CONSTRUCTION SPECIFICATIONS

GS&P Project Number 41089.01

OVERHEAD 13kV HENDRIX INSTALLATION

GUM HOLLOW ROAD AND NORTH ILLINOIS AVENUE

OAK RIDGE, TENNESSEE

DATE: FEBRUARY 2016

PREPARED FOR:

CITY OF OAK RIDGE ELECTRIC DEPARTMENT

PREPARED BY:

G S & P

GRESHAM, SMITH AND PARTNERS
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END OF SECTION

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The following is a list of Construction Drawings in which this contract is to be based. These drawings are entitled "Overhead 13kV Hendrix Installation, Gum Hollow Road and North Illinois Avenue, and dated November 30, 2015.

GUM HOLLOW ROAD

DRAWING NO.	DRAWING DESCRIPTION	REVISION
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END OF SECTION

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Sealed proposals for the construction of replacement 3-phase, 13kV Overhead Hendrix circuit along Gum Hollow Road and N. Illinois Avenue in Oak Ridge, Tennessee will be received by City of Oak Ridge at 100 Woodbury Lane, Oak Ridge, TN 37830 until 2:00 pm local time on March 17, 2016, and immediately thereafter will be opened and publicly read.

The Owner reserves the right to reject any or all bids and to waive any informalities or technicalities therein. Bids shall be Lump Sum, however, they will be based on Unit Prices.

The work to be done consists generally of: Re-conductor of approximately 3.6 miles of existing 13kV Hendrix along Gum Hollow Road, Graceland Road and Glassboro Drive and approximately 0.4 miles of existing 13kV Hendrix along N. Illinois Avenue. Work to include installation of new overhead conductor and removal of existing conductor, as well as any other related work, as shown on the drawings and/or described in the specifications.

Drawings and specifications may be obtained from Gresham, Smith and Partners, 2095 Lakeside Centre Way, Suite 120, Knoxville, TN 37922.

A Pre-Bid Meeting will be held on Tuesday, March 8, 2016 at 100 Woodbury Lane, Oak Ridge, TN 37831 at 1:00pm local time. This meeting is not mandatory, but attendance is highly encouraged by the Owner in order to address any questions that the Bidder may have concerning the project.

Each bid shall be accompanied by a Certified Check on a solvent bank or a Bidder's Bond issued by a Surety Company licensed to operate in the State of Tennessee, in the amount of five percent of the total bid price, as a guarantee that if the bid is accepted, the Bidder will enter into a contract and execute the Performance and Payment Bonds in the form and within the time specified. Bidder’s Bond shall be made payable to “City of Oak Ridge, Tennessee”.

The successful Bidder will be required to execute a Performance Bond and a Payment Bond, each in the amount of 100 percent of the Contract, issued by a Surety Company licensed to operate in the State and shall be named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department.

Each Bidder shall be a licensed Contractor as required by the regulations of the State of Tennessee General Assembly's Contractor's Licensing Act of 1994, and all amendments thereto in effect on bid receipt date. License number, expiration date, and license classification shall be shown on the outside of the envelope containing the bid of the General Contractor. The license number, expiration date, and license classification shall also be shown for the electrical subcontractor, plumbing subcontractor, and mechanical subcontractor, as applicable. Failure to show these items on outside of envelope will result in non-acceptance by the City. Such submissions shall remain unopened and will be returned to the submitting entity upon request.

No Bidder may withdraw his bid for a period of ninety (90) days after date of actual bid opening, without Owner's consent.

END OF SECTION

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1.1 DEFINED TERMS.

A. Terms used in these INSTRUCTIONS FROM THE UTILITY TO BIDDERS have the meanings assigned to them in the GENERAL CONDITIONS.

1.2 QUALIFICATIONS OF BIDDERS.

A. The prospective Bidder is referred to Section 00 4513, CONTRACTOR QUALIFICATION REQUIREMENTS for the qualifications required by the Utility for the utility Work of this Project and submission of qualifications to the Utility Owner.

B. The prospective Bidder is referred to Section 00 4143 for information regarding the completion of the Bid Form to be attached to the front of the Bid Documents.

1.3 EXAMINATION OF CONTRACT DOCUMENTS AND SITE.

A. The prospective Bidder is referred to Utility Section 00 7200 for information regarding examination of Contract Documents and the Project Site.

B. It is the responsibility of each Bidder before submitting a Bid, to (a) examine the Contract Documents thoroughly, (b) visit the site to become familiar with the local conditions that may affect cost, progress, performance or furnishing of the Work, (c) consider federal, state and local Laws and Regulations that may affect cost, progress, performance or furnishing of the Work, (d) study and carefully correlate Bidder's observations with the Contract Documents, and (e) notify Engineer of all conflicts, errors or discrepancies in the Contract Documents.

1.4 AVAILABILITY OF LANDS FOR WORK

A. The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Contractor. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by Owner unless otherwise provided in the Contract Documents

1.5 SALES AND USE TAXES.

A. The Owner is exempt from State Sales and Use Taxes on materials and equipment to be incorporated into the Work. Said taxes shall not be included in the Contract Price.

1.6 IDENTIFICATION OF UTILITY OWNER, ENGINEER, AND UTILITY PROJECT REPRESENTATIVE.

A. Refer to Section 01 3113 PROJECT COORDINATION for the identification of the Utility Owner, Engineer, and the Utility Project Representative.

1.7 OFFICERS AND EMPLOYEES NOT TO HAVE FINANCIAL INTEREST

A. No contract shall be made with any officer or employee of the Owner or any firm or corporation in which any officer or employee of the Owner has financial interest.

1.8 COMPLIANCE WITH ALL LAWS, ORDINANCES, STATUTES, AND REGULATIONS

A. The Contractor shall comply with all federal, state, county and local laws, ordinances, statutes, and regulations. Pursuant to City Code § 5-413, the Owner may not accept bids from Bidders in default of any payment of any nature due to the Owner, including but not limited to taxes, licenses and fees.

1.9 ANTI-DISCRIMINATION

A. The Contractor, in performing the Work covered by this project, shall not discriminate against any person because of race, creed, color, national origin, age, sex, sexual orientation, disability, religion or other legally protected status. The Owner encourages the utilization of minority and women-owned businesses in its contracting and subcontracting projects.

1.10 TOBACCO PRODUCTS

A. The Contractor and its employees/subcontractors shall comply with all building policies, regulations, schedules and rules as set out and required by the Owner. Please note smoking (including e-cigarettes) and the use of tobacco products (chewing) is prohibited in the Owner's facilities. For any work done at the Owner's facilities, any smoking occurring outside of the buildings must occur at least twenty (20) feet away from any entrance, open window or other opening into which smoke could infiltrate into the building. Spent smoking materials are to be properly discarded and not littered on the grounds.

1.11 SKILLED WORKERS / BACKGROUND CHECKS

A. The Contractor shall only furnish employees who are competent and skilled for work under this contract. If, in the opinion of the Owner, an employee of the Contractor is incompetent or disorderly, refuses to perform in accordance with the terms and conditions of the contract, threatens or uses abusive language while on the Owner's property, or is otherwise unsatisfactory, that employee shall be removed from all Work under this contract. The Contractor's employees working on this project may be subject to police background checks at the sole discretion of the Owner.

END OF SECTION

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1.1 GENERAL

A. This form is for the Bidder's convenience as noted in Section 00 2113 – INSTRUCTIONS TO BIDDERS.

This form is not required, however, **the information IS required on the front of the Bid Envelope**.

PROJECT: _____

OWNER: _____

ADDRESS: _____

_____

BIDDER IDENTIFICATION

BIDDER: _____

ADDRESS: _____

_____

BIDDER'S CONTRACTOR'S LICENSE INFORMATION

LICENSE NUMBER: _____

LICENSE CLASSIFICATION APPLICABLE TO PROJECT: _____

LICENSE EXPIRATION DATE: _____ DOLLAR LIMIT: _____

_____

SUBCONTRACTORS TO BE USED ON THIS PROJECT

Provide following for each listed subcontractor or so designate if Bidder is providing the Work Classification.
Indicate "NONE" if Work Classification is not applicable.

Type of Work	License No.	Expires	Classification

B. Cut and tape securely to front of Bid Envelope. **The Bid Envelope shall be separate from the postal/mailing/delivery service Deliver Envelope (when delivery envelope is required. See also INSTRUCTIONS TO BIDDERS)**.

END OF SECTION

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Project Identification: Gum Hollow Road and N. Illinois Avenue 13kV Hendrix Installation

This Bid shall be submitted as follows:

By Regular Mail:	**In Person or By Overnight Delivery:**
Attn: Lyn Majeski Finance Department City of Oak Ridge P.O. Box 1 Oak Ridge, TN 37831-0001	Attn: Lyn Majeski Finance Department City of Oak Ridge 100 Woodbury Lane Oak Ridge, TN 37830

This Bid is submitted from:

Contractor Name: _____

Address: _____

City, State, Zip: _____

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with Owner in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with other terms and conditions of the Contract Documents.

2. Bidder accepts all of the terms and conditions of the Advertisement or Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for ninety (90) days after the day of Bid opening. Bidder will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements within fifteen days after the date of Owner's Notice of Award.

3. In submitting this Bid, Bidder represents, as more fully set forth in the Agreement, that:

   (a) Bidder has examined copies of all the Bidding Documents and of the following Addenda (receipt of all which is hereby acknowledged, if no addenda received, insert "None"):

Number	Date
_____	_____
_____	_____
_____	_____

   (b) Bidder has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.

(c) Bidder has given Engineer written notice to all conflicts, errors or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by Engineer is acceptable to Bidder.

(d) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid: Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

4. **LUMP SUM BID** - The BIDDER will complete the Work in accordance with the Contract Documents and Specifications for the following lump sum price:

LUMP SUM FIXED PRICE ITEMS

DESCRIPTION	UNIT	UNIT PRICE (LABOR)	UNIT PRICE (MATERIAL)	TOTAL LABOR & MATERIAL
INSTALL 40/4 WOOD POLE	EACH		N/A	
INSTALL 45/3 WOOD POLE	EACH		N/A	
INSTALL 45/3 DUCTILE IRON POLE	EACH		N/A	
INSTALL 45/2 DUCTILE IRON POLE	EACH		N/A	
INSTALL AC1241-01 FRAMING ASSY.	EACH			
INSTALL AC1243-01 FRAMING ASSY.	EACH			
INSTALL AC1244-01 FRAMING ASSY.	EACH			
INSTALL AC1263-01 FRAMING ASSY.	EACH			
INSTALL AC1264-01 FRAMING ASSY.	EACH			
INSTALL AC1265-01 FRAMING ASSY.	EACH			
INSTALL RTL-15 SPACER BRACKET	EACH		N/A	
INSTALL A5-1 FRAMING ASSY.	EACH			
INSTALL C7-CL FRAMING ASSY.	EACH			
INSTALL G13-KVA ASSEMBLY	EACH		N/A	
INSTALL SL-1 STREET LIGHT	EACH		N/A	
INSTALL J1 ASSEMBLY	EACH			
INSTALL J3 ASSEMBLY	EACH			
INSTALL K7 ASSEMBLY	EACH			
INSTALL E1-2T ASSEMBLY	EACH			
INSTALL E2-2T ASSEMBLY	EACH			
INSTALL E3-10 ASSEMBLY	EACH			
INSTALL FP2 ASSEMBLY	EACH			

INSTALL M2-1R ASSEMBLY	EACH			
INSTALL UM2-5R ASSEMBLY	EACH			
INSTALL UM5-2 ASSEMBLY	EACH			
INSTALL M3-3CS ASSEMBLY	EACH			
INSTALL 336 AAC SPACER CABLE	L.F.		N/A	
INSTALL #1/0 ACSR MESSENGER	L.F.		N/A	
INSTALL #6 DUPLEX	L.F.			
REMOVE POLE	EACH		N/A	
REMOVE EXISTING CONDUCTOR	L.F.		N/A	
REMOVE EXISTING ASSEMBLIES	L.S.		N/A	
REMOVE SL-1 STREET LIGHT	EACH		N/A	
NON-MAINLINE TRIMMING	L.F.		N/A	
ROCK REMOVAL	L.S.		N/A	

BID SUMMARY

LUMP SUM BASE BID: ($ _____)
ALLOWANCES FOR AUTHORIZED CONTRACT AMENDMENTS: ($ 40,000.00)
OWNER FURNISHED MATERIALS: ($ 175,000.00)

TOTAL BID PRICE: **($_____)**
(To be used for Bonding)

TOTAL AMOUNT DUE CONTRACTOR: **($_____)**
(Total Bid Price minus Owner Supplied Materials and Contract Amendments)

The allowance for Authorized Contract Amendments will only be utilized for authorized Change Orders. The Contractor will not automatically receive these monies.

5. Bidder agrees that Work will be completed and ready for final payment within _____ calendar days after receipt of Notice to Proceed.

   Bidder accepts the provisions of the Agreement as to liquidated damages of $250.00/day for failure to complete the Work on time.

6. The following documents are attached to and made a condition of this Bid:

   (a) Required Bid Security in the form of 5% Bid Bond or Bank Check in the amount of 5% of the Bid.

   (b) Bidder's Qualifications, Document 00 4513.

   (c) Drug-Free Workplace Affidavit, Document 00 4520.

(d) Equal Employment Opportunity Affidavit, Document 00 4536.

(e) Copies of Contractor's and Subcontractor's License Certificates

7. Communications concerning this Bid shall be addressed to:

The address of Bidder indicated below.

The following address:

Principal Contact: _____

Alternate Contact: _____

Email: _____

Phone: _____ Fax: _____

Mail Address: _____

_____

Street Address: _____

_____

8. The terms used in this Bid which are defined in the GENERAL CONDITIONS or Instructions will have the meanings assigned to them in the GENERAL CONDITIONS or Instructions.

Submitted on _____, 20____.

State Contractor License No. _____

If Bidder is:

A Partnership:

_____ (SEAL)
(Individual's Signature)

_____
(Individual's Name - Print/Type)

doing business as: _____

Business address: _____

_____

Phone No.: _____

A Corporation:

_____
(Corporation Name)

By: _____ Title: _____
(Signature of person authorized to sign)

_____
(Print/Type name of person authorized to sign)

(Corporate Seal)

Attest: _____
(Secretary)

_____
(State of incorporation)

Business address: _____

_____

Phone No.: _____

END OF SECTION

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1.1 GENERAL

A. The purpose of this document is to list the qualification requirements for the Electrical Utility Contractor (or Subcontractor) proposed for the Overhead and/or Underground Utility work required for the completion of the Project as established in the Drawings and Specifications.

This document also lists Electrical Utility Contractors that have been Pre-Qualified by the Utility Owner for work required by this Project. **Work on this Project is NOT in any way restricted to the listed Pre-Qualified Electrical Utility Contractors**. Contractors that have not been Pre-Qualified shall submit the required qualifications and information in Section 00 4515 – BIDDERS QUALIFICATION STATEMENT for the Utility Owner's inspection.

1.2 REQUIREMENTS

A. Tennessee State Contractor's License Classification(s): CE and MU-A4

B. Five years of experience in the construction of electrical utility projects of the type depicted in the Project Drawing and Specifications.

C. Minimum of $20 Million total value of electrical utility projects completed in the previous calendar year.

D. Seventy (70%) percent of contractors' overall project value shall be in the electric utility field.

E. Minimum Bonding capacity of $5 Million.

F. Minimum Liability Insurance Aggregate of $3,000,000.

G. Shall demonstrate availability of suitable equipment, qualified supervisory and field crews for the type of work required by the Project, and workload to meet the Project Schedule.

1.3 REQUIREMENTS FOR NON-PREQUALIFIED CONTRACTORS

Electrical Utility Contractors that are **NOT** listed as "Pre-Qualified", shall **submit the following information to the Utility Owner ten (10) days prior to the Bid Date.** The Utility Owner will notify the Contractor as to acceptance or rejection of their company to submit a bid for the project.

