

ELEVATION VIEW

- Notes: (1) Test shall be performed according to test designation no. 3-11 of MASH.  
 (2) The impact location is at the center of splice between post nos. 12 and 13.  
 (3) BCT anchors are placed in  $\phi 3'$  holes, then backfilled and tamped with soil.  
 (4) Critical region is between post nos. 10 and 18.  
 (5) Soil backfill to extend at least 5' behind posts.



Midwest Roadside Safety Facility

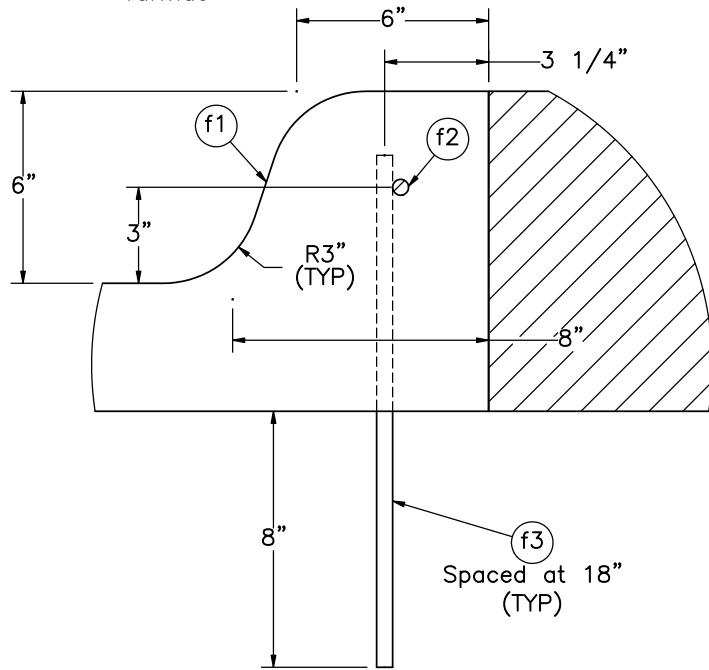
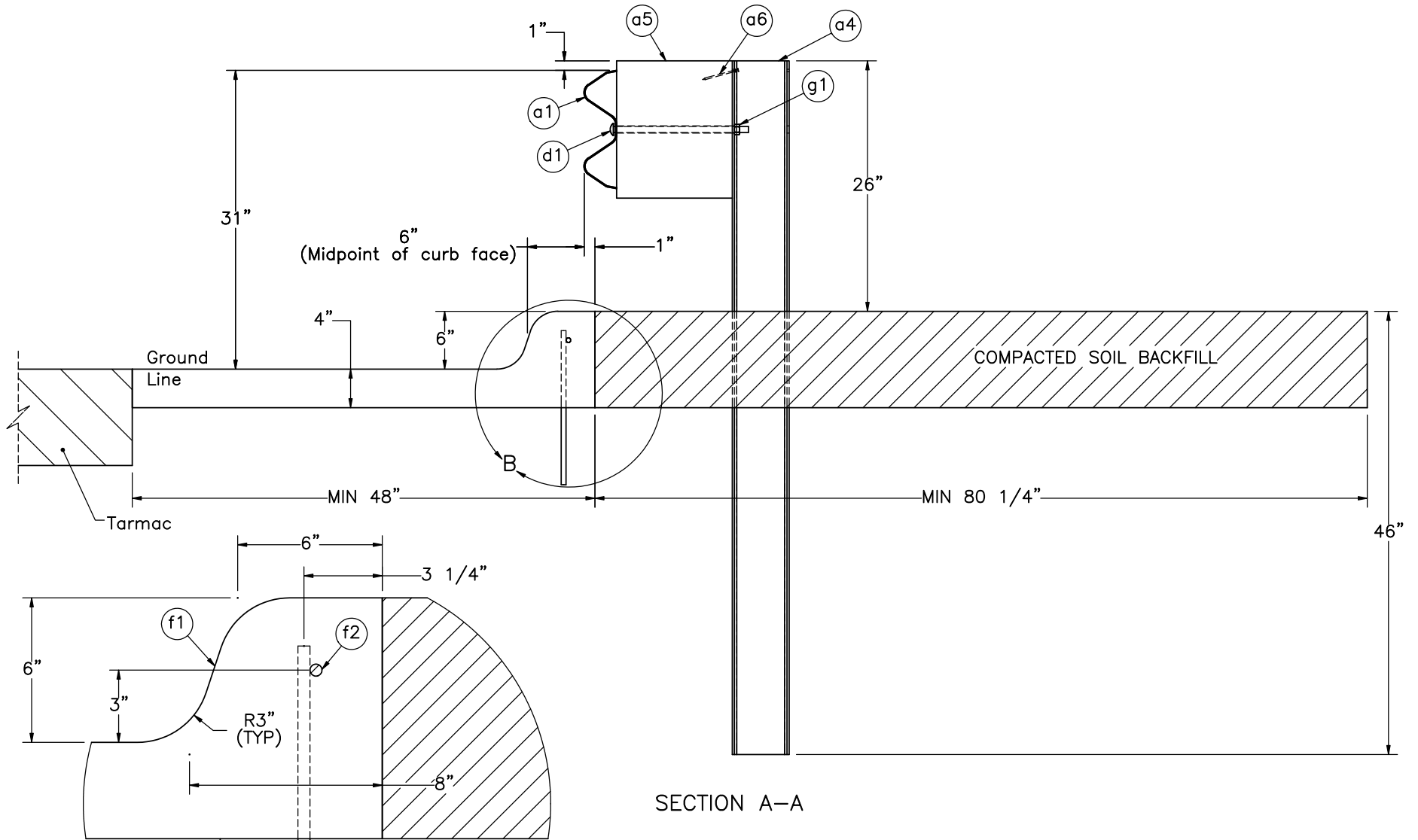
MGS with Curb and Omitted Post  
 Test No. MGSCO-4

System Layout

DWG. NAME:  
 MGSCO-4\_R3

SCALE: 1:220  
 UNITS: In.

SHEET:  
 1 of 15  
 DATE:  
 11/20/2019  
 DRAWN BY:  
 JEK/LJP  
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 KAL



