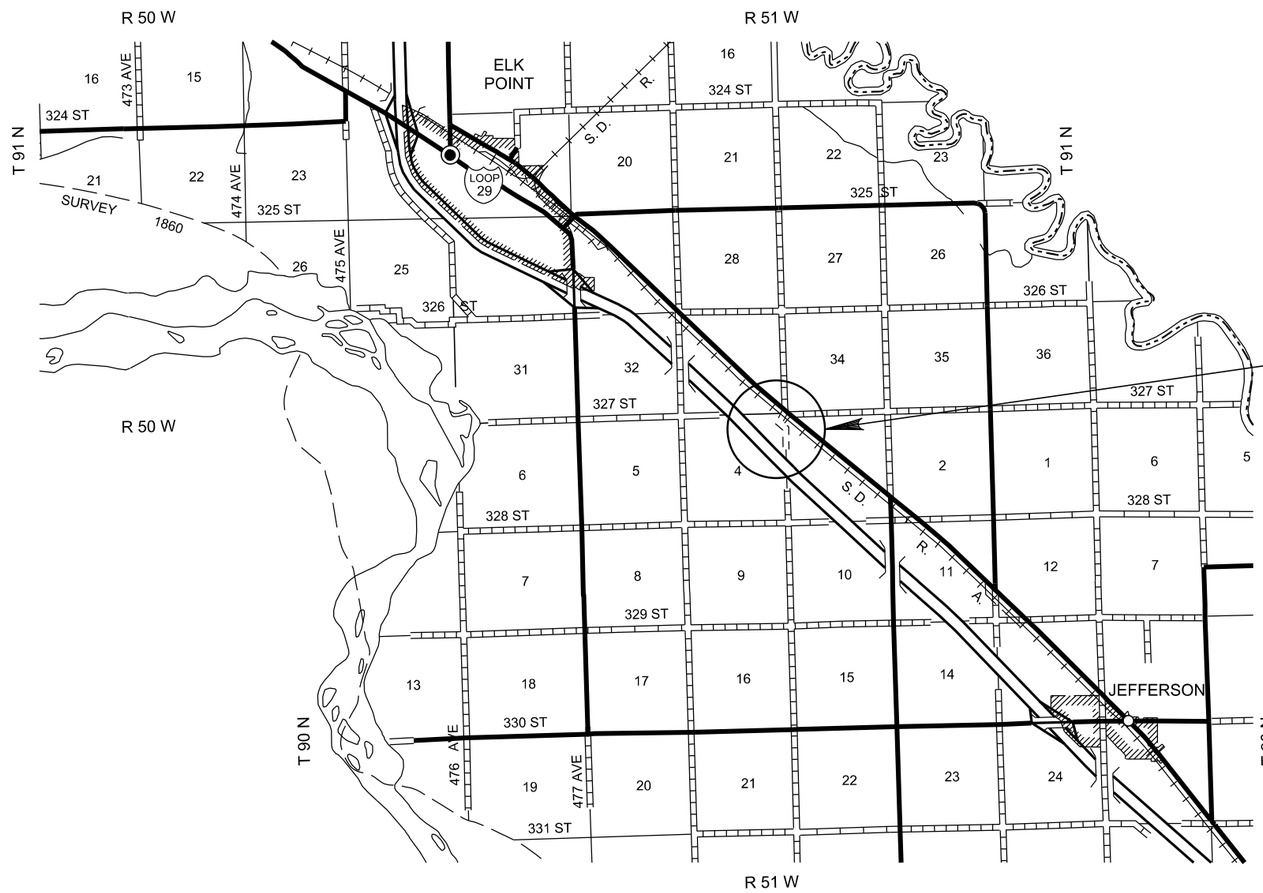
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	HR Y501(01)	S1	S4

FOR BIDDING PURPOSES ONLY

SECTION S: PERMANENT SIGNING PLANS

INDEX OF SHEETS



REGISTERED PROFESSIONAL ENGINEER
REG NO.
8161
JOSH
LARSON
9-25-15
SOUTH DAKOTA

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	HR Y501(01)	S2	S4

FOR BIDDING PURPOSES ONLY

Rev. 10/1/15 JDL

SECTION S ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
632E0014	1.75' Diameter Breakaway Support Concrete Footing	24.0	Ft
632E1230	W6x15 Steel Post	60.0	Ft

SCOPE OF PERMANENT SIGN WORK

Work on this project requires the installation of posts for two (2) Changeable Message Signs.

