

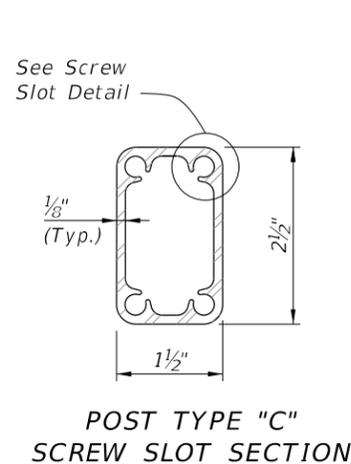
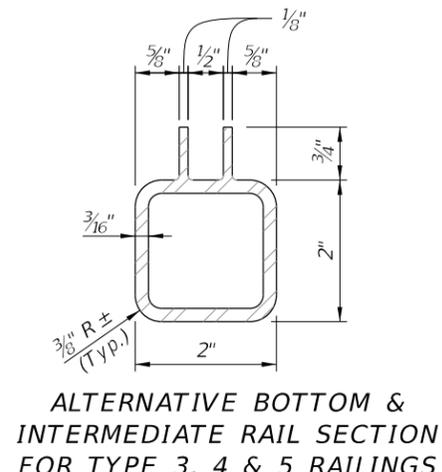
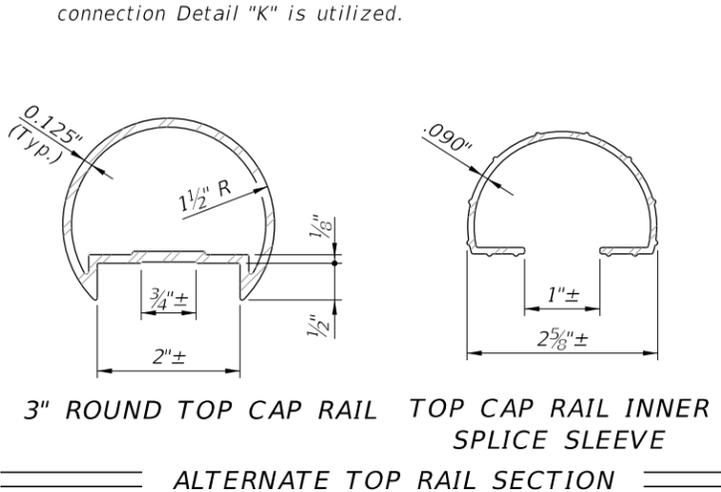
3D VIEW OF RAILING WITH TYPE 1 - PICKET INFILL PANEL  
(42" Height shown, 48" Height Similar)

TABLE 1 - RAILING MEMBERS

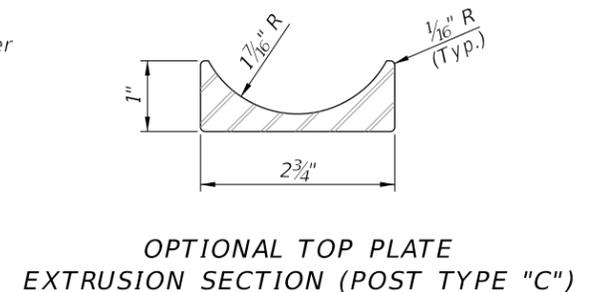
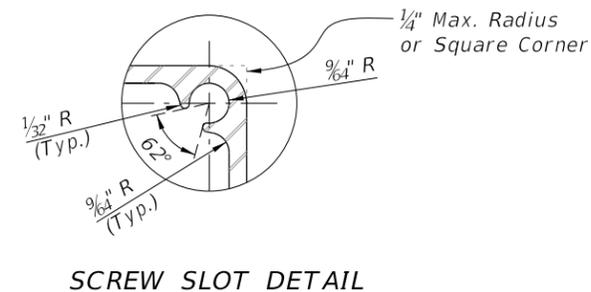
| MEMBER                                    | ALLOY <sup>(1)</sup> | DESIGNATION                         | OUTSIDE DIMENSION | WALL THICKNESS        |
|---|----------------------|-------------------------------------|-------------------|-----------------------|
| Posts (Type "A" & "B")                    | 6061-T6              | RT 2x2x0.250                        | 2.00" x 2.00"     | 0.250"                |
| Posts (Type "C")                          | 6061-T6              | Extrusion 1½x2½x0.125               | 1.50" x 2.50"     | 0.125"                |
| Top Plate (Type "C")                      | 6061-T6              | Extrusion (See Details)             | 2¾" x 7"          | Varies                |
| Top Rail                                  | 6061-T6              | 2½" NPS (Sch. 10)                   | 2.875"            | 0.120"                |
|   |                      | 3" Round Top Cap Rail               | 3.000"            | 0.125"                |
| End Hoops                                 | 6063-T5              | 2½" NPS (Sch. 10)                   | 2.875"            | 0.120"                |
|   |                      | 3.00 OD x 0.125 Wall                | 3.000"            | 0.125"                |
| Top Rail Joint/Splice Sleeves             | 6063-T5              | 2.50 OD x 0.125 Wall                | 2.500"            | 0.125"                |
|   |                      | Top Cap Rail Inner Sleeve           | 2.800"            | 0.090"                |
| Intermediate & Bottom Rail                | 6061-T6              | RT 2x2x0.250                        | 2.00" x 2.00"     | 0.250" <sup>(2)</sup> |
| Int. & Bottom Rail Post Connection Sleeve | 6063-T5              | 1.50 OD x 0.125 Wall <sup>(3)</sup> | 1.500"            | 0.125"                |
| Handrail Joint/Splice Sleeves             | 6063-T5              | 1" NPS (Sch. 40)                    | 1.315"            | 0.133"                |
|   | 6063-T5              | 1.50 OD x 0.125 Wall                | 1.500"            | 0.125"                |
| Handrails                                 | 6061-T6              | 1½" NPS (Sch. 40)                   | 1.900"            | 0.145"                |
| Handrail Support Bar                      | 6061-T6              | ¾" Ø Round Bar                      | 0.750"            | N/A                   |
| Pickets (Type 1 Infill Panel)             | 6061-T6              | ¾" Ø Round Bar                      | 0.750"            | N/A                   |
| Infill Panel Members (Types 2 - 5)        | 6063-T5              | Varies (See Details)                | Varies            | Varies                |

TABLE 1 NOTES:

- (1) Alloy 6061-T6 or 6063-T52 & T6 may be substituted for Alloy 6063-T5.
- (2) 0.188" wall thickness permitted for rails with post spacings less than 5'-9".
- (3) 1" NPS (Sch. 40) non-slit rail sleeves may be substituted when welded connection Detail "K" is utilized.



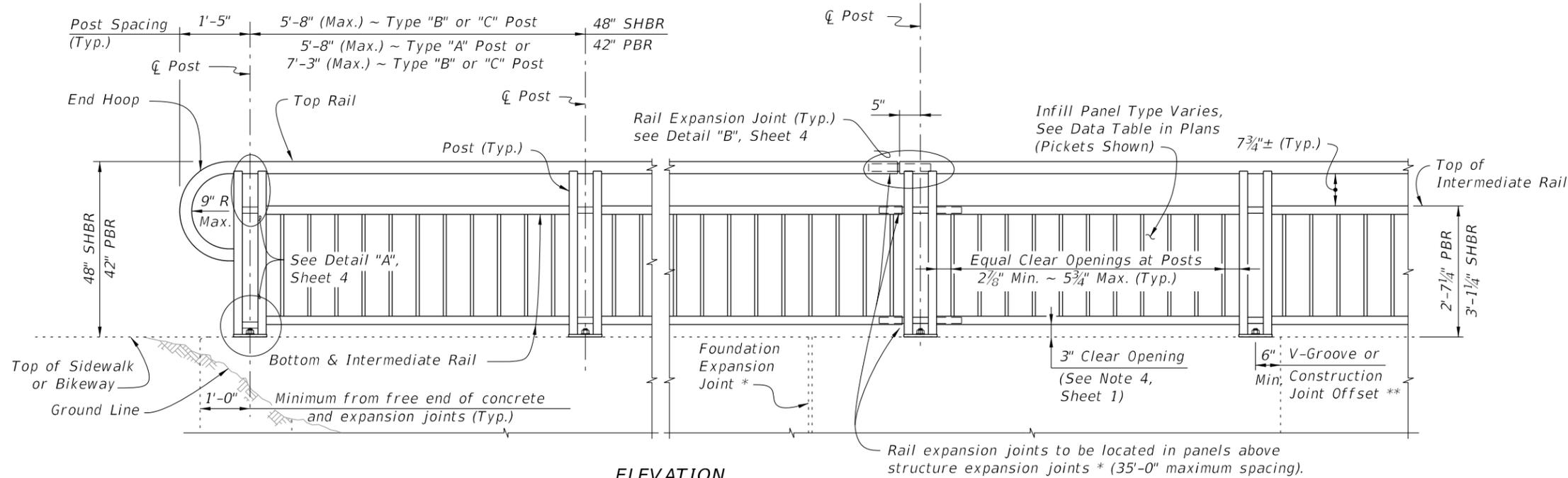
CROSS REFERENCES:  
Detail "A", Sheet 4  
Detail "B", Sheet 4  
Detail "K", Sheet 3



