THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY

April 29, 2014

DESIGN BULLETIN No. 14-06

SUBJECT: Railroad Bridge Fence

Tollway Base Sheet Drawings M45 and M46, Railroad Bridge Fence details have been developed for overhead structures crossing Railroad right-of-way.

The installation is to provide shielding for the Railroad facility and the Railroad employees below from objects being projected off the bridge. It shall be provided on both sides of all overhead structures crossing Railroad right-of-way. The limits of the fence with barrier rail shall comply with the specific railroad requirements.

These details have been added to the Tollway Base Sheets M-45 and 46. Design Section Engineers (DSE) are hereby directed to immediately utilize these details for all contracts currently under design. These details will be included in the next release of Tollway Standards. In the meantime, DSEs should request the MicroStation© files so they can be included in these as plan details.

Paul D. Kovacs, P.E.
Chief Engineer

04/29/14
Date

RAILROAD BRIDGE FENCE (Tollway)

Effective: April 29, 2014

Description. The work shall consist of constructing a chain link fence to the outside face of a parapet or barrier on structures over railroads as shown in the plans. This work shall include the preparation of all shop drawings, provide materials, labor and equipment necessary to fabricate, furnish and install chain link fence and post attachment components as described in this special provision.

Materials. Material shall be according to the following.

Chain Link Fence Components:

(a) Posts: Posts shall be according to ASTM F 1083, Galvanized Steel Pipe, 3" Nominal Pipe Size (NPS), Schedule 40, 3.5" Outside Diameter, 0.216" Wall Thickness

(b) Chain Link Fabric: Fabric shall be according to ASTM A 392, 2" mesh with twisted top and knuckled bottom selvage, Zinc Coated Steel, 0.148" coated wire diameter, class 2 coating.

(c) Tie Wires: Tie wires shall be according to ASTM F 626, Zinc Coated Steel Wire, No. 9 gauge

(d) Brace Bands: Bracing bands shall be according to ASTM F 626, No. 12 gauge (min. thickness) x ¾" (min. width) Steel Bands (Beveled or Heavy)

(e) Tension Bars: Tension bars shall be according to ASTM F 626, 3/16" (min. thickness) x ¾" (min. width) x 5' 10" (min. height) Steel Bars

(f) Tension Bands: Tension bands shall be according to ASTM F 626, No. 14 gauge (min. thickness) x ¾" (min. width) Steel Bands

(g) Miscellaneous Fence Components: Miscellaneous fence components shall be according to ASTM F 626, Zinc Coated Steel – includes post or loop caps, combination rail ends, clamps and all other miscellaneous fittings and hardware

(h) Nuts and Bolts: Nuts and bolts shall be according to ASTM A 307, 3/8" diameter x 4 ¼" Hex Headed Bolts for Pipe Clamp Connections to the Posts.

(i) Washers: Washers shall be according to ASTM F 436, Flat.

(j) Tension Wire: Tension wire shall be according to ASTM A 824 and A 817, Type II Zinc Coated Steel Wire – No. 7 gauge, Class 4 Coating

(k) Hog Rings: Hog rings shall be according to ASTM F 626, Zinc Coated Steel Wire – No. 12 gauge

(l) Brace Rails: Brace rails shall be according to ASTM F 1083, Galvanized Steel Pipe – 1 1/4" NPS, Schedule 40, 1.660" Outside Diameter, 0.140" Wall Thickness.

Post Attachment Components:

(m) Pipe Clamps: Pipe clamps shall be according to ASTM A 36 or A 709 Grade 36, ¼" Steel Plate

(n) Shim Plates: Shim plates shall be according to ASTM F 626, Zinc Coated Steel – ¼" Thickness, 3" x 9 ½", with 3/4" diameter holes.

(o) Adhesive Anchor Rods: Adhesive anchor roads shall be according to ASTM F 1554 Grade 36, fully threaded headless Anchor Rods – 5/8" diameter x 6 ½".

(p) Neoprene Pads: Neoprene pads shall be in accordance with Article 1052.02(a) of the Standard Specifications.

Hot-dip galvanize all chain link fence components not otherwise indicated as being coated, and all post attachment components ,except neoprene pads, in accordance with Section 1006 of the Standard Specifications.

General. The Contractor shall furnish and install the chain link fence according to the lines, grades, and dimensions shown on the plans and approved shop drawings. Work shall be accomplished according to Sections 509 and 664 of the Standard Specifications except as modified here-in:

Article 509.05 (c) Delete paragraph 1, third sentence; "Stretcher bars shall be used on all four sides of each panel".