PERMANENT SIGNING

The Contractor shall furnish all posts, stiffeners, bases, hardware, and labor for installation of permanent signs in size, type, and quantity as shown in these plans and/or as required by the Engineer.

The Contractor shall provide all labor and equipment necessary to install permanent signing, as detailed in these plans and/or as required by the Engineer. Payment for new signposts, hardware, bases, and labor will be made at the contract unit price per foot for W6x15 Steel Post. The lengths of the posts in the sign tables are approximate lengths only. The post lengths shall be verified by the Contractor. The Contractor is urged to cut posts to length on job site after site by site verification of post length.

The Contractor shall stake the signs and the Engineer will verify the location prior to installation. The lateral distance from the roadway and the height of the sign shall be established by the Contractor according to the Permanent Signing Typicals, as well as the Standard Plates in the plans and the MUTCD.

CONCRETE FOOTINGS

The exposed portion of fixed base concrete footings shall be formed to provide a uniform diameter section and half-inch chamfer on the grout pad as shown on the footing details. The amount of exposed concrete footings, anchor bolts, or slip bases on the up-slope side of the footing shall not be greater than 4 inches as shown on the footing details.

Footings for breakaway signs shall be below ground as shown on the footing details and need not be formed.

Excavation for footings shall be accomplished from off the roadway and shoulders where feasible. The excavation areas shall be covered if not filled by nightfall. Concrete shall be placed within 24 hours of excavation.

CMS1, Right Shoulder – Sta 371+62.00

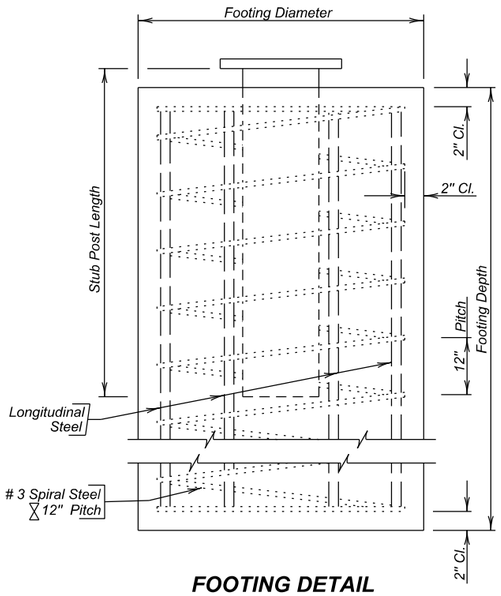
				Footing Steel				
				Longitudinal Steel		Spiral, ft		Quantity, lb
Post Size	Footing Diamter, ft	Footing Depth, ft	Stub Post Length, ft	Qty and Size	Length, ft	Diameter	Length	
W 6 X 15	1.75	6	2	8 - #6 Bars	5.6667	1.4167	37.75	68.09

CMS2, Right Shoulder – Sta 369+86.00

				Footing Steel				
				Longitudinal Steel		Spiral, ft		Quantity, lb
Post Size	Footing Diamter, ft	Footing Depth, ft	Stub Post Length, ft	Qty and Size	Length, ft	Diameter	Length	
W 6 X 15	1.75	6	2	8 - #6 Bars	5.6667	1.4167	37.75	68.09

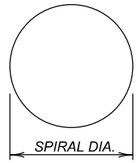
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	HR Y501(01)	S3	S4

