

- Notes:
- (1) Test shall be performed according to test designation 3-11 using MASH 2016 criteria.
 - (2) Impact Location is 73 3/16" upstream from centerline of post no. 4.
 - (3) Critical region is from post nos. 3 and 7.



Midwest Roadside Safety Facility

MNDOT Bike Rail Retrofit Test Series MNPD

System Layout

DWG. NAME:
MNPD-3_R20

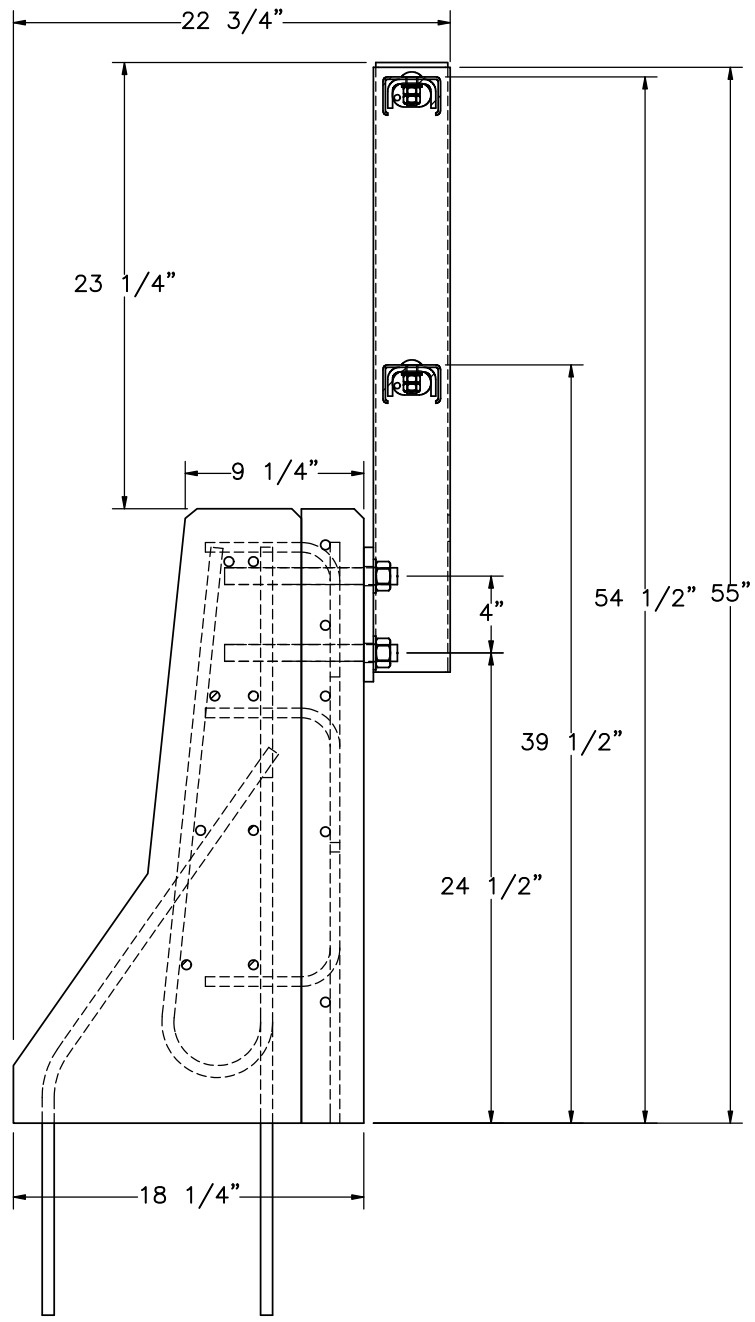
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UNITS: in.

SHEET:
1 of 25

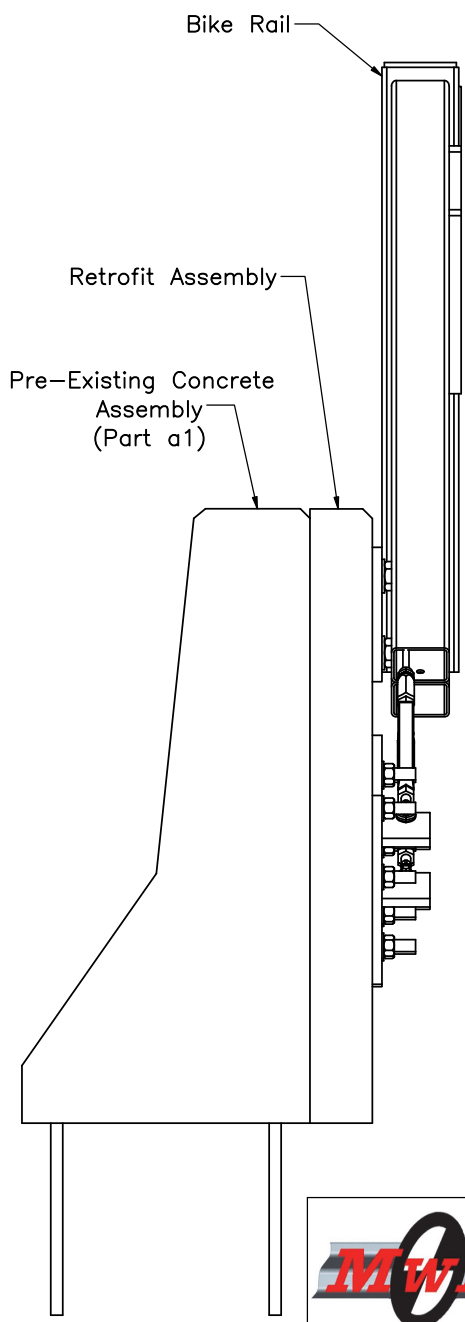
DATE:
10/26/2020

DRAWN BY:
JRF/JRD/SB
W/JEK/MJM

REV. BY:
JEK/MH/JC
H/RKF



SECTION A-A



PROFILE VIEW

Note: (1) Steel reinforcement not shown in profile view for clarity.



Midwest Roadside Safety Facility

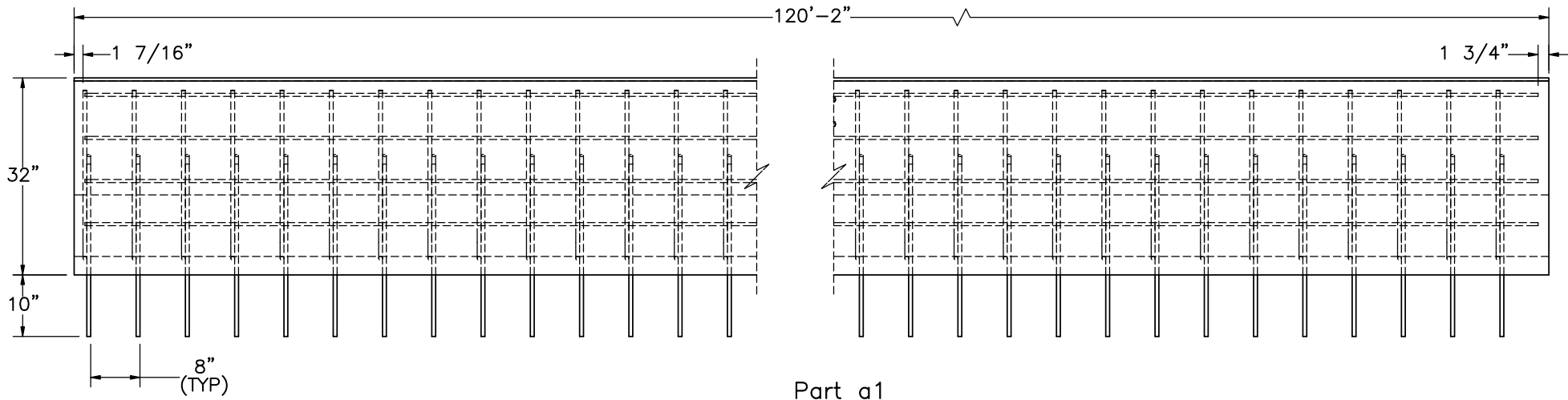
MNDOT Bike Rail Retrofit
Test Series MNPD

Profile Detail

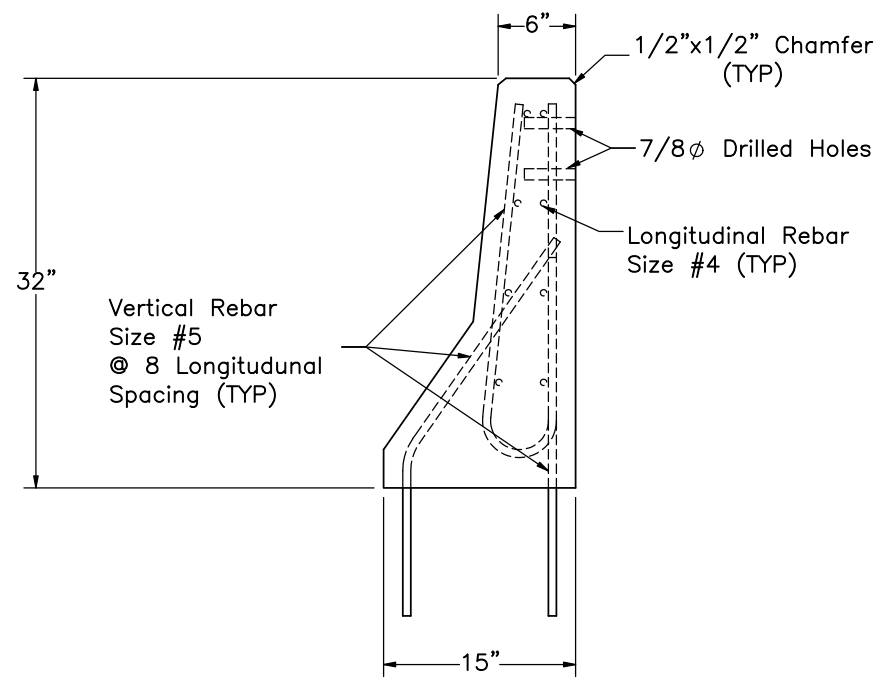
DWG. NAME.
MNPD-3_R20

SCALE: 1:10
UNITS: in.

SHEET:
2 of 25
DATE:
10/26/2020
DRAWN BY:
JRF/JRD/SB
W/JEK/MJM
REV. BY:
JEK/MH/JC
H/RKF



Part a1
ELEVATION VIEW



PROFILE VIEW
SCALE 1:10



Midwest Roadside
Safety Facility

MNDOT Bike Rail Retrofit
Test Series MNPD

Pre-Existing Concrete Parapet
Assembly

DWG. NAME: MNPD-3_R20

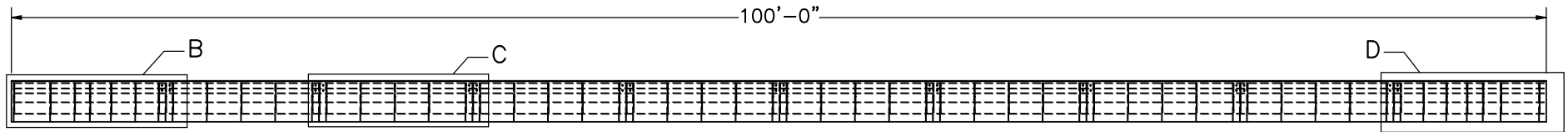
SHEET:
3 of 25

DATE:
10/26/2020

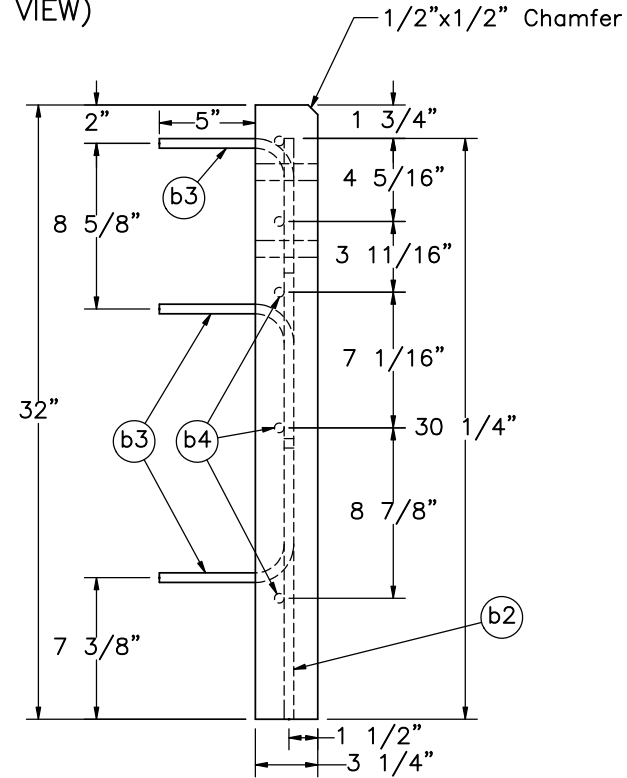
DRAWN BY:
JRF/JRD/SB
W/JEK/MJM

REV. BY:
JEK/MH/JC
H/RKF

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UNITS: in.