A. Completed Section 00 4515 – BIDDERS QUALIFICATION STATEMENT

B. References for three (3) contracts (different Utility Owners) within the past two (2) years for similar Overhead and/or Underground Electric Line work performed by the proposed Contractor. References shall include the names and telephone numbers of the Utility Owner's personnel with whom the Contractor had primary contact.

C. Detailed information of supervisory/field personnel including experience, qualifications, and training for performing Overhead and/or Underground Electric Line work.

D. Detailed information on any contractual penalties, OHSA violations, legal proceedings, lawsuits or claims levied against the proposed Contractor within the past two (2) years, contending breach of or noncompliance with contract requirements or specifications.

1.4 PREQUALIFIED CONTRACTORS

The following Contractors have been Pre-Qualified by the Utility Owner for the Work required by this Project:

ELECTRIC UTILITY CONTRACTORS

Davis H. Elliot Co. Inc.
Attn: Bill Harrison
4211 Georgia Avenue
Nashville, TN 37209
Phone: 615-460-7166
Fax: 615-460-7685

Service Electric Company
Attn: Chris Froehlich
1631 East 25th Street
Chattanooga, TN 37404
Phone: 423-847-4789
Fax: 423-490-7524

Pike Electric
Attn: Ronnie Gilbert
100 Pike Way
Mount Airy, NC 27030
Phone: 336-623-7750
Fax: 336-719-4582

END OF SECTION

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This Document is to be submitted separately from the Bidding Documents. See Document 00 2113, INSTRUCTIONS TO BIDDERS.

Submitted by:

Name of Organization: _____

Name of Individual: _____

Title: _____

Address: _____

_____

Telephone: _____

Email Address: _____

BUSINESS ORGANIZATION INFORMATION:

Check one: ☐ Corporation ☐ Partnership

If Corporation:

a. Date and State of Incorporation: _____

b. List of Executive Officers:

Name	Title
_____	_____
_____	_____
_____	_____

If Partnership:

a. Date and State of Organization: _____

b. Name of Current General Partners:

_____

_____

c. Type of Partnership:

☐ General ☐ Publicly Traded ☐ Limited ☐ Other (describe):

GENERAL BUSINESS INFORMATION:

1. Name of Surety Company and name, address, email, and phone number of agent.

_____

_____

_____

2. What is your approximate total bonding capacity?
   ☐ $500,000 to $2,000,000 ☐ $2,000,000 to $5,000,000
   ☐ $5,000,000 to $10,000,000 ☐ $10,000,000 or more

3. Is your organization a member of a controlled group of corporations as defined in I.R.C. Sec 1563? ☐ Yes ☐ No
   If yes, show names and addresses of affiliated companies:

_____

_____

4. Describe the permanent safety program you maintain within your organization. Use attachment if necessary.

_____

_____

5. Furnish the following information with respect to an accredited banking institution familiar with your organization.

   Name of Bank: _____

   Address: _____

   _____

   Account Manager: _____

   Telephone: _____

GENERAL PROJECT INFORMATION:

1. Value of Electric Utility Work completed during the last calendar year: $_____
2. Value of all Work completed for the last calendar year: $_____
3. Attach a Schedule A listing major Electric Utility projects, similar to the proposed Project, completed by this organization in the past three (3) years, with contact names and phone numbers. List dollar value of Electric Utility work.

4. Attach a Schedule B listing current Electric Utility projects under construction by this organization, with contact names and phone numbers. (If joint venture, list each participant's projects separately).

5. Has your organization ever failed to complete any construction contract awarded to it?
   ☐ Yes ☐ No
   If yes, describe circumstances on attachment.

6. Over the last five years, has your organization ever failed to substantially complete a project in a timely manner?
   ☐ Yes ☐ No

7. Has any corporate officer, partner, joint venture participant or proprietor ever failed to complete a project in a timely manner while an employee/officer of another firm?
   ☐ Yes ☐ No
   If yes, describe circumstances on attachment.

8. Contractor's License Number for the state(s) in which this organization is licensed to do business:

   _____

   _____

I hereby certify that the information submitted herewith, including any attachment is true to the best of my knowledge and belief.

By: _____

Title: _____

Dated: _____

END OF SECTION

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DRUG-FREE WORKPLACE AFFIDAVIT

(must be attached to bid form upon submission)

STATE OF TENNESSEE
COUNTY OF _____

DRUG-FREE WORKPLACE AFFIDAVIT
OF PRIME BIDDER

NOW COMES AFFIANT, who being duly sworn, deposes and says:

1. He/She is the principal officer for _____;
   (insert name and address of bidding entity)

2. That the bidding entity has submitted a bid to _____;
   (insert name of city, dept, project No.)

   for the construction of _____;
   (insert name of project)

3. That the bidding entity employs no less than five (5) employees;

4. That Affiant certifies that the bidding entity has in effect, at the time of submission of its bid to perform the construction referred to above, a drug-free workplace program that complies with §50-9-113, *Tennessee Code Annotated*;

5. That this affidavit is made on personal knowledge.

Further Affiant saith not.

_____
AFFIANT

SUBSCRIBED AND SWORN TO before me this ___day of _____, 20____.

_____
NOTARY PUBLIC

My commission expires:_____

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EQUAL EMPLOYMENT OPPORTUNITY AFFIDAVIT

(must be attached to bid form upon submission)

STATE OF TENNESSEE DATE: _____
COUNTY OF _____

CONTRACTOR: _____

PROJECT: _____

During the performance of this Contract, the Bidder agrees as follows:

1. The Bidder will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Bidder will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: employment; upgrading; demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Bidder agrees to post, in conspicuous places available to employees and applicants for employment, notices to be provided setting forth the provision of this Equal Opportunity Clause.

2. The Bidder will, in all solicitations or advertisements for employees placed by or on behalf of the Bidder, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

3. The Bidder will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representative of the Bidder's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

4. The Bidder will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

5. The Bidder will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

6. In the event of the Bidder's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Bidder may be declared ineligible for further contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in the said Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies

invoked as provided in the said Executive Order or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

7. The Bidder will include this Equal Opportunity Clause in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Bidder will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance; provided, however, that in the event a Bidder becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the Bidder may request the United States to enter into such litigation to protect the interests of the United States.

_____

(Contractor Company Name)

By: _____ Title: _____

(Signature of person authorized to sign)

_____

(Print/Type name of person authorized to sign)

END OF SECTION

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City Contract Number FY2016-219

THIS AGREEMENT, made and entered into this _____ day of _____ in the year Two Thousand and Sixteen (2016), by and between the City of Oak Ridge, Tennessee hereinafter called the Owner, whose office is located at 200 S. Tulane Avenue, P.O. Box 1, Oak Ridge, Tennessee 37831-0001 and _____ whose office is located at _____ _____ hereinafter called the Contractor, and sometimes referred to as though it were an individual,

WITNESSETH that the parties to these presents, each in consideration of the undertakings, promises and agreements on the part of the other herein contained, have undertaken, promised and agreed, and do hereby undertake, promise and agree, the Owner for itself, its successors and assigns, and the Contractor for himself, his successors and assigns, as follows:

1.0 The Contractor agrees, at his own sole cost and expense, to perform all the work, including providing management, information and reports, labor, materials, construction facilities, tools and equipment, and services, except the specific materials and services to be provided by the Owner or by others, necessary to complete and to complete in a good, substantial, workmanlike and approved manner within the time hereinafter specified and in accordance with terms, conditions and provisions of this Contract, and of the instructions, orders and directions of the Owner made in accordance with this Contract, the construction of Gum Hollow Road and North Illinois Avenue 13kV Hendrix Circuits and performance of related work for the Gum Hollow Road and Illinois Avenue 13kV Hendrix Project for the City of Oak Ridge, Oak Ridge, Tennessee.

The above work is more completely described in the Signed Bid Form (Section 00 4143), General Conditions (Section 00 7200), all of the Technical Specifications, and the Drawings which are part hereof.

2.0 The Owner agrees to furnish to the Contractor only the materials listed in Section 01 1113E, Part 1.7.

3.0 The Contractor agrees to begin work within 30 calendar days from the date of the "Notice to Proceed" and to ensure the completion of the work within ___ calendar days of receipt of Notice to Proceed. Since time is of the essence of this Contract and compliance with this schedule is necessary for the complete success of the work, the Contractor agrees to take all precautions in preparation and management which may be necessary to ensure completion in time, as required by this Contract. The Contractor agrees to pay liquidated damages of $250 per day for each day after the completion date ensured above for which construction activities remain outstanding, which amount the Owner shall deduct from monies owed to the Contractor.

The Contractor agrees that he will complete the work in accordance with the schedule provided with the proposal.

4.0 The Owner agrees to pay and the Contractor agrees to accept as full compensation, satisfaction, and discharge for all work performed and all materials installed, and for all costs and expenses incurred, damages sustained and for each and every matter, thing or act performed, furnished or suffered in accordance with the terms, conditions and provisions thereof, and of the instructions, orders and directions of the Owner thereunder, except changes or additions covered by Change Orders, which shall be paid for as provided in the General Conditions, a lump sum equal to:

Total Contract Dollars: _____ dollars ($_____)
Authorized Contract Amendments: _____ dollars ($_$40,000.00___)
Owner Furnished Materials: _____ dollars ($ _$175,000.00__)
Amount to Contractor: _____ dollars ($_____)

5.0 All the provisions contained in this Agreement, Insurance Requirements, General Conditions, Supplemental General Conditions, Special Conditions, Scope of Work, Technical Specifications, Drawings, and those items included by reference shall be deemed terms and conditions of the Contract as if fully embodied herein.

These Contract documents are complementary, and what is called for by any of them shall be as binding as if called for by all.

6.0 Without limiting any of the other obligations or liabilities of the Contractor, the Contractor shall adhere to the instructions and provide and maintain performance bonding and also insurance in accordance with the provisions set forth in the Insurance Requirements until the work is completed and accepted by the Owner.

The Contractor shall, before commencing work on this Contract, deliver to the Owner three copies of Certificates of Insurance and bonding, completed by his insurance carrier or agent certifying that minimum insurance coverage as required are in effect. Certificates shall indicate Contractor's name, Project Name and the Contract Number. Duplicate copies of insurance policies shall be furnished to the Owner within ten (10) days after the execution of the Contract when so requested by the Owner. The same procedure shall be followed for subcontractors.

7.0 The Contractor intends to subcontract specific portions of the work to the following subcontractors:

Description	Subcontractors' Names and Addresses
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

8.0 This Contract, and attachments thereto, represents the entire and integrated agreement between the parties hereto and supersedes all prior and contemporaneous negotiations, representations and agreements, whether written or oral, with respect to the subject hereof. This Contract may be amended only by written instrument signed by both Owner and Contractor.

9.0 To the fullest extent permitted by all applicable laws and regulations, the Contractor hereby agrees to protect, indemnify and hold harmless the Owner and their consultants, agents and employees from and against any and all claims, loss, expense, damage, charges and costs direct, indirect or consequential (including but not limited to fees and charges of engineers, architects, attorneys and other professional and court costs), collectively referred to as "claims," for injury to or death of persons and injury to or destruction of property suffered or alleged to have been suffered as a result of any act or omission on the part of the Contractor, any of the Contractor's subcontractors, anyone for whose acts any of them may be liable, or others whose services are engaged by the Contractor or anyone directly or indirectly employed or controlled by either of them in the course of the performance of the Work provided for in the Contract Documents, except such injury, destruction or death as may be caused by the sole negligence or fault of the Owner.

When the Owner submits notice, the Contractor shall promptly defend any aforementioned action. In any and all claims against the Owner or any of their consultants, agents or employees by any employee of the Contractor, any of the Contractor's subcontractors, anyone for whose acts any of them may be liable, or others whose services are engaged by the Contractor or anyone directly or indirectly employed or controlled by either of them in the course of the performance of the work provided for in the Contract, the indemnification obligation described herein shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts. The limits of insurance required in this Contract shall not limit the Contractor's obligations under this article.

The terms of this provision shall survive the termination or suspension of the Contract Documents.

10.0 The Contractor shall comply with all federal, state, county and local laws, ordinances, statutes, and regulations.

11.0 The Contractor shall obtain, at the Contractor's expense, all permits, licenses and bonds required by law or ordinance and maintain the same in full force and effect.

12.0 The Contractor shall at all times during the Contract Documents maintain in full force and effect Comprehensive General Liability, Workers' Compensation and Property Damage Insurance in the amounts set forth below and naming the Owner of Oak Ridge, Tennessee as an *additional insured*.

The Contractor shall maintain policies providing the following insurance protection, each policy containing a requirement that, in the event of change or cancellation, thirty (30) days' prior written notice be sent by mail to the Owner. Certificates of Insurance describing the coverage shall be furnished by the Contractor and shall contain the following express obligation:

"This is to certify that the policies of insurance described herein have been issued to the insured for whom this certificate is issued and are in force at this time. In the event of cancellation or material change in a policy affecting the certificate holder, thirty (30) days' prior written notice will be given the certificate holder."

1. Comprehensive General Liability:

Bodily Injury	$300,000	each occurrence
	$700,000	aggregate
Property Damage	$100,000	each occurrence
Or Combined Single Limit of	$1,000,000	

2. Workers' Compensation and Employer's Liability as provided for in applicable statutes.

3. Comprehensive Automobile Liability (Including all owned, non-owned and hired vehicles)

Bodily Injury	$300,000	each person
	$700,000	each occurrence
Property Damage	$100,000	each occurrence
Or Combined Single Limit of	$1,000,000	

The Contractor may purchase at its own expense such additional or other insurance protection as it may deem necessary. Maintenance of the required minimum insurance protection does not relieve the Contractor of responsibility for any losses not covered by the above-required policies.

Before commencement of work hereunder, the Contractor agrees to furnish to the City of Oak Ridge (Legal Department, P.O. Box 1, Oak Ridge, Tennessee 37831-0001) a Certificate of Insurance or other evidence satisfactory to the Owner to the effect that such insurance has been procured and is in force.

13.0 The Contractor shall not award, assign, transfer or pledge any work to any subcontractor without prior written approval of the Owner, which approval will not be given until the Contractor submits to the Owner a written statement concerning the proposed award to the subcontractor, which statement shall contain such information as the Owner may require.

The Contractor shall be as fully responsible to the Owner for the acts and omissions of subcontractors, and of persons either directly or indirectly employed by said subcontractors, as the Contractor is for the acts and omissions of persons directly employed by the Contractor.

The Contractor shall make a condition of all subcontracts and/or cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of the Contract Documents insofar as applicable to the work of subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the Contract Documents.

Nothing contained herein hall create any contractual relation between any subcontractor and the Owner.

14.0 The Owner may terminate the Contract Documents or any task hereunder in whole or in part:

1. Whenever the Contractor shall default in performance of the Contract Documents and fails to cure the default within such time period (if any) required by the Owner after receiving a notice specifying the default; or

2. Whenever, for any reason, the Owner determines that such termination is in the best interests of the Owner.

Termination shall be effected by delivery to the Contractor of a notice of termination specifying the date upon which termination is effective. Upon termination for default, the Contractor shall be liable to the Owner for any and all rights and remedies provided at law or equity. Upon termination, all finished or unfinished documents, data, studies, surveys, drawings, maps, models, photographs, and reports prepared by the Contractor under the Contract Documents (if any) shall become the Owner's property and the Contractor shall be entitled to receive just and equitable compensation for any work satisfactorily completed hereunder.

Notwithstanding the above, the Contractor shall not be relieved of liability to the Owner for damages sustained by the Owner by virtue of any breach of the Contract by the Contractor, and the Owner may withhold any payments to the Contractor for the purpose of set-off until such time as the exact amount of damages due the Owner from the Contractor is determined.

