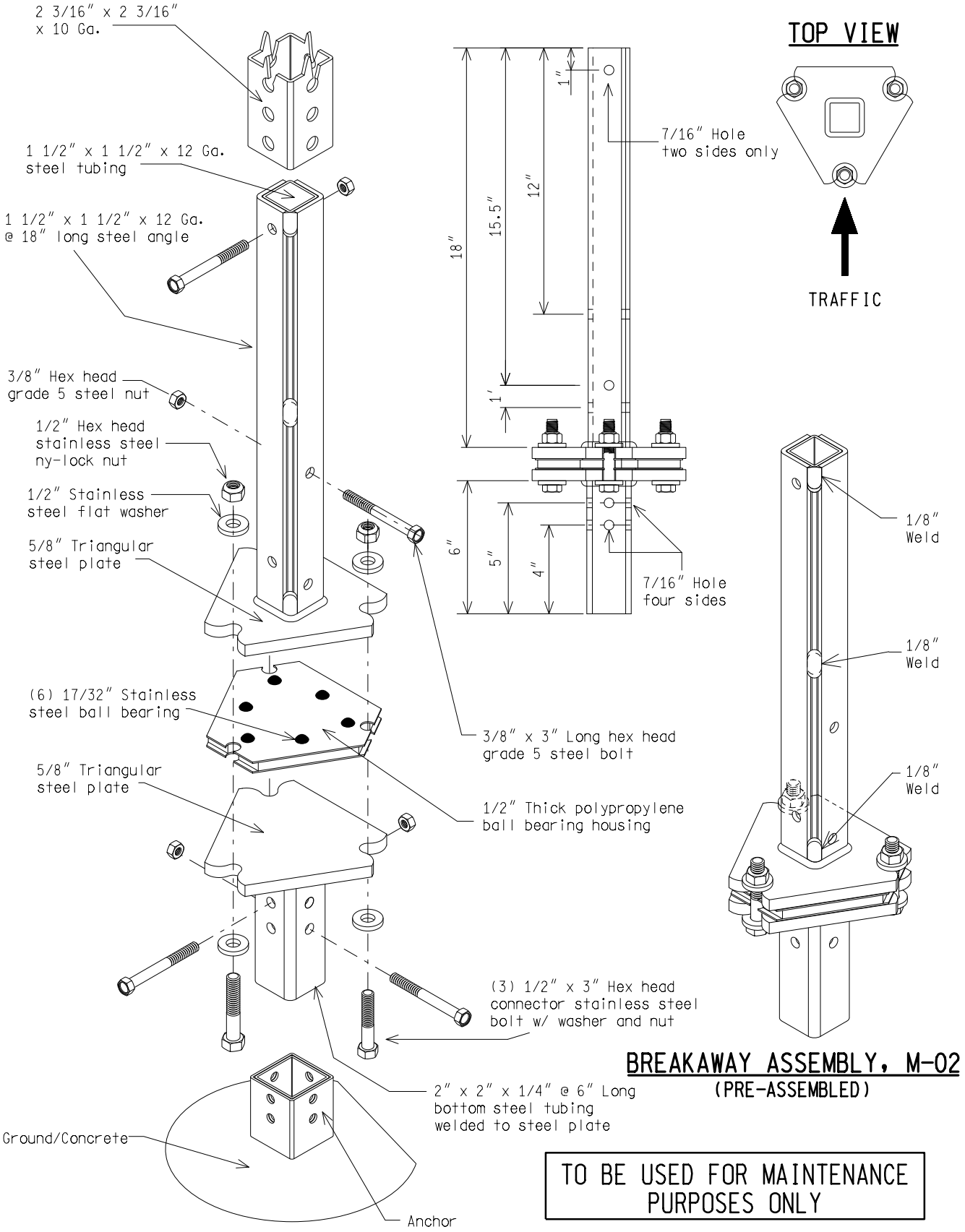


BREAKAWAY ASSEMBLY, M-02

(PRE-ASSEMBLED)

TO BE USED FOR MAINTENANCE PURPOSES ONLY

MDOT Michigan Department of Transportation PREPARED BY DESIGN DIVISION DRAWN BY: DHD CHECKED BY: AJU	DEPARTMENT DIRECTOR Kirk T. Steudle APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES APPROVED BY: (SPECIAL DETAIL) DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR PERFORATED STEEL SQUARE TUBE SIGN BREAKAWAY SYS			
		(SPECIAL DETAIL) F.H.W.A. APPROVAL	03/20/12 PLAN DATE	SIGN-205-A	SHEET 1 OF 14

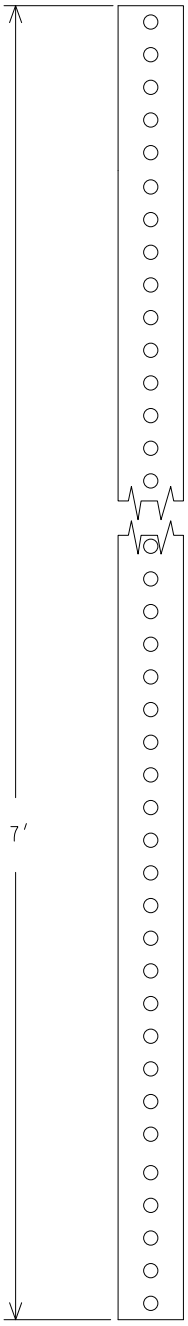
MDOT PART NUMBER	LIST OF MATERIALS
M-01	Winged anchor assembly 2 1/4" x 36" - 2 1/2" x 18" for soil installation
M-02	Assembly, square post breakaway 2 3/16" 10 ga.
M-03	Post, inner 2 3/16" x 7' 10 ga.
M-04	Post, outer 2 1/2" x 14' 10 ga.
M-05	3/8"- 16 x 3", grade 5 hex head steel bolts with nuts (5 each)
M-07	Assembly, ball bearing plate
M-08	1/2"- 13 x 3" stainless steel hex head bolts with nuts & washers
M-11	5/16"- 18 grade 5 large corner bolt with nut
M-12	3/8" aluminum drive rivet (use with type iii signs only)
M-13	Assembly, square post breakaway 2 1/4" x 36", 12 ga. for concrete installation

