ADVERTISEMENT FOR BIDS

Sealed proposals will be received in the Office of the Procurement Manager, Greenville Utilities Commission, 401 S. Greene Street, Greenville, North Carolina 27834 until 4:00 pm (EDST) on June 30, 2020 and immediately thereafter publicly opened and read for the furnishing of Sugg Parkway Substation Structures, Equipment, and Foundation Design.

Instructions for submitting bids and complete specifications will be available in the Office of the Procurement Manager, Greenville Utilities Commission, 401 S. Greene Street, Greenville, North Carolina during regular office hours, which are 8:30AM – 5:00PM Monday through Friday.

Greenville Utilities Commission reserves the right to reject any or all bids. **Late bids will not be considered.**

Notice to Bidders:

Greenville Utilities Commission is committed to the health and safety of our customers and employees. We are taking the spread of COVID-19 very seriously and continue to monitor the latest Local, State, and Federal guidance. We are receiving FedEx, UPS, US Mail.

We are requesting that you also send a scanned copy of your bid or electronic copy via e-mail to my attention at: haddocgc@guc.com Please note to send the scanned copy of your bid or electronic copy via e-mail on July 1, 2020 by 4:00 pm. Do not send before July 1, 2020.

We must still receive your sealed proposal/bid (paper hardcopy) by 4:00 pm (EDST) on June 30, 2020 per the bid instructions for your sealed proposal/bid to be considered.

SECTION I

GENERAL INSTRUCTIONS FOR FORMAL BIDS

RELATED TO THE PURCHASE OF APPARATUS, SUPPLIES,

MATERIALS, AND EQUIPMENT

1. NOTICE TO BIDDERS

Sealed bids, subject to the conditions made a part hereof, will be received in the Office of the Procurement Manager, Greenville Utilities Commission, 401 S. Greene Street, Greenville, North Carolina 27834 until 4:00 pm (EDST) on June 30, 2020, the day of opening. Bids submitted in a fax or e-mail in response to this Invitation for Bids **will not be acceptable.**

2. STANDARD FORMS REQUIRED

Each bidder must submit a proposal on the enclosed bid forms. **The bid must be signed by an authorized official of the firm. Return only the attached Proposal Form. Do not return the Advertisement for Bids, Instructions to Bidders or Specifications.**

3. PREPARATION OF BID

Bids must be in sealed envelopes clearly marked on the outside with the name of the bid and the bid opening date and time. Bid shall be addressed to PROCUREMENT MANAGER, GREENVILLE UTILITIES COMMISSION, 401 S. GREENE STREET, GREENVILLE, NORTH CAROLINA 27834.

4. TIME FOR OPENING BIDS

Bids will be opened promptly and read at the hour and on the date set forth in the advertisement in the Office of the Procurement Manager, Greenville Utilities Main Office, 401 S. Greene Street, Greenville, North Carolina. Bidders or their authorized agents are invited to be present.

5. BID SECURITY

Each Proposal shall be accompanied by cash, cashier's check, or certified check drawn on a bank insured with the Federal Deposit Insurance Corporation or the Savings Association Insurance Fund, payable to the Owner, in an amount not less than five percent (5%) of the total bid as a guarantee that a Purchase Order, if awarded, will be accepted. In lieu thereof, a Bid Bond may be submitted by the Bidder in an amount not less than five percent (5%) of the total bid.

6. NC SALES TAX

Do **not** include NC sales taxes in bid figure; however, Greenville Utilities Commission (GUC) does pay sales tax. Sales tax should be added to the invoice as a separate item.

7. FEDERAL EXCISE TAX

GUC is exempt from Federal Excise Tax and will issue a Federal Exemption Certificate upon request to the successful bidder.

8. EXCEPTIONS TO BE CLEARLY STATED

If bid is not in strict accordance with Section II, "Specifications," bidder must list or note all exceptions **on the Request for Proposal Form**, otherwise, it is fully understood that the successful bidder will furnish equipment and/or materials exactly as specified. GUC reserves the right to accept or reject bids with noted minor deviations from specifications and to determine the lowest responsible, responsive bid from the standpoint of quality, performance, and price.

9. EVALUATION AND AWARD OF BIDS

GUC reserves the right to reject any and all bids, to waive any and all informalities, and to disregard all nonconforming or conditional bids or counter proposals. In evaluating bids, GUC shall consider whether the bids comply with the prescribed requirements, plus all alternates or options requested. GUC reserves the right to include or exclude any option or alternative in GUC's opinion is in GUC's best interests. If a bid is to be awarded, it will be awarded to the lowest responsible, responsive bidder whose evaluation by GUC indicates that the award will be in GUC's best interests. Only firm prices will be considered for award of this bid.

10. PROMPT PAYMENT DISCOUNTS

Bidders are urged to compute all discounts into the price offered. If a prompt payment discount is offered, it may be considered in the award of the contract.

11. NUMERICAL ERRORS

In the case of a discrepancy between a unit price and the extension (the unit price multiplied by the number of units), the unit price governs. In the case where numerical bids are stated both in numbers and in words, the words govern.

12. BID WITHDRAWAL

A bidder must notify GUC in writing of its request to withdraw a bid within seventy-two (72) hours after the bid opening, not including Saturdays, Sundays, or holidays. In order to justify withdrawal, the bidder must demonstrate that a substantial error exists and that the

bid was submitted in good faith.

13. MINORITY BUSINESS PARTICIPATION PROGRAM

GUC has adopted an Affirmative Action and Minority and Women Business Enterprise Plan (M/WBE) Program. Firms submitting a proposal are attesting that they also have taken affirmative action to ensure equality of opportunity in all aspects of employment, and to utilize M/WBE suppliers of materials and/or labor.

14. DELIVERY TIME

Delivery time is to be stated and will be considered in the evaluation of bids. Failure by the successful bidder to meet quoted delivery shall be interpreted as non-compliance with these specifications and may be deemed sufficient cause for removal of the manufacturer and/or distributor from our lists as acceptable manufacturers or bidders.

15. DELIVERY

Shipments will be made only upon individual releases from a blanket purchase order issued by GUC in accordance with GUC's current needs. Time is of the essence with respect to all deliveries under this Agreement. Delivery of all equipment, materials, or supplies shall be made Free on Board (FOB) Sugg Parkway Substation, 1390 Sugg Parkway, Greenville NC 27834, unless otherwise specified. The agreed price for such equipment, materials, or supplies shall include all costs of delivery and ownership, and risks of loss shall not be transferred from Provider to GUC until express written acceptance of delivery and inspection by GUC. Delivery hours are between 8:00 AM and 4:30 PM Tuesday-Thursday only. **GUC's purchase order number is to be shown on the packing slip or any related documents.** GUC reserves the right to refuse or return any delivery with no purchase order number or which is damaged. GUC will not be charged a restocking fee for any delivery which is refused or returned.

16. CONTRACT PERIOD

TBD

17. MANUFACTURER

Bidder is to specify the manufacturer of items being quoted if applicable.

18. QUANTITIES

Quantities specified are only estimates of GUC's requirements. GUC reserves the right to purchase more or less than the stated quantities at prices indicated in the submitted Proposal Form based on our actual needs.

19. CONTACT INFORMATION

Questions regarding this bid request should be directed to Cleve Haddock, CLGPO, Procurement Manager, at (252) 551-1533, haddocgc@guc.com. **All questions regarding this bid must be received by or before 5:00 pm (EDST) on June 15, 2020.**

20. TERMS AND CONDITIONS

The attached Terms and Conditions apply to all purchases made by Greenville Utilities Commission (GUC) and must be considered as part of the bid proposal.

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SECTION II

GREENVILLE UTILITIES COMMISSION

SPECIFICATIONS FOR SUGG

PARKWAY SUBSTATION STRUCTURES, EQUIPMENT, AND FOUNDATION DESIGN

1.0 GENERAL

1.1 Scope

These specifications are for furnishing FOB job site structures, equipment, and foundation design for Sugg Parkway Substation project.

Sugg Parkway Substation – 1390 Sugg Parkway, Greenville, NC 27834

The structures and equipment shall be furnished complete and ready for installation, connection, and immediate service and shall include:

- Tubular aluminum bus conductor, cable connectors and accessories
- Bus support insulators
- (2) 115 kV H-frame dead-end structure with 115 kV switch & motor operator
- Six (6) 15 kV equipment bays
- 15 kV group operated switches and hook stick switches

Foundation design for the circuit switcher and for all vendor supplied structures will be provided by the vendor.

1.2 Delivery

The equipment shall be delivered FOB to Sugg Parkway Substation, 1390 Sugg Parkway, Greenville NC 27834 by truck shipment and unloaded by Greenville Utilities. Greenville Utilities shall receive shipping notice at least 48 hours before delivery.

The Contractor shall submit to Greenville Utilities duplicate copies of shipping notices describing each shipment of material or equipment.

The Contractor shall contact Ken Wade, Substation Engineer at least 72 hours prior to arrival of equipment at the delivery site, to notify Greenville Utilities of the method of shipment and date of arrival. Telephone notification shall be made between 8:00 a.m. and 5:00 p.m., Monday through Friday, telephone 252-551-1570.

The Contractor shall pay all demurrage costs resulting from delays in unloading, if those delays are caused by failure of the Contractor to notify Greenville Utilities of shipment or to schedule shipment as specified above.

1.3 Shipping Requirements

All materials shall be suitably protected to prevent damage and loss during shipment. Special care shall be exercised in loading the members for shipment to assure that members will not be deformed by overburdened loads and that wearing of the galvanized surfaces will not occur during shipment.

The steel structures shall be shipped assembled where shipping conditions permit.

Each bidder shall furnish with his proposals, under the Section PROPOSAL DATA, a list of the structure items that will require field assembly and describe the shipping sections. All small items shall be bagged, identified and shipping in boxes or crates. The contents of all boxes and crates shall be identified with a packing slip.

1.4 Codes and Standards

Except where specifically stated otherwise, all equipment furnished under these specifications shall conform to the latest applicable standards of ASTM, NEMA, NESC, ANSI, IEEE, NEC, and EEI and shall be in accordance with the applicable requirements of the Federal "Occupational Safety and Health Standards."

The requirements of the drawings and the written text of these specifications shall govern in case of conflict between them and any of the referenced codes and standards except the mandatory standards which shall govern in all cases. Any conflict between standards shall be referred to Greenville Utilities to determine which standard shall govern.

1.5 Correction of Manufacturing Errors

Equipment and materials shall be complete in all respects within the limits herein outlined. All manufacturing errors or omissions required to be corrected in the field shall be done by the manufacturer or his duly authorized representative and at the Supplier's expense.

1.6 Arrangement and Ratings

This project is for the construction of a115 to 13.2 kV substation. The substation will include a new transformer rated 20/26.7/33.3 MVA OA/FA/FA @ 55°C rise (22.4/29.8/37.3 MVA OA/FA/FA @ 65°C rise) with load tap changer (LTC). The 115 kV system will include a 115 kV feed through with three motor operated air break switches. The 115 kV bus will be designed for two transformer taps. The 13.2 kV substation section will include a main and transfer 13.2 kV bus and a six bay distribution structure. Initially four 1200 ampere circuit breakers and one 2000 ampere main bus breaker will be installed. The distribution feeders will exit the substation underground.

The arrangement of the structures is depicted in Appendix B. Section 4.1 lists the equipment details.

1.7 Material to be Furnished

Material and equipment shall be furnished in accordance with the drawings and bill of material as listed in Appendix A, Appendix B and these specifications. The bill of material included in this specification represents GUC's standard substation package. The quantities are not exact. The vendor is responsible to furnish all structures and equipment to ensure a complete substation.

2.0 ENGINEERING DATA

2.1 General

This section covers the requirements for moment and loading data, manufacturer's drawings, instruction manuals, and other engineering data that the Contractor shall submit to Greenville Utilities for design information and review.

2.2 Correspondence

Correspondence forwarding drawings, instruction manuals, and other engineering data shall be addressed as follows:

Electronic	**Correspondence**	**Delivery**
Ken Wade	Greenville Utilities	Greenville Utilities
wadekr@guc.com	PO Box 1847	801 Mumford Road
John Powell	Greenville, NC 27835-1847	Greenville, NC 27834
powelljl@guc.com	Attention: Mr. Ken Wade	Attention: Mr. Ken Wade

Always include the Manufacturer's order number.

2.3 Drawings, Bills of Material, and Loading Data

2.3.1 Shop drawings, bills of material, and loading reaction data covering all fabricated materials furnished under this Specification shall be submitted to Greenville Utilities for approval within **35** days after award of contract. Drawings shall be a maximum of 24 by 36 inches. No work shall be performed in connection with fabrication or manufacture of materials until the drawings and data have been approved.

2.3.2 Loading data shall show the worst-case loads at the foundations in the "X", "Y", and "Z" directions, and resulting moments at the foundation surfaces.

2.3.3 Drawings and necessary data which show the kind, size, arrangement, weights of each component, and operation of component materials and devices; the external connections, anchorage, and supports required; and the dimensions needed for installation and correlation with other materials and equipment shall be submitted to the Greenville Utilities for review.

2.3.4 Approval drawings and reaction data, either preliminary or certified, shall be submitted to Greenville Utilities electronically. Each drawing submitted shall be clearly marked with the name of the project, the order number, the Contractor's name, and references to applicable specification paragraphs. When catalog pages are submitted, the applicable items shall be indicated, and the pages shall be included in the Substation Equipment Manual.

2.3.5 Drawings, data, and equipment manuals will be reviewed by Greenville Utilities and returned to the Contractor marked APPROVED, APPROVED AS NOTED, or RETURN FOR CORRECTIONS.

2.3.6 When the drawings, data, and equipment manuals are returned marked APPROVED AS NOTED or RETURNED FOR CORRECTIONS, the changes and/or corrections shall be made as noted thereon and corrected copies shall be submitted electronically to Greenville Utilities for final approval and distribution.

2.3.7 When the drawings are returned marked RETURNED FOR CORRECTIONS, the corrections shall be made as noted thereon and as instructed by Greenville Utilities, and shall be submitted electronically.

2.3.8 Greenville Utilities' review of drawings and data will cover only general conformity to the Specifications and the external connections and dimensions. Greenville Utilities' review of drawings returned marked APPROVED will not constitute a blanket approval of all dimensions, quantities, and details of the material, equipment, device, or item shown and does not relieve the Contractor from any responsibility for errors or deviations from the contract requirements. All drawings and data, after final approval by the Greenville Utilities, shall become a part of the contract documents and the work shown or described thereby shall be performed in conformity therewith unless otherwise required by Greenville Utilities. After all drawings have been approved, the Contractor will submit the drawings to Greenville Utilities in AutoCAD format, 2013 version. The Substation Equipment Manual shall be bound in one binder with four copies delivered to Greenville Utilities and one copy sent electronically in Adobe (pdf) format.

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3.0 SUBSTATION STEEL STRUCTURES

3.1 General

This section cover materials and fabrication for substation wide flange steel structures to be incorporated in the **Sugg Parkway Substation** in Greenville, North Carolina.

The structures furnished under these specifications shall include all new structures indicated on the drawings listed in Appendix B..

The structures shall be complete with all field connection bolts required for erecting the structures and all bolts required for mounting the equipment furnished under other sections of these specifications. In addition, mounting bolts shall be furnished for mounting other equipment as indicated on the drawings.

All testing and welding specifications required by these specifications shall be performed by an independent testing laboratory retained by the Fabricator and accepted by Greenville Utilities. All testing qualification expenses shall be paid by the Fabricator.

Certain dimensions indicated on Greenville Utilities' drawings shall be adjusted as required to suit the equipment furnished by the Contractor under other sections of these specifications. The dimensions required for the equipment furnished shall be shown on the Contractor's detail shop drawings and the materials and fabrication required shall be provided as part of the contract work. There will be no adjustment in price because of these requirements.

The following minimum clearances shall be maintained:

Clearance	**115 kV**	**13.2 kV**
Metal-to metal phase spacing (inches)	53"	12"
Vertical break disconnect switch center-to center phase spacing (inches)	84"	24"
Horn gap switch (if used to interrupt transmission line charging currents, loop currents, or transformer magnetizing currents) and expulsion type fuses center-to-center phase spacing (inches)	120"	36"
Phase-to-ground (inches)	47"	10"
Vertical clearance from energized parts or jumpers to grade (feet-inches)	12'-0"	9'-0"
Clearance from unguarded live parts to working platform (feet-inches)		
Vertical	11'-7"	9'-0"
Horizontal	6'-1"	3'-6"
Low bus height above top of foundation (feet)	12'-0"	14'-0"
High bus height above top of foundation (feet)	20'-0"	23'-8"

Detail sealed engineering calculations, shop drawings, foundation drawings and erection drawings shall be prepared, checked, and submitted, to Greenville Utilities in accordance with the requirements of Section 2. Engineers seal on calculations shall be for the State of North Carolina or the state of the Engineers' primary residence.

3.2 Codes and Standards

All material furnished under this section shall conform to the applicable codes or standards of the technical societies or organizations listed in these specifications, to the specific standards mentioned in this section, and the latest edition of North Carolina Building Code.

Reference to technical societies or organizations may be made by abbreviation in accordance with the following list.

AHDGA	-	American Hot-Dip Galvanizers Association
AISC	-	American Institute of Steel Construction
AISI	-	American Iron and Steel Institute
ANSI	-	American National Standards Institute
ASCE	-	American Society of Civil Engineers
ASTM	-	American Society of Testing and Materials
AWS	-	American Welding Society
IEEE	-	Institute of Electrical and Electronic Engineers
NEMA	-	National Electrical Manufacturers Association

Except as otherwise specified or specifically indicated on the drawings, all materials furnished and work performed in connection with substation structure work under this section shall be in conformity with the AISC Manual of Steel Construction, Ninth Edition.

3.3 Structure Loads

The following structure loads shall be considered.

3.3.1 Apparatus Loads

Apparatus loads include the following:

- Weight of equipment
- Conductor and bus weight
- Friction forces, moments, and torque due to mechanical operation of apparatus such as air break switches

3.3.2 Climatological Loading

- Ice Loading: The Ice Loading Condition is 0.5 inch radial ice thickness, at 0 degrees F, with a wind pressure of 2.3 pounds per square foot (psf).
- Extreme Wind: The extreme wind condition shall be a 31 psf horizontal wind pressure, with no ice, at a temperature of 60 degrees F.

3.3.3 Application of Wind Loads and Ice Loads on Structures

The wind pressures for Section 3.3.2 will be applied to the vertical projection of the structural members for the first bent. A bent consists of one or more columns effectively all in on plane, including bracing between the members. For successive bents, the wind pressure will be reduced in proportion to the shade factor K, where K is defined as follows:

$$K = L / 4W$$

L = Distance from front of the first bent to front of the following bent.

W = The least dimension perpendicular to the wind direction.

If L is greater than 4W, then shading is ineffective and full wind pressure is applied to the next bent (K=1).

Shape factors for applying wind force will be applied as follows:

Round shapes	1.0
Octagonal shapes	1.4
Flat shapes	1.6

For lattice towers, lattice box columns and trusses, the exposed area is assumed to be 1.5 times the total exposed area of the component members.

3.4 Allowable Stresses and Deflections

Allowable stresses shall be calculated according to the methods outlined in the latest edition of the AISC Manual of Steel Construction. The following deflection limits shall apply when the structure is under a set of compatible loads without short circuit forces.

3.4.1 Class “A” Structures

Intended for the support of high voltage equipment, i.e., air break switches and other circuit interrupting devices

- Horizontal deflection of vertical members: 1.0% of the vertical height
- Vertical deflection of horizontal members: 0.5% of the span
- Horizontal deflection of horizontal members: 0.5% of the span

3.4.2 Class “B” Structures

Where deflections within the limits do not affect the performance of support equipment, i.e., dead-end structures without switches, bus supports, and miscellaneous equipment supports

- Horizontal deflection of vertical members: 2.0% of the vertical height
- Vertical deflection of horizontal members: 0.5% of the span
- Horizontal deflection of horizontal members: 1.0% of the span

3.5 Materials

All materials shall be new and undamaged and shall conform to pertinent AISC and ASTM standard specifications and the following requirements.