FOR BIDDING PURPOSES ONLY

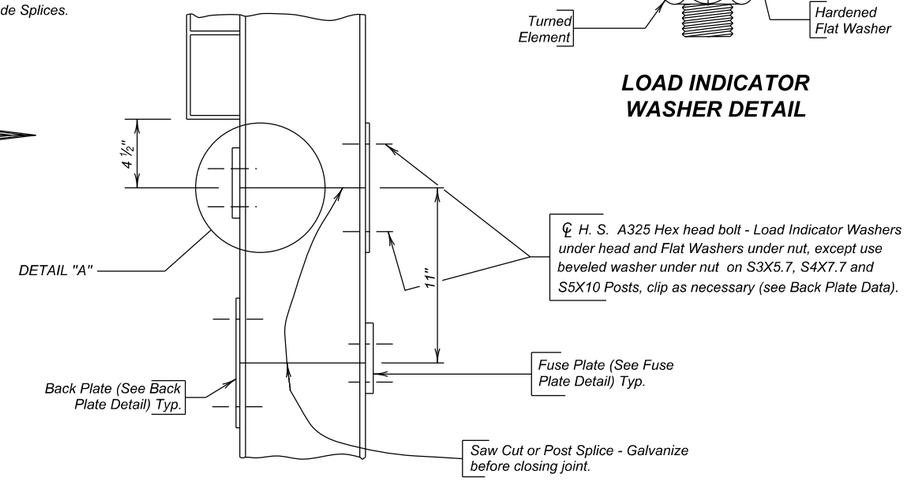


FOOTING DETAIL

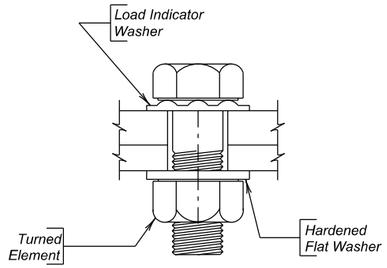
⧖ # Spirals - Use 6" pitch and 1 ½ extra turns at each end. Use 1 ½ turns for lap at splice as required, or weld as approved by the Office of Bridge Design, Spirals may be smooth bars, Bar length shown does not include Splices. Dimensions are out to out of bars.



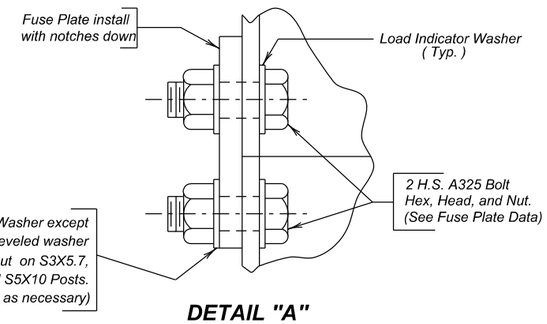
TRAFFIC DIRECTION



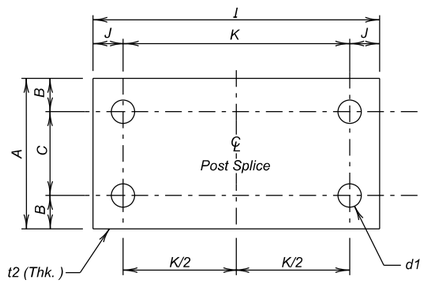
FUSE & BACK PLATE INSTALLATION



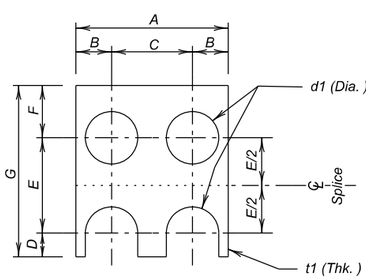
LOAD INDICATOR WASHER DETAIL



DETAIL "A"



BACK PLATE DETAIL



FUSE PLATE DETAIL

NOTES-

1. Design Specification: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 2001 Edition with 2003 Interims.
2. Concrete Footings shall be Class M6 - fc = 4000 p. s. i.
3. Structural Steel shall comform to ASTM A36.
4. All Reinforcing Steel, except spirals, shall conform to ASTM 615 Grade 60.
5. Spiral Reinforcing Steel may be fabricated from cold drawn wire ASTM A82, or hot rolled plain or deformed bars conforming to the strength requirements of ASTM A615, Grade 60.
6. All Bolts and Nuts shall conform to ASTM A325 except that ½" diameter bolts may conform to either ASTM A325 or ASTM A449. Washers shall conform to ASTM F436. All hardware shall be galvanized in accordance with ASTM A153.
7. All structural steel including Posts and Post Stubs shall be galvanized in accordance with ASTM A123.
8. All Bolt Holes shall be drilled. All plate cuts shall preferably be saw cuts. However, Flame Cutting will be permitted providing all edges are ground smooth (metal projecting beyond the plane of the plate face will NOT be allowed).
9. All welding and weld inspection shall be in accordance with the latest edition of AWS D 1.1 Structural Welding Code.

