



Request for Bids
PWC 2324021-REBID

Procurement and Construction of
Gillespie B1.9 Solar PV Utility Station

ISSUED FOR BID
November 22, 2023

Fayetteville Public Works Commission
Administrative Building
955 Old Wilmington Road
Fayetteville, NC 28301

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Project Overview

GILLESPIE B1.9 SOLAR PV UTILITY STATION

Fayetteville Public Works Commission (“PWC”) invites bids from qualified, interested contractors to procure, install, interconnect to PWC’s distribution grid, test, and commission a utility scale turn-key 1.9 MW (AC) solar photovoltaic generating station (the “Project”) to be located at 3858 Gillespie Street, Fayetteville, North Carolina (the “Site”). PWC will thereafter own, operate, and maintain the Project and the Site, except to the extent otherwise specifically provided in this Request for Bids (“RFB”).

Respondents to this RFB are required to demonstrate qualification in installing and interconnecting utility-scale PV facilities.

Each Respondent shall identify the proposed material components to be installed as part of this Project and associated costs, brand and model numbers, country of origin, and estimated lead time and applicable spec sheets. PWC will be seeking federal funding to contribute to the financing of this Project, including, but not limited to, investment tax credits, federal subsidized loans, and federal grants. The awarded Respondent will therefore be required to comply with the Federal Funding Addendum to the Construction Agreement included in this RFB, which Addendum sets forth the domestic content requirement, along with wage and hour, apprentice, and other requirements.

Any final awards or decisions to proceed with the project are expressly subject to the approval of PWC Board of Commissioners and the City Council of the City of Fayetteville.

**ADVERTISEMENT FOR BID
FAYETTEVILLE PUBLIC WORKS COMMISSION**

GILLESPIE B1.9 SOLAR PV UTILITY STATION

**Cumberland County
North Carolina**

Pursuant to N.C.G.S 143-129, 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 2:00 p.m. EST on Tuesday, January 2, 2024, at which time they will be publicly opened and read.

Bids must be enclosed in a sealed envelope addressed to Victoria McAllister, Senior Procurement Advisor, Fayetteville Public Works Commission, 955 Old Wilmington Road, Fayetteville, North Carolina 28301. The outside of the envelope must be marked **SEALED BID: GILLESPIE B1.9 SOLAR PV UTILITY STATION** and shall indicate the name, address and state license number of the bidder. Bids shall be submitted on the printed forms, or exact copies thereof, contained in the Contract Documents.

Each bid shall be accompanied by a bid bond of five percent (5%) of the bid executed by a surety company licensed under the laws of North Carolina to execute the Contract in accordance with the bid bond and upon failure to forthwith make payment, the surety shall pay the obligee an amount equal to the amount of said bond. Said deposit shall be retained by the Owner as liquidated damages in event of failure of the successful bidder to execute the Contract within ten (10) days after the Notice of Award or give satisfactory surety as required by law.

Performance and Payment Bonds are required in the amount of 100% of the Contract amount and shall be furnished by the Contractor.

All Contractors are notified that North Carolina Statutory provisions as to licensing of Contractors will be followed as applicable in receiving and evaluating bids and in reading and awarding the Contract (Chapter 87 of the North Carolina General Statutes).

The license classification shall be:

Part 1:	Public Utilities (Electrical-Ahead of Point of Delivery)	-	Unlimited
	Unclassified	-	Unlimited

Plans and Specifications including Contract Documents will be available online for viewing and downloading on or about Wednesday, November 22, 2023, on the PWC Procurement website at <https://www.faypwc.com/purchasing>. In addition, the documents will be available from the Fayetteville State University Construction Resource Office (FSU CRO) at <https://www.uncc.edu/academics/colleges-schools-and-departments/broadwell-college-of-business-and-economics/outreach-centers/construction-resource-office>. In collaboration with the North Carolina Institute of Minority Economic Development, the FSU CRO offers services and support to help small, minority, veteran, and women-owned businesses identify and compete for construction-related projects.

At the FSU CRO, potential bidders may:

- Research, view and print project drawings to scale free of charge;
- Use available software to prepare their bid; and
- Receive certification and pre-qualification assistance.

Please email the FSU CRO to make an appointment: fsucro@uncfsu.edu

Plans and Specifications are also being furnished to ISQFT (www.isqft.com) for online posting. Purchase of the documents is not required to bid.

Fayetteville Public Works Commission reserves the right to reject any or all bids for any reason determined by PWC to be in its best interest, or to award the bid to the lowest responsible bidder or bidders, taking into consideration quality, performance, and the time specified in the bids for the performance of the contract.

The bidder to whom the contract may be awarded must comply fully with the requirements of North Carolina General Statutes Section 143-129, as amended.

No bids may be withdrawn after the scheduled Bid Opening for a period of ninety (90) calendar days.

FAYETTEVILLE PUBLIC WORKS COMMISSION
Candice S. Kirtz
Director of Supply Chain

Instructions to Bidders
GILLESPIE B1.9 SOLAR PV UTILITY STATION

For a proposal to be considered it must be in accordance with the following instructions:

1. Qualifications of Bidders

- a. Each entity or person submitting a bid in response to this Request for Bids (each of whom is a “Bidder”) is notified that relevant Articles of Chapter 87 of the General Statutes of North Carolina will be observed in receiving and awarding contracts. Each Bidder for this Project must be properly licensed for the Work.
- b. To demonstrate a Bidder’s qualifications to perform the Work prior to award, a bidder shall within forty-eight (48) hours of PWC’s request to do so, submit written evidence such as financial data, previous experience, present commitments, and such other data that may be requested as follows:
 - i. Evidence of the Bidder’s authority to do business in the state where the Project is located.
 - ii. Bidder’s state contractor license number.
 - iii. Official name of Bidder and length of time the organization has been in business under present name.
 - iv. Address, phone and fax numbers of Bidder’s main place of business. Address and phone numbers of Bidder’s office that will manage the Project if different than above.
 - v. Officers of Bidder. Name and resume of designated project manager and field superintendent. Number of regular employees of the organization.
 - vi. Latest financial statement showing assets and liabilities of the company.
 - vii. Name and home office address of the surety proposed and the name and address of the responsible local claim agent.
 - viii. Listing of completed projects of similar size and type in the last 5 years.
 - ix. Existing work commitments.
 - x. List of work to be subcontracted. Name and addresses of subcontractors.
 - xi. Names and addresses of major material Suppliers.
 - xii. Statement that bidder is capable of completing the project within the stated time.
 - xiii. Safety record of company for the last 5 years showing each alleged violation, finding or determination of violation(s), and fine(s) paid.
 - xiv. List of all litigated claims/resolutions/final judgements for the last 10 years.
 - xv. Information regarding any debarments of the bidder by any authority having taken such action in the last 10 years.
- c. Bidders must provide within their Bid Form, at the time bids are due, a properly completed and executed copy of either: Affidavit A- Listing of Good Faith Efforts or Affidavit B-Intent to Self-perform with Own workforce. Along with Affidavit E- Identification of MWDBE Participation.
- d. The apparent low Bidder shall submit within 24 hours of PWC’s notification, a properly completed and executed copy of either: Affidavit C – Percentage of MWDBE Participation or Affidavit D – Good Faith Efforts.

- e. A Bidder's failure or refusal to furnish any information requested pursuant to this section shall constitute a basis for disqualification of the bidder.
2. Examination of Bid Documents, Other Related Data, and Site of Project
- a. *Subsurface and Physical Conditions*
 - i. The Bid Documents (as defined in the form of Construction Agreement comprising the applicable Request for Bids or Request for Proposals) identify:
 - 1. Those reports known to PWC of explorations and tests of subsurface conditions at or contiguous to the Site.
 - 2. Those drawings known to PWC of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
 - b. *Underground Facilities*
 - i. Information and data shown or indicated in the Bid Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to PWC and Engineer by owners of such Underground Facilities, including PWC, or others.
 - c. *Hazardous Environmental Condition*
 - i. The Bid Documents identify any reports and drawings known to PWC relating to a Hazardous Environmental Condition identified at the Site.
 - d. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bid Documents due to differing or unanticipated subsurface or physical conditions appear in Section 5 of the General Conditions.
 - e. On request, PWC will provide all Bidders access to the Site to conduct such examinations, investigations, explorations, tests, and studies as any Bidder deems necessary for submission of a Bid. Bidder shall clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.
 - f. Reference is made to the Bid Documents for the identification of the general nature of other work that is to be performed at the Site by PWC or others (such as other prime contractors) that relates to the Work contemplated by these Bid Documents. On request, PWC will provide to each Bidder for examination access to or copies of contract documents (other than portions thereof related to price) for such other work.
 - g. It is the responsibility of each Bidder before submitting a Bid to:

- i. Examine and carefully study the Bid Documents, and the other related data identified in the Bid Documents, including any Addenda;
- ii. Visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work and completion of the Project;
- iii. Become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;
- iv. Carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in the Bid Documents, and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in the Bid Documents;
- v. Consider the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bid Documents; and the Site-related reports and drawings identified in the Bid Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific sequences of construction expressly required by the Bid Documents; and (3) Bidder's safety precautions and programs;
- vi. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bid Documents;
- vii. Become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bid Documents;
- viii. Promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bid Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and
- ix. Determine that the Bid Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

- x. The Site shall be inspected only in the company of an authorized representative of the Owner with appointments made through the Owner's project representative. The project representative's contact information for this project is [PWC employee name, title, and contact info].
- h. The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of the Bid Documents, that without exception the Bid is premised upon performing and furnishing the Work required by the Bid Documents and applying any specific sequences of construction that may be shown or indicated or expressly required by the Bid Documents, that Bidder has given PWC written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bid Documents and the written resolutions thereof by PWC, if any, are acceptable to Bidder, and that the Bid Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.
- i. Copies of reports and drawings referenced in the Bid Documents will be made available by PWC to any Bidder on request. Those reports and drawings are not part of the Contract Documents. Bidder is solely responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings unless otherwise stated in the Bid Documents.

3. Site and Other Areas

The Site is identified in the Bid Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by PWC unless otherwise stated in or required by the Bid Documents. PWC has either express permission, exclusive control of the Site, or has obtained the temporary easements for construction and limited staging and laydown area as indicated on the Drawings and in the Bid Documents; however, all additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor with agreements being in writing and a copy of the agreement provided to PWC. All permits, regulatory approvals and fees associated with obtaining the additional area shall be the full responsibility of the Contractor unless otherwise provided in the Bid Documents.

4. Interpretations and Addenda

- a. All questions about the meaning or intent of the Bid Documents are to be submitted to PWC in writing only. Interpretations or clarifications considered necessary by PWC, in response to such questions, will be issued by Addenda to all Bidders by being posted on PWC's website at faypwc.com. Questions received less than seven (7) Business Days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

- b. Addenda may be issued to clarify, correct, or change the Bid Documents as deemed advisable by PWC.
- c. Submittal with questions shall include the project name, PWC bid number, the person's name submitting the question as well as the person's company, telephone number, and email address.
- d. Addenda, when issued, will be on file at the offices of the PWC at least twenty-four (24) hours before Bids are opened. It shall be the Bidder's responsibility to make inquiry as to the Addenda issued. All such Addenda shall become part of the Contract Documents and all Bidders shall be bound by such Addenda, whether or not received by the Bidders.

5. Bid Security

- a. A Bid must be accompanied by Bid security made payable to PWC in an amount of five percent (5%) of Bidder's maximum Bid price (determined by adding the base bid and all alternatives) and in the form of a certified check, bank money order, or a Bid Bond (on the form attached) issued by a surety meeting the requirements of Article VI of the General Conditions.
- b. The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security, and met any other required conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within fifteen (15) Business Days after the Notice of Award, PWC may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such annulment of the Notice of Award and forfeiture of the security shall be PWC's exclusive remedy if Bidder defaults.

6. Contract Times

The number of days within which, or the dates by which, the Work is to be substantially completed, ready for final payment are set forth in the Notice to Proceed.

7. Liquidated Damages

Provisions for liquidated damages, if any, are set forth in the Contract Documents.

8. “Or-Equal” Items

- a. The Agreement, if awarded, will be on the basis of materials and equipment specified or described in the Bid Documents, or those “or-equal” materials and equipment approved by PWC and identified by Addendum. The materials and equipment described in the Bid Documents establish a standard of required type, function, and quality to be met by any proposed “or-equal” item. PWC may, in its discretion, not consider any item of material or equipment as an “or-equal” unless written request for approval has been submitted by Bidder and has been received by PWC at least ten (10) Business Days before the bid opening date. PWC’s decision of approval or disapproval of a proposed item will be in its sole discretion and final. If PWC approves any proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.
- b. Applications for review of “or-equals” materials or equipment shall be by Bidders only.
- c. All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bid Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” requests are made at Bidder’s sole risk.

9. Subcontractors, Suppliers, and Others

- a. If the Bid Documents require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to PWC in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within two (2) Business Days after Bid opening submit to PWC a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by PWC. If PWC, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, PWC may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, without an increase in the Bid.
- b. If apparent Successful Bidder declines to make any such substitution, PWC may declare the Bid as non-responsive and award the Contract to the next lowest, responsible Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which PWC makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to PWC subject to revocation of such acceptance after the Effective Date of the Agreement as provided in the General Conditions.

- c. Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

10. Preparation of Bid

- a. The Bid Form is included with the Bid Documents. Additional copies may be obtained from PWC.
- b. All blanks on the Bid Form shall be completed as necessary and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each item listed therein. In the case of optional alternatives the words "No Bid," "No Change," or "Not Applicable" may be entered. Bid forms shall not be conditional, limited, or restricted in any way.
- c. A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown.
- d. A Bid by a partnership shall be executed in the partnership name and signed by a general partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown.
- e. A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.
- f. A Bid by an individual shall show the Bidder's name and official address.
- g. A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.
- h. All names shall be printed in below the signatures.
- i. The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- j. Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.
- k. The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

11. Basis of Bid; Comparison of Bids

- a. *Lump Sum*

- i. When the Bid Form is set up for Lump Sum bidding, Bidders shall submit a Bid on a lump sum basis as set forth in the Bid Form and required by the Bid Documents.
- ii. When the Bid Form includes Alternate(s), Bidders shall submit a Bid on a lump sum basis for the base Bid and include a separate price for each alternate described in the Bid Documents as provided for in the Bid Form. The price for each alternate will be the amount added to or deleted from the base Bid if PWC selects the alternate.
- iii. In the comparison of Bids, alternatives will be applied in the same order of priority as listed in the Bid Form to the extent that project funds are available.

b. *Unit Price*

- i. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.
- ii. The total of all estimated prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with the General Conditions.
- iii. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.
- iv. When the Bid Form includes Alternate(s), Bidder shall submit a Bid on a unit price basis for the base Bid and include a separate price for each alternate described in the Bid Documents as provided for in the Bid Form. The price for each alternate will be the amount added to or deleted from the base Bid if PWC selects the alternate.
- v. In the comparison of Bids, alternatives will be applied in the same order of priority as listed in the Bid Form to the extent that project funds are available.

c. *Allowances*

- i. When the Bid Form includes cash allowances, the Bid price shall include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with the General Conditions.

12. Submittal of Bid

- a. PWC, at the location and time indicated in the Advertisement for Bids, will receive sealed Bids. Bids received after the indicated time and date shall not be considered.
- b. With each copy of the Bid Documents, a Bidder may be furnished one separate unbound copy of the Bid Form and the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and all attachments as outlined in the Bid Form. The complete list of required bid documents can also be found in the attached Bidder's Checklist. The completed checklist shall be the first page of all bids submitted.
- c. A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement for Bids and shall be enclosed in a plainly marked package with the Project title and PWC Bid Number, and the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED" and the Project title and PWC Bid Number. A mailed Bid shall be addressed to PWC's Procurement Department, Attn: Victoria McAllister, Senior Procurement Advisor, 955 Old Wilmington Road, Fayetteville, NC 28301.
- d. The Bidder shall be fully responsible for PWC's timely receipt of the Bid at the location designated by PWC for receipt of the Bids.
- e. Each Bidder that wishes to submit trade secret or other proprietary information to PWC must execute and deliver to PWC prior to the submission of such information PWC's standard nondisclosure agreement ("NDA"). Please contact Victoria McAllister, Senior Procurement Advisor, at procurement@faypwc.com in order to obtain a copy of the NDA.

13. Modification and Withdrawal of Bid

- a. A Bid may be modified or withdrawn only prior to the date and time for the opening of Bids by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted. Modifications shall indicate only the amount to be added to or deducted from the Bidder's Bid amount as submitted on the Bid Form.
- b. No bid may be withdrawn after the Bid opening for a period of ninety (90) days unless otherwise indicated in the Bid Form except as in accordance with the provisions of NCGS §143-129.1.

14. Opening of Bids

Bids will be opened at the time and place indicated in the Advertisement for Bids and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

15. Bids to Remain Subject to Acceptance

All Bids will remain subject to acceptance for the period of ninety (90) days, unless otherwise stated in the Bid Form, but PWC may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

16. Evaluation of Bids and Award of Contract

- a. PWC reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids or for any reason determined to be in the best interest of PWC. PWC further reserves the right to reject the Bid of any Bidder that PWC finds, after reasonable inquiry and evaluation, to not be responsible. PWC also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder when the lowest responsible Bid is in excess of the funds available.
- b. More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.
- c. In evaluating Bids, PWC will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.\
- d. In evaluating Bidders, PWC will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Bid Documents.
- e. PWC may conduct such investigations as PWC deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work in accordance with the Contract Documents.
- f. If the Contract is awarded, PWC will award the Contract to the Bidder whose Bid is in the best interests of PWC and is reasonably expected to yield timely and proper completion of the Project.
- g. In determining the lowest responsible Bidder, PWC may take into consideration the past performance of Bidder on construction contracts with particular concern given to completion times, quality of work, safety record, cooperation with other contractors, and cooperation with owner.
- h. In determining the responsive Bidder, PWC shall take into consideration bidder's compliance with the requirements of NCGS §143-128.2(c) as applicable. Failure of the low bidder to furnish affidavit(s) and documentation as required by the Bid Form for compliance with NCGS §143-128.2(c) may constitute a basis for disqualification of the Bid.

- i. PWC reserves the right to reject a Bid based on PWC determining the Bidder is non-responsible if the evidence submitted by, or investigation of, such Bidder fails to satisfy PWC that such Bidder is properly qualified to carry out the obligations of the Agreement and to complete the Work described therein.
- j. Should PWC adjudge that the apparent low Bidder is not the lowest responsible Bidder by virtue of the above information, said apparent low Bidder will be so notified and his Bid security shall be returned.
- k. If the Contract is to be awarded, PWC reserves the right to award contracts to the lowest responsive, responsible bidder in the manner described above.

17. Contract Security and Insurance

Article 6 of the General Conditions, as may be modified by the Contract Documents, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to PWC, it shall be accompanied by such bonds.

18. Signing of Agreement

- a. When PWC issues a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement along with the other Contract Documents which are identified in the Agreement as attached thereto. Within ten (10) Business Days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to PWC.
- b. In case of failure of Bidder to execute the Agreement, PWC may at its option consider the Bidder in default, in which case Bid security accompanying Bid shall be retained by PWC.
- c. Applicable laws, ordinances, and the rules and regulations of authorities having jurisdiction over construction of the Project shall apply to the contract throughout.

19. Sales and Use Tax The Bidder who receive the contract award shall comply fully with the requirements outlined hereinafter, so that PWC may recover the amount of the tax permitted under the law.

- a. It shall be the awarded Bidder's responsibility to furnish PWC documentary evidence showing the material used, sales tax paid, and County paid (County of sale) by the awarded Bidder and each of its subcontractors. Such evidence shall be transmitted with each pay estimate.
- b. The documentary evidence shall consist of a certified statement by the awarded Bidder and each of its subcontractors individually showing total purchases of materials from each separate vendor and total sales taxes paid each vendor. The awarded Bidder shall submit a certified statement with each pay request, for sales taxes paid during that pay request period. A certified form is required even if no sales tax was paid for pay request period.

- c. Materials used from the awarded Bidder or subcontractor's warehouse stock shall be shown in a certified statement at warehouse stock prices and amount of County of Use Tax paid.
- d. The awarded Bidder shall not be required to certify the Subcontractor's statements but must obtain the Subcontractor's certification.
- e. The awarded Bidder (Contractor) 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 paid for materials, etc.
- f. The awarded Bidder (Contractor) shall not include any tax paid on supplies, tools, and equipment, which the awarded Bidder uses to perform its obligations under the Contract Documents and should include only those building materials, supplies, fixtures, and equipment which actually become a part of the Work.

**BID SCHEDULE – PERFORMANCE AND DELIVERY
FAYETTEVILLE PUBLIC WORKS COMMISSION
GILLESPIE B1.9 SOLAR PV UTILITY STATION**

Deadline for Questions from Bidders ¹	5:00 p.m. EST Friday, December 8, 2023
Deadline for Addenda issued by PWC Procurement Department and Project Engineer ²	5:00 p.m. EST Friday, December 15, 2023
Bid Opening (Submittal Deadline)	2:00 p.m. EST Tuesday, January 2, 2024 Fayetteville Public Works Commission Administrative Building Conference Room 107 955 Old Wilmington Road Fayetteville, NC 28301
Contract Times:	365 calendar days from the Notice to Proceed Date
Liquidated Damages:	\$1,000.00 per day for each day beyond the Completion Date
PWC’s Bid Acceptance Period	Within ninety (90) Calendar Days unless otherwise noted

-
1. Questions regarding this bid must be submitted in writing to the attention of Victoria McAllister, Senior Procurement Advisor, by email to procurement@faypwc.com.

Bidders are expressly prohibited from contacting any FPWC official or employee associated with this Invitation to Bid, except as noted above. Violation of this prohibition is grounds for the immediate disqualification of the bidder.

2. Any addenda to these Contract Documents will be issued by the Project Engineer no later than the date and time stated above.

Bidder's Checklist

This checklist shall be included as the first page of the submitted bid. As outlined in Article 7 of the Bid Form section, the following items shall be included with the fully executed Bid Form:

BID SUBMITTAL CHECKLIST

- 1. Enter Contractor's License Number where called for in the Bid Form and on the outside of the sealed envelope containing the Bid.
- 2. Photocopy of Contractor's License.
- 3. Bid Bond
- 4. Bid Forms.
- 5. Provide the responsible North Carolina Registered Agent for Insurance Claims. Include contact information.
- 6. Provide the proposed responsible Bonding Company name. Include contact information.
- 7. List of proposed Subcontractors and material suppliers exceeding 5% of the Contract Value.
- 8. Non-Collusive Affidavit.
- 9. Nondiscrimination Clause.
- 10. Affidavit of Organization and Authority and Sworn Statement.
- 11. Equal Employment Opportunity Acknowledgment.
- 12. Certification regarding Debarment, Proposed Debarment, and other Responsible Matters.
- 13. FTA Certification Regarding Lobbying.
- 14. Identification of Minority Business Participation Form.
- 15. Affidavit A – Listing of Good Faith Efforts, et al.
- 16. Affidavit B – (Only if the Contractor will perform **ALL ELEMENTS OF THE WORK** on this project with their own forces **AND** will complete **ALL ELEMENTS OF THIS PROJECT WITHOUT THE USE OF SUBCONTRACTORS, MATERIAL SUPPLIERS, OR PROVIDERS OF PROFESSIONAL SERVICES.**
- 17. MWDBE Forms
- 18. SLS Disclosure Form.

****FAILURE TO SUBMIT THE ABOVE FORMS WITH THE BID FORM MAY BE JUST CAUSE FOR REJECTION OF THE BID BY THE OWNER****

Bid Form

PROJECT: Gillespie B1.9 Solar PV Utility Station

PWC BID NO.: PWC 2324021

BIDDER: _____

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Fayetteville Public Works Commission
Procurement Department
955 Old Wilmington Road
Fayetteville, NC 28301

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with PWC in the form included in the Bid Documents to perform all Work as specified or indicated in the Bid Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bid Documents.

ARTICLE 2 – BIDDER’S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid shall remain subject to acceptance for ninety (90) days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of PWC.

ARTICLE 3 – BIDDER’S REPRESENTATIONS

3.01 In submitting this bid, bidder represents that:

A. Bidder has examined and carefully studied the Bid Documents, other related data identified in the Bid Documents, and the following Addenda, receipt of which is hereby acknowledged:

No. _____, dated _____

No. _____, dated _____

No. _____, dated _____

No. _____, dated _____

No. _____, dated _____

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

- C. Bidder is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in Bid Documents, and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified.
- E. Bidder has considered the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bid Documents; and the Site-related reports and drawings identified in the Bid Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific sequences of construction expressly required by the Bid Documents; and (3) Bidder's safety precautions and programs.
- F. Based on the information and observations referred to in Paragraph 3.01.E above, Bidder does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bid Documents.
- G. Bidder is aware of the general nature of work to be performed by PWC and others at the Site that relates to the Work as indicated in the Bid Documents.
- H. Bidder has given PWC written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bid Documents, and the written resolution thereof by PWC is acceptable to Bidder.
- I. The Bid Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
 - 1. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
 - 2. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
 - 3. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.A:

- a. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;
- b. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of PWC, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive PWC of the benefits of free and open competition;
- c. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of PWC, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
- d. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Project and all other Work in accordance with the Contract Documents for a Lump Sum of: _____ Dollars (\$ _____). The Lump Sum is comprised of the following specified components and associated costs (all of which must total the lump sum amount), brand and model numbers, country of origin, and estimated lead time are specified below, along with confirmation of the attachment of applicable spec sheets, with additional sheets attached as needed:

	<u>Cost</u>	<u>Brand +Model</u>	<u>Country of Origin</u>	<u>Spec Sheet Attached</u>	<u>Est Lead Time</u>
PV Modules:	\$ _____	_____	_____	_____ (Yes/No)	_____ (Days)
Racking:	\$ _____	_____	_____	_____ (Yes/No)	_____ (Days)
Inverter:	\$ _____	_____	_____	_____ (Yes/No)	_____ (Days)
Other Components:	\$ _____	_____	_____	_____ (Yes/No)	_____ (Days)
Labor+Misc:	\$ _____				

PWC will furnish the distribution transformer (12.47kV to 480V secondary) for interconnecting the Project with PWC's electric grid; provided, however, Bidder shall be responsible for all labor needed to complete the grid interconnection, as well as all other components and equipment required for the interconnection.

5.02 Bidders are hereby notified that NCGS 143-128(d), requires all bidders on single prime projects to identify on their Bid form the contractors they have selected for the subdivisions for branches of work for (1) HVAC, (2) Plumbing, (3) Electrical, and (4) General. Accordingly, bidder shall list below applicable selected contractors for the following branches of work (write "N/A" if not applicable or self-performed).

HVAC	_____	_____
	Name	License No.
Plumbing	_____	_____
	Name	License No.
Electrical	_____	_____
	Name	License No.
General	_____	_____
	Name	License No.

- A. Bidder acknowledges that it is the intention of PWC to let contracts on a basis of the Bids received in accordance with NCGS 143-129 and in such manner as they deem to be for the best interests of PWC.
- B. Bidder acknowledges that PWC reserves the right to accept or reject any or all bids and to waive any informalities in the bidding.
- C. Bidder acknowledges that should the total bid exceed the funds available to construct the project, PWC reserves the right to reduce the scope of work from the project by deleting certain lump sum or unit price bid items prior to awarding the contract to bring the project within the funds available.
- D. Bidder acknowledges that if this contract is awarded, Bidder must, with every pay request, furnish to PWC an accurate itemized statement of North Carolina sales taxes paid on materials, supplies, equipment, and other items charged to this contract.
- E. Bidder agrees to begin work within ten (10) days from the date of the Notice to Proceed.
- F. Bidder agrees that should PWC reduce the scope of work by 25% or less of the Total Bid price prior to award of the contract, the lump sum price on all bid items shall remain unchanged.
- G. Bidder agrees to provide all necessary tools, machinery, equipment, apparatus, and all other means necessary to do all the work and will furnish all labor, materials and all else required to complete such Contract as may be entered into, in the manner prescribed in and in accordance with the terms of the Specifications and Contract and in accordance with the true intent and meaning thereof, and in accordance with the Plans and/or Drawings and the requirements of the Engineers under them, in a first class manner.

ARTICLE 6 – TIME OF COMPLETION

- 6.01 Bidder agrees that the Work will be substantially complete within five hundred forty (540) calendar days after the date when the Contract Times commence to run as provided in the General Conditions and will achieve Final Completion and be ready for final payment in accordance with the General Conditions within five hundred eighty-five (585) calendar days after the date when the Contract Times commence to run.
- 6.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the Contract Times. This amount is agreed upon as the proper measure of liquidated damages PWC will sustain, per day, by the failure of the undersigned to complete the work, within the stipulated time, and it is not to be construed, in any sense, as a penalty.

ARTICLE 7 – ATTACHMENTS TO THIS BID

- 7.01 The following documents are submitted with and made a condition of this Bid:
 - A. Required Bid security in the form of a Bid Bond or Certified Check;
 - B. In accordance with NCGS 143-128.2(c), Bidder shall identify on its bid the minority businesses that it will use on the project and the total dollar value of the bid that will be

performed by the minority businesses and list the good faith efforts (Affidavit A) made to solicit participation. A Bidder that will perform all of the work with its own workforce may submit an Affidavit B to that effect in lieu of the affidavit A required above.

1. Nondiscrimination Agreement;
2. Use of MWDBE Businesses;
3. Identification of Minority Business Participation; and
4. Affidavit A, Listing of Good Faith Effort, or Affidavit B, Intent to Perform Contract with Own Workforce.

C. Contractor's Certificates, Affidavit of Organization and Authority of Sworn Statement;

D. Non-Collusive Affidavit; and

E. Evidence of authority to do business in the state of the Project (i.e., copy of contractor's license);

7.02 Submit the Bidder's Checklist as provided in the Bid Documents with the bid submittal. The Checklist shall be completed and included as the first page of the submittal.

7.03 After the bid opening PWC will consider all bids and alternates and determine the lowest responsible, responsive bidder. Upon notification of being the apparent low Bidder, the Bidder shall then file within 72 hours of the notification of being the apparent lowest bidder, the following:

A. An Affidavit (C) that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the goal established by PWC and indicated in the Instruction to Bidders. This affidavit shall give rise to the presumption that the bidder has made the required good faith effort; or,

B. Affidavit (D) of its good faith effort to meet the goal. The document must include evidence of all good faith efforts that were implemented, including any advertisements, solicitations, and other specific actions demonstrating recruitment and selection of minority businesses for participation in the contract.

7.04 Bidder understands that if this Bid is accepted by PWC, Bidder shall not substitute for the subcontractors named in the Bid Documents except as otherwise specifically allowed in such Bid Documents.

ARTICLE 8 – DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the other Bid Documents

ARTICLE 9 – BID SUBMITTAL

9.01 Bidder's License

A. Number: _____

B. Classification: _____

C. Limitation: _____

D. Employer's Tax ID No.: _____

E. Business Address: _____

F. Phone No.: _____
G. Fax No.: _____
H. Contact Person: _____
I. E-mail Address: _____
J. Phone No. w/ Ext.: _____

9.02 This Bid is submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____

(Individual's signature)

Doing business as (if applicable): _____

A Partnership

Partnership Name: _____

The Organization and Internal Affairs of the Partnership are governed by the laws of the State of:

By: _____

(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title (typed or printed): _____

Attest: _____

(Signature of Corporate Secretary)

A Corporation

Corporation Name: _____ (SEAL)

State of Incorporation: _____

Type (if applicable, General Business, Professional, Service): _____

By: _____

(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title (typed or printed): _____

(CORPORATE SEAL)

Attest: _____

(Signature of Corporate Secretary)

Date of Qualification to do business in North Carolina is: _____

Limited Liability Company - LLC

Name of LLC: _____

State under whose Laws the LLC was formed: _____

By: _____
(Signature of Manager)

Name (typed or printed): _____

Title (typed or printed): _____

LIST OF SUBCONTRACTORS

In compliance with the Instructions to Bidders and the other Bid Documents, the undersigned submits the following names of Subcontractors to be used in performing the Work.

The Bidder certifies that all Subcontractors listed are eligible to perform the Work and that all Subcontractors performing more than five percent of the work are listed.

Subcontractor's Work

Subcontractor's Name

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Bidder's Signature

Bid Bond

<p>Bidder</p> <p>Name: _____</p> <p>Address (<i>principal place of business</i>): _____</p>	<p>Surety</p> <p>Name: _____</p> <p>Address (<i>principal place of business</i>): _____</p>
<p>Owner</p> <p>Name: Fayetteville Public Works Commission</p> <p>Address (<i>principal place of business</i>): 955 Old Wilmington Road Fayetteville, NC 28301</p>	<p>Bid</p> <p>Project (<i>name and location</i>): GILLESPIE B1.9 SOLAR PV UTILITY STATION 3858 Gillespie Street, Fayetteville, North Carolina</p> <p>Bid Due Date: January 2, 2024</p>
<p>Bond</p> <p>Penal Sum: _____</p> <p>Date of Bond: _____</p>	
<p>Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.</p>	
<p>Bidder</p> <p>_____</p> <p style="text-align: center;"><i>(Full formal name of Bidder)</i></p>	<p>Surety</p> <p>_____</p> <p style="text-align: center;"><i>(Full formal name of Surety) (corporate seal)</i></p>
<p>By: _____</p> <p style="text-align: center;"><i>(Signature)</i></p>	<p>By: _____</p> <p style="text-align: center;"><i>(Signature) (Attach Power of Attorney)</i></p>
<p>Name: _____</p> <p style="text-align: center;"><i>(Printed or typed)</i></p>	<p>Name: _____</p> <p style="text-align: center;"><i>(Printed or typed)</i></p>
<p>Title: _____</p>	<p>Title: _____</p>
<p>Attest: _____</p> <p style="text-align: center;"><i>(Signature)</i></p>	<p>Attest: _____</p> <p style="text-align: center;"><i>(Signature)</i></p>
<p>Name: _____</p> <p style="text-align: center;"><i>(Printed or typed)</i></p>	<p>Name: _____</p> <p style="text-align: center;"><i>(Printed or typed)</i></p>
<p>Title: _____</p>	<p>Title: _____</p>
<p><i>Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.</i></p>	

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs upon the failure of Bidder to deliver within the time required by the Bid Documents (or any extension thereof agreed to in writing by PWC) the executed Agreement required by the Bid Documents and any performance and payment bonds required by the Bid Documents.
3. This obligation will be null and void if:
 - 3.1. PWC accepts Bidder's Bid and Bidder delivers within the time required by the Bid Documents (or any extension thereof agreed to in writing by PWC) the executed Agreement required by the Bid Documents and any performance and payment bonds required by the Bid Documents, or
 - 3.2. All Bids are rejected by PWC, or
 - 3.3. PWC fails to issue a Notice of Award to Bidder within the time specified in the Bid Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within thirty (30) calendar days after receipt by Bidder and Surety of written notice of default from PWC, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by PWC and Bidder, provided that the total time for issuing Notice of Award including extensions does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will be commenced under this Bond prior to thirty (30) calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety, and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond will be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

**POWER OF ATTORNEY
(Attach)**

**CONTRACTOR'S CERTIFICATES
AFFIDAVIT OF ORGANIZATION AND
AUTHORITY AND SWORN STATEMENT**

GILLESPIE B1.9 SOLAR PV UTILITY STATION

STATE OF _____)
COUNTY OF _____)

_____ (affiant's full legal name), being the first duly sworn on oath deposes and says that the Bidder on the attached Bid is organized as indicated below and that all statements herein made are made on behalf of such Bidder and that this deponent is authorized to make them.

(Fill Out Only Applicable Paragraphs)

1. CORPORATION:

The Bidder is a corporation organized and existing under the laws of the State of _____ and its President is _____; its Secretary is _____, and it does have a corporate seal. The President is authorized to sign construction contracts and bids for the Company by action of its Board of Directors taken _____, a certified copy of which is hereto attached. (Strike out last sentence if not applicable.)

2. PARTNERSHIP:

The Bidder is a partnership consisting of _____ and _____, partners doing business under the name of: _____.

3. SOLE TRADER:

The Bidder is an individual and if operating under a trade name, such trade name is as follows: _____.

4. ADDRESS and TELEPHONE:

The primary business address of the Bidder is as follows:

Bidder's primary phone number is: _____.

Bidder
By: _____

Subscribed and sworn to before me this ____ day of _____, 20__.

Notary Public
My Commission Expires: _____.

[SEAL]

EQUAL EMPLOYMENT OPPORTUNITY

During the performance of this Contract the Contractor agrees as follows:

- a. The Contractor will not discriminate against any employee or applicant because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to race, color, religion, sex, or national origin. Such action shall include but not be limited to the following: employment, upgrading, demotion, or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of the nondiscrimination clause.
- b. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.
- c. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other Contract understanding, a notice, to be provided, advising the labor union or worker's representative of the Contractor's commitments under the Equal Employment Opportunity Section of this Contract, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- d. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this Contract or with any of such rules, regulations, or orders, this Contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further OWNER Contracts.
- e. The Contractor will include the provisions of this section in every subcontract or purchase order unless exempted by rules, regulations, or orders of the OWNER so that such provisions will be binding upon each Subcontractor or vendor.

(Use the following form for signatures by a CORPORATION):

Corporate Name

ATTEST:

(Assistant) Secretary

(Vice) President

(CORPORATE SEAL)

(Use the following form for signatures by and INDIVIDUAL):

BY: _____ (Seal)

WITNESS:

(ACKNOWLEDGEMENT OF THE ABOVE SIGNATURE MUST BE NOTARIZED)

NONDISCRIMINATION CLAUSE

It is specifically agreed as part of the consideration of the signing of this Contract that the parties hereto, their agents, officials, employees or servants will not discriminate in any manner on the basis of age, handicap, race, color, creed, sexual orientation or national origin with reference to the subject matter of this Contract, no matter how remote.

This provision being incorporated for the benefit of Fayetteville Public Works Commission, Fayetteville, North Carolina and its residents may be enforced as set out in said ordinances, enforcement of this provision shall be by action for specific performance, injunctive relief, or other remedy as by law provided.

This provision shall be binding on the successors and assigns of the parties hereto with reference to the subject matter of this Contract.

(Use the following form for signatures by a CORPORATION):

Corporate Name

ATTEST:

(Assistant) Secretary

BY: _____
(Vice) President

(Printed Name)

BY: _____
(Printed Name)

(Corporate Seal)

(Use the following form for signatures by a PARTNERSHIP or INDIVIDUAL):

BY: _____(SEAL)

(Printed Name)

WITNESS:

(Printed Name)

F.T.A. CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

(To be submitted with each bid or offer exceeding \$100,000)

The undersigned _____ certifies, to the best of his or her knowledge and belief, that:

- (1) No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form--LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions [as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96). Note: Language in paragraph (2) herein has been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (P.L. 104-65, to be codified at 2 U.S.C. 1601, *et seq.*.)]
- (3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

[Note: Pursuant to 31 U.S.C. § 1352(c)(1)-(2)(A), any person who makes a prohibited expenditure or fails to file or amend a required certification or disclosure form shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such expenditure or failure.]

The Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the

provisions of 31 U.S.C. A 3801, *et seq.*, apply to this certification and disclosure, if any.

_____ Signature of Contractor's Authorized Official

_____ Name and Title of Contractor's Authorized Official

_____ Date

**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

Title

Printed Name

Date

DAVIS-BACON INSTRUCTIONS

To be included in the Contract Documents:

- The entire contents of 29 CFR 5.5
- The appropriate wage determination (usually Heavy). This determination must be the most current and have been in effect at least 10 days prior to bid opening. If a wage determination for the project location is not available, then the Statewide wage determination may be used. If it takes longer than 90 days to execute contracts and the wage determination changes, then the new wage rates must be incorporated into the contract. Wage Determinations can be found at : <http://www.wdol.gov/sca.aspx>

During Construction:

- Post the Davis-Bacon Poster
www.dol.gov/whd/regs/compliance/posters/fedprojc.pdf
- Post the appropriate wage rates. These should be the ones included in the specifications and any new classifications approved by the Department of Labor.
- Weekly payrolls are to be maintained onsite for all subject contractors and subcontractors. Number them for each week of the construction period including weeks that do not have payroll. Form WH 347 is suggested. Do not submit these to the State SRF office, submit them to the municipality for review. Link to Form WH 347 - - <http://www.dol.gov/whd/forms/wh347.pdf>
- The municipality will conduct interviews with employees when there are irregularities concerning wages being paid. Use Standard Form 1445.
- For additional wage classification approvals, complete form SF 1444 found at this link: <http://www.dol.gov/whd/govcontracts/SF1444.pdf> Email this form to: whd-cbaconformance_incoming@dol.gov

The entire contents of this package is:

- 1)These Instructions
- 2)29 CFR 5.5
- 3)Davis-Bacon Poster
- 4)Payroll form WH 347

29 CFR §5.5 Contract provisions and related matters.

(a) The Agency head shall cause or require the contracting officer to insert in full in any contract in excess of \$2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a public building or public work, or building or work financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in §5.1, the following clauses (or any modifications thereof to meet the particular needs of the agency, *Provided*, That such modifications are first approved by the Department of Labor):

(1) *Minimum wages.* (i) All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in §5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH- 1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii)(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a

classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) *Withholding.* The (write in name of Federal Agency or the loan or grant recipient) shall upon its own action or upon written request of an authorized representative of the

Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) *Payrolls and basic records.* (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the (write in name of agency). The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site

at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit them to the applicant, sponsor, or owner, as the case may be, for transmission to the (write in name of agency), the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, sponsor, or owner).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the (write the name of the agency) or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of

any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) *Apprentices and trainees-(i) Apprentices.* Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) *Trainees.* Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour

Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) *Equal employment opportunity.* The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) *Compliance with Copeland Act requirements.* The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) *Subcontracts.* The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the (write in the name of the Federal agency) may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) *Contract termination: debarment.* A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) *Compliance with Davis-Bacon and Related Act requirements.* All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) *Disputes concerning labor standards.* Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

(10) *Certification of eligibility.* (i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by

virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

(b) *Contract Work Hours and Safety Standards Act.* The Agency Head shall cause or require the contracting officer to insert the following clauses set forth in paragraphs (b)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by §5.5(a) or §4.6 of part 4 of this title. As used in this paragraph, the terms *laborers* and *mechanics* include watchmen and guards.

(1) *Overtime requirements.* No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) *Violation; liability for unpaid wages; liquidated damages.* In the event of any violation of the clause set forth in paragraph (b)(1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.

(3) *Withholding for unpaid wages and liquidated damages.* The (write in the name of the Federal agency or the loan or grant recipient) shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) *Subcontracts.* The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (b)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (b)(1) through (4) of this section.

In addition to the clauses contained in paragraph (b), in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in §5.1, the Agency Head shall cause or require the contracting officer to insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Agency Head shall cause or require the contracting officer to insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

EMPLOYEE RIGHTS

UNDER THE DAVIS-BACON ACT

FOR LABORERS AND MECHANICS EMPLOYED ON FEDERAL OR FEDERALLY ASSISTED CONSTRUCTION PROJECTS

PREVAILING WAGES

You must be paid not less than the wage rate listed in the Davis-Bacon Wage Decision posted with this Notice for the work you perform.

OVERTIME

You must be paid not less than one and one-half times your basic rate of pay for all hours worked over 40 in a work week. There are few exceptions.

ENFORCEMENT

Contract payments can be withheld to ensure workers receive wages and overtime pay due, and liquidated damages may apply if overtime pay requirements are not met. Davis-Bacon contract clauses allow contract termination and debarment of contractors from future federal contracts for up to three years. A contractor who falsifies certified payroll records or induces wage kickbacks may be subject to civil or criminal prosecution, fines and/or imprisonment.

APPRENTICES

Apprentice rates apply only to apprentices properly registered under approved Federal or State apprenticeship programs.

PROPER PAY

If you do not receive proper pay, or require further information on the applicable wages, contact the Contracting Officer listed below:

or contact the U.S. Department of Labor's Wage and Hour Division.



WAGE AND HOUR DIVISION
UNITED STATES DEPARTMENT OF LABOR

1-866-487-9243
TTY: 1-877-889-5627
www.dol.gov/whd



PAYROLL

For contractor's optional use; see instructions at dol.gov/agencies/whd/forms/wh347

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

NAME OF CONTRACTOR	OR SUBCONTRACTOR	ADDRESS	OMB No. 1235-0008 Expires 09/30/2026
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PAYROLL NO.	FOR WEEK ENDING	PROJECT AND LOCATION	PROJECT OR CONTRACT NO.
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(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) NO. OF WITHHOLDING EXEMPTIONS	(3) WORK CLASSIFICATION	OT OR ST.	(4) DAY AND DATE							(5) TOTAL HOURS	(6) RATE OF PAY	(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS					(9) NET WAGES PAID FOR WEEK
				HOURS WORKED EACH DAY										FICA	WITH- HOLDING TAX	OTHER	TOTAL DEDUCTIONS		
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While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that it will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W. Washington, D.C. 20210

Date _____

I, _____
(Name of Signatory Party) (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by

_____ on the
(Contractor or Subcontractor)

_____;
(Building or Work)

_____ day of _____, _____, and ending the _____ day of _____, _____,
all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

_____ from the full
(Contractor or Subcontractor)

weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

- in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

- Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

REMARKS:

NAME AND TITLE

SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 3729 OF TITLE 31 OF THE UNITED STATES CODE.

Non-Collusive Affidavit

STATE OF _____)
COUNTY OF _____)

First being duly sworn deposes and says that:

1. She/He is the _____
(Owner, Partner, Officer, Representative or Agent)
of _____, the Bidder that has submitted the attached Bid;

2. She/He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;

3. Such Bid is genuine and is not a collusive or sham Bid;

4. Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, have in any way colluded, conspired, connived or agreed, directly or indirectly, with any other Bidder, firm, or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted; or to refrain from bidding in connection with such Contract; or have in any manner, directly or indirectly, sought by agreement or collusion, or communication, or conference with any Bidder, firm, or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit, or cost elements of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance, or unlawful agreement any advantage against (Recipient), or any person interested in the proposed Contract;

5. The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the Bidder or any other of its agents, representatives, owners, employees or parties in interest, including this affidavit.

By: _____

Printed or Typed Name: _____

Its _____
(Title)

Subscribed and sworn to before me this _____ day of _____,
20____.

My commission expires _____
Notary Public
[SEAL]

END OF AFFIDAVIT



**MINORITY, WOMEN, AND DISADVANTAGED
BUSINESS ENTERPRISE PROGRAM**

for

CONSTRUCTION CONTRACTS

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1. PURPOSE

The Fayetteville Public Works Commission (PWC) is committed to promoting the utilization of Minorities, Women, and Disadvantaged Businesses by providing equal opportunity for participating in all aspects of PWC's construction projects.

To achieve this purpose, PWC has established this Minority, Women, and Disadvantaged Business Enterprise Program (MWDBE) to support historically underutilized businesses, encourage capacity development, and offer procurement opportunities to certified business enterprises.

