

All barrier segments are bolted to concrete tarmac through the anchor pockets with 1" [25] diameter ASTM F1554 Grade 36 threaded rods (Part f1) epoxied into 1 1/8" [29] diameter pre-drilled holes in the concrete tarmac.

SECTION A-A  
SCALE 1 : 20

- Notes: (1) Place 1" [25] diameter bolts or threaded rods (Part f1) into every bolt anchor pocket location (10 each) of all barrier segments.
- (2) Place grout wedges (Part e1) at the toe of each barrier segment between adjacent barrier segments in every joint.
- (3) Test shall be performed according to test designation no. 3-11 of MASH.
- (4) The critical impact location is 51 3/16" [1300] upstream from the centerline of the joint between barrier nos. 4 and 5.
- (5) NJDOT Precast Concrete Curb and Construction Barrier curb will be referred to as Portable Concrete Barrier (PCB).
- (6) The system is NJDOT Type 4 (Alternate B) barrier with joint class D as specified in the 2013 NJDOT Roadway Design Manual.



Midwest Roadside  
Safety Facility

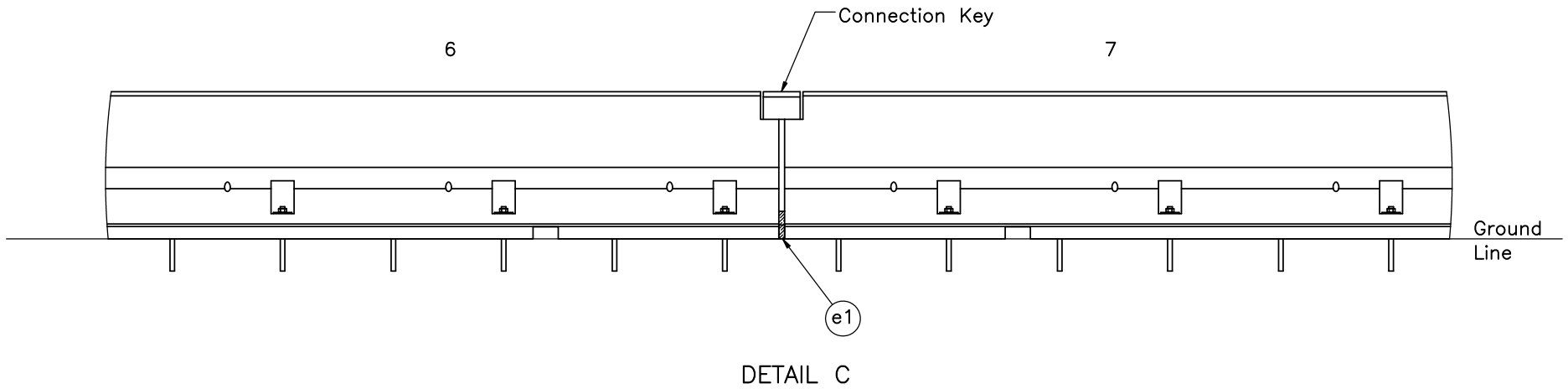
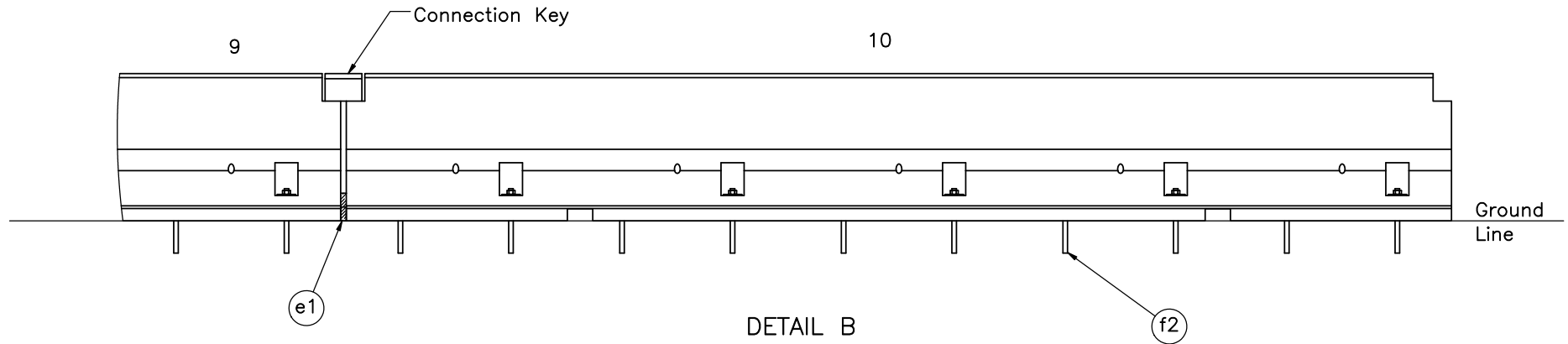
NJ Bolted Portable  
Concrete Barrier  
Test NJPCB-2

System Layout

DWG. NAME.  
NJPCB-2\_R17

SCALE: 1:245  
UNITS: In.[mm]

SHEET:  
1 of 15  
DATE:  
10/30/2018  
DRAWN BY:  
TJD/JEK/DT  
M/MES/MBD  
REV. BY:  
KAL/TJD/RK  
F/JCH/SB



Midwest Roadside  
Safety Facility

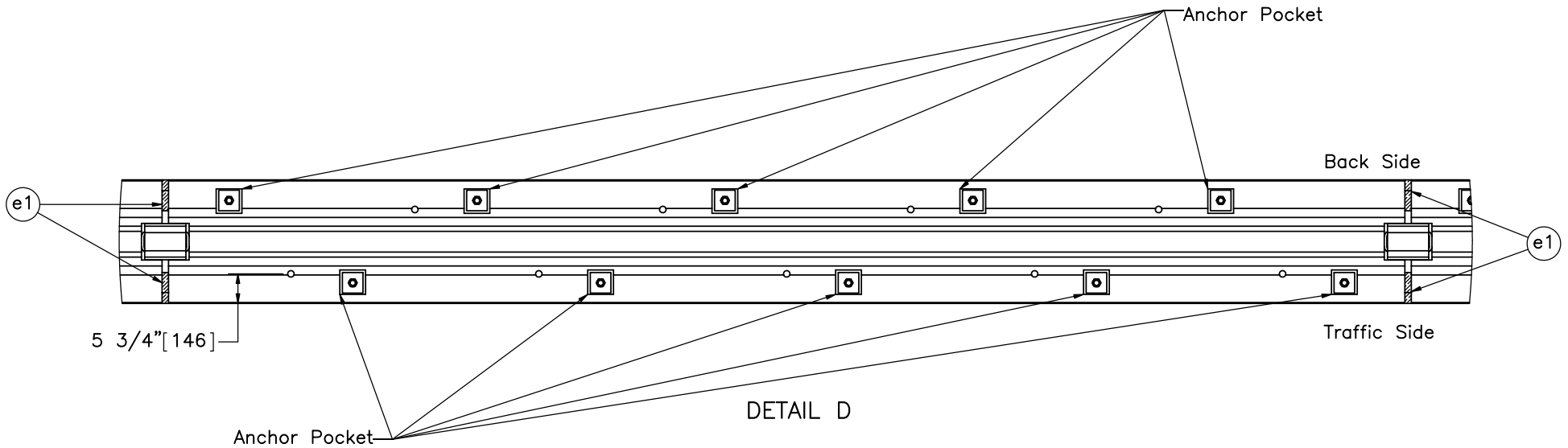
NJ Bolted Portable  
Concrete Barrier  
Test NJPCB-2

