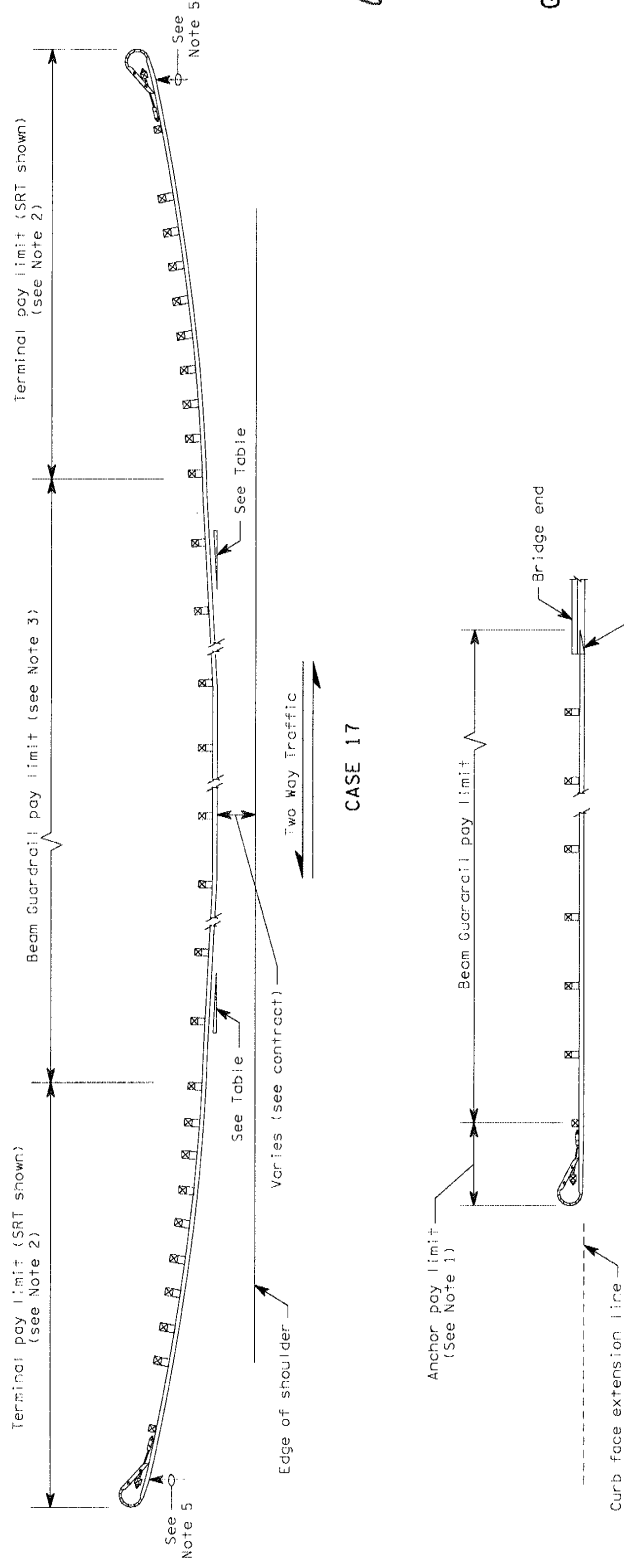
NOTES

1. Type 4 anchor required. For details, see applicable Standard Plan(s).
2. For terminal type and details, see contract and applicable Standard Plan(s).
3. Post spacing is 6'-3" except where noted.
4. For guardrail to bridge rail connection see applicable Standard Plan(s) or Contract.
5. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10:1 when the guardrail is within 12'-0" from the edge of the shoulder. Beyond 12'-0", the slope shall not be steeper than 6:1.



CASE 16

FLARE RATE TABLE	
Rate	Posted Speed (mph)
15:1	70
14:1	60
12:1	55
11:1	50
10:1	45
9:1	40 or less



CASE 17

CASE 18



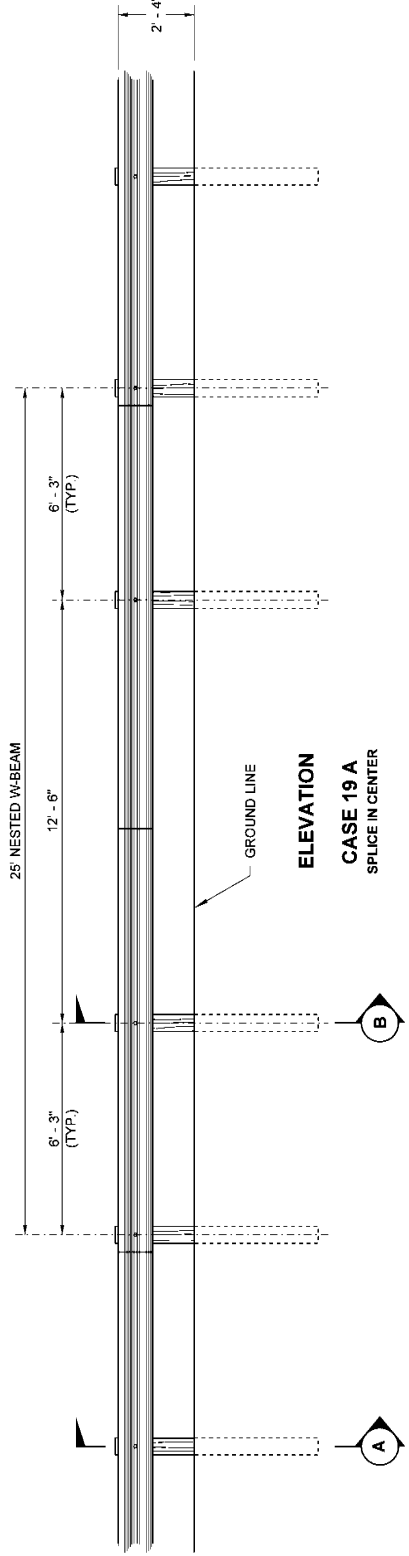
EXPIRES MAY 3, 2000

GUARDRAIL PLACEMENT  
STANDARD PLAN C-2J

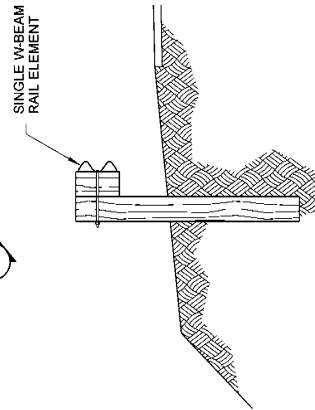
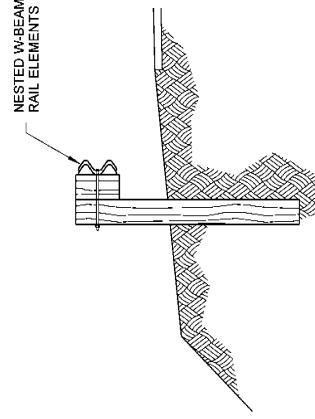
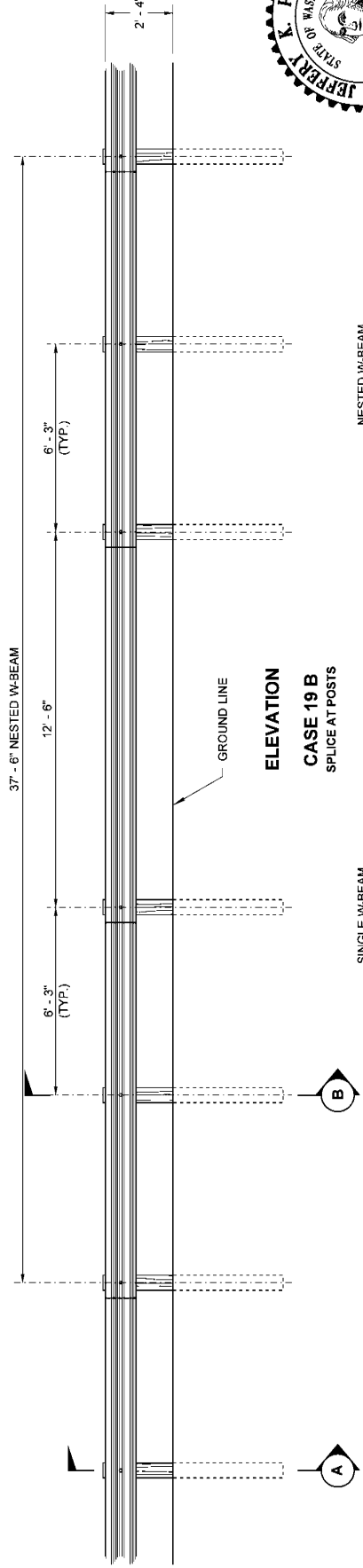
APPROVED FOR PUBLICATION  
*Clifford E. Mansfield*  
DATE 6/23/98  
DUTY STATE DESIGN ENGINEER  
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION  
OLYMPIA, WASHINGTON

DATE	REVISION	RBA	BY
5/98	Revise Flair Rate Table.		

BEAM GUARDRAIL PAY LIMIT



BEAM GUARDRAIL PAY LIMIT



*Jeff Peterson*  
 Jeffrey K. Peterson  
 Professional Engineer  
 License No. 36937  
 State of Washington  
 12/23/2014

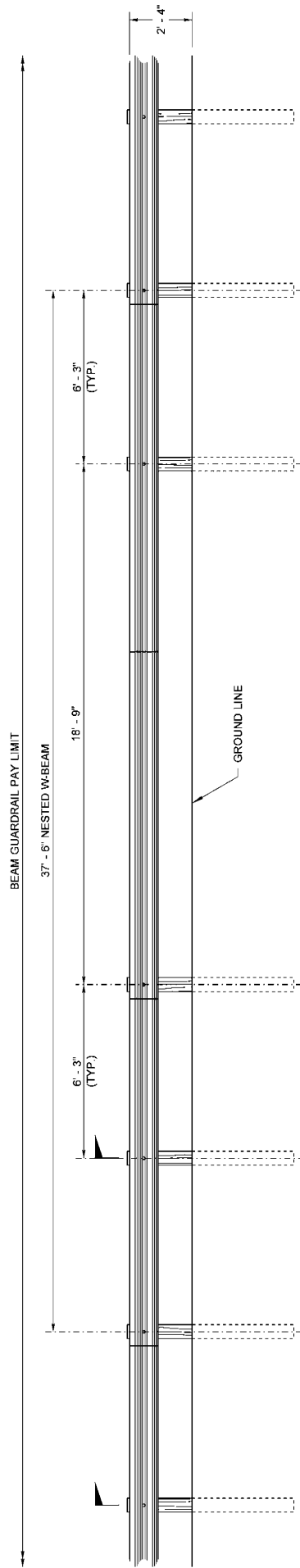
**GUARDRAIL PLACEMENT**  
**12'-6" SPAN**

**STANDARD PLAN C-2K**  
 SHEET 1 OF 1 SHEET

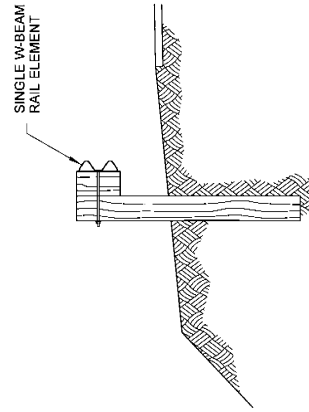
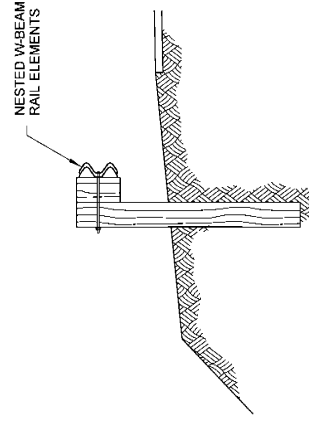
APPROVED FOR PUBLICATION  
 Consultant: Jeff Peterson  
 201 12-23-14 11:55 AM

STATE DESIGN ENGINEER





ELEVATION CASE 20



Peterson, Jeff (HQ Design)  
Jun 29 2016 2:29 PM

**Jeff Peterson**  
**GUARDRAIL PLACEMENT**  
**18'-9" SPAN**

**STANDARD PLAN C-2n**

SHEET 1 OF 1 SHEET

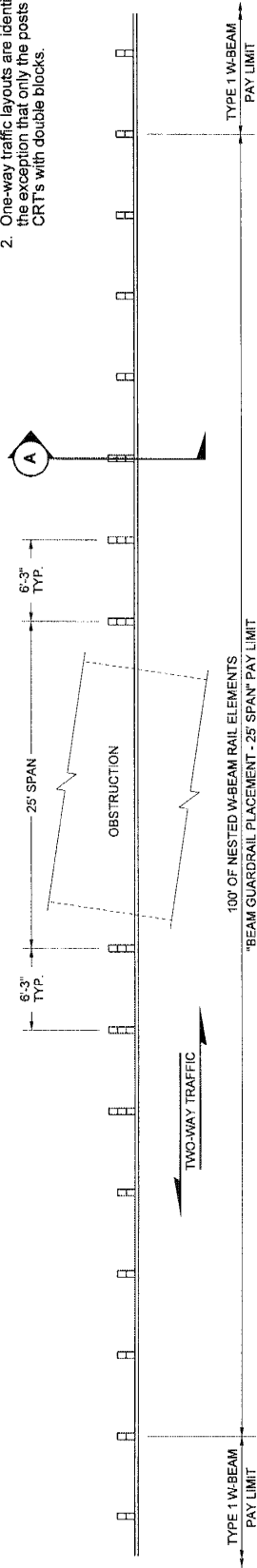
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Christopher Jeff  
Jun 12 2016 11:59 AM

STATE DESIGN ENGINEER

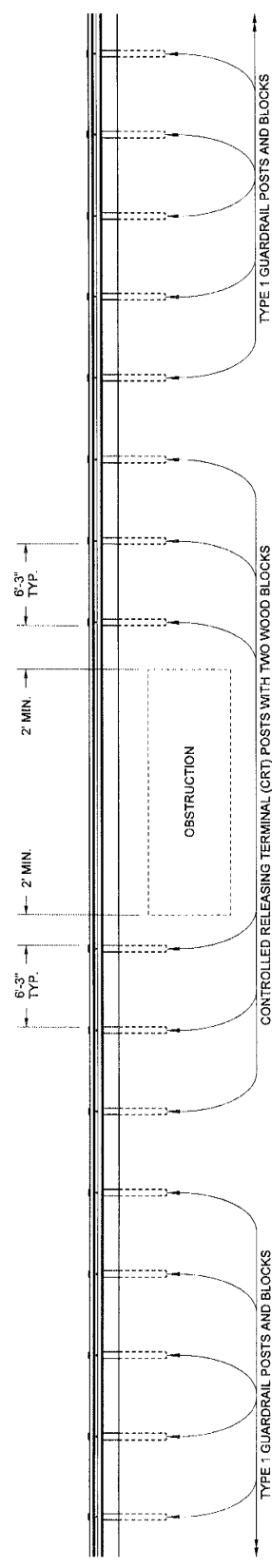
Washington State Department of Transportation

**NOTES**

1. See Standard Plan C-1b for additional details.
2. One-way traffic layouts are identical to the two-way layout with the exception that only the posts trailing the span need to be CRT's with double blocks.

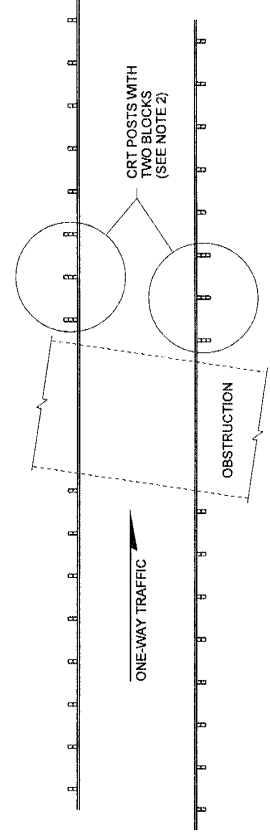


**PLAN**

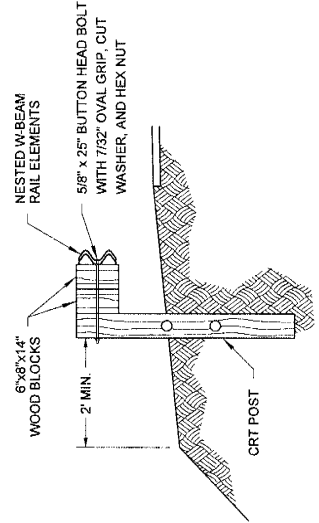


**ELEVATION**

**CASE 21**



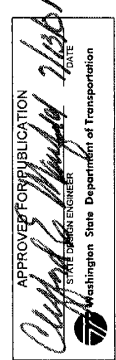
**ONE-WAY TRAFFIC LAYOUT**



**SECTION A**



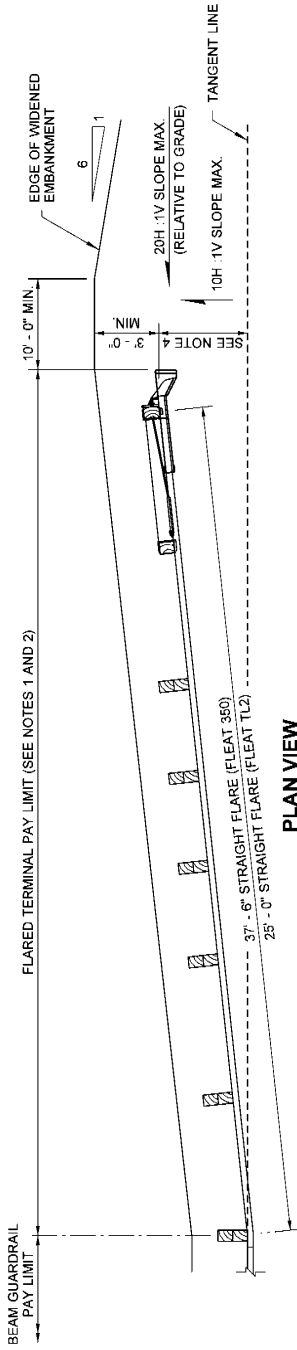
**GUARDRAIL PLACEMENT  
25' SPAN  
STANDARD PLAN C-20**



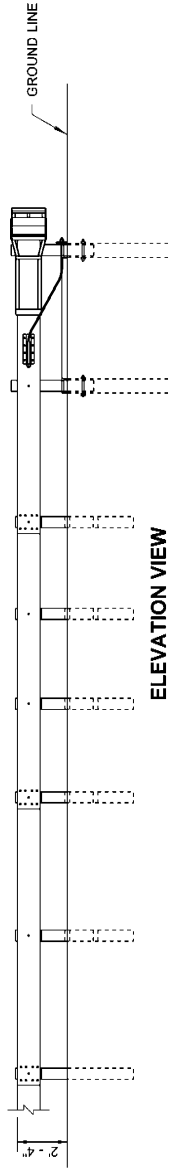


**NOTES**

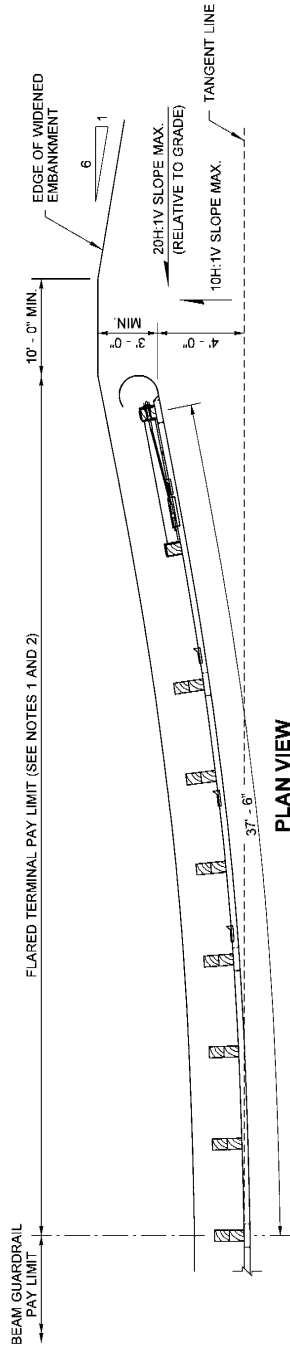
1. Unless otherwise indicated in the contract, the SRT - 350 (12.5, 8 Post) as manufactured by Trinity Industries, Inc., or a FLEAT 350 as manufactured by Road Systems Inc., shall be installed per manufacturer's recommendations. If specified in the Contract, the FLEAT TL2 as manufactured by Road Systems, Inc. shall be installed per manufacturer's recommendations.
2. Where terminal is placed on a curve, and post offsets would result in the rail encroaching onto the shoulder (e.g., the inside of a curve), the posts shall be installed so that the face of the rail is at the edge of the shoulder.
3. When snow load post washers and snow load rail washers are called for in the contract, the snow load rail washers must be omitted within the terminal limits.
4. Offset distances:  
 FLEAT 350 ..... 4' - 0"  
 FLEAT TL2 ..... 1' - 8" minimum



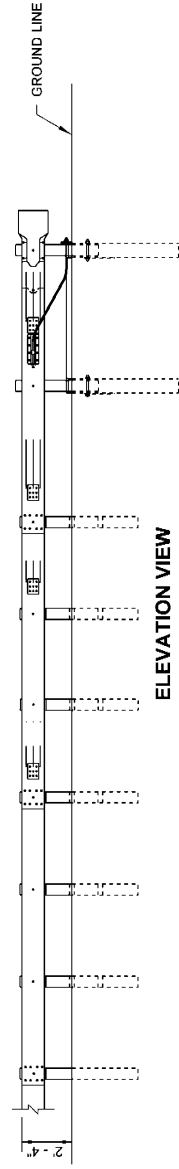
**PLAN VIEW**



**ELEVATION VIEW  
FLEAT OPTION**



**PLAN VIEW**



**ELEVATION VIEW  
SRT OPTION**



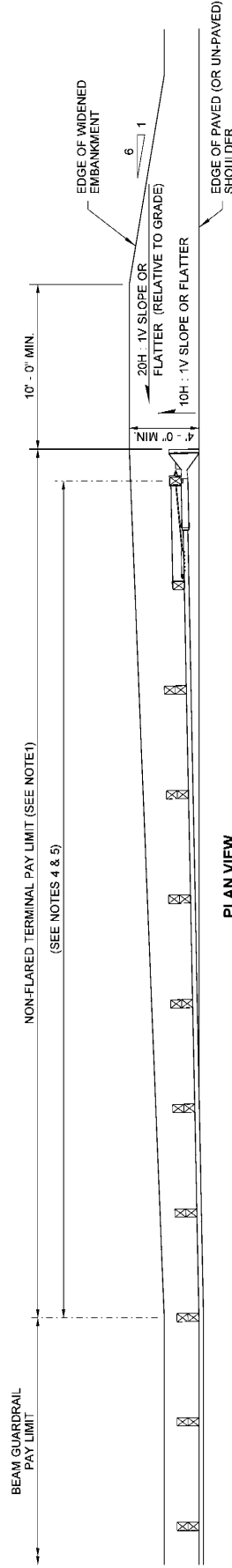
*Jeff Peterson*  
 Peterson, Jeff (HQ Design)  
 Jun 29 2016 3:35 PM  
 6322

**BEAM GUARDRAIL  
 FLARED TERMINAL  
 STANDARD PLAN C-4b**  
 SHEET 1 OF 1 SHEET

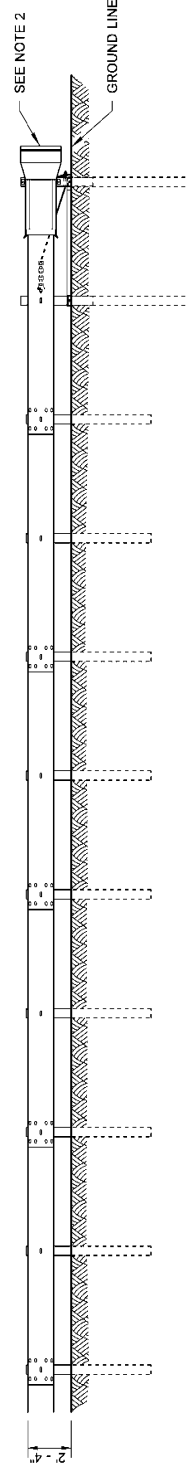
APPROVED FOR PUBLICATION  
 Checked: Jeff  
 Date: 03/05/2014 PM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

**NOTES**

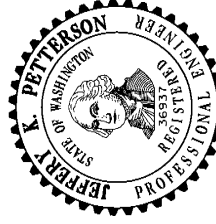
1. An SKT-350 as manufactured by Road Systems, Inc. shall be installed according to manufacturer's recommendations. When a TL2 terminal is specified in the Contract an SKT-TL2 as manufactured by Road Systems, Inc. shall be installed according to the manufacturer's recommendations.
2. A reflectorized object marker shall be installed according to manufacturer's recommendations.
3. When snow load post washers and snow load rail washers are required by the Contract, the snow load rail washers must not be installed within the terminal limits.
4. Terminal shall be installed at a taper, ensuring that end piece is entirely off the shoulder.
5. Length for SKT-350 is 50' (ft). Length for SKT-TL2 is 25' (ft).



**PLAN VIEW**



**ELEVATION VIEW**



*Jeff Peterson*  
 Peterson, Jeff (HQ Design)  
 Carpenter, Jeff  
 Jan 30 2016 7:01 AM

**BEAM GUARDRAIL  
 NON-FLARED TERMINAL  
 STANDARD PLAN C-4e**

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
 Carpenter, Jeff  
 Jan 13 2016 5:21 PM

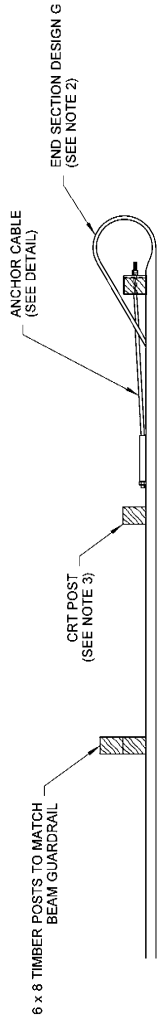
STATE DESIGN ENGINEER

Washington State Department of Transportation

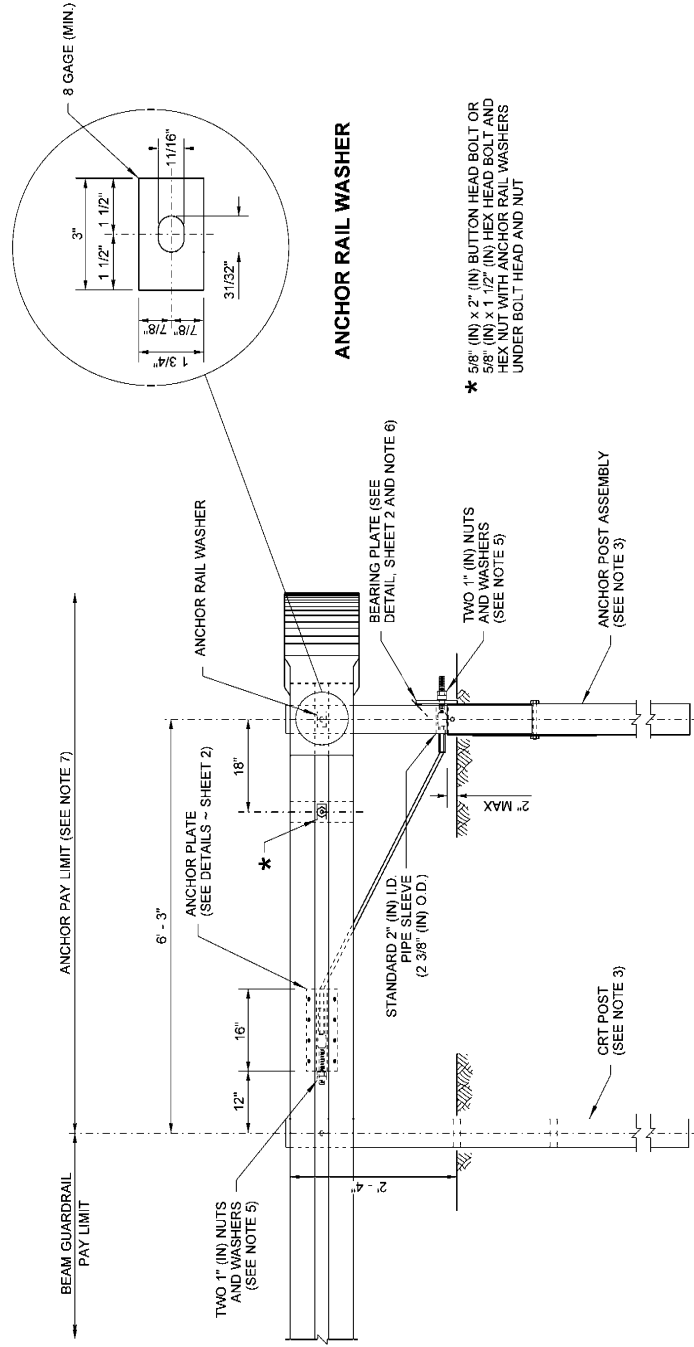
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**NOTES**

1. Anchor plate may be constructed from 1/4" (in) plates welded to equal strength and dimensions as shown.
2. For end section details see **Standard Plan C-7**.
3. For post details, see **Standard Plan C-1b**.
4. Eight 5/8" (in) x 1/2" (in) machine bolts with hex nut and washer. Place washer on face side of rail.
5. Outside nut shall be torqued against inside nut a minimum of 100 ft-lbs.
6. Toenail bearing plate with 10d nail at corners to prevent turning.
7. Anchor pay limit does not apply when anchor is included in a Beam Guardrail Terminal.



**PLAN**



**ANCHOR RAIL WASHER**

\* 5/8" (IN) x 2" (IN) BUTTON HEAD BOLT OR 5/8" (IN) x 1 1/2" (IN) HEX HEAD BOLT AND HEX NUT WITH ANCHOR RAIL WASHERS UNDER BOLT HEAD AND NUT

**TYPE 1 ANCHOR**

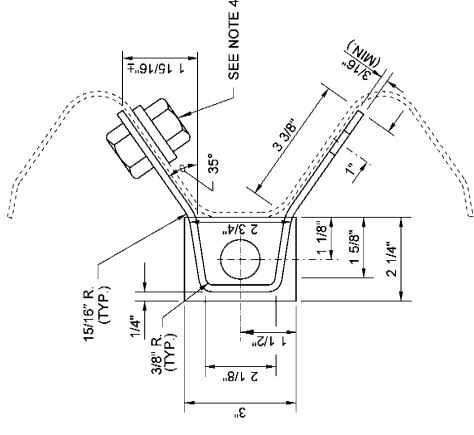


*Jeff Peterson*  
Peterson, Jeff (HQ Design)  
Jun 30 2016 7:05 AM

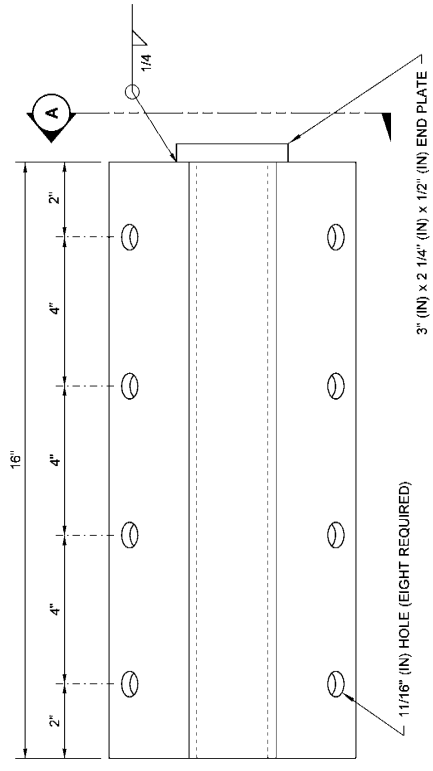
**BEAM GUARDRAIL TYPE 1**

**STANDARD PLAN C-6**  
SHEET 1 OF 2 SHEETS

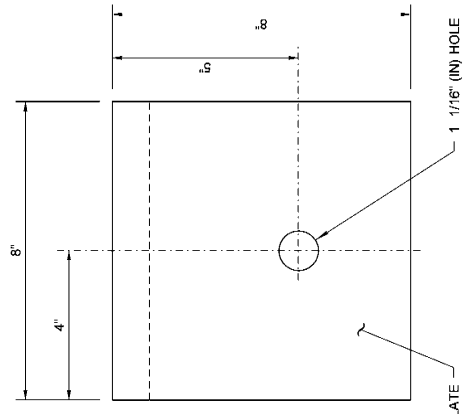
APPROVED FOR PUBLICATION  
 Prepared by: *Jeff Peterson*  
 Date: 06/30/2016 PM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation



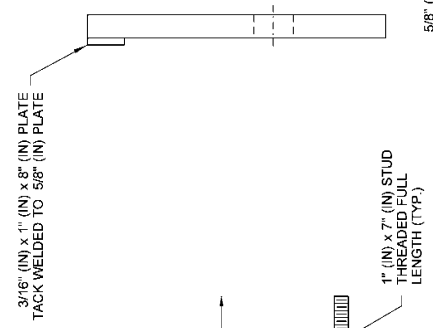
SECTION A



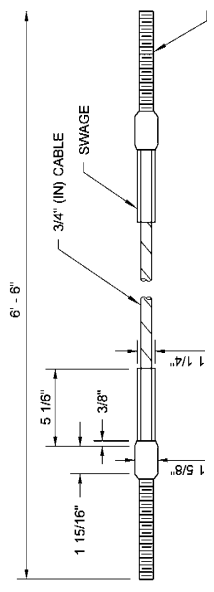
ELEVATION  
ANCHOR PLATE  
(SEE NOTE 1)



BEARING PLATE



ANCHOR CABLE



ANCHOR CABLE



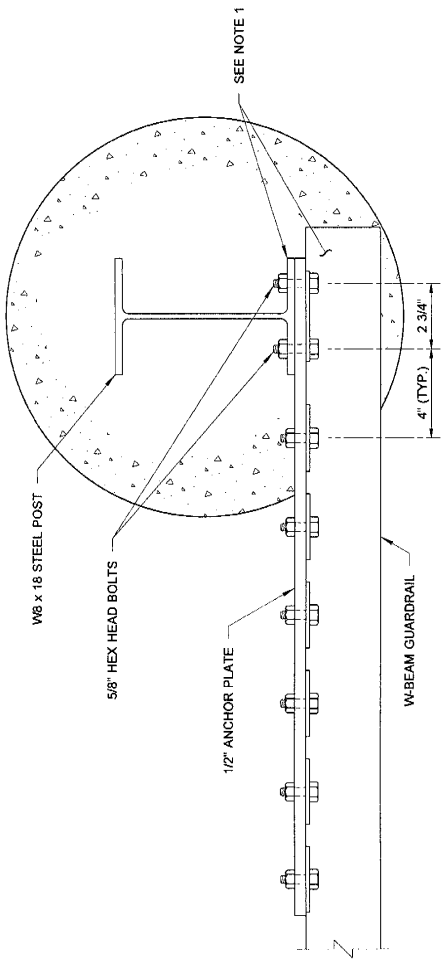
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**BEAM GUARDRAIL TYPE 1**

**STANDARD PLAN C-6**  
 SHEET 2 OF 2 SHEETS

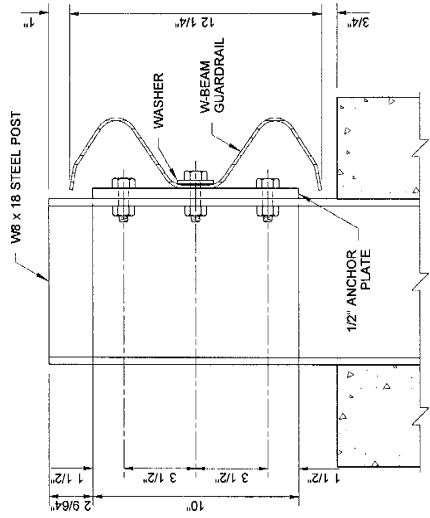
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 STATE DESIGN ENGINEER  
 Washington, State Department of Transportation

**NOTES**

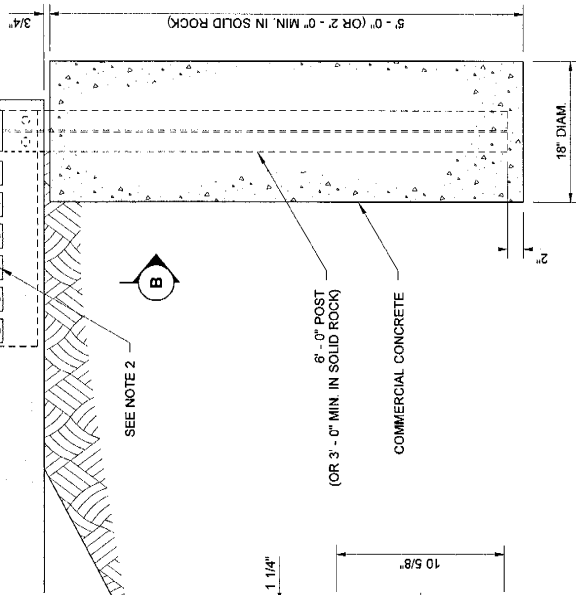
1. Rail section and W8 x 18 steel post shall be fabricated to receive 5/8" hex head bolts as shown.
2. All bolts shall be high strength 5/8" hex head bolts with anchor rail washers.



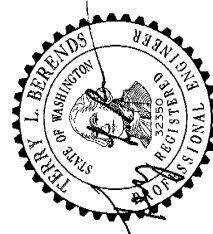
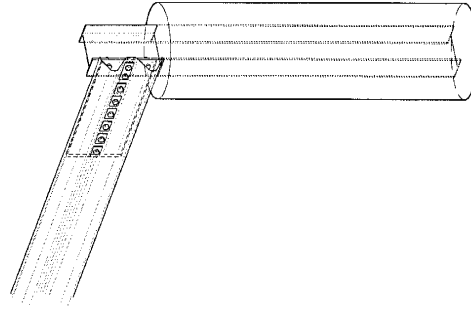
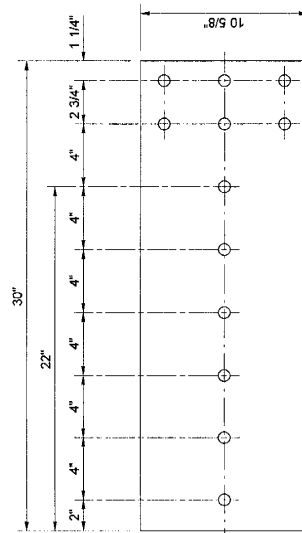
**PLAN**



ONE 1 3/4" x 5 1/4" x 0.188" WASHER WITH TWO 1 1/16" HOLES



**ELEVATION**



10-5-08  
**BEAM GUARDRAIL ANCHOR TYPE 2**

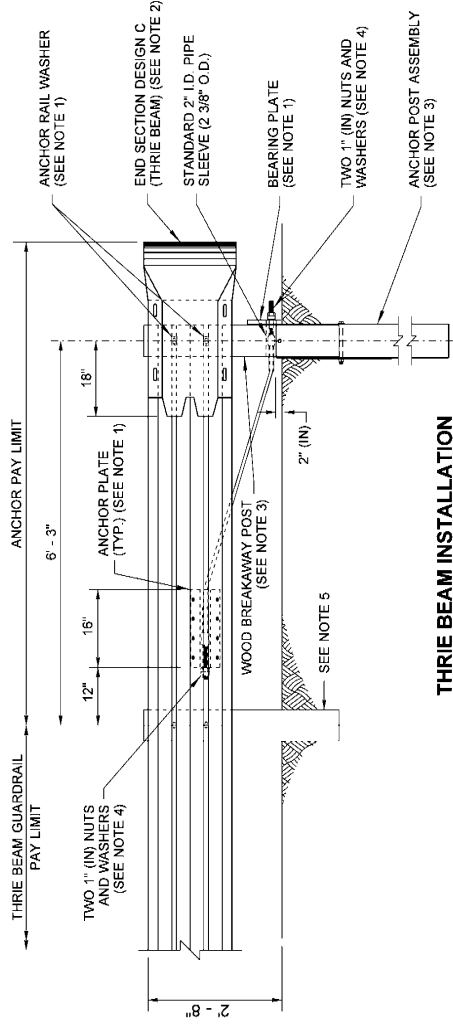
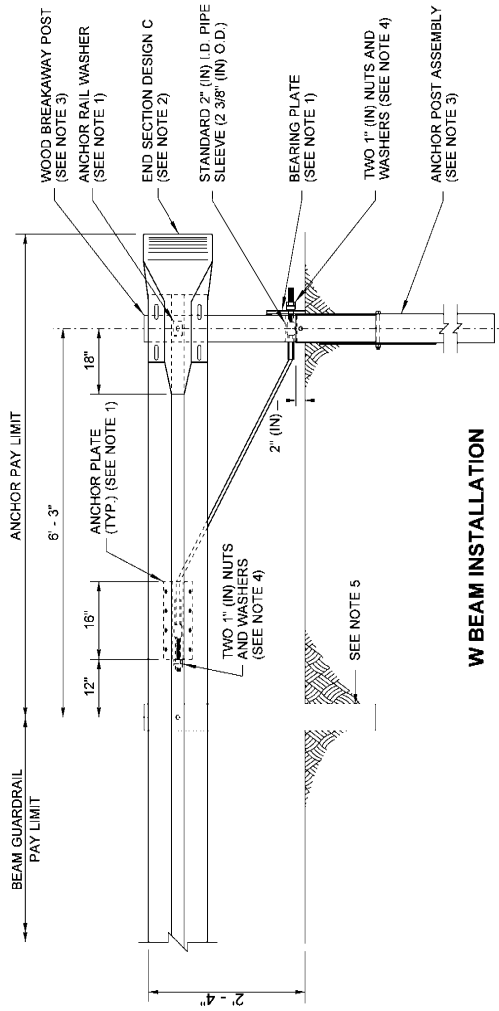
**STANDARD PLAN C-6a**

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
*Terry L. Berens*  
STATE DESIGN ENGINEER  
Washington State Department of Transportation  
DATE: 10/14/08

**NOTES**

1. For anchor details, see **Standard Plan C-6**.
2. For end section details see **Standard Plan C-7 or C-7a**.
3. For post details, see **Standard Plan C-1b**.
4. Outside nut shall be torqued against inside nut a minimum of 100 ft.-lbs.
5. Post and block shall match beam guardrail posts.

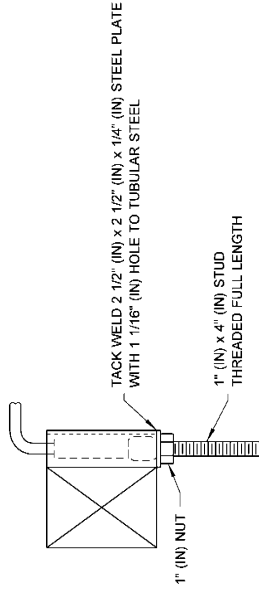
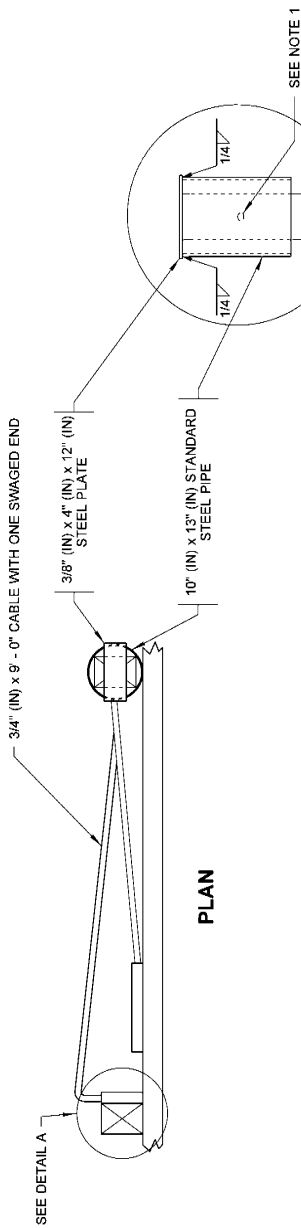


*Jeff Peterson*  
**BEAM GUARDRAIL ANCHOR TYPE 4**

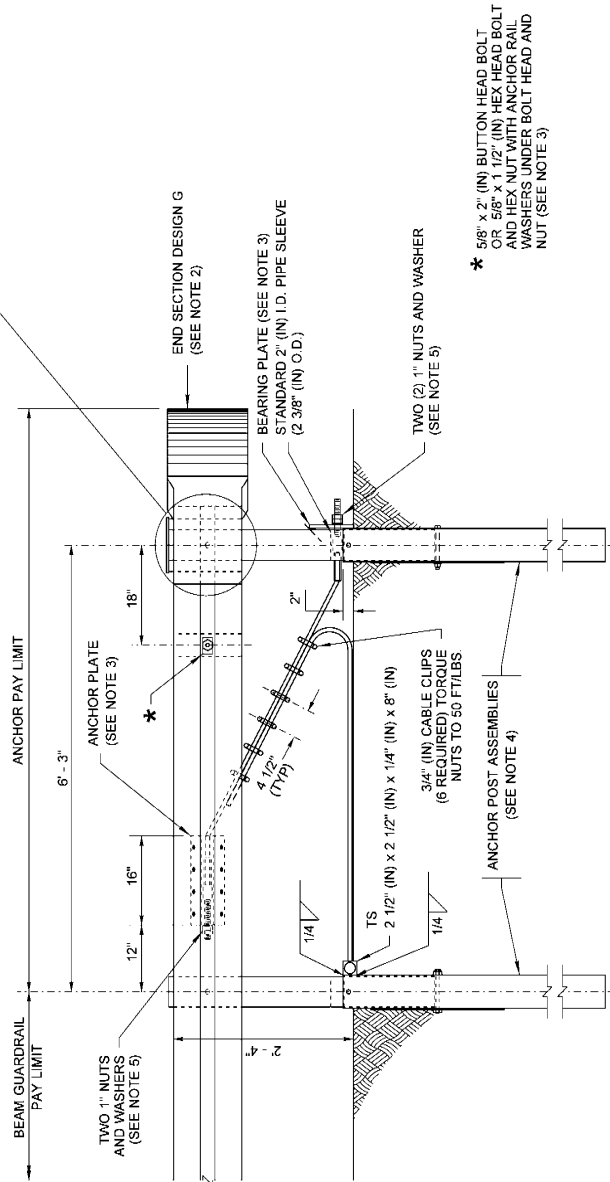
**STANDARD PLAN C-6C**  
 SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
 Checked by: *Jeff Peterson*  
 Date: 12/21/16 2:23 PM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

- NOTES**
1. Attach W-beam to steel pipe with 5/8" (in) x 1 1/4" (in) button head bolt with no washer. No connection to the post is required.
  2. For end section details see **Standard Plan C-7**.
  3. For anchor details see **Standard Plan C-6**.
  4. For post details see **Standard Plan C-1b**.
  5. Outside nut shall be torqued against inside nut a minimum of 100 ft/lbs.



**DETAIL A**



\* 5/8" x 2" (IN) BUTTON HEAD BOLT x 2" x 1/2" (IN) HEX HEAD BOLT AND HEX NUT WITH ANCHOR BOLT WASHERS UNDER BOLT HEAD AND NUT (SEE NOTE 3)

**TYPE 5 ANCHOR**

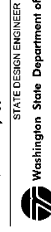


Jeff Peterson  
Professional Engineer  
No. 36937  
Expires 12/31/14

**BEAM GUARDRAIL TYPE 5**

**STANDARD PLAN C-6d**  
SHEET 1 OF 1 SHEET

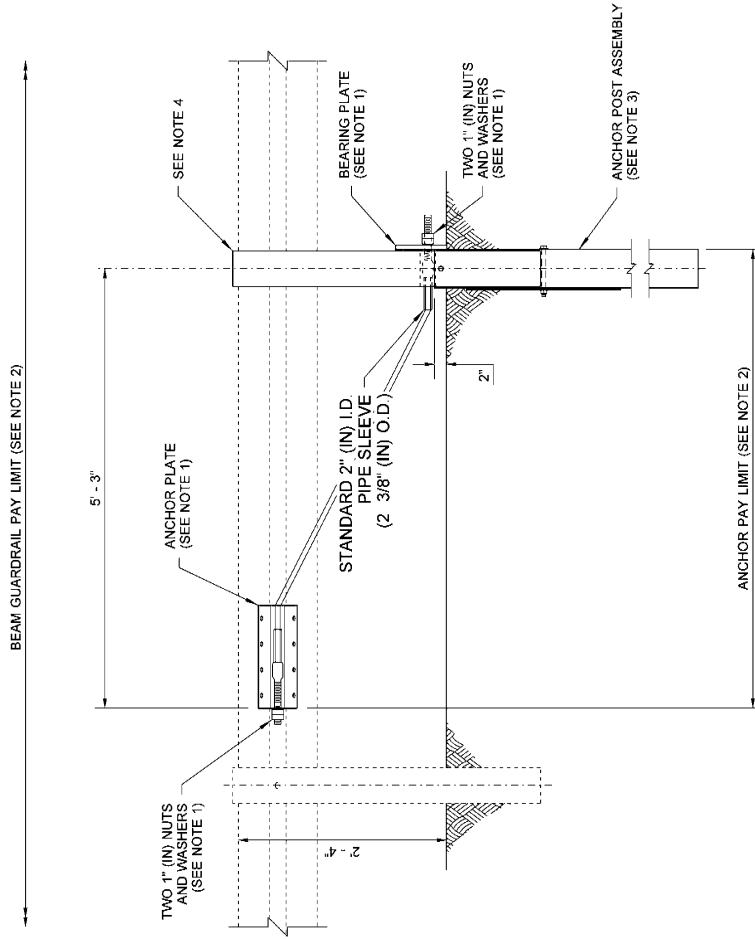
APPROVED FOR PUBLICATION  
Company: Jeff  
Date: 10/10/13 11:04 AM





**NOTES**

1. For anchor details, see **Standard Plan C-6**.
2. The rail element is to be included in the "Beam Guardrail" pay item. The "Anchor" pay item includes the anchor post, anchor plate, anchor cable, bearing plate, nuts and washers.
3. For post details, see **Standard Plan C-1b**.
4. Post material shall match beam guardrail posts on rest of guardrail run.



**TYPE 7 ANCHOR**



*Jeff Larson*  
 Peterson, Jeff (HQ Design)  
 Jan 30 2016 7:11 AM

**BEAM GUARDRAIL ANCHOR  
 TYPE 7**

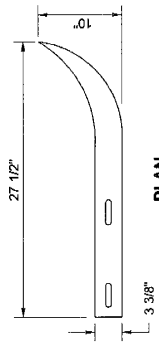
**STANDARD PLAN C-6f**

SHEET 1 OF 1 SHEET

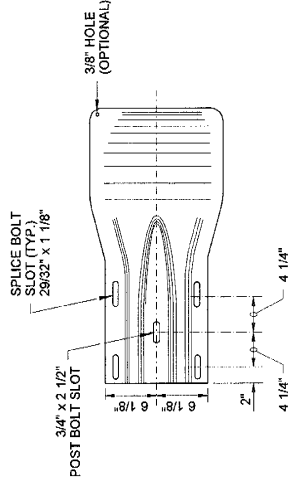
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*Casper, Jeff*  
 Jun 15 2016 2:23 PM

STATE DESIGN ENGINEER

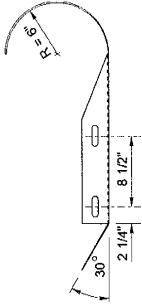
Washington State Department of Transportation



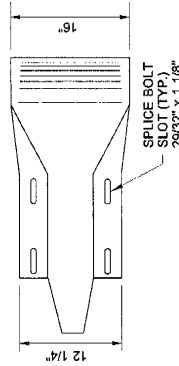
PLAN



ELEVATION  
DESIGN A



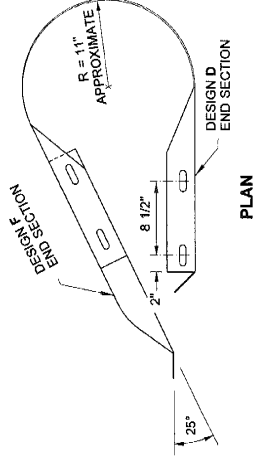
PLAN



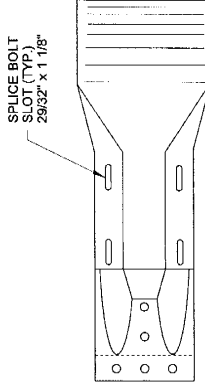
ELEVATION  
DESIGN C

**NOTES**

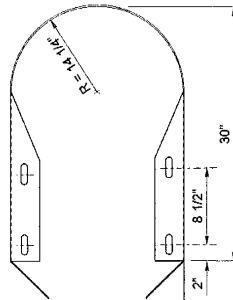
1. End Section Design G shall be used except where noted on the plans or contract.
2. Attach guardrail to bridge rail or concrete barrier with 7/8" diameter bolts (five minimum) **Standard Spec. 9-06.5(4)**, with thin slab ferrule inserts or resin bonded anchors. See the Contract Plans.
3. A single piece having similar dimensional shape to Design G and mating with the W-beam guardrail is an alternate.
4. In cases where Design "F" end section is lapped on the outside of the guardrail, a galvanized 1" ID, 2" OD, 0.134" thick, narrow Type A Plain Washer or an anchor rail washer shall be placed under the splice bolt heads.



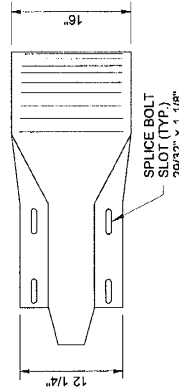
PLAN



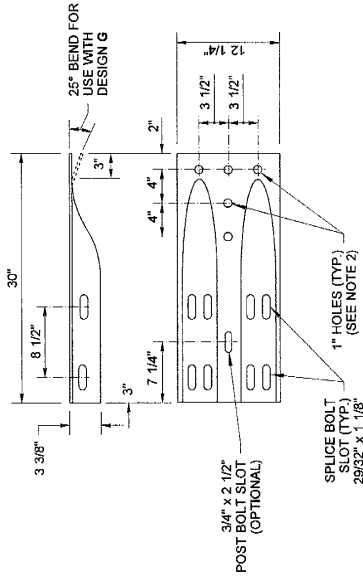
ELEVATION  
DESIGN D  
(SEE NOTE 3)



PLAN



ELEVATION  
DESIGN E



ELEVATION  
DESIGN F  
(SEE NOTE 4)



6-8-2011

**BEAM GUARDRAIL  
END SECTIONS  
STANDARD PLAN C-7**

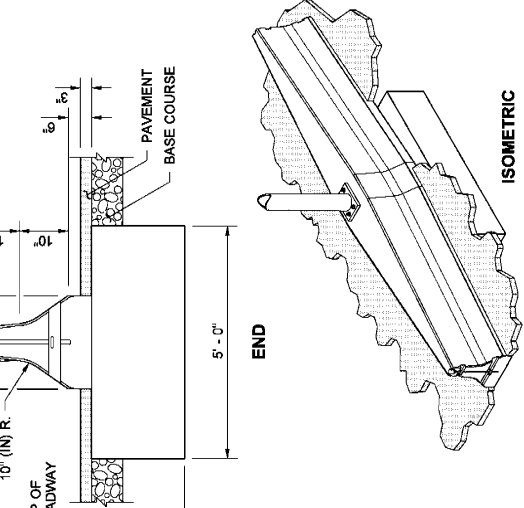
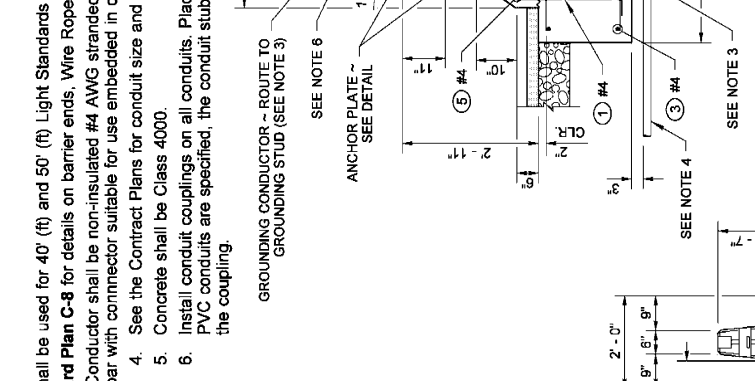
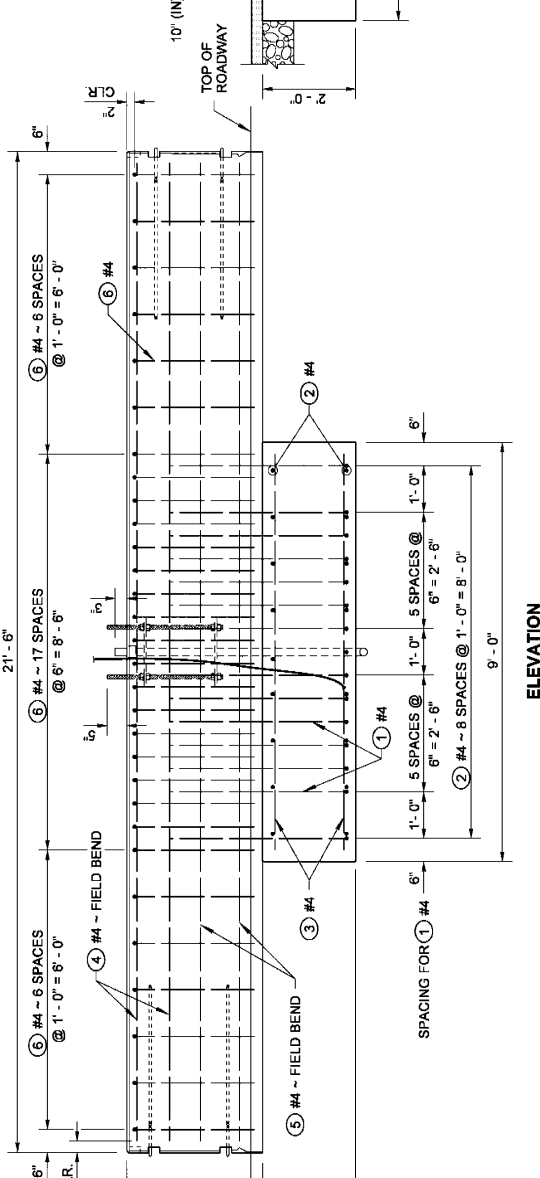
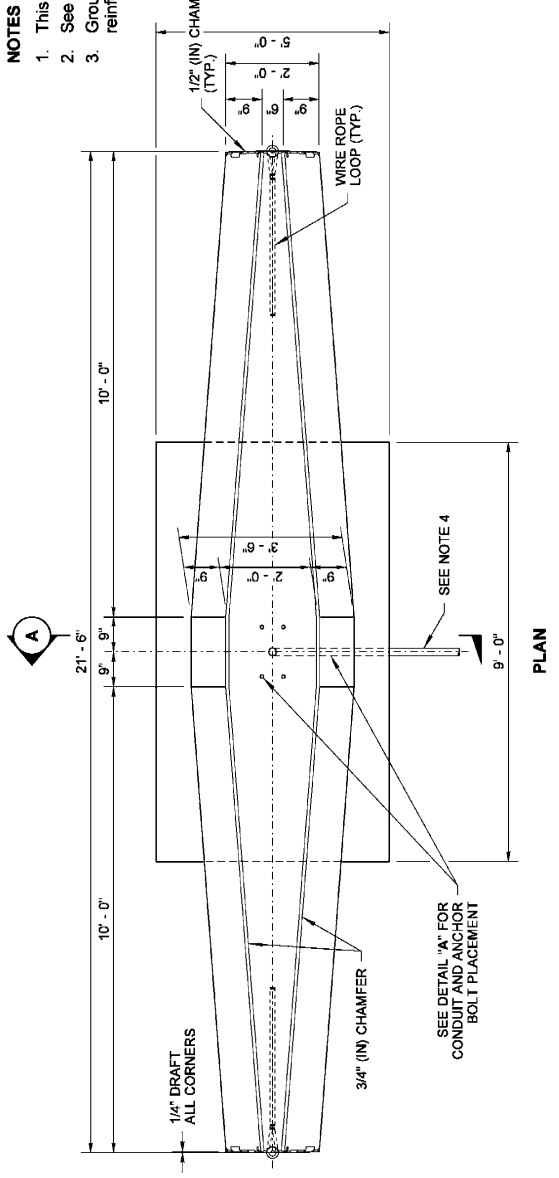
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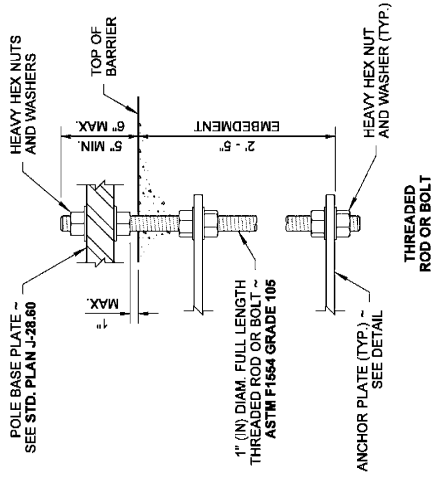
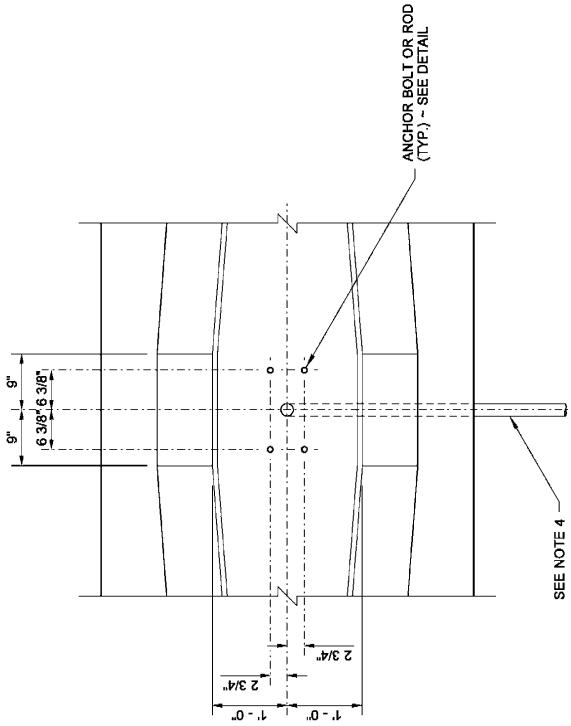
**NOTES**

1. This plan shall be used for 40' (ft) and 50' (ft) Light Standards with 16' (ft) max. length double mast arms.
2. See **Standard Plan C-8** for details on barrier ends, Wire Rope Loops, and Connecting Pins.
3. Grounding Conductor shall be non-insulated #4 AWG stranded copper, provide 3' - 0" min. slack. Clamp to steel reinforcing bar with connector suitable for use embedded in concrete.
4. See the Contract Plans for conduit size and placement.
5. Concrete shall be Class 4000.
6. Install conduit couplings on all conduits. Place coupling tops flush with top of concrete. If PVC conduits are specified, the conduit stub and end bell bushing shall not be glued to the coupling.



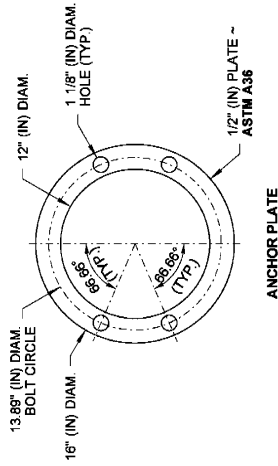
Zeldemrust, Richard  
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**CONCRETE BARRIER  
 LIGHT STANDARD SECTION  
 STANDARD PLAN C-8b**

SHEET 1 OF 2 SHEETS  
 APPROVED FOR PUBLICATION  
 Carpenter, Jeff  
 Feb 29 2016 12:30 PM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation



**ANCHOR BOLT DETAIL**

ALL NUTS, BOLTS, WASHERS, AND RODS SHALL BE FULLY GALVANIZED IN ACCORDANCE WITH ASTM F2329



BAR LIST				BENDING DIAGRAM	
MARK	LOCATION	QTY.	SIZE	LENGTH	(ALL DIMENSIONS ARE OUT TO OUT)
①	FOOTING - DOWEL	28		4' - 3"	
②	FOOTING	18		4' - 8"	
③	FOOTING	9	#4	8' - 8"	
④	BARRIER	4		21' - 0"	
⑤	BARRIER	4		21' - 0"	
⑥	BARRIER	30		5' - 3" TO 6' - 9"	



Richard P. Zeldenrust, Richard  
Feb 2 2016 4:20 PM

CS0871

**CONCRETE BARRIER  
LIGHT STANDARD SECTION  
STANDARD PLAN C-8b**

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION

Carpanter, Jeff

Feb 29 2016 12:31 PM

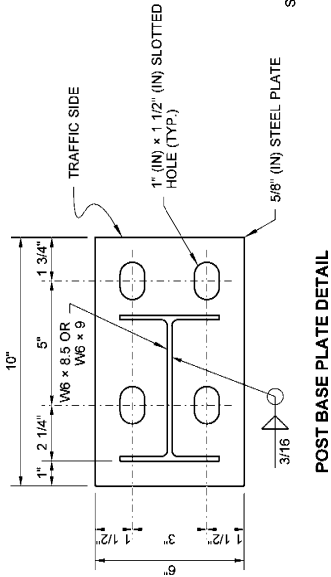
STATE DESIGN ENGINEER

Washington State Department of Transportation

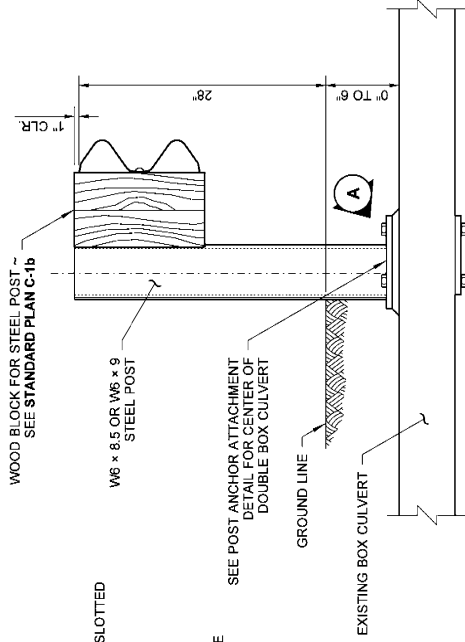
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**NOTES**

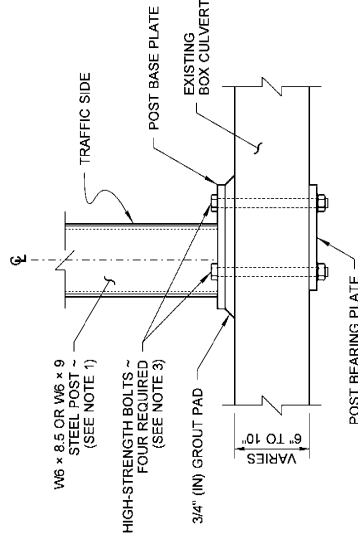
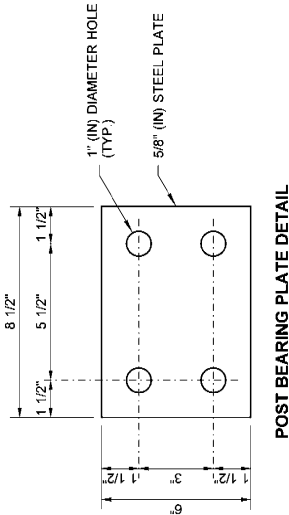
1. Length of W8 x 35, W6 x 8.5 or W6 x 9 shall be determined by measurement from ground line to top of grout pad. This distance shall be verified by the Contractor.
2. Attach Guardrail Post to Box Culvert with 3/4" (in) diameter high-strength bolts with resin-bonded anchors.
3. Drill 1 1/4" (in) diameter hole in concrete slab for 7/8" (in) diameter high-strength bolt. Length of bolt is determined by top slab of Box Culvert thickness, which shall be verified by the Contractor.
4. For details of post attachment to Double Box Culvert, see **Standard Plan C-2i**.



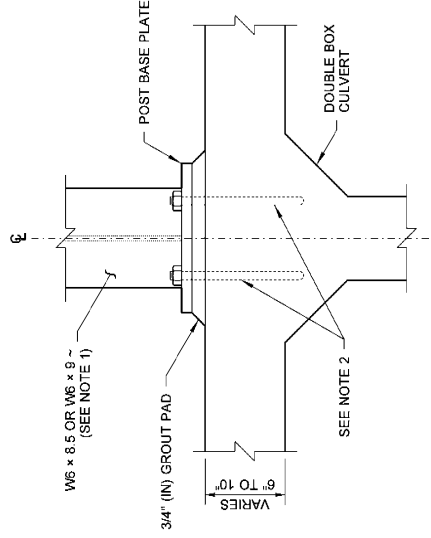
DRAWN BY: COLBY FLETCHER



**BOX CULVERT GUARDRAIL STEEL POST TYPE 2**  
(0" (IN) TO 6" (IN) GROUND COVER)



**DETAIL A**  
POST BASE ATTACHMENT



**POST ANCHOR ATTACHMENT DETAIL**  
(SEE NOTE 4)



Peterson Jeffrey A. Peterson  
June 29, 2016 to 12/31/2021

*Jeff Peterson*

**BOX CULVERT GUARDRAIL STEEL POST**

**STANDARD PLAN C-10**

SHEET 1 OF 2 SHEETS

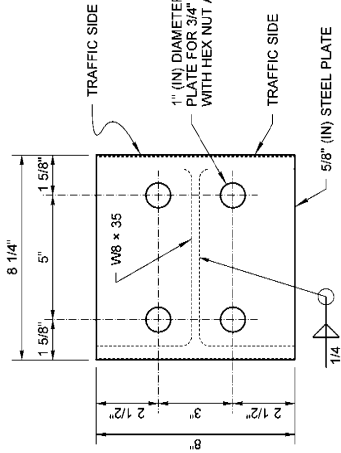
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Carpenter, Jeff  
Jul 13 2016 2:23 PM

*Carpenter, Jeff*

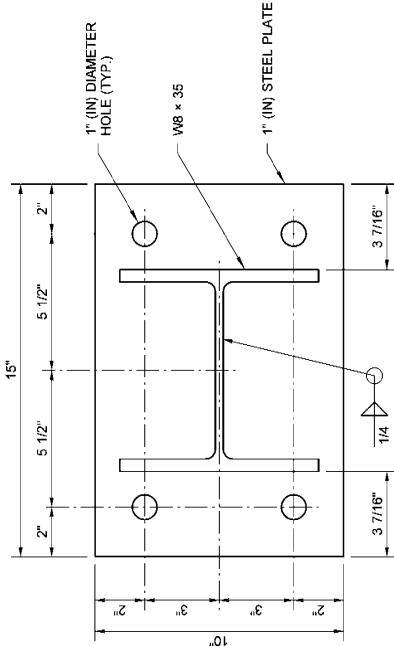
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Washington State Department of Transportation

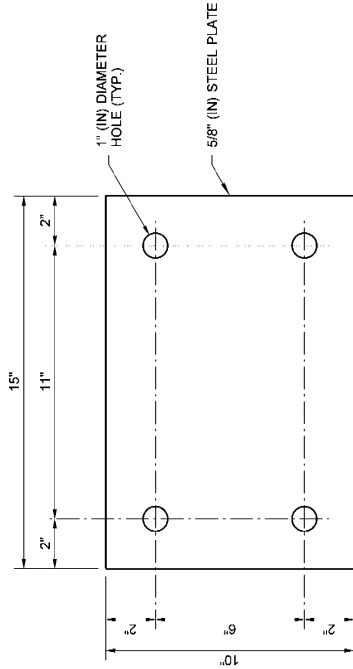




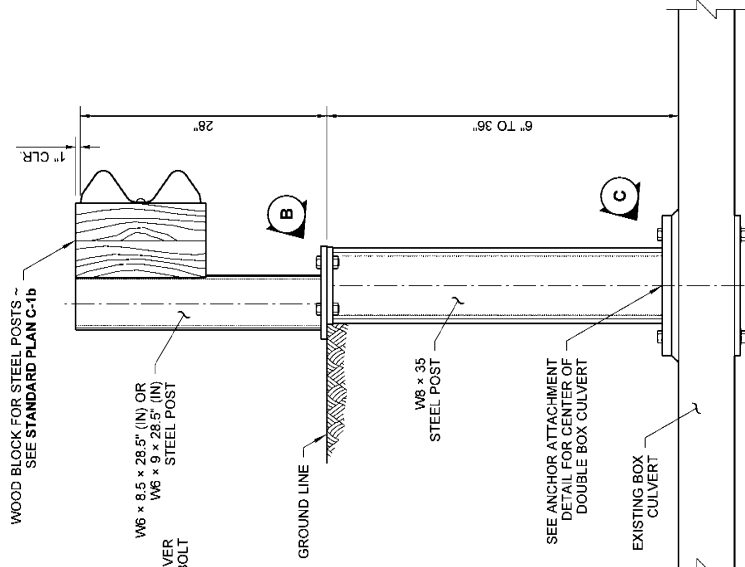
COVER PLATE DETAIL



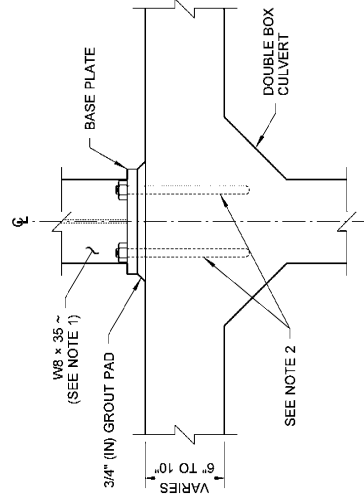
BASE PLATE DETAIL



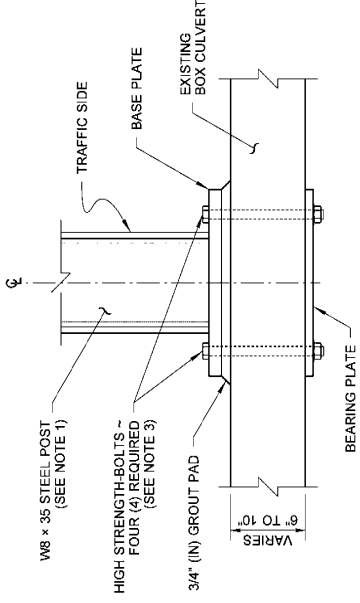
BEARING PLATE DETAIL



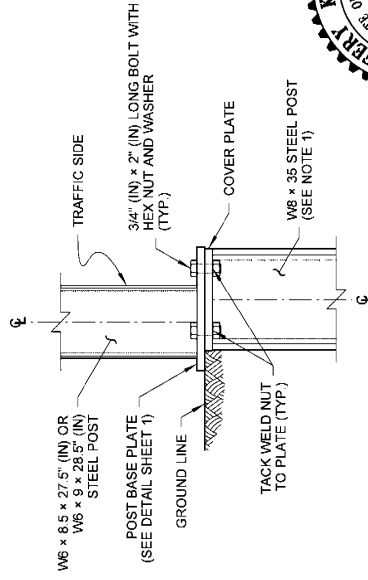
BOX CULVERT GUARDRAIL STEEL POST TYPE 1  
(6" (IN) TO 36" (IN) GROUND COVER)



ANCHOR ATTACHMENT DETAIL  
(SEE NOTE 4)



DETAIL C  
POST ATTACHMENT



DETAIL B  
BASE ATTACHMENT



Jeff Peterson  
Peterson, Jeff (HQ Design)  
Jan 30 2016 7:13 AM

**BOX CULVERT GUARDRAIL  
STEEL POST**  
**STANDARD PLAN C-10**

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION

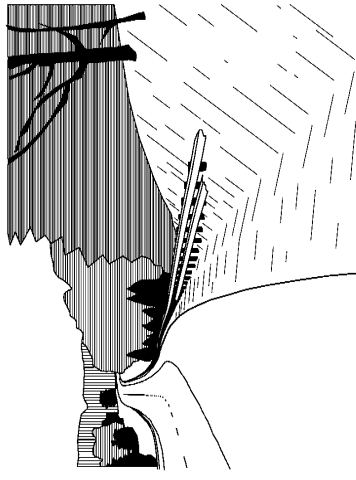
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STATE DESIGN ENGINEER

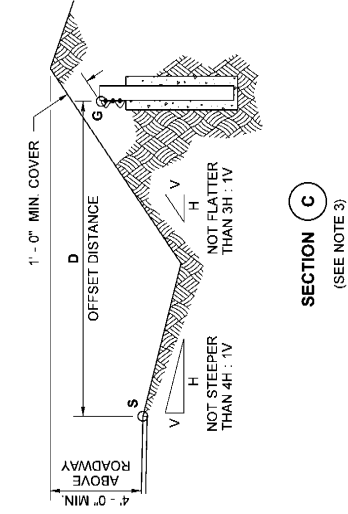
Washington, State Department of Transportation

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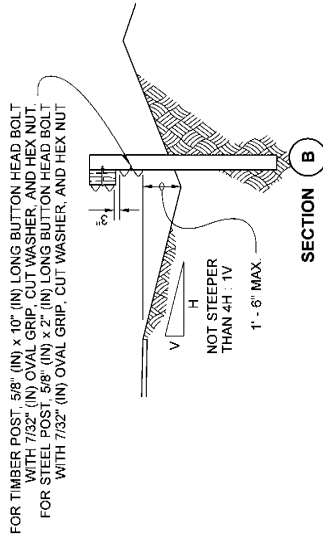




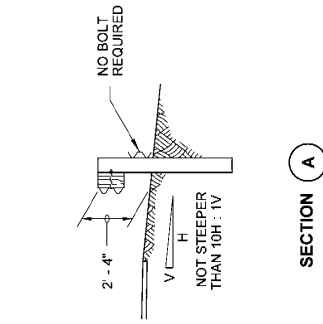
PERSPECTIVE



SECTION C  
(SEE NOTE 3)



SECTION B



SECTION A

NOTES

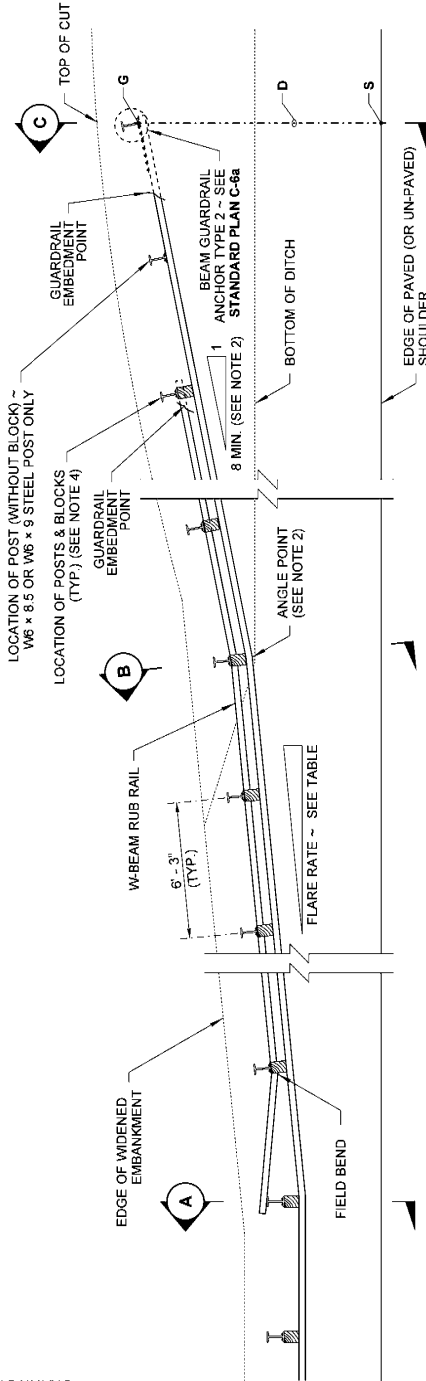
1. Posts installed on shoulder slopes steeper than 10 : 1 shall be 8' (ft) long.
2. The flare rate of the guardrail may be increased after crossing the ditch bottom to shorten the length of the terminal.
3. Determine the height of the W-Beam at the Anchor (G) by first calculating the perpendicular offset distance (D) from the edge of shoulder (S) to the Anchor (on station). Multiply that distance by 0.1, then subtract the product from the elevation of the same point (S) on the edge of shoulder used to obtain the offset distance (at the same station). Add Beam Guardrail design height (28' (in)) to that remainder for a sum that equals the elevation of the top of the W-Beam at the Anchor.  
Refer to SECTION "C".  
Elevation G = (Elevation S - D x (0.1)) + 28  
4. Timber or steel post. Steel post shown.



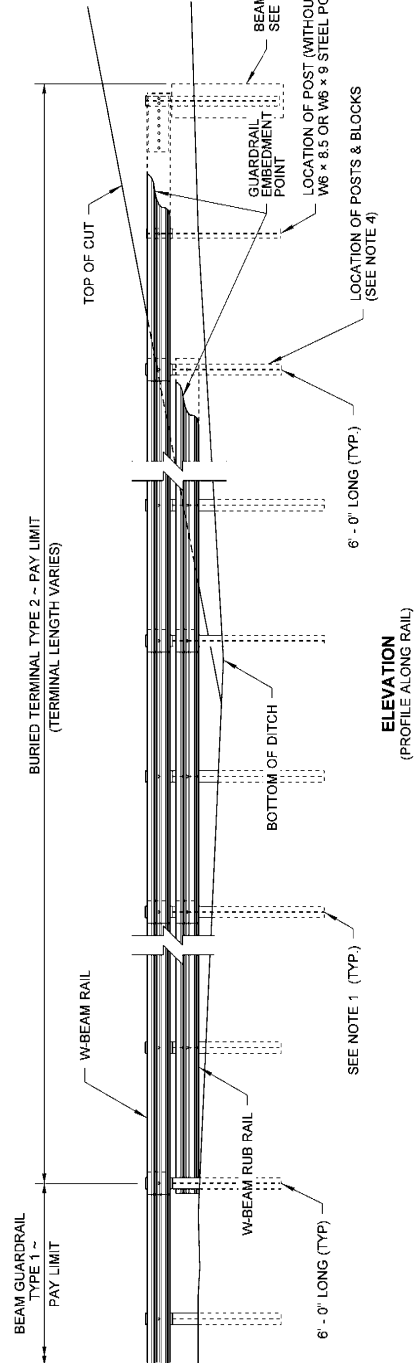
**BEAM GUARDRAIL TYPE 1  
BURIED TERMINAL TYPE 2**  
**STANDARD PLAN C-22.14-04**  
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
Christopher Hoff  
State Design Engineer  
Washington State Department of Transportation

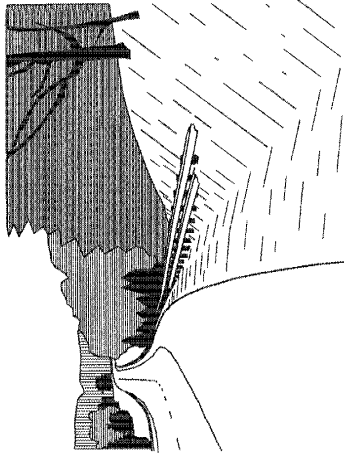
FLARE RATE TABLE	
RATE (FT)	POSTED SPEED (MPH)
15 : 1	70
14 : 1	60
12 : 1	55
11 : 1	50
10 : 1	45
9 : 1	40 OR LESS



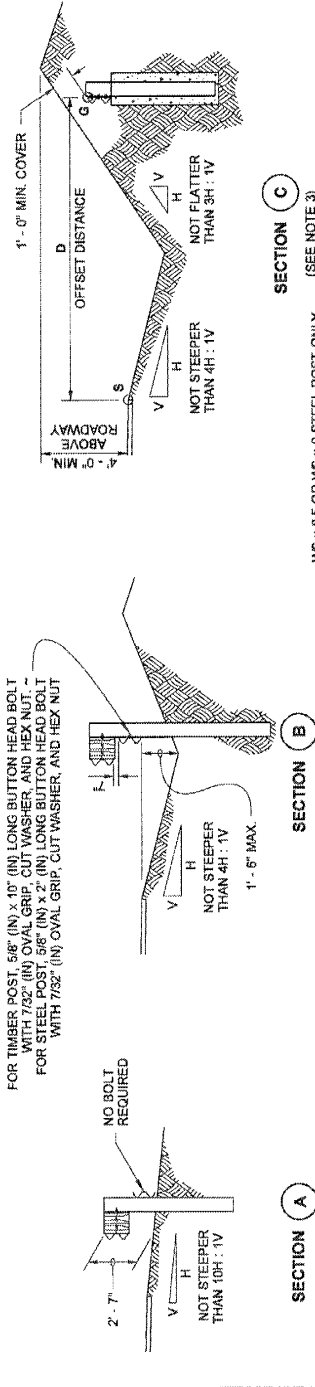
PLAN



ELEVATION  
(PROFILE ALONG RAIL)



PERSPECTIVE



NOTES

1. Posts installed on shoulder slopes steeper than 10H : 1V shall be 8' (ft) long.
2. The flare rate of the guardrail may be increased after crossing the ditch bottom to shorten the length of the terminal.
3. Determine the height of the W-Beam at the Anchor (G) by first calculating the perpendicular offset distance (D) from the edge of shoulder (S) to the Anchor (on station). Multiply that distance by 0.1, then subtract the product from the elevation of the same point (S) on the edge of shoulder used to obtain the offset distance (at the same station). Add Beam Guardrail design height (31" (in)) to that remainder for a sum that equals the elevation of the top of the W-Beam at the Anchor.