Midwest Roadside  
Safety Facility

MGS with Curb and  
Omitted Post  
Test No. MGSCO-4

Post Detail

DWG. NAME.  
MGSCO-4\_R3

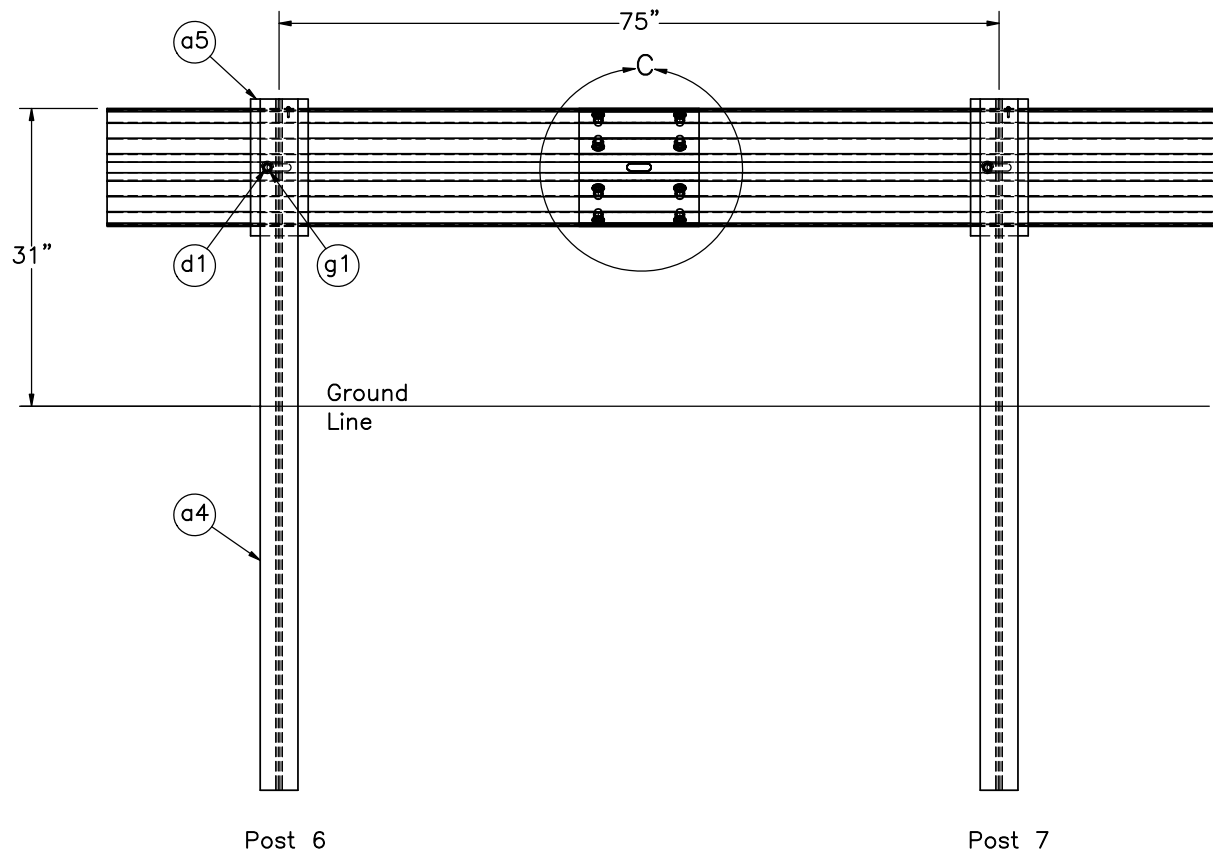
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SHEET:  
2 of 15

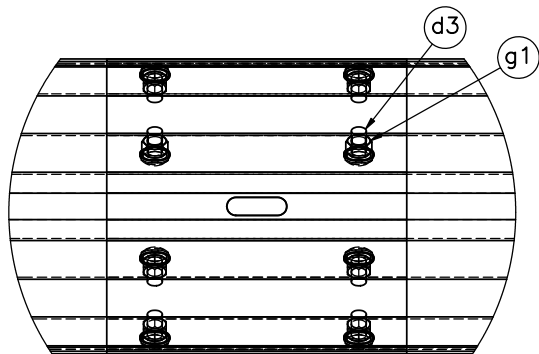
DATE:  
11/20/2019

DRAWN BY:  
JEK/LJP

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RKF/JCH/  
KAL




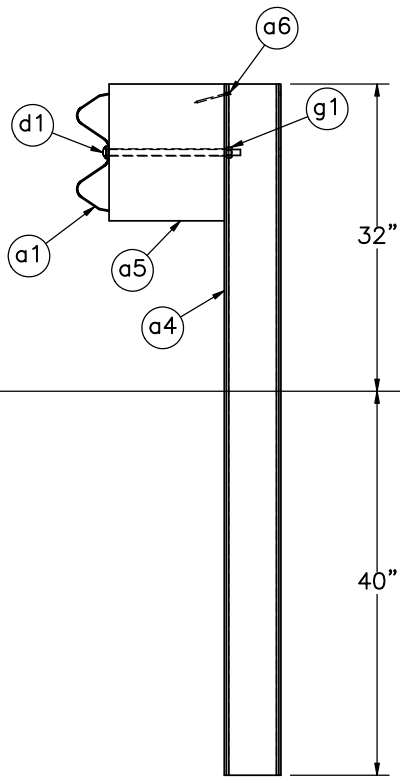
SPLICE DETAIL  
BACKSIDE



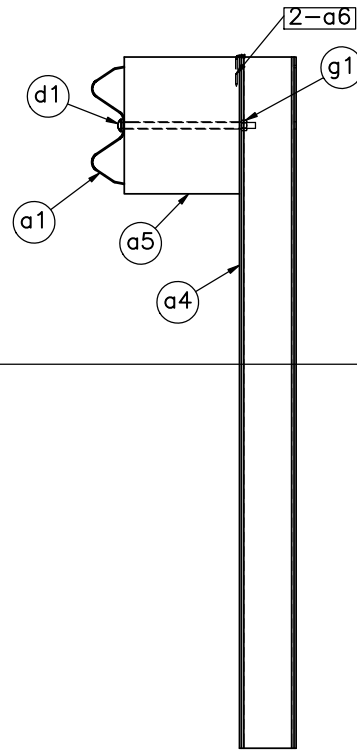
DETAIL C  
SCALE 1:8

Note: (1) Guardrail bolts (part d1) on the upstream side of the web.

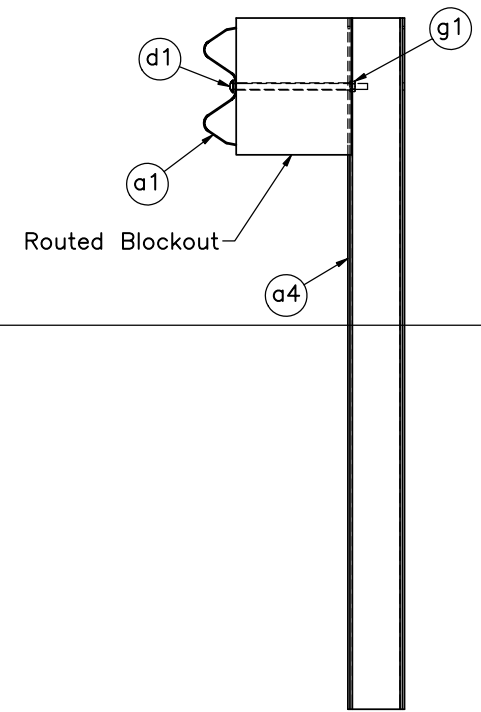
 Midwest Roadside Safety Facility	MGS with Curb and Omitted Post Test No. MGSCO-4	SHEET: 3 of 15
	Splice and Post Detail	DATE: 11/20/2019
DWG. NAME: MGSCO-4_R3	SCALE: 1:20 UNITS: In.	DRAWN BY: JEK/LJP
		REV. BY: RKF/JCH/ KAL