Steel shapes and plates for structures	ASTM A36 steel. Minimum yield point of 36,000 psi including appurtenant materials. Galvanized after fabrication.
Structural tubing members	ASTM 500, Grade B. Minimum yield point of 46,000 psi. ¼ inch minimum wall thickness, galvanized after fabrication.
Welding electrodes	AWS D1.1-80 (as specified in Table 4.1.1 "Matching Filler Metal Requirements"). Low hydrogen types, tensile strength range of 70,000 psi minimum.
Structural members bolted connections	ASTM A325, heavy hex bolts and install high strength threaded fasteners in accordance with AISC "specifications for structural joints using ASTM A325 or A490 bolts."
Connection bolts and bolts for equipment mounting	ASTM A394; hexagon bolts and nuts, flat or beveled washers, and MacLean-Fogg "M-F Lock Nut #1" locking devices. All bolting materials shall be galvanized.
Galvanizing	ASTM A384, ASTM A385, and ASTM A386
Shapes and plates	ASTM A123
Bolts, nuts, and washers	Galvanized as specified in ASTM A394 and ASTM A153.
Anchor bolts	ASTM A153

3.6 Anchor Bolts

The contractor shall provide detailed design of the anchor bolts. Detailed design calculations and design drawings to verify the anchor bolt design shall be provided to Greenville Utilities for review. Design shall be based on equipment weights and loads, line tensions and climatological design criteria as listed in these specifications.

Anchor bolts shall be fabricated from ASTM A36 steel rods and shall have heavy hexagon nuts conforming to ASTM A307, Grade B. Anchor bolts, nuts and washers shall be hot-dip galvanized after fabrication, threads being undercut to provide a tolerance equal to ANSI Class 2A. Each bolt shall be furnished with two nuts and sufficient threads to permit a nut to be installed on each side of the or template.

The Contractor shall provide anchor bolts for columns and stands. Greenville Utilities will provide anchor bolts for the circuit breakers.

3.7 Field Connection Bolts

Field connection bolts, nuts, and washers shall be furnished for all structure field connections and equipment mounting with the overage of five per cent plus five bolts of each type, size, and length. The length of bolts shall be determined with sufficient projection for washer, nut, and locknut.

With locknuts in place, bolt projection beyond the locknut shall be from ¼ inch to ½ inch inclusive.

Smooth beveled washers shall be furnished for use when the bearing faces of the bolted parts will have a slope of 1:20 or greater with respect to a plane normal to the bolt axis.

Bolting materials shall be shipped in sturdy kegs or pails which shall be marked with the size, length, count, and other descriptive data as required to fully describe the contents.

3.8 Fabrication

The structures shall be fabricated in conformity with the dimensions, arrangements, sizes, and weights or thicknesses indicated on the drawings or stipulated in the specifications. All members shall be detailed and fabricated in accordance with AISC standards, specifications, and details unless otherwise indicated on the drawings or specified herein and shall have been pre-assembled at the factory prior to shipping to ensure proper fit.

The structures shall be shipped assembled where shipping conditions permit. Each bidder shall furnish with his proposal, under the heading PROPOSAL DATA, a list of the structure items that will require field assembly and describe the shipping sections. When proposals are submitted without statements describing sectional shipments, it will be understood that no field assembly of the structures will be required.

When delivered, members shall be straight, free from warp, unauthorized splices and bends, or local deformations. Holes and other provisions for field connections shall be accurate and shop checked so that when the structure is field assembled, proper fit will be provided. All punching, drilling, and reaming of the holes shall be done in the shop before galvanizing.

All fabricated materials shall conform to the tolerances specified in the AISC Manual and ASTM A6. In additions, the allowable tolerance for sweep shall be no more than 1/8 inch in 10 feet of length regardless of the type of steel section. If necessary, the Contractor shall cull out or straighten materials that do not comply with the specified tolerances. Materials that do not comply with the specified sweep and camber requirements may be rejected.

Baseplates shall also be checked after fabrication and will be rejected if anchor bolt holes are not within 1/32 inch of their specified location with respect to the center of the anchor bolt group or cluster.

Contact surfaces at all column splices and at all other compression joints depending upon contact bearing shall have the bearing surfaces prepared to a common plane by milling, sawing, or other acceptable means. Only milling will be acceptable where milling is specifically indicated on the drawings.

Shearing, flame cutting, and chipping shall be done carefully and accurately. Baseplates, fillers, stiffeners, and connection plates shall be neatly fitted and shall not have ragged edges. Holes shall be cut, drilled, or punched at right angles to the surface and shall not be made or enlarged by burning. Holes shall be clean-cut without torn or

ragged edges, and burrs resulting from drilled or reaming operations shall be removed with the proper tool.

Bolt holes shall be provided for mounting equipment, conduit, and grounding attachments as indicated on the drawings.

Except as otherwise indicated on the drawings or specified herein, shop connections shall be all welded and field connections shall be all bolted. Bolted connections shall be bearing type with all threads excluded from the shear planes of the connected parts.

3.9 Nondestructive Testing

Nondestructive testing shall be provided in accordance with the requirements of Article 6.7 of the referenced AWS code as follows.

Magnetic particle inspection or ultrasonic inspection shall be provided at all circumferential welds and all other critical welds.

Inspection and evaluation of the test data shall be performed by persons fully qualified by training and experience to inspect, evaluate, and accept or reject these welds. Copies of the test reports covering this inspection shall be furnished to Greenville Utilities. Any defective weld shall be removed, rewelded, and re-inspected at the Contractor's expense.

3.10 Identification

All separate structural members and parts shall be plainly marked, as an aid in assembly, with the identifying mark on the member corresponding to the identical mark on the erection drawings. Marks shall be metal stamped into each member in characters not less than ½ inch high. Stamping shall be done before galvanizing, but marks shall be clearly legible after galvanizing. Marks shall also be painted on the galvanized members with nonpermanent paint in characters not less than one inch high. Connection materials shall be packaged in separate containers with durable fade proof and weatherproof markings.

3.11 Galvanizing

All steel materials furnished under this section shall be hot-dip galvanized after fabrication. Materials shall be prepared for galvanizing by being properly cleaned, pickled, rinsed, and dried.

A durable, high quality, relatively smooth coating is required. The Contractor's attention is directed to the requirements of ASTM A384, ASTM A385, and ASTM A386 in this regard. Greenville Utilities may at its option inspect the galvanizing in process. Grounds for rejection of members because of galvanizing defects shall be as listed in Table II of the "Inspection Manual for Hot-dip Galvanized Products" published by the American Zinc Institute except that excessive general roughness, pimples, lumpiness, and runs shall be cause for rejection. Greenville Utilities will determine whether defects are excessive or not.

After all cutting, punching, reaming, welding, drilling, capping, and cleaning have been completed, all steel members shall be degreased, pickled, rinsed, pre-fluxed, and galvanized in accordance with the latest recommendations of AHDGA for compliance with the ASTM specifications.

The galvanizing coating shall cover all interior surfaces of hollow members as well as exteriors surfaces, channels, angles, and all other unsymmetrical sections shall be straightened after galvanizing as required to meet the specified tolerance requirements.

Anchor bolts shall be galvanized over their entire length.

4.0 DESCRIPTION OF SUBSTATION EQUIPMENT

4.1 General

This section covers materials and equipment to be supplied by the Contractor and incorporated in to the **Sugg Parkway Substation**. All material and equipment furnished under this section shall conform to the applicable codes or standards of the technical societies or organizations mentioned in this section.

4.2 Bus Materials

Bus materials furnished shall conform to the following:

The rigid substation bus shall be aluminum alloy 6063-T6 seamless pipe manufactured in accordance with ASTM Specification B-241. Schedule 40 pipe size (IPS) pipe shall be used. Jumper cables shall be provided and sized as shown on the drawings unless otherwise noted.

All shop welding shall be by the inert-gas electric-arc welding method.

End enclosure plugs shall be furnished for all bus pipe.

All aluminum bus sections shall be individually packaged in fiber boxes for shipment.

Current carrying connections to bus tube shall be radial swage compression type manufactured by **Deutsch Metal Components**. Qualified personnel, using manufactures' recommended methods, shall install swage radial compression connections. Welded and bolted connections shall not be used for electrical bus tube connections.

Current carrying connections to AAC and ACSR cable shall be compression terminal type with factory installed corrosion inhibitor. Current carrying connections to copper cable shall be bolted type.

Where aluminum to copper connections are to be made, the contact surfaces will be tinned, or copper lined as appropriate for the metal-to-metal contact. Terminal pad connection bolts, Belleville lock washers, and nuts will be stainless steel or bronze as appropriate and of appropriate length for the connection. A sufficient number including a 5% overage amount shall be provided to make all electrical connections. An ample quantity of recommended electrical joint compound shall be furnished that will be used to prevent oxidation between the dissimilar metals and to prevent possible entrance of contaminants between the contact surfaces.

The Contractor shall provide complete information for tightening of all electrical connections secured with bolts or studs. The information furnished shall include torque wrench settings or complete details of other tightening procedures recommended for bus joints and connector attachments.

Bus received at the job site with scratches, burrs, or abrasions will be returned to the Contractor for repair or replacement. All other blemishes including black marks, scuff marks, etc., shall be repaired in the field under the direction of a manufacturer's

representative. The costs of field repairing the bus, repackaging, and shipping the bus back to the manufacturer shall be borne by the Contractor.

Bus fittings and jumpers shall be individually wrapped and packed in wooden crates. Sawdust or other similar non-deleterious shock absorbing material shall be used as a filler material to further protect the fittings and jumpers during shipping and handling. The sizes of the crates used shall be as large as practical to permit ease of handling by normal handling equipment.

4.3 Insulators

All 115 kV insulators shall be porcelain station post type, NEMA Technical Reference 286, ANSI 70 sky gray color. All 13.2 kV insulators shall be porcelain station post type, NEMA Technical Reference 205, ANSI 70 sky gray color.

4.4 Arrestors

All 115kV arrestors shall be Eaton Cooper Cat. No. UHAA096076A5249A11.

All 15kV arrestors shall be Eaton Cooper Cat. No. UHAA010008A1411A11.

4.5 Disconnect Switches

Switches shall be in accordance with applicable paragraphs of the NEMA, IEEE, and ANSI specifications and shall conform to the following additional conditions.

Insulators shall be as specified in Section 4.3.

Switch bases, operating mechanisms, and operating rods shall be hot-dip galvanized after all machining and threading operations. Operating rods and levers shall be cut to length and all machining operations and threading shall be completed at the factory. The operating mechanisms shall have provisions for grounding and for padlocking in the open and closed positions. All operating mechanisms shall be mounted on the structures. Each switch operator for group operator switches shall be furnished complete with all operating pipes, interphase spaces, pipe couplings, guide bearings, ground braids and offsets required to operate the switch from the ground.

All 15 kV switches shall be furnished with copper live parts.

All group-operated switches shall be furnished with a galvanized steel operator grounding platform with dimensions of 3 feet by 6 feet. Two compression terminals per grounding platform, one on each end of the platform, shall be provided by the Contractor.

Contractor shall provide Burndy Type GG, Anderson Type GC-109, or equivalent ground clamp for attaching ground braids to the operating pipe.

Switch bearings shall be of the sealed greaseless type.

All switches shall be manufactured by Cleveland Price.

4.6 Voltage Transformers

Voltage transformers shall be rated in accordance with the ratings shown on the drawings, applicable paragraphs of the NEMA, IEEE, and ANSI specifications.

4.7 Power Fuses

Power fuses shall be rated in accordance with the ratings shown on the drawings, applicable paragraphs of the NEMA, IEEE, and ANSI specification. Insulators shall be as specified under Section 4.3.

4.8 Ground Conductor and Connectors

No. 2/0 AWG copper ground stingers will be furnished by others for connection of each steel structure column to the below grade ground grid. The Owner shall furnish above grade No. 2/0 AWG copper ground conductor to connect the ground stingers to switch operating handles, switch operating platforms, voltage transformers, and surge arresters.

The Contractor shall provide all above grade ground connectors required for connecting ground stingers and above grade ground conductor to the steel structures. Above grade ground conductors shall be supported by bronze ground clamps at interval not to exceed four feet. Connectors shall be bronze ground clamps, cable-to-flat, type GC as manufactured by Anderson, or equal. Connectors on material listing have been specified for 1/2" thick steel structure. If thickness is other than 1/2", fabricator shall coordinate appropriate change order to specify connectors for correct steel thickness.

All equipment and switch operating platforms shall be bonded at two diagonally separating locations. All equipment shall be grounded with single 2/0 AWG copper except the power transformer shall be grounded with dual 4/0 AWG copper.

The switch platform shall have a continuous ground stinger from the below grade ground grid, to each diagonal corner pad, to the steel column and to the operating mechanism. The operating control pipe shall be bonded with a flexible braid strap. A separate ground stinger shall be bonded to both switch platform pads with the first ground stinger with a parallel groove grounding connector.

The static mast shall be a 2" x 10' galvanized pipe. There shall be a continuous 2/0 AWG copper ground from the static mast to the below grade ground grid. The copper conductor shall be bonded to the steel column every 4 to 6 feet.

4.9 Stranded Conductor Current Carrying Connections

Current carrying connections to AAC and ACSR cable shall be compression terminal type with factory installed corrosion inhibitor. Current carrying connections to copper cable shall be bolted type.

Where aluminum to copper connections are to be made, the contact surfaces will be tinned, or copper lined as appropriate for the metal-to-metal contact. Terminal pad connection bolts, Belleville lock washers, and nuts will be stainless steel or bronze as appropriate and of appropriate length for the connection. A sufficient number including a 5% overage amount shall be provided to make all electrical connections. An ample quantity of recommended electrical joint compound shall be furnished that will be used to prevent oxidation between the dissimilar metals and to prevent possible entrance of contaminants between the contact surfaces.

The Contractor shall provide complete information for tightening of all electrical connections secured with bolts or studs. The information furnished shall include torque wrench settings or complete details of other tightening procedures recommended for bus joints and connector attachments.

4.10 Equipment Details

BUS Dimensions	Bus Size
115 kV main bus	3” Schedule 40
115 kV tap bus	3” Schedule 40
15 kV main bus	3” Schedule 40
15 kV main bus tap	2” Schedule 40
15 kV transfer bus	2” Schedule 40

CONDUCTOR Sizes	Size
Transmission incoming line – 115 kV	1272 AAC
Power Transformer High Side – 115 kV	336 ACSR
Power Transformer Low Side – 15 kV	2-795 AAC
Bus Breaker – 15 kV	2-795 AAC
Feeder Breaker – 15 kV	1272 AAC
Distribution outgoing line – 15 kV	1000 MCM UG

Device Quantities	Quantity
Power Transformers	1
115 kV Circuit Switchers	1
15 kV Source Breakers (2000A)	1
15 kV Feeder Breakers (1200A)	4
Potential Transformer Sources	1
Station Service Transformers	1

Preferred Equipment Manufacturers	Manufacturers
Switches	Cleaveland-Price
Bus Connectors	Deutsch Power Products
Cable Connectors	Hubbell CCLS

4.11 Other Equipment

The Bill of Material Appendix A provides the recommended manufacturer and catalog number. The items provided by Greenville Utilities are identified by “Owner” as the manufacturer. The Contractor shall use the same item number in the developed Bill of Material and drawings. The Bill of Material and drawings can be provided electronically upon request.

5.0 Foundation Design

5.1 General

Vendor shall design foundations for all structures provided by the Vendor.

Vendor shall design foundation for one Owner provided S&C Series 2000 Circuit Switcher Model 2010 Catalog No. 197838AE12H2KMTT2VW1Y. Manufacturer approval drawings included in Appendix C. Foundation loading per pedestal is included in the manufacturer approval drawings.

5.2 Codes and Standards

All designs furnished under this section shall conform to the applicable codes or standards of the technical societies or organizations listed in these specifications, to the specific standards mentioned in this section, and the latest edition of North Carolina Building Code.

Reference to technical societies or organizations may be made by abbreviation in accordance with the following list.

ACI	-	American Concrete Institute
ANSI	-	American National Standards Institute
ASCE	-	American Society of Civil Engineers
ASTM	-	American Society of Testing and Materials
RUS	-	Rural Utilities Service

5.3 Foundation Design Criteria and Types

All drilled shaft (augered pier) and spread footing foundations shall conform to the standards listed in RUS 1724E-300 Chapter 8 Foundations.

The vendor shall utilize the geotechnical subsurface engineering report is included in this document, Appendix D, in the design of foundations. **Borings B-1 and B-2** included in the report yield the soil conditions at Sugg Parkway Substation.

The vendor shall design the foundations to address the allowable load-bearing capacity of the subsurface materials and the allowable deformations permitted upon the structure/foundation under loading.

Drilled shaft foundations are the preferred foundation type. Spread footing foundations will be allowed in lieu of drilled shaft foundations where soil conditions dictate the necessity for spread footings.