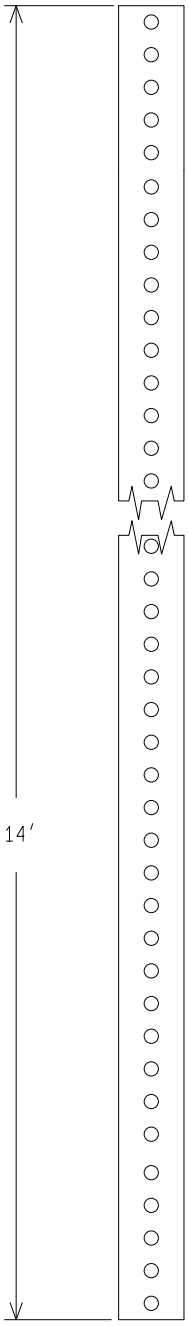
NOTES:

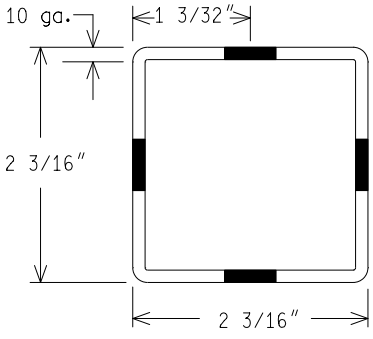
1. Refer to the wind-load charts (sheet 11 of 14) for appropriate sign post installation.
2. The anchor M-01 is used for soil and the m-13 is for concrete installation.
3. M-12 rivets are used for Type III signs only. refer to installation instructions (sheet 9 of 11).
4. Quantity of materials used for the single post installation will be increased according to the number of posts required for proper sign placement.

TO BE USED FOR MAINTENANCE PURPOSES ONLY

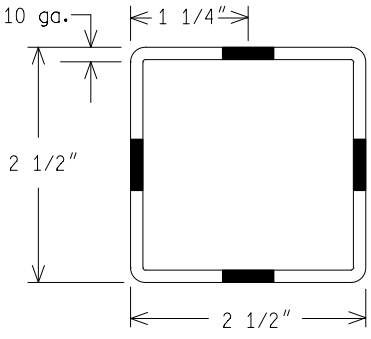
NOT TO SCALE







INNER POST, M-03



OUTER POST, M-04

TO BE USED FOR MAINTENANCE PURPOSES ONLY

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MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN	(SPECIAL DETAIL) F.H.W.A. APPROVAL	03/20/12 PLAN DATE	SIGN-205-A	SHEET 3 OF 14

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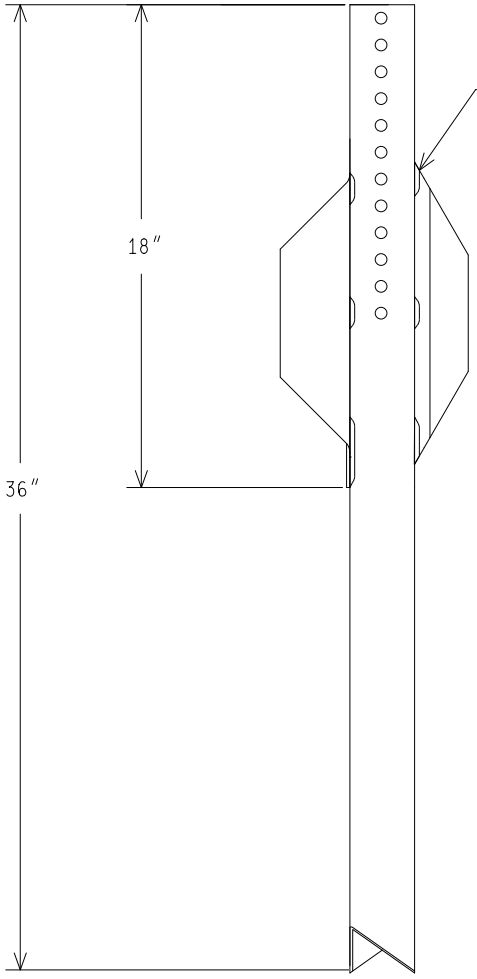
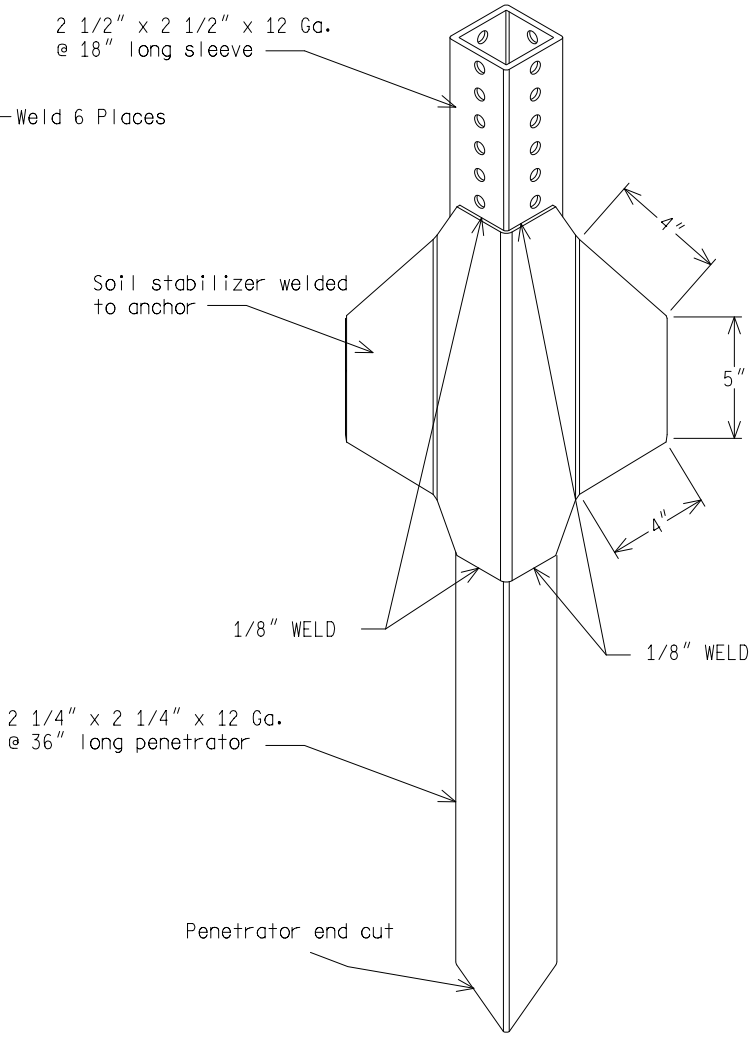
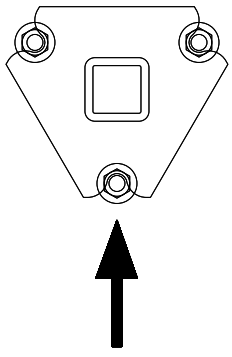