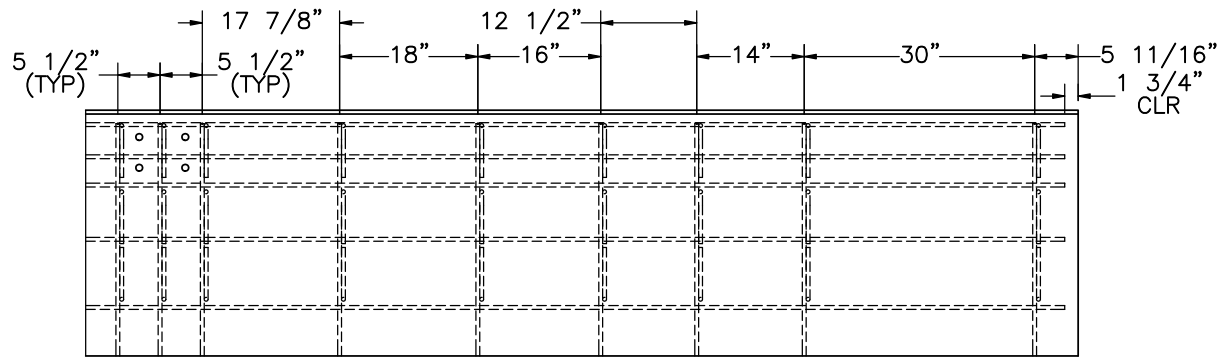
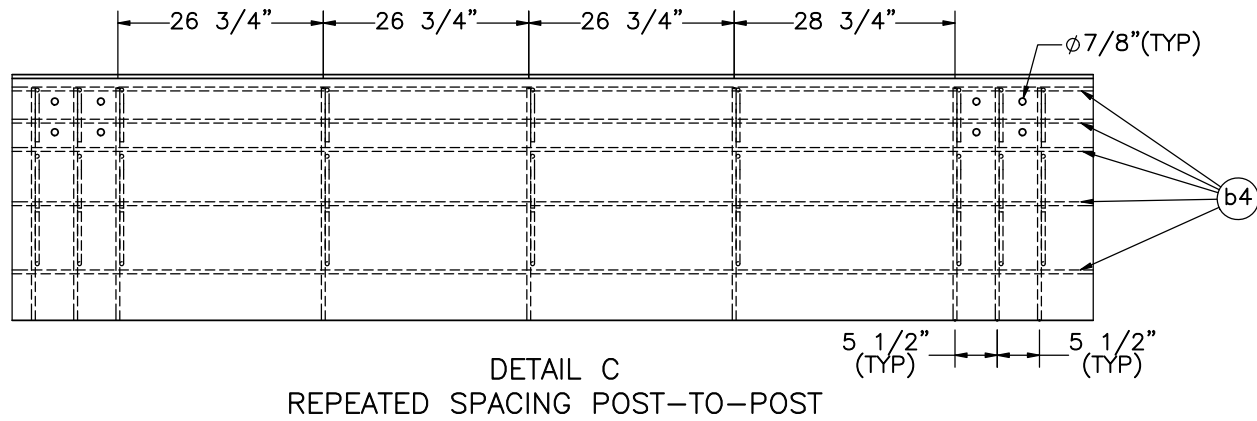
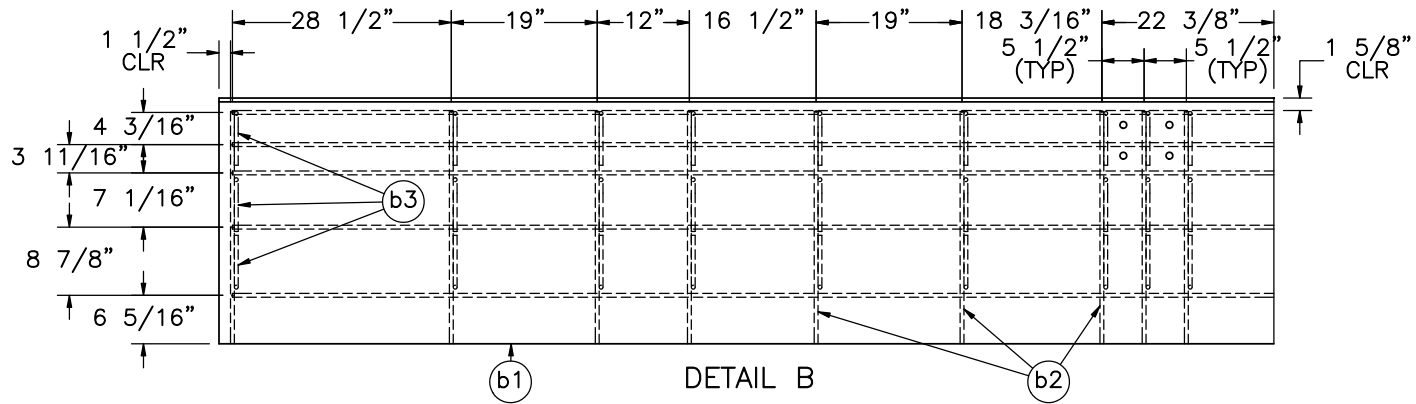
ELEVATION VIEW
(BACKSIDE VIEW)



PROFILE VIEW
SCALE 1:10

Item No.	QTY.	Description	Material Specification	Treatment Specification
-	1	Retrofit Assembly	-	-
b1	1	Concrete for Retrofit	5,000 psi minimum	-
b2	63	#4 Bar, 30 1/4" Total Length	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775)
b3	189	#4 Bar, 12 3/4" Total Unbent Length	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775)
b4	5	#4 Bar, 1196 1/2" Total Length	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775)

Midwest Roadside Safety Facility	MNDOT Bike Rail Retrofit Test Series MNPD		SHEET: 4 of 25
			DATE: 10/26/2020
		Retrofit Assembly	DRAWN BY: JRF/JRD/SB W/JEK/MJM
DWG. NAME: MNPD-3_R20		SCALE: 1:125 UNITS: in.	REV. BY: JEK/MH/JC H/RKF



Note: (1) 12" minimum longitudinal lap length.

DETAIL D



Midwest Roadside
Safety Facility

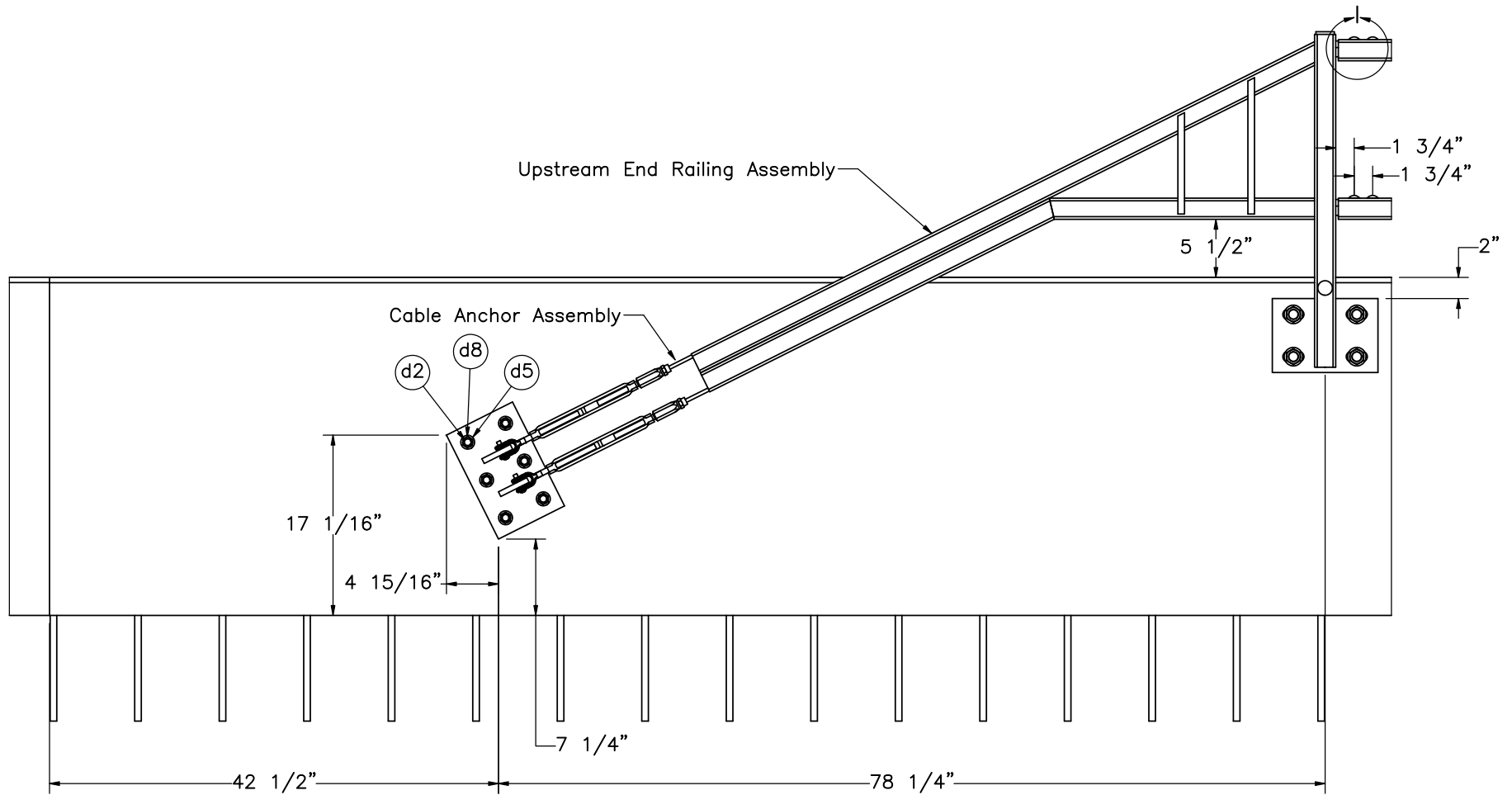
MNDOT Bike Rail Retrofit
Test Series MNPD

Retrofit Details

DWG. NAME:
MNPD-3_R20

SCALE: 1:25
UNITS: in.

SHEET:
5 of 25
DATE:
10/26/2020
DRAWN BY:
JRF/JRD/SB
W/JEK/MJM
REV. BY:
JEK/MH/JC
H/RKF



DETAIL E

- Note: (1) At each cable anchor bolt: 5" minimum embedment, and torque to 30 ft-lb.
- (2) Provide an adhesive with a minimum characteristic bond strength in uncracked concrete of 1.5 ksi. Embed the anchorage no less than embedment shown regardless of characteristic bond strength. Drill through reinforcement (if encountered) to achieve minimum embedment. Ensure hex nut is in contact with the adjacent surface and torque to value specified unless a higher torque is recommended by the manufacturer.



Midwest Roadside Safety Facility

MNDOT Bike Rail Retrofit
Test Series MNPD

Upstream End Rail Details

DWG. NAME:
MNPD-3_R20

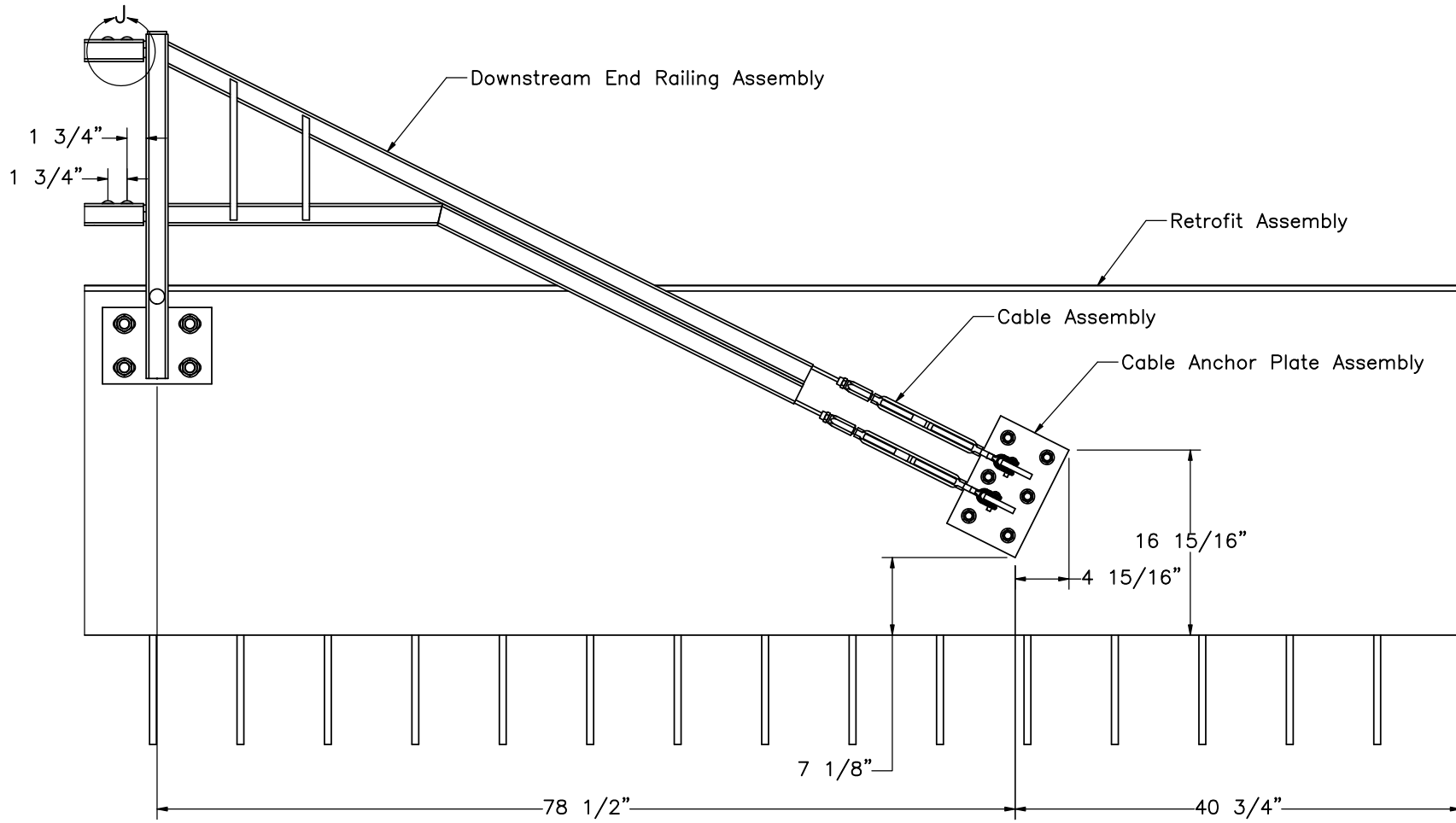
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UNITS: in.

