GENERAL NOTES
CONCRETE: Concrete for the Traffic Railing (Vertical Face Retrofit) and replacement curb sections shall be Class IV. Concrete for Curb Transition Blocks shall be Class II (Bridge Deck).

REINFORCING STEEL: Reinforcing steel shall be ASTM A615, Grade 60, except Expansion Dowel Bar B which shall be ASTM A36 smooth round bar hot-dip galvanized in accordance with the Specifications.

EXPANSION SLEEVE ASSEMBLY: Pipe sleeve shall be ASTM D2241 PVC pipe, SDR13.5. End Cap shall be ASTM D2466 PVC socket fitting, Schedule 40. End of Sleeve assembly at railing open joint shall be sealed with silicone to prevent concrete intrusion during railing casting. A compressive expanded polystyrene plug is required in the opposite end of the assembly for correct dowel positioning during railing casting. Correct dowel positioning is required in order to provide for thermal movement of the deck.

ADHESIVE-BONDED ANCHORS AND DOWELS: Adhesive Bonding Material Systems for Anchors and Dowels shall comply with Specification Section 513. The field testing proof loads required by Specification Section 416 shall be 23,800 lbs. for Dowel Bars 6D on the inside face (traffic side) of the railing (1'-0" embedment) and 18,500 lbs for Dowel Bars 6D along the outside face of the traffic railing (9" min. embedment).

BRIDGES ON CURVED ALIGNMENTS: The details presented in these Standards are shown for bridges on tangent alignments. Details for bridges on horizontally curved alignments are similar.

BARRIER DELINERATORS: Barrier Delinicators shall meet Specification Section 993. Install barrier delinicators on top of the Traffic Railing along the entire length of bridge 2" from the face on the traffic side at the spacing shown in the table below. Barrier Delinicator color (white or yellow) shall match the color of the near edgeline.

PAYMENT: Concrete Traffic Railing- Bridge Retrofit- Post & Beam Railing (each) includes all materials and labor required to demolish a portion of the existing structure where required and to construct the concrete portion of the retrofit railings. Guardrail Bridge Anchorage Assembly (each) includes all barrier delinicators for the entire bridge length, transition blocks, and necessary hardware to complete the Guardrail transitions shown.

BARREL DELINERATOR SPACING

<table>
<thead>
<tr>
<th>Distance to Face of Railing</th>
<th>Spacing (Ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 4</td>
<td>40</td>
</tr>
<tr>
<td>4 to 8</td>
<td>80</td>
</tr>
<tr>
<td>&gt; 8</td>
<td>None Required</td>
</tr>
</tbody>
</table>

ESTIMATED TRAFFIC RAILING QUANTITIES

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>CY/FT</td>
<td>0.064</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.003 per in. height</td>
</tr>
<tr>
<td>Reinforcing Steel</td>
<td>LB/FT</td>
<td>13.27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.10 per in. length</td>
</tr>
</tbody>
</table>

GUARDRAIL TRANSITIONS - EXISTING
POST & BEAM BRIDGE RAILINGS (WIDE CURBS)

INDEX NO. 405 SHEET NO. 1 of 6
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAM

BILL OF REINFORCING STEEL

<table>
<thead>
<tr>
<th>MARK</th>
<th>SIZE</th>
<th>LENGTH</th>
<th>NOTE NOS.</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>4</td>
<td>AS REQD.</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>1&quot; B</td>
<td>2'-0&quot;</td>
<td>2 &amp; 3</td>
</tr>
<tr>
<td>C</td>
<td>4</td>
<td>2'-0&quot;</td>
<td>1, 2 &amp; 3</td>
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<tr>
<td>D</td>
<td>6</td>
<td>AS REQD.</td>
<td>2 &amp; 3</td>
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<td>1 6, 3</td>
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<tr>
<td>M</td>
<td>4</td>
<td>4'-8&quot;</td>
<td>1 6, 3</td>
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<td>N</td>
<td>4</td>
<td>2'-3&quot;</td>
<td>1 6, 3</td>
</tr>
<tr>
<td>S</td>
<td>3</td>
<td>AS REQD.</td>
<td>2, 3 &amp; 4</td>
</tr>
</tbody>
</table>