SIDE VIEW



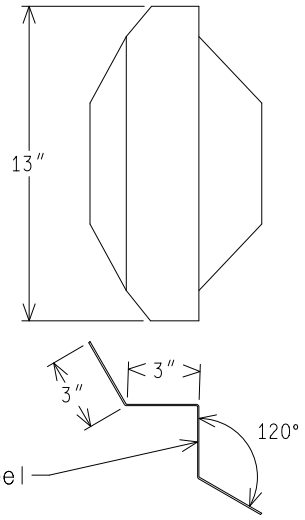
EXPLODED VIEW

TOP VIEW



TRAFFIC

WINGED ANCHOR ASSEMBLY FOR SOIL INSTALLATION, M-01



SOIL STABILIZER

TO BE USED FOR MAINTENANCE PURPOSES ONLY

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN	(SPECIAL DETAIL) F.H.W.A. APPROVAL	03/20/12 PLAN DATE	SIGN-205-A	SHEET 4 OF 14

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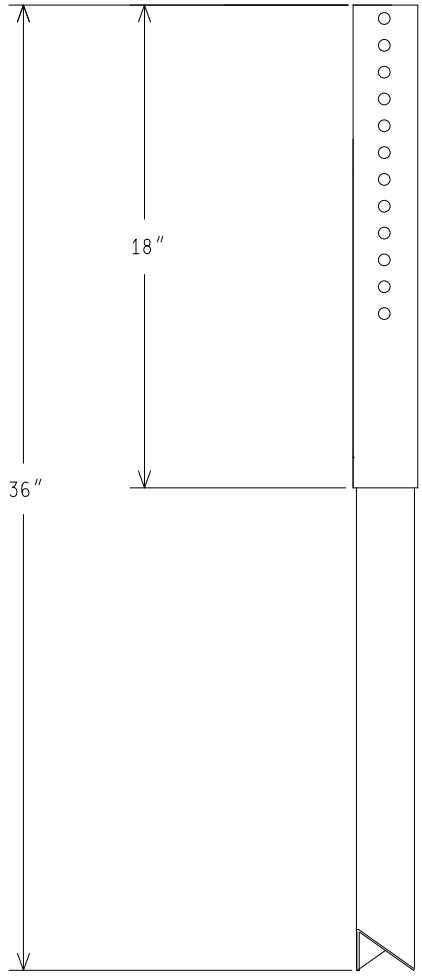
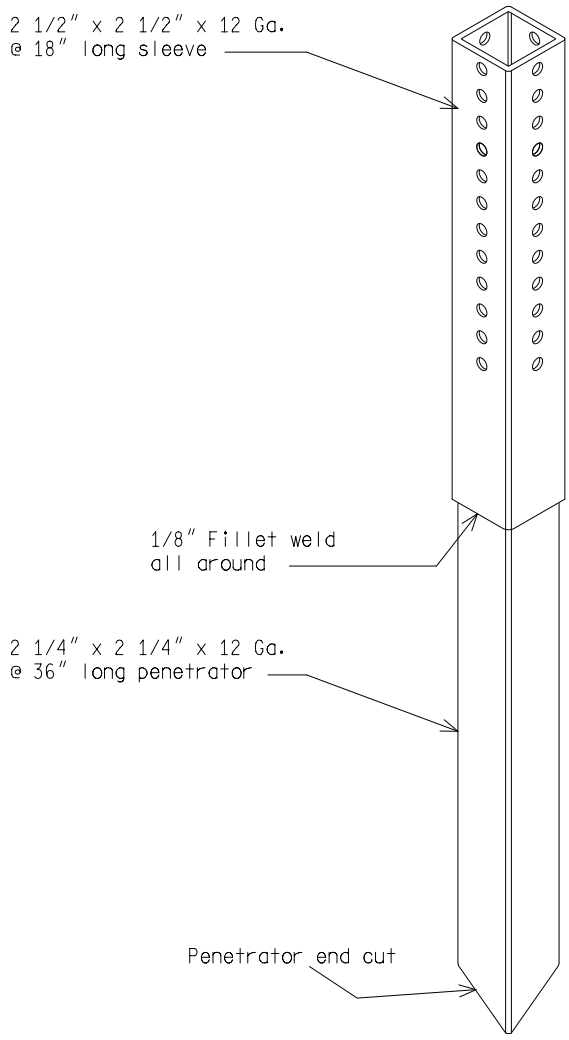
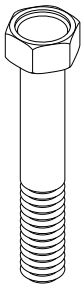


SIDE VIEW

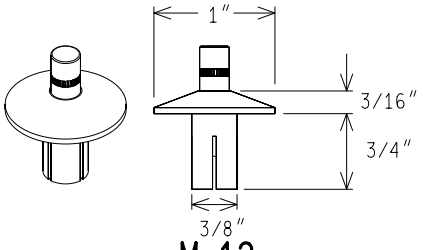


EXPLODED VIEW



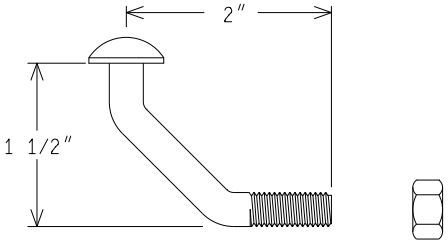
M-05

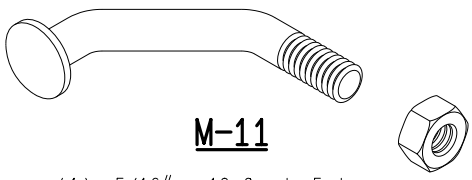
(5) 3/8″ - 16 x 3″ Grade 5 hex head steel bolt
(5) 3/8″ - 16 Hex steel nut



M-12

3/8″ Aluminum drive rivet
see (sheet 9 of 11)





M-11

(1) 5/16″ - 18 Grade 5 large corner steel bolt
(1) 5/16″ - 18 Hex steel nut

TO BE USED FOR MAINTENANCE PURPOSES ONLY

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN	(SPECIAL DETAIL) F.H.W.A. APPROVAL	03/20/12 PLAN DATE	SIGN-205-A	SHEET 5 OF 14

