



**Summary of Major Changes in  
Standard Specifications For Road and  
Bridges  
&  
Traffic Signal Standard Details**

**July 26<sup>th</sup>, 2016**

# Outline



- Section 736
- Section 1020
- Traffic Signal Standard Details – Sheet No 5 ( revised special foundation design)



# Blue Book Changes

- Added IMSA certification requirements for contractors
- Clarified traffic signal contractors' maintenance and responsibility during construction including procedure when contractors fail to respond to call-out.
- Clarified signal inspection procedure and added the requirements to include Operations and Maintenance manual before final acceptance.



# Bluebook Changes

- Added temporary traffic signal installation item
- Added TS2 cabinet and ATC controller pay items
- A lot of the lengthy material specifications in section 1020 are replaced with TOAPL reference
- [http://wwwsp.dotd.la.gov/Inside\\_LaDOTD/Divisions/Operations/Traffic\\_Services/Pages/Traffic\\_Operations\\_Approved\\_Products\\_List.asp](http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Operations/Traffic_Services/Pages/Traffic_Operations_Approved_Products_List.asp)  
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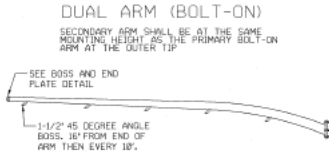
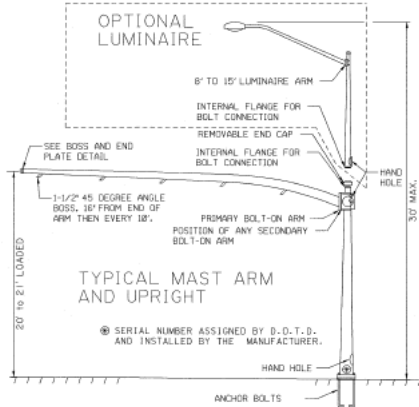
# 2015 TSD sheet 04



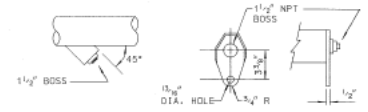
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55' SINGLE, 50'X35' DUAL, AND OVER MAST ARM DETAIL

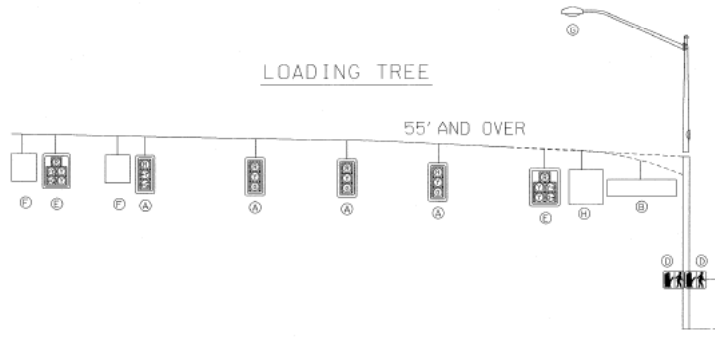


BOSS AND END PLATE DETAIL



- NOTE:
- ALL BOSSES SHALL BE PLUGGED WITH A 1-1/2" GALVANIZED STEEL CONDUIT PLUG WITH A SQUARE HEAD END. WHEN CABLE IS ROUTED THROUGH THE BOSS A RUBBER COMPRESSION BUSHING SHALL BE USED TO SEAL AND HOLD CABLE IN BOSS. CABLE SHALL BE SECURED TO MAST ARM FROM BOSS TO SIGNAL HEAD WITH 1/2" WIDE WEATHER RESISTANT TIE WRAPS.
  - TEN (10) CONDUCTOR SIGNAL CABLE FROM CONTROLLER MAY BE SPLICED IN POLE BASE TO TWO (2) - SIX (6) CONDUCTOR SIGNAL CABLES ROUTED TO TWO (2) - THREE (3) SECTION SIGNAL HEADS ON THE MAST ARM. NO OTHER SPLICING SHALL BE ALLOWED.
  - ALL SPLICES SHALL BE MADE WITH AN ALL COPPER OPEN-ENDED COMPRESSION SPLICE CAP INSTALLED TO THE MANUFACTURER'S RECOMMENDED METHOD AND INSULATED. WIRE NUTS SHALL NOT BE ALLOWED!
  - A 1/2" #13NC GROUND LUG SHALL BE REQUIRED AND BE ACCESSIBLE BY THE HAND HOLE.