SHEET:
6 of 25

DATE:
10/26/2020

DRAWN BY:
JRF/JRD/SB
W/JEK/MJM

REV. BY:
JEK/MH/JC
H/RKF



DETAIL F

- Note: (1) At each cable anchor bolt: 5" minimum embedment, and torque to 30 ft-lb.
- (2) Provide an adhesive with a minimum characteristic bond strength in uncracked concrete of 1.5 ksi. Embed the anchorage no less than embedment shown regardless of characteristic bond strength. Drill through reinforcement (if encountered) to achieve minimum embedment. Ensure hex nut is in contact with the adjacent surface and torque to value specified unless a higher torque is recommended by the manufacturer.



MNDOT Bike Rail Retrofit
Test Series MNPD

Downstream End Rail Details

DWG. NAME: MNPD-3_R20

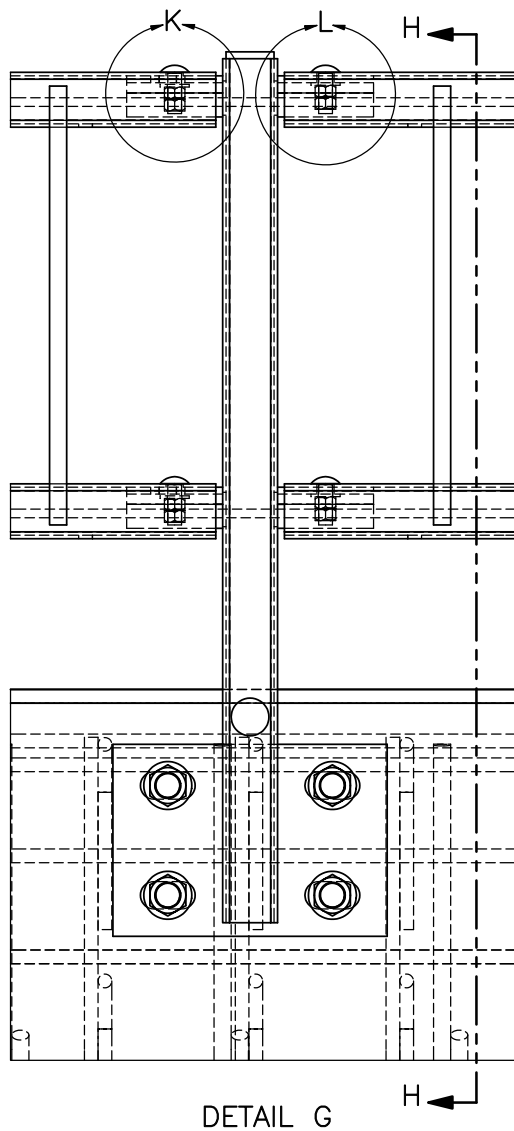
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UNITS: in.

SHEET: 7 of 25

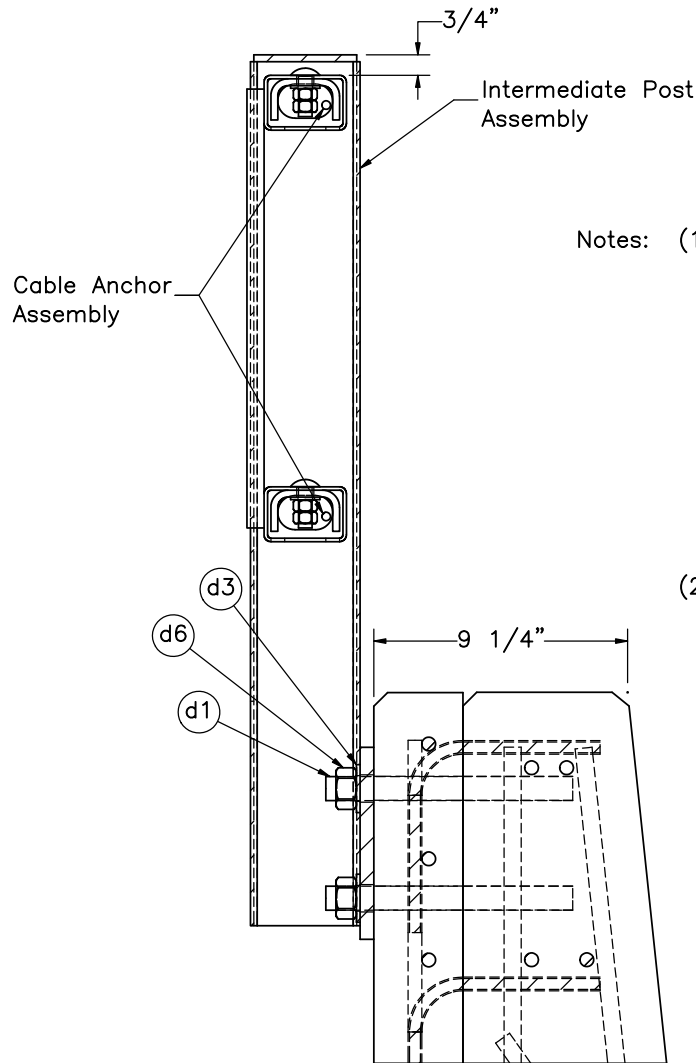
DATE: 10/26/2020

DRAWN BY: JRF/JRD/SBW/JEK/MJM

REV. BY: JEK/MH/JC H/RKF



DETAIL G



SECTION H-H

- Notes: (1) Provide an adhesive with a minimum characteristic bond strength in uncracked concrete of 1.5 ksi. Embed the anchorage no less than embedment shown regardless of characteristic bond strength. Drill through reinforcement (if encountered) to achieve minimum embedment. Ensure hex nut is in contact with the adjacent surface and torque to value specified unless a higher torque is recommended by the manufacturer.
- (2) At each post anchor: 7 1/4" minimum embedment, and torque to 80 ft-lb.



Midwest Roadside
Safety Facility

MNDOT Bike Rail Retrofit
Test Series MNPD

Rail Post Details

DWG. NAME:
MNPD-3_R20

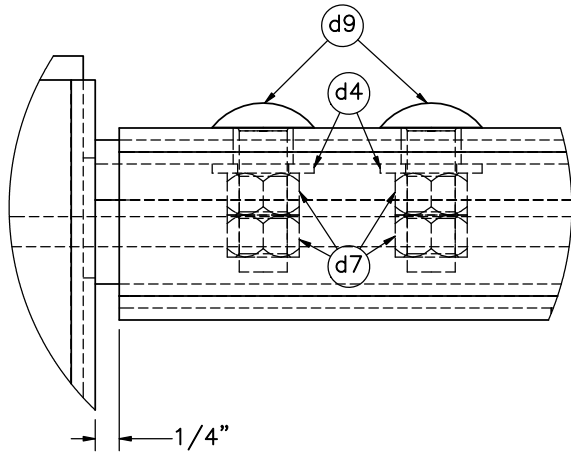
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SHEET:
8 of 25

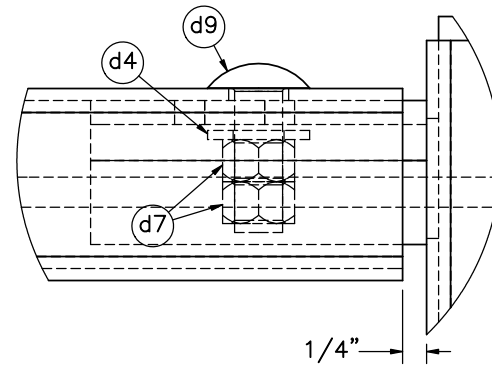
DATE:
10/26/2020

DRAWN BY:
JRF/JRD/SB
W/JEK/MJM

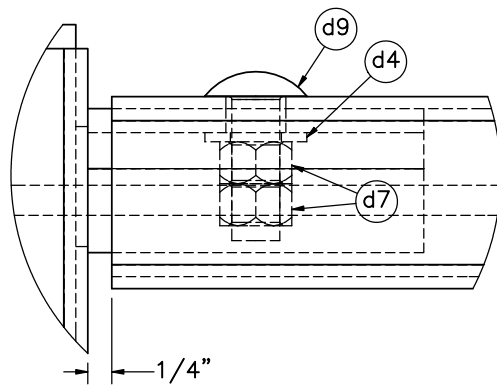
REV. BY:
JEK/MH/JC
H/RKF



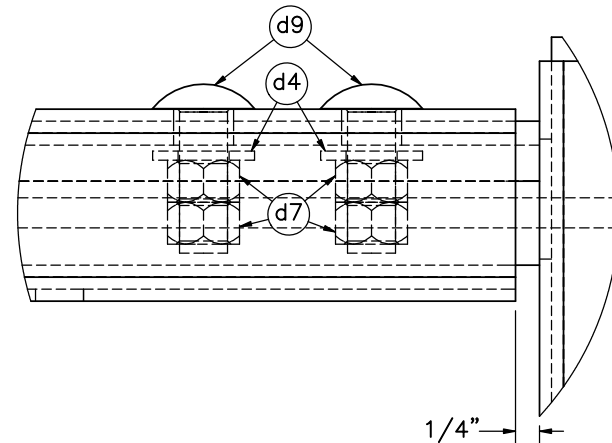
DETAIL I
UPSTREAM END RAIL-POST ONLY



DETAIL K
TYPICAL FOR ALL EXPANSION/UPSTREAM ENDS



DETAIL L
TYPICAL FOR ALL FIXED ENDS
(DOWNSTREAM ENDS EXCEPT LOCATION OF DETAIL I)



DETAIL J
DOWNSTREAM END RAIL-POST ONLY

- Notes: (1) At expansion end provide 1/16 in. gap between underside of bent plate and upper nut to allow lateral movement of the rail.
 (2) Dome head bolts may have a flat head key in center region, heads, or flattened sides sufficient for an open-end wrench to sufficiently reduce snagging on the heads. If flattened sides are used, use a washer under the reduced head size.



Midwest Roadside
Safety Facility

MNDOT Bike Rail Retrofit
Test Series MNPD

Rail-Post Connection Details

DWG. NAME:
MNPD-3_R20

SCALE: 1:2
UNITS: in.

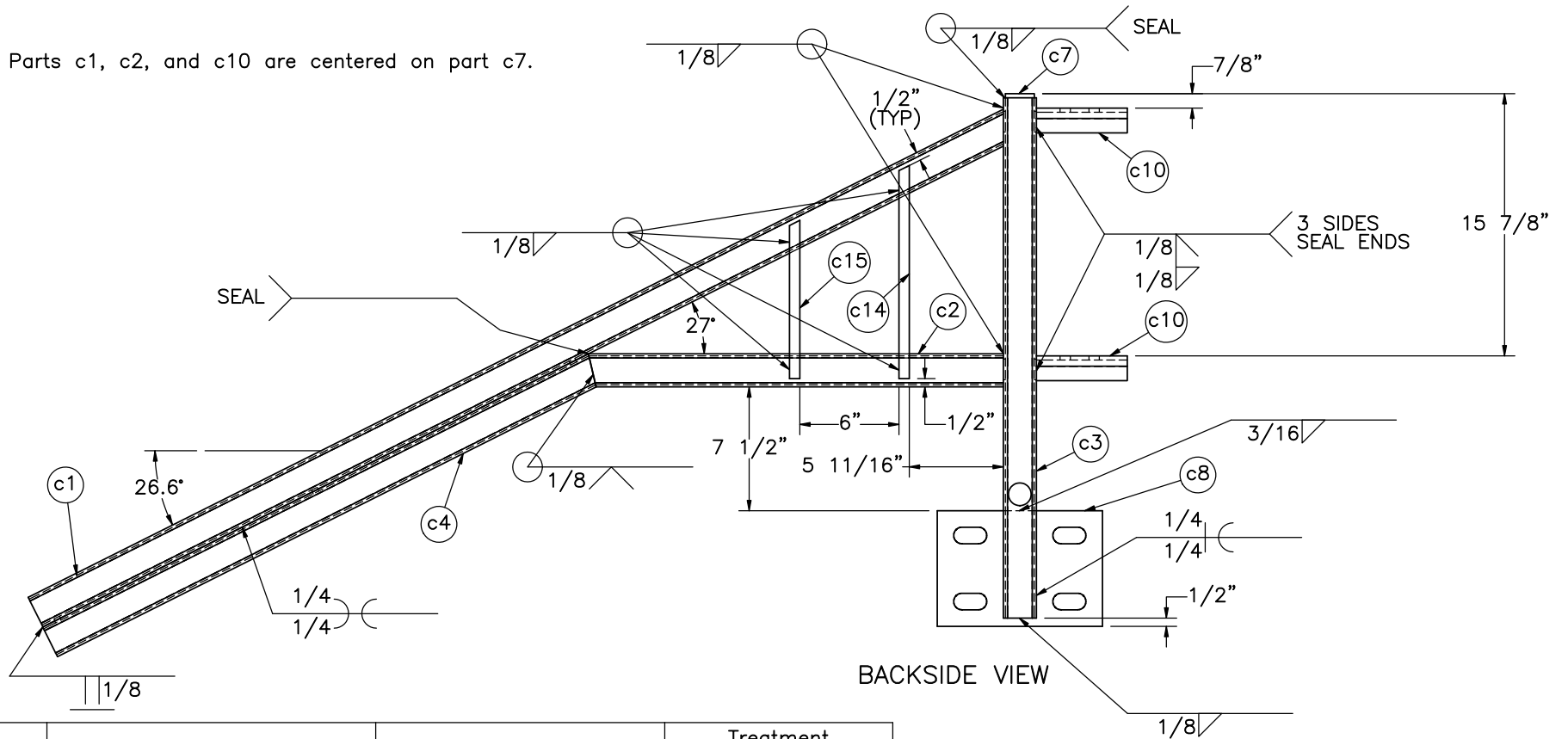
SHEET:
9 of 25

DATE:
10/26/2020

DRAWN BY:
JRF/JRD/SB
W/JEK/MJM

REV. BY:
JEK/MH/JC
H/RKF

Note: Parts c1, c2, and c10 are centered on part c7.