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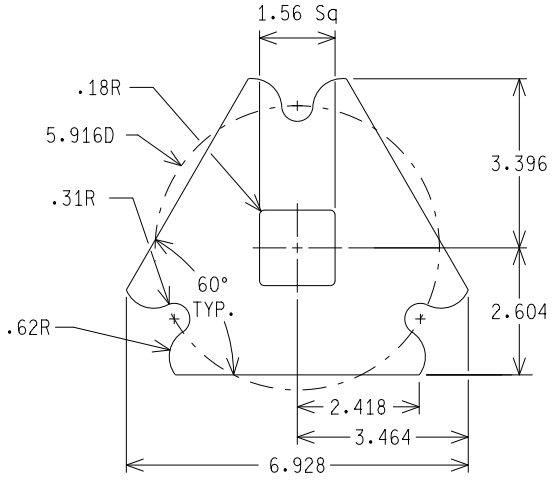
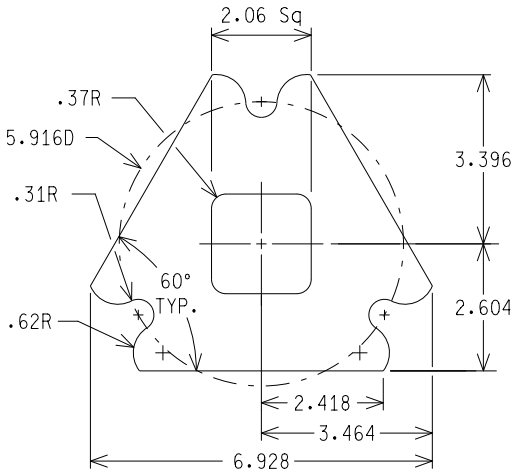
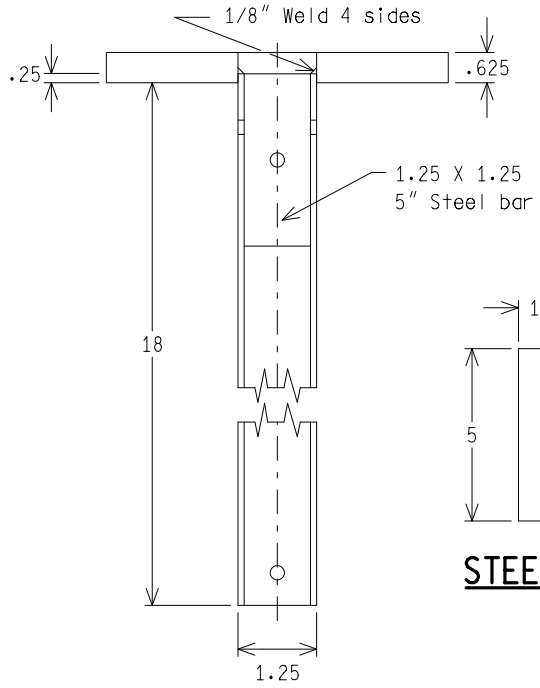
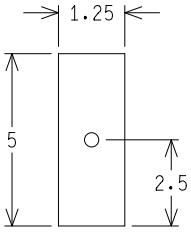


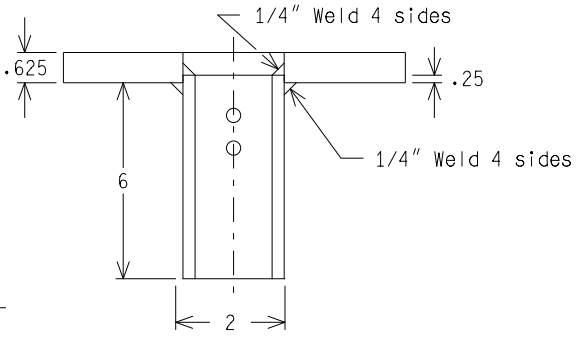




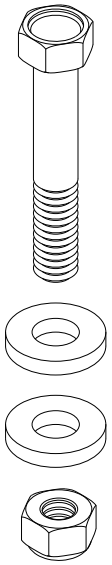
18" STUB



STEEL BAR



6" STUB



M-08

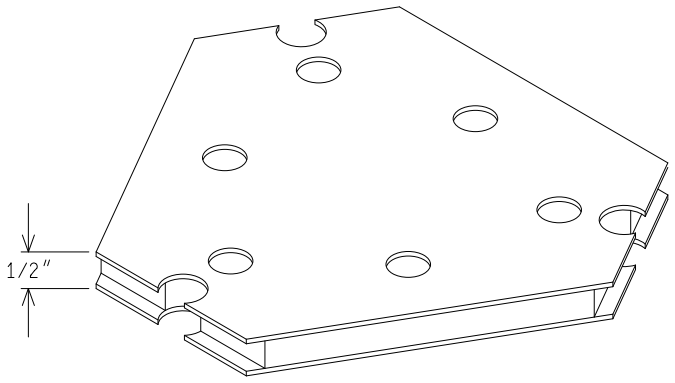
(3) 1/2" - 13 x 3" Hex head stainless steel bolt
(3) 1/2" - 13 Hex ny-lock stainless steel nut
(6) 1/2" x 1/8" Heavy duty steel flat washer

TO BE USED FOR MAINTENANCE PURPOSES ONLY

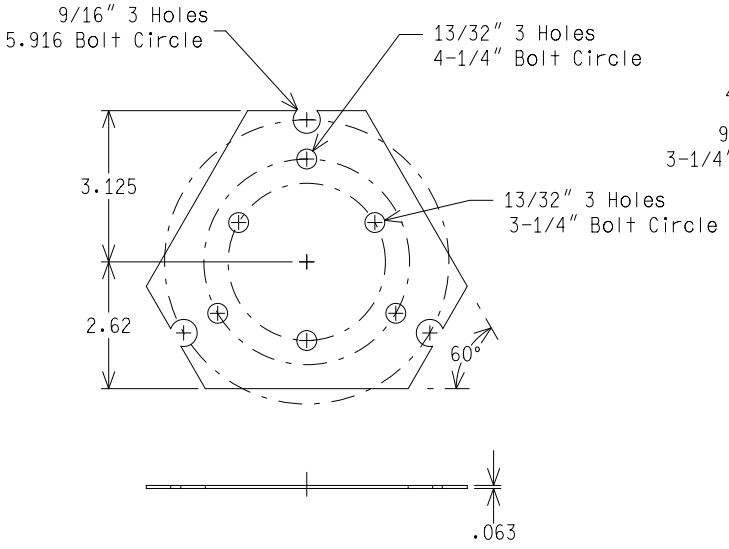
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN	(SPECIAL DETAIL) F.H.W.A. APPROVAL	03/20/12 PLAN DATE	SIGN-205-A	SHEET 6 OF 14