Barrier Bolt Anchor Details

DWG. NAME:  
NJPCB-2\_R17

SCALE: 1:35  
UNITS: In./mm

SHEET:  
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DATE:  
10/30/2018  
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Concrete Barrier  
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Bolt Anchor Pocket Locations

DWG. NAME.  
NJPCB-2\_R17

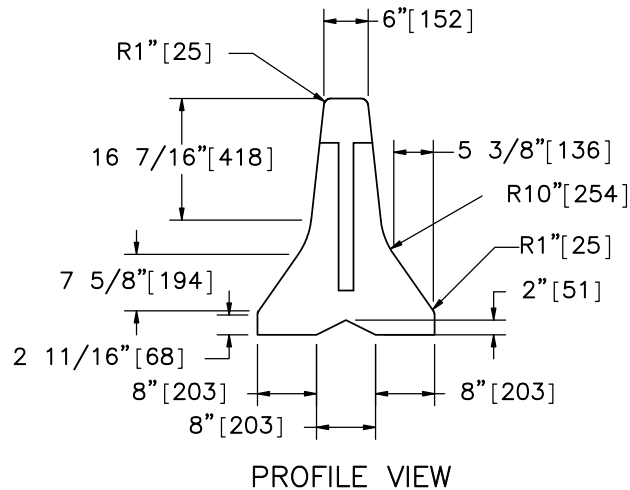
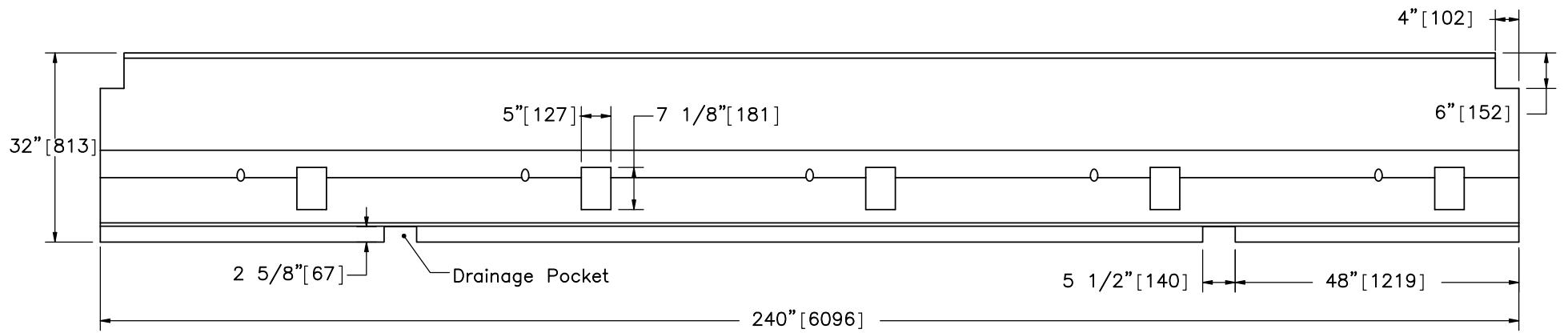
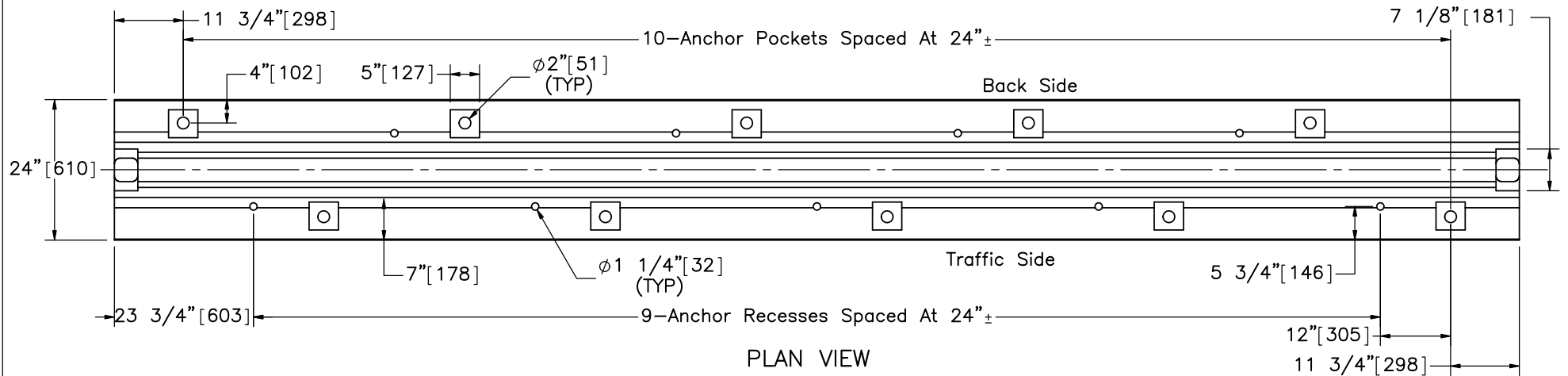
SCALE: 1:30  
UNITS: In.[mm]

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3 of 15

DATE:  
10/30/2018

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- Notes: (1) Concrete has a minimum 28-day compressive strength of 3.7 ksi [25.5 MPa].  
 (2) Two 2 5/8" x 5 1/2" [67 x 140] drainage pockets required in segments 12' [3658] long or greater.



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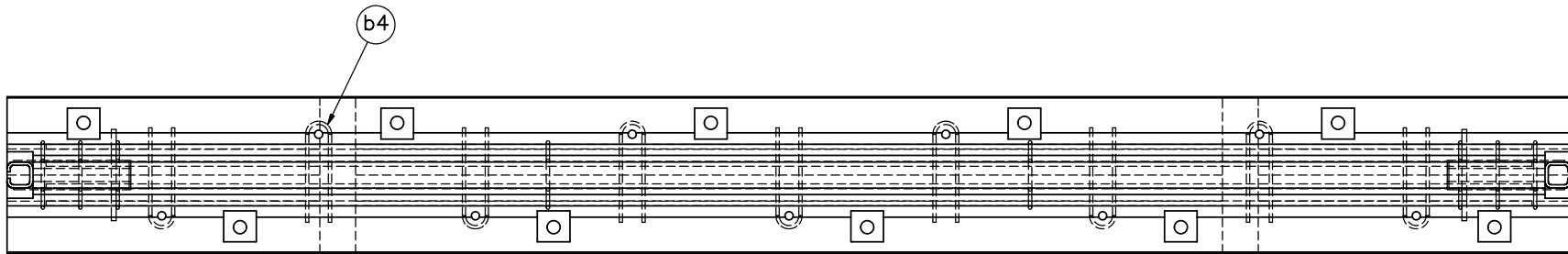
NJ Bolted Portable  
Concrete Barrier  
Test NJPCB-2