Shop Drawings. The Contractor shall submit shop drawings in accordance with the provisions of Article 105.04 of the Tollway Supplemental Specifications for all chain link fence and post attachment components.

No materials detailed in the Plans and/or described in the Special Provision, or covered by the shops drawings shall be delivered to the site of the work until the shop drawings have been approved.

Construction Procedures. All construction and installation methods and procedures for chain link fence components and post attachment components shall be in strict accordance with the Plans, the manufacturer's recommendations, the approved shop drawings and as directed by the Engineer.

Any chain link fence component and post attachment component which, in the judgment of the Engineer, is not furnished and installed in accordance with the Plans, the Special Provision, the approved shop drawings, or the manufacturer's specifications shall be subject to rejection. Any such installation which is rejected shall be removed and replaced with material acceptable to the Engineer. The costs for any such adjustments shall be the responsibility of the Contractor.

Installation Procedures. The fence posts shall be installed plumb. Shims shall be used as required to achieve plumb and clearance for 6" of chain link fabric. Shims at bottom clamp to be omitted if clearance and plumb are otherwise provided. Total thickness of shims will be determined in the field.

Adhesive Bonded Anchors and Dowels shall comply with and be installed in accordance with Section 509 of the Standard Specifications.

Welding shall be accomplished only after written permission of the Engineer. All welding shall be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1, current edition. Weld metal shall be E60XX or E70XX. Non Destructive Testing of welds is not required.

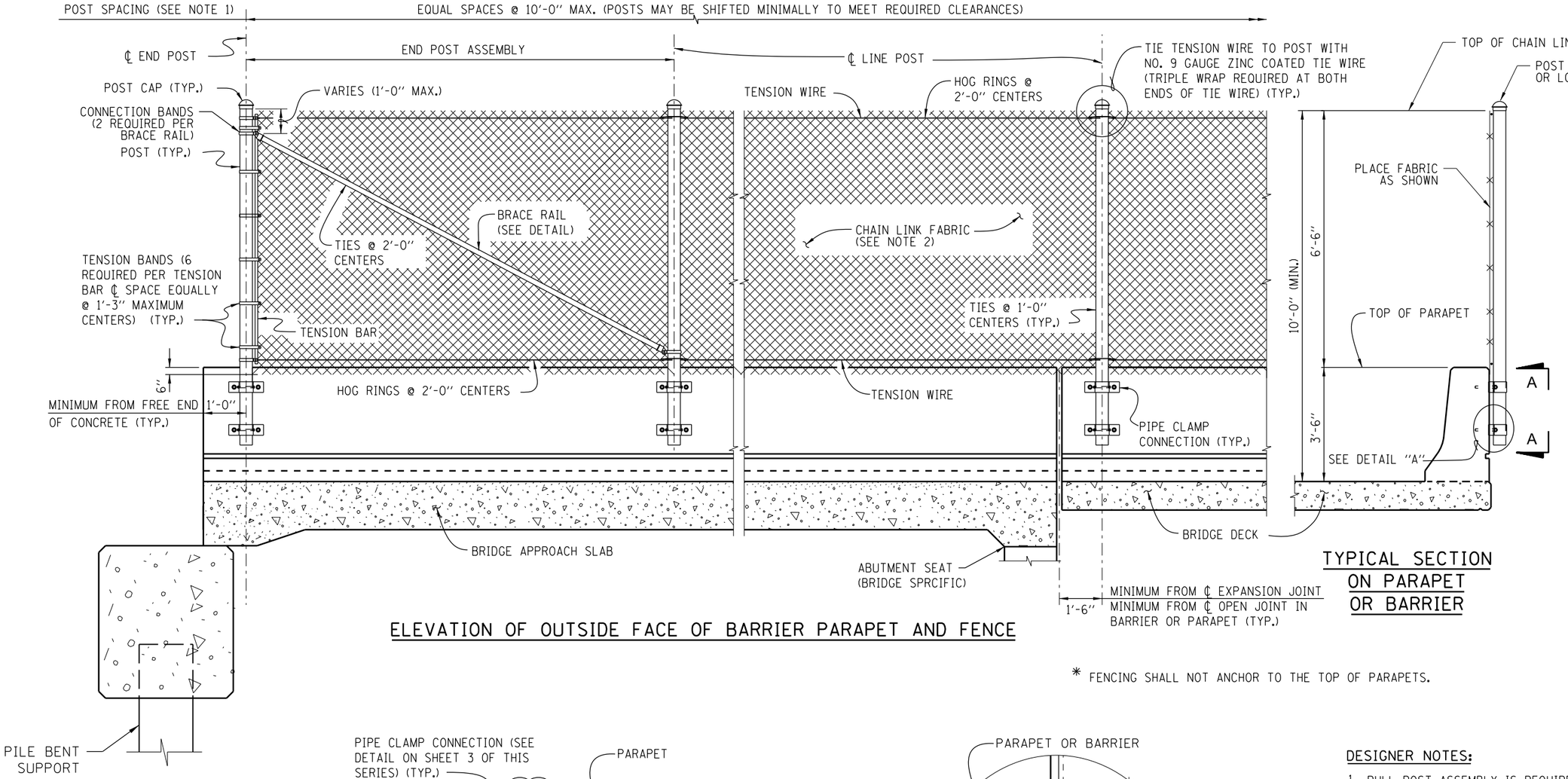
Protective electrical grounding shall be in accordance with Article 664.11 of the Standard Specifications.