NOTES

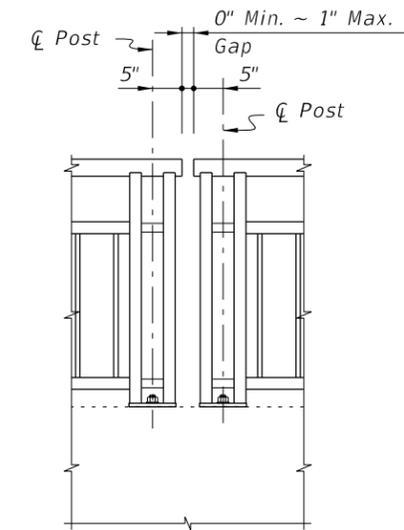
1. Shop Drawings are required, see Specification Section 515.
2. For bridge mounted railings, work this Index with Index 515-061 Bridge Bicycle/Pedestrian Railing (Aluminum)
3. Materials:
  - A. Structural Extrusions, Tube, Pipe and Bars: Table 1 and ASTM B221 or ASTM B429
    - a. Top, bottom and intermediate rail corner bends with maximum 4'-0" post spacing may be Alloy 6063-T6
  - B. Base Plates and Rail Caps: ASTM B209 Alloy 6061-T6
  - C. Perforated panels (Type 5) Alloy 3003-H14
  - D. Stainless steel (SS) screws: Type 316 or 18-8 Alloy
  - E. Aluminum screws: Alloy 2024-T4 or 7075-T73
  - F. Galvanized Steel Fasteners: coated in accordance with Specification Section 962.
    - a. Hex Head Bolts: ASTM A 307
      1. ⅝" diameter single bolt option, Grade 36
      2. ⅞" diameter four bolt option, Grade 55
    - b. Adhesive Anchors: ASTM F1554 fully threaded rods, Grade 55
    - c. Hex Nuts: ASTM A563
    - d. Flat Washers: ASTM F436
    - e. Plate Washers: ASTM A36 or ASTM A706 Grade 36.
  - G. Shims: ASTM B209 Alloy 6061 or 6063
  - H. Bearing Pads: Provide ⅛" thick Plain, Fabric Reinforced or Fabric Laminated Bearing Pads meeting the requirements of Specification Section 932 for Ancillary Structures.
4. Fabricate pickets and vertical panel elements parallel to the posts; except Type 2, 3 and 5 panel infills may be fabricated parallel to the longitudinal grade. Maintain a maximum clear opening of 5⅞" for standard installations and 3⅞" when a 4" sphere requirement is indicated in the Data Tables.
5. Locate railing expansion joints between the posts on either side of the deck expansion joint. Maximum spacing between expansion joints is 35'-0".
6. Field splices are similar to the Expansion Joint Detail and may be approved by the Engineer to facilitate handling; but the top rail must be continuous across a minimum of two posts.
7. For intermediate and bottom horizontal rails, the screwed joints shown may be substituted with alternate joints shown in detail "K" for Post Type "A" & "B".
8. Make corners and changes in tangential longitudinal alignment with a 9" bend radius or terminate adjoining sections with mitered end sections when handrails are not required.
9. For changes in tangential longitudinal alignment greater than 45°, position posts a maximum of 2'-0" each side of the corner but not at the corner apex.
10. For curved longitudinal alignments, shop bend the top and bottom rails and handrails to match the alignment radius.
11. Handrails are required and must be continuous at landings for:
  - A. Grades Steeper than 5%
  - B. Three or more steps
12. Installation: Cutting of reinforcing steel is permitted for post installed anchors.

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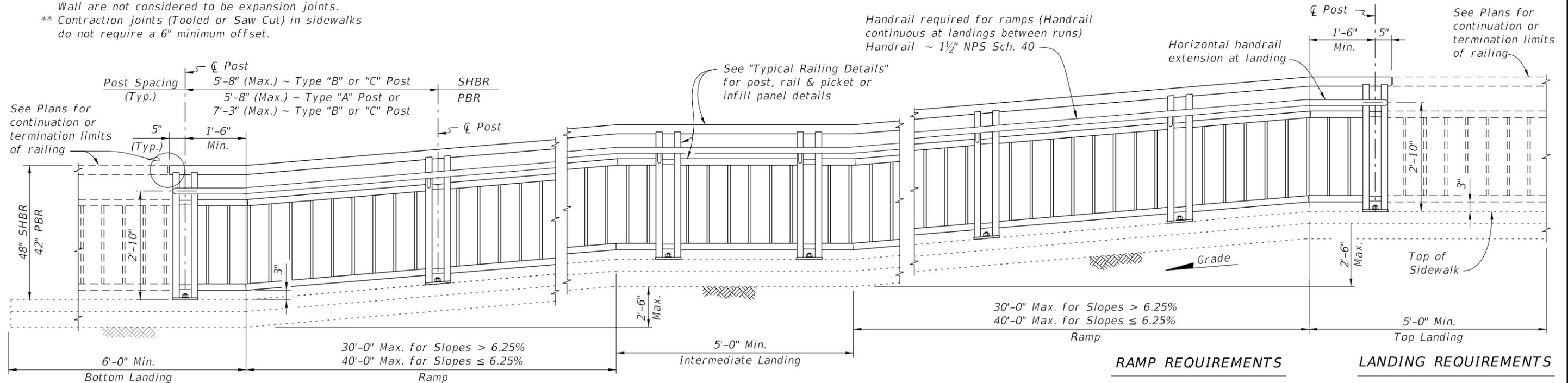
**ELEVATION**  
(Showing Outside Face of Railing with Type "A" Posts)

**TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%**  
(Type 1 - Picket Railing Shown, Other Types Similar)



**EXPANDED ELEVATION AT CORNERS**  
**DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS**

- NOTES:**  
 \* Keyed construction joints in Index 400-011 Gravity Wall are not considered to be expansion joints.  
 \*\* Contraction joints (Tooled or Saw Cut) in sidewalks do not require a 6" minimum offset.

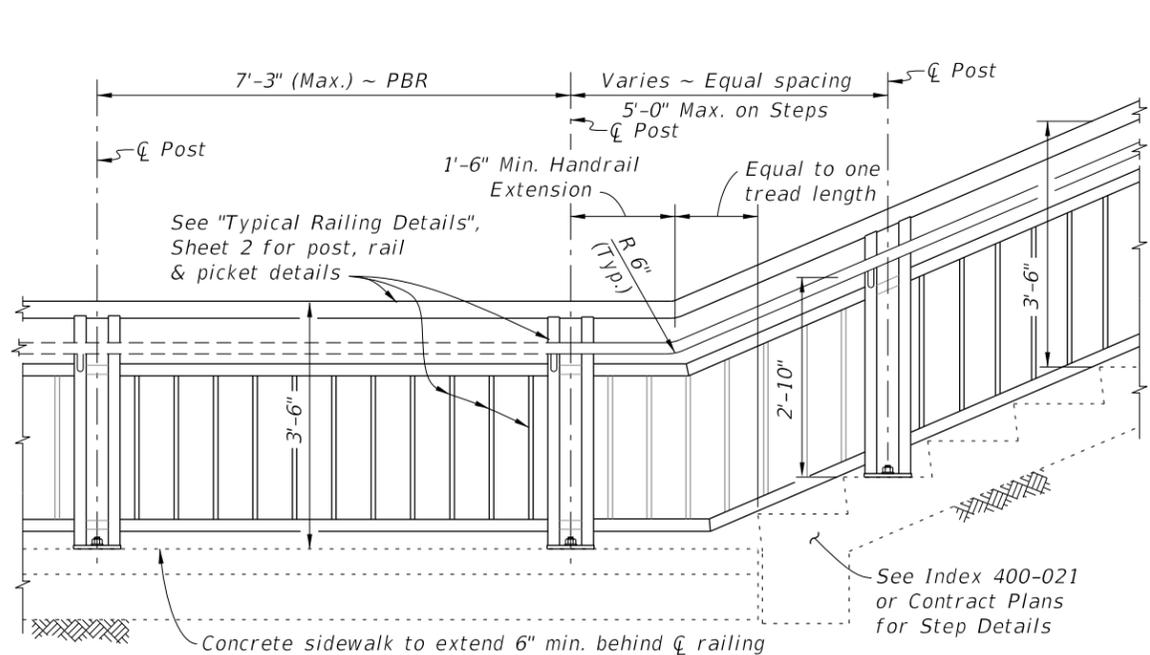


**ELEVATION**  
(Showing Inside Face of Railing with Type "A" Posts)

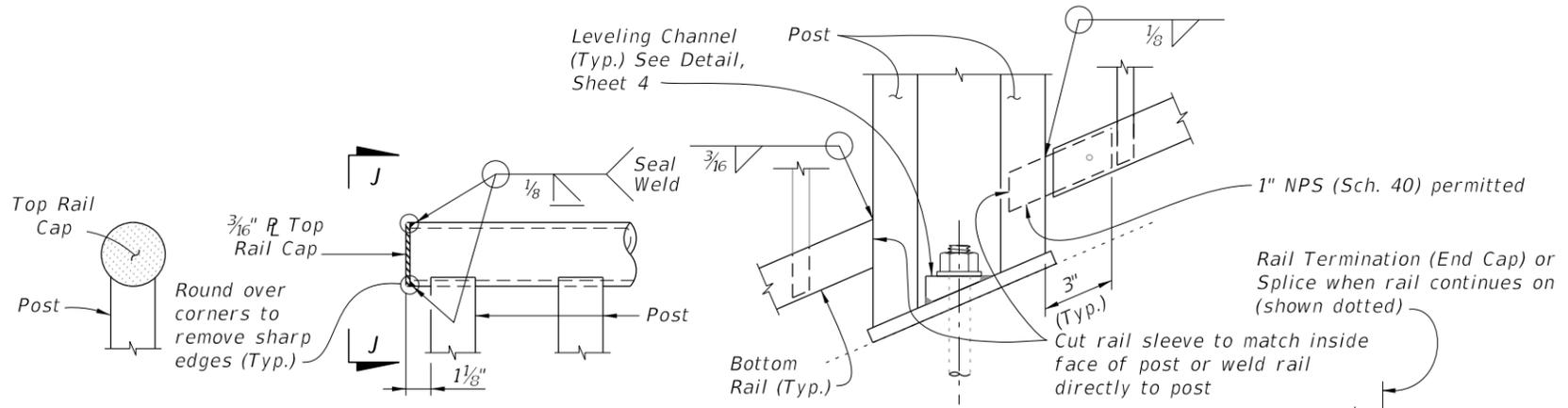
**RAILINGS ON GRADES STEEPER THAN 5%**  
(Type 1 - Picket Railing Shown, Other Types Similar)

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|                           |          |              |   |                              |                                       |                  |                 |
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| LAST REVISION<br>11/01/15 | REVISION | DESCRIPTION: |  | FY 2023-24<br>STANDARD PLANS | PEDESTRIAN/BICYCLE RAILING (ALUMINUM) | INDEX<br>515-062 | SHEET<br>2 of 9 |
|---------------------------|----------|--------------|---|------------------------------|---------------------------------------|------------------|-----------------|