REINFORCING STEEL NOTES:
1. All bar dimensions in the bending diagrams are cut to size.
2. The reinforcement for the railing on a retaining wall shall be the same as detailed for a bridge deck.
3. All reinforcing steel in the Vertical Face Retrofit Railing shall have a 2" minimum cover.
4. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-0".
5. Expansion Dowel Bars B shall be ASTM A36 smooth round bar and hot-dip galvanized in accordance with the Specifications.

OPEN JOINT EXPANSION DOWEL DETAIL
(Railing Reinforcing Not Shown For Clarity)

Dowel Installation Note:
Shift dowel hole to clear if the existing reinforcement is encountered.

PARTIAL PLAN OF RAILING (SKEW ANGLE θ LESS THAN 70°)

PARTIAL PLAN OF RAILING (SKEW ANGLE θ = 70° OR GREATER)

GUARDRAIL TRANSITIONS - EXISTING
POST & BEAM BRIDGE RAILINGS (WIDE CURBS)

INDEX NO. 405

FDOT 2014
DESIGN STANDARDS

NOTE NOS.

LENGTH

SIZE

MARK

AS REQD.

4

2'-0"

20" Preformed Joint Filler at top of existing Curb shall extend beyond the joint material (Silicone, poured rubber, armored neoprene seal or sliding plates) as shown to prevent concrete intrusion during railing casting and shall be placed so as not to restrict in any way normal joint movement.

Dowel Installation Note:
Shift dowel hole to clear if the existing reinforcement is encountered.

Match width of Bridge Deck

2" Cover

(Typ.)

1'-0"

Top of Existing Curb

Pairs of Bars 4C @ 3½" sp. (Typ.) Shift to clear Bars 6D as required

Vertical Face Retrofit Railing

Expansion Dowel Sleeve Assembly

Pairs of Bars 4C @ 3½" sp. (Typ.) Shift to clear Bars 6D as required

2 equal sp (1½" Max.)

1½" or 2'-3" spacing (Typ.)**

2 equal spaces (1½" Max. on Approach Slab; 1½" Max. on Bridge)

3" Int. Open Joint

or Joint Filler

Spacing Expansion Dowel Bar B

1'-0"

Length of Expanded Polystyrene

Plug to match width of joint

Top of Existing Curb

2" Cover

(Typ.)

1'-0"

2" above existing curb for corner overhangs

Expansion Dowel Sleeve Assembly

Gutter Line

2 equal sp (1½" Max.)

1½" or 2'-3" spacing (Typ.)**

2 equal spaces (1½" Max. on Approach Slab; 1½" Max. on Bridge)

Existing Bridge Deck

2" above existing curb for corner overhangs

Expansion Dowel Bar B

1'-0"

Expansion Dowel Sleeve Assembly

Existing Approach Slab

Gutter Line

2 equal sp (1½" Max.)

1½" or 2'-3" spacing (Typ.)**

2 equal spaces (1½" Max. on Approach Slab; 1½" Max. on Bridge)

Existing Bridge Deck

2" above existing curb for corner overhangs

Existing Approach Slab

Gutter Line

2 equal sp (1½" Max.)

1½" or 2'-3" spacing (Typ.)**

2 equal spaces (1½" Max. on Approach Slab; 1½" Max. on Bridge)

Existing Bridge Deck

2" above existing curb for corner overhangs

Existing Approach Slab

Gutter Line

2 equal sp (1½" Max.)

1½" or 2'-3" spacing (Typ.)**

2 equal spaces (1½" Max. on Approach Slab; 1½" Max. on Bridge)

Existing Bridge Deck

2" above existing curb for corner overhangs

Existing Approach Slab

Gutter Line

2 equal sp (1½" Max.)

