



INVITATION FOR BID

PWC2627011

STRUCTURES AND EQUIPMENT FOR THE POD 5 – MCARTHUR ROAD SUBSTATION

**Date of Issue: September 11, 2026
Bid Opening Date: October 6, 2026
3:00 P.M.**

Direct all inquiries concerning this IFB to:

**Nikole Bohannon
Procurement Manager
procurement@faypwc.com**

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**ADVERTISEMENT FOR BID
FAYETTEVILLE PUBLIC WORKS COMMISSION
STRUCTURES AND EQUIPMENT FOR THE POD 5 - MCARTHUR ROAD SUBSTATION**

**Cumberland County
North Carolina**

Pursuant to N.C.G.S 143-129 and 133-3, sealed Bids are solicited and will be received at Fayetteville Public Works Commission, Administration Building, Conference Room 107, 955 Old Wilmington Road, Fayetteville, NC 28301, until **3:00 p.m., EST Tuesday, October 6, 2026**, for the **STRUCTURES AND EQUIPMENT FOR THE POD 5 - MCARTHUR ROAD SUBSTATION**.

Enclosed please find the Instructions to Bidders, Detailed Specifications, and Bid Pricing Form. Bids shall be submitted on the forms provided herein, or exact copies thereof, and the bidder shall return one copy of the entire bid packet along with the completed Bid Pricing Form and any other information specified in the bid documents.

Enclosed are the Instructions to Bidders, Material/Technical Specifications, and Bid Pricing Form. Bidders must submit the completed Attachment A, Attachment B, Attachment C (if applicable), and Attachment H Economic Impact Discloser Form, and any required addendum acknowledgments. Submissions must be made using the provided forms or exact copies thereof, as specified in the IFB documents. Unsolicited bid samples or descriptive literature may not be examined or tested, will not be used to determine responsiveness, and will not be deemed to vary any of the provisions of the IFB. Failure to comply with these requirements shall constitute sufficient cause to reject a bid without further consideration.

Questions regarding this bid must be submitted in writing to the attention of **Nikole Bohannon**, at procurement@faypwc.com no later than **4:00 p.m., EST Tuesday, September 22, 2026**, in order to be considered for a response.

Mailed bids must be addressed to **Nikole Bohannon**, Procurement Manager, Fayetteville Public Works Commission, 955 Old Wilmington Road, Fayetteville, North Carolina 28301. The outside of the envelope must be marked **IFB: PWC2627011 STRUCTURES AND EQUIPMENT FOR THE POD 5 - MCARTHUR ROAD SUBSTATION** and shall indicate the name and address of the bidder. Late bids will not be considered.

Fayetteville Public Works Commission reserves the right to accept or reject any or all bids, to waive minor informalities or technicalities as permitted by law, to disregard nonconforming or nonresponsive bids, and to re-advertise for bids if deemed in the best interest of PWC. The bid tabulation and announcement of the apparent low bidder at the bid opening do not constitute a binding contract with PWC. No contract will be considered awarded until a formal written Agreement is executed by both PWC and the successful bidder. The award of a contract, if made, will be to the lowest responsive, responsible bidder whose qualifications indicate the award will be in the best interest of PWC.

**FAYETTEVILLE PUBLIC WORKS COMMISSION
Nikole Bohannon
Procurement Manager**

INSTRUCTIONS TO BIDDERS
FAYETTEVILLE PUBLIC WORKS COMMISSION
STRUCTURES AND EQUIPMENT FOR THE POD 5 - MCARTHUR ROAD SUBSTATION

PURPOSE AND BACKGROUND

Fayetteville Public Works Commission intends to solicit bids from qualified vendors to furnish and deliver all materials and equipment (except materials and equipment specified to be furnished by the Owner) complete and conforming to the specifications for the installation of the McArthur Road Substation.

OBJECTIVE OF THE REQUEST

It is the intent of this bid invitation to obtain pricing for **STRUCTURES AND EQUIPMENT FOR THE POD 5 - MCARTHUR ROAD SUBSTATION** within the material/technical specifications section of this Invitation for Bid (IFB). You are requested to submit your bid on the enclosed **Attachment B: Bid Pricing Form**.

IFB SCHEDULE

The following table shows the schedule of events to prepare your organization's response. The key deadlines and targeted dates for this process are as follows:

Action	Responsibility	Date/Time
Advertisement Date	Bidders	September 11, 2026
Question Deadline	Bidders	September 22, 2026, at 4:00 p.m.
Addendum Deadline	PWC	September 24, 2026, at 5:00 p.m.
Bid Opening	Bidders	October 6, 2026, at 3:00 p.m.
Target Commission Date	PWC	October 28, 2026
Target Council Date	PWC	November 11, 2026
Award /Sale of Goods Agreement	PWC	November 2026
Preferred Delivery – Technical Specification A	Awarded Bidder	June 1, 2027
Preferred Delivery – Technical Specification B	Awarded Bidder	March 1, 2027

QUESTIONS

Written questions shall be e-mailed to procurement@faypwc.com by the date and time specified in the IFB schedule. Bidders will enter **"IFB PWC2627011 – Questions"** as the subject of the email.

Questions received prior to the submission deadline date, the Procurement Advisor's response, and any additional information deemed necessary by PWC will be posted in the form of an addendum to the PWC website and shall become an Addendum to this IFB. No information, instruction, or advice provided orally or informally by any PWC personnel, whether made in response to a question or otherwise concerning this IFB, shall be considered authoritative or binding. Bidders shall rely only on the written material contained in an Addendum to this IFB.

Inquiries should be submitted no later than the date and time noted in the IFB schedule. Questions answered verbally will be followed up by written addenda as deemed necessary; oral interpretations shall have no effect.

Bidders are expressly prohibited from contacting any PWC official or employee associated with this IFB or project, except through the Procurement Advisor identified on the IFB cover page and only in the manner described above.

ECONOMIC IMPACT (EI) PROGRAM PARTICIPATION

Fayetteville PWC supports fair and open competition in all procurement activities and encourages participation from qualified businesses of all sizes. For the purposes of PWC procurements, a qualified business is one that demonstrates the capacity, capability, and resources to perform in accordance with the specifications, terms, and conditions of the solicitation. PWC also recognizes the value that small and locally based suppliers bring to the community and to the efficiency of its operations.

While no specific business certification is required for award, bidders that are certified as a Disadvantaged Business Enterprise (DBE), Small Business Administration (SBA)-certified firm, or PWC Small Local Supplier (SLS) are encouraged to participate and, when applicable, to indicate that status on the Economic Impact Disclosure Form included in this solicitation.

GREATER FAYETTEVILLE CHAMBER OF COMMERCE

Members of the Greater Fayetteville Chamber of Commerce preferred, but not required.

REFERENCES

Bidders are encouraged to provide up to three (3) references where the company has supplied equipment or services within the energy and power generation industry, when the model or equipment differs from that noted in **Attachment A: Material/Technical Specifications** or **Attachment B: Bid Pricing Form**. PWC may contact these references to assess whether the bidder's performance was satisfactory and aligned with industry standards. The information obtained may be considered in the evaluation of the bid. If PWC is listed as a reference, it may be included as one of the three (3) optional references.

COMPANY NAME	CONTACT NAME	TELEPHONE NUMBER	EMAIL
Fayetteville Public Works Commission, if applicable			

VENDOR REGISTRATION VIA ISUPPLIER

- 1) All vendors interested in doing business with PWC must register as a vendor through the iSupplier Portal using the link below. The iSupplier self-service portal enables vendors to have real-time access to information regarding purchase orders, invoices, and payments through a secure environment. Attach a copy of your W9 to your online registration.

<https://www.faypwc.com/isupplier-doing-business-with-pwc/>

SUBMISSION INSTRUCTIONS

- 1) Bids should be complete and carefully worded and should convey all the information requested in the IFB. Bids should be prepared simply and economically, providing a straightforward, concise description of the bidder's capabilities to satisfy the requirements of the IFB. Emphasis should be on completeness and clarity of content. Any proposed deviation, exception, clarification, or variation to the Material/Technical Specifications or the Sale of Goods Agreement must be clearly identified and submitted only on the applicable Form of Exceptions (**Attachment F** and/or **Attachment G**). Deviations, conditions, or bidder standard terms included elsewhere in the bid, including in cover letters, pricing notes, appendices, or other materials, shall not modify the requirements of this IFB and may render the bid nonresponsive. Proposed exceptions to the Sale of Goods Agreement that materially alter or are inconsistent with the rights, obligations, risk allocation, remedies, indemnification, warranty, insurance, governing law, limitation of liability, delivery, payment, or other material terms of the Agreement may affect responsiveness, award eligibility, or contract execution. PWC reserves the right to request clarification of such exceptions and, if deemed in the best interest of PWC, negotiate their resolution. If the parties are unable to reach agreement on mutually acceptable terms, PWC may reject the bid, rescind an award, or proceed to the next lowest responsive, responsible bidder.
- 2) Unsolicited bid samples or descriptive literature may not be examined or tested, will not be used to determine responsiveness, and will not vary any of the provisions of the IFB. PWC reserves the right to accept or reject any or all bids, to waive minor informalities or technicalities as permitted by law, to disregard nonconforming or nonresponsive bids, and to re-advertise for bids if deemed in the best interest of PWC. The bid tabulation and announcement of the apparent low bidder at the bid opening do not constitute a binding contract with PWC. No contract will be considered awarded until a formal written Agreement is executed by both PWC and the successful bidder. The award of a contract, if made, will be to the lowest responsible, responsive bidder whose qualifications indicate the award will be in the best interest of PWC.
- 3) Bids may be withdrawn by the bidder only in writing and if receipt of such withdrawal is acknowledged by PWC prior to the time for the bid submittal deadline identified in the Advertisement for Bidders (or such later date included in an Addendum). Written withdrawal requests shall be submitted on the bidder's letterhead and signed by an official of the bidder duly authorized to make such request. Any withdrawal request made after the bid submittal deadline shall be allowed only if the price bid was based upon a mistake that constituted a substantial error, provided the bid was submitted in good faith, and then only pursuant to the terms of N.C.G.S. § 143-129.1.

- 4) Bids must be submitted in an envelope clearly marked with **“IFB: PWC2627011 STRUCTURES AND EQUIPMENT FOR THE POD 5 - MCARTHUR ROAD SUBSTATION”** along with the bidder's name and address. **Even if this envelope is placed inside a courier's envelope, the courier envelope itself must also be properly marked to ensure the bid can be identified without opening it.** This is critical for proper sorting and handling, as multiple bids are received daily for different Procurement Advisors. Any bid received without proper labeling on the courier envelope will be returned to the sender and will not be considered for award. All bids must be delivered to the Fayetteville Public Works Commission, Administration Building, Procurement Department, at 955 Old Wilmington Road, Fayetteville, NC 28301, by the specified deadline. Late bids will not be considered.
- 5) Bids will be examined promptly after the due date, and an award will be made at the earliest possible date. Bids must be held firm for PWC for a period of sixty (60) days after the bid due date. A purchase order will be issued to the awarded bidder.
- 6) Bidders shall submit bids only on the Bid Pricing Forms provided herein, or exact copies thereof **(See Attachment B: Bid Pricing Form)**. Failure to provide full and complete Bid Pricing Forms using the form provided herein will result in a bid being deemed non-responsive.
- 7) All bids must be signed by an authorized official of the bidder. Bids may be rejected for any omission, alteration of form, additions not called for, conditional bid, or any irregularities of any kind.
- 8) Do not submit alternate bids unless specifically called for.

QUANTITIES AND PRICING

- 1) All bidders are advised to include all costs incurred by the bidder in delivering the **STRUCTURES AND EQUIPMENT FOR THE POD 5 - MCARTHUR ROAD SUBSTATION** to the PWC **Insert Location Name** in their bid submittal, including but not limited to materials, labor, overhead, profit, freight, handling, duties, tariffs, and other import-related charges, unless expressly authorized otherwise in this IFB.
- 2) Known tariffs, duties, and import-related charges effective as of the bid due date shall be included in the bid price. Pricing that excludes such costs or conditions included upon shipment date, import date, or future determination may be deemed nonresponsive.
- 3) The invoice submitted for payment shall not reflect any additional or separate charges (including fuel surcharges, tolls, or tariffs). PWC is not tax-exempt.
- 4) Post-award price increases related to fuel surcharges, tolls, or tariffs are not permitted.
- 5) If price adjustments are permitted for non-tariff cost changes during the Agreement term, such adjustments shall be expressly identified in this IFB, limited to the specific indices listed, and applied only at the intervals stated. Any permitted price adjustment shall be based solely on the identified index or indices.

BID PRICE EVALUATION

- 1) If required by the Bid Pricing Form, bidders shall provide a unit price and an extended price for each line item. The extended price shall be calculated by multiplying the bidder's unit price by the quantity identified in the IFB.
- 2) As part of the evaluation process, PWC will prepare a bid tabulation using the quantities identified in the IFB and the unit prices submitted by each bidder. PWC will verify the bidder's extended price for each line item by multiplying the bidder's submitted unit price by the applicable IFB quantity. PWC will not modify or adjust a bidder's submitted unit price.
- 3) For IFBs containing multiple line items, the total tabulated bid price shall be determined by summing the tabulated extended prices for all line items.
- 4) The tabulated bid price is intended to ensure a consistent and equitable comparison of bids using the same quantities and pricing methodology for all bidders. The bidder's submitted unit price shall govern for each line item. In the event of a discrepancy between a bidder's submitted extended price, total bid price, bid opening announcement, or other bidder-calculated totals and the tabulated bid price calculated using the bidder's submitted unit prices and the IFB quantities, the tabulated bid price shall control for evaluation and award recommendation purposes.
- 5) PWC reserves the right to use the tabulated bid price for bid tabulation, evaluation, responsiveness determinations, and award recommendation purposes. Separate freight, handling, delivery, tariff, surcharge, fuel, or similar charges not incorporated into the bidder's submitted unit prices shall not be included in the tabulated bid price unless expressly permitted elsewhere in the IFB.

EVALUATION AND AWARD

- 1) An award of a contract is subject to the approval by the Board of Commissioners of PWC and the Fayetteville, North Carolina City Council.
- 2) Following award approval, PWC will provide the Sale of Goods Agreement to the successful bidder for signature. The successful bidder shall execute and return the Agreement within thirty (30) calendar days of receipt. If the Agreement is not fully executed within thirty (30) calendar days, including situations involving proposed revisions, exceptions, or conditions that materially alter the terms of the IFB or Sale of Goods Agreement, PWC reserves the right, at its sole discretion, to rescind the award and proceed to the next lowest responsive, responsible bidder without further obligation to the initially selected bidder.
- 3) PWC reserves the right to inspect, at a reasonable time, the equipment, item, plant, or other facilities of a prospective Bidder prior to award, and during the Sale of Goods Agreement term, as PWC deems necessary to determine that such equipment, item, plant, or other facilities conform with the specifications/requirements and are adequate and suitable for the proper and effective performance of the Sale of Goods Agreement.
- 4) PWC reserves the right to request additional information from bidders to aid in the evaluation process. This information may include but is not limited to, financial statements, a reference list of contracts of similar size, etc.

- 5) PWC reserves the right to make a single award for all items or may award separate contracts to multiple bidders for various items to the lowest responsive, responsible bidder or bidders, taking into consideration product quality, performance to PWC, and conformity with the specifications in these bid documents. PWC may also consider, among other things, the Bidder's past performance conduct on other contracts, and other information as PWC deems necessary to assist in the evaluation of any bid.
- 6) A Sale of Goods Agreement will be executed in connection with this award. For one-time purchases, the Sale of Goods Agreement will cover the anticipated delivery timeframe required to fulfill the purchase. For purchases utilizing releases, the Sale of Goods Agreement will be awarded for an initial period of one (1) year, to begin on contract execution date, and may be extended for an additional one-year period, if the placement or delivery of the final releases extends beyond the initial term, upon mutual written agreement of both parties. The Sale of Goods Agreement will govern applicable pricing, delivery, and contractual terms for the applicable purchase type.
- 7) The successful bidder shall not assign, transfer, or convey any part of the agreement, including rights or obligations, to a third party without obtaining prior written approval from PWC. This includes the assignment of payments that may become due under the agreement. Any unauthorized assignment may result in disqualification or termination of the agreement. Approved assignments do not relieve the successful bidder of their responsibilities under the terms of the agreement unless explicitly stated in writing by PWC.
- 8) The successful bidder must promptly notify PWC in writing of any legal actions, investigations, or issues arising during the agreement period that may impact their ability to perform their obligations under the agreement. Failure to provide timely notification may result in termination of the agreement. As outlined in **Attachment C: Certification of Primary Participant Regarding Debarment, Suspension, and Other Responsibility Matters**, the successful bidder must also certify that no such legal impediments exist at the time of bid submission. If circumstances change after submission or during the agreement period, the bidder is required to immediately inform PWC, providing full details of the situation.

DELIVERY AND PAYMENT

- 1) Delivery to be made F.O.B. Public Works Commission, 235 Southland Drive, Fayetteville, NC 28311.
- 2) Deliveries shall be made between the hours of **9:00 a.m. and 3:00 p.m., Monday through Thursday, holiday excluded**, within the time frame specified on the Bid Pricing Form.
- 3) Payment for equipment, material, supplies, etc. purchased pursuant to this bid shall be made by Public Works Commission approximately thirty days after the same has been delivered, inspected, approved and the invoice received in the PWC Accounts Payable Office, P.O. Box 1089, Fayetteville, North Carolina 28302.

ATTACHMENT A: TECHNICAL SPECIFICATIONS A & B

Suitability for Intended Use

Bidders are requested to offer items that meet or exceed the requirements of the Technical Specifications. PWC reserves the right to evaluate all bids for compliance with these requirements and to determine suitability based on performance, compatibility, and intended use. Such evaluation shall be conducted consistent with the requirements of N.C.G.S. §§143 129 and 133-3.

Descriptive Literature

Each bid shall be accompanied by complete descriptive literature, specifications, and all other pertinent data necessary for a thorough evaluation of the item(s) bid and sufficient to determine compliance of the item(s) with the specifications. Failure to include such information shall be a sufficient basis for rejection of the bid.

Deviations

The nature of all proposed deviations or variations from the detailed Material/Technical Specifications listed herein shall be clearly and completely described by the bidder on the applicable Form of Exceptions – Specifications.

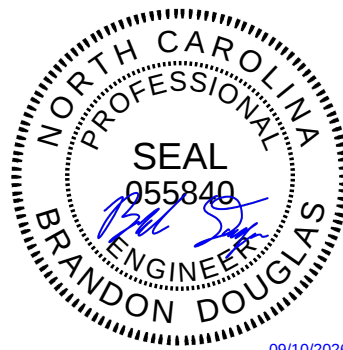
Failure to identify a deviation or variation shall be interpreted as the bidder's confirmation that the items offered are in full and strict compliance with the Technical Specifications, and the successful bidder shall be held responsible for supplying conforming goods.

Deviations shall be explained in sufficient detail to permit evaluation. No implication is made or intended by PWC that any deviation or variation will be acceptable, and material deviations or variations may result in the bid being deemed nonresponsive.

**FAYETTEVILLE PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA**

**SPECIFICATIONS FOR THE
STRUCTURES AND EQUIPMENT FOR THE
POD 5 – MCARTHUR RD SUBSTATION**

TECHNICAL SPECIFICATION A



09/10/2026

**Booth & Associates, LLC
Consulting Engineers
2300 Rexwoods Drive
Raleigh, North Carolina 27607
Firm License No. F-0221**

TECHNICAL SPECIFICATION A

1.0	Standards	1
2.0	Basic System Rating	1
3.0	Drawing and Documentation	1
4.0	Structural Steel Design	2
5.0	Structural Steel.....	3
6.0	Approval Drawings.....	4
7.0	Lightning Protection Structures	5
8.0	Miscellaneous Structures/Hardware	5
9.0	Bus Insulators	5
10.0	Bus and Leads	5
11.0	Bus Supports	5
12.0	Connectors	5
13.0	Group-Operated Disconnect Switches.....	6
14.0	Surge Arrestors	7
15.0	Single-Pole Disconnect Switches	7
16.0	Instrument Transformers.....	7
17.0	Station Grounding.....	8
18.0	List of Materials – Substation Structures and Equipment.....	8
19.0	Hookstick and Container	8
20.0	Distribution Transformers.....	8
21.0	Station Signs	8

APPENDICES

1. List of Drawings
2. Structural and Tubular Steel Specification
3. Steel Weight Breakdown
4. Vicinity Map

**FAYETTEVILLE PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA**

**SPECIFICATIONS FOR STRUCTURES AND
EQUIPMENT FOR THE
POD 5 – MCARTHUR RD SUBSTATION**

TECHNICAL SPECIFICATION A

1.0 Standards

All equipment and materials covered by these Specifications shall be in accordance with the applicable provisions of the latest editions of the Standards of the ASTM, ANSI, NEMA, IEEE, OSHA, and the latest revision of the NESC. Where a Manufacturer's name and type of equipment is indicated in the Specifications, it is for clarity and the establishment of a standard and is restrictive unless the use of an approved equal is specifically mentioned.

The Bidder may offer alternate pricing for equivalent items by other Manufacturers. However, **all** base bids must explicitly comply with the designated materials specified herein. The Owner may elect to purchase alternates, as proposed by the Bidder. The alternate materials are subject to review and approval by the Owner's Engineer.

2.0 Basic System Rating

The basic system ratings for the substation shall be as follows:

System High-Side Voltage	230,000 volts, three-phase wye, basic insulation level shall be 950 kV, 60 Hertz.
System Low-Side Voltage	All 69 kV wye, initial basic insulation level should be 350 kV, 60 Hertz operated at 69,000 volts.
Transformer	One (1) 230-66 kV, 120/160/200 MVA Autotransformer
Primary Bus, Secondary Bus, and Neutral Bus	Strength requirements to match weight of equipment, ice, and wind loadings.
Outgoing 69 kV Circuits	Overhead.
230 kV Circuit Breaker	One (1) 245kV, 3000A, 50000A IC, 125V DC Control Power, Circuit Breaker
Bus & Feeder Circuit Breakers	Four (4) 72.5kV, 2000A, 40000A IC, 125V DC Control Power, Circuit Breaker.
Protective Relaying Panels	125-volt DC and 120/240-volt AC single-phase.

3.0 Drawings and Documentation

3.1 Conceptual Design

The work shall conform to the Booth & Associates' Drawings listed in the *Appendices*, all of which form a part of these Specifications.

3.2 Substation High-Bay and Low-Bay Structures

3.2.1 Structural Design

The Bidder shall perform the structural design of both the standard structural shape steel and the tubular steel.

3.2.2 Design and Fabrication Drawings

The Bidder will prepare drawings for both the tubular and standard structures and provide the final Bill of Materials.

- 3.3 Approval of specification sheets and Bill of Materials will be required. The Manufacturer shall supply the Bill of Materials to the Owner's Engineer so they may ascertain that all materials and equipment being furnished by the Manufacturer meet the Specifications. Specifications sheets shall be supplied for all switches, connectors, fittings, insulators, and surge arresters.
- 3.4 Final Bill of Materials shall be furnished by the Manufacturer for installation of this substation. All final documentation shall be delivered to the Owner's Engineer and shall include five (5) copies of the Bill of Materials.
- 3.5 All Drawings and documentation shall be submitted via email to Booth & Associates, LLC, Attention: Katiana Mauras (katiana.mauras@booth-assoc.com) and Public Works Commission; Attention: Mr. Joel Valley (joel.valley@faypwc.com)

4.0 **Structural Steel Design**

- 4.1 Structural design calculations shall include, but are not limited to, connection design, anchor bolt design, base plate design, deflections, rigid bus design, and support reactions (factored and unfactored), per Appendix 2: Structural and Tubular Steel Specification.

All supporting structures shall be designed in accordance to a minimum of one (1), or all required, of the following codes or standards:

- NESC C2 (latest edition at time of bidding)
- ASCE Manual No. 113 *Substation Structure Design Guide*
- RUS Bulletin 1724E-300 *Design Guide for Rural Substations*
- ASCE Manual No. 7 Minimum Design Loads for Buildings and Other Structures
- IEEE 693 Recommended Practice for Seismic Design of Substations
- American Welding Society Structural Welding Code-Steel (AWS D1.1)
- Steel Structures Painting Council Surface Preparation Specification (SSPC-SP)
- American Institute of Steel Construction (AISC), Specification for the Design, Fabrication and Erection of Structural Steel for Building
- American Society of Civil Engineers (ASCE) Standard, Design of Steel Transmission Pole Structures, Manual 48
- American Society of Civil Engineers (ASCE) Standard, Design of Latticed Steel Transmission Structures, Manual 10
- American Society of Testing and Materials, various standards

- 4.1.1 For structures that extend outside the substation or structures that support a conductor that extends outside the substation, the strength and loading requirements of NESC C2 shall be followed.

- 4.1.2 For structures that do not extend outside the substation, nor any conductor or equipment supported thereon, appropriate strength and loading requirements of an industry-approved, good engineering resource shall be followed. The ASCE Manual No. 113 *Substation Structure Design Guide* is considered a preapproved resource. Any other resources, design guides, manuals, or codes utilized must be provided to and approved by Booth & Associates. No edition of the AISC *Steel Construction Manual* may be referenced for the appropriate load factors and load combinations. However, the most recent edition of the AISC *Steel Construction Manual* may be referenced in determining the appropriate strength reduction factors and member design capacity. NEMA SG-6 *Power Switching Equipment* has been rescinded and

ASCE Manual No. 113 *Substation Structure Design Guide* shall be followed in its place.

- 4.1.3 Deflection limits for all structures shall be those referenced in ASCE Manual No. 113.
- 4.1.4 Load and Resistance Factor Design (LRFD) shall be used for the design of substation structures. AISC Steel Construction Manual shall be used for the design of structures using standard structural shapes. ASCE/SEI 48 shall be used for the design of structures using hollow tubular member shapes. ASCE 10 is recommended for the design of lattice structures using angles.
- 4.1.5 For any project under the jurisdiction of RUS, the strength, loading, and deflection requirements of RUS Bulletin 1724E-300 *Design Guide for Rural Substations* shall be followed for all structures.

5.0 Structural Steel

- 5.1 The substation structures to be included in the Form of Proposal shall conform to the following specifications and are identified on the appropriate substation project drawing.

The major substation structures are to include:

- 1) Two (2) 230 kV switch structures
- 2) Twenty (20) single phase bus support stands
- 3) One (1) 69 kV seven-bay circuit exit structure
- 4) Two (2) 69 kV station service transformer stand

This list may not be comprehensive.

- 5.2 If any material whatsoever in any state of completion is found defective as to workmanship, details, or materials or is contrary to the design for these Specifications, it shall be rejected. This rejection may take place at the rolling mills, fabricating plant, galvanizing plant, or at the site of the structure. Any rejected materials shall be replaced without any expense whatsoever to the Owner.
- 5.3 All structural shapes shall be conforming to ASTM A992 except for channels, angles, and plates which shall conform to ASTM A36 unless otherwise shown on the drawings.
- 5.4 Steel pipe shall conform to ASTM A53, Type E or S, Grade B unless otherwise noted on the drawings.
- 5.5 Structural square and rectangular tubing shall conform to ASTM A500, Grade B.
- 5.6 Bolts, except for anchor bolts, shall conform to ASTM F3125, A325 Type I. Nuts shall conform to ASTM A563 and shall be of grade and style suitable for use with bolts supplied. Galvanized nuts shall be grade DH. Washers shall conform to ASTM F436 unless otherwise shown on the drawings.
- 5.7 Anchor bolts shall conform to F1554 Standard Specification for Anchor Bolts, Steel, Gr. 55 ksi yield strength, or as specified on the drawings. Each anchor bolt shall be furnished with washers and nuts of equivalent strength to the ASTM A563, Heavy Hexagon, specification. Washers shall adhere to ASTM F436 Extra Thick unless otherwise shown on the drawings.
- 5.8 All anchor bolts required for the installation of the structures shall be furnished by the Manufacturer. Anchor bolts shall be completely hot-dipped galvanized, complete with two (2) heavy hex nuts and flat washers for leveling, unless otherwise shown on the drawings.
- 5.9 Welding shall be performed by qualified operators using procedures in accordance with AWS D1.1 and using E70XX electrodes. All surface areas to be welded shall be cleaned completely of rust, scales, oil or grease, and any other foreign matter. Welds that do not exhibit a neat, smooth appearance shall be ground smooth.
- 5.10 Structures shall be hot-dip galvanized after fabrication.
- 5.11 Galvanizing shall conform to ASTM A123. Precautions shall be taken against embrittlement,

warp, and distortion in accordance with ASTM A143 and A384.

- 5.12 Fasteners and anchor bolts shall be galvanized in accordance with ASTM F2329.
- 5.13 All parts of the structure shall be neatly finished. All members shall be free from kinks, twists, bends, or open joints. All members that are bent or out of line after galvanizing shall be carefully straightened with a straightening roll or straightening machine. The use of sledges in straightening bent material or other methods in which the material or its finish may be mutilated shall not be allowed.
- 5.14 All nuts shall be readily accessible to a wrench for adjustment. Bolts shall not be flushed but shall project approximately ¼ inch beyond the face of the nuts. Nuts shall fit the shanks so that they may be screwed on with the fingers and at the same time not fit so loosely that the value of the bolts acting with the tension of the head of the nut will be reduced.
- 5.15 All steel members shall be clearly marked to provide easy identification in the field. **Trusses and box columns up to, and including, 4 feet x 4 feet shall be assembled before shipment to ensure correctness and shall be shipped assembled.** If the Manufacturer does not intend to ship the trusses and box columns completely assembled, he shall so state in the quote. Markings on component parts shall indicate the structure to which they apply.
- 5.16 Sectional members combined to form columns of the required height will not be accepted. Angles for column legs must be continuous to provide the necessary height.
- 5.17 Continuous punching of steel sections for equipment mounting is not acceptable. Holes shall be provided as needed for erection and equipment installation, but unnecessary holes will not be accepted.

6.0 **Approval Drawings**

- 6.1 Receipt of Approval Drawings by the Bidder constitutes an authorization for manufacture predicated upon the Drawings and corrections found thereon. After the return of Approval Drawings, release for shipment is to be granted by either the Owner or its Engineer, based upon the Manufacturer's compliance with the following:

- (1) Furnishing of the requested number of copies of the Final Drawings as called for in the Specifications.
- (2) Thirty (30) days notification of tentative shipping schedule and forty-eight (48) hours notification prior to delivery.
- (3) Coordination of manufacturing and delivery with the Owner's construction schedule.
- (4) Approval Drawings are to be submitted electronically in AutoCAD® 2018 format or newer in lieu of paper copies.

6.2 **Design and Fabrication Drawings**

Approval of Shop Drawings, specification sheets, and Bill of Materials will be required. The Bidder shall supply one (1) digital copy of all Shop Drawings and Bills of Materials to the Owner's Engineer, via email, so they may ascertain that all materials and equipment being furnished by the Bidder meet the Specifications. Specification sheets shall be supplied for all connectors, fittings, etc. The drawings may be submitted directly to the Public Works Commission; Attention: Mr. Joel Valley, 955 Old Wilmington Road; Fayetteville, NC 28301 (joel.valley@faypwc.com).

Final Drawings and final Bill of Materials shall be furnished by the Bidder for installation of the substation. All final documentation shall be submitted directly to the Public Works Commission; Attention: Mr. Joel Valley, 955 Old Wilmington Road; Fayetteville, NC 28301 (joel.valley@faypwc.com), for distribution and shall include the following:

- (1) Drawing files of all Drawings noted above. Drawing files shall be compatible for use with AutoCAD® 2018.
- (2) Equipment Assembly Details for apparatus supplied by the Bidder but manufactured by Others.

7.0 Lightning Protection Structures

- 7.1 Lightning mast ground clamps shall be included for attachment of 2/0 AWG copper leads as defined in Section 15.0 Connectors.

8.0 Miscellaneous Structures / Hardware

- 8.1 A switch grounding platform used for protecting the switch operator in the event of a fault at the switch during manual operation shall be furnished for each group-operated switch. The platform shall be open-grating design with the grounding connector locations on opposite corners for attachment of 2/0 AWG copper as shown on the drawings.
- 8.2 Miscellaneous fastener hardware shall conform to the industry standards for the purpose for which they are to be used.

All quantities of fastener hardware shall be shipped with a **minimum of 10% overcount** above the designated quantity necessary for assembly.

9.0 Bus Insulators

All bus insulators shall be wet-processed porcelain colored sky gray, shall conform to the IEEE Standards for insulators.

Bus insulators for supporting bus and leads shall be standard station post non-stacking or uniform-diameter stack type meeting ANSI-BIL units complete with connectors, bolts, and washers as required.

Bus insulators shall be as manufactured by Lapp, Locke, Newell, PPC, MacLean, or approved equal.

10.0 Bus and Leads

The Drawings include a sheet of details to indicate the several methods to be used for connecting and supporting the bus and leads. The conductors shall be provided with the necessary supports and connectors as illustrated by these details. The hardware required for the conductor and overhead ground wire attachments shall be furnished by the Bidder and shall conform to the following specifications: ANSI C135 for bolts, ASTM B317 6101-T6, ASTM A47 for malleable iron. All hardware supplied shall be hot-dipped galvanized.

Bus and leads shall be as shown on Drawings.

11.0 Bus Supports

All substation bus shall be supported by either fixed, slip-fit, or expansion attachment to the station post insulators, as indicated on the Drawings. Bus supports shall be radio noise-free.

12.0 Connectors

Connectors shall be suitable for the purpose they are intended and shall provide a sound electrical and mechanical connection.

The Bidder is responsible for supplying the connectors and hardware for all bus and leads as defined in Section 12, Bus and Leads, and shown on the Drawings. A corrosion-inhibiting compound shall be furnished in a sufficient quantity to be applied to all connections.

- 12.1 All connector fittings to the bus shall be aluminum bolt-on or as shown on Drawings. Alternate bids may be submitted based upon the substitution of equivalent connectors by other manufacturers. However, such substitutions are subject to approval by the Owner's Engineer.
- 12.2 Cable terminal fittings required for the bus leads around switches, equipment, and between switches and rigid bus shall be aluminum bolted, compression type, or bolted bronze type with the appropriate two-hole or four-hole NEMA spacing pad.
- 12.3 Expansion terminal connectors for the bus shall be as shown on the Drawings. Where the expansion joint requires the fabrication of minor components (support plates, etc.), the Bidder shall fabricate such components in compliance with the illustrated details prior to shipment.
- 12.4 Grounding clamp connectors will be required for supporting or bonding the copper ground cable to steel columns, beams, lightning masts, and/or fence/fabric posts. Supporting

grounding clamp connectors will be required every 4 feet minimum for columns and beams to minimize the sag in the cable.

- 12.5 A copper to aluminum bimetallic transition plate shall be provided for all non-similar connections between terminal connections on all equipment, including transformers, breakers, and switches to bus leads where it is necessary to make an aluminum-to-copper connection.
- 12.6 All hardware supplied for bolted electrical fittings shall be stainless steel 18-8 alloy.
- 12.7 All quantities of fastener hardware shall be shipped with a minimum 10% over count above the designated quantity necessary for assembly.
- 12.8 Bidder to verify that all conductor terminal pads shall **match and fit onto switch terminal pads** with regard to pad size, NEMA rating, and pad shoulder configurations.

13.0 Group-Operated Disconnect Switches

13.1 Switch Construction

The switches shall meet all applicable ANSI and other industry mechanical and electrical standards and shall be completely assembled and adjusted at the factory. The switches shall be of the manual-operating type by means of an operator pipe handle, and all parts of the operating mechanism shall be furnished for installing the complete three-phase switch and mechanism on the supporting structure. The switches shall be physically sized to fit properly in the locations shown on the Drawings. Switches shall be suitable for either horizontal or vertical mounting. A galvanized steel double-channel base plate shall be furnished and drilled for installation prior to galvanizing.

The switches shall be of copper or aluminum construction with tin-plated copper contacts for both the center contacts and the hinge contacts.

All switches shall be complete with stainless steel arcing horns, pipe handle operating mechanism for manual operation, outboard bearings guide plate, operating pipe, flexible grounding braid, an open- and closed-position indicator, and provisions for padlocking in either the open or closed position. Oilite bearings shall be used for moving parts not provided with greaseless ball-bearing assemblies having stainless steel balls and races. Bearings shall be permanently sealed and require no greasing or other field maintenance. The switches shall be designed such that when they are fully open to 90°, the metal-to-metal spacing to the adjacent phase will not be less than specified for each voltage class. Switch terminals shall be provided with four-hole NEMA spacing electro tin-plated terminals for copper or aluminum conductor connections as per the Drawings.

The switch insulators shall be ANSI No. 70 sky gray standard or high strength, non-tapered, uniform-diameter stacks, station post with 3-inch or 5-inch-diameter bolt circles both top and bottom. The switch shall have two (2) insulators per pole as indicated on the Drawings. The switch insulators shall be free to rotate without affecting the position of the terminal pads.

13.2 Ratings for Group-Operated Switches

Vee-center break and vertical break, group-operated air break switches located on the high voltage structure shall be outdoor type, two (2) insulators, group operated, air break disconnect, complete with arcing horns, operating mechanism for worm-gear operation, outboard bearing, and guide plate. Oilite bearings shall be used for moving parts not provided with greaseless ball-bearing assemblies having stainless steel balls and races. Terminals shall be tin-plated NEMA four-hole suitable for bronze or aluminum conductor connectors as per the Drawings.

13.3 Approved Switch Manufacturers and Alternates

All bids should include switches as specified in this Specification and Bill of Material; however, alternates may be considered based on price or lead time. All proposed alternate switches must be of equivalent type and function.

14.0 Surge Arresters

Surge arresters for the high- and low-voltage sides for the power transformers will be provided by the power transformers manufacturer, as furnished by the Owner.

Metal oxide surge arresters are rated in terms of maximum continuous operating voltage (MCOV). However, metal oxide arresters that are given conventional ratings may be furnished if the MCOV equivalent ratings are as specified here.

The surge arresters shall comply with IEEE Standard C-62.11.

15.0 Single-Pole Disconnect Switches

The switches shall be outdoor type, meet all applicable ANSI, NEMA, and other industry mechanical and electrical standards, and shall be completely assembled and adjusted at the factory. The switches shall be physically sized to fit properly in the locations shown on the Drawings. Switches shall be suitable for either horizontal or vertical mounting as shown on the Drawings. A galvanized steel channel base plate shall be furnished and drilled for installation prior to galvanizing.

The switches shall be of copper construction with electro-tin-plated contacts for both the jaw and the hinge contacts. The switch terminals shall be provided with two-hole or four-hole NEMA spacing and electro-tin-plated terminals for copper or aluminum conductor connectors as per the Drawings.

Bidder shall verify that all conductor terminal pads shall **match and fit onto switch terminal pads** with regard to pad size, NEMA rating, and pad shoulder configurations.

The power fuses shall be outdoor type, meet all applicable ANSI, NEMA, and other industry mechanical and electrical standards, and shall be completely assembled at the factory. Fuse mounting hardware shall consist of the base, insulators, complete upper and lower contact assemblies, terminal connectors sized for specified cable as shown on the Drawings, and fuse unit end fittings. The mounting shall be suitable for vertical offset or inverted installation.

The switches shall be shipped completely assembled on bases with post insulators oriented to accommodate the appropriate mounting location.

15.1 Hookstick Switches

Single-pole hookstick disconnect switches shall be provided for isolation of the feeder vacuum circuit breakers and shall be rated as per the attached Bill of Material.

15.2 Fuses and Fuse Mounting Hardware

Fuses, fuse barrels, and fuse mounting hardware shall be provided for isolation of the station service transformer and potential transformers. One (1) fuse (and end fittings) of the proper rating shall be supplied with each mounting plus additional spares as specified on the Bill of Materials.

16.0 Instrument Transformers

16.1 Potential transformers (PTs) in the substation shall be provided by the Bidder for use of metering the high-voltage bus by the Owner. PTs shall be outdoor type, metering class, single primary, tapped secondary, 60 cycle, single bushing.

16.2 Current transformers (CTs) in the substation shall be provided by the Bidder for use of metering the high-voltage bus by the Owner. CTs shall be outdoor type, metering class, single primary, tapped secondary, 60 cycle, single bushing.

16.3 Potential transformers (PTs) in the substation shall be provided by the Bidder for use of metering the low-voltage bus by the Owner. PTs shall be outdoor type, metering class, single primary, tapped secondary, 60 cycle, dual bushing.

17.0 Station Grounding

17.1 The station grounding below grade conductors shall be provided by the substation contractors as follows: ground grid bus – 4/0 AWG bare SD copper, seven-strand, 2/0 AWG bare SD copper, seven-strand for perimeter conductor.