SECTION D-D  
NAIL THROUGH HOLE IN POST FLANGE



BLOCKOUT ATTACHMENT ALTERNATIVE  
2 NAILS BENT OVER TOP



BLOCKOUT ATTACHMENT ALTERNATIVE  
ROUTED BLOCKOUT



Midwest Roadside  
Safety Facility

MGS with Curb and  
Omitted Post  
Test No. MGSCO-4

Blockout Attachment Options

DWG. NAME.  
MGSCO-4\_R3

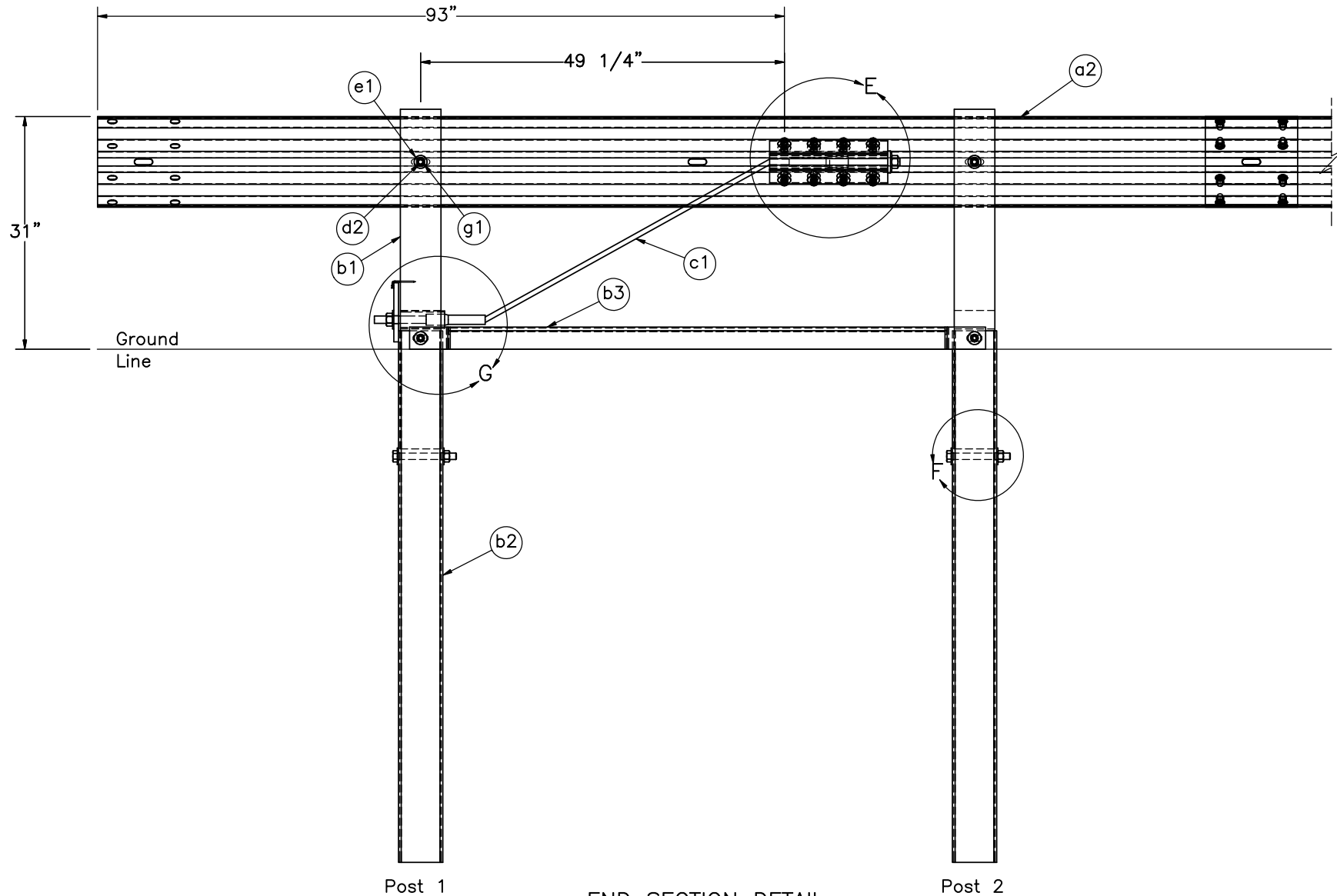
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UNITS: In.

SHEET:  
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DATE:  
11/20/2019

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JEK/LJP

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END SECTION DETAIL  
BACKSIDE (TYP)

Note: (1) Downstream end section (post nos. 27 & 28) is mirrored.



Midwest Roadside  
Safety Facility

MGS with Curb and  
Omitted Post  
Test No. MGSCO-4

End Section Detail

DWG. NAME.  
MGSCO-4\_R3

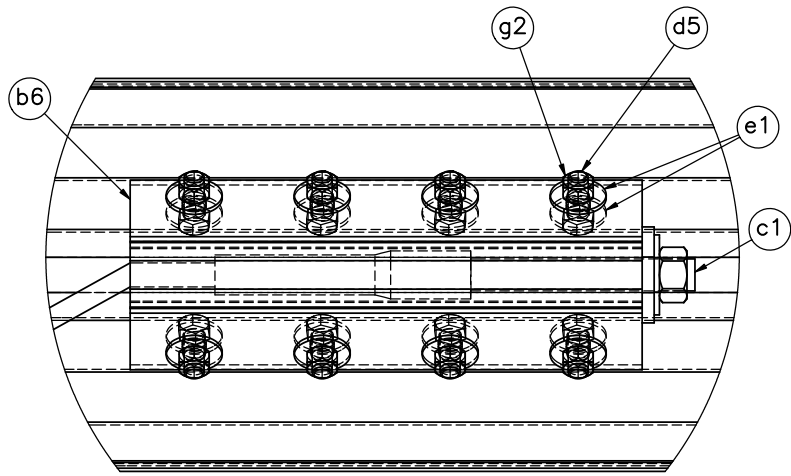
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SHEET:  
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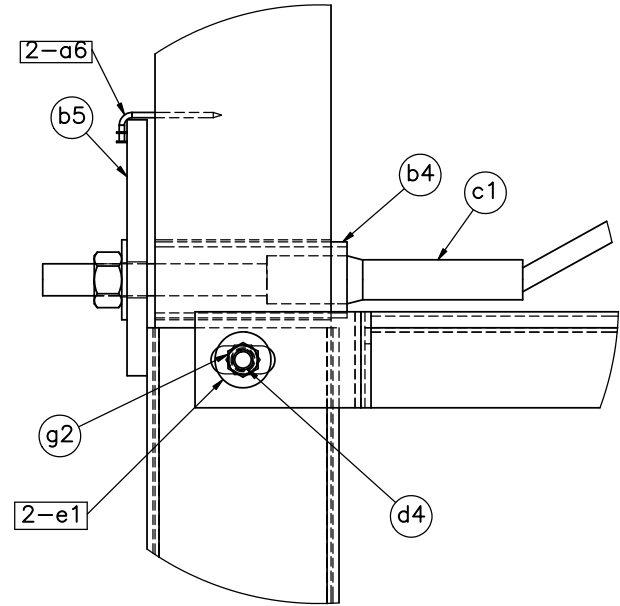
DATE:  
11/20/2019

DRAWN BY:  
JEK/LJP

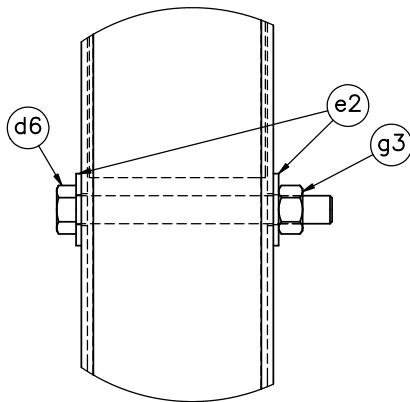
REV. BY:  
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DETAIL E



DETAIL G



DETAIL F

Note: (1) Additional washer (part e1) on the opposite side under the head of bolt (part d4).