APPENDIX A

BILL OF MATERIAL

GREENVILLE UTILITIES COMMISSION

			PROJECT NO:	**FK-2132**
ITEM	QTY	**MFG**	**CAT. NO.**	**DESCRIPTION**
1	54896	MID		STEEL STRUCTURES, HOT-DIPPED GALVANIZED AFTER FABRICATION AND ASSEMBLED WITHIN LIMITATIONS OF TRUCKING
1A	4	VAL		H-FRAME POLES, 75' DIRECT EMBEDDED WITH 5' SHIELD SPIKE
2A	144	UNIQUE		ANCHOR BOLT: 1" WITH 2HHN,2FW
2B	32	UNIQUE		ANCHOR BOLT: 3/4" X 12" WITH 2HHN,2FW
2C	56	UNIQUE		ANCHOR BOLT: 3/4" WITH 2HHN,2FW
8	14	AMICO		SWITCH OPERATOR GROUND PLATFORM, 3 X 4'
SA	28	AE	TLS-42-L	GROUND CONN
10	2	CLEV-PRICE	CB-A	SWITCH: 115 KV 1200AMP GROUP OPERATED CENTER BREAK, ALUMINUM LIVE PARTS, MOTOR OPERATED, STANDARD ARCING HORNS,
10	12	SEVES		INSULATOR: 115 KV STATION POST TR-286
11	1	CLEV-PRICE	V2-C	SWITCH: 115 KV 1200 AMP GROUP OPERATED VERTICAL BREAK, COPPER LIVE PARTS, MOTOR OPERATED, STANDARD ARCING HORNS,
11	9	SEVES		INSULATOR: 115 KV STATION POST TR-286
12	9	CLEV-PRICE	CB-CV	SWITCH: 15 KV 2000 AMP GROUP OPERATED CENTER BREAK VEE, COPPER LIVE PARTS, STANDARD ARCING HORNS, SWING HANDLE CONTROL, AND TR-205 INSULATORS
14	2	CLEV-PRICE	CB-CV	SWITCH: 15 KV 1200 AMP GROUP OPERATED CENTER BREAK VEE, COPPER LIVE PARTS, STANDARD ARCING HORNS, SWING HANDLE CONTROL, AND TR-205 INSULATORS
15	12	CLEV-PRICE	LCO-C	SWITCH: 15 KV 2000 AMP HOOKSTICK DISCONNECT, WITH TINED TERM PADS, AND TR-205 INSULATORS
15	48	SEIB	GMB40058	BOLTS: 5/8" X 4" GMB W/HN,LW,WW
16	30	CLEV-PRICE	LCO-C	SWITCH: 15 KV 1200 AMP HOOKSTICK DISCONNECT, WITH TINED TERM PADS, AND TR-205 INSULATORS
16	120	SEIB	GMB40058	BOLTS: 5/8" X 4" GMB W/HN,LW,WW

ITEM	QTY	MFG	CAT. NO.	DESCRIPTION
17	30	CLEV-PRICE	LCO-CT	SWITCH: 15 KV 1200 AMP HOOKSTICK TANDEM DISCONNECT, WITH TINED TERM PADS, AND TR-205 INSULATORS
17	120	SEIB	GMB22558	BOLTS: 5/8" X 2-1/4" GMB W/HN,LW,WW
20	14	S&C	192222R2-E-Z5	FUSED DISCONNECT 15 KV 200 AMP, SMD-20
20	56	SEIB	GMB200	BOLTS: 1/2" X 2" GMB W/HN,LW,FW
20A	8	S&C	702003	FUSE UNIT, 3K
20B	8	GE	9F59UBD251	CURRENT LIMITING COMPANION FUSE
30	22	SEVES		INSULATOR: 115 KV STATION POST TR-286
30	88	SEIB	GCS10058	BOLTS: 5/8" X 1" GCS W/LW,FW
31	81	SEVES		INSULATOR: 15 KV STATION POST TR-205
31	102	SEIB	GCS100	BOLTS: 1/2" X 1" GCS W/LW,FW
31	60	SEIB	GCS200	BOLTS: 1/2" X 2" GCS W/LW,FW
40	6	COOPER	UHAA096076A5249A11	LIGHTNING ARRESTER, 76 KV MCOV STATION CLASS POLYMER
40	18	SEIB	GMB250	BOLTS: 1/2" X 2-1/2" GMB W/HN,LW
41	30	COOPER	UHAA010008A1411A11	LIGHTNING ARRESTER, 8.4 KV MCOV STATION CLASS POLYMER
41	90	SEIB	GMB275	BOLTS: 1/2" X 2-3/4" GMB W/HN,LW
50		BY	OWNER	STATION SERVICE TRANSFORMER
51	6	ABB	7525A91G05	POTENTIAL TRANSFORMER, 7200:120VOLT, VOZ-11M
51	24	SEIB	GMB15038	BOLTS: 3/8" X 1-1/2" GMB W/HN,LW
60		BY	OWNER	CABLE: 1272 AAC
61		BY	OWNER	CABLE: 795 AAC
62		BY	OWNER	CABLE: 336 ACSR 18/1
63	960	TW		BUS: 3" IPS AL 6063-T6 SEAMLESS (24 PIECES AT 40')
64	1440			BUS: 2" IPS AL 6063-T6 SEAMLESS (36 PIECES AT 40')
65		BY	OWNER	CABLE; 2/0 BARE COPPER
66		BY	OWNER	CABLE: #2 BARE COPPER SOLID TINNED
67		BY	OWNER	CABLE: 1/0 ACSR
68		BY	OWNER	CABLE: 7#9 ALUMOWELD STATIC WIRE
70	12	SMI	STCF-1299-D	TEE CONN COMP 1272 AAC TO 4-HOLE PAD

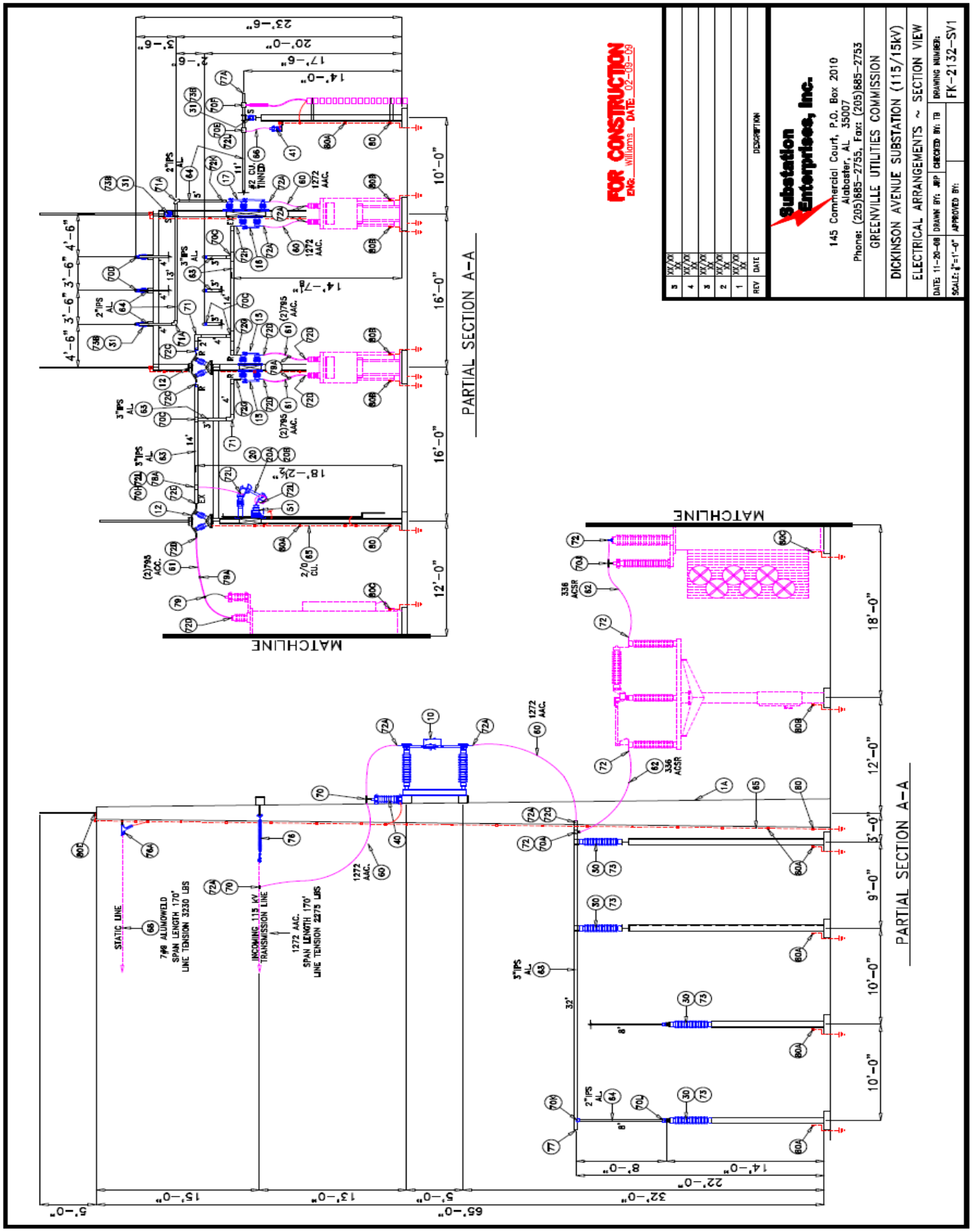
ITEM	QTY	MFG	CAT. NO.	DESCRIPTION
70A	6	DMC	PLK11OOD48E5	TEE CONN COMP 3" ALTO 4-HOLE PAD
70C	24	DMC	PLK1500D4848E1	TEE CONN COMP 3" AL MAIN & TAP
700	42	DMC	PLK1500D3232E1	TEE CONN COMP 2" AL MAIN & TAP
70E	30	DMC	PLK1200D32E1	TEE CONN COMP 2" ALTO 2-HOLE PAD
7OF	30	DMC	PLK11OOD32E5	TEE CONN COMP 2" ALTO 4-HOLE PAD
70G	12	DMC	PLK1500D3248E1	TEE CONN COMP 3" ALTO 2" AL TAP
70H	14	DMC	PLK1200D48E1	TEE CONN COMP 3" ALTO 2-HOLE PAD
70J	3	SMI	STCF-684-C	TEE CONN COMP 336 18/1 ACSR TO 4-HOLE PAD
70J	12	SEIB	SSB225	BOLTS: 1/2" X 2-1/4" SSB W/HN,BW,2FW
70K	6	DMC	PLK1600D3248	TEE CONN COMP 3" ALTO (2) 2" AL TAPS AT 15 DEGREES
70L	12	DMC	PLK1500D3248E2	TEE CONN COMP 3" ALTO 2" AL TAPS AT 15 DEGREES
71	12	DMC	PLK1400D48E4	COUPLER 90 DEG COMP 3" AL
71A	36	DMC	PLK1400D32E4	COUPLER 90 DEG COMP 2" AL
71B	2	DMC	PLK1000D48	COUPLER STRAIGHT COMP 3" AL
72	12	Anderson	CCLS-684-C	TERM CONN COMP 336 18/1 ACSR TO 4-HOLE PAD, SHORT BARRELL
72	48	SEIB	SSB225	BOLTS: 1/2" X 2-1/4" SSB W/HN,BW,2FW
72A	108	Anderson	CCLS-1300-D	TERM CONN COMP 1272 AAC TO 4-HOLE PAD, SHORT BARREL
72A	432	SEIB	SSB225	BOLTS: 1/2" X 2-1/4" SSB W/HN,BW,2FW
72C	24	DMC	PLK1850D48A	TERM CONN COMP 3" ALTO 4-HOLE PAD, CENTERFORMED
72C	96	SEIB	SSB225	BOLTS: 1/2" X 2-1/4" SSB W/HN,BW,2FW
72D	18	DMC	CPLK9642D07950 s	TERM CONN COMP (2) 795 AAC TO 4-HOLE PAD
72D	72	SEIB	SSB225	BOLTS: 1/2" X 2-1/4" SSB W/HN,BW,2FW
72E	18	DMC	PLK2600D48E1-90	TERM CONN COMP EXPANSION 3" ALTO 4-HOLE PAD
72E	72	SEIB	SSB225	BOLTS: 1/2" X 2-1/4" SSB W/HN,BW,2FW
72F	18	DMC	PLK1850D48B	TERM CONN COMP 3" ALTO 4-HOLE PAD, CENTERFORMED
72F	72	SEIB	SSB225	BOLTS: 1/2" X 2-1/4" SSB W/HN,BW,2FW

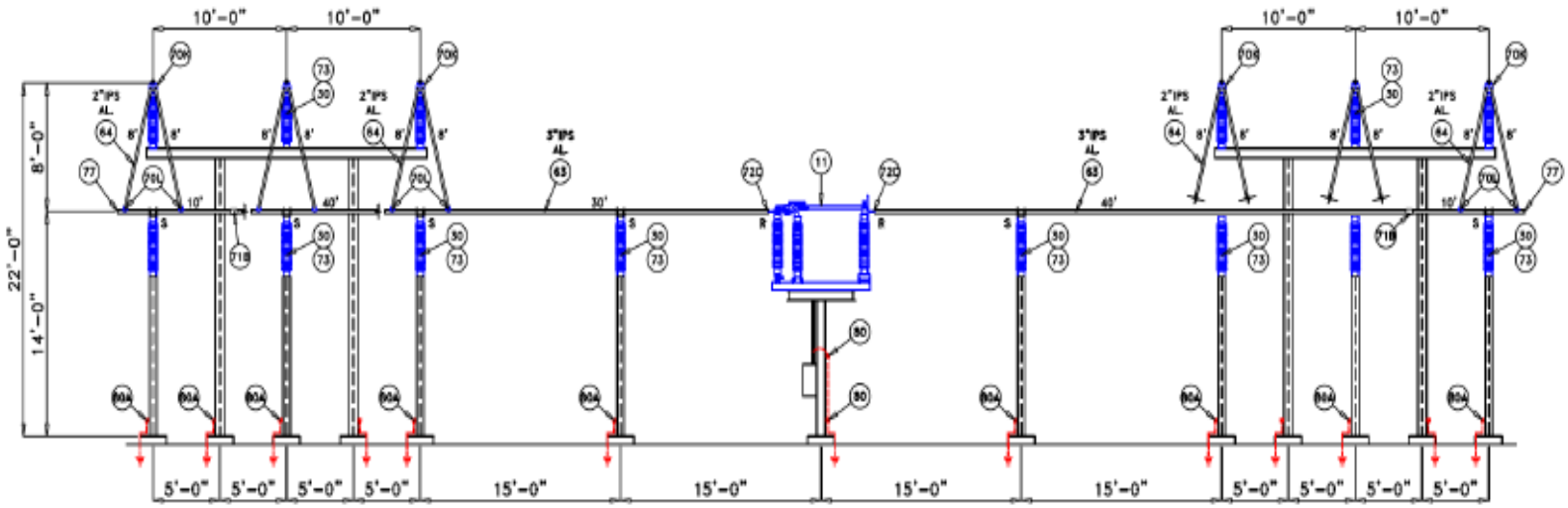
ITEM	QTY	MFG	CAT. NO.	DESCRIPTION
72G	12	DMC	PLK1870D48B	TERM CONN COMP 3" ALTO 4-HOLE PAD 90 DEG
72G	48	SEIB	SSB225	BOLTS: 1/2" X 2-1/4" SSB W/HN,BW,2FW
72H	6	DMC	PLK2601D48E1	TERM CONN COMP EXPANSION 3" ALTO 4-HOLE PAD, 90 DEG
72H	24	SEIB	SSB225	BOLTS: 1/2" X 2-1/4" SSB W/HN,BW,2FW
72J	42	DMC	PLK1870D32A	TERM CONN COMP 2" ALTO 4-HOLE PAD 90 DEG
72J	168	SEIB	SSB225	BOLTS: 1/2" X 2-1/4" SSB W/HN,BW,2FW
72K	30	DMC	PLK1880D32A	TERM CONN COMP 2" ALTO 4-HOLE PAD
72K	120	SEIB	SSB175	BOLTS: 1/2" X 1-3/4" SSB W/HN,BW,2FW
72L	66	DOSS	DPL13-2N-AA	TERM CONN COMP #2 CU TO 2-HOLE PAD
72L	132	SEIB	SSB200	BOLTS: 1/2" X 2" SSB W/HN,BW,2FW
72M	9	DMC	PLK1850D32A	TERM CONN COMP 2" ALTO 4-HOLE PAD, CENTERFORMED
72M	36	SEIB	SSB200	BOLTS: 1/2" X 2" SSB W/HN,BW,2FW
72N	3	DMC	PLK2600D32E1-90	TERM CONN COMP EXPANSION 2" ALTO 4-HOLE PAD
72N	12	SEIB	SSB200	BOLTS: 1/2" X 2" SSB W/HN,BW,2FW
720	12	DMC	PLK2601D32E2	TERM CONN COMP EXPANSION 2" ALTO 4-HOLE PAD, 90 DEG
720	48	SEIB	SSB200	BOLTS: 1/2" X 2" SSB W/HN,BW,2FW
73	22	DOSS	HPS300-5-CH-AA	BUS SUPPORT 3" ALTO 5" B.C., SLIPPED
73A	6	DOSS	HPS300-3-CH-AA	BUS SUPPORT 3" ALTO 3" B.C., SLIPPED
73B	75	DOSS	HPS200-3-CH-AA	BUS SUPPORT 2" ALTO 3" B.C., SLIPPED
76	12	AE	ADS-130-S	STRAIN CLAMP 1272 AAC
76	12	O.B.	511008-1400	SUSPENSION INSULATORS, POLYMER
76	12	AE	HYCE-15-12	Y-CLEVIS EYE EXTENSION
76	12	AE	YBC-30	Y-BALL CLEVIS
76A	B	AE	MDE-46-N	STRAIN CLAMP 7#9 ALUMOWELD
76A	B	SEI		EYE BOLT, 5/B X B"
77	1B	DOSS	CI300-AA	CORONA END CAP 3" AL
77A	36	DOSS	CI200-AA	CORONA END CAP 2" AL
78	24	DMC	PLK1160D4B	GROUND STUD FOR 3" AL
78A	14	SMI	TP-B2	TRANSITION PLATES

ITEM	QTY	MFG	CAT. NO.	DESCRIPTION
79	3	DMC	CL732D07950	CABLE SPACER 795 AAC TO 4-HOLE PAD
79	3	SMI	1AC1	ANGLE CLIP, 3-1/4" UABC
79	24	SEIB	SSB200	BOLTS: 1/2" X 2" SSB W/HN,BW,2FW
79A	9	DMC	CL702D07950	CABLE SPACER 795 AAC
80	75	AE	GC-143A-G2-1/2	GROUND CONN TWO PIECE DOUBLE GROOVE 1/0--4/0 CU TO FLAT
80A	150	AE	GC-141A-G2-1/2	GROUND CONN TWO PIECE SINGLE GROOVE 1/0-4/0 CU TO FLAT
80B	26	DOSS	QLB25S-2N	GROUND CONN TERMINAL 2/0--4/0 CU TO 2-HOLE PAD
80B	52	SEIB	SSB175	BOLTS: 1/2" X 1-3/4" SSB W/HN,BW,2FW
80C	4	DOSS	T2CVH50-4N	GROUND CONN TERMINAL (2) 2/0--500 CU TO 4-HOLE PAD
80E	22	AE	GC-111-6C	GROUND CONN 1-1/2" IPS PIPE TO 2/0 CU
81D	14	DOSS	CF200-5A	BRAIDED SHUNT
82		BY	OWNER	GROUND RODS
83		BY	OWNER	BELOW GRADE CADWELD MOLDS AND WELD METALS
		BF&MAR		BOLTS
		MAR		BOLTS
	1448	SOL	8M89301	1/2" SS BELLEVILLE WASHERS
	36	SOL	8M89301	1/2" SS BELLEVILLE WASHERS

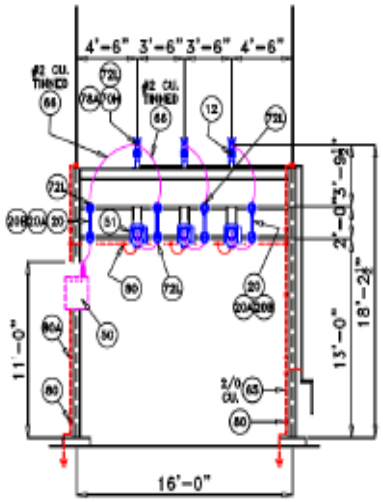
Appendix B

Substation Section Views 1-6


FOR CONSTRUCTION
ENG. Williams DATE: 02-09-09
Substation Enterprises, Inc.
145 Commercial Court, P.O. Box 2010
Alabaster, AL 35007
Phone: (205)685-2755, Fax: (205)685-2753
GREENVILLE UTILITIES COMMISSION
DICKINSON AVENUE SUBSTATION (115/15kV)
ELECTRICAL ARRANGEMENTS ~ SECTION VIEW
DATE: 11-20-08
DRAWN BY: JPP
CHECKED BY: TB
DRAWING NUMBER: FK-2132-SV1
SCALE: 1"=1'-0"
APPROVED BY:
DESCRIPTION
DATE
REV
PARTIAL SECTION A-A
MATCHLINE
STATIC LINE
7#8 ALUMOWELD
SPAN LENGTH 170'
LINE TENSION 3230 LBS
INCOMING 115 kV
TRANSMISSION LINE
1272 AAC.
SPAN LENGTH 170'
LINE TENSION 2275 LBS
336 ACSR
1272 AAC.
3"IPS AL.
2"IPS AL.
#2 CU. TINNED
2/0 CU.
(2)795 AAC.