PROCEDURE FOR ASSEMBLING SLIP BASE-

1. Place galvanized Sheet Metal Diaphrams on top of the lower slip plate.
2. Connect main post to Stub Post with clean unlubricated bolts and nuts with one Hardened Washer on each bolt between slip plates.
3. Plumb post by adding shims between slip plates.
4. Tighten bolts to a practical maximum, using a 12" - 15" wrench in order to bed surfaces and clean threads. DO NOT TIGHTEN TO PROOF LOAD.
5. Loosen all bolts and retighten in increments, using a systematic order, until each bolt has been tightened to the specified torque corresponding to the post size used (See Slip Base Plate Data). Tighten bolts only to the torque specified. DO NOT OVERTIGHTEN. Check torque on each bolt after entire sign has been erected.

ASSEMBLY OF FRICTION FUSE PLATES, BACK PLATES AND STIFFENERS-

1. High strength bolts shall be tightened so as to obtain a residual tension by the use of load indicator washers.
2. High strength bolts may be tightened by the "Turn of the Nut" method as provided in Section 11.5.6.4.4 of the AASHTO Standard Specifications for Highway Bridges in lieu of #1 above.

SHOP PLANS-

The fabricator shall initially submit two (2) copies of the shop plans to the Office of Bridge Design for review. One reviewed copy will be sent back to the fabricator who will then make changes, if any, and then send the Office of Bridge Design six (6) final approved copies for distribution.

TABLE 1 - FUSE PLATE DATA

Post Size	A	B	C	D	E	F	G	d1	t1	Bolt Size
S3X5. 7	2 5/8"	9/16"	1 1/2"	1/2"	1 1/2"	1 1/8"	3 1/8"	5/8" Ø	1/4"	1/2" Ø
S4X7. 7	2 5/8"	9/16"	1 1/2"	1/2"	1 1/2"	1 1/8"	3 1/8"	5/8" Ø	1/4"	1/2" Ø
S5X10	3"	11/16"	1 5/8"	5/8"	2 1/4"	1 1/8"	4"	3/4" Ø	3/8"	5/8" Ø
W6X12	4"	15/16"	2 1/8"	5/8"	2 1/2"	1 3/8"	4 1/2"	3/4" Ø	3/8"	5/8" Ø
W6X15	6"	1 3/8"	3 1/4"	5/8"	2 1/2"	1 3/8"	4 1/2"	3/4" Ø	3/8"	5/8" Ø
W6X20	6"	1 3/8"	3 1/4"	5/8"	2 1/2"	1 3/8"	4 1/2"	3/4" Ø	3/8"	5/8" Ø
W8X18	5 1/4"	1 5/16"	2 5/8"	3/4"	2 1/2"	1 3/8"	4 5/8"	7/8" Ø	1/2"	3/4" Ø
W8X21	5 1/4"	1 5/16"	2 5/8"	3/4"	2 1/2"	1 3/8"	4 5/8"	7/8" Ø	1/2"	3/4" Ø
W8X24	6 1/2"	1 1/2"	3 1/2"	7/8"	3"	1 5/8"	5 1/2"	1" Ø	9/16"	7/8" Ø
W8X28	6 1/2"	1 9/16"	3 3/8"	1/8"	3"	1 3/4"	5 3/8"	1" Ø	1/2"	7/8" Ø
W8X31	8"	1 5/8"	4 3/4"	1"	3 1/2"	2"	6 1/2"	1 1/8" Ø	5/8"	1" Ø
W10X33	8"	1 7/8"	4 1/4"	1 1/8"	4 1/2"	2 1/4"	7 7/8"	1 1/4" Ø	3/4"	1 1/8" Ø