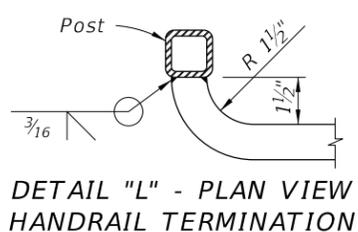


**RAILING CONTINUATION BEYOND STEPS OR STAIRS**  
(Bottom shown, Top similar)

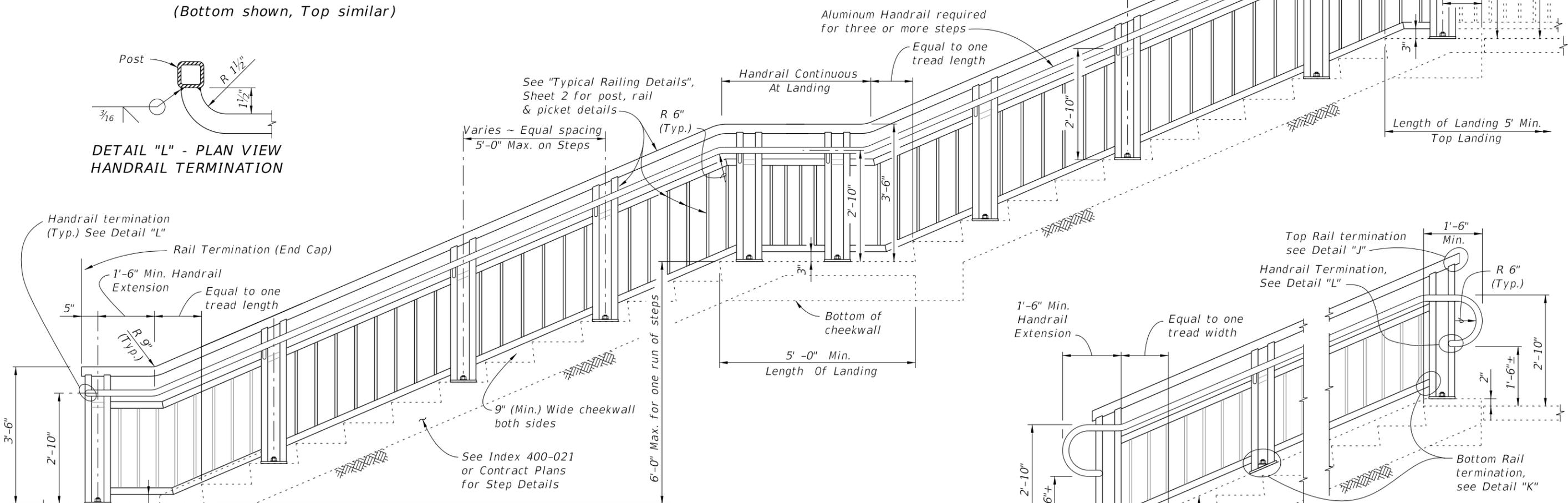


**VIEW J-J**     **DETAIL "J" - ELEVATION VIEW TOP RAIL TERMINATION**     **DETAIL "K" - ELEVATION VIEW BOTTOM RAIL CONNECTION (Intermediate Rail Similar)**

**RAIL TERMINATION DETAILS**



**DETAIL "L" - PLAN VIEW HANDRAIL TERMINATION**



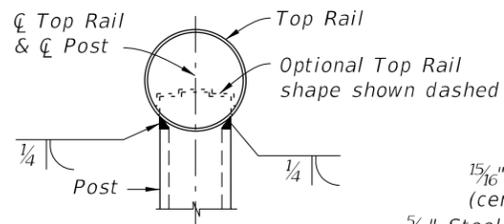
**ELEVATION**  
(At-Grade Steps shown, Elevated Stairs similar)

**ALTERNATE HANDRAIL END TREATMENT OR MOUNTING LOCATION FOR SLOPED WALLS**

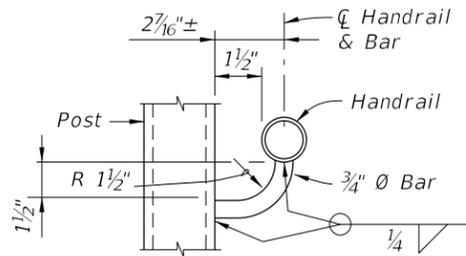
**RAILINGS ON STEPS & STAIRS**

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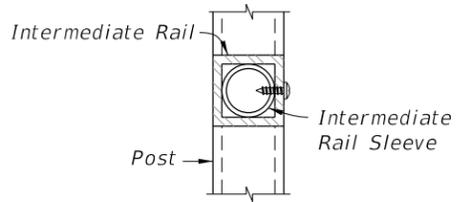
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| LAST REVISION 11/01/16 | DESCRIPTION: |  | FY 2023-24 STANDARD PLANS | PEDESTRIAN/BICYCLE RAILING (ALUMINUM) | INDEX 515-062 | SHEET 3 of 9 |
| REVISION               |              |  |                           |                                       |               |              |



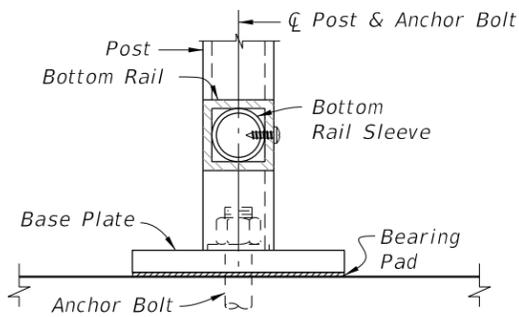
**SECTION A-A**  
(Top Rail Connection)



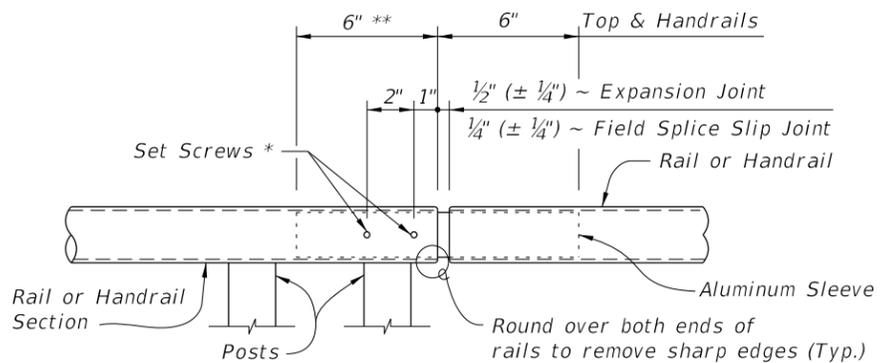
**SECTION B-B**  
(Handrail Connection)



**SECTION C-C**  
(Intermediate Rail Connection)

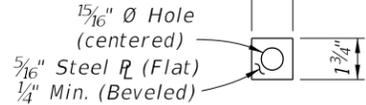


**SECTION D-D**  
(Bottom Rail Connection -  
Single Anchor Bolt Shown)

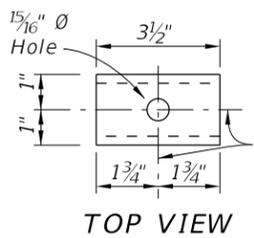
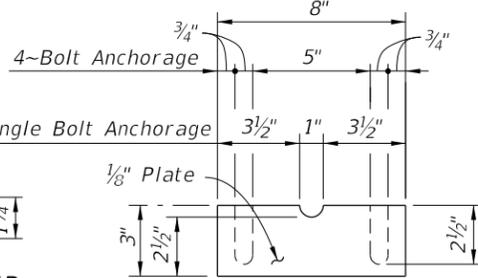


