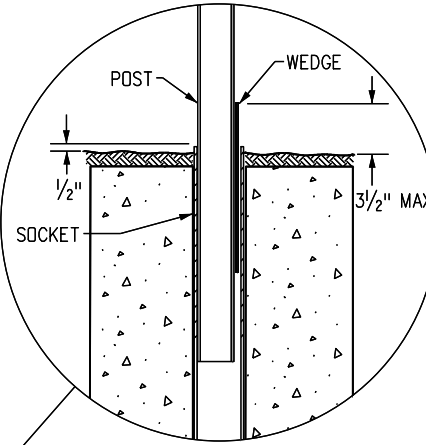
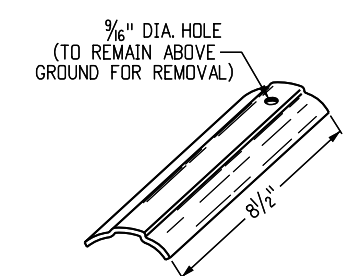
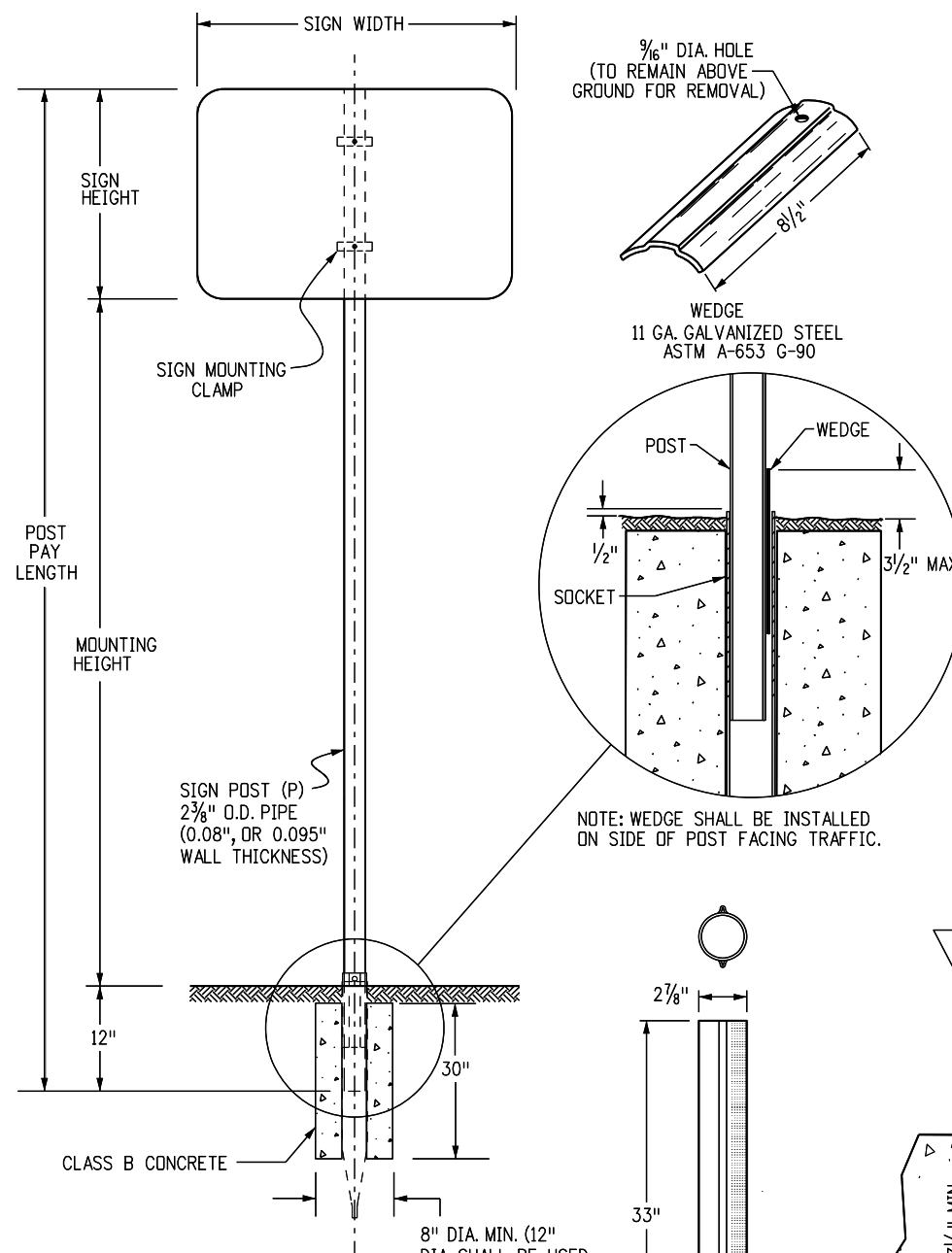
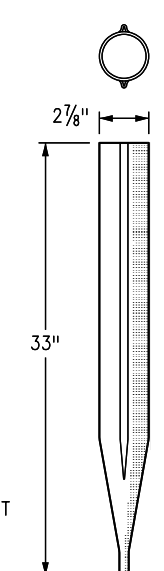


**TUBULAR STEEL POSTS
(SOCKET SYSTEM) (FOR USE WITH ALL P-POST INSTALLATIONS)
(SEE SHEET 2 FOR P1 AND P2 POST INSTALLATIONS)**

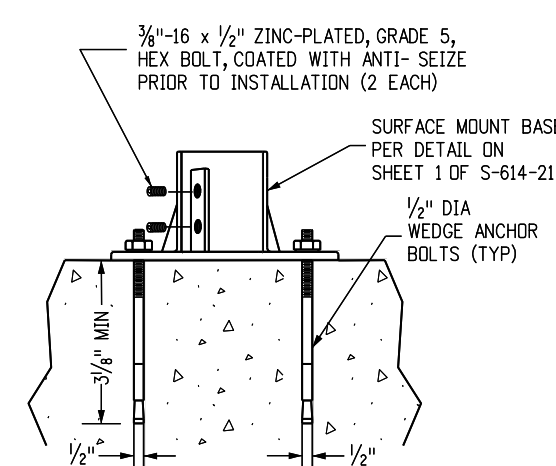
**SIGNPOST SELECTION GUIDE (90 MPH WIND LOAD DESIGN)
(FOR SOCKET SYSTEM AND SLIPBASE INSTALLATIONS USING P, P1 OR P2 POSTS)**



NOTE: WEDGE SHALL BE INSTALLED ON SIDE OF POST FACING TRAFFIC.



TUBULAR CONCRETE FOOTING
12 GA. GALVANIZED
STEEL ASTM - 787



**SIDE VIEW
SURFACE MOUNT DETAIL
(P POST ONLY)**

THE POST MAY BE SURFACE MOUNTED WHEN APPROVED BY THE ENGINEER

SIGN HEIGHT (FT)	7' MOUNTING HEIGHT														
	SIGN WIDTH (FT)														
	1	2	2.5	3	4	5	6	7	8	9	10	11	12+		
1	P	P	P	P	P	P1	SIZES NOT USED								
2	P	P	P	P	P	P1	SIZES NOT USED								
2.5	P	P	P	P	P1	P1	SIZES NOT USED								
3	P	P	P	P1	P1	P1	SIZES NOT USED								
4	P	P1	P1	P1	P1	P1	SIZES NOT USED							TWO P1'S	
5	SIZES NOT USED		P1	P1	P1	P1	SIZES NOT USED							TWO P2'S	
6	SIZES NOT USED		P1	P1	P1	P2	SIZES NOT USED							TWO P2'S	THREE P2'S
7	SIZES NOT USED		P1	P1	P2	SIZES NOT USED							TWO P2'S	SEE CHART NOTE 5.	

SEE CHART NOTE 4.

