

- Notes: (1) Test shall be performed according to test designation no. 3-11 of MASH.  
 (2) The impact location is 51 5/8" upstream of the joint between barrier nos. 8 and 9.  
 (3) Use native soil fill under asphalt.  
 (4) The ends of the barrier should be pulled until there is no slack in the joints.  
 (5) Barrier nos. 5-15 are located in front of trench.  
 (6) Saddle Cap Assemblies only used between barrier nos. 5-13.



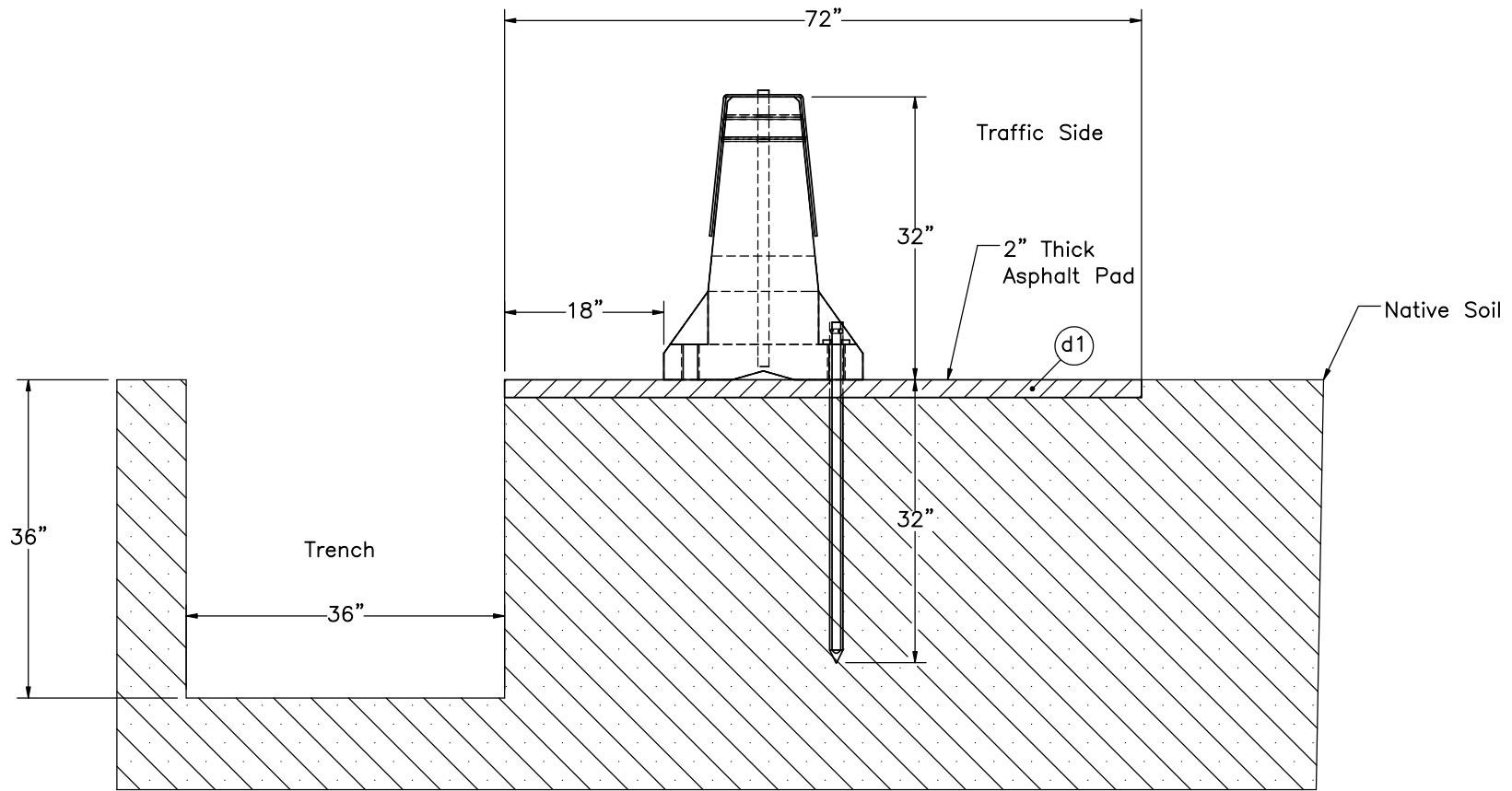
Midwest Roadside  
Safety Facility

WI PCB Anchorage Tie-  
Down  
Test No. WITD-4  
System Layout

DWG. NAME:  
WITD-4\_R4

SCALE: 1:270  
UNITS: in.

SHEET:  
1 of 14  
DATE:  
2/6/2023  
DRAWN BY:  
RWB/JPA  
REV. BY:  
BJP/KAL/R  
WB/JCH



SECTION A-A  
Barrier Nos. 5 through 13



Midwest Roadside  
Safety Facility

WI PCB Anchorage Tie-  
Down  
Test No. WITD-4  
System Profile

DWG. NAME.  
WITD-4\_R4

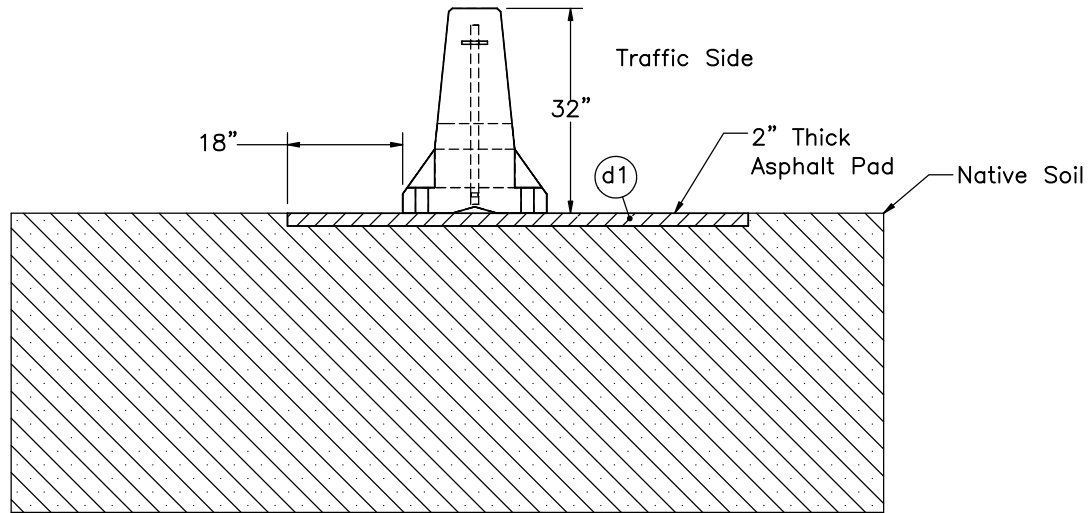
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UNITS: in.

