

# Specification E-1114

## AUSTIN ENERGY, ELECTRIC UTILITY DEPARTMENT

### PURCHASE SPECIFICATION

### FOR

### DESIGN AND FABRICATION OF

### POLES, DISTRIBUTION, STEEL

DATE	PREPARED BY	ISSUANCE/REVISION	APPROVAL PROCESS SUPV. / MATERIALS SUPV.
7/29/97	Peter G. Soosay, P.E.	Revision	
5/20/02	Mary N. Coleman, P.E.	Revision	_____
7/15/02	Mary N. Coleman, P.E.	Revision	_____
2/8/06	Mary N. Coleman, P.E./Mike Gaub	Revision	_____
8/6/08	J. Gauthier	Revision	_____
5/14/14	Lee Emmick, P.E.	Revision	_____
7/19/19	Julius Heslop, P.E.	Revision	<u>Julius Heslop</u>
			Julius Heslop
4/11/20	Julius Heslop, P.E.	Revision	
12/29/21	Julius Heslop, P.E.	Revision	Julius Heslop
10/5/22	Julius Heslop, P.E.	Revision	Julius Heslop, P.E.
06/15/23	Cruz Lara	Revision	<u>Cruz Lara</u>

<u>Reason for Revision</u>	<u>Affected Paragraphs</u>
Added Corrosion Protection to full embedment	5.4.3 and Attachment 2 (Coleman)
Added one (1) bolted ground clamp at 10' from pole top.	5.5.1 and Attachment 2 (Coleman)
Made bolt holes a requirement.	5.5.2 and Attachment 4 (Coleman)
Reformatted to new Technical Specification Format and to Mirror E-1541	All paragraphs (Gaub)
Add requirements for Pole Weights to Identification Tag and requirements for Pole Steps as requested.	3.3.3.4, 3.5, Attachment 4
Add Attachment 4, Bolt Hole Patterns	
Removed Commercial Items and Renumbered (7/15/02) Format, Language & Re-order	4.0, 5.0, 6.0 (deleted), 7.0 (deleted) 1.0 through 4.3.1
Added deliverables; included header (8/6/08)	4.4
Changed Jacking Nuts to Jacking Vangs and added weld marks to two piece poles (5/14/14)	3.3.3 and 3.3.4
Addition of Circular Pole (7/8/19)	Attachment 2, Attachment 1, 3.5.5 and 3.5.6
Removal pre-drilling and hole patterns	Attachment 5, 3.2.3.D, 3.2.5.A.4
Addition of balance marker (7/8/19)	3.2.4.C
Addition of LD MOD Moments (4/11/20)	Attachment 1
Correct Table of Contents, references (4/11/20)	Table of Contents
Addition of 70-MOD (12/28/21)	Attachment 1
Attachments and specification references were not matching	
Changed reference of attachment 3 to attachment 4	3.2.4 B (6/15/23)
Changed reference of attachment 5 to attachment 2 and 3	3.5.1 (6/15/23)
Change reference of attachment 7 to attachment 6	3.5.3 (6/15/23)

This specification, until rescinded, shall apply to each future purchase and contract for the commodity described herein.  
Retain for future reference.

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**CITY OF AUSTIN ELECTRIC UTILITY DEPARTMENT  
PURCHASE SPECIFICATION  
FOR  
DESIGN AND FABRICATION OF  
POLES, DISTRIBUTION, STEEL**

**1.0 SCOPE AND CLASSIFICATION**

**1.1 Scope**

- 1.1.1 This specification sets forth the requirements for design, material, fabrication, finishing and shipping of galvanized and self-weathering steel distribution structures.
- 1.1.2 This specification contains a description of the items being purchased, quantities, specific structure details, finish requirements, and, when necessary, attachments used to amend this specification.
- 1.1.3 The City of Austin Electric Utility Department is hereinafter referred to as Austin Energy.
- 1.1.4 Austin Energy requires a qualified Contractor to supply distribution structures. The poles shall be made of either galvanized steel or self-weathering steel. The poles shall be symmetrical about the transverse and longitudinal axis, with a gradual and constant taper.
- 1.1.5 The term “Engineer” refers to the Standards Engineer at 4411-B Meinardus St., Austin TX, 78744.
- 1.1.6 The term “Fabricator” refers to the party selected to design, fabricate, and furnish the product.
- 1.1.7 After contract execution, any modifications must be approved in writing by the Austin Energy Engineer.

## 1.2 Classification

1.2.1 Attachments 1, 2, 3, 4 and 5 define the design requirements for distribution structures.

## 2.0 APPLICABLE STANDARDS

Reference to standard specifications shall be the latest revision of such specifications with abbreviations as listed below:

AISC	-	American Institute of Steel Construction
ANSI	-	American National Standards Institute
ASCE	-	American Society of Civil Engineers
ASME	-	American Society of Mechanical Engineers
ASNT	-	American Society of Non-Destructive Testing
ASTM	-	American Society of Testing and Materials
AWS	-	American Welding Society
NEMA	-	National Electrical Manufacturers Association
NESC	-	National Electrical Safety Code
SSPC	-	Structural Steel Painting Council

## 3.0 PHYSICAL REQUIREMENTS

### 3.1 Material

3.1.1 All material used in the structure shall have a minimum yield strength equal to or greater than the value used in the design calculations. The Contractor shall indicate the material used in each part of the structure and the specification covering the material.