LOADING TREE



NOTES:  
Ⓢ EFFECTIVE PROJECTED AREA

DEVICE	DESCRIPTION	PROJ. AREA (SQ. FT.)	WEIGHT (LBS.)
A) SIGNAL	12" x 3" SEC. SIGNAL W/BACKPLATES	10.40 (Ⓢ)	56
B) SIGNAL	72" x 18" STREET NAME SIGN	9.00	36
C) SIGNAL	12" x 3" SEC SIGNAL HEAD NO BACKPLATE	4.90 (Ⓢ)	50
D) SIGNAL	DUAL 2 SECTION PEDESTRIAN SIGNAL	8.00 (Ⓢ)	80
E) SIGNAL	12" x 5" SEC SIGNAL WITH BACKPLATES	16.00 (Ⓢ)	85
F) SIGN	24" x 30" REGULATORY SIGN	5.00	20
G) LUMINAIRE	LUMINAIRE	3.30	75
H) SIGN	36" x 36" BLANK OUT REGULATORY SIGN (40" x 40" OVERALL)	11.20	94
I) SIGN	30" x 36" REGULATORY SIGN	7.50	30

DESIGN CRITERIA:  
THESE TRAFFIC SIGNAL SUPPORT STRUCTURES SHALL BE DESIGNED IN ACCORDANCE WITH LOADING AND ALLOWABLE STRESS REQUIREMENTS OF 2009 AASHTO "STANDARDS SPECIFICATION FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS", FOURTH EDITION. WIND LOADS ARE BASED ON A BASIC WIND SPEED OF 130 MPH WITH A RECURRENCE INTERVAL OF 50 YEARS AND A FATIGUE CATEGORY OF 2. FATIGUE LOADS ARE BASED ON THE REQUIREMENTS OF SECTION 11.7 AND THE FOLLOWING DESIGN LOADS.

- VORTEX SHEDDING: NOT APPLICABLE FOR STRUCTURES WITH A TAPER OF AT LEAST 0.14"/FT. PER AASHTO.
- NATURAL WIND GUSTS: THE YEARLY MEAN WIND SPEED FOR NATURAL WIND GUSTS WILL BE ASSUMED TO BE 11.2 MPH.
- GALLOPING: STRUCTURES ARE NOT DESIGNED TO RESIST PERIODIC GALLOPING FORCES.
- TRUCK-INDUCED GUST: STRUCTURES ARE NOT DESIGNED TO INCLUDE TRUCK-INDUCED GUSTS.
- ARMS MAY BE CURVED OR STRAIGHT.