17.2 Ground rods shall be provided by the substation contractor and shall be Copperweld $\frac{3}{4}$ inch

diameter, 10 feet in length, and of the sectional type. Ground rod connections shall be Cadweld type, suitable for 4/0 AWG copper ground bus. Drive heads and couplings shall be furnished with the sectional rods.

- 17.3 All connections below grade shall be Cadweld and shall be provided by the substation contractor.
- 17.4 Equipment and structure ground bonding leads shall be provided by the Bidder as follows: 2/0 AWG bare SD copper, seven-strand.
- 17.5 The transformer ground bonding leads shall be provided by the Bidder as follows: dual 4/0 AWG bare SD copper, seven-strand.

18.0 List of Materials - Substation Structures and Equipment

A list of the major items required for the substation is included in the attached Bill of Material. Items noted as “By Contractor” in the list are to be furnished by Contractor.

19.0 Hookstick and Container

One (1) station class hookstick shall be provided as follows: one (1) 12-foot to 18-foot adjustable fiberglass stick with NEMA disconnect head. An appropriate length storage container shall be supplied with each hookstick.

20.0 Distribution Transformers

The Bidder shall supply two (2) distribution transformers to supply AC station service for the substation equipment.

The Bidder shall provide mounting provisions for those transformers on the structure in the locations as shown on the Drawings included with these Specifications. The Manufacturer shall ensure the mounting clearance between the transformer’s primary insulators and the power fuse mounting base or truss exceeds the minimum clearance requirements of the National Electrical Safety Code (NESC). The Bidder shall also ensure that NESC requirements are met for minimum distance to the ground for personal safety.

21.0 Station Signs

- 21.1 The Bidder Shall furnish danger and warning signs as described in the Bill of Materials. Warning and danger signs shall be 28 inches x 14 inches and be bilingual with both English and Spanish. Test symbols shall conform to NESC 2012 and ANSI Z535.
- 21.2 The Bidder shall furnish porcelain enamel phase identification tags (including suitable devices for mounting) with 4-inch letters on the structures at the end of each bus, at each line termination structure, over each breaker position, and at each instrument transformer with the color and designations as follows:
 - A Phase: White letter on red background
 - B Phase: Black letter on white background
 - C Phase: White letter on blue background

APPENDICES

- 1 – List of Drawings
- 2 – Structural and Tubular Steel Specifications
- 3 – Steel Weight Breakdown
- 4 – Vicinity Map

1

List of Drawings

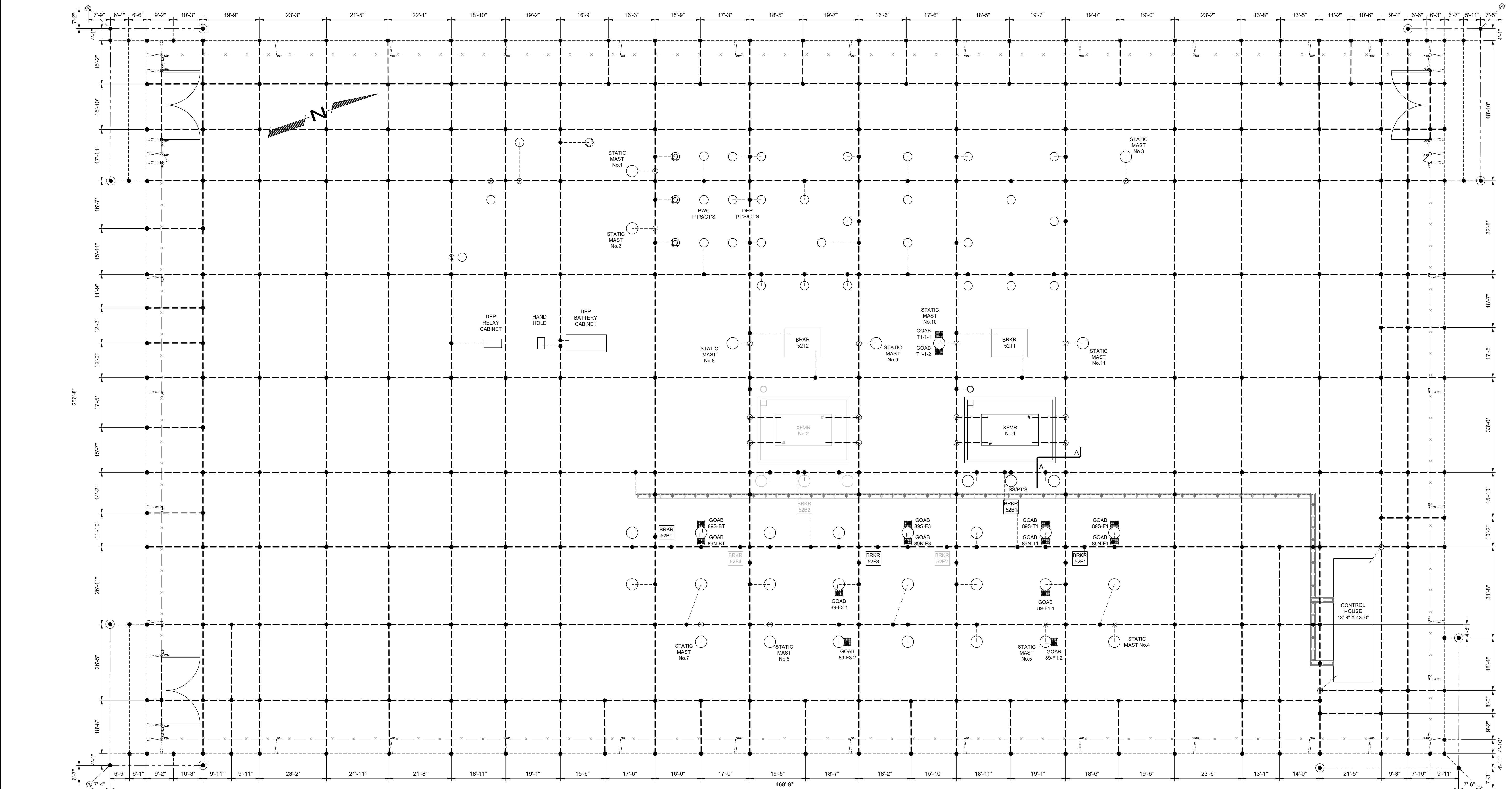
**FAYETTEVILLE PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA**

**SPECIFICATIONS FOR STRUCTURES AND
EQUIPMENT FOR THE
POD 5 – MCARTHUR RD SUBSTATION**

LIST OF DRAWINGS - A

The work shall conform to the following Drawings by Booth and Associates, LLC, all of which form a part of these Specifications. The Contractor is responsible for contacting procurement@faypwc.com if any drawings not indicated to be furnished at a later date are missing from their bid package. If the Bidder does not contact procurement@faypwc.com regarding any drawings, their bid will be considered based on all Drawings and Specifications, as issued for bids.

Sheet No. DE8992	Title
S2	ONE LINE DIAGRAM, 230/66KV BANKS
S3	ONE LINE DIAGRAM, 66KV BUS AND FEEDERS
GP-001	GROUNDING PLAN
GP-002	GROUNDING DETAILS 1
GP-003	GROUNDING DETAILS 2
S-GA-001	PLAN VIEW
S-GA-002	SECTION A-A
S-GA-003	SECTION B-B, C-C, D-D & E-E
S-GA-004	SECTION F-F & G-G
S-GA-005	SECTION H-H
S-GA-006	SECTION I-I
S-GA-007	SECTION J-J & K-K
S-GA-008	POINT OF DELINEATION
S-GA-101	SECTIONS DETAILS SHT. 1 OF 3
S-GA-102	SECTIONS DETAILS SHT. 2 OF 3
S-GA-103	SECTIONS DETAILS SHT. 3 OF 3
S-GA-110	BILL OF MATERIALS



GROUNDING NOTES:

1. ALL APPARATUS (TRANSFORMERS, CIRCUIT BREAKERS, ETC.) SHALL HAVE MINIMUM TWO SEPARATE CONNECTIONS TO GROUND GRID.

2. TRANSFORMER CONNECTIONS TO THE GROUND GRID SHALL BE 4/0 AWG BARE COPPER.

3. GROUND GRID SHALL BE BURIED A MINIMUM OF 30" BELOW SUBSTATION SUBGRADE.

4. EXTERNAL $\frac{3}{8}$ " AT CORNERS OF GROUND GRID TO BE BURIED AT 4" BELOW GRADE AS MARKED ON PLAN ABOVE. TIE INTO 30" BURIED GRID AT MARKED POINTS.

5. FINISHED SUBSTATION GRADE INCLUDES 3" #57 WASHED STONE AND 3" ABC OF CRUSHER RUN ABOVE SUBGRADE. STONE SHALL EXTEND A MINIMUM OF 5 FT BEYOND SUBSTATION FENCE. STONE SHALL HAVE A MINIMUM RESISTIVITY OF 2,500 OHM-METER.
6. SWITCH OPERATOR PLATFORMS SHALL BE LOCATED ON THE SAME SIDE OF SWITCH AS OPERATING HANDLE.

7. TEST EACH GROUND ROD PRIOR TO CONNECTION TO THE GROUND GRID. EACH 10 FT GROUND ROD SHOULD READ 3.5 OHMS OR LESS.

8. TEST THE GROUND GRID SYSTEM BEFORE ENERGIZING THE SUBSTATION AND WHILE ISOLATED FROM TRANSMISSION OR DISTRIBUTION SYSTEM(S). IF THE READING EXCEEDS X OHMS, CONTACT THE ENGINEER.

9. GROUND GRID MUST BE INSTALLED BEFORE THE OIL CONTAINMENT SYSTEM, IF APPLICABLE.

10. INSTALL GROUND GRID BEFORE INSTALLING CABLE TRENCH. COORDINATE CONSTRUCTION EFFORTS.

11. INSTALL 2/0 AWG. CU. GROUND ALONG LENGTH OF

- ALL CABLE TRENCH. SUPPORT GROUND AT TOP OF TRENCH INSIDE WALL. BOND TO GROUND GRID AT EACH INTERSECTION ALONG LENGTH OF CABLE TRENCH.
12. SUBSTATION MATERIAL SUPPLIER SHALL BE RESPONSIBLE FOR FURNISHING ALL ABOVE GRADE SUBSTATION GROUNDING MATERIAL.

13. SUBSTATION LABOR CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL BELOW GRADE GROUNDING MATERIAL INCLUDING CONNECTIONS TO AND FROM GRID.

14. ALL FENCE EXTERNAL TO THE FENCE ENCLOSING SUBSTATION AND SWITCHYARD SHALL BE NON-CONDUCTIVE WITHIN 20' RADIUS OF ANY GROUNDED STRUCTURE OR BELOW-GRADE GROUNDING CONDUCTOR. NON-CONDUCTIVE FENCE SHALL BE SUPPLIED BY AIMS INTERNATIONAL OR APPROVED EQUAL.

GROUNDING PLAN

SCALE: 1/16"=1'-0"

15. THIS DRAWING AND ASSOCIATED STUDY ONLY ADDRESS SAFETY IN AREAS SHOWN ON THIS DRAWING.

16. SUBSTATION LABOR CONTRACTOR TO MAKE CONNECTIONS TO UTILITY SWITCH STATION GROUND GRID (TYP.).

17. FENCE POSTS SHALL BE BONDED TO GROUND GRID EVERY 40 FT. OR LESS.

18. SURGE ARRESTERS SHALL HAVE A DIRECT CONNECTION TO GROUND GRID.

19. CONNECTORS SHALL CONFORM TO RELEVANT REQUIREMENT OUTLINED IN IEEE 837.

LEGEND

- 4/0 AWG. S.D. BARE COPPER, NOTE 3

2/0 AWG. S.D. BARE COPPER, NOTE 3

2/0 AWG. S.D. BARE COPPER, 4' DEPTH, NOTE 3

#2 S.D. TINNED COPPER

GRID CONNECTORS: CADWELD TYPE

3/4" DIA. COPPERWELD GROUND RODS, 10' IN LENGTH

SWITCH OPERATOR PLATFORM

CONCRETE FOUNDATION

SUBSTATION FENCE
- VERTICAL GROUND TIE
- UTILITY FENCE (BY OTHERS)
- OIL CONTAINMENT
- GRID CONNECTION TO REBAR: CADWELD TYPE
- CABLE TRENCH
- 3 FT. PERSONNEL GATE
- 24 FT. DOUBLE HUNG GATE (INWARD SWING ONLY)

REFERENCES

PLAN VIEW	S-GA-001
CONDUIT PLAN & DETAILS	E-CP-001 TO E-CP-004
CONDUIT & CABLE SCHEDULE	E-CP-101 & E-CP-102
GROUNDING PLAN	E-GP-001
GROUNDING DETAILS	E-GP-002 TO E-GP-003
FOUNDATION PLAN	S-FP-001
FOUNDATION DETAILS	S-FD-001 TO S-FD-008
OIL CONTAINMENT	S-OC-001 TO S-OC-003

PRELIMINARY - DO NOT USE FOR CONSTRUCTION	NO.	REVISIONS	DATE	PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE	
	A	PRELIMINARY	06/02/26	POINT OF DELIVERY No. 5	
				GROUNDING PLAN	
				DWN. DDS	DATE: 07/07/25
				CKD. RDM	APPD. RDM
				SCALE: 1/16"=1'	PLOT: NONE
	NO.	REVISIONS	DATE	DWG. NO.	DE8992 GP-001

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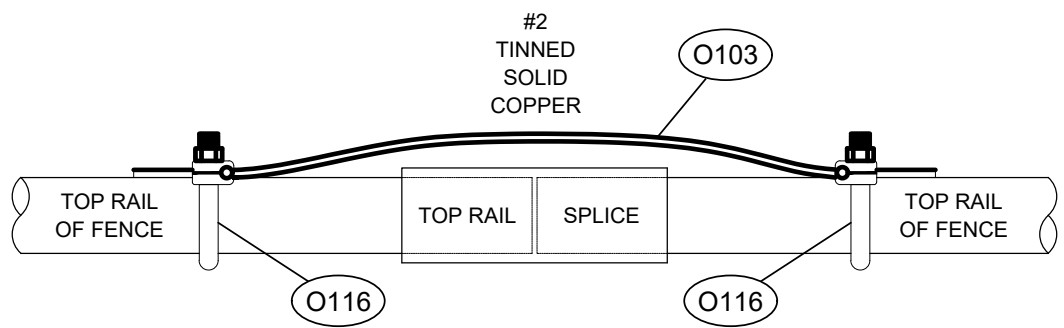


- OPERATOR PLATFORM
-
- N.T.S.

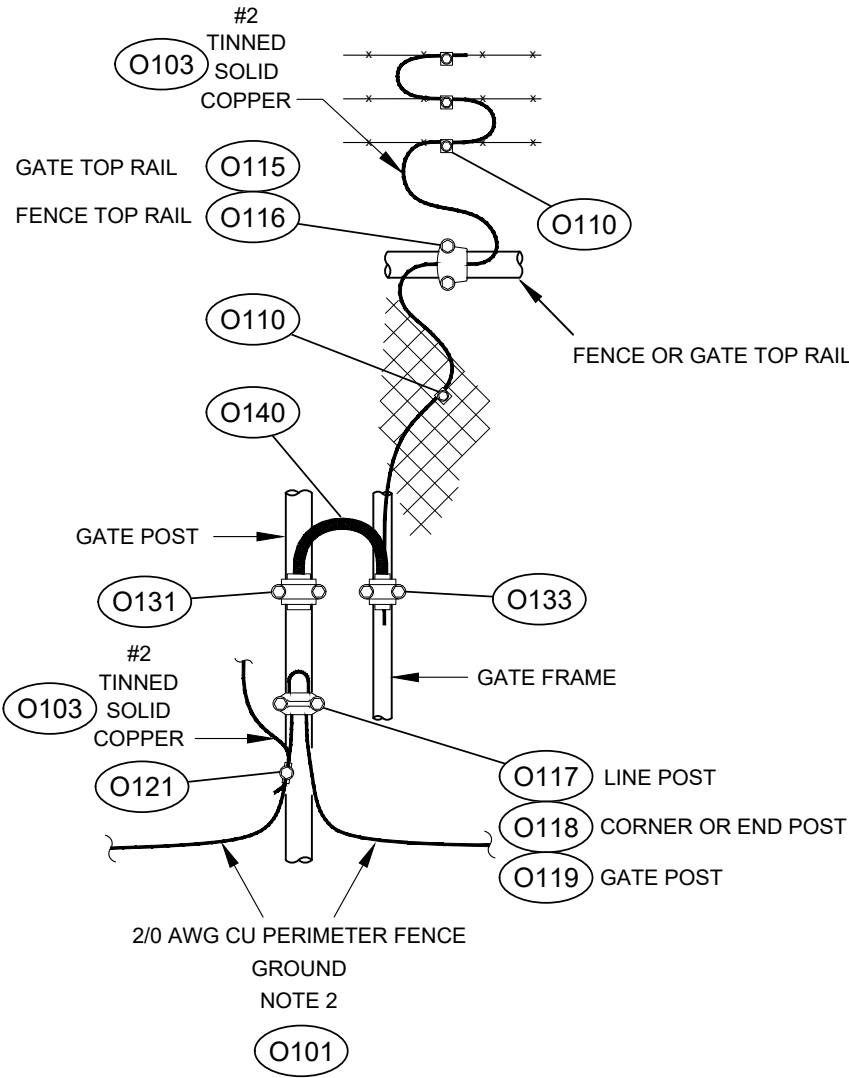


PLAN VIEW	S-GA-001
CONDUIT PLAN & DETAILS	E-CP-002 TO E-CP-004
CONDUIT & CABLE SCHEDULE	E-CP-101 & E-CP-102
GROUNDING PLAN & DETAILS	E-GP-001 TO E-GP-003
FOUNDATION PLAN	S-FP-001
FOUNDATION DETAILS	S-FD-001 TO S-FD-008
OIL CONTAINMENT	S-OC-001 TO S-OC-003

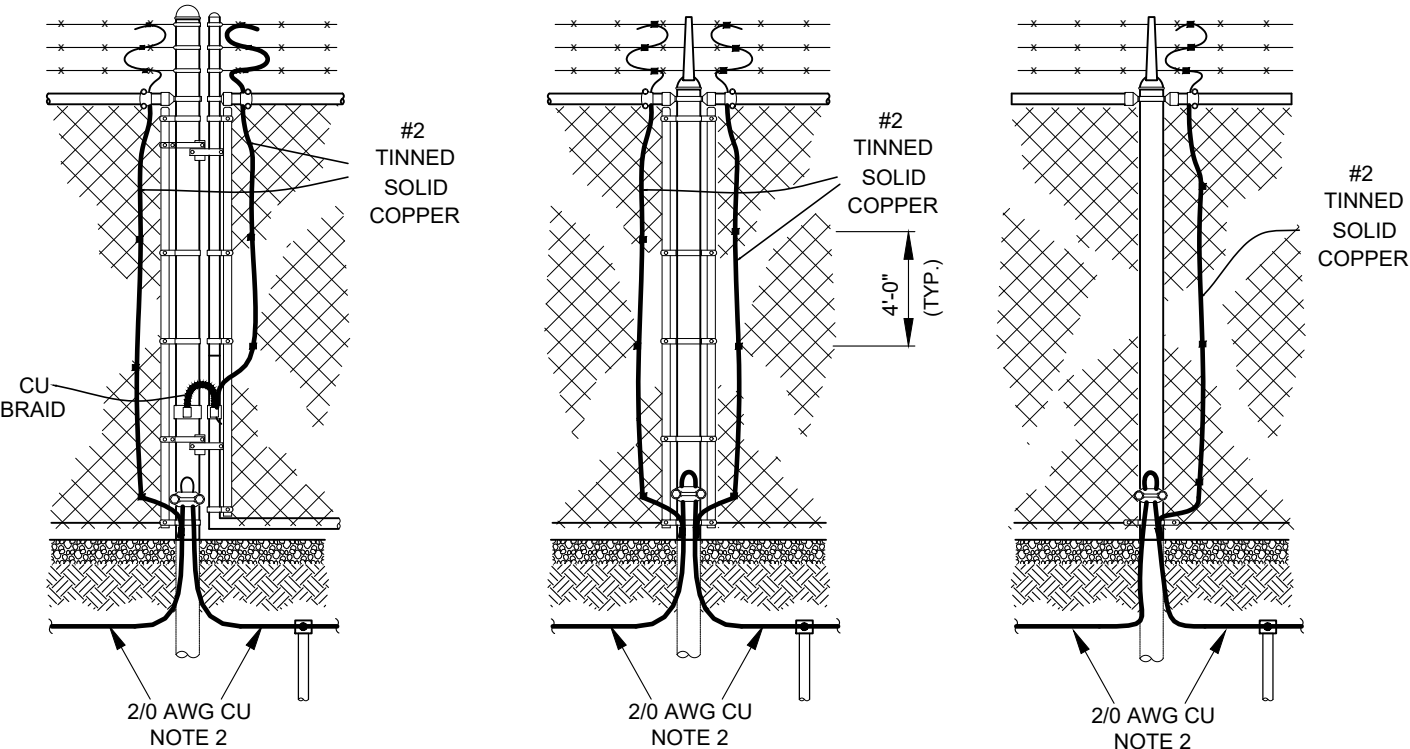
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	A	PRELIMINARY	06/02/26				
				POINT OF DELIVERY No. 5			
				GROUNDING DETAILS 1			
© 07/25	NO.	REVISIONS	DATE	DWN.	DDS	DATE: 07/10/25	DWG. NO.
				CKD.	RDM	APPD. RDM	DE8992
				SCALE: AS NOTED	PLOT: NONE		GP-002



GROUNDING FENCE RAIL SPLICE POINTS
N.T.S.

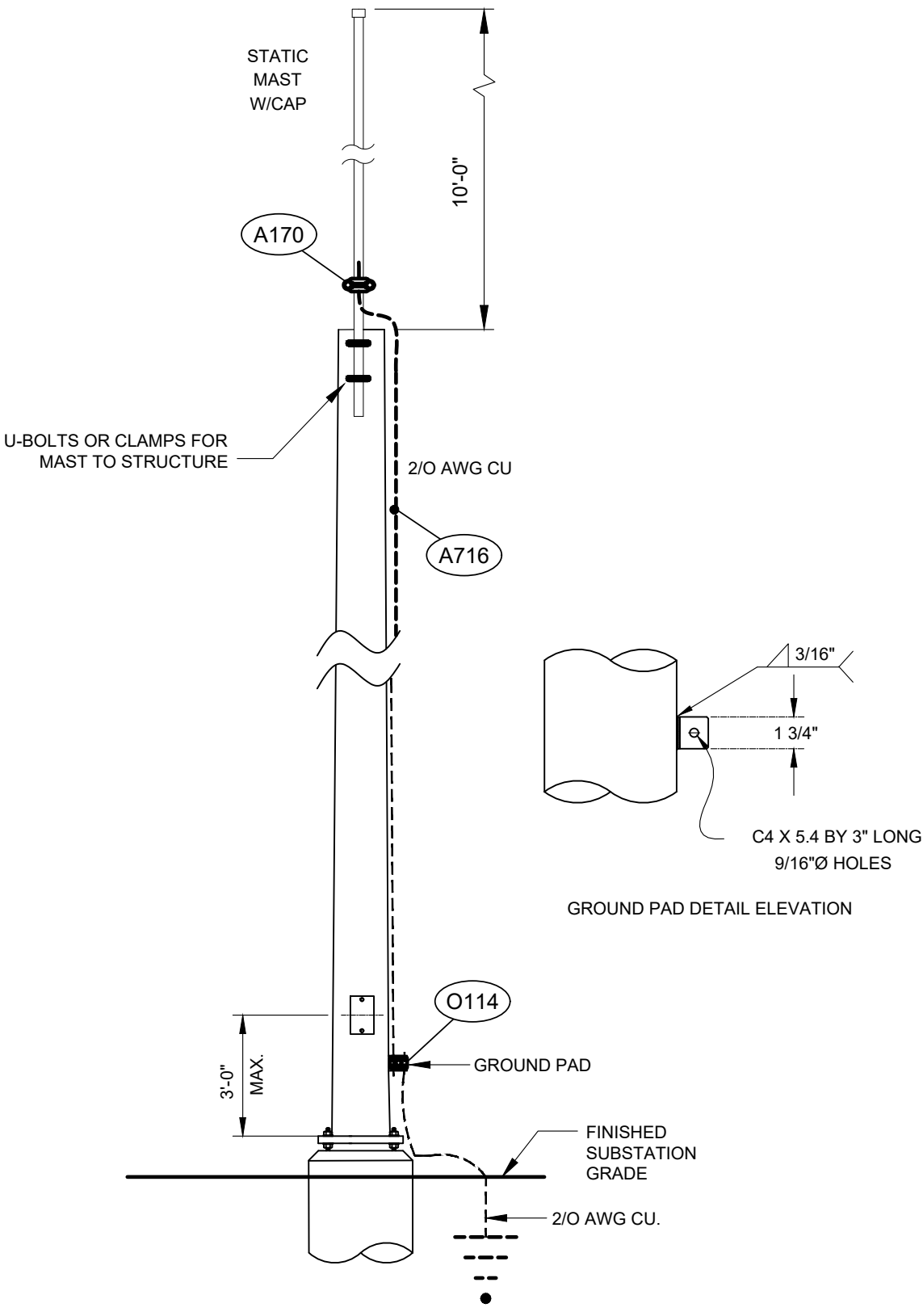


TYPICAL FENCE FITTING DETAIL
N.T.S.



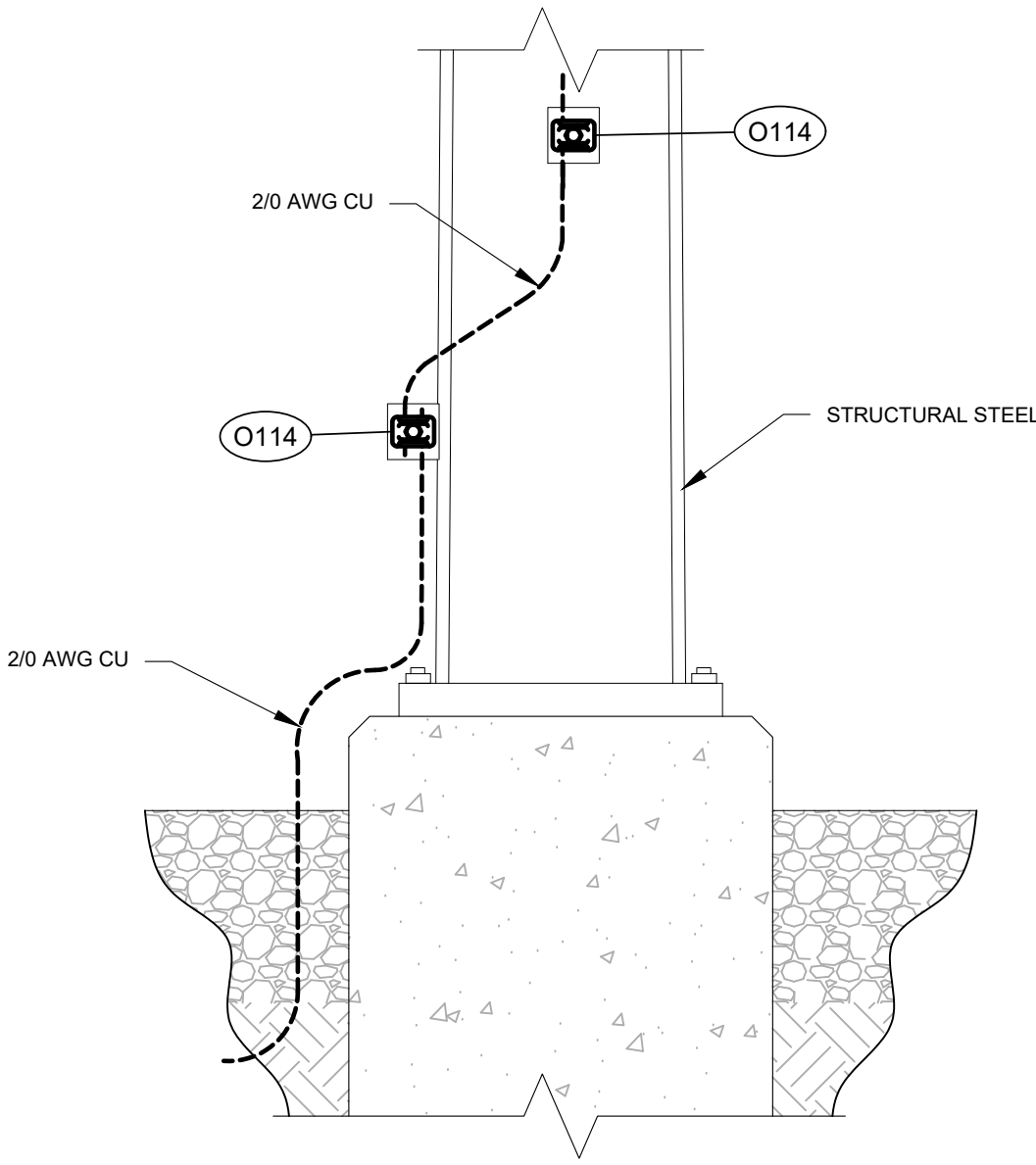
GATE POST
CORNER POST
(OR LINE POST W/BREAK IN FABRIC)
LINE POST
(NO BREAK IN FABRIC)

TYPICAL FENCE GROUNDING DETAILS
N.T.S.

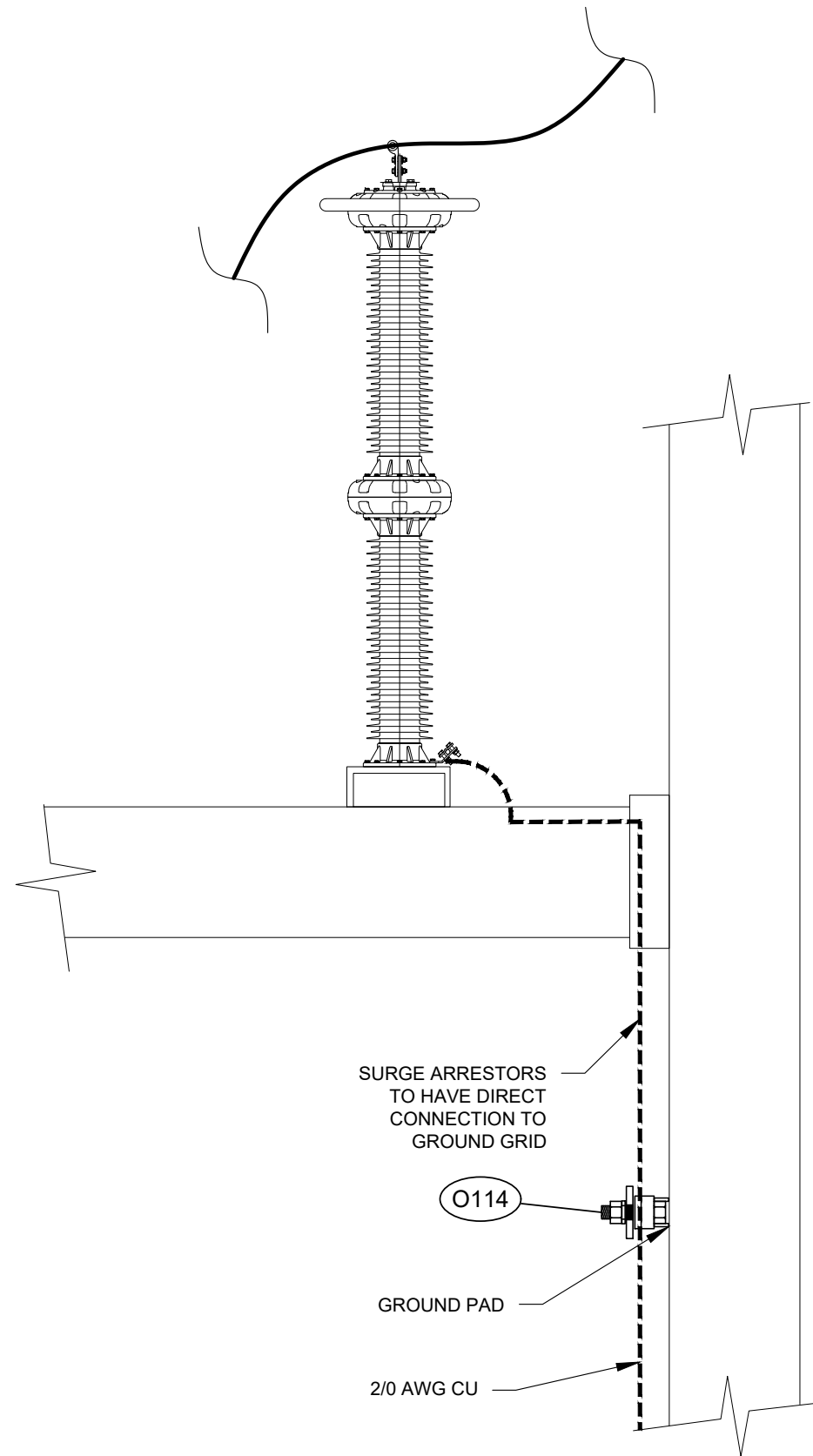


STATIC MAST GROUNDING DETAIL
N.T.S.

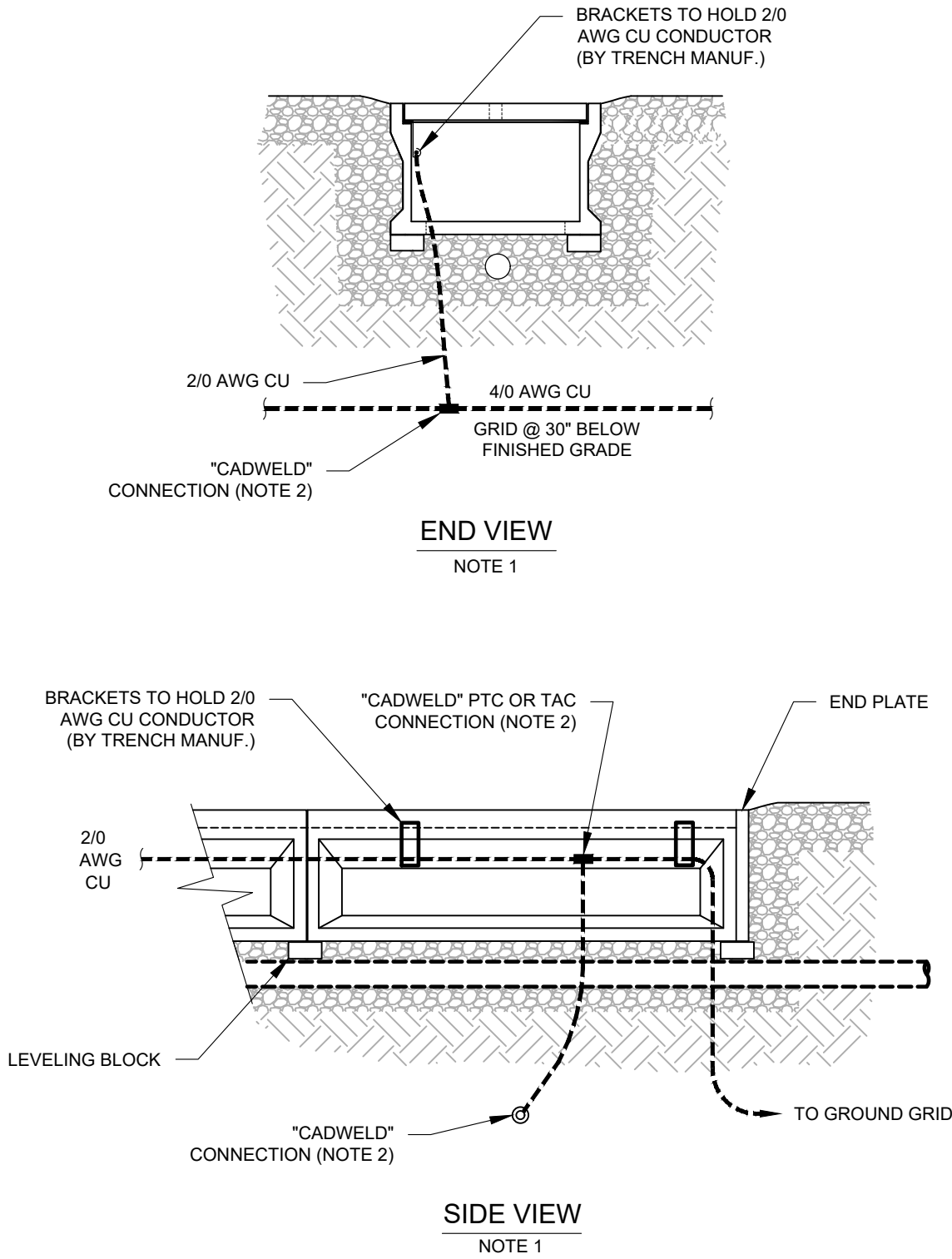
NOTE:
RUN CONTINUOUS #2/0 COPPER WIRE FROM GROUNDING
SYSTEM UP COLUMN THROUGH GROUNDING TERMINAL AND
UP TO STAND MOUNTED EQUIPMENT. (IF REQUIRED)



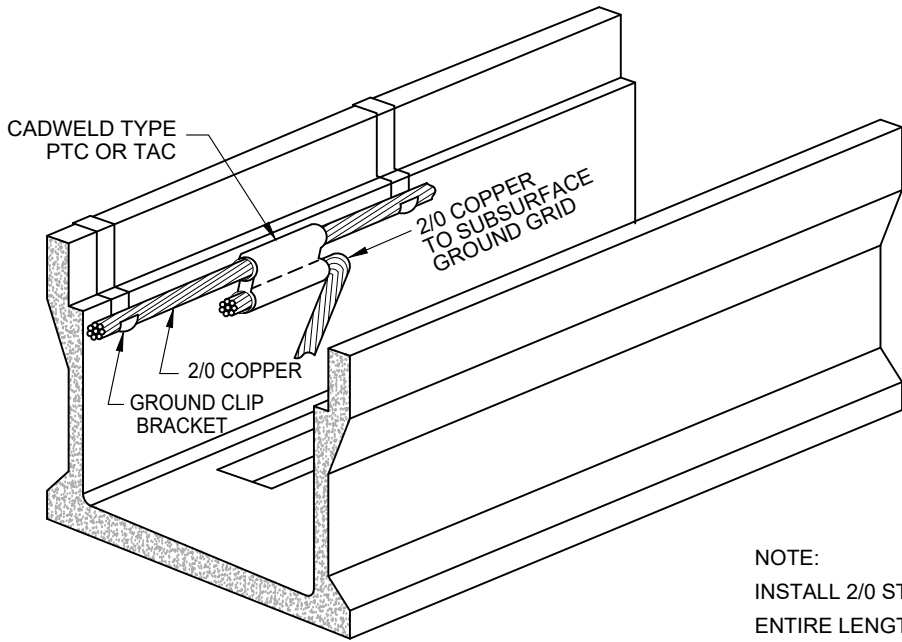
TYPICAL STRUCTURE GROUNDING
N.T.S.



GROUND ARRESTOR DETAIL
(N.T.S.)



TYPICAL TRENCH GROUNDING DETAIL
N.T.S.



GROUND CLIP DETAIL
(N.T.S.)

FOR BID PURPOSES
NOT FOR CONSTRUCTION

- NOTES:
- SEE SHEET E-CP-002 TO E-CP-004 FOR CABLE TRENCH DETAIL.
 - BOND 2/0 AWG CU TO GROUND GRID AT ALL GROUND GRID CONDUCTOR CROSSING.

