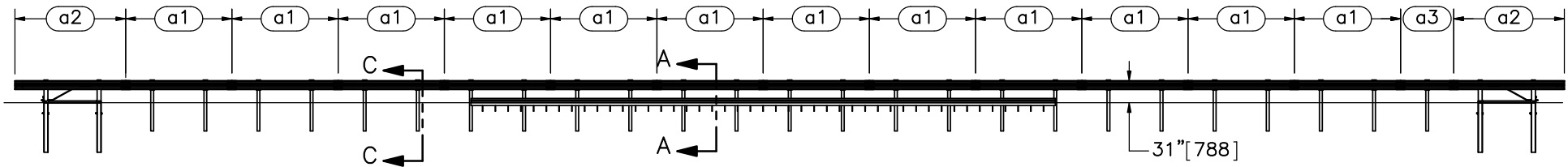



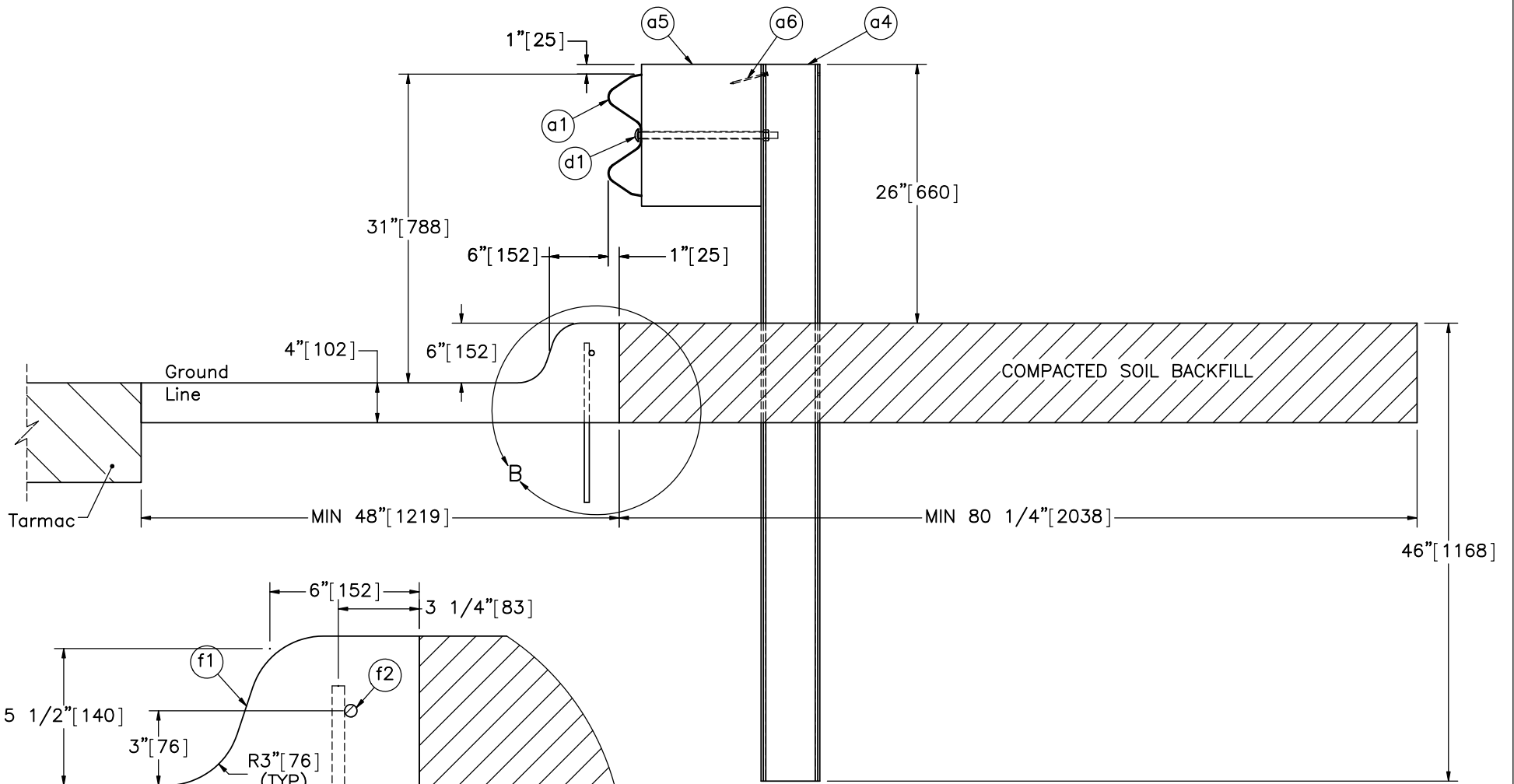
PLAN VIEW



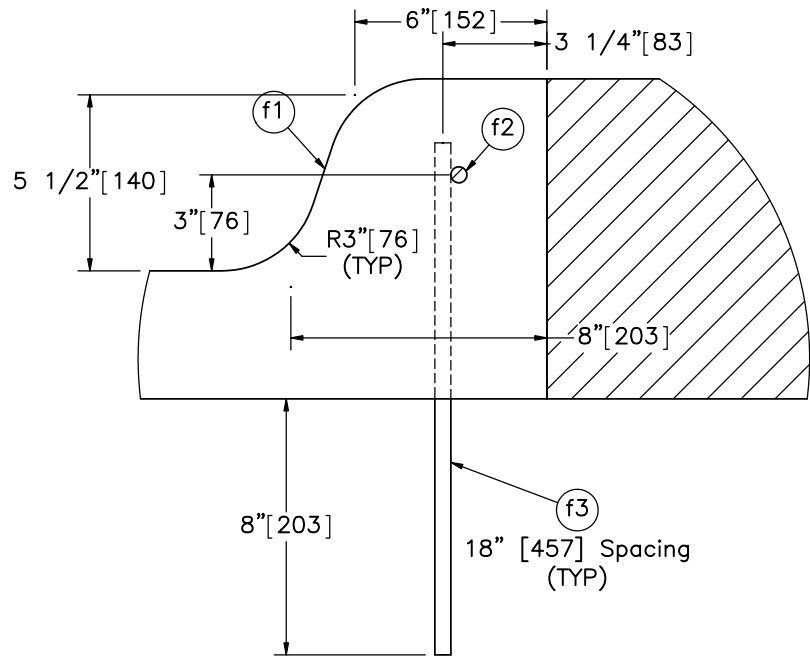
ELEVATION VIEW

- Notes: (1) Test shall be performed according to test designation no. 3-11 of MASH.  
 (2) The impact location is 138" [3,505] upstream of the center of the splice between post nos. 14 and 15.  
 (3) BCT anchors are placed in  $\phi 3'$  [914] 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' [1,524] behind posts.

|  |                                  |                     |
|--|----------------------------------|---------------------|
| <br>Midwest Roadside<br>Safety Facility | MGS with Curb<br>Test No. MGSC-8 | SHEET:<br>1 of 13   |
|  | System Layout                    | DATE:<br>10/23/2017 |
| DWG. NAME:<br>MGSPost-Curb-8_R0  | SCALE: 1:220<br>UNITS: In.[mm]   | DRAWN BY:<br>DTM    |
|  |                                  | REV. BY:<br>-       |