SECTION B–B



SECTION D–D

FOR CONSTRUCTION
BY: Williams DATE: 02-06-09

REV	DATE	DESCRIPTION
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4	00/00/00	
3	00/00/00	
2	00/00/00	
1	12/19/08	CHANGES PER GUC APPROVAL

Substation Enterprises, Inc.
145 Commercial Court, P.O. Box 2010
Alabaster, AL 35007
Phone: (205)685-2755, Fax: (205)685-2753

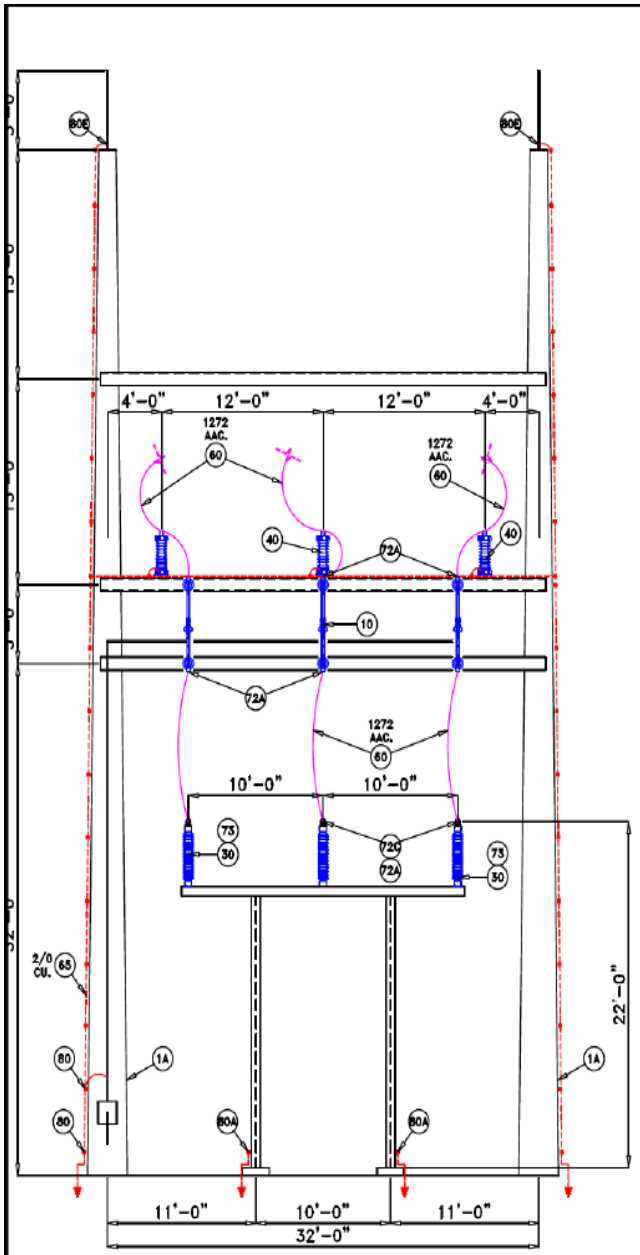
GREENVILLE UTILITIES COMMISSIONS

DICKINSON AVENUE SUBSTATION (115/15kV)

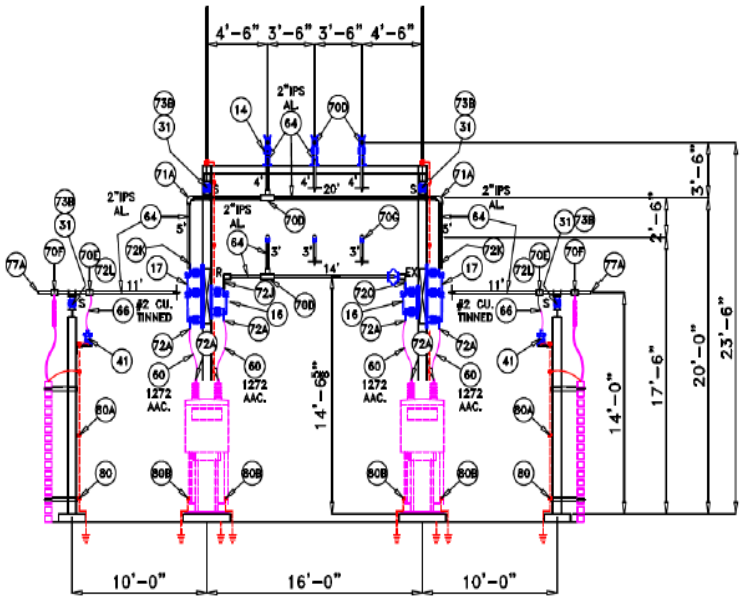
ELECTRICAL ARRANGEMENTS ~ SECTION VIEW

DATE: 11-20-08 | DRAWN BY: JRP | CHECKED BY: TB | DRAWING NUMBER: FK-2132-SV2

SCALE: 3/8"=1'-0" | APPROVED BY:



SECTION C-C



SECTION E-E

FOR CONSTRUCTION
ENG: Williams DATE: 02-09-09

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2	XX/XX/XX	
1	XX/XX/XX	

Substation Enterprises, Inc.
145 Commercial Court, P.O. Box 2010
Alabaster, AL 35007
Phone: (205)685-2755, Fax: (205)685-2753

GREENVILLE UTILITIES COMMISSION

DICKINSONS AVENUE SUBSTATION

ELECTRICAL ARRANGEMENTS SECTION VIEW

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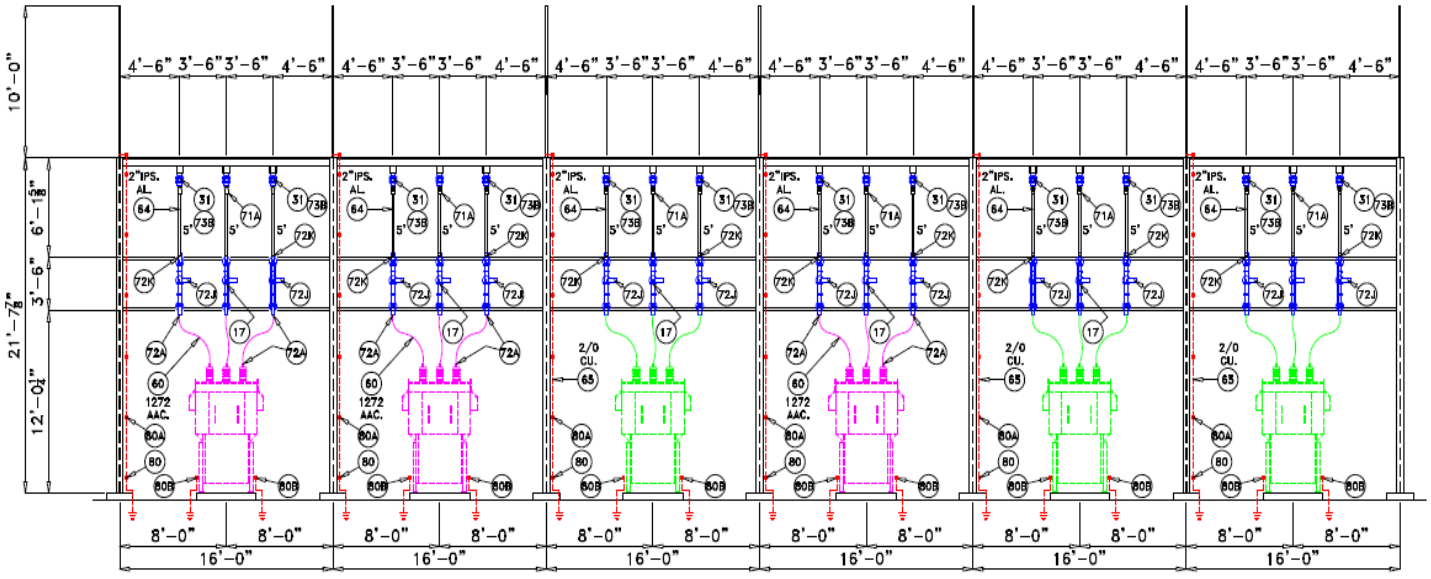

SECTION F-F

FOR CONSTRUCTION
ENG: Williams DATE: 02-09-09

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3	XX/XX/XX	
2	XX/XX/XX	
1	12/12/08	CHANGES PER GUC APPROVAL

Substation Enterprises, Inc.
145 Commercial Court, P.O. Box 2010
Alabaster, AL 35007
Phone: (205)685-2755, Fax: (205)685-2753

GREENVILLE UTILITIES COMMISSION
DICKINSON AVENUE SUBSTATION (115/15kV)
ELECTRICAL ARRANGEMENTS ~ SECTION VIEW

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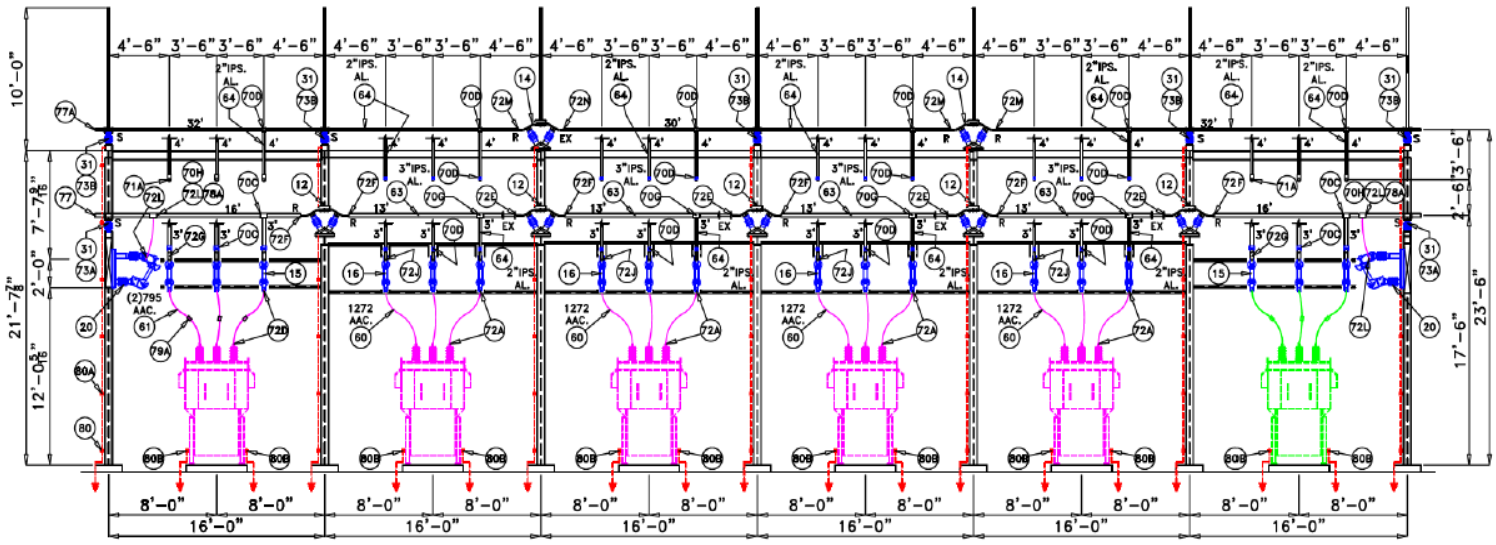

SECTION G-G

FOR CONSTRUCTION
ENG: Williams DATE: 04-09-09

REV	DATE	DESCRIPTION
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3	XX/XX/XX	
2	XX/XX/XX	
1	XX/XX/XX	

Substation Enterprises, Inc.

145 Commercial Court, P.O. Box 2010
Alabaster, AL 35007
Phone: (205)685-2755, Fax: (205)685-2753

GREENVILLE UTILITIES COMMISSION

DICKINSON AVENUE SUBSTATION (115/15kV)

ELECTRICAL ARRANGEMENTS ~ SECTION VIEW

DATE: 11-21-08	DRAWN BY: JRP	CHECKED BY: TB	DRAWING NUMBER:
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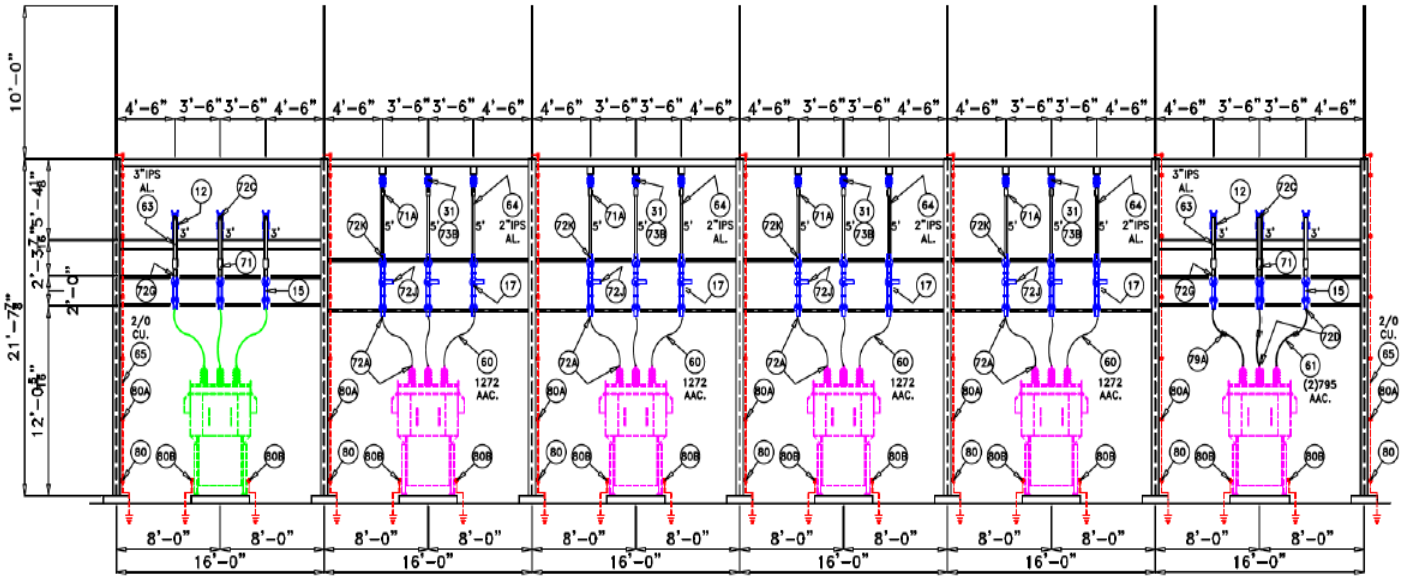


SECTION H-H

BUS CUTTING SCHEDULE
~N.T.S.~

3"IPS AL
ITEM# 63
24 PCS. @ 40'-0"

40'	5 PCS.
30' 10'	2 PCS.
32' 4' 4'	2 PCS.
22' 12' 4' 2'	2 PCS.
16' 14' 3' 3' 4' D	6 PCS.
14' 13' 13'	6 PCS.
4' 4' 4' 4' 4' 4' 2' 2' 2' 2' 8' D	1 PC.

2"IPS AL
ITEM# 64
36 PCS. @ 40'-0"

32' 8'	6 PCS.
30' 5' 5'	3 PCS.
20' 20'	6 PCS.
14' 11' 11' 4'	9 PCS.
14' 14' 5' 3' 3' D	1 PC.
14' 3' 3' 3' 3' 3' 3' 3' 2' D	1 PC.
13' 10' 7' 5' 5'	2 PCS.
11' 11' 11' 5' 2' D	4 PCS.
8' 8' 5' 5' 5' 5' 4'	3 PCS.
5' 5' 5' 4' 4' 4' 4' 4' 4' D	1 PC.

FOR CONSTRUCTION
ENG: Williams DATE: 02-09-09

Substation Enterprises, Inc.
145 Commercial Court, P.O. Box 2010
Alabaster, AL 35007
Phone: (205)685-2755, Fax: (205)685-2753

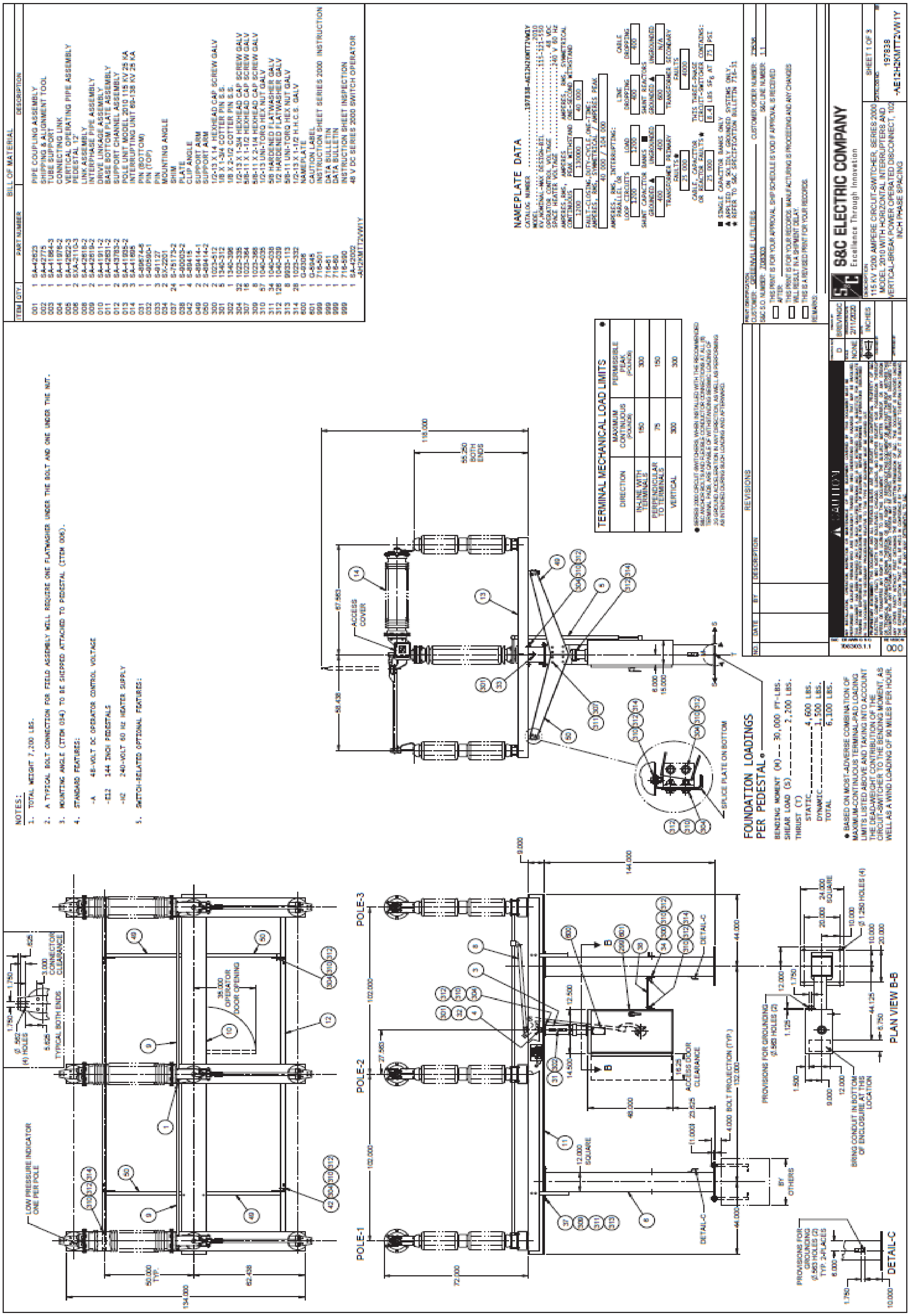
GREENVILLE UTILITIES COMMISSION
DICKINSON AVENUE SUBSTATION (115/15kV)
ELECTRICAL ARRANGEMENTS ~ SECTION VIEW

REV	DATE	DESCRIPTION
5	XX/XX/XX	
4	XX/XX/XX	
3	XX/XX/XX	
2	XX/XX/XX	
1	XX/XX/XX	

DATE: 11-21-08 | DRAWN BY: JRP | CHECKED BY: TB | DRAWING NUMBER: FK-2132-SV6
SCALE: 3/8"=1'-0" | APPROVED BY:

Appendix C

S&C Circuit Switcher


NOTES:
1. TOTAL WEIGHT 7,200 LBS.
2. A TYPICAL BOLT CONNECTION FOR FIELD ASSEMBLY WILL REQUIRE ONE FLATWASHER UNDER THE BOLT AND ONE UNDER THE NUT.
3. MOUNTING ANGLE (ITEM 034) TO BE SHIPPED ATTACHED TO PEDESTAL (ITEM 006).
4. STANDARD FEATURES:
-A 48-VOLT DC OPERATOR CONTROL VOLTAGE
-E12 144 INCH PEDESTALS
-H2 240-VOLT 60 Hz HEATER SUPPLY
5. SWITCH-RELATED OPTIONAL FEATURES:
BILL OF MATERIAL
POLE-1
POLE-2
POLE-3
LOW PRESSURE INDICATOR ONE PER POLE
OPERATOR DOOR OPENING
ACCESS COVER
ACCESS DOOR CLEARANCE
SPLICE PLATE ON BOTTOM
PLAN VIEW B-B
DETAIL-C
BRING CONDUIT IN BOTTOM OF ENCLOSURE AT THIS LOCATION
PROVISIONS FOR GROUNDING
FOUNDATION LOADINGS PER PEDESTAL
BENDING MOMENT (M) 30,000 FT-LBS.
SHEAR LOAD (S) 2,200 LBS.
THRUST (T)
STATIC 4,600 LBS.
DYNAMIC 1,500 LBS.
TOTAL 6,100 LBS.
TERMINAL MECHANICAL LOAD LIMITS
NAMEPLATE DATA
REVISIONS
CAUTION
S&C ELECTRIC COMPANY
Excellence Through Innovation
115 KV 1200 AMPERE CIRCUIT-SWITCHER, SERIES 2000 MODEL 2010 WITH HORIZONTAL INTERRUPTERS AND VERTICAL-BREAK POWER OPERATED DISCONNECT, 102 INCH PHASE SPACING
SHEET 1 OF 3
197838
-AE12H2KMTT2VW1Y
GREENVILLE UTILITIES

Appendix D

Geotechnical Report

October 15, 2019

Greenville Utilities Commission
PO Box 1847
Greenville, NC 27835

Attn: Mr. Ken Wade – Substation and Controls Engineer
P: (252) 551-1570
E: wadekr@guc.com

Re: Geotechnical Engineering Report
Sugg Parkway Substation
Sugg Parkway and Old Creek Road
Greenville, Pitt County, NC
Terracon Project No. 72195082

Dear Mr. Wade:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. P72195082 dated September 6, 2019. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

NORTH CAROLINA PROFESSIONAL SEAL 042183 ENGINEER ANDREW J. GLIMAK
10/15/19

Seth A. Bowman
Staff Professional
Geotechnical Services

Andrew J. Glimak, PE
Geotechnical Project Engineer
Registered NC 042183

Reviewed by: Kevin Sohrabnia, PE

Terracon Consultants, Inc. 314 Beacon Drive Winterville, NC 28590
P (252) 353 1600 F (252) 353 0002 terracon.com Registered NC F-0869

REPORT TOPICS

Note: This report was originally delivered in a web-based format. Orange Bold text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the *GeoReport* logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

Note: Refer to each individual Attachment for a listing of contents.

