

Transmittal No. 21-09
December 21, 2021

Standard Plans

Distribution: Electronic Distribution Recipients

Subject: Standard Plan 710

The following Standard Plan is modified:
5-297.710 Extruded Panel Mounting Details

See attached Summary of Changes for details.

Instructions:

1. Record this transmittal letter number, date and subject on the transmittal record sheet located in the front of the manual. The last Transmittal Letter was 21-08, dated November 9, 2021.
2. Remove from the manual:
 - Standard Plan Index
 - Standard Plan 5-297.710
3. Insert into the manual:
 - Standard Plan Index, sheets 1-8 of 8 (12-16-2021)
 - Standard Plan 5-297.710 (12-16-2021)
4. The Standard Plans Manual and associated Transmittal Letters are available online in PDF format at <https://standardplans.dot.state.mn.us/StdPlan.aspx>
5. Any technical questions regarding this transmittal should be directed to Mike Elle, State Design Standards Engineer, at (651) 252-7644, or by email to DesignStandards.DOT@state.mn.us

Michael Elle

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State Design Standards Engineer
Office of Project Management and Technical Support

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Summary of Changes
Standard Plan 5-297.710
Extruded Panel Mounting Details
Transmittal Letter No. (21-09)

Sheet 1 of 4

1. Eliminated post clip hardware specifications.
2. Added a general note to see sheet 3 of 4 for post clip details.
3. Moved second general note to sheet 2 of 4.
4. Clarified note ④.
5. Rotated and revised View C-C for clarity.
6. Added "(TYP)" to post clip callout on Section A-A.

Sheet 2 of 4

1. General note was moved from sheet 1 of 4 to this sheet.

Sheet 3 of 4

1. Added post clip hardware size and material callouts.
2. Revised second, third, fourth, and fifth general notes for clarity.

Sheet 4 of 4

1. Eliminated post clip hardware specifications.
2. Added a general note to see sheet 3 of 4 for post clip details.
3. Clarified note ②.
4. Rotated and revised View C-C for clarity.
5. Added "(TYP)" to post clip callout on Section A-A.

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<u>SERIES</u>	<u>SUBJECT</u>
5-297.000	BLANK
5-297.100	GRADING
5-297.200	SURFACING
5-297.300	VEGETATION
5-297.400	DRAINAGE, EROSION CONTROL, AND SEDIMENT CONTROL
5-297.500	BLANK
5-297.600	SAFETY FEATURES AND SPECIAL STRUCTURES
5-297.700	SIGNING
5-297.800	TEMPORARY TRAFFIC CONTROL, PAVEMENT MARKING, LIGHTING, AND SIGNALS

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5-297.108	Standard Acceleration and Deceleration Lanes (Urban) Bituminous Pavement	05-27-14	
5-297.111	Right and Left-Turn Lanes	05-27-14	
5-297.115 (1 of 2)	Staking Information Sheet	08-06-14	
5-297.115 (2 of 2)	Staking Information Sheet	08-06-14	
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5-297.210	Acceleration and Deceleration Lane (Urban) Rigid Design Mainline Jointed Pavement 15 Ft. Panel Length	02-16-16	
5-297.217 (1 of 2)	Concrete Mainline Pavement 15 Ft. Panel Length Rural	02-16-16	
5-297.217 (2 of 2)	Concrete Mainline Pavement 15 Ft. Panel Length Urban or Concrete Shoulder	02-16-16	
5-297.219	Concrete Ramp/Loop Pavement 15 Ft. Panel Length	02-16-16	
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5-297.221 (2 of 4)	Pavement Joints Expansion (Design E)	08-13-20	
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5-297.223 (1 of 2)	Bridge Approach Panel Reinforcement Details (Type F Concrete Barrier on Wingwall)	12-20-11	08-22-16
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5-297.233 (1 of 2)	Bridge Abutment Approach Treatment for Abutment on Footing	08-22-19	
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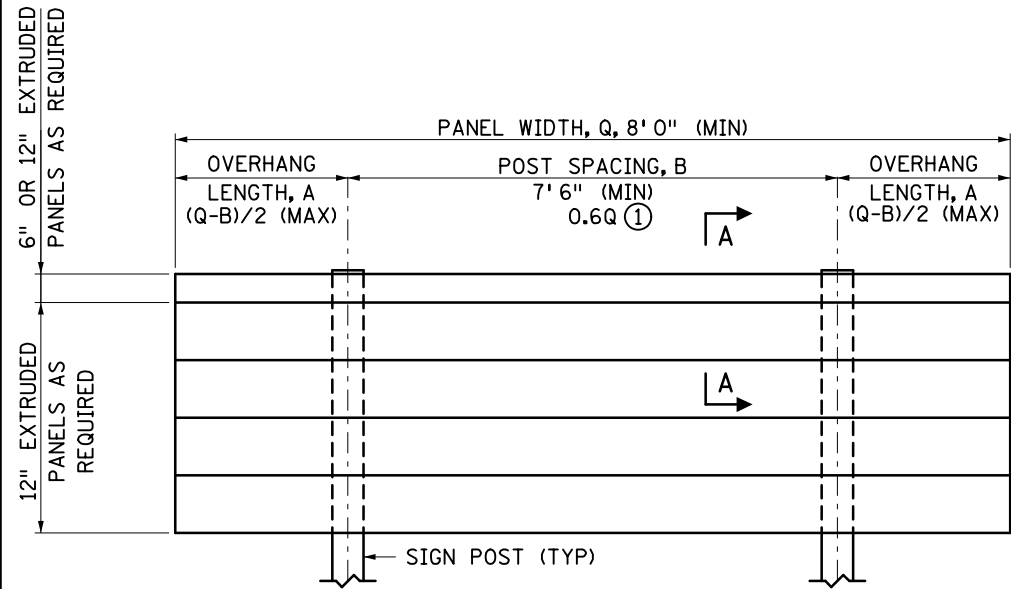
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5-297.631 (2 of 2)	Retaining Wall (1V:2H Sloped Fill) Pile Foundation Geometry and Data	08-27-14	09-01-16
5-297.632 (1 of 2)	Retaining Wall (Live Load Surcharge) Spread Footing Geometry and Data	08-27-14	09-01-16
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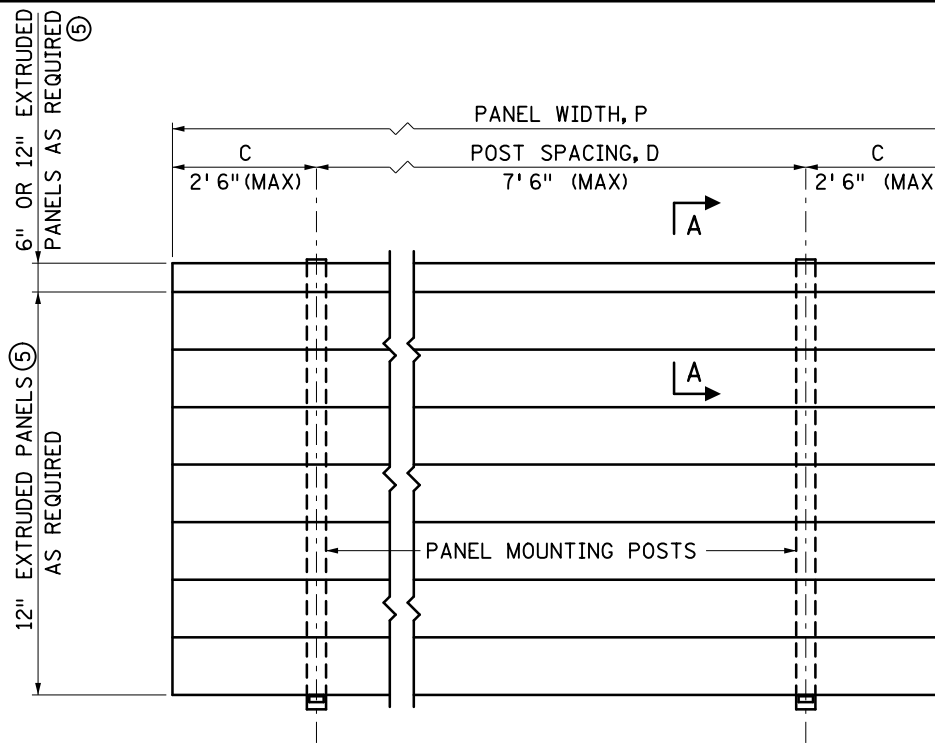
PLAN NO.	SUBJECT	APPROVAL	REVISION
		DATE	DATE
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5-297.763 (1 of 2)	Standard Overhead Sign Structures - Design D - Foundation Details	03-05-20	05-26-20
5-297.763 (2 of 2)	Standard Overhead Sign Structures - Design D - Foundation Details	03-05-20	
5-297.764	Standard Overhead Sign Structures - Design D - Base Plate, Handhole, Electrical, and Cover Plate Details	03-05-20	
5-297.765	Standard Overhead Sign Structures - Design D - Truss-to-Post Connection Details	03-05-20	
5-297.766	Standard Overhead Sign Structures - Design D - Sign Truss Details Type A	05-01-19	05-28-19
5-297.767	Standard Overhead Sign Structures - Design D - Sign Truss Details Type B	05-01-19	05-28-19
5-297.768	Standard Overhead Sign Structures - Design D - Sign Truss Details Type C	05-01-19	05-28-19
5-297.769 (1 of 3)	Standard Overhead Sign Structures - Design D - Walkway Details	03-05-20	
5-297.769 (2 of 3)	Standard Overhead Sign Structures - Design D - Walkway Details: Railing	03-05-20	
5-297.769 (3 of 3)	Standard Overhead Sign Structures - Design D - Walkway Details	05-01-19	
5-297.770	Standard Overhead Sign Structures - Design D - Walkway and Railing Retrofit Details	05-01-19	
5-297.772	Standard Overhead Sign Structures - Design D - DMS Mounting Details	03-05-20	
5-297.773	Standard Overhead Sign Structures - Design D - Rock Socket Foundation Details	01-15-21	
5-297.774	Standard Overhead Sign Structures - Design D - Variable Length Drilled Shaft Details	01-15-21	

