Contact Information:
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Summary of the changes:
Sheet 1: Note 41 added optional other materials.
Sheet 2: Added Note 4.
Sheet 3 & 4: Added bolt as option for splice connection.
Sheet 6: Clarified that a domed shape top cap is permissible.

Commentary / Background:
Changes are added because of repeated shop drawing comments that need to be approved everytime. Purpose is to prevent shop drawings from being rejected due to these changes, and to reduce the number of shop drawings related to the items clarified.

Other Affected Offices / Documents: (Provide name of person contacted)
Yes ☑ No
☐ Other Standard Plans –
☒ FDOT Design Manual –
☑ Basis of Estimates Manual –
☐ Standard Specifications –
☐ Approved Product List –
☐ Construction –
☐ Maintenance –

Origination Package Includes:
(Email or hand deliver package to Rick Jenkins)
Yes ☑ N/A
☒ Redline Mark-ups
☐ Proposed Standard Plan Instruction (SPI)
☐ Revised SPI
☐ Other Support Documents

Implementation:
☒ Design Bulletin (Interim)
☐ DCE Memo
☐ Program Mgmt. Bulletin
☐ FY-Standard Plans (Next Release)

Contact the Roadway Design Office for assistance in completing this form
GENERAL NOTES:
1. Shop Drawings. This Index is considered fully detailed, only submit shop drawings for minor modifications not detailed in the Plans.
2. Prior to Fabrication: Verify the installed foundation elevation will result in the required signal elevation and adjust the Pole height as needed.
3. Details for Signal and Sign locations, Signal Head attachment, Sign attachment, Pedestrian Head attachment, and Foundation Conduit are not shown for simplicity.

4. Materials:
   A. Poles: ASTM A1011 or ASTM A48
   B. Anchor Bolts, Nuts and Washers:
      i. Anchor Bolts: ASTM F1554 Grade 55
      ii. Nuts: ASTM A563 DH Heavy-Hex
      iii. Washers: ASTM F436 Type 2, under turned element
   C. Mast Arm Splice:
      i. Stainless Steel Screws: AISI Type 316
      ii. Free-Swinging, Internally Illuminated Street Signs
   D. Bolts, Nuts and Washers:
      i. High Strength Hex Head Bolts: ASTM F3125, Grade A325, Type 1
      ii. Nuts: ASTM A563 Grade A Heavy-Hex
      iii. Washers: ASTM A709 or ASTM A36, Grade 36
   E. Fabrication:
      i. Round or 12-sided (Min.

5. Fabrication:
   A. Welding:
      i. Specification 640-6.4 and
   B. AASHTO LRFD Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals Section 14.4.4
   C. Taper pole diameter at 0.14 inches per foot (Typ.

6. Coatings:
   A. Protection: ASTM A1011 or ASTM A48
   B. Greater than or equal to 3/4" ASTM A2 Grade 50, 55, 60 or 65
   C. ASTM A295 Grade A (4 ksi yield) or Grade B (5 ksi yield)

7. Construction:
   A. Foundation: Specification 455 Drilled Shaft, except that payment is included in the cost of the Mast Arm.
   B. Install Pole vertically.
   C. Fabricators to provide details for approval. Identification Tag located on inside of pole visible from handhole, or on outside of pole inside Terminal Compartment. Tag to be stamped with the following information:
   D. Stainless Steel Cap With (3) Stainless Steel Shrink Rivets or Screws. Fabricators to provide details for approval. Identification Tag located on inside of pole visible from handhole, or on outside of pole inside Terminal Compartment. Tag to be stamped with the following information:
   E. Free-Swinging, Internally Illuminated Street Signs

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ELEVATION AND NOTES

Mast Arm Assembly (Luminaire Arm Not Shown)
1. The Structural Grout Pad diameter may be reduced where the footprint of the Grout Pad does not provide adequate clearance for the sidewalk and accessibility considerations.

2. See Index 649-030 and the plans for actual quantity of bolts in the Base Plate Connection.

3. The bottom hex nut of the Double Nuts shown in Section A-A may be substituted by a half-height anchor 'jam' nut. Provide individual nut covers that are available for each bolt.

