For Bars 4H & 4G, Match Top Slab or Sidewalk Reinforcing Cover

**Typical Section at Light Pole Pedestal for Approach Slab or Bridge Deck Thickness Less Than 1'-5½" at Coping**

- 1½" Ø Conduit
- 2 - 2" Ø Conduits
- Construction Joint Permitted
- Bars 4F5 (pairs) (Shift as required to clear Traffic Railing, Approach Slab or Bridge Deck Reinforcing)
- Anchor Plate (dashed lines)
- Construction Joint Permitted
- Bars 4F4 (pairs) (Shift as required to clear Traffic Railing, Approach Slab or Bridge Deck Reinforcing)

**Typical Section at Light Pole Pedestal for Approach Slab or Bridge Deck Thickness Less Than 1'-1½" at Coping**

- 1' - 1½" Ø Conduit
- 2 - 2" Ø Conduits
- Construction Joint Permitted
- Bars 4F5 (pairs) (Shift as required to clear Traffic Railing, Approach Slab or Bridge Deck Reinforcing)
- Anchor Plate (dashed lines)
- Construction Joint Permitted
- Bars 4F4 (pairs) (Shift as required to clear Traffic Railing, Approach Slab or Bridge Deck Reinforcing)

**Light Pole Pedestal**

- Bars 4F4 (pairs)
- Anchor Plate (dashed lines)
- Lap (Bars 4F1 with 4F2)
- Bars 4G (Tie to Top Slab Reinforcing, shift to maintain lap with Bars 4F1)

**Elevation View**

- See Anchor Plate Detail
- Bars 4F5 (pairs)
- 4 - Anchor Bolts (see Sheet 3)

**Cross Reference:**

For Detail "A", Anchor Plate Detail and Light Pole Pedestal Notes, see Sheet 3.

---

**Description:**

- Pedestal and Light Pole
- Top of Traffic or Pedestrian/Bicycle Railing
- Concrete Pedestal Surface, Sloped Longitudinally with Profile Grade and Transversely with Cross Slope.
- Bars 4F1 (pairs)
- Anchor Plate (dashed lines)
- Construction Joint Permitted
- Bars 4F4 (pairs) (Shift as required to clear Traffic Railing, Approach Slab or Bridge Deck Reinforcing)

**Notes:**

- Anchor Bolt, Nuts, Washers and Anchor Plate are dashed for clarity.
- Bars 4F4 (pairs) - 7 sp. @ 1'-0" +
- Bars 4G Top Pair - 7 sp. @ 1'-0" +
- Bars 4F4 & 4F5 (pairs) - 7 sp.
- Bars 4G (Typ.)
- Bars 4F5 (pairs) - 7 sp.
- Bars 4F2 (pairs) - 7 sp.
- Bars 4G (Typ.)
- Bars 4F3 (pairs) - 7 sp.
- Bars 4F1 (pairs) - 7 sp.
- Bars 4F2 (pairs) - 7 sp.
- Bars 4F1 (pairs) - 7 sp.
- Bars 4F2 (pairs) - 4 - Anchor Bolts (see Sheet 3)
- Bars 4F5 (pairs)
- Anchor Plate (dashed lines)
- Lap (Bars 4F1 with 4F2)
- Bars 4G (Tie to Top Slab Reinforcing, shift to maintain lap with Bars 4F1)
- Bars 4F4 (pairs) (Shift as required to clear Traffic Railing, Approach Slab or Bridge Deck Reinforcing)

**Plan View**

- Pedestal and Light Pole
- Top of Traffic or Pedestrian/Bicycle Railing
- Concrete Pedestal Surface, Sloped Longitudinally with Profile Grade and Transversely with Cross Slope.
- Bars 4F1 (pairs)
- Anchor Plate (dashed lines)
- Construction Joint Permitted
- Bars 4F4 (pairs) (Shift as required to clear Traffic Railing, Approach Slab or Bridge Deck Reinforcing)

**Elevation View**

- Light Pole Pedestal for Approach Slab or Bridge Deck Thickness Less Than 1'-5½" at Coping

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**Revision Information:**

- LAST REVISION: 07/01/15
- FY 2017-18 DESIGN STANDARDS
- LIGHT POLE PEDESTAL
- INDEX NO. 07/26/16 9:05:55 AM
- SHEET NO. 1 of 3
- REV NO. 21200
**Light Pole Pedestal Notes**

1. Concrete and reinforcing steel required for the construction of the Pedestal shall meet the same requirements as the Traffic Railing or Pedestrian/Bicycle Railing the Pedestal is attached to.