<u>PLAN NO.</u>	<u>SUBJECT</u>	<u>APPROVAL DATE</u>	<u>REVISION DATE</u>
5-297.779	Overhead Sign Structures - Foundation Extension - Design D Extension Details - Type 1-4 Posts	01-15-21	
5-297.780 (1 of 2)	Overhead Sign Structures - Foundation Extension - Design D Extension Details - Type 5-6 Posts	01-15-21	
5-297.780 (2 of 2)	Overhead Sign Structures - Foundation Extension - Design D Extension Details - Type 5-6 Posts	01-15-21	
5-297.781	Overhead Sign Structures - Foundation Extension – Interim Design B Extension Details - Type 1-4 Posts	01-15-21	
5-297.782 (1 of 2)	Overhead Sign Structures - Foundation Extension – Interim Design B Extension Details - Type 5-7 Posts	01-15-21	
5-297.782 (2 of 2)	Overhead Sign Structures - Foundation Extension – Interim Design B Extension Details - Type 5-7 Posts	01-15-21	
5-297.783	Overhead Sign Structures - Foundation Extension - Design B Extension Details - Type 1-3 Posts	01-15-21	
5-297.784 (1 of 2)	Overhead Sign Structures - Foundation Extension - Design B Extension Details - Type 4-5 Posts	01-15-21	
5-297.784 (2 of 2)	Overhead Sign Structures - Foundation Extension - Design B Extension Details - Type 4-5 Posts	01-15-21	
5-297.785 (1 of 2)	Overhead Sign Structures - Foundation Extension - Design B Extension Details - Type 6-7 Posts	01-15-21	
5-297.785 (2 of 2)	Overhead Sign Structures - Foundation Extension - Design B Extension Details - Type 6-7 Posts	01-15-21	
5-297.786 (1 of 2)	Overhead Sign Structures - Foundation Extension - Design B Extension Details - Type 8-9 Posts	01-15-21	
5-297.786 (2 of 2)	Overhead Sign Structures - Foundation Extension - Design B Extension Details - Type 8-9 Posts	01-15-21	
5-297.787 (1 of 3)	Overhead Sign Structures - Foundation Extension - Design B Extension Details - Type 10-13 Posts	01-15-21	
5-297.787 (2 of 3)	Overhead Sign Structures - Foundation Extension - Design B Extension Details - Type 10-13 Posts	01-15-21	
5-297.787 (3 of 3)	Overhead Sign Structures - Foundation Extension - Design B Extension Details - Type 10-13 Posts	01-15-21	
5-297.788	Overhead Sign Structures - Foundation Extension - Design B Extension Details - Type 14-15 Posts	01-15-21	
5-297.789 (1 of 2)	Overhead Sign Structures - Foundation Extension - Design B Extension Details - Type 16-19 Posts	01-15-21	
5-297.789 (2 of 2)	Overhead Sign Structures - Foundation Extension - Design B Extension Details - Type 16-19 Posts	01-15-21	
5-297.800			
TEMPORARY TRAFFIC CONTROL, PAVEMENT MARKING, LIGHTING, AND SIGNALS			
5-297.801	Interim Pavement Markings and Signing	10-10-19	
5-297.805 (1 of 5)	Temporary Overhead Sign Structures – General Elevation and Notes	03-06-20	
5-297.805 (2 of 5)	Temporary Overhead Sign Structures – Foundation Details	03-06-20	
5-297.805 (3 of 5)	Temporary Overhead Sign Structures – Post and Baseplate Details	03-06-20	
5-297.805 (4 of 5)	Temporary Overhead Sign Structures – Beam Details	06-28-21	
5-297.805 (5 of 5)	Temporary Overhead Sign Structures – Sign Panel and Panel Mounting Post Details	03-06-20	
5-297.811 (1 of 2)	Alternate Pedestrian Route (APR) Layouts	03-18-21	
5-297.811 (2 of 2)	Alternate Pedestrian Route (APR) Layouts	03-18-21	
5-297.813 (1 of 2)	Temporary Pedestrian Access Route (TPAR) Devices – Channelizers, Sidewalk Barricades, and Portable Stands	03-18-21	
5-297.813 (2 of 2)	Temporary Pedestrian Access Route (TPAR) Devices – Temporary Curb Ramps and Walkway Surfaces	03-18-21	
5-297.820 (1 of 3)	T-100 Light Tower Pile Foundation Design	11-05-19	
5-297.820 (2 of 3)	T-120 Light Tower Pile Foundation Design	11-05-19	
5-297.820 (3 of 3)	T-140 Light Tower Pile Foundation Design	11-05-19	

<u>PLAN NO.</u>	<u>SUBJECT</u>	<u>APPROVAL</u> <u>DATE</u>	<u>REVISION</u> <u>DATE</u>
5-297.821 (1 of 3)	T-100 Light Tower Mat Foundation Design	11-05-19	
5-297.821 (2 of 3)	T-120 Light Tower Mat Foundation Design	11-05-19	
5-297.821 (3 of 3)	T-140 Light Tower Mat Foundation Design	11-05-19	