SIGN HEIGHT (FT)	8' MOUNTING HEIGHT										
	SIGN WIDTH (FT)										
	1	2	2.5	3	4	5	6	7	8	9	
1	P	P	P	P	P	P1	SIZES NOT USED				
2	P	P	P	P	P1	P1	SIZES NOT USED				
2.5	P	P	P	P1	P1	P1	SIZES NOT USED				
3	P	P	P1	P1	P1	P1	SIZES NOT USED				
4	P	P1	P1	P1	P1	P1	SIZES NOT USED				TWO P1'S
5	SIZES NOT USED		P1	P1	P1	P2	SIZES NOT USED				TWO P2'S
6	SIZES NOT USED		P1	P1	P1	P2	SIZES NOT USED				TWO P2'S
7	SIZES NOT USED		P1	P1	P1'S	P1'S	SIZES NOT USED				TWO P2'S

CHART NOTES

1. TYPICAL POST MOUNTING HEIGHTS FROM GROUND TO BOTTOM OF SIGN PANEL ARE 7, 8 OR 9 FEET. OTHER HEIGHTS MAY BE REQUIRED WHEN SIGNS ARE MOUNTED ON STEEPER FILL OR CUT SLOPES.
2. FOR SIGNS MOUNTED ON TWO POSTS, THE MINIMUM DISTANCE BETWEEN POSTS SHALL BE 2 FEET AND THE MAXIMUM DISTANCE SHALL BE 8 FEET. DISTANCE FROM POST TO EDGE OF SIGN PANEL(S) SHALL BE 0 TO 4 INCHES. WHEN BACKING ZEES ARE USED, POSTS SHALL BE INSTALLED WITH A MINIMUM OF 2 INCHES TO THE EDGE OF THE BACKING ZEE.
3. ALL SIGN PANELS GREATER THAN 60 INCHES IN WIDTH MUST BE MOUNTED ON TWO POSTS TO PREVENT TURNING.
4. THE POST SIZES SHOWN ARE THE MINIMUM SIZES REQUIRED. TWO P1 POSTS MAY BE SUBSTITUTED WHERE ONE P2 POST IS INDICATED. P2 POSTS MAY BE SUBSTITUTED FOR P1 POSTS WHEN DIRECTED BY THE ENGINEER. W-SHAPE BEAM MAY BE SUBSTITUTED FOR P2 POSTS WHEN DIRECTED BY THE ENGINEER.
5. USE W-SHAPE BEAMS ONLY FOR SIGN POSTS.

SIGN HEIGHT (FT)	9' MOUNTING HEIGHT										
	SIGN WIDTH (FT)										
	1	2	2.5	3	4	5	6	7	8	9	
1	P	P	P	P	P	P1	SIZES NOT USED				
2	P	P	P	P	P1	P1	SIZES NOT USED				
2.5	P	P	P	P1	P1	P1	SIZES NOT USED				
3	P	P	P1	P1	P1	P1	SIZES NOT USED				TWO P1'S
4	P	P1	P1	P1	P1	P1	SIZES NOT USED				TWO P1'S
5	SIZES NOT USED		P1	P1	P1	P2	SIZES NOT USED				TWO P2'S
6	SIZES NOT USED		P1	P1	P2	TWO P1'S	SIZES NOT USED				TWO P2'S
7	SIZES NOT USED		P1	P2	TWO P1'S	TWO P1'S	SIZES NOT USED				TWO P2'S

GENERAL NOTES

1. SIGN PANELS LESS THAN 60 INCHES IN WIDTH MAY BE ATTACHED DIRECTLY TO T BRACKETS WITHOUT ZEES AND SIGN PANELS LESS THAN 48 INCHES IN WIDTH MAY BE ATTACHED DIRECTLY TO U BRACKETS WITHOUT ZEES. WIDTH OF A DIAMOND CONFIGURED SIGN PANEL IS MEASURED ACROSS OPPOSITE CORNERS.
2. U-BRACKETS MAY BE USED FOR MULTIPLE SIGN INSTALLATIONS.
3. FOR BACKING ZEE REQUIREMENTS AND DETAILS, SEE STANDARD PLANS S-614-3 AND S-614-4.
4. THE CONTRACTOR SHALL INSTALL THE POSTS PER THE MANUFACTURER'S RECOMMENDATIONS WITHOUT ADDITIONAL COMPENSATION.

POST NOTES

THE POST MAY BE PRE-PUNCHED WITH 3/8\"/>

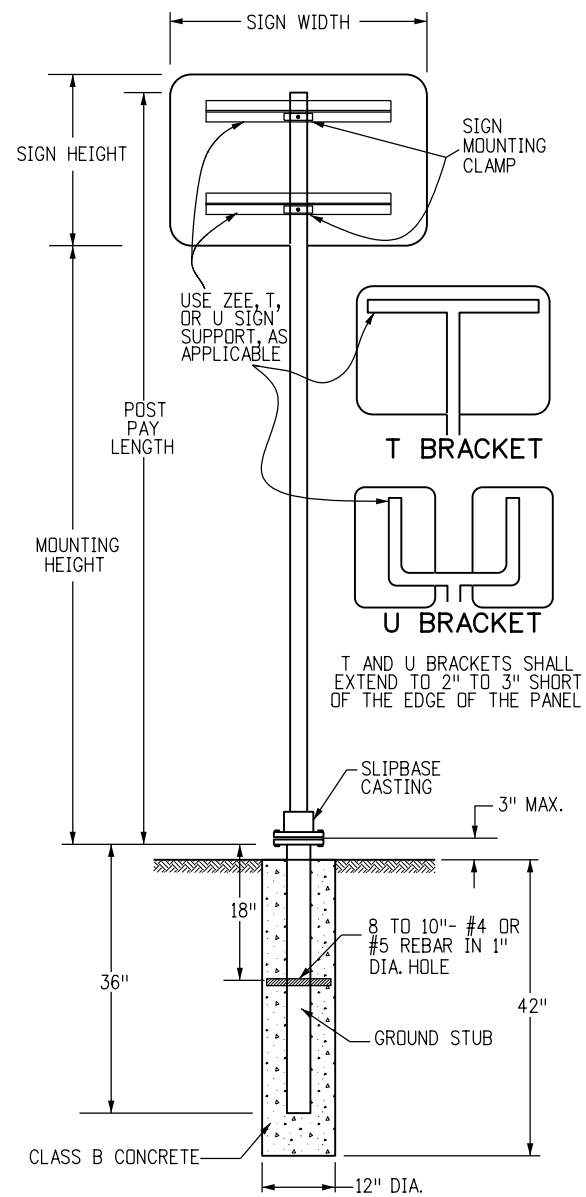
- 1\", 3\", 10\", 16\", 21\", 23\", 24\", 27\", 33\", 37\", 39\", AND 45\"/>

POST SPECIFICATIONS

POST SIZE	OUTSIDE DIAMETER	WALL THICKNESS	MATERIAL	** COATING	MAX ALLOW MOMENT	PAID FOR AS:
P	2.375"	.080"	ASTM-513	ASTM A-653 G-210 WITH 3.0 MIL POLYMER COATING PER ASTM A123 CLEAR COATING	1.47 KIP FT	STEEL SIGN SUPPORT (2 INCH ROUND)
P1	2.875"	.160"	ASTM-513	GC HOT DIPPED PER ASTM-123	4.02 KIP FT	STEEL SIGN SUPPORT (2 1/2 INCH ROUND NP-40)
P2	2.875"	.276"	ASTM-500		5.13 KIP FT	STEEL SIGN SUPPORT (2 1/2 INCH ROUND SCH 80)

** COLOR POWDER COATING MAY BE ADDED ACCORDING TO MANUFACTURER SPECIFICATIONS FOR SPECIAL LOCATIONS WHEN SHOWN ON THE PLANS.