SHEET:  
2 of 14

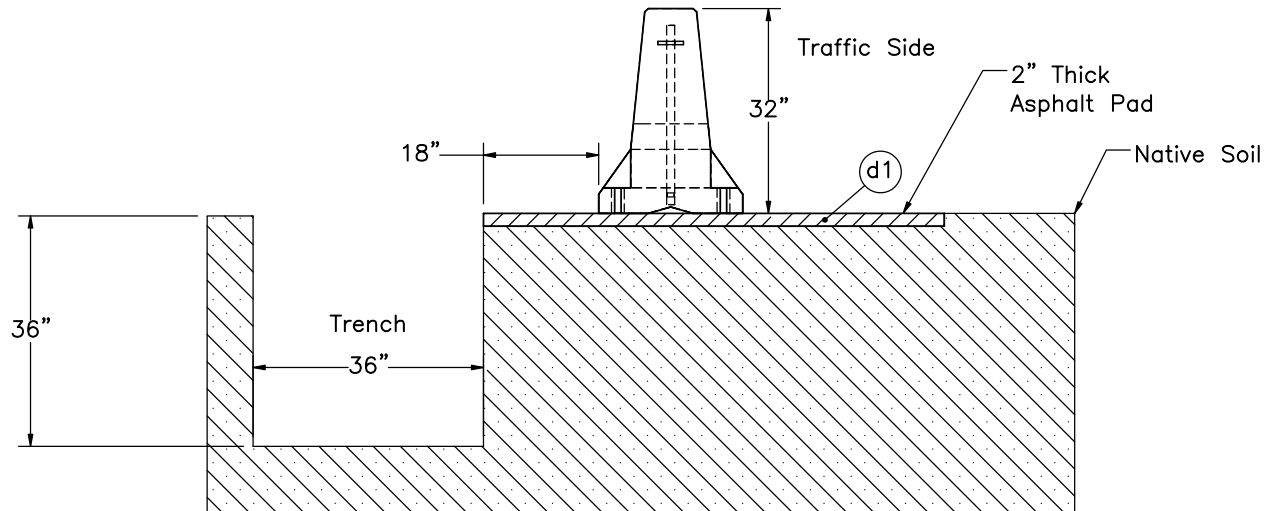
DATE:  
2/6/2023

DRAWN BY:  
RWB/JPA

REV. BY:  
BJP/KAL/R  
WB/JCH



SECTION B-B  
Barrier Nos. 1 through 4 and 16



SECTION C-C  
Barrier Nos. 14 and 15



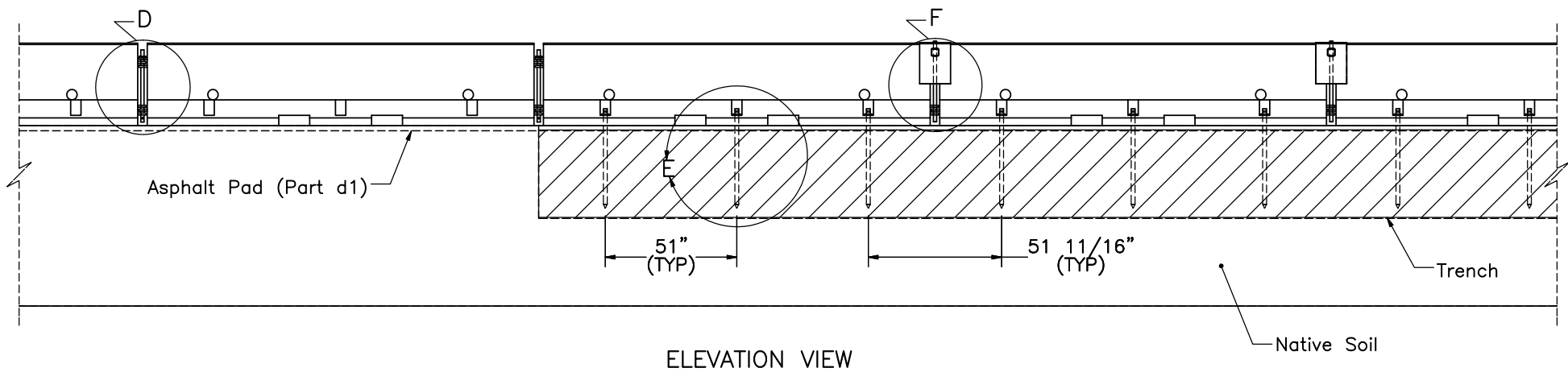
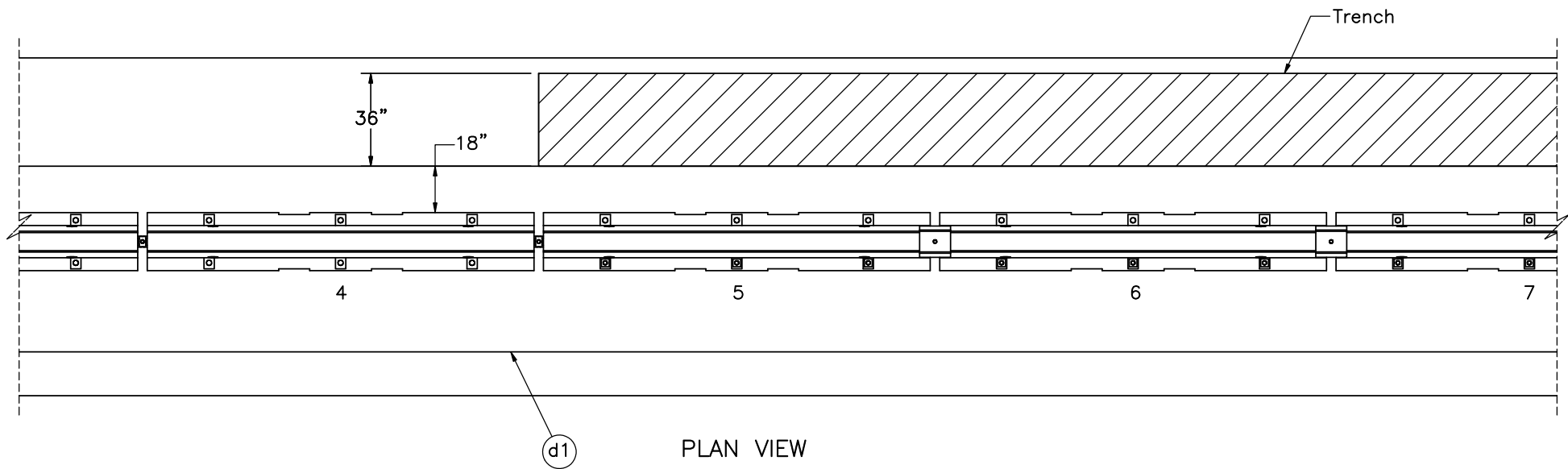
Midwest Roadside  
Safety Facility

WI PCB Anchorage Tie-  
Down  
Test No. WITD-4  
System Profile

DWG. NAME:  
WITD-4\_R4

SCALE: 1:30  
UNITS: in.

SHEET:  
3 of 14  
DATE:  
2/6/2023  
DRAWN BY:  
RWB/JPA  
REV. BY:  
BJP/KAL/RWB/JCH



Note: (1) Barrier nos. 5 through 13 are anchored in all traffic-side bolt pockets.