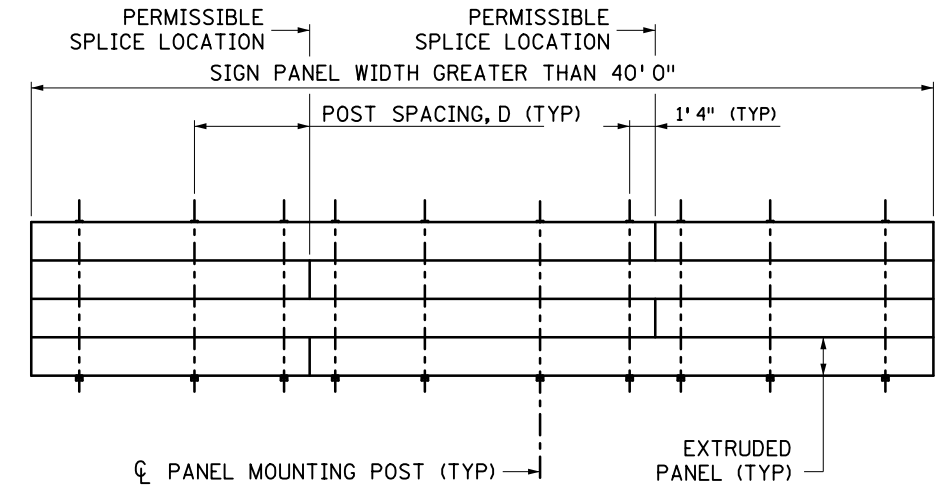
I-BEAM MOUNTED EXTRUDED PANEL ELEVATION ②



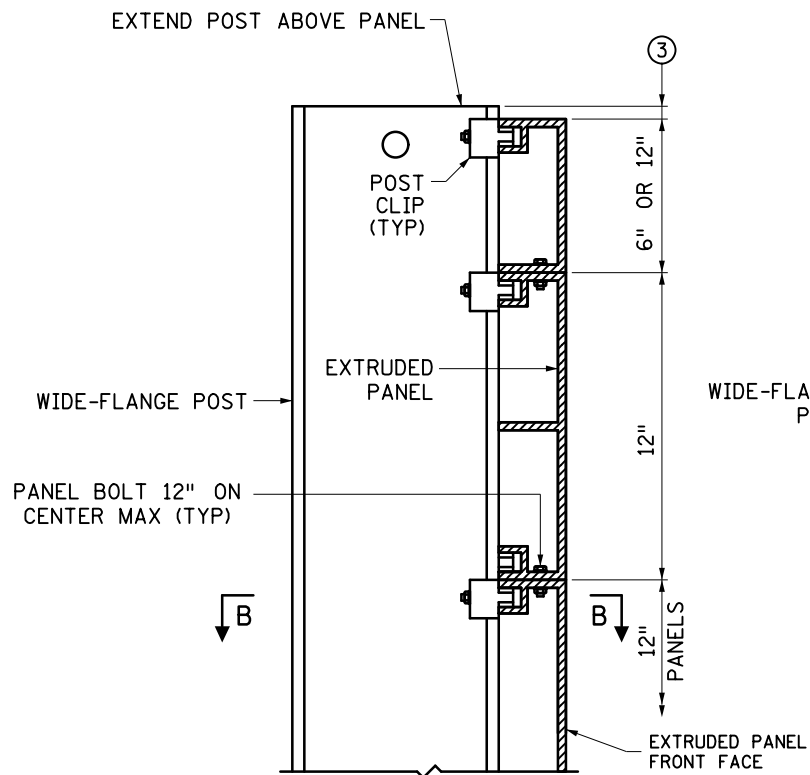
OVERHEAD SIGN STRUCTURE EXTRUDED PANEL ELEVATION

PANEL MOUNTING POST			
NO. OF POSTS	P	C	D
2	12' 0" OR LESS	0.207P	0.586P
3	12' 6" THRU 17' 0"	0.145P	0.355P
4	17' 6" THRU 23' 0"	0.107P	0.262P
5	23' 6" THRU 29' 0"	0.084P	0.208P
6	29' 6" THRU 35' 0"	0.070P	0.172P
7	35' 6" THRU 40' 0"	0.059P	0.147P
9	40' 6" THRU 41' 6"	0.059P	0.147P
10	41' 6" THRU 47' 0"	0.052P	0.128P
11	47' 6" THRU 53' 0"	0.048P	0.113P
12	53' 6" THRU 59' 0"	0.041P	0.102P
13	59' 6" THRU 65' 0"	0.040P	0.092P

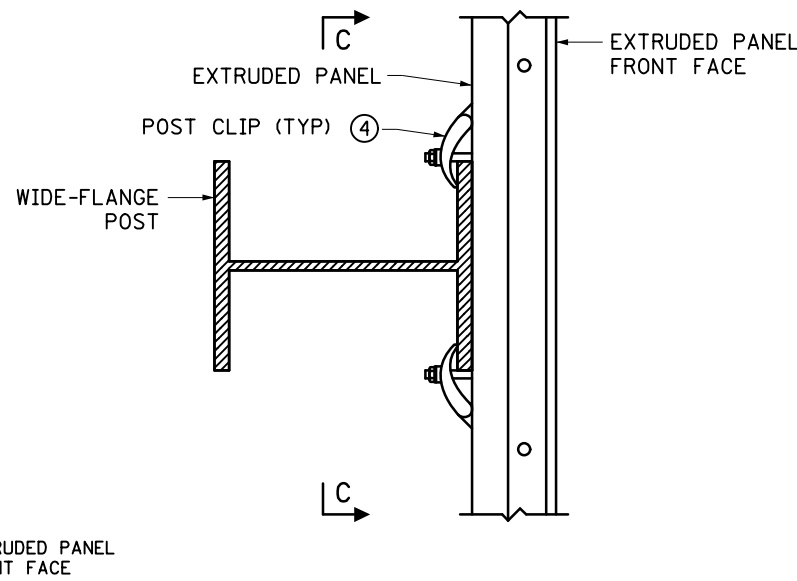
POST SPACING MAY BE ADJUSTED ±12" AS REQUIRED IF CONFLICT WITH TRUSS MEMBERS IS ENCOUNTERED.



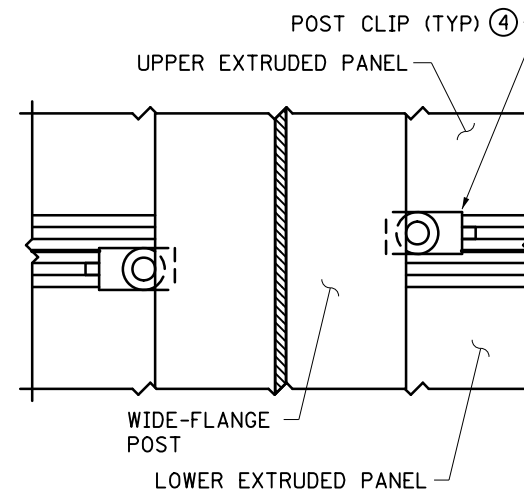
EXTRUDED PANEL SPLICE STAGGER DIAGRAM
EXTRUDED PANEL WIDTH EXAGGERATED FOR CLARITY



SECTION A-A



SECTION B-B



VIEW C-C

DESIGN CRITERIA:

THE DETAILS SHOWN ON THESE STANDARD PLANS ARE BASED ON THE AASHTO "LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS", FIRST EDITION, 2015 AND THE 2017, 2018, 2019, AND 2020 INTERIM REVISIONS.

STRENGTH LIMIT WIND LOADING OF 120 MPH
SERVICE LIMIT WIND LOADING OF 76 MPH

GENERAL NOTES:

FOR POST CLIP DETAILS, SEE SHEET 3 OF 4.

SAW CUT ALL POST CUTS. PLATES MAY BE SHEARED OR FLAME CUT USING A MECHANICALLY GUIDED CUTTING TORCH. PREPARE EDGES IN ACCORDANCE WITH SPEC. 2471.3.C.4 AND SPEC. 2471.3.D.4.