Midwest Roadside  
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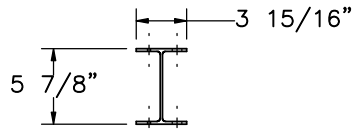
MGS with Curb and  
Omitted Post  
Test No. MGSCO-4

BCT Anchor Detail

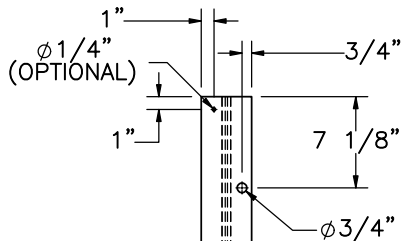
DWG. NAME.  
MGSCO-4\_R3

SCALE: 1:6  
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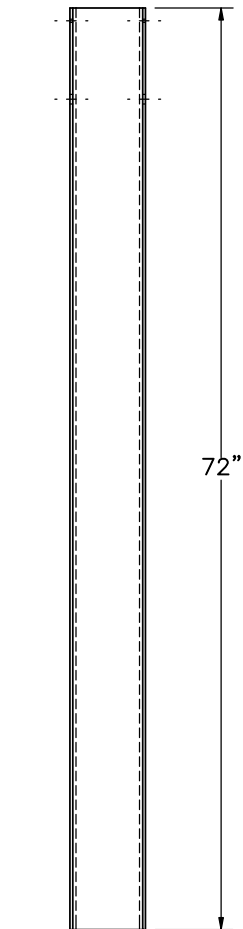
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DATE:  
11/20/2019  
DRAWN BY:  
JEK/LJP  
REV. BY:  
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KAL



PLAN VIEW

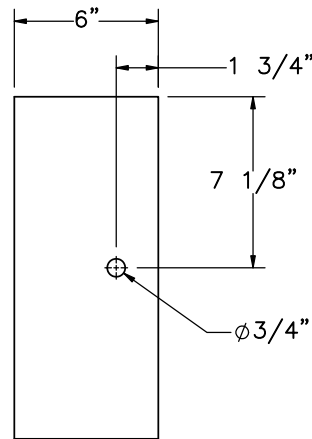


ELEVATION VIEW

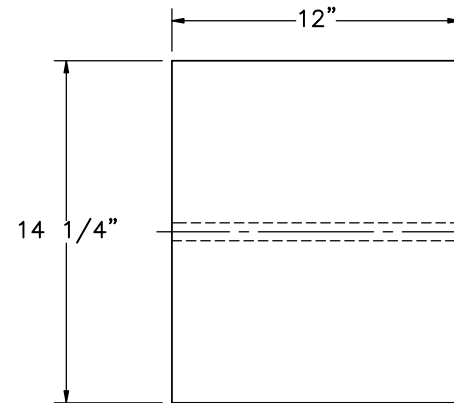


PROFILE VIEW

Part a4



ELEVATION VIEW



PROFILE VIEW

SCALE 1:8  
Part a5



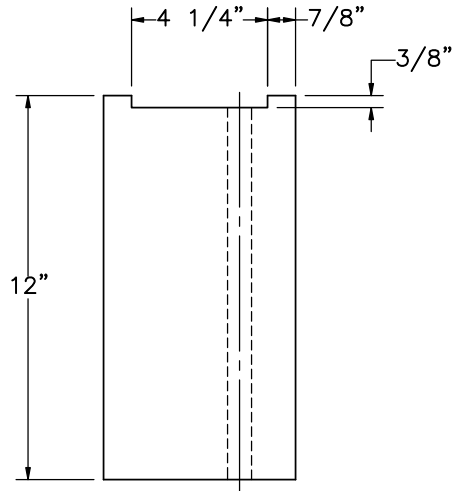
Midwest Roadside  
Safety Facility

MGS with Curb and  
Omitted Post  
Test No. MGSCO-4  
Post Nos. 3-26 Components

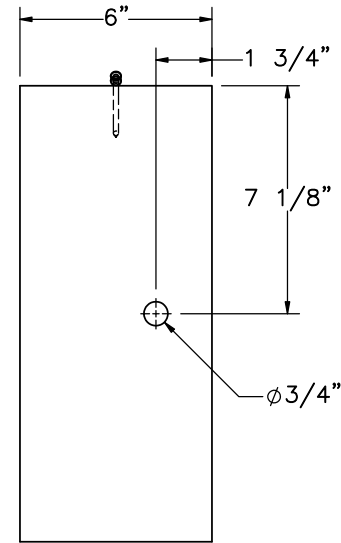
DWG. NAME.  
MGSCO-4\_R3

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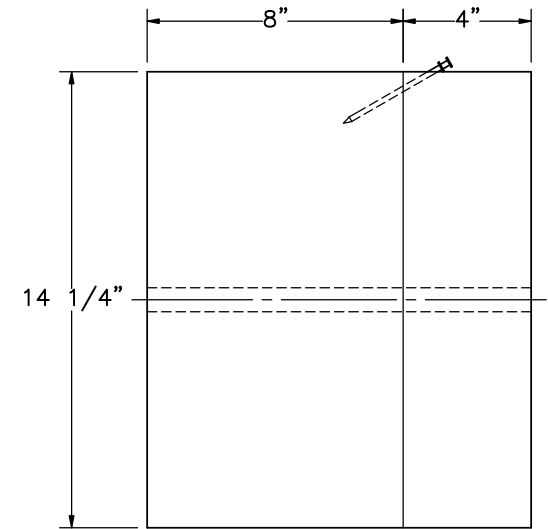
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DATE:  
11/20/2019  
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PLAN VIEW

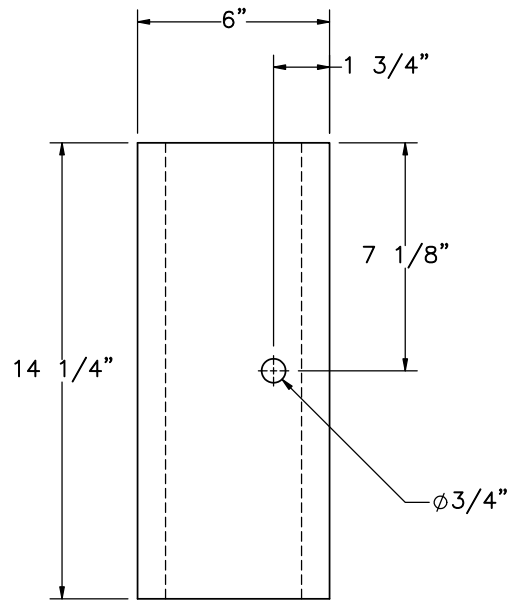


ELEVATION VIEW



PROFILE VIEW

Alternate Blockout Option –  
6"x4"x14 1/4" Blockout  
with 6"x8"x14 1/4" Blockout