SECTION A-A



DETAIL B  
SCALE 1 : 6



Midwest Roadside  
Safety Facility

MGS with Curb  
Test No. MGSC-8

Post Detail

DWG. NAME:  
MGSPost-Curb-8\_R0

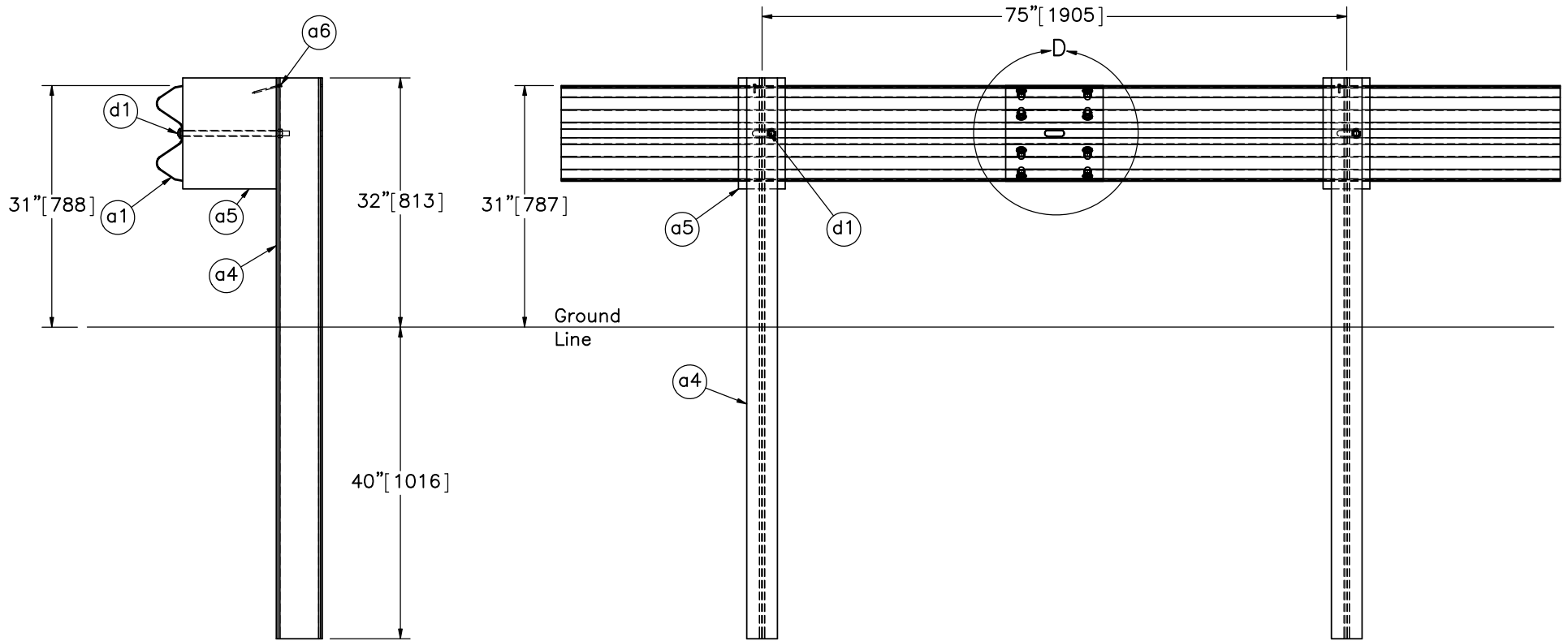
SCALE: 1:15  
UNITS: In.[mm]