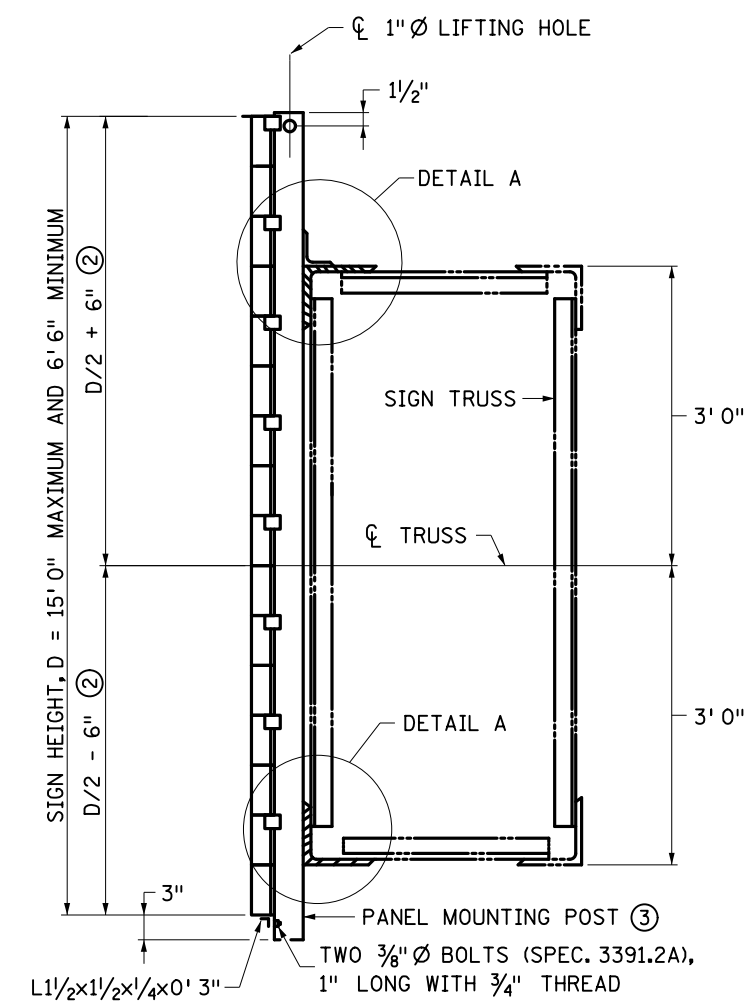
- ① ROUND TO THE NEAREST EVEN INCH FOR DIMENSION D.
- ② SEE I-BEAM-SUPPORTED SIGN STRUCTURAL ELEVATION FOR PANEL WIDTH, POST SPACING, AND OVERHANG LENGTHS.
- ③ 1/2" - OVERHEAD SIGN STRUCTURE SUPPORTED
1/2" MIN.; 1" MAX. - I-BEAM SUPPORTED
- ④ PLACE ONE POST CLIP ON THE UPPER EXTRUDED PANEL AND THE ADJACENT POST CLIP ON THE LOWER EXTRUDED PANEL ON THE OPPOSITE SIDE OF THE WIDE FLANGE POST.
- ⑤ EXTRUDED PANELS FOR INDIVIDUAL SIGN WIDTHS GREATER THAN 40' 0" MAY BE SPLICED.
USE NO MORE THAN ONE SPLICE PER EXTRUDED PANEL.
LOCATE SPLICES AS SHOWN. USE AN ADDITIONAL PANEL MOUNTING POST AT EACH SPLICE LOCATION.
SPLICED EXTRUDED PANEL SEGMENTS MUST SPAN A MINIMUM OF THREE POSTS. STAGGER SPLICE LOCATIONS.

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KEVIN WESTERN
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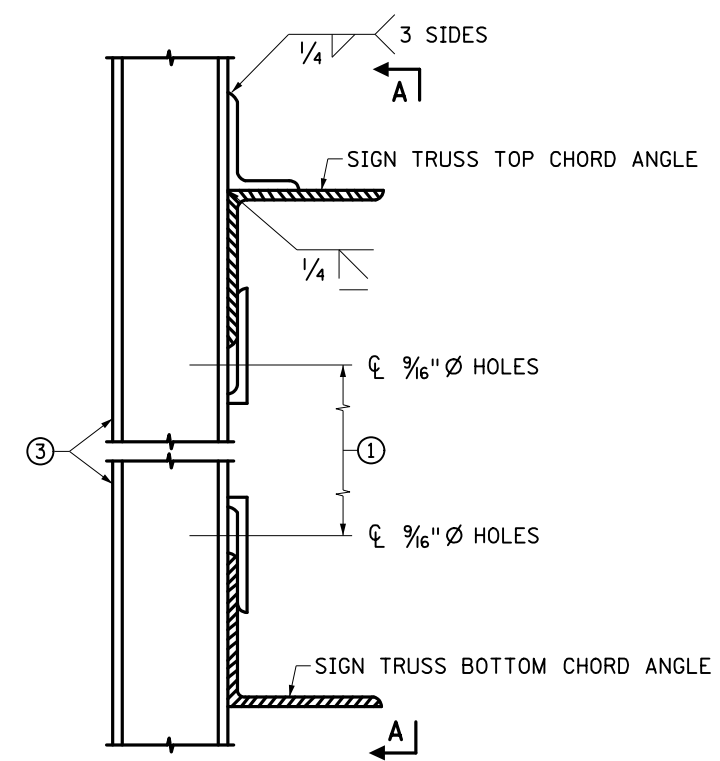
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STANDARD PLAN 5-297.710 1 OF 4
Tom Styrbicki
THOMAS STYRBICKI
STATE DESIGN ENGINEER
APPROVED: 12-16-2021
REVISED:
STATE PROJ. NO. (TH) SHEET NO. OF SHEETS

EXTRUDED PANEL MOUNTING DETAILS

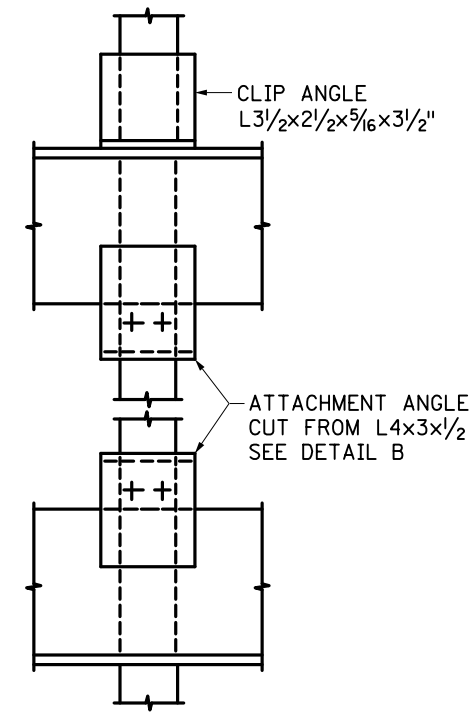
DESIGN D PANEL MOUNTING POST QUANTITIES INCLUDES MOUNTING ANGLES	
PANEL HEIGHT	WEIGHT PER POST (LBS.)
6' 6" (78")	70
7' 0" (84")	74
7' 6" (90")	78
8' 0" (96")	82
8' 6" (102")	86
9' 0" (108")	90
9' 6" (114")	93
10' 0" (120")	97
10' 6" (126")	101
11' 0" (132")	105
11' 6" (138")	160
12' 0" (144")	166
12' 6" (150")	172
13' 0" (156")	178
13' 6" (162")	184
14' 0" (168")	190
14' 6" (174")	196
15' 0" (180")	202