2. OVERVIEW

PWC's MWDBE Program is a voluntary goals program in construction, A&E services, purchase contracts, and professional and general (other) services based on "good-faith efforts." These goals are established for a five-year period and achievement will be evaluated annually.

The aspirational goals of PWC for the utilization of Minority, Women, and Disadvantaged Business Enterprises for construction services are:

Minority business participation in construction services	14%
Women business participation in construction services	11%

I. INTRODUCTION

In 2021, Fayetteville Public Works Commission (PWC) contracted with Griffin & Strong, P.C. (GSPC) to conduct a Disparity Study to determine the effectiveness of the current policies related to local, minority, and women owned businesses and to recommend modifications and adjustments, if necessary, to PWC's policies that comply with the law.

PWC continues to implement race and gender conscious and race and gender-neutral measures to try to increase utilization of Minority, Women, and Disadvantaged Business Enterprise (MWDBE) firms. PWC has a basis to continue race and gender conscious remedies or policies toward achieving annual aspirational goals.

The MWDBE aspirational goals and guidelines developed and recommended do not require nor provide for racially based set-asides; rather they require good-faith effort by both local government and contractors to recruit and select minorities and women businesses, consistent with North Carolina Statutes and the Constitution of the United States as interpreted by the Croson Decision.

II. ADMINISTRATION

PWC General Manager/CEO is authorized to take all usual and legal administrative actions necessary to implement this Program. The ultimate responsibility for the MWDBE Program administration is assigned to the PWC General Manager/CEO or its designee. PWC General Manager/CEO or its designee is either to be personally responsible or to designate a specific person to coordinate and manage this Program. PWC General Manager/CEO or its designee is responsible for determining whether a contractor has complied with this Program and shown good-faith efforts to do so. Except for those staff services specifically assigned by this Program to other departments, the heads of departments responsible for the construction shall be responsible to PWC General Manager/CEO or its designee and shall cooperate with PWC General Manager/CEO or its designee in implementing this Program.

The MWDBE Program shall apply to all construction contracts. The provisions of this Program take precedence over any other department plans or procedures in conflict herewith, except specific requirements mandated by terms or conditions of agreements in force between PWC and the federal government or the State of North Carolina that require different procedures than those described in this Program. This Program will be evaluated at the end of five years to determine its effectiveness and what adjustments are required.

III. DEFINITIONS

Affirmative Action - Specific steps to eliminate discrimination and efforts to ensure nondiscriminatory results and practices in the future, and to fully involve Minority, Women, and Disadvantaged Business Enterprises in contracts and programs.

Aspirational Goal/Goal - A voluntary percentage or quantitative objective.

Bidder/Participant - Any person, firm, partnership, corporation, association, or joint venture seeking to be awarded a public contract or subcontract.

Contract - A mutually binding legal relationship or any modification thereof obligating the seller to furnish equipment or service, including construction and leases, and obligating the buyer to pay for them.

Contractor - Any person, firm, partnership, corporation, association, or joint venture that has been awarded a public contract or lease, including every subcontract on such a contract.

Day – A calendar day of 24 hours measured from midnight to the next midnight. Also referred to throughout the Program documents as “days or “calendar days.”

Discrimination - To distinguish, differentiate, separate and/or segregate on the basis of age, race, religion, color, sex, national origin, handicap and/or veteran status.

Equipment - Includes materials, supplies, commodities, and apparatus.

Joint Venture - An association of two or more businesses to carry out a single business enterprise for profit, for which purpose they combine their property, capital, efforts, skills, and knowledge.

Lessee - A business that leases, or is negotiating to lease, property from PWC or equipment or services to PWC, or to the public on PWC property.

Minority - A person who is a citizen or lawful permanent resident of the United States and who is:

- a. Black American (a person having origins in any of the black racial groups of Africa);
- b. Hispanic American (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);
- c. Portuguese (a person of Portuguese, Brazilian, or other Portuguese culture origin, regardless of race);
- d. Asian American (a person having origins in any of the original people of the Far East, Southeast Asia, the Indian sub-continent, or the Pacific Islands); and
- e. Native American (a person having origins in any of the original people of North America).

MWDBE - Any certified minority, women, and disadvantaged business enterprise.

Minority, Women, Disadvantaged Business Enterprise (MWDBE) - A business that is at least fifty-one (51) percent owned and controlled by minority group members or women. An MWDBE is **bona fide** only if the minority group or female ownership interests are real and continuing and not created solely to meet the MWDBE requirement. In addition, the MWDBE must itself perform satisfactory work or services or provide supplies under the contract and not act as a mere conduit. In short, the contractual

relationship must also be **bona fide**.

IV. PROCEDURES FOR CONSTRUCTION CONTRACTS

A. Purpose and Application

1. The general purpose of this Program is to help develop and support Minority, Women, and Disadvantaged Business Enterprises (MBE, WBE, and DBE) by providing opportunities for participation in the performance of all construction contracts financed entirely with PWC funds.
2. This Program shall apply to construction contracts when the PWC's estimated contract cost is \$100,000 or more, except when a contract is exempt from competitive bidding under the General Statutes of North Carolina. Contracts between \$30,000 and \$99,999.99 will also be covered by the exemption.
3. Where contracts are financed in whole or in part with federal or state funds, including grants, loans, or other funding sources containing MBE, WBE, DBE Programs, PWC will follow the federal government or the State of North Carolina. PWC General Manager/CEO or its designee will be responsible for monitoring the Program to ensure the goals are met.
4. Since PWC construction contracts are prepared by the Engineering and Facilities Departments, each of these departments shall prepare such documents with Procurement pre-approved templates for the bidding process, which includes the Program goals as required to implement this Program.
 - a. Within sixty (60) days of the Commission's approval of this Program, the departmental procedures and contract provisions shall be in effect for all bid documents issued after the date of Commission approval.

B. MWDBE Aspirational Goals

1. To implement the purpose of this Program, the goal shall be to award at least fourteen (14) percent of the total of all construction contract award amounts in each fiscal year to MBE firms and at least eleven (11) percent to WBE firms.
2. PWC General Manager/CEO or its designee may determine that higher or lower goals are appropriate on a project-by-project basis, where it can be shown that the type, size, or location of the project will affect the availability of MBE, WBE, or DBE firms, so long as the aggregate of all contracts does not lower the annual goals.

C. Invitation for Bids

1. Bidders shall submit MWDBE information with their bids. Such information shall be
-

subject to verification by MWDBE Program staff before awarding the contract. The information shall include the names of the MWDBEs to be used and the dollar value of each such MWDBE transaction.

2. Contractors, subcontractors, suppliers, or MWDBE members of a joint venture intended to satisfy the PWC's MBE/WBE/DBE goals shall be certified by the State Department of Transportation (DOT) or North Carolina Office of Historically Underutilized Business (HUB).

D. PWC Responsibilities

1. **MWDBE Directory** – The MWDBE Program staff will establish and maintain a directory of certified Minority, Women, and Disadvantaged Business Enterprises. The purpose of the directory is to provide a resource for prime bidders on PWC construction projects who intend to solicit bids from MBE and WBE subcontractors and suppliers to meet PWC's MBE and WBE goals. The directory will not constitute a recommendation or endorsement of any listed firm.

The directory will be developed and maintained by the MWDBE Program Staff.

- a. The directory will include:
 - i. Business name, address, telephone number, and email address;
 - ii. Name(s) of business owner(s);
 - iii. Type of license;
 - iv. NAICS;
 - v. Type of MWDBE certification, and;
 - vi. Certification and expiration date with an acceptable agency.
 - b. PWC shall advertise on a contract-by-contract basis throughout the year as deemed necessary for MWDBE outreach. Advertisements shall be placed with minority/women-focused publications (state and local). Notification will also be sent to community organizations which might have knowledge of MWDBE firms.
 - c. The department heads and MWDBE Program staff should attend local and regional business fairs to promote the MWDBE Program. The departments shall also identify potentially eligible contractors through affirmative action efforts and the normal course of business. The names of identified contractors shall be forwarded to the MWDBE Program staff.
2. **MWDBE Eligibility Standards** – The eligibility of a business is determined by the ownership and control of the business.
 - a. An eligible Minority Business Enterprise owner is a citizen or lawful permanent resident of the United States, a member of a recognized ethnic or racial group, and fifty-one (51) percent owner of the business.
 - b. The eligible ethnic or racial groups are:
-

- i. Black/African American
- ii. Hispanic American
- iii. Asian American

iv. Native American

- c. An eligible Women Business Enterprise owner is a citizen or lawful resident of the United States and a fifty-one (51) percent owner of the business and is female.

3. **Removal of MWDBE Procedures** - A contractor certified as a MWDBE may be removed from the program directory for, but not limited to, any of the following reasons:

- a. **Change of Status** - PWC General Manager/CEO or its designee may remove a MWDBE if he/she finds that the ownership or control of the business changes so that the business no longer meets the requirements of Section IV, D(2) (b) and (c) above.

- b. **Failure to comply with the MWDBE Program** - The certification of a business as a MWDBE may be removed by PWC General Manager/CEO or its designee if he/she finds any of the following conditions:

- i. That a business has submitted inaccurate, false or incomplete information to PWC;
- ii. That in performance of a contract, a business has failed to comply with requirements of the contract with PWC;
- iii. That in performance of a contract, a business has failed to comply with MWDBE requirements of a contract established by a contractor with PWC in response to PWC requirements; or
- iv. That a business has otherwise failed to comply with the provisions of this MWDBE Program.

- c. **Appeal of Removal** - A business may appeal a determination of a MWDBE by satisfying the eligibility requirements in Section IV, D (2) (b) and (c).

- d. **Pre-bid Meeting or Site Visit** - PWC may hold a pre-bid meeting on formal and informal bid contracts for all prospective bidders, subcontractors, and MWDBEs for the purpose of explaining the provisions of the MWDBE Program, the process for bidding, and the contract to be performed. Available data on MWDBEs interested and/or capable of engaging in the prospective contract shall be made available to prospective bidders, contractors, and subcontractors.

E. Contractor Good-Faith Efforts

The contractor (bidder) shall make good-faith efforts to encourage the participation of MWDBEs in projects prior to submission of bids in order to be considered as a responsive bidder. A good-faith effort shall include, at a minimum, specific affirmative action steps and complete documentation thereof. The following list of factors to determine good-faith effort is not exclusive or exhaustive:

1. Whether the bidder attended any pre-submittal or pre-bid meetings, if scheduled by PWC;
2. Whether the bidder identified and selected specific items of the project for which the contract could be performed by Minority and/or Women Business Enterprises, to provide an opportunity for participation by those enterprises (including, where appropriate, breaking down contracts into economically feasible units to facilitate MWDBE participation);
3. Whether the bidder advertised, a reasonable time before the date the bids are opened, in one or more daily or minority weekly newspapers or trade associations (i.e., N.C. Minority Business Association), trade journals, or other media;
4. Whether the bidder provided email notice of their interest in bidding on the contract to at least three (3) Minority, Women, or Disadvantaged Business Enterprises (for each identified sub-item of the contract) licensed to provide the specific items of the project a reasonable time prior to the opening of bids;
5. Whether the bidder provided interested Minority, Women, and Disadvantaged Business Enterprises with information about the Plan, specifications, and requirements for the selected subcontracting or material supply work;
6. Whether the bidder contacted PWC's MWDBE Program staff for assistance in identifying minority and women businesses certified with approved public agencies as referenced in Section IV, D (2) (b) and (c);
7. Whether the bidder negotiated in good-faith with Minority, Women, or Disadvantaged Business Enterprises and did not unjustifiably reject as unsatisfactory bids prepared by a Minority, Women, or Disadvantaged Business Enterprises, as defined by PWC;
8. Whether the bidder, where applicable, advised and made efforts to assist interested MWDBEs in obtaining bonds, lines of credit, or insurance required by PWC or contractor;
9. Whether the bidder's efforts to obtain MWDBEs participation could reasonably be expected by PWC to produce a level of participation sufficient to meet the goals of PWC.

Bidders are cautioned that even though their submittal indicates they will meet the MWDBE goals, they should document their good-faith efforts and be prepared to submit this information to protect their eligibility for award of the contract in the event PWC questions whether the good-faith requirement has been met.

10. **Performance of MBE/WBE/DBE Subcontractors and Suppliers** - The MWDBEs listed by the contractor on the Program Affidavits, which is determined by PWC to be certified, shall perform the work and supply the materials for which they are listed unless the contractor has received prior written authorization from PWC to perform the work with other forces or to obtain the materials from other sources.
-

The contractor shall enter into subcontracts and supply copies of all fully executed subcontracts with each MWDBE listed on the Program Affidavits to PWC's MWDBE Program staff after award of the contract and prior to the issuance of a Notice to Proceed. Any amendments to the subcontracts shall be submitted to the MWDBE Program staff within **five (5) days** of execution.

Authorization to utilize other forces or sources of materials shall be requested by submitting a "Change or Add a Subcontractor Form" for the following reasons:

- a. The listed MWDBE, after having had a reasonable opportunity to do so, fails or refuses to execute a written contract, when such written contract, based upon the general terms, conditions, plans and specifications for the project, or on the terms of such subcontractor's or supplier's written bid, is presented by the contractor.
- b. The listed MWDBE becomes bankrupt or insolvent.
- c. The listed MWDBE fails or refuses to perform his/her subcontract or furnish the listed materials.
- d. The work performed by the listed subcontractor is unsatisfactory according to industry standards and is not in accordance with the plans and specifications; or the subcontractor is substantially delaying or disrupting the progress of the work.

All "Change or Add a Subcontractor Forms" shall be accompanied by good faith efforts documentation as specified on the form.

F. Awarding of Construction Contracts

1. If a construction contract is to be awarded, it shall be awarded in accordance with North Carolina General Statutes to the lowest responsible bidder who complies with all of the prescribed requirements and either:
 - a. Made a good-faith effort to comply with these goals and requirements before the time bids are opened as described above. Where a good-faith effort is claimed by the apparent lowest responsible bidder, the bidder shall be required to submit documentation **WITHIN TWENTY- FOUR (24) HOURS OF PWC'S NOTIFICATION**, which in most instances will occur the day of bid opening to show that the criteria for good-faith efforts have been met, or
 - b. Once a firm is determined to be an eligible MWDBE, and before the contract is awarded, the total dollar value to be paid to the MWDBE shall be evaluated by the MWDBE Program Staff to ensure that it is in accordance with the bidder's proposal.
-

If the evaluation shows that the bidder has misrepresented MWDBE participation or has not made a good-faith effort to meet the contract goals for MBE or WBE participation, the bidder may be disqualified.

G. Counting MWDBE Participation Toward Meeting the Aspirational Goals

The degree of participation by MWDBE contractors, subcontractors, suppliers, or joint-venture partners in contract awards shall be counted in the following manner:

1. Once a firm is determined to be an eligible MWDBE contractor in accordance with this Program, the total dollar value of the contract awarded to the MWDBE is counted as participation.
 2. The goals can be met by any certified MWDBE contractor, subcontractor, supplier, trucker, or joint-venture partner as listed in PWC and agency directory. All MWDBEs used to meet the goal must be certified by an approved agency and verified by PWC at the time of bid opening. Only certified firms can be counted toward the goal. The standard for certification is set forth in this Program.
 3. The total dollar value of a contract with a disadvantaged business owned and controlled by a minority woman is counted toward either the minority goal or the goal for women, but not toward both. The contractor or MWDBE Program staff may choose the goal to which the value is applied.
 4. In the case of a joint venture, the joint venture recipient or contractor may count toward its MWDBE goals a portion of the total dollar value of the contract that the MWDBE partner's participation in the joint-venture represents. Credit will be given equal to the minority partner's percentage of ownership in the joint venture. A MWDBE joint-venture partner must be responsible for a clearly defined portion of the work to be performed in addition to satisfying requirements for ownership and control.
 5. A recipient or contractor may count toward its MWDBE goals only expenditures to MWDBEs whose ownership interests are real and continuing and not created solely to meet PWC's goals for participation, and that perform a commercially useful function in the work of a contract. A MWDBE is considered to perform a commercially useful function when it is responsible for execution of a distinct element of the work of a contract and carries out its responsibilities by actually performing, managing, and supervising the work involved. To determine whether a MWDBE is performing a commercially useful function, the MWDBE Program staff shall evaluate the amount of work subcontracted, industry practices, and other relevant factors. Consistent with normal industry practices, an MWDBE may enter into subcontracts. If a MWDBE contractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of normal industry practices, the MWDBE shall be presumed not to be performing a commercially useful function. Evidence to rebut this presumption may be presented to the MWDBE Program staff. The MWDBE may present evidence to rebut this presumption. The MWDBE Program staff decision on the rebuttal of this presumption is subject to review by PWC General Manager/CEO or its designee. Once a contractor is determined to be an eligible MWDBE in accordance with this section, the total dollar
-

value of the contract awarded to MWDBE is counted toward the applicable MWDBE goals, except as provided in the provisions of this section.

6. A contractor may count toward its MWDBE goals expenditures for materials and supplies obtained from MWDBE suppliers and manufacturers, provided that the MWDBE assumes the actual and contractual responsibility for the provision of the materials and supplies.

H. Documentation of Attainment of MWDBE Participation Requirements

In order that PWC General Manager/CEO or its designee may make a recommendation to PWC as to the responsiveness of bidders, bidders shall be required to submit the following information on each MWDBE-related subcontract:

1. A description of the subcontract and purchase(s) of significant equipment and supplies to be used to perform the subcontract or prime contract, including the name and address of each MWDBE firm selected, and the name and telephone number of a contact person;
2. The dollar amount of participation of each MWDBE;
3. A statement of intent from the MWDBE subcontractor or material supplier as;
 - a. Identified in Section IV, H(1) above that they intend to contract or supply the materials, or
 - b. Sworn statements, with appropriate documentation, showing that the contractor made a good-faith effort to comply with the MWDBE Program in accordance with Section IV, E of this Program.

V. UTILIZATION OF JOINT VENTURE

PWC is committed to promoting the utilization of joint venturing amongst business enterprises and to support, encourage, and offer procurement opportunities to support utilization when available so that business enterprises can meet capacity development.

The purpose of Joint Venturing is to connect high potential MWDBEs with a Prime Contractor that will supplement their growth and development. Joint Venturing is seen as an important approach to help MWDBEs compete for larger contracts. PWC conducts many outreach events to connect certified MWDBEs with PWC decision makers and prime contractors. PWC shall provide targeted outreach, training, and technical support

to MWDBEs and urge Prime contractors to provide an equivalent level of outreach and support when joint venturing is available. PWC's mission is to provide an innovative program to the industry that focuses on the accelerated growth of diverse partnerships.

3. FAYETTEVILLE PUBLIC WORKS COMMISSION'S MWDBE COMPLIANCE PROVISIONS

APPLICATION:

The requirements of Fayetteville Public Works Commission (PWC) Minority, Women, and Disadvantaged Business Enterprise (MWDBE) Program for participation specific contracts are hereby made part of the Contract Documents. Copies of the Program may be obtained from:

Fayetteville Public Works Commission
Economic Inclusion Programs
P.O. Box 1089
Fayetteville, North Carolina 28302
Phone (910) 223-4016 Fax (910) 483-1429
E-mail: EIProgram@faypwc.com

NCDOT DBE Directory: www.ebs.nc.gov/VendorDirectory HUB
Directory: <https://ncadmin.nc.gov/businesses/hub>

MWDBE Compliance Requirements:

1. The Bidder shall provide, with their Bid Form, at the time bids are due, the documents set forth below, properly executed. Returning executed copies indicates and establishes that the Bidder understands and agrees to any incorporated MWDBE contract provisions.
2. All Bidders must provide with their Bid Form, at the time bids are due, a properly completed and executed copy of **either:**
 - Affidavit A – Listing of Good-Faith Efforts **OR**
 - *Affidavit B – Intent to Self-Perform with Own Workforce.

*Affidavit B should **only** be used if the Contractor will perform **ALL Elements** of the Work on this project with their own forces **AND** will complete **ALL Elements** of this project **WITHOUT** the use of subcontractors, material suppliers, or providers of professional services.

3. Upon being identified as the apparent lowest responsive, responsible Bidder, a Bidder shall, within twenty-four (24) hours of PWC's notification provide a properly completed and executed copy of **either:**
-

- Affidavit C – Percentage of MWDBE Participation **OR**
- Affidavit D – Good-Faith Efforts.

4. All Bidders must provide with their Bid Form, at the time bids are due, a properly completed and executed copy of Affidavit E- Identification of MWDBE/Local Participation Form

All written statements, certifications, or intentions made by the Bidder shall become a part of the agreement between the Contractor and Fayetteville Public Works Commission for performance of this contract.

SUBCONTRACTOR PAYMENT REQUIREMENTS:

North Carolina General Statutes 143-134.1 (N.C.G.S.) states that the percentage of retainage on payments made by the prime contractor to the subcontractor shall not exceed the percentage of retainage on payments made by the Fayetteville Public Works Commission to the prime contractor. Failure to comply with this provision shall be considered a breach of the contract, and the contract may be terminated in accordance with the termination provisions of the contract.

The Contractor shall provide an itemized statement of payments to each MWDBE subcontractor before final payment is processed.

The Contractor shall provide an itemized statement of payments to each NON-MWDBE subcontractor before final payment is processed.

Contractor

Signature

Printed Name

Title

Date

4. Affidavit A: Listing of the Good Faith Efforts

Affidavit of _____
(Name of Bidder)

I have made a good faith effort to comply under the following areas checked:

<i>Total Available GFE Points: 155</i>		<i>Minimum Number GFE Points Required: 50</i>
Points		
10	Contacting minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor or available on State or local government-maintained lists at least 10 days before the bid or proposal date and notifying them of the nature and scope of the work to be performed.	
10	Making the construction plans, specifications and requirements available for review by prospective minority businesses or providing these documents to them at least 10 days before the bid or proposals are due.	
15	Breaking down or combining elements of work into economically feasible units to facilitate minority participation.	
10	Working with minority trade, community, or contractor organizations identified by the Office for Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.	
10	Attending any pre-bid meetings scheduled by the public owner.	
20	Providing assistance in getting required bonding or insurance or providing alternatives to bonding or insurance for subcontractors.	
15	Negotiating in good faith with interested minority businesses and not rejecting them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.	
25	Providing assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisting minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.	
20	Negotiating joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.	
20	Providing quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.	
Total GFE Points (Claimed by Bidder):		Total GFE Points (Assessed by PWC):

In accordance with NCGS 143-128.2(d) the undersigned will enter into a formal agreement with the firms listed in the Identification of Small Disadvantaged Business Participation schedule conditional upon execution of a contract with the Owner. Failure to abide by any applicable statutory provision may constitute a breach of the contract. The undersigned hereby certifies that he or she has read the terms of the MWDBE business commitment and is authorized to bind the Bidder to the commitment herein set forth.

5. Date: _____ **Name of Authorized Officer:** _____

State of North Carolina, County of _____

SEAL

Subscribed and sworn to before me this _____ day of 20____
Notary Public _____
My commission expires _____

6. Affidavit B: Intent to Perform Contract with Own Workforce

Affidavit of _____
(Name of Bidder)

7. I hereby certify that it is our intent to perform 100% of the work required for contract:

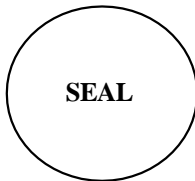
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform **all elements of the work** on this project with his/her own current workforces; and will complete all elements of this project **without** the use of subcontractors, material suppliers, or providers of professional services.

The Bidder agrees to provide any additional information or documentation requested by the Owner in support of the above statement.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

8. **Date:** _____ **Name of Authorized Officer:** _____



State of North Carolina, County of _____

Subscribed and sworn to before me this _____ day of 20____

Notary Public _____

My commission expires _____

9. Affidavit C: Percentage of MWDBE Participation

Affidavit of _____
(Name of Bidder)

I hereby certify that on contract: _____
(Name of Project)

\$ _____
(Dollar Amount of Total Bid)

I will expend a minimum of _____% of the total dollar amount of the contract with Minority, Women, and Disadvantaged Business Enterprises (MWDBE). MWDBEs will be employed as subcontractors, vendors, or providers of professional services. Such work will be subcontracted to the following firms listed below.

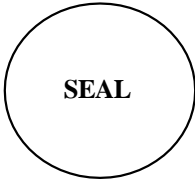
<u>Name, Address, & Phone No.</u>	<u>*MWDBE Category</u>	<u>NAICS</u>	<u>Dollar Value</u>	<u>% of Contract</u>

*MWDBE categories: Black-African Americans (B), Hispanic-Americans (H), Asian- Americans (A), Native-Americans (I), Women (F), Socially/Economically Disadvantaged (D)

Pursuant to NCGS 143-128.2(d), the undersigned will enter into a formal agreement with MWDBEs for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the Bidder to the commitment herein set forth.

10. *Date:* _____ *Name of Authorized Officer:* _____



State of North Carolina, County of _____
Subscribed and sworn to before me this _____ day of 20____
Notary Public _____
My commission expires _____

11. Affidavit D: Good Faith Efforts

If Owner determines using reasonable discretion that Affidavit C is insufficient, Bidder agrees to provide the following information regarding any good-faith efforts.

<u>Name, Address, & Phone No.</u>	<u>*MWDBE Category</u>	<u>NAICS</u>	<u>Dollar Value</u>

*MWDBE categories: Black-African Americans (B), Hispanic-Americans (H), Asian- Americans (A), Native-Americans (I), Women (F), Socially/Economically Disadvantaged (D)

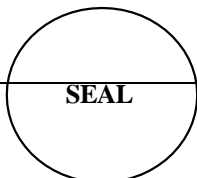
Bidder may be requested to provide documentation of the Bidder’s good-faith efforts. Examples of documentation may include the following:

- a. Copies of solicitations for quotes to MWDBEs. Each solicitation may include a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.
- b. Copies of quotes or responses received from each firm responding to the solicitation.
- c. A telephone log of follow-up calls to each firm sent a solicitation.
- d. For subcontracts where a MWDBE is not considered the lowest responsible sub- bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.
- e. Documentation of any contacts or correspondence to MWDBE, community or contractor organizations in an attempt to meet the goal.
- f. Copy of pre-bid roster.
- g. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for MWDBEs.
- h. Letter detailing reasons for rejection of a MWDBE due to lack of qualification.
- i. Letter documenting proposed assistance offered to MWDBEs in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive Bidder.

12. Date: _____ **Name of Authorized Officer:** _____

State of North Carolina, County of _____



Subscribed and sworn to before me this _____ day of 20____
Notary Public _____
My commission expires _____

13. Affidavit E: Identification of MWDBE/Local Participation

(Name of Bidder)

I hereby certify that on contract: _____

(Name of Project)

We will use the following Minority, Women, and Disadvantaged Business Enterprises (MWDBE), and Local (Cumberland, Hoke, Harnett County) as construction subcontractors, vendors, suppliers, or providers of professional services.

<u>Name, Address, & Phone No.</u>	<u>*MWDBE Category / **Local</u>	<u>NAICS</u>	<u>Dollar Value</u>

*MWDBE categories: Black-African Americans (B), Hispanic-Americans (H), Asian- Americans (A), Native-Americans (I), Women (F), Socially/Economically Disadvantaged (D)

**Local: Fayetteville Metropolitan Statistical Area (MSA) comprising of Cumberland County, Hoke County, and Harnett County. PWC is requesting this information for reporting purposes only, and use of local entities will not be considered for compliance with the requirements of the MWDBE Program.

14. The total value of MWDBE/local business contracting will be \$ _____

Date: _____ Name of Authorized Officer: _____



State of North Carolina, County of _____

Subscribed and sworn to before me this _____ day of 20____

Notary Public _____

My commission expires _____

ATTACH TO BID ATTACH TO BID ATTACH TO BID ATTACH TO BID

FAYETTEVILLE PUBLIC WORKS COMMISSION

15. MWDBE ADD / CHANGE FORM

If a MWDBE subcontractor fails to complete work under the subcontract for any reason, the recipient must require the prime contractor to employ the good faith efforts set forth in the MWDBE Program if soliciting a replacement or additional subcontractor.

16. For MWDBE Change Request, please provide all information below:

Prime Contractor: _____ Subcontracted

Work: _____ Previous

Subcontractor: _____ Reason this for
change request:

New Subcontractor: _____ MWDBE

Category:

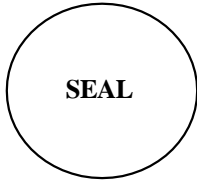
To Add MWDBE Subcontractor/Subcontracted work:

If this is a new trade being subcontracted or a subcontractor that was not documented in the original Project Bid Information submittal, then good faith efforts to solicit a MWDBE must be documented, as the original MWDBE instructions indicate. Please provide all good faith efforts below showing all the MWDBE firms contacted to perform this work along with any additional good faith efforts or evidence that there are not reasonably available firms in the work area. PWC's MWDBE Program requires that good faith efforts are to be carried out to the fullest extent practicable. If solicitations were not carried out due to being impracticable, please attach this explanation to this form.

Name, Address, & Contact Information	MBE or WBE and Certifying agency	How was this firm contacted (email, letter, or Phone) and what was the result of the solicitation? *

*Must submit copies of emails or letters. If phone calls were made this sheet can serve as documentation of calls

17. Date: _____ Name of Authorized Officer:



State of North Carolina, County of _____

Subscribed and sworn to before me this _____ day of
20_____ Notary

Public _____

My commission expires _____

MINORITY, WOMEN, DISADVANTAGED BUSINESS ENTERPRISE (MWDBE) PROGRAM / SMALL LOCAL SUPPLIER (SLS) PROGRAM

1. PWC is committed to promoting the utilization of Minority, Women, and Disadvantaged Businesses in PWC's geographical statistical area (GSA) by providing equal opportunity for participating in all aspects of PWC's contracting programs. The GSA consists of NCDOT division areas 3-8, and 10. PWC is also committed to promoting the utilization of small, local businesses in the Fayetteville Metropolitan Statistical Area (MSA) by increasing opportunities for those businesses to participate in PWC procurements. The MSA consists of Cumberland County, Hoke County, and Harnett County.
2. PWC requires Bidders to report efforts to utilize Minority, Women, and Disadvantaged Business Enterprises (MWDBEs) and Historically Underutilized Businesses (HUBs) for specific projects and requires all Bidders to report all such efforts for MWDBEs, HUBs, and Small Local Suppliers regardless of the requirements of a specific project. Bidders shall document any good-faith efforts and utilization in the MWDBE forms provided within the Contract Documents.
3. NCDOT Disadvantaged Business Enterprise (DBE) and NC Department of Administration (DOA) Historically Underutilized Business (HUB) firms with current certifications are acceptable for listing in the bidder's submittal of MWDBE participation and will be considered to meet any necessary contract goal. Firms that are certified through NCDOT are listed in the "Vendor Directory" which can be accessed through the following: <https://www.ebs.nc.gov/VendorDirectory/default.html>. Firms that are certified through NC DOA are listed at the "HUB Vendor Search" which can be accessed through the following. <https://www.doa.state.nc.us/HUB/searchhub.html>.
4. Bidders shall submit, with their bid, the MWDBE documentation required in the Contract Documents.

SMALL LOCAL SUPPLIER / MWDDBE SUBCONTRACTOR DISCLOSURE FORM

Contractor: _____
 Address & Phone: _____
 Project: _____
 Name: _____
 Pay Application # _____

Please complete the below form by providing the necessary information for the payments made to each subcontractor, vendor, or supplier for the work associated with the identified pay application. This form must be fully completed and attached to each pay application.

Firm Name, Address, and Contact Information	Payment Amount	Type of Work/Commodity (Include NAICS Code)

Signature

Printed Name Title

Date

Notice of Award

Date of Issuance:

Owner: Fayetteville Public Works Commission

Project No.: PWC 2324021

Engineer:

Project: Gillespie B1.9 Solar PV Utility Station

Contract Name:

Bidder:

Bidder's Address:

You are notified that Owner has accepted your Bid dated [date] for the above Contract, and that you are the Successful Bidder and are awarded a Contract for the Gillespie B1.9 Solar PV Generating Station.

The Contract Price of the awarded Contract is \$[Contract Price]. Contract Price is subject to adjustment based on the provisions of the Contract, including but not limited to those governing changes, as applicable.

[Number of copies sent] unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award or has been transmitted or made available to Bidder electronically.

Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to PWC [number of copies sent] counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) the Contract security (such as required performance and payment bonds) and insurance documentation, as specified in the Instructions to Bidders and in the General Conditions.
3. Other conditions precedent (if any): [Describe other conditions that require Successful Bidder's compliance]

Failure to comply with these conditions within the time specified will entitle PWC to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within ninety (90) days after you comply with the above conditions, PWC will return to you one fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in the General Conditions.

Owner: Fayetteville Public Works Commission

By (*signature*): _____

Name (*printed*): _____

Title: _____

Copy: Engineer

**ACCEPTANCE OF AWARD
GILLESPIE B1.9 SOLAR PV GENERATING STATION**

Receipt of the preceding NOTICE OF AWARD is hereby acknowledged this the _____
day of _____, 2024.

(CONTRACTOR)

By: _____

Title: _____

[FORM OF AGREEMENT FOR BID REFERENCE]

State of North Carolina
Cumberland County

CONSTRUCTION AGREEMENT

THIS CONSTRUCTION AGREEMENT (“Agreement” or “Contract”) is made by and between the City of Fayetteville, by and through the Fayetteville Public Works Commission (“PWC”), a North Carolina public authority, and [REDACTED] (“Contractor”), a [REDACTED] registered to do business in North Carolina (each of PWC and Contractor is a “Party” and both are collectively the “Parties”) as of the date of execution last written below (the “Effective Date”). The Parties agree as follows:

1. The Construction Project. Contractor shall furnish and bear solely the entire cost of all labor and materials necessary for the construction and/or renovation of the Project (defined hereinbelow) as specified in the Contract Documents (defined hereinbelow) and complete all Work on the Project in a workmanlike manner in strict accordance with the Contract Documents, schedule delivery of the new materials, furnish and bear solely the entire cost of all supervision, contract administration, equipment, tools, and other means necessary to complete the Project, perform every obligation imposed by the Contract Documents, and be solely responsible for the clean-up and disposal of all materials and debris relating to or arising from the construction and renovation, subject to any exceptions that are specifically set forth in the Contract Documents. Except as otherwise specifically provided in the Contract Documents, Contractor is solely responsible for all construction means, methods, techniques, sequences, procedures, safety precautions or programs, supervising, coordinating, and performing all the Work necessary to complete the Project; provided, however, PWC shall have the right, without incurring any liability to the Contractor, to suspend Contractor’s performance when a PWC employee, in his or her opinion, observes a safety violation involving a threat to life or imminent danger of bodily injury, and the suspension shall remain in effect until Contractor remedies the safety violation.

2. Terms. Capitalized terms used in this Agreement have the meaning specified below:

“Business Day” means each calendar day that is not a Saturday, Sunday, holiday observed by the federal government for its employees, or holiday observed by PWC for its employees.

“Final Completion” means: (i) the Project is completed in accordance with this Agreement, except for punch list items; (ii) PWC has received any required temporary or final certificate of occupancy from the governmental agency with jurisdiction over the Project; and (iii) the registered architects or engineers (the “Designer(s)”) who designed portions or components of the Project have issued certificates of final completion as to those portions or components.

“Contract Documents” means the following documents that were either made available to Contractor 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. Bid Documents (including, but not limited to, the General Conditions)
- c. Contractor's Submitted Bid
- d. Bid Bond
- e. Form of Exceptions
- f. Notice of Award
- g. Acceptance of Award
- h. Performance Bond
- i. Payment Bond
- j. Copy of General Contractor's License
- k. Certificate of Insurance
- l. Technical Specifications
- m. Additional Specifications

The following documents may be delivered or issued on or after the Effective Date of the Agreement and may not be attached to this Agreement, but are considered Contract Documents when executed by the Parties:

- n. Notice to Proceed and Acceptance of Notice
- o. Work Change Directive(s)
- p. Change Order(s)
- q. Field Order(s)

There are no Contract Documents other than those identified in this Agreement. The Contract Documents may only be amended, modified, or supplemented as provided in this Agreement in a writing signed by the Parties.

"Fault" means a breach of contract by Contractor, negligent, reckless, or intentional act(s) or omission(s) constituting a tort under applicable statutes or common law by one or more Responsible Persons, or violation(s) of applicable statute(s) or regulation(s) by a Responsible Person.

"Project" means _____, as more specifically set forth in the Contract Documents.

"Responsible Person" means the Contractor and each of its employees, agents, representatives, subcontractors, or other persons and entities for which Contractor may be liable or responsible as a result of any statutory, tort, or contractual duty.

The terms used in this Agreement shall have the meaning as stated herein and in the Contract Documents. In the event of a conflict between the terms of this Agreement and any other component(s) of the Contract Documents, the terms of this Agreement shall govern.

3. Contract Price. PWC shall pay Contractor for Final Completion in accordance with the Contract Documents the amount identified in the accepted Bid Form of Contractor, being in the total amount of \$ _____ (the "Price"). Contractor understands and acknowledges that the Price is derived from a specific appropriation of funds provided for the Project. Contractor agrees and acknowledges the Price is equal to the aggregate cost of all Work to be done on the Project, including all labor, materials, equipment,

apparatus, and supplies, set in accordance with the amount specified on the Bid Form submitted by Contractor and accepted by PWC.

4. Contract Times. The Parties shall perform their obligations under this Agreement in compliance with all scheduling deadlines set forth in the Contract Documents. The Contractor shall commence the Work to be performed under this Agreement on a date to be specified in accordance with the Notice to Proceed issued by PWC. Contractor shall achieve Final Completion no later than five hundred eighty-five (585) consecutive calendar days from said date, plus any modifications thereof allowed in accordance with the Contract Documents (the "Completion Date").

5. Payment. PWC shall pay Contractor in installment payments plus a final payment, as set forth in the Contract Documents. For each applicable installment payment, Contractor shall submit an application for payment in accordance with the Contract Documents. An application for payment will be processed by PWC as provided in the Contract Documents. Such installment payments shall reflect the actual cost of the Work, not to exceed in total the Price, and the allocable portion of the total Price for said installment. PWC shall make payment to the Contractor, less any applicable retainage set forth in the Contract Documents; provided, however, that PWC may withhold all or a portion of a payment on account of (1) incomplete Work, (2) defective or nonconforming Work, (3) claims filed or a reasonable basis to believe that such claims will be filed imminently, (4) failure of the Contractor to make payments properly for labor, services, materials, equipment or subcontracts, (5) damages caused to PWC or another party by one or more Responsible Persons, or (6) failure to comply with the terms and conditions of this Agreement. In the final payment, PWC shall pay the balance of the Price, including all retained amounts, less any Liquidated Damages and other applicable damage and claim amounts, to Contractor within forty-five (45) days after the later of the delivery of written notice from the Contractor of Final Completion to PWC or PWC's verification of Final Completion, which verification process shall be undertaken not less than ten (10) days after delivery of Contractor's written notice of Final Completion; provided, however, that PWC may withhold a reasonable sum from the final payment to ensure correction of any final items or condition on the Project.

6. Retainage. Subject to any restrictions applicable to any federal or state (or other) grant funds that may be utilized for the Project, PWC may, in its discretion, retain up to five percent (5%) of any periodic payment due Contractor; provided, however, when the Project is fifty percent (50%) complete, PWC, with written consent of the surety, shall not retain any further retainage from periodic payments due Contractor if Contractor continues to perform satisfactorily and any nonconforming Work identified in writing prior to that time by PWC or the Designer has been corrected by Contractor and accepted by PWC or the Designer, and provided further that full payment, less authorized deductions, shall also be made for those line item trades that have reached one hundred percent (100%) completion of their contract obligations by or before the Project is fifty percent (50%) complete if Contractor has performed satisfactorily in accordance with G.S. 143-134.1(b2), contingent upon PWC's receipt of an approval or certification from the Designer that the Work performed by the subcontractor is acceptable and in accordance with the Contract Documents. If PWC determines Contractor's performance is unsatisfactory, PWC may, in its discretion, reinstate retainage for each subsequent periodic application for payment as authorized in this Section up to the maximum amount of five percent (5%). The Project shall be deemed fifty percent (50%) complete when Contractor's gross project invoices, excluding the value of materials stored off-Site, equal or exceed fifty percent (50%) of the Price, except the value of materials stored on-Site shall not exceed twenty percent (20%) of Contractor's gross project invoices for the purpose of

determining whether the Project is fifty percent (50%) complete. Within 60 days after the submission of a pay request and one of the following occurs, as specified in the Contract Documents, PWC, with written consent of the surety, shall release to Contractor all retainage on payments held by PWC: (i) PWC receives a certificate of substantial completion from the Designer in charge of the Project; or (ii) PWC receives beneficial occupancy or use of the Project; provided, however, PWC may in its discretion retain sufficient funds to secure Final Completion or corrections and punch list items on any Work. If PWC retains funds, the amount retained shall not exceed two and one-half times the estimated value of the Work to be completed or corrected or addressed in the punch list. Any reduction in the amount of the retainage on payments shall be with the consent of Contractor's surety. The existence of any third-party claims against Contractor or any additive change orders to the Construction Documents shall not be a basis for delaying the release of any retainage on payments. Notwithstanding anything in this Section to the contrary, following fifty percent (50%) completion of the Project, PWC shall be authorized to withhold additional retainage from a subsequent periodic payment, not to exceed five percent (5%), in order to allow PWC to retain two and one-half percent (2.5%) total retainage through the Final Completion. In the event that PWC elects to withhold additional retainage on any periodic payment subsequent to release of retainage on a line-item of Work pursuant to G.S. 143-134.1(b2), Contractor may also withhold from the subcontractors remaining on the project sufficient retainage to offset the additional retainage held by PWC, notwithstanding the actual percentage of retainage withheld by PWC of the Project as a whole. Neither PWC's nor Contractor's release of retainage on payments as part of a payment in full on a line-item of Work pursuant to G.S. 143-134.1(b2) shall affect any applicable warranties on Work done by Contractor or subcontractor, and the warranties shall not begin to run any earlier than either PWC's receipt of a certificate of substantial completion from the Designer in charge of the Project or PWC receives beneficial occupancy.

7. Liquidated Damages. Time is of the essence with respect to performance of each of the Parties' obligations under this Agreement. Contractor recognizes and acknowledges that PWC will suffer financial and other losses if the Project is not completed by the Completion Date. The Parties recognize and agree that the delays, expense, and difficulties involved in proving in a legal proceeding the actual loss suffered by PWC if the Project is not completed by the Completion Date. Accordingly, instead of requiring any such proof, Contractor and PWC agree that in the event Contractor fails to achieve Final Completion by the Completion Date, Contractor shall pay to PWC as liquidated damages to compensate PWC for damages related to the delayed Final Completion one thousand dollars (\$1000.00) per day ("Liquidated Damages") for each calendar day Contractor fails to achieve Final Completion by the Completion Date.

8. Contractor's Representations and Warranties. In order to induce PWC to enter into this Agreement, Contractor makes the following representations and warranties to PWC:

a. Contractor is duly licensed in the State of North Carolina to complete all Work necessary for the Project, is duly organized, validly existing and in good standing and has all requisite powers, rights, and authority to execute, enter into, and perform this Agreement in accordance with the terms and conditions of this Agreement, and this Agreement constitutes a legal, valid, and binding obligation of Contractor enforceable against it in accordance with its terms.

b. Contractor has read the Contract Documents, and acknowledges and understands all data, materials, specifications, and requirements identified in the Contract Documents.

c. Contractor has visited the Site for the Project, conducted a thorough, visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance in completing the Project. Contractor is familiar with and is satisfied as to all laws and regulations that may affect cost, progress, and performance to complete the Project.

d. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Contract Documents and any accompanying reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Contract Documents and any accompanying reports and drawings.

e. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, if any, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.

f. Based on the information and observations referred to in subsection e. of this Section, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Price commencing on the commencement date and in accordance with the other terms and conditions of the Contract.

g. Contractor is aware of the general nature of Work to be performed by PWC and others at the Site that relates to the Work as indicated in the Contract Documents.

h. Contractor has given PWC's Designer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by the Designer is acceptable to Contractor.

i. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

j. Contractor's entry into this Agreement constitutes an incontrovertible representation by Contractor that, without exception, all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

k. Contractor has no business or personal relationship with any PWC Commissioner, officer, director, manager, or supervisor and Contractor

covenants to disclose immediately to PWC any such relationship that develops during the performance of Work on the Project.

9. Contractor's Payment Obligations. Contractor shall pay all of its obligations arising out of or in connection with the Project in a timely manner to all persons supplying materials in the prosecution of the Work and to all laborers and others employed thereon.

10. Performance and Payment Bonds. Contractor shall obtain and deliver to PWC a performance bond in the amount of one hundred percent (100%) of the Price, conditioned upon the faithful performance of the Project and all Work in accordance with the Contract Documents, which bond shall be solely for the protection of PWC. Contractor shall obtain and deliver to PWC a payment bond in the amount of one hundred percent (100%) of the Price, conditioned upon the prompt payment for all labor or materials for which the Contractor or one or more of its subcontractors is liable, which payment bond shall be solely for the protection of the persons furnishing materials or performing labor for which the Contractor is liable. The performance bond and the payment bond shall be executed by one or more surety companies legally authorized to do business in the State of North Carolina, shall become effective upon the awarding of the construction contract by PWC to Contractor, and shall at all times comply with the requirements set forth in Article 3 of North Carolina General Statutes Chapter 44A. In the event PWC deems the surety or sureties upon any bond necessary for this Agreement and for the Final Completion to be unsatisfactory, or if for any reason, such bond ceases to be adequate to cover the performance and/or payment of the Work, Contractor shall, at its expense, within five (5) days after the receipt of notice from PWC, furnish an additional bond or bonds in such form and amount, and with such surety or sureties as shall be satisfactory to PWC. In such event no further payment to Contractor shall be deemed to be due under this Agreement until new or additional security for the performance and payment of the Project shall be furnished in manner and form satisfactory to PWC. Contractor understands and acknowledges that PWC, as a public authority, is not subject to the provisions of Articles 1 and 2 of Chapter 44A of the General Statutes, in accordance with G.S. 44A-34 and applicable law.

11. Contractor's Damage Repair Obligations. Contractor shall be responsible for all damages to the property of the City of Fayetteville and of PWC that may result from the normal procedure of a Responsible Person's actions in the prosecution of the Work or that may be caused by or result from the negligence of a Responsible Person during the progress of or connected with the prosecution of the Work, whether within the limits of the Work or elsewhere. Contractor shall promptly restore all such property so damaged to a condition as good as it was immediately prior to Contractor initiating the Work on the Project.

12. Defective Work. The Project shall be subject to observation and approval by PWC, Designer, and representatives of governmental agencies with jurisdiction over the Project. PWC and Designer shall be entitled to enter at all reasonable times the premises subject to construction or renovation to inspect the Work performed by or on behalf of Contractor, provided that such entry and inspection does not materially interfere with the progress of construction. Contractor shall correct promptly, at no cost to PWC, all Work reasonably rejected by PWC or by its representatives. Should Contractor fail to correct rejected Work, PWC may, acting in its sole discretion, correct such Work and the Contractor shall pay PWC's actual costs of correction and any other applicable amounts identified in the Contract Documents.