SHEET:  
2 of 13

DATE:  
10/23/2017

DRAWN BY:  
DTM

REV. BY:  
-

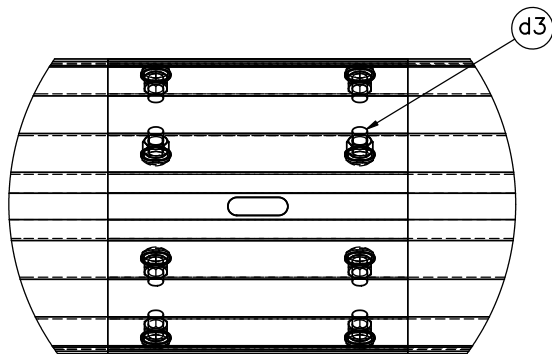


SECTION C-C

Post 23


SPLICE DETAIL  
BACKSIDE

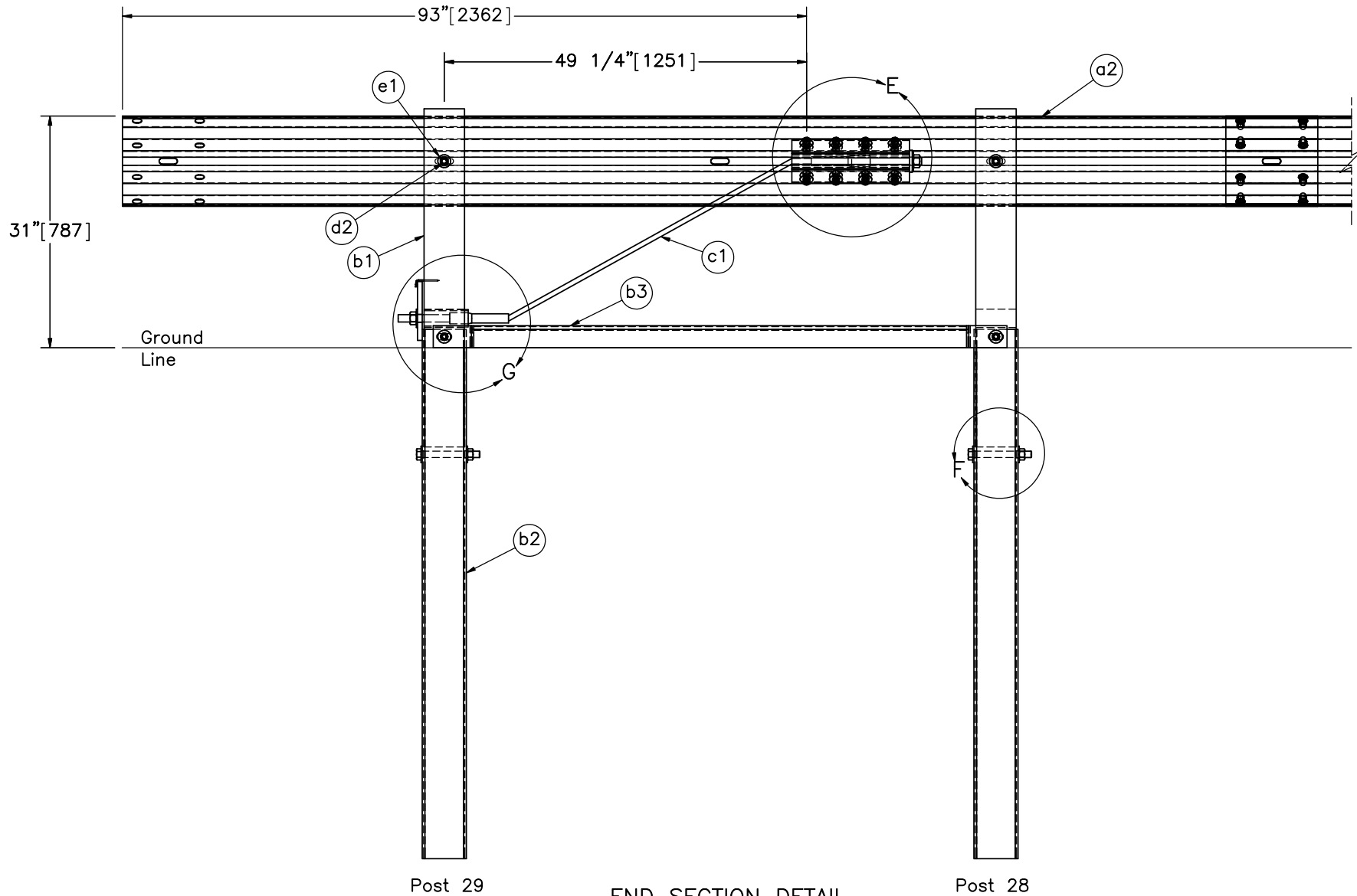
Post 22



DETAIL D  
SCALE 1 : 8

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

|   |                                  |                     |
|---|----------------------------------|---------------------|
|  | MGS with Curb<br>Test No. MGSC-8 | SHEET:<br>3 of 13   |
|   | Splice and Post Detail           | DATE:<br>10/23/2017 |
| Midwest Roadside<br>Safety Facility   | DWG. NAME:<br>MGSPost-Curb-8_R0  | DRAWN BY:<br>DTM    |
|   | SCALE: 1:20<br>UNITS: In.[mm]    | REV. BY:<br>-       |



Post 29

Post 28

END SECTION DETAIL  
BACKSIDE (TYP)

Note: (1) Downstream end section (post nos. 1 & 2) is mirrored.



Midwest Roadside  
Safety Facility

MGS with Curb  
Test No. MGSC-8

End Section Detail

DWG. NAME.  
MGSPost-Curb-8\_R0

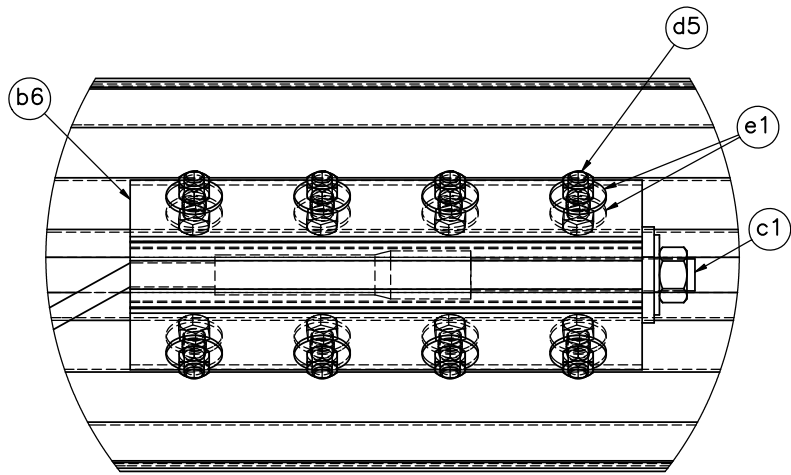
SCALE: 1:20  
UNITS: In.[mm]

SHEET:  
4 of 13

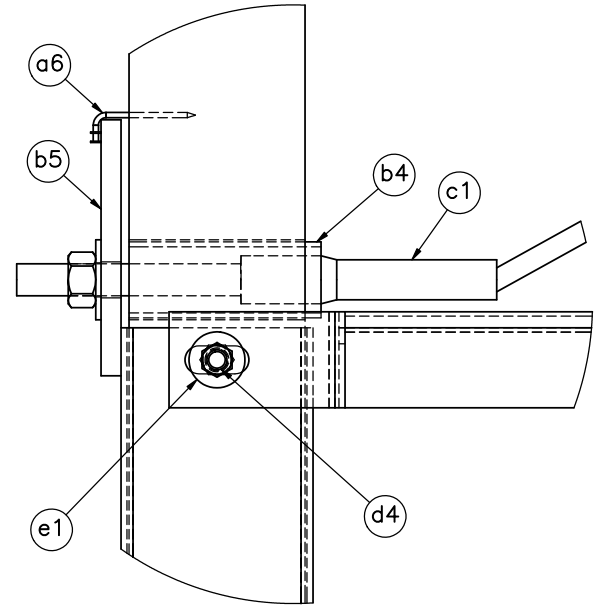
DATE:  
10/23/2017

DRAWN BY:  
DTM

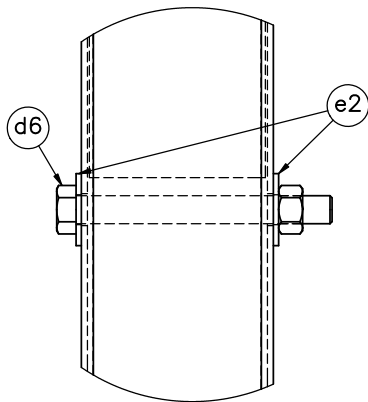
REV. BY:  
-



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  
Safety Facility

MGS with Curb  
Test No. MGSC-8

BCT Anchor Detail

DWG. NAME.  
MGSPost-Curb-8\_R0

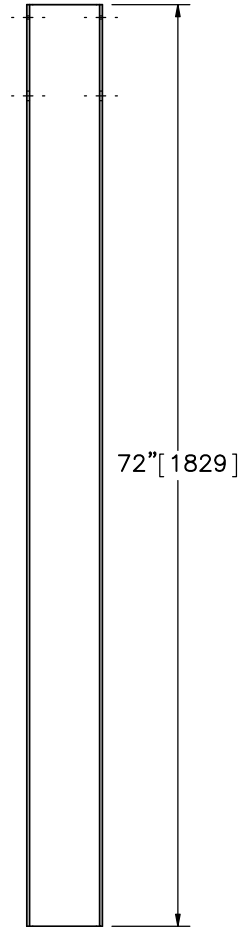
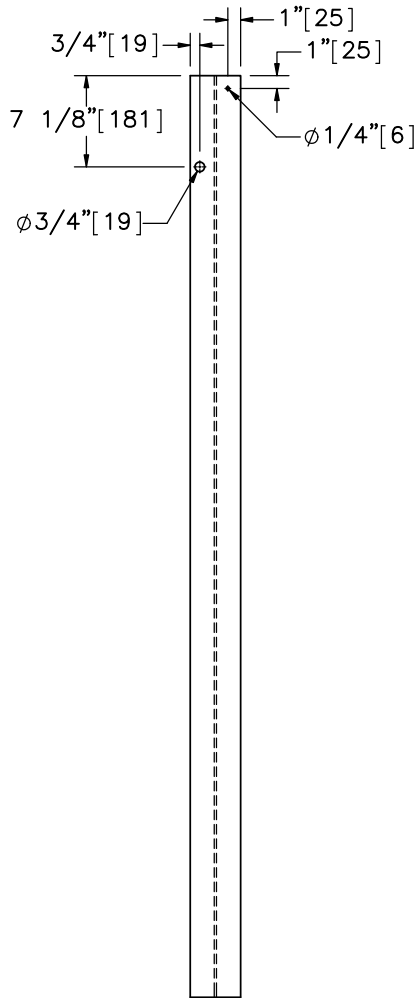
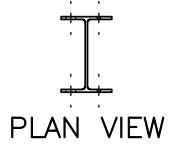
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UNITS: In.[mm]