**ROUND RAILS - TOP RAIL OR HANDRAIL**  
(Top Rail at Expansion Joint Shown)

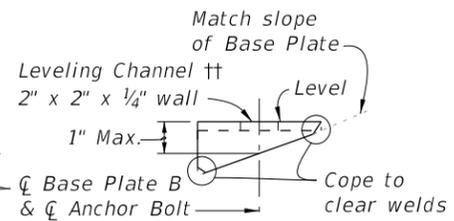
**PLATE WASHER  
DETAIL**



**SHIM PLATE DETAIL**

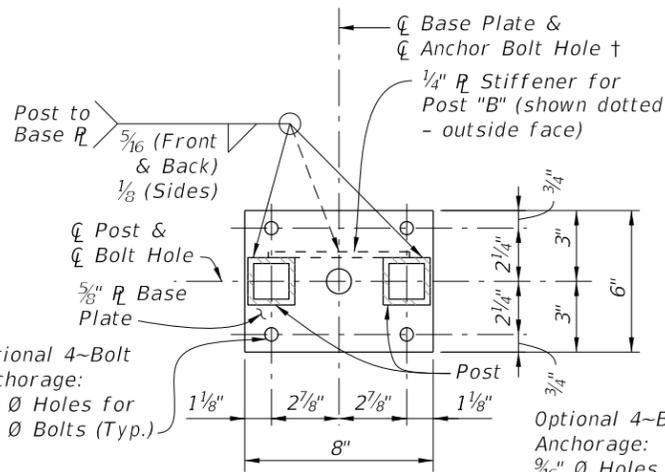


**TOP VIEW**

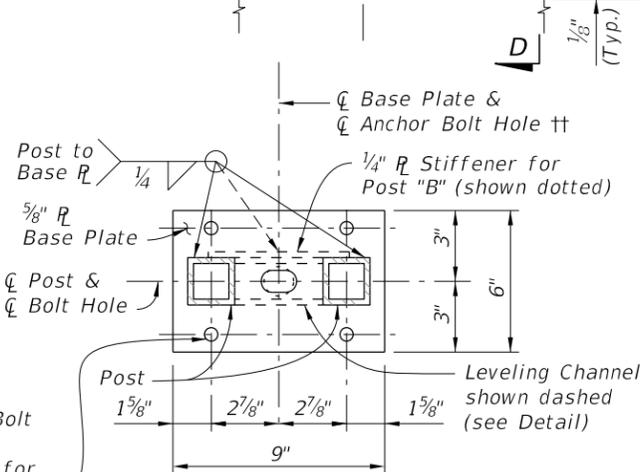


**SIDE VIEW**

**LEVELING CHANNEL DETAIL**

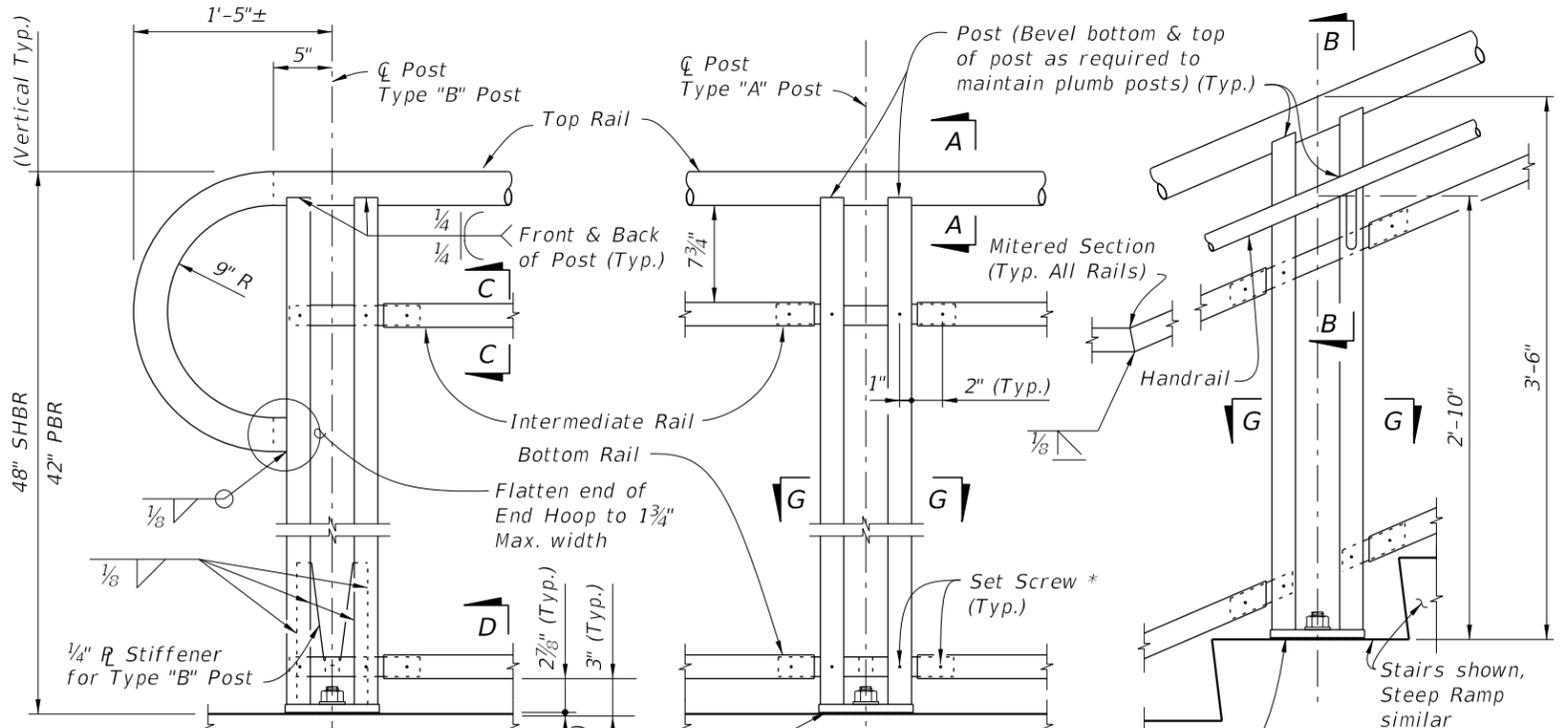


**BASE PLATE A**



**BASE PLATE B**

**SECTION G-G - BASE PLATE DETAILS**

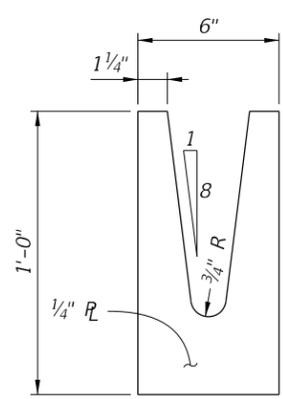


**DETAIL "A" - RAIL CONNECTIONS**  
(Showing Inside Face of Railing)  
(Pickets/Panels and 4~Bolt Anchorage Not Shown for Clarity)

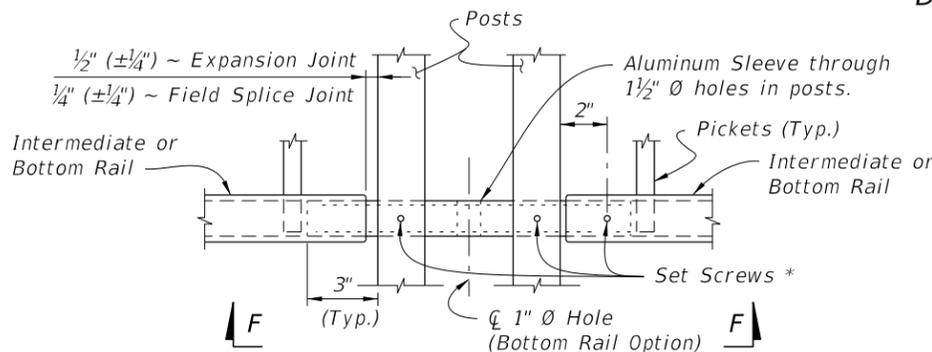
**NOTES:**

- † Base Plate A (Ramps - Bolts normal) use 15/16 inch diameter holes for single anchor bolts with flat washers for slopes ≤ 8.33%.
- ‡ Base Plate B (Stairs - Bolts plumb) use 1/4 inch diameter holes for single anchor bolts with beveled plate and washers for slopes > 8.33% to ≤ 15%; use 15/16 inch x 1/2 inch slotted holes with leveling channel for slopes > 15%.
- \* 1/4 inch diameter x 3/4 inch pan head aluminum or stainless steel set screws. Screws must be set flush against the outside face of rails & posts and underside of handrails. A single tack weld (1/2 inch max. length) at top of the sleeve for each post may be substituted for the set screws. Do not provide set screws for rails at free end of expansion joints.

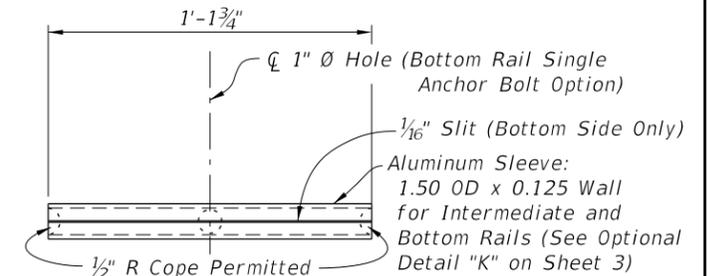
**POST "B" STIFFENER  
DETAIL**



\*\* Embedded length may be 4 inch for plug welded connection.



**SQUARE RAILS - INTERMEDIATE OR BOTTOM RAIL**  
(Bottom Rail Shown at Expansion Joint Shown)



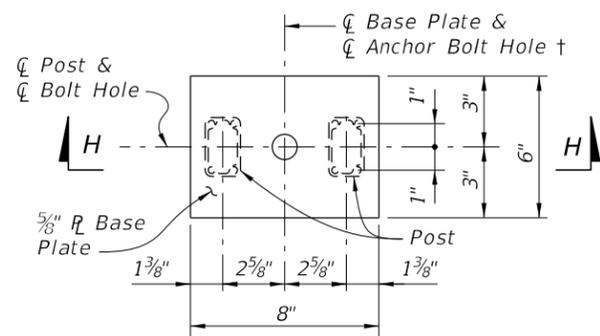
**VIEW F-F**  
**INTERMEDIATE OR BOTTOM RAIL -**  
**ALUMINUM SLEEVE DETAIL (Bottom Side Shown)**

**CROSS REFERENCE:**

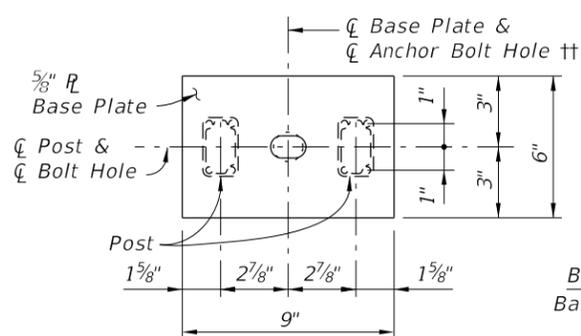
For location of Details "B", See Sheet 2.

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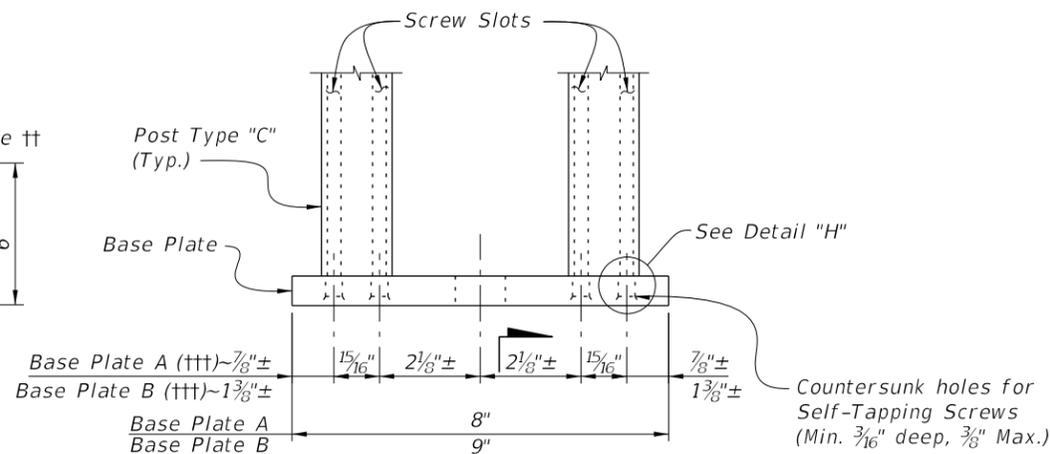
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| LAST REVISION<br>11/01/16 | REVISION | DESCRIPTION: |  | FY 2023-24<br>STANDARD PLANS | PEDESTRIAN/BICYCLE RAILING (ALUMINUM) | INDEX<br>515-062 | SHEET<br>4 of 9 |
|---------------------------|----------|--------------|--|------------------------------|---------------------------------------|------------------|-----------------|



BASE PLATE A

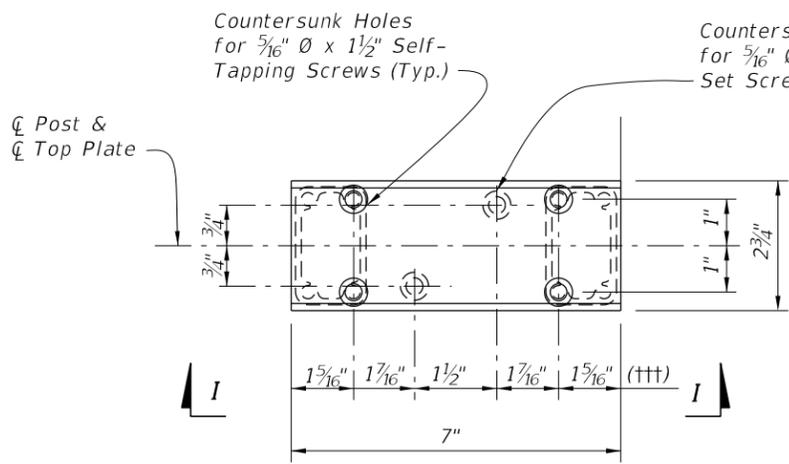


BASE PLATE B

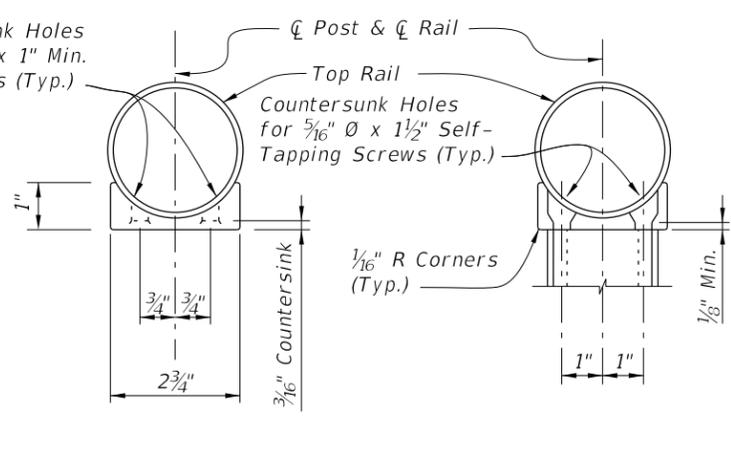


SECTION H-H  
(Screws Not Shown for Clarity)