3.1.2 Rolled shapes and plate shall comply with the following ASTM specifications:

Carbon steel	A-36
High strength carbon steel	A-440
High strength low alloy steel	A-242
	A-441
	A-572
	A-36 Modified
Self-Weathering	A-871

Special steel or bolt material specifications other than the above, if applicable, contractor shall provide specific reference to the appropriate specification and will require approval by Austin Energy.

- 3.1.3 Structural Plate material shall be mill-certified to meet an impact of 15 ft-lb. at -20° F in the longitudinal direction using the Charpy V-Notch Impact Test in accordance with ASTM A673. There shall be an average of three (3) tests with no one test below 10ft-lb. The location of the test samples shall be in accordance with ASTM A673.
- 3.1.4 When required, assembly and step bolts shall be A-394 or A-325. Step bolts shall be installed with self-locking "Ancolock" nuts or equivalent. Bolts and nuts shall have a class 2 tolerance as defined by ANSI B1.1 after galvanizing or self-weathering finish has formed.

### **3.2 Fabrication**

- 3.2.1 Fabrication shall be in accordance with AISC specifications and shall be equal to the best shop practice of modern steel fabricating shops.
- 3.2.2 Welding
  - A. Design of all joints or seams and all welding procedures shall be in accordance with Structural Welding Code AWS D1.1, including the latest addenda. The bidder shall provide welding procedures and processes to be used in the various joints or seams.
  - B. Welders shall be qualified on all welds used during the fabrication process in accordance with AWS D1.1.
  - C. Upon request by the Engineer, Bidder shall provide weld design calculations for arms, baseplates, and other joint details.
  - D. The bidder shall indicate the inspection methods and may use any combination of inspection methods to ensure that quality and fabrication welds meet the design requirements. a minimum, ultrasonic inspection, conforming to Section 6 of ANSI/AWS D1.1, latest revision, American Welding Structural Welding Code - Steel", shall be made of all full penetration welds.
- 3.2.3 Quality and Finish
  - A. Finish of structures shall be as specified below. Any exceptions shall be by Contractor and are subject to rejection by the Engineer.
  - B. Option "A" - Hot-dipped galvanized
    - 1. Steel shall be hot dipped galvanized inside and outside after fabrication. The galvanizing shall be in accordance with ASTM Specification A-123. Precautions shall be taken against hydrogen embrittlement in accordance with ASTM Specification A-143. Double dipping is not allowed. Sections using metalizing shall be provided to Austin Energy and shall be sealed to prevent internal corrosion.
    - 2. Galvanized structures shall be free and clear of acid drops, tear drop edges, flaking zinc, rough appearance, trapped slag, holes covered with zinc membrane and in general shall be smooth, clean, attractive in appearance and unscarred when received. Pieces having galvanizing which do not meet these requirements, in the sole opinion of the Engineer, shall be rejected.

C. Option "B" - Self-weathering

1. Steel surfaces shall be blast cleaned after fabrication in accordance with the Steel Structures Painting Council's Surface Preparation Specification SP6, commercial finish, to ensure rapid and uniform weathering.
2. Self-weathering structures shall have an initial formation of patina that is consistent in thickness and appearance. All Self-Weathered poles shall have a top and butt end sealer plate welded continuously with a fillet weld. On multiple piece poles, the embedded section shall have a sealer plate continuously fillet welded just inside the top end of the each base section. Pieces, which do not meet these requirements, in the sole opinion of the Engineer, shall be rejected.

D. Option "C" -Painted

1. Steel surfaces shall be cleaned in accordance with the Steel Structures Painting Council's Surface Preparation Specification (SSPC) -SP6 immediately prior to painting
2. All sections for any part of the structure, shall be hermetically sealed. Surface 's finished edges shall be clean cut and free from burrs and chips. Roughness of oxygen cut surfaces shall not be greater than that defined by AWS D1.1.
3. Connections shall be arranged to minimize the eccentricity of loading on the member. The mastic coating for pole structures for direct embedment shall be applied prior to painting. The mastic coating shall meet the requirements of Section coating

3.2.4 Identification Marking

- A. Each piece of structure shall be permanently marked with the same designation as shown on the fabrication drawings (per Attachment IV). The mark shall be located 12 inches from the point where the two poles have minimum required overlap as outlined in section 3.3.3.
- B. Each piece of structure, except the bottom piece, shall have a 3"x5" steel nameplate permanently affixed 5 feet above the base. The bottom piece of structure shall have the steel nameplate permanently affixed 5 feet above the groundline. The plate shall be stamped according to the format shown in Attachment IV.
- C. Each piece of structure shall have a center of balance marker (Label to include-Weight (lbs.), distance (in) from end, & balance point marked with "BP").
- D. For multi-section pole shafts, a match mark shall be placed on each section at the connection to indicate proper orientation. These match marks shall be in line for all sections of the same pole shaft.

- E. All identification markings shall be clearly legible after galvanizing or self-weathering finish has formed.

### 3.2.5 Tolerances

- A. The finished work shall conform to the tolerances set forth in these specifications and shall be sufficiently accurate to permit field erection without reaming and with only a moderate amount of drifting. Maximum tolerance allowed on finished work shall conform to the following:

1. Cutting length  $\pm 1/16"$
2. Center to center distance of end holes on a piece  $\pm 1/16"$
3. Variation of gage lines  $\pm 1/32"$
4. Compression members shall be straight to a tolerance of  $1/1000$  of the total length  $\pm 1/32"$
5. All material shall be free of deformations, bends, twists, or kinks. Straightening of damaged material shall not be permitted.