13. As-Built Drawings. Contractor shall maintain during the progress of the Project as-built drawings indicating the current status of the Project as actually performed. Upon Final

Completion, Contractor shall prepare a final version of such as-built drawings and submit them to PWC for approval.

14. Assignment. This Agreement shall be binding upon and inure to the benefit of the Parties, their legal representatives, successors, and assigns. Contractor may not assign, transfer, convey, or encumber, whether voluntarily or by operation of law, this Agreement or any obligations, rights under, or interests in this Agreement to a third party without the prior written consent of PWC; and, specifically, but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

15. Indemnity. Contractor shall indemnify, defend, and hold harmless PWC and its Commissioners, officers, employees, agents, and representatives and the City of Fayetteville and its elected officials, managers, employees, agents, and representatives and Design Engineer (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 if the Fault of one or more Responsible Persons is a proximate cause of the loss, damage, or expense indemnified. Contractor's obligation to indemnify, defend, and hold harmless the Indemnitees shall survive the termination of this Agreement.

16. Insurance. Contractor shall maintain during the performance of the Work and for at least three (3) years after the Final Completion the insurance coverage set forth in the Contract Documents, 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 initiating any Work on the Project, Contractor shall deliver certificates of insurance confirming each such coverage required by the Contract Documents, and Contractor 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 comprehensive automobile and commercial liability insurance policies. Commercial general liability coverage shall be written on an "occurrence" basis. Contractor 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 Contractor fail to provide and maintain certificates as set forth herein, PWC shall have the right, but shall not have 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 Contractor, or to seek reimbursement for said payments from Contractor. Any such sums paid by PWC shall be due and payable immediately by Contractor upon notice from PWC. The insurance provisions of this Agreement shall not be construed as a limitation on Contractor's responsibilities and liabilities pursuant to the terms and conditions of this Agreement. Contractor's obligation to maintain insurance for three (3) years after Final Completion shall survive the termination of this Agreement.

17. Warranty. The Contractor hereby grants to PWC a warranty on all materials and Workmanship involved in the Project for a period of one (1) year from the Completion Date and

a period of two (2) years from the Completion Date for any latent structural defects. PWC shall give written notice to Contractor of any claim under this Section within the time specified hereinabove. This warranty shall be in addition to, and not in derogation of, all other rights and privileges which PWC may have under law, equity, or instrument, and shall survive the Completion Date and the final settlement and shall be binding on Contractor notwithstanding any provision in any other writing executed by PWC heretofore or contemporaneous with the execution of the Agreement or prior to the Completion Date.

18. Waiver. No failure on the part of any party to exercise, and no delay in exercising, any right, power, or privilege hereunder shall operate as a waiver thereof, nor shall any single or partial exercise of any right hereunder preclude any other or further cumulative and not exclusive of any remedies provided by law. This Agreement shall be binding upon and inure to the benefit of the parties, their legal representatives, successors, and assigns. This Agreement may not be assigned, transferred, conveyed, or encumbered, whether voluntarily or by operation of law, by either party without the prior written consent of the other party, which consent shall not be unreasonably withheld.

19. Law. THIS AGREEMENT SHALL BE GOVERNED BY AND INTERPRETED AND ENFORCED IN ACCORDANCE WITH THE LAWS OF THE STATE OF NORTH CAROLINA WITHOUT GIVING EFFECT TO THE CHOICE OF LAW PROVISIONS THEREOF. The Contractor shall at all times comply with all applicable Federal, state, and local laws and building codes in the performance of its obligations under the Agreement.

20. Dispute Resolution. In the event of any dispute, controversy, or claim of any kind or nature arising under or in connection with this Agreement (a "Dispute") and involving any two or more of the following parties, PWC, Designer, Contractor or any subcontractor of Contractor, the party initiating the Dispute shall serve written notice of a Dispute on the party(ies) to the dispute, and those parties shall endeavor to settle the dispute first through direct, informal discussions between the parties' selected representatives. Any such representative(s) shall have binding authority to settle the Dispute. In the event the parties do not settle the Dispute within ten (10) days from the date of written notice of the Dispute, any party to the Dispute may, by written notice to the other party(ies), engage a mediator certified under the laws of the State of North Carolina to mediate the Dispute within thirty (30) days of such notice. The parties to the Dispute shall attend mediation in good faith. In the event mediation is unsuccessful, any party to the dispute may initiate civil litigation. All of the foregoing dispute resolution procedures shall be held in Cumberland County, North Carolina or in the courts whose jurisdiction includes Cumberland County, North Carolina. This Agreement shall be governed by, and construed in accordance with, the laws of the State of North Carolina. Venue for any proceedings arising under or relating to this Agreement shall be in the courts serving Cumberland County, North Carolina, and Contractor consents to the exercise of personal jurisdiction over Contractor by such courts and waives all objections and defenses relating to *forum non conveniens* and venue. The cost of the mediator in a dispute resolution process shall be divided equally among the parties to the process; provided, however, PWC shall bear at least one-third of the cost if PWC is a party to the dispute resolution and the remainder of the cost shall be divided equally among the other parties participating in the dispute resolution. PWC shall, in its contractual arrangements with Designer, and Contractor shall, in its contracts with subcontractors and they in their contracts with lower-tier subcontractors authorize and direct such parties to participate in the dispute resolution procedures set forth in this Section. Unless otherwise directed in writing by PWC, Contractor shall continue the Project and maintain compliance with the scheduling deadlines set forth in the Contract Documents during any dispute resolution proceedings. If Contractor continues to perform, PWC shall make payments due for the continued performance

in accordance with this Agreement. The provisions of this Section shall not extend any applicable statutes of limitation or repose.

21. Execution; Modification; Entire Agreement; Severability. 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. No oral communication, promise, understanding, or agreement before, contemporaneous with, or after the execution of this Agreement shall affect or modify any of the terms and conditions and obligations of the Contract Documents. The Contract Documents shall be modified only by a subsequent writing signed by both Parties. The Contract Documents shall be conclusively considered to contain and express all the terms and conditions agreed upon by the Parties, notwithstanding any prior or contemporaneous written communication, promise, understanding or agreement. Should any provision of this Agreement or any of the Contract Documents at any time be in conflict with any law, statute, rule, regulation, order, or ruling and thus be unenforceable, or be unenforceable for any other reason, then the remaining provisions of this Agreement shall remain in full force and effect and the court shall give the offending provision the fullest meaning and effect permitted by law. The titles of the Sections 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.

22. Notices. Any notice which either Party is required or desires to give the other hereunder 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 herein below, 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 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 therefore 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 L. Bryant, CEO/General Manager
PO Box 1089
Fayetteville, NC 28302

To Contractor:

23. Termination. PWC may terminate this Agreement immediately if during the progress of the Work or during the warranty period, the Contractor:

- a. Persistently fails to prosecute the Work properly and in accordance with this contract, including but not limited to include failure to provide sufficient crews,

- equipment, or resources, or failure to adhere to the schedule;
- b. Demonstrates disregard for the policies, procedures, or requirements of PWC;
- c. Demonstrates complete disregard of the authority of PWC or its designated representatives; or
- d. Violates in any substantial way the provisions and requirements of this Agreement.

Such termination shall be effective upon written notice to Contractor and its surety. PWC may terminate the contract for its convenience by providing Contractor at least seven (7) calendar days prior written notice, in which event Contractor shall be paid for all Work completed, plus other expenses as mutually agreed upon between PWC and Contractor.

24. Compliance with North Carolina and Federal Law. Contractor 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. Contractor 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 N.C.G.S. §64-26(a). Contractor hereby pledges, attests, and warrants through execution of this Agreement that Contractor 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 Contractor shall comply with all E-Verify requirements. Failure to comply with the above requirements shall be considered a breach of this Agreement. Contractor hereby further acknowledges that the execution and delivery of this Agreement constitutes Contractor's certification to PWC and to the North Carolina State Treasurer that, as of the date of the Effective Date of this Agreement, Contractor 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. Contractor represents and warrants to Commission that Contractor, 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. Contractor also shall at all times during the term of this Agreement comply with Executive Order 11246, , as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and implementing regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," including but not limited to the Equal Opportunity Clause requirements set forth in 41 C.F.R. § 60-1.4. Contractor 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.

25. Solar PV Modules. All solar PV modules installed by Contractor in the Project must qualify either as nonhazardous waste at end-of-life or as disposable as universal waste.

26. Sales and Use Taxes. Contractor shall, upon each pay request under this Agreement, furnish to PWC all 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 paid for said materials; and Contractor shall also furnish PWC an affidavit certifying the total costs of materials purchased for all work performed within pay request period under this Agreement and the total amount of North Carolina Sales Tax paid for said materials. Contractor shall further comply with all requirements relating to sales and use taxes set forth in the Instructions to Bidders and other Contract Documents.

27. Environmental Compliance. Except in strict compliance with Environmental Laws (defined below), neither Contractor nor its employees, agents, contractors, subcontractors, licensees or invitees shall use, handle, store, or dispose of (or permit the use, handling, storing, or disposal of) any hazardous or toxic waste or substance in delivering the Services (or transport, transship or permit the transportation or transshipment of the same over or through the real property managed or operated by PWC) which is regulated, controlled, or prohibited by any federal, state, or local laws, ordinances, and/or regulations, including without limitation the Resource Conservation and Recovery Act, 42 U.S.C. § 6901, et seq. ("RCRA"); the Comprehensive Environmental Response Compensation and Liability Act of 1980, as amended, 42 U.S.C. § 9601, et. seq. ("CERCLA"); the Hazardous Materials Transportation Act, 49 U.S.C. § 801, et. seq; the Federal Water Pollution Control Act, 33 U.S.C. § 1321, et. seq; the Toxic Substances Control Act, 15 U.S.C. ("TSCA"); and the Occupational Safety and Health Act, 29 U.S.C. § 651 et seq. (as subsequently amended, "Environmental Laws"). As used herein, hazardous or toxic substances or materials shall include without limitation the following: (1) "hazardous wastes" as defined under RCRA or any other federal, state or local law or regulation, (2) "hazardous substances" as defined under CERCLA or any other federal, state or local law or regulation, (3) gasoline, petroleum, or other hydrocarbon products, by-products, derivatives, or fractions (including spent products), (4) "toxic substances" as defined under TSCA, (5) "regulated medical waste" as defined by 40 C.F.R. § 259.30, (6) any radioactive materials or substances, or (7) asbestos and asbestos containing products. "Hazardous Environmental Condition" means the existence of one or more hazardous or toxic substances or materials on the real property owned or managed by PWC on which the Project is to be constructed. Contractor shall comply with the Emergency Planning and Community Right-to-Know Act of 1986, as amended. Contractor shall immediately report orally to PWC and confirm in writing within three (3) hours any type of chemical spill that occurs in or on any real property managed or operated by PWC.

28. Addendum. **THIS AGREEMENT INCLUDES AS A MATERIAL AND ESSENTIAL TERM HEREOF THE FEDERAL FUNDING ADDENDUM ATTACHED HERETO AND INCORPORATED HEREIN BY REFERENCE. CONTRACTOR ACKNOWLEDGES THAT PWC IS SEEKING FEDERAL FUNDING TO CONTRIBUTE TO THE FINANCING OF THIS PROJECT, INCLUDING, BUT NOT LIMITED TO, INVESTMENT**

TAX CREDITS, FEDERAL SUBSIDIZED LOANS, AND FEDERAL GRANTS. CONTRACTOR REPRESENTS AND WARRANTS TO PWC THAT CONTRACTOR IS CAPABLE OF COMPLYING WITH EACH OF THE REQUIREMENTS SET FORTH IN THE FEDERAL FUNDING ADDENDUM, AND CONTRACTOR COVENANTS TO COMPLY IN ALL RESPECTS WITH EACH OF THE REQUIREMENTS SET FORTH IN THE FEDERAL FUNDING ADDENDUM AND TO PROVIDE SUCH DOCUMENTATION AND OTHER FORMS OF VALIDATION THAT PWC REQUESTS FROM TIME TO TIME IN ORDER TO APPLY FOR OR COMPLY WITH SUCH FEDERAL FUNDING REQUIREMENTS. IF CONTRACTOR FAILS TO COMPLY WITH THIS PROVISION, PWC'S DAMAGES FOR CONTRACTOR'S BREACH HEREOF SHALL INCLUDE, BUT WILL NOT BE LIMITED TO, THE VALUE OF THE FEDERAL FUNDING FOR WHICH PWC WOULD OTHERWISE HAVE BEEN ELIGIBLE.

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

The City of Fayetteville, by and through
the Fayetteville Public Works Commission

[CONTRACTOR]

By: _____
Timothy L. Bryant, CEO/GM

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 Haskins, Chief Financial Officer

Approved as to form:

James P. West, Chief Legal Officer

FEDERAL FUNDING ADDENDUM

PWC intends to maximize the tax credits and federal funding opportunities available to PWC for its Project. Contractor and its subcontractors shall therefore comply with the following tax credit and federal funding requirements. Many, if not all, of the following requirements are in the beginning stages of implementation, with federal departments and agencies still in the process of releasing guidance and regulations governing implementation and compliance. Accordingly, this Federal Funding Addendum is necessarily subject to such guidance and implementation, and Contractor and its subcontractors shall in good faith and in a commercially reasonable manner coordinate and cooperate with PWC in complying with the following tax credit and federal funding requirements and any related changes in the law for such requirements, as reasonably directed by PWC. Contractor and its subcontractor shall also provide to PWC upon its request from time-to-time such documentation, attestations, certifications, and other instruments and records reasonably needed by PWC to receive such tax credits and federal funding.

Tax Credit Requirements

In order to allow PWC to comply fully with the requirements applicable to maximizing Investment Tax Credits (“ITCs”) under sections 48 and 48E of the Internal Revenue Code (“IRC”) and the Production Tax Credits (“PTCs”) under sections 45 and 45Y of the IRC and to comply with the Build America, Buy America Act (“BABAA”), the Contractor and each of its subcontractors shall:

- (1) Pay laborers and mechanics wages at rates not less than the prevailing rates for construction, alteration, or repair of a similar character in the locality in which such facility is located, as most recently determined by the Secretary of Labor, as set forth in IRS Notice 2022-61 and which may be amended and updated. Contractor shall comply with the recordkeeping requirements under § 6001 and §1.6001-1 of the IRC and shall timely deliver to PWC sufficient, complete, and accurate certifications and records, including books of accounts or records for work performed by the Contractors and its subcontractors to establish that such prevailing wages were paid.
- (2) Satisfy three specific apprenticeship requirements: (1) Apprenticeship Labor Hour Requirements; (2) Apprenticeship Ratio Requirements; and (3) Apprenticeship Participation Requirements, as set forth in IRS Notice 2022-61, as may be amended and updated. Contractor shall timely deliver to PWC sufficient, complete, and accurate certifications and records that demonstrate satisfaction the three foregoing apprenticeship requirements and comply with the recordkeeping requirements under § 6001 and §1.6001-1 of the IRC, “including maintaining books of account or records in sufficient form to establish that the Apprenticeship Labor Hour and Apprenticeship Participation Requirements have been satisfied.”
- (3) In order to satisfy the domestic content requirements of the BABAA, certify to PWC that any steel, iron, or manufactured product which is a component of the Project (upon Contractor’s achievement of Final Completion and upon each subcontractor’s completion of its portion of the Project) was produced in the United States, in accordance with IRS Notice 2023-38 and Parts 184 and 200 of Title 2 of the Code of Federal Regulations, as may be amended and updated. Project components for utility-scale photovoltaic system include, but are not limited to:

Project Component	Categorization
Steel photovoltaic module racking	Steel/Iron

Pile or ground screw	Steel/Iron
Steel or iron rebar in foundation (e.g., concrete pad)	Steel/Iron
Photovoltaic tracker (if applicable)	Manufactured Product
Photovoltaic module (which includes the following Manufactured Product components, if applicable: photovoltaic cells, mounting frame or backrail, glass, encapsulant, backsheet, junction box (including pigtails and connectors), edge seals, pottants, adhesives, bus ribbons, and bypass diodes)	Manufactured Product
Inverter	Manufactured Product

Contractor’s certification must state, consistent with the BABAA, that all steel, iron, and manufactured product incorporated in the Project were produced in the United States and meets the domestic content requirement as of the date the Project is placed in service. Contractor shall comply with the recordkeeping requirements under § 6001 and §1.6001-1 of the IRC and shall timely deliver to PWC sufficient, complete, and accurate certifications and records that demonstrate satisfaction the domestic content requirement.

Contractor and its subcontractors shall comply with the above prevailing wage, apprenticeship, domestic content, and BABAA requirements in accordance with (1) sections 48, 48E, 45, and 45Y of the IRC, as may be amended; (2) the Build America, Buy America Act, Public Law 117-58; and (3) all applicable guidance and rules issued by the Treasury Department, Internal Revenue Service, and any other applicable federal or state agency(ies), as may be amended and updated.

Federal Funding Requirements

In order to allow PWC to seek and secure additional federal funding, Contractor shall also comply with all applicable requirements of 2 CFR Subtitle A, Chapter II, Part 200, and Appendix II to Part 200, and cooperate with PWC to provide all records, reports, certification, and other documentation needed by PWC to comply with the requirements of 2 CFR Subtitle A, Chapter II, Part 200, that are applicable to PWC and the Project. Such requirements specifically include the Davis-Bacon Act and 29 CFR Subtitle A Part 5, LABOR STANDARDS PROVISIONS APPLICABLE TO CONTRACTS COVERING FEDERALLY FINANCED AND ASSISTED CONSTRUCTION (ALSO LABOR STANDARDS PROVISIONS APPLICABLE TO NONCONSTRUCTION CONTRACTS SUBJECT TO THE CONTRACT WORK HOURS AND SAFETY STANDARDS ACT), including but not limited to the following requirements:

- (1) Minimum wages.
 - (i) All laborers and mechanics employed or working upon the site of the Work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe

benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii)

(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so

advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside, in a separate account, assets for the meeting of obligations under the plan or program.

(2) Withholding. The (write in name of Federal Agency or the loan or grant recipient) shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, the (Agency) may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in

section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)

(A) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the (write in name of agency). The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit them to the applicant, sponsor, or owner, as the case may be, for transmission to the (write in name of agency), the Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, sponsor, or owner).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no

deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The Contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the (write the name of the agency) or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees —

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) Compliance with Copeland Act requirements. The Contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the (write in the name of the Federal agency) may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The

prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

(i) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

Such requirements also specifically include the Contract Work Hours and Safety Standards Act requirements in 29 CFR Subtitle A Part 5.5(b), including but not limited to:

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (b)(1) of this section the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of \$31 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek

of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.

(3) Withholding for unpaid wages and liquidated damages. PWC shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (b)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (b)(1) through (4) of this section.

The Contractor and its subcontractors shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the Completion Date for all laborers and mechanics, including guards and watchmen, working on the contract for the Project. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. The records to be maintained under this paragraph shall be made available by the Contractor and its subcontractor to PWC and relevant federal agencies for inspection, copying, or transcription by authorized representatives of PWC, relevant federal agencies, and the U.S. Department of Labor, and the Contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

Contractor shall also comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended by the Clean Water Act (33 U.S.C. 1251-1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

Contractor represents and warrants to PWC that Contractor is not listed on the governmentwide exclusions in the System for Award Management (SAM), and Contractor shall file all required certifications. Each subcontracting tier shall certify to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each subcontracting tier shall disclose to the tier above any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Each subsequent subcontracting tier shall forward such disclosures up each tier to PWC.

Contractor shall comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, the requirements of which include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR part

247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds \$10,000 or the value of the quantity acquired during the preceding fiscal year exceeded \$10,000. Contractor shall also establish an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines.

Contractor shall comply with the Buy America provisions of the Infrastructure Investment and Jobs Act, the Office of Management and Budget M-22-11 memorandum (issued April 18, 2022), and all federal department and agency guidance and regulations related to the Buy America preference, as each may be amended and updated. Contractor and subcontractors shall ensure, to the greatest extent practicable, that all iron, steel, and manufactured products used in the Project are produced in the United States and that all construction materials used in the Project are manufactured in the United States. Contractor and subcontractors shall include the requirements of this paragraph in all subawards, including all contracts and purchase orders for work or products under the contract to construct the Project. To the extent Contractor and/or subcontractors experience issues in meeting the Buy America requirements, Contractor and subcontractors shall promptly notify PWC within a reasonable time, provide PWC all information necessary, and coordinate with PWC to the extent PWC needs to request a waiver from the Buy America requirements.

Notice to Proceed

Owner: **Fayetteville Public Works Commission** Project No.: PWC 2324021

Engineer: _____

Contractor: _____

Project: Gillespie B1.9 Solar PV Utility Station

Contract Name: _____

Effective Date of Contract: _____

PWC hereby notifies Contractor that the Contract Times under the above Contract will commence to run on [date Contract Times are to start] pursuant to Paragraph 4.01 of the General Conditions.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work will be done at the Site prior to such date.

In accordance with the Agreement: [Insert number of days and dates.]

The number of days to achieve Substantial Completion is five hundred forty (540) day from the date stated above for the commencement of the Contract Times, resulting in a date for Substantial Completion of [date, calculated from commencement date above]; and the number of days to achieve Final Completion and readiness for final payment is five hundred eight-five (585) days from the commencement date of the Contract Times, resulting in a date for readiness for final payment of [date, calculated from commencement date above].

Before starting any Work at the Site, Contractor must comply with the following:

[Note any access limitations, security procedures, or other restrictions]

Owner: **Fayetteville Public Works Commission**

By (*signature*): _____

Name (*printed*): _____

Title: _____

Date Issued: _____

Copy: Engineer



GENERAL CONDITIONS FOR THE
FAYETTEVILLE PUBLIC WORKS COMMISSION
GILLESPIE B1.9 SOLAR PV UTILITY STATION

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General Conditions

Article I. Definitions and Terminology

Section 1.01 Definitions

Capitalized terms used in the Bid Documents or Contract Documents, including the singular and plural forms, shall have the meaning indicated in the definitions below. In addition to terms specifically defined below, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

- (a) Addenda—Written or graphic instruments issued before the opening of Bids which clarify, correct, or change the Bid Documents or other Contract Documents.
- (b) Agreement—The written instrument, executed by PWC and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties, designates the specific documents that encompass the Contract Documents, and provides other material provisions that govern the relationship between the parties as it relates to the Project. The Agreement is also referred to, and titled as, the “Construction Agreement.”
- (c) Application for Payment—The form that Contractor shall use during the Work in requesting progress or final payments. Any Application for Payment shall be accompanied by such supporting documentation as is required by the Contract Documents.
- (d) Bid—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
- (e) Bidder—An individual or entity that submits a Bid to PWC for the Project.
- (f) Bid Documents—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
- (g) Bidding Requirements—The Invitation to Bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bidder’s original Bid with any requisite attachments.
- (h) Business Day—each calendar day that is not a Saturday, Sunday, or holiday observed by PWC (New Year’s Day, Martin Luther King, Jr. Day, Good Friday, Memorial Day, Independence Day, Labor Day, Veteran’s Day, Thanksgiving Day (and the day after), and Christmas (2 days) for its employees.
- (i) Change Order—A document that is signed by Contractor and PWC, which authorizes an addition, deletion, or revision in the Work, an adjustment in the Contract Price or the Contract Times, a change in the scope of the Project, or other revision to the Agreement, issued on or after the Effective Date of the Agreement.
- (j) Change Proposal—A written request by Contractor, submitted in compliance with the procedural requirements set forth in the Contract Documents, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by PWC

concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Agreement.

- (k) **Constituent of Concern**—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. (“CERCLA”); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5101 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. (“RCRA”); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
- (l) **Contract Price**—The money that PWC has agreed to pay Contractor for Final Completion in accordance with the Contract Documents. May also be referred to as “Price” throughout the Contract Documents.
- (m) **Contract Times**—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; and (b) Final Completion.
- (n) **Contractor**—The individual or entity with which PWC has contracted for performance of the Work and Final Completion.
- (o) **Day**—a calendar day of 24 hours measured from midnight to the next midnight. Also referred to throughout the Contract Documents as “days” or “calendar days.”
- (p) **Design Engineer**—The Engineering firm identified on the Contract Drawings and their duly authorized employees and agents, such employees and agents acting within the scope of the particular duties entrusted to them in each case.
- (q) **Drawings**—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
- (r) **Field Order**—A written order issued by Project Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
- (s) **Final Completion**—Has the meaning as set forth in the Construction Agreement.
- (t) **Laws and Regulations; Laws or Regulations**—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction. Such terms, unless otherwise specified, shall refer to North Carolina laws and regulations.
- (u) **Milestone**—A principal event in the performance of the Work that the Agreement requires Contractor to achieve by an intermediate completion date or by a time prior to Final Completion.

- (v) Non-Compliance Notice—A written notice issued by PWC to Contractor indicating a violation of any term, provision, or requirement of the Contract Documents.
- (w) Notice of Award—The written notice by PWC to a Bidder providing of PWC’s acceptance of the Bid upon timely compliance by the Bidder with any conditions precedent provided in the notice.
- (x) Notice to Proceed—A written notice by PWC to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
- (y) Progress Schedule—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor’s plan to accomplish the Work within the Contract Times.
- (z) Project—has the meaning ascribed to it in the Agreement and is as more specifically set forth throughout the Contract Documents. “Project” includes the total undertaking to be accomplished for PWC by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
- (aa) Project Engineer—the PWC employee assigned by PWC to coordinate, manage, monitor, and otherwise perform the administration necessary and consistent with PWC’s responsibilities to achieve Final Completion. The Project Engineer has authority to coordinate and work with the Design Engineer regarding any engineering questions, concerns, revisions, alterations, deletions, or additions to the Work, and has authority to approve any changes in the scope of the Work. Project Engineer may assign a “Project Coordinator” who will also be an employee of PWC and have the duties and responsibilities set by the Project Engineer.
- (bb) PWC—Fayetteville Public Works Commission. PWC may also be referred to in the Contract Documents as “Owner.”
- (cc) Samples—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
- (dd) Schedule of Submittals—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Project Engineer’s review of the submittals and the performance of related construction activities.
- (ee) Schedule of Values—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
- (ff) Shop Drawings—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Contract Drawings and are not Contract Documents.

- (gg) Site—Lands or areas indicated in the Contract Documents as being furnished by PWC upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by PWC which are designated for the use of Contractor.
- (hh) Specifications—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
- (ii) Subcontractor—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
- (jj) Substantial Completion—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Project Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
- (kk) Successful Bidder—The Bidder whose Bid PWC accepts, and to which PWC provides a Notice of Award.
- (ll) Supplementary Conditions—Any part of the Agreement that amends or supplements these General Conditions.
- (mm) Supplier—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
- (nn) Technical Data—Those items expressly identified as Technical Data in the Bid Documents, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.
- (oo) Underground Facilities—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
- (pp) Unit Price Work—Work to be paid for on the basis of unit prices.
- (qq) Work—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result

of performing or providing all labor, services, materials, equipment, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents and necessary to achieve Final Completion.

- (rr) Work Change Directive—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by PWC and recommended by the Project Engineer, ordering an addition, deletion, or revision in the Work.

Section 1.02 Terminology

The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

- (a) Intent of Certain Terms or Adjectives:

- (i) The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Project Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Project Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Project Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions the Contract Documents.

- (b) Defective—when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:

- (i) does not conform to the Contract Documents; or
- (ii) does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
- (iii) has been damaged prior to Project Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by PWC at Substantial Completion in accordance with the Contract Documents).

- (c) Furnish, Install, Perform, Provide

- (i) The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
- (ii) The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
- (iii) The words “perform” or “provide,” when used in connection with services, materials, or

equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

- (iv) If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

Article II. Preliminary Matters

Section 2.01 Delivery of Bonds and Evidence of Insurance

- (a) Bonds: Contractor shall deliver to PWC such bonds as Contractor is required to furnish simultaneously with delivering the executed Agreement to PWC.
- (b) Contractor’s Insurance: Contractor shall deliver to PWC the certificates and other evidence of the insurance required by the Contract Documents simultaneously with delivering the executed Agreement to PWC.

Section 2.02 Copies of Documents

- (a) PWC will furnish to Contractor up to five (5) printed copies of the Contract Documents upon request by Contractor, and one (1) copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- (b) PWC will maintain and safeguard at least one original printed record version of the Agreement, including Drawings and Specifications signed and sealed by Design Engineer or other design professionals as applicable. PWC agrees to make such original printed record version of the Agreement reasonably available to Contractor for review during PWC’s normal business hours. PWC may delegate the responsibilities under this provision to Design Engineer.

Section 2.03 Before Starting any Work

- (a) Within ten (10) Days after the Contractor receives the Notice of Award from PWC (or as otherwise specifically required by the Contract Documents), Contractor shall submit to PWC for timely review:
 - (i) a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the identifiable aspects of the Work, including any Milestones specified in the Contract Documents, and identifying a single critical path, in such formats as may be required by PWC, including the native format used to create the schedule;
 - (ii) a preliminary Schedule of Submittals; and
 - (iii) Any Shop Drawings, Samples, and other submittals required by the Contract Documents before the Preconstruction Conference.

Section 2.04 Preconstruction Conference; Designation of Authorized Representatives

- (a) Before any Work at the Site is started, a preconstruction conference attended by PWC, Project Engineer, Contractor, Design Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss general Project issues including, but not limited, the following:
 - (i) The schedules and submittals referred to in Section 2.03;
 - (ii) Contractor's designated authorized representative as described in Section 2.04(b);
 - (iii) Safety;
 - (iv) Procedures for handling Shop Drawings, Samples, and other submittals;
 - (v) Processing Applications for Payment, electronic or digital transmittals;
- (b) At the preconstruction conference Contractor shall designate, in writing, a specific individual to act as its authorized representative with respect to its services and responsibilities under the Contract Documents. Such individual shall have the authority to transmit and receive information, render decisions relative to the requirements of the Contract Documents, and otherwise act on behalf of the Contractor.

Section 2.05 Initial Acceptance of Schedules

- (a) At least twenty (20) Days before submission of the first Application for Payment a conference, attended by Contractor, PWC, and others as appropriate, will be held to review for acceptability to Project Engineer as provided below the schedules submitted in accordance with Paragraph 2.03(a). PWC shall have ten (10) Days to review the submission and provide feedback to Contractor. Contractor shall then have ten (10) days to make any corrections and adjustments as indicated by PWC and to complete and resubmit the schedules as necessary. No progress payment shall be made to Contractor until acceptable schedules are submitted to and approved by Project Engineer.
- (b) The Progress Schedule will be acceptable to Project Engineer if it provides an orderly progression of the Work to achieve Final Completion and all applicable Milestones within the Contract Times and identifies a single critical path. Such acceptance will not impose on Project Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
- (c) Contractor's Schedule of Submittals will be acceptable to Project Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

Section 2.06 Electronic Transmittals

- (a) Except as otherwise stated elsewhere in the Contract Documents, PWC and Contractor and their authorized agents may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through electronic mail at the address(es) designated by each Party.
- (b) When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the

items resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

Article III. Contract Documents: Intent, Requirements, Reuse

Section 3.01 Intent

- (a) The Contract Documents are complementary; what is required by one is as binding as if required by all.
- (b) It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.
- (c) Project Engineer, Design Engineer, or both, will issue clarifications and interpretations of the Contract Documents as provided herein.
- (d) To the extent necessary that Work, construction, or conditions not covered by these General Conditions is required for Contractor to achieve Final Completion, "Special Conditions" for such Work will be provided to Contractor and shall be part of the Contract Documents.
- (e) In case of any inconsistency, conflict, or ambiguity among the Contract Documents, the documents shall govern in the following order: (1) Change Orders; (2) Addenda; (3) the fully executed Agreement; (4) Special Conditions; (5) any Drawings and Technical Specifications; and (6) General Conditions.

Section 3.02 Reference Standards

- (a) Standards Specifications, Codes, Laws and Regulations
 - (i) Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or North Carolina laws and regulations in effect as of the Effective Date of the Agreement, except as may be otherwise specifically stated in the Contract Documents.
 - (ii) No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of PWC or Contractor, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to PWC or any of its officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents.

Section 3.03 Reporting and Resolving Discrepancies

- (a) Contractor's Verification of Figures and Measurements

- (i) Before undertaking any portion of the Work, Contractor shall review all of the Contract Documents to and check and verify all figures and dimensions for the Project. Contractor shall promptly report in writing to Project Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Project Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to these General Conditions.
- (ii) If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Project Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as defined hereinafter) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Project Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to these General Conditions.

(b) Resolving Discrepancies:

- (i) Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for PWC shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
 - 1) *the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or*
 - 2) *the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).*

Section 3.04 Reuse of Documents

- (a) Contractor and its Subcontractors and Suppliers shall not have or acquire any title to or ownership rights in any of the:
 - (i) Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Design Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of PWC and Design Engineer and specific written verification or adaptation by Design Engineer, where applicable; or
 - (ii) Contract Documents and shall not reuse any such Contract Documents for any purpose without PWC's express written consent.
- (b) The prohibitions of this provision shall survive final payment or termination of the Agreement. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

Article IV. Commencement and Progress of the Work

Section 4.01 Commencement of Work

- (a) The Contract Times will commence to run on the day indicated in the Notice to Proceed issued by PWC to Contractor. A Notice to Proceed may be given at any time after the Effective Date of the Contract.
- (b) Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date. Contractor's failure to commence the Work within fifteen (15) Days of the date stated in the Notice to Proceed shall be deemed a material breach of the Agreement unless PWC otherwise determines in its sole discretion and agrees in writing to a delay of the Contract Times based on the applicable circumstances.

Section 4.02 Reference Points

- (a) Construction staking will be performed by Design Engineer, who will also prepare and furnish construction cut sheets, signed and sealed by a North Carolina professional land surveyor, to PWC and Contractor. Contractor shall not install any utilities without a sheet. All requests for staking shall be made not less than 96 hours in advance.
- (b) Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and staking, and shall make no changes or relocations without the prior written approval of Project Engineer. Contractor shall report to Project Engineer whenever any reference point staking is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or staking by professionally qualified personnel.

Section 4.03 Progress Schedule

- (a) Contractor shall adhere to the Progress Schedule established in accordance with Section 2.03 as it may be adjusted from time-to-time as provided below. Contractor shall submit to Project Engineer for acceptance any proposed adjustments in the Progress Schedule that will not result in changing the Contract Times and such submittal shall include a copy of the schedule in its native format. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article IX.
- (b) Contractor shall carry on the Work and adhere to the Progress Schedule during any disputes or disagreements with PWC. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by these General Conditions or as PWC and Contractor may otherwise agree in writing.

Section 4.04 Delays in Contractor's Progress

- (a) If PWC, Project Engineer, anyone for whom PWC is responsible, or a Force Majeure Event delays, disrupts, or interferes with the performance or progress of the Work, then

Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price, provided that such act is the sole cause of the delay. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

- (b) Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused wholly or in part by or within the control of Contractor, including any concurrent delay. Delay, disruption, and interference attributable to and wholly or partially within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- (c) Contractor must submit any Change Proposal, consistent with the procedure set forth in Article IX, seeking an adjustment in Contract Price or Contract Times under this provision within ten (10) calendar days of the commencement of the event that causes the delay, disruption, or interference with the Work and Contract Times.

Article V. Availability of Lands; Subsurface and Physical Conditions; Hazardous Environmental Conditions

Section 5.01 Availability of Lands

- (a) PWC will be responsible for obtaining any required easements and encroachments, and otherwise furnishing the Site, necessary to complete the Work, except as provided elsewhere in the Contract Documents.
- (b) Upon reasonable written request, PWC shall furnish to Contractor a current statement of record legal title and legal description of the lands upon which the Work is to be completed and PWC's interest therein.
- (c) Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment necessary to complete the Work. Any and all agreements between the Contractor and any individual property owner(s) shall not obligate PWC, PWC's employees, Project Engineer, or Design Engineer in any manner, and Contractor shall, before performing any work on any such property, obtain a signed and notarized release of liability of PWC and Design Engineer that is suitable to PWC as confirmed in writing.
- (d) Contractor and any of its Subcontractors shall exercise care and caution to avoid damage to any private property. Should any such damage to private property occur, it is Contractor's responsibility to notify the Project Engineer promptly in writing that such damage occurred, the extent of the damage, and Contractor's written plan to remedy the damage. If Contractor fails to timely correct damage to private property, PWC reserves the right to withhold progress payments until damage is corrected and/or to correct damage and back-charge Contractor for costs incurred. At the Completion of the Project, Contractor shall obtain a signed release from all owners of private property to which damage occurred that releases PWC and Design Engineer and acknowledges a settlement for the damage or that such damage was adequately remedied.

Section 5.02 Use of Site and Other Areas

- (a) Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site and other adjacent areas permitted by Laws and Regulations and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
- (b) Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris during the progress of the Work. Removal and disposal of such debris shall conform to applicable Laws and Regulations.
- (c) Prior to Final Completion, Contractor shall clean the Site and the Work and make it ready for utilization by PWC. At the completion of all of the Work, Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- (d) Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

Section 5.03 Differing Subsurface or Physical Conditions or Underground Facilities

- (a) If Contractor believes that any subsurface or physical condition or Underground Facilities that is uncovered or revealed at the Site either:
 - (i) is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely is materially inaccurate;
 - (ii) is of such a nature as to require a change in the Contract Documents;
 - (iii) differs materially from that shown or indicated in the Contract Documents; or
 - (iv) is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and within five days and before further disturbing the subsurface or physical conditions or Underground Facilities or performing any Work in connection therewith, notify PWC and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement approved by PWC permitting Contractor to do so.

- (b) After receipt of Contractor's written notice, Project Engineer will review the subsurface or physical condition or Underground Facilities in question; determine the necessity of PWC obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any of the differing site condition categories in this Section 5.03; and obtain any pertinent cost or schedule information from Contractor.

- (c) Project Engineer will issue a written statement to Contractor regarding the subsurface or physical condition or Underground Facilities in question, which addresses the resumption of Work in connection with such condition and indicates whether any change in the Contract Documents will be made. Contractor will continue with other work not affected by these site conditions during this process.
- (d) Possible Price and Times Adjustments:
 - (i) Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition or Underground Facilities, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work in the opinion of the Project Engineer; subject, however, to the following:
 - 1) *such condition must fall within at least one of the categories in this Section 5.03; and,*
 - 2) *Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.*
 - (ii) Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition or Underground Facilities if:
 - 1) *Contractor knew of the existence of such condition at the time Contractor proffered its Bid to PWC or executed the applicable Agreement for the Project; or*
 - 2) *the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's Bid; or*
 - 3) *Contractor failed to give the written notice as required.*
 - (iii) Any contract adjustment under this section shall be set forth in a Change Order approved by PWC.
 - (iv) Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 calendar days after Project Engineer's written statement to Contractor regarding the subsurface or physical condition or Underground Facilities in question.

Section 5.04 Underground Utilities

- (a) Contractor shall ascertain the location and type of all underground utility lines or structures that may be located within the limits of the Site or any area where Work is to be performed.
 - (i) The exact location of underground utilities or structures may vary from prior plans, permits, maps, or other documentation, and others may not be designated. The Contractor is fully responsible for verification of the exact location of all underground utility lines or structures within the limits of the Site or the area where the work is to be performed, whether known or unknown by PWC, and for providing necessary

protection and/or repair if damage.

- (ii) Should uncharted or incorrectly charted piping or other utilities be encountered during excavations, the Contractor shall immediately halt any Work, notify PWC, and await direction from PWC before proceeding with any Work. The Contractor shall fully cooperate with PWC and any other utility company in keeping respective services and facilities in operation.
- (b) PWC has used reasonable care to locate and depict existing underground installation on the construction drawings, but the accuracy cannot be guaranteed, and some items may not be shown which exist. Actual horizontal and vertical locations have not been verified. As part of the Work, the Contractor is required to dig up each utility which may conflict with construction in advance to verify locations. The utilities shall be “dug up” a minimum of fourteen (14) Days in advance of actual installation of new utilities to allow PWC an opportunity to adjust grades and alignments, to avoid a conflict, and to address any other issues.
- (c) The Contractor shall adhere to the provisions of the North Carolina Underground Utility Safety and Damage Prevention Act. The Contractor shall make a documented request to the North Carolina One Call Center, and/or individual utility owners, in order to locate any facilities within the Site limits or any area where Work is to be performed at least forty-eight (48) hours in advance of the day the Work is scheduled to begin. The Contractor shall include the cost of any coordination and cooperation for utilities in its Bid.
 - (i) Location assistance requested from PWC by Contractor should include the actual horizontal location, type number, size, and depth of all lines. All costs associated with locating and marking existing utilities or the utilities representatives shall be the responsibility of the Contractor.
 - (ii) The Owner, Project Engineer, Design Engineer, and/or Consultants shall not be liable to the Contractor for any claims, costs, losses, or damages incurred or sustained on or in connection with locating existing underground installations.
- (d) If the Contractor fails to schedule locates or perform advance physical locations in advance of the construction and a conflict arises, the Contractor will be required to make corrective measures as instructed by the Project Engineer at the Contractor’s expense. The Contractor’s failure to advance plan (minimum fourteen (14) days) by physically uncovering existing utilities in advance of construction shall not be cause for claim of lost time or for additional compensation. No additional payment will be made for re-mobilization required by the utility locator.
 - (i) The Contractor shall inform all equipment operators, either those employed by him or those employed by his subcontractors, of information obtained from the utility owners prior to initiation of any aspect of any Work.
- (e) PWC and Design Engineer shall not be responsible for the accuracy or completeness of

any information or data provided to the Contractor with respect to underground facilities.

- (f) The entire cost of all of the following will be included in the Contract Price, and Contractor shall bear full responsibilities for all such costs, including but not limited to:
 - (i) Reviewing and checking all such information and data;
 - (ii) Locating all underground facilities shown or indicated in the Contract Documents;
 - (iii) Coordination of the Work with the owners of such underground facilities, including PWC, during any portion of the Work; and
 - (iv) The safety and protection of all such underground facilities and repairing any damage thereto resulting from the Work.
- (g) Contractor shall be responsible for the discovery of existing underground installations, in advance of any excavating or trenching as required in the Contract Documents.
- (h) If an underground facility is discovered at or contiguous to the Site that was not shown or indicated in the Contract Documents or of which Contractor was not aware prior to starting that portion of any Work, Contractor shall, immediately after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency), identify the owner of such underground facility and give written notice to PWC. Upon receipt of written notice, PWC will review the pertinent condition, determine the necessity of obtaining additional information, and advise Contractor in writing. During such time, Contractor shall be responsible for the safety and protection of such underground facility. If PWC concludes that a change in the Contract Documents is required, a Change Order will be issued.
- (i) The Contract Price and/or the Contract Time, may be adjusted if PWC determines, in its discretion, that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work subject to the following:
 - 1) *Facility was not shown or indicated in the Contract Documents, and*
 - 2) *The Contractor did not know of or could not anticipate the facility.*

Section 5.05 Hazardous Environmental Conditions at Site

- (a) Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work or Hazardous Environmental Condition was caused by Contractor.

- (b) Contractor shall be responsible for controlling, containing, and removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating each Hazardous Environmental Condition which Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible caused or contributed to or which was otherwise created by the presence of any Constituents of Concern introduced or allowed by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- (c) If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency); and (3) immediately notify Project Engineer (and promptly thereafter confirm such notice in writing). Project Engineer will evaluate such condition or take corrective action, if any. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then PWC may have the Hazardous Environmental Condition removed and remediated and impose a set-off against payments to Contractor to account for the reasonable associated costs.
- (d) Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after PWC has delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- (e) If PWC and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within thirty (30) calendar days of PWC's written notice regarding the resumption of Work, Contractor may submit a Change Proposal or PWC may impose a set-off.
- (f) If after receipt of such written notice Contractor does not agree to resume such Work based on reasonable evidence it is unsafe or does not agree to resume such Work under such special conditions, then PWC may order the portion of the Work that is in the area affected by such condition to be deleted from the Work.

Article VI. Bonds and Insurance

Section 6.01 Performance and Payment Bonds

- (a) Contractor shall obtain and furnish to PWC a performance bond in the amount of one hundred percent (100%) of the Contract Price, conditioned upon the faithful performance of the Project and all Work in accordance with the Contract Documents, which bond shall be solely for the protection of PWC.
- (b) Contractor shall obtain and furnish to PWC a payment bond in the amount of one hundred percent (100%) of the Contract Price, conditioned upon the prompt payment for

all labor or materials for which the Contractor or one or more of its subcontractors is liable, which payment bond shall be solely for the protection of the persons furnishing materials or performing labor for which the Contractor is liable.

- (c) The performance bond and the payment bond shall be executed by one or more surety companies legally authorized to do business in the State of North Carolina, shall become effective upon the awarding of the construction contract by PWC to Contractor, and shall at all times comply with the requirements set forth in Article 3 of North Carolina General Statutes Chapter 44A.
- (d) In the event PWC deems the surety or sureties upon any bond necessary for the Agreement and Final Completion to be unsatisfactory, or if for any reason, such bond ceases to be adequate to cover the performance and/or payment of the Work, Contractor shall, at its expense, and within ten (10) days after the receipt of notice from PWC, furnish such additional bond(s) in such form and amount, and with such surety or sureties, as shall be satisfactory to PWC. In such event no further payment to Contractor shall be deemed to be due under this Agreement until new or additional security for the performance and payment of the Project shall be furnished in manner and form satisfactory to PWC.
- (e) By executing the Agreement, Contractor understands and acknowledges that PWC, as a public authority, and the City, as a municipal corporation, are not subject to the provisions of Articles 1 and 2 of Chapter 44A of the General Statutes, in accordance with G.S. 44A-34 and applicable law.

Section 6.02 Insurance

- (a) Contractor shall maintain during the life of the Agreement and during the completion of any Work the following insurance coverages, which insurance shall be placed with insurance companies authorized to do business in the State of North Carolina and rate A minus VII or better by the current edition of Best's Key Rating Guide or otherwise approved in writing by PWC:
 - (i) Commercial general liability insurance with limits of \$1,000,000 per occurrence, \$2,000,000 aggregate other than products/completed operations; \$2,000,000 aggregate for products/completed. Commercial general liability coverage shall be written on an "occurrence" basis.
 - (ii) Automobile liability insurance in an amount not less than \$1,000,000 combined single limit per accident for bodily injury and property damage from owned, non-owned, and hired automobiles.
 - (iii) Workers' compensation insurance as required by the Laws and Regulations. In the event any employee(s), contractor(s), or subcontractor(s) engaged to perform any Work under the Agreement is not protected under the applicable workers' compensation laws, the Contractor shall provide adequate coverage for the protection of such employee(s), contractor(s), or subcontractor(s) not otherwise protected.
 - (iv) In the event the Project concerns building construction or repair work, Contractor shall purchase and maintain "Builder's Risk" insurance. This insurance shall include the interests of the PWC, Contractor, and any Subcontractor(s) and shall be written on a

one hundred percent (100%) completed value basis (full value as of the date that all construction is finished and includes the Contractor's Contract Price), and to remain in force until Final Completion.