Refer to SECTION "C":

$$\text{Elevation G} = (\text{Elevation S} - D(0.1)) + 31$$

4. Timber or steel post. Steel post shown.

FLARE RATE TABLE	
RATE (FT)	POSTED SPEED (MPH)
15 : 1	70
14 : 1	60
12 : 1	55
11 : 1	50
10 : 1	45
9 : 1	40 OR LESS



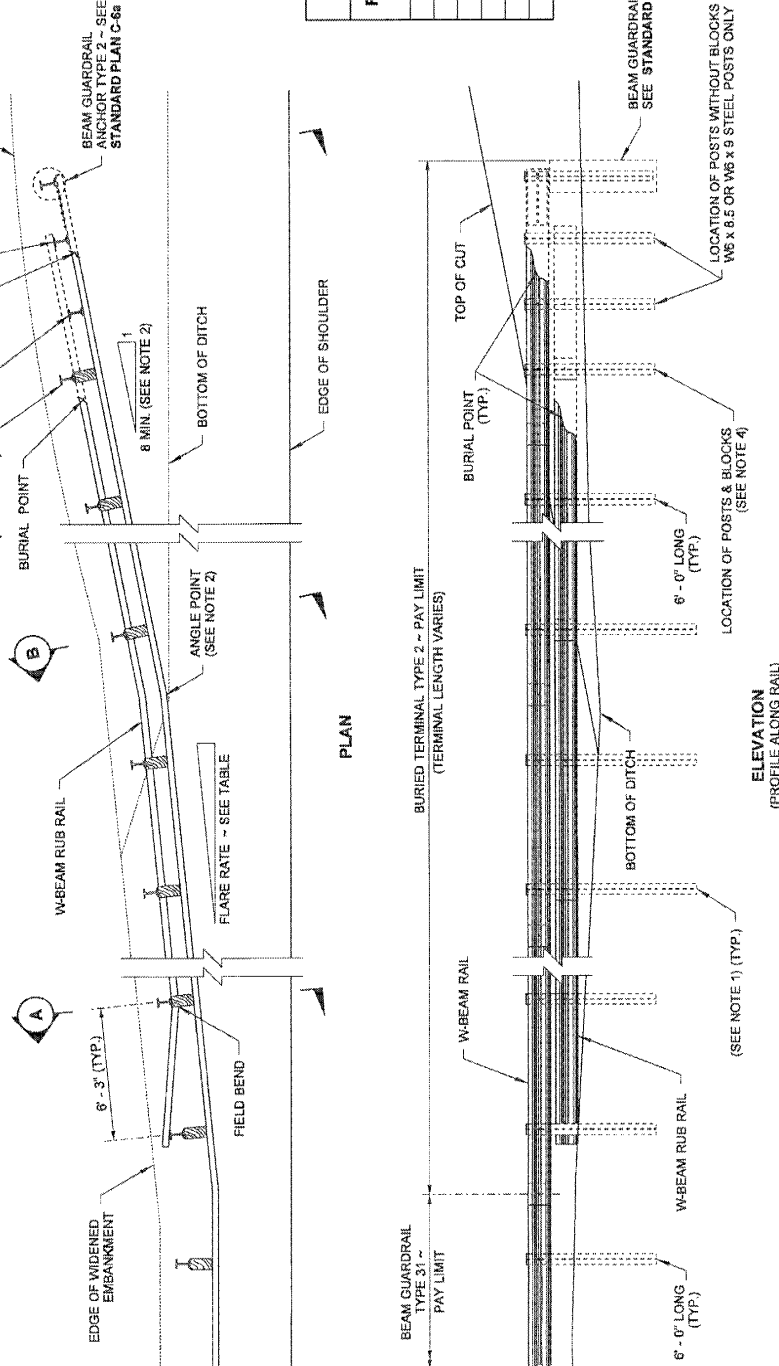
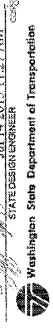
Barry, Ed  
 July 14 2015 7:54 AM

**BEAM GUARDRAIL TYPE 31 ~ BURIED TERMINAL TYPE 2**  
**STANDARD PLAN C-22.16-05**

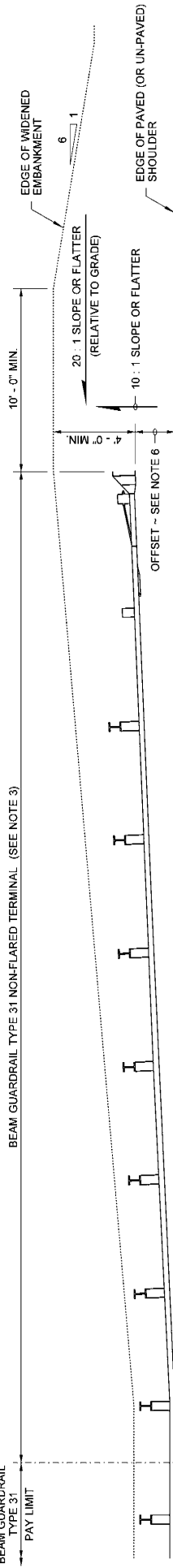
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Computer: Jeff  
 Jul 14 2015 11:37 AM

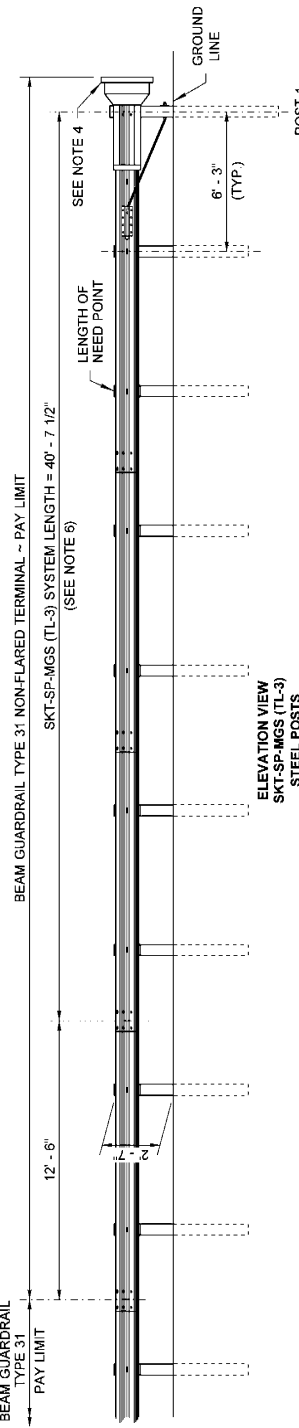


BEAM GUARDRAIL TYPE 31  
PAY LIMIT

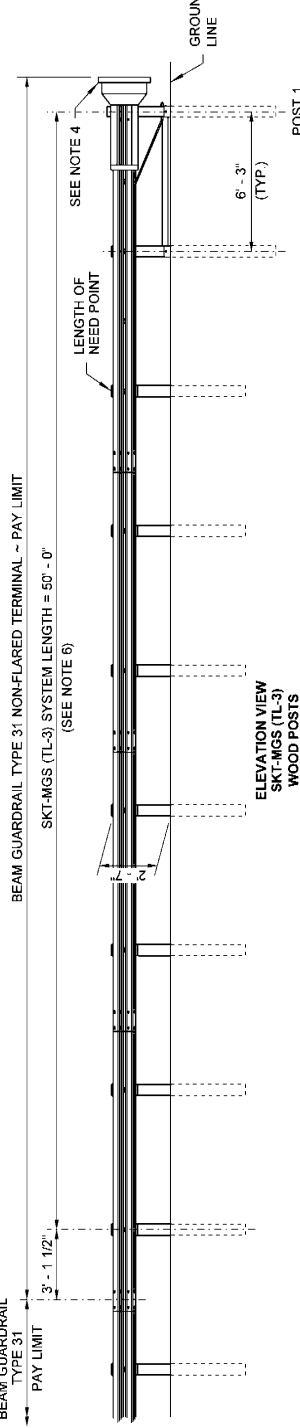


**PLAN VIEW**  
SKT-SP-MGS (TL-3) SHOWN

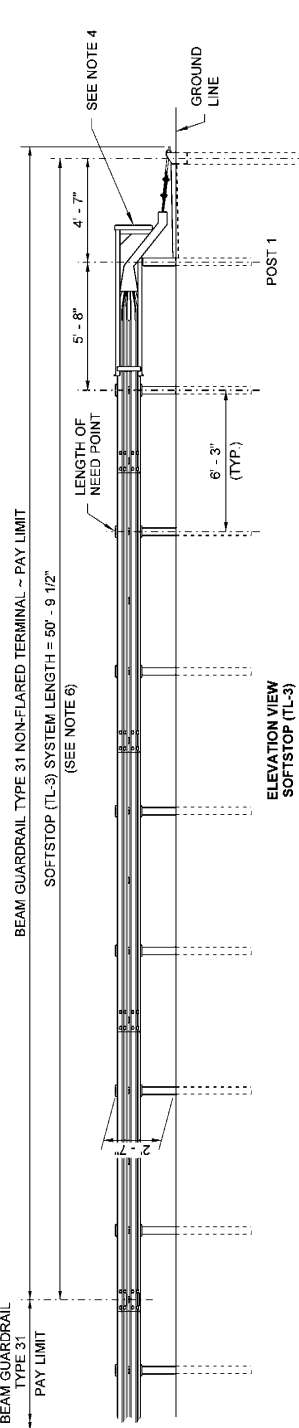
BEAM GUARDRAIL TYPE 31  
PAY LIMIT



BEAM GUARDRAIL TYPE 31  
PAY LIMIT



BEAM GUARDRAIL TYPE 31  
PAY LIMIT



**NOTES**

1. The implementation of the Manual for Assessment of Safety Hardware (MASH) criteria may result in the acceptance of guardrail terminal systems currently not shown on this plan, or the elimination of guardrail terminals that are on this plan. Non-flared terminals shall be selected from the WSDOT Qualified Products List (QPL) or approved through the WSDOT Request for Approval of Materials (RAM) process.
2. This terminal is FHWA eligible at Test Level Three (TL-3) and may be used for all posted speeds.
3. An SKT-MGS (TL-3) or an SKT-SP-MGS (TL-3) as manufactured by Road Systems, Inc. or SOFTSTOP (TL-3) as manufactured by Trinity Highway Products, LLC shall be installed according to manufacturer's recommendations.
4. A reflectorized object marker shall be installed according to manufacturer's recommendations.
5. When snow load post washers and snow load rail washers are required by the Contract, the snow load rail washers shall not be installed within the terminal limits.
6. Terminal shall be installed at a widening, ensuring the end piece is entirely off the shoulder. While this terminal does not require an offset at the end, a flare is recommended. For the SKT-MGS (TL-3) and the SKT-SP-MGS (TL-3), a maximum flare of 25 : 1 or flatter, over the length of the terminal is allowed with a maximum offset of 24' (in) over 50' (ft).



**JEFFERY K. PETERSON**  
STATE OF WASHINGTON  
REGISTERED PROFESSIONAL ENGINEER  
LICENSE NO. 36937  
EXPIRES JULY 13, 2016 TO 6/30/2021

*Jeff Peterson*  
**BEAM GUARDRAIL TYPE 31  
NON-FLARED TERMINAL  
(ALL POSTED SPEEDS)  
STANDARD PLAN C-22-40-05**

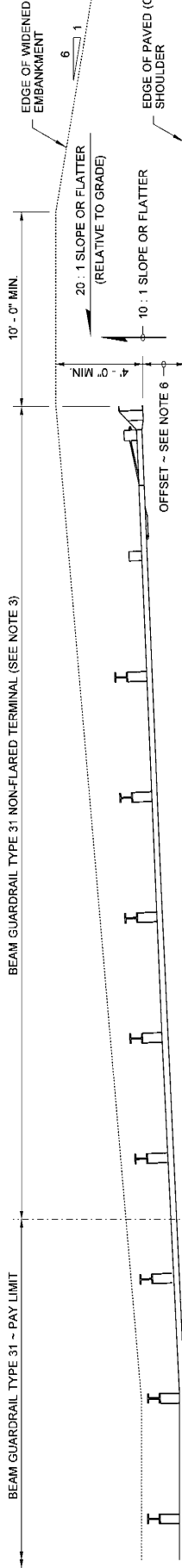
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
Catherine A. Joff  
10/13/2016 4:23 PM

STATE DESIGN ENGINEER



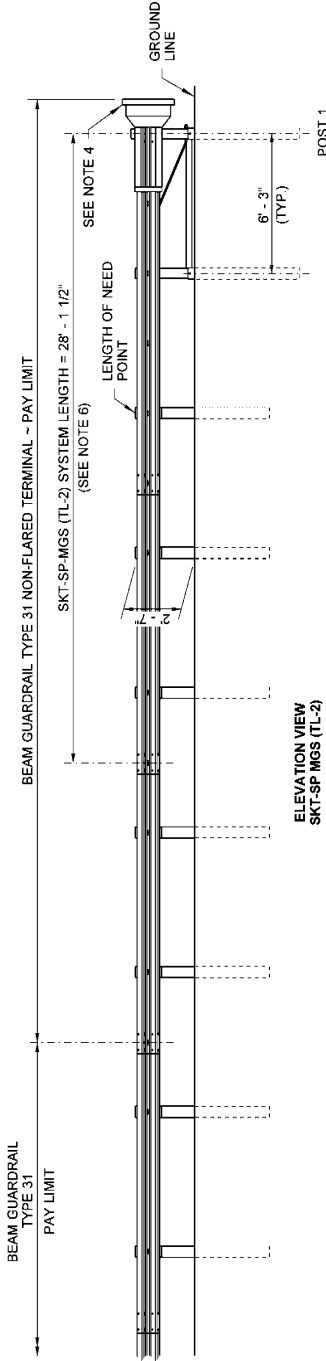
ANCHOR POST



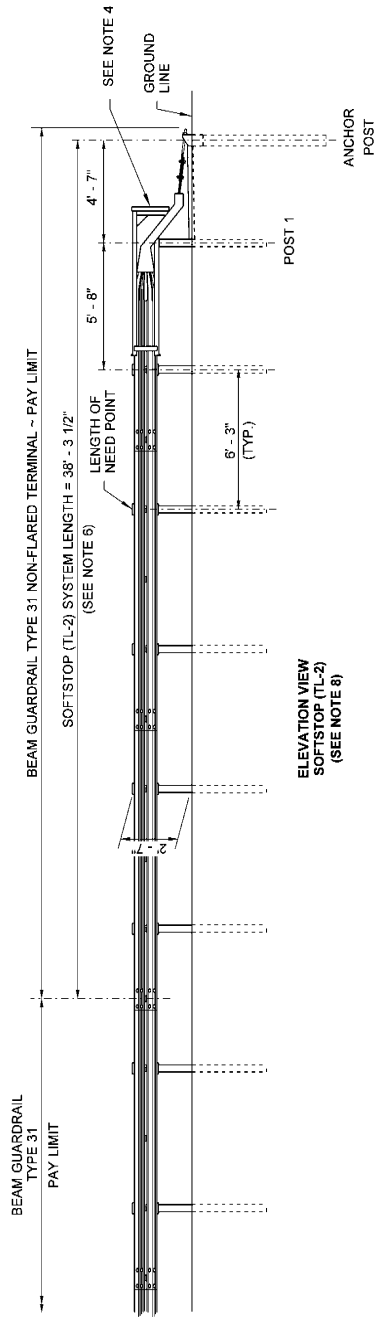
**NOTES**

1. The Implementation of the Manual for Assessment of Safety Hardware (MASH) criteria may result in the acceptance of guardrail terminal systems currently not shown on this plan, or the elimination of guardrail terminals that are on this plan. Non-Flared terminals shall be selected from the WSDOT Qualified Products List (QPL) or approved through the WSDOT Request for Approval of Materials (RAM) process.
2. This terminal is FHWA eligible at Test Level Two (TL-2) and may be used in applications with posted speeds of 45 mph or less.
3. An SKT-SP-MGS (TL-2) as manufactured by Road Systems, Inc. or SOFTSTOP (TL-2) as manufactured by Trinity Highway Products, LLC shall be installed according to manufacturer's recommendations.
4. A reflectorized object marker shall be installed according to manufacturer's recommendations.
5. When snow load post washers and snow load rail washers are required by the Contract, the snow load rail washers shall not be installed within the terminal limits.
6. Terminal shall be installed at a widening, ensuring the end piece is entirely off the shoulder. While this terminal does not require an offset at the end, a flare is recommended. For the SKT-SP-MGS (TL-2), a maximum flare of 25 : 1 or flatter over the length of the terminal is allowed with a maximum offset of 24" (in) over 50' (ft). For the SOFTSTOP (TL-2) a maximum flare of 38.29 : 1 or flatter is allowed over the system length of 38' - 3 1/2" with a maximum offset of 12' (in) at the anchor post.

**PLAN VIEW**  
(SKT-SP-MGS (TL-2) SHOWN)



**ELEVATION VIEW**  
SKT-SP-MGS (TL-2)



**ELEVATION VIEW**  
SOFTSTOP (TL-2)  
(SEE NOTE 8)



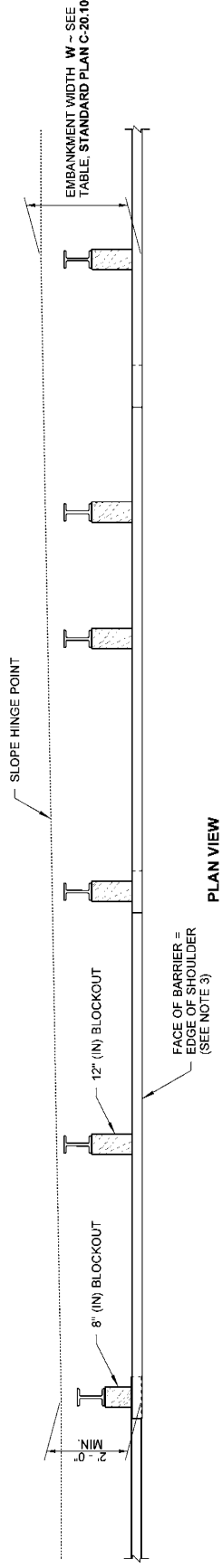
**JEFFREY K. PETERSON**  
 STATE OF WASHINGTON  
 REGISTERED PROFESSIONAL ENGINEER  
 License No. 36937  
 Exp. 12/31/2025  
**BEAM GUARDRAIL TYPE 31  
 NON-FLARED TERMINAL  
 (POSTED SPEED  
 45 MPH AND BELOW)**  
**STANDARD PLAN C-22.45-02**  
 SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
 Carpenter, Jeff  
 Jul 13 2024 12:24 PM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

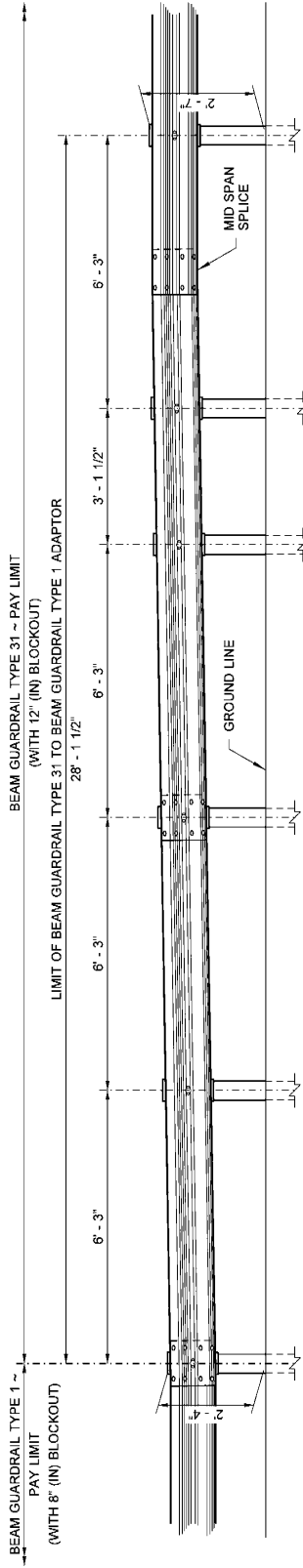
7. For terminal details, see WSDOT approved manufacturer's drawings.
8. The SOFTSTOP terminal is supplied with steel posts only. It can be used with guardrail runs composed of steel or wood guardrail posts.

**NOTES**

1. Refer to **Standard Plans C-1** and **C-1b** for component details for Beam Guardrail Type 1 (not shown on this plan).
2. Refer to **Standard Plan C-20.10** for component details for Beam Guardrail Type 31 (not shown on this plan).
3. Accommodating the wider blockout (12" (in) width) used with Type 31 guardrail will require widening the embankment by 4" (in) or narrowing the shoulder by 4" (in).
4. Wood blocks shown. Blocks of alternate material may be used. See **Standard Specification 9-16.3(2)**.
5. All posts for any standard barrier run shall be of the same type: timber or steel.



**PLAN VIEW**

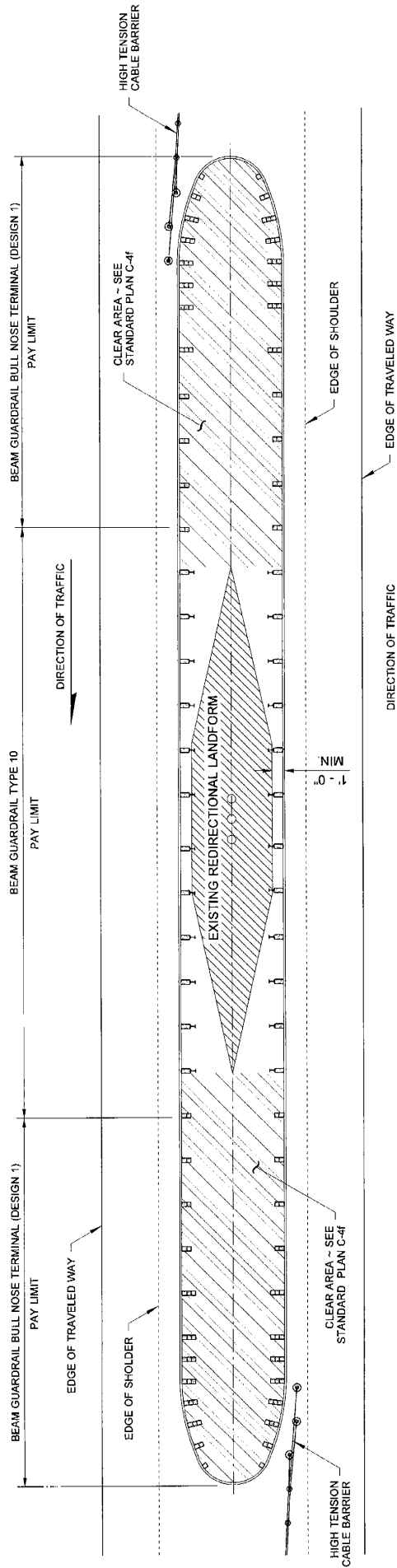


**ELEVATION VIEW ~ PROFILE TAPER**




Jeffrey A. Petterson  
**BEAM GUARDRAIL TYPE 31  
 TO BEAM GUARDRAIL TYPE 1  
 ADAPTOR**  
**STANDARD PLAN C-25.80-04**  
 SHEET 1 OF 1 SHEET

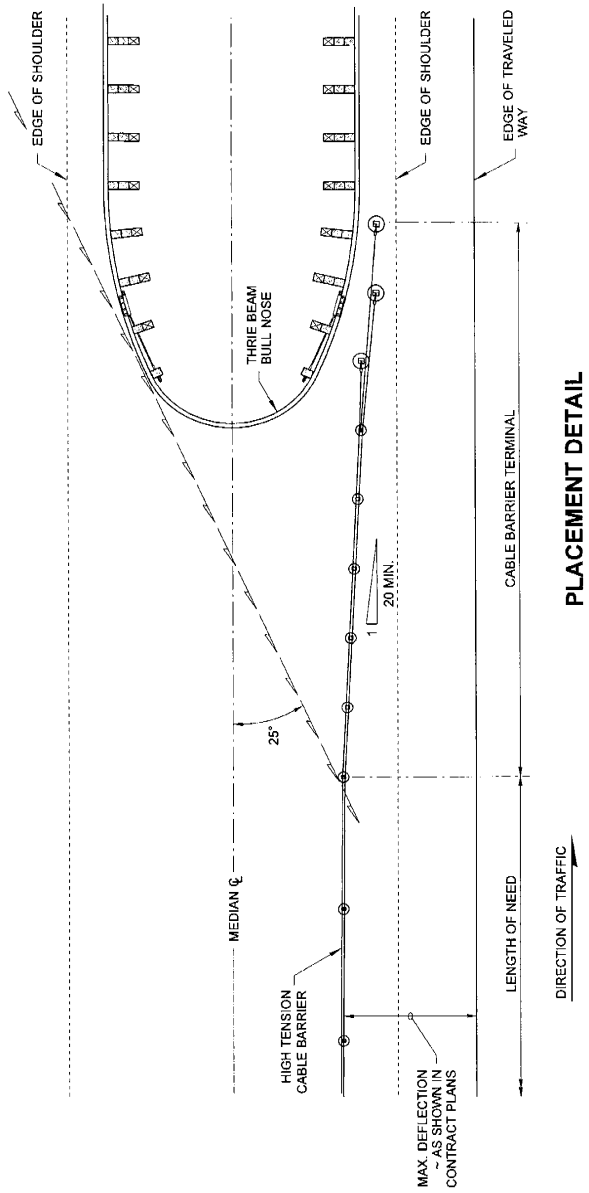
APPROVED FOR PUBLICATION  
 Checked: *Roff*  
 Date: 12/30/16 2:28 PM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation



DRAWN BY: FERN LIDDELL

**PLAN VIEW  
CASE 9A**

**LEGEND**  
 Design Layout Line



**PLACEMENT DETAIL**



7-2-2017

**BARRIER PLACEMENT  
CABLE TO THRIE BEAM  
BULL NOSE CONNECTION  
STANDARD PLAN C-40.14-02**

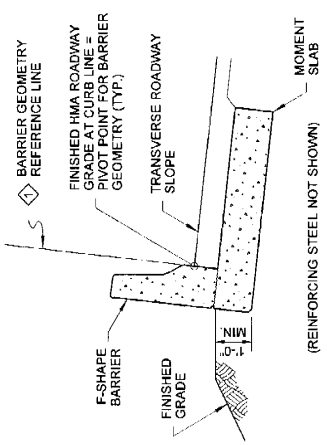
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
*Paula B. Bostwick*  
 STATE DESIGN ENGINEER DATE 7/2/17  
 Washington State Department of Transportation

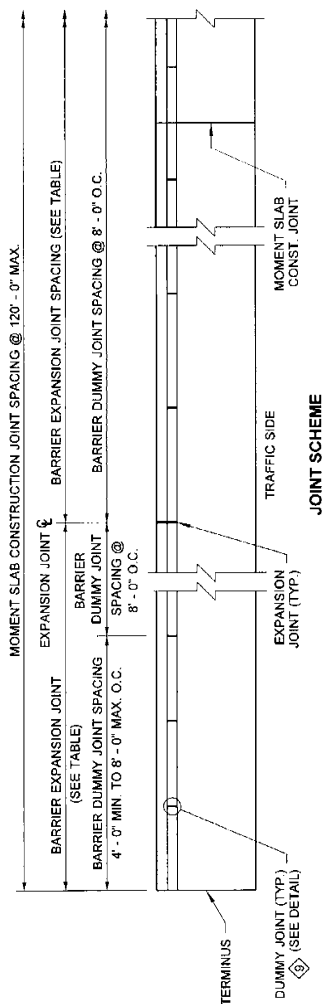
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**KEY NOTES**

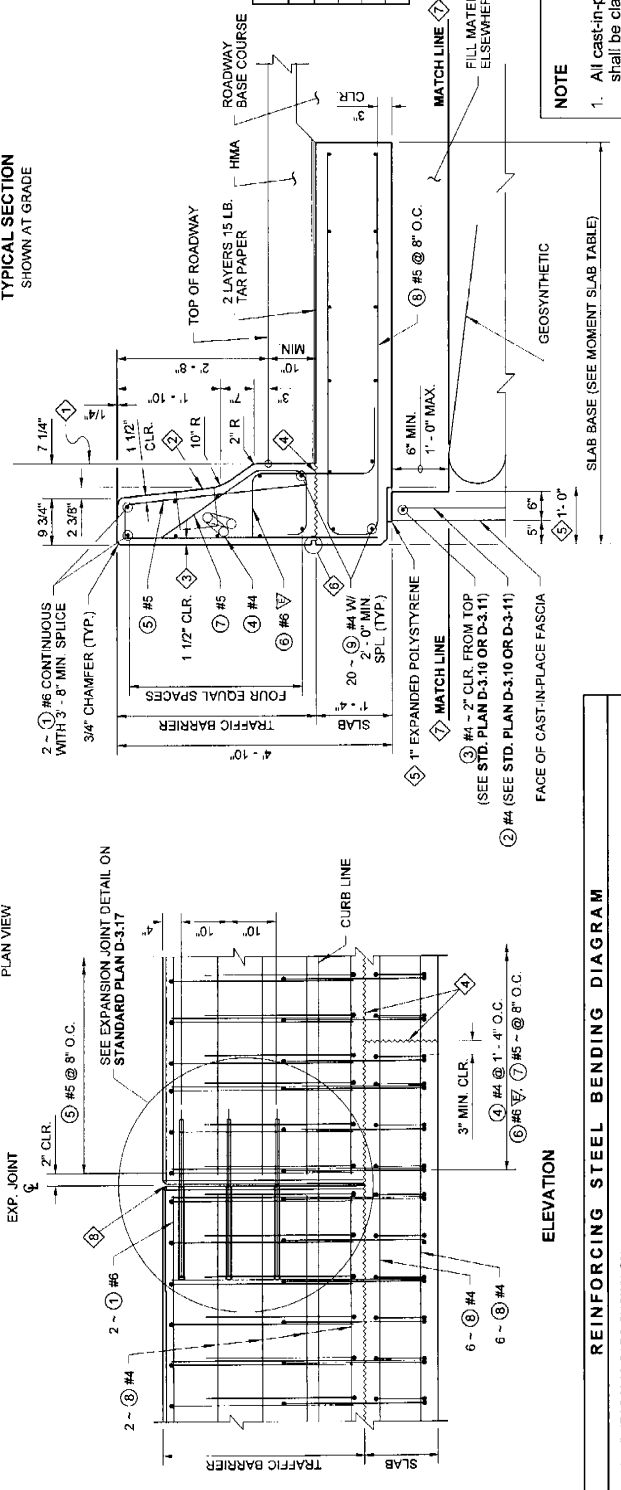
- 1. THE BARRIER GEOMETRY REFERENCE LINE (B.G.R.L.) IS PERPENDICULAR TO THE TRANSVERSE ROADWAY SLOPE (T.R.S.). FOR SUPERELEVATED TRANSVERSE ROADWAY SLOPES, THE B.G.R.L. ON THE LOW SIDE OF THE ROADWAY SHALL BE PERPENDICULAR TO THE T.R.S. UP TO A MAXIMUM OF 8% SUPERELEVATION. THE B.G.R.L. ON THE HIGH SIDE SHALL ALWAYS BE PERPENDICULAR TO THE T.R.S.
- 2. JUNCTION BOX (MOUNT BOX) COVER IS FLUSH WITH THE BARRIER FACE WITH A 0" TOLERANCE PROTRUDING BEYOND THE BARRIER FACE AND 1/8" RECESSED. USE NEW JUNCTION BOX WITH STAINLESS-STEEL BOLTS AND NUTS WITH SUP-FORMS - SEE STANDARD PLAN J-40.37.
- 3. 1 1/2" MIN. CONCRETE COVER - INCREASE THE COVER AS REQUIRED TO ACCOMMODATE ARCHITECTURAL FEATURES AND FINISH.
- 4. CONSTRUCTION JOINT WITH ROUGHENED SURFACE.
- 5. THE NOTCH, DETAILED BY THESE DIMENSIONS AND SPECIFICATIONS, IS REQUIRED ONLY IF THE BARRIER IS ON WALL FACING.
- 6. RUSTICATION - SEE RUSTICATION DETAIL.
- 7. FOR STRUCTURAL DETAILS BELOW THE MATCH LINE, SEE STANDARD PLANS D-3.10, D-3.10 OR D-3.11.
- 8. 1/2" EXPANSION JOINT WITH PREMOULDED JOINT FILLER.
- 9. INSTALL BARRIER DUMMY JOINTS ON TRAFFIC SIDE ONLY WHEN ARCHITECTURAL FEATURES ARE SPECIFIED.



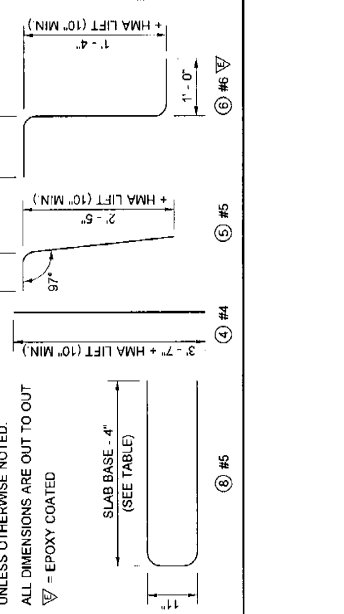
(REINFORCING STEEL NOT SHOWN) TYPICAL SECTION SHOWN AT GRADE



JOINT SCHEME PLAN VIEW



REINFORCING STEEL BENDING DIAGRAM

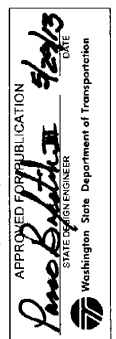


SLAB LENGTH	SLAB BASE	BARRIER EXPANSION JOINT SPACING	
		ON WALL	AT GRADE
MIN.			
80'-1"	7'-0"	8'-0"	120'-0"
80'-1"	8'-0"	8'-0"	80'-0"
40'-1"	9'-0"	7'-0"	60'-0"
0	40'-0"		CONTACT BRIDGE OFFICE



**PERMANENT GEOSYNTHETIC WALL F-SHAPE BARRIER STANDARD PLAN D-3.16-02**

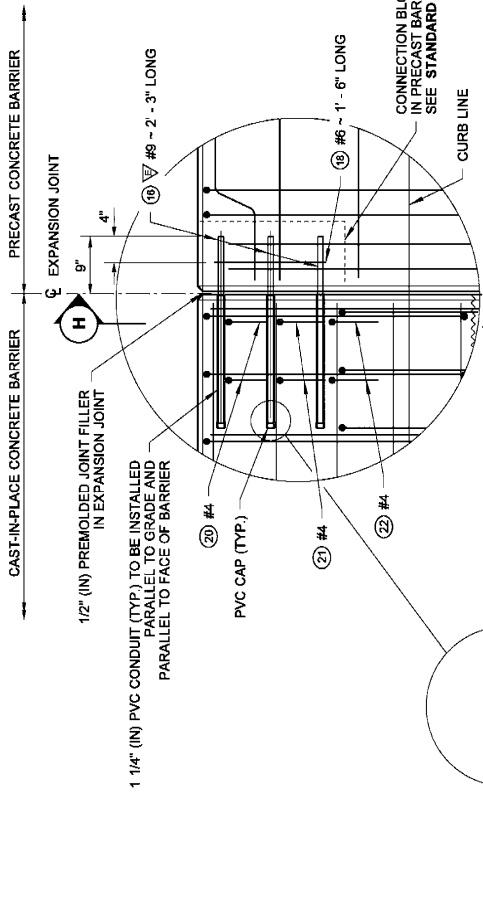
SHEET 1 OF 1 SHEET



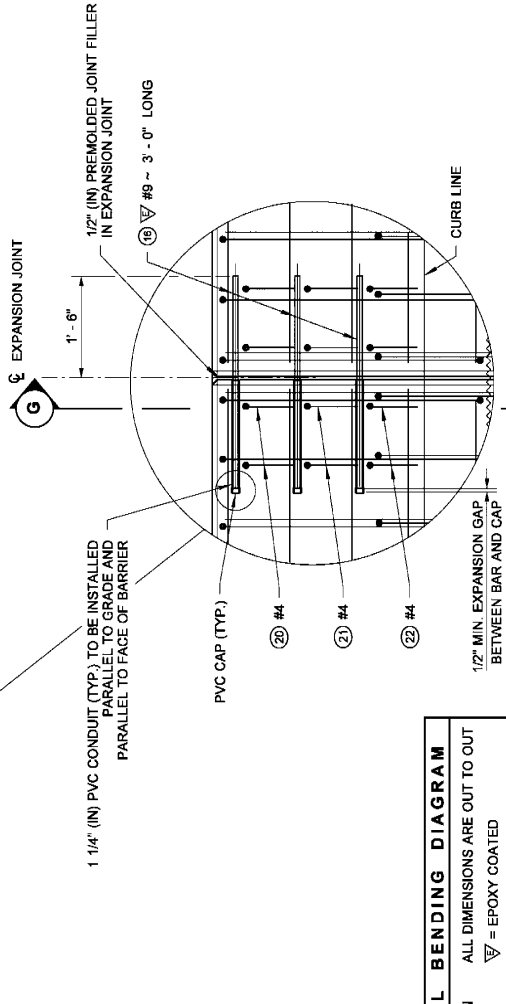
RUSTICATION DETAIL

DUMMY JOINT DETAIL

**NOTE**  
1. All cast-in-place concrete shall be class 4000.



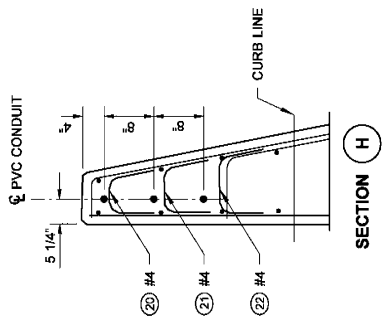
**EXPANSION JOINT DETAIL**  
FOR CAST-IN-PLACE TO PRECAST  
BARRIER CONNECTION



**EXPANSION JOINT DETAIL**

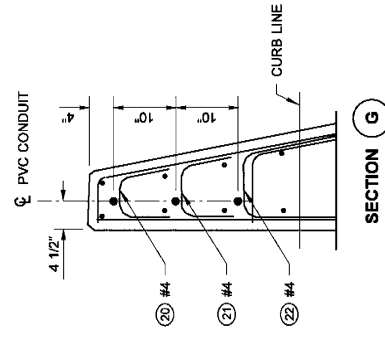
**NOTE**

1. Ensure that no concrete enters the PVC conduit during concrete placement.



**SECTION H**

FOR DETAILS NOT SHOWN ~ SEE TYPICAL SECTION  
STANDARD PLAN D-3.15 OR D-3.16



**SECTION G**

FOR DETAILS NOT SHOWN ~ SEE TYPICAL SECTION  
STANDARD PLAN D-3.15 OR D-3.16

**REINFORCING STEEL BENDING DIAGRAM**

ALL REINFORCING BARS SHOWN ON THIS PLAN SHALL BE AASHTO M 31 UNLESS OTHERWISE NOTED.

#4 L = 7"  
 #4 L = 8 7/8"  
 #4 L = 10 3/4"



*Bijan Khateghi*  
 Bijan Khateghi, P.E.  
 Apr. 25, 2016 2:25 PM

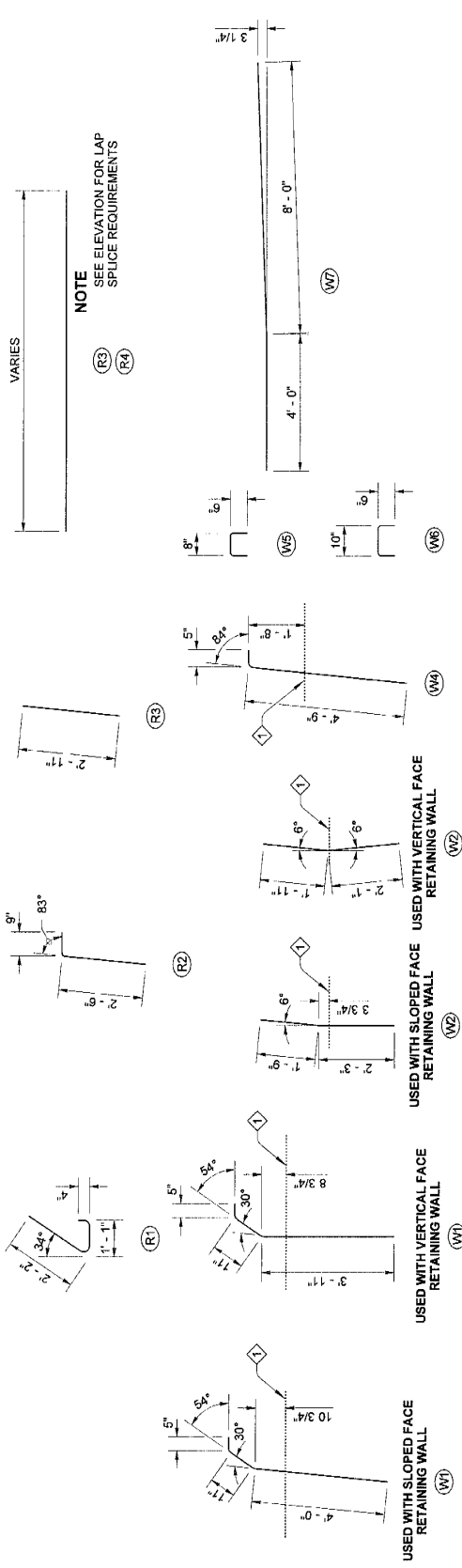
**PERMANENT  
 GEOSYNTHETIC WALL  
 EXPANSION JOINT DETAILS  
 STANDARD PLAN D-3.17-02**

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
*Carpenter, Jeff*  
 Carpenter, Jeff  
 May 9, 2016 12:04 PM  
 STATE DESIGN ENGINEER  
 DATE  
 Washington State Department of Transportation

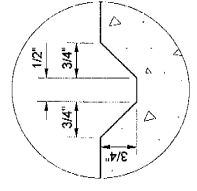
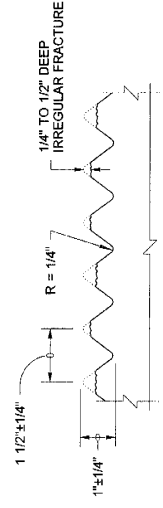


REINFORCING STEEL BENDING DIAGRAM



ALL DIMENSIONS ARE OUT TO OUT  
SEE STD. SPEC. FOR BENDING DIAMETERS

◇ CONSTRUCTION JOINT - LEVEL TRANSVERSE WITH ROUGHENED SURFACE

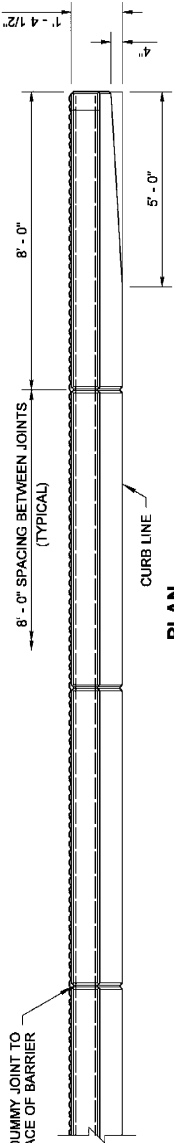


TRAFFIC BARRIER DETAILS  
FOR REINFORCED CONCRETE  
RETAINING WALLS  
STANDARD PLAN D-15.10-01

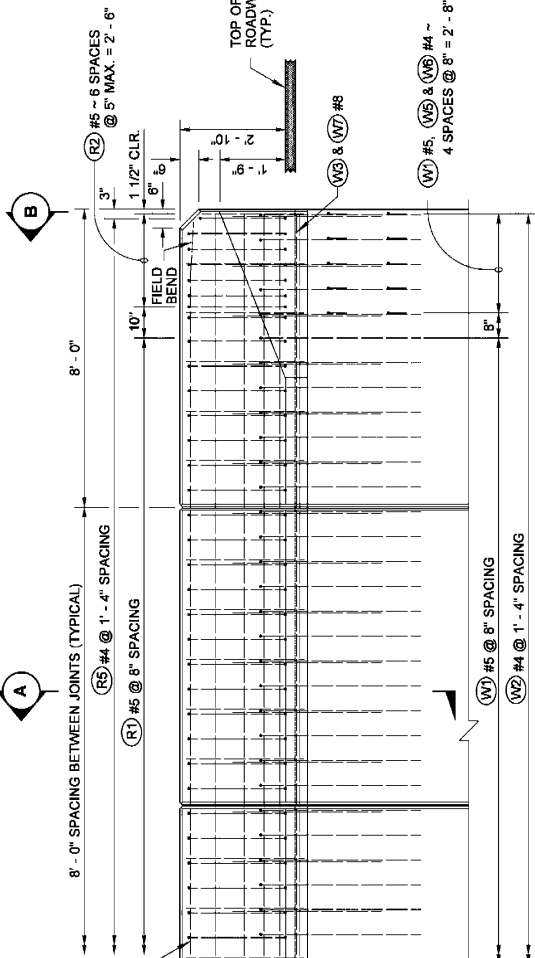
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION  
 12/2/08  
 STATE OF WASHINGTON  
 PROFESSIONAL ENGINEER  
 Washington State Department of Transportation

DUMMY JOINT - SEE DETAIL DUMMY JOINT TO BE OMITTED ON BACK FACE OF BARRIER



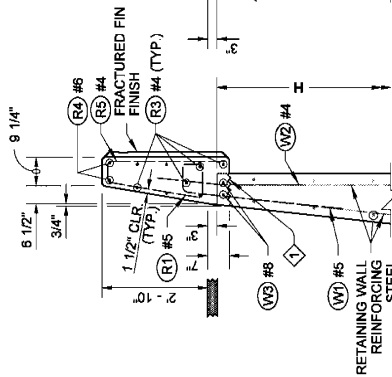
PLAN



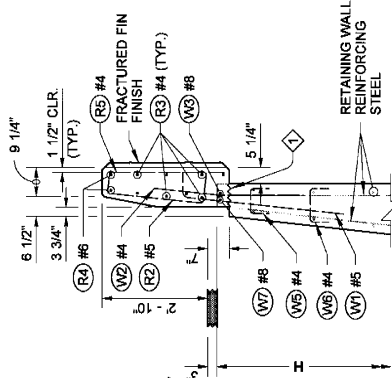
ELEVATION

CONSTRUCTION JOINT - LEVEL TRANSVERSE WITH ROUGHENED SURFACE

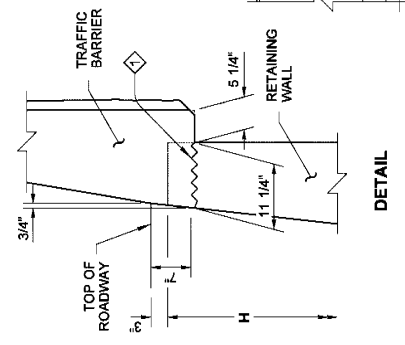
ATTACH GUARDRAIL TO CONCRETE TRAFFIC BARRIER WITH 7/8" (IN DIAM. HIGH STRENGTH BOLTS (STANDARD SPECIFICATION 9-06.5(4)) WITH THIN SLAB FERRULE INSERTS OR RESIN BONDED ANCHORS. SEE THE CONTRACT PLANS.



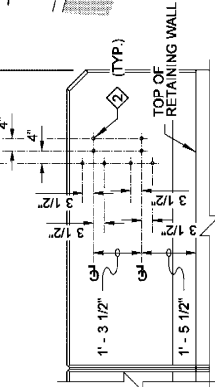
SECTION A



SECTION B



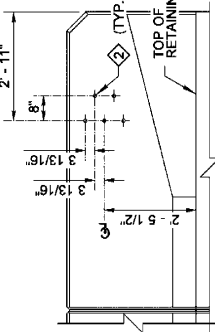
DETAIL



ELEVATION

PERSPECTIVE VIEW

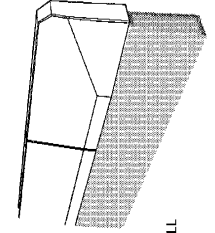
BEAM GUARDRAIL TRANSITION TYPE 20 CONNECTION



ELEVATION

PERSPECTIVE VIEW

BEAM GUARDRAIL TRANSITION TYPE 21 CONNECTION



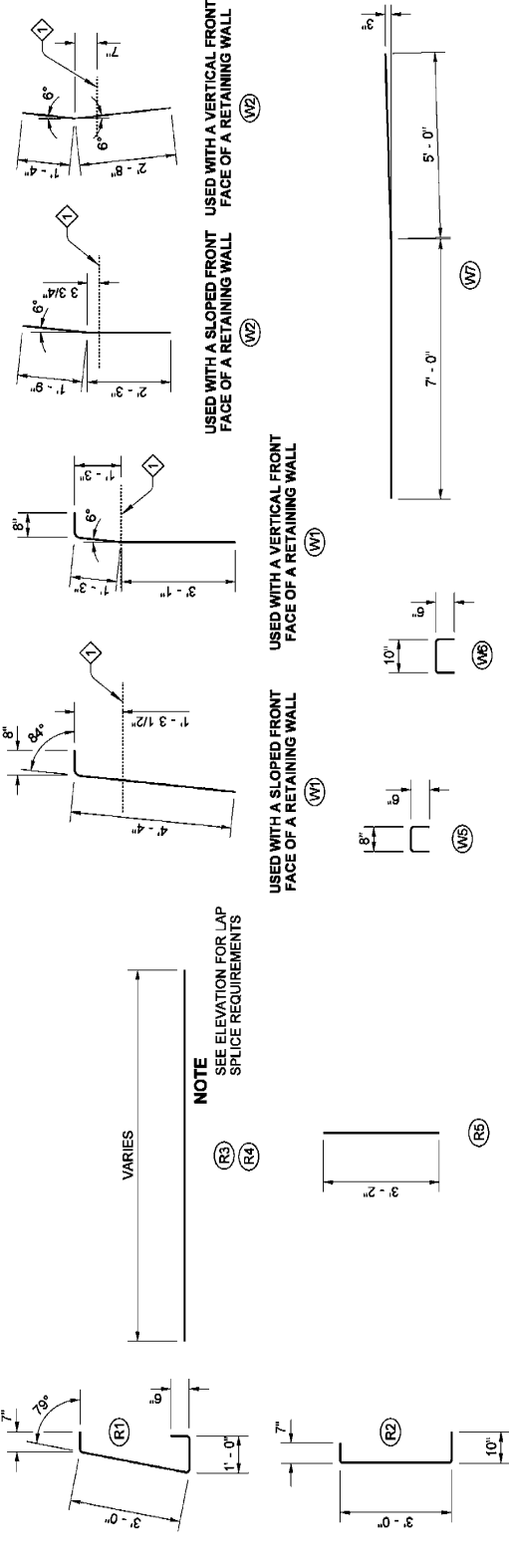
**Brian Khateghi**  
 Professional Engineer  
 No. 27695  
 State of Washington  
 Apr 28 2016 2:24 PM

**TRAFFIC BARRIER DETAILS FOR REINFORCED CONCRETE RETAINING WALLS**  
 STANDARD PLAN D-15-20-03

SHEET 1 OF 2 SHEETS

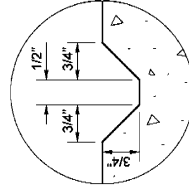
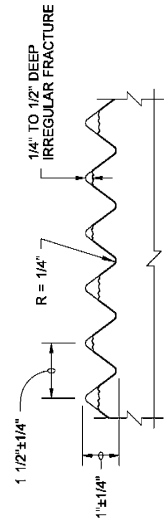
APPROVED FOR PUBLICATION  
 Carpenter, Jeff  
 May 9 2016 12:05 PM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

**REINFORCING STEEL BENDING DIAGRAM**



◇ CONSTRUCTION JOINT ~ LEVEL TRANSVERSE WITH ROUGHENED SURFACE

ALL DIMENSIONS ARE OUT TO OUT  
SEE STD. SPEC. FOR BENDING DIAMETERS



DUMMY JOINT DETAIL

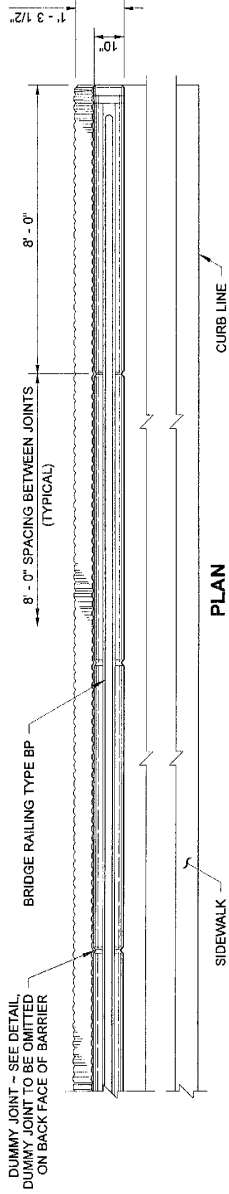


**Brian Khateghi**  
Professional Engineer  
No. 27695  
State of Washington  
May 19 2016 11:28 AM

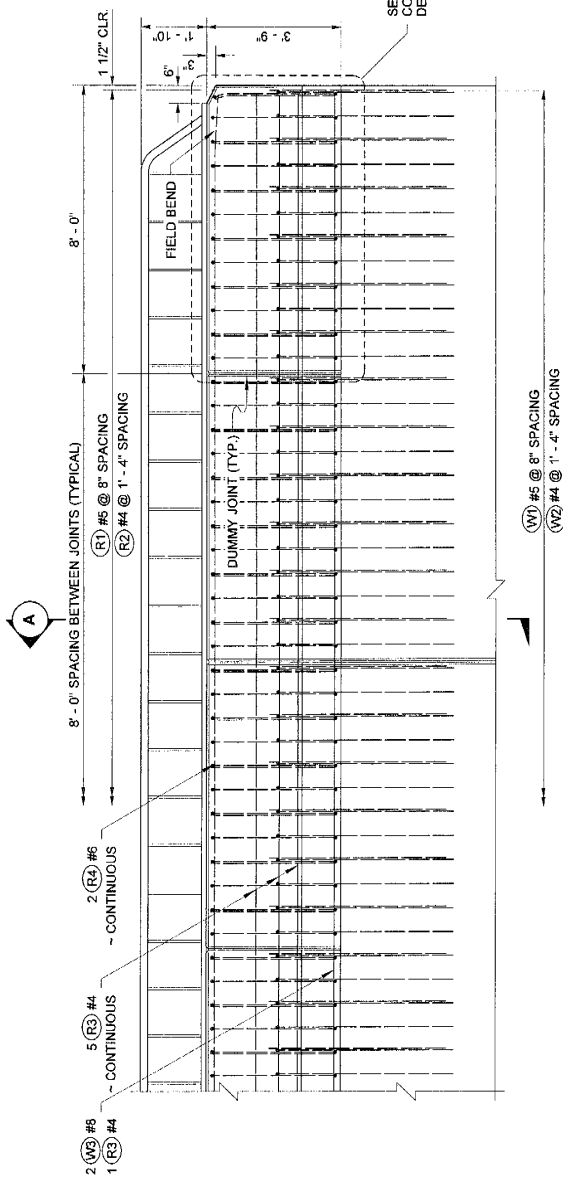
**TRAFFIC BARRIER DETAILS  
FOR REINFORCED CONCRETE  
RETAINING WALLS**  
**STANDARD PLAN D-15.20-03**

SHEET 2 OF 2 SHEETS

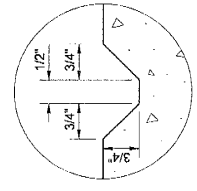
APPROVED FOR PUBLICATION  
*Carpenter, Jeff*  
Carpenter, Jeff  
Jan 1 2016 3:48 PM  
STATE DESIGN ENGINEER  
Washington State Department of Transportation



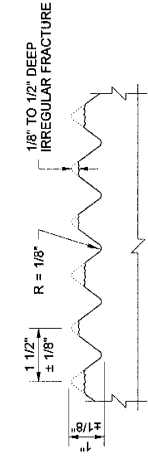
PLAN



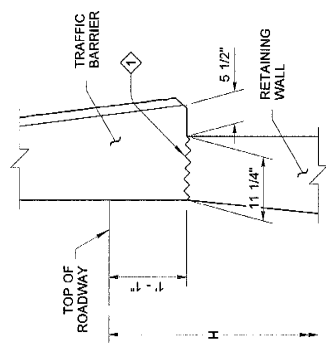
ELEVATION



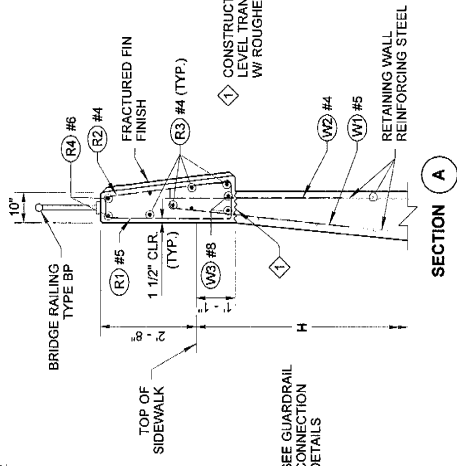
DUMMY JOINT DETAIL



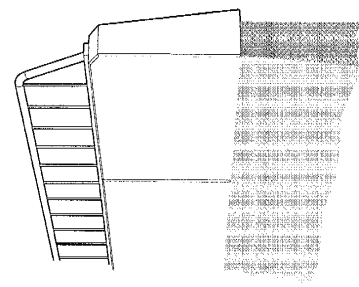
PLAN VIEW  
FRACTURED FIN FINISH DETAIL



DETAIL



SECTION A



OBLIQUE VIEW



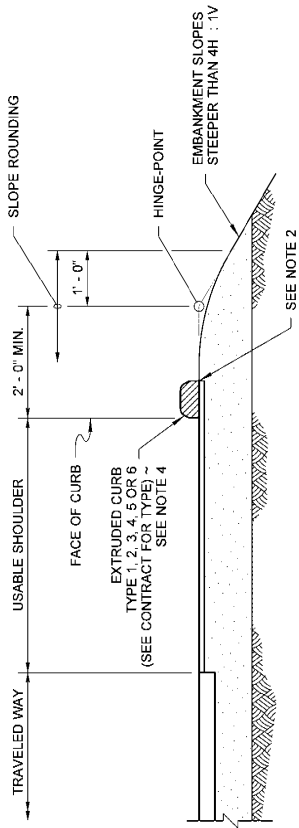
**TRAFFIC BARRIER DETAILS  
FOR REINFORCED CONCRETE  
RETAINING WALLS  
STANDARD PLAN D-15.30-01**

SHEET 1 OF 2 SHEETS

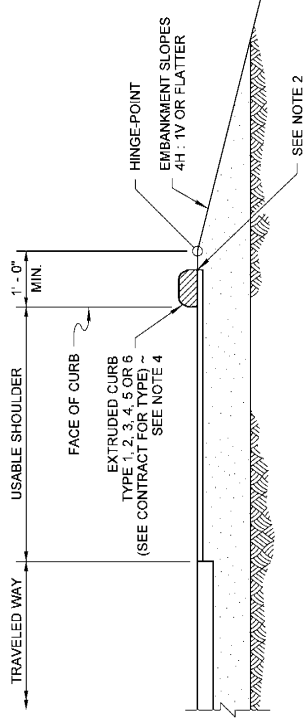
APPROVED FOR PUBLICATION  
  
 STATE REGISTERED ENGINEER  
 12/2/08  
 DATE  
 Washington State Department of Transportation

**NOTES**

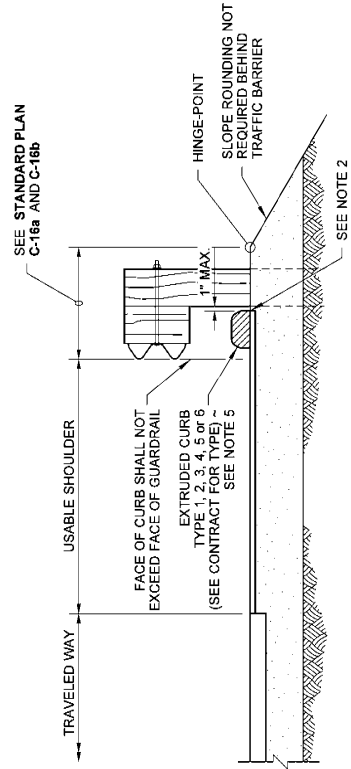
1. The installation of curb in areas with existing guardrail could require the removal and resetting of the guardrail or its components.
2. Extend shoulder pavement to provide a base for the extruded curb.
3. See Contract for exception to distances shown.
4. Type 3 and 6 curbs are not used on roadways with a posted speed greater than 40 mph.
5. Type 3 and 6 are not used under beam guardrail on roadways with a posted speed greater than 50 mph.
6. For extruded curb placement at Beam Guardrail Type 31, See **Standard Plan C-20.10**.
7. For extruded curb details, See **Standard Plan F-10.42**.



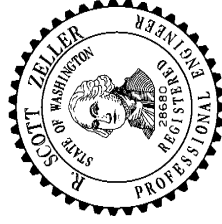
**EXTRUDED CURB WITH SLOPE ROUNDING**



**EXTRUDED CURB WITHOUT SLOPE ROUNDING**



**EXTRUDED CURB AT BEAM GUARDRAIL**



Zeller, Scott  
Jun 24 2016 7:15 AM

**EXTRUDED CURB  
PLACEMENT**

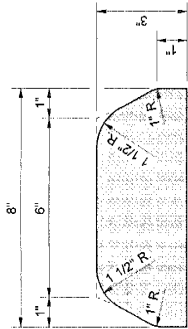
**STANDARD PLAN F-10.40-03**

SHEET 1 OF 1 SHEET

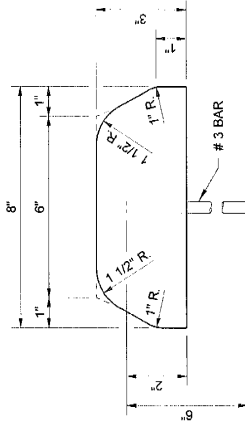
APPROVED FOR PUBLICATION  
Christopher J. Jedd  
Jun 23 2016 2:37 PM

STATE DESIGN ENGINEER

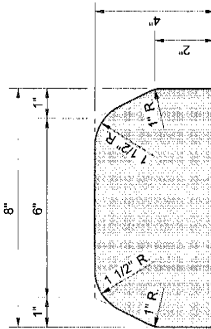
Washington State Department of Transportation



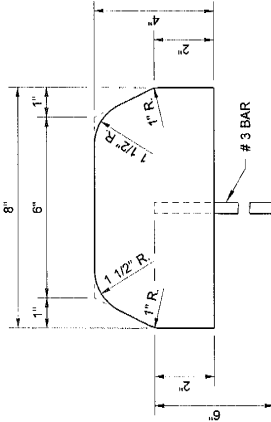
**TYPE 1**  
(HOT MIX ASPHALT)



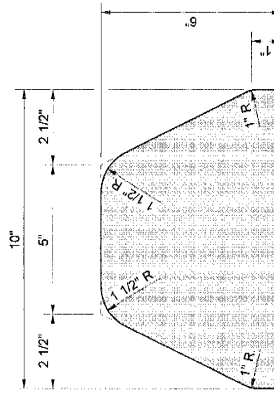
**TYPE 4**  
(CEMENT CONCRETE)



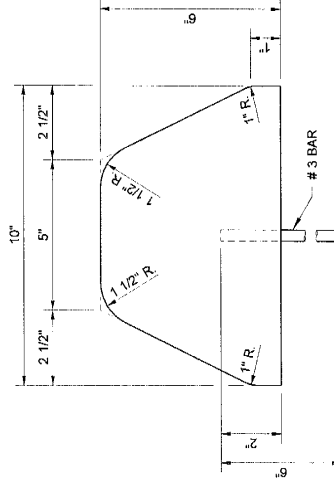
**TYPE 2**  
(HOT MIX ASPHALT)



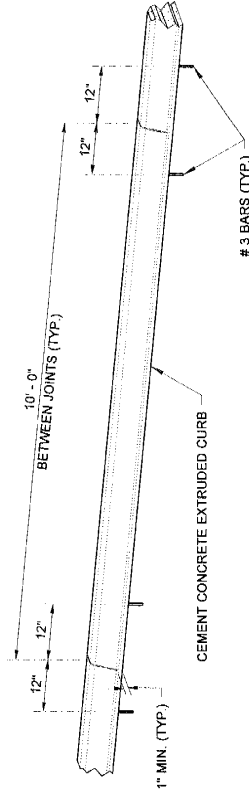
**TYPE 5**  
(CEMENT CONCRETE)



**TYPE 3**  
(HOT MIX ASPHALT)



**TYPE 6**  
(CEMENT CONCRETE)



**SPACING OF ANCHOR BARS**  
(FOR TYPES 4, 5, AND 6)

**NOTE**  
JOINTS MAY BE FORMED DURING INSTALLATION USING A CRACKING STRIP CUT ON JOINTS AFTER CONCRETE CURES TO MINIMUM STRENGTH.



EXPIRES AUGUST 26, 2007

**EXTRUDED CURB**

**STANDARD PLAN F-10.42-00**

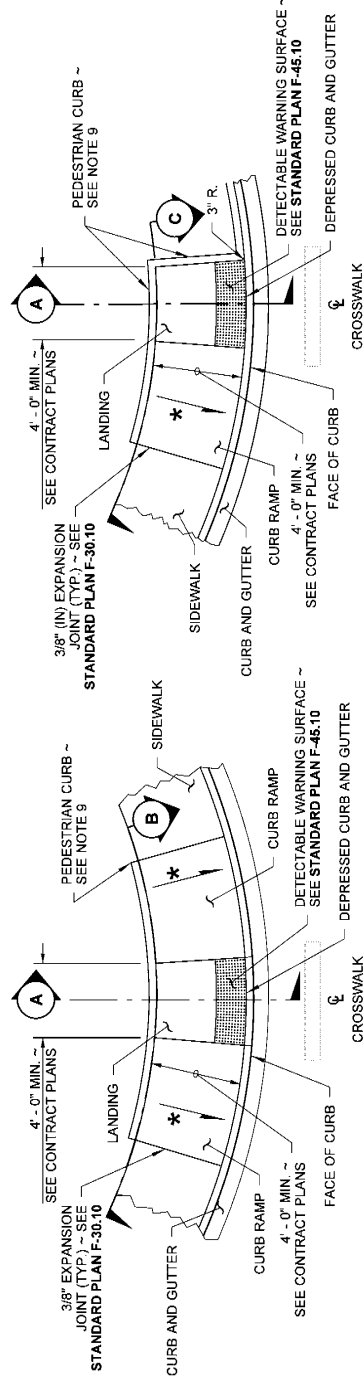
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Ken Leroy Smith  
STATE DESIGN ENGINEER  
Washington State Department of Transportation

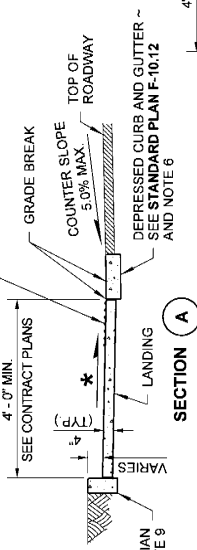
**NOTES**

- At marked crosswalks, the connection between the landing and the roadway must be contained within the width of the crosswalk markings.
- Where "GRADE BREAK" is called out, the entire length of the grade break between the two adjacent surface planes shall be flush.
- Do not place Gratings, Junction Boxes, Access Covers, or other appurtenances on any part of the Curb Ramp or Landing, or in the Depressed Curb and Gutter where the Landing connects to the roadway.
- See Contract Plans for the curb design specified. See **Standard Plan F-10.12** for Curb, Curb and Gutter, Depressed Curb and Gutter, and Pedestrian Curb details.
- See **Standard Plan F-30.10** for Cement Concrete Sidewalk Details. See Contract Plans for width and placement of sidewalk.
- The Bid Item "Cement Concrete Curb Ramp Type ..." does not include the adjacent Curb, Curb and Gutter, Depressed Curb and Gutter, Pedestrian Curb, or Sidewalks.
- The Curb Ramp length is not required to exceed 15 feet (unless otherwise shown in the Contract Plans). When applying the 15-foot max. length, the running slope of the curb ramp is allowed to exceed 8.3%. Use a single constant slope from bottom of ramp to top of ramp to match into the sidewalk over a horizontal distance of 15 feet. Do not include abutting landing(s) in the 15-foot max. measurement. When a ramp is constructed on a radius, the 15-foot max. length is measured on the inside radius along the back of the walkway.
- Curb Ramps and Landings shall receive a broom finish. See **Standard Specifications 8-14**.
- Pedestrian Curb may be omitted if the ground surface at the back of the Curb Ramp and/or Landing will be at the same elevation as the Curb Ramp or Landing and there will be no material to retain.



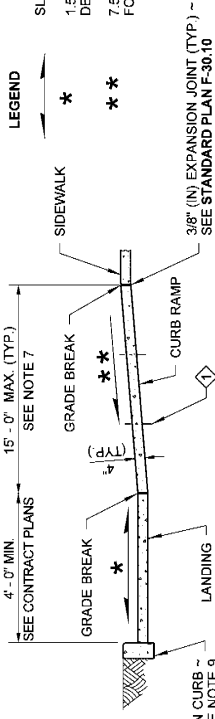
**PLAN VIEW TYPE PARALLEL B**

**PLAN VIEW TYPE PARALLEL A**



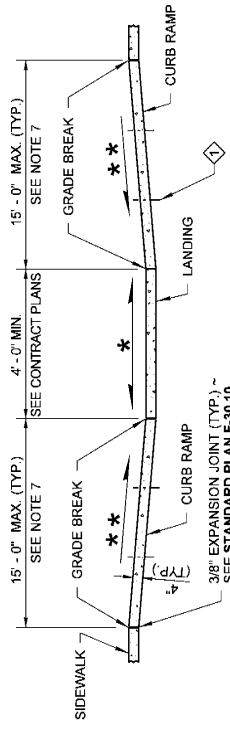
**SECTION A**

CONTRACTION JOINT (TYP.) - SEE **STANDARD PLAN F-30.10** FOR CURB RAMP LENGTHS GREATER THAN 8'-0" PROVIDE CONTRACTION JOINT EQUALLY SPACED 4'-0" MIN. OC.



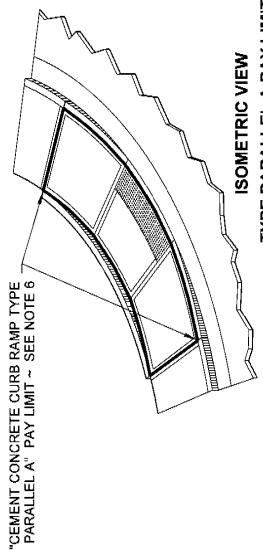
**SECTION B**

(ALONG INSIDE RADIUS AT BACK OF WALKWAY)

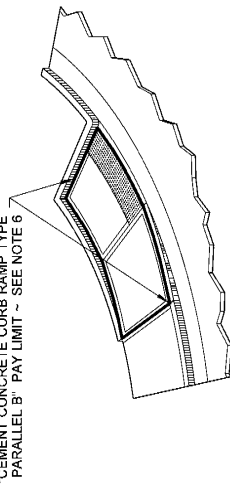


**SECTION C**

(ALONG INSIDE RADIUS AT BACK OF WALKWAY)



**ISOMETRIC VIEW TYPE PARALLEL A PAY LIMIT**



**ISOMETRIC VIEW TYPE PARALLEL B PAY LIMIT**



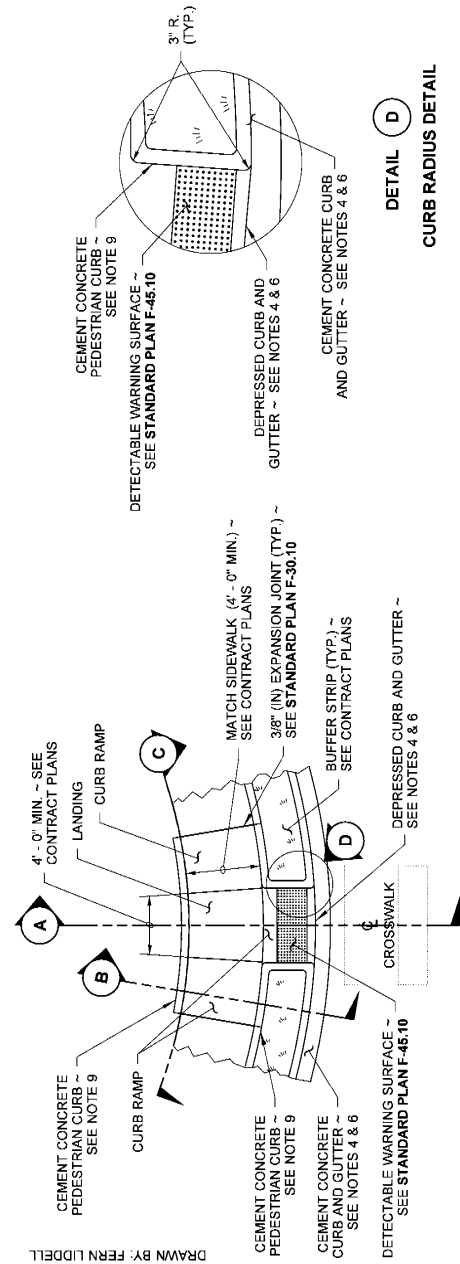
Zeller, Scott  
Jun 24 2016 7:19 AM  
6382

**PARALLEL CURB RAMP**  
**STANDARD PLAN F-40.12-03**  
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
 Date: 06/24/2016 12:37 PM  
 User: Scott Zeller  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

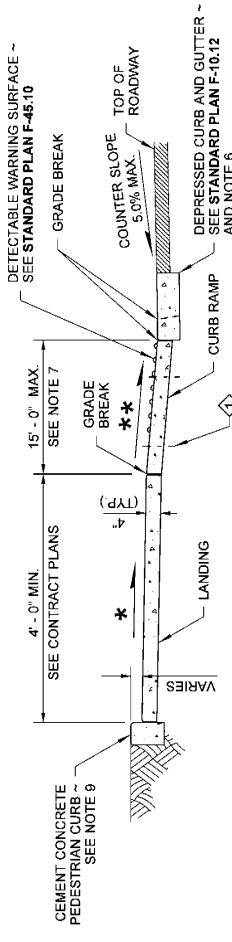
**NOTES**

- At marked crosswalks, the connection between the curb ramp and the roadway must be contained within the width of the crosswalk markings.
- Where "GRADE BREAK" is called out, the entire length of the grade break between the two adjacent surface planes shall be flush.
- Do not place Gratings, Junction Boxes, Access Covers, or other appurtenances on any part of the Curb Ramp or Landing, or in the Depressed Curb and Gutter where the landing connects to the roadway.
- See Contract Plans for the curb design specified. See **Standard Plan F-10.12** for Curb, Curb and Gutter, Depressed Curb, Gutter and Pedestrian Curb details.
- See **Standard Plan F-30.10** for Cement Concrete Sidewalk Details. See Contract Plans for width and placement of sidewalk.
- The Bid Item "Cement Concrete Curb Ramp Type \_\_\_" does not include the adjacent Curb, Curb and Gutter, Depressed Curb and Gutter, Pedestrian Curb, or Sidewalks.
- The Curb Ramp length is not required to exceed 15 feet (unless otherwise shown in the Contract Plans). When applying the 15-foot max. length, the running slope of the curb ramp is allowed to exceed 8.3%. Use a single constant slope from bottom of ramp to top of ramp to match into the sidewalk over a horizontal distance of 15 feet. Do not include the abutting landing in the 15-foot max. measurement. When a ramp is constructed on a radius, the 15-foot max. length is measured on the inside radius along the back of the walkway.
- Curb Ramps and Landings shall receive a broom finish. See **Standard Specifications 8-14**.
- Pedestrian Curb may be omitted if the ground surface at the back of the Curb Ramp and/or Landing will be at the same elevation as the Curb Ramp or Landing and there will not be material to retain.



**DETAIL D**  
CURB RADIUS DETAIL

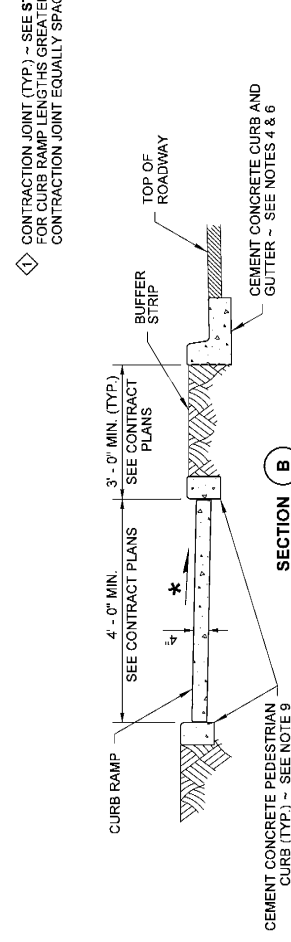
**SECTION A**



**LEGEND**

- SLOPE IN EITHER DIRECTION
- \* 1.5% OR FLATTER RECOMMENDED FOR DESIGNFORMWORK (2% MAX.)
- \*\* 7.5% OR FLATTER RECOMMENDED FOR DESIGNFORMWORK (8.3% MAX.)

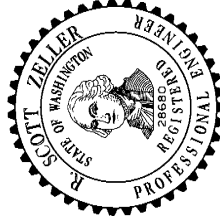
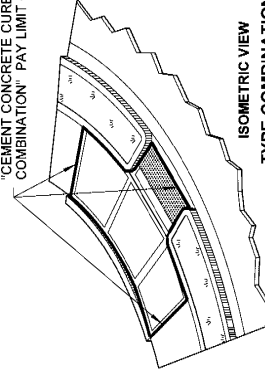
**SECTION B**



**SECTION C**

(ALONG INSIDE RADIUS AT BACK OF WALKWAY)

"CEMENT CONCRETE CURB RAMP TYPE COMBINATION" PAY LIMIT ~ SEE NOTE 6



Zeller, Scott  
Jun 24 2016 7:20 AM

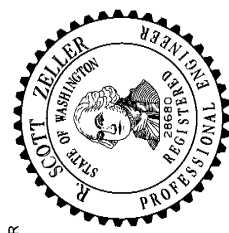
**COMBINATION CURB RAMP**  
**STANDARD PLAN F-40.14-03**  
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
 Engineer: Jeff  
 Date: 05/10/2016 PM  
 STATE DESIGN ENGINEER  
 Washington, State Department of Transportation

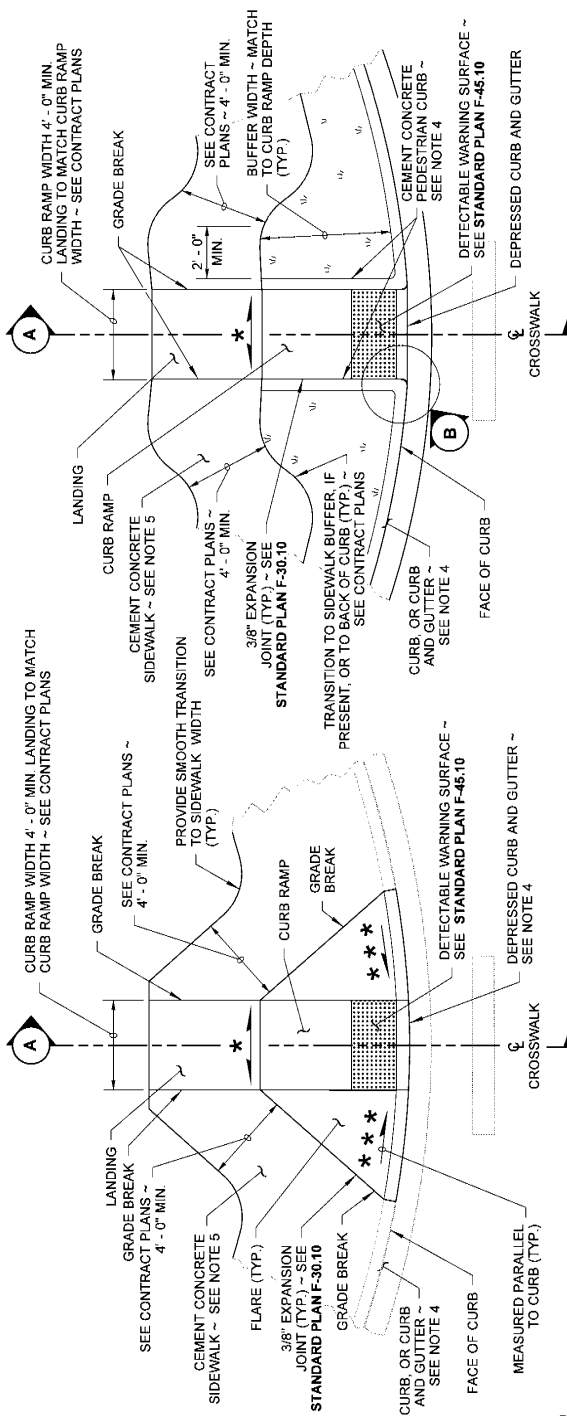


- NOTES**
- At marked crosswalks, the connection between the curb ramp and the roadway must be contained within the width of the crosswalk markings.
  - Where "GRADE BREAK" is called out, the entire length of the grade break between the two adjacent surface planes shall be flush.
  - Do not place Gratings, Junction Boxes, Access Covers, or other appurtenances on any part of the Curb Ramp or Landing, or in front of the Curb Ramp where it connects to the roadway.
  - See Contract Plans for the curb design specified. See **Standard Plan F-10.12** for Curb, Curb and Gutter, Depressed Curb and Gutter, and Pedestrian Curb details.
  - See **Standard Plan F-30.10** for Cement Concrete Sidewalk Details. See Contract Plans for width and placement of sidewalk.
  - The Bid Item "Cement Concrete Curb Ramp Type **A**" does not include the adjacent Curb, Curb and Gutter, Depressed Curb and Gutter, Pedestrian Curb, or Sidewalks.
  - The Curb Ramp length is not required to exceed 15 feet (unless shown otherwise in the Contract Plans). When applying the 15-foot max. length, the running slope of the Curb Ramp is allowed to exceed 8.3%. Use a single constant slope from bottom of ramp to top of ramp to match into the landing over a horizontal distance of 15 feet. Do not include the abutting landing in the 15-foot max. measurement.
  - Curb Ramps and Landings shall receive a broom finish. See **Standard Specifications 8-14**.
  - Pedestrian Curb may be omitted if the ground surface at the back of the Curb Ramp and/or Landing will be at the same elevation as the Curb Ramp or Landing and there will not be material to retain.

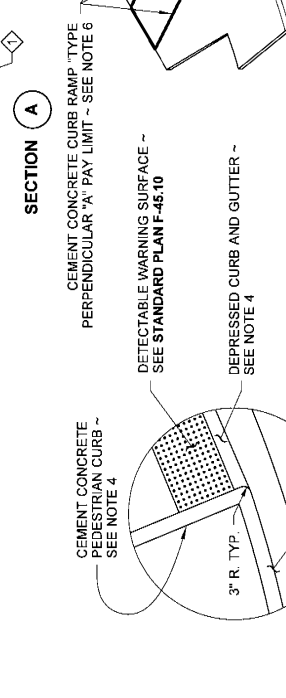
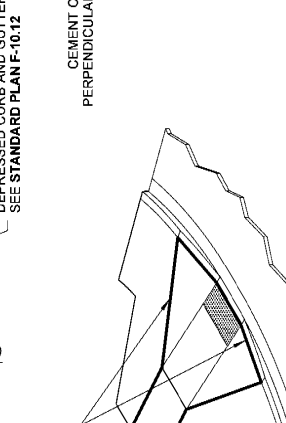
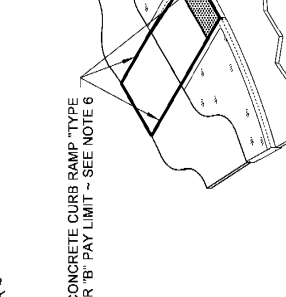
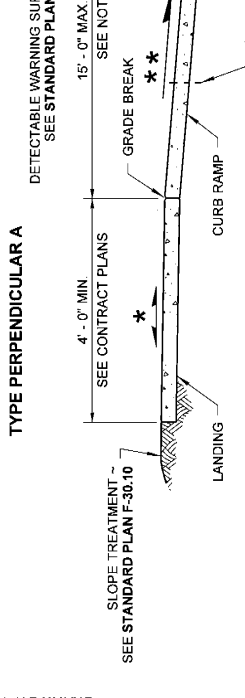
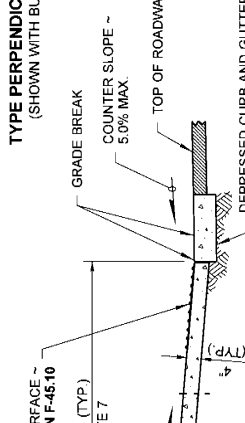
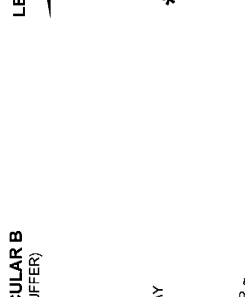
APPROVED FOR PUBLICATION  
 Carpenter, Jeff  
 Jun 27 2016 2:28 PM  
 STATE DESIGN ENGINEER  
 Washington, State Department of Transportation



**PERPENDICULAR CURB RAMP**  
 STANDARD PLAN F-40.15-03  
 SHEET 1 OF 1 SHEET



- LEGEND**
- ▲ SLOPE IN EITHER DIRECTION
  - \* 1.5% OR FLATTER RECOMMENDED FOR DESIGN/FORMWORK (2% MAX.)
  - \*\* 7.5% OR FLATTER RECOMMENDED FOR DESIGN/FORMWORK (8.3% MAX.)
  - \*\*\* 9.5% OR FLATTER RECOMMENDED FOR DESIGN/FORMWORK (10% MAX.)