- B. Fabricator shall size assembly bolts without allowances for washers, unless specifically requested. All bolts shall be of the coarse thread series furnished with self locking "Ancolock" hex nuts or equivalent unless otherwise specified. All bolts shall be of such a length that they pass entirely through the nut and have a minimum projection of two complete threads. Locking of nuts shall be by both mechanical method between the mated threads of the nuts and bolts, and by the application of "Ancolock" or equivalent self-locking nuts to all assembly bolts.
- C. A five (5) percent overage of bolts and self-locking nuts shall be included.

### 3.2.6 Modifications

- A. Structures are to be fabricated in accordance with detailed drawings furnished by the Fabricator for approval of the Engineer.
- B. For fabrication only orders, minor deviations in member layout to accommodate variations in shop practices will be permitted provided that these deviations do not materially alter the configuration of the structures and do not reduce the strength of the structures. When such deviations in member layout are made, drawings showing these deviations shall be submitted to the Engineer for approval and the originals of such drawings shall become the property of the Austin Energy upon completion of the order.

## 3.3 Pole Shafts

- 3.3.1 Pole shafts used in the structures shall be a minimum of twelve (12) sides and tapered. Taper shall not exceed 0.4 inches per linear foot.



- 3.3.2 Shaft sections up to 55 feet in length shall be furnished as one piece unless otherwise specified by the Engineer.
- 3.3.3 When the pole height requires more than one shaft section, each section shall be pre-fitted for a telescoping type of assembly. The upper section at a joint shall telescope over the lower section by not less than 1 1/2 times the distance between flats. Structure sections shall be numbered to relate to the structure identification and at joints both sections shall be clearly marked so that the related faces can be correctly matched in the field assembly. A weld mark shall be made on each section to show that the sections are fully mated.
- 3.3.4 Four (4) jacking vangs per splice joint shall be welded to opposite walls of the pole shaft in order to accommodate a hydraulic jacking device for field assembly. The jacking vangs shall:
- Be located with the other pole attachments in mind such that it is possible to lay each pole section down flat with no protrusions
  - Be located as to be clear of the section overlap
  - Not be less than 24 inches apart when the joint is fully telescoped.
- 3.3.5 The pole top deflection shall not be greater than 10% of the total pole height under full loading conditions with overloads.
- 3.3.6 Pole tops shall be capped with a steel plate. The steel plate shall be flush with the pole faces. There shall be no protrusions of the sealer plate beyond the circumference of the pole faces.
- 3.3.7 Poles shall include a butt plate of at least 1/4 inch thickness. The butt plate for self-weathering poles shall completely enclose the shaft base. The butt plate on galvanized poles shall be detailed to allow adequate drainage during galvanizing.

### **3.4 Embedment**

- 3.4.1 The poles will be embedded to a depth as set forth in Attachment 1.
- 3.4.2 The embedded portion of the pole shall not exceed 32" in diameter.
- 3.4.3 Three (3) ft. below grade and two (2) ft. above grade of the embedded structure shall be coated with an Engineer approved coating that protects the coated section from corrosion for the life of the pole. This shall be the coating practice for all galvanized and self-weathering pole shafts. Please refer to Attachment 1, Attachment 2, and/or Attachment 3.
- 3.4.4 The coating shall be Targuard or an equivalent, with a minimum thickness of 16 mils. Another coating capable of protecting the coated section from corrosion for the life of the pole shall be allowed if the Engineer approves its use.
- 3.4.5 The coating application shall be performed by a certified applicator.

### **3.5 Structure Attachments**

- 3.5.1 Pole shafts shall have provisions for four (4) bolted ground clamps consisting of 1/2" steel hex nuts welded over 5/8" holes. These holes shall be placed as set forth in Attachment 2 & 3.

- 3.5.2 Pre-drilling of 11/16 inch and/or 13/16 inch holes will be required. Each Austin Energy Purchase Release will indicate quantity and the type of Bolt Hole Pattern to be used, otherwise drawings provided by AE will indicate size and location of holes to be drilled prior to shipping of poles.
- 3.5.3 Each Austin Energy Purchase Release will indicate if provisions for use of removable pole steps will be required. Pole steps are a standard Austin Energy inventory item and are not to be furnished. Pole step attachments shall accommodate the Hubbell J600007 detachable step. The lowest step shall be located 24 inches above the ground line and the remaining step attachments shall be located on two (2) pole faces at 90 degrees to each other. Step attachments shall be vertically spaced 30 inches on centers on each face (15 inches between consecutive steps). In addition, working step attachments shall be located on four (4) faces of all poles at four (4) and at six (6) feet below each conductor and distribution attachment. Step pole attachment shall be in accordance with Attachment 6.
- 3.5.4 All parts bearing the same identification marking (§ 3.2.4) shall be interchangeable.
- 3.5.5 During galvanizing. Butt/Bearing plate on Galvanized Structures and Powder Coated over Galvanized Structures shall be at least 1/4-inch thick and be a Valmont Sure Ground Combination Bearing Plate & Grounding Electrode or an Austin Energy Engineer approved equivalent.
- 3.5.5.1 Butt/Bearing plate on Galvanized poles shall be detailed to allow adequate drainage
- 3.5.5.2 Butt/Bearing plate on Self-Weathering poles shall completely enclose the shaft base.
- 3.5.6 Pole tops shall be supplied with a removable pole cap. The pole cap circumference shall be flush with the circumference of the pole face(s). There shall be no protrusions of the pole cap beyond the circumference of the pole face(s).