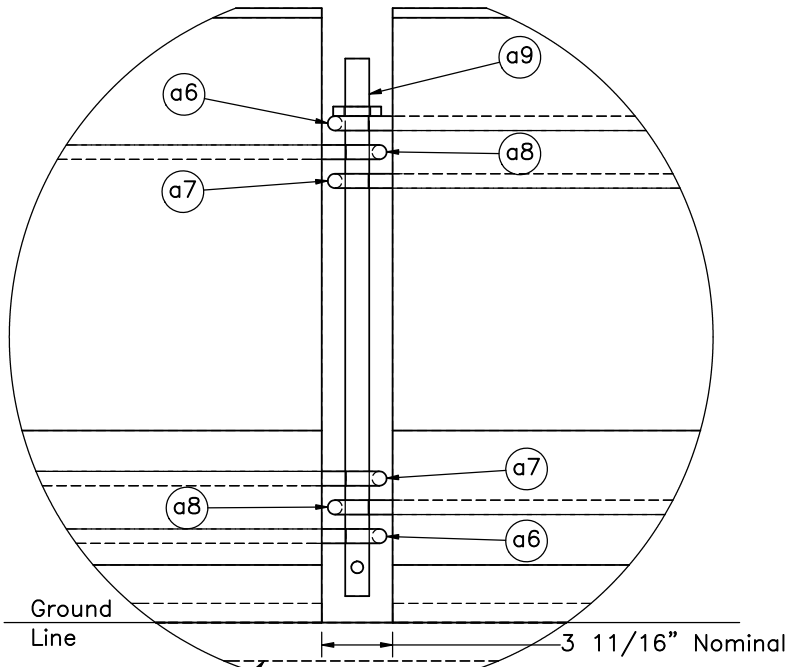
Midwest Roadside  
Safety Facility

WI PCB Anchorage Tie-  
Down  
Test No. WITD-4  
Concrete Barrier Assembly

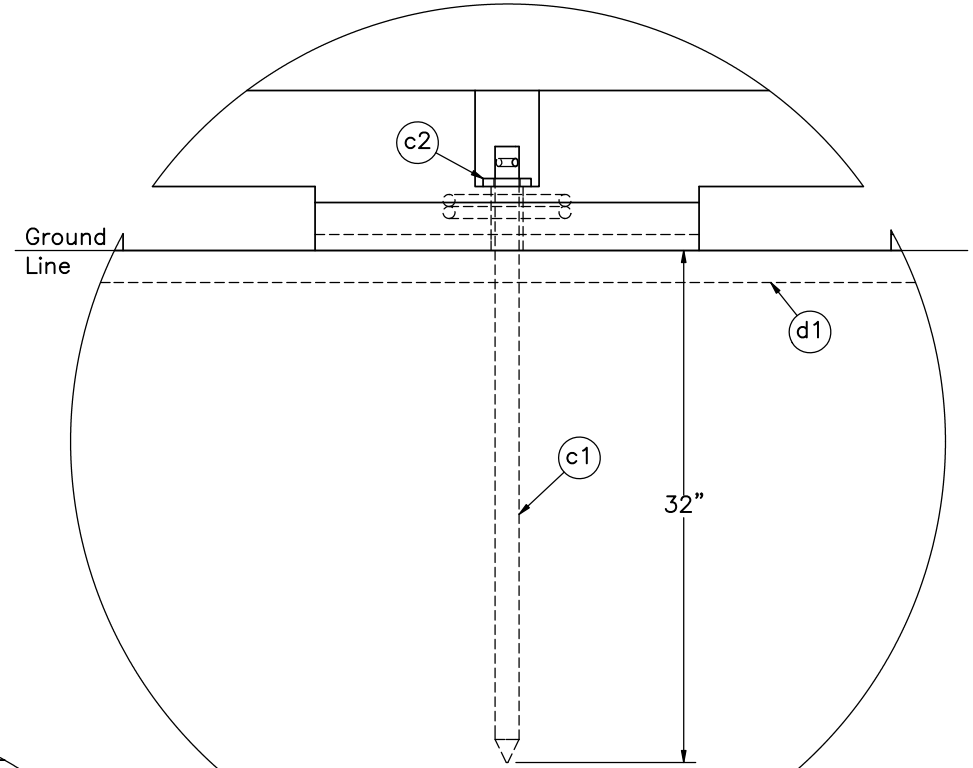
DWG. NAME.  
WITD-4\_R4

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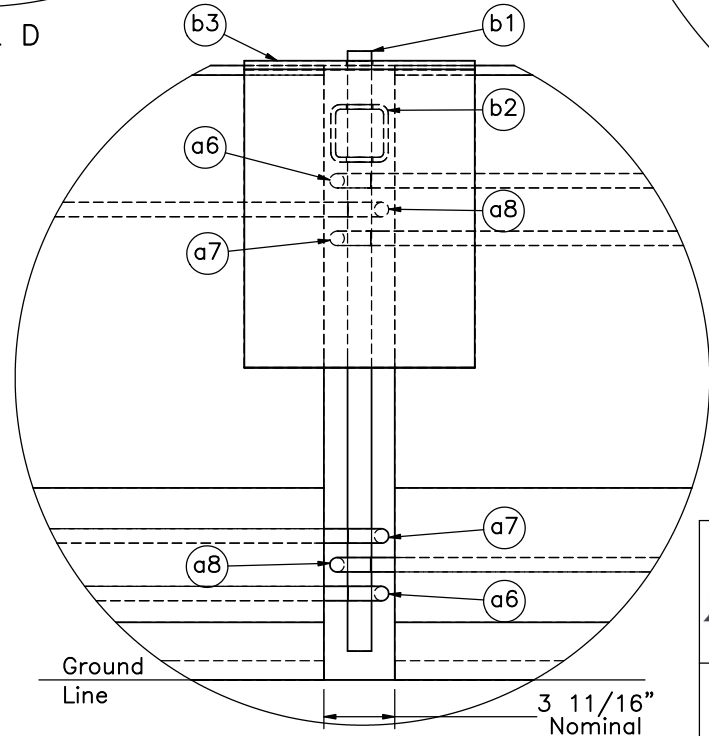
SHEET:  
4 of 14  
DATE:  
2/6/2023  
DRAWN BY:  
RWB/JPA  
REV. BY:  
BJP/KAL/RWB/JCH



DETAIL D



DETAIL E  
SCALE 1:12



DETAIL F

Note: (1) Barrier nos. 5 through 13 are anchored in all traffic-side bolt pockets.



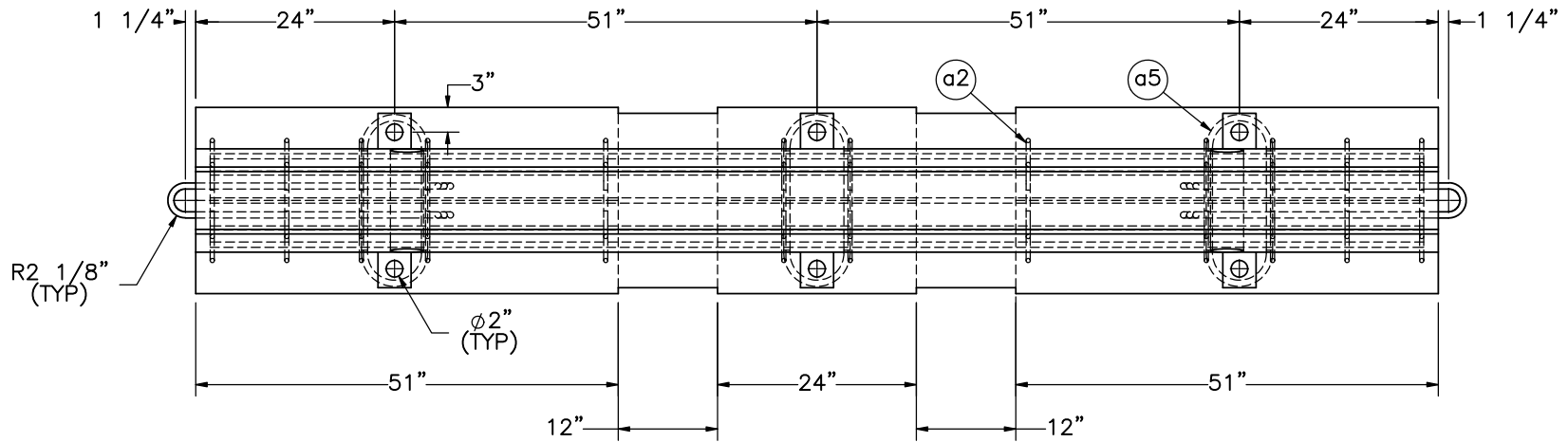
Midwest Roadside Safety Facility

WI PCB Anchorage Tie-Down  
Test No. WITD-4  
Connection and Anchorage Details

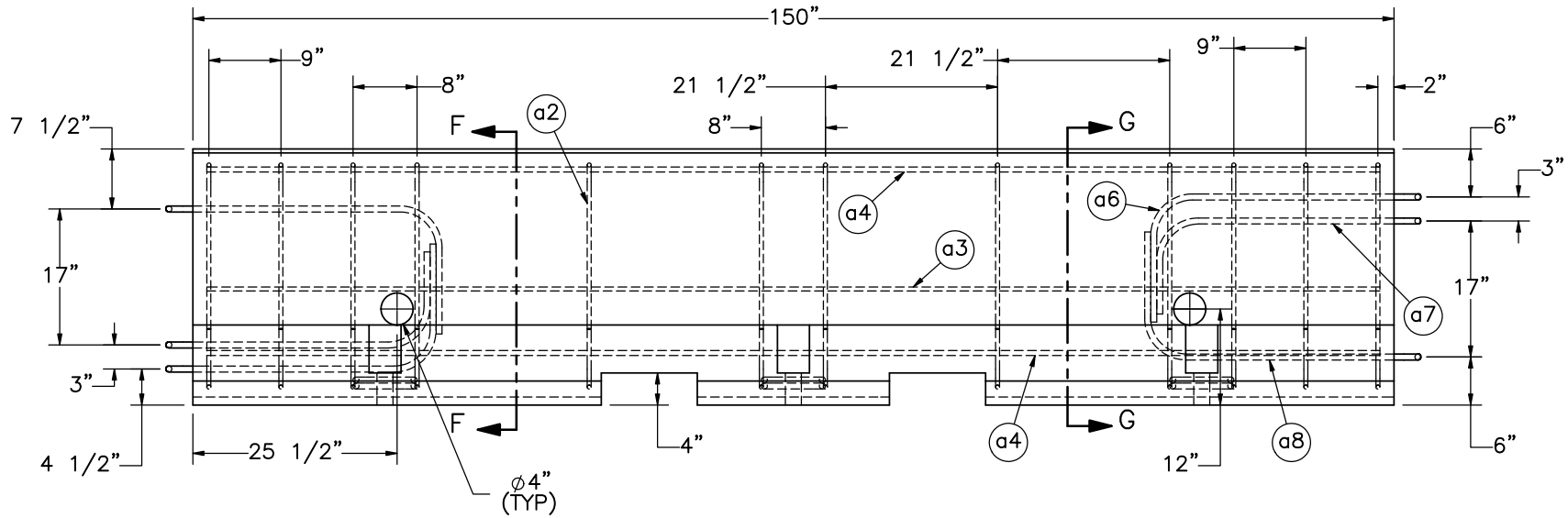
DWG. NAME:  
WITD-4\_R4

SCALE: 1:10  
UNITS: in.