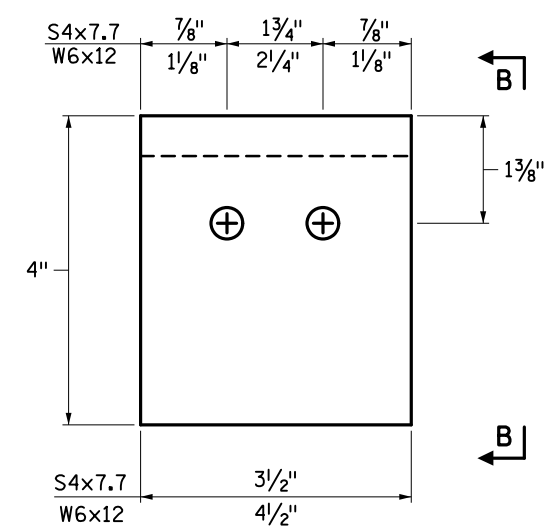
TYPICAL SECTION
DESIGN D TRUSS SHOWN



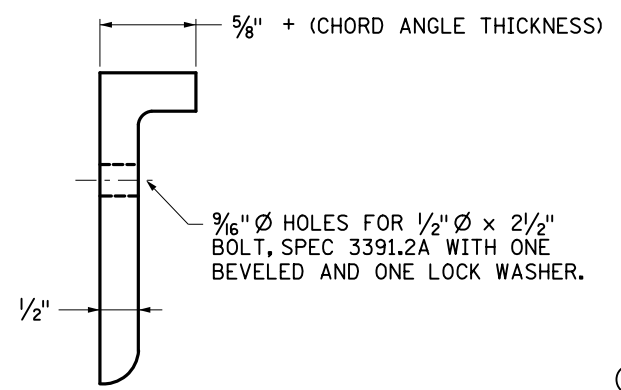
DETAIL A



VIEW A-A



DETAIL B



VIEW B-B

- NOTES:
- PROVIDE STRUCTURAL STEEL IN ACCORDANCE WITH SPEC 3308. GALVANIZE STRUCTURAL STEEL IN ACCORDANCE WITH SPEC. 3394 AND HARDWARE IN ACCORDANCE WITH SPEC. 3392. FURNISH HIGH-STRENGTH BOLTS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH SPEC. 3391. PLACE HIGH-STRENGTH BOLTS IN ACCORDANCE WITH SPEC. 2402.
 - (1) (TRUSS DEPTH) - (TOP & BOTTOM CHORD ANGLE LEGS) - 1/4".
 - (2) SEE NOTE (1) ON STANDARD PLAN 5-297.761 WHEN STANDARD PANELS AND DMS ARE MOUNTED ON THE SAME SPAN.
 - (3) S4x7.7 FOR SIGN HEIGHTS LESS THAN OR EQUAL TO 11' 0". W6x12 FOR SIGN HEIGHTS OVER 11' 0".

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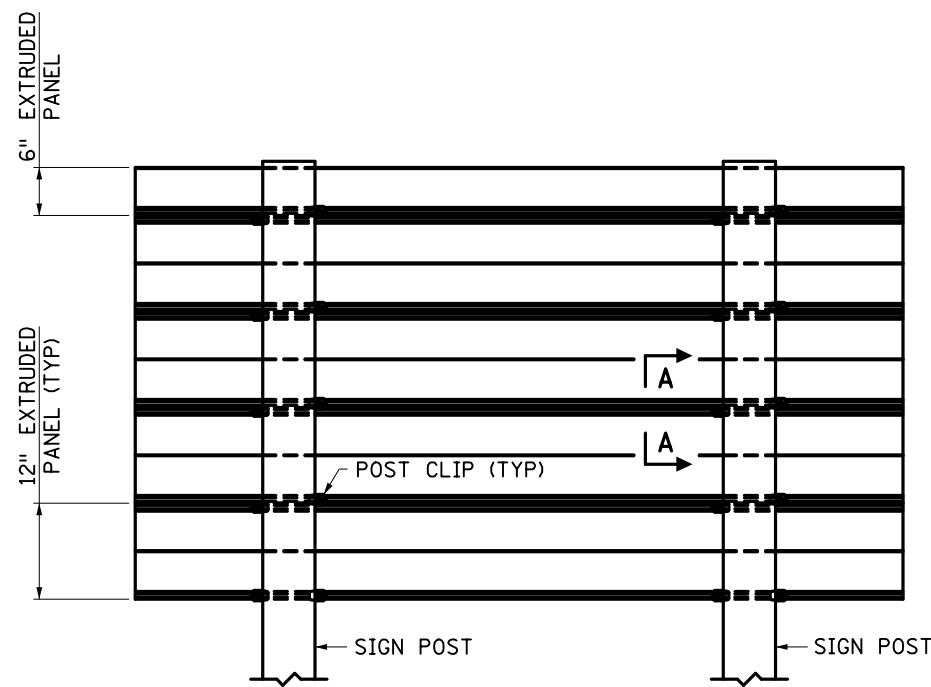
STANDARD PLAN 5-297.710 2 OF 4

APPROVED: 12-16-2021
REVISED:

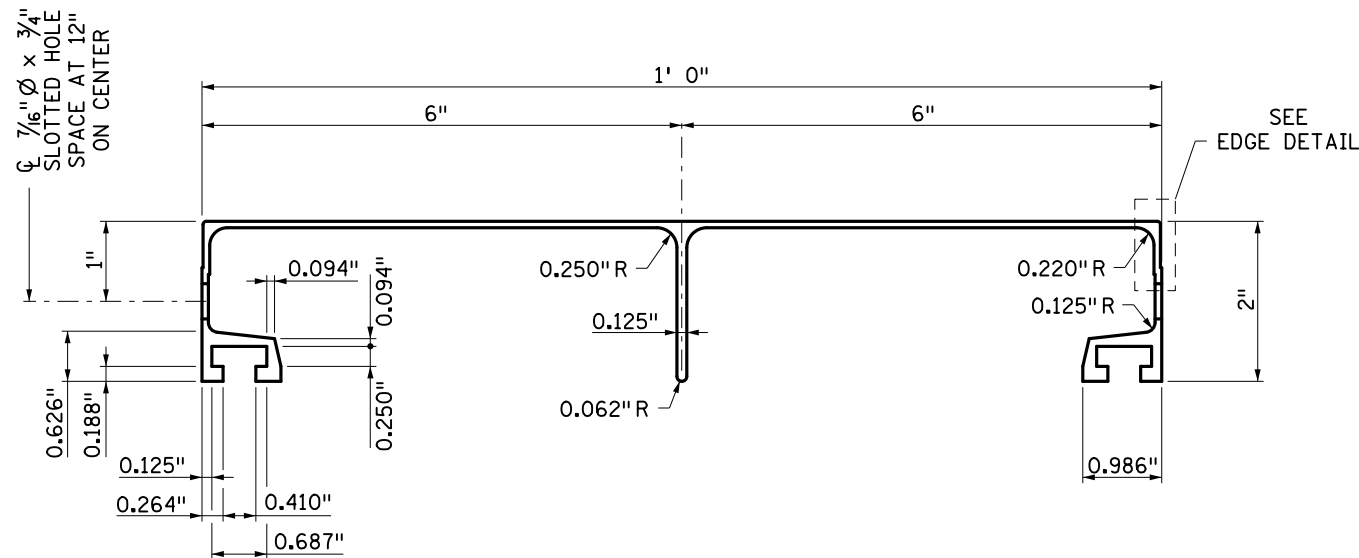
Tom Styrbicki
THOMAS STYRBICKI
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STATE PROJ. NO. (TH) SHEET NO. OF SHEETS