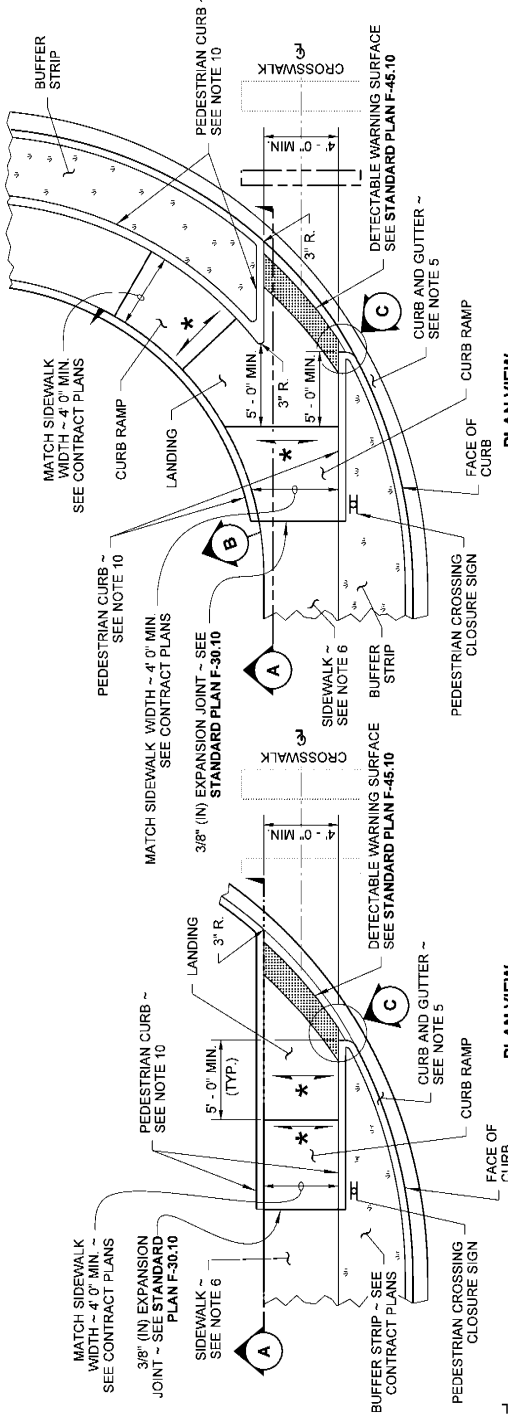
**ISOMETRIC VIEW TYPE PERPENDICULAR B PAY LIMIT**

**ISOMETRIC VIEW TYPE PERPENDICULAR A PAY LIMIT**

**CURB RADIUS DETAIL B**

**NOTES**

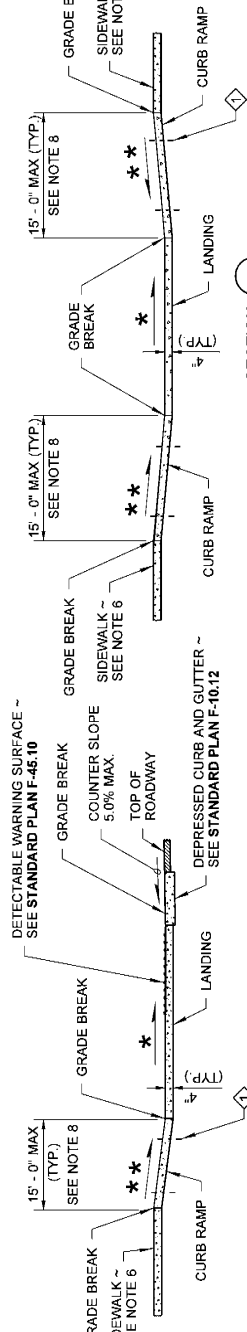
1. This plan is to be used where pedestrian crossing in one direction is not permitted.
2. At marked crosswalks, the connection between the Landing and the roadway must be contained within the width of the crosswalk markings.
3. Where "GRADE BREAK" is called out, the entire length of the grade break between the two adjacent surface planes shall be flush.
4. Do not place Gratings, Junction Boxes, Access Covers, or other appurtenances on any part of the Curb Ramp or Landing or in the Depressed Curb and Gutter where the Landing connects to the roadway.
5. See Contract Plans for the curb design specified. See **Standard Plan F-10.12** for Curb, Curb and Gutter, Depressed Curb, Gutter and Pedestrian Curb details.
6. See **Standard Plan F-30.10** for Cement Concrete Sidewalk Details. See Contract Plans for width and placement of sidewalk.
7. The Bid Item "Cement Concrete Curb Ramp Type \_\_\_" does not include the adjacent Curb, Curb and Gutter, Depressed Curb and Gutter, Pedestrian Curb, or Sidewalks.
8. The Curb Ramp length is not required to exceed 15 feet (unless shown otherwise in the Contract Plans). When applying the 15-foot max. length (measured from back of sidewalk) the running slope of the curb ramp is allowed to exceed 8.3%. Use a single constant slope from bottom of ramp to top of ramp to match into the sidewalk over a horizontal distance of 15 feet.
9. Curb Ramps and Landings shall receive a broom finish. See **Standard Specifications 8-14**.
10. Pedestrian Curb may be omitted if the ground surface at the back of the Curb Ramp and/or Landing will be at the same elevation as the Curb Ramp or Landing and there will be material to retain.



**PLAN VIEW TYPE SINGLE DIRECTION B**

**PLAN VIEW TYPE SINGLE DIRECTION A**

DRAWN BY: FERN LIDDELL



**SECTION A**

**SECTION B**

CONTRACTION JOINT (TYP.) ~ SEE **STANDARD PLAN F-30.10** FOR CURB RAMP LENGTHS GREATER THAN 9'-0\"/>

(ALONG INSIDE RADIUS AT BACK OF WALKWAY)

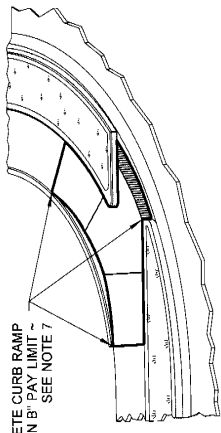


Zeller, Scott  
Jun 24 2016 7:21 AM

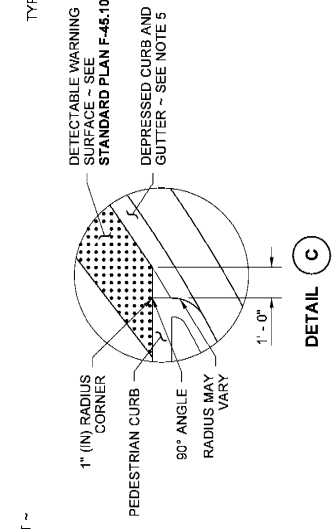
**SINGLE DIRECTION CURB RAMP**

**STANDARD PLAN F-40.16-03**  
SHEET 1 OF 1 SHEET

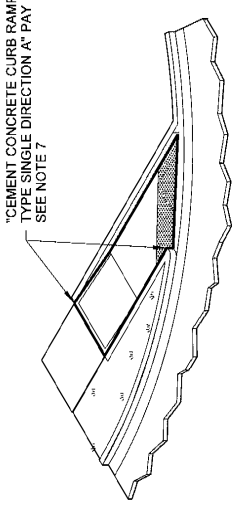
APPROVED FOR PUBLICATION  
Engineer: *[Signature]*  
Jun 25 2016 2:59 PM  
STATE DESIGN ENGINEER  
Washington, State Department of Transportation



**ISOMETRIC VIEW TYPE SINGLE DIRECTION B PAY LIMIT**



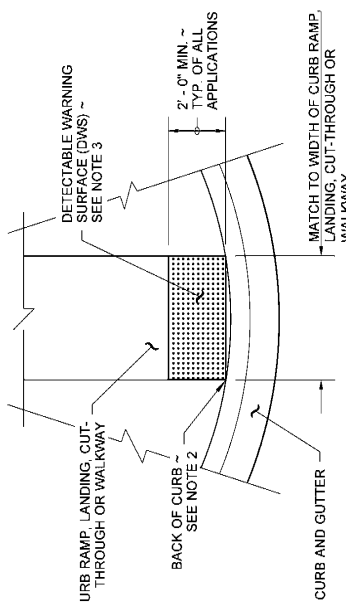
**DETAIL C**



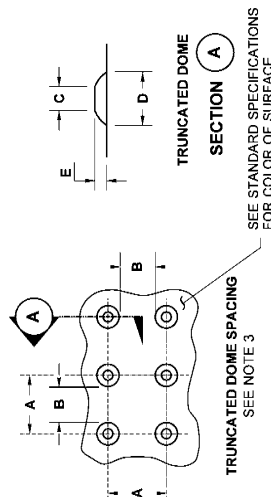
**ISOMETRIC VIEW TYPE SINGLE DIRECTION A PAY LIMIT**

**NOTES**

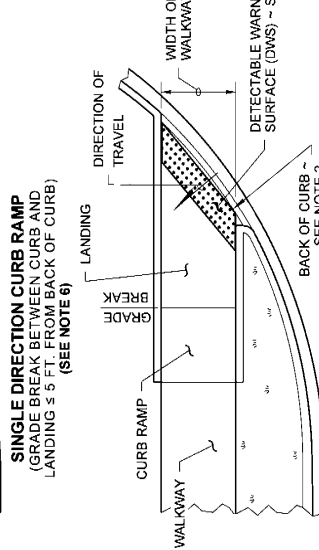
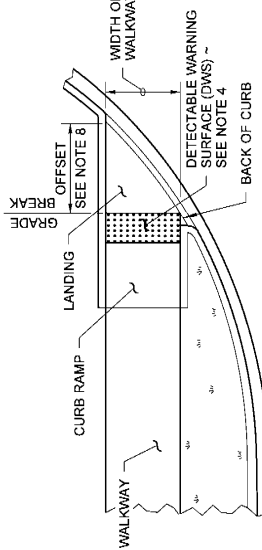
- The Detectable Warning Surface (DWS) shall extend the full width of the curb ramp, landing, or other roadway entrance as applicable. Exception: If the Manufacturer of the DWS requires a concrete border around the DWS, a variance of up to 2 inches on each side of the DWS is permitted.
- The Detectable Warning Surface (DWS) shall be placed at the back of curb, with the two leading corners of the DWS panel placed adjacent to the back of the curb, and with no more than a 2 inch gap between the DWS and the back of the curb measured at the center of the DWS panel. Exception: If the Manufacturer of the selected DWS requires a concrete border around the DWS, a variance of up to 2 inches from the back of the curb is permitted (measured at the leading corners of the DWS panel).
- The rows of truncated domes shall be aligned to be perpendicular to the grade break at the back of curb.
- The rows of truncated domes shall be aligned to be parallel to the direction of travel.
- If curb and gutter are not present, such as a shared-use path connection, the Detectable Warning Surface shall be placed at the pavement edge.
- See **Standard Plans** for sidewalk and curb ramp details.
- If a curb ramp is required, the location of the Detectable Warning Surface must be at the bottom of the ramp and within the required distance from the rail.
- When the grade break between the curb ramp and the landing is less than or equal to 5 ft. from the back of curb at all points, place the Detectable Warning Surface on the bottom of the curb ramp directly above the grade break.



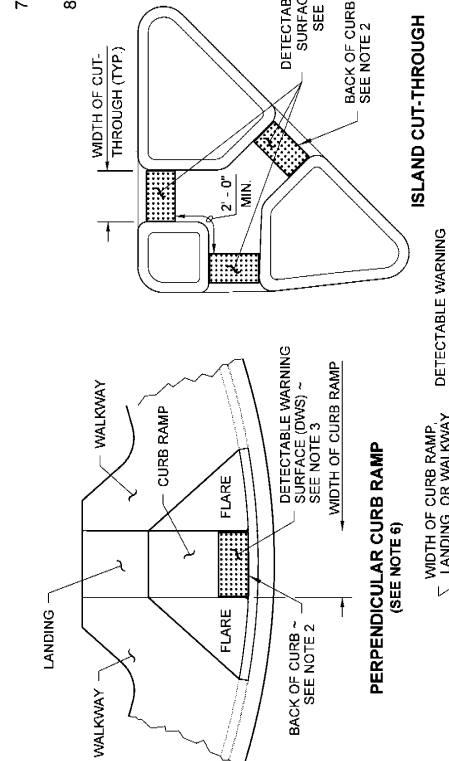
	MIN.	MAX.
A	1.80"	2.40"
B	0.65"	—
C	0.45"	0.90"
D	0.9"	1.40"
E	0.2"	0.2"



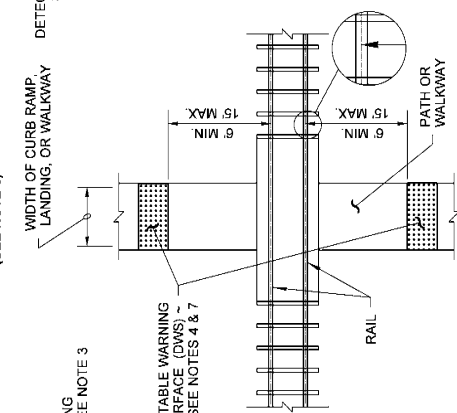
**TRUNCATED DOME DETAILS**



**DETECTABLE WARNING SURFACE DETAIL**



**PERPENDICULAR CURB RAMP**  
(SEE NOTE 6)



**ROUNDABOUT SPLITTER ISLAND**

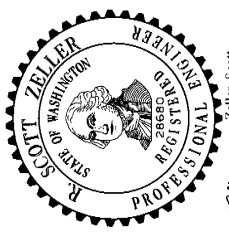


**PEDESTRIAN RAILROAD CROSSING**



**PLACEMENT GUIDELINES**

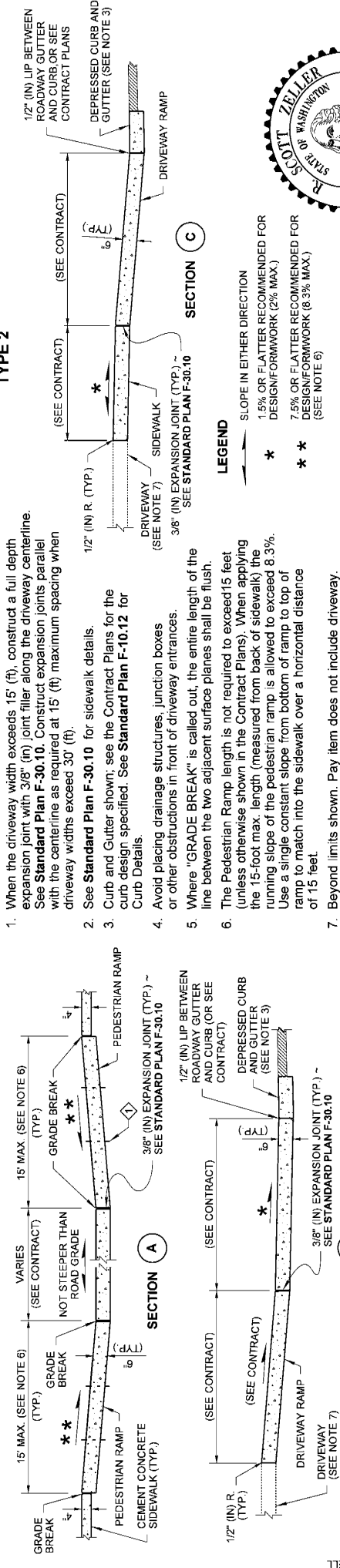
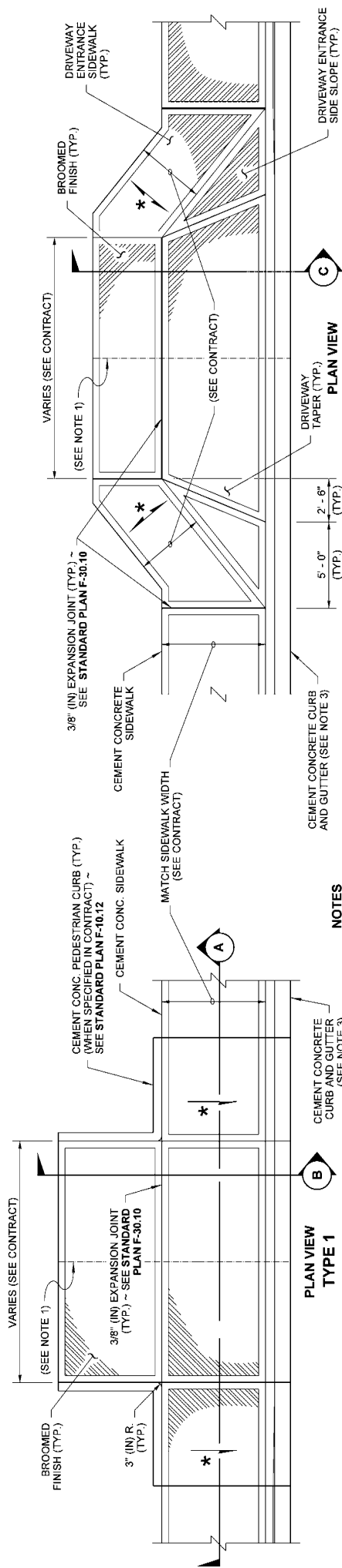
**SHARED-USE PATH CONNECTION**



Zeller, Scott  
Jul 12, 2016 4:25 PM

**DETECTABLE WARNING SURFACE**  
**STANDARD PLAN F-45.10-02**  
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
*Christopher Poff*  
 Date: 7/13/16 12:58 PM  
 STATE DESIGN ENGINEER  
 Washington, State Department of Transportation



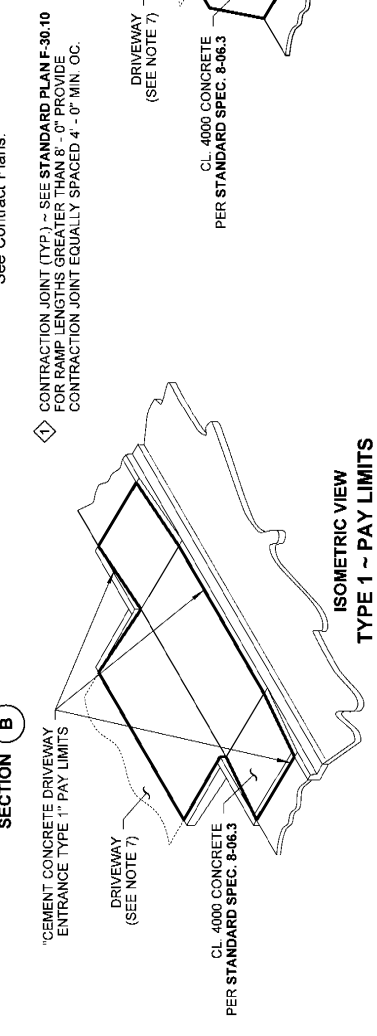
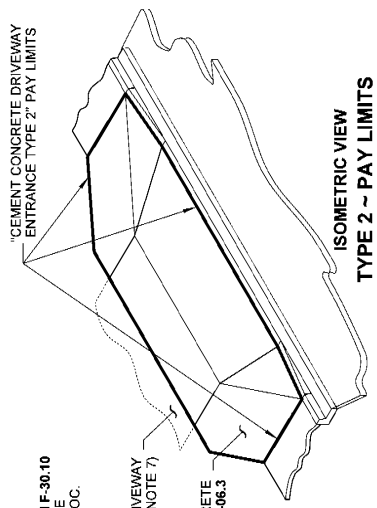
- NOTES**
- When the driveway width exceeds 15' (ft), construct a full depth expansion joint with 3/8" (in) joint filler along the driveway centerline. See **Standard Plan F-30.10**. Construct expansion joints parallel with the centerline as required at 15' (ft) maximum spacing when driveway widths exceed 30' (ft).
  - See **Standard Plan F-30.10** for sidewalk details.
  - Curb and Gutter shown; see the Contract Plans for the curb design specified. See **Standard Plan F-10.12** for Curb Details.
  - Avoid placing drainage structures, junction boxes or other obstructions in front of driveway entrances.
  - Where "GRADE BREAK" is called out, the entire length of the line between the two adjacent surface planes shall be flush.
  - The Pedestrian Ramp length is not required to exceed 15 feet (unless otherwise shown in the Contract Plans). When applying the 15-foot max. length (measured from back of sidewalk) the running slope of the pedestrian ramp is allowed to exceed 8.3%. Use a single constant slope from bottom of ramp to top of ramp to match into the sidewalk over a horizontal distance of 15 feet.
  - Beyond limits shown. Pay item does not include driveway. See Contract Plans.

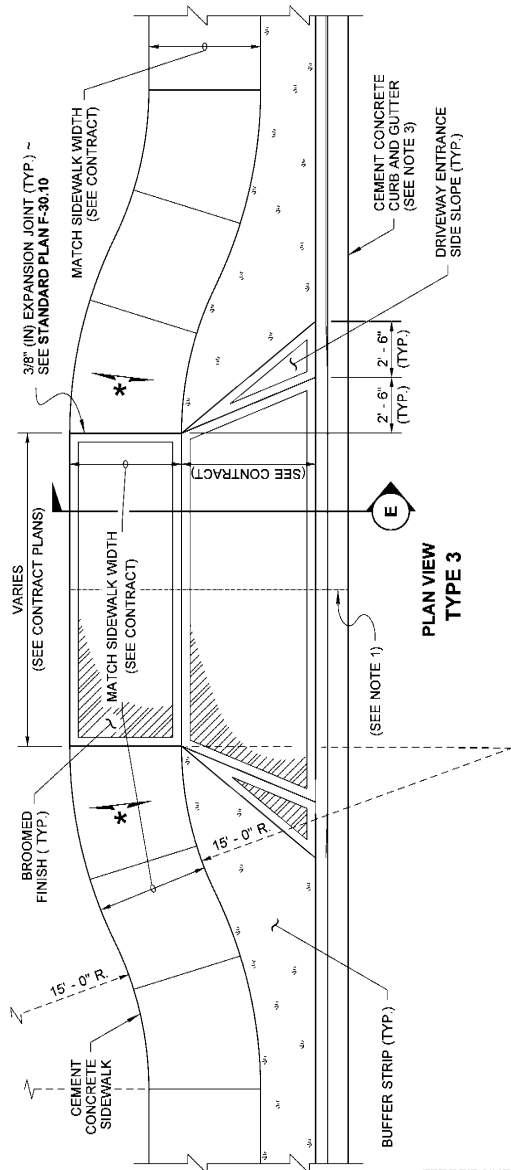


Mark Scott  
 July 12, 2016 4:26 PM  
**CEMENT CONCRETE DRIVEWAY ENTRANCE TYPES 1, 2, 3, & 4**  
**STANDARD PLAN F-80.10-04**  
 SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION  
 Competent: *goff*  
 STATE DESIGN ENGINEER  
 Washington, State Department of Transportation

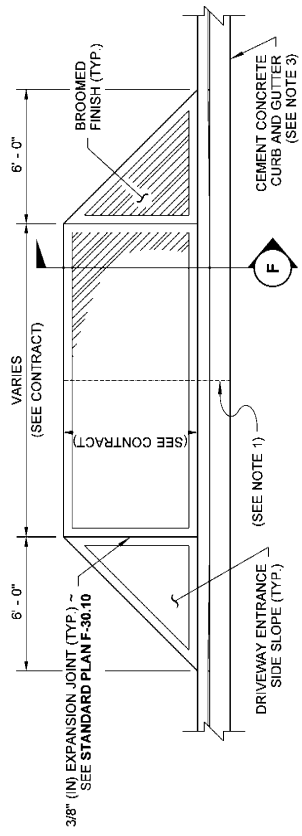
- LEGEND**
- SLOPE IN EITHER DIRECTION
- \* 1.5% OR FLATTER RECOMMENDED FOR DESIGN/FORMWORK (2% MAX.)
  - \*\* 7.5% OR FLATTER RECOMMENDED FOR DESIGN/FORMWORK (8.3% MAX.) (SEE NOTE 6)



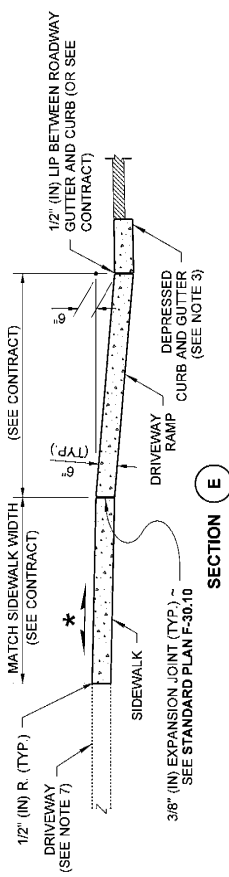


**PLAN VIEW  
TYPE 3**

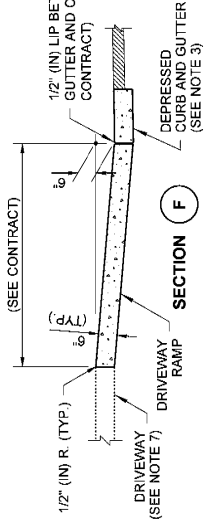
**PLAN VIEW  
TYPE 4 \***



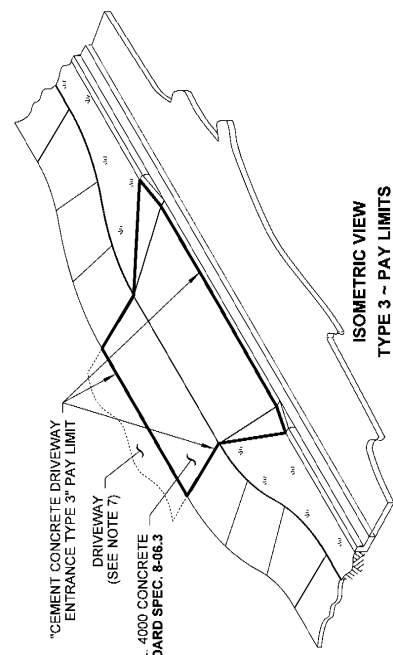
\* THIS ENTRANCE TYPE SHALL NOT BE USED ALONG A PEDESTRIAN ROUTE



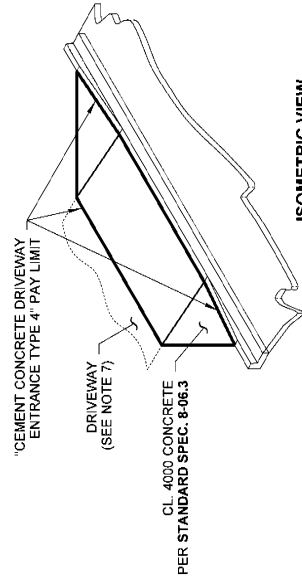
**SECTION E**



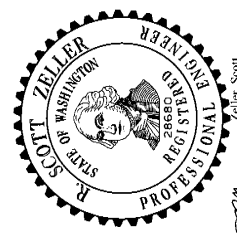
**SECTION F**



**ISOMETRIC VIEW  
TYPE 3 ~ PAY LIMITS**



**ISOMETRIC VIEW  
TYPE 4 ~ PAY LIMITS**

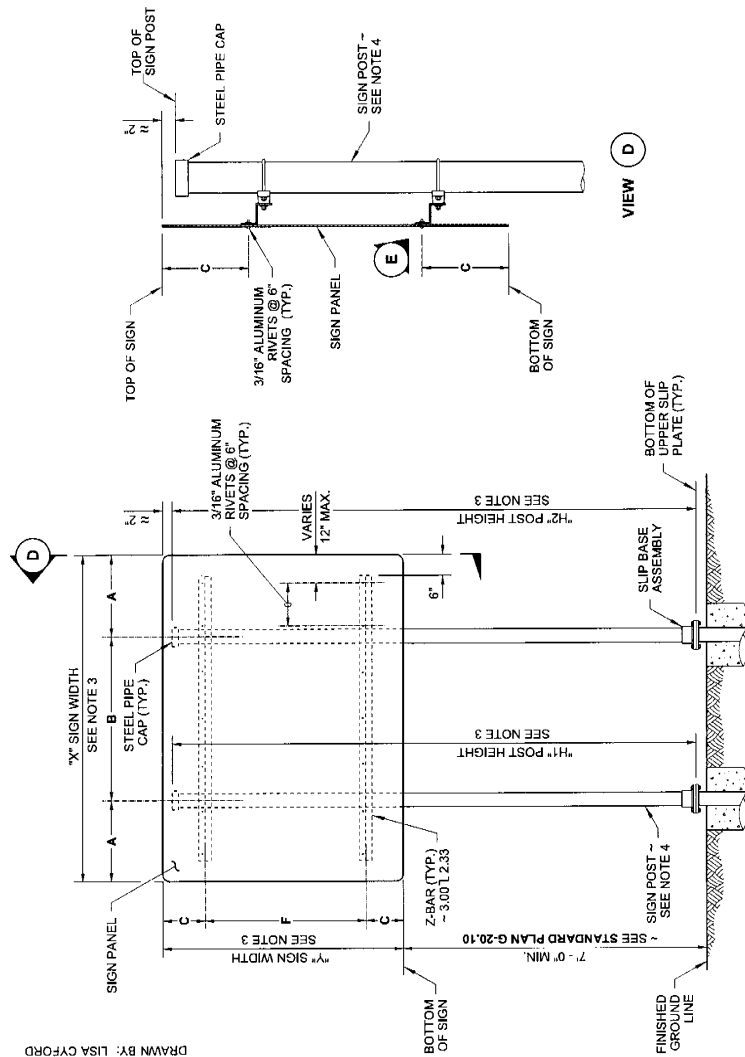


APPROVED FOR PUBLICATION  
 State of Washington  
 July 18, 2016 12:22 PM  
 State Design Engineer  
 Washington State Department of Transportation

**CEMENT CONCRETE  
 DRIVEWAY ENTRANCE  
 TYPES 1, 2, 3, & 4  
 STANDARD PLAN F-80.10-04**  
 SHEET 2 OF 2 SHEETS

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DRAWN BY: LISA CYFORD

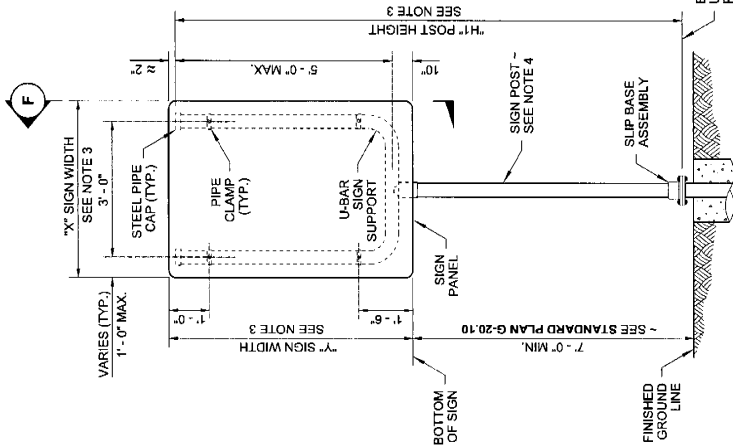


ELEVATION  
TYPE PL SIGN SUPPORT  
DUAL POST INSTALLATION

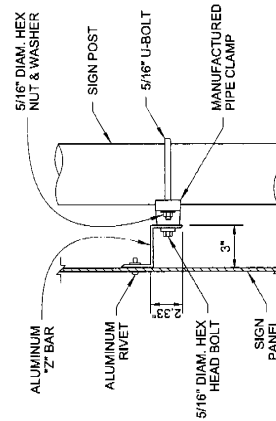
"X" SIGN WIDTH	
A	8'-0"
B	10'-0"
C	2'-0"
F	3'-0"

"Y" SIGN HEIGHT	
A	8'-0"
B	10'-0"
C	2'-0"
F	3'-0"

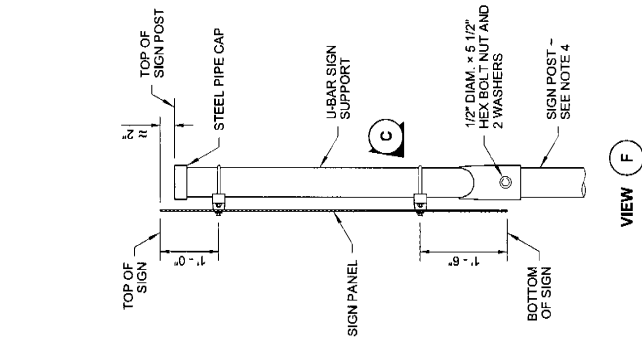
A, B, C & F, MAY BE INTERPOLATED  
FOR INTERMEDIATE SIGN SIZES



ELEVATION  
TYPE PL-U SIGN SUPPORT



DETAIL  
E



VIEW  
F



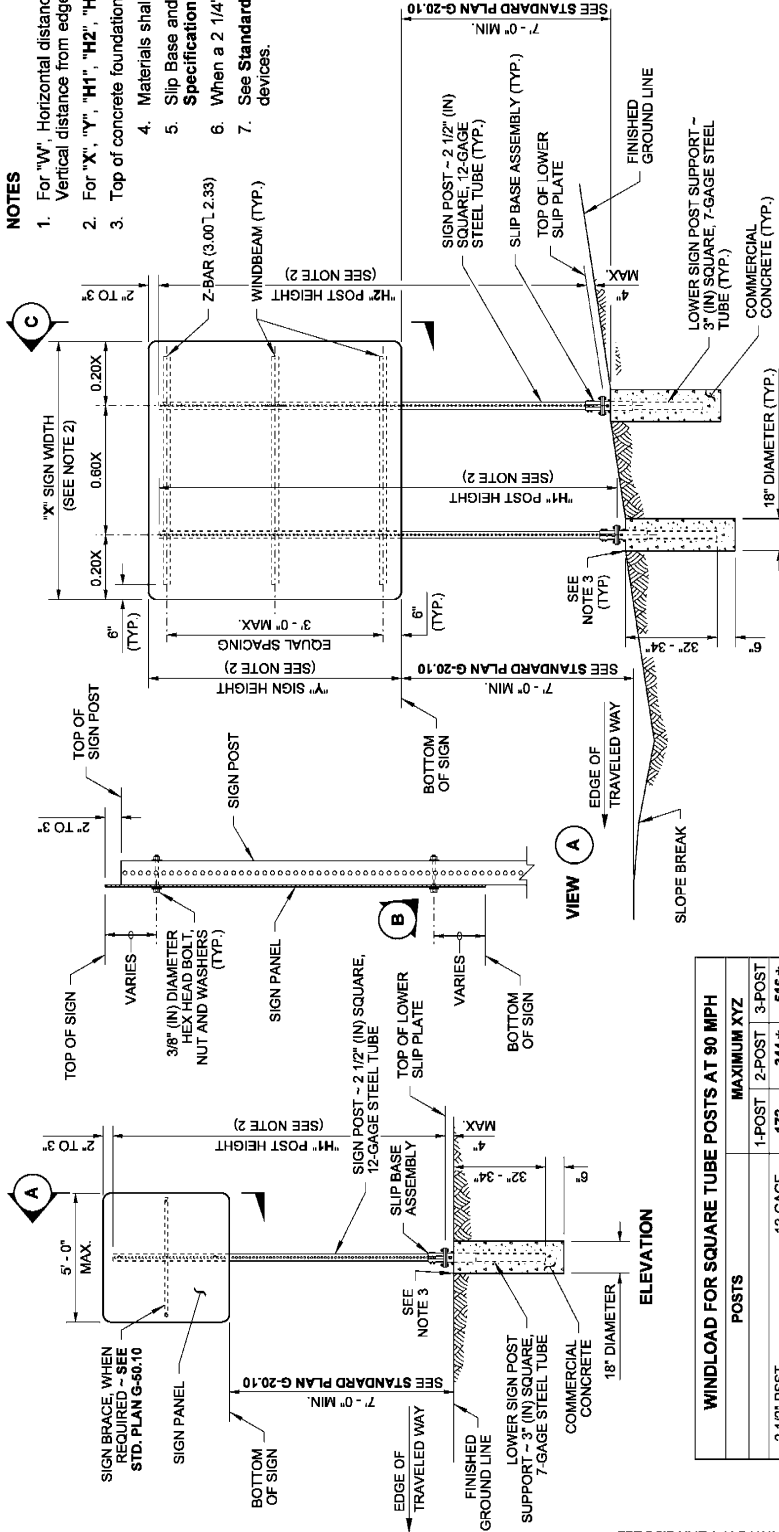
**STEEL SIGN SUPPORT  
TYPES PL, PL-T, & PL-U  
INSTALLATIONS DETAILS  
STANDARD PLAN G-24.30-01**

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION  
*Amo Butcher* 2/7/12 DATE  
STATE REGISTERED PROFESSIONAL ENGINEER  
Washington State Department of Transportation

**NOTES**

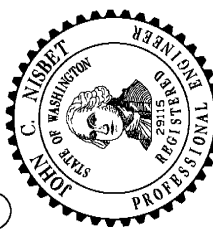
1. For "W", Horizontal distance from edge of traveled way to center of nearest post, and "V", Vertical distance from edge of traveled way to bottom of sign, see **Standard Plan G-20.10**.
2. For "X", "Y", "H1", "H2", "H3", and "H4", refer to the Sign Specification Sheet in the Contract.
3. Top of concrete foundations shall be smooth, dense and uniform to finished groundline.
4. Materials shall meet the requirements of **Standard Specification 9-28**.
5. Slip Base and all other materials shall meet the requirements of **Standard Specification 9-06**.
6. When a 2 1/4" (in) insert is used, the insert shall be a minimum of 7 feet.
7. See **Standard Plan J-40.35** and Contract Plans for installations with electrical devices.



**WINDLOAD FOR SQUARE TUBE POSTS AT 90 MPH**

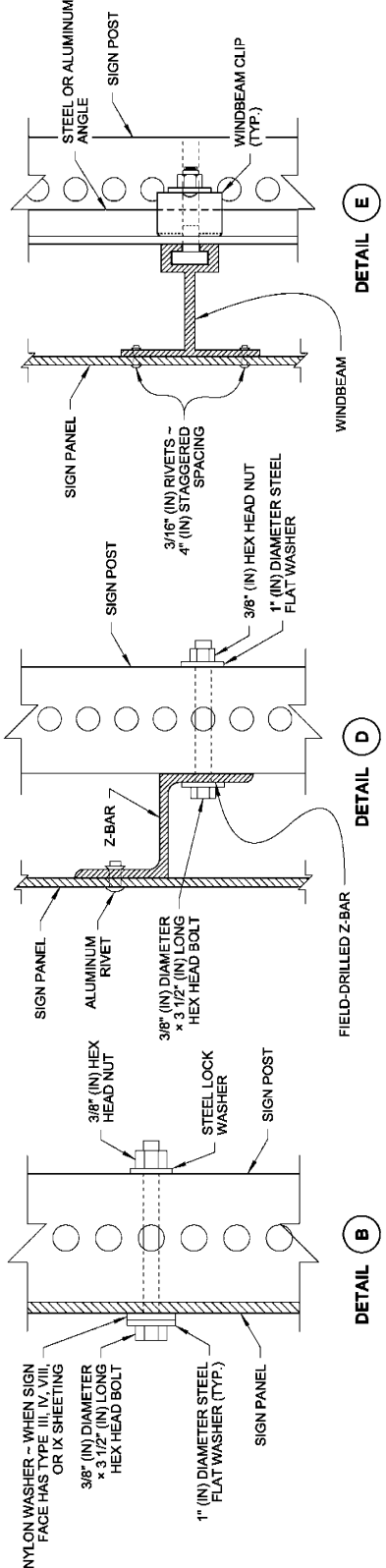
POSTS	MAXIMUM XYZ		
	1-POST	2-POST	3-POST
2 1/2" PSST	172	344 *	516 *
2 1/2" PSST with 2 1/4" insert (SEE NOTE 6)	309 *	618 *	927 *

\* SLIP BASE REQUIRED (UNLESS BEHIND BARRIER)



*Nisbett, John*  
 Feb 29 2016 9:17 AM  
**STEEL SIGN SUPPORT**  
**TYPES SB-1, SB-2 & SB-3**  
**INSTALLATION DETAILS**  
**STANDARD PLAN G-24.40-06**

SHEET 1 OF 4 SHEETS  
 APPROVED FOR PUBLICATION  
*Carpenter, Jeff*  
 Feb 29 2016 12:32 PM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

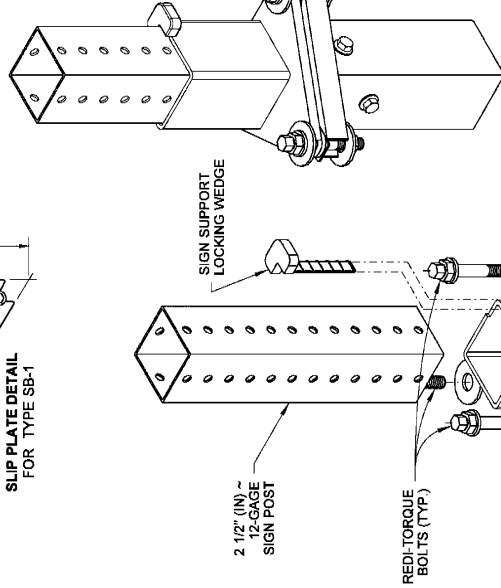
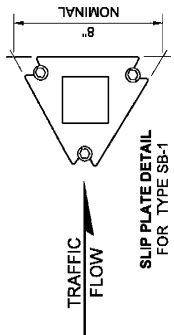


**STEEL SIGN SUPPORT TYPES SB-1, SB-2 & SB-3 ~ 8" (IN)**



**ASSEMBLY NOTES**

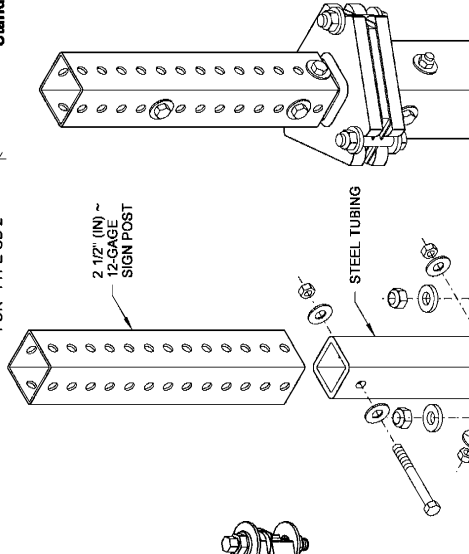
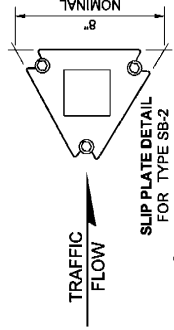
1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are shown on this plan only to illustrate how the parts are assembled. Do not tighten any single Slip Plate Bolt to the recommended torque before pretightening the other bolts. Progressively tighten the three Slip Plate Bolts in 10 ft-lb increments, alternately, to a final torque of 40 ft-lbs on each.
2. Slip Base assembly and all other materials shall meet the requirements of **Standard Specifications 9-06 and 9-28.**



ISOMETRIC VIEW

EXPLODED VIEW

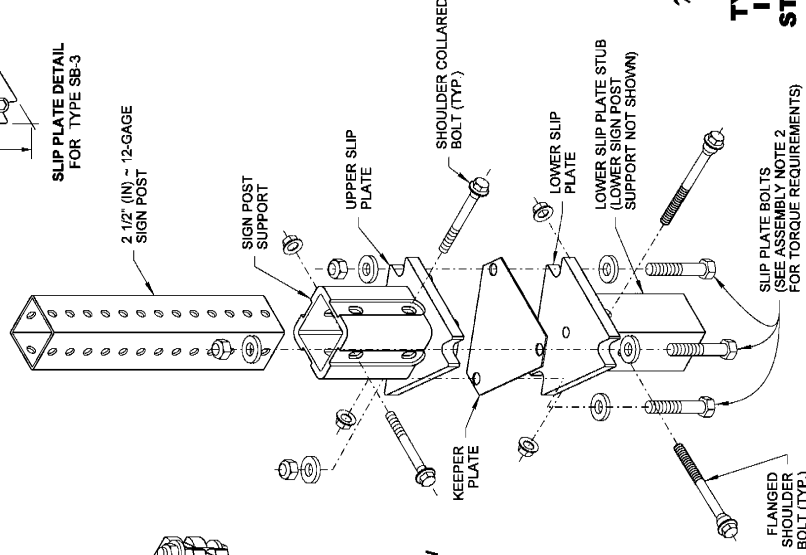
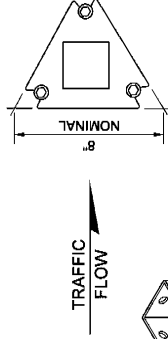
TYPE SB-1  
SLIP BASE ASSEMBLY



ISOMETRIC VIEW

EXPLODED VIEW

TYPE SB-2  
SLIP BASE ASSEMBLY



ISOMETRIC VIEW

EXPLODED VIEW

TYPE SB-3  
SLIP BASE ASSEMBLY



*Nisbett, John*  
Feb 29 2016 9:18 A.M.

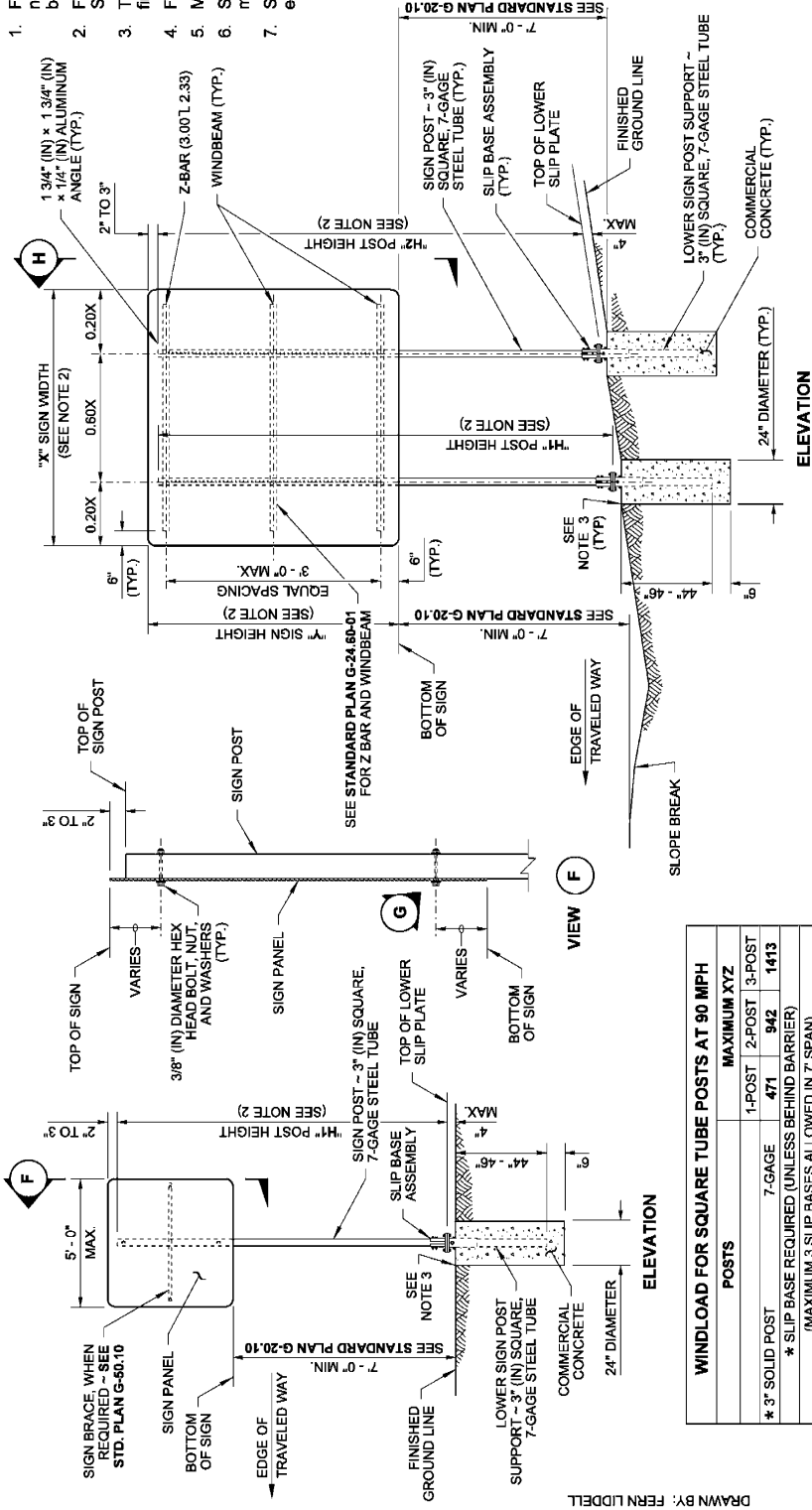
**STEEL SIGN SUPPORT  
TYPES SB-1, SB-2 & SB-3  
INSTALLATION DETAILS  
STANDARD PLAN G-24.40-06**

SHEET 2 OF 4 SHEETS

APPROVED FOR PUBLICATION  
Carpenter, Jeff  
Feb 29 2016 12:34 P.M.  
STATE DESIGN ENGINEER  
Washington State Department of Transportation

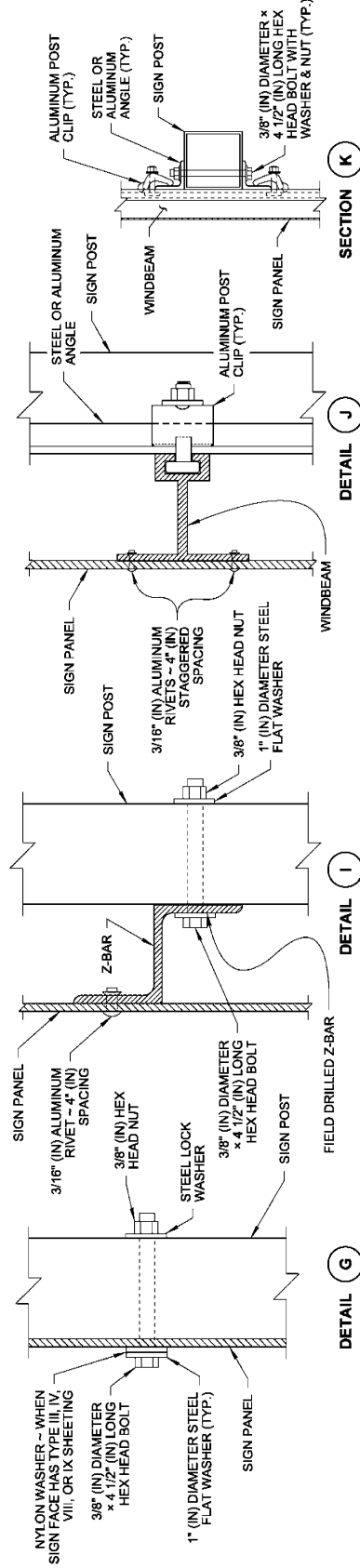
**NOTES**

1. For "W", Horizontal distance from edge of traveled way to center of nearest post, and "V", Vertical distance from edge of traveled way to bottom of sign, see **Standard Plan G-20.10**.
2. For "X", "Y", "H1", "H2", "H3", and "H4", refer to the Sign Specification Sheet in the Contract.
3. Top of concrete foundation shall be smooth, dense, and uniform to finished ground line.
4. Field drill posts to accept angle and cold galvanized holes.
5. Materials shall meet the requirements of **Standard Specification 9-28**.
6. Slip Base assembly and all other materials shall meet the requirements of **Standard Specifications 9-06** and **9-28**.
7. See **Standard Plan J-40.35** and Contract Plans for installations with electrical devices.



POSTS	MAXIMUM XYZ		
	1-POST	2-POST	3-POST
* 3" SOLID POST	471	942	1413
* SLIP BASE REQUIRED (UNLESS BEHIND BARRIER)			
(MAXIMUM 3 SLIP BASES ALLOWED IN 7' SPAN)			

**ELEVATION**



**DETAIL G**

**DETAIL I**

**DETAIL J**

**DETAIL K**

**VIEW H**



Market, John  
Feb. 29, 2016 9:19 AM

**STEEL SIGN SUPPORT TYPES SB-1, SB-2 & SB-3 INSTALLATION DETAILS STANDARD PLAN G-24.40-06**

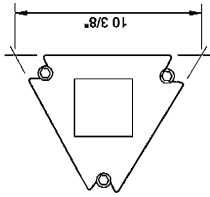
SHEET 3 OF 4 SHEETS

APPROVED FOR PUBLICATION  
Carpenter, Jeff  
Feb. 29, 2016 12:35 PM  
STATE DESIGN ENGINEER  
Washington State Department of Transportation

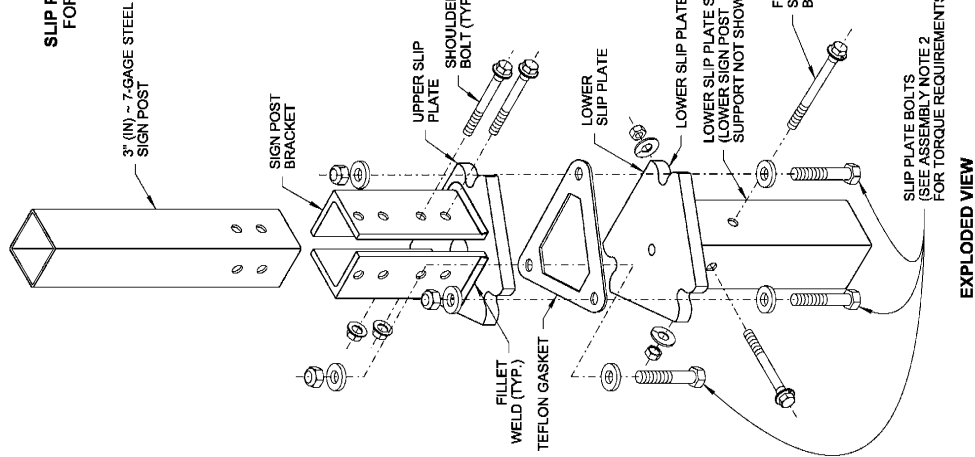
**STEEL SIGN SUPPORT TYPES SB-1, SB-2 & SB-3 ~ 10" (IN)**

**ASSEMBLY NOTES**

1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are shown on this plan only to illustrate how the parts are assembled.
2. Do not tighten any single Slip Plate Bolt to the recommended torque before pretightening the other bolts. Progressively tighten the three Slip Plate Bolts in 10 ft-lb increments, alternately, to a final torque of 40 ft-lbs on each.
3. Use only Slip Base manufacturer supplied hardware that meets the requirements of **Standard Specifications 9-06 and 9-28.**

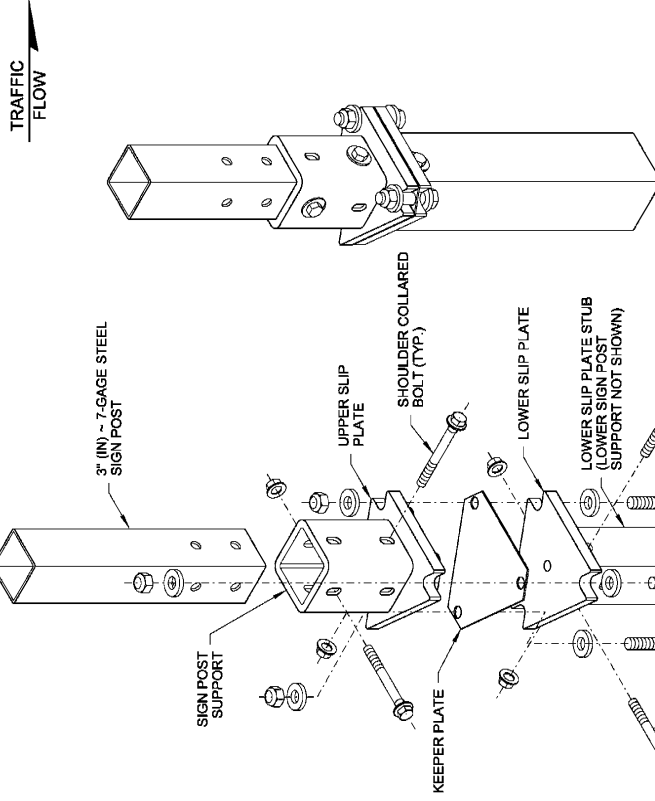


SLIP PLATE DETAIL FOR TYPE SB-1



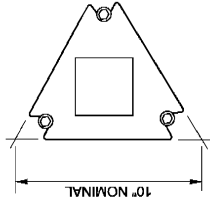
EXPLODED VIEW

TYPE SB-1  
SLIP BASE ASSEMBLY

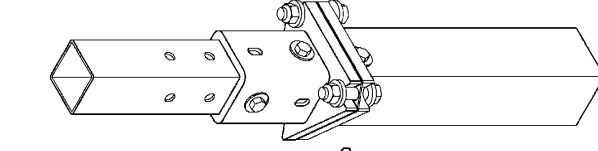


EXPLODED VIEW

TYPE SB-3  
SLIP BASE ASSEMBLY



SLIP PLATE DETAIL FOR TYPE SB-3



ISOMETRIC VIEW



Nisbett, John Feb 29 2016 9:19 AM

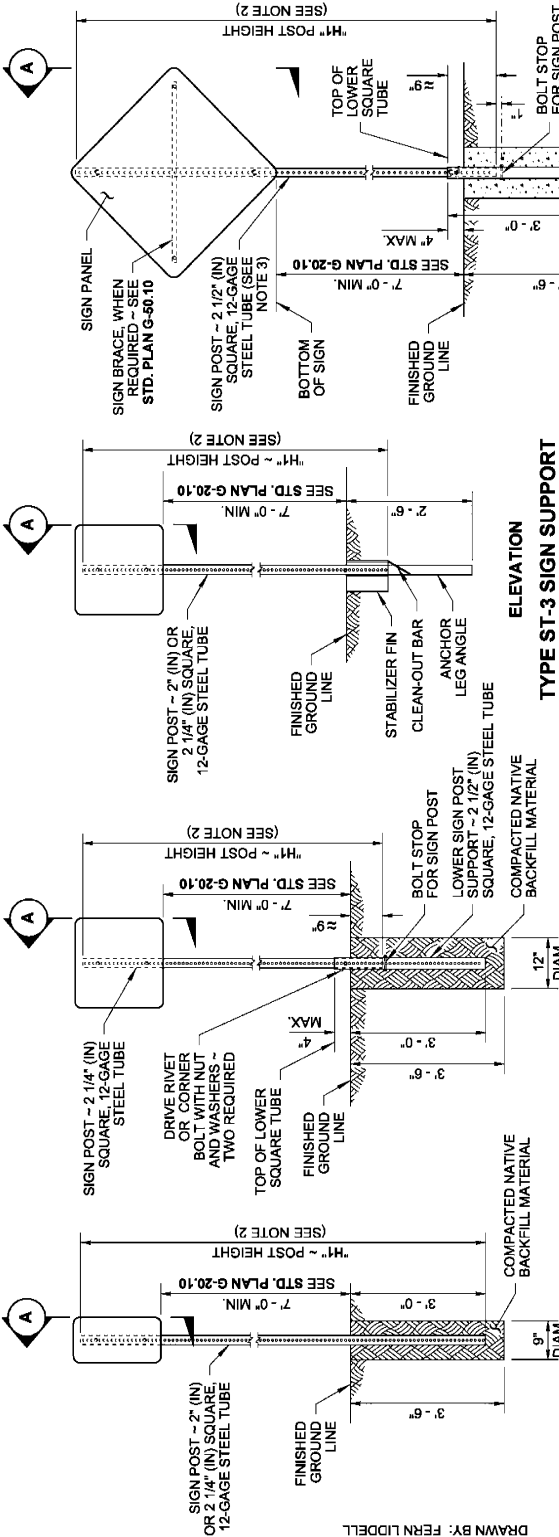
**STEEL SIGN SUPPORT TYPES SB-1, SB-2 & SB-3  
INSTALLATION DETAILS  
STANDARD PLAN G-24.40-06**

SHEET 4 OF 4 SHEETS

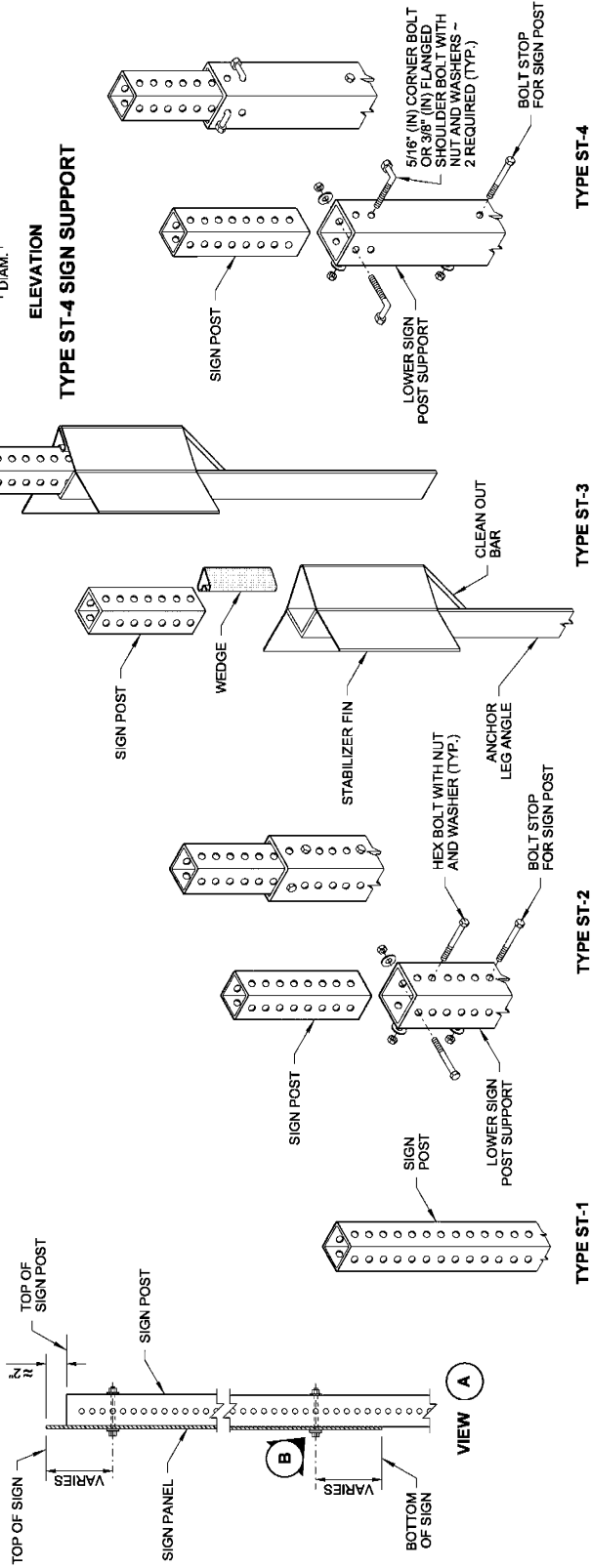
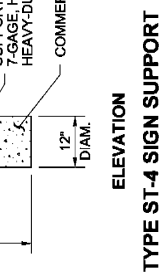
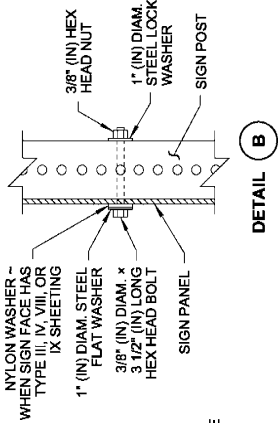
APPROVED FOR PUBLICATION  
Carpenter, Jeff Feb 29 2016 12:35 PM  
STATE DESIGN ENGINEER  
Washington State Department of Transportation

**NOTES**

- Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are shown on this plan only to illustrate how the parts are assembled.
- For "H1", refer to the Sign Specification Sheet in the Contract.
- A 2" (in) post with a 2 1/4" (in) PSST anchor or a 2 1/4" (in) post with a 2 1/2" (in) PSST anchor may be substituted. See Contract Plans.
- Perforated square steel post shall meet the requirements of **Standard Specification 9-06**.
- Use only base connection manufacturer supplied hardware that meets the requirements of **Standard Specifications 9-06 and 9-28**.



DRAWN BY: FERN LIDDELL

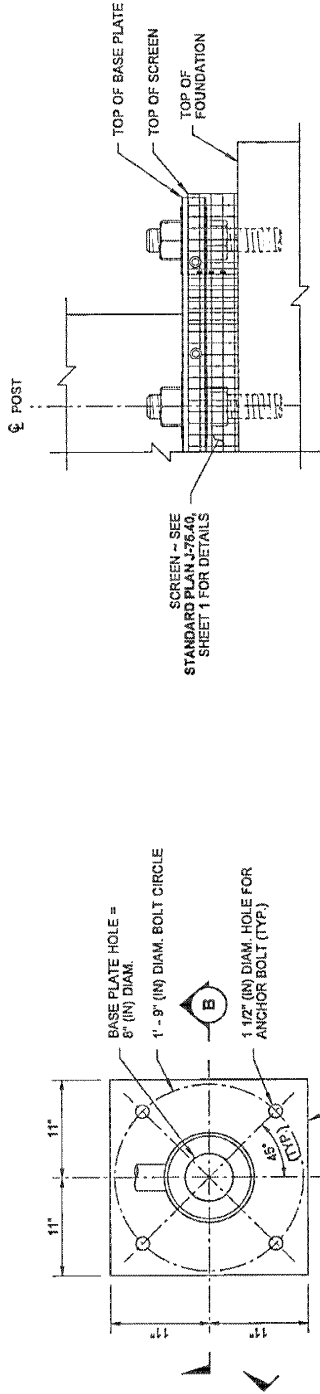


Noted, John  
Jun 12 2014 7:41 AM

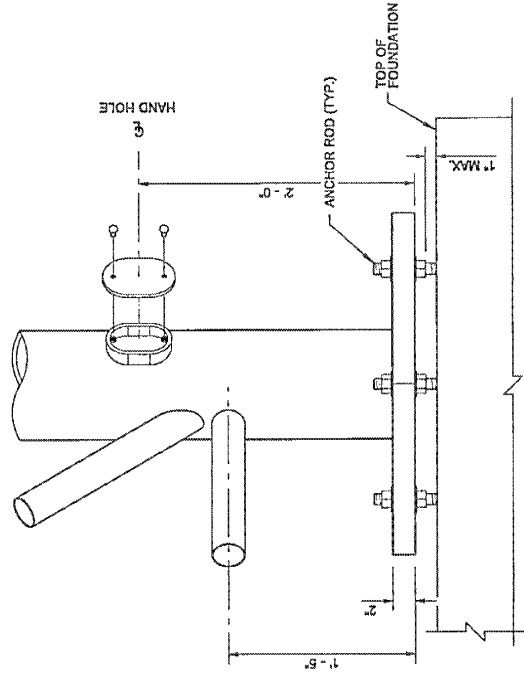
**STEEL SIGN SUPPORT  
TYPES ST-1 - ST-4  
INSTALLATION DETAILS  
STANDARD PLAN G-24.50-03**

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
Bakovich, Pasco  
Jan 17 2014 9:39 AM  
*Rene B. Bakovich*  
STATE DESIGN ENGINEER  
Washington State Department of Transportation



**SCREEN DETAIL**  
 CONDUIT OMITTED FOR CLARITY - FOR ELECTRICAL REQUIREMENTS  
 SEE STANDARD PLAN J-76.46



**VIEW C**  
**POST BASE DETAILS**  
 CONDUIT OMITTED FOR CLARITY - FOR ELECTRICAL REQUIREMENTS  
 SEE STANDARD PLAN J-76.46



Zelbenrust, Richard  
 2015.06.11 14:11:56 -0700

**SIGN BRIDGE  
 (TRUSS-TYPE)**

**STANDARD PLAN G-70.10-03**

SHEET 4 OF 4 SHEETS

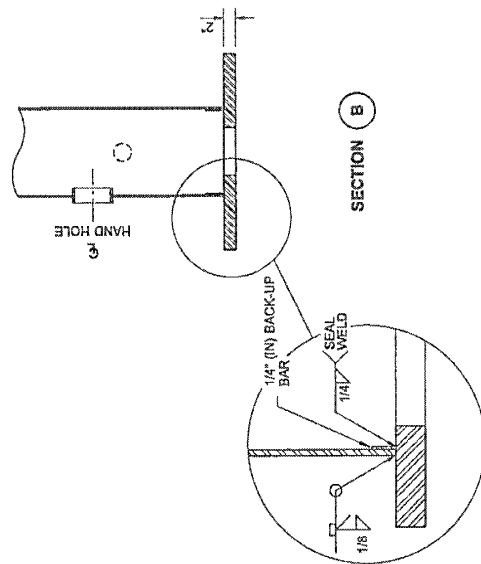
APPROVED FOR PUBLICATION

Carretero, JST  
 Jan 18 2015 7:53 AM

STATE DESIGN ENGINEER

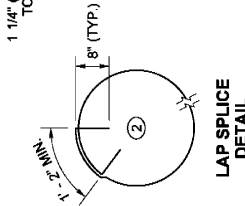
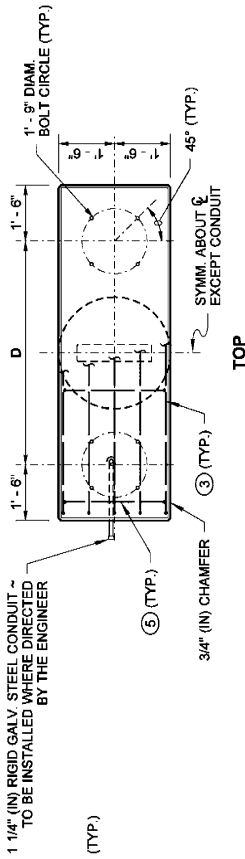
Washington State Department of Transportation

**BASE WELD DETAIL**

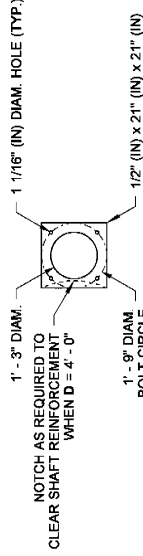


MATERIAL SPECIFICATIONS	
SHAFT CONCRETE	CLASS 4000P
ALL OTHER CONCRETE	CLASS 4000
STEEL REINF. BAR	AASHTO M 31 GRADE 60
ANCHOR RODS	ASTM F 1554 GRADE 105
ANCHOR NUTS	AASHTO M 291
ANCHOR WASHERS	AASHTO M 233
ANCHORAGE GALVANIZING	AASHTO M 232
ANCHOR PLATE	ASTM A 36

◆ CASE THE EXCAVATION AND PLACE USING TREMIE METHOD WHEN WATER IS PRESENT



LAP SPLICE DETAIL



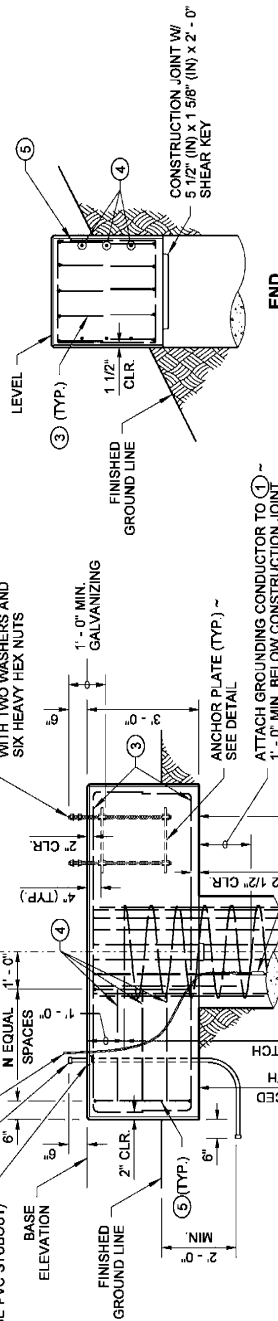
ANCHOR PLATE DETAIL

GROUNDING CONDUCTOR SHALL BE NON-INSULATED #4 AWG STRANDED COPPER - PROVIDE 3'-0" MIN. SLACK (ROUTE TO GROUNDING STUD)

INSTALL CONDUIT ON BOTH ENDS OF SIGN BRIDGE CONDUIT COUPLING - INSTALL FLUSH WITH TOP OF FOUNDATION (DO NOT GLUE PVC STUBOUT)

SYMMETRICAL ABOUT CL EXCEPT CONDUIT

ANCHOR ROD - 4" (IN) DIAM. x 2'-8" THICK END 8" MIN. EACH END WITH TWO WASHERS AND SIX HEAVY HEX NUTS

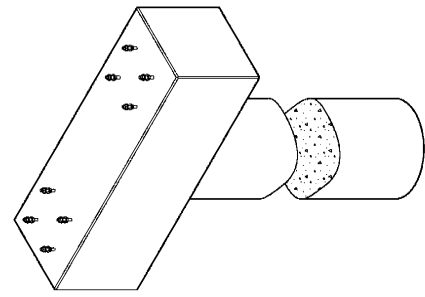


CONCRETE SHALL BE PLACED DIRECTLY AGAINST EARTH

DEPTH = Z - SEE TABLE

ATTACH GROUNDING CONDUCTOR TO 1'-0" MIN. BELOW CONSTRUCTION JOINT

CLAMP STEEL REINFORCING BAR WITH CONNECTOR SUITABLE FOR USE EMBEDDED IN CONCRETE

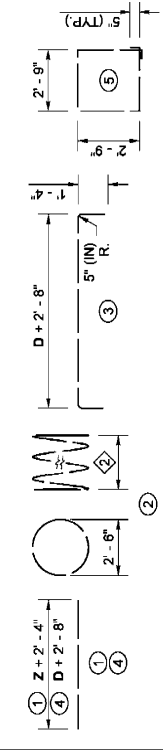


ISOMETRIC

VARIABLES	TABLE				ALLOWABLE LATERAL BEARING PRESSURE (PSF)
	SPAN LENGTH				
60' OR LESS	61' TO 90'	91' TO 120'	121' TO 150'		
DIMENSION - D	4'-0"	5'-0"	6'-0"	7'-0"	10
BAR SPACES - N	2	3	6	10	
SHAFT DEPTH - Z	11'-6"	13'-6"	15'-0"	16'-6"	2500 OR BETTER

MARK	LOCATION	SPAN LENGTH							
		60' OR LESS	61' TO 90'	91' TO 120'	121' TO 150'	60' OR LESS	61' TO 90'	91' TO 120'	121' TO 150'
1	SHAFT - VERTICAL	11	9	14	11	18	11	23	11
2	SHAFT - SPIRAL	1	4	1	4	1	4	1	4
3	CAP - TOP AND BOTTOM	8	6	8	7	10	8	12	8
4	CAP - SIDES	6	4	6	4	6	4	6	4
5	CAP - HOOPS	6	4	8	4	14	4	22	4

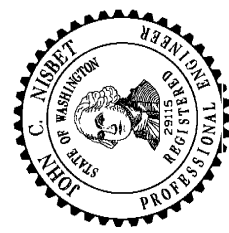
BENDING DIAGRAM



(ALL DIMENSIONS ARE OUT TO OUT)

2" (IN) RADIUS, UNLESS OTHERWISE NOTED

◆ DETERMINE LENGTH FROM PLANS



Nisbet, John  
Feb 29 2016 9:23 AM

**SIGN BRIDGE (TRUSS-TYPE)  
FOUNDATION TYPE 1**

**STANDARD PLAN G-70.20-03**

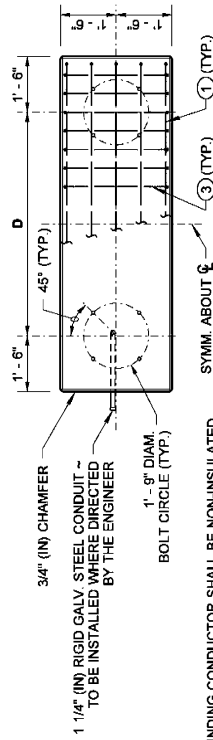
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
Carpenter, Jeff  
Feb 29 2016 12:37 PM



Washington State Department of Transportation

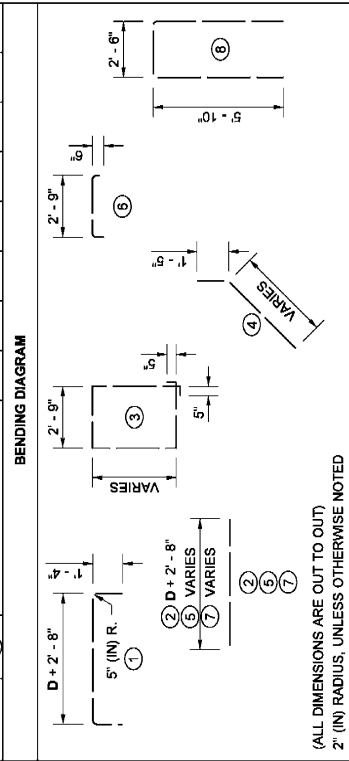
MATERIAL SPECIFICATIONS	
CONCRETE	CLASS 4000P
STEEL	AASHTO M 31
REINF. BAR	GRADE 60
ANCHOR RODS	ASTM F 1554 GRADE 105
ANCHOR NUTS	AASHTO M 291
ANCHOR WASHERS	AASHTO M 293
ANCHORAGE GALVANIZING	AASHTO M 232
ANCHOR PLATE	ASTM A 36



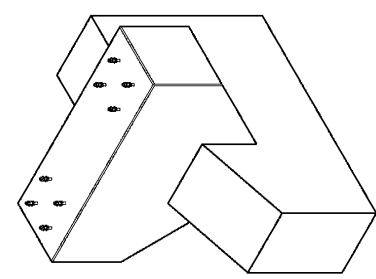
- 3/4" (IN) CHAMFER
- 1 1/4" (IN) RIGID GALV. STEEL CONDUIT ~ TO BE INSTALLED WHERE DIRECTED BY THE ENGINEER
- 1" - 9" DIAM. BOLT CIRCLE (TYP.)
- GROUNDING CONDUCTOR SHALL BE NON-INSULATED #4 AWG STRANDED COPPER ~ PROVIDE 3" - 0" MIN. SLACK (ROUTE TO GROUNDING STUD)
- INSTALL CONDUIT ON BOTH ENDS OF SIGN BRIDGE
- CONDUIT COUPLING - INSTALL FLUSH WITH TOP OF BARRIER (DO NOT GLUE PVC STUBOUT)
- ANCHOR ROD ~ 1" (IN) DIAM. X 2" - 9" THREADED 8" MIN. EACH END, WITH TWO WASHERS AND SIX HEAVY HEX NUTS
- 1" - 0" MIN GALVANIZING (TYP.)
- 2" CLR.
- 6"
- MIN.
- 6"
- 45°
- 3" - 0"
- DEPTH - Z ~ SEE TABLE
- ⑥ @ 1" - 6" MAX SPACING
- CLAMP STEEL REINFORCING BAR WITH CONNECTOR SUITABLE FOR USE EMBEDDED IN CONCRETE
- 3" CLR.
- 10" - 0"
- SIDE

VARIABLES	SPAN LENGTH		
	60' OR LESS	91' TO 120'	120' TO 150'
DIMENSION - D	4' - 0"	6' - 0"	7' - 0"
BAR SPACES - N	2	3	6
SHAFT DEPTH - Z	2	3	6
TYPE	7' - 6"	8' - 6"	10' - 0"
ALLOWABLE LATERAL BEARING PRESSURE (PSF)	2500 OR BETTER	1500 - 2499	

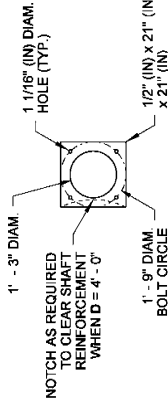
FOUNDATION TYPE	MARK	LOCATION	SPAN LENGTH							
			60' OR LESS	61' TO 90'	91' TO 120'	120' TO 150'	120' TO 150'	120' TO 150'		
2 AND 3	①	CAP - TOP	4	6	4	7	5	8	6	8
	②	CAP - SIDES	14	4	16	4	18	4	18	4
	③	CAP - HOOPS	6	4	8	4	14	4	22	4
	④	CAP - BOTTOM	8	6	8	7	10	8	12	8
	⑤	FND WALL - VERTICAL	30	6	42	6	42	7	50	7
	⑥	FND WALL - TIES	8	5	8	5	8	5	8	5
2	⑦	FND WALL - HORIZONTAL	4	5	4	5	4	5	4	5
	⑧	FND WALL - HORIZONTAL	8	5	8	5	10	5	12	5
3	⑧	FND WALL - HORIZONTAL	10	5	12	5	14	5	16	5



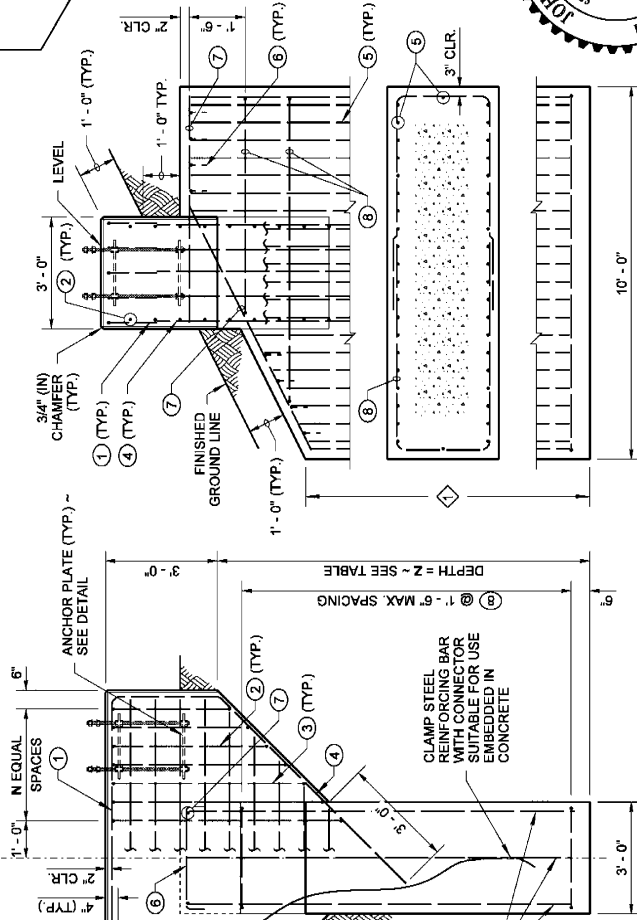
(ALL DIMENSIONS ARE OUT TO OUT)  
2" (IN) RADIUS, UNLESS OTHERWISE NOTED



ISOMETRIC



ANCHOR PLATE DETAIL



SIDE

END

Concrete below finished ground line shall be placed directly against undisturbed earth, or alternately, backfill placed around foundation shall be compacted in conformance with Standard Specification 2-09.3(1)e, method 1 or 4.  
All formwork shall be removed.

FOUNDATION TYPES 2 & 3

SIGN BRIDGE (TRUSS-TYPE)  
FOUNDATION TYPE 2 & 3

STANDARD PLAN G-70-30-03

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Carpenter, Jeff  
Feb 29 2016 12:38 PM  
STATE DESIGN ENGINEER

Washington State Department of Transportation



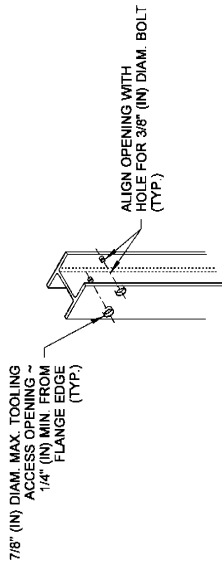
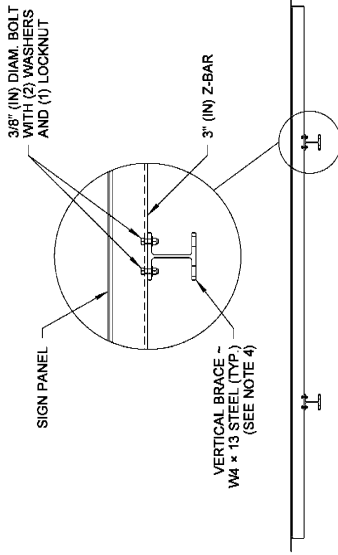
Nisbett, John  
Feb 29 2016 9:26 AM

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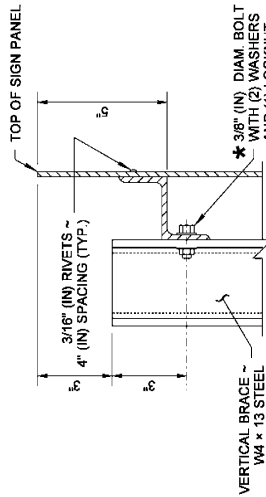


**NOTES**

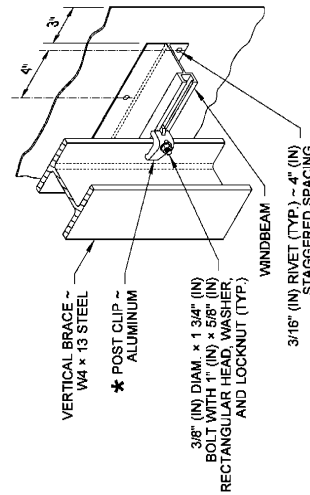
1. Windbeam and 3" (IN) Z-Bar are aluminum. All nuts, bolts, washers, and other hardware shall be stainless steel per **Standard Specification Section 9-28.11**, except as noted. Galvanize all non-stainless steel parts.
2. See **Standard Plan G-90.20** (Monotube), or **G-90.30** (Truss) for additional Overhead Sign Mounting details.
3. For VMS mounting, the Contractor may substitute W6 x 12 steel or W8 x 13 steel sections for the Vertical Brace W4 x 13 steel.