REFERENCES			
PLAN VIEW	S-GA-001		
CONDUIT PLAN & DETAILS	E-CP-002 TO E-CP-004		
CONDUIT & CABLE SCHEDULE	E-CP-101 & E-CP-102		
GROUNDING PLAN & DETAILS	E-GP-001 TO E-GP-003		
FOUNDATION PLAN	S-FP-001		
FOUNDATION DETAILS	S-FD-001 TO S-FD-008		
OIL CONTAINMENT.....	S-OC-001 TO S-OC-003		

PRELIMINARY - DO NOT USE FOR CONSTRUCTION	NO.	REVISIONS	DATE	PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE			
	A	PRELIMINARY	06/02/26	POINT OF DELIVERY No. 5			
				GROUNDING DETAILS 2			
				DWN.	DDS	DATE: 07/10/25	DWG. NO.
				CKD.	RD	APPD. RD	DE8992
				NO.	REVISIONS	DATE	GP-003
				SCALE: AS NOTED	PLOT: NONE		

CONDUCTOR	APPROX. CURRENT CARRYING CAPACITY*
TUBING, 6" NPS SCH. 80 AL.	4891 AMPS.
TUBING, 4" NPS SCH. 80 AL.	3720
TUBING, 3" NPS SCH. 80 AL.	2760
TUBING, 2" NPS SCH. 80 AL.	1700
TUBING, 6" NPS SCH. 40 AL.	4064
TUBING, 4" NPS SCH. 40 AL.	3165
TUBING, 3" NPS SCH. 40 AL.	2425
TUBING, 2" NPS SCH. 40 AL.	1465
AAC, 1590 MCM	1333
ACSR, 1272 MCM, 26/7	1200
ACSR, 954 MCM, 45/7	1010
AAC, 954 MCM	982
ACSR, 795 MCM, 26/7	907
ACSR, 538 1/4 MCM, 18/7	530
ACSR, 2/0 AWG, 6/1	340
ACSR, 1/0 AWG, 6/1	230
COPPER, 1000 MCM, 61 STD.	1285
COPPER, 750 MCM, 61 STD.	1075
COPPER, 500 MCM, 37 STD.	830
COPPER, 4/0 AWG, 19 STD.	480
COPPER, 4/0 AWG, 7 STD.	480
COPPER, 2/0 AWG, 7 STD.	355
COPPER, #2 AWG, SOLID	231
UABC, 4" x 4" x 3/8"	3125
UABC, 4" x 4" x 1/4"	2640
UABC, 3 1/4" x 3 1/4" x 1/4"	2325
AL, BAR 3" x 1/2"	1350
AL, BAR 3" x 1/4"	938

DIAMETER BOLT (INCHES)	RECOMMENDED TORQUE NON-LUBRICATED STEEL & SILICON BRONZE HARDWARE (FOOT*LB)	RECOMMENDED TORQUE LUBRICATED HARDWARE & ALUMINUM HARDWARE (FOOT*LB)
1/2"	40	25
5/8"	55	40
3/4"	70	60

1. MATERIAL/MAN/FABRICATOR TO VERIFY THAT CONDUCTOR TERMINAL PADS MATCH AND FIT ONTO SWITCH TERMINAL PADS (SIZE, NEMA RATING AND SHOULDER).
2. SUBSTATION CONTRACTOR SHALL COORDINATE WITH UTILITY TO INSTALL CONDUCTORS. TO UTILITY STRUCTURE. SEE TRANSMISSION PLAN & PROFILE FOR DISTANCE OF OHGW, OPGW AND CONDUCTOR DEAD-END.
3. EXTEND SUBSTATION STONE 5 FT BEYOND SUBSTATION FENCE AND 20 FT BEYOND GATE(S).
4. STRUCTURAL DIMENSIONS ARE APPROXIMATE, SEE MANUFACTURER DRAWINGS FOR ACTUAL DIMENSIONS.
5. ALL ALUMINUM TUBE CONDUCTORS OVER 20 FEET IN LENGTH SHALL INCLUDE APPROPRIATE DAMPING TO PREVENT AEOLIAN VIBRATIONS. DAMPING TO BE ACCOMPLISHED BY INSERTING A LENGTH OF 336 4 ACSR CONDUCTOR INSIDE EACH SECTION OF TUBING.
6. TO PREVENT EXCESSIVE INTERNAL CONDENSATION, ALUMINUM TUBE CONDUCTORS SHALL INCLUDE WEEP HOLES AT THE BOTTOM OF HORIZONTAL AND VERTICAL RUNS.

THE VALUE ARE FOR ALTITUDES OF 3300 FT OR LESS. FOR HIGHER ALTITUDE REFER TO RULE 124A1 (NESC-2017).

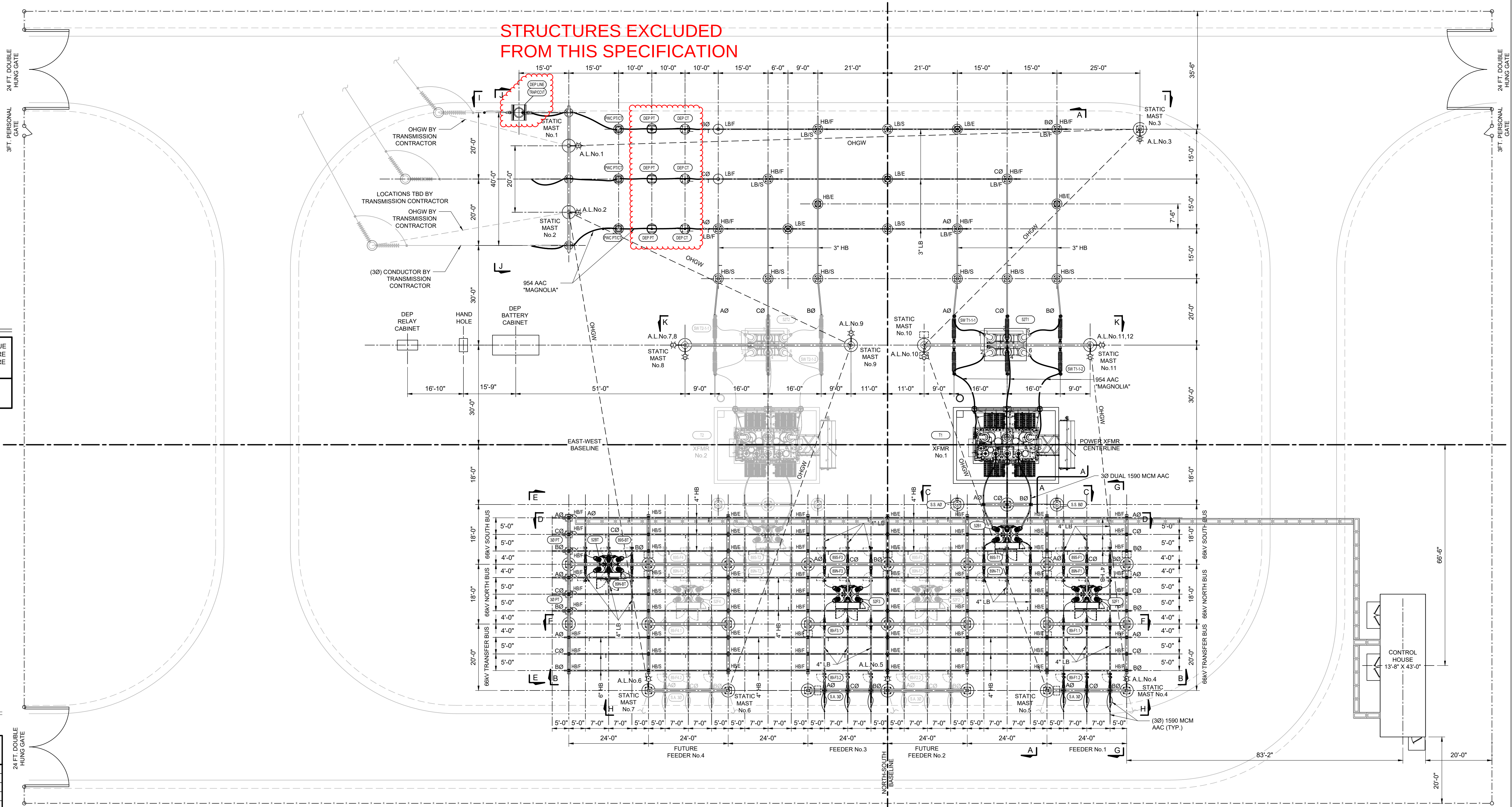
RATED KV	BIL KV	SPACING
34.5	200	10'-7"
46	250	10'-11"
69	350	11'-7"
115	550	13'-0"
138	650	13'-8"
161	750	14'-4"
230	900	15'-5"

STRUCTURE, APPARATUS AND LIGHTNING ARRESTERS ARE ALL GROUNDED TO THE SAME GROUNDING SYSTEM. STATION DESIGNED FOR THE FOLLOWING ELECTRICAL CLEARANCES/SPACINGS:

RATED KV	BIL KV	RIGID BUS CONDUCTORS (IEEE, NEMA, NESC)				GROUP-OPERATED SWITCHES (NEMA)		
		SPACING ⁽²⁾	CLEARANCE ⁽¹⁾			⌋ TO ⌋ SPACING ⁽²⁾		
		PHASE TO ⌋ TO ⁽³⁾	METAL TO METAL ⁽⁴⁾	PHASE TO GROUND ⁽⁵⁾	CLEARANCE ABOVE GRADE ⁽⁶⁾	HORN GAP VERT./HOR. BREAK	DISCONNECT VERTICAL BREAK	DISCONNECT HORIZONTAL BREAK
230	900	11'-0"	7'-5"	6'-8"	15'-0"	16'-0"	11'-0"	16'-0"
69	350	5'-0"	2'-7"	2'-6"	11'-0"	7'-0"	5'-0"	6'-0"

1. "CLEARANCE" IS DEFINED AS A SURFACE-TO-SURFACE MEASUREMENT.
2. "SPACING" IS DEFINED AS A $\perp$ TO $\perp$ MEASUREMENT.
3. INTENDED FOR PHASES ORIENTED IN PARALLEL RUNS.
4. INTENDED FOR NON-PARALLEL POINTS OF CROSSING.
5. EXCEEDS MINIMUM CLEARANCES TO MATCH NEMA STANDARD POST INSULATOR DIMENSIONS.
6. ROUNDED UP TO THE NEAREST EVEN FOOT, PER NESC (2017). MEASURED FROM TOP OF EQUIPMENT FOUNDATIONS, IF SUITABLE FOR PEDESTRIAN ACCESS.

OHGW SUPPORT STRUCTURES SHALL WITHSTAND LINE TAKE-OFF AT THE ANGLES SHOWN WITH A MAX LOAD OF 800 POUNDS PER OHGW. A MINIMUM VERTICAL CLEARANCE OF 15'-0" SHALL BE MAINTAINED FROM OHGW TO BUSWORK OR ENERGIZED CONDUCTORS.



SCALE: 1/16"=1'-0"

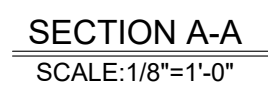
EQUIPMENT VIEW IS PRELIMINARY.
WAITING ON VENDOR DRAWINGS.

F	FIXED CONNECTION	-----	OVERHEAD GROUND WIRE (OHGW)
S	SLIP FIT	X X	SUBSTATION FENCE
HB	HIGH BUS SUPPORT	=====	OIL CONTAINMENT AREA
HL	HIGH/LOW BUS SUPPORT		
LB	LOW BUS SUPPORT	[]	OPERATOR PLATFORM
E	EXPANSION SUPPORT		
	AREA LIGHTS	-----	FUTURE INSTALLATION

PLAN VIEW	S-GA-001
SECTIONS	S-GA-002 TO S-GA-008
SECTIONS DETAILS	S-GA-101 TO S-GA-103
BILL OF MATERIAL	S-GA-110
FOUNDATION PLAN	S-FP-001
FOUNDATION DETAILS	S-FD-001 TO S-FD-009
OIL CONTAINMENT	S-OC-001 TO S-OC-003

PRELIMINARY - DO NOT USE FOR CONSTRUCTION	NO.	REVISIONS	DATE	PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE			
	A	PRELIMINARY	04/11/25	POINT OF DELIVERY No. 5			
	B	PRELIMINARY	07/02/25				
	C	PRELIMINARY	06/02/26				
	D	PRELIMINARY	06/24/26				
				PLAN VIEW			
				DWN. DDS	DATE: 05/28/25	DWG. NO. DE8992 S-GA-001	
			CKD. RDM	APPO. RDM			
			SCALE: 1/16"=1'	PLOT: NONE			
© 08/24	NO.	REVISIONS	DATE				

DE8992-S-GA-001 (ID 146281).DWG



1. MATERIAL MANUFACTURER TO VERIFY THAT CONDUCTOR TERMINAL PADS MATCH AND FIT ON TO SWITCH TERMINAL PADS (SIZE, NEMA RATING AND SHOULDER).
2. SUBSTATION CONTRACTOR SHALL COORDINATE WITH UTILITY TO INSTALL CONDUCTORS TO UTILITY STRUCTURE. SEE TRANSMISSION PLAN & PROFILE FOR DISTANCE OF OHGW, OPGW (IF APPLICABLE) AND CONDUCTOR DEAD-END.
3. SURGE ARRESTER SHALL HAVE A DIRECT CONNECTION TO GROUND GRID.
4. STRUCTURAL DIMENSIONS ARE APPROXIMATE. SEE MANUFACTURER DRAWINGS FOR ACTUAL DIMENSIONS WHEN AVAILABLE.
5. FOR CONDUIT INFORMATION, SEE CONDUIT DRAWINGS.
6. ALL ALUMINUM TUBE CONDUCTORS OVER 20 FEET IN LENGTH SHALL INCLUDE APPROPRIATE DAMPING TO PREVENT AEOLIAN VIBRATIONS. DAMPING TO BE ACCOMPLISHED BY INSERTING A LENGTH OF 336.4 ACSR CONDUCTOR INSIDE EACH SECTION OF TUBING.
7. TO PREVENT EXCESSIVE INTERNAL CONDENSATION, ALUMINUM TUBE CONDUCTORS SHALL INCLUDE WEEP HOLES AT THE BOTTOM OF HORIZONTAL AND VERTICAL RUNS.

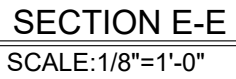
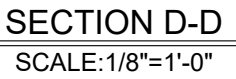
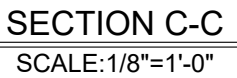
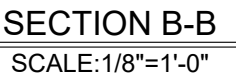
E - EXPANSION BUS SUPPORT OR EXPANSION TERMINAL FITTING
S - SLIP BUS SUPPORTS (DO NOT WELD AT FITTING)
F - FIXED BUS SUPPORTS (WELD TUBE AT FITTING)

PLAN VIEW	S-GA-001
SECTIONS	S-GA-002 TO S-GA-008
SECTIONS DETAILS	S-GA-101 TO S-GA-103
BILL OF MATERIAL	S-GA-110
FOUNDATION PLAN	S-FP-001
FOUNDATION DETAILS	S-FD-001 TO S-FD-009
OIL CONTAINMENT	S-OC-001 TO S-OC-003

PRELIMINARY - DO NOT USE FOR CONSTRUCTION	A	PRELIMINARY	04/11/25	PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE		
	B	PRELIMINARY	06/02/26			
	C	PRELIMINARY	06/24/26	POINT OF DELIVERY No. 5		
				SECTION A-A		
				DWN. A/S	DATE: 06/02/25	DWG. NO. DE9962 S-GA-002
				CKD. BGD	APPD. BGD	
				SCALE: 1/8"=1'	PLOT: NONE	

05/25

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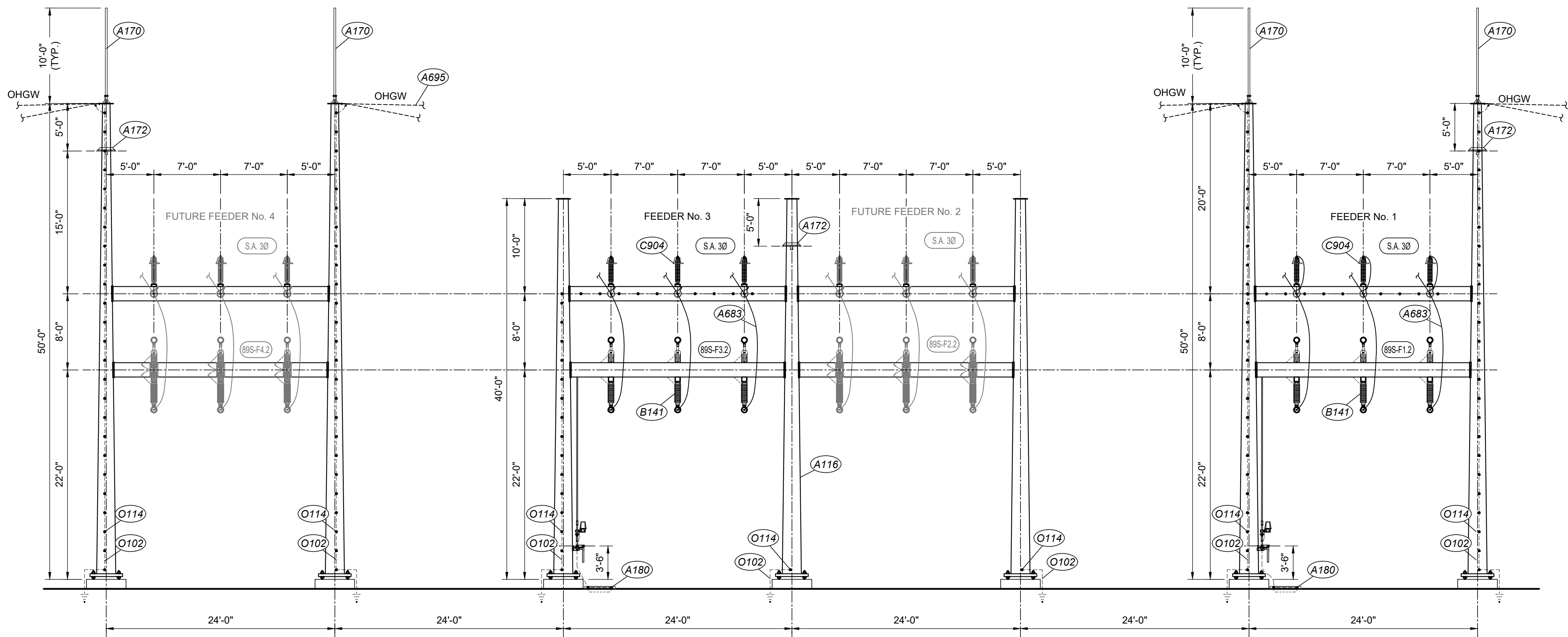
PRELIMINARY - DO NOT USE FOR CONSTRUCTION	A	PRELIMINARY	04/11/25	PUBLIC WORKS COMMISSION		
	B	PRELIMINARY	06/02/26	OF THE CITY OF FAYETTEVILLE		
	C	PRELIMINARY	06/24/26	POINT OF DELIVERY No. 5		
				SECTION B-B, C-C, D-D & E-E		
				DWN. DDS	DATE: 06/02/25	DWG. NO.
				CKD. BGD	APPD. BGD	DE8992
				SCALE: 1/8"=1'	PLOT: NONE	S-GA-003
© 05/25	NO.	REVISIONS	DATE			



1. MATERIAL MANUFACTURER TO VERIFY THAT CONDUCTOR TERMINAL PADS MATCH AND FIT ON TO SWITCH TERMINAL PADS (SIZE, NEMA RATING AND SHOULDER).
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3. SURGE ARRESTER SHALL HAVE A DIRECT CONNECTION TO GROUND GRID.
4. STRUCTURAL DIMENSIONS ARE APPROXIMATE. SEE MANUFACTURER DRAWINGS FOR ACTUAL DIMENSIONS WHEN AVAILABLE.
5. FOR CONDUIT INFORMATION, SEE CONDUIT DRAWINGS.
6. ALL ALUMINUM TUBE CONDUCTORS OVER 20 FEET IN LENGTH SHALL INCLUDE APPROPRIATE DAMPING TO PREVENT AEOLIAN VIBRATIONS. DAMPING TO BE ACCOMPLISHED BY INSERTING A LENGTH OF 336.4 ACSR CONDUCTOR INSIDE EACH SECTION OF TUBING.
7. TO PREVENT EXCESSIVE INTERNAL CONDENSATION, ALUMINUM TUBE CONDUCTORS SHALL INCLUDE WEEP HOLES AT THE BOTTOM OF HORIZONTAL AND VERTICAL RUNS.

PLAN VIEW	S-GA-001
SECTIONS	S-GA-002 TO S-GA-008
SECTIONS DETAILS	S-GA-101 TO S-GA-103
BILL OF MATERIAL	S-GA-110
FOUNDATION PLAN	S-FP-001
FOUNDATION DETAILS	S-FD-001 TO S-FD-009
OIL CONTAINMENT	S-OC-001 TO S-OC-003

DE8992-S-GA-002-008 (ID 148517).DWG



SECTION H-H
SCALE: 1/8"=1'-0"

INSTALLATION NOTES:

1. MATERIALMAN/FABRICATOR TO VERIFY THAT CONDUCTOR TERMINAL PADS MATCH AND FIT ON TO SWITCH TERMINAL PADS (SIZE, NEMA RATING AND SHOULDER).
2. SUBSTATION CONTRACTOR SHALL COORDINATE WITH UTILITY TO INSTALL CONDUCTORS TO UTILITY STRUCTURE. SEE TRANSMISSION PLAN & PROFILE FOR DISTANCE OF OHGW, OPGW (IF APPLICABLE) AND CONDUCTOR DEAD-END.
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SUPPORT LEGEND:

- E - EXPANSION BUS SUPPORT OR EXPANSION TERMINAL FITTING
S - SLIP BUS SUPPORTS (DO NOT WELD AT FITTING)
F - FIXED BUS SUPPORTS (WELD TUBE AT FITTING)

REFERENCES:

- PLAN VIEW S-GA-001
SECTIONS S-GA-002 TO S-GA-008
SECTIONS DETAILS S-GA-101 TO S-GA-103
BILL OF MATERIAL S-GA-110
FOUNDATION PLAN S-FP-001
FOUNDATION DETAILS S-FD-001 TO S-FD-009
OIL CONTAINMENT S-OC-001 TO S-OC-003

PRELIMINARY
NOT FOR CONSTRUCTION

PRELIMINARY - DO NOT USE FOR CONSTRUCTION	A	PRELIMINARY	04/11/25	PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE		
	B	PRELIMINARY	06/02/26	POINT OF DELIVERY No. 5		
	C	PRELIMINARY	06/24/26	SECTION H-H		
				DWN. DDS	DATE: 05/28/25	DWG. NO.
				CKD. BGD	APPD. BGD	DE8992
				NO.	REVISIONS	DATE
				SCALE: 1/8"=1'	PLOT: NONE	S-GA-005



INSTALLATION NOTES:

1. MATERIAL MANUFACTURER TO VERIFY THAT CONDUCTOR TERMINAL PADS MATCH AND FIT ON TO SWITCH TERMINAL PADS (SIZE, NEMA RATING AND SHOULDER).
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SUPPORT LEGEND:

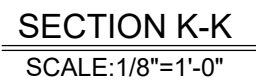
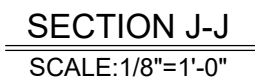
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REFERENCES:

PLAN VIEW	S-GA-001
SECTIONS	S-GA-002 TO S-GA-008
SECTIONS DETAILS	S-GA-101 TO S-GA-103
BILL OF MATERIAL	S-GA-110
FOUNDATION PLAN	S-FP-001
FOUNDATION DETAILS	S-FD-001 TO S-FD-009
OIL CONTAINMENT	S-OC-001 TO S-OC-003

**PRELIMINARY
NOT FOR CONSTRUCTION**

PRELIMINARY - DO NOT USE FOR CONSTRUCTION	A	PRELIMINARY	04/11/25	PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE		
	B	PRELIMINARY	06/02/26	POINT OF DELIVERY No. 5 SECTION I-I		
	C	PRELIMINARY	06/24/26			
					DWN. DDS	DATE: 05/26/25
				CKD. BGD	APPD. BGD	
				SCALE: 1/8"=1'	PLOT: NONE	



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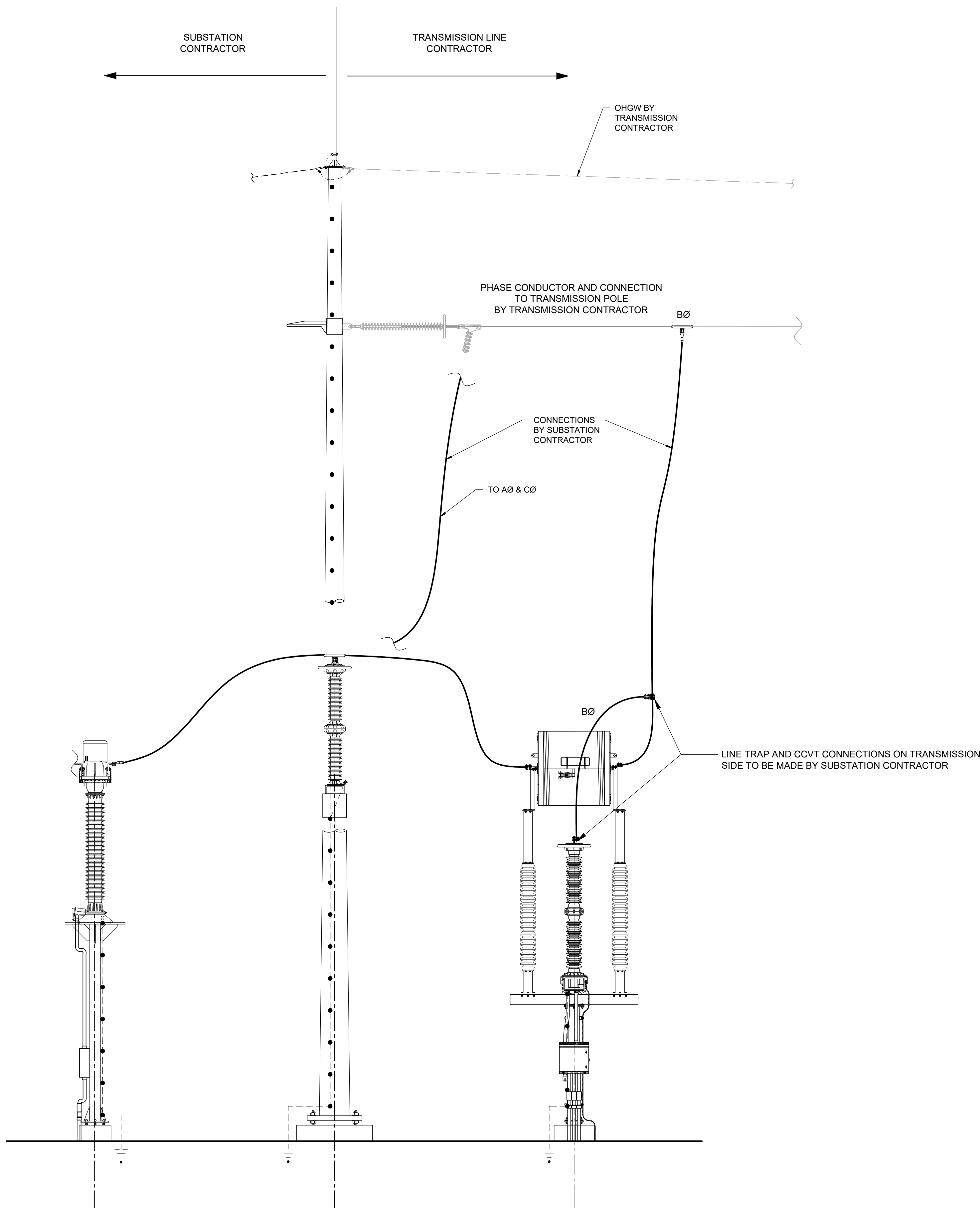
E - EXPANSION BUS SUPPORT OR EXPANSION TERMINAL FITTING
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PLAN VIEW	S-GA-001
SECTIONS	S-GA-002 TO S-GA-008
SECTIONS DETAILS	S-GA-101 TO S-GA-103
BILL OF MATERIAL	S-GA-110
FOUNDATION PLAN	S-FP-001
FOUNDATION DETAILS	S-FD-001 TO S-FD-009
OIL CONTAINMENT	S-OC-001 TO S-OC-003

**PRELIMINARY
NOT FOR CONSTRUCTION**

PRELIMINARY - DO NOT USE FOR CONSTRUCTION	A	PRELIMINARY	04/11/25	PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE		
	B	PRELIMINARY	06/02/26	POINT OF DELIVERY No. 5		
	C	PRELIMINARY	06/24/26			
				DWN. DDS	DATE: 05/28/25	DWG. NO. DE8902 S-GA-007
				CKD. BGD	APPD. BGD	
				SCALE: 1/8"=1'	PLOT: NONE	
© 05/25	NO.	REVISIONS	DATE			

PROTH A. ASSOCIATES, LLC
PROTH A. ASSOCIATES, LLC RIGHTS RESERVED



INSTALLATION NOTES:

1. MATERIALMAN/FABRICATOR TO VERIFY THAT CONDUCTOR TERMINAL PADS MATCH AND FIT ON TO SWITCH TERMINAL PADS (SIZE, NEMA RATING AND SHOULDER).
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REFERENCES:

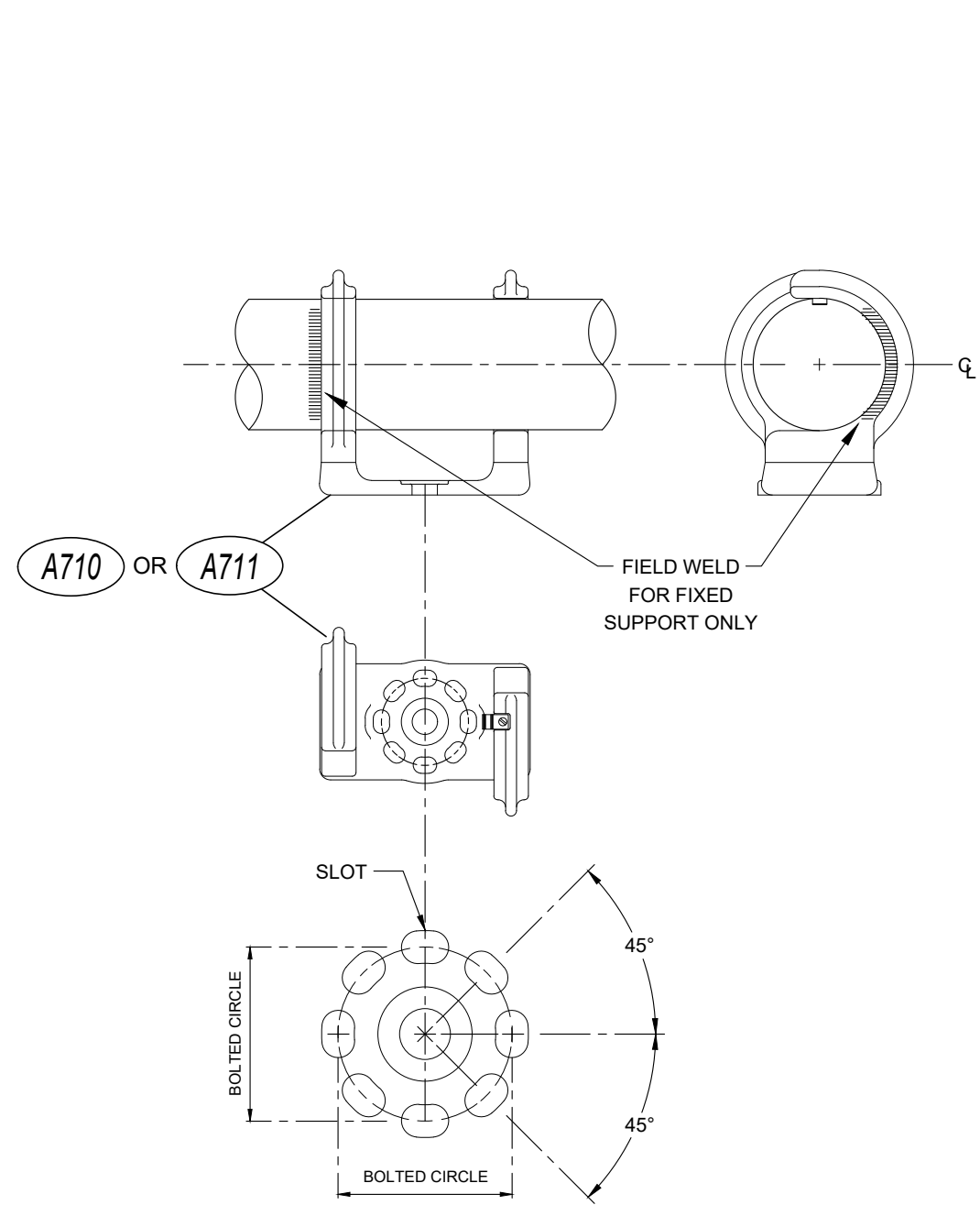
PLAN VIEW	S-GA-001
SECTIONS	S-GA-002 TO S-GA-008
SECTIONS DETAILS	S-GA-101 TO S-GA-103
BILL OF MATERIAL	S-GA-110
FOUNDATION PLAN	S-FP-001
FOUNDATION DETAILS	S-FD-001 TO S-FD-009
OIL CONTAINMENT.....	S-OC-001 TO S-OC-003

PRELIMINARY
NOT FOR CONSTRUCTION

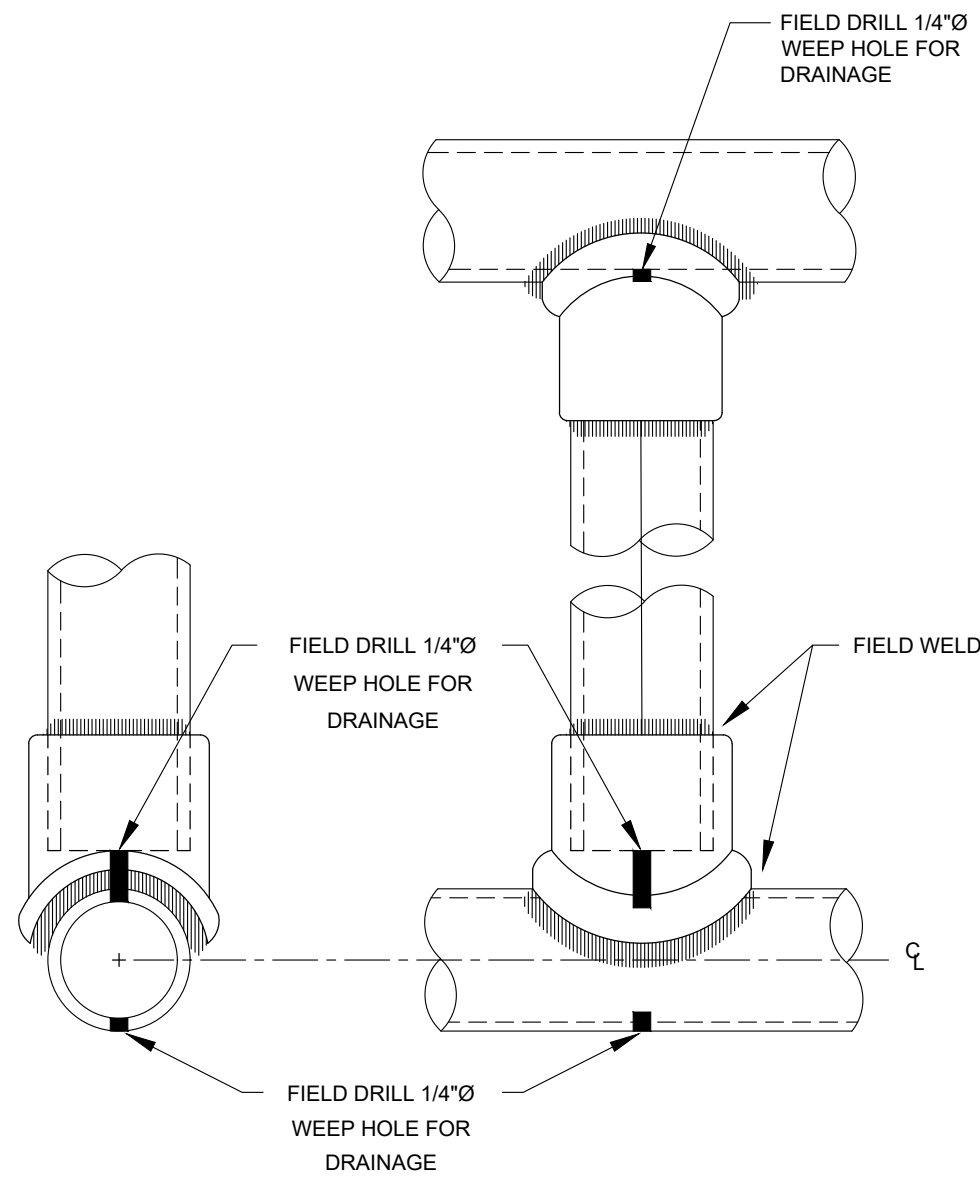
POINT OF DELINEATION

SCALE:1/4"=1'-0"

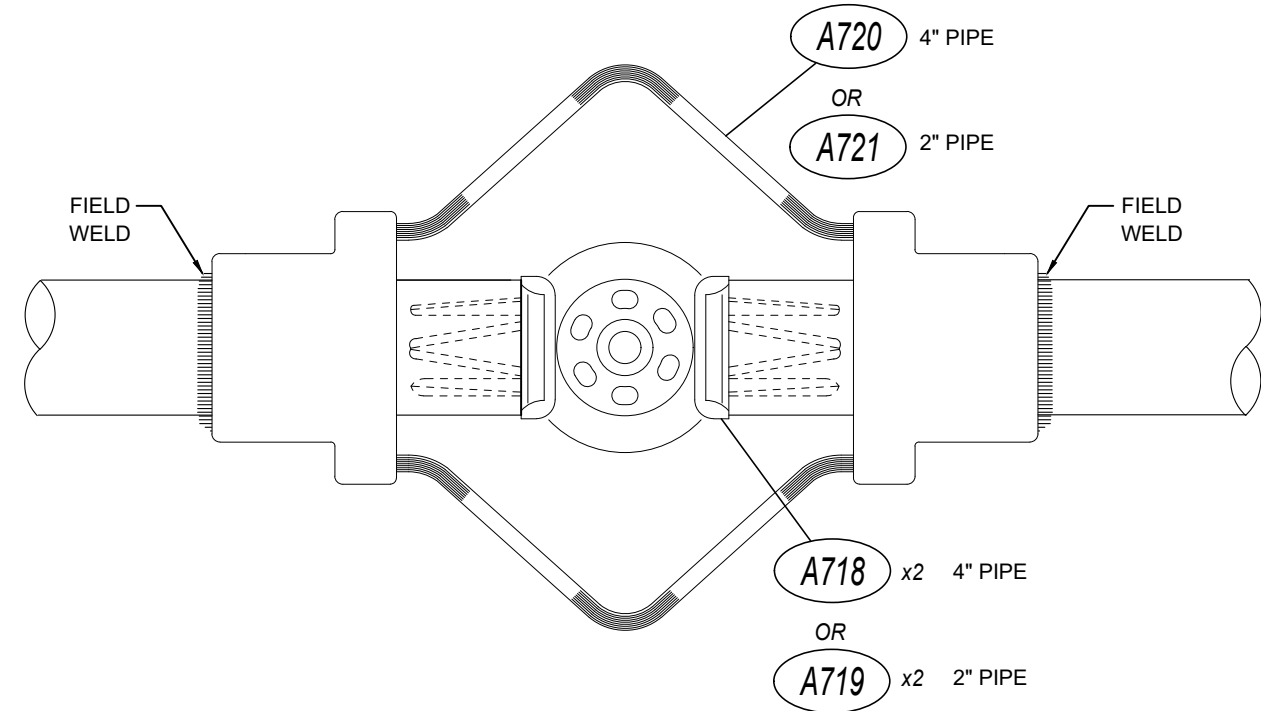
PRELIMINARY - DO NOT USE FOR CONSTRUCTION	A	PRELIMINARY	06/02/26	PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE		
	B	PRELIMINARY	06/24/26			
				POINT OF DELIVERY No. 5		
				POINT OF DELINEATION		
				DWN. DDS	DATE: 01/09/26	DWG. NO. DE8992 S-GA-008
				CKD. BGD	APPD. BGD	
				NO.	REVISIONS	DATE
				SCALE: 1/4"=1'		PLOT: NONE



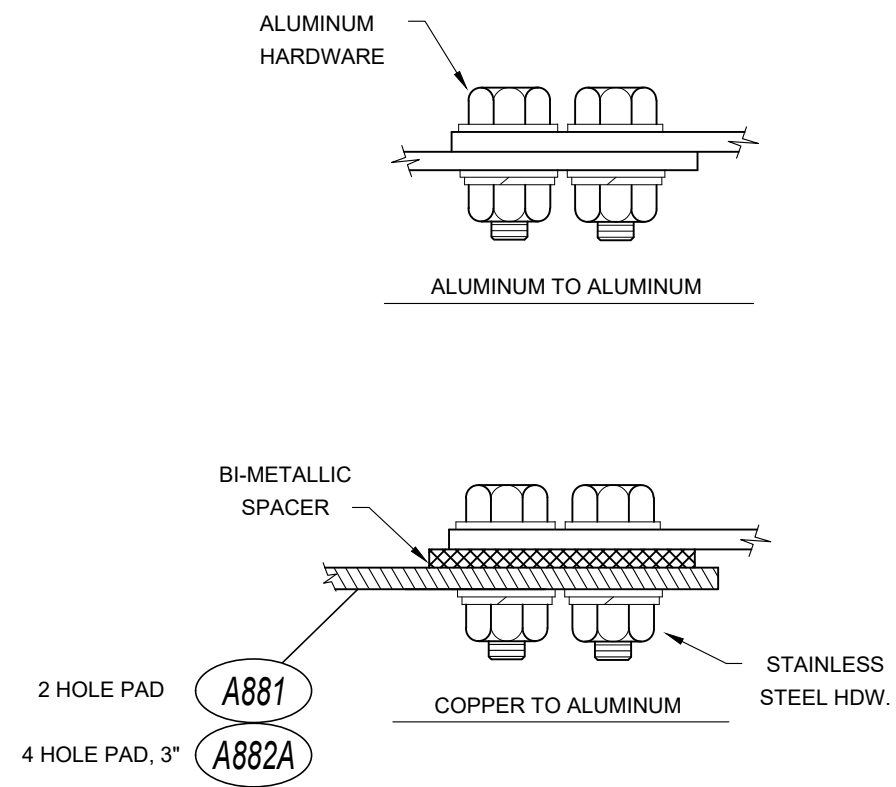
BUS SUPPORT DETAIL
N.T.S.