Concrete Barrier Segment

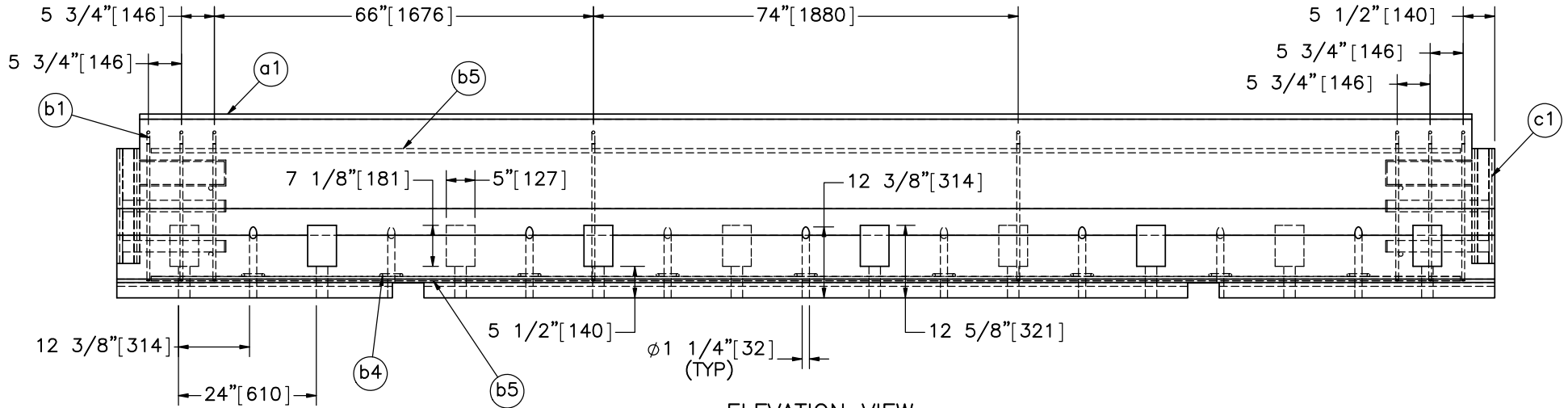
DWG. NAME:  
NJPCB-2\_R17

SCALE: 1:26  
UNITS: In.[mm]

SHEET:  
4 of 15  
DATE:  
10/30/2018  
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PLAN VIEW



ELEVATION VIEW



Midwest Roadside  
Safety Facility

NJ Bolted Portable  
Concrete Barrier  
Test NJPCB-2

Reinforcement Details

DWG. NAME:  
NJPCB-2\_R17

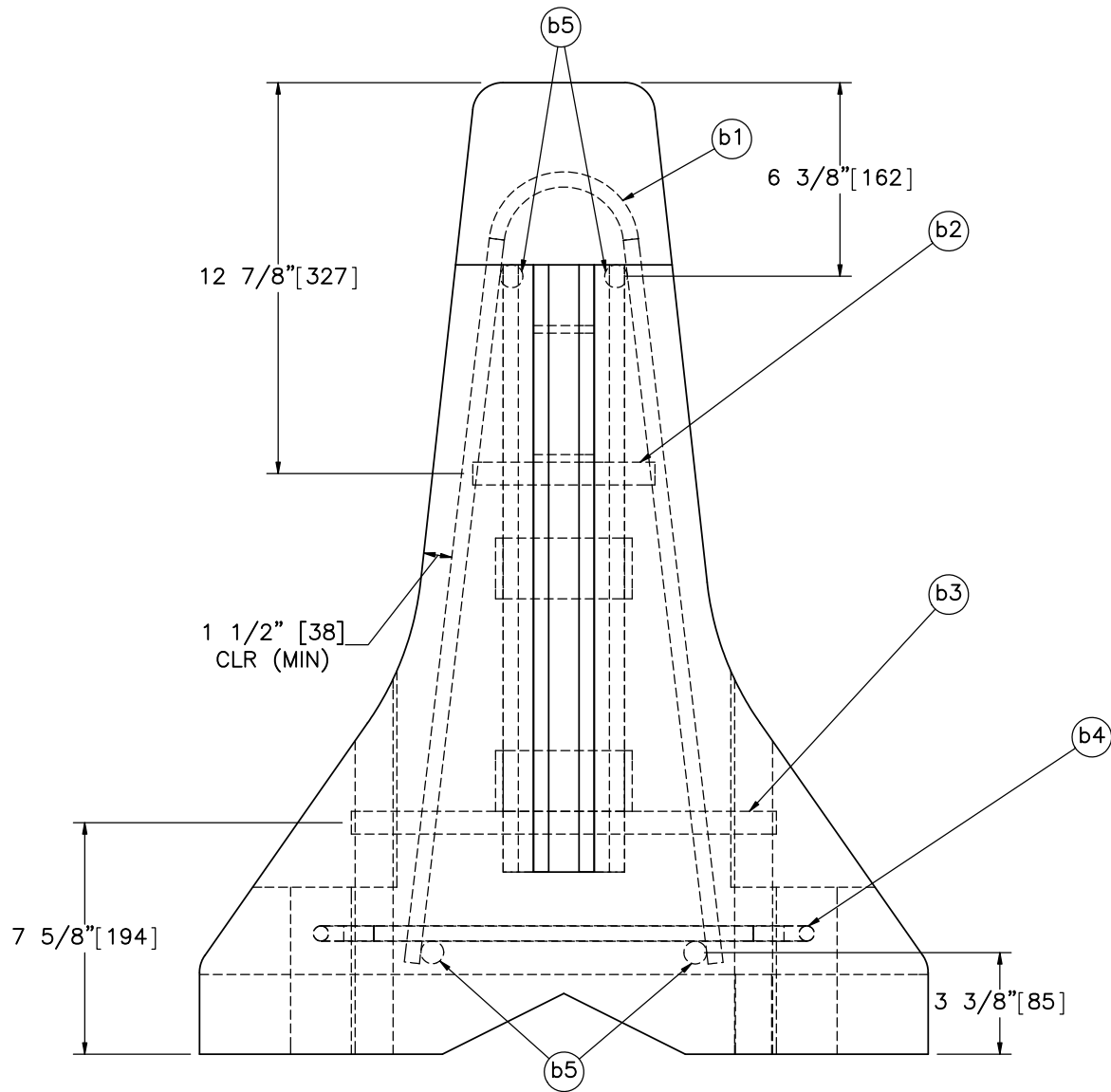
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UNITS: In.[mm]