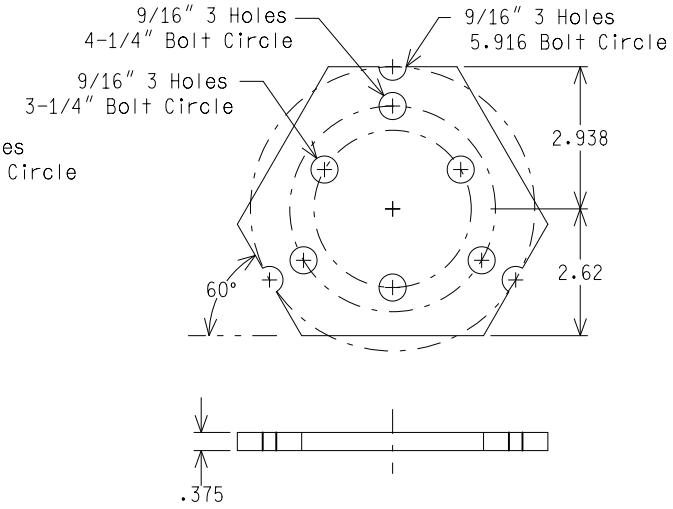
NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



M-07
BALL BEARING PLATE ASSEMBLY



1/16" POLYPROPYLENE PLATE



3/8" POLYPROPYLENE PLATE

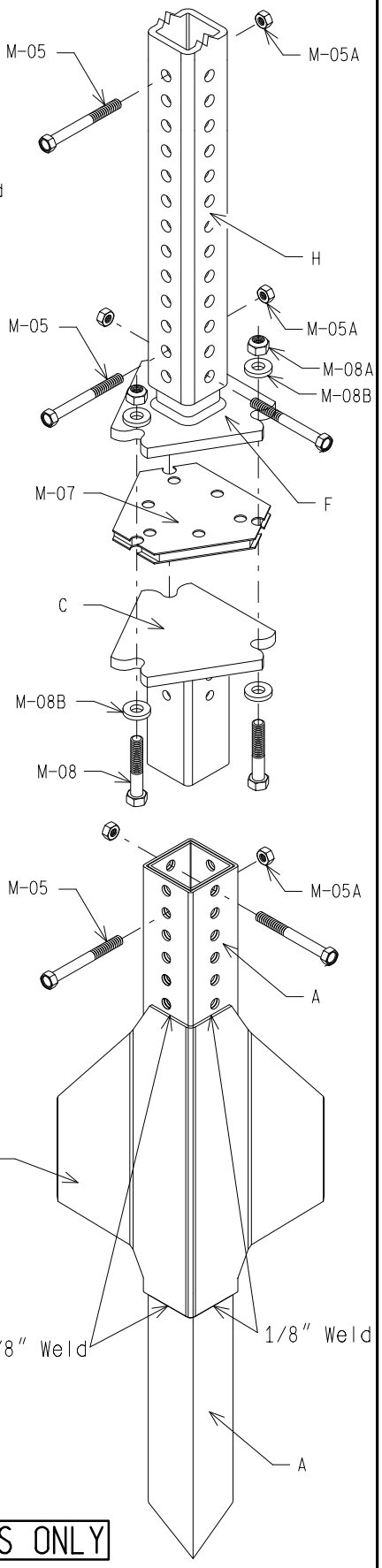
(6) 17/32" STAINLESS STEEL BALL BEARING

TO BE USED FOR MAINTENANCE PURPOSES ONLY

NOT TO SCALE

INSTALLATION CHECKLIST

- ☐ 1. Install the appropriate anchor assembly (a) into the ground and align with the traffic flow (see figure 1).
  - ☐ a) For concrete installation (required in weak soil), a 32″ deep and 8″ minimum diameter hole is required for concrete footings.
  - ☐ b) For standard soil installation, attach soil stabilizer (b) to the anchor (a) and fastened with two 3/8″ corner bolts (M-11) and two 3/8″ nuts (M-11a) through the 7th and 12th hole from the top of anchor (as shown).
- ☐ 2. Install anchor assembly allowing only two holes above grade.
- ☐ 3. Slide 6″ stub (c) of breakaway assembly into anchor assembly having the bolt location align with traffic flow(see figure 1) and fasten with two 3/8″ x 3″ bolts (M-05) and nuts (M-05a).
- ☐ 4. If breakaway assembly is pre-assembled, proceed to step 14.
- ☐ 5. Place the ball bearing assembly (M-07) on the 6″ stub (c).
- ☐ 6. Place the 18″ stub (f) on top of the ball bearing (e) with the 3 hole side of (f) facing oncoming traffic.
- ☐ 7. Align the 18″ stub (f), the ball bearing (m-07) and the 6″ stub (c).
- ☐ 8. Slide each flat washer (M-08b) on each of the three inverted 1/2″ x 3″ stainless steel bolts (M-08).
- ☐ 9. Insert above bolt (M-08) with flat washer (M-08b) up through notched hole of assembly (c), (M-07) and (f).
- ☐ 10. Place the second flat washer (M-08b) down on to the above bolts (M-08).
- ☐ 11. Complete by fastening the stainless steel ny-lock nut (m-08a) to the stainless steel bolt (M-08) and tighten snugly down against the top flat washer (M-08b).
- ☐ 12. Repeat step 9, 10 & 11 on the two remaining notched holes of the triangular points.
- ☐ 13. After fastening all hardware, torque the three 1/2″ stainless steel ny-lock nuts (M-08a) in a circular pattern to 40 ft-lbs maximum.
- ☐ 14. Slide appropriate upright post assembly (h), (refer to the allowable sign area per post/windload charts), on the 18″ stub (f) of breakaway assembly and fasten with three 3/8″ x 3″ bolts (M-05) and nuts (M-05a).



TRAFFIC FLOW →

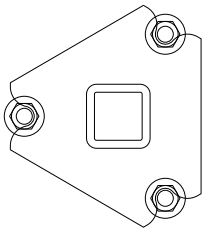


FIGURE 1.

TO BE USED FOR MAINTENANCE PURPOSES ONLY

NOT TO SCALE

INSTALLATION INSTRUCTIONS

1. Check with utility companies to mark anchor and post location
2. Orientate anchor for correct sign placement (see figure 1, sheet 8 of 14).
3. Use drive cap to install anchor half way, check for plumb.
4. Continue to install anchor until two holes are remaining above surface level.
5. Remove drive cap.
6. Install sign on post using mdot approved hardware for Type II signs and aluminum rivets for Type III signs.
7. Insert post with sign into anchor six holes deep.
8. See Sign-100-Series and Sign-120-Series for appropriate bottom height.
9. Use corner bolt to fasten anchor and post.
10. Following these procedures the post and anchor will be installed according to NCHRP 350.