BASE PLATE DETAILS FOR TYPE "C" POST

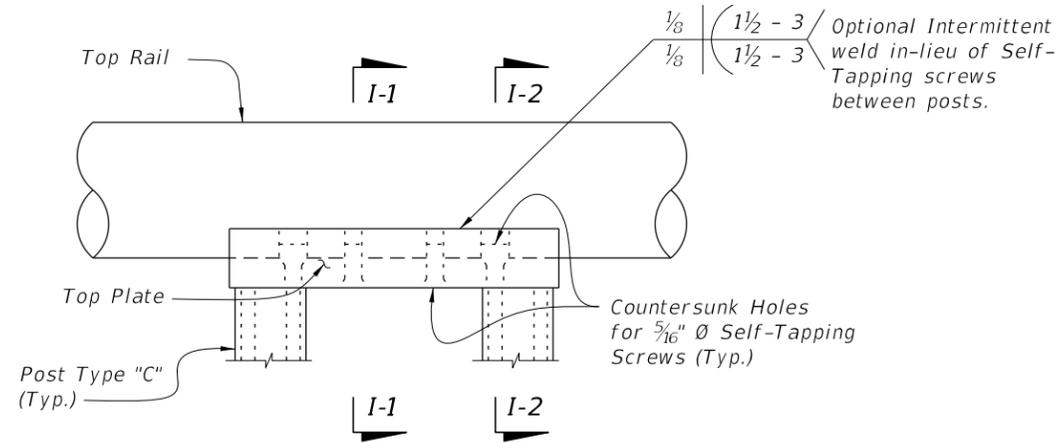


PLAN



SECTION "I-1"

SECTION "I-2"



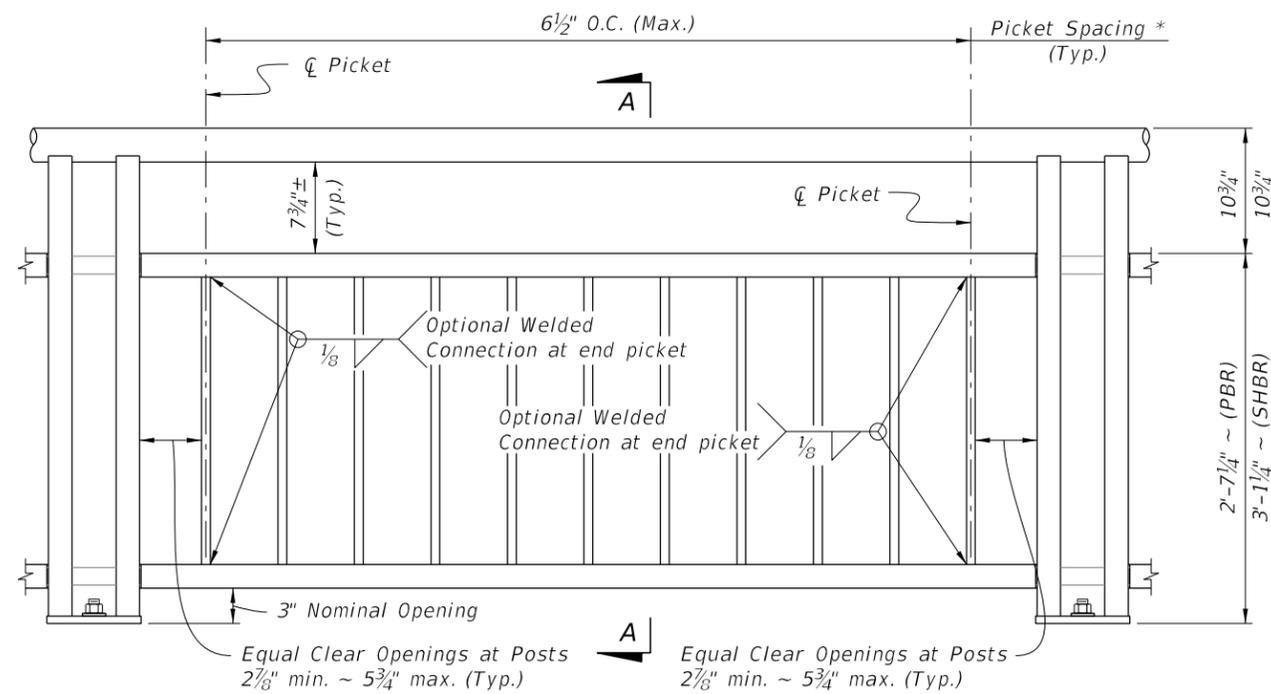
VIEW "I"

TOP PLATE DETAILS FOR TYPE "C" POST  
(Screws Not Shown For Clarity)

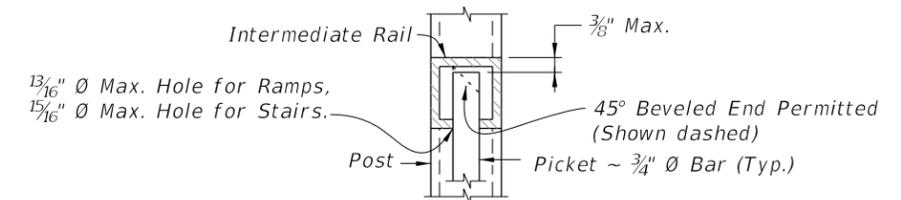
Notes:  
 † See Sheet 4 for Notes.  
 †† See Sheet 4 for Notes.  
 ††† Length varies for beveled posts on grades. Holes must be drilled plumb to align with screw slot.

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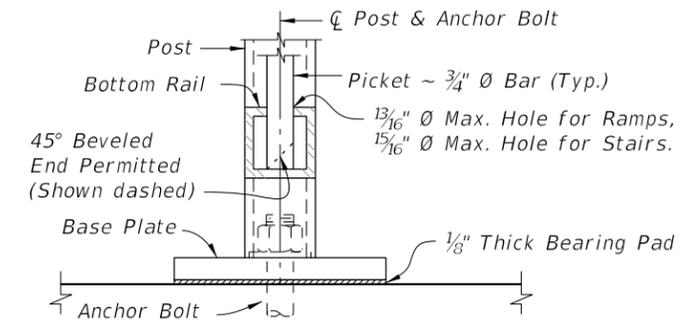
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| LAST REVISION<br>11/01/16 | REVISION | DESCRIPTION: |  | FY 2023-24<br>STANDARD PLANS | PEDESTRIAN/BICYCLE RAILING (ALUMINUM) | INDEX<br>515-062 | SHEET<br>5 of 9 |
|---------------------------|----------|--------------|--|------------------------------|---------------------------------------|------------------|-----------------|



SECTION A-A



DETAIL "1A"  
(Top of Picket Connection)

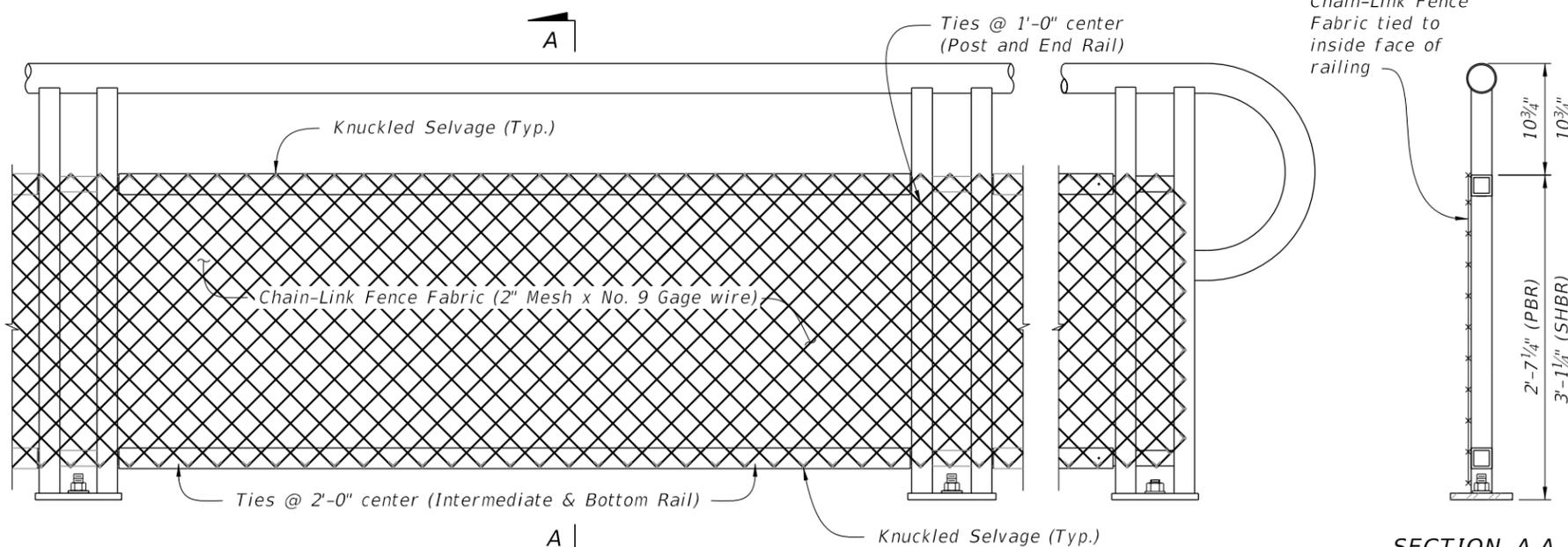


DETAIL "1B"  
(Bottom of Picket Connection)

**TYPE 1 - PICKET INFILL PANEL**

**PICKET NOTES:**

\* Picket Spacing of  $6\frac{1}{2}"$  centers is based on a  $\frac{3}{4}"$   $\varnothing$  Bar for standard applications. When shown in the Contract Plans a  $4\frac{1}{2}"$  picket spacing may be required. See Note 4 (Sheet 1).