TABLE 5 - BACK PLATE DATA

Post Size	A	B	C	J	K	I	d1	t2	Bolt Size
S3X5. 7	2 5/8"	9/16"	1 1/2"	1 1/4"	4 1/2"	7"	5/8" Ø	1/4"	1/2" Ø
S4X7. 7	2 5/8"	9/16"	1 1/2"	1 1/4"	4 1/2"	7"	5/8" Ø	1/4"	1/2" Ø
S5X10	3"	11/16"	1 5/8"	1 1/4"	4 3/4"	7 1/4"	3/4" Ø	1/4"	5/8" Ø
W6X12	4"	15/16"	2 1/8"	1 1/4"	4 3/4"	7 1/4"	3/4" Ø	1/4"	5/8" Ø
W6X15	6"	1 3/8"	3 1/4"	1 1/4"	5 1/4"	7 3/4"	3/4" Ø	1/4"	5/8" Ø
W6X20	6"	1 3/8"	3 1/4"	1 1/4"	5 1/4"	7 3/4"	3/4" Ø	1/4"	5/8" Ø
W8X18	5 1/4"	1 5/16"	2 5/8"	1 3/8"	5 3/4"	8 1/2"	7/8" Ø	1/4"	3/4" Ø
W8X21	5 1/4"	1 5/16"	2 5/8"	1 3/8"	5 3/4"	8 1/2"	7/8" Ø	1/4"	3/4" Ø
W8X24	6 1/2"	1 1/2"	3 1/2"	1 5/8"	6"	9 1/4"	1" Ø	5/16"	7/8" Ø
W8X28	6 1/2"	1 9/16"	3 3/8"	1 3/4"	6"	9 1/2"	1" Ø	3/8"	7/8" Ø
W8X31	8"	1 5/8"	4 3/4"	2"	6 1/2"	10 1/2"	1 1/8" Ø	3/8"	1" Ø
W10X33	8"	1 7/8"	4 1/4"	2 1/2"	7"	1'- 0"	1 1/4" Ø	7/16"	1 1/8" Ø

ERECTION DETAILS
FOR
TWO-POST TWO-DIRECTION BREAKAWAY SIGN SUPPORTS
S. D. DEPT. OF TRANSPORTATION
DECEMBER 1994 (1) OF (2)

MK	REVISION	DATED	BY
⧖	Pitch Correction	3/24/11	DM
✳	Specification Update	7/11/05	AV