TO BE USED FOR MAINTENANCE PURPOSES ONLY

NOT TO SCALE

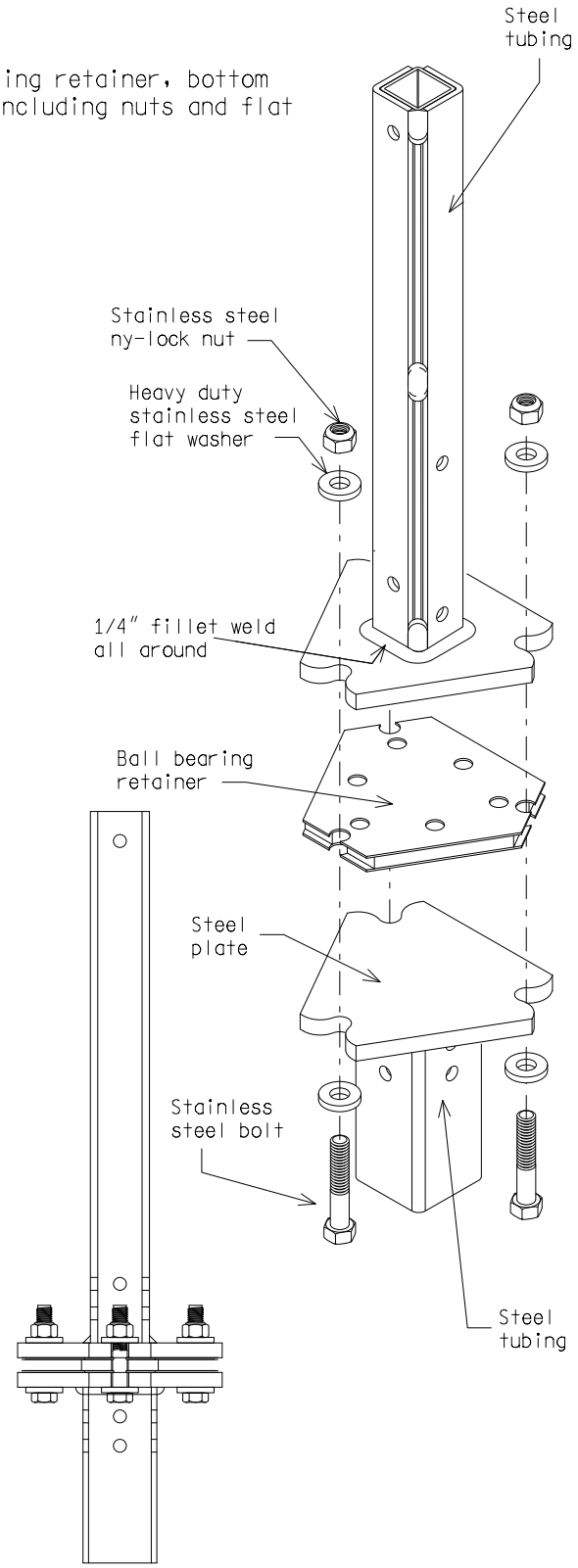
PERFORATED STEEL SQUARE TUBE SIGN BREAKAWAY SYSTEM SPECIFICATIONS

The breakaway system is designed to allow a traffic sign to breakaway near ground level upon impact by a vehicle. The breakaway system conforms to nchrp 350 standards for breakaway sign supports.

Basic Types: Triangular, three bolt base.

Basic Components: Top coupling, middle ball bearing retainer, bottom coupling, and clamping bolts including nuts and flat washers.

1. Top coupling consists of a 1-1/2" square steel tube (12 ga. wall @ 18-1/4" long) and (2) 1-1/2" 12 ga formed steel angles @ 18" long welded to a 5/8" triangular steel plate.
2. Bottom coupling consists of a 2" square steel tube (1/4" wall @ 6" long) welded to a 5/8" triangular steel plate.
3. The top and bottom steel tubing are structural ASTM A500 Grade B with a minimum Yield Strength of 46,000 psi.
4. The top and bottom 5/8" thick triangular steel plates are structural ASTM A572 Grade 50 with a minimum Yield strength of 50,000 psi.
5. Both top and bottom couplings are hot-dip galvanized (zinc coated) finished.
6. Top and bottom triangular steel plates have a bolt circle diameter of 5-29/32".
7. Middle ball bearing retainer thickness: 1/2" maximum. Ball bearings are stainless steel and 7/32" diameter.
8. Clamping Bolt Type: 316 stainless steel with dry lubricant.
9. Clamping Bolt Size: 1/2" diameter and 3" in length.
10. Steel nuts are 1/2" stainless steel ny-lock nut.
11. Flat washers are 3/16" thick, 17/32"id, 1-1/8"od.
12. Clamping Bolt Torque: 40 lbs-ft maximum.
13. No scheduled retorque is required.
14. Periodic inspection is recommended.



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MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN	(SPECIAL DETAIL) F.H.W.A. APPROVAL	03/20/12 PLAN DATE	SIGN-205-A	SHEET 10 OF 14

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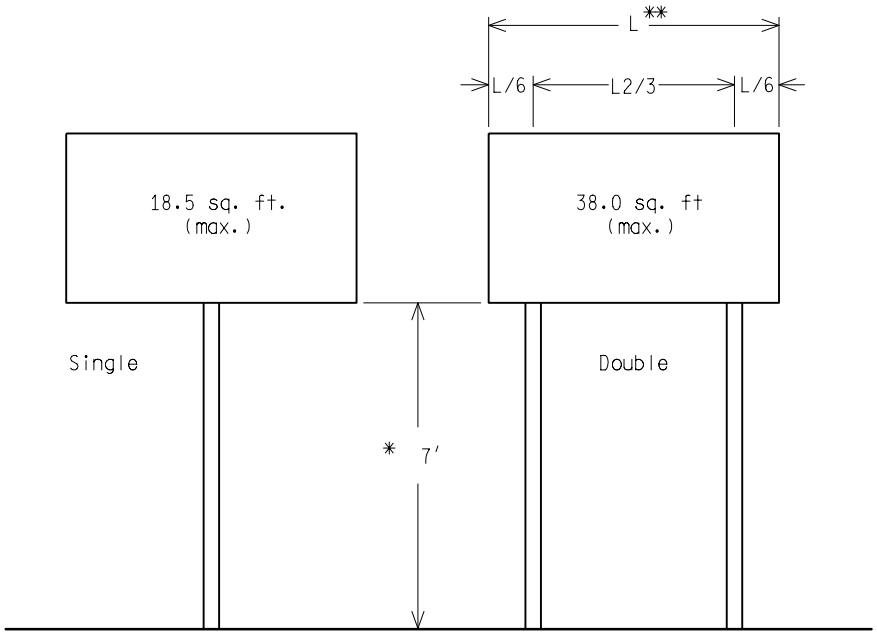
PERFORATED STEEL SQUARE TUBE SIGN BREAKAWAY SYSTEM FOR 90 MPH WIND SPEED



*/** The bottom height is defined as height from the near edge of the travel lane pavement to the bottom of the sign panel. See Sign-100-Series and Sign-120-Series for required minimum bottom height and support spacings.