1½" or 2'-3" spacing (Typ.)**

2 equal spaces (1½" Max. on Approach Slab; 1½" Max. on Bridge)
1. On approach end provide a Roadway Guardrail Transition, Index No. 402 (as shown) or other site specific treatment. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is on the bridge, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is along the Wing Wall, see Schemes 2, 3, 4 or 5. Sheets 4, 5 and 6. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing. For treatment of trailing end see Roadway Plans.

2. Field cut Bars 5S and Dowel Bars 6D to maintain clearance within Vertical Face Retrofit Railing.

3. Where existing structure has been removed and not encased in new concrete; match adjoining areas and finish flat by grouting or grinding as required. Exposed existing reinforcing steel not encased in new concrete shall be burned off 1" below existing concrete and grouted over.

NOTES:

- Non skewed deck joint shown, actual joint dimensions and orientation vary. For treatment at skewed deck joints see Skew Detail. Provide open Railing Joints at Deck Expansion Joint locations matching the dimension of the Deck Joint.

- **Curb heights vary from 5" Min. to 1'-2" Max.**

- **Embedment** - 2'-6" preferred with 2" Edge Distance or Bottom Clearance. 6" Min. If Edge Distance or Bottom Clearance is less than 2".

- Front Face of Backwall, Begin or End Bridge & Match Line (See Sheets 4, 5 or 6)

- Embedment - (Varies)
SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:
1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railings End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.
2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.
3. If a Special Steel Guardrail Post is required for attachment to the top of a sloping Wing Wall, saw cut and remove a wedge shaped portion of the sloping Wing Wall as required to provide a level surface for post installation.

SCHEME 2
RAILING END TREATMENT FOR PARALLEL CURBS

SCHEME 2 NOTES:
1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 3 of 6. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-0" minimum dimension shall apply to both the front and back face of the railing.
2. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend beyond end of existing End Bent Wing Wall, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railings End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.
3. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.
**GUARDRAIL TRANSITIONS - EXISTING POST & BEAM BRIDGE RAILINGS (WIDE CURBS)**

**SCHEME 3 NOTES:**

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is on the bridge, attach Three-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 3 of 6.

2. Dowel Bars 4A may be installed on a maximum angle of 45° to the cut edge of the Approach Slab as shown to facilitate drilling of holes and installation of bars.

3. At the Contractor’s option, along the length of the Approach Slab curb that is to be replaced, Dowel Bars 6D may be cast in with the new section of curb as shown or they may be installed in drilled holes in the new section of curb using an Adhesive Bonding Material System with a 1'-0" minimum embedment.

---

**PARTIAL PLAN OF RAILING**

- **Existing Wing Post:**
  - Type: 4C (Typ.)
  - Expansion Dowel Sleeve Assembly
  - Bars 60 @ 7'-3" Spacing
  - Max. (Front Face only)
  - Bars 60 cut to clear Backwall

- **Existing Curb:**
  - Type: 5S (Field Bend) (Typ.)
  - Existing Flared Wing Wall
  - Edge of Approach Slab (Location Varies)
  - Vertical Face Retrofit Railing

- **Asphalt Overlay:**
  - When present (Varies)
  - Roadway Guardrail Transition (See Note 1 Below & Note 1, Sheet 3 of 6)
  - Final Riding Surface

- **Existing Approach Slab:**
  - Direction of Traffic

---

**PARTIAL ELEVATION OF INSIDE FACE OF RAILING**

- **Existing Wing Post:**
  - Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity

**SCHEME 3 END TREATMENT FOR FLARED CURBS**

**SCHEME 4 NOTES:**

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is on the Wing Wall, attach Three-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 3 of 6.

2. Dowel Bars 4A may be installed on a maximum angle of 45° to the cut edge of the Approach Slab as shown to facilitate drilling of holes and installation of bars.