SHEET:  
5 of 15

DATE:  
10/30/2018

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PROFILE VIEW



Midwest Roadside  
Safety Facility

NJ Bolted Portable  
Concrete Barrier  
Test NJPCB-2

Reinforcement Details – End  
View

DWG. NAME:  
NJPCB-2\_R17

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

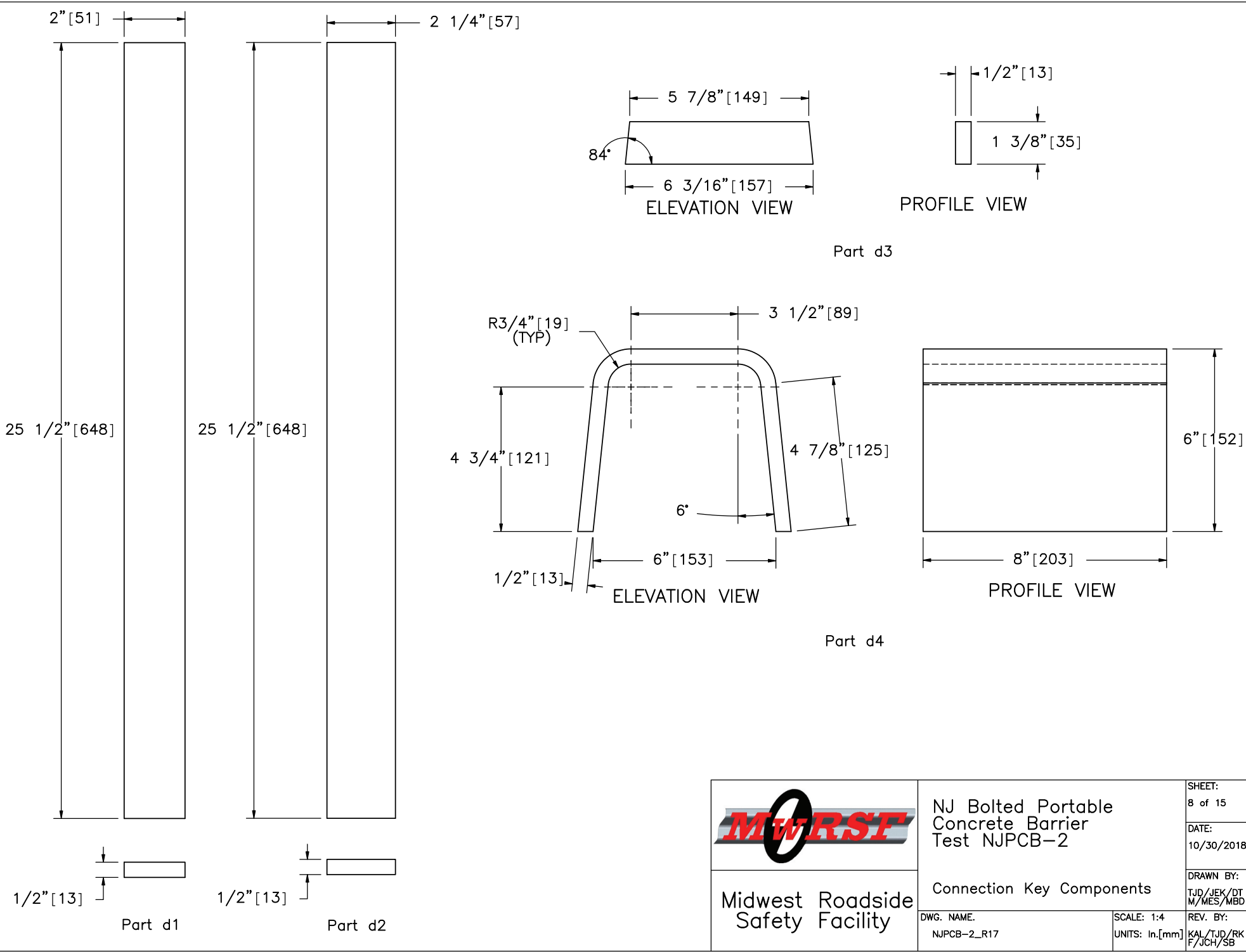
SHEET:  
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10/30/2018

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Midwest Roadside Safety Facility

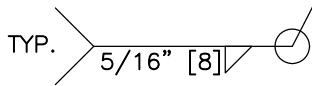
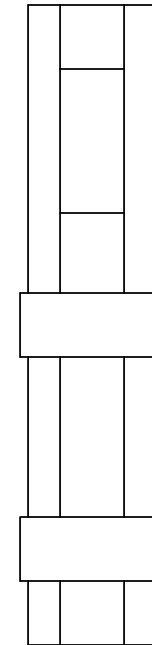
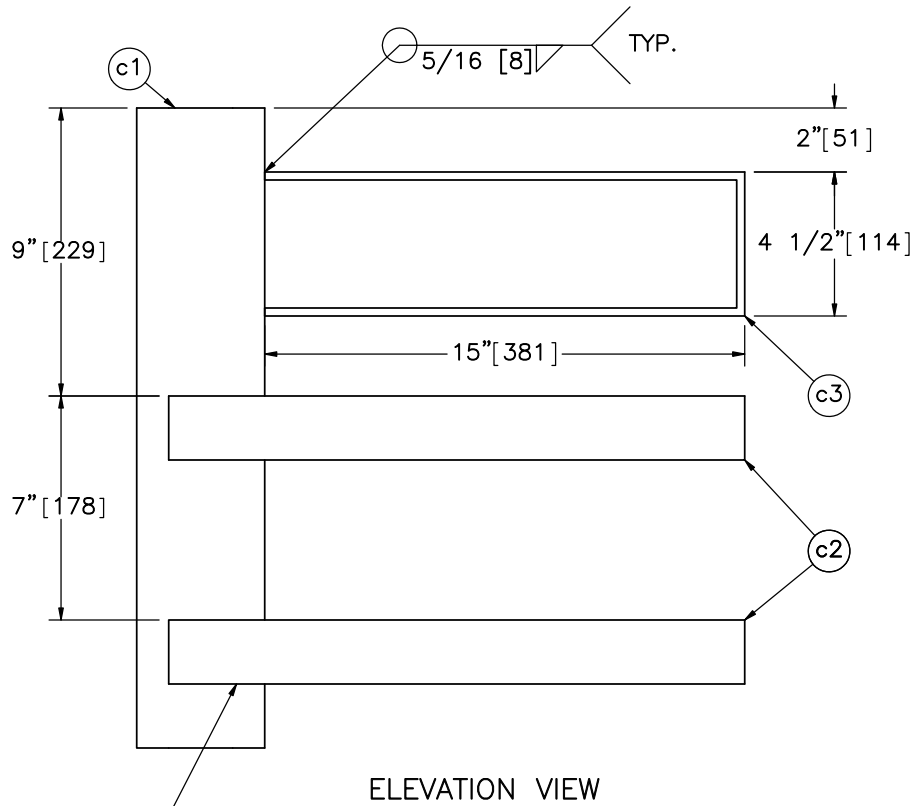
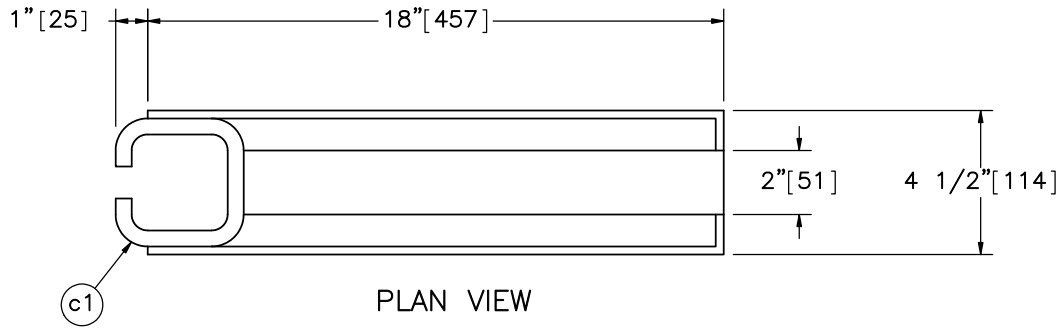
NJ Bolted Portable Concrete Barrier Test NJPCB-2