DESIGNED BY	DRAWN BY	CHECKED BY	
RH/DM	RH/TB	RH/DM	Kevin N. Goeden
CNTYPCEM	PCEMDSPG	BSTDBS2C	BRIDGE ENGINEER

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	HR Y501(01)	S4	S4

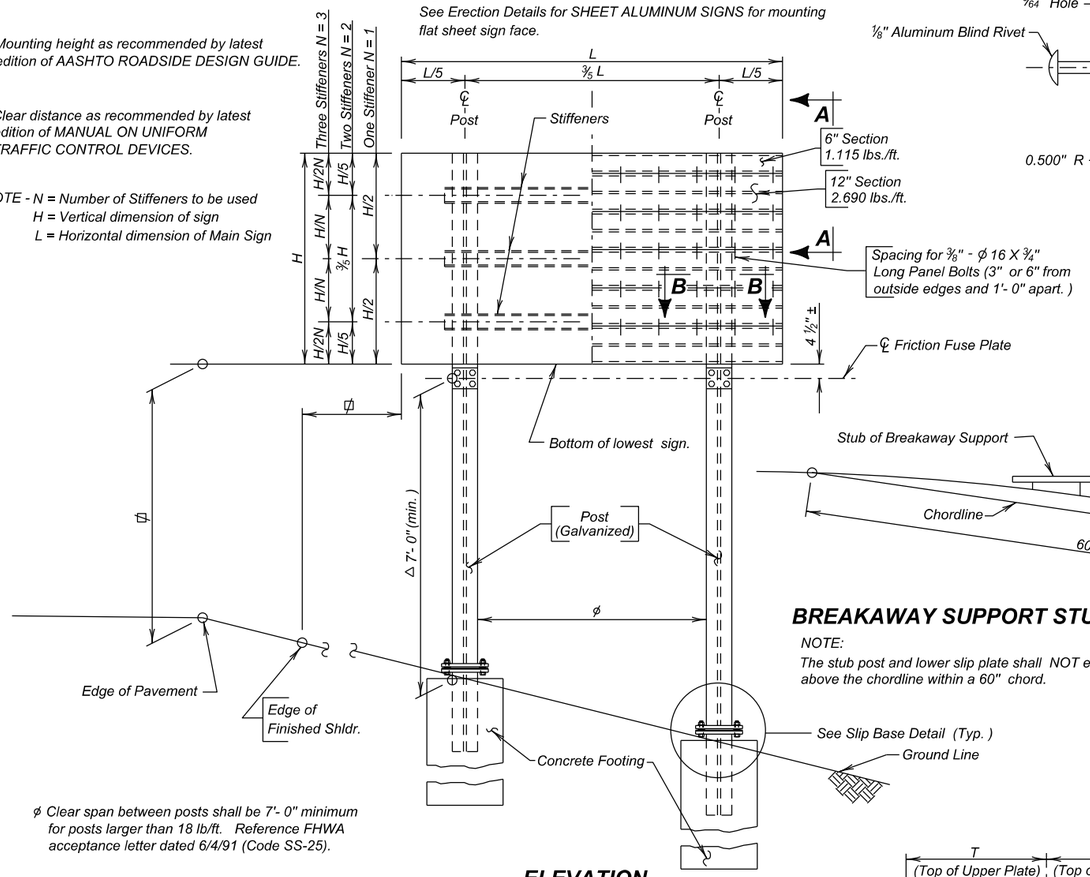
FOR BIDDING PURPOSES ONLY

△ *Mounting height as recommended by latest edition of AASHTO ROADSIDE DESIGN GUIDE.*

ϕ *Clear distance as recommended by latest edition of MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.*

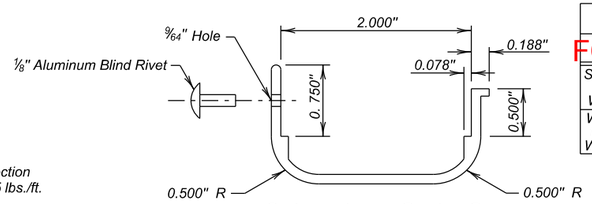
NOTE - N = Number of Stiffeners to be used
H = Vertical dimension of sign
L = Horizontal dimension of Main Sign

NOTE-
Sign face details shown are those for extruded aluminum panels. See Erection Details for SHEET ALUMINUM SIGNS for mounting flat sheet sign face.



ELEVATION

ϕ *Clear span between posts shall be 7'- 0" minimum for posts larger than 18 lb/ft. Reference FHWA acceptance letter dated 6/4/91 (Code SS-25).*



SIDE TRIM MOLDING

Side Trim Molding is required on all vertical edges of extruded panels. They shall be fastened at a minimum of one (1) rivet per panel.

BREAKAWAY SUPPORT STUB CLEARANCE DIAGRAM

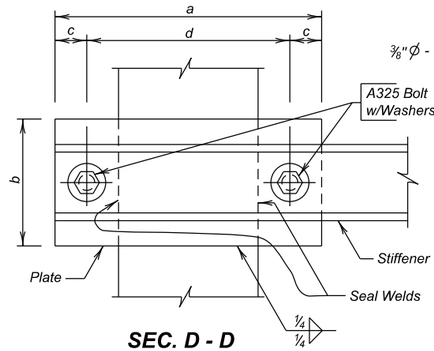
NOTE:
The stub post and lower slip plate shall NOT extend more than 4" max. above the chordline within a 60" chord.

STIFFENER DATA

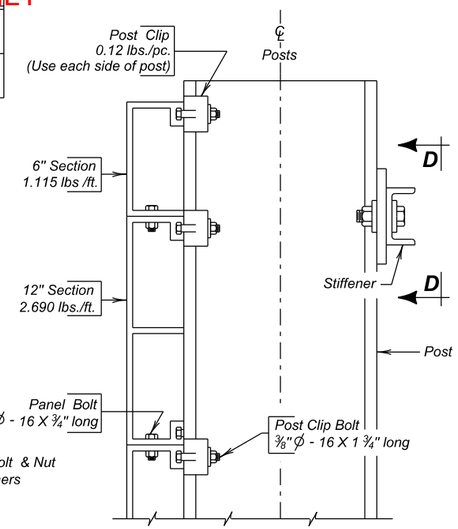
Post	Stiffener	a	b	c	d	Bolt A325	Plate Thk.
S3X5. 7 thru W8X21	C3X5	10 ½"	5"	1 ¼"	8"	⅝" ϕ	5⁄16"
W8X24 thru W10x33	C5X6. 7	13 ½"	6"	1 ½"	10 ½"	⅞" ϕ	⅜"