SECTION A-A

| TABLE 2 - CHAIN-LINK PANEL COMPONENT MATERIALS                         |      |  |
|--|------|--|
| COMPONENT  | ASTM | COMPONENT INFORMATION  |
| Chain-Link Fence Fabric (2" mesh with knuckled top and bottom selvage) | A392 | Zinc-Coated Steel - No. 9 gage (coated wire diameter), Class 2 Coating   |
|  | A491 | Aluminum-Coated Steel - No. 9 gage (coated wire diameter)  |
|  | F668 | Polyvinyl Chloride (PVC) Coated Steel - No. 9 gage Zinc-Coated Wire (metallic-coated core wire diameter) ~ See Plans for specified color of PVC. |
| Tie Wires  | F626 | Zinc-Coated Steel Wire - No. 9 gage with coating to match Chain-Link Fence Fabric.   |
| Tension Bars   | F626 | $\frac{3}{16}"$ (min. thickness) x $\frac{3}{4}"$ (min. width) x 2'-3' (min. height) Steel Bars  |
| Miscellaneous Fence Components   | F626 | Zinc-Coated Steel  |

**CHAIN-LINK PANEL NOTE:**

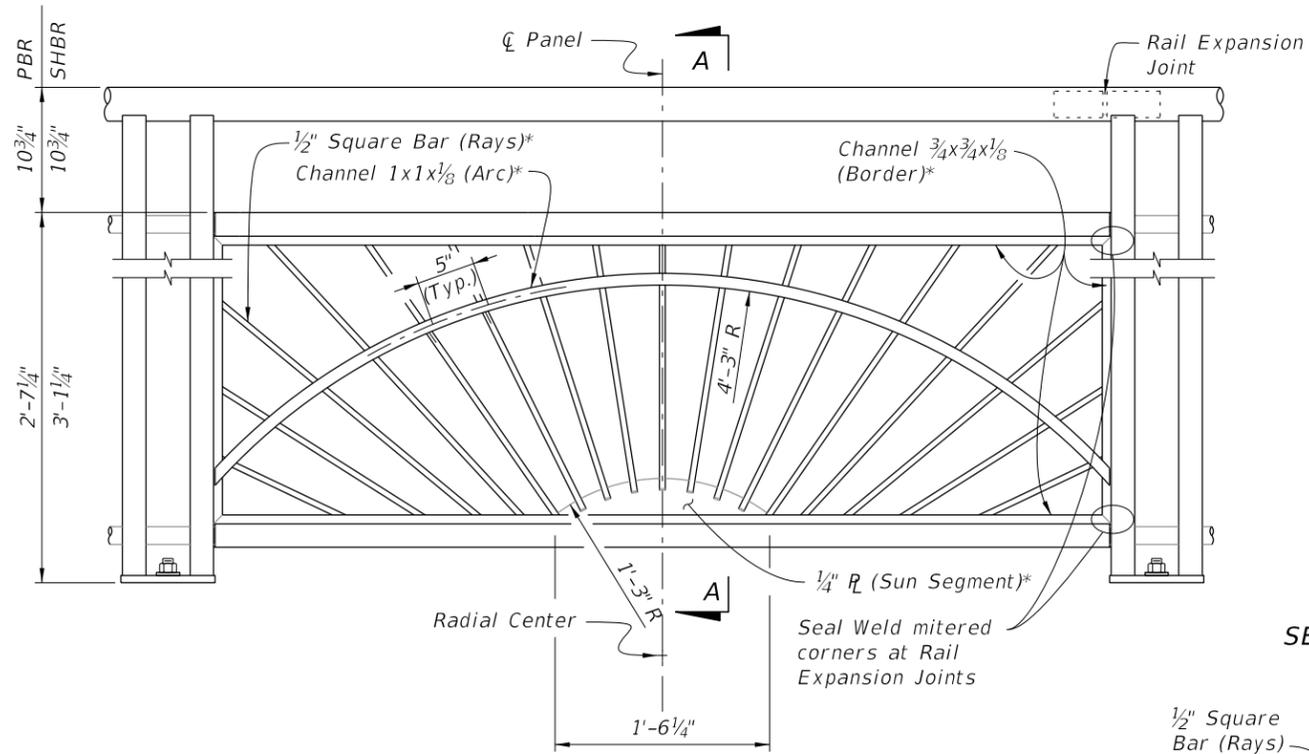
Chain-Link Fence Fabric shall be continuous along limits of railing. Splicing of Chain-Link panels using Tension Bars at 20'-0" minimum increments is permitted.

**TYPE 2 - CHAIN-LINK (Continuous Infill Panel)**

**NOTE:**

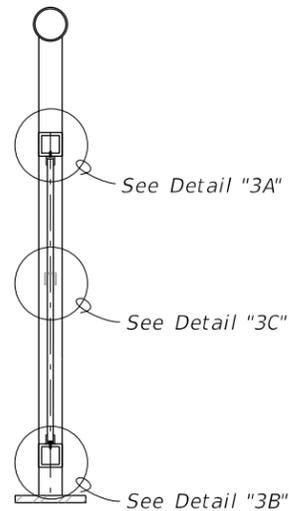
See Plans for Infill Panel option required.

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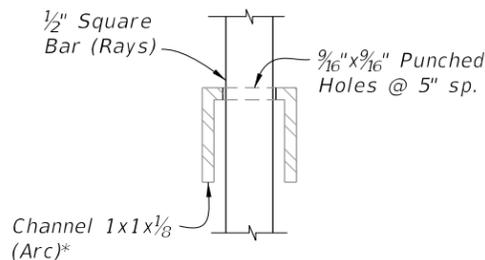


**TYPE 3 - SUNSHINE INFILL PANEL**

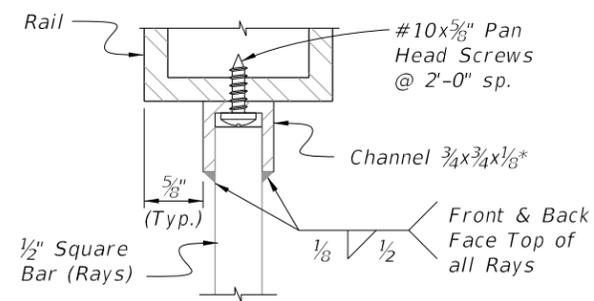
\* Arc, Rays and Sun Segment may be formed in a single panel from 1/2" plate (ASTM B209 Alloy 6061-T6 or T651) pattern cut with laser or plasma CNC, welded to a 1x1x1/8 Angle Border or the 3/4x3/4x1/8 Channel Border shown.



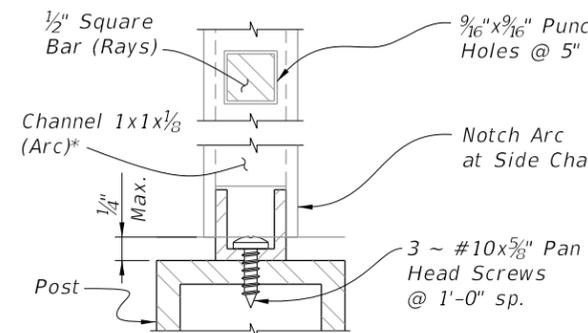
**SECTION A-A**



**DETAIL "3C" RAY/ARC CONNECTION**

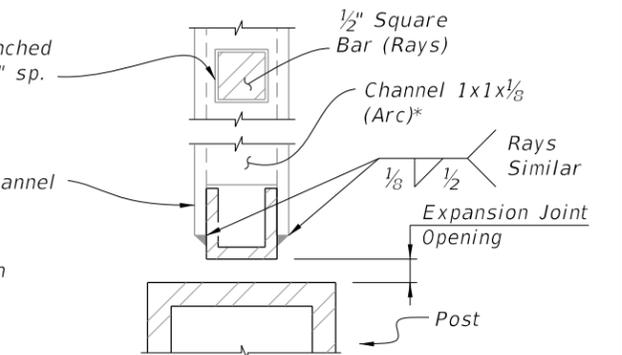


**DETAIL "3A" INTERMEDIATE RAIL/RAY CONNECTION**

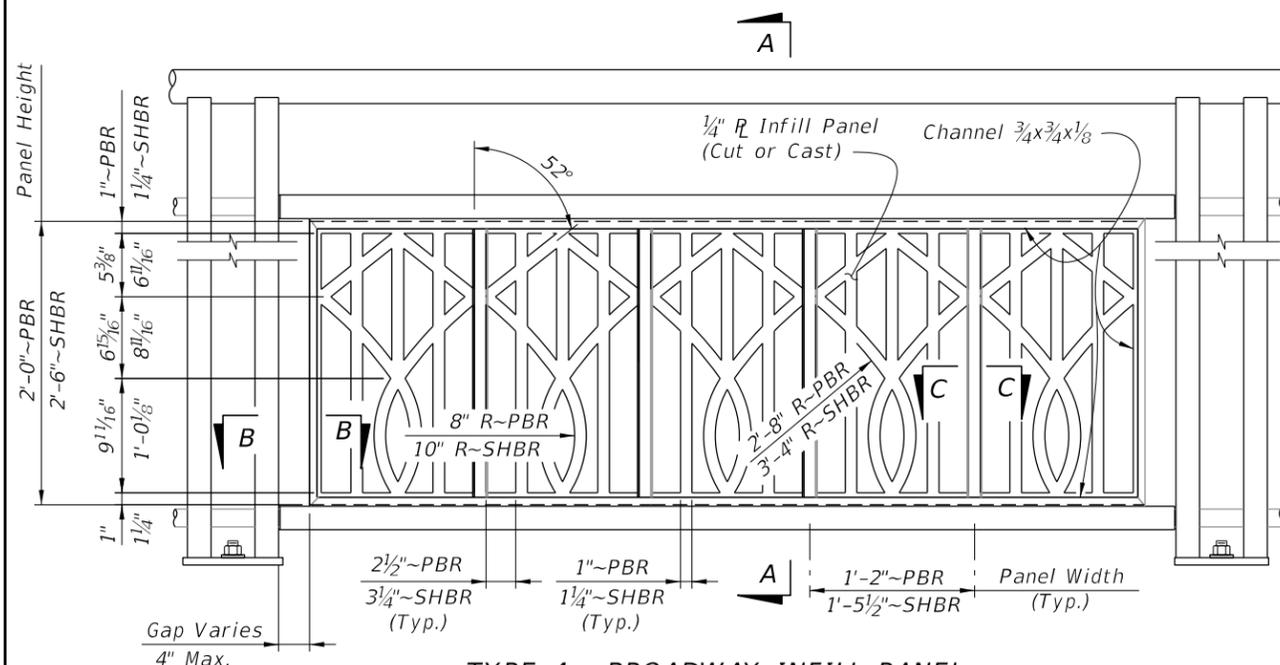


**DETAIL "3D" ARC/POST CONNECTION (Continuous Top Rail)**

**DETAIL "3B" BOTTOM RAIL/RAY CONNECTION**

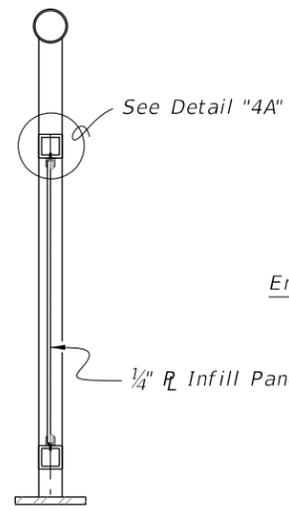


**DETAIL "3E" PANEL END CONNECTION AT POST WITH EXPANSION JOINT**

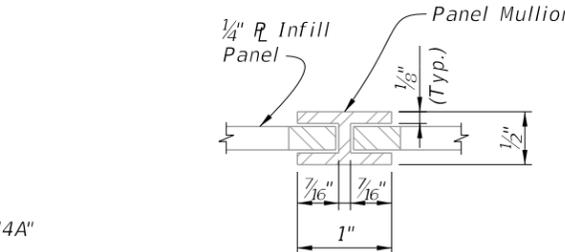


**TYPE 4 - BROADWAY INFILL PANEL**

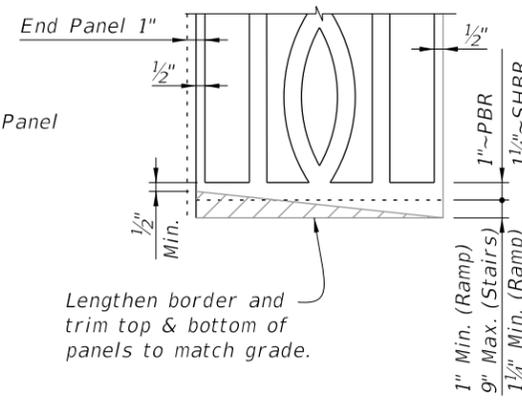
NOTE: See Plans for Infill Panel Option required.