Thread bottom tension wire through the bottom mesh loops. Tighten the bottom rail tension wire around the end posts. Tighten the brace rail tension wire around the end posts and first interior posts. Bottom tension wire shall utilize a separate tension band. Brace rail tension wire shall either use a separate tension band or wrap around the post. Draw the wire tight and wrap it around itself a minimum of three loops next to the posts.

Method of Measurement. This work will be measured for payment in feet, along the top of the fence from center to center of the end posts.

Basis of Payment. This work will be paid for at the contract unit price per foot for RAILROAD BRIDGE FENCE.

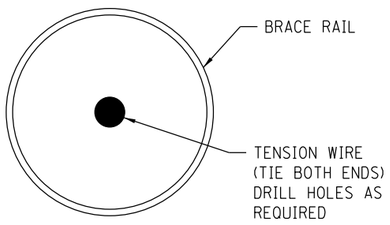
Pay Item Number	Designation	Unit of Measure
JI664100	RAILROAD BRIDGE FENCE	FOOT



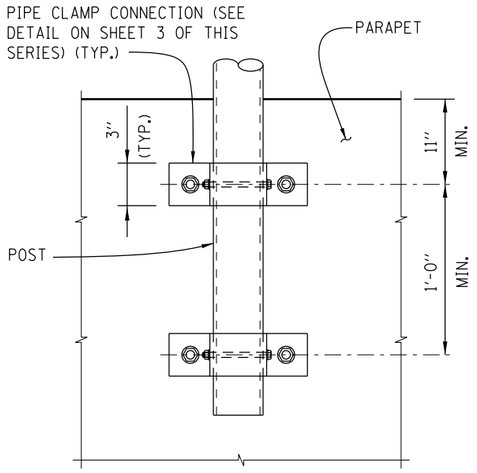
ELEVATION OF OUTSIDE FACE OF BARRIER PARAPET AND FENCE

TYPICAL SECTION ON PARAPET OR BARRIER

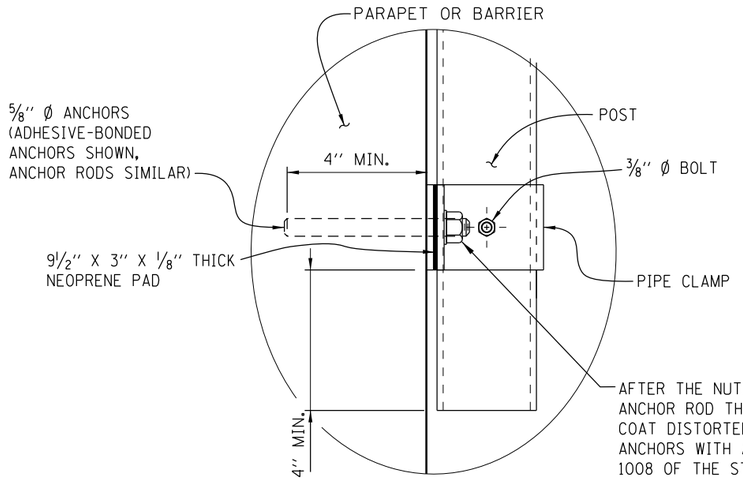
* FENCING SHALL NOT ANCHOR TO THE TOP OF PARAPETS.