Item No.	QTY.	Description	Material Specification	Treatment Specification
-	1	Upstream Railing Assembly	-	ASTM A123
c1	1	HSS3"x2"x1/8", 66" Long Angled Rail Tube	ASTM A500 Gr. B	See Assembly
c2	1	HSS3"x2"x1/8", 25 1/8" Long Angled Rail Tube	ASTM A500 Gr. B	See Assembly
c3	1	HSS4"x2"x1/8", 31 1/2" Post	ASTM A500 Gr. B	See Assembly
c4	1	HSS3"x2"x1/8", 36 15/16" Long Angled Rail Tube	ASTM A500 Gr. B	See Assembly
c7	1	3 3/4"x1 3/4"x1/4" Rail Top Plate	ASTM A709 Gr. 36	See Assembly
c8	1	10"x7"x1/2" Post Mounting Plate	ASTM A709 Gr. 36	See Assembly
c10	2	5 1/2"x4 9/16"x1/4" Post Attachment Bent Plate	ASTM A709 Gr. 36	See Assembly
c14	1	12 7/8"x5/8"x5/8" Long Spindle	ASTM A709 Gr. 36	See Assembly
c15	1	9 9/16"x5/8"x5/8" Long Spindle	ASTM A709 Gr. 36	See Assembly



Midwest Roadside Safety Facility

MNDOT Bike Rail Retrofit Test Series MNPD

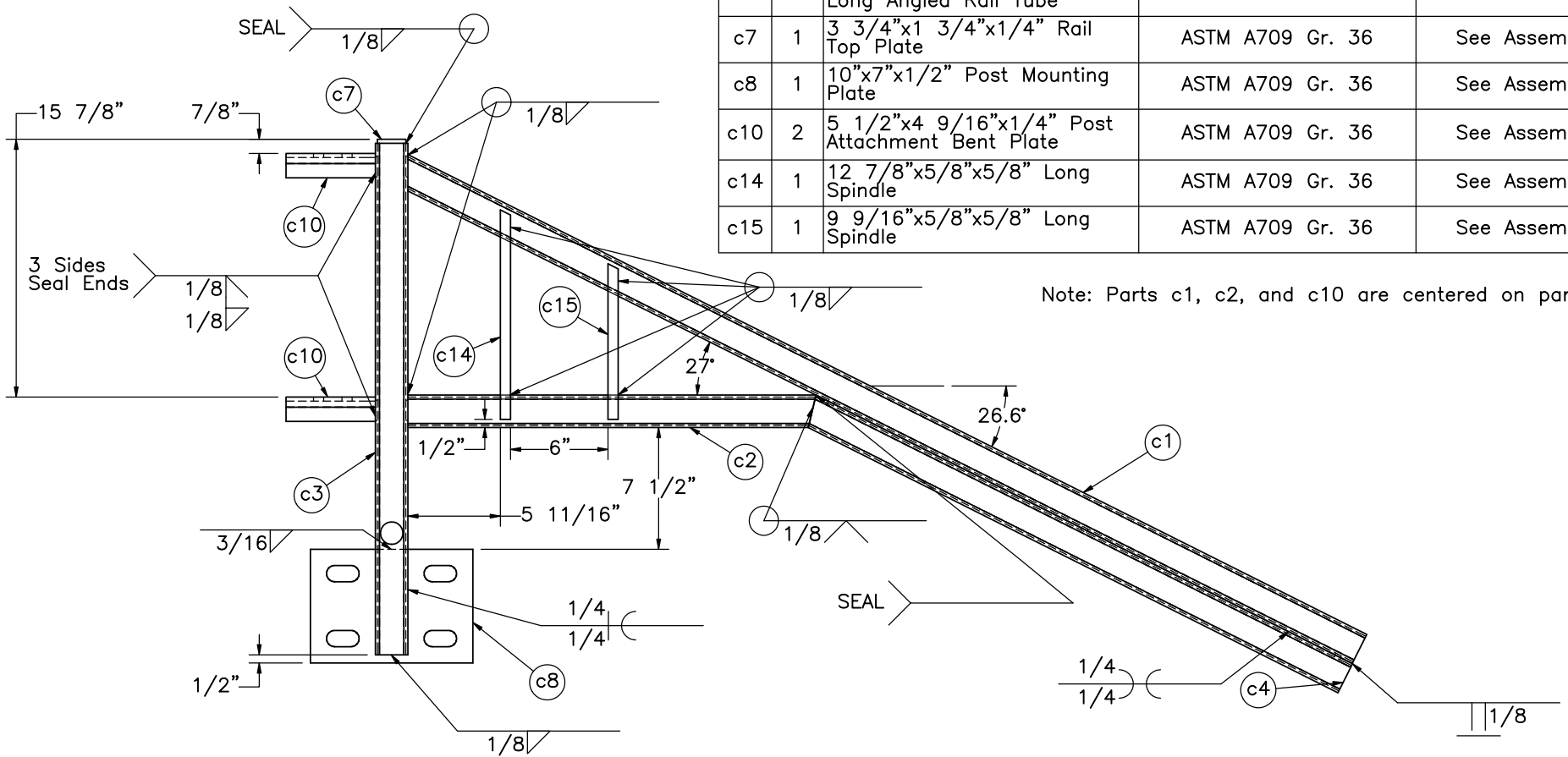
Upstream Railing Assembly

DWG. NAME:
MNPD-3_R20

SCALE: 1:10
UNITS: in.

SHEET:
10 of 25
DATE:
10/26/2020
DRAWN BY:
JRF/JRD/SB
W/JEK/MJM
REV. BY:
JEK/MH/JC
H/RKF

Item No.	QTY.	Description	Material Specification	Treatment Specification
-	1	Downstream Railing Assembly	-	ASTM A123
c1	1	HSS3"x2"x1/8", 66" Long Angled Rail Tube	ASTM A500 Gr. B	See Assembly
c2	1	HSS3"x2"x1/8", 25 1/8" Long Angled Rail Tube	ASTM A500 Gr. B	See Assembly
c3	1	HSS4"x2"x1/8", 31 1/2" Post	ASTM A500 Gr. B	See Assembly
c4	1	HSS3"x2"x1/8", 36 15/16" Long Angled Rail Tube	ASTM A500 Gr. B	See Assembly
c7	1	3 3/4"x1 3/4"x1/4" Rail Top Plate	ASTM A709 Gr. 36	See Assembly
c8	1	10"x7"x1/2" Post Mounting Plate	ASTM A709 Gr. 36	See Assembly
c10	2	5 1/2"x4 9/16"x1/4" Post Attachment Bent Plate	ASTM A709 Gr. 36	See Assembly
c14	1	12 7/8"x5/8"x5/8" Long Spindle	ASTM A709 Gr. 36	See Assembly
c15	1	9 9/16"x5/8"x5/8" Long Spindle	ASTM A709 Gr. 36	See Assembly



Note: Parts c1, c2, and c10 are centered on part c7.

BACKSIDE VIEW



Midwest Roadside
Safety Facility

MNDOT Bike Rail Retrofit
Test Series MNPD

Downstream Railing Details

DWG. NAME.
MNPD-3_R20

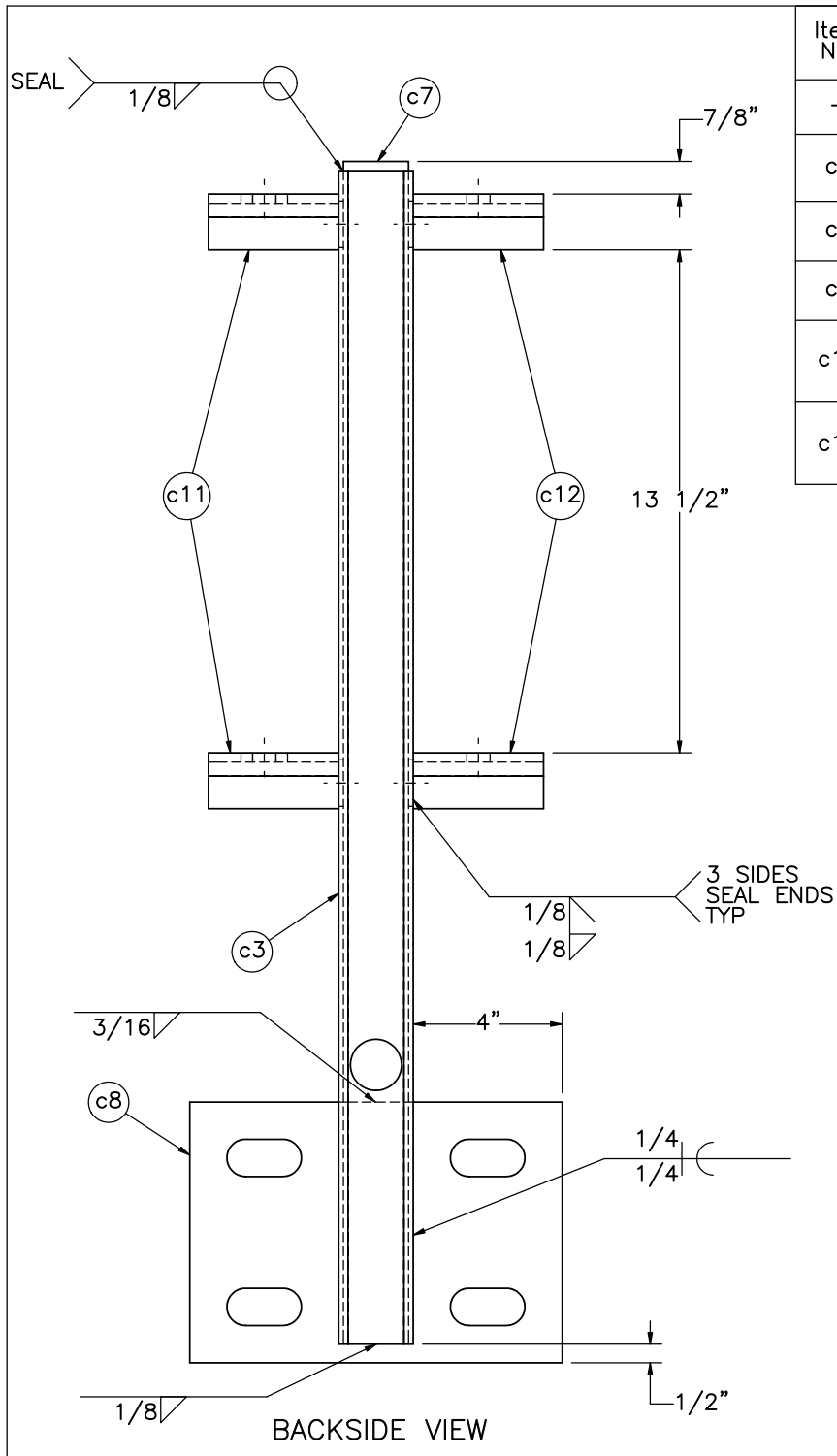
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SHEET:
11 of 25

DATE:
10/26/2020

DRAWN BY:
JRF/JRD/SB
W/JEK/MJM

REV. BY:
JEK/MH/JC
H/RKF



Item No.	QTY.	Description	Material Specification	Treatment Specification
-	9	Intermediate Rail Post Assembly	-	ASTM A123
c3	1	HSS4"x2"x1/8", 31 1/2" Post	ASTM A500 Gr. B	See Assembly
c7	1	3 3/4"x1 3/4"x1/4" Rail Top Plate	ASTM A709 Gr. 36	See Assembly
c8	1	10"x7"x1/2" Post Mounting Plate	ASTM A709 Gr. 36	See Assembly
c11	2	3 1/2"x4 9/16"x1/4" Post Attachment Bent Plate-Expansion End	ASTM A709 Gr. 36	See Assembly
c12	2	3 1/2"x4 9/16"x1/4" Post Attachment Bent Plate-Fixed End	ASTM A709 Gr. 36	ASTM A123

Note: Parts c11 and c12 are centered on part c7.