**PARTIAL VERTICAL BRACE @ Z-BAR CONNECTION**

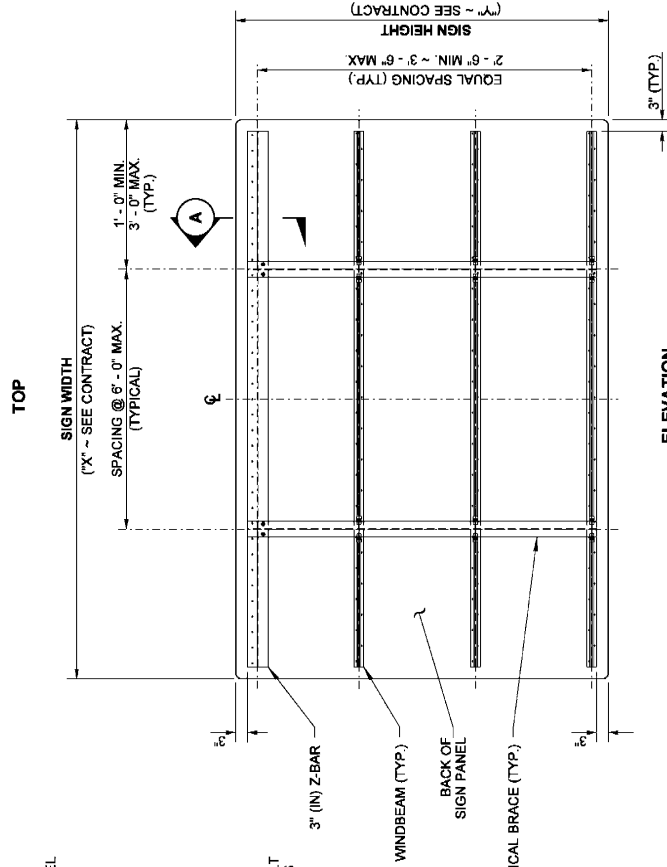


**SECTION A**



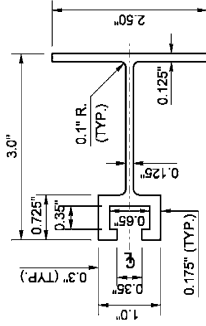
**WINDBEAM CONNECTION DETAIL**

- \* ATTACH ON BOTH SIDES OF WIDE FLANGE STEEL POST

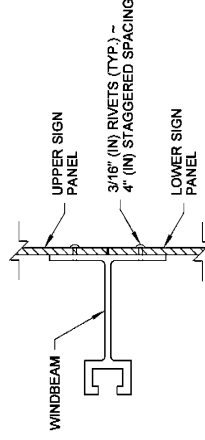


**ASSEMBLY NOTES**

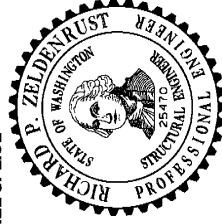
All parts shall be plumb and square. Bring all parts into full contact with each other. Fasteners and associated hardware shall be in a snug tight condition when assembled. Bolted parts shall fit solidly together.



**WINDBEAM DETAIL**



**HORIZONTAL SIGN PANEL SPLICE**



Zeldner, Richard  
Apr 21 2016 1:05 PM

**OVERHEAD SIGN BRACING AND MOUNTING**

**STANDARD PLAN G-90.10-02**

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Contractor: *Bill Berens*

Engineer: RPE

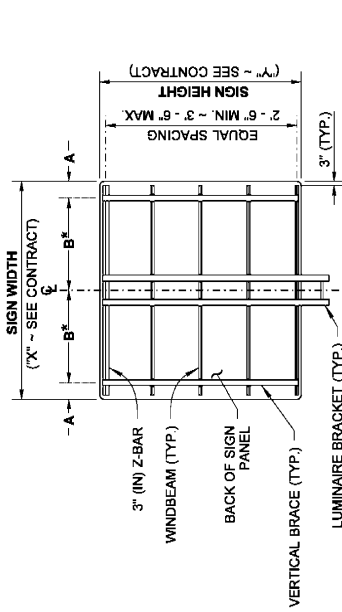
Apr 28 2015 10:16 AM

STATE DESIGN ENGINEER

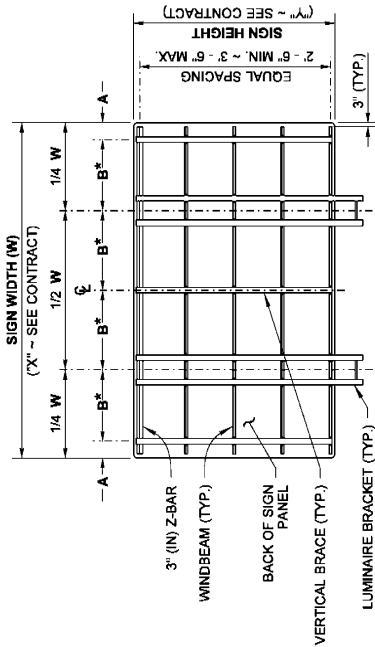
Washington State Department of Transportation

**NOTES**

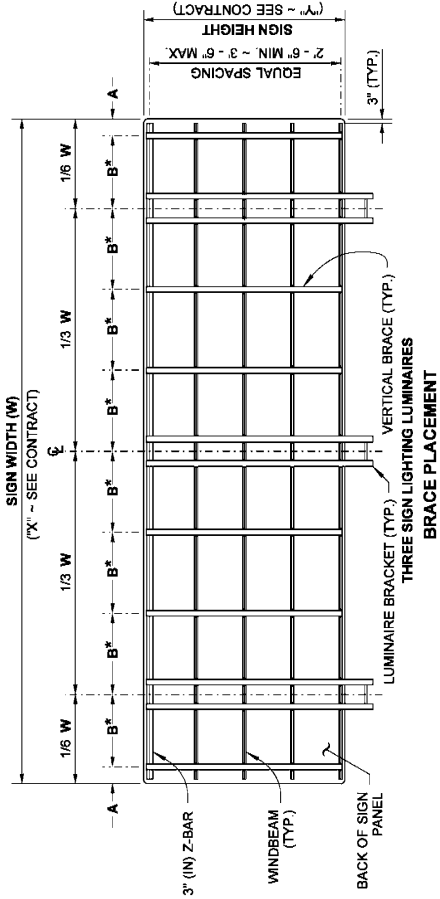
1. Install Sign Lighting Luminares (and Brackets) only when required in the Contract.
2. All nuts, bolts, washers, and other hardware shall be stainless steel per **Standard Specification Section 9-28.11**, except as noted. Galvanize all non-stainless steel parts.
3. See **Standard Plan G-90.20** (Monotube), or **G-90.30** (Truss) for additional Overhead Sign Lighting details.



**ONE SIGN LIGHTING LUMINAIRE BRACE PLACEMENT**



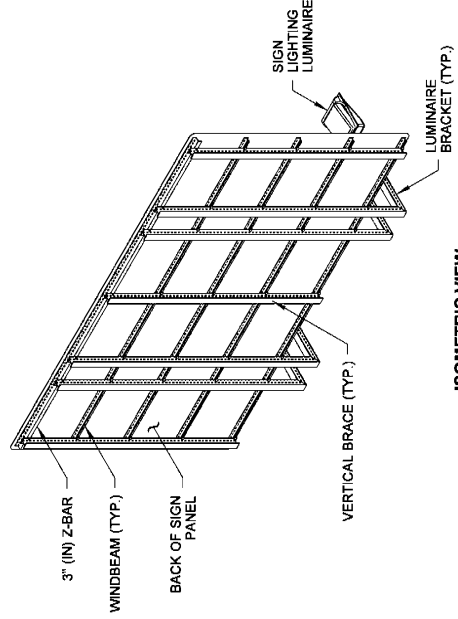
**TWO SIGN LIGHTING LUMINAIRE BRACE PLACEMENT**



**THREE SIGN LIGHTING LUMINAIRE BRACE PLACEMENT**

VERTICAL BRACE SPACING WITH SIGN LIGHTING		
SIGN WIDTH	A	B*
ONE SIGN LIGHTING LUMINAIRE		
8'-0"	6"	3'-6"
10'-0"	6"	4'-6"
12'-0"	6"	5'-6"
14'-0"	1'-0"	6'-0"
16'-0"	2'-0"	6'-0"
TWO SIGN LIGHTING LUMINAIRE		
18'-0"	6"	4'-3"
20'-0"	6"	4'-9"
22'-0"	6"	5'-3"
24'-0"	6"	5'-9"
26'-0"	6"	6'-3"
28'-0"	6"	6'-9"
30'-0"	1'-0"	7'-0"
32'-0"	2'-0"	7'-0"
THREE SIGN LIGHTING LUMINAIRE		
34'-0"	6"	4'-1 1/2"
36'-0"	6"	4'-4 1/2"

\* IF "B" EXCEEDS THE SPACING LISTED ON THIS VERTICAL BRACE SPACING TABLE, ADD AN ADDITIONAL VERTICAL BRACE.



**ISOMETRIC VIEW**



Richard P. Zeldenzust  
 Engineer, Jeff  
 Apr 21 2016 1:09 PM

**OVERHEAD SIGN LIGHTING BRACING**

**STANDARD PLAN G-90.11-00**

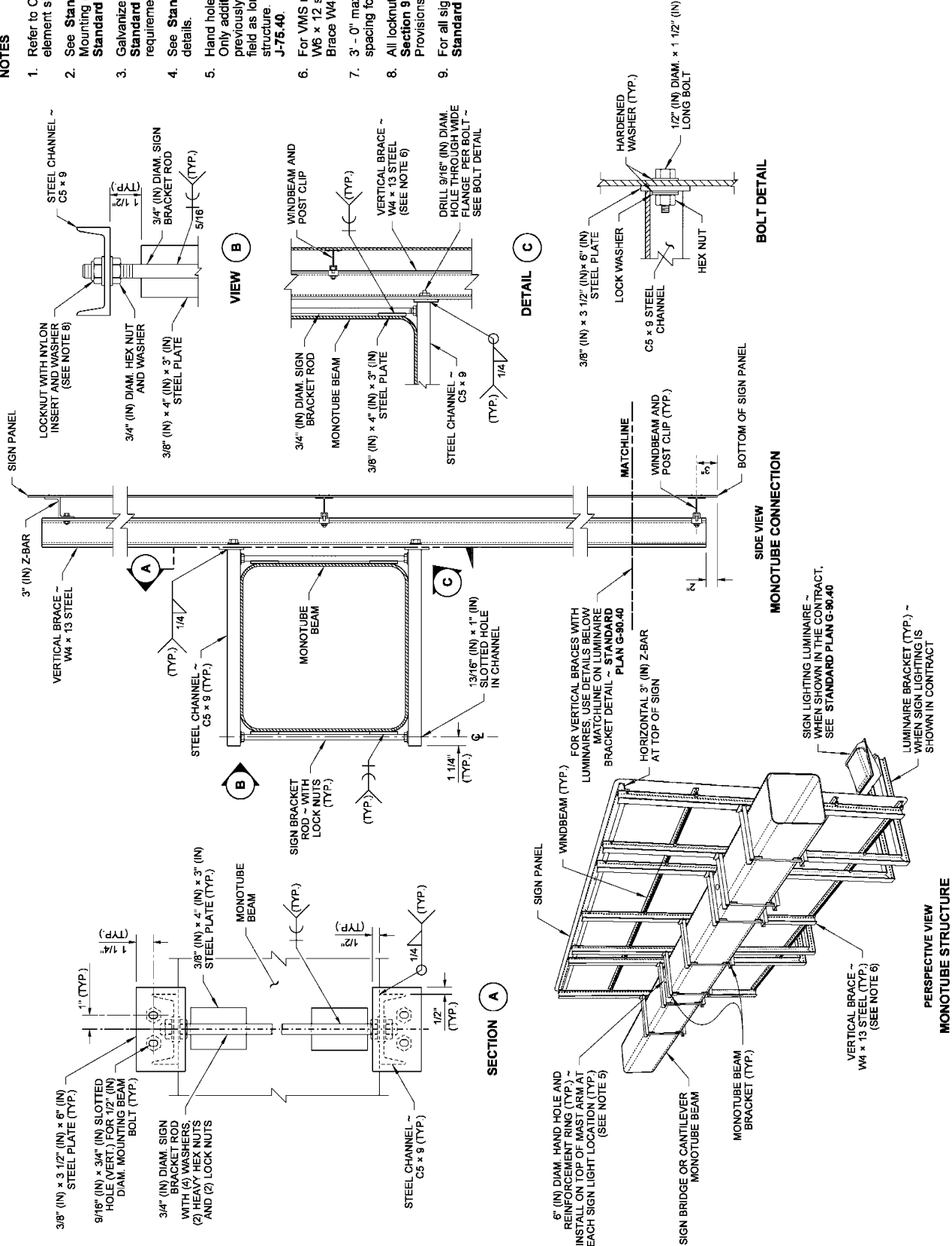
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
 Carpenter, Jeff  
 Apr 28 2016 3:10 PM

STATE DESIGN ENGINEER  
 Washington State Department of Transportation

**NOTES**

1. Refer to Contract Plans for Monotube Beam Bracket element sizes, dimensions, and weld symbols.
2. See **Standard Plan G-90.10** for Sign Bracing and Mounting details. For Sign Bridge Structure parts, see **Standard Specification Section 9-28.14(2)**.
3. Galvanize all non-stainless steel parts. See **Standard Specification Section 9-28.14(2)** for requirements.
4. See **Standard Plan G-90.40** for Sign Lighting details.
5. Hand holes shall be installed at the time of fabrication. Only additional conduits for lighting accommodations to previously non-illuminated structures may be installed in the field as long as the proper repairs are made to the structure. For details not shown, see **Standard Plan J-75.40**.
6. For VMS mounting, the Contractor may substitute W6 x 12 steel or W8 x 13 steel sections for the Vertical Brace W4 x 13 steel.
7. 3' - 0" max. Vertical Brace and Monotube Beam Bracket spacing for walk-in cabinet Type VMS installation.
8. All locknuts shall conform to **Standard Specification Section 9-28.11** as supplemented in the Special Provisions.
9. For all sign lighting bracing details not shown, see **Standard Plan G-90.11**.

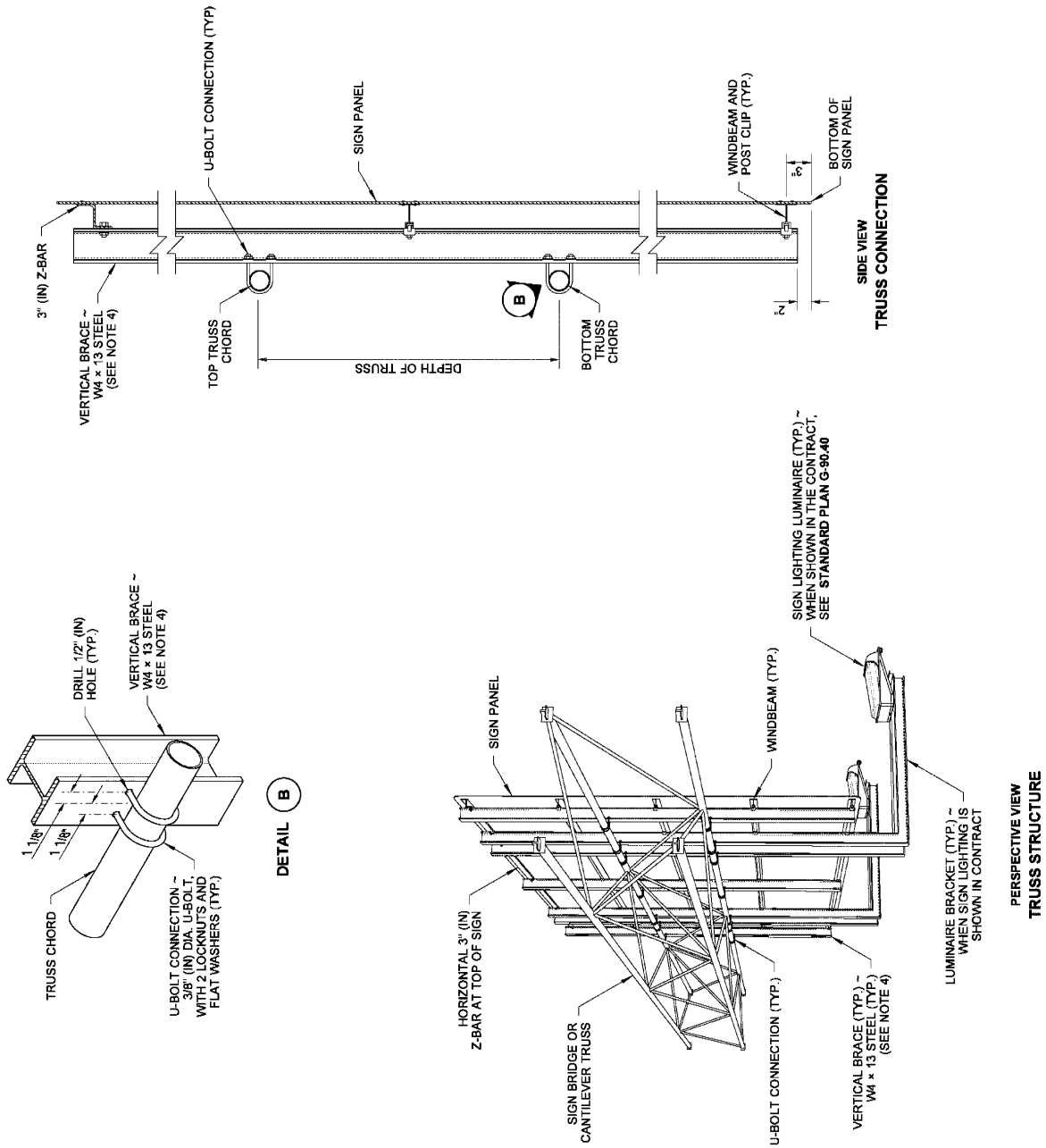


Zeldner, Richard  
 Apr 21, 2016 1:40 PM  
**OVERHEAD SIGN MOUNTING  
 (MONOTUBE STRUCTURE)**  
**STANDARD PLAN G-90.20-04**  
 SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
 Carpenter, Jeff  
 Apr 28, 2016 1:01 PM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

**NOTES**

1. U-Boils, Washers and Nuts shall be stainless steel, except as noted.
2. See **Standard Plan G-90.10** for Sign Bracing and Mounting details. For Sign Bridge Structure parts, see **Standard Specification Section 9-28.14(2)**.
3. Galvanize all non-stainless steel parts. See **Standard Specification Section 9-28.14(2)** for requirements.
4. For VMS mounting, the contractor may substitute W6 x 12 Steel or W8 x 13 Steel sections for the Vertical Brace W4 x 13 Steel.
5. 3' - 0" MAX. Vertical Brace spacing for Walk-In Cabinet Type VMS installation.
6. All locknuts shall conform to **Standard Specification Section 9-28.11** as supplemented in the Special Provisions.
7. For all sign lighting bracing details not shown, See **Standard Plan G-90.11**.



Richard P. Zeldenrust, Richard  
 Carpenter, Jeff  
 Apr 21, 2016 1:41 PM

**OVERHEAD SIGN MOUNTING  
 (TRUSS STRUCTURE)  
 STANDARD PLAN G-90.30-03**

SHEET 1 OF 1 SHEET

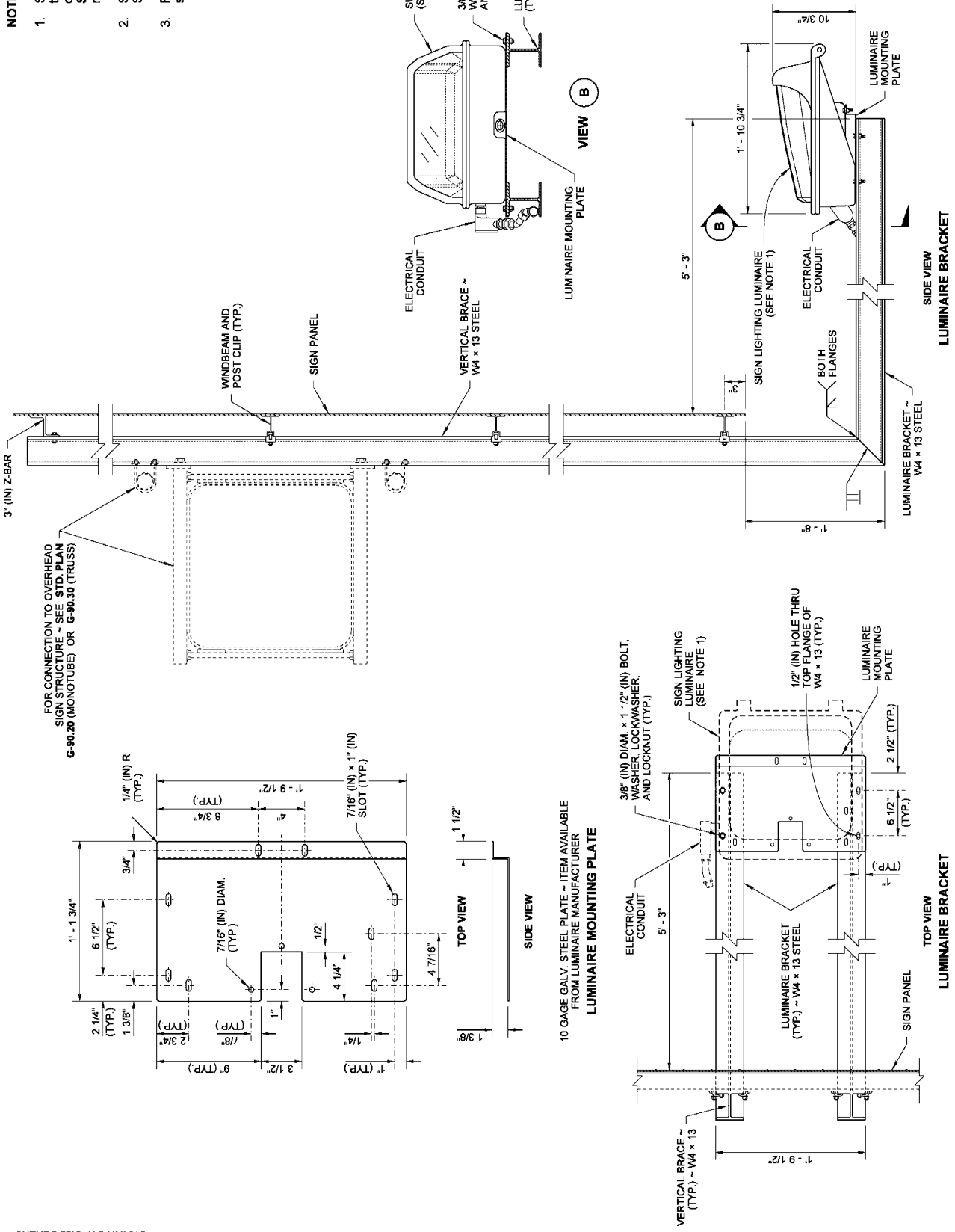
APPROVED FOR PUBLICATION  
 Carpenter, Jeff  
 Apr 28, 2016 1:07 PM

Richard P. Zeldenrust  
 STATE DESIGN ENGINEER



**NOTES**

1. Sign Lighting Luminaire shall include a 3/4" (in) threaded side entry, a gasketed front entry, a door prop, and 4 mounting holes. Refer to **Standard Spec. 8-20.3(13)** for additional requirements.
2. See **Standard Plan J-75.40** and **J-75.45** for Sign Light Luminaire Electrical Details.
3. For all sign lighting bracing details not shown, see **Standard Plan G-90.11**.



Zeldemrust, Richard  
 Apr 21, 2016 1:42 PM

**OVERHEAD SIGN LIGHTING DETAILS**  
**STANDARD PLAN G-90.40-02**

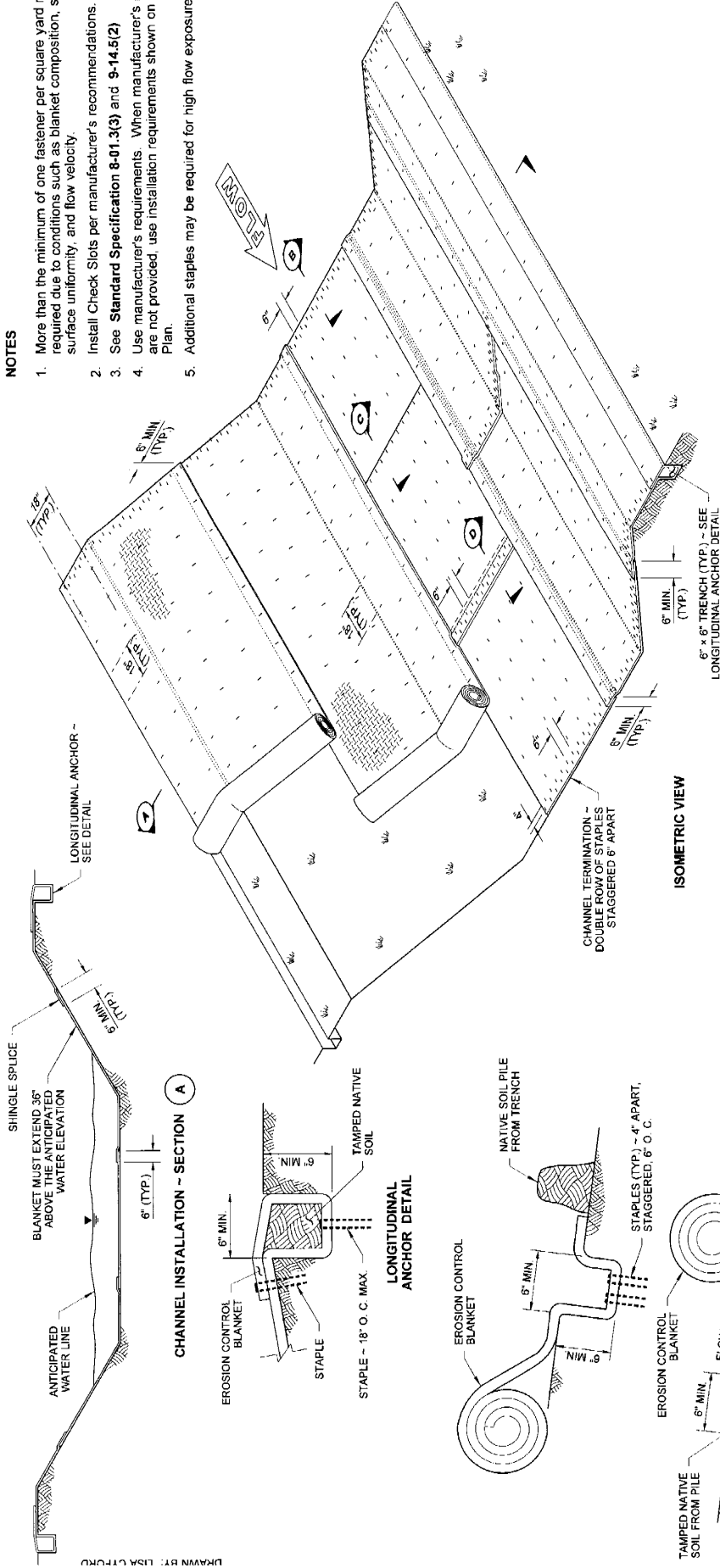
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
 Carpenter, Jeff  
 Apr 28, 2016 3:11 PM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

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**NOTES**

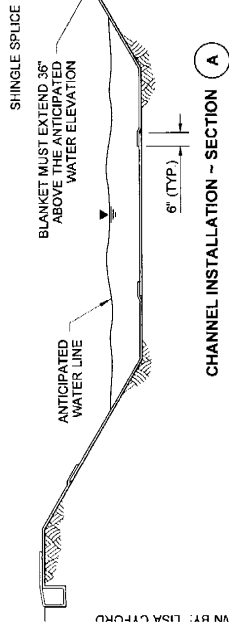
1. More than the minimum of one fastener per square yard may be required due to conditions such as blanket composition, soil type, surface uniformity, and flow velocity.
2. Install Check Slots per manufacturer's recommendations.
3. See **Standard Specification 8-01.3(3)** and **9-14.5(2)**
4. Use manufacturer's requirements. When manufacturer's requirements are not provided, use installation requirements shown on Standard Plan.
5. Additional staples may be required for high flow exposure.



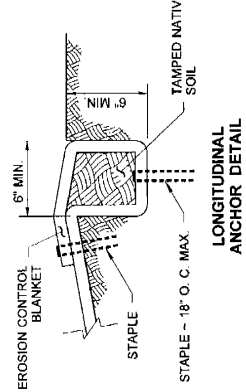
**INSTALLATION STEPS:**

1. Prepare smooth slope.
2. Amend soil and seed, as specified
3. Dig anchor trench. Set aside native soil removed from trench.
4. Secure blanket in anchor trench, staking or stapling blanket as shown.
5. Replace native soil previously removed from trench.
6. Roll blanket parallel to the slope in a controlled manner, taking care to remove excess slack, and taking care not to stretch blanket.
7. Stake or staple blanket as shown so there are no gaps between the blanket and the soil. Staple while unrolling blanket to minimize walking on blanket.

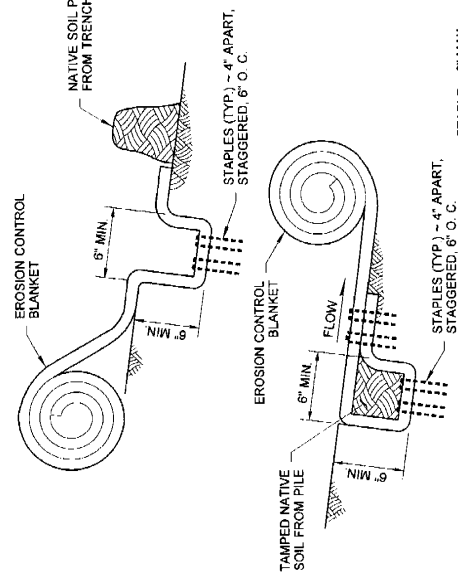
ISOMETRIC VIEW



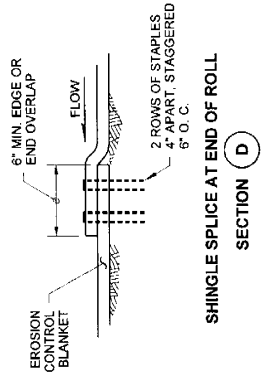
CHANNEL INSTALLATION - SECTION A



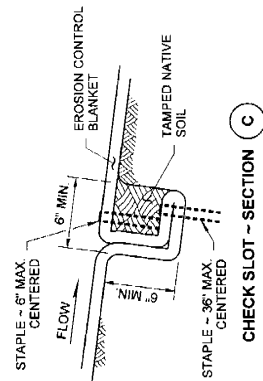
LONGITUDINAL ANCHOR DETAIL



INITIAL ANCHOR - SECTION B



SHINGLE SPICE AT END OF ROLL



CHECK SLOT - SECTION C

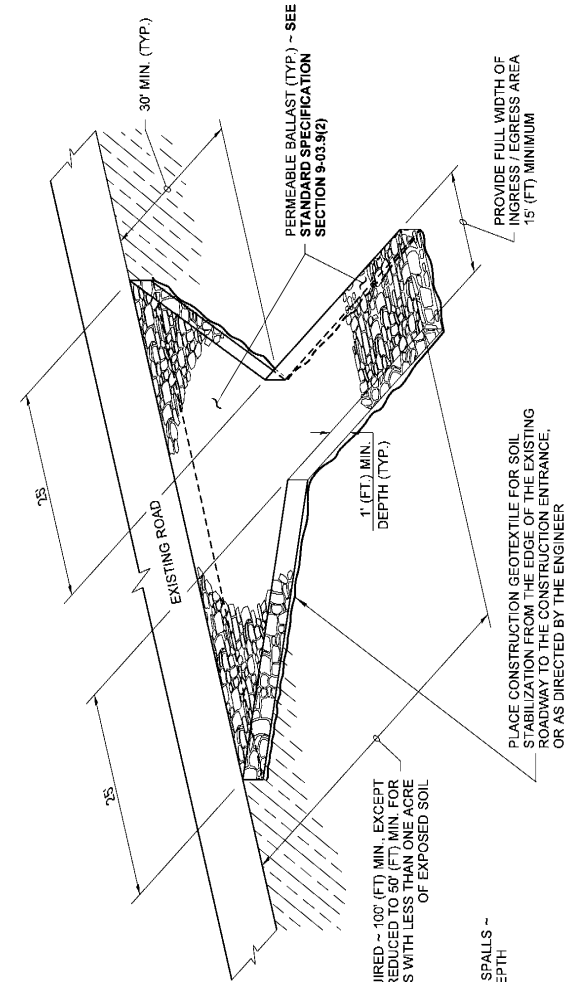


STATE OF WASHINGTON  
REGISTERED LANDSCAPE ARCHITECT  
*Sandra L. Salisbury*  
SANDRA L. SALISBURY  
LICENSE NO. 880  
DATE: 6 June 2013

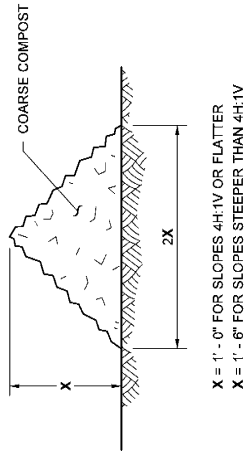
**BIODEGRADABLE EROSION CONTROL BLANKET PLACEMENT FOR DITCHES STANDARD PLAN 1-60.20-01**

SHEET 1 OF 1 SHEET

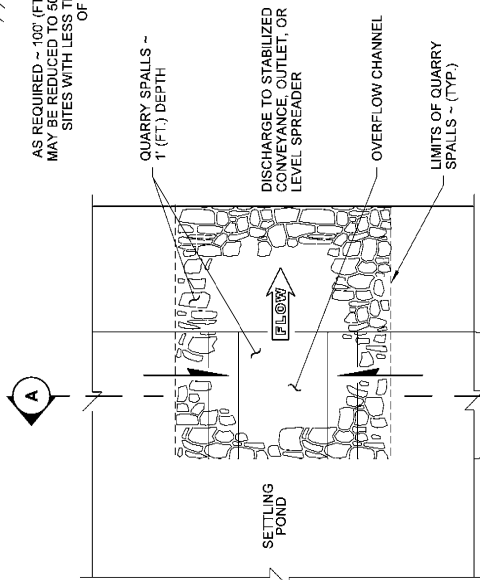
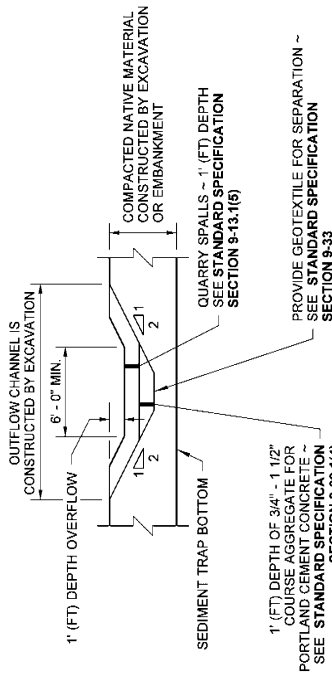
APPROVED FOR PUBLICATION  
*Sandra L. Salisbury*  
STATE ENGINEER  
Washington, State Department of Transportation  
DATE: 6/6/13



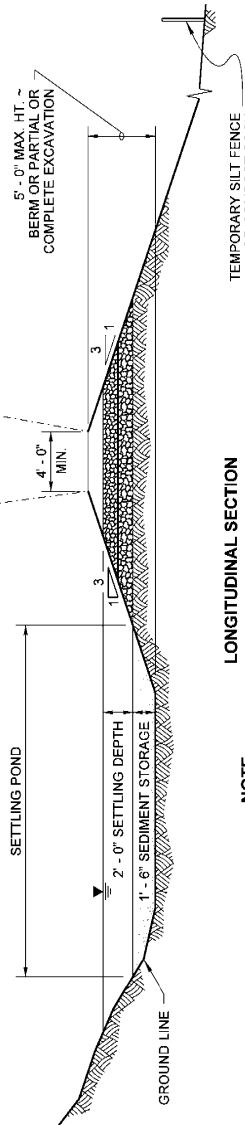
**ISOMETRIC VIEW**  
**STABILIZED CONSTRUCTION ENTRANCE**  
 STABILIZED CONSTRUCTION ENTRANCE SHALL MEET THE REQUIREMENTS OF STANDARD SPECIFICATION SECTION 8-01.3(7).



**TYPICAL SECTION**  
**COMPOST BERM DETAIL**



**PARTIAL PLAN VIEW OF BERM**  
 SHOWN LARGER FOR CLARITY



**NOTE**  
 PLACE GEOTEXTILE UNDER THE SPILLWAY AND SIDE SLOPES. PROVIDE A CONTINUOUS LAYER BETWEEN THE GRAVEL/ROCK AND THE NATIVE EARTHEN MATERIAL.

**TEMPORARY SEDIMENT TRAP**



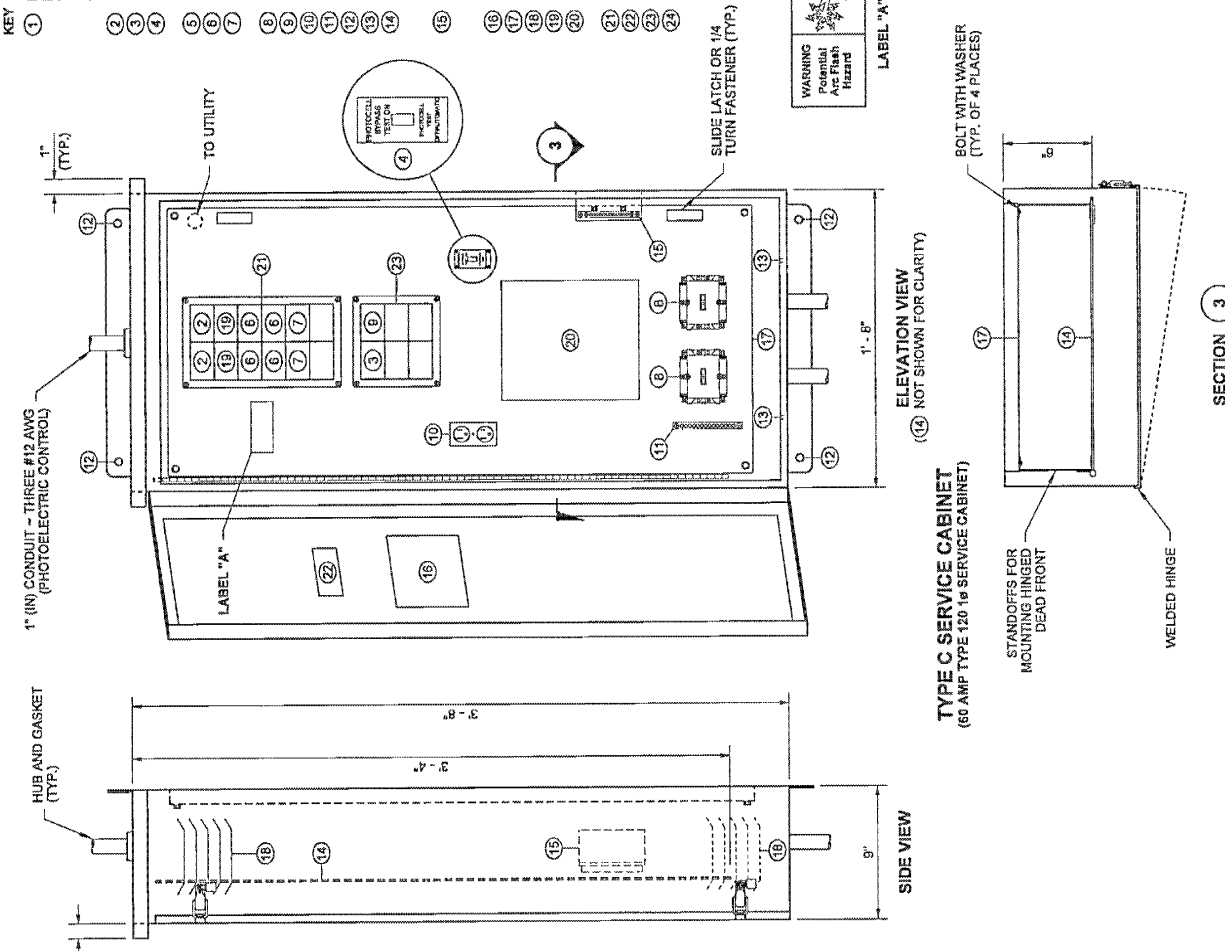
**MISCELLANEOUS**  
**EROSION CONTROL PLAN DETAILS**  
**STANDARD PLAN I-80.10-02**  
 SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
 06/15/2017 10:28 AM  
 J. Lidell  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

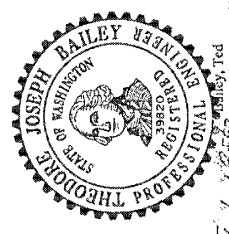


**NOTES (CONTINUED)**

9. See Standard Specification 9-29.24 (Service Cabinets).
10. Hinges shall have stainless steel or brass pins.
11. Cabinet shall be rated NEMA 3R and shall include two rain-tight vents.
12. The metering equipment door shall be pad-locked. Each door shall be gasketed. See Standard Plan J-10.20 for door hinge details. Concealed heavy-duty stainless steel lift-off hinges are allowed as an alternative. Upper left door shall have three hinges, lower left door shall have two hinges, and right door shall have three hinges. All doors shall have a two-position door stop assembly.
13. The following equipment within the service enclosure shall have an appropriately engraved phenolic name plate attached with screws or rivets:  
Key Number 4 name plate shall read as follows:  
"PHOTOCELL BYPASS TEST ON" AND "PHOTOCELL TEST OFF - AUTOMATIC."  
See service cabinet detail.
14. Dimensions shown are minimum and shall be adjusted to accommodate the various sizes of equipment installed.
15. All busswork shall be high-grade copper and shall equal or exceed the main breaker rating. All breakers shall bolt on to the busswork. Jumping of breakers shall not be allowed. Busswork shall accommodate all future equipment as shown in the Breaker Schedule.
16. The photoelectric control unit shall be centered in the photoelectric control enclosure to permit 360 degree rotation of the photoelectric control unit without removal of the photoelectric control unit or the photoelectric control enclosure.
17. All internal wire runs shall be identified with "TO - FROM" coded tags labeled with the code letters and/or numbers shown on the Schedules. Approved PVC or polyolefin wire marking sleeves shall be used.
18. All nuts, bolts, screws, and washers used for mounting the photoelectric control enclosure, conduit body covers, and junction box cover shall be ASTM F693 or A193 Type 304 or Type 316 stainless steel.
19. A 1% tolerance is allowed for all dimensions.
20. See Contract for Breaker Schedule.
21. Install conduit couplings on all conduits.
22. The photoelectric control enclosure shall be fabricated from 5/8" (in) expanded steel mesh with welded seams and mounting flanges and shall be hot-dip galvanized after fabrication. Type 5052 - H32 aluminum with 5/8" (in) x 5/8" (in) expanded steel mesh may be used as an alternative material. See Standard Plan J-10.20 for enclosure mounting details.
23. Slotted steel channel and mounting hardware components shall be stainless steel. Conduit clamps shall be hot-dip galvanized steel or stainless steel.
24. When using alternate door hinge, remove hinge pin prior to welding the hinge to the cabinet and prior to hot-dip galvanizing. After galvanizing, replace pin with a brass pin or solder in place. See Standard Plan J-10.20 for alternate door hinge details.



- KEY**
- 1 METER BASE PER SERVING UTILITY REQUIREMENTS - AS A MINIMUM, THE METER BASE SHALL BE SAFETY TYPE SOCKET WITH EACH COPY INSTALLED TEST BYPASS FACILITY. THE METERS AND INSTRUMENTS OF BUSERC DRAWING 304 - METER BASE ENCLOSURE SHALL BE FABRICATED FROM TYPE 304 STAINLESS STEEL.
  - 2 MAIN BREAKER (DPST - SIZE PER BREAKER SCHEDULE)
  - 3 PHOTOELECTRIC CONTROL BREAKER (SPST - 15 AMP - 120/240 VOLT)
  - 4 TEST SWITCH (SPDT - SNAP ACTION - POSITIVE CLOSE - 15 AMP - 120/277 VOLT - "T" RATED)
  - 5 PHOTOELECTRIC CONTROL UNIT - SEE STANDARD SPECIFICATION 9-29.11(2)
  - 6 BRANCH BREAKER (DPST - SIZE PER BREAKER SCHEDULE)
  - 7 SPARE BREAKER - SEE BREAKER SCHEDULE (DPST - 20 AMP - 240/480 VOLT)
  - 8 CONTACTOR - SEE BREAKER SCHEDULE
  - 9 RECEPTACLE BREAKER (SPST - 20 AMP - 120/240 VOLT)
  - 10 RECEPTACLE - GROUNDED (GFCI - 20 AMP - 125 VOLT)
  - 11 ISOLATED NEUTRAL BUSS - 14 LUG COPPER
  - 12 MOUNTING HOLE - SEE STANDARD PLAN J-10.20 FOR MOUNTING DETAILS
  - 13 1/4" (IN) DIAMETER DRAIN HOLE - DRILL BEFORE GALVANIZING
  - 14 HINGED DEAD FRONT WITH 1/4 TURN FASTENERS OR SLIDE LATCH - DEAD FRONT PANEL BOLTS SHALL NOT EXTEND INTO VERTICAL LIMITS OF THE BREAKER ARRAY(S)
  - 15 CABINET MAIN BONDING JUMPER ASSEMBLY - BUSS SHALL BE 12 LUG TINNED COPPER - SEE STANDARD PLAN J-10.20 FOR CABINET MAIN BONDING JUMPER ASSEMBLY DETAILS
  - 16 METAL WIRING DIAGRAM HOLDER
  - 17 REMOVABLE SUBPANEL FOR EQUIPMENT
  - 18 SCREENED VENTS - TWO REQUIRED (ONE EACH SIDE) - LOUVERED PLATES
  - 19 TRANSFORMER BREAKER (DPST - 15 AMP - 480 VOLT)
  - 20 DRY TRANSFORMER (480/120 VOLT) - 3 KVA - COPPER BUSSED AND COPPER WOUND
  - 21 12-CIRCUIT PANEL BOARD - MINIMUM SIZE WITH MAIN BREAKER
  - 22 LABEL CABINET WITH BUSSWORK RATING
  - 23 6-CIRCUIT PANEL BOARD - MINIMUM SIZE
  - 24 UTILITY DISCONNECT SWITCH ENCLOSURE WITH COVER - OMIT IF UTILITY DOES NOT REQUIRE THE DISCONNECT SWITCH

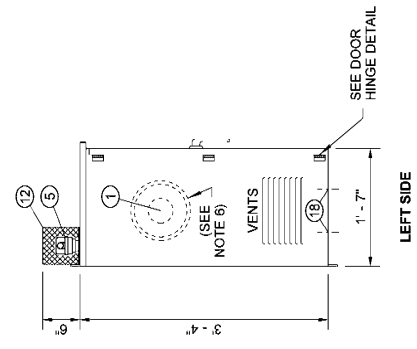
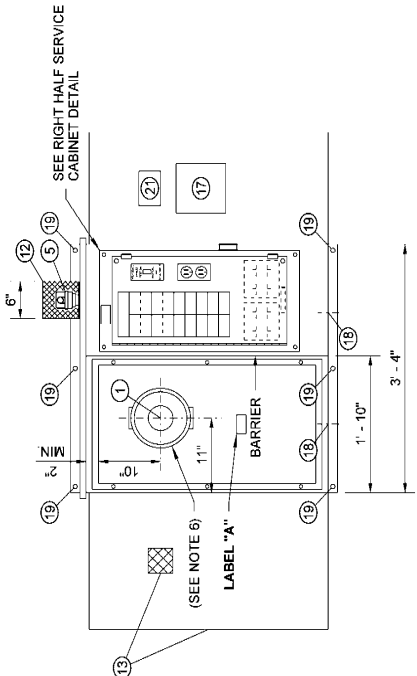
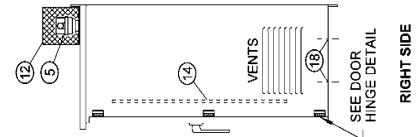


*Theodore Joseph Bailey*, May 28 2015 10:09 AM  
**SERVICE CABINET TYPE C**  
**(0 - 60 AMP TYPE 240/480**  
**VOLT SINGLE PHASE)**  
**STANDARD PLAN J-10.18-00**

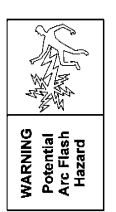
SHEET 2 OF 2 SHEETS  
 APPROVED FOR PUBLICATION  
 Bakerich, Panko  
 Jun 2 2015 4:20 PM  
*Alexander Bakerich*  
 STATE LICENSED ENGINEER  
 Washington State Department of Transportation

**KEY**

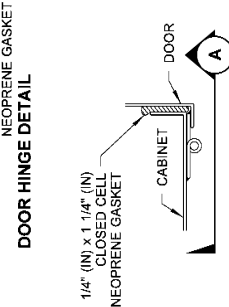
- 1 METER BASE PER SERVING UTILITY REQUIREMENTS - AS A MINIMUM THE METER BASE SHALL BE SAFETY SOCKET BOX WITH FACTORY INSTALLED TEST BYPASS FACILITY THAT MEETS THE REQUIREMENTS OF EUSERC DRAWING 305 - WHEN THE UTILITY REQUIRES METER BASE TO BE MOUNTED ON THE SIDE OR BACK OF THE SERVICE CABINET, THE METER BASE ENCLOSURE SHALL BE FABRICATED FROM TYPE 304 STAINLESS STEEL
- 2 MAIN BREAKER - DPST - SIZE PER BREAKER SCHEDULE
- 3 PHOTOCELL BREAKER - SPST 15 AMP - 120/240 VOLT
- 4 TEST SWITCH - SPDT SNAP ACTION - POSITIVE CLOSE 15 AMP - 120/277 VOLT - "T" RATED
- 5 PHOTOELECTRIC CONTROL - SEE STANDARD SPECIFICATION 9-29.11(2)
- 6 BRANCH BREAKER - SEE BREAKER SCHEDULE
- 7 SIGNAL BREAKER - SEE BREAKER SCHEDULE
- 8 CONTACTOR (BEHIND DEAD FRONT) - SEE BREAKER SCHEDULE
- 9 RECEPTACLE BREAKER - SPST 20 AMP - 120/240 VOLT
- 10 RECEPTACLE (GROUNDED) - GFCI 20 AMP - 125 VOLT
- 11 ISOLATED NEUTRAL BUSS - 14 LUG COPPER
- 12 PHOTOCELL ENCLOSURE - ENCLOSURE TO BE FABRICATED FROM 5/8" (IN) EXPANDED STEEL MESH WITH WELDED SEAMS AND MOUNTING FLANGES - HOT-DIP GALVANIZED AFTER FABRICATION - TYPE 5052 - H32 ALUMINUM WITH 5/8" (IN) X 5/8" (IN) OPENINGS EQUIVALENT TO 5/8" (IN) EXPANDED STEEL MESH MAY BE USED AS ALTERNATIVE MATERIAL - SEE PHOTOCELL MOUNTING DETAIL
- 13 HINGED FRONT FACING DOOR WITH 4" (IN) X 4" (IN) MINIMUM POLISHED WIRE GLASS WINDOW
- 14 HINGED DEAD FRONT WITH 1/4" TURN FASTENERS OR SLIDE LATCH (TYP) TO BE USED TO OPEN DOOR - DO NOT EXTEND INTO VERTICAL LIMITS OF THE BREAKER ARRAY(S)
- 15 CABINET MAIN BONDING JUMPER ASSEMBLY - BUSS SHALL BE 14 LUG TINNED COPPER - SEE CABINET MAIN BONDING JUMPER ASSEMBLY DETAIL
- 16 SPARE BRANCH BREAKER - DPST 20 AMP - 120/240 VOLT
- 17 METAL WRING DIAGRAM HOLDER
- 18 1/4" (IN) DIAMETER DRAIN HOLE - DRILL BEFORE GALVANIZING MOUNTING HOLE - SEE SERVICE CABINET MOUNTING DETAILS
- 19 18-CIRCUIT PANEL BOARD - MINIMUM SIZE WITH SEPARATE MAIN BREAKER
- 20 LABEL CABINET WITH BUSSWORK RATING



**SERVICE CABINET DETAIL**

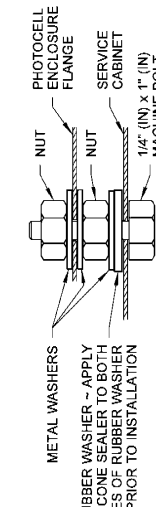
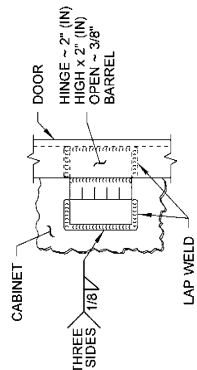


**DOOR HINGE DETAIL**

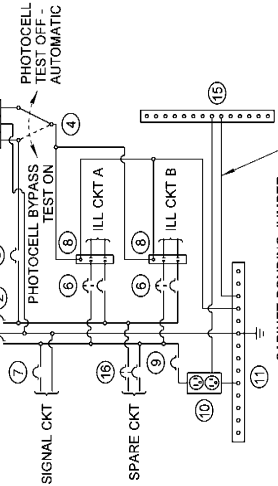
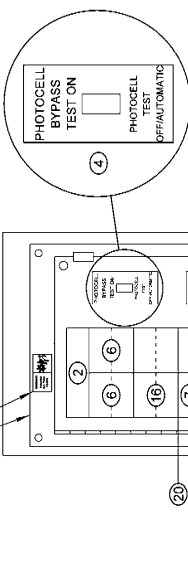


**DOOR HINGE DETAIL**

ALTERNATE TYPE B MODIFIED CABINET (SEE NOTE 16)

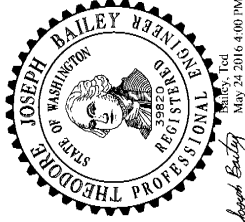


**PHOTOCELL ENCLOSURE MOUNTING DETAIL**



**RIGHT HALF SERVICE CABINET DETAIL**

**SECTION A**



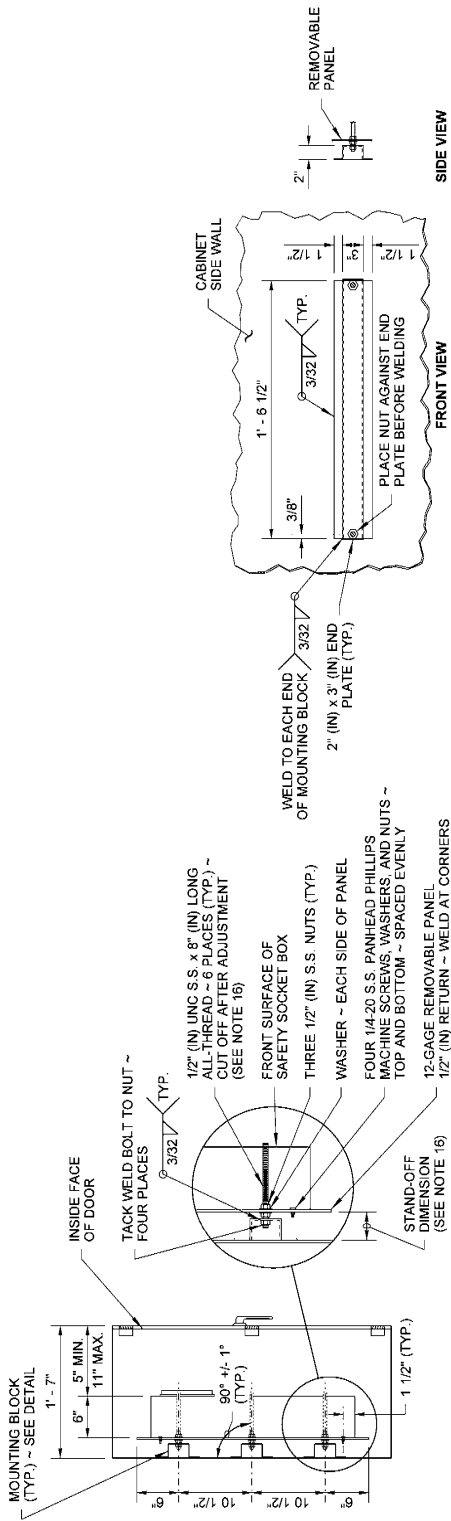
**SERVICE CABINET TYPE B MODIFIED (0 - 200 AMP TYPE 120/240 SINGLE PHASE) STANDARD PLAN J-10.20-01**

APPROVED FOR PUBLICATION  
 Engineer: Colby Fletcher  
 State Design Engineer  
 Washington State Department of Transportation

**NOTES (200 AMP TYPE 120/240 1ø SERVICE CABINET)**

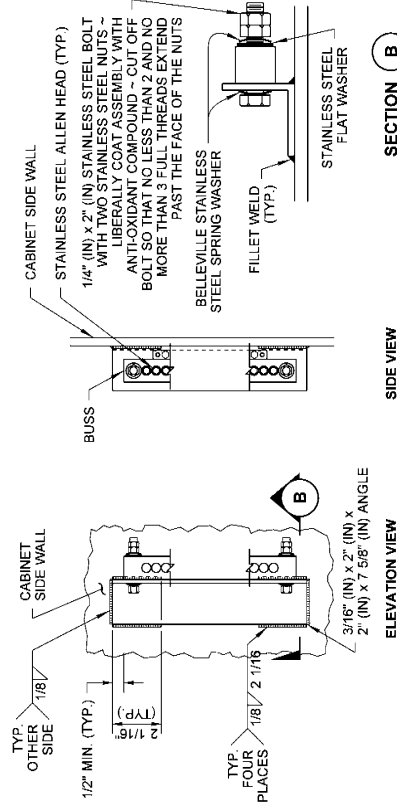
1. See **Standard Specification 9-29-24** (Service Cabinets).
2. Hinges shall have stainless steel or brass pins.
3. Cabinets shall be rated NEMA 3R and shall include two rain-tight vents.
4. Metering equipment door shall be pad-lockable. Each door shall be gasketed. Install Best CX Construction Core on right side door. See Door Hinge Detail.
5. The following equipment within the service enclosure shall have an appropriately engraved phenolic name plate attached with screws or rivets:  
Key Numbers 2, 3, 4, 6, 7, 8, 9, & 16  
Key Number 4 name plate shall read:  
"PHOTOCELL BYPASS TEST ON" and "PHOTOCELL TEST OFF-AUTOMATIC". See Service Cabinet Detail.
6. Metering arrangements vary with different serving Utilities. The Utility may require meter base mounting in the enclosure, on the side, or on the back of the enclosure. The Utility may require the dimension between the door and the front of the safety socket box to be less than the 11" (in) shown in the Left Side - Safety Socket Box Mounting Detail. The Contractor shall verify the serving Utility's requirements prior to fabrication and installation of the service equipment.
7. Dimensions shown are minimum and shall be adjusted to accommodate the various sizes of equipment installed.
8. All busswork shall be high-grade copper and shall equal or exceed the main breaker rating. All breakers shall bolt onto the busswork. Jumping of breakers shall not be allowed. Busswork shall accommodate all future equipment as shown in the breaker schedule.
9. The photocell unit shall be centered in the photocell enclosure to permit 360 degree rotation of the photocell without removal of the photocell unit or the photocell enclosure.
10. All internal wire runs shall be identified with "TO - FROM" coded tags labeled with the code letters and/or numbers shown on the schedules. Approved PVC or polyolefin wire marking sleeves shall be used.
11. All nuts, bolts, and washers used for mounting the photocell enclosure shall be stainless steel.
12. A 1% tolerance is allowed for all dimensions.
13. Slotted steel channel and mounting hardware components shall be stainless steel. Conduit clamps shall be hot-dipped galvanized steel or stainless steel.
14. The meter base portion of this service was designed to meet metering portion of **EUSERC Drawing 309** requirements.
15. When using alternate door hinge:  
Remove hinge pin prior to welding hinge to cabinet and prior to hot-dip galvanizing. After galvanizing, replace pin with brass pin and solder in place.
16. Verify the service utility stand-off dimension. Adjust the removable panel to the measurement provided by the Utility Company. After adjustment, cut off all-thread bolts so that no less than two and no more than three full threads extend past the face of the nuts.
17. As an alternate to the bolted or field welded strut mount supports, 1 5/8" (in) x 3 1/4" (in) 12-gage continuous slotted steel channel or factory welded 1 5/8" (in) x 1 5/8" (in) 12-gage back to back continuous slotted steel channel may be used. Three pairs required.

DRAWN BY: COLBY FLETCHER

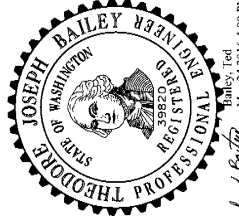


**LEFT SIDE - SAFETY SOCKET BOX MOUNTING DETAIL**

**MOUNTING BLOCK DETAIL**  
12-GAGE - MATERIAL SHALL BE THE SAME AS CABINET MATERIAL



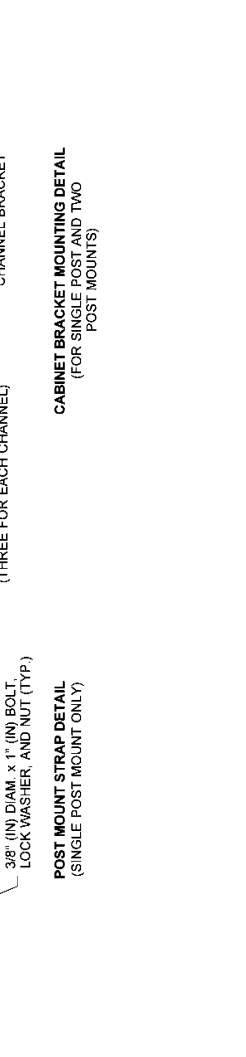
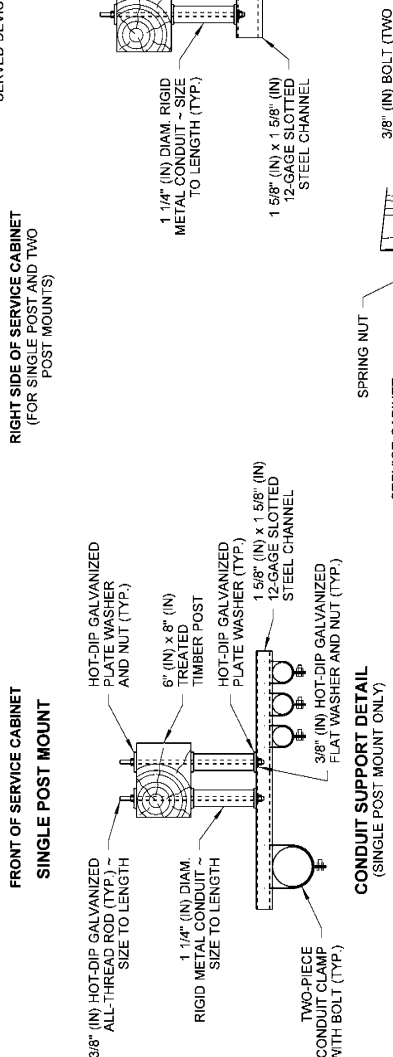
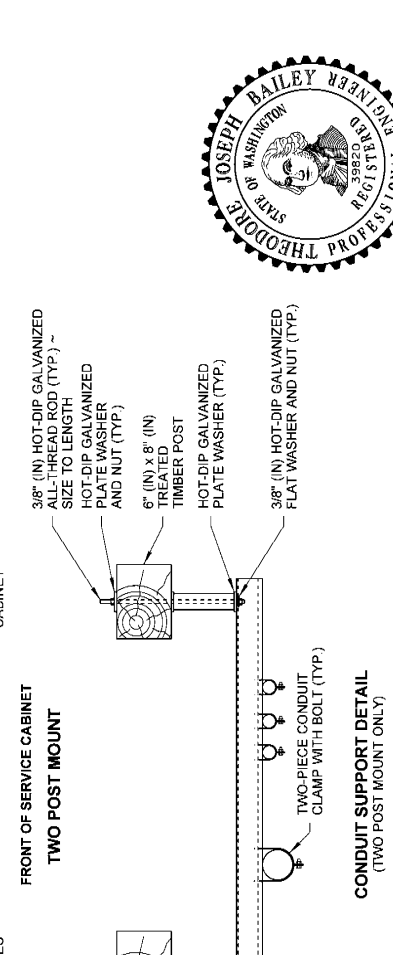
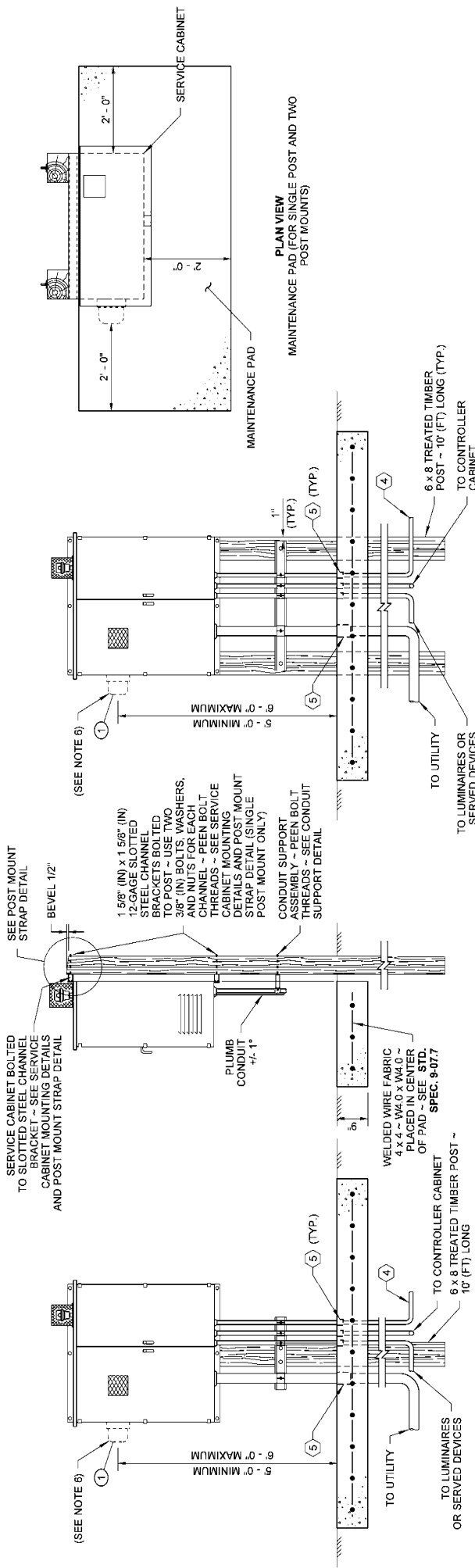
**CABINET MAIN BONDING JUMPER ASSEMBLY DETAIL**



**THEODORE JOSEPH BAILEY**  
REGISTERED PROFESSIONAL ENGINEER  
MECHANICAL  
May 24 2016 4:00 PM  
**SERVICE CABINET TYPE B**  
**MODIFIED (0 - 200 AMP TYPE**  
**120/240 SINGLE PHASE)**  
**STANDARD PLAN J-10.20-01**

SHEET 2 OF 5 SHEETS

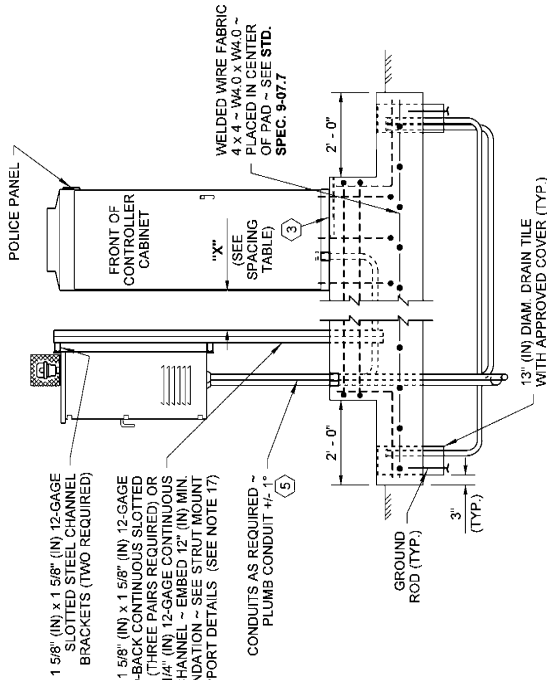
APPROVED FOR PUBLICATION  
Carpenter, Jeff  
Jan 17 2016 3:46 PM  
STATE DESIGN ENGINEER  
Washington State Department of Transportation



*Theodor Joseph Bailey*  
 May 24, 2016 4:00 PM  
**SERVICE CABINET TYPE B**  
**MODIFIED (0 - 200 AMP TYPE**  
**120/240 SINGLE PHASE)**  
**STANDARD PLAN J-10.20-01**  
 SHEET 3 OF 5 SHEETS

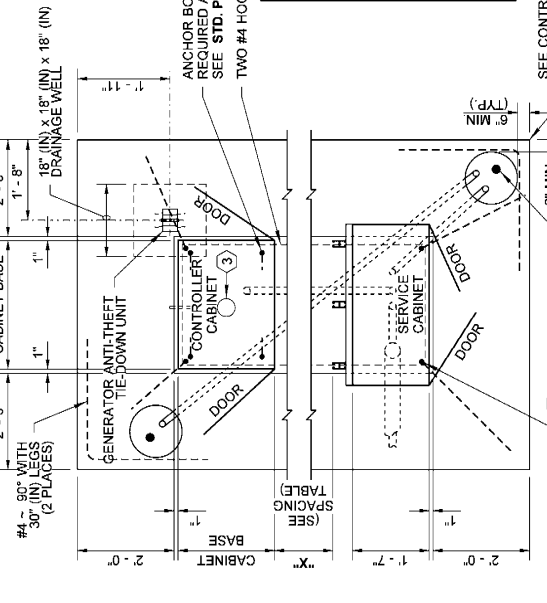
APPROVED FOR PUBLICATION  
 Christopher Jeff  
 June 1, 2016 3:59 PM  
 STATE DESIGN ENGINEER  
 Washington, State Department of Transportation

- ① DRIVE GROUND RODS BEFORE PLACING CONCRETE. MOVE RODS AND DRAIN TILES WITH COVERS AS REQUIRED TO ACHIEVE FULL GROUND PENETRATION ~ MAINTAIN A 6" (FT) MINIMUM CLEARANCE BETWEEN GROUND RODS AS DETAILED ON STANDARD PLAN J-60.05
- ② ALL RMC CONDUITS PENETRATING CABINET SHALL BE TERMINATED WITH GROUNDING END BUSHING AND BONDED TO THE CABINET GROUNDING BUSS
- ③ 4" (IN) DIAM. x 1/2" (IN) DEEP SUMP. SLOPE FOUNDATION TOWARD SUMP ~ 3/8" (IN) DIAM. POLYETHYLENE OR COPPER DRAIN PIPE ~ SLOPE TO DRAIN OUTSIDE FOUNDATION ~ LOCATE DRAIN AWAY FROM ACCESS DOORS TO SERVICE GROUND ~ PER STANDARD PLAN J-60.05
- ④ INSTALL CONDUIT COUPLINGS ON ALL CONDUITS ~ TOP OF CONDUIT COUPLINGS SHALL BE FLUSH WITH TOP OF CONCRETE ~ IF PVC CONDUITS ARE SPECIFIED, THE CONDUIT STOP AND END BUSHING SHALL NOT BE GLUED TO THE COUPLING

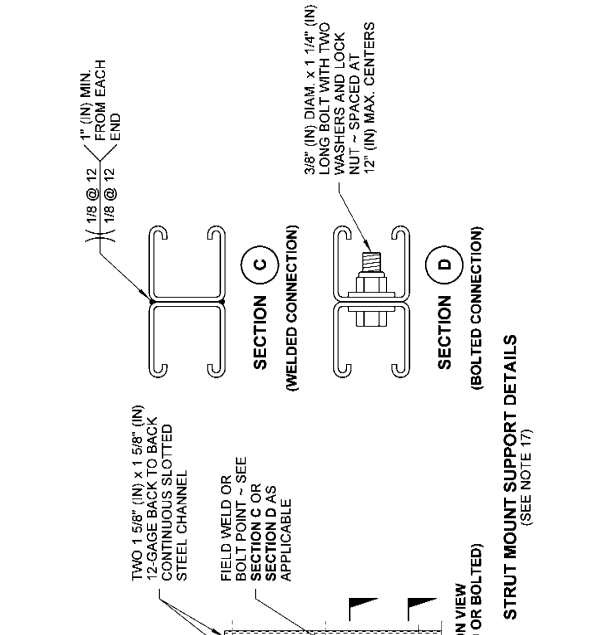
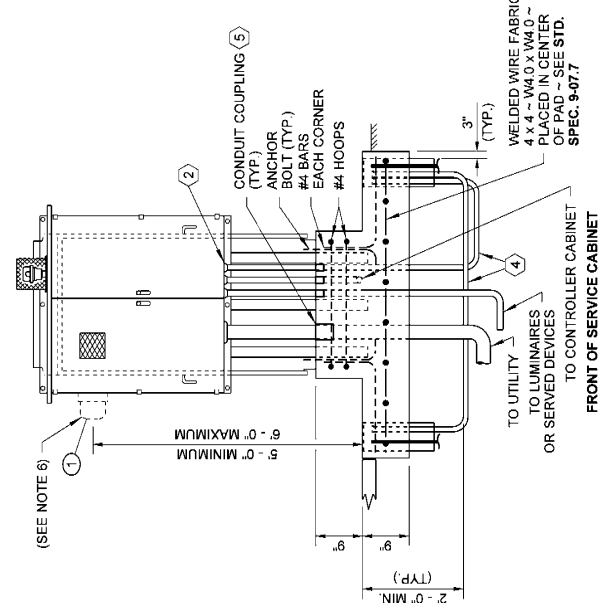


CABINET TYPE	"X"
332 OR 334 TYPE CABINET	26"
333SD TYPE CABINET	24"
332D OR 334D TYPE CABINET	26"
NEMA P44 TYPE CABINET	46 1/2"

FOR A SPECIAL DESIGN CABINET THAT IS NOT LISTED ON STD. PLAN J-10.10: "X" = WIDTH OF DOOR OPEN TO 180° PLUS 2 INCHES



PLAN VIEW OF SERVICE CABINET  
 #4 BAR EACH CORNER ① GROUND ROD (TYP.) ⑥ SEE CONTROLLER CABINET FOUNDATION DETAILS ON STANDARD PLAN J-10.10 FOR CABINET DIMENSION TABLE AND DETAILS NOT SHOWN



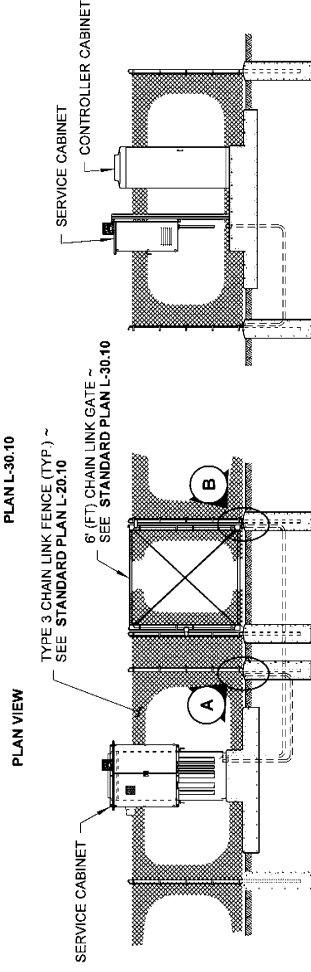
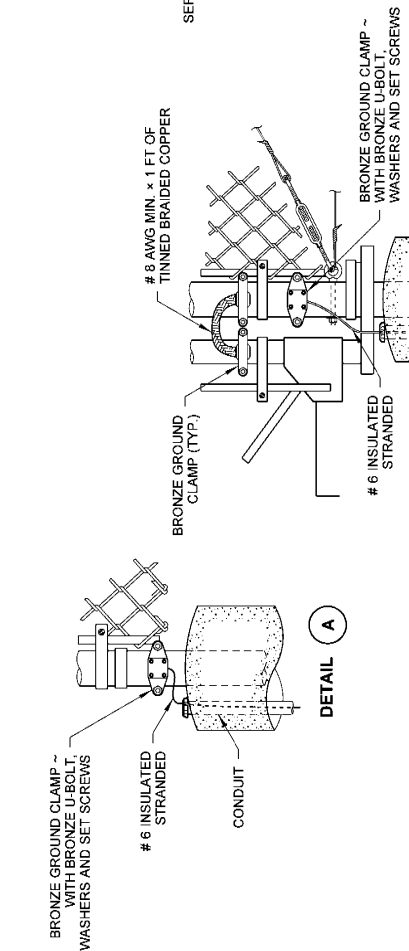
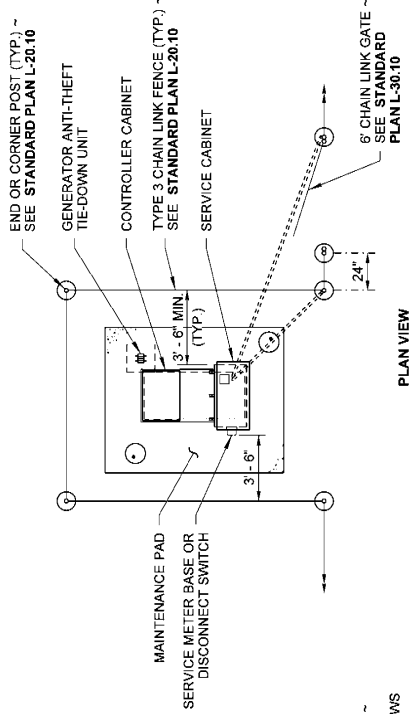
STRUT MOUNT SUPPORT DETAILS (SEE NOTE 17)



**SERVICE CABINET TYPE B  
 MODIFIED (0 - 200 AMP TYPE  
 120/240 SINGLE PHASE)  
 STANDARD PLAN J-10.20-01**

SHEET 4 OF 5 SHEETS

APPROVED FOR PUBLICATION  
 Carpenter, Jeff  
 Jan 13/16 3:49 PM  
 STATE DESIGN ENGINEER  
 Washington, State Department of Transportation

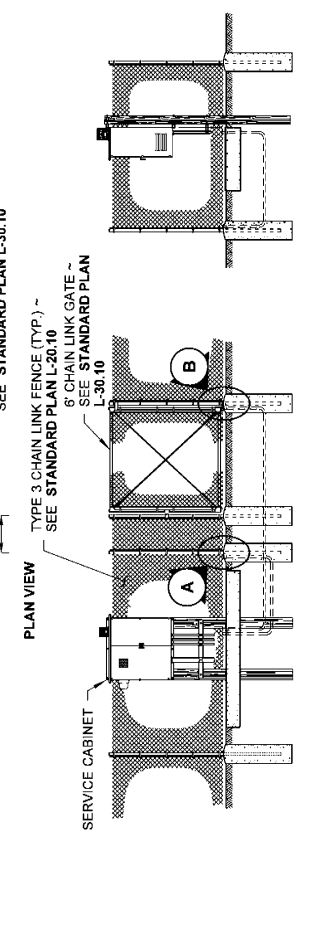
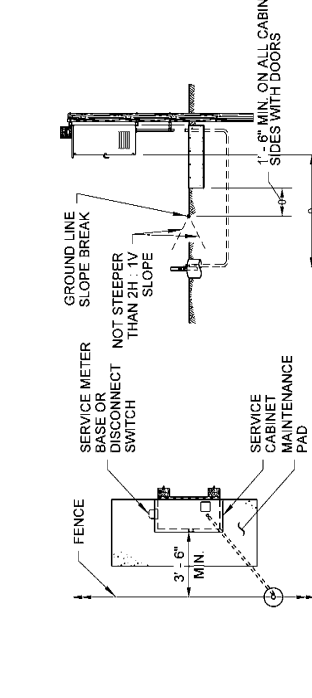


**ELEVATION VIEW**  
**PAD MOUNTED SERVICE CABINET WITHIN RIGHT-OF-WAY FENCE**  
 FOR CONDUITS NOT SHOWN, DRAIN TILE FOR GROUNDING, DRAIN TUBES, REINFORCING STEEL, ETC. OMITTED FOR CLARITY, SEE SHEET 4 FOR ADDITIONAL DETAILS.

*Theodore Joseph Bailey*  
 Bailey, Ted  
 May 24, 2016 4:01 PM

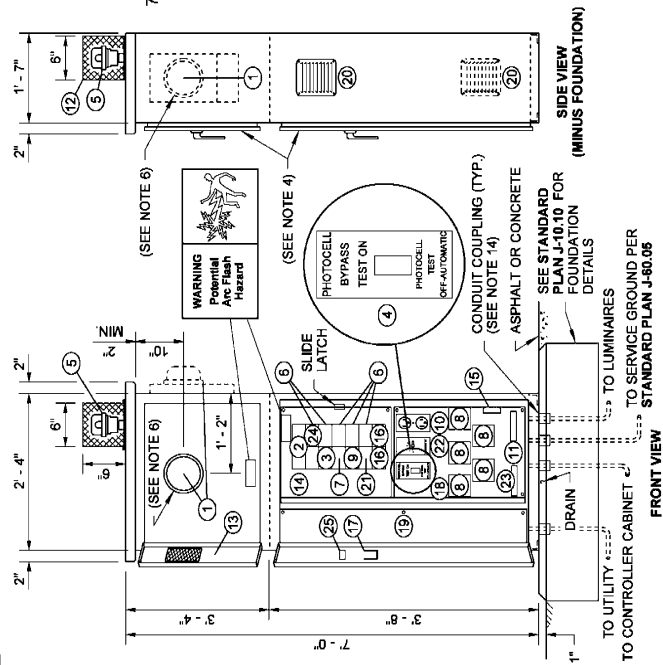
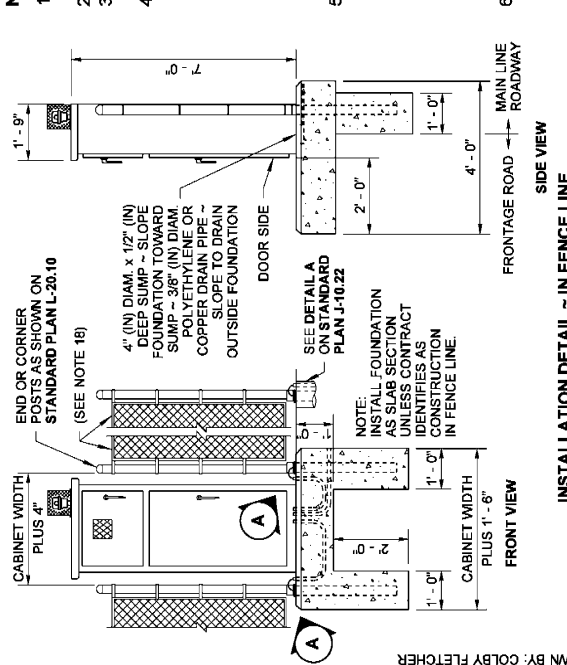
**SERVICE CABINET TYPE B**  
**MODIFIED (0 - 200 AMP TYPE**  
**120/240 SINGLE PHASE)**  
**STANDARD PLAN J-10.20-01**

SHEET 5 OF 5 SHEETS  
 APPROVED FOR PUBLICATION  
 11/11/2016 3:50 PM  
*Christopher Hoff*  
 STATE DESIGN ENGINEER  
 Washington, State Department of Transportation



**ELEVATION VIEW**  
**POST MOUNTED SERVICE CABINET WITHIN RIGHT-OF-WAY FENCE**  
 FOR CONDUITS NOT SHOWN, DRAIN TILE FOR GROUNDING, DRAIN TUBES, REINFORCING STEEL, ETC. OMITTED FOR CLARITY, SEE SHEET 4 FOR ADDITIONAL DETAILS.

**PLAN VIEW**  
**SERVICE CABINET IN VICINITY OF CHAIN LINK FENCE**  
 POST MOUNTED SERVICE CABINET SHOWN.  
 PAD MOUNTED SERVICE CABINET SIMILAR

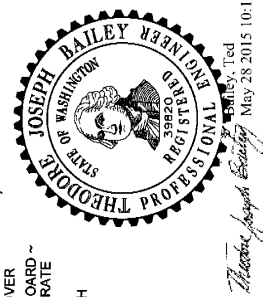


**NOTES (200 AMP TYPE 120/240 1ø SERVICE CABINET)**

1. See Standard Specification 9-29.24 (Service Cabinets).
2. Hinges shall have stainless steel or brass pins.
3. Cabinets shall be rated NEMA 3R and shall include two rain-tight vents.
4. Metering equipment door shall be pad-locked. Each door shall be gasketed. Install Best CX Construction Core on bottom door. See Door Hinge Detail, Standard Plan J-10.20. Concealed heavy-duty stainless steel lift-off hinges are allowed as an alternative to Door Hinge Detail on Standard Plan J-10.20. Upper door shall have two hinges and lower door shall have three hinges. The lower door shall have a two-position door stop assembly. The following equipment within the service enclosure shall have an appropriately engraved phenolic name plate attached with screws or rivets:  
Key Numbers 2, 3, 4, 6, 7, 8, 9, 16, & 21  
Key Number 4 name plate shall read:  
"PHOTOCELL BYPASS TEST ON" and  
"PHOTOCELL TEST OFF-AUTOMATIC."  
See Service Cabinet Detail.
5. Metering arrangements vary with different serving Utilities. The Utility may require meter base mounting in the enclosure, on the side, or on the back of the enclosure. The Utility may require the dimension between the door and the front of the safety socket box to be less than the 11" (in) shown in the Left Side - Safety Socket Box Mounting Detail. See Standard Plan J-10.10 for Safety Socket Box Detail. The Contractor shall verify the serving Utility's requirements prior to fabrication and installation of the service equipment.
6. Dimensions shown are minimum and shall be adjusted to accommodate the various sizes of equipment installed.