PROJECT NUMBER: \_\_\_\_\_

DATE: \_\_\_\_\_

NO. \_\_\_\_\_

REVISION DESCRIPTION: \_\_\_\_\_

TRAFFIC SIGNAL STANDARD DETAILS

55' SINGLE, 50'X35' DUAL AND OVER MAST ARM DETAIL

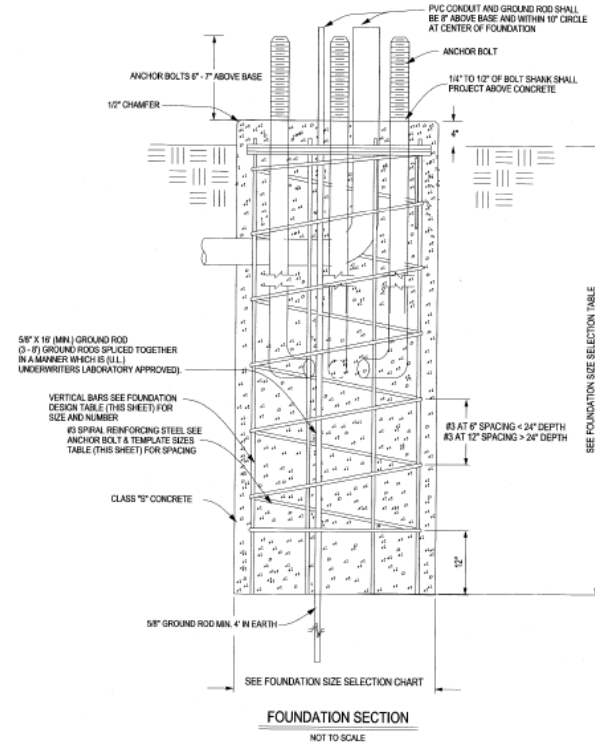
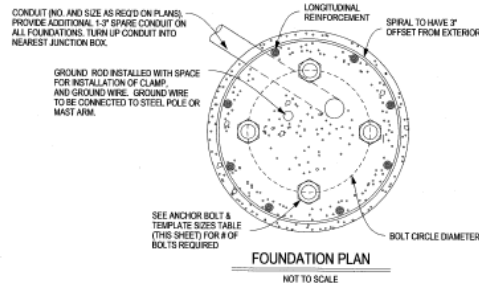
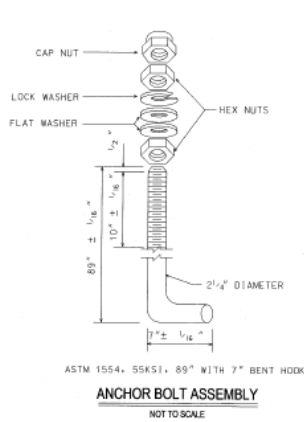
TSD-04

TRAFFIC ENGINEERING

# 2015 TSD sheet 05



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**GENERAL NOTES:**

1. THREADS FOR ANCHOR BOLTS AND NUTS SHALL BE ROLLED OR CUT THREADS.
2. THE CONTRACTOR SHALL STATE THE LOCATION OF EACH POLE FOUNDATION AND NOTIFY THE PROJECT ENGINEER FOR CONCURRENCE IN THE LOCATION BEFORE PROCEEDING WITH THE INSTALLATION OF THE POLE FOUNDATION.
3. ONCE THE POLE FOUNDATION IS INSTALLED, MAST ARM LENGTHS SPECIFIED ON PLANS ARE TO BE VERIFIED BEFORE ORDERING. IF A TIME EXTENSION IS NEEDED, IT SHALL BE AT THE DISCRETION OF THE PROJECT ENGINEER TO GRANT THE EXTENSION.
4. CONDUIT SHALL BE INSTALLED ACCORDING TO PLANS. CONDUIT SHALL BE CENTERED IN THE FOUNDATION WITH SPACING.
5. ALL SPARE CONDUIT IN FOUNDATIONS SHALL BE STUBBED OUT 24\"/>

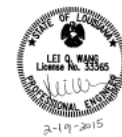
**FOUNDATION SIZE SELECTION CHART**  
Foundation Size Selection (diameter in inches, length in feet)

Mast Arm Length (ft)	Foundation Size Selection (diameter in inches, length in feet)			
	Zone 1 (Diameter/Depth)	Zone 2+ (Diameter/Depth)	Zone 3+ (Diameter/Depth)	Zone 4 (Diameter/Depth)
55	* * *	42 18	36 14	* * *
60	* * *	42 19	36 15	* * *
65	* * *	48 17	36 16	* * *
70	* * *	48 19	36 17	* * *
50 & 35	54 18	36 20	36 23	* * *
50 & 40	54 18	36 20	36 23	* * *
55 & 40	* * *	42 18	36 16	* * *
55 & 45	* * *	42 18	36 14	* * *

