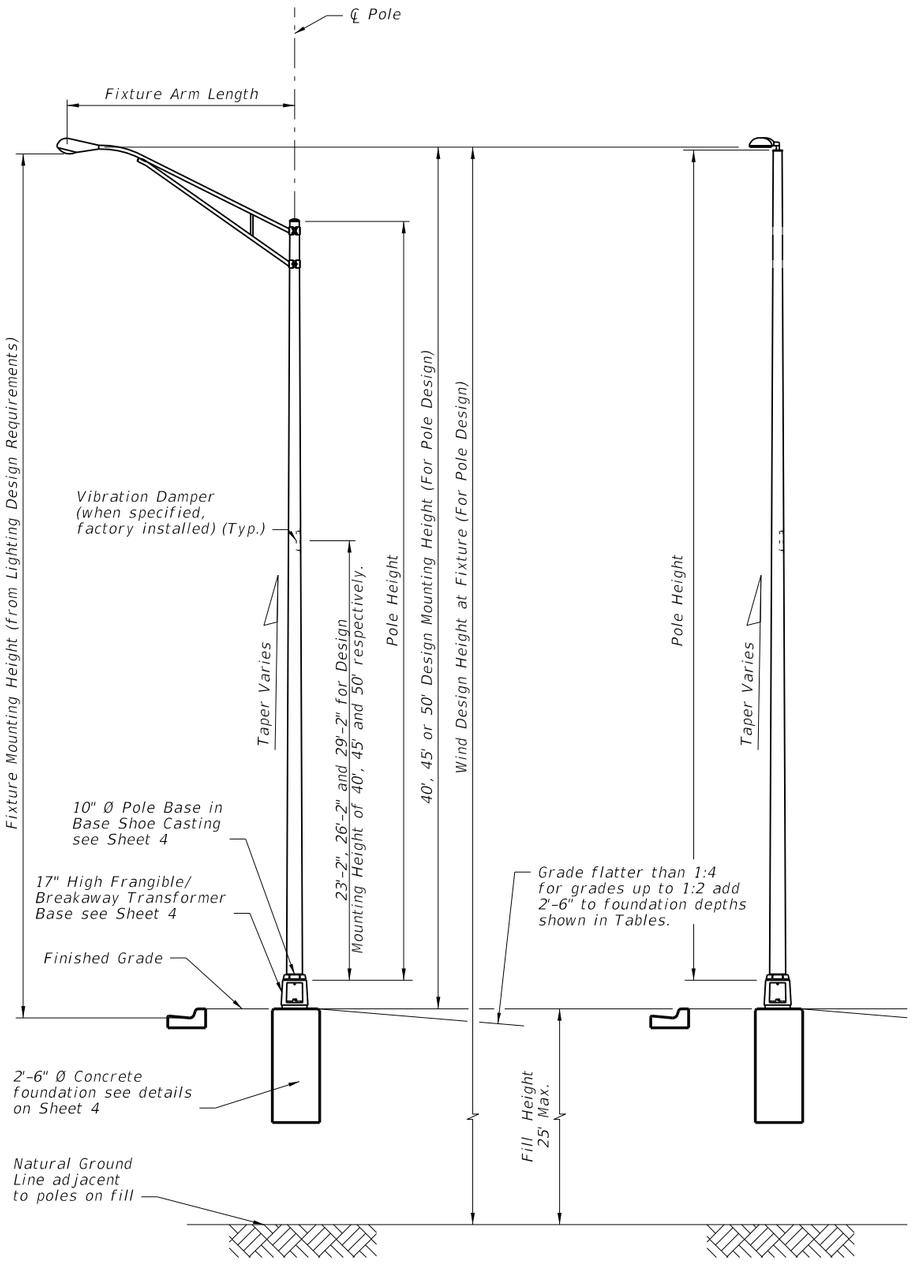
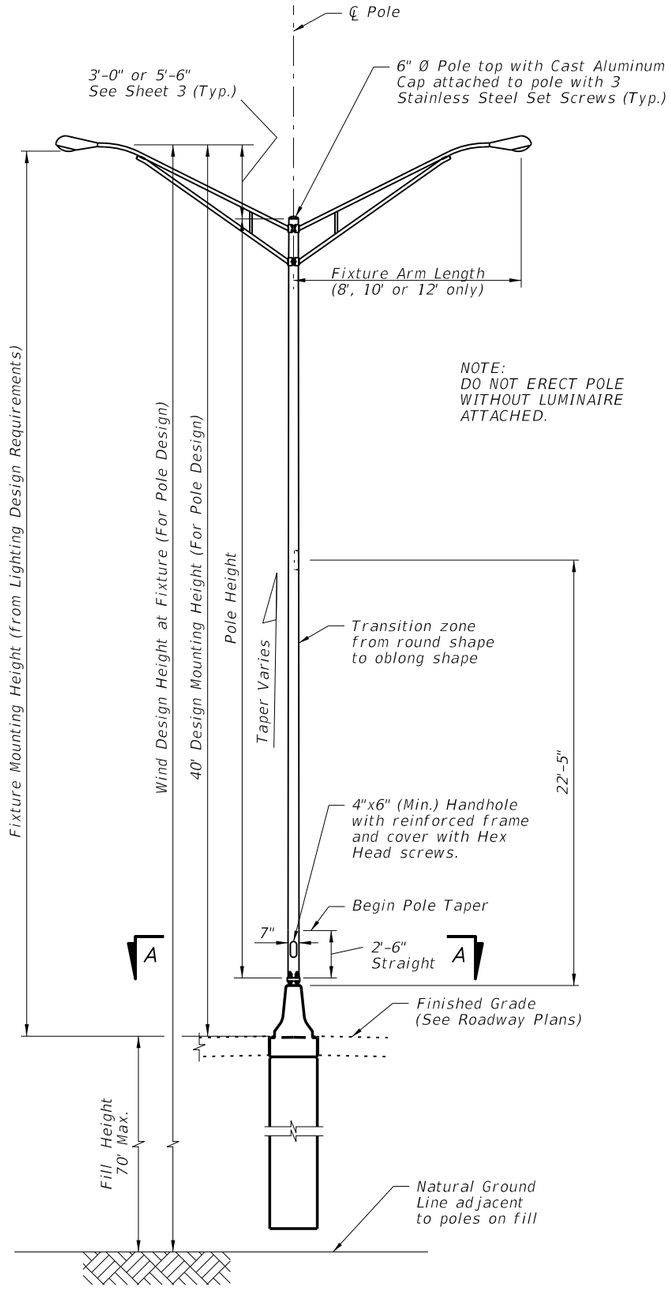
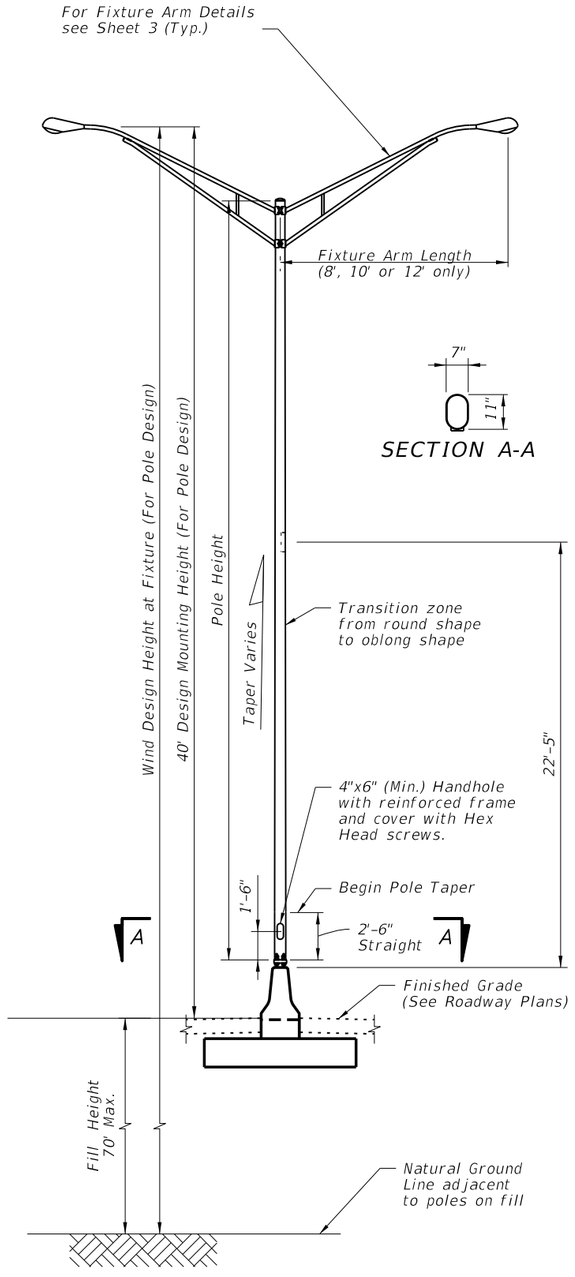