## **4.0 GENERAL REQUIREMENTS AND INFORMATION**

### **4.1 Design Loading**

- 4.1.1 All structures shall be designed to withstand the ground line moments at the embedment depths set forth in Attachment 1, without the yielding or failure of any part of the structure.
- 4.1.2 The Supplier is responsible for all design and loading calculations for the requirements described herein and in Attachments 1, 2 or 3, 5, and 6. All design calculations and drawings shall be sealed by the Fabricator's registered Professional Engineer who is licensed in the state of Texas.

- 4.1.3 Preliminary drawings shall include structure configuration, dimensions, weights and stress diagrams, and computer printout of maximum loading and loading conditions.
- 4.1.4 The design details shall also include maximum ground line moments, horizontal shear and vertical loading, uplift or bearing.

#### **4.2 Design Data and Files**

- 4.2.1 The Fabricator shall submit all design data in the form of a PLS-POLE Steel Pole Properties (.spp) file or in a spreadsheet organized as specified by the Engineer.

#### **4.3 Inspections**

- 4.3.1 The Fabricator's inspection personnel performing nondestructive examination (other than visual) shall be qualified in accordance with ASNT Practice No. SNT-TC-1A.

#### **4.4 Deliverables**

- 4.4.1 The Fabricator shall submit the following deliverables with each purchase order:
  - A. Approval drawings
  - B. Test reports
    1. One copy of the certified mill test report for all steel, including anchor bolts and base plates,
    2. One copy of the ultrasonic test report for each base plate, evidence of the ability of the steel to meet the required impact properties.
    3. One copy of welding procedures, welding procedures, welding operator test results, welding inspection reports.
  - C. Final structure drawings (including fabrication drawings)



ATTACHMENT 1

DISTRIBUTION GROUND LINE MOMENT DESIGN DATA

POLE APPLICATION GUIDE

## ATTACHMENT 1

## Distribution Ground Line Moment Design Data

## Pole Application Guide

<b>Steel Pole Application Information</b>			
<b>Epoxy Protective Coating Located between (Ft)</b>	<b>Pole Length (Ft)</b>	<b>Setting Depth (Ft)</b>	<b>Pole Ground Line Moment Capacity (Ft-Kips)</b>
<b>LD-2 or EQUIVALENT</b>			
4.00-9.00	40	7.00	120.00
4.50-9.50	45	7.50	135.00
5.00-10.00	50	8.00	145.00
5.75-10.75	55	8.75	155.00
6.25-11.25	60	9.25	170.00
7.00-12.00	65	10.00	180.00
7.50-12.50	70	10.50	195.00
8.00-13.00	75	11.00	218.00
8.50-13.50	80	11.50	233.00
9.50-14.50	85	12.50	248.00
10.00-15.00	90	13.00	264.00
10.50-15.50	95	13.50	280.00
11.00-16.00	100	14.00	296.00
11.50-16.50	105	14.50	313.00
12.00-17.00	110	15.00	331.00
13.50-18.50	120	16.50	367.00

<b>LD-4 or EQUIVALENT</b>			
4.50-9.50	40	7.50	165.00
5.00-10.00	45	8.00	180.00
5.50-10.50	50	8.50	195.00
6.25-11.25	55	9.25	210.00
6.75-11.75	60	9.75	230.00
7.50-12.50	65	10.50	250.00
8.00-13.00	70	11.00	270.00
8.50-13.50	75	11.50	303.00
9.00-14.00	80	12.00	325.00
10.00-15.00	85	13.00	347.00
10.50-15.50	90	13.50	370.00
11.00-16.00	95	14.00	394.00
11.50-16.50	100	14.50	416.00
12.00-17.00	105	15.00	435.00
12.50-17.50	110	15.50	453.00
14.00-19.00	120	17.00	491.00

## ATTACHMENT 1(Continued)

## Distribution Ground Line Moment Design Data

## Pole Application Guide

<b>Steel Pole Application Information</b>			
<b>Epoxy Protective Coating Located between (Ft)</b>	<b>Pole Length (Ft)</b>	<b>Setting Depth (Ft)</b>	<b>Pole Ground Line Moment Capacity (Ft-Kips)</b>
<b>LD-6 or EQUIVALENT</b>			
5.00-10.00	40	8.00	205.00
5.50-10.50	45	8.50	230.00
6.00-11.00	50	9.00	255.00
6.75-11.75	55	9.75	275.00
7.25-12.25	60	10.25	300.00
8.00-13.00	65	11.00	330.00
8.50-13.50	70	11.50	355.00
9.00-14.00	75	12.00	409.00
9.50-14.50	80	12.50	440.00
10.50-15.50	85	13.50	472.00
11.00-16.00	90	14.00	506.00
11.50-16.50	95	14.50	540.00
12.00-17.00	100	15.00	576.00
12.50-17.50	105	15.50	613.00
13.00-18.00	110	16.00	651.00
14.50-19.50	120	17.50	709.00