ELEVATION VIEW

Alternate Blockout Option –  
6"x12"x14 1/4" Routed Blockout



Midwest Roadside  
Safety Facility

MGS with Curb and  
Omitted Post  
Test No. MGSCO-4

Blockout Alternatives

DWG. NAME.  
MGSCO-4\_R3

SCALE: 1:6  
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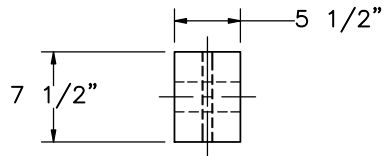
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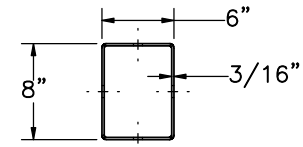
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REV. BY:  
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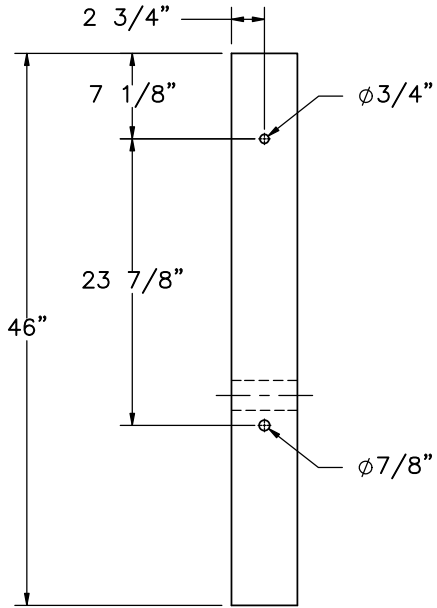




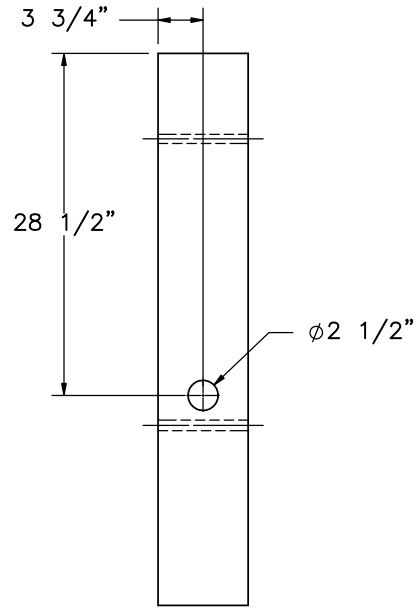
PLAN VIEW



PLAN VIEW

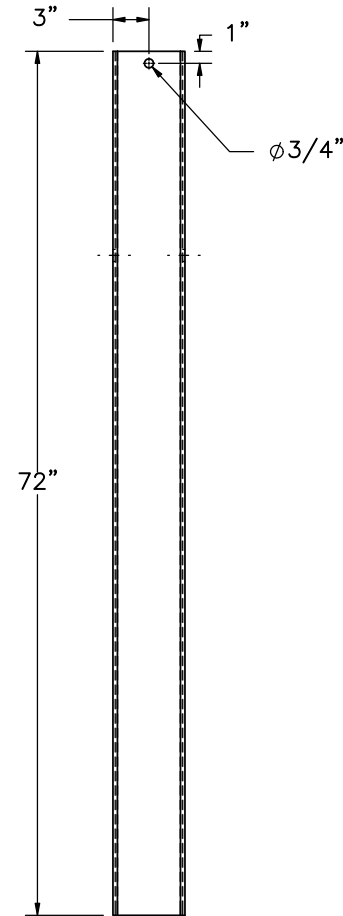


ELEVATION VIEW

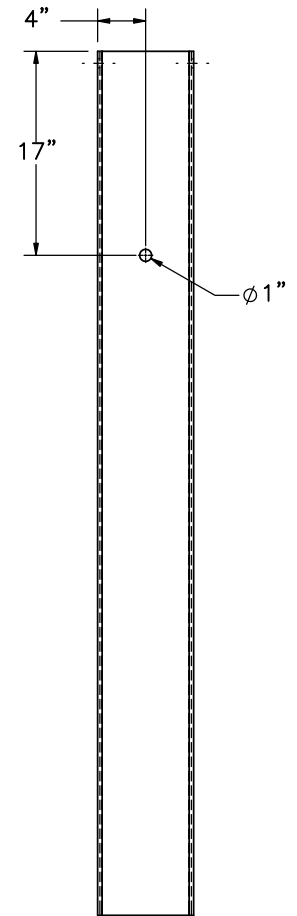


PROFILE VIEW

Part b1



ELEVATION VIEW



PROFILE VIEW

Part b2



Midwest Roadside Safety Facility

MGS with Curb and Omitted Post  
Test No. MGSCO-4

BCT Timber Post & Foundation Tube Detail

DWG. NAME:  
MGSCO-4\_R3

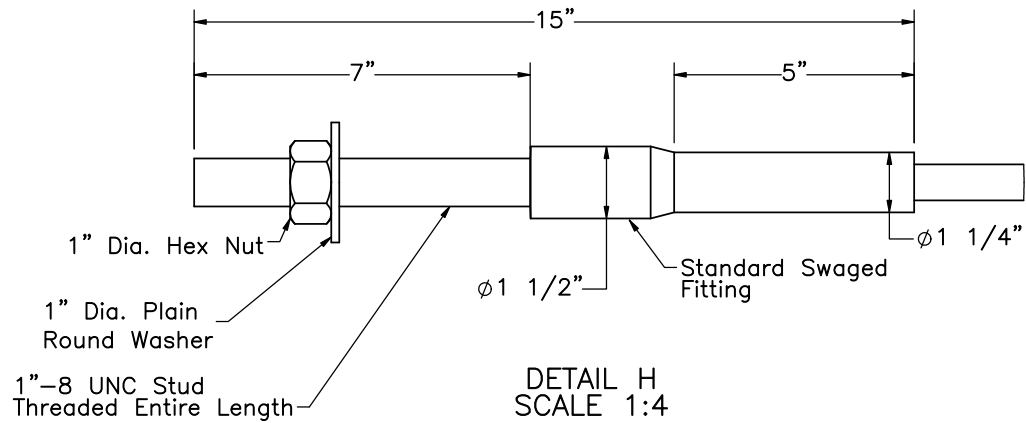
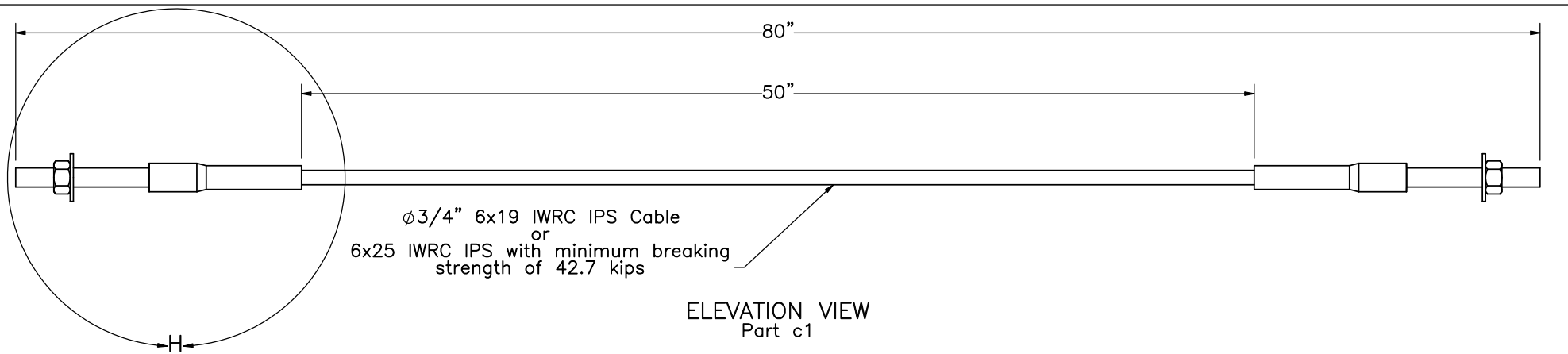
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11/20/2019