Midwest Roadside
Safety Facility

MNDOT Bike Rail Retrofit
Test Series MNPD

Intermediate Post Assembly

DWG. NAME.
MNPD-3_R20

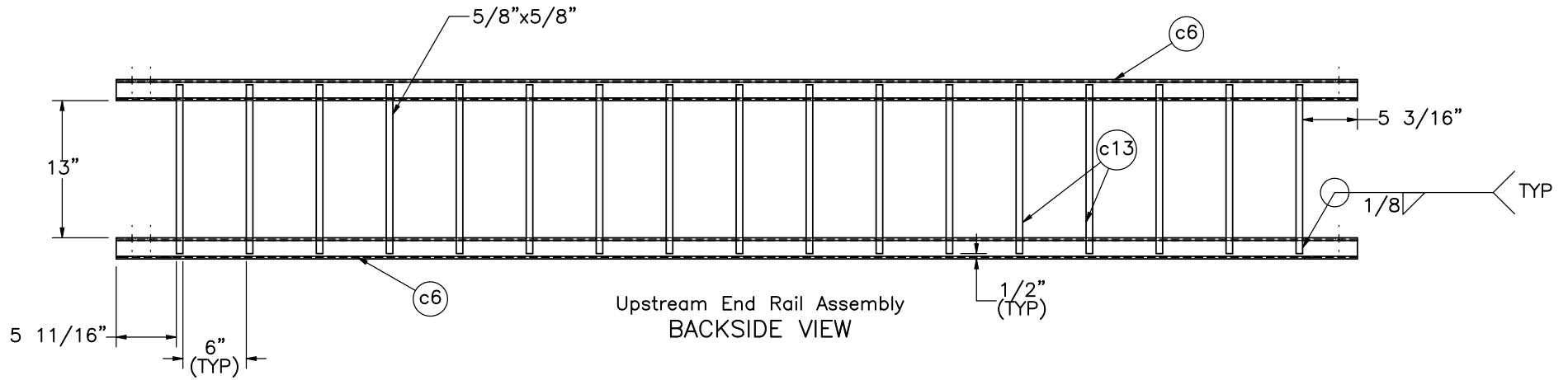
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SHEET:
12 of 25

DATE:
10/26/2020

DRAWN BY:
JRF/JRD/SB
W/JEK/MJM

REV. BY:
JEK/MH/JC
H/RKF



Item No.	QTY.	Description	Material Specification	Treatment Specification
-	1	Upstream End Rail Assembly	-	ASTM A123
c6	2	HSS3"x2"x1/8", 117 1/2" Long Endrail Tube	ASTM A500 Gr. B	See Assembly
c13	17	16"x5/8"x5/8" Long Rail Spindle	ASTM A709 Gr. 36	See Assembly



Midwest Roadside
Safety Facility

MNDOT Bike Rail Retrofit
Test Series MNPD

Upstream End Rail Assembly

DWG. NAME.
MNPD-3_R20

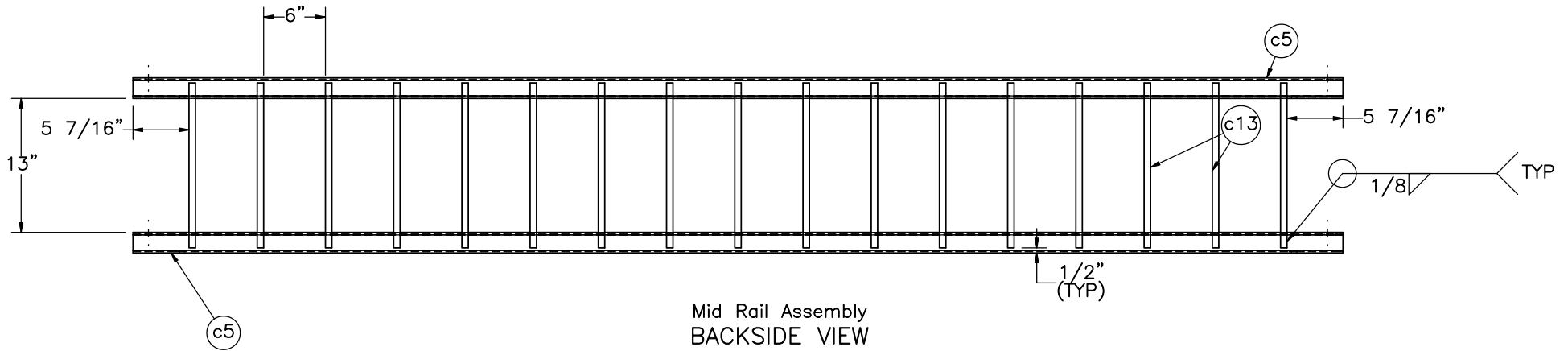
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13 of 25

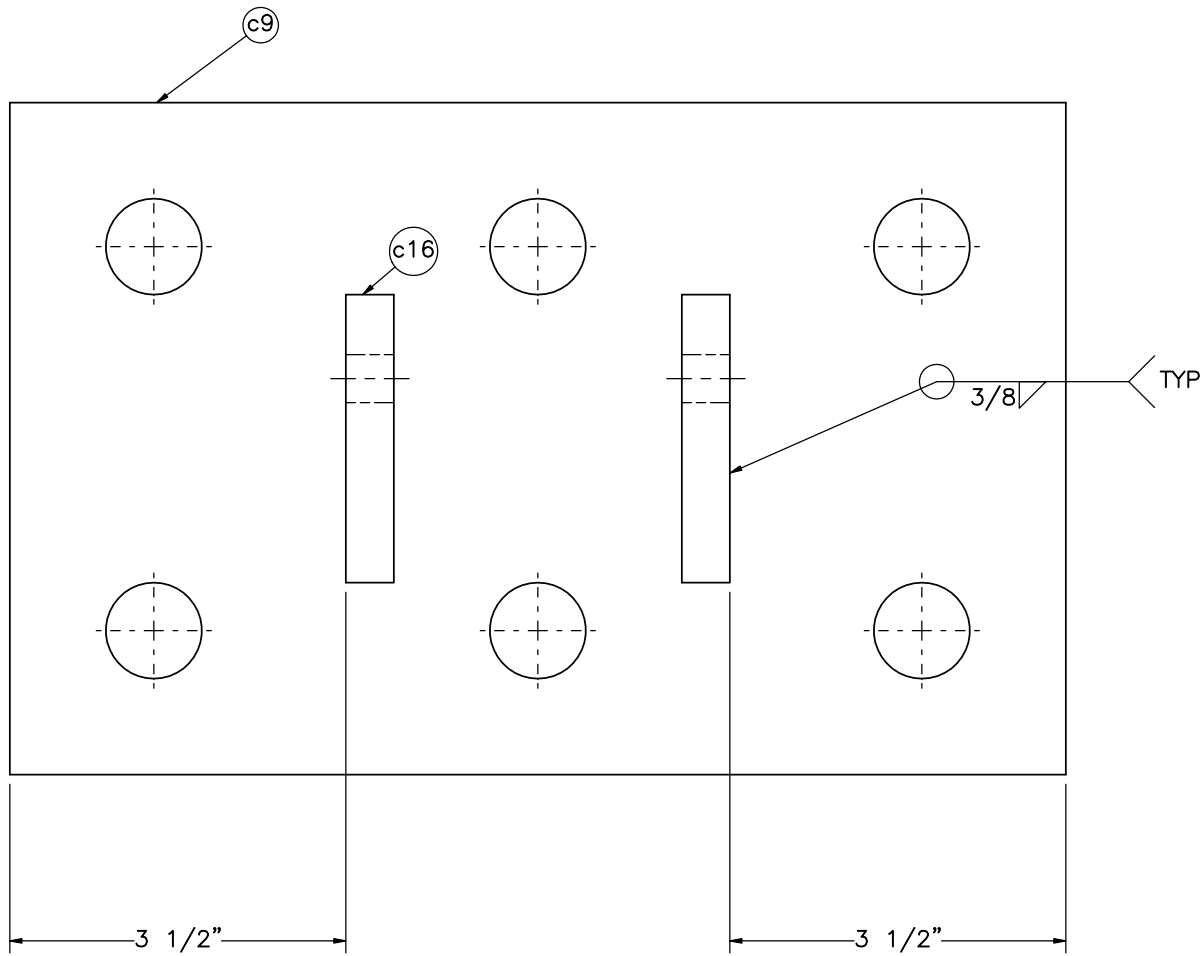
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10/26/2020

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W/JEK/MJM

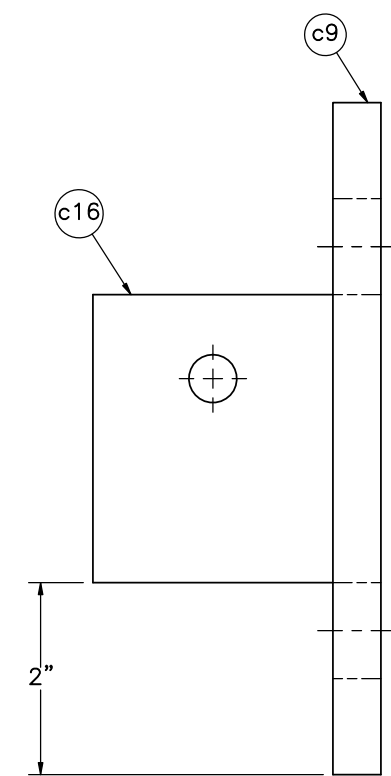
REV. BY:
JEK/MH/JC
H/RKF



Item No.	QTY.	Description	Material Specification	Treatment Specification	 Midwest Roadside Safety Facility	MNDOT Bike Rail Retrofit Test Series MNPD	SHEET: 14 of 25
-	7	Mid Rail Assembly	-	ASTM A123			
c5	2	HSS3"x2"x1/8", 117 1/2" Long Rail Tube	ASTM A500 Gr. B	See Assembly		Mid Rail Assembly	DRAWN BY: JRF/JRD/SB W/JEK/MJM
c13	17	16"x5/8"x5/8" Long Rail Spindle	ASTM A709 Gr. 36	See Assembly		DWG. NAME: MNPD-3_R20	SCALE: 1:15 UNITS: in. REV. BY: JEK/MH/JC H/RKF



BACKSIDE ELEVATION VIEW



PROFILE VIEW

Item No.	QTY.	Description	Material Specification	Treatment Specification
-	2	Cable Anchor Plate Assembly	-	ASTM A123
c9	1	7"x11"x1/2" Cable Anchor Plate	ASTM A709 Gr. 36	See Assembly
c16	2	3"x2 1/2"x1/2" Cable Anchor Plate Flange	ASTM A709 Gr. 36	See Assembly



Midwest Roadside Safety Facility

MNDOT Bike Rail Retrofit
Test Series MNPD

Cable Anchor Plate Assembly

DWG. NAME: MNPD-3_R20

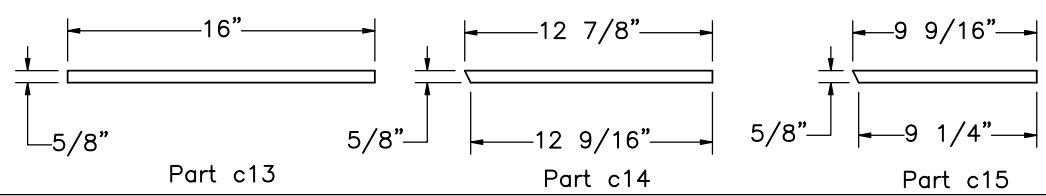
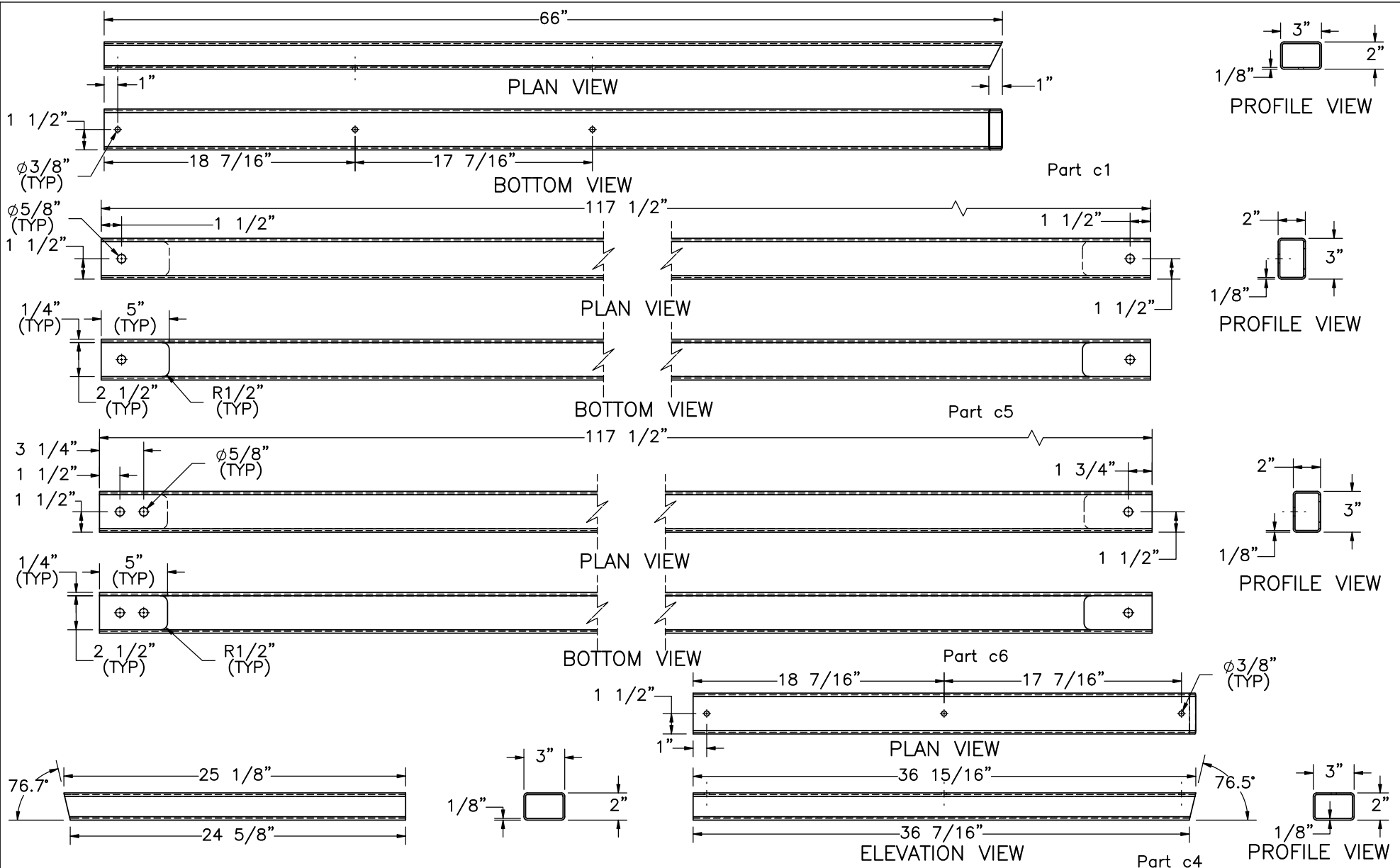
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UNITS: in.