SHEET:  
5 of 14  
DATE:  
2/6/2023  
DRAWN BY:  
RWB/JPA  
REV. BY:  
BJP/KAL/RWB/JCH



PLAN VIEW



ELEVATION VIEW  
Part a1



Midwest Roadside  
Safety Facility

WI PCB Anchorage Tie-  
Down  
Test No. WITD-4

Portable Concrete Barrier  
Details

DWG. NAME:  
WITD-4\_R4

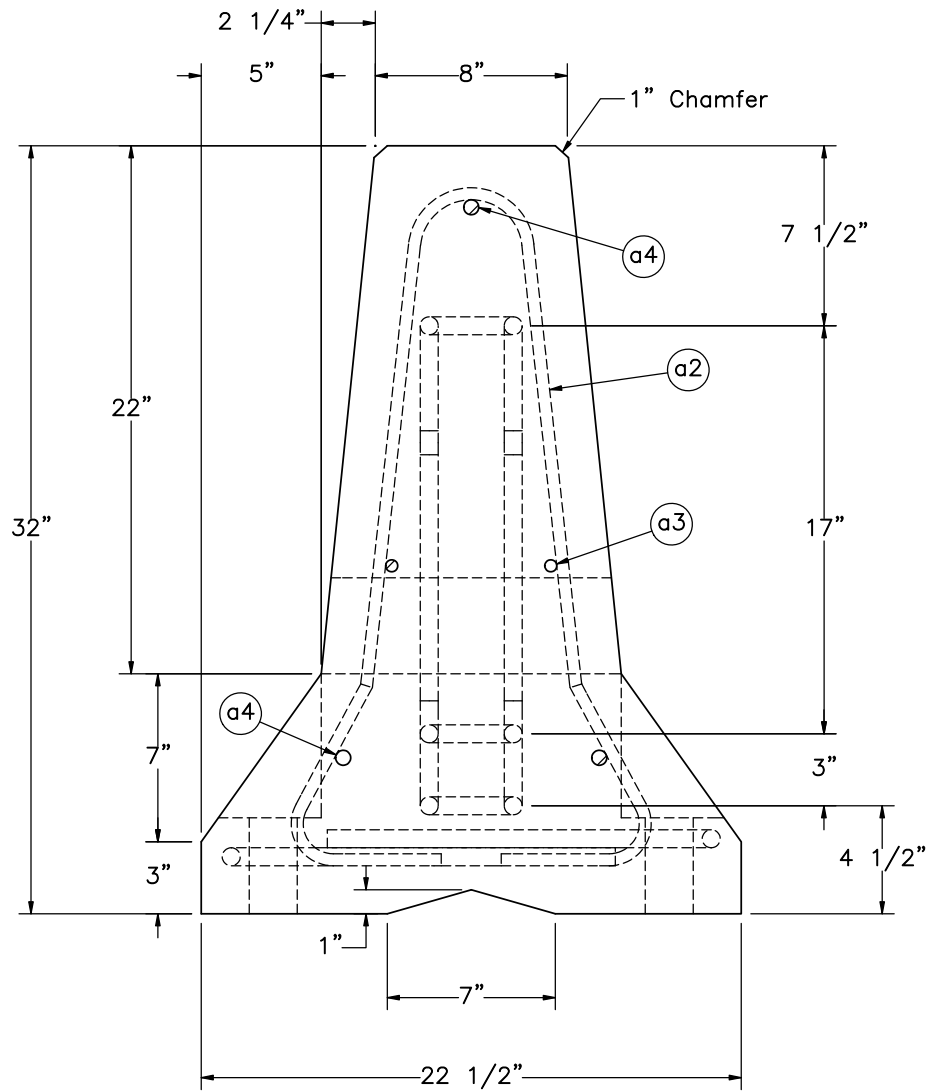
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UNITS: in.

SHEET:  
6 of 14

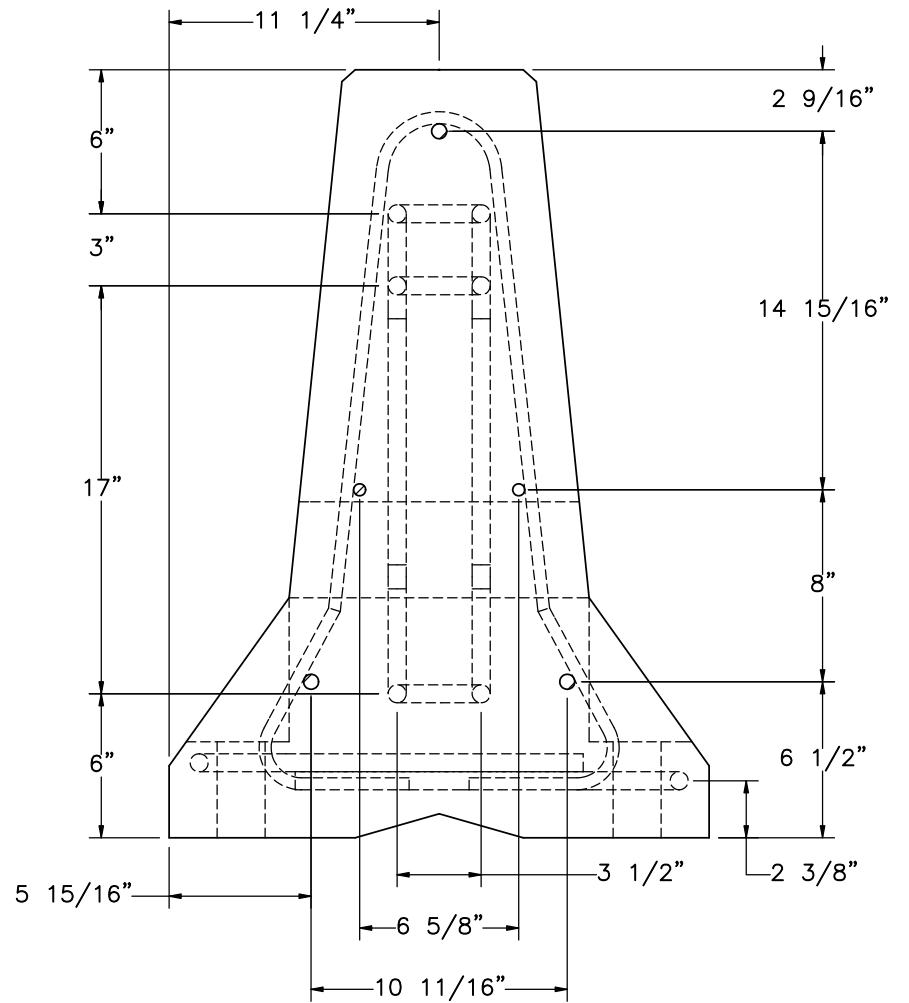
DATE:  
2/6/2023

DRAWN BY:  
RWB/JPA

REV. BY:  
BJP/KAL/R  
WB/JCH



SECTION F-F



SECTION G-G

Note: (1) 2" clear cover used for all reinforcement.



Midwest Roadside  
Safety Facility

WI PCB Anchorage Tie-  
Down  
Test No. WITD-4

Portable Concrete Barrier  
Details

DWG. NAME:  
WITD-4\_R4

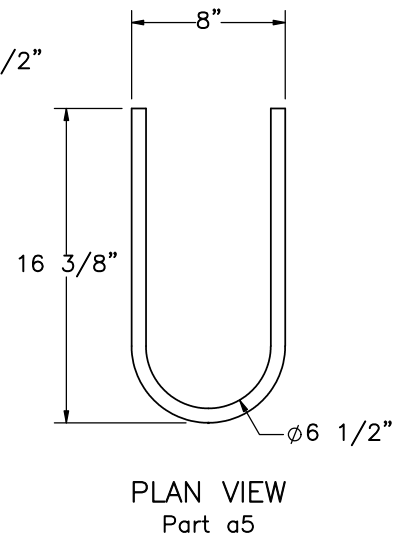
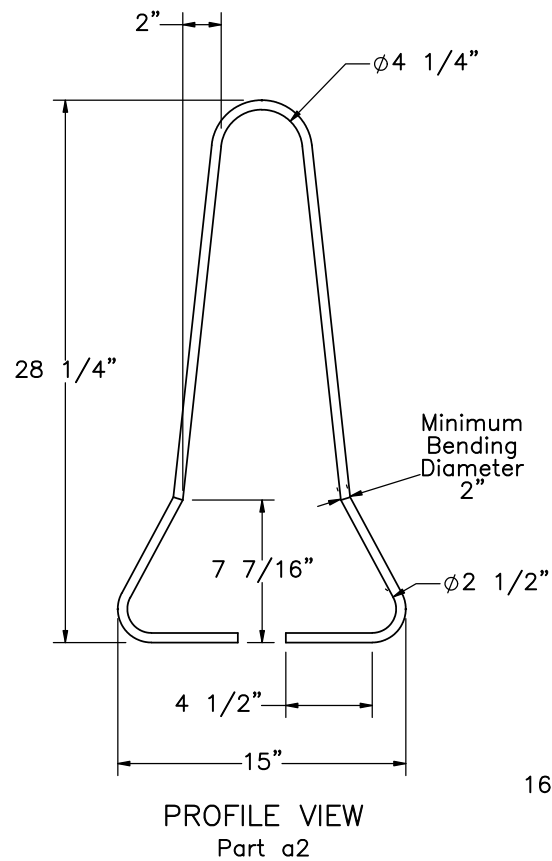
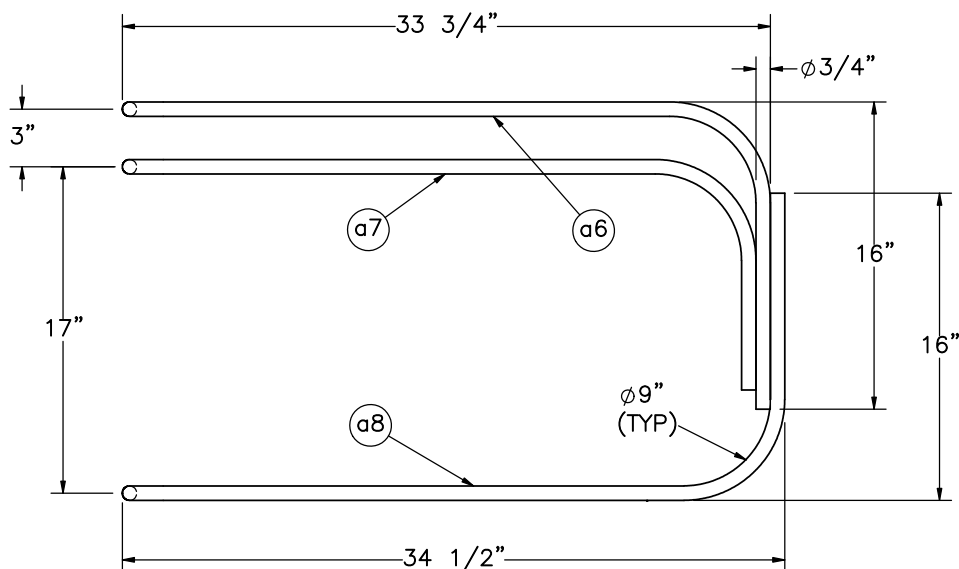
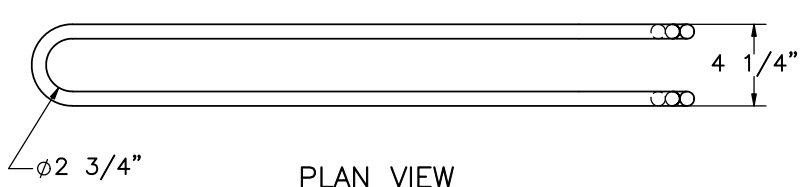
SCALE: 1:8  
UNITS: in.