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Midwest Roadside Safety Facility

MGS with Curb and Omitted Post  
Test No. MGSCO-4

BCT Anchor Cable

DWG. NAME.  
MGSCO-4\_R3

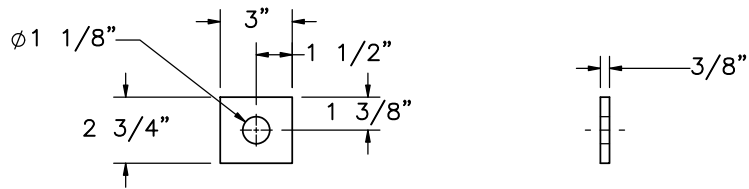
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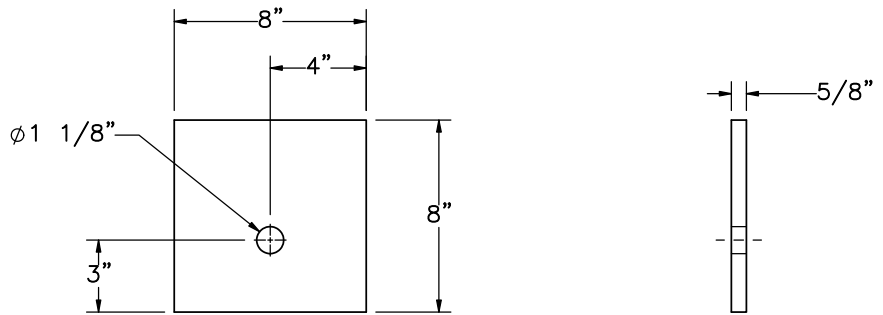
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11/20/2019

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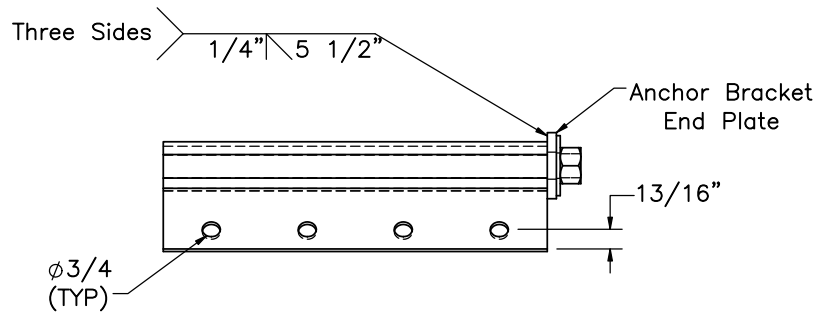


ELEVATION VIEW PROFILE VIEW  
Anchor Bracket End Plate

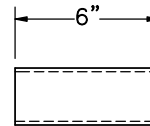


ELEVATION VIEW PROFILE VIEW

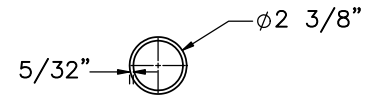
Part b5



PLAN VIEW

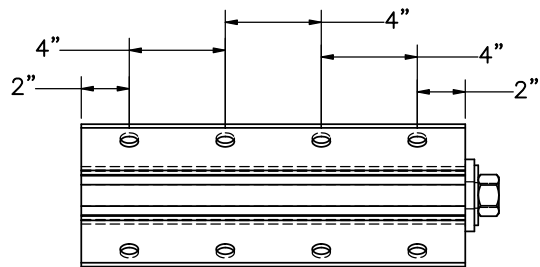


ELEVATION VIEW

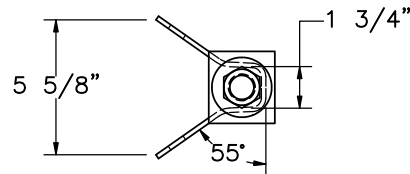


PROFILE VIEW

Part b4



ELEVATION VIEW



PROFILE VIEW

Part b6



Midwest Roadside Safety Facility

MGS with Curb and Omitted Post  
Test No. MGSCO-4

BCT Post Components & Anchor Bracket

DWG. NAME:  
MGSCO-4\_R3

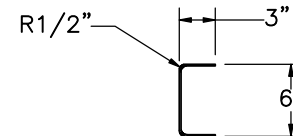
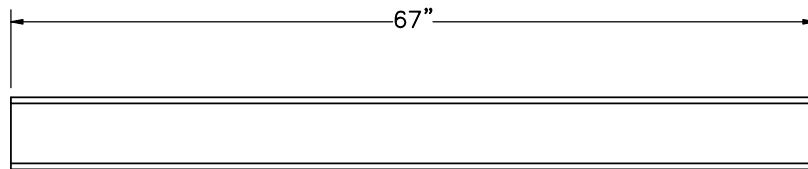
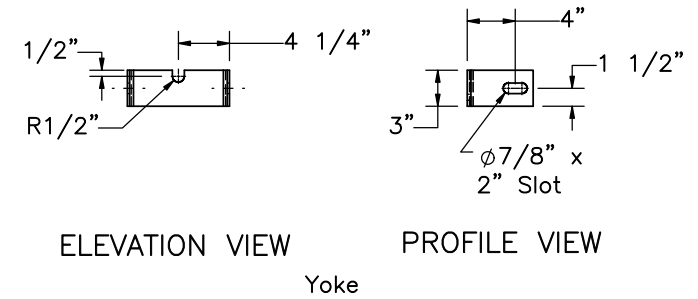
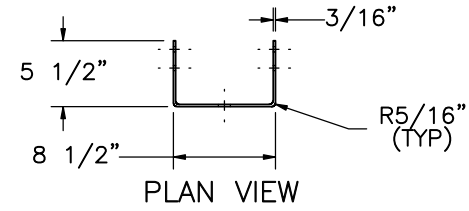
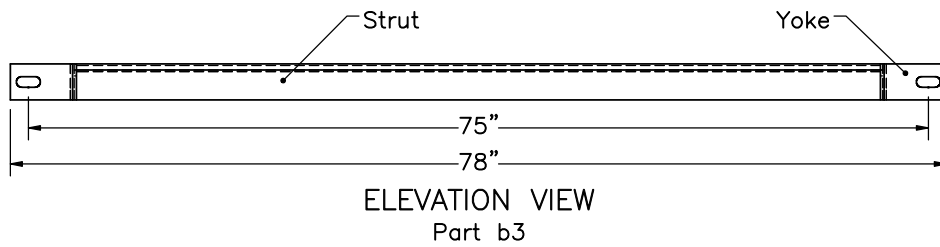
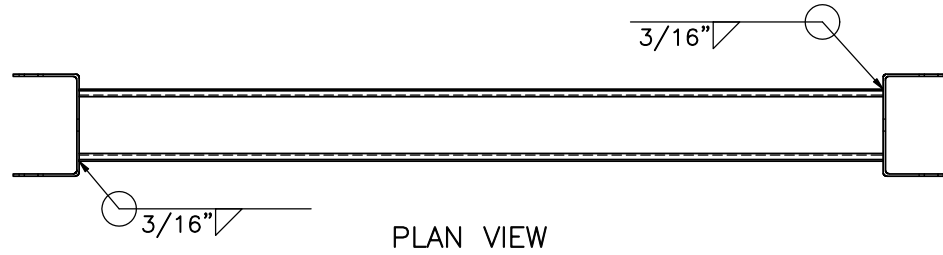
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11/20/2019