SHEET: 15 of 25

DATE: 10/26/2020

DRAWN BY: JRF/JRD/SBW/JEK/MJM

REV. BY: JEK/MH/JCH/RKF



Midwest Roadside Safety Facility

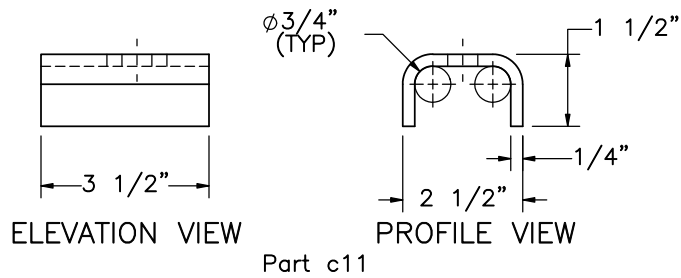
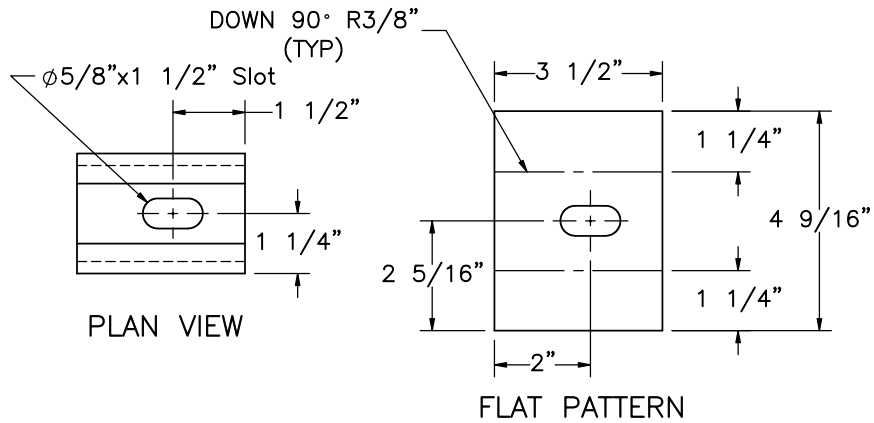
MNDOT Bike Rail Retrofit
Test Series MNPD

Rail Components

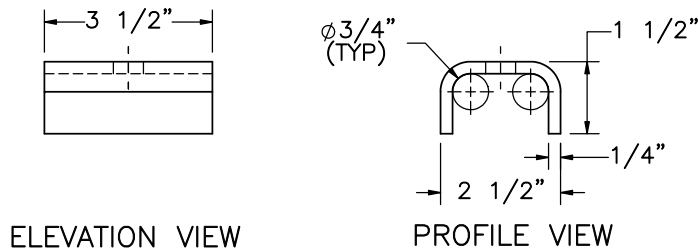
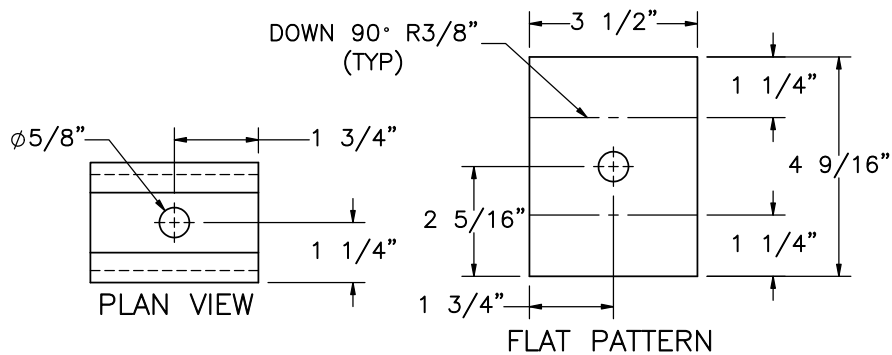
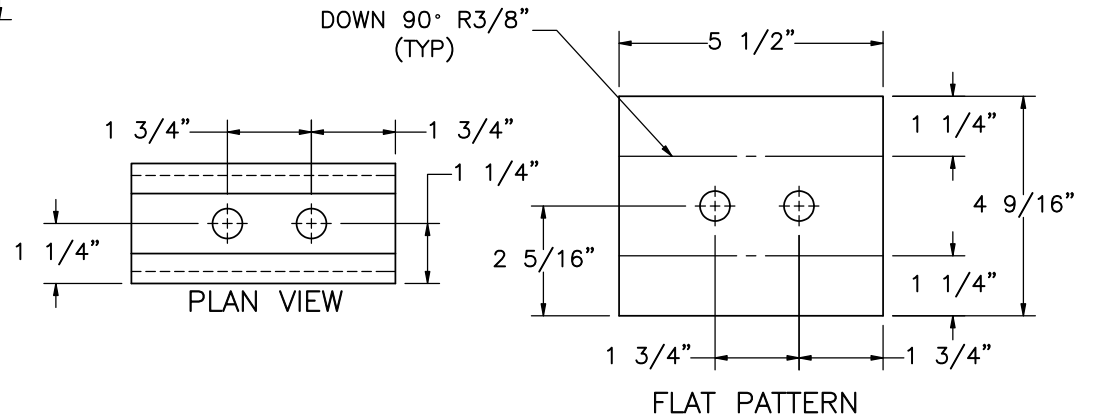
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MNPD-3_R20

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SHEET:
16 of 25
DATE:
10/26/2020
DRAWN BY:
JRF/JRD/SB
W/JEK/MJM
REV. BY:
JEK/MH/JC
H/RKF



Part c11



Part c12

Part c10



Midwest Roadside Safety Facility

MNDOT Bike Rail Retrofit Test Series MNPD

Rail Components

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MNPD-3_R20

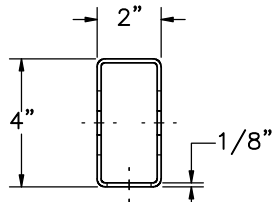
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SHEET:
17 of 25

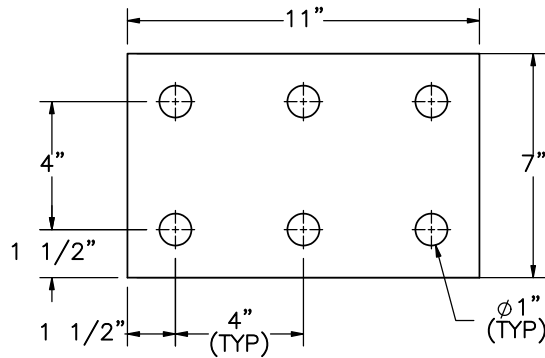
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10/26/2020

DRAWN BY:
JRF/JRD/SB
W/JEK/MJM

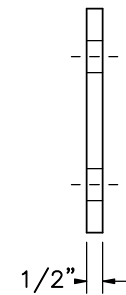
REV. BY:
JEK/MH/JC
H/RKF



PLAN VIEW

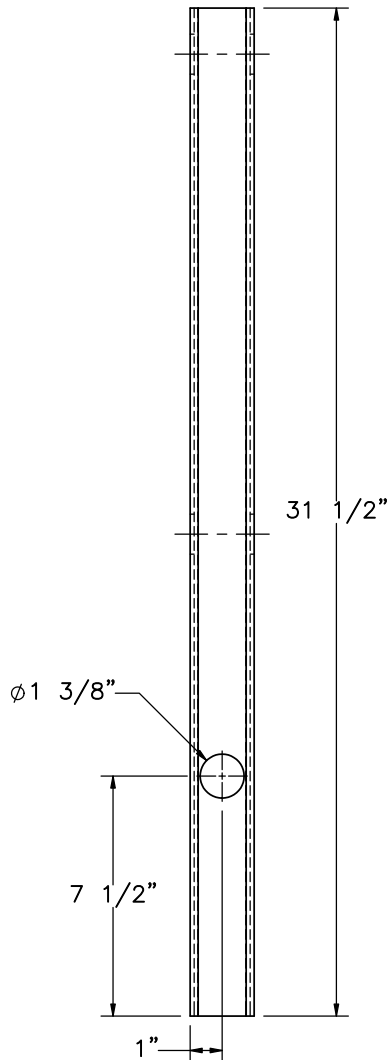


ELEVATION VIEW



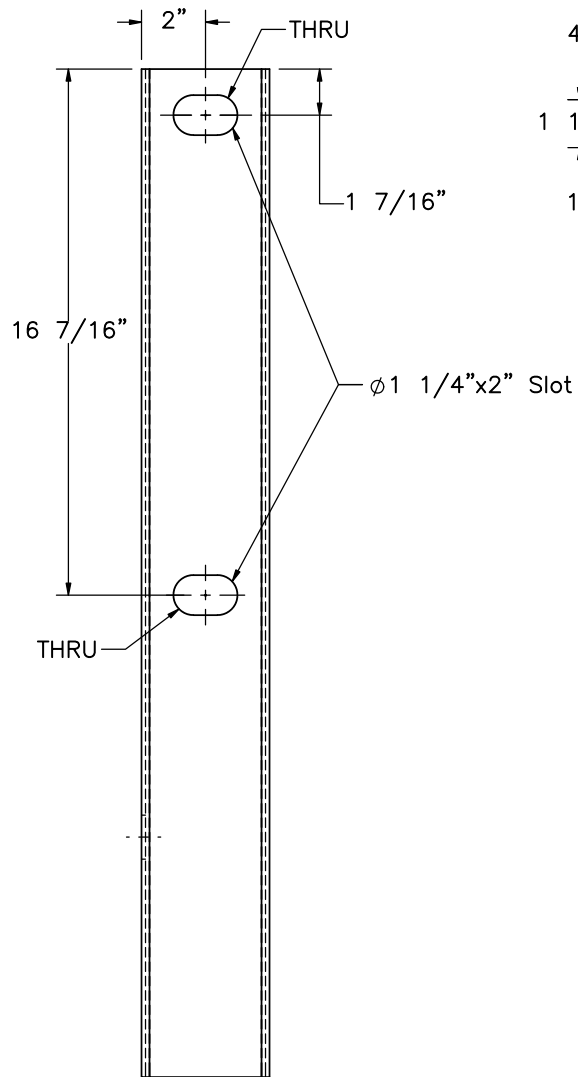
PROFILE VIEW

Part c9

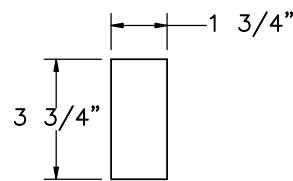


ELEVATION VIEW

Part c3



PROFILE VIEW



PLAN VIEW

Part c7



PROFILE VIEW



Midwest Roadside
Safety Facility

MNDOT Bike Rail Retrofit
Test Series MNPD

Post Components

DWG. NAME:
MNPD-3_R20

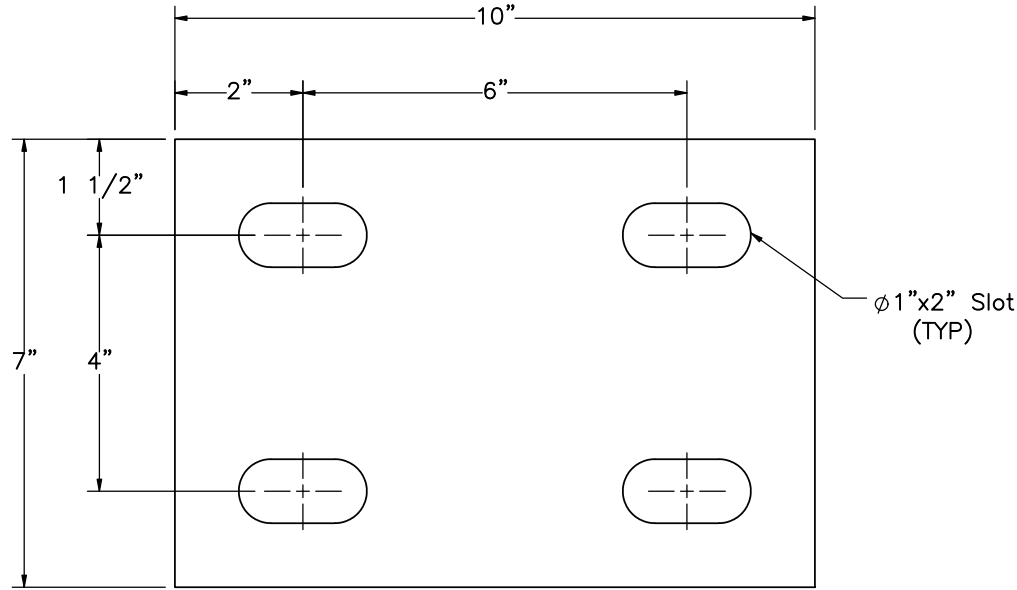
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SHEET:
18 of 25