3. At the Contractor’s option, along the length of the Approach Slab curb that is to be replaced, Dowel Bars 6D may be cast in with the new section of curb as shown or they may be installed in drilled holes in the new section of curb using an Adhesive Bonding Material System with a 1'-0" minimum embedment.

---

**PARTIAL PLAN OF RAILING**

- **Existing Wing Post:**
  - Type: 4C (Typ.)
  - Expansion Dowel Sleeve Assembly
  - Bars 60 @ 7'-3" Spacing
  - Max. (Front Face only)
  - Bars 60 cut to clear Backwall

- **Existing Curb:**
  - Type: 5S (Field Bend) (Typ.)
  - Vertical Face Retrofit Railing

- **Asphalt Overlay:**
  - When present (Varies)
  - Roadway Guardrail Transition (See Note 1 Below & Note 1, Sheet 3 of 6)
  - Final Riding Surface

- **Existing Approach Slab:**
  - Direction of Traffic

---

**PARTIAL ELEVATION OF INSIDE FACE OF RAILING**

- **Existing Wing Post:**
  - Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity

**SCHEME 4 END TREATMENT FOR FLARED CURBS**
SCHEME 5 NOTES:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Three-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 3 of 6.

2. Dowel Bars 6D @ 1'-3" (Typ.) may be cast in place of Dowel Bars 6D (Typ.) and Dowel Bar 6S (Typ.) as shown. Dowel Bars 6D (Typ.) and Dowel Bar 6S (Typ.) may be omitted on trailing ends with no opposing traffic.

3. Provide Transition Block (See Note 3) or Curb if existing Approach Slab Curb does not extend beyond end of existing End Bent Wing Wall similar to Transition Block (See Note 3).

4. Field bend Dowel Bars 6D within Transition Block as required to maintain clearance. Dowel Bars 6D may be cast in place of Dowel Bars 6D (Typ.) and Dowel Bar 6S (Typ.) as shown.

5. At the Contractor's option, along the length of the Approach Slab curb that is to be replaced, Dowel Bars 6D may be cast in place of Dowel Bars 6D (Typ.) and Dowel Bar 6S (Typ.) as shown.

6. Dowel Bars 4N may be installed on a maximum angle of 45° to the cut edge of the Approach Slab as shown to facilitate drilling of holes and installation of bars.

7. Dowel Bars 4N @ 1'-3" (Typ.) within Transition Block as required to maintain clearance. Dowel Bars 4N may be cast in place of Dowel Bars 4N (Typ.) and Dowel Bar 5S (Typ.) as shown.

8. Dowel Bars 4M (1'-0" Min. Embedment, See Note 4) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

9. Dowel Bars 5S (See Note 5) may be cast in place of Dowel Bars 5S (Typ.) as shown.

10. Dowel Bars 4A @ 9" Max. (Field Bend as required to maintain clearance) (Typ.) may be cast in place of Dowel Bars 4A (Typ.) as shown.

11. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

12. Dowel Bars 4A @ 9" Max., Min. 3 full length bars (Typ.) may be cast in place of Dowel Bars 4A (Typ.) as shown.

13. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

14. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

15. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

16. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

17. Dowel Bars 4A @ 9" Max., Min. 3 full length bars (Typ.) may be cast in place of Dowel Bars 4A (Typ.) as shown.

18. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

19. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

20. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

21. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

22. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

23. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

24. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

25. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

26. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

27. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

28. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

29. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

30. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

31. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

32. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

33. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

34. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

35. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

36. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

37. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

38. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

39. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

40. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

41. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

42. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

43. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

44. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

45. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

46. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

47. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

48. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

49. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.

50. Dowel Bars 6D (See Note 5) may be cast in place of Dowel Bars 6D (Typ.) as shown.

51. Dowel Bars 4M (See Note 5) may be cast in place of Dowel Bars 4M (Typ.) and Dowel Bar 5S (Typ.) as shown.