2. Light Pole Pedestal may be used with the following:
   - Index No. 420 - Traffic Railing (32" F Shape)
   - Index No. 422 - Traffic Railing (42" Vertical Shape)
   - Index No. 423 - Traffic Railing (32" Vertical Shape)
   - Index No. 424 - Traffic Railing (Coral Shape)
   - Index No. 425 - Traffic Railing (42" F Shape)
   - Index No. 420 - Pedestrian/Bicycle Railing
   - Index No. 421 - Aluminum Pedestrian/Bicycle Bullet Railing for Traffic Railing (32" F Shape), or Index No. 5210 - Traffic Railing /Noise Wall (Bridge).

3. Unless otherwise noted, Traffic Railing (32" F Shape) is shown in all Views and Sections. The Pedestal details for other Traffic Railings shall be included in the Bid Price for the Traffic Railing or Pedestrian/Bicycle Railing the Pedestal is attached to.

**Anchor Bolt Design**

Anchor Bolt Design shall be as shown on the standard Roadway Aluminum Light Pole configurations shown on Index 17515 and the following design limitations:

- **Load Case 1**: See Table 1
  - Load Case 1: 150 mph Design Wind Speed, 15' arm length, 50' Design Mounting Height with a 75' bridge deck height above natural ground, or MLW.

- **Load Case 2**: See Table 2
  - Load Case 2: 150 mph Design Wind Speed, 15' arm length, 50' Design Mounting Height with a 75' bridge deck height above natural ground, or MLW.

- Anchor Bolt Diameter, T' Ø (Load Case 1), 1 1/2 Ø (Load Case 2).
- Anchor Bolts: ASTM A563 Grade A, Heavy-Hex.
- Washers: ASTM F436 Type 1.
- Anchor Place: ASTM A569 (Grade 36) or ASTM A36.
- All Nuts, Bolts and Washers shall be galvanized by ASTM A325.

The Contractor is responsible for ensuring the anchor bolt configuration is compatible with the light pole base plate. Submit modifications of the anchor bolt design to the Engineer for approval.

**Payment**

The cost of Wire Screen, Anchor Bolts, Nuts, Washers and Anchor Plates shall be included in the Bid Price for Light Poles. The cost of all Labor, Concrete and Reinforcing Steel required for the Construction of the Pedestals, EJB, and Miscellaneous Hardware required for the completion of the Electrical System, shall be included in the Bid Price for the Traffic Railing or Pedestrian/Bicycle Railing the Pedestal is attached to.

**Estimated Light Pole Pedestal Quantities per Light Pole Pedestal**

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Concrete Per Pedestal Thickness</td>
<td>CF/IN.</td>
<td>0.040</td>
</tr>
<tr>
<td>Reinforcing Steel</td>
<td>LB</td>
<td>195 (182)</td>
</tr>
</tbody>
</table>

(The Reinforcing Steel quantity shown in parenthesis is for a Pedestal attached to Pedestrian/Bicycle Railing - Index No. 820 with Bridge Deck or Approach Slab thinner than 1'-0".) Add 59 lbs. for Bars 4J1 & 4J2 when Pedestal Thickness is greater than 1'-5".)

**Detail "A"**

- Concrete Pedestal Surface shall be Sloped Longitudinally with Profile Grade and Transversely with Cross Slope.
- Anchor Bolts shall be included in the Bid Price for the traffic Railing or Pedestrian/Bicycle Railing the Pedestal is attached to.
1. Furnish and install approved Conduits and Fittings in accordance with the Specifications, this Standard, the National Electric Code (NEC) and as directed by the Engineer.

2. Furnish and install Schedule 80 PVC Conduits in accordance with Specification Section E30 and this Index. Connect Conduit and Fittings using solvent cement in accordance with the manufacturer's recommendations.