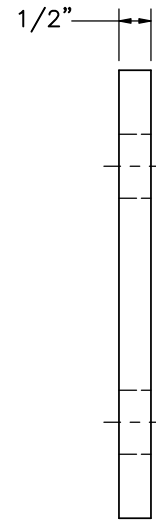
DATE:
10/26/2020

DRAWN BY:
JRF/JRD/SB
W/JEK/MJM

REV. BY:
JEK/MH/JC
H/RKF

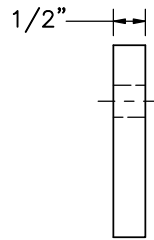


ELEVATION VIEW

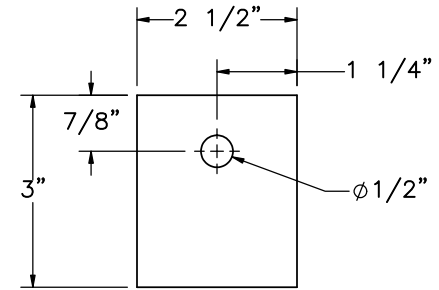


PROFILE VIEW

Part c8



ELEVATION VIEW



PROFILE VIEW

Part c16



Midwest Roadside Safety Facility

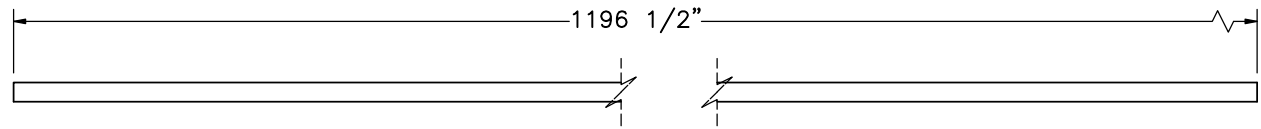
MNDOT Bike Rail Retrofit Test Series MNPD

Cable Anchor Components

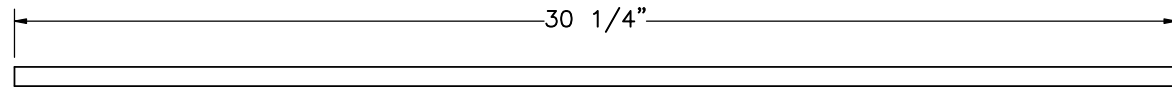
DWG. NAME:
MNPD-3_R20

SCALE: 1:3
UNITS: in.

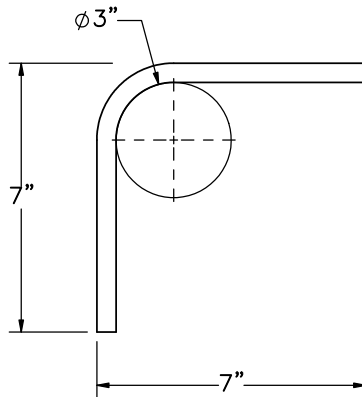
SHEET:
19 of 25
DATE:
10/26/2020
DRAWN BY:
JRF/JRD/SB
W/JEK/MJM
REV. BY:
JEK/MH/JC
H/RKF



Part b4



Part b2



Part b3

Bar	QTY.	Size	Total Unbent Length	Material Specification	Treatment Specification
b2	63	#4	30 1/4"	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775)
b3	189	#4	12 3/4"	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775)
b4	5	#4	1196 1/2"	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775)



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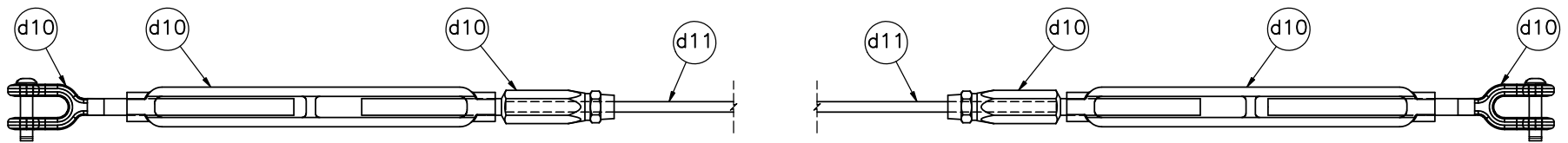
MNDOT Bike Rail Retrofit
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System Rebar

DWG. NAME:
MNPD-3_R20


SCALE: 1:5
UNITS: in.

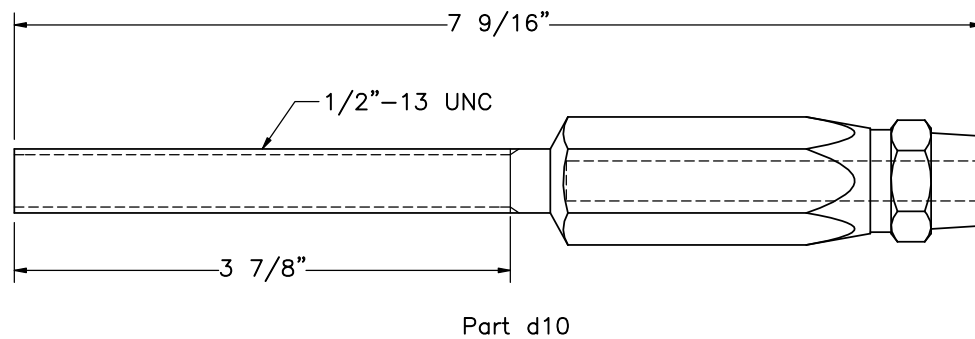
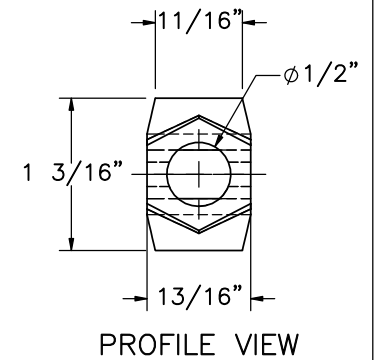
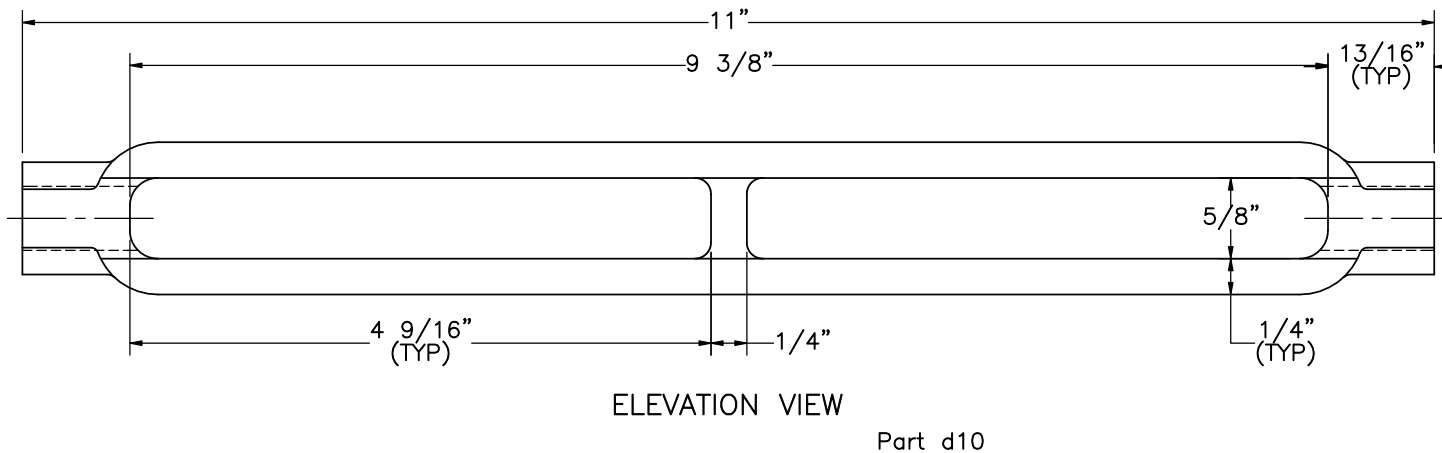
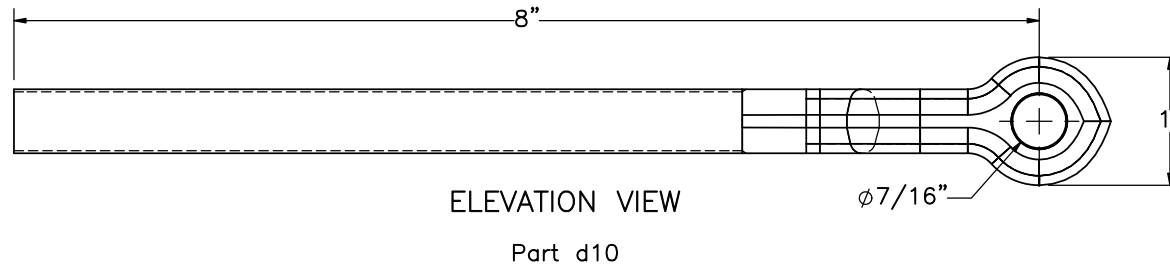
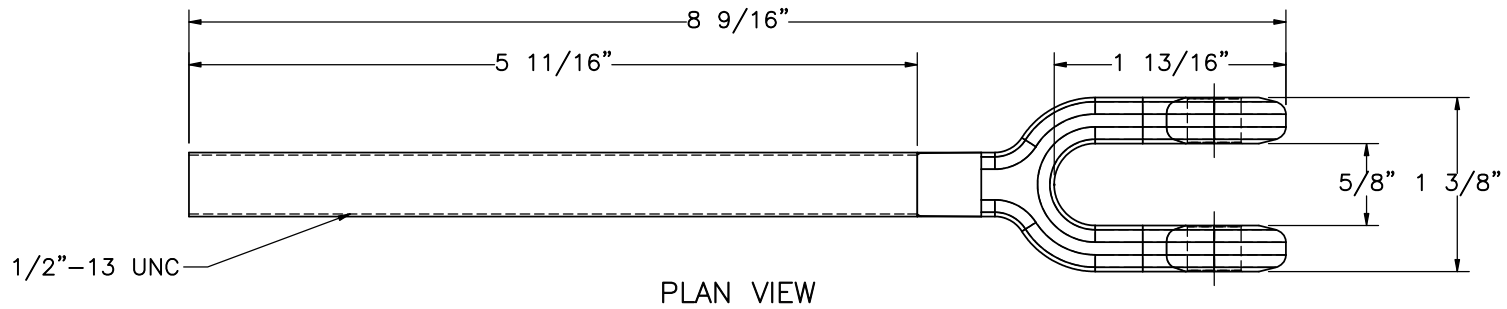
SHEET:
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ELEVATION VIEW

Note: (1) For all turnbuckles, hand tighten firmly to remove all slack from cable

Item No.	QTY.	Description	Material Specification	Treatment Specification	 Midwest Roadside Safety Facility	MNDOT Bike Rail Retrofit Test Series MNPD		SHEET: 21 of 25
-	2	Cable Assembly	-					DATE: 10/26/2020
d10	2	Electroline XD-4031-BX Forged Series Open Body Clevis and Socket Turnbuckle	ASTM F1145 Type 1 Gr. 1 Min. Breaking Strength 9,160 lbs	ASTM A153		Cable Assembly	DRAWN BY: JRF/JRD/SBW/JEK/MJM	
d11	1	5/16" Dia. 7x19 FC Wire Rope	ASTM A1023 Table 7 EIP MIN Breaking Strength 9800	ASTM A1007		DWG. NAME: MNPD-3_R20	SCALE: 1:5 UNITS: in.	REV. BY: JEK/MH/JC H/RKF