Computer File Information		Sheet Revisions		Colorado Department of Transportation 2829 W. Howard Pl. Denver, CO 80204 Phone: 303-757-9654 FAX: 303-757-9219	TUBULAR STEEL SIGN SUPPORT DETAILS	STANDARD PLAN NO.	
Creation Date: 07/04/12	Created By: KEN	Date: 03/01/24	Comments: Update general note 1, updated ASTM reference for galvanized steel, added surface mount detail and updated charts.			S-614-8	
Last Modification Date: 03/01/24	Last Modified By: YSaucedo			Traffic & Safety Engineering	Issued By: Traffic & Safety Engineering Branch July 31, 2019	Project Sheet Number:	
CAD Ver.: MicroStation V8	Scale: Not to Scale	Units: English				EB	

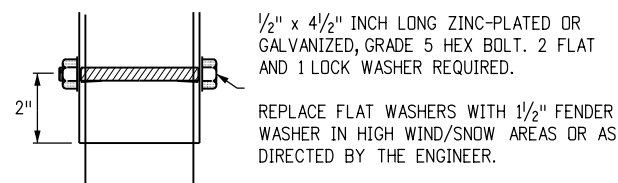


**TUBULAR STEEL POST
(WITH SLIPBASE)
(FOR USE WITH ALL P1 AND
P2 POST INSTALLATIONS)
(SEE SHEET 1 FOR P-POST INSTALLATIONS)**

DIMENSIONS FOR MOUNTING CLAMP (ALL DIMENSION ARE IN INCHES)

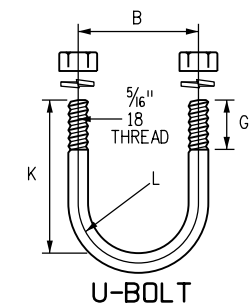
STANDARD PIPE SIZE	A	B	C	D	E	F	G	K	L	R ₁	R ₂
2	3 ³ / ₄	2 ³ / ₄	1 ¹ / ₂	1 ¹ / ₈	1 ¹ / ₂	3 ¹ / ₁₆	1	2 ¹¹ / ₁₆	1 ¹⁷ / ₃₂	1 ¹ / ₄	1 ³ / ₁₆
2 ¹ / ₂	4 ¹ / ₄	3 ³ / ₄	2	1 ¹ / ₄	1 ¹ / ₂	1 ¹ / ₄	1	3 ³ / ₁₆	1 ¹⁵ / ₃₂	1 ¹ / ₂	1 ¹ / ₁₆

T AND U BRACKET ATTACHMENT



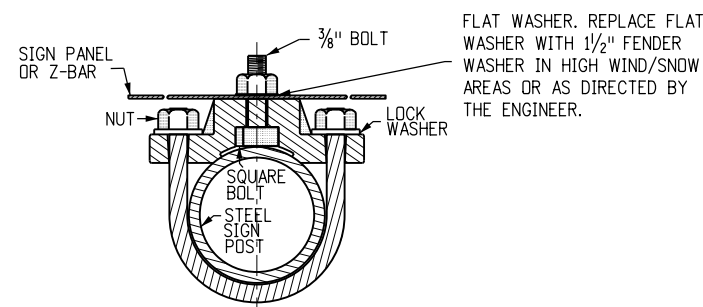
PIPE CLAMP CASTING

PIPE CLAMP CASTING SHALL BE ASTM B26 OR B108 ALUMINUM ALLOY A444.0-T4 OR 356.0-F. ALL SIGN MOUNTING CLAMP PARTS NOT MADE FROM ALUMINUM SHALL BE GALVANIZED STEEL IN CONFORMANCE WITH ASTM A153 OR STAINLESS STEEL.

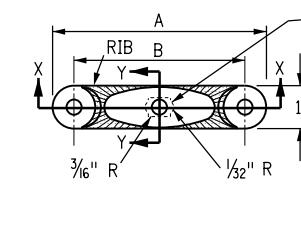
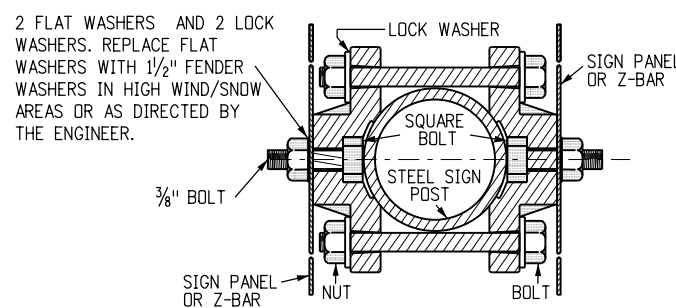


U-BOLT TO BE MADE IN ACCORDANCE WITH STANDARD MANUFACTURING PROCEDURE. 1/4" OR 5/18" DIAMETER STOCK IS PERMISSIBLE. AMERICAN STANDARD REGULAR SEMI-FINISHED HEX NUTS AND SPRING LOCKWASHERS.

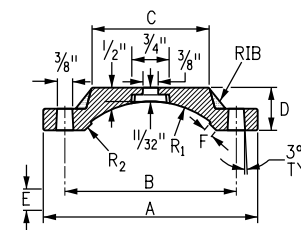
TYPICAL SINGLE BRACKET



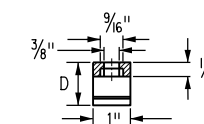
TYPICAL BACK TO BACK



SLOT TO HOLD HEAD OF 3/8" HEX HEAD BOLT. THE BOLT SHALL BE 1 1/4" LONG, WITH FULL THREADS, A MEDIUM WASHER, AND GALVANIZED STEEL OR ALUMINUM SELF-LOCKING HEX HEAD NUT. THE BOLT HEAD MUST NOT TURN IN THE SLOT.



SECTION X-X

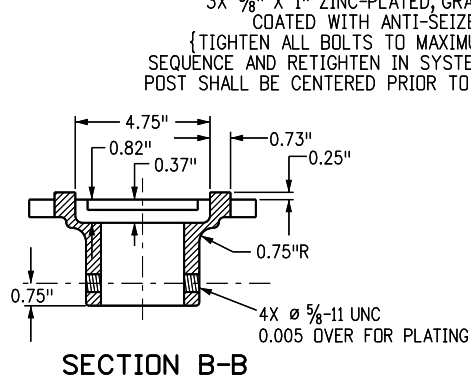
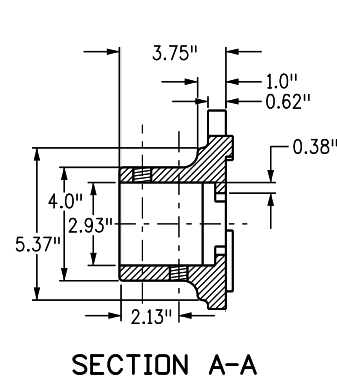
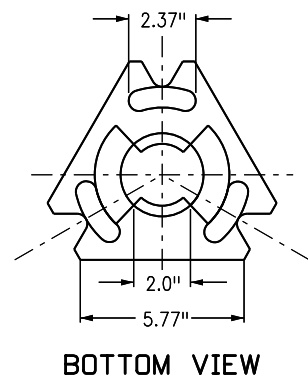
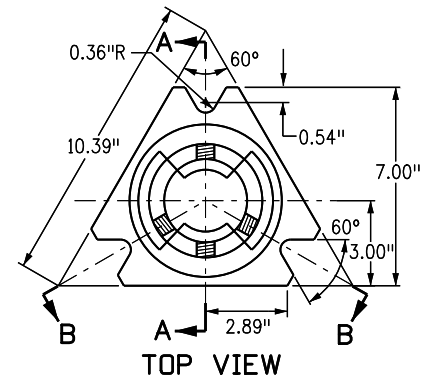


