

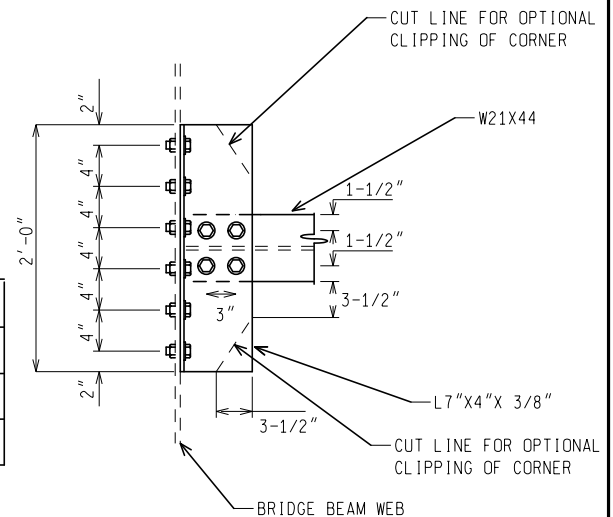
PLAN VIEW
TYPE E: 2 BRACKETS SIGN CONNECTION

Table 1.

CANTILEVER LENGTH IN FEET "C" (MAX. 18ft)**			
COLUMN	NO HANGER	HANGER	DIAPHRAGM*
TYPE II	$C < 5$	$C \geq 5$	$C \geq 12$
TYPE I	$C < 7$	$C \geq 7$	$C \geq 12$

* SEE DIAPHRAGM DETAIL SHEET #3

** IF THE CANTILEVER "C" LENGTH EXCEEDS THE MAXIMUM ALLOWED (18'), THE SPACING BETWEEN THE BRIDGE FASCIA AND THE BACK OF THE SIGN PANEL SHOULD BE REDUCED FROM 20" TO MINIMUM OF 4"



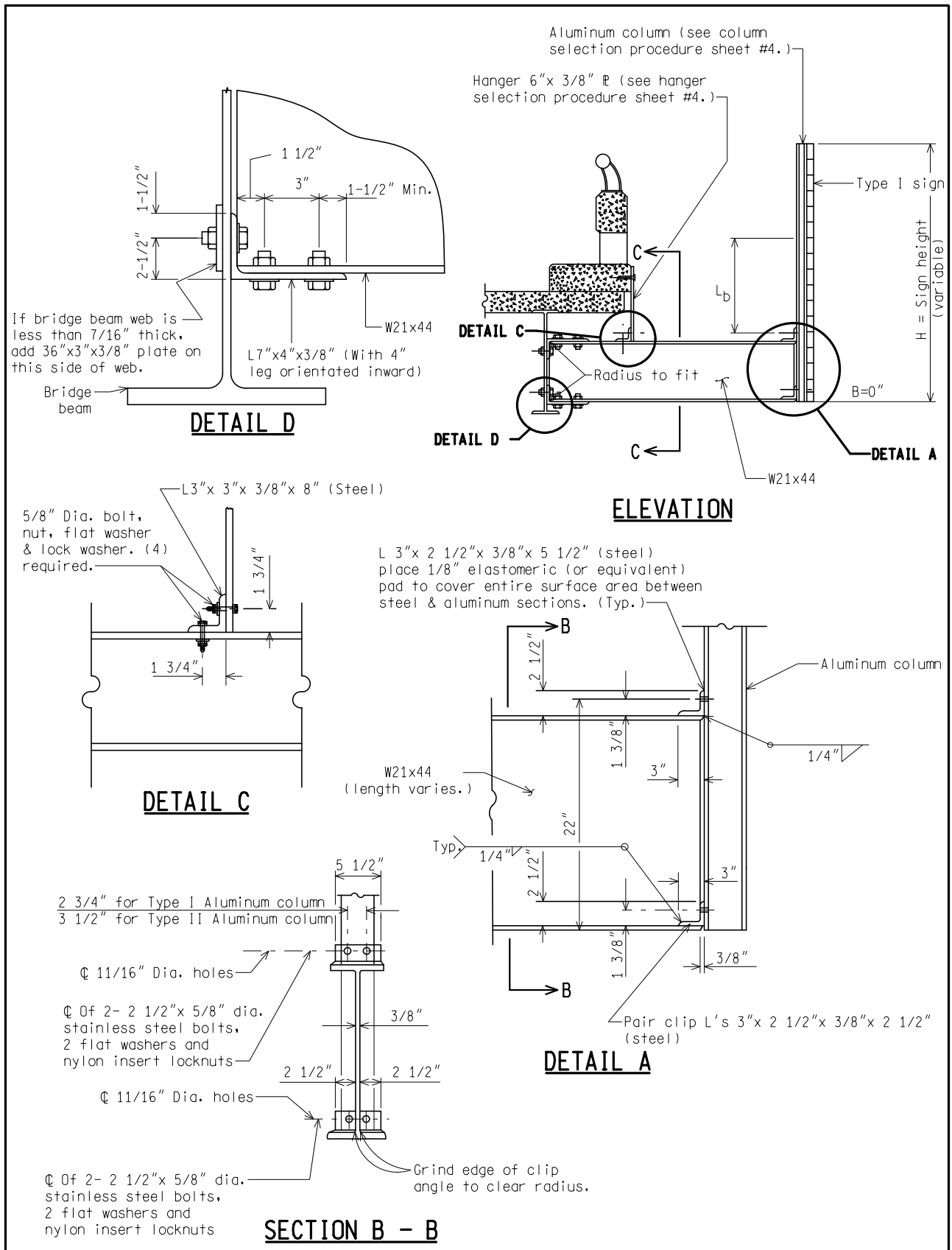
IF BEAM WEB IS LESS THAN 7/16" THICK ADD 3/8" X 3" X 24" STEEL R ON INSIDE FACE.