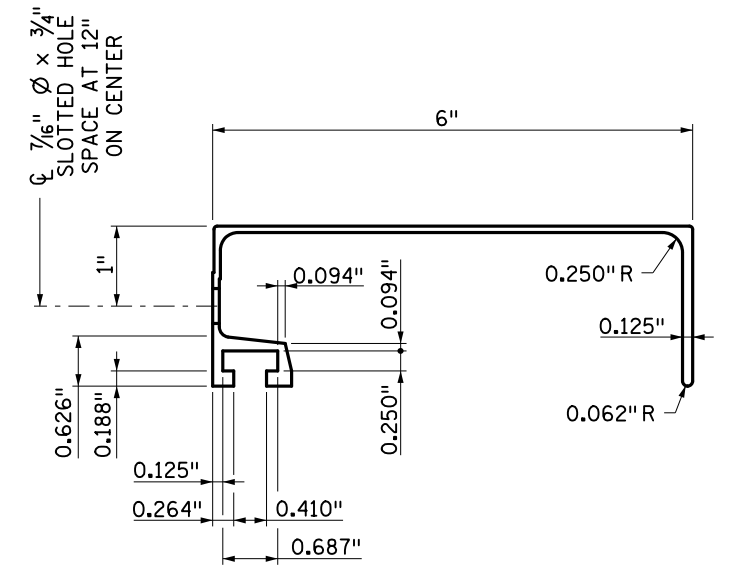
EXTRUDED PANEL MOUNTING DETAILS
PANEL MOUNTING POST DETAILS



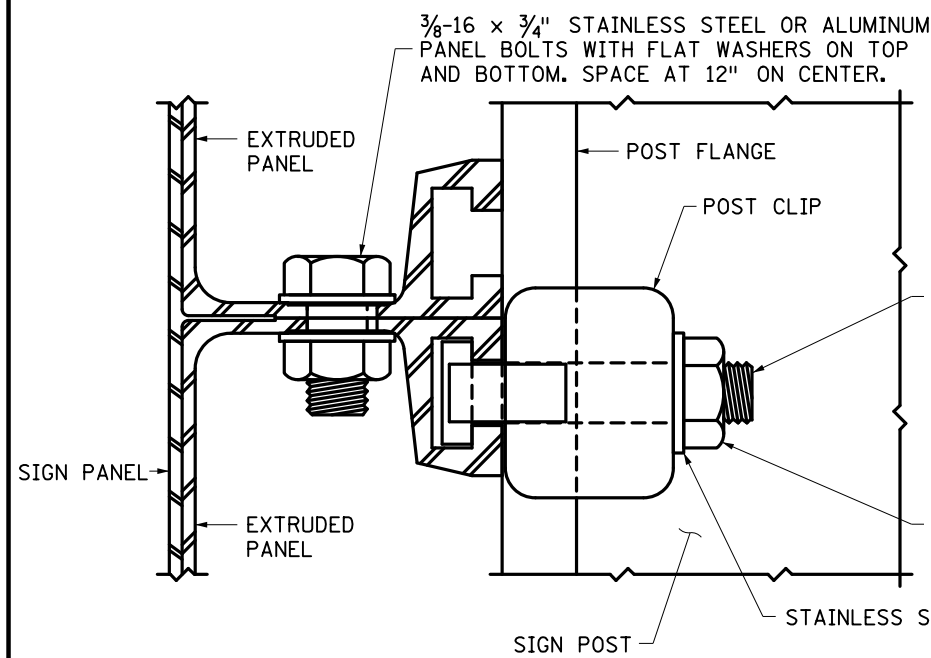
TYPICAL PANEL MOUNTING



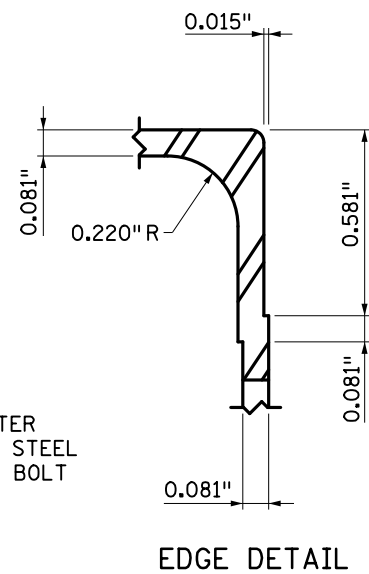
EXTRUDED PANEL - 12"
MINIMUM UNIT WEIGHT = 2.53 LB PER FT OF LENGTH



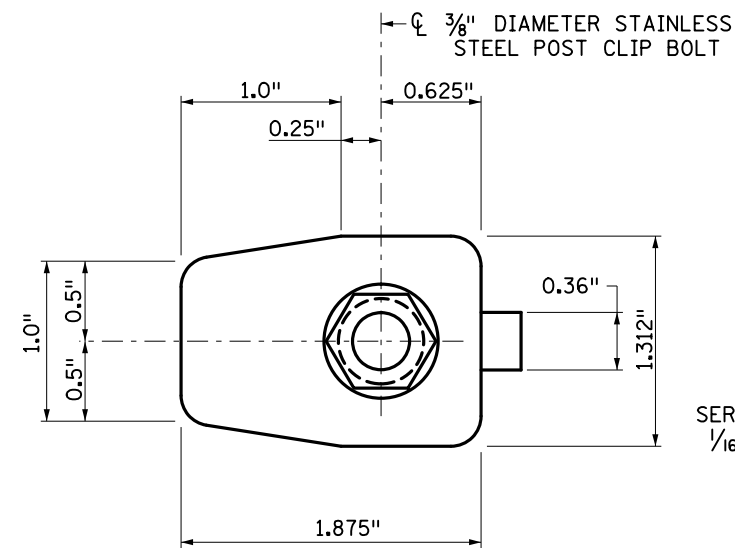
EXTRUDED PANEL - 6"
MINIMUM UNIT WEIGHT = 1.02 LB PER FT OF LENGTH



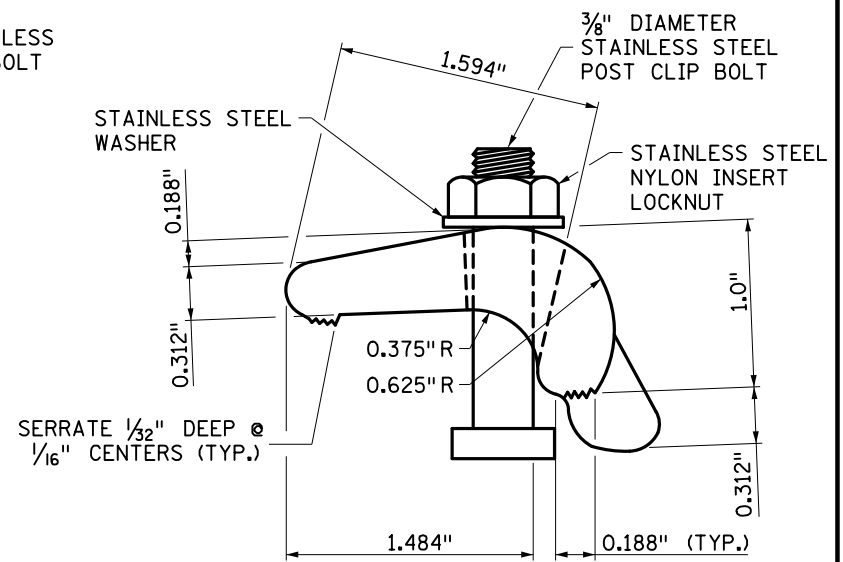
SECTION A-A



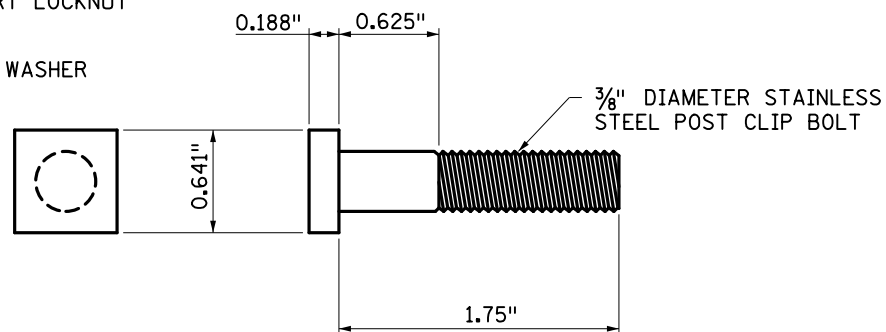
EDGE DETAIL



POST CLIP PLAN



POST CLIP ELEVATION



POST CLIP BOLT

NOTES:

- PROVIDE EXTRUDED PANELS IN ACCORDANCE WITH SPEC. 3352.
- PROVIDE POST CLIPS IN ACCORDANCE WITH ASTM B26 OR B108 CAST ALUMINUM ALLOY 356.0-76.
- PROVIDE STAINLESS STEEL POST CLIP BOLTS IN ACCORDANCE WITH SPEC. 3391.
- PROVIDE ALUMINUM PANEL BOLTS AND FLAT WASHERS IN ACCORDANCE WITH ASTM 2024-T4. PROVIDE ALUMINUM NUTS IN ACCORDANCE WITH ASTM 6061-T6.
- TORQUE ALUMINUM PANEL BOLTS TO 12 FT-LBS. TORQUE STAINLESS STEEL POST CLIP BOLTS TO 21 FT-LBS. OVERTIGHTENING IS PROHIBITED.

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STANDARD PLAN 5-297.710

3 OF 4

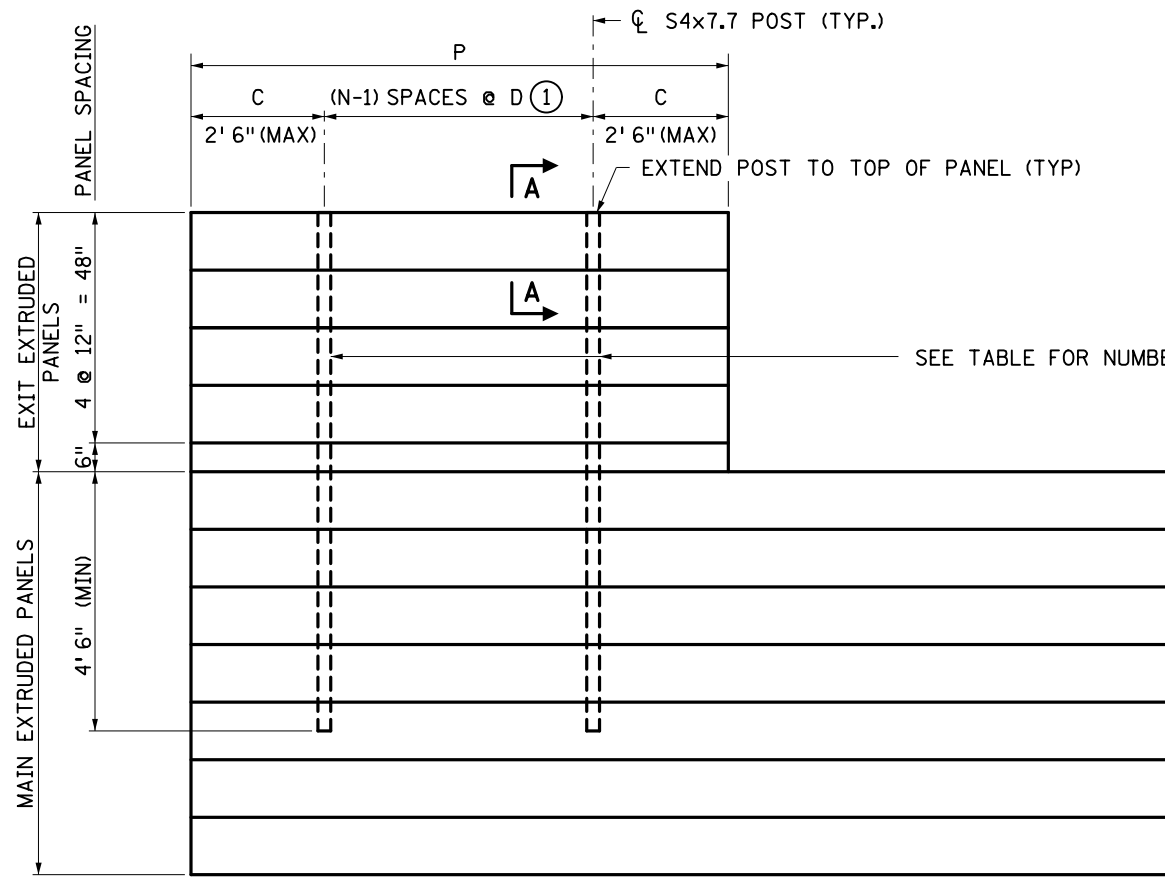
Tom Styrbicki
THOMAS STYRBICKI
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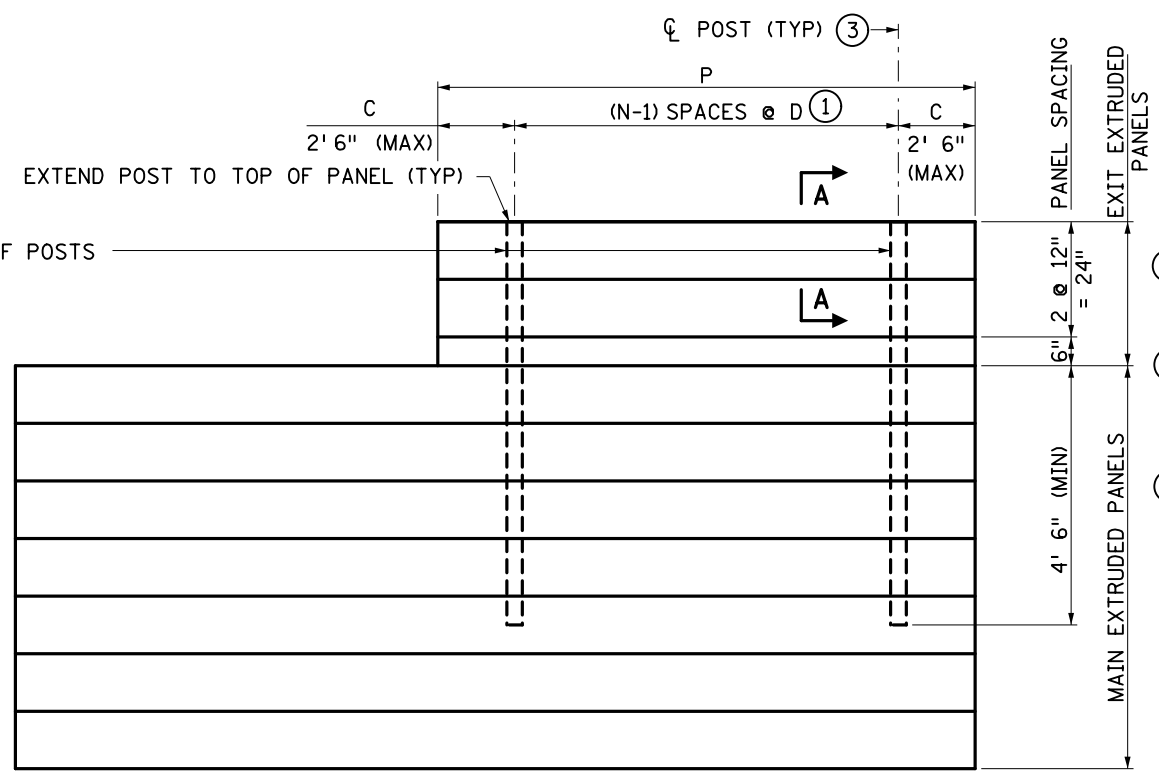
STATE PROJ. NO.