SHEET:  
5 of 13

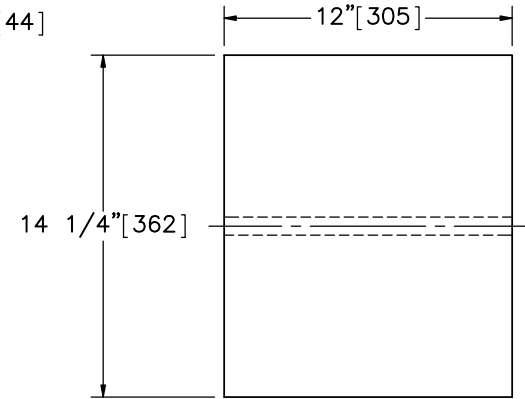
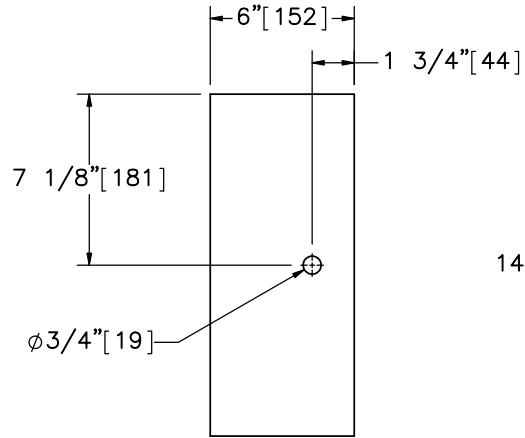
DATE:  
10/23/2017

DRAWN BY:  
DTM

REV. BY:  
-



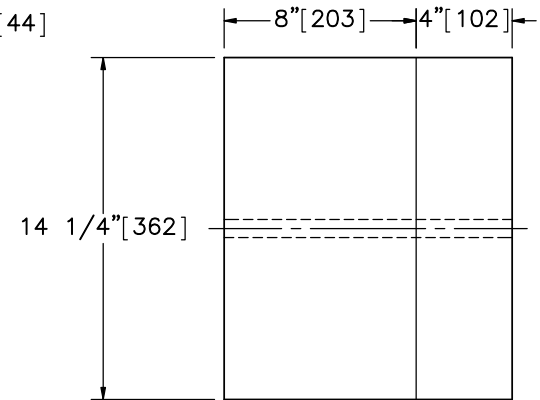
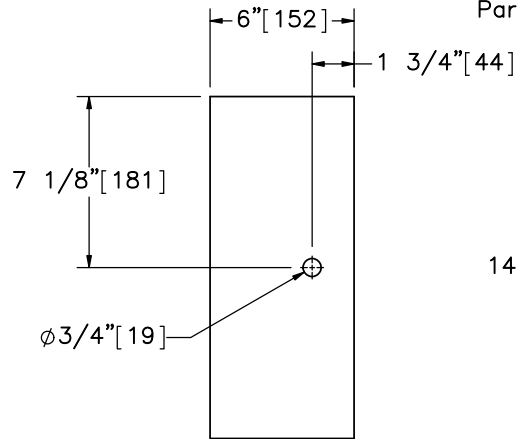
Part a4



ELEVATION VIEW

PROFILE VIEW

SCALE 1:8  
Part a5



ELEVATION VIEW

PROFILE VIEW

SCALE 1:8

Alternate Blockout Option -  
6"x4"x14 1/4" [152x102x362] Blockout  
with 6"x8"x14 1/4" [152x203x362] Blockout



Midwest Roadside  
Safety Facility

MGS with Curb  
Test No. MGSC-8

Post Nos. 3-27 Components

DWG. NAME.  
MGSPost-Curb-8\_R0

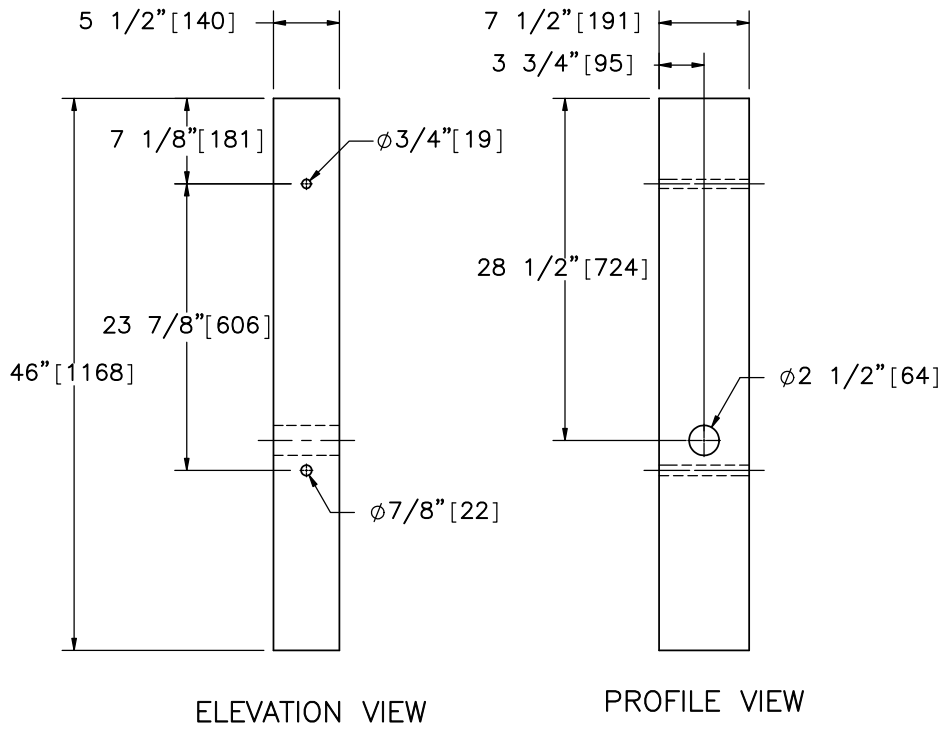
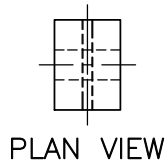
SCALE: 1:20  
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SHEET:  
6 of 13