- (v) Regardless of the nature of the work to be performed, coverage must also be provided for the theft or damage of building materials and supplies, which are not permanently attached or stored on Site for any period of time. This coverage shall be an "Installation Floater." If no building construction or repair is involved for the Project, the amount of the coverage shall equal the value of the materials stored on site.
- (b) Prior to initiating any Work on the Project, Contractor shall deliver to PWC certificates of insurance confirming each such coverage set forth above, and Contractor shall direct its insurers to provide annually to PWC certificates confirming each such coverage during the coverage period.
- (c) PWC shall be named as an additional insured in the comprehensive automobile and commercial liability insurance policies.
- (d) Contractor 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 Contractor fail to provide and maintain certificates as set forth herein, PWC shall have the right, but shall not have 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 Contractor, or to seek reimbursement for said payments from Contractor. Any such sums paid by PWC shall be due and payable immediately by Contractor upon notice from PWC.
- (e) The insurance coverage requirements shall not be construed as a limitation on Contractor's responsibilities and liabilities pursuant to the terms and conditions of this Agreement. Contractor's obligation to maintain insurance for three (3) years after Final Completion shall survive the termination of this Agreement.
- (f) If Contractor fails to obtain and maintain any required insurance, PWC may exclude Contractor from the Site, impose an appropriate set-off against payment, and exercise PWC's termination rights pursuant to the Contract Documents.
- (g) PWC does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.

Article VII. Contractor's Responsibilities

Section 7.01 Supervision and Superintendence

- (a) Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of

construction subject to the terms, provisions, and specifications set forth in the Contract Documents.

- (b) At all times during the progress of the Work, Contractor shall assign a competent superintendent, satisfactory to Project Engineer, to supervise the Work and to respond to Project Engineer concerning PWC's interests in the Work.
- (c) Contractor's superintendent shall have full authority to act on behalf of Contractor and all communications, instructions, directions, and notices given to the superintendent by the Project Engineer shall be binding to the Contractor.
- (d) Contractor's superintendent shall be responsible for coordination of the Work with other contractors or subcontractors. The superintendent shall not be replaced without written notice to PWC except under extraordinary circumstances.
- (e) Subcontractors
 - (i) Contractor shall submit the names and references all Subcontractors to the Project Engineer for approval before commencing any Work.
 - 1) *In the event Contractor seeks to substitute any Subcontractor that was identified in Contractor's Bid, Contractor shall promptly provide PWC with: (1) the Subcontractor it seeks to substitute; (2) the identity of the Subcontractor to be substituted; and (3) the reason for the requested substitution.*
 - 2) *PWC will review the requested substitution within five (5) Business Days and provide written approval or denial of the substitution, with such approval not to be unreasonably withheld.*
 - (ii) Contractor's superintendent shall be available to be present at the Site at any time that any Subcontractor(s) is performing any of the Work. Construction activity shall be stopped if the Contractor's superintendent is not available to be at the Site.

Section 7.02 Labor; Working Hours

- (a) Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site. Contractor shall remove from the Project any person who appears incompetent, disorderly, or otherwise unsatisfactory. Contractor shall also remove any person who appears in PWC's sole discretion to be incompetent, disorderly, or otherwise unsatisfactory. If Contractor fails to do so, PWC reserves the right to take such action as may be necessary to remove any such person.
- (b) Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed on Business Days and within the hours of 6:00 a.m. and 8:00 p.m. Contractor will not perform Work on non-Business Days. Contractor may perform Work outside regular working hours or on Saturdays,

Sundays, or legal holidays only with PWC's written consent, which will not be unreasonably withheld. In such circumstances, Contractor shall submit a written request to PWC at least two (2) Business Days prior to any Work that it requests to complete on a non-Business Day and PWC will, in its sole discretion, approve or deny such request. If such work outside of a Business Day is approved, PWC will set forth the specific parameters that Contractor must follow, including time of work, personnel, and any other issues.8

Section 7.03 Services, Materials, and Equipment

- (a) Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and Final Completion, whether or not such items are specifically called for in the Contract Documents.
- (b) All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise specified in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of PWC. If required by PWC or its designee, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- (c) All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be specified in the Contract Documents.

Section 7.04 "Or Equals"

- (a) Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Project Engineer authorize the use of other items of material or equipment under the circumstances described below.
 - (i) If Project Engineer determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Project Engineer shall deem it an "or equal" item and confirm such in writing to Contractor. A proposed item of material or equipment will be considered functionally equal to an item so named if:
 - 1) *in the exercise of reasonable judgment Project Engineer determines that:*
 - a) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - b) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

- c) it has a proven record of performance and availability of responsive service; and
- d) it is not objectionable to PWC.

2) *Contractor certifies that, if approved and incorporated into the Work:*

- a) there will be no increase in the Contract Price or Contract Times; and
 - b) it will conform substantially to the detailed requirements of the item specified in the Contract Documents.
- (b) Contractor shall provide all data in support of any proposed “or equal” item at Contractor’s expense.
- (c) Project Engineer will be allowed a reasonable time to evaluate each “or-equal” request. Project Engineer may require Contractor to furnish additional data about the proposed “or-equal” item. Project Engineer will be the sole judge of acceptability. Contractor shall not order, furnish, install, or utilize any “or-equal” it until Project Engineer has reviewed the request, determined that the proposed item is an “or-equal,” and provided written confirmation to Contractor.
- (d) Project Engineer’s denial of an “or-equal” request shall be final and binding and may not be reversed through an appeal under any provision of the Contract Documents.

Section 7.05 Concerning Subcontractors, Suppliers, and Others

- (a) Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to PWC.
- (b) Contractor shall not subcontract more than forty-nine percent (49%) of the final Contract Price.
- (c) Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract Documents.
- (d) After the submittal of Contractor's Bid or final negotiation of the terms of the Agreement, PWC may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work.
- (e) Prior to entry into any binding subcontract or purchase order, Contractor shall submit to PWC the identity of the proposed Subcontractor or Supplier (unless PWC has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to PWC unless PWC raises a substantive, reasonable objection within five (5) Business Days.
- (f) No acceptance by PWC of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of PWC to the completion of the Work in accordance with the Contract Documents.
- (g) Contractor shall be fully responsible to PWC for all acts and omissions of the

Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.

- (h) Contractor shall be solely responsible for scheduling and coordinating the Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.
- (i) Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with PWC, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.
- (j) All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of PWC.
- (k) PWC may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.
- (l) Nothing in the Contract Documents:
 - (i) shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between PWC or Design Engineer and any such Subcontractor, Supplier, or other individual or entity; nor
 - (ii) shall create any obligation on the part of PWC or Design Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

Section 7.06 Patent Fees and Royalties

- (a) Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device that is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of PWC, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by PWC in the Contract Documents.

Section 7.07 Permits

- (a) Unless otherwise specified in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses necessary to achieve Final Completion. Contractor shall timely seek assistance from PWC if necessary to obtain any permits or licenses; provided that, the Contract Times shall not be extended if PWC determines, in its discretion, that Contractor delayed or otherwise did not act expeditiously in requesting such assistance. PWC shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for Final Completion that are applicable at the time of the submission of

Contractor's Bid.

Section 7.08 Taxes

- (a) Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the applicable Laws and Regulations for the Project and which are applicable during the performance of the Work.

Section 7.09 Laws and Regulations

- (a) Contractor shall give all notices required by, and shall comply with, all Laws and Regulations applicable to the Project. Except as otherwise expressly required, PWC shall not be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- (b) Contractor shall bear all resulting costs and losses for any of its actions or inactions that are contrary to Laws or Regulations.
- (c) PWC or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under the Agreement) concerning any Laws or Regulations having an effect on the Contract Price or Contract Times, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If PWC and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 calendar days of such notice Contractor may submit a Change Proposal.

Section 7.10 Record Documents

- (a) Contractor shall maintain in good order one (1) printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. These record documents, together with all approved Samples, will be available to Project Engineer for reference. Upon Final Completion, Contractor shall deliver these record documents to PWC.

Section 7.11 Safety and Protection

- (a) Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 - (i) all persons on the Site or who may be affected by the Work;
 - (ii) all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - (iii) other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground

Facilities not designated for removal, relocation, or replacement in the course of construction.

- (b) Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss, and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify PWC, the owners of adjacent property or Underground Facilities, and other contractors and owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- (c) Contractor shall comply with the requirement of any of PWC's applicable health programs, which may be revised from time to time based on specific circumstances or applicable guidance from the Center for Disease Control or other applicable entity. Such health programs will be identified in the Special Conditions if applicable to the Project.
- (d) Contractor shall comply with the requirements of PWC's applicable safety programs. The Special Conditions identify any of PWC's safety programs that are applicable to the Project.
- (e) Contractor shall remedy, at its expense, all damage, injury, or loss to any property caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable.
- (f) Contractor's duties and responsibilities for safety and protection shall continue until such time as Final Completion is achieved.
- (g) Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.
- (h) Contractor shall designate in writing to PWC a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

Section 7.12 Emergencies

- (a) In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to, and shall, act to prevent threatened damage, injury, or loss. Contractor shall give PWC prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused or are required as a result of any emergency. If PWC determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

Section 7.13 Shop Drawings, Samples, and Other Submittals

- (a) Contractor shall timely submit Shop Drawings and Samples required by the Contract

Documents to Project Engineer for review and approval in accordance with applicable specifications.

- (b) Before submitting a Shop Drawing or Sample, Contractor shall have
 - (i) reviewed the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - (ii) verified all measurements, quantities, dimensions, performance and design criteria, installation requirements, materials, catalog numbers, and similar information;
 - (iii) verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - (iv) verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
- (c) With each submittal, Contractor shall give Project Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to PWC for review and approval of each such variation.
- (d) Where a Shop Drawing or Sample is required by the Contract Documents, any related Work performed prior to Project Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- (e) Project Engineer will provide timely review of any required Shop Drawings and Samples. Such review, and subsequent determination of approval, will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
- (f) Project Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.
- (g) Project Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not change the Contract Times or Contract Price, unless such changes are included in a Change Order.
- (h) Project Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall not result in such item becoming a Contract Document.
- (i) Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples.
- (j) Resubmittal Procedures:
 - (i) Contractor shall make corrections required by Project Engineer and shall return the

required number of corrected copies of Shop Drawings and submit new Samples as required for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by PWC or Project Engineer on previous submittals.

- (ii) Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three (3) submittals. If PWC has engaged a Design Engineer for the Project, Design Engineer will record Design Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Design Engineer's charges to PWC for such time. PWC may impose a set-off against payments due to Contractor to secure reimbursement for such charges.
- (iii) If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Design Engineer's charges to PWC for its review time, and PWC may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

Section 7.14 Contractor's General Warranty and Guarantee

- (a) In order to induce PWC to enter into an Agreement with Contractor for the Project, Contractor warrants and guarantees to PWC that:
 - (i) Contractor is duly licensed in the State of North Carolina to complete all Work necessary for the Project, is duly organized, validly existing and in good standing and has all requisite powers, rights, and authority to execute, enter into, and perform the Agreement in accordance with the terms and conditions of the Agreement, and the Agreement constitutes a legal, valid, and binding obligation of Contractor enforceable against it in accordance with its terms.
 - (ii) Contractor has read the Contract Documents, and acknowledges and understands all data, materials, specifications, and requirements identified in the Contract Documents.
 - (iii) Contractor has visited the site for the Project, conducted a thorough, visual examination of the site and adjacent areas, and become familiar with and is satisfied as to the general, local, and site conditions that may affect cost, progress, and performance in completing the Project.
 - (iv) Contractor is familiar with and is satisfied as to all laws and regulations that may affect cost, progress, and performance to complete the Project.
 - (v) Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the site and all drawings of physical conditions relating to existing surface or subsurface structures at the site that have been identified in the Detail Specifications and any accompanying reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the site that have been identified in the Contract Documents and any accompanying reports and drawings.
 - (vi) Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, if any, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques,

- sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.
- (vii) Based on the information and observations referred to in subsection "(v)" of this Section, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price and in accordance with the other terms and conditions of the Contract Documents.
 - (viii) Contractor is aware of the general nature of work to be performed by PWC and others at the Site that relates to the Work as indicated in the Contract Documents.
 - (ix) Contractor has given PWC written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by PWC is acceptable to Contractor.
 - (x) The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
 - (xi) Contractor's entry into this Agreement constitutes an incontrovertible representation by Contractor that, without exception, all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.
 - (xii) Contractor is ready, willing, and able to begin the Work and complete it within the time provided, and Contractor is aware of no reason, condition, or pending claim that would impede, negatively affect, or delay Contractor from beginning the Work and completing the Work within the time provided
 - (xiii) Contractor has no business or personal relationship with any PWC Commissioner, officer, director, manager, or supervisor and Contractor covenants to disclose immediately to PWC any such relationship that develops during the performance of Work on the Project.
- (b) Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
- (i) observations by Project Engineer;
 - (ii) recommendation by Project Engineer or payment by PWC of any progress or final payment;
 - (iii) the issuance of a certificate of Substantial Completion by Project Engineer or any payment related thereto by PWC;
 - (iv) use or occupancy of the Work or any part thereof by PWC;
 - (v) any review and approval of a Shop Drawing or Sample submittal;
 - (vi) the issuance of a notice of acceptability by Project Engineer;
 - (vii) any inspection, test, or approval by others; or
 - (viii) any correction of defective Work by PWC.
- (c) If the Contract Documents require the Contractor to accept the assignment of a contract entered into by PWC, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to PWC for the Work described in the assigned contract.

Section 7.15 Indemnification

- (a) Contractor shall indemnify, defend, and hold harmless PWC and its Commissioners,

officers, employees, agents, and representatives and the City and its elected officials, managers, employees, agents, and representatives and Designer (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 if the Fault of one or more Responsible Persons is a proximate cause of the loss, damage, or expense indemnified.

- (b) Contractor's obligation to indemnify, defend, and hold harmless the Indemnitees shall survive the termination of the Agreement.
- (c) In any and all claims against the Indemnitees of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, Contractor's indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

Section 7.16 Claims Procedure

- (a) PWC shall notify the Contractor of all potential claims related to the Work within seven (7) calendar days of receiving notification or having knowledge of such potential claim. Should the Contractor receive a potential claim related to the Work, the Contractor shall notify PWC within seven (7) calendar days of receiving notification. The Contractor shall provide the claimant and PWC with a written response acknowledging receipt of the claim within seven (7) calendar days.
- (b) If the Contractor meets with the Claimant about the claim, a representative designated by PWC shall be present at all times. PWC shall maintain a record of any claim received, and the steps taken to resolve. PWC shall also concurrently investigate each case. The Contractor agrees to furnish PWC any information regarding the claim, the actions which led to the claim and/or the investigation of the claim. Contractor shall provide their proposed response to PWC within thirty (30) calendar days of receiving the claim. Upon receipt of the response PWC and the Contractor will discuss and reach a mutual agreement of the response necessary to send to the Claimant within fifteen (15) calendar days. Once the agreement is made the Contractor shall make a formal written resolution to the claimant.
- (c) Failure to act in good faith or respond to a claim in the timelines established by the Contract Documents will constitute a lack of response by the Contractor, therefore validating the claim. PWC will deduct the total amount of the claim from the monthly pay application. Failure to comply with the above requirements for resolving claims may, at the sole discretion of PWC, result in breach of contract.
- (d) The Contractor is aware of these claims procedures and understands that it is PWC's practice to pursue reimbursement/subrogation for any and all claims related expenses, which are incurred as a result of the Contractor's performance under these Contract Documents and allowed within the applicable statute of limitations.

Section 7.17 Delegation of Professional Design Services

- (a) Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.
- (b) If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, PWC will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to PWC.
- (c) PWC shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals.
- (d) Pursuant to this Section, PWC's, or its designee's, review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. PWC specifically retains final approval of such submittals.
- (e) Contractor shall not be responsible for the adequacy of the performance or design criteria specified by PWC.

Article VIII. PWC's Responsibilities

- (a) In awarding the bid to Contractor and executing the applicable Agreement, PWC acknowledges the following responsibilities:
 - (i) Except as otherwise provided in these General Conditions, PWC shall issue all communications directly to Contractor or its designee.
 - (ii) PWC may at its discretion replace Design Engineer and Project Engineer. The replacement Design Engineer or Project Engineer's status under the Contract Documents shall be that of the former Design Engineer or Project Engineer.
 - (iii) PWC shall promptly furnish the data required of PWC under the Contract Documents.
 - (iv) PWC shall make payments to Contractor when they are due as provided in the Contract Documents.
 - (v) PWC shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. PWC will not be responsible for Contractor's failure to perform the Work in

- accordance with the Contract Documents.
- (vi) Upon request of Contractor, PWC shall furnish to Contractor reasonable evidence that financial arrangements have been made to satisfy PWC's obligations under the Contract Documents (including obligations under proposed changes in the Work).
 - (vii) While at the Site, PWC's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which PWC has been informed.
 - (viii) PWC shall furnish copies of any applicable PWC safety program(s) to Contractor, which Contractor shall review and implement.

Article IX. Amending the Contract Documents; Changes in the Work

Section 9.01 Amending and Supplementing Contract Documents

- (a) The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
 - (i) Change Orders: If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.
 - (ii) Work Change Directives: A Work Change Directive will not change the Contract Price or the Contract Times, but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 9.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. PWC must submit any dispute or request seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.
 - (iii) Field Orders: Project Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on PWC and on Contractor, which shall perform promptly the Work involved. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

Section 9.02 PWC-Authorized Changes in the Work

- (a) Without invalidating the Agreement and without notice to any surety, PWC may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Design Engineer's recommendation when applicable and

to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work as revised. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

Section 9.03 Unauthorized Changes in the Work

- (a) Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented.

Section 9.04 Change of Contract Price

- (a) The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of these General Conditions.
- (b) An adjustment in the Contract Price will be determined as follows:
 - (i) where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved; or
 - (ii) where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit as agreed to in writing by the Parties); or
 - (iii) where the Work involved is not covered by unit prices contained in the Contract Documents and the Parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work plus a reasonable Contractor's fee for overhead and profit.
- (c) Contractor's Fee: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:
 - (i) a mutually acceptable fixed fee; or
 - (ii) if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - 1) *for unit prices, the Contractor's fee shall be fifteen percent (15%);*
 - 2) *for all other costs incurred, the Contractor's fee shall be five percent (5%);*
 - 3) *the amount of credit to be allowed by Contractor to PWC for any change that results in a net decrease in the Contract Price will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and*
 - 4) *when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change.*

Section 9.05 Change of Contract Times

- (a) The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 9.06.
- (b) An adjustment of the Contract Times shall be subject to the limitations set forth in these Contract Documents as it concerns delays in Contractor's progress.

Section 9.06 Change Proposals

- (a) Contractor shall submit a Change Proposal to PWC to request an adjustment in the Contract Times and/or Contract Price. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.
 - (i) Procedures: Contractor shall submit each Change Proposal to PWC promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Times (if any), to PWC within 15 calendar days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.
 - (ii) PWC Action: PWC will review each Change Proposal and, within 30 calendar days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing to Contractor. If PWC does not take action on the Change Proposal within 30 calendar days, then the Change Proposal is deemed denied, thereby commencing the time for appeal under these General Conditions.
 - (iii) Binding Decision: PWC's decision will be final and binding unless Contractor appeals the decision.

Section 9.07 Execution of Change Orders

- (a) PWC and Contractor shall execute appropriate Change Orders covering:
 - (i) changes in the Contract Price or Contract Times that are agreed to by the parties, including any undisputed sum or amount of time for Work performed in accordance with a Work Change Directive;
 - (ii) changes in Contract Price resulting from a PWC set-off, unless Contractor has duly contested such set-off;
 - (iii) changes in the Work which are: (a) ordered by PWC, (b) required because of PWC's acceptance of defective Work or PWC's correction of defective Work, or (c) agreed to by the parties, subject to the need for Design Engineer's recommendation if the change in the Work involves the design (as set forth in the Contract Documents), or other engineering or technical matters; and
 - (iv) changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results.

Section 9.08 Notification to Surety

- (a) If the provisions of any bond require notice to be given to a surety of any change

affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

Article X. Tests, Inspections, and Approvals; Correction, Removal, or Acceptance of Defective Work

Section 10.01 Access to Work

- (a) PWC, Design Engineer, their consultants and other representatives and personnel of PWC, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

Section 10.02 Tests, Inspections, and Approvals

- (a) Contractor shall give Project Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- (b) PWC shall retain and pay for the initial services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by PWC, except those costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 10.05.
- (c) If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish the required certificates of inspection or approval to PWC.
- (d) Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
 - (i) by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to PWC;
 - (ii) to attain PWC's and Design Engineer's acceptance of materials or equipment to be incorporated in the Work;
 - (iii) by manufacturers of equipment furnished under the Contract Documents;
 - (iv) for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 - (v) for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to PWC, as confirmed in writing by Project

Engineer to Contractor.

- (e) If the Contract Documents require the Work (or part thereof) to be approved by PWC or its designee, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- (f) If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Project Engineer, Contractor shall, if requested by Project Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense.

Section 10.03 Defective Work

- (a) All Work shall be performed in a workmanlike manner, in accordance with applicable standards of care and lawful requirements, and free from defects. It is Contractor's obligation to assure that the Work complies with this standard and is not defective.
- (b) PWC or its designee has the authority to determine whether Work is defective, and to reject defective Work.
- (c) Prompt notice of all defective Work of which PWC has actual knowledge will be given to Contractor.
- (d) Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if PWC has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- (e) When correcting defective Work, Contractor shall take no action that would void or otherwise impair PWC's special warranty and guarantee, if any, on said Work.
- (f) In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against PWC by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if PWC and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then PWC may impose a reasonable set-off against payments due.

Section 10.04 Acceptance of Defective Work

- (a) If, instead of requiring correction or removal and replacement of defective Work, PWC prefers to accept it, PWC may do so (subject, if such acceptance occurs prior to final payment, to Design Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles and will not endanger public safety). Any such acceptance must be in a writing signed by PWC that specifically identifies the defective work being accepted.
- (b) Contractor shall pay all claims, costs, losses, and damages attributable to PWC's

evaluation of and determination to accept such defective Work (such costs to be approved by PWC as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order.

- (c) If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then PWC may impose a reasonable set-off against payments due. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to PWC.

Section 10.05 Uncovering Work

- (a) PWC has discretion to require, at its initial cost, additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- (b) If any Work is covered contrary to the written request of PWC, then Contractor shall, if requested by PWC or its designee, uncover such Work for observation, and then replace the covering, all at Contractor's expense.
- (c) If PWC considers it necessary or advisable that covered Work be observed by PWC or inspected or tested by others, then Contractor, at PWC's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as PWC may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
 - (i) If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility PWC shall be entitled to impose a reasonable set-off against payments due.
 - (ii) If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 calendar days of the determination that the Work is not defective.

Section 10.06 PWC May Stop the Work

- (a) If the Work is defective, or Contractor fails to supply sufficiently skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then PWC in its discretion may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of PWC to stop the Work shall not give rise to any duty on the part of PWC to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

Section 10.07 PWC May Correct Defective Work

- (a) If Contractor fails within the time specified by PWC in a written notice from PWC to correct defective Work, or to remove and replace rejected Work as required by PWC, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then PWC may, after seven (7) calendar days written notice to Contractor, correct or remedy any such deficiency; provided, however, PWC will not be required to wait seven (7) calendar days in the event that: (1) Contractor informs PWC it does not intend to correct the defective work; (2) good cause exists for PWC to conclude that Contractor is unable to correct the defective work; or (3) emergent circumstances require immediate action and Contractor is unable or unwilling to do so.
- (b) In exercising the rights and remedies under this Section, PWC shall proceed expeditiously. In connection with such corrective or remedial action, PWC may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which PWC has paid Contractor but which are stored elsewhere. Contractor shall allow PWC and its officers, employees, representatives, agents and other contractors, and Design Engineer and its employees and agents access to the Site to enable PWC to exercise the rights and remedies under this Section.
- (c) All claims, costs, losses, and damages incurred or sustained by PWC in exercising the rights and remedies under this Section will be charged against Contractor as set-offs against payments due. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- (d) Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by PWC of PWC's rights and remedies under this Section.

Article XI. Claims

Section 11.01 Claims Process

- (a) The following disputes between PWC and Contractor shall be submitted to the Claims process set forth in this Article:
 - (i) Appeals by PWC or Contractor of Design Engineer's decisions regarding Change Proposals;
 - (ii) PWC or Contractor's demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
 - (iii) Disputes that Design Engineer has been unable to address because they do not involve the design (as set forth in the Contract Documents), the acceptability of the Work, or other engineering or technical matters.

Section 11.02 Submittal of Claim

- (a) The party submitting a claim shall deliver it directly to the other party to the Agreement promptly (but in no event later than 30 calendar days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 calendar days of the decision under appeal. The responsibility to substantiate a claim shall rest with the party making the claim. In the case of a claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

Section 11.03 Review and Resolution

- (a) The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party.

Section 11.04 Dispute Resolution

- (a) In the event of any dispute, controversy, or claim of any kind or nature arising under or in connection with this Agreement (a "Dispute") and involving any two or more of the following parties, PWC, Designer, Contractor or any subcontractor of Contractor, the party initiating the Dispute shall serve written notice of a Dispute on the party(ies) to the dispute, and those parties shall endeavor to settle the dispute first through direct, informal discussions between the parties' selected representatives. Any such representative(s) shall have binding authority to settle the Dispute. In the event the parties do not settle the Dispute within ten (10) days from the date of written notice of the Dispute, any party to the Dispute may, by written notice to the other party(ies), engage a mediator certified under the laws of the State of North Carolina to mediate the Dispute within thirty (30) days of such notice. The parties to the Dispute shall attend mediation in good faith. In the event mediation is unsuccessful, any party to the dispute may initiate civil litigation. All of the foregoing dispute resolution procedures shall be held in Cumberland County, North Carolina or in the courts whose jurisdiction includes Cumberland County, North Carolina. This Agreement shall be governed by, and construed in accordance with, the laws of the State of North Carolina. Venue for any proceedings arising under or relating to this Agreement shall be in the courts serving Cumberland County, North Carolina, and Contractor consents to the exercise of personal jurisdiction over Contractor by such courts and waives all objections and defenses relating to *forum non conveniens* and venue. The cost of the mediator in a dispute resolution process shall be divided equally among the parties to the process; provided, however, PWC shall bear at least one-third of the cost if PWC is a party to the dispute resolution and the remainder of the cost shall be divided equally among the other parties participating in the dispute resolution. PWC shall, in its contractual arrangements with Designer, and Contractor shall, in its contracts with subcontractors and they in their contracts with lower-tier subcontractors authorize and direct such parties to participate in the dispute resolution procedures set forth in this Section. Unless otherwise directed in writing by PWC, Contractor shall continue the Project and maintain compliance with the scheduling deadlines set forth in the Contract Documents during any dispute resolution proceedings. If Contractor continues to perform, PWC shall make

payments due for the continued performance in accordance with this Agreement. The provisions of this Section shall not extend any applicable statutes of limitation or repose.

Article XII. Payments to Contractor; Set-Offs; Completion; Correction Period

Section 12.01 Progress Payments

- (a) The Schedule of Values will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the Project Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period. Progress payments for cost-based Work will be based on the Cost of the Work completed by the Contractor during the pay period.

- (b) Applications for Payments:
 - (i) Contractor shall submit to Project Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents or reasonably requested by PWC. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that PWC has received the materials and equipment free and clear, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect PWC's interest.
 - (ii) Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
 - (iii) The amount of retainage for progress payments will be as stipulated in the Contract Documents.

- (c) Review of Applications:
 - (i) Project Engineer will, within ten (10) Business Days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to PWC, or return the Application to Contractor indicating in writing Project Engineer's reason(s) for refusing to recommend payment. In the latter case, the Contractor may make the necessary corrections and resubmit the Application.
 - (ii) Project Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Project Engineer to PWC, based on Project Engineer's observations of the executed Work, and on Project Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Project Engineer's knowledge, information, and belief:
 - 1) *the Work has progressed to the point indicated;*
 - 2) *the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract*

- Documents, a final determination of quantities and classifications for Unit Price Work, and any other qualifications stated in the recommendation); and*
- 3) *the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Project Engineer's responsibility to observe the Work.*
- (iii) By recommending any such payment Project Engineer will not thereby be deemed to have represented that:
- 1) *inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Project Engineer in the Contract Documents; or*
 - 2) *there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by PWC or entitle PWC to withhold payment to Contractor.*
- (iv) Neither Project Engineer's review of Contractor's Work for the purposes of recommending payments nor Project Engineer's recommendation of any payment, including final payment, will impose responsibility on Project Engineer:
- 1) *to supervise, direct, or control the Work, or*
 - 2) *for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or*
 - 3) *for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or*
 - 4) *to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price.*
- (v) Project Engineer may refuse to recommend the whole or any part of any payment if, in Project Engineer's opinion, it would be incorrect to make the representations to PWC outlined in this Section.
- (d) Project Engineer will recommend reductions in payment (set-offs) necessary in Project Engineer's opinion to protect PWC from loss because:
- (i) *the Work is defective, requiring correction or replacement;*
 - (ii) *the Contract Price has been reduced by Change Orders;*
 - (iii) *PWC has been required to correct defective Work or has accepted defective Work in accordance with these General Conditions;*
 - (iv) *PWC has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or*
 - (v) *Project Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.*
- (e) Payment Becomes Due:
- (i) *Twenty (20) Business Days after presentation of the Application for Payment to PWC with Project Engineer's recommendation, the amount recommended (subject to any*

PWC set offs) will become due, and when due will be paid by PWC to Contractor.

(f) Reductions in Payment by PWC:

(i) In addition to any reductions in payment (set-offs) recommended by Project Engineer, PWC is entitled to impose a set-off against payment based on any of the following:

- 1) *PWC has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;*
- 2) *Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;*
- 3) *Contractor has failed to provide and maintain required bonds or insurance;*
- 4) *PWC has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;*
- 5) *PWC has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;*
- 6) *the Work is defective, requiring correction or replacement;*
- 7) *PWC has been required to correct defective Work or has accepted defective Work in accordance with the Contract Documents;*
- 8) *the Contract Price has been reduced by Change Orders;*
- 9) *an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;*
- 10) *liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or Final Completion; or*
- 11) *there are other items entitling PWC to a set off against the amount recommended.*

(ii) If PWC imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Project Engineer, PWC will give Contractor immediate written notice stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. PWC shall promptly pay Contractor the amount so withheld, or any adjustment agreed to by PWC and Contractor if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

(iii) Upon a subsequent determination that PWC's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due and subject to interest as provided in the Contract Documents.

(iv) Notwithstanding any other provision herein to the contrary, PWC's exercise of any reduction or set-off right shall not serve as a limitation or restriction on the amount or bases on which PWC may recover its damages.

Section 12.02 Substantial Completion

(a) When Contractor considers the entire Work ready for its intended use Contractor shall notify PWC and Design Engineer in writing that the entire Work is substantially complete

and request that PWC acknowledge in writing that Contractor has met Substantial Completion.

- (b) Promptly after Contractor's notification, PWC, Contractor, and Design Engineer shall make an inspection of the Work to determine the status of completion. If PWC does not consider the Work substantially complete, PWC will notify Contractor in writing giving the reasons therefor. PWC shall thereafter submit to Contractor an initial draft of punch list items to be completed or corrected before final payment.
- (c) If Design Engineer considers the Work substantially complete, Design Engineer will deliver to PWC a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Design Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. PWC shall have seven (7) Business Days after receipt of the preliminary certificate to make written objection to Design Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, PWC concludes that the Work is not substantially complete, PWC will, within fourteen (14) calendar days after submission of the preliminary certificate to PWC, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor.
- (d) At the time of receipt of the preliminary certificate of Substantial Completion, PWC and Contractor will confer regarding PWC's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by PWC. Unless PWC and Contractor agree otherwise in writing, PWC shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon PWC use or occupancy of the Work.
- (e) After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment and shall complete such items within the time specified by PWC. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- (f) PWC shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

Section 12.03 Partial Use or Occupancy

- (a) Prior to Substantial Completion of all the Work, PWC may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which PWC, Design Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by PWC for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - (i) At any time PWC may request in writing that Contractor permit PWC to use or occupy

- any such part of the Work that PWC believes to be substantially complete.
- (ii) At any time Contractor may notify PWC and Design Engineer in writing that Contractor considers any such part of the Work substantially complete and request Design Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - (iii) Within a reasonable time after either such request, PWC, Contractor, and Design Engineer shall make an inspection of that part of the Work to determine its status of completion. If Design Engineer does not consider that part of the Work to be substantially complete, Design Engineer will notify PWC and Contractor in writing giving the reasons therefor.
 - (iv) No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements regarding builder's risk or other property insurance.

Section 12.04 Final Inspection

- (a) Upon written notice from Contractor that Final Completion has been achieved or an agreed portion thereof is complete, PWC will promptly make a final inspection with Project Engineer, Design Engineer, and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

Section 12.05 Final Payment

- (a) Application for Payment:
 - (i) After Contractor has, in the opinion of PWC, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents, and other documents, Contractor may make application for final payment.
 - (ii) The final Application for Payment shall be accompanied (except as previously delivered) by:
 - 1) *all documentation called for in the Contract Documents;*
 - 2) *consent of the surety, if any, to final payment;*
 - 3) *satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to PWC free and clear or will so pass upon final payment;*
 - 4) *a list of all disputes that Contractor believes are unsettled; and*
 - 5) *complete and legally effective releases or waivers (satisfactory to PWC) required by the Contract Documents.*
 - (iii) If Design Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Design Engineer will, within ten (10) Business Days after receipt of the final Application for Payment, indicate in writing Design Engineer's recommendation of final payment and present the Application for Payment to PWC for payment. Such recommendation shall account for any set-offs against payment that are necessary in Design Engineer's opinion to protect PWC from loss for the reasons stated above with respect to progress payments. At the same time Design Engineer will also give written notice to PWC and

Contractor that the Work is acceptable and that Final Completion has been achieved. Otherwise, Design Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

- (iv) Within thirty (30) calendar days after the presentation to PWC of the final Application for Payment and accompanying documentation, the amount recommended by Design Engineer (less any further sum PWC is entitled to set off against Design Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by PWC to Contractor.

Section 12.06 Waiver of Claims

- (a) The making of final payment will not constitute a waiver by PWC of claims or rights against Contractor. PWC expressly reserves claims and rights arising from defective Work appearing after final inspection, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from Contractor's indemnification obligations, or from Contractor's continuing obligations under the Contract Documents.
- (b) The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against PWC other than those pending matters that have been duly submitted or appealed under the provisions of the Contract Documents.

Section 12.07 Correction Period

- (a) If within one (1) year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to PWC and in accordance with PWC's written instructions:
 - (i) correct the defective repairs to the Site or such other adjacent areas;
 - (ii) correct such defective Work;
 - (iii) if the defective Work has been rejected by PWC, remove it from the Project and replace it with Work that is not defective, and
 - (iv) satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.
- (b) If Contractor does not promptly comply with the terms of PWC's written instructions, or in an emergency where delay would cause serious risk of loss or damage, PWC may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or other dispute resolution costs) arising out of or relating to

such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

- (c) In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date only as provided in the Contract Documents.
- (d) Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Article XII, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- (e) Contractor's obligations under this Article XII are in addition to all other obligations and warranties, whether express or implied. The provisions of this Article XII shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

Article XIII. Suspension of Work and Termination

Section 13.01 PWC May Suspend Work

- (a) At any time and without cause, PWC may suspend the Work or any portion thereof for a period of not more than 90 consecutive calendar days by written notice to Contractor and Design Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than thirty (30) calendar days after the date fixed for resumption of Work.

Section 13.02 PWC May Terminate for Cause

- (a) The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
 - (i) Contractor's continued failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
 - (ii) Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 - (iii) Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
 - (iv) Contractor's repeated disregard of the authority of PWC, Project Engineer, or Design Engineer.
- (b) If one or more of the events identified in Paragraph 13.02(a) occurs, then after giving Contractor (and any surety) ten (10) calendar days written notice that PWC is considering a declaration that Contractor is in default and termination of the Agreement, PWC may proceed to:

- (i) declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and
 - (ii) enforce the rights available to PWC under any applicable performance bond.
- (c) Subject to the terms and operation of any applicable performance bond, if PWC has terminated the Contract for cause, PWC may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which PWC has paid Contractor but which are stored elsewhere, and complete the Work as PWC may deem expedient.
- (d) PWC may not proceed with termination of the Contract under Paragraph 13.02(b) if Contractor within seven (7) calendar days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure and such efforts are agreed to by PWC.
- (e) If PWC proceeds as provided in Paragraph 13.02(b), Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by PWC, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to PWC. Such claims, costs, losses, and damages incurred by PWC will be reviewed by PWC as to their reasonableness and, when so approved by PWC, incorporated in a Change Order.
- (f) Where Contractor's services have been so terminated by PWC, the termination will not affect any rights or remedies of PWC against Contractor then existing or which may thereafter accrue, or any rights or remedies of PWC against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by PWC will not release Contractor from liability.
- (g) The provisions of any applicable payment or performance bond shall govern over any inconsistent provisions of this Section.

Section 13.03 PWC May Terminate For Convenience

- (a) Upon seven (7) calendar days written notice to Contractor, PWC may, without cause and without prejudice to any other right or remedy of PWC, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - (i) completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - (ii) expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

- (iii) other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- (b) Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

Section 13.04 Contractor May Stop Work or Terminate

- (a) If, through no act or fault of Contractor, (1) the Work is suspended for more than ninety (90) consecutive calendar days by PWC or under an order of court or other public authority or (2) PWC fails for sixty (60) calendar days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven (7) calendar days written notice to PWC, and provided PWC does not remedy such suspension or failure within that time, terminate the Contract and recover from PWC payment on the same terms as provided in this Article.
- (b) In lieu of terminating the Contract and without prejudice to any other right or remedy, if PWC has failed for thirty (30) calendar days to pay Contractor any sum finally determined to be due, Contractor may, seven (7) calendar days after written notice to PWC, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

Section 13.05 Morality

- (a) If, in the sole opinion of PWC, at any time Contractor or any of its owner(s) or employee(s) or agent(s) (each party, owner, employee, and agent is an "Actor") engages in any one or more actions that bring disrepute, contempt, scandal, or public ridicule to the Actor or subject the Actor to prosecution or offend the community or public morals or decency or denigrate individuals or groups in the community served by PWC or are scandalous or inconsistent with community standards or good citizenship or may adversely affect PWC's finances, public standing, image, or reputation or are embarrassing or offensive to PWC or may reflect unfavorably on PWC or are derogatory or offensive to one or more employee(s) or customer(s) of PWC, PWC may immediately upon written notice to Contractor terminate the Agreement, in addition to any other rights and remedies that PWC may have pursuant to the Contract Documents or at law or in equity.

Article XIV. Miscellaneous

Section 14.01 Additional General Terms and Conditions

- (a) Contractor shall be subject to any additional terms and conditions for this Project as set forth in the applicable Appendices as specific in the Agreement, which is incorporated by reference as if set forth word-for-word herein.

Section 14.02 Giving Notice

- (a) Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 - (i) delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended;
 - (ii) delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice; or
 - (iii) sent to PWC or Contractor's designee(s) via email, with a confirmation of receipt.

Section 14.03 Computation of Times

- (a) When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

Section 14.04 Cumulative Remedies

- (a) The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

Section 14.05 Limitation of Damages

- (a) With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither PWC nor Design Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

Section 14.06 No Waiver

- (a) A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or any other provision of the Contract Documents.

Section 14.07 Survival of Obligations

- (a) All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, Final Completion, and acceptance of the Work or termination or completion of the Agreement or termination of the services of Contractor.

Section 14.08 Controlling Law

- (a) The Agreement shall be governed by the law of the State of North Carolina.

Section 14.09 Headings

- (a) Article and paragraph headings, numbers, and letters are inserted for convenience only and do not constitute parts of these General Conditions.

Performance Bond

<p>Contractor</p> <p>Name: [Full formal name of Contractor]</p> <p>Address <i>(as registered with Secretary of State, if applicable)</i>: [Address of Contractor]</p>	<p>Surety</p> <p>Name: [Full formal name of Surety]</p> <p>Address <i>(as registered with Secretary of State, if applicable)</i>: [Address of Surety]</p>
<p>Owner</p> <p>Name: Fayetteville Public Works Commission</p> <p>Mailing address: 955 Old Wilmington Road Fayetteville, NC 28301</p>	<p>Contract</p> <p>Description <i>(name and location)</i>: GILLESPIE B1.9 SOLAR PV UTILITY STATION 3858 Gillespie Street, Fayetteville, North Carolina</p> <p>Contract Price: [Amount from Contract]</p> <p>Effective Date of Contract: [Date from Contract]</p>
<p>Bond</p> <p>Bond Amount: [Amount]</p> <p>Date of Bond: [Date] <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i></p> <p>Modifications to this Bond form: <input type="checkbox"/> None <input type="checkbox"/> See Paragraph 16</p>	
<p>Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.</p>	
Contractor as Principal	Surety
<hr style="border: none; border-top: 1px solid black;"/> <i>(Full formal name of Contractor)</i>	<hr style="border: none; border-top: 1px solid black;"/> <i>(Full formal name of Surety) (corporate seal)</i>
By: <hr style="border: none; border-top: 1px solid black;"/> <div style="text-align: center;"><i>(Signature)</i></div>	By: <hr style="border: none; border-top: 1px solid black;"/> <div style="text-align: center;"><i>(Signature)(Attach Power of Attorney)</i></div>
Name: <hr style="border: none; border-top: 1px solid black;"/> <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: <hr style="border: none; border-top: 1px solid black;"/> <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: <hr style="border: none; border-top: 1px solid black;"/>	Title: <hr style="border: none; border-top: 1px solid black;"/>
Attest: <hr style="border: none; border-top: 1px solid black;"/> <div style="text-align: center;"><i>(Signature)</i></div>	Attest: <hr style="border: none; border-top: 1px solid black;"/> <div style="text-align: center;"><i>(Signature)</i></div>
Name: <hr style="border: none; border-top: 1px solid black;"/> <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: <hr style="border: none; border-top: 1px solid black;"/> <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: <hr style="border: none; border-top: 1px solid black;"/>	Title: <hr style="border: none; border-top: 1px solid black;"/>
<p><i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i></p>	

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to PWC for the performance of the Contract, which is incorporated herein by reference.
2. If the Contractor satisfactorily performs the Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.
3. If there is no PWC Default under the Contract, the Surety's obligation under this Bond will arise after:
 - a. PWC first provides notice to the Contractor and the Surety that PWC is considering declaring a Contractor Default. Such notice may indicate whether PWC is requesting a conference among PWC, Contractor, and Surety to discuss the Contractor's performance. If PWC does not request a conference, the Surety may, within five (5) business days after receipt of PWC's notice, request such a conference. If the Surety timely requests a conference, PWC shall attend. Unless PWC agrees otherwise, any conference requested under this Paragraph 3 will be held within ten (10) business days of the Surety's receipt of PWC's notice. If PWC, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement does not waive PWC's right, if any, subsequently to declare a Contractor Default;
 - b. PWC declares a Contractor Default, terminates the Contract and notifies the Surety; and
 - c. PWC has agreed to pay the Balance of the Contract Price in accordance with the terms of the Contract to the Surety or to a contractor selected to perform the Contract.
4. Failure on the part of PWC to comply with the notice requirement in Paragraph 3 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.
5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
 - a. Arrange for the Contractor, with the consent of PWC, to perform and complete the Contract;
 - b. Undertake to perform and complete the Contract itself, through its agents or independent contractors;
 - c. Obtain bids or negotiated proposals from qualified contractors acceptable to PWC for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by PWC and a contractor selected with

PWC concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to PWC the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by PWC as a result of the Contractor Default; or

- d. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
 - i. After investigation, determine the amount for which it may be liable to PWC and, as soon as practicable after the amount is determined, make payment to PWC; or
 - ii. Deny liability in whole or in part and notify PWC, citing the reasons for denial.
6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from PWC to the Surety demanding that the Surety perform its obligations under this Bond, and PWC shall be entitled to enforce any remedy available to PWC. If the Surety proceeds as provided in Paragraph 5, and PWC refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, PWC shall be entitled to enforce any remedy available to PWC.
7. If the Surety elects to act under Paragraph 5, then the responsibilities of the Surety to PWC will not be greater than those of the Contractor under the Contract, and the responsibilities of PWC to the Surety will not be greater than those of PWC under the Contract. Subject to the commitment by PWC to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:
 - a. the responsibilities of the Contractor for correction of defective work and completion of the Contract;
 - b. additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and
 - c. liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.
8. If the Surety elects to act under Paragraph 5, the Surety's liability is limited to the amount of this Bond.
9. The Surety shall not be liable to PWC or others for obligations of the Contractor that are unrelated to the Contract, and the Balance of the Contract Price will not be reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than PWC or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders, and other obligations.
11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in North Carolina and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.
12. Notice to the Surety, PWC, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.
13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.
14. Definitions
 - a. *Balance of the Contract Price*—The total amount payable by PWC to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by PWC in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Contract.
 - b. *Contract*—The agreement between PWC and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.
 - c. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Contract.
 - d. *PWC Default*—Failure of PWC, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Contract.
 - e. *Contract Documents*—All the documents that comprise the agreement between PWC and Contractor.
12. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

13. Modifications to this Bond are as follows: **None**

Payment Bond

<p>Contractor</p> <p>Name: [Full formal name of Contractor]</p> <p>Address (as registered w/ Secretary of State, if applicable): [Address of Contractor]</p>	<p>Surety</p> <p>Name: [Full formal name of Surety]</p> <p>Address (as registered w/ Secretary of State, if applicable): [Address of Surety]</p>
<p>Owner</p> <p>Name: Fayetteville Public Works Commission</p> <p>Mailing address: 955 Old Wilmington Road Fayetteville, NC 28301</p>	<p>Contract</p> <p>Description (name and location): GILLESPIE B1.9 SOLAR PV UTILITY STATION 3858 Gillespie Street, Fayetteville, North Carolina</p> <p>Contract Price: [Amount, from Contract]</p> <p>Effective Date of Contract: [Date, from Contract]</p>
<p>Bond</p> <p>Bond Amount: [Amount]</p> <p>Date of Bond: [Date]</p> <p><i>(Date of Bond cannot be earlier than Effective Date of Contract)</i></p> <p>Modifications to this Bond form: <input type="checkbox"/> None <input type="checkbox"/> See Paragraph 18</p>	
<p>Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.</p>	
<p>Contractor as Principal</p>	<p>Surety</p>
<p>_____</p> <p style="text-align: center;"><i>(Full formal name of Contractor)</i></p>	<p>_____</p> <p style="text-align: center;"><i>(Full formal name of Surety) (corporate seal)</i></p>
<p>By: _____</p> <p style="text-align: center;"><i>(Signature)</i></p>	<p>By: _____</p> <p style="text-align: center;"><i>(Signature)(Attach Power of Attorney)</i></p>
<p>Name: _____</p> <p style="text-align: center;"><i>(Printed or typed)</i></p>	<p>Name _____</p> <p style="text-align: center;"><i>(Printed or typed)</i></p>
<p>Title: _____</p>	<p>Title: _____</p>
<p>Attest: _____</p> <p style="text-align: center;"><i>(Signature)</i></p>	<p>Attest _____</p> <p style="text-align: center;"><i>(Signature)</i></p>
<p>Name: _____</p> <p style="text-align: center;"><i>(Printed or typed)</i></p>	<p>Name _____</p> <p style="text-align: center;"><i>(Printed or typed)</i></p>
<p>Title: _____</p>	<p>Title: _____</p>
<p><i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i></p>	

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to PWC to pay for labor, materials, and equipment furnished for use in the performance of the Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless PWC from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no PWC Default under the Contract, the Surety's obligation to PWC under this Bond will arise after PWC has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against PWC or PWC's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When PWC has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless PWC against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond will arise after the following:
 - a. Claimants who do not have a direct contract with the Contractor:
 - i. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
 - ii. have sent a Claim to the Surety (at the address described in Paragraph 13).
 - b. Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5 is given by PWC to the Contractor, that shall be sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.
7. When a Claimant has satisfied the applicable conditions of Paragraph 5, the Surety shall promptly and at the Surety's expense take the following actions:
 - a. Send an answer to the Claimant, with a copy to PWC, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
 - b. Pay or arrange for payment of any undisputed amounts.