3. Furnish and install Embedded Junction Boxes (EJB) with weatherproof covers sized in accordance with NEC requirements and the maximum size limits shown. Install EJB adjacent to the Begin and End of Bridges, Begin and End of Retaining Walls, and at other required locations. Omit EJB at Begin or End of Retaining Walls adjacent to Bridges unless a precast Traffic Railing with junction slab is used. Position EJB as shown.

4. Furnish and install Expansion Fittings at locations shown in the Plans. Certify that Expansion Fittings used at a given location are rated to accommodate the anticipated movement at that location: along Bridge decks—see Structures Plans, Expansion Joint Data Table; along Retaining Walls and other unspecified locations—2" minimum.

5. Furnish and install Expansion/Deflection Fittings at locations shown in the Plans. Certify that Expansion/Deflection Fittings used at a given location are rated to accommodate a minimum rotation of 36 degrees and the anticipated movement at that location: along Bridge decks—see Structures Plans, Expansion Joint Data Table; along Retaining Walls and other unspecified locations—0.7" minimum.

6. For all Conduits designated for future use, install either a #12 AWG Pull Wire or a Polypropylene cord between every EJB and install a #12 AWG Pull Wire from the first and last EJB in Traffic Railing or Parapet to the capped end of the Conduit.

7. For Conduit not designated for future use, see Plans for details. For Conduit designated for future use, stub out and cap the Conduit and drive a 3'-0" long ½" (min.) diameter Steel Pipe to be flush with the ground line adjacent to the end of the Conduit as shown on Sheets 2, 3 or 4. Provide the location of the stub out with Steel Pipe to the Engineer for inclusion on the As-Built Plans.

8. Shift vertical Railing reinforcement symmetrically to provide 2" clearance to EJB. Space shifted vertical reinforcement at minimum 3" centers. Cut horizontal Railing reinforcement to provide 2" clearance to EJB and provide supplemental reinforcement as shown. To facilitate placement of Conduit, Expansion Fittings, and Expansion/Deflection Fittings, shift reinforcing a maximum of 1" but do not cut railing reinforcing to facilitate Conduit or Fittings. Do not bundle Conduits, or Conduit and horizontal reinforcement.

9. Unless otherwise shown in the plans, include the cost of furnishing and installing Conduit, Pull Cords and Wires, EJB, Expansion and Expansion/Deflection Fittings and all associated hardware required to complete the installation in the cost of the Traffic Railing or Pedestrian Railing (Parapet) that the Conduit is installed in.

* Reduce to 6" maximum when installed in Pedestrian/Bicycle Railings.
Begin or End Approach Slab

Top of Bridge Deck

2'-0" (Min.)

300'-0" (Max.)

PARTIAL PLAN VIEW OF MEDIAN TRAFFIC RAILING
ALONG BRIDGE

3'-0" Open Joint

EJB 'B' (Single Conduit)
(1'-6" Max. x 8" Max. x 8" Max.)
(Typ.)

Field Bend Conduit Under and Over EJB (Typ.)

2" Ø PVC Conduits

300'-0" (Max.)

PARTIAL ELEVATION VIEW OF MEDIAN TRAFFIC RAILING
ALONG BRIDGE

2" Ø Conduits
See Note 3

Provide 2 - 10'-0" long supplemental #5 Bars centered on EJB

Galvanized Steel EJB 'B' (Front Face) without cover

SECTION A-A
Median Traffic Railing
(See Notes 4 & 5)

CHAMFER DETAIL
(See Note 5)

Bridge and Approach Slab with Median Traffic Railing

NOTES:
1. Work this sheet with Index No. 421.
2. Adjust Conduit horizontally and vertically as necessary to align with EJB.
3. When installed in traffic face of a railing, use only Galvanized Steel EJB 'B' with a minimum 2" thick galvanized steel cover.
4. Position EJB such that, with gasket and cover plate secured and in place, plate is flush with the railing face. Flush is +4" to -1½" measured with a horizontal straightedge.

CONDUIT STUB-OUT DETAIL

Bridge Deck

2'-0" (Min.)

6'-0" (Min.)

Front Face of Backwall or
Begin or End Bridge

See Conduit Stub-Out Detail below

CONDUIT DETAILS
INDEX NO. 21210

FY 2017-18
DESIGN STANDARDS

CONDUIT DETAILS
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CONDUIT DETAILS
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DESIGN STANDARDS

CONDUIT DETAILS
INDEX NO. 21210
NAVIGATION LIGHT NOTES:
1. Provide Navigation Light System in compliance with Specifications Section 510.