Connection Key Components

DWG. NAME:  
NJPCB-2\_R17

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

SHEET:  
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DATE:  
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NJ Bolted Portable  
Concrete Barrier  
Test NJPCB-2

Connection Socket

DWG. NAME.  
NJPCB-2\_R17

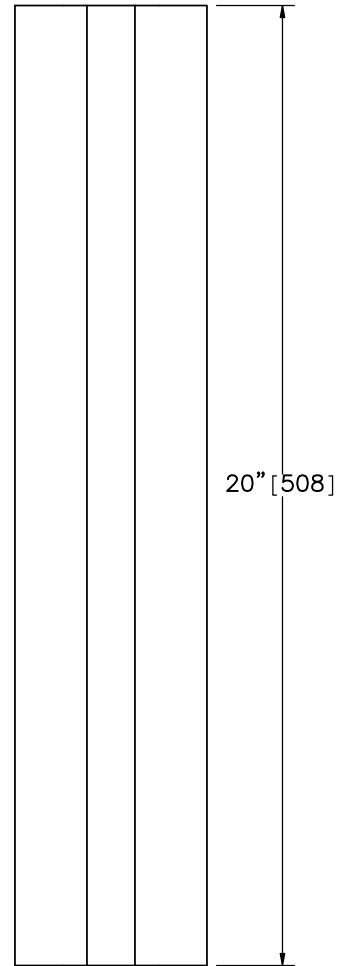
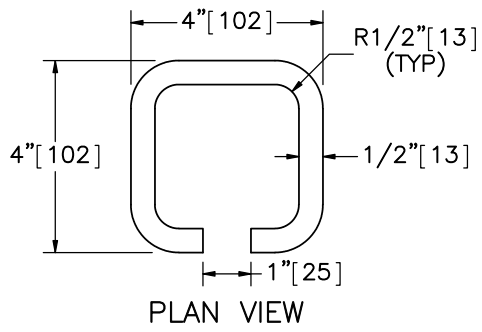
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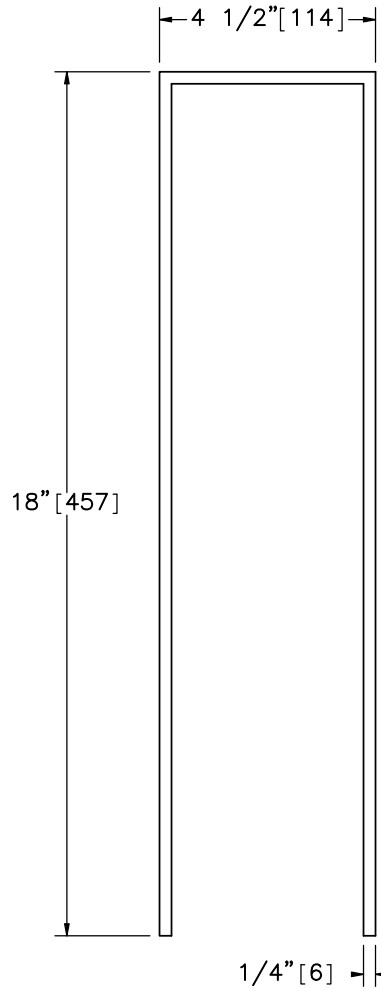
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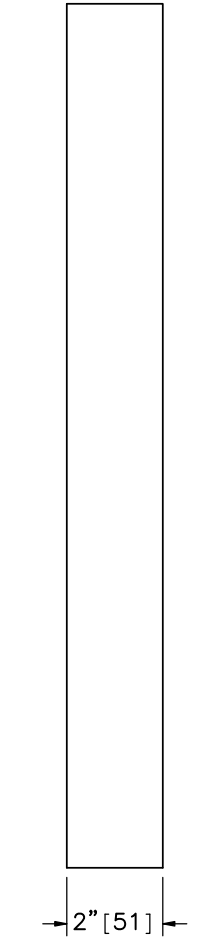
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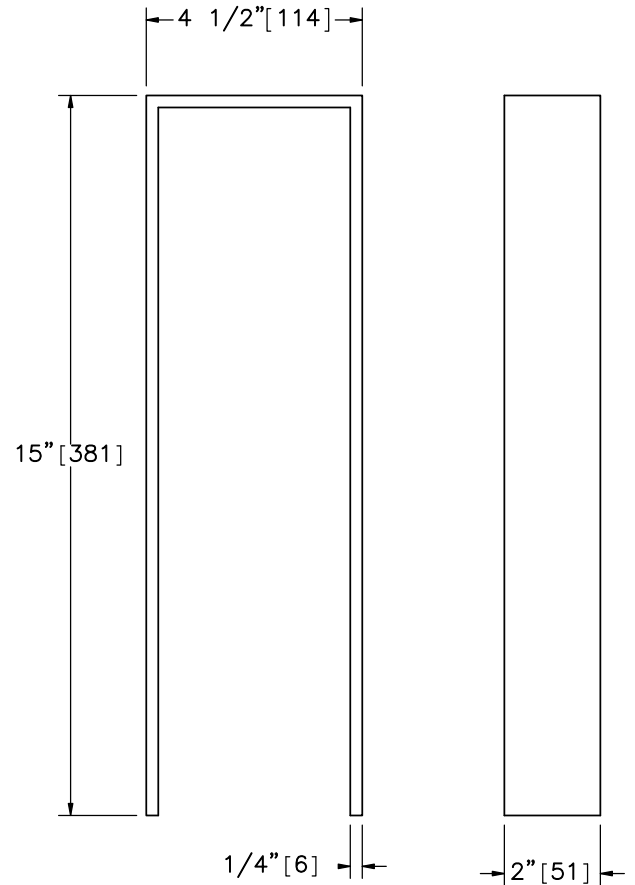
ELEVATION VIEW  
Part c1



ELEVATION VIEW  
Part c2



PROFILE VIEW



ELEVATION VIEW  
Part c3

PROFILE VIEW



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NJ Bolted Portable  
Concrete Barrier  
Test NJPCB-2