SHEET:  
7 of 14

DATE:  
2/6/2023

DRAWN BY:  
RWB/JPA

REV. BY:  
BJP/KAL/RWB/JCH



Note: (1) Bar quantities are per barrier (Part a1).

Bill of Bars

| Item No. | QTY | Size | Unbent Length       | Material                 |
|----------|-----|------|---------------------|--------------------------|
| a2       | 12  | #4   | 70 $\frac{9}{16}$ " | A615 Gr.60               |
| a3       | 2   | #4   | 146 $\frac{1}{2}$ " | A615 Gr.60               |
| a4       | 3   | #5   | 146 $\frac{1}{2}$ " | A615 Gr.60               |
| a5       | 6   | #6   | 36 $\frac{1}{8}$ "  | A615 Gr.60               |
| a6       | 2   | #6   | 95 $\frac{1}{16}$ " | A709 Gr.70 or A706 Gr.60 |
| a7       | 2   | #6   | 85 $\frac{9}{16}$ " | A709 Gr.70 or A706 Gr.60 |
| a8       | 2   | #6   | 96 $\frac{9}{16}$ " | A709 Gr.70 or A706 Gr.60 |



Midwest Roadside  
Safety Facility

WI PCB Anchorage Tie-  
Down  
Test No. WITD-4

Portable Concrete Barrier Rebar  
Details

DWG. NAME:  
WITD-4\_R4

SCALE: 1:10  
UNITS: in.

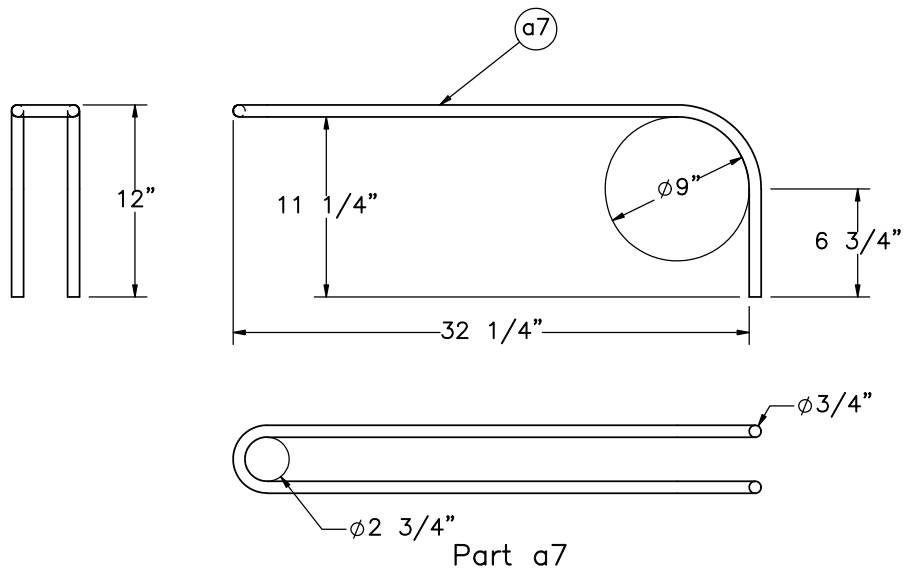
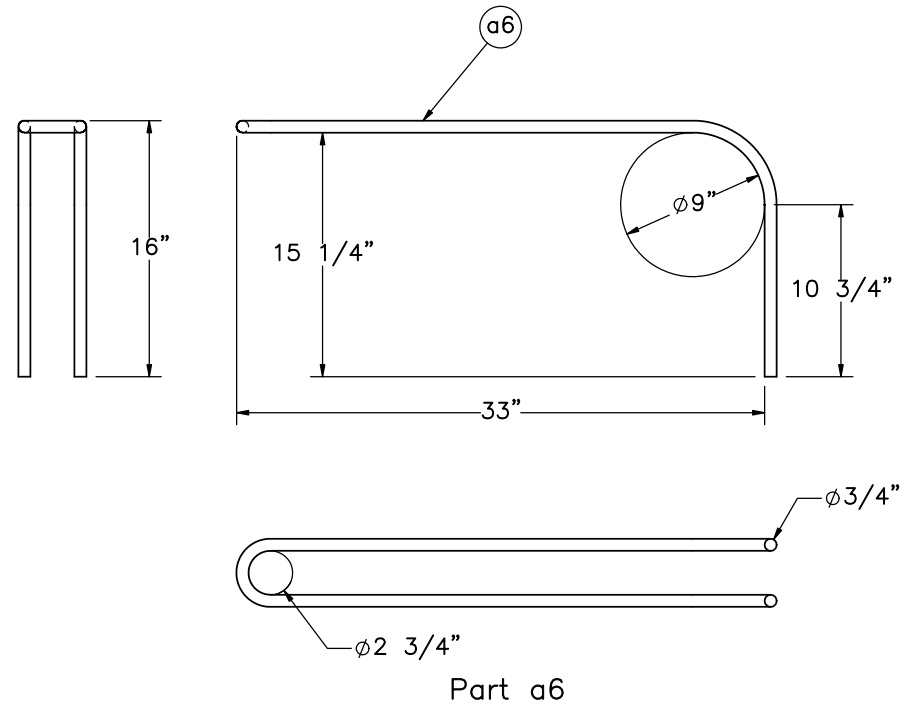
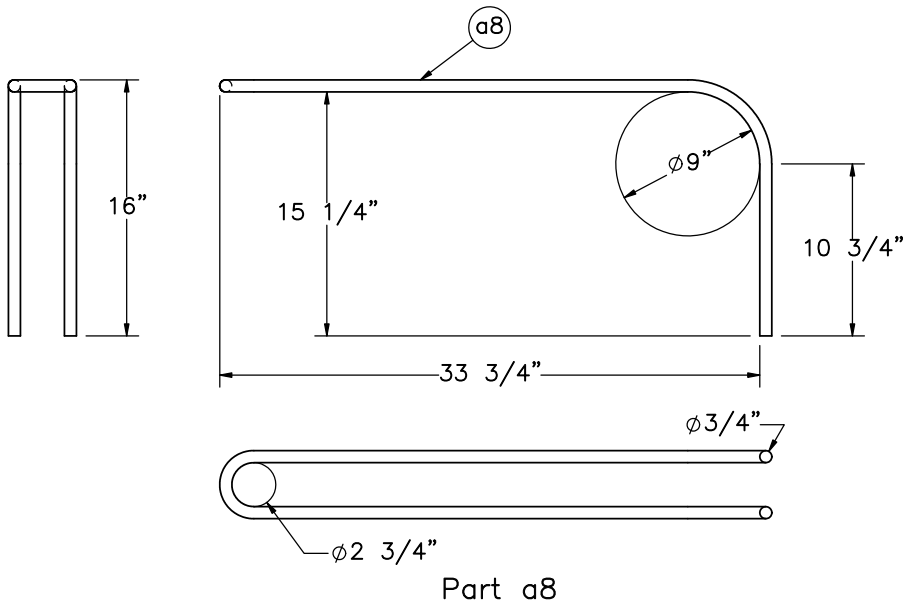
SHEET:  
8 of 14