DETAIL B

TO BE USED FOR MAINTENANCE PURPOSES FOR EXISTING BRIDGE CONNECTIONS ONLY

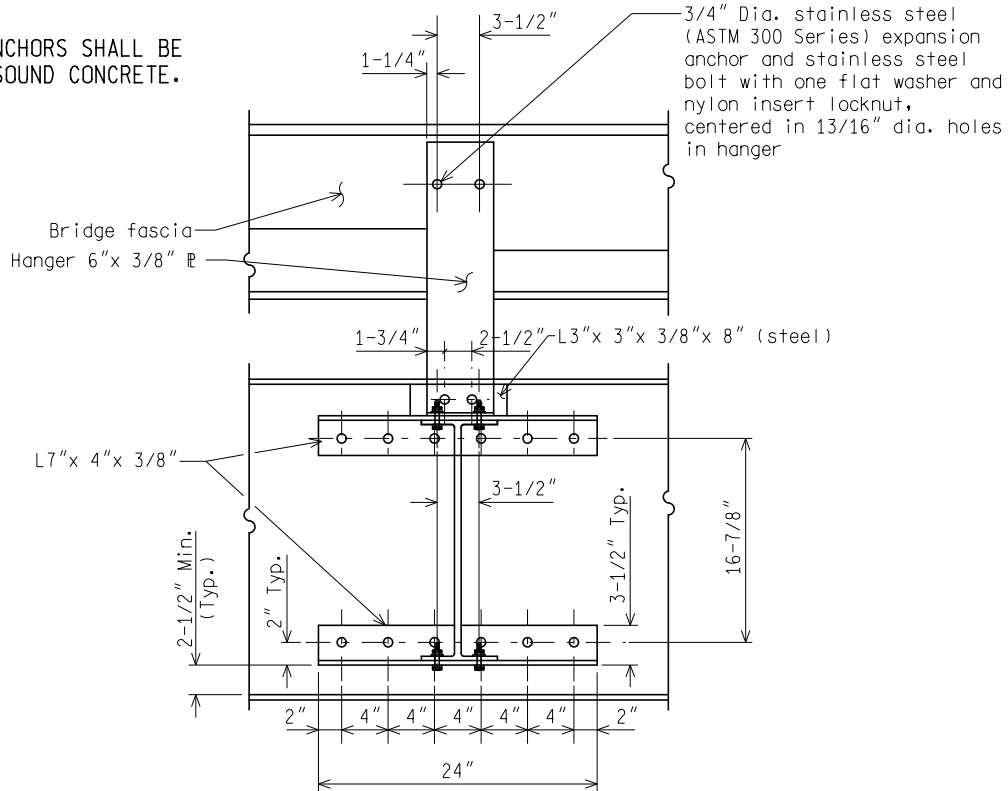
OLD VIII-830E

<p>PREPARED BY DESIGN DIVISION</p> <p>DRAWN BY: <u>DHD</u></p> <p>CHECKED BY: <u>AJU</u></p>	<p>DEPARTMENT DIRECTOR Kirk T. Steudle</p> <p>APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES</p>	<p>MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR</p> <p>BOLTED BRIDGE CONNECTION TYPE E & F ($\theta \geq 10$)</p>		