**KEY**

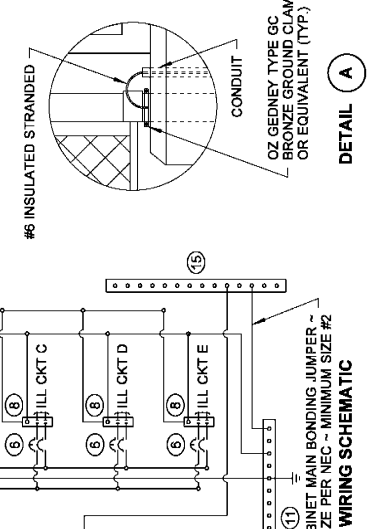
1. METER BASE PER SERVING UTILITY REQUIREMENTS - AS A MINIMUM, THE METER BASE SHALL BE SAFETY SOCKET BOX WITH FACTORY-INSTALLED TEST BYPASS FACILITY THAT MEETS THE REQUIREMENTS OF EUSERC DRAWING 905 - WHEN THE UTILITY REQUIRES METER BASE TO BE MOUNTED ON THE SIDE OR BACK OF THE SERVICE CABINET, THE METER BASE ENCLOSURE SHALL BE FABRICATED FROM TYPE 304 STAINLESS STEEL.
2. MAIN BREAKER - SEE BREAKER SCHEDULE
3. PHOTOCELL BREAKER - SPST 15 AMP - 120/240 VOLT
4. TEST SWITCH - SPDT SNAP ACTION - POSITIVE CLOSE 15 AMP - 120/277 VOLT - "T" RATED
5. PHOTOELECTRIC CONTROL - SEE STANDARD SPECIFICATION 9-29.11(2)
6. BRANCH BREAKER - SEE BREAKER SCHEDULE
7. SIGNAL BREAKER - SEE BREAKER SCHEDULE
8. CONTACTOR - SEE BREAKER SCHEDULE
9. RECEPTACLE BREAKER - SPST 20 AMP - 120/240 VOLT
10. RECEPTACLE (GROUNDED) - GFCI 20 AMP - 125 VOLT
11. ISOLATED NEUTRAL BUSS - 14 LUG COPPER
12. PHOTOCELL ENCLOSURE - ENCLOSURE TO BE FABRICATED FROM ENGRAVED PHENOLIC ALUMINUM AFTER FABRICATION. TYPE 304 MOUNTING FLANGES - HOT DIP GALVANIZED AFTER FABRICATION. TYPE 304 MATERIAL - SEE PHOTOCELL MOUNTING DETAIL ON STANDARD PLAN J-10.20
13. HINGED FRONT FACING DOOR WITH 4" (IN) x 4" (IN) MINIMUM POLISHED WIRE GLASS WINDOW
14. HINGED DEAD FRONT WITH 1/4 TURN FASTENERS OR SLIDE LATCH - DEAD FRONT PANEL BOLTS SHALL NOT EXTEND INTO VERTICAL LIMITS OF THE BREAKER ARRAY(S)
15. CABINET MAIN BONDING JUMPER ASSEMBLY - BUSS SHALL BE 14 LUG TINNED COPPER - SEE CABINET MAIN BONDING JUMPER ASSEMBLY DETAIL ON STANDARD PLAN J-10.20
16. SPARE BRANCH BREAKER - DPST 20 AMP - 120/240 VOLT
17. METAL WIRING DIAGRAM HOLDER
18. REMOVABLE EQUIPMENT MOUNTING PAN - 6" (IN) x 6" (IN) MIN. UNDERGROUND FEED - SERVICE W/REWAY (LEFT REAR CORNER)
19. HEATER BREAKER - SPST 15 AMP - 120/240VOLT
20. THERMOSTAT - 40° F CLOSURE - 3 DIFFERENTIAL
21. STRIP HEATER (100 WATT NOMINAL) WITH TERMINAL STRIP COVER
22. 24-CIRCUIT PANEL BOARD - MINIMUM SIZE SEPARATE MAIN BREAKER
23. LABEL CABINET WITH BUSSWORK RATING



**SERVICE CABINET TYPE D  
(0 - 200 AMP TYPE  
120/240 SINGLE PHASE)  
STANDARD PLAN J-10.21-00**

SHEET 1 OF 1 SHEET

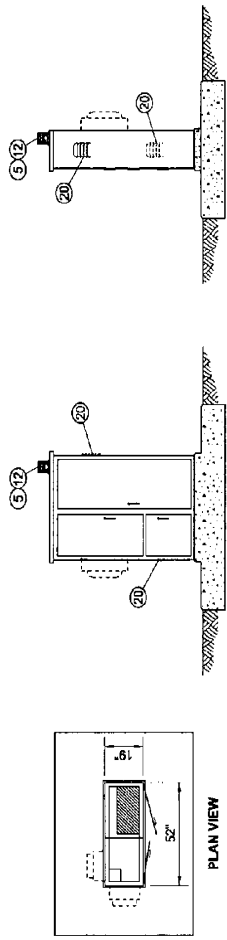
APPROVED FOR PUBLICATION  
Bakovich, Pasco  
Jan. 2015 4:22 PM  
STATE DESIGN ENGINEER  
Washington State Department of Transportation



DRAWN BY: COLBY FLETCHER

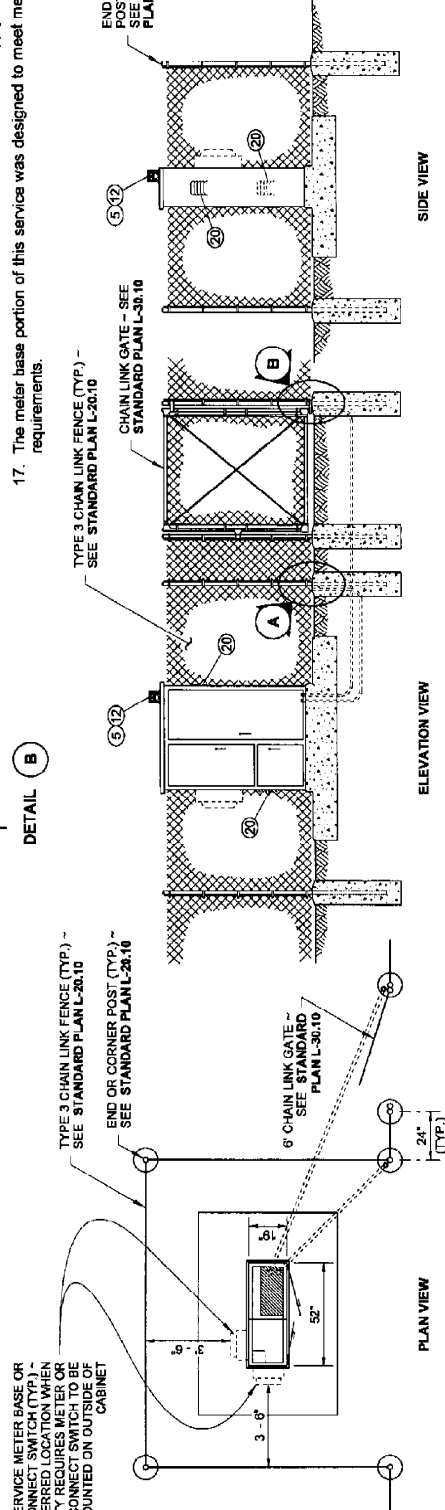
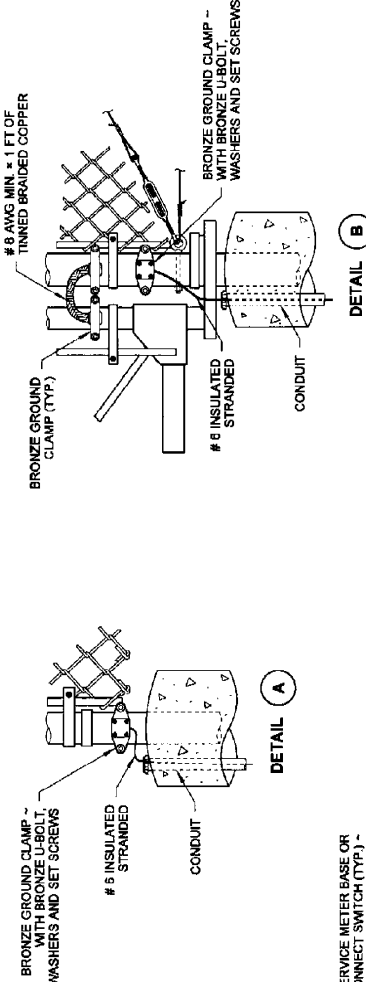
**NOTES**

1. Metering Arrangements vary with different servicing utilities. The utility may require meter base mounting in the enclosure, on the side, or on the back of the enclosure. The utility may require the dimension between the door and the front of the safety socket box to be less than the 11" shown in the left side safety socket box mounting detail, see Standard Plan J-3b. The Contractor shall verify the servicing utility's requirements prior to fabrication of and installing the service equipment.
2. The requirement for a disconnect switch ahead of the Meter varies with different servicing utilities. The Contractor shall verify the servicing utilities requirements prior to fabrication and installing the service equipment.
3. See Standard Specification 9-29.24, Service Cabinets.
4. Hinges shall have stainless steel or brass pins.
5. Cabinets shall be rated NEMA 3R and shall include two rain tight vents.
6. Metering equipment doors shall be pad lockable. Each door shall be gasketed. Install best construction core on bottom left and right doors. See door hinge detail, Standard Plan J-3b. Concealed heavy duty stainless steel lift off hinges are allowed as an alternative. Upper left door shall have 3 hinges, lower left door shall have 2 hinges, and right door shall have 3 hinges. All doors shall have a two position door stop assembly.
7. The following equipment within the service enclosure shall have an appropriately engraved phenolic name plate attached with screws or rivets: Key number 2, 3, 4, 6, 7, 8, 9, 16, 21 and 24. Key number 4 name plate shall read: "Photocell Bypass Test On" and "Photocell Test Off-Automatic". See Service Cabinet detail.
8. The dimensions shown are minimum and shall be adjusted to accommodate the various sizes of equipment installed.
9. All busswork shall be high grade copper and shall equal or exceed the main breaker rating. All breakers shall bolt onto the busswork. Jumping of breakers shall not be allowed. Busswork shall accommodate all future equipment as shown in the breaker schedule.
10. The photocell unit shall be centered in the photocell enclosure to permit 360 degree rotation of the photocell without removal of the photocell unit or the photocell enclosure.
11. All internal wire runs shall be identified with "To-From" coded tags labeled with the code letters and/or numbers shown on the schedules. Approved PVC or Polyolefin wire marking sleeves shall be used.
12. All nuts, bolts, and washers used for mounting photocell enclosure shall be stainless steel.
13. A 1% tolerance is allowed for all dimensions.
14. See plans for breaker schedule.
15. Install conduit couplings on all conduits. Place couplings flush with top of concrete foundation.
16. Seal cabinet to foundation with a 1/2" bead of silicone. Apply silicone to dry surface only.
17. The meter base portion of this service was designed to meet metering portion of Euserc Drawing 309 requirements.



**SERVICE CABINET INSIDE RIGHT-OF-WAY**

INSTALL FOUNDATION AS SLAB SECTION UNLESS IDENTIFIED FOR CONSTRUCTION IN FENCE LINE IN CONTRACT PLANS



**SERVICE CABINET WITHIN RIGHT-OF-WAY FENCE**

FOR CONDUITS NOT SHOWN, DRAIN TILE FOR GROUNDING, DRAIN TUBES, REINFORCING STEEL, ETC. OMITTED FOR CLARITY, SEE STANDARD PLAN J-10.10 FOR DETAILS.

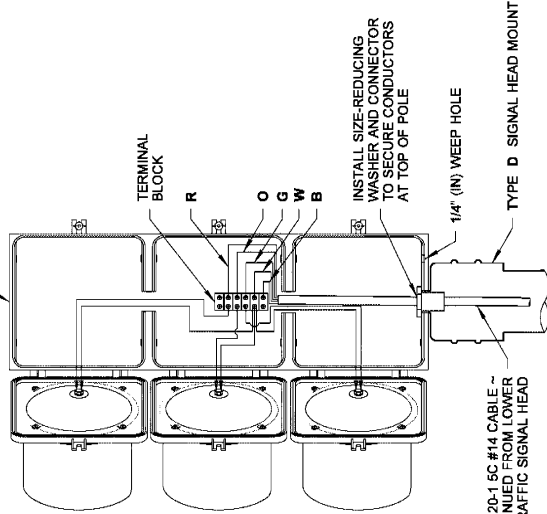


**SERVICE CABINET TYPE E  
(0 - 200 AMP TYPE 240/480  
SINGLE PHASE  
STANDARD PLAN J-10.22-00**

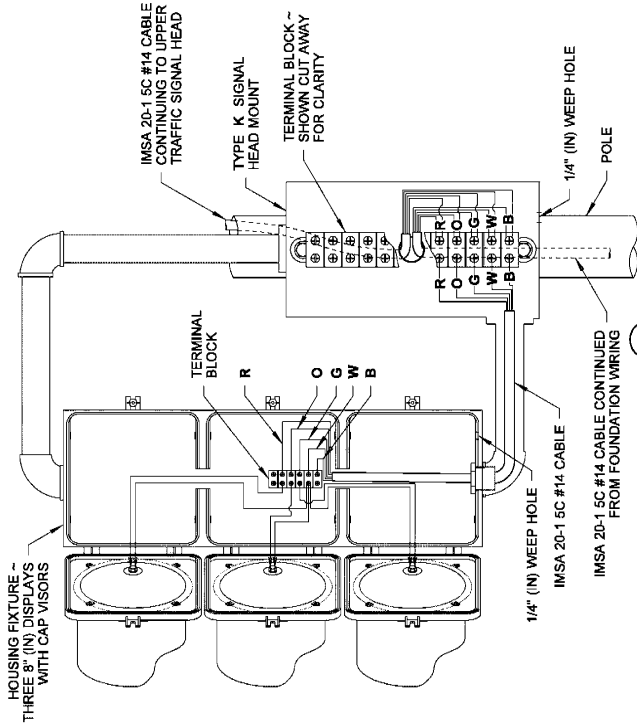
SHEET 1 OF 2 SHEETS  
 APPROVED FOR PUBLICATION  
 DATE 5/29/13  
 STATE ENGINEER  
 Washington State Department of Transportation



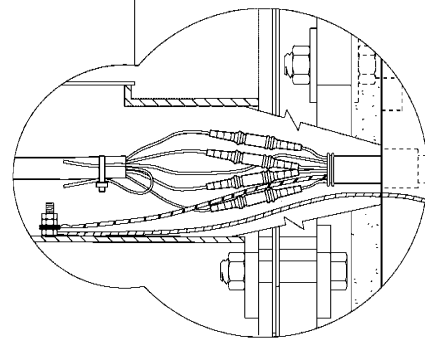
HOUSING FIXTURE -  
THREE 12" (IN) DISPLAYS  
WITH TUNNEL VISORS



**DETAIL A**  
UPPER TRAFFIC SIGNAL HEAD WIRING  
(BACKPLATE NOT SHOWN FOR CLARITY)



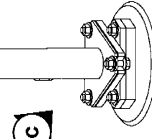
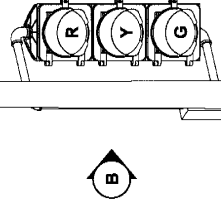
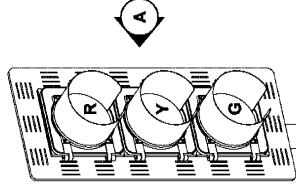
**DETAIL B**  
LOWER TRAFFIC SIGNAL HEAD WIRING  
(SHOWN LARGER FOR CLARITY)



**DETAIL C**  
FOUNDATION WIRING

**NOTES**

1. See **Standard Plan J-21.10** for Ramp Meter Signal Standard and Foundation Details.
2. See **Standard Specification 9-28.17** for additional Mounting Bracket and Fitting information not shown.
3. Top of Leveling Nut height shall be 1" (in) max. above foundation.
4. Heat-shrink cap for all spare conductors not terminated on a terminal strip.
5. Provide Cable Tie at wiring entering the Junction Box (Slip Base installations only). See **Detail A, Standard Plan J-28.70**.



**PERSPECTIVE VIEW  
RAMP METER**

COLOR CODE	USE
R	RED DISPLAY
O	AMBER DISPLAY
G	GREEN DISPLAY
W	NEUTRAL CONDUCTOR
B	SPARE CONDUCTOR



*Theodore Joseph Bailey*  
Jul 8 2015 3:08 PM

**RAMP METER  
SIGNAL STANDARD  
ELECTRICAL DETAILS**

**STANDARD PLAN J-22.16-03**

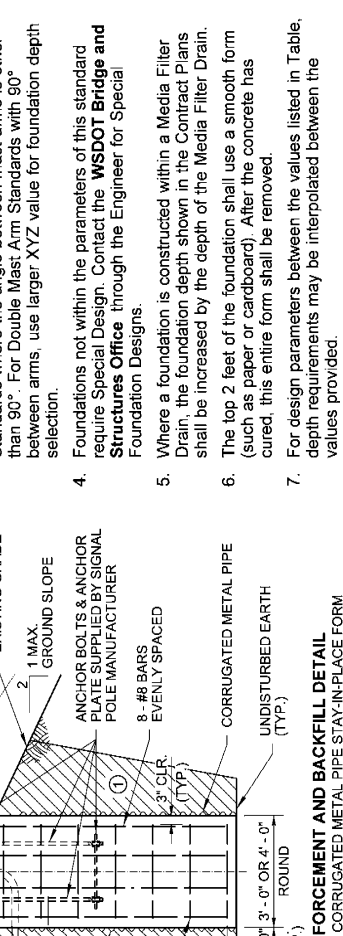
SHEET 1 OF 1 SHEET

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Carpenter, Jeff  
Jul 10 2015 7:19 AM

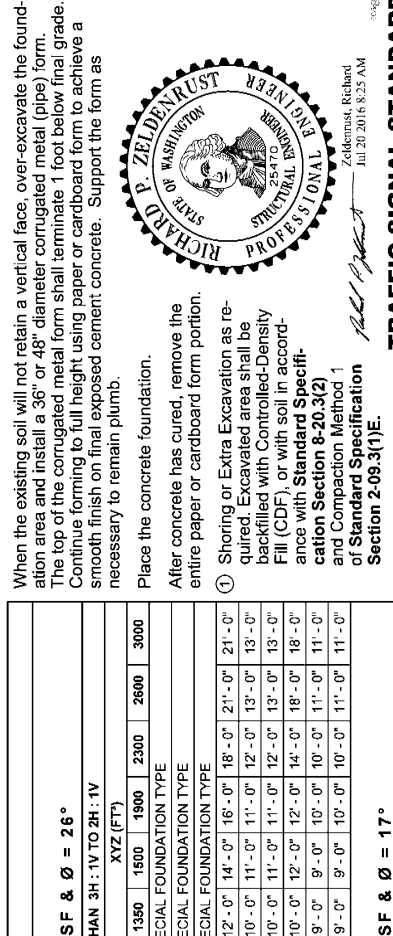
STATE DESIGN ENGINEER  
Washington State Department of Transportation

- NOTES**
- This structure has been designed according to the Fifth Edition 2009 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Basic wind velocity is 90 mph. Design Life/Recurrence Interval 50 years, and Fatigue Category III.
  - Foundations are designed for Type II, III, and SD Signal Standards with a maximum mast arm length of 65'.
  - Foundations are designed for Single Mast Arm Standards and Double Mast Arm Standards with 90° between arms. Special foundation design is required for Double Arm Standards where the angle between mast arms is other than 90°. For Double Mast Arm Standards with 90° between arms, use larger XYZ value for foundation depth selection.
  - Foundations not within the parameters of this standard require Special Design. Contact the **WSDOT Bridge and Structures Office** through the Engineer for Special Foundation Designs.
  - Where a foundation is constructed within a Media Filter Drain, the foundation depth shown in the Contract Plans shall be increased by the depth of the Media Filter Drain.
  - The top 2 feet of the foundation shall use a smooth form (such as paper or cardboard). After the concrete has cured, this entire form shall be removed.
  - For design parameters between the values listed in Table, depth requirements may be interpolated between the values provided.
  - Install Signal Foundation Identification Tag. See Standard Plan J-26.15 for details.

**ALTERNATE #1**  
**FOUNDATION REINFORCEMENT DETAIL**  
 CONCRETE CAST DIRECTLY AGAINST UNDISTURBED EARTH, DRILLED SHAFT



**ALTERNATE #2**  
**FOUNDATION REINFORCEMENT AND BACKFILL DETAIL**  
 CONCRETE CAST WITHIN A CORRUGATED METAL PIPE STAY-IN-PLACE FORM



**FOUNDATION DEPTH "D" TABLE**  
**ALTERNATE #1 DRILLED SHAFT-TYPE CONSTRUCTION**  
 FOR LATERAL BEARING PRESSURE = 2500 PSF & Ø = 34°, 1500 PSF & Ø = 28°, 1000 PSF & Ø = 26°

ALLOWABLE LATERAL BEARING PRESSURE	FOUNDATION TYPE	GROUND SLOPE = GREATER THAN 3H: 1V TO 2H: 1V									
		700	900	1350	1500	1900	2300	2600	3000	3000	3000
1000 PSF	3'-0" ROUND	10'-0"	10'-0"	11'-0"	11'-0"	15'-0"	18'-0"	20'-0"	20'-0"	20'-0"	20'-0"
	3'-0" SQUARE	8'-0"	8'-0"	9'-0"	9'-0"	10'-0"	11'-0"	12'-0"	12'-0"	12'-0"	12'-0"
	4'-0" ROUND	8'-0"	8'-0"	9'-0"	9'-0"	10'-0"	11'-0"	12'-0"	12'-0"	12'-0"	12'-0"
1500 PSF	3'-0" ROUND	7'-0"	7'-0"	8'-0"	8'-0"	11'-0"	13'-0"	15'-0"	18'-0"	18'-0"	18'-0"
	3'-0" SQUARE	7'-0"	7'-0"	7'-0"	8'-0"	8'-0"	9'-0"	10'-0"	10'-0"	10'-0"	10'-0"
	4'-0" ROUND	7'-0"	7'-0"	7'-0"	8'-0"	8'-0"	9'-0"	10'-0"	10'-0"	10'-0"	10'-0"
2500 PSF OR GREATER	3'-0" ROUND	6'-0"	6'-0"	7'-0"	7'-0"	8'-0"	8'-0"	11'-0"	15'-0"	15'-0"	15'-0"
	3'-0" SQUARE	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	7'-0"	8'-0"	8'-0"	8'-0"
	4'-0" ROUND	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	7'-0"	7'-0"	8'-0"	8'-0"

ALLOWABLE LATERAL BEARING PRESSURE	FOUNDATION TYPE	GROUND SLOPE = GREATER THAN 3H: 1V TO 2H: 1V									
		700	900	1350	1500	1900	2300	2600	3000	3000	3000
1000 PSF	3'-0" ROUND	10'-0"	10'-0"	11'-0"	11'-0"	15'-0"	18'-0"	20'-0"	20'-0"	20'-0"	20'-0"
	3'-0" SQUARE	8'-0"	8'-0"	9'-0"	9'-0"	10'-0"	11'-0"	12'-0"	12'-0"	12'-0"	12'-0"
	4'-0" ROUND	8'-0"	8'-0"	9'-0"	9'-0"	10'-0"	11'-0"	12'-0"	12'-0"	12'-0"	12'-0"
1500 PSF	3'-0" ROUND	7'-0"	7'-0"	8'-0"	8'-0"	11'-0"	13'-0"	15'-0"	18'-0"	18'-0"	18'-0"
	3'-0" SQUARE	7'-0"	7'-0"	7'-0"	8'-0"	8'-0"	9'-0"	10'-0"	10'-0"	10'-0"	10'-0"
	4'-0" ROUND	7'-0"	7'-0"	7'-0"	8'-0"	8'-0"	9'-0"	10'-0"	10'-0"	10'-0"	10'-0"
2500 PSF OR GREATER	3'-0" ROUND	6'-0"	6'-0"	7'-0"	7'-0"	8'-0"	8'-0"	11'-0"	15'-0"	15'-0"	15'-0"
	3'-0" SQUARE	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	7'-0"	8'-0"	8'-0"	8'-0"
	4'-0" ROUND	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	7'-0"	7'-0"	8'-0"	8'-0"

ALLOWABLE LATERAL BEARING PRESSURE	FOUNDATION TYPE	GROUND SLOPE = GREATER THAN 3H: 1V TO 2H: 1V									
		700	900	1350	1500	1900	2300	2600	3000	3000	3000
1000 PSF	3'-0" ROUND	10'-0"	10'-0"	11'-0"	11'-0"	15'-0"	18'-0"	20'-0"	20'-0"	20'-0"	20'-0"
	3'-0" SQUARE	8'-0"	8'-0"	9'-0"	9'-0"	10'-0"	11'-0"	12'-0"	12'-0"	12'-0"	12'-0"
	4'-0" ROUND	8'-0"	8'-0"	9'-0"	9'-0"	10'-0"	11'-0"	12'-0"	12'-0"	12'-0"	12'-0"
1500 PSF	3'-0" ROUND	7'-0"	7'-0"	8'-0"	8'-0"	11'-0"	13'-0"	15'-0"	18'-0"	18'-0"	18'-0"
	3'-0" SQUARE	7'-0"	7'-0"	7'-0"	8'-0"	8'-0"	9'-0"	10'-0"	10'-0"	10'-0"	10'-0"
	4'-0" ROUND	7'-0"	7'-0"	7'-0"	8'-0"	8'-0"	9'-0"	10'-0"	10'-0"	10'-0"	10'-0"
2500 PSF OR GREATER	3'-0" ROUND	6'-0"	6'-0"	7'-0"	7'-0"	8'-0"	8'-0"	11'-0"	15'-0"	15'-0"	15'-0"
	3'-0" SQUARE	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	7'-0"	8'-0"	8'-0"	8'-0"
	4'-0" ROUND	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	7'-0"	7'-0"	8'-0"	8'-0"



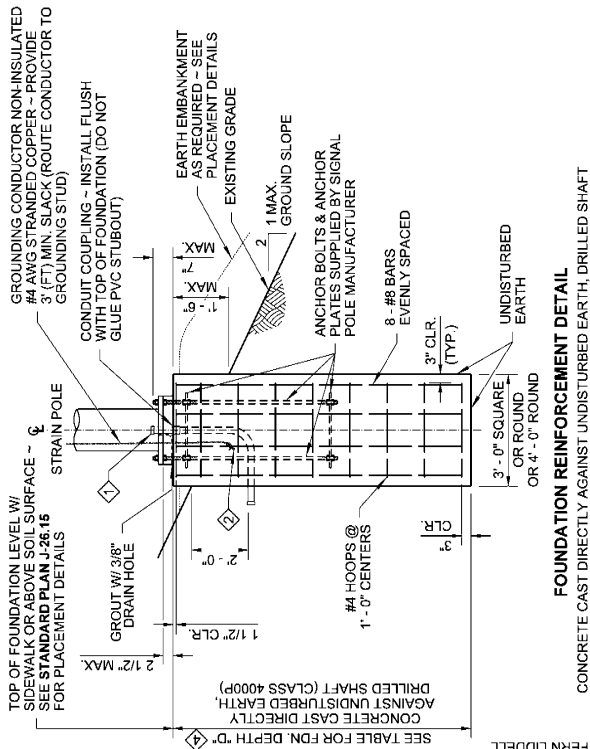
Zeldenzust, Richard  
 July 20, 2016 8:23 AM

**TRAFFIC SIGNAL STANDARD FOUNDATION**  
**STANDARD PLAN J-26.10-03**  
 SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
 Carpenter, Jeff  
 July 21, 2016 8:27 AM



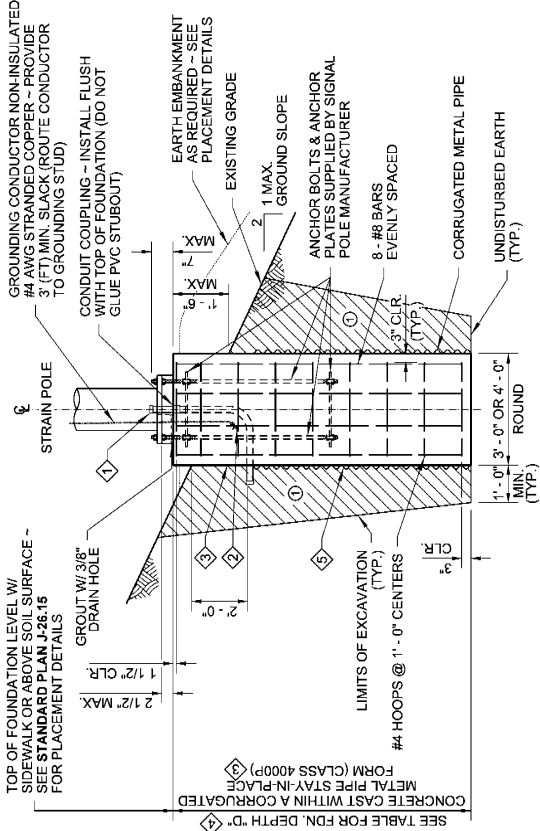
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**ALTERNATE #1**

**FOUNDATION REINFORCEMENT DETAIL**

CONCRETE CAST DIRECTLY AGAINST UNDISTURBED EARTH, DRILLED SHAFT



**ALTERNATE #2**

**FOUNDATION REINFORCEMENT AND BACKFILL DETAIL**

CONCRETE CAST WITHIN A CORRUGATED METAL PIPE STAY-IN-PLACE FORM

- NOTES**
- This structure has been designed according to the **Fifth Edition 2009 AASHTO Standard Specifications** for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. Basic wind velocity 90 mph, Design Life/Recurrence Interval 50 years, and Fatigue Category III.
  - Foundations are designed for Type IV and V Strain Pole Standards with a maximum mast arm length of 16'-0".
  - Foundations not within the parameters of this standard require Special Design. Contact the **WSDOT Bridge and Structures Office** through the Engineer for Special Foundation Designs.
  - Where a foundation is constructed within a Media Filter Drain, the foundation depth shown in the Contract Plans shall be increased by the depth of the Media Filter Drain.
  - The top 2 feet of the foundation shall use a smooth form (such as paper or cardboard). After the concrete has cured, this entire form shall be removed.
  - See **Standard Plan J-27.15** for Strain Pole Standards Type IV and V details.
  - Install Signal Foundation Identification Tag. See **Standard Plan J-26.15** for details.

- CONDUIT SIZE AND QUANTITY AS SHOWN IN THE CONTRACT; CAP BOTH ENDS.
- CLAMP CONDUCTOR TO STEEL REINFORCING WITH LISTED CONNECTOR SUITABLE FOR USE EMBEDDED IN CONCRETE.
- PAPER OR CARDBOARD FORM SHALL NOT STAY-IN-PLACE
- SEE NOTE 4

**ALTERNATE #2 - CONSTRUCTION METHOD METAL (SUBSURFACE) FORM REQUIRED**

When the existing soil will not retain a vertical face, over-excavate the foundation area and install a 36" or 48" (in) diameter corrugated metal (pipe) form. The top of the corrugated metal form shall terminate 1 foot below final grade. Continue forming to full height using a paper or cardboard form to achieve a smooth finish on final exposed cement concrete. Support the form as necessary to remain plumb.

Place the concrete foundation.

After concrete has cured, remove the entire paper or cardboard form portion.

- Shoring or Extra Excavation as required. Excavated area shall be backfilled with Controlled-Density Fill (CDF), or with soil in accordance with **Standard Specification Section 8-20.3(2)** and Compaction Method 1 of Standard Specification Section 2-09.3(1)(E).

**ALTERNATE #1 DRILLED SHAFT-TYPE CONSTRUCTION - DEPTH "D"**

FOR LATERAL BEARING PRESSURE = 2500 PSF & Ø = 34", 1500 PSF & Ø = 28", 1000 PSF & Ø = 26"

ALLOWABLE LATERAL BEARING PRESSURE	GROUND SLOPE = 3H:1V OR FLATTER						GROUND SLOPE = 1V TO 2H:1V					
	1900	2700	3700	4800	5300	7200	1900	2700	3700	4800	5300	7200
1000 PSF	3'-0" ROUND	11'-0"	13'-0"	15'-0"	16'-0"	20'-0"	3'-0" ROUND	10'-0"	12'-0"	13'-0"	15'-0"	17'-0"
1500 PSF	3'-0" SQUARE	11'-0"	13'-0"	15'-0"	16'-0"	20'-0"	3'-0" SQUARE	10'-0"	12'-0"	13'-0"	15'-0"	17'-0"
2500 PSF OR GREATER	3'-0" ROUND	9'-0"	11'-0"	12'-0"	14'-0"	16'-0"	3'-0" ROUND	8'-0"	9'-0"	10'-0"	11'-0"	13'-0"
	3'-0" SQUARE	9'-0"	11'-0"	12'-0"	14'-0"	16'-0"	3'-0" SQUARE	8'-0"	9'-0"	10'-0"	11'-0"	13'-0"
	4'-0" ROUND	8'-0"	9'-0"	10'-0"	11'-0"	13'-0"	4'-0" ROUND	7'-0"	8'-0"	9'-0"	10'-0"	11'-0"
	4'-0" ROUND	6'-0"	7'-0"	8'-0"	9'-0"	11'-0"	4'-0" ROUND	5'-0"	6'-0"	7'-0"	8'-0"	10'-0"

**ALTERNATE #2 CORRUGATED METAL PIPE TYPE CONSTRUCTION - DEPTH "D"**

FOR LATERAL BEARING PRESSURE = 2500 PSF & Ø = 23", 1500 PSF & Ø = 18", 1000 PSF & Ø = 17"

ALLOWABLE LATERAL BEARING PRESSURE	GROUND SLOPE = 3H:1V OR FLATTER						GROUND SLOPE = 1V TO 2H:1V					
	1900	2700	3700	4800	5300	7200	1900	2700	3700	4800	5300	7200
1000 PSF	3'-0" ROUND	11'-0"	13'-0"	15'-0"	16'-0"	20'-0"	3'-0" ROUND	10'-0"	12'-0"	13'-0"	15'-0"	17'-0"
1500 PSF	3'-0" ROUND	10'-0"	11'-0"	12'-0"	13'-0"	16'-0"	3'-0" ROUND	9'-0"	10'-0"	11'-0"	13'-0"	15'-0"
2500 PSF OR GREATER	3'-0" ROUND	7'-0"	8'-0"	9'-0"	10'-0"	13'-0"	3'-0" ROUND	6'-0"	7'-0"	8'-0"	10'-0"	12'-0"
	4'-0" ROUND	6'-0"	7'-0"	8'-0"	9'-0"	11'-0"	4'-0" ROUND	5'-0"	6'-0"	7'-0"	9'-0"	11'-0"
	4'-0" ROUND	5'-0"	6'-0"	7'-0"	8'-0"	10'-0"	4'-0" ROUND	4'-0"	5'-0"	6'-0"	8'-0"	10'-0"



Richard P. Zeldenzust  
 2400 West 10th Street  
 Tacoma, WA 98501  
 July 20, 2016 8:27 AM

**TYPE IV AND V STRAIN POLE TRAFFIC SIGNAL FOUNDATION**

**STANDARD PLAN J-27.10-01**

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
 by *Carapenter, Jeff*  
 on 11/13/2016 8:27 AM

STATE DESIGN ENGINEER

Washington State Department of Transportation



BASE TABLE			LUMINAIRE HEIGHT (+2' - 6')
ADAPTOR TYPE	ANCHOR BOLT (IN)	BOLT CIRCLE DIAMETER (IN) "BC"	EXISTING BASE TYPE
A-1	1"	11"	WELDED PLATE
A-2	1"	12 1/4"	CAST ALUMINUM
A-3	1"	12 3/4"	STEEL TRANSFORMER
A-4	1 1/8"	14 1/8"	2-PC. ALUM. CLAMP
A-5	1 1/4"	14 1/8"	2-PC. ALUM. CLAMP

USE MATCHING DIAMETER FOR THREADED STUDS.  
 CONTRACTOR SHALL VERIFY BOLT CIRCLE "BC" IN THE FIELD BEFORE ORDERING. IF "BC" OR ANCHOR BOLT SIZES DIFFER FROM THOSE LISTED, CONTACT HQ BRIDGE AND STRUCTURES OFFICE.

40' (FT) LUMINAIRE W/ 1 x 16' (FT) MAX. MAST ARM OR 35' (FT) LUMINAIRE W/ 2 x 16' (FT) MAST ARMS.

50' (FT) LUMINAIRE W/ 1 x 16' (FT) MAX. MAST ARM OR 40' (FT) LUMINAIRE W/ 2 x 16' (FT) MAST ARMS - TOTAL WEIGHT 1000 LBS (MAX).

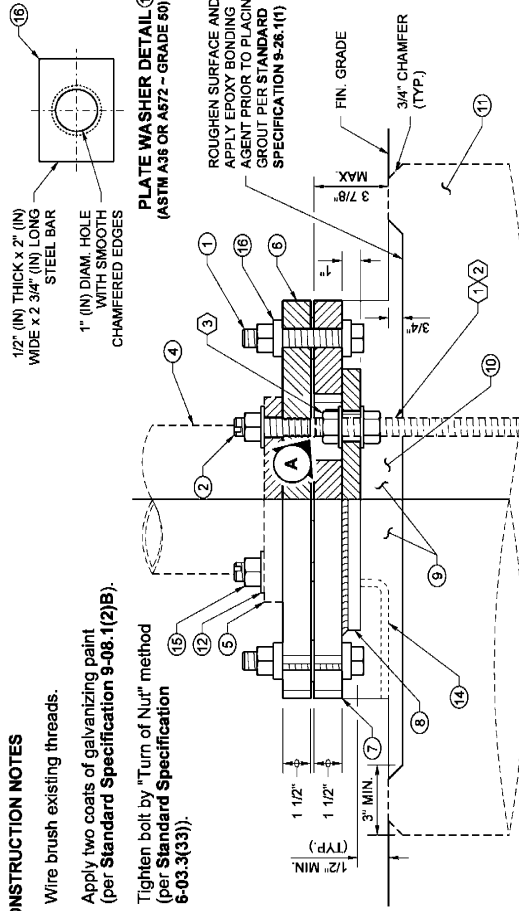
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**CONSTRUCTION NOTES**

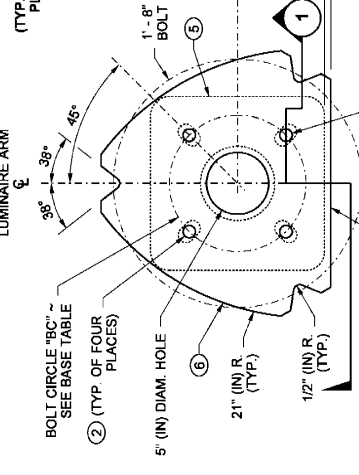
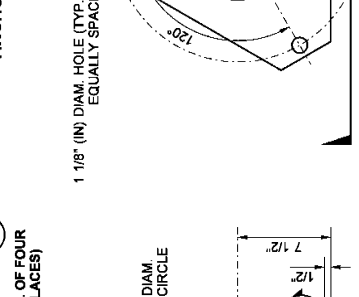
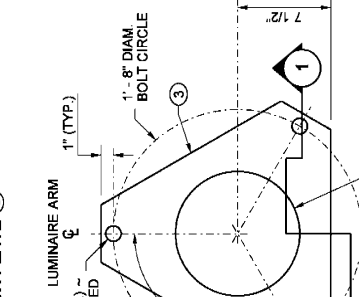
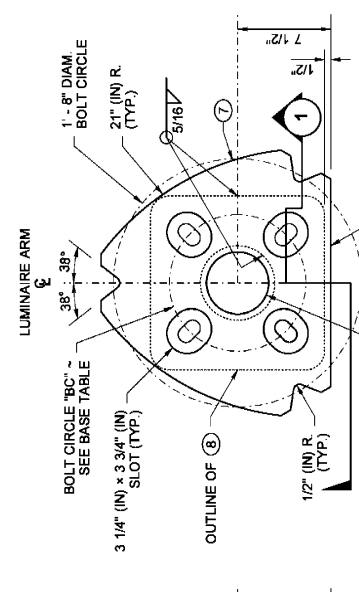
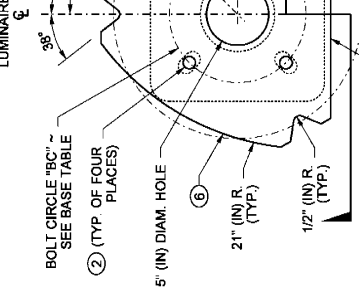
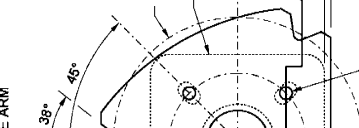
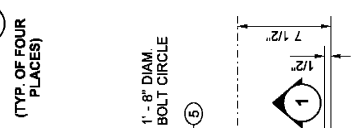
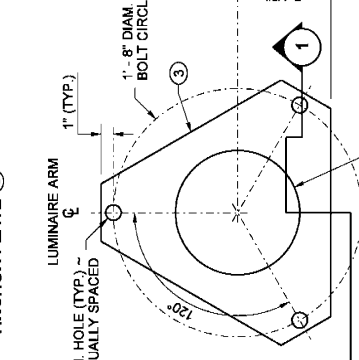
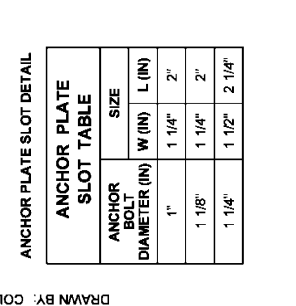
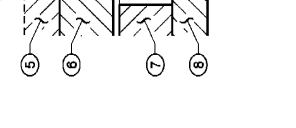
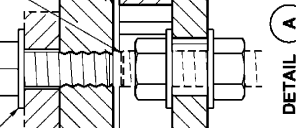
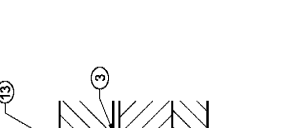
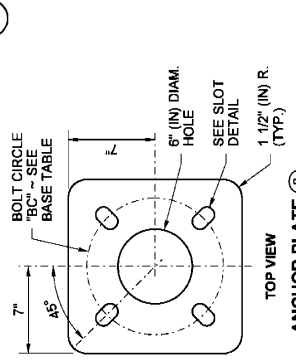
- Wire brush existing threads.
- Apply two coats of galvanizing paint (per Standard Specification 9-06.1(2)(B)).
- Tighten bolt by "Turn of Nut" method (per Standard Specification 6-03.3(33)).

**NOTES**

- The purpose of this plan is to provide the details for retrofitting a 4-bolt frangible base with a slip base assembly.
- Existing anchor bolts shall be inspected for corrosion, thread damage, and galvanizing. To minimize galvanic corrosion between dissimilar metals, ensure galvanizing remains intact while installing aluminum luminaire.
- After bolting the bottom slip plate assembly to the foundation, fill the slotted bolt holes with mastic per Standard Specification 9-08.7.
- Grade around the foundation to ensure the stub height does not exceed 3 7/8" (in). For grading requirements, see Standard Plan J-28.22.
- Removal of the frangible base from the existing base plate is required.
- Misaligned anchor bolts shall be removed and replaced.
- This adaptor shall be used only on luminaire poles that contain a handhole. Replace standards and foundation when the handhole is located in the frangible base.
- Galvanize the anchor plate, bottom slip plate, and top slip plate after fabrication according to ASTM A123.
- Galvanize all hardware according to ASTM F2329.



**SECTION 1**

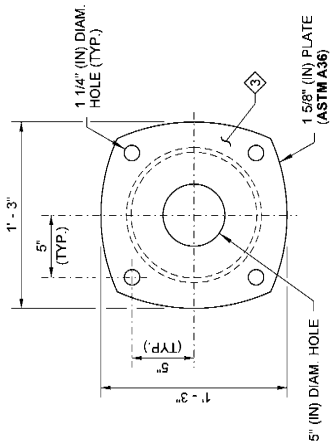


**SLIP BASE ADAPTOR FOR 4-BOLT LIGHT STANDARD BASE STANDARD PLAN J-28.43-00**  
 SHEET 1 OF 1 SHEET

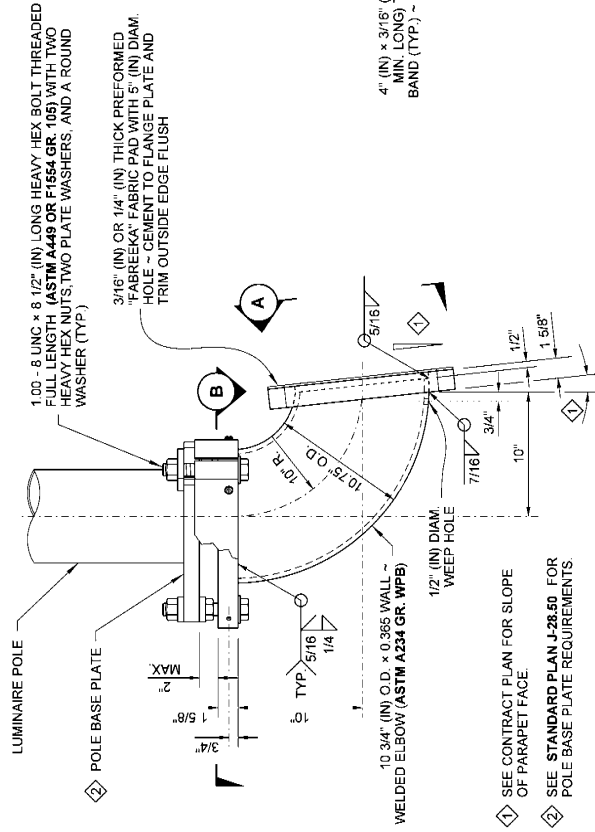
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 Babonch, Pasco  
 Jan 11, 2014 1:53 PM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

**NOTES**

- Galvanize the Elbow Assembly after fabrication according to **AASHTO M 111**. All bolts, rods and related hardware shall be galvanized after fabrication per **ASTM F2329**.
- See **Standard Plan J-28.50** for Pole Base and Hand Hole details.
- The presence of pedestrian railing shall be verified prior to light standard fabrication. When pedestrian railing is present or to be installed, locate hand hole as detailed in the Bridge Pedestrian Barrier details.
- See **Standard Plan J-28.70** for further wiring details.

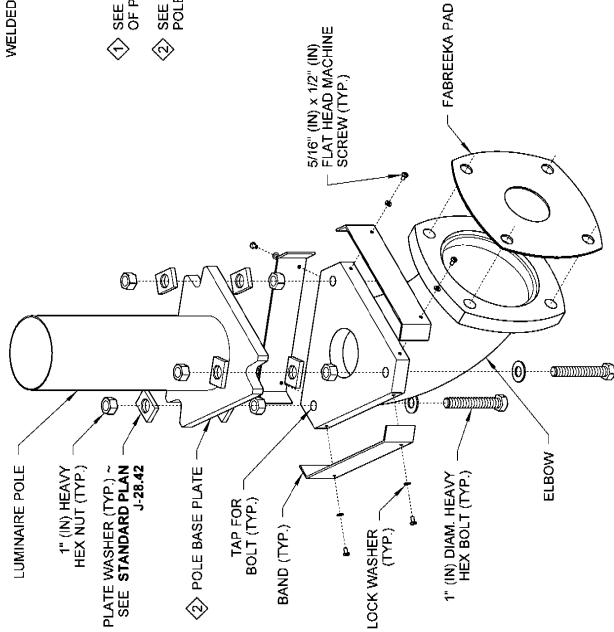


③ THE FACE SHALL BE PLANE AFTER FABRICATION, TO PROVIDE A SEAL BETWEEN THE BARRIER AND THE ELBOW.



**STEEL LIGHT STANDARD ELBOW DETAIL**

FOR LUMINAIRE POLES WITH SINGLE MAST ARM 12" - 0" OR LESS AND DOUBLE MAST ARMS 8" - 0" OR LESS, MOUNTED ON BRIDGE OR RETAINING WALLS.



**EXPLODED ISOMETRIC VIEW**



Richard P. Zeldman, Richard P. Zeldman, Richard P. Zeldman  
 July 20, 2016 8:28 AM

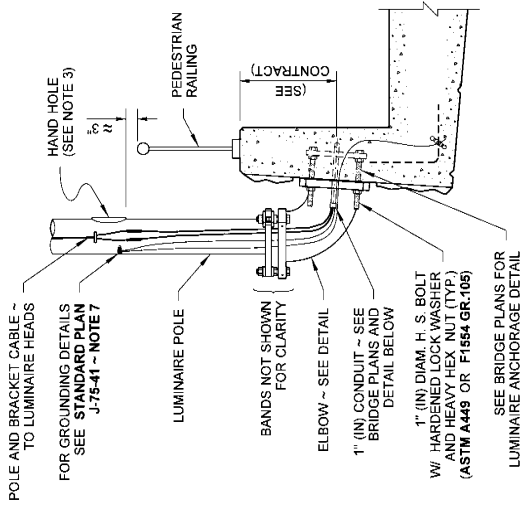
**STEEL LIGHT STANDARD  
 ELBOW MOUNTING ON  
 BRIDGE & RETAINING WALL  
 STANDARD PLAN J-28.45-03**

SHEET 1 OF 2 SHEETS

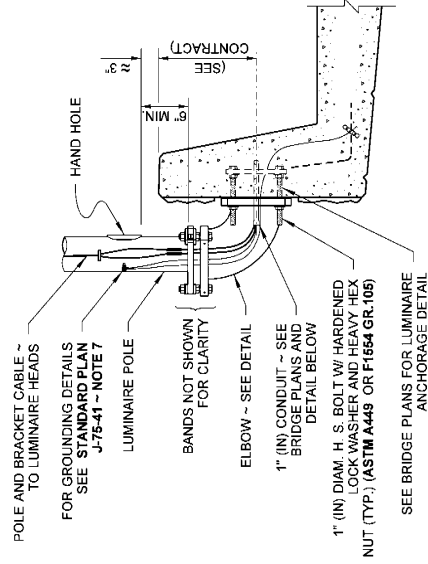
APPROVED FOR PUBLICATION  
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 July 20, 2016 8:28 AM

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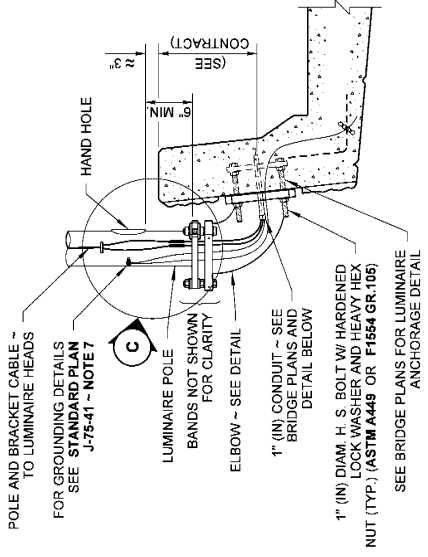
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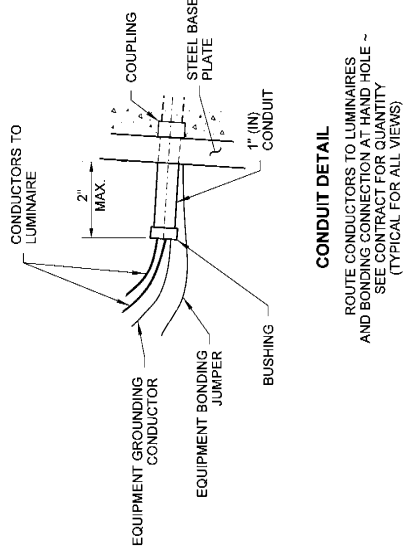
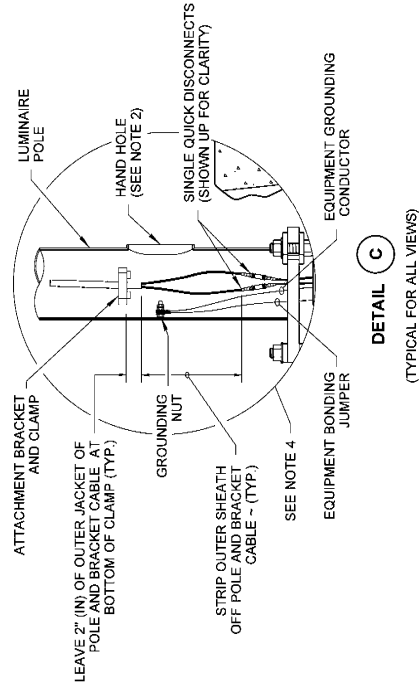
BRIDGE PEDESTRIAN BARRIER



WHEN TRAFFIC BARRIER HEIGHT IS 42" (IN), MAINTAIN APPROXIMATE HEIGHT FROM TOP OF BARRIER TO HAND HOLE SHOWN  
SINGLE SLOPE BRIDGE TRAFFIC BARRIER  
TYPICAL SECTIONS



F-SHAPE BRIDGE TRAFFIC BARRIER



DRAWN BY: FERN LIDDELL



Richard P. Zeldenzust  
Address: Richard  
Jul 20 2016 8:37 AM

**STEEL LIGHT STANDARD  
ELBOW MOUNTING ON  
BRIDGE & RETAINING WALL  
STANDARD PLAN J-28.45-03**

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION  
Compenter, Jeff  
Jul 21 2016 8:29 AM

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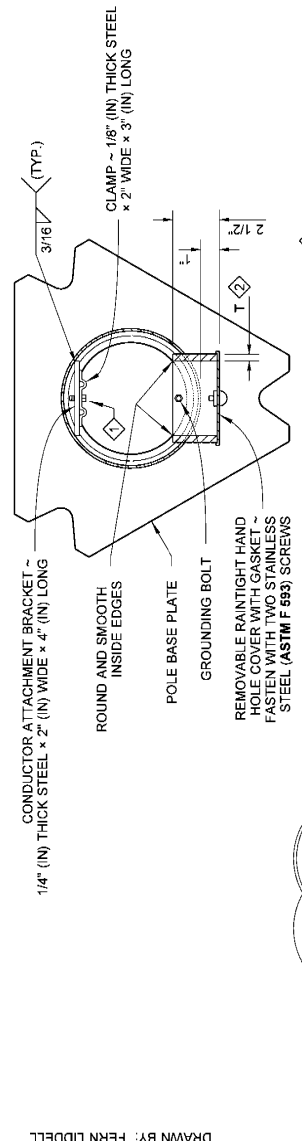
Washington State Department of Transportation

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**NOTES**

1. Pole Base Plate for a Slip Base design shall be 1 1/4" (in) steel manufactured from **ASTM A572 GR.50** or **ASTM A588**. Pole Base Plate for a Fixed Base design shall be either 1 1/4" (in) steel manufactured from **ASTM A572 GR.50**, **ASTM A588**, or 1 1/2" (in) manufactured from **ASTM A36**. All Pole Base Plate notched surfaces shall be finished smooth.
2. Round and smooth all edges along wire-way to protect conductors. See **Standard Plan J-28.70** for wiring details.
3. Galvanizing shall be in accordance with **AASHTO M 111**.
4. See **Standard Plans C-8b, C-85.14, and J-28.60** for foundation and base plate requirements when steel light standards are mounted on concrete traffic barrier.
5. See **Standard Plan J-28.42** for details when Slip Base is required.

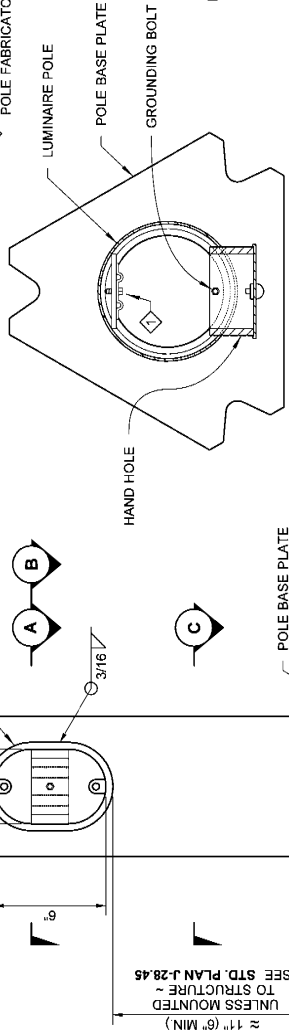


① THE CONDUCTOR ATTACHMENT CONFIGURATIONS VARY AMONG DIFFERENT MANUFACTURERS. CONDUCTOR ATTACHMENTS ARE REQUIRED ON ALL POLES FIXED OR SLIP BASE.

② T = RIM PLATE THICKNESS BY LUMINAIRE POLE FABRICATOR.

FIXED BASE: RADIUS = (D/2 + 1/16") (TYP.) ~ FOR "D," SEE TABLE ON **STANDARD PLAN J-28.30**

SLIP BASE: RADIUS = 9/16" (TYP.) ~ MATCH SLIP PLATE, **STANDARD PLAN J-28.42**

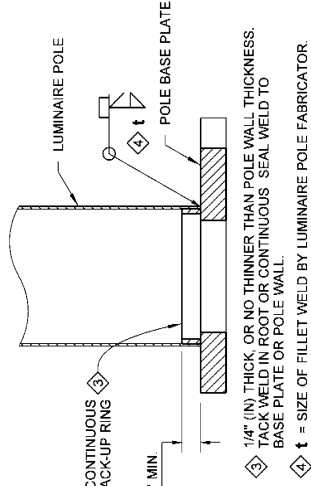


FOR DETAILS NOT SHOWN, SEE VIEW A ABOVE ORIENTATION FOR INSTALLATION ON BRIDGE OR RETAINING WALL ~ SEE **STANDARD PLAN J-28.45**

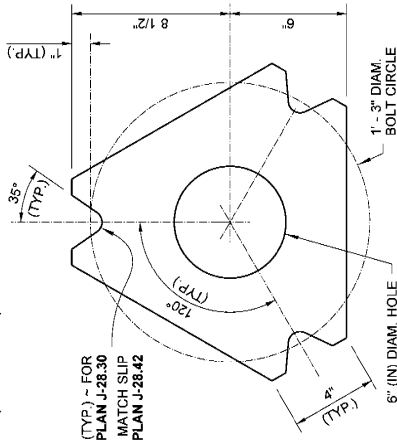
(COVER NOT SHOWN FOR CLARITY)

**ELEVATION VIEW**

CONFIGURATION AND LOCATION OF THE HAND HOLE VARIES AMONG MANUFACTURERS ~ MINIMUM SIZE OPENING SHOWN



SECTION D



**POLE BASE PLATE DETAIL**



Richard P. Zeldanrust  
 License No. 25470  
 Expires 12/31/2016 8:29 AM

**STEEL LIGHT STANDARD  
 POLE BASE AND  
 HAND HOLE DETAILS  
 STANDARD PLAN J-28.50-03**

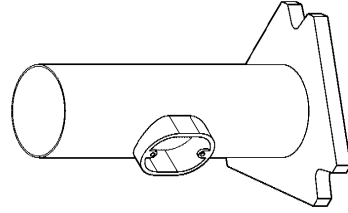
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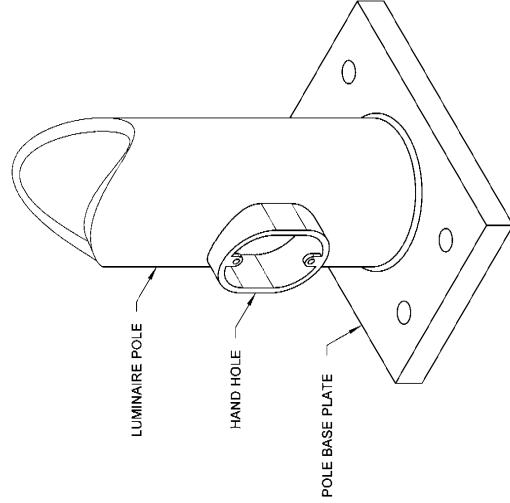
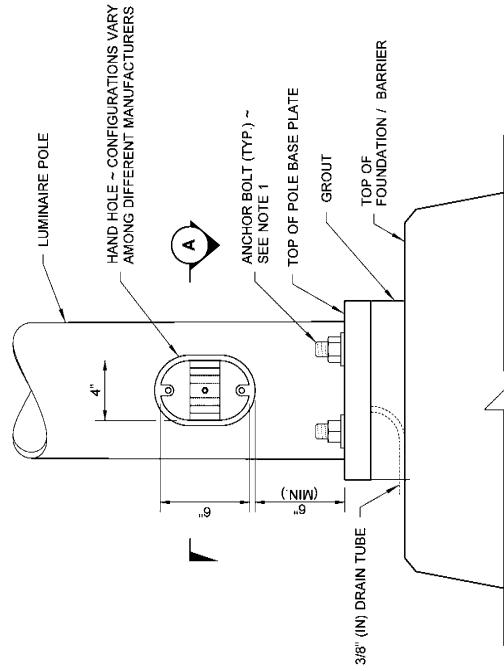
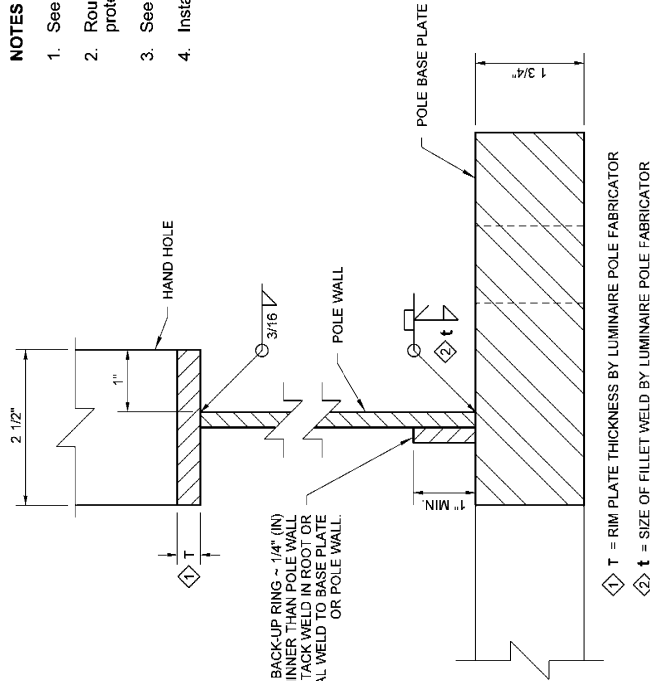
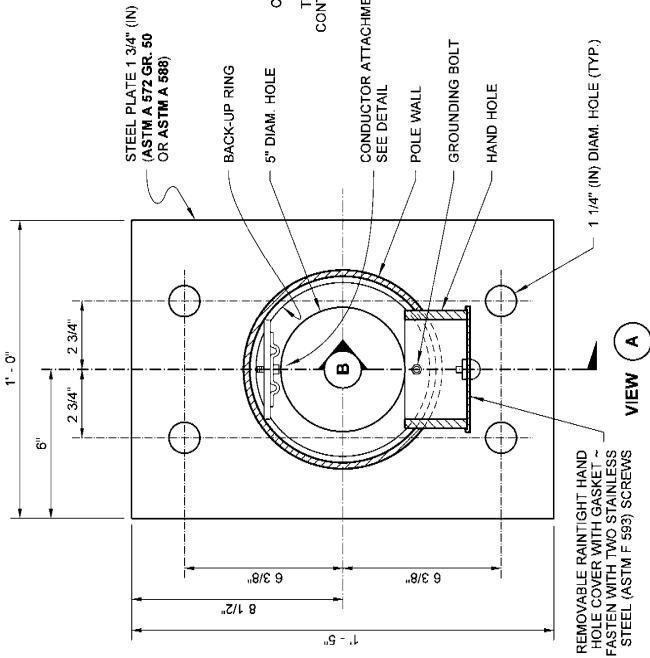
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 Christopher J. Hoff  
 10/17/2016 8:25 AM

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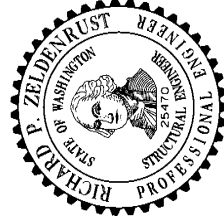
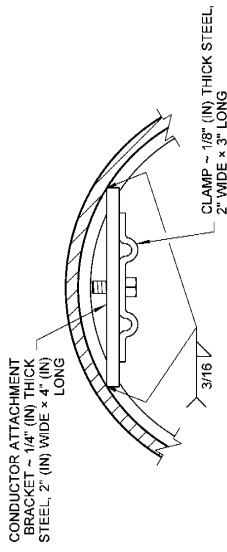
**ISOMETRIC VIEW**





**NOTES**

1. See **Standard Plans C-8b** and **C-85.14** for foundation and anchor bolt details.
2. Round and smooth all edges around hand hole and along the wire-way to protect the conductors.
3. See **Standard Plan J-28.70** for wiring details.
4. Install grout after plumbing the pole.



Richard P. Zeldnerust, Richard  
Zeldnerust, Richard  
Jul 26 2016 8:37 AM

**STEEL LIGHT STANDARD  
BARRIER MOUNTED BASE**

**STANDARD PLAN J-28.60-02**

SHEET 1 OF 1 SHEET

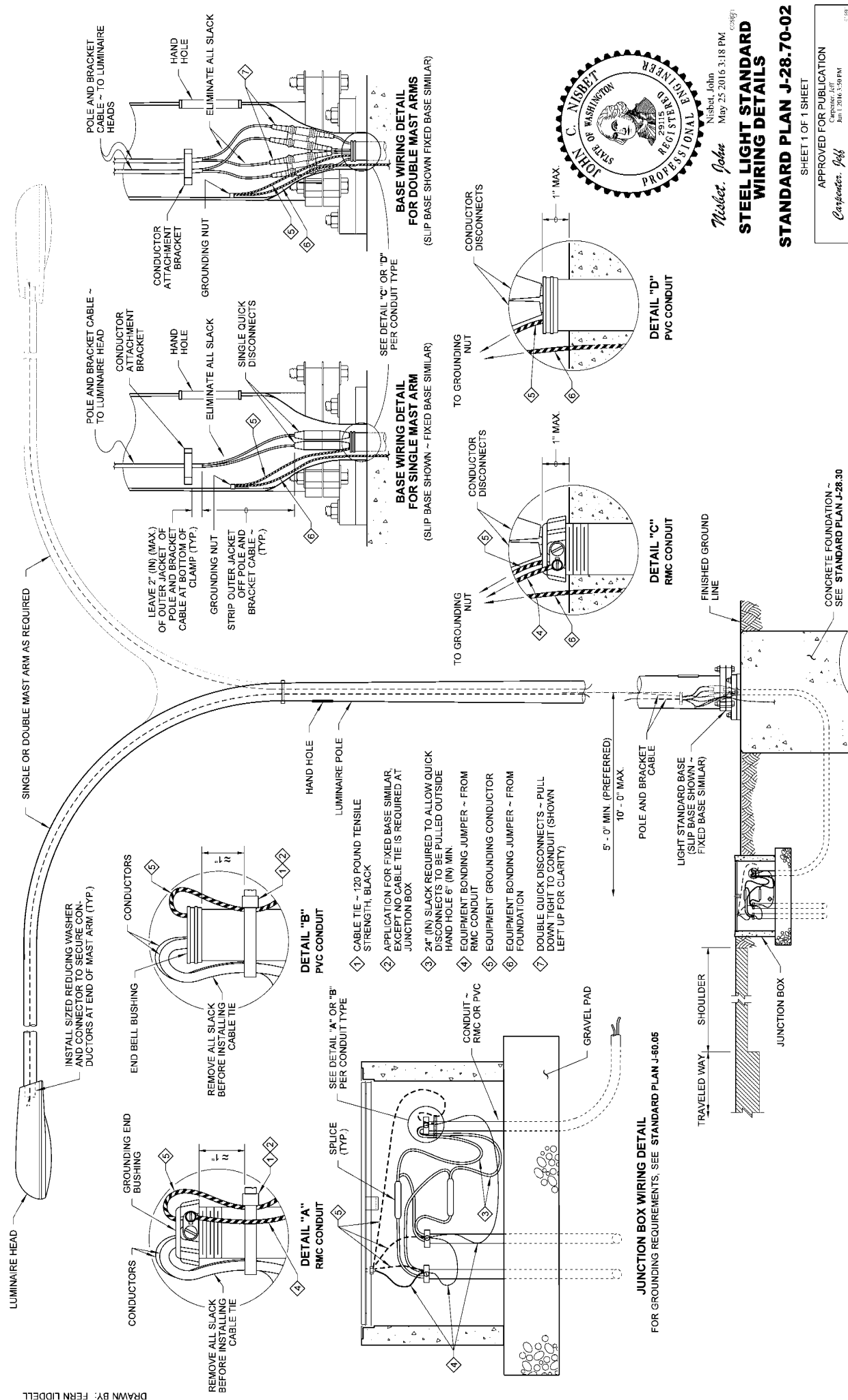
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DATE: JUL 26 2016 8:37 AM

Richard P. Zeldnerust

STATE DESIGN ENGINEER

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SINGLE OR DOUBLE MAST ARM AS REQUIRED

INSTALL SIZED REDUCING WASHER AND CONNECTOR TO SECURE CONDUCTORS AT END OF MAST ARM (TYP.)

REMOVE ALL SLACK BEFORE INSTALLING CABLE TIE

REMOVE ALL SLACK BEFORE INSTALLING CABLE TIE

HAND HOLE

LUMINAIRE POLE

CABLE TIE - 120 POUND TENSILE STRENGTH, BLACK

APPLICATION FOR FIXED BASE SIMILAR, EXCEPT NO CABLE TIE IS REQUIRED AT JUNCTION BOX

24" (IN) SLACK REQUIRED TO ALLOW QUICK DISCONNECTS TO BE PULLED OUTSIDE HAND HOLE 6" (IN) MIN.

EQUIPMENT BONDING JUMPER - FROM RMC CONDUIT

EQUIPMENT GROUNDING CONDUCTOR FOUNDATION

DOUBLE QUICK DISCONNECTS - PULL DOWN TIGHT TO CONDUIT (SHOWN LEFT UP FOR CLARITY)

5'-0" MIN. (PREFERRED) 10'-0" MAX.

JUNCTION BOX WIRING DETAIL FOR GROUNDING REQUIREMENTS. SEE STANDARD PLAN J-60.05

POLE AND BRACKET CABLE

LIGHT STANDARD BASE (SLIP BASE SHOWN - FIXED BASE SIMILAR)

FINISHED GROUND LINE

CONCRETE FOUNDATION - SEE STANDARD PLAN J-28.30



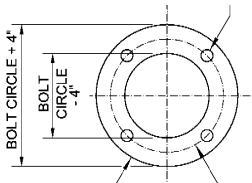
Marked, John Nisbet, John  
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**STEEL LIGHT STANDARD WIRING DETAILS**  
**STANDARD PLAN J-28.70-02**  
SHEET 1 OF 1 SHEET

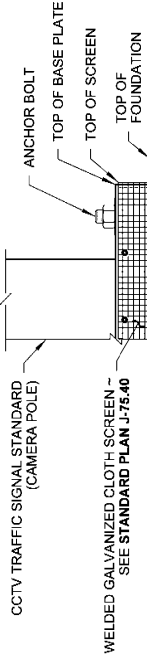
APPROVED FOR PUBLICATION  
Carpenter, Jeff  
Jan 11 2016 1:59 PM  
STATE DESIGN ENGINEER  
Washington, State Department of Transportation

TYPICAL LOCATION OF JUNCTION BOX AND FOUNDATION

(4) 1 1/4" (IN) DIAM. ANCHOR BOLTS  
W/ (6) HEAVY HEX NUTS AND  
(6) WASHERS PER BOLT -  
BOLT IS GALVANIZED,  
FULL LENGTH (ASTM A449  
OR F1554 GRADE 105)



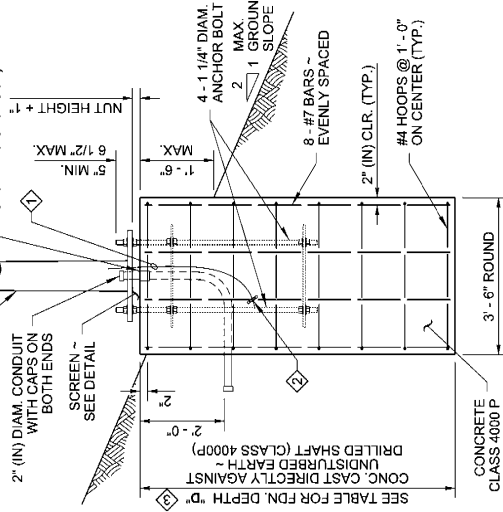
ANCHOR BOLT ASSEMBLY  
\* THREADED LENGTH



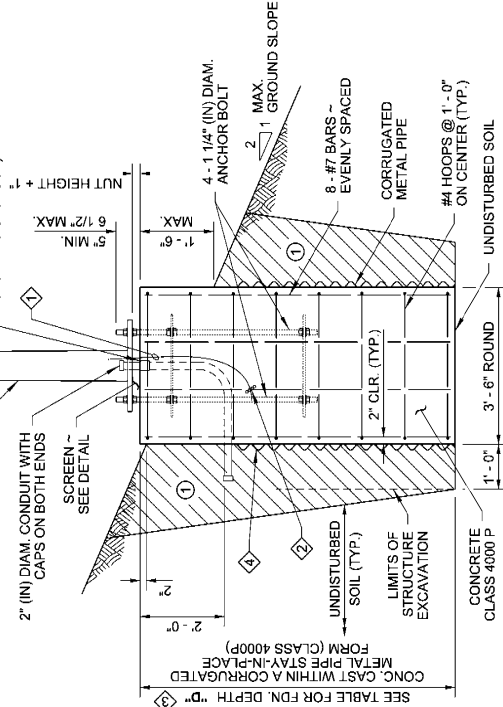
WELDED GALVANIZED CLOTH SCREEN

CONDUIT COUPLING - INSTALL FLUSH WITH TOP OF FOUNDATION (DO NOT GLUE PVC STUBOUT)

CONDUIT COUPLING - INSTALL FLUSH WITH TOP OF FOUNDATION (DO NOT GLUE PVC STUBOUT)



FOUNDATION REINFORCEMENT DETAIL  
ALTERNATE # 1  
(CONCRETE CAST DIRECTLY AGAINST UNDISTURBED EARTH)



FOUNDATION REINFORCEMENT AND BACKFILL DETAIL  
ALTERNATE # 2  
(CONCRETE CAST INSIDE CORRUGATED METAL PIPE STAY-IN-PLACE FORM) (SEE NOTE 5)

NOTES

1. These Foundations are designed for a minimum of 1,500 PSF allowable lateral bearing pressure for the soil. A Special Foundation shall be required for soil with allowable lateral bearing pressure lower than 1,500 PSF.
2. These Foundations are designed for installation on level ground, or on sloping ground, not to exceed 2H : 1V slopes. Slopes steeper than 2H : 1V require a special design.
3. Where a foundation is constructed within a Media Filter Drain, the foundation depth shown in the Contract Plans shall be increased by the depth of the Media filter Drain.
4. Foundations not within the parameters of this standard require Special Design. Contact the **WSDOT Bridge and Structures Office** through the Engineer for Special Foundation Designs.
5. The top 2' - 0" of the foundation shall use a smooth form (such as paper or cardboard). After the concrete has cured, this entire form shall be removed.

DESIGN CRITERIA:

This structure has been designed according to the Fifth Edition **2009 AASHTO Standard Specifications** for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. Basic wind velocity is 90 MPH. Design Life/Recurrence Interval 50 years and Fatigue Category III.

WIND VELOCITY:

90 MPH  
Maximum Pole Deflection shall not exceed 0.7" in 30 MPH and 1.4" in 70 MPH wind.

LOAD CASE # 1

Camera (1) - EPA = 4.00 sq. ft. @ 2' - 0" above pole top, and:  
Dish (1) - 1' - 0" diameter @ pole top level

LOAD CASE # 2

Camera (1) - EPA = 4.00 sq. ft. @ 2' - 0" above pole top, and:  
Camera (2) - EPA = 0.54 sq. ft. each @ 1' - 0" and 2' - 0" from pole top, and:  
NEMA Cabinet (2) - EPA = 1.33 sq. ft. each @ 3' - 8" from pole top, install both NEMA cabinets back to back, and:  
Radio Equipment (2) - EPA = 2.25 sq ft. each @ 2' - 0" and 9' - 0" from pole top.

EPA = Effective Projected Area  
ALTERNATE #2 - CONSTRUCTION METHOD

- ① Shoring or Extra Excavation as required. Excavated area shall be backfilled with Controlled-Density Fill (CDF), or with soil in accordance with **Standard Specification Section 8-20.3(2)** and **Compaction Method 1 of Standard Specification Section 2-09.3(1)E**.
- ② GROUNDING CONDUCTOR # 4 AWG STRANDED COPPER WITH 3' (FT) MIN. SLACK. ROUTE CONDUCTOR TO CCTV TRAFFIC SIGNAL STANDARD (CAMERA POLE) GROUNDING STUD.
- ③ CLAMP CONDUCTOR TO STEEL REINFORCING WITH LISTED CONNECTOR SUITABLE FOR USE EMBEDDED IN CONCRETE.
- ④ SEE NOTE 3.



Richard P. Zeldenzust  
Professional Engineer  
July 29, 2016 8:34 AM

**TYPE CCTV TRAFFIC SIGNAL STANDARD (CAMERA POLE) FOUNDATION DETAILS**  
**STANDARD PLAN J-29.10-01**  
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
Christopher A. Hoff  
July 29, 2016 8:34 AM  
STATE DESIGN ENGINEER  
Washington, State Department of Transportation

- NOTES**
- Verify Pole Top Plate, Camera Mount Plate, Bolt Circle, and Bolt Holes are adequate for the required Camera prior to releasing poles for manufacturing.
  - Steel shall be galvanized after fabrication per **AASHTO M111**. Hardware shall be galvanized per **AASHTO M232**. Fasteners less than 0.50" (in.) diameter shall be stainless or brass.
  - Attach Camera to Camera Mount Plate using four (4) 3/8" - 16 UNC x 1.75" stainless steel bolts with eight (8) stainless steel washers and four (4) lock-nuts with nylon inserts, or as approved by the Camera Supplier.
  - For Ground Mount Details, see **Standard Plan J-29.10**. For Elbow Mount Details, see **Standard Plan J-29.16**.

**DESIGN CRITERIA:**

This structure has been designed according to the Fifth Edition **2009 AASHTO Standard Specifications** for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. Basic wind velocity is 90 MPH. Design Life/Recurrence Interval 50 years.

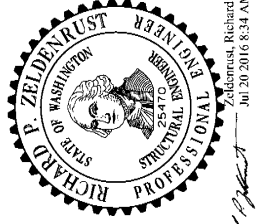
**WIND VELOCITY:**

90 MPH  
Maximum Pole Deflection shall not exceed 0.7" in 30 MPH and 1.4" in 70 MPH wind.

**LOAD CASE #1:**

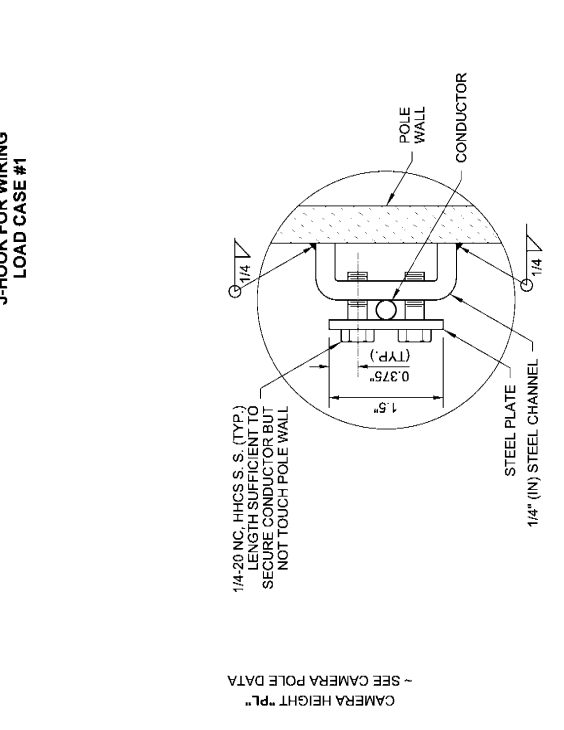
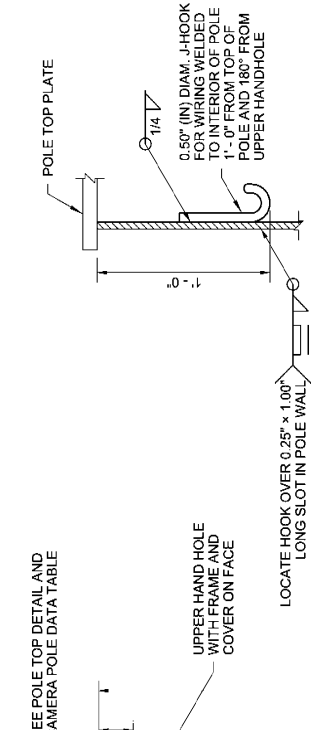
Camera (1) - EPA = 4.00 sq. ft. @ 2' - 0" above pole top, and:  
Dish (1) - 1' - 0" diameter @ pole top level.  
**LOAD CASE #2:**  
Camera (1) - EPA = 4.00 sq. ft. @ 2' - 0" above pole top, and:  
Camera (2) - EPA = 0.54 sq. ft. @ 1' - 0" and 2' - 0" from pole top, and:  
NEMA Cabinet (2) - EPA = 1.33 sq. ft. @ 3' - 8" from pole top, install back-to-back NEMA Cabinets, and:  
Radio Equipment (2) - EPA = 2.25 sq. ft. each @ 2' - 0" and 9' - 0" from pole top.