STANDARD ROADWAY ALUMINUM LIGHT POLE W/ARM

STANDARD ROADWAY ALUMINUM LIGHT POLE W/TOP MOUNT



MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE ON CYLINDRICAL FOUNDATION



MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE ON SPREAD FOOTING FOUNDATION

ELEVATIONS

6/3/2014 2:15:25 PM

LAST REVISION	REVISION	DESCRIPTION:			
07/01/14			2015 DESIGN STANDARDS	STANDARD ALUMINUM LIGHTING	INDEX NO. 17515 / SHEET NO. 1 of 8

ALUMINUM LIGHT POLE GENERAL NOTES

1. Designed in accordance with FDOT Structures Manual.

2. All tables were developed assuming the following Luminaire properties: Effective Projected Area of 1.55 sq. ft. (includes wind drag coefficient) and 75 pounds (max.)

3. Perform all welding in accordance with the American Welding Society Structural Welding Code Aluminum ANSI/AWS D1.2 (current edition).

4. See Standard Index No. 17500 for grounding and wiring details.

5. Light Pole Specifications:
   a. Poles: ASTM B221, Alloy 6063-T6.
   b. Arm Tube Extrusions: ASTM B221 – Alloy 6063-T6.
   c. Finish: For pole and arms; 50 grit satin rubbed finish.
   d. Pole Connection Extrusions, Bars and Plates: ASTM B221 – Alloy 6063-T6.
   e. Aluminum Caps and Covers: ASTM B-26(319-F).
   f. Weld Metal: ER4043.
   g. Stainless Steel Fasteners and Hardware: AISI Grade 304.
   h. Aluminum alloy 6063: T4 condition and heat treated in accordance with ASTM B597 to T6.
   i. Frangible Base: ASTM B26 Alloy 356-T6 or ASTM 108 Alloy 356-T6.

6. Provide "J", "S" or "C" hook at top of pole for electrical cable.

7. Furnish each pole with a 2"x4" (max) aluminum identification tag. Submit details for approval. Secure to Transformer Base with 0.125" stainless steel rivets or screws. Locate Identification Tag on the inside of base and visible from the door opening. Include the following information: Financial Project ID, Pole Height and Manufacturer's Name.

8. For Clamp and Frangible Transformer Base Design, certify that the components are capable of providing the required capacity. Certify that the frangible Transformer Base conforms to the current FHWA required AASHTO Frangibility Requirements, tested under NCHRP Report 350 Guidelines (eg. Akron Foundry TB1-17).

9. For Median Barrier Mounted Aluminum Light Poles, the fabricator must demonstrate the ability to produce a crack free pole. The fabicator's FDOT approved QC Plan must contain the following information prior to construction:

   - Tests demonstrating a pole with a 0.25" wall thickness achieves an ultimate moment capacity of 36 k-ft in the strong axis and 30 k-ft in the weak axis.
   - Tests demonstrating a pole with a 0.313" wall thickness achieves an ultimate moment capacity of 44 k-ft in the strong axis and 37 k-ft in the weak axis.
   - Test results showing that under the ultimate moment capacity loads, the pole does not buckle at the shape transition area.
   - Complete details and calculations for the reinforced 4"x6"(min.) handhole located 1'-6" above the base plate.

10. This Design Standard is considered fully detailed and no shop drawings are necessary. Submit shop drawings for minor modifications not detailed in the plans.

ROADWAY ALUMINUM LIGHTING POLE NOTES

1. Foundation Materials:
   a. Reinforcing Steel: ASTM A615 Grade 60.
   b. Concrete: Class I.
   c. Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563 Grade DH nuts and ASTM F436 Type 1 washers (all galvanized in accordance with ASTM F2329).

2. Shoe Base and Frangible/Breakaway Transformer Base Casting Specifications.
   a. Shoe Base Casting: ASTM B26 – Alloy 356-T6 or ASTM B108 – Alloy 356-T6.
   b. Frangible/Breakaway Transformer Base Casting: ASTM B26 – Alloy 356-T6 or ASTM B108 – Alloy 356-T6.
   c. Shoe Base Connection Bolts: ASTM A325 Type 1 with ASTM A563 Grade DH nuts and ASTM F436 Type 1 washers (all galvanized in accordance with ASTM F2329).

3. Pole Notes:
   a. Tapered as required to provide a top outside diameter (O.D.) of 6" with a base O.D. of 10". Portions of the shaft near the base shoe and at the arm connections may be held constant at 10" and 6" respectively to simplify fabrication.
   b. Transverse welds are allowed only at the base.
   c. Poles constructed out of two or more sections with overlapping splices are not permitted.
   d. Equip poles with a vibration damper at locations per Specification Section 715.

MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE

1. Foundation Materials:
   a. Reinforcing Steel: ASTM A615 Grade 60.
   b. Concrete: Class I.
   c. Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563 Grade DH nuts and ASTM A36 Plate Washer or ASTM F436 Type 1 washers (all galvanized in accordance with ASTM F2329). Coupler shall be in accordance with AASHTO 5.11.5.2.2.

2. Base Connection Materials:
   a. Aluminum Base Plate and Stiffener: Alloy 6061-T6.
   b. Backer Ring: ASTM B221, Alloy 6063-T6.
   c. Bearing Plate for Anchor Bolts: ASTM A709 Grade 36 or ASTM A36.

3. Pole Notes:
   a. Tapered as required to provide a 6" (O.D.) round top with a 11"x7" (O.D.) oblong base. Portions of the shaft near the base and at the arm connections may be held constant at 11"x7" oblong and 6" round respectively to simplify fabrication.
   b. Transverse welds are allowed only at the base.
   c. Poles constructed out of two or more sections with overlapping splices are not permitted.
   d. Equip poles with a damping device.

FOUNDATION NOTES

The foundations for Standard Roadway Aluminum Light Poles are pre-designed and are based upon the following conservative soil criteria which covers the majority of soil types found in Florida:

Classification = Cohesionless (Fine Sand)
Friction Angle = 30 Degrees (30°)
Unit Weight = 50 lbs./cu. ft. (assumed saturated)

Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several foundations. Borings in the area that were performed for other purposes may be used to confirm the assumed soil properties.

EMBEDDED JUNCTION BOX NOTES

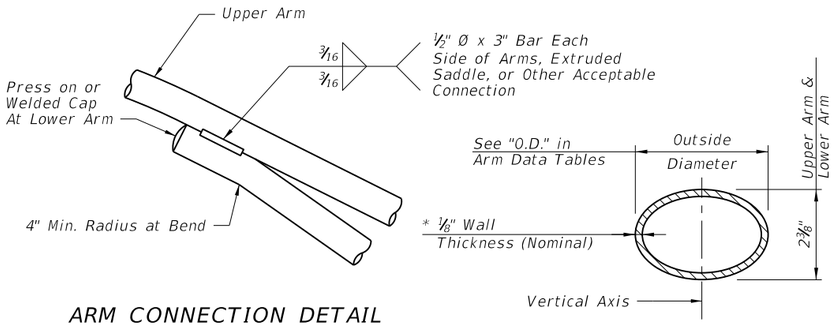
1. Fabricate embedded junction boxes from ASTM A 36 steel and hot-dip galvanized in accordance with ASTM A 123 after fabrication. All seams shall be continuously welded and ground smooth. Provide watertight cover with neoprene gasket and secure cover with galvanized screws.