REPORT SUMMARY

Topic [1]	Overview Statement [2]
Project Description	The project includes a new substation with associated above-ground power lines off Sugg parkway and Old Creek Road in Greenville, NC.
Geotechnical Characterization	The borings encountered very loose to medium dense sand underlain by denser sand. Groundwater is anticipated at a depth of 3 to 4 feet below the existing ground surface.
Earthwork	After stripping topsoil, the substation footprint should be densified in place using a medium weight vibratory roller. The purpose of the vibratory rolling is to densify the loose, near surface disturbed soils and potentially improve foundation support.
Substation Mat Foundations	Shallow foundations will be sufficient Allowable bearing pressure = 1,000 psf Expected settlements: < 1-inch total, < 1/2-inch differential
Pole Deep Foundations	The poles to be supported by drilled piers installed with the slurry method of drilling to help prevent blow out. Design parameters for the lateral resistance and end bearing capacity of drilled piers are presented in this report.
General Comments	This section contains important information about the limitations of this geotechnical engineering report.

1. If the reader is reviewing this report as a pdf, the topics above can be used to access the appropriate section of the report by simply clicking on the topic itself.
2. This summary is for convenience only. It should be used in conjunction with the entire report for design purposes.

Geotechnical Engineering Report

Sugg Parkway Substation
Sugg Parkway and Old Creek Road
Greenville, Pitt County, NC
Terracon Project No. 72195082
October 15, 2019

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed substation and poles to be located at Sugg Parkway and Old Creek Road in Greenville, Pitt County, NC. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Foundation design and construction
- Seismic site classification per IBC

The geotechnical engineering Scope of Services for this project included the advancement of four test borings to a depth of approximately 30 feet below existing site grades.

Maps showing the site and boring locations are shown in the Site Location and Exploration Plan sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs and as separate graphs in the Exploration Results section.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located along Sugg Parkway and Old Creek Road in Greenville, Pitt County, NC. Coordinates: 35.6523°N, 77.3334°W (approximate) See Site Location
Existing Improvements	Undeveloped fields near existing above-ground power lines.
Current Ground Cover	Grass and cultivated soils
Existing Topography	Relatively level

Item	Description
Geology	The subject site is located in the Coastal Plain Physiographic Province. The Coastal Plain soils consist mainly of marine sediments that were deposited during successive periods of fluctuating sea level and moving shoreline. The soils include sands, silts, and clays with irregular deposits of shells, which are typical of those lain down in a shallow sloping sea bottom. Recent alluvial sands, silts, and clays are typically present near rivers and creeks. According to USGS Mineral Resources On-Line Spatial Data based on the 1998 digital equivalent of the 1985 Geologic Map of North Carolina updated in 1998, the site is mapped within the Yorktown Formation and Duplin Formation, Undivided (Tertiary)

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Information Provided	Email communication with requested boring locations on August 29, 2019.
Proposed Structures	The project includes a new substation with associated above-ground power lines off Sugg parkway and Old Creek Road in Greenville, NC.
Building Construction	Concrete drilled pier foundations or vibratory driven piles are anticipated for the power lines. Mat foundations for transformers and small equipment pads are assumed.
Maximum Loads	■ Substation: 15 to 100 kips (assumed) ■ Poles: 4,500 ft-kips overturning at the ground surface (assumed)
Grading/Slopes	Up to 2 feet of cut and/or fill placement
Estimated Start of Construction	Early 2020

GEOTECHNICAL CHARACTERIZATION

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of site preparation and foundation options. Conditions encountered at each exploration point are indicated on the individual logs. The individual logs can be found in the Exploration Results section and the GeoModel can be found in the Figures section of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	Looser Sand	Very loose to loose Clayey Sand (SC) and Silty Clayey Sand (SC-SM)
2	Loose to Medium Dense Sand	Generally Silty Sand (SM) and Poorly Graded Sand (SP)
3	Medium Dense to Dense Sand	Poorly Graded Sand (SP), Clayey Sand (SC), Silty Sand (SM)

Groundwater

Groundwater was measured at depths of 3.5 to 4 feet during drilling using hollow stem augers. Based on the moisture condition of the soil samples, groundwater is anticipated at depths of 3 to 4 feet below the existing ground surface.

The groundwater level can change due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

GEOTECHNICAL OVERVIEW

The borings in the substation area encountered very loose to loose sand underlain by relatively denser sand. The borings along the proposed alignment encountered loose to medium dense sand underlain by relatively denser sand.

After stripping top soil, the substation footprint should be densified in place using a medium weight vibratory roller. The purpose of the vibratory rolling is to densify the loose, near surface disturbed soils and potentially improve foundation support.

We understand drilled piers are proposed as foundations for the poles. Shallow groundwater and sandy soils as encountered in the borings are conditions where caving of the sidewalls or "blow out" of the bottom can occur in the pier excavation. The "blow out" is caused by hydrostatic pressures causing water to flow upward into the excavation and lift soil from the bottom. Excavation for the piers utilizing slurry drilling techniques will reduce the potential blow out by counter-balancing the hydrostatic pressure.

The General Comments section provides an understanding of the report limitations.

EARTHWORK

Earthwork is anticipated to include site preparation, excavations, and fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations.

Site Preparation

Site preparation should begin with the complete removal of the surface vegetation and topsoil in the proposed substation area. Based on site observations during the drilling process, topsoil should be stripped up to a depth of approximately 3 inches. A Terracon representative should field verify the stripping depth during construction. Topsoil may be reused in areas of the site to be landscaped but should not be used for fill.

After stripping, the exposed subgrade soils in the substation footprint should be densified in place using a medium weight vibratory roller. The purpose of the vibratory rolling is to densify the exposed subgrade soils to potentially improve the foundation bearing soils. The roller should make at least six passes across the site, with the second set of three passes perpendicular to the first set of three passes. If water is brought to the surface by the vibratory rolling, the operation should be discontinued until the water subsides. Vibratory rolling should be completed during dry weather.

After the vibratory rolling, pore pressures should be allowed to dissipate for a minimum of 16 hours. After the waiting period, proofrolling should be performed on the exposed subgrade soils in areas to receive fill or at the subgrade elevation with a fully loaded, tandem-axle dump truck (20-ton minimum) or similar rubber-tired construction equipment. Proofrolling is recommended as a means of detecting areas of soft or unstable subgrade soils. The proofrolling should be performed during a period of dry weather to avoid degrading an otherwise suitable subgrade. The proofrolling operations should be observed by a representative of the geotechnical engineer. Subgrade soils that exhibit excessive rutting or deflection during proofrolling should be repaired as directed by the field representative. Typical repairs include overexcavation followed by replacement with either properly compacted fill or by a subgrade stabilization fabric in conjunction with a sand fill or crushed stone.

Fill Material Types

Fill required to achieve design grade should be classified as structural fill and general fill. Structural fill is material used below, or within 5 feet of structures, pavements or constructed slopes. General fill is material used to achieve grade outside of these areas. Earthen materials used for structural and general fill should meet the following material property requirements:

Soil Type [1]	USCS Classification	Acceptable Parameters (for Structural Fill)
Imported Soil	SC, SM, SP	All location and elevations.
On-Site Soils	SC, SM, SP	On site soils that meet these soil classifications are generally suitable for fill if properly moisture conditioned.

1. Controlled, compacted fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the geotechnical engineer for evaluation.

On-site near surface clays, if encountered, are not recommended for use as structural fill due to their high fines content and moisture sensitivity relative to sandy soils available. Near surface clay could be considered for use as general fill.

Fill Compaction Requirements

Structural and general fill should meet the following compaction requirements.

Item	Structural Fill	General Fill
Maximum Lift Thickness	9 inches or less in loose thickness when heavy, self-propelled compaction equipment is used 4 to 6 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used	Same as Structural fill
Minimum Compaction Requirements [1, 2]	95% of max. above and below foundations	92% of max.
Water Content Range [1]	-2% to +2% of optimum	As required to achieve min. compaction requirements

1. Fill should be tested for moisture content and compaction during placement. If in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the tests should be reworked and retested as required until the specified moisture and compaction requirements are achieved.
2. It is not necessary to achieve 95% compaction on the existing ground prior to placing fill or beginning construction. However, the subgrade should be evaluated by a representative of the geotechnical engineer prior to placing fill or beginning construction.

It is important to note that the use of rubber-tired traffic, such as lulls, may impact the prepared subgrade soils leading to re-grading. We recommend that the use of rubber-tired traffic be limited on the prepared subgrades or that the stabilized area be prepared for their travel.

Grading and Drainage

During construction, grades should be sloped to promote runoff away from the construction area. Final surrounding grades should be sloped away from the structure on all sides to prevent ponding of water.

Earthwork Construction Considerations

Shallow excavations for the proposed structures are anticipated to be accomplished with conventional construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to construction.

The groundwater table could affect excavations, especially for the deeper excavations for utilities. A temporary dewatering system consisting of sumps with pumps could be necessary to achieve the anticipated depths of excavation. The actual dewatering system should be selected and designed by a specialty contractor.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local, and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.

Construction Observation and Testing

The earthwork efforts should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of vegetation and topsoil, proofrolling, and mitigation of areas delineated by the proofroll to require mitigation.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas. One density and water content test should be performed for every 50 linear feet of compacted utility trench backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. If unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

SUBSTATION MAT FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in Earthwork, the following design parameters are applicable for the substation mat foundations.

DESCRIPTION	VALUE
Maximum Net allowable bearing pressure	1,000 psf
The required embedment below lowest adjacent finished grade for frost protection and protective embedment [1]	12 inches
Modulus of subgrade reaction	8 pounds per square inch per inch (psi/in)
Estimated approximate total settlement [2]	Up to 1 inch
Estimated differential settlement [2]	Up to ½ inch
Ultimate coefficient of sliding friction	0.35
Uplift Resistance	Weight of foundation concrete.

1. For frost protection and to reduce effects of seasonal moisture variations in subgrade soils.
2. The actual magnitude of settlement that will occur beneath the foundations will depend upon the variations within the subsurface soil profile, the structural loading conditions and the quality of the foundation excavation. The estimated total and differential settlements listed assume that the foundation-related earthwork and the foundation design are completed in accordance with our recommendations.

Construction Considerations

The mat foundation subgrade should be free of water and loose soil prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Should the subgrade soils become excessively disturbed or saturated, the affected soil should be removed prior to placing concrete.

DRILLED PIER FOUNDATIONS

Drilled Pier Design Parameters

The upper 3 feet of surficial material should be ignored due to the potential effects of frost action and construction disturbance. To avoid a reduction in uplift and lateral resistance caused by variable soil depths and quality, we recommend that a minimum pier length be stated on the design drawings.

The poles are to be supported by drilled piers installed with the slurry method of drilling to help prevent blow out. Design parameters for the lateral resistance and end bearing capacity of drilled piers are presented in Design Soil Parameters for Drilled Piers.

SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC). Based on the soil properties encountered at the site and as described on the exploration logs and results, it is our professional opinion that the **Seismic Site Classification is D**. Subsurface explorations at this site were extended to a maximum depth of 30 feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.

LIQUEFACTION

Based on the results of the borings, liquefaction is not expected based on the relatively low level of ground motions associated with the design earthquake and density of the soils.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we

can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

FIGURES

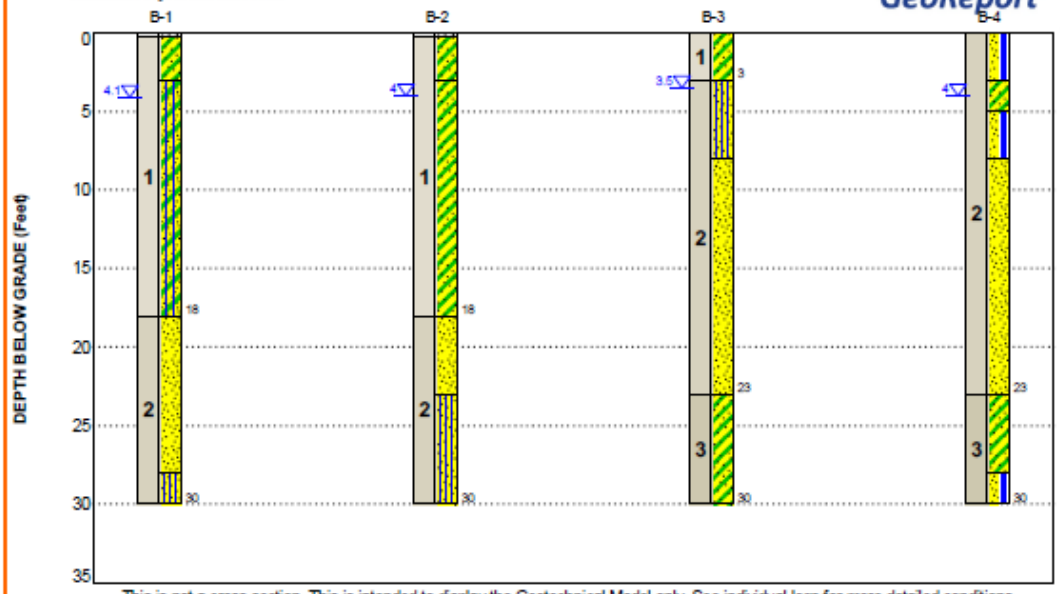
Contents:

Note: All attachments are one page unless noted above.

GEOMODEL

Sugg Parkway Substation ■ Greenville, NC
Terracon Project No. 72195082

Terracon GeoReport



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Looser Sand	Very loose to loose Clayey Sand (SC) and Silty Clayey Sand (SC-SM)
2	Loose to Medium Dense Sand	Generally Silty Sand (SM) and Poorly Graded Sand (SP)
3	Medium Dense to Dense Sand	Poorly Graded Sand (SP), Clayey Sand (SC), Silty Sand (SM)

LEGEND

- Topsoil
- Clayey Sand
- Silty Clayey Sand
- Poorly-graded Sand
- Silty Sand
- Poorly-graded Sand with Silt

▽ First Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time. Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
Numbers adjacent to soil column indicate depth below ground surface.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Number of Borings	Boring Depth (feet)	Location
Two	30	New Substation and requested boring locations

Boring Layout and Elevations: Boring locations were marked in the field by the client. The location of the borings should be considered accurate only to the degree implied by the means and methods used to define it.

Subsurface Exploration Procedures: We advanced the borings with a track-mounted rotary drill rig using hollow stem auger and mud rotary drilling techniques. Four samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. We observed and recorded groundwater levels during drilling and sampling. For safety purposes, all borings were backfilled with soil cuttings after their completion.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests to understand the engineering properties of the various soil strata, as necessary, for this project. Procedural standards noted below are for reference to methodology in general. In some cases, variations to methods were applied because of local practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Method of Determination of Water Content of Soil and Rock by Mass
- ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- ASTM D2488 Standard Practice of Description and Identification of Soils (Visual Manual Method)
- ASTM D422 Standard Test Method for Particle Size Analysis of Soils
- ASTM D1140 Standard Test Methods for Determining the Amount of Material Finer than No. 200 Sieve in Soils by Washing
- ASTM D4318 Standard Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils

The laboratory testing program often included examination of soil samples by an engineer. Based on the material's texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System.

SITE LOCATION AND EXPLORATION PLANS

Contents:

Site Location Plan
Exploration Plan

Note: All attachments are one page unless noted above.

SITE LOCATION
Sugg Parkway Substation ■ Greenville, NC
October 15, 2019 ■ Terracon Project No. 72195082

Terracon GeoReport

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY QUADRANGLES INCLUDE: GREENVILLE NE, NC (1/1/1998) and GREENVILLE SE, NC (1/1/1998).