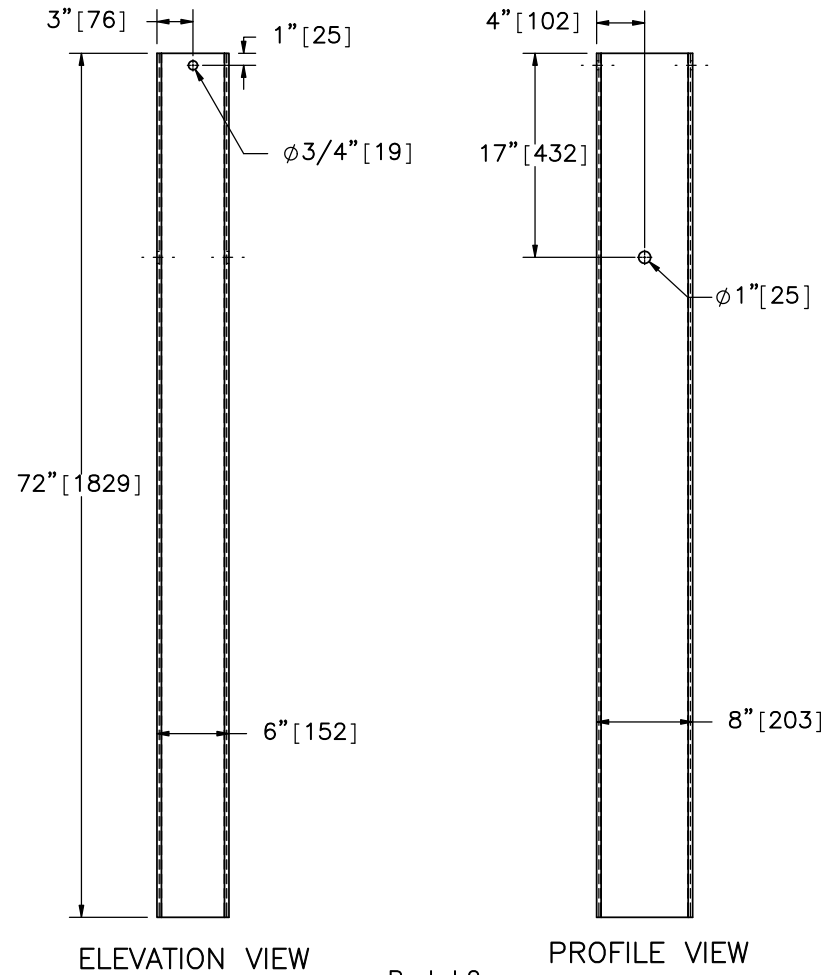
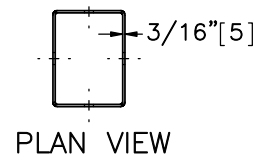
DATE:  
10/23/2017

DRAWN BY:  
DTM

REV. BY:  
-



Part b1



Part b2



Midwest Roadside  
Safety Facility

MGS with Curb  
Test No. MGSC-8

BCT Timber Post &  
Foundation Tube Detail

DWG. NAME.  
MGSPost-Curb-8\_R0

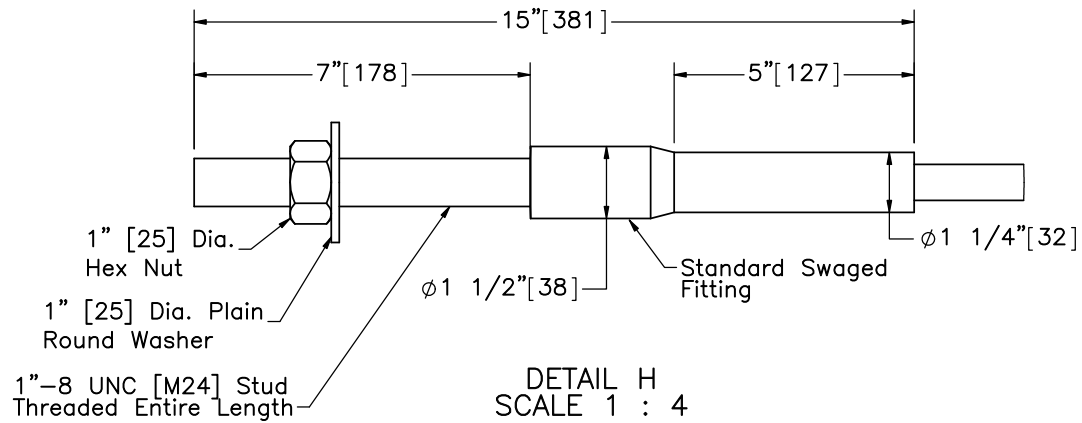
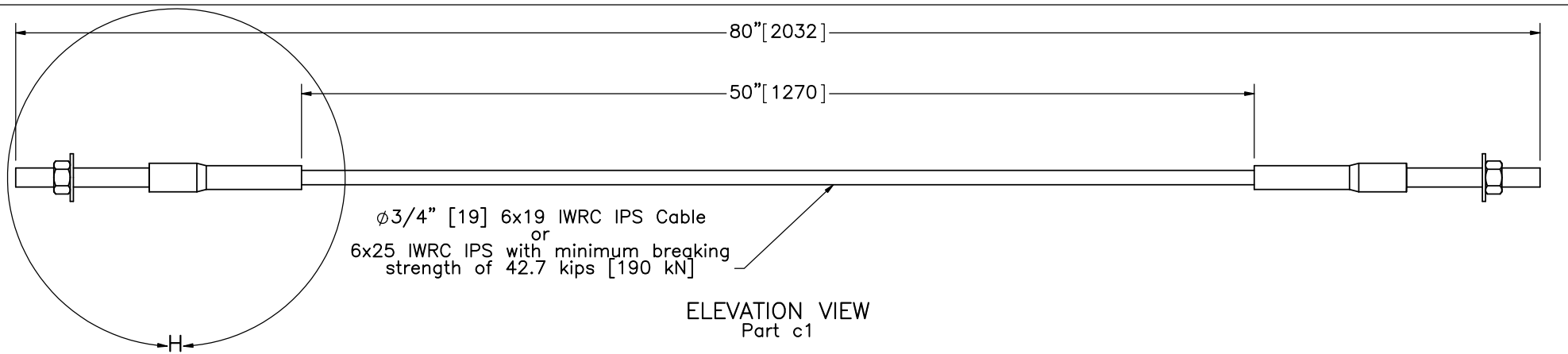
SCALE: 1:16  
UNITS: In.[mm]

SHEET:  
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10/23/2017

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DTM

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-



Midwest Roadside Safety Facility

MGS with Curb  
Test No. MGSC-8

BCT Anchor Cable

DWG. NAME.  
MGSPost-Curb-8\_R0

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

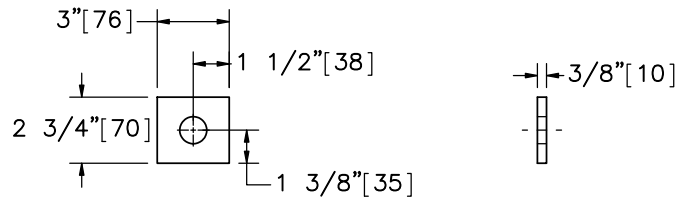
SHEET:  
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DATE:  
10/23/2017

DRAWN BY:  
DTM

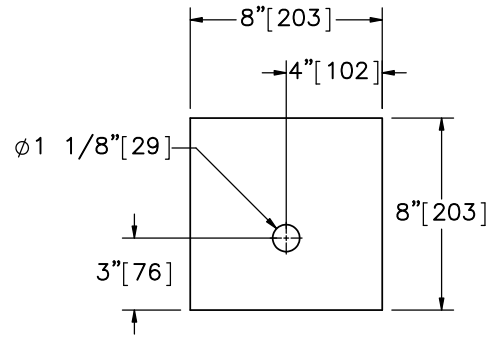
REV. BY:  
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ELEVATION VIEW PROFILE VIEW