The Owner will have no liability to the Contractor for any cause whatsoever arising out of, or in connection with, termination including but not limited to lost profits and lost opportunities.

15.0 The Contractor, in performing the Work, shall not discriminate against any person because of race, creed, color, national origin, age, sex, sexual orientation, disability, religion or other legally protected status. The Owner encourages the utilization of minority and women-owned businesses in its contracting and subcontracting projects and the Contractor is encouraged to actively solicit the participation of these businesses. The Contractor shall inform all of its subcontractors and vendors providing work or services under this Contract of this requirement and shall ensure compliance therewith.

16.0 The Contractor represents that it has, or will, secure at the Contractor's expense, all personnel required to perform the Work and services outlined in the Contract Documents. Such personnel shall not be employees of or have any contractual relationship with the Owner.

All of the services required hereunder will be performed by the Contractor or under the Contractor's supervision, and all personnel engaged in the work shall be fully qualified and shall be authorized or permitted under state and local laws to perform such services.

17.0 The Contract Documents are governed by the laws of the State of Tennessee.

IN WITNESS WHEREOF, the parties hereto have duly executed this Agreement the day and year first above written.

City of Oak Ridge:

By: _____

Name: Warren L. Gooch

Title: Mayor

Approved as to form and legality:

Kenneth R. Kurshenski
(City Attorney)

Contractor:

By: _____
(Contractor)

Name: _____

Title: _____

Approved by Resolution: _____

END OF SECTION

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Contractor to provide Performance Bond and Payment Bond, executed on standard forms. City of Oak Ridge, Tennessee (Owner) has approval over all Bond Forms. Insert immediately following this page.

END OF SECTION

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CERTIFICATE OF INSURANCE

Contractor to provide Certificate of Insurance, executed on standard forms. Insert immediately following this page.

END OF SECTION

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1.1 GENERAL

Substitutes and "Or As Approved"

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment of other Suppliers may be submitted to Owner for review under the circumstances described below. The Owner will must approve all requested substitutes prior to the Contractor ordering any materials.

1. *"Or As Approved" Items:* If in Owner's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by the Owner as an "or as approved" item, in which case review and approval of the proposed item may, in Owner's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

   a. in the exercise of reasonable judgment Engineer determines that:

      1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

      2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and

      3) it has a proven record of performance and availability of responsive service.

   b. Contractor certifies that, if approved and incorporated into the Work:

      1) there will be no increase in cost to the Owner or increase in Contract Times; and

      2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

1.2 DEFINITIONS

Wherever used in these GENERAL CONDITIONS or in the other Contract Documents related to the installation, relocation, removal, or in any other context of Utility Owned facilities, the following terms have the meanings indicated which are applicable to both the singular and the plural thereof.

"Contract" – the written agreement between the Department and the Contractor covering the Department Work and the Utility Work to be performed; other Contract Documents are attached to the Contract and made a part thereof as provided therein.

"Contractor" and/or “State Contractor” – the person, firm or corporation with whom the Department has entered into the Contract.

"Defective" – an adjective which when modifying the word Utility Work refers to Utility Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to the Utility Project Representative’s recommendation of final payment.

”Department” and “TDOT” - The Department of Transportation of the State of Tennessee.

“Inspector” – The Owner’s authorized representative of the Utility Owner assigned to make detailed inspections of materials and Contract performance.

"Laws and Regulations; Laws or Regulations" – laws, rules, regulations, ordinances, codes and/or orders of any governmental authority.

"Project" – the total construction of which the Utility Work to be provided under the Contract Documents may be the whole or a part, as indicated elsewhere in the Contract Documents.

"Shop Drawings" – all drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for the Contractor to illustrate some portion of the Utility Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a Supplier and submitted by the Contractor to illustrate material or equipment for some portion of the Utility Work.

"Underground Facilities" – all pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities, which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

“Utility”, “Utility Owner”, or “Owner” – specifically for the Utility Work of utility relocation, this shall mean the public agency, cooperative, corporation, company or individual named in the Department’s Use and Occupancy Agreement, that operates and maintains the utility facilities.

“Utility Contractor” – a subcontractor engaged by the State Contractor to provide the construction of the utility facilities that are included in the Contract Documents.

"Utility Drawings" – the drawings which show the character and scope of the Utility Work to be performed and which have been prepared or approved by the Utility Engineer and are referred to in the Contract Documents.

“Engineer” – The person, firm, or corporation identified by and appointed by the Utility responsible for all design related matters associated with the Utility Work of utility construction.

"Utility Project Representative" – the authorized representative of the Utility who is assigned to the Project or any part thereof, specifically for the Utility Work of the Project.

"Utility Work" – the entire completed utility construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Utility Work is the result of performing services, furnishing labor and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

1.3 WARRANTY

The Contractor warrants and guarantees to the Owner and the Engineer that all Work will be in accordance with the Contract Documents and will not be defective. Notice of all defects shall be given to the Contractor promptly upon discovery thereof. All defective Work, whether or not in place, may be rejected, corrected or accepted per direction of the Owner.

If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee or warranty required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, the Contractor shall promptly, without cost to the Owner and in accordance with the Owner's instructions, either correct such defective Work, or, if it has been rejected by the Owner, remove it from the site and replace it with non-defective Work. If the Contractor does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, the Owner may have the defective Work corrected or the rejected Work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of engineers, attorneys and other professionals) will be paid by the Contractor. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment

END OF SECTION

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1.1 INTERPRETATIONS - ADDENDA

A. Interpretations and Addenda for questions concerning the meaning or intent of the Contract Documents and response of these will be made through the issuing of Addenda.

B. All Addenda are incorporated, by reference, into the Contract. Failure of any Bidder or sub-bidder to receive any addenda shall not relieve the Bidder of any obligation with respect to his Bid.

C. All Addenda and modifications to the Contract Documents shall be inserted and indexed numerically in this location behind this page and coordinated as instructed in each Addendum.

END OF SECTION

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1.1 SUMMARY

A. The "Project," of which the "Work" of this Contract is a part, is titled “Overhead 13kV Hendrix Installation, Gum Hollow Road and North Illinois Avenue, Oak Ridge, Tennessee”.

B. The "Work" of this Contract is defined in the Contract Documents to include furnishing and paying for all necessary labor, tools, equipment, and other items, and constructing complete in every detail and ready for Owner’s beneficial use, as specified herein, and/or indicated on the Contract Drawings listed elsewhere in these specifications. This project shall consist generally of but not be limited to the following items:

Overhead Electrical Distribution System

1. Poles
2. Overhead Assemblies
3. Stringing/Sagging Conductors
4. Switches
5. Distribution Systems
6. Easement Clearing
7. Transformers and Service Equipment
8. Street and Area Lighting
9. Line Protection Equipment
10. Temporary Construction Facilities

C. Contractor shall correct all deficiencies in “Work” by the Contractor as may be indicated by testing and as directed by the Engineer.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and other Sections in DIVISION 1 of these Specifications.

B. Section 01 2200 – MEASUREMENT AND PAYMENT

C. Section 01 5000 – TEMPORARY FACILITIES AND CONTROLS

D. Section 33 7100 – OVERHEAD ELECTRICAL LINE CONSTRUCTION

E. Section 33 7116 – ELECTRICAL UTILITY POLES

F. Section 33 7123 – OVERHEAD ELECTRICAL LINE MATERIALS

1.3 WORK CONDITIONS

A. All of the work will be done with existing facilities <u>energized</u>.

B. The Contractor shall take all necessary precautions and use the appropriate safety work methods for working on energized facilities as may be specified by Federal, State, Local, or other appropriate regulatory authority.

1.4 TEMPORARY CONSTRUCTION FACILITIES

A. See Section 01 5000 – TEMPORARY FACILITIES AND CONTROLS for requirements for temporary construction facilities.

1.5 SERVICE OUTAGES

A. All Contractor requested outages shall be coordinated with the Customer. A representative of the Contractor shall be on-site during outages. Exact details of the outages, including date, time, duration and facilities involved, shall be presented to the Owner at least three Owner working days prior to proposed outage.

B. Contractor Outage Request:
Contractor shall provide written information to the Owner according to the following format:

Outage No. [Specify]	Outage of [Specify] Circuit.
Time:	[Date], [Day] between the hours of [Time].
Duration:	Approximately [Specify] hours.
Purpose:	

1.6 PROJECT SCHEDULING AND CONSTRUCTION MILESTONES

A. The following Project Schedule Milestones shall be incorporated into the Project Construction:

DATE	MILESTONE
1. June 20, 2016	Substantial Completion
2. July 10, 2016	Project Completion

B. Any potential delays in the Project Schedule due to extreme weather conditions should be submitted to the Owner at least five (5) days prior to the anticipated event.

1.7 OWNER FURNISHED MATERIALS

A. The Table below is a tabulation of the equipment to be furnished by the Owner and/or others. Updated equipment delivery information will be provided to the Contractor when it is available.

CORED ID #	QTY.	DESCRIPTION
3-0797	60	THIMBLE CLEVIS, HENDRIX (HDTC)
3-2812	145	INSULATOR, PIN TYPE, HENDRIX (HP1-15VTP
3-2816	45	DEADEND GRIP, HENDRIX (CG-0120)
3-3791	15	WOOD POLE, 40FT CLASS 3

3-3793	8	WOOD POLE, 45FT CLASS 3
	1	DUCTILE IRON POLE, 45FT CLASS 2
3-3779	6	DUCTILE IRON POLE, 45FT CLASS 3
3-5723	64,000	WIRE, SPACER, 336.4 AAC
3-5810	35	MESSENGER BRACKET, HENDRIX (BM-14)
3-5812	45	ANGLE BRACKET, HENDRIX (BA3-15)
3-5813	35	STIRRUP, HENDRIX (TS-1)
3-5816	525	SPACER, HENDRIX (RTL-15)
3-5817	20	ANTI-SWAY BRACKET, HENDRIX (BAS-14F
	15	DEADEND GRIP, HENDRIX (MG-4128)
	12	PIN, INSULATOR, HENDRIX (LSP-1)
	132	PIN, INSULATOR, HENDRIX (SSP-2)
	44	CLAMP, ANGLE, HENDRIX (CMA-1)
	16000	WIRE, MESSENGER, 052 AWA

1.8 OWNER FURNISHED WORK

A. The Owner will furnish:
   1. Labor for coordination and operations of the electric system that is required by construction activities. This includes activities such as power system switching operations and controls. This does not include items such as project construction activities or temporary facilities not specifically listed as Owner Furnished Work.

1.9 OWNER'S SALVAGE MATERIALS

A. The salvage materials listed below are to be removed by the Contractor and returned to the Owner at the location designated.

   1. All materials and hardware items removed from existing facilities shall be returned to the Owner's warehouse.

1.10 ENERGIZING FACILITIES

A. The Engineer will review Project related Test Reports and the Work. After review and acceptance of the Test Reports and Work, the Engineer and Owner will determine the suitability of the facility to be energized.

B. The facilities will not be accepted for energizing without the appropriate safe guards in place as required by Owner, Federal, State, Local, or other appropriate regulatory authority.

C. The Contractor shall be on site during the energizing of all facilities.

1.11 QUALITY ASSURANCE

A. Perform all work in accordance with applicable codes and standards.

B. Maintain at least one copy of Contract Drawings and Manufacturers' recommended installation methods on site at all times.

END OF SECTION

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1.1 SECTION INCLUDES

A. Description of basic units and assemblies used in the Work.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in DIVISION 1 of these Specifications.

1.3 SUBMITTALS

A. As required by and described in the General Conditions, Contractor shall prepare and submit a Schedule of Values to be compatible with the Application for Payment.

1.4 ASSEMBLY UNIT BASIS

A. The construction assemblies are on a unit basis or as otherwise indicated below so that the Owner may authorize any combination, addition, or deletion of construction units desired.

B. The descriptions apply to those assemblies on the project drawings and assembly guide drawings and includes all necessary labor and material required to make the assemblies complete.

1.5 ASSEMBLY GUIDE DRAWINGS AND PROJECT CONSTRUCTION DRAWINGS

A. The assembly and guide drawings are diagrammatic indicating major items of materials and general arrangement of assemblies to establish a standard of construction.

B. Conditions encountered in the field may vary materially from those shown on the assembly guide drawings, and the construction shall be modified as required to accommodate the field conditions involved. In special cases the Engineer will determine the most suitable method of framing to be used.

1.6 UNIT PRICE METHOD OF MEASUREMENT

A. The Unit Prices, as stated in the Contract Documents, shall include all necessary labor, equipment, basic supplies, overhead, profit and applicable taxes to provide a complete Unit ready for the Owners use. The Unit shall include all items and shall be measured as described below and in the appropriate detail/guide drawings.

B. Installation Assemblies

1. Pole unit shall consist of one pole in place and shall be measured on a per unit basis. The first two digits of the unit description indicate length; the third shows ASA classification. Thus 35-4 signifies a 35 foot class 4 pole. Unit consists of necessary means of excavation required by the types of soils and interferences encountered, and specified backfilling

around pole. Unit price shall include any necessary repair or replacement of existing concrete, asphalt, or other manmade surfaces disturbed by excavation.

2. Pole Top Assemblies shall consist of the hardware, crossarms and their appurtenances, insulators, and connectors installed as required to support the conductors and measured on a per unit basis. Unit does include all required field drilling for installation of assembly.

3. Conductor units shall consist of 1,000 feet of single conductor, and shall be measured by the horizontal distance between conductor supports. The unit includes proper stringing and sagging, tie wires, sleeves for splicing, connectors, and armor rods; jumpers and connections at deadends, junctions and taps. Designation of each conductor shall be by the Manufacturer's industry standard designations.

4. Guy units shall consist of the necessary length of guy wire, pole attachment fittings bolts, lag screws, guy bonding bolt, guy strain insulators, guy grips, clamps, etc., and all grounding jumpers and connectors. Unit shall include the wire length between pole attachment and anchor attachment, or in the case of overhead guys, to pole attachments. Unit description is applicable to both overhead and down guys.

5. Guy markers are not included with the guy unit, unless otherwise indicated.

6. Each anchor unit shall consist of the anchor, rod, and eye nut installed complete and ready for attaching the guy wire, and shall be measured on a per unit basis. Includes all shear pins as required for power anchor installation when specified.

7. Secondary and Service Assemblies shall consist of the hardware, insulators, tie wire, armor tape, armor rods, all appropriate size and type connectors, tying, sagging and re-sagging, handling, holding and splicing of all cables whether new, or existing, and those transferred from an existing position to a new position on the same pole, or to a new pole. Unit shall be measured on a per unit basis.

8. The following are descriptions of assemblies that are not explicit or shown on the Contract Drawings.

   a. Grounding units consist of the pole ground wire, staples, plates, wraps, or rods, all connector, clamps and associated hardware and jumper leads required to interconnect conductors and equipment that are to be grounded.

   b. Transformers
      1) Consists of the transformer, primary and secondary jumpers and leads, length and size as required, hot line clamps, connectors and mounting hardware.
      2) Protective equipment, crossarms, insulator, and steel pins are called for separately, unless designated on the assembly guide drawings.
      3) Transformers that are transferred shall be reconnected like the existing wiring scheme using the existing size jumpers and leads as a minimum size for the new installation.

c. Line Protection Equipment

1) Consists of the hardware, appropriate size and type of jumpers, leads and all connectors, and clamps, mounting brackets, fuse links, etc., required to install fused cutouts, lightning arresters, switches, etc.

d. Lightning Fixtures and Appurtenances

1) Consists of the hardware, luminaries, supporting mast arms, leads, jumpers, all connectors, etc., and adjustments required.

C. Removal Assemblies

1. Removal assembly units cover the furnishing of all labor for removal of existing units of construction from existing lines, disassembling into material items, and all labor and transportation for the returning of all materials in groups of like items to the warehouse of the Owner or other location as specified in the Contract Documents.