TUBE TO TUBE DETAIL
N.T.S.

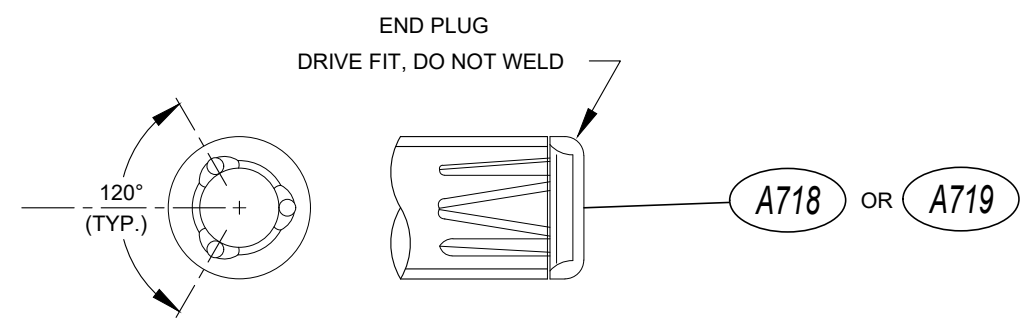


EXPANSION TO CONNECTORS DETAIL
N.T.S.

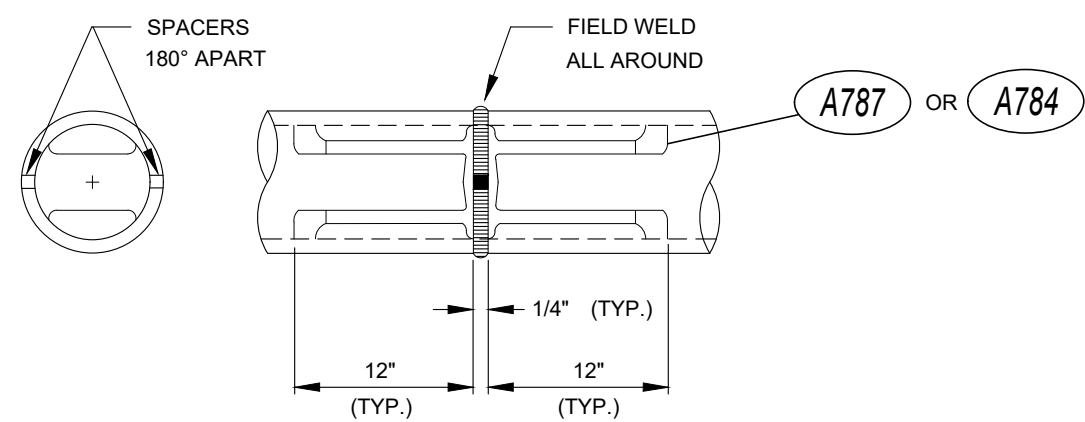


NOTE:
APPLY ELECTRICAL JOINT COMPOUND TO BOTH CONNECTIONS

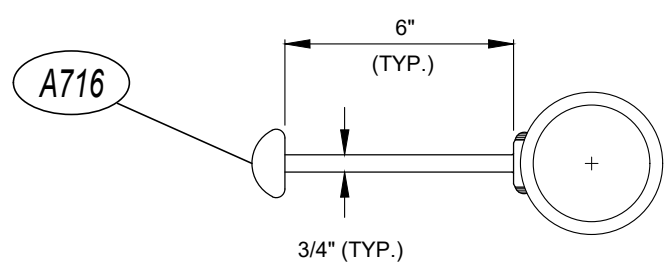
ELECTRICAL CONNECTIONS
N.T.S.



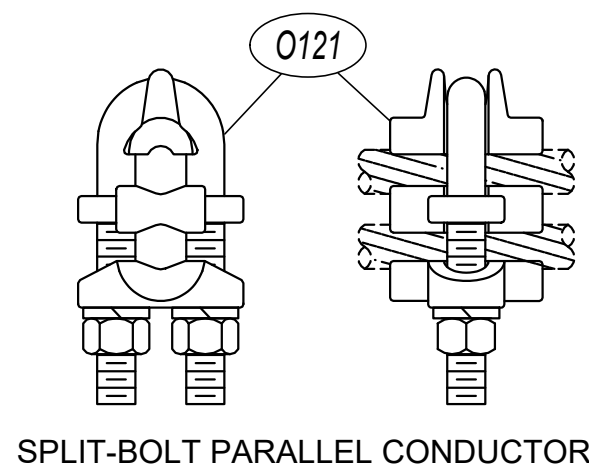
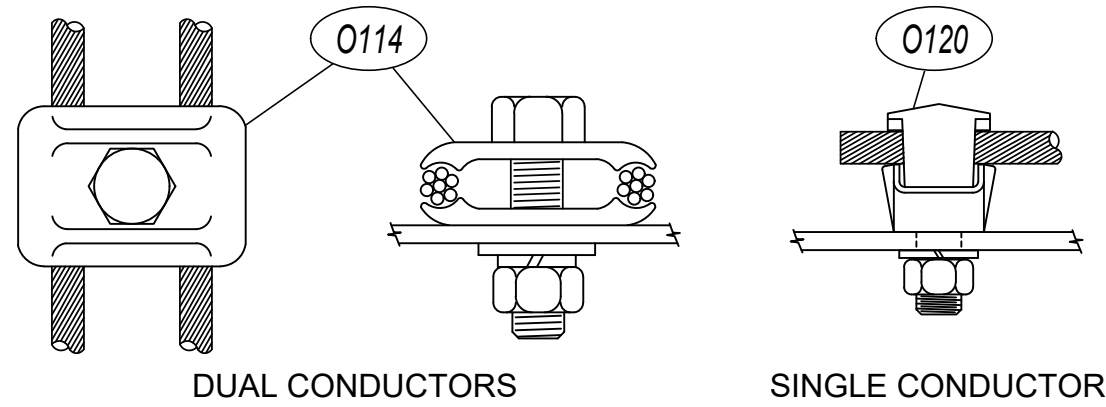
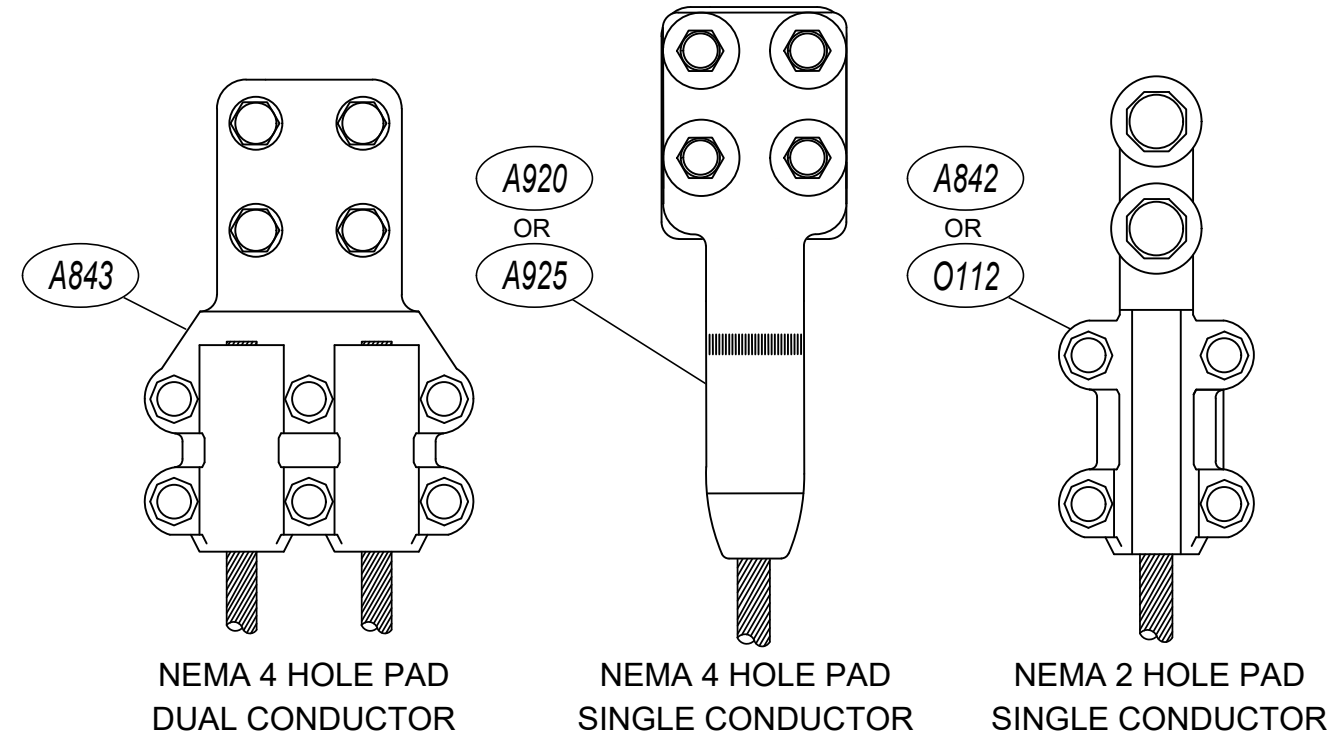
CORONA END PLUG DETAIL
N.T.S.



CONNECTOR DETAIL
N.T.S.

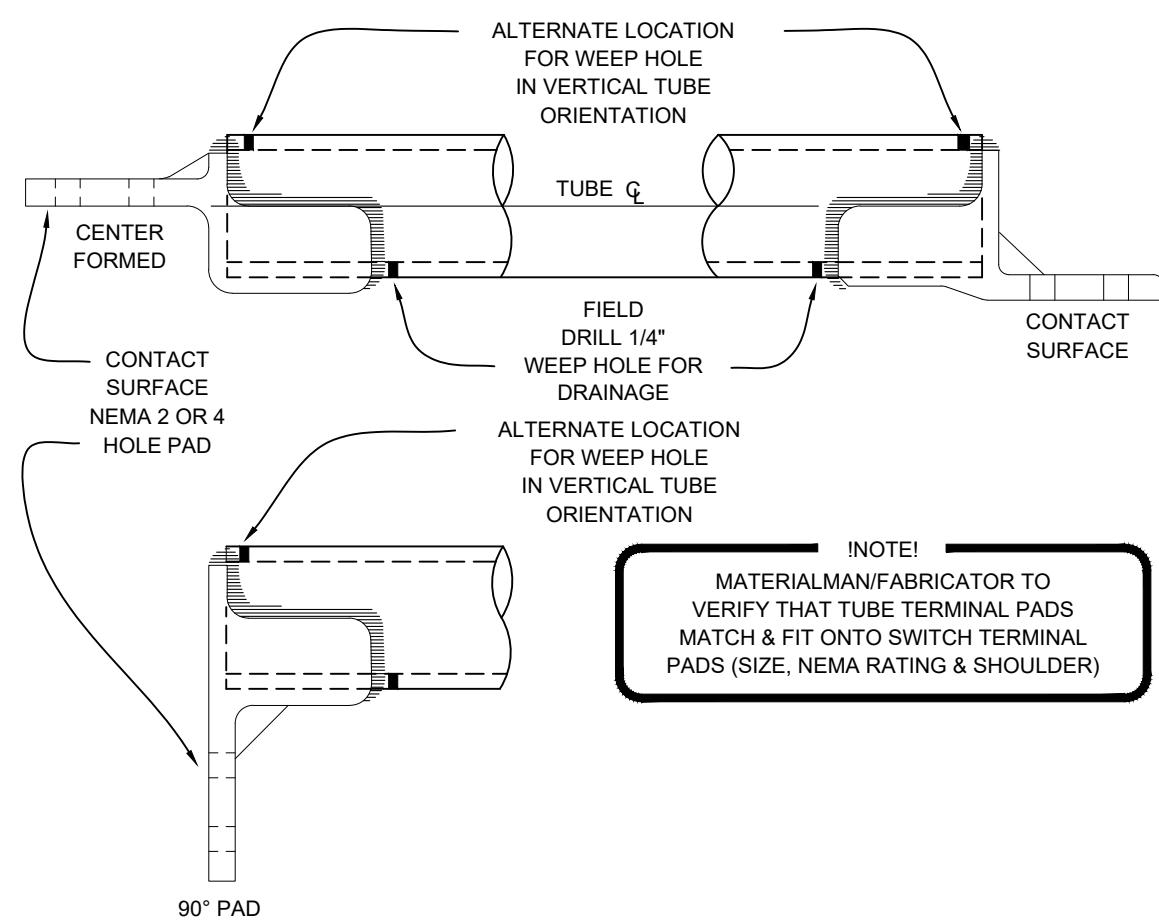


GROUND STUD DETAIL
N.T.S.



NOTE:
1. USE TO ATTACH GRID TAPS TO STRUCTURE CONDUCTORS, AND AT PERPENDICULAR RUNS TO EQUIPMENT ETC.

TYPICAL STRUCTURE CONDUCTOR CONNECTORS
N.T.S.

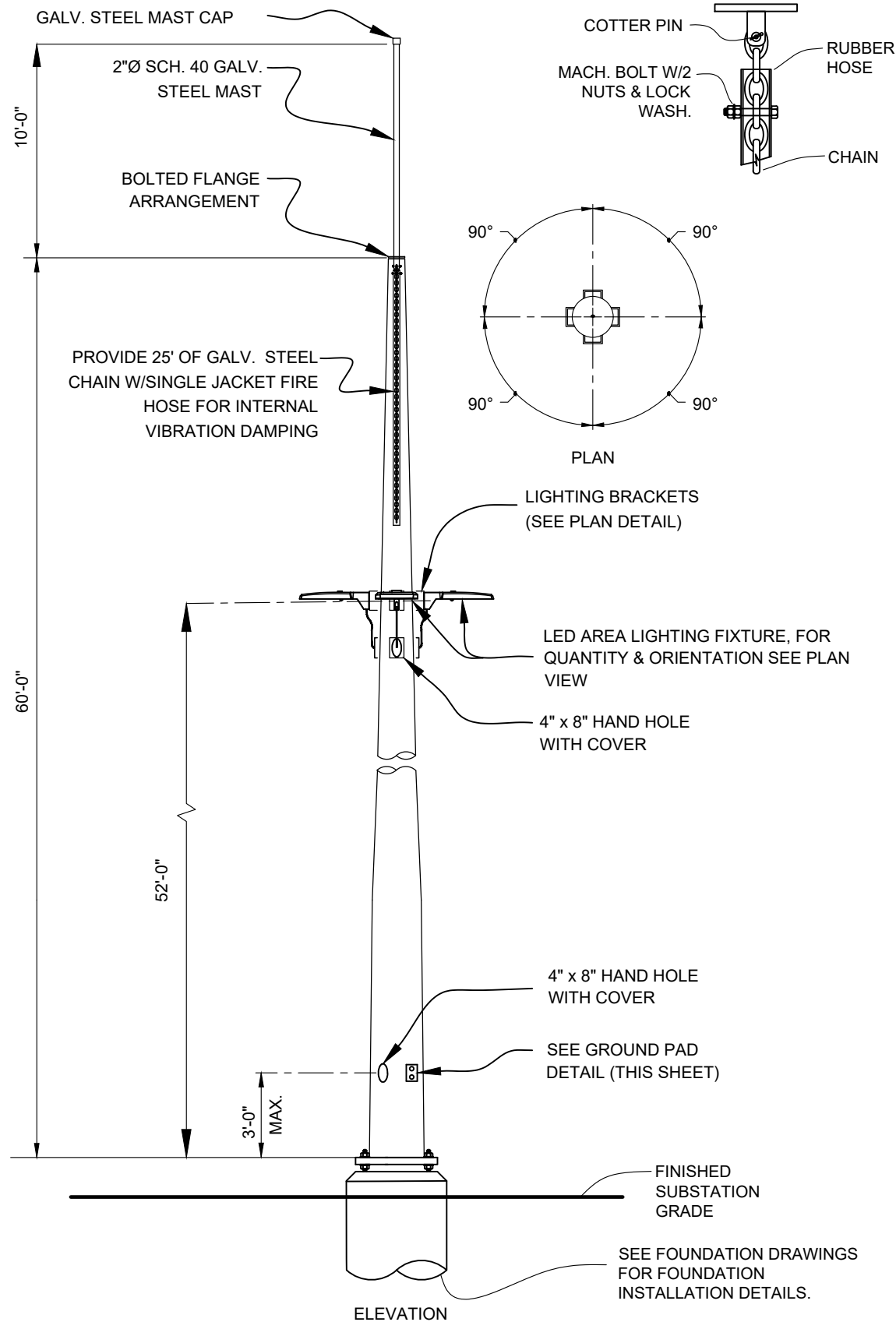


TUBE TO SWITCH PAD
N.T.S.

**PRELIMINARY
NOT FOR CONSTRUCTION**

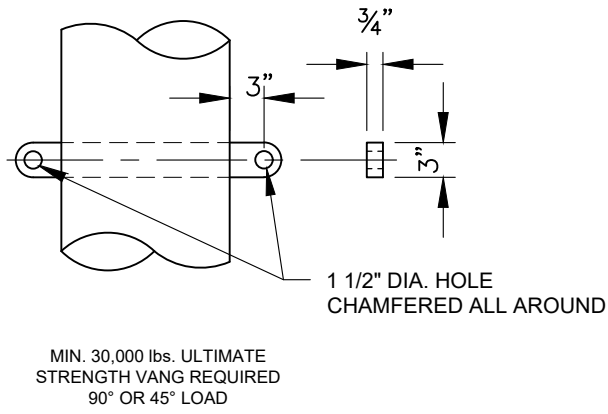
REFERENCES:	
PLAN VIEW	S-GA-001
SECTIONS	S-GA-002 TO S-GA-008
SECTIONS DETAILS	S-GA-101 TO S-GA-103
BILL OF MATERIAL	S-GA-110
FOUNDATION PLAN	S-FP-001
FOUNDATION DETAILS	S-FD-001 TO S-FD-009
OIL CONTAINMENT	S-OC-001 TO S-OC-003

PRELIMINARY - DO NOT USE FOR CONSTRUCTION	A	PRELIMINARY	06/02/26	PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE	
				POINT OF DELIVERY No. 5	
				SECTIONS DETAILS SHT. 1 OF 3	
	DWN.	AVS	DATE: 07/02/25	DWG. NO. DE8992	
	CKD.	RDH	APPD. RDH	S-GA-101	
	NO.	REVISIONS	DATE	SCALE: AS NOTED PLOT: NONE	
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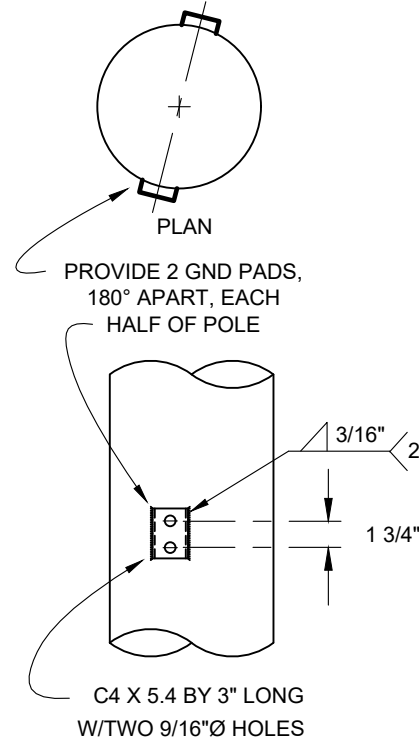
STATIC POLE DETAIL

N.T.S.



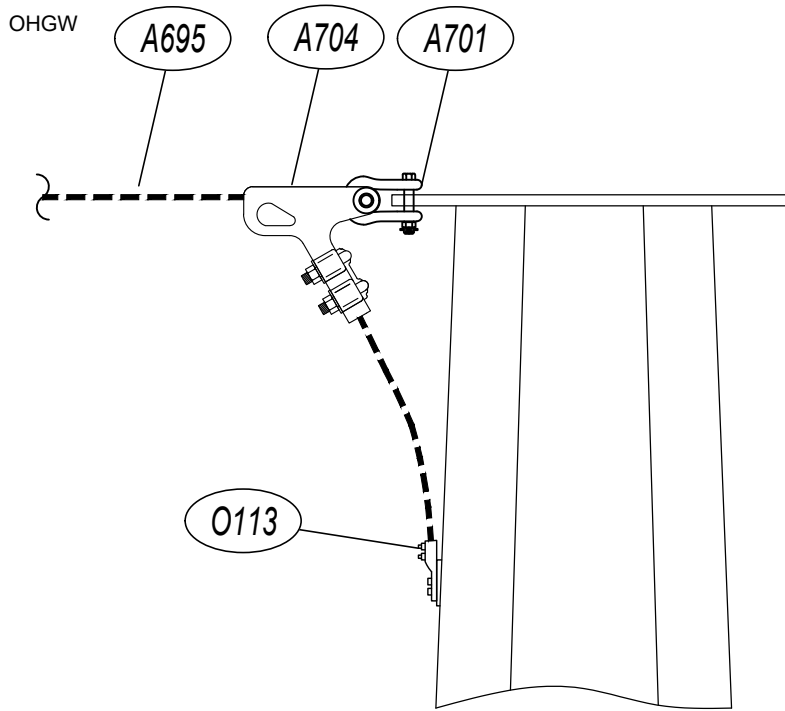
MAST SHIELD WIRE THRU-VANG DETAIL

N.T.S.



GROUND PAD DETAIL

N.T.S.



OHGW DEAD-END

N.T.S.

PRELIMINARY
NOT FOR CONSTRUCTION

REFERENCES:				
PLAN VIEW	S-GA-001			
SECTIONS	S-GA-002 TO S-GA-008			
SECTIONS DETAILS	S-GA-101 TO S-GA-103			
BILL OF MATERIAL	S-GA-110			
FOUNDATION PLAN	S-FP-001			
FOUNDATION DETAILS	S-FD-001 TO S-FD-009			
OIL CONTAINMENT	S-OC-001 TO S-OC-003			

PRELIMINARY - DO NOT USE FOR CONSTRUCTION	A	PRELIMINARY	06/02/26	PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE			
				POINT OF DELIVERY No. 5			
				SECTIONS DETAILS SHT. 2 OF 3			
				DWN. AVS	DATE: 07/02/25	DWG. NO. DE8992	
				CKD. RDM	APPD. RDM	S-GA-102	
© 07/25	NO.	REVISIONS	DATE	SCALE: AS NOTED	PLOT: NONE		



DE8992-S-GA-101-103 (ID 149304).DWG

ITEM No.	DESCRIPTIONS	QUANTITY	MANUFACTURER	CATALOG No./TYPE
GROUP A: 000-499 - SUBSTATION STRUCTURES				
A105	STRUCTURE, STEEL GALVANIZED, 69 KV, LV SWITCH STRUCTURE, INCLUDING MOUNTING HARDWARE, FASTENERS, AND ANCHOR BOLTS	1 LOT	-	-
A116	STRUCTURE, STEEL, 69 KV, LINE-TERMINATING AND/OR SUPPORT FOR BUSWORK AND SWITCHES, INCLUDING MOUNTING HARDWARE, FASTENERS, AND ANCHOR BOLTS	1 LOT	-	-
A161	STRUCTURE, STEEL, STATIC POLE, 60'-0", WITH LIGHTNING MAST, VIBRATION DAMPENING MECHANISM, LIGHT MOUNTING, 70'-0" TOTAL HEIGHT WITH MAST	1	-	-
A172	LED AREA LIGHTING FIXTURE AND PHOTOCONTROL	10	COOPER OR EQUIVALENT	USSL-C02-D-U-T4-SA-AP OR EQUIVALENT
A180	STRUCTURE, STEEL, SWITCH OPERATOR, GROUNDING PLATFORM FOR GROUP OPERATED AIR BREAK INSTALLATION, 3'-0" X 4'-0" OPEN GRATING.	14	-	-
A181	STRUCTURE, STEEL, STANDS FOR 69KV PTS, INCLUDING MOUNTING HARDWARE, FASTENERS, AND ANCHOR BOLTS	1 LOT	-	-
A182	STRUCTURE, STEEL, STANDS FOR STATION SERVICE TRANSFORMERS, INCLUDING MOUNTING HARDWARE, FASTENERS, AND ANCHOR BOLTS	2	-	-
A400	ALUMINIUM TUBULAR BUS, 4" SPS SCH40, ALLOY 6063-T6, SEAMLESS PIPE, PLAIN ENDS, 40'	13	WMWA OR EQUIVALENT	-
A401	ALUMINIUM TUBULAR BUS, 3" SPS SCH40, ALLOY 6063-T6, SEAMLESS PIPE, PLAIN ENDS, 40'	21	WMWA OR EQUIVALENT	-
GROUP A: 500-549 - FIBER OPTIC CABLE HARDWARE				
GROUP A: 600-649 - INSULATORS AND CONDUCTOR SUPPORTS				
A629	INSULATOR, OUTDOOR, APPARATUS STATION POST, 230 KV, TR304, 900 KV BIL, 5" B.C., 80" HIGH, ANSI 70 GRAY GLAZE	21	NGK OR EQUIVALENT	PS090201 OR EQUIVALENT
A630	INSULATOR, OUTDOOR, APPARATUS STATION POST, 69 KV, TR278, 350 KV BIL, 5" B.C., 30" HIGH, ANSI 70 GRAY GLAZE	96	NGK OR EQUIVALENT	PH03510 OR EQUIVALENT
GROUP A: 670-699 - WIRE				
A674	WIRE, BARE, COPPER, TINNED, #2, SOLID, SOFT DRAWN	AS REQUIRED	-	-
A682	WIRE, BARE, ALUMINUM, 954 KCMIL AAC "MAGNOLIA"	AS REQUIRED	-	-
A683	WIRE, BARE, ALUMINUM, 1590 KCMIL AAC "COREOPSIS"	AS REQUIRED	-	-
A685	WIRE, BARE ALUMINUM, 336.4 ASCR	AS REQUIRED	-	-
A695	OHGW, 7X NO. 6 ALUMOWELD	AS REQUIRED	-	-
GROUP A: 700-999 - SUBSTATION CONNECTORS				
A701	ANCHOR SHACKLE, 1" RADIUS	14	SEFCOR OR EQUIVALENT	AH-1221 OR EQUIVALENT
A704	CLAMP, BOLTED D.E. & SOCKET FOR 7X NO. 6 ALUMOWELD OHGW	14	SEFCOR OR EQUIVALENT	AQD-75-SF OR EQUIVALENT
A710	BUS SUPPORT, ALUMINUM 4" SPS TUBE TO INSULATOR, 5" B.C.	52	SEFCOR OR EQUIVALENT	ASWH-64-5-SE OR EQUIVALENT
A711	BUS SUPPORT, ALUMINUM 3" SPS TUBE TO INSULATOR, 3" B.C.	17	SEFCOR OR EQUIVALENT	ASWH-62-5-SE OR EQUIVALENT
A713	TEES, WELDMENT, ALUMINUM, TUBE TO FLAT, 4" SPS TO 4-HOLE NEMA PAD, 3" WIDTH	6	SEFCOR OR EQUIVALENT	WTF-6269-4A OR EQUIVALENT
A714	TEES, WELDMENT, ALUMINUM, TUBE TO TUBE, 4" SPS TO 4" SPS	36	SEFCOR OR EQUIVALENT	WFTT-6464-HV OR EQUIVALENT
A716	GROUNDING STUD, WELDMENT, ALUMINUM, 3"-6" SPS	57	SEFCOR OR EQUIVALENT	WTS-6064 OR EQUIVALENT
A718	CONNECTOR, WELDMENT, ALUMINUM, CORONA END PLUG, 4" SPS	72	SEFCOR OR EQUIVALENT	DP-64-AL OR EQUIVALENT
A719	CONNECTOR, WELDMENT, ALUMINUM, CORONA END PLUG, 3" SPS	21	SEFCOR OR EQUIVALENT	DP-62-AL OR EQUIVALENT
A720	BUS SUPPORT, ALUMINUM, 4" SPS TUBE TO INSULATOR, 5" B.C., EXPANSION	27	SEFCOR OR EQUIVALENT	WXCT0-64-5 OR EQUIVALENT
A721	BUS SUPPORT, ALUMINUM, 3" SPS TUBE TO INSULATOR, 5" B.C., EXPANSION	5	SEFCOR OR EQUIVALENT	WXCT0-62-5 OR EQUIVALENT
A723	CONNECTOR, WELDMENT, ALUMINUM, 90 DEG COUPLER, TUBE TO TUBE, 4" SPS TO 4" SPS SCH. 40	24	SEFCOR OR EQUIVALENT	WLB190-6464-HV OR EQUIVALENT
A724	CONNECTOR, WELDMENT, ALUMINUM, TERMINAL, 3" SPS TO 4-HOLE NEMA PAD, 3" WIDTH	6	SEFCOR OR EQUIVALENT	WFTIC-62-4A OR EQUIVALENT
A780	CONNECTOR, WELDMENT, ALUMINUM, TERMINAL, 90 DEGREE, 4" SPS TO 4-HOLE NEMA PAD, 3" WIDTH	20	SEFCOR OR EQUIVALENT	WFT90-64-4A OR EQUIVALENT
A781	CONNECTOR, WELDMENT, ALUMINUM, TERMINAL, 4" SPS TO 4-HOLE NEMA PAD, 3" WIDTH	22	SEFCOR OR EQUIVALENT	WTF-64-4A OR EQUIVALENT
A782	CONNECTOR, WELDMENT, ALUMINUM, 15 DEGREE, TEE, 3" SPS MAIN TO DUAL 3" SPS TAP	6	SEFCOR OR EQUIVALENT	WFFT15-6262 OR EQUIVALENT
A783	CONNECTOR, WELDMENT, ALUMINUM, 15 DEGREE, TEE, 3" SPS MAIN TO 3" SPS TAP	24	SEFCOR OR EQUIVALENT	WFTT15-6262 OR EQUIVALENT
A784	CONNECTOR, WELDMENT, ALUMINUM, COUPLER, TUBE TO TUBE, 3" SPS TO 3" SPS SCH 40	AS REQUIRED	SEFCOR OR EQUIVALENT	WSC-6262 OR EQUIVALENT
A786	CONNECTOR, WELDMENT, ALUMINUM, TERMINAL, 90 DEGREE, 3" SPS TO 4-HOLE NEMA PAD, 3" WIDTH	6	SEFCOR OR EQUIVALENT	WSFFT90-62-4A OR EQUIVALENT
A787	CONNECTOR, WELDMENT, ALUMINUM, COUPLER, TUBE TO TUBE, 4" SPS TO 4" SPS SCH 40	AS REQUIRED	SEFCOR OR EQUIVALENT	WSC-6464 OR EQUIVALENT
A842	CONNECTOR, BOLTED, BRONZE, TERMINAL, FOR #6 - 250 KCMIL COPPER TO 4-HOLE NEMA PAD, 3" WIDTH	16	SEFCOR OR EQUIVALENT	FNCT-12-4A OR EQUIVALENT
A843	CONNECTOR, BOLTED, ALUMINUM, TERMINAL, DOUBLE 1250-1600 MCM AAC TO 4-HOLE NEMA PAD, 3" WIDTH	70	SEFCOR OR EQUIVALENT	AFNC2-43-4A OR EQUIVALENT
A866	CONNECTOR, CABLE SPACER, ALUMINUM, BOLTED, 1431-1590 MCM AAC	AS REQUIRED	SEFCOR OR EQUIVALENT	ASPC-43-4 OR EQUIVALENT
A870	CONNECTOR, FLEX, ALUMINUM, 90 TO FLAT	12	SEFCOR OR EQUIVALENT	AFX90-4B-4 OR EQUIVALENT
A881	CONNECTOR, TRANSITION PLATE, ALUMINUM TO COPPER 2-HOLE	AS REQUIRED	SEFCOR OR EQUIVALENT	ATP-B2 OR EQUIVALENT
A882A	CONNECTOR, TRANSITION PLATE, ALUMINUM TO COPPER 4-HOLE, LENGTH 3"	AS REQUIRED	SEFCOR OR EQUIVALENT	ATP-C OR EQUIVALENT
A884	CONNECTOR, MATERIALS FOR EACH NEMA 2-HOLE ELECTRICAL CONNECTION, BRONZE TO BRONZE OR BRONZE TO ALUMINUM, ALL COMPONENTS STAINLESS STEEL	AS REQUIRED	-	-
	A. BOLT HH 1/2" X LENGTH REQUIRED WITH NUT	2 EACH	-	-
	B. FLAT WASHER	4 EACH	-	-
	C. SPRING WASHER	2 EACH	-	-
A886	CONNECTOR, MATERIALS FOR EACH NEMA 4-HOLE ELECTRICAL CONNECTION, BRONZE TO BRONZE OR BRONZE TO ALUMINUM, ALL COMPONENTS STAINLESS STEEL	AS REQUIRED	-	-
	A. BOLT HH 1/2" X LENGTH REQUIRED WITH NUT	4 EACH	-	-
	B. FLAT WASHER	8 EACH	-	-
	C. SPRING WASHER	4 EACH	-	-
A920	CONNECTOR, COMPRESSION, ALUMINUM, TERMINAL, 954 AAC "MAGNOLIA" TO 4-HOLE NEMA PAD (INCLUDES SPARES)	42	SEFCOR OR EQUIVALENT	AL-1126-4A OR EQUIVALENT
A923	ALUMINUM TEE, COMPRESSION, 954 AAC "MAGNOLIA" TO 4-HOLE NEMA PAD	12	SEFCOR OR EQUIVALENT	ATCF-1126-4A OR EQUIVALENT
A924	ALUMINUM TEE, COMPRESSION, 1590 AAC "COREOPSIS" TO 4-HOLE NEMA PAD	14	SEFCOR OR EQUIVALENT	ATCF-160-4A OR EQUIVALENT
A925	CONNECTOR, COMPRESSION, ALUMINUM, TERMINAL, 1590 AAC "COREOPSIS" TO 4-HOLE NEMA PAD (INCLUDES SPARES)	40	SEFCOR OR EQUIVALENT	AL-160-4A OR EQUIVALENT
A998A	DANGER SIGNS: "DANGER - HIGH VOLTAGE" FOR ATTACHMENT TO SUBSTATION FENCE, W/ MTG. HARDWARE.	15	ELECTROMARK OR EQUIVALENT	-
A998B	WARNING SIGN: "WARNING - HIGH VOLTAGE" FOR ATTACHMENT TO SUBSTATION FENCE, W/ MTG. HARDWARE.	15	ELECTROMARK OR EQUIVALENT	-
A999	INHIBITOR COMPOUND, ANTI-OXYGEN, CONDUCTOR	AS REQUIRED	SEFCOR OR EQUIVALENT	BN-OX-8 OR EQUIVALENT
GROUP B: 001-999 - GROUP-OPERATED AIR-BREAK SWITCHES				
B140	SWITCH, AIR, OUTDOOR, GROUP-OPERATED, CENTER BREAK SWITCH WITH HORN GAP (ARCING HORN), 230 KV, 1200 AMPERE, 900 KV BIL, 61,000 AMPERE MOMENTARY, TO BE SUPPLIED WITH PORCELAIN STATION POST TR-304 INSULATORS AND OPERATORS, INCLUDES ALL HARDWARE AND FASTENERS. SWITCH SHALL INCLUDE AUXILIARY CONTACTS, MINIMUM 8 DECKS	2	ROYAL OR EQUIVALENT	AV23012 OR EQUIVALENT

ITEM No.	DESCRIPTIONS	QUANTITY	MANUFACTURER	CATALOG No./TYPE
B141	SWITCH, AIR, OUTDOOR, GROUP-OPERATED, VEE CENTER BREAK, 69 KV, 1200 AMPERE, 350 KV BIL, 61,000 AMPERE MOMENTARY, TO BE SUPPLIED WITH PORCELAIN STATION POST TR-216 INSULATORS AND OPERATORS, INCLUDES ALL HARDWARE AND FASTENERS. SWITCH SHALL INCLUDE AUXILIARY CONTACTS, MINIMUM 8 DECKS	8	ROYAL OR EQUIVALENT	AV6912 OR EQUIVALENT
B142	SWITCH, AIR, OUTDOOR, GROUP-OPERATED, VEE CENTER BREAK SWITCH WITH HORN GAP (ARCING HORN), 69 KV, 2000 AMPERE, 350 KV BIL, 100,000 AMPERE MOMENTARY, TO BE SUPPLIED WITH PORCELAIN STATION POST TR-216 INSULATORS AND OPERATORS, INCLUDES ALL HARDWARE AND FASTENERS. SWITCH SHALL INCLUDE AUXILIARY CONTACTS, MINIMUM 8 DECKS	4	ROYAL OR EQUIVALENT	AV6920 OR EQUIVALENT
GROUP C: 001-999 - SURGE ARRESTERS				
C408	ARRESTER, SURGE, STATION CLASS, 57 KV MCOV, ANSI 70 GRAY, FOR 69 KV BUSHINGS ON TRANSFORMER	3 BY XMFR MFR.	ABB OR EQUIVALENT	Q072SA057A OR EQUIVALENT
C409	ARRESTER, SURGE, STATION CLASS, 152 KV MCOV, ANSI 70 GRAY, FOR 230 KV BUSHINGS ON TRANSFORMER	3 BY XMFR MFR.	ABB OR EQUIVALENT	Q230SA152A OR EQUIVALENT
C904	ARRESTER, SURGE, STATION CLASS, 48 KV MCOV, ANSI 70 GRAY, FOR USE ON 69 KV FEEDERS, BASE-MOUNTED	6	SIEMENS OR EQUIVALENT	3EL2-072-2PJ21-4YA5 OR EQUIVALENT
C905	ARRESTER, SURGE, STATION CLASS, 152KV MCOV, ANSI 70 GRAY, FOR USE ON 230 KV H-FRAME, BASE-MOUNTED	3	SIEMENS OR EQUIVALENT	3EL2-230-2PJ21-4YA5 OR EQUIVALENT
GROUP D: 001-999 - SINGLE-POLE DISCONNECTING SWITCHES				
D991	240/120 V, 200A HEAVY DUTY DISCONNECT SWITCH, NEMA 3R, WITH 200A FUSES	3 BY SUBSTATION CONTRACTOR	EATON OR EQUIVALENT	DH224NRK OR EQUIVALENT
GROUP E: 001-999 - POWER CIRCUIT BREAKERS				
E400	BREAKER, CIRCUIT, POWER, OUTDOOR, THREE-PHASE, SF6, 245 KV, 3000 AMPERE CONTINUOUS, 50,000 AMPERE INTERRUPTING, MOTOR DISCONNECT/EARTHING SWITCH	1 BY OWNER	SIEMENS OR EQUIVALENT	SPS2-245-50-2 OR EQUIVALENT
E803	BREAKER, CIRCUIT, POWER, OUTDOOR, THREE-PHASE, VACUUM, 72.5 KV, 2000 AMPERE CONTINUOUS, 40,000 AMPERE INTERRUPTING	4 BY OWNER	MEIDEN OR EQUIVALENT	72.5-VCB-40-2000 OR EQUIVALENT
GROUP F: 001-999 - CIRCUIT RECLOSURES				
GROUP G: 001-999 - METERS, RELAYS, AND INSTRUMENT TRANSFORMERS				
G941	TRANSFORMER, VOLTAGE, SINGLE-PHASE, 69 KV, 350/600:1, WITH 0.3 W,X,Y,Z,ZZ, 350 KV BIL IEEE METERING	9	ITEC OR EQUIVALENT	VTO-350 VB103500350D000 OR EQUIVALENT
G942	TRANSFORMER, VOLTAGE, SINGLE-PHASE, 230 KV, DUKE METERING	3	BY DUKE	
G943	TRANSFORMER, CURRENT, SINGLE-PHASE, 230 KV, DUKE METERING	3	BY DUKE	
G944	TRANSFORMER, CURRENT AND VOLTAGE, SINGLE-PHASE, 230 KV, PWC METERING	3	RITZ OR EQUIVALENT	CMO 245 (need verification from RITZ) OR EQUIVALENT
GROUP H: 001-999 - TRANSFORMERS				
H415	TRANSFORMER, POWER, THREE-PHASE, LTC, 230 KV NOMINAL PRIMARY, 66 KV NOMINAL SECONDARY	1 BY OWNER	WEG OR EQUIVALENT	
H910	TRANSFORMER, STATION SERVICE, 100 KVA, LINE TO GROUND, 40,250 VOLTS TO 250/125 VOLTS	2	ITEC OR EQUIVALENT	PA1035032299P01 OR EQUIVALENT

FOR BID PURPOSES
NOT FOR CONSTRUCTION

NOTES:

1. ALL ITEMS TO BE PROVIDED BY THE STRUCTURES AND EQUIPMENT PACKAGER UNLESS OTHERWISE NOTED.

PRELIMINARY - DO NOT USE FOR CONSTRUCTION	A	PRELIMINARY	06/02/26	PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE			
				POINT OF DELIVERY No. 5			
				BILL OF MATERIALS SCHEDULE 1			
© 07/25		NO.	REVISIONS	DATE	DWN: DDS CKD: RDM SCALE: NTS	DATE: 07/03/25 APPD: RDM PLOT: NONE	DWG. NO. DE8992 S-GA-110

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2

Structural and Tubular Steel **Specifications**

**FAYETTEVILLE PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA**

**STRUCTURAL AND TUBULAR STEEL
SPECIFICATIONS FOR
POD 5 SUBSTATION**

ISSUE FOR BID

**PRELIMINARY – DO NOT
USE FOR CONSTRUCTION**

ISSUED FOR BID

September 01, 2026

BOOTH & ASSOCIATES, LLC

**Booth & Associates, LLC
Consulting Engineers
2300 Rexwoods Drive, Ste. 300
Raleigh, North Carolina 27607
Firm License No.: F-0221**

**FAYETTEVILLE PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA**

**SPECIFICATIONS FOR STRUCTURES AND
EQUIPMENT FOR THE
POD 5 – MCARTHUR RD SUBSTATION**

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**FAYETTEVILLE PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA**

**SPECIFICATIONS FOR STRUCTURES AND EQUIPMENT FOR THE
POD 5 – MCARTHUR RD SUBSTATION**

TECHNICAL SPECIFICATIONS

1.0 General

- 1.1 Construction documents including all design drawings and specifications of all disciplines complement each other and shall be read and interpreted collectively.
- 1.2 Where a conflict or conflicts are found between construction documents, then the conflict shall be brought to the attention of the Engineer, in writing, for resolution.
- 1.3 The structural steel fabricator shall be responsible for coordination between the requirements of the structural steel design drawings, the electrical general arrangement plans, and the equipment mounting requirements.
- 1.4 Where equipment mounting locations and/or elevations are shown on the structural steel drawings, then adjustment of such locations or elevations to match the mounting and/or clearances requirements are allowed provided this adjustment does not exceed 6 inches in any one location, and provided such adjustment does not create conflict(s) with structural steel members or connections. Where more adjustment is needed, it shall be referred to the Engineer for resolution and approval before fabrication.
- 1.5 This specification covers detailing, furnishing, fabrication, painting/galvanizing and delivery of all structural/miscellaneous steel, tubular steel, and aluminum/steel/fiberglass grating as shown on the drawings.
- 1.6 All work, including workmanship, pertaining to this specification shall be done in accordance with the reference standard revisions in effect at the time of contract award.
 - 1.6.1 AISC American Institute of Steel Construction (AISC), Specification for the Design, Fabrication and Erection of Structural Steel for Buildings, latest edition.
 - 1.6.2 American Society of Civil Engineers (ASCE) Standard, Design of Steel Transmission Pole Structures, Manual 48, latest edition.
 - 1.6.3 American Welding Society (AWS), Structural Welding Code, AWS D1.1, latest edition.
 - 1.6.4 Steel Structure Painting Council (SSPC), Surface Preparation Specification, SSPC-SP6, latest edition.
 - 1.6.5 American Society for Testing and Materials (ASTM), various standards, latest version.
 - 1.6.6 American National Standards Institute (ANSI), National Electrical Safety Code, ANSI C2, latest edition.