Connection Socket Components

DWG. NAME:  
NJPCB-2\_R17

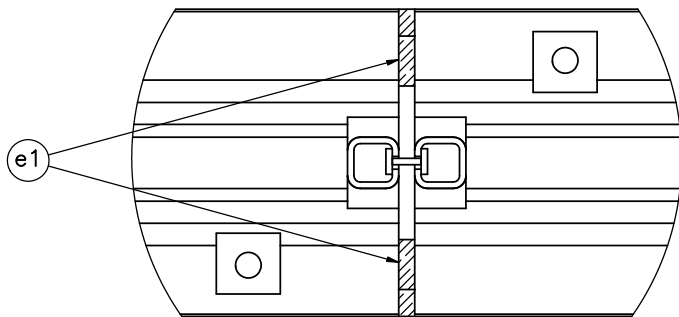
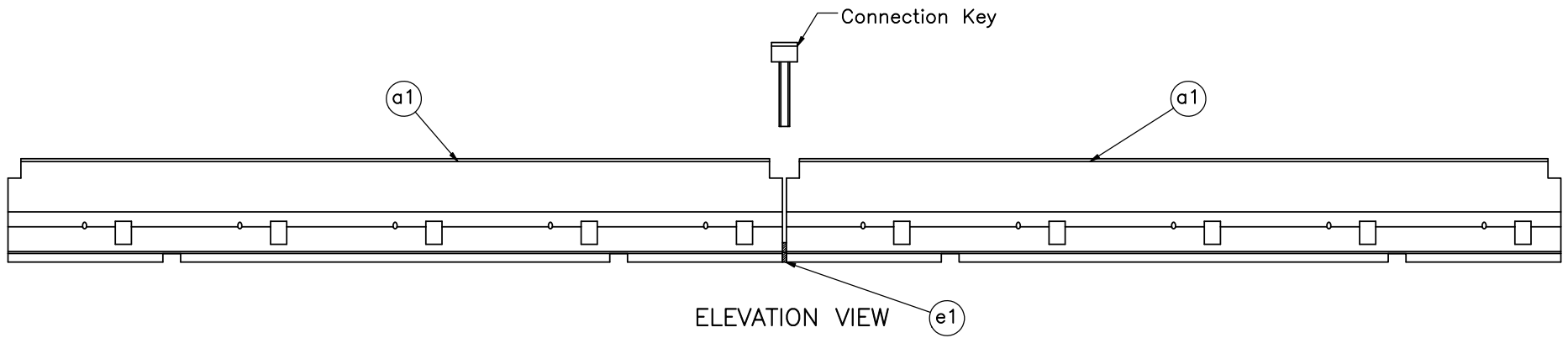
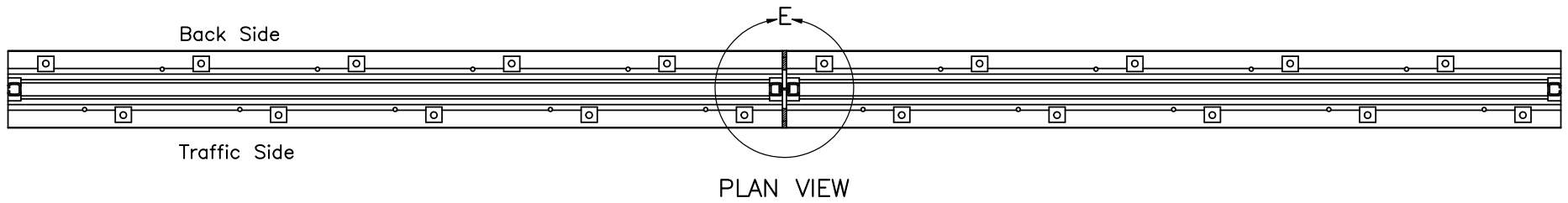
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UNITS: In.[mm]

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DETAIL E  
SCALE 1 : 15

- Notes: (1) Curved cover plate and stiffeners are not shown in Plan View and Detail E.
- (2) Groundline and vertical anchors at toe of barrier not shown for clarity.



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NJ Bolted Portable  
Concrete Barrier  
Test NJPCB-2

Connection Key Placement

DWG. NAME.  
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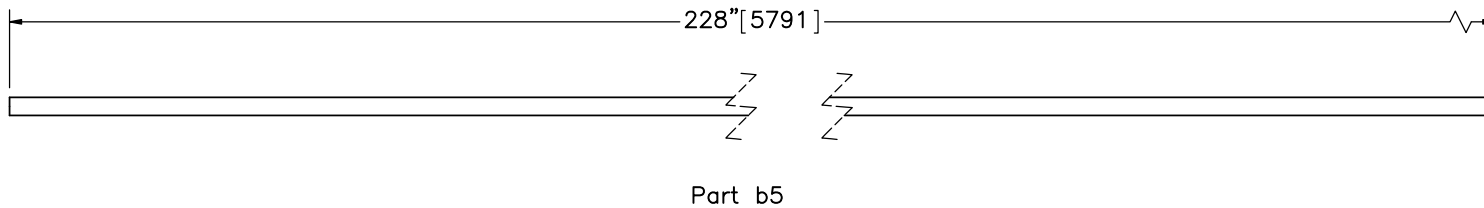
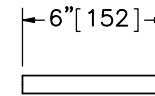
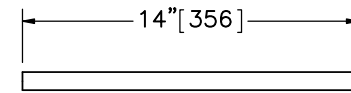
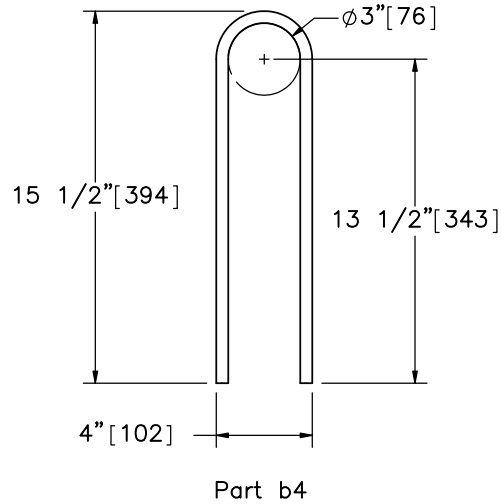
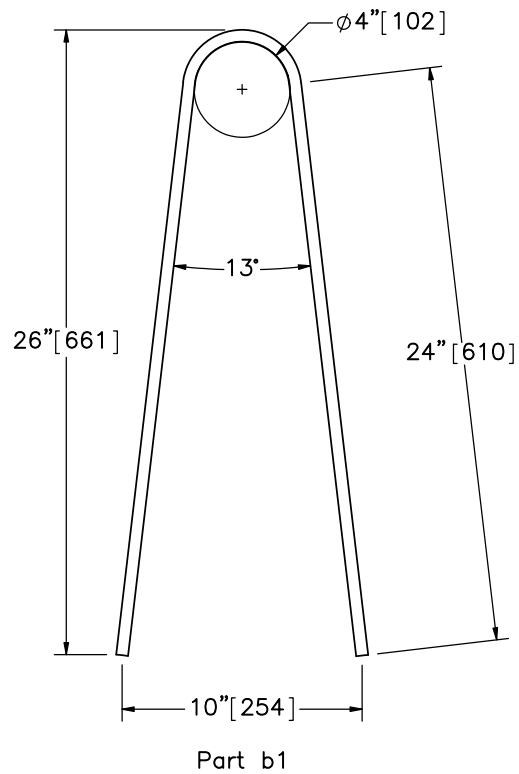
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UNITS: In./mm