2. Contractor shall reinstall at his own expense any other units removed by him for his own convenience.

3. Existing materials turned in to the Owner shall be verified with the inventory of unit assemblies removed. Material items not turned in will be charged to the Contractor at the Owner's present stock value. Keep accurate records of the material item breakdown turned in and have the Owner's representative verify accuracy of this inventory. A summary of this inventory, verified by the Owner, shall be given to the Engineer at the completion of the project.

4. The unit of removal shall include any holding or handling of conductors where such is involved, and re-installing as required.

5. Materials damaged due to negligence and/or improper handling will be charged to the Contractor at the Owner's present stock value. No charge will be made for material items returned to the Owner which, in the opinion of the Owner or the Engineer, were not damaged in removal and handling even though the materials may not be reusable for reasons of obsolescence or deterioration.

a. Poles - All poles of the same height, regardless of pole class, are designated by the same unit. Do not remove ground wire or pole numbers from the pole. Where concrete, asphalt, or other man-made surfaces are encountered the replacement surface shall be that of the surrounding surface and shall be included in the bid price.

b. Pole-top Assemblies - The unit of removal of pole-top assemblies includes all hardware, crossarms and their appurtenances, insulators, and connectors.

c. Conductors - Removal unit for each size of conductor or cable is shown by the conductor or cable type, and consists of 1,000 feet of single conductor and is the measured horizontal distance between conductor supports. If unit is to be

completely removed from Project and stored, remove in the longest practical length, preferably between deadends, without unnecessary kinking or nicking. Coil or reel all conductors for delivery to the Owner. Remove and retain possession of all tie wire, armor rods, jumpers, and miscellaneous connectors. The Owner will furnish reels if the conductor is to be returned to the Owner's warehouse on reels. The Owner will charge $150.00 for each reel that is not returned or returned in a damaged condition.

d. Guys - Remove and coil guy strand in the longest practical length. Dismantle all three-bolt clamps, guy attachments, bonding bolts and guy markers.

e. Anchors - Only anchor rods are to be removed in the anchor removal units. If the rod cannot be unscrewed, the end of the rod shall either be cut off or bent down so that the rod will be at least 18 inches below the ground line.

f. All other units designed for removal shall include hardware, convection, insulators, or other items of our existing assembly: and include all necessary handling or holding, untying, re-sagging, retiring, or re-installing conductors to remain.

D. Transferred Assemblies

1. For all transferred units, unit price measurement shall include any necessary labor and equipment to transport the unit from one site to another, or to handle the unit in place while it is detached and then reattached. If conductor is shown on Contract Drawings as transferred, unit will include moving the conductor from the aerial suspension and connection to the pole-top assembly. Unit would not include stringing, but would include sagging.

2. Consists of furnishing of all labor for removing and re-installing the unit specified from one location to another on the same or a new pole. Includes materials such as bolts, armor rods, connectors, clamps, splices, leads and jumpers, insulators, and all mounting hardware and supports the handling or holding of conductors, and untying, re-sagging, and retiring, all as required to re-install the unit in the new locations. Material in the transfer unit such as bolts of proper length and size, brackets, and other items may be reused if in satisfactory condition. All other items required to re-install the unit shall be included in the Bid Price.

3. Also includes the removal and reattachment of any or all conductors associated with the unit, any sagging or re-sagging, tying, untying and re-tying, armor rodding or re-armor rodding, all splices, connectors, etc., and any other labor and hardware required to make a complete assembly.

E. Easement Clearing

1. Line Easement Clearing unit shall consist of clearing an easement corridor with a base unit measuring one (1) linear foot in length and having a width of 10'-0" each side of Centerline of the facilities. Payment shall be on a lump sum basis and shall include clearing of all

foliage, underbrush, tree removal, and such tree trimming as indicated on the Contract Documents. This unit shall not include removal of any danger trees.

2. Danger trees shall be included in the line easement lump sum bid price and shall include clearing and removal of such units as indicated in the Contract Document.

F. Existing Assemblies and Conditions

1. When existing assemblies are encountered include attention and maintenance work such as re-stapling pole grounds, inspecting and tightening nuts/locknuts and grounding bonds, securing the wires, backfilling existing poles, and other work to miscellaneous item such that the integrity of the existing assembly is assured.

2. Include such work in the Bid Price. Any change or replacement to an existing assembly shall be approved prior to commencement of work on an assembly.

1.7 QUALITY ASSURANCE

A. Use required means to assure arithmetical accuracy of the sums described.

B. When so required by the Engineer, provide copies of the subcontracts or other data acceptable to the Engineer, substantiating the sums described.

1.8 PAYMENT

A. Payment for the Work done under the project shall be paid upon completion of the Work as described in these Contract Documents.

B. Upon completion of the Work and before final payment, the Contractor must furnish evidence to the Owner that all labor, subcontractors, and other employees working for the Contractor pursuant to this project have been fully paid. Upon final payment, the Owner is to be released from all liability whatsoever growing out of this project.

END OF SECTION

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1.1 SECTION INCLUDES

A. Coordination

B. Project Representatives and Addresses

1.2 COORDINATION

A. All work, submittals, and testing shall be coordinated with the Work listed in the Contract Documents to assure efficient progress of the Project Construction.

1.3 PROJECT REPRESENTATIVES AND ADDRESS

A. Owner: City of Oak Ridge, Tennessee

Physical Address: 100 Woodbury Lane
Oak Ridge, Tennessee 37830

Mailing Address: P.O. Box 1
Oak Ridge, Tennessee 37831-0001

Phone: (865) 425-1830

Primary Contact: Missy Shehan
Alternate Contact: Margaret Elgin, P.E.

B. Engineer: Gresham, Smith and Partners

Address: 2095 Lakeside Centre Way, Suite 120
Knoxville, Tennessee 37922

Phone: (865) 521-6777
Fax: (865) 539-7192

Primary Contact: Richard Yeager
Alternate Contact: John Wharton, P.E.

C. All correspondence, submittals, shop drawings, test reports, instruction manuals, operation manuals and any other pertinent Project materials shall be submitted to the Owner at the address listed above in Section A.

D. Forward a copy of all correspondence addressed to the Owner to the Engineer.

E. All correspondence, submittals or other items associated with the Contract shall be identified by the Project Owner and Project name as listed in the Contract Documents.

END OF SECTION

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1.1 SECTION INCLUDES

A. Submittal Procedures

B. Construction and Progress Schedules

1.2 RELATED SECTIONS

A. DIVISIONS 0 and 1 - CONTRACT DOCUMENTS, and GENERAL REQUIREMENTS: These shall apply to all work included in this section.

B. Section 01 2200 – MEASUREMENT AND PAYMENT

C. Section 01 3113 – PROJECT COORDINATION

D. Section 01 3323 – SHOP DRAWINGS

E. Section 01 3326 – QUALITY CONTROL

F. Section 01 7839 – PROJECT RECORD DOCUMENTS

1.3 SUBMITTAL PROCEDURES

A. Transmit each submittal with transmittal letter or Engineer accepted form. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.

B. Submit shop drawings as specified in Section 01 3323 - SHOP DRAWINGS.

C. Identify project, Contractor, subcontractor or supplier; pertinent drawing sheet and detail number(s), and specification section number, as appropriate.

D. Schedule submittals to expedite the project, and deliver to Engineer with copy of transmittal letter to Owner's representative as identified in Section 01 3113 - PROJECT COORDINATION.

E. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of the completed Work.

F. Provide space for Contractor and Engineer review stamps.

G. Revise and resubmit submittals as required, identify all changes made since previous submittal.

H. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.4 SUBMITTAL SCHEDULE

A. Provide schedule for project submittals in accordance with the specifications and as agreed to by Engineer and Contractor.

1.5 CONSTRUCTION AND PROGRESS SCHEDULE

A. Submit initial progress schedule in duplicate within 10 days after date established in Notice to Proceed for Engineer review.

B. Revise and resubmit on a monthly basis, or as required by Owner.

C. Submit a computer generated chart with separate line for each major section of Work or operation, identifying first work day of each week.

D. Indicate estimated percentage of completion for each item of Work at each submission.

E. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and under Allowances.

END OF SECTION

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1.1 SECTION INCLUDES

A. Submit Shop Drawings and product data required by contract documents.

1.2 RELATED SECTIONS

A. DIVISIONS 0 and 1 - CONTRACT DOCUMENTS, and GENERAL REQUIREMENTS: These shall apply to all work included in this section.

B. Section 01 3129 – SUBMITTALS

C. Section 01 7839 – PROJECT RECORD DOCUMENTS

1.3 SHOP DRAWINGS

A. Shop drawings shall include: fabrication information; material lists; manufacturer's catalog sheets and/or descriptive data, showing dimensions, performance characteristics, and capacities; electrical characteristics, and capacities; and other pertinent information as required to obtain approval of the items involved.

B. Drawings shall be presented in a clear and thorough manner.

1. Details shall be identified by reference to sheet and detail numbers shown on Contract Drawings and Specification Sections.

1.4 PRODUCT DATA

A. Preparation:

1. Clearly mark each copy to identify pertinent products or models.

2. Show dimensions and clearances required.

B. Manufacturer's standard drawings and diagrams:

1. Modify drawings and diagrams to delete information which is not applicable to the Work.

2. Supplement standard information to provide information specifically applicable to the Work.

1.5 CONTRACTOR RESPONSIBILITIES

A. Designate in the construction schedule, or in a separate coordinated schedule, the dates for submission and the dates that reviewed Shop Drawings and product data will be required to maintain construction schedule.

B. Review Product Data prior to submission to the Engineer and Owner.

C. Contractor is responsible for review of all supplier submittals.

D. Determine and verify:

1. Field measurements

2. Field construction criteria

3. Catalog numbers and similar data

4. Conformance with specifications

E. Coordinate each submittal with requirements of the Work and of Contract Documents.

F. Notify the Owner/Engineer in writing, at time of submission, of any deviations in the submittals from requirements of the Contract Documents, along with recommended substitutions for review and approval by Owner/Engineer.

G. Begin no fabrication or work which required submittals until return of submittals with satisfactory review.

1.6 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the work or in the work of any other contractor.

B. Number of submittals required:

1. Shop Drawings: Submit three (3) paper copies of shop drawings of all items for which shop drawings are specified in other sections, and for all major equipment items.

2. Product Data: Submit three (3) copies of product data of all items for which product data is specified in other sections and for all major items.

3. One (1) copy of electronic data files of all drawings prepared for the project. Format shall be either CAD format (.DGN or .DWG), or PDF format. Media shall be CD-ROM.

C. Submittals shall contain:

1. Submittal identification number. Submittals shall be numbered consecutively. Re-submittals shall use the same submittal number with an alphabetic suffix added.

2. The date of submission and the dates of any previous submissions.

3. The project title and number.
4. The names of:
   a. Contractor
   b. Subcontractor
   c. Supplier
   d. Manufacturer

5. Identification of the project, with the specification section number.

6. Field dimensions, clearly identified as such.

7. Relation to adjacent or critical features of the work or materials.

8. Applicable standards, such as ASTM or Federal Specification numbers.

9. Identification of deviations from Contract Documents.

10. Identification of revisions on resubmittals.

11. An 8"x3" blank space for Contractor and Engineer stamps.

12. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the Work of Contract Documents.

1.7 RETURN FOR RE-SUBMISSION

A. The Engineer will return for resubmission all shop drawings submitted without the above specified approval and certification which in the Engineers opinion contain numerous discrepancies, have not been checked, or do not meet the requirements for submission.

1.8 REVIEW OF SUBMITTALS

A. The Engineer will review, mark and date all submitted shop drawings. Two (2) sets will be returned to the Contractor and remaining sets will be retained by the Engineer. Contractor shall make corrections and changes as indicated.

B. Resubmit shop drawings as specified above, until satisfactory review has been obtained. Corrections and/or changes indicated on shop drawings by Engineer/Owner shall not be considered as an extra work order.

C. After satisfactory "Review" or "Furnish as Corrected" has been obtained for all shop drawings, three (3) copies of shop drawings marked "FOR CONSTRUCTION" shall be furnished to the Owner/Engineer within 21 days of receipt of approval drawings by Contractor. Format of electronic data files shall be as specified in Article 1.06, above.

D. Review of shop drawings by the Owner/Engineer will be general only, and such review will not relieve the Contractor of responsibility for accuracy of such shop drawings, proper fitting, coordination, construction of work, and furnishing materials required by the Specifications but not indicated on shop drawings. Review of shop drawings shall not be construed as approving departures from the Specifications.

1.9 DISTRIBUTION

A. Distribute copies of Shop Drawings and copies of Product Data which carry the Engineer stamp of approval to:

1. Job site file
2. Record Documents File
3. Other affected contractors
4. Subcontractors
5. Supplier or fabricator

1.10 OWNER / ENGINEER DUTIES

A. Review submittals with reasonable promptness and in accordance with schedule.

B. Affix stamp and initials or signature, and indicate requirements for resubmittal, or satisfactory review of submittal.

C. Return submittals to Contractor for distribution, or for resubmission.

END OF DOCUMENT

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1.1 SECTION INCLUDES

A. Required inspection and testing services are intended to assist in the determination of compliance of the work with the quality standards specified or indicated.

1.2 RELATED SECTIONS

A. DIVISIONS 0 and 1 - CONTRACT DOCUMENTS, and GENERAL REQUIREMENTS: These shall apply to all work included in this section.

1.3 QUALITY OF WORK

A. Perform all work in the most workmanlike manner and according to the best standard practices. All work shall be free from faults and defects in workmanship.

B. Contractor shall be solely responsible for quality control of the work and shall maintain quality control over suppliers, manufacturers, products, services, site conditions and workmanship, to produce work of specified quality.

C. Required testing and inspection are intended to assist in determination of probable compliance of the Work with the Contract Documents, but do not relieve Contractor of responsibility for this compliance. Specified testing and inspection are not intended to limit Contractor's quality control program.

D. Contractor shall submit a Project Quality Control Plan prior to construction of the project.

E. All workmanship and services shall be subject to inspections, examinations and tests by the Owner at any and all times during the performance of this Contract. The Owner shall have the right to reject defective workmanship and to require correction. Rejected workmanship shall be satisfactorily corrected without charge therefore. If the Contractor fails to proceed at once to correct such defective workmanship, the Owner may proceed with such corrective work and the Contractor shall be liable for all direct cost occasioned in the performance therefore.

This provision does not negate, modify or replace any warranties contained elsewhere in the Contract Documents. This provision shall survive the termination or suspension of the Contract Documents.

Neither payment nor any provisions in the Contract Documents shall relieve the Contractor of responsibility for faulty materials or defective workmanship. The Owner shall give notice of observed defects with reasonable promptness. The deterioration due to ordinary use and normal wear is excepted from this guarantee.

The Contractor shall reimburse the Owner for the cost of damage, if any, as well as the cost of replacing defective materials or workmanship. If replacements are not made within ten (10) days after notice is given of such defect in workmanship, or thirty (30) days in the case of materials, then the Owner shall have the right to make replacements and charge the cost of the same to the Contractor or the Contractor’s surety.

END OF DOCUMENT

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1.1 SECTION INCLUDES

A. Quality Assurance

B. Schedule of References

1.2 QUALITY ASSURANCE

A. Comply with latest revision of the standard for all equipment, materials and labor, except when more rigid requirements are specified or are required by applicable codes.

B. Request clarification from Engineer before proceeding, should specified reference standards conflict with Contract Documents.

1.3 SCHEDULE OF REFERENCE

A. Documents and/or Standards from the following agencies may be referenced in the Contract Documents:

AA	Aluminum Association
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
CRSI	Concrete Reinforcing Steel Institute
CSI	Construction Specifications Institute
EEI	Edison Electric Institute
EPA	Environmental Protection Agency
FOA	Fiber Optic Association

ICEA	Insulated Cable Engineers' Association
IEEE	Institute of Electrical and Electronics Engineers
NCTA	National Cable & Telecommunications Association
NEC	National Electrical Code
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers' Association
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
SSPC	Steel Structures Painting Council
RUS	Rural Utilities Service
UL	Underwriters' Laboratories, Inc.