- c. The Surety's failure to discharge its obligations under Paragraph 7.a or 7.b will not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.a or 7.b, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.
8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.c, and the amount of this Bond will be credited for any payments made in good faith by the Surety.
9. Amounts owed by PWC to the Contractor under the Construction Contract will be used for the performance of the Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and PWC accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Contract are dedicated to satisfying obligations of the Contractor and Surety under this Bond, subject to PWC's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to PWC, Claimants, or others for obligations of the Contractor that are unrelated to the Contract. PWC shall not be liable for the payment of any costs or expenses of any Claimant under this Bond and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to the applicable provision of Paragraph 5, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit will be applicable.
13. Notice and Claims to the Surety, PWC, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and PWC shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. Definitions

- a. *Claim*—A written statement by the Claimant including at a minimum:
 - i. The name of the Claimant;
 - ii. The name of the person for whom the labor was done, or materials or equipment furnished;
 - iii. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Contract;
 - iv. A brief description of the labor, materials, or equipment furnished;
 - v. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Contract;
 - vi. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
 - vii. The total amount of previous payments received by the Claimant; and
 - viii. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

 - b. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

 - c. *Contract*—The agreement between PWC and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

 - d. *PWC Default*—Failure of PWC, which has not been remedied or waived, to pay the Contractor as required under the Contract or to perform and complete or comply with the other material terms of the Contract.

 - e. *Contract Documents*—All the documents that comprise the agreement between PWC and Contractor.
17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term PWC will be deemed to be Contractor.

18. Modifications to this Bond are as follows: **None**

PAGE FOR ATTACHING

CERTIFICATION OF INSURANCE

PAGE FOR ATTACHING

POWER OF ATTORNEY

APPENDICES

1. Technical Specifications: Labor
2. Booth & Associates, LLC – Drawing List
3. Owner-Furnished Material List
4. General Construction Notes
5. Technical Specifications: Foundation
6. Geotechnical Report
7. Contractor's Concrete Test Sample Report
8. Approved Major Equipment List
9. Vicinity Map
10. Overhead Distribution Specification
 - a. Staking Sheet
 - b. Labor and Materials Contract
 - c. Assembly Drawings
 - d. Contractor and Owner Furnished Material List
11. PWC Provided Equipment Specifications
12. Electrical Drawing Set
13. Civil Drawing Set
14. Civil Access Drawing Set

1 –Technical Specifications
Labor



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

**INSTALLATION OF THE
GILLESPIE B1.9 SOLAR UTILITY STATION**

TECHNICAL SPECIFICATIONS

1.0 General Conditions

- 1.1 The Drawings and Specifications are complementary, one to the other. That which is shown on the Drawings or called for in the Specifications shall be as binding as if both were called for and shown. The intention of the Drawings and Specifications is to include all labor, materials, transportation, equipment, and any other items necessary to do a complete job.
- 1.2 In such cases where the nature of the work requires clarification by the Engineer, such clarifications shall be furnished by the Engineer with reasonable promptness by means of written instructions or Detail Drawings, or both. Clarifications and Drawings shall be consistent with the intent of Contract Documents and shall become a part thereof.
- 1.3 All construction shall be performed in a workmanlike manner and shall conform to the Drawings and Specifications. The installation shall conform to the latest edition of specifications and publications from the following. The Contractor shall contact the Engineer for clarification / interpretation if there is a discrepancy between codes.
- *National Electrical Code (NEC)* and interim amendments,
 - *National Electrical Safety Code (NESC)*,
 - *National Electrical Manufacturers Association (NEMA)*,
 - *North Carolina Building Code*,
 - *Occupational Safety and Health Administration (OSHA)*,
 - *North Carolina Department of Labor, Division of Occupational Safety and Health (OSHNC)*
 - *American National Standards Institute (ANSI)*,
 - *American Welding Society (AWS)*,
 - *American Society for Testing and Materials (ASTM)*,
 - *American Institute of Steel Construction (AISC)*,
 - *American Concrete Institute (ACI)*,
 - *Acoustical Society of America (ASA)*,
 - *Institute of Electrical and Electronics Engineers (IEEE)*,
 - *Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice,"* and
 - *Underwriters Laboratories (UL)*
- 1.4 The Contractor shall install all of the major materials and equipment as listed as furnished by "Owner" or "others" and as required for the installation of the project and will furnish and install the miscellaneous materials and equipment listed elsewhere in this Specification and shown on the Drawings.

The Contractor shall also be responsible for transporting, off-loading and storage of the major materials and equipment furnished by the Owner or others that are currently stored at the Warehouse. The Contractor shall be responsible for receiving, off-loading and storage of any materials delivered to the site.

The Contractor shall provide a Material Person who is competent, organized and familiar with the material associated with this project. The Material Person will be responsible for arranging delivery, receiving, storing, disbursing and tracking all the material associated with this project. This person shall not be changed without prior approval of the Owner.

This Material Person will be responsible for reporting material shortages and misfabrications to the Owner, Engineer, and/or Supplier. The Material Person will work directly with the Owner, Engineer, and/or Supplier and will be the person on the project who is totally responsible for material.

The Contractor shall verify the quantity and condition of all materials delivered to him/her and in case there is any damage to or shortage of materials, he/she shall report same to the Owner and Engineer in writing, within twenty-four (24) hours after delivery. If there is any shortage or damage which is sufficient to cause the materials to be unfit for use in the work, and the shortage or damage has not been reported as specified above, the Contractor will be charged with actual cost of replacement of such shortage or damage.

Damaged or defective materials and equipment, or waste of materials due to faulty handling or negligence during the course of installation or testing on the part of the Contractor shall be replaced, repaired, or charged against the Contractor at their actual cost to the Owner at the point of delivery to the Contractor, to the satisfaction of the Owner.

The Contractor shall provide temporary structures or heat, at his/her own expense, during construction for the proper storage of the materials and equipment furnished by the Owner to adequately house or protect them against deterioration or damage for whatever cause. Materials not adequately protected by the Contractor will be so protected by the Owner at the expense of the Contractor.

Upon completion of the work, the Contractor shall return to the Owner, at their storage areas, all materials and equipment furnished by the Owner and not used in the construction. Surplus materials and equipment thus returned shall be neatly stockpiled. The Contractor will be charged for any materials and equipment not used and not returned the amount equal to the cost of the materials and equipment to the Owner at point of delivery to the Contractor. Written receipts shall be made for returned materials, and copy shall be mailed to the Owner and copy retained by the Contractor.

- 1.5 The Contractor shall submit to the Engineer for approval a complete list of the Contractor provided material and equipment within thirty (30) days after the award of the Contract. The list of materials and equipment shall include, but not be limited to; concrete mix design, grounding materials, conduit materials, cable trench layout, control cables, electrical panel boards, etc., with specific supplier names, manufacturer names, catalog numbers and catalog data sheets. The Owner reserves the right to strict approval of proposed Contractor-furnished materials to insure system compatibility.

The Owner reserves the right to not allow the Contractor to begin work if the Contractor has not submitted the list of miscellaneous material and equipment. The additional time required to receive approval for the submittals will not extend the completion date of the project or negate the liquidated damages.

- 1.6 All Contractor-furnished material and equipment shall be new.
- 1.7 The Contractor shall submit to the Owner and Engineer a complete Bill of Material, after approval has been given for the Contractor-furnished materials, with an individual unit cost for each item. This is needed for the Owner's Continuing Property Records (CPR's) accounting system.
- 1.8 The Contractor shall submit to the Owner and Engineer for review catalog cut sheets, Shop or Setting Drawings and/or manufacturer product data or schedules for each item not on the approved Bill of Material within thirty (30) days after the award of the Contract, so as not to cause delay in the project.
- 1.9 The Contractor shall be responsible for laying out the work. The Contractor shall, immediately upon entering project site for purpose of beginning work, locate all general reference points and take such action as is necessary to prevent their destruction, lay out

his own work, and be responsible for any error resulting from his failure to exercise such precaution. All project staking shall be provided by the Contractor.

- 1.10 All Contractor furnished material used in the solar utility station shall abide by the provisions and requirements of the Build America Buy America Act (BABA). The contractor shall maintain comprehensive documentation and records to substantiate the compliance with the BABA including subcontracting. All non-BABA compliant material shall be identified by the contractor and material documents shall be submitted to the Owner's engineer for review. Approval is required before procurement.
- 1.11 The Contractor shall provide and maintain the adequate number of temporary toilets recommended for the number of workmen on-site, through the completion of the project. Also, water service for construction, if required, shall be the responsibility of the Contractor.

Temporary power, meter and disconnect if necessary, shall be supplied by the Owner during construction. The Owner will pay the monthly electric bill.

2.0 **Scope of Work**

The Contractor's work shall include the furnishing of all labor, tools and equipment, and materials, as outlined in Section 3.0, "Solar Utility Station Construction Assembly Units" and the installation of those materials and the Owner-Furnished materials as indicated necessary to construct the subject station.

The following is a brief structural description of the station, geographic location, and an explanation of the basic Owner/Contractor responsibilities:

The GILLESPIE B1.9 SOLAR UTILITY STATION includes:

- a. Solar panel modules (see drawings for count)
- b. PV module racking
- c. String inverters
- d. 1500V DC Combiner Boxes
- e. 480V/3500A AC Switchboard
- f. SCADA and DAS system
- g. Metering rack with enclosures sensors and wiring
- h. 15kVA 480V to 120V transformer, mini power zone (MPZ)
- i. MET station and corresponding instruments and sensors
- j. 2500kVA 480V to 12.47kV power transformer
- k. Riser pole with fused cutout and MV surge arrestors
- l. PT pole with MV PT
- m. Recloser pole with MV 3-phase bypass switch, MV 3-phase trip recloser, MV surge arrestors, and SEL-651R
- n. Aux power pole with MV GOAB switch, MV fused cutout, MV to LV control power transformer (CPT), and MV surge arrestors
- o. Associated grounding system, conductors, conduit / cable trench system, communication cable, concrete pad(s), yard stone, roads and security fence.

The geographic location of the GILLESPIE B1.9 SOLAR UTILITY STATION is shown on the vicinity map located in the Appendices.

2.1 **Owner Responsibilities**

Work that will be performed by the Owner or others and is not included in this Contract for the solar utility station includes the following:

- 2.1.1 Furnish the 2500kVA 480V to 12.47kV power transformer.
- 2.1.2 Furnish 9S meter for PWC metering.
- 2.1.3 Furnish POI Distribution poles.

2.2 Contractor Responsibilities

- 2.2.1 Removal of existing trees and shrubs as shown on drawings.
- 2.2.2 Appropriate grading of the site.
- 2.2.3 Install owner-provided Riser pole, install and furnish fused cutout and MV surge arrestors.
- 2.2.4 Install owner-provided PT pole, install and furnish MV PT.
- 2.2.5 Install owner-provided Recloser pole, install and furnish MV 3-phase bypass switch, MV 3-phase trip recloser, MV surge arrestors, and SEL-651R.
- 2.2.6 Install owner-provided Aux power pole, install and furnish MV GOAB switch, MV fused cutout, MV to LV control power transformer (CPT), and MV surge arrestors.
- 2.2.7 Furnish the metering racking and enclosures.
- 2.2.8 Furnish and install the Solar panel modules.
- 2.2.9 Furnish and install the fixed tilt racking.
- 2.2.10 Furnish and install the string inverters.
- 2.2.11 Furnish and install the 1500V DC Combiner Boxes.
- 2.2.12 Furnish and install the 480V/3500A AC Switchboard.
- 2.2.13 Furnish and install the 15kVA 480V to 120V transformer, mini power zone (MPZ).
- 2.2.14 Install the 2500kVA 480V to 12.47kV power transformer.
- 2.2.15 Install the metering racking and enclosures.
- 2.2.16 Install the MET station enclosures, instruments, and sensors.
- 2.2.17 Furnish, install, and connect communication cables from the SCADA control cabinet to associated instruments and controllers as described by the SCADA vendor.
- 2.2.18 Furnish, install and wire for the DAS control cabinet to associated instruments and controllers as described by the DAS vendor.
- 2.2.19 Any miscellaneous material required shall be furnished and installed by the Contractor to complete the work.

2.3 Project Change Orders

The Owner, without invalidating the contract, may order changes in the scope of work of the contract, consisting of additions, deletions, or other revisions with the contract amount and completion time, being adjusted accordingly. All such changes in construction shall be authorized by a change order as outlined in Contract Section. No changes in work shall begin without prior written approval by the Owner.

3.0 Solar Utility Station Construction Assembly Units

3.1 Structures

3.1.1 Structural Steel Installation

The Contractor shall be responsible for off-load, storage, and installation of the structural steel.

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.

All structural steel and anchor bolts are hot-dipped galvanized. All steel surfaces or finish damage damaged during the material handling, installation or removal of various equipment shall be thoroughly cleaned, brushed and cold galvanized applied with Galvanox or approval equal.

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 solar utility station yard with several inches of washed stone, the use of a storage trailer, or an enclosed structure.

The structural steel and cast steel shall conform to ASTM Specifications A-36 and A-27 respectively. Wrought iron shall conform to ASTM Specifications A-41 for bolts, rods and bars, A-42 for plates, and A-162 for sheets. Gauges of sheet iron and steel, as specified, are U.S. Standard for Sheet and Plate. Gauges of nonferrous metals are Brown and Sharpe.

3.2 PV Modules

Contractor shall select a PV module to be used throughout the site that is aluminum framed mono-crystalline. Contractor shall install and permanently fasten all wiring associated with the PV modules in accordance with the Manufacturer's requirements, drawings, and specifications.

3.3 PV Racking

Contractor shall install and permanently fasten all electrical and communication related components of the Racking in accordance with the Manufacturer's requirements, drawings and specifications.

3.4 String Inverters

The Contractor shall install and permanently fasten all electrical and communication related components of the string inverters. Contractor shall coordinate with the manufacturer(s) to ensure the inverters are installed, wired, terminated, programmed, tested, commissioned and as built per the drawings, specifications, and manufacturer requirements.

3.5 DC Combiner Boxes

The Contractor shall install and permanently fasten all electrical components of the DC Combiner Boxes in accordance with the drawings and specifications.

3.6 AC Switchboard

The Contractor shall install and permanently fasten all electrical and communication related components of the AC Switchboard in accordance with the drawings and specifications.

3.7 SCADA Rack and Hardware

The SCADA cabinet will be furnished and installed by the Contractor. Equipment rack for the solar utility station will have SCADA cabinet. All power cables, and control cables shall be furnished, installed, and terminated by the Contractor according to the drawings and specifications.

3.8 Data Acquisition System

The DAS cabinet will be furnished and installed by the Contractor. Equipment rack for the solar utility station will have a DAS cabinet. All power cables, and control cables shall be furnished, installed, and terminated by the Contractor according to the drawings and specifications.

3.9 Metering Station

The Contractor shall install and permanently fasten all electrical and communication related components of the metering system in accordance with the drawings and specifications including the Schweitzer Engineering Laboratories, Inc. SEL-735 and 9S socket meter.

3.10 Mini Power Zone

The Contractor shall install and permanently fasten all electrical and communication related components of the MPZ in accordance with the drawings and specifications.

3.11 Meteorological Station

The Contractor shall install and permanently fasten all electrical and communication related components, instruments, and sensors of the MET system in accordance with the drawings and specifications.

3.12 Power Transformer

The 2500kVA 480V to 12.47kV power transformer will be furnished by the Owner and delivered to the pad at the station. The final assembly, dress-out, oil-filling, and manufacturer testing will be performed by the Owner. The Contractor shall install the electrical connections for the high-voltage, low-voltage bushings, surge arresters, control wires, AC and DC power wires, and ground leads for the transformer at the project site in accordance with the drawings and specifications.

3.13 Conduit and Cable

3.13.1 Conduit

Non-Metallic Conduit - Non-Encased

The Contractor shall furnish and install rigid non-metallic, polyvinyl chloride (PVC), Schedule 40, conduit for all below ground and above ground conduit runs in the sizes and to the locations as shown on the Drawings, complete with appropriate pull strings.

The Contractor shall begin the conduit installation from the precast concrete cable trench to the appropriate equipment enclosure locations and junction boxes per the Plans and Details.

The Contractor shall install all conduits to the junction boxes and/or to the equipment cabinets and install pull-strings in preparation for pulling control cable. The conduit system shall be installed in the straightest path possible and with the minimum amount of bends in any given conduit run. The installation shall avoid sharp radius bends in any one conduit run. The minimum radius bend shall be per the manufacturer's recommendations.

In the event the use of rigid conduit is not as well suited for the installation into the equipment control cabinet, it may be necessary to use non-metallic flexible liquid-tight conduit. The Contractor shall contact the Owner prior to using in cases such as cabinets for the power transformers or power circuit breakers. The Contractor shall be prepared to furnish and install the rigid and/or flexible conduit and be responsible for the required necessary fittings.

The conduit system installation shall be complete with adapters, fittings, elbows, sweeps, flexible liquid-tight fittings, bushings, locknuts, and weatherheads, as required and as shown on the drawings and specifications for complete installation. Conduits shall be cleaned, installed, and joined using the appropriate PVC cleaner and solvent cement, as recommended by the Manufacturer, at all fittings and joints in the layouts.

The Contractor shall exercise necessary precautions to prevent the accumulation of water, dirt, or concrete in the conduits during execution of the work. Conduits that have been deformed or crushed in any way shall not be installed. Conduits in which water or other foreign materials have been permitted to accumulate shall be cleaned thoroughly or the conduit run replaced where such accumulation cannot be removed by methods approved by the Owner's Engineer.

Trenches shall be of necessary width for the proper laying of the conduits and the trench banks shall be as nearly vertical as practicable. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of conduit on undisturbed soil at every point along its entire length. Care shall be taken not to excavate below the depth indicated. Unauthorized overdepth shall be backfilled with loose, granular, moist earth, thoroughly tamped. Whenever wet or otherwise unstable soil is encountered that is incapable of properly supporting the conduit (as determined by the Owner's Engineer) such soil shall be removed to the depth required and the trench backfilled to the proper grade with coarse sand, fine gravel, or other suitable material, as hereinafter specified.

In the event trenching excavations are in excess of five feet (5') in depth, the trench shall include shoring or slope-cutting of vertical walls in accordance with OSHA regulations.

Junction Boxes

The junction boxes shall be furnished and installed by the Contractor. The junction boxes for the project shall be rated NEMA 3R weatherproof, and shall include terminal blocks, cartridge fuses, mounting panel, and power connectors, as shown on the Drawings.

Lighting

Exterior yard lighting shall be furnished and installed by the Contractor as shown on the Drawings and Details.

3.13.2 Cables

The Contractor shall submit qualifications for the electricians performing the installation and termination of the power and control wiring for the project to the Engineer for approval, upon award of Contract.

All power and control cables shall be clearly and permanently marked at each termination of the jacket in accordance with the cable numbers shown on the drawings and specifications. Each conductor shall be clearly and permanently marked at each termination. Each cable and each individual conductor shall be labeled using Brady "I.D. Pro Plus" Type wire marking sleeve or approved equal. Conductor markings shall be in accordance with the Drawings. The markers shall indicate on each end the device identification and device terminal numbers shown on the Drawings to be issued to the Contractor. The wire markers shall indicate the destination of the wire, not the origin. Wiring shall be done in an orderly manner to permit the addition of Owner's wiring and for troubleshooting wire tracing. The cable jacket shall remain on the cable to a point within one foot (1') of where the first conductor is terminated. At the termination of the jacket, the cable shall be

securely sealed using plastic electrical tape. The cables shall be neatly bundled together and secured to the panel/cabinet using plastic cable ty-wraps.

All power and control wiring shall be continuous from terminal point to terminal point; no splices will be permitted. Terminations shall be made using insulated ring tongue compression connectors, AMP PIDG; spade-type terminals shall not be used unless otherwise noted or approved. All control wiring shall be neatly dressed and tied using plastic cable ty-wraps, in each device. Terminations, wire markers, electrical tape, and ty-wraps shall be furnished by the Contractor. The Contractor is to terminate all power and control wiring unless indicated to be by Others. All spare control and power cables shall have at least one loop in bottom of compartment and / or be long enough to reach any terminal in compartment.

Routing AC cable underground shall have a minimum depth of 4' for the primary side and 2 ½' to 3' on the secondary side. Backfill of these cables shall comply with 3.15 Grading and Backfilling.

Control Cable

Control cables shall be furnished, installed, and terminated by the Contractor. Routing control cable underground shall have a minimum 2 ½' to 3'. Backfill of these cables shall comply with 3.15 Grading and Backfilling.

3.14 Foundations

3.14.1 General

The Contractor shall furnish and install the reinforced concrete foundations as shown on the drawings and attached specification, complete with excavation, off-site disposal of excavated spoils, grading, backfilling, and compaction of all excavations to restore existing grade levels, foundation layout, concrete, rebar, tie wire, and forming materials.

The reinforced concrete foundations, footings, piers and pads shall be installed as indicated on the Drawings, and to undisturbed earth. Dimensions indicated for anchor bolt settings shall be checked against the manufacturer's erection drawings, structural steel and/or equipment to be installed prior to the construction of the formwork.

3.15 Site Preparation

Phase 1 Sediment and Erosion Control

The contractor shall install construction entrance and any necessary culvert pipes prior to any land disturbing activities. Flag construction limits wetlands and any sensitive areas located on site and clear only what is necessary to install perimeter erosion control BMP's. Install all perimeter control BMP's including silt fence and silt fence outlets. Begin clearing and grubbing of the vegetation and dispose of all waste material in accordance with the approved solid waste management plan and all applicable guidelines with the county.

Phase 2 sediment and Erosion Control

The contractor shall clear what is necessary to install primary sediment control BMP's i.e., sediment traps, diversion channels and sediment basins. Immediately stabilize any BMP with rolled erosion control product and riprap where required. Mulch and seed to stabilize bare soil as needed before disturbing continuing the installation of the remaining erosion control measures. Once the temporary sediment control BMP's are stabilized and operational, complete the remainder of the site clearing within the construction limits. Topsoil to be reused in areas to be landscaped or seeded may be stockpiled within a designated stockpile location. The stockpile location shall be surrounded on three sides by silt fence with one side open to earth moving equipment. All topsoil, vegetation,

debris, and other unsuitable material should be removed from the site to an approved and permitted location. Begin rough grading to required subgrades as indicated. Subgrade soils shall be inspected by a geotechnical engineer utilizing proof rolling methods and compacted per the grading specifications prior to the placement of fill material. All areas of fill shall be installed in lifts, compacted, and tested as outlined in the grading specifications. Use temporary seed as conditions warrant in areas with no current work. Finalize the installation of the access drives (including stone), complete grading, and stabilize all disturbed areas by seeding and mulching. Haul away or dispose of any excess spoils not needed to balance the site, if any topsoil it to remain stockpiled, protect with silt fencing around the perimeter. Soil stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than fourteen (14) days after work has ceased, except as stated in the pertaining department of environmental quality standard notes. Seed graded slopes and denuded areas following initial soil disturbance. After final use, the spoils area shall be restored and seeded. Remove the temporary construction entrance, restore and seed the disturbed area within the DOT right of way. After construction is over and the site is stabilized, install permanent vegetation on the disturbed areas.

Phase 3 Sediment and Erosion Control

BMP's must be maintained as designed until all permanent vegetation is established. Once permanent vegetation/stabilization has been established on site, excluding sediment basins, with a minimum eighty percent (80%) coverage of the disturbed areas, decommission any basins. If a sediment basin has water in it, the water must be pumped out from the surface into a filter bag on a level area free of debris or use another approved method with non-erosive properties. If there is a lot of sediment/silt in the bottom of the basins and must be hauled off, mix with dry material, or set aside to dry then haul off. Grade surrounding area and fill basins and their respective diversions to final elevations as required in the drawings. No sediment control measures are to be removed without approval of the state environmental agency. After final grading has been completed, disturbed areas must be stabilized with permanent vegetation. Arrange to finalize DOT apron that connects to the existing road used for access.

Grading and Backfilling

Yard, trench and general backfilling is required to return the disturbed areas to the previous finish grade prior to the construction. This shall constitute grading to the elevations shown on the drawings, allowing an average of 2% of grade with the natural slope of the ground for drainage. The area shall be brought to a smooth compacted plane in such a manner that there will be no pockets or depressions which will hold water, and so that the area will drain naturally. The trenches shall be carefully backfilled with the excavated materials approved for backfilling, consisting of earth, loam, sandy clay, sand and gravel, soft shale, or other approved materials, free from large clods of earth or stones, deposited in six-inch (6") layers and thoroughly and carefully tamped until the conduit or cable has a minimum cover of one foot (1'). The remainder of the backfill material shall then be placed in the trench in one-foot (1') layers and tamped. Any trenches improperly backfilled, or where settlement occurs, shall be reopened to the depth required for proper compaction, then refilled and compacted, with the surface restored to the required grade and compaction as specified. Open trenches in roadways or other areas subject to traffic shall be backfilled in six-inch (6") layers, and each layer shall be moistened and compacted to a density at least equal to that of the surrounding earth and in such manner as to permit the rolling and compaction of the filled trench with the adjoining earth to provide the required bearing value. Finish grade areas shall be raked clean and free from all trash, wood, forms, and other debris after completion of work, and all spoil piles shall be leveled and excess materials disposed of. If any spoils materials appear to have contamination, contractor is to seek guidance from Owner or Owner's

Engineer. Otherwise, dispose of spoils at a state environmental agency approved location.

3.16 Fence

Fences and Gates

The Contractor will furnish and install all fence and signs to be installed on the fence. The Owner will furnish padlocks for all gates.

The Contractor shall furnish and install any temporary fencing needed to maintain a safe and secure site and to completely isolate any construction activity from any energized device or structure.

3.17 Grounding

The below-grade grounding systems shall be grounded per Drawings and details.

3.18 Overhead Distribution Poles

Refer to Appendix 10 – Overhead Distribution Specification

3.19 Testing

The Contractor shall perform testing for:

- a. PV modules to verify their performance in accordance with the manufacturer specifications.
- b. String inverters in accordance with manufacturer specifications.
- c. Each control cable by means of meggering conductor-to-conductor and each conductor-to-ground prior to termination,
- d. The Contractor shall verify each control cable for proper cable and conductor size, type, and labeling per the drawings.
- e. Each control cable termination shall be verified per the interconnect drawings for proper conductor lugs, crimping, color codes, lock washers, and tightness.
- f. The Contractor shall verify control circuit AC & DC molded-case circuit breakers and fuses of the correct size and type,
- g. AC switchboard DC disconnect connections and their circuit breakers for proper sizing and termination locations.
- h. The Contractor shall verify the AC electrical systems for each source capability; branch circuits for proper magnitude and neutral and/or ground terminations at the destination

The Contractor shall provide the required and acceptable documentation for all testing to the Owner.

3.20 Energization and De-energization

The contractor shall perform the initial energization and de-energization of the Solar Utility Station in accordance with the documentation provided by the Owner.

2 - Booth & Associates, LLC – Drawing List

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

GILLESPIE-B1.9 SOLAR UTILITY STATION

LIST OF DRAWINGS

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

ELECTRICAL

Sheet No.	Title
EP-100	Utilities Single Line Diagram
EP-101	Solar Single Line Diagram
EP-102	Communication Block Diagram
EP-103	Equipment Schedule and Calculations
EP-104	Conductor Schedules
EP-110	Electrical Site Plan
EP-111A	Array Plan 1A – Partial
EP-111B	Array Plan 1B – Partial
EP-150	Distribution Overhead Plan & Profile
EP-153	Distribution Overhead Sag Tables
EP-154	Distribution Overhead Details
EP-155	Distribution Overhead Details
EP-156	Distribution Overhead Details
EP-251	Module Wiring Details
EP-252	Underground Electrical Details
EP-253	Electrical Details
EP-260	Electrical Grounding Diagram
EP-261	Electrical Grounding Details
EP-262	PV Fence Grounding Details
EP-300	Equipment Plans & Elevations
EP-301	Cabinet Elevations & Bom
EP-302	Equipment Pad 1 Foundation Details
EP-302A	Equipment Pad 1 Foundation Details
EP-303	Equipment Pad 2 Foundation Details
EP-303A	Equipment Pad 2 Foundation Details
EP-304	Support Structure 1 Details
EP-305	Support Structure 2 Details
EP-450	Labels & Markings

CIVIL

Sheet No.	Title
CG001	Cover Sheet
CG002	Construction Sequence, Legend, and Notes
CG003	Ground Stabilization and Materials Handling
CG004	Self-Inspection, Record Keeping, and Recording
CG100	Existing Site Conditions
CG101	Pre-Construction Project Drainage Analysis
CG102	Site Soils
CG200	Erosion and Sediment Control Plan – Phase I
CG201	Erosion and Sediment Control Plan – Phase II
CG202	Erosion and Sediment Control Plan – Phase II
CG300	Post-Construction Project Drainage Analysis
CG400	Basin Details
CG401	Basin Details
CG500	Grading and Erosion Control Details
CG501	Grading and Erosion Control Details
CG502	Grading and Erosion Control Details
CG600	Channel Calculations
CG601	Skimmers & Sediment Basin Calculations
CG700	Driveway Permit Drawings Cover Sheet
CG701	Driveway Plan and Sight Distances
CG702	Driveway Details

3 – Owner-Furnished Material List

OWNER-FURNISHED MATERIAL LIST

CLIENT: Fayetteville PWC-Fayetteville, NC
PROJECT: Gillespie-B1.9 Solar Utility Station
PROJECT NO.: P.0574167.R.TE
CONTRACTOR:
DATE: September __, 2023

ITEM	DESCRIPTION	DELIVERY LOCATION	SUPPLIER	ESTIMATED DELIVERY DATE	QTY
1	12.47kV to 480V Power Transformer	Site	ERMCO	on hand	1 ea
2	S-9 meter	Site	Owner Choice	TBD	1 lot
3	POI Distribution Poles	Site	Owner Choice	TBD	1 lot
4	Recloser	Site	Owner Choice	on hand	1 ea
5	Switch 25 KV, 600 Amp Recloser Bypass	Site	Owner Choice	on hand	6 ea
6	Crossarm, 8 foot wood	Site	Owner Choice	on hand	10 ea
7	Brace, Crossarm, wood	Site	Owner Choice	on hand	10 ea
8	Conductor-UG Primary cable #4/0; 1/0 OH Primary-"Azusa"; #2 OH Secondary Triplex-"Shrimp-XLP"	Site	Owner Choice	on hand	0.704 ea
9	Kit, Termination, Cable 4/0 AL, 25 kV	Site	Owner Choice	on hand	3 ea
10	Elbow, 25 KV 200A LB 4/0 AL	Site	Owner Choice	on hand	3 ea
11	Guy wire 7#6	Site	Owner Choice	on hand	0.176 ea
12	Jumpers 1/0 covered "Oilnut"	Site	Owner Choice	on hand	0.176 ea
13	Deadend insulator 35 KV	Site	Owner Choice	on hand	21 ea
14	Hotline clamp	Site	Owner Choice	on hand	13 ea
15	Conduit - 5" PVC	Site	Owner Choice	on hand	41 ea
16	Lightning arresters; 10 kV, 8.4 MCOV - Riser type; Heavy Duty	Site	Owner Choice	on hand	10 ea
17	Mounting Bracket 3 Phase	Site	Owner Choice	on hand	1 ea
18	Fused Cutout (15/27 kV) w/ mounting bracket, Loadbreak 100A; 25 KV	Site	Owner Choice	on hand	4 ea
19	Transformer 0.5 KVA	Site	Owner Choice	on hand	1 ea
20	Mounting bracket for cutout/lightning arrester	Site	Owner Choice	on hand	3 ea
21	PT/CT cluster mount bracket	Site	Owner Choice	on hand	1 ea
22	GOAB 600 Amp	Site	Owner Choice	on hand	1 ea
23	UGuard 2"	Site	Owner Choice	on hand	3 ea
24	2" Flexible Conduit for Control	Site	Owner Choice	on hand	1 ea
25	PT for meter to be mounted in 2500 KVA transformer	Site	Owner Choice	on hand	3 ea
26	Elbow Arresters 10KV	Site	Owner Choice	on hand	3 ea
27	Bushing Well Inserts	Site	Owner Choice	on hand	3 ea
28	500 MCM CU between 2500 KVA transformer and switchgear	Site	Owner Choice	on hand	140 ft

4 – General Construction Notes

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

**GENERAL CONSTRUCTION NOTES
FOR THE
GILLESPIE-B1.9 SOLAR SUBSTATION**

REVISION	DESCRIPTION	DATE
A	ISSUED FOR BID	09/15/2023

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

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FAYETTEVILLE PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA

SPECIFICATIONS FOR
PV ELECTRICAL CONSTRUCTION FOR THE
GILLESPIE-B1.9 SOLAR SUBSTATION

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

**SPECIFICATIONS FOR
PV ELECTRICAL CONSTRUCTION FOR THE
GILLESPIE-B1.9 SOLAR SUBSTATION**

TECHNICAL SPECIFICATIONS

1. Codes & Standards

1.1. The Solar Facility shall be designed to comply with the following Codes and Standards, unless otherwise specified by the local AHJ. When Code and Owner specifications conflict, Contractor shall contact Owner for direction.

- National Electrical Code (NEC)
- National Electrical Safety Code (NESC)
- IEEE Std. 80, IEEE Guide for Safety in AC Substation Grounding and other IEEE Standards as required
- ANSI/IEEE Std. 81, IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a ground System and other ANSI/IEEE Standards as required
- IEEE 519 Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems
- IEEE 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems
- UL 1741 Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources
- UL 62109-1 Standard for Safety of Power Converters for Use in Photovoltaic Power Systems
- UL 44 Thermoset-Insulated Wires and Cables
- UL 854 Service Entrance Cables
- UL1703 Flat-Plate Photovoltaic Modules and Panels
- UL 2703 Standard for Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels
- UL 3703 Standard for Solar Trackers
- UL 4703 Photovoltaic Wire
- UL 9540 Energy Storage Systems
- NFPA 70E Standard for Electrical Safety in the Workplace
- International Building Code (IBC)
- State and local electric requirements to the extent required

1.2. The following sections are a set of guidelines to be followed, but they should not serve as a justification for deviating from the codes and safety standards established in the excerpt above, should any such deviation not be explicitly enumerated herein.

2. General

2.1. The project design's life should be at least 30-years and the project equipment and hardware installation shall be done with this intention in mind.

- 2.2. Certain design criteria specified in this document may go beyond the minimum requirements of the NEC. However, changes are not allowed unless the Owner's engineer grant written approval.
- 2.3. All electrical equipment, conduits, and components must be protected adequately from damage by using approved means such as bollards, fences, shields, or guards.
- 2.4. All Equipment shall be installed per manufacturer's specifications, installation manuals, and contract drawings.
- 2.5. MV equipment installed outside of fences shall be inaccessible to the public, such as pole mounted equipment, or shall utilize tamper-resistant construction which prevents entry by unauthorized personnel.
- 2.6. If equipment manufacturer requires it, caulk along bottom perimeter of equipment mounted on concrete pads to prevent water entry between bottom of enclosure and top of concrete slab. Use only exterior 100% acrylic silicone elastomeric caulk.
- 2.7. Balance of system equipment shall be installed so as not to shade array during peak solar resource window of 10AM-2PM EST on any day of the year.
- 2.8. Contractor shall not install any equipment, raceways, or materials otherwise to any structure unless noted as such on the drawings. Contractor shall not use the racking piles to support inter-row conduits. Any deviations must be approved through the Owner's engineer.
- 2.9. All materials potentially exposed to direct or indirect sunlight shall be UV rated.

3. Installation Work Quality

- 3.1. Electrical equipment must be installed in an organized and professional manner. The Contractor is responsible for ensuring that all installations follow the clearance requirements of the National Electrical Code (NEC), National Electric Safety Code (NESC), and Occupational Safety and Health Administration (OSHA).
- 3.2. Any communication or approval with the Owner must go through the project manager or the Owner's engineer.
- 3.3. The Contractor is responsible for verifying all dimensions on the drawings and laying out all areas of the array and equipment prior to installation to ensure that there are no discrepancies, unforeseen conditions, or obstructions. If any issues are found, the Contractor must notify the Owner immediately.
- 3.4. The Contractor must locate and protect any existing utilities and equipment found in the work area.
- 3.5. All personnel working on the project have "stop work authority" and must stop working or that of their co-workers if they feel that an unsafe condition is present, which poses an environmental, health, or safety hazard to workers or the project.
- 3.6. Enclosures or guards must be installed in locations where electrical equipment may be exposed to physical damage.
- 3.7. Internal parts of electrical equipment must not be damaged or contaminated by foreign materials such as paint, plaster, cleaners, abrasives, or corrosive residues. There should also be no damaged parts that could negatively impact the safe operation or mechanical strength of the equipment.

- 3.8. All hot-dipped galvanized ferrous material that will be subjected to drilling, cutting, pile-driving, or other conditions that could compromise the integrity of the galvanized protection must be treated immediately after metal work is completed with a minimum 95% galvanized zinc compound to prevent corrosion.
- 3.9. All bolted connections must be torqued according to device listing or manufacturer recommendations using a calibrated torque wrench. Impact drivers are not to be used for final torquing of any hardware.
- 3.10. Torqued electrical connections should be marked with a permanent marking paint pen or torque lacquer, while torqued mechanical/racking connections should be marked with a permanent marker or paint pen.
- 3.11. All hardware used in exposed locations or for grounding & bonding must be stainless steel and meet any utility construction standards, unless approved otherwise by the Owner.
- 3.12. Anti-seize lubricant must be used on stainless hardware or silicon bronze nut on a stainless-steel bolt.
- 3.13. All packaging must be removed from equipment prior to commissioning.
- 3.14. Paper copies of shop drawings, warranties, calibration certificates, etc. must be given to the Owner's engineer when they cannot reasonably be stored in equipment enclosures.
- 3.15. Manufacturer test reports must be collected and given to the Owner's engineer.
- 3.16. All module, DC string, and PV output circuit connectors must be kept clean and dry until connected.
- 3.17. The use of dissimilar metals together should be avoided to prevent corrosion. If connections or terminations of dissimilar metals are necessary, bi-metallic transitions should be used to prevent corrosion. The use of oxide inhibitor is not an acceptable substitute for bi-metallic transition. Tin plated materials can be used as a transition between copper and aluminum.
- 3.18. All materials shall be new, in proper working condition, and marked and listed by a Nationally Recognized Testing Laboratory (NRTL). The materials shall be used for their intended purposes.
- 3.19. All equipment shall be assembled, installed, and tested per manufacturer's specifications and manuals. If installation manuals are not provided they must be requested, received and reviewed prior to installation.
- 3.20. All equipment and installation methods shall comply with the latest utility construction standards as applicable.

4. Photovoltaic (PV) Modules

- 4.1. All PV modules must be thoroughly inspected before they are mounted on the rack.
- 4.2. Personnel shall not step or stand on PV modules or lean on their glass during installation. The racking and panels are not intended for live loads and could invalidate the warranty.
- 4.3. When handling PV panels, extra caution must be taken to avoid scratching either side. Panels with scratches that go beyond the protective laminate layer should not be mounted and must be replaced at the contractor's expense.

- 4.4. The contractor is required to install PV panels in a visually appealing way, with the racking being adjustable to ensure that the panels are level and perpendicular to adjacent modules. The racking will be inspected by the owner or their representatives.

5. Wire Management

- 5.1. Prior to installation, the Owner must approve all wire management methods and materials.
- 5.2. All wire management must be performed neatly, in an orderly and professional manner.
- 5.3. UV rated spiral wrap, edge-guard, or split loom must be used to protect wires from sharp edges and abrasion. Split loom is required for gaps larger than 4 inches on all exposed sections of tracker wiring, such as motor wire, DC wire, and LV AC wire.
- 5.4. Mechanical or other approved sunlight-resistant means must be used to secure all exposed cables, such as module leads and PV source circuit wiring.
- 5.5. UV rated ties are acceptable for securement and support, but they must be listed, identified, and submitted for review and approval before installation. UV rated ties that are only listed for securement cannot be used for support.
- 5.6. Thin gauge stainless steel wire bundlers, with or without PVC coating, are not permitted for wire management.
- 5.7. PV source and output conductor cable clips may be stainless steel (e.g., ACC clips by Wiley or cable clips by Cooper Industries) or approved UV rated thermoplastic clips with stainless steel attachment points.
- 5.8. PV source circuit wiring must be adequately supported in lengths not exceeding 24".
- 5.9. Module-to-module interconnections must be supported a maximum of 12" from the junction box and the module-to-module connection point.
- 5.10. Module lead connectors must be easily accessible and protected from direct sunlight or rain, and they must not be installed within tubing, conduit, or module gaps.
- 5.11. Module lead connectors must be protected from weather and damage during on-site storage.
- 5.12. All source circuit wiring must be installed with wires securely fastened to either the solar module frames or racking support structure.

6. Conductors (General)

- 6.1. Conductors must be installed at a minimum height of 18 inches above ground level, unless noted otherwise in the plans or transitioning to underground conditions.
- 6.2. Any repairs to conductors need to be approved by the Owner's engineer. Any approved repairs must be done by the manufacturer's provided method.
- 6.3. Conductors must be handled and installed in a way that protects them from physical damage, such as using wire management materials or routing in a raceway.
- 6.4. Sharp edges of racking or raceways that may compromise conductor insulation should not be in contact with any conductor during installation.
- 6.5. When conductors of different circuits pass through the same manhole, handhole, or pull box, cover the conductors of each circuit with arc-proof tape, spiral wrapped half-lapped and held in place with reverse-wrapped glass fiber tape.

- 6.6. The use of "one-shot" or "die-less" crimpers is not allowed. Contractor shall use the appropriate compression tool(s) listed for use with the selected compression connector(s) being installed.
- 6.7. All conductors must be routed in a way that ensures access to necessary components requiring operator access, such as indicators, valves, sample ports, switches, tap changes, fuse wells, etc.
- 6.8. Control wiring between equipment should be terminated on field wiring terminal boards and labeled with terminal board and terminal number identification at both ends.
- 6.9. Compression style lugs must be used for all PV conductors, and terminations must be rated for the maximum DC or AC voltage of the system.
- 6.10. Lugs must include inspection windows for quality assurance, and lugs without inspection windows may be used only with Owner approval.
- 6.11. Approved oxide inhibitor must be applied to exposed conductors immediately after stripping and brushing, as well as immediately prior to the installation of termination lugs for all DC and AC power conductor terminations, unless otherwise required by equipment manufacturers.
- 6.12. Premium grade pressure sensitive vinyl color coding tape should be used, which is resistant to heat, cold, moisture, UV, and fade.
- 6.13. The size and spacing of lug holes should match the size and spacing of equipment studs and busbar holes.
- 6.14. Mechanical set screw lugs may be used to terminate equipment grounding conductors.
- 6.15. Utility phase sequence must be verified, and phase conductors installed in the correct sequence at all AC terminals.
- 6.16. Written consent from the Owner is required before splicing any wires.
- 6.17. All wires and cables must be labeled with wrap-around laminating vinyl machine printed ID labels or other approved labeling methods that indicate destination, source, and phase or polarity on each end.
- 6.18. Lugs and connectors must be listed and designated for use with the appropriate conductor material and termination point.
- 6.19. Stripped conductors must be clean and undamaged at all terminations.
- 6.20. The conductor outer jacket must be labeled with an NRTL listing and rated for use in conduit.
- 6.21. Direct landing of conductors is only allowed on equipment specifically rated for the size and material of the conductor being landed.
- 6.22. All AC power conductor terminations must use irreversible, double crimp, long barrel, NEMA 2-hole compression type lugs rated at 90°C where approved by equipment manufacturer or supplier. Single bolt compression lugs may be used with Owner's engineer approval where double crimp lugs are not possible.
- 6.23. Conductors must have integral coloring or colored electrical tape at all terminations to indicate grounded conductors (unless bare CU), equipment grounding conductors, and AC phase conductors.

- 6.24. Electrical tape alone is insufficient as the only means of insulation. Manufacturer's instructions must be followed for the installation and application of insulating products.
- 6.25. A maximum of two stackable compression lugs may be used when more than one compression lug is needed per phase or per a single termination location. Lugs should be landed on either side of the termination pad whenever possible.
- 6.26. All electrical connections must use conical or Belleville lock washers, unless otherwise required by equipment manufacturers.
- 6.27. All connectors and corresponding crimping tools must be listed for their specific application.
- 6.28. If a site uses the same color code for multiple voltages, it is necessary to use a sign or labeling to indicate the specific voltage. The color coding to be used shall follow the standard specified in the design documents, unless otherwise indicated:
 - 6.28.1. >2KV: Phase A – Red, Phase B – Yellow, Phase C – Blue
 - 6.28.2. 600V/346Y: Phase A – Brown, Phase B – Orange, Phase C – Yellow
 - 6.28.3. 480V/277Y: Phase A – Brown, Phase B – Orange, Phase C – Yellow
 - 6.28.4. 208V/120Y: Phase A – Black, Phase B – Red, Phase C – Blue
 - 6.28.5. Neutral (Any circuit voltage) – White or Gray
 - 6.28.6. Ground – Green, black with green strip, or bare
 - 6.28.7. DC Functionally Grounded: Positive – Red or Blue, Negative – Black

7. **DC Wiring**

- 7.1. The conductor's outer jacket must be labeled with a NRTL listing, marked as sunlight-resistant, and rated for direct burial or use in conduit where applicable.
- 7.2. PV string and harness source circuit conductors must be made of copper and type PV Wire, with XLPE insulation rated at 90°C and a 2kV capacity.
- 7.3. PV source and output circuits should not be mixed with other system circuits in the same raceway, cable tray, cable, outlet box, junction box, or similar fitting, unless separated by a partition.
- 7.4. String harnesses should adhere to industry standards, and insulation resistance tests (IRT) should be performed on all connections after installation and before module connection to demonstrate insulation quality.
- 7.5. Conductors connected to moving parts of a tracker system must be copper only, rated for extra-hard usage, and sized appropriately to prevent damage during routine movement. The minimum number of strands for #8 wire is 49, and for #10 wire, it is 19 strands. Flexible connections must be tagged accordingly on the outer jacket.
- 7.6. Collector source conductors (i.e., BLA, Trunk Bus) must be made of aluminum and type PV Wire, with XLPE insulation rated at 90°C and a 2kV capacity.
- 7.7. Combiner box / disconnect output circuit conductors must be made of aluminum and type PV Wire, with XLPE insulation rated at 90°C and a 2kV capacity unless otherwise approved.