<b>LD-8 or EQUIVALENT</b>			
5.50-10.50	40	8.50	255.00
6.00-11.00	45	9.00	285.00
6.50-11.50	50	9.50	315.00
7.25-12.25	55	10.25	345.00
7.75-12.75	60	10.75	380.00
8.50-13.50	65	11.50	415.00
9.00-14.00	70	12.00	455.00
9.50-14.50	75	12.50	528.00
10.00-15.00	80	13.00	571.00
11.00-16.00	85	14.00	615.00
11.50-16.50	90	14.50	661.00
12.00-17.00	95	15.00	708.00
12.50-17.50	100	15.50	757.00
13.00-18.00	105	16.00	808.00
13.50-18.50	110	16.50	860.00
15.00-20.00	120	18.00	970.00

## ATTACHMENT 1 (Continued)

## Distribution Ground Line Moment Design Data

## Pole Application Guide

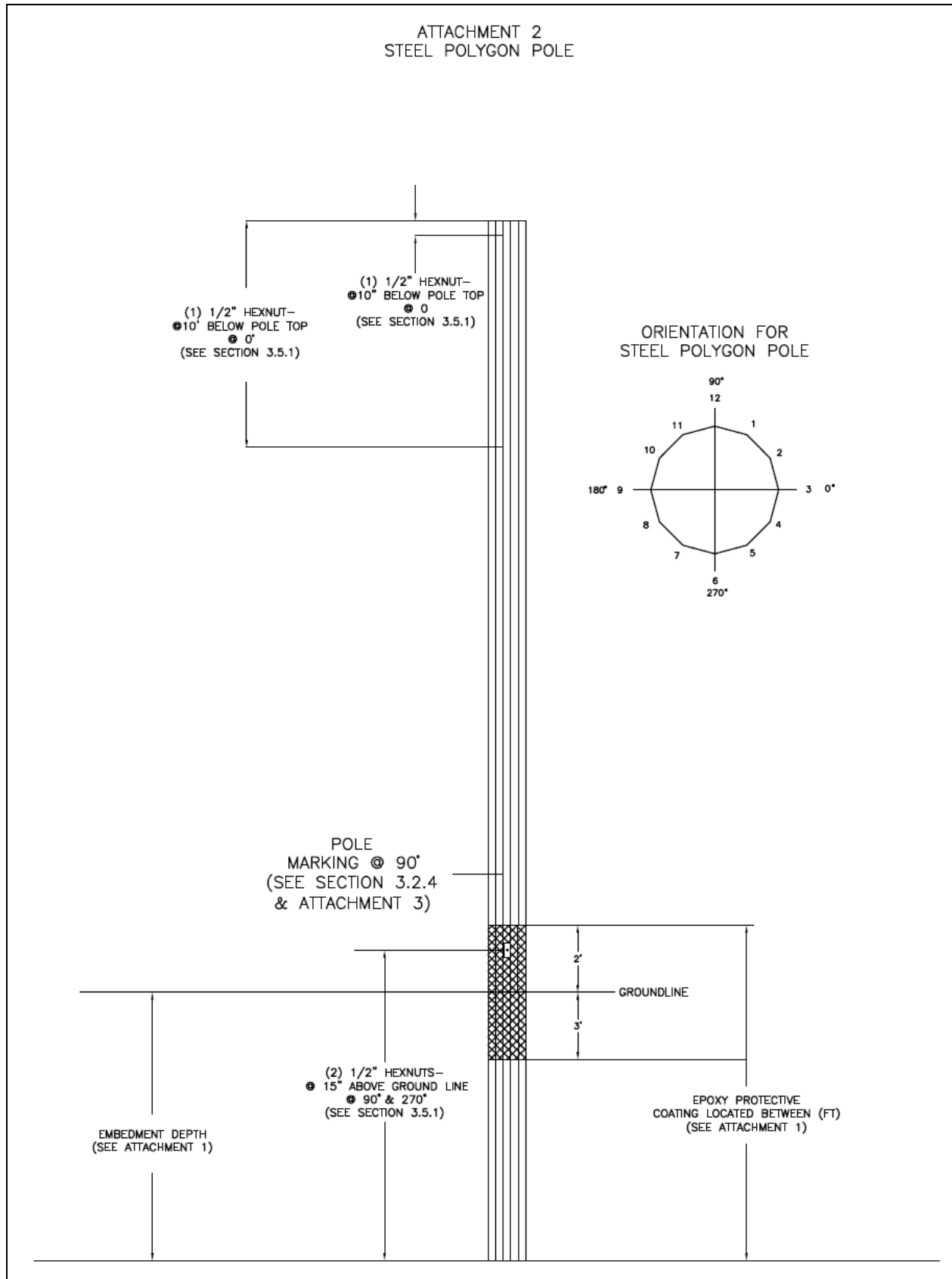
<b>Steel Pole Application Information</b>			
<b>Epoxy Protective Coating Located between (Ft)</b>	<b>Pole Length (Ft)</b>	<b>Setting Depth (Ft)</b>	<b>Pole Ground Line Moment Capacity (Ft-Kips)</b>
<b>LD-10 or EQUIVALENT</b>			
6.00-11.00	40	9.00	305.00
6.50-11.50	45	9.50	345.00
7.00-12.00	50	10.00	385.00
7.75-12.75	55	10.75	425.00
8.25-13.25	60	11.25	470.00
9.00-14.00	65	12.00	515.00
9.50-14.50	70	12.50	565.00
10.00-15.00	75	13.00	670.00
10.50-15.50	80	13.50	727.00
11.50-16.50	85	14.50	785.00
12.00-17.00	90	15.00	847.00
12.50-17.50	95	15.50	910.00
13.00-18.00	100	16.00	975.00
13.50-18.50	105	16.50	1025.00
14.00-19.00	110	17.00	1076.00
15.50-20.50	120	18.50	1176.00