END OF SECTION

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PART 1. GENERAL

1.1 SECTION INCLUDES

A. Summary of temporary facilities and controls that are required for the Work, such as:

1. Overhead line construction guard structures
2. Environmental Controls
3. Erosion Controls
4. Construction Cleaning
5. Traffic regulation

1.2 RELATED SECTIONS

A. DIVISIONS 0 and 1 - PROPOSAL DOCUMENTS, MATERIALS CONTRACT AND GENERAL REQUIREMENTS: These shall apply to all work included in this section.

1.3 REFERENCES

A. Published Specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work in this section where cited in Section 01 4219 - REFERENCE STANDARDS.

PART 2. EXECUTION

2.1 TEMPORARY GUARD STRUCTURES

A. Utility and Road Crossings.

1. The contractor shall furnish and install all guard structures required for all crossings over electric supply lines, communication lines, railroads, roads, highways, and other obstructions, and for the protection of the conductors. The Contractor shall obtain the necessary permissions or permits for stringing conductors over utilities, highways, railroads, and other obstructions. The Contractor shall make adequate preparations to safely cross all facilities with a minimum of inconvenience and delay to the public. The cost for any necessary temporary structures shall be built in to the Lump Sum price for the construction of the project.

2. The Contractor shall furnish and install steel traffic plates to cover open trenches to allow vehicle traffic flow. Contractor is responsible for pinning of the plates and temporary asphalt ramp edges for plates. Plate installation shall be coordinated with local roadway authorities.

3. When guard structures are no longer needed, the Contractor shall safely remove all temporary structures and appurtenances.

B. Environmental Protection

1. Perform Work in such a manner as to maximize preservation of beauty, conservation of natural resources and minimize marring and scarring of the landscape and silting of drainage areas and streams. Do not deposit trash, herbicides, or other chemicals or their containers in or near streams, waterways, drainage areas, streets, alleys, lawns, pastures, or on the landscape.

2. Contractor shall utilize and if warranted, implement the procedures of "A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities" for the duration of construction.

C. Project Clean Up

1. The site and the structures to be constructed thereon shall be maintained and kept clean and free from rubbish, unused materials, and equipment during the construction period. From time to time, remove all dirt, rubbish and surplus materials of all descriptions, including equipment not in use, and maintain the site in a neat and orderly condition. Materials or equipment known to belong to others shall not be removed from the site without duly notifying the Owner thereof.

2. Upon completion of the work the Contractor shall remove all construction equipment and unused materials provided for the Work.

D. Erosion Control

1. Prior to construction activities that will cause disturbance to storm water discharges, drainage paths, or which may cause erosion of soil and the discharge of other pollutants, the Contractor shall file a Notice of Intent (NOI) with the Department of Environment and Conservation.

2. An Erosion and Control Plan for the Project shall be developed and implemented in accordance with State regulations concerning the general permit.

3. The Contractor shall file and be the signatory principal for the NOI, and shall be solely responsible for: compliance to applicable state and federal laws, liabilities, or penalties pursuant to non-compliance.

4. Source for obtaining the NOI, the Tennessee Erosion and Sediment Control Handbook, and rules governing general permits:

Storm water NOI Processing
Division of Water Pollution Control
401 Church Street
Department of Environment and Conservation
Nashville, Tennessee 37243-1534

Or

Division of Water Pollution Control
T.E.R.R.A. Building, 4th Floor,
150 Ninth Avenue north
Tennessee Department of Health and Environment
Nashville, Tennessee 37247-3420

2.2 TRAFFIC CONTROL AND WARNINGS

A. Schedule and perform all work to interfere as little as possible with vehicular traffic flow. Poor planning and gross inconsiderateness of traffic flow will be just cause for the Owner to stop the Contractor's work until the unsatisfactory conditions have been remedied.

B. Mark clearly all open ditches, soft backfill, parked equipment, etc., with signs and barricades during day hours, and in addition, with flares at night. Maintain all flares, signs, and barricades during weekends, holidays, and at other times when work is not in progress.

C. Provide adequate signs and watchmen to comply with the requirements of all authorities having jurisdiction, and as necessary for the safety and convenience of the general public.

END OF SECTION

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PART 1. GENERAL

1.1 SUMMARY

A. Protect products scheduled for use in the Work by means including, but not necessarily limited to, those described in this Section.

B. Related Work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

2. Additional procedures also may be prescribed in other Sections of these Specifications.

1.2 QUALITY ASSURANCE

A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

1.3 MANUFACTURERS' RECOMMENDATIONS

A. Except as otherwise approved by the Utility Owner, determine and comply with manufacturers' recommendations on product handling, storage, and protection.

1.4 PACKAGING

A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.

1. Maintain packaged materials with seals unbroken and labels intact until time of use.

2. Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.

B. The Owner may reject as non-complying such material and products that do not bear identification satisfactory to the Utility Owner as to manufacturer, grade, quality, and other pertinent information.

1.5 PROTECTION AND HANDLING

A. Protect finished surfaces, including jambs and soffits of openings used as passageways, through which equipment and materials are handled.

B. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.

C. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.

1.6 REPAIRS AND REPLACEMENTS

A. In event of damage, promptly make replacements and repairs to the approval of the Owner and at no additional cost to the Owner.

B. Additional time required to secure replacements and to make repairs will not be considered by the Owner to justify an extension in the Contract Time of Completion.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Record of changes

B. Final “As-Built” drawings

C. Operation and maintenance manuals

1.2 RELATED SECTIONS

A. DIVISIONS 0 and 1 - CONTRACT DOCUMENTS, and GENERAL REQUIREMENTS: These shall apply to all work included in this section.

B. Other requirements affecting Project Record Documents may appear in pertinent other Sections of these Specifications.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 00 72 00 – GENERAL CONDITIONS and Section 01 3219 - SUBMITTALS

B. The Engineer's approval of the current status of Project Record Documents may be a prerequisite to the Engineer's approval of request for final payment under the Contract.

C. Prior to submitting request for final payment, secure the Engineer's approval of the current status of the Project Record Documents.

D. Prior to submitting request for final payment, submit the final Project Record Documents to the Engineer for approval.

1.4 QUALITY ASSURANCE

A. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Engineer.

B. Accuracy of records:

1. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to show the change properly.

2. Accuracy of records shall be such that future search for items shown in the Contract Documents may rely reasonably on information obtained from the approved Project Record Documents.

C. Make entries within 24 hours after receipt of information that the change has occurred.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer of all recorded data to the final Project Record Documents.

B. In the event of loss of recorded data, use means necessary to again secure the data to the Engineer's approval.

1. Such means shall include, if necessary in the opinion of the Engineer, removal and replacement of concealing materials by Contractor at his cost.

2. In such case, provide replacements to the standards originally required by the Contract Documents by Contractor at his cost.

PART 2 PRODUCTS

2.1 RECORD DOCUMENTS

A. Job set: Promptly following the Effective Date of Agreement secure from the Engineer at no charge to the Contractor one complete set of all Documents comprising the Contract.

PART 3 EXECUTION

3.1 MAINTENANCE OF JOB SET

A. Immediately upon receipt of the job set described in Paragraph 2.1-A above, identify each of the Documents with the title, "RECORD DOCUMENTS - JOB SET."

B. Preservation:

1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Engineer.

2. Do not use the job set for any purpose except entry of new data and for review by the Engineer, until start of transfer of data to final Project Record Documents.

3. Maintain the job set at the site of Work as that site is designated by the Engineer.

C. Making entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.

2. Date all entries.

3. Call attention to the entry by a "cloud" drawn around the area or areas affected.

4. In the event of overlapping changes, use different colors for the overlapping changes.

D. Make entries in the pertinent other Documents as approved by the Engineer.

E. Drawings shall clearly show actual installed locations, depth, and sizes of:

1. Pipework of all descriptions below ground outside of building and structures, including locations of cleanouts, manholes, inlets, hydrants, and underground valves.

2. Electrical conduits, electrical ducts, ground grid conductors, and directly buried conductors underground outside of buildings and structures, including locations of pull and junction boxes, electric manholes and handholes, pad mounted electrical equipment, utility poles, electrical outlets, and lighting fixtures.

F. Conversion of schematic layouts:

1. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts, and similar items, is shown schematically and is not intended to portray precise physical layout.

   a. Final physical arrangement is determined by the Contractor, subject to the Engineer's approval.
   b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items which are shown only schematically on the Drawings.

2. Show on the job set of Record Drawings, by dimension accurate to within one inch, the centerline of each run of items such as are described in Article 3.01-E above.

   a. Clearly identify the item by accurate note such as "cast iron drain," "galv. water," and the like.
   b. Show, by symbol or note, the vertical location of the item ("under slab," "in ceiling plenum," "exposed," and the like).
   c. Make all identification so descriptive that it may be related reliably to the Specifications.

3. The Engineer may waive the requirements for conversion of schematic layouts where, in

the Engineer's judgment, conversion serves no useful purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Engineer.

G. Review and submittal:

1. Submit the completed set of Project Record Documents to the Engineer.

2. Participate in review meetings as required.

3. Make required changes and promptly deliver the Project Record Documents to the Engineer.

3.2 FINAL DRAWINGS

A. At completion of project, the Contractor shall incorporate all revisions into the shop drawings to provide a complete set of final drawings. The drawings shall be marked as "Final-As Constructed".

B. Submit three (3) paper copies of all shop drawings. Maximum size of all drawings is 22"x34".

C. One (1) copy of electronic data files of all drawings prepared for the project. Format shall be PDF format with changes highlighted for clarity. Media shall be CD-ROM.

3.3 OPERATION AND MAINTENANCE MANUALS

A. The Contractor shall provide four (4) complete sets of Operations and Maintenance Manuals covering all equipment furnished for the project.

B. Contents of Operations and Maintenance Manuals

1. Manufacturer's technical literature; descriptive bulletins; installation, operation and maintenance instructions; and parts list.

2. As-Constructed shop drawings.

3. Certified factory test results.

C. Format

1. All Operations and Maintenance Manuals shall be bound in a three ring binder of suitable size (maximum 2") for the material to be inserted.

2. Binders shall be white in color with clear jacket for the insertion of printed cover and edge identification sheets.

3. All information bound shall be 8½" x 11" or accordion folded to this size.

4. Page dividers with plastic reinforced holes and tabs shall be used to organize Operations and Maintenance Manuals.

5. Binder cover and edge inserts shall contain project name, date and subject matter of the manual.

D. Organization

1. Table of Contents shall list all information contained.

2. Contact information for all major equipment suppliers, Contractor, and subcontractors.

3. Organize manual by equipment item. Contents as specified above.

3.4 FINAL SUBMITTAL

A. All Record Documents including, job set, final drawings and Operation and Maintenance Manuals shall be submitted to Engineer prior to submitting final payment request.

3.5 CHANGES SUBSEQUENT TO ACCEPTANCE

A. The Contractor has no responsibility for recording changes in the Work subsequent to Final Completion, except for changes resulting from work performed under Warranty.

END OF SECTION

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PART 1. GENERAL

1.1 SECTION INCLUDES

A. Clearing and Cleaning Site of Plant Life, Grass, and Debris.

1.2 RELATED SECTIONS

A. DIVISIONS 0 and 1 – CONTRACT DOCUMENTS AND GENERAL REQUIREMENTS: These shall apply to all work included in this section.

PART 2. EXECUTION

2.1 CLEARING AND GRUBBING

A. Clear and Grub the Following Areas:
   1. Only areas necessary to obtain access to the required installation of facilities. All Mainline Tree Trimming will be provided by the Utility Owner.

B. In all areas requiring clearing and grubbing, completely remove all buried logs, brush, grass, weeds, vegetation, and other unsuitable materials. Refill to proper elevation all holes resulting from the grubbing operations, and compact the fill as specified in other sections.

C. Dispose of all spoil materials by removal to approved disposal areas away from the project site.

D. Clean and clear out undergrowth and dead wood, without disturbing compaction of subsoil.

E. Burning of debris on the site shall NOT BE PERMITTED.

2.2 PROTECTION

A. Protect plant growth and features remaining as final landscaping.

B. Protect bench marks and existing work from damage or displacement.

C. Maintain designated site access for vehicle and pedestrian traffic.

END OF SECTION

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PART 1. GENERAL

1.1 SECTION INCLUDES

A. Overhead electric system line construction.

B. Furnishing necessary equipment and incidental materials to install the specified assemblies in the quantities required by the Contract Drawings and these Specifications to provide a complete and working installation.

C. Basic methods and test reports.

D. Removals of existing facilities as shown in the Contract Drawings.

1.2 RELATED SECTIONS

A. DIVISIONS 0 and 1 – CONTRACT DOCUMENTS AND GENERAL REQUIREMENTS: These shall apply to all work included in this section.

B. Section 01 1113 – SUMMARY OF WORK

C. Section 01 2200 – MEASUREMENT AND PAYMENT

D. Section 31 1100 – CLEARING AND GRUBBING

E. Section 33 7116 – ELECTRICAL UTILITY POLES

F. Section 33 7126 – OVERHEAD ELECTRICAL LINE MATERIALS

1.3 REFERENCES

A. Published Specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work in this section where cited in Section 01 4219 – REFERENCE STANDARDS and in the listing below:

1. “The Lineman’s and Cableman’s Handbook”, McGraw-Hill Publishing Company.

2. “National Electric Safety Code”, ANSI – C2 (NESC).

3. “NFPA 70 National Electrical Code – 2002 Edition”, National Fire Protection Association.

4. “Guide to Transmission and Distribution Standards and Specifications”, Tennessee Valley Public Power Association.

5. “Specifications and Drawings for 24.9/14.4 kV Line Construction”, Rural Utilities Service Bulletin 1728F-803.

1.4 SUBMITTALS

A. Submittal information and shop drawings shall be submitted for approval in accordance with Section 01 3219 – SUBMITTALS and Section 01 3323 – SHOP DRAWINGS.

1. Sagging method chosen, proposed procedure, and test results.

1.5 ASSEMBLY GUIDE DRAWINGS AND PROJECT CONSTRUCTION DRAWINGS

A. The Construction Drawings are diagrammatic indicating major items of materials and general arrangement of assemblies to establish a standard of construction.

B. Conditions encountered in the field may vary from those shown on Contract Drawings, and the construction shall be modified as required to accommodate the field conditions involved. The general arrangement of circuits and clearances indicated on the assembly guide drawings shall be maintained. The Engineer shall approve any deviation from Contract Drawings prior to construction.

1.6 ASSEMBLY UNIT BASIS

A. The Construction assemblies are on a unit basis so that the Owner may authorize any combination, addition or deletion, or construction units desired.

B. The descriptions apply to those assemblies on the project drawings and assembly guide drawings and includes all necessary labor and incidental installation materials required to install the assemblies complete. Unit descriptions are provided in Section 01 2200 – MEASUREMENT AND PAYMENT.

1.7 WARRANTY

A. All labor, materials, and equipment supplied under this specification shall be warranted as outlined in the GENERAL CONDITIONS.

PART 2. EXECUTION

2.1 POLE-TOP ASSEMBLIES

A. Crossarms shall be installed as per the Manufacturer's installation instructions.

B. Level all support crossarms and conductor supports. Those on tangent construction shall be at right angles to the conductors they support. Balance the conductor loading equally between the supports

C. Field drilled holes shall be in line with the strain or at right angles to the assembly they support. Assemblies mounted on uneven pole surfaces shall be adjusted with metal shims where practical.

D. Install assemblies and equipment rigid and secure, plumb and level, and in alignment with related and adjoining work. Welding or cutting of materials or deviation from Manufacturer recommendations for attachment or support shall be prohibited.