STIFFENER NOTES-

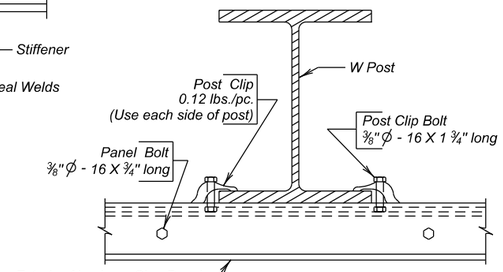
1. *Stiffeners must always be used on Two Post Breakaway signs regardless of type of sign face employed.*
2. *Number of stiffeners used, N, shall be as follows:*
   If H < = 2' - 0" then N = 1
   if 2' - 0" < H < = 8' - 0" then N = 2
   if 8' - 0" < H < = 15' - 0" then N = 3



SEC. D - D



SEC. A - A

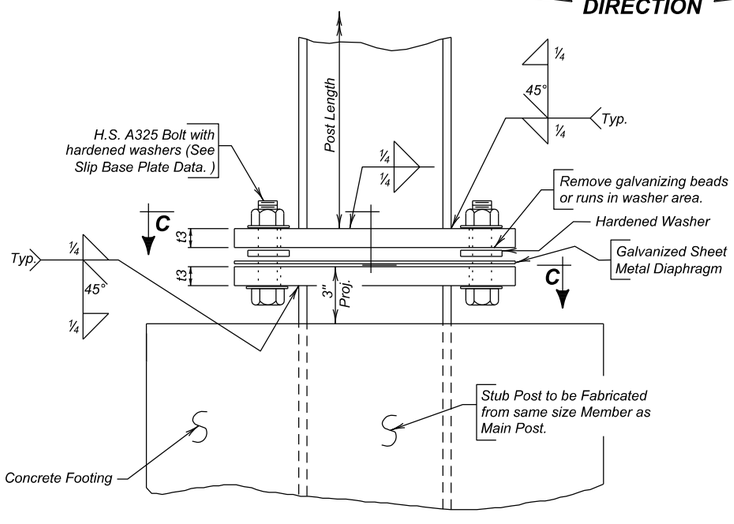


SEC. B - B

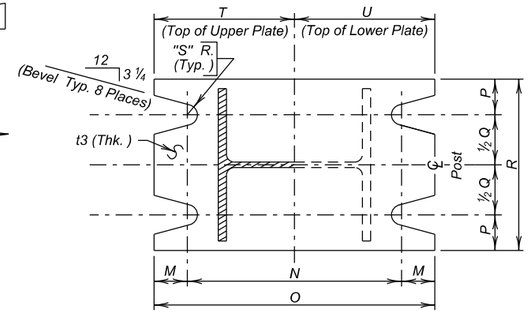
(Stiffener not shown)