BRACE RAIL DETAIL



VIEW A-A



DETAIL A

DESIGNER NOTES:

1. PULL POST ASSEMBLY IS REQUIRED AT MAXIMUM INTERVALS OF 200'. SEE BASE SHEET M46.
2. FABRIC SHALL NOT BE SPLICED BY PICKETS. FABRIC SPLICES IF REQUIRED SHALL ONLY OCCUR AT POSTS AT A MINIMUM OF 100 FT. BETWEEN SPLICES. (ADD THIS NOTE TO PLANS.)
3. RAILROAD BRIDGE FENCE SHALL BE DETAILED ON SUPERSTRUCTURE DRAWING.
4. COORDINATE LIMITS OF RAILROAD BRIDGE FENCE WITH SPECIFIC RAILROAD REQUIREMENTS.

NOTE TO DESIGNER

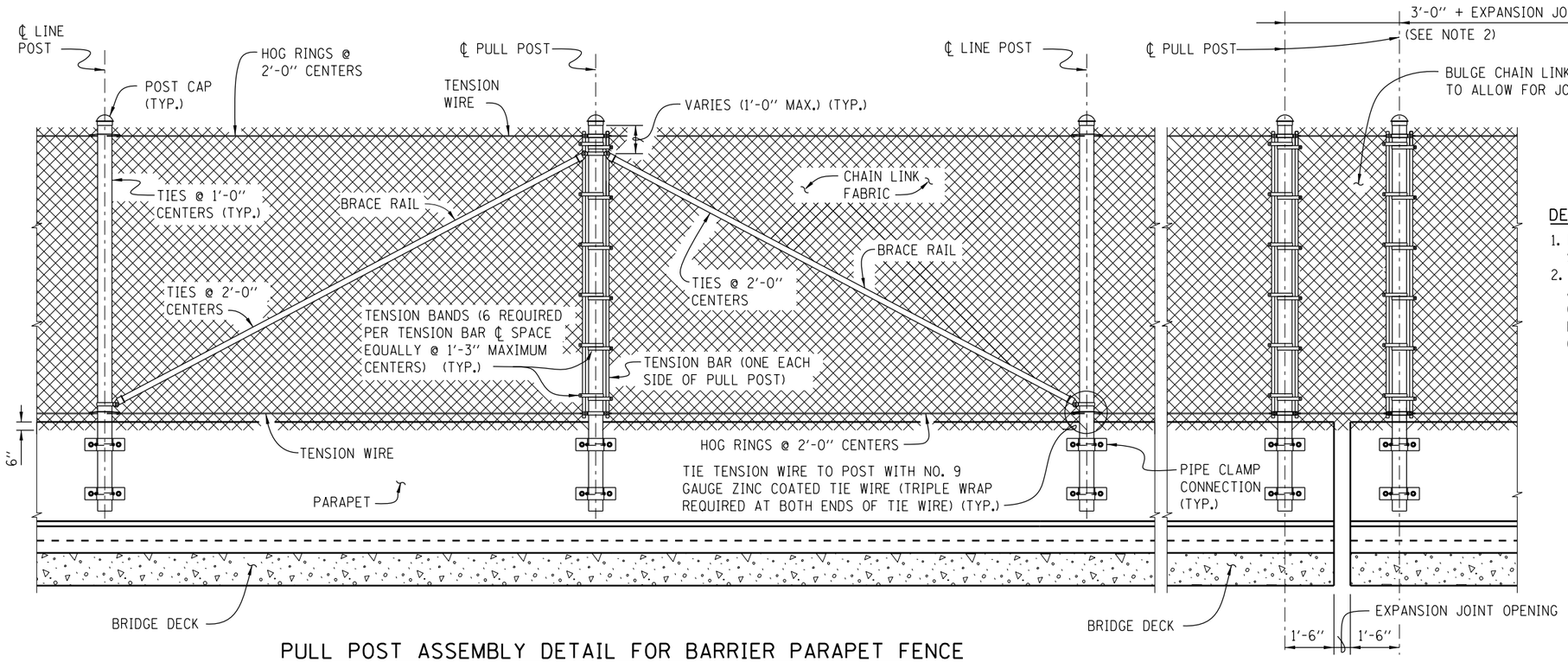
THIS BASE SHEET SHOWS TYPICAL NEW CONSTRUCTION BUT IT IS NOT A STANDARD DRAWING. IT REQUIRES COMPLETION BY THE DSE PRIOR TO INSERTION INTO A CONTRACT. MICROSTATION FILES ARE CONTAINED W/IN THE CADD MANUAL RESOURCE CD OR AVAILABLE FROM THE TOLLWAY. THE DSE SHALL ACCEPT THE RESPONSIBILITY OF THE DESIGN OF THIS SHEET UPON ITS COMPLETION & INSERTION INTO A CONTRACT. THIS "NOTE TO DSE" SHALL BE REMOVED BY THE DSE PRIOR TO INSERTION OF THE SHEET INTO THE PLAN SET.