DATE:  
2/6/2023

DRAWN BY:  
RWB/JPA

REV. BY:  
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Midwest Roadside  
Safety Facility

WI PCB Anchorage Tie-  
Down  
Test No. WITD-4

Portable Concrete Barrier Loop  
Bar Details

DWG. NAME:  
WITD-4\_R4

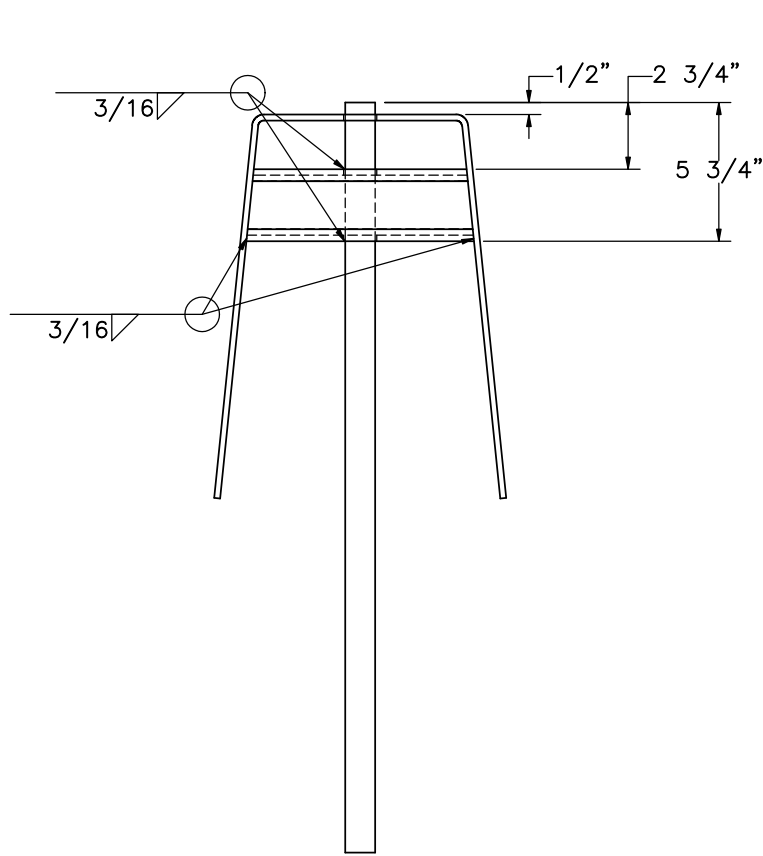
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UNITS: in.

SHEET:  
9 of 14

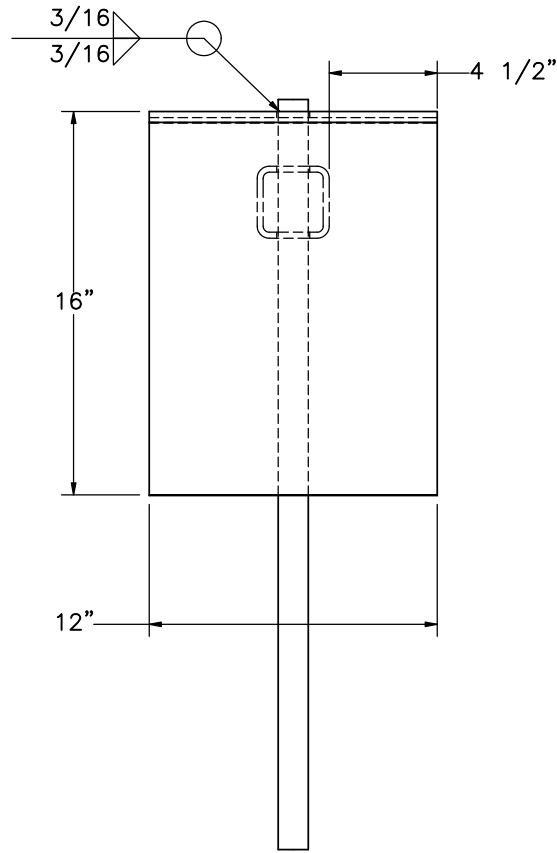
DATE:  
2/6/2023

DRAWN BY:  
RWB/JPA

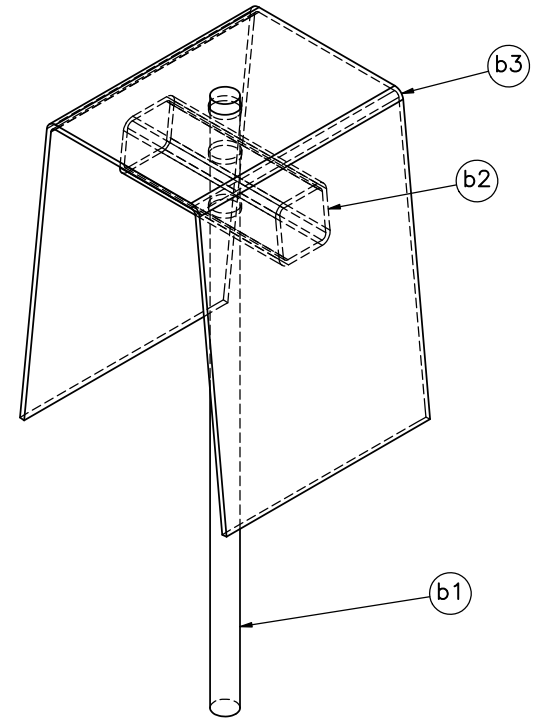
REV. BY:  
BJP/KAL/R  
WB/JCH



ELEVATION VIEW



PROFILE VIEW



ISOMETRIC VIEW

- Notes: (1) Complete as many of the welds shown as possible.  
 (2) Saddle Cap Assemblies only used between barrier nos. 5-13.  
 (3) Saddle Cap Assembly does not need to be galvanized for testing purposes.

| Item No. | QTY. | Description                                 | Material Specification | Treatment Specification |
|----------|------|---|------------------------|-------------------------|
| -        | 8    | Saddle Cap Assembly                         | -                      | ASTM A123               |
| b1       | 1    | 1 1/4" Dia., 31 1/4" Long Connector Pin     | ASTM A36               | -                       |
| b2       | 1    | HSS 3"x3"x1/4", 9 1/2" Long Stiffening Tube | ASTM A1085             | -                       |
| b3       | 1    | 40 5/16"x12"x1/4" Saddle Cap                | A572 Gr. 50            | -                       |



Midwest Roadside Safety Facility

WI PCB Anchorage Tie-Down  
 Test No. WITD-4

Saddle Cap Assembly Details

DWG. NAME:  
WITD-4\_R4

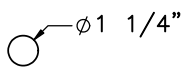
SCALE: 1:8  
UNITS: in.