SECTION Y-Y

DETAILS FOR SIGN PANEL ATTACHMENT

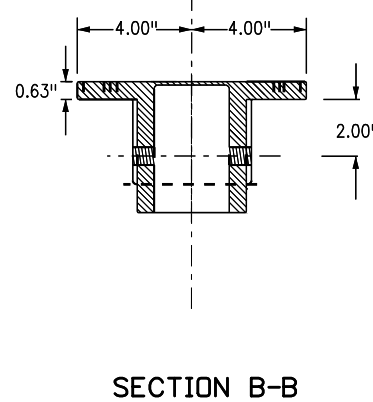
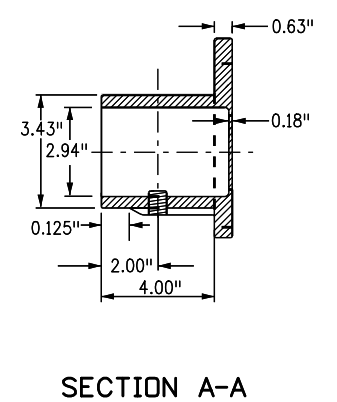
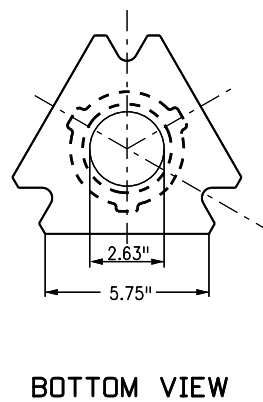
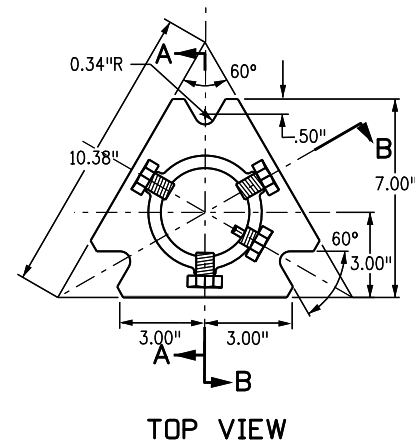
MOUNTING CLAMP FOR SOCKET OR SLIPBASE

Computer File Information		Sheet Revisions		Colorado Department of Transportation 2829 W. Howard Pl. Denver, CO 80204 Phone: 303-757-9436 FAX: 303-757-9219	Traffic & Safety Engineering	MKB	TUBULAR STEEL SIGN SUPPORT DETAILS	Issued By: Traffic & Safety Engineering Branch July 31, 2019	STANDARD PLAN NO.	
Creation Date: 07/04/12		Date:	Comments							
Created By: SCL		12/29/20	BOLT LENGTH IN 'T' AND 'U' BRACKET ATTACHMENT WASHER REQUIREMENTS IN SIGN PANEL ATTACHMENT							
Last Modification Date: 12/29/20										
Last Modified By: DiNardo										
CAD Ver.: MicroStation V8	Scale: Not to Scale	Units: English								Project Sheet Number:



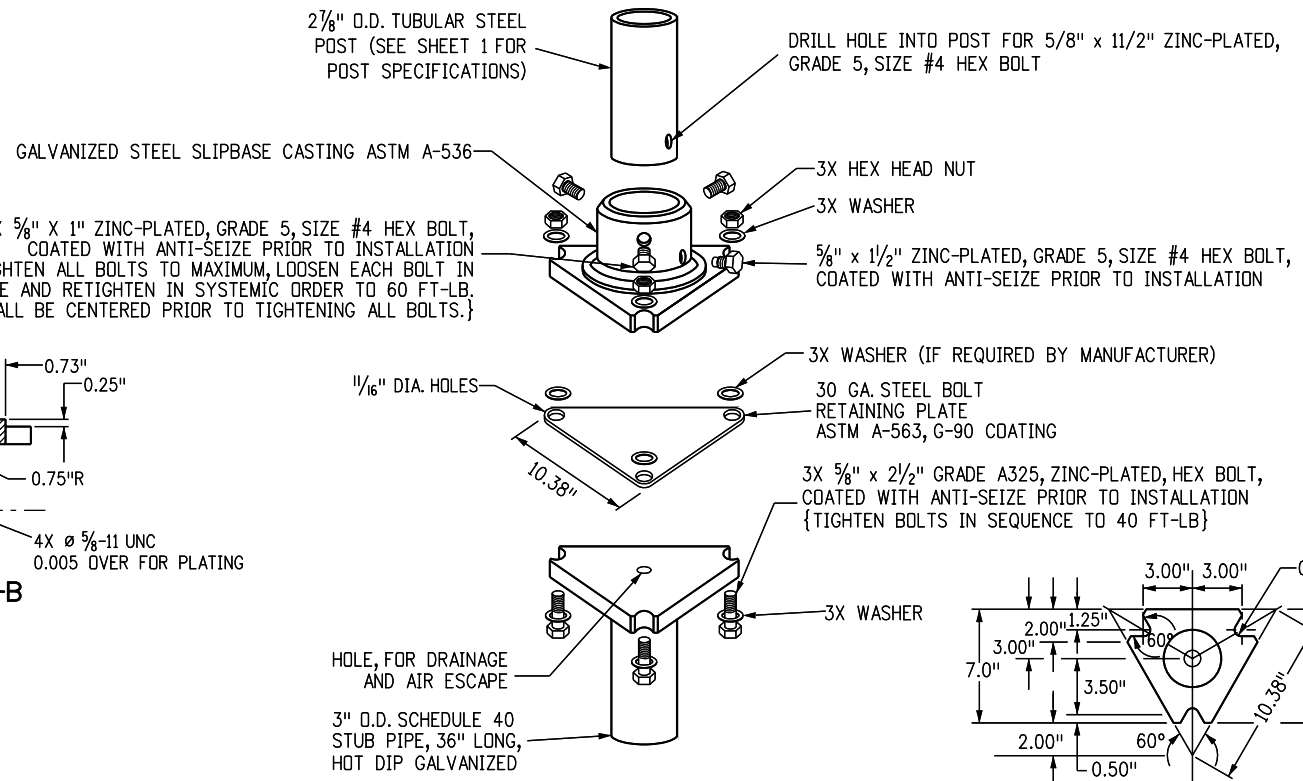
SLIPBASE CASTING 1

DIRECTION OF TRAVEL

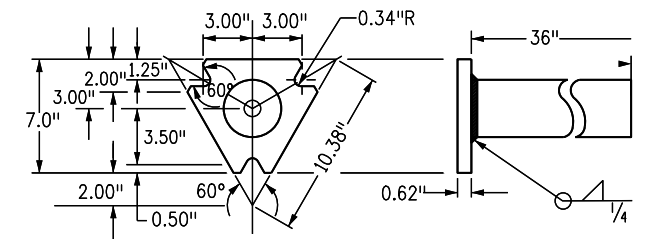


SLIPBASE CASTING 2

DIRECTION OF TRAVEL



TYPICAL ASSEMBLY



SLIPBASE STUB BASE

SLIPBASE CASTING REQUIREMENTS

FOR 2-7/8 INCH POSTS (P1 OR P2 POSTS)
GALVANIZED STEEL SLIPBASE CASTING ASTM-536

MOUNTING HARDWARE

- 3 - EACH 5/8" x 2 1/2" INCH LONG HEX BOLT
- 3 - EACH 5/8" x 1" INCH LONG ZINC-PLATED, GRADE 5 SIZE #4 HEX BOLT
- 1 - EACH 5/8" x 1 1/2" INCH LONG ZINC-PLATED, GRADE 5 SIZE #4 HEX BOLT
- 1 - EACH 30 GAUGE STEEL BOLT RETAINING PLATE ASTM A-563, G-90 COATING

INSTALLATION REQUIREMENTS

ALL HEX BOLTS SHALL BE COATED WITH ANTI-SEIZE PRIOR TO INSTALLATION

ALL HARDWARE WILL BE GALVANIZED OR ZINC PLATED.

