Chapter 03 - Superstructure

SECTION 04

FENCE AND RAILING (SUP-FR)

Chapter 03 - Superstructure

Section 04 – Fence and Railing

SUB-SECTION **01**

FENCING

(SUP-FR(FN))

* 2b = average spacing of end post and adjacent span, with exceptions as noted on Sheet 2.

** 2a = average spacing of flanking spans.

*** End Post greater than 20'-0" shown (see Sheet 2 of 2)

ELEVATION - FENCING

Scale: None

FENCE SPACING ON BRIDGES

- All spacings shall be equal in each span.
- Fence post spacing should range from 6'-0" min. to 8'-0" max. except as modified in the transition area described on Sheet 2. Effort should be made to make spacing of posts for all spans nearly equal as possible.
- Transition areas shall be provided on both ends of the bridge comprised of a tapered concrete lug and two to three tapered fence panels, spaced as shown on Sheet 2 of 2.
- Fence shall be continuous across all supports.

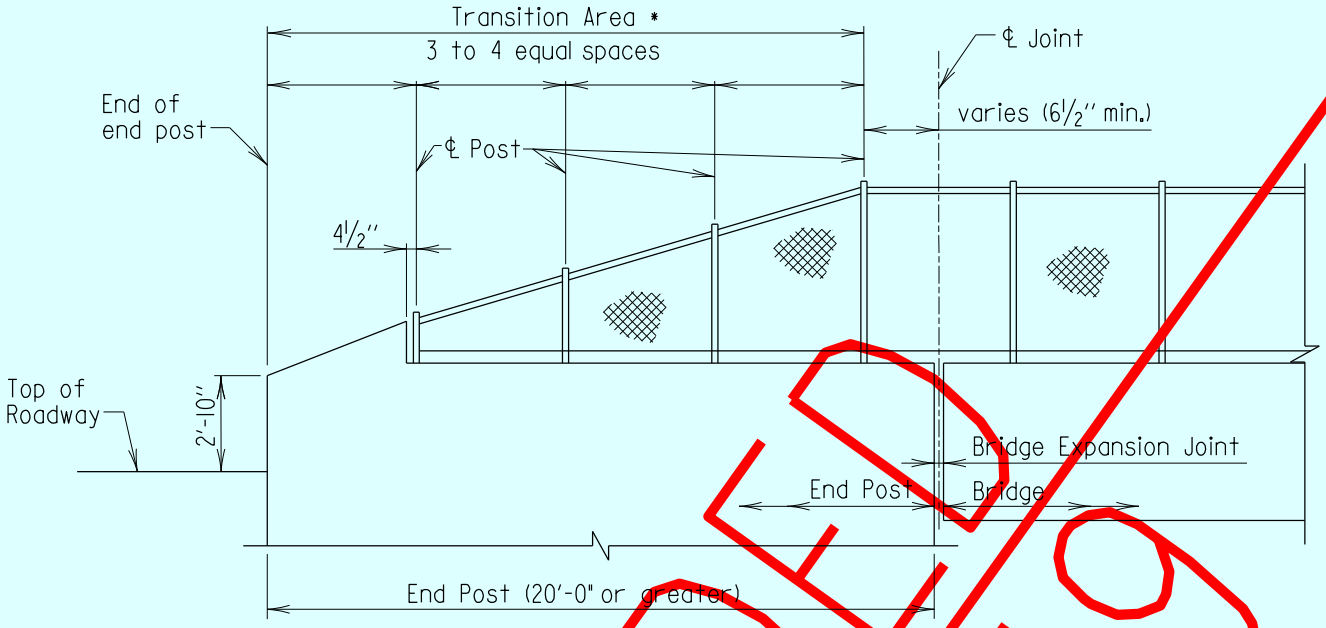
RESCINDED 09-11-2019

DETAIL NO. SUP-FR(FN)-101 RESCINDED
SEE BRIDGE DESIGN MANUAL
FOR INFORMAION ON FENCE LAYOUT

* FOR OFFICE USE ONLY *

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
Glenn C. Boulton DIRECTOR OFFICE OF STRUCTURES DATE: 07/27/2018	LAYOUT OF FENCING ON BRIDGES
VERSION 2.0	DETAIL NO. SUP-FR(FN)-101 SHEET 1 OF 2

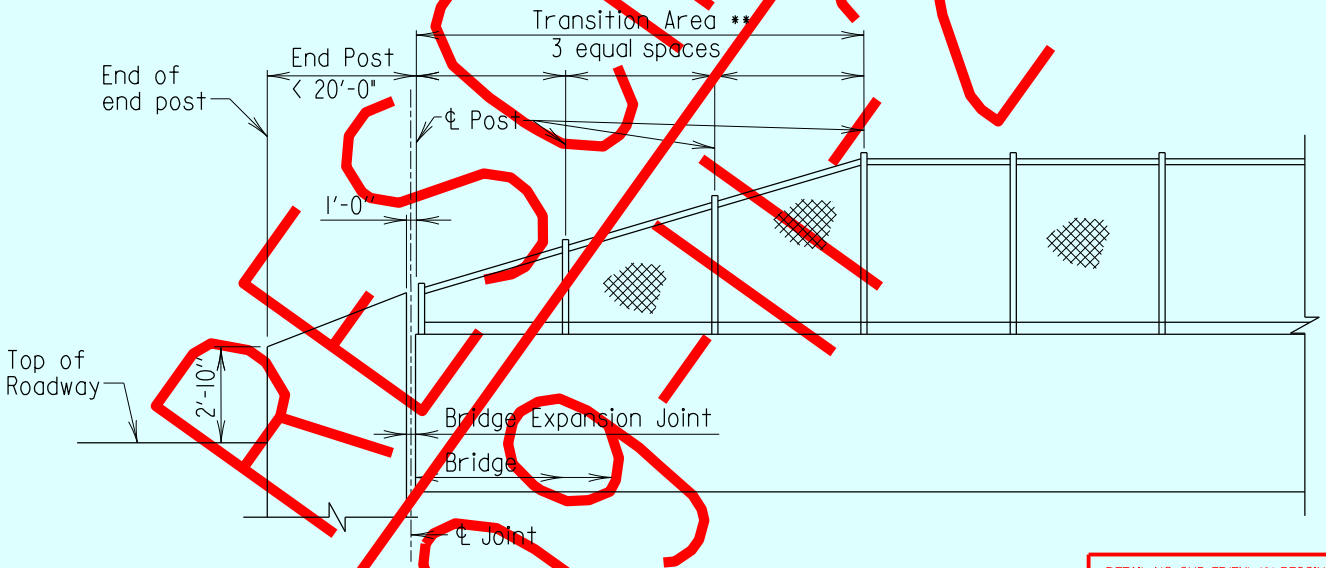
SUPER FENCE/RAILING



ELEVATION - FENCE TRANSITION ON END POST (L ≥ 20'-0")

Scale: None

* The Transition Area shall always begin at the end of the end post and be laid out so that 3 equal spaces are provided when the end post length is between 20' and 25'. The transistion area shall contain 4 equal spaces when the end post is greater than 25' in length. The transition area shall be located entirely on the end post.



ELEVATION - FENCE TRANSITION ON BRIDGE (L < 20'-0")

Scale: None

DETAIL NO. SUP-FR(FN)-101 RESCINDED
SEE BRIDGE DESIGN MANUAL
FOR INFORMAION ON FENCE LAYOUT

** The Transition Area shall always begin at the beginning of the bridge and be laid out so that 3 equal fence spaces are provided on the bridge. The end post shall contain a tapered concrete lug to match the height of the fence at the end of the bridge (1'-9"±). The fence transition area shall be located entirely on the bridge.

Notes:
1. Transition areas shall be provided on both ends of the bridge, comprised of a tapered concrete lug and two to three tapered fence panels.
2. The height of the concrete end post at the approach and trail end shall be 2'-10".
3. A tapered fence panel shall never be placed over an expansion joint.

* FOR OFFICE USE ONLY *

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
Glenn C. Walton DIRECTOR OFFICE OF STRUCTURES DATE: 07/28/2018	LAYOUT OF FENCING ON BRIDGES
VERSION 2.0	DETAIL NO. SUP-FR(FN)-101 SHEET 2 OF 2

SUPER FENCE/RAILING

RESCINDED 09-11-2019

GENERAL NOTES

Specifications: Latest SHA Specifications and Special Provisions for materials and construction. Latest AASHTO LRFD Bridge Design Specifications.

Materials: Posts and rails shall conform to ASTM F-1083, Schedule 80. Fabric shall be 6 gauge, 2" PVC coated mesh conforming to 914.01.

All posts, braces, fittings and hardware shall be PVC coated. Coating shall conform to 914.03 except that nuts, bolts and washers shall also be PVC coated and touched up after installation.

All plates shall be steel conforming to ASTM A 709 Grade 36.

Anchor studs or anchor bolts shall conform to ASTM A 276, Type 430 or Type 304 stainless steel annealed, hot-finished, ultimate strength 70 000 psi min., 20% min. elongation. Threads may be rolled or cut.

Epoxy grout for anchor studs in cored holes shall conform to 902.11 (d).

PVC color for all elements of fence shall be black unless otherwise noted.

Construction: All longitudinal rails shall be parallel to top of parapet.

All posts shall be set normal to top of parapet for roadway grades 6% or less. For grades over 6% posts shall be set plumb.

The chain link fence shall be true to line, taut, tight fit to top of parapet, with $\frac{1}{2}$" min. to 1" max. gap, and shall comply with the best practice for fence construction of this type.

Post and rails shall be permanently positioned before fabric is placed.

For post spacing see pertinent structure sheets.

Precoated longitudinal rails, if cut, shall have the cut end coated with PVC touch up material supplied by the manufacturer prior to erection.

If Contractor elects to place anchor studs after placing concrete parapet, newly placed rebars shall be located so that coring does not damage same, all holes shall be cored (not drilled) and the diameter of the cored holes for the anchor studs shall be $\frac{7}{8}$".

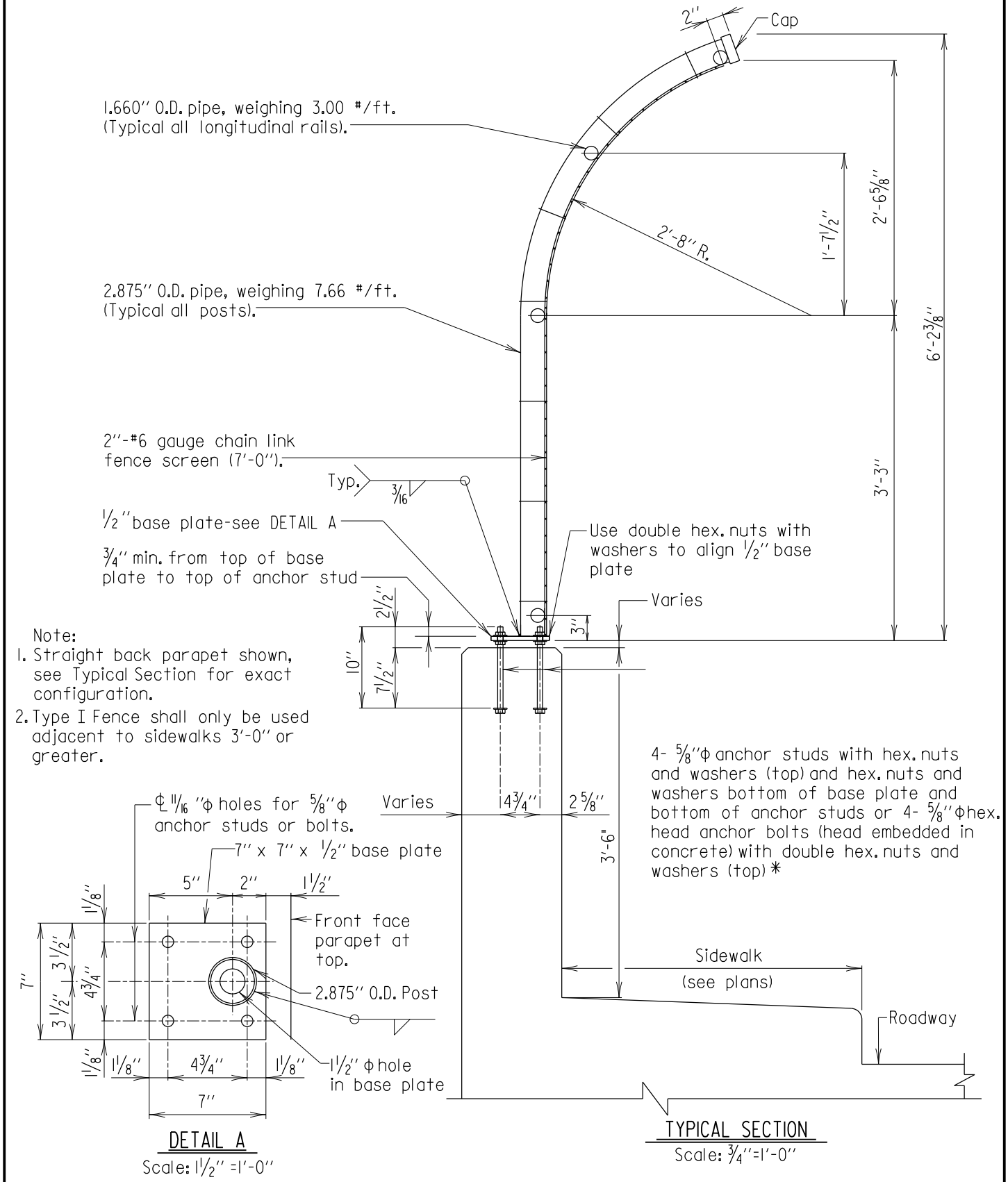
Measurement and Payment: The furnishing, fabricating, erecting, etc., of all new chain link fence on the bridges, complete in place, will not be measured for payment but all costs thereof shall be included in the Contract lump sum prices for the pertinent Chain Link Safety Fence For Bridge items.

The furnishing, fabricating, erecting, etc., of all new chain link fence anti-climb shields, complete in place, will be measured and paid for at the Contract unit prices per each for the pertinent Chain Link Safety Fence Anti-Climb Shield items.

Any defects uncovered by the inspection of welds on base plates and poles shall be repaired or replaced by new members at no additional cost to the Administration.

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES DATE: 10/09/2007	CHAIN LIKE SAFETY FENCE-NEW STRUCTURES GENERAL NOTES
VERSION 1.0	DETAIL NO. SUP-FR(FN)-201 SHEET 1 OF 1

SUPER FENCE/RAILING



* As an option, the Contractor may set the anchor studs after placing concrete barrier using 7/8'' dia. cored holes and an approved epoxy grout. Nuts and washers shall be omitted from the embedded ends of anchor studs. No additional compensation will be allowed for this option.

APPROVAL
DIRECTOR OFFICE OF STRUCTURES
DATE: 08/27/2019
VERSION
2.00

STATE OF MARYLAND
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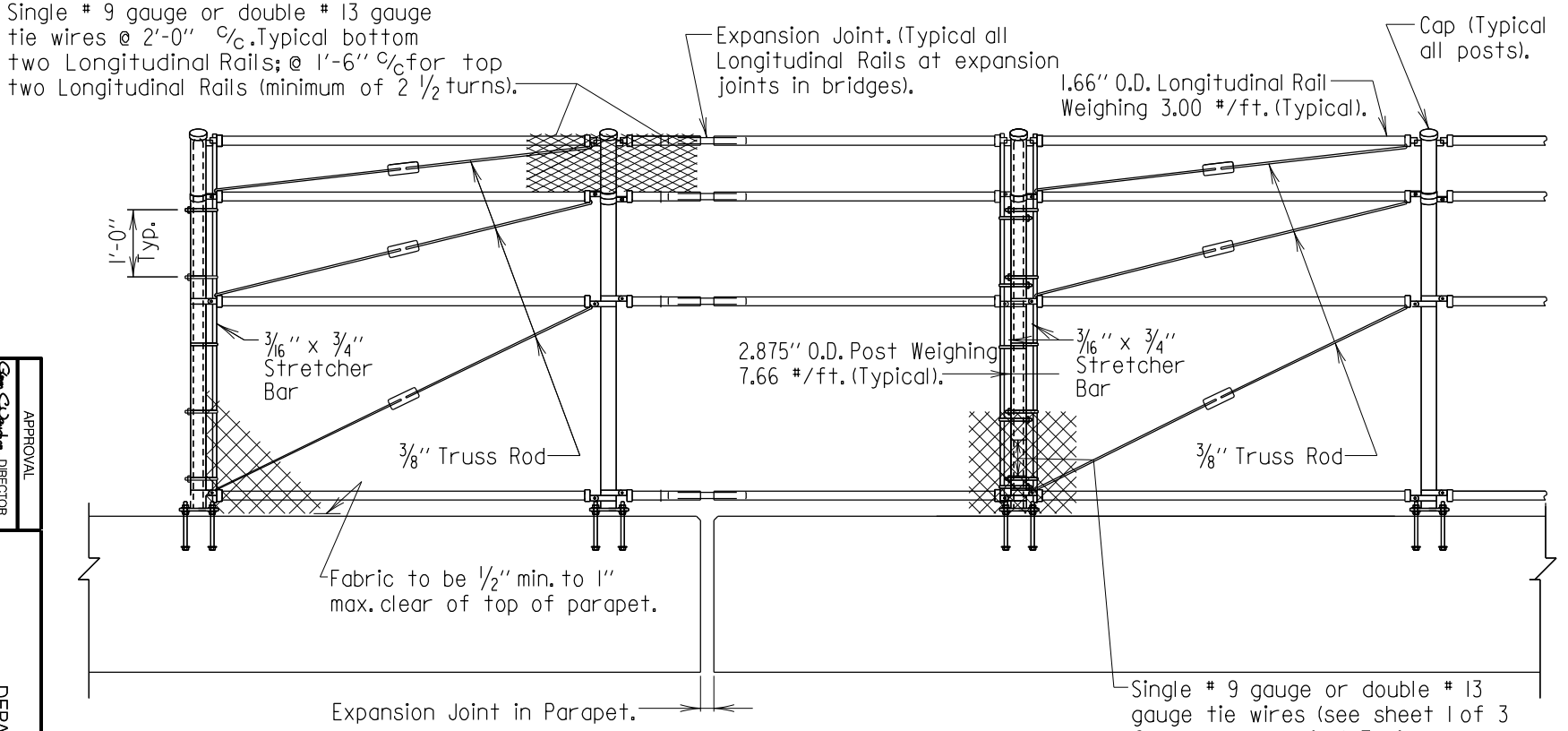
TYPE I CHAIN LINK SAFETY FENCE NEW STRUCTURES

DETAIL NO. SUP-FR(FN)-202 SHEET 1 OF 2

SUPER FENCE/RAILING



ELEVATION

Scale: 3/8"=1'-0"

Notes:

1. Before placing fencing, place 1/2" to 1" thick material (wood, etc.) on top of parapet to ensure the desired gap is achieved. After fence is rigidly attached, this temporary blocking shall be removed.
2. Place Truss Rod as shown adjacent to bridge expansion joints and fence end panels.
3. Place anti-climb shield at second interior post of main span. Typical for both ends and both sides of bridge.

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
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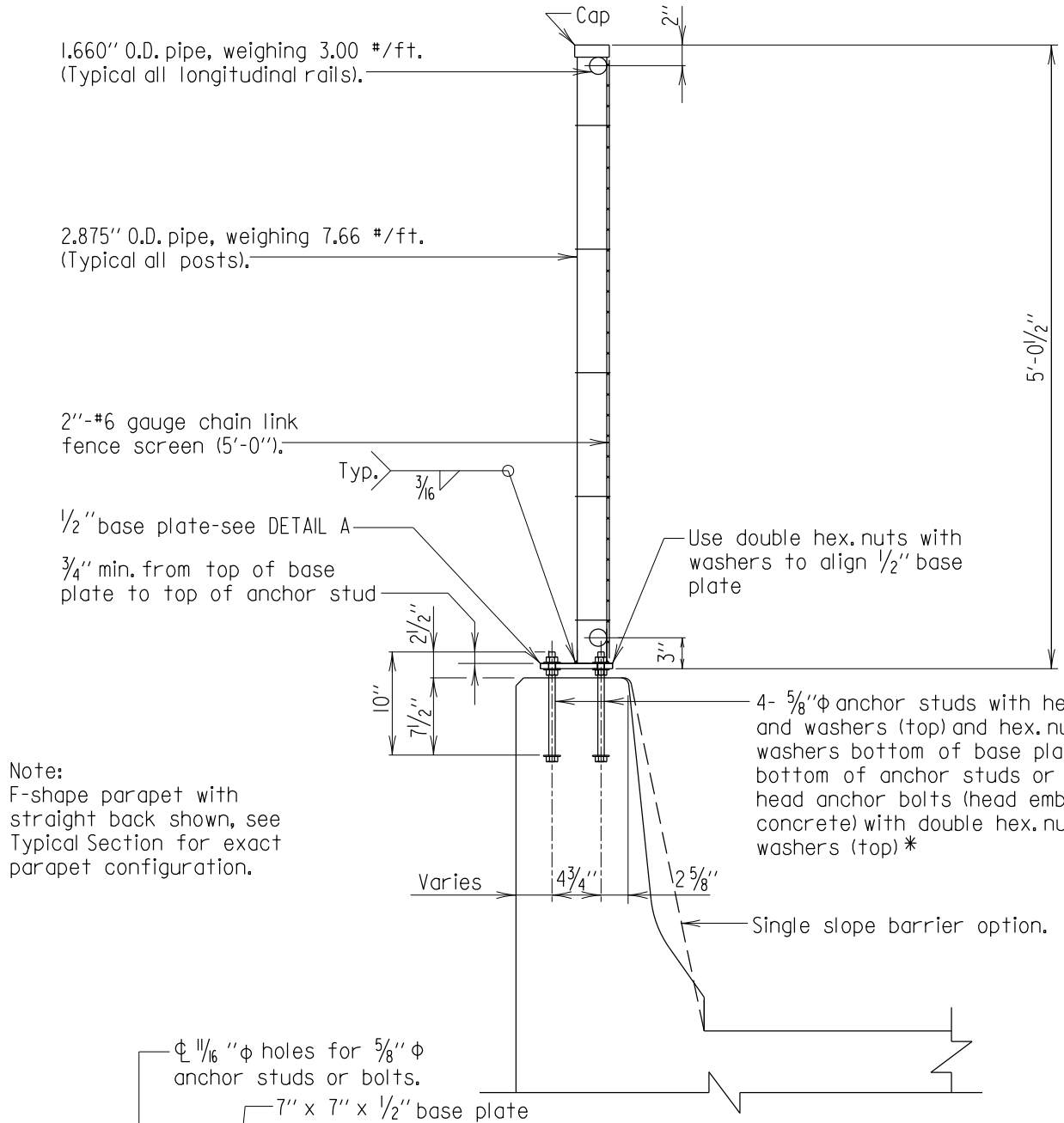
TYPE I CHAIN LINK SAFETY FENCE
NEW STRUCTURES

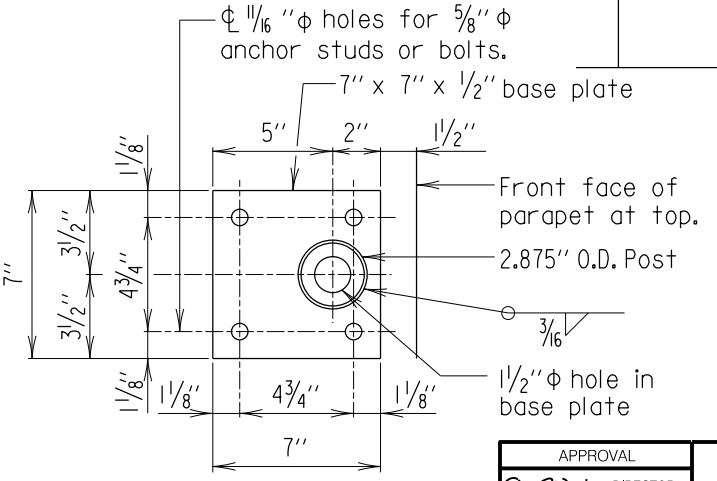
DETAIL NO. SUP-FR(FN)-202

SHEET 2 OF 2

APPROVAL	VERSION	DATE
DIRECTOR OFFICE OF STRUCTURES	2.00	08/27/2019

SUPER FENCE/RAILING





TYPICAL SECTION

Scale: 3/4''=1'-0''

DETAIL A

Scale: 1 1/2''=1'-0''

* As an option, the Contractor may set the anchor studs after placing concrete barrier using 7/8'' dia. cored holes and an approved epoxy grout. Nuts and washers shall be omitted from the embedded ends of anchor studs. No additional compensation will be allowed for this option.

APPROVAL
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES
DATE: 08/27/2019
VERSION
2.00

STATE OF MARYLAND
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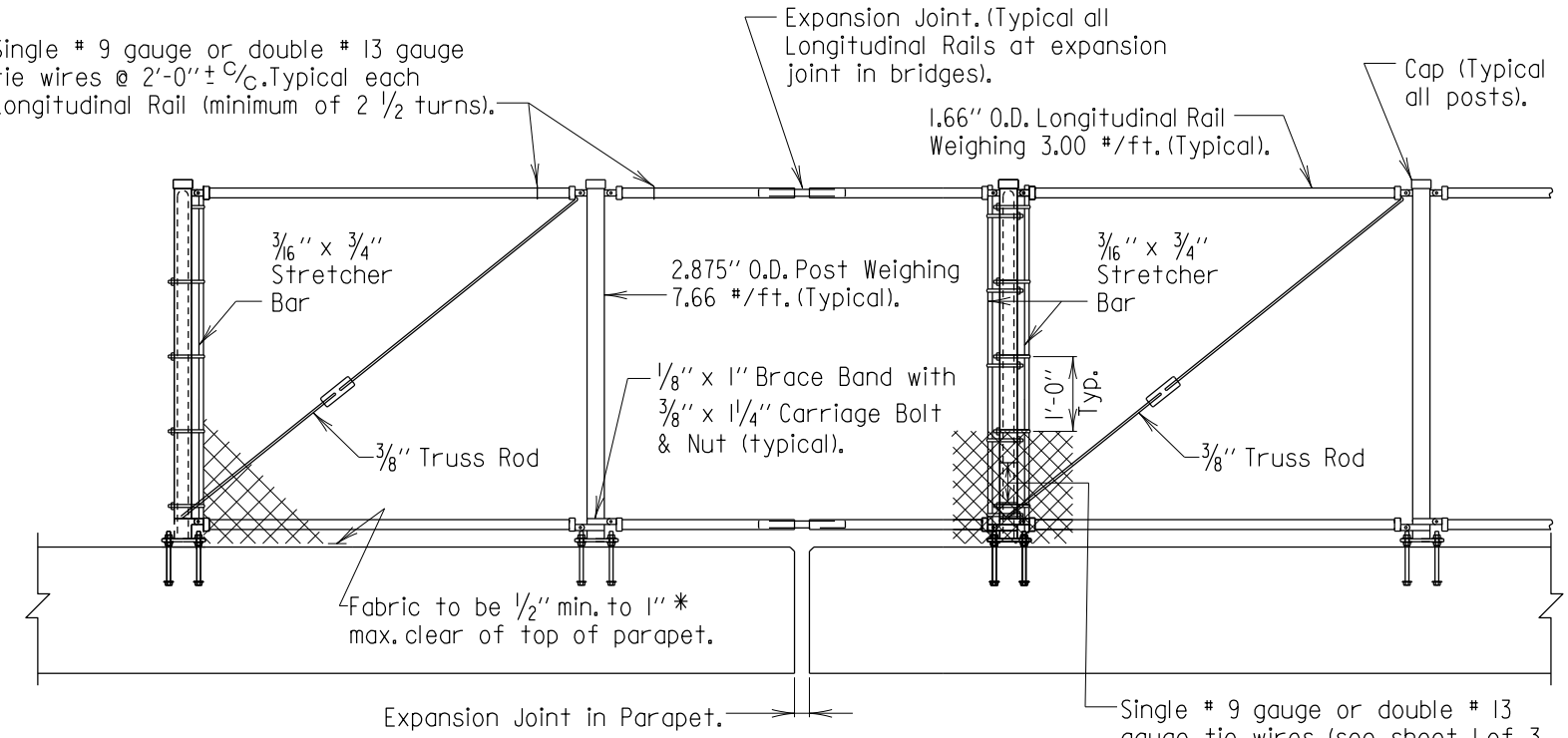
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

TYPE II CHAIN LINK SAFETY FENCE FOR NEW STRUCTURES WITH F-SHAPE OR SINGLE SLOPE PARAPET

DETAIL NO. SUP-FR(FN)-203 SHEET 1 OF 2

SUPER FENCE/RAILING



ELEVATION

Scale: 3/8"=1'-0"

Notes:

1. Before placing fencing, place 1/2" to 1" thick material (wood, etc.) on top of parapet to ensure the desired gap is achieved. After fence is rigidly attached, this temporary blocking shall be removed.
2. Place Truss Rod as shown adjacent to bridge expansion joints and fence end panels.

APPROVAL
DIRECTOR
OFFICE OF STRUCTURES

DATE: 08/27/2019

VERSION
2.00

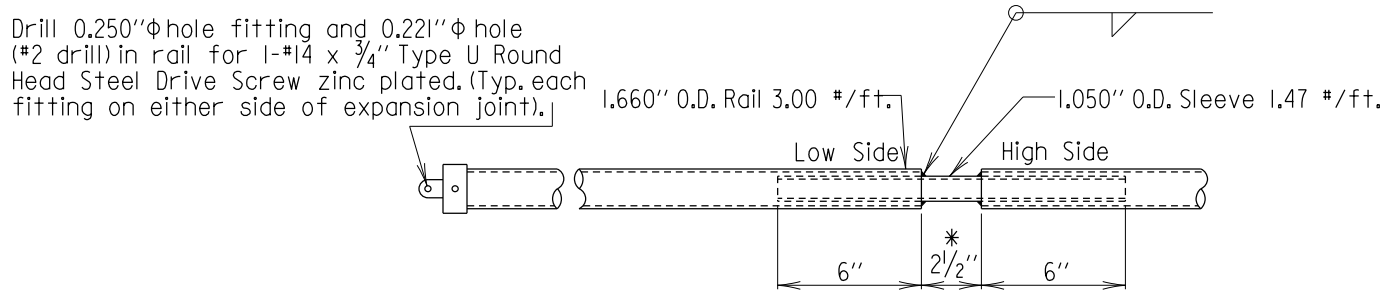
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

TYPE II CHAIN LINK SAFETY FENCE FOR NEW STRUCTURES WITH F-SHAPE OR SINGLE SLOPE PARAPET

DETAIL NO. SUP-FR(N)-203

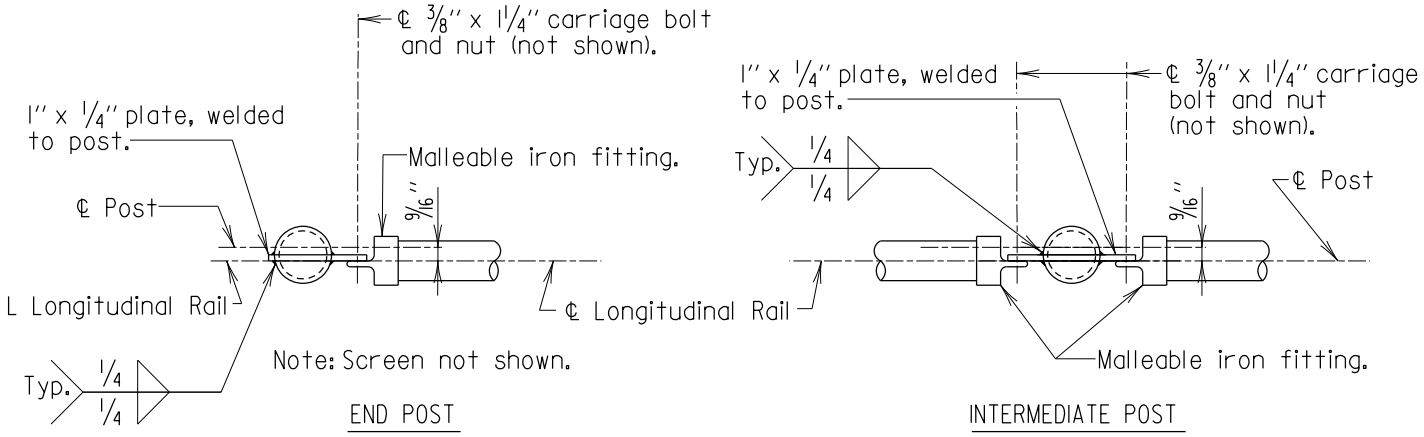
SHEET 2 OF 2

SUPER FENCE/RAILING



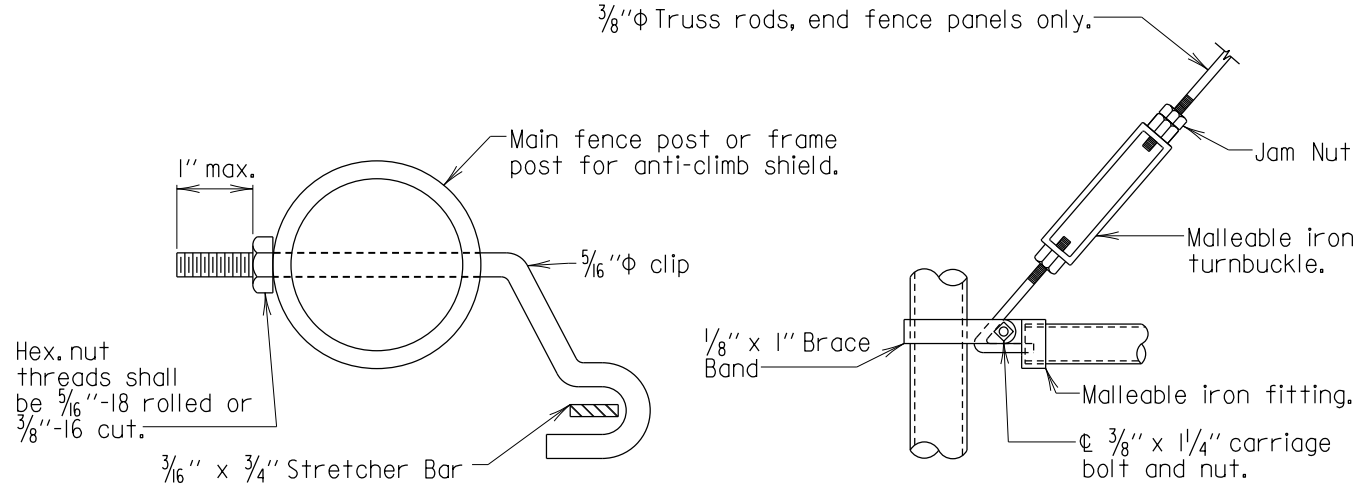
EXPANSION JOINT DETAILS

Scale: 1 1/2'' = 1'-0''



TOP LONGITUDINAL RAIL - POST ATTACHMENT

Scale: 1 1/2'' = 1'-0''



STRETCHER BAR ATTACHMENT

Scale: None

TRUSS ROD ATTACHMENT

Scale: 1 1/2'' = 1'-0''

* If opening in parapet is 2 1/2'' or less. If opening is greater then this, dimension shall be increased to match proposed movement.

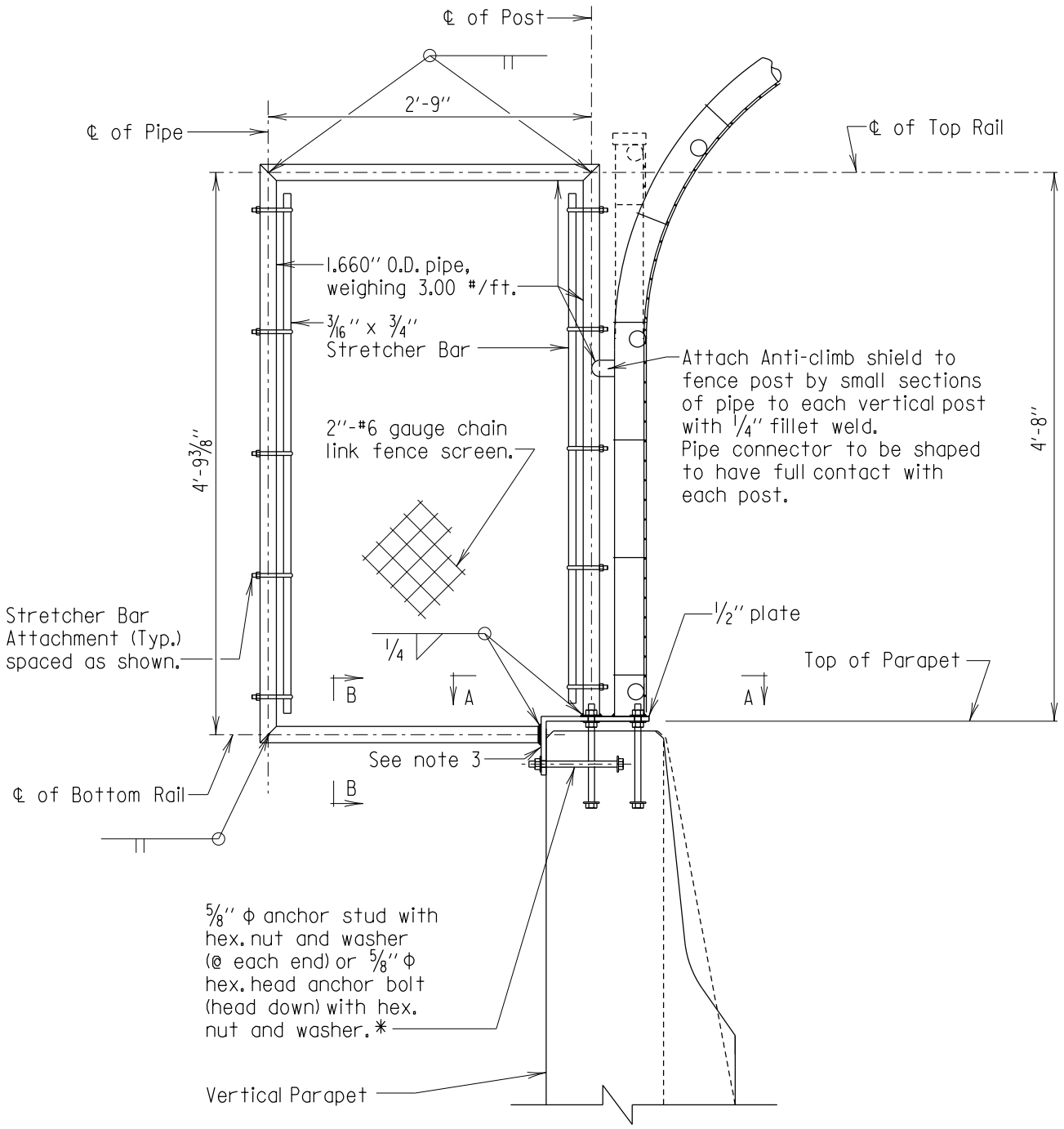
APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 01/22/2001
VERSION
1.0

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

CHAIN LINK SAFETY FENCE - NEW STRUCTURES MISCELLANEOUS DETAILS

DETAIL NO. SUP-FR(FN)-204 SHEET 1 OF 1

SUPER FENCE/RAILING



* As an option, the Contractor may set the anchor studs after placing concrete barrier using 7/8" dia. cored holes and an approved epoxy grout. Nuts and washers shall be omitted from the embedded ends of anchor studs. No additional compensation will be allowed for this option.

TYPICAL SECTION

Scale: 3/4" = 1'-0"

Note:
F-shape parapet with straight back shown, see Typical Section for exact parapet configuration.

Notes:
1. For Sections A-A and B-B see Sheet 2 of 2 of this detail.
2. For additional anchor bolt details see SUP-FR(FN)-202 or SUP-FR(FN)-203.
3. For diamond back configuration, bend to match rear barrier taper.

APPROVAL
DIRECTOR OFFICE OF STRUCTURES
DATE: 09/11/2019
VERSION
1.01

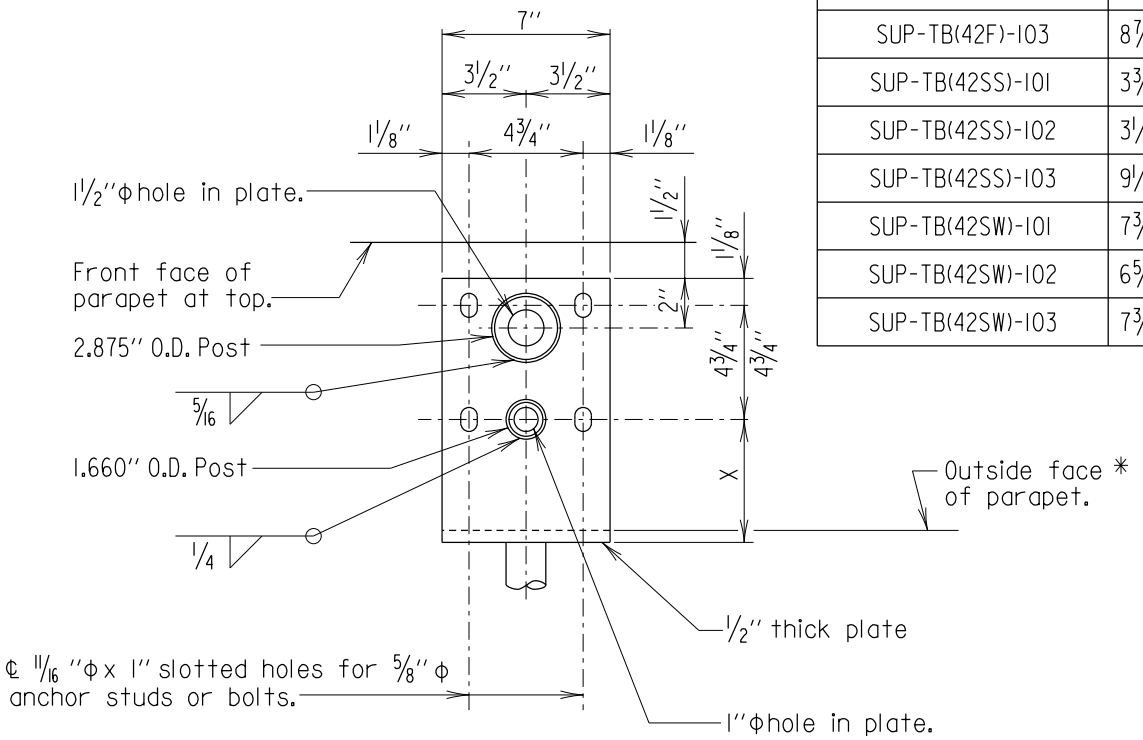
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

ANTI-CLIMB SHIELD FOR CHAIN LINK SAFETY FENCES TYPES I AND II

DETAIL NO. SUP-FR(FN)-205 SHEET 1 OF 2

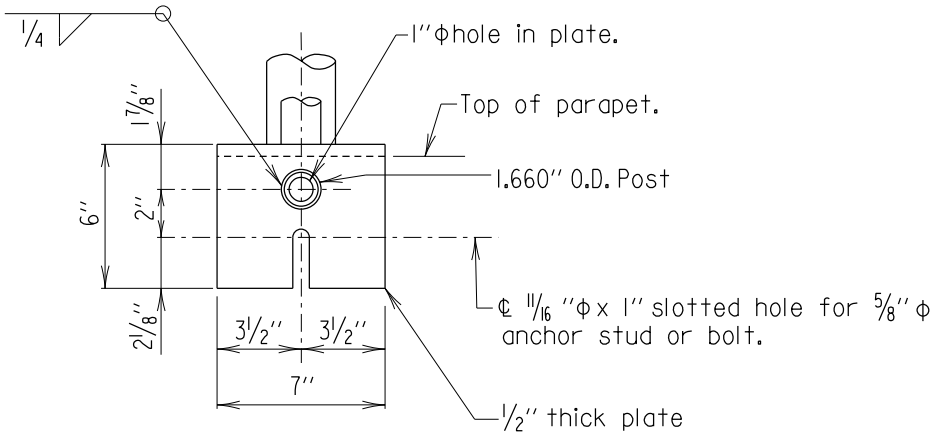
SUPER FENCE/RAILING

Detail No.	X
SUP-TB(42F)-101	3 1/8"
SUP-TB(42F)-102	3"
SUP-TB(42F)-103	8 7/8"
SUP-TB(42SS)-101	3 3/8"
SUP-TB(42SS)-102	3 1/4"
SUP-TB(42SS)-103	9 1/8"
SUP-TB(42SW)-101	7 3/8"
SUP-TB(42SW)-102	6 5/8"
SUP-TB(42SW)-103	7 3/8"



SECTION A-A

Scale: 1 1/2" = 1'-0"



SECTION B-B

Scale: 1 1/2" = 1'-0"

* For Special Parapets outside face of parapet to be formed with a 8" wide recess, perpendicular to top of parapet, to accept anti-climb shield base plate. Recess to be 5" long measured from top of parapet.

APPROVAL
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES
DATE: 09/11/2019
VERSION
1.01

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

ANTI-CLIMB SHIELD FOR CHAIN LINK SAFETY FENCES TYPES I AND II

DETAIL NO. SUP-FR(FN)-205 SHEET 2 OF 2

SUPER FENCE/RAILING.

GENERAL NOTES

Specifications: Latest SHA Specifications and Special Provisions for materials and construction. Latest AASHTO Standard Specifications for Highway Bridges for design.

Materials: Posts and rails shall conform to ASTM F-1083, Schedule 80. Fabric shall be 6 gauge, 2" PVC coated mesh conforming to 914.01.

All posts, braces, fittings and hardware shall be PVC coated. Coating shall conform to 914.03 except that nuts, bolts and washers shall also be PVC coated and touched up after installation.

All plates shall be steel conforming to ASTM A 709 Grade 36.

Anchor studs or anchor bolts shall conform to ASTM A 276, Type 430 or Type 304 stainless steel annealed, hot-finished, ultimate strength 70 000 psi min., 20% min. elongation. Threads may be rolled or cut.

Epoxy grout for anchor studs in cored holes shall conform to 902.11 (d).

PVC color for all elements of fence shall be black unless otherwise noted.

Construction: All longitudinal rails shall be parallel to top of wall.

All posts shall be set normal to top of wall for roadway grades 6% or less. For grades over 6% posts shall be set plumb.

The chain link fence shall be true to line, taut, tight fit to top of wall ($\frac{1}{2}$" maximum gap) and shall comply with the best practice for fence construction of this type.

Post and rails shall be permanently positioned before fabric is placed.

For post spacing see pertinent structure sheets.

Precoated longitudinal rails, if cut, shall have the cut end coated with PVC touch up material supplied by the manufacturer prior to erection.

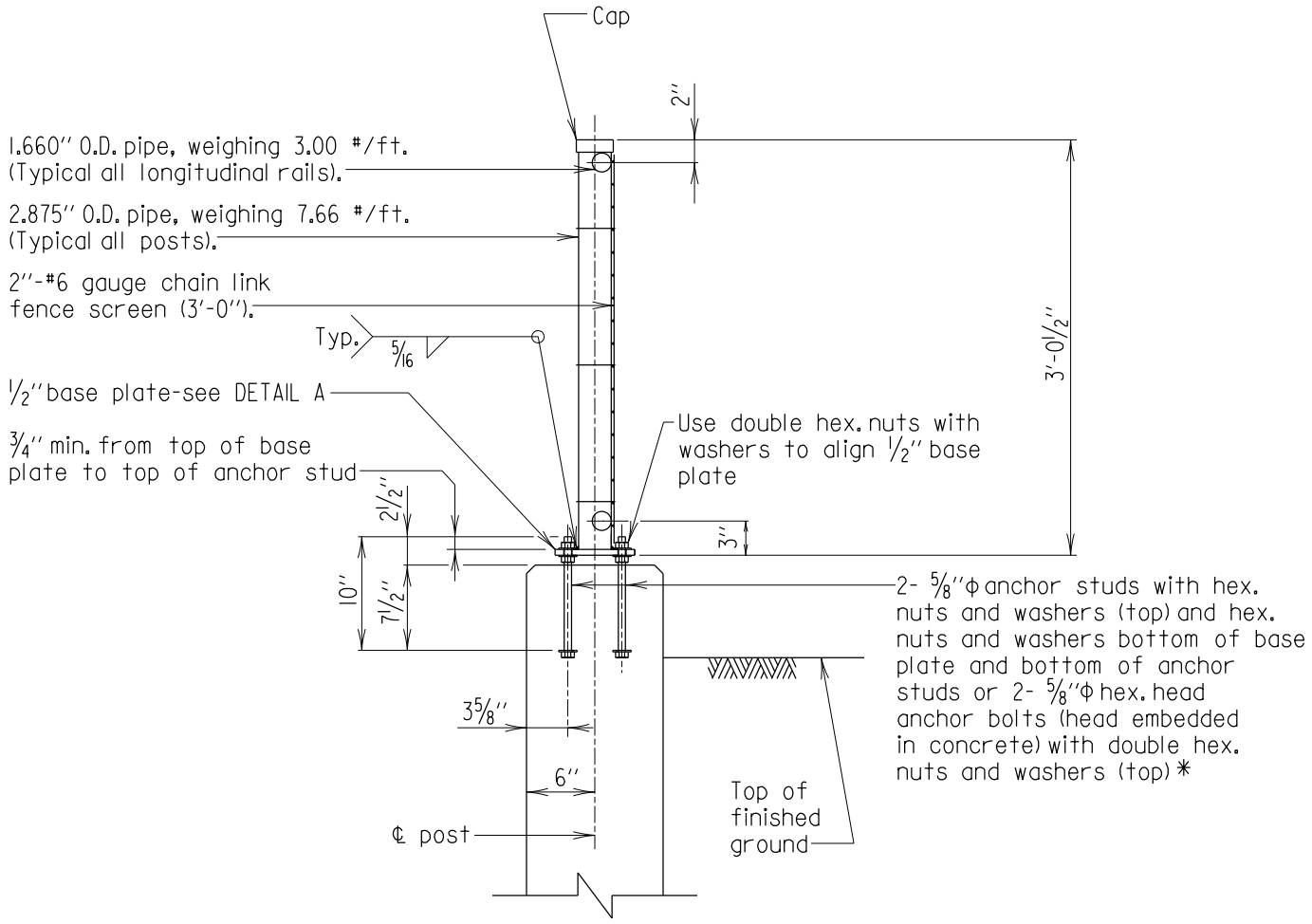
If Contractor elects to place anchor studs after placing concrete wall, newly placed rebars shall be located so that coring does not damage same, all holes shall be cored (not drilled) and the diameter of the cored holes for the anchor studs shall be $\frac{7}{8}$".

Measurement and Payment: The furnishing, fabricating, erecting, etc., of all new chain link fence on the retaining wall or culvert headwalls and wing walls, complete in place, will not be measured for payment but all costs thereof shall be included in the Contract lump sum prices for the pertinent Retaining Wall or Box Culvert item(s).

Any defects uncovered by the inspection of welds on base plates and poles shall be repaired or replaced by new members at no additional cost to the Administration.

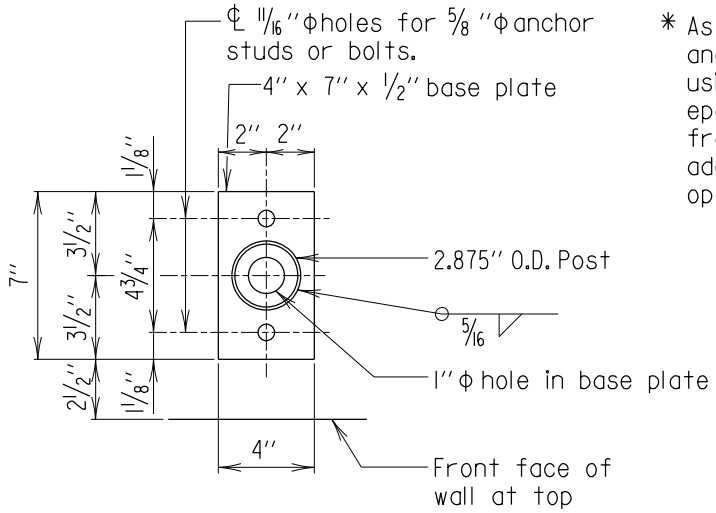
APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES DATE: 07/24/2001	CHAIN LINK SAFETY FENCE RETAINING WALLS AND BOX CULVERTS GENERAL NOTES
VERSION 1.0	DETAIL NO. SUP-FR(FN)-301 SHEET 1 OF 1

SUPER FENCE/RAILING



TYPICAL SECTION

Scale: 3/4'' = 1'-0''



DETAIL A

Scale: 1 1/2'' = 1'-0''

* As an option, the Contractor may set the anchor studs after placing concrete wall using 7/8'' dia. cored holes and an approved epoxy grout. Nuts and washers shall be omitted from the embedded ends of anchor studs. No additional compensation will be allowed for this option.

Note:
This fence shall be used on box culverts with headwalls located at the bottom of fill slopes.

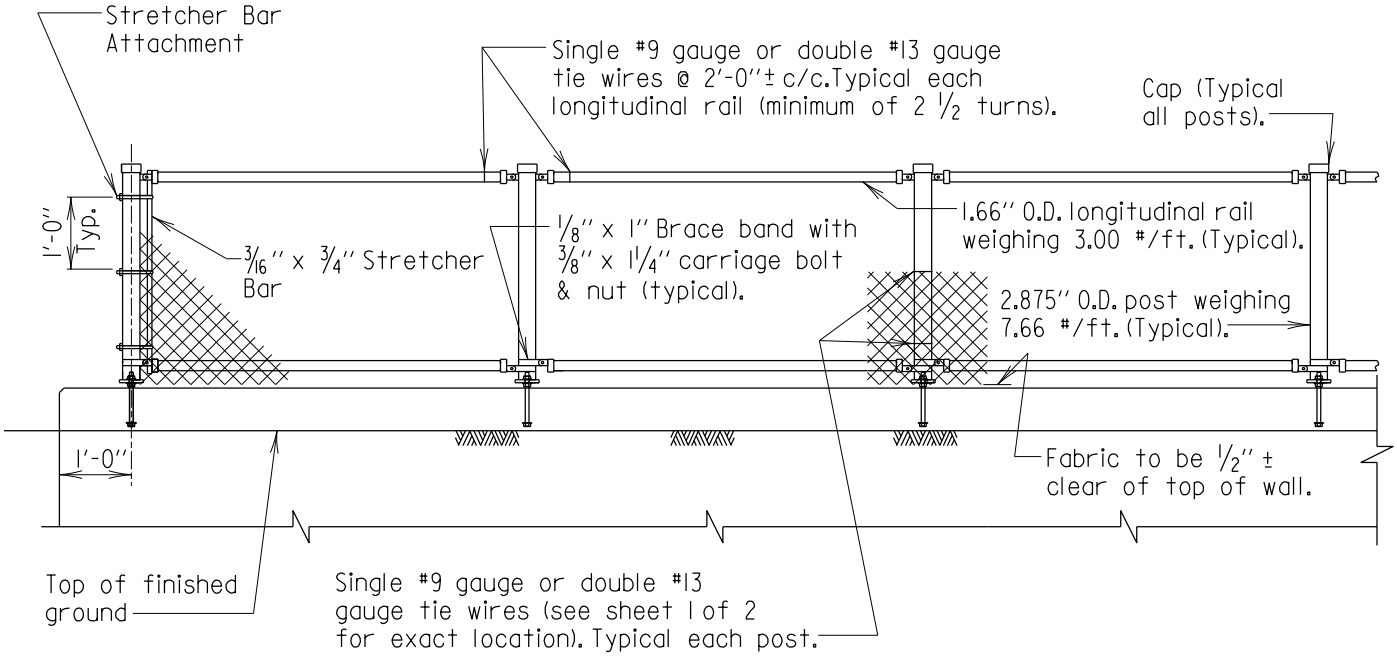
APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 01/14/2014
VERSION
1.0

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

TYPE III CHAIN LINK SAFETY FENCE RETAINING WALLS AND BOX CULVERTS

DETAIL NO. SUP-FR(FN)-302 SHEET 1 OF 2

SUPER FENCE/RAILING



ELEVATION

Scale: 3/8" = 1'-0"

Note:
For additional details see Det. No. SUP-FR(FN)-204

APPROVAL
C.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 01/14/2014
VERSION
1.0

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

TYPE III CHAIN LINK SAFETY FENCE RETAINING WALLS AND BOX CULVERTS

DETAIL NO. SUP-FR(FN)-302 SHEET 2 OF 2

SUPER FENCE/RAILING

GENERAL NOTES

Specifications: Latest SHA Specifications and Special Provisions for materials and construction. Latest AASHTO Standard Specifications for Highway Bridges for design.

Materials: All posts and pickets shall be hot rolled steel conforming to A 787, G90. All rail channels shall be rolled "U" channels conforming to A 653, G90. All steel shall be hot dipped galvanized in conformance with A 525, G90.

All pickets for the fences shall be square with 16 gauge thickness and a tensile strength of 50,000 psi.

All horizontal rails for the fence shall be 1⅜" wide by 1½" deep, and shall be rolled into "U" channels with a wall thickness of 0.12".

Rail attachment bracket shall be die cast of zinc per ASTM B 86-83 Z 33521. Ball and socket design capable of 30 degrees swivel. Bracket shall fully encapsulate rail end.

Rings shall be cast aluminum. Attach rings to top rail by inserting mounting block into top rail and riveting through side of rail using ¼" rivet. Hold bottom of ring in place by inserting dowel that protrudes from ring through predrilled hole in middle rail. Rings may be omited if the slope of the railing is set at an angle more than 10 degrees.

Vertical posts for the fence shall be 2" square with a 14 gauge thickness and a tensile strength of 50,000 psi.

All anchor plates shall be steel conforming to A 709, Grade 50.

Anchor studs or anchor bolts shall conform to A 276, Type 430 or Type 304 stainless steel annealed, hot-finished, ultimate strength 70,000 psi min., 20% min. elongation. Threads may be rolled or cut.

Epoxy grout for anchor studs in cored holes shall conform to 902.11 (d).

Construction: All picket, rail, bracket and post attachments shall be made with ¼" industrial drive rivets.

All longitudinal rails shall be parallel to top of wall.

All metal shall be given a polyester resin based powder coating applied by the electrostatic spray process.

The finished color shall be black.

For post spacing see pertinent structure sheets.

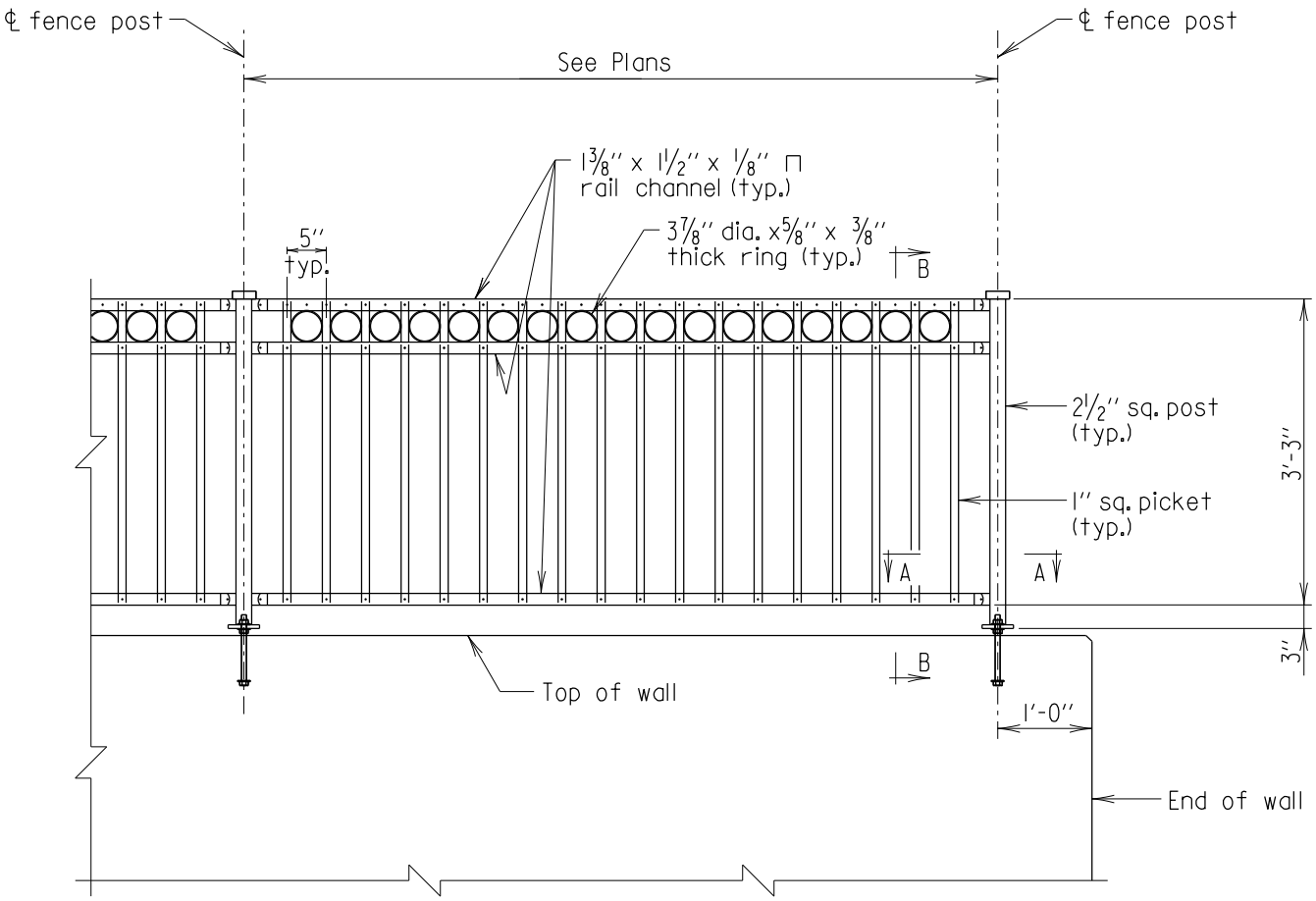
Precoated longitudinal rails, if cut, shall have the cut end coated with touch up material supplied by the manufacturer prior to erection.

Measurement and Payment: The furnishing, fabricating, erecting, etc., of all new fence on the bridges, complete in place, will not be measured for payment but all costs thereof shall be incidental to the '5-foot Ornamental Fence' item.

Any defects uncovered by the inspection of welds on base plates and posts shall be repaired or replaced by new members at no additional cost to the Administration.

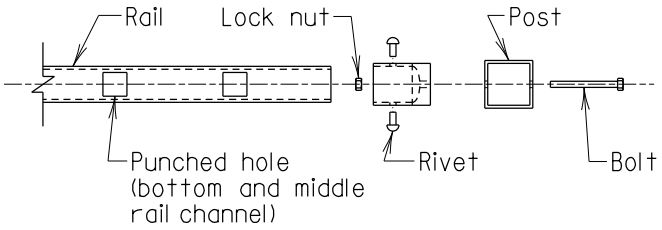
APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES DATE: 02/10/2017	ORNAMENTAL FENCE GENERAL NOTES
VERSION 1.0	DETAIL NO. SUP-FR(FN)-401 SHEET 1 OF 1

SUPER FENCE/RAILING.



ORNAMENTAL FENCE ELEVATION

Scale: 1/2" = 1'-0"

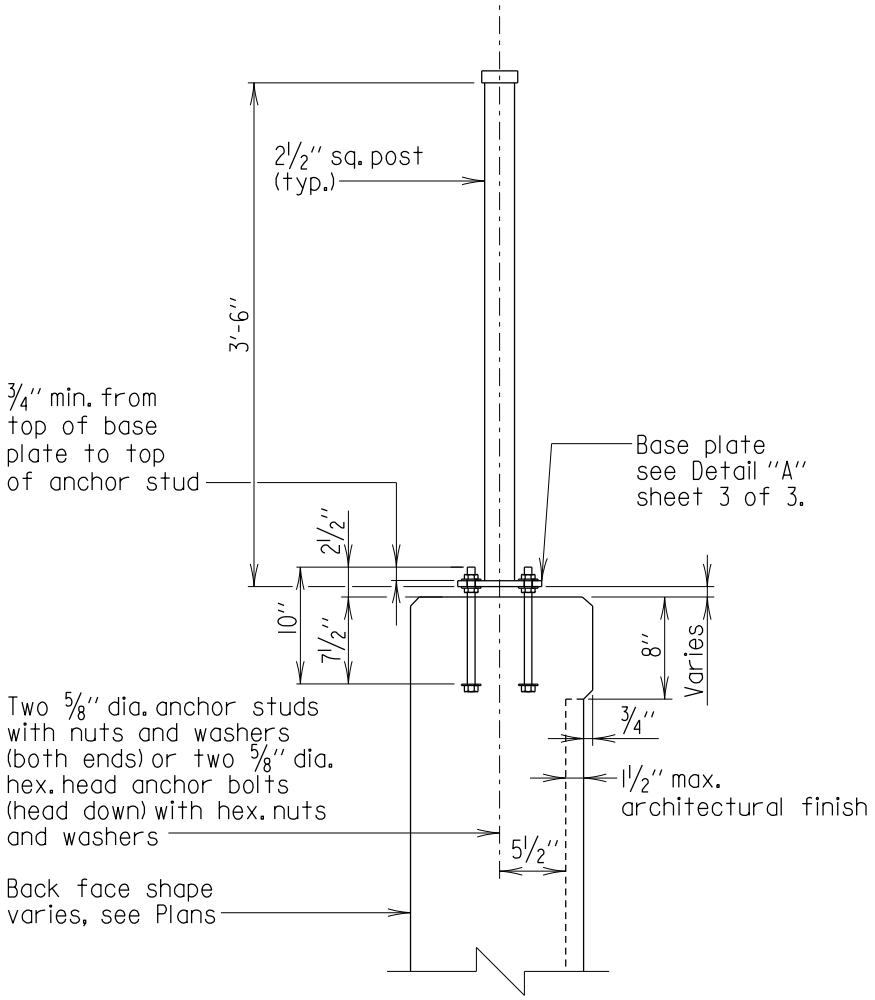


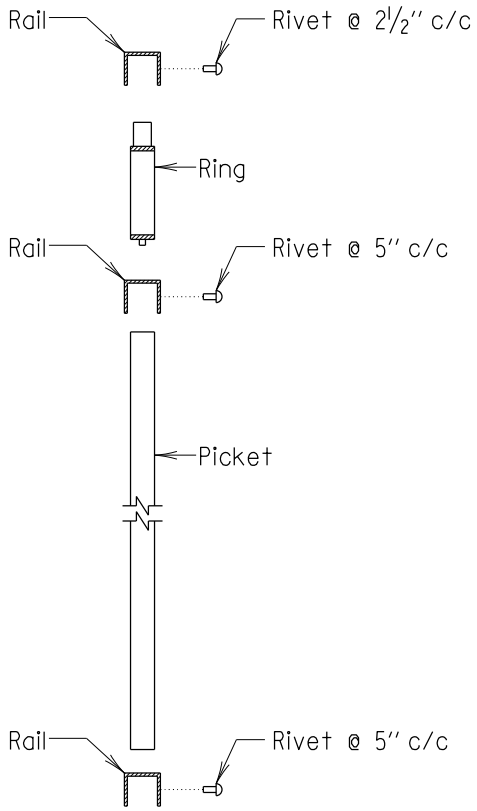
SECTION A-A (EXPLODED)

Scale: 1 1/2" = 1'-0"

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
Glenn Clingenpeel DIRECTOR OFFICE OF STRUCTURES DATE: 02/10/2017	3 FOOT ORNAMENTAL FENCE DETAILS
VERSION 1.0	DETAIL NO. SUP-FR(FN)-402 SHEET X OF X

SUPER FENCE/RAILING





TYPICAL SECTION

Scale: ¾" = 1'-0"

SECTION B-B (EXPLODED)

Scale: 1½" = 1'-0"

Notes:
1. All fence posts shall be set normal to top of wall.
2. All longitudinal rail channels shall be parallel to top of wall.
3. For fence post spacing, see General Plan and Elevation.

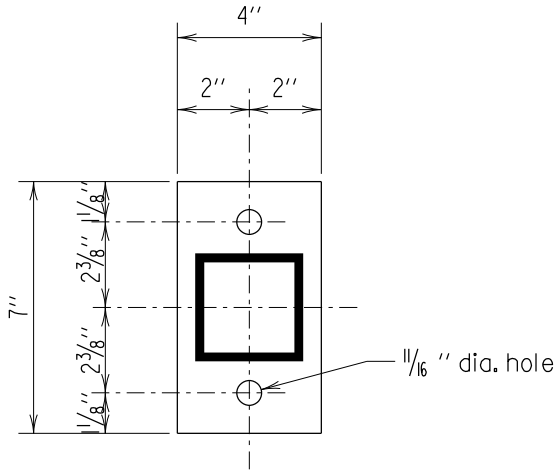
APPROVAL
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES
DATE: 02/10/2017
VERSION
1.0

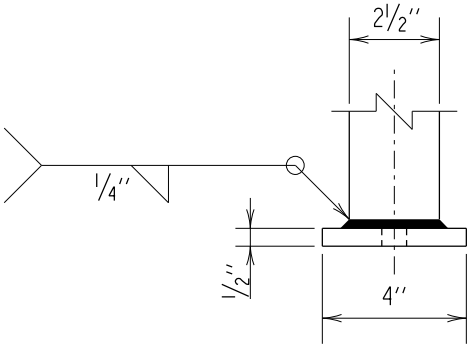
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

3 FOOT ORNAMENTAL FENCE DETAILS

DETAIL NO. <DETAIL NO.> SHEET 2 OF 3

SUPER FENCE/RAILING.



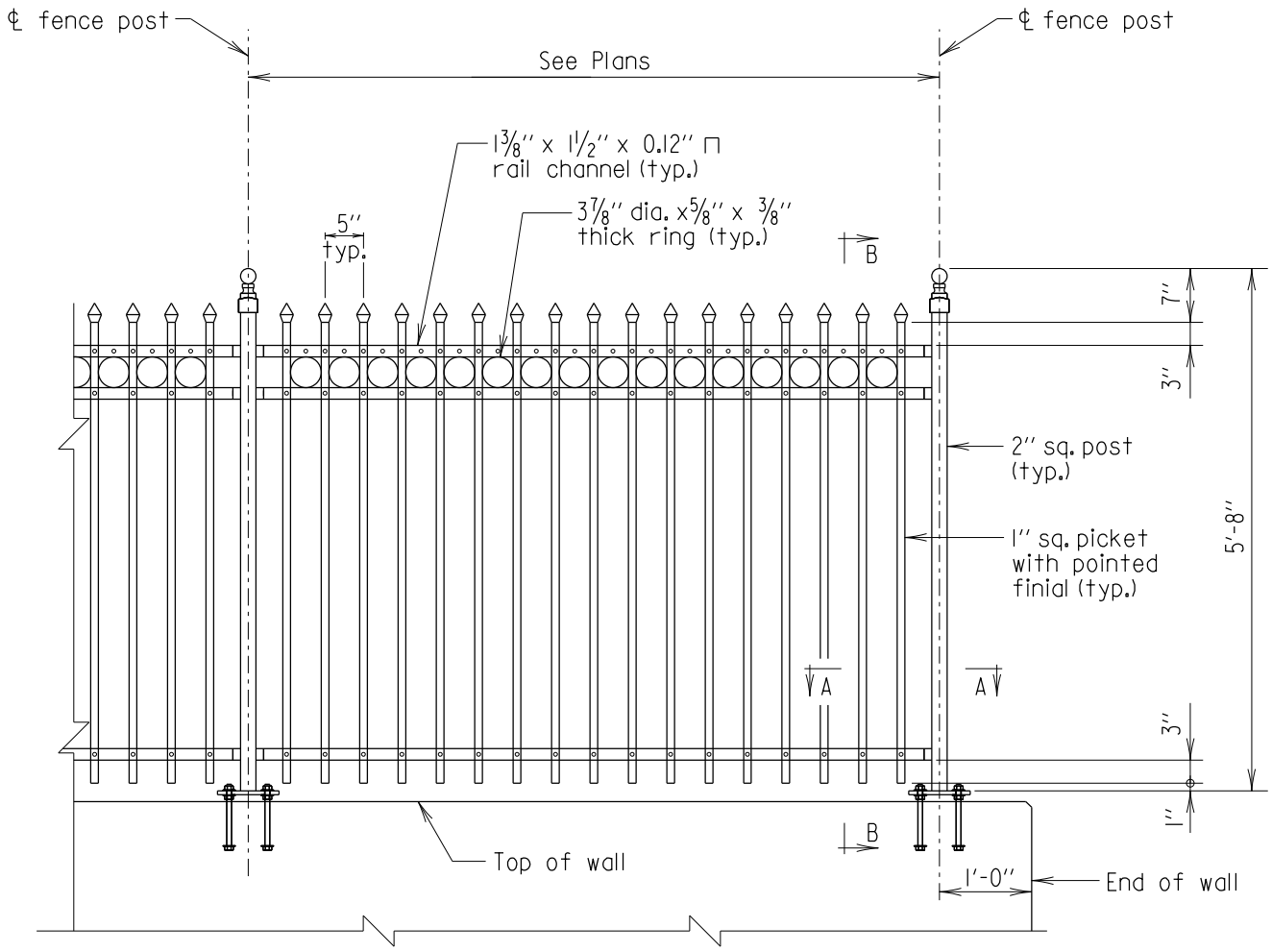


TYPICAL SECTION

Scale: 3'' = 1'-0''

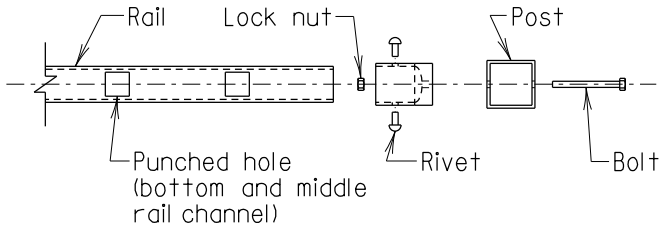
APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES DATE: 02/10/2017	3 FOOT ORNAMENTAL FENCE BASE PLATE DETAILS
VERSION 1.0	DETAIL NO. SUP-FR(FN)-402 SHEET 3 OF 3

SUPER FENCE/RAILING.



ORNAMENTAL FENCE ELEVATION

Scale: 1/2" = 1'-0"

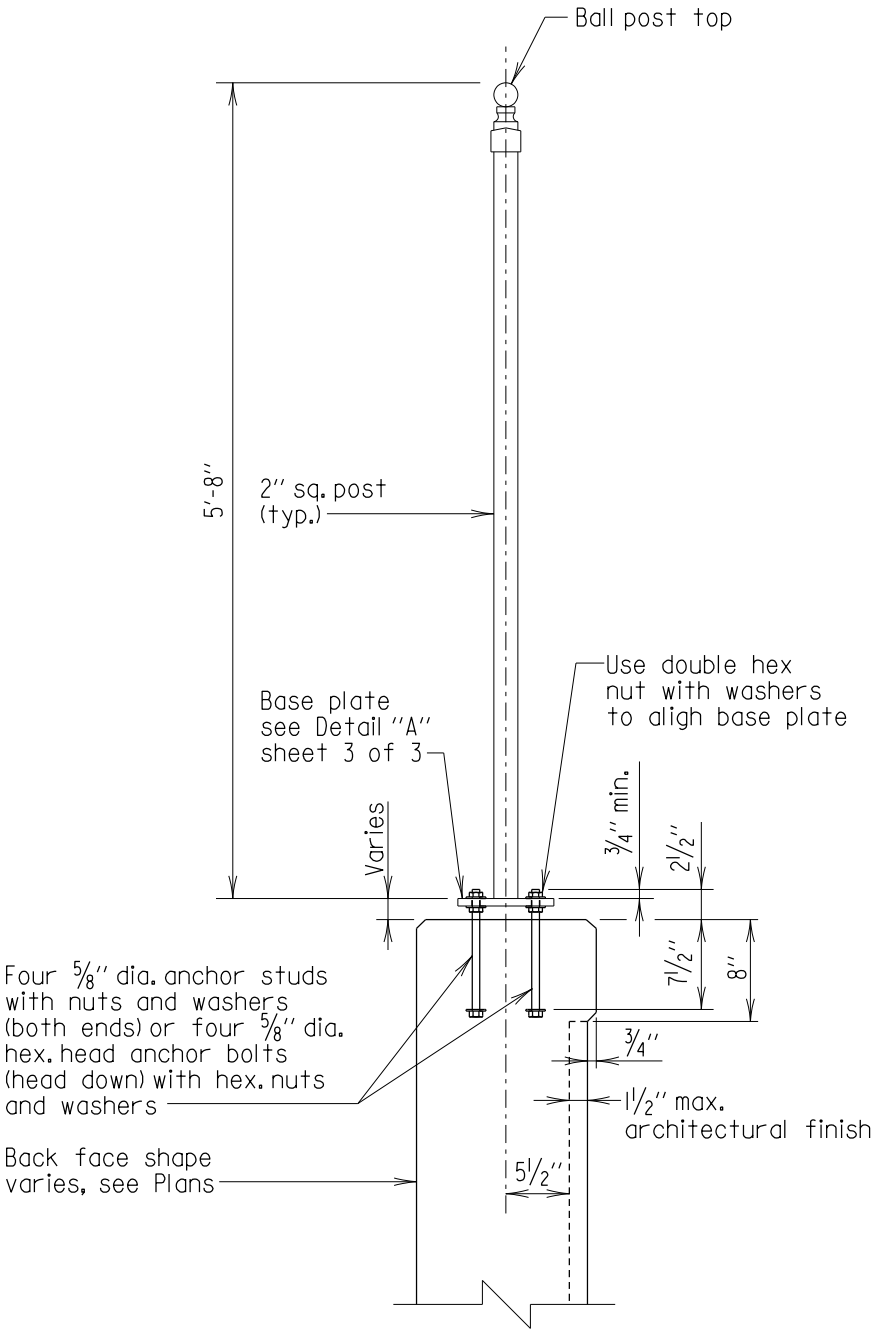


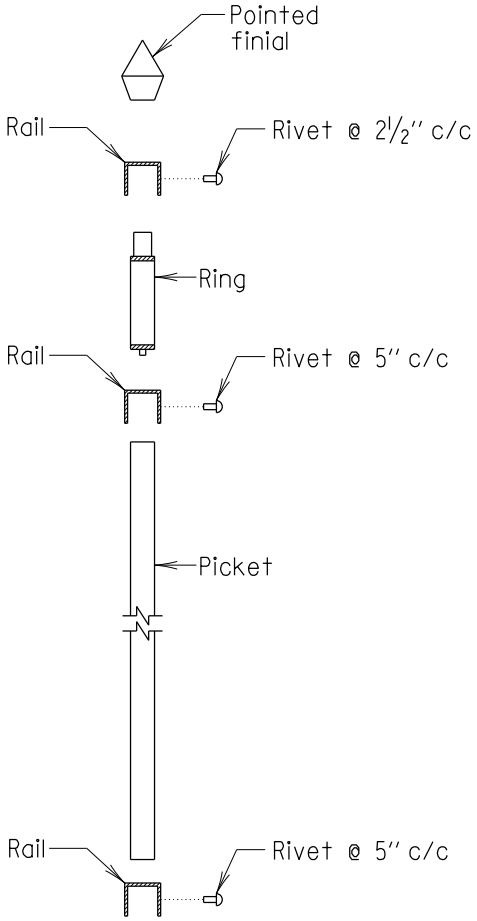
SECTION A-A (EXPLODED)

Scale: 1 1/2" = 1'-0"

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES DATE: 02/10/2017	5 FOOT ORNAMENTAL FENCE DETAILS
VERSION 1.0	DETAIL NO. SUP-FR(FN)-403 SHEET 1 OF 3

SUPER FENCE/RAILING.





TYPICAL SECTION

Scale: 3/4" = 1'-0"

SECTION B-B (EXPLODED)

Scale: 1 1/2" = 1'-0"

Notes:
1. All fence posts shall be set plumb.
2. All longitudinal rail channels shall be parallel to top of wall.
3. For fence post spacing, see General Plan and Elevation.

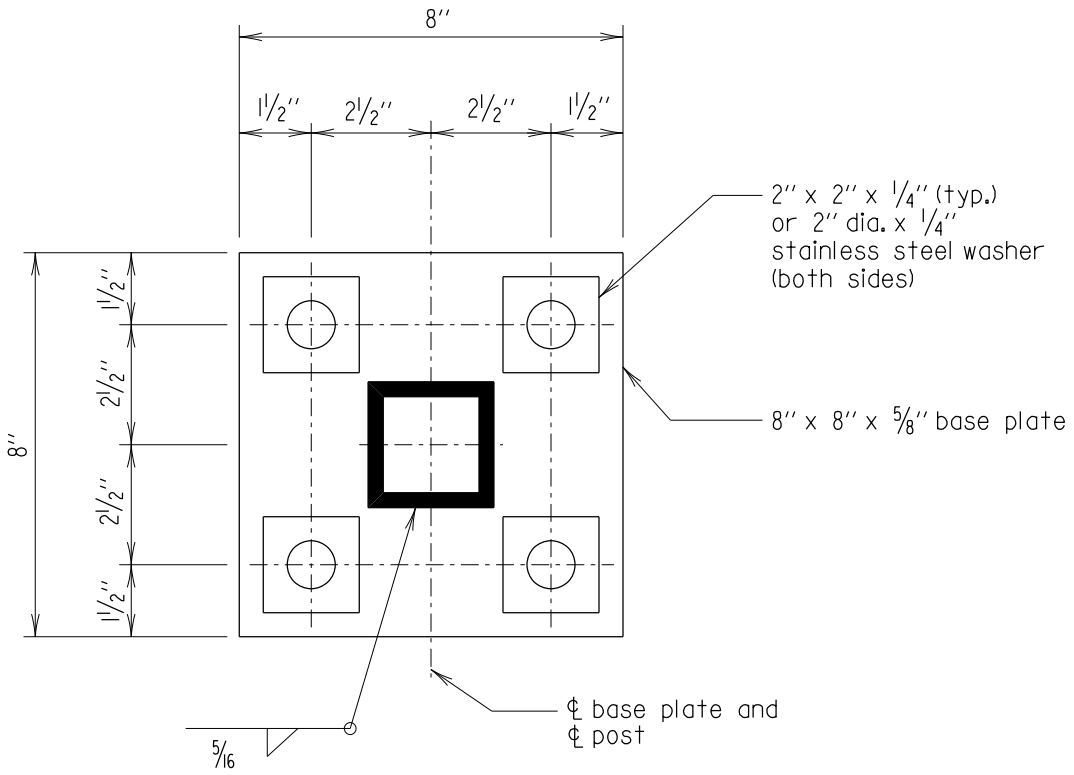
APPROVAL
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES
DATE: 02/10/2017
VERSION
1.0

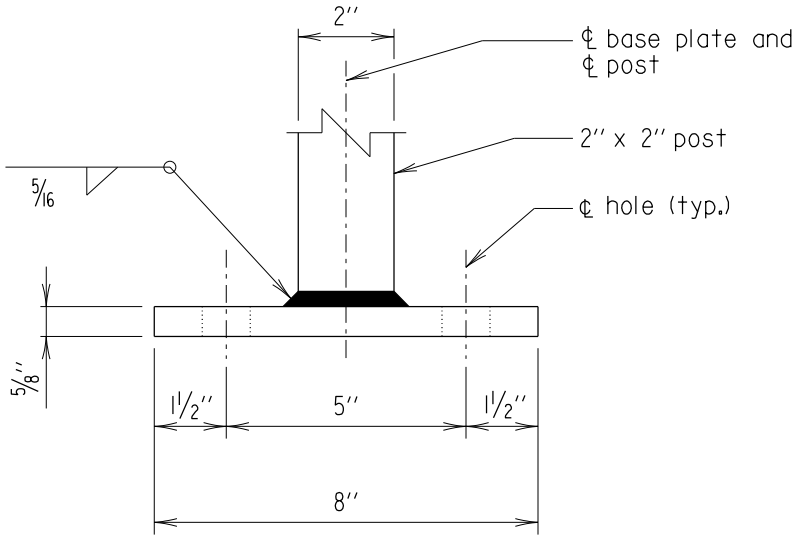
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

5 FOOT ORNAMENTAL FENCE DETAILS

DETAIL NO. SUP-FR(FN)-403 SHEET 2 OF 3

SUPER FENCE/RAILING.





DETAIL ''A''

Scale: 3'' = 1'-0''

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES DATE: 02/10/2017	5 FOOT ORNAMENTAL FENCE BASE PLATE DETAILS
VERSION 1.0	DETAIL NO. SUP-FR(FN)-403 SHEET 3 OF 3

SUPER FENCE/RAILING.

Chapter 03 - Superstructure

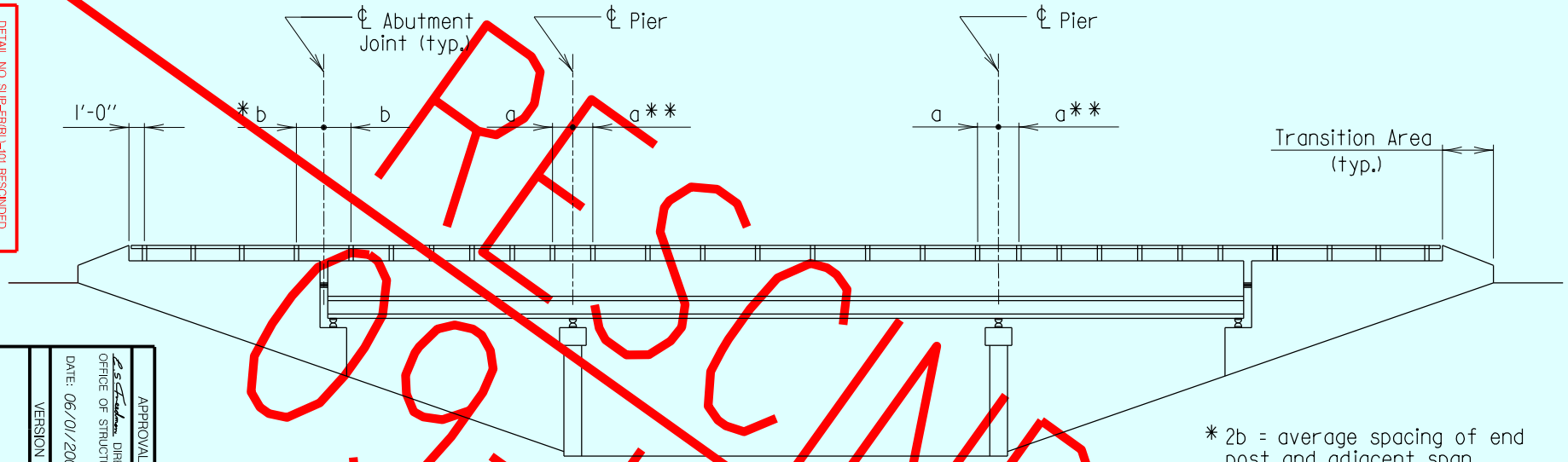
Section 04 – Fence and Railing

SUB-SECTION **02**

RAILING

(SUP-FR(RL))

DETAIL NO. SUP-FR(RL)-101 RESCINDED
SEE BRIDGE DESIGN MANUAL
FOR INFORMATION ON RAILINGS



* 2b = average spacing of end post and adjacent span.
** 2a = average spacing of flanking spans.

ELEVATION - RAILING
Scale: None

POST SPACING ON BRIDGES WITH ONE OR TWO STRAND RAILING

- All spacings shall be equal in each span, and on each end post.
- Rail post spacing should range from 6'-0" min. to 8'-0" max. unless a closer post spacing is required due to crash test and as modified in the transition area described on Sheet 2. Effort should be made to make spacing of posts for all spans as nearly equal as possible.
- Transition areas shall be provided on both ends of the bridge comprised of a tapered concrete lug as shown on Sheet 2 of 2.
- Rail shall be continuous across all supports.

RESCINDED
09-11-2019

APPROVAL
DIRECTOR
OFFICE OF STRUCTURES
DATE: 06/01/2005
VERSION
1.0

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

LAYOUT OF RAILING ON BRIDGES

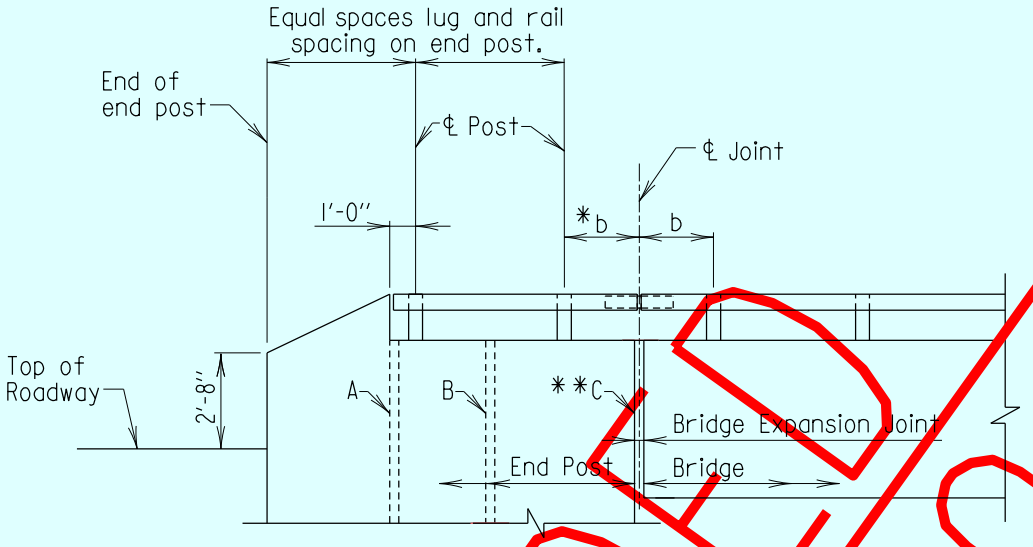
DETAIL NO. SUP-FR(RL)-101

SHEET 1 OF 2

* FOR OFFICE USE ONLY *

* GUIDE SHEET FOR PLAN DEVELOPMENT ONLY - DO NOT INCLUDE THIS SHEET IN CONTRACT PLANS *

SUPER FENCE/RAILING



* 2b = average spacing of end post and adjacent span.

ELEVATION - END POST TRANSITION AREA

Scale: None

Notes:
1. Transition areas should be provided on both ends of the bridge, comprised of a tapered concrete lug.
2. Transition areas will always begin at the end of the end posts and be laid out in accordance with the following chart.
3. All rail spaces shall be equal in each span.

END POST TRANSITION AREA

Roadway Joint Location	End Post Length	Rail Panels on End Post
A	L ≤ 8'-0"	0
B	8'-0" < L ≤ 12'-0"	1/2
**C	20'-0" < L	(n + 1/2) full rail panel

** Location of Bridge Expansion Joint C varies depending on the number of full height rail panels on the endpost.

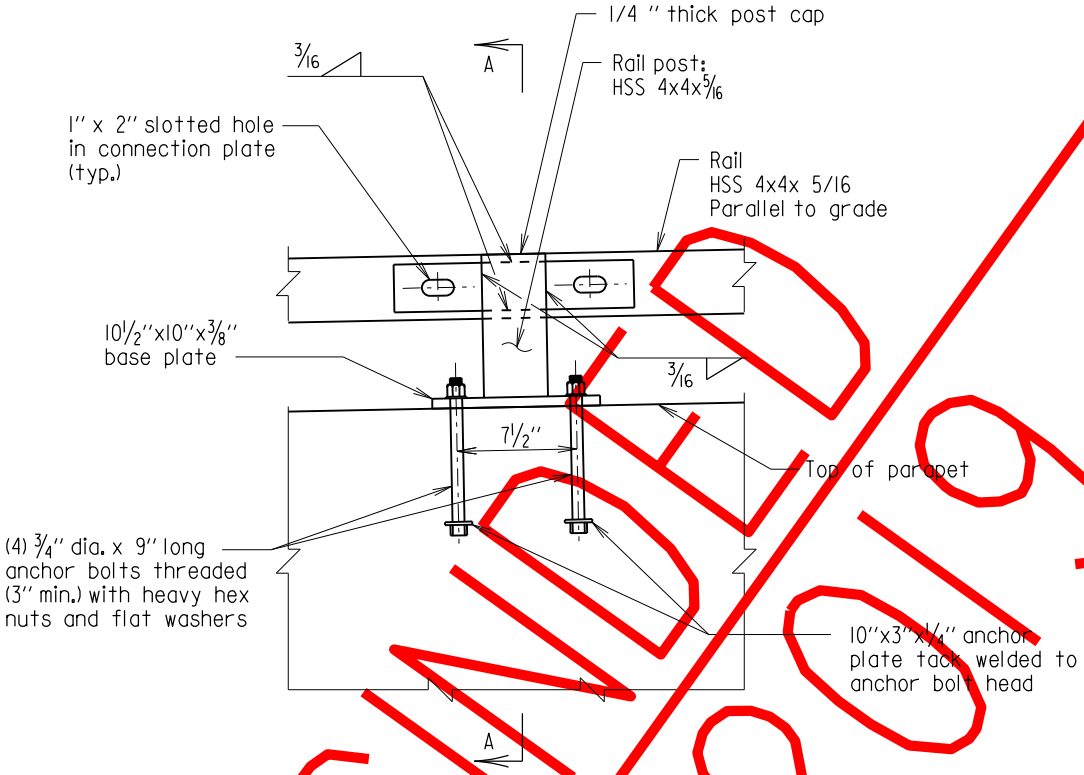
n = the number of full rail panels on the end post

DETAIL NO. SUP-FR(RL)-101 RESCINDED
SEE BRIDGE DESIGN MANUAL
FOR INFORMATION ON RAILINGS

* FOR OFFICE USE ONLY *

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES DATE: 06/01/2005	LAYOUT OF RAILING ON BRIDGES
VERSION 1.0	DETAIL NO. SUP-FR(RL)-101 SHEET 2 OF 2

SUPER FENCE/RAILING



REAR ELEVATION

Scale: 1" = 1'-0"

GENERAL NOTES:

1. All railings shall be fabricated and erected as indicated on the Plans and in accoradance with Standard Spcifications section 461.
2. Rail shall be parallel to the grade of the roadway. Rail sections shall be attached to as many posts as possible, but not less than two.
3. The center line of any splice and/or expansion joint shall be located at least 2'-0" away from center line of a post except where indicated otherwise on Plans. Whenever possible, the splice shall be located over the expansion joints in the parapet.
4. Rail elements shall be structural tubing in accordance with ASTM A500 Grade B, A618 or A501.
5. Steel posts and plates shall conform to ASTM A36 unless otherwise noted.
6. All bolts shall be ASTM A325 with heavy hex nuts and washers, as specified, unless noted otherwise.
7. The nut securing the post base plate to the concrete shall be tightened to a snug fit and given an additional 1/8 turn.
8. Posts shall be set perpendicular to top of curb. For post spacing see Plans (Maximum 10'-0" Spacing).
9. Ends of tube sections shall be sawed. Grind smooth exposed edges. All cut ends shall be true and smooth and capped.
10. All structural steel including fasteners shall be hot-dip galvanized as per ASTM A-123 after fabrication, except as noted. All anchor plates shall be attached before galvanizing.
11. In setting anchor bolts be sure enough threads are exposed so that nuts can be completely attached (1 1/2" min.).

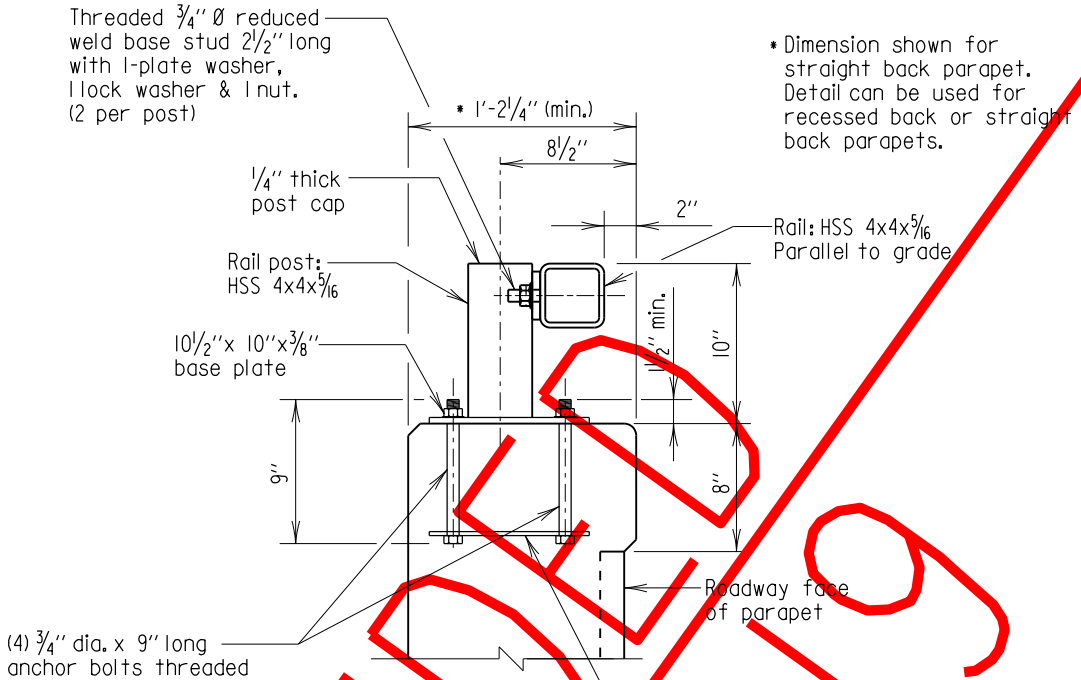
DETAIL NO. SUP-FR(RL)-201 RESCINDED
THIS RAILING IS NOT
MASH COMPLIANT

APPROVAL
Ben C Dayhoff DIRECTOR OFFICE OF STRUCTURES
DATE: 02/13/2019
VERSION
1.0

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

ONE-STRAND PARAPET-MOUNTED PEDESTRIAN RAILING (FOR USE ON PARAPETS WITH SIDEWALKS ONLY)

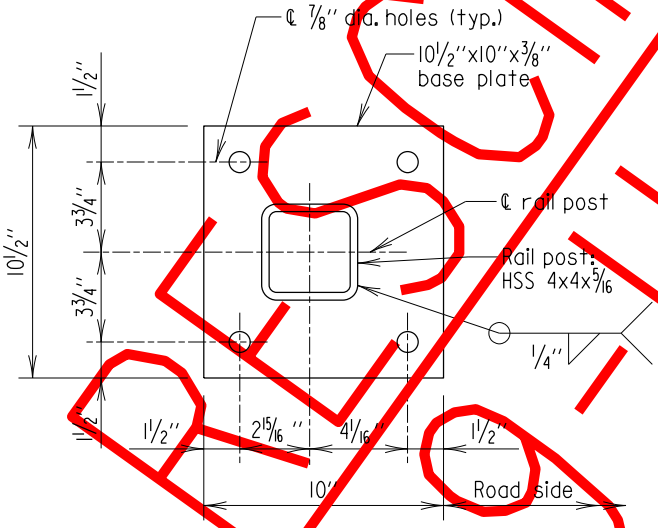
DETAIL NO. SUP-FR(RL)-201 SHEET 1 OF 3



* Dimension shown for straight back parapet. Detail can be used for recessed back or straight back parapets.

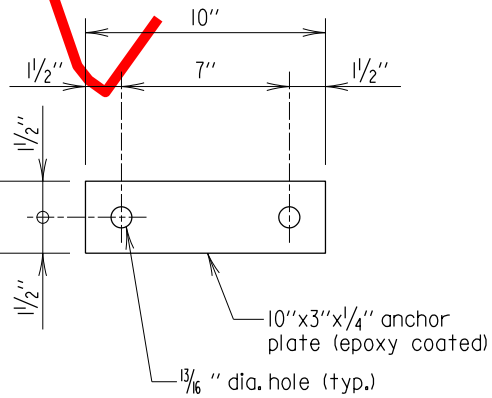
SECTION A-A

Scale: 1" = 1'-0"



PLAN
BASE PLATE DETAIL

Scale: 1 1/2" = 1'-0"



PLAN
ANCHOR PLATE DETAIL

Scale: 1 1/2" = 1'-0"

RESCINDED 09-11-2019

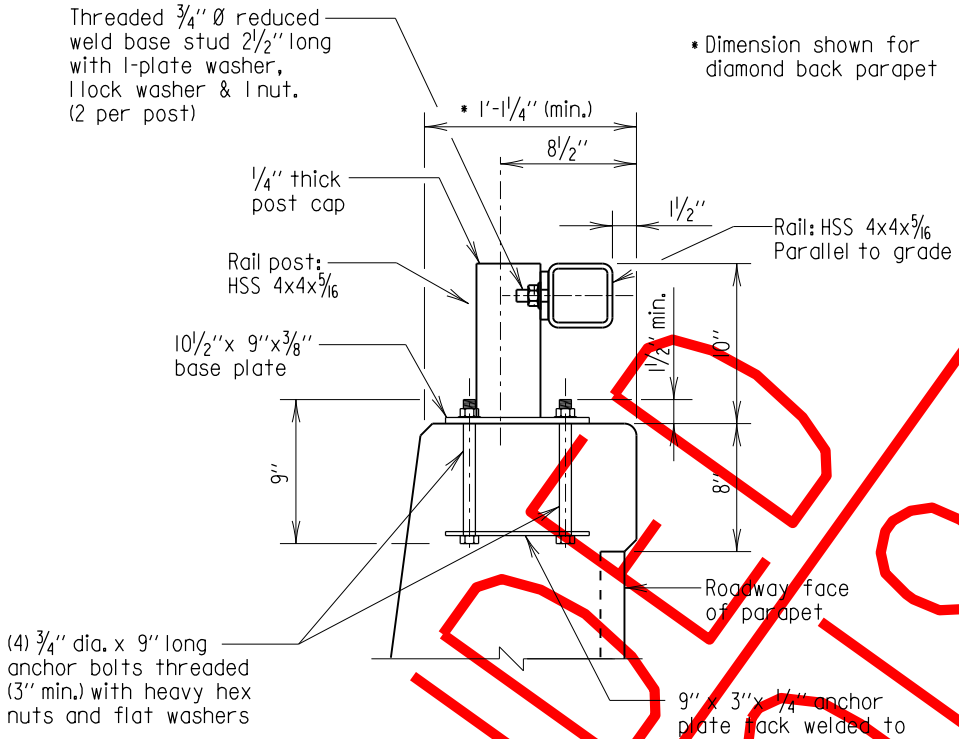
DETAIL NO. SUP-FR(RL)-201 RESCINDED
THIS RAILING IS NOT
MASH COMPLIANT

APPROVAL
Ram C Venkata DIRECTOR OFFICE OF STRUCTURES
DATE: 08/01/2018
VERSION
1.0

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

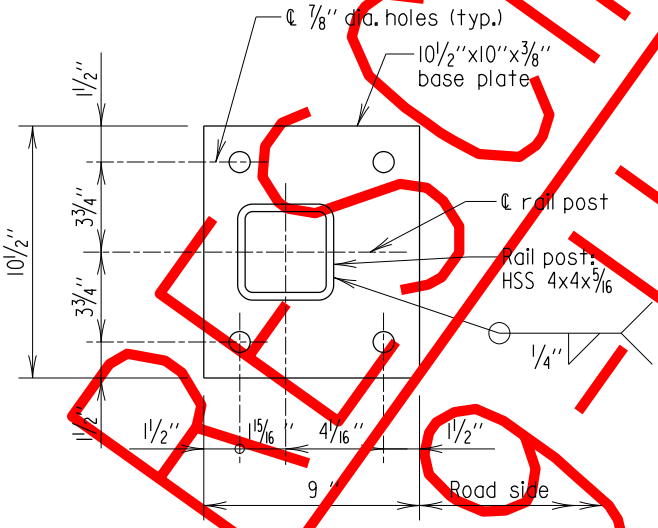
ONE-STRAND PARAPET-MOUNTED PEDESTRIAN RAILING (FOR USE ON PARAPETS WITH SIDEWALK ONLY)

DETAIL NO. SUP-FR(RL)-201 SHEET 2 OF 3



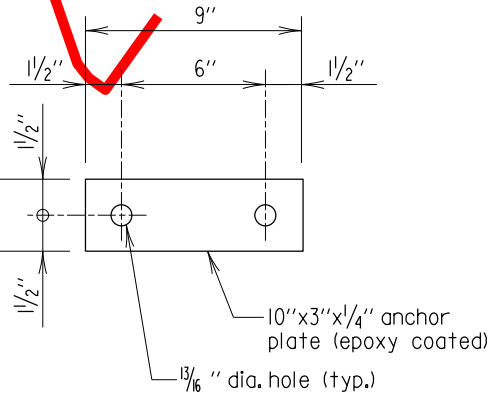
SECTION A-A

Scale: 1" = 1'-0"



PLAN
BASE PLATE DETAIL

Scale: 1 1/2" = 1'-0"



PLAN
ANCHOR PLATE DETAIL

Scale: 1 1/2" = 1'-0"

RESCINDED 09-11-2019

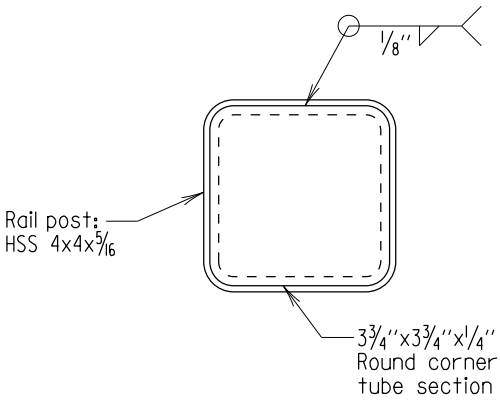
DETAIL NO. SUP-FR(RL)-201 RESCINDED
THIS RAILING IS NOT MASH COMPLIANT

APPROVAL
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES
DATE: 08/01/2018
VERSION
1.0

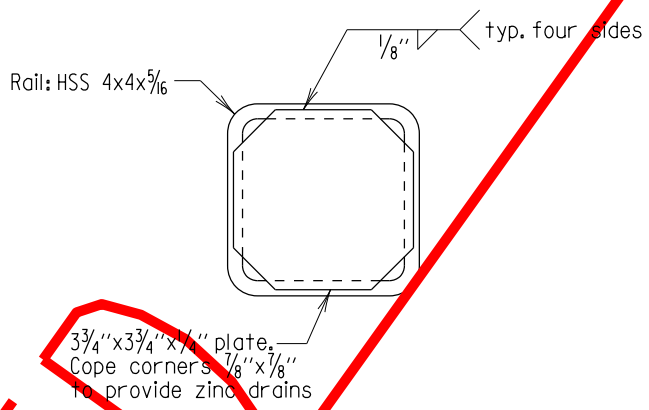
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

ONE-STRAND PARAPET-MOUNTED PEDESTRIAN RAILING (FOR USE ON PARAPETS WITH SIDEWALK ONLY)

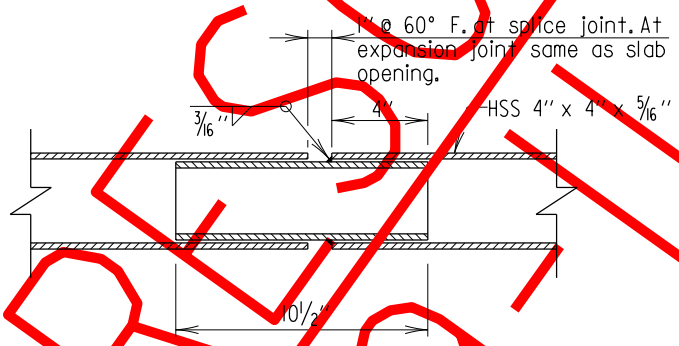
DETAIL NO. SUP-FR(RL)-201 SHEET 2 OF 3



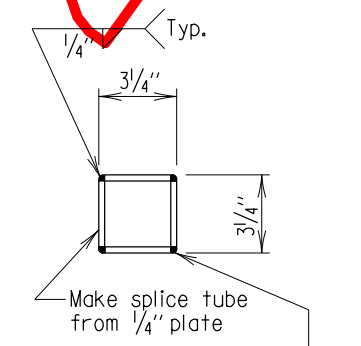
PLAN
RAIL POST CAP DETAIL
Scale: 3" = 1'-0"



ELEVATION
RAIL END CAP DETAIL
Scale: 3" = 1'-0"



PLAN



SECTION - SPLICE TUBE

RAIL SPLICE DETAILS (HSS 4" x 4" x 5/16")
Scale: 1 1/2" = 1'-0"

RESCINDED
09-11-2019

DETAIL NO. SUP-FR(RL)-201 RESCINDED
THIS RAILING IS NOT
MASH COMPLIANT

APPROVAL
Sam C Dayton DIRECTOR OFFICE OF STRUCTURES
DATE: 08/01/2018
VERSION
1.0

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

ONE-STRAND PARAPET-MOUNTED PEDESTRIAN RAILING (FOR USE ON PARAPETS WITH SIDEWALK ONLY)

DETAIL NO. SUP-FR(RL)-201 SHEET 3 OF 3

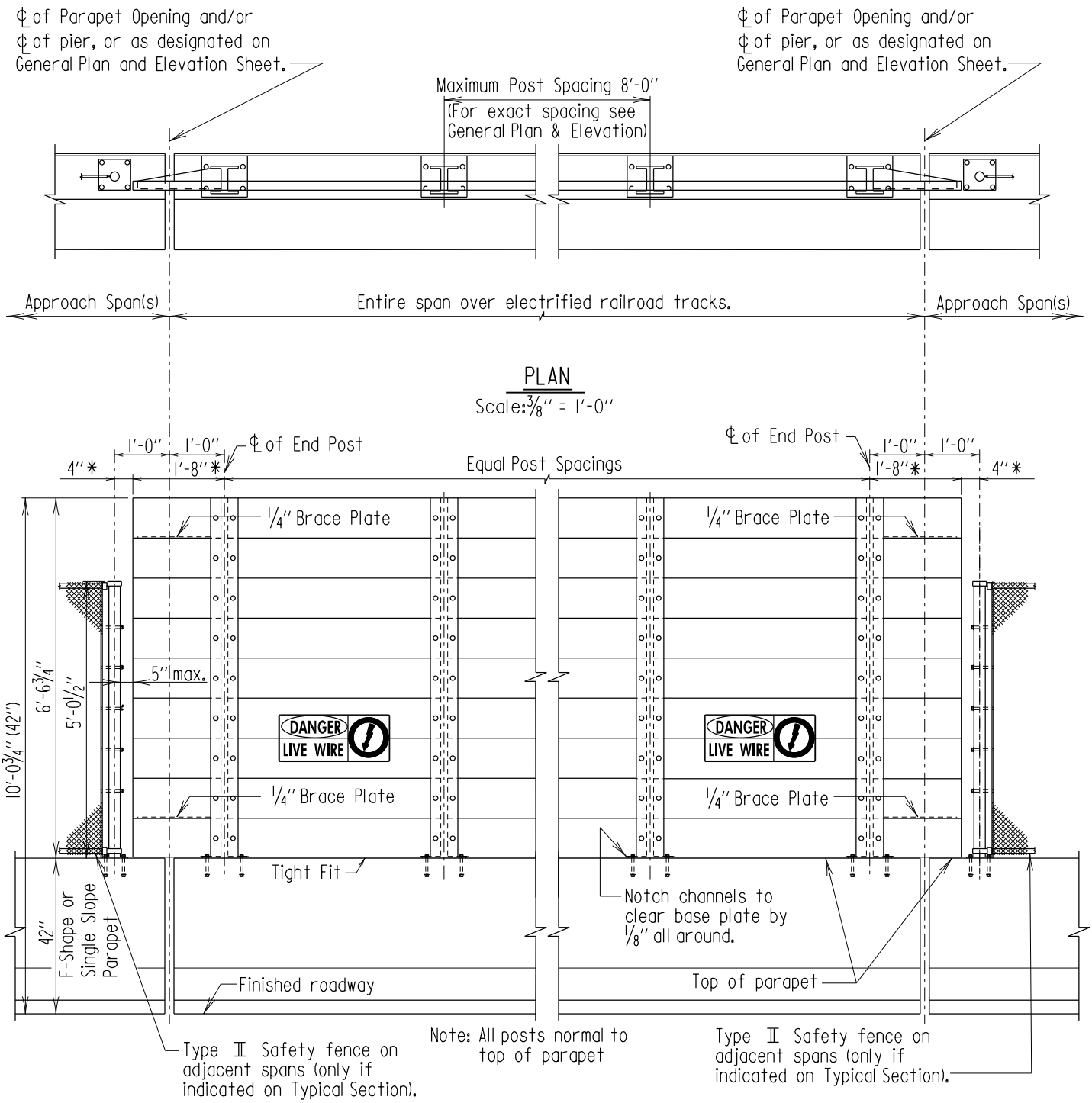
Chapter 03 - Superstructure

Section 04 – Fence and Railing

SUB-SECTION **03**

Railroad Barrier

(SUP-FR(RR))



Note:

1. All shapes and plates (except anchor plates) to be aluminum Designation 6061-T6. Welding of aluminum elements shall follow AWS D1.2.
2. Material for anchor studs shall conform to A.S.T.M. Designation: A-276, Type 430 or Type 304 Stainless Steel, annealed, hot-finished, ultimate strength 70,000 p.s.i. min. 20% min. elongation. Threads to be rolled and not cut.
3. Material for anchor plates shall be steel conforming to A.S.T.M. Designation: A-36 epoxy coated.
4. All hardware not specifically called for on any detail shall be stainless steel A.S.T.M. A-304.

* For both spans fixed at this support; for expansion increase 4" dimension and reduce 1'-8" dimension as necessary. (Maximum clear opening 5").

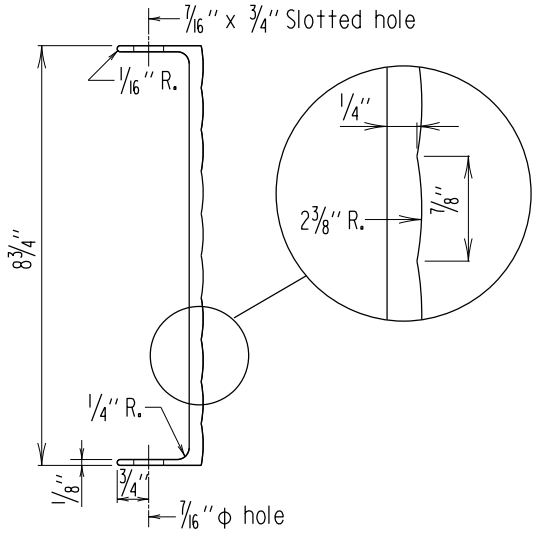
APPROVAL
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES
DATE: 07/25/2019
VERSION
1.01

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

PROTECTIVE BARRIER FOR PORTION OF BRIDGE OVER ELECTRIFIED RAILROAD WITH F-SHAPE OR SINGLE SLOPE PARAPET

DETAIL NO. SUP-FR(RR)-101 SHEET 1 OF 4

SUPER FENCE/RAILING

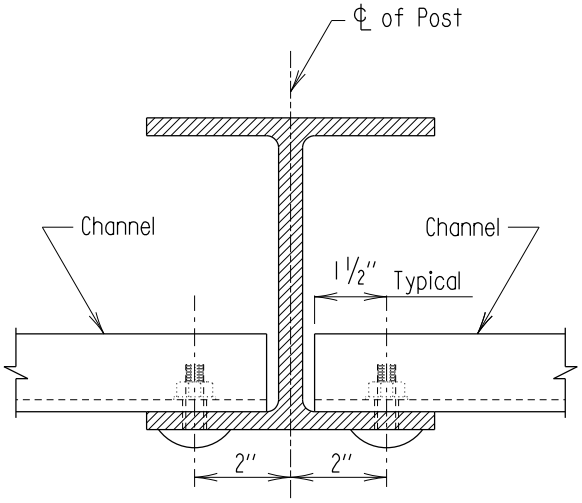


CHANNEL SECTION
Scale: 3" = 1'-0"

TYPICAL SECTION AT POST
Scale: 3" = 1'-0"

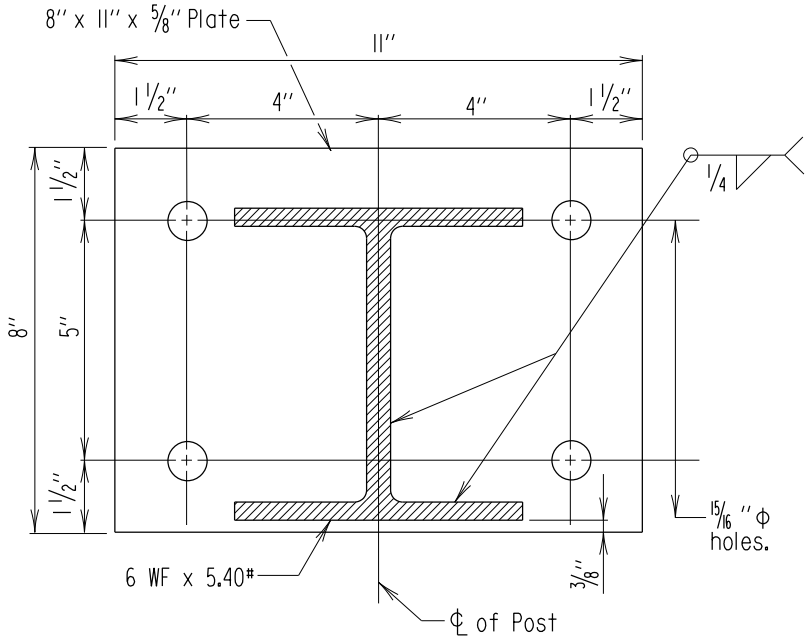
APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES DATE: 07/25/2019	PROTECTIVE BARRIER FOR PORTION OF BRIDGE OVER ELECTRIFIED RAILROAD WITH F-SHAPE OR SINGLE SLOPE PARAPET
VERSION 1.01	DETAIL NO. SUP-FR(RR)-101 SHEET 2 OF 4

SUPER FENCE/RAILING



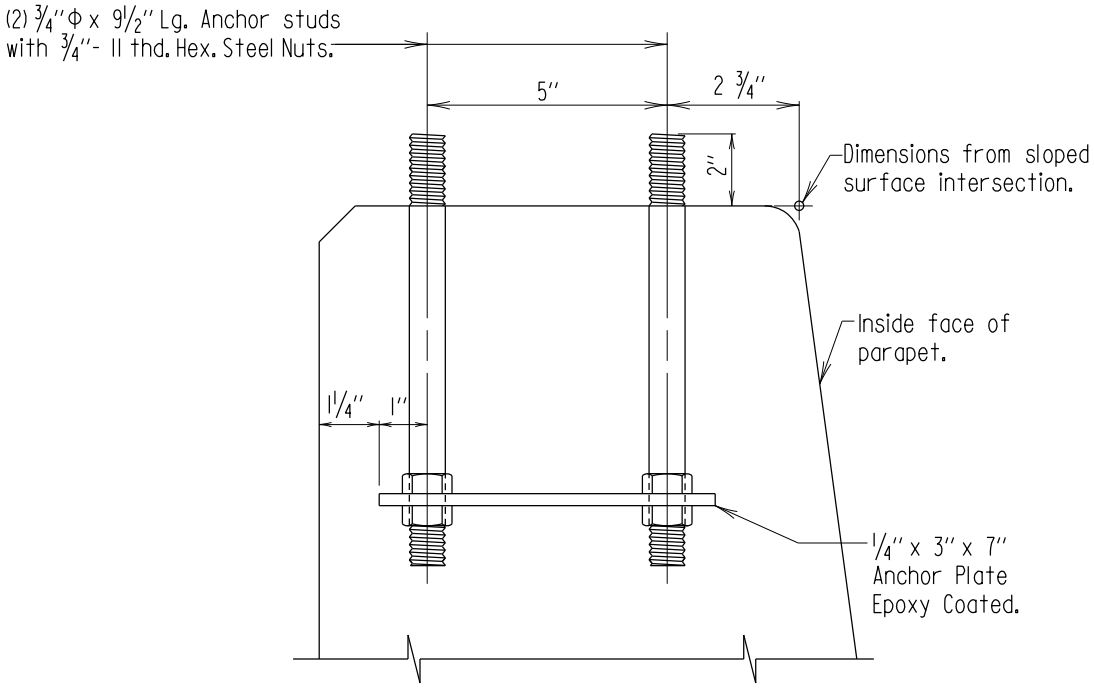
INTERMEDIATE POST CONNECTION

Scale: 3" = 1'-0"



BASE PLATE DETAIL

Scale: 3" = 1'-0"

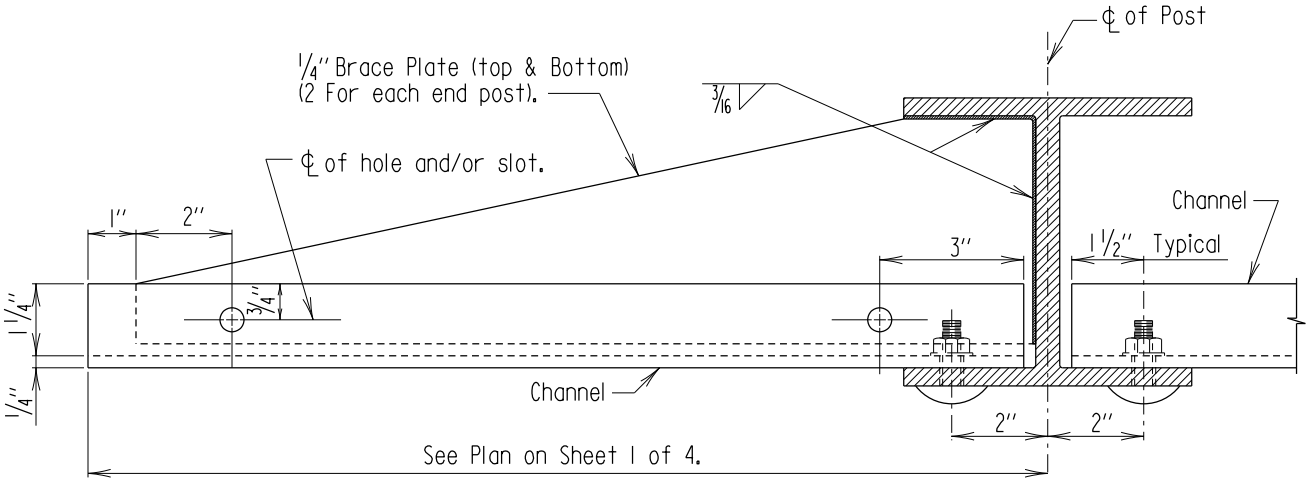


ANCHORAGE DETAIL

Scale: 3" = 1'-0"

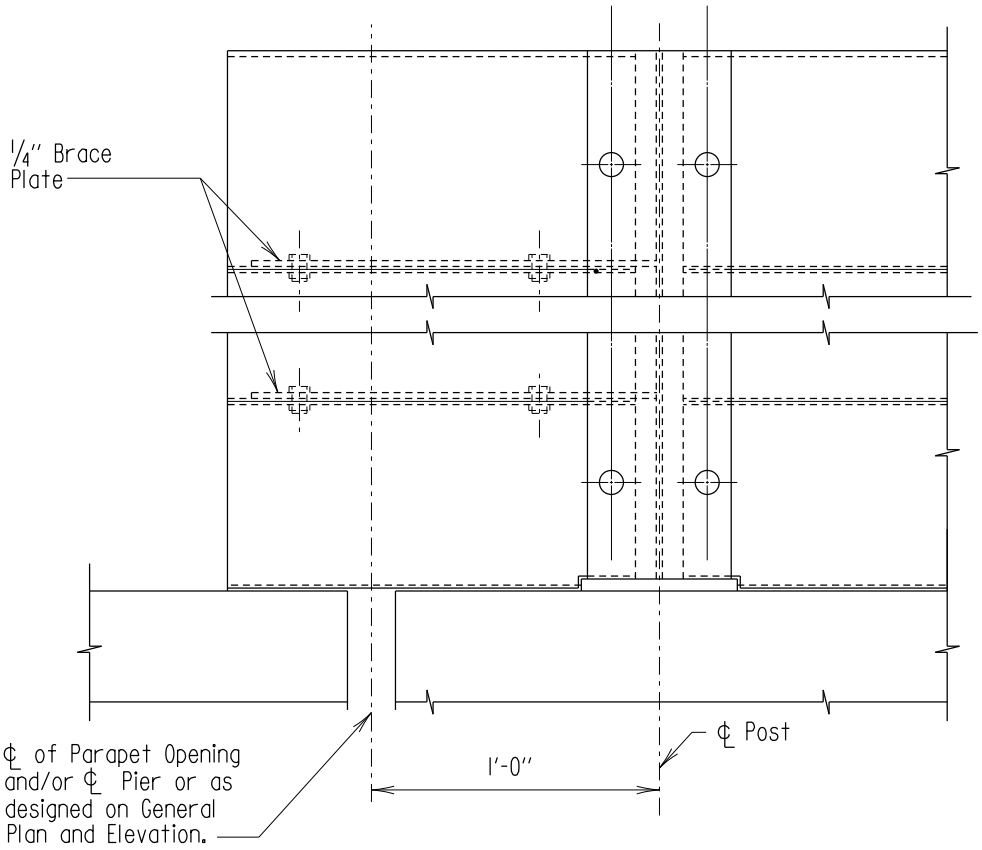
APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES DATE: 07/25/2019	PROTECTIVE BARRIER FOR PORTION OF BRIDGE OVER ELECTRIFIED RAILROAD WITH F-SHAPE OR SINGLE SLOPE PARAPET
VERSION 1.01	DETAIL NO. SUP-FR(RR)-101 SHEET 3 OF 4

SUPER FENCE/RAILING



END POST CONNECTIONS

Scale: 3" = 1'-0"

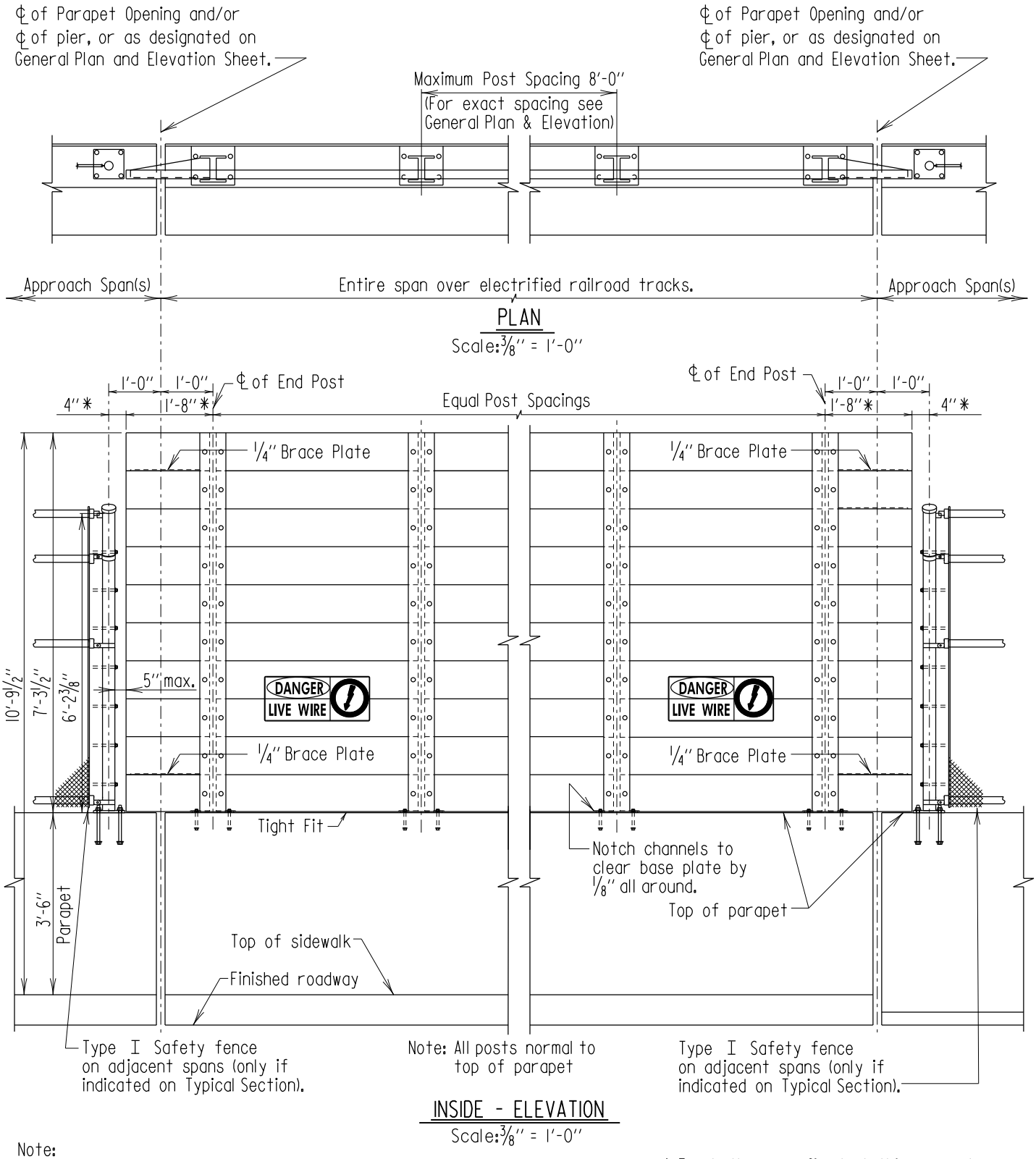


END POST ELEVATION

Scale: 3" = 1'-0"

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES DATE: 07/25/2019	PROTECTIVE BARRIER FOR PORTION OF BRIDGE OVER ELECTRIFIED RAILROAD WITH F-SHAPE OR SINGLE SLOPE PARAPET
VERSION 1.01	DETAIL NO. SUP-FR(RR)-101 SHEET 4 OF 4

SUPER FENCE/RAILING



INSIDE - ELEVATION

Scale: 3/8" = 1'-0"

Note:

1. All shapes and plates (except anchor plates) to be aluminum Designation 6061-T6. Welding of aluminum elements shall follow AWS D1.2.
2. Material for anchor studs shall conform to A.S.T.M. Designation: A-276, Type 430 or Type 304 Stainless Steel, annealed, hot-finished, ultimate strength 70,000 p.s.i. min. 20% min. elongation. Threads to be rolled and not cut.
3. Material for anchor plates shall be steel conforming to A.S.T.M. Designation: A-36 epoxy coated.
4. All hardware not specifically called for on any detail shall be stainless steel A.S.T.M. A-304.

* For both spans fixed at this support; for expansion increase 4" dimension and reduce 1'-8" dimension as necessary. (Maximum clear opening 5").

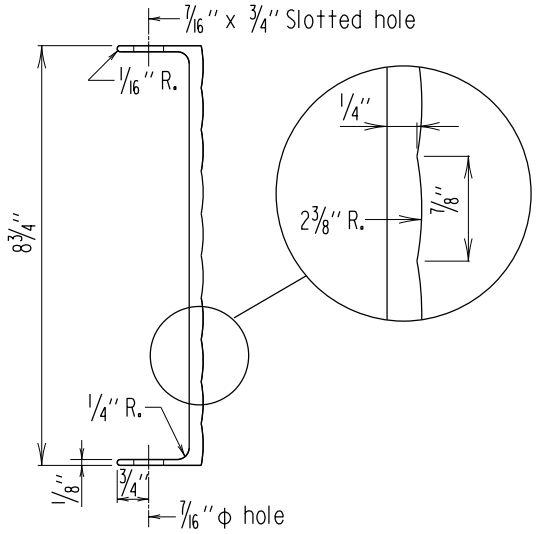
APPROVAL
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES
DATE: 07/25/2019
VERSION
2.00

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

PROTECTIVE BARRIER FOR PORTION OF BRIDGE OVER ELECTRIFIED RAILROAD WITH SIDEWALK

DETAIL NO. SUP-FR(RR)-102 SHEET 1 OF 4

SUPER FENCE/RAILING

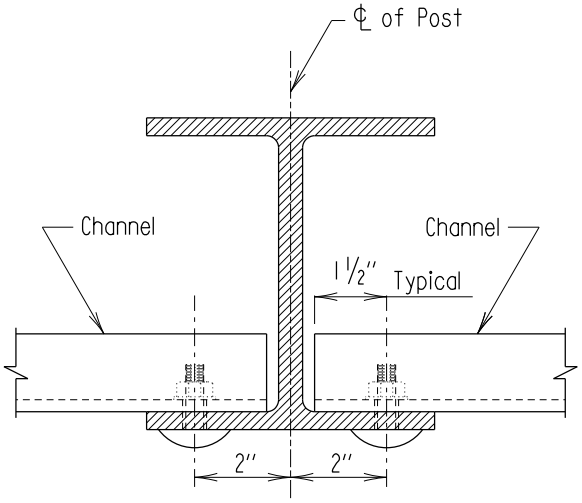


CHANNEL SECTION
Scale: 3" = 1'-0"

TYPICAL SECTION AT POST
Scale: 3" = 1'-0"

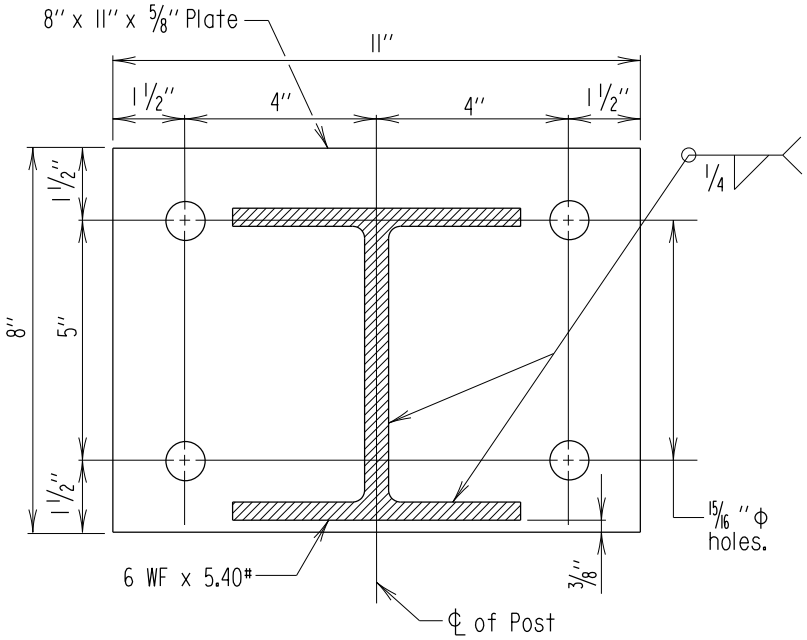
APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES DATE: 07/25/2019	PROTECTIVE BARRIER FOR PORTION OF BRIDGE OVER ELECTRIFIED RAILROAD WITH SIDEWALK
VERSION 2.00	DETAIL NO. SUP-FR(RR)-102 SHEET 2 OF 4

SUPER FENCE/RAILING



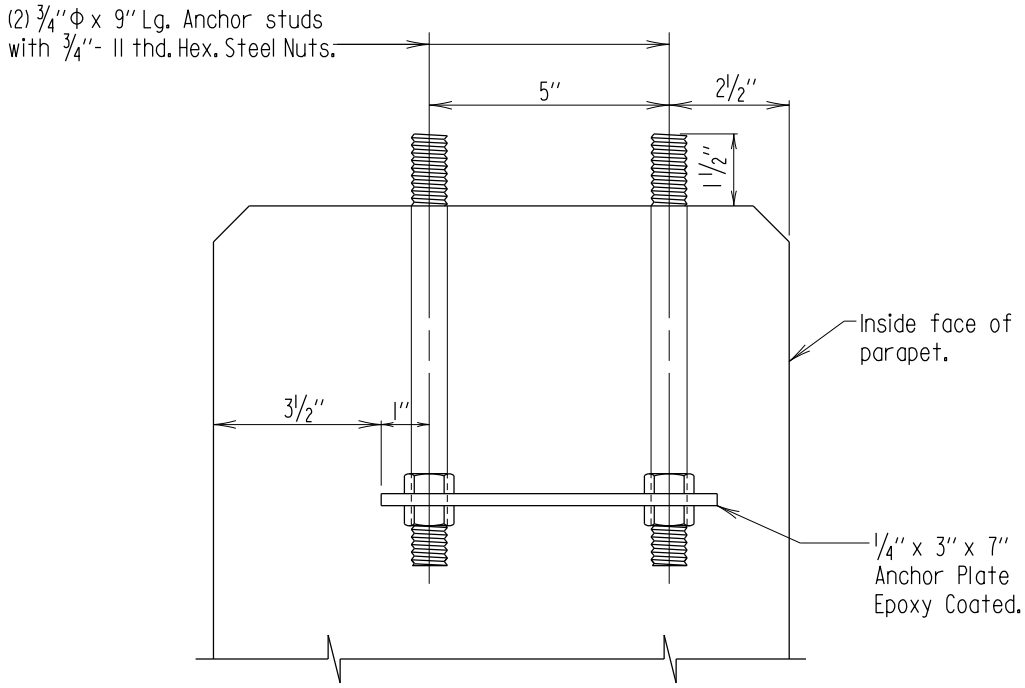
INTERMEDIATE POST CONNECTION

Scale: 3" = 1'-0"



BASE PLATE DETAIL

Scale: 3" = 1'-0"

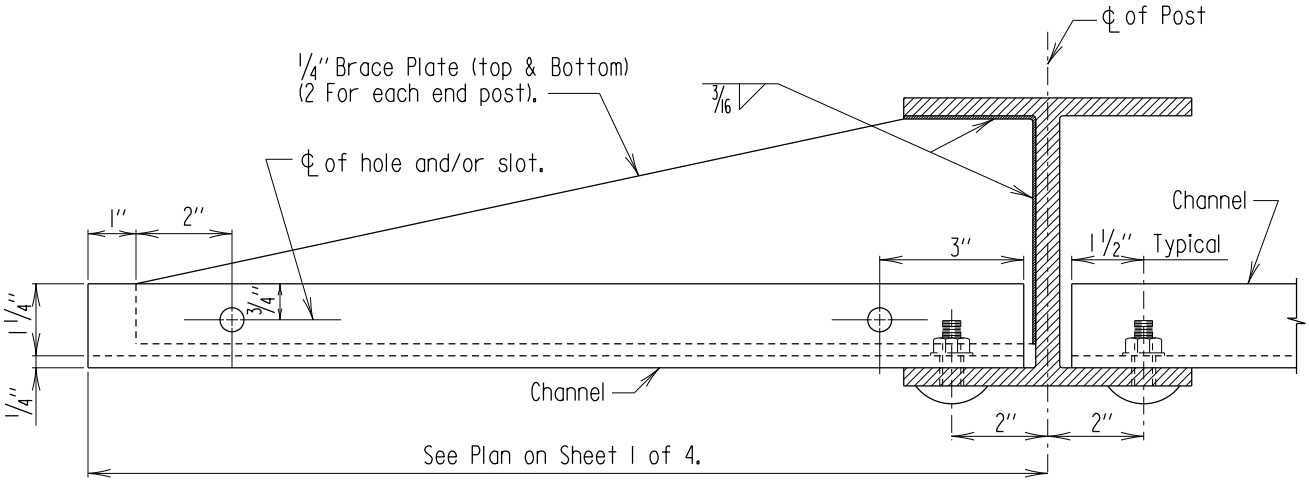


ANCHORAGE DETAIL

Scale: 3" = 1'-0"

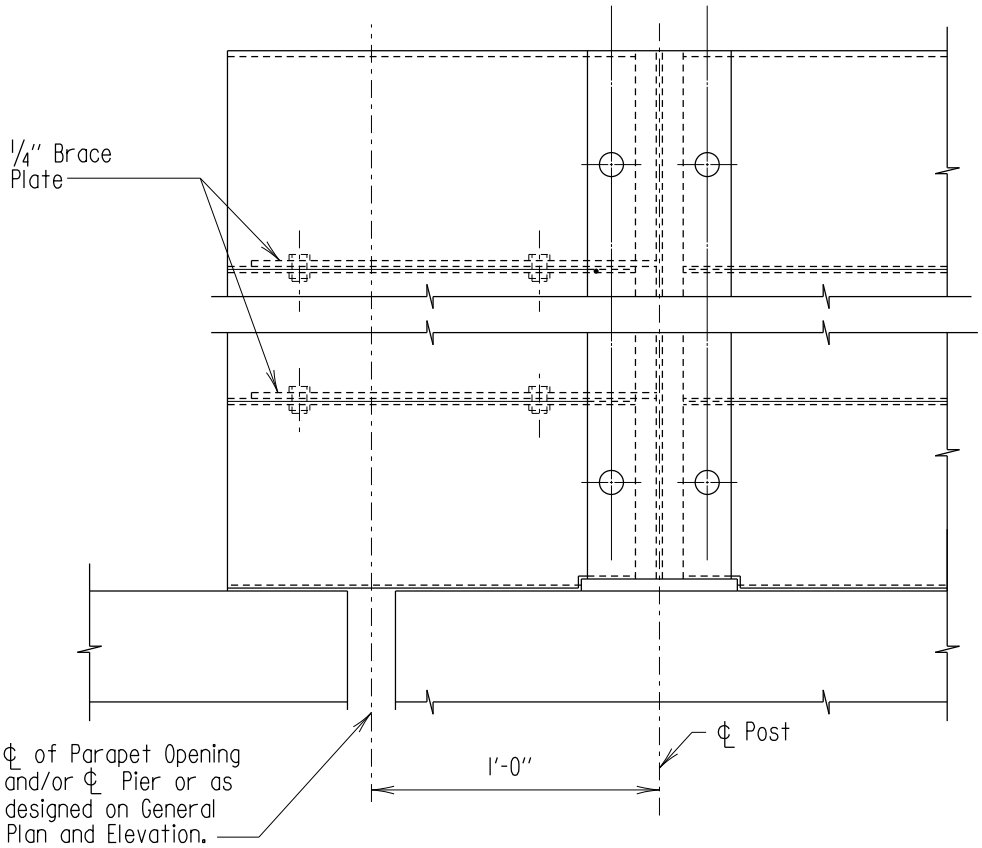
APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES DATE: 07/25/2019	PROTECTIVE BARRIER FOR PORTION OF BRIDGE OVER ELECTRIFIED RAILROAD WITH SIDEWALK
VERSION 2.00	DETAIL NO. SUP-FR(RR)-102 SHEET 3 OF 4

SUPER FENCE/RAILING



END POST CONNECTIONS

Scale: 3" = 1'-0"

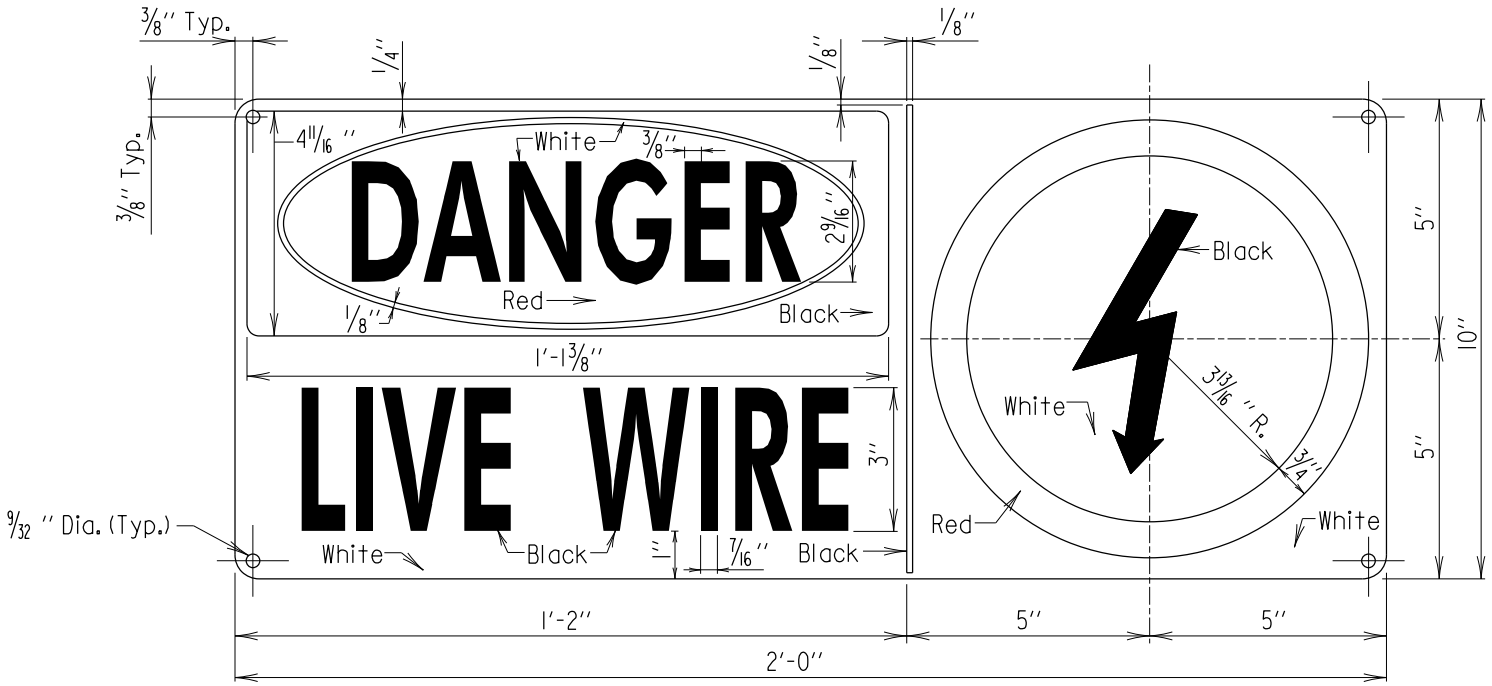


END POST ELEVATION

Scale: 3" = 1'-0"

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
Glenn C. Vaughan DIRECTOR OFFICE OF STRUCTURES DATE: 07/25/2019	PROTECTIVE BARRIER FOR PORTION FOR BRIDGE OVER ELECTRIFIED RAILROAD WITH SIDEWALK
VERSION 2.00	DETAIL NO. SUP-FR(RR)-102 SHEET 4 OF 4

SUPER FENCE/RAILING



PLAN

Scale: 3'' = 1'-0''

Notes:

1. Sign to be made of 0.04 thick aluminum, rounded corners.
2. Solvent-clean and pretreat all surfaces with a wash primer conforming to MIL-C-15328. Follow with a zinc primer meeting Federal Specification TT-P-1757 or TT-P-645. Finish coat may be and oil, alkyd, vinyl or epoxy paint that does not contain lead in its pigment.
3. Letters to be on front only. Size to be as shown.
4. Back of sign to be mill finish.
5. Holes to be provided with nickeled brass eyelets to permit securing of signs with 1/4''ϕ x 3/4'' Lg. Stainless Steel Hex. Hd. cap screws, washers and locknuts. Burr threads after installation (where applicable). If attached to concrete suitable anchor insert shall be used.
6. Signs on protective barrier to be fastened 5'-0'' above area adjacent to the parapet.
7. Cost of furnishing and installing the signs to be included in the price for Protective Barrier.

APPROVAL
DIRECTOR
OFFICE OF STRUCTURES

DATE: 01/22/2001

VERSION 1.0

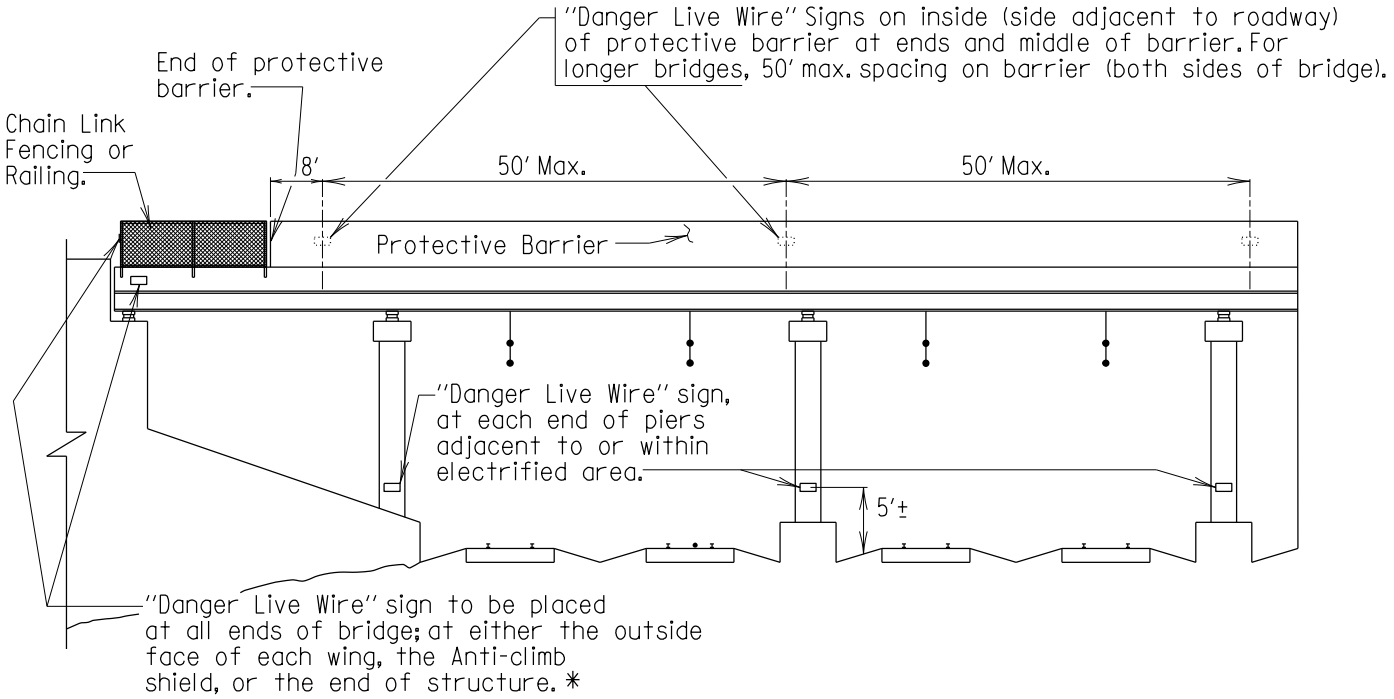
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

ELECTRIFIED TERRITORY DANGER SIGN

DETAIL NO. SUP-FR(RR)-201

SHEET 1 OF 2

SUPER FENCE/RAILING



OVERHEAD BRIDGES

Scale: None

* Where structure is of multispan configuration and end of bridge is a considerable distance from electrified areas (over 200' from electrified span) additional signs shall be placed in spans just adjacent to electrified span(s).

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES DATE: 01/22/2001	ELECTRIFIED TERRITORY DANGER SIGN
VERSION 1.0	DETAIL NO. SUP-FR(RR)-201 SHEET 2 OF 2

SUPER FENCE/RAILING