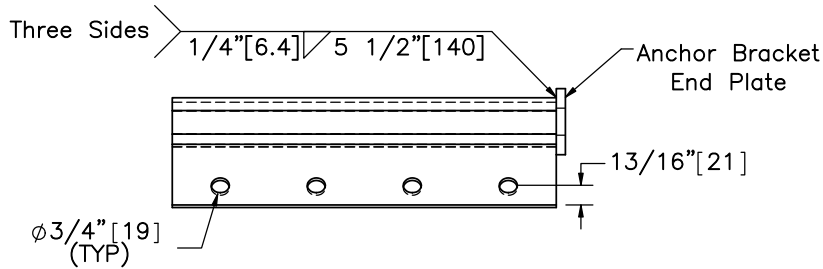
Anchor Bracket End Plate



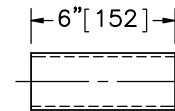
ELEVATION VIEW

PROFILE VIEW

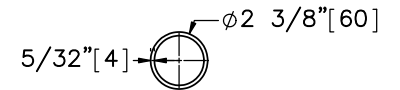
Part b5



PLAN VIEW

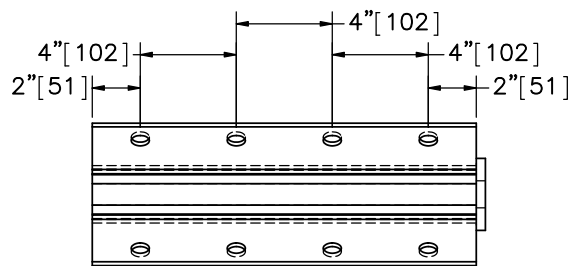


ELEVATION VIEW

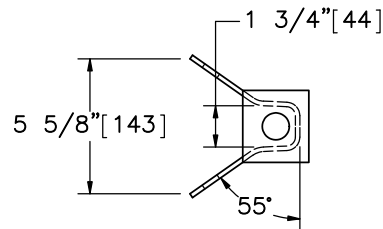


PROFILE VIEW

Part b4



ELEVATION VIEW



PROFILE VIEW

Part b6



Midwest Roadside Safety Facility

MGS with Curb  
Test No. MGSC-8

BCT Post Components &  
Anchor Bracket

DWG. NAME:  
MGSPost-Curb-8\_R0

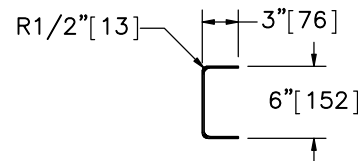
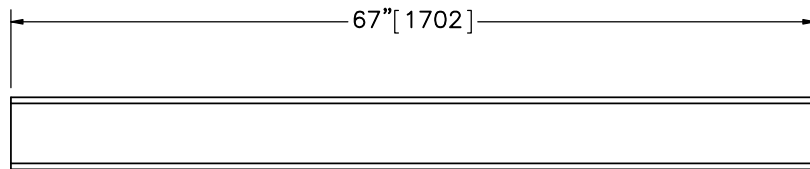
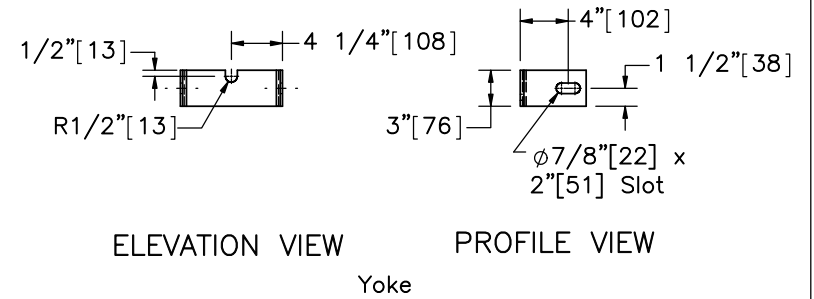
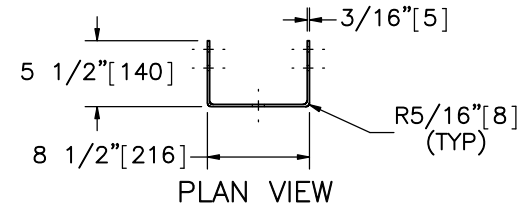
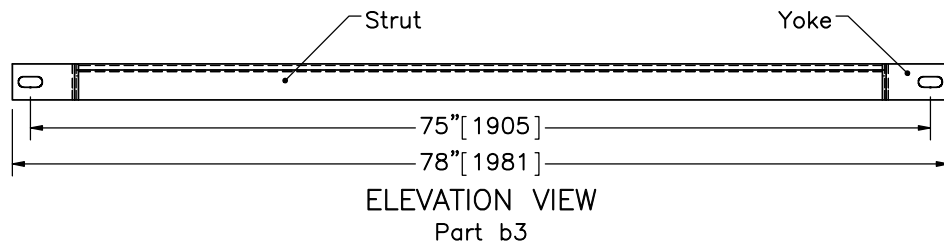
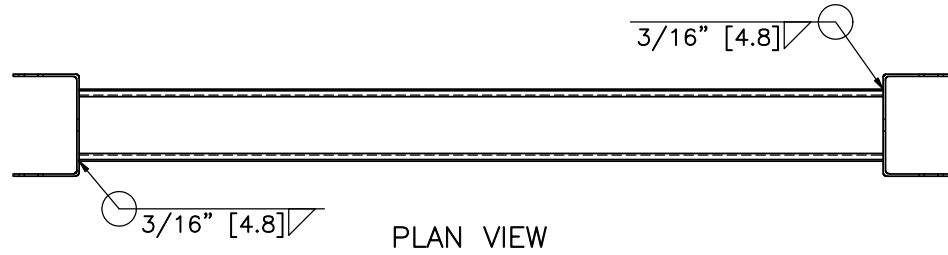
SCALE: 1:8  
UNITS: In.[mm]

SHEET:  
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DATE:  
10/23/2017

DRAWN BY:  
DTM

REV. BY:  
-



ELEVATION VIEW

PROFILE VIEW

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



Midwest Roadside  
Safety Facility

MGS with Curb  
Test No. MGSC-8

Ground Strut Details

DWG. NAME.  
MGSPost-Curb-8\_R0

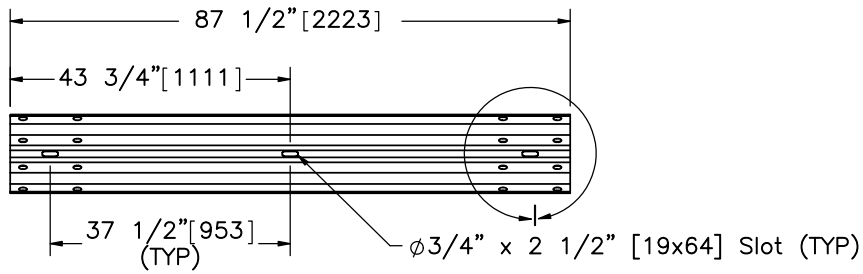
SCALE: 1:16  
UNITS: In.[mm]