2. Completed embedded junction box and conduit risers are incidental to the cost of concrete barrier wall.

6/3/2014 2:15:26 PM

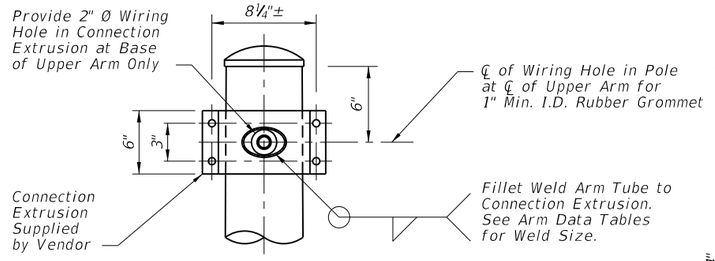
NOTES

LAST REVISION	REVISION	DESCRIPTION:	2015 DESIGN STANDARDS	STANDARD ALUMINUM LIGHTING	INDEX NO.	SHEET NO.
07/01/14					17515	2 of 8

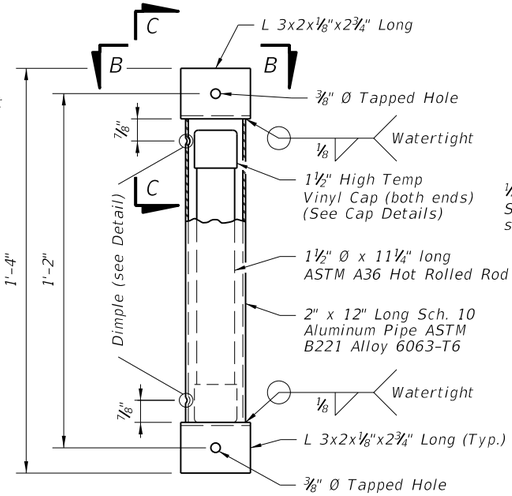


ARM CONNECTION DETAIL

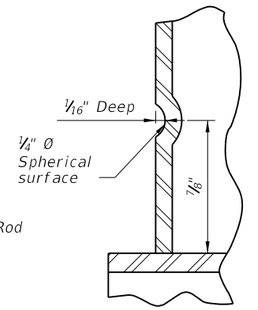
ARM SECTION



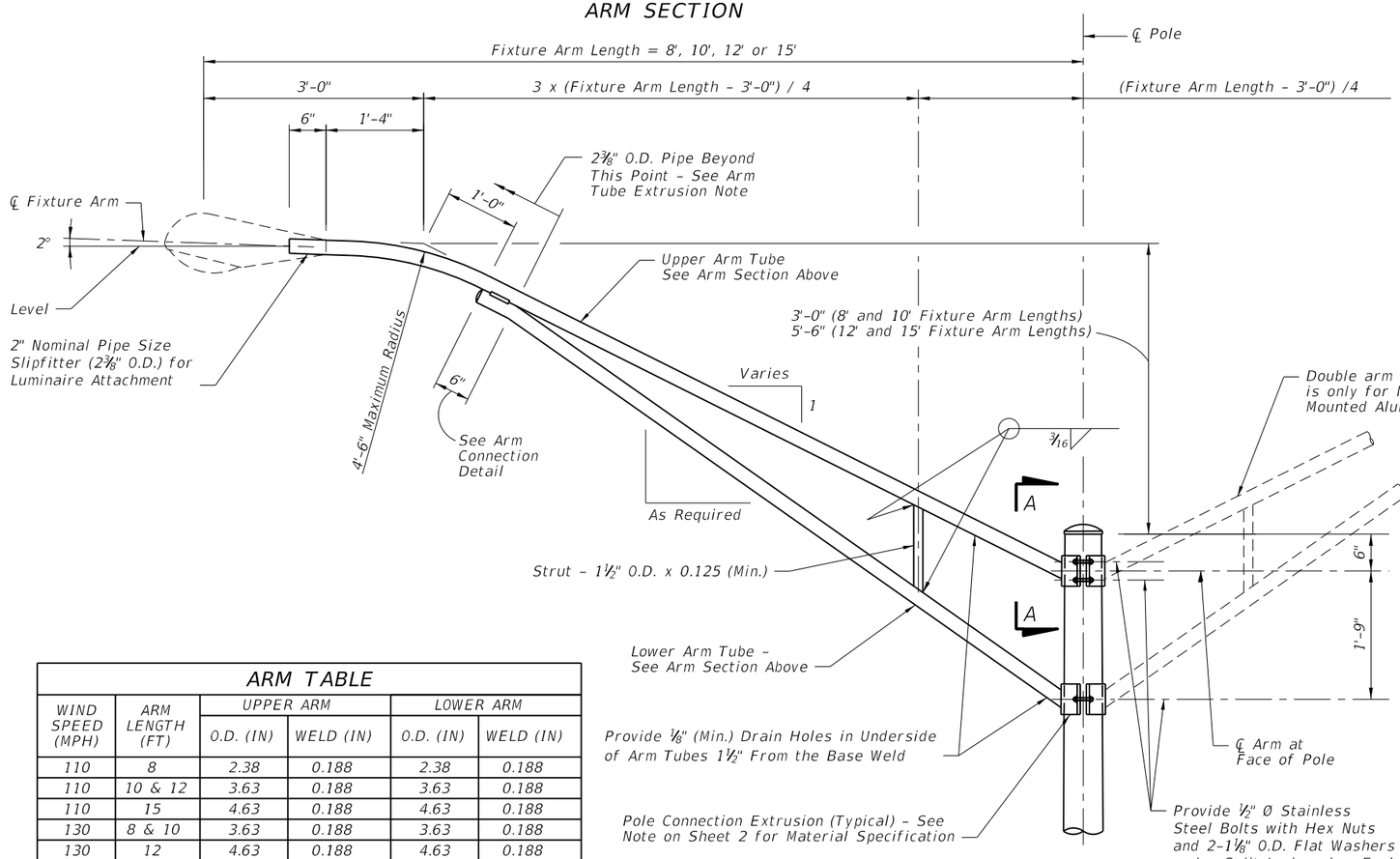
SECTION A-A
(Connection At Lower Arm Similar)



VIBRATION DAMPER ELEVATION



DIMPLE DETAIL

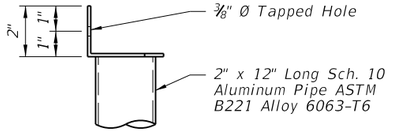


ARM ELEVATION

ARM TABLE					
WIND SPEED (MPH)	ARM LENGTH (FT)	UPPER ARM		LOWER ARM	
		O.D. (IN)	WELD (IN)	O.D. (IN)	WELD (IN)
110	8	2.38	0.188	2.38	0.188
110	10 & 12	3.63	0.188	3.63	0.188
110	15	4.63	0.188	4.63	0.188
130	8 & 10	3.63	0.188	3.63	0.188
130	12	4.63	0.188	4.63	0.188
130	15	4.63	0.25	4.63	0.25
150	8	3.63	0.188	3.63	0.188
150	10	3.63	0.250	3.63	0.250
150	12	4.63	0.250	4.63	0.250
150	15	4.63	0.313	4.63	0.313

* Increase Member Wall Thickness as Necessary to Meet Minimum Requirements of the Welding Code for the Connection Weld Sizes Shown in the Arm and Pole Tables.

VIEW B-B



VIEW C-C

HIGH TEMP VINYL CAP DETAIL

ARM TUBE EXTRUSIONS NOTES:

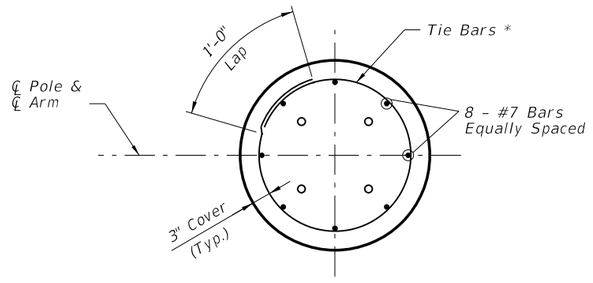
At the pole connections, provide arm tube extrusions with dimensions as shown in the ARM SECTION and as tabulated in the ARM DATA Tables. Uniformly transition elliptical section to a cylindrical section at the arm connection.

The fabricator may substitute elliptical cross sections other than those tabulated, provided the section properties about the vertical axis and the area of the section equal or exceed that of the required section, and provide minimum wall thickness of ⅛" nominal and within the Aluminum Association Tolerances.