E. Where subsequent alteration, adjustment, or reworking of existing assemblies is required, it shall be performed using materials and workmanship to match those of the original installation; and restored at least to the conditions which existed, unless otherwise indicated.

F. Install new materials and equipment and connect to existing installations, where indicated, with minimum interference to existing facilities.

G. Align suspension units with the bisector of the line angle on vertical angle construction. Insure all cotter keys are in place in suspension units.

H. Extra care shall be exercised during all phases of construction to prevent scarring or abrading the surface of any assembly item. Ladders may be hung from assembly to simplify clipping-in operations; however, the ladder hooks shall be covered with a rubber hose or otherwise padded to prevent damage to the protective coating.

2.2 INSULATORS

A. Exercise care in handling and installing insulators and in assembling suspension units.

B. Each insulator unit shall be inspected and when installed shall be free of cracks, chips, bent pins, and other defects. Defective insulators shall be removed from the work site immediately.

C. All insulators installed shall have surfaces cleaned of all foreign material and porcelain insulators shall be wiped to a bright finish.

D. Install horizontal mounted insulators at right angles to the conductors they support.

E. Deadend insulator strings, when completely assembled, shall have all cotter pins fully seated. Deadend insulator strings must be attached to the structure after setting the poles. The insulator strings shall be hoisted into position with slings or wires in a manner so as not to cause damage.

F. When material items are mounted on each structure prior to setting the poles, the structures shall be supported off the ground before pole setting to maintain clean surfaces and to avoid damage to the assemblies.

2.3 CONDUCTORS AND APPURTENANCES

A. Stringing

1. All poles shall be plumb before stringing conductors.

2. Carefully handle conductors. Do not drag them over sharp objects nor allow them to be stepped upon or run over by vehicles. Avoid kinking, twisting or abrading the conductors in any manner. Inspect the conductor as it is unreeled for cuts, abrasions, and other injuries. Cut out the faulty sections and splice the conductor as required.

3. Install the conductors and accessories in accordance with Manufacturer's recommendation. Pull the conductors over suitable rollers or stringing blocks. Properly mount on the pole or crossarm to insure proper sagging. Prevent binding while stringing.

4. Conductors shall be strung by controlled-tension method using proper stringing blocks. Conductors larger than 1.0 inches in diameter and ACSR conductors of multiple stranded steel cores shall be strung using neoprene lined or similar type blocks. The stringing equipment shall have groove sizes that will in no way damage the conductor, and capable of maintaining preset tensions and pulling speed. Maintain sufficient continuous tension to keep conductors clear of the ground or obstructions that could cause damage to or by the conductor.

5. The tension on any conductor during stringing shall not exceed 50 percent of the ultimate strength of the conductor at the temperature existing at the time of stringing.

6. When, during the stringing operation, a conductor contacts another conductor, the ground, or some other object which might cause damage, the conductor shall be lowered, wiped clean, and closely inspected by the Engineer to determine the extent of damage. Depending on the severity of damage and the length of the damaged section, repairs shall be made by smoothing of the conductor with fine sandpaper or by cutting out the damaged section and splicing.

7. Locate the cable pullers, tensioners and pulling machines as near mid-span as possible. In no case shall the slope of the conductor between the machine and the stringing block at the first structure be steeper than three horizontal to one vertical.

B. Sag Operations and Tests

1. The length of conductor sagged in one operation shall be limited to the length that can be sagged satisfactorily, or as approved by the Engineer.

2. Sag in as level and as average a ground span as possible.

3. Sag all conductors in accordance with Sag Tables that will be furnished by the Engineer. Where new and existing conductors are strung together, sag both conductors with the sag tables, unless otherwise specified by the Engineer.

4. The Contractor may select one of three methods to sag conductor:

    a. Transit Method - Use of a transit to accurately measure the sag by calculated angle of sight method, calculated target method, or horizontal line of sight method.
    b. Dynamometer Method - Insertion of a dynamometer in line with the sagging equipment to verify actual tension of the line.
    c. Stopwatch or Time-Wave Method - measurement of return waves after striking or jerking the conductor to produce an initial wave.

5. In sagging one reel length, the sag of two spans shall be checked. In sagging lengths of more than one reel, the sag of three or more spans near each end and the middle of the length being sagged shall be checked. The length of the spans used for checking shall be approximately equal to the ruling span. At the option of the Engineer, all spans which exceed the ruling span by 25 percent or more shall be checked for sag; and, at sharp vertical angles, the sag shall be checked on both sides of the angle. The following spans are unacceptable for sagging tests: Inclined spans, tangent to vertical configurations, deadends, tangent to angles and spans with splices.

6. Sagging shall not be performed when wind or other adverse weather conditions prevent satisfactory sagging. Sagging shall not be performed at temperatures below 20 degrees Fahrenheit.

7. The air temperature at the time and place of sagging shall be determined by a certified etched-glass or a highly accurate bimetal thermometer. Record the temperature at which the conductor is sagged and the spans in which sags are measured and furnish this information to the Engineer.

8. The Contractor shall verify the electrical clearances to foreign wire crossings or other supports after sagging operation is complete. Record clearances and submit to Engineer.

C. Clipping In

1. Clipping may begin as soon as the conductor has been sagged. Tape or ink mark a reference point on the conductor measured from the center of the stringing block location. After clipping-in verify that the conductor has not moved from its sagging point. Clipping should progress so as to avoid trapping uneven sags between clipped sections.

2. Long spans, inclined spans, and deadend spans shall be clipped in first, so as to minimize conductor movement. At the option of the Engineer, the Contractor may be directed to also clip in at the mid-point and one-quarter points of sagging operation.

3. Lifting of the conductors shall be done with a hoist and lifting hook that will not notch or severely bend the conductors. The conductor lifting hook should have an elastomer cover so as not to damage the surface of the conductors. The conductors shall not be lifted high enough such that the conductor will creep in adjacent spans.

4. Bundled conductors may be lifted simultaneously by the use of a yoke arrangement supporting the hooks and a single method of lifting.

5. Conductors shall NOT remain in lifting blocks for more than 72 hours to avoid damage to conductors or sheaves.

6. If shown on the Contract Drawings, dampers shall be installed immediately after clipping to prevent possible wind vibration damage.

D. Conductors shall be cut out and spliced in any location where damage on the cable has occurred. Repair sleeves may be used to repair damaged conductor when the damage is concentrated in a small area or when the number of broken strands is less than 10% of the strands on the outer layer. Any damaged location shall be reported to and reviewed by the Engineer, prior to repair.

2.4 SPLICES AND TIES

A. New conductors shall not have more than one splice per conductor in any span. Do not locate splices in new conductor within 10 feet of any conductor support. Cut out and re-splice improperly located splices, injured portions, crooked or imperfect splices. Do not leave bent or curved splices in the conductors.

B. Where existing conductors are reworked, splices may be located less than 10 feet from a support or hardware, if sufficient distance is provided for future maintenance; but in no case shall a splice be located within 2 feet of conductor hardware or supports.

C. Splices in new conductors shall not be located in NESC defined Grade B crossing spans. No extra payment will be made for any splices that may be required for any reason in existing conductors left in place.

D. Clean the contact surfaces thoroughly before splicing and carefully follow Manufacturer's recommendations. Use the proper die and crimping tool that is mated to the splice. Insure that the proper spacing and number of crimps are made.

E. Use the Manufacturer’s recommended inhibitor when splicing and installing connectors to aluminum conductors. Use a pressure gun with tapered nozzle to inject the inhibitor into splicing sleeves.

F. Splices and compression connectors on conductors larger than 0.60 inches diameter shall be hydraulically crimped. Automatic splices may be used, as approved, but only in full tension conductors.

G. When a bow (non-hex) die is used, the crimping tool is to be rotated 90 degrees between crimps in order to avoid banana bowing of the splice. If a connector bows it shall be cut out and replaced. It shall not be repaired by hammering on it.

H. Ties shall be of the type and configuration as required for the conductor and support used, and in accordance with the Contract Drawings. Tie wire shall be tightly drawn around the conductor support and armor rod so that no slack space occurs. Tie wires around insulators shall not be cris-crossed.

I. Pre-formed conductor ties may be used for re-working of energized conductors if approved. Hot line ties shall not be used.

2.5 CLAMPS, JUMPERS, AND CONNECTORS

A. Use proper size connections and only those which will not cause galvanic action where conductors are of dissimilar metals. The contact surfaces of clamps and conductors shall be cleaned and bright using a steel brush as the principal cleaning medium. Where bolted connectors are approved the bolts shall be brought down hard, but the threads shall not be overstressed. Use a suitable inhibitor on aluminum surfaces for all connectors, hot-line clamps, etc.

B. Exercise utmost care when installing parallel groove clamps where specified. Clean the contact surface of the clamp and the wire. Bolts shall be brought down hard, but the threads shall not be over stressed. Bolted clamps shall not be used on grounding connections.

C. Install hot-line clamps so that they are permanently bonded to the load side of the line, allowing the jumper to be de-energized when the clamp is disconnected from the supply line.

D. Allow sufficient, but not excessive slack in jumpers and other leads. Make them neat and uniform in appearance and in general run in horizontal and vertical planes with rounded turns. Support all jumpers to prevent excessive movement between supports and to clear all conflicts and maintain clearances as required by NESC. Do not use broom-stick coils in any jumpers.

E. At points of deadends, taps and take-offs of the main supply line, conductor tails shall be left long enough to be used as jumpers and such that splices or connections shall be limited to one per phase.

F. Existing conductors to be connected to transformers, line equipment, or other conductors shall be thoroughly cleaned and connections made as would be for new conductors.

G. Size each jumper, whether existing or new, to be at least as large as the conductor on the load side.

H. All line and service connections shall be made with compression connectors. Use of bolted connection shall have prior approval from the Engineer. Aluminum to copper connections shall be made with connectors suitable for use with dis-similar metals.

I. Service connections, with the exception of the neutral connection, shall be covered at the point of connection with black all-weather vinyl electrical tape, or if approved, a polyethylene plastic cover.

2.6 GROUNDS

A. Where ground rods are specified, drive ground rods the full length in undisturbed earth a minimum of 2'-0" from the surface of the pole, with the top of the rod and the grounding jumper a minimum of 1'-0" below natural grade. Install ground rods at all transformer and equipment locations and as shown in the Contract Drawings.

B. Interconnect all equipment grounds, neutral wires, and protective equipment and attach to a common pole ground wire. Make at least two (2) continuous connections on all equipment from the equipment frame or case of equipment tank to the multi-grounded system.

C. Leave each ground rod uncovered from the rod clamp to the pole until the Engineer authorizes backfilling. DO NOT LEAVE HOLES EXPOSED THAT WILL ENDANGER THE PUBLIC.

D. Alternative ground rod installation locations and arrangements shall be approved by the Engineer on a case by case basis.

E. On transmission lines where distribution underbuild is present the underbuild system neutral shall be interconnected with the transmission line pole ground wire. In cases where separate pole ground wires are used for the two systems they shall be interconnected both above and below ground.

F. Sufficiently tighten offset downlead wires to make a secure assembly of uniform appearance. Maintain evenly spaced distance between the offset downlead wire and the adjacent phase conductors.

G. All connections for pole grounds shall be made with compression connectors.

2.7 GUYS

A. Provide guys at all points of unbalanced strain in conductor and structures at corners, junctions and deadends as shown on the Contract Drawings. Attach guys to poles at the load centers.

B. Provide span guys at all locations where down guys cannot be used, at all unbalanced loads on crossarms, and use stub poles where required to obtain proper guying clearance requirements. Do not install any guy in violation with NESC requirements.

C. Install each guy centered on the pole without pulling to either side or causing an unequal strain on guy hooks, clamps, or sections of the guy and hardware. Neatly sever or cut all guy tails.

D. Unless specified elsewhere, install down guys with a one-to-one (45 degree) lead-to-height ratio.

E. All guys shall be bonded to the pole grounding system unless otherwise directed by the Engineer. Grounding jumpers shall be of minimum conductivity equivalent to the pole ground wire. Grounding connectors to the guy and the system ground wire shall be compression type

suitable for dissimilar metals.

F. Guys shall be placed before the conductors are strung. Insure proper adjustment of guys when stringing operations are being performed so that loading on structures will be balanced.

G. Unless specified otherwise, guy attachment, hooks or plates shall only have one guy attached.

H. Guy primaries and secondaries separately.

2.8 ANCHORS

A. Anchors shall be installed according to Manufacturer's instructions.

B. Locate anchors as far as practical from street crossings, driveways, crosswalks, and foot paths.

C. Install all anchor rods in line with the strain and the guy slope. DO NOT INSTALL ANCHOR RODS VERTICALLY AND THEN BEND OR TRENCH THEM INTO POSITION. Leave no more than 6 inches of the rod exposed above ground. In cultivated fields, or disturbed soils where the rod might become covered, leave no more than 12 inches of the rod exposed above ground. In no case shall the eye of the rod be covered by soil.

D. On expanding anchors or rock anchors use an auger that will excavate a hole just large enough to accommodate the unexpanded anchor, such that, upon installation and expansion of the anchors the maximum holding capacity can be obtained. DO NOT USE A LARGE AUGER SUCH AS THE POLE AUGER.

E. The backfill for the anchor hole shall be thoroughly tamped with suitable soil the full length of the anchor hole.

F. Anchors shall be installed to sufficient depth and with sufficient torque such that each installation shall hold a total guy load of 30,000 pounds maximum.

G. For power installed screw anchors, a double helix anchor shall be installed at a depth no greater than 14 feet. If the required torque is not achieved, the anchor shall be removed and a double-helix square shaft or other multi-helix square shaft anchor shall be installed.

H. If difficulty is encountered in installing anchors, the Engineer shall be contacted to recommend additional installation methods.

2.9 HARDWARE AND BOLTS

A. Securely tighten all hardware.

B. Provide a washer at each point where a bolt head or nut bears on the surface of a pole or crossarm.

C. Provide a locknut with each nut, eyenut, or other fastener on all bolts or threaded hardware.

D. Carefully select bolts for proper length. Bolts shall extend at least ½ inch and not more than two (2) inches beyond nuts or locknuts. Eyebolts shall be in line with the strain at all deadends, and shall bisect the line angle and at all angles made that are not deadends. All bolts shall be in a level plane to the hardware attached.

E. DO NOT CUT OFF BOLTS THAT ARE TOO LONG - REPLACE THEM WITH PROPER LENGTH BOLTS.

F. All connections shall be bearing type connections. Bolt length shall provide for nuts, locknuts, and washer.

G. High strength bolts and their installation and bolting tools and equipment shall be in accordance with the structure manufacturer's recommendations and the "Specifications for Structural Joints Using ASTM A325 or A490 Bolts" including the commentary given therewith, as approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation and endorsed by AISC, except as otherwise modified or supplemented herein. Bolt length shall be selected in accordance with the Research Council specification. The Research Council specification is dated August 14, 1980. All methods, tools, and equipment shall be subject to the acceptance of the Engineer.

2.10 SWITCHES

A. Use proper size compression spades for terminal pads.

B. Adjust switches to Manufacturer recommendations. Switch operation shall be subject to inspection prior to energizing.

C. Provide two connections to ground on metal support frames.

2.11 MISCELLANEOUS

A. Phase to Phase Conductor Spacers:

1. Install at 30'-0" intervals between poles as indicated on the drawings.

2.12 PHASING OF CONDUCTORS

A. Phasing shall be in accordance with the Contract Drawings where indicated. Where phasing is not indicated the phasing placement and connection shall be as approved by the Engineer.

B. Verify phasing, whether indicated or not, by site review of each source connection at substation. Final phase rotation and placement is the responsibility of the Contractor.