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Safety Facility

MNDOT Bike Rail Retrofit
Test Series MNPD

Cable Components

DWG. NAME:
MNPD-3_R20

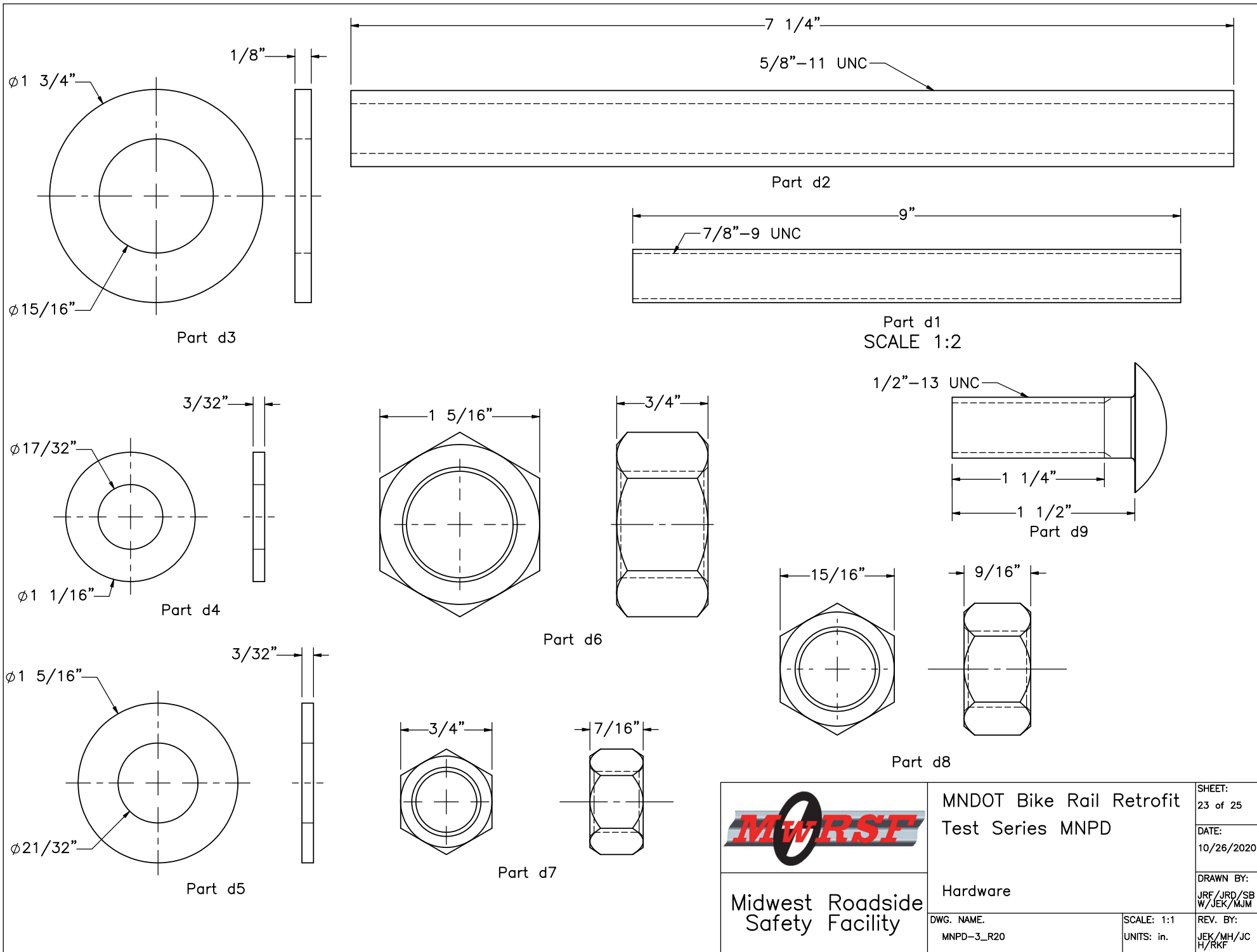
SCALE: 2:3
UNITS: in.

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DRAWN BY:
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Part d1
SCALE 1:2

1/2"-13 UNC

Part d9

Part d8

Part d6

Part d7

Part d3

Part d4

Part d5



Midwest Roadside
Safety Facility

MNDOT Bike Rail Retrofit
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Hardware

DWG. NAME:
MNPD-3_R20

SCALE: 1:1
UNITS: in.

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DATE:
10/26/2020

DRAWN BY:
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REV. BY:
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Item No.	QTY.	Description	Material Specification	Treatment Specification	Hardware Guide
a1	1	Pre-existing Concrete Barrier	—	—	—
b1	1	Concrete for Retrofit	5,000 psi minimum	—	—
b2	63	#4 Bar, 30 1/4" Total Length	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775)	—
b3	189	#4 Bar, 12 3/4" Total Unbent Length	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775)	—
b4	5	#4 Bar, 1196 1/2" Total Length	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775)	—
c1	2	HSS3"x2"x1/8", 66" Long Angled Rail Tube	ASTM A500 Gr. B	See Assembly	—
c2	2	HSS3"x2"x1/8", 25 1/8" Long Angled Rail Tube	ASTM A500 Gr. B	See Assembly	—
c3	9	HSS4"x2"x1/8", 31 1/2" Post	ASTM A500 Gr. B	See Assembly	—
c4	2	HSS3"x2"x1/8", 36 15/16" Long Angled Rail Tube	ASTM A500 Gr. B	See Assembly	—
c5	12	HSS3"x2"x1/8", 117 1/2" Long Rail Tube	ASTM A500 Gr. B	See Assembly	—
c6	4	HSS3"x2"x1/8", 117 1/2" Long Endrail Tube	ASTM A500 Gr. B	See Assembly	—
c7	9	3 3/4"x1 3/4"x1/4" Rail Top Plate	ASTM A709 Gr. 36	See Assembly	—
c8	9	10"x7"x1/2" Post Mounting Plate	ASTM A709 Gr. 36	See Assembly	—
c9	2	7"x11"x1/2" Cable Anchor Plate	ASTM A709 Gr. 36	See Assembly	—
c10	4	5 1/2"x4 9/16"x1/4" Post Attachment Bent Plate	ASTM A709 Gr. 36	See Assembly	—
c11	14	3 1/2"x4 9/16"x1/4" Post Attachment Bent Plate-Expansion End	ASTM A709 Gr. 36	See Assembly	—
c12	14	3 1/2"x4 9/16"x1/4" Post Attachment Bent Plate-Fixed End	ASTM A709 Gr. 36	ASTM A123	—
c13	136	16"x5/8"x5/8" Long Rail Spindle	ASTM A709 Gr. 36	See Assembly	—
c14	2	12 7/8"x5/8"x5/8" Long Spindle	ASTM A709 Gr. 36	See Assembly	—
c15	2	9 9/16"x5/8"x5/8" Long Spindle	ASTM A709 Gr. 36	See Assembly	—
c16	4	3"x2 1/2"x1/2" Cable Anchor Plate Flange	ASTM A709 Gr. 36	See Assembly	—
d1	36	7/8"-9 UNC, 9" Long Threaded Rod	ASTM F1554 Gr. 36	ASTM A153 or B695 Class 55	—
d2	12	5/8"-11 UNC, 7 1/4" Long Threaded Rod	ASTM F1554 Gr. 36	ASTM A153 or B695 Class 55	—
d3	36	7/8" Dia. Hardened SAE Washer	ASTM F436	ASTM A153 or B695 Class 55	—
d4	36	1/2" Dia. Hardened SAE Washer	ASTM F436	ASTM A153 or B695 Class 55	—
d5	12	5/8" Dia. Hardened SAE Washer	ASTM F436	ASTM A153 or B695 Class 55	—
d6	36	7/8"-9 UNC Hex Nut	ASTM A563A	ASTM A153 or B695 Class 55	—
d7	72	1/2"-13 Jam Nut	ASTM A563A	ASTM A153 or B695 Class 55	—



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MNDOT Bike Rail Retrofit
Test Series MNPD

Bill of Materials

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MNPD-3_R20

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Item No.	QTY.	Description	Material Specification	Treatment Specification	Hardware Guide
d8	12	5/8"-9 UNC Hex Nut	ASTM A563A	ASTM A153 or B695 Class 55	-
d9	36	1/2"-13 UNC, 1 1/2" Long Round Head Bolt	ASTM A307 Gr. A	ASTM A153 or B695 Class 55	-
d10	4	Electroline XD-4031-BX Forged Series Open Body Clevis and Socket Turnbuckle	ASTM F1145 Type 1 Gr. 1 Min. Breaking Strength 9,160 lbs	ASTM A153	-
d11	4	5/16" Dia. 7x19 FC Wire Rope	ASTM A1023 Table 7 EIP MIN Breaking Strength 9800	ASTM A1007	-
f1	-	Chemical Epoxy	Min. Bond Strength (1.5 ksi)	-	-

	MNDOT Bike Rail Retrofit Test Series MNPD		SHEET: 25 of 25
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Midwest Roadside Safety Facility	Bill of Materials		DRAWN BY: JRF/JRD/SB W/JEK/MJM
	DWG. NAME: MNPD-3_R20	UNITS: in.	REV. BY: JEK/MH/JC H/RKF

REV.	DATE OF ISSUE	Page	NATURE OF CHANGES	REVIEWER	REVISED BY
0	10/16/2019		Original Drawing created from assembly made by Jaryd and Jackson	-	
1	10/23/2019	1	Added a backside view, edited dimensions, added impact notes, and moved profile view	JEK	JRF
		2	Added page, added profile view, and added section view		
		3	Moved previous page 2 to here		
		4	Moved detail view to next page, added part balloons, and edited description.		
		5	Removed assembly view, moved detail view from previous page here, and edited dimensions		
		6	Removed views, and added detail view.		
		7	Removed views, and added detail view.		
		8	Added page, and added assembly view		
		9	Added page, and added assembly view		
		10	Added page, and added assembly view		
		11	Added page, and added assembly view		
		12	Added page, and added assembly view		
		13	Added page, and added assembly view		
		14	Split previous page 8 into two parts for clarity.		
		15	Added flat patterns for bent plates		
		16	Added part view, and adjust previous views.		
		17	Edited Bill of bars, and hid tangencies		
		18	Added page, and added part views.		
		19	Rearraged views, and changed scaling.		
		20	Edited descriptions, material specs, treatment specs and hardware guide		
		21	Edited descriptions, material specs, treatment specs and hardware guide		
4	1/13/2020	All	Changed all references of left/right to upstream/downstream	JEK/MH/JCH	SBW
		1	Updated note.		
		10	Added note.		
		11	Added note.		
		12	Added note.		

		16	Added part c1.		
		20	Quantities corrected		
		21	Rebuilt parts d10 and d11.		
		BOM	Added Adhesive Anchorage to BOM, updated material/treatment specs on b2-b4 and d10-d13		
5	1/14/2020	BOM	Description: d13.	MH	JEK
6	1/22/2020	BOM	Mtrl: b2-b4.	MH	JEK
7	2/20/2020	10	Removed tick marks in weld dimension notes. Updated weld notes for parts c1, c7, c10, c14, and c15.	MAHP	MJM
		11	Removed tick marks in weld dimension notes. Updated weld notes for parts c1, c2, c7, c11, c14, and c15.		
		12	Removed tick marks in weld dimension notes. Updated weld notes for parts c7 and c12.		
		13	Added dimension note for spindle. Updated weld note for part c6.		
		14	Updated weld not for part c5.		
		15	Removed tick marks in weld note dimension.		
		16	Edited part c1 length to 66". Edited part c3 hole to 1 3/8" diameter.		
		17	Edited part c4 length to 36 15/16".		
		BOM	Updated parts c2, d10, and d11, part descriptions. Updated part d13, material specification and treatment specification.		
8	2/28/2020	8	Moved detailing bubbles	JEK	SBW
		11	Fixed weld note		
		17	Turned on hidden lines		
		20	Edited part description for d10 and d11		
		22	Fixed dimensioning on parts d2, d4, and d5		
		BOM	Fixed part description on parts d2, d10, and d11		
9	3/2/2020	10	Updated weld note	JEK	SBW
		11	Updated weld note		
		2	Placed Wire rope in appropriate location		
		4	Added dimension.		
		8	Placed Wire rope in appropriate location, and adjusted distance from top of post plate to top of rail. Edited note.		

10	3/6/2020	10	Changed weld note and adjusted distance from top of post plate to top of bent plate.	MAHP	JRF
		11	Changed weld note and adjusted distance from top of post plate to top of bent plate.		
		20	Edited description for part d12		
		BOM	Edited description for part d12		
11	3/12/2020	6	Added dimsenion lines. Shifted part balloons.	JCH	LJP
		7	Added dimension lines.		
		9	Edited detail view descriptions.		
		10	Added angle dimension.		
		11	Added angle dimension.		
		16	Moved post components to sheet 18. Added rail components.		
		17	Moved rails to sheet 16. Increased scale.		
		18	Moved rail components to sheet 16. Moved cable anchor components to sheet 19. Added post components.		
		19	New sheet for cable anchor components.		
		BOM	Description: c3, c8.		
12	3/13/2020	1	Added dimesioning to elevation view, detailing out post distances.	RKF	SBW
		10	Fixed BOM row heights.		
		16	Added underside views to detail out the notchs on parts c5 and c6.		
		18	Fixed dimensioning on part c3.		
13	3/25/2020	-	Changed test name to MNPDP-3	MH	MJM
		21	Edited parts d10 and d11, descriptions, materails specifications, and treatment specifications to reflect consolidated parts. Parts d12 and d13 removed.		
14	6/16/2020	7	Replaced part c11 with c10 and added second bolt/nut. Added detail J.	MH	LJP
		8	Added detail J.		
		9	Added note 2.		
		11	Replaced part c11 with c10 and added second bolt/nut.		
		12	Edited weld notes.		
		16	Added holes to parts c1 and c4.		

15	6/19/2020	10	Edited weld notes on post mounting plate.	MH	JRF
		11	Edited weld notes on post mounting plate.		
		12	Edited weld notes on post mounting plate.		
16	7/1/2020	21	Adjusted part notes to better reflect the BOM	MH	SBW
17	7/6/2020	10	Changed weld dimensions between parts c8 and c3	MH	SBW
		11	Changed weld dimensions between parts c8 and c3		
		12	Changed weld dimensions between parts c8 and c3		
18	8/3/2020	20	Fixed typo in sheet title	MH	LJP
19	8/5/2020	10	Moved weep holes on parts c1 and c4 to inside walls (sides that are welded together)	MH	JRF
		11	Moved weep holes on parts c1 and c4 to inside walls (sides that are welded together)		
		16	Added Bottom and Plan Views for parts c1 and c4, respectively. These are to show the moved weep holes.		
20	10/26/2020	2	Added dimensions. Added note 1.		LJP
		3	Changed top parapet dimension to 6".		
		5	Added drilled holes.		
		8	Added 9 1/4" dimension.		