NOTES

PIPE RAILING & POSTS:
Pipe Rails and Posts shall be in accordance with ASTM A53 Grade B for standard weight pipe and ASTM A500 Grade B, C or D for structural tube. Bars for handrail supports shall be ASTM A36. Posts and End Rails shall be fabricated and installed plumb, a 1° tolerance when measured at 8'-0" above the foundation. Corners and changes in tangential longitudinal alignment, may be made continuous with a 9" bend radius or terminated at adjoining sections with a standard end hoop when handrails are not required. For changes in tangential longitudinal alignment greater than 45°, posts shall be interrupted at the corner apex. For curved longitudinal alignments the top and bottom rails and handrails shall be shop bent to match the alignment radius.

RAILING MEMBER DIMENSIONS TABLE

<table>
<thead>
<tr>
<th>MEMBER</th>
<th>DESIGNATION</th>
<th>OUTSIDE DIMENSION</th>
<th>WALL THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posts</td>
<td>2&quot; NPS (Sch. 40)</td>
<td>2.375&quot;</td>
<td>0.154&quot;</td>
</tr>
<tr>
<td>Posts</td>
<td>2&quot; NPS (Sch. 40)</td>
<td>2.375&quot;</td>
<td>0.154&quot;</td>
</tr>
<tr>
<td>Rails</td>
<td>1½&quot; NPS (Sch. 40)</td>
<td>1.900&quot;</td>
<td>0.120&quot;</td>
</tr>
<tr>
<td>Rails</td>
<td>1½&quot; NPS (Sch. 40)</td>
<td>1.910&quot;</td>
<td>0.134&quot;</td>
</tr>
<tr>
<td>Handrails Joint/Splice Sleeves</td>
<td>1½&quot; NPS (Sch. 40)</td>
<td>1.900&quot;</td>
<td>0.147&quot;</td>
</tr>
<tr>
<td>Handrail Support Bar</td>
<td>1½&quot; Ø Round Bar</td>
<td>1.900&quot;</td>
<td>N/A</td>
</tr>
</tbody>
</table>

BASE PLATES:
Base Plates shall be in accordance with ASTM A36 or ASTM A572 Grade 36.

SHIM PLATES:
Shim Plates shall be aluminum in accordance with ASTM B209, Alloy 6061 or 6063. Shim plates shall be used for foundation height adjustments greater than ½" and localized irregularities greater than ½". Field trim shim plates when necessary to match the contours of the foundation. Reclaimed shim plates may be used. shim plates shall be coated with a galvanizing compound in accordance with the Specifications.

ANCHOR BOLTS:
Anchor bolts shall be in accordance with ASTM F1554 Grade 36. Neoprene washers shall be Self-Locking (Item No. 519-11). Payment for the Guiderail will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, rail splice assembly, base plates, anchor bolts, nut washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the Guiderail.

Base Plates shall be in accordance with Section 962 of the Specifications. All nuts, bolts and washers shall be hot-dip galvanized in accordance with Section 962 of the Specifications.

ANCHOR BOLTS:
All anchor bolts shall have single self-locking hex nuts. Tack welding of the nut to the anchor bolt may be used in lieu of self-locking nuts. All nuts shall be in accordance with ASTM A563 or ASTM A194. Flat Washers shall be in accordance with ASTM F1554 and Plain Washers (for long slotted holes only) shall be in accordance with ASTM A36 or ASTM A572 Grade 36. After the nuts have been snug tightened, the anchor bolt threads shall be distorted to prevent removal of the nuts. Distorted threads and tack welds shall be coated with a galvanizing compound in accordance with the Specifications.

RESILIENT AND NEOPRENE PADS:
Resilient and Neoprene pads shall be in accordance with Specification Section 932, except that testing of the finished pads shall not be required. Neoprene pads shall be diometer hardness 60 or 70.

JOINTS:
All fixed joints are to be welded all around and ground smooth. Expansion Joints shall be spaced at a maximum of 30'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate shipping and handling, but CFS shall be continuous across a minimum of two channels. The Contractor shall be responsible for obtaining a Continuity Field Splice (Detail "E") to make the railing continuous for unforeseen field adjustments.

WELDING:
All welding shall be in accordance with the American Welding Society Structural Welding Code (Steel) AWS/D1.1 (current edition). Weld metal shall be E60XX or E70XX. Nondestructive testing of welds is not required. Shop drawings shall be in accordance with the Specifications.

PAYMENT:
Payment for the Guiderail will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, rail splice assembly, base plates, anchor bolts, nut washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the Guiderail.

Means and methods of installation of the Guiderail. Washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the Guiderail.
ELEVATION

TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%

For Details "C", "D" and "E", see Sheet 4.

CROSS REFERENCE:

ELEVATION

RAILINGS ON GRADES STEEPER THAN 5% TO 8.33%

RAMP REQUIREMENTS

LANDING REQUIREMENTS

Max. landing slope = 2% Max. landing cross-slope = 2%
**TYPICAL SECTION ON CONCRETE SIDEWALK**

**TYPICAL SECTION ON GRAVITY WALL**

(Other Retaining Walls Similar)

**TYPICAL SECTION ON STEPS & STAIRS**

**DETAIL "F" (OPTIONAL SHIMMING DETAIL FOR CROSS SLOPE CORRECTION)**

(Used in lieu of Beveled Shim Plates)

**OPTIONAL SIDEWALK ANCHORAGE DETAIL**

**NOTES:**

*** 2 – 1/2" Ø Anchor Bolts (**); Expansion Anchors Not Permitted.

Galvanized Steel Anchors Permitted (C-I-P); Galvanized Adhesive Anchors Permitted

*** Adhesive anchors shall be fully threaded headless anchor bolts or galvanized steel bolts (as shown) (C-I-P); Galvanized U-Bolts or Plastic or Galvanized Steel Plugs

Seal end of post with a plastic or galvanized steel plug

Seal end of post with an Adhesive Bonding Material System in accordance with Specification Section 937 and installed in accordance with Specification Section 916. The minimum embedment is 6".