TUBULAR STEEL SIGN SUPPORT SLIPBASE NOTES

1. REFER TO SIGNING PLANS FOR SIGN LOCATIONS AND HEIGHT
2. MINIMUM ALLOWABLE TENSION CAPACITY FOR WEDGE ANCHORS = 3000 LBS.
3. MAXIMUM ALLOWABLE MOMENT FOR SIGN BASE = 5.13 kip-ft.
4. PAY ITEM "STEEL SIGN SUPPORT(X-INCH ROUND)(SLIPBASE)" SHALL INCLUDE STUB BASE, CASTING AND NECESSARY HARDWARE (SLIPBASE CASTING MOUNTING HARDWARE AS SHOWN ON THIS SHEET)
5. PAY ITEM "STEEL SIGN SUPPORT CASTING" SHALL INCLUDE CASTING AND NECESSARY MOUNTING HARDWARE (SLIPBASE CASTING MOUNTING HARDWARE AS SHOWN ON THIS SHEET)
6. PAY ITEM "STEEL SIGN GROUND STUB BASE (36 INCH)" SHALL INCLUDE SLIPBASE STUB BASE

CAST-IN-PLACE SLIPBASE FOR NEW INSTALLATIONS

Computer File Information	
Creation Date:	07/04/12
Created By:	KEN
Last Modification Date:	03/01/24
Last Modified By:	YSaucedo
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	

Sheet Revisions	
Date:	Comments
R-2 03/01/24	Updated typical assembly to include a drilled hole into the post for the Hex Bolt and added an optional third washer between retaining plate and slipbase.
R-1 12/29/20	5/8" x 2 1/2" HEX BOLTS FROM GRADE 5, SIZE #4 TO GRADE A325 IN TYPICAL ASSEMBLY

Colorado Department of Transportation

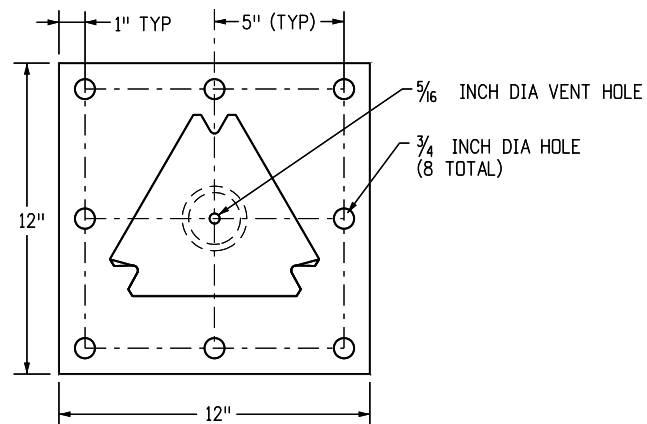
2829 W. Howard Pl.
Denver, CO 80204
Phone: 303-757-9654
FAX: 303-757-9219

Traffic & Safety Engineering EB

TUBULAR STEEL SIGN SUPPORT DETAILS

Issued By: Traffic & Safety Engineering Branch July 31, 2019

STANDARD PLAN NO.
S-614-8
Standard Sheet No. 3 of 7
Project Sheet Number:



SURFACE MOUNT SLIPBASE BASE PLATE FABRICATION REQUIREMENTS

BASE PLATE - 3/4 INCH ASTM A 36 PLATE STEEL
 PIPE STUB - 3 INCH NOMINAL SCHEDULE 80, ASTM A-500 GRADE B
 TOP PLATE - MEET REQUIREMENTS OF SHEET 3

MEET ASTM A-123 GALVANIZING AFTER FABRICATION IS COMPLETE

SURFACE MOUNT SLIPBASE TUBULAR STEEL SIGN BASE REQUIREMENTS

FOR 2-7/8 INCH POSTS (P1 OR P2 POSTS)
 FOR CONCRETE SURFACES GREATER THAN 7 INCHES THICK
 FOR CONCRETE SURFACES GREATER THAN 12 INCHES IN WIDTH

MOUNTING HARDWARE

- 8 - EACH 5/8 x 5 1/2 INCH LONG "HILTI KWIK HUS-EZ SCREW ANCHORS
- 16 - EACH 5/8 INCH FLAT WASHERS
- 8 - EACH 5/8 INCH LOCK WASHERS
- 8 - EACH 5/8 INCH NUTS

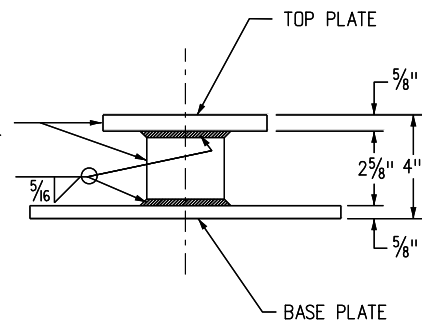
INSTALLATION REQUIREMENTS:

DRILL: (8) - 5/8 INCH HOLES 6 INCH DEEP, CLEAN HOLE PRIOR TO INSTALLING ANCHORS

USE ADDITIONAL WASHERS FOR SHIMMING TO LEVEL BASE PLATE.

ALL HARDWARE WILL BE GALVANIZED OR ZINC PLATED.