EPA = Effective Projected Area



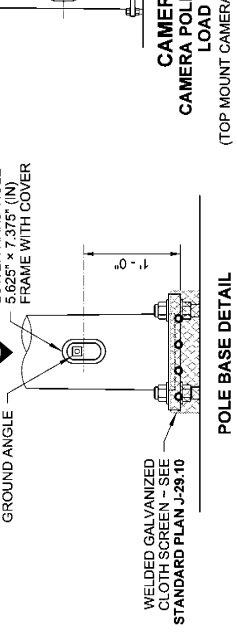
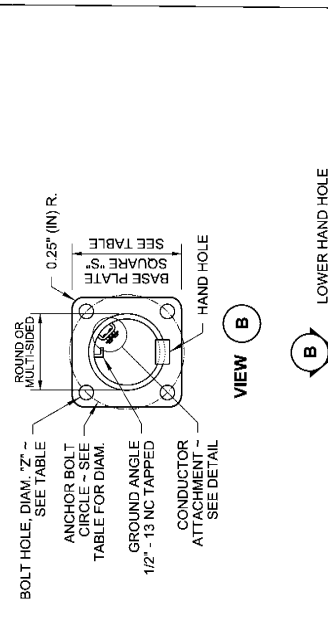
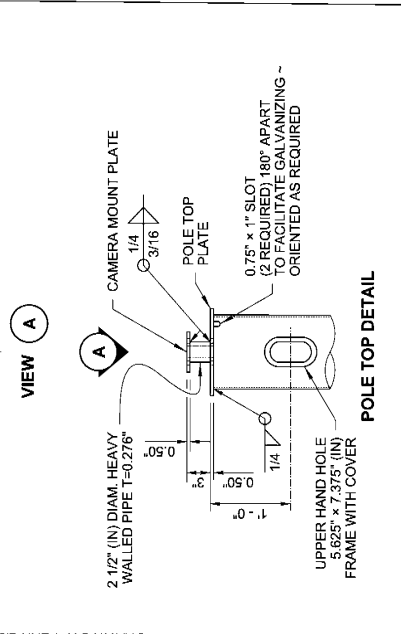
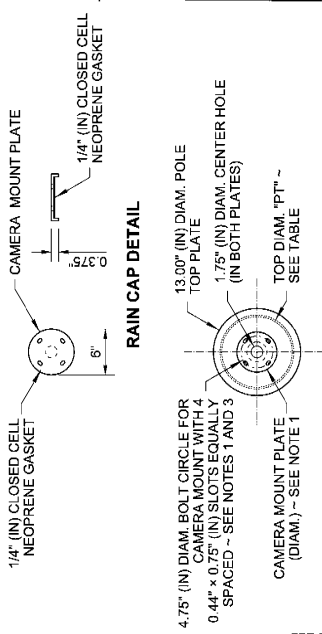
**TYPE CCTV TRAFFIC SIGNAL STANDARD (CAMERA POLE)**  
**STANDARD PLAN J-29.15-01**  
SHEET 1 OF 2 SHEETS

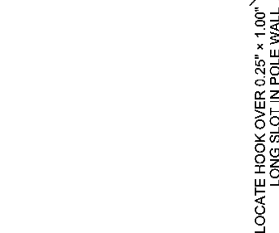
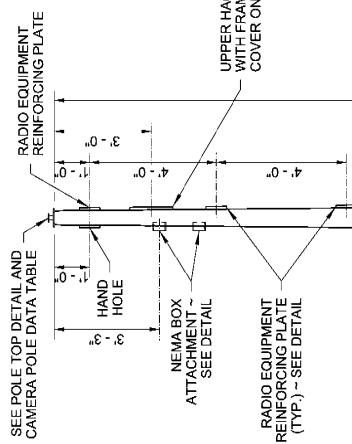
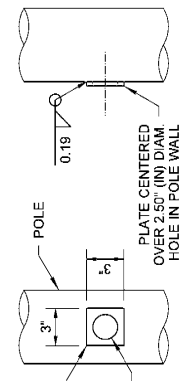
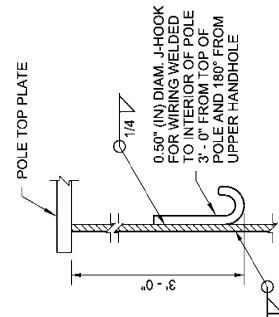
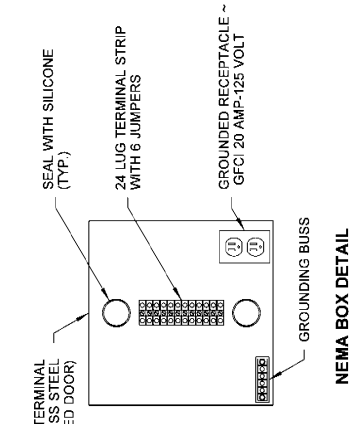
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Casper, Jeff  
Jul 21, 2016 8:30 AM  
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Washington, State Department of Transportation



**CAMERA POLE DATA**

CAMERA HEIGHT "PL" (FT.)	POLE MOUNT TYPE	TOP DIAM. "PT" (IN.) (MIN.)	POLE TUBE		ANCHOR BOLT DIAM. (IN.)	CONNECTION BOLT DIAM. (IN.)
			SQUARE "S" (IN.)	HOLE "Z" (IN.)		
15	ELBOW	8.50	25.00	25.50	1.50	1.25
20	ELBOW	8.50	25.00	25.50	1.50	1.25
30	ELBOW	9.00	25.00	25.50	1.50	1.25
20 - 30	GROUND	9.00	25.00	25.50	1.50	1.25
40	GROUND	9.00	25.00	25.50	1.50	1.25
40	GROUND	9.00	25.00	25.50	1.50	1.25
50	GROUND	10.00	25.00	25.50	1.50	1.25
50	GROUND	10.00	25.00	25.50	1.50	1.25





- KEY**
- CAMERA/TDA POLE MOUNTS
  - NEMA 4X (STAINLESS STEEL) ~ SIZE 16" H x 12" W x 6" D
  - CAMERA MOUNT PLATE
  - CAMERA UPPER HANDHOLE
  - 2" COUPLING
  - 2" SHORT NIPPLE
  - CHANNEL DRILLED 1/8" OVERSIZE OF NIPPLE
  - STEEL WASHER
  - CONDUIT WATERTIGHT LOCKNUT
  - END BUSHING
  - BACK PLATE ~ DRILL OVER SIZE FOR CONDUIT, SEAL WASHER, AND LOCKNUT
  - TERMINAL BLOCK
  - HINGED DOOR WITH TWO PAD-LOCKABLE FLIP LATCHES (TYP.)
  - J-HOOK FOR WIRING

**CAMERA POLE FOR LOADING LOAD CASE #2**  
 (TOP MOUNT CAMERA, 2 SIDE MOUNT CAMERAS, 2 NEMA CABINETS & 2 RADIO EQUIPMENTS)

**TOP OF FOUNDATION OR TOP OF MOUNT (SEE PLAN J-29.10) IS REQUIRED ~ SEE STANDARD PLAN J-29.10 OR J-29.16 FOR DETAILS)**



**TYPE CCTV TRAFFIC SIGNAL STANDARD (CAMERA POLE) STANDARD PLAN J-29.15-01**

SHEET 2 OF 2 SHEETS

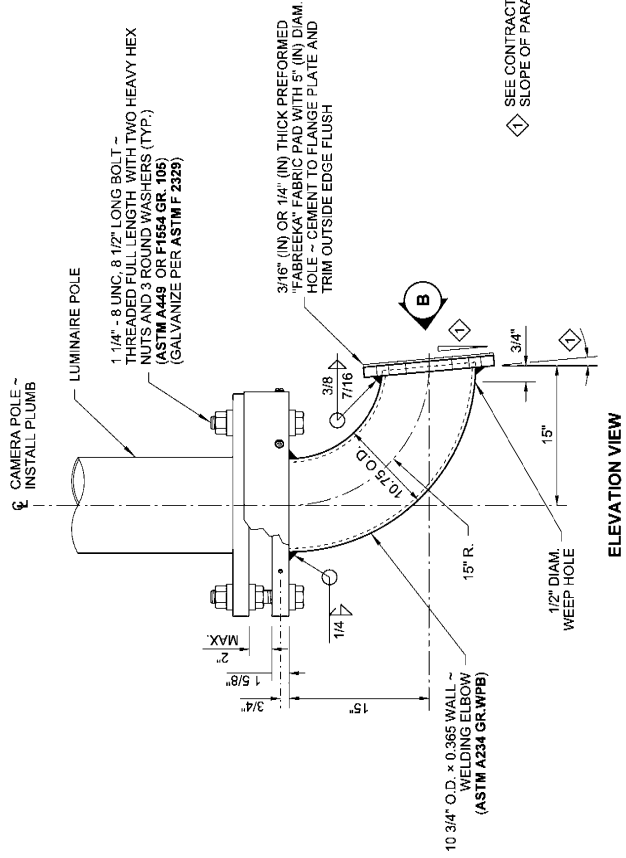
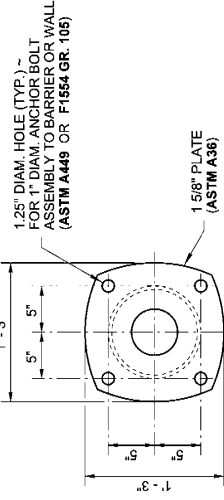
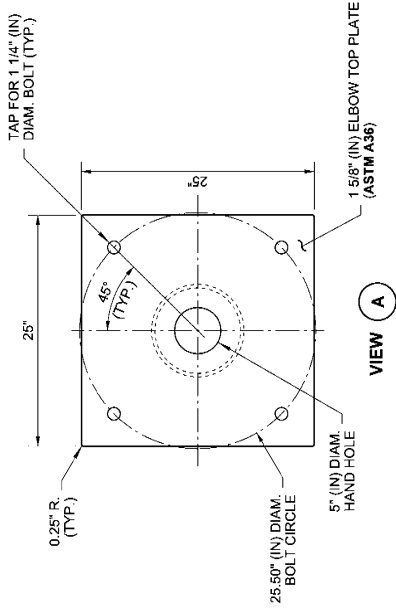
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 Professional Engineer  
 July 20, 2016 8:35 AM

APPROVED FOR PUBLICATION  
 July 21, 2016 8:30 AM

Washington State Department of Transportation

**NOTES**

1. For information not shown, see Steel Light Standard Elbow detail, **Standard Plan J-28.45**. For Camera Pole Details, see **Standard Plan J-29.15**.
2. Round and smooth all edges along wire-way to protect conductors.
3. The manufacturer shall verify that the Elbow Top Plate matches the Camera Pole Base, and shall submit the shop drawings for approval.
4. Galvanize after fabrication according to **AASHTO M111**.
5. Install galvanized steel protective band (3/16" thick x 4" high (**ASTM A36**) on all four sides, as shown in **Standard Plan J-28.45**, except fasten 6" from corners on 25" square base.



SEE CONTRACT PLANS FOR SLOPE OF PARAPET FACE



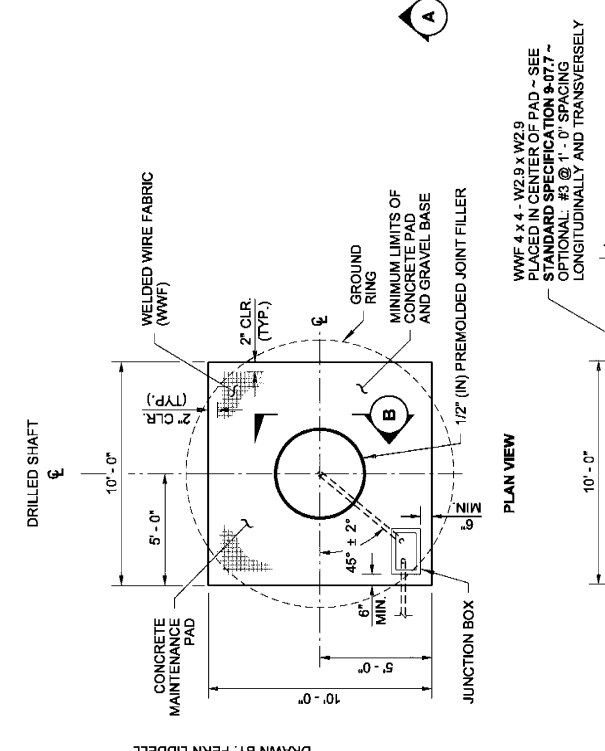
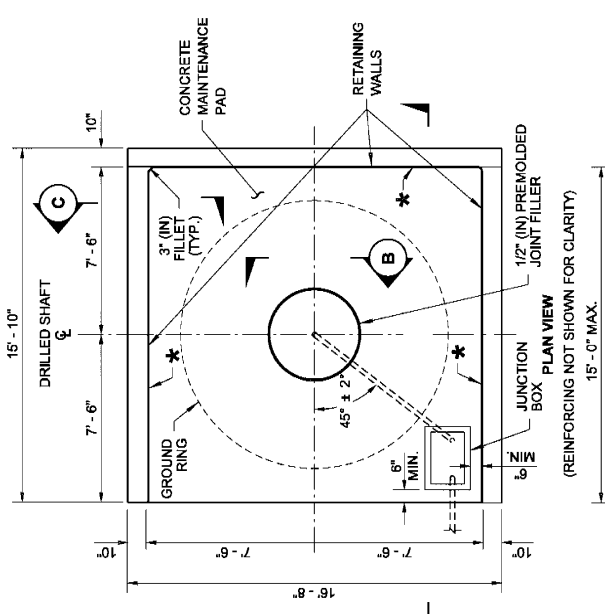
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**STANDARD PLAN J-29.16-02**  
 SHEET 1 OF 1 SHEET

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 July 21, 2016 8:31 AM  
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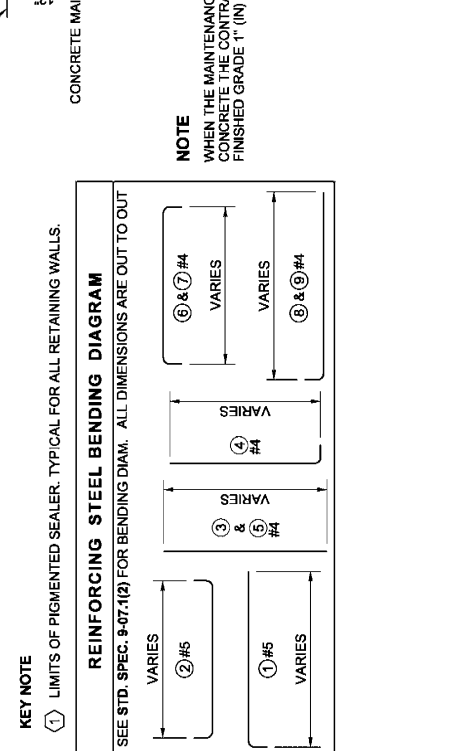
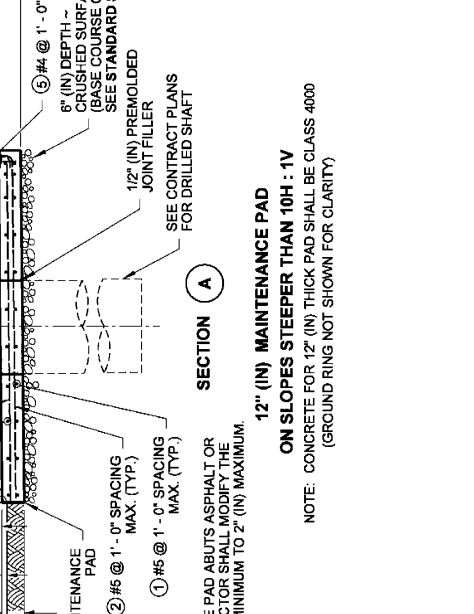
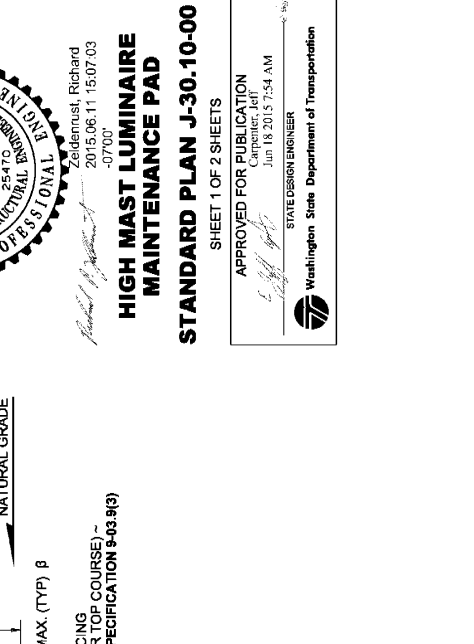
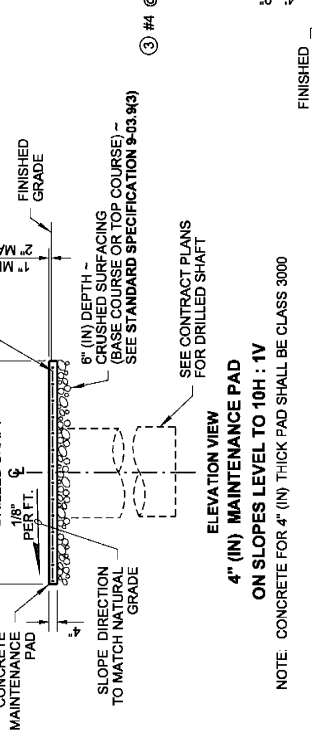
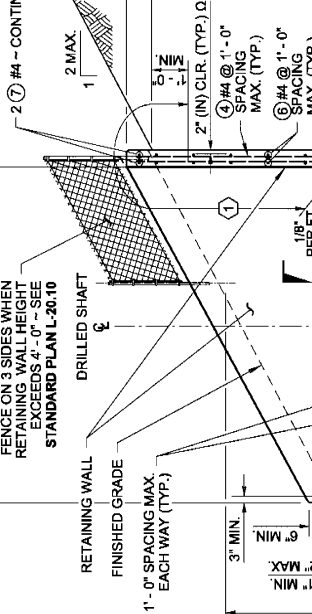
**CAMERA POLE ELBOW MOUNT ~ 25" SQUARE**

DRAWN BY: FERN LIDDELL

- NOTES**
- All material and workmanship shall be in accordance with the **Standard Specifications**.
  - The maintenance pad and retaining walls have been designed to meet the requirements of the **AASHTO LRFD Bridge Design Specifications, 7th Edition, 2014**.
  - Concrete for 12" (in) thick maintenance pad shall be class 4000. Concrete for 4" (in) thick maintenance pad shall be class 3000.
  - Height of wall varies to match slope of finished grade. Contractor shall field-determine wall height at each maintenance pad location and obtain approval from the Engineer prior to proceeding with construction.
  - All exposed corners shall have 3/4" (in) chamfers.
  - For grounding details not shown, see **Standard Plan J-60.06**.
  - Where concrete cover (clear) thickness is not shown, the clear distance from the face of the concrete to the face of any reinforcing steel shall be as follows: 3" (in) for bottom of maintenance pad, 2" (in) for top of maintenance pad, and 1 1/2" (in) at all other locations.
  - Falswork shall be carefully released to prevent impact or undue stress on the structure.
  - See Contract Plans for number, type, and location of conduits and conductors.
  - Contractor shall orient the maintenance pad to align with the direction of natural grade as shown. Engineer's approval of maintenance pad slope and orientation required prior to proceeding with construction.
  - Use 4" (in) Maintenance Pad on level ground or slopes not exceeding 10H : 1V. Use 12" (in) Maintenance Pad on slopes steeper than 10H : 1V. Slopes steeper than 2H : 1V shall require a special design.



- LEGEND**
- ★ FRACTURED FINISH
  - β EXTEND BAR 8" (IN) INTO FOOTING
  - Ω ADJACENT TO SOIL



**KEY NOTE**

① LIMITS OF PIGMENTED SEALER. TYPICAL FOR ALL RETAINING WALLS.

**REINFORCING STEEL BENDING DIAGRAM**

SEE STD. SPEC. 9-07(12) FOR BENDING DIAM. ALL DIMENSIONS ARE OUT TO OUT

**NOTE**

WHEN THE MAINTENANCE PAD ADJUTS ASPHALT OR CONCRETE THE CONTRACTOR SHALL MODIFY THE FINISHED GRADE 1" (IN) MINIMUM TO 2" (IN) MAXIMUM.

**NOTE**

12" (IN) MAINTENANCE PAD ON SLOPES STEEPER THAN 10H : 1V

NOTE: CONCRETE FOR 12" (IN) THICK PAD SHALL BE CLASS 4000 (GROUND RING NOT SHOWN FOR CLARITY)

**NOTE**

4" (IN) MAINTENANCE PAD ON SLOPES LEVEL TO 10H : 1V

NOTE: CONCRETE FOR 4" (IN) THICK PAD SHALL BE CLASS 3000



Richard P. Zeldner  
 Registered Professional Engineer  
 License No. 25470  
 State of Washington  
 Expires 06/11/2015  
 2015.06.11 15:07:03

**HIGH MAST LUMINAIRE MAINTENANCE PAD**

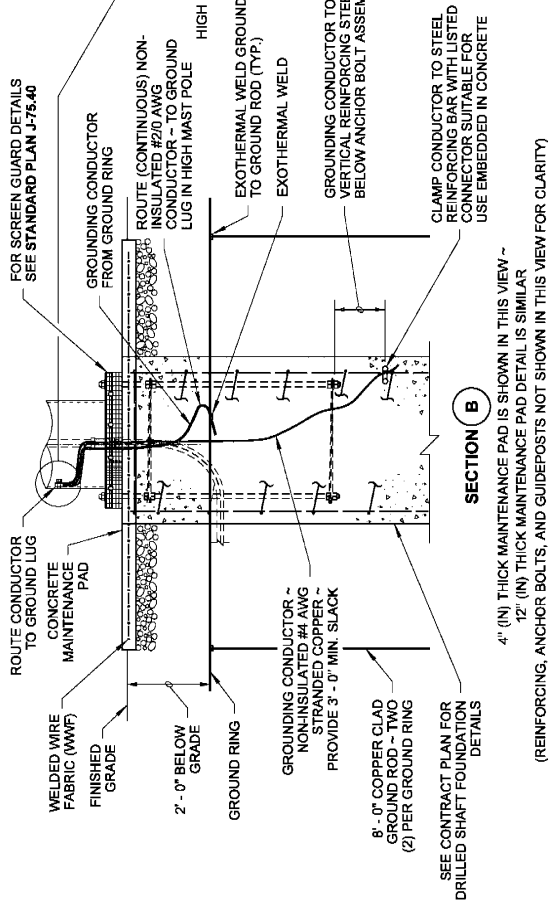
**STANDARD PLAN J-30.10-00**

SHEET 1 OF 2 SHEETS

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 Carpenter, Jeff  
 Jun 18 2015 7:34 AM

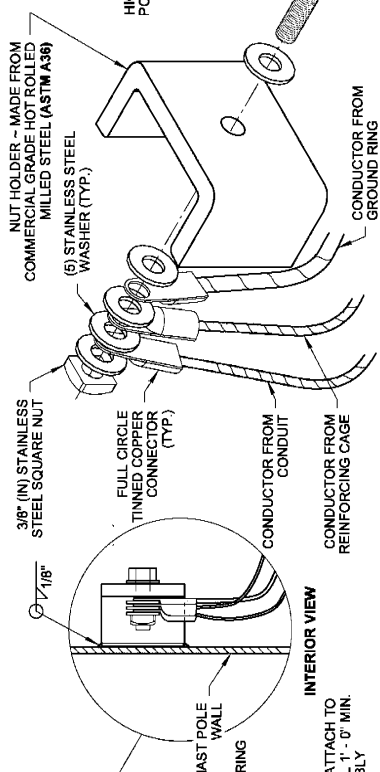
STATE DESIGN ENGINEER  
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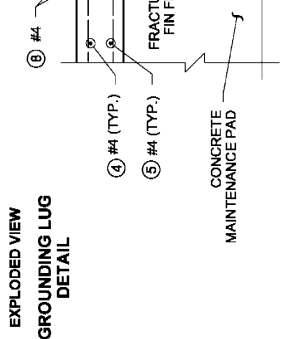


**SECTION (B)**

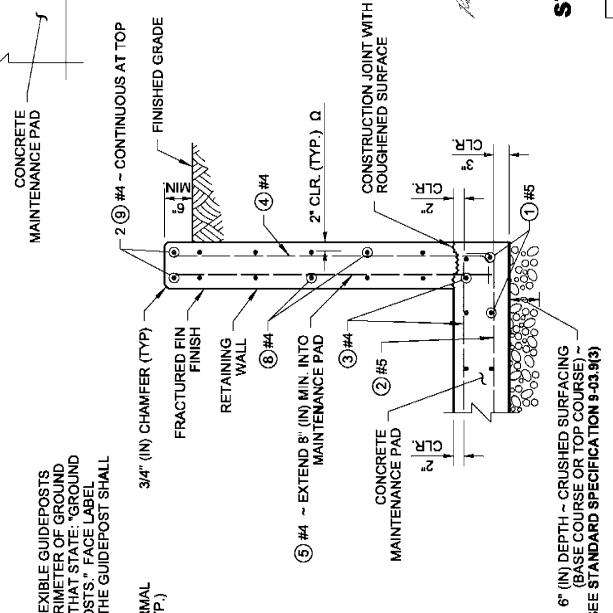
4" (IN) THICK MAINTENANCE PAD IS SHOWN IN THIS VIEW ~  
 12" (IN) THICK MAINTENANCE PAD DETAIL IS SIMILAR  
 (REINFORCING, ANCHOR BOLTS, AND GUIDEPPOSTS NOT SHOWN IN THIS VIEW FOR CLARITY)



**EXPLODED VIEW  
 GROUNDING LUG  
 DETAIL**

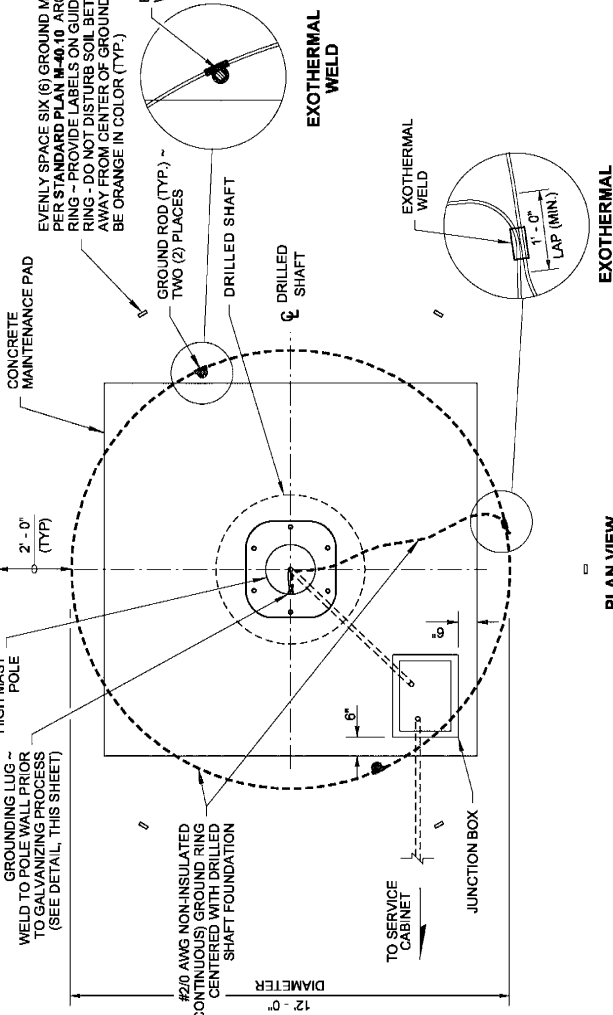


**SECTION (D)**



**SECTION (C)**

(CHAIN LINK FENCE NOT SHOWN FOR CLARITY)



**PLAN VIEW**

**HIGH MAST POLE MAINTENANCE PAD AND GROUNDING DETAILS**

4" (IN) THICK MAINTENANCE PAD IS SHOWN IN THIS VIEW ~  
 12" (IN) THICK MAINTENANCE PAD DETAIL IS SIMILAR  
 (REINFORCING NOT SHOWN FOR CLARITY)



Zeidenrust, Richard  
 2015.06.11 15:07:28 -0700

**HIGH MAST LUMINAIRE  
 MAINTENANCE PAD**

STANDARD PLAN J-30.10-00

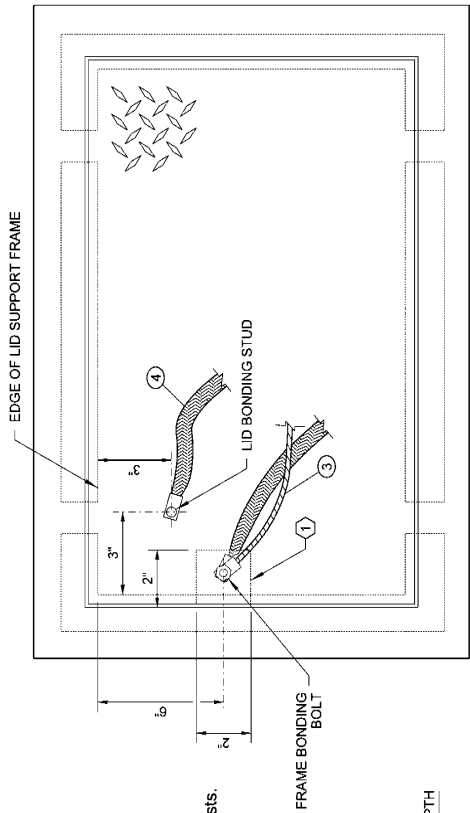
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION  
 Carpenter, Jeff  
 Jun 18 2015 7:54 AM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

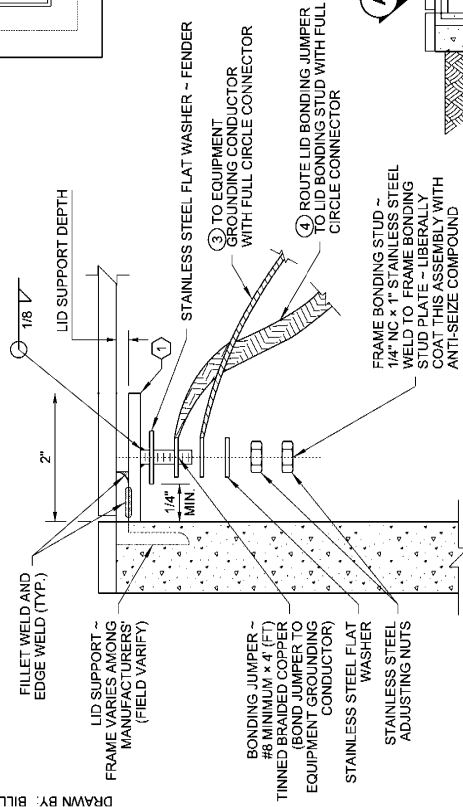
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- ① 3/8" (in) x 2" (in) x 2" (in) Frame Bonding Stud Plate with 1/4 NC x 1" Stainless Steel Bonding Stud.
  - Weld Bonding Stud to Frame Bonding Plate.
  - Weld to lid support frame.
  - 1/4" (in) weld ~ 3 sides.
  - Grind lid bearing surface flat after welding.
  - All corners rounded. Corners along exposed sheared or cut edges shall be broken by light grinding to achieve an approximate 1/16" (in) chamfer or rounding.
  - Protect conductors with fireproof cloth prior to welding.
  - Omit Frame Bonding Stud Plate if the Frame Bonding point already exists.
- ② Weld all around lid bonding stud ~ 1/4 NC x 1" stainless steel ~ liberally coat entire assembly w/ anti-seize compound.

DRAWN BY: BILL BERENS

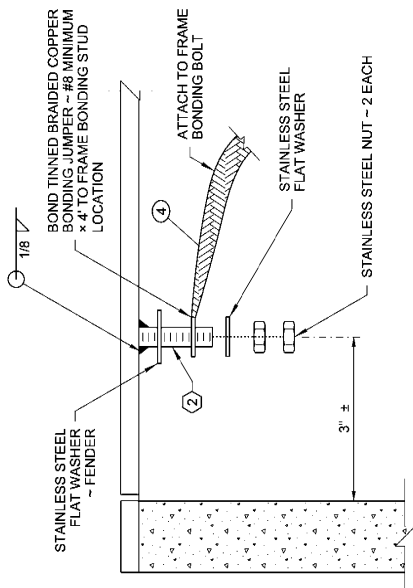
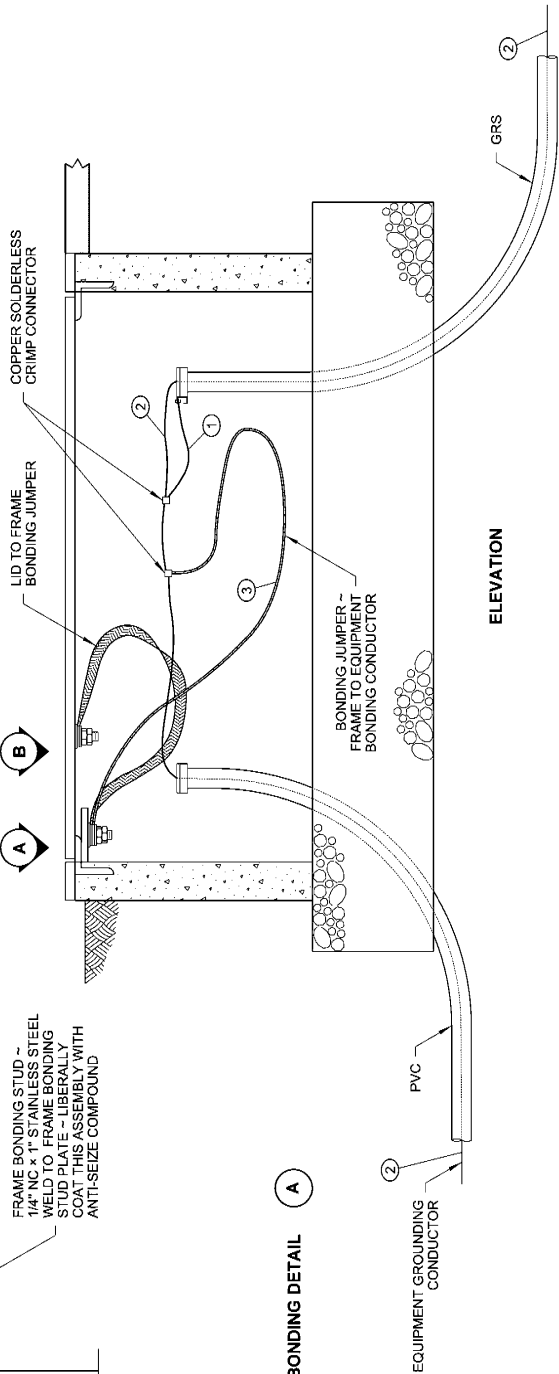


PLAN

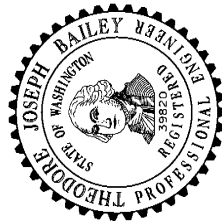


FRAME BONDING DETAIL A

LID BONDING DETAIL B



- KEY**
- ① BONDING JUMPER
  - ② EQUIPMENT GROUNDING CONDUCTOR
  - ③ BONDING JUMPER ATTACHED TO BOX WALL COUPLING NUT
  - ④ BONDING JUMPER ATTACHED TO BOX LID(S) GROUND STUD. # 8 AWG (MIN.) x 4' (FT) TINNED BRAIDED COPPER.



Joseph Bailey, P.E.  
July 19, 2016 12:38 PM

**EXISTING JUNCTION BOX  
RETROFIT GROUNDING  
DETAILS**

**STANDARD PLAN J-40.05-00**

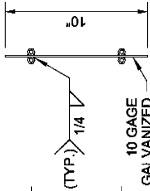
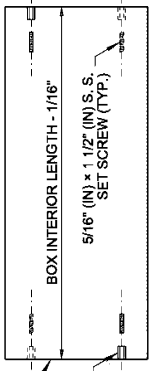
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION  
 Christopher Joffe  
 July 17, 2016 10:17 AM  
 STATE DESIGN ENGINEER  
 Washington, State Department of Transportation

TAPER DIVIDER ENDS TO MATCH INSIDE TAPER OF BOX

5/16" (IN) x 1" (IN) S.S. COUPLING NUT (TYP.)

5/16" (IN) x 1 1/2" (IN) S.S. SET SCREW (TYP.)



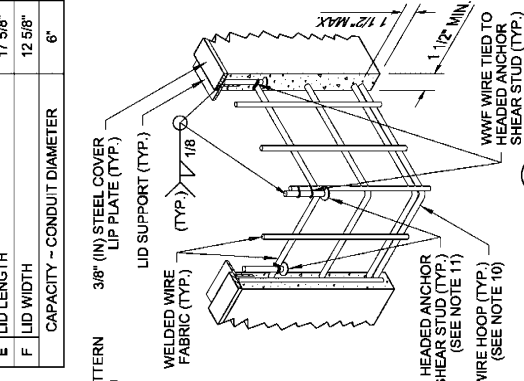
**JUNCTION BOX DIMENSION TABLE**

MARK	ITEM	BOX TYPE	
		TYPE 1	TYPE 2
A	OUTSIDE LENGTH OF JUNCTION BOX	22"	33"
B	OUTSIDE WIDTH OF JUNCTION BOX	17"	22 1/2"
C	INSIDE LENGTH OF JUNCTION BOX	18" - 19"	28" - 29"
D	INSIDE WIDTH OF JUNCTION BOX	13" - 14"	17" - 18"
E	LID LENGTH	17 5/8"	28 5/8"
F	LID WIDTH	12 5/8"	18 1/8"
	CAPACITY - CONDUIT DIAMETER	6"	12"

**NOTES**

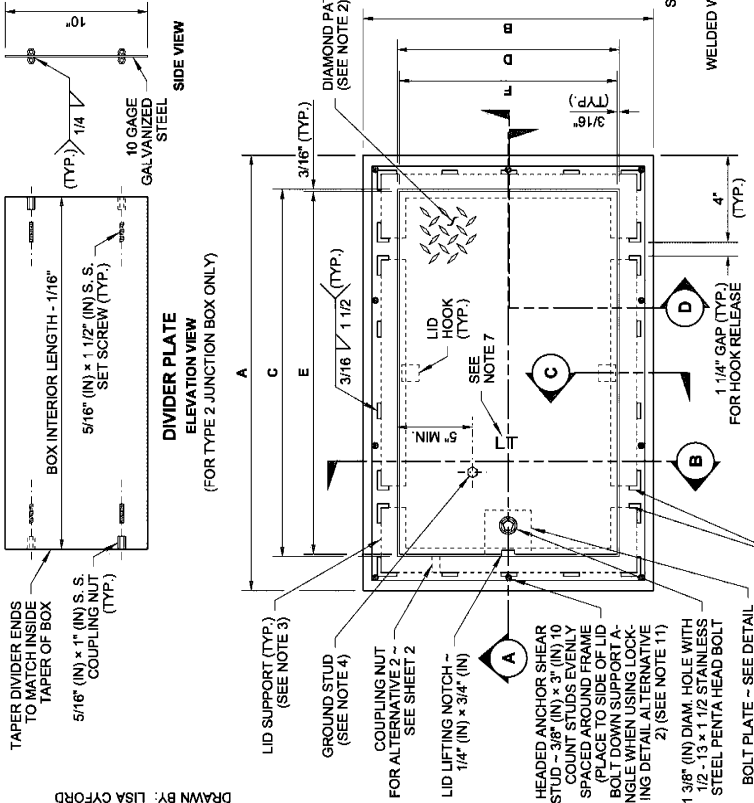
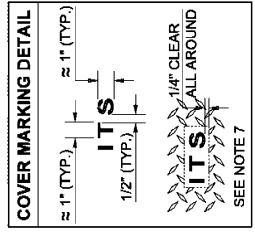
- All box dimensions are approximate. Exact configurations vary among manufacturers.
- Minimum lid thickness shown. Junction Boxes installed in sidewalks, walkways, and shared-use paths shall have a slip-resistant coating on the lid and lip cover plate, and shall be installed with the surface flush with and matched to the grade of the sidewalk, walkway, or shared-use path. The non-slip lid shall be identified with permanent markings on the underside, indicating the type of surface treatment (see Contract Documents for details) and the year of manufacture. The permanent marking shall be 1/8" (in) line thickness formed with a mild steel weld bead and shall be placed prior to hot-dip galvanizing.
- Lid support members shall be 3/16" (in) minimum thick steel C, L, or T shape, welded to the frame.
- A 1/4-20 NC x 3/4" (in) stainless steel ground stud shall be welded to the bottom of the lid; include (2) stainless steel nuts and (2) stainless steel flat washers.
- Bolts and nuts shall be liberally coated with anti-seize compound.
- Equipment Bonding Jumper shall be # 8 AWG min. x 4' (ft) of tinned braided copper.

- The System Identification letters shall be 1/8" (in) line thickness formed with a mild steel weld bead. See Cover Marking detail. Grind off diamond pattern before forming letters. For System Identification details, see **Standard Specification 9-29.2(4)**.
- When required in the Contract, provide a 10" (in) x 27 1/2" (in), 10 gauge divider plate, complete, with fasteners, in each Type 2 Junction Box where specified.
- When required in Contract, provide a 12" (in) deep extension for each Type 2 Junction Box where specified.
- See the **Standard Specifications** for alternative reinforcement and class of concrete.
- Headed Anchor Shear Studs must be welded to the Steel Cover Lip Plate and wire tied in two places to the vertical Welded Wire Fabric when in contact with each other. Wire tie all other Headed Anchor Shear Studs to the horizontal Welded Wire Fabric.
- Lid Bolt Down Attachment Tab provides a method of retrofitting by using a mechanical process in lieu of welding. Attachment Tab shown depicts a typical component arrangement; actual configurations of assembly will vary among manufacturers. See approved manufacturers' shop drawings for specifics.
- Unless otherwise noted in the plans or approved by the Engineer, Junction Boxes, Cable Vaults, and Pull Boxes shall not be placed within the sidewalks, walkways, shared use paths, traveled ways or paved shoulders. All Junction Boxes, Cable Vaults, and Pull Boxes placed within the traveled way or paved shoulders shall be Heavy-Duty.
- Distance between the top of the conduit and the bottom of the Junction Box lid shall be 6" (in) min. to 8" (in) max. for final grade of new construction only. See **Standard Specification 8-20.3(5)**. Where adjustments are to be made to existing Junction Boxes, or for interim construction stages during the contract, the limits shall be from 6" (in) min. to 10" (in) max. See **Standard Specification 8-20.3(6)**.

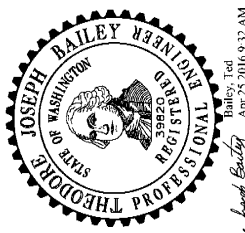
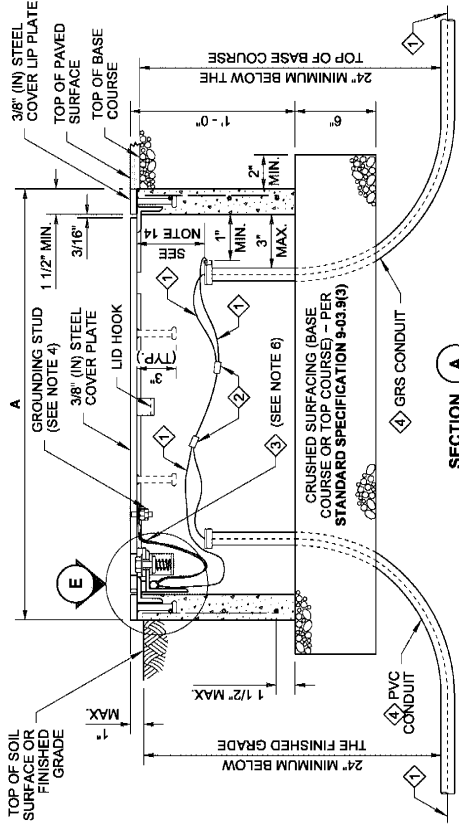


**SECTION D**  
PERSPECTIVE VIEW

- Equipment Grounding Conductor
- Copper Solderless Crimp Connector
- Equipment Bonding Jumper (See Note 6)
- See Contract for conduit size and number



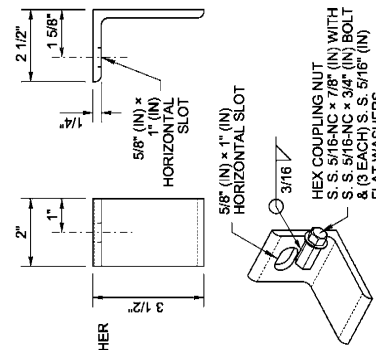
**SECTION A**  
ELEVATION VIEW



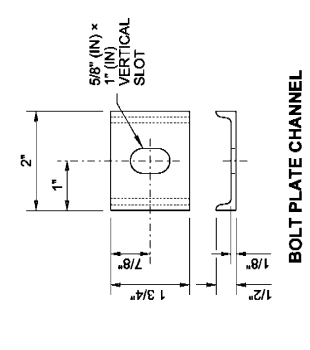
**LOCKING LID STANDARD DUTY JUNCTION BOX TYPES 1 & 2**  
**STANDARD PLAN J-40.10-04**  
SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION  
Carpenter, Jeff  
Apr. 28, 2016 9:32 AM  
STATE DESIGN ENGINEER  
Washington State Department of Transportation

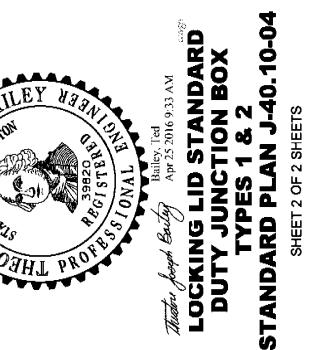
**SECTION B**  
(CONDUITS NOT SHOWN)



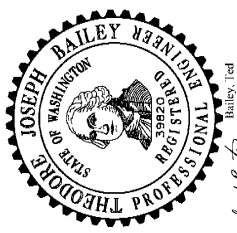
**ALTERNATIVE 1**  
**LID BOLT DOWN ATTACHMENT TAB**  
(SEE NOTE 12)



**ALTERNATIVE 2**  
**LID BOLT DOWN ATTACHMENT TAB**  
(SEE NOTE 12)

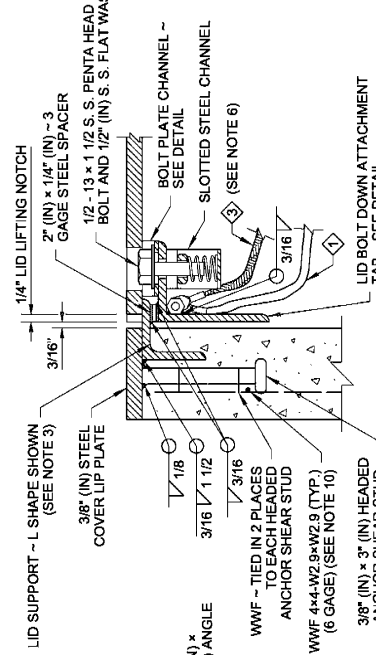


**ALTERNATIVE 3**  
**LID BOLT DOWN ATTACHMENT TAB**  
(SEE NOTE 12)

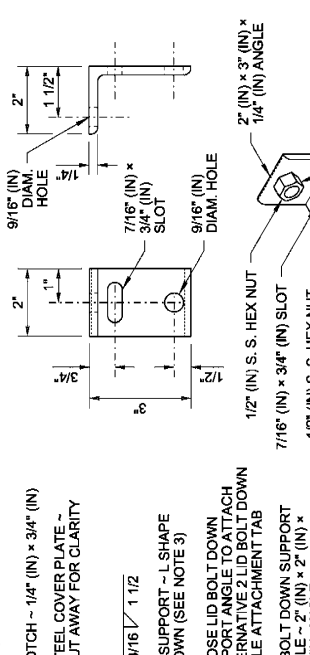


**LOCKING LID STANDARD DUTY JUNCTION BOX TYPES 1 & 2**  
**STANDARD PLAN J-40.10-04**  
SHEET 2 OF 2 SHEETS

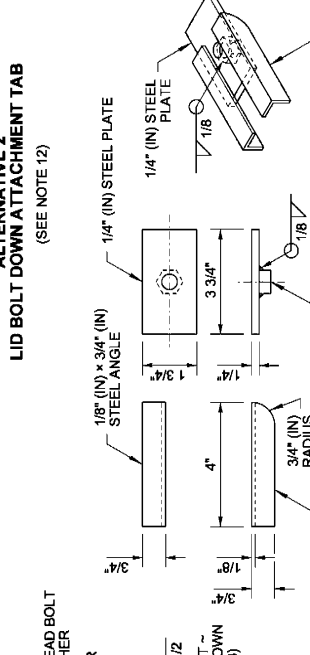
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Capehart, WA  
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STATE DESIGN ENGINEER  
Washington State Department of Transportation



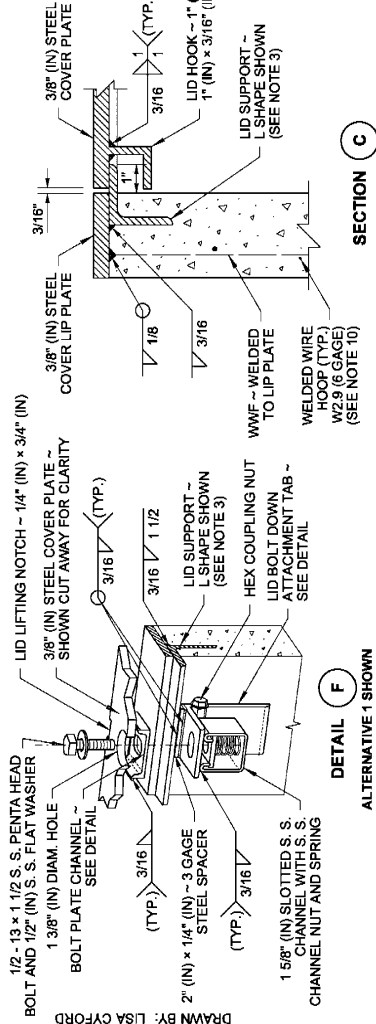
**SECTION C**  
**DETAIL F**  
**ALTERNATIVE 1 SHOWN PERSPECTIVE VIEW**



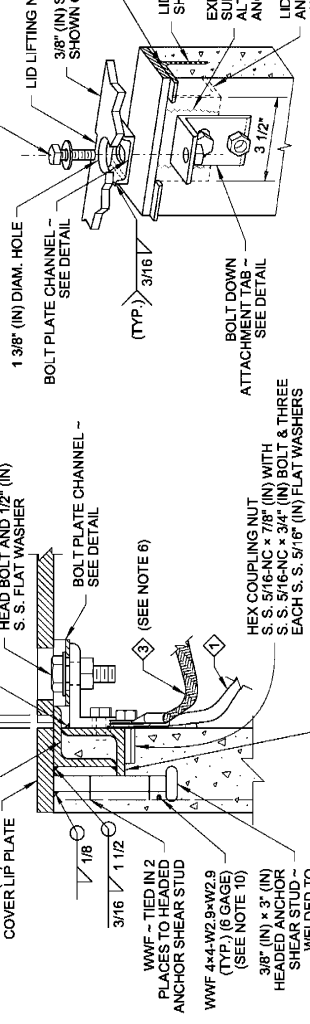
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**DETAIL F**  
**ALTERNATIVE 2 SHOWN PERSPECTIVE VIEW**



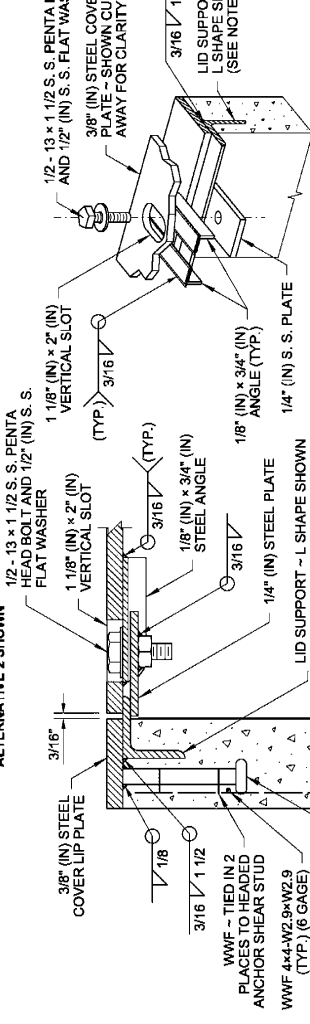
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**DETAIL F**  
**ALTERNATIVE 3 SHOWN PERSPECTIVE VIEW**



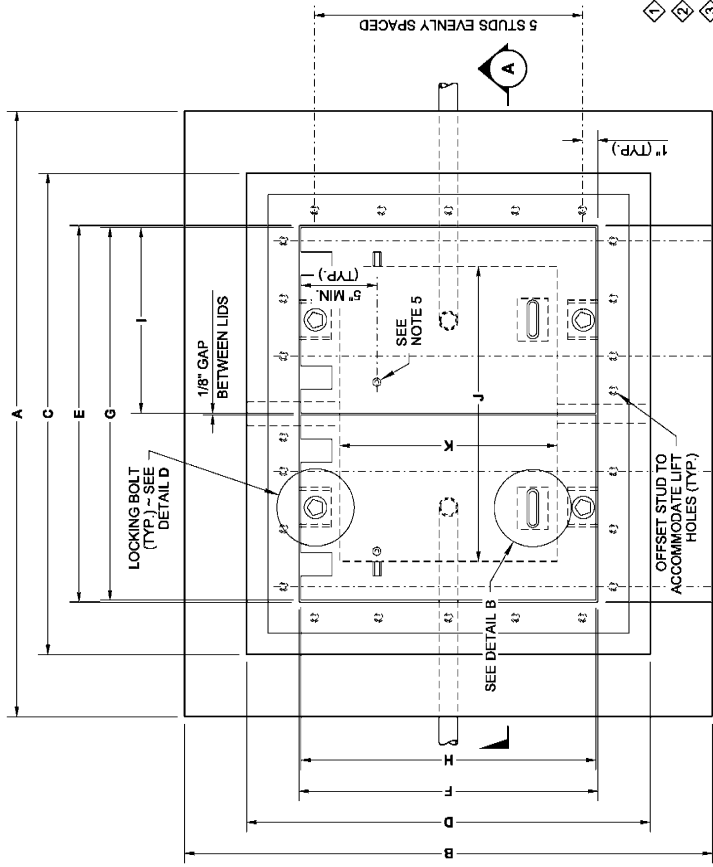
**SECTION F**  
**DETAIL F**  
**ALTERNATIVE 1 SHOWN PERSPECTIVE VIEW**



**SECTION F**  
**DETAIL F**  
**ALTERNATIVE 2 SHOWN PERSPECTIVE VIEW**



**SECTION E**  
**DETAIL F**  
**ALTERNATIVE 3 SHOWN PERSPECTIVE VIEW**



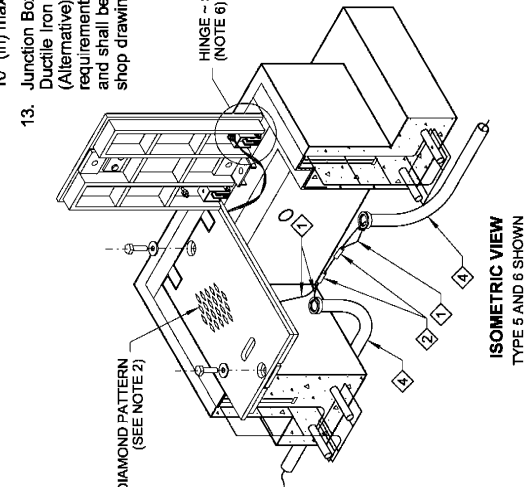
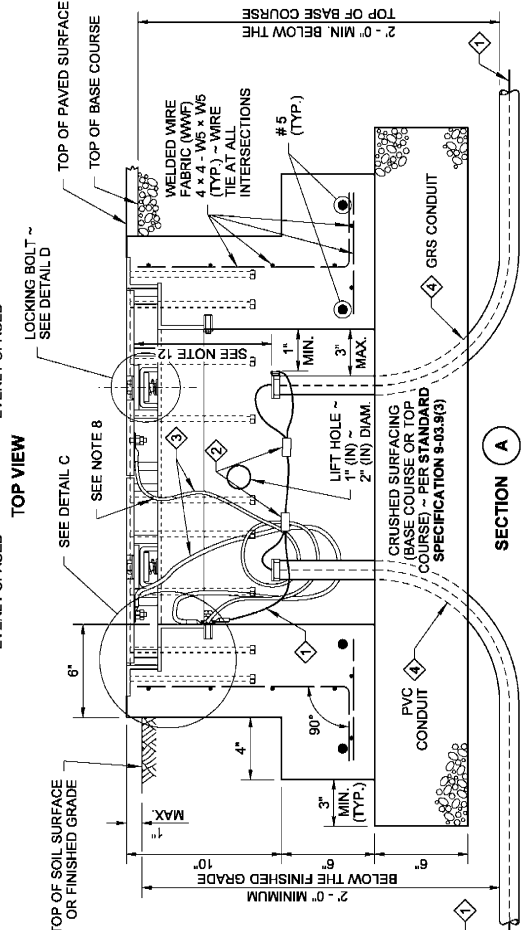
JUNCTION BOX DIMENSION TABLE		BOX TYPE			
MARK	ITEM	TYPE 4	TYPE 5	TYPE 6	
A	OVERALL LENGTH	39"	48"	56"	
B	OVERALL WIDTH	34"	37"	44"	
C	JUNCTION BOX LENGTH	31"	40"	48"	
D	JUNCTION BOX WIDTH	26"	29"	36"	
E	LID OPENING LENGTH	24"	33 1/8"	41 1/8"	
F	LID OPENING WIDTH	19"	22 1/8"	29 1/4"	
G	TYPE 4, 5 & 6 LID WIDTH	24"	—	—	
H	TYPE 4, 5 & 6 LID LENGTH	19"	21 7/8"	29"	
I	TYPE 5 & 6 LID LENGTH	—	16 3/8"	20 3/8"	
J	INSIDE BOX LENGTH	19"	28"	36"	
K	INSIDE BOX WIDTH	14"	17"	24"	
X	STIFFENER SPACING	VARIABLES	VARIABLES	VARIABLES	
Y	STIFFENER SPACING	VARIABLES	VARIABLES	VARIABLES	
Z	STIFFENER LENGTH	18 7/4"	21 1/8"	28 1/4"	
	CAPACITY ~ CONDUIT DIAM.	6"	12"	24"	

**NOTES**

- All box dimensions are approximate. Exact configurations vary among manufacturers.
- All lid thicknesses are minimum.
- Lid perimeter shall bear on frame. Mill to bearing seat and lid perimeter for full even contact after fabrication of frame and lid. Lid and frame units with uneven bearing will be rejected.
- The installed lid and frame shall fit with full even contact around the perimeter of a junction box after installation. Care shall be taken to prevent debris accumulation on the contact surfaces.
- A 1/4-20 NC x 1" (in) S. S. ground stud shall be welded to the bottom of each lid: include (2) each S. S. nuts and (3) each S. S. flat washers.
- The hinges shall allow the lids to open 180°. When lid assembly is Ductile Iron (Alternative) and equipped with Safety Bars, lids shall open 110°.
- Bolts and nuts shall be liberally coated with anti-seize compound.
- Connect Equipment Bonding Jumper to ground stud on lid. As an alternative to ground stud connection, the Equipment Bonding Jumper shall be attached to the front face of the hinge pocket with a 5/16-20 NC x 1" (in) S. S. bolt, (2) each S. S. nuts, and (3) each S. S. flat washers. Equipment bonding jumper shall be #8 AWG min. x 4' (ft) of tinned braided copper.
- The System Identification letters shall be 1/8" (in) line thickness formed by a mild steel weld bead. See Cover Marking details. Grind off diamond pattern before forming letters. Ductile iron lid lettering shall be recessed, 1/8" (in) line thickness. See **Standard Specification 9-29.2(4)** for details.
- See **Standard Specification 9-29.2(1)B** for class of concrete.

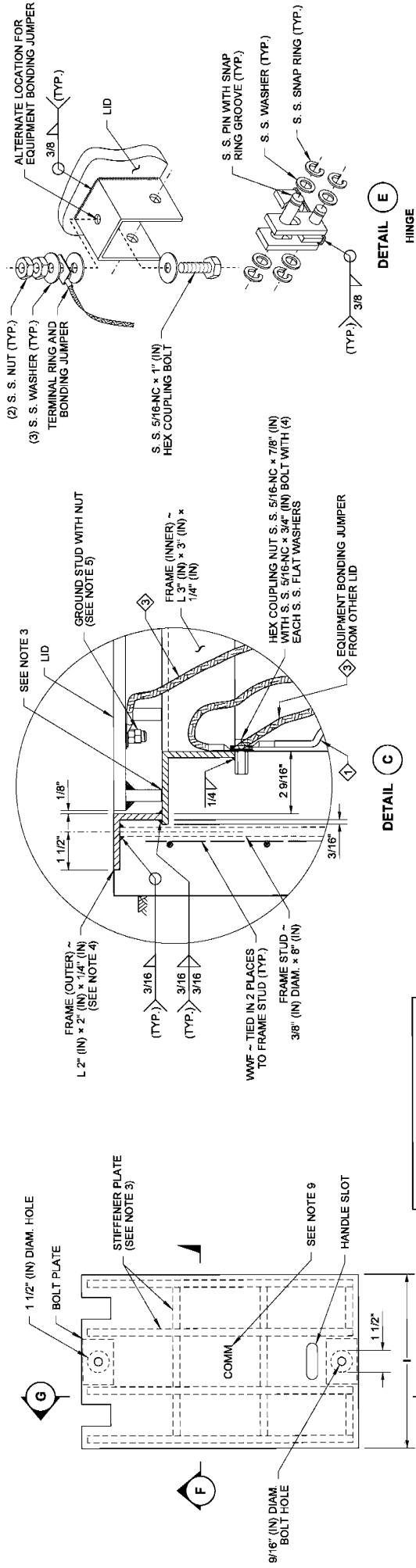
- Unless otherwise noted in the plans or approved by the Engineer, Junction Boxes, Cable Vaults, and Pull Boxes shall not be placed within the traveled way or paved shoulders. All Junction Boxes, Cable Vaults, and Pull Boxes placed within the traveled way or paved shoulders shall be Heavy-Duty. Heavy-Duty Junction Boxes shall not be installed in side-walks, walkways, and shared use paths.
- Distance between the top of the conduit and the bottom of the Junction Box lid shall be 6" (in) min. to 8" (in) max., for final grade of new construction only. See **Standard Specification 8-20.3(6)**. Where adjustments are to be made to existing Junction Boxes, or for interim construction stages during the contract, the limits shall be from 6" min. to 10" (in) max. See **Standard Specification 8-20.3(6)**.
- Junction Box Types 4, 5, or 6 may be equipped with Ductile Iron (Alternative) Lids and a Cast Iron (Alternative) Frame. Junction box shall meet the requirements of **Standard Specification 9-29.2** and shall be in accordance with approved shop drawings.

- ① Equipment Grounding Conductor
- ② Copper Solderless Crimp Connector
- ③ Equipment Bonding Jumper (See Note 8)
- ④ See Contract Plans and Special Provisions for conduit size and number



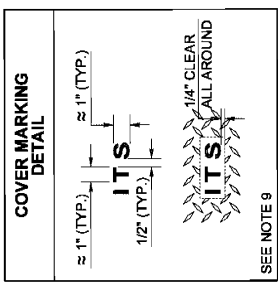
Bailey, Ted  
*Theodore Joseph Bailey*  
 Apr 25 2016 5:08 PM  
**HEAVY-DUTY JUNCTION BOX TYPES 4, 5, & 6**  
**STANDARD PLAN J-40.20-03**

SHEET 1 OF 2 SHEETS  
 APPROVED FOR PUBLICATION  
*Carpenster, Jeff*  
 Carpenter, Jeff  
 Apr 26 2016 9:15 PM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

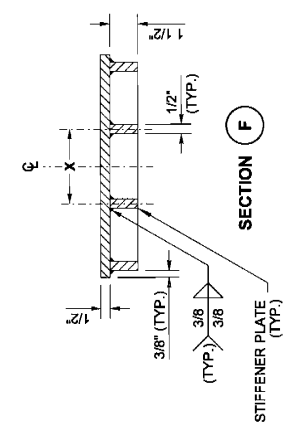


**DETAIL E**  
HINGE

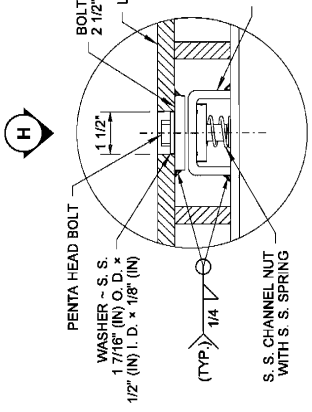
**DETAIL C**



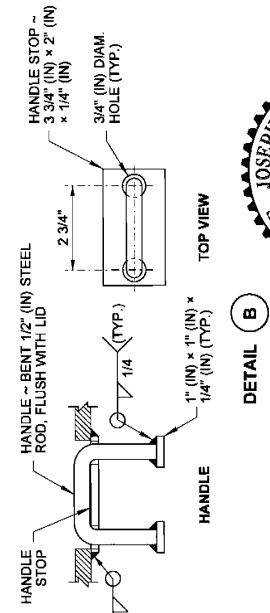
**PLAN VIEW LID**  
TYPE 5 AND 6 SHOWN



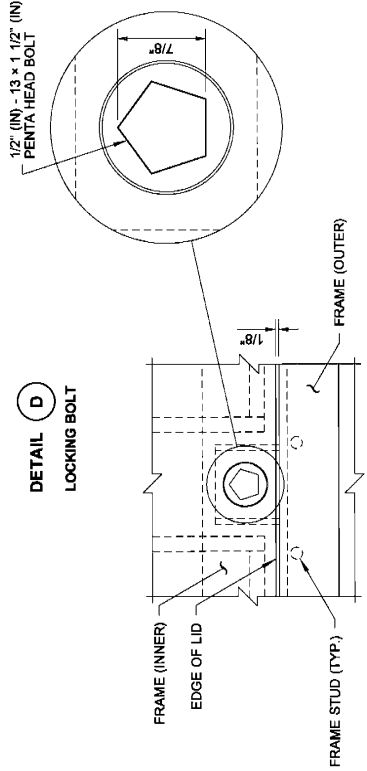
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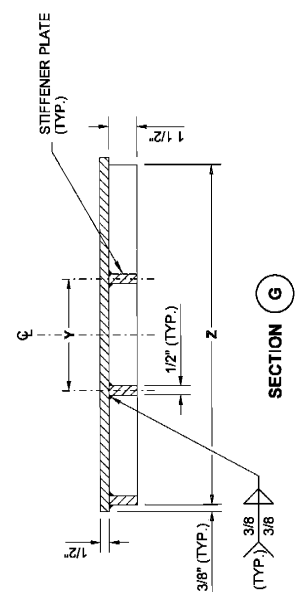
**DETAIL D**  
LOCKING BOLT



**DETAIL B**



**VIEW H**

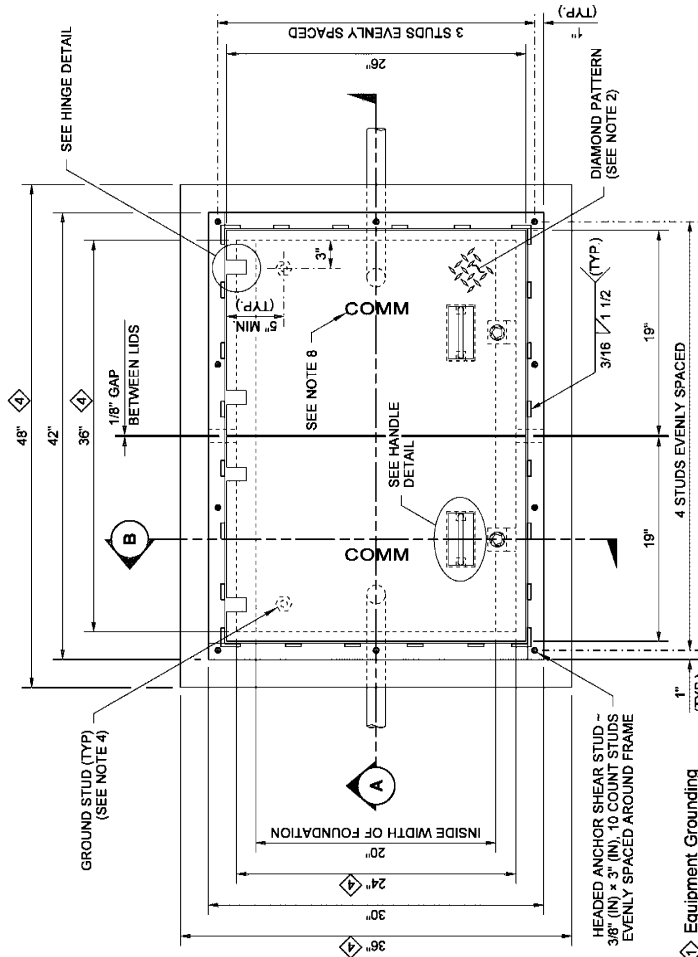


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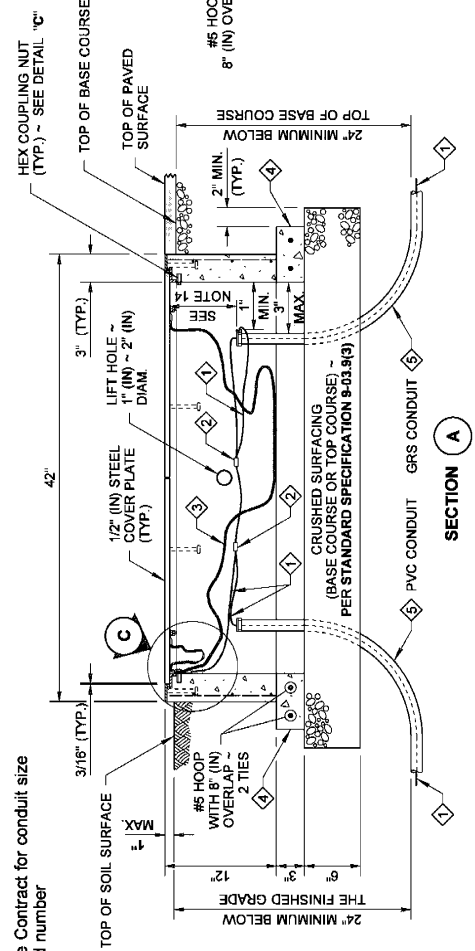
**HEAVY-DUTY JUNCTION BOX TYPES 4, 5, & 6**  
**STANDARD PLAN J-40.20-03**  
 SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION  
 Christopher Jeff  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation  
 APR 28 2016 5:15 PM  
 05555

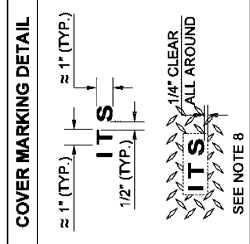


**PLAN VIEW**  
**LOCKING LID STANDARD DUTY JUNCTION BOX**

- ① Equipment Grounding Conductor
- ② Copper Solderless Crimp Connector
- ③ Equipment Bonding Jumper
- ④ Foundation
- ⑤ See Contract for conduit size and number



**SECTION A**



**NOTES**

1. All box dimensions are approximate. Exact configurations vary among manufacturers.
2. Minimum lid thicknesses are shown. Junction Boxes installed in sidewalks, walkways, and shared-use paths shall have a slip-resistant coating on the lid and lip cover plate and shall be installed with the surface flush with and matched to the grade of the sidewalk, walkway, or shared-use path. The non-slip lid shall be identified with permanent markings on the underside, indicating the type of surface treatment (see Contract Documents for details) and the year of manufacture. The permanent marking shall be 1/8" (in) line thickness formed with a mild steel weld bead and shall be placed prior to hot-dip galvanizing.
3. Lid support members shall be 3/16" (in) min. thick steel C, L, or T shape, welded to the frame. Exact configurations vary among manufacturers.
4. A 1/4-20 NC x 3/4" (in) S. S. ground stud shall be welded to the bottom of each lid; include (2) S. S. nuts and (2) S. S. flat washers.
5. The hinges shall allow the lids to open 180°.
6. Bolts and nuts shall be liberally coated with anti-seize compound.
7. Connect Equipment Bonding Jumper to ground stud on lid. As an alternative to the ground stud connection, the Equipment Bonding Jumper shall be attached to the front face of the hinge pocket with a 5/16-20 NC x 3/4" (in) S. S. bolt, (2) each S. S. nuts, and (2) each S. S. flat washers. Equipment Bonding Jumper shall be #8 AWG min. x 4 (ft) of tinned braided copper.
8. The System Identification letters shall be 1/8" (in) line thickness formed by a mild steel weld bead. See Cover Marking detail. Grind off diamond pattern before forming letters. See **Standard Specification 9-29.2(4)** for details.
9. See the **Standard Specifications** for alternative reinforcement and class of concrete.
10. See **Standard Plan J-40.10** for Welded Wire Fabric and Headed Anchor Shear Stud attachment details.
11. Capacity ~ conduit diameter = 24" (in)
12. Lid Bolt Down Attachment Tab provides a method of retrofitting by using a mechanical process in lieu of welding. Attachment Tab shown depicts a typical component arrangement; actual configurations of assembly will vary among manufacturers. See approved manufacturers' shop drawing for specifics.
13. Unless otherwise noted in the plans or approved by the Engineer, Junction Boxes, Cable Vaults and Pull Boxes shall not be placed within the sidewalk, walkway, shared use path, traveled way or paved shoulders. All Junction Boxes, Cable Vaults, and Pull Boxes placed within the traveled way or paved shoulders shall be Heavy-Duty.
14. Distance between the top of the conduit and the bottom of the Junction Box lid shall be 6" (in) min. to 8" (in) max. for final grade of new construction only. See **Standard Specification 8-20.3(6)**. Where adjustments are to be made to existing Junction Boxes, or for interim construction stages during the contract, the limits shall be from 6" (in) min. to 10" (in) max. See **Standard Specification 8-20.3(6)**.

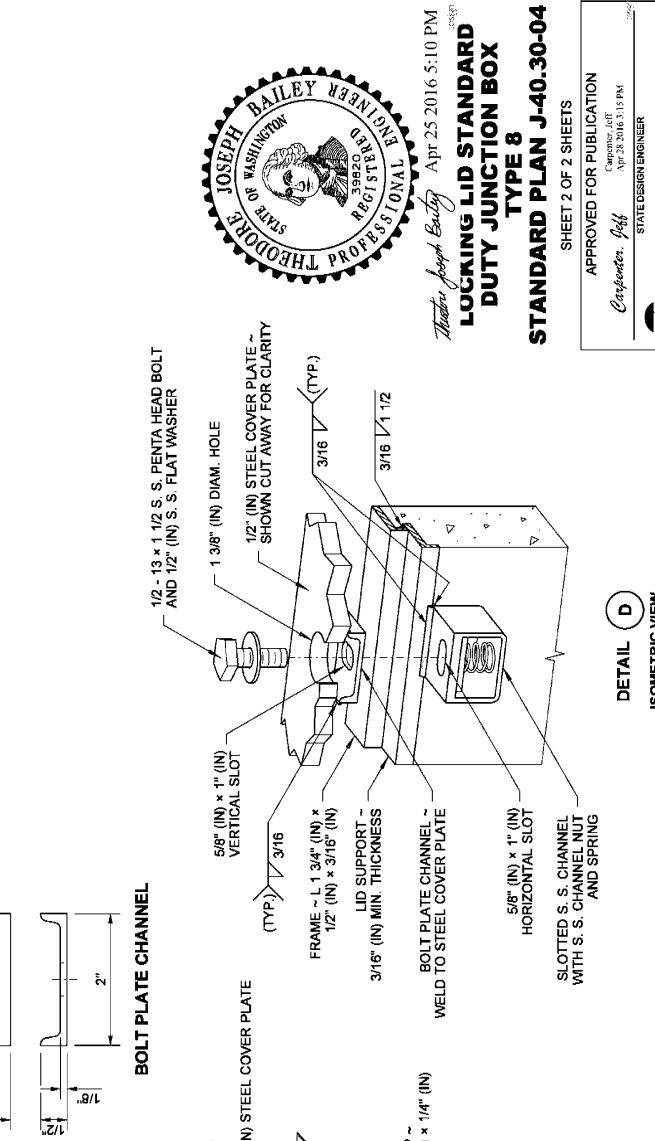
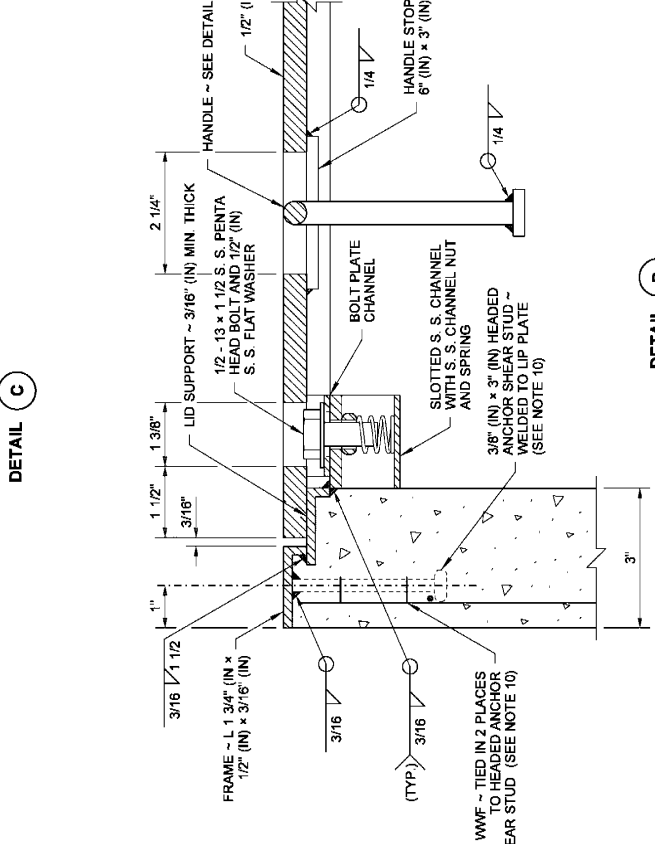
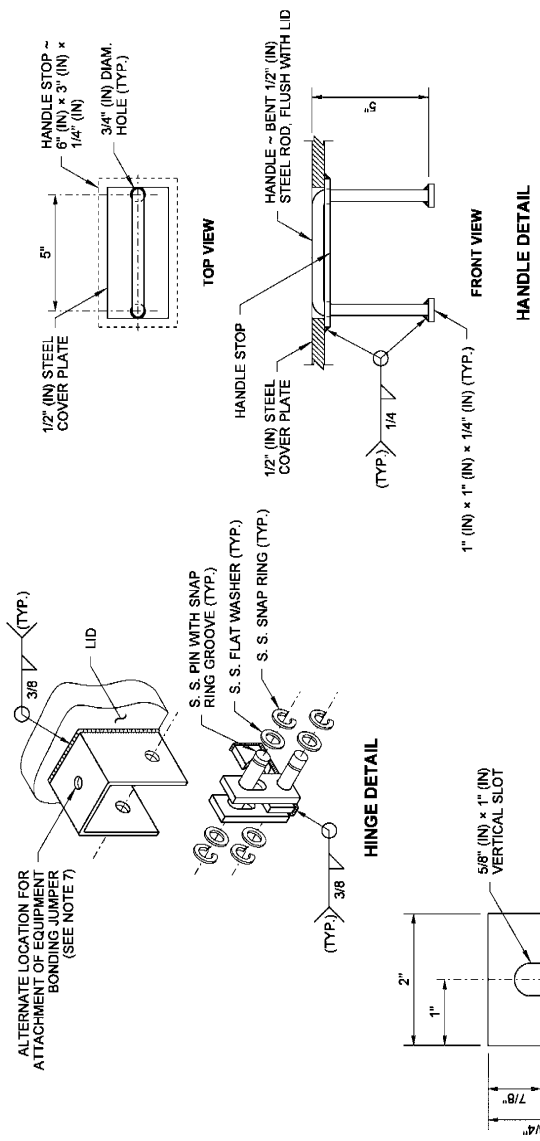
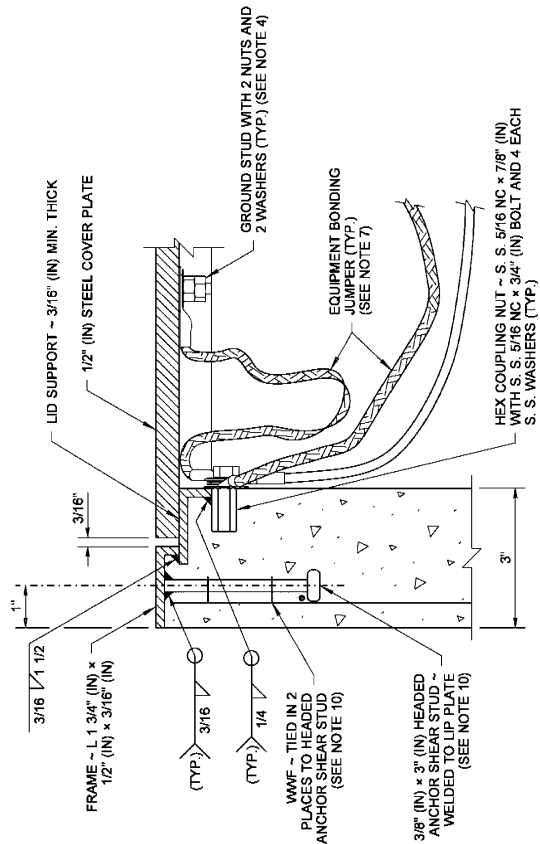


*Theodore Joseph Bailey*  
 APR 25 2016 6:09 PM  
**LOCKING LID STANDARD DUTY JUNCTION BOX TYPE 8**  
**STANDARD PLAN J-40.30-04**  
 SHEET 1 OF 2 SHEETS

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 Carpenter, Jeff  
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**SECTION B**  
CONDUITS NOT SHOWN



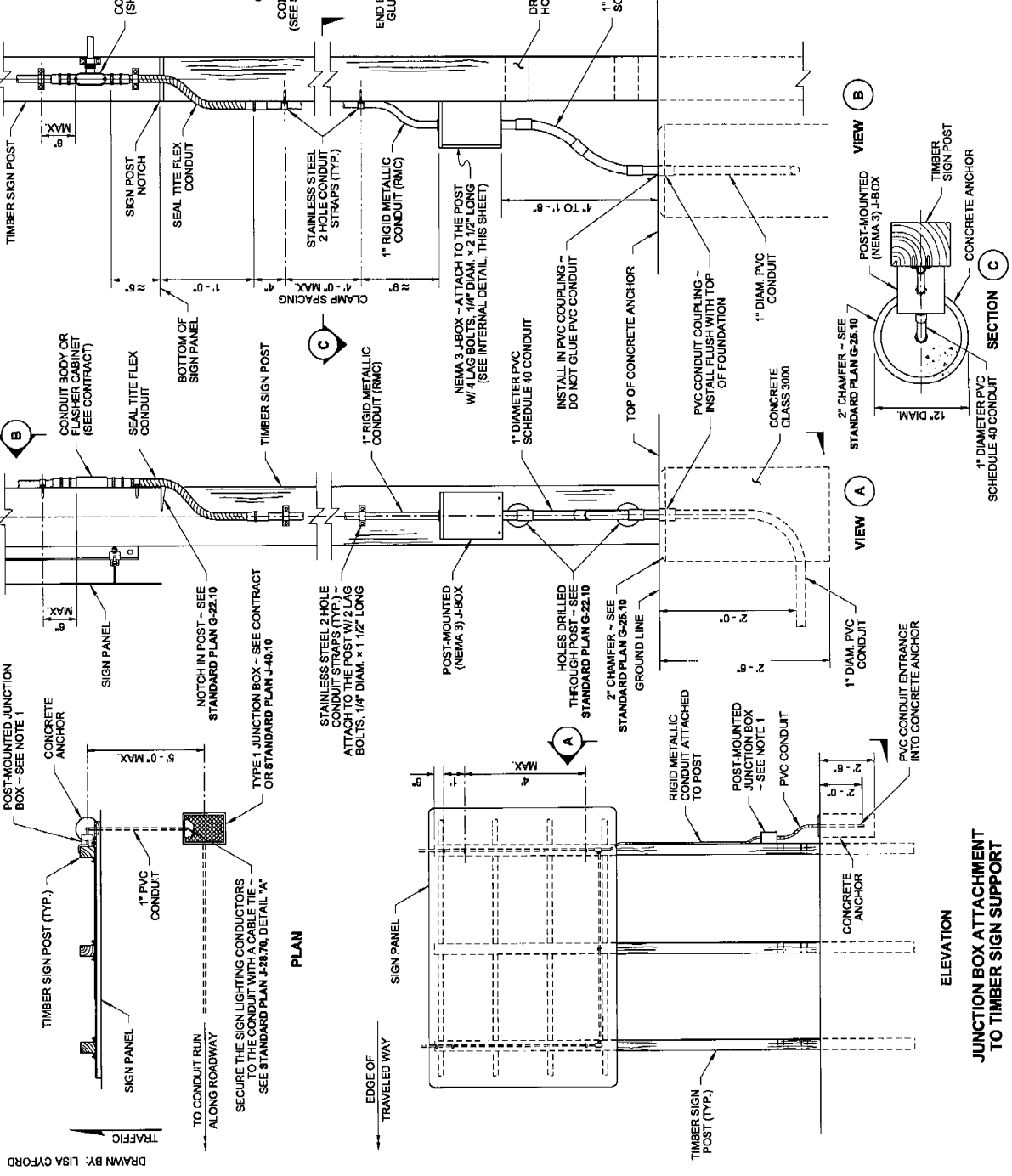


*Theodore Joseph Bailey* Apr 25 2016 5:10 PM  
**LOCKING LID STANDARD DUTY JUNCTION BOX TYPE 8**  
**STANDARD PLAN J-40.30-04**

SHEET 2 OF 2 SHEETS  
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**NOTE**

1. Install the Junction Box on the Timber Sign Post or the Steel Sign Support that is farthest from the roadway.
2. See Standard Plan J-21.16 for Flashing Beacon Installation details. See Standard Plan J-21.17 for Electrical Wiring details.