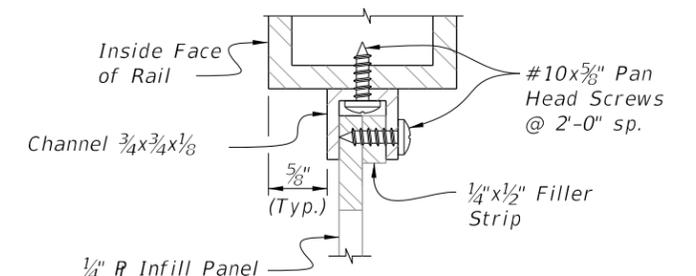
**SECTION A-A**



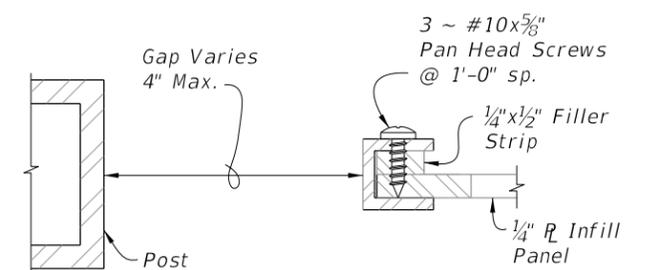
**SECTION C-C PANEL/SPLICE CONNECTION**



**PANEL ADJUSTMENT FOR RAILINGS ON GRADES**



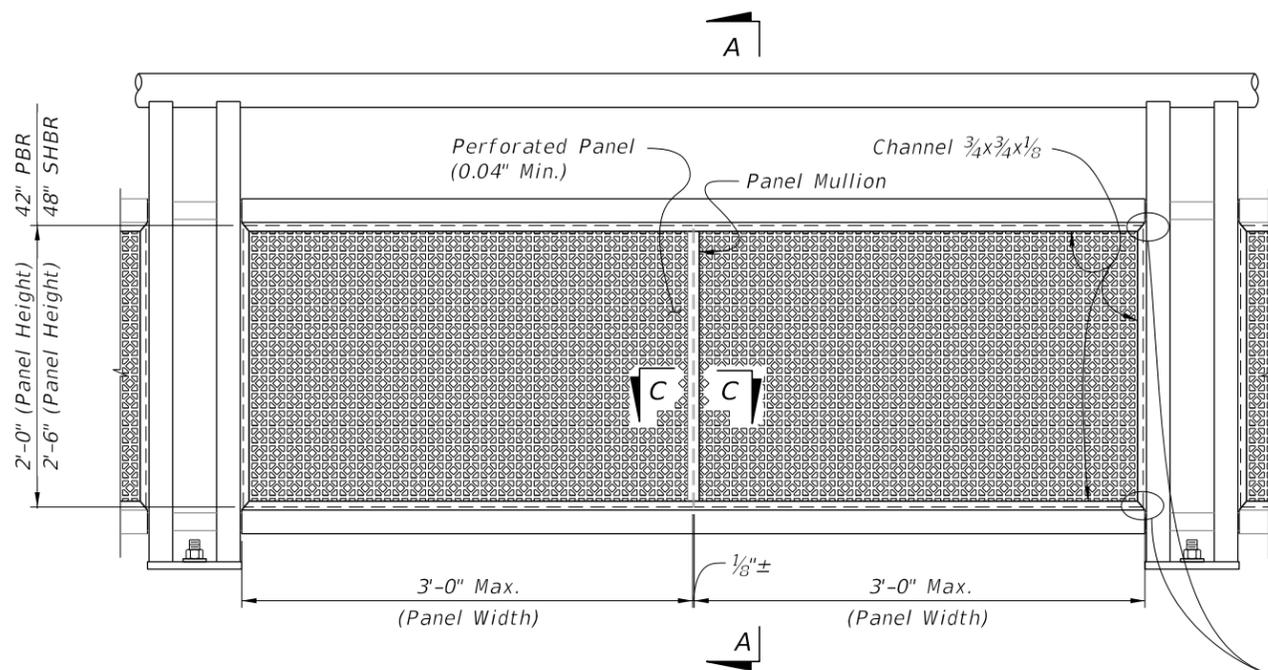
**DETAIL "4A" PANEL/RAIL CONNECTION (Top Shown, Bottom Similar)**



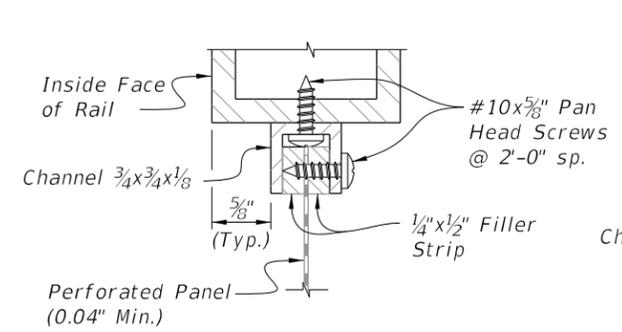
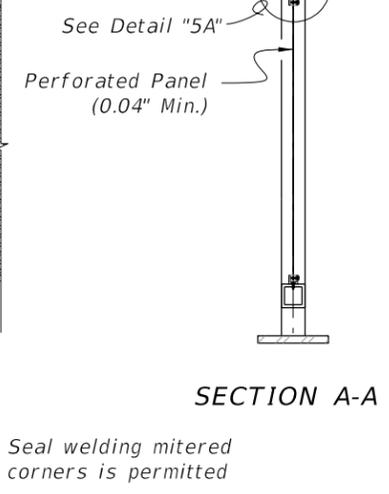
**SECTION B-B PANEL END CAP**

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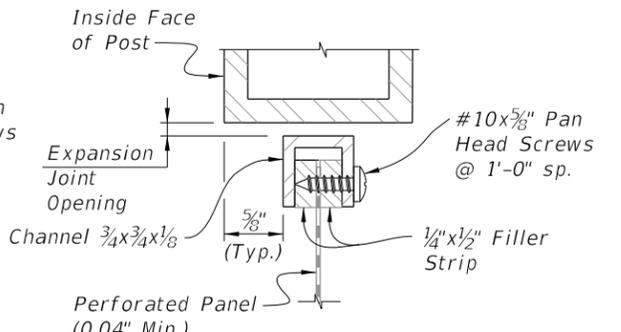
|                           |              |  |                              |                                       |                  |                 |
|---------------------------|--------------|--|------------------------------|---------------------------------------|------------------|-----------------|
| LAST REVISION<br>11/01/16 | DESCRIPTION: |  | FY 2023-24<br>STANDARD PLANS | PEDESTRIAN/BICYCLE RAILING (ALUMINUM) | INDEX<br>515-062 | SHEET<br>7 of 9 |
|                           |              |  |                              |                                       |                  |                 |



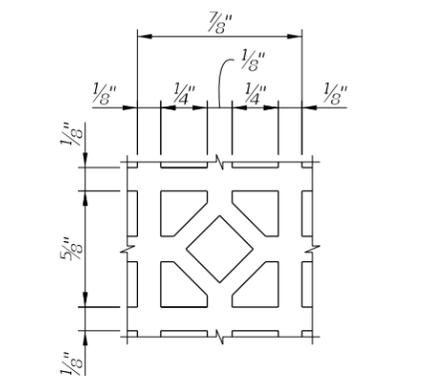
TYPE 5 - PERFORATED INFILL PANEL



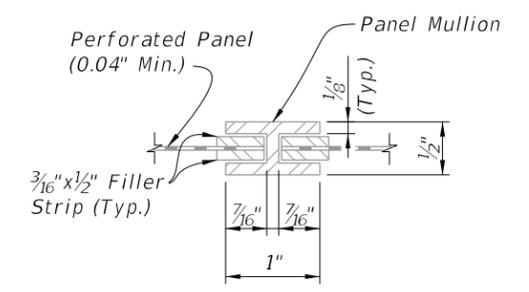
DETAIL "5A"  
PANEL/RAIL CONNECTION  
(Top Shown, Bottom Similar)



DETAIL "5B"  
PANEL END CONNECTION  
(Expansion Joint Shown, Sides Similar)