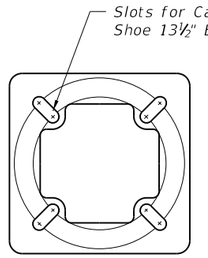
The outside diameter about the minor axis should be held at 2⅜" at the upper and lower arms.

ARM & DAMPER DETAILS

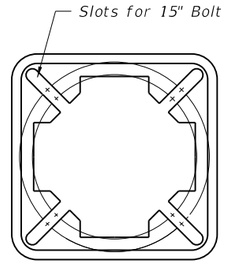
6/3/2014 2:15:27 PM



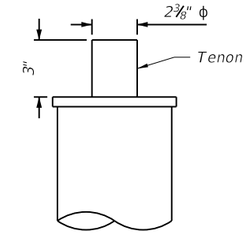
SECTION C-C



TOP VIEW TRANSFORMER BASE

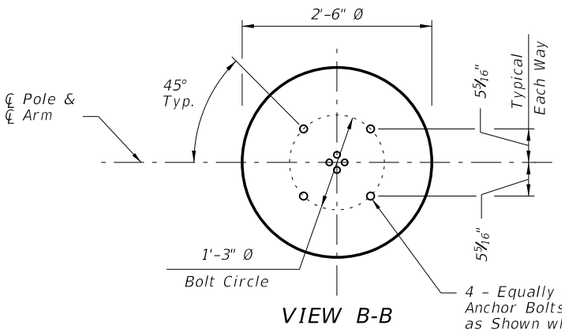


BOTTOM VIEW TRANSFORMER BASE



TOP MOUNT TENON

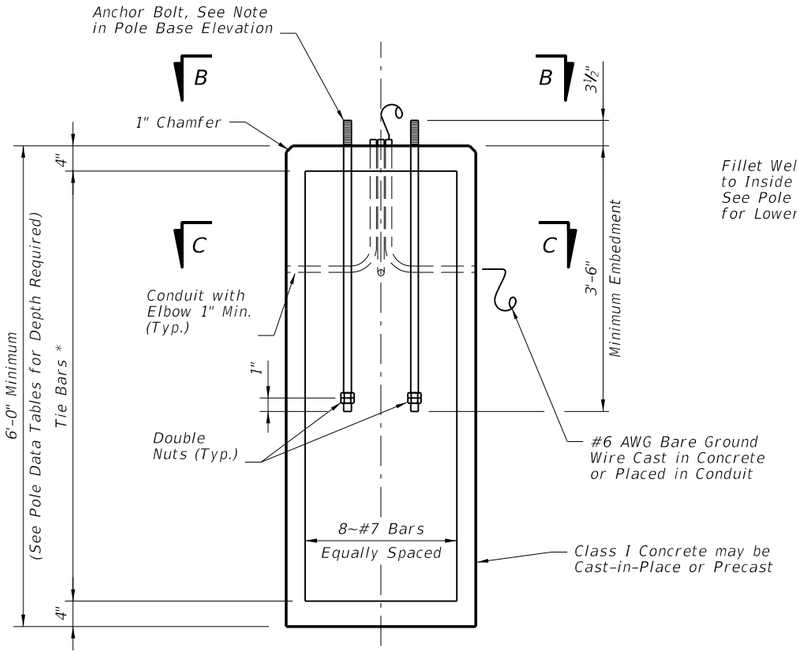
POLE TABLE W/ARM					
WIND SPEED (MPH)	ARM LENGTH (FT)	DESIGN MOUNTING HEIGHT (FT)	POLE WALL (IN)	UPPER WELD (IN)	LOWER WELD (IN)
110	8, 10, 12 & 15	40 & 45	0.156	0.156	0.156
110	8, 10, 12 & 15	50	0.188	0.188	0.188
130	8, 10 & 12	40	0.156	0.156	0.156
130	15	40	0.188	0.188	0.188
130	8, 10, & 12	45	0.188	0.188	0.188
130	15	45	0.250	0.250	0.250
130	8, 10, 12 & 15	50	0.250	0.250	0.250
150	8, 10, & 12	40	0.188	0.188	0.188
150	15	40	0.250	0.250	0.250
150	8, 10, 12 & 15	45	0.250	0.250	0.250
150	8, 10, 12 & 15	50	0.313	0.313	0.313



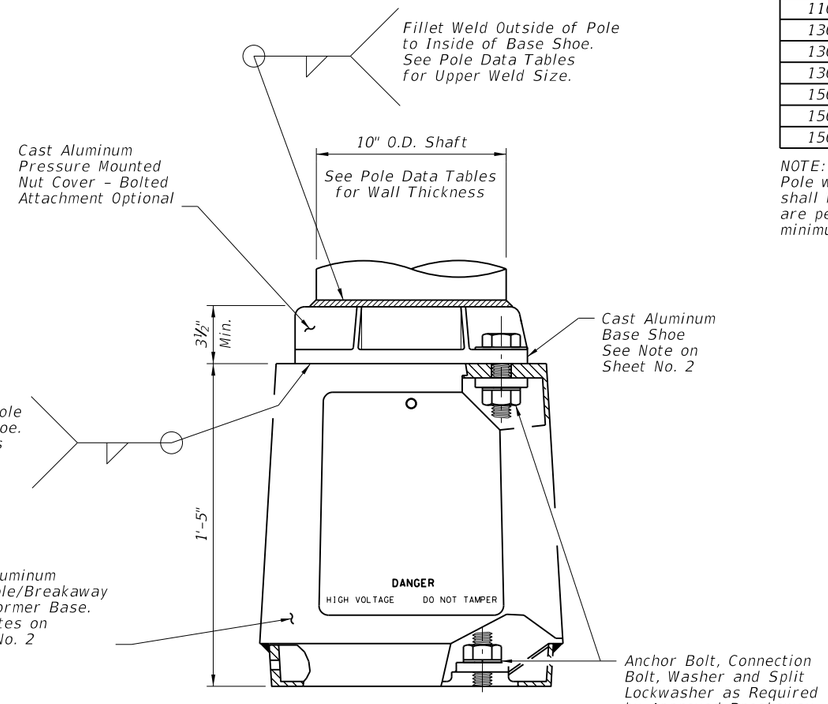
VIEW B-B

POLE TABLE W/TOP MOUNT				
WIND SPEED (MPH)	DESIGN MOUNTING HEIGHT (FT)	POLE WALL (IN)	UPPER WELD (IN)	LOWER WELD (IN)
110	40 & 45	0.125	0.125	0.125
110	50	0.156	0.156	0.156
130	40	0.125	0.125	0.125
130	45	0.156	0.156	0.156
130	50	0.188	0.188	0.188
150	40	0.156	0.156	0.156
150	45	0.188	0.188	0.188
150	50	0.250	0.250	0.250

NOTE:
Pole wall thicknesses shown in the POLE TABLE are nominals and shall be within the Aluminum Association Tolerances. Thicker walls are permitted and tapered walls may be used provided the minimum Aluminum Association thicknesses are not violated.



FOUNDATION



POLE BASE ELEVATION

* 1. Shop-weld assemblies of foundation stirrup reinforcing bars are permitted in reinforced concrete foundation provided that:
   a. The reinforcing bars conform to ASTM Specification A706/706M.
   b. The holding wires conform to ASTM Specification A1064.
   c. The Shop welding is performed by machines under a continuous, controlled process, approved by the Engineer.
   d. Quality control yield strength and tensile strength tests are performed on shop-welded specimens and the test results are available, upon request, to the Engineer.
2. #4 Tie Bars @ 12" centers (max.) or D10 (or W10) spiral @ 6" pitch, 3 flat turns top and 1 flat turn bottom.