EXTRUDED PANEL MOUNTING DETAILS

(TH) SHEET NO. OF SHEETS



54" PANEL MOUNTING



30" PANEL MOUNTING

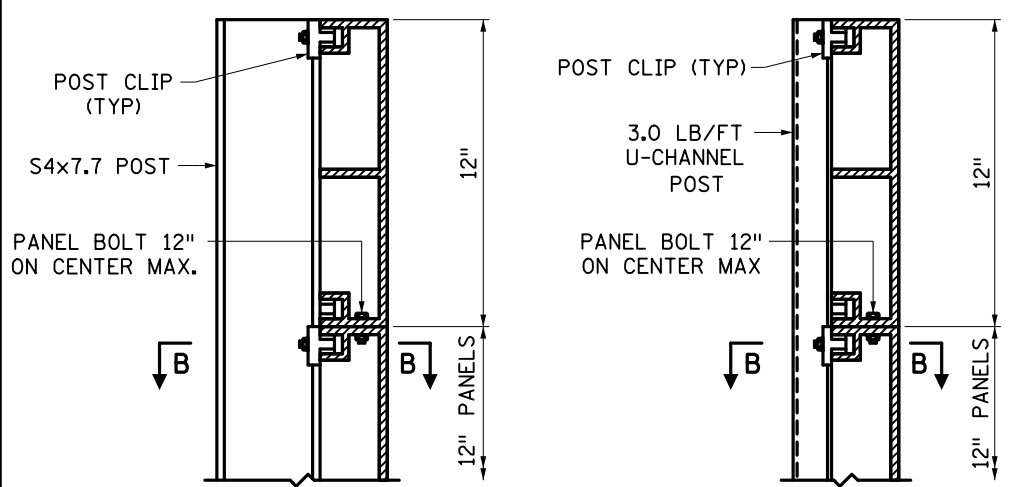
NOTES:
 FOR POST CLIP DETAILS, SEE SHEET 3 OF 4.
 FOR I-BEAM-MOUNTED OR OVERHEAD SIGN STRUCTURES, LEFT-JUSTIFY EXTRUDED PANELS FOR LEFT EXITS AND RIGHT-JUSTIFY FOR RIGHT EXITS.
 PROVIDE STRUCTURAL STEEL IN ACCORDANCE WITH SPEC. 3306. GALVANIZE STRUCTURAL STEEL IN ACCORDANCE WITH SPEC. 3394 AND HARDWARE IN ACCORDANCE WITH SPEC. 3392. PROVIDE FASTENERS IN ACCORDANCE WITH SPEC. 3391.

- ① SPACING AND LOCATION MAY BE ADJUSTED WHERE NECESSARY TO AVOID CONFLICTS WITH I-BEAM-MOUNTED OR OVERHEAD SIGN STRUCTURE POSTS.
- ② PLACE ONE POST CLIP ON THE UPPER EXTRUDED PANEL AND THE ADJACENT POST CLIP ON THE LOWER EXTRUDED PANEL ON THE OPPOSITE SIDE OF THE POST FLANGE.
- ③ PROVIDE U-CHANNEL POST IN ACCORDANCE WITH SPEC. 3401.

30" PANEL MOUNTING POSTS			
PANEL WIDTH, P	NUMBER OF POSTS, N	C	D
8' 0" OR LESS	2	0.200P	0.600P
8' 6" TO 11' 6"	3	0.145P	0.355P
12' 0" TO 14' 0"	4	0.080P	0.280P

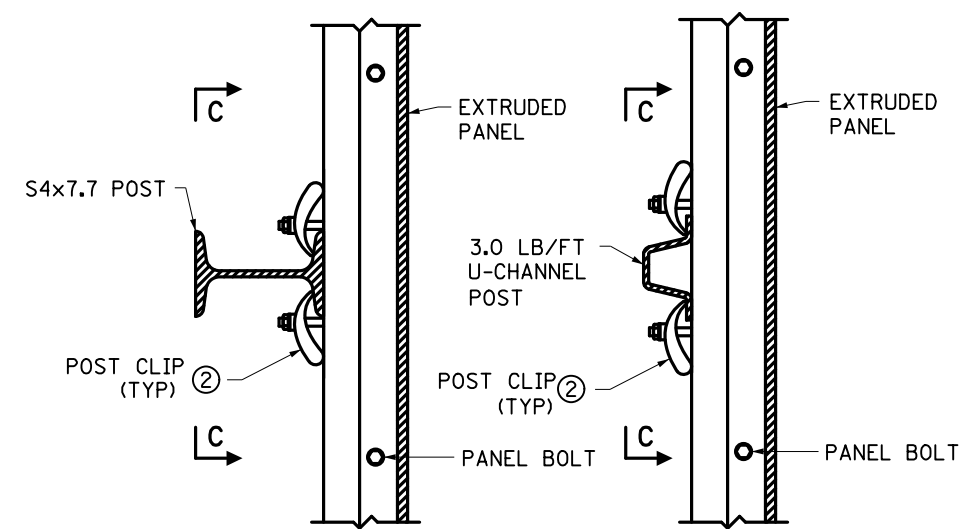
54" PANEL MOUNTING POSTS			
PANEL WIDTH, P	NUMBER OF POSTS, N	C	D
12' 0" OR LESS	2	0.207P	0.586P
12' 6" TO 17' 0"	3	0.145P	0.355P

30" AND 54" PANEL MOUNTING POST QUANTITIES		
POST LENGTH	POST TYPE	WEIGHT PER POST (LBS.)
7' 0" (84")	U-CHANNEL	21
9' 0" (108")	S4x7.7	70



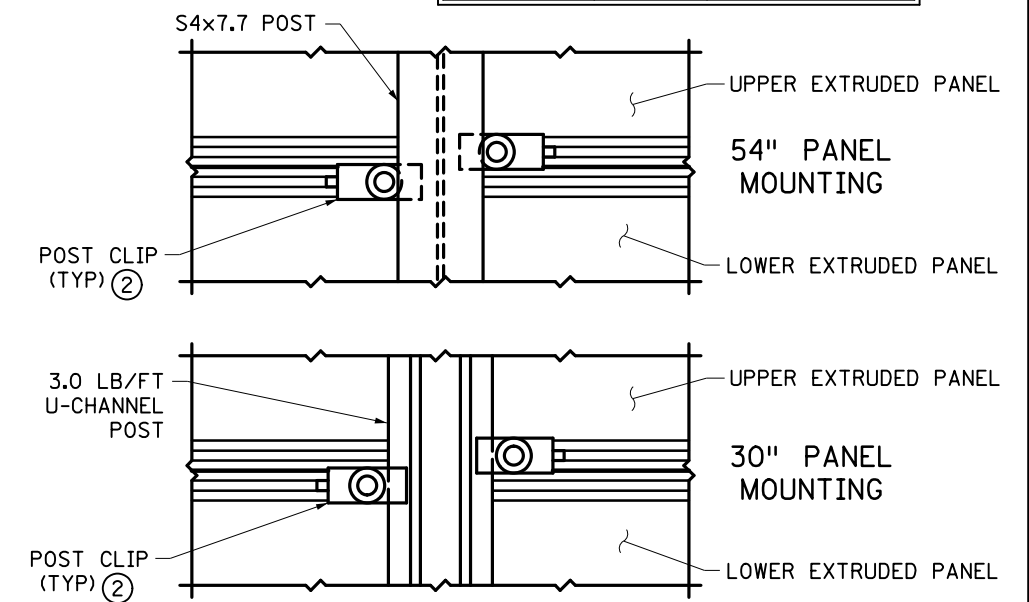
54" PANEL MOUNTING 30" PANEL MOUNTING

SECTION A-A



54" PANEL MOUNTING 30" PANEL MOUNTING

SECTION B-B



VIEW C-C

REVISION:
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 STANDARD PLAN 5-297.710 4 OF 4
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 REVISED:
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EXTRUDED PANEL MOUNTING DETAILS