

- Notes: (1) Test shall be performed according to test designation no. 3-10 of MASH criteria.
- (2) At a minimum, critical post nos. 26-48 are placed in 18" [457] diameter hole backfilled and tamped in well compacted soil.
- (3) Test cable tensions of 2500 ± 200 lb [11.1 ± 0.890 kN].
- (4) Bottom cable on impact side.
- (5) Span between posts 68 and 69 is 144" [3658].
- (6) Post nos. 3-74 are modified weak posts as shown on sheets 15-18.



Midwest Roadside
Safety Facility

Midwest 4-Cable Barrier
System

System Layout

DWG. NAME.
MWP-9_R6

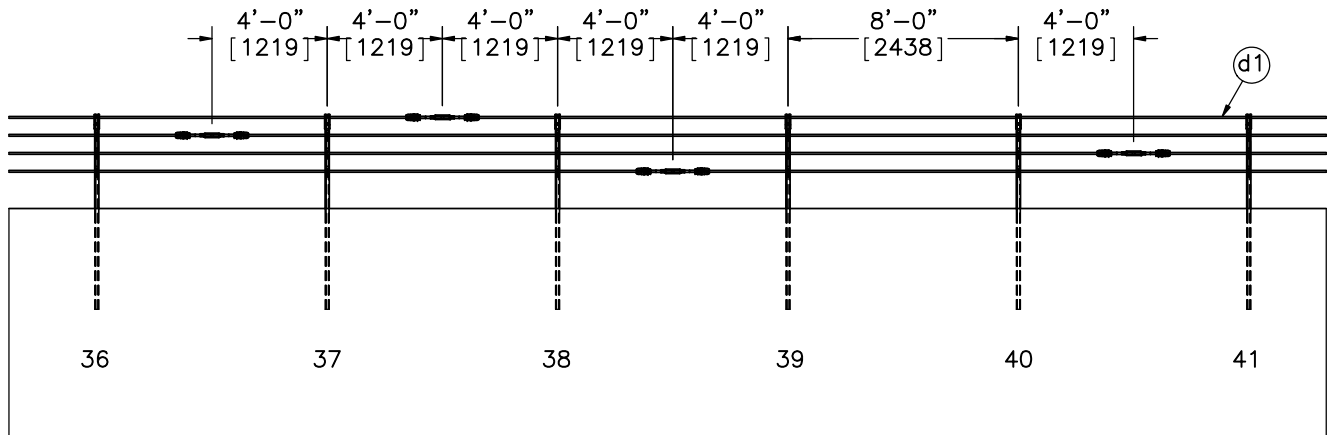
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UNITS: in.[mm]

SHEET:
1 of 26

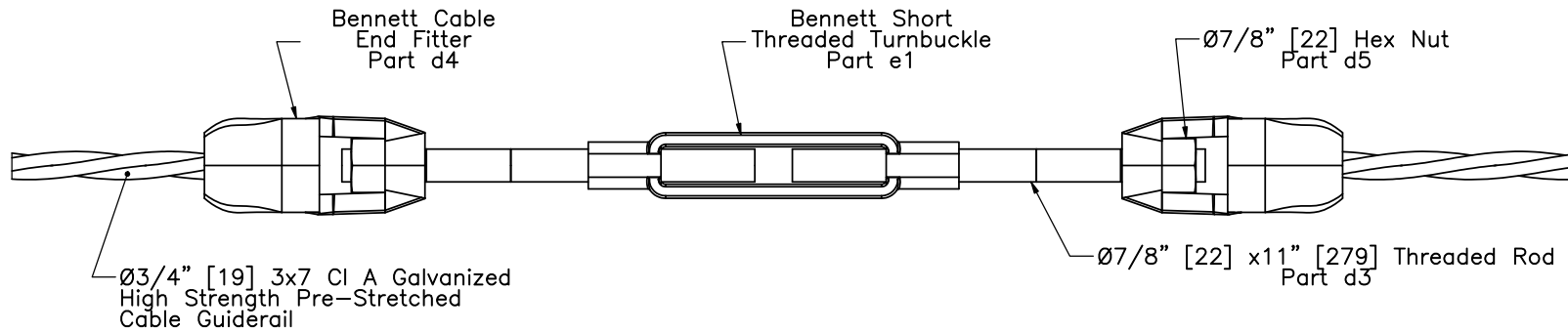
DATE:
1/26/2018

DRAWN BY:
JEK

REV. BY:
KAL/TJD/
MP




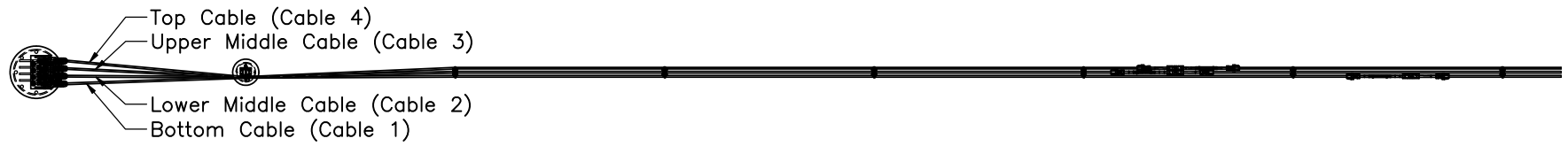
DETAIL A
Cable Splice Location Detail



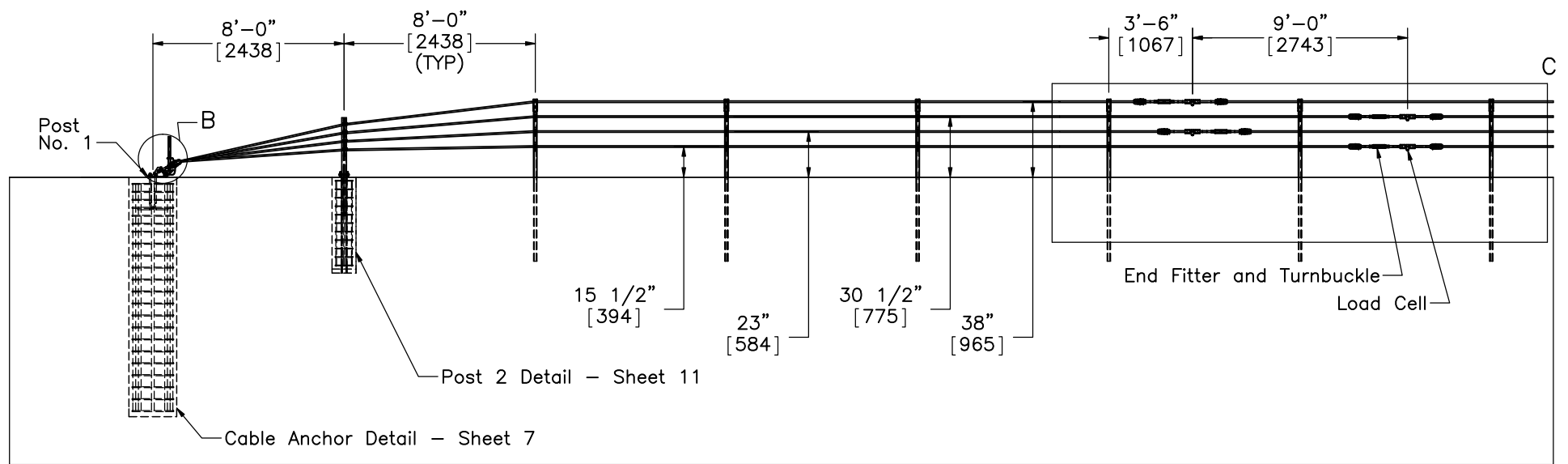
Cable Splice Detail
SCALE 1:6

Notes: (1) The splice locations may be moved as long as two adjacent cable splices are not located on top of one another.


	Midwest 4-Cable Barrier System		SHEET: 2 of 26
			DATE: 1/26/2018
Midwest Roadside Safety Facility	Cable Splice Location and Detail		DRAWN BY: JEK
	DWG. NAME: MWP-9_R6	SCALE: 1:80 UNITS: in.[mm]	REV. BY: KAL/TJD/MP

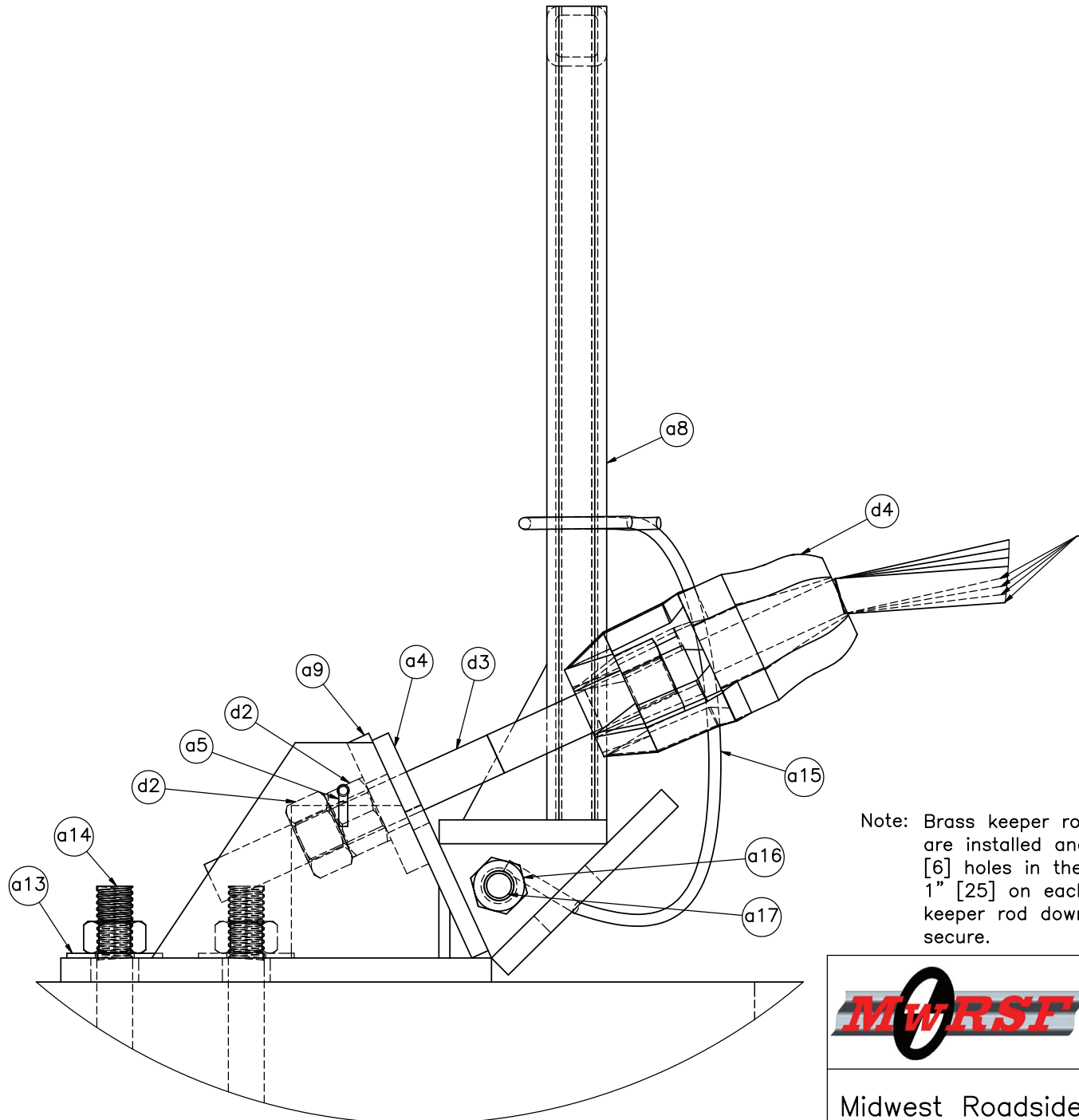


PLAN VIEW



ELEVATION VIEW

	Midwest 4-Cable Barrier System		SHEET: 3 of 26
	Cable Terminal Detail		DATE: 1/26/2018
Midwest Roadside Safety Facility	DWG. NAME: MWP-9_R6	SCALE: 1:78 UNITS: in.[mm]	DRAWN BY: JEK
			REV. BY: KAL/TJD/MP



All cables run over the foot of the cable release lever. The middle two cables run through the lever uprights.

Note: Brass keeper rod (Part a5) to be placed after all cables are installed and tensioned. Slide rod through the 1/4" [6] holes in the Anchor Bracket, leaving a minimum of 1" [25] on each side of the Anchor Bracket. Bend brass keeper rod down on each side of Anchor Bracket to secure.

DETAIL B



Midwest 4-Cable Barrier System

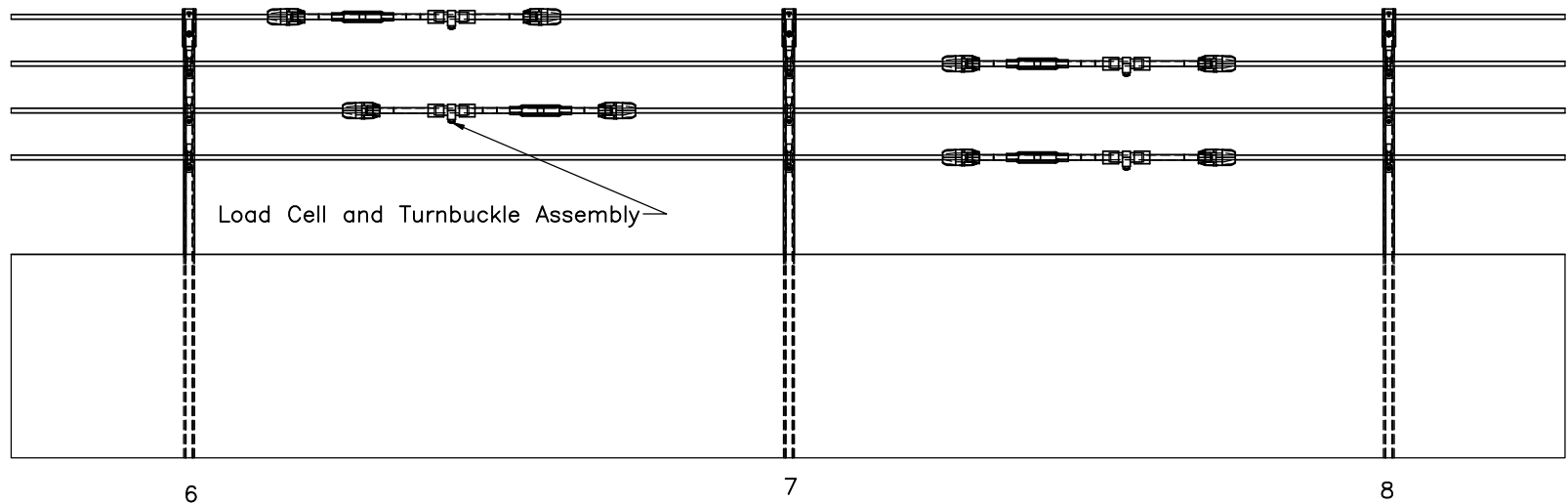
Midwest Roadside Safety Facility

Cable Anchor Detail

DWG. NAME:
MWP-9_R6

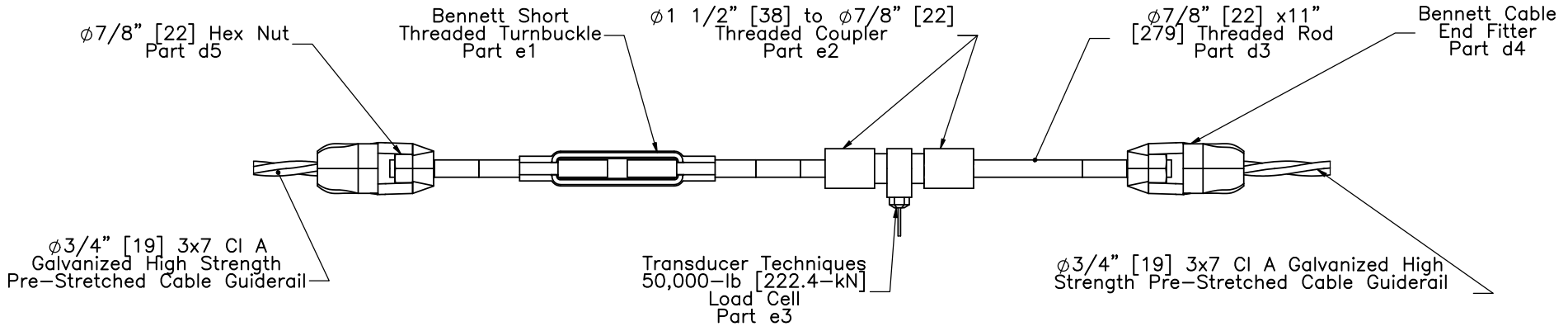
SCALE: 5:16
UNITS: in.[mm]

SHEET: 4 of 26
DATE: 1/26/2018
DRAWN BY: JEK
REV. BY: KAL/TJD/ MP



Load Cell and Turnbuckle Assembly

DETAIL C
SCALE 1 : 30



Note: Two RH-threaded rods and one LH-threaded rod required for load cell and turnbuckle assembly.