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10/23/2017

DRAWN BY:  
DTM

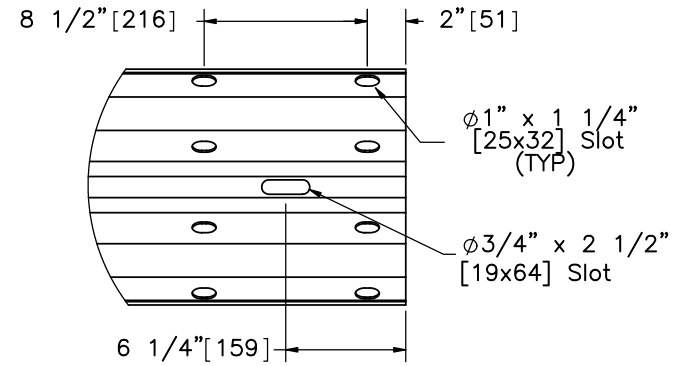
REV. BY:  
-



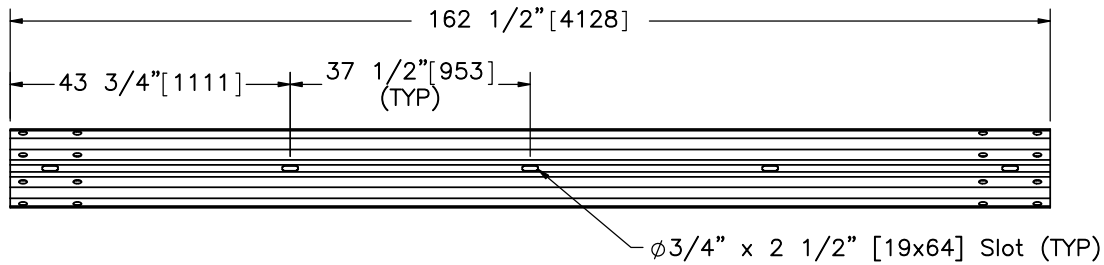
ELEVATION VIEW

Part a3

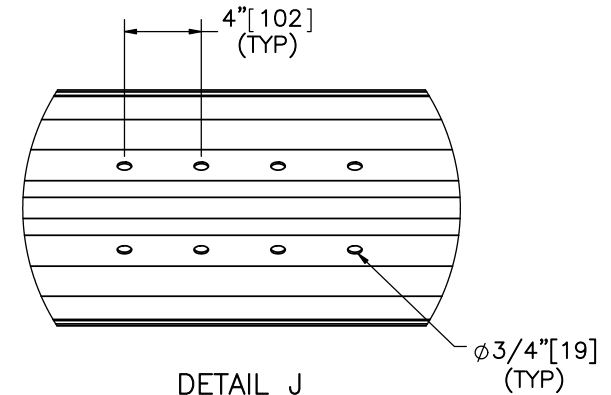
PROFILE VIEW



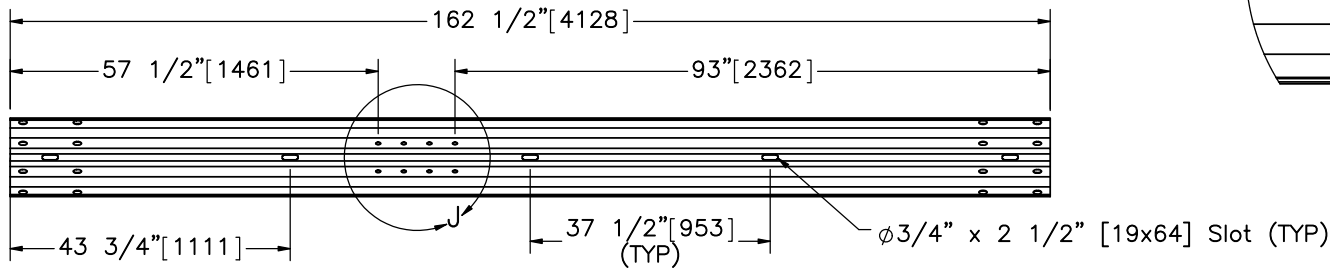
DETAIL I  
 SCALE 1 : 10



ELEVATION VIEW  
 Part a1



DETAIL J  
 SCALE 1 : 10



ELEVATION VIEW  
 Part a2



Midwest Roadside  
 Safety Facility

MGS with Curb  
 Test No. MGSC-8

Rail Section Details

DWG. NAME.  
 MGSPost-Curb-8\_RO

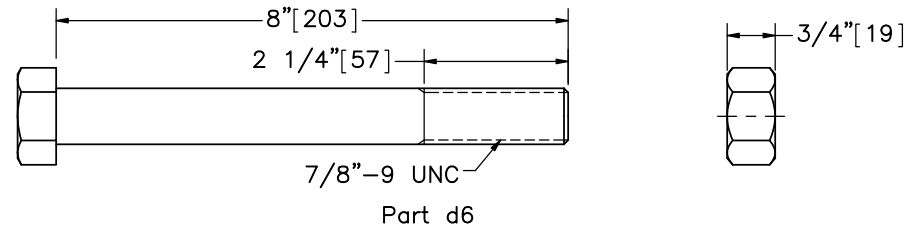
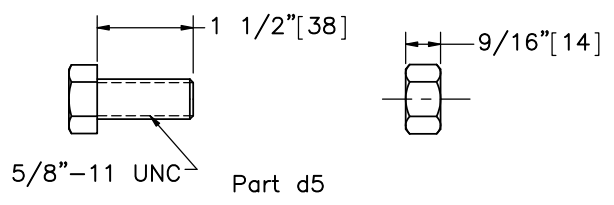
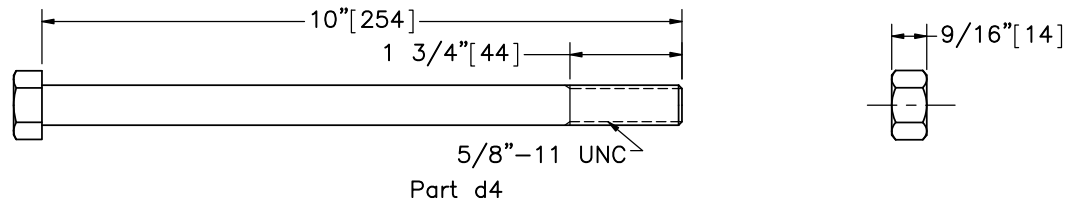
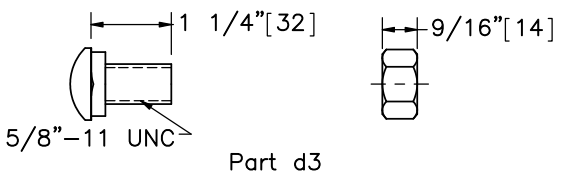
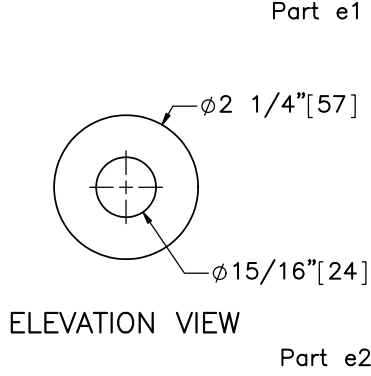
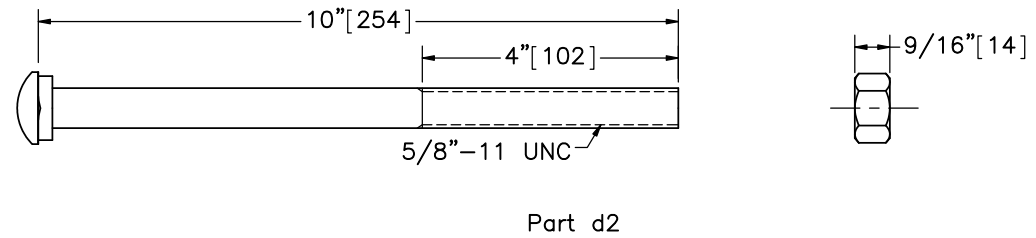
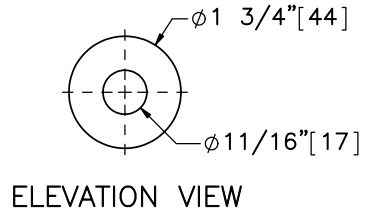
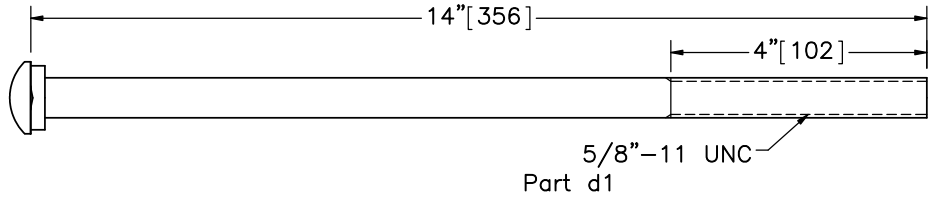
SCALE: 1:30  
 UNITS: In.[mm]