FOUNDATION TABLE W/ARM		
WIND SPEED (MPH)	DESIGN MOUNTING HEIGHT (FT)	TOTAL DEPTH (FT) **
110	40	7
110	45 & 50	8
130	40 & 45	8
130	50	9
150	40 & 45	9
150	50	10

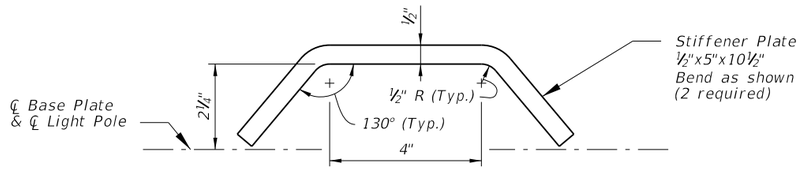
FOUNDATION TABLE W/TOP MOUNT		
WIND SPEED (MPH)	DESIGN MOUNTING HEIGHT (FT)	TOTAL DEPTH (FT) **
110	40	6
110	45 & 50	7
130	40	6
130	45 & 50	7
150	40 & 45	7
150	50	8

** Depths shown in table are for grades flatter than 1:4, for grades up to 1:2 add 2'-6" to foundation depths shown in table.

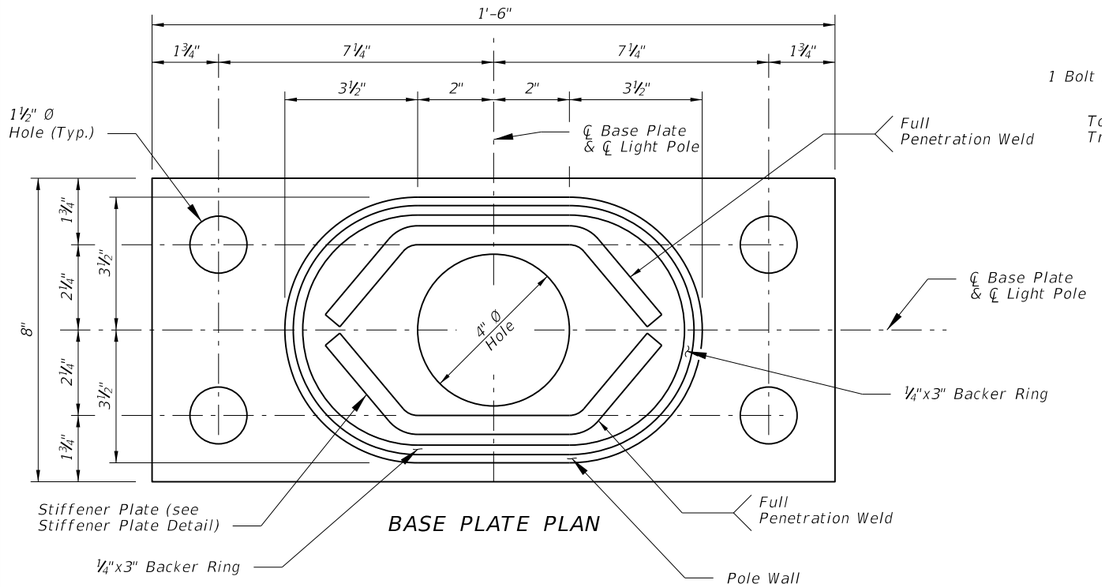
POLE AND BASE DETAILS FOR ROADWAY ALUMINUM LIGHT POLE

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/14			FDOT 2015 DESIGN STANDARDS	STANDARD ALUMINUM LIGHTING	17515	4 of 8

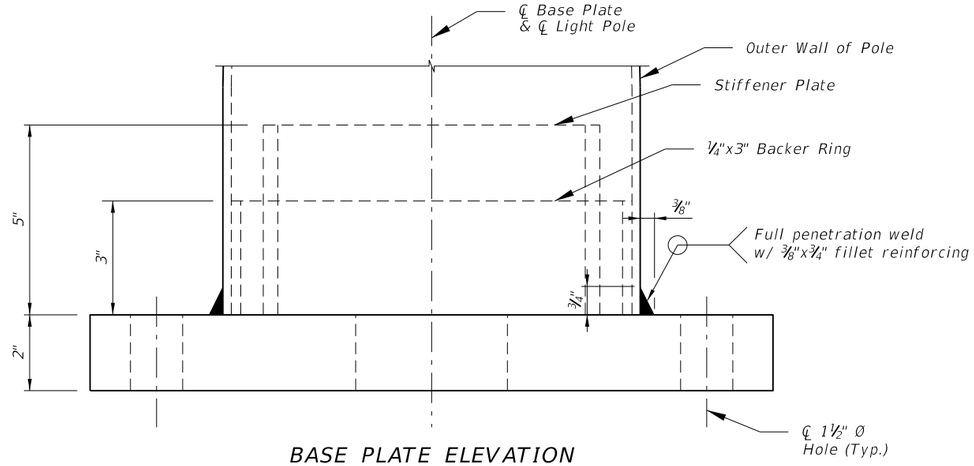
6/3/2014 2:15:27 PM



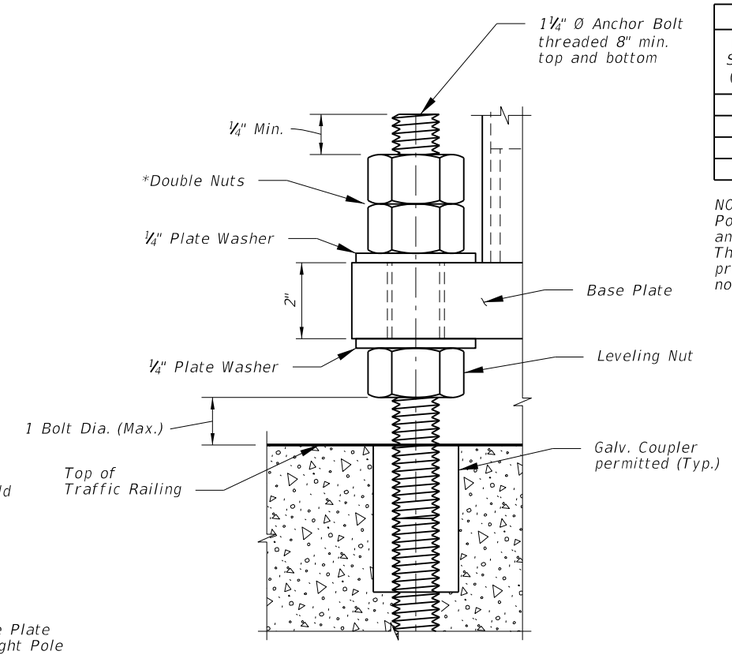
STIFFENER PLATE DETAIL



BASE PLATE PLAN



BASE PLATE ELEVATION



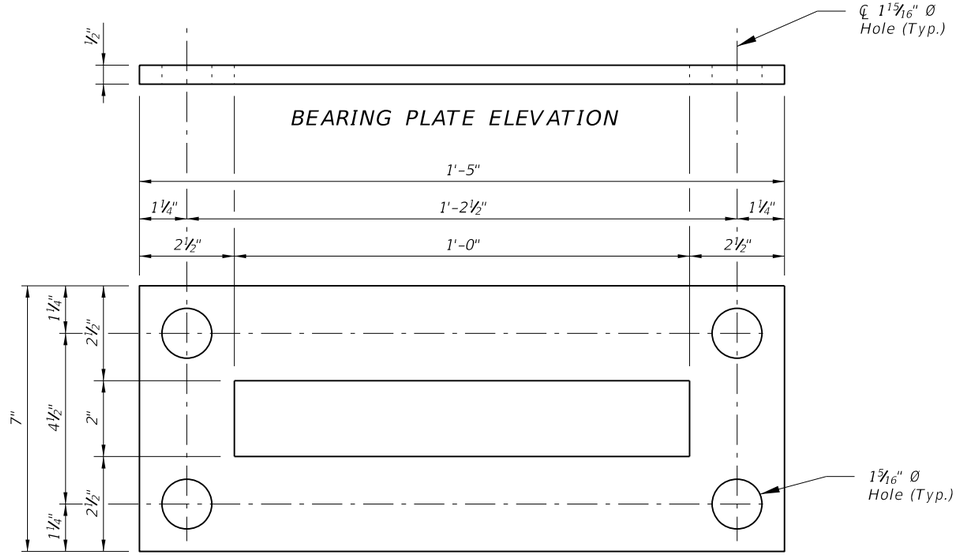
DETAIL 'A'

*Top nut may be ½ height
Jam Nut. Provide individual nut
cover (not shown) for each bolt.