SLIPBASE WILL MEET REQUIREMENTS OF STD PLAN NO. S-614-8 SLIPBASE STUB POST DETAIL EXCEPT FOR OVERALL HEIGHT




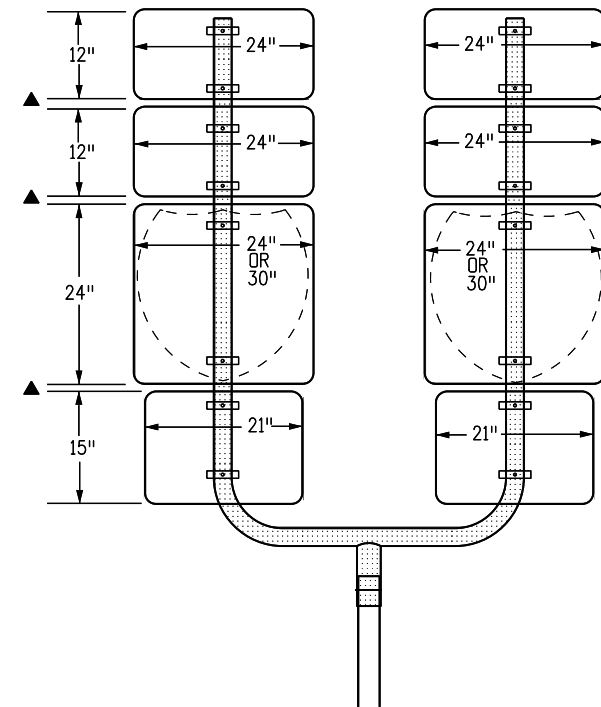
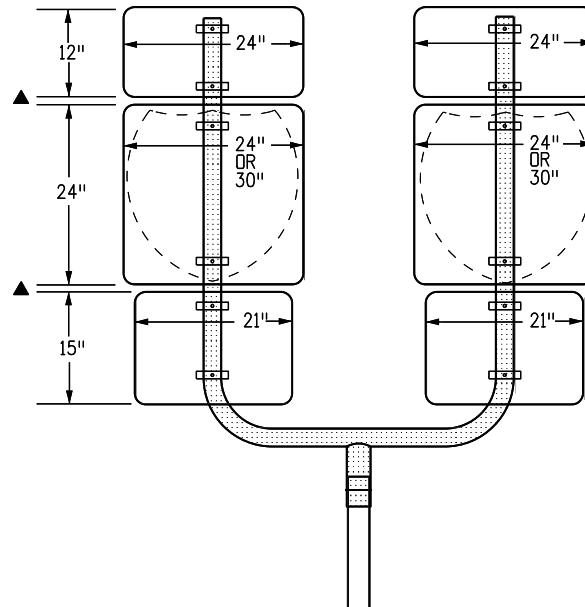
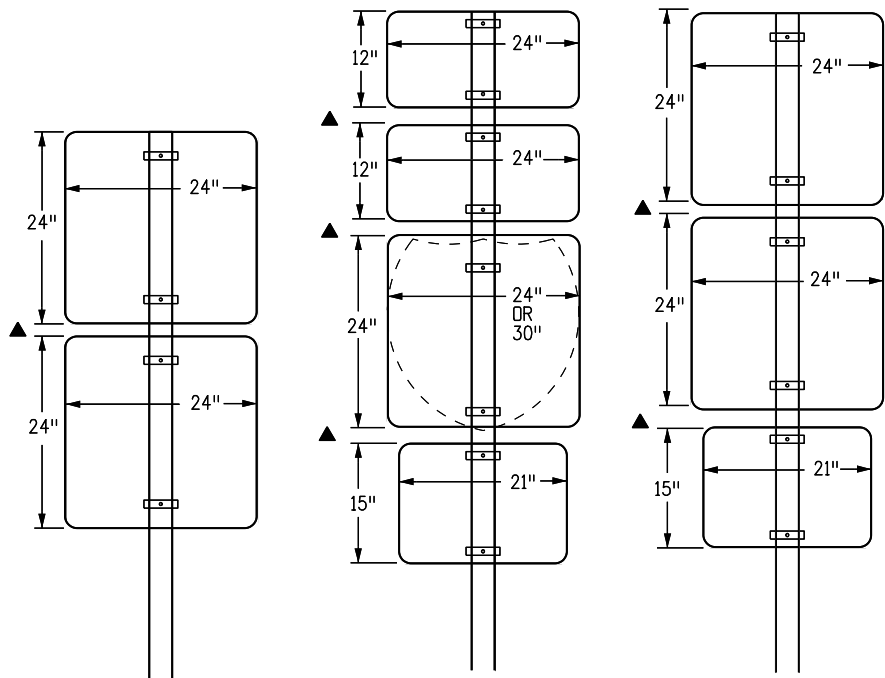
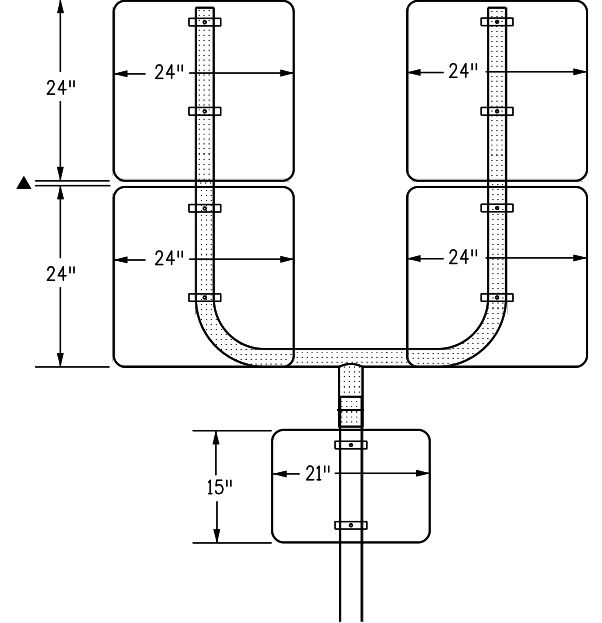
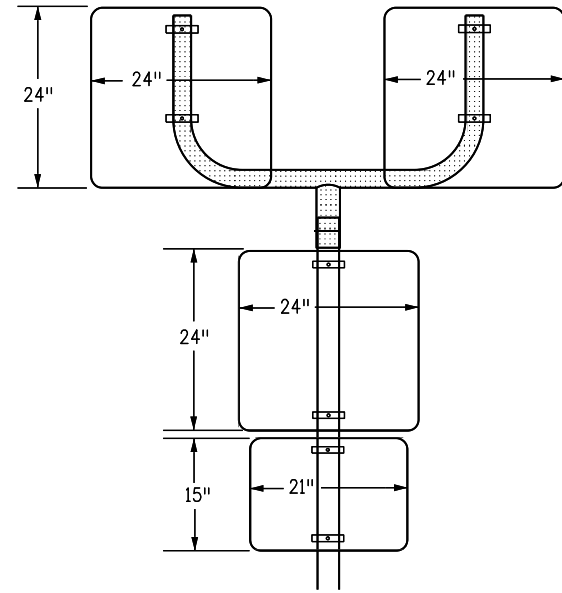
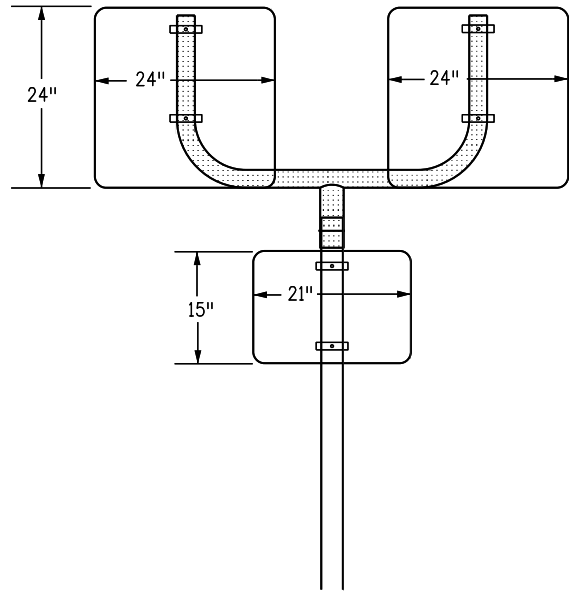
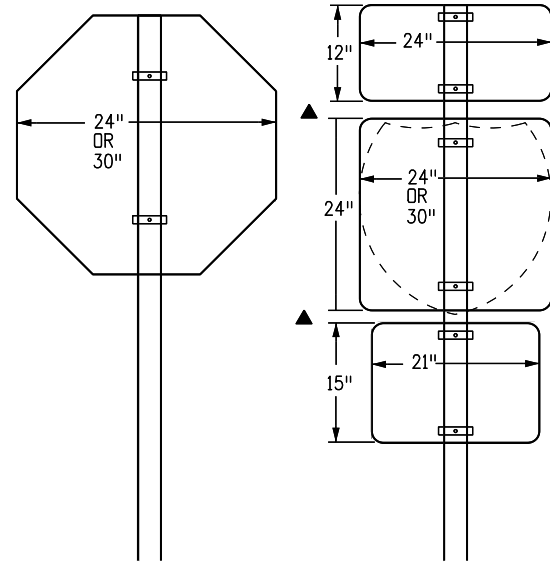
SURFACE MOUNT SLIPBASE BASE PLATE

TUBULAR STEEL SIGN SUPPORT SURFACE MOUNT SLIPBASE NOTES

1. REFER TO SIGNING PLANS FOR SIGN LOCATIONS AND HEIGHT
2. REFER TO SHEET 3 FOR SLIPBASE CASTING INFORMATION
3. MINIMUM ALLOWABLE TENSION CAPACITY FOR WEDGE ANCHORS = 3000 LBS.
4. MAXIMUM ALLOWABLE MOMENT FOR SIGN BASE = 5.13 kip-ft.
5. PAY ITEM "STEEL SIGN SURFACE MOUNT BASE PLATE (SLIPBASE)" SHALL INCLUDE BASE PLATE, CASTING AND ALL NECESSARY HARDWARE (SLIPBASE CASTING MOUNTING HARDWARE AS SHOWN ON SHEET 3 AND SURFACE MOUNT SLIPBASE MOUNTING HARDWARE AS SHOWN ON THIS SHEET)
6. PAY ITEM "STEEL SIGN SURFACE MOUNT BASE PLATE" SHALL INCLUDE BASE PLATE AND NECESSARY HARDWARE (SURFACE MOUNT SLIPBASE MOUNTING HARDWARE AS SHOWN ON THIS SHEET)

SURFACE MOUNT SLIPBASE FOR RETROFIT INSTALLATIONS

Computer File Information		Sheet Revisions		Colorado Department of Transportation  2829 W. Howard Pl. Denver, CO 80204 Phone: 303-757-9654 FAX: 303-757-9219 Traffic & Safety Engineering	TUBULAR STEEL SIGN SUPPORT DETAILS EB	STANDARD PLAN NO.	
Creation Date: 04/12/18		Date:	Comments			S-614-8	
Created By: DiNardo		03/01/24	Revised note 2, 5 and 6.			Standard Sheet No. 4 of 7	
Last Modification Date: 03/01/24						Project Sheet Number:	
Last Modified By: YSaucedo							
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English							



CLASS I SIGN COMBINATIONS (DIRECT ATTACHMENT)


CLASS I SIGN COMBINATIONS USING U-BRACKETS

▲ SEE NOTE 6 ON SHEET 6

Computer File Information	
Creation Date:	07/04/12
Created By:	KEN
Last Modification Date:	03/01/24
Last Modified By:	YSaucedo
CAD Ver.:	MicroStation V8
Scale:	Not to Scale
Units:	English

Sheet Revisions	
Date:	Comments
03/01/24	Revised reference note for vertical spacing.