\* Special Design Required

**ANCHOR BOLT & TEMPLATE SIZES**

DRILLED SHAFT DIA	REINFORCING STEEL		ANCHOR BOLT DESIGN		
	VERT BARS	SPIRAL SPACING	# OF ANCHOR BOLTS	ANCHOR BOLT DIA	BOLT CIRCLE DIA
30"	12-#10	#3 AT 6" < 24" DEPTH #3 AT 12" > 24" DEPTH	4	2 1/4"	24"
42"	17-#10	#3 AT 6" < 24" DEPTH #3 AT 12" > 24" DEPTH	6	2 1/4"	30"
54"	28-#10	#3 AT 6" < 24" DEPTH #3 AT 12" > 24" DEPTH	6	2 1/4"	30"



REVISIONS

NO.	DATE	DESCRIPTION

TRAFFIC SIGNAL STANDARD DETAILS  
30" SINGLE, 50/35/35' DUAL,  
AND OVER FOUNDATION

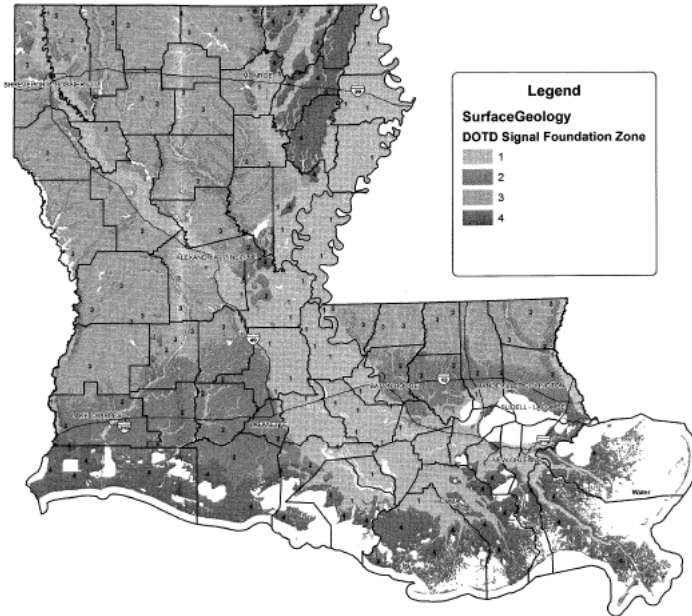
TRAFFIC ENGINEERING

# 2015 TSD sheet 06



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GENERAL STATIC MAP FOR FOUNDATION REQUIREMENTS SHOWN HERE.  
SEE <http://goo.gl/QHv2o3> FOR LOCATION SPECIFIC CLASSIFICATION.  
ALTERNATIVE: LADOTD WEBSITE/HOME/INSIDE LADOTD/DIVISIONS/OPERATIONS /TRAFFIC SERVICES/TRAFFIC OPERATIONS/APPROVED PRODUCT LIST/TOAPL 165.



**Legend**  
**SurfaceGeology**  
**DOTD Signal Foundation Zone**

- 1
- 2
- 3
- 4

**FOUNDATION SIZE ZONING:**

1. FOUNDATION ZONES ARE BASED ON THE 1984 GEOLOGICAL MAP OF LOUISIANA PUBLISHED BY THE LOUISIANA GEOLOGICAL SURVEY. LOCAL GEOLOGICAL VARIATIONS ARE LIKELY DUE TO HUMAN ACTIVITIES OR NATURAL EVENTS.
2. THE ZONING MAP IS INTENDED TO ASSIST IN SIZING FOUNDATION FOR SELECTED SIGNAL POLES AND SHOULD NOT BE VIEWED AS A SUBSTITUTE OF ENGINEERING JUDGMENT OR PROPER DESIGN.
3. SOME SOILS SUCH AS GRAVEL OR CEMENTED SOILS MAY NOT BE AMENABLE TO THE CONVENTIONAL DRILLED SHAFT CONSTRUCTION. EXERCISE CAUTION AND SEEK CONFIRMATION OF THE SOIL CONDITIONS DURING DESIGN AND/OR DURING SHAFT EXCAVATION.

