

- Note: (1) Test shall be performed according to test designation no. 3-11 of MASH.
 (2) The impact location is 51 3/16" [1,300] upstream of the joint between barrier nos. 8 and 9.
 (3) Rear toe of barrier placed 1" [25] from edge of bridge pit.
 (4) Barrier nos. 5-13 are anchored in all traffic-side bolt pockets.



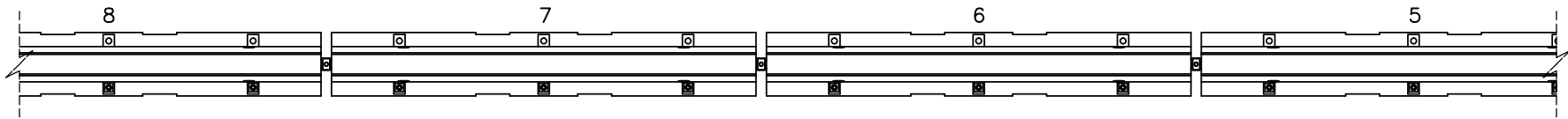
Midwest Roadside
Safety Facility

WI PCB Anchorage Tie-
Down
Test No. WITD-1
System Layout

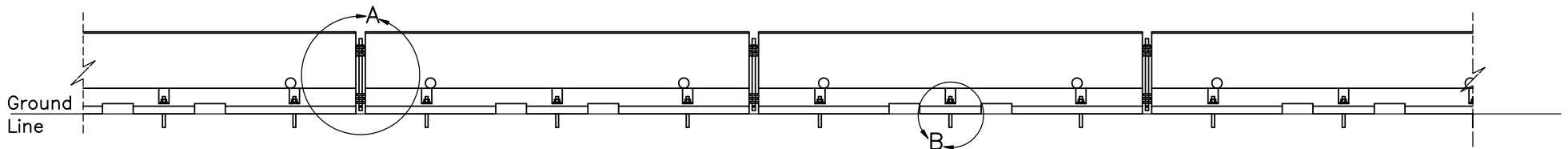
DWG. NAME.
WITD-1_R10

SCALE: 1:270
UNITS: in.[mm]

SHEET:
1 of 9
DATE:
5/25/2017
DRAWN BY:
MES/JEK
REV. BY:
JEK/KAL/
RWB



PLAN VIEW



ELEVATION VIEW

Note: (1) Barrier nos. 5–13 are anchored in all traffic-side bolt pockets.
 (2) Threaded rod epoxy anchored using Hilti HIT-RE 500 V3 epoxy or equivalent.



Midwest Roadside
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WI PCB Anchorage Tie-

Down

Test No. WITD-1

Concrete Barrier Assembly

DWG. NAME:
 WITD-1_R10

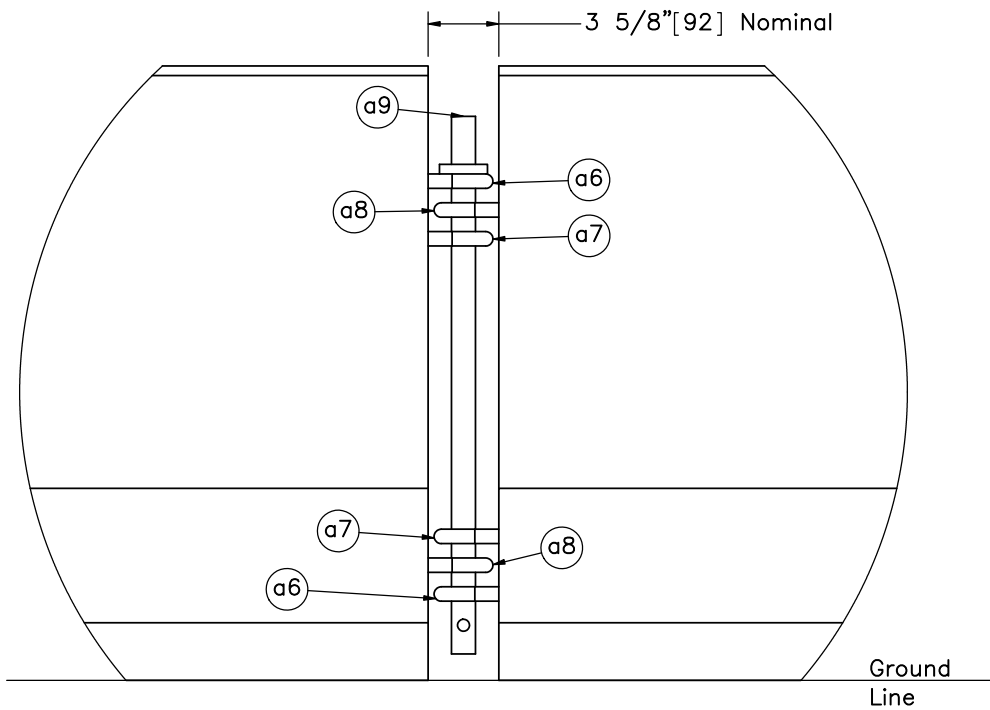
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 UNITS: in./mm