Colorado Department of Transportation



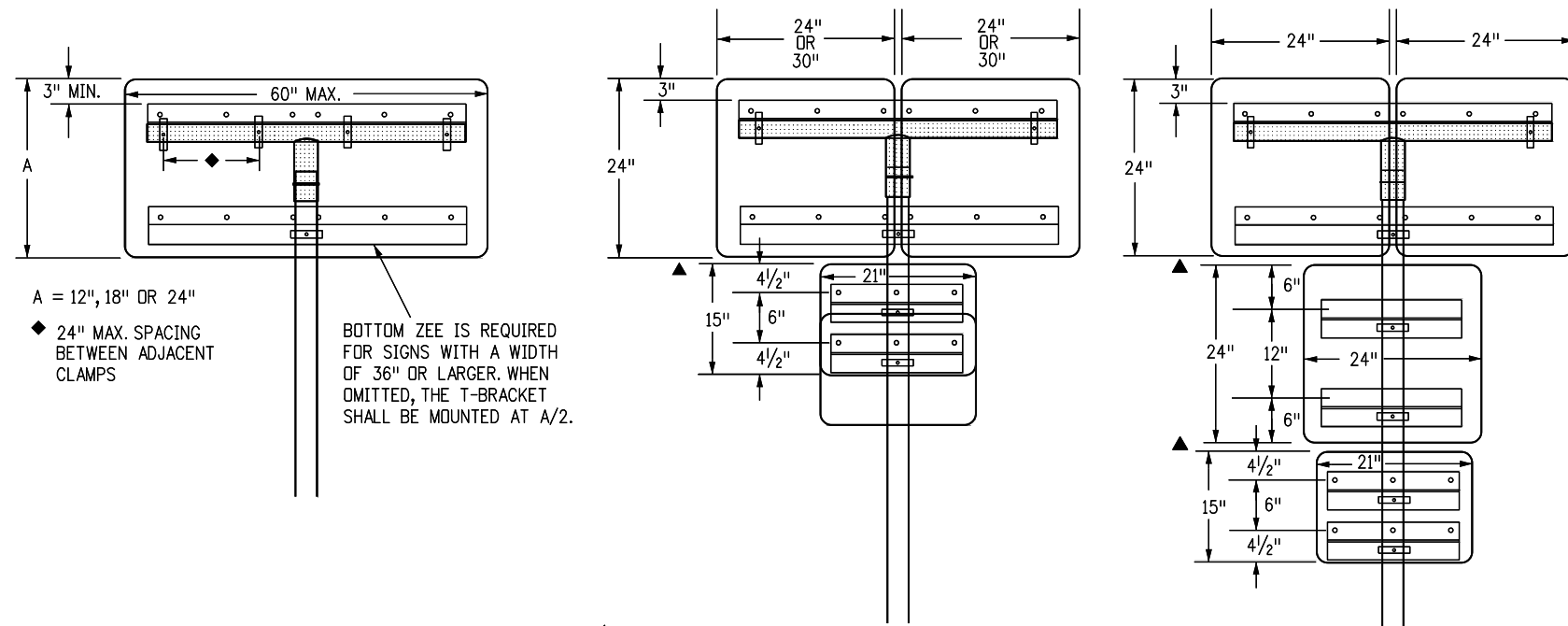
2829 W. Howard Pl.
Denver, CO 80204
Phone: 303-757-9654
FAX: 303-757-9219

Traffic & Safety Engineering EB

**TUBULAR STEEL SIGN
SUPPORT DETAILS**

Issued By: Traffic & Safety Engineering Branch July 31, 2019

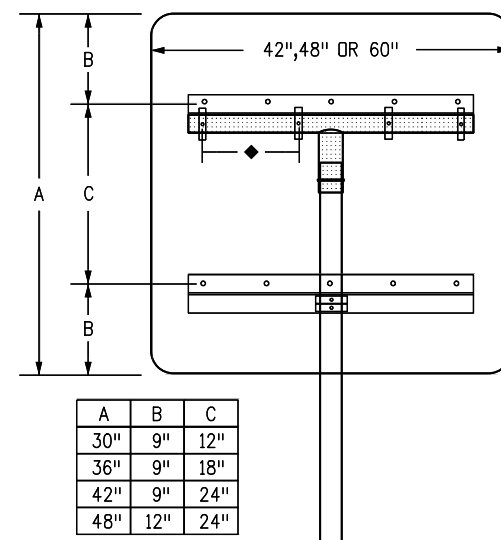
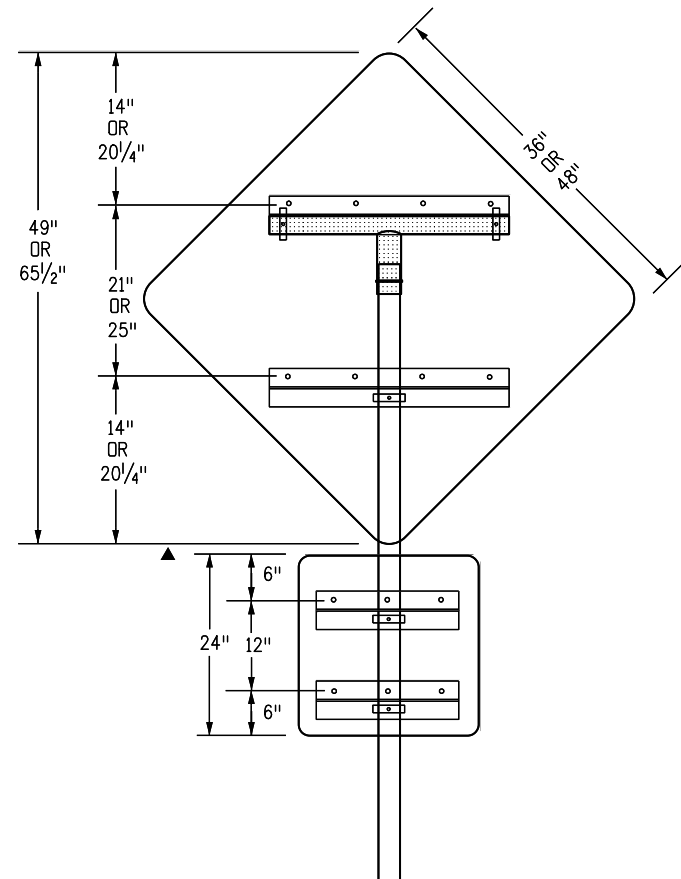
STANDARD PLAN NO.
S-614-8
Standard Sheet No. 5 of 7
Project Sheet Number:



PANEL WIDTHS	ZEE LENGTH
21"	15"
24"	18"
30"	24"
36"	30"
42"	36"
45"	39"
48"	42"
54"	48"
60"	54"
36" DIAMOND	22"
48" DIAMOND	36"
24" & 24"	43"
24" & 30"	49"
30" & 30"	55"
36" & 36"	67"
45" & 36"	76"
24" & 24" & 24"	68"
24" & 24" & 30"	74"
24" & 30" & 24"	74"
30" & 24" & 30"	80"
24" & 30" & 30"	80"
30" & 30" & 30"	86"