**ZONE 1 - ALLUVIAL SOILS FORMED BY THE RED RIVER, THE OUACHITA RIVER, THE ATCHAFALAYA RIVER, AND THE MISSISSIPPI RIVER. ASSUMED AVERAGE SOIL SHEAR STRENGTH IS AT LEAST 250 POUNDS PER SQUARE FOOT (PSF).**

**ZONE 2 - PLEISTOCENE AGE PRAIRIE TERRACES DEPOSITS. ASSUMED AVERAGE SOIL SHEAR STRENGTH IS AT LEAST 500 PSF.**

**ZONE 3 - PLEISTOCENE AGE OR OLDER DEPOSITS OTHER THAN ZONE 2. ASSUMED AVERAGE SHEAR STRENGTH IS AT LEAST 1,000 PSF.**

**ZONE 4 - MOSTLY COASTAL MARSH AND SAND/GRAVEL DEPOSITS. SPECIAL DESIGN IS REQUIRED FOR THE SIGNAL POLE WITHIN THIS ZONE.**

**CONSTRUCTION NOTES:**

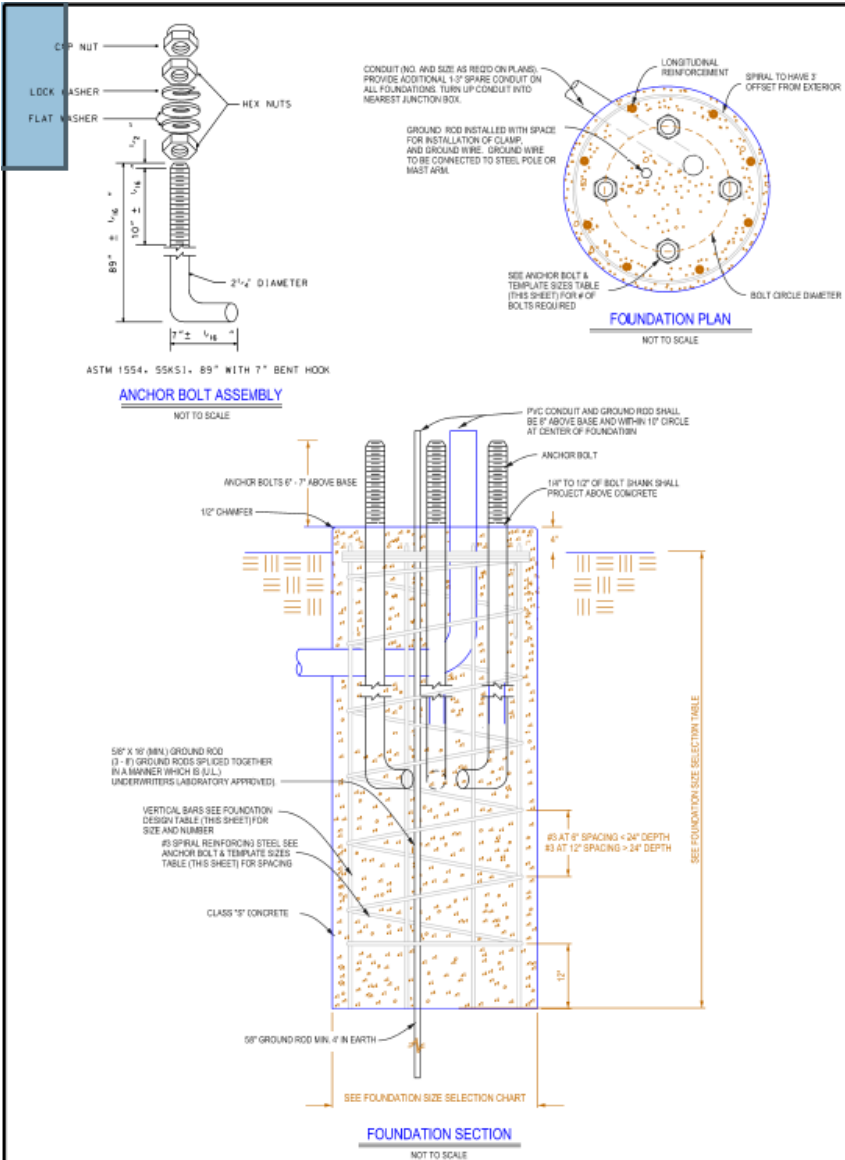
1. IF GROUNDWATER IS ENCOUNTERED DURING FOUNDATION EXCAVATION AND NO CAVE IN IS OBSERVED, THE GROUNDWATER SHOULD BE PUMPED OUT PRIOR TO STEEL CAGE PLACEMENT. THE WATER REMAINS IN THE EXCAVATION SHOULD BE NO MORE THAN 1/2 INCH.
2. IF GROUNDWATER IS ENCOUNTERED DURING FOUNDATION EXCAVATION AND CAVE IN IS OBSERVED, THE EXCAVATION SHOULD BE CEASED. CONTACT THE PROJECT ENGINEER IMMEDIATELY. SHOULD THE CAVING IS EXCESSIVE, BACKFILL THE EXCAVATION IMMEDIATELY.
3. FREE FALL CONCRETE IS ALLOWED FOR DRY HOLES ONLY. THE CONCRETE SHALL BE PLACED WITH A HOPPER OR A TREMIE. WHEN FREE FALL METHOD IS USED, CONTROL THE CONCRETE TO FALL VERTICALLY WITHOUT CONTACTING SHAFT WALL OR STEEL CAGE TO PREVENT SEGREGATION.
4. CONCRETE PLACEMENT WITH A TREMIE IS REQUIRED IF EXCESSIVE GROUNDWATER (MORE THAN 6 INCHES ACCUMULATION) IS ENCOUNTERED.  
WHEN THE SOIL CONDITIONS ARE SUSPECTED TO BE DIFFERENT THAN THOSE DESCRIBED IN THE FOUNDATION SIZE ZONING, CONTACT THE PROJECT ENGINEER IMMEDIATELY TO EVALUATE THE SUITABILITY OF THE FOUNDATION DESIGN.