	<p>APPROVED BY: _____ (SPECIAL DETAIL) DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT</p>	<p>(SPECIAL DETAIL) <u>08/20/2013</u> F.H.W.A. APPROVAL PLAN DATE</p>	<p>SIGN-899-B</p>	<p>SHEET 1 OF 5</p>



TO BE USED FOR MAINTENANCE PURPOSES FOR EXISTING BRIDGE CONNECTIONS ONLY

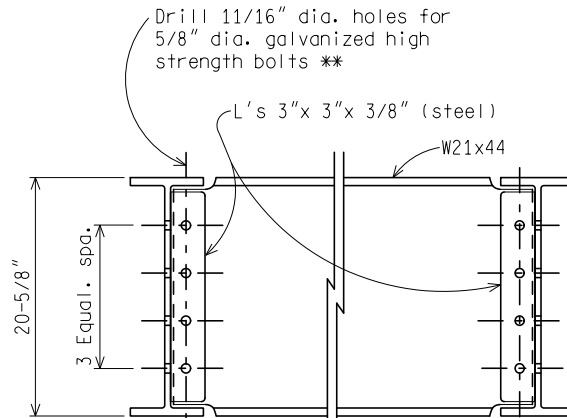
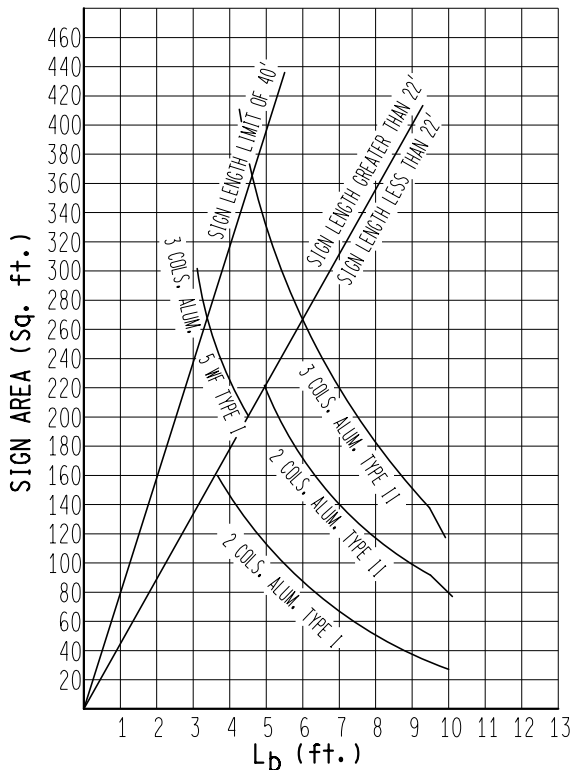
NOTE:
EXPANSION ANCHORS SHALL BE DRILLED IN SOUND CONCRETE.