2.13 REMOVALS

A. Keep careful and accurate records of all materials removed or reused as specified.

B. When backfilling holes at pole removal locations do not dig holes in the landscape to obtain backfill. Obtain backfill dirt by scooping or scraping within the designated right-of-way or by fill dirt obtained locally. Do not dig seeded areas within highway or public rights-of-way. Do not place foreign objects in backfill.

C. Reuse only those materials as specified or as indicated that are equivalent in size, rating, capacity and other requirements of new materials and not damaged or deteriorated. Reuse of any other materials shall have prior approval by the Engineer. Upon this approval careful and accurate records shall be kept and submitted to the Engineer itemizing the particular materials reused and the location of their use.

D. Immediately remove from the job site any materials that are removed from existing assemblies.

END OF SECTION

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PART 2. GENERAL

1.1 SECTION INCLUDES

A. Pole materials and installation.

B. Basic methods.

C. Installation of suitable aggregate, concrete, or earth backfill.

D. Removals of existing facilities as shown in the Contract Drawings.

1.2 RELATED SECTIONS

A. DIVISIONS 0 and 1 – CONTRACT DOCUMENTS AND GENERAL REQUIREMENTS: These shall apply to all work included in this section.

B. Section 01 1113 – SUMMARY OF WORK

C. Section 01 2200 – MEASUREMENT AND PAYMENT

D. Section 31 1100 – CLEARING AND GRUBBING

E. Section 33 7126 – OVERHEAD ELECTRICAL LINE MATERIALS

1.3 REFERENCES

A. Published Specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work in this section where cited in Section 01 4219 – REFERENCE STANDARDS and in the listing below:

1. “The Lineman’s and Cableman’s Handbook”, McGraw-Hill Publishing Company.

2. “National Electric Safety Code”, ANSI – C2 (NESC).

3. “NFPA 70 National Electrical Code – 2002 Edition”, National Fire Protection Association.

4. “Guide to Transmission and Distribution Standards and Specifications”, Tennessee Valley Public Power Association.

5. American Society for Testing and Materials (ASTM), various standards, latest revision.

6. REA Bulletin 1724E-204, “Guide Specification for Steel Single Pole and H-Frame Structures”.

7. American Society of Civil Engineers (ASCE) Standard, “Design of Steel Transmission Pole Structures”, Manual 72, latest edition.

8. Tennessee Department of Transportation Standard Specifications for Road and Bridge Construction, Section 903.05, Aggregate for Mineral Base and Surface Courses, Grading D.

9. ASTM C29 Unit Weight of Aggregate
   ASTM C33 Standard Specification for Concrete Aggregates
   ASTM C136 Sieve or Screen Analysis of Fine and Coarse Aggregate

1.4 DEFINITIONS

A. Cambering - the fabricating of a slight convex curve in a pole or crossarm.

B. D/t - the ratio of the diameter of a tubular pole to the steel plate thickness.

C. Engineer - a registered or licensed person, who may be a staff employee or an outside consultant, and who provides engineering services. Engineer also includes duly authorized assistants and representatives of the licensed person.

D. Ground-line - a designated location on the pole where the surface of the ground will be after installation of a direct embedded pole.

E. Load factors (LF) - a multiplier which is applied to each of the vertical, transverse and longitudinal structure loads to obtain an *ultimate load.*

F. P-delta (P-Δ) moment - secondary moment created by the vertical loads acting on the structure when the structure deflects from its unloaded position.

G. Point of fixity - location on the pole at ground-line or below ground-line where the maximum moment occurs.

H. Raking - the practice of installing a straight pole out of plumb, or at an inclined angle.

I. w/t - Ratio of the width of the pole (flat-to-flat) to the plate thickness.

J. Ultimate load - The maximum design load which includes the appropriate *load factor* specified.

K. UNC – Unified Coarse Threads.

1.5 SUBMITTALS

A. Submittal information and shop drawings shall be submitted for approval in accordance with Section 01 3219 – SUBMITTALS and Section 01 3323 – SHOP DRAWINGS.

1.6 PROJECT CONSTRUCTION DRAWINGS

A. Conditions encountered in the field may vary from those shown on Contract Drawings, and the construction shall be modified as required to accommodate the field conditions involved. The Engineer shall approve any deviation from Contract Drawings prior to construction.

1.7 UNIT BASIS

A. The descriptions apply to those poles that are on the project drawings and include all necessary labor and incidental installation materials required to install the poles complete. Unit descriptions are provided in Section 01 2200 – MEASUREMENT AND PAYMENT.

1.8 WARRANTY

A. All labor, materials, and equipment supplied under this specification shall be warranted as outlined in the GENERAL CONDITIONS.

PART 3. PRODUCTS

2.1 WOOD POLES

A. Pole Materials and Classifications

1. Poles shall be made of Douglas Fir or Southern Yellow Pine. See Section 33 7126 – OVERHEAD ELECTRICAL LINE MATERIALS for treatment requirements.

2. Pole classifications and properties shall conform to ANSI Standards as indicated in the table below:

POLE CLASS	HORIZONTAL LOAD (LBS)	LENGTH RANGE (FT)	MINIMUM TIP CIRCUMFERENCE (IN)	MINIMUM CIRCUMFERENCE AT 6FT FROM BUTT (IN)
H4	8,700	40-125	35	51
H3	7,500	40-125	33	48.5
H2	6,400	35-125	31	43.5
H1	5,400	35-125	29	41.5
1	4,500	35-125	27	41
2	3,700	20-125	25	34
3	3,000	20-90	23	32
4	2,400	20-70	21	29.5
5	1,900	20-50	19	27.5
6	1,500	20-45	17	21

2.2 METAL (STEEL / DUCTILE IRON) POLES

A. Pole Materials

1. All materials shall comply with the applicable requirements of ASTM specifications. Any modifications to ASTM specifications must be approved by the Owner.

2. Poles, arms and conductor brackets shall conform to ASTM A36, ASTM A536, ASTM A572, ASTM 581, ASTM A588, ASTM 871 or ASTM A595.

3. For galvanized structures, steel used for the pole shaft shall have a silicon content of less than .06 percent.

B. Fabrication

1. All welding shall be in accordance with the AWS D1.1, latest edition. Welders shall be qualified in accordance with AWS D1.1 welding procedures.

2. One hundred percent penetration welds shall be required in, but not limited to, the following areas:
   a. Circumferential welds (C-welds) joining structural members.
   b. Longitudinal welds in the female portion of the joint within the slip joint area.
   c. Welds at the butt joints of back-up strips; and
   d. Base plate to shaft weld.
   e. Longitudinal welds for a minimum length of 3 inches where there are adjacent C-welds, flange welds, base welds and ends of tubes.

3. Quality and acceptability of every inch of the full penetration welds shall be determined by visual and ultrasonic inspection.

4. All other penetration welds shall have 60 percent minimum penetration. Quality and acceptability of all welds other than full penetration welds shall be determined by visual inspection, supplemented by magnetic particle, ultrasonic or dye penetrant inspection.

5. All weld back-up strips shall be continuous the full length of the welds. Care shall be exercised in the design of welded connections to avoid areas of high stress concentration which could be subject to fatigue or brittle fractures.

6. Field welding shall not be permitted except with owner’s approval and the manufacturer’s direction in repairing a pole.

7. All parts of the structure shall be neatly finished and free from kinks or twists. All holes, blocks, and clips shall be made with sharp tools and shall be clean-cut without torn or ragged edges.

8. Before being laid out or worked in any manner, structural material shall be straight and clean. If straightening is necessary, it shall be done by methods that will not damage the metal.

9. Shearing and cutting shall be performed carefully and all portions of the work shall be finished neatly. Copes and re-entrant cuts shall be filleted before cutting.

10. All forming or bending during fabrication shall be done by methods that will prevent embrittlement or loss of strength in the material being worked.

C. Design Criteria

1. For structures designed for Transmission facilities of 46kV and above, pole designs shall be prepared from the attached structure information (Attachments A and B of this Section) and design loads (Attachment B of this Section). The structure shall be capable of withstanding all specified loading cases including secondary stresses from foundation movements when specified in Attachment B of this Section but not considering the possible restraining effect of conductors or shield wires. The structure shall withstand the loads without failure, permanent distortion, or exceeding any specified deflection limitations.

2. Poles shall be designed with a minimum number of joints. Field welding shall not be allowed as part of the design of a new pole. The shaft joints to be made in the field shall be slip joints or bolted flange joints. Slip joint length shall be at least 1-1/2 times the largest inside diameter of the female section.

3. Minimum plate thickness for all pole components shall be 3/16 inch.

4. Structures which are to be direct embedded shall have bearing plates. Bearing plates shall have a diameter not more than 2 inches greater than the maximum pole diameter.

5. When ground sleeves are required, ground sleeve must have a minimum thickness of 3/16 inch and shall be centered at the ground-line. Grounds sleeves are not to be considered in strength calculations.

6. Poles shall have nearly a uniform taper throughout their entire length.

7. Weathering steel structures shall be designed to eliminate water and refuse traps.

8. Each pole shall be <u>permanently marked</u> on the pole shaft, 60 inches above the ground-line and on the bottom of the base plate with the following information:
   a. Structure Number
   b. Structure Height
   c. Structure Class
   d. Owner Name
   e. Date Manufactured

9. Holes for connection bolts shall be 1/16 inch larger than the nominal diameter of the bolts.

10. Field drilled holes must be approved by the Owner. If the manufacturer is aware of the Owner's intent to field drill holes, then they must supply a touch-up kit to the Owner when the poles are delivered.

D. Tolerances

3. Manufacturing Tolerances shall be limited to the following:

TYPE	TOLERANCE
POLE HEIGHT	ONE PIECE: ±2 INCHES, OR ±1 INCH ±1/8 INCH PER 10 FEET OF LENGTH, WHICHEVER IS GREATER (i.e. 120 FOOT POLE SHALL HAVE A LENGTH OF 120 FEET ±2-1/2 INCHES
POLE DIAMETER	-0 INCH, +1/4 INCH
POLE END SQUARENESS	±1/2 INCH PER FOOT OF POLE DIAMETER
POLE SWEEP	1/8 INCH PER 10 FEET OF POLE LENGTH
POLE TWIST	NONE ACCEPTABLE
SLIP JOINT TOLERANCES	TOLERANCES PER MANUFACTURER'S RECOMMENDATIONS AND TOTAL POLE LENGTH REQUIREMENTS ABOVE
BOLT HOLE ALIGNMENT	NOT TO VARY FROM THE LONGITUDINAL POLE CENTERLINE OF THAT GROUP OF HOLES BY MORE THAN 1/16 INCH
LOCATION OF IDENTIFICATION PLATE	±2 INCHES

E. Grounding

3. Two grounding connections shall be welded to the pole shaft. The top connection shall be installed 6 inches below the point of the neutral or shield attachment, whichever is higher. The bottom connection shall be installed 18 inches above the ground-line or 6 inches above the ground collar. The grounding connections will be either the two-hole NEMA pad, or a nut, or a threaded insert installed in the pole, or as approved by the Owner.

4. Threaded inserts installed for grounding shall be made of Type 316 stainless steel and provided with standard 1/2-inch, 13 UNC threads. Threads shall be protected from coatings.

F. Finishes

3. The following finished are acceptable: Galvanizing, Zinc Primer and Painting, Weathering Steel, and below grade coating.

   a. **Galvanizing:** All structures and structural components which are hot-dip galvanized shall meet all the requirements of ASTM A123 or ASTM A153. Measures shall be taken to prevent warping and distortion according to ASTM A384 and to prevent embrittlement

according to ASTM A143. Poles made of ASTM A588 steel shall not be galvanized due to the high silicon content of the steel. Poles made of ASTM A536 shall not be galvanized.

b. **Zinc Primer and Painting:** Poles that are to be painted shall be hermetically sealed to prevent corrosion of interior surfaces. After shot or sand blasting and cleaning, a zinc primer of 3 mils dry film thickness (DFT) and two coats of finish paint, each 3 mils DFT shall be applied to all exterior surfaces in accordance with the paint supplier's recommendations. A guarantee against flaking or fading of the paint for a minimum of 5 years shall be provided.

c. **Weathering Steel:** Steel shall conform to ASTM A588, ASTM A536 or ASTM A871. After fabrication, poles made of weathering steel (natural finish for ASTM A536) shall be cleaned of oil, scale, etc., to ensure uniform and rapid formation of the protective oxide layer.

d. **Below Grade Coating:** When poles are to be directly embedded, a 16 mil (minimum DFT), two component hydrocarbon extended polyurethane coating that is resistant to ultraviolet light shall be applied on the exposed surface of the embedded portion of the pole. Any other coatings shall be approved by the Owner.

G. Inspection and Testing

1. Any members which are bent or warped or otherwise improperly fabricated shall be properly repaired or replaced.

2. The cost of tests made by the manufacturer (except full scale load tests on poles), including cost of the certified test reports shall be considered included in the price.

3. The manufacturer shall make tests in accordance with ASTM A327/A327M-11, ASTM A370 and ASTM A673 to verify that the material used in the structures meets the impact properties.

4. Mill test reports showing chemical and physical properties of all material furnished under this specification shall be maintained by the manufacturer for a period of 5 years and shall be traceable to the structure.

5. All plates over 1-1/2 inches thick shall be ultrasonically tested to assure against defects which could lead to lamellar tearing.

6. Welders or welding operators shall be qualified in accordance with the provisions of AWS D1.1.

7. The manufacturer shall make certified welding reports for each structure. The reports covering welding shall include all welds of each structure. Each weld shall be clearly identified; and the report shall consist of the method of testing, whether the weld is acceptable, the identification of the structure, the date, and the name and signature of the inspector.

H. Shipping

1. Each shipment shall be accompanied by a list of all parts, identifiable by structure type and number. Arms, bolts and miscellaneous hardware will be identified by the list for match up with the respective pole shaft. All parts required for any one structure shall be in one shipment, if possible.

2. The Utility Owner shall be notified prior to shipment that such shipment is to take place, and they reserve the right to inspect the components prior to shipment. The notification shall give quantities, weight, name of common carrier used, and expected time of arrival.

3. When shipping self-supported structures, the anchor bolts shall be welded to the holding plate in the bottom of the cage. A removable template shall be used at the top of the cage and shall be marked to show the centerline for tangent structures and the angle bisector for angle structures. Matching marks are to be on the base plate so proper alignment can be made. Bolt clusters shall be rigid enough to withstand the normal jolts of shipping and handling with no displacement of bolts from the proper positions within the cluster.

4. Unless otherwise agreed to by the Utility Owner, the anchor bolt cage shall be shipped at least 30 days prior to pole shipment.

5. Salt-treated wood blocking and urethane foams shall not be used when shipping or storing weathering steel poles.

2.3 COARSE AGGREGATES

A. ASTM C33 No. 67 gradation.

B. If filler, in addition to that naturally present in the aggregate material, is necessary for satisfactory compaction, it shall be uniformly blended with the aggregate material at the crushing plant.

C. If the additional filler is composed of sand, the amount of sand shall not exceed 20 percent by weight of the total combined aggregate.

2.4 CONCRETE

A. Portland Cement ASTM C150: Type 1.

B. Coarse and Fine Aggregates: ASTM C33.

C. Water: Clean and free of injurious amounts of oil, alkali, organic matter, or other deleterious materials.

D. Mix: Compressive Strength (7 day) 2100 psi.
Compressive Strength (28 day) 4000 psi.

E. Provide air entraining admixture conforming to ASTM C260.

F. Slump: Three inch maximum, one inch minimum.

2.5 WETHERING SEVERITY

A. Provide materials in accordance with ASTM C33 table 3 to the requirements for Class 3S weathering regions.

B. Do not use crushed concrete or recycled concrete for materials.

PART 4. EXECUTION

3.1 GENERAL

A. Existing Underground Installations:

1. Existing underground installations such as water lines, gas mains, and sewers in the vicinity of pole foundation drilling locations are indicated on the Drawings only to the extent that such information has been made available to or discovered by the Owner/Engineer in preparing the Drawings. There is no guarantee as to the accuracy or completeness of such information, and all responsibility for the accuracy and completeness thereof is expressly disclaimed.