SHEET:
 2 of 9

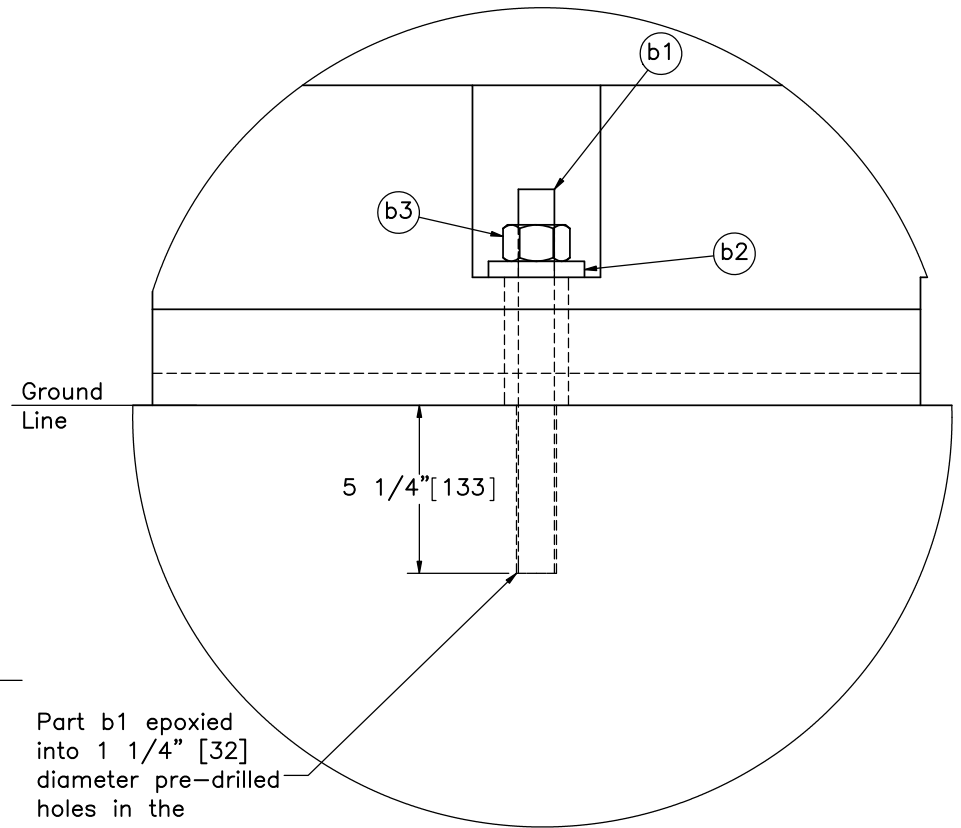
DATE:
 5/25/2017

DRAWN BY:
 MES/JEK

REV. BY:
 JEK/KAL/
 RWB




DETAIL A

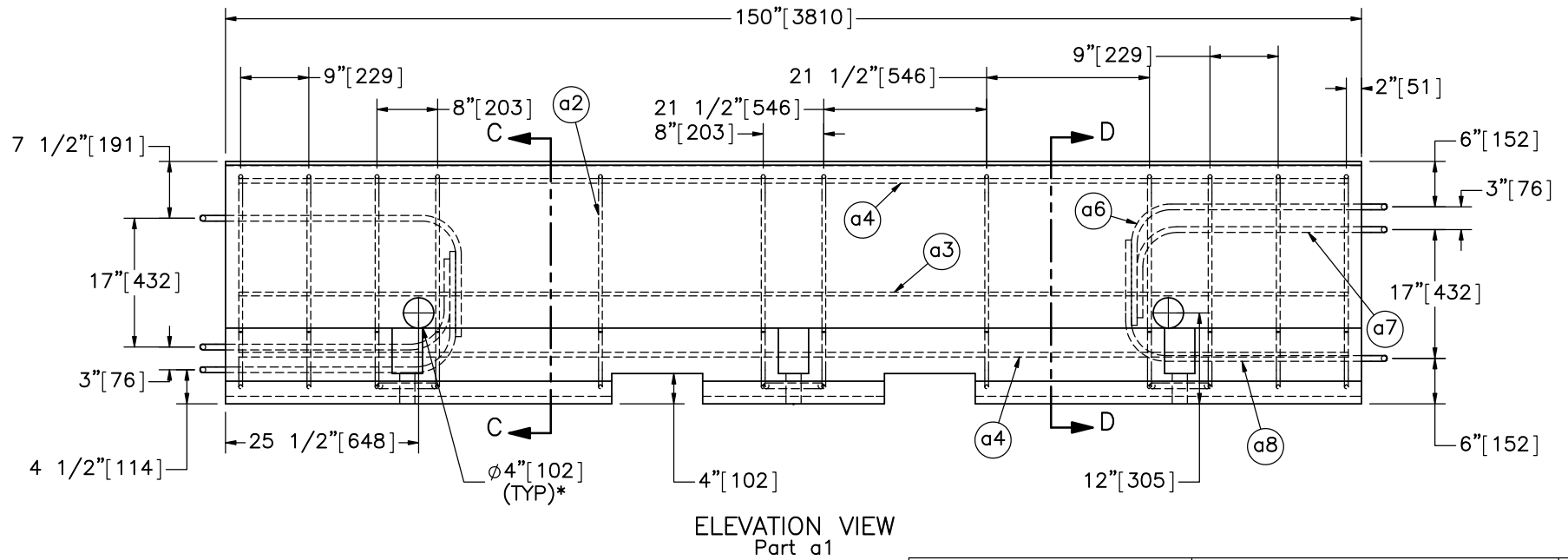
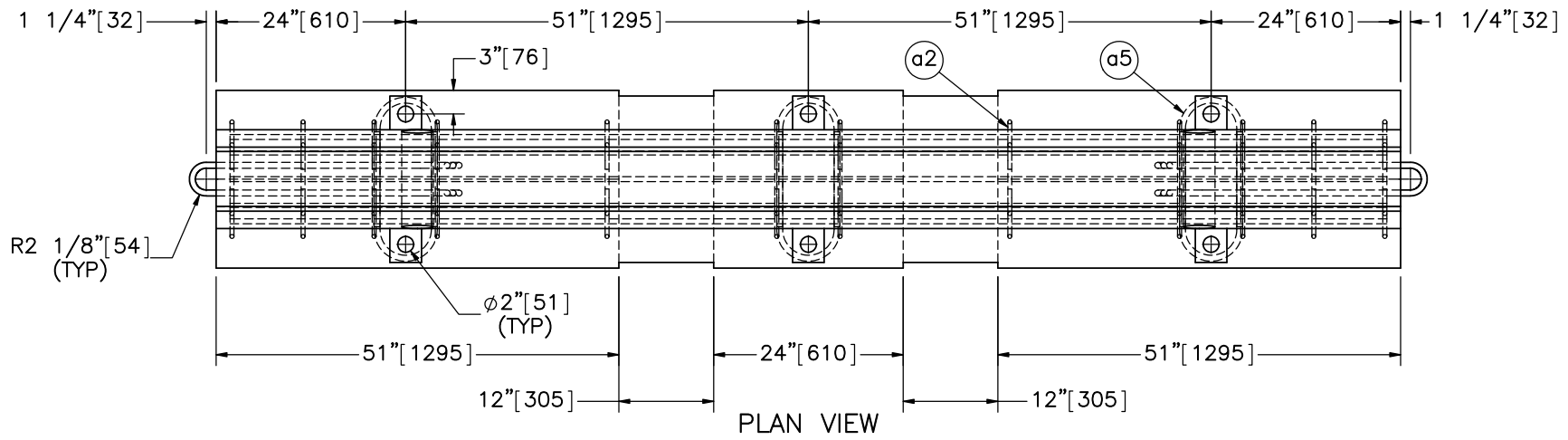


Part b1 epoxied into 1 1/4" [32] diameter pre-drilled holes in the concrete tarmac.

DETAIL B
SCALE 1 : 6

- Note: (1) Barrier nos. 5-13 are anchored in all traffic-side bolt pockets.
 (2) Threaded rod (part b1) epoxy anchored using Hilti HIT-RE 500 V3 epoxy or equivalent.
 (3) Follow all Hilti installation guidance. Use 1/8" [3] oversize bit. Clean holes with steel wire brushes and are nozzels to remove dust. Installation temperature range of 23°F-104°F [-5°C-40°C]. Follow cure time on package. Limit installation torque to 175 ft-lbs [237 N-m].

 Midwest Roadside Safety Facility	WI PCB Anchorage Tie-Down Test No. WITD-1	SHEET: 3 of 9
	Connection and Anchorage Details	DATE: 5/25/2017
DWG. NAME: WITD-1_R10	SCALE: 1:10 UNITS: in.[mm]	DRAWN BY: MES/JEK
		REV. BY: JEK/KAL/RWB



*Hole in tested barrier 1/2" [25] smaller than design.