EXPLORATION PLAN
Sugg Parkway Substation ■ Greenville, NC
October 15, 2019 ■ Terracon Project No. 72195082

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

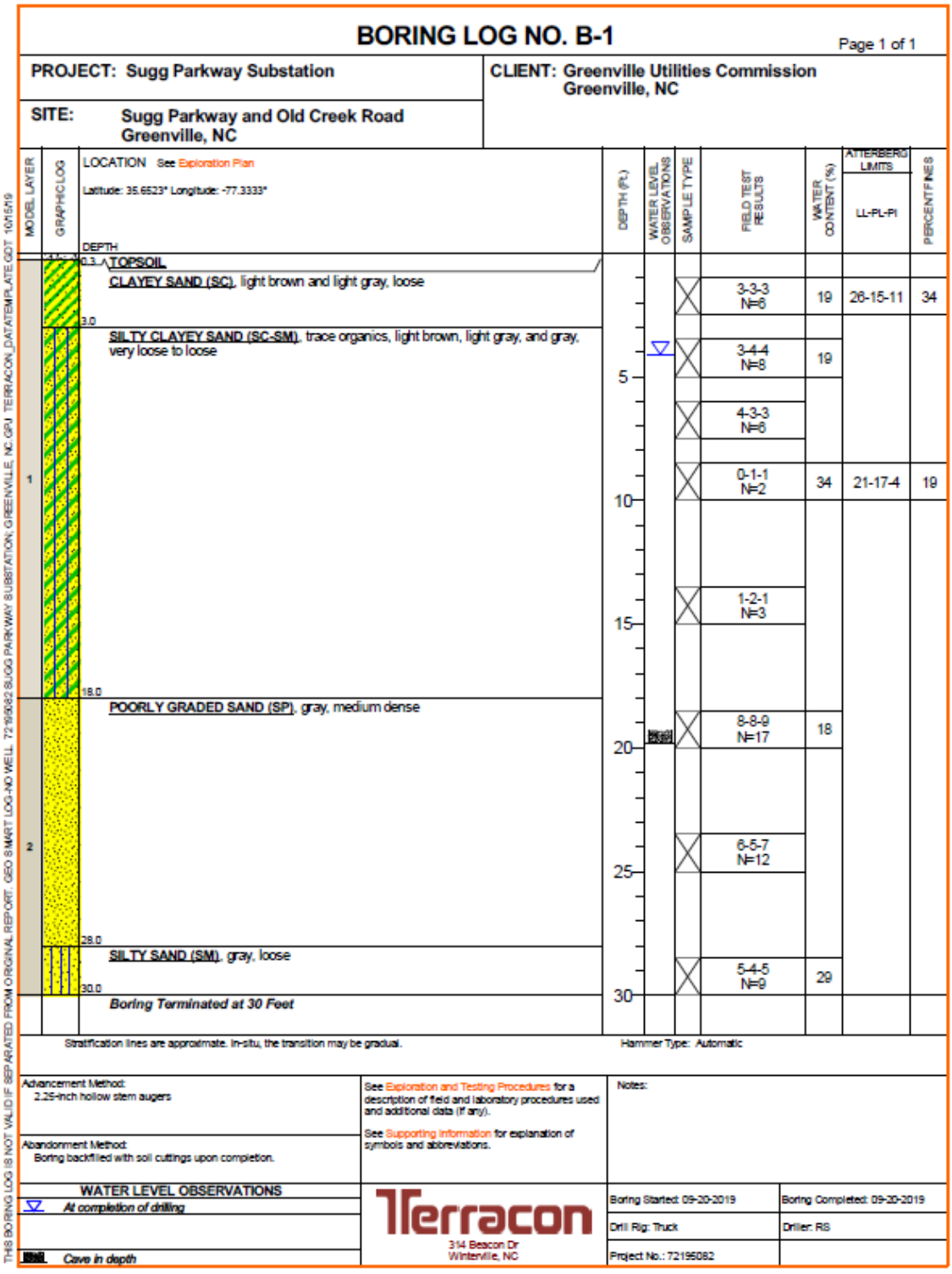
AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

EXPLORATION RESULTS

Contents:

Boring Logs (B-1 through B-4)
Grain Size Distribution
Atterberg Limits

Note: All attachments are one page unless noted above.



BORING LOG NO. B-1

Page 1 of 1

PROJECT: Sugg Parkway Substation

CLIENT: Greenville Utilities Commission
Greenville, NC

SITE: Sugg Parkway and Old Creek Road
Greenville, NC

LOCATION See Exploration Plan

Latitude: 35.6523° Longitude: -77.3333°

MODEL LAYER	DEPTH	GRAPHIC LOG		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	0.3		**TOPSOIL**							
1			**CLAYEY SAND (SC)**, light brown and light gray, loose				3-3-3 N=6	19	26-15-11	34
	3.0		**SILTY CLAYEY SAND (SC-SM)**, trace organics, light brown, light gray, and gray, very loose to loose		▽		3-4-4 N=8	19		
				5			4-3-3 N=6			
							0-1-1 N=2	34	21-17-4	19
				10						
							1-2-1 N=3			
				15						
							8-8-9 N=17	18		
2				20						
							6-5-7 N=12			
	28.0		**SILTY SAND (SM)**, gray, loose	25						
							5-4-5 N=9	29		
	30.0		***Boring Terminated at 30 Feet***	30						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2.25-inch hollow stem augers

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (if any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *At completion of drilling*

Cave in depth

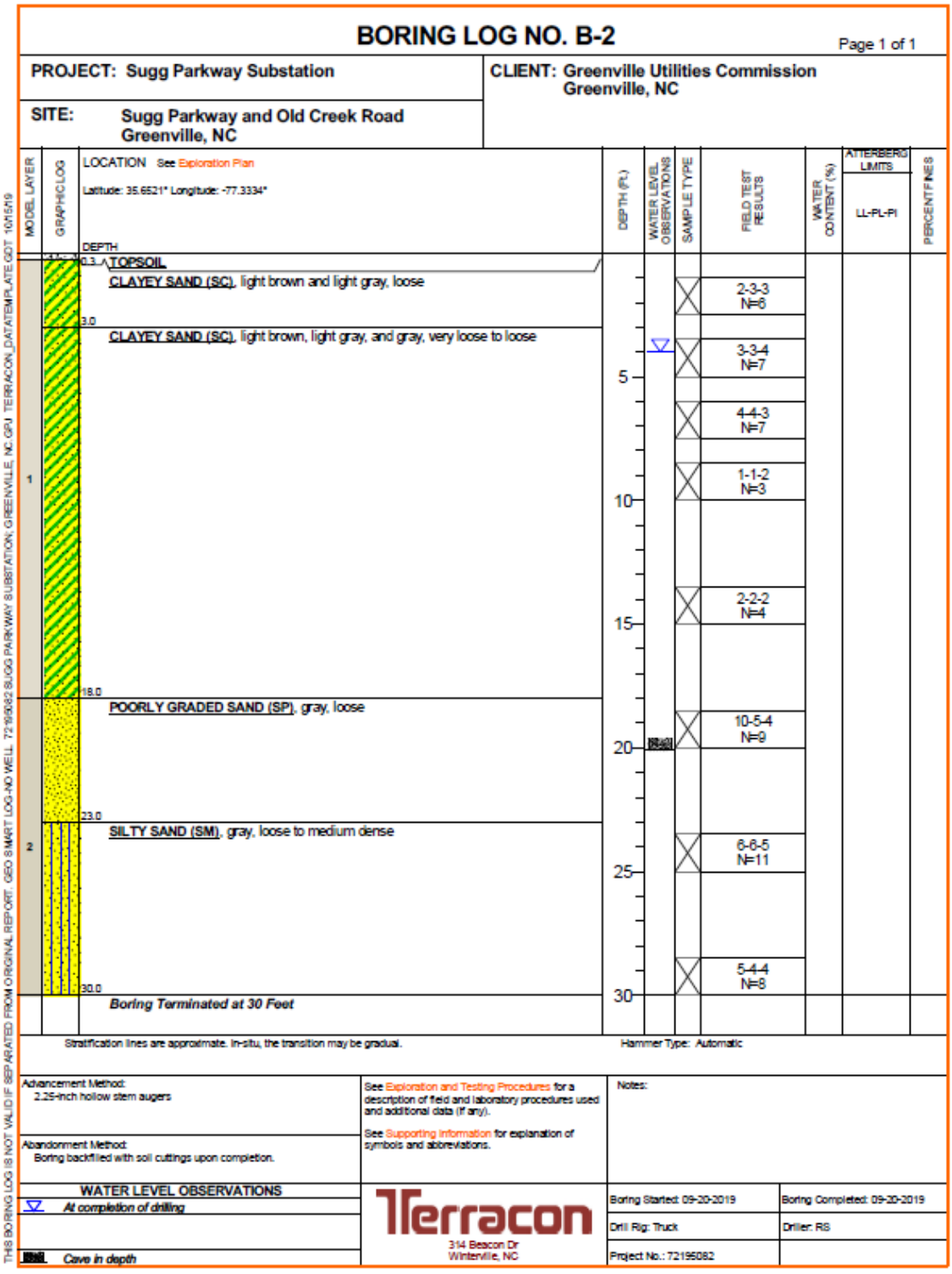
Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 09-20-2019 | Boring Completed: 09-20-2019

Drill Rig: Truck | Driller: RS

Project No.: 72195082

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 72195082 SUGG PARKWAY SUBSTATION, GREENVILLE, NC.GPJ TERRACON_DATATEMPLATE.GDT 10/15/19



BORING LOG NO. B-2

Page 1 of 1

PROJECT: Sugg Parkway Substation

CLIENT: Greenville Utilities Commission
Greenville, NC

SITE: Sugg Parkway and Old Creek Road
Greenville, NC

LOCATION See Exploration Plan

Latitude: 35.6521° Longitude: -77.3334°

DEPTH	MODEL LAYER	GRAPHIC LOG	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0.3								
TOPSOIL								
CLAYEY SAND (SC), light brown and light gray, loose	1				2-3-3 N=6			
3.0								
CLAYEY SAND (SC), light brown, light gray, and gray, very loose to loose	1		▽		3-3-4 N=7			
5					4-4-3 N=7			
					1-1-2 N=3			
10								
					2-2-2 N=4			
15								
18.0								
POORLY GRADED SAND (SP), gray, loose	2				10-5-4 N=9			
20								
23.0								
SILTY SAND (SM), gray, loose to medium dense	2				6-6-5 N=11			
25								
					5-4-4 N=8			
30								
30.0								
Boring Terminated at 30 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2.25-inch hollow stem augers

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (if any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *At completion of drilling*

Cave in depth

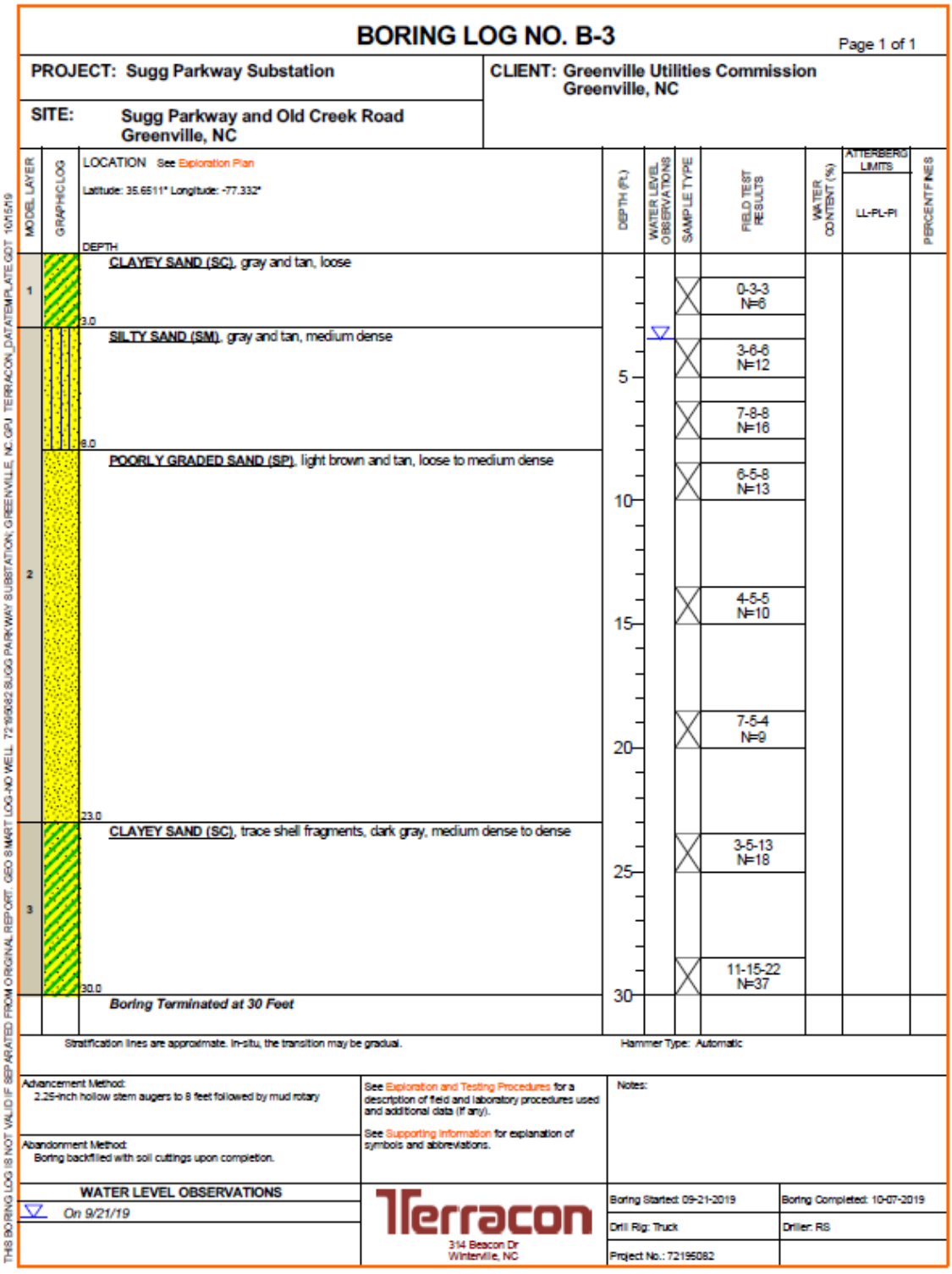
Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 09-20-2019 | Boring Completed: 09-20-2019

Drill Rig: Truck | Driller: RS

Project No.: 72195082

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 72195082 SUGG PARKWAY SUBSTATION, GREENVILLE, NC.GPJ TERRACON_DATATEMPLATE.GDT 10/15/19



BORING LOG NO. B-3

Page 1 of 1

PROJECT: Sugg Parkway Substation

CLIENT: Greenville Utilities Commission
Greenville, NC

SITE: Sugg Parkway and Old Creek Road
Greenville, NC

LOCATION See Exploration Plan

Latitude: 35.6511° Longitude: -77.332°

MODEL LAYER	GRAPHIC LOG	DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		3.0	CLAYEY SAND (SC), gray and tan, loose				0-3-3 N=6			
			SILTY SAND (SM), gray and tan, medium dense	5	▽		3-6-6 N=12			
							7-8-8 N=16			
2		8.0	POORLY GRADED SAND (SP), light brown and tan, loose to medium dense	10			6-5-8 N=13			
				15			4-5-5 N=10			
		23.0		20			7-5-4 N=9			
3			CLAYEY SAND (SC), trace shell fragments, dark gray, medium dense to dense	25			3-5-13 N=18			
		30.0		30			11-15-22 N=37			
			Boring Terminated at 30 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2.25-inch hollow stem augers to 8 feet followed by mud rotary

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (if any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ On 9/21/19

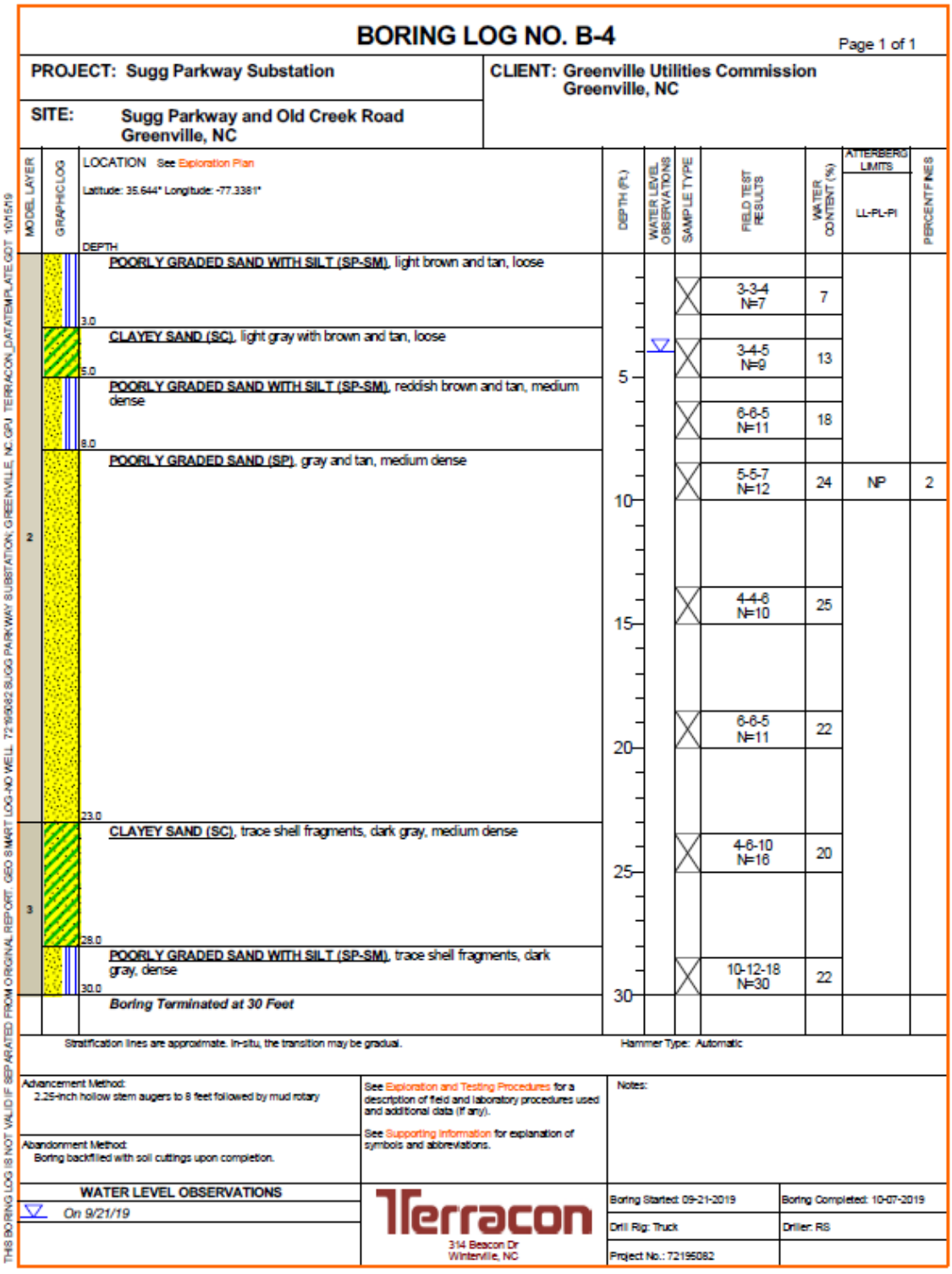
Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 09-21-2019 | Boring Completed: 10-07-2019

Drill Rig: Truck | Driller: RS

Project No.: 72195082

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 72195082 SUGG PARKWAY SUBSTATION, GREENVILLE, NC.GPJ TERRACON_DATATEMPLATE.GDT 10/15/19



BORING LOG NO. B-4

Page 1 of 1

PROJECT: Sugg Parkway Substation

CLIENT: Greenville Utilities Commission
Greenville, NC

SITE: Sugg Parkway and Old Creek Road
Greenville, NC

LOCATION See Exploration Plan

Latitude: 35.644° Longitude: -77.3381°

MODEL LAYER	GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
2		**POORLY GRADED SAND WITH SILT (SP-SM)**, light brown and tan, loose							
		3.0			X	3-3-4 N=7	7		
		CLAYEY SAND (SC), light gray with brown and tan, loose		▽	X	3-4-5 N=9	13		
		5.0	5						
		POORLY GRADED SAND WITH SILT (SP-SM), reddish brown and tan, medium dense			X	6-6-5 N=11	18		
		8.0							
		POORLY GRADED SAND (SP), gray and tan, medium dense			X	5-5-7 N=12	24	NP	2
			10						
					X	4-4-6 N=10	25		
			15						
					X	6-6-5 N=11	22		
			20						
3		**CLAYEY SAND (SC)**, trace shell fragments, dark gray, medium dense			X	4-6-10 N=16	20		
		28.0	25						
		POORLY GRADED SAND WITH SILT (SP-SM), trace shell fragments, dark gray, dense			X	10-12-18 N=30	22		
		30.0	30						
		Boring Terminated at 30 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2.25-inch hollow stem augers to 8 feet followed by mud rotary

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (if any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ On 9/21/19

Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 09-21-2019 | Boring Completed: 10-07-2019