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BILL OF BARS				
ITEM NO.	QTY.	BAR SIZE	TOTAL LENGTH	MATERIAL SPEC.
b1	80	#4 [13]	59" [1499]	A615 Gr. 60
b2	20	#6 [19]	6" [152]	A615 Gr. 60
b3	20	#6 [19]	14" [356]	A615 Gr. 60
b4	90	#4 [13]	37" [940]	A615 Gr. 60
b5	40	#6 [19]	19'-0" [5791]	A615 Gr. 60

Note: (1) Quantities in Bill of Bars represent a system with ten barriers.



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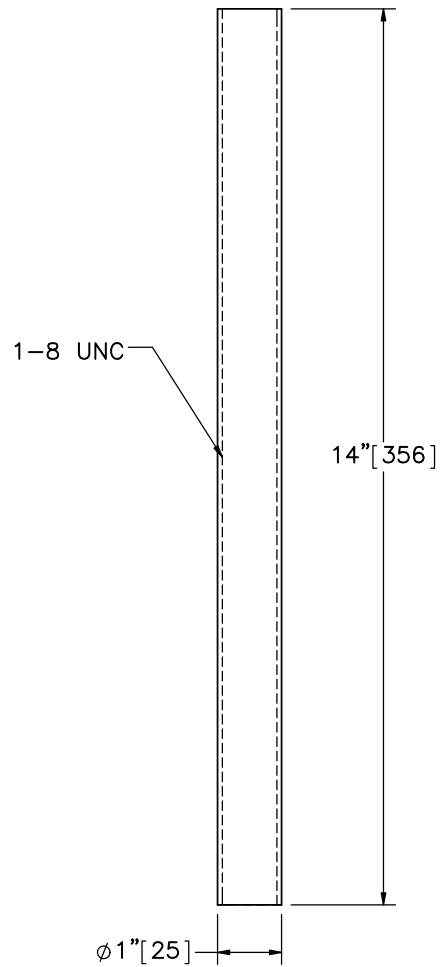
NJ Bolted Portable  
Concrete Barrier  
Test NJPCB-2

Bill of Bars

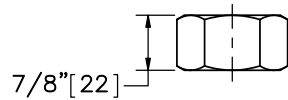
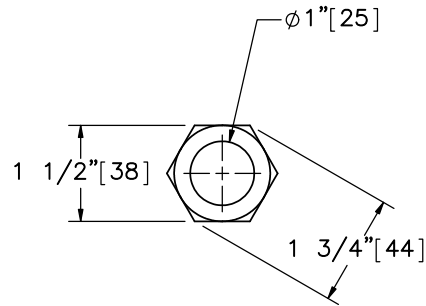
DWG. NAME.  
NJPCB-2\_R17

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UNITS: In.[mm]

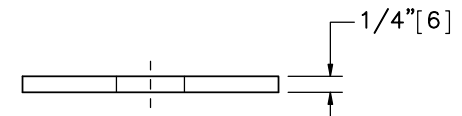
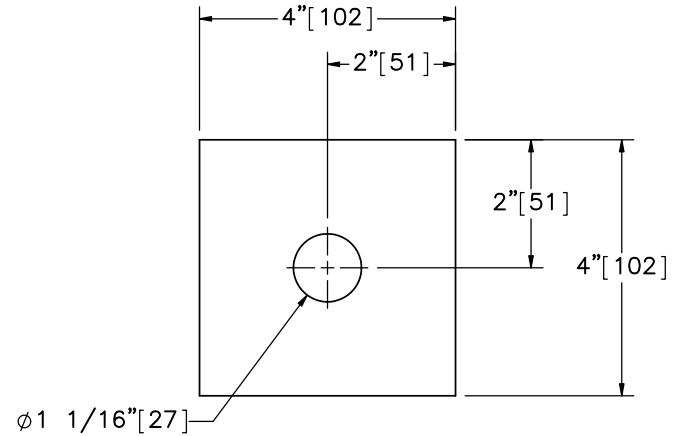
SHEET:  
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DATE:  
10/30/2018  
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Part f1



Part f2



Part f3



Midwest Roadside  
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NJ Bolted Portable  
Concrete Barrier  
Test NJPCB-2

Anchor Bolt/Rod Options

DWG. NAME:  
NJPCB-2\_R17

SCALE: 1:3  
UNITS: In.[mm]


SHEET:  
13 of 15

DATE:  
10/30/2018

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M/MES/MBD

REV. BY:  
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- (1) Minimum concrete clear cover for reinforcement steel shall be 1 1/2" [38 mm].
- (2) All segments shall be bolted.
- (3) After a segment has been placed and the connection key inserted, pull the unit in a direction parallel to its longitudinal axis to remove any slack in the joint.
- (4) The portable concrete barrier shall be cast in steel forms.
- (5) The portable concrete barrier shall be barrier segments of 20 feet [6,096 mm]. However, other lengths may be used to meet field conditions. The number and placement of the b2 and b3 reinforcement steel will vary with the length of the barrier segment as shown on the table of variable reinforcement steel. The b5 reinforcement steel shall be 10" [254 mm] shorter than the nominal length of the barrier segments.
- (6) Reinforcing shown is the minimum required. Additional reinforcing necessary for handling shall be the option and responsibility of the contractor.
- (7) Welding and fabrication of steel structures shall be in accordance with sections 1 thru 6 of the ANSI/AASHTO/AWS D1.5 bridge welding code and section 10 of the ANSI/AWS D1 structural welding code. Surfaces to be welded shall be free of scale, slag, rust, moisture, grease or any other material that will prevent proper welding or produce objectional fumes. Welding shall be shielded metal arc welding using properly dried 5/32" [4 mm] dia. E7018 electrodes.
- (8) The length of the bolts/threaded rods shall be such that a minimum embedment length of 7" [178 mm] is obtained when embedded into concrete pavement. Holes in bridge decks shall be 1 1/4" [32 mm] diameter maximum and made with a core drill or any other approved rotary drilling device that does not impart an impact force.
- (9) Use non-shrink grout of a plastic consistency that is listed on the QPL and conforms to ASTM C 1107 with the following amendments:
  1. Ensure that the grout has a working time of at least 30 minutes from the time the water is added.
  2. Match the color of the hardened grout, where visible, to the color of the adjacent hardened concrete.
  3. Include 1-day strength tests as part of the performance requirements of ASTM C 1107.
  4. Ensure that the grout contains no more than 0.05 percent chlorides or 5.0 percent sulfates by weight.
  5. Minimum 1-day compressive strength of 1,000 psi [6.9 MPa].
- (10) Use connection key in every joint. Grout is placed at the toe of each barrier segment between adjacent barrier segments in every joint. Bolt every segment to the concrete tarmac with bolts in every anchor pocket.

