
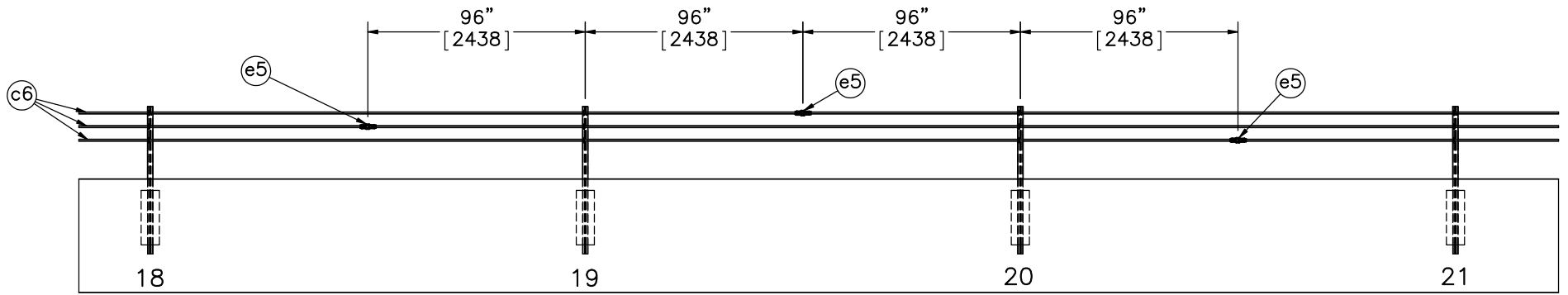
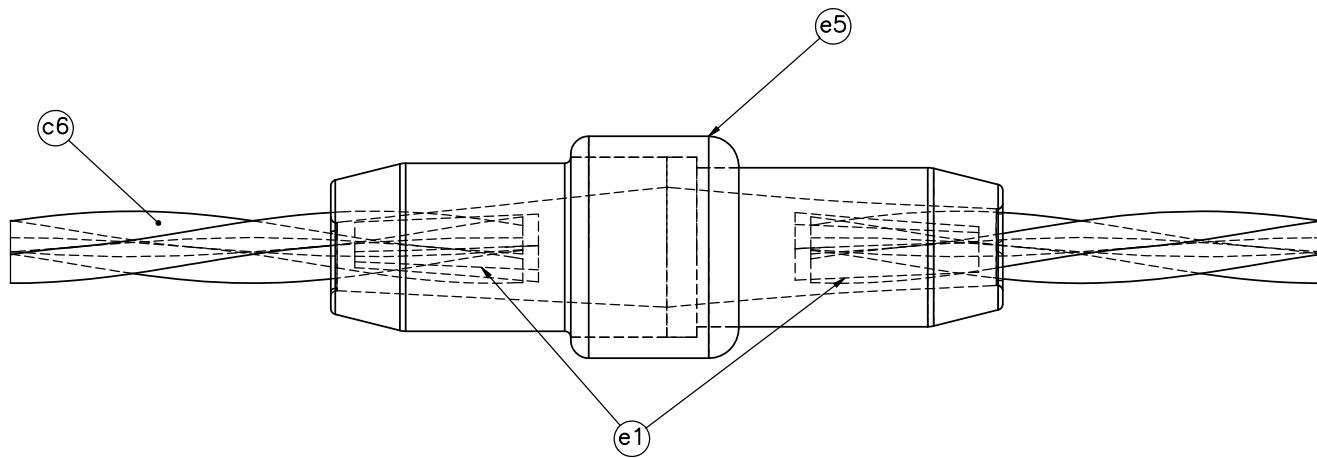


- Notes: (1) Impact point is 64" [1626] downstream from center of post no. 16. Post nos. 14 through 17 could be used as reference for impact point location.
- (2) Target tow speed shall be 65.7 mph [105.7 km/h].
- (3) Test vehicle brakes are to be applied 35'-3" [10744] from point of impact.
- (4) Splice locations are relative to impact location.
- (5) Post hole diameter is 2' [610] within the critical region.
- (6) Critical region extends from post nos. 13 through 30 based on location of impact relative to post no. 16.
- (7) Level grading needs to extend 15' [4572] behind the back face of posts.
- (8) Per NYSDOT, cable compensating device is not to be used.
- (9) Per NYSDOT, tension cables such that 1" [25] sag exists between post spans. Need to record corresponding tension.


 Midwest Roadside Safety Facility	NY Cable Guardrail New J-Bolt	SHEET: 1 of 16
	System Layout	DATE: 5/28/2014
DWG. NAME: NY-Cable-GR29_R13	SCALE: 1:750 UNITS: in.[mm]	DRAWN BY: JGP/CWP/SDB
		REV. BY: KAL/TH/JCH

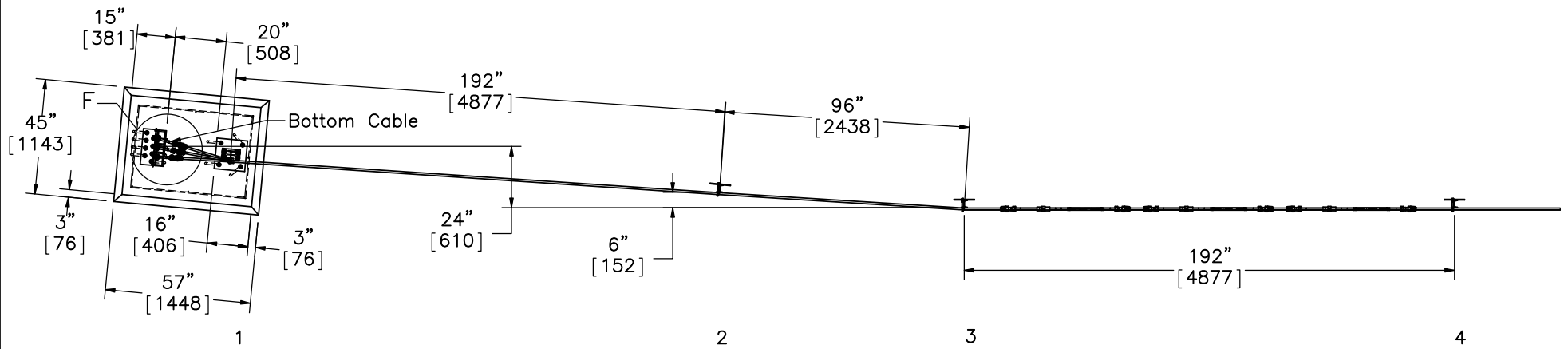


DETAIL A

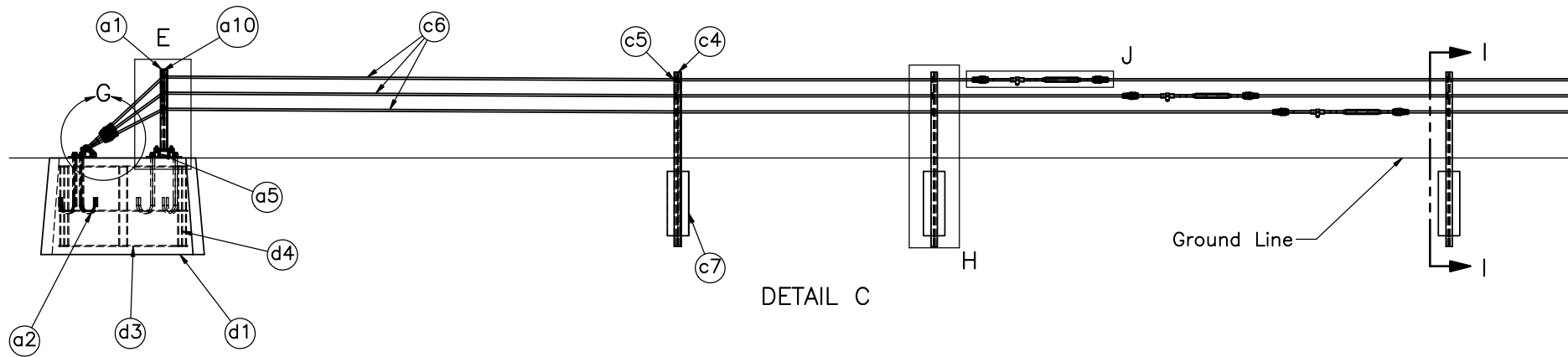


CABLE SPLICE DETAIL


	NY Cable Guardrail New J-Bolt		SHEET: 2 of 16
	Cable Splice Location		DATE: 5/28/2014
DWG. NAME: NY-Cable-GR29_R13			SCALE: 1:70 UNITS: in.[mm]
Midwest Roadside Safety Facility		REV. BY: KAL/TH/ JCH	DRAWN BY: JGP/CWP/ SDB

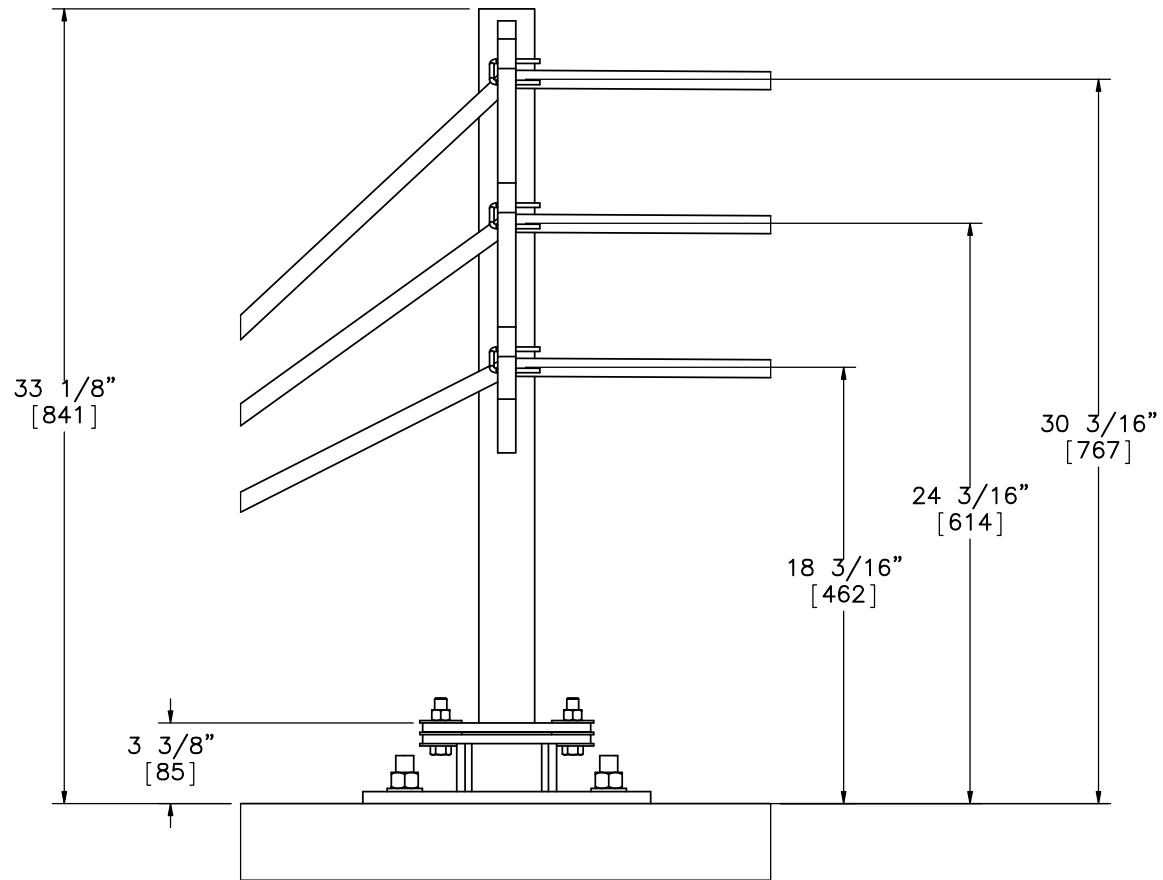


DETAIL B



DETAIL C

	NY Cable Guardrail New J-Bolt		SHEET: 3 of 16
	Midwest Roadside Safety Facility		DATE: 5/28/2014
Upstream Cable Terminal Detail			DRAWN BY: JGP/CWP/ SDB
DWG. NAME: NY-Cable-GR29_R13		SCALE: 1:60 UNITS: in.[mm]	REV. BY: KAL/TH/ JCH



DETAIL E
Post 1



Midwest Roadside
Safety Facility

NY Cable Guardrail
New J-Bolt

End Post Detail

DWG. NAME.
NY-Cable-GR29_R13

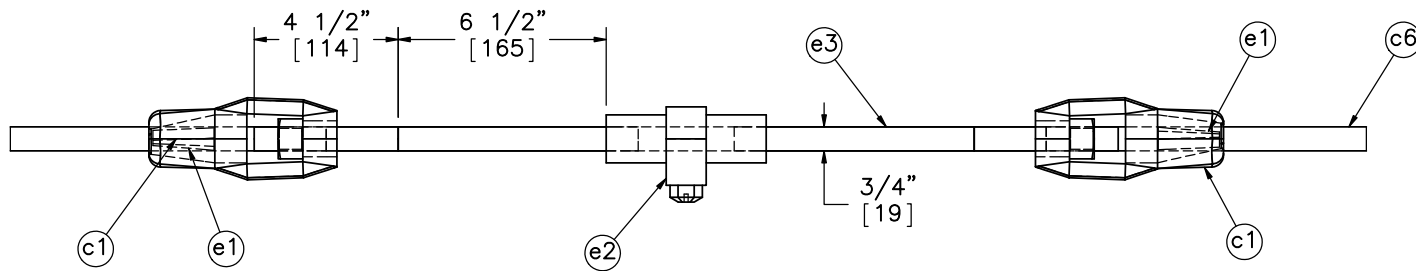
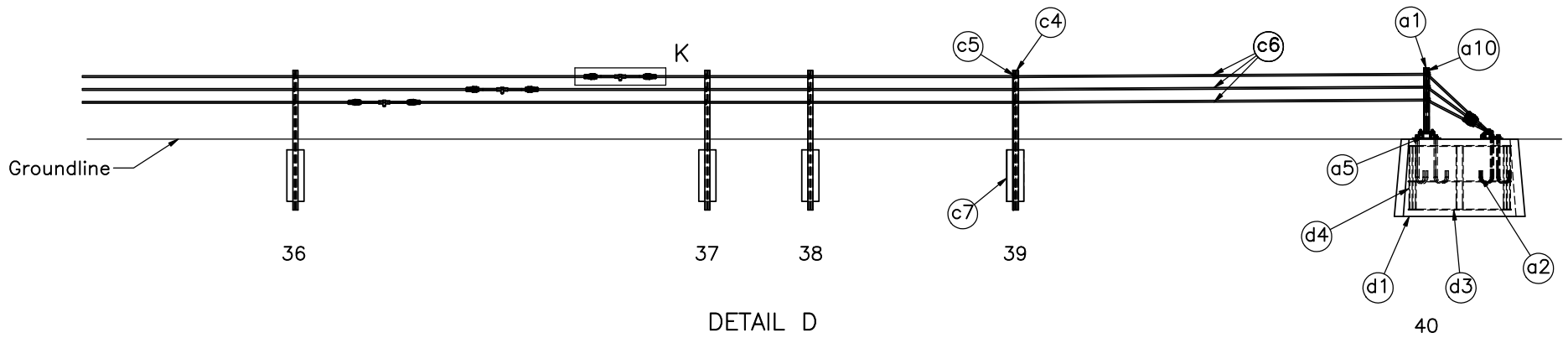
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UNITS: in.[mm]

SHEET:
4 of 16

DATE:
5/28/2014

DRAWN BY:
JGP/CWP/
SDB

REV. BY:
KAL/TH/
JCH



Midwest Roadside
Safety Facility

NY Cable Guardrail
New J-Bolt

Downstream Cable Terminal
Detail

DWG. NAME.
NY-Cable-GR29_R13

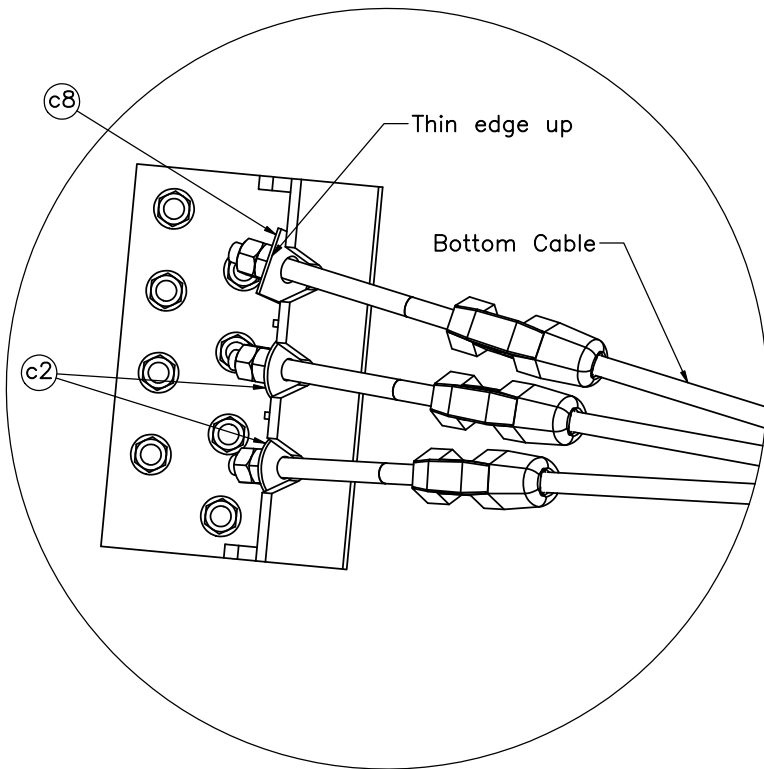
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SHEET:
5 of 16

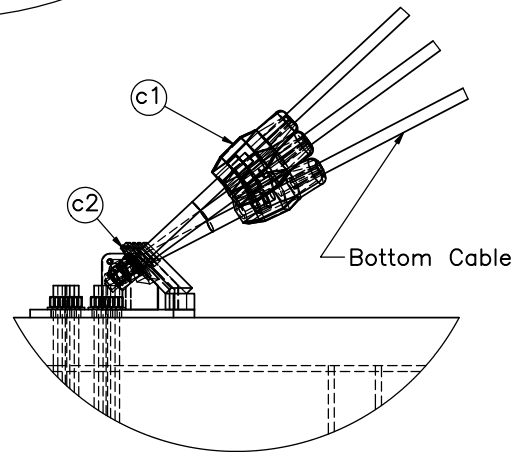
DATE:
5/28/2014

DRAWN BY:
JGP/CWP/
SDB

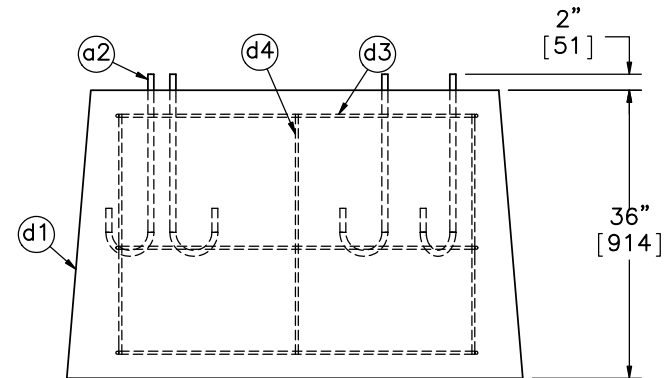
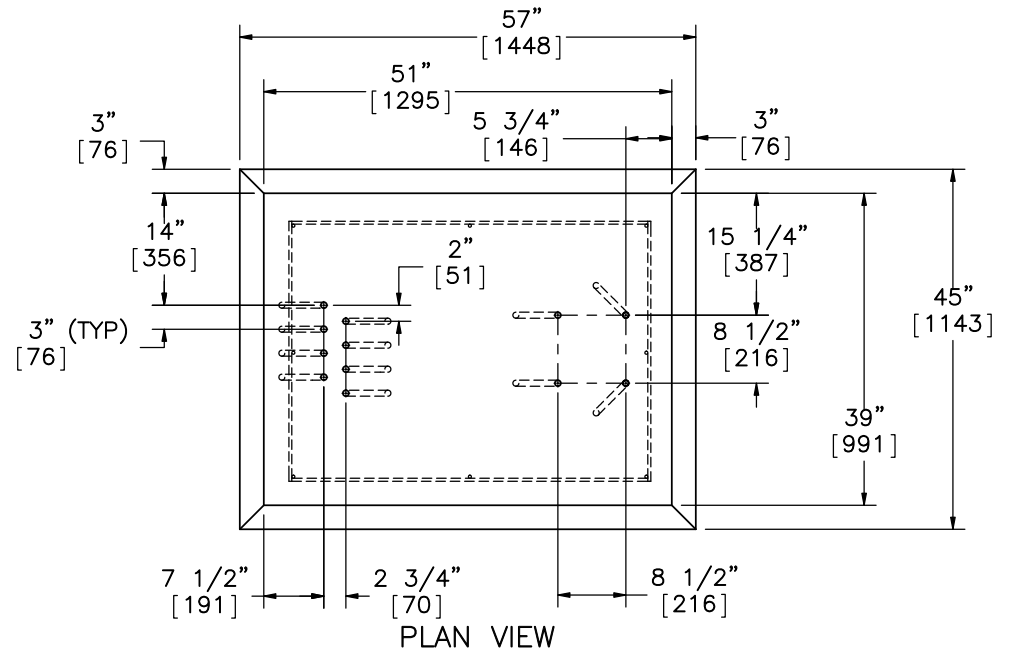
REV. BY:
KAL/TH/
JCH



DETAIL F
SCALE 1:7



DETAIL G
SCALE 1:12



Concrete Anchor Block and Hooked
Anchor Studs

- Notes: (1) 14 in. [356] long anchor rod with 12 in. [305] embedment depth may be used in place of part no. a2.
 (2) Need to be careful when drilling holes for anchor rods so as to not break out the concrete.



Midwest Roadside
Safety Facility

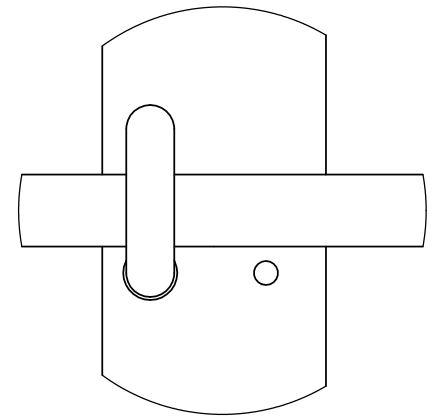
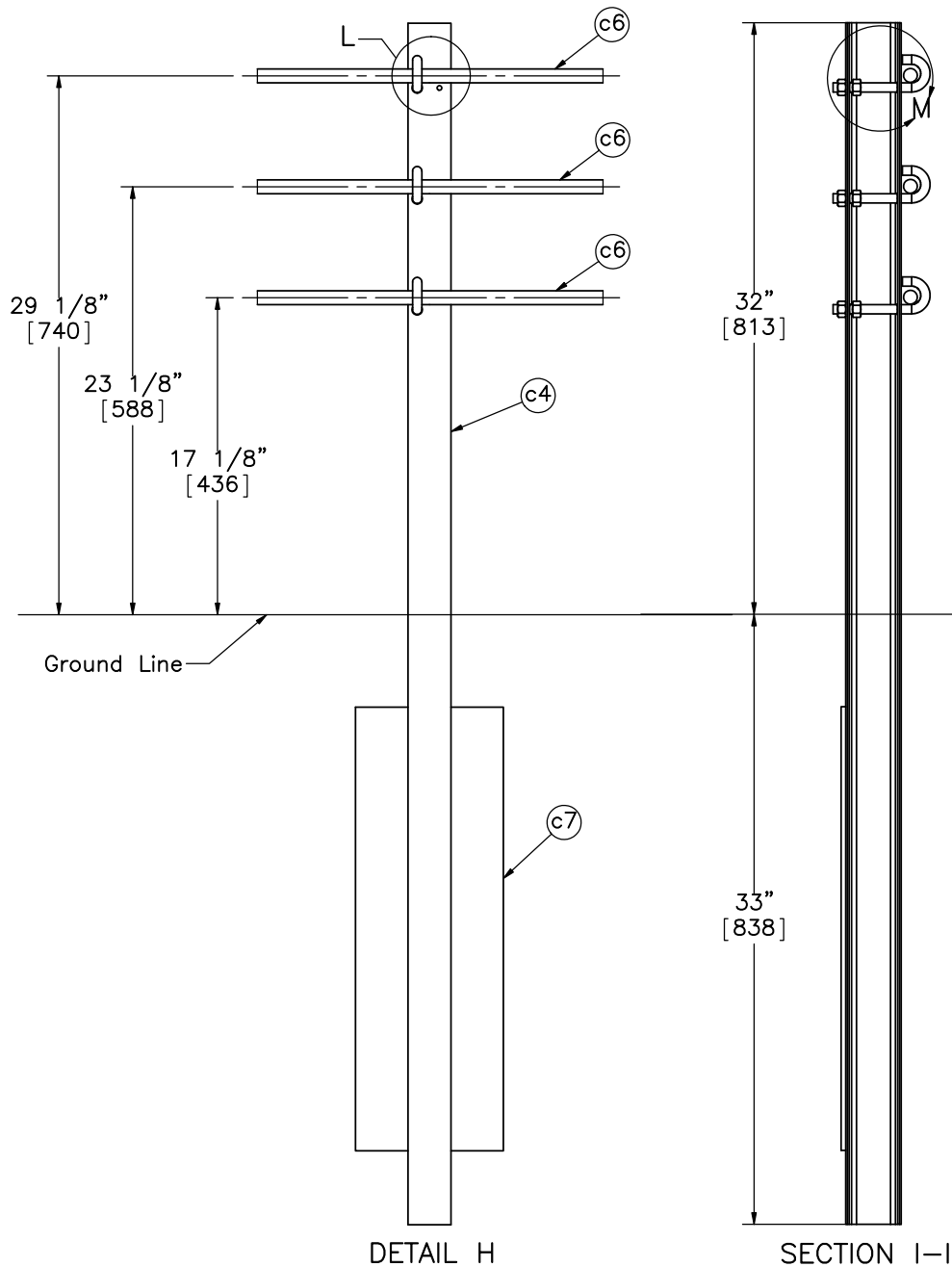
NY Cable Guardrail
New J-Bolt

Anchor Details

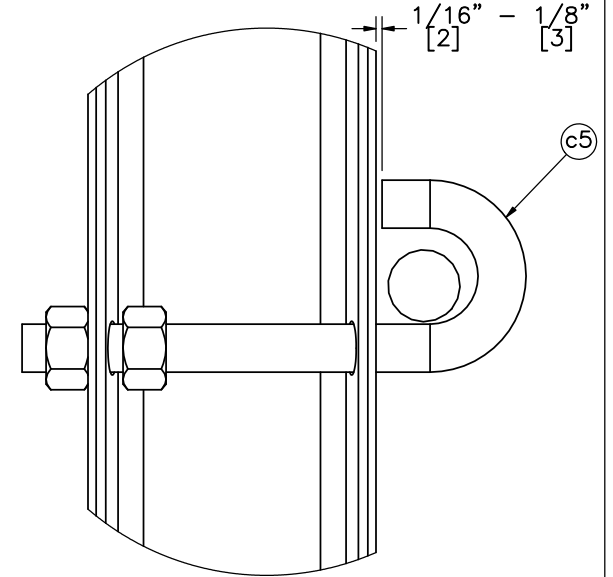
DWG. NAME.
NY-Cable-GR29_R13

SCALE: 1:24
UNITS: in.[mm]

SHEET:
6 of 16
DATE:
5/28/2014
DRAWN BY:
JGP/CWP/
SDB
REV. BY:
KAL/TH/
JCH



DETAIL L
SCALE 1 : 2



DETAIL M
SCALE 1 : 2



Midwest Roadside
Safety Facility

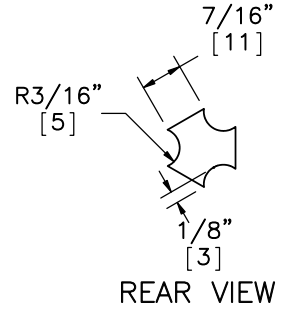
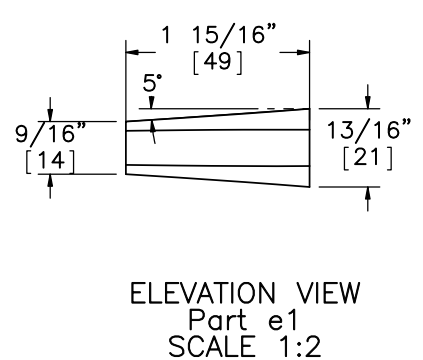
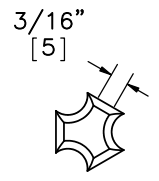
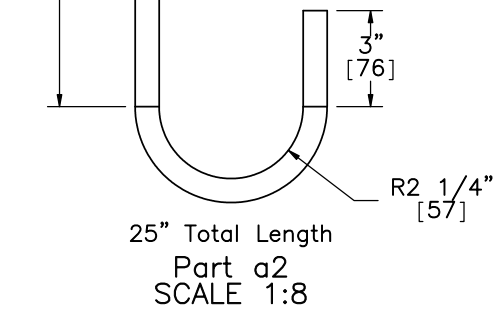
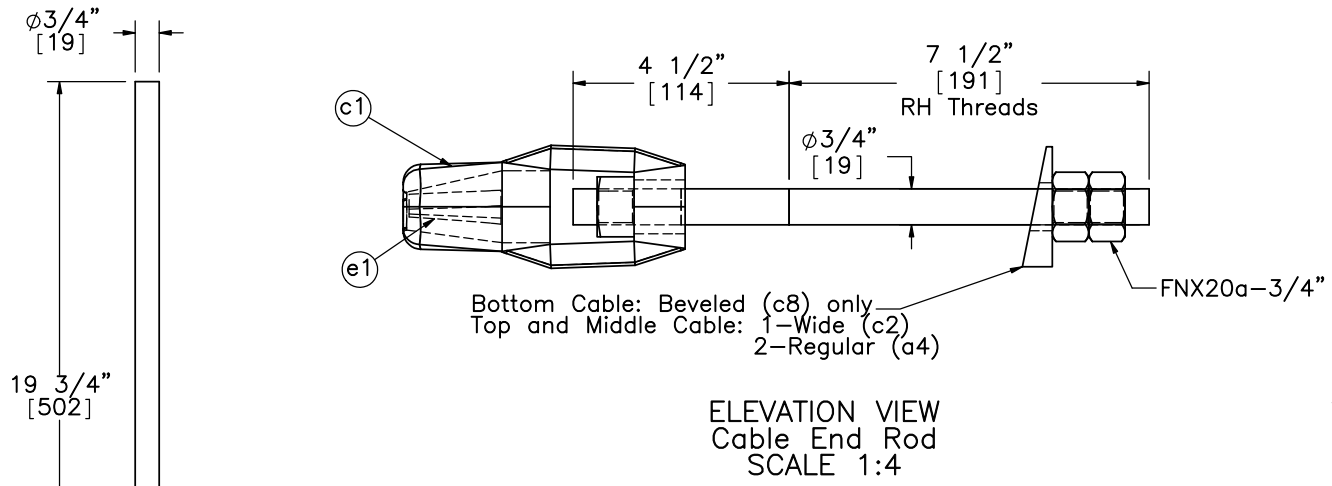
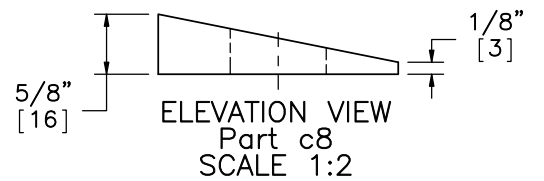
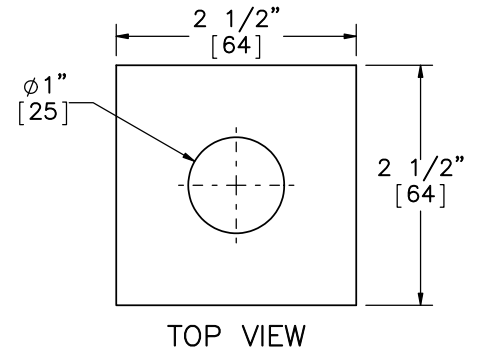
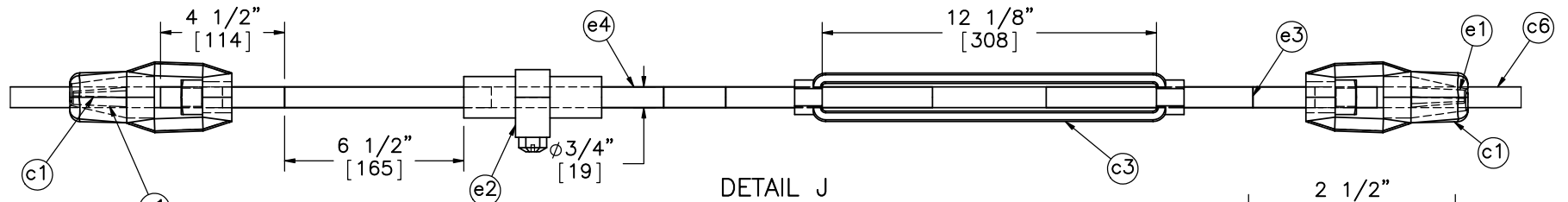
NY Cable Guardrail
New J-Bolt

S3x5.7 Post Assembly

DWG. NAME.
NY-Cable-GR29_R13

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

SHEET:
7 of 16
DATE:
5/28/2014
DRAWN BY:
JGP/CWP/
SDB
REV. BY:
KAL/TH/
JCH



Washer	Washer Series	Inside Diameter "A"			Outside Diameter "B"			Thickness "C"		
		Basic	Plus	Minus	Basic	Plus	Minus	Basic	Max.	Min.
3/4"	Regular	0.812	0.03	0.007	1.469	0.03	0.007	0.134	0.16	0.108
	Wide	0.812	0.03	0.007	2	0.03	0.007	0.165	0.192	0.136
1/2"	Narrow	0.531	0.015	0.005	1.062	0.03	0.007	0.095	0.121	0.074

**NY Cable Guardrail
New J-Bolt**

Anchor Stud and Cable
Turnbuckle

DWG. NAME: NY-Cable-GR29_R13

SHEET: 8 of 16

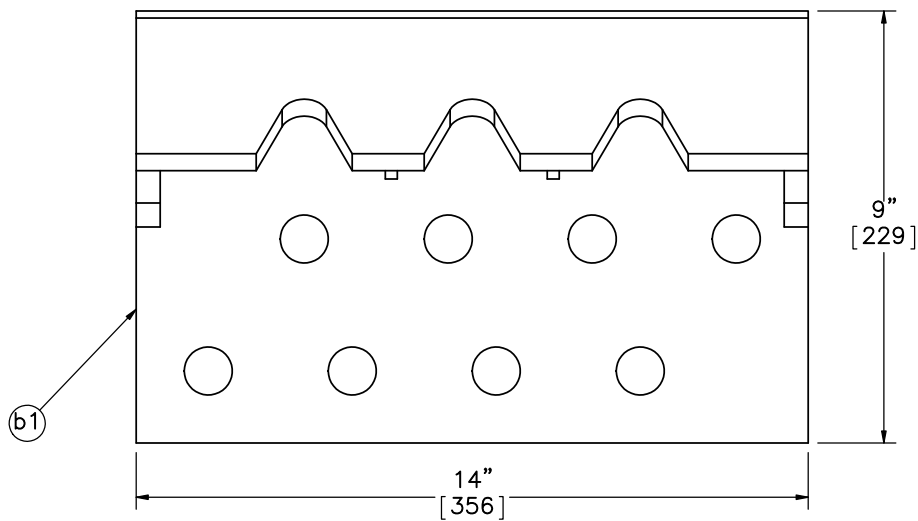
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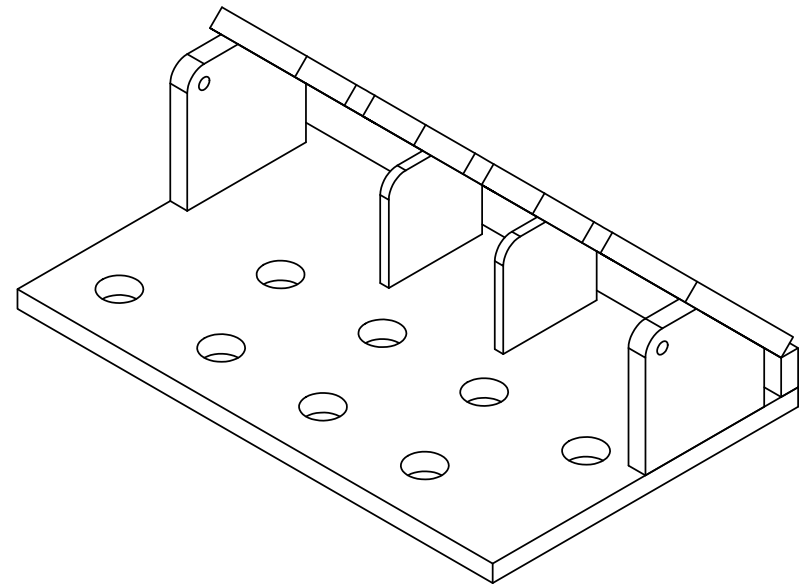
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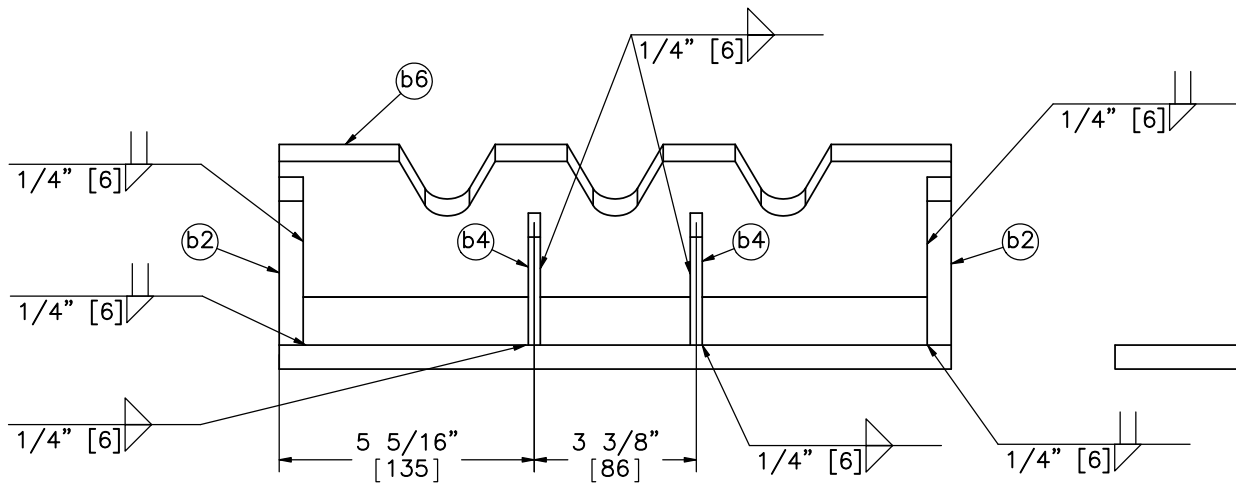
Midwest Roadside Safety Facility



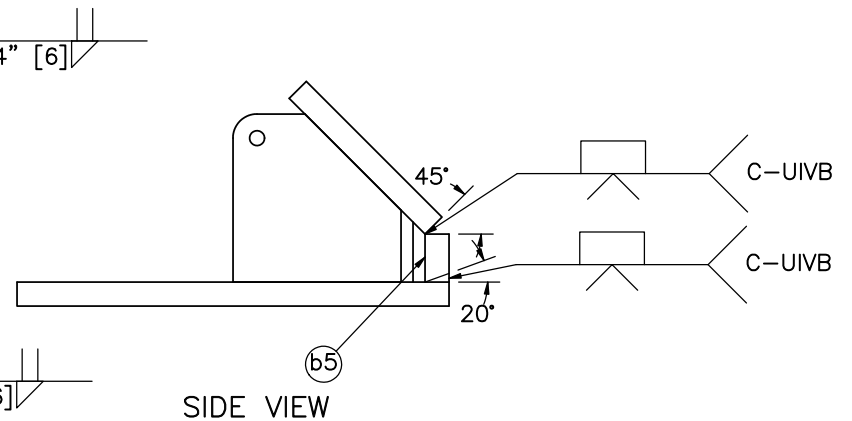
PLAN VIEW



ISOMETRIC VIEW



ELEVATION VIEW



SIDE VIEW



Midwest Roadside
Safety Facility

NY Cable Guardrail
New J-Bolt

Welded Plate Anchor Angle
Detail

DWG. NAME:
NY-Cable-GR29_R13

SCALE: 1:4
UNITS: in.[mm]

SHEET:
9 of 16

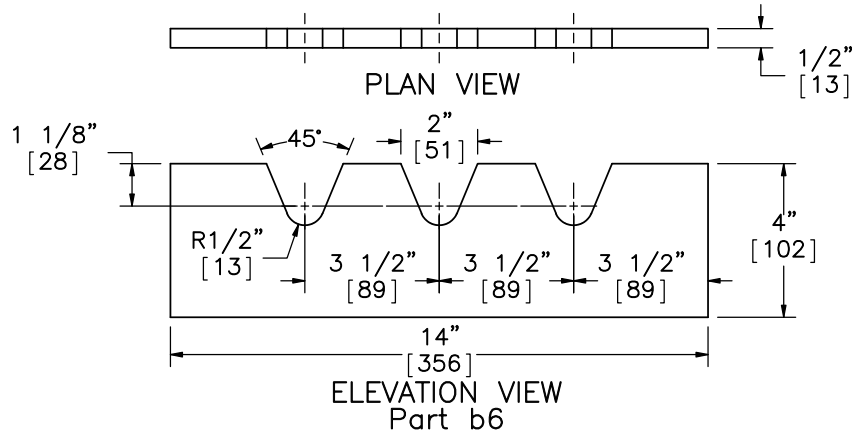
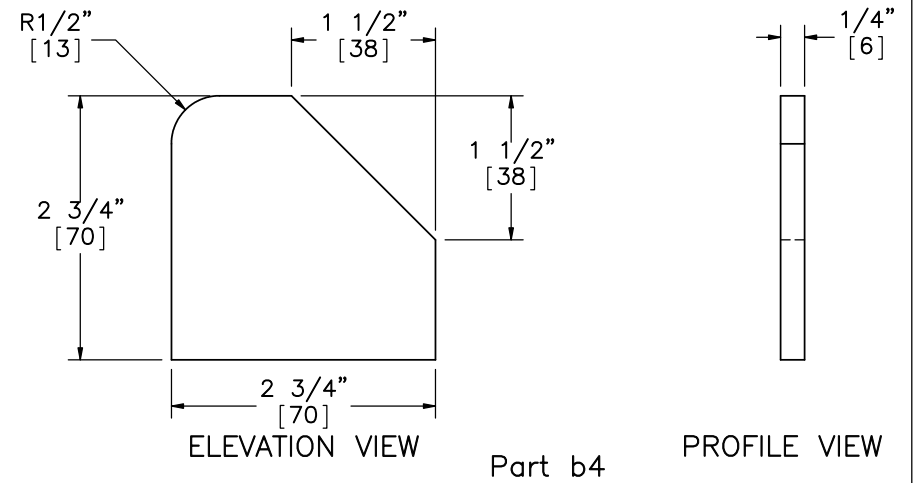
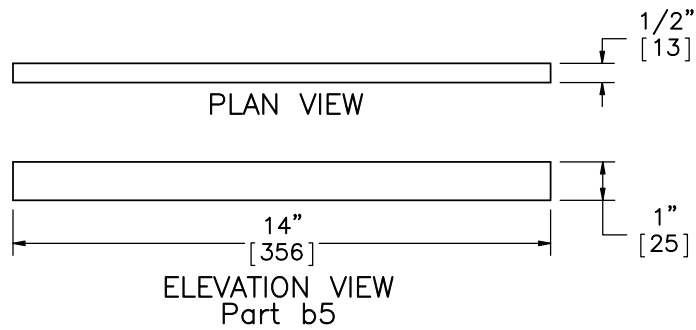
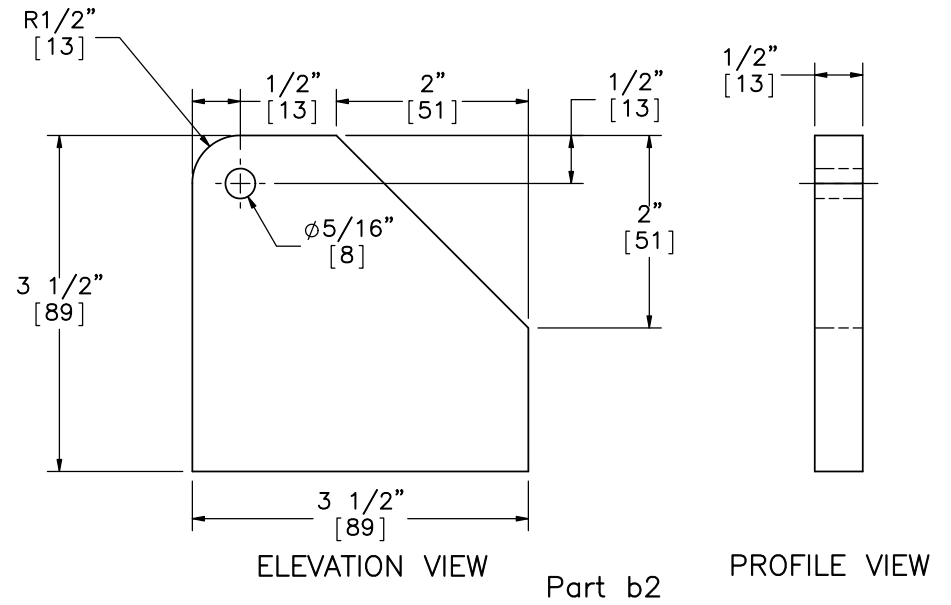
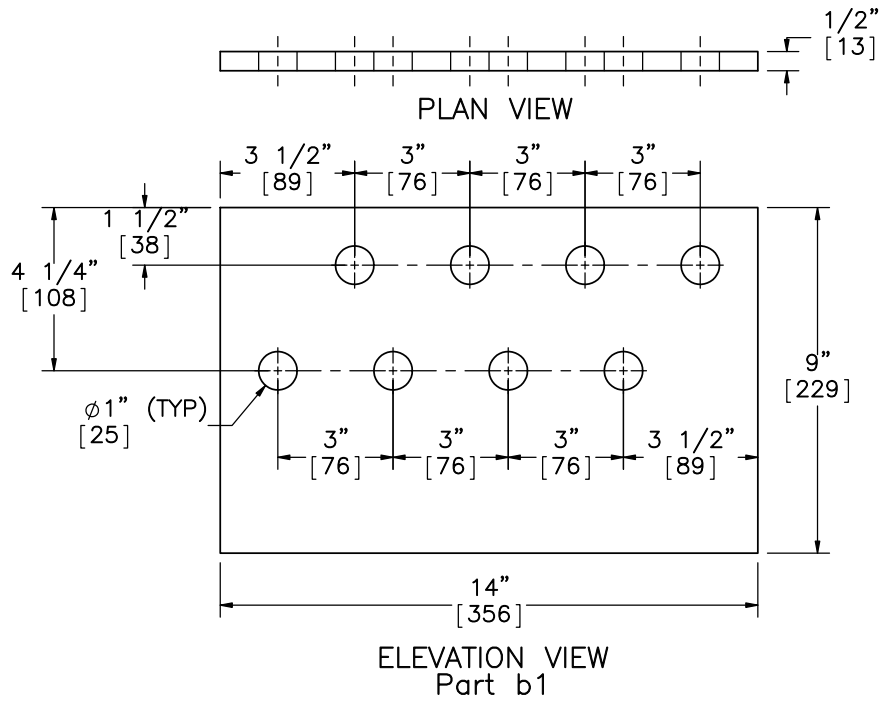
DATE:
5/28/2014

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JGP/CWP/
SDB

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JCH

C-UIVB

C-UIVB



Midwest Roadside Safety Facility

NY Cable Guardrail
New J-Bolt

Welded Plate Anchor Angle
Components

DWG. NAME:
NY-Cable-GR29_R13

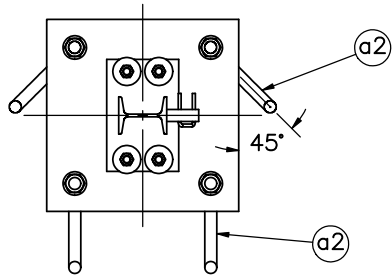
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SHEET:
10 of 16

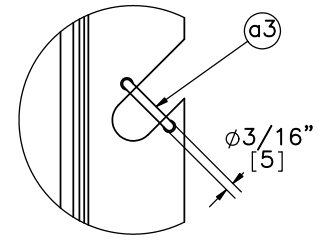
DATE:
5/28/2014

DRAWN BY:
JGP/CWP/
SDB

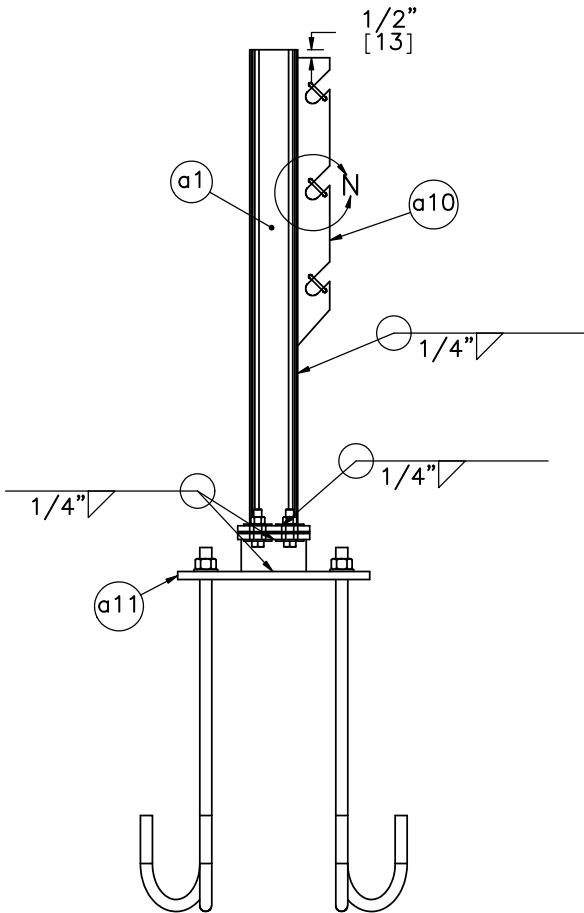
REV. BY:
KAL/TH/
JCH



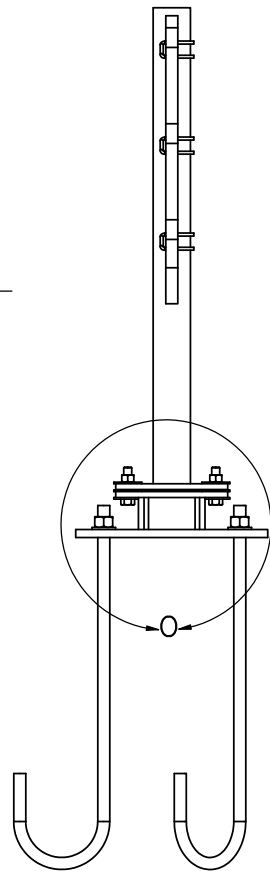
TOP VIEW



DETAIL N
SCALE 1 : 4

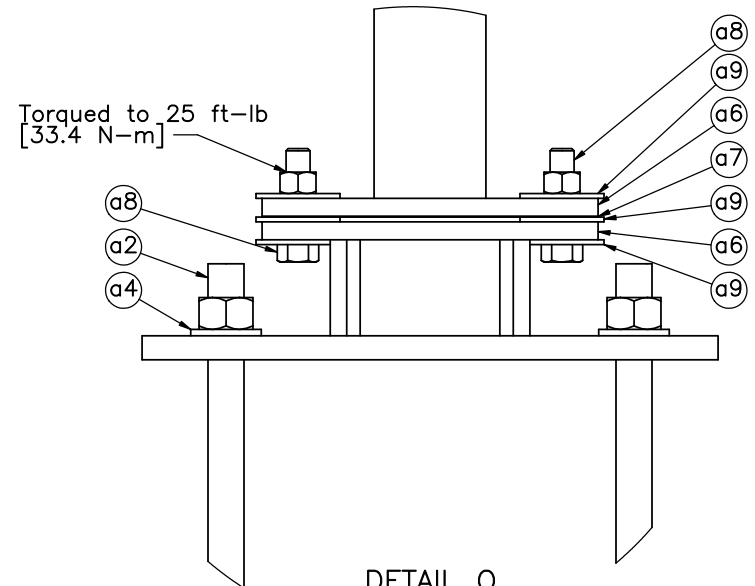


PROFILE VIEW



ELEVATION VIEW

Post nos. 1 and 40



DETAIL O
SCALE 1 : 4



Midwest Roadside
Safety Facility

NY Cable Guardrail
New J-Bolt

Anchor Post Assembly

DWG. NAME:
NY-Cable-GR29_R13

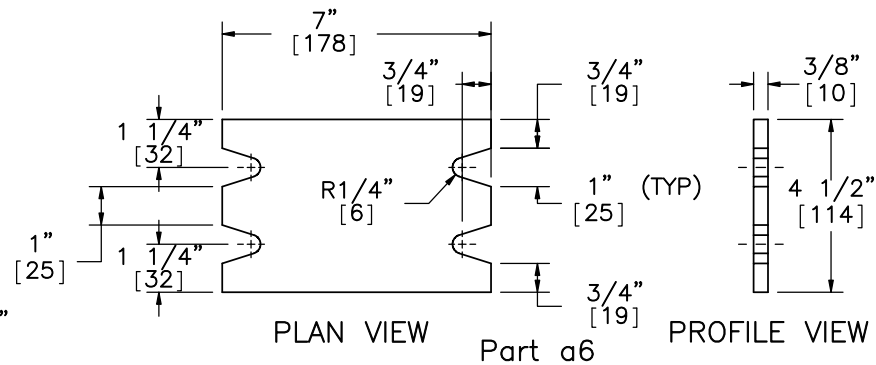
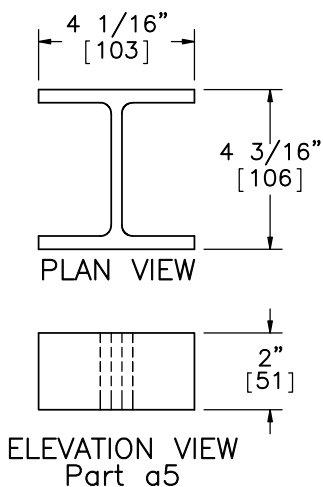
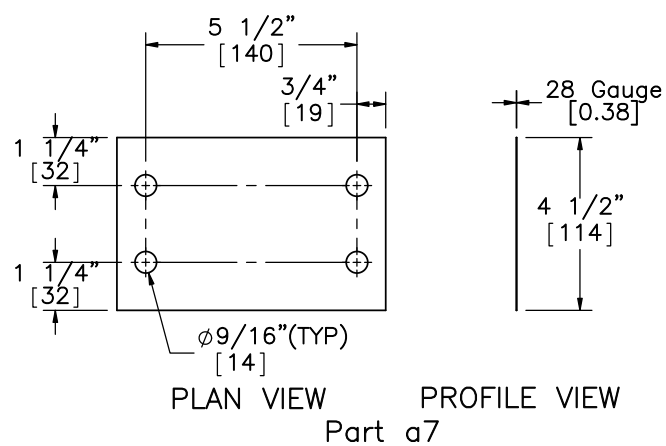
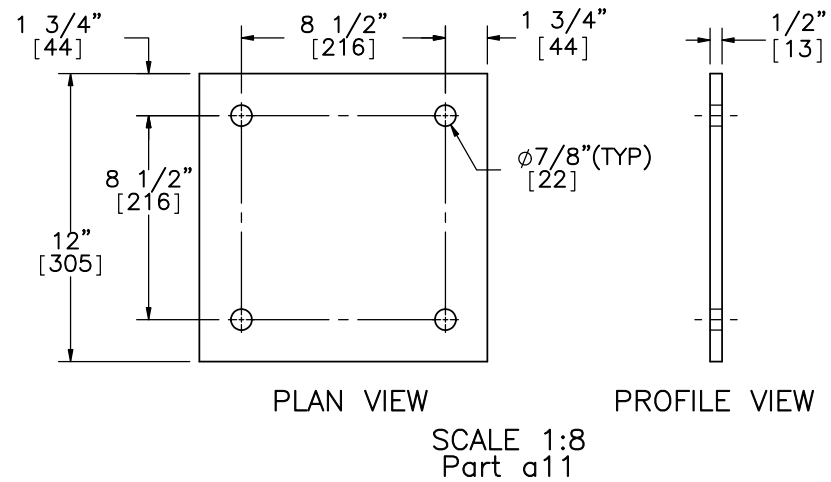
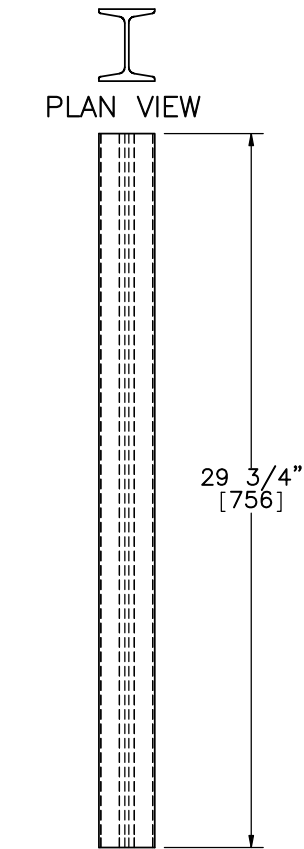
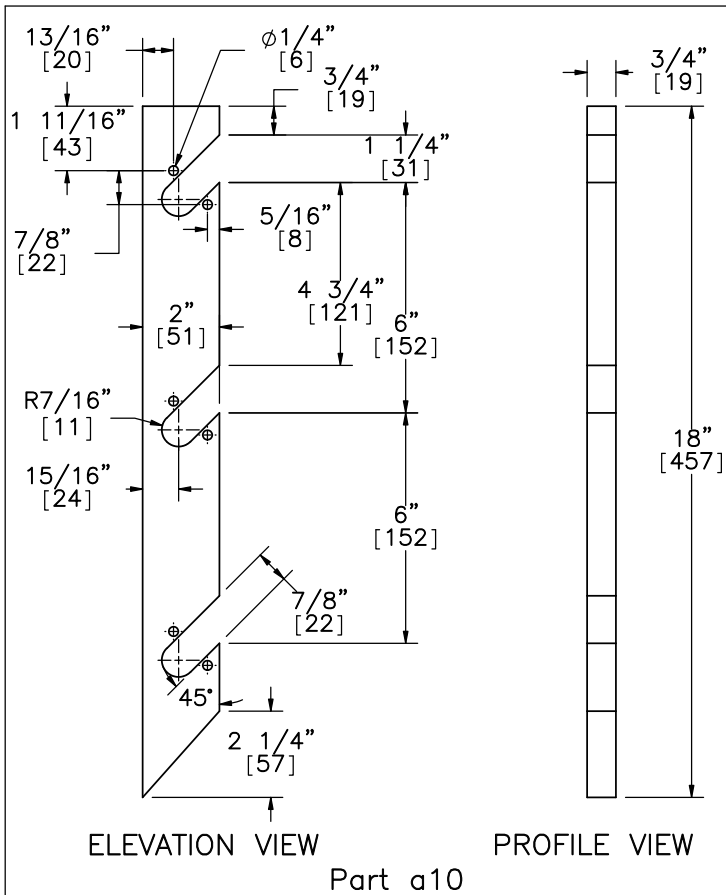
SCALE: 1:24
UNITS: in.[mm]

SHEET:
11 of 16

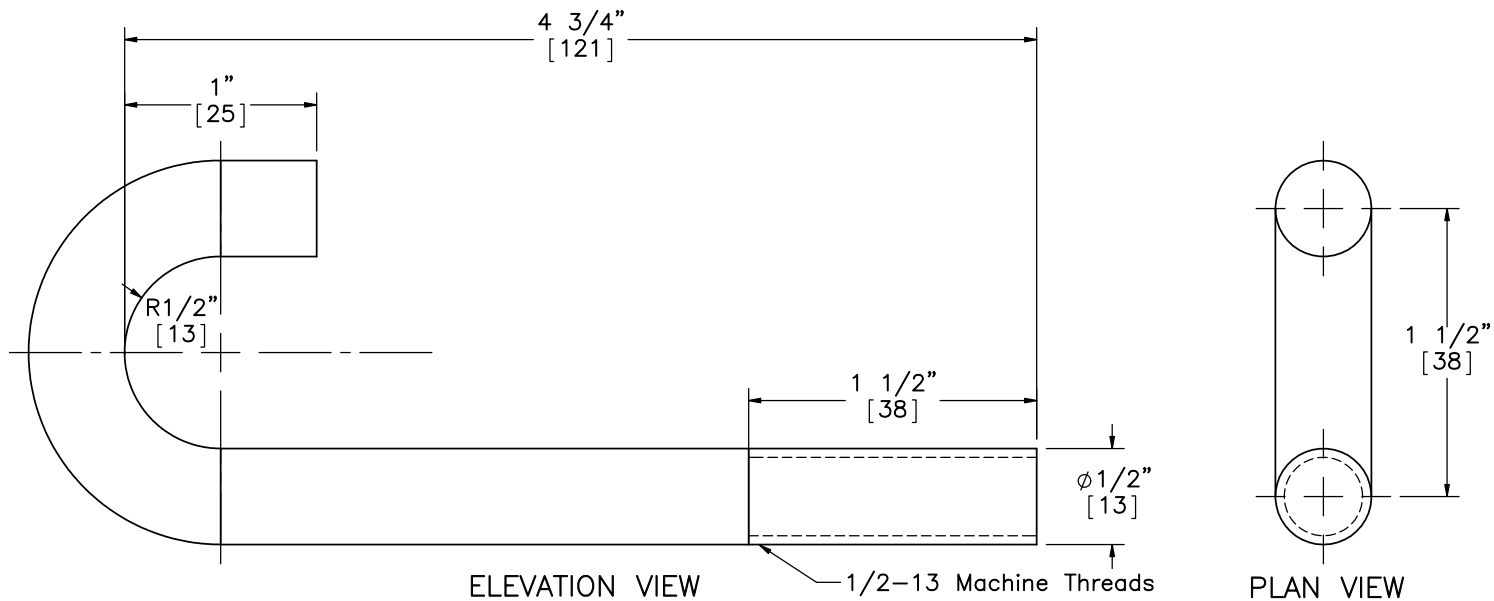
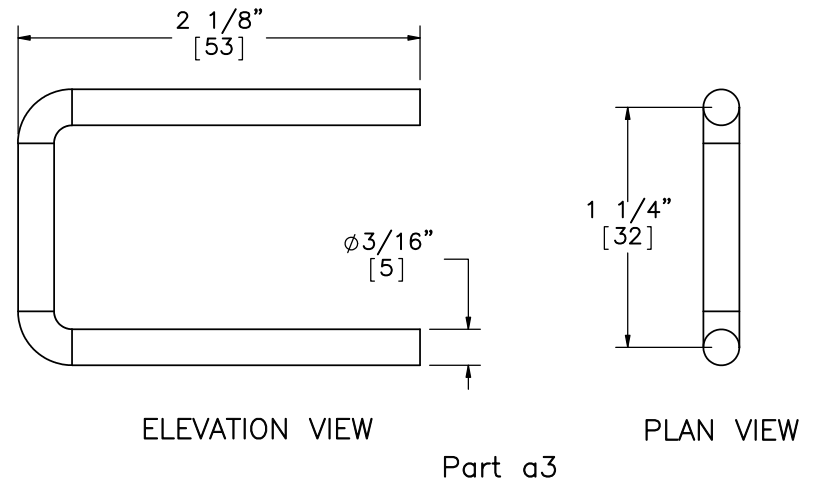
DATE:
5/28/2014

DRAWN BY:
JGP/CWP/
SDB

REV. BY:
KAL/TH/
JCH




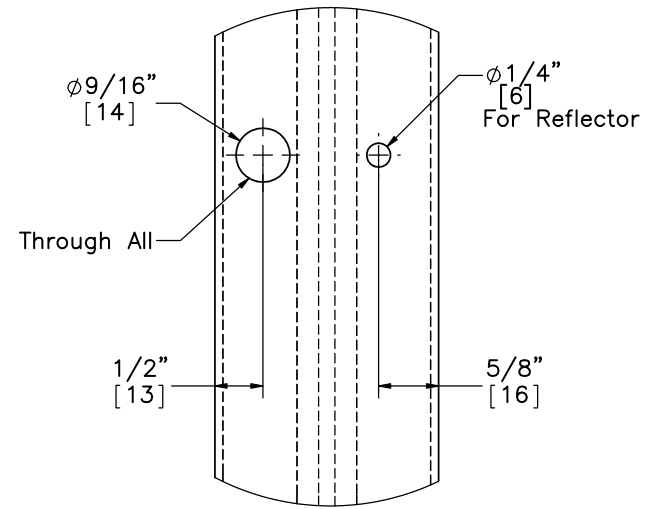
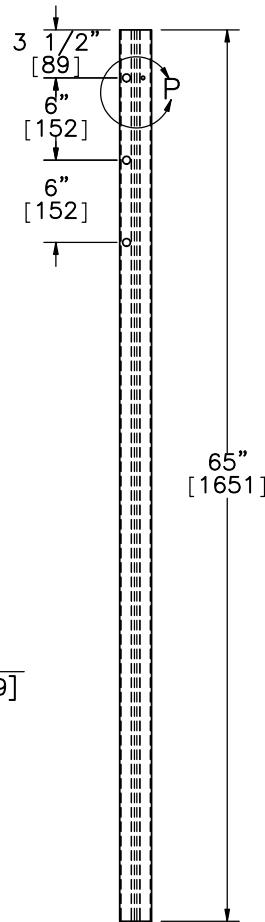
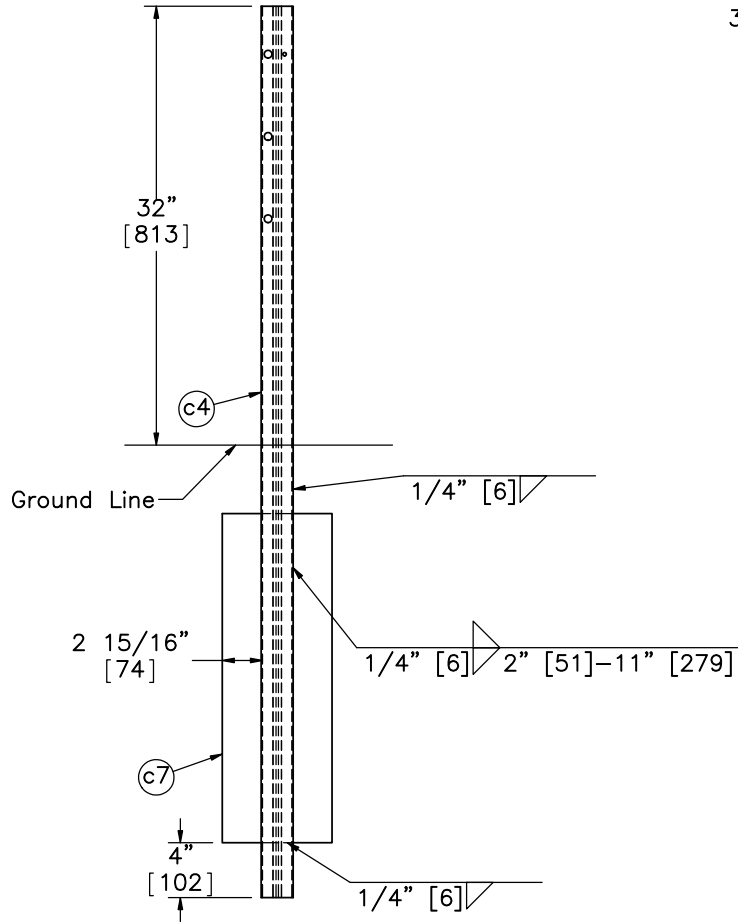
NY Cable Guardrail New J-Bolt		SHEET: 12 of 16
		DATE: 5/28/2014
Anchor Post Components		DRAWN BY: JGP/CWP/ SDB
DWG. NAME: NY-Cable-GR29_R13	SCALE: 1:5 UNITS: in.[mm]	REV. BY: KAL/TH/ JCH



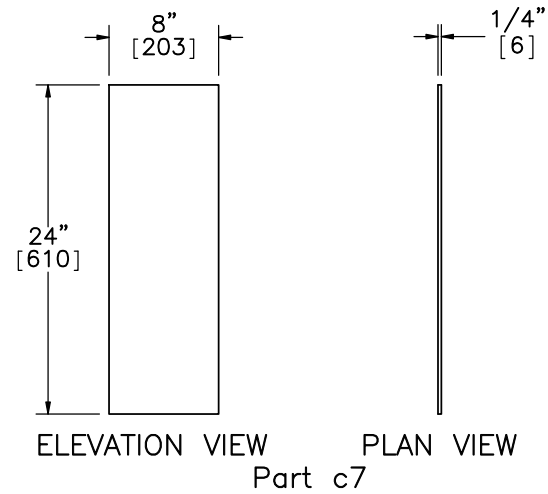
Part c5

Note: (1) For testing purposes, the j-bolt may be fabricated from ASTM A36 round bar stock which is bent and threads cut and then galvanized.

	NY Cable Guardrail New J-Bolt		SHEET: 13 of 16
	J-Bolt and Brass Rod Details		DATE: 5/28/2014
Midwest Roadside Safety Facility	DWG. NAME: NY-Cable-GR29_R13	SCALE: 1:1 UNITS: in.[mm]	DRAWN BY: JGP/CWP/ SDB
			REV. BY: KAL/TH/ JCH



DETAIL P
SCALE 1 : 2



NOTE: (1) Soil plate on non-impact side.



Midwest Roadside
Safety Facility

NY Cable Guardrail
New J-Bolt

Line Post

DWG. NAME.
NY-Cable-GR29_R13

SCALE: 1:14
UNITS: in.[mm]

SHEET:
14 of 16

DATE:
5/28/2014

DRAWN BY:
JGP/CWP/
SDB

REV. BY:
KAL/TH/
JCH

Item No.	QTY.	Description	Material Specification	Hardware Guide
a1	2	S3x5.7 [S76x8.5] 29 3/4" [756] Long Anchor Post	ASTM A36 Galv.	—
a2	24	3/4" [19] Dia. UNC, Hooked Anchor J-Bolt and Nut	ASTM A307 Gr. C and ASTM A563 DH Galv.	FRH20a
a3	6	3/16" [5] Dia. 5 1/4" [133] Long Brass Rod	ASTM B16-00	—
a4	32	φ3/4" Plain Round Washer-OD 1.5"	Grade 2 Galvanized	FWC20a
a5	2	W4x13 [W102x19.3] Anchor Post Stub	ASTM A36 Galv.	—
a6	4	7"x4 1/2"x3/8" [178x114x10] Slip Impact Base	ASTM A36 Galv.	—
a7	2	7"x4 1/2"x28 Gauge [178x144x0.38] Keeper Plate	ASTM A36 Galv.	—
a8	8	1/2" [13] Dia. UNC, 2" [51] Long Bolt and Nut	ASTM A307 Gr. A/ASTM F1554 Gr. 36/SAE Gr. 2 and ASTM A563 Gr. A	FBX14a
a9	24	1/2" [13] Dia. Narrow Washer (OD 1" [25])	ASTM 844/SAE Gr. 2	FWC12a
a10	2	18"x2"x3/4" [457x51x19] Anchor Post Cable Hanger	ASTM A707 Gr. 36 Galv.	—
a11	2	12"x12"x1/2" [305x305x13] Anchor Post Base	ASTM A709 Gr. 36 Galv.	—
b1	2	14"x9"x1/2" [356x229x13] Cable Anchor Base Plate	ASTM A709 Gr. 36 Galv.	—
b2	4	3 1/2"x3 1/2"x1/2" [89x89x13] Cable Anchor External Gusset	ASTM A709 Gr. 36 Galv.	—
b3	2	1/4" [6] Dia. 15" [381] Long Brass Rod	ASTM B16-00	—
b4	4	2 3/4"x2 3/4"x1/4" [70x70x6] Cable Anchor Internal Gusset	ASTM A709 Gr. 36 Galv.	—
b5	2	14"x1"x1/2" [356x25x13] Cable Anchor Front Plate	ASTM A709 Gr. 36 Galv.	—
b6	2	14"x4"x1/2" [356x102x13] Cable Anchor Top Plate	ASTM A709 Gr. 36 Galv.	—
c1	18	Cable End Fitting	ASTM A27 Galv.	RCE03
c2	4	3/4" [19] Plain Round Washer (OD 2" [51])	ASTM F844/SAE Gr. 2 Galv.	FWC20a
c3	3	Cable Turnbuckle	AASHTO M269/ASTM F1145	—
c4	38	S3x5.7 [S76x8.5] 65" [1651] Long Line Post	ASTM A36	—
c5	114	1/2" [13] J-Bolt and Nut	Bolt ASTM A36 and Nut ASTM A563DH Galv.	—
c6	3	3/4" [19] Dia. Cable Approx. 600' [183 m]	AASHTO M30 Type 1 Class A Galv.	RCM01
c7	38	2'x8"x0.25" Soil Plate	ASTM A36 Galv.	—
c8	2	1" [25] Dia. Beveled Washer	ASTM A36	—
d1	2	Concrete Anchor Block	3000 psi [20.68 MPa] Compressive Strength	—
d2	12	32 1/2" [826] Long #3 [#10] Rebar	ASTM A36	—
d3	12	44 1/2" [1130] Long #3 [#10] Rebar	ASTM A36	—
d4	16	30" [762] Long #3 [#10] Rebar	ASTM A36	—
e1	24	Cable Wedge	ASTM A47 Gr. 32510	—
e2	6	50,000-lb Load Cell	N/A	—
e3	18	3/4" [19] Dia. UNC Threaded Rod	ASTM A449	—
e4	3	3/4" [19] Dia. UNC Left-Handed Threaded Rod	ASTM A449	—
e5	3	3/4" [19] Cable Splice	ASTM A536	—



Midwest Roadside
Safety Facility

NY Cable Guardrail
New J-Bolt


Bill of Materials

DWG. NAME.
NY-Cable-GR29_R13

SCALE: NONE
UNITS: in.[mm]

SHEET:
15 of 16
DATE:
5/28/2014
DRAWN BY:
JGP/CWP/
SDB
REV. BY:
KAL/TH/
JCH

- (1) All posts shall be S3x5.7 rolled steel section. The anchor post stub shall be W4x13.
- (2) 3/4" round wire cable shall consist of three strands (7 wires per strand) and have a minimum tensile strength of 25,000 lbf.
- (3) Cable ends shall be fabricated from malleable iron or cast steel. The cable splice and wedge shall be fabricated from malleable iron or ASTM A536 ductile iron 65-42-12.
- (4) All cable ends and splices shall be designed to use the wedge shown on sheet 11 and shall develop the full strength of the 3/4" round cable (25000 lb). The cables, ends, and splices shall be hot dipped galvanized as indicated in material specification for cable guide rail. The wedge shall not be galvanized.
- (5) Stagger cable splices. Provide a minimum of 20' between any pair. Provide a minimum of 100' between cable splices on the same cable.
- (6) Alternate designs for the steel turnbuckle cable end assembly or spring cable end assembly shall be submitted for approval.
- (7) Tension cable such that there is a total of 1" [25] cable sag at the midspan between two posts near the impact point.
- (8) The concrete anchor shall be set into the excavation as detailed. The bottom of the anchor shall have a full and even bearing on the surface under it. The top shall be back filled in accordance with the requirements of 203-3.15 "fill and back fill at structures, culverts, pipes, conduits, and direct burial cables."
- (9) Do not install cable guide railing on curves with a centerline radius of less than 440'.
- (10) Curbs greater than 3" high are not to be retained or placed if design, posted, or operating speed exceeds 35 mph. Rail mounting height is to be measured from pavement if offset between pavement and curb is less than or equal to 9" and from ground beneath rail if offset > 9".
- (11) Lifting devices, if embedded in concrete, shall be rated by their manufacturer as having a "safe working load" of four tons.
- (12) At all locations where the cable is connected to a cable socket with a wedge type connection, one wire of the wire rope shall be crimped over the base of the wedge to hold it firmly in place.

	NY Cable Guardrail New J-Bolt		SHEET: 16 of 16
			DATE: 5/28/2014
Midwest Roadside Safety Facility	Notes		DRAWN BY: JGP/CWP/ SDB
	DWG. NAME: NY-Cable-GR29_R13	SCALE: NONE UNITS: in.[mm]	REV. BY: KAL/TH/ JCH