SHEET:  
10 of 14

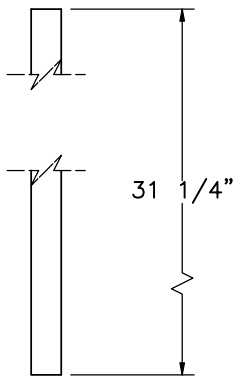
DATE:  
2/6/2023

DRAWN BY:  
RWB/JPA

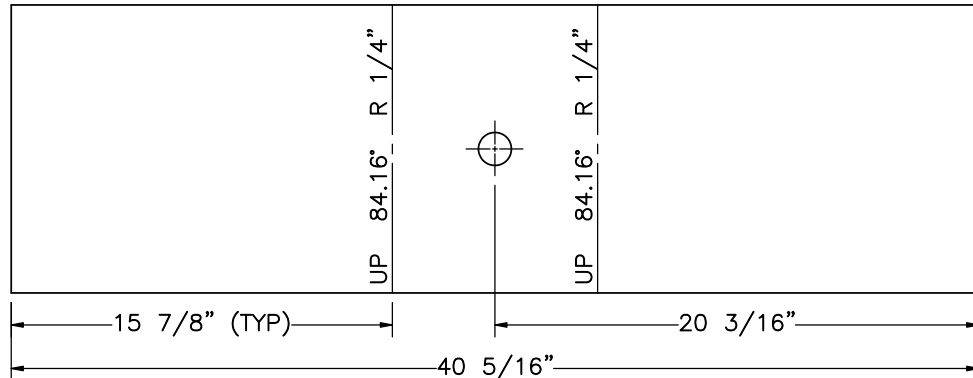
REV. BY:  
BJP/KAL/RWB/JCH



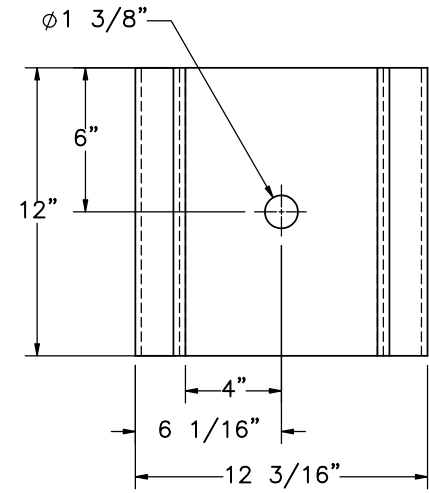
PLAN VIEW



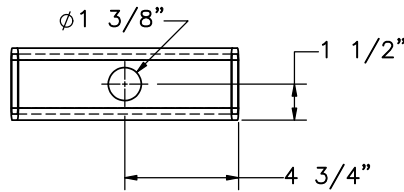
ELEVATION VIEW  
Part b1



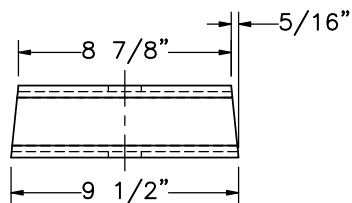
FLAT PATTERN



PLAN VIEW

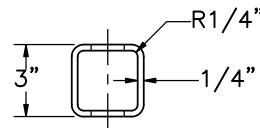


PLAN VIEW

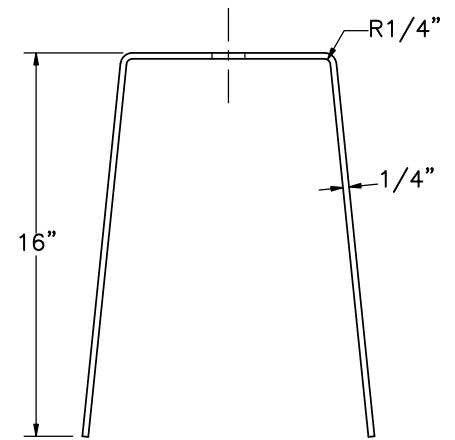


ELEVATION VIEW

Part b2



PROFILE VIEW



ELEVATION VIEW

Part b3



Midwest Roadside  
Safety Facility

WI PCB Anchorage Tie-  
Down

Test No. WITD-4

Saddle Cap Assembly Details

DWG. NAME:  
WITD-4\_R4

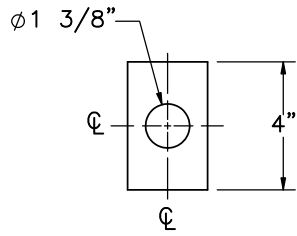
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DRAWN BY:  
RWB/JPA

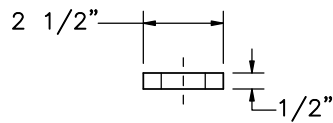
REV. BY:  
BJP/KAL/RWB/JCH

SHEET:  
11 of 14

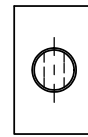
DATE:  
2/6/2023



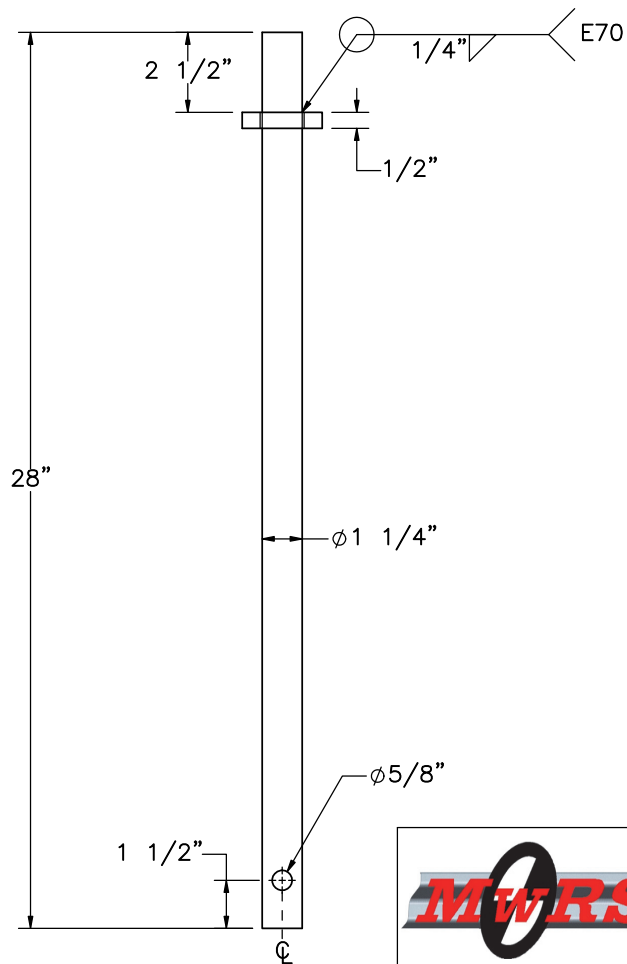
PLAN VIEW



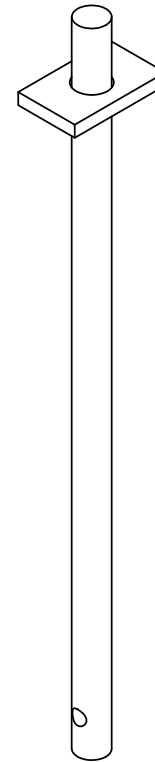
ELEVATION VIEW  
PLATE



PLAN VIEW



ELEVATION VIEW  
Part a9



ISOMETRIC VIEW



Midwest Roadside  
Safety Facility

WI PCB Anchorage Tie-  
Down  
Test No. WITD-4  
Connector Pin Details

DWG. NAME.  
WITD-4\_R4

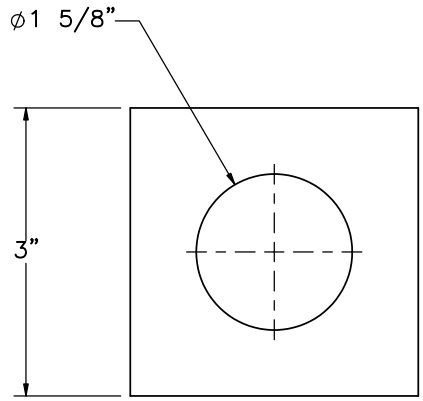
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UNITS: in.

SHEET:  
12 of 14

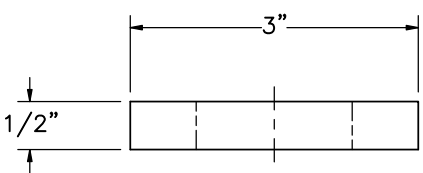
DATE:  
2/6/2023

DRAWN BY:  
RWB/JPA

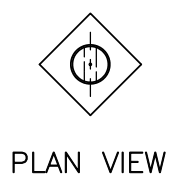
REV. BY:  
BJP/KAL/R  
WB/JCH



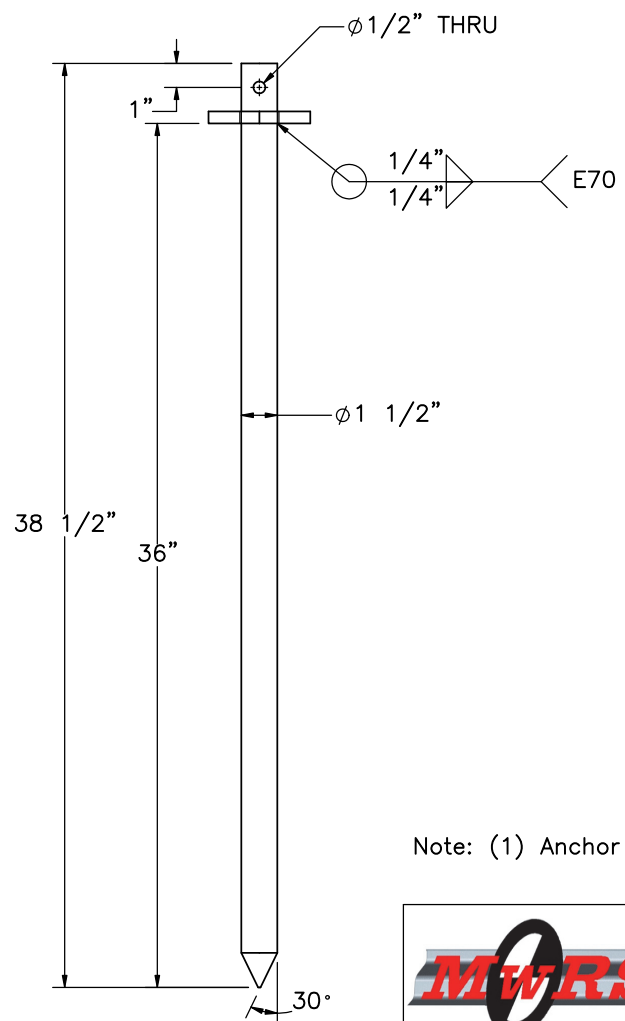
PLAN VIEW



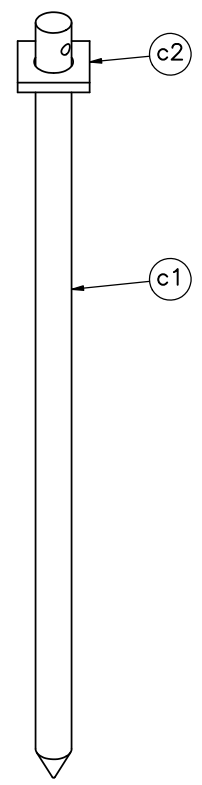
ELEVATION VIEW  
SCALE 1:2  
Part c2



PLAN VIEW



ELEVATION VIEW



ISOMETRIC VIEW

Note: (1) Anchor pins will be used to anchor barrier nos. 5-13.