- Use RFL when Pier is at Channel Edge and see CFR, Title 33, part 118 for Mounting Height restrictions. Use RCL otherwise.
- Mounted only on the Pier that defines CM, otherwise does not apply.
- RFL to be located at mid length of straight portion of fender.

**NOTE:** Size conduit and conductors per NEC requirements. Do not use conduit smaller than 2" Ø.

**NAVIGATION LIGHT SYSTEM SCHEMATIC**

**FOR SINGLE BRIDGE WITH FENDERS**

**FOR DUAL BRIDGES WITH FENDERS**

**FOR SINGLE BRIDGE WITHOUT FENDERS**

**FOR DUAL BRIDGES WITHOUT FENDERS**

**LEGEND**

- **LC**: Lighting Contactor
- **PC**: Photocell Control
- **Xmer**: Transformer (If Required)
- **RFL**: Red Pier/Fender Light (180° visibility)
- **RCL**: Red Channel Margin Light (180° visibility)
- **GCL**: Green Center Channel Light (360° visibility)
- **CGL**: Clearance Gauge Light
- **CM**: Channel Margin or Pier inner surface whichever defines Channel Edge.

**TYPICAL ELECTRICAL SCHEMATIC DIAGRAM**

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>LC</td>
<td>Lighting Contactor</td>
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<tr>
<td>PC</td>
<td>Photocell Control</td>
</tr>
<tr>
<td>Xmer</td>
<td>Transformer (If Required)</td>
</tr>
<tr>
<td>RFL</td>
<td>Red Pier/Fender Light (180° visibility)</td>
</tr>
<tr>
<td>RCL</td>
<td>Red Channel Margin Light (180° visibility)</td>
</tr>
<tr>
<td>GCL</td>
<td>Green Center Channel Light (360° visibility)</td>
</tr>
<tr>
<td>CGL</td>
<td>Clearance Gauge Light</td>
</tr>
<tr>
<td>CM</td>
<td>Channel Margin or Pier inner surface whichever defines Channel Edge.</td>
</tr>
</tbody>
</table>

**POWER CONDUCTORS**

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<tr>
<th>DISTANCE (feet)</th>
<th>VOLTS</th>
<th>CONDUCTOR</th>
<th>TRANSFORMER</th>
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<tbody>
<tr>
<td>0 - 75</td>
<td>120</td>
<td>#12 AWG</td>
<td>N/A</td>
</tr>
<tr>
<td>75 - 500</td>
<td>120 or 240</td>
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<td>500 - 1000</td>
<td>240</td>
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<tr>
<td>1000 - 2000</td>
<td>480</td>
<td>#6 AWG</td>
<td>2 KVA</td>
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<tr>
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<td>480</td>
<td>#6 AWG</td>
<td>2 KVA</td>
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<tr>
<td>5000 - 10000</td>
<td>480</td>
<td>#4 AWG</td>
<td>2 KVA</td>
</tr>
<tr>
<td>Over 10000</td>
<td>480</td>
<td>#4 AWG</td>
<td>2 KVA</td>
</tr>
</tbody>
</table>
GCL OR RCL MOUNTING DETAILS (SCHEMATIC)

VIEW A-A

(Traffic Railing - 32" F Shape shown, other railings similar)

* Supplied by Light Fixture Manufacturer

SECTION B-B

TYPICAL POSITION OF RCL OR GCL RELATIVE TO SUPERSTRUCTURES
BOX GIRDER MAINTENANCE LIGHTING NOTES:

1. Submit shop drawings to the Engineer detailing the layout of the maintenance lighting system for the entire structure. The shop drawings must include, but not be limited to, the following items:
   a. Conduit layout and installation details through diaphragms, around post-tensioning (PT) ducts, lateral bracing and cross frames as necessary.
   b. Conduit access through box girder end diaphragms with minimum 1" clearance in all directions.
   c. Conduit expansion fitting details.
   d. Fastener details for the interior electrical system.
   e. Single line diagram showing mini power centers, switches, contactors, timers, etc.
   f. Mini power center details including circuit breaker details.
   g. Mini power center mounting details if required.
   h. Feeder schedule.