2.0 Materials

- 2.1 All structural shapes shall be conforming to ASTM A992 except for channels, angles, and plates which shall conform to ASTM A36.
- 2.2 Structural steel pipe shall conform to ASTM A53, Type E or S, Grade B, unless otherwise shown on the drawings.
- 2.3 Structural square and rectangular tubing shall conform to ASTM A500, Grade B.
- 2.4 Steel for tapered columns shall conform to ASTM A572, unless otherwise shown on the drawings.
- 2.5 Anchor bolts shall conform to F1554 Standard Specification for Anchor Bolts, grade 36, 55, and 105 ksi yield strength as specified on the drawings. Each anchor bolt shall be furnished with washers and nuts. Nuts shall be of equivalent strength to the ASTM A563 Heavy Hexagon specification. Washers shall adhere to ASTM F436 Extra Thick, unless otherwise shown on the drawings.
- 2.6 Bolts, except for anchor bolts, shall conform to ASTM F3125, A325 Type I. Nuts shall conform to ASTM A563 and shall be of grade and style suitable for use with bolts supplied. Galvanized nuts shall be grade DH. Washers shall conform to ASTM F436, unless otherwise shown on the drawings.

3.0 Structural Steel Details and Fabrication

- 3.1 Fabrication and workmanship shall conform to the AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings, unless otherwise specified.
- 3.2 Welding shall be performed by qualified operators using procedures in accordance with AWS D1.1 and using E70XX electrodes. All surface areas to be welded shall be cleaned completely of rust, scales, oil or grease, and any other foreign matter. Welds which do not exhibit a neat, smooth appearance shall be ground smooth.
- 3.3 Structures shall be hot-dip galvanized after fabrication, unless otherwise shown on the drawings.
- 3.4 All structural steel bolts shall be minimum five-eighths inch (5/8") diameter, unless otherwise shown on the drawings.
- 3.5 The maximum size of bolts to be used in any section, clearances, edge distance, and general structural practice not definitely stated in the Specifications shall be in accordance with the standard of the latest edition of the American Institute of Steel Construction.
- 3.6 All anchor bolts required for the installation of the structures shall be furnished by the Manufacturer. Anchor bolts shall be hot-dip galvanized, complete with two (2) heavy hex nuts and extra thick flat washers for leveling, unless otherwise shown on the drawings.
- 3.7 All parts of the structure shall be neatly finished. All members shall be free from kinks, twists, bends, or open joints. All members that are bent or out of line after galvanizing shall be carefully straightened with a straightening roll or straightening machine. The use of sledges in straightening bent material or other methods in which the material or its finish may be mutilated shall not be allowed.

- 3.8 All nuts shall be readily accessible to a wrench for adjustment. Bolts shall not be flushed but shall project approximately one-fourth inch (1/4-inch) beyond the face of the nuts. Nuts shall fit the shanks so that they may be screwed on with the fingers and at the same time not fit so loosely that the value of the bolts acting with the tension of the head of the nut will be reduced.
- 3.9 All steel members shall be clearly marked to provide easy identification in the field. **Trusses and box columns up to, and including, four feet by four feet (4'-0" x 4'-0"), shall be assembled before shipment to ensure correctness, and shall be shipped assembled.** If the Manufacturer does not intend to ship the trusses and box columns completely assembled, he shall so state in the quote. Markings on component parts shall indicate the structure to which they apply.
- 3.10 Sectional members combined to form columns of the required height will not be accepted. Angles for column legs must be continuous to provide the necessary height.
- 3.11 Continuous punching of steel sections for equipment mounting is not acceptable. Holes shall be provided as needed for erection and equipment installation, but unnecessary holes will not be accepted.
- 3.12 If any material whatsoever in any state of completion is found defective as to workmanship, details, or materials or is contrary to the design for these specifications, it shall be rejected. This rejection may take place at the rolling mills, fabricating plant, galvanizing plant, or at the site of the structure. Any rejected materials shall be replaced without any expense whatsoever to Owner.

4.0 Tubular Steel Structure Details and Fabrication

- 4.1 Lifting lugs are optional. The manufacturer shall supply all instructions for handling and erection of poles and arms.
- 4.2 Each pole shall be permanently marked on the pole shaft seventy-two inches (72") above ground line and on the bottom of base plate or bearing plate with the following identifying information:
- a. Manufacturer's Identification
 - b. Structure Type
 - c. Height and Class
 - d. Structure Number
 - e. Ultimate Ground Line Moment
 - f. Owner's Name
 - g. Date Manufactured
- The method of identification shall be approved by the Owner. In addition, there shall be clear indication or marks for handling or sling points, storage rack points, and lifting joints for standing the pole and vibratory pole base.
- 4.3 All welding shall be in accordance with the American Welding Society Code AWS D1.1, latest edition. Welders shall be qualified in accordance with AWS .1 welding procedures.

- 4.4 One hundred percent (100%) penetration welds shall be required in, but not limited to, the following areas:
- a. circumferential welds (C-welds) joining structural members,
 - b. longitudinal welds in the female portion of the joint within the slip joint area,
 - c. welds at the butt joints of back-up strips,
 - d. base plate to shaft weld,
 - e. longitudinal welds for a minimum length of three inches (3") where there are adjacent C-welds, flange welds, base welds and ends of tubes.
- 4.5 Full penetration or equivalent ninety percent (90%) partial penetration with fillet overlap shall be used for vang-to-plate shaft, and arm box joints.
- 4.6 Quality and acceptability of every inch of the full penetration welds shall be determined by visual and ultrasonic inspection.
- 4.7 All other penetration welds shall have sixty percent (60%) minimum penetration. Quality and acceptability of all welds other than full penetration welds shall be determined by visual inspection, supplemented by magnetic particle, ultrasonic or dye penetrant inspection.
- 4.8 All weld back-up strips shall be continuous the full length of the welds. Care shall be exercised in the design of welded connections to avoid areas of high stress concentration which could be subject to fatigue or brittle fractures.
- 4.9 Field welding shall not be permitted except with the Engineer's and Owner's approval and with the manufacturer's direction in repairing a pole.
- 4.10 All parts of the structure shall be neatly finished and free from kinks or twists. All holes, blocks, and clips shall be made with sharp tools and shall be clean-cut without torn or ragged edges.
- 4.11 Before being laid out or worked in any manner, structural material shall be straight and clean. If straightening is necessary, it shall be done by methods that will not injure the metal.
- 4.12 Minimum plate thickness for all pole components shall be three-sixteenths inch (3/16").
- 4.13 Shearing and cutting shall be performed carefully and all portions of the work shall be finished neatly. Copes and re-entrant cuts shall be filleted before cutting.
- 4.14 All forming or bending during fabrication shall be done by methods that will prevent embrittlement or loss of strength in the material being worked.
- 4.15 Holes for connection bolts shall be one-sixteenth inch (1/16") larger than the nominal diameter of the bolts. Holes in the flange plates for bolted splices shall be one-eighth inch (1/8") larger than the bolt diameter. Holes in the base plates for anchor bolts shall be three-eighths inch (3/8") larger than the nominal diameter of the anchor bolts. The details of all connections and splices shall be subject to the approval of the Owner or his representatives.

- 4.16 Holes in steel plates which are punched must be smooth and cylindrical without excessive tear out or depressions. Any burrs that remain after punching shall be removed by grinding, reaming, etc.
- 4.17 Holes of any diameter may be drilled in plate of any thickness. Care shall be taken to maintain accuracy when drilling stacks of plates.
- 4.18 Holes may be made by use of a machine guided oxygen torch. Flame cut edges shall be reasonably smooth and suitable for the stresses transmitted to them.
- 4.19 The overall length of the assembled structure should not be less than six inches (6") of the specified length and not more than twelve inches (12").

5.0 Finishes

- 5.1 Galvanizing
 - 5.1.1 Structures shall be hot-dip galvanized after fabrication, unless otherwise shown on the drawings.
 - 5.1.2 Galvanizing shall conform to ASTM A123. Precautions shall be taken against embrittlement, warpage and distortion in accordance with ASTM A143 and A384.
 - 5.1.3 Fasteners and anchor bolts shall be galvanized in accordance with ASTM F2329.
- 5.2 Coatings for Embedded Portion of Poles
 - 5.2.1 A sixteen (16) mil (minimum dry film thickness), two (2) component hydrocarbon extended polyurethane coating that is resistant to ultraviolet light shall be applied on the exposed surface of the embedded portion of the pole. The coating shall extend from the butt to five feet (5'-0") above ground line. Termination of coating at location above ground shall be feathered. Other coatings shall be approved by the Owner prior to their use.

6.0 Field Touch Up of Galvanized Surfaces

- 6.1 Structural steel shall be touched up with cold galvanizing compound so that all surfaces are completely protected and free of runs and sags.
- 6.2 All steel requiring touch-up shall be dry and free of all dirt, rust, oil, loose paint and other foreign material. Surfaces shall be prepared in accordance with Steel Structures Painting Council Specifications on Surface Preparation.
- 6.3 All steel surfaces or finish damaged during the material handling, installation or removal of various equipment shall be thoroughly cleaned, brushed and cold galvanized with inorganic zinc rich paint.
- 6.4 Approved inorganic zinc products:
 - 6.4.1 Dimetcote 9, manufacturer: PPG Protective Coatings
 - 6.4.2 Carbozinc 11, manufacturer: Carboline Company
 - 6.4.3 Cathacoat 304V, manufacturer: ICI-DEVOE
- 6.5 All galvanized structural steel shall be repaired in accordance with ASTM A780.

7.0 Erection

- 7.1 Prior to the erection of structural steel, the Contractor shall measure all steel members in order to confirm that the material is in accordance with fabricator's shop drawings. Any items which require significant modification shall be reported to Booth and Associate's engineers immediately.
- 7.2 The Contractor shall be responsible for furnishing, installing, maintaining, and removing temporary structures required to support steel during erection.
- 7.3 No electrical equipment or cables shall be installed on any steel structure until all structural members have been completely erected and all fasteners properly secured to the specified torque.
- 7.4 All steel contact surfaces at connections shall be free of all scale, dirt, oil, etc.
- 7.5 All steel structures shall be plumb and level. Structural bolts shall not be tightened until all parts are installed in place. After steel is completely installed, bolts shall then be installed to final torque levels. Care shall be exercised to prevent kinking of steel members. Base plates for columns shall be leveled and installed using the double-nut method unless noted.
- 7.6 The Contractor shall take the necessary measures required to prevent any foreign material, such as mud, dirt, concrete splatter, etc., from accumulating on the stored materials. These measures shall include, but shall not be limited to, the use of timbers/pallets to elevate material above grade, covering an area of the initially graded substation yard with several inches of washed stone, the use of a storage trailer, or an enclosed structure.

8.0 Shipping Instructions

- 8.1 Material shall be carefully prepared for shipment so as to prevent damage to components and their protective coatings or loss of components.
- 8.2 Each shipment shall be accompanied by a checklist of all parts, identifiable by structure type and number. Bolts and miscellaneous hardware will be identified by the list for match up with the respective structure and shall be boxed or bundled. All parts required for any one structure shall be in one (1) shipment, if possible.
- 8.3 The manufacturer is responsible for repairing or replacing any structures which are delivered to the site with manufacturing errors. Repair and/or replacement costs shall include the structure itself, as well as any associated construction costs.
- 8.4 All materials shall be shipped to the jobsite by truck.
- 8.5 One full set of approved shop drawings, Erection Diagrams and Details, shall be shipped to the jobsite with the steel order.

9.0 References

9.1 ASTM International

- 1. ASTM A36-Standard Specification for Carbon Structural Steel
- 2. ASTM A53-Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless

3. ASTM A123-Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
4. ASTM A143-Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
5. ASTM F2329- Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners
6. ASTM A384-Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing Steel Assemblies
7. ASTM A500-Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
8. ASTM A501-Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
9. ASTM A563-Standard Specification for Carbon and Alloy Steel Nuts
10. ASTM A572-Standard Specification for High-Strength Low-Alloy Columbium Vanadium Structural Steel
11. ASTM A780-Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
12. ASTM A992-Standard Specification for Structural Steel Shapes
13. ASTM F3125-Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength
14. ASTM F1554-Standard Specification for Anchor Bolts, Steel, 36, 55 and 105-ksi Yield Strength

9.2 American Welding Society

1. AWS D1.1-Structural Welding Code-Steel

9.3 American Institute of Steel Construction

1. AISC 360 Specification for Structural Steel Buildings

3

Steel Weight Breakdown

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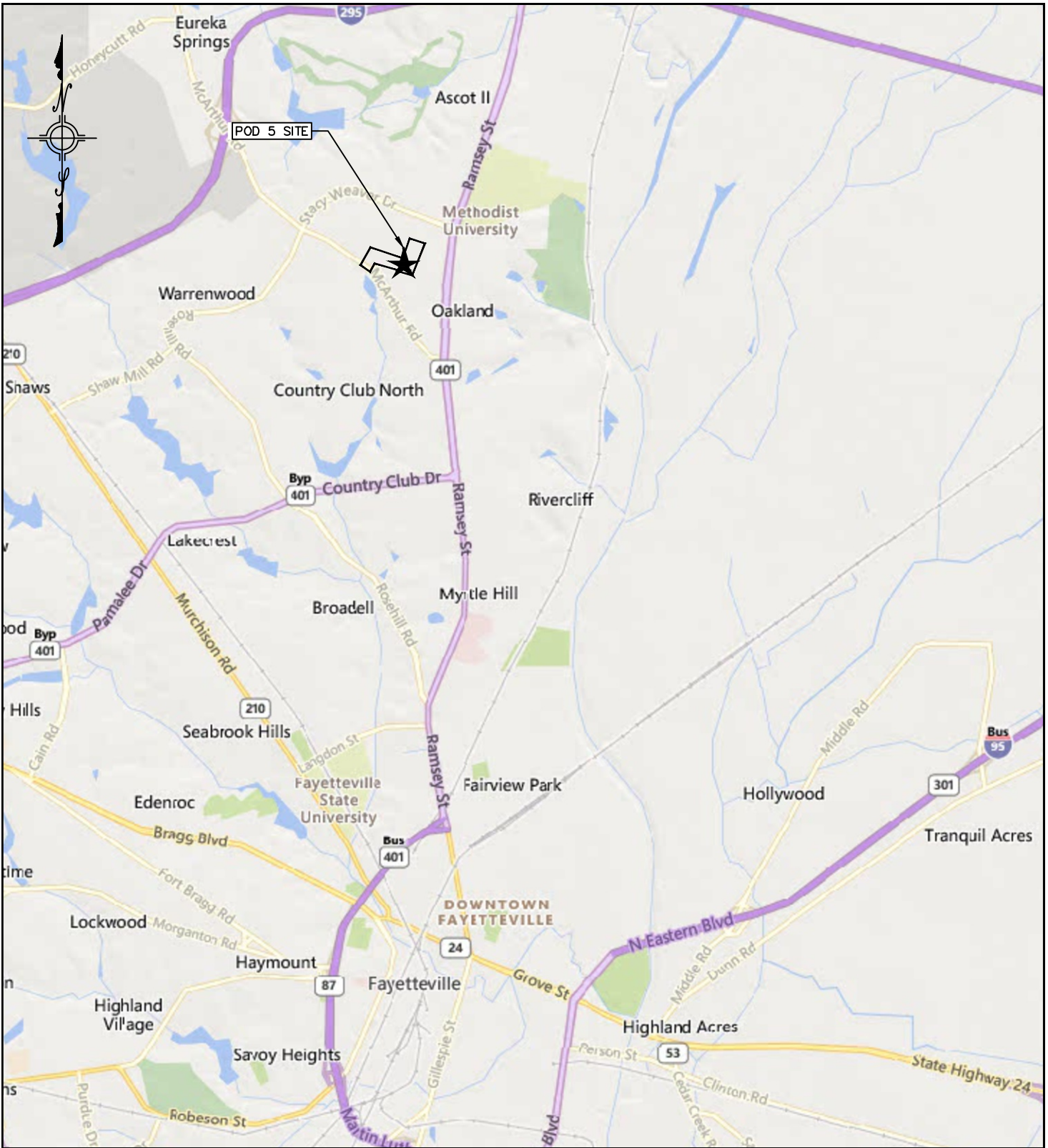
**STRUCTURES AND EQUIPMENT SPECIFICATION FOR THE
POD 5 – MCARTHUR RD SUBSTATION**

STEEL WEIGHT BREAKDOWN - A

Structural Steel Summary			
Structure	Quantity	Weight/Str	Total Weight
SST Stand	2	906.60	1,813.20
Low Side Str	1	37,556.14	37,556.14
Total Black Weight			39,369.34
Total Galvanized (4%)			40,944.11

4

Vicinity Map



SITE LOCATION:

28311 SOUTHLAND DR
FAYETTEVILLE, NC

COORDINATES:

N 35° 7' 44.61"
W 78° 53' 01.23"

FAYETTEVILLE PUBLIC WORKS
FAYETTEVILLE, NC

POD 5
VICINITY MAP



DWN.	MEB	DATE:	11/13/24
CKD.	REA	APPD.	REA
SCALE:	1" = 5000'	FILE:	POD5_VM_USGS
JOB NO.	P0718627	DATE	REVISION
	©11/2024		

DWG. NO.
VM-1

**FAYETTEVILLE PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA**

**SPECIFICATIONS FOR THE
STRUCTURES AND EQUIPMENT FOR THE
POD 5 – MCARTHUR RD SUBSTATION**

TECHNICAL SPECIFICATION B



09/10/2026

**Booth & Associates, LLC
Consulting Engineers
2300 Rexwoods Drive
Raleigh, North Carolina 27607
Firm License No. F-0221**

TECHNICAL SPECIFICATION B

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APPENDICES

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2. Structural and Tubular Steel Specification
3. Steel Weight Breakdown
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**FAYETTEVILLE PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA**

**SPECIFICATIONS FOR STRUCTURES AND
EQUIPMENT FOR THE
POD 5 – MCARTHUR RD SUBSTATION**

TECHNICAL SPECIFICATION B

1.0 Standards

All equipment and materials covered by these Specifications shall be in accordance with the applicable provisions of the latest editions of the Standards of the ASTM, ANSI, NEMA, IEEE, OSHA, and the latest revision of the NESC. Where a Manufacturer's name and type of equipment is indicated in the Specifications, it is for clarity and the establishment of a standard and is restrictive unless the use of an approved equal is specifically mentioned.

The Bidder may offer alternate pricing for equivalent items by other Manufacturers. However, **all** base bids must explicitly comply with the designated materials specified herein. The Owner may elect to purchase alternates, as proposed by the Bidder. The alternate materials are subject to review and approval by the Owner's Engineer.

2.0 Basic System Rating

The basic system ratings for the substation shall be as follows:

System High-Side Voltage	230,000 volts, three-phase wye, basic insulation level shall be 950 kV, 60 Hertz.
System Low-Side Voltage	All 69 kV wye, initial basic insulation level should be 350 kV, 60 Hertz operated at 69,000 volts.
Transformer	One (1) 230-66 kV, 120/160/200 MVA Autotransformer
Primary Bus, Secondary Bus, and Neutral Bus	Strength requirements to match weight of equipment, ice, and wind loadings.
Outgoing 69 kV Circuits	Overhead.
230 kV Circuit Breaker	One (1) 245kV, 3000A, 50000A IC, 125V DC Control Power, Circuit Breaker
Bus & Feeder Circuit Breakers	Four (4) 72.5kV, 2000A, 40000A IC, 125V DC Control Power, Circuit Breaker.
Protective Relaying Panels	125-volt DC and 120/240-volt AC single-phase.

3.0 Drawings and Documentation

3.1 Conceptual Design

The work shall conform to the Booth & Associates' Drawings listed in the *Appendices*, all of which form a part of these Specifications.

3.2 Substation High-Bay and Low-Bay Structures

3.2.1 Structural Design

The Bidder shall perform the structural design of both the standard structural shape steel and the tubular steel.

3.2.2 Design and Fabrication Drawings

The Bidder will prepare drawings for both the tubular and standard structures and provide the final Bill of Materials.

3.3 Approval of specification sheets and Bill of Materials will be required. The Manufacturer shall supply the Bill of Materials to the Owner's Engineer so they may ascertain that all materials and equipment being furnished by the Manufacturer meet the Specifications. Specifications sheets shall be supplied for all switches, connectors, fittings, insulators, and surge arresters.

3.4 Final Bill of Materials shall be furnished by the Manufacturer for installation of this substation. All final documentation shall be delivered to the Owner's Engineer and shall include five (5) copies of the Bill of Materials.

All Drawings and documentation shall be submitted via email to Booth & Associates, LLC, Attention: Katiana Mauras (katiana.mauras@booth-assoc.com) and Public Works Commission; Attention: Mr. Joel Valley (joel.valley@faypwc.com).

4.0 **Structural Steel Design**

4.1 Structural design calculations shall include, but are not limited to, connection design, anchor bolt design, base plate design, deflections, rigid bus design, and support reactions (factored and unfactored), per Appendix 2: Structural and Tubular Steel Specification.

All supporting structures shall be designed in accordance to a minimum of one (1), or all required, of the following codes or standards:

- NESC C2 (latest edition at time of bidding)
- ASCE Manual No. 113 *Substation Structure Design Guide*
- RUS Bulletin 1724E-300 *Design Guide for Rural Substations*
- ASCE Manual No. 7 Minimum Design Loads for Buildings and Other Structures
- IEEE 693 Recommended Practice for Seismic Design of Substations
- American Welding Society Structural Welding Code-Steel (AWS D1.1)
- Steel Structures Painting Council Surface Preparation Specification (SSPC-SP)
- American Institute of Steel Construction (AISC), Specification for the Design, Fabrication and Erection of Structural Steel for Building
- American Society of Civil Engineers (ASCE) Standard, Design of Steel Transmission Pole Structures, Manual 48
- American Society of Civil Engineers (ASCE) Standard, Design of Latticed Steel Transmission Structures, Manual 10
- American Society of Testing and Materials, various standards

4.1.1 For structures that extend outside the substation or structures that support a conductor that extends outside the substation, the strength and loading requirements of NESC C2 shall be followed.

4.1.2 For structures that do not extend outside the substation, nor any conductor or equipment supported thereon, appropriate strength and loading requirements of an industry-approved, good engineering resource shall be followed. The ASCE Manual No. 113 *Substation Structure Design Guide* is considered a preapproved resource. Any other resources, design guides, manuals, or codes utilized must be provided to and approved by Booth & Associates. No edition of the AISC *Steel Construction Manual* may be referenced for the appropriate load factors and load combinations. However, the most recent edition of the AISC *Steel Construction Manual* may be referenced in determining the appropriate strength reduction factors and member design capacity. NEMA SG-6 *Power Switching Equipment* has been rescinded and

ASCE Manual No. 113 *Substation Structure Design Guide* shall be followed in its place.

- 4.1.3 Deflection limits for all structures shall be those referenced in ASCE Manual No. 113.
- 4.1.4 Load and Resistance Factor Design (LRFD) shall be used for the design of substation structures. AISC Steel Construction Manual shall be used for the design of structures using standard structural shapes. ASCE/SEI 48 shall be used for the design of structures using hollow tubular member shapes. ASCE 10 is recommended for the design of lattice structures using angles.
- 4.1.5 For any project under the jurisdiction of RUS, the strength, loading, and deflection requirements of RUS Bulletin 1724E-300 *Design Guide for Rural Substations* shall be followed for all structures.

5.0 Structural Steel

- 5.1 The substation structures to be included in the Form of Proposal shall conform to the following specifications and are identified on the appropriate substation project drawing.

The major substation structures are to include:

- 1) One (1) 230 kV H-frame dead-end
- 2) Three (3) 230 kV CT/PT stands

This list may not be comprehensive. All steel structures shown in GA Drawings to be provided by Bidder.

- 5.2 If any material whatsoever in any state of completion is found defective as to workmanship, details, or materials or is contrary to the design for these Specifications, it shall be rejected. This rejection may take place at the rolling mills, fabricating plant, galvanizing plant, or at the site of the structure. Any rejected materials shall be replaced without any expense whatsoever to the Owner.
- 5.3 All structural shapes shall be conforming to ASTM A992 except for channels, angles, and plates which shall conform to ASTM A36 unless otherwise shown on the drawings.
- 5.4 Steel pipe shall conform to ASTM A53, Type E or S, Grade B unless otherwise noted on the drawings.
- 5.5 Structural square and rectangular tubing shall conform to ASTM A500, Grade B.
- 5.6 Bolts, except for anchor bolts, shall conform to ASTM F3125, A325 Type I. Nuts shall conform to ASTM A563 and shall be of grade and style suitable for use with bolts supplied. Galvanized nuts shall be grade DH. Washers shall conform to ASTM F436 unless otherwise shown on the drawings.
- 5.7 Anchor bolts shall conform to F1554 Standard Specification for Anchor Bolts, Steel, Gr. 55 ksi yield strength, or as specified on the drawings. Each anchor bolt shall be furnished with washers and nuts of equivalent strength to the ASTM A563, Heavy Hexagon, specification. Washers shall adhere to ASTM F436 Extra Thick unless otherwise shown on the drawings.
- 5.8 All anchor bolts required for the installation of the structures shall be furnished by the Manufacturer. Anchor bolts shall be completely hot-dipped galvanized, complete with two (2) heavy hex nuts and flat washers for leveling, unless otherwise shown on the drawings.
- 5.9 Welding shall be performed by qualified operators using procedures in accordance with AWS D1.1 and using E70XX electrodes. All surface areas to be welded shall be cleaned completely of rust, scales, oil or grease, and any other foreign matter. Welds that do not exhibit a neat, smooth appearance shall be ground smooth.
- 5.10 Structures shall be hot-dip galvanized after fabrication.
- 5.11 Galvanizing shall conform to ASTM A123. Precautions shall be taken against embrittlement, warpage, and distortion in accordance with ASTM A143 and A384.

- 5.12 Fasteners and anchor bolts shall be galvanized in accordance with ASTM F2329.
- 5.13 All parts of the structure shall be neatly finished. All members shall be free from kinks, twists, bends, or open joints. All members that are bent or out of line after galvanizing shall be carefully straightened with a straightening roll or straightening machine. The use of sledges in straightening bent material or other methods in which the material or its finish may be mutilated shall not be allowed.
- 5.14 All nuts shall be readily accessible to a wrench for adjustment. Bolts shall not be flushed but shall project approximately ¼ inch beyond the face of the nuts. Nuts shall fit the shanks so that they may be screwed on with the fingers and at the same time not fit so loosely that the value of the bolts acting with the tension of the head of the nut will be reduced.
- 5.15 All steel members shall be clearly marked to provide easy identification in the field. **Trusses and box columns up to, and including, 4 feet x 4 feet shall be assembled before shipment to ensure correctness and shall be shipped assembled.** If the Manufacturer does not intend to ship the trusses and box columns completely assembled, he shall so state in the quote. Markings on component parts shall indicate the structure to which they apply.
- 5.16 Sectional members combined to form columns of the required height will not be accepted. Angles for column legs must be continuous to provide the necessary height.
- 5.17 Continuous punching of steel sections for equipment mounting is not acceptable. Holes shall be provided as needed for erection and equipment installation, but unnecessary holes will not be accepted.

6.0 **Approval Drawings**

- 6.1 Receipt of Approval Drawings by the Bidder constitutes an authorization for manufacture predicated upon the Drawings and corrections found thereon. After the return of Approval Drawings, release for shipment is to be granted by either the Owner or its Engineer, based upon the Manufacturer's compliance with the following:
 - (5) Furnishing of the requested number of copies of the Final Drawings as called for in the Specifications.
 - (6) Thirty (30) days notification of tentative shipping schedule and forty-eight (48) hours notification prior to delivery.
 - (7) Coordination of manufacturing and delivery with the Owner's construction schedule.
 - (8) Approval Drawings are to be submitted electronically in AutoCAD® 2018 format or newer in lieu of paper copies.

6.2 **Design and Fabrication Drawings**

Approval of Shop Drawings, specification sheets, and Bill of Materials will be required. The Bidder shall supply one (1) digital copy of all Shop Drawings and Bills of Materials to the Owner's Engineer, via email, so they may ascertain that all materials and equipment being furnished by the Bidder meet the Specifications. Specifications sheets shall be supplied for all connectors, fittings, etc. The drawings may be submitted directly to the Public Works Commission; Attention: Mr. Joel Valley, 955 Old Wilmington Road; Fayetteville, NC 28301 (joel.valley@faypwc.com).

Final Drawings and final Bill of Materials shall be furnished by the Bidder for installation of the substation. All final documentation shall be submitted directly to the Public Works Commission; Attention: Mr. Joel Valley, 955 Old Wilmington Road; Fayetteville, NC 28301 (joel.valley@faypwc.com), for distribution and shall include the following:

- (3) Drawing files of all Drawings noted above. Drawing files shall be compatible for use with AutoCAD® 2018.
- (4) Equipment Assembly Details for apparatus supplied by the Bidder but manufactured by Others.23

7.0 Lightning Protection Structures

- 7.1 Lightning mast ground clamps shall be included for attachment of 2/0 AWG copper leads as defined in Section 15.0 Connectors.

8.0 Miscellaneous Structures / Hardware

- 8.1 A switch grounding platform used for protecting the switch operator in the event of a fault at the switch during manual operation shall be furnished for each group-operated switch. The platform shall be open-grating design with the grounding connector locations on opposite corners for attachment of 2/0 AWG copper as shown on the drawings.
- 8.2 Miscellaneous fastener hardware shall conform to the industry standards for the purpose for which they are to be used.

All quantities of fastener hardware shall be shipped with a **minimum of 10% overcount** above the designated quantity necessary for assembly.

9.0 Bus Insulators

All bus insulators shall be wet-processed porcelain colored sky gray, shall conform to the IEEE Standards for insulators.

Bus insulators for supporting bus and leads shall be standard station post non-stacking or uniform-diameter stack type meeting ANSI-BIL units complete with connectors, bolts, and washers as required.

Bus insulators shall be as manufactured by Lapp, Locke, Newell, PPC, MacLean, or approved equal.

10.0 Bus and Leads

The Drawings include a sheet of details to indicate the several methods to be used for connecting and supporting the bus and leads. The conductors shall be provided with the necessary supports and connectors as illustrated by these details. The hardware required for the conductor and overhead ground wire attachments shall be furnished by the Bidder and shall conform to the following specifications: ANSI C135 for bolts, ASTM B317 6101-T6, ASTM A47 for malleable iron. All hardware supplied shall be hot-dipped galvanized.

Bus and leads shall be as shown on Drawings.

11.0 Bus Supports

All substation bus shall be supported by either fixed, slip-fit, or expansion attachment to the station post insulators, as indicated on the Drawings. Bus supports shall be radio noise-free.

12.0 Connectors

Connectors shall be suitable for the purpose they are intended and shall provide a sound electrical and mechanical connection.

The Bidder is responsible for supplying the connectors and hardware for all bus and leads as defined in Section 12, Bus and Leads, and shown on the Drawings. A corrosion-inhibiting compound shall be furnished in a sufficient quantity to be applied to all connections.

- 12.1 All connector fittings to the bus shall be aluminum bolt-on or as shown on Drawings. Alternate bids may be submitted based upon the substitution of equivalent connectors by other manufacturers. However, such substitutions are subject to approval by the Owner's Engineer.
- 12.2 Cable terminal fittings required for the bus leads around switches, equipment, and between switches and rigid bus shall be aluminum bolted, compression type, or bolted bronze type with the appropriate two-hole or four-hole NEMA spacing pad.
- 12.3 Expansion terminal connectors for the bus shall be as shown on the Drawings. Where the expansion joint requires the fabrication of minor components (support plates, etc.), the Bidder shall fabricate such components in compliance with the illustrated details prior to shipment.
- 12.4 Grounding clamp connectors will be required for supporting or bonding the copper ground cable to steel columns, beams, lightning masts, and/or fence/fabric posts. Supporting

grounding clamp connectors will be required every 4 feet minimum for columns and beams to minimize the sag in the cable.

- 12.5 A copper to aluminum bimetallic transition plate shall be provided for all non-similar connections between terminal connections on all equipment, including transformers, breakers, and switches to bus leads where it is necessary to make an aluminum-to-copper connection.
- 12.6 All hardware supplied for bolted electrical fittings shall be stainless steel 18-8 alloy.
- 12.7 All quantities of fastener hardware shall be shipped with a minimum 10% over count above the designated quantity necessary for assembly.
- 12.8 Bidder to verify that all conductor terminal pads shall **match and fit onto switch terminal pads** with regard to pad size, NEMA rating, and pad shoulder configurations.

13.0 Group-Operated Disconnect Switches

13.1 Switch Construction

The switches shall meet all applicable ANSI and other industry mechanical and electrical standards and shall be completely assembled and adjusted at the factory. The switches shall be of the manual-operating type by means of an operator pipe handle, and all parts of the operating mechanism shall be furnished for installing the complete three-phase switch and mechanism on the supporting structure. The switches shall be physically sized to fit properly in the locations shown on the Drawings. Switches shall be suitable for either horizontal or vertical mounting. A galvanized steel double-channel base plate shall be furnished and drilled for installation prior to galvanizing.

The switches shall be of copper or aluminum construction with tin-plated copper contacts for both the center contacts and the hinge contacts.

All switches shall be complete with stainless steel arcing horns, pipe handle operating mechanism for manual operation, outboard bearings guide plate, operating pipe, flexible grounding braid, an open- and closed-position indicator, and provisions for padlocking in either the open or closed position. Oilite bearings shall be used for moving parts not provided with greaseless ball-bearing assemblies having stainless steel balls and races. Bearings shall be permanently sealed and require no greasing or other field maintenance. The switches shall be designed such that when they are fully open to 90°, the metal-to-metal spacing to the adjacent phase will not be less than specified for each voltage class. Switch terminals shall be provided with four-hole NEMA spacing electro tin-plated terminals for copper or aluminum conductor connections as per the Drawings.

The switch insulators shall be ANSI No. 70 sky gray standard or high strength, non-tapered, uniform-diameter stacks, station post with 3-inch or 5-inch-diameter bolt circles both top and bottom. The switch shall have two (2) insulators per pole as indicated on the Drawings. The switch insulators shall be free to rotate without affecting the position of the terminal pads.

13.2 Ratings for Group-Operated Switches

Vee-center break and vertical break, group-operated air break switches located on the high voltage structure shall be outdoor type, two (2) insulators, group operated, air break disconnect, complete with arcing horns, operating mechanism for worm-gear operation, outboard bearing, and guide plate. Oilite bearings shall be used for moving parts not provided with greaseless ball-bearing assemblies having stainless steel balls and races. Terminals shall be tin-plated NEMA four-hole suitable for bronze or aluminum conductor connectors as per the Drawings.

13.3 Approved Switch Manufacturers and Alternates

All bids should include switches as specified in this Specification and Bill of Material; however, alternates may be considered based on price or lead time. All proposed alternate switches must be of equivalent type and function.

14.0 Surge Arresters

Surge arresters for the high- and low-voltage sides for the power transformers will be provided by the power transformers manufacturer, as furnished by the Owner.

Metal oxide surge arresters are rated in terms of maximum continuous operating voltage (MCOV). However, metal oxide arresters that are given conventional ratings may be furnished if the MCOV equivalent ratings are as specified here.

The surge arresters shall comply with IEEE Standard C-62.11.

15.0 Single-Pole Disconnect Switches

The switches shall be outdoor type, meet all applicable ANSI, NEMA, and other industry mechanical and electrical standards, and shall be completely assembled and adjusted at the factory. The switches shall be physically sized to fit properly in the locations shown on the Drawings. Switches shall be suitable for either horizontal or vertical mounting as shown on the Drawings. A galvanized steel channel base plate shall be furnished and drilled for installation prior to galvanizing.