Midwest Roadside Safety Facility

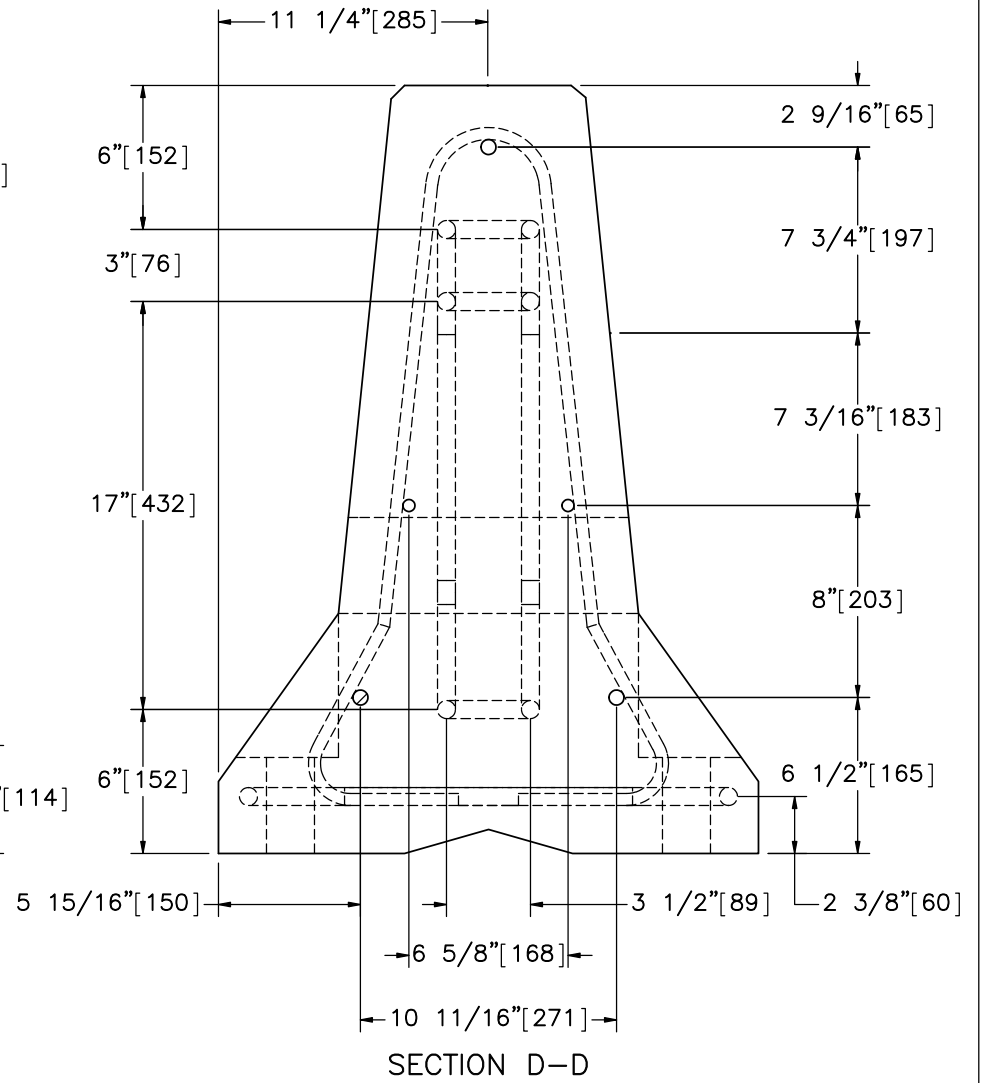
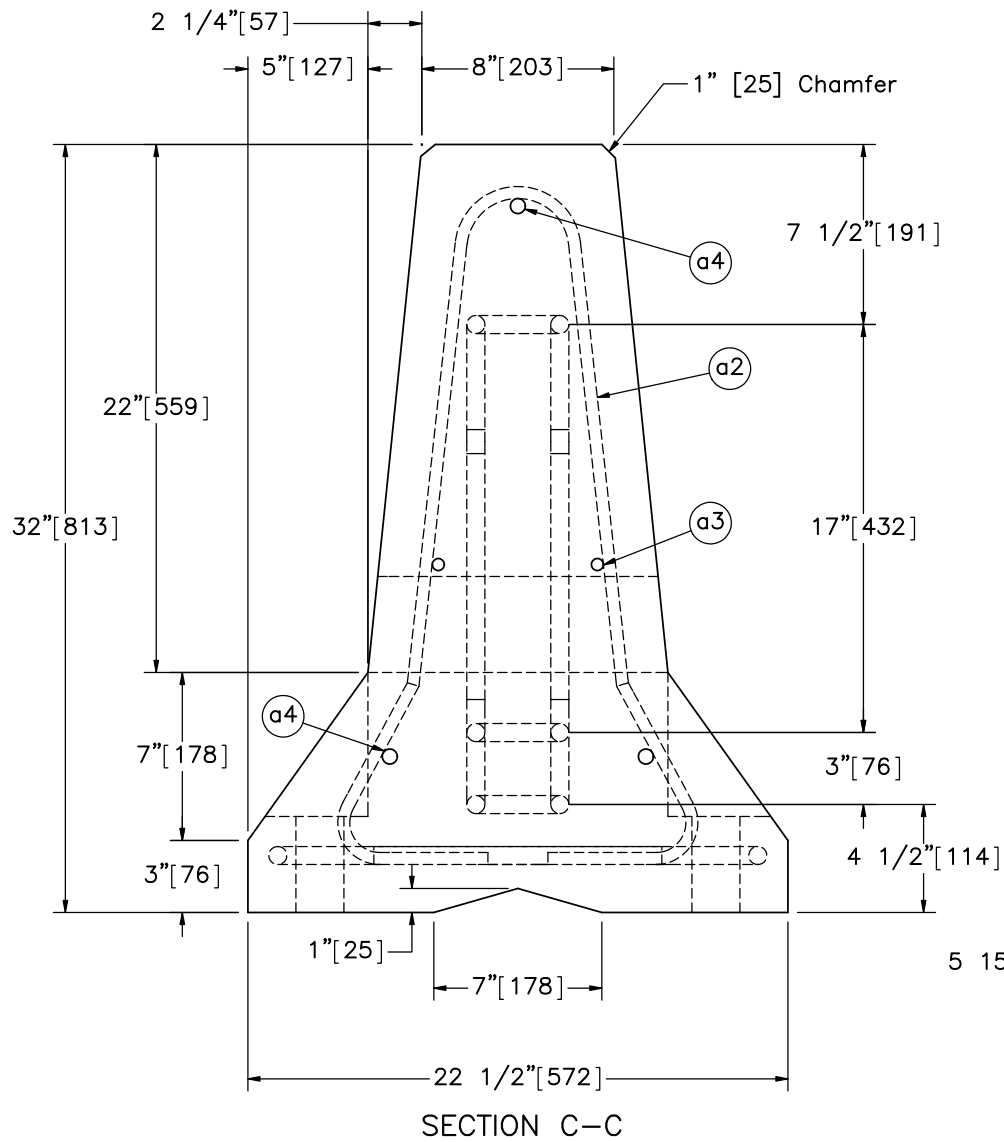
WI PCB Anchorage Tie-Down
Test No. WITD-1