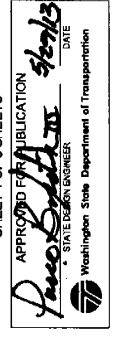


5-29-13

**SIGN POST-MOUNTED JUNCTION BOX**

**STANDARD PLAN J-40.35-01**

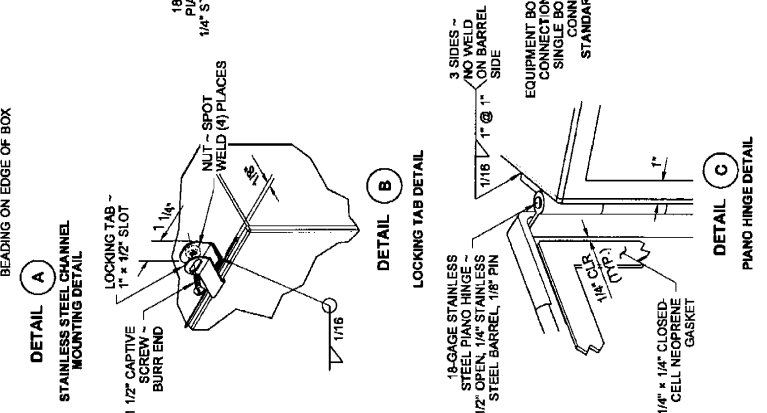
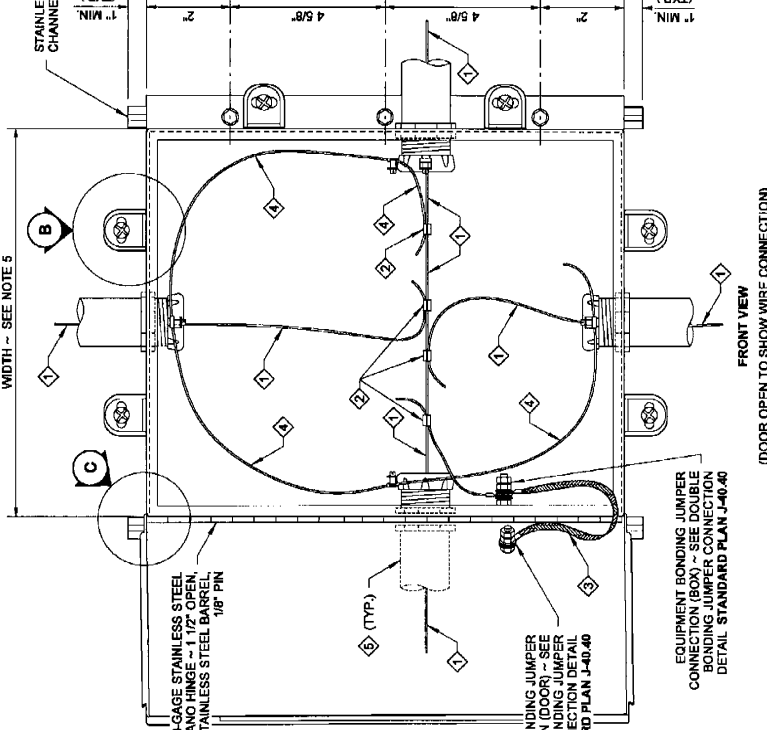
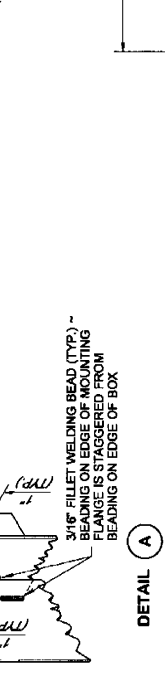
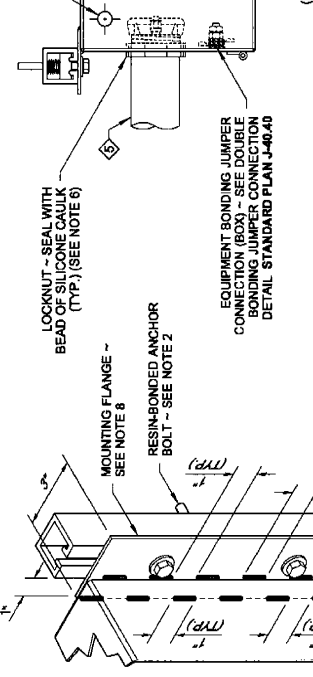
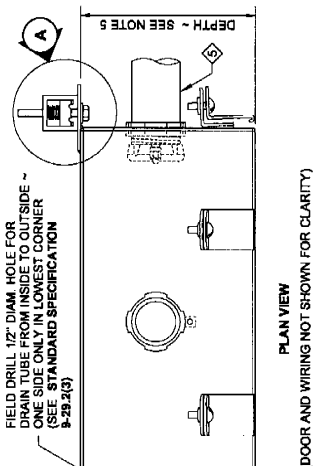
SHEET 1 OF 3 SHEETS



**ELEVATION**

**JUNCTION BOX ATTACHMENT TO TIMBER SIGN SUPPORT**

- NOTES**
1. Drilling through reinforcing steel is not allowed. If steel is hit while drilling, the location shall be moved and the abandoned hole filled with grout conforming to **Standard Specification 6-02.3(20)**.
  2. Mount the stainless steel support using an approved resin-bonded anchor system, installed per manufacturer's recommendation. Resin-bonded anchors shall be stainless steel and shall be of 3/8" diameter (Expansion Anchors are not allowed). Anchor bolt embedment shall be 4 1/2" min. See **Standard Plan J-60.13** for Stainless Steel Channel details.
  3. There shall be a minimum of 3" edge distance to the centerline of anchor holes in concrete. See **Standard Plan J-60.13** for Stainless Steel Channel details.
  4. The System identification letters on the box lid shall be 1/8" line thickness formed by engraving, stamping, or with a stainless steel weld bead. See System Identification Detail and **Standard Specifications 9-29.2(4)**.
  5. Junction Box shall be dimensioned as shown in the Contract. If the conduit sizes shown in the Contract are changed, the box dimensions shall be revised in accordance with **NEC 314.28** using the 8 times multiplier for length and width dimensions.
  6. Fittings shall be UL listed and CSA-certified watertight on the outside of the Junction Box conduit connection. An insulated grounded end bushing shall be used to terminate Rigid Metal Conduit.
  7. Equipment Bonding Jumper shall be # 8 AWG (min.) x 1 foot of tinned, braided copper.
  8. Junction Box shall be constructed of 12-gauge, Type 304 stainless steel with welded seam construction and # 4 finish. Mounting Flange shall also be 12-gauge, Type 304 stainless steel.



**FRONT ENTRY  
NEMA 4X SURFACE-MOUNT  
JUNCTION BOX  
STANDARD PLAN J-40.39-00**

SHEET 1 OF 1 SHEET

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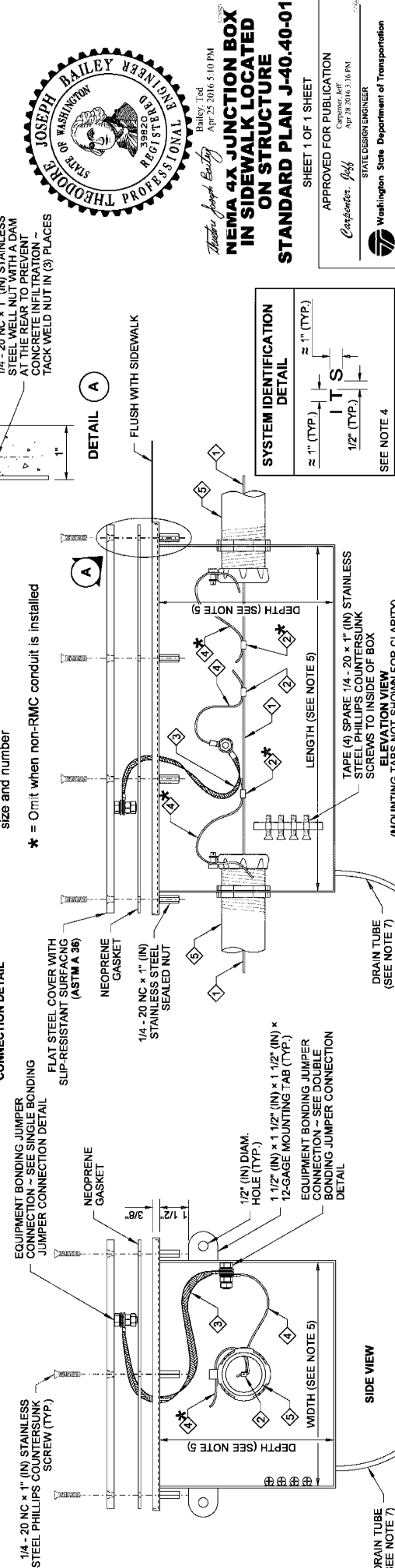
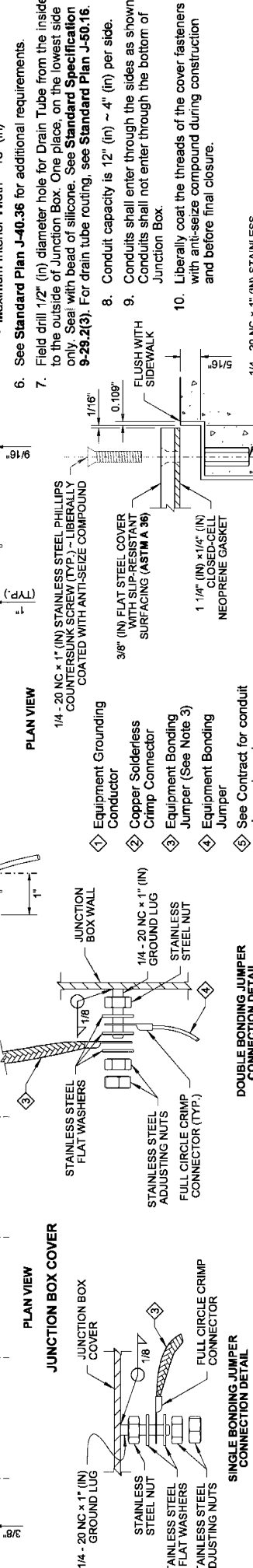
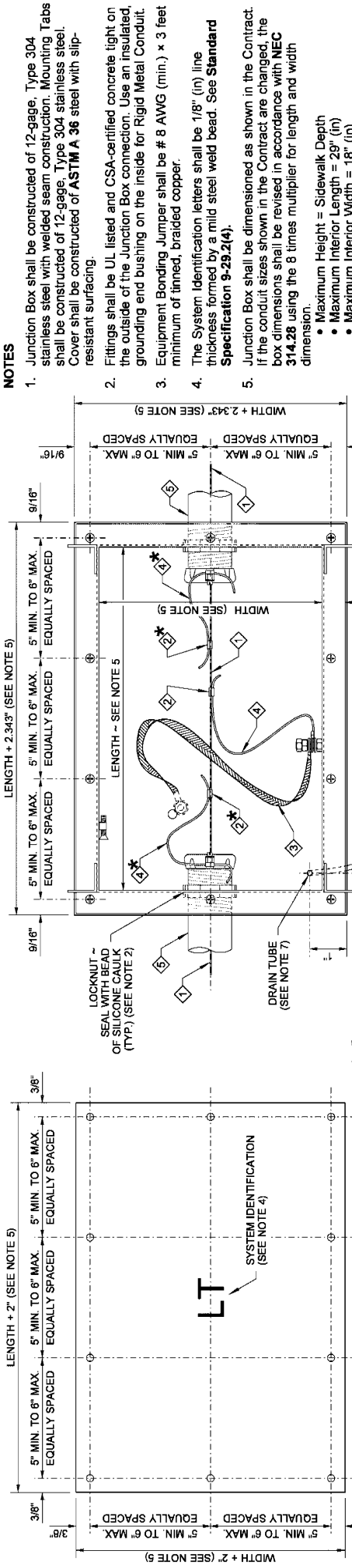
*Lisa Cyford*  
DATE: 5/15/13

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SYSTEM IDENTIFICATION DETAIL	
≈ 1" (TYP.)	≈ 1" (TYP.)
1"	1"
1/2" (TYP.)	1/2" (TYP.)

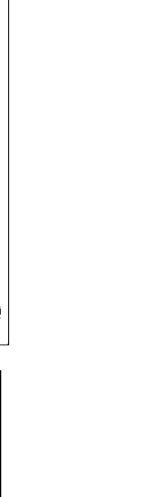
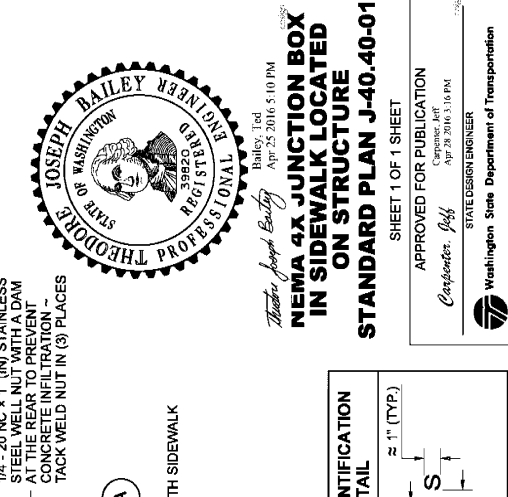
SEE NOTE 4



**NOTES**

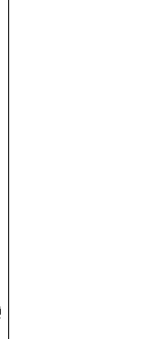
- Junction Box shall be constructed of 12-gage, Type 304 stainless steel with welded seam construction. Mounting Tabs shall be constructed of 12-gage, Type 304 stainless steel. Cover shall be constructed of **ASTMA 36** steel with slip-resistant surfacing.
- Fittings shall be UL listed and CSA-certified concrete tight on the outside of the Junction Box connection. Use an insulated, grounding end bushing on the inside for Rigid Metal Conduit.
- Equipment Bonding Jumper shall be # 8 AWG (min.) x 3 feet minimum of tinned, braided copper.
- The System Identification letters shall be 1/8" (in) line thickness formed by a mild steel weld bead. See **Standard Specification 9-29.2(4)**.
- Junction Box shall be dimensioned as shown in the Contract. If the conduit sizes shown in the Contract are changed, the box dimensions shall be revised in accordance with **NEC 314.28** using the 8 times multiplier for length and width dimension.
  - Maximum Height = Sidewalk Depth
  - Maximum Interior Length = 29" (in)
  - Maximum Interior Width = 18" (in)

- See **Standard Plan J-40.36** for additional requirements.
- Field drill 1/2" (in) diameter hole for Drain Tube from the inside to the outside of Junction Box. One place, on the lowest side only. Seal with bead of silicone. See **Standard Specification 9-29.2(3)**. For drain tube routing, see **Standard Plan J-50.16**.
- Conduit capacity is 12" (in) - 4" (in) per side.
- Conduits shall enter through the sides as shown.
- Conduits shall not enter through the bottom of Junction Box.
- Liberaly coat the threads of the cover fasteners with anti-seize compound during construction and before final closure.



**NEMA 4X JUNCTION BOX  
IN SIDEWALK LOCATED  
ON STRUCTURE  
STANDARD PLAN J-40.40-01**

SHEET 1 OF 1 SHEET  
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Apr 28, 2016 3:16 PM  
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\* = Omit when non-RMC conduit is installed  
size and number

(MOUNTING TABS NOT SHOWN FOR CLARITY)

**NOTES**

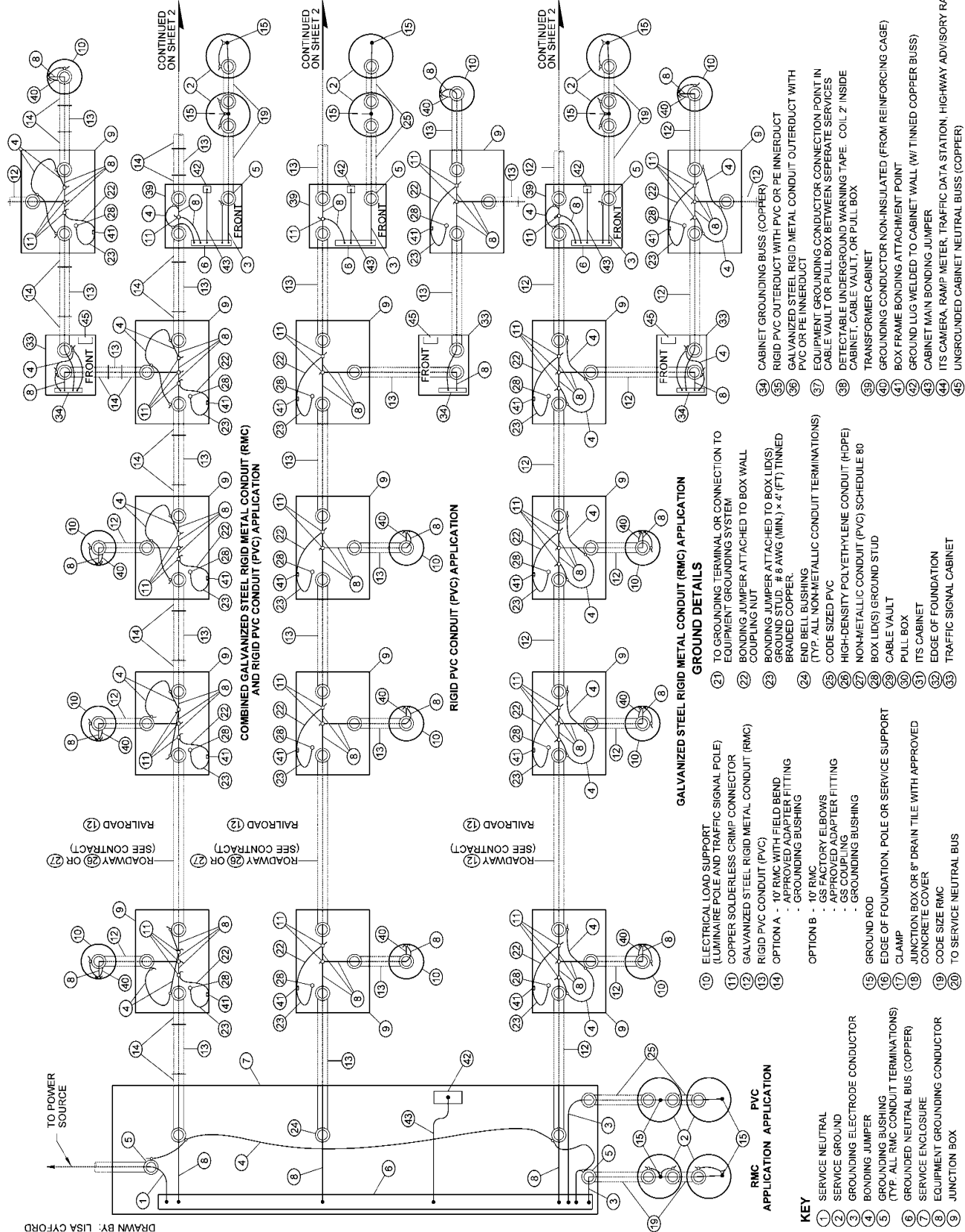
1. If parallel circuits of different sizes are contained in one conduit, the size of the grounding conductor shall be determined on the basis of the largest conductor. Only one grounding conductor is required for each conduit, regardless of the number of circuits contained.
2. Service ground per serving utility requirement. If the utility uses aluminum service conductors, an approved Al-Cu pressure-type ground connector shall be used to secure the service neutral to the copper neutral bar in the service enclosure. Except for the above, all grounding conductors shall be copper.
3. Equipment grounding conductors and grounding electrode conductors shall be sized in accordance with the National Electrical Code (No. 8 minimum).



*Bailey, Ted*  
Bailey, Ted  
39820  
Jul 19 2016 1:29 PM

**TYPICAL  
GROUNDING DETAILS**  
STANDARD PLAN J-60.05-01  
SHEET 1 OF 3 SHEETS

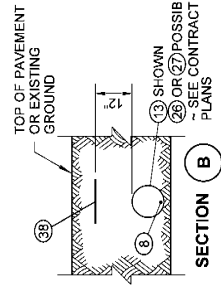
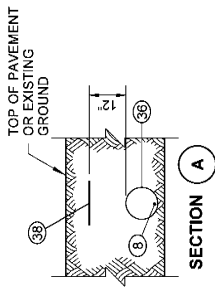
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Washington, State Department of Transportation



DRAWN BY: LISA CYFORD

**KEY**

- 1 SERVICE NEUTRAL
- 2 SERVICE GROUND
- 3 GROUNDING ELECTRODE CONDUCTOR
- 4 BONDING JUMPER
- 5 GROUNDING BUSHING
- 6 GROUNDING CONDUIT TERMINATIONS (TYP. ALL RMC CONDUIT TERMINATIONS)
- 7 GROUNDED NEUTRAL BUS (COPPER)
- 8 SERVICE ENCLOSURE
- 9 EQUIPMENT GROUNDING CONDUCTOR
- 10 JUNCTION BOX
- 11 ELECTRICAL LOAD SUPPORT (LUMINAIRE POLE AND TRAFFIC SIGNAL POLE)
- 12 COPPER SOLDERLESS CRIMP CONNECTOR
- 13 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)
- 14 RIGID PVC CONDUIT (PVC)
- 15 OPTION A - 10' RMC WITH FIELD BEND
- 16 OPTION B - 10' RMC
- 17 GS FACTORY ELBOWS
- 18 APPROVED ADAPTER FITTING
- 19 GS COUPLING
- 20 GROUNDING BUSHING
- 21 GROUND ROD
- 22 EDGE OF FOUNDATION, POLE OR SERVICE SUPPORT CLAMP
- 23 JUNCTION BOX OR 8" DRAIN TILE WITH APPROVED CONCRETE COVER
- 24 CODE SIZE RMC
- 25 TO SERVICE NEUTRAL BUS
- 26 GALVANIZED STEEL RIGID METAL CONDUIT (RMC) APPLICATION
- 27 TO GROUNDING TERMINAL OR CONNECTION TO EQUIPMENT GROUNDING SYSTEM
- 28 BONDING JUMPER ATTACHED TO BOX WALL COUPLING NUT
- 29 BONDING JUMPER ATTACHED TO BOX LIDS) GROUND STUD, # 8 AWG (MIN.) x 4' (FT) TINNED BRAIDED COPPER
- 30 END BELL BUSHING (TYP. ALL NON-METALLIC CONDUIT TERMINATIONS)
- 31 CODE SIZED PVC
- 32 HIGH-DENSITY POLYETHYLENE CONDUIT (HDPE)
- 33 NON-METALLIC CONDUIT (PVC) SCHEDULE 80
- 34 BOX LID(S) GROUND STUD
- 35 CABLE VAULT
- 36 PULL BOX
- 37 ITS CABINET
- 38 EDGE OF FOUNDATION
- 39 TRAFFIC SIGNAL CABINET
- 40 COMBINED GALVANIZED STEEL RIGID METAL CONDUIT (RMC) AND RIGID PVC CONDUIT (PVC) APPLICATION
- 41 RIGID PVC CONDUIT (PVC) APPLICATION
- 42 TO GROUNDING TERMINAL OR CONNECTION TO EQUIPMENT GROUNDING SYSTEM
- 43 BONDING JUMPER ATTACHED TO BOX WALL COUPLING NUT
- 44 BONDING JUMPER ATTACHED TO BOX LIDS) GROUND STUD, # 8 AWG (MIN.) x 4' (FT) TINNED BRAIDED COPPER
- 45 END BELL BUSHING (TYP. ALL NON-METALLIC CONDUIT TERMINATIONS)
- 46 CODE SIZED PVC
- 47 HIGH-DENSITY POLYETHYLENE CONDUIT (HDPE)
- 48 NON-METALLIC CONDUIT (PVC) SCHEDULE 80
- 49 BOX LID(S) GROUND STUD
- 50 CABLE VAULT
- 51 PULL BOX
- 52 ITS CABINET
- 53 EDGE OF FOUNDATION
- 54 TRAFFIC SIGNAL CABINET
- 55 GALVANIZED STEEL RIGID METAL CONDUIT (RMC) APPLICATION
- 56 TO GROUNDING TERMINAL OR CONNECTION TO EQUIPMENT GROUNDING SYSTEM
- 57 BONDING JUMPER ATTACHED TO BOX WALL COUPLING NUT
- 58 BONDING JUMPER ATTACHED TO BOX LIDS) GROUND STUD, # 8 AWG (MIN.) x 4' (FT) TINNED BRAIDED COPPER
- 59 END BELL BUSHING (TYP. ALL NON-METALLIC CONDUIT TERMINATIONS)
- 60 CODE SIZED PVC
- 61 HIGH-DENSITY POLYETHYLENE CONDUIT (HDPE)
- 62 NON-METALLIC CONDUIT (PVC) SCHEDULE 80
- 63 BOX LID(S) GROUND STUD
- 64 CABLE VAULT
- 65 PULL BOX
- 66 ITS CABINET
- 67 EDGE OF FOUNDATION
- 68 TRAFFIC SIGNAL CABINET
- 69 CABINET GROUNDING BUSS (COPPER)
- 70 RIGID PVC OUTERDUCT WITH PVC OR PE INNERDUCT
- 71 GALVANIZED STEEL RIGID METAL CONDUIT OUTERDUCT WITH PVC OR PE INNERDUCT
- 72 EQUIPMENT GROUNDING CONDUCTOR CONNECTION POINT IN CABLE VAULT OR PULL BOX BETWEEN SEPARATE SERVICES
- 73 DETECTABLE UNDERGROUND MARKING TAPE, COIL 2' INSIDE CABINET, CABLE VAULT, OR PULL BOX
- 74 TRANSFORMER CABINET
- 75 GROUNDING CONDUCTOR NON-INSULATED (FROM REINFORCING CAGE)
- 76 BOX FRAME BONDING ATTACHMENT POINT
- 77 GROUND LUG WELDED TO CABINET WALL (W/ TINNED COPPER BUSS)
- 78 CABINET MAIN BONDING JUMPER
- 79 ITS CAMERA, RAMP METER, TRAFFIC DATA STATION, HIGHWAY ADVISORY RADIO
- 80 UNGROUNDED CABINET NEUTRAL BUSS (COPPER)



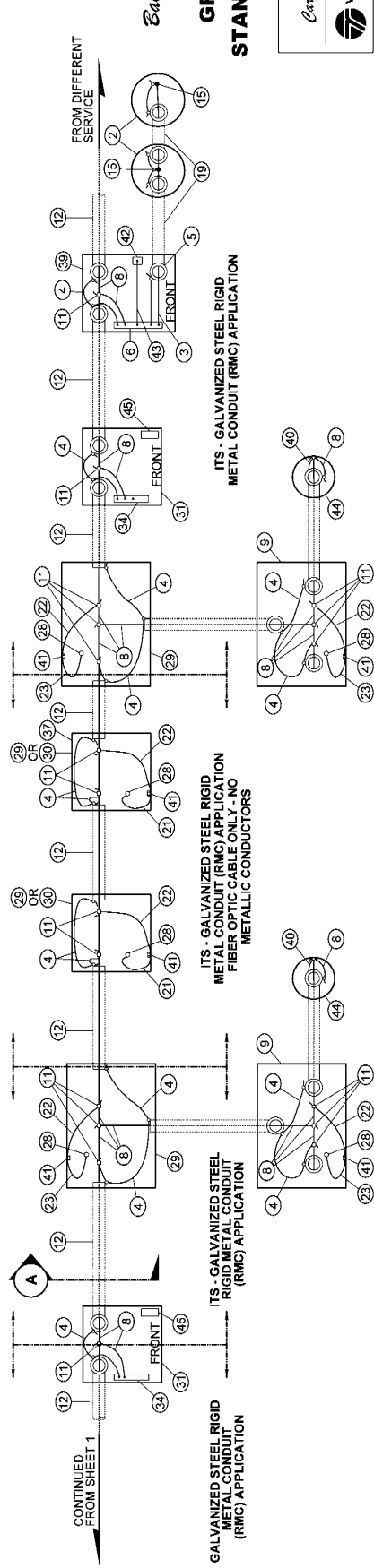
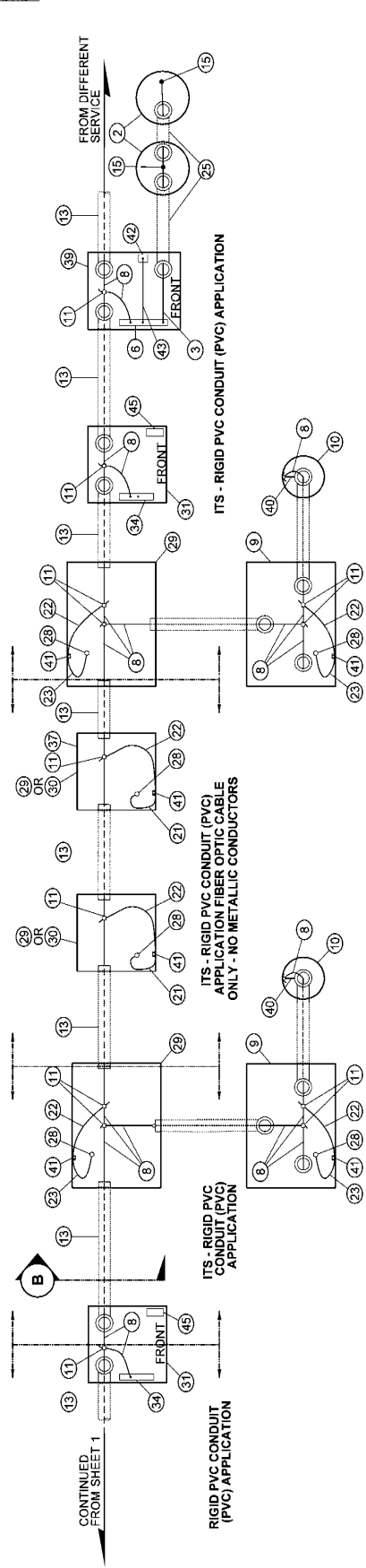
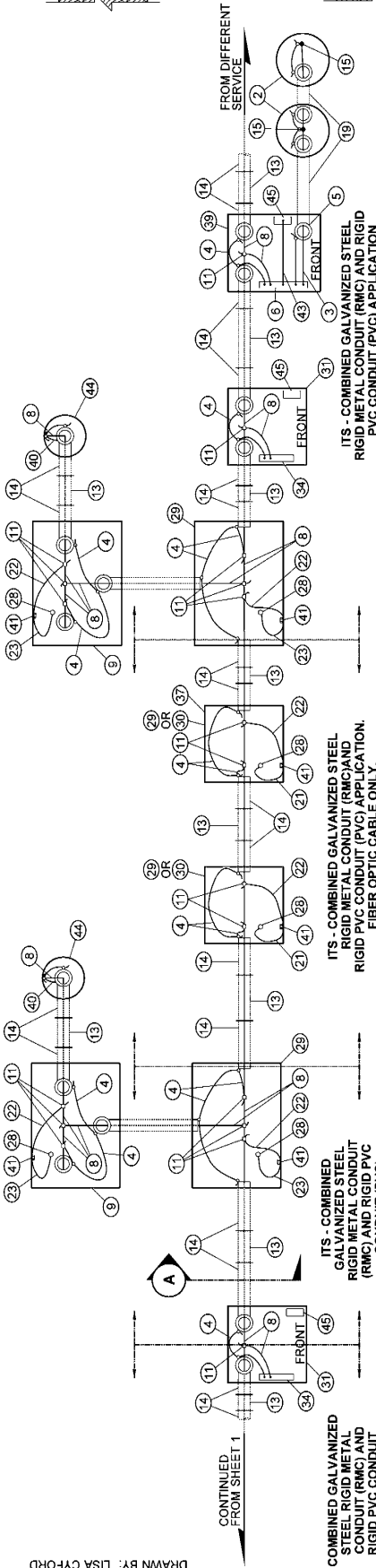
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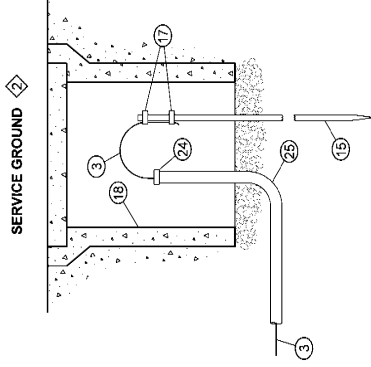
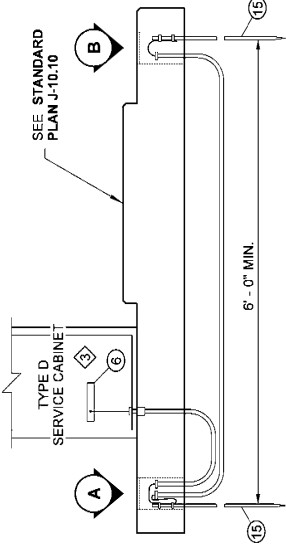
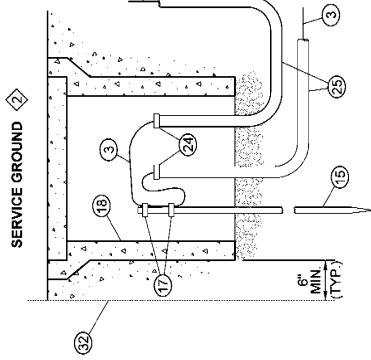
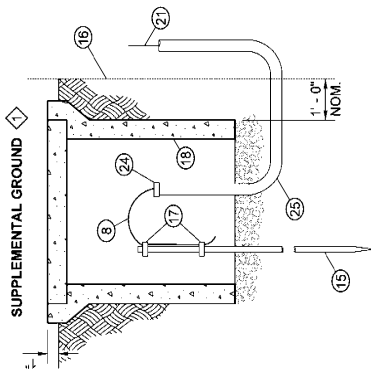
**TYPICAL**  
**STANDARD PLAN J-60.05-01**

SHEET 2 OF 3 SHEETS

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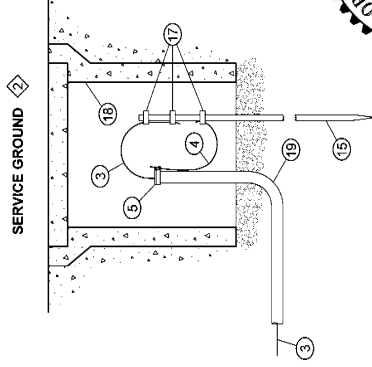
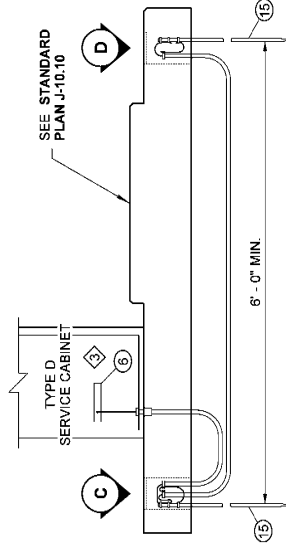
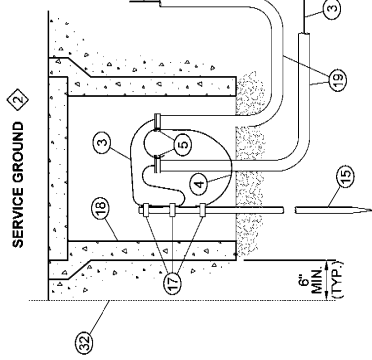
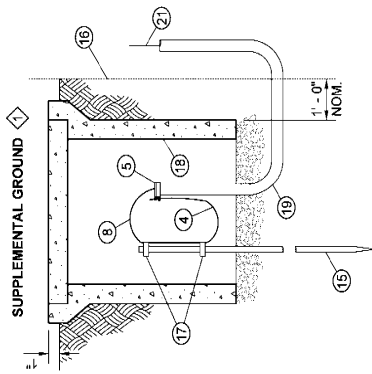


SEE KEY ON SHEET 1  
FOR PARTS

DETAIL B

RIGID PVC CONDUIT (PVC) APPLICATION

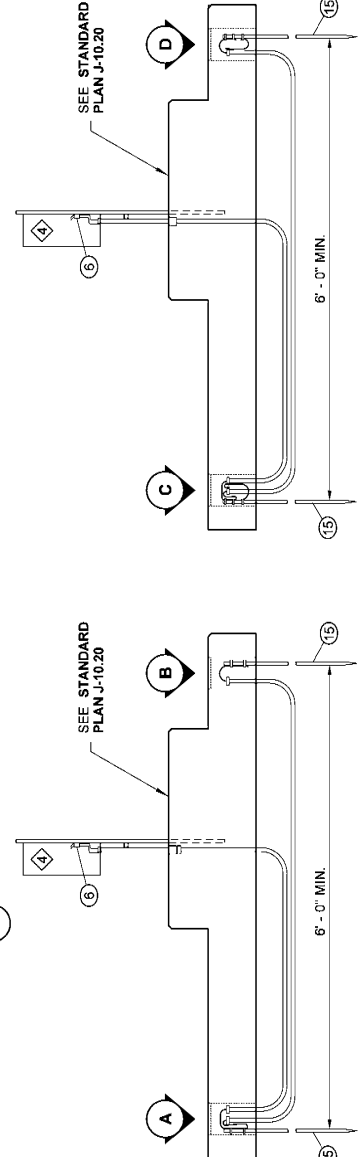
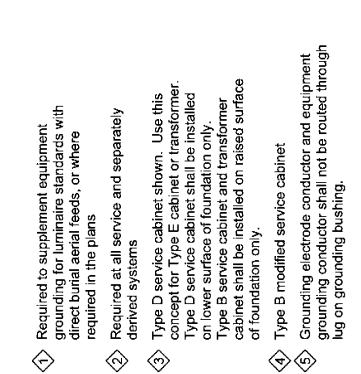
DETAIL A



DETAIL D

GALVANIZED STEEL RIGID METAL CONDUIT (RMC) APPLICATION

DETAIL C



- 1 Required to supplement equipment grounding for luminaire standards with direct burial feed's, or where required in the plans
- 2 Required at all service and separately derived systems
- 3 Type D service cabinet shown. Use this concept for Type E cabinet or transformer. Type D service cabinet shall be installed on lower surface of foundation only. Type B service cabinet and transformer cabinet shall be installed on raised surface of foundation only.
- 4 Type B modified service cabinet.
- 5 Grounding electrode conductor and equipment grounding conductor shall not be routed through lug on grounding bushing.

RIGID PVC CONDUIT (PVC) APPLICATION

GALVANIZED STEEL RIGID METAL CONDUIT (RMC) APPLICATION

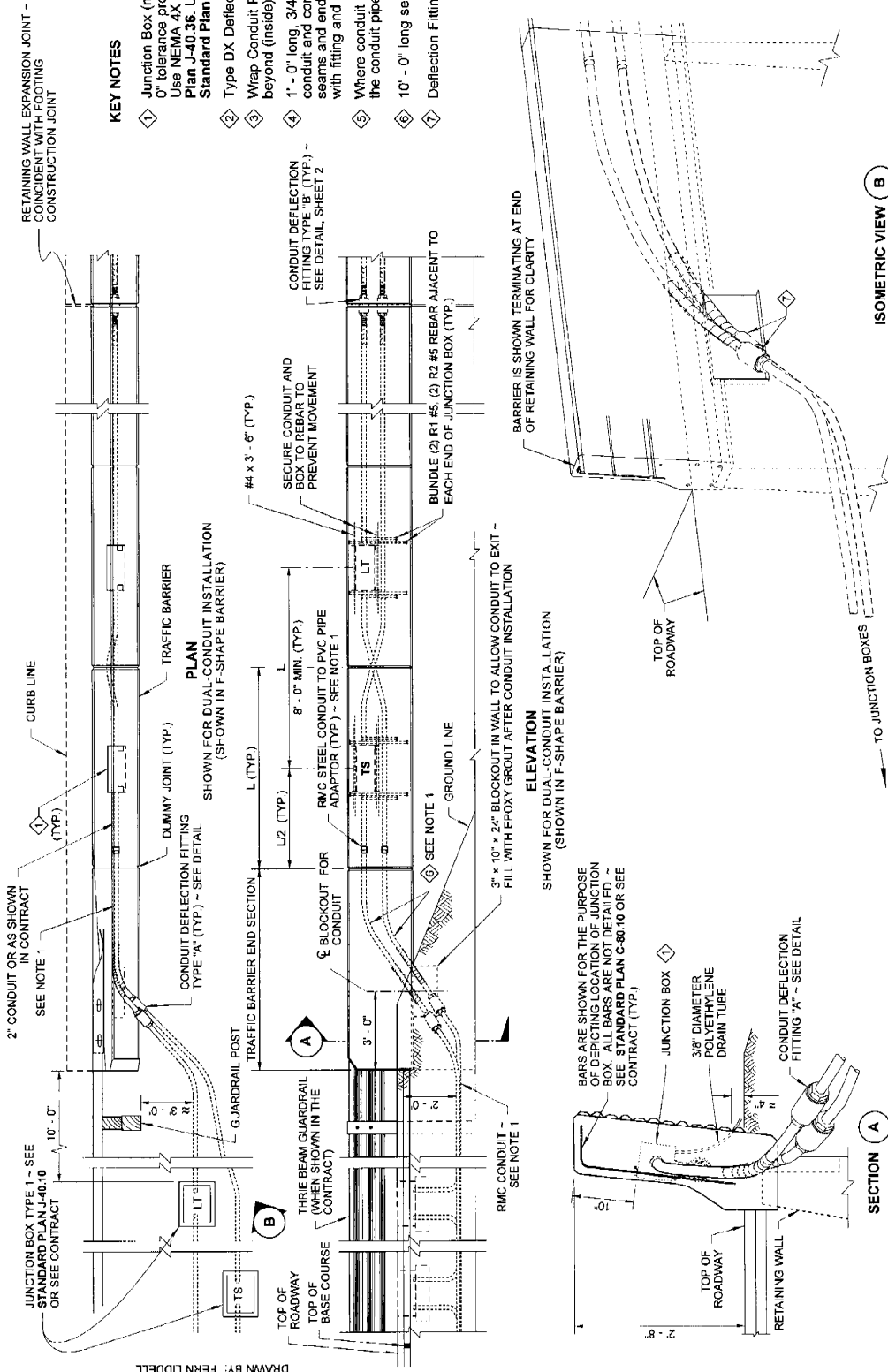


THEODORE JOSEPH BAILEY  
STATE OF WASHINGTON  
REGISTERED PROFESSIONAL ENGINEER  
LICENSE NO. 39820  
Jul 19 2016 1:30 PM  
Bailey, Ted  
TYPICAL  
STANDARD PLAN J-60.05-01  
SHEET 3 OF 3 SHEETS

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STATE DESIGN ENGINEER  
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**NOTES**

1. Install Galvanized Steel Rigid Metal Conduit (RMC) between the Junction Box(es) Type 1 and the DX fitting(s) "A". RMC conduit shall also be used from the DX fitting(s) "A" to the PVC adaptor in the barrier.  
PVC Conduit may be used only in stationary-form barriers. Connect to RMC using a PVC adaptor.  
RMC Conduit may be used in stationary-form barriers, but it shall be used in slip-form barriers.
2. See **Standard Plan D-15.10** for additional information on F-Shape barrier, or see **Standard Plan D-15.20** for Single-Slope Barrier.
3. Pipe wrap tape shall be 2" wide, 20 mil thick, and installed with 1" minimum overlap.



DRAWN BY: FERN LIDDELL



5-15-13  
**CONDUIT INSTALLATION  
 IN TRAFFIC BARRIER  
 ON RETAINING WALL**  
**STANDARD PLAN J-60.11-00**  
 SHEET 1 OF 2 SHEETS

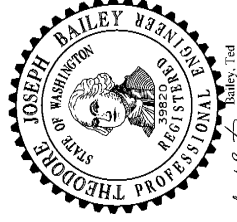
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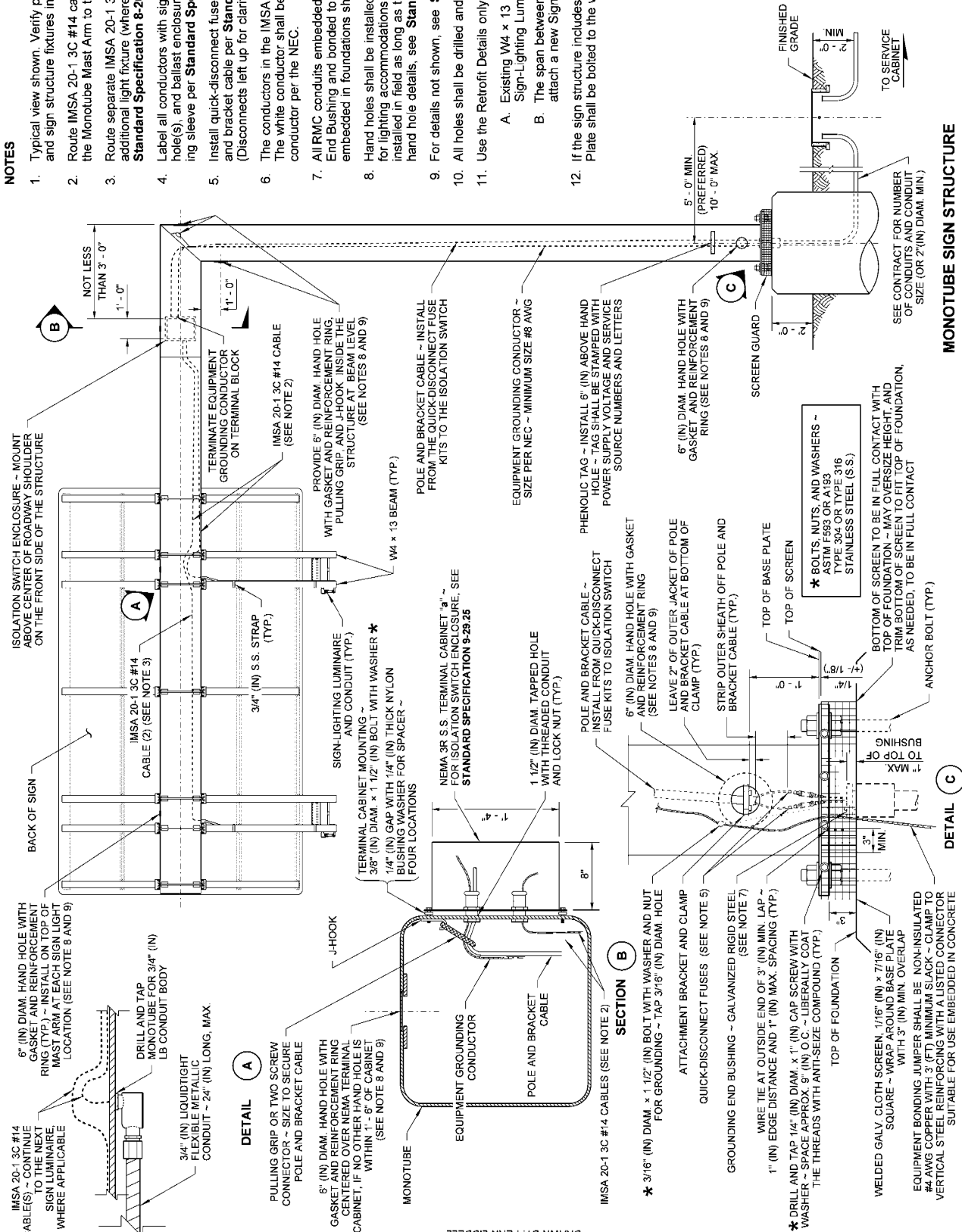
**NOTES**

1. Typical view shown. Verify power source location, quantities, location of signs, and sign structure fixtures in Contract Plans.
2. Route IMSA 20-1 3C #14 cable(s) from isolation switch along inside bottom of the Monotube Mast Arm to the liquidtight conduit connector(s) at hand hole(s).
3. Route separate IMSA 20-1 3C #14 cable from load side of terminal strip to each additional light fixture (where applicable) and provide sufficient slack wire per **Standard Specification 8-20-3(8)**.
4. Label all conductors with sign light and circuit number at isolation switch, hand hole(s), and ballast enclosure(s). Labels shall be a PVC or Polyolefin wire marking sleeve per **Standard Specification 9-29**.
5. Install quick-disconnect fuse kits between the power supply wires and the pole and bracket cable per **Standard Specification 9-29.7**. Pull down tight to conduit. (Disconnects left up for clarity). Fuse size shall be 200% larger than load size.
6. The conductors in the IMSA 20-1 3C #14 cable shall be black, red, and white. The white conductor shall be permanently identified as an equipment grounding conductor per the NEC.
7. All RMC conduits embedded in foundation shall be terminated with Grounding End Bushing and bonded to the Foundation Grounding Bus. All PVC conduits embedded in foundations shall be terminated with End Bell Bushing.
8. Hand holes shall be installed at the time of fabrication. Only additional conduits for lighting accommodations to previously non-illuminated structures may be installed in field as long as the proper repairs are made to the structure. For hand hole details, see **Standard Plan J-75.41**.
9. For details not shown, see **Standard Plan G-90.40**.
10. All holes shall be drilled and tapped.
11. Use the Retrofit Details only when the following conditions apply:
  - A. Existing W4 x 13 Luminaire Brackets are to be reused for a new Sign-Lighting Luminaire.
  - B. The span between the existing Luminaire Brackets is too wide to attach a new Sign-Lighting Luminaire and Luminaire Mounting Plate.
12. If the sign structure includes a maintenance walkway, the Luminaire Mounting Plate shall be bolted to the walkway grating.



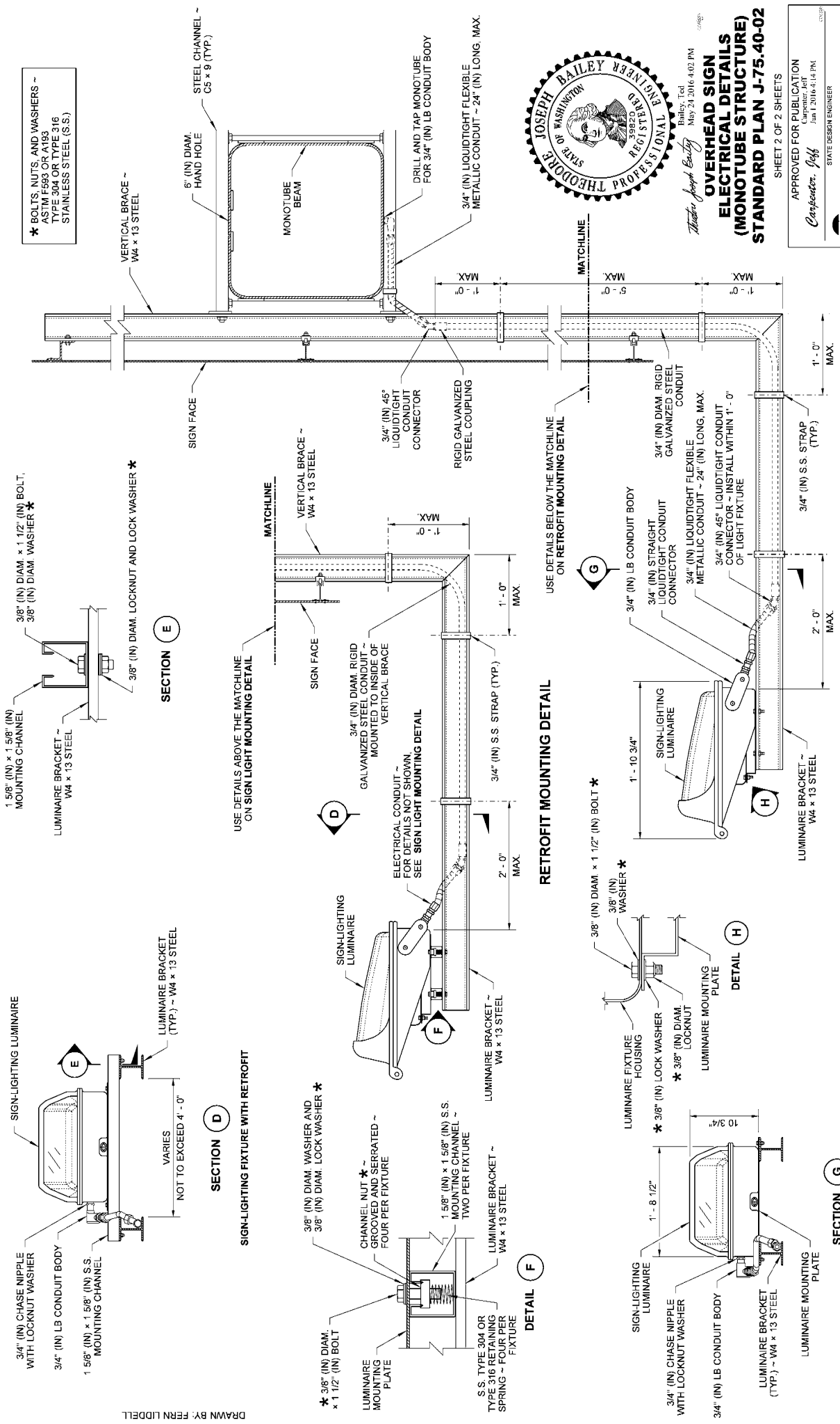
**OVERHEAD SIGN ELECTRICAL DETAILS (MONOTUBE STRUCTURE)**  
**STANDARD PLAN J-75.40-02**  
 SHEET 1 OF 2 SHEETS

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 Competence, Jeff  
 State Design Engineer  
 Washington, State Department of Transportation



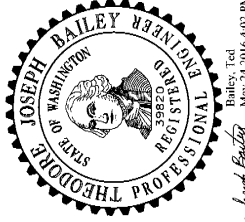
**MONOTUBE SIGN STRUCTURE**

(SEE CONTRACT FOR ORIENTATION OF SIGN STRUCTURE)



DRAWN BY: FERN LIDDELL

\* BOLTS, NUTS, AND WASHERS ~ ASTM F593 OR A193 TYPE 304 OR TYPE 316 STAINLESS STEEL (S.S.)



**OVERHEAD SIGN ELECTRICAL DETAILS (MONOTUBE STRUCTURE) STANDARD PLAN J-75.40-02**  
 SHEET 2 OF 2 SHEETS

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 License No. 1414  
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**NOTES**

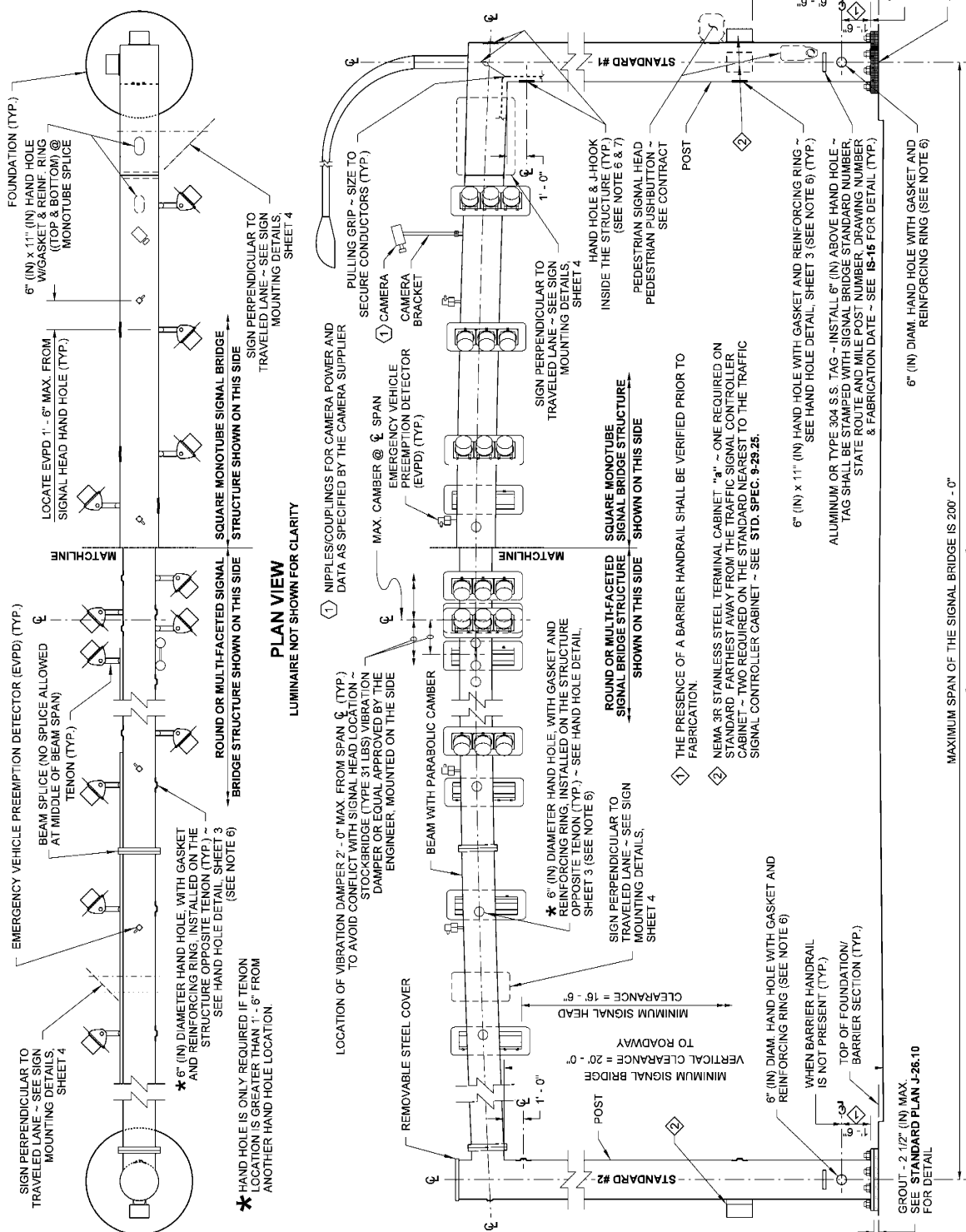
1. Sign bridge, sign support structure and signal bridge foundation shall be designed by the Engineer of Record for all installations (at grade, mounted on a bridge structure or on a wall structure).
2. Typical view shown. See Contract Plans for quantities and locations of signal heads, EVP detectors, cameras, and signs.
3. Route signal cable(s) from terminal cabinet along inside bottom of the Signal Bridge to the Tenon(s) connector(s) at hand hole(s). Provide sufficient slack wire to allow the conductor or cable to be pulled a minimum of 18" (in) outside the Signal Bridge at the nearest hand hole to the equipment connection point.
4. All conductors shall be labeled in accordance with **Standard Specification 8-20.3(8)**. Labels shall be provided at the terminal cabinet (at the terminal board and conduits), equipment terminals, and at the hand hole nearest equipment connection point.
5. All RMC conduits embedded in foundation shall be terminated with a grounding end bushing and bonded to the structure grounding terminal. All PVC conduits embedded in foundations shall be terminated with end bell bushing.
6. Hand holes shall be designed by the Engineer of Record and installed at the time of fabrication.
7. Install hand hole on outside of the post at beam level when foundation is cast at grade. Install hand hole on traffic side of post when signal bridge is mounted on bridge, retaining wall or other structure.
8. Equipment grounding conductor shall be non-insulated # 4 AWG copper with 3' (ft) minimum slack. Clamp to horizontal steel reinforcing with a listed connector suitable for use embedded in concrete. For details, see Elevation View Signal Bridge Hand Hole Placement on Standard, Sheet 2. Or see Foundation Detail in Bridge Deck or Bridge Deck Island, Sheet 2.
9. Equipment grounding conductor shall be non-insulated #4 AWG copper with 3' (ft) minimum slack. Clamp to vertical steel reinforcing with a listed connector suitable for use embedded in concrete. For Detail, see Partial Foundation Detail, Sheet 2.
10. Variable Message Signs (VMS) shall not be installed on signal bridge.
11. No sign larger than 12' (ft) long x 4' (ft) tall shall be installed on signal bridge.



Theodore Joseph Bailey, Inc.  
Bailey, Inc.  
Jun 23, 2016 1:46 PM

**SIGNAL BRIDGE STANDARD ELECTRICAL DETAILS**  
**STANDARD PLAN J-75-41-01**  
SHEET 1 OF 4 SHEETS

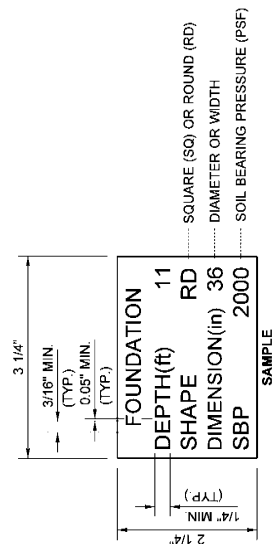
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Carpenter, Jeff  
Jun 23, 2016 2:30 PM  
STATE DESIGN ENGINEER  
Washington, State Department of Transportation



DRAWN BY: BILL BERENS

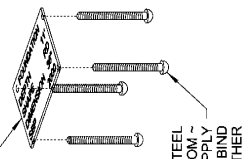
**DESIGN CRITERIA**

SIGNAL BRIDGE SHALL BE DESIGNED AND ANALYZED IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATION FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRE AND TRAFFIC SIGNAL - FIFTH EDITION - DATED 2009 AND INTERIMS. USING BASIC WIND SPEED OF 90 MPH AND 50 YEARS OF DESIGN LIFE. FATIGUE DESIGN OF THE STRUCTURE CONFORMS TO FATIGUE CATEGORY I OF THE SPECIFIED AASHTO STANDARD SPECIFICATION.



**SIGNAL FOUNDATION IDENTIFICATION TAG DETAIL**  
TEXT SHALL BE ENGRAVED 0.014" (IN) DEEP

10-GAGE TYPE 304 OR 316 STAINLESS STEEL TAG - RECESS FLUSH WITH TOP OF FINISHED FOUNDATION

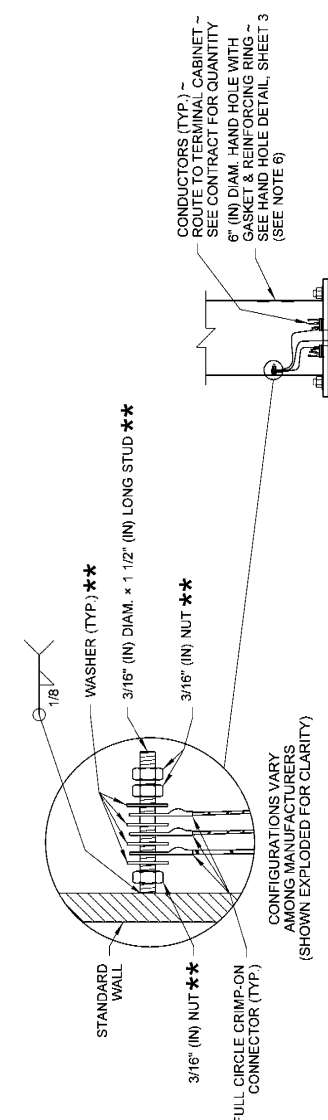


**IDENTIFICATION TAG DETAIL**



**SIGNAL BRIDGE STANDARD ELECTRICAL DETAILS**  
**STANDARD PLAN J-75-41-01**  
SHEET 2 OF 4 SHEETS

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**PARTIAL FOUNDATION DETAIL**  
(GROUT PAD/SCREEN NOT SHOWN FOR CLARITY)

CONDUCTORS (TYP.) - ROUTE TO TERMINAL CABINET - SEE CONTRACT FOR QUANTITY  
6" (IN) DIAM. HAND HOLE WITH GASKET & REINFORCING RING - SEE HAND HOLE DETAIL, SHEET 3 (SEE NOTE 6)

CONDUIT COUPLING - INSTALL FLUSH WITH TOP OF FOUNDATION - DO NOT GLUE PVC STUBOUT (TYP.)

GRINDING CONDUCTOR (SEE NOTE 9)

WASHER (TYP.) \*\*  
3/16" (IN) DIAM. x 1 1/2" (IN) LONG STUD \*\*  
3/16" (IN) NUT \*\*

STANDARD WALL  
FULL CIRCLE CRIMP-ON CONNECTOR (TYP.)

CONFIGURATIONS VARY AMONG MANUFACTURERS (SHOWN EXPLODED FOR CLARITY)

\*\* BOLTS, NUTS, AND WASHERS ~ ASTM F593 OR A193 TYPE 304 OR TYPE 316 STAINLESS STEEL (S.S.)

**PARTIAL FOUNDATION DETAIL**  
(GROUT PAD/SCREEN NOT SHOWN FOR CLARITY)

CONDUCTORS (TYP.) - ROUTE TO TERMINAL CABINET - SEE CONTRACT FOR QUANTITY  
6" (IN) DIAM. HAND HOLE WITH GASKET & REINFORCING RING - SEE HAND HOLE DETAIL, SHEET 3 (SEE NOTE 6)

CONDUIT COUPLING - INSTALL FLUSH WITH TOP OF FOUNDATION - DO NOT GLUE PVC STUBOUT (TYP.)

GRINDING CONDUCTOR (SEE NOTE 9)

WASHER (TYP.) \*\*  
3/16" (IN) DIAM. x 1 1/2" (IN) LONG STUD \*\*  
3/16" (IN) NUT \*\*

STANDARD WALL  
FULL CIRCLE CRIMP-ON CONNECTOR (TYP.)

CONFIGURATIONS VARY AMONG MANUFACTURERS (SHOWN EXPLODED FOR CLARITY)

\*\* BOLTS, NUTS, AND WASHERS ~ ASTM F593 OR A193 TYPE 304 OR TYPE 316 STAINLESS STEEL (S.S.)

**PARTIAL FOUNDATION DETAIL**  
(GROUT PAD/SCREEN NOT SHOWN FOR CLARITY)

CONDUCTORS (TYP.) - ROUTE TO TERMINAL CABINET - SEE CONTRACT FOR QUANTITY  
6" (IN) DIAM. HAND HOLE WITH GASKET & REINFORCING RING - SEE HAND HOLE DETAIL, SHEET 3 (SEE NOTE 6)

CONDUIT COUPLING - INSTALL FLUSH WITH TOP OF FOUNDATION - DO NOT GLUE PVC STUBOUT (TYP.)

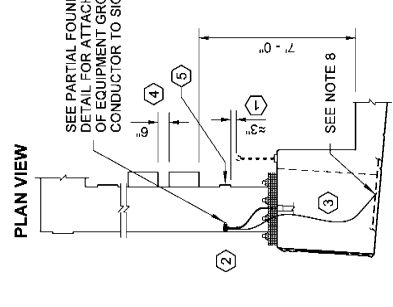
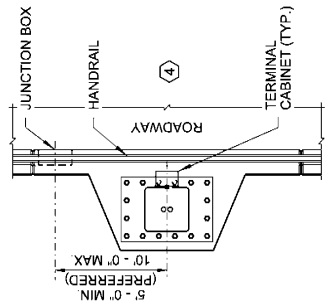
GRINDING CONDUCTOR (SEE NOTE 9)

WASHER (TYP.) \*\*  
3/16" (IN) DIAM. x 1 1/2" (IN) LONG STUD \*\*  
3/16" (IN) NUT \*\*

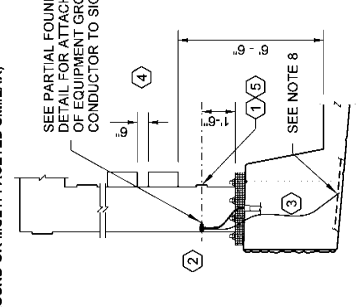
STANDARD WALL  
FULL CIRCLE CRIMP-ON CONNECTOR (TYP.)

CONFIGURATIONS VARY AMONG MANUFACTURERS (SHOWN EXPLODED FOR CLARITY)

\*\* BOLTS, NUTS, AND WASHERS ~ ASTM F593 OR A193 TYPE 304 OR TYPE 316 STAINLESS STEEL (S.S.)



**ELEVATION VIEW WITH HANDRAIL**  
(SQUARE MONOTUBE SHOWN - ROUND OR MULTI-FACETED SIMILAR)



**ELEVATION VIEW WITHOUT HANDRAIL**  
(SQUARE MONOTUBE SHOWN - ROUND OR MULTI-FACETED SIMILAR)

- 1 PRESENCE OF A BARRIER HANDRAIL SHALL BE VERIFIED PRIOR TO SIGNAL BRIDGE FABRICATION
- 2 NO TERMINAL CABINET SHALL BE MOUNTED ON SIDE OPPOSITE THE ROADWAY
- 3 SEE BRIDGE SHEETS FOR FOUNDATION DESIGN
- 4 WHEN SIGNAL BRIDGE IS MOUNTED ON A STRUCTURE TERMINAL CABINETS SHALL BE MOUNTED ON THE TRAFFIC SIDE OF THE POST AS SHOWN
- 5 HAND HOLE - SEE NOTE 6

SEE STANDARD PLAN J-28.15 FOR FOUNDATION PLACEMENT DETAILS

**PARTIAL FOUNDATION TO JUNCTION BOX DETAIL**

SEE PARTIAL FOUNDATION DETAIL FOR ATTACHMENT OF EQUIPMENT GROUNDING CONDUCTOR TO SIGNAL BRIDGE

SEE DETAIL STANDARD PLAN J-75.40 TOP OF ROADWAY/ISLAND

SEE NOTE 8

SEE CONTRACT FOR QUANTITY AND SIZES OF CONDUITS (TYP.)

TO CONTROLLER CABINET OR SERVED DEVICE

SEE CONTRACT FOR QUANTITY AND SIZES OF CONDUITS (TYP.)

POST  
6" DIAM. HAND HOLE

FOUNDATION

GROUT PAD - SEE DETAIL, STD. PLAN J-28.10

SIGNAL FOUNDATION IDENTIFICATION TAG

SEE CONTRACT FOR QUANTITY AND SIZES OF CONDUITS (TYP.)

**PARTIAL SIGNAL FOUNDATION DETAIL**  
(ROUND OR MULTI-FACETED SHOWN - SQUARE MONOTUBE SIMILAR)

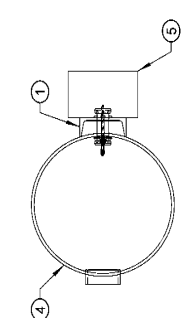
**PARTIAL SIGNAL FOUNDATION DETAIL**  
(ROUND OR MULTI-FACETED SHOWN - SQUARE MONOTUBE SIMILAR)

**PARTIAL SIGNAL FOUNDATION DETAIL**  
(ROUND OR MULTI-FACETED SHOWN - SQUARE MONOTUBE SIMILAR)

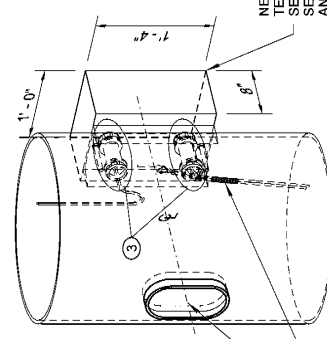
**FOUNDATION DETAIL ON BRIDGE - CROSS BEAM**  
(NO FOUNDATION ALLOWED ON BRIDGE DECK)

**FOUNDATION DETAIL ON BRIDGE - CROSS BEAM**  
(NO FOUNDATION ALLOWED ON BRIDGE DECK)

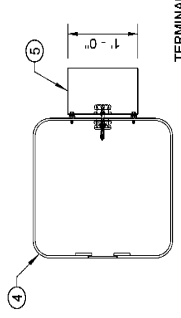
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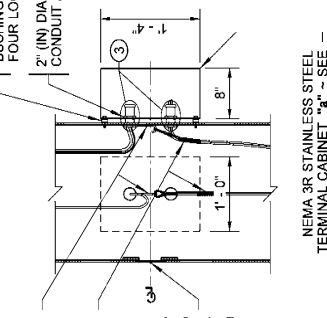
PLAN VIEW



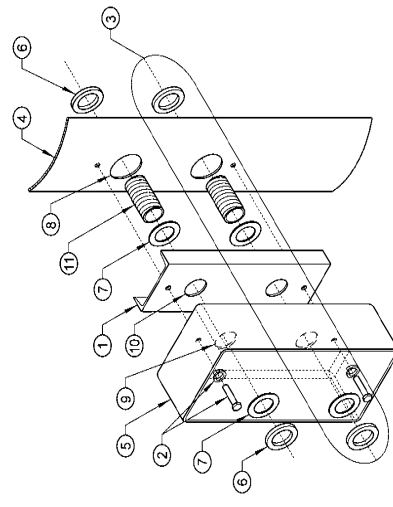
MULTI-SIDED (ROUND) TERMINAL CABINET MOUNTING DETAIL



PLAN VIEW



SECTION @ TERMINAL CABINET SQUARE MONOTUBE CABINET MOUNTING DETAIL



WIREWAY DETAIL ISOMETRIC VIEW

KEY NOTES

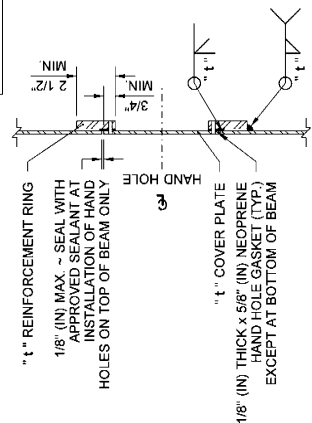
- 1 6 x 8.2 LB/FT CHANNEL - HOT-DIP GALVANIZED
- 2 TWO EACH:
  - 1/2-13 NC x 2 1/2" (IN) HEX HEAD BOLT \*\*
  - LOCK WASHERS (DRILL AND TAP POLE TO ACCEPT) \*\*
- 3 WIREWAY (SEE DETAIL THIS SHEET)
- 4 METAL POST
- 5 CABINET
- 6 END BUSHING (TYP.)
- 7 SEALING LOCKNUT (TYP.)
- 8 POLE WALL DRILLED SO BUSHING WILL PASS THROUGH (TYP.)
- 9 CABINET WITH BACK WALL DRILLED 1/8" (IN) OVERSIZE OF NIPPLE (TYP.)
- 10 CHANNEL DRILLED 1/8" (IN) OVERSIZE OF NIPPLE (TYP.)
- 11 2" (IN) DIAM. x 4" (IN) NIPPLE (UNLESS OTHERWISE NOTED) (TYP.)

TERMINAL CABINET MOUNTING ~ 3/8" (IN) DIAM. x 1 1/2" (IN) BOLT WITH WASHER \*\* DRILL AND TAP POLE TO ACCEPT  
 1/4" (IN) GAP WITH 1/4" (IN) THICK NYLON BUSHING WASHER FOR SPACER ~ FOUR LOCATIONS  
 2" (IN) DIAM. NIPPLE WITH THREADED CONDUIT AND LOCK NUT (TYP.)

J-HOOK  
 PULLING GRIP ~ SIZE TO SECURE CONDUCTORS  
 6" (IN) x 11" (IN) HAND HOLE BY GASKET & REINF. RING CENTERED OPPOSITE NEMA TERMINAL CABINET (TYP.) (SEE NOTE 6)  
 NEMA 3R STAINLESS STEEL TERMINAL CABINET "3" ~ SEE STANDARD SPEC 9-29.25 AND WIREWAY DETAIL THIS SHEET  
 SQUARE TUBE SHOWING MONOTUBE STRUCTURE ~ FOR MULTI-SIDED (ROUND) TERMINAL CABINET MOUNTING DETAIL  
 PER MULTI-SIDED (ROUND) TERMINAL CABINET MOUNTING DETAIL

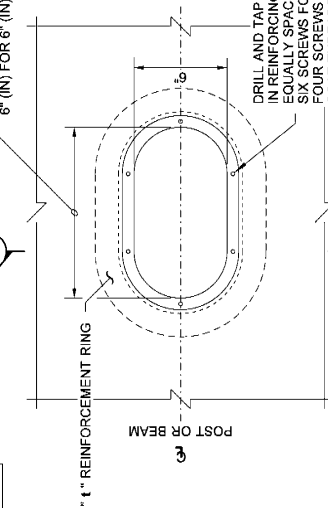
6" (IN) x 11" (IN) HAND HOLE W/GASKET & REINF. RING CENTERED OPPOSITE NEMA TERMINAL CABINET (TYP.) (SEE NOTE 6)  
 PULLING GRIP ~ SIZE TO SECURE CONDUCTORS

\*t\* = MATCH REINFORCEMENT RING OR WELD SIZE TO MEMBER THICKNESS



SECTION A

11" (IN) FOR 6" (IN) x 11" (IN) HAND HOLE  
 6" (IN) FOR 6" (IN) DIAM. HAND HOLE



6" (IN) x 11" (IN) HAND HOLE SHOWN 6" (IN) DIAM. HAND HOLES SIMILAR EXCEPT AS SHOWN

SQUARE MONOTUBE STRUCTURE EXAMPLE HAND HOLE DETAIL

(OPENING DIMENSIONS ALSO APPLY TO MULTI-SIDED/ROUND STRUCTURES)

\*\* BOLTS, NUTS, AND WASHERS - ASTM F593 OR A193 TYPE 304 OR TYPE 316 STAINLESS STEEL (S.S.)

DRILL AND TAP 1/4" (IN) S.S. COVER SCREWS EQUALLY SPACED AROUND HAND HOLE EXCEPT AS SHOWN  
 FOUR SCREWS FOR 6" (IN) x 11" (IN) HAND HOLE  
 COAT THREADS WITH ANTI-SEIZE COMPOUND

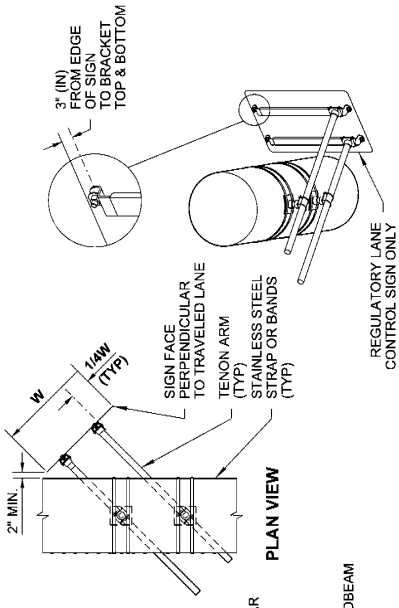
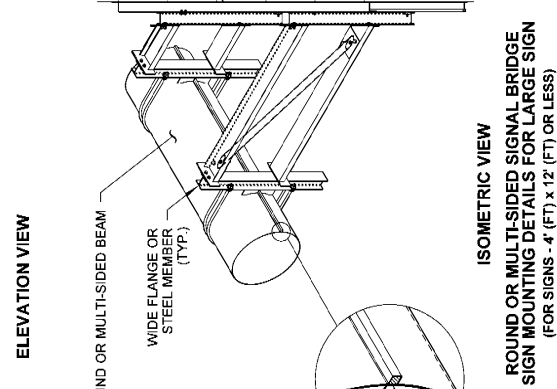
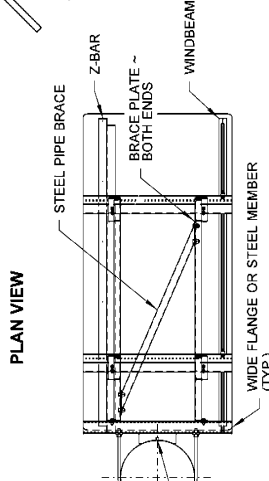
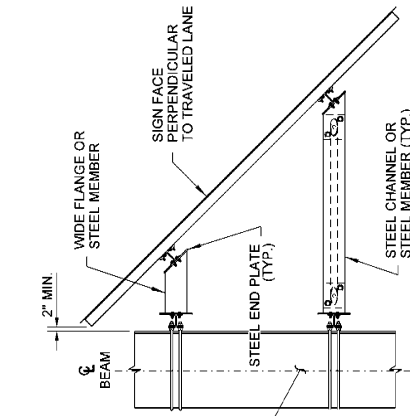
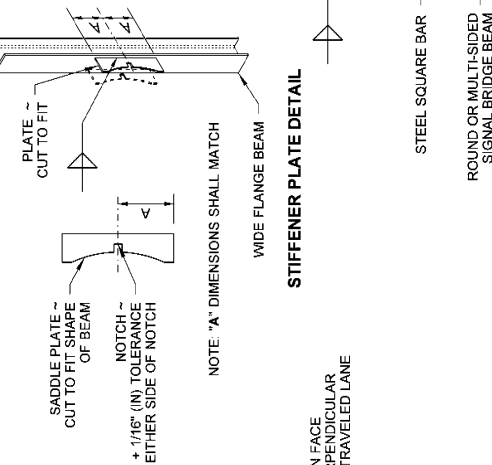
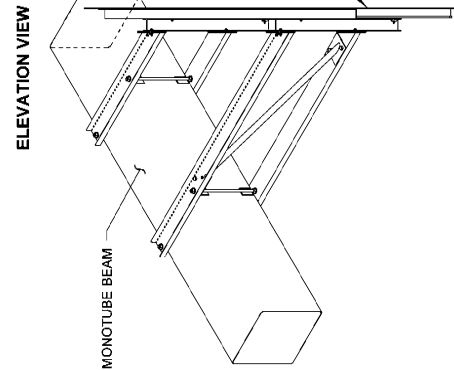
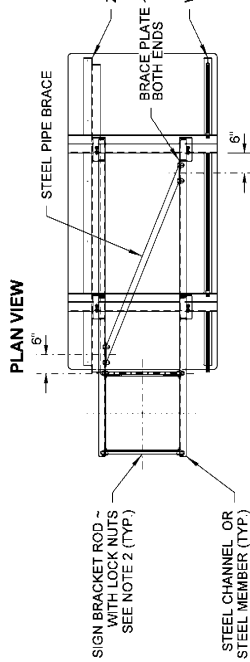
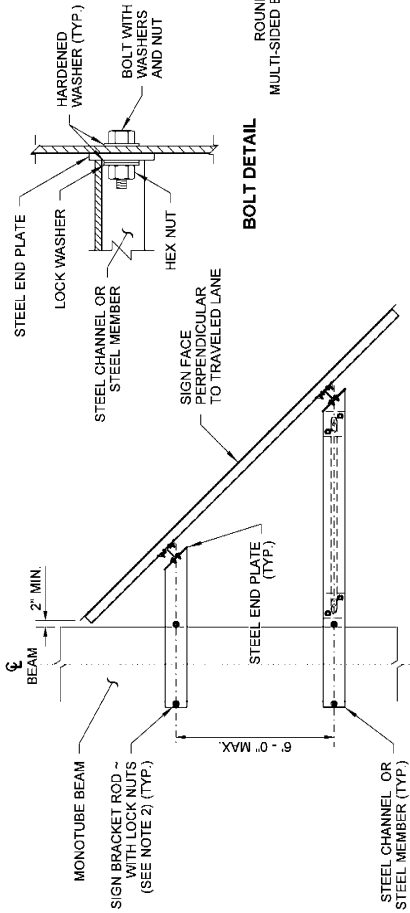


*Theodor Joseph Bailey*  
 Bailey, Ted  
 Jun 23 2016 1:50 PM  
**SIGNAL BRIDGE STANDARD ELECTRICAL DETAILS**  
**STANDARD PLAN J-75-41-01**  
 SHEET 3 OF 4 SHEETS

APPROVED FOR PUBLICATION  
*Casperden, Jeff*  
 Jun 29 2016 2:30 PM  
 STATE DESIGN ENGINEER  
 Washington, State Department of Transportation

**SIGN MOUNTING NOTES**

1. All Locknuts shall conform to **Standard Specification Section 9-28.11** as supplemented in the **Special Provisions**.
2. Hot dip galvanize all non-stainless parts.
3. For sign lighting details, See **Standard Plans J-75.40** (for Monotube) and **J-75.45** (for Round or Multi-sided) structures.
4. Each sign shall be supported by a minimum of two support structures.
5. This details conceptual sign support and bracing. Engineer of Record shall design and analyze sign support in accordance with AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signal - Latest edition.

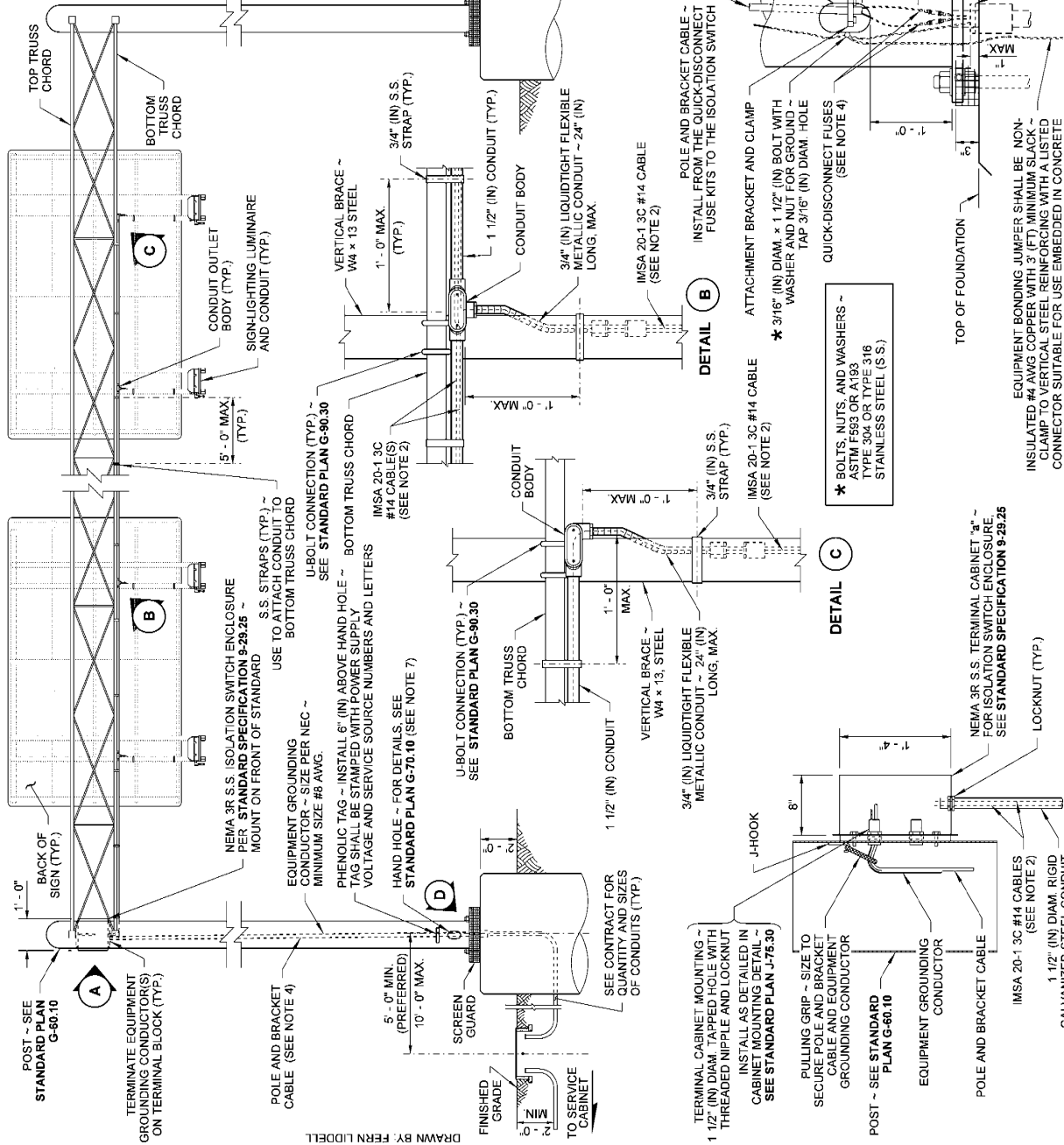


*Theodore Joseph Bailey*  
Bailey, Inc.  
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**SIGNAL BRIDGE STANDARD ELECTRICAL DETAILS**  
**STANDARD PLAN J-75.41-01**  
SHEET 4 OF 4 SHEETS

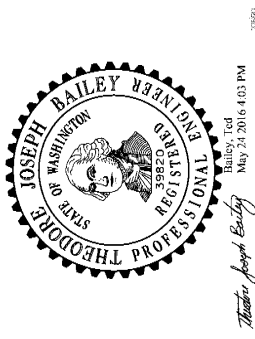
APPROVED FOR PUBLICATION  
Engineer, Jeff  
Jan 23 2016 2:30 PM  
STATE DESIGN ENGINEER  
Washington, State Department of Transportation

**NOTES**

- Typical view shown. Verify power source location, quantities, and location of signs and sign structure fixtures in Contract Plans
- Route separate IMSA 20-1 3C #14 cables from load side of terminal strip to each additional Sign-Lighting Luminaire (where applicable) and provide sufficient slack wire per **Standard Specification 8-20.3(8)**.
- Label all conductors with sign light and circuit number at isolation switch, hand hole, and ballast enclosure. Label shall be a PVC or Polyolefin wire marking sleeve per **Standard Specification 9-29**.
- Install quick-disconnect fuse kits between the power supply wires and pole and bracket cable per **Standard Specification 9-29.7**. Pull down tight to conduit. Fuse size shall be 200% larger than load size. (Disconnects shown left for clarity.)
- The conductors in the IMSA 20-1 3C #14 cable shall be black, red, and white. The white conductor shall be permanently identified as an equipment grounding conductor per the NEC.
- All RMC conduits embedded in foundation shall be terminated with grounding end bushing and bonded to the ground terminal in the base of pole. All PVC conduits embedded in foundations shall be terminated with end bell bushing. See **Standard Plan J-10.10 note 3**.
- Hand holes shall be installed at the time of fabrication. Hand Hole may be installed in field only when additional conduits for lighting accommodations to previously non-illuminated structures is needed, and as long as the proper repairs are made to structure. Contact **Bridge and Structures** office through PE for installation/repair procedures.
- For details not shown, see **Standard Plan G-90.40**.
- All holes shall be drilled and tapped.
- Use the Retrofit details only when the following conditions apply:
  - Existing W4 x 13 Steel Beam sign brackets are to be reused for a new Sign-Lighting Luminaire.
  - The span between the existing Luminaire Brackets is too wide to attach the new Sign-Lighting Luminaire and Luminaire Mounting Plate.
- If the sign structure includes a maintenance walkway, the Luminaire Mounting Plate shall be bolted to the walkway grating.