The switches shall be of copper construction with electro-tin-plated contacts for both the jaw and the hinge contacts. The switch terminals shall be provided with two-hole or four-hole NEMA spacing and electro-tin-plated terminals for copper or aluminum conductor connectors as per the Drawings.

Bidder shall verify that all conductor terminal pads shall **match and fit onto switch terminal pads** with regard to pad size, NEMA rating, and pad shoulder configurations.

The power fuses shall be outdoor type, meet all applicable ANSI, NEMA, and other industry mechanical and electrical standards, and shall be completely assembled at the factory. Fuse mounting hardware shall consist of the base, insulators, complete upper and lower contact assemblies, terminal connectors sized for specified cable as shown on the Drawings, and fuse unit end fittings. The mounting shall be suitable for vertical offset or inverted installation.

The switches shall be shipped completely assembled on bases with post insulators oriented to accommodate the appropriate mounting location.

15.1 Hookstick Switches

Single-pole hookstick disconnect switches shall be provided for isolation of the feeder vacuum circuit breakers and shall be rated as per the attached Bill of Material.

15.2 Fuses and Fuse Mounting Hardware

Fuses, fuse barrels, and fuse mounting hardware shall be provided for isolation of the station service transformer and potential transformers. One (1) fuse (and end fittings) of the proper rating shall be supplied with each mounting plus additional spares as specified on the Bill of Materials.

16.0 Instrument Transformers

16.1 Potential transformers (PTs) in the substation shall be provided by the Bidder for use of metering the high-voltage bus by the Owner. PTs shall be outdoor type, metering class, single primary, tapped secondary, 60 cycle, single bushing.

16.2 Current transformers (CTs) in the substation shall be provided by the Bidder for use of metering the high-voltage bus by the Owner. CTs shall be outdoor type, metering class, single primary, tapped secondary, 60 cycle, single bushing.

16.3 Potential transformers (PTs) in the substation shall be provided by the Bidder for use of metering the low-voltage bus by the Owner. PTs shall be outdoor type, metering class, single primary, tapped secondary, 60 cycle, dual bushing.

17.0 Station Grounding

17.1 The station grounding below grade conductors shall be provided by the substation contractors as follows: ground grid bus – 4/0 AWG bare SD copper, seven-strand, 2/0 AWG bare SD copper, seven-strand for perimeter conductor.

- 17.2 Ground rods shall be provided by the substation contractor and shall be Copperweld $\frac{3}{4}$ inch diameter, 10 feet in length, and of the sectional type. Ground rod connections shall be Cadweld type, suitable for 4/0 AWG copper ground bus. Drive heads and couplings shall be furnished with the sectional rods.
- 17.3 All connections below grade shall be Cadweld and shall be provided by the substation contractor.
- 17.4 Equipment and structure ground bonding leads shall be provided by the Bidder as follows: 2/0 AWG bare SD copper, seven-strand.
- 17.5 The transformer ground bonding leads shall be provided by the Bidder as follows: dual 4/0 AWG bare SD copper, seven-strand.

18.0 List of Materials - Substation Structures and Equipment

A list of the major items required for the substation is included in the attached Bill of Material. Items noted as "By Contractor" in the list are to be furnished by Contractor.

19.0 Hookstick and Container

One (1) station class hookstick shall be provided as follows: one (1) 12-foot to 18-foot adjustable fiberglass stick with NEMA disconnect head. An appropriate length storage container shall be supplied with each hookstick.

20.0 Distribution Transformers

The Bidder shall supply two (2) distribution transformers to supply AC station service for the substation equipment.

The Bidder shall provide mounting provisions for those transformers on the structure in the locations as shown on the Drawings included with these Specifications. The Manufacturer shall ensure the mounting clearance between the transformer's primary insulators and the power fuse mounting base or truss exceeds the minimum clearance requirements of the National Electrical Safety Code (NESC). The Bidder shall also ensure that NESC requirements are met for minimum distance to the ground for personal safety.

All transformers utilize an industry standard hanger bracket with two (2) 5/8-inch bolts in-line on 11¼-inch spacing.

21.0 Station Signs

- 21.1 The Bidder Shall furnish danger and warning signs as described in the Bill of Materials. Warning and danger signs shall be 28 inches x 14 inches and be bilingual with both English and Spanish. Test symbols shall conform to NESC 2012 and ANSI Z535.
- 21.2 The Bidder shall furnish porcelain enamel phase identification tags (including suitable devices for mounting) with 4-inch letters on the structures at the end of each bus, at each line termination structure, over each breaker position, and at each instrument transformer with the color and designations as follows:
 - A Phase: White letter on red background
 - B Phase: Black letter on white background
 - C Phase: White letter on blue background

APPENDICES

- 1 – List of Drawings
- 2 – Structural and Tubular Steel Specifications
- 3 – Steel Weight Breakdown
- 4 – Vicinity Map

1

List of Drawings

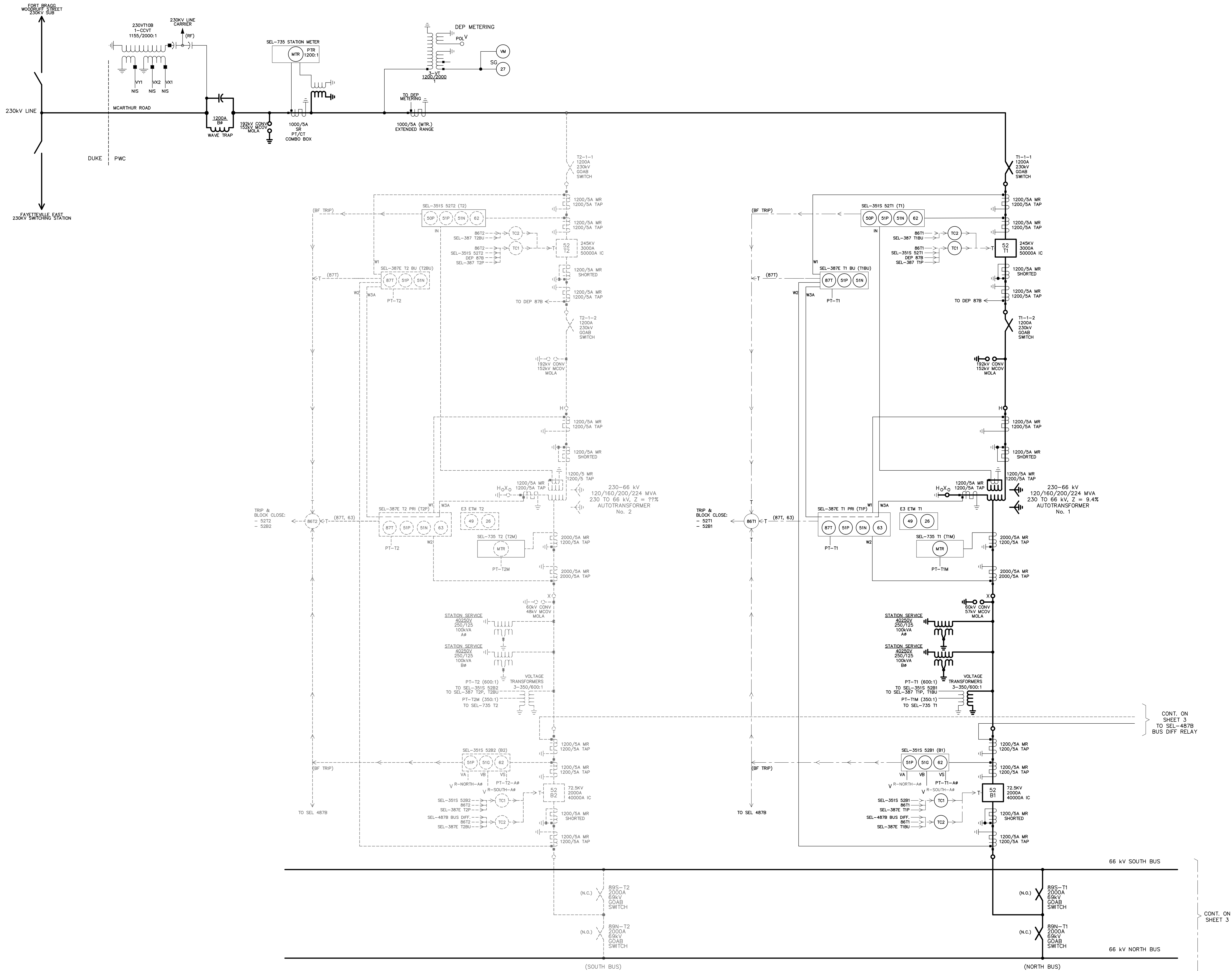
**FAYETTEVILLE PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA**

**SPECIFICATIONS FOR STRUCTURES AND
EQUIPMENT FOR THE
POD 5 – MCARTHUR RD SUBSTATION**

LIST OF DRAWINGS - B

The work shall conform to the following Drawings by Booth and Associates, LLC, all of which form a part of these Specifications. The Contractor is responsible for contacting procurement@faypwc.com if any drawings not indicated to be furnished at a later date are missing from their bid package. If the Bidder does not contact procurement@faypwc.com regarding any drawings, their bid will be considered based on all Drawings and Specifications, as issued for bids.

Sheet No. DE8992	Title
S2	ONE LINE DIAGRAM, 230/66KV BANKS
S-GA-001	PLAN VIEW
S-GA-006	SECTION I-I
S-GA-007	SECTION J-J
S-GA-008	POINT OF DELINEATION
S-GA-101	SECTIONS DETAILS SHT. 1 OF 3
S-GA-102	SECTIONS DETAILS SHT. 2 OF 3
S-GA-103	SECTIONS DETAILS SHT. 3 OF 3
S-GA-111	BILL OF MATERIALS SCHEDULE 2



2300 Rawlwood Drive Suite 300, Raleigh, NC 27607
NC F-0221

PRELIMINARY -
DO NOT USE FOR
CONSTRUCTION

NO.	DATE	ENG.	ISSUED FOR BID	REVISIONS
0	08/17/2026	BGD		

PROJECT NAME: POINT OF DELIVERY 5 (POD 5) MCARTHUR ROAD	DRAWING TITLE: ONE LINE DIAGRAM 230/66kV BANKS
---	--

DRAWN BY:	MM
CHECKED BY:	AC
APPROVED BY:	JH
DATE:	02/06/2025
SCALE:	N.T.S.
FILE NUMBER:	DE8992
SHEET:	S2

CONDUCTOR	APPROX. CURRENT CARRYING CAPACITY*
TUBING, 6" NPS SCH. 80 AL.	4891 AMPS.
TUBING, 4" NPS SCH. 80 AL.	3720
TUBING, 3" NPS SCH. 80 AL.	2760
TUBING, 2" NPS SCH. 80 AL.	1700
TUBING, 6" NPS SCH. 40 AL.	4064
TUBING, 4" NPS SCH. 40 AL.	3165
TUBING, 3" NPS SCH. 40 AL.	2425
TUBING, 2" NPS SCH. 40 AL.	1465
AAC, 1590 MCM	1333
ACSR, 1272 MCM, 26/7	1200
ACSR, 954 MCM, 45/7	1010
AAC, 954 MCM	982
ACSR, 795 MCM, 26/7	907
ACSR, 538 1/4 MCM, 18/7	530
ACSR, 2/0 AWG, 6/1	340
ACSR, 1/0 AWG, 6/1	230
COPPER, 1000 MCM, 61 STD.	1285
COPPER, 750 MCM, 61 STD.	1075
COPPER, 500 MCM, 37 STD.	830
COPPER, 4/0 AWG, 19 STD.	480
COPPER, 4/0 AWG, 7 STD.	480
COPPER, 2/0 AWG, 7 STD.	355
COPPER, #2 AWG, SOLID	231
UABC, 4" x 4" x 3/8"	3125
UABC, 4" x 4" x 1/4"	2640
UABC, 3 1/4" x 3 1/4" x 1/4"	2325
AL, BAR 3" x 1/2"	1350
AL, BAR 3" x 1/4"	938

DIAMETER BOLT (INCHES)	RECOMMENDED TORQUE NON-LUBRICATED STEEL & SILICON BRONZE HARDWARE (FOOT*LBs)	RECOMMENDED TORQUE LUBRICATED HARDWARE & ALUMINUM HARDWARE (FOOT*LBs)
1/2"	40	25
5/8"	55	40
3/4"	70	60

1. MATERIAL/MANUFACTURER TO VERIFY THAT CONDUCTOR TERMINAL PADS MATCH AND FIT ONTO SWITCH TERMINAL PADS (SIZE, NEMA RATING AND SHOULDER).
2. SUBSTATION CONTRACTOR SHALL COORDINATE WITH THE INSTALL CONTRACTORS TO UTILITY STRUCTURE. SEE TRANSMISSION PLAN & PROFILE FOR DISTANCE OF OHGW, OPGW AND CONDUCTOR DEAD-END.
3. EXTEND SUBSTATION STONE 5 FT BEYOND SUBSTATION FENCE AND 20 FT BEYOND GATE(S).
4. STRUCTURAL DIMENSIONS ARE APPROXIMATE, SEE MANUFACTURER DRAWINGS FOR ACTUAL DIMENSIONS.
5. ALL ALUMINUM TUBE CONDUCTORS OVER 20 FEET IN LENGTH SHALL INCLUDE APPROPRIATE DAMPING TO PREVENT AEOLIAN VIBRATIONS. DAMPING TO BE ACCOMPLISHED BY INSERTING A LENGTH OF 336 x ACSR CONDUCTOR INSIDE EACH SECTION OF TUBING.
6. TO PREVENT EXCESSIVE INTERNAL CONDENSATION, ALUMINUM TUBE CONDUCTORS SHALL INCLUDE WEEP HOLES AT THE BOTTOM OF HORIZONTAL AND VERTICAL RUNS.

THE VALUE ARE FOR ALTITUDES OF 3300 FT OR LESS. FOR HIGHER ALTITUDE REFER TO RULE 124A1 (NESC-2017).

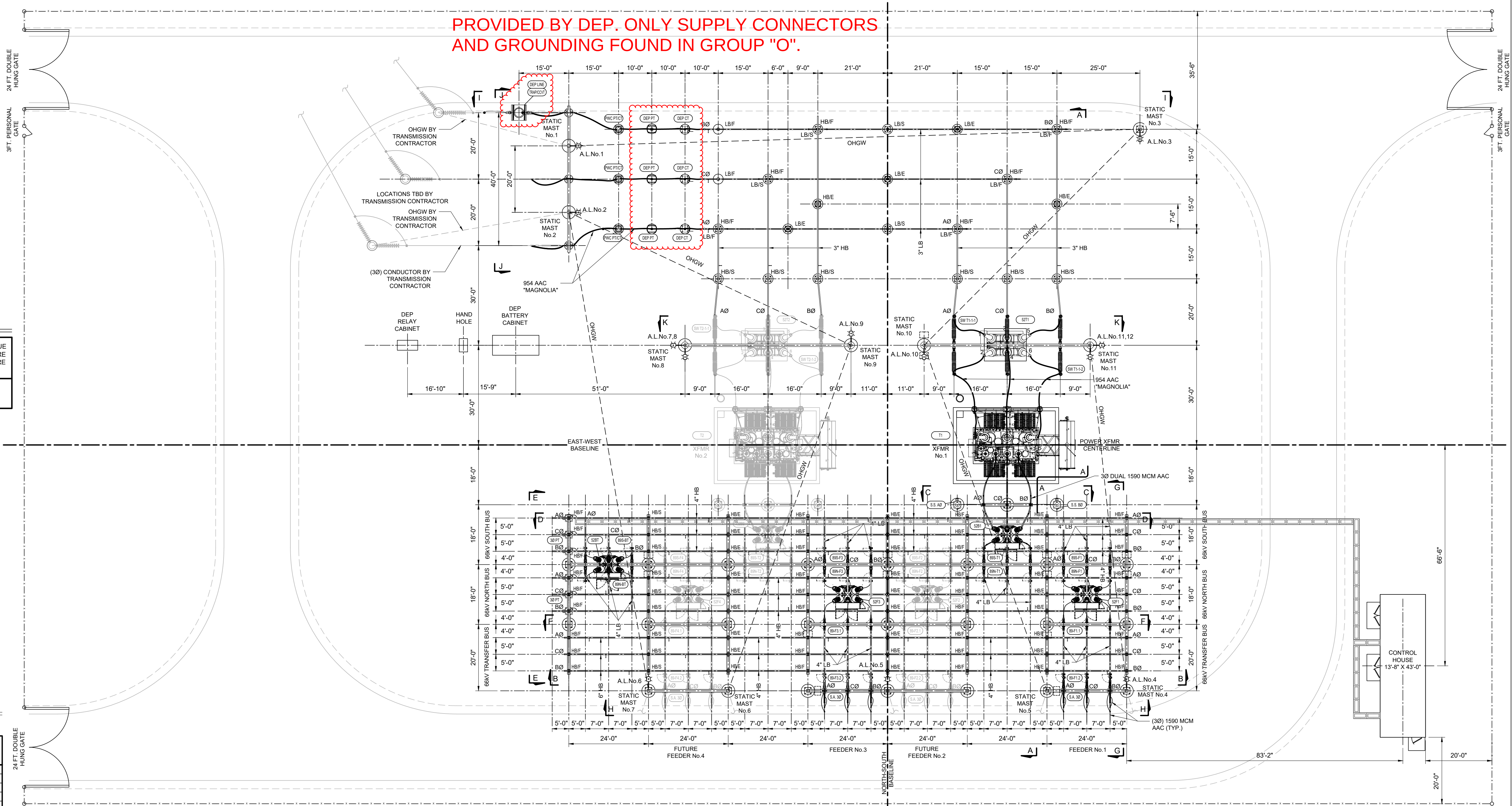
RATED KV	BIL KV	SPACING
34.5	200	10'-7"
46	250	10'-11"
69	350	11'-7"
115	550	13'-0"
138	650	13'-8"
161	750	14'-4"
230	900	15'-5"

STRUCTURE, APPARATUS AND LIGHTNING ARRESTERS ARE ALL GROUNDED TO THE SAME GROUNDING SYSTEM. STATION DESIGNED FOR THE FOLLOWING ELECTRICAL CLEARANCES/SPACINGS:

RATED KV	BIL KV	RIGID BUS CONDUCTORS (IEEE, NEMA, NESC)				GROUP-OPERATED SWITCHES (NEMA)		
		SPACING ⁽²⁾		CLEARANCE ⁽¹⁾		ϕ TO ϕ SPACING ⁽²⁾		
		PHASE TO PHASE ϕ TO ϕ ⁽³⁾	METAL TO METAL ⁽⁴⁾	PHASE TO GROUND ⁽⁵⁾	CLEARANCE ABOVE GRADE ⁽⁶⁾	HORN GAP VERT./HOR. BREAK	DISCONNECT VERTICAL BREAK	DISCONNECT HORIZONTAL BREAK
230	900	11'-0"	7'-5"	6'-8"	15'-0"	16'-0"	11'-0"	16'-0"
69	350	5'-0"	2'-7"	2'-6"	11'-0"	7'-0"	5'-0"	6'-0"

1. "CLEARANCE" IS DEFINED AS A SURFACE-TO-SURFACE MEASUREMENT.
2. "SPACING" IS DEFINED AS A $\frac{1}{2}$ TO $\frac{1}{4}$ MEASUREMENT.
3. INTENDED FOR PHASES ORIENTED IN PARALLEL RUNS.
4. INTENDED FOR NON-PARALLEL POINTS OF CROSSING.
5. EXCEEDS MINIMUM CLEARANCES TO MATCH NEMA STANDARD POST INSULATOR DIMENSIONS.
6. ROUNDED UP TO THE NEAREST EVEN FOOT, PER NESC (2017). MEASURED FROM TOP OF EQUIPMENT FOUNDATIONS, IF SUITABLE FOR PEDESTRIAN ACCESS.

OHGW SUPPORT STRUCTURES SHALL WITHSTAND LINE TAKE-OFF AT THE ANGLES SHOWN WITH A MAX LOAD OF 800 POUNDS PER OHGW. A MINIMUM VERTICAL CLEARANCE OF 15'-0" SHALL BE MAINTAINED FROM OHGW TO BUSWORK OR ENERGIZED CONDUCTORS.



SCALE: 1/16"=1'-0"

EQUIPMENT VIEW IS PRELIMINARY.
WAITING ON VENDOR DRAWINGS.

F	FIXED CONNECTION	-----	OVERHEAD GROUND WIRE (OHGW)
S	SLIP FIT	X X	SUBSTATION FENCE
HB	HIGH BUS SUPPORT	=====	OIL CONTAINMENT AREA
HL	HIGH/LOW BUS SUPPORT		
LB	LOW BUS SUPPORT	[]	OPERATOR PLATFORM
E	EXPANSION SUPPORT	-----	FUTURE INSTALLATION
	AREA LIGHTS		

PLAN VIEW	S-GA-001
SECTIONS	S-GA-002 TO S-GA-008
SECTIONS DETAILS	S-GA-101 TO S-GA-103
BILL OF MATERIAL	S-GA-110
FOUNDATION PLAN	S-FP-001
FOUNDATION DETAILS	S-FD-001 TO S-FD-009
OIL CONTAINMENT	S-OC-001 TO S-OC-003

PRELIMINARY - DO NOT USE FOR CONSTRUCTION	NO.	REVISIONS	DATE	PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE			
	A	PRELIMINARY	04/11/25	POINT OF DELIVERY No. 5			
	B	PRELIMINARY	07/02/25				
	C	PRELIMINARY	06/02/26				
	D	PRELIMINARY	06/24/26				
				PLAN VIEW			
			DWN. DDS	DATE: 05/28/25	DWG. NO. DE8992 S-GA-001		
			CKD. RDM	APPO. RDM			
			SCALE: 1/16"=1'	PLOT: NONE			
© 08/24	NO.	REVISIONS	DATE				

DE8992-S-GA-001 (ID 146281).DWG



INSTALLATION NOTES:

1. MATERIAL MANUFACTURER TO VERIFY THAT CONDUCTOR TERMINAL PADS MATCH AND FIT ON TO SWITCH TERMINAL PADS (SIZE, NEMA RATING AND SHOULDER).
2. SUBSTATION CONTRACTOR SHALL COORDINATE WITH UTILITY TO INSTALL CONDUCTORS TO UTILITY STRUCTURE. SEE TRANSMISSION PLAN & PROFILE FOR DISTANCE OF OHGW, OPGW (IF APPLICABLE) AND CONDUCTOR DEAD-END.
3. SURGE ARRESTER SHALL HAVE A DIRECT CONNECTION TO GROUND GRID.
4. STRUCTURAL DIMENSIONS ARE APPROXIMATE, SEE MANUFACTURER DRAWINGS FOR ACTUAL DIMENSIONS WHEN AVAILABLE.
5. FOR CONDUIT INFORMATION, SEE CONDUIT DRAWINGS.
6. ALL ALUMINUM TUBE CONDUCTORS OVER 20 FEET IN LENGTH SHALL INCLUDE APPROPRIATE DAMPING TO PREVENT AEOLIAN VIBRATIONS. DAMPING TO BE ACCOMPLISHED BY INSERTING A LENGTH OF 336.4 ACSR CONDUCTOR INSIDE EACH SECTION OF TUBING.
7. TO PREVENT EXCESSIVE INTERNAL CONDENSATION, ALUMINUM TUBE CONDUCTORS SHALL INCLUDE WEEP HOLES AT THE BOTTOM OF HORIZONTAL AND VERTICAL RUNS.

E - EXPANSION BUS SUPPORT OR EXPANSION TERMINAL FITTING
S - SLIP BUS SUPPORTS (DO NOT WELD AT FITTING)
F - FIXED BUS SUPPORTS (WELD TUBE AT FITTING)

PLAN VIEW	S-GA-001
SECTIONS	S-GA-002 TO S-GA-008
SECTIONS DETAILS	S-GA-101 TO S-GA-103
BILL OF MATERIAL	S-GA-110
FOUNDATION PLAN	S-FP-001
FOUNDATION DETAILS	S-FD-001 TO S-FD-009
OIL CONTAINMENT	S-OC-001 TO S-OC-003

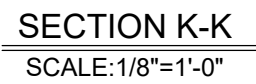
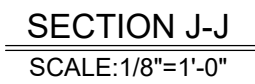
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NOT FOR CONSTRUCTION**

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	C	PRELIMINARY	06/24/26			
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			CKD. BGD	APPO. BGD		
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NO.	REVISIONS	DATE
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1. MATERIAL MANUFACTURER TO VERIFY THAT CONDUCTOR TERMINAL PADS MATCH AND FIT ON TO SWITCH TERMINAL PADS (SIZE, NEMA RATING AND SHOULDER).
2. SUBSTATION CONTRACTOR SHALL COORDINATE WITH UTILITY TO INSTALL CONDUCTORS TO UTILITY STRUCTURE. SEE TRANSMISSION PLAN & PROFILE FOR DISTANCE OF OHGW, OPGW (IF APPLICABLE) AND CONDUCTOR DEAD-END.
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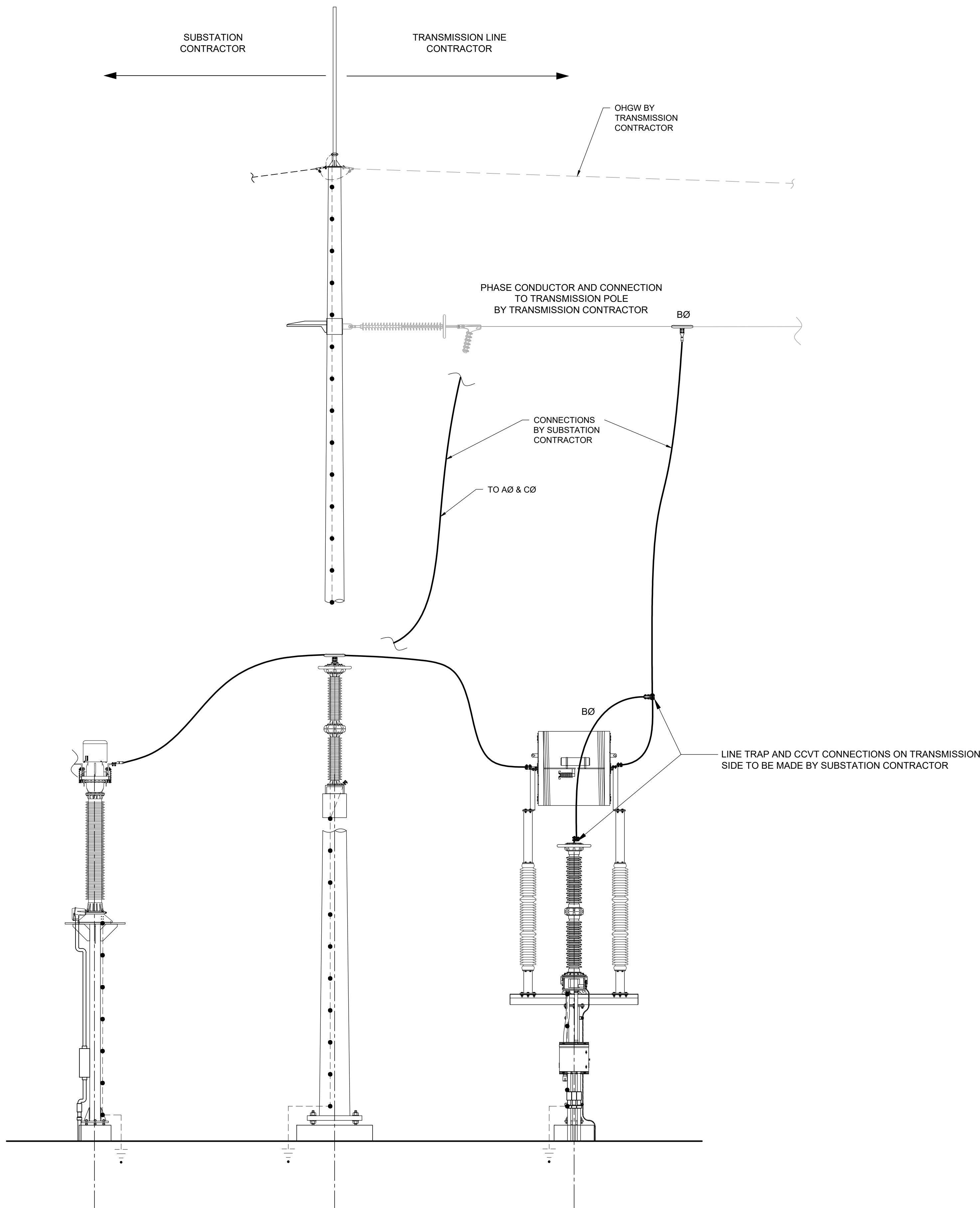
E - EXPANSION BUS SUPPORT OR EXPANSION TERMINAL FITTING
S - SLIP BUS SUPPORTS (DO NOT WELD AT FITTING)
F - FIXED BUS SUPPORTS (WELD TUBE AT FITTING)

PLAN VIEW	S-GA-001
SECTIONS	S-GA-002 TO S-GA-008
SECTIONS DETAILS	S-GA-101 TO S-GA-103
BILL OF MATERIAL	S-GA-110
FOUNDATION PLAN	S-FP-001
FOUNDATION DETAILS	S-FD-001 TO S-FD-009
OIL CONTAINMENT	S-OC-001 TO S-OC-003

**PRELIMINARY
NOT FOR CONSTRUCTION**

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					CKD. BGD	APPD. BGD	
					SCALE: 1/8"=1' PLOT: NONE		

© 05/25	NO.	REVISIONS	DATE			
PRINT & ASSIGNED: 05/28/25						



INSTALLATION NOTES:

1. MATERIALMAN/FABRICATOR TO VERIFY THAT CONDUCTOR TERMINAL PADS MATCH AND FIT ON TO SWITCH TERMINAL PADS (SIZE, NEMA RATING AND SHOULDER).
2. SUBSTATION CONTRACTOR SHALL COORDINATE WITH UTILITY TO INSTALL CONDUCTORS TO UTILITY STRUCTURE. SEE TRANSMISSION PLAN & PROFILE FOR DISTANCE OF OHGW, OPGW (IF APPLICABLE) AND CONDUCTOR DEAD-END.
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REFERENCES:

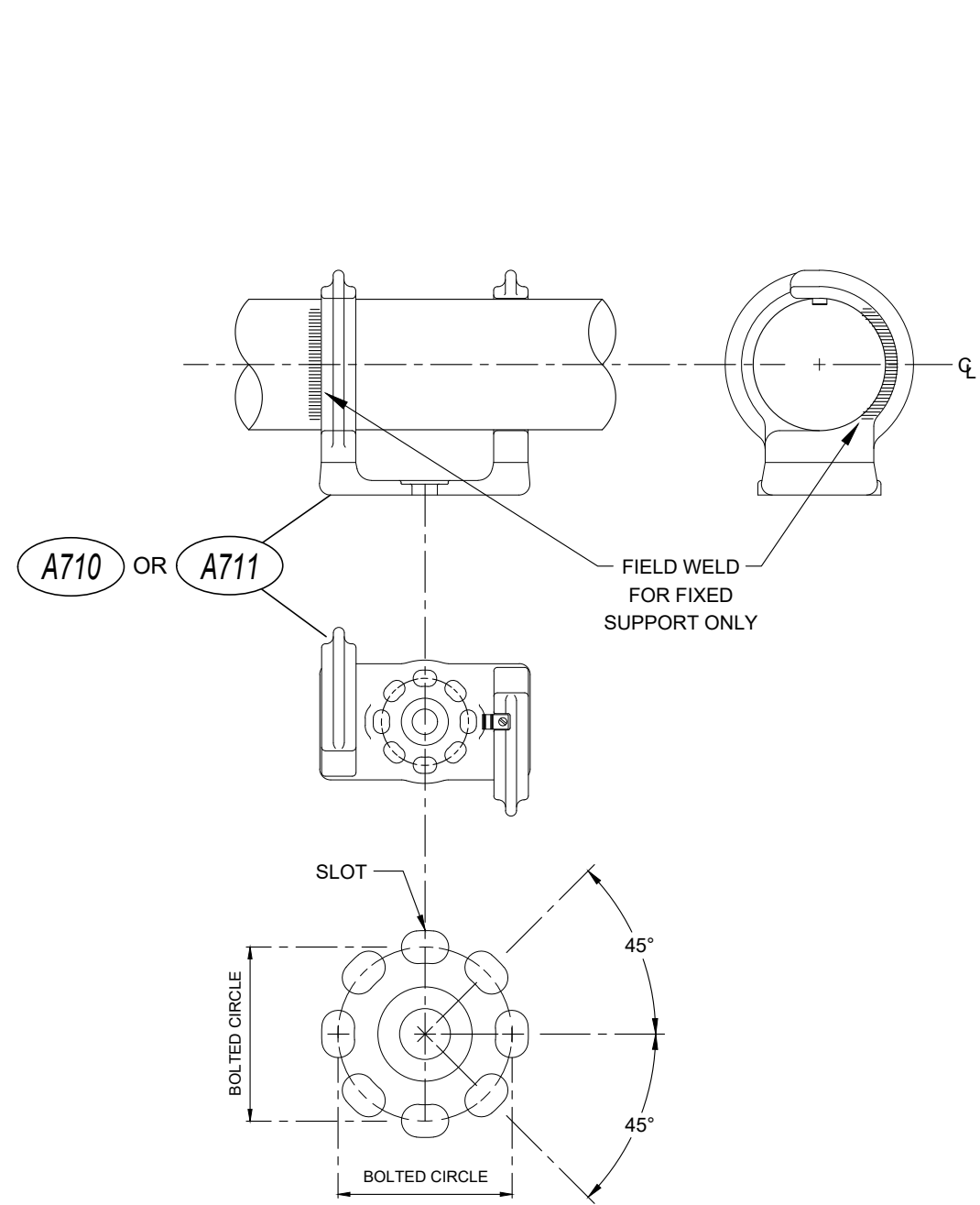
PLAN VIEW	S-GA-001
SECTIONS	S-GA-002 TO S-GA-008
SECTIONS DETAILS	S-GA-101 TO S-GA-103
BILL OF MATERIAL	S-GA-110
FOUNDATION PLAN	S-FP-001
FOUNDATION DETAILS	S-FD-001 TO S-FD-009
OIL CONTAINMENT.....	S-OC-001 TO S-OC-003

PRELIMINARY
NOT FOR CONSTRUCTION

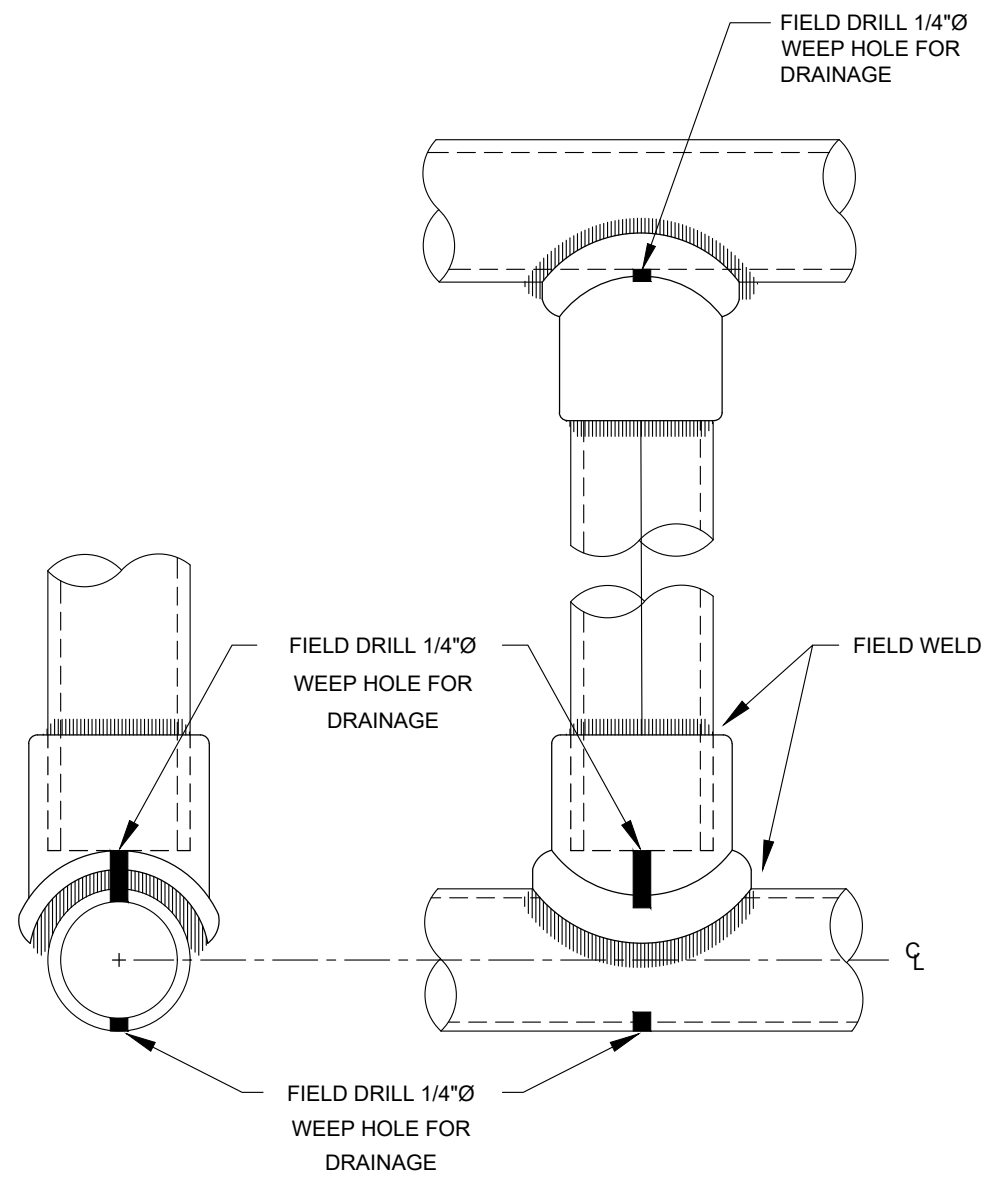
POINT OF DELINEATION

SCALE:1/4"=1'-0"

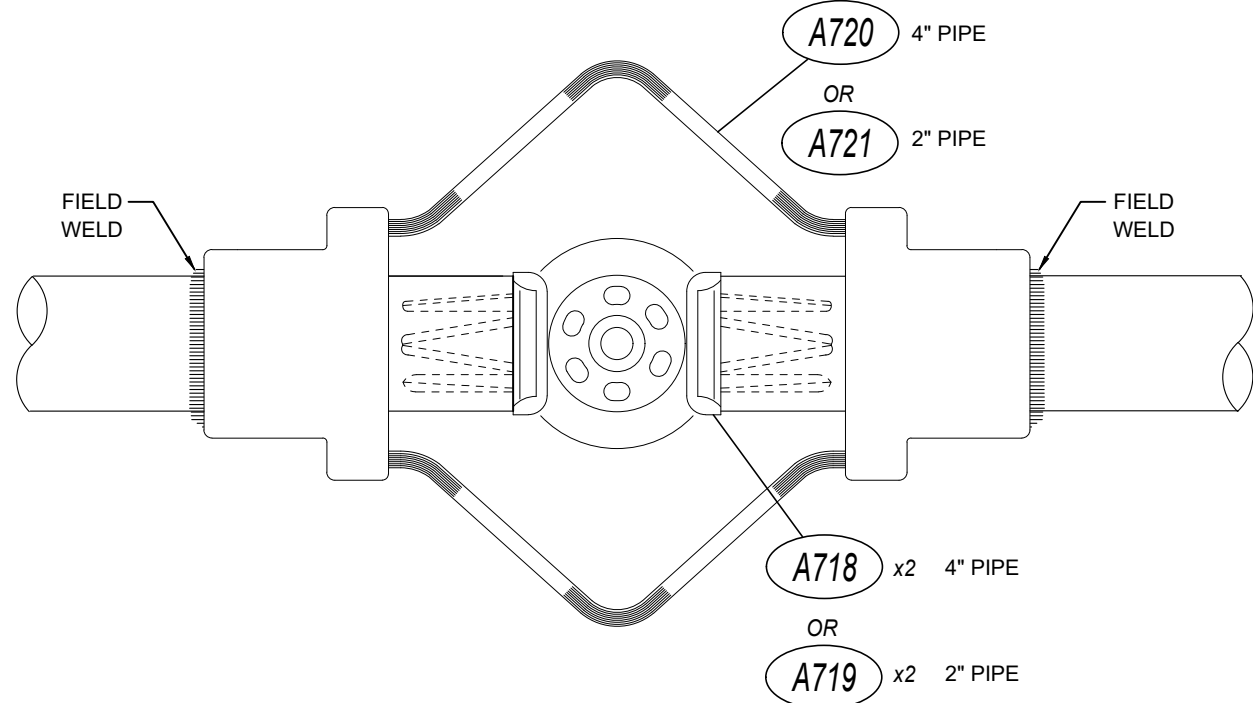
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				POINT OF DELINEATION		
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				CKD. BGD	APPD. BGD	
				NO.	REVISIONS	DATE
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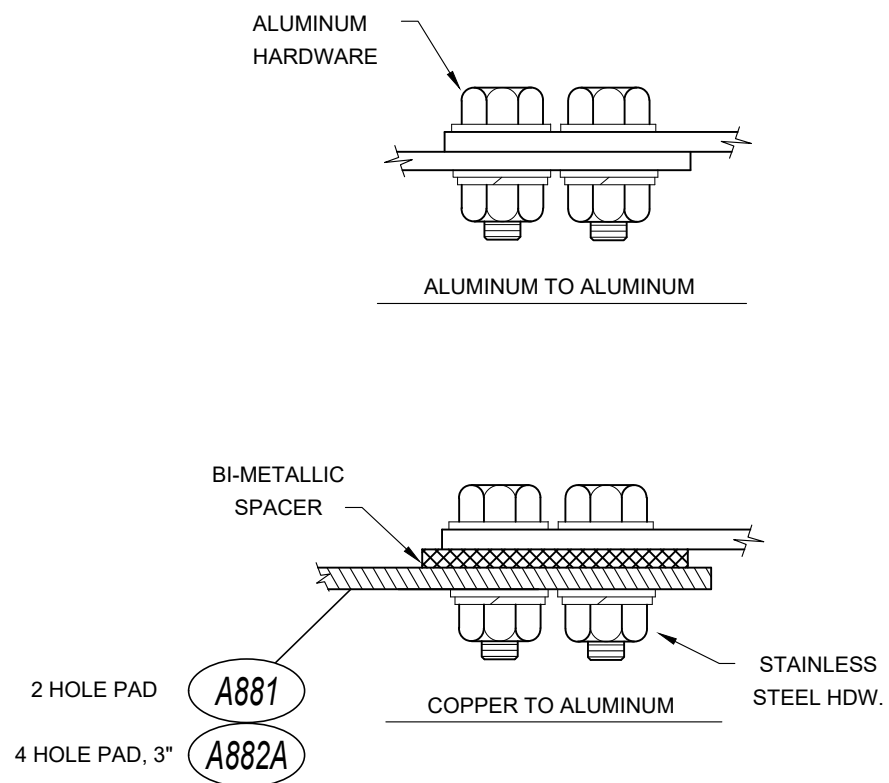
BUS SUPPORT DETAIL
N.T.S.