<b>Steel Pole Application Information</b>			
<b>Epoxy Protective Coating Located between (Ft)</b>	<b>Pole Length (Ft)</b>	<b>Setting Depth (Ft)</b>	<b>Pole Ground Line Moment Capacity (Ft-Kips)</b>
<b>LD-MOD or EQUIVALENT</b>			
7.00-12.00	50	10.00	990
7.75-12.75	55	10.75	1125
8.25-13.25	60	11.25	1250
9.00-14.00	65	12.00	1365
9.50-14.50	70	12.50	1470

<b>Circular Pole Application Information</b>			
<b>Height of Epoxy Protective Coating (Ft)</b>	<b>Pole Length (Ft)</b>	<b>Setting Depth (Ft)</b>	<b>Pole Ground Line Moment Capacity (Ft-Kips)</b>
<b>CLASS 3 or EQUIVALENT</b>			
9.00	40	7.00	58.13
9.50	45	7.50	66.56
10.00	50	8.00	75.00
<b>CLASS 2 or EQUIVALENT</b>			
9.00	40	7.00	71.70
9.50	45	7.50	82.11
10.00	50	8.00	92.52
10.75	55	8.75	102.35
11.25	60	9.25	112.76
<b>CLASS 1 or EQUIVALENT</b>			
9.00	40	7.00	87.20
9.50	45	7.50	99.86
10.00	50	8.00	112.52
10.75	55	8.75	124.48
11.25	60	9.25	137.13
12.00	65	10.00	149.09
12.50	70	10.50	161.75
<b>CLASS 1 or EQUIVALENT</b>			
13.00	75	11.00	174.41
13.75	80	11.75	186.36
14.50	85	12.50	198.32
15.00	90	13.00	210.98
15.50	95	13.50	223.63