- 7.8. Electrical connectors must match the type and brand of the module manufacturer-provided connectors and must be listed.
- 7.9. Strain relief must be provided at each module junction box, at the entry and exit of conduit, and at the entry into combiner box / disconnect enclosures.
- 7.10. #12 PV Wire, copper, with XLPE insulation rated at 90°C and a 2kV capacity may be used for PV string jumper conductors.
- 7.11. In-line fuses on the positive conductor designed for overmolding must be used for wire harnesses.
- 7.12. All DC material must have an NRTL-listed voltage rating equal to, or greater than, the DC system voltage shown in the contract drawings.
- 7.13. Damaged DC Cable must not be repaired without the owner's review and approval. Manufacturer repair instructions must be followed in the case of an owner-approved repair.

8. DC Combiner / Load Break Disconnect Boxes

- 8.1. When installing conductors, they should be properly secured to avoid contact with sharp edges and to comply with the bending radius requirements.
- 8.2. Mechanical set screw terminations are only approved for combiner box terminations.
- 8.3. Conductor work loops should be provided in the boxes to allow for clamp-on meter ampacity testing and cable contraction/expansion.
- 8.4. The DC disconnect box should have liquid-tight cord grips installed through the bottom of the box to prevent leakage. The boxes must also be thoroughly cleaned to eliminate any debris.
- 8.5. All disconnect and combiner enclosures shall be securely closed and locked after installation and wiring is complete by padlock or utility seal to prevent tampering.

9. DC & LV AC Overcurrent Protection Devices

- 9.1. The contractor is responsible for providing overcurrent protection devices for all conductors, busses, and electrical equipment that may be damaged due to excessive current on the circuit.
- 9.2. All overcurrent devices should be coordinated selectively so that branch level circuits are deenergized first during a faulting event, leaving as many main level circuits as possible in operation.
- 9.3. All fuses should be installed in such a way that rating labels are visible.
- 9.4. Circuit breakers subject to reverse power flow should be listed as back feed compatible.
- 9.5. Low-voltage AC and DC molded case or electromagnetic circuit breakers must be bolt-on type, while pop out or quick-release types are not acceptable.
- 9.6. All overcurrent protection devices should be installed based on the instructions of associated equipment manufacturers and the assigned application of the Engineer of Record.
- 9.7. All fuses rated 100A and greater should be securely fastened to the fuse holders with nuts and bolts per the manufacturer-approved means, and the fuses should be deemed non-load break rated.

10. Inverters

- 10.1. The inverter connection to the transformer shall be installed according to the factory specifications.
- 10.2. To ensure safety and compliance, all direct bus connections must be approved by the inverter and transformer manufacturers.
- 10.3. String inverters should be mounted no less than 30 inches above ground level and 24 inches above Base-Flood Elevation (or higher if required).
- 10.4. When cable conductors are used for the AC side outputs, their voltage rating should be sufficient to withstand the inverter's maximum operational voltage (not nominal).
- 10.5. Use the manufacturer's recommended lifting locations as indicated in the installation documentation for inverters

11. Low Voltage AC Wiring

- 11.1. Low Voltage AC conductors minimum conductor and insulation rating shall be specified by the Owner's engineer.
- 11.2. Low Voltage AC conductor terminations on service laterals shall follow the latest version of the utility construction standards.
- 11.3. Low voltage AC conductors shall have power supplied via a molded case circuit breaker, sized to protect the conductors and the components that they serve.
- 11.4. Low voltage AC cable splices shall not be used unless approved by Owner on a case-by-case basis and may only use NRTL listed splice lug kits.

12. Low Voltage Auxiliary Power Transformers

- 12.1. The enclosure for the auxiliary transformer should be made of coated steel and must have a NEMA 3R or 4X rating.
- 12.2. The windings of the transformer should be encapsulated with epoxy.
- 12.3. For the low voltage interface, a touch-safe, dead front panel with circuit breakers appropriately sized for the auxiliary equipment should be used, otherwise the secondary leads can be directly connected to an external interface.
- 12.4. Electrostatic shields should be installed on transformer windings.

13. Inverter Step-Up Transformer (ISU)

- 13.1. All conductors must be routed in a way that allows operators to access indicators, valves, sample ports, switches, tap changes, fuse wells, and other components and accessories that require access.
- 13.2. The low voltage wire on cable output conductors must be equipped with NEMA two-hole long barrel compression lugs or as per the manufacturer's instructions.
- 13.3. The temperature, pressure, and liquid level transformer alarm I/O must be wired to the SCADA network.

14. Underground Trenches

- 14.1. A minimum clearance of 12 inches must be maintained between power and control/communication wiring, unless otherwise noted.

- 14.2. The distance between the trench edge and racking support pile should be at least 3 feet, or as specified by the racking manufacturer.
- 14.3. Screened native soil used for these applications must not contain organic or deleterious materials, and particles larger than 1/2 inch (for direct burial) or 3/4 inch (for underground conduit) must be removed through physical screening. Visual inspection is not an acceptable method for this process.
- 14.4. The distance between the trench edge and any concrete pads must be at least 3 feet, unless approved by the Owner's engineer.
- 14.5. For cable trenches crossing diversion ditches, maintain the minimum cable ground cover by aligning the trench depth with the diversion ditch depth throughout the length of the trench.
- 14.6. After the sand cover, the initial backfill layer must rise to a height of 12 inches over the conductors or conduit before being compacted. Subsequent backfill layers must be installed in 6-inch lifts, each of which must be compacted to 90% of Standard Proctor Density.
- 14.7. Prior approval is necessary for imported backfill material. To obtain approval, submit the proposed material for thermal resistivity (ASTM D5334) and Standard Proctor compaction (ASTM D698) testing.
- 14.8. Running underground cable under racking or trackers requires explicit approval from the Owner.
- 14.9. For road crossings, the trench compaction must be equal to or greater than the subgrade compaction specified in the geotechnical report, or 95%, whichever is greater.
- 14.10. Conductors for direct burial and underground conduit applications must rest on at least 3 inches of sand or screened native soil and be covered on all sides by a minimum of 3 inches of the same material.
- 14.11. Conduit for cable installation under roads must extend 6 feet beyond the edge of the roadway.

15. Electrical Warning Tape

- 15.1. The tape shall be red.
- 15.2. Tape must be procured from the following manufacturers, or an equivalent tape approved by the Owner: Terra-Tape and Terra-Tape D by Reef Industries, Houston, TX; Markline and Detectatape by Allen Systems, Houston, TX; or Industrial Tape and Supply Company, Atlanta, GA.
- 15.3. The width of the warning and tracer tape must be at least 6 inches.
- 15.4. Warning and tracer tape must be placed above pipes, conduits, or cables at depths specified in the approved plans.
- 15.5. The tape above any electrical conductors must have the wording "BURIED ELECTRICAL LINE BELOW" continuously repeated every 30 inches to indicate the presence of the utility below.
- 15.6. The contractor must install warning and tracer tape at least once for every 2 feet of trench width, evenly spaced.

- 15.7. Tracer tape for pipes, conduit, and/or electrical cables must consist of a metal core bonded to plastic layers, with a minimum thickness of 5 millimeters. It must be located at the depth specified in the approved plans.
- 15.8. Unless approved by the Owner's engineer, cable separation must be maintained.

16. Grounding and Bonding

- 16.1. Grounding Electrode Conductors (GEC's) shall be installed to take the shortest route to the grounding electrode as possible and shall minimize the amount of bends.
- 16.2. All grounding splices and connections shall be irreversible crimp. If crimping, oxide inhibitor shall be applied before crimping.
- 16.3. For equipment pad ground ring connections, one ground rod shall be installed in an accessible test well. The connection of the ground ring to this ground rod shall be reversible such that the ground rod may be tested with a single connection to this ground ring.
- 16.4. Racking components and structural supports must be electrically bonded together by a listed and approved means.
- 16.5. Inter-rack bonding jumpers, if required, shall be flexible tin coated copper braiding (e.g., Wiley) or stranded copper conductor of size, type, and termination method specified and approved.
- 16.6. Modules shall be grounded to racking supports with a method approved and listed by the racking manufacturer. Grounding clips or washers shall be arranged per the manufacturer instructions so that the removal of a module does not interrupt the racking grounding connection of any other module.
- 16.7. Bare copper GEC shall be installed in conduit and shall extend at least 6" out from concrete equipment pad.
- 16.8. Grounding system components shall be listed for their purpose, including but not limited to ground rods, grounding lugs, grounding clamps, etc.
- 16.9. All Equipment Grounding Conductors (EGC's) shall be either insulated or uninsulated copper, or uninsulated tin-plated copper, unless otherwise noted.
- 16.10. Contractor shall not bond positive or negative source or output conductors to ground at any location. For a grounded system, the only current carrying conductor connection to ground shall be the internal inverter manufacturer-provided connection.
- 16.11. Grounding lugs and connections used outdoors and exposed to the environment shall be listed for direct burial (DB). This information shall be clearly noted on product submittals to be approved by Owner. Deviations may be approved for listed hardware for use above 18" from ground level.
- 16.12. All gates, whether temporary or permanent, shall have grounds installed per the drawing details, and as per follows:
 - 16.12.1. Fences shall be grounded at each side of a gate or opening.
 - 16.12.2. Fence gates shall be bonded to the grounding conductor, jumper, or fence.
 - 16.12.3. A buried bonding jumper shall be used to bond across the gate or opening in the fence unless a non-conducting fence section is used.

17. Raceway & Conduit

- 17.1. All underground conductors in conduit shall be routed in schedule 40 PVC or HDPE conduit unless otherwise noted.
- 17.2. Schedule 40 PVC or HDPE stub-ups shall be used when entering equipment cabinets that are installed flush on concrete pads or skid mounted.
- 17.3. All above-grade conductors in conduit not in enclosed equipment cabinets shall be installed in Schedule 80 PVC or HDPE conduit unless otherwise noted.
- 17.4. Intermediate metal conduit shall be hot-dipped galvanized steel conforming to ANSI C80.6 and UL 1242. Conduit shall be as manufactured by Allied Tube and Conduit Corp., Wheatland Tube Co., LTV Steel Tubular products Co. or approved equal.
- 17.5. Rigid metal conduit shall be hot-dipped galvanized steel confirming to ANSI C80.1 and UL 6. Conduit shall be as manufactured by Allied Tube and Conduit Co., Wheatland Tube Co., LTV Steel Tubular Co., or approved equal. RMC 90s shall be protected with an approved method (tape or paint).
- 17.6. Electric metallic tubing shall be hot-dipped galvanized steel conforming to ANSI C80.3 and UL 797. Tubing shall be as manufactured by Pyle National, Allied Tube and Conduit Corp., Wheatland Tube Company, or approved equal.
- 17.7. PVC conduit shall be Schedule 40 or 80 90°C and conform to NEMA Standard TC-2. PVC conduit shall be as manufactured by Carlon Electrical Products Co., Allied Tube and Conduit Company, Triangle Company or approved equal.
- 17.8. HDPE conduit shall be 90°C and conform to NEMA Standard TC-7. HDPE conduit shall be as manufactured by Carlon Electrical Products Co., or approved equal.
- 17.9. Liquid-tight flexible metal conduit shall be galvanized steel with extruded moisture and oil-proof outer jacket of polyvinyl chloride plastic. Conduit shall be as manufactured by Allied Tube and Conduit Corp., Wheatland Tube Co., LTV Steel Tubular products Co. or approved equal.
- 17.10. All openings into equipment, including conduit, shall be sealed to prevent entry of insects and rodents. Conduit gland plates shall be used where required by equipment manufacturer.
- 17.11. Conduit sealant shall be Polywater FST 250.
- 17.12. Weatherheads shall be sealed with Polywater AFT.
- 17.13. All conduit fittings shall be listed.
- 17.14. Intermediate and rigid metal conduit fittings, couplings and connectors shall be threaded and galvanized.
- 17.15. Couplings and connectors for electric metallic tubing shall be watertight compression fittings.
- 17.16. Couplings and connectors for PVC and LFMC shall be watertight fittings.
- 17.17. All conduits transitioning from under to above ground and terminating at a combiner box or other raised equipment, shall have an expansion fitting installed at the point of transition.

- 17.18. Expansion fittings shall allow for up to 2" movement in either direction, shall be OZ Gedney type 'TX' for EMT and type 'AX' for IMC, or equal by Appleton or Crouse-Hinds or approved equal.
- 17.19. PVC conduit clamps 2" or smaller and rated for expansion shall be E978JC-CAR Snap Strap Double Mount Support Strap, or equal by Carlon or approved equal.
- 17.20. Completely install all conduit runs and backfill duct banks before pulling cable. Pull a flexible mandrel and brush through each conduit after installation. If wet, swab conduit interior before pulling cables.
- 17.21. Long, straight exposed conduit runs (100'±0" or more) shall have expansion fittings installed per NEC 2020 300.7(B). Expansion fittings shall also be used when conduit spans an expansion joint.
- 17.22. When transitioning conductors from free air to in conduit a fitting with sealant shall be used to prevent the entry of moisture.
- 17.23. Seal all conduits to prevent transmission of humid air between interior and exterior of equipment.
- 17.24. 1/4" foam wrap or other approved bond breaker shall be installed around conduit in areas where concrete is to be poured against it. The foam shall extend for the full depth of concrete.
- 17.25. Conduits stubbed up from below grade shall be in the appropriate locations and plumb.
- 17.26. Conduits stubbed up shall immediately be capped to prevent water entry during construction.
- 17.27. Tops of conduit shall be a minimum of 4" above the concrete pad or gravel bedding to prevent ingress of water.
- 17.28. Conduits in concrete pads shall be properly secured so they don't displace during pour.
- 17.29. Maintain all conduit entries to equipment within manufacturer's designated conduit entry space and arrange conduits to permit the most direct routing of cables to terminals and to allow adequate slack to accommodate the required bending radii, earth settling, disconnection, parking of MV elbow connectors.
- 17.30. All conduits stubbed into or otherwise entering equipment enclosures to be equipped with bushings or approved equal to prevent abrasion.
- 17.31. All conduit passing through fire-rated assemblies shall be sealed with a fire-rated, listed fire stopping product.
- 17.32. All conduit passing through water-tight assemblies shall be sealed with a listed waterproofing product.
- 17.33. All spare or empty conduits shall be provided with a nylon drag line, shall be capped on both ends, and labeled as spare.
- 17.34. All conduits and raceways inside buildings/interior locations shall be EMT.
- 17.35. All EMT fittings shall be steel compression type, not set screw type. Cast compression fitting shall not be used.
- 17.36. All raceway fittings in outdoor locations shall be rain-tight compression type, unless otherwise noted.

- 17.37. PVC installed in exposed exterior locations shall be marked from the manufacturer as UV resistant.
- 17.38. HDPE couplings with other types of conduit shall be listed for those conduit types.
- 17.39. PVC glue shall not be used for PVC to HDPE connections. Either epoxy or compression fittings shall be used.
- 17.40. Use Myers (or approved equal) hub for RMC to provide moisture protection for conduit entrances in all applicable locations.
- 17.41. Use a gasketed water tight PVC fitting with bell ends to provide moisture protection for conduit entrances in all applicable locations.
- 17.42. Medium voltage and PV output circuits cable installed in conduit shall use RMC or fiberglass sweeps at 90 degree bends closest to which it is being pulled.
- 17.43. RMC sweeps used less than 18" below grade, unless encased within at least 2" of concrete, shall be bonded according to NEC 2020 250.86.
- 17.44. Circuits routed in cable tray shall include dividers to separate AC, DC, and communications circuits from each other.

18. Enclosures

- 18.1. Enclosures must be installed at least 30 inches above the ground level or 24 inches above the Base-Flood Elevation, whichever of the two is higher.
- 18.2. NEMA 3 boxes must be equipped with a listed drain plug to enable water drainage. The installation must comply with the manufacturer's instructions.
- 18.3. NEMA 4 and 4X boxes do not require a weep hole or listed drain plug if the conduit is designed to prevent water from entering the enclosure.
- 18.4. All outdoor enclosures should be rated for outdoor use and installed with a drainage and ventilation system if applicable.
- 18.5. For low voltage AC electrical enclosures, fiberglass, powder-coated steel, or stainless steel shall be used. NEMA 3R rating is required for outdoor applications if mounted vertically, while NEMA 4 rating is required if mounted with access door/panel mounted out of vertical. However, if the project is identified as being in a highly corrosive environment, including nearby salt water and industrial sources, NEMA 4X rated equipment may be necessary.
- 18.6. In all bottom conduit entries to open cable compartments with cable terminations, 12 inches of Class 5 washed gravel drainage bedding must be provided.
- 18.7. Enclosures must be installed on a cross brace with at least two support members, or an exterior equipment cabinet wall approved by the owner.
- 18.8. Enclosures must be installed in a way that maintains their NEMA rating, including sealing any openings.
- 18.9. If DC and AC circuits are included in the same enclosure, they must be partitioned so that the respective circuits are completely isolated from each other. Communication circuits, except fiber optic circuits, should be separated as much as possible to minimize interference.
- 18.10. Enclosures must be designed and listed for their intended use, and they must have the appropriate current, voltage, and interrupt ratings for their application.

- 18.11. Doors or removable panels providing access to normally energized parts must be closed with a padlock or require tools for removal.
- 18.12. Any metal shavings resulting from site work must be cleaned from the interior of enclosures, the top surface of enclosures, the roof surface, and any additional areas where oxidation or conductive metal shavings could cause rust, electrical short circuits, or other damage.
- 18.13. All wireways must be rated NEMA 4 or higher and appropriately sized to route all anticipated cables.

19. Labels and Identification

- 19.1. The contractor is responsible for providing all necessary signs and labels in accordance with local AHJ, utility, OSHA, and NEC regulations, including but not limited to sections 690 and 705. The system must be labeled to comply with all applicable safety codes and requirements.
- 19.2. All equipment must have labels on the front exterior that correspond to the identification shown on the contract drawings.
- 19.3. All wires and cables must be labeled with wrap-around laminating vinyl machine printed ID labels or other approved methods that indicate their designation, source/destination, and polarity/phase.
- 19.4. All cables must be labeled at each end and splice location, and if possible, at an accessible point inside the equipment enclosure, with circuit and phase identification that corresponds to the contract drawings.
- 19.5. All signs must meet the requirements of ANSI Z535.1, .2, .3, .4, .5-2011, and comply with NESC rule 110A.1.A. All labeling and signage must be made of listed materials.
- 19.6. MV Cable labels must be visible from outside without requiring one to reach inside or move the cables, when the enclosure doors are open.
- 19.7. All equipment per drawings must have arc flash hazard warning labels that comply with ANSI Z535.4 and NFPA 70E. Labels must be applied on accessible doors or barriers of outdoor equipment.
- 19.8. All electrical equipment, panels, combiner boxes, and associated equipment must be clearly labeled with weatherproof, engraved nameplates that use Owner-specified naming conventions.
- 19.9. All labels must be applied in a way that allows them to be read without having to move equipment or cables.
- 19.10. For diagnostic and troubleshooting purposes, all cables must be uniquely tagged and identified with such tagging on the record construction drawings. These cables must have a label affixed to the outer jacket at each termination of type and format that are reasonably acceptable to Owner, meeting the minimum requirements above.
- 19.11. Engraved signs and appropriate warning labels must be provided, identifying that a photovoltaic system is in operation and that there may be multiple power sources on-site. Plaques or directories must be provided to show the locations of other service disconnecting means, where required by the local utility and/or NEC.

5 – Technical Specifications:
Foundation

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

**FOUNDATION TECHNICAL SPECIFICATIONS
 FOR THE
 GILLESPIE-B1.9 SOLAR UTILITY STATION**

REVISION	DESCRIPTION	DATE
0	ISSUED FOR BID	09/15/2023

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

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TECHNICAL SPECIFICATIONS

1.0 General

The Foundation Specifications and Drawings are complementary, each to the other.

The Contractor shall furnish and install the reinforced concrete foundations as shown on the drawings, complete with excavation, off-site disposal of excavated spoils, grading, backfilling, and compaction of all excavations to restore existing grade levels, foundation layout, concrete, rebar, tie wire, and forming materials.

The reinforced concrete foundations, footings, piers and pads shall be installed as indicated on the Drawings, and to undisturbed earth. Dimensions indicated for anchor bolt settings shall be checked against the manufacturer's erection drawings, structural steel and/or equipment to be installed prior to the construction of the formwork.

1.1. Special Conditions

The contractor is responsible to review and become familiar with the soil boring report supplied by McKim & Creed, Inc. for the **Gillespie-B1.9 Solar Utility Station, located in Fayetteville, North Carolina, Project No. P.0574167.R.TE**. The report will be delivered to bidders as an addendum to the bid package no later than September 29th, 2023.

1.2. Concrete

This section specifies the minimum materials, workmanship, and performance standards for cast-in-place concrete including reinforcing steel, forms, finishing, curing, and other associated work.

Cast-in-place concrete shall be in accordance with the latest applicable requirements of the ACI, ASTM, and CRSI, except as modified by these Specifications. For the purposes of mix design, cast-in-place concrete is considered to be of Exposure Category F2 as defined by ACI 318.

Requirements for Concrete By Exposure Class				
Exposure Class	Max w/cm	Minimum Compressive Strength	Air Content	Cement Type
F2	0.45	4,500	6 ± 1	I

**Source: ACI 318-11, Table 4.3.1

The Owner shall be informed at least 24 hours in advance of the times and places at which concrete will be placed.

1.3. Materials

1.3.1. Cement

Only one (1) brand of cement shall be used for exposed concrete. Cement reclaimed from cleaning bags or leaking containers shall not be used. Cement shall be used in the sequence of receipt of shipments, unless otherwise directed by the Engineer. Cement will be accepted on the basis of the manufacturer's mill certificate of compliance with the Specification requirements. Portland cement shall conform to the "Standard Specifications for Portland Cement", serial designation C150, Type I of the ASTM.

1.3.2. Cementitious Materials

Fly ash shall conform to the latest edition of ASTM C 618 and be of type Class F.

1.3.3. Fine Aggregate

Fine aggregate shall consist of washed natural siliceous sand, composed of clean, hard and durable grains, and shall be of a quality and gradation approved by the Engineer. Manufactured sand will not be accepted. All fine aggregate shall be free from injurious amounts of alkaline and organic impurities. Fine aggregate shall be graded from coarse to fine and shall conform to ASTM C33.

1.3.4. Coarse Aggregate

Coarse aggregate shall consist of crushed stone or other approved inert material with similar characteristics. It shall be clean, hard, durable, and free from injurious amounts of deleterious matter. Clay and shale particles shall not exceed 1 percent (1%). Course aggregate shall be graded from coarse to fine and shall conform to ASTM C33.

1.3.5. Water

Water shall be clean, fresh, and free from injurious amounts of mineral and organic substances. Iron in water shall not exceed 0.25 ppm.

1.3.6. Admixtures

All admixtures are to be supplied by a single approved manufacturer, such as: Master Builders, WR Grace & Co., or Sika Chemical. Admixtures shall conform to the following standards:

Water Reducing (plasticizer)	ASTM C494, Type A
Water Reducing and Retarding	ASTM C494, Type D
High Range Water Reducer	ASTM C494, Type F
High Range Water Reducer and Retarder	ASTM C494, Type G
Air-Entraining Agent	ASTM C260

1.3.7. Reinforcing Steel

- a. Reinforcing Bars - All reinforcing steel bars shall be of the deformed type conforming to the requirements of ASTM A615 or A706-Grade 60.
- b. Welded Wire Fabric – Welded wire fabric reinforcement used in slabs shall conform to the requirements of ASTM A1064. It shall be continuous, shall have joints lapped at least one full mesh, and shall be supported at proper elevations by standard accessories. Lapping of sheets shall be staggered to avoid continuous lap in either direction.
- c. Accessories – Accessories such as chairs, ties, bolsters, spacers, etc., shall be of suitable type, as approved, adequate to prevent displacement during construction.
- d. Mechanical Splices – Classified Type 2 in accordance with ACI 318-11 and approved by Engineer. Dayton/Richmond “Dowel Bar Splicer” or “Coupler Splice” system, Bar-Lock “Coupler Systems” or Barsplice Products.

1.3.8. Forms

Forms shall be made of rigid, straight, and uniform material that is free of injurious chemicals or organic matter.

Plywood	Product Standard PS1, waterproof, resin-bonded, exterior type Douglas fir; face adjacent to concrete Grade B plywood or better.
Metal	Of sufficient gauge to resist deformation.
Fiberboard	Fed Spec LLL-B-810, Type II; tempered, waterproof, screenback.
Lumber	Straight, uniform width and thickness, and free from knots, offsets, holes, dents, and other surface defects.
Chamfer strips	Clear pine, surface against concrete shall be planed.
Form coating	Nonstaining and nontoxic after 30 days, VOC compliant; Burke "Form Release (WB)," L&M Chemical "E Z Strip," Nox-Crete "Form Coating," or Symons "Thrift Kote E."
Polyethylene film	Fed Spec L-P-378D, Type I; 6 mil.

1.3.9. Finishing Compounds

Bonding compound	Epoxy - ASTM C881; Sika Chemical "Sikadur Hi-Mod"; or acceptable equal Latex - ASTM C1059; Dayton Acrylic Bonding Agent J40; or acceptable equal
Membrane Curing compound	ASTM C1315, Type I, Class A, maximum VOC 5.8 lb/gal (700 g/L), minimum 25 percent solids, acrylic, nonyellowing, unit moisture loss 0.40 kg/m ² maximum in 72 hours; L&M Chemical "Dress & Seal 30," Sonneborn "Kure-N-Seal 30," or Symons "Cure & Seal 30%."

1.4. Submittals

Three copies of all reports shall be submitted to the Owner and Engineer within fifteen (15) days of contract award and prior to any concreting operations. The Engineer will provide approval within ten days (10 days) of receipt of submittals. All submittals shall be provided to the Owner and Engineer as a single packet. A Submittal Log is provided in Appendix A.

1.4.1. Material Reports

The report should include the source and quality of concrete materials and the concrete proportions proposed for the work. Complete certified reports covering the materials and proportions proposed and tested in accordance with ACI 318 shall be submitted to the Owner and Engineer. Reports shall be prepared by an independent testing laboratory. Owner and Engineer review of these reports will be for general acceptability only; continued compliance with all contract provisions will be required.

Reports on cement shall include the type, brand, manufacturer, composition, and method of handling (sack or bulk).

Reports on admixtures shall include the ASTM C260 or ASTM C494 classification, brand, manufacturer, and active chemical ingredients. All admixtures shall be the products of one manufacturer.

Reports on aggregates shall include the source, type, gradation, deleterious substances, soundness, potential for harmful materials, and potential for alkali reactivity. The results of all tests and field service records to verify potential reactivity are required to verify compliance with ASTM C33, including Appendix XI.

A certification that the reinforcing steel furnished complies with the requirements specified in the section titled "Materials" shall be furnished to the Owner and Engineer. The certification shall be signed by the Contractor and the reinforcing steel fabricator.

1.4.2. Mix Design Reports

A tentative concrete mix shall be designed and tested for each size and gradation of aggregates and for each mix class specified. Mix Design Reports shall be provided to the Owner and Engineer for each mix class to be utilized in the project and intended use identified on each mix report. Design quantities and test results of each mix shall be submitted to Owner and Engineer for review. With Engineer's and/or Owner's approval, acceptable mixes may be field adjusted as necessary to meet the requirements of these Specifications.

The report for each tentative concrete mix submitted shall contain the following information:

- a. Intended use and placement method.
- b. Design Slump.
- c. Total gallons of water per cubic yard.
- d. Cement content.
- e. Cementitious materials content.
- f. Ratio of fine to total aggregates.
- g. Weight (surface dry) of each aggregate per cubic yard.
- h. Quantity of each admixture.
- i. Air content.
- j. Compressive strength based on 7 day and 28 day compression test.
- k. Times of initial set.
- l. Documentation of required average compressive strength or mix proportioning data per ACI 318.

Initial set tests shall be made at ambient temperatures of 70° F and 90° F to determine compliance with the initial set time specified hereinafter. The test at 70° F shall be made using concrete containing the specified plasticizing and air-entraining admixtures. The test at 90° F shall be made using concrete containing the specified plasticizing retarder and air-entraining admixtures. The initial set shall be determined in accordance with ASTM C403.

1.4.3. Mix Class

Each concrete mix class shall be designed and controlled within the limits specified in the following table:

Mix Class Table					
Coarse					
Usage	28 Day Strength (psi)	Nominal Maximum Aggregate Size No. 4 Sieve	Slump ± 1"	Min Cement (lb/cu yd)	Max Water/Cement Ratio
General Usage	4,500	1"	5"	535	0.45
Drilled Piers (dry, uncased, or permanent casing)	4,500	3/4"	5" ⁽¹⁾	560	0.45
Drilled Piers (temporary casing)	4,500	3/4"	7" ⁽¹⁾	560	0.45
Drilled Piers (slurry displacement)	4,500	3/4"	8" ⁽¹⁾	560	0.45
Underwater	5,000	3/4"	8"	658	0.41
Note: A plasticizer or plasticizing retarder shall be included in all general usage and drilled piers concrete mixes. High range water reducer (Type F or G) shall be included in all underwater mixes.					
(1) Slump requirement during placement with any admixtures.					

**Source: ACI 318-11, Table 4.3.1; ACI 336.1-01, Table 2.4.3; ACI 350-06, Table 4.1.2.1

Concrete shall not be deposited under water, except with specific permission of the Owner and Engineer.

1.5. Mix Requirements

The acceptability of concrete will be judged on compliance with the specified requirements listed in the Mix Class Table and not on the basis of strength alone.

1.5.1. Total Water Content

Total water content of concrete shall not exceed the amount calculated using the maximum water to cement ratio in the Mix Class Table.

1.5.2. Slump

Slump shall not be greater than that indicated in the Mix Class Table for each mix, unless otherwise authorized by the Owner.

1.5.3. Total Air Content

The total volumetric air content of concrete after placement shall be six percent plus or minus one percent (6% ± 1%).

1.5.4. Admixtures

The admixture content, batching method, and time of introduction to the mix shall be in accordance with the manufacturer's recommendations for compliance with these Specifications.

A plasticizing or plasticizing retarder admixture shall be included in all concrete, unless otherwise accepted by the Owner.

Plasticizing retarder admixture shall be adjusted as specified under the initial set.

1.5.5. Strength

The minimum 28 day acceptable compressive strength for each mix class as determined by ASTM C39 shall not be less than that indicated in the Mix Class Table.

All concrete shall exceed the specified minimum compressive strengths. Each test cylinder will be evaluated separately, and the Owner will be the sole judge of the validity and representative qualities of the tests.

In cases where the strength of the test cylinders for any portion of the work falls below the requirements specified herein, the Owner or Engineer may require the Contractor to secure test specimens of the hardened concrete represented by these cylinders. Specimens shall be secured and tested in accordance with ASTM C42 and shall have a minimum diameter of 3 inches.

Dependent upon the location of the concrete section in question, the Owner or Engineer may approve low frequency ultrasonic testing or other nondestructive techniques as an alternate to cone drilling and testing.

If the additional investigation verifies the existence of defective concrete, one of the following remedial actions shall be implemented as determined by the Owner:

- a. The Contractor shall assume the costs to remove and replace all defective concrete.
- b. The Contractor shall assume the cost of design and construction changes necessary to incorporate the inferior concrete.
- c. The Contractor shall provide satisfactory reimbursement or allowance to the Owner for the acceptance of the lower quality concrete.

1.5.6. Initial Set

The initial set as determined by ASTM C403 shall not be attained until at least 2.5 hours after the water and cement are added to the aggregates. The quantity of retarding admixture shall be adjusted as necessary to compensate for variations in temperature and job conditions.

1.6. Storage of Materials

Cement shall be stored in suitable moisture proof enclosures. Reclaimed cement or cement that has become caked or lumpy shall not be used.

Aggregates shall be stored so that segregation and the inclusion of foreign materials are prevented. The bottom 6 inches of aggregate piles that have been in contact with the ground shall not be used.

Reinforcing steel and embedments shall be carefully handled and stored on supports that will keep the steel from contact with the ground.

1.7. Batching and Mixing

Batching and mixing may be performed at the jobsite with suitable equipment, or by an acceptable ready-mix concrete supplier. Personnel performing the batching and mixing shall be qualified and experienced. Mixing and transporting concrete shall be in accordance with ASTM C94 unless otherwise indicated herein.

1.7.1. Batching

Aggregates and cement shall be measured by weight. Aggregate weights shall be adjusted for moisture content.

Each admixture shall be dispensed by a mechanical device that will ensure accurate and automatic measurement.

The minimum amount of water required to produce the desired slump shall be batched automatically. Any additional water required to produce and maintain a uniform slump shall be added manually by the mixer operator. Slump shall be kept uniform. Aggregates shall float uniformly throughout the mass and the concrete shall flow sluggishly when vibrated.

1.7.2. Mixing

Concrete shall be mixed in a rotating drum as specified in ASTM C94 until all ingredients are uniformly distributed throughout the batch. Mixers shall not be loaded in excess of their rated capacities. Each batch shall be completely discharged before the mixer is recharged.

1.7.3. Ready-Mix Concrete

Ready-mixed concrete shall conform to ASTM C94, except as otherwise specified herein.

Truck mixers shall be revolving drum type and shall be equipped with a mixing water tank. Only the prescribed amount of mixing water shall be placed in the tank for any one batch, unless the tank is equipped with a device by which the amount of water added to each batch can be readily verified by the Owner.

A delivery ticket shall be prepared for each load of ready-mixed concrete delivered. The truck operator shall hand a copy of each ticket to the Owner at the time of delivery. Tickets shall indicate the mix identification, the number of yards delivered, the quantities of each material in the batch, the outdoor temperature in the shade, the time at which the cement was added, and the numerical sequence of the delivery.

When a truck mixer or agitator is used for transporting concrete, the concrete shall be delivered to the jobsite and completely discharged within 90 minutes, or before the drum has revolved 300 revolutions, whichever comes first, after the introduction of the mixing water to the cement and aggregates, or the introduction of the cement to the aggregates. Longer time periods must be approved by the Engineer. In hot weather, or under conditions contributing to quick stiffening of the concrete, a time less than that specified above may be required by the Engineer. When a truck mixer is used for the complete mixing of the concrete, the mixing operation shall begin within 30 minutes after the cement has been mixed with the aggregates.

1.8. Placement Temperature

The temperature of concrete, when being placed, shall be checked in accordance with ASTM C1064 and be as follows:

- a. Not less than 40°F in moderate weather.
- b. Not less than 50°F in weather during which the mean daily temperature drops below 40°F.
- c. Not greater than 90°F during hot weather.

1.9. Hot Weather Concreting

Except as modified herein; hot weather concreting shall comply with ACI 305R. A water-reducing retarder shall be added to the concrete mix when the placement temperature of the concrete exceeds 75°F.

At air temperatures of 90°F or above, special procedures shall be applied to keep the concrete as cool as possible during placement and curing. The temperature of the concrete during placement shall not exceed 90°F.

1.10. Cold Weather Concreting

The conditions of cold weather concreting exist when the air temperature has fallen to, or is expected to fall below, 40°F during the protection period as described in Section 1.10.7 of this specification. Cold weather concreting shall comply with ACI 306R.

1.10.1. Embedments and Surfaces

All surfaces against which concrete is to be placed, including reinforcement, shall be free from snow, ice, and frost. All metallic items embedded in the concrete, including bars, need to be heated if the air temperature is below 10°F. Metallic embedments with a cross-sectional area great than 4 in.² should be heated above 32°F.

1.10.2. Subgrade Condition

Concrete shall not be placed against frozen base or subgrade. Provisions for heating the subgrade or base shall be the responsibility of the Contractor and should be sufficient to raise and maintain the temperature above 32°F.

Contractor shall limit surface temperatures of supporting materials beneath slabs-on-ground and the concrete to a temperature differential of less than 20°F.

1.10.3. Placement and Protection Temperature

The minimum temperature of concrete as placed and to be maintained after placement shall be as specified in Line 1 of the **Cold Weather Concrete Temperatures Table**.

Concrete temperatures for placement shall not be more than 20°F of that given in the **Cold Weather Concrete Temperatures Table**.

Methods for ensuring the placement and protection temperature such as concrete mixture acceleration, insulation, heat systems, enclosures, a combination of these practices, or other methods are the responsibility of the Contractor and shall be in accordance with ACI 306R.

1.10.4. Mixing Temperature

The minimum temperature of concrete at time of mixing shall be as specified in Lines 2, 3, and 4 of the Cold Weather Concrete Temperatures Table.

Concrete temperatures for mixing shall not be more than 15°F of that given in the **Cold Weather Concrete Temperatures Table**.

Methods for ensuring the mixing temperature such as heating mixing water, heating aggregates, or other methods, are the responsibility of the Contractor and shall be in accordance with ACI 306R.

Cold Weather Concrete Temperatures Table					
		Section size, minimum dimension			
		< 12 in.	12 to 36 in.	36 to 72 in.	> 72 in.
Line	Air Temp.	Minimum concrete temperature as placed and maintained			
1	-	55°F	50°F	45°F	40°F
		Minimum concrete temperature as mixed for indicated air temperature*			
2	Above 30°F	60°F	55°F	50°F	45°F
3	0 to 30°F	65°F	60°F	55°F	50°F
4	Below 0°F	70°F	65°F	60°F	55°F
5	-	Max allowable gradual temperature drop in first 24 hours after end of protection			
		50°F	40°F	30°F	20°F

*For colder weather, a greater margin in temperature is provided between concrete as mixed and required minimum temperature of fresh concrete in place.
Note 1: For Line 1, maximum placement temperature is minimum temperature in the table plus 20°F.
Note 2: For Lines 2-4, maximum temperature is minimum temperature in the table plus 15°F

*Source: ACI 306R-16 Cold Weather Concreting, Table 5.1-Recommended concrete temperatures.

1.10.5. Temperature Records

Contractor shall be responsible to provide a temperature measuring device at several points within enclosure and recording the temperature no less than twice per 24 hour period. For drilled piers only one measuring device at the edge is required.

The temperature measuring device shall left in place throughout the protection period.

Contractor shall record the maximum and minimum temperature readings in each 24-hour period and provide to the Engineer of Record.

1.10.6. Concrete Curing

Curing of concrete shall be in accordance with section 1.14 of this specification. If water curing is used, terminate use at least 24 hours before any anticipated exposure of the concrete to freezing temperatures.

1.10.7. Concrete Protection Duration

Concrete shall be protected, at a minimum, as described in the **Cold Weather Concrete Temperatures Table** from the effects of freezing-and-thawing cycles for durations as provided in the **Cold Weather Protection Period Table**.

The protection period of concrete shall extend until the concrete has reached a minimum compressive strength of 3,500 psi, if repeated cycles of freezing-and-thawing are expected prior to the concrete reaching the specified design strength.

1.11. Field Control Testing

The Contractor shall engage an independent professional testing agency and laboratory to provide all necessary equipment and personnel to perform all concrete testing at the Contractor's expense. The testing agency and laboratory must be approved by the Owner and Engineer, prior to commencing work. Personnel performing tests shall be certified ACI Grade 1 Concrete Field Testing Technician. Copies of the test results shall be sent directly from the testing agency to the Engineer for review. Structures or equipment shall not be placed on the foundations until acceptance of test results by the Engineer.

The frequency hereinafter specified for each field control test is a minimum. If directed

to do so by the Owner, any additional field control tests required shall be made.

1.11.1. Sampling

All concrete used for testing purposes shall be obtained in accordance with ASTM C172.

1.11.2. Slump

Consistency will be determined in the field by the slump test in accordance with ASTM C143. A minimum of one (1) slump test shall be performed on each load of concrete. If water is added at the job site to increase the slump, the recorded slump shall be tested after the addition of water. The specified slump for each class and usage of concrete can be found in the Mix Class Table.

1.11.3. Air Entrainment

Air entrained concrete shall be used in all applications where concrete will be exposed to moisture and cycles of freezing and thawing. Air content shall be determined in accordance with ASTM C231 or ASTM C173. A minimum of one (1) air entrainment test shall be performed for each batch of concrete used on the project and from which concrete compression test cylinders are made. The specified air content shall be between five and seven percent (5% and 7%).

1.11.4. Compression Test Cylinders

A set of compression test cylinders is required for each batch of concrete used on the project. Each set will consist of five (5), four inch by eight inch (4" x 8") compressive test cylinders prepared, cured, and delivered in accordance with ASTM C31. Each cylinder shall be labeled with the project name, date, and cylinder identification number. An information card or field report shall be completed for each set of cylinders and shall include the following:

- a. Date sampled
- b. Time batched
- c. Time sampled
- d. Ticket number
- e. Air temperature
- f. Concrete temperature
- g. Gallons of water added
- h. Specified 28-day strength
- i. Slump
- j. Air Content
- k. Admixtures
- l. Concrete mix identification
- m. Specific location of pour

The test cylinders shall be transported to a professional testing laboratory at least 8 hours after final set and within 20 to 24 hours from the time they were made. Transportation time of test cylinders shall not exceed 4 hours.

Testing of the cylinders shall be handled by the Contractor through a qualified testing laboratory in accordance with ASTM C39 in accordance with the following schedule:

- a. One (1) cylinder at seven (7) days
- b. Three (3) cylinders at twenty-eight (28) days
- c. One (1) cylinder reserved for a fifty-six (56) day test, if necessary

The Contractor shall require the laboratory to send three sets of compressive test reports to the Owner, in addition to those copies furnished to the Contractor. One (1) copy of the test reports shall be forwarded directly to the Engineer for review within two (2) working days after the tests are performed.

In the event a test fails to meet the specified compressive strength requirements, the Engineer may require the Contractor to obtain core samples of the hardened concrete in question. Core samples shall be secured and tested in accordance with ASTM C42 and shall have a minimum diameter of three inches (3"). If tests further substantiates that the concrete represented by the cylinders and core samples is below the strength requirements specified herein, the Engineer may order such concrete removed and replaced at the expense of the Contractor.

At the location of pole foundations one of the cylinders shall be taken from the concrete used in the top 5 feet of each pole foundation. Such cylinders shall be individually identified by pole number and tested prior to pole erection.

1.11.5. Test Reports

Certified reports of all tests made by the testing laboratory shall be promptly furnished to the Owner and Engineer, and all other persons designated by the Owner.

1.12. Compaction

The contractor shall engage an independent professional Geotechnical engineering firm to provide all necessary equipment and personnel to perform excavation inspections of foundation subgrade. If unsuitable material is encountered at the proposed subgrade elevation shown on the drawings, the contractor shall, under the direction of the geotechnical engineer, remove the unsuitable material and backfill with well compacted six inch (6") layers of stone or gravel base material, or concrete. Compacted sub grade shall be approved for 3,000 lbs per square foot bearing capacity by the Geotechnical engineer.

1.13. Protection Against Moisture Loss

Immediately after placing or finishing, concrete surfaces not covered by forms shall be protected against moisture loss (cured) for not less than seven (7) days by covering with white opaque polyethylene sheets lapped four inches (4") at edges and ends. Burlap may be used only for unexposed concrete surfaces and shall be in at least two (2) layers. Surface from which forms are removed before the curing period has elapsed shall be protected as specified for surfaces not covered by forms. All materials used for prevention of moisture loss shall be in accordance with ASTM C171.

1.14. Curing

Curing of concrete shall be by methods which will keep the concrete surfaces adequately wet during the specified curing period and in accordance with ACI 308R. Troweled surfaces shall be cured, except those which will receive a separate finish or coating, with the membrane curing compound specified in the article titled "Materials" in this section. Float finished surfaces shall be cured, except those which will receive a separate finish, with either the membrane curing compound specified or with water. Only water curing will be permitted on surfaces that will receive a separate finish or coating.

Water saturation of concrete surfaces shall begin as quickly as possible, but no later than 12 hours in dry weather and 24 hours in damp weather after initial set of the concrete. The rate of water application shall be regulated to provide complete surface coverage with a minimum of runoff. The application of water to formed surfaces may be interrupted for surface rubbing only over the areas being rubbed at the time. The concrete surface shall not be allowed to become dry during such interruption.

After rubbing has been completed, rubbed surfaces shall be covered with saturated burlap for the remainder of the curing period.

Membrane curing compound shall be applied within 30 minutes after final finishing of the surface. Membrane curing compound shall be spray applied at a coverage of not more than 300 square feet per gallon. Membrane curing shall not be used on surfaces that will be covered at a later date with grout, mortar, concrete, or other coating.

1.15. Protection

The Contractor shall protect all concrete against injury until final acceptance by Owner. The Contractor shall be prepared to protect all concrete in accordance with the requirements of this paragraph. Temperature shall be controlled by controlling the temperature of aggregate and mixing water. Mixing time shall be kept at a minimum and elapsed time between mixing and placing shall be minimized. The interior surfaces of forms and ground upon which concrete is to be placed shall be thoroughly wetted before concrete is poured. After the first frost and until the mean daily temperature in the vicinity of the work rises above 40°F for more than 1 day, the concrete shall be protected against freezing for not less than 72 hours after it is placed, using insulation material with or without supplementary heat in accordance with ACI 306R.

1.16. Earthwork

1.16.1. Surveying

Prior to commencing earthwork, the Owner shall provide staking at the site. This will include substation centerline, transmission line center line, including points of intersection (PIs) and line of sight points, and new structure pole and anchor locations. Excavation work shall not proceed until Owner approves staked structure locations.

The Contractor shall be responsible for all necessary environmental and roadway surveying necessary to complete the project. The Contractor shall perform all subsequent layout work necessary to ensure that the foundation is constructed to the correct dimensions and in the locations specified on the Drawings. If the Contractor finds that any staking has been disturbed, is missing or is in error, he shall notify the Engineer promptly. The Contractor shall exercise caution to protect all reference staking.

1.16.2. Subsurface Conditions

The Contractor shall familiarize himself with the subsurface conditions as shown on the boring logs, and exercise his own judgment as to the nature and difficulty of the proposed work. It should be noted in particular that the ground water level may change from the level existing at the time of the test borings.