TUBE TO TUBE DETAIL
N.T.S.

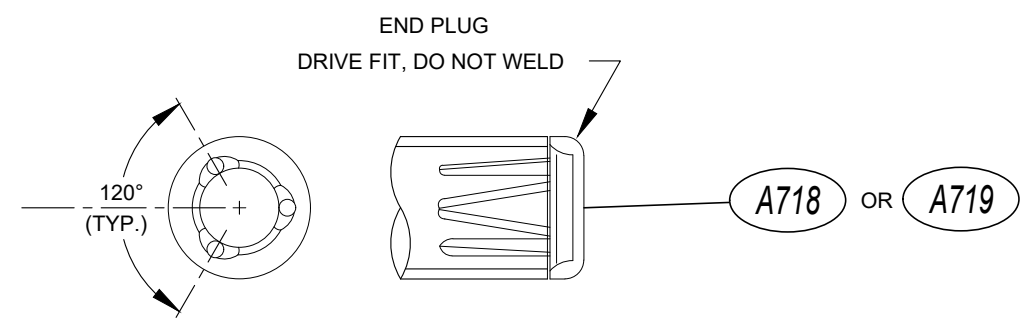


EXPANSION TO CONNECTORS DETAIL
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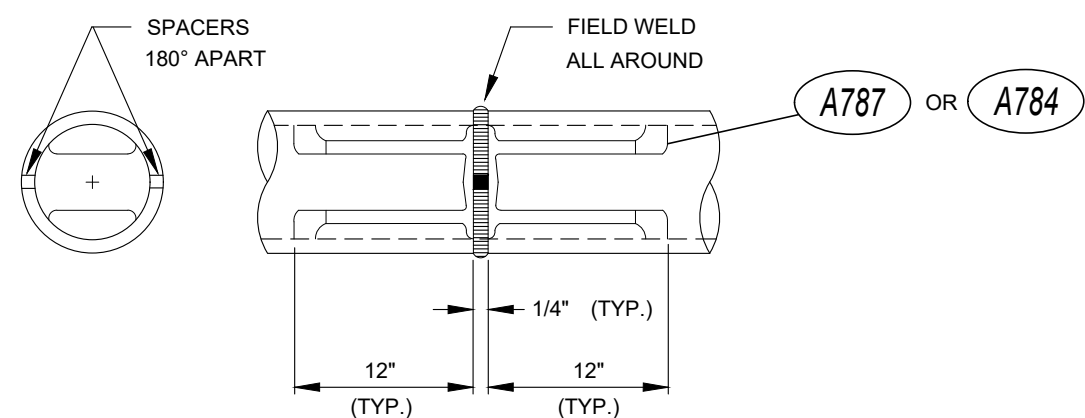


NOTE:
APPLY ELECTRICAL JOINT COMPOUND TO BOTH CONNECTIONS

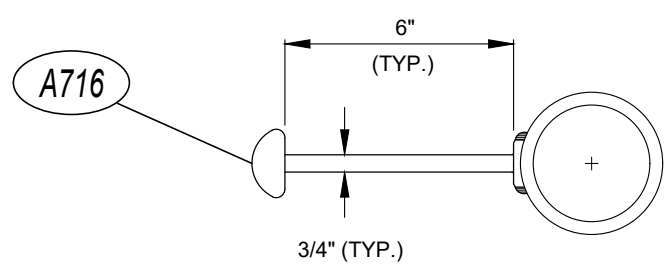
ELECTRICAL CONNECTIONS
N.T.S.



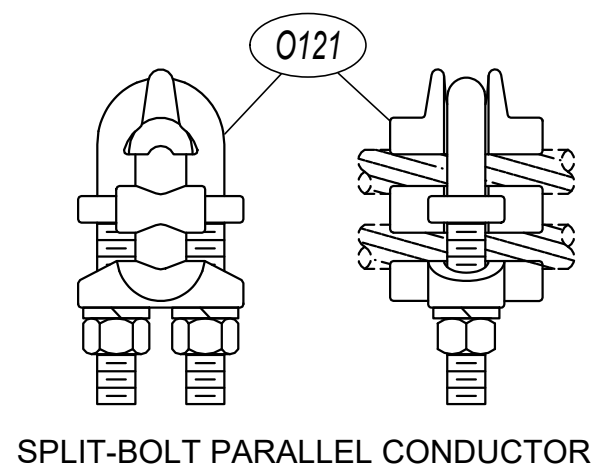
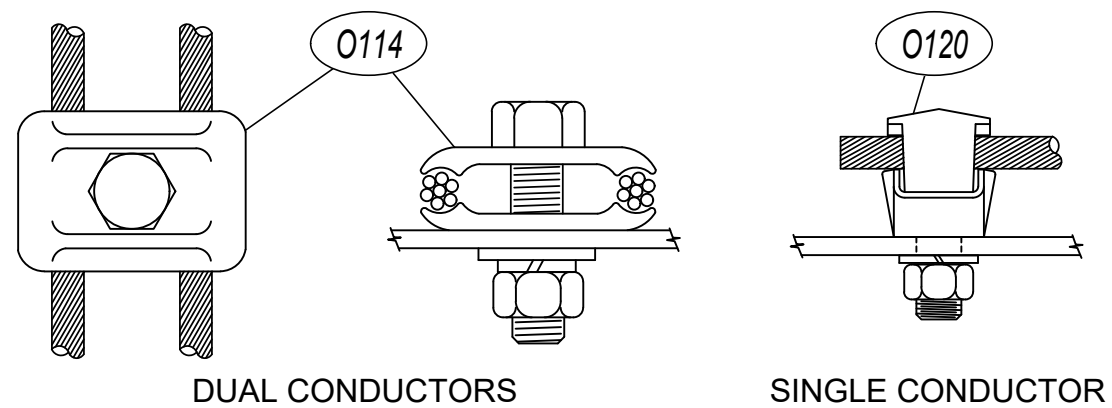
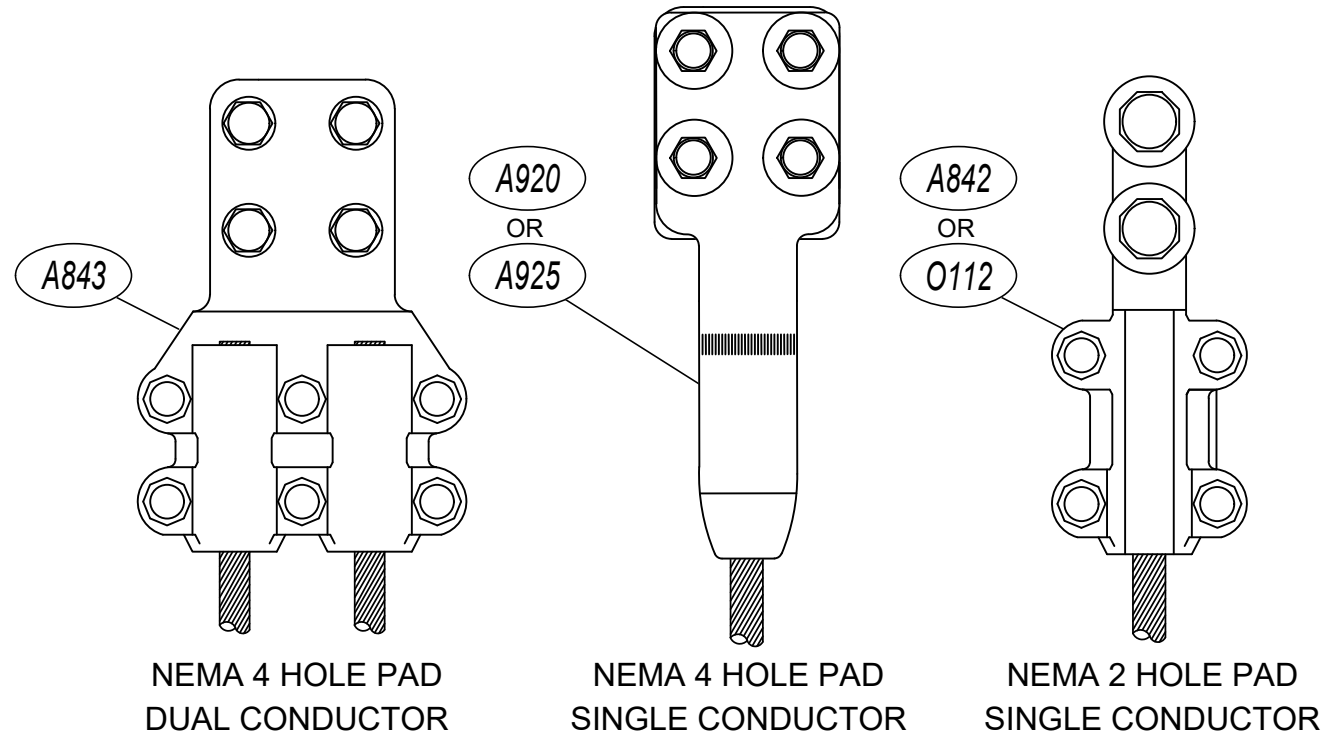
CORONA END PLUG DETAIL
N.T.S.



CONNECTOR DETAIL
N.T.S.

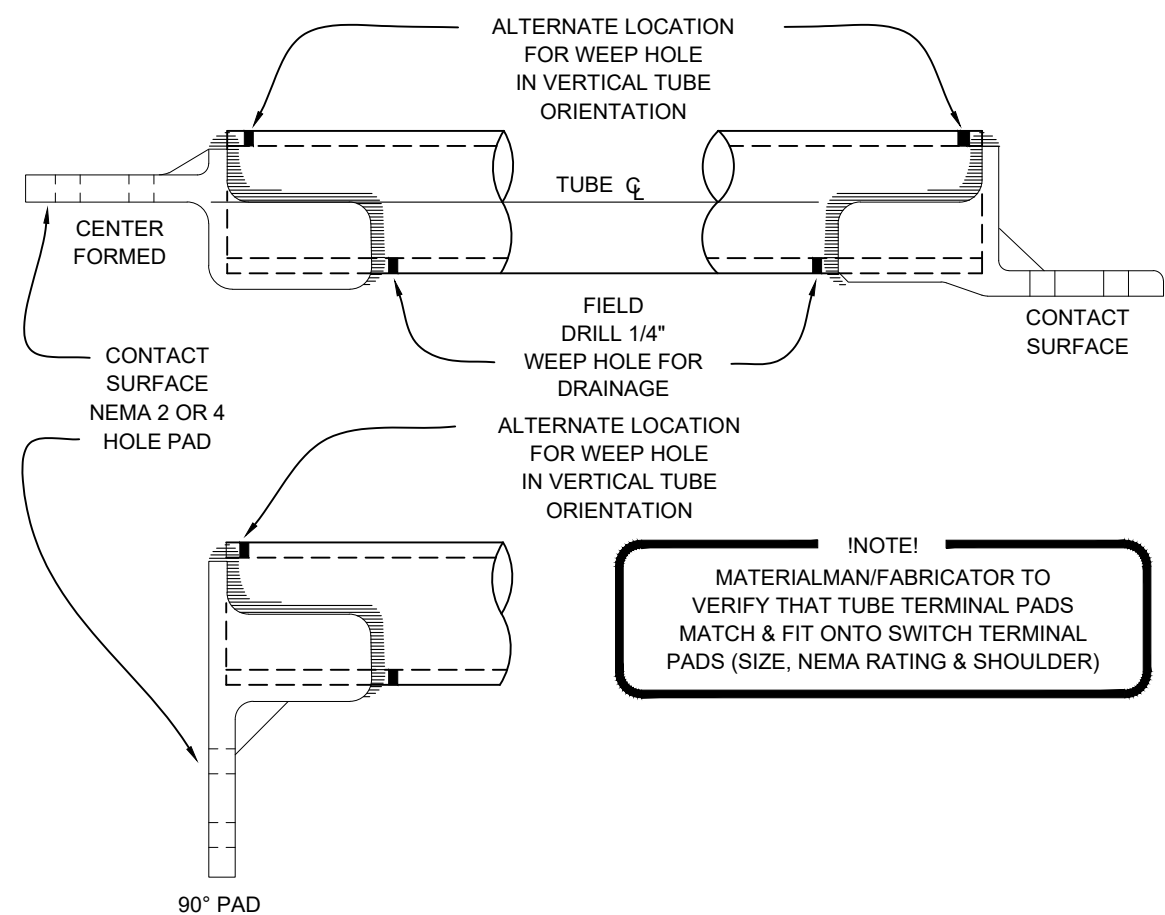


GROUND STUD DETAIL
N.T.S.



NOTE:
1. USE TO ATTACH GRID TAPS TO STRUCTURE CONDUCTORS, AND AT PERPENDICULAR RUNS TO EQUIPMENT ETC.

TYPICAL STRUCTURE CONDUCTOR CONNECTORS
N.T.S.

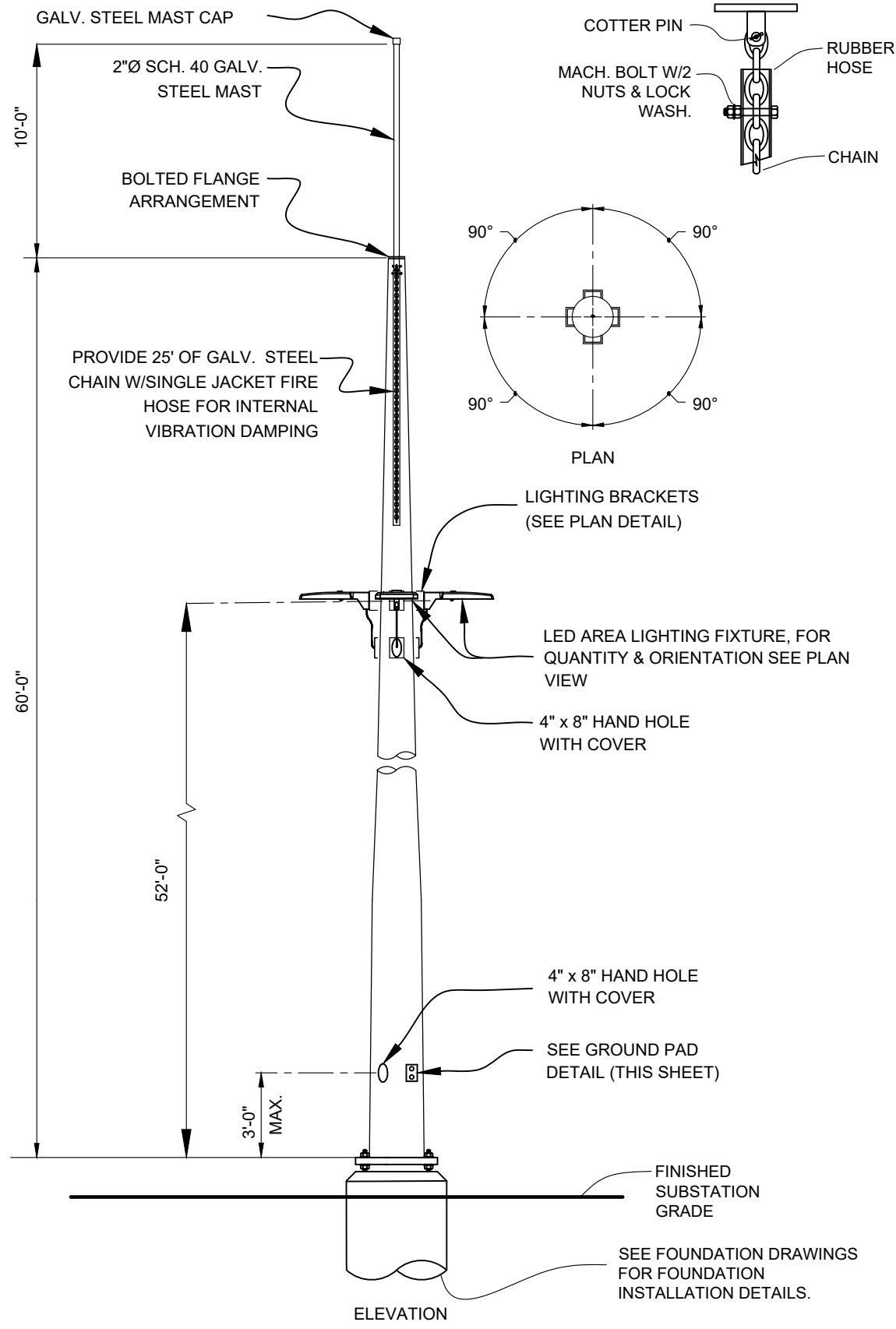


TUBE TO SWITCH PAD
N.T.S.

**PRELIMINARY
NOT FOR CONSTRUCTION**

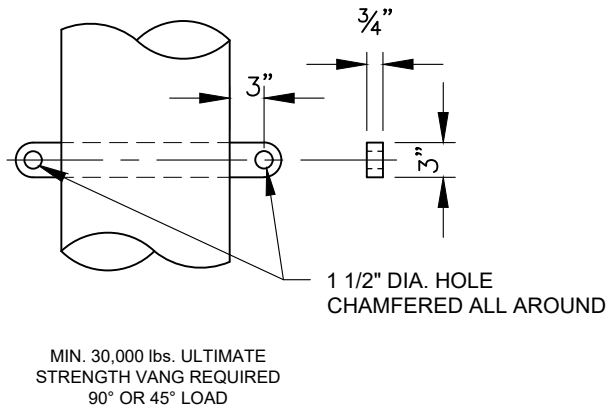
REFERENCES:	
PLAN VIEW	S-GA-001
SECTIONS	S-GA-002 TO S-GA-008
SECTIONS DETAILS	S-GA-101 TO S-GA-103
BILL OF MATERIAL	S-GA-110
FOUNDATION PLAN	S-FP-001
FOUNDATION DETAILS	S-FD-001 TO S-FD-009
OIL CONTAINMENT	S-OC-001 TO S-OC-003

PRELIMINARY - DO NOT USE FOR CONSTRUCTION	A	PRELIMINARY	06/02/26	PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE	
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	DWN.	AVS	DATE: 07/02/25	DWG. NO. DE8992	
	CKD.	RDH	APPD. RDH	S-GA-101	
	NO.	REVISIONS	DATE	SCALE: AS NOTED	
				PLOT: NONE	



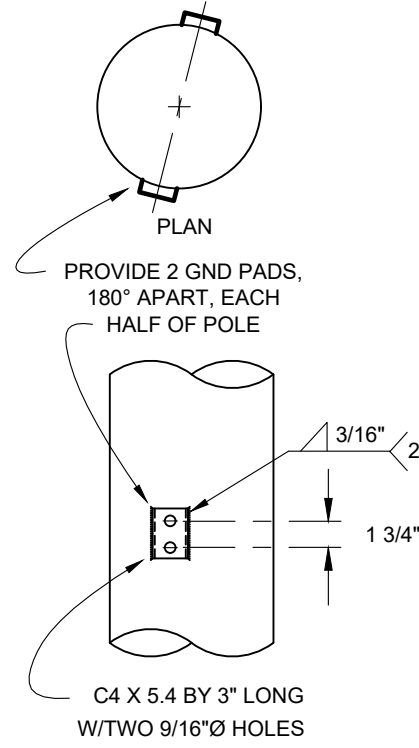
STATIC POLE DETAIL

N.T.S.



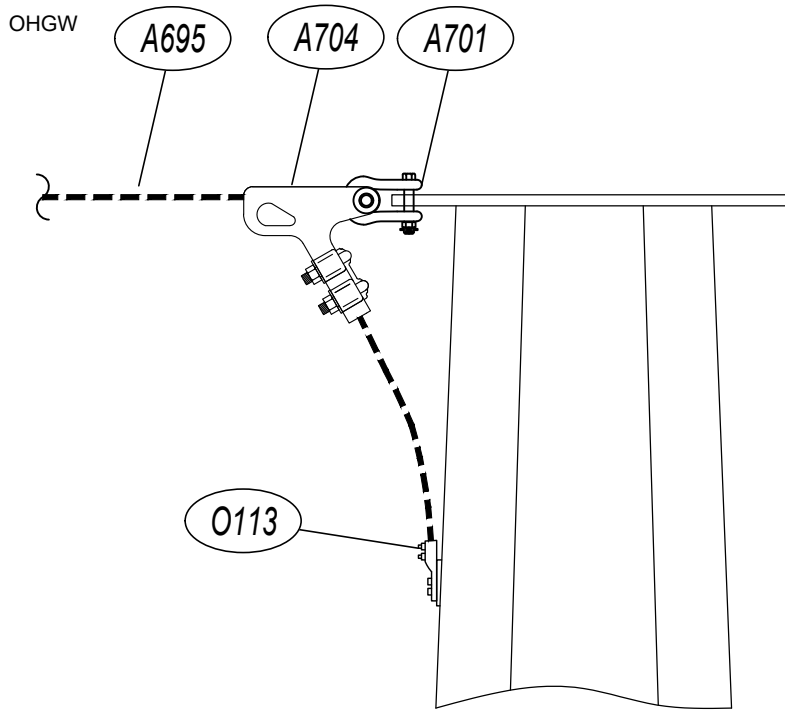
MAST SHIELD WIRE THRU-VANG DETAIL

N.T.S.



GROUND PAD DETAIL

N.T.S.



OHGW DEAD-END

N.T.S.

PRELIMINARY
NOT FOR CONSTRUCTION

REFERENCES:				
PLAN VIEW	S-GA-001			
SECTIONS	S-GA-002 TO S-GA-008			
SECTIONS DETAILS	S-GA-101 TO S-GA-103			
BILL OF MATERIAL	S-GA-110			
FOUNDATION PLAN	S-FP-001			
FOUNDATION DETAILS	S-FD-001 TO S-FD-009			
OIL CONTAINMENT	S-OC-001 TO S-OC-003			

PRELIMINARY - DO NOT USE FOR CONSTRUCTION	A	PRELIMINARY	06/02/26	PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE	
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				CKD. RDM	APPD. RDM
	NO.	REVISIONS	DATE	SCALE: AS NOTED	PLOT: NONE
					DWG. NO. DE8992 S-GA-102



DE8992-S-GA-101-103 (ID 149304).DWG

ITEM No.	DESCRIPTIONS	QUANTITY	MANUFACTURER	CATALOG No./TYPE
GROUP A: 000-499 - SUBSTATION STRUCTURES				
A101	STRUCTURE, STEEL GALVANIZED, 230 KV, HV SWITCH STRUCTURE, INCLUDING MOUNTING HARDWARE, FASTENERS, AND ANCHOR BOLTS	2	-	-
A102	STRUCTURE, STEEL GALVANIZED, 230 KV, HV TRANSITION STRUCTURE, INCLUDING MOUNTING HARDWARE, FASTENERS, AND ANCHOR BOLTS	1	-	-
A103	STRUCTURE, STEEL, 230 KV, STAND FOR PWC METERING EQUIPMENT, INCLUDING MOUNTING HARDWARE, FASTENERS, AND ANCHOR BOLTS	3	-	-
A115	STRUCTURE, STEEL, 230 KV, LINE-TERMINATING AND/OR SUPPORT FOR BUSWORK AND SWITCHES, INCLUDING MOUNTING HARDWARE, FASTENERS, AND ANCHOR BOLTS	1 LOT	-	-
A170	MAST, LIGHTNING, 10 FEET WITH CLAMP FOR 2/0 COPPER AND U-BOLTS FOR MOUNTING	11	-	-
A172	LED AREA LIGHTING FIXTURE AND PHOTOCONTROL	2	COOPER OR EQUIVALENT	USSL-C02-D-U-T4-SA-AP OR EQUIVALENT
GROUP A: 500-549 - FIBER OPTIC CABLE HARDWARE				
GROUP A: 600-649 - INSULATORS AND CONDUCTOR SUPPORTS				
GROUP A: 670-699 - WIRE				
A682	WIRE, BARE, ALUMINUM, 954 KCMIL AAC "MAGNOLIA"	AS REQUIRED	-	-
GROUP A: 700-999 - SUBSTATION CONNECTORS				
A886	CONNECTOR, MATERIALS FOR EACH NEMA 4-HOLE ELECTRICAL CONNECTION, BRONZE TO BRONZE OR BRONZE TO ALUMINUM, ALL COMPONENTS STAINLESS STEEL	AS REQUIRED	-	-
	A. BOLT HH 1/2" X LENGTH REQUIRED WITH NUT	4 EACH	-	-
	B. FLAT WASHER	8 EACH	-	-
	C. SPRING WASHER	4 EACH	-	-
A920	CONNECTOR, COMPRESSION, ALUMINUM, TERMINAL, 954 AAC "MAGNOLIA" TO 4-HOLE NEMA PAD (INCLUDES SPARES)	12	SEFCOR OR EQUIVALENT	AL-1126-4A OR EQUIVALENT
A923	ALUMINUM TEE, COMPRESSION, 954 AAC "MAGNOLIA" TO 4-HOLE NEMA PAD	4	SEFCOR OR EQUIVALENT	ATCF-1126-4A OR EQUIVALENT
GROUP B: 001-999 - GROUP-OPERATED AIR-BREAK SWITCHES				
GROUP C: 001-999 - SURGE ARRESTERS				
C905	ARRESTER, SURGE, STATION CLASS, 152KV MCOV, ANSI 70 GRAY, FOR USE ON 230 KV H-FRAME, BASE-MOUNTED	3	SIEMENS OR EQUIVALENT	3EL2-230-2PJ21-4YA5 OR EQUIVALENT
GROUP D: 001-999 - SINGLE-POLE DISCONNECTING SWITCHES				
GROUP E: 001-999 - POWER CIRCUIT BREAKERS				
GROUP F: 001-999 - CIRCUIT RECLOSURES				
GROUP G: 001-999 - METERS, RELAYS, AND INSTRUMENT TRANSFORMERS				
G944	TRANSFORMER, CURRENT AND VOLTAGE, SINGLE-PHASE, 230 KV, PWC METERING	3	RITZ OR EQUIVALENT	CMO 245 (need verification from RITZ) OR EQUIVALENT
GROUP H: 001-999 - TRANSFORMERS				
GROUP I: 001-999 - VOLTAGE LINE TRAP				
I-100	WAVE TRAP/CCVT - HORIZONTAL, 1200 AMPERE	1	BY DUKE	TBD
GROUP O: 001-999 - STATION GROUNDING				
O100	BELOW GRADE GROUNDING SYSTEM, PER BOOTH & ASSOCIATES, LLC. DRAWINGS. SYSTEM INCLUDES COPPER WELD GROUNDING RODS, DRIVE HEADS, COUPLERS, CAD WELD BONDING SYSTEM, 4/0 COPPER MAIN, 2/0 COPPER JUMPERS AND PERIMETER SYSTEM, GROUND, PER BOOTH & ASSOCIATES, INC. DRAWINGS. SYSTEM INCLUDES 3/4" X 10' COPPER WELD GROUNDING RODS, DRIVE HEADS, COUPLERS, CAD WELD BONDING SYSTEM	TBD BY SUBSTATION CONTRACTOR	N/A	N/A
O101	WIRE, BARE, COPPER, 2/0, 7 STRAND, SOFT DRAWN (BELOW GRADE PLUS TAILS)	TBD BY SUBSTATION CONTRACTOR	N/A	N/A
O102	WIRE, BARE, COPPER, 2/0, 7 STRAND, SOFT DRAWN (ABOVE GRADE)	AS REQUIRED	CUWIRE OR EQUIVALENT	
O103	WIRE, BARE, COPPER, TINNED #2, SOLID, SOFT DRAWN (FENCE)	AS REQUIRED	CUWIRE OR EQUIVALENT	
O104	WIRE, BARE, COPPER, 4/0, 7 STRAND, SOFT DRAWN (BELOW GRADE PLUS TAILS)	TBD BY SUBSTATION CONTRACTOR	N/A	N/A
O110	CONNECTOR, BOLTED, SPLIT-BOLT, #2 TINNED COPPER TO FENCE FABRIC/BARBED WIRE	345	BURNDY OR EQUIVALENT	KSU23 OR EQUIVALENT
O112	CONNECTOR, BOLTED, BRONZE, TERMINAL, SINGLE 2/0 AWG OR 4/0 TO 2-HOLE NEMA PAD, TIN PLATED	12	SEFCOR OR EQUIVALENT	FNCT-12H-2B-SND OR EQUIVALENT
O113	CONNECTOR, BOLTED BRONZE, TERMINAL, TAP LUG, #8 AWG TO 2/0 AWG TO 1-HOLE FLAT PAD, TIN PLATED, WASHER	34	SEFCOR OR EQUIVALENT	UN-4048-BW-SND OR EQUIVALENT
O114	CONNECTOR, BOLTED, BRONZE, GROUND CLAMP, FOR ONE OR TWO CABLE, #4 TO 300 KCMIL COPPER FLAT BAR	300	SEFCOR OR EQUIVALENT	GTC2-14B OR EQUIVALENT
O115	CONNECTOR, BOLTED, BRONZE, GROUNDING CLAMP, CABLE TO TUBE, #4 - #2 AWG TO 2" O.D. (GATE RAIL) , TIN PLATED	8	SEFCOR OR EQUIVALENT	1-OC-2648-SND OR EQUIVALENT
O116	CONNECTOR, BOLTED, BRONZE, GROUNDING CLAMP, CABLE TO TUBE, #4 - #2 AWG TO 1-3/4" O.D. (FENCE TOP RAIL) , TIN PLATED	100	SEFCOR OR EQUIVALENT	1-OC-2548-SND OR EQUIVALENT
O117	CONNECTOR, BOLTED, BRONZE, GROUNDING CLAMP, CABLE TO TUBE, DUAL #4 - 2/0 AWG TO 2-1/2" O.D. (FENCE LINE POST), TIN PLATED	30	SEFCOR OR EQUIVALENT	GU1-5809-SND OR EQUIVALENT
O118	CONNECTOR, BOLTED, BRONZE, GROUNDING CLAMP, CABLE TO TUBE, DUAL #4 - 2/0 AWG TO 3" O.D. (FENCE CORNER POST), TIN PLATED	4	SEFCOR OR EQUIVALENT	GU1-6009-SND OR EQUIVALENT
O119	CONNECTOR, BOLTED BRONZE, GROUNDING CLAMP, CABLE TO TUBE, DUAL 2/0 AWG TO 4.0" O.D. (FENCE GATE POST), TIN PLATED	10	SEFCOR OR EQUIVALENT	GU1-6309 OR EQUIVALENT
O121	CONNECTOR, BOLTED, SPLIT-BOLT, #2 TINNED COPPER TO 2/0 AWG COPPER	45	SEFCOR OR EQUIVALENT	BN-N-2/0SP OR EQUIVALENT
O122	ENCLOSURE GROUNDING STUD FOR 2/0 AWG COPPER, BOLTED, TIN PLATED	30	BURNDY OR EQUIVALENT	KC26B1-NSP-TN OR EQUIVALENT
O123	CONNECTOR, BOLTED, BRONZE, GROUNDING CLAMP, CABLE TO TUBE, #4 SOLID - 2/0 AWG TO 2" O.D. (STRUCTURE STATIC POLE), TIN PLATED	11	HUBBELL OR EQUIVALENT	1-OC-2648-SND
O131	GROUND CLAMP, 4" O.D. PIPE GATE POST TO BRAID, TIN PLATED (INCLUDES SPARE)	8	SEFCOR OR EQUIVALENT	GBR-63-SND
O133	GROUND CLAMP, 2" O.D. PIPE GATE POST TO BRAID, TIN PLATED (INCLUDES SPARE)	8	SEFCOR OR EQUIVALENT	GBR-54-SND
O140	FLEXIBLE GROUNDING BRAID, 200 AMPERE, TIN PLATED (INCLUDES SPARE)	8	SEFCOR OR EQUIVALENT	XBG146-D1-24
O141	TERMINAL, 2/0 STRANDED COPPER TO 1-HOLE PAD, 7/16" DIA HOLE, 3/16" THICK PAD MAX	12	BURNDY OR EQUIVALENT	YA26N
O142	FIGURE 6-SHAPED COPPER TAP CONNECTOR 1/0-250KCMIL RUN TO #4-2/0 TAP (FOR CONNECTION TO GROUND GRID)	8	BURNDY OR EQUIVALENT	YP29C261

FOR BID PURPOSES
NOT FOR CONSTRUCTION

NOTES:

1. ALL ITEMS TO BE PROVIDED BY THE STRUCTURES AND EQUIPMENT PACKAGER UNLESS OTHERWISE NOTED.

PRELIMINARY - DO NOT USE FOR CONSTRUCTION	A	PRELIMINARY	06/02/26	PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE		
				POINT OF DELIVERY No. 5		
				BILL OF MATERIALS SCHEDULE 2		
		DWN: DDS	DATE: 05/05/26	DWG. NO. DE8992 S-GA-111		
		CKD: RDM	APPD: RDM			
© 07/25		NO.	REVISIONS	DATE	SCALE: NTS	PLOT: NONE

2

Structural and Tubular Steel **Specifications**

**FAYETTEVILLE PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA**

**STRUCTURAL AND TUBULAR STEEL
SPECIFICATIONS FOR
POD 5 SUBSTATION**

ISSUE FOR BID

**PRELIMINARY – DO NOT
USE FOR CONSTRUCTION**

ISSUED FOR BID

September 01, 2026

BOOTH & ASSOCIATES, LLC

**Booth & Associates, LLC
Consulting Engineers
2300 Rexwoods Drive, Ste. 300
Raleigh, North Carolina 27607
Firm License No.: F-0221**

**FAYETTEVILLE PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA**

**SPECIFICATIONS FOR STRUCTURES AND
EQUIPMENT FOR THE
POD 5 – MCARTHUR RD SUBSTATION**

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**FAYETTEVILLE PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA**

**SPECIFICATIONS FOR STRUCTURES AND EQUIPMENT FOR THE
POD 5 – MCARTHUR RD SUBSTATION**

TECHNICAL SPECIFICATIONS

1.0 General

- 1.1 Construction documents including all design drawings and specifications of all disciplines complement each other and shall be read and interpreted collectively.
- 1.2 Where a conflict or conflicts are found between construction documents, then the conflict shall be brought to the attention of the Engineer, in writing, for resolution.
- 1.3 The structural steel fabricator shall be responsible for coordination between the requirements of the structural steel design drawings, the electrical general arrangement plans, and the equipment mounting requirements.
- 1.4 Where equipment mounting locations and/or elevations are shown on the structural steel drawings, then adjustment of such locations or elevations to match the mounting and/or clearances requirements are allowed provided this adjustment does not exceed 6 inches in any one location, and provided such adjustment does not create conflict(s) with structural steel members or connections. Where more adjustment is needed, it shall be referred to the Engineer for resolution and approval before fabrication.
- 1.5 This specification covers detailing, furnishing, fabrication, painting/galvanizing and delivery of all structural/miscellaneous steel, tubular steel, and aluminum/steel/fiberglass grating as shown on the drawings.
- 1.6 All work, including workmanship, pertaining to this specification shall be done in accordance with the reference standard revisions in effect at the time of contract award.
 - 1.6.1 AISC American Institute of Steel Construction (AISC), Specification for the Design, Fabrication and Erection of Structural Steel for Buildings, latest edition.
 - 1.6.2 American Society of Civil Engineers (ASCE) Standard, Design of Steel Transmission Pole Structures, Manual 48, latest edition.
 - 1.6.3 American Welding Society (AWS), Structural Welding Code, AWS D1.1, latest edition.
 - 1.6.4 Steel Structure Painting Council (SSPC), Surface Preparation Specification, SSPC-SP6, latest edition.
 - 1.6.5 American Society for Testing and Materials (ASTM), various standards, latest version.
 - 1.6.6 American National Standards Institute (ANSI), National Electrical Safety Code, ANSI C2, latest edition.

2.0 Materials

- 2.1 All structural shapes shall be conforming to ASTM A992 except for channels, angles, and plates which shall conform to ASTM A36.
- 2.2 Structural steel pipe shall conform to ASTM A53, Type E or S, Grade B, unless otherwise shown on the drawings.
- 2.3 Structural square and rectangular tubing shall conform to ASTM A500, Grade B.
- 2.4 Steel for tapered columns shall conform to ASTM A572, unless otherwise shown on the drawings.
- 2.5 Anchor bolts shall conform to F1554 Standard Specification for Anchor Bolts, grade 36, 55, and 105 ksi yield strength as specified on the drawings. Each anchor bolt shall be furnished with washers and nuts. Nuts shall be of equivalent strength to the ASTM A563 Heavy Hexagon specification. Washers shall adhere to ASTM F436 Extra Thick, unless otherwise shown on the drawings.
- 2.6 Bolts, except for anchor bolts, shall conform to ASTM F3125, A325 Type I. Nuts shall conform to ASTM A563 and shall be of grade and style suitable for use with bolts supplied. Galvanized nuts shall be grade DH. Washers shall conform to ASTM F436, unless otherwise shown on the drawings.

3.0 Structural Steel Details and Fabrication

- 3.1 Fabrication and workmanship shall conform to the AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings, unless otherwise specified.
- 3.2 Welding shall be performed by qualified operators using procedures in accordance with AWS D1.1 and using E70XX electrodes. All surface areas to be welded shall be cleaned completely of rust, scales, oil or grease, and any other foreign matter. Welds which do not exhibit a neat, smooth appearance shall be ground smooth.
- 3.3 Structures shall be hot-dip galvanized after fabrication, unless otherwise shown on the drawings.
- 3.4 All structural steel bolts shall be minimum five-eighths inch (5/8") diameter, unless otherwise shown on the drawings.
- 3.5 The maximum size of bolts to be used in any section, clearances, edge distance, and general structural practice not definitely stated in the Specifications shall be in accordance with the standard of the latest edition of the American Institute of Steel Construction.
- 3.6 All anchor bolts required for the installation of the structures shall be furnished by the Manufacturer. Anchor bolts shall be hot-dip galvanized, complete with two (2) heavy hex nuts and extra thick flat washers for leveling, unless otherwise shown on the drawings.
- 3.7 All parts of the structure shall be neatly finished. All members shall be free from kinks, twists, bends, or open joints. All members that are bent or out of line after galvanizing shall be carefully straightened with a straightening roll or straightening machine. The use of sledges in straightening bent material or other methods in which the material or its finish may be mutilated shall not be allowed.