SHEET NUMBER		PROJECT	
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PROJECT NO.	DATE	DATE	DATE
REVISION DESCRIPTION			
NO.	DATE		
			
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TRAFFIC ENGINEERING			

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# 2016 TSD sheet 05



Mast Arm Length(s) (ft)	Bending Moment (ft-lb)	Torsion (ft-lb)	Shear (lb)	Axial Force (lb)	Foundation Size Selection (diameter in inches, depth in feet)			
					Zone 1 (Diameter/Depth)	Zone 2 (Diameter/Depth)	Zone 3 (Diameter/Depth)	Zone 4 (Diameter/Depth)
55	125,120	121,100	5,508	5,862	* * 42 18	36 14	* * *	* * *
60	141,805	128,940	5,938	6,561	* * 42 18	36 15	* * *	* * *
65	161,259	150,480	6,138	6,955	* * 48 17	36 16	* * *	* * *
70	182,103	165,590	6,628	7,377	* * 48 19	36 17	* * *	* * *
50 & 35	142,230	101,630	5,868	7,572	54 18	36 20	36 13	* * *
50 & 40	147,540	103,630	5,868	7,798	54 18	36 20	36 13	* * *
55 & 40	159,408	119,900	5,918	8,195	* * 42 18	36 14	* * *	* * *
55 & 45	165,981	119,870	5,918	8,425	* * 42 18	36 14	* * *	* * *

\* Special Design Foundation Required

DRILLED SHAFT DIA	REINFORCING STEEL		ANCHOR BOLT DESIGN	
	VERT BARS	SPIRAL SPACING	# OF ANCHOR BOLTS	ANCHOR BOLT DIA
36"	12 - #10	#3 AT 6" x 24" DEPTH #3 AT 12" x 24" DEPTH	4	2 1/4"
42"	14 - #10	#3 AT 6" x 24" DEPTH #3 AT 12" x 24" DEPTH	6	2 1/4"
54"	25 - #10	#3 AT 6" x 24" DEPTH #3 AT 12" x 24" DEPTH	6	2 1/4"