Midwest Roadside Safety Facility

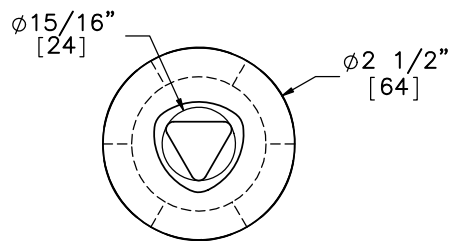
Midwest 4-Cable Barrier System

Load Cell and Turnbuckle Configuration

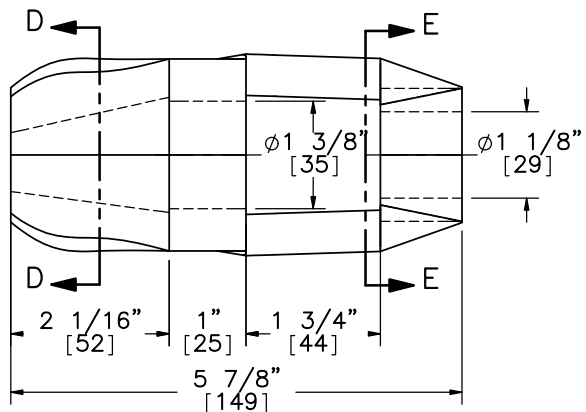
DWG. NAME:
MWP-9_R6

SCALE: 1:8
UNITS: in.[mm]

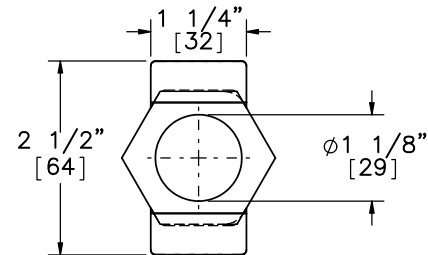
SHEET: 5 of 26
DATE: 1/26/2018
DRAWN BY: JEK
REV. BY: KAL/TJD/ MP



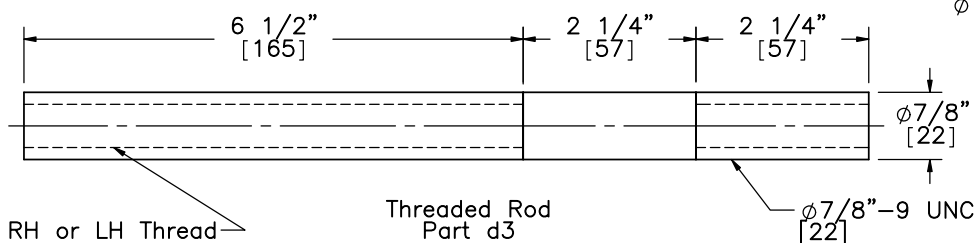
SECTION D-D



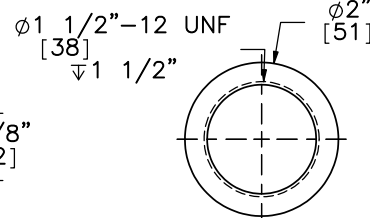
ELEVATION VIEW
Part d4



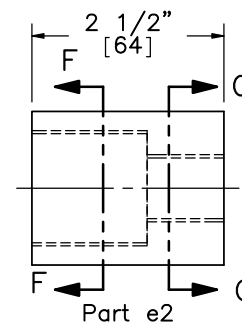
SECTION E-E



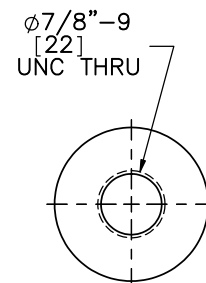
Threaded Rod
Part d3



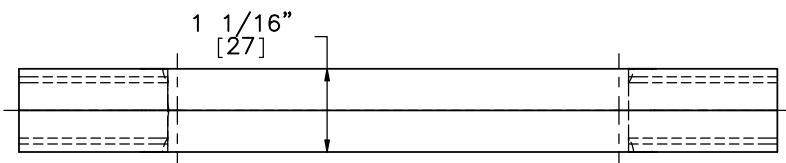
SECTION F-F



Part e2

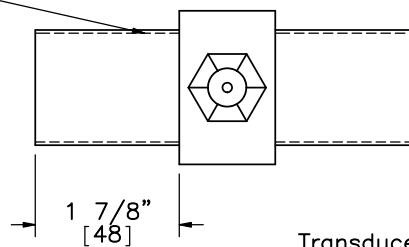


SECTION G-G

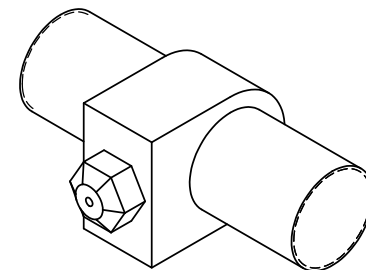


PLAN VIEW

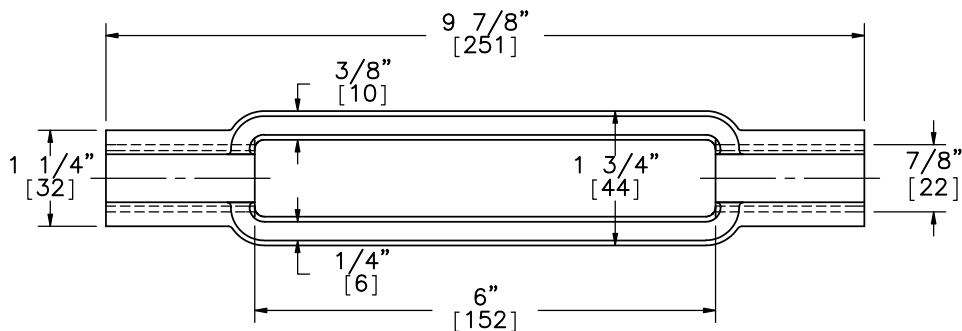
$\phi 1 \frac{1}{2}$ "-12 UNF Threaded Both Sides
[38]



1 7/8" [48]



Transducer Techniques
50,000-lb [222.4-kN] Rated Load Cell
Model# TLL-50K
Part e3



ELEVATION VIEW
Part e1



Midwest Roadside
Safety Facility

Midwest 4-Cable Barrier
System

Load Cell Assembly Component
Details

DWG. NAME:
MWP-9_R6

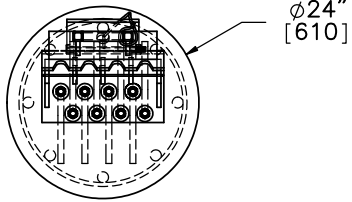
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UNITS: in.[mm]

SHEET:
6 of 26

DATE:
1/26/2018

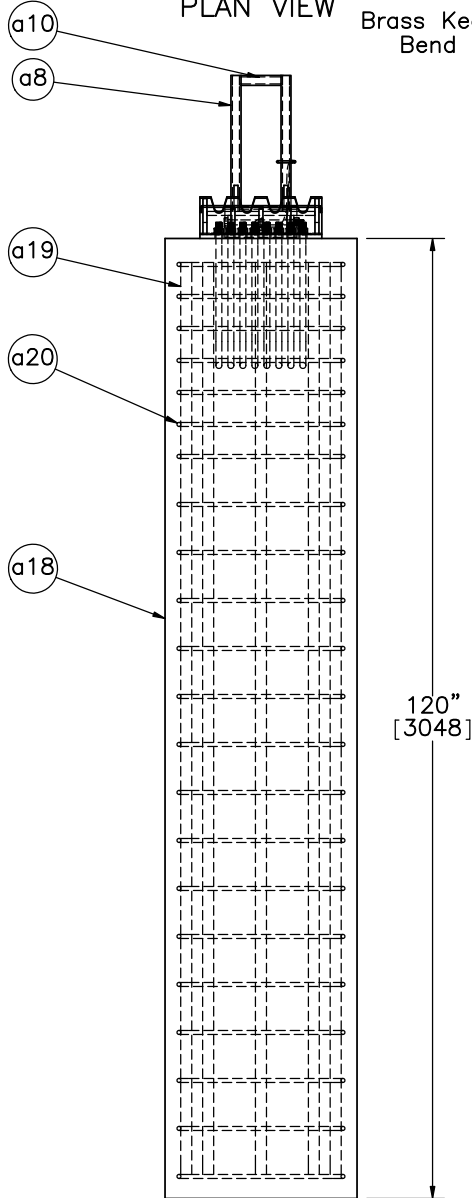
DRAWN BY:
JEK

REV. BY:
KAL/TJD/
MP



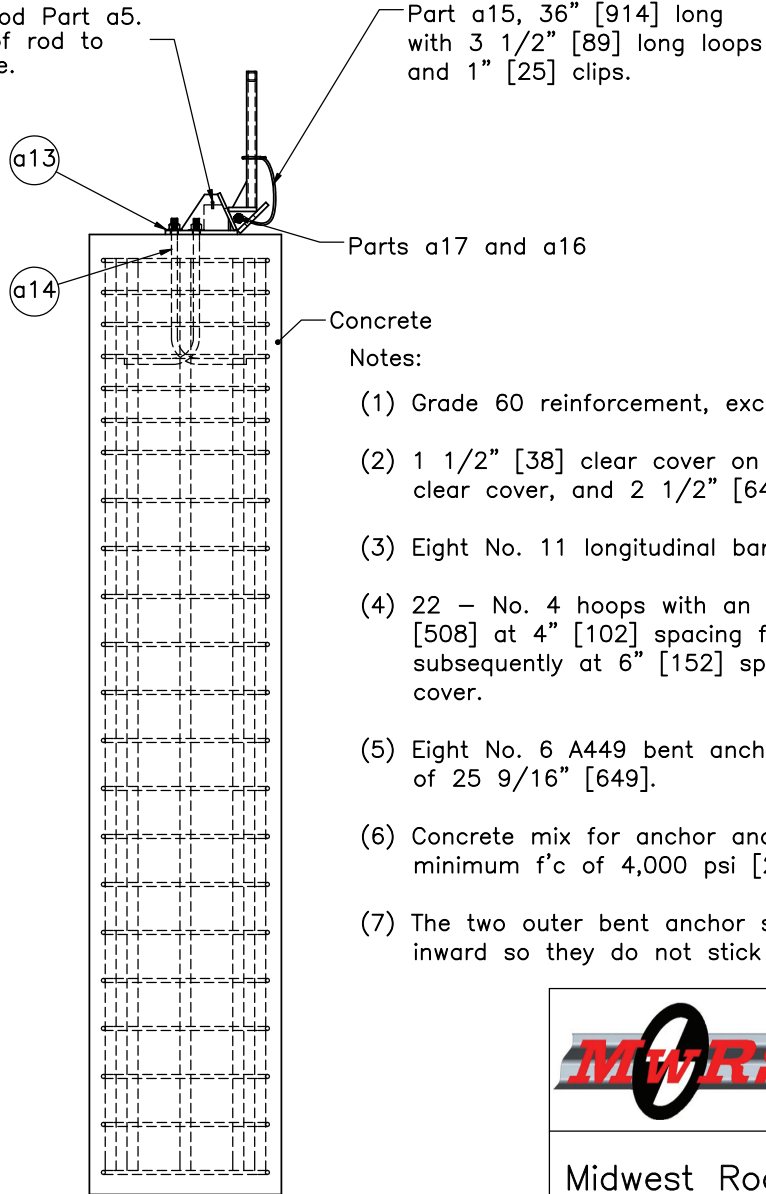
Ø24"
[610]

PLAN VIEW



ELEVATION VIEW

Brass Keeper Rod Part a5.
Bend ends of rod to secure.



PROFILE VIEW

Part a15, 36" [914] long
with 3 1/2" [89] long loops
and 1" [25] clips.

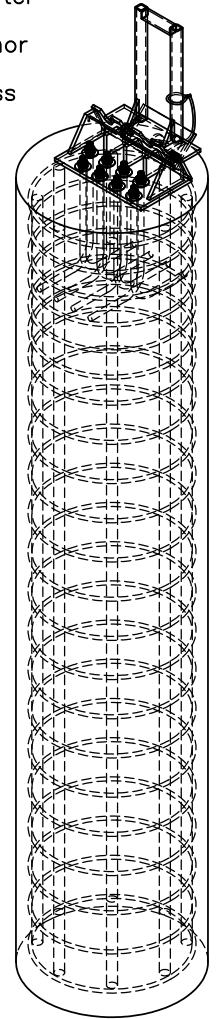
Parts a17 and a16

Concrete

Notes:

- (1) Grade 60 reinforcement, except bent anchor studs.
- (2) 1 1/2" [38] clear cover on sides, 3" [76] on top clear cover, and 2 1/2" [64] clear cover on bottom.
- (3) Eight No. 11 longitudinal bars.
- (4) 22 - No. 4 hoops with an inner diameter of 20" [508] at 4" [102] spacing for the top 24" [610] and subsequently at 6" [152] spacing until bottom clear cover.
- (5) Eight No. 6 A449 bent anchor studs having a length of 25 9/16" [649].
- (6) Concrete mix for anchor and posts shall provide a minimum f'c of 4,000 psi [27.6 MPa].
- (7) The two outer bent anchor studs must be turned inward so they do not stick out of concrete cover.

Note: Brass keeper rod (Part a5) to be placed after all cables are installed and tensioned. Slide rod through the 1/4" [6] holes in the Anchor Bracket, leaving a minimum of 1" [25] on each side of the Anchor Bracket. Bend brass keeper rod down on each side of Anchor Bracket to secure.



ISOMETRIC VIEW



Midwest Roadside
Safety Facility

Midwest 4-Cable Barrier
System

Cable Anchor Detail Post Nos.
1 & 76

DWG. NAME:
MWP-9_R6

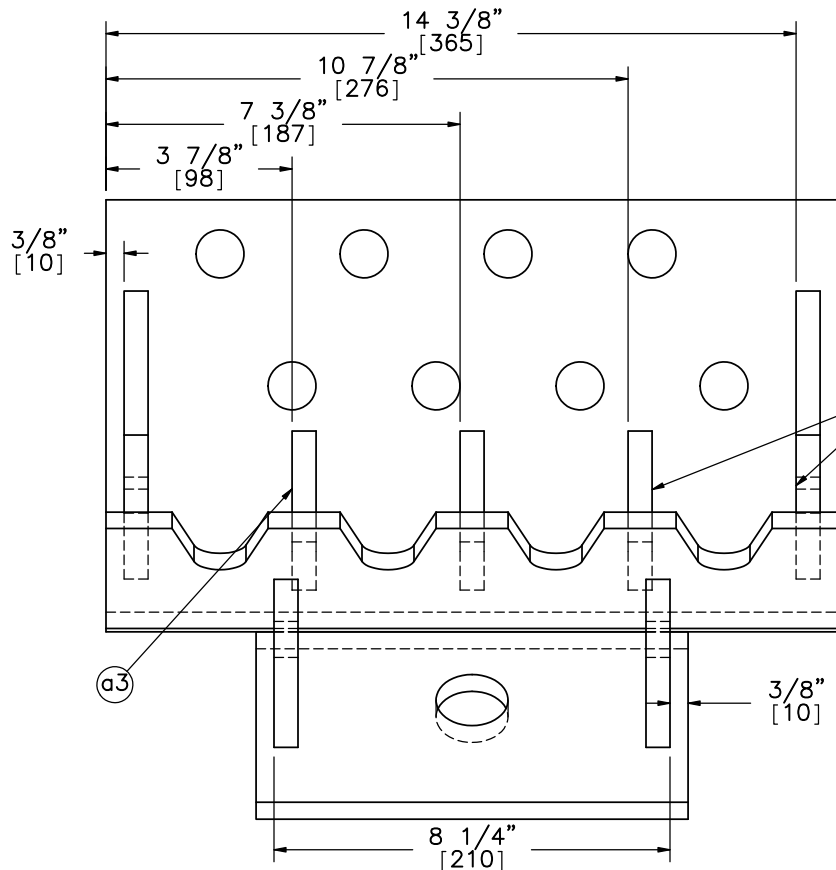
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SHEET:
7 of 26

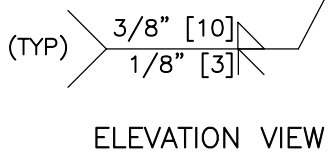
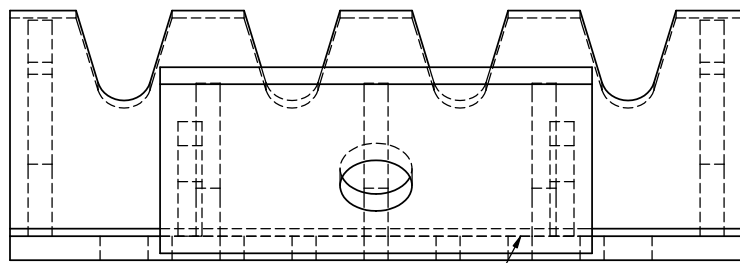
DATE:
1/26/2018

DRAWN BY:
JEK

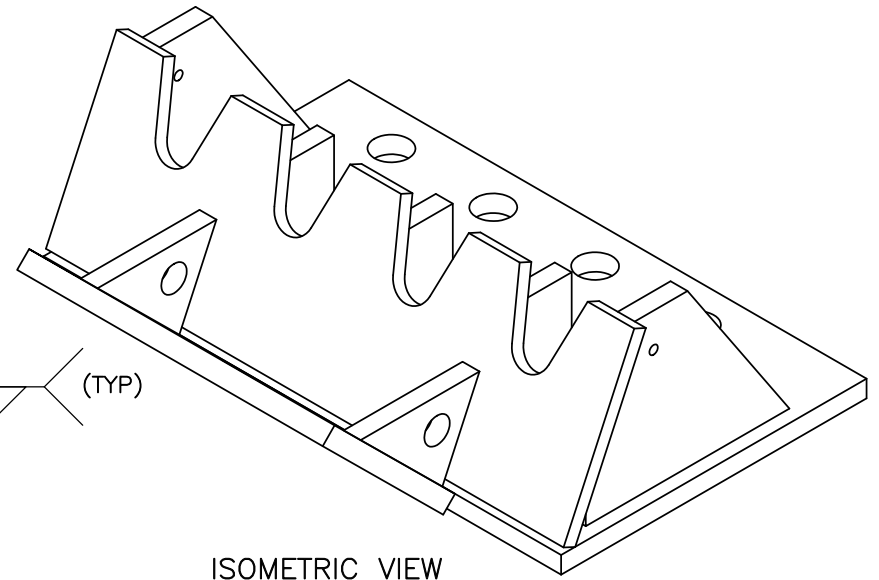
REV. BY:
KAL/TJD/
MP



PLAN VIEW

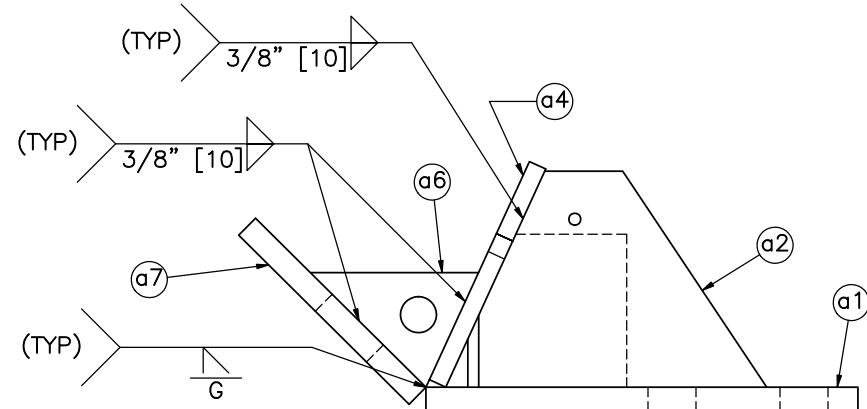


ELEVATION VIEW




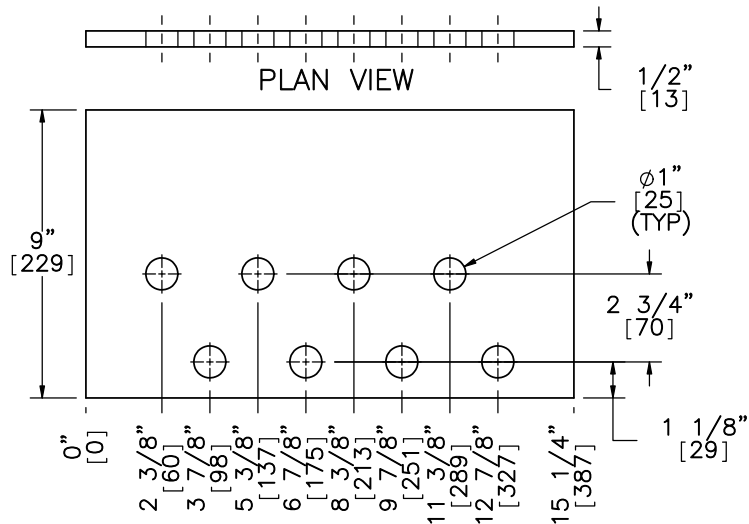
ISOMETRIC VIEW

- Notes: (1) All steel plates conform to ASTM A36.
 (2) The cable anchor bracket is to be galvanized following fabrication.