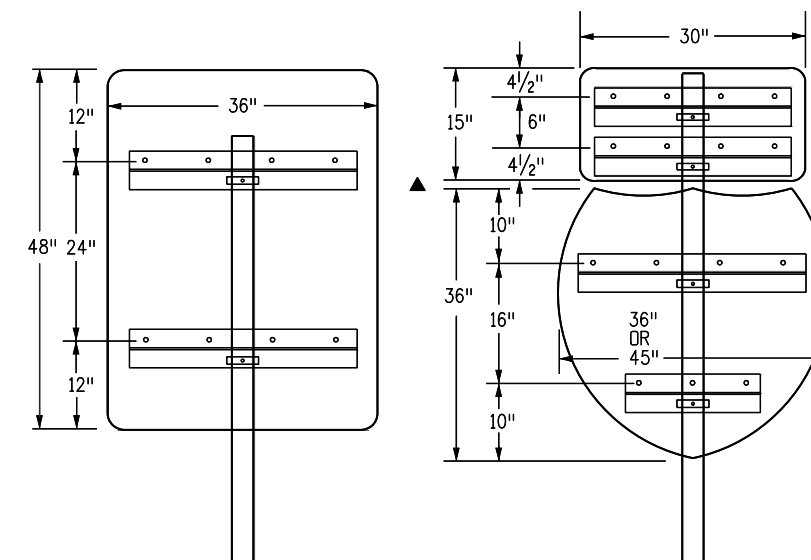
NOTES

- Z-BAR LENGTH SHALL BE 3 INCH ($\pm 1/2$ INCH) SHORT OF THE EDGE OF THE SIGN OR ROW OF SIGNS ON BOTH SIDES. THE ACCOMPANYING TABLE GIVES THE Z-BAR LENGTH FOR MOST TYPICAL PANEL COMBINATIONS.
- FIRST AND LAST HOLES SHALL BE 2 INCH FROM EDGE OF Z-BAR. THE HOLES IN BETWEEN SHALL BE 6 INCH TO 8 INCH APART.
- T AND U BRACKETS SHALL TERMINATE 2 INCHES TO 3 INCHES FROM EDGE OF SIGN PANEL. WHEN A ZEE IS CONNECTED TO A T-BRACKET, THEY SHALL BE THE SAME LENGTH EXCEPT WHEN THE ZEE MUST EXTEND BEYOND THE MAXIMUM LENGTH OF A T-BRACKET.
- TWO MOUNTING CLAMPS ARE REQUIRED ON ZEES WHERE THERE IS ONLY ONE ZEE FOR THE PANEL AND THE ZEE IS ATTACHED TO ONLY ONE POST.
- ZEES SHALL BE ATTACHED TO T-BRACKETS AND U-BRACKETS WITH U-BOLTS OR MOUNTING CLAMPS.
- ▲ VERTICAL SPACING BETWEEN SIGN PANELS SHALL BE 1 INCH TO $1/2$ INCH TYPICAL.
- IN SPECIAL CASES U-BRACKETS MAY BE USED TO MOUNT SIGNS THAT FACE DIFFERENT DIRECTIONS. THE ENGINEER SHALL DETERMINE THE ORIENTATION OF THE SIGN PANELS AND VERIFY THAT THE MAXIMUM ALLOWABLE WIND LOADS FOR THE POST ARE NOT EXCEEDED.



A	B	C
30"	9"	12"
36"	9"	18"
42"	9"	24"
48"	12"	24"

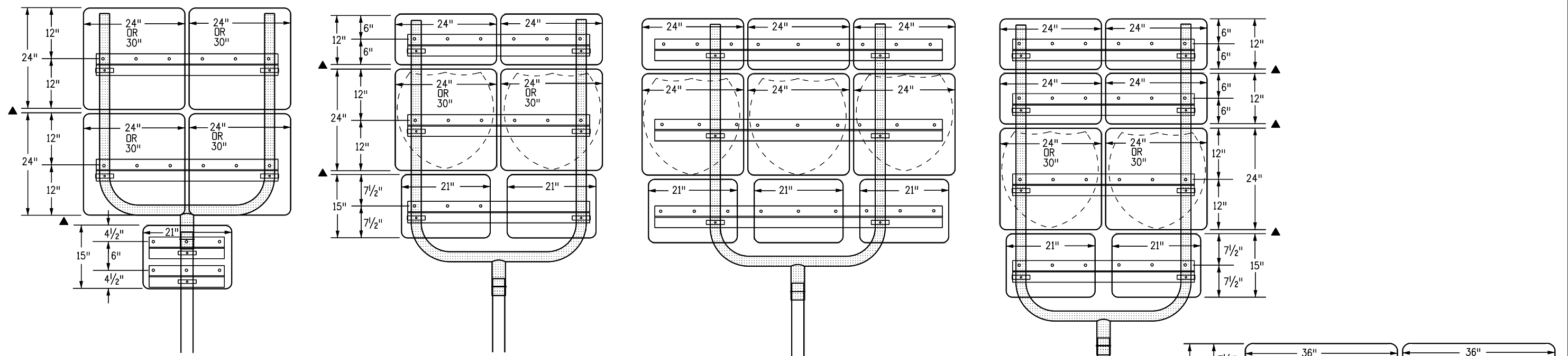
◆ 24" MAX. SPACING BETWEEN ADJACENT CLAMPS



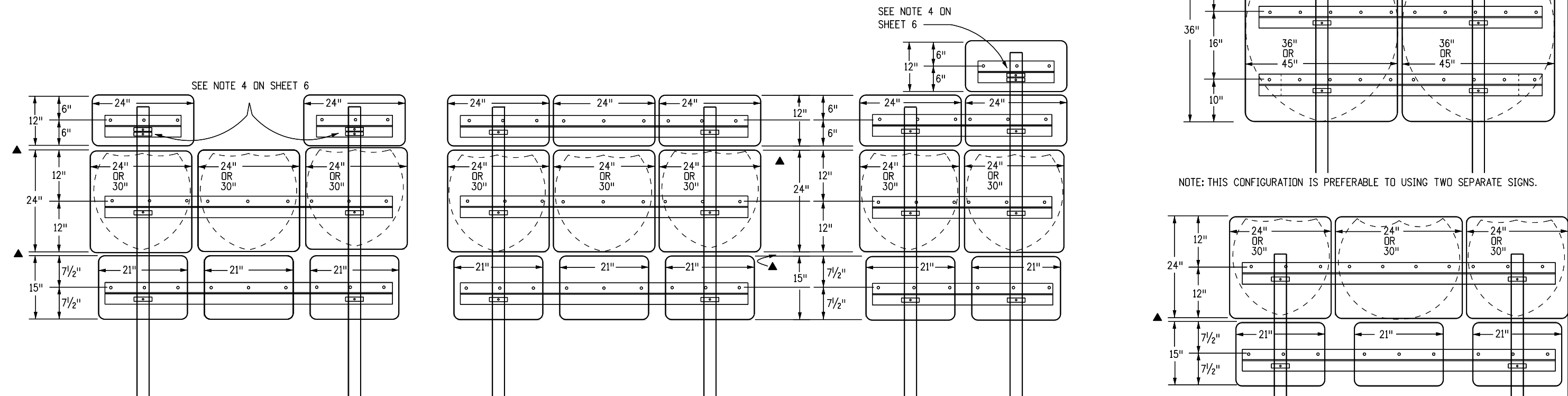
CLASS II SIGN COMBINATIONS USING T-BRACKETS WITH Z-BAR

SINGLE POST CLASS II SIGNS USING Z-BAR

EB



CLASS II SIGN COMBINATIONS USING U-BRACKETS



CLASS II SIGN COMBINATIONS USING TWO POSTS

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03/01/24	Revised reference note for vertical spacing.

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Traffic & Safety Engineering EB

**TUBULAR STEEL SIGN
SUPPORT DETAILS**

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STANDARD PLAN NO.

S-614-8
Standard Sheet No. 7 of 7
Project Sheet Number: