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))
07/27/2018

FOR INFORMATION ON FENCE LAYOUT
SEE BRIDGE DESIGN MANUAL

DETAIL NO. SUP-FR(FN)-101 RESCINDED

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.

* 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)
The Transition Area shall always begin at the end of the bridge and be laid out so that 3 equal spaces are provided on the bridge. The Transition 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 bridge.

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Transition Area

3 equal spaces

Transition Area

2' - 10"

Transition Area

4 equal spaces

Transition Area

3 to 4 equal spaces

Notes:

1. The Transition Area shall always begin at the end of the bridge and be laid out so that 3 equal spaces are provided on the bridge. The Transition 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 bridge.

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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(a).

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 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 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.
**Super Fence/Railing**

**NEW STRUCTURES**

**TYPE I CHAIN LINK SAFETY FENCE**

**STATE OF MARYLAND**

**DEPARTMENT OF TRANSPORTATION**

**STATE HIGHWAY ADMINISTRATION**

**OFFICE OF STRUCTURES**

**APPROVAL**

**DIRECTOR**

**OFFICE OF STRUCTURES**

**DATE:** 08/27/2019

**VERSION**

2.00

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**DETAIL NO. SUP-FR(FN)-202**

**SHEET 1 OF 2**

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*As an option, the Contractor may set the anchor studs after placing concrete barrier using 3/8" 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.*

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1.660" O.D. pipe, weighing 3.00 #/ft. (Typical all longitudinal rails).

2.875" O.D. pipe, weighing 7.66 #/ft. (Typical all posts).

2"-#6 gauge chain link fence screen (7'-0").

1/2" base plate—see DETAIL A

3/4" min. from top of base plate to top of anchor stud

Note:
1. Straight back parapet shown. See Typical Section for exact configuration.
2. Type I Fence shall only be used adjacent to sidewalks 3'-0" or greater.

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4- 5/8" anchor studs with hex. nuts and washers (top) and hex. nuts and washers bottom of base plate and bottom of anchor studs or 4- 5/8" hex. head anchor bolts (head embedded in concrete) with double hex. nuts and washers (top) *

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**DETAIL A**

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

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* Use double hex. nuts with washers to align 1/2" base plate

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**TYPICAL SECTION**

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

---

3'-6"

4- 5/8" anchor studs or bolts. 6 holes for 5/8" anchor studs or bolts.

7" x 7" x 1/8" base plate

Front face parapet at top.

2.875" O.D. Post

2 1/2"

1/2" 7/8" 1 1/4"

1/2" 7/8" 1 1/4"

1/2" hole in base plate

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**DETAIL NO. SUP-FR(FN)-202**

**SHEET 1 OF 2**
Notes:

1. Before placing fencing, place ½” 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.

Expansion Joint in Parapet.
1.660" O.D. pipe, weighing 3.00 #/ft. (Typical all longitudinal rails).

2.875" O.D. pipe, weighing 7.66 #/ft. (Typical all posts).

2"-#6 gauge chain link fence screen (5'-0').

½" base plate—see DETAIL A

½" min. from top of base plate to top of anchor stud

⅜" plate — See DETAIL A

⅜" min. from top of base plate to top of anchor stud

Use double hex. nuts with washers to align ½" base plate

4- ⅜" anchor studs with hex. nuts and washers (top) and hex. nuts and washers bottom of base plate and bottom of anchor studs or 4- ⅜" head anchor bolts (head embedded in concrete) with double hex. nuts and washers (top) *

Single slope barrier option.

Typical Section
Scale: ⅛"=1'-0''

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

As an option, the Contractor may set the anchor studs after placing concrete barrier using ⅜" 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 for exact parapet configuration.

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

As an option, the Contractor may set the anchor studs after placing concrete barrier using ⅜" 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.

* As an option, the Contractor may set the anchor studs after placing concrete barrier using ⅜" 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.
Single # 9 gauge or double # 13 gauge tie wires @ 2'-0" @ 90°. Typical each longitudinal rail (minimum of 2 1/2 turns).

Expansion Joint, (Typical all longitudinal rails at expansion joint in bridges).

1.66" O.D. Longitudinal Rail Weighing 3.00#/ft. (Typical).

2.875" O.D. Post Weighing 7.66#/ft. (Typical).

3/8" Truss Rod

Fabric to be 1/2" min. to 1" max. clear of top of parapet.

Expansion Joint in Parapet.

3/8" x 3/4" Stretcher Bar

1/2" x 1" Brace Band with 3/8" x 1/4" Carriage Bolt & Nut (Typical).

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 rigidity attached, this temporary blocking shall be removed.
2. Place Truss Rod as shown adjacent to bridge expansion joints and fence end panels.
Drill 0.250" hole fitting and 0.221" hole (*2 drill) in rail for 1-¼ x ¼" Type U Round Head Steel Drive Screw zinc plated. (Typ. each fitting on either side of expansion joint).  

**EXPANSION JOINT DETAILS**  
Scale: 1/2" = 1'-0"

- 1.660" O.D. Rail 3.00 #/ft.  
- 1.050" O.D. Sleeve 1.47 #/ft.  

Note: Screen not shown.  

**TOP LONGITUDINAL RAIL - POST ATTACHMENT**  
Scale: 1/2" = 1'-0"

- 3/8" Truss rods, end fence panels only.  
- 1" x ¼" plate, welded to post.  
- 5/8" x 1/4" carriage bolt and nut (not shown).  
- Malleable iron fitting.

**STRETCHER BAR ATTACHMENT**  
Scale: None

- 5/8" x 1/4" Stretcher Bar  
- Hex. nut threads shall be 3/8"-18 rolled or 5/8"-16 cut.  
- Main fence post or frame post for anti-climb shield.  
- 5/8" x 5/8" clip  
- 1/4" x 1" Brace Band  
- Malleable iron fitting.

**TRUSS ROD ATTACHMENT**  
Scale: 1/2" = 1'-0"

- 3/8" x 5/8" carriage bolt and nut.  
- Malleable iron turnbuckle.  
- Jam Nut  
- Malleable iron fitting.

* If opening in parapet is 2½" or less, if opening is greater than this, dimension shall be increased to match proposed movement.
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/FRNI-202 or SUP-FR/FRNI-203.
3. For diamond back configuration, bend to match rear barrier taper.

* 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.
**SECTION A-A**

Scale: 1\" = 1'-0"

- 1\" hole in plate.
- 1\" hole in plate.
- Top of parapet.
- 2.875\" O.D. Post
- 1.660\" O.D. Post

\( \frac{1}{4} \)\" thick plate

\( \frac{1}{4} \)\" hole in plate.

\( \frac{1}{8} \)\" hole in plate.

- \( \frac{1}{8} \)\" x 1\" slotted holes for \( \frac{5}{8} \)\" anchor studs or bolts.

**SECTION B-B**

Scale: 1\" = 1'-0"

- 1\" hole in plate.
- Top of parapet.
- 1.660\" O.D. Post

\( \frac{3}{8} \)\"\" hole in plate.

- \( \frac{3}{8} \)\"\" x 1\" slotted hole for \( \frac{5}{8} \)\" anchor stud or bolt.

\( \frac{1}{2} \)\" thick plate

*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.*
GENERAL NOTES


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 (1/16" maximum gap) and shall comply with the best practice for fence construction of this type.

Posts 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 1/2".

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 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.
1.660" O.D. pipe, weighing 3.00 #/ft. (Typical all longitudinal rails).

2.875" O.D. pipe, weighing 7.66 #/ft. (Typical all posts).

2"-#6 gauge chain link fence screen (3'-0').

1/2" base plate-see DETAIL A

3/4" min. from top of base plate to top of anchor stud

Type III chain link safety fence.

Super fence/railing

1.0

DETAIL NO. SUP-FR(FN)-302
GENERAL NOTES


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 1½" wide by 1½" deep, and shall be rolled into "U" channels with a wall thickness of 0.025".

Rally attachment bracket shall be die cast of zinc per ASTM B 86-83 Z 3352L. 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 1/4" rivet. Hold bottom of ring in place by inserting dowel that protrudes from ring through predrilled hole in middle rail. Rings may be omitted 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), Measurement and Payment:

Construction: All picket, rail, bracket and post attachments shall be made with 1/4" 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.

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.
ORNAMENTAL FENCE ELEVATION

Scale: $\frac{1}{2}'' = 1'-0''$

SECTION A-A (EXPLODED)

Scale: $\frac{1}{2}'' = 1'-0''$
3 FOOT ORNAMENTAL FENCE DETAILS

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.
TYPICAL SECTION

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

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3 FOOT ORNAMENTAL FENCE
BASE PLATE DETAILS

DETAIL NO. SUP-FRIFN-402 SHEET 3 OF 3
ORNAMENTAL FENCE ELEVATION

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

SECTION A-A (EXPLODED)

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

Rail

Lock nut

Post

Punched hole (bottom and middle rail channel)

Rivet

Bolt

SUPER Fence/Railing
STATE OF MARYLAND
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OFFICE OF STRUCTURES

5 FOOT ORNAMENTAL FENCE DETAILS

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

Notes:
Four 5/8" dia. anchor studs with nuts and washers (both ends) or four 5/8" dia. hex. head anchor bolts (head down) with hex. nuts and washers.

Back face shape varies, see Plans.

Use double hex nut with washers to align base plate.

Scale: $\frac{3}{4}'' = 1'-0''$

Scale: $\frac{1}{2}'' = 1'-0''$

Base plate see Detail "A" sheet 3 of 3

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.
5 FOOT ORNAMENTAL FENCE
BASE PLATE DETAILS

DETAIL "A"
Scale: 3" = 1'-0"

2" x 2" x 1/4" (typ.)
or 2" dia. x 1/4"
stainless steel washer
(both sides)

8" x 8" x 5/8" base plate

2" x 2" post

2" hole (typ.)

8" x 8" x 5/8" base plate and
2" post

5/8"

1/2"

5"

1/2"

8"
Chapter 03 - Superstructure

Section 04 – Fence and Railing

SUB-SECTION 02

RAILING

(SUP-FR(RL))
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.

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

<table>
<thead>
<tr>
<th>Location of Bridge Expansion Joint C varies depending on the number of rail panels on the endpost.</th>
<th>Notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>Location of End Post Length on End Post</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Roll Panels on End Post</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Roll Panels</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>End of Roadway</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>Equal spaces lug and rail panel</td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>End Post Spacing on End Post</td>
</tr>
<tr>
<td><strong>G</strong></td>
<td>Average Spacing of End Post and Adjacent Span.</td>
</tr>
</tbody>
</table>
Steel posts and plates shall conform to ASTM A36 unless otherwise noted. Posts shall be set perpendicular to top of curb. For post spacing see Plans (Maximum 10'-0" Spacing).

Rail elements shall be structural tubing in accordance with ASTM A500 Grade B, A618 or A501. 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. 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. 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.

All railings shall be fabricated and erected as indicated on the Plans and in accordance with Standard Specifications section 461. All bolts shall be ASTM A325 with heavy hex nuts and washers, as specified, unless noted otherwise. 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. In setting anchor bolts be sure enough threads are exposed so that nuts can be completely attached (1½" min.). All rails 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. 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. 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. The nut securing the post base plate to the concrete shall be tightened to a snug fit and given an additional ½ turn.

GENERAL NOTES:

1. All railings 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.
2. 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.
3. The nut securing the post base plate to the concrete shall be tightened to a snug fit and given an additional ½ turn.
4. 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. In setting anchor bolts be sure enough threads are exposed so that nuts can be completely attached (1½" min.).
Chapter 03 - Superstructure

Section 04 – Fence and Railing

SUB-SECTION 03

Railroad Barrier

(SUP-FR(RR))
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STATE HIGHWAY ADMINISTRATION
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PROTECTIVE BARRIER FOR PORTION OF BRIDGE OVER ELECTRIFIED RAILROAD WITH F-SHAPE OR SINGLE SLOPE PARAPET

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.
4. All hardware not specifically called for on any detail shall be stainless steel A.S.T.M. A-276.

Note: All posts normal to top of parapet

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

SUP-FR(RR)-101

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

TYPICAL SECTION AT POST

Scale: 3" = 1'-0"

Concrete shall be finished as necessary to provide good barrier alignment at posts and barrier. If finished surface is not acceptable to the Engineer, then grinding shall be performed at no additional cost to the Administration.

Double hex. nuts with lock washers
(Nuts to be A.S.T.M. B-211 alloy 6061-T6 or alloy 6262-T9
and washer shall be Designated A.S.T.M. B-209 Aluminum Alloy
Al clad 2024-T4)

A.S.T.M. B-209 Aluminum Alloy

A.S.T.M. B-211 aluminum alloy

6061-T6 or alloy 6262-T9

6262-T9

Al clad 2024-T4

Coat entire bottom flange of all channels adjacent to the parapet with an approved caulking compound.

Dimensions from sloped surface intersection.

Single thickness of preformed fabric bearing pad conforming to 910.02.03. Pad shall contact entire bottom surface of base plate with ¹⁄₄ inch maximum protrusion beyond base plate on any side.

Tight fit under barrier full length.

Channel Sections @ 8 ¹⁄₄" = 6'-6" max.

6 WF x 5.40#

Channel Section

¹⁄₈" x ¹⁄₈" Slotted hole

⁷⁄₈" Anchor Studs

5"

2 ⁷⁄₈"

Dimensions from sloped surface intersection.

Concrete shall be finished as necessary to provide good barrier alignment at posts and barrier. If finished surface is not acceptable to the Engineer, then grinding shall be performed at no additional cost to the Administration.

Tight fit under barrier full length.

Dimensions from sloped surface intersection.

Single thickness of preformed fabric bearing pad conforming to 910.02.03. Pad shall contact entire bottom surface of base plate with ¹⁄₄ inch maximum protrusion beyond base plate on any side.

TYPICAL SECTION AT POST

Scale: 3" = 1'-0"

Concrete shall be finished as necessary to provide good barrier alignment at posts and barrier. If finished surface is not acceptable to the Engineer, then grinding shall be performed at no additional cost to the Administration.

Double hex. nuts with lock washers
(Nuts to be A.S.T.M. B-211 alloy 6061-T6 or alloy 6262-T9
and washer shall be Designated A.S.T.M. B-209 Aluminum Alloy
Al clad 2024-T4)

A.S.T.M. B-209 Aluminum Alloy

A.S.T.M. B-211 aluminum alloy

6061-T6 or alloy 6262-T9

6262-T9

Al clad 2024-T4

Coat entire bottom flange of all channels adjacent to the parapet with an approved caulking compound.

Dimensions from sloped surface intersection.

Single thickness of preformed fabric bearing pad conforming to 910.02.03. Pad shall contact entire bottom surface of base plate with ¹⁄₄ inch maximum protrusion beyond base plate on any side.

TYPICAL SECTION AT POST

Scale: 3" = 1'-0"

Concrete shall be finished as necessary to provide good barrier alignment at posts and barrier. If finished surface is not acceptable to the Engineer, then grinding shall be performed at no additional cost to the Administration.

Double hex. nuts with lock washers
(Nuts to be A.S.T.M. B-211 alloy 6061-T6 or alloy 6262-T9
and washer shall be Designated A.S.T.M. B-209 Aluminum Alloy
Al clad 2024-T4)

A.S.T.M. B-209 Aluminum Alloy

A.S.T.M. B-211 aluminum alloy

6061-T6 or alloy 6262-T9

6262-T9

Al clad 2024-T4

Coat entire bottom flange of all channels adjacent to the parapet with an approved caulking compound.

Dimensions from sloped surface intersection.

Single thickness of preformed fabric bearing pad conforming to 910.02.03. Pad shall contact entire bottom surface of base plate with ¹⁄₄ inch maximum protrusion beyond base plate on any side.

TYPICAL SECTION AT POST

Scale: 3" = 1'-0"

Concrete shall be finished as necessary to provide good barrier alignment at posts and barrier. If finished surface is not acceptable to the Engineer, then grinding shall be performed at no additional cost to the Administration.
INTERMEDIATE POST CONNECTION
Scale: 3" = 1'-0"

(2) \( \frac{3}{4}'' \) x 9½" Lg. Anchor studs with \( \frac{3}{4}'' \) 11 thd. Hex. Steel Nuts.

BASE PLATE DETAIL
Scale: 3'' = 1'-0''

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

Dimensions from sloped surface intersection.

Inside face of parapet.

\( \frac{1}{4}'' \times 3'' \times 7'' \) Anchor Plate Epoxy Coated.
Channel

\( \Phi \) of Post

\( \frac{1}{4}'' \) Brace Plate (top & bottom)
(2 for each end post).

\( \Phi \) of hole and/or slot.

\( \frac{1}{4}'' \)

\( \frac{1}{4}'' \)

\( \frac{1}{4}'' \)

\( \frac{1}{4}'' \)

See Plan on Sheet 1 of 4.

**END POST CONNECTIONS**

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

\( \frac{1}{4}'' \) Brace Plate

\( \Phi \) of Parapet Opening
and/or \( \Phi \) Pier or as
designed on General
Plan and Elevation.

**END POST ELEVATION**

Scale: 3'' = 1'-0''
**Type I Safety fence**

on adjacent spans (only if indicated on Typical Section).

Note: All posts normal to top of parapet

**Inside - Elevation**

Scale: \(\frac{3}{8}'' = 1'-0''\)

Notch channels to clear base plate by \(\frac{1}{8}''\) all around.

Type I Safety fence on adjacent spans (only if indicated on Typical Section).

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

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**Notes**

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.
4. All hardware not specifically called for on any detail shall be stainless steel A.S.T.M., A-304.

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**Detail No.** SUP-FR(RR)-102

**State Highways Administration**

**Branch** Division of Structures

**State of Maryland**

**Department of Transportation**

**Office of Structures**

**Approvals**

**Superintend/Office of Structures**

**Date** 07/25/2019

**Version**

2.00

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**Protective Barrier for Portion of Bridge Over Electrified Railroad with Sidewalk**
CARích R. X. 1' max.

Concrete shall be finished as necessary to provide good barrier alignment at posts and barrier. If finished surface is not acceptable to the Engineer, then grinding shall be performed at no additional cost to the Administration.

Double hex. nuts with lock washers (nuts to be A.S.T.M. B-211 alloy 6061-T6 or alloy 6262-T9 and washer shall be Designated A.S.T.M. B-209 Aluminum Alloy Alclad 2024-T4.)

Tight fit under barrier full length.

Single thickness of preformed fabric bearing pad conforming to 910.02.03. Pad shall contact entire bottom flange of barrier with an approved caulking compound.

Coat entire bottom flange of all channels adjacent to the parapet with an approved caulking compound.
**Intermediate Post Connection**

Scale: 3" = 1'-0"

(2) \( \frac{3}{4} \)" x 9" Lg. Anchor studs with \( \frac{3}{4} \)" - 11 thd. Hex. Steel Nuts.

**Base Plate Detail**

Scale: 3" = 1'-0"

**Anchorage Detail**

Scale: 3" = 1'-0"

Inside face of parapet.

\( \frac{1}{4} \)" x 3" x 7" Anchor Plate Epoxy Coated.

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**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-FRRR-102**

**Date:** 07/25/2019

**Version:** 2.00

**Sheet 3 of 4**
Channel

Typical of hole and/or slot.

$\frac{1}{4}''$ Brace Plate (top & bottom)
(2 for each end post).

$\phi$ of hole and/or slot.

END POST CONNECTIONS
Scale: 3'' = 1'-0''

$\phi$ of Post

See Plan on Sheet 1 of 4.

END POST ELEVATION
Scale: 3'' = 1'-0''

$\phi$ of Parapet Opening and/or $\phi$ Pier or as designed on General Plan and Elevation.

$\frac{1}{4}''$ Brace Plate

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

PROTECTIVE BARRIER FOR PORTION FOR BRIDGE OVER ELECTRIFIED RAILROAD WITH SIDEWALK

DETAIL NO. SUP-FR(IRR)-102

SHEET 4 OF 4
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 an 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 nickleplated brass eyelets to permit securing of signs with 1/8" x 1/2" 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.
"Danger Live Wire" Signs on inside (side adjacent to roadway) of protective barrier at ends and middle of barrier. For longer bridges, 50' max. spacing on barrier (both sides of bridge). For shorter bridges, 50' Max. spacing on barrier (both sides of bridge). "Danger Live Wire" Signs on inside (side adjacent to roadway) of protective barrier at ends and middle of barrier. For longer bridges, 50' max. spacing on barrier (both sides of bridge). For shorter bridges, 50' Max. spacing on barrier (both sides of bridge).

"Danger Live Wire" sign to be placed at all ends of bridge; at either the outside face of each wing, the Anti-climb shield, or the end of structure.∗

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).