PIPEDRAIN & POSTS
Pipe Rails and Posts shall be in accordance with ASTM A 543 Grade B for standard weight pipe and ASTM A 450 (Grade B, C, or D) or ASTM A 450 for structural tube. Bars for handrail supports shall be ASTM A 450, Posts and End Rails shall be fabricated and installed plumb. 1” tolerance when measured at 3’-6” above the foundation. Corners and changes in tangential/longitudinal alignment, may be made continuous with a 10” bend radius or terminated at adjoining sections without regard to handrails unless otherwise designed. For changes in tangential/longitudinal alignment greater than 45°, posts shall be positioned at a maximum distance of 2”-0” each side of the corner and shall be located at the crown of the curve. For curved longitudinal alignments the top and bottom rails and handrails shall be shaped 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” NPS (Sch. 40)</td>
<td>2.77”</td>
<td>0.15”</td>
</tr>
<tr>
<td>Rails</td>
<td>2” NPS (Sch. 40)</td>
<td>2.47”</td>
<td>0.14”</td>
</tr>
<tr>
<td>Rail Join/Splice Sleeves</td>
<td>1/2” NPS (Sch. 40)</td>
<td>1.93”</td>
<td>0.15”</td>
</tr>
<tr>
<td>Handrail Join/Splice Sleeves</td>
<td>1” NPS (Sch. 40)</td>
<td>1.93”</td>
<td>0.15”</td>
</tr>
<tr>
<td>Handrail</td>
<td>1/2” NPS (Sch. 40)</td>
<td>1.93”</td>
<td>0.15”</td>
</tr>
<tr>
<td>Handrail Support Bar</td>
<td>2” Round Bar</td>
<td>1.00”</td>
<td>N/A</td>
</tr>
</tbody>
</table>

BASE PLATES
Base plates shall be in accordance with ASTM A 36 or ASTM A 709 Grade 36.

SHRIMP PLATES:
Shrimp Plates shall be aluminum in accordance with ASTM B 209, Alloy 6061 or 6063. Shrimp plates shall be used for foundation height adjustments greater than 1/2”, and localized irregularities greater than 1/4”.

Field trim. Shrimp plates when necessary to match the contours of the foundation. Beveled shim plates may be used in lieu of trimmed flat shim plates shown. Stacked shim plates must be bonded together with adhesive bonding material and limited to a maximum total thickness of 1/2”, unless longer anchor bolts are provided for the exposed thread length.

COATINGS
The railing shall be hot-dip galvanized after fabrication in accordance with Section 962 of the Specifications. All nuts and washers shall be hot-dip galvanized in accordance with Section 962 of the Specifications.

ANCHORS (S.T.)
Anchor bolts shall be in accordance with ASTM F 1554 Grade 56. Neadless anchor bolts for Adhesive Anchors shall be threaded full length. Cutting of reinforcing steels is permitted for drilled hole installation. All anchor bolts shall have single self-locking hex nuts. Tack welding of the nuts to the anchor bolt may be used in lieu of self-locking nuts. All nuts shall be in accordance with ASTM F 2224 or ASTM A 494. Flat Washers (not long slotted holes only) shall be in accordance with ASTM A 450 or ASTM A 709 Grade 36. After the nuts have been snug tightened, the anchor bolt threads shall be distorted to prevent removal of the nuts. Slotted threads and tack welds shall be coated with a galvanizing compound in accordance with the Specifications.

RECESSED AND NEOPRENE RODS
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 a minimum 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 shopping and handling, but rails shall be continuous across a minimum of two posts. Only use the Contiguity Field Splice (Detail 2E) to make the railing continuous for unforeseen field adjustments.

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

SWR DESIGNATIONS:
Complete details addressing project specific geometry (fence & grading) showing past and expansion joint locations must be submitted by the Contractor to the Engineer for approval prior to fabrication of the railing. Shop drawings shall be in accordance with the Specifications.

Payment:
Guiderail shall be paid for under the contract unit price for Pipe Guiderail (Steel), LF [Item No. 254.5-1]. Payment for the Guiderail will be prorated as shown in the plan of the length of the top rail, and includes rails, posts, rail splice assembly, base plates, anchor bolts, nuts, 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%

See Plans for continuation or termination limits of railing.

See "Typical Railing Details" for post & rail details.

Rail expansion joints to be located in panels above structure expansion joints ≠ (30'-0" maximum spacing).

RAMP REQUIREMENTS

For ramps greater than 3.5%:
Max ramp slope = 8.33%
Max ramp cross-slope = 2.0%

LANDING REQUIREMENTS

Max landing slope = 2%
Max landing cross-slope = 2%

RAILINGS ON GRADES STEEPER THAN 5% TO 8.33%

Bottom Landing

Intermediate Landing

Top Landing

RAMP

11'-0"

6'-0"

30'-0" Max for Slopes > 6.25%
40'-0" Max for Slopes ≤ 6.25%

6'-0" Min.

5'-0" Min.

30'-0" Min for Slopes > 6.25%
40'-0" Min for Slopes ≤ 6.25%

Top of Sidewalk

Top of Sidewalk

11'-0"

6'-0"

6'-0" (Max.) ~ Equal Panels

Post Spacing

Post

Post

Variety (4" Min., 1'-0" Max.) (Typ.)

Top of Sidewalk or Bikeway

Top of Sidewalk or Bikeway

Ground Line

Ground Line

NOTES:

NPS = Nominal Pipe Size

STRUCTURES EXPANSION JOINTS NOTE:

* Keyed construction joints in Index No. 520 Gravity Wall are not considered to be expansion joints.

CROSS REFERENCE:

For Details "C", "D" and "E", see Sheet 4 of 5.

2010 FDOT Design Standards

STEEL PIPE GUIDERAIL
RAILING CONTINUATION BEYOND STEPS
(Bottom shown, Top similar)

Steel Handrail required for three or more steps
(Handrail and checkwall continuous at landings)
Handrail = 1 1/2" NPS (Sch. 40)

1 1/4" Min. Handrail Extension
8"  Post
3 1/2" Min. Handrail Extension

6"  Post

Handrail Continuous
2 1/2" Landing

Handrail Termination
See Detail #4 (Typ.)

See Index No. 521 or Contract Plans for Step Details

Concrete sidewalk to extend 6" min. behind 8" railing

Length of landing 5' Min.
Top Landing

9" Min. Wide checkwall both sides

2 1/2" Landing

4 1/2" Min. Handrail Extension

See Index No. 521 or Contract Plans for Step Details

ELEVATION
(At-Grade Steps)

ALTERNATE END TREATMENT

POST
CJP
1/2"
TYPICAL SECTION ON CONCRETE SIDEWALK

DETAL "F" (OPTIONAL SHIMMING DETAIL FOR CROSS SLOPE CORRECTION) (Used in lieu of Beveled Shim Plates)

TYPICAL SECTION ON GRAVITY WALL (Other Retaining Walls Similar)

NOTES:
** 2 ~ 3/8" x 6" Steel Anchors: Galvanized Steel Bolts (A325N) 2-1/2" or Longer; Galvanized U-Bolts Permitted (C-1-1-P); Galvanized Adhesive Anchors Permitted (C-1-1-P). Expansion Anchors Not Permitted.
*** Adhesive anchors shall be fully threaded headless anchor bolts set in drilled holes (manufacturer recommended diameter) with an Adhesive Bonding Material System in accordance with Specification Section 9.17 and installed in accordance with Specification Section 4.16. The minimum embedment is 6".

OPTIONAL SIDEWALK ANCHORAGE DETAIL