**GENERAL NOTES:**

1. THREADS FOR ANCHOR BOLTS AND NUTS SHALL BE ROLLED OR CUT THREADS.
2. THE CONTRACTOR SHALL STAKE THE LOCATION OF EACH POLE FOUNDATION AND NOTIFY THE PROJECT ENGINEER FOR CONCURRENCE IN THE LOCATION BEFORE PROCEEDING WITH THE INSTALLATION OF THE POLE FOUNDATION.
3. ONCE THE POLE FOUNDATION IS INSTALLED, MAST ARM LENGTHS SPECIFIED ON PLANS ARE TO BE VERIFIED BEFORE ORDERING. IF A TIE EXTENSION IS NEEDED, IT SHALL BE AT THE DISCRETION OF THE PROJECT ENGINEER TO GRANT THE EXTENSION.
4. CONDUIT SHALL BE INSTALLED ACCORDING TO PLANS. CONDUIT SHALL BE CENTERED IN THE FOUNDATION WITH EVEN SPACING.
5. ALL SPARE CONDUIT IN FOUNDATIONS SHALL BE STUBBED OUT 24" BELOW GRADE AND BROUGHT INTO JUNCTION BOX.
6. TOP OF BASE SHALL BE ROUND WITH CHAMFERED EDGE.
7. SERVICE CONDUIT SHALL BE 2" DIA. SCH 80 PVC.
8. USE A GROUND ROD CLAMP TO ATTACH THE 46 AWG BARE GROUND WIRE ONTO THE GROUND ROD AND THE OTHER END TO BE CONNECTED TO THE POLE.
9. ALL GROUND RODS, REGARDLESS OF FOUNDATION SIZE SHALL PROVIDE THROUGH THE FOUNDATION AND A MINIMUM OF 4' SHALL BE EMBEDDED INTO THE EARTH.

**SPECIAL DESIGN FOUNDATION NOTES:**

1. THE CONSULTANT SHALL SIZE THE FOUNDATION BASED ON THE SITE SPECIFIC STRUCTURAL REACTIONS IN ACCORDANCE WITH THE REQUIREMENTS OF ASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, AND LADOTT MAST ARM DESIGN CRITERIA (TSD-04). A 25-YR RECURRENCE INTERVAL AND A WIND SPEED OF 110 MPH FOR THE ENTIRE STATE SHALL BE USED TO SIZE THE FOUNDATION ONLY. THE FOUNDATION SIZE DETERMINATION SHALL CONSIDER LATERAL, BENDING MOMENTS, AND TORSIONAL MOMENTS. AN ADEQUATE SAFETY FACTOR SHALL BE APPLIED.
2. THE FOUNDATION SIZE SELECTION TABLE IS BASED ON THE MANUFACTURER PROVIDED FOUNDATION REACTIONS USING A 25-YEAR RECURRENCE INTERVAL AND A WIND SPEED OF 11.0 MPH. THE MAST ARM STRUCTURAL DESIGN SHALL CONFORM TO THE CODE REQUIREMENTS FOR THE RECURRENCE INTERVAL AND A WIND SPEED OF 130 MPH. THE CONSULTANT MAY AT HIS/HER DISCRETION USE THE FOUNDATION SIZE SELECTION TABLE SHOULD THE STRUCTURAL REACTIONS CALCULATED BASED ON THE REQUIREMENTS SET FORTH IN NOTE 1 BE WITHIN THE LOADS SPECIFIED.
3. SHOULD THE STRUCTURAL REACTIONS EXCEED THE LOADS SPECIFIED IN THE FOUNDATION SIZE SELECTION TABLE, THE CONSULTANT SHALL PROCURE SITE SPECIFIC GEOTECHNICAL DESIGN DATA FOR FOUNDATION DESIGN.
4. THE SPECIAL DESIGN, AT THE DISCRETION OF THE TRAFFIC SERVICES SECTION, MAY BE SUBJECT TO DOTD'S BRIDGE DESIGN AND/OR GEOTECHNICAL AND PAVEMENT SERVICES SECTIONS' REVIEW PRIOR TO FINAL PLAN ACCEPTANCE.