Portable Concrete Barrier Details

DWG. NAME:
WITD-1_R10

SCALE: 1:22
UNITS: in.[mm]

SHEET:
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DATE:
5/25/2017
DRAWN BY:
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RWB



Note: (1) 2" [51] clear cover used for all reinforcement.



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WI PCB Anchorage Tie-
Down
Test No. WITD-1

Portable Concrete Barrier
Details

DWG. NAME:
WITD-1_R10

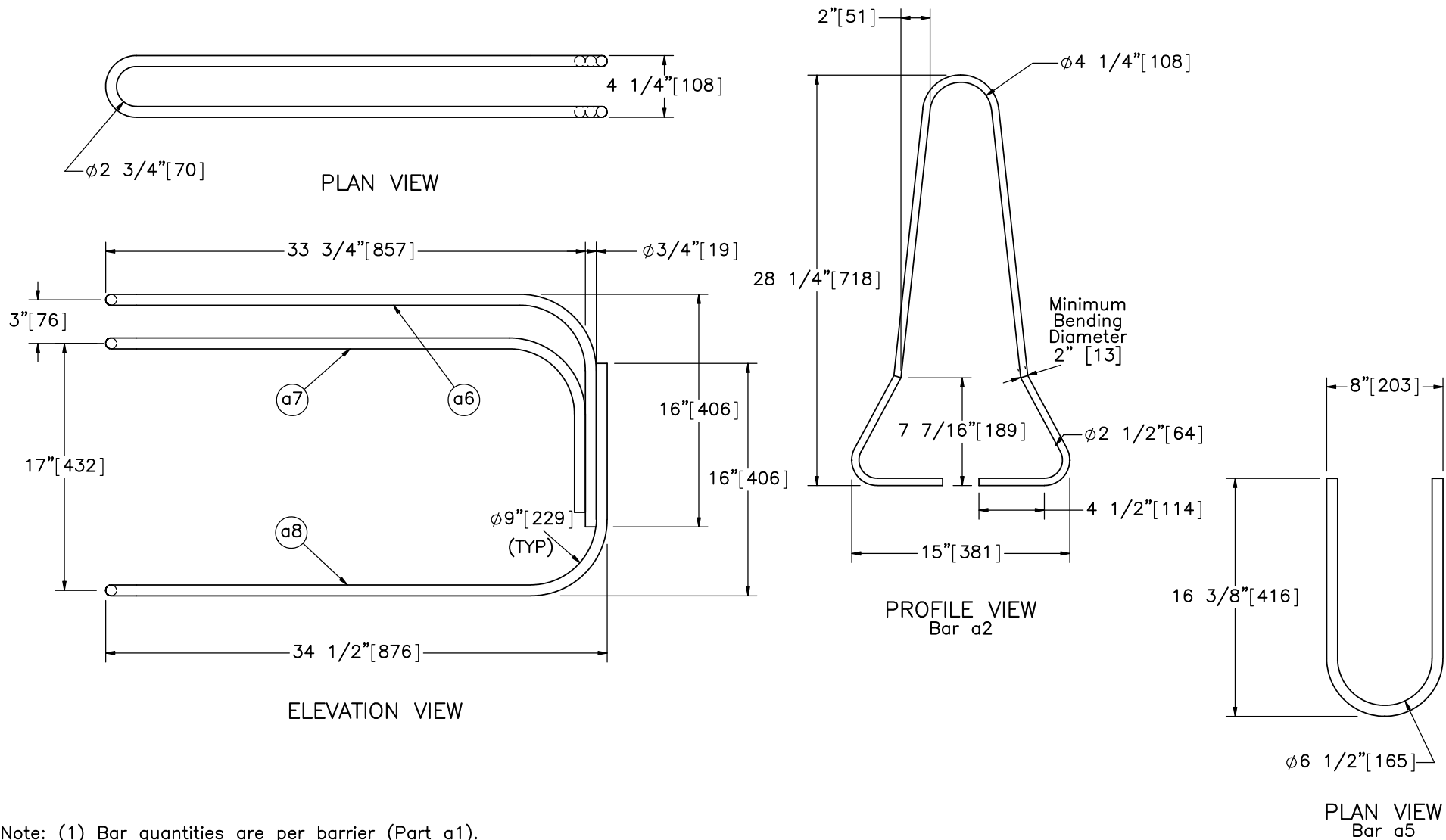
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UNITS: in.[mm]

