**CONCRETE GUTTER AND DRAINS AT RETAINING WALLS**

- **Edge Of Pavement**: Minimum distance as required to comply with safety criteria.
- **Variable Front Slope**: 1:2 slope if necessary to go beyond normal toe of slope and maintain ditch width by moving out back slope.
- **Normal Slope**: Ditch not to be steeper than 1:10.
- **Steel Plate**: Fully threaded rod installed in adhesive-bonded anchor. Cast-in-place, hex bolt:
  - Minimum embedment: 2 11/2 x 2 1/2 x 1/8 anchor with nuts and washers.
  - 1 1/2 Ø Anchor with nuts and washers. PVC pipe sleeve.
  - 1 7/8 x 14 bolt with nut and washer.

**METHOD FOR SETTING LIMITS OF VARIABLE FRONT SLOPES AT DRAINAGE STRUCTURES**

- 1. \( L = 10 \times H \) (No Maximum)
- 2. \( L = 10 \times L \) (Ditch Offset) (Maximum \( L = 100' \))

**GUARD AT PIPE ENDS**

- Guards to be constructed only at locations specifically called for in plans.
<table>
<thead>
<tr>
<th>RAILROAD COMPANY</th>
<th>CLEARANCE BELOW BOTTOM OF RAIL (FRET)</th>
<th>STRENGTH ASTM (C76) CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama &amp; Gulf Coast Railway (Rail America)</td>
<td>5.5</td>
<td>IV</td>
</tr>
<tr>
<td>All Railway &amp; Bay Line Railroad (Genesee &amp; Wyoming)</td>
<td>5.5 / 4.5</td>
<td>V</td>
</tr>
<tr>
<td>CSX Transportation</td>
<td>5.5</td>
<td>V</td>
</tr>
<tr>
<td>First Coast Railroad (Genesee &amp; Wyoming)</td>
<td>5.5 / 4.5</td>
<td>V</td>
</tr>
<tr>
<td>Florida Midland Central &amp; Northern Railroads</td>
<td>5.5</td>
<td>V</td>
</tr>
<tr>
<td>Florida East Coast (FEC) Railway Company</td>
<td>5.5</td>
<td>IV</td>
</tr>
<tr>
<td>Florida West Coast Railroad Company</td>
<td>5.5</td>
<td>V</td>
</tr>
<tr>
<td>Georgia &amp; Florida Railway, Inc.</td>
<td>5.5</td>
<td>V</td>
</tr>
<tr>
<td>Norfolk Southern (NS) Railway Corporation</td>
<td>5.5 / 4.5</td>
<td>V</td>
</tr>
<tr>
<td>Port of Palm Beach District Railroad</td>
<td>5.5</td>
<td>IV</td>
</tr>
<tr>
<td>Seminole Gulf Railway (LP)</td>
<td>6.0</td>
<td>V</td>
</tr>
<tr>
<td>South Central Florida Express</td>
<td>6.0</td>
<td>V</td>
</tr>
<tr>
<td>Talleyrand Terminal Railroad (Genesee &amp; Wyoming)</td>
<td>5.5 / 4.3</td>
<td>V</td>
</tr>
<tr>
<td>South Florida Regional Transportation Authority (Tri-County Commuter Rail)</td>
<td>5.5</td>
<td>V</td>
</tr>
</tbody>
</table>

(1) - Distance standard for yard and industrial tracks.

(2) - Clearance is for casing pipe. All subgrade carrier pipelines and wirelines will be installed within a casing pipe which will extend from Right-of-Way line to Right-of-Way line.

METHOD FOR DETERMINING THE LENGTH OF SPECIAL PIPE REQUIRED UNDER RAILROADS

INLETS, MANHOLES OR JUNCTION BOXES ON INTEGRAL PRECAST CONCRETE RISER FOR CONCRETE PIPE

PLAN OF TOP

SECTION

Varies See Plans

For Optional Construction Joints See Index 425-001

Reinforced Concrete Top

12" For All Others

#5 Bars

6" For Other Size Pipes

3'-6" For 54" Pipe

5'-4" For 54" Pipe

6'-0" For Other Size Pipes

54" Minimum
(Span Or Dia.)

Round Or Elliptical Pipe

For Integral Riser Reinforcement

#5 Bars @ 18" Ctrs. Vert.

And 6" Ctrs. Horiz.

Bend Pipe Into Riser

Integral Riser Reinforcement

5" Bars @ 18" Ctrs. Vert.

And 6" Ctrs. Horiz.

Minimum Length Of Special Pipes Required

(To Be In Increments Of 6')

Top Of Rail

Standard Cover See Table Above

MINIMUM CLEARANCE

Bottom Of Rail

3'-6" Min.

Additional Std. Strength
Pipe As Required

Flow Line Of Pipe

Additional Std. Strength
Pipe As Required

1:1 2/3 Slop (Design Loading)

STRENGTH

ASTM (C76) CLASS

5.5 IV

5.5 V

5.5 V

5.5 IV

5.5 V

5.5 V

5.5 / 4.5 V

5.5 IV

6.0 V

6.0 V

5.5 / 4.3 V

5.5 V

(2) - Clearance is for casing pipe. All subgrade carrier pipelines and wirelines will be installed within a casing pipe which will extend from Right-of-Way line to Right-of-Way line.