NOTE:
For signs over 38 sq. ft use the charts on Sign-150-Series.

TO BE USED FOR MAINTENANCE PURPOSES ONLY

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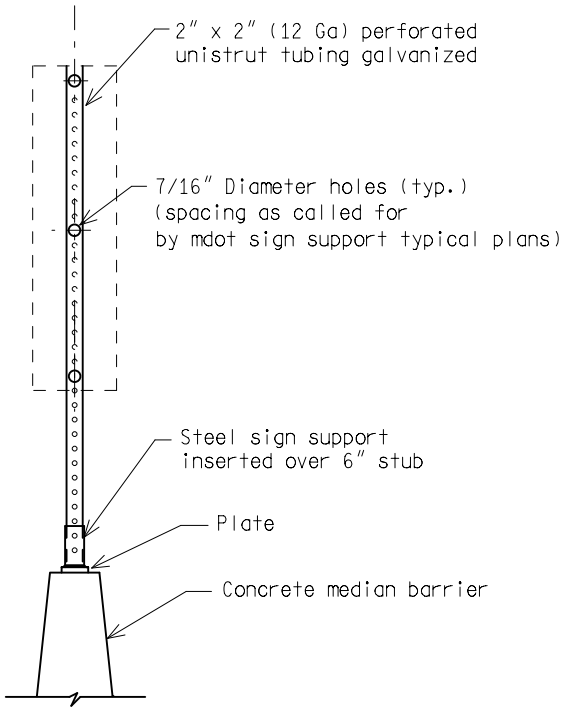
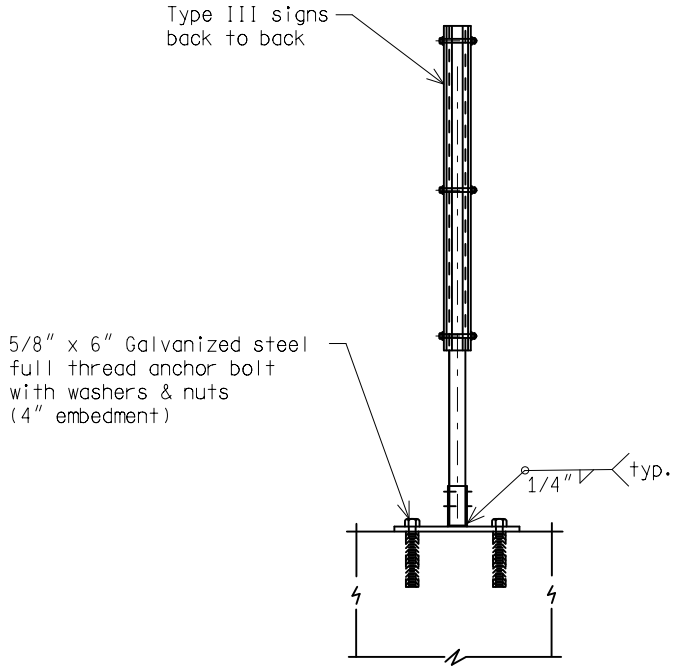
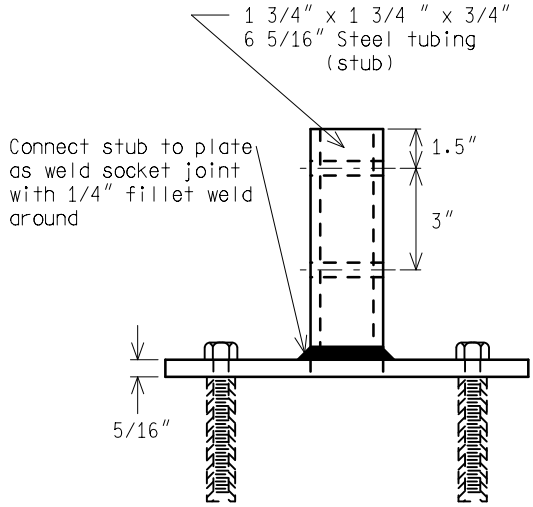


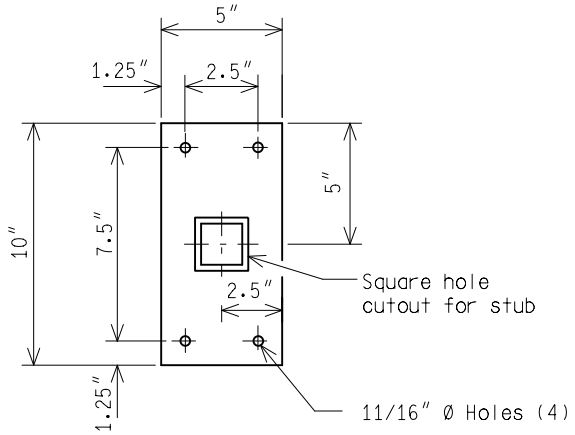
FRONT ELEVATION



SIDE ELEVATION

CONCRETE MEDIAN BARRIER CONNECTION
(SQUARE TUBE SUPPORT)





BASE PLATE DETAILS

TO BE USED FOR MAINTENANCE PURPOSES ONLY

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN	(SPECIAL DETAIL) F.H.W.A. APPROVAL	03/20/12 PLAN DATE	SIGN-205-A	SHEET 12 OF 14