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**OVERHEAD SIGN ELECTRICAL DETAILS (TRUSS STRUCTURE) STANDARD PLAN J-75.45-02**  
 SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION  
 Engineer: *F. Bailey*  
 Date: 05/24/16 03:18 PM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

TERMINAL CABINET MOUNTING - INSTALL AS DETAILED IN CABINET MOUNTING DETAIL - SEE STANDARD PLAN J-75.30

PULLING GRIP AND BRACKET SECURE POLE AND BRACKET CABLE AND EQUIPMENT GROUNDING CONDUCTOR

EQUIPMENT GROUNDING CONDUCTOR

POLE AND BRACKET CABLE

POLE AND BRACKET CABLE - INSTALL FROM THE QUICK-DISCONNECT FUSE KITS TO THE ISOLATION SWITCH

ATTACHMENT BRACKET AND CLAMP

QUICK-DISCONNECT FUSES

STRIP OUTER SHEATH OFF POLE AND BRACKET CABLE

HAND HOLE - FOR DETAILS

LEAVE 2" (IN) OF OUTER SHEATH OF POLE AND BRACKET CABLE JACKET AT BOTTOM OF CLAMP

ANCHOR BOLT

SCREEN GUARD - FOR DETAILS, SEE STANDARD PLAN J-75.40

U-BOLT CONNECTION (TYP.) - SEE STANDARD PLAN G-90.30

CONDUIT BODY

3/4" (IN) LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT - 24" (IN) LONG, MAX.

IMSA 20-1 3C #14 CABLE

U-BOLT CONNECTION (TYP.) - SEE STANDARD PLAN G-90.30

CONDUIT BODY

3/4" (IN) LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT - 24" (IN) LONG, MAX.

IMSA 20-1 3C #14 CABLE

U-BOLT CONNECTION (TYP.) - SEE STANDARD PLAN G-90.30

CONDUIT BODY

3/4" (IN) LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT - 24" (IN) LONG, MAX.

IMSA 20-1 3C #14 CABLE

U-BOLT CONNECTION (TYP.) - SEE STANDARD PLAN G-90.30

CONDUIT BODY

3/4" (IN) LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT - 24" (IN) LONG, MAX.

IMSA 20-1 3C #14 CABLE

DETAIL A

DETAIL C

DETAIL B

DETAIL D

\* BOLTS, NUTS, AND WASHERS - ASTM A550 OR A193-316 STAINLESS STEEL (S.S.)

EQUIPMENT BONDING JUMPER SHALL BE NON-INSULATED #4 AVG COPPER WITH 3" (FT) MINIMUM SLACK - CLAMP TO VERTICAL STEEL REINFORCING WITH A LISTED CONNECTOR SUITABLE FOR USE EMBEDDED IN CONCRETE

GROUNDING END BUSHING - GALVANIZED RIGID STEEL (SEE NOTE 6)



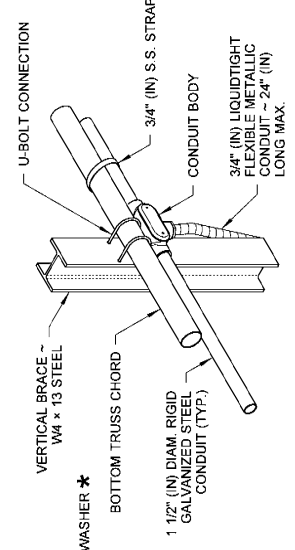
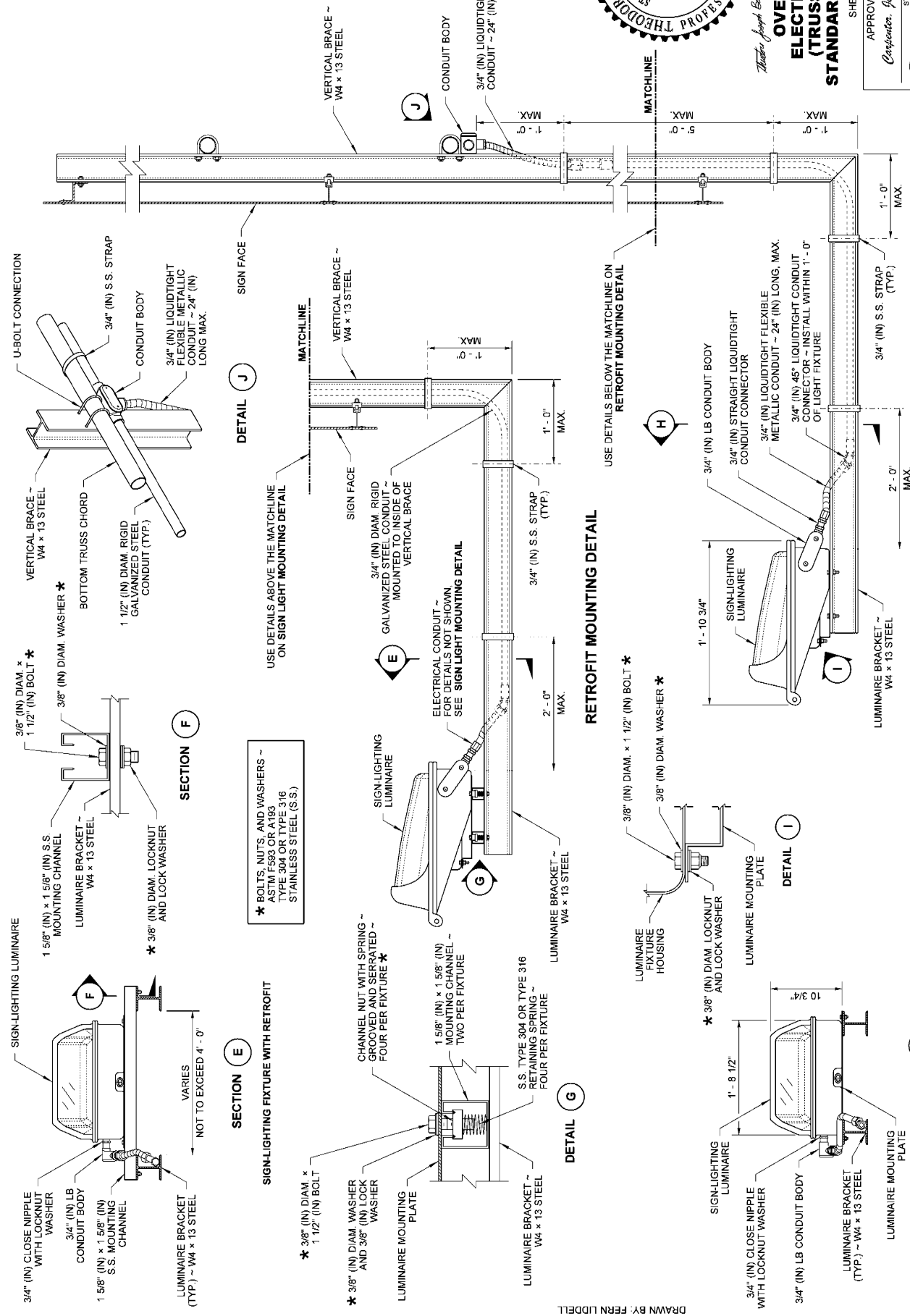


**OVERHEAD SIGN ELECTRICAL DETAILS (TRUSS STRUCTURE) STANDARD PLAN J-75.45-02**

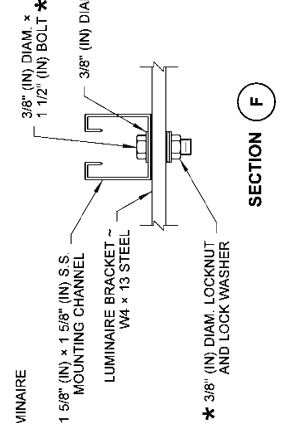
THEODORE JOSEPH BAILEY  
 ENGINEER, P.E.  
 301 T. 316, G.S. PM  
 STATE DESIGN ENGINEER  
 Washington, State Department of Transportation

SHEET 2 OF 2 SHEETS

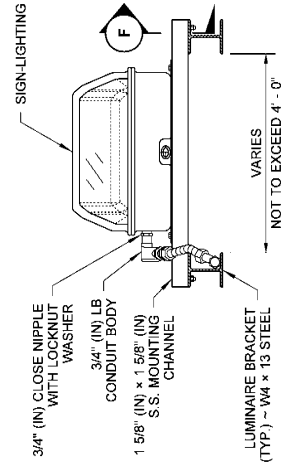
APPROVED FOR PUBLICATION  
 Carpenter, Jeff  
 301 T. 316, G.S. PM  
 STATE DESIGN ENGINEER  
 Washington, State Department of Transportation



**DETAIL J**

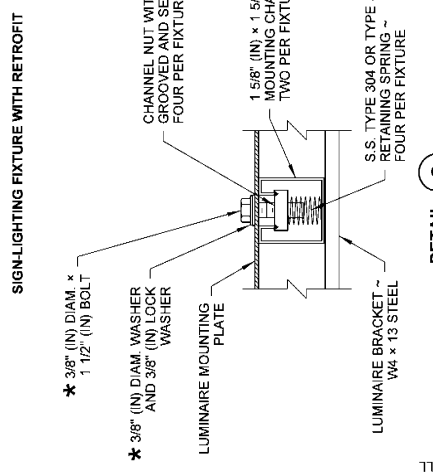


**SECTION F**

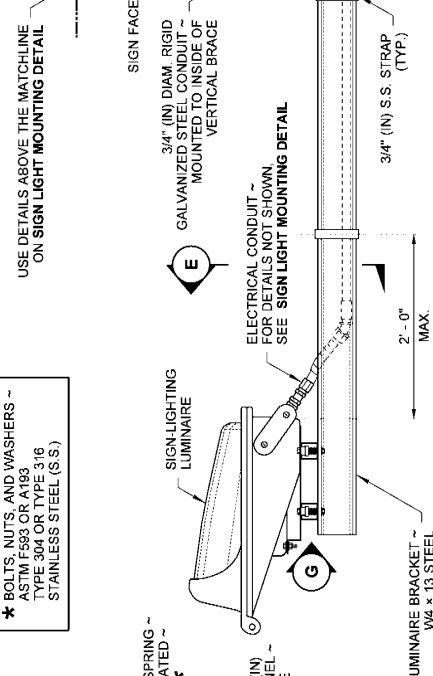


**SECTION E**

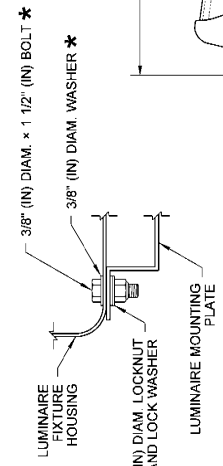
**\* BOLTS, NUTS, AND WASHERS ~ ASTM F593 OR A193 TYPE 304 OR TYPE 316 STAINLESS STEEL (S.S.)**



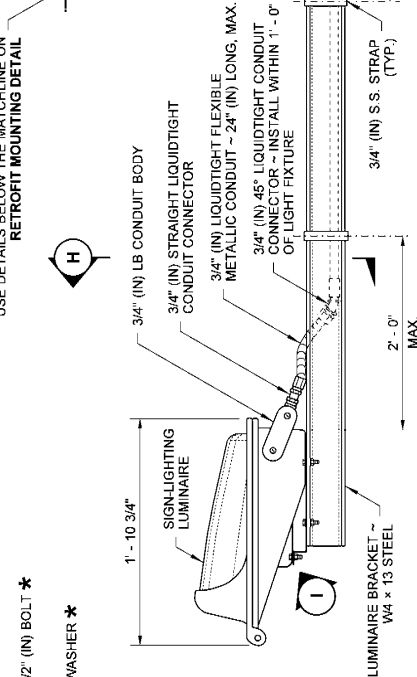
**DETAIL G**



**RETRIFIT MOUNTING DETAIL**



**DETAIL I**

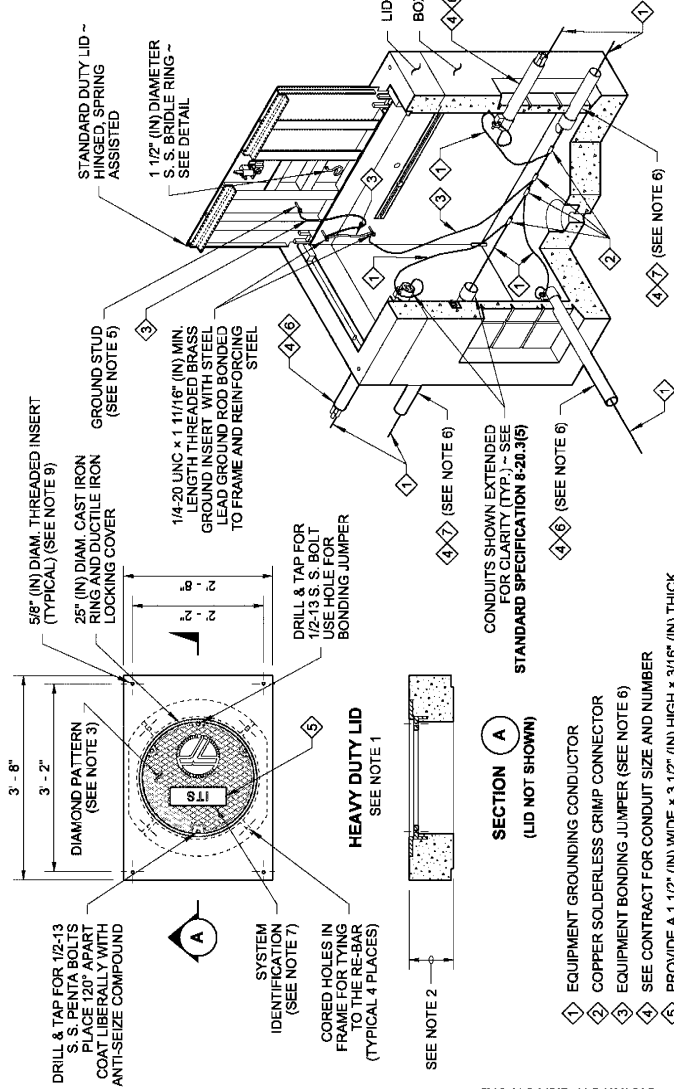


**SIGN LIGHT MOUNTING DETAIL**

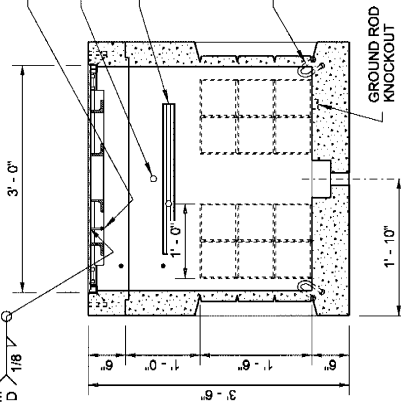
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**NOTES**

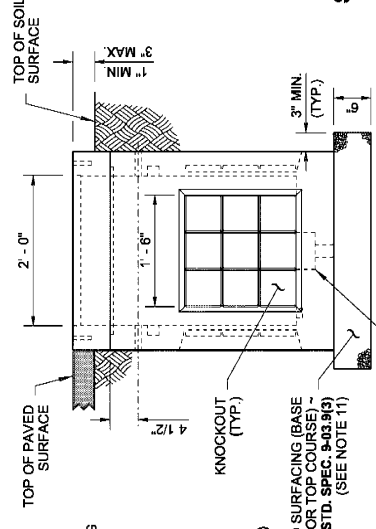
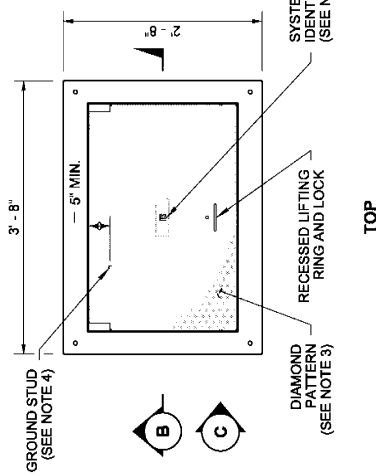
1. A Heavy Duty Lid is required for all Pull Boxes placed in the traveled way or paved shoulder. A Standard Duty Lid shall be used for all other locations, including boxes placed in sidewalks (does not include driveways), walkways, or shared use paths.
2. The Heavy Duty Lid thickness shall be 9" (in) for all new installations. Where an existing Pull Box is to have a new Heavy Duty Lid installed, the lid thickness shall either be 6" (in), where no overlay is called for in the Contract, or it shall be fabricated such that the lid is flush with the top of the new overlay.
3. Minimum lid thickness shown. The diamond pattern shall be a minimum of 3/32" (in) thick.
4. Standard Duty Pull Boxes installed in sidewalks, walkways, or shared-use paths shall have a slip-resistant coating on lid and shall be installed with the surface flush with and matched to the grade of the sidewalk, walkway, or shared-use paths. The non-slip lid shall be identified with permanent marking on the underside indicating the type of surface treatment (see Contract Documents for details) and the year of manufacture. The permanent marking shall be 1/8" (in) line thickness formed with a weld bead and shall be placed prior to hot-dip galvanizing.
5. For Standard Duty Lids, attach a 1/4-20 UNC x 1" (in) S. S. ground stud, coated with anti-seize compound. For Heavy Duty Lids, install a 1/2-13 UNC x 1 1/4" (in) S. S. bolt in a 5/8" (in) diameter cored hole in the ductile iron lid gusset as a ground stud. All ground studs shall include (3) S. S. nuts and (2) S. S. flat washers.
6. See Contract Plans and Standard Plan J-60.05 for bonding jumper requirements. Bonding jumper between lid and frame shall be #8 AWG (min.) x 4' (ft) tinned braided copper.
7. The system identification letters shall be 1/8" (in) line thickness formed by casting or with a mild steel weld bead. See COVER MARKING DETAIL. See Standard Specification 9-23.2(4). Ductile iron lid lettering shall be recessed.
8. Cement concrete shall be Class 4000.
9. Plastic plugs shall be put into the lid inserts after fabrication and the lid installation.
10. Capacity - conduit diameter = 40" (in).
11. Excavate material, place 6" (in) crushed surfacing pad per Standard Specification Section 6-20.3(6).
12. This drawing depicts a typical Pull Box assembly. Reinforcing not shown. Each manufacturer's Pull Box assembly will vary. Refer to the approved manufacturer's shop drawings for all dimensions and the actual arrangement.
13. The lid is an assembly consisting of the metal lid(s) and frame, reinforcing steel, brass ground inserts, and concrete.
14. Field bend #3 reinforcing bar to allow conduit into the Pull Box. Field bend reinforcing bar back into place, wire tie in (2) places, and cast in commercial concrete (commercial concrete only allowed for box bottom/wall completion).



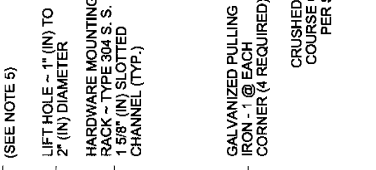
**ISOMETRIC CUTAWAY**



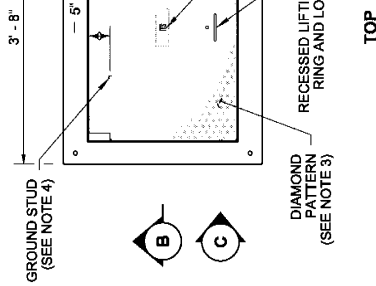
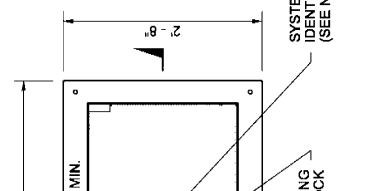
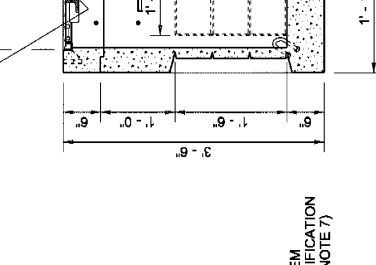
**PULL BOX ASSEMBLY (SHOWN WITH STANDARD DUTY LID)**



**VIEW C**



**SECTION B**



**PULL BOX**

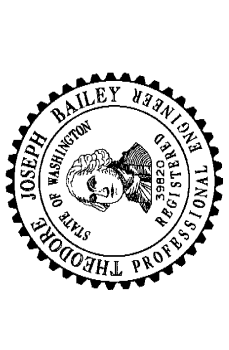
Bailey, Tol  
Apr 25 2016 5:10 PM

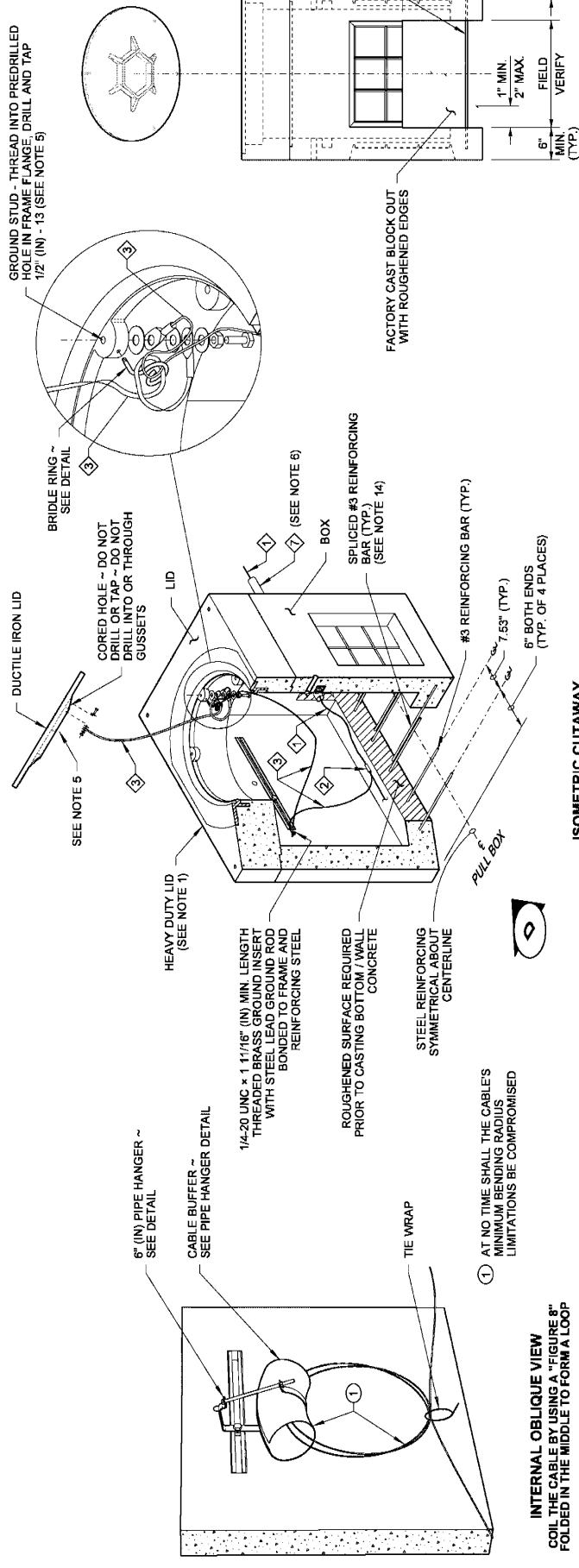
**STANDARD PLAN J-90.10-02**

SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION  
Catherine Jett  
Apr 28 2016 10:04 AM

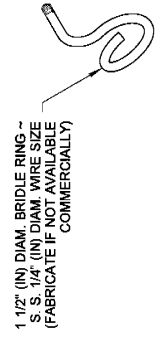
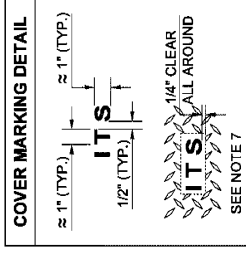
STATE DESIGN ENGINEER  
Washington State Department of Transportation



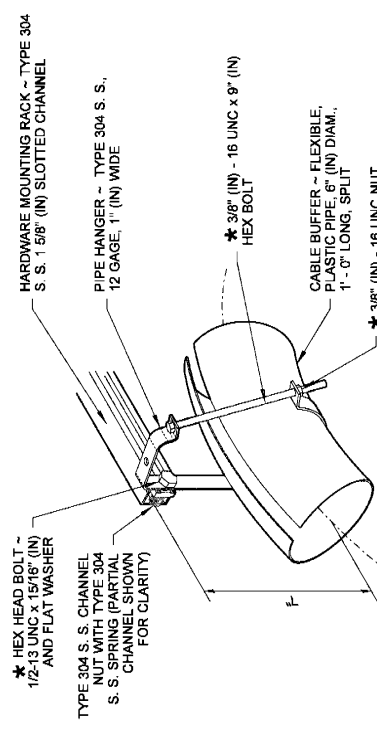


ISOMETRIC CUTAWAY

OPEN BOTTOM PULL BOX ASSEMBLY (SHOWN WITH HEAVY DUTY LID) SEE PULL BOX SHEET 1, FOR DIMENSIONS NOT SHOWN

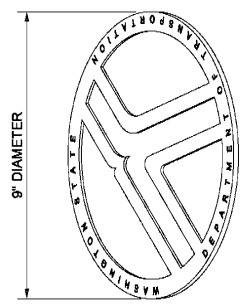
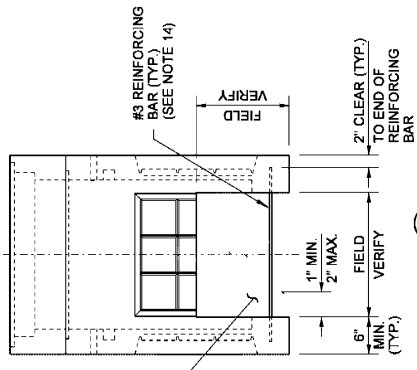


BRIDLE RING DETAIL



PIPE HANGER DETAIL

VIEW D



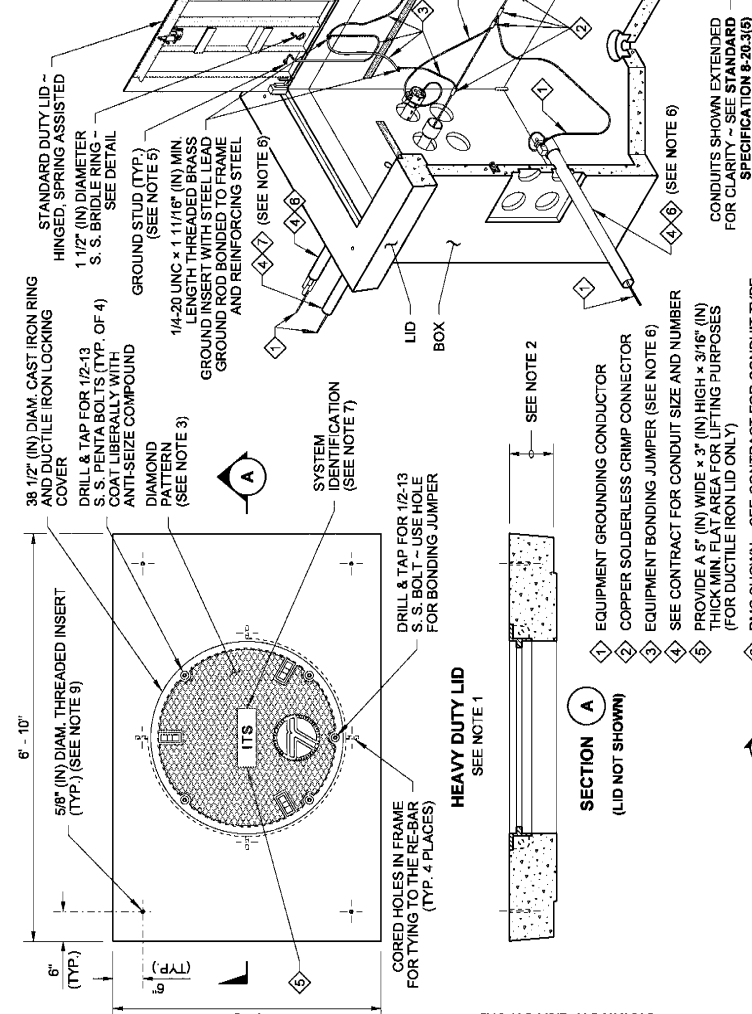
Bailey, Ted  
Theodore Joseph Bailey  
Apr 23 2016 5:11 PM  
FULL BOX

STANDARD PLAN J-90.10-02  
SHEET 2 OF 2 SHEETS

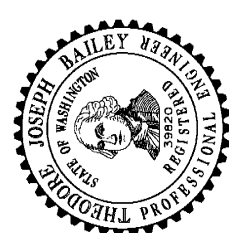
APPROVED FOR PUBLICATION  
Carpenter, Jeff  
Apr 28 2016 3:17 PM  
STATE DESIGN ENGINEER  
Washington State Department of Transportation

**NOTES**

- A Heavy Duty Lid is required for all Cable Vaults placed in the traveled way or paved shoulder. A Standard Duty Lid shall be used for all other locations, including vaults placed in sidewalks (does not include driveways), walkways, or shared use paths.
- The Heavy Duty Lid thickness shall be 9" (in) for all new installations. Where an existing Cable Vault is to have a new Heavy Duty Lid installed, the lid thickness shall either be 6" (in), where no overlay is called for in the Contract, or it shall be fabricated such that the lid is flush with the top of the new overlay.
- Minimum lid thickness shown. The diamond pattern shall be a minimum of 3/32" (in) thick.
- Standard Duty Cable Vaults installed in sidewalks, walkways, or shared-use paths shall have a slip-resistant coating on the lid and shall be installed with the surface flush with and matched to the grade of the sidewalk, walkway, or shared-use paths. The non-slip lid shall be identified with permanent marking on the underside indicating the type of surface treatment (see Contract Documents for details) and the year of manufacture. The permanent marking shall be 1/8" (in) line thickness formed with a weld bead and shall be placed prior to hot-dip galvanizing.
- For Standard Duty Lids, attach a 1/4-20 UNC x 1" (in) S.S. ground stud, coated with anti-seize compound. For Heavy Duty Lids, install a 1/2-13 UNC x 1 1/4" (in) S.S. bolt in a 5/8" (in) diameter cored hole in the ductile iron lid gusset as a ground stud. All ground studs shall include (3) S.S. nuts and (2) S.S. flat washers.
- See Contract Plan Sheets and **Standard Plan J-60.05** for Bonding Jumper requirements. Bonding jumper between lid and frame shall be #8 AWG (min.) x 4' (ft) tinned braided copper.
- The system identification letters shall be 1/8" (in) line thickness formed by casting or with a mild steel weld bead. See **COVER MARKING DETAIL, Standard Specification 9-29.2(4)**.
- Ductile iron lid lettering shall be recessed.
- Cement concrete shall be Class 4000.
- Plastic plugs shall be put into the lid inserts after fabrication and the lid installation.
- Capacity - conduit diameter = 60" (in).
- Excavate material, place 6" (in) crushed surfacing pad per **Standard Specification 8-20.3(6)**.
- This drawing depicts a typical Cable Vault assembly. Reinforcing not shown. Each manufacturer's Cable Vault assembly will vary. Refer to the approved manufacturer's shop drawings for all dimensions and the actual arrangement.
- The lid is an assembly consisting of the metal lid(s) and frame, reinforcing steel, brass ground insert, and concrete.
- Field bend #3 reinforcing bar to allow conduit into the Cable Vault. Field bend reinforcing bar back into place, wire tie in (2) places and cast in commercial concrete (commercial concrete only allowed for bottomwall completion).



DRAWN BY: LISA CYFORD



*Theodore Joseph Bailey*  
Bailey, Ted  
Apr 25 2016 5:11 PM  
CSE 070

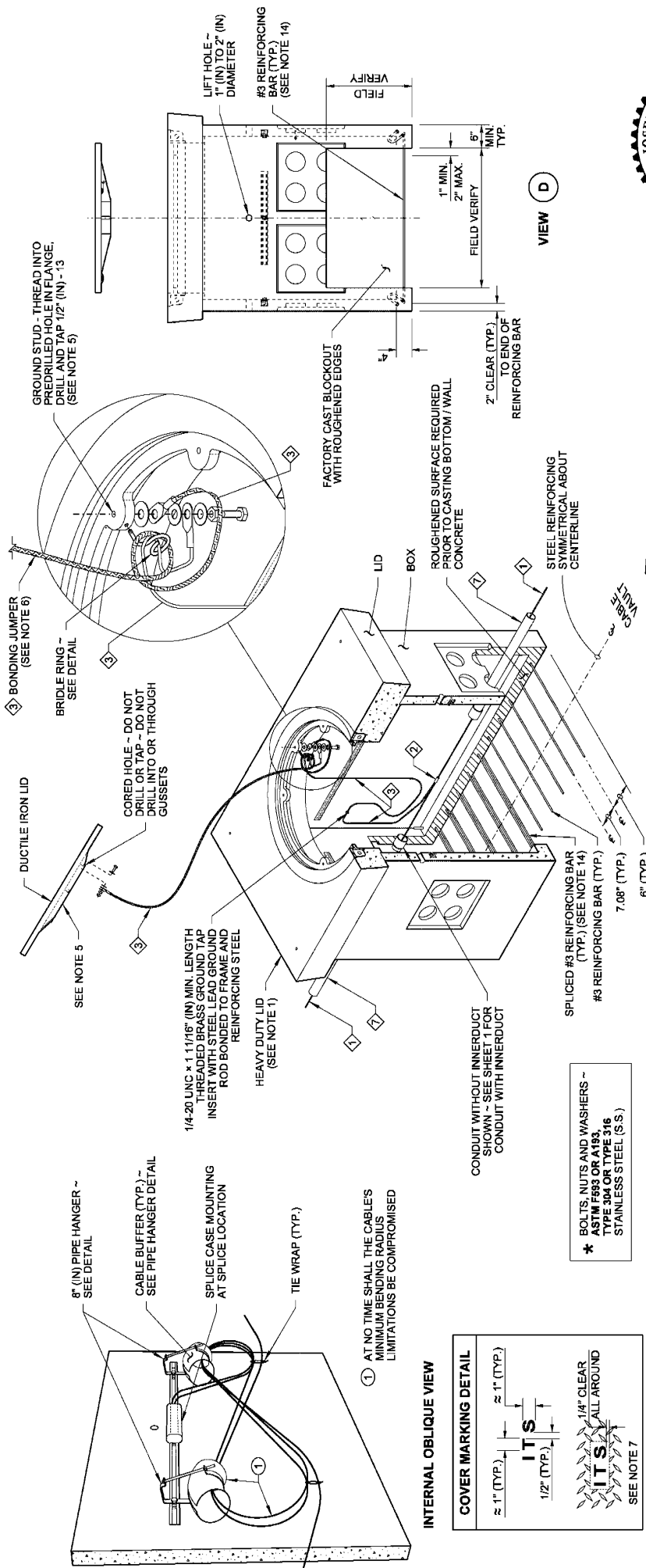
**CABLE VAULT**

**STANDARD PLAN J-90.20-02**

SHEET 1 OF 2 SHEETS

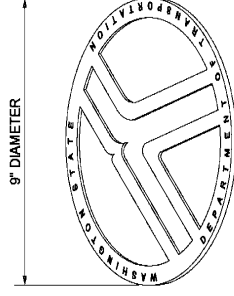
APPROVED FOR PUBLICATION  
*Christopher Poff*  
 Christopher Poff  
 Apr 28 2016 3:17 PM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

DRAWN BY: LISA CYFORD



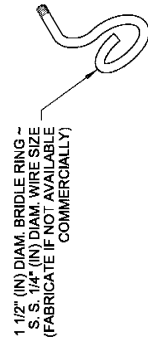
**OPEN BOTTOM CABLE VAULT**  
(SHOWN WITH HEAVY DUTY LID)

SEE CABLE VAULT, SHEET 1, FOR DIMENSIONS NOT SHOWN



LOGO DETAIL

**BRIDLE RING DETAIL**



PIPE HANGER DETAIL  
FABRICATE IF NOT AVAILABLE COMMERCIALY



Theodore Joseph Bailey  
Bailey, Ted  
Apr 25 2016 5:11 PM

**CABLE VAULT**

**STANDARD PLAN J-90.20-02**

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION

Caroline Jeff  
Apr 28 2016 3:17 PM

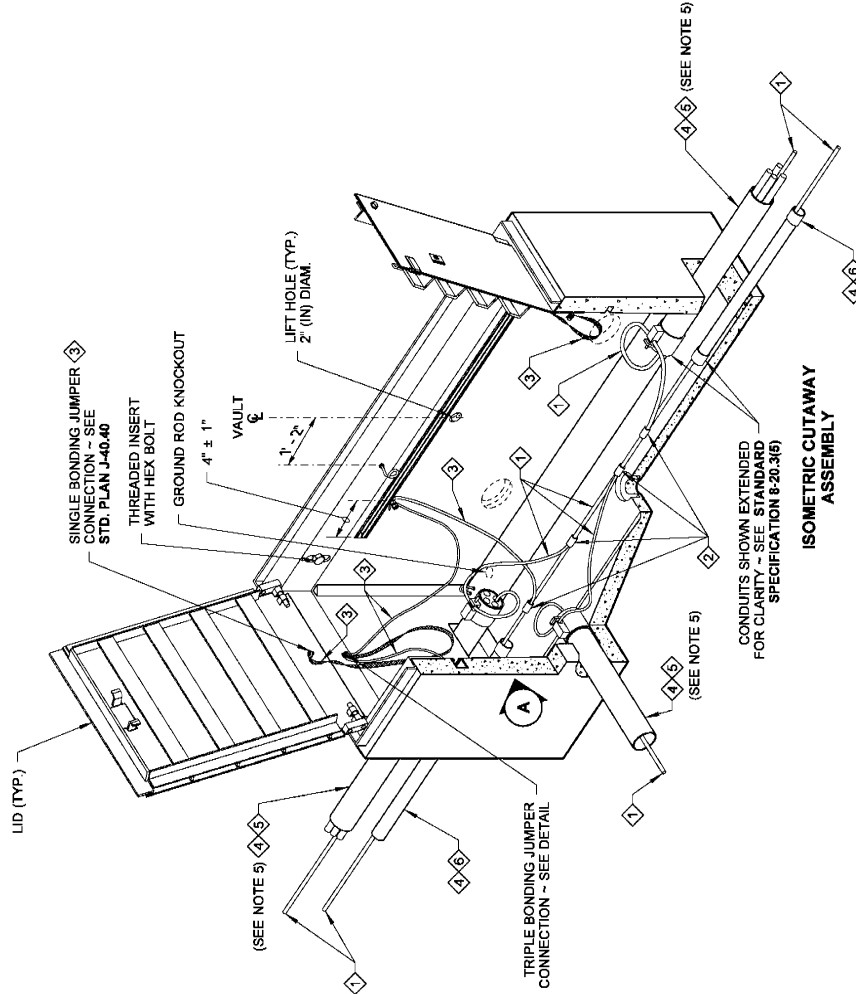
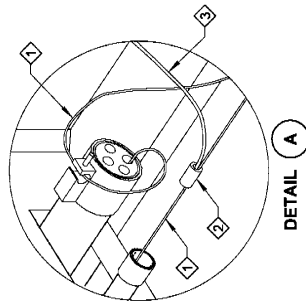
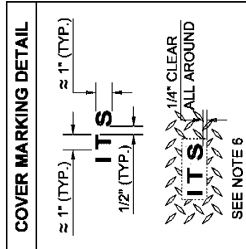
Compendex, Jeff

STATE DESIGN ENGINEER

Washington State Department of Transportation

**NOTES**

- The Small Cable Vault shall not be used within the traveled way or paved shoulder. The Small Cable Vault may be installed in walkways, sidewalks, and shared use paths.
- The diamond pattern shall be a minimum of 3/32" (in) thick.
- Small Cable Vaults installed in sidewalks, walkways, and shared-use paths shall have a slip-resistant coating on the lid and shall be installed with the surface flush with and matched to the grade of the sidewalk, walkway, and shared-use paths. The non-slip lid shall be identified with permanent marking on the underside indicating the type of surface treatment (see Contract Documents for details) and the year of manufacture. The permanent marking shall be 1/8" (in) line thickness formed with a weld bead and shall be placed prior to hot-dip galvanizing.
- A 1/4 - 20 UNC x 1" (in) ground stud with three nuts and two flat washers shall be welded to each lid and coated with anti-seize compound. A 1/4 - 20 UNC x 1" (in) ground stud with three nuts and four washers shall be welded to the frame and coated with anti-seize compound.
- Connect a bonding jumper to the grounded end and bushing for RMC conduit and connect the RMC conduit bushing jumper to the equipment grounding conductor at the hex coupling nut welded to the stainless steel channel. Connect the equipment grounding conductors in the PVC and/or HDPE conduits to the hex coupling nut. The bonding jumper shall be #8 min. x 1' (ft) of tinned braided copper between the lid and the frame and shall be #8 AWG min. from the frame to the hex coupling nut. See Contract Plans and **Standard Plan J-60.05** for bonding jumper requirements.
- The system identification letters shall be 1/8" (in) line thickness formed with a mild steel weld bead. See **COVER MARKING DETAIL, Standard Specification 9-29.2(4)**.
- Cement concrete shall be Class 4000.
- Capacity - conduit diameter = 40" (in).
- Vault shall be installed on 6" (in) crushed surfacing pad in accordance with **Standard Specification 8-20.3(6)**.
- Typical Small Cable Vault features and arrangement shown. Reinforcing not shown. Dimensions and arrangements will vary slightly by manufacturer. See Approved shop drawings.
- Small Cable Vaults for WSDOT Projects shall only be installed with the lid frame bearing on the concrete portion of cable vault.



\* BOLTS, NUTS AND WASHERS -  
 ASTM F593 OR A193,  
 TYPE 304 OR TYPE 316  
 STAINLESS STEEL (S.S.)

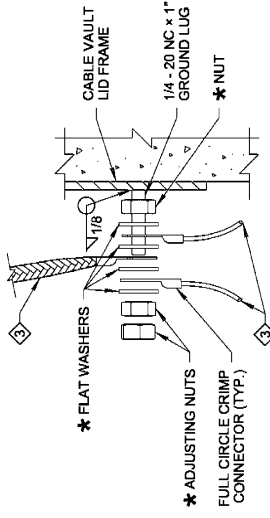


*Theodore Joseph Bailey*  
 Bailey, Ted  
 Apr 23, 2016 5:12 PM

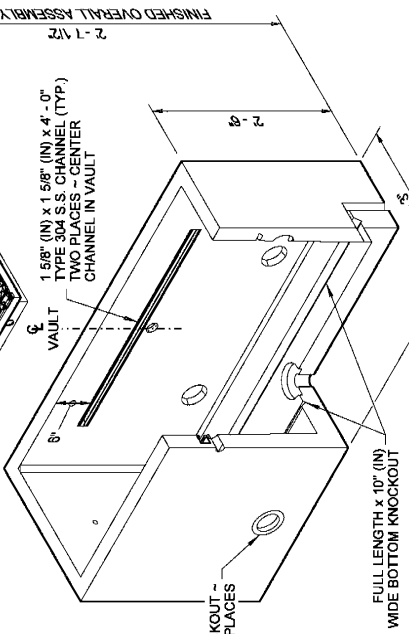
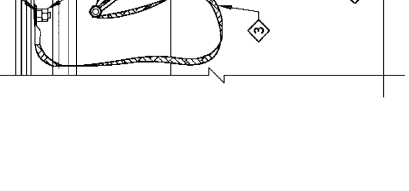
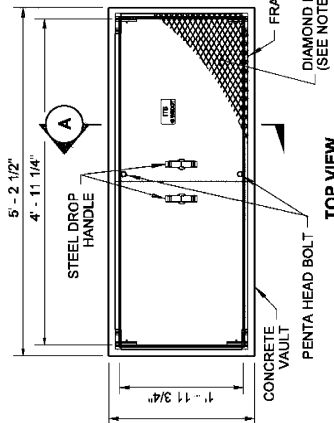
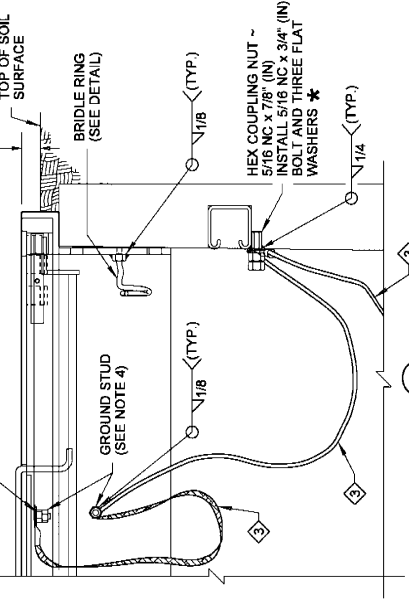
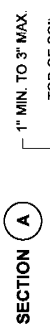
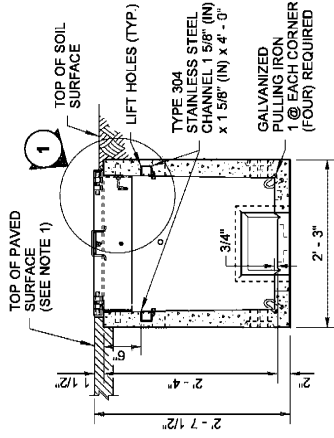
**SMALL CABLE VAULT**  
 STANDARD PLAN J-90.21-01

SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION  
 Carpenter, Jeff  
 Apr 28, 2016 3:11 PM  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation



- TRIPLE BONDING JUMPER CONNECTION DETAIL**
- EQUIPMENT GROUNDING CONDUCTOR
  - COPPER SOLDERLESS CRIMP CONNECTOR
  - EQUIPMENT BONDING JUMPER (SEE NOTE 5)
  - SEE CONTRACT FOR CONDUIT SIZE AND NUMBER
  - RMC SHOWN - SEE CONTRACT FOR CONDUIT TYPE
  - PVC OR HDPE (PVC SHOWN) - SEE CONTRACT FOR CONDUIT TYPE



3/4" (IN) DIAM. THREADED INSERT WITH \* 3/4" (IN) x 1" (IN) HEX BOLT AND FLAT WASHER (TYP. FOUR PLACES)

8" (IN) PIPE HANGER - SEE DETAIL

BRIDLE RING - VAULT (SEE DETAIL)

ROUTE EQUIPMENT BONDING JUMPER TO GROUND STUD ON FRAME

CABLE BUFFER (TYP.) - SEE PIPE HANGER DETAIL

TIE WRAP (TYP.)

SPlice CASE MOUNTING AT SPlice LOCATION WHEN REQUIRED - SEE CONTRACT PLANS

1 AT NO TIME SHALL THE CABLE'S MINIMUM BENDING RADIUS LIMITATIONS BE COMPROMISED

INTERNAL ISOMETRIC VIEW

HINGE PIN ~ STAINLESS STEEL (TYP) FOUR PLACES

1 1/4" (IN) x 1 1/4" (IN) x 3/16" (IN) ANGLE FRAME ~ WITH FRAME

METAL LIDS ~ VAULT

1 5/8" (IN) x 1 5/8" (IN) x 4" - 0" TYPE 304 S.S. CHANNEL (TYP) TWO PLACES - CENTER CHANNEL IN VAULT

PENTA HEAD BOLT (TYP) TWO PLACES

5" (IN) DIAM. KNOCKOUT - FOUR PLACES

FULL LENGTH x 10" (IN) WIDE BOTTOM KNOCKOUT

ISOMETRIC VIEW

2'-7 1/2" FINISHED OVERALL ASSEMBLY HEIGHT

1 1/2"

8"

8"

11 1/2"

BRIDLE RING DETAIL

HARDWARE MOUNTING RACK - TYPE 304 STAINLESS STEEL 1 5/8" (IN) x 5/8" (IN) SLOTTED CHANNEL

PIPE HANGER - TYPE 304 STAINLESS STEEL 12 GAGE, 1" (IN) WIDE

CABLE BUFFER - FLEXIBLE PLASTIC PIPE 6" (IN) DIAM., 1'-0" LONG, SPLIT

\* 3/8" (IN) - 16 UNC x 9" (IN) HEX BOLT

\* 3/8" (IN) - 16 UNC NUT

1 AT NO TIME SHALL THE CABLE'S MINIMUM BENDING RADIUS LIMITATIONS BE COMPROMISED

PIPE HANGER DETAIL

FABRICATE IF NOT AVAILABLE COMMERCIALY

TOP VIEW

5'-2 1/2"

4'-11 1/4"

STEEL DROP HANDLE

FRAME

DIAMOND PATTERN (SEE NOTE 2)

CONCRETE VAULT

PENTA HEAD BOLT

SECTION A-A

2'-7 1/2"

2'-4"

2'-3"

1 1/2"

TOP OF PAVED SURFACE (SEE NOTE 1)

TOP OF SOIL SURFACE

BRIDLE RING (SEE DETAIL)

1" MIN. TO 3" MAX. TOP OF SOIL SURFACE

DETAIL 1

GROUND STUD (SEE NOTE 4)

BRIDLE RING (SEE DETAIL)

HEX COUPLING NUT ~ 5/16 NC x 7/8" (IN) INSTALL 5/16 NC x 3/4" (IN) BOLT AND THREE FLAT WASHERS \*

1/18" (TYP.)

1/18" (TYP.)

1/14" (TYP.)

END VIEW

8 1/2"

10"

8 1/2"

3" MIN. (TYP.)

TOP OF SOIL SURFACE

TOP OF PAVED SURFACE (SEE NOTE 1)

2" (IN) DIAM. LIFT HOLE

5 1/2" (IN) x 10" (IN) KNOCKOUT WITH 2 1/2" (IN) DIAM. DRAIN HOLE

GROUND ROD KNOCKOUT

CRUSHED SURFACING (BASE COURSE OR TOP COURSE) - PER STD. SPEC. 9-03.8(3)

1 1/2" (IN) DIAM. BRIDLE RING ~ S.S. 1/4" (IN) DIAM. WIRE SIZE (FABRICATE IF NOT AVAILABLE COMMERCIALY)

1 1/4" (IN) x 1 1/4" (IN) x 3/16" (IN) ANGLE FRAME

BRIDLE RING DETAIL

PENTA HEAD BOLT (TYP) TWO PLACES

5" (IN) DIAM. KNOCKOUT - FOUR PLACES

FULL LENGTH x 10" (IN) WIDE BOTTOM KNOCKOUT

ISOMETRIC VIEW

2'-7 1/2" FINISHED OVERALL ASSEMBLY HEIGHT

1 1/2"

8"

8"

11 1/2"

BRIDLE RING DETAIL

HARDWARE MOUNTING RACK - TYPE 304 STAINLESS STEEL 1 5/8" (IN) x 5/8" (IN) SLOTTED CHANNEL

PIPE HANGER - TYPE 304 STAINLESS STEEL 12 GAGE, 1" (IN) WIDE

CABLE BUFFER - FLEXIBLE PLASTIC PIPE 6" (IN) DIAM., 1'-0" LONG, SPLIT

\* 3/8" (IN) - 16 UNC x 9" (IN) HEX BOLT

\* 3/8" (IN) - 16 UNC NUT

1 AT NO TIME SHALL THE CABLE'S MINIMUM BENDING RADIUS LIMITATIONS BE COMPROMISED

PIPE HANGER DETAIL

FABRICATE IF NOT AVAILABLE COMMERCIALY

TOP VIEW

5'-2 1/2"

4'-11 1/4"

STEEL DROP HANDLE

FRAME

DIAMOND PATTERN (SEE NOTE 2)

CONCRETE VAULT

PENTA HEAD BOLT

SECTION A-A

2'-7 1/2"

2'-4"

2'-3"

1 1/2"

TOP OF PAVED SURFACE (SEE NOTE 1)

TOP OF SOIL SURFACE

BRIDLE RING (SEE DETAIL)

1" MIN. TO 3" MAX. TOP OF SOIL SURFACE

DETAIL 1

GROUND STUD (SEE NOTE 4)

BRIDLE RING (SEE DETAIL)

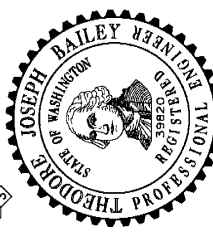
HEX COUPLING NUT ~ 5/16 NC x 7/8" (IN) INSTALL 5/16 NC x 3/4" (IN) BOLT AND THREE FLAT WASHERS \*

1/18" (TYP.)

1/18" (TYP.)

1/14" (TYP.)

DRAWN BY: FERN LIDDELL



THEODORE JOSEPH BAILEY  
STATE OF WASHINGTON  
REGISTERED PROFESSIONAL ENGINEER  
No. 39820

THEODORE JOSEPH BAILEY  
Professional Engineer  
Apr 25, 2016 5:12 PM  
10249P

SMALL CABLE VAULT

STANDARD PLAN J-90.21-01

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION  
Carpenter, Jeff  
Carpenter, Jeff  
Apr 28, 2016 3:18 PM

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

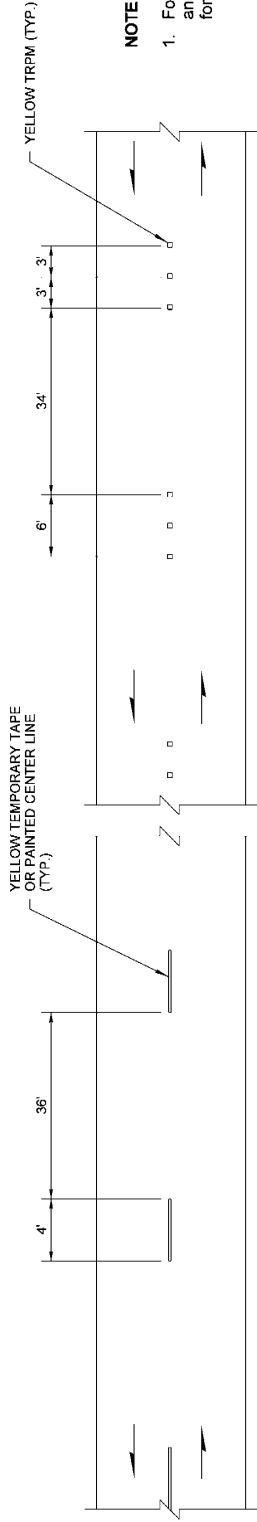
SEE ISOMETRIC CUTAWAY ASSEMBLY - SHEET 1, FOR DIMENSIONS NOT SHOWN

FABRICATE IF NOT AVAILABLE COMMERCIALY

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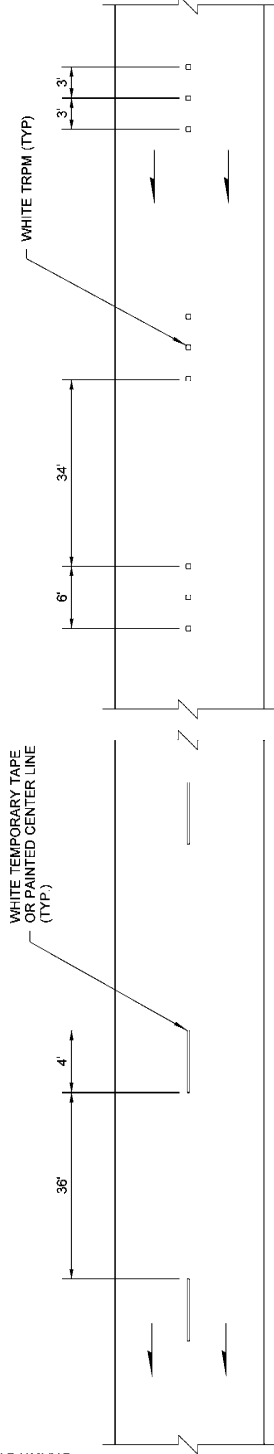


DRAWN BY: FERN LIDDELL

HOT MIX ASPHALT PAVEMENT

BITUMINOUS SURFACE TREATMENT

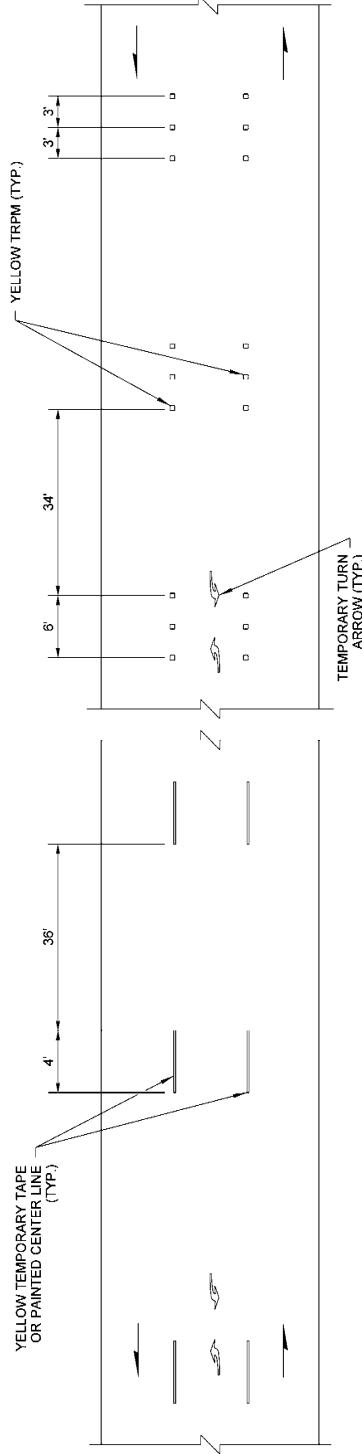
TWO-LANE ROADWAY



HOT MIX ASPHALT PAVEMENT

BITUMINOUS SURFACE TREATMENT

ONE-WAY TWO-LANE ROADWAY



HOT MIX ASPHALT PAVEMENT

BITUMINOUS SURFACE TREATMENT

TWO-WAY TWO-LANE LEFT TURN ROADWAY

**NOTE**

1. For Hot Mix Asphalt Paving projects ~ "DO NOT PASS" and "PASS WITH CARE" signs shall be included for passing zones.



Project: John  
 May 16 2016 9:56 AM

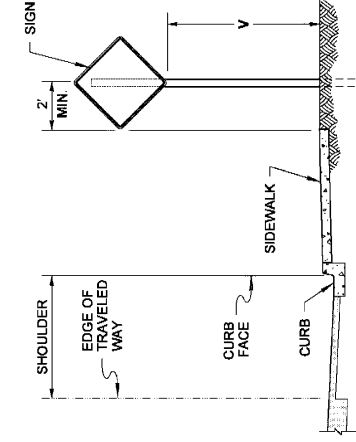
**TEMPORARY PAVEMENT MARKING ~ SHORT DURATION STANDARD PLAN K-70.20-01**

SHEET 1 OF 1 SHEET

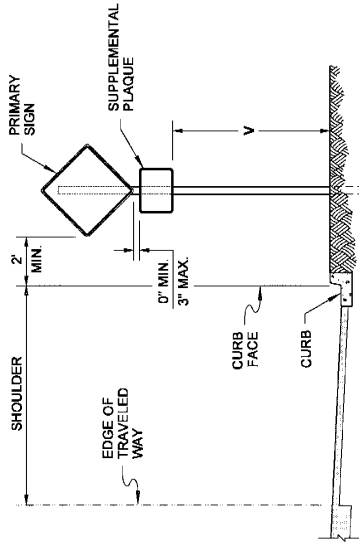
APPROVED FOR PUBLICATION  
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 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

**NOTES**

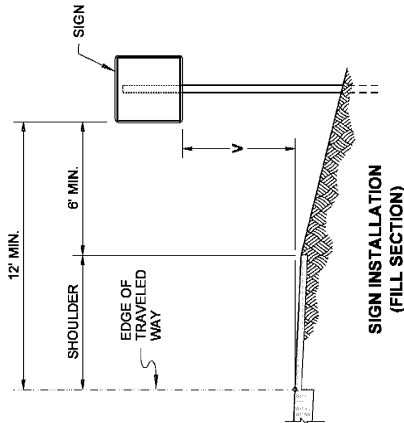
1. For sign installation details, see **Standard Plan G - series**.
2. Where it is impractical to locate a sign with the lateral offset, a minimum of 2 (ft) offset may be used. A 1 (ft) lateral offset may be used in business, commercial or residential areas.
3. The "V" height for signs, with an area of more than 50 square feet and two or more sign supports, is 7 feet in both rural and urban areas.



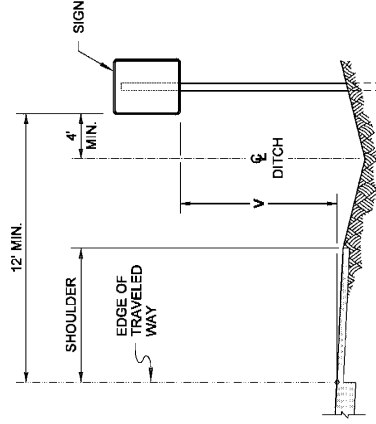
**SIGN INSTALLATION  
(SIDEWALK AND CURB SECTION)**



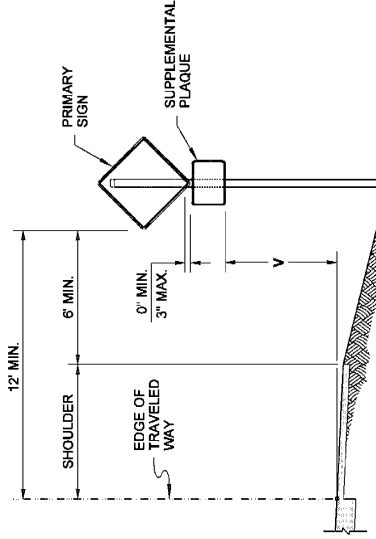
**SIGN INSTALLATION  
(CURB SECTION)**



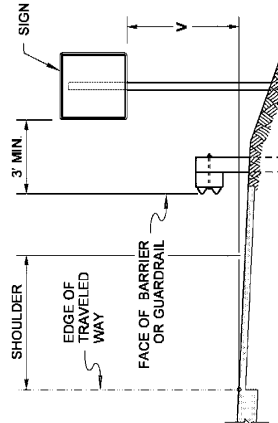
**SIGN INSTALLATION  
(FILL SECTION)**



**SIGN INSTALLATION  
(DITCH SECTION)**



**SIGN WITH SUPPLEMENTAL  
PLAQUE INSTALLATION  
(FILL SECTION)**



**SIGN INSTALLATION  
(BEHIND TRAFFIC BARRIER)**

HEIGHT V	
TO BOTTOM OF SIGN (NO SUPPLEMENTAL PLAQUE)	TO BOTTOM OF SUPPLEMENTAL PLAQUE (WHEN REQUIRED)
RURAL 5' MINIMUM	4' MINIMUM
URBAN 7' MINIMUM	6' MINIMUM

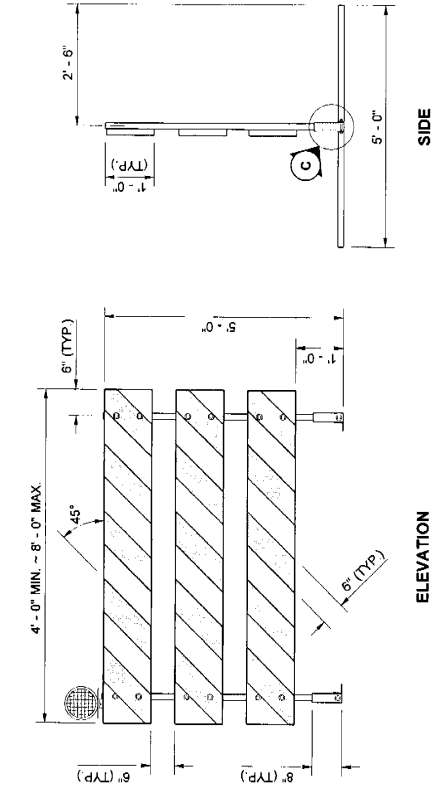


*Nisbett, John*  
Nisbett, John  
May 16 2016 9:57 AM  
**CLASS A  
CONSTRUCTION SIGNING  
INSTALLATION  
STANDARD PLAN K-80.10-01**  
SHEET 1 OF 1 SHEET

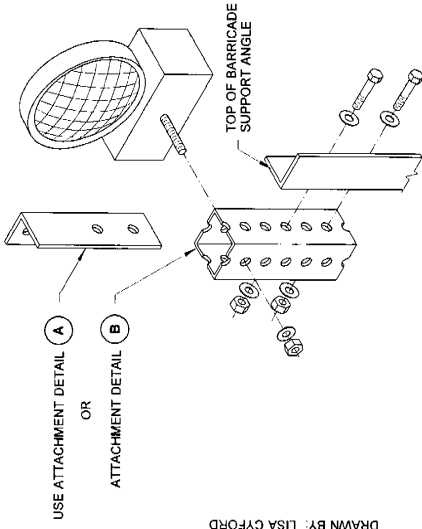
APPROVED FOR PUBLICATION  
*Carpenter, Jeff*  
Carpenter, Jeff  
Jan 1 2016 4:20 PM  
STATE DESIGN ENGINEER  
Washington State Department of Transportation

**NOTES**

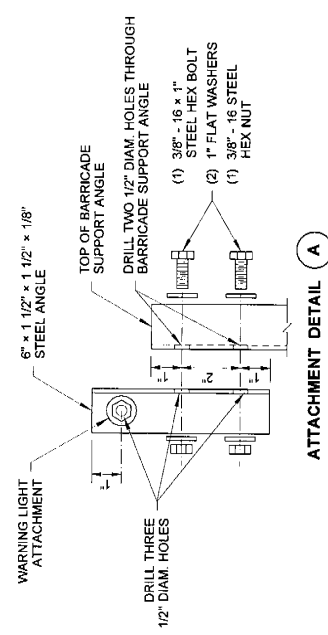
1. All fasteners may be zinc plated, galvanized or stainless steel. All steel angle and tubular steel shall be hot-rolled, high carbon steel, painted or galvanized.
2. Install one lightweight Type A Low-intensity flashing warning light on the traffic side of the barricade. Install two Type A Low-intensity flashing warning lights per barricade when the barricades are used to close a roadway. Attach the light to the barricade according to the light manufacturer's recommendations or use the details shown on this plan.
3. Stripes on barricade rails shall be alternating orange and white retroreflective stripes (sloping downward at an angle of 45 degrees in the direction traffic is to pass).
4. The Type 3 barricade design shown on this plan meets the crash test requirements of NCHRP 350. Alternative designs may be approved if they conform to the NCHRP 350 crash test criteria and the MUTCD.
5. When a sign is mounted on the barricade, it shall be securely bolted to at least two plywood panels. The top of the sign shall not be higher than the top panel of the barricade.
6. When sandbags are used in freezing weather, Urea fertilizer shall be mixed with the sand in a quantity to prevent the sand from freezing.



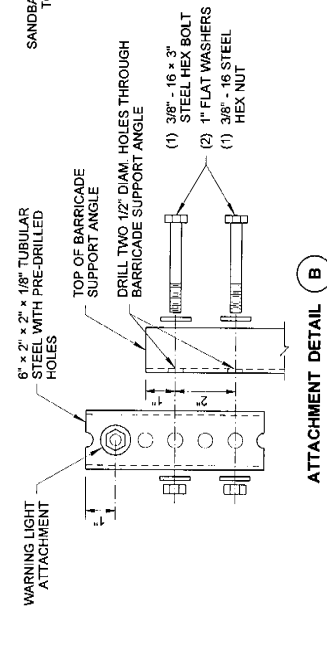
**TYPE 3 BARRICADE**



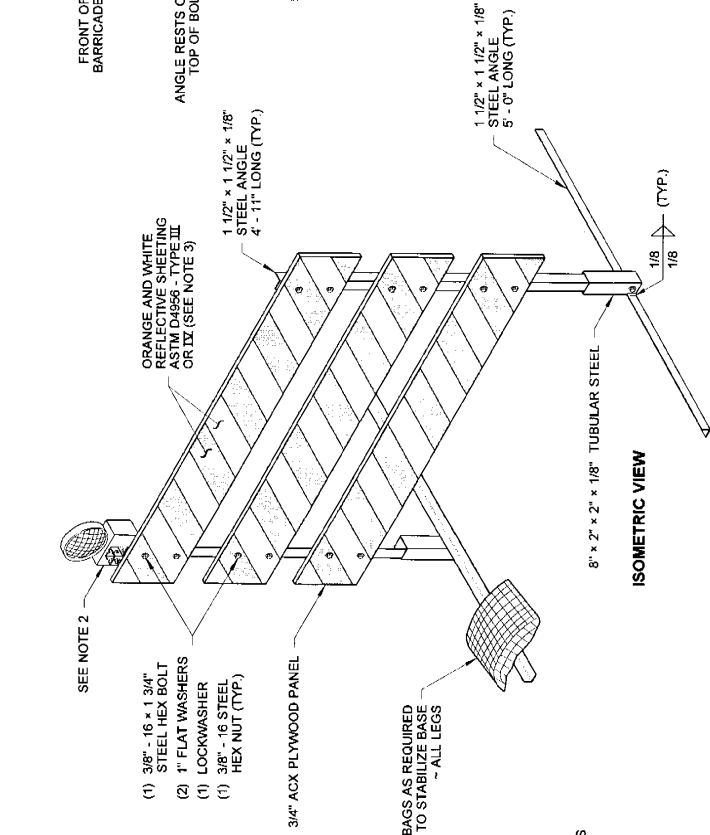
**WARNING LIGHT ATTACHMENT DETAIL**



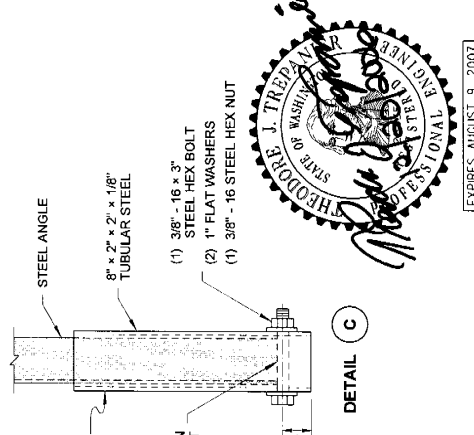
**ATTACHMENT DETAIL A**



**ATTACHMENT DETAIL B**



**ISOMETRIC VIEW**



**DETAIL C**



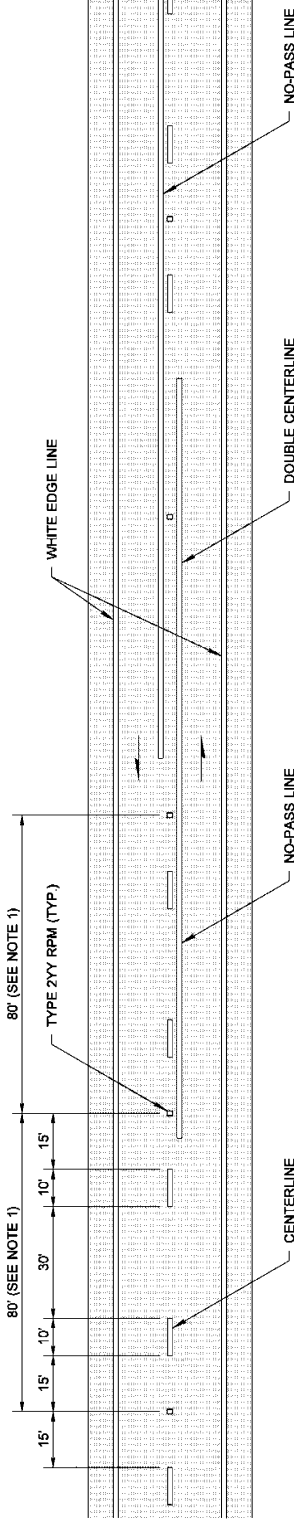
EXPIRES: AUGUST 9, 2007

**TYPE 3 BARRICADE**  
 STANDARD PLAN K-80.20-00  
 SHEET OF 2 SHEETS  
 APPROVED FOR PUBLICATION  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

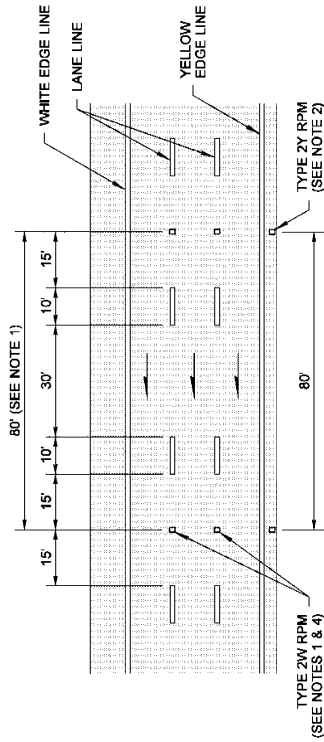
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**NOTES**

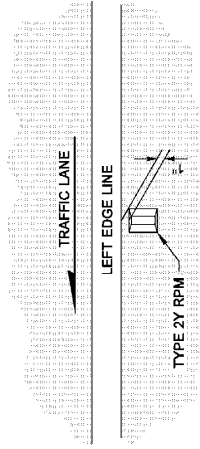
1. Raised Pavement Markers Types 2YY and 2W shall be spaced at 80' (ft) intervals on tangents and on horizontal curves with a radius of 1500' (ft) or more, and at 40' (ft) intervals on horizontal curves having radii of less than 1500' (ft). Center the RPMs in the gaps between the pavement marking lines.
2. Type 2Y RPMs, when specified, shall be placed outside the left Edge Line at 80' (ft) intervals. See "LEFT EDGE OF LANE PLACEMENT DETAIL."
3. Recessed pavement markers, when specified, shall be installed at the locations shown for Type 2W RPMs on multilane one-way roadways, and Type 2YY RPMs on two-lane two-way roadways.
4. The Type 2W RPMs placed on multilane one-way roadways and all RPMs set in recesses shall have an abrasion-resistant coating.
5. Do not recess side-to-side RPMs on Wide Dotted Lane Lines.



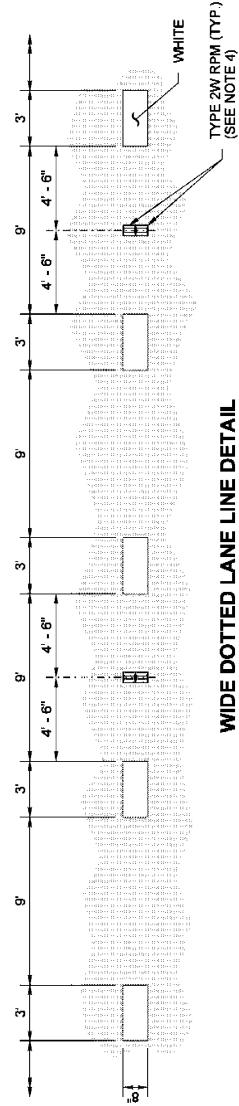
**TWO-LANE TWO-WAY TRAFFIC**



**MULTILANE ONE-WAY TRAFFIC**



**LEFT EDGE OF LANE PLACEMENT DETAIL**  
(SEE NOTE 2)



**WIDE DOTTED LANE LINE DETAIL**  
(SEE NOTE 5)

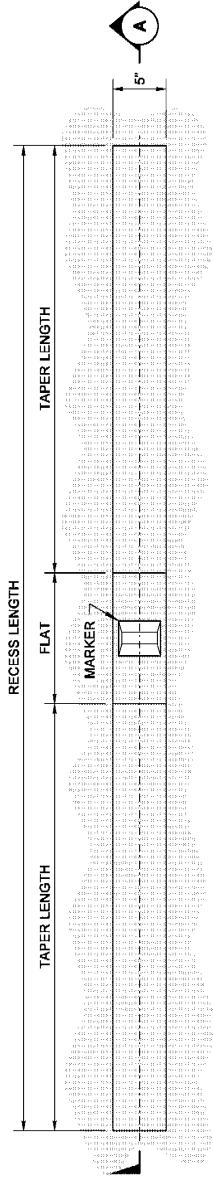
TYPE 2 RPM RAISED FACE COLORS	
TYPE 2YY	YELLOW AND YELLOW
TYPE 2W	WHITE - ONE SIDE ONLY
TYPE 2Y	YELLOW - ONE SIDE ONLY



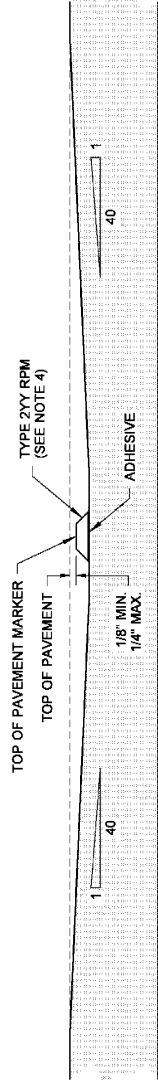
*Brian Walsh, Brian*  
 Feb 29 2016 10:18 AM  
**LONGITUDINAL MARKING SUPPLEMENT WITH RAISED PAVEMENT MARKERS**  
**STANDARD PLAN M-20.30-04**

SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION  
 Carpenter, Jeff Feb 29 2016 12:39 PM  
*Carpenter, Jeff*  
 STATE DESIGN ENGINEER  
 Washington State Department of Transportation

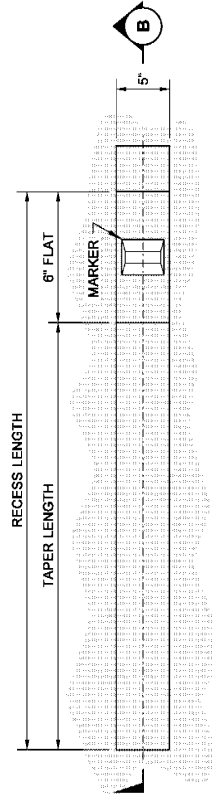


PLAN VIEW

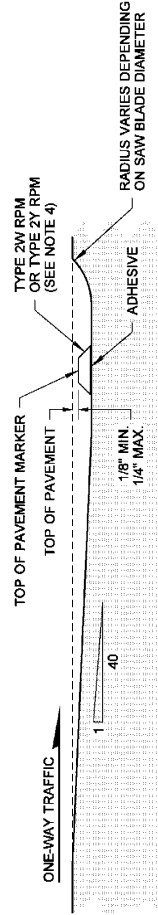


SECTION A

**TWO-WAY ROADWAY RECESSED PAVEMENT MARKER DETAILS**  
FOR USE WHERE SPECIFIED IN CONTRACT



PLAN VIEW



SECTION B

**ONE-WAY ROADWAY RECESSED PAVEMENT MARKER DETAILS**  
FOR USE WHERE SPECIFIED IN CONTRACT

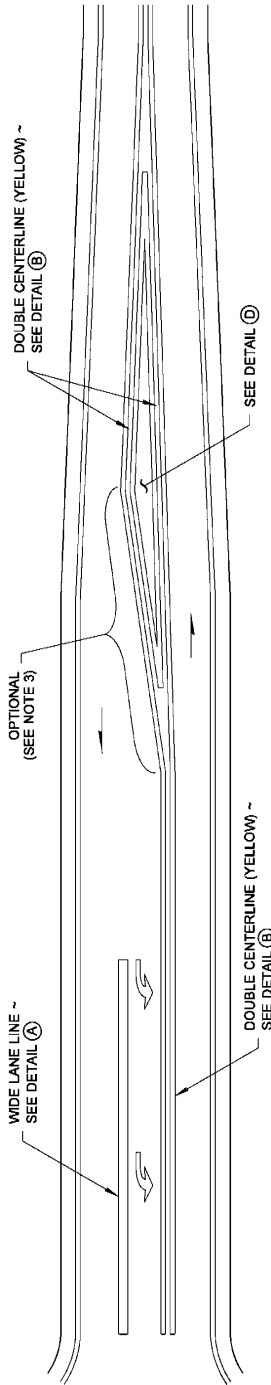
DRAWN BY: COLBY FLETCHER



*Walsh, Brian*  
Walsh, Brian  
Feb 29 2016 10:20 AM  
**LONGITUDINAL MARKING  
SUPPLEMENT WITH RAISED  
PAVEMENT MARKERS**  
**STANDARD PLAN M-20.30-04**

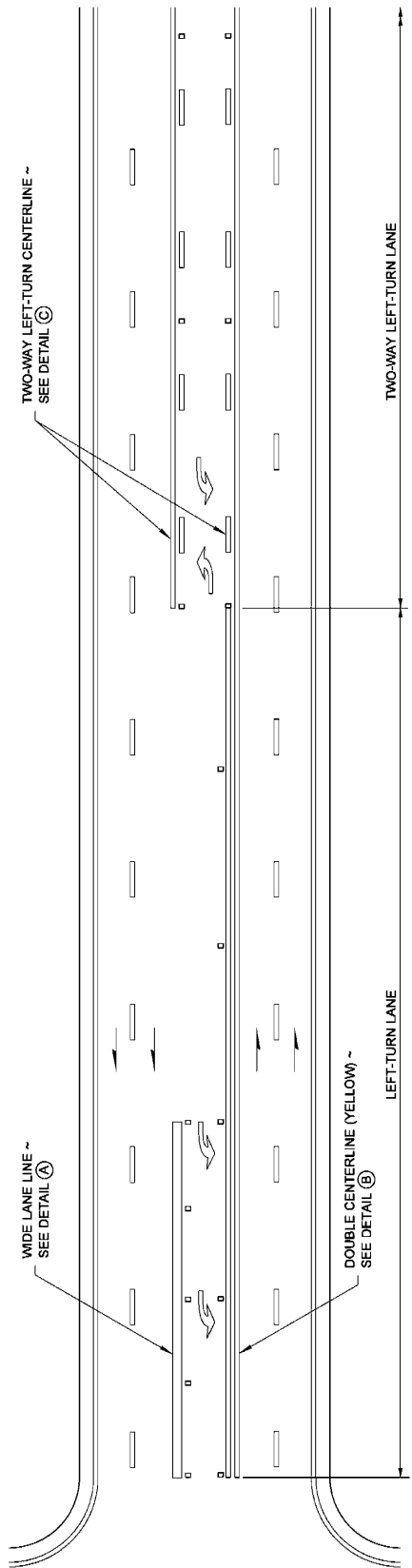
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION  
Carpenter, Jeff  
Feb 29 2016 12:39 PM  
STATE DESIGN ENGINEER  
Washington State Department of Transportation

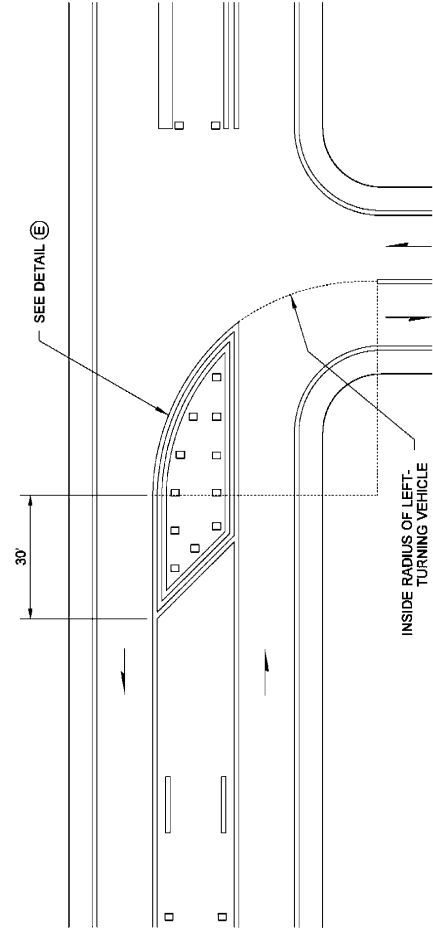


**LEFT-TURN LANE**  
(SEE NOTE 3)

Type 2L (SL) Traffic Arrow



**TWO-WAY LEFT-TURN LANE**



**END TWO-WAY LEFT-TURN LANE**

**NOTES**

1. Raised pavement markers shall be installed only when specified in the Contract Plans.
2. See the Standard Plans for marker designation.
3. The portion labeled "OPTIONAL" is used only when the Optional Marked Deceleration Taper (see Standard Plans M-3.10 and M-3.20) is specified in the Contract Plans.



APPROVED FOR PUBLICATION  
 LONGITUDINAL MARKING  
 SUPPLEMENT WITH RPMs ~  
 TURN LANES  
 STANDARD PLAN M-20.40-03

SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION  
 R. Bruce Byrd  
 State Design Engineer  
 Washington State Department of Transportation