4. Detail 'A' Silicone Caulk may be applied after installation. Consult with Manufacturer.
**DESCRIPTION:**

Must Arm Assemblies

**NOTE:**

1. Install the "Slip Joint" splice with a tight fit and no change in the Mast taper due to the splice.

2. Details shown on this sheet are for 12 sided pole sections. However, sections with more than 12 sides and round sections are permitted provided outside diameter and wall thickness are not reduced.

3. Match mark the Arm and Connection Plates to ensure proper assembly and the seam weld is in the proper location (seam located at the bottom side of the Arm).
DESCRIPTION:

1. Install the 'Slip Joint' splice with a tight fit and no change in the Mast Arm taper due to the splice.
2. Details shown on this sheet are for 12 sided pole sections. However, sections with more than 12 sides and round sections are permitted provided outside diameter and wall thickness are not reduced.
3. Match mark the Arm and Connection Plates to ensure proper assembly and the seam weld is in the proper location (seam located at the bottom side of the Arm).
4. 'UF' measured counter clockwise from $\xi$ First Mast Arm Extension.
5. Adjust width of top and bottom Connection Plates to maintain minimum clearance shown.

NOTE:
NOTES:
1. Handhole covers may be omitted when Terminal Compartment is provided.
2. See Mast Arm Tabulation sheet to see if Terminal Compartment is required and for locations.
3. Terminal Compartment Frame Height 2'-0" minimum to 2'-6" maximum. Align bottom of Terminal Compartment a minimum of 1" below the bottom of the Handhole Frame.
4. Any combination of Option 'a' or 'b' may be used, provided both lifting and wiring is accommodated.
5. ADDED to Note 4: Cap may be flat plate or domed cap with set screws.

ADDED Note 5: An alternate terminal compartment frame detail is allowed where the compartment frame is of constant depth and cuts into the pole at the frame top and bottom but lays flush with the pole on the frame sides. The frame is then welded to the pole using fillet welds all around the outside.
GENERAL NOTES:

1. Shop Drawings. This Index is considered fully detailed, only submit shop drawings for minor modifications not detailed in the Plans.

2. Prior to Fabrication: Verify the installed foundation elevation will result in the required signal elevation and adjust the Pole height as needed.

3. Details for Signal and Sign locations, Signal Head attachment, Sign attachment, Pedestrian Head attachment, and Foundation piers are not shown for simplicity.

4. Materials:
   a. Poles, Mast Arms, and Backing Rings:
      - Less than \( \frac{3}{8} \) in. ASTM A1011 Grade 30, 50, 60 or 65
      - Greater than or equal to \( \frac{3}{8} \) in. ASTM A36 Grade 30, 50, 60 or 65
   b. ASTM A593 Grade 4 (55 ksi yield) or Grade 6 (60 ksi yield)
   c. Steel Plates, ASTM A56
   d. Weld Metal, E70XX
   e. nuts and Washers:
      - High strength hex head: Bolts: ASTM F3125, Grade A325, Type 1
      - nuts: ASTM A563 OH Industries
   f. Washers: ASTM A493 Type 1, one under turned element
   g. Anchor Bolts, Nuts and Washers:
      - Anchor Bolts: ASTM F1134 Grade 55
      - nuts: ASTM A563 Grade 4 Heavy-Hex (5 per anchor bolt)
      - Plate Washers: ASTM A536 (2 per bolt)
   h. Threaded Bars/Slugs: ASTM A36 or ASTM A307
   i. Handhole Frame: ASTM A109 or ASTM A36, Grade 36
   j. Handhole Cover: ASTM A1011, Grade 50, 50, 60 or 65
   k. Pole Caps and Nut Covers: Fabricate from cast aluminum or galvanized carbon steel
   l. Stainless Steel Screws: AISI Type 316
   m. Pole Caps and Nut Covers: Fabricate from cast aluminum or galvanized carbon steel
   n. Stainless Steel Screws: AISI Type 316
   o. Concrete Class IV (Drilled Shaft) for all environmental classifications
   p. Reinforcing Steel: Specification 415