POLE TABLE				
WIND SPEED (MPH)	ARM LENGTH (FT)	DESIGN MOUNTING HEIGHT (FT)	POLE WALL (IN)	FILL HEIGHT (FT)
110	8, 10, 12	40	0.25	Up to 70'
130	8, 10, 12	40	0.25	Up to 70'
150	8, 10, 12	40	0.25	Up to 20'
150	8, 10, 12	40	0.313	>20' to 70'

NOTE:
Pole wall thicknesses shown in the POLE TABLE are nominals and shall be within the Aluminum Association Tolerances. Thicker walls are permitted and tapered walls may be used provided the minimum Aluminum Association thicknesses are not violated.

NOTE:
For locations of Bearing Plates, Base Plates and Detail 'A' see Sheets 6 & 7.



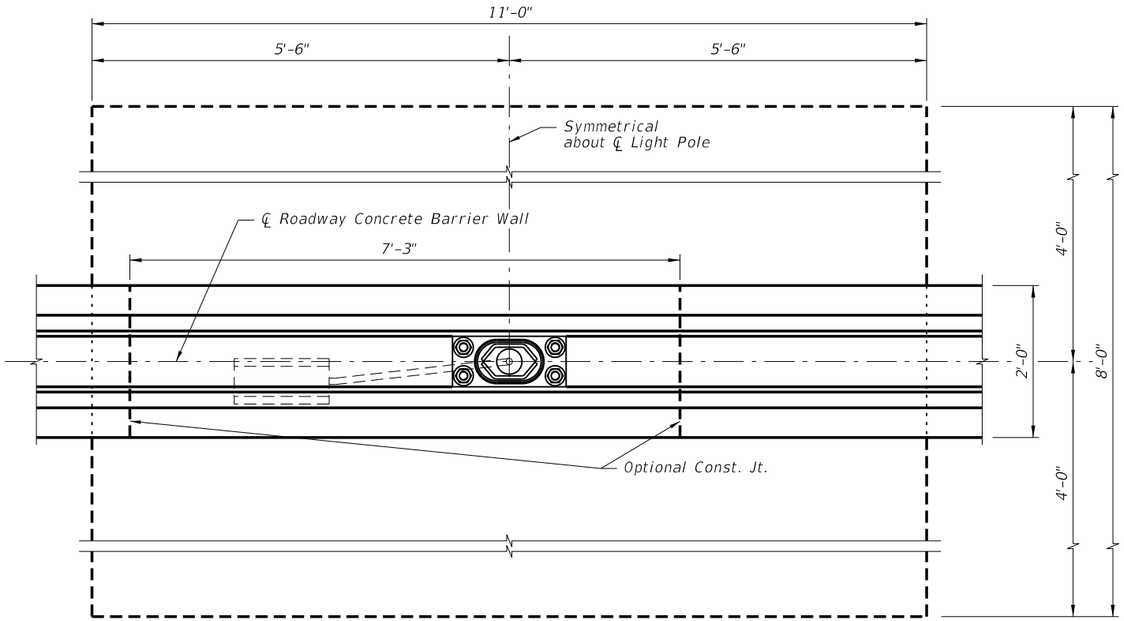
BEARING PLATE ELEVATION

BEARING PLATE PLAN

BASE PLATE DETAILS FOR MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE

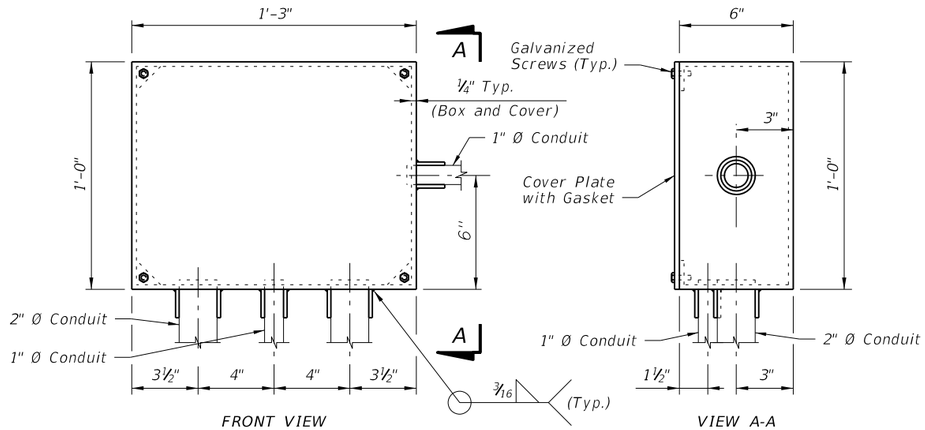
LAST REVISION	REVISION	DESCRIPTION:	FDOT 2015 DESIGN STANDARDS	STANDARD ALUMINUM LIGHTING	INDEX NO.	SHEET NO.
07/01/09					17515	5 of 8

6/3/2014 2:15:28 PM

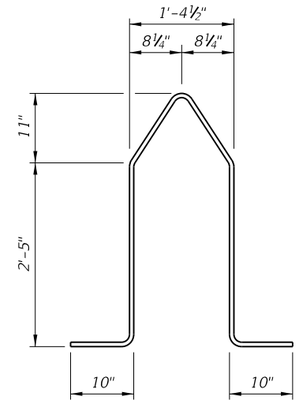


Provide dowel bars
@ construction joint

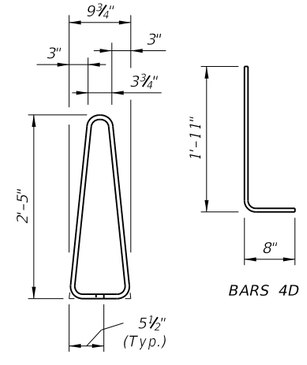
PLAN
(Reinforcing steel not shown)



EMBEDDED JUNCTION BOX DETAILS



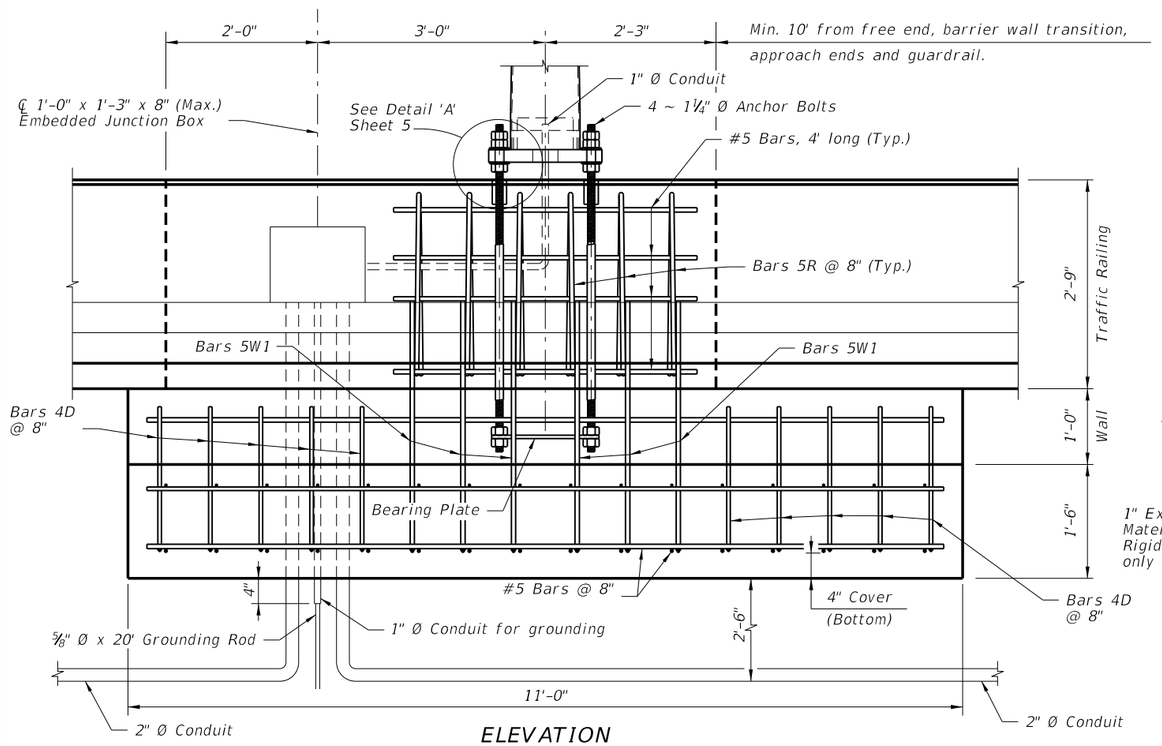
BARS 5W1



BARS 4D

BARS 5R

BAR BENDING DIAGRAMS



ELEVATION
(For Roadway Concrete Barrier Wall reinforcing steel see Design Std. Index No. 410)