2. Ensure installation meets all requirements of the latest edition of the National Electrical Code (NEC) and local ordinances. Install grounding in accordance with NEC Article 250. Maintain separation between 480V and 120V Conductors / Conduits throughout.

3. Furnish all labor, equipment, materials, and incidentals required for a complete and functional installation.

4. Use only new, unused and Underwriters Laboratories (UL) listed equipment and materials for outdoor use.

5. Furnish and install polyvinyl chloride (PVC) conduit in conformance with UL Section 651, NEC Section 347 and NEMA TC-2, UV-resistant and schedule 80. Bend conduits as necessary to connect to loads.

6. Provide PVC sleeve 2" larger in diameter than conduit to accommodate construction tolerances.

7. Install a UL labeled expansion fitting for specified PVC conduit at all structure expansion joints. Provide certification that the expansion fitting meets the following minimum requirements: Compatibility with the connected conduits, waterproof, UV protected and allows longitudinal movement equal to that of the Expansion Joint.

8. Use only Alloy 316 stainless steel supporting hardware. Provide minimum 6" fasteners. For concrete or SIP form mounting, provide anchor bolts (expansion, drop-in or adhesive) suitable for dynamic loading due to vibration caused by traffic). Install fasteners to avoid conflicts with reinforcing steel and PT ducts. For structural steel mounting, do not attach fasteners to main members, i.e. webs and flanges.

9. Furnish power distribution at 480V AC, 1 phase, with step down transformers at regular intervals. Furnish 7.5 KVA mini power center with eight 20A breakers as the step down transformer, feeding a maximum of 20 lamps and 20 receptacles. Each mini power center will provide power to no more than 1000' of bridge, preferably 500' on each side of the mini power center, 480V top feed, 120V bottom feed to maintain separation.

10. Furnish and install lighting contactors to switch the 480V AC feeding the mini power centers.

11. Furnish and install copper conductors, Type THHW. Do not use any conductor larger than #4 AWG.

12. Provide enough slack in all interior cable terminations to allow for minor shifting of the structure.

13. Furnish and install National Electric Manufacturers Association (NEMA) Type 4X (non-metallic) surface mounted boxes sized in conformance with the NEC.

14. Furnish and install 120V duplex receptacles (GFI, NEMA Type 5-20R), in non-metallic outlet boxes at 50' maximum on centers. Provide each receptacle with a gasketed weather-protective outdoor plate. Maximum wire size to connect to receptacles is #12 AWG.

15. Furnish and install fully enclosed, incandescent light fixtures with gasketed clear globes and wire guards at 50' maximum on centers. Provide 100 watt, 120 volt, vibration resistant and brass base incandescent lamps.

16. Provide six hour reset timers for each circuit to turn off the lighting system automatically.

CROSS REFERENCES:
1. For Maintenance Light Details, see Sheet 2.
2. For actual bridge section, see Structures Plans.
Approach Slab
Bridge Deck

Bridge Deck

Approach Slab

Bridge Deck

PVC Sleeve cast thru End Diaphragm, (see Note 6)
Grout after installation

CONCRETE BOX GIRDER BRIDGE SECTION THRU END BENTS

CROSS REFERENCE:
1. For Box Girder Maintenance Lighting Notes see Sheet 1.

STEEL BOX GIRDER BRIDGE SECTION THRU END BENTS

MAINTENANCE LIGHTING FOR BOX GIRDER

CROSS REFERENCE:
1. For Box Girder Maintenance Lighting Notes see Sheet 1.
Hinge Note:
Orient the Access Hatch so that the hinges are located down-grade.