5. Fabrication:
   a. Poles:
      - Specification 660-4.4 and
      - AASHTO LRFD Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals Section 14.4.4
   b. Mast Arms and Mast Arms:
      - Round or 12-sided (Min.)
      - Larger than or equal to \( \frac{3}{8} \) in. per foot
      - Upright poles must be a single section. For arms and upright poles, circumferential welds and laminated sections are not permitted.
      - Arms may be either one or two sections. See Sheet 4 for telecommunication splice detail.
      - Fabricate longitudinal seam welds with 60 percent minimum penetration or fusion welds except:
         - Use a full-generation groove weld within 6 inches of the circumferential tube-to-plate connection.
         - Use full-generation groove welds on the female end section of telecommunication splice (i.e., slip type) field splices for a minimum length of three and one-half times the inside diameter of the female section plus 6 inches.
   f. Locate longitudinal seam weld along the:
      - Lower quadrant of the arm.
      - Same side of the arm as the arm connections.
      - Face handle perpendicular from arm on simple arm poles, perpendicular from the first arm of double arms poles facing away from traffic or see special instructions on the Mast Arm Tabulation Sheet.
   h. Provide a 1 or 2 hole at the top of the pole for signal wiring support (See Sheet 6)
   i. First and Second arm camber angle = 2
   j. Bolt holes diameters as follows:
      - bolts of anchor bolts, bolt diameter plus \( \frac{1}{8} \) in. prior to galvanizing.
      - Anchor Bolts Bolt diameter plus \( \frac{1}{2} \) in.
   6. Coatings:
   a. Hot-Dipped Galvanized with 0.030 thickness
   b. AASHTO LRFD Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals Section 14.4.4
   c. Plate Washers: ASTM A36 (2 per bolt)
   d. Washers: ASTM F436 Type 1, one under turned element
   e. High Strength Hex Head Bolts: ASTM F3125, Grade A325, Type 1
   f. Stainless Steel Set Screws
   g. Vented Mast Arm Cap With (3) Stainless Steel Set Screws

6. Sealing:
   a. All Nuts, Bolts, Washers and Threaded Bars/Slugs: ASTM F2329
   b. All other steel items including plate washers ASTM A123

7. Construction:
   a. Foundation: Specification 655 Drilled Shafts, except that payment is included in the cost of the Mast Arm.
   b. Install Pole vertically.
   c. Place structural grout pad with drain between top of foundation and bottom of backplate in accordance with Specification 649-7.
   d. Attach Sign Panels and Signals centered on the elevation of the Mast Arm.
   e. Wire Access holes are \( \frac{1}{4} \) in. or less in diameter.

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ELEVATION AND NOTES

Single Arm Shown, Double Arm Similar (Luminaire Arm Not Shown)
**NOTES:**

1. The Structural Grout Pad diameter may be reduced where the footprint of the Grout Pad does not provide adequate clearance for the sidewalk and/or accessibility considerations.

2. See Index 649-030 and the plans for actual quantity of bolts in the Base Plate Connection.

3. The bottom hex nut of the Double Nuts shown in Section A-A may be substituted by a half-height anchor 'jam' nut. Provide individual nut covers (not shown) for each bolt.

4. Detail 'A' Silicone Caulk may be applied after installation. Consult with Manufacturer to determine suitability of the caulking to be applied.

5. See Index 649-030 and the plans for actual quantity of bolts in the Base Plate Connection.

6. See Index 649-030 and the plans for actual quantity of bolts in the Base Plate Connection.
Mast Arm Assembly

Arm Splice
Arm Connection

Pole Connection Plate

'FT'

Bottom Plates
Typ. Top and Base Plate

Mast Arm Extension

'FL'

(FP)

Connection Bolt Ø

Edge of Mast Arm

Base Plate

Mast Arm Extension

Section B-B

Detail 'B'

Detail 'C'

Section C-C

Edge of Top Connection Plate

Opening

Backing Ring

See DETAIL 'D'

Typ. Top and Bottom Plates

Bottom Connection Plate (Top Conn. Plate Similar)

Section D-D

Detail 'C'

NOTE:
1. Install the 'Slip Joint' splice with a tight fit and no change in the Mast Arm taper due to the splice.
2. Details shown on this sheet are for 12 sided pole sections. However, sections with more than 12 sides and round sections are permitted provided outside diameter and wall thickness are not reduced.
3. Match mark the Arm and Connection Plates to ensure proper assembly and the seam weld is in the proper location (seam located at the bottom side of the Arm).