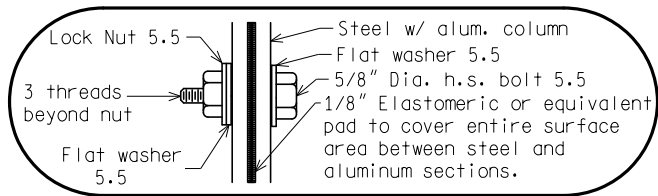
Drill 11/16" dia. holes to template for 2-1/2"x 5/8" dia. bolts, nuts, flat washers & lock washers **

SECTION C - C

Table 2.



DIAPHRAGM DETAIL
(SEE SHEET #1 FOR LOCATION)



** Bolt Detail

TO BE USED FOR MAINTENANCE PURPOSES FOR EXISTING BRIDGE CONNECTIONS ONLY

NOT TO SCALE

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MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN	(SPECIAL DETAIL) F.H.W.A. APPROVAL	08/20/2013 PLAN DATE	SIGN-899-B	SHEET 3 OF 5
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NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.

TYPE	ALUMINUM COLUMN
I	5" x 5" x 5.37 lbs/ft WIDE FLANGE-ARMY-NAVY SERIES
II	6" x 6" x 7.85 lbs/ft WIDE FLANGE-H BEAMS

COLUMN SELECTION PROCEDURE

- Determine B using the longest required column. (B = 0.0" Min.)
- $L_b = 1/2$ of the distance between the top the sign and the top clip angle bolt.
 $L_b = 1/2 (H + B - 2')$
- Determine the sign area (ft²) according to the example given below include Exit No. sign if any,

A = Exit No. sign 10ft x 2ft = 20.0 (ft²)
A = Parent sign 15ft x 7.5ft = 112.5 (ft²)
TOTAL AREA = 132.5 (ft²)

Average height = H = $\frac{\text{TOTAL AREA (ft}^2\text{)}}{\text{Parent sign length (ft)}}$

Average height = H = $\frac{132.5 \text{ (ft}^2\text{)}}{15.0 \text{ (ft)}}$ = 8.83ft

- Use Table 2 on sheet no. 3 of 4, to determine the size and number of columns required.

B. Hanger

- Calculate cantilever "C": (Refer to Sign-840 series)
- From Table 1 on sheet #1, determine if hangers are required.

NOTES:

- All bolts shall be galvanized high strength bolts.
- All bolts, nuts, and washers shall be hot dip galvanized. Nuts shall be tapped 0.015" oversize.
- All aluminum and steel components shall be per current MDOT Standard Specifications For Construction. All steel components shall be hot-dip galvanized.
- All stainless steel expansion anchors should accommodate 3/4" dia. stainless steel bolt and shall provide a minimum pullout resistance of 15,000 lbs at 1/16" maximum slippage.
- Sign location may be shifted to avoid joints or stiffeners.
- θ = Angle between sign and bridge fascia. Angle is a function of permissible cantilever "C" and sign length "L". See Sign-840 Series.
- Sign connection to mounting support columns shall have the same bolt arrangement as shown for Connections for Sign to Mounting Supports for Cantilevers and Trusses. (Typical Plan Sign-700 Series, Sign Connection Details)
- Bottom edge of sign shall be horizontal when erected and shall be a minimum of 18" above the lower bridge beam flange at all points.
- Type "E" Connection denotes a two-bracket sign connection.
- Type "F" Connection denotes a three-bracket sign connection.
- Extreme caution shall be exercised when drilling holes for the 3/4" diameter expansion anchors.
- Expansion anchors shall be chosen from the current Qualified Products List.
- Expansion anchors shall be installed as per manufacturer's recommendations.

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14. Expansion anchors shall be drilled in sound concrete.
15. When the sign support is attached to A-588 Bridge Beams the connection interface shall be blast cleaned, and primed with organic zinc-rich paint before placing the new connection. The paint shall overlap the perimeter of the connection by 2 inches. The paint color shall be "Brown Weathering Steel", Federal Code Number 10062. The perimeter of the contact surface of the sign supports connection to the beam web shall be sealed in accordance to Subsection 713.03.F of the Standard Specifications For Construction.
16. The bolted connection of the sign support to the beam web shall be according to Subsection 707.03.D.7 of the Standard Specifications For Construction.

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