Plan View of Access Hatch Assembly

Section Thru Access Opening

Design Standards

For Steel Box Sections

ACCESS HATCH ASSEMBLY

Hinge Detail

Hinge Bar Detail

Hatch Lock Bar Detail

Box Lock Bar Detail

Notes:
1. All Structural Steel material in Access Hatch Assemblies shall conform to ASTM A709 Grade 36.
2. 1/2" Ø Pipe Grab Rail shall be in accordance with ASTM A53 Grade B for standard weight pipe (Schedule 40).
3. 1/2" Ø Hatch Handle Bar, Hitch Pin and 1" Ø Ladder Brace shall be in accordance with ASTM A36.
4. All bolts shall conform to ASTM A307 or A449. All nuts shall conform to ASTM A563 and all washers shall conform to ASTM A563 and all washers shall conform to ASTM F-436.
5. All exposed edges of plates and openings shall be ground smooth.
6. Place Ladder Brace near the End Bents exclusively and only when the height is reasonable for access by a Ladder.
7. See Framing Plan sheets for locations of Access Hatch Openings.
8. Coat structural steel in accordance with Specification Section 560.
9. Include the cost of the Access Hatch Assembly and incidental items in the cost of the Steel Box Girders. No separate payment will be made for coating structural steel.
HINGE NOTE:
1. Orient the Access Hatch so that the hinges are located down-grade.

SECTION THRU ACCESS OPENING

NOTES:
1. All Structural Steel material in Access Hatch Assemblies shall conform to ASTM A709 Grade 36.
2. 1/8" Ø Pipe Grab Rail shall be in accordance with ASTM A53 Grade B for standard weight pipe (Schedule 40).
3. 1/8" Ø Hatch Handle Bar and Hitch Pin shall be in accordance with ASTM A36.
4. All bolts shall conform to ASTM A307 or A449. All nuts shall conform to ASTM A563 and all washers shall conform to ASTM F-436.
5. All exposed edges of plates and openings shall be ground smooth.
6. See Framing Plan sheets for locations of Access Hatch Openings.
7. Coat structural steel in accordance with Specification Section 560.
8. Include the cost of the Access Hatch Assembly and incidental items in the cost of the Concrete Box Section.

INDEX NO. 21251

REVISION 07/01/15

DESIGN STANDARDS

ACCESS HATCH ASSEMBLY

FOR CONCRETE BOX SECTIONS

FY 2017-18

LAST REVISION 07/01/15

DESCRIPTION: FOR CONCRETE BOX SECTIONS

ACCESS HATCH ASSEMBLY

INDEX NO. 21251

SHEET NO. 1 of 1
**ACCESS DOOR NOTES:**

STRUCTURAL STEEL

Fabricate Door Assemblies using structural steel in accordance with Specification 962, any grade. Grind all exposed edges and burrs smooth. Non-destructive testing of welds is not required. See Plans for details of Diaphragm, Stiffeners and Top and Bottom Plates.

EXPANDED METAL MESH:

Expanded metal mesh shall be ⅜ in. No. 16 expanded carbon steel mesh in accordance with ASTM F 1367, Type II, Class 2, Grade A.

BOLTS, NUTS AND STEEL WASHERS:

Bolts shall be stainless steel hex head bolts meeting the requirements of ASTM F 593, Type 316. Nuts shall be ASTM F 594, Type 316. Steel washers shall be stainless steel compatible with the bolts and nuts.

PTFE WASHERS:

PTFE washers shall be ⅛ in. or 1/16 in. (nominal), ⅛ in. or 1/16 in. thick, sized for use with ⅛ in. or ⅛ in. diameter bolts as shown.

COATING:

Coat Access Door Assemblies after complete fabrication, including the expanded metal mesh, using an Interior Box Girder Coating System in accordance with Specification 973. Weld expanded metal mesh to the door frame after the door frame has been abrasive blast cleaned and prior to coating. Install Bolts and PTFE Washers after coating. Touch-up tack weld on Latch Bolt after welding.

DOOR HINGE LOCATION:

Place door hinges on the transverse downward side of the access opening.

PADLOCKS:

Provide a suitable keyed commercial grade, weather resistant padlock with a 2 in. shackle for each Access Door Assembly located at Bridge Apertures. Key all padlocks for Access Door Assemblies and Access Hatches (if present) on an individual bridge alike.

Non-destructive testing of welds is not required. See Plans for details of welds. Coat Access Door Assemblies after complete fabrication, including the expanded metal mesh, using an Interior Box Girder Coating System in accordance with Specification 973. Weld expanded metal mesh to the door frame after the door frame has been abrasive blast cleaned and prior to coating. Install Bolts and PTFE Washers after coating. Touch-up tack weld on Latch Bolt after welding.