2. The Contractor shall be solely responsible for locating all existing underground installations prior to drilling pole holes. The Contractor shall use his own information and shall not rely upon any information indicated on the Drawings concerning existing underground installations.

3. The Contractor will be held responsible for any interruption in the service of underground facilities resulting from his operations, unless the facilities owner has given specific approval for the interruption in each case.

4. Except where the damaged parties desire to conduct their own repair and restoration work, the Contractor shall repair and fully restore any underground facility damaged during the construction period to a condition equal to or better than that which existed at the time of damage. All repair and restoration work shall be done to the complete satisfaction of the damaged parties and the Owner.

5. The Contractor shall make his own arrangements with any jurisdictional authority requiring inspection of repaired or reconditioned utility facilities. All inspection fees applicable shall be paid by the Contractor.

6. Where the damaged parties desire to conduct their own repair and restoration work, the Contractor shall render all assistance to facilitate this corrective work. The Contractor shall assume all just and reasonable expenses thus incurred by the damaged parties.

7. Each underground facility encountered shall be accurately located on the Project Record Drawings, indicating the original location and relocation, if any. When all work is completed, the marked copy of the Drawings shall be submitted to the Owner as part of the field records.

3.2 POLE INSTALLATION

A. Handle poles carefully. Do not drop them from transportation vehicles. Use appropriate slings. Steel tongs or other grips that cause damage to pole surfaces are not acceptable.

B. The diameter of each pole hole shall be as required for compaction of backfill around the pole, but not less than the pole diameter at the butt plus 6 inches.

C. Pole hole excavation shall include removal of stumps, roots, and other obstructions as necessary to provide a clean hole to the required depth.

D. Poles shall be immediately set and plumbed after hole excavation.

E. The minimum setting depth shall be as follows:

LENGTH OF POLE (FEET)	SETTING DEPTH (FEET)	LENGTH OF POLE (FEET)	SETTING DEPTH (FEET)
35	5.5	80	10.0
40	6.0	85	10.5
45	6.5	90	11.0
50	7.0	95	11.5
55	7.5	100	12.0
60	8.0	105	12.5

3. On a sloping ground, measure the depth of the hole from the low side of the slope.

4. Each pole in single-pole structures and in multi-pole structures on level ground surfaces shall be set with variation no greater than 3 inches of the depth specified in the preceding table. When conditions are encountered that warrant setting depths in excess thereof the Engineer shall be notified prior to setting the pole.

F. Pole hole excavation by hand digging or other means shall be at the option of the Contractor. If Contractor encounters conditions with rock, recommendations for excavation must be submitted to the Utility Owner for approval.

G. Tamp thoroughly by mechanical method with earth backfill around the poles for the full depth of the hole. Mechanical tamping shall be in maximum 6-inch layers. Bank excess dirt up around the pole. Refill and thoroughly tamp to the ground line any settlement that occurs until completion of the Contract.

H. Poles shall be set in alignment and plumb with and across the line, except at angles where vertical suspension insulators or offset framing is used. Poles set on these type angles unless otherwise indicated shall be offset on the bisector of the angle so that the conductors shall hang directly over the point of intersection and in line with the poles in both directions either side of the angle.

I. Where rocks and gravel larger than 2 inches and without at least 50 per cent soil composition, and where swampy type soils are encountered in hole digging, this shall not be used as backfill. Do not use sod or grassy soil or place foreign objects in the backfill.

J. Each pole shall be set within ±1-1/2 inches transversely of the location indicated on the Drawings. Longitudinal location shall be within ±1 foot. Vertical alignment of all poles shall be within 3 inch of plumb.

K. When raking is specified, poles shall be raked one inch for each 10 feet of pole out of the ground. Poles shall be raked only upon prior approval from the Engineer.

3.3 WOOD POLES

A. Do not cut the top of poles except under very exceptional conditions and upon prior approval by the Engineer. If the top is cut, cover with an approved pole cap. Do not, under any circumstances, cut off the butt of any pole.

B. Do not frame poles that have sweeps or crooks across the line.

C. Plug all unused holes prior to pole erection using treated wood dowel pins. When holes are enlarged treat the hole with preservative compound of the same type as the pole treatment.

D. The Contractor shall field drill all bolt holes which are required for a complete installation. Where single members are bolted to more than two poles, holes in the center poles shall be drilled only after poles are set. Field drilled bolt holes shall be drilled using a bit with a diameter not larger than 1/16 inch greater than the diameter of the bolt to be inserted.

E. Field drilled holes shall be in line with the strain or at right angles to the assembly they support. Assemblies mounted on uneven pole surfaces shall be adjusted with metal shims or gaining of poles as approved by the Engineer. All field drilled holes, gains, and cut surfaces shall be treated with a preservative compound of the same type as the pole treatment or a liberal amount of 5 percent Pentachlorophenol.

F. Gaining of poles, where required, shall be perpendicular to bolt holes and shall not exceed ¼-inch in depth.

G. All structures shall be framed and assembled as indicated on the drawings. Assembly procedures shall minimize the amount of pole climbing that must be done after the structure is set. Any pole which is badly spurred shall be shaved and brushed with a preservative acceptable to the Engineer.

3.4 TUBULAR STEEL, DUCTILE IRON AND CONCRETE POLES

A. All structure components shall be handled with care to prevent damage to the finish. Padded cradles and nylon slings shall be used when handling the structures.

B. Poles shall be lifted by appropriate lifting rigs, utilizing a two point pickup when required. When lifting poles it is important to use lift points indicated by the manufacturer to prevent pole cracking or structural damage.

C. Tubular shafts which are shipped in more than one piece shall be assembled using two jacks placed on opposite sides of the shaft. Shaft assembly shall be performed according to the Manufacturer's instructions, drawings and recommendations.

D. Bolts:

3. Tightening of galvanized bolts shall be done by the "turn-of-nut" method only. A washer shall be used under the element to be turned in tightening.

4. Bolt installation and bolting tools and equipment shall be in accordance with the structure Manufacturer's recommendations. Nuts and bolts shall be handled and installed in a manner that will not damage the galvanized finish. Wrenches which deform the nut or bolt head or which mar the galvanized finish shall be replaced by wrenches acceptable to the Engineer. The Contractor shall replace, without cost to the Owner, all bolts and nuts damaged during installation with new, undamaged bolts and nuts of the same type, size, and quality as the original bolts.

5. Bolted connections shall be drifted to proper position and the holes inspected to ensure that bolt threads will not be damaged by forcing the bolts in place.

6. The Contractor shall make a thorough inspection to ensure that all bolts are tightened and that a locknut has been installed and tightened on each bolt where required.

7. Any structure bolt which has been tightened shall not be loosened and re-tightened. Bolts which have been loosened after tightening shall be discarded and new bolts used in their place. New bolts shall be furnished by the Contractor at no cost to the Owner.

E. All damaged galvanized surfaces shall be cleaned of grease, scale, and all foreign matter and repaired with "AMCO 322 Galvanizing Sticks" or "AMCO 321 Galvanizing Powder" as manufactured by Force Chemicals Division of American Solder and Flux Co., Inc. of Paoli, Pennsylvania, or an acceptable equal material. The touchup galvanizing material shall be applied in strict accordance with the manufacturer's application instructions to provide a uniformly coated surface. The Contractor shall furnish and apply the touchup galvanizing material to any surface where the galvanizing coating is broken or removed. Where practical, the galvanizing repair shall be done before the structures are set. Repair to galvanized surfaces damaged by the Contractor shall be at no cost to the Owner.

F. Where ground-line protection sleeves are furnished, they shall be centered at the standard depth that allows this protection sleeve to extend below and above the ground-line on individual poles. If the setting dimension or side hill slope causes the sleeve not to be 6" above or below the ground-line, the pole shall have a coating of bitumastic applied at ground-line to extend 1 foot above and below the ground-line.

G. Aggregate Placement:

3. Backfill aggregate shall be placed in compacted 6 inch lifts by means of mechanical or hydraulic tamping.

4. Bank aggregate around the structure to a height 6 inches above existing grade and taper to the edges of the backfilled hole. Refill and thoroughly tamp any settlement that occurs until completion of the contract.

5. Do no place foreign objects in backfill.

H. Concrete Placement:

3. Earthen form work is to be used in stable soils. Where soils are unsuitable, use forms for round columns spirally constructed of laminated plies of fiber similar to Sonotube Fiber Forms, or an approved equal.

4. Where round form work cannot be utilized, Contractor, at his option, may use form work of No. 2 common lumber or better. The form work may be square, but encompass as a minimum the circular diameter indicated in the Contract Drawings. Square form work shall penetrate below grade at least 2 feet, to a depth reached as suitable soils. The square adjoinment to circular shall be a monolithic pour.

5. Slope the exposed concrete to drain away from structure with at least ½ inch of slope reaching to the outer limit of the filled area.

6. Form-work shall not be removed for 24 hours after placement.

I. Structure Stabilization:

3. Structures shall be stabilized by holding, guying, or bracing until placement of special backfill has been completed.

4. When concrete backfill is used the structure shall be supported for at least 72 hours, and no external loads shall be subsequently applied for at least 7 days.

3.5 REMOVALS

A. Keep careful and accurate records of all materials removed or reused as specified.

B. When backfilling holes at pole removal locations do not dig holes in the landscape to obtain backfill. Obtain backfill dirt by scooping or scraping within the designated right-of-way or by fill dirt obtained locally. Do not dig seeded areas within highway or public rights-of-way. Do not place foreign objects in backfill.

C. Reuse only those materials as specified or as indicated that are equivalent in size, rating, capacity and other requirements of new materials and not damaged or deteriorated. Reuse of any other materials shall have prior approval by the Engineer. Upon this approval careful and accurate records shall be kept and submitted to the Engineer itemizing the particular materials reused and the location of their use.

D. Immediately remove from the job site any materials that are removed from existing assemblies.

END OF SECTION

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PART 1. GENERAL

1.1 SECTION INCLUDES

A. Overhead electric system construction

B. Materials and Equipment

1.2 RELATED SECTIONS

A. DIVISIONS 0 and 1 – CONTRACT DOCUMENTS AND GENERAL REQUIREMENTS: These shall apply to all work included in this section.

B. Section 33 7100 – OVERHEAD ELECTRICAL LINE CONSTRUCTION

C. Section 33 7116 – ELECTRICAL UTILITY POLES

1.3 REFERENCES

A. Published Specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work in this section where cited in Section 01 4219 – REFERENCE STANDARDS.

1.4 SUBMITTALS

A. Shop drawings shall be submitted for approval in accordance with Section 01 3219 – SUBMITTALS and Section 01 3323 – SHOP DRAWINGS.

B. Final Drawings, Manuals, and Test Reports shall be provided prior to shipment in accordance with Section 01 7839 – PROJECT RECORD DOCUMENTS.

1.5 QUALITY ASSURANCE

A. All materials, equipment and appurtenances used in construction of this project shall be new and shall conform to those acceptable by standard publications used in line construction, unless otherwise specified herein.

B. Supply all equipment and accessories new and free from defects.

C. Supply all equipment and accessories in compliance with applicable standards and with all applicable national, state, and local codes.

D. All items of a given type shall be the products of the same Manufacturer.

PART 2. PRODUCTS

2.1 ACCEPTABLE MATERIALS

A. All materials, equipment and appurtenances used in construction of this project shall be new, carry a minimum 1 year warranty for a period beginning with acceptance of the project by the Owner, and shall conform to the requirements as specified herein.

B. Manufacturer's names and catalog numbers are specified to establish the reliability, type, size, rating or capacity, design, or other features of the materials required. A closed specification is not intended and duplicating items of other reputable manufacturers will be acceptable upon the Engineer's approval, unless otherwise specified.

2.2 WOOD PRODUCTS

A. Crossarms and Timbers:
   1. All wood crossarms shall be treated with pentochorophenal with minimum retention of AWPA Standard A5 Section 5 in accordance with RUS Specification DT-5B, dated January 1982.

2.3 INSULATORS

A. Distribution:
   1. Horizontal Post: MacLean #NPKG10XB005, or as approved by Owner.
   2. Vertical Post/Pin: MacLean #DP55-6, or as approved by Owner.
   3. Suspension/Strain: MacLean #DS-15M, or as approved by Owner.

2.4 CONDUCTORS AND APPURTENANCES

A. Conductors:
   1. 336.4kcmil AAC Hendrix Spacer Cable
   2. 052 AWA Hendrix Messenger Cable
   3. #6 Duplex

B. Miscellaneous Conductors:
   1. Miscellaneous sizes and types as required for jumpers, connections, ties, etc., and handling, holding, tying, re-tying, sagging, etc.

C. Appurtenances:
   1. Splices:
      a. All 1 piece compression type.

   2. Connectors:
      a. All main line connections of AAC or ACSR, use bolted connections as approved.
      b. Switch Pad connectors shall be SafeCor #AL-70-2B, or as approved.
      c. Miscellaneous sizes and types as required.

3. Conductor Clamps:
   a. AAC and ACSR:
      1) Post Clamps: Sized for conductor to fit appropriate post insulator.
      2) Strain clamps: 20,000-lb rated bolted, as recommended by insulator manufacturer.

4. Lighting Arresters:
   a. Distribution Class: 10kV, PDV-100 Polymer housed, Ohio Brass #213709-7324 or as approved by Owner.

5. Fused Cutouts:
   a. 100A non-loadbreak: ABB #X1NCANAM11, or as approved by Owner.
   b. 100A loadbreak: ABB #Y1NCANBM11, or as approved by Owner.
   c. 200A loadbreak: ABB #Y1NCBNUA21, or as approved by Owner.

6. Fuses: Kearney, size as required.

7. Stirrup: AMP #600474, or as approved by Owner.

8. Terminators: 3M #5641-1/0 used with SC0010 stem connector, or as approved by Owner.

2.5 POLE LINE HARDWARE

A. All hardware shall be hot-dip galvanized.

B. Locknuts type MF.

C. Miscellaneous:
   1. Crossarm Arrester mounting bracket: MacLean #7106C0001, or as approved by Owner.

   2. Cutout and lightning arrester bracket: MacLean #G3MA014813DDB, or as approved by Owner.

   3. Disconnect switch bracket: MacLean #J26167, or as approved by Owner.

2.6 GUYS AND ANCHORS

A. Guys:
   1. Guy Strand: 3/8 inch high strength steel, 7 strand class A galvanized.

   2. Guy bonding clamps for anchor rod eyes, malleable iron with hot-dip galvanized steel bolt, sized to rod eye type and guy strand.

   3. Grounding jumpers AWG No. 4 soft drawn copper using suitable compression connectors.

   4. Guy deadends – preformed type.

5. Guy Marker plastic PVC material 8 ft. yellow with spiral grip.

B. Anchors:
   1. Anchor Type: 10” Power Installed Helix, Chance #C102-5005, or as approved by Owner.

   2. Anchor Rod & Eyenut: 1”x7’ Rod and Tripleye Nut, Chance #E102-0053, or as approved by Owner.

2.7 GROUNDS

A. Pole ground wires shall be No. 4 AWG solid soft drawn copper, unless otherwise noted on Contract Drawings.

B. Solid soft drawn copper for grounding jumpers, same size as pole grounds.

C. All connections for pole grounds shall be compression type.

D. Ground rods copper clad 5/8” X 8’-0”.

E. Ground rod clamp: Joclyn #JAB34K.

2.8 SWITCHES

A. Distribution:
   1. Hook Operated Disconnect, 14.4kV, 110kV BIL, 600 Amp Continuous. S&C #4942R10, or as approved by Owner.

2.9 CONDUIT HARDWARE

A. Conduit sealing bushing for conduit riser shall be OZ Gedney type CSB or as approved.

END OF SECTION

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