SHEET:
5 of 9

DATE:
5/25/2017

DRAWN BY:
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REV. BY:
JEK/KAL/
RWB



Bill of Bars

Bar	QTY	Size	Total Length	Material
a2	12	#4	72"[1829]	A615 Gr.60
a3	2	#4	146"[3708]	A615 Gr.60
a4	3	#5	146"[3708]	A615 Gr.60
a5	6	#6	35"[889]	A615 Gr.60
a6	2	#6	101"[2565]	A709 Gr.70 or A706 Gr.60
a7	2	#6	91"[2311]	A709 Gr.70 or A706 Gr.60
a8	2	#6	102"[2591]	A709 Gr.70 or A706 Gr.60



Midwest Roadside Safety Facility

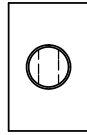
WI PCB Anchorage Tie-Down
Test No. WITD-1

Portable Concrete Barrier Rebar Details

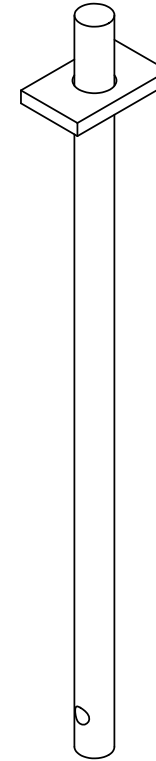
DWG. NAME:
WITD-1_R10

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

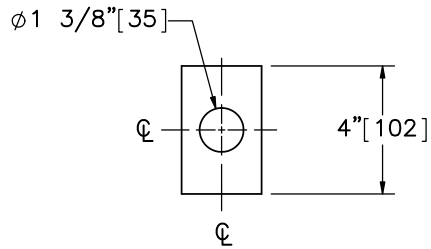
SHEET:
6 of 9
DATE:
5/25/2017
DRAWN BY:
MES/JEK
REV. BY:
JEK/KAL/
RWB