1.16.3. Excavations

All excavation will be classified as “common excavation.” All excavation, including soft shale, gravel or other material, which can be moved by hand or

machine, is defined as common excavation. Owner shall be notified if excavated material is significantly different from that indicated in the soil borings. Excavation work shall include the removal and subsequent handling of all materials excavated or otherwise removed in performance of the contract work, regardless of the type, character, composition, or condition thereof. Over-excavation shall be backfilled with well compacted six inch (6") layers of stone or gravel base material, or concrete. If the over-excavation is unnecessary, the cost of the backfill shall be borne by the Contractor. The quality of the soil and the adequacy of its bearing value shall be decided by the Engineer before backfill or concrete is placed in any excavation. Where water is encountered, the excavation shall be kept dry by pumping during the installation of the structure and during the backfilling process. If unsuitable material is encountered at the proposed bearing surface under the concrete foundation, the Geotechnical Engineer may require further excavation to reach sound bearing. Proposed washed stone or no frost structural fill indicated under foundations is required as an integral part of the foundations. The dimensions indicated on the drawings are a minimum and required for adequate foundations. All existing underground pipes, conduits, drains, and other underground facilities uncovered or otherwise affected by the excavation work shall be located, protected, shored, braced, supported, and maintained.

Excavation for structures shall be performed according to lines and elevations indicated on the drawings and to the limits required to perform the line construction work. Machine excavation shall be controlled to prevent undercutting the proper subgrade elevations. Machine excavation shall not be used within 5 feet of existing permanent structures and facilities. Only hand tools shall be used for excavation around existing permanent structures and facilities.

Work shall be performed so that construction areas will be as free as possible from obstructions and from interference with the transportation, storage, or handling of materials. Excavated materials free of trash, rocks, roots, and other foreign materials, and that meet the specified requirements, may be used as required for backfills constructed under these Specifications.

Excavations shall be maintained in a safe, clean, and sound condition up to the time of placement of concrete. All excavations shall be suitably protected when not attended. Whenever necessary, the Contractor shall re-excavate materials which have accumulated in previously prepared excavations. Any muck or other unsatisfactory bearing material resulting from frost, action or entrance of water into excavations previously prepared to the required bearing shall be removed and replaced with well-compacted stone or gravel, backfill or concrete at the Contractor's expense.

Subgrades for structures shall be firm, dense, and thoroughly compacted and consolidated; shall be free from mud and muck; and shall be sufficiently stable to remain firm and intact under the feet of the workers.

Subgrades that are otherwise solid but become mucky on top due to construction operations shall be reinforced with one or more layers of crushed rock or gravel subgrades.

The finished elevation of stabilized structure subgrades shall not be above the subgrade elevations indicated on the drawings.

1.16.4. Backfill (Other than subgrade)

Material for backfill shall be composed of earth free of wood, grass, roots, broken concrete, large stones, trash, or debris of any kind.

A Standard Proctor Compaction Test shall be performed on the proposed backfill material samples. The samples should be tested to determine the maximum, dry density, optimum moisture content and natural moisture content. These test results are to be used to ensure proper compaction during backfilling procedures.

All fill material shall be placed in lifts not to exceed eight inches (8") in uncompacted thickness and be free of all organic material. Fill shall not be placed in heavy rain or placed on frozen ground. Frozen material shall not be used as backfill.

Field compaction tests shall be taken by the approved geotechnical engineer from each fill volume measuring 2,000 feet² maximum by twelve inches (12") deep. If testing results indicate that compaction does not meet specified requirements, fill materials shall be removed, replaced as required, and compacted and retested until acceptable.

All fill areas shall be compacted to at least ninety-five percent (95%) of the Standard Proctor maximum dry density.

1.16.5. Rock Excavation

The Contractor shall be responsible for the removal and proper disposal of solid rock when encountered in holes for concrete foundations. Solid rock shall be defined as solid, naturally-occurring mineral formations that cannot be effectively removed by conventional trenchers, backhoes, or pressure augers. Loose rock or limestone in intermittent layers that result in "difficult digging" shall not be defined as solid rock excavations. "Solid rock" shall require the use of air hammers, blasting or other specialized equipment (Note: Blasting must be approved by the Owner or Engineer in accordance with local ordinances). When solid rock, boulders, or detached stones are encountered and cannot be removed by normal power-driven drills or augers, the Owner shall be notified. Rock excavation techniques shall be used to achieve the desired excavated dimensions. Rock excavation shall consist of igneous, metamorphic, and sedimentary stones, each having a volume of 1/2 cubic yard or more, as determined by physical or visual measurements and approved by Owner.

If rock is encountered, it shall be removed and replaced with suitable materials in such a manner as to provide fully compacted earth in all areas disturbed external to foundations. In the event that rock is encountered in the excavation, the Contractor shall be compensated for such rock removal, based upon unit price as set forth by the Contractor in the Form of Proposal. In the event such rock is encountered, it shall be the duty of the Contractor to notify the Engineer and/or Owner and arrange a meeting to agree upon the approximate total cost for the removal of the rock, prior to any removal of the rock. Quantities will be agreed upon jointly by the Contractor and the Owner (or Engineer) as excavations occur. Over-excavation to remove rock will not be counted in the quantity of rock excavations.

An accurate record shall be kept of the dates and amounts of rock excavation at each location. The Owner will authorize payment for rock excavation at each

location by signing the Contractor's record as excavations occur. Payment will be on a cubic yard basis as measured in place in the hole requiring rock excavation. This measurement will be based on the foundation excavation or normal trench width and depth, as if no rock were encountered.

In cases where the extent of rock excavation is questioned, the Engineer and/or Owner may require the Contractor to prove that material should be classified as rock excavation. The Contractor shall provide a demonstration that the material cannot be removed with a backhoe equipped with a minimum one-half (1/2) cubic yard heavy-duty trenching bucket placed on a machine capable of a lifting capacity of 7,500 pounds at a trench depth of ten feet (10'). The Contractor may be required to provide equipment specification data verifying that the above minimum-rated equipment will be used for demonstration purposes. The equipment is to be in good repair and in proper working condition.

1.16.6. Blasting

Blasting or other use of explosives will not be permitted without Owner's approval.

1.16.7. Sheeting and Shoring

The Contractor shall do all bracing, sheeting, and shoring necessary to perform and protect all excavations as required for safety and to conform to laws and regulations of all governmental bodies having jurisdiction. When sheeting is used, it shall be removed during or upon completion of backfilling.

The stability of previously constructed structures and facilities shall not be impaired or endangered by new excavation work. Previously constructed structures and facilities include those existing when this construction begins and those provided under these Specifications.

Adequate sheeting and shoring shall be provided as required to protect and maintain the stability of previously constructed structures and facilities and the sides of excavations until they are backfilled. Sheeting, bracing, and shoring shall be designed and built to withstand all loads that might be caused by earth movement or pressure. Sheeting and shoring shall maintain the shape of the excavation under all circumstances.

2.0 **Slabs on Grade and Mat Foundations**

2.1. General

This section covers general installation of concrete slabs on grade, mat foundations, and vertical surfaces; formwork; testing of concrete for slabs on grade and mat foundations; and other appurtenant work. All work shall be in accordance with the Plans, Specifications, and Assembly Drawings.

2.2. Concrete

The Contractor shall supply ready mixed concrete prepared in accordance with ASTM C94, "Standard Specification for Ready-Mixed Concrete" with a minimum compressive strength of 4,500 psi at twenty-eight (28) days when tested in accordance with ASTM C39. Concrete shall conform to specifications in Mix Class Table. Air content for concrete in slabs on grade and mat foundations shall be six percent plus or minus one percent ($6\% \pm 1\%$).

2.3. Subgrade

The subgrade shall be brought to an even plane and compacted solid. Washed stone or no frost structural fill shall be installed, at a minimum, as indicated on the drawings and properly compacted. All slabs on grade and mat foundations shall be placed on a minimum six inch (6") thick layer of compacted washed stone. An independent professional Geotechnical engineering firm shall inspect all subgrades for adequate bearing capacity as specified on the Foundation Drawings.

2.4. Formwork

Forms shall be constructed to the shape, form, line, and grade required and shall be maintained sufficiently rigid to prevent deformation under the load imposed by supported inserts or by wet concrete. The top edges of forms shall be finished to a specified elevation, slope, or contour. They shall be brought to a true line and grade so that the top concrete surface can be finished with a screed or template resting on the top edges of the forms.

Design and construction tolerances shall be in accordance with ACI 117. Forms shall be designed and constructed in proper position and accurate alignment. Formed surfaces exposed to view shall have a Class C finish, and concealed surfaces may have a Class D finish as defined by ACI 301.

Concrete shall be placed against job-built plywood forms or forms that are lined with plywood or fiberboard, except as otherwise specified. At Owner's discretion, prefabricated forms or metal frames may be permitted only for surfaces that are not normally exposed to view when construction has been completed. Plywood and fiberboard shall be new when brought to the construction site and shall be properly coated, protected, and maintained throughout its use. All plywood and fiberboard materials that are damaged, cracked, weathered, or otherwise unsuitable, in the Owner's opinion, for producing smooth, uniformly textured formed surfaces will be rejected as form material.

Vertical surfaces of footings extended above grade shall be formed.

Form ties shall be of the removable end, permanently embedded body type, and shall have sufficient strength, stiffness, and rigidity to support and maintain the form in proper position and alignment without the use of auxiliary spreaders. Outer ends of the permanently embedded portions of form ties shall be at least 1 inch back from adjacent outer concrete faces. Permanently embedded portions of form ties that are not provided with threaded ends shall be constructed so that the removable ends can be broken off by twisting, without chipping or spalling the concrete surface. The type of form ties used shall be acceptable to the Owner.

Form ties shall be uniformly spaced in exposed surfaces and aligned in horizontal and vertical rows.

After removal of form ties, the resulting voids in the outer concrete face shall be filled with grout and finish flush with surface of concrete.

Chamfer strips shall be placed in forms to bevel all salient edges and corners except edges which are to be buried and edges which are indicated on the drawings as requiring special treatment. Foundations shall have formed beveled salient edges for all vertical and horizontal corners unless specifically indicated otherwise on the drawings. Bevel dimensions shall be 3/4 by 3/4 inch unless indicated otherwise on the drawings.

2.4.1. Coating

Forms shall be coated with form oil before reinforcement is placed.

2.4.2. Removal

Forms shall not be removed until permission of the Engineer has been obtained.

2.5. Expansion Joints

Expansion joints and joints between slabs and vertical surfaces shall be installed according to the Drawings. Premolded fibrated asphalt expansion joint material shall be in accordance with ASTM 1751 and shall be one-half inch (1/2") wide and extend from the bottom of the slab to one half inch (1/2") from the top of the slab. The premolded fibrated asphalt expansion joint material shall then be covered by a one-half inch (1/2") wide strip of polyethylene bond breaker tape. The tape shall be installed along the top of the asphalt expansion joint material only and not on the vertical walls of the slabs. The polyethylene bond breaker tape shall then be covered with one-half inch (1/2") wide by one-half inch (1/2") thick by required length of Vulkem #45 polyurethane sealant for horizontal joints and Dymonic FC Polyurethane sealant for vertical joints according to the manufacturer's installation guidelines.

2.6. Construction Joints

Construction joints not indicated on the Drawings shall be so made and located as to least impair the strength of the structure. Where a joint is to be made, the surface of the placed concrete shall be thoroughly wetted and slushed with a coat of neat cement grout immediately before placing the new concrete. All laitance shall first be removed from the placed concrete.

2.7. Reinforcement

Reinforcements shall be accurately formed. Unless otherwise indicated on the drawings or specified herein, the details of fabrication shall conform to ACI 318.

All bar supports, ties, spacers, bolsters, inserts, screeds, and other concrete accessories required shall be provided to maintain reinforcing in its proper position and permit proper placement of concrete.

Responsibility for the design of all bar support systems shall be assumed by the contractor.

Except where indicated on the drawings, welding of reinforcement for any purpose, and tack welding in particular, is expressly prohibited. Reinforcements upon which unauthorized welding has been performed will be presumed to be damaged and such reinforcing shall be removed and replaced at Contractor's expense. Replacement materials shall conform to all applicable requirements of these specifications.

Welded chairs and supports may be used provided they are clamped or wired to the reinforcement.

Except as otherwise indicated on the drawings, metal reinforcement for concrete shall have the concrete protective cover specified in Chapter 7 of ACI 318.

Steel reinforcing bars shall be placed in the concrete wherever shown on the drawings. Unless otherwise shown on the drawings or directed, measurements made in placing the bars shall be to the center lines of the bars. Before the reinforcing bars are placed, the surfaces of the bars and the surfaces of any metal bar supports shall be cleaned of heavy flaky rust, loose mill scale, dirt, grease, or other foreign substances. After being placed,

the reinforcing bars shall be maintained in a clean condition until they are completely embedded in the concrete. Main reinforcement shall have a minimum clear protective cover to the surface of the concrete as shown on the drawings. Reinforcing bars shall be accurately placed and secured in position so that they will not be displaced during the placing of the concrete, and special care shall be exercised to prevent any disturbance of the reinforcing bars in concrete that already has been placed. Rustproof metal chairs, metal hangers, metal spacers, or other satisfactory metal supports may be used for supporting reinforcing bars. No metallic reinforcement supports will be allowed to break the plane at the edge of concrete. Precast concrete blocks may be used for supporting reinforcing bars.

With the exception of lapped portions of spliced bars that are wired or clamped together, the clear distance between parallel bars shall be not less than 1.5 times the maximum size of coarse aggregate in the concrete, or less than 2 inches.

Unless otherwise required by the Specifications or drawings, splices shall conform to ACI 318. Splices shall be Class B tension-lapped splices unless a different class is indicated on the drawings.

Splices shall not be used in regions of maximum bending stress. Welded splices shall not be used.

Mechanical splices are acceptable if approved by the Owner.

All reinforcement shall be shop bent cold. No field bends in reinforcement will be permitted.

2.8. Installation of Anchorage Items

Anchorage items, including bolts, dowels, and other similar devices, shall be of sufficient number and size and so located to ensure anchorage sufficient for the purpose intended. Anchorage items shall be checked against equipment base plates and Drawings prior to placing of concrete.

Anchor bolts shall be securely fastened in a template in the dimensions / orientation / spacings to match the structural steel base plate as shown on the Drawings. The template shall be secured to support the anchor bolts independent of the concrete being placed and cast in place during the concrete placement around the anchor bolts to ensure the proper bonding to the concrete.

In the event the anchor bolts are installed and require re-alignment and/or spacing correction, the Contractor shall contact the Owner and Engineer promptly for permission to proceed prior to any realignment methods. Anchor bolt projection shall be installed per the dimensions as shown on the detail drawings.

2.9. Placing

Water shall be removed from excavations before concrete is deposited. Hardened concrete, debris, and other foreign materials shall be removed from the interior of forms and from the inside of mixing and conveying equipment; reinforcement secured in position will be subject to inspection and approval by the Engineer. Runways for buggies or wheelbarrows shall not be supported on reinforcement or formwork

Concrete shall be conveyed from mixer to forms as rapidly as practicable without segregation or loss of ingredients. Concrete shall be deposited in its final position without moving it laterally in the forms for a distance greater than 5 feet.

Concrete having attained its initial set or having contained its water content for more than

one and one half (1 ½) hours shall not be used in the work. Concrete shall not be dropped freely more than five feet (5') in unexposed work nor more than three feet (3') in exposed work. Unless approved by the Engineer, concrete shall be mixed and placed only when the temperature is at least 40°F; concrete footings shall be placed upon surfaces free from frost, ice, mud, loose or unsound rock, and other detrimental substances.

All concrete shall be thoroughly vibrated with appropriate vibrating equipment while concrete is being placed. Settling concrete with shovels only will not be accepted. Vibrators shall not be used as a method to move concrete laterally.

Concrete shall be deposited to the required thickness and finished monolithically to a smooth, level surface by floating and troweling.

2.10. Bonding and Grouting

Before depositing new concrete on or against concrete that has set, the existing surfaces shall be roughened and cleaned. Horizontal construction joints shall be given a brush coat of grout consisting of cement and fine aggregate in the same proportion as the concrete to be placed, following by approximately three inches (3") of concrete of regular mix, except that the proportion of coarse aggregate shall be reduced fifty percent (50%). Grout for setting bearing plates and other items shall be composed of equal parts of sand and Portland Cement.

2.11. Finishes of Concrete Other Than Floors and Slabs

Slight honeycomb and minor defects shall be patched with cement mortar made with one (1) part cement and two (2) parts fine aggregate. Exposed surfaces shall be given a rubbed finish. Fins and other projections shall be carefully removed, offsets leveled, and surface damage repaired. The surfaces then shall be rubbed with cement or carborundum bricks and water, leaving the surface uniformly smooth and clean. Projecting ends of all form ties shall be removed and recessed a minimum of 1 inch. The resulting recesses shall be cleaned, wetted, and filled with patching mortar.

No surface treatment will be required for buried or permanently submerged concrete not forming an integral part of a structure except that required to obtain the surface elevations or contours and surfaces free of laitance. The unformed surfaces of all other concrete shall be screeded and given an initial float finish, followed by additional floating and troweling where required.

Float finished surfaces shall be finished to provide a flat profile per ACI 347 Class C Finishing.

Screeding shall provide a concrete surface conforming to the proper elevation and contour with all aggregates completely embedded in adjacent mortar. Surface irregularities in screeded surfaces shall be limited as required to produce finished surfaces within the tolerances specified. If no further finishing is required, surface irregularities shall not exceed ACI 347 Class C.

Screeded surfaces shall be given an initial float finish as soon as the concrete has stiffened sufficiently for proper working. Any piece of coarse aggregate that may be disturbed by the float or that causes a surface irregularity shall be removed and replaced with mortar. Initial floating shall produce a surface of uniform texture and appearance with no unnecessary working of the surface with the float.

The initial floating shall be followed with a second floating at the time of initial set. The second floating shall produce a smooth, uniform, and workmanlike float finish of uniform

texture and color. Unless additional finishing is specifically required, the completed finish for all unformed surfaces shall be a float finish as produced by the second floating.

Floating shall be performed with hand floats or suitable mechanical compactor floats.

Any surfaces designated on the drawings to be troweled shall be steel trowel finished. Troweling shall be performed after the second floating when the surface has hardened sufficiently to prevent an excess of fines being drawn to the surface. Troweling shall produce a dense, smooth, uniform surface free from blemishes and trowel marks.

2.12. Clean-Up

All forms shall be completely removed. All materials, equipment, and rubbish shall be removed, and the premises left in a neat condition.

3.0 **Drilled Cylindrical Foundations**

3.1. General

This section covers general requirements for the installation of drilled cylindrical foundations and other appurtenant work. All work shall be in accordance with the Plans, Specifications, Plan & Profile Sheets, and Assembly Drawings. Work shall conform to all requirements of ACI 336.1-01 published by the American Concrete Institute, except as modified by these Contract Documents.

3.2. Concrete

The Contractor shall supply ready mixed concrete prepared in accordance with ASTM C94, "Standard Specification for Ready-Mixed Concrete" with a minimum compressive strength of 4,500 psi for surface mounted structures and 3,000 psi for direct embedded structures at twenty-eight (28) days when tested in accordance with ASTM C39. Concrete shall conform to specifications in Mix Class Table. Air content shall be six percent plus or minus one percent ($6\% \pm 1\%$).

3.3. Excavations

The diameter and depth of each hole shall be as required for structures to be placed according to the Plans and Drawings. Holes shall be drilled with such types of drilling equipment that will produce the excavation shown on the drawings. Drill rigs, which do not run true, will not be acceptable.

Holes for direct embedded structures shall be as required for compaction of backfill around the pole but shall not be less than the pole diameter at the butt plus 12 inches.

Holes for caissons shall be as shown on the Plans and Drawings. The depth noted on the drawings is to be considered minimum. If unsuitable materials affecting required bearing value are encountered, the excavation shall be continued to whatever depth is necessary to obtain suitable material per the approval of the geotechnical engineer on site. When depth required by the Owner is greater than depth shown on the drawings, the neat line excavation and volume of reinforced concrete to fill it will be paid for by the Owner.

Hole excavation shall include removal of stumps, roots, and other obstructions necessary to provide a clean vertical hole to the depth specified on the drawings. Excavation shall be performed with a power driven auger. As soon as the auger is withdrawn, any direct embedded structures shall be set to the depth specified on the drawings and in accordance with these specifications.

Excavated holes shall be covered and protected when the associated structures will not be set during the same working day.

Holes may be excavated by the drilling and mud slurry technique. Prior to start of construction, Owner's approval shall be submitted for a drilling mud procedure for wet hole excavation when sufficient side wall pressure cannot be obtained by use of water void of additives. Drilling mud shall be Super Mud manufactured by Polymer Drilling Systems or acceptable equal. Drilling mud shall be mixed in accordance with manufacturer's recommendations and to the proper consistency for maintaining the sides of the hole. With the Owner's approval, attapulgitic clay type drilling mud may be substituted for Super Mud on holes where Super Mud will not provide sufficient side wall pressure to maintain the sides of the hole excavation.

Under no circumstances can bentonitic or kaolinitic clay products be used.

3.4. Removal of Water

Adequate dewatering equipment shall be provided and maintained to remove and dispose of all surface and groundwater entering excavations and other parts of the work. Each excavation shall be kept dry during subgrade preparation and continually thereafter until construction to be provided therein is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result. Disposal of water shall be in accordance with federal, state, and local regulations.

If infiltration of groundwater exceeds a rise of one-quarter inch (1/4") per minute or the total height of water in the bottom of the pier exceeds two inches (2"), the pier shall be considered a wet pier and wet pier concrete placement methods shall be used. Wet pier placement methods shall be approved by the Engineer and Owner, prior to the commencement of work.

3.5. Temporary Casing

Temporary casing will be required at all excavations where workmen are required to do hand excavation or remove obstructions in the lower portions of the caissons or to re-clean the bottoms of caissons prior to the placement of concrete. Temporary casings will also be required at locations where the soil will not stand without support or where, because of ground water or soil conditions, sloughing of the sides of caissons may seriously delay or endanger the satisfactory completion of excavation and placement of concrete. The Contractor shall have immediately available for use on the job an ample supply of casing for each size that will be required for use in the caissons and shall provide additional amounts, if required, to ensure orderly progress of the job. Such casing may be in short pieces but with jointing pieces of sufficient strength that assembled sections of casing may be pulled complete as concrete is placed or immediately thereafter. The casing shall also be of such strength and rigidity as to maintain the required excavation lines against the pressure of sloughing material from the sides of the caissons. All temporary casing shall be removed from caissons as concrete is placed or immediately thereafter, and in such a manner as to prevent sloughing material from dropping to the bottoms of caissons, falling on top of freshly placed concrete or intruding into the concrete mass.

Permanent casing will not be permitted except by special permission of the Owner or as shown on the drawings.

3.6. Permanent Casing

Smooth wall metal pipe casing shall be installed as indicated on the drawings or as permitted by special permission of the Owner.

The casing shall not extend more than 6 inches below the top of the hole. Any part of the

casing extending above this elevation shall be cut off. Casings shall be installed as drilling proceeds or immediately after the auger is withdrawn as required to prevent sloughing or caving of the excavation walls.

3.7. Dimensional Tolerances

The location and dimensions of the drilled caisson shall be as exact as possible to the locations shown on the drawings and staked in the field. The maximum allowable tolerance will be as follows.

Top of the drilled caisson shall be set to the elevation shown on drawings, except where otherwise directed by the Owner or Engineer.

The variation in elevation of the bottom of the drilled caisson from the specified depth shall be from 0 to +6 inches, except where required to be deeper due to soil conditions.

Maximum deviation of the axis of the hole from the vertical shall be no more than 1 inch in 8 feet.

The diameter of any drilled caisson shall not be less than specified or more than 4 inches greater than specified.

3.8. Pier Installation Record

Accurate pier installation records shall be maintained and shall contain the following information for each pier:

- a. Contractor's name.
- b. Drill rig operator's name.
- c. Location/Structure Number.
- d. Shaft diameter.
- e. Elevation of shaft above grade.
- f. Depth of rock.
- g. Depth of shaft.
- h. Depth of ground water.
- i. Caving or sloughing of excavation.
- j. Drilling difficulties.
- k. Casing insertion, size and length, and whether or not removed.
- l. Date and time of start and finish excavation.
- m. Length and diameter of reinforcing bar cage.
- n. Date and time concrete placed.
- o. Calculated volume of excavation based on diameter of shaft.
- p. Total quantity of concrete placed.
- q. Test Cylinder Numbers in order of placement in foundation (bottom to top)

3.9. Reinforcement

Steel reinforcing bars shall be placed in the concrete wherever shown on the drawings. Unless otherwise shown on the drawings or directed, measurements made in placing the bars shall be to the center lines of the bars. Before the reinforcing bars are placed, the surfaces of the bars and the surfaces of any metal bar supports shall be cleaned of heavy flaky rust, loose mill scale, dirt, grease, or other foreign substances. After being placed, the reinforcing bars shall be maintained in a clean condition until they are completely embedded in the concrete. Main reinforcement shall have a minimum clear protective cover to the surface of the concrete as shown on the drawings. Reinforcing bars shall be accurately placed and secured in position so that they will not be displaced during the

placing of the concrete, and special care shall be exercised to prevent any disturbance of the reinforcing bars in concrete that already has been placed.

All reinforcement shall be shop bent cold. No field bends in reinforcement will be permitted.

3.10. Concrete Placement General

The handling, depositing, and compacting of concrete shall conform to these Specifications subject to adjustment by the Owner for weather or placement conditions.

Concrete shall not be pumped through aluminum pipe or aluminum alloy pipe.

Before concrete is placed, forms and anchor bolts shall be rigidly secured in their proper position; all dirt, mud, water, and debris removed from the space to be occupied by the concrete; and all surfaces cleaned that may have become encrusted with dried mortar or concrete from previous placement operations. The entire installation shall be acceptable to the Owner.

Anchorage items shall be checked against equipment base plates and Drawings prior to placing of concrete. In the event the anchor bolts are installed and require re-alignment and/or spacing correction, the Contractor shall contact the Owner and Engineer promptly for permission to proceed prior to any realignment methods. Anchor bolt projection shall be installed per the dimensions as shown on the detail drawings.

Cold joints are not allowed unless specifically approved by the Owner and Engineer. When a cold joint is approved the surface of hardened concrete upon which fresh concrete is to be placed shall be rough and clean. An epoxy bonding compound shall be applied in accordance with the manufacturer's recommendation.

Concrete shall be brought to the point of final deposit by methods that prevent the separation or loss of the ingredients. Concrete shall not be allowed to free fall, uncontrolled, more than 5 feet. Concrete shall be deposited in its final position without moving it laterally in the forms for a distance greater than 5 feet.

3.11. Concrete Placement – Dry Hole

Concrete shall be placed in the drilled caisson as soon after excavation as possible. Immediately prior to the placement of concrete, the caisson shall be cleaned of water, debris, or other materials harmful to concrete including ice, clods, and piles of loose earth. Surfaces against which concrete is being placed shall be free of frost, and in cold weather shall be enclosed or heated, if necessary, prior to placing concrete to ensure this requirement is met. Water in bottom of caissons must be removed or absorbed. Equipment shall include a pump and two vibrators in good working condition, hoppers and elephant trunks for directing the flow of concrete down the caissons, and an ample supply of sacked cement for use in drying the bottom of caissons. The Contractor shall not place any concrete until the excavation and embedded items are checked and approved by the Owner or Engineer. In a drilled caisson where the Contractor can free fall the concrete down the center of the caisson without having the concrete come in contact with the embedded items, which may cause segregation of the aggregate, the Contractor may place the concrete with the use of an elephant trunk or drop chutes and shall use vibrators. The maximum free fall distance shall be no more than 5 feet. If the Owner or Engineer sees the above method cannot be implemented, then the Contractor shall place the concrete for the first lift using hoppers and sections of elephant trunk or drop chutes. Normal procedure expected to be followed by the Contractor will be to place the concrete to an elevation approximately 5 feet above the bottom of the caissons

and vibrate this deposit with one pass of the vibrator down to the bottom of the caisson and back to the top of concrete. Following this, the remainder of the concrete may be poured in two or more lifts of equal height with one pass of the vibrator down to the bottom of the lift and back up on each lift. In placing concrete, internally operated vibrators of a minimum diameter of 2-1/4 inches and having a speed of 5,000 rpm or more are to be used. On the upper lifts of the piles, elephant trunks will not be required, but the placing of the concrete shall be done in such a manner as to prevent segregation of the aggregates.

3.12. Concrete Placement – Wet Hole

Where sufficient groundwater is encountered during excavation to result in standing water in the caisson, the Contractor shall provide pumps with sumps just large enough for pump sections or special pumps, which can extract water from the bottom of the caisson without the requirement of a sump. Immediately prior to the start of the concrete placement, water shall be pumped from the caisson to the elevation of the bottom of the caisson or, if a sump is used, leaving a depth of water not exceeding 4 inches in the sump. The use of dry cement to “dry up” the water left in the sump will then be permissible provided the rate of inflow is sufficiently slow to permit placement of concrete without increasing the water-cement ratio. To follow this procedure, the Contractor must have dry cement ready to place into the caisson immediately after pumping is terminated and also have adequate concrete at the site. If, in the opinion of the Owner or Engineer, the rate of inflow of ground water is too great to obtain concrete of acceptable quality, it will be necessary for the Contractor to place concrete using the tremie method.

3.13. Concrete Placement – Tremie Method

Where the inflow of water into a caisson is too rapid to permit placement of concrete in the dry, the Contractor shall place the concrete underwater by the tremie method. In such cases, a special mix of concrete will be required with coarse aggregate (gravel), 3/4 inch maximum size, and a minimum of seven bags of cement per yard. A retarding agent, approved by the Owner and Engineer, may be used. No vibration of the tremie concrete will be required or permitted, but it will be permissible to vibrate the tremie pipe under certain conditions when the flow of concrete becomes sluggish, and it will also be permissible to vibrate the casing, if used, when the caisson is filled with concrete at the time the casing pull is started. The tremie pipe shall have the minimum diameter of 8 inches and shall be equipped with a foot valve or gate at the bottom end, which is watertight and can be positively controlled from the ground surface. If joints are required in the tremie pipe, they shall be watertight. The entire assembly shall be watertight, and under no circumstances will concrete be permitted to flow through water in the tremie. In placing concrete, the lower end of the tremie shall be placed as close to the bottom as possible and no more than 6 inches to the bottom of the caisson and shall not be raised until a seal has been established between the tremie pipe and the concrete sufficient to prevent entry of water into the tremie. The discharge end of the tremie shall be kept submerged in the concrete a sufficient depth to maintain, at all times, an adequate seal during underwater placement. The placing of concrete by tremie in any caisson shall not be started until a sufficient supply of concrete is at the site to complete placing of

concrete in the caisson up to the ground surface. Once started, the underwater placement shall proceed without interruption until the top of the concrete has been brought to the above-mentioned elevation. As soon as the level of concrete has reached the above-mentioned level over the tremie pipe, the Contractor shall remove the water being displaced by the concrete. Concrete may be placed by tremie only when authorized by the Owner or Engineer.

3.14. Consolidation

During and immediately after depositing, concrete shall be consolidated thoroughly and worked around reinforcements, embedments, and into the corners of the forms.

Concrete shall be consolidated by means of mechanical vibrating equipment supplemented by hand rodding, spading, and/or tamping. Unless otherwise accepted by the Owner, mechanical vibrators shall be spud type immersion vibrators which will maintain at least 9,000 cycles per minute when immersed in concrete. The number and type of vibrators shall be subject to the acceptance of the Owner.

The vibrator shall be constantly relocated and placed in each location only once for each lift. Lower lifts shall be vibrated with the one immediately above it.

3.15. Finishes of Concrete Other Than Floors and Slabs

Slight honeycomb and minor defects shall be patched with cement mortar made with one (1) part cement and two (2) parts fine aggregate. Exposed surfaces shall be given a rubbed finish. Fins and other projections shall be carefully removed, offsets leveled, and surface damage repaired. The surfaces then shall be rubbed with cement or carborundum bricks and water, leaving the surface uniformly smooth and clean. Projecting ends of all form ties shall be removed. The resulting recesses shall be cleaned, wetted, and filled with patching mortar.

No surface treatment will be required for buried or permanently submerged concrete not forming an integral part of a structure except that required to obtain the surface elevations or contours and surfaces free of laitance. The unformed surfaces of all other concrete shall be screeded and given an initial float finish, followed by additional floating and troweling where required.

Float finished surfaces shall be finished to provide a flat profile per ACI 347 Class C Finishing.

Screeding shall provide a concrete surface conforming to the proper elevation and contour with all aggregates completely embedded in adjacent mortar. Surface irregularities in screeded surfaces shall be limited as required to produce finished surfaces within the tolerances specified. If no further finishing is required, surface irregularities shall not exceed ACI 347 Class C.

Screeded surfaces shall be given an initial float finish as soon as the concrete has stiffened sufficiently for proper working. Any piece of coarse aggregate that may be disturbed by the float or that causes a surface irregularity shall be removed and replaced with mortar. Initial floating shall produce a surface of uniform texture and appearance with no unnecessary working of the surface with the float.

The initial floating shall be followed with a second floating at the time of initial set. The second floating shall produce a smooth, uniform, and workmanlike float finish of uniform texture and color. Unless additional finishing is specifically required, the completed finish for all unformed surfaces shall be a float finish as produced by the second floating.

Floating shall be performed with hand floats or suitable mechanical compactor floats.

Any surfaces designated on the drawings to be troweled shall be steel trowel finished. Troweling shall be performed after the second floating when the surface has hardened sufficiently to prevent an excess of fines being drawn to the surface. Troweling shall produce a dense, smooth, uniform surface free from blemishes and trowel marks.

3.16. Clean-Up

All forms shall be completely removed. All materials, equipment, and rubbish shall be removed and the premises left in a neat condition.

3.17. Repairing Defective Concrete

Defects in formed concrete surfaces shall be repaired to the satisfaction of the Owner within 24 hours, and defective concrete replaced within 48 hours after the adjacent forms have been removed. All concrete that is porous, honeycombed, or otherwise defective to a depth in excess of 1 inch shall be cut out and removed to sound concrete, with edges square cut to avoid feathering. Surfaces shall be coated with epoxy bonding compound before the repair concrete is placed.

Concrete repair work shall be performed in a manner that will not interfere with thorough curing of surrounding concrete. Mortar and concrete used in repair work shall be adequately cured and finished to match adjacent surfaces.

4.0 **References**

4.1. American Concrete Institute

1. ACI 117 – Specifications for Tolerances for Concrete Construction and Materials
2. ACI 318 – Building Code Requirements for Structural Concrete and Commentary
3. ACI 301 – Specifications for Structural Concrete
4. ACI 305R – Hot Weather Concreting
5. ACI 306R – Cold Weather Concreting
6. ACI 308R – Guide to Curing Concrete
7. ACI 336.1 – Specification for the Construction of Drilled Piers
8. ACI 347 – Guide to Formwork for Concrete
9. ACI 350 – Code Requirements for Environmental Engineering Concrete Structures and Commentary

4.2. ASTM International

1. ASTM A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
2. ASTM A706 – Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement
3. ASTM A1064 – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
4. ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field
5. ASTM C33 – Standard Specification for Concrete Aggregates
6. ASTM C39 – Standard Test Method for Compressive Strength of

Cylindrical Concrete Specimens

7. ASTM C42 – Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
8. ASTM C94 – Standard Specification for Ready Mixed Concrete
9. ASTM C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete
10. ASTM C150 – Standard Specification for Portland Cement
11. ASTM C171 – Standard Specification for Sheet Materials for Curing Concrete
12. ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete
13. ASTM C173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
14. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
15. ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete
16. ASTM C403 – Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance
17. ASTM C494 – Standard Specification for Chemical Admixtures for Concrete
18. ASTM C1064 – Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
19. ASTM C1315 – Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete
20. ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

4.3. American Welding Society

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

6 – Geotechnical Report



Report of Subsurface Exploration and Geotechnical Engineering Evaluation

Gillespie Solar Farm
Fayetteville, North Carolina
F&R Project No. 66B-0122

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September 29, 2023



September 29, 2023

Mr. Robin Lee
Director of Surveying
McKim & Creed Inc.
1730 Varsity Drive
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Raleigh, NC 27606

**Subject: Report of Subsurface Exploration & Geotechnical Engineering Evaluation
Gillespie Solar Farm**
Fayetteville, North Carolina
F&R Project No. 66B-0122

Dear Mr. Lee:

Froehling & Robertson, Inc. (F&R) has completed the authorized subsurface exploration and geotechnical engineering evaluation for the proposed Gillespie Solar Farm located in Fayetteville, North Carolina. Our services were performed in general accordance with F&R's Proposal No. 2366-00163 REV. 1 dated June 21, 2023. The attached report presents our understanding of the project, reviews our exploration procedures, describes existing site and general subsurface conditions, and presents geotechnical engineering design and construction recommendations.

We have enjoyed working with you on this project, and are prepared to assist you with the recommended quality assurance observation and testing services during construction. Please contact us if you have any questions regarding this report or if we may be of further service.

Sincerely,
FROEHLING & ROBERTSON, INC.

Brian W. McCarthy, P.E.
Staff Geotechnical Engineer



Michael S. Sabodish Jr., Ph.D., P.E.
Geotechnical Dept. Manager



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APPENDICES

APPENDIX I

- Site Vicinity Map (Figure No. 1)
- Boring Location Plan (Figure No. 2)
- Subsurface Profile (Figure No. 3)

APPENDIX II

- Key to Soil Classification
- Unified Soil Classification Chart
- Boring Logs

APPENDIX III

- Field Resistivity Test Results
- Laboratory Test Results
- Corrosivity Test Report

APPENDIX IV

- GBA Document "Important Information about Your Geotechnical Engineering Report"



1.0 PURPOSE & SCOPE OF SERVICES

The purpose of the subsurface exploration and geotechnical engineering evaluation was to explore the subsurface conditions in the area of the proposed development and to provide geotechnical engineering recommendations that can be used during the design and construction phases of the project.

F&R's scope of services included the following:

- Completion of five (5) soil test borings (B-1 through B-5) to depths ranging from 30 to 50 feet below the existing ground surface;
- Preparation of typed Boring Logs and development of a Subsurface Profile;
- Performance of geotechnical laboratory testing on representative soil samples;
- Performing field electrical resistivity tests at two locations;
- Performing corrosivity and laboratory thermal resistivity testing;
- Performing a geotechnical engineering evaluation of the subsurface conditions with regard to their suitability for the proposed construction;
- Preparation of this geotechnical report by professional engineers.

2.0 PROJECT INFORMATION

2.1 SITE LOCATION AND DESCRIPTION

The project is located on the west side of Gillespie Street, approximately 250 feet south of the intersection of Gillespie Street and Sally Hill Circle in Fayetteville, North Carolina (See Figure 1 in Appendix I). The project site consists of an approximately 44-acre parcel of land that is identified with Parcel Identification Number (PIN) 0424-66-0123 according to information obtained from the Cumberland County GIS online database.

Based on observations made during our site activities, the project site mostly consists of cleared former pastures on the northern half of the project site, and wooded land in the southern half of the site. Overhead power lines are present along the northeast property line of the project site and run in southeast to northwest direction. A pond is located in the western portion of the site. The pond appears to drain to a smaller pond to the south.



Based on the ground surface elevations obtained from Cumberland County topographic data, the project site slopes from the northeast towards the pond in the western portion of the site, from an approximate elevation of EL 190 to EL 150.

2.2 PROPOSED CONSTRUCTION

The proposed development will involve the construction of rows of solar panels within the northern half of the parcel that will be aligned in an approximate north-south direction. Detailed information related to panel loading and foundation type was not provided. We anticipate the panels will be supported on driven piles embedded to depths roughly 5 to 10 feet below the existing ground surface. Equipment pads with switchboards and transformers is proposed to be located at the eastern side of the site adjacent to the proposed entrance drive. Information provided to F&R regarding the weight of equipment pads (mat loading) should not exceed a net allowable bearing capacity of 500 pounds per square foot (psf). F&R assumes that cut and fills of less than 3 feet will be required to establish site grades.

3.0 EXPLORATION AND LABORATORY TESTING PROCEDURES

3.1 SUBSURFACE EXPLORATION

F&R advanced a total of five (5) soil test borings (B-1 to B-5) as part of this exploration at the approximate locations requested by Booth & Associates and as shown on the Boring Location Plan presented as Figure No. 2 in Appendix I.

The test borings locations were established in the field by F&R using a hand-held GPS unit. Ground surface elevations at the boring locations were interpolated from Cumberland County GIS topographic information. Given these methods of determination, the boring locations and ground surface elevations should only be considered approximate.

The test borings were advanced with a track-mounted drill rig using 2-1/4" inside diameter (I.D.) hollow stem augers for borehole stabilization. Representative soil samples were obtained using a standard, two-inch outside diameter (O.D.) split-barrel sampler in general accordance with ASTM D 1586, Penetration Test and Split-Barrel Sampling of Soils (Standard Penetration Test).



The number of blows required to drive the split barrel sampler three, consecutive 6-inch increments with an automatic hammer is recorded and the blows of the last two 6-inch increments are added to obtain the Standard Penetration Test (SPT) N-values representing the penetration resistance of the soil. Five (5) Standard Penetration Tests were collected within the top 10 feet and then at a nominal interval of approximately 5 feet thereafter.

A representative portion of the soil was obtained from each SPT sample, sealed in an eight-ounce glass jar, labeled, and transported to our laboratory for final classification and analysis by a geotechnical engineer. The soil samples were classified in general accordance with the Unified Soil Classification System (USCS), using visual-manual identification procedures (ASTM D2488). A Boring Log for each test boring is presented in Appendix II.

Groundwater level measurements were not attempted at the termination of drilling in the borings due to utilizing mud rotary drilling techniques. Borings B-3 and B-5 were backfilled immediately after drilling. Temporary piezometers were installed in borings B-1, B-2, and B-4 to facilitate the measurement of stabilized groundwater levels. The temporary piezometers consisted of 1-inch diameter, hand-slotted PVC pipe installed into the completed borings. Following the collection of the stabilized groundwater readings, the temporary piezometers were removed from the borings and all of the boreholes were backfilled with soil cuttings.

3.2 FIELD RESISTIVITY TESTING

F&R also performed a field resistivity survey at the referenced project site at two locations selected by Booth & Associates (see Figure 2 in Appendix I). The resistivity testing was performed in general accordance with ASTM G57 by the Wenner 4-point method using a Megger DET 5/4D Digital Earth Tester. Resistance measurements were made at each test area using electrodes spaced approximately 2, 5, 10 and 40 feet. The results of the resistivity testing are presented in Appendix III.



3.3 LABORATORY TESTING

F&R selected two representative soil samples and subjected them to routine geotechnical index testing consisting of Natural Moisture Content, Sieve Analysis and Atterberg Limits determinations. The purpose of the index testing was to aid in our classification of the soil samples and development of engineering recommendations. The laboratory testing was performed in general accordance with applicable ASTM standards and are presented in Appendix III of this report.

In addition to the geotechnical testing, thermal resistivity and corrosivity tests were also performed. The thermal resistivity/conductivity testing was performed in general accordance with ASTM D 5334. Two undisturbed Shelby tube samples and two five gallon bucket samples from the auger cuttings were collected at/near borings B-2 and B-4 from depths of 1 to 3.5 feet below the ground surface. Thermal resistivity tests were performed on bulk soil samples recompacted to 85% of the Modified Proctor and samples from the Shelby Tubes. The results of the thermal resistivity tests are still pending and will be issued under a separate letter at a later date.

Three SPT jar soil samples were subjected to pH, chloride ion, soluble sulfates, electrical resistivity, redox potential, and sulfides testing to aid in assessing the corrosivity potential of the on-site soils as will be discussed in Section 4.4. The results of the corrosivity tests are presented in Appendix III.

4.0 REGIONAL GEOLOGY & SUBSURFACE CONDITIONS

4.1 REGIONAL GEOLOGY

The project site is located in the Coastal Plain Physiographic Province of North Carolina. The near surface Coastal Plain soils have resulted from the deposition of sediments several million years ago during the period that the ocean receded from this area to its present location along the Atlantic Coast. The Coastal Plain Province is a broad flat plain with widely spaced low rolling hills where the near-surface soils have their origin from the deposition of sediments several million



years ago during the period that the ocean receded from this area to its present location along the Atlantic Coast. It is noted that the Coastal Plain soils vary in thickness from only a few feet along the western border to over ten thousand feet in some areas along the coast.

According to the Geologic Map of North Carolina (1985), the site is located in the Cape Fear Formation. The Cape Fear Formation is mapped as Cretaceous period marine deposits that are described as sandstone and sandy mudstone, yellowish gray to bluish gray, mottled red to yellowish orange, indurated, graded and laterally continuous bedding, blocky clay, faint cross-bedding, feldspar and mica common.

4.2 SUBSURFACE CONDITIONS

4.2.1 General

The subsurface conditions discussed in the following paragraphs and those shown on the attached Boring Logs represent an estimate of the subsurface conditions based on an interpretation of the boring data using normally-accepted, geotechnical engineering judgments. Although individual soil test borings are representative of the subsurface conditions at the boring locations on the dates shown, they are not necessarily indicative of subsurface conditions at other locations or at other times. A subsurface profile has been prepared from the boring data to graphically illustrate the subsurface conditions encountered at the site. The subsurface profile is presented as Figure No. 3 in Appendix I. Strata breaks designated on the boring logs and subsurface profile represent approximate boundaries between soil types. The transition from one soil type to another may be gradual or occur between soil samples. More-detailed descriptions of the subsurface conditions at the individual boring locations are presented on the boring logs provided in Appendix II.

4.2.2 Surficial Materials

Surficial Organic Soils were encountered at the surface of the borings, from the ground surface to a depth of 0.2 feet. The Surficial Organic Soils generally consisted of dark-colored soil material containing roots, fibrous matter, and/or other organic components, and is generally unsuitable for



engineering purposes. F&R has not performed any laboratory testing to determine the organic content or other horticultural properties of the observed Surficial Organic Soil materials. Therefore, the term Surficial Organic Soil is not intended to indicate suitability for landscaping and/or other purposes. The Surficial Organic Soil depths provided in this report are based on driller observations and should be considered approximate. We note that the transition from Surficial Organic Soil to underlying materials may be gradual, and therefore the observation and measurement of the Surficial Organic Soil depths is subjective. Actual Surficial Organic Soil depths should be expected to vary.

4.2.3 Possible Fill Soils

Possible Fill soils were encountered below the surficial soils in boring B-2 and extended to a depth of 3.5 feet below the existing ground surface. It is noted that sometimes the relatively small and disturbed sample obtained in the field is insufficient to definitively describe the origin of the subsurface material. Since man-made materials, deleterious materials, or other obvious evidence of fill were not encountered in some of the soil samples, the materials believed to be earth fill are referred to as “possible fill”. Based on a review of historical aerial images, it appears the existing possible fill materials are located in areas adjacent to historical agricultural fields.

The possible fill soils consisted of moist, loose silty fine sand (SM) with SPT N-values ranging from 6 to 7 bpf. The possible fill soils appeared to contain trace amounts of roots.