BASE SHEET M45

Illinois Tollway

RAILROAD BRIDGE FENCE

DATE
4-13-2014



PULL POST ASSEMBLY DETAIL FOR BARRIER PARAPET FENCE

EXPANSION ASSEMBLY DETAIL

(REQUIRED ONLY AT EXPANSION JOINT LOCATIONS WHERE TOTAL MOVEMENT EXCEEDS 6")

DESIGNER NOTES:

1. FOR TREATMENT AT BRIDGE ENDS, SEE BASE SHEET M45.
2. THE 3'-0" DIMENSION SHOWN IS FOR EXPANSION JOINT OPENINGS 9" OR LESS. IF THE EXPANSION JOINT OPENING EXCEEDS 9", INCREASE THIS DIMENSION BY THE DIFFERENCE BETWEEN THE EXPANSION JOINT OPENING AND 9".

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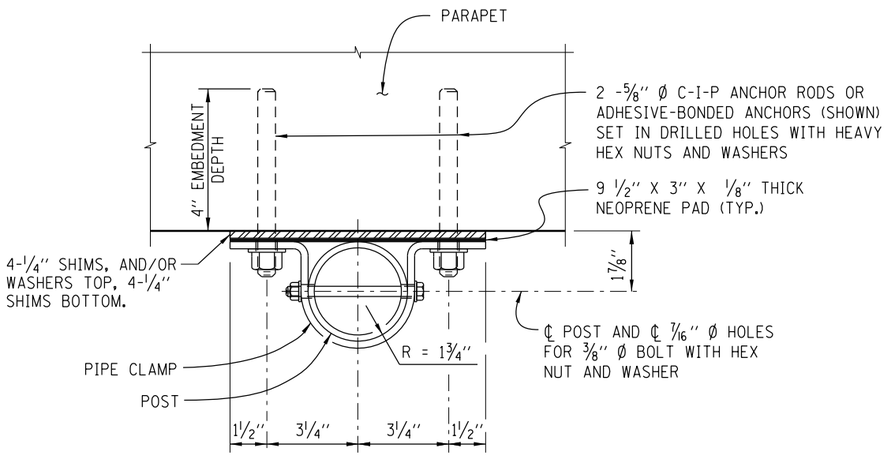
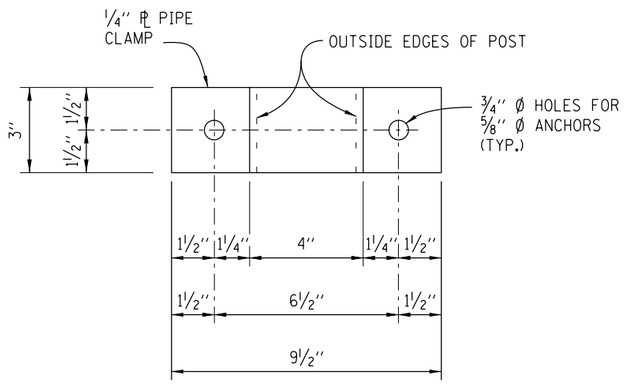
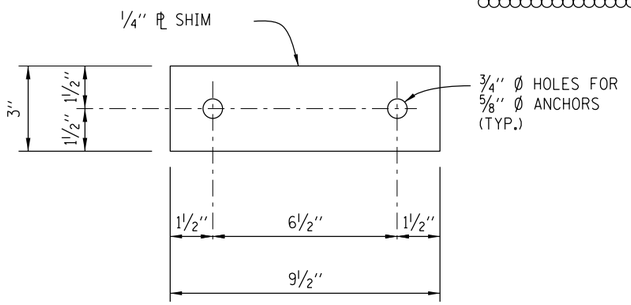


PIPE CLAMP CONNECTION DETAIL



PIPE CLAMP DETAIL



SPACER DETAIL

(MUST BE MANUFACTURED FROM AN INCOMPRESSIBLE MATERIAL (I.E., STEEL OR ALUMINUM))

BASE SHEET M46

Illinois Tollway

RAILROAD BRIDGE FENCE

DATE
4-13-2014