	NJ Bolted Portable Concrete Barrier Test NJPCB-2		SHEET: 14 of 15
			DATE: 10/30/2018
Midwest Roadside Safety Facility	General Notes		DRAWN BY: TJD/JEK/DT M/MES/MBD
	DWG. NAME: NJPCB-2_R17	SCALE: None UNITS: In.[mm]	REV. BY: KAL/TJD/RK F/JCH/SB

Item No.	QTY.	Description	Material Spec	Galvanization Spec
a1	10	Concrete Barrier Segment – NJDOT Type 4 Barrier (Alternate B) used as Type 1	Min. f'c = 3,700 psi [25.5 MPa]	–
b1	80	1/2" [13] Dia., 59" [1,499] Long Bent Rebar	ASTM A615 Gr. 60	–
b2	20	3/4" [19] Dia., 6" [152] Long Rebar	ASTM A615 Gr. 60	–
b3	20	3/4" [19] Dia., 14" [356] Long Rebar	ASTM A615 Gr. 60	–
b4	90	1/2" [13] Dia., 37" [940] Long Bent Rebar	ASTM A615 Gr. 60	–
b5	40	3/4" [19] Dia., 228" [5,791] Long Rebar	ASTM A615 Gr. 60	–
c1	20	4"x4"x1/2" [102x102x13] x 20" [508] Long Tube	ASTM A500 Gr. B or C	–
c2	40	40 1/2"x2"x1/4" [1,029x51x6] Bent Steel Plate	ASTM A36	–
c3	20	34 1/2"x2"x1/4" [876x51x6] Bent Steel Plate	ASTM A36	–
d1	18	25 1/2"x2"x1/2" [648x51x13] Steel Plate	ASTM A36	–
d2	9	25 1/2"x2 1/4"x1/2" [648x57x13] Steel Plate	ASTM A36	–
d3	18	6 3/16"x1 3/8"x1/2" [157x35x13] Steel Plate – Stiffener	ASTM A36	–
d4	9	17"x8"x1/2" [432x203x13] Bent Steel Plate – Top Plate	ASTM A36	–
e1	1	Non–Shrink Grout	Min. 1–day Compressive Strength 1,000 psi [6.9 MPa]	–
f1	100	1" [25] Dia. UNC, 14" [356] Long Threaded Rod	ASTM F1554 Gr. 36	* ASTM A153 or B695 Class 55 or F2329
f2	100	1" [25] Dia. UNC Hex Nut	ASTM A563A	* ASTM A153 or B695 Class 55 or F2329
f3	100	4"x4"x1/4" [102x102x6] Square Washer	ASTM A36	* ASTM A123
g1	1	Epoxy Resin	Min. pull out capacity of 20,500 lb [91.2 kN] when embedded in 7" [178] of 3,000 psi [20.7 MPa] concrete. Min. bond strength of 1,461 psi [10.1 MPa]	–

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



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NJ Bolted Portable  
Concrete Barrier  
Test NJPCB–2

Bill of Materials

DWG. NAME.  
NJPCB–2\_R17

SCALE: None  
UNITS: In.[mm]

SHEET:  
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DATE:  
10/30/2018  
DRAWN BY:  
TJD/JEK/DT  
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REV. BY:  
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REV.	DATE OF ISSUE	Page	NATURE OF CHANGES	REVIEWER	REVISED BY
0	1/29/2016	-	Made NJPCB-2 Using NJPCB-1	-	EMR
1	2/10/2016	1	Note edits.	KAL	EMR
		12	Drawings removed.		
		13	Sheet added.		
		14	Note edits.		
		15	Item additions. Item number edits. Item description edits. Material specification edits.		
2	2/15/2016	1	Note edits. Item number additions.	KAL/TJD	EMR
		2	Item number addition. Item number edit.		
		3	Note edits.		
		4	Note edits. Dimension edits.		
		5	Note edits. Dimension edits.		
		7	Note edits. Weld description edit. Note added.		
		8	Scale edits. Note edits.		
		9	Note edits.		
		10	Dimensions added.		
		11	Notes removed. Note added.		
		12	Table column removed. Table column moved. Table rows removed. Table rows moved. Item number edits. Table column width edits. Table title edit. Table column header edits. Bar bend circles added. Dimensions removed. Dimensions added. Drawings added.		
		13	Drawings removed. Drawings moved. Notes removed. Note edit.		
15	Item number edits. Item description edits. Row removed. Material specification edits.				
3	2/17/2016	1	Changed direction of impact and barrier numbering to match test conditions. Changed font scale for views. Updated note.	KAL	TJD
		3	Changed text from anchor bolt pocket to anchor pocket.		
		8	Fixed font in part text. Removed view from part c4.		
		10	Fixed font in part text.		
		12	Fixed font in part text. Added broken view of part 6b3 and removed scaling.		
		13	Changed layout of parts.		
		-	All bolts changed to threaded rods with nuts. All bolts removed.		

4	2/17/2016	1	Note edit. Item numbers added.	RKF	EMR
		2	Note edit.		
		8	Note edits.		
		10	Note edits.		
		11	Note edits.		
		12	Note edits.		
		13	Part removed. Part edit. Note edit.		
		14	Row added. Rows reordered. Rows added. Item number edits. Part description edits. Material Specification edits.		
5	3/9/2016	1	Note edits.	JCH	TJD
		14	Material spec and description edits.		
6	3/10/2016	1	Added note 5.	SB	TJD
		4	Added radii to drawing.		
		15	Bill of materials edit.		
7	3/17/2016	5	Note edits.	SB	TJD
		6	Note edits.		
		12	Note edits. Bill of bars edits.		
		15	Bill of materials edit.		
8	3/24/2016	1	Updated title.	SB	TJD
9	5/24/2016	2	Changed sheet name.	SB	TJD
		3	Changed sheet name.		
		11	Note edit.		
		15	Bill of materials edit.		
10	5/25/2016	11	Note edit.	KAL	TJD
		14	Changed sheet scale.		
11	12/19/2016	-	Template, font sizes, dual dimension placement, conventions updated throughout. Part renumbering. Dimension shifts throughout.	JEK	JEK
12	1/18/2017	5	Corrected labeling of upper longitudinal bar.	JEK	JEK
13	5/26/2017	BOM	Galv: c1-3, d1-4, f1-3. Note add.	KAL	JEK
14	6/5/2017	15	Changed Galv. Spec for part nos. b1-b5.	JEK	DTM
15	8/15/2017	BOM	Added bond strength to material spec for part no. g1.	KAL	MES
16	2/27/2018	14	Note 9-5 edit.	KAL	JEK
		BOM	Mtrl: e1.		

System: NJ Bolted Portable Concrete Barrier

Revision History

Drawing: NJPCB-2

17	10/30/2018	1	Note 6 edit.	KAL	MBD
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