≠ *See Erection Details for SLIP BASE ALTERNATE.*

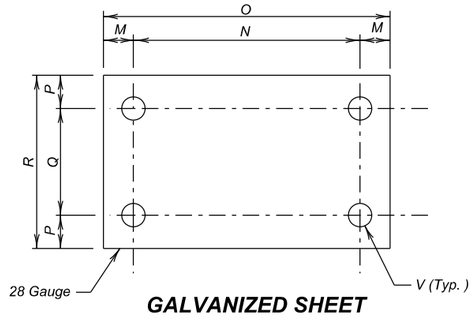
TRAFFIC DIRECTION



≠ SLIP BASE DETAIL



SEC. C - C



GALVANIZED SHEET METAL DIAPHRAGM

TABLE 3 - SHEET METAL DIAPHRAGM DATA

Post Size	M	N	O	P	Q	R	V
S3X5. 7	¾"	6"	7 ½"	¾"	1 ½"	3"	⅝"
S4X7. 7	¾"	6"	7 ½"	¾"	1 ½"	3"	⅝"
S5X10	⅞"	7 ¼"	9"	¾"	2"	3 ½"	¾"
W6X12	⅞"	8 ½"	10"	⅞"	2 ¾"	4 ½"	¾"
W6X15	1 ⅛"	8 ½"	10 ¾"	1 ¼"	4"	6 ½"	⅞"
W6X20	1 ⅛"	10"	1'- 0 ¼"	1 ¼"	4"	6 ½"	⅞"
W8X18	1 ⅛"	8 ½"	10 ¾"	1 ¼"	4"	6 ½"	⅞"
W8X21	1 ¼"	11 ¼"	1'- 0 ¼"	1 ½"	4"	6 ½"	1"
W8X24	1 ¼"	11 ¼"	1'- 1 ¾"	1 ¼"	3 ½"	6"	1"
W8X28	1 ½"	11"	1'- 2"	1 ⅝"	2 ⅜"	4 ¼"	1"
W8X31	1 ¾"	11 ¼"	1'- 2 ¾"	1 ⅞"	5 ¼"	9"	1 ⅛"
W10X33	1 ¾"	1'- 2"	1'- 5 ½"	1 ⅞"	5 ¼"	9"	1 ⅛"

TABLE 4 - SLIP BASE PLATE DATA

Post Size	M	N	O	P	Q	R	S	T	U	t3	Bolt Size	Bolt Torque
S3X5. 7	¾"	6"	7 ½"	¾"	1 ½"	3"	9⁄32"	3 ¾"	3 ¾"	5⁄8"	½" Ø	142" - #
S4X7. 7	¾"	6"	7 ½"	¾"	1 ½"	3"	9⁄32"	3 ¾"	3 ¾"	5⁄8"	½" Ø	142" - #
S5X10	⅞"	7 ¼"	9"	¾"	2"	3 ½"	11⁄32"	4 ½"	4 ½"	⅞"	⅝" Ø	345" - #
W6X12	⅞"	8 ¼"	10"	⅞"	2 ¾"	4 ½"	11⁄32"	5"	5"	⅞"	⅝" Ø	345" - #
W6X15	1 ⅛"	8 ½"	10 ¾"	1 ¼"	4"	6 ½"	13⁄32"	5 ⅜"	5 ⅜"	1"	¾" Ø	554" - #
W6X20	1 ⅛"	10"	1'- 0 ¼"	1 ¼"	4"	6 ½"	13⁄32"	6 ⅛"	6 ⅛"	1"	¾" Ø	554" - #
W8X18	1 ⅛"	10 ½"	1'- 0 ¾"	1 ¼"	3 ½"	6"	13⁄32"	6 ⅜"	6 ⅜"	1"	¾" Ø	554" - #
W8X21	1 ¼"	11 ¼"	1'- 1 ¾"	1 ¼"	3 ½"	6"	15⁄32"	6 ⅞"	6 ⅞"	1"	⅞" Ø	645" - #
W8X24	1 ½"	11"	1'- 2"	1 ⅝"	4 ¼"	7 ½"	15⁄32"	7"	7"	1"	⅞" Ø	645" - #
W8X28	1 ⅝"	11 ¼"	1'- 2 ½"	1 ⅝"	4 ¼"	7 ½"	17⁄32"	7 ¼"	7 ¼"	1 ⅛"	1" Ø	735" - #
W8X31	1 ¾"	11 ¼"	1'- 2 ¾"	1 ⅞"	5 ¼"	9"	17⁄32"	7 ⅜"	7 ⅜"	1 ⅛"	1" Ø	735" - #
W10X33	1 ¾"	1'- 2"	1'- 5 ½"	1 ⅞"	5 ¼"	9"	17⁄32"	8 ¾"	8 ¾"	1 ¼"	1" Ø	735" - #

NOTE: Diaphragm need not be regalvanized after cutting to size and drilling of holes.

ERECTION DETAILS FOR TWO-POST TWO-DIRECTION BREAKAWAY SIGN SUPPORTS

S. D. DEPT. OF TRANSPORTATION

DECEMBER 1994

2 OF 2

DESIGNED BY	DRAWN BY	CHECKED BY	
RH/DM	TB	RH/DM	Kevin N. Goeden
CNTYPCEM	PCEMDSPG	BSTDBS2D	BRIDGE ENGINEER