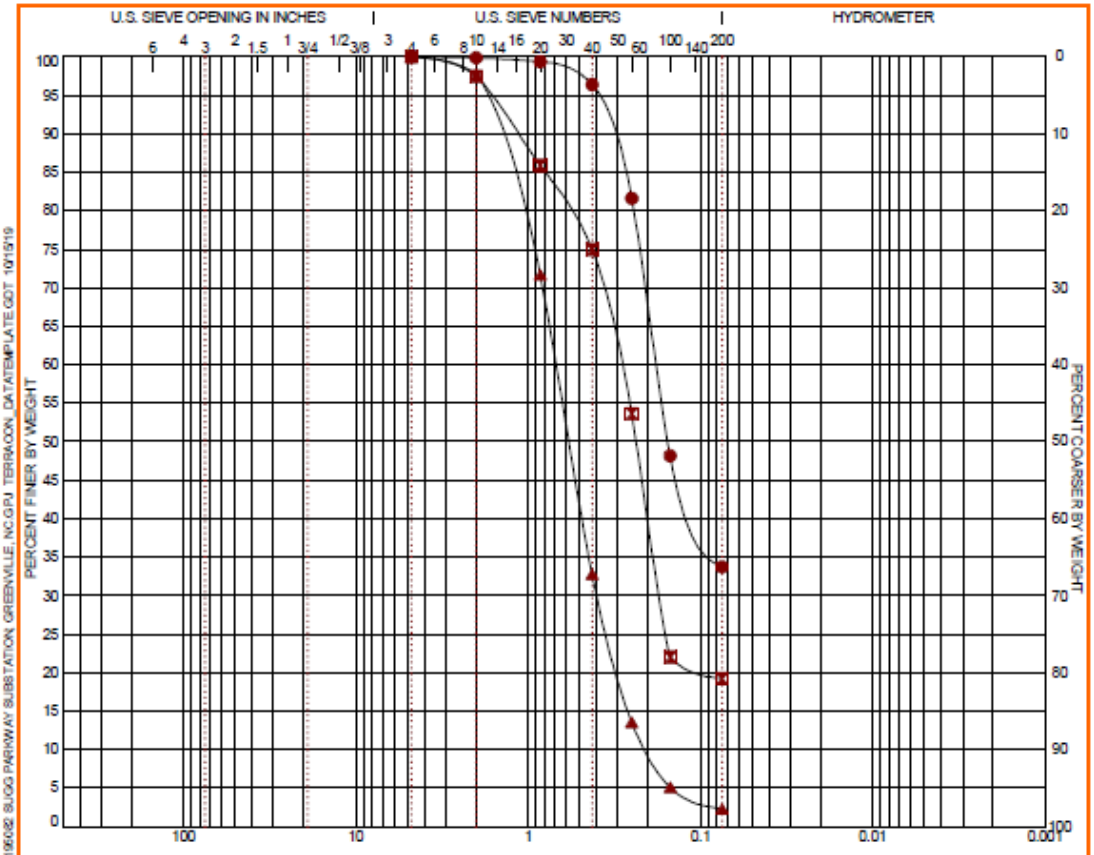
Drill Rig: Truck | Driller: RS

Project No.: 72195082

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 72195082 SUGG PARKWAY SUBSTATION, GREENVILLE, NC.GPJ TERRACON_DATATEMPLATE.GDT 10/15/19

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
●	B-1	1 - 2.5	0.0	0.0	66.3		33.7		SC
⊠	B-1	8.5 - 10	0.0	0.0	80.8		19.2		SC-SM
▲	B-4	8.5 - 10	0.0	0.0	97.7		2.3		SP

GRAIN SIZE	●	⊠	▲
D_{60}	0.18	0.293	0.69
D_{30}		0.171	0.394
D_{10}			0.202

COEFFICIENTS	●	⊠	▲
C_C			1.11
C_U			3.42

●		⊠		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#4	100.0	#4	100.0	#4	100.0
#10	99.87	#10	97.46	#10	97.74
#20	99.36	#20	85.89	#20	71.69
#40	96.4	#40	74.96	#40	32.77
#60	81.62	#60	53.63	#60	13.54
#100	48.18	#100	22.01	#100	5.1
#200	33.73	#200	19.24	#200	2.29

SOIL DESCRIPTION	
●	CLAYEY SAND (SC)
⊠	SILTY, CLAYEY SAND (SC-SM)
▲	POORLY GRADED SAND (SP)

REMARKS	
●	
⊠	8.5 to 10 feet
▲	

PROJECT: Sugg Parkway Substation

SITE: Sugg Parkway and Old Creek Road
Greenville, NC

Terracon
314 Beacon Dr
Winterville, NC

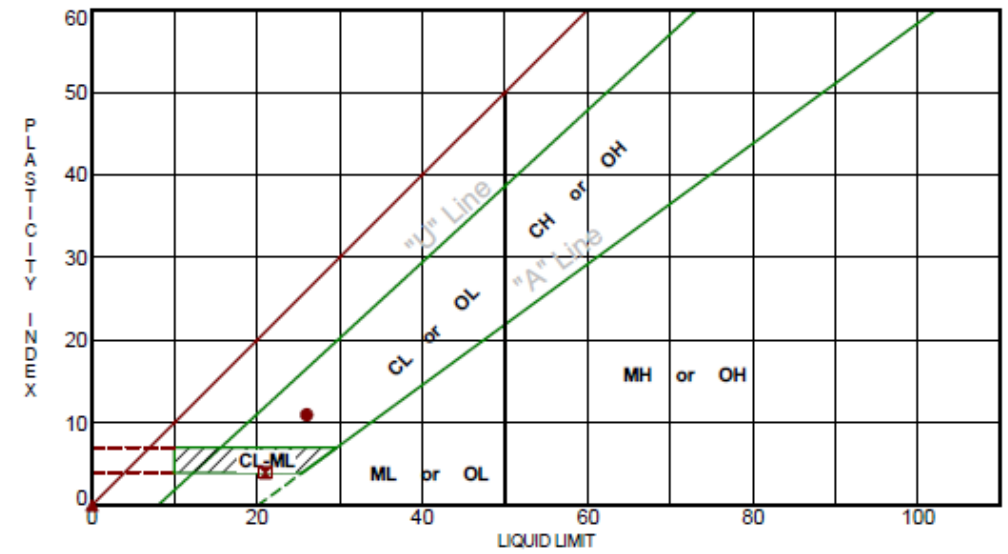
PROJECT NUMBER: 72195082

CLIENT: Greenville Utilities Commission
Greenville, NC

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE USCS 1 72195082 SUGG PARKWAY SUBSTATION GREENVILLE, NC.GPJ TERRACON_DATATEMPLATE.GDT 10/15/19

ATTERBERG LIMITS RESULTS

ASTM D4318



	Boring ID	Depth	LL	PL	PI	Fines	USCS	Description
●	B-1	1 - 2.5	26	15	11	33.7	SC	CLAYEY SAND
⊠	B-1	8.5 - 10	21	17	4	19.2	SC-SM	SILTY, CLAYEY SAND
▲	B-4	8.5 - 10	NP	NP	NP	2.3	SP	POORLY GRADED SAND

PROJECT: Sugg Parkway Substation

SITE: Sugg Parkway and Old Creek Road
Greenville, NC

Terracon
314 Beacon Dr
Winterville, NC

PROJECT NUMBER: 72195082

CLIENT: Greenville Utilities Commission
Greenville, NC

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS 72195082 SUGG PARKWAY SUBSTATION, GREENVILLE, NC.GPJ TERRACON_DATATEMPLATE.GDT 10/15/19

DESIGN SOIL PARAMETERS FOR DRILLED PIERS

LANDSCAPE Applicable to the following tables:

- The thickness of the bottom layer is undetermined due to the boring termination depth.
- Soil classifications are based on visual examination of soil samples.
- Soil parameters are ultimate values, appropriate safety factors should be applied by the designer.
- We have considered groundwater at a depth of 3 to 4 feet.
- The upper 3 feet of soil profile should be ignored due to surface disturbance and frost action.
- Only LRFD design values with a resistance factor (factored loads) have been provided for use with the design.
- The noted bearing pressure should be considered applicable to a depth 25 feet below the existing ground surface. this allows for 5 feet of data below the maximum tip depth of the shaft assuming shaft diameters of approximately 36 inches. Should it be necessary to extend the pile bottom below that depth or increase the diameter of the shaft at a depth of 25 feet, we recommend that a supplemental exploration be performed to collect deeper soil data.

Boring B-1

Layer (feet)		Soil Type (Clay/Sand)	Effective Unit Weight of Soil (pcf)	Cohesion (psf)	Coefficient of Horizontal Soil Stress (K)	Friction Angle (degrees)	LPile k-value (pci)	Factored Skin Friction (psf)	Factored End Bearing Pressure (psf)
Top	Bottom								
0	4	Sand	112	—	—	—	—	—	—
4	8	Sand	50.6	—	1.76	29	35	260	4,800
8	18	Sand	42.6	—	0.98	28	20	230	1,800
18	23	Sand	57.6	—	1.62	32	75	540	10,000
23	30	Sand	52.6	—	1.24	31	60	520	7,200

1. General notes applicable to the above values are included at the beginning of this section.

Boring B-2

Layer (feet)		Soil Type (Clay/Sand)	Effective Unit Weight of Soil (pcf)	Cohesion (psf)	Coefficient of Horizontal Soil Stress (K)	Friction Angle (degrees)	LPile k-value (pci)	Factored Skin Friction (psf)	Factored End Bearing Pressure (psf)
Top -	Bottom								
0	4	Sand	112	—	—	—	—	—	—
4	8	Sand	50.6	—	1.67	29	35	250	4,200
8	18	Sand	43.6	—	1.08	28	20	260	2,400
18	30	Sand	52.6	—	1.22	30	50	470	6,000

1. General notes applicable to the above values are included at the beginning of this section.

Boring B-3

Layer (feet)		Soil Type (Clay/Sand)	Effective Unit Weight of Soil (pcf)	Cohesion (psf)	Coefficient of Horizontal Soil Stress (K)	Friction Angle (degrees)	LPile k-value (pci)	Factored Skin Friction (psf)	Factored End Bearing Pressure (psf)
Top	Bottom								
0	3	Sand	112	—	—	—	—	—	—
3	13	Sand	53.6	—	2.80	31	60	340	7,800
13	23	Sand	52.6	—	2.08	30	50	420	6,000
23	28	Sand	57.6	—	1.35	32	75	620	10,000
28	30	Sand	67.6	—	1.47	35	100	890	10,000

1. General notes applicable to the above values are included at the beginning of this section.

Boring B-4

Layer (feet)		Soil Type (Clay/Sand)	Effective Unit Weight of Soil (pcf)	Cohesion (psf)	Coefficient of Horizontal Soil Stress (K)	Friction Angle (degrees)	LPile k-value (pci)	Factored Skin Friction (psf)	Factored End Bearing Pressure (psf)
Top	Bottom								
0	3	Sand	113	—	—	—	—	—	—
3	23	Sand	52.6	—	1.76	31	60	370	6,000
23	28	Sand	57.6	—	0.98	32	75	590	9,600
28	30	Sand	67.6	—	1.62	35	100	510	10,000

1. General notes applicable to the above values are included at the beginning of this section.

SUPPORTING INFORMATION

Contents:

Note: All attachments are one page unless noted above.

SAMPLING	WATER LEVEL	FIELD TESTS
Split Spoon	Water Initially Encountered Water Level After a Specified Period of Time Water Level After a Specified Period of Time Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	N Standard Penetration Test Resistance (Blows/Ft.) (HP) Hand Penetrometer (T) Torvane (DCP) Dynamic Cone Penetrometer UC Unconfined Compressive Strength (PID) Photo-Ionization Detector (OVA) Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Descriptive Term (Density)	Standard Penetration or N-Value Blows/Ft.	Descriptive Term (Consistency)	Unconfined Compressive Strength Qu, (tsf)	Standard Penetration or N-Value Blows/Ft.
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	> 4.00	> 30

RELATIVE PROPORTIONS OF SAND AND GRAVEL		RELATIVE PROPORTIONS OF FINES	
Descriptive Term(s) of other constituents	Percent of Dry Weight	Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	<15	Trace	<5
With	15-29	With	5-12
Modifier	>30	Modifier	>12

GRAIN SIZE TERMINOLOGY		PLASTICITY DESCRIPTION	
Major Component of Sample	Particle Size	Term	Plasticity Index
Boulders	Over 12 in. (300 mm)	Non-plastic	0
Cobbles	12 in. to 3 in. (300mm to 75mm)	Low	1 - 10
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)	Medium	11 - 30
Sand	#4 to #200 sieve (4.75mm to 0.075mm	High	> 30
Silt or Clay	Passing #200 sieve (0.075mm)		

UNIFIED SOIL CLASSIFICATION SYSTEM

Terracon GeoReport

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or [$Cc<1$ or $Cc>3.0$] [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F, G, H]
			Fines classify as CL or CH		GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or [$Cc<1$ or $Cc>3.0$] [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G, H, I]
			Fines classify as CL or CH		SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A"		CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried	< 0.75	OL	Organic clay [K, L, M, N] / Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K, L, M]
			PI plots below "A" line		MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried	< 0.75	OH	Organic clay [K, L, M, P] / Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

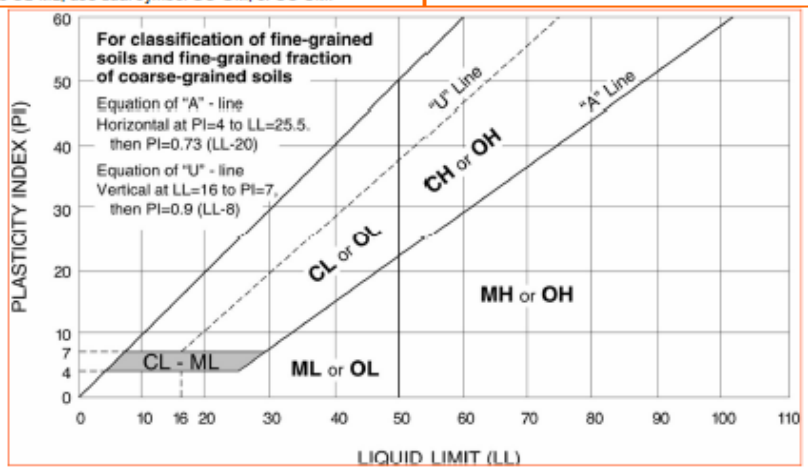
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



Vendor Name: _____

GREENVILLE UTILITIES COMMISSION
PROPOSAL FORM
SUGG PARKWAY SUBSTATION
STRUCTURES, EQUIPMENT, AND FOUNDATION DESIGN

The undersigned bidder hereby declares that it has carefully examined the enclosed detailed specifications for furnishing GUC with the below listed item(s). The undersigned bidder further agrees, if this proposal is accepted within thirty (30) days from the date of the opening, to furnish any or all of the item(s) upon the quoted price.

ITEM NO.	DESCRIPTION	TOTAL PRICE
I	Steel Structures Weight of Steel _____lbs.	$_____
II	Equipment and Components	$_____
III	Foundation Design	$_____
	TOTAL	$_____
	Delivery Time _____ weeks	

Method of Award: GUC will award this bid as a total bid.

Complete and Check All Math: It is the responsibility of the Bidder to extend bid prices and supply a total for all item(s).

[Balance of page left blank intentionally]

Vendor Name: _____

GREENVILLE UTILITIES COMMISSION

Exception/Variation Form

Specifications for: Sugg Parkway Substation Structures, Equipment, and Foundation Design

Provider's Certification: This is to certify that it is our intent to furnish equipment, material, services, etc. in absolute compliance with the bid specification except where expressly noted below.

Instructions: List all exceptions or variations to these bid specifications. Providers shall identify each exception or variation by specification page. The omission of exception or variation information shall be deemed by the Commission as the Provider's intent to absolutely comply with the bid specification. If additional space is required, Provider may reproduce this form as necessary.

Page #	Exception/Variation

Authorized Signature of Certification: _____
Print Name: _____

Firm Represented: _____
Address: _____

It is certified that this bid is made in good faith and without collusion or connection with any other person bidding on the same above listed items. It is also certified that this bid is made in good faith and without collusion or connection with any GUC employee(s).

Each Bid shall be accompanied by cash, cashier's check, or certified check drawn on a bank insured with the Federal Deposit Insurance Corporation or the Savings Association Insurance Fund, payable to the Owner, in an amount not less than five percent (5%) of the total bid as a guarantee that a Purchase Order, if awarded, will be accepted. In lieu thereof, a Bid Bond may be submitted by the Bidder in an amount not less than five percent (5%) of the total bid (see attached Bid Bond form). The total bid price for which the five percent (5%) applies shall be the total of all schedules.

Certified check or cash for $_____or bid bond for $_____attached.

Firm Name _____ Phone (_____)_____

Address_____

City _____ State _____ Zip Code _____

Fax (____)_____ E-Mail _____

Authorized Official _____ Title _____
Typed Name

_____ Date _____
Signature

BID BOND

KNOW ALL MEN BY THESE PRESENT, THAT WE _____

as Principal, and_____

as Surety, who is duly licensed to act as Surety in North Carolina, are held and firmly bound unto the Greenville Utilities Commission, Greenville, NC, as Obligee, in the penal sum of _____

_____DOLLARS ($_____) (5% Bid Bond), lawful money of

the United States of America, for the payment of which, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these present.

SIGNED, Sealed and dated this_____ day of_____, 2020.

WHEREAS, the said Principal is herewith submitting a Proposal for

_____

and the Principal desires to file this Bid Bond in lieu of making the cash deposit as required by the bidding documents contained herein;

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION is such that if the principal shall

be awarded the Purchase Order for which the bid is submitted and shall accept the Purchase Order within ten (10) days after the award of same to the principal, then this obligation shall be null and void; but if the principal fails to so accept such Purchase Order as required by the bidding documents contained herein, the Surety shall, upon demand, forthwith pay to the Obligee the amount set forth in the first paragraph hereof, and upon failure to forthwith make such payment, the Surety shall pay the Obligee an amount equal to double the amount of this Bid Bond as set forth in the first paragraph hereof. Power of Attorney from the Surety to its Attorney-in-Fact is attached hereto.

_____

Principal

By_____ (SEAL)

_____

Corporate Surety

By _____(SEAL)

PERFORMANCE BOND/PAYMENT BOND

Date of Execution: _____

Name of Principal: _____

(Contractor) _____

Name of Surety: _____

Name of Contracting Body: _____

Amount of Bond: _____

Project: _____

KNOW ALL THESE MEN BY THESE PRESENT, That We, the Principal and Surety above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these present.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal entered into a certain Contract with the Contracting Body, identified as shown above and hereto attached.

NOW, THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said Contract during the original term of said Contract and any extensions there of that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the Contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above bounded parties have executed this instrument under the several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed, and these present duly signed by its undersigned representative, pursuant to authority of its governing body.

Executed in five (5) counterparts.

Witness:

_____
(Proprietorship or Partnership)

ATTEST:

By: _____

Title: _____
(Corporate Secretary or
Assistant Secretary Only)

CONTRACTOR:

_____
(Trade or Corporate Name)

By: _____

Title: _____

(CORPORATE SEAL)

Witness:

_____

Countersigned:

_____

_____
N.C. Licensed Resident Agent

_____

_____
(Name and Address – Surety Agent)

_____

_____
Surety Company Name and N.C.
Regional or Branch Office Address

SURETY COMPANY:

_____

By: _____

Title: _____
(Attorney-in-Fact)

(SURETY SEAL)

SPACE FOR ATTACHING POWER OF ATTORNEY
(Performance Bond)

SECTION III

TERMS AND CONDITIONS FOR THE PURCHASE OF

APPARATUS, SUPPLIES, MATERIALS, AND EQUIPMENT

These Terms and Conditions, made and entered into on this the _____ day of _____, by and between GREENVILLE UTILITIES COMMISSION OF THE CITY OF GREENVILLE, PITT COUNTY, NORTH CAROLINA, with one of its principal offices and places of business at 401 S. Greene Street, Post Office Box 1847, Greenville, Pitt County, North Carolina 27835-1847, hereinafter referred to as "GUC" and _____, a _____ organized and existing under and by virtue of the laws of the State of _____, with one of its principal offices and places of business at _____, hereinafter referred to as "PROVIDER";

1.0 TAXES

No taxes shall be included in any bid prices. GUC is exempt from Federal Excise Tax. GUC is not exempt from North Carolina state sales and use tax or, if applicable, Pitt County sales and use tax. Such taxes shall be shown as a separate item on the invoice.