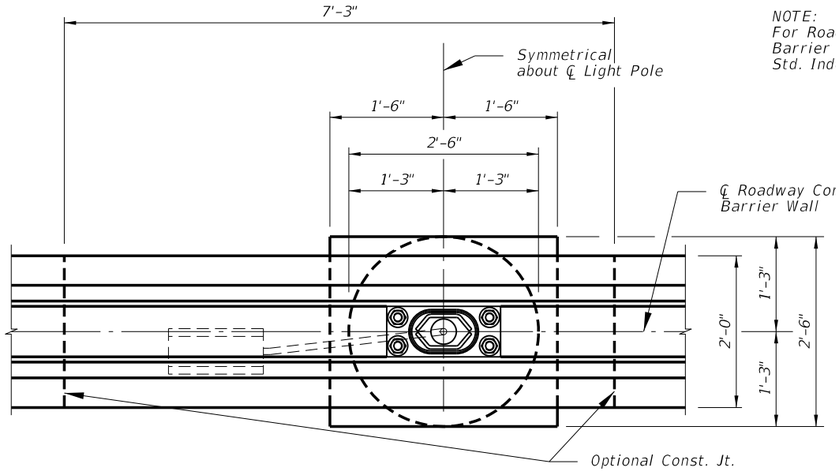
END VIEW

NOTE:
For Bearing Plate Details
see Sheet 5.

SPREAD FOOTING DETAILS FOR MEDIAN BARRIER MOUNTED ALUMIMUM LIGHT POLE

LAST REVISION	REVISION	DESCRIPTION:				
07/01/09			FDOT 2015 DESIGN STANDARDS	STANDARD ALUMINUM LIGHTING	INDEX NO. 17515	SHEET NO. 6 of 8

6/3/2014 2:15:29 PM

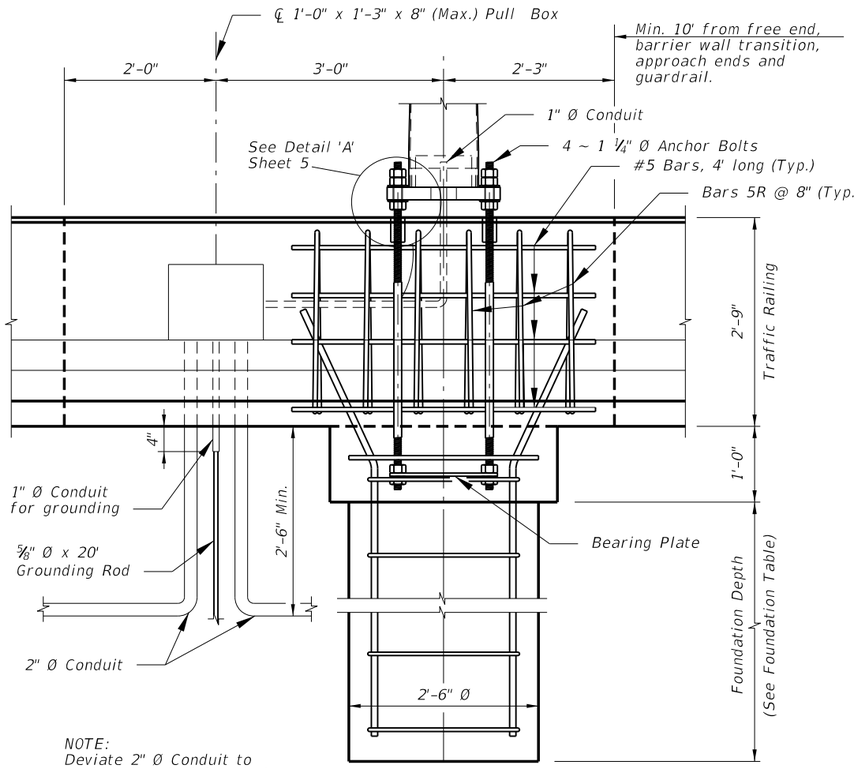


PLAN

(Reinforcing steel not shown)

Provide dowel bars @ construction joint

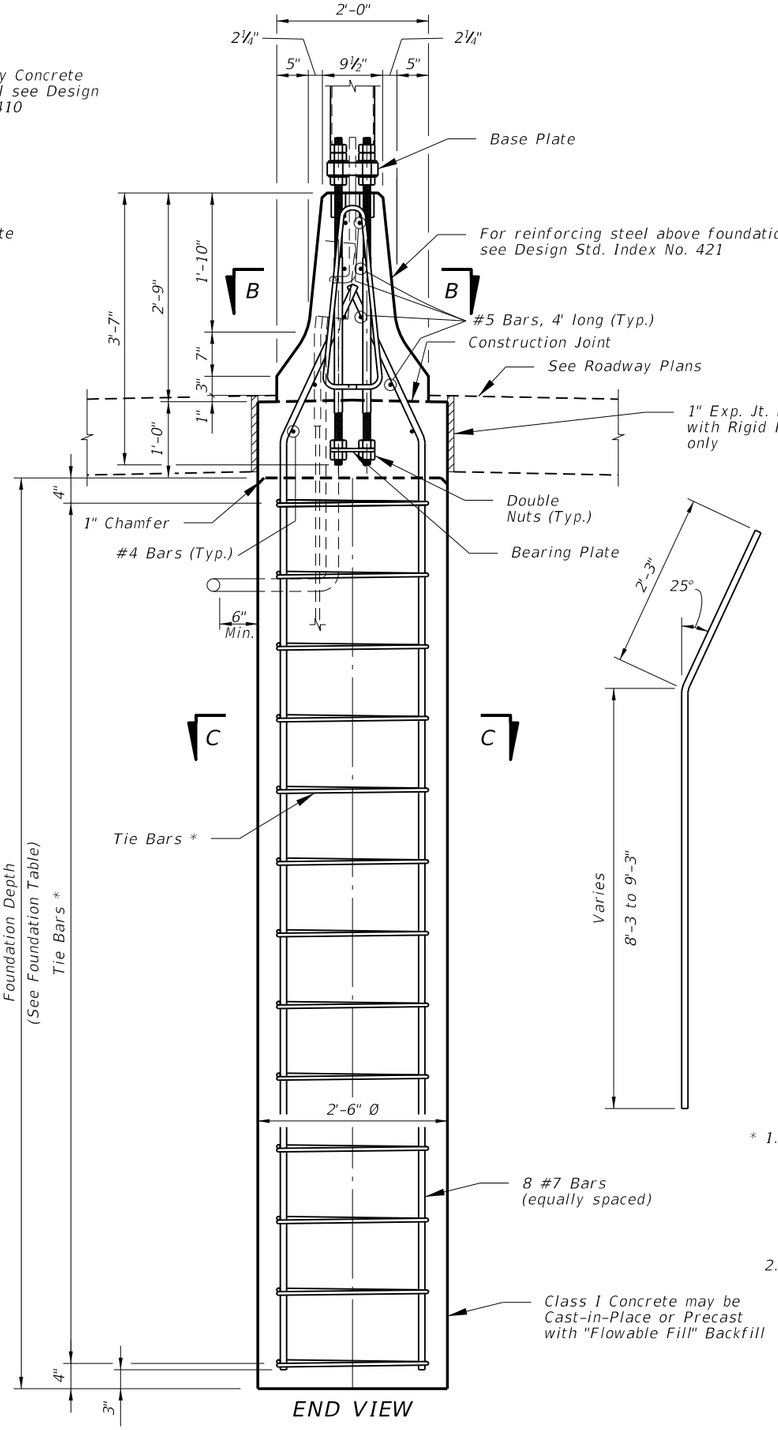
NOTE:
For Roadway Concrete Barrier Wall see Design Std. Index 410



ELEVATION

(For Roadway Concrete Barrier Wall reinforcing steel see Design Std. Index No. 410)

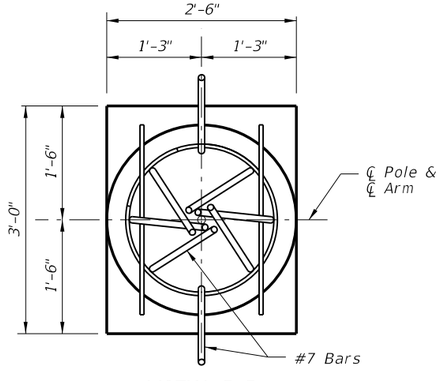
NOTE:
Deviate 2" Ø Conduit to avoid cylindrical foundation.