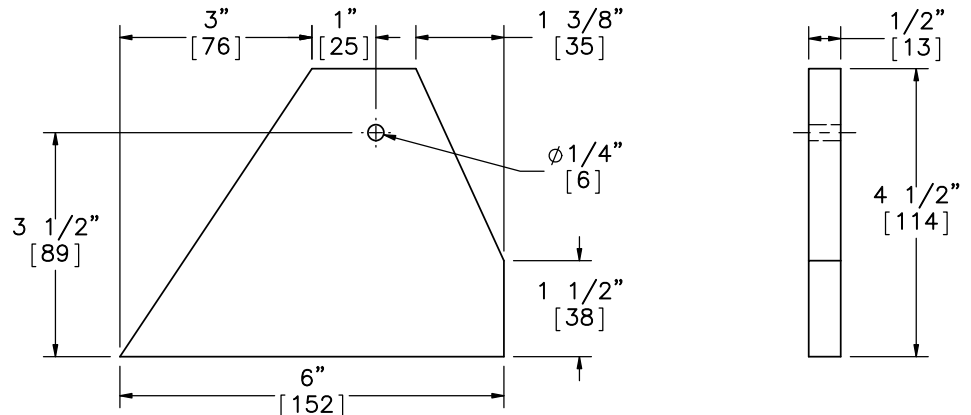


PROFILE VIEW

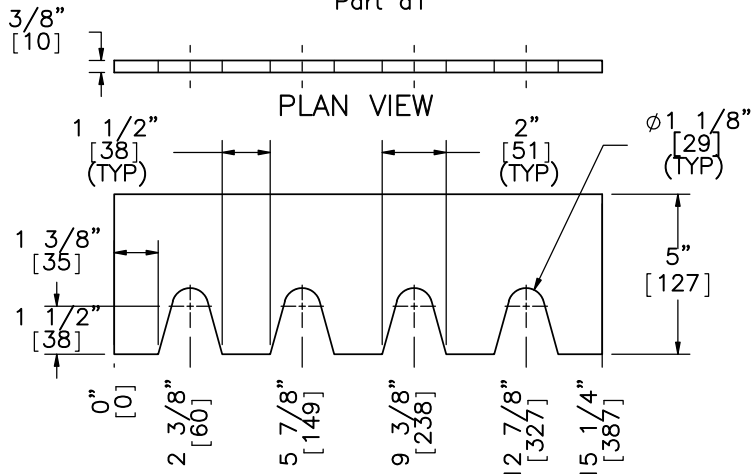
	Midwest 4-Cable Barrier System		SHEET: 8 of 26
	Cable Anchor Bracket		DATE: 1/26/2018
Midwest Roadside Safety Facility	DWG. NAME: MWP-9_R6	SCALE: 1:4 UNITS: in.[mm]	DRAWN BY: JEK
			REV. BY: KAL/TJD/MP



Part a1



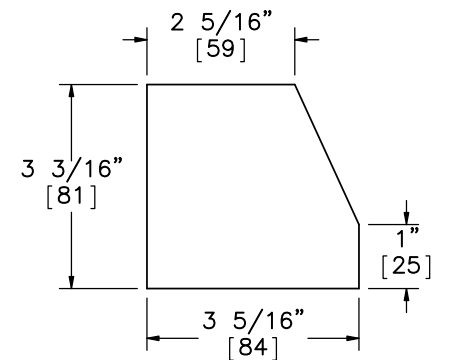
SCALE 1:3
Part a2



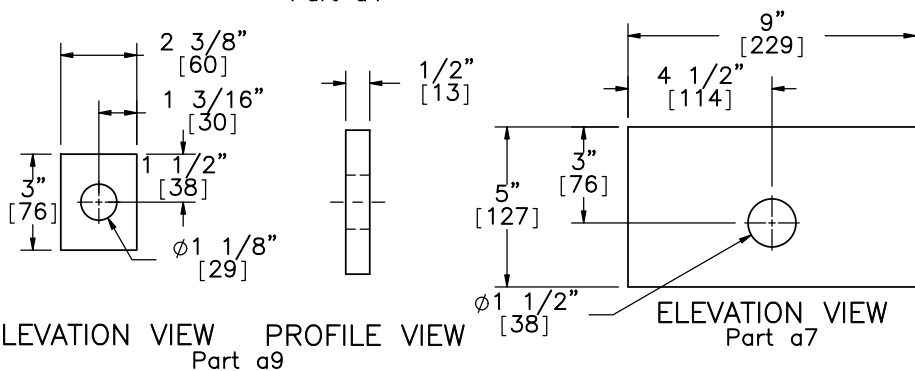
Part a4



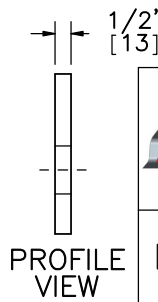
SCALE 1:3
Part a6



SCALE 1:3
Part a3



Part a9



Part a7



Midwest Roadside Safety Facility

Midwest 4-Cable Barrier System

Cable Anchor Bracket Components

DWG. NAME:
MWP-9_R6

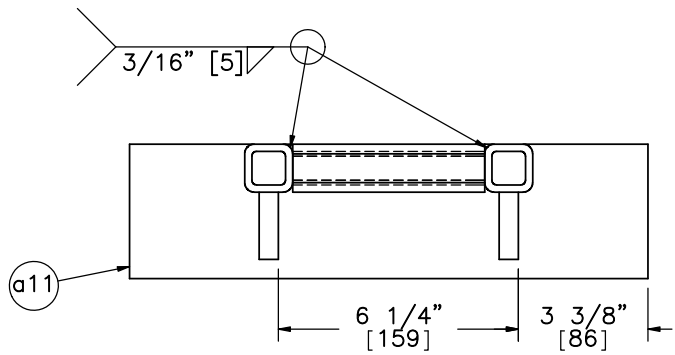
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UNITS: in.[mm]

SHEET:
9 of 26

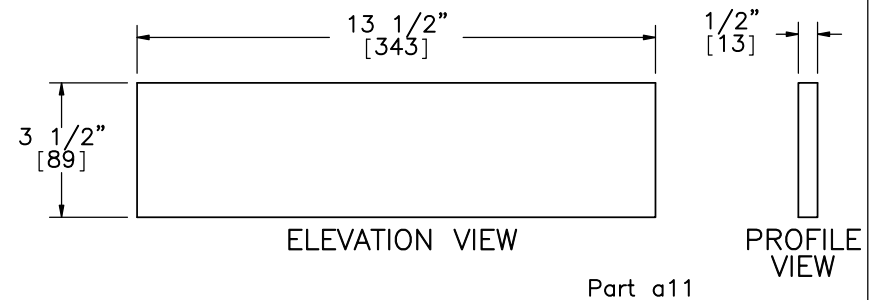
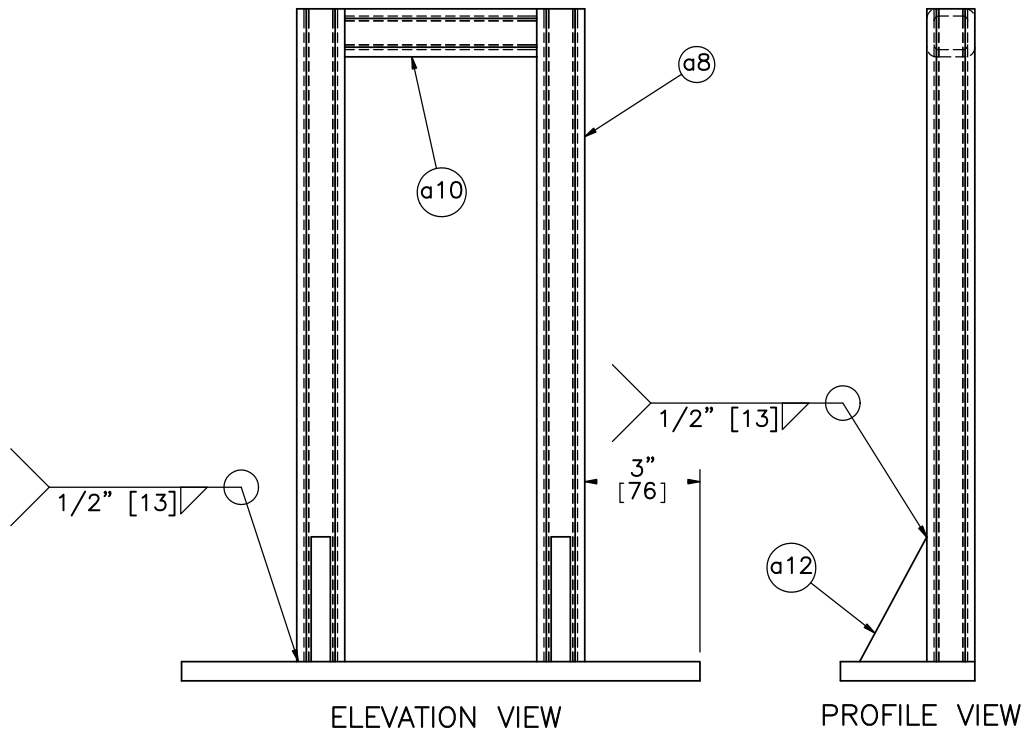
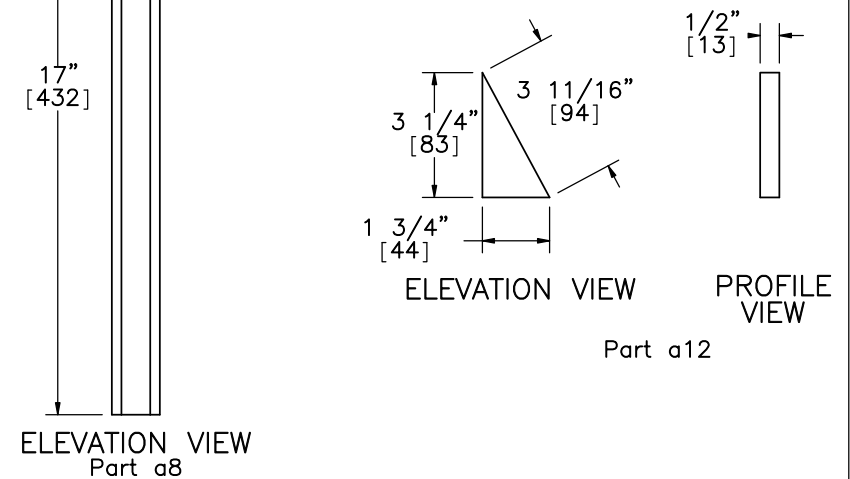
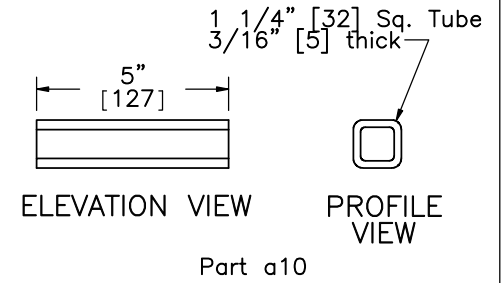
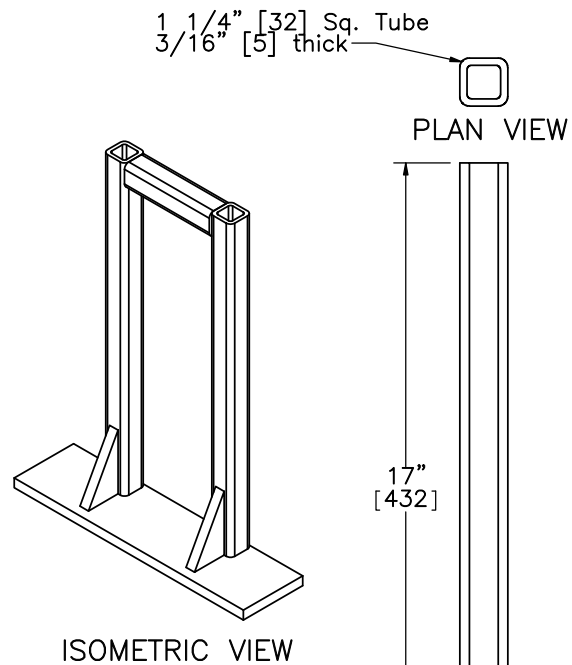
DATE:
1/26/2018

DRAWN BY:
JEK

REV. BY:
KAL/TJD/
MP



- Notes: (1) The kicker lever should be flush with the top of the kicker plate.
 (2) The 3 1/4" [83] leg of the kicker plate gusset should line up with the kicker lever.
 (3) The bottom of the cable release lever should rest upon Part a6.
 (4) All steel plates conform to ASTM A36.
 (5) All steel tubing conforms to ASTM A500 Grade B.



Midwest Roadside Safety Facility

Midwest 4-Cable Barrier System

Cable Release Lever

DWG. NAME:
MWP-9_R6

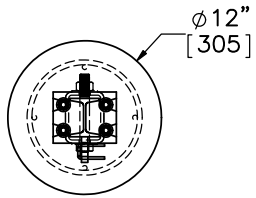
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SHEET:
10 of 26

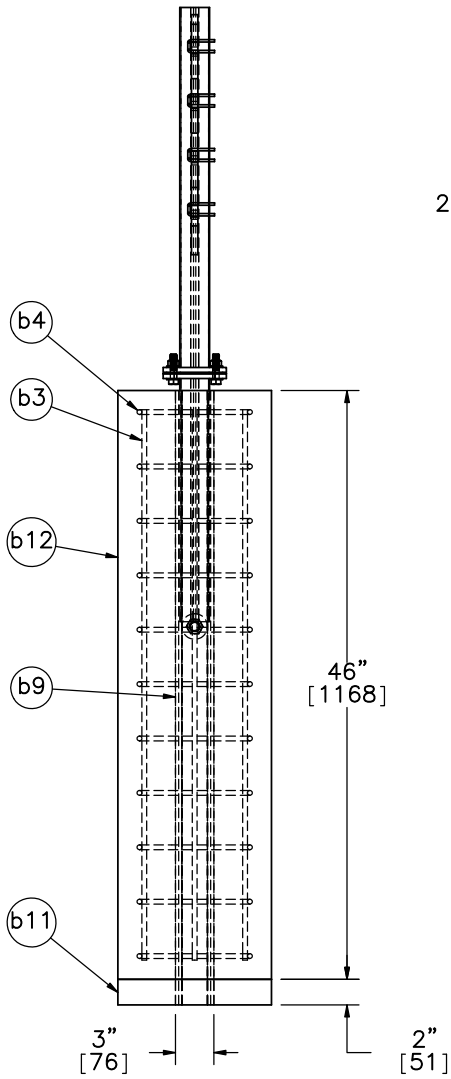
DATE:
1/26/2018

DRAWN BY:
JEK

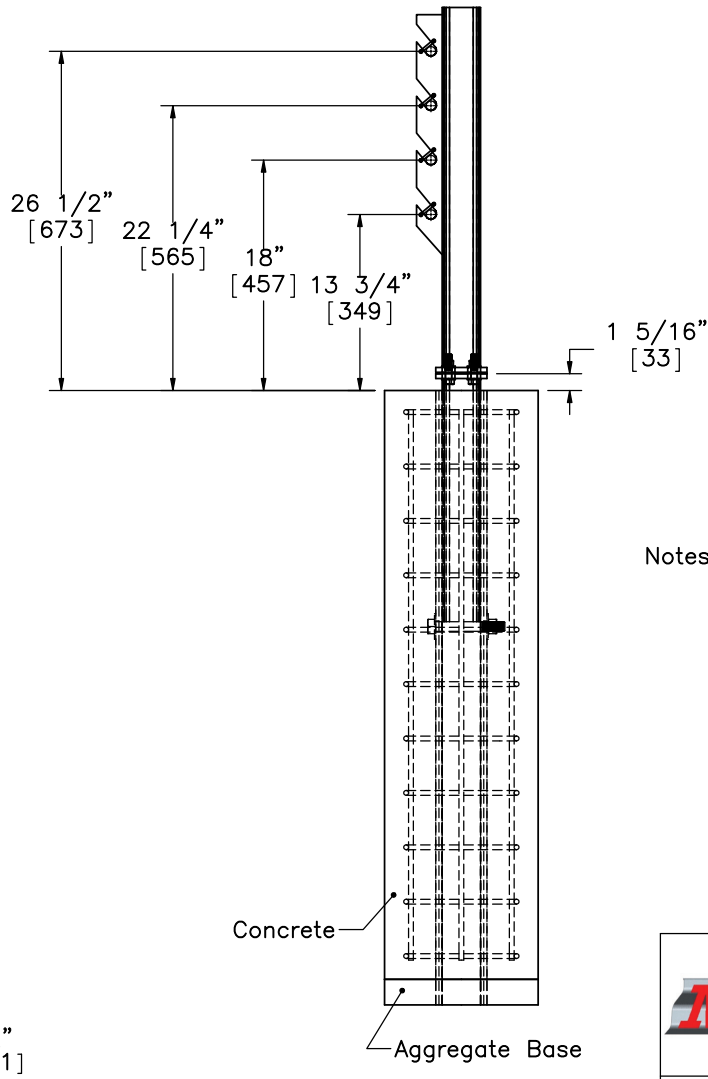
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KAL/TJD/
MP



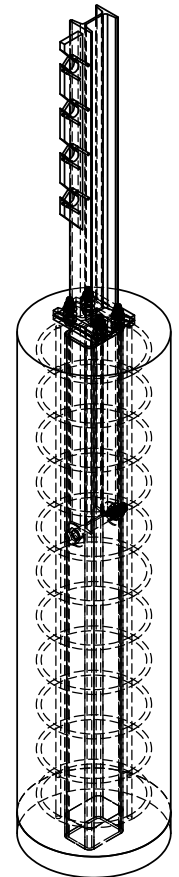
PLAN VIEW



ELEVATION VIEW



PROFILE VIEW



ISOMETRIC VIEW

- Notes: (1) Grade 60 Reinforcement.
 (2) 1 1/2" [38] clear cover.
 (3) 11 No. 3 hoops with an inner diameter of 7 1/4" [184] and a vertical spacing of 4 1/4" [108].
 (4) 4 No. 3 longitudinal bars.
 (5) Concrete mix for anchor posts shall provide a minimum f'_c of 4,000 psi [27.6 MPa].

Cable Support Post
 Post 2 & 75 Only



Midwest Roadside
 Safety Facility

Midwest 4-Cable Barrier
 System

Second Post Detail
 Post Nos. 2 & 75

DWG. NAME:
 MWP-9_R6

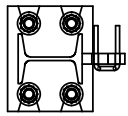
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 UNITS: in.[mm]

SHEET:
 11 of 26

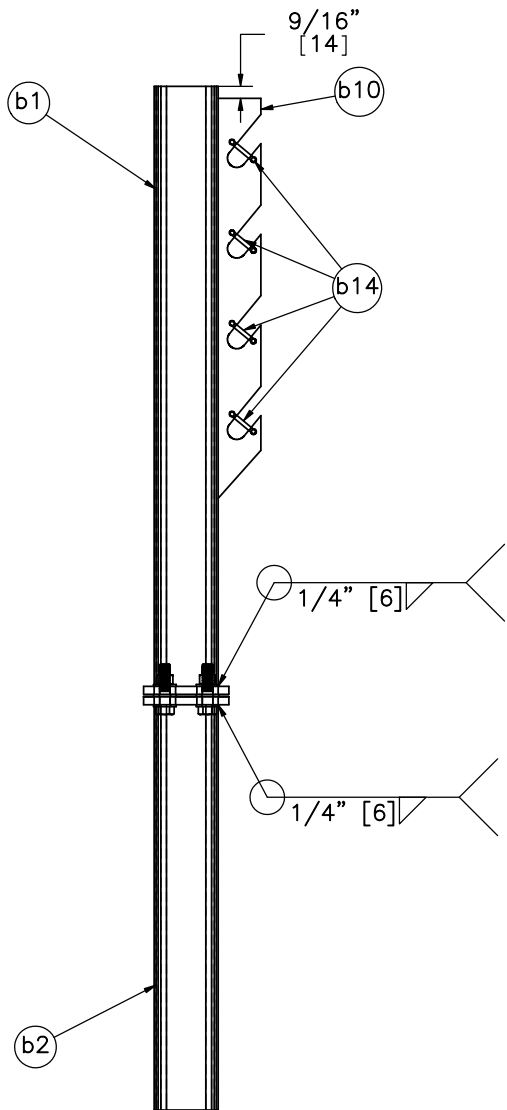
DATE:
 1/26/2018

DRAWN BY:
 JEK

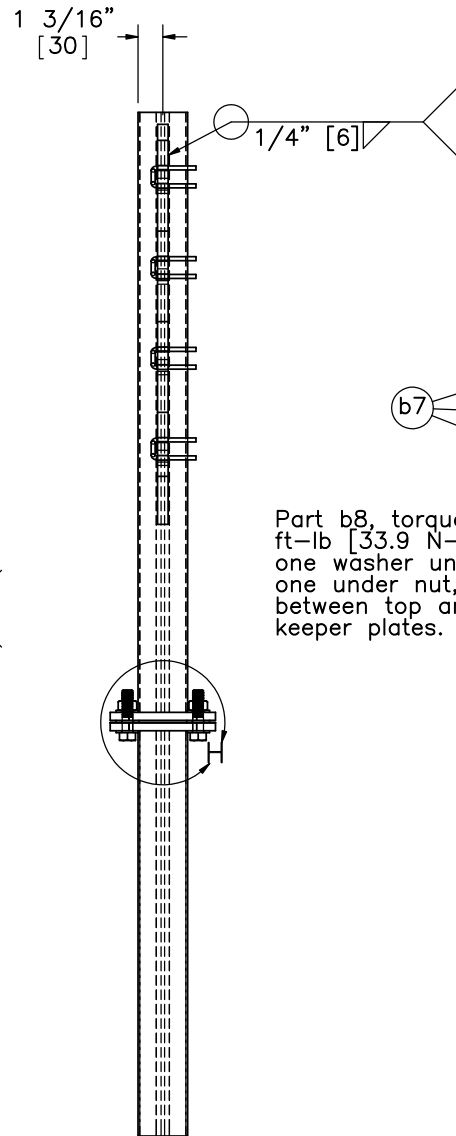
REV. BY:
 KAL/TJD/
 MP



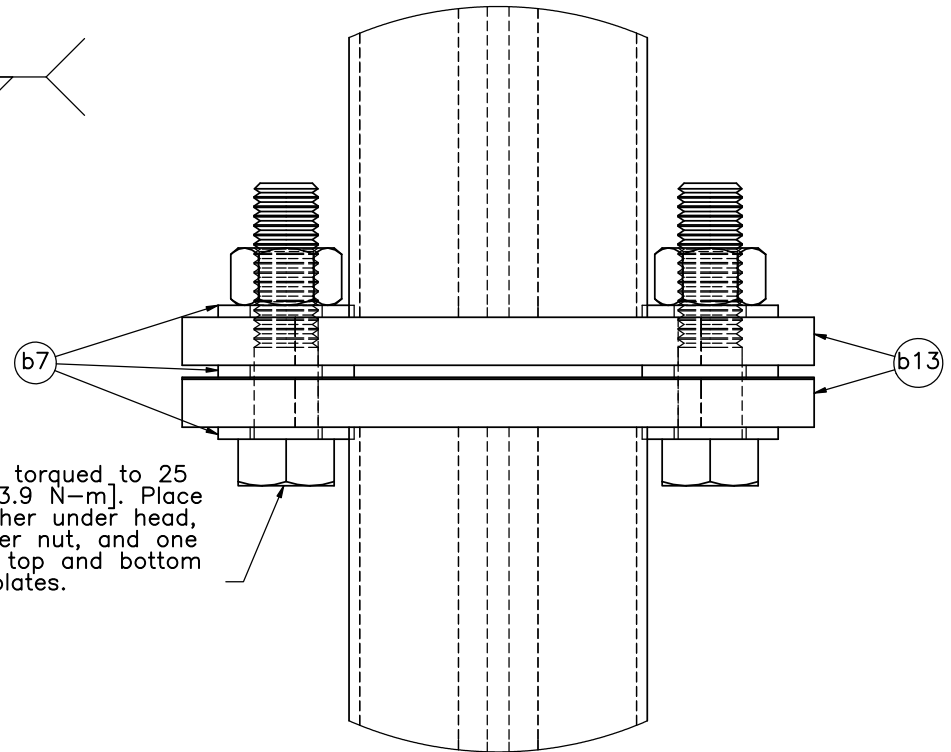
PLAN VIEW



ELEVATION VIEW



PROFILE VIEW



Part b8, torqued to 25 ft-lb [33.9 N-m]. Place one washer under head, one under nut, and one between top and bottom keeper plates.

DETAIL H
SCALE 2:3

Note: (1) Brass cable retainers (Part b14) should be inserted into designated holes, and the ends of the retainers should be bent to retain retainers in the holes.



Midwest Roadside
Safety Facility

Midwest 4-Cable Barrier
System

Cable Hanger Assembly
Post Nos. 2 & 75

DWG. NAME:
MWP-9_R6

SCALE: 1:9
UNITS: in.[mm]

SHEET:
12 of 26

DATE:
1/26/2018

DRAWN BY:
JEK

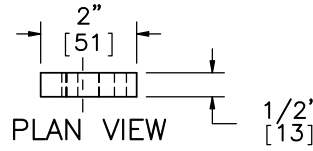
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KAL/TJD/
MP



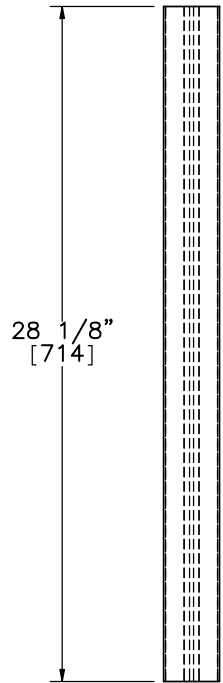
PLAN VIEW



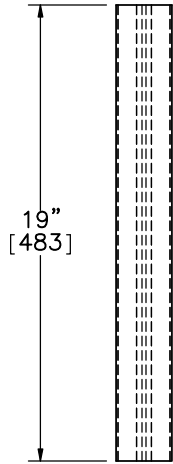
PLAN VIEW



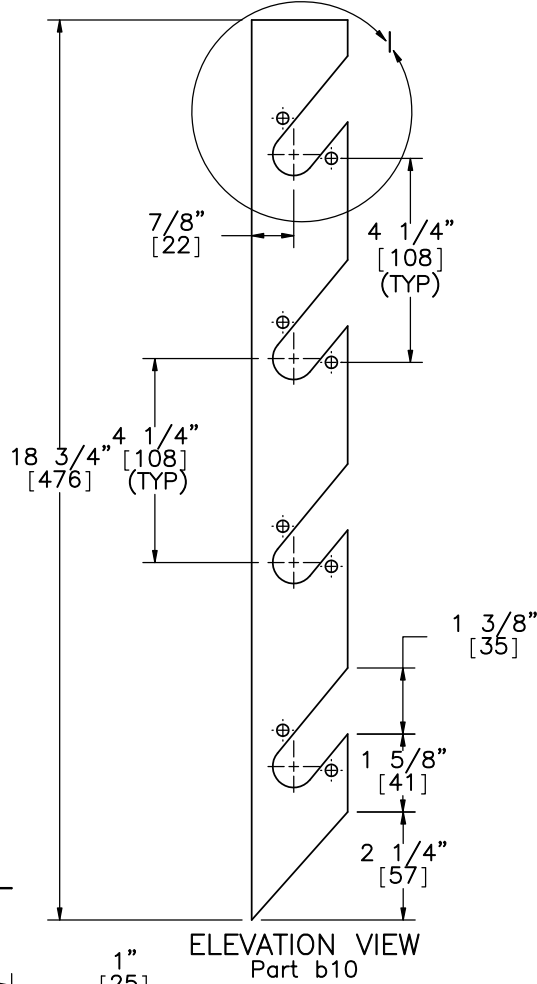
PLAN VIEW



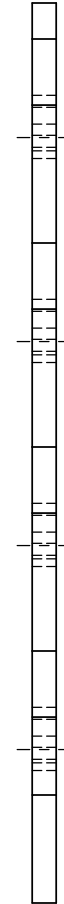
ELEVATION VIEW
Part b1



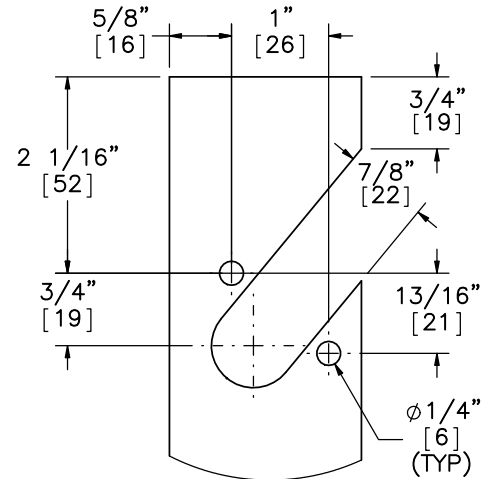
ELEVATION VIEW
Part b2



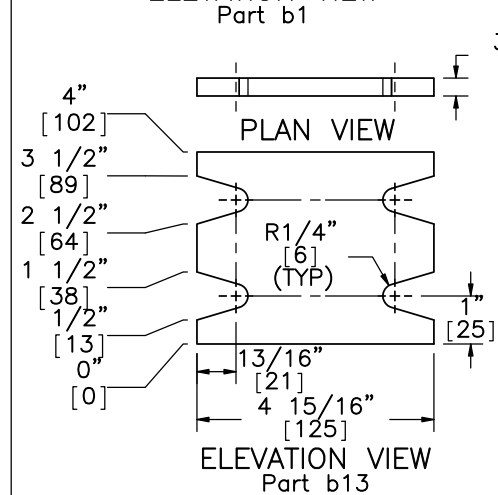
ELEVATION VIEW
Part b10



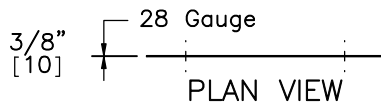
PROFILE VIEW



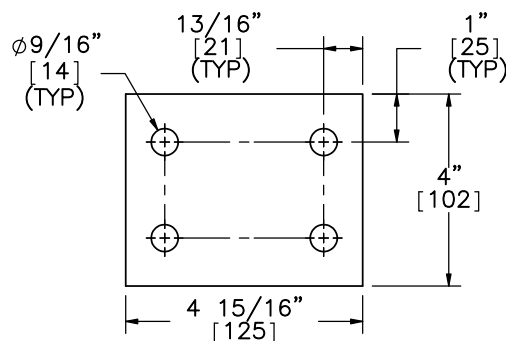
DETAIL 1
SCALE 1 : 2



ELEVATION VIEW
Part b13



PLAN VIEW



ELEVATION VIEW
Part b5



Midwest Roadside
Safety Facility

Midwest 4-Cable Barrier
System

Cable Hanger Assembly
Post Nos. 2 & 75

DWG. NAME:
MWP-9_R6

SCALE: 1:8
UNITS: in.[mm]

SHEET:
13 of 26

DATE:
1/26/2018

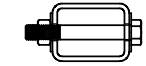
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JEK

REV. BY:
KAL/TJD/
MP

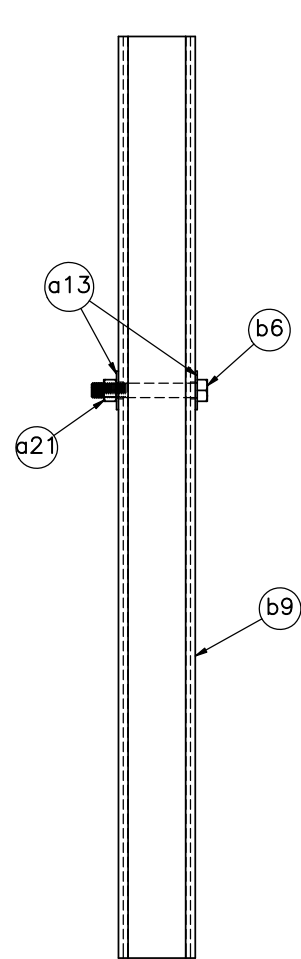
4" [102] x 3" [76] x 1/4" [6] tube
 ASTM A500 Grade B



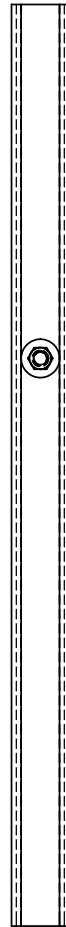
PLAN VIEW



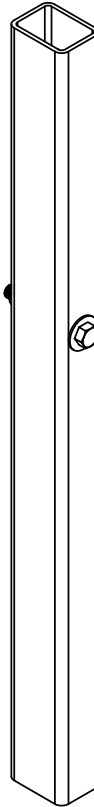
PLAN VIEW



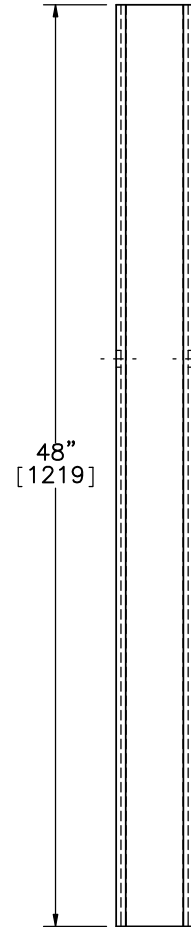
ELEVATION VIEW



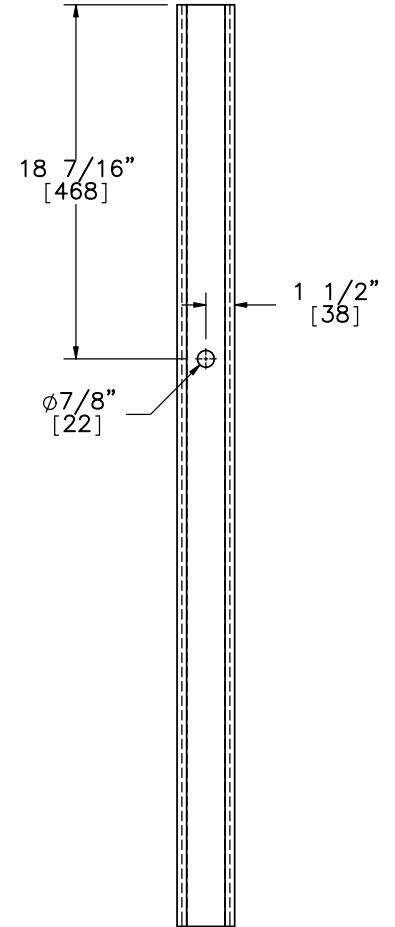
PROFILE VIEW



ISOMETRIC VIEW



ELEVATION VIEW



PROFILE VIEW

Part b9



Midwest Roadside
 Safety Facility

Midwest 4-Cable Barrier
 System

Foundation Tube Assembly
 Post Nos. 2 & 75

DWG. NAME:
 MWP-9_R6

SCALE: 1:10
 UNITS: in.[mm]

SHEET:
 14 of 26

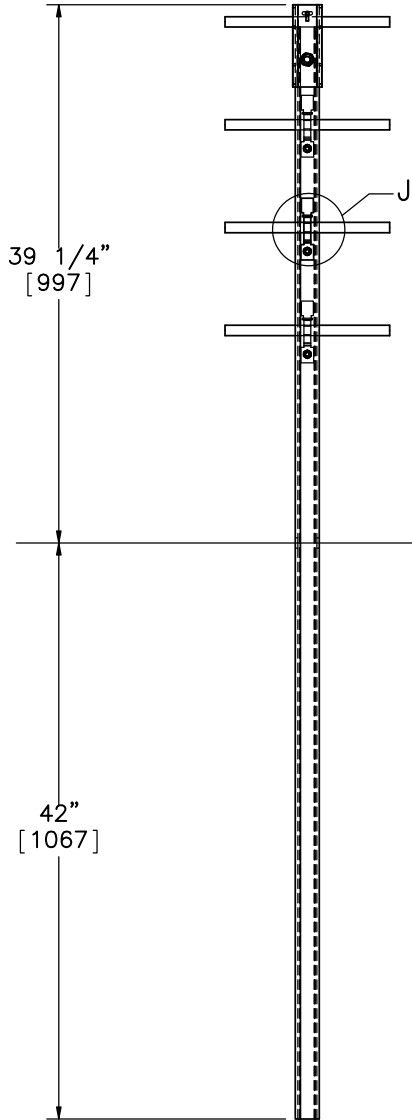
DATE:
 1/26/2018

DRAWN BY:
 JEK

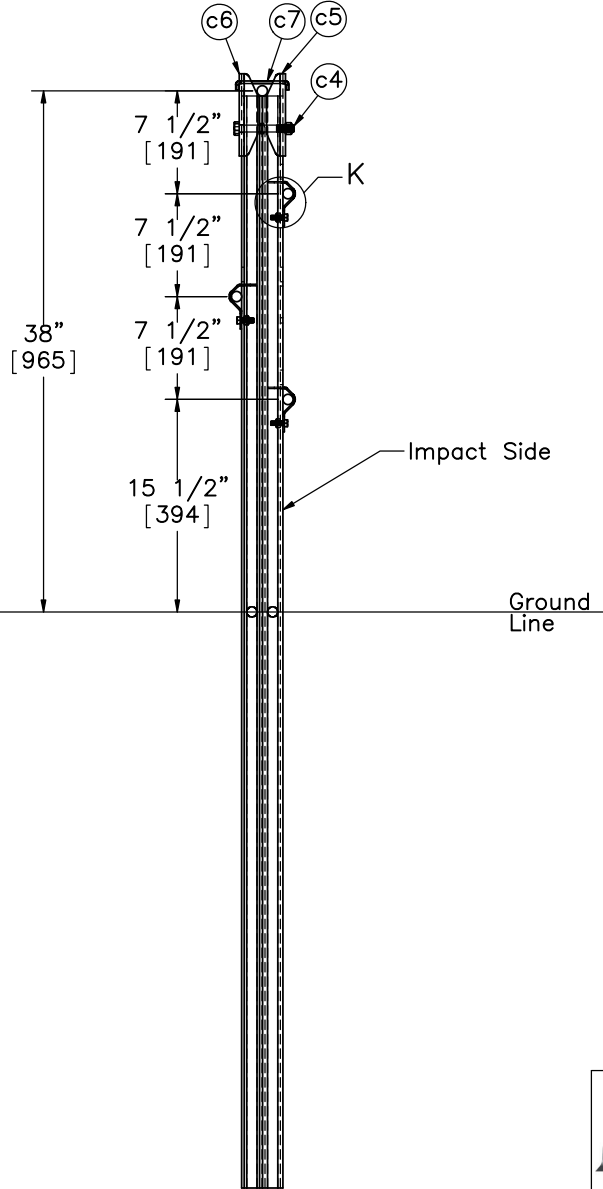
REV. BY:
 KAL/TJD/
 MP



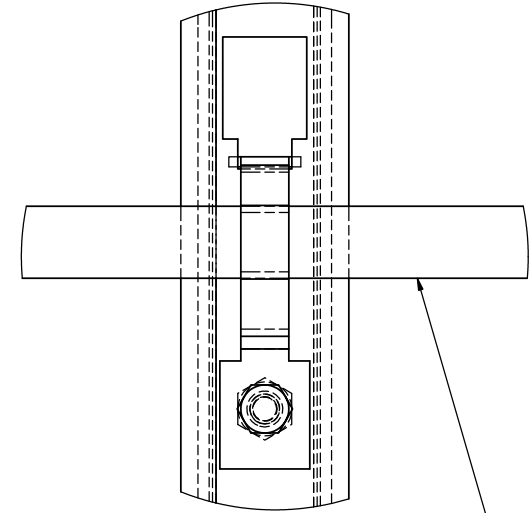
PLAN VIEW



ELEVATION VIEW

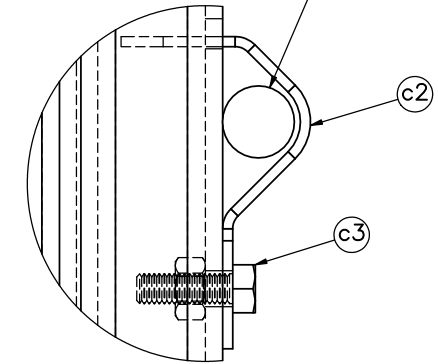


PROFILE VIEW



DETAIL J
SCALE 1 : 2

Cable



DETAIL K
SCALE 1 : 2

Note: Brass cable clip (Part c7) should be inserted into designated hole and slot in the post cap.



Midwest Roadside Safety Facility

Midwest 4-Cable Barrier System

Weak Post

DWG. NAME:
MWP-9_R6

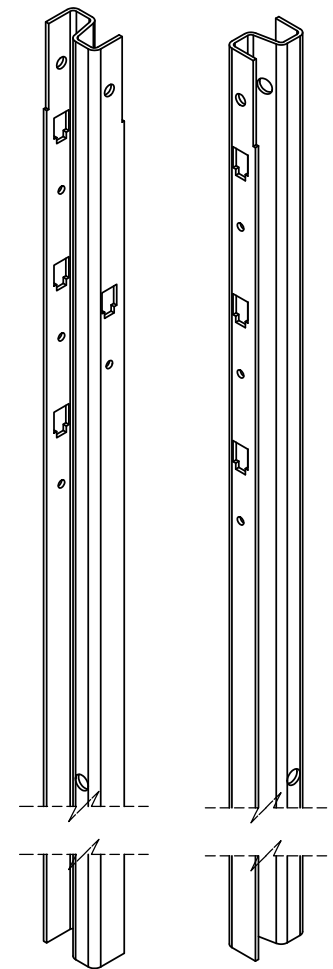
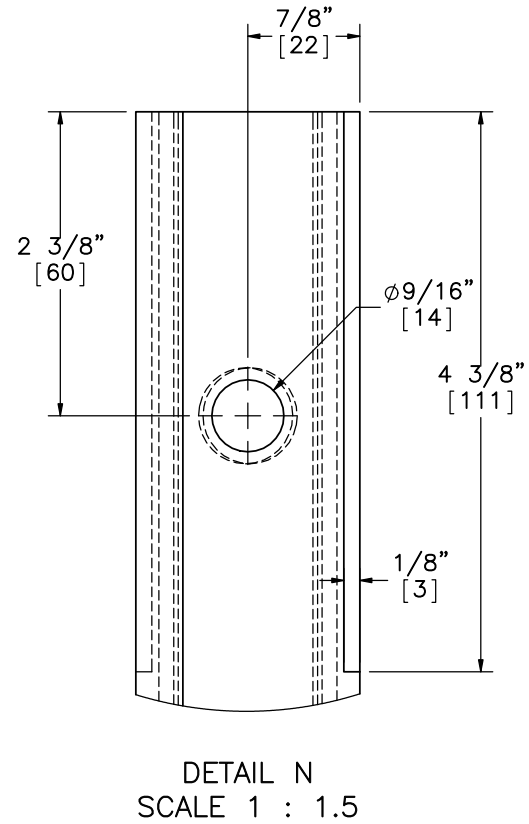
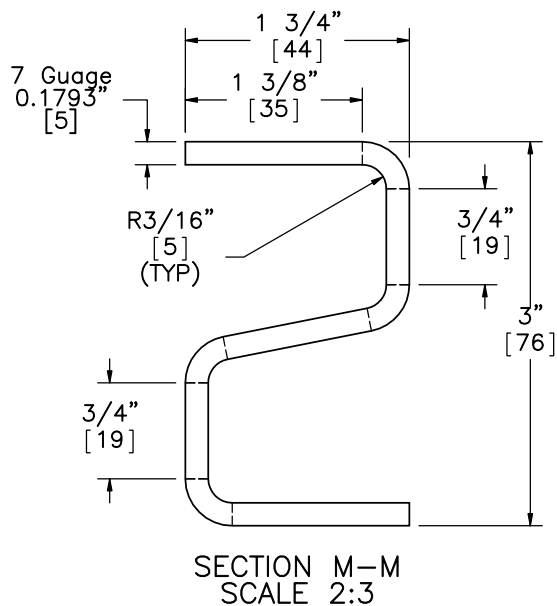
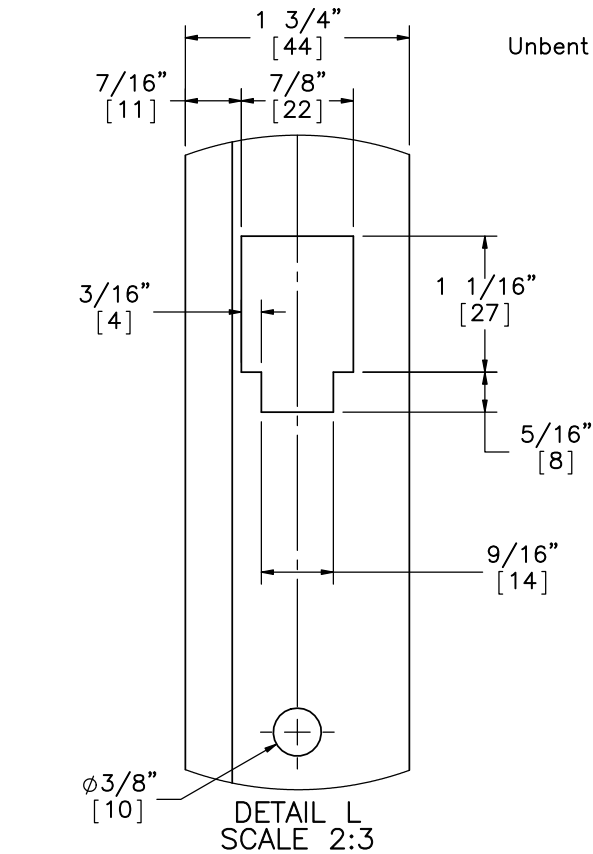
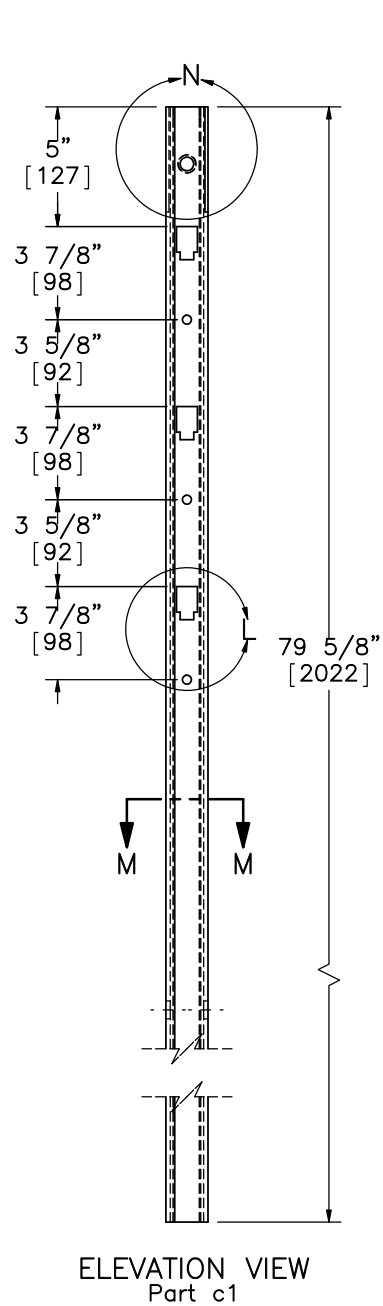
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UNITS: in.[mm]

SHEET:
15 of 26

DATE:
1/26/2018

DRAWN BY:
JEK

REV. BY:
KAL/TJD/
MP



Midwest Roadside Safety Facility

Midwest 4-Cable Barrier System

Post Nos. 3-74

DWG. NAME.
MWP-9_R6

SCALE: 1:8
UNITS: in.[mm]

SHEET:
16 of 26

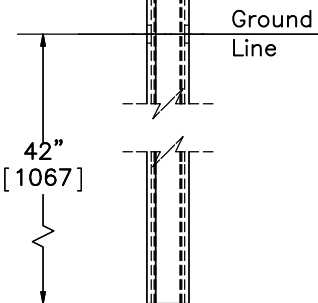
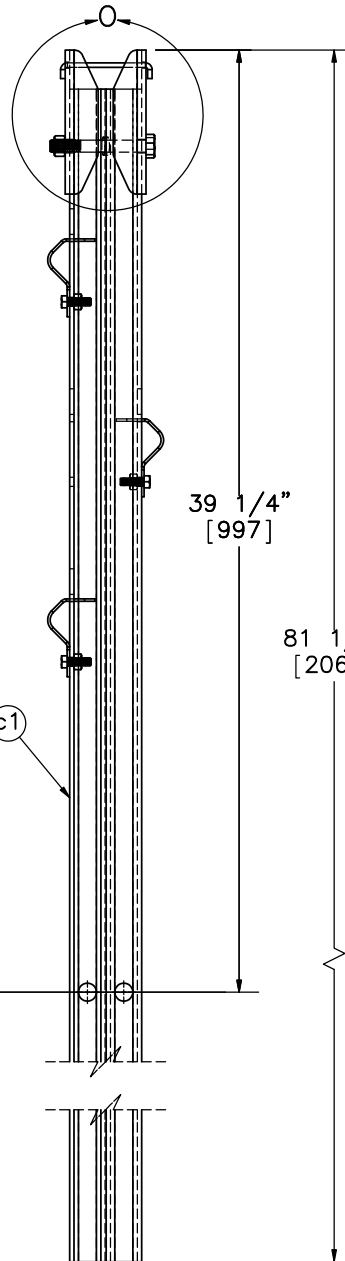
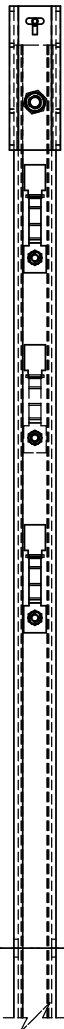
DATE:
1/26/2018

DRAWN BY:
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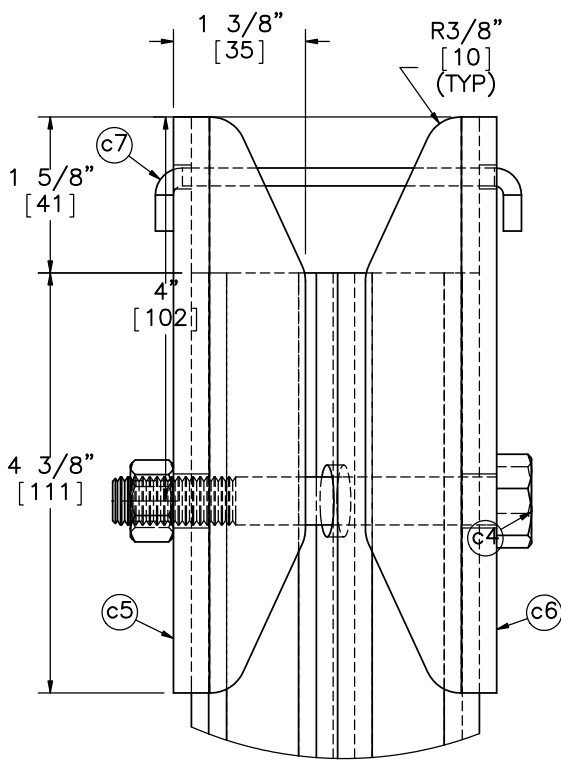
REV. BY:
KAL/TJD/
MP



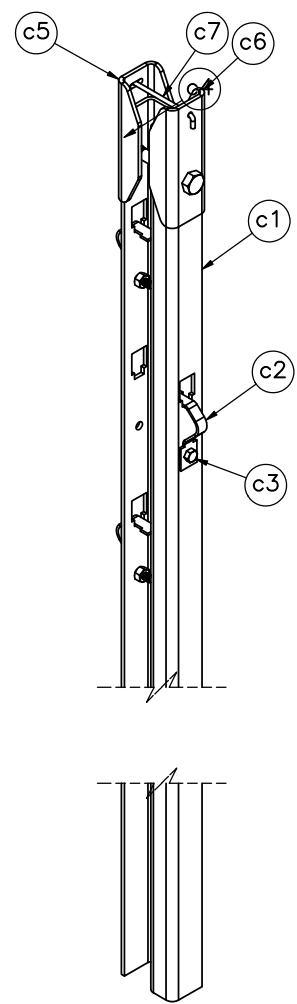
PLAN VIEW



ELEVATION VIEW PROFILE VIEW
Post Assembly



DETAIL 0
SCALE 1 : 2



ISOMETRIC VIEW



Midwest Roadside Safety Facility

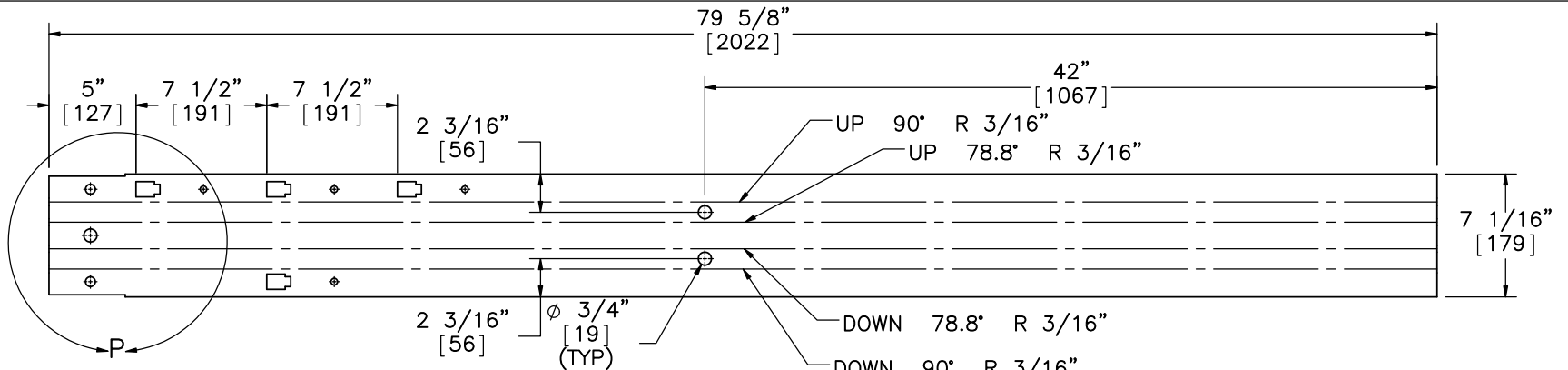
Midwest 4-Cable Barrier System

Post Assembly

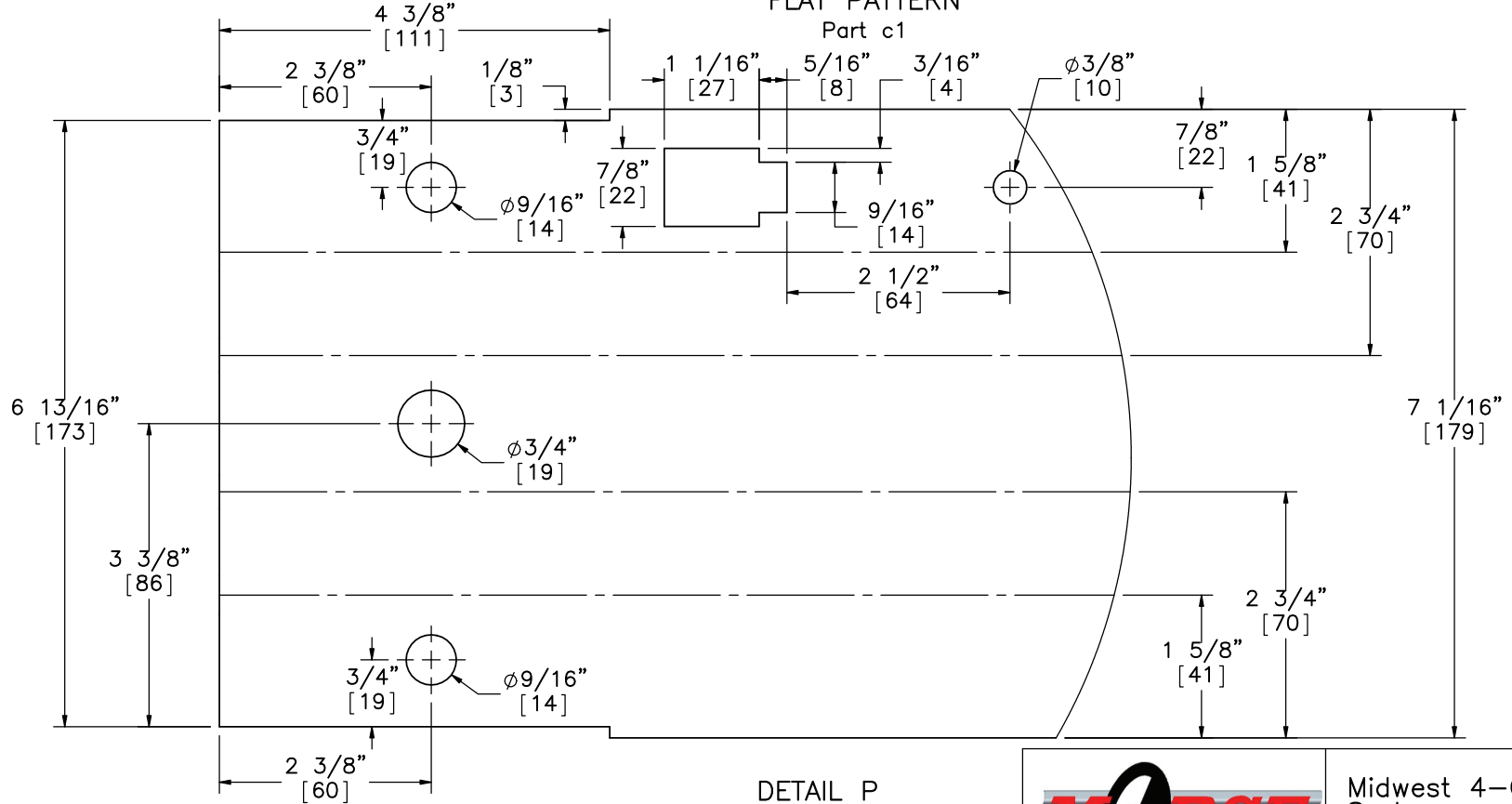
DWG. NAME:
MWP-9_R6

SCALE: 1:8
UNITS: in.[mm]

SHEET:
17 of 26
DATE:
1/26/2018
DRAWN BY:
JEK
REV. BY:
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MP



FLAT PATTERN



DETAIL P
 SCALE 1 : 2



Midwest Roadside Safety Facility

Midwest 4-Cable Barrier System

Post Nos. 3-74

DWG. NAME.
 MWP-9_R6

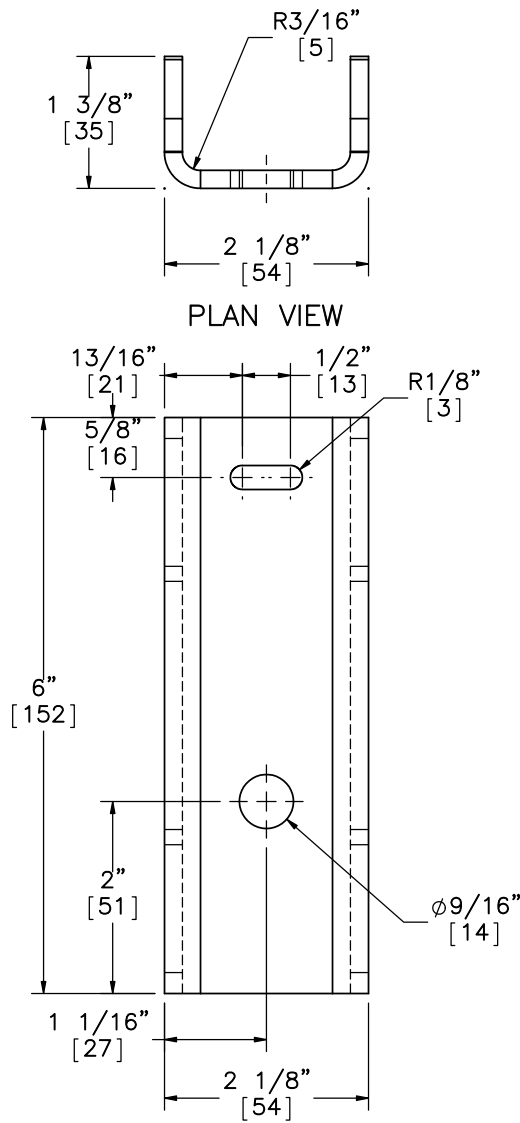
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SHEET:
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DATE:
 1/26/2018

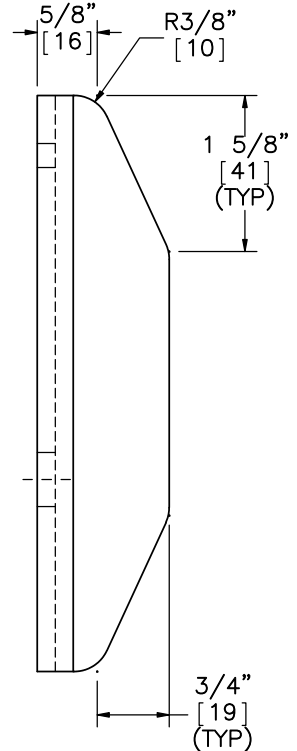
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REV. BY:
 KAL/TJD/MP

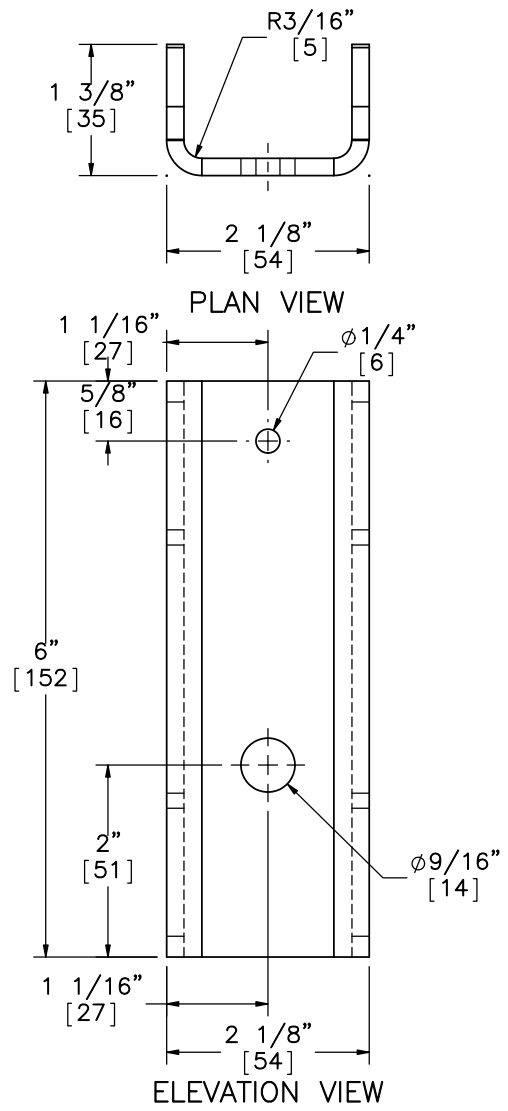


PLAN VIEW

ELEVATION VIEW

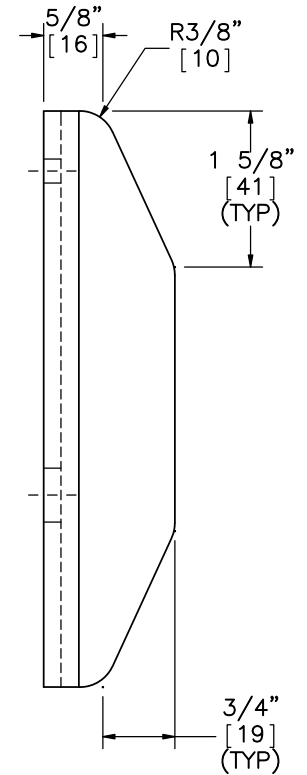


PROFILE VIEW



PLAN VIEW

ELEVATION VIEW



PROFILE VIEW

Part c5

Part c6



Midwest Roadside Safety Facility

Midwest 4-Cable Barrier System

Post Cap Details, Post Nos. 3-74

DWG. NAME:
MWP-9_R6

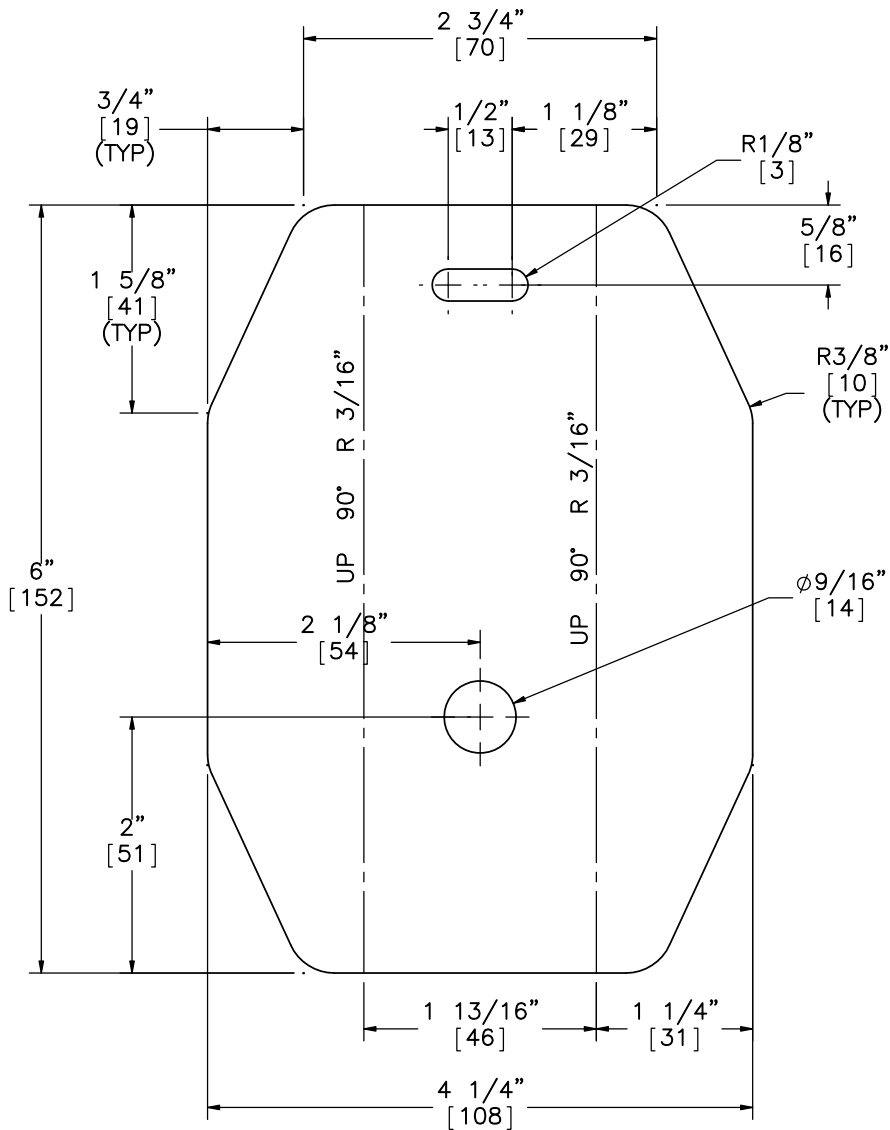
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SHEET:
19 of 26

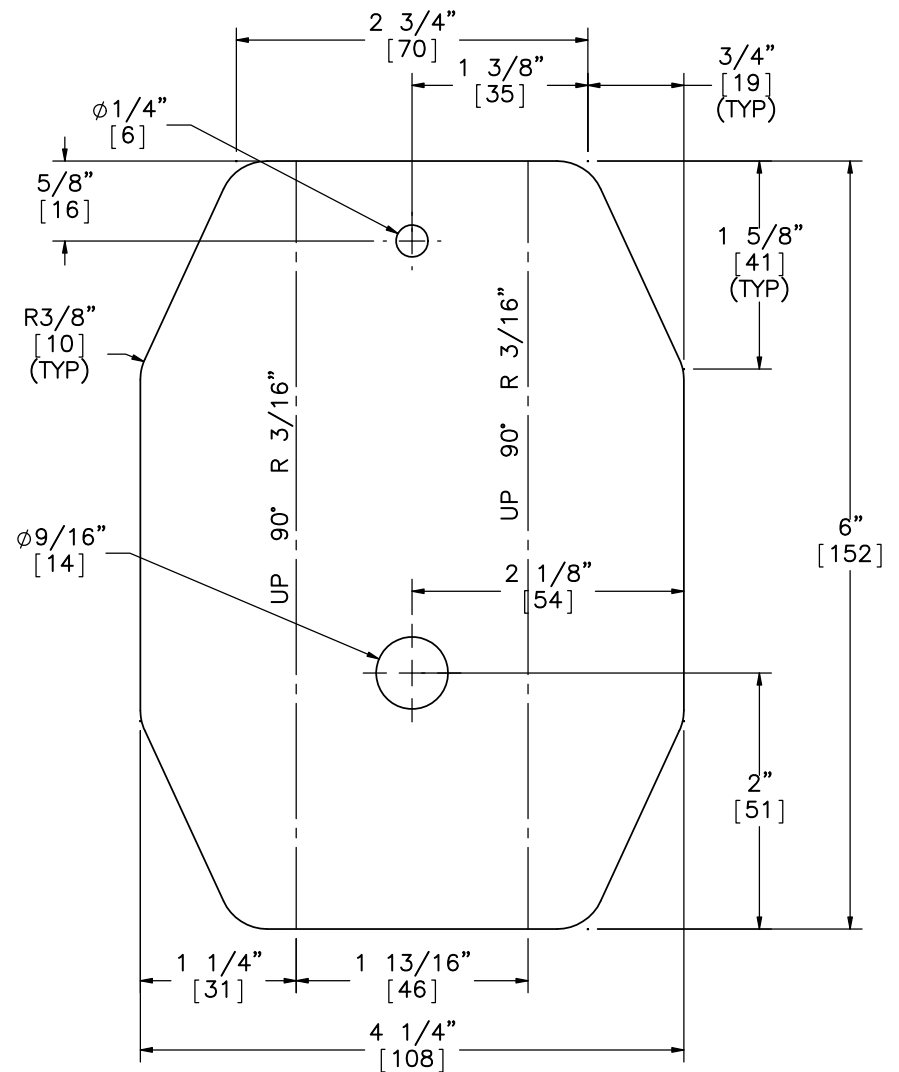
DATE:
1/26/2018

DRAWN BY:
JEK

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MP



FLAT PATTERN
Part c5



FLAT PATTERN
Part c6



Midwest Roadside
Safety Facility

Midwest 4-Cable Barrier
System

Post Cap Flat Patterns

DWG. NAME:
MWP-9_R6

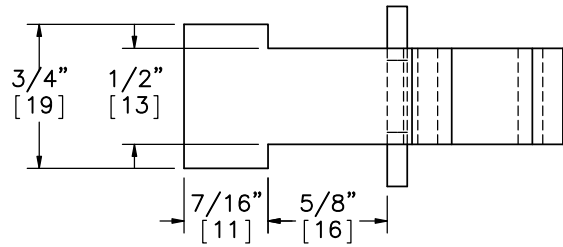
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SHEET:
20 of 26

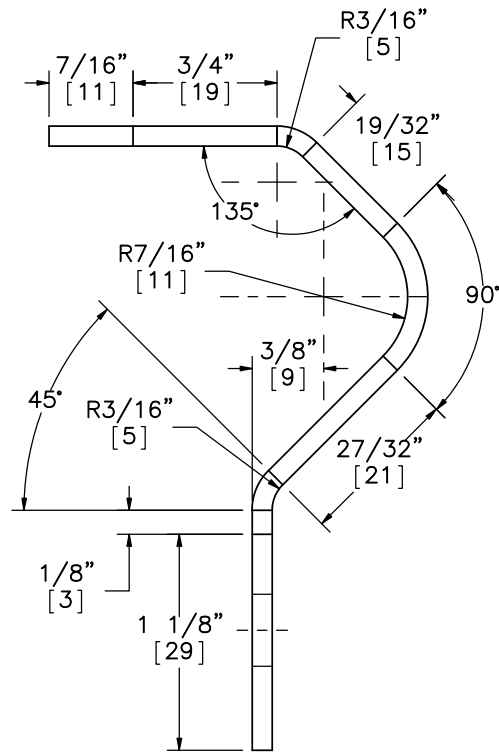
DATE:
1/26/2018

DRAWN BY:
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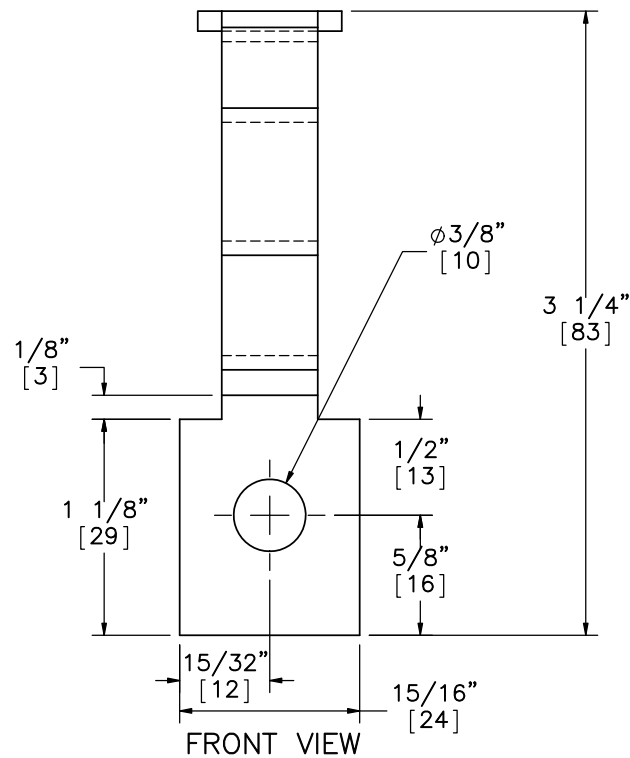
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KAL/TJD/
MP



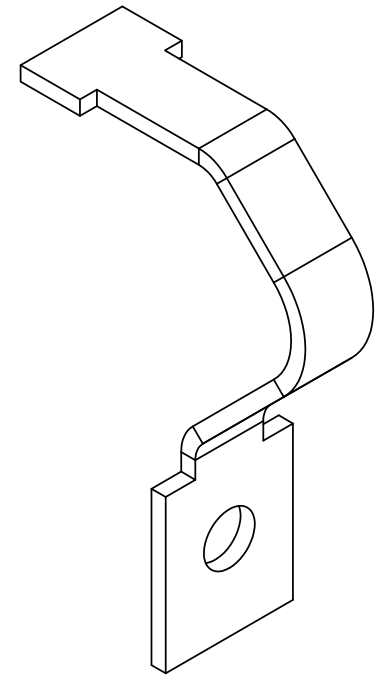
TOP VIEW



PROFILE VIEW
Tabbed Bracket Version 10
Part c2



FRONT VIEW



ISOMETRIC VIEW



Midwest Roadside
Safety Facility

Midwest 4-Cable Barrier
System

Tabbed Bracket Version 10
(12 Gauge)

DWG. NAME:
MWP-9_R6

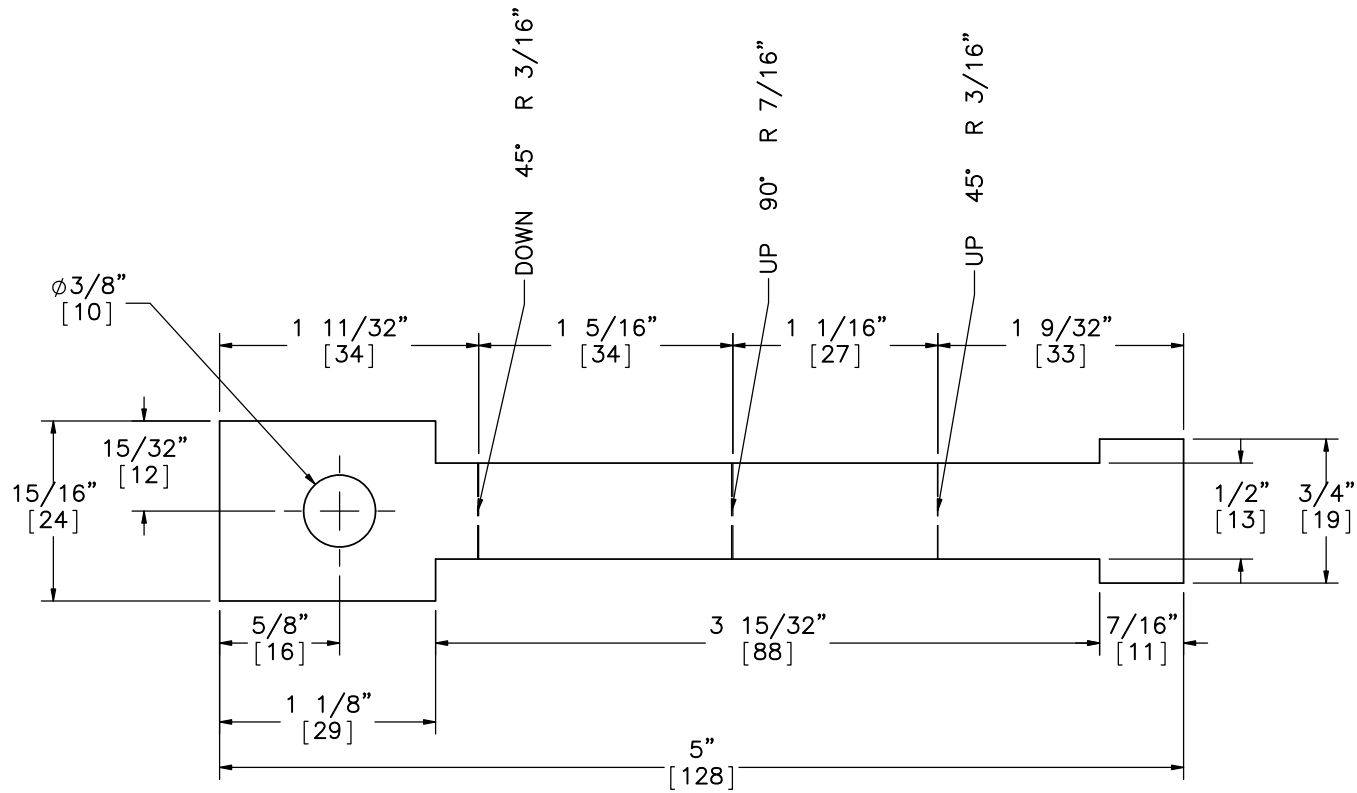
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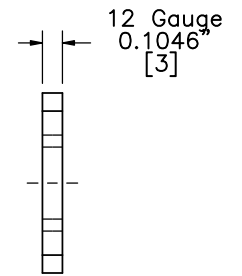
DATE:
1/26/2018

DRAWN BY:
JEK

REV. BY:
KAL/TJD/
MP



FLAT PATTERN FRONT/BACK
 Tabbed Bracket Version 10
 Part c2



FLAT PATTERN
 SIDE VIEW



Midwest Roadside
 Safety Facility

Midwest 4-Cable Barrier
 System

Tabbed Bracket Version 10
 Flat Pattern

DWG. NAME:
 MWP-9_R6

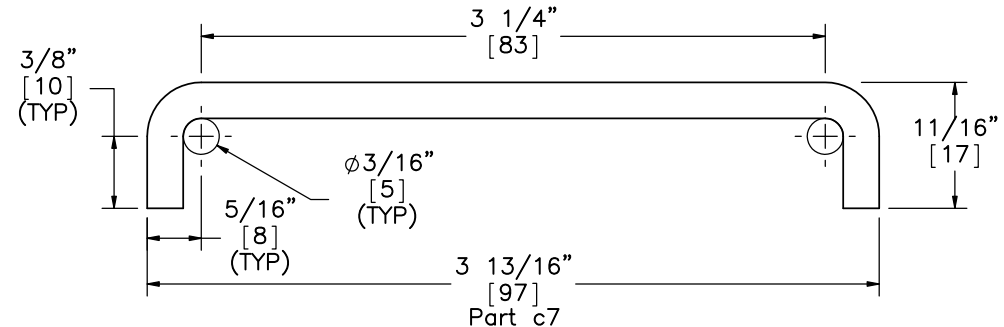
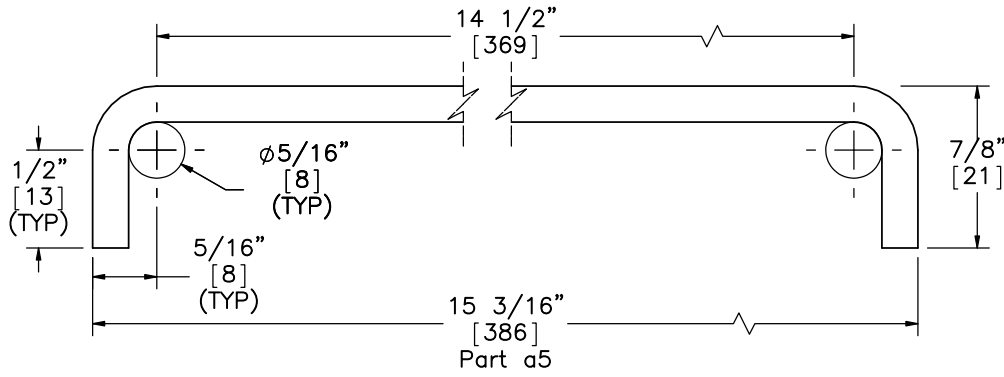
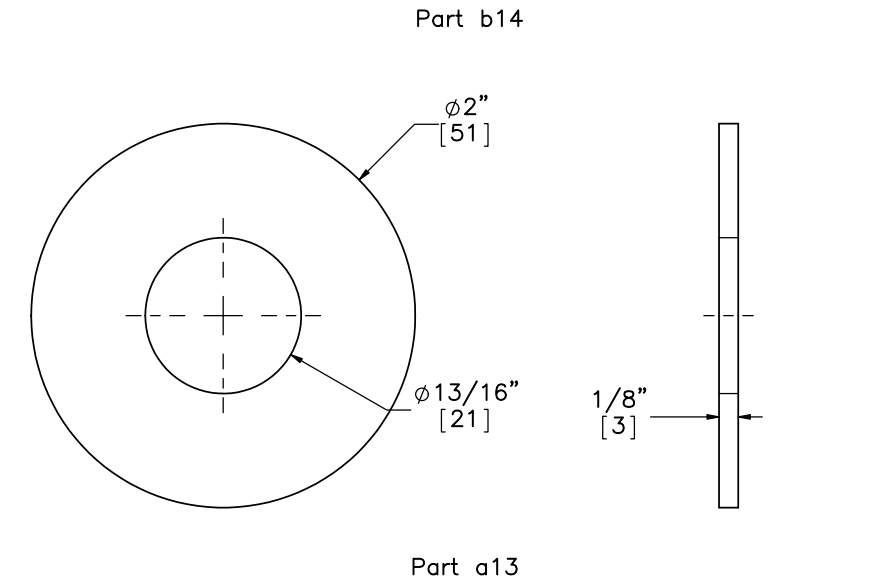
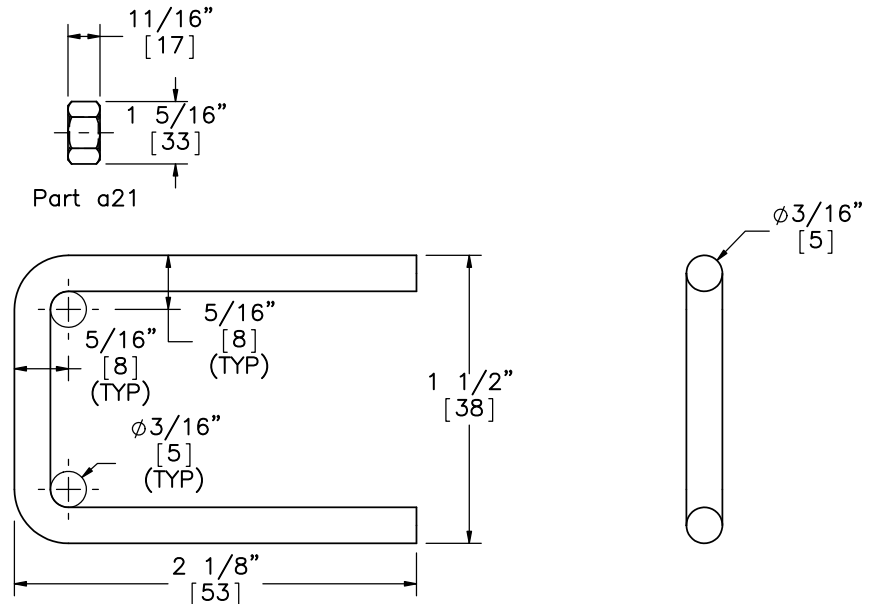
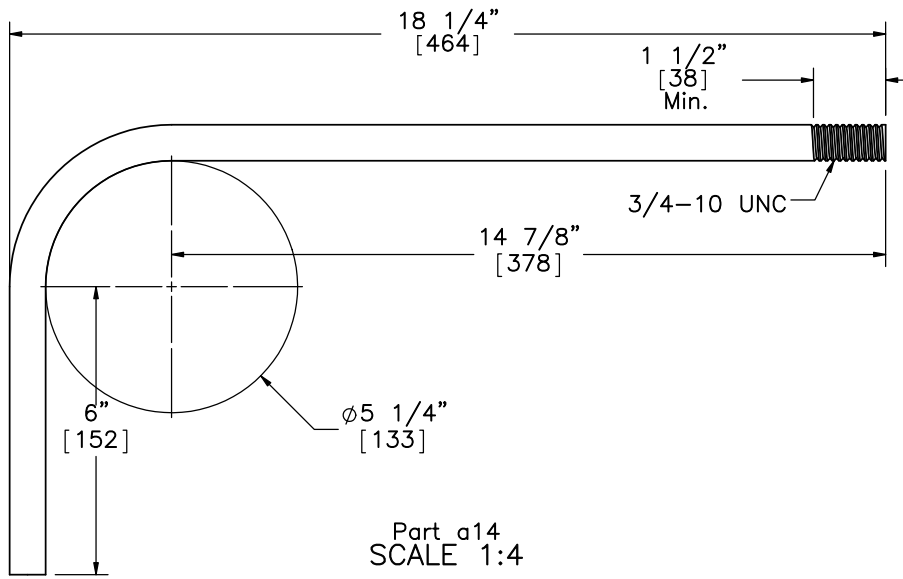
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DATE:
 1/26/2018

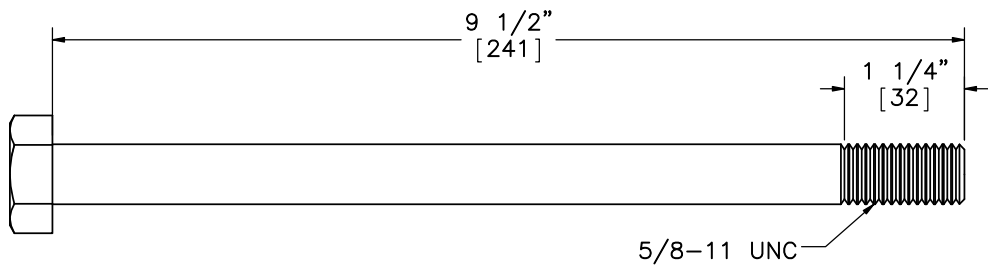
DRAWN BY:
 JEK

REV. BY:
 KAL/TJD/
 MP

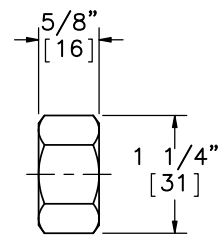


- Notes: (1) Part a14 total unbent length is 25 9/16" [649].
 (2) Part c7 total unbent length is 4 9/16" [116].
 (3) Part b14 total unbent length is 5 1/8" [130].
 (4) Part a5 total unbent length is 16 1/4" [413].

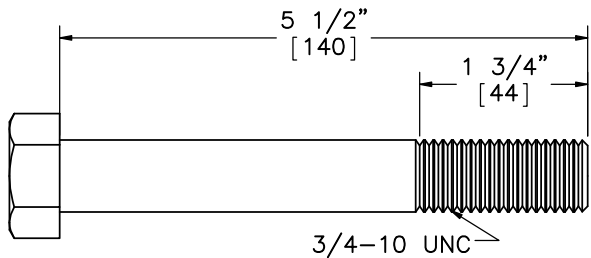
 Midwest Roadside Safety Facility	Midwest 4-Cable Barrier System	SHEET: 23 of 26
	J-Hook Anchor and Brass Cable Clip	DATE: 1/26/2018
DWG. NAME: MWP-9_R6	SCALE: 1:1 UNITS: in.[mm]	DRAWN BY: JEK
		REV. BY: KAL/TJD/MP



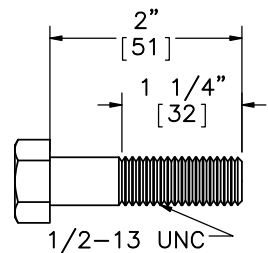
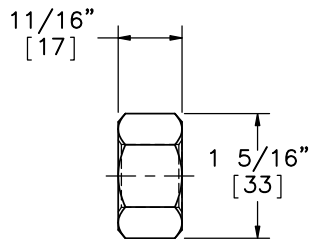
Part a17



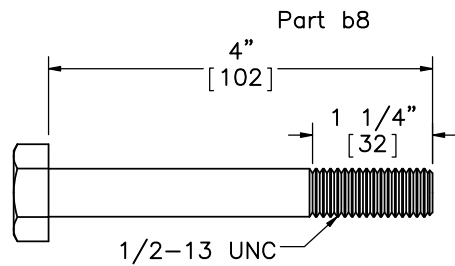
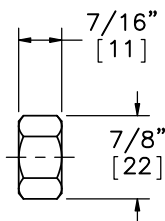
Part a16



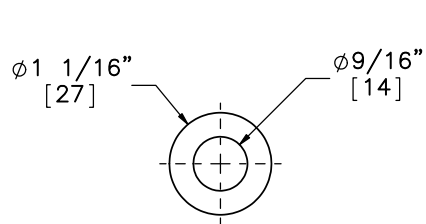
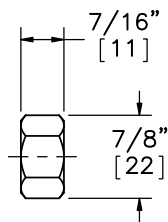
Part b6



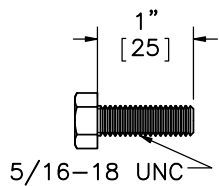
Part b8



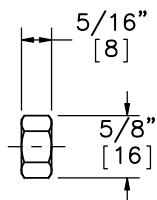
Part c4




Part b7



Part c3



	Midwest 4-Cable Barrier System	SHEET: 24 of 26
	Hardware	DATE: 1/26/2018
Midwest Roadside Safety Facility	DWG. NAME: MWP-9_R6	SCALE: 1:2 UNITS: in.[mm]
		DRAWN BY: JEK
		REV. BY: KAL/TJD/MP

Item No.	QTY.	Description	Material Specification	Galv. Specification
a1	2	Cable Anchor Base Plate	ASTM A36	AASHTO M111 (ASTM A123)
a2	4	Exterior Cable Plate Gusset	ASTM A36	AASHTO M111 (ASTM A123)
a3	6	Interior Cable Plate Gusset	ASTM A36	AASHTO M111 (ASTM A123)
a4	2	Anchor Bracket Plate	ASTM A36	AASHTO M111 (ASTM A123)
a5	2	3/16" [5] Dia. Brass Keeper Rod, 16 1/4" [413] Long Unbent	ASTM B16-00	-
a6	4	Release Gusset	A36 Steel	AASHTO M111 (ASTM A123)
a7	2	Release Lever Plate	A36 Steel	AASHTO M111 (ASTM A123)
a8	4	1 1/4x1 1/4x3/16" [32x32x5] TS CT Kicker Lever Tube	ASTM A500 Gr. B	AASHTO M111 (ASTM A123)
a9	8	CMB High Tension Anchor Plate Washer	ASTM A36	AASHTO M111 (ASTM A123)
a10	2	1 1/4x1 1/4x3/16" [32x32x5] TS CT Kicker Lever Connecting Tube	ASTM A500 Gr. B	AASHTO M111 (ASTM A123)
a11	2	3 1/2"x13 1/2"x1/2" [89x343x13] Kicker Plate	ASTM A36	AASHTO M111 (ASTM A123)
a12	4	CT Kicker - Gusset	ASTM A36	AASHTO M111 (ASTM A123)
a13	20	3/4" [19] Dia. Flat Washer	ASTM F844	AASHTO M232 (ASTM A153) for Class C or AASHTO M298 (ASTM B695) for Class 50
a14	16	3/4" [19] Dia. UNC J-Hook Anchor	ASTM A449 Type 1	AASHTO M232 (ASTM A153) for Class C or AASHTO M298 (ASTM B695) for Class 50
a15	2	1/4" [6] Dia. 7x19 Aircraft Retaining Cable, 36" [914] Long	ASTM A1023	ASTM A1007
a16	2	5/8" [16] Dia. Heavy Hex Nut	ASTM A563C	AASHTO M232 (ASTM A153) for Class C or AASHTO M298 (ASTM B695) for Class 50
a17	2	5/8" [16] Dia. UNC, 9 1/2" [241] Long Hex Bolt	ASTM A449 Type 1 or SAE J429 Gr. 5	AASHTO M232 (ASTM A153) for Class C or AASHTO M298 (ASTM B695) for Class 50
a18	2	24" [610] Dia. Concrete Anchor, 120" [3048] Long	Min. f'c = 4,000 psi [27.6 MPa]	-
a19	16	#11 Straight Rebar, 114" [2896] Long	ASTM A615 Gr. 60 or ASTM A706 Gr. 60	-
a20	44	#4 Anchor Hoop Rebar with 21" [533] Dia., 84" [2134] Long Unbent	ASTM A615 Gr. 60 or ASTM A706 Gr. 60	-
a21	18	3/4" [19] Dia. UNC Heavy Hex Nut	ASTM A563DH	AASHTO M232 (ASTM A153) for Class C or AASHTO M298 (ASTM B695) for Class 50
b1	2	S3x5.7 [S76x8.5] Post, 28 1/8" [714] Long	ASTM A572 GR50-07, ASTM A709 GR50-09A, ASTM A992-06A	AASHTO M111 (ASTM A123)
b2	2	S3x5.7 [S76x8.5] Post, 19" [483] Long	ASTM A572 GR50-07, ASTM A709 GR50-09A, ASTM A992-06A	AASHTO M111 (ASTM A123)
b3	8	#3 Straight Rebar, 43" [1092] Long	ASTM A615 Gr. 60 or ASTM A706 Gr. 60	-
b4	22	7 1/4" [184] Dia. No. 3 Hoop Reinforcement, 37" [940] Long Unbent	ASTM A615 Gr. 60 or ASTM A706 Gr. 60	-
b5	2	2nd Post Keeper Plate, 28 Gauge	ASTM A36	AASHTO M111 (ASTM A123)



Midwest Roadside Safety Facility

Midwest 4-Cable Barrier System

Bill of Materials

DWG. NAME.
MWP-9_R6

SCALE: NONE
UNITS: in.[mm]

SHEET:
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DATE:
1/26/2018

DRAWN BY:
JEK

REV. BY:
KAL/TJD/
MP

Item No.	QTY.	Description	Material Specification	Galv. Specification
b6	2	3/4" [19] Dia. UNC, 5 1/2" [140] Long Hex Bolt and Nut	Bolt ASTM A307 Gr. A/Nut ASTM A563A	AASHTO M232 (ASTM A153) for Class C or AASHTO M298 (ASTM B695) for Class 50
b7	24	1/2" [13] Dia. Washer with 1 1/16" [27] OD	ASTM F844	AASHTO M232 (ASTM A153) for Class D or AASHTO M298 (ASTM B695) for Class 50
b8	8	1/2" [13] Dia. UNC, 2" [51] Long Hex Bolt and Nut	Bolt ASTM A307 Gr. A/Nut ASTM A563A	AASHTO M232 (ASTM A153) for Class C or AASHTO M298 (ASTM B695) for Class 50
b9	2	4x3x1/4" [102x76x6] Foundation Tube, 48" [1219] Long	ASTM A500 Grade B	AASHTO M111 (ASTM A123)
b10	2	2nd Post Cable Hanger	ASTM A36	AASHTO M111 (ASTM A123)
b11	2	12" [305] Dia. 2nd Post Anchor Aggregate, 2" [51] Deep	Standard Strong Soil	-
b12	2	12" [305] Dia. 2nd Post Concrete Anchor, 46" [1168] Long	Min f'c = 4,000 psi [27.6 MPa]	-
b13	4	2nd Post Base Plate	ASTM A36	AASHTO M111 (ASTM A123)
b14	8	3/16" [5] Dia., 5 1/8" [130] Long Unbent Brass Rod	ASTM B16-00	-
c1	72	3"x1-3/4"x7 Gauge [76x44x4.6] x 79 5/8" [2022] Long Bent Z-Section Post with 3/4" [19] Dia. Weakening Holes	Hot-Rolled ASTM A1011 HSLA Gr. 50	AASHTO M111 (ASTM A123)
c2	216	12 Gauge Tabbed Bracket - Version 10	Hot-Rolled ASTM A1011 HSLA Gr. 50	AASHTO M111 (ASTM A123)
c3	216	5/16" [8] Dia. UNC, 1" [25] Long Hex Cap Screw and Nut	Bolt SAE J429 Gr. 5 or ASTM A449 Type 1/Nut ASTM A563DH	AASHTO M232 (ASTM A153) for Class C or AASHTO M298 (ASTM B695) for Class 50
c4	72	1/2" [13] Dia. UNC, 4" [102] Long Hex Bolt and Nut	Bolt SAE J429 Gr. 5 or ASTM A449 or ASTM A325/Nut ASTM A563DH	AASHTO M232 (ASTM A153) for Class C or AASHTO M298 (ASTM B695) for Class 50
c5	72	2 1/8"x1 3/8"x7 Gauge [54x35x4.6], 6" [152] Long Bent Steel Plate	Hot-Rolled ASTM A1011 HSLA Gr. 50	AASHTO M111 (ASTM A123)
c6	72	2 1/8"x1 3/8"x7 Gauge [54x35x4.6], 6" [152] Long Bent Steel Plate	Hot-Rolled ASTM A1011 HSLA Gr. 50	AASHTO M111 (ASTM A123)
c7	72	3/16" [5] Dia. Brass Cable Clip, 4 9/16" [116] Long Unbent	ASTM B16 Brass C36000 Half Hard (H02), ROUND, TS >= 68.0 ksi, YS >= 52.0 ksi	-
d1	1	3/4" [19] Dia. 3x7 Cable Guiderail	AASHTO M30 Type 1 or ASTM A741 Type 1 with minimum breaking strength = 39 kips (173.5 kN)	Class A
d2	16	7/8" [22] Dia. Heavy Hex Nut	ASTM A563C	AASHTO M232 (ASTM A153) for Class C or AASHTO M298 (ASTM B695) for Class 50
d3	28	7/8" [22] Dia. UNC, 11" [279] Long Threaded Rod	ASTM A449 Type 1 or ASTM A193 Gr. B7	AASHTO M232 (ASTM A153) for Class C or AASHTO M298 (ASTM B695) for Class 50
d4	24	Bennett Cable End Fitter	ASTM A47	AASHTO M232 (ASTM A153) for Class A
d5	24	7/8" [22] Dia. Hex Nut	ASTM A563DH	AASHTO M232 (ASTM A153) for Class C or AASHTO M298 (ASTM B695) for Class 50
e1	8	Bennett Short Threaded Turnbuckle	As Supplied	-
e2	8	Threaded Load Cell Coupler	Not Applicable (NA)	NA
e3	4	50,000-lb [222.4-kN] Load Cell	Not Applicable (NA)	NA



Midwest Roadside Safety Facility

Midwest 4-Cable Barrier System

Bill of Materials

DWG. NAME.
MWP-9_R6

SCALE: NONE
UNITS: in.[mm]

SHEET:
26 of 26

DATE:
1/26/2018

DRAWN BY:
JEK

REV. BY:
KAL/TJD/
MP

REV.	DATE OF ISSUE	Page	NATURE OF CHANGES	REVIEWER	REVISED BY
0	8/16/2016	-	Originated from drawing MWP-8_R2.	-	JEK
1	8/18/2016	-	Physical Part Changes: c1, c5, c6, c7. New page: 17. Hyphenated dimension style corrected to normal style. Brass rod added to post assembly.	KAL/TJD	JEK
		1	Minor text edit. Reference to other sheet corrected.		
		2	Part a4 corrected to d4. Post numbering text size.		
		4	Scale change. Part a9 moved to page 9. Note added. Part a13 designation.		
		5	Text edit (notes).		
		6	Minor dimension movement. Part e2 label added.		
		7	Part b7 designation removed. Part a21 designation corrected to a20. Minor movement. Note edit.		
		8	Minor text edit.		
		9	Minor text edit. Part a9 added.		
		10	Minor text edit.		
		11	Minor dimension movement.		
		12	Minor text edits. Detail lettering corrected.		
		13	Minor text edits. Part b13 dimension text size corrected.		
		15	Note added. Part designations added.		
		16	Detail N added. Isometric changed to post only. Movement. Minor text edit.		
		17	New page: post assembly details.		
		18	Detail view changes. Dimension edits reflecting physical change.		
19	Physical changes. Dimension edits.				
20	Minor dimension edits.				
22	Part b5 added. Part c4 corrected to c7. Tangent lines removed. Note edits and additions. Dimension additions.				
23	Additional dimensioning. Diameter dimensions removed. Thread notes added.				
24	Description edits: a8, a10-12, a20, b1-2, b4, b11-12, b14. Material edits: a10, a14, a17-20, b3-4, b11-12.				
25	Part added: c7. Description edits: c4-6, d2. Material edits: c1-4, d3.				
2	8/24/2016	-	New page: post cap flat patterns.	TJD/KAL	JEK
		1	Note 6 edit.		
		4	Note edit.		
		7	Minor text edit.		
		11	Minor text edit.		

Revision History

2	8/24/2016	13	Minor dim edits.	TJD/KAL	JEK
		15	Note edit.		
		19	Minor dim edits.		
		20	New page: post cap flat patterns.		
		23	Dim edits. Centermark edits.		
		25	Table column added. Description edits: a5, a11, a15, a18-19. Parts b8-b14 moved to page 26.		
		26	Table column added. Description edits: b8-9, b11, b14, c7. Material edit: d5, e1.		
3	8/25/2016	2	Part d3 labeled.	TJD/KAL	JEK
		4	Part d3 labeled.		
		20	Dimensions added.		
		23	Part a21 (new) made separate from a14. Dimensions added: a5, a14, a21, c7.		
		25	New: a21. Moved to p.26: b6-7. Description edit: a14. Galv edit: a1-4, a6-17, b1-2, b5.		
		26	Moved: b6-7. Description edits: d3, d5. Material edits: c7, d1, d3, e2-3. Galv edits: b6-10, b13, c1-6, d1-5, e2-3.		
4	8/29/2016	7	Part description edits.	KAL	JEK
		12	Part description edits.		
		15	Note shift.		
		25	Description edit: a15. Material edit: a5, a14-15.		
		26	Material edit: d3. Galv edit: b7, c1-2, c5-7, d4.		
5	11/1/2016	1	Impact Location Corrected.	KAL	JEK
		15	Bolt flipped so that nut is on impact side of the system.		
6	1/26/2018	12	Metric conversion in note corrected.	MP	JEK
		23	Metric conversion on 5/16" measurements overridden.		
		24	Metric conversion on part b7 ID corrected.		
		BOM	Description (metric): b9, b12. Mtrl (metric): d1.		