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ELEVATION VIEW

PROFILE VIEW

6"x3" [152x76] 10 Gauge [3.4] Strut



Midwest Roadside  
Safety Facility

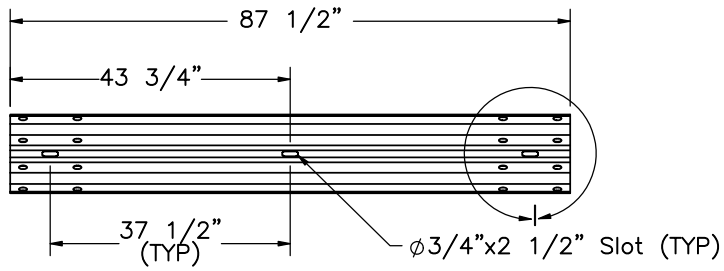
MGS with Curb and  
Omitted Post  
Test No. MGSCO-4

Ground Strut Details

DWG. NAME:  
MGSCO-4\_R3

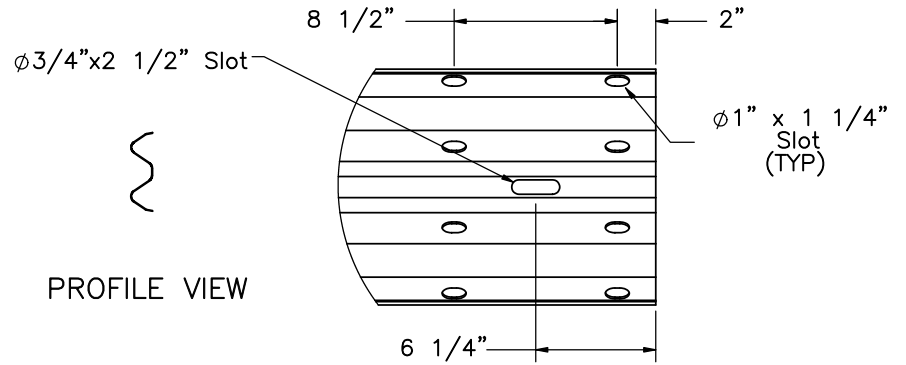
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11/20/2019  
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JEK/LJP  
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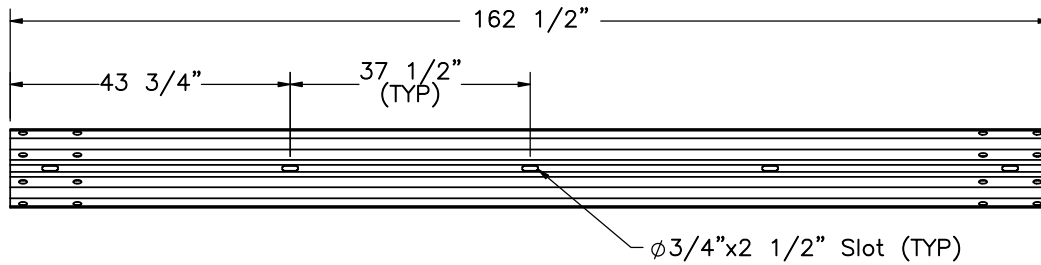


ELEVATION VIEW

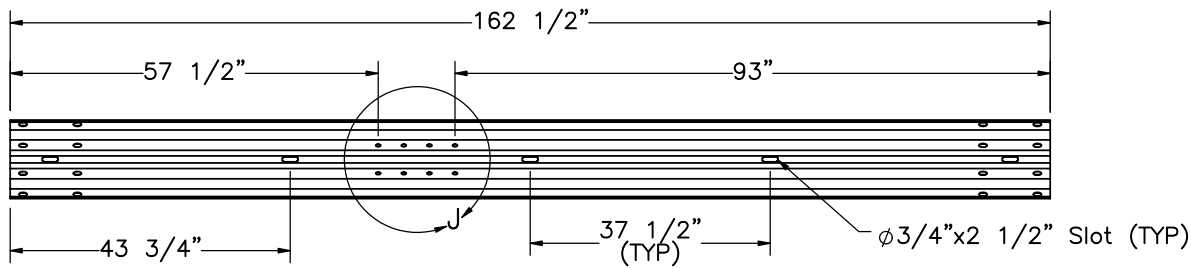
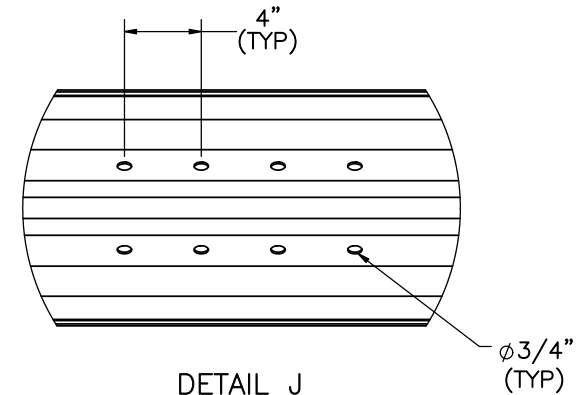
Part a3



DETAIL I  
SCALE 1:10



ELEVATION VIEW  
Part a1



ELEVATION VIEW  
Part a2



Midwest Roadside  
Safety Facility

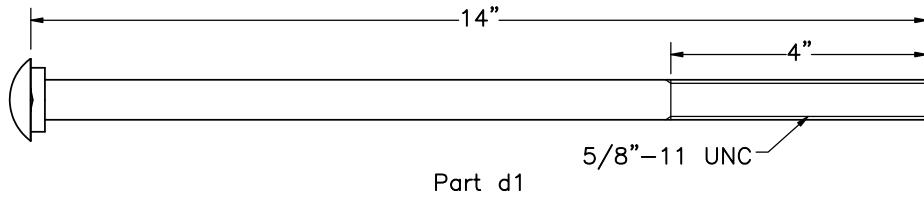
MGS with Curb and  
Omitted Post  
Test No. MGSCO-4

Rail Section Details

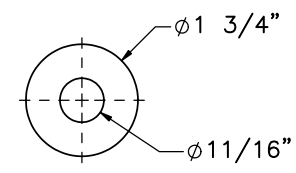
DWG. NAME.  
MGSCO-4\_R3

SCALE: 1:30  
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SHEET:  
13 of 15  
DATE:  
11/20/2019  
DRAWN BY:  
JEK/LJP  
REV. BY:  
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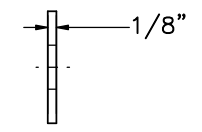