- 3.8 All nuts shall be readily accessible to a wrench for adjustment. Bolts shall not be flushed but shall project approximately one-fourth inch (1/4-inch) beyond the face of the nuts. Nuts shall fit the shanks so that they may be screwed on with the fingers and at the same time not fit so loosely that the value of the bolts acting with the tension of the head of the nut will be reduced.
- 3.9 All steel members shall be clearly marked to provide easy identification in the field. **Trusses and box columns up to, and including, four feet by four feet (4'-0" x 4'-0"), shall be assembled before shipment to ensure correctness, and shall be shipped assembled.** If the Manufacturer does not intend to ship the trusses and box columns completely assembled, he shall so state in the quote. Markings on component parts shall indicate the structure to which they apply.
- 3.10 Sectional members combined to form columns of the required height will not be accepted. Angles for column legs must be continuous to provide the necessary height.
- 3.11 Continuous punching of steel sections for equipment mounting is not acceptable. Holes shall be provided as needed for erection and equipment installation, but unnecessary holes will not be accepted.
- 3.12 If any material whatsoever in any state of completion is found defective as to workmanship, details, or materials or is contrary to the design for these specifications, it shall be rejected. This rejection may take place at the rolling mills, fabricating plant, galvanizing plant, or at the site of the structure. Any rejected materials shall be replaced without any expense whatsoever to Owner.

4.0 Tubular Steel Structure Details and Fabrication

- 4.1 Lifting lugs are optional. The manufacturer shall supply all instructions for handling and erection of poles and arms.
- 4.2 Each pole shall be permanently marked on the pole shaft seventy-two inches (72") above ground line and on the bottom of base plate or bearing plate with the following identifying information:
- a. Manufacturer's Identification
 - b. Structure Type
 - c. Height and Class
 - d. Structure Number
 - e. Ultimate Ground Line Moment
 - f. Owner's Name
 - g. Date Manufactured
- The method of identification shall be approved by the Owner. In addition, there shall be clear indication or marks for handling or sling points, storage rack points, and lifting joints for standing the pole and vibratory pole base.
- 4.3 All welding shall be in accordance with the American Welding Society Code AWS D1.1, latest edition. Welders shall be qualified in accordance with AWS .1 welding procedures.

- 4.4 One hundred percent (100%) penetration welds shall be required in, but not limited to, the following areas:
- a. circumferential welds (C-welds) joining structural members,
 - b. longitudinal welds in the female portion of the joint within the slip joint area,
 - c. welds at the butt joints of back-up strips,
 - d. base plate to shaft weld,
 - e. longitudinal welds for a minimum length of three inches (3") where there are adjacent C-welds, flange welds, base welds and ends of tubes.
- 4.5 Full penetration or equivalent ninety percent (90%) partial penetration with fillet overlap shall be used for vang-to-plate shaft, and arm box joints.
- 4.6 Quality and acceptability of every inch of the full penetration welds shall be determined by visual and ultrasonic inspection.
- 4.7 All other penetration welds shall have sixty percent (60%) minimum penetration. Quality and acceptability of all welds other than full penetration welds shall be determined by visual inspection, supplemented by magnetic particle, ultrasonic or dye penetrant inspection.
- 4.8 All weld back-up strips shall be continuous the full length of the welds. Care shall be exercised in the design of welded connections to avoid areas of high stress concentration which could be subject to fatigue or brittle fractures.
- 4.9 Field welding shall not be permitted except with the Engineer's and Owner's approval and with the manufacturer's direction in repairing a pole.
- 4.10 All parts of the structure shall be neatly finished and free from kinks or twists. All holes, blocks, and clips shall be made with sharp tools and shall be clean-cut without torn or ragged edges.
- 4.11 Before being laid out or worked in any manner, structural material shall be straight and clean. If straightening is necessary, it shall be done by methods that will not injure the metal.
- 4.12 Minimum plate thickness for all pole components shall be three-sixteenths inch (3/16").
- 4.13 Shearing and cutting shall be performed carefully and all portions of the work shall be finished neatly. Copes and re-entrant cuts shall be filleted before cutting.
- 4.14 All forming or bending during fabrication shall be done by methods that will prevent embrittlement or loss of strength in the material being worked.
- 4.15 Holes for connection bolts shall be one-sixteenth inch (1/16") larger than the nominal diameter of the bolts. Holes in the flange plates for bolted splices shall be one-eighth inch (1/8") larger than the bolt diameter. Holes in the base plates for anchor bolts shall be three-eighths inch (3/8") larger than the nominal diameter of the anchor bolts. The details of all connections and splices shall be subject to the approval of the Owner or his representatives.

- 4.16 Holes in steel plates which are punched must be smooth and cylindrical without excessive tear out or depressions. Any burrs that remain after punching shall be removed by grinding, reaming, etc.
- 4.17 Holes of any diameter may be drilled in plate of any thickness. Care shall be taken to maintain accuracy when drilling stacks of plates.
- 4.18 Holes may be made by use of a machine guided oxygen torch. Flame cut edges shall be reasonably smooth and suitable for the stresses transmitted to them.
- 4.19 The overall length of the assembled structure should not be less than six inches (6") of the specified length and not more than twelve inches (12").

5.0 Finishes

- 5.1 Galvanizing
 - 5.1.1 Structures shall be hot-dip galvanized after fabrication, unless otherwise shown on the drawings.
 - 5.1.2 Galvanizing shall conform to ASTM A123. Precautions shall be taken against embrittlement, warpage and distortion in accordance with ASTM A143 and A384.
 - 5.1.3 Fasteners and anchor bolts shall be galvanized in accordance with ASTM F2329.
- 5.2 Coatings for Embedded Portion of Poles
 - 5.2.1 A sixteen (16) mil (minimum dry film thickness), two (2) component hydrocarbon extended polyurethane coating that is resistant to ultraviolet light shall be applied on the exposed surface of the embedded portion of the pole. The coating shall extend from the butt to five feet (5'-0") above ground line. Termination of coating at location above ground shall be feathered. Other coatings shall be approved by the Owner prior to their use.

6.0 Field Touch Up of Galvanized Surfaces

- 6.1 Structural steel shall be touched up with cold galvanizing compound so that all surfaces are completely protected and free of runs and sags.
- 6.2 All steel requiring touch-up shall be dry and free of all dirt, rust, oil, loose paint and other foreign material. Surfaces shall be prepared in accordance with Steel Structures Painting Council Specifications on Surface Preparation.
- 6.3 All steel surfaces or finish damaged during the material handling, installation or removal of various equipment shall be thoroughly cleaned, brushed and cold galvanized with inorganic zinc rich paint.
- 6.4 Approved inorganic zinc products:
 - 6.4.1 Dimetcote 9, manufacturer: PPG Protective Coatings
 - 6.4.2 Carbozinc 11, manufacturer: Carboline Company
 - 6.4.3 Cathacoat 304V, manufacturer: ICI-DEVOE
- 6.5 All galvanized structural steel shall be repaired in accordance with ASTM A780.

7.0 Erection

- 7.1 Prior to the erection of structural steel, the Contractor shall measure all steel members in order to confirm that the material is in accordance with fabricator's shop drawings. Any items which require significant modification shall be reported to Booth and Associate's engineers immediately.
- 7.2 The Contractor shall be responsible for furnishing, installing, maintaining, and removing temporary structures required to support steel during erection.
- 7.3 No electrical equipment or cables shall be installed on any steel structure until all structural members have been completely erected and all fasteners properly secured to the specified torque.
- 7.4 All steel contact surfaces at connections shall be free of all scale, dirt, oil, etc.
- 7.5 All steel structures shall be plumb and level. Structural bolts shall not be tightened until all parts are installed in place. After steel is completely installed, bolts shall then be installed to final torque levels. Care shall be exercised to prevent kinking of steel members. Base plates for columns shall be leveled and installed using the double-nut method unless noted.
- 7.6 The Contractor shall take the necessary measures required to prevent any foreign material, such as mud, dirt, concrete splatter, etc., from accumulating on the stored materials. These measures shall include, but shall not be limited to, the use of timbers/pallets to elevate material above grade, covering an area of the initially graded substation yard with several inches of washed stone, the use of a storage trailer, or an enclosed structure.

8.0 Shipping Instructions

- 8.1 Material shall be carefully prepared for shipment so as to prevent damage to components and their protective coatings or loss of components.
- 8.2 Each shipment shall be accompanied by a checklist of all parts, identifiable by structure type and number. Bolts and miscellaneous hardware will be identified by the list for match up with the respective structure and shall be boxed or bundled. All parts required for any one structure shall be in one (1) shipment, if possible.
- 8.3 The manufacturer is responsible for repairing or replacing any structures which are delivered to the site with manufacturing errors. Repair and/or replacement costs shall include the structure itself, as well as any associated construction costs.
- 8.4 All materials shall be shipped to the jobsite by truck.
- 8.5 One full set of approved shop drawings, Erection Diagrams and Details, shall be shipped to the jobsite with the steel order.

9.0 References

9.1 ASTM International

- 1. ASTM A36-Standard Specification for Carbon Structural Steel
- 2. ASTM A53-Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless

3. ASTM A123-Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
4. ASTM A143-Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
5. ASTM F2329- Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners
6. ASTM A384-Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing Steel Assemblies
7. ASTM A500-Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
8. ASTM A501-Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
9. ASTM A563-Standard Specification for Carbon and Alloy Steel Nuts
10. ASTM A572-Standard Specification for High-Strength Low-Alloy Columbium Vanadium Structural Steel
11. ASTM A780-Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
12. ASTM A992-Standard Specification for Structural Steel Shapes
13. ASTM F3125-Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength
14. ASTM F1554-Standard Specification for Anchor Bolts, Steel, 36, 55 and 105-ksi Yield Strength

9.2 American Welding Society

1. AWS D1.1-Structural Welding Code-Steel

9.3 American Institute of Steel Construction

1. AISC 360 Specification for Structural Steel Buildings

3

Steel Weight Breakdown

**FAYETTEVILLE PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA**

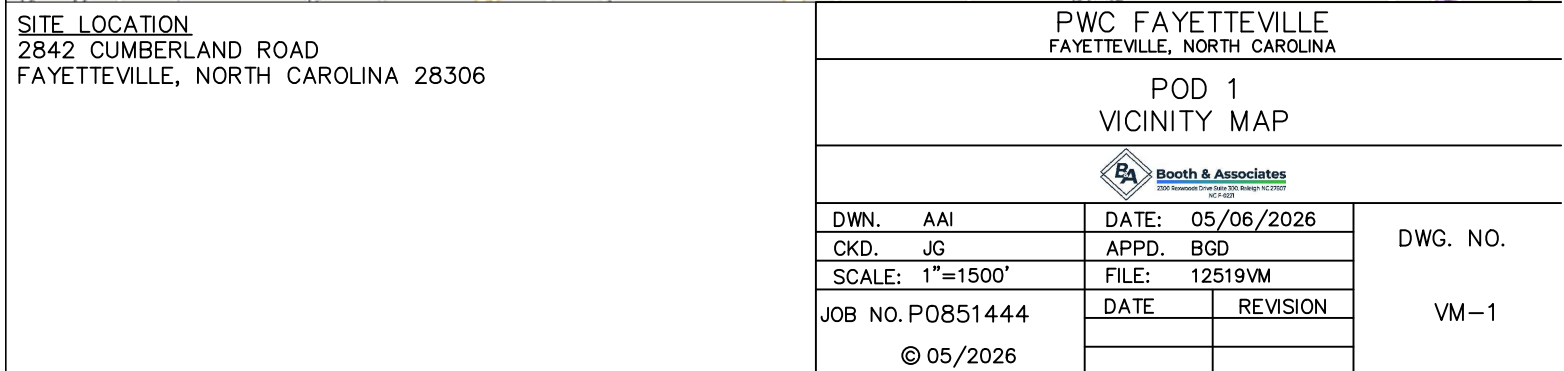
**STRUCTURES AND EQUIPMENT SPECIFICATION FOR THE
POD 5 – MCARTHUR RD SUBSTATION**

STEEL WEIGHT BREAKDOWN - B

Structural Steel Summary			
Structure	Quantity	Weight/Str	Total Weight
1 High Bus	8	1,022.89	8,183.12
1 Low Bus	13	976.96	12,700.48
PT-CT Stand	3	1,447.34	4,342.02
Ground Mat	21	468.00	9,828.00
Total Black Weight			14,170.02
Total Galvanized (4%)			14,736.82

4

Vicinity Map



ATTACHMENT B: BID PRICING FORM

Bidder Information:

Name of Company

Company Location

Phone Number

Email Address

Manufacturer

Manufacturer Location

Is the company an N.C.

Certified DBE

Printed Name

Title

Authorized Signature

Date

Bidders shall submit pricing exclusively on the Bid Pricing Form provided in this IFB, fully completed and properly executed. A complete submission includes bidder and manufacturer information, required line-item pricing (including part numbers, lead times, unit and extended prices), required tariff disclosures, acknowledgment of all issued addenda, and the signature of an authorized representative. All pricing must include all known tariffs, duties, and import-related charges effective as of the bid due date, remain firm for a minimum of sixty (60) calendar days from bid opening, be F.O.B. Destination, and shall not be conditioned upon shipment date, import date, regulatory change, exchange rate fluctuation, or any other post-bid variable.

Furnish And Deliver:

Item #	QTY.	UOM	DESCRIPTION	UNIT PRICE	EXTENDED PRICE
1	1	LS	Technical Specifications – A Structure and Equipment as described in the Technical Specifications A and Drawings for the POD 5 – McArthur Road Substation	\$	\$

Company Name: _____

1	1	LS	Technical Specifications – B Structure and Equipment as described in the Technical Specifications B and Drawings for the POD 5 – McArthur Road Substation	\$	\$
---	---	----	--	----	----

TOTAL EXTENDED BID

\$ _____

Delivery Schedule (Days): Technical Specifications A	
Approval Drawings	
Final Drawings	
Delivery	
Field Service Engineering (Per Day Rate)	
Per Day Rate (including expenses) for field service engineering for additional days	\$ _____

Delivery Schedule (Days): Technical Specifications B	
Approval Drawings	
Final Drawings	
Delivery	
Field Service Engineering (Per Day Rate)	
Per Day Rate (including expenses) for field service engineering for additional days	\$ _____

Tariff Disclosure Section:

- Are any tariffs included in the Bid Price?
☐ Yes ☐ No
- If yes, complete the table below for each tariff-impacted line item or component included in this bid:

Line Item / Component			
Country of Origin			
Base Cost of Affected Component (Included in Bid)			
Tariff % Applied at Bid			
Tariff Cost Included in Bid			

Company Name: _____

3. Percentage of total bid price attributable to tariffs: _____ %
4. Total tariff cost included in this bid: \$ _____
5. The Bidder certifies that the tariff values identified above reflect the tariff cost included in the bid price as of the bid due date.

Signature: _____ Date: _____

Addendum Acknowledgment Section:

The Bidder has received, acknowledged, and used the following addenda in completing the Bid. (Initial and Date as appropriate).

Addendum No. 1	Date _____
Addendum No. 2	Date _____
Addendum No. 3	Date _____
Addendum No. 4	Date _____
Addendum No. 5	Date _____
Addendum No. 6	Date _____
Addendum No. 7	Date _____

ATTACHMENT C: CERTIFICATION OF PRIMARY PARTICIPANT REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS

The Primary Participant, _____ (major third party contractor), certifies to the best of its knowledge and belief, that it and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
2. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
3. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (2) of this certification; and
4. Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

(If the primary participant is unable to certify to any of the statements in this certification, the participant shall attach an explanation to this certification.)

THE PRIMARY PARTICIPANT _____ CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF THE CONTENTS OF THE STATEMENTS SUBMITTED ON OR WITH THIS CERTIFICATION AND UNDERSTANDS THAT THE PROVISIONS OF 31 U.S.C. SECTIONS 3801 ET. SEQ. ARE APPLICABLE THERETO.

Signature
FOR THE POD 5 - MCARTHUR ROAD SUBSTATION

STRUCTURES AND EQUIPMENT

Printed Name

Date

PWC at a Glance



Customers



- In operation since 1905
- Provides Electric, Water & Wastewater Services to more than 250,000 people
- Total Customers: 123,017
- Number of Services: 275,382
 - Electric: 83,918
 - Water: 98,439
 - Wastewater: 93,004
 - Irrigation: 6,426
- Customers with 2+ services: 75%

Customer Service



- Annual Customer Contacts: 443,258
- Average Monthly Calls: 33,657
- Annual Bills Generated: 1.5 Million
- Customer Incentive Programs: 14
- Annual Water Leak Notifications: 20,772 (24 million gal)

Employees



- Number of Employees: 690
- Average Tenure of Employees: 10 years
- Average Age: 45
- Annual Turnover: 6.0%*
- Annual Hours Worked: 1.3 Million

*non retirement

Facilities



- Butler-Warner Generation Plant (268 MW)
 - Electric Service Area: 147 Sq. miles
- P.O. Hoffer Water Treatment Facility (39.5 MGD)
- Glenville Lake Water Treatment Facility (18.0 MGD)
 - Drinking Water Service Area: 116 Sq. miles
- Cross Creek Water Reclamation Facility (25 MGD)
- Rockfish Creek Water Reclamation Facility (21 MGD)
 - Wastewater Service Area: 109 Sq. miles

Electric Operations



- Purchase Wholesale Power from Duke Energy
- Only NC municipal system to own/operate a generation plant (Dispatched for use by Duke Energy)
- Generation Capacity: 265 MW
- Annual MWH Sold: 2 million
- System Peak: 499 MW (Feb. 20, 2015)
- Solar Generation Capacity: 2.9 MW
- Annual Solar Generation: 1,454,371 KWH
- Battery Storage: 2 MW
- Electric Distribution Substations: 32
- Distribution Lines: 1,364 miles
- Transmission Lines: 123 miles
- Streetlights/Area Lights: 38,023

Water/Wastewater Operations



- Population Served: 225,000+
- Drinking Water Treated: 10.645 Billion Gallons/Year
- 100% Compliant for all EPA Drinking Water Standards
- Daily Water Treatment Capacity: 50 MG/Day
- Daily Wastewater Treatment Capacity: 46 MG/Day
- Water/Wastewater Infrastructure: 2,979 miles
- Hydrants: 8,780
- Sanitary Sewer Lift Stations: 79
- Manholes: 34,430

Financial



- FY24 Annual Operating Budget: \$450 Million
- Total Assets: \$1.89 Billion
- Bond Rating: Aa2(Moody's), AA (Standard & Poor's), AA (Fitch)
- Operations & Maintenance Expense per Customer: \$570 (\$618 National Median)
- Annual Cash Contributions to the City of Fayetteville in Lieu of Taxes: \$12.06 Million
- Annual Streetlight Services: \$4.14 Million
- Annual Annexation Construction Costs: \$8.49 Million
- Total Value of Annual Contributions to the City of Fayetteville: \$30.81 Million

Visit www.FayPWC.com to learn more about PWC



SALE OF GOODS AGREEMENT

This Sale of Goods Agreement ("Agreement") is made by and between the City of Fayetteville (the "City"), by and through the Fayetteville Public Works Commission ("PWC"), a North Carolina public authority, and [insert seller's full legal name] ("Seller"), a [identify the legal entity and State in which formation was accomplished] (each of PWC and Seller is a "Party" and both are collectively the "Parties") as of the date of execution last written below (the "Effective Date"). In consideration of the mutual covenants and agreements contained herein, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, The Parties agree as follows:

1. Sale of Goods. Seller shall sell to PWC and PWC shall purchase from Seller the following [Identify the goods specifically] (the "Goods"). PWC may issue a purchase order for the Goods that specifies any additional applicable terms and conditions set forth for the purchase (a "Purchase Order"), but such Purchase Order is subject to the terms of this Agreement. In the event of a conflict between the provisions of this Agreement and the provisions of any Contract Documents, attachment, exhibit or Purchase Order made pursuant to this Agreement, the terms of this Agreement shall govern.

2. Contract Documents. "Contract Documents" means, collectively, the following documents that were either made available to Seller by PWC during the bid solicitation process (including Drawings) or executed by the Parties, or both, which are all incorporated by reference herein:

- a. This Agreement
- b. Notice to Prospective Bidders
- c. Definitions
- d. Instructions to Bidders
- e. General Conditions
- f. Materialman's Proposal
- g. Bid Bond
- h. Technical Specifications
- i. Purchase Order(s)
- j. Addenda

3. Delivery of Goods. Seller shall deliver the Goods [EITHER: "on or before _____" OR "as specified in the Contract Documents or an applicable Purchase Order issued by PWC" OR "as otherwise agreed in writing by the Parties"] (the "Delivery Date"). Timely delivery of the Goods is of the essence. If Seller fails to deliver the Goods on or before the Delivery Date, PWC may, without any liability to Seller, terminate this Agreement immediately by providing written notice to Seller. Unless otherwise specified in an applicable Purchase Order or the Contract Documents, excluding this Agreement, all Goods shall be delivered to PWC's Warehouse at 955 Old Wilmington Road, Fayetteville, North Carolina 28301 (the "Delivery Point") during PWC's normal business hours. Delivery shall be made FOB Delivery Point.

4. Title and Risk of Loss. Title of the Goods passes to PWC upon delivery of the Goods to the Delivery Point. Seller bears all risk of loss or damage to the Goods until delivery of the Goods to the Delivery Point.

5. Packaging. Seller shall properly pack, mark, and ship the Goods as instructed by PWC and otherwise in accordance with applicable law and industry standards and shall provide PWC with all shipment documentation showing the quantity of pieces in shipment, the number of cartons or containers in shipment, Seller's name, the airway bill or bill of lading number, and the state of origin.

6. Inspection and Rejection of Nonconforming Goods. PWC has the right to inspect the Goods on or after the Delivery Date. PWC, at its sole option, may inspect all or a sample of the Goods, and may reject all or any portion of the Goods if it determines the Goods are nonconforming or defective. If PWC rejects any portion of the Goods, PWC has the right, effective upon written notice to Seller, to: (a) terminate this Agreement in its entirety and require Seller to remove the Goods in a commercially reasonable time period or pay the full cost and expense to have the rejected Goods returned to Seller; or (b) reject the Goods and require replacement of the rejected Goods at Seller's sole expense. If PWC requires replacement of the Goods, Seller shall, at its sole expense and in the lesser of ninety (90) days or the number of days between any applicable Purchase Order of PWC and the Delivery Date, replace the nonconforming Goods and pay for all related expenses, including, but not limited to, transportation charges for the return of the defective goods and the delivery of replacement Goods. Any inspection or other action by PWC under this Section shall not reduce or otherwise affect Seller's obligations under this Agreement, including Seller's warranties, and PWC shall have the right to conduct further inspections after Seller has carried out its remedial actions.

7. Price. PWC shall purchase the Goods from Seller in the total amount of \$_____ ("Price"). The Price includes all packaging, transportation costs to the Delivery Location, insurance, fees, and applicable taxes, including, but not limited to, all sales, use, or excise taxes. No increase in the Price is effective, whether due to increased material, labor, transportation costs or otherwise, without the prior written consent of PWC.

8. Billing and Payment. Seller shall invoice PWC within thirty (30) days after the completion of the delivery of the Goods. PWC shall pay the undisputed portion of the invoice within forty-five (45) calendar days after PWC's receipt of the invoice. All payments from PWC to Seller shall be transferred electronically to Seller's designated financial institution, and Seller shall, prior to delivery of its invoice to PWC, supply the name of Seller's financial institution, routing number, and account number on the form available from PWC and provide to PWC a completed and signed IRS Form W-9. Seller has the right to impose a late payment charge of one percent (1%) per month for amounts unpaid by PWC by the date due.

Seller shall comply with all of the following requirements so that PWC may recover the full amount of sales and use tax under North Carolina law permitted under the law:

- a. Furnish PWC documentary evidence showing the material used, sales tax paid, and County paid (County of sale). The documentary evidence shall include Seller's certified statement showing total purchases of materials from each separate vendor and total sales taxes charged to PWC and paid by Seller. The documentary evidence shall also include Seller's certified statement as to the amount paid by PWC for sales tax on the Goods. A certified form is required even if no sales tax was paid for the pay request period. Materials used from Seller's warehouse stock shall be shown in a certified statement at warehouse stock prices and amount of County of Use Tax charged to PWC and paid by Seller;

- b. Seller shall furnish to PWC invoices or copies of invoices for all materials purchased for said work within pay request period, and such invoices shall state the amount of North Carolina Sales Tax, if any, paid for the Goods. Seller shall also furnish to PWC invoices identifying the amount paid for the sales and use tax on Services that are subject to such taxation under North Carolina law; and
- c. Seller shall not include any tax paid on supplies, tools, and equipment that Seller uses to perform its obligations under this Agreement.

9. Warranties. Seller warrants to PWC that for a period of twenty-four (24) months from the Delivery Date, all Goods will: (a) be free from any defects in workmanship, material and design; (b) conform to applicable specifications, drawings, designs, samples and other requirements set forth in the Contract Documents or as specified by PWC and agreed to by Seller; (c) be fit for their intended purpose and operate as intended; (d) be free and clear of all liens, security interests, or other encumbrances; and (e) not infringe or misappropriate any third party's patent or other intellectual property rights. These warranties survive any delivery, inspection, acceptance or payment of or for the Goods by PWC. These warranties are cumulative and in addition to any other warranty provided by law or equity. Any applicable statute of limitations runs from the date of PWC's discovery of the noncompliance of the Goods with the foregoing warranties. If PWC gives Seller notice of noncompliance with this Section 9, Seller shall, at its own cost and expense, within thirty (30) days replace or repair the defective or nonconforming Goods and pay for all related expenses, including, but not limited to, transportation charges for the return of the defective or nonconforming goods to Seller and the delivery of repaired or replacement Goods to PWC.

10. Termination. Notwithstanding any other or additional remedies that may be provided under this Agreement, PWC may terminate this Agreement with immediate effect upon written notice to the Seller, either before or after the acceptance of the Goods, if: (a) Seller repudiates, or threatens to repudiate, any of its obligations under this Agreement; (b) Seller is in breach of, or threatens to breach, any representation, warranty, or covenant of Seller under this Agreement and either the breach cannot be cured or, if the breach can be cured, it is not cured by Seller within a commercially reasonable period of time under the circumstances, in no case exceeding seven (7) days following Seller's receipt of Notice of such breach; (c) Seller fails to, or threatens to fail to, timely deliver Goods conforming to the requirements of, and otherwise in accordance with, the terms and conditions of this Agreement; or (d) Seller becomes insolvent, files a petition for bankruptcy, or commences or has commenced against it proceedings relating to bankruptcy, receivership, reorganization, or assignment for the benefit of creditors. PWC shall be obligated to pay Seller only for work performed and reasonable expenses incurred until delivery of the notice of termination.

11. Insurance. During the term of this Agreement and for a period of three (3) years after the date of this Agreement, Seller shall, at its own expense, maintain and carry insurance in full force and effect that includes, but is not limited to, commercial general liability (including product liability) with limits no less than \$1,000,000 for each occurrence and \$3,000,000 in the aggregate and umbrella liability in a sum no less than \$5,000,000, which insurance shall be placed with insurance companies authorized to do business in the State of North Carolina and rated A minus VII or better by the current edition of Best's Key Rating Guide or otherwise approved in writing by PWC. Prior to delivering any Goods, Seller shall deliver to PWC certificates of insurance confirming each such coverage, and Seller shall direct its insurers to provide annually to PWC certificates confirming each such coverage during the coverage period. PWC shall be named as an additional insured in the insurance policy. Seller shall not

reduce or allow the required insurance coverages to lapse without PWC's prior written approval. All policies for insurance must be endorsed to contain a provision giving PWC a thirty (30) calendar day prior written notice by certified mail of any cancellation of that policy or material reduction in coverage. Should a notice of cancellation be issued for non-payment of premiums or any part thereof, or should Seller fail to provide and maintain certificates as set forth herein, PWC shall have the right, but not the obligation, to pay such premium to the insurance company or to obtain such coverage and to deduct such payment from any sums that may be due or become due to Seller, or to seek reimbursement for said payments from Seller. Any such sums paid by PWC shall be due and payable immediately by Seller upon notice from PWC. The insurance provisions of this Agreement shall not be construed as a limitation on Seller's responsibilities and liabilities pursuant to the terms and conditions of this Agreement.

12. Indemnification. Seller shall indemnify, defend, and hold harmless PWC and its Commissioners, officers, employees, agents, and representatives (collectively, "Indemnitees") from and against all claims, actions, liabilities, damages, losses, costs, and expenses (including, without limitation, injury to or death of any persons and damage to property, economic and consequential damages and attorneys' fees) asserted by one or more third parties against one or more of the Indemnitees arising out of negligent or willful acts, violations of law, infringement of any patent, trademark, trade secret, copyright, or other intellectual property right of a third party, or omissions or breach of the obligations set forth in this Agreement by Seller or any of its employees, agents, representatives, and subcontractors. Seller's obligation to indemnify, defend, and hold harmless the Indemnitees shall survive the termination of this Agreement and shall include the duty to pay for the reasonable attorney's fees and costs associated with defending the Indemnitee(s) by the legal counsel of each Indemnitee's choice.

13. Notices. Any notice which either Party is required or desires to give the other shall be deemed sufficiently given if, in writing, it is delivered personally, or sent by certified U.S. mail, return-receipt requested, postage prepaid, to the addresses listed hereinbelow, or such other address as either Party shall give to the other Party by written notice in accordance herewith. Any notice given herein by personal delivery shall be deemed delivered when received. Any properly addressed notice given herein by certified mail shall be deemed delivered on the third Business Day after the same is deposited in an official United States Post Office, postage prepaid, or if sooner upon the date when the return receipt therefor is signed, or refusal to accept the mailing by the addressee is noted thereon by the postal authorities.

To PWC:

Fayetteville Public Works Commission
Attn: Timothy Bryant, CEO/General Manager
PO Box 1089
Fayetteville, NC 28302

To Seller:

[INSERT MAILING ADDRESS]

14. Compliance. Seller hereby acknowledges that "E-Verify" is the federal E-Verify program operated by the US Department of Homeland Security and other federal agencies which is used to verify the work authorization of newly hired employees pursuant to federal law and in accordance with Article 2, Chapter 64 of the North Carolina General Statutes. Seller further acknowledges that all employers, as defined by Article 2, Chapter 64 of the North Carolina General Statutes, must use E-Verify and after hiring an employee to work in the United

States, shall verify the work authorization of the employee through E-Verify in accordance with NCGS §64-26(a). Seller hereby pledges, attests, and warrants through execution of this Agreement that Seller complies with the requirements of Article 2, Chapter 64 of the North Carolina General Statutes and further pledges, attests, and warrants that all subcontractors currently employed by or subsequently hired by Seller to provide services for PWC shall comply with all E-Verify requirements. Failure to comply with the above requirements shall be considered a breach of this Agreement. Seller hereby further acknowledges that the execution and delivery of this Agreement constitutes Seller's certification to PWC and to the North Carolina State Treasurer that, as of the Effective Date, Seller is not listed on (a) the Final Divestment List created and maintained by the North Carolina Department of State Treasurer pursuant to the Iran Divestment Act of 2015, Chapter 147, Article 6E of the General Statutes of North Carolina (the "Iran Divestment Act"); or (b) the list of companies that the North Carolina State Treasurer determines to be engaged in a boycott of Israel in accordance with Article 6G of Chapter 147 of the General Statutes of North Carolina. Seller represents and warrants to Commission that Seller, and all persons and entities owning (directly or indirectly) an ownership interest in it: (i) are not, and will not become, a person or entity with whom a party is restricted from doing business with under regulations of the Office of Foreign Asset Control ("OFAC") of the Department of the Treasury (including, but not limited to, those named on OFAC's Specially Designated and Blocked Persons list) or under any statute, executive order (including, but not limited to, the September 24, 2001, Executive Order 13224 Blocking Property and Prohibiting Transactions with Persons Who Commit, Threaten to Commit, or Support Terrorism), or other governmental action; and (ii) are not knowingly engaged in, and will not knowingly engage in, any dealings or transactions or be otherwise associated with such persons or entities described in clause (i) above. Seller also shall at all times during the term of this Agreement comply with Executive Order 11246, including but not limited to the Equal Opportunity Clause requirements set forth in 41 C.F.R. § 60-1.4. Seller shall abide by the requirements of 41 CFR 60-300.5(a) and 60-741.5(a) prohibiting discrimination against qualified individuals on the basis of protected veteran status or disability and requiring affirmative action by covered prime contractors and subcontractors to employ and advance in employment qualified protected veterans and individuals with disabilities.

15. Cumulative Remedies. All rights and remedies provided in this Agreement are cumulative and not exclusive, and the exercise by either Party of any right or remedy does not preclude the exercise of any other rights or remedies that may now or subsequently be available at law or in equity.

16. Miscellaneous Provisions. Seller is and shall remain an independent contractor. Nothing contained in this Agreement shall be deemed or construed to create the relationship of principal and agent or of partnership or of joint venture or of any association whatsoever between the Parties. No breach or non-performance of any term of this Agreement shall be deemed to be waived by either Party unless said breach or non-performance is waived in writing and signed by the Parties. No waiver of any breach or non-performance under this Agreement shall be deemed to constitute a waiver of any subsequent breach or non-performance, and for any such breach or non-performance each Party shall be entitled to such remedies as provided by law. No consent or waiver by a Party shall be effective unless it is in writing and then only to the extent specifically stated. The invalidity, illegality, or un-enforceability of any portion or provision of this Agreement shall in no way affect the validity, legality, and/or enforceability of any other portion or provision of this Agreement. Any invalid, illegal, or unenforceable provision of this Agreement shall be deemed severed from this Agreement, and the balance of the Agreement shall be construed and enforced the same as if the Agreement had not contained

any portion or provision which was invalid, illegal, or unenforceable; provided, however, severability shall not prevent this entire Agreement from being void in the event any portion or provision of this Agreement that is of the essence of this Agreement shall be void. This is the entire agreement of the Parties on the subject matter hereof, and all prior negotiations, representations, proposals, letters, agreements, understandings, or other communications between the Parties, whether written or oral, are hereby merged into the Agreement and superseded by this Agreement. This Agreement shall not be modified unless such modifications are evidenced in writing, signed by both Parties. Nothing herein shall be construed to give any right or benefits hereunder to anyone other than the Parties. This Agreement shall be governed by the laws of the State of North Carolina without the application of the laws of any other state. The exclusive venue for all mediations and litigation and any other legal proceedings regarding this Agreement shall be the State and Federal Courts serving Cumberland County, North Carolina, and Seller consents to personal jurisdiction in such courts. Seller irrevocably waives, to the fullest extent permitted by law, any objection that it may now or hereafter have to the laying of the venue of any such suit, action or proceeding in any such court serving Cumberland County or that any such suit, action or proceeding brought in any such court serving Cumberland County has been brought in an inconvenient forum. This Agreement may be executed in counterparts with the same effect as if the signatures to each counterpart were upon a single instrument, and all such counterparts together shall be deemed an original of this Agreement. For purposes of this Agreement, a facsimile copy or scanned copy or photocopy of a party's signature shall be sufficient to bind such party. This Agreement shall be subject to execution by electronic means in accordance with Article 40 of Chapter 66 of the North Carolina General Statutes. The titles of the paragraphs throughout this Agreement are for convenience only and the words contained therein shall in no way be held to explain, modify, amplify, or aid in the interpretation, construction, or meaning of the provisions of this instrument.

17. Assignment. Seller shall not assign, transfer, or convey any part of the Agreement, including rights or obligations, to a third party without obtaining the prior written approval of PWC in its discretion. The prohibition on assignment includes an assignment of payments that may become due under the Agreement. Any unauthorized assignment shall be deemed to be a material breach of this Agreement. An approved assignment shall not relieve Seller of its responsibilities under the terms hereof unless explicitly stated in writing by PWC.

18. Conflicts. Except with PWC's knowledge and prior written consent, Seller shall not engage in any activity or accept any employment, interest or contribution that would reasonably appear to compromise Seller's professional judgment with respect to the Goods. Seller shall disclose to PWC any business or personal relationship with any Commissioner, officer, director, manager, or supervisor of PWC.

IN WITNESS WHEREOF, the Parties have executed this Agreement by their duly authorized representatives as of the Effective Date.

Fayetteville Public Works Commission

[INSERT SELLER'S FULL LEGAL NAME]

By: _____
Timothy Bryant, CEO/General Manager

By: _____
_____, _____
(Printed Name) (Title)

Date: _____

Date: _____

This instrument has been preaudited in the manner required by the Local Government Budget and Fiscal Control Act (N.C. Gen. Stat. § 159-1 et seq.).

By: _____
Rhonda Graham, Chief Financial Officer

Approved as to form:

Legal Dept.

SAMPLE

ATTACHMENT F: FORM OF EXCEPTIONS – SPECIFICATIONS

BIDDER: _____

MANUFACTURER: _____

INSTRUCTIONS: The following is a list of exceptions to the Material/Technical Specifications pertaining to the furnishing of the subject materials. Bidders shall identify each exception by page and paragraph number on this form. The omission of exceptions shall be interpreted as the bidder's confirmation of full compliance with the Material/Technical Specifications.

PAGE NO. AND PARAGRAPH	EXCEPTION/VARIATION

If, in submitting this bid, the bidder has made any exceptions to bid documents, the bidder understands that PWC will evaluate the effect of such exceptions or variations in determining responsiveness and award eligibility. Material exceptions or variations will not be considered and may result in the bid being deemed nonresponsive.

ATTACHMENT G: FORM OF EXCEPTIONS – SALE OF GOODS AGREEMENT

BIDDER: _____

MANUFACTURER: _____

INSTRUCTIONS: The following is a list of exceptions to the Sale of Goods Agreement pertaining to the furnishing of the subject materials. Bidders shall identify each exception by page and paragraph number on this form. The omission of exceptions shall be interpreted as the bidder's confirmation of full compliance with the Sale of Goods Agreement.

PAGE NO. AND PARAGRAPH	EXCEPTION/VARIATION

Proposed exceptions to the Sale of Goods Agreement that materially alter or are inconsistent with the rights, obligations, risk allocation, remedies, indemnification, warranty, insurance, governing law, limitation of liability, delivery, payment, or other material terms of the Agreement may affect responsiveness, award eligibility, or contract execution. PWC reserves the right to request clarification of such exceptions and, if deemed in the best interest of PWC, negotiate their resolution. If the parties are unable to reach agreement on mutually acceptable terms, PWC may reject the bid, rescind an award, or proceed to the next lowest responsive, responsible bidder.

ATTACHMENT H: ECONOMIC IMPACT DISCLOSURE FORM

Company Name: _____
Address & Phone: _____
Name: _____
Pay Application # _____

Please provide the names of any local suppliers or subcontractors anticipated to be used on this project. For purposes of this requirement, “local” refers to firms located within the Fayetteville Metropolitan Statistical Area (MSA), which includes Cumberland, Hoke, and Harnett Counties. This form must be fully completed **and** submitted with the bid and with each subsequent pay application.

Firm Name	Local	Construction Trade or Supplies	Payment Amount
<i>Ex. ABC Company</i>	<i>Local – MSA</i>	<i>Hauling</i>	<i>\$25,000.00</i>

Signature

Printed Name STRUCTURES AND EQUIPMENT FOR
THE POD 5 - MCARTHUR ROAD SUBSTATION

Date

ATTACHMENT I: BID SUBMITTAL CHECKLIST

To ensure your bid is considered for evaluation and potential award, the following forms and required information must be submitted in full. Each item on this checklist must be completed and provided with your bid response. Failure to submit any required documentation or information may result in disqualification. Please carefully review the checklist to confirm all required materials are included before submitting your bid.

- ☐ 1. Properly Marked Sealed Mailed Bid (Submission Instructions paragraph 4)
- ☐ 2. Attachment A Drawings, Descriptive Literature, etc. (completed and provided)
- ☐ 3. Attachment B Complete and submit in full, including all pricing, required fields, and addenda acknowledgment. Failure to submit a complete form may result in the bid being deemed nonresponsive.
- ☐ 4. Attachment C (completed and signed) or Explanation (provided)
- ☐ 5. Attachment F Form of Exceptions –Specifications (completed and provided, if applicable)
- ☐ 6. Attachment G Form of Exceptions – Sale of Goods Agreement (completed and provided, if applicable)
- ☐ 7. Attachment H Economic Impact Disclosure Form (completed)