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DATE:  
 10/23/2017

DRAWN BY:  
 DTM

REV. BY:  
 -



Midwest Roadside Safety Facility

|                                  |                              |                     |
|----------------------------------|------------------------------|---------------------|
| MGS with Curb<br>Test No. MGSC-8 |                              | SHEET:<br>12 of 13  |
| Hardware                         |                              | DATE:<br>10/23/2017 |
| DWG. NAME:<br>MGSPost-Curb-8_R0  | SCALE: 1:3<br>UNITS: In.[mm] | DRAWN BY:<br>DTM    |
|                                  |                              | REV. BY:<br>-       |

| Item No. | QTY. | Description   | Material Specification   | Galvanization Specification         | Hardware Guide |
|----------|------|---|--|-------------------------------------|----------------|
| a1       | 12   | 12'-6" [3,810] 12 gauge [2.7] W-Beam MGS Section                    | AASHTO M180  | ASTM A123 or A653                   | RWM04a         |
| a2       | 2    | 12'-6" [3,810] 12 gauge [2.7] W-Beam MGS End Section                | AASHTO M180  | ASTM A123 or A653                   | RWM14a         |
| a3       | 1    | 6'-3" [1,905] 12 gauge [2.7] W-Beam MGS Section                     | AASHTO M180  | ASTM A123 or A653                   | RWM04a         |
| a4       | 25   | W6x8.5 [W152x12.6] or W6x9 [W152x13.4], 72" Long [1,829] Steel Post | ASTM A992<br>Min. 50 ksi [345 MPa]   | ASTM A123                           | PWE06          |
| a5       | 25   | 6"x12"x14 1/4" [152x305x368] Timber Blockout for Steel Posts        | SYP Grade No.1 or better   | -                                   | PDB10a         |
| a6       | 25   | 16D Double Head Nail  | -  | -                                   | -              |
| b1       | 4    | BCT Timber Post - MGS Height  | SYP Grade No. 1 or better<br>(No knots 18" [457] above or below ground tension face) | -                                   | PDF01          |
| b2       | 4    | 72" [1829] 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" [60] O.D. x 6" [152] Long BCT Post Sleeve                    | ASTM A53 Gr. B Schedule 40   | ASTM A123                           | FMM02          |
| b5       | 2    | 8"x8"x5/8" [203x203x16] 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       | 25   | 5/8" [16] Dia. UNC, 14" [356] Long Guardrail Bolt and Nut           | Bolt - ASTM A307 Gr. A<br>Nut - ASTM A563A   | ASTM A153 or B695 Class 55 or F2329 | FBB06          |
| d2       | 4    | 5/8" [16] Dia. UNC, 10" [254] Long Guardrail Bolt and Nut           | Bolt - ASTM A307 Gr. A<br>Nut - ASTM A563A   | ASTM A153 or B695 Class 55 or F2329 | FBB03          |
| d3       | 112  | 5/8" [16] Dia. UNC, 1 1/4" [32] Long Guardrail Bolt and Nut         | Bolt - ASTM A307 Gr. A<br>Nut - ASTM A563A   | ASTM A153 or B695 Class 55 or F2329 | FBB01          |
| d4       | 4    | 5/8" [16] Dia. UNC, 10" [254] Long Hex Head Bolt and Nut            | Bolt - ASTM A307 Gr. A<br>Nut - ASTM A563A   | ASTM A153 or B695 Class 55 or F2329 | FBX16a         |
| d5       | 16   | 5/8" [16] Dia. UNC, 1 1/2" [38] Long Hex Head Bolt and Nut          | Bolt - ASTM A307 Gr. A<br>Nut - ASTM A563A   | ASTM A153 or B695 Class 55 or F2329 | FBX16a         |
| d6       | 4    | 7/8" [22] Dia. UNC, 8" [203] Long Hex Head Bolt and Nut             | Bolt - ASTM A307 Gr. A<br>Nut - ASTM A563A   | ASTM A153 or B695 Class 55 or F2329 | -              |
| e1       | 44   | 5/8" [16] Dia. Plain Round Washer                                   | ASTM F844  | ASTM A123 or A153 or F2329          | FWC16a         |
| e2       | 8    | 7/8" [22] Dia. Plain Round Washer                                   | ASTM F844  | ASTM A123 or A153 or F2329          | -              |
| f1       | 1    | Curb  | f'c = 4,000 psi [27.6 MPa]   | -                                   | -              |
| f2       | 1    | #4 Rebar 819" [20,803] Long   | ASTM A615 Gr. 60   | -                                   | -              |
| f3       | 45   | #4 Rebar 16" [406] Long   | ASTM A615 Gr. 60   | -                                   | -              |



Midwest Roadside  
Safety Facility

MGS with Curb  
Test No. MGSC-8

Bill of Materials

DWG. NAME.  
MGSPost-Curb-8\_R0

SCALE: None  
UNITS: In.[mm]

SHEET:  
13 of 13

DATE:  
10/23/2017

DRAWN BY:  
DTM

REV. BY:  
-

System: MGS w/ Curb  
Drawing: MGSPost-Curb-8

Revision History

| REV. | DATE OF ISSUE | Page | NATURE OF CHANGES   | REVIEWER | REVISED BY |
|------|---------------|------|---|----------|------------|
| 0    | 10/23/2017    | -    | Drawing created from OmitPost-Curb-7_R2. Impact location change. Rail height changed from 32" to 31". | -        | DTM        |