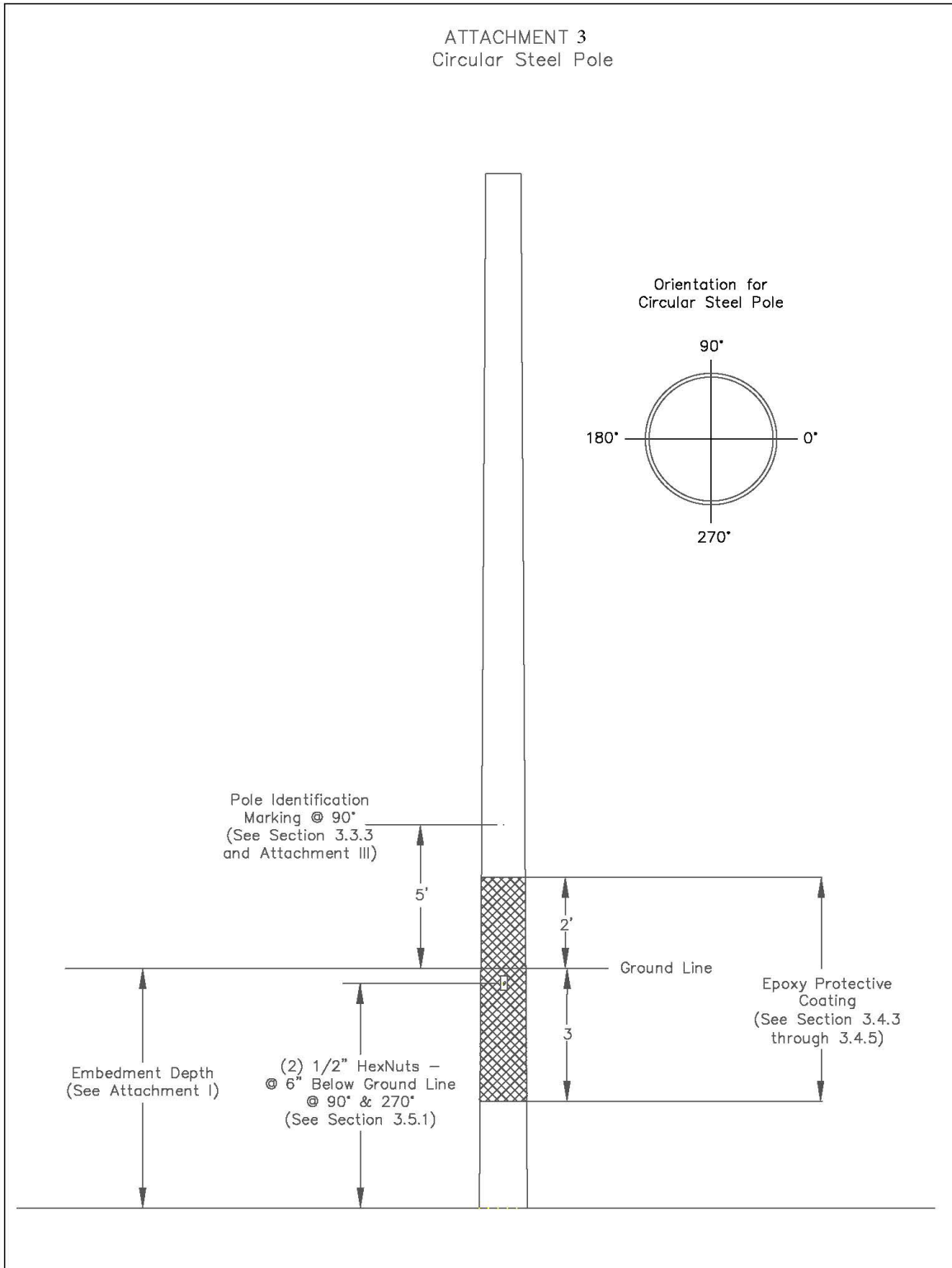
ATTACHMENT 2

STEEL POLYGON POLE



ATTACHMENT 3

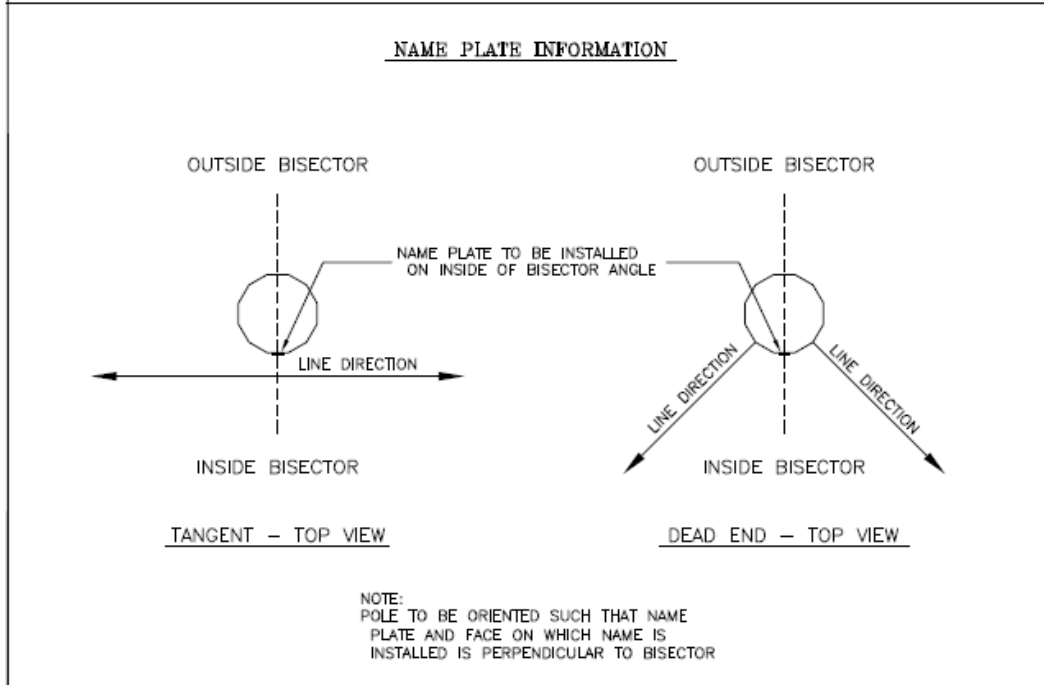
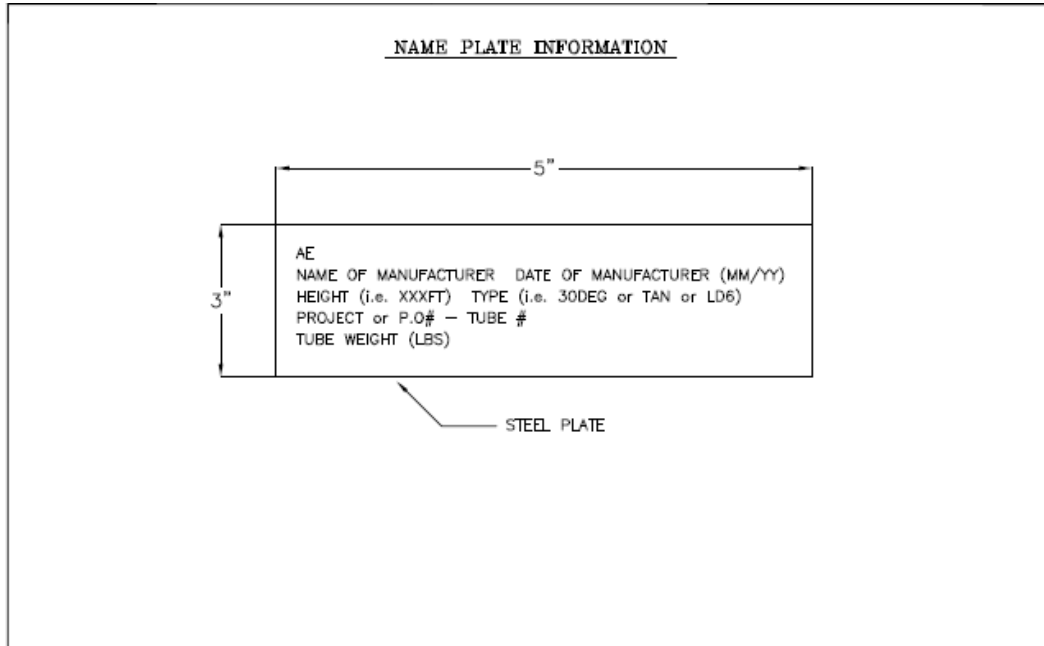
CIRCULAR STEEL POLE





ATTACHMENT 4

Identification Marking



NOTE:  
POLE TO BE ORIENTED SUCH THAT NAME  
PLATE AND FACE ON WHICH NAME IS  
INSTALLED IS PERPENDICULAR TO BISECTOR

	TITLE: NAME PLATE INFORMATION AND PLACEMENT				DRAWN: JJG	SCALE: NTS
					CHECKED:	FILENAME: 544-0.dwg
					DATE: 7/11/08	DRAWING NO.: 7D-544-0