Note:
- 'FB', 'FP', 'UC' - Top Diameters
- 'FC', 'FG', 'UD' - Base Diameters
- Measured Flat To Flat
- Inside Radius Measured Center to Flat
- Inside Bend Radius = Larger of Five Times Wall Thickness or 1 Inch
- Seam Weld (Typ.)
- Bolt With Self Locking Nut
- Ø Threaded Bar/Stud or

1 2/12 Ø 8 Threaded Bar/Stud or Bolt With Self Locking Nut (See Note 1)

May Vary For Special Design

Splice = 3'-0" (Nominal) (2'-0" Min.)

Five Times Wall Thickness or 1 Inch)

Seam Weld (Typ.)

Bolt With Self Locking Nut

6 8/12 Ø Connection Bolts

Face of Arm Base Plate at J Arm

1/8" Wall Thickness

1/8" Wall Thickness

Center to Flat

Inside Bend Radius = Larger of Five Times Wall Thickness or 1 Inch

Splice = 3'-0" (Nominal) (2'-0" Min.)

4" Ø Wiring Hole (Typ.)

Center of Pole

Wall Thickness

(See Note 3)
1. Install the 'Slip Joint' splice with a tight fit and no change in the Mast Arm taper due to the splice.

2. Details shown on this sheet are for 12 sided pole sections. However, sections with more than 12 sides and round sections are permitted provided outside diameter and wall thickness are not reduced.

3. Match mark the Arm and Connection Plates to ensure proper assembly and the seam weld is in the proper location (seam located at the bottom side of the Arm).

4. "UF" measured counter clockwise from § First Mast Arm Extension.

5. Adjust width of top and bottom Connection Plates to maintain minimum clearance shown.

NOTE:

DOUBLE ARM CONNECTIONS & SPLICE DETAILS

SECTION E-E

SECTION F-F

SECTION G-G

DESCRIPTION:

REVISED

11/01/21

DRAFT

APPROVED

REVISION

LAST

INDEX

FA O. 2022-23

M A S T  A R M  A S S E M B L E S

STANDARD PLANS

649-031

4 of 6
NOTES:

1. Handhole covers may be omitted when Terminal Compartment is provided.

2. See Mast Arm Tabulation sheet to see if Terminal Compartment is required and for locations.

3. Terminal Compartment Frame Height 2'-0" minimum to 2'-6" maximum. Align bottom of Terminal Compartment a minimum of 1" below the bottom of the Handhole Frame.

4. Any combination of Option 'a' or 'b' may be used, provided both lifting and wiring is accommodated. Cap may be flat plate or domed cap with set screws.

5. An alternate terminal compartment frame detail is allowed where the compartment frame is of constant depth and cuts into the pole at the frame top and bottom but lays flush with the pole on the frame sides. The frame is then welded to the pole using full penetration welds all around the outside.

Mast Arm Assembly

11 Gage Mast Arm Handhole Cover
5% OD x 1/16 Wall Thck Std. Mast Arm Handhole Frame

Cover

11 Gage Handhole Cover
4% OD x 1/16 Wall Thick Std. Mast Arm Handhole Frame

Handhole

11 Gage Handhole Cover

Frame

Cover Clip (Typ.)
Tack Welded Cover Clip (Typ.)
Threaded Hole For 1/2" B Hex Head Screw (Typ.)

Handhole Frame

SECtION J-J

Handhole Frame

SECtION K-K (Thru Handhole)

Handhole Frame

SECtION K-K (Terminal Compartment)

POLE TOP

Flat Washer

Pole Cap Plate

1/2" Ø Hole Min. Bolt

1/2" Thick

Center Of Pole, Pole Cap And Lifting Bar

Pole Cap Plate

ISO VIEW (Option 'a')

1/2" Overhang (Min.)

1/2" Min. Thick.

C' Hook For Wiring, 1/2" Commercial Grade Hot Rolled Bar Welded To Inside Of Pole

Pole Cap Plate

CUT-AWAY (Option 'b')

Lifting Bar With (Bolt Size + 3/8") Hole And Matching Nut Tack Weld To Underside Of Bar

Pole Cap Plate

CUT-AWAY (Option 'a')

1/2" Min.

Center Of Pole, Pole Cap And Lifting Bar

Center Of Pole, Pole Cap And Lifting Bar

POLE Cap Plate

C' Hook For Wiring And Lifting, 1/2" Commercial Grade Hot Rolled Bar Welded To Inside Of Pole

POLE TOP DETAILS

Handhole And Pole Top Details

Cover剪辑