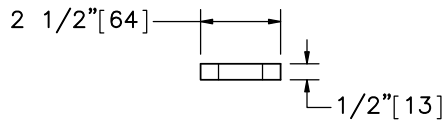
PLAN VIEW



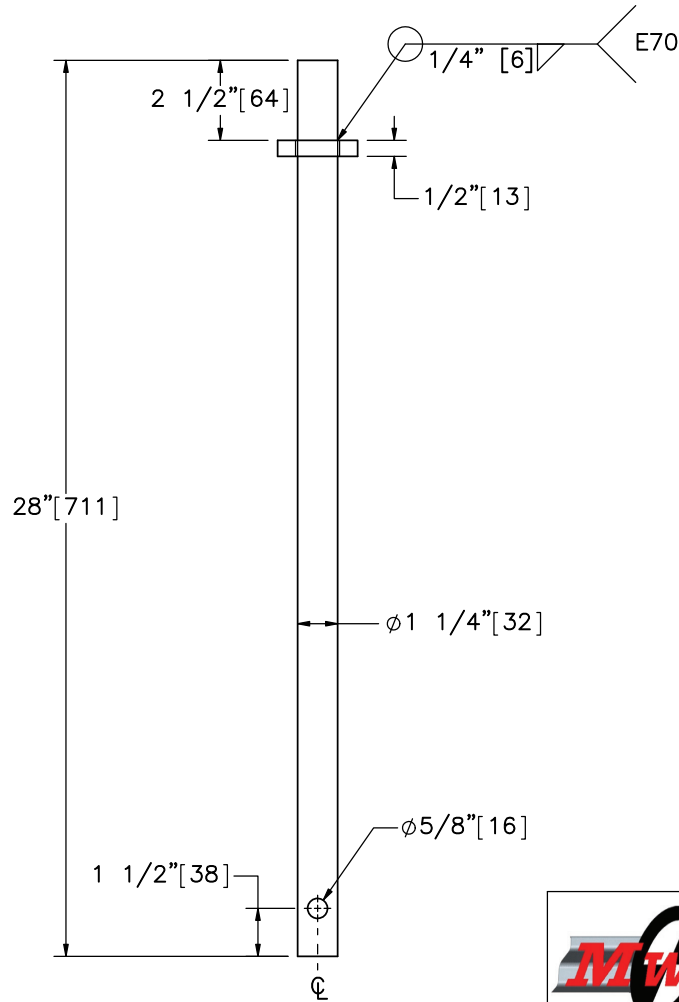
ISOMETRIC VIEW



PLAN VIEW



ELEVATION VIEW
PLATE



ELEVATION VIEW
Part a9



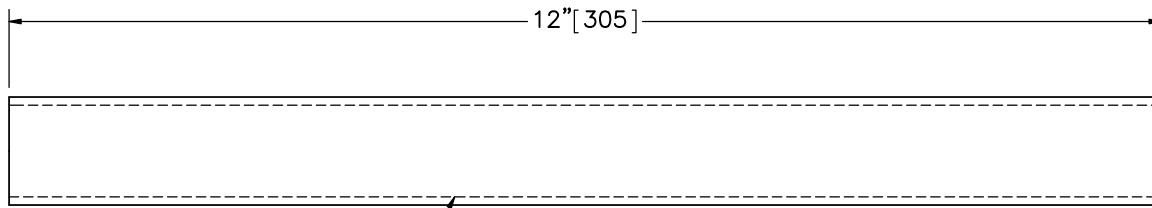
Midwest Roadside
Safety Facility

WI PCB Anchorage Tie-
Down
Test No. WITD-1
Connector Pin Details

DWG. NAME.
WITD-1_R10

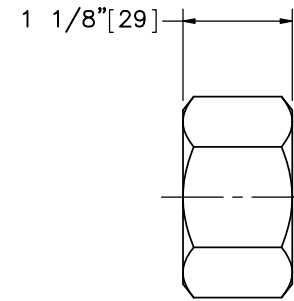
SCALE: 1:6
UNITS: in.[mm]

SHEET:
7 of 9
DATE:
5/25/2017
DRAWN BY:
MES/JEK
REV. BY:
JEK/KAL/
RWB

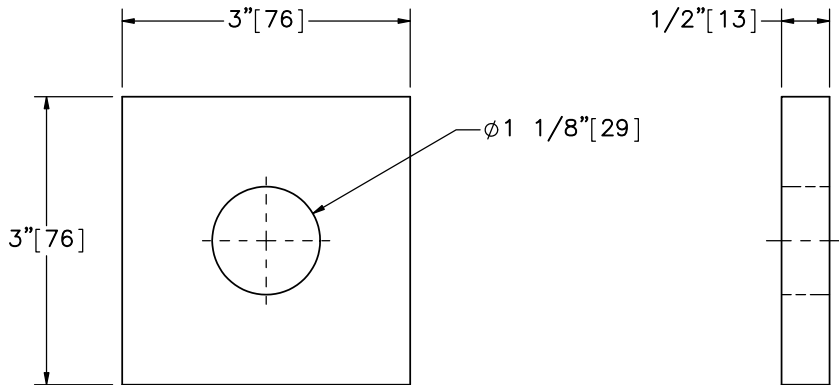


1-1/8"-7 UNC

Part b1



Part b3



Part b2



Midwest Roadside
Safety Facility

WI PCB Anchorage Tie-

Down

Test No. WITD-1

Anchor Components

DWG. NAME.
WITD-1_R10

SCALE: 1:2
UNITS: in.[mm]