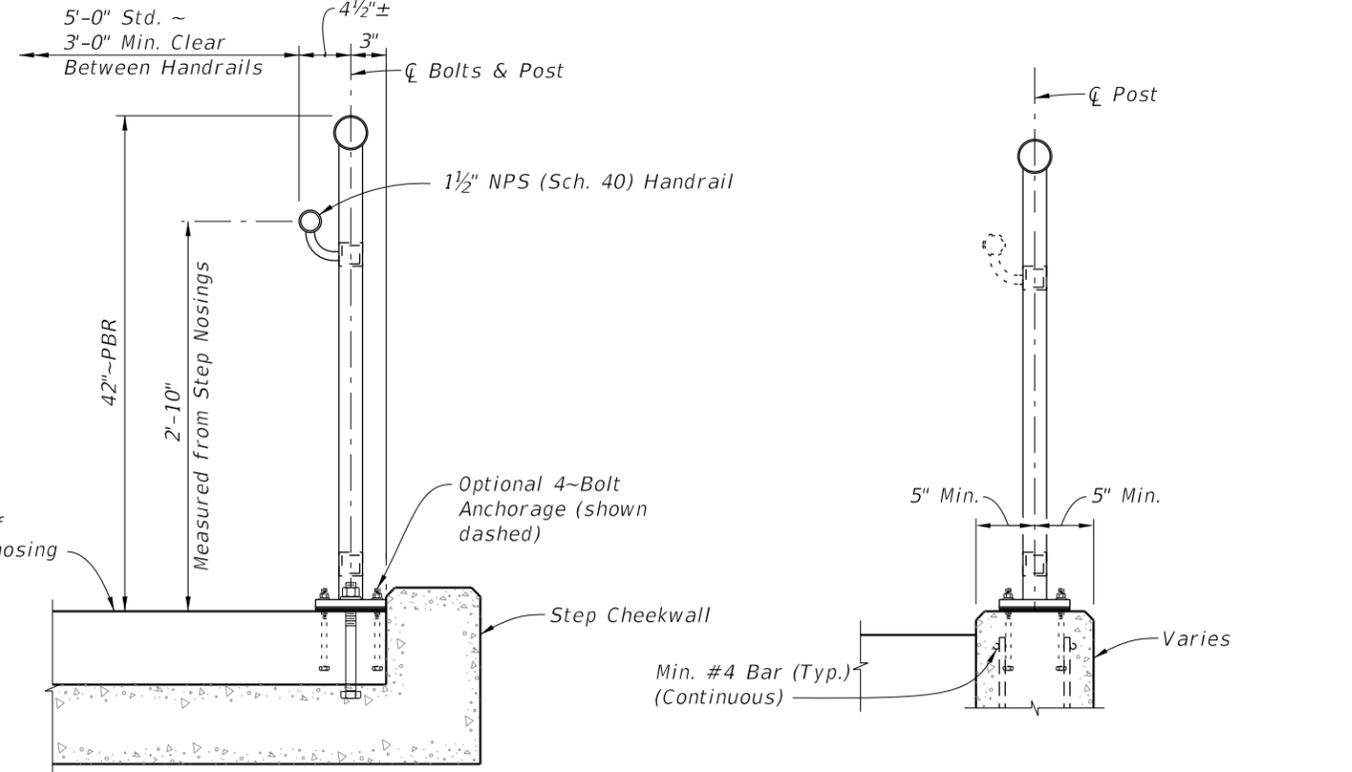
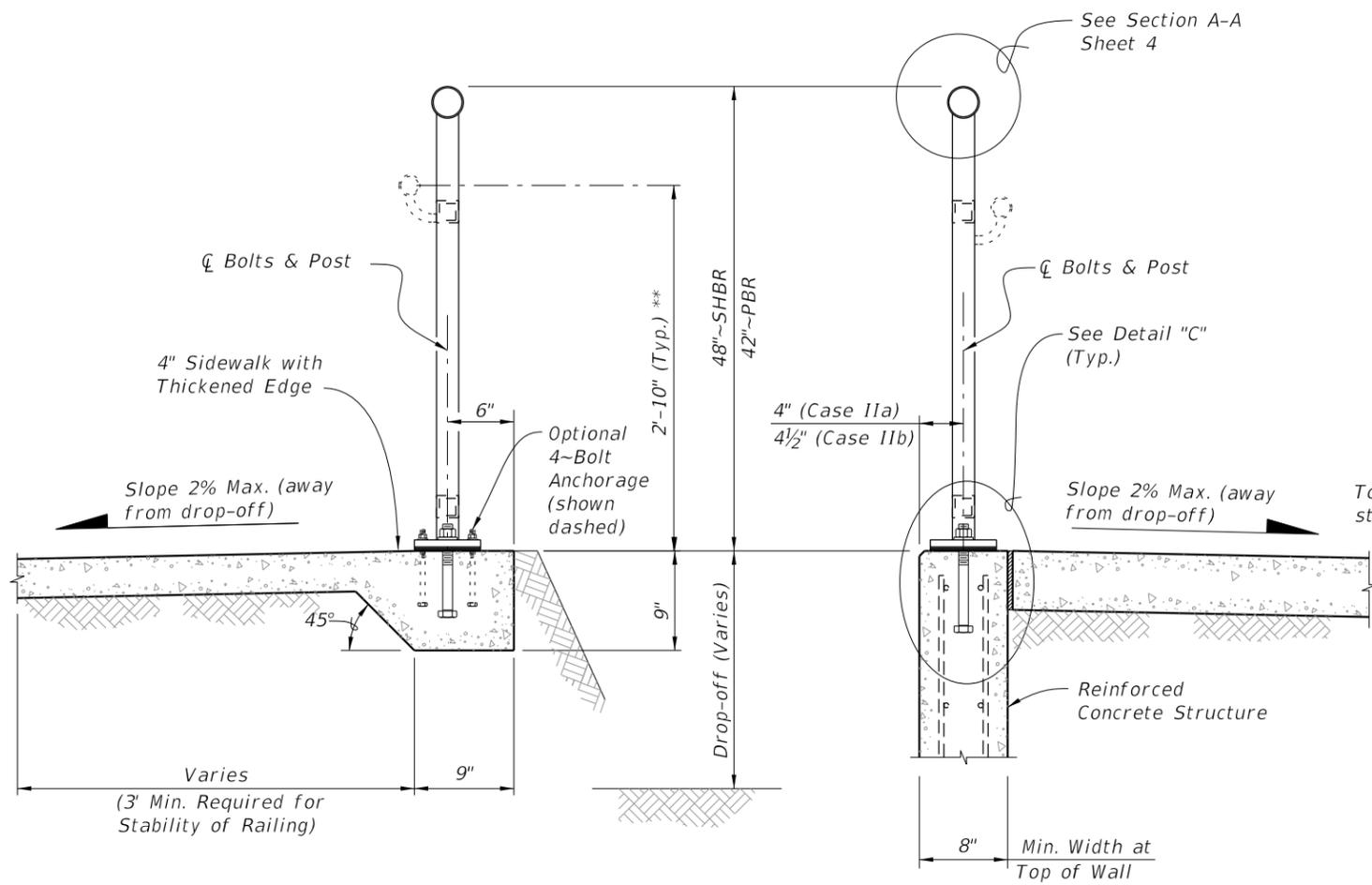
REPEATING PATTERN DETAIL  
FOR PERFORATED PANEL



SECTION C-C  
PANEL/SPLICE CONNECTION

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|                           |          |              |  |                              |                                       |                  |                 |
|---------------------------|----------|--------------|--|------------------------------|---------------------------------------|------------------|-----------------|
| LAST REVISION<br>11/01/16 | REVISION | DESCRIPTION: |  | FY 2023-24<br>STANDARD PLANS | PEDESTRIAN/BICYCLE RAILING (ALUMINUM) | INDEX<br>515-062 | SHEET<br>8 of 9 |
|---------------------------|----------|--------------|--|------------------------------|---------------------------------------|------------------|-----------------|

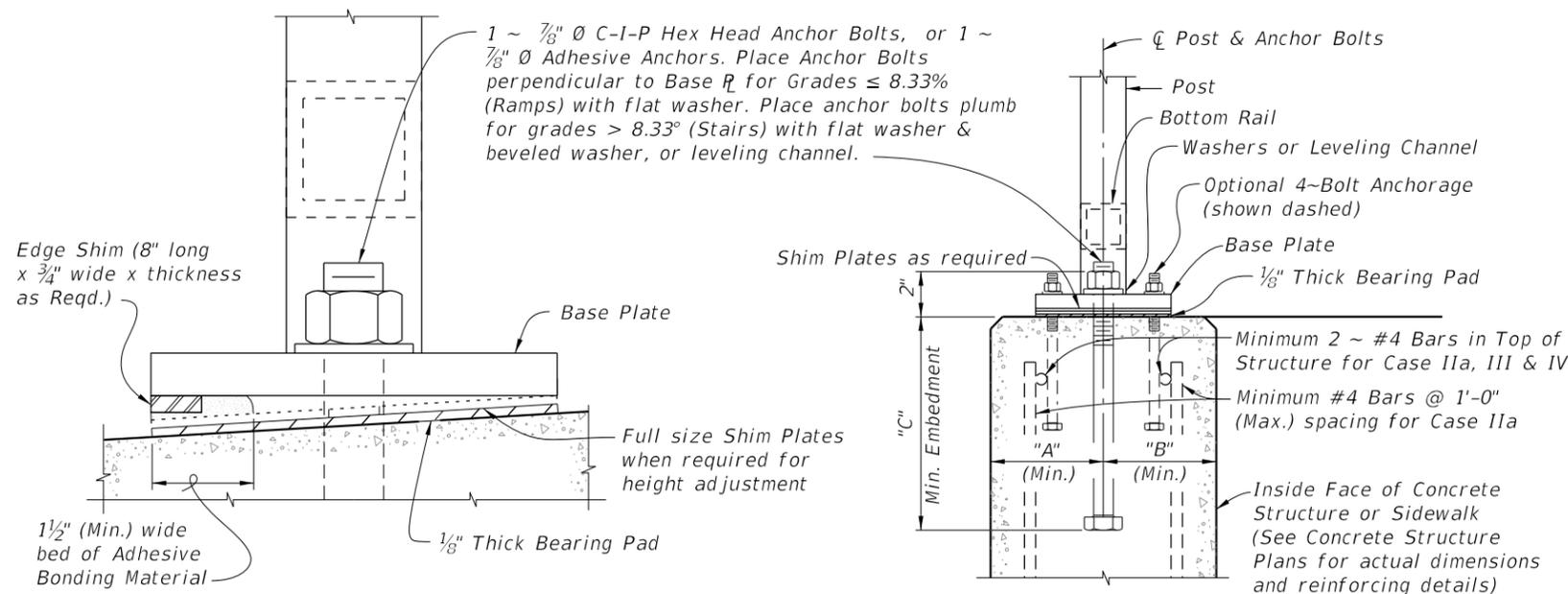


TYPICAL SECTION ON CONCRETE SIDEWALK (Case I)

TYPICAL SECTION ON RETAINING WALL (Case II)

TYPICAL SECTION ON STEPS & STAIRS (Case III)

TYPICAL SECTION FOR 4-BOLT ANCHORAGE (Case IV)



| CASE | STRUCTURE TYPE             | DIMENSIONS     |                       |               | ANCHOR LENGTH       |                 | ANCHOR SIZE |
|------|----------------------------|----------------|-----------------------|---------------|---------------------|-----------------|-------------|
|      |                            | "A" Edge Dist. | "B" Edge Dist.        | "C" Embedment | C.I.P Hex Head Bolt | Adhesive Anchor |             |
|      |                            | I              | Unreinforced Concrete | 6"            | 1'-2"               | 6"              |             |
| IIa  | Reinforced Concrete        | 4"             | 4"                    | 9"            | 10 1/2"             | 11"             | 7/8" Ø      |
| IIb  | Gravity Wall Index 400-011 | 4 1/2"         | 3 1/2" @ top          | 9"            | 10 1/2"             | 11"             | 7/8" Ø      |
| III  | Step Cheekwall             | 4 1/2"         | 4 1/2"                | 9"            | 10 1/2"             | 11"             | 7/8" Ø      |
| IV   | Varies                     | 5"             | 5"                    | 5"            | 6 1/2"              | 7"              | 7/16" Ø     |

\*\* When required; measured from top of sidewalk (Typ.)

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