ATTACHMENT 5

LOAD TREE AND LOADING DATA

ATTACHMENT 5

Loading Data and Load Tree

(Specification E-1114)

**1 PRIMARY CONDUCTOR**

- 1.1 Type - 795 kcmil All Aluminum (37 Strand) - Arbutus
- 1.2 Maximum tension - 4905 Lbs. at NESC Medium Loading District
- 1.3 Maximum tension - 1922 Lbs. at 60° F. Final Tension
- 1.4 Wind and Weight Span - 300 Ft
- 1.5 Conductor Bare Weight - 0.7464 Lbs/Ft
- 1.6 Conductor Diameter - 1.0260 In.

**2 NEUTRAL CONDUCTOR**

- 2.1 Type - 4/0 AWG All Aluminum (7 Strand) - Oxlip
- 2.2 Maximum tension - 1770 Lbs. at NESC Medium Loading District
- 2.3 Maximum tension - 512 Lbs. at 60° F. Final Tension
- 2.4 Wind and Weight Span - 300 Ft
- 2.5 Conductor Bare Weight - 0.1987 Lbs/Ft
- 2.6 Conductor Diameter - 0.5220 In.

**3 TELEPHONE CABLE**

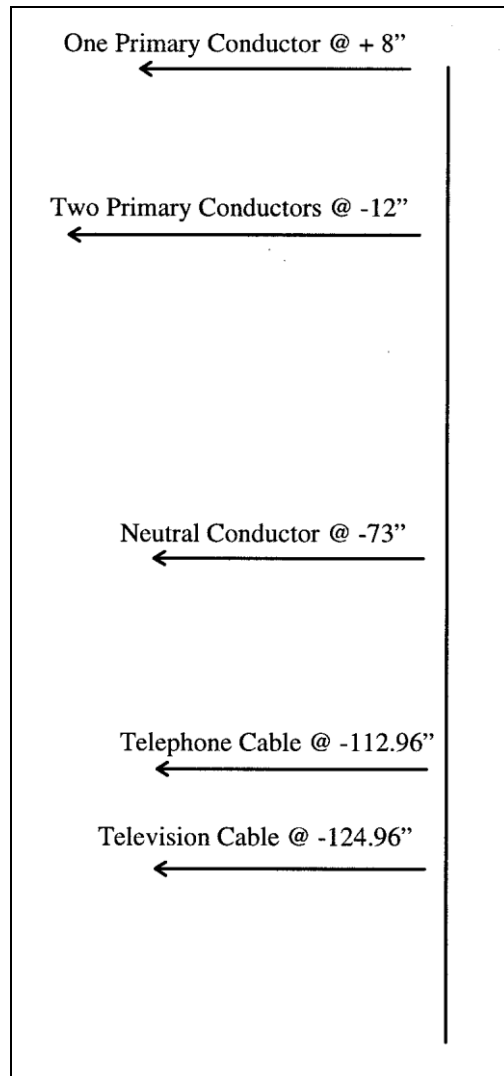
- 3.1 Type - 300 Pair
- 3.2 Maximum tension - 2600 Lbs. at NESC Medium Loading District
- 3.3 Maximum tension - 1000 Lbs. at 60° F. Final Tension
- 3.4 Wind and Weight Span - 300 Ft
- 3.5 Conductor Bare Weight - 1.3050 Lbs/Ft
- 3.6 Conductor Diameter - 2.2650 In.

**4 TELEVISION CABLE**

- 4.1 Type - 156 Count Fiber
- 4.2 Maximum tension - 1000 Lbs. at NESC Medium Loading District

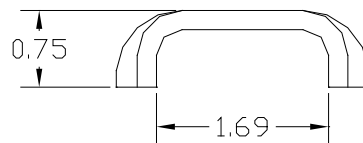
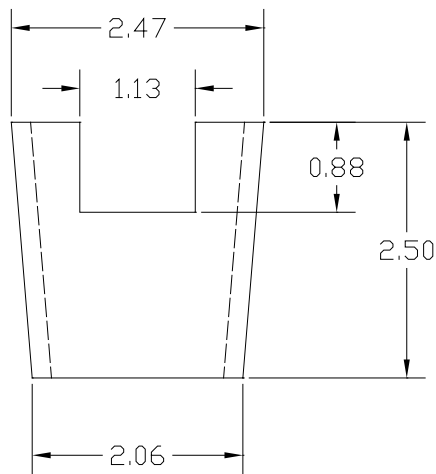
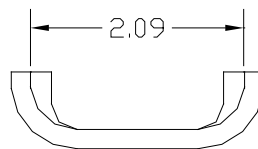
- 4.3 Maximum tension - 400 Lbs. at 60° F. Final Tension
- 4.4 Wind and Weight Span - 300 Ft
- 4.5 Conductor Bare Weight - 0.3020 Lbs/Ft
- 4.6 Conductor Diameter - 0.8400 In.

5 LOAD TREE



Attachment 6

Step Lug Detail



TITLE: POLE SUPPLY AGREEMENT  
STEP LUG DETAIL

DRAWN: brm  
CHECKED:  
DATE: 8/28/02

SCALE: NTS  
FILENAME: 544-14.dwg  
DRAWING NO.: 7D-544-14