SHEET:
8 of 9

DATE:
5/25/2017


DRAWN BY:
MES/JEK

REV. BY:
JEK/KAL/
RWB

Item No.	QTY.	Description	Material Spec	Galvanization Spec	Hardware Guide
a1	16	Portable Concrete Barrier	Min f'c = 5,000 psi [34.5 MPa]	–	SWC09
a2	192	1/2" [13] Dia., 72" [1,829] Long Form Bar	ASTM A615 Gr. 60	–	SWC09*
a3	32	1/2" [13] Dia., 146" [3,708] Long Longitudinal Bar	ASTM A615 Gr. 60	–	SWC09*
a4	48	5/8" [16] Dia., 146" [3,708] Long Longitudinal Bar	ASTM A615 Gr. 60	–	SWC09*
a5	96	3/4" [19] Dia., 36" [914] Long Anchor Loop Bar	ASTM A615 Gr. 60	–	SWC09*
a6	32	3/4" [19] Dia., 101" [2,565] Long Connection Loop Bar	ASTM A709 Gr. 70 or A706 Gr. 60	–	SWC09*
a7	32	3/4" [19] Dia., 91" [2,311] Long Connection Loop Bar	ASTM A709 Gr. 70 or A706 Gr. 60	–	SWC09*
a8	32	3/4" [19] Dia., 102" [2,591] Long Connection Loop Bar	ASTM A709 Gr. 70 or A706 Gr. 60	–	SWC09*
a9	15	1 1/4" [32] Dia., 28" [711] Long Connector Pin	ASTM A36	–	FMW02
b1	27	1 1/8" [29] Dia. UNC, 12" [305] Long Threaded Rod	ASTM A307 Gr. A	**ASTM A153 or B695 Class 55 or F2329	–
b2	27	3"x3"x1/2" [76x76x13] Washer Plate	ASTM A36	**ASTM A123	–
b3	27	1 1/8" [29] Dia. Heavy Hex Nut	ASTM A563A	**ASTM A153 or B695 Class 55 or F2329	–
c1	–	Hilti HIT-RE 500 V3 Epoxy or equivalent	Minimum bond strength for 1 1/8" [29] anchor > 1,650 psi [11 MPa] in uncracked concrete	–	–

* Included in SWC09 hardware guide designation.

** Component does not need to be galvanized for testing purposes.

	WI PCB Anchorage Tie- Down Test No. WITD-1	SHEET: 9 of 9
	Bill of Materials	DATE: 5/25/2017
Midwest Roadside Safety Facility	DWG. NAME: WITD-1_R10	DRAWN BY: MES/JEK
	SCALE: 1:768 UNITS: in.[mm]	REV. BY: JEK/KAL/ RWB

REV.	DATE OF ISSUE	Page	NATURE OF CHANGES	REVIEWER	REVISED BY
0	3/17/2017	-	Originated from LDPCB_V2_R7. Added anchor rods to the traffic side of barrier nos. 5-13. Eliminated side box beams and mounting bracket and corresponding holes on PCBs.	-	MES
1	3/28/2017	1	Edited notes and barrier nos.	JEK	MES
		2	Edited notes.		
		3	Edited notes and sheet name.		
		4	Deleted notes, edited dimensions and changed bar nos.		
		5	Edited dimensions and changed bar nos.		
		6	Edited dimensions, changed bar nos. and added bill of bars table.		
		7	Edited dimensions		
		8	Edited dimensions and sheet name.		
2	3/28/2017	9	Deleted rebar part nos., change material and galvanization specs for part nos. a2, b1, b2 and b3 and changed part no. c1 item no.	JEK	MES
		1	Edited ground line		
		2	Edited notes.		
		3	Edited notes.		
		8	Edited dimensions.		
3	3/30/2017	9	Edited material spec for part no. a1 and description for part nos. b1 and b2.	KAL	MES
		2	Edited notes.		
		3	Edited notes and changed bar numbers.		
		4	Added notes and changed bar numbers.		
		5	Changed bar numbers.		
		6	Changed bar numbers.		
4	3/31/2017	9	Added back in rebar parts and added galvination spec. Changed description for part c1. Added note.	RWB	MES
		1	Edited notes and dimensions.		
		2	Added ground line. Edited notes.		
		3	Added ground line. Edited notes. Added concrete hole dimensions. Added ground to DETAIL B.		
5	4/4/2017	9	Removed rebar epoxy galvanization. Changed epoxy material specification and description. Edited item b3 description.	JEK	MES
		2	Edited barrier gap size and added concrete hole note.		

6	4/6/2017	1	Added note four.	KAL	MES
		3	Edited notes.		
7	4/10/2017	1	Note 3 edit.	KAL	JEK
8	4/21/2017	-	Test name change. Document Name Change.	JEK/KAL	JEK
		1	Note 2 edit. Dim shift.		
		5	Dim add.		
		9	Description: a2-a4, a6-a8. Mtrl: a2-a8.		
9	5/2/2017	9	Mtrl: b3.	KAL/RWB	JEK
10	5/25/2017	BOM	Galv: a9, b1-3.	RWB	JEK