### GENERAL NOTES:

1. THREADS FOR ANCHOR BOLTS AND NUTS SHALL BE ROLLED OR CUT THREADS.
2. THE CONTRACTOR SHALL STAKE THE LOCATION OF EACH POLE FOUNDATION AND NOTIFY THE PROJECT ENGINEER FOR CONCURRENCE IN THE LOCATION BEFORE PROCEEDING WITH THE INSTALLATION OF THE POLE FOUNDATION.
3. ONCE THE POLE FOUNDATION IS INSTALLED, MAST ARM LENGTHS SPECIFIED ON PLANS ARE TO BE VERIFIED BEFORE ORDERING. IF A TIME EXTENSION IS NEEDED, IT SHALL BE AT THE DISCRETION OF THE PROJECT ENGINEER TO GRANT THE EXTENSION.
4. CONDUIT SHALL BE INSTALLED ACCORDING TO PLANS. CONDUIT SHALL BE CENTERED IN THE FOUNDATION WITH EVEN SPACING.
5. ALL SPARE CONDUIT IN FOUNDATIONS SHALL BE STUBBED OUT 24" BELOW GRADE AND BROUGHT INTO JUNCTION BOX.
6. TOP OF BASE SHALL BE ROUND WITH CHAMFERED EDGE.
7. SERVICE CONDUIT SHALL BE 2" DIA. SCH. 80 PVC.
8. USE A GROUND ROD CLAMP TO ATTACH THE #6 AWG BARE GROUNDWIRE ONTO THE GROUND ROD AND THE OTHER END TO BE CONNECTED TO THE POLE.
9. ALL GROUND RODS, REGARDLESS OF FOUNDATION SIZE SHALL PROTRUDE THROUGH THE FOUNDATION AND A MINIMUM OF 4" SHALL BE EMBEDDED INTO THE EARTH.

### SPECIAL DESIGN FOUNDATION NOTES:

1. THE CONSULTANT SHALL SIZE THE FOUNDATION BASED ON THE SITE SPECIFIC STRUCTURAL REACTIONS IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS, AND LA DOTD MAST ARM DESIGN CRITERIA (TSD-04). A 25-YR RECURRENCE INTERVAL AND A WIND SPEED OF 110 MPH FOR THE ENTIRE STATE SHALL BE USED TO SIZE THE FOUNDATION ONLY. THE FOUNDATION SIZE DETERMINATION SHALL CONSIDER LATERAL, BENDING M-MOMENTS, AND TORSIONAL MOMENTS. AN ADEQUATE SAFETY FACTOR SHALL BE APPLIED.
2. THE FOUNDATION SIZE SELECTION TABLE IS BASED ON THE MANUFACTURER PROVIDED FOUNDATION REACTIONS USING A 25-YEAR RECURRENCE INTERVAL AND A WIND SPEED OF 110 MPH. THE MAST ARM STRUCTURAL DESIGN SHALL CONFORM TO THE CODE REQUIREMENTS FOR THE RECURRENCE INTERVAL AND A WIND SPEED OF 110 MPH. THE CONSULTANT MAY AT HIS/HER DISCRETION USE THE FOUNDATION SIZE SELECTION TABLE SHOULD THE STRUCTURAL REACTIONS CALCULATED BASED ON THE REQUIREMENTS SET FORTH IN NOTE 1 BE WITHIN THE LOADS SPECIFIED.
3. SHOULD THE STRUCTURAL REACTIONS EXCEED THE LOADS SPECIFIED IN THE FOUNDATION SIZE SELECTION TABLE, THE CONSULTANT SHALL PROCURE SITE SPECIFIC GEOTECHNICAL DESIGN DATA FOR FOUNDATION DESIGN.
4. THE SPECIAL DESIGN, AT THE DISCRETION OF THE TRAFFIC SERVICES SECTION, MAY SUBJECT TO DOTD'S BRIDGE DESIGN AND/OR GEOTECHNICAL AND PAVEMENT SERVICES SECTIONS' REVIEW PRIOR TO FINAL PLAN ACCEPTANCE.



**Questions?**