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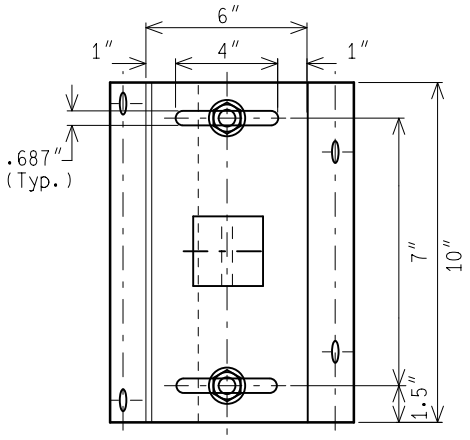
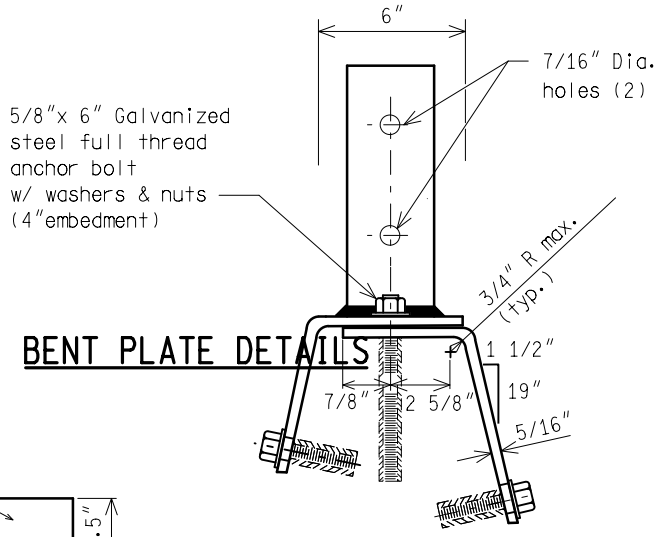
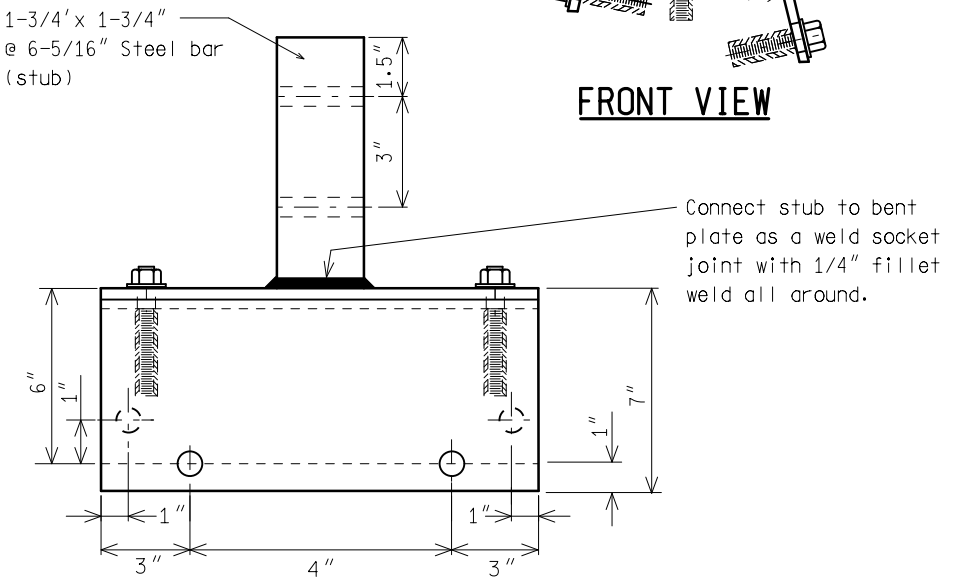


TOP VIEW

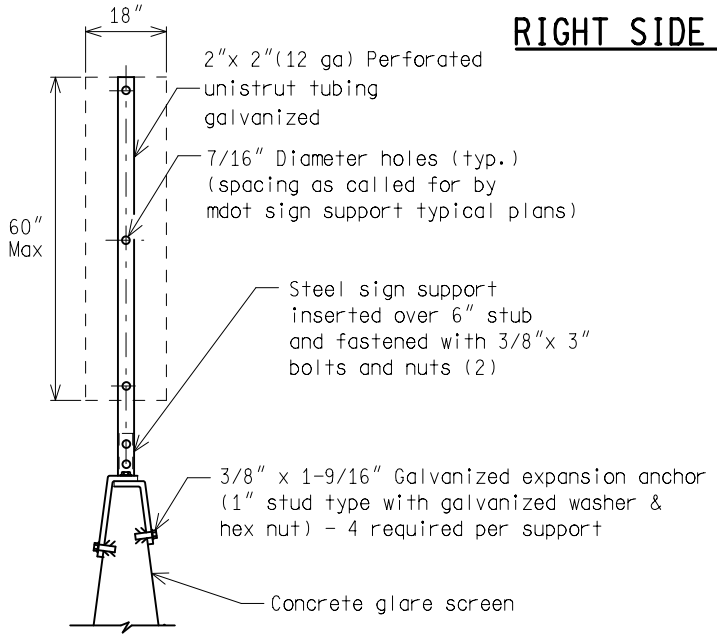


BENT PLATE DETAILS

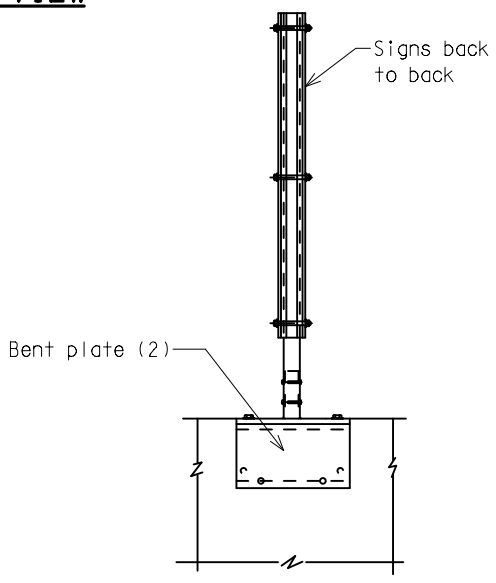
FRONT VIEW



RIGHT SIDE VIEW



FRONT ELEVATION



SIDE ELEVATION

CONCRETE GLARE SCREEN CONNECTION

(SQUARE TUBE SUPPORT)

TO BE USED FOR MAINTENANCE PURPOSES ONLY

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN	(SPECIAL DETAIL) F.H.W.A. APPROVAL	03/20/12 PLAN DATE	SIGN-205-A	SHEET 13 OF 14

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.

NOTES:

1. The materials and galvanized finish for the connection components (steel pipe, channels, square tube, stub & plate) shall be per the current MDOT Standard Specifications for Construction after fabrication.

2. All fastening hardware (bolts, nuts and washers) shall be galvanized to ASTM 153, full thread anchor bolt manufactured to ASTM A36 Mod55. Hex bolt manufactured to A307.

3. The adhesive anchoring system tested to ASTM E488.

4. Pipe support suitable for a single sign connection with a maximum of 4 sq. ft. & a back to back sign connection with a maximum of 8 sq. ft.

5. Square tube support suitable for single sign connection with a maximum of 7.5 sq. ft. & a back to back sign connection with a maximum of 15 sq.ft.

6. Sign substrates shall be aluminum for ground mount and barrier connections per section 919 of the current Standard Specifications for Construction.

7. Concrete median barriers having a top width of 6″ or wider shall use the concrete median barrier connection (square tube support).

8. Glare screen and barrier connections must be installed to ensure that either a pipe support or a square tube is plumb on the glare screen or concrete barrier wall.

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