2.0 INVOICES

It is understood and agreed that orders will be shipped at the established contract prices and quantities in effect on dates orders are placed. Invoicing at variance with this provision may subject the contract to cancellation. Applicable North Carolina sales tax shall be invoiced as a separate line item. All invoices must bear the GUC purchase order number. Mail all invoices to Greenville Utilities Commission, Finance Department, P.O. Box 1847, Greenville, NC 27835-1847.

3.0 PAYMENT TERMS

Payments for equipment, materials, or supplies will be made after the receipt and acceptance of the equipment, materials, supplies or services and after submission of a proper invoice. GUC's normal payment policy is thirty (30) days. GUC will not be responsible for any goods delivered without a purchase order having been issued. Payment will be made in U.S. currency only.

4.0 QUANTITIES

Quantities specified are only estimates of GUC's requirements. GUC reserves the right to purchase more or less than the stated quantities at prices indicated in the submitted Proposal Form based on our actual needs.

5.0 AFFIRMATIVE ACTION

The Provider will take affirmative action in complying with all Federal and State requirements

concerning fair employment and employment of the handicapped, and concerning the treatment of all employees, without discrimination by reason of race, color, religion, sex, national origin, or physical handicap.

6.0 CONDITION AND PACKAGING

Unless otherwise indicated in the bid, it is understood and agreed that any item offered or shipped shall be new and in first class condition, that all containers shall be new and suitable for storage or shipment, and that prices include standard commercial packaging.

7.0 SAMPLES

Samples of items, if required, must be furnished free of expense to GUC, and if not destroyed, will, upon request, be returned at the Provider's expense. Request for the return of samples must be made at the bid opening; otherwise, the samples will become GUC's property. Each individual sample must be labeled with Provider's name.

8.0 SPECIFICATIONS

Any deviation from specifications must be clearly pointed out, otherwise, it will be considered that items offered are in strict compliance with specifications, and the Provider will be held responsible. Deviations must be explained in detail. **The Provider shall not construe this paragraph as inviting deviation or implying that any deviation will be acceptable.**

9.0 INFORMATION AND DESCRIPTIVE LITERATURE

Providers are to furnish all information requested. Further, as may be specified elsewhere, each Provider must submit with its proposal: cuts, sketches, descriptive literature, and/or complete specifications covering the products offered. Reference to literature submitted with a previous bid does not satisfy this provision. Bids which do not comply with these requirements will be subject to rejection.

10.0 AWARD OF CONTRACT

As directed by statute, qualified bids will be evaluated and acceptance made of the lowest responsible, responsive bid most advantageous to GUC as determined upon consideration of such factors as prices offered, the quality of the article(s) offered, the general reputation and performance capabilities of the Provider, substantial conformity with the specifications and other conditions set forth in the bid, the suitability of the article(s) for the intended use, the related services needed, the date(s) of delivery and performance, and such other factors deemed by GUC to be pertinent or peculiar to the purchase in question.

Acceptance of the order includes acceptance of all terms, conditions, prices, delivery instructions, and specifications as shown on this set of Terms and Conditions and in this order or attached to and made a part of this order.

The conditions of this order cannot be modified except by written amendment in the form of "Amended Purchase Order," which has been approved by GUC's Procurement Manager.

In the event of a Provider's failure to deliver or perform as specified, GUC reserves the right to cancel the order or any part thereof, without prejudice to GUC's other rights. The Provider agrees that GUC may return part of or all of any shipment at Provider's expense. GUC may charge the Provider with all reasonable expenses resulting from such failure to deliver or perform.

11.0 MEDIATION/BINDING ARBITRATION

In the event of any dispute between the Parties, the Parties agree to submit any dispute to non-binding mediation before a mutually agreeable Mediator prior to initiating litigation. If the Parties are unable to agree upon a Mediator within thirty (30) days after demand therefore, either Party may petition a Court of competent jurisdiction for the designation of a qualified Mediator for these purposes. Each Party shall bear its own costs and expenses of participating in the mediation (including, without limitation, reasonable attorneys' fees), and each Party shall bear one-half (1/2) of the costs and expenses of the Mediator. Unless otherwise agreed, the Parties will hold the mediation in Greenville, North Carolina. The matters discussed or revealed in the mediation session shall not be disclosed in any subsequent litigation.

In the event the matter is not resolved in mediation, either Party may request arbitration. The parties shall jointly select an Arbitrator, and shall be bound by the decision of the Arbitrator with respect to any dispute between the parties with respect to this Agreement. If the parties are unable to mutually agree upon an Arbitrator, the Parties shall each select an Arbitrator, and the two Arbitrators so selected shall select a third Arbitrator, and the decision of the majority of the Arbitrators shall be conclusive and binding upon the Parties. The Parties at all times agree to equally split the costs of any Arbitrator(s) selected in an effort to resolve the dispute between the Parties. Any party desiring to resolve a dispute under the terms of this Agreement shall notify the other Party in writing, and the Parties shall seek to agree upon a mutually agreed-upon Arbitrator within a period of ten (10) days from the date of such written demand. If the Parties are unable to agree within such ten (10) day period, the Parties shall each select an Arbitrator, and the two (2) Arbitrators so selected shall select a third Arbitrator within fifteen (15) days from the date of the written demand for arbitration, and a decision shall be rendered by the Arbitrator(s) so selected within five (5) days after such Arbitrator(s) is selected.

12.0 GOVERNMENT RESTRICTIONS

In the event any Governmental restrictions may be imposed which would necessitate alteration of the material, quality, workmanship, or performance of the items offered on this bid prior to their delivery, it shall be the responsibility of the successful Provider to notify the GUC Procurement Manager, at once, indicating in its letter the specific regulation which required such alterations. GUC reserves the right to accept any such alterations, including any price adjustments occasioned thereby, or, in the sole discretion of GUC, to cancel the contract.

13.0 INSURANCE

13.1 Coverage – During the term of the contract, the Provider at its sole cost and expense shall provide commercial insurance of such type and with the following coverage and limits:

13.1.1 Workers' Compensation – The Provider shall provide and maintain Workers' Compensation Insurance, as required by the laws of North Carolina, as well as employer's liability coverage with minimum limits of $1,000,000 each accident, covering all Providers' employees who are engaged in any work under the contract. If any work is sublet, the Provider shall require the subcontractor to provide the same coverage for any of its employees engaged in any work under the contract.

13.1.2 General Liability – Commercial Liability Coverage written on an "occurrence" basis in the minimum amount of $1,000,000 per occurrence.

13.1.3 Automobile – Automobile Liability Insurance, to include coverage for all owned, hired, and non-owned vehicles used in connection with the contract with a minimum combined single limit of $1,000,000 per accident.

13.2 Requirements - Providing and maintaining adequate insurance coverage is a material obligation of the Provider. All such insurance shall meet all laws of the State of North Carolina. Such insurance coverage shall be obtained from companies that are authorized to provide such coverage and that are authorized to do business in North Carolina by the Commissioner of Insurance. The Provider shall at all times comply with the terms of such insurance policies and all requirements of the insurer under any of such insurance policies, except as they may conflict with existing North Carolina laws or this contract. The limits of coverage under each insurance policy maintained by the Provider shall not be interpreted as limiting the Provider's liability and obligations under the contract. It is agreed that the coverage as stated shall not be canceled or changed until thirty (30) days after written notice of such termination or alteration has been sent by registered mail to GUC's Procurement Manager.

14.0 PATENTS AND COPYRIGHTS

The Provider shall hold and save GUC, its officers, agents, and employees, harmless from liability of any kind, including costs and expenses, including reasonable attorney fees, on account of any copyrighted articles or any patented or unpatented invention, device or appliance manufactured or used in the performance of this contract.

15.0 PATENT AND COPYRIGHT INDEMNITY

The Provider will defend or settle, at its own expense, any action brought against GUC to the extent that it is based on a claim that the product(s) provided pursuant to this agreement infringe any U.S. copyright or patent; and will pay those costs, damages, and attorney fees finally awarded against GUC in any such action attributable to any such claim, but such defense, settlements, and payments are conditioned on the following: (1) that Provider shall be notified promptly in writing by GUC of any such claim; (2) that Provider shall have sole control of the defense of any action on such claim and of all negotiations for its settlement or compromise; (3) that GUC shall cooperate with Provider in a reasonable way to facilitate the settlement of defense of such claim; (4) that such claim does not arise from GUC modifications not authorized by the Provider or from the use of combination of products provided by the Provider with products provided by GUC or by others; and (5) should such product(s) become, or in the Provider's opinion likely to become, the subject of such claim of infringement, then GUC shall permit Provider, at Provider's option and expense, either to procure for GUC the right to continue using the product(s), or replace or modify the same so that it becomes non-infringing and performs in a substantially similar manner to the original product.

16.0 EXCEPTIONS

All proposals are subject to the terms and conditions outlined herein. All responses will be controlled by such terms and conditions and the submission of other terms and conditions, price catalogs, and other documents as part of a Provider's response will be waived and have no effect on this Request for Proposal or any other contract that may be awarded resulting from this solicitation. The submission of any other terms and conditions by a Provider may be grounds for rejection of the Provider's proposal. The Provider specifically agrees to the terms and conditions set forth in this set of Terms and Conditions by affixing its name on the signatory page contained herein.

17.0 CONFIDENTIAL INFORMATION

Except as provided by statute and rule of law, GUC will keep trade secrets in which the Provider does not wish disclosed confidential. Each page shall be identified in boldface at the top and bottom as "CONFIDENTIAL" by the Provider. Cost information shall not be deemed confidential. The determination of whether a matter is confidential will be determined by North Carolina law.

18.0 ASSIGNMENT

No assignment of the Provider's obligations or the Provider's right to receive payment hereunder shall be permitted without the express written consent of GUC, provided however, upon written request approved by the GUC Procurement Manager, solely as a convenience to the Provider, GUC may:

- Forward the Provider's payment check directly to any person or entity designated by the Provider, and

- Include any person or entity designated by Provider as a joint payee on the Provider's payment check.

- In no event shall such approval and action obligate GUC to anyone other than the Provider, and the Provider shall remain responsible for fulfillment of all contract obligations.

19.0 ACCESS TO PERSON AND RECORDS

GUC shall have reasonable access to persons and records of Provider as a result of all contracts entered into by GUC.

20.0 INSPECTION AT BIDDER'S SITE

GUC reserves the right to inspect, at a reasonable time, the item, plant, or other facilities of a prospective Provider prior to contract award and during the contract term as necessary for GUC's determination that such item, plant, or other facilities conform to the specifications/requirements and are adequate and suitable for the proper and effective performance of the contract. Provider may limit GUC's access to restricted areas.

21.0 AVAILABILITY OF FUNDS

Any and all payments of compensation of this specific transaction and any continuation or any renewal or extension are dependent upon and subject to the allocation of GUC funds for the purpose set forth in this Agreement.

22.0 GOVERNING LAWS

All contracts, transactions, agreements, etc., are made under and shall be governed by and construed in accordance with the laws of the State of North Carolina.

23.0 ADMINISTRATIVE CODE

Bids, proposals, and awards are subject to applicable provisions of the North Carolina Administrative Code and General Statues and Laws of the State of North Carolina.

24.0 EXECUTION

In the discretion of GUC, failure of a duly authorized official of Provider to sign the Signatory Page may render the bid invalid.

25.0 CLARIFICATIONS/INTERPRETATIONS

Any and all questions regarding these Terms and Conditions must be addressed to the GUC Procurement Manager. Do not contact the user directly. **These Terms and Conditions are a**

complete statement of the parties' agreement and may only be modified in writing signed by Provider and the GUC Procurement Manager.

26.0 SITUS

The place of all contracts, transactions, agreements, their situs and forum, shall be North Carolina, where all matters, whether in contract or tort, relating to the validity, construction, interpretation, and enforcement shall be determined.

27.0 TERMINATION OF AGREEMENT

GUC or Provider may terminate this Agreement for just cause at any time. Provider will be paid for all time and expenses incurred as of the termination date. Termination for just cause by either party shall be by certified letter and shall be effective thirty (30) days after signed and acknowledged receipt of said letter. Just cause shall be based on reasonable grounds, and there must be a fair and honest cause or reason for such action. The causes for termination, include, but are not limited to: (1) Provider's persistent failure to perform in accordance with the Terms and Conditions, (2) Provider's disregard of laws and regulations related to this transaction, and/or (3) Provider's substantial violation of the provisions of the Terms and Conditions.

28.0 DELIVERY

Shipments will be made only upon releases from a purchase order issued by GUC in accordance with GUC's current needs.
Time is of the essence with respect to all deliveries under this Agreement. Delivery of all equipment, materials, or supplies shall be made Free on Board (FOB) GUC Warehouse, 801 Mumford Road, Greenville, North Carolina 27834, unless otherwise specified. The agreed price for such equipment, materials, or supplies shall include all costs of delivery and ownership, and risks of loss shall not be transferred from Provider to GUC until express written acceptance of delivery and inspection by GUC. Delivery hours are between 8:00 AM and 4:30 PM Tuesday-Thursday only. **GUC's purchase order number is to be shown on the packing slip or any related documents.** GUC reserves the right to refuse or return any delivery with no purchase order number or which is damaged. GUC will not be charged a restocking fee for any delivery which is refused or returned.

29.0 INDEMNITY PROVISION

Provider agrees to indemnify and save GREENVILLE UTILITIES COMMISSION of the City of Greenville, Pitt County, North Carolina, and the City of Greenville, North Carolina, its co-owners, joint venturers, agents, employees, and insurance carriers harmless from any and all losses, claims, actions, costs, expenses including reasonable attorney fees, judgments, subrogations, or other damages resulting from injury to any person (including injury resulting in death), or damage (including loss or destruction) to property of whatsoever nature of any person arising out of or incident to the performance of the terms of this Contract by Provider, including, but not limited to, Provider's employees, agents, subcontractors, and others designated by Provider to perform work or services in, about, or attendant to, the work and services under the

terms of this Contract. Provider shall not be held responsible for any losses, expenses, claims, subrogations, actions, costs, judgments, or other damages, directly, solely, and proximately caused by the negligence of Greenville Utilities Commission of the City of Greenville, Pitt County, North Carolina. Insurance covering this indemnity agreement by the Provider in favor of Greenville Utilities Commission of the City of Greenville, Pitt County, North Carolina, and the City of Greenville, North Carolina, shall be provided by Provider.

30.0 FORCE MAJEURE

Neither party shall be considered in default in the performance of its obligations hereunder to the extent that the performance of any such obligation is prevented or delayed by any cause, existing or future, which is beyond the reasonable control of such party. In any such event of force majeure, the parties shall advise each other of such event, and the parties shall negotiate an equitable adjustment to their respective obligations under this Agreement.

31.0 WARRANTY(IES)

The Provider hereby includes all warranties, whether expressed or implied, including, but not limited to, the Implied Warranty of Merchantability and the Implied Warranty of Fitness for a Particular Purpose.

32.0 INTEGRATED CONTRACT

These Terms and Conditions, Instructions to Bidders, Specifications, and the selected Provider's bid represents the entire contract between the Parties. No verbal or other written agreement(s) shall be held to vary the provisions of this Agreement.

33.0 CONTRACT PROVISIONS

Each of the provisions of these Terms and Conditions shall apply to the full extent permitted by law, and the invalidity in whole or in part of any provision shall not affect the remainder of such provision or any other provisions.

34.0 E-VERIFY

E-Verify - I understand that E-Verify is the federal E-Verify program operated by the United States Department of Homeland Security and other federal agencies, or any successor or equivalent program used to verify the work authorization of newly hired employees pursuant to federal law in accordance with NCGS §64-25 et seq. I am aware of and in compliance with the requirements of E-Verify and Article 2 of Chapter 64 of the North Carolina General Statutes. To the best of my knowledge, any subcontractors employed by me as a part of this contract are in compliance with the requirements of E-Verify and Article 2 of Chapter 64 of the North Carolina General Statutes.

35.0 IRAN DIVESTMENT ACT CERTIFICATION

By acceptance of this purchase order, Vendor/Contractor certifies that, as of the date of the purchase order or contract, it is not on the Final Divestment List as created by the State Treasurer pursuant to N.C.G.S. § 143-6A-4. In compliance with the requirements of the Iran Divestment Act and N.C.G.S. § 143C-6A-5(b), Vendor/Contractor shall not utilize in the performance of the contract any subcontractor that is identified on the Final Divestment List.

36.0 UNIFORM GUIDANCE

Contracts funded with federal grant or loan funds must be procured in a manner that conforms with all applicable federal laws, policies, and standards, including those under the Uniform Guidance (2 C.F.R. Part 200).

37.0 NOTICES

Notices to the Parties should be sent to the names and addresses specified below:

Cleve Haddock, CLGPO
Procurement Manager
Greenville Utilities Commission
401 South Greene Street
Greenville, NC 27834

Vendor Specified on Page 1 of Section III when awarded.

GREENVILLE UTILITIES COMMISSION

By: _____
Anthony C. Cannon

Title: General Manager/CEO
(Authorized Signatory)

Date: _____

Attest: _____

Name (Print): Amy Wade

Title: Executive Secretary

Date: _____

(OFFICIAL SEAL)

COMPANY NAME:

By: _____

Name (Print): _____

Title: _____
(Authorized Signatory)

Date: _____

Attest: _____

Name (Print): _____

Title: Corporate Secretary

Date: _____

(CORP. SEAL)

This instrument has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act.

By: _____
Jeff W. McCauley

Title: Chief Financial Officer

Date: _____

APPROVED AS TO FORM AND LEGAL CONTENT:

By: _____
Phillip R. Dixon

Title: General Counsel

Date: _____

CHANGE ORDER

GREENVILLE UTILITIES COMMISSION
PROJECT CHANGE ORDER

Assigned by Finance
Change Order Number: CO-_____

Department: _____ Date: _____ Capital Project Number: _____
Project Name: _____ Vendor Name: _____
Initiated By: _____ (Name) Vendor Address: _____
☐ Owner ☐ Engineer ☐ Contractor Vendor Contact: _____
☐ Other _____

1. TYPE OF CHANGE: ☐ Design ☐ Engineering ☐ Scope ☐ Other _____
2. REASON FOR CHANGE: ☐ Owner ☐ Vendor ☐ Safety ☐ Construction ☐ Cost ☐ Schedule
3. CHANGE ORDER DESCRIPTION: _____

Change Order Justification - _____

4. ACCOUNT NUMBER: _____
5. SCHEDULE IMPACT: ☐ No Impact ☐ Schedule Impact 6. Project Delay Of: ☐ Days ☐ Weeks ☐ Months (Check One)
Start Date: _____ Finish Date: _____ Total Time Delay: _____

7. ESTIMATED COST:			
Project Mgmt	_____	☐ Add	☐ Deduct
Engr/Design	_____	☐ Add	☐ Deduct
Construction	_____	☐ Add	☐ Deduct
Labor	_____	☐ Add	☐ Deduct
Materials	_____	☐ Add	☐ Deduct
Other Direct	_____	☐ Add	☐ Deduct
Indirect	_____	☐ Add	☐ Deduct
Total Change Order Amount:	_____	☐ Add	☐ Deduct

8. REVISED CAPITAL PROJECT COST: Original Budget: $ _____ Revised Estimate to Complete: $_____

APPROVED ☐ DISAPPROVED ☐ _____ Project Manager Date

APPROVED ☐ DISAPPROVED ☐ _____ Department Head Date

APPROVED ☐ DISAPPROVED ☐ _____ Assistant General Manager/Chief Operating Officer Date

APPROVED ☐ DISAPPROVED ☐ _____ General Manager/Chief Executive Officer Date

RETURN TO FINANCE AFTER GM/CEO SIGNATURE