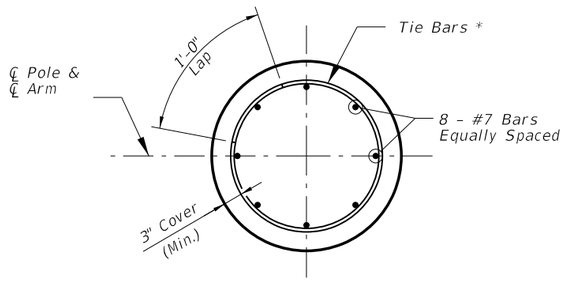
END VIEW

NOTE:
For Base Plate Details, Bearing Plate Detail and Detail 'A' see Sheet 5

FOUNDATION TABLE		
WIND SPEED (MPH)	DESIGN MOUNTING HEIGHT (FT)	FOUNDATION DEPTH (FT)
110	40	8
130	40	9
150	40	9



VIEW B-B



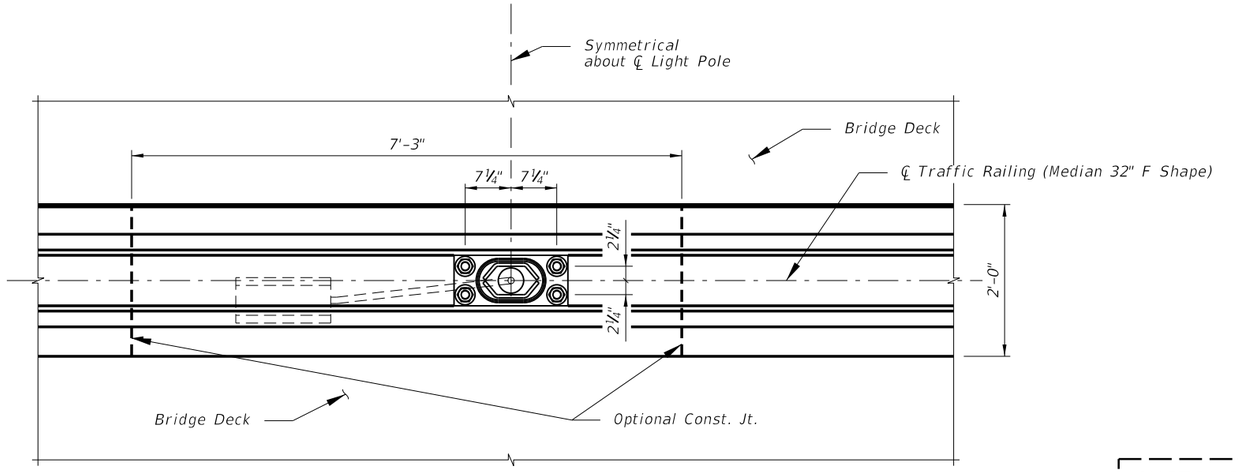
SECTION C-C

* 1. Shop-weld assemblies of foundation stirrup reinforcing bars are permitted in reinforced concrete foundation provided that:
   a. The reinforcing bars conform to ASTM Specification A706/706M.
   b. The holding wires conform to ASTM Specification A82 or A496.
   c. The Shop welding is performed by machines under a continuous, controlled process, approved by the Engineer.
   d. Quality control tests are performed on shop-welded specimens and the test results are available, upon request, to the Engineer.
2. #4 Tie Bars @ 12" centers (max.) or D10 (or W10) spiral @ 6" pitch, 3 flat turns top and 1 flat turn bottom.

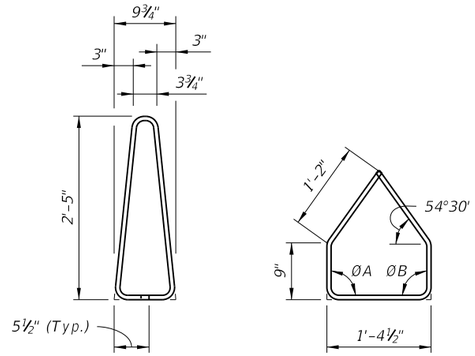
CYLINDRICAL FOUNDATION DETAILS FOR MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE

6/3/2014 2:15:29 PM

LAST REVISION	REVISION	DESCRIPTION:	FDOT 2015 DESIGN STANDARDS	STANDARD ALUMINUM LIGHTING	INDEX NO.	SHEET NO.
07/01/09					17515	7 of 8



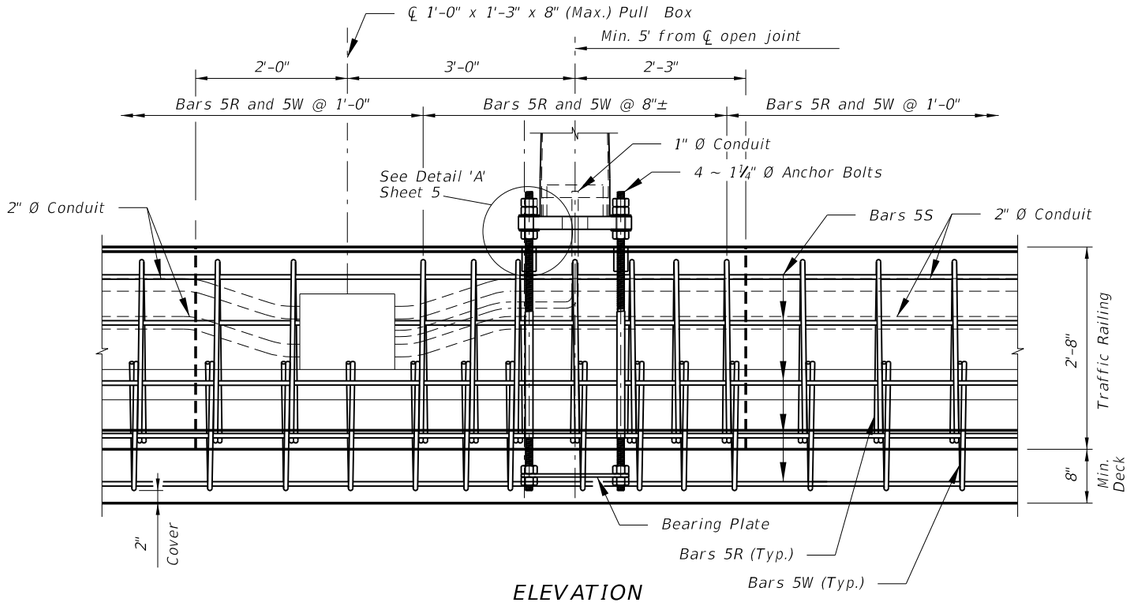
PLAN
(Reinforcing steel not shown)



BAR BENDING DIAGRAMS

INSTRUCTIONS TO DESIGNER:

In order to minimize vibration of light poles due to traffic, locate light poles near substructure supports.



ELEVATION
(Longitudinal and transverse deck reinforcing steel not shown)

END VIEW
(Longitudinal and transverse deck reinforcing steel not shown)

NOTES:
1. For Base Plate Details, Bearing Plate Details and Detail 'A' see sheet 5.
2. See Design Standard Index No. 421 for details of Traffic Railing (Median 32" F Shape) and angles ∠A and ∠B.

DETAILS FOR TRAFFIC RAILING (MEDIAN 32" F SHAPE) MOUNTED ALUMIMUM LIGHT POLE

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/09			FDOT 2015 DESIGN STANDARDS	STANDARD ALUMINUM LIGHTING	17515	8 of 8

6/3/2014 2:15:30 PM