Part d1

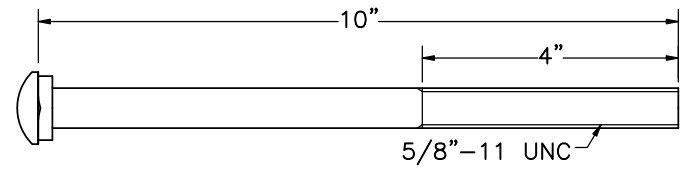


ELEVATION VIEW

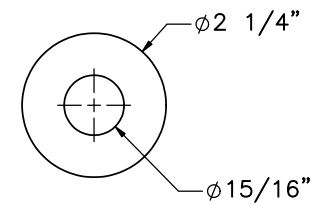
Part e1



PROFILE VIEW

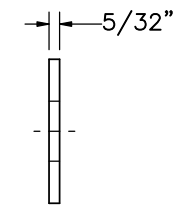


Part d2

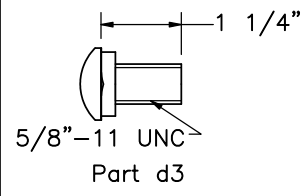


ELEVATION VIEW

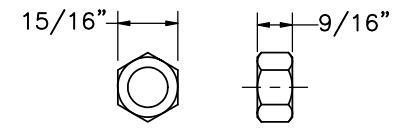
Part e2



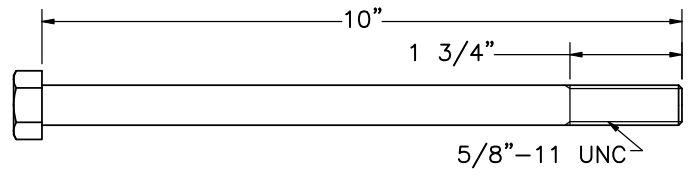
PROFILE VIEW



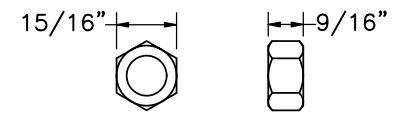
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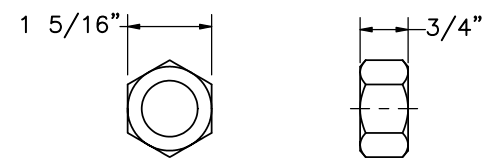
Part g1



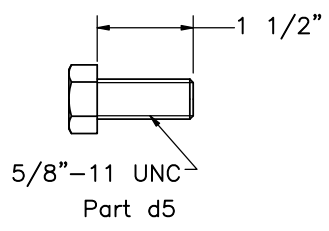
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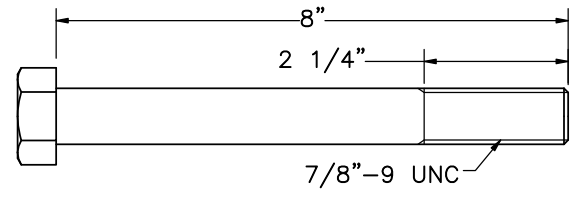
Part g2



Part g3



Part d5



Part d6



Midwest Roadside Safety Facility

MGS with Curb and Omitted Post  
Test No. MGSCO-4  
Hardware

DWG. NAME:  
MGSCO-4\_R3

SCALE: 1:3  
UNITS: In.

SHEET:  
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DATE:  
11/20/2019  
DRAWN BY:  
JEK/LJP  
REV. BY:  
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Item No.	QTY.	Description	Material Specification	Treatment Specification	Hardware Guide
-	-	Soil	-	-	-
a1	15	12'-6" 12-gauge W-Beam MGS Section	AASHTO M180	ASTM A123 or A653	RWM04a
a2	2	12'-6" 12-gauge W-Beam MGS End Section	AASHTO M180	ASTM A123 or A653	RWM14a
a3	1	6'-3" 12-gauge W-Beam MGS Section	AASHTO M180	ASTM A123 or A653	RWM04a
a4	24	W6x8.5 or W6x9, 72" Long Steel Post	ASTM A992 Min. 50 ksi	ASTM A123	PWE06
a5	24	6"x12"x14 1/4" Timber Blockout for Steel Posts	AASHTO M168 or SYP Grade No.1 or better	AASHTO M133	PDB10a
a6	28	16D Double Head Nail	-	-	-
b1	4	BCT Timber Post - MGS Height	AASHTO M168 or SYP Grade No. 1 or better	AASHTO M133	PDF01
b2	4	72" Long Foundation Tube	ASTM A500 Gr. B	ASTM A123	PTE06
b3	2	Ground Strut Assembly	ASTM A36	ASTM A123	PFPO2
b4	2	2 3/8" O.D. x 6" Long BCT Post Sleeve	ASTM A53 Gr. B Schedule 40	ASTM A123	FMM02
b5	2	8"x8"x5/8" Anchor Bearing Plate	ASTM A36	ASTM A123	FPB01
b6	2	Anchor Bracket Assembly	ASTM A36	ASTM A123	FPA01
c1	2	BCT Anchor Cable	-	-	FCA01
d1	24	5/8" Dia. UNC, 14" Long Guardrail Bolt	ASTM A307 Gr. A	ASTM A153 or B695 Class 55 or F1941 or F2329	FBB06
d2	4	5/8" Dia. UNC, 10" Long Guardrail Bolt	ASTM A307 Gr. A	ASTM A153 or B695 Class 55 or F1941 or F2329	FBB03
d3*	112	5/8" Dia. UNC, 1 1/4" Long Guardrail Bolt	ASTM A307 Gr. A	ASTM A153 or B695 Class 55 or F1941 or F2329	FBB01
d4	4	5/8" Dia. UNC, 10" Long Hex Head Bolt	ASTM A307 Gr. A	ASTM A153 or B695 Class 55 or F1941 or F2329	FBX16a
d5	16	5/8" Dia. UNC, 1 1/2" Long Hex Head Bolt	ASTM A307 Gr. A	ASTM A153 or B695 Class 55 or F1941 or F2329	FBX16a
d6	4	7/8" Dia. UNC, 8" Long Hex Head Bolt	ASTM A307 Gr. A	ASTM A153 or B695 Class 55 or F1941 or F2329	-
e1	44	5/8" Dia. Plain USS Washer	ASTM F844	ASTM A123 or A153 or F2329	FWC16a
e2	8	7/8" Dia. Plain USS Washer	ASTM F844	ASTM A123 or A153 or F2329	-
f1	1	Curb	f'c = 4,000 psi	-	-
f2	1	#4 Rebar 819" Long	ASTM A615 Gr. 60	-	-
f3	45	#4 Rebar 16" Long	ASTM A615 Gr. 60	-	-
g1	140	5/8" Dia. Heavy Hex Nut	ASTM A563A	ASTM A153 or B695 Class 55 or F1941 or F2329	-
g2	20	5/8" Dia. Hex Nut	ASTM A563A	ASTM A153 or B695 Class 55 or F1941 or F2329	FNX16a
g3	4	7/8" Dia. Hex Nut	ASTM A563A	ASTM A153 or B695 Class 55 or F1941 or F2329	-

\* 2" Long Guardrail Bolts (FBB02) may be used in place of part d3 at nested splice locations.



Midwest Roadside  
Safety Facility

MGS with Curb and  
Omitted Post  
Test No. MGSCO-4

Bill of Materials

DWG. NAME.  
MGSCO-4\_R3

SCALE: None  
UNITS: In.

SHEET:  
15 of 15

DATE:  
11/20/2019

DRAWN BY:  
JEK/LJP

REV. BY:  
RKF/JCH/  
KAL