Midwest Roadside  
Safety Facility

WI PCB Anchorage Tie-  
Down  
Test No. WITD-4  
Anchor Pin Details

DWG. NAME.  
WITD-4\_R4

SCALE: 1:8  
UNITS: in.

SHEET:  
13 of 14


DATE:  
2/6/2023

DRAWN BY:  
RWB/JPA

REV. BY:  
BJP/KAL/R  
WB/JCH

| Item No. | QTY. | Description                                  | Material Specification             | Treatment Specification | Hardware Guide |
|----------|------|--|------------------------------------|-------------------------|----------------|
| a1       | 16   | Portable Concrete Barrier                    | Min f'c = 5,000 psi                | —                       | SWC09          |
| a2       | 192  | 1/2" Dia., 70 9/16" Long Form Bar            | ASTM A615 Gr. 60                   | —                       | SWC09*         |
| a3       | 32   | 1/2" Dia., 146 1/2" Long Longitudinal Bar    | ASTM A615 Gr. 60                   | —                       | SWC09*         |
| a4       | 48   | 5/8" Dia., 146 1/2" Long Longitudinal Bar    | ASTM A615 Gr. 60                   | —                       | SWC09*         |
| a5       | 96   | 3/4" Dia., 36 1/8" Long Anchor Loop Bar      | ASTM A615 Gr. 60                   | —                       | SWC09*         |
| a6       | 32   | 3/4" Dia., 95 1/16" Long Connection Loop Bar | ASTM A709 Gr. 70 or A706 Gr. 60    | —                       | SWC09*         |
| a7       | 32   | 3/4" Dia., 85 9/16" Long Connection Loop Bar | ASTM A709 Gr. 70 or A706 Gr. 60    | —                       | SWC09*         |
| a8       | 32   | 3/4" Dia., 96 9/16" Long Connection Loop Bar | ASTM A709 Gr. 70 or A706 Gr. 60    | —                       | SWC09*         |
| a9       | 7    | 1 1/4" Dia., 28" Long Connector Pin          | ASTM A36                           | —                       | FMW02          |
| b1       | 8    | 1 1/4" Dia., 31 1/4" Long Connector Pin      | ASTM A36                           | See Assembly ***        | —              |
| b2       | 8    | HSS 3"x3"x1/4", 9 1/2" Long Stiffening Tube  | ASTM A1085                         | See Assembly ***        | —              |
| b3       | 8    | 40 5/16"x12"x1/4" Saddle Cap                 | A572 Gr. 50                        | See Assembly ***        | —              |
| c1       | 27   | 1 1/2" Dia., 38 1/2" Long Anchor Pin         | ASTM A36                           | ASTM A123 ***           | FRS01          |
| c2       | 27   | 3"x3"x1/2" Washer Plate                      | ASTM A36                           | ASTM A123 ***           | FRS01**        |
| d1       | 1    | 204'-7 5/16"x72"x2" Asphalt Pad              | NE SPR Mix with 64-34 Grade Binder | —                       | —              |

\* Included in SWC09 hardware guide designation.  
\*\* Included in FRS01 hardware guide designation.  
\*\*\* Component does not need to be galvanized for testing purposes.

|  |  |                             |
|--|--|-----------------------------|
| <br><b>Midwest Roadside<br/>Safety Facility</b> | <b>WI PCB Anchorage Tie-<br/>Down</b><br>Test No. WITD-4 | SHEET:<br>14 of 14          |
|  | Bill of Materials  | DATE:<br>2/6/2023           |
| DWG. NAME:<br>WITD-4_R4  | SCALE: None<br>UNITS: in.                                | DRAWN BY:<br>RWB/JPA        |
|  |  | REV. BY:<br>BJP/KAL/RWB/JCH |

| REV. | DATE OF ISSUE | Page | NATURE OF CHANGES  | REVIEWER | REVISED BY |
|------|---------------|------|--|----------|------------|
| 0    | 1/6/2023      | -    | Made from WITD-3. Connector Pin (a9) from WITD-3 replaced with saddle cap assembly consisting of part nos. b1, b2, and b3. Part nos. b1, b2, and c1 from WITD-3 were renamed c1, c2, and d1, respectively. | -        | JPA        |
| 1    | 1/10/2023     | -    | Metric dimensions removed in various locations.  | BJP/KAL  | JPA        |
|      |               | 1    | Updated dimension text.  |          |            |
|      |               | 2    | Notes added under view labels.   |          |            |
|      |               | 3    | Notes added under view labels.   |          |            |
|      |               | 4    | Updated dimension text. Shifted barrier nos. up. Edited note 1.  |          |            |
|      |               | 5    | Edited note 1.   |          |            |
|      |               | 6    | Removed note.  |          |            |
|      |               | 8    | Edited bill of bars. Edited rebar labels.  |          |            |
|      |               | 9    | Edited rebar labels.   |          |            |
|      |               | 10   | Part labels shifted. Views shifted. Dimension fixed.   |          |            |
|      |               | 11   | Removed plan view. Edited note 1. Treatment specs updated. Part b2 description updated. QTY column updated. Sheet scale increased.   |          |            |
|      |               | 12   | Removed part label. Added item no. balloons.   |          |            |
|      |               | BOM  | Part b2 description updated. Treatment specs updated for part nos. b1 through b3. Part b1 hardware guide reference removed.  |          |            |
|      |               | -    | Connector Pin (a9) to Replace Saddle Cap Assembly (b1, b2, b3) except between barrier nos. 5-13.   |          |            |
|      |               | -    | Add sheet 12: Connector Pin Details.   |          |            |
|      |               | 1    | Impact location dimension change. Added notes 5 and 6. Note 2 edit.  |          |            |
|      |               | 2    | Added dimension.   |          |            |
|      |               | 3    | Updated Section B-B and C-C to match new pin selection.  |          |            |

|     |   |     |  |         |     |
|-----|---|-----|--|---------|-----|
| 2   | 1/20/2023   | 4   | Added Detail F.  | RWB     | JPA |
|     |   | 5   | Added Detail F. Updated Detail D.  |         |     |
|     |   | 7   | Extended dimension leader.   |         |     |
|     |   | 10  | Becomes sheet 11.  |         |     |
|     |   | 11  | Becomes sheet 10. Assembly QTY updated.  |         |     |
|     |   | 12  | Becomes Sheet 13. Move dimension. Add note 1. Add centerline.  |         |     |
|     |   | BOM | Update QTY column. Add part no. a9. Update material spec for b2.   |         |     |
| 3   | 1/24/2023   | -   | Saddle cap updated throughout (part no. b3). Part renamed accordingly.   | RWB/BJP | JPA |
|     |   | -   | Shift part d1 downstream to be beneath barrier no. 16.   |         |     |
|     |   | -   | Unbent lengths of rebar corrected throughout (part nos. a2 through a8). Bars renamed accordingly. Likely caused by using inner/outer radii instead of radii at the midpoints in length calculations. |         |     |
|     |   | 1   | Dimensions updated and shifted.  |         |     |
|     |   | 3   | View labels updated.   |         |     |
|     |   | 5   | Added part balloon.  |         |     |
|     |   | 6   | Fixed part balloon. Extended dimension leader.   |         |     |
|     |   | 7   | Combined dimensions.   |         |     |
|     |   | 8   | Update column label in Bill of Bars. Update rebar lengths.   |         |     |
|     |   | 9   | Remove treatment specification. Add dimensions.  |         |     |
|     |   | 11  | Update dimensions.   |         |     |
|     |   | 13  | Part no. c2 dimension correction.  |         |     |
| BOM | Add treatment specifications asterisks. Update part descriptions. |     |  |         |     |
| 4   | 2/6/2023  | 10  | Add note 3. Add treatment specification.   | JCH     | JPA |