Possible fill soils exhibiting SPT N-values of 4 bpf or less are generally indicative of fill with poor compaction while fill soils exhibiting SPT N-values of 5 to 8 bpf are generally indicative of fill with moderate compaction. Well-compacted fill, that does not contain gravel, would typically exhibit SPT N-values of 9 bpf or higher. In general, it appears that the possible fill was moderately compacted.



4.2.4 Coastal Plain Soils

Native coastal plain soils were encountered in all of the borings below the surficial organic and possible fill soils. The native soils typically consisted of very loose to very dense silty and clayey sands (USCS – SM and SC) with SPT N-values ranging from 2 to 79 bpf, and soft highly plastic clay (USCS – CH) with a SPT N-value of 4 bpf.

Very loose sand layers were encountered in borings B-1, B-3, B-4, and B-5 at depths ranging from just below the existing ground surface to 3.5 feet below the existing ground surface. Deeper layers of very loose sand were encountered in borings B-3 and B-5 at depth of 38.5 and 28.5 feet, respectively, and extended to depths of 43.5 and 33.5 feet, respectively.

A layer of soft, highly plastic clay (CH) was encountered in boring B-5 at a depth of 33.5 feet below the existing ground surface, and extended to the boring termination depth of 35 feet.

4.3 SOIL MOISTURE AND GROUNDWATER CONDITIONS

Moist soils (*i.e.*, within 3 percentage points of the estimated optimum moisture content) were encountered in all borings in the upper 2 to 8.5 feet of the soil profile. Wet or saturated soils (3 percentage points or greater over the estimated optimum moisture content) were encountered in the soil profile of all of the borings, at depths ranging from 2 to 8.5 feet below existing borings. Once encountered, these wet or saturated soils extended to the boring termination depths, with the exception of boring B-2, where the wet or saturated soils extended to a depth of 13.5 feet below the existing ground surface. A deeper layer of saturated soils were encountered in boring B-2 at a depth of 18.5 feet and extended to the boring termination depth of 30 feet.

Groundwater level measurements were not attempted at the termination of drilling due to utilizing mud rotary techniques. Borings B-3 and B-5 were backfilled immediately after drilling. After a stabilization period of approximately 24-hours following completion of drilling, groundwater levels were measured in borings B-1, B-2, and B-4. Stabilized groundwater was encountered at depths ranging from 13.9 to 14.8 feet below the existing ground surface in these borings.



It should be noted that the groundwater levels fluctuate depending upon seasonal factors such as precipitation and temperature. As such, soil moisture and groundwater conditions at other times may vary from those described in this report. F&R notes that due to the presence of relatively impervious silty and clayey soils, noted on the project site, trapped or perched water conditions may be encountered during periods of inclement weather and during seasonally wet periods.

4.4 SOIL CORROSIVITY EVALUATION

Three soil samples were subjected to laboratory testing to determine pH, Chloride and Sulfate concentrations as well as Electrical Resistivity and Redox Potential. The results of the pH, Chloride, Sulfate, Sulfide, Electricity Resistivity and Redox Potential testing are presented in the following table:

Boring	Sample Depth (ft)	Moisture Content (%)	pH	Chloride (mg/kg)	Sulfate (mg/kg)	Sulfides (mg/kg)	Electrical Resistivity (ohm-cm)	Redox Potential (mV)
B-1	1-3.5	4.63	5.09	<262*	<367*	34.8	3,850	255
B-2	1-3.5	2.21	4.97	<256*	<358*	<25.5*	2,490	263
B-4	1-3.5	3.42	5.00	<259*	<362*	<25.8*	4,460	286

*Below indicated method quantitation limit

Corrosion potential of soils for underground structures is dependent upon several factors including pH, soil moisture, resistivity, sulfates and chlorides. It is F&R's opinion that the soils on this site appear to have a mild to moderate corrosion potential based on the slightly acidic pH readings, relatively low chloride and sulfate concentrations and moderately high resistivity.

We are not aware of the existence of other corrosive factors such as coal, cinders, muck, peat, mine wastes, or landfills at this site, which may categorize the site as highly corrosive and negate the test results.



5.0 PRELIMINARY GEOTECHNICAL DESIGN RECOMMENDATIONS

5.1 GENERAL

The geotechnical engineering recommendations contained in this section of the report are based upon the results of the five soil test borings, the information provided regarding the proposed construction, and our familiarity with geotechnical engineering practices in this area. It is our opinion that the subsurface conditions encountered at the project site are suitable for the proposed construction from a geotechnical engineering perspective provided the recommendations presented in this report are followed throughout the design and construction phases of this project. F&R requests an opportunity to review project structural plans and specifications to confirm that the recommendations presented in this report have been properly interpreted and implemented, and to determine if additional geotechnical recommendations are warranted. Please contact F&R at your earliest convenience if you feel additional recommendations are warranted or if the recommendations in this report need additional clarification.

5.2 SOLAR PANEL FOUNDATION SUPPORT

Details related to solar panel type, foundation type and design foundation loads are not available. We anticipate the proposed solar panels will be supported on deep foundation system i.e. driven piles. The piles should be designed to resist lateral and uplift forces.

In order to assist in the foundation design, L-Pile deep foundation parameters have been provided in the following table. The L-Pile parameters are provided for the subsurface conditions encountered in the borings and represents an idealized subsurface profile. Please note that the tabulated values in Table 1 are for the given layered models with the understanding that the transitions between different soil strata are usually less distinct than those indicated in the table.



TABLE 1: L Pile Parameters

Depth (feet)		Soil Type	Total Unit Weight (pcf)	Cohesive Strength (psf)	L-Pile 5.0 Design Parameters		Friction Angle (degrees)	USCS
Top	Bottom				Strain ϵ_{50}	Static Soil Modulus, K (pci)		
0	6.5	Silty Sand	115	-	-	25	29	SM
6.5	13.5	Silty Sand	115	-	-	25	29	SM
13.5	18.5	Clayey Sand	120	-	-	60	33	SC
18.5	28.5	Silty Sand	115	-	-	20	29	SM
28.5	35	Clayey Sand/Sandy Clay	110	300	0.02	25	28	SC/CH

Notes:

1. All depths are from existing grade and should be adjusted based on the top of foundation elevation.
2. The soil parameters in the above tables are based on correlations with the SPT values.

5.3 EQUIPMENT PAD Foundation SUPPORT

We understand that equipment pads will be installed for support of various control and monitoring equipment and transformers. F&R understands that the equipment slabs will consist of a reinforced 9-inch thick concrete slab supported by a layer of 1-foot thick washed stone or non-frost structural fill. F&R has been informed that the soil contact pressures generated by the loading on the mats would not exceed 500 psf. Due to the relatively light expected loading and the conditions encountered in boring B-1, settlements of the equipment pads are estimated to be on the order of 1 inch or less. We would expect that the settlements would be relatively uniform across a rigidly designed mat. Provided that the site preparation and fill placement recommendations presented in the subsequent sections of this report are followed, the proposed equipment pad area near B-1 is suitable to support the equipment pads.

The magnitude of settlements will be influenced by the variation in excavation requirements across the along mat footprint, the distribution of loads, and the variability of underlying soil conditions. Our settlement analysis was performed on the basis of the provided structural loading at the time of this report. Actual settlements experienced by the structures and the time required for these soils to settle will be influenced by undetected variations in subsurface conditions, final grading



plans, and the quality of fill placement and foundation construction. If the proposed structure loads are greater than indicated in earlier in this section or if there are additional mat foundations proposed that F&R has not been apprised of, please provide pertinent structural information for F&R to review and comment.

For purposes of design, it is recommended that the mat design be based on a coefficient of subgrade reaction (K) of 13 pci. F&R recommends that the layer of non-frost structural fill extend at least 2 feet below exterior grades for frost and bearing capacity considerations. Final slab and reinforcing sizing should be determined by the Project Structural Engineer based on actual design loads, building code requirements and other structural considerations.

5.4 ACCESS ROAD DESIGN CONSIDERATIONS

Due to the presence of some very loose surface soils, unstable subgrade conditions could develop along the access roadway alignment beneath construction equipment during removal of surficial organic soils. In order to help prevent unstable conditions from occurring, it is recommended that the surficial soils be stabilized prior to roadway grading by undercutting and replacing the very loose soils. F&R anticipates that the subgrade undercut/repair depths will be on the order of 12 to 18 inches. Additional repairs may be recommended at the time of construction. These repairs will be based upon actual field conditions observed by the geotechnical engineer and should be determined based upon proofrolling and/or other subgrade evaluations. If these evaluations reveal unstable conditions, the method of repair should be as directed by the project geotechnical engineer. Methods of repair may include, but are not necessarily limited to: drying and re-compaction; additional undercutting; application of lime; use of geotextiles; or other methods deemed appropriate by the project geotechnical engineer. Any necessary repairs should be made based upon actual field conditions observed by the geotechnical engineer at the time of construction, and should be determined based upon proofrolling and other subgrade evaluations.

We have been informed that the first 50 feet of the entrance driveway will consist of asphalt pavement, with the remaining length being unpaved. The pavement structure should comply



with the minimum standards for roadways as required by the City of Fayetteville. Proofrolling of the pavement subgrades, placement of ABC base course and asphalt surface courses, should be observed, tested and approved by the project geotechnical engineer. Upon request, F&R would be pleased to provide a site specific pavement design in accordance with the City of Fayetteville requirements based on the actual soil subgrade strength testing (CBR tests) and estimated traffic volumes. However, at this time we believe a preliminary asphalt section consisting of 3 inches of 9.5B asphalt and 8 inches of compacted NCDOT ABC stone would likely be sufficient for the project.

For the interior drives, it is anticipated that one light maintenance pickup truck will visit the site every day. For light maintenance traffic, we recommend an 8 inch layer of compacted ABC stone to be placed on the access road. Since the road will not be paved, we recommend a woven geotextile (equivalent to Mirafi 500X) be installed on the subgrade prior to placement of the ABC stone. The subgrade should be confirmed to be stable prior to placement of the geo-textile.

We emphasize that good drainage is essential for successful performance of the road. The access road should be maintained in a drained condition at all times. Water build-up in the gravel surface could saturate the underlying soils and result in softening of the subgrade and premature failures. Proper drainage may be aided by grading the site such that surface water is directed away from the road, and construction of swales adjacent to the road. The access road should be graded such that surface water is directed towards the outer limits of the road.

5.5 SITE SEISMIC CLASSIFICATION

The following recommendations are based on the 2018 North Carolina Building Code (NCBC). Our scope of services did not include site specific soil shear wave velocity testing. F&R has evaluated the data obtained from the soil test borings for assignment of Seismic Site Class to this site.

In accordance with procedures outlined in the 2018 NC Building Code for determining Site Class, a weighted average of the soil conditions in the upper 100 feet was performed using SPT N-values with the assumption that very dense/very hard soils are present below the maximum 50 foot



exploration depth. Based on this evaluation of the SPT N-values, the soil profile indicates a Site Class “E” is applicable to the project. It may be beneficial to consider performing shear wave testing to evaluate whether the site class may be upgraded to Site Class D if the upgrade would provide significant cost benefits to the project.

Although F&R has not performed a liquefaction evaluation, it is F&R’s opinion that there does not appear to be a potential for liquefaction due to the presence of moderate consistency silty and clayey sands that typically exist over most of the site within the depths of our exploration. In addition, the relatively high fines content of the finer grained clays encountered across the site also indicate that liquefaction is unlikely. If a detailed evaluation of liquefaction is desired, F&R would be available to perform such an evaluation at your request.

6.0 GEOTECHNICAL CONSTRUCTION RECOMMENDATIONS

6.1 SITE PREPARATION

Initial site development should include stripping all surficial organic soils, roots, vegetation and any other deleterious materials from load bearing areas. The stripping should extend a distance of at least 5 feet beyond the building/foundation perimeters. Following the stripping operations, the exposed subgrade soils at the finished subgrade level and in fill sections should be proofrolled with a loaded tandem axle dump truck, scraper, or other similar type of construction equipment at the option of the geotechnical engineer to confirm the stability of the subgrade soils. The proofroll operations should be observed by a geotechnical engineer or his representative. If proofrolling reveals unstable conditions, the method of repair should be as directed by the project geotechnical engineer. Methods of repair may include, but are not necessarily limited to drying and re-compaction; undercutting and replacement with suitable structural fill; use of geotextiles and/or geo-grids with select fill; use of lime stabilization; or other methods deemed appropriate by the project geotechnical engineer. Very loose soils were encountered within the upper 2 to 6.5 feet of the soil profile of the borings and as such, F&R anticipates that subgrade repairs may be required to establish stable subgrades across portions of the site.



Wet to saturated soils conditions were encountered in the borings at depths ranging from 2 to 8.5 feet to termination depths of the borings. As such, the cut soils from mass grading operations and from utility trench excavations will likely be wet and require drying in order to be successfully used as compacted, structural fill and backfill. In addition, it is possible that relatively shallow perched and subsurface water could be encountered during construction depending upon the time of the year site grading is performed. Open ditches and/or interceptor drains may be required to improve site and soil profile drainage, improve soil moisture conditions, and help stabilize near surface conditions.

6.2 STRUCTURAL FILL PLACEMENT AND COMPACTION

Below the surficial and existing possible fill soils, the on-site native near-surface soils that were encountered typically consisted of silty and clayey sands (SM and SC). These soils should be suitable for re-use as structural fill but may require drying to achieve adequate compaction and stability. Structural fill should have moisture contents within 2 to 3 percent of optimum moisture at the time of placement. If highly plastic soils (CH and MH) soils are encountered during site grading activities they should not be used as structural fill.

Approved structural fill, not including NCDOT ABC stone, should consist of granular material or low plasticity (PI less than 15) silty and clayey sandy soils (SM and SC). If imported structural fill is required for the project, the fill should be approved by the geotechnical engineer prior to these materials being transported to the site. All structural fill should be within 2 to 3 percentage points of optimum moisture content at the time of placement.

Structural fill should be placed in lifts not to exceed 6 to 8 inches and compacted to at least 95 percent of the Standard Proctor (ASTM D-698) maximum dry density. The top 12 inches of subgrades in all load bearing building and pavement areas should be compacted to at least 98 percent of the Standard Proctor (ASTM D-698) maximum dry density. Utility trench backfill in load bearing areas should be compacted to at least 95 percent of the Standard Proctor (ASTM D-698) maximum dry density. Fill and backfill materials placed in non-load bearing areas (e.g., non-



vehicular grassed areas) areas should be compacted to at least 92 percent of the Standard Proctor (ASTM D-698) maximum dry density.

Monitoring of all site preparation including stripping, undercutting and backfilling operations; fabric/stabilization material placement; and density testing on each lift of backfill to verify that adequate compaction is being achieved should be performed by a qualified soils technician working under the direct supervision of the geotechnical engineer.

Depending upon the cut depths and site conditions at the time of construction, some soils may require moisture conditioning (i.e., drying of wet soils, or wetting of dry soils) prior to use as structural fill. As such, it is recommended that earthwork be performed during the summer and early fall months (mid-April through November) when the weather conditions are more conducive to moisture conditioning of soils.

As previously stated, the on-site soils have sufficient silt/clay content to render them moisture sensitive. The on-site soils will become unstable (i.e., pump and rut) during normal construction activities when in the presence of excess moisture. Soils with a moisture content greater than 3 percentage points above the optimum moisture content are generally considered to have excessive moisture. During earthwork and construction activities, surface-water runoff should be drained away from construction areas to prevent water from ponding on or saturating the soils within excavations or on subgrades.

6.3 EQUIPMENT PAD FOUNDATION CONSTRUCTION RECOMMENDATIONS

We recommend that all foundation subgrades and bearing grades be observed by a qualified geotechnical engineer or their representative prior to placement of reinforcing steel and concrete. The purpose of the engineering observation would be to determine that the foundations bear in suitable soils at the proper embedment depths, and that unsuitable soft or loose materials are undercut and backfilled with approved structural fill material. Hand auguring and Dynamic Cone Penetrometer (DCP) testing should be performed at the direction of the project geotechnical engineer to verify the consistency of the subgrade soils and underlying support soils.



It is recommended that a smooth bladed backhoe bucket be used to remove the final 6 to 12 inches of soils above the subgrade in order to prevent disturbing soils below the subgrade and/or prevent gouging narrow grooves in the subgrade as may occur with a toothed-end bucket.

If soft, very loose, or otherwise unsuitable soils are encountered at the subgrade elevation, undercutting and repair may be required. If undercutting is performed, the undercut excavations should be backfilled with materials approved by the project geotechnical engineer. We anticipate that most undercuts can be backfilled with clean sands (less than 10 percent fines), NCDOT ABC stone, and/or No. 57 washed stone up to the planned subgrade. If ABC stone is utilized, it may be placed in 12 inch thick lifts and compacted to at least 95 percent of the Standard Proctor maximum dry density (ASTM D-698). If clean sand is used, it may be placed in a single 8 to 12 inch thick lifts and compacted to at least 95 percent of the Standard Proctor maximum dry density (ASTM D-698). The washed stone thickness should not exceed 2 feet before the surface of the washed stone is densified with a heavy vibratory plate compactor to the satisfaction of the geotechnical engineer or their representative. In some circumstances, the geotechnical engineer may recommend that the undercuts be backfilled with lean concrete or flowable fill.

Exposure to the environment may weaken the soils at the subgrade level if excavations remain open for long periods of time. The subgrade surface should be level or suitably benched and free of loose soil, ponded water, and debris. If the subgrade soils are softened by surface water intrusion or exposure, the softened soils must be removed from the excavation immediately prior to placement of concrete. Excavations must be maintained in a drained/de-watered condition throughout the foundation construction process. If the foundation excavations must remain open overnight, or if rainfall becomes imminent while the subgrade soils are exposed, we strongly recommend that a 2 to 3 inch thick “mud mat” of lean concrete (2,000 psi) be placed on the subgrade before placing the reinforcing steel. In addition, F&R stresses the need for positive perimeter surface drainage around structure areas to direct all runoff water away from structures and foundations.



6.4 PAVEMENT CONSTRUCTION RECOMMENDATIONS

Pavement subgrades should be prepared as outlined in previous sections of this report. All base course stone beneath flexible pavement should be compacted to at least 100 percent of the modified Proctor maximum dry density (ASTM D-1557).

We emphasize that good base course drainage is essential for successful pavement performance. The ABC stone should be maintained in a drained condition at all times. Water build-up in the base course could result in premature pavement failures. Proper drainage may be aided by grading the site such that surface water is directed away from pavements and construction of swales adjacent to pavements. All pavements should be graded such that surface water is directed towards the outer limits of the paved area or to catch basins located such that surface water does not remain on the pavement.

Flexible asphalt pavements and bases should be constructed in accordance with the guidelines of the latest applicable NCDOT Standard Specifications for Roads and Structures. Materials, weather limitations, placement and compaction are specified under appropriate sections of this publication.

6.5 TEMPORARY EXCAVATION RECOMMENDATIONS

We anticipate that the excavations at some locations may not be able to be sufficiently sloped and may require temporary shoring. Trench boxes or internally-braced excavations are anticipated; however, the type of excavation stabilization or shoring system used should be selected and designed by the contractor.

Mass excavations and other excavations required for construction of this project must be performed in accordance with the United States Department of Labor, Occupational Safety and Health Administration (OSHA) guidelines (29 CFR 1926, Subpart P, Excavations) or other applicable jurisdictional codes for permissible temporary side-slope ratios and/or shoring requirements. The OSHA guidelines require daily inspections of excavations, adjacent areas and protective systems by a “competent person” for evidence of situations that could result in cave-



ins, indications of failure of a protective system, or other hazardous conditions. All excavated soils, equipment, building supplies, etc., should be placed away from the edges of excavations at a distance equaling or exceeding the depth of the excavation. F&R cautions that the actual excavation slopes will need to be evaluated frequently each day by the “competent person” and flatter slopes or the use of shoring may be required to maintain a safe excavation depending upon excavation-specific circumstances. The contractor is responsible for providing the “competent person” and all aspects of site excavation safety. F&R can evaluate specific excavation slope situations if we are informed and requested by the owner, designer, or contractor’s “competent person”.

7.0 CONTINUATION OF SERVICES

As previously discussed, a geotechnical engineer should be retained to monitor and test earthwork activities, and observe subgrade preparations for foundations and pavements. It should be noted that the actual soil conditions at the various subgrade levels and footing bearing grades will vary across this site and thus the presence of the geotechnical engineer and/or their representative during construction will serve to validate the subsurface conditions and recommendations presented in this report.

A geotechnical engineer should be employed to monitor the earthwork, foundation construction, and pile testing performed by others and to report that the recommendations contained in this report are completed in a satisfactory manner. The continued geotechnical engineering involvement on the project will aid in the proper implementation of the recommendations discussed herein. The following is a recommended scope of services:

- Review of project plans and construction specifications to verify that the recommendations presented in this report have been properly interpreted and implemented;
- Observe the earthwork process to document that subsurface conditions encountered during construction are consistent with the conditions anticipated in this report;
- Observe the subgrade conditions before placing structural fill including proofroll observations;
- Observe the placement and compaction of any structural fill and backfill, and perform laboratory and field compaction testing of the fill;



- Observe the installation and testing of piles for the solar panel support systems; and,
- Observe all foundation excavations and footing bearing grades for compliance with the recommended design soil bearing capacity. We also stress the importance of conducting hand auger and DCP testing at and extending several feet below the footing bearing grade in order to give an indication of the anticipated subsurface conditions and define footings that should be undercut and repaired as outlined in this report.

8.0 LIMITATIONS

This report has been prepared for the exclusive use of McKim & Creed and/or their agents, for specific application to the referenced project in accordance with generally-accepted soil and foundation engineering practices. No other warranty, express or implied, is made. Our evaluations and recommendations are based on design information furnished to us; the data obtained from the previously-described, subsurface exploration program, and generally-accepted geotechnical engineering practice. The evaluations and recommendations do not reflect variations in subsurface conditions, which could exist intermediate of the boring locations or in unexplored areas of the site.

There are important limitations to this and all geotechnical studies. Some of these limitations are discussed in the information prepared by GBA, which is included in Appendix IV. We ask that you please review this information.

Regardless of the thoroughness of a subsurface exploration, there is the possibility that conditions between borings will differ from those at the boring locations, that conditions are not as anticipated by the designers, or that the construction process has altered the soil conditions. Therefore, experienced geotechnical engineers should evaluate earthwork, pavement, and foundation construction to verify that the conditions anticipated in design actually exist. Otherwise, we assume no responsibility for construction compliance with the design concepts, specifications, or recommendations.

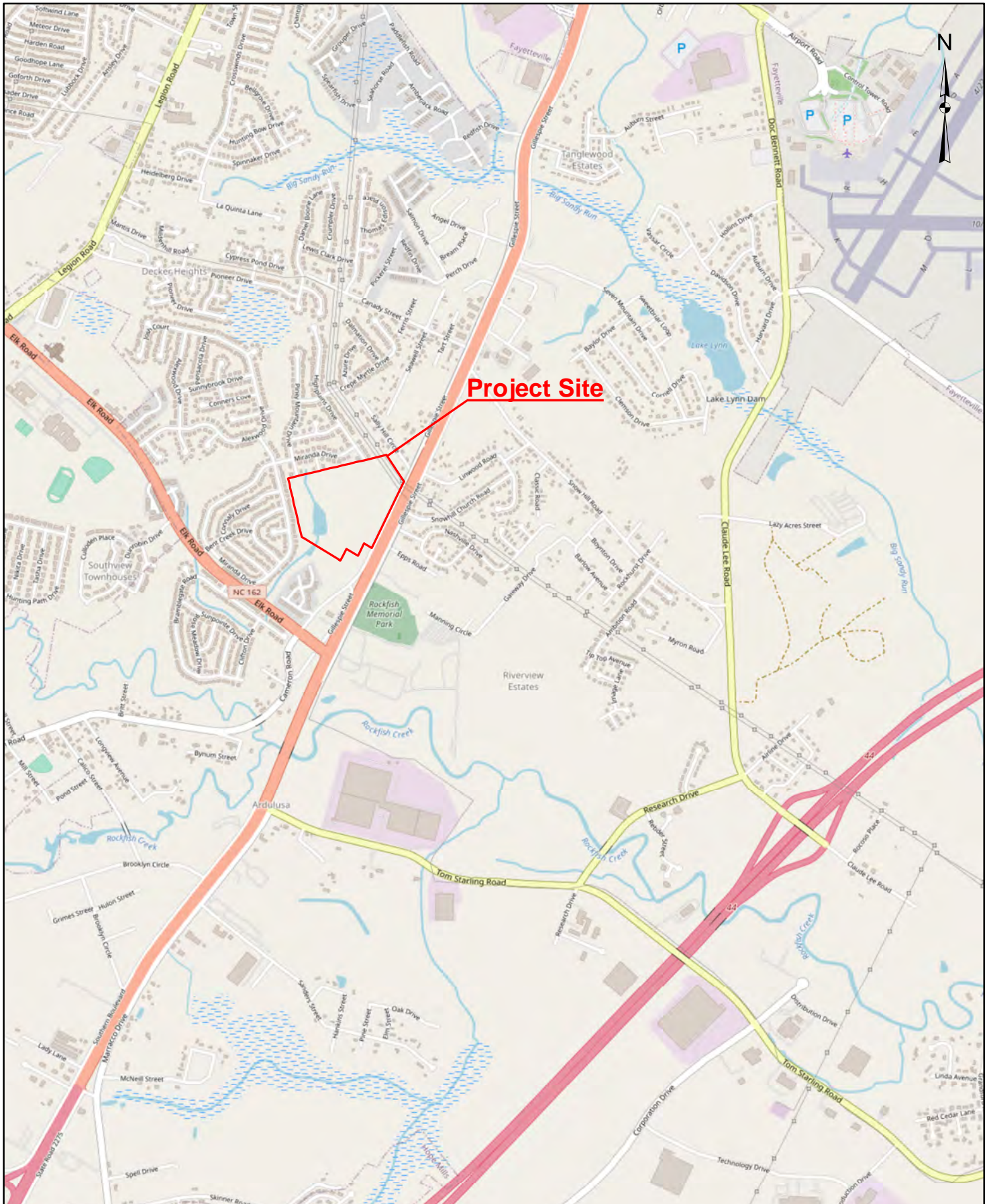


In the event that changes are made in the design or location of the proposed structures, the recommendations presented in the report shall not be considered valid unless the changes are reviewed by our firm and conclusions of this report modified and/or verified in writing. If this report is copied or transmitted to a third party, it must be copied or transmitted in its entirety, including text, attachments, and enclosures. Interpretations based on only a part of this report may not be valid.

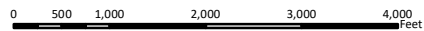


APPENDIX I

FIGURES



Site Vicinity Map

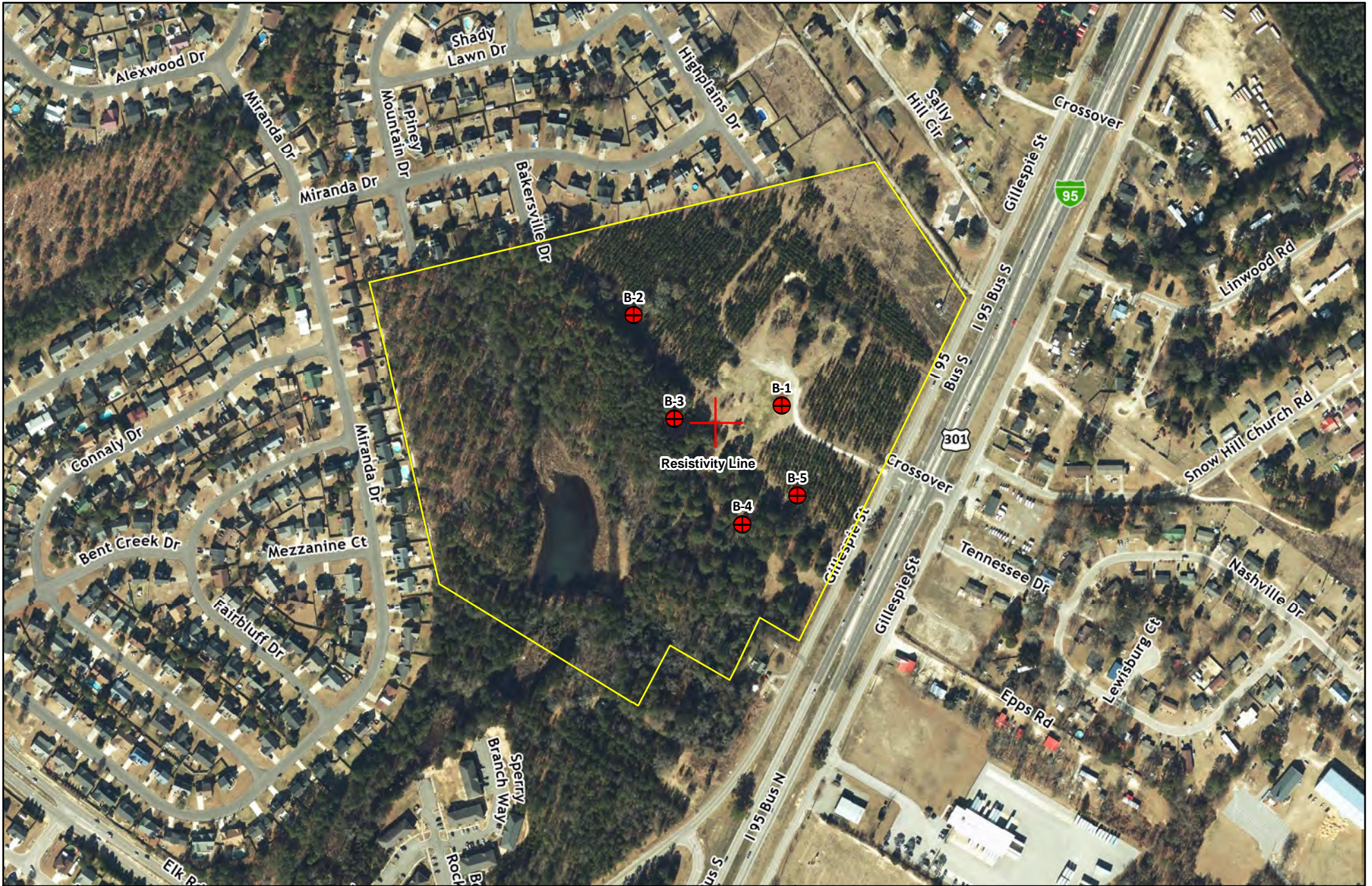


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310 Hubert Street
Raleigh, North Carolina 27603
T 919.828.3441

Client:	McKim & Creed
Project:	Gillispie Solar Farm
Location:	Fayetteville, Cumberland County, NC
Project Number:	66B-0122
Data:	Open Street
Date:	September 2023

Scale: 1 inch = 2,000 feet



Boring Location Plan



310 Hubert Street
 Raleigh, North Carolina 27603
 T 919.828.3441

Client:	McKim & Creed	
Project:	Gillespie Solar Farm	
Location:	Fayetteville, Cumberland County, NC	
Project Number:	668-0122	
Data:	NCOne Map Parcel 2023/Aerial 2021	
Date:	September 2023	Scale: 1 inch = 400 feet

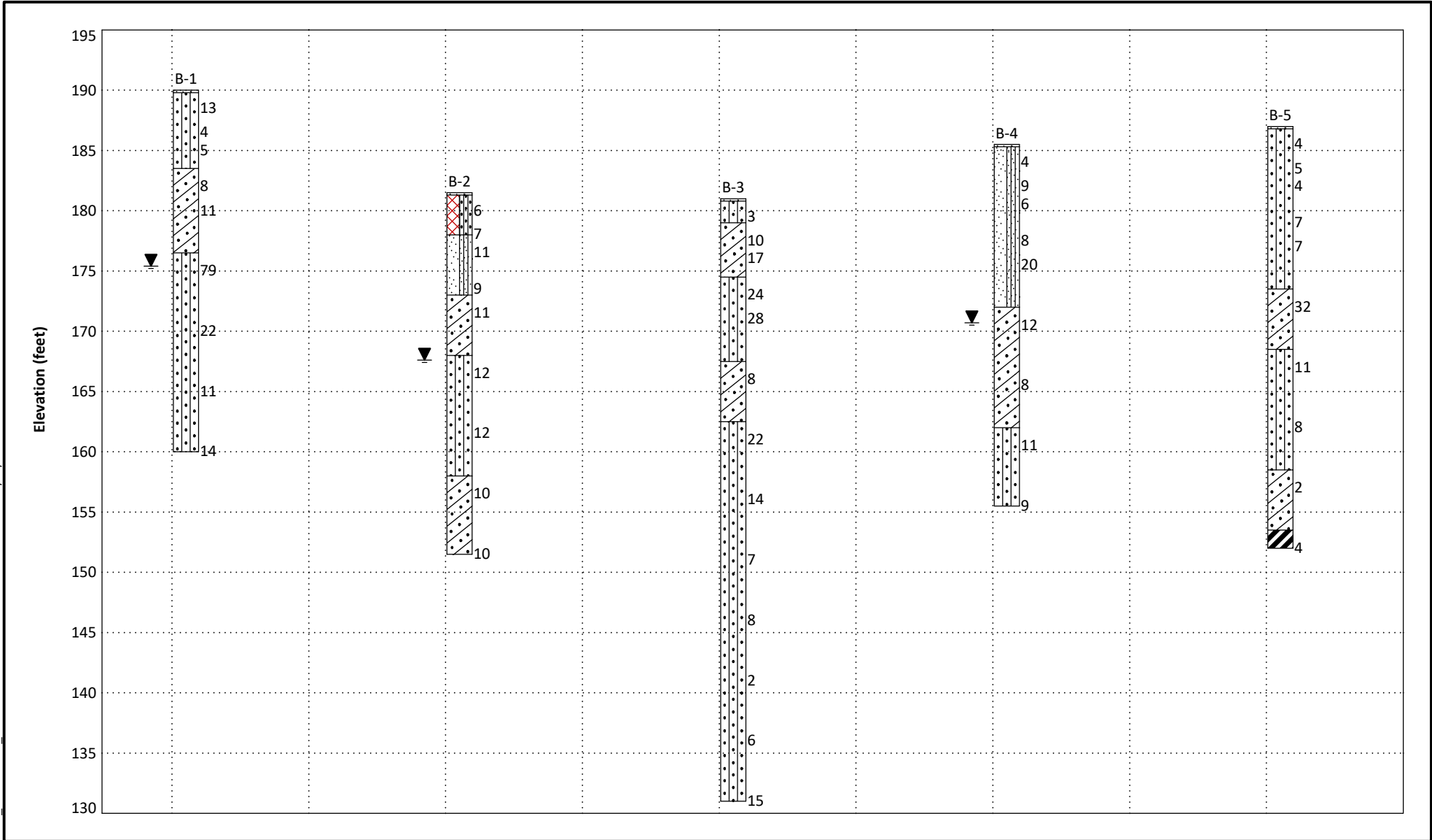
FIGURE No.: 2



SUBSURFACE PROFILE

Plot Based on Elevation
Profile Name: Figure No. 3

Project No: 66B-0122
Client: McKim & Creed
Project: Gillespie Solar Farm
City/State: Fayetteville, NC





APPENDIX II

BORING LOGS



KEY TO SOIL CLASSIFICATION

Correlation of Penetration Resistance with Relative Density and Consistency

<u>Sands and Gravels</u>		<u>Silts and Clays</u>	
<u>No. of Blows, N</u>	<u>Relative Density</u>	<u>No. of Blows, N</u>	<u>Relative Density</u>
0 - 4	Very loose	0 - 2	Very soft
5 - 10	Loose	3 - 4	Soft
11 - 30	Medium dense	5 - 8	Firm
31 - 50	Dense	9 - 15	Stiff
Over 50	Very dense	16 - 30	Very stiff
		31 - 50	Hard
		Over 50	Very hard

Particle Size Identification (Unified Classification System)

Boulders:	Diameter exceeds 8 inches
Cobbles:	3 to 8 inches diameter
Gravel:	<u>Coarse</u> - 3/4 to 3 inches diameter <u>Fine</u> - 4.76 mm to 3/4 inch diameter
Sand:	<u>Coarse</u> - 2.0 mm to 4.76 mm diameter <u>Medium</u> - 0.42 mm to 2.0 mm diameter <u>Fine</u> - 0.074 mm to 0.42 mm diameter
Silt and Clay:	Less than 0.07 mm (particles cannot be seen with naked eye)

Modifiers

The modifiers provide our estimate of the amount of silt, clay or sand size particles in the soil sample.

<u>Approximate Content</u>	<u>Modifiers</u>
≤ 5%:	Trace
5% to 12%:	Slightly silty, slightly clayey, slightly sandy
12% to 30%:	Silty, clayey, sandy
30% to 50%:	Very silty, very clayey, very sandy

<u>Field Moisture Description</u>	
Saturated:	Usually liquid; very wet, usually from below the groundwater table
Wet:	Semisolid; requires drying to attain optimum moisture
Moist:	Solid; at or near optimum moisture
Dry:	Requires additional water to attain optimum moisture

Ground Water

▽ Water Level in Bore Hole Immediately after Drilling

▼ Static Water Level after 24 Hours



UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

<i>MAJOR DIVISION</i>				<i>TYPICAL NAMES</i>	
<i>GRAVELS</i> More than 50% of coarse fraction larger than No. 4 sieve	<i>CLEAN GRAVEL</i> (little or no fines)		GW	Well graded gravels	
	<i>CLEAN GRAVEL</i> (little or no fines)		GP	Poorly graded gravels	
	<i>GRAVELS with fines</i>		GM	Silty gravels	
			GC	Clayey gravels	
	<i>SANDS</i> More than 50% of coarse fraction smaller than No. 4 sieve	<i>CLEAN SAND</i> (little or no fines)		SW	Well graded sands
		<i>CLEAN SAND</i> (little or no fines)		SP	Poorly graded sands
<i>SAND with fines</i>			SM	Silty sands, sand/silt mixtures	
			SC	Clayey sands, sand/clay mixtures	
<i>SILTS AND CLAYS</i> Liquid Limit is less than 50		ML	Inorganic silts, sandy and clayey silts with slightly plasticity		
		CL	Sandy or silty clays of low to medium plasticity		
		OL	Organic silts of low plasticity		
	<i>SILTS AND CLAYS</i> Liquid Limit is greater than 50		MH	Inorganic silts, sandy micaceous or clayey elastic silts	
			CH	Inorganic clays of high plasticity, fat clays	
			OH	Organic clays of medium to high plasticity	
<i>HIGHLY ORGANIC SOILS</i>			PT	Peat and other highly organic soils	
<i>MISCELLANEOUS MATERIALS</i>				PWR (Partially Weathered Rock)	
				Rock	
				Asphalt	
				ABC Stone	
				Concrete	
				Surficial Organic Soil	



Project No: 66B-0122
Client: McKim & Creed
Project: Gillespie Solar Farm
City/State: Fayetteville, NC

Elevation: 190 ±
Total Depth: 30.0'
Boring Location: See Boring Location Plan

Drilling Method: Mud Rotary
Hammer Type:
Date Drilled: 8/16/23
Driller: A. Sturchio

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks	
189.8	0.2	SURFICIAL ORGANIC SOILS	5-6-7	0.0		GROUNDWATER DATA: 0 Hr: Not Measured due to mud rotary techniques 24 Hrs: 14.6' inside PVC	
		COASTAL PLAIN: Very Loose to Medium Dense, Tan, Moist to Wet, Silty Fine to Coarse SAND (SM) Wet at 2.0'	3-2-2	1.5	13		
				2.0			
				3-2-3	3.5		4
					5.0		5
					6.5		
				3-4-4	8.0		8
				5-5-6	8.5		
					10.0		11
					13.5		
183.5	6.5	Loose to Medium Dense, Red, Orange, Wet, Clayey Fine to Coarse SAND (SC)					
			15-32-47	13.5	79		
				15.0			
				18.5			
			11-11-11	20.0	22		
				23.5			
			2-4-7	25.0	11		
				28.5			
			5-6-8	30.0	14		
176.5	13.5	Medium Dense to Very Dense, Red-Yellow-Orange, Wet to Saturated, Silty Fine to Coarse SAND (SM) Saturated 13.5'-28.5'					
160.0	30.0	Boring Terminated at 30.0 feet.					

BORING_LOG_66B-0122_BORE_LOGS.GPJ F&R.GDT 9/29/23

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.



Project No: 66B-0122

Elevation: 181.5 ±

Drilling Method: Mud Rotary

Client: McKim & Creed

Total Depth: 30.0'

Hammer Type:

Project: Gillespie Solar Farm

Boring Location: See Boring Location Plan

Date Drilled: 8/18/23

City/State: Fayetteville, NC

Driller: A. Sturchio

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks
181.3	0.2	SURFICIAL ORGANIC SOILS POSSIBLE FILL: Loose, White to Yellow-Tan and Brown, Dry to Moist, Poorly Graded SAND (SP-SM) with Silt and Trace Roots Moist at 2.0'	3-3-3	0.0	6	GROUNDWATER DATA: 0 Hr: Not Measured due to mud rotary techniques 24 Hrs: 13.9' inside PVC
			3-4-3	1.5 2.0		
178.0	3.5	RESIDUAL: Loose to Medium Dense, Tan, Moist to Saturated, Poorly Graded SAND (SP-SM) with Silt and Trace Roots (3.5'-6.5')	3-6-5	3.5	7	
		Saturated at 6.5'		5.0	11	
			4-4-5	6.5	9	
				8.0 8.5		
173.0	8.5	Medium Dense, Orangish Tan, Wet, Slightly Clayey Fine to Medium SAND (SC)	5-6-5	10.0	11	
168.0	13.5	Medium Dense, Pink and White to Yellow-Tan, Moist to Saturated, Silty Fine to Medium SAND (SM) Saturated at 18.5'	3-5-7	13.5	12	
				15.0		
			5-6-6	18.5	12	
				20.0		
158.0	23.5	Loose, Red-Orange-Brown, Saturated, Clayey Fine to Medium SAND (SC) with Trace Mica	3-5-5	23.5	10	
				25.0		
			3-5-5	28.5	10	
151.5	30.0	Boring Terminated at 30.0 feet.				

BORING_LOG_66B-0122_BORE_LOGS.GPJ F&R.GDT 9/29/23

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.



Project No: 66B-0122
Client: McKim & Creed
Project: Gillespie Solar Farm
City/State: Fayetteville, NC

Elevation: 181 ±
Total Depth: 50.0'
Boring Location: See Boring Location Plan

Drilling Method: Mud Rotary
Hammer Type:
Date Drilled: 8/18/23
Driller: A. Sturchio

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks
180.8	0.2	SURFICIAL ORGANIC SOILS	1-1-2	0.0	3	0 Hr: Not Measured due to mud rotary techniques
179.0	2.0		4-5-5	1.5		
		Loose to Medium Dense, Red-Brown, Moist, Clayey Fine to Medium SAND (SC)	4-5-12	2.0	10	
				3.5	17	
174.5	6.5	Medium Dense, Red-Orange and Yellow, Wet, Silty Fine to Coarse SAND (SM)	10-11-13	5.0	24	
				6.5	28	
				8.0		
				8.5		
167.5	13.5	Loose, Red-Orange and Yellow, Wet, Clayey Fine to Coarse SAND (SC)	3-3-5	10.0		
				13.5	8	
162.5	18.5	Very Loose to Medium Dense, Red-Yellow-Tan, Wet to Saturated, Slightly Clayey Silty Fine to Coarse SAND (SM) with Trace Mica and Fine Gravel (38.5'-48.5')	8-10-12	15.0		
				18.5	22	
				20.0		
				23.5	14	
				25.0		
				28.5	7	
				30.0		
				33.5	8	
				35.0		
				38.5	2	
			40.0			
			43.5	6		
			45.0			
			48.5	15		
131.0	50.0	Boring Terminated at 50.0 feet.				

BORING_LOG_66B-0122_BORE_LOGS.GPJ F&R.GDT 9/29/23

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.



Project No: 66B-0122
Client: McKim & Creed
Project: Gillespie Solar Farm
City/State: Fayetteville, NC

Elevation: 185.5 ±
Total Depth: 30.0'
Boring Location: See Boring Location Plan

Drilling Method: Mud Rotary
Hammer Type:
Date Drilled: 8/17/23
Driller: A. Sturchio

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks	
185.3	0.2	SURFICIAL ORGANIC SOILS COASTAL PLAIN: Loose to Medium Dense, Red-Orange-Tan, Moist to Wet, Poorly Graded SAND (SP-SM) with Silt and Trace Roots (0.0'-2.0') Wet (8.5'-13.5')	3-3-1	0.0	4	GROUNDWATER DATA: 0 Hr: Not Measured due to mud rotary techniques 24 Hrs: 14.8' inside PVC	
			2-2-7	1.5 2.0			
			2-3-3	3.5	9		
				5.0	6		
			5-4-4	6.5	8		
			5-6-14	8.0 8.5	20		
				10.0			
172.0	13.5		Loose to Medium Dense, Pink and Tan to Red-Orange, Wet, Silty Clayey Fine SAND (SC)	4-5-7	13.5		12
					15.0		
				3-3-5	18.5		8
				20.0			
162.0	23.5	Loose to Medium Dense, Yellow-Tan to Red-Orange, Saturated, Slightly Clayey Silty Fine to Coarse SAND (SM)	4-5-6	23.5	11		
				25.0			
			4-4-5	28.5	9		
155.5	30.0	Boring Terminated at 30.0 feet.			30.0		

BORING_LOG_66B-0122_BORE_LOGS.GPJ F&R.GDT 9/29/23

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.



Project No: 66B-0122
Client: McKim & Creed
Project: Gillespie Solar Farm
City/State: Fayetteville, NC

Elevation: 187 ±
Total Depth: 35.0'
Boring Location: See Boring Location Plan

Drilling Method: Mud Rotary
Hammer Type:
Date Drilled: 8/17/23
Driller: A. Sturchio

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks
186.8	0.2	SURFICIAL ORGANIC SOILS	2-2-2	0.0		0 Hr: Not Measured due to mud rotary techniques
		COASTAL PLAIN: Very Loose to Loose, Yellowish-Orangish Tan, Moist to Saturated, Silty Fine to Coarse SAND (SM)		1.5	4	
			2-2-3	2.0		
			2-2-2	3.5	5	
				5.0	4	
		Wet at 6.5'	4-3-4	6.5		
				8.0	7	
		Saturated at 8.5'	3-3-4	8.5		
				10.0	7	
173.5	13.5	Dense, Orange-Tan-Gray, Wet, Clayey Fine to Medium SAND (SC)	16-16-16	13.5		
				15.0	32	
168.5	18.5	Loose to Medium Dense, Red-Yellow-Orange, Wet, Slightly Clayey Silty Fine to Coarse SAND (SM)	7-6-5	18.5		
				20.0	11	
			4-4-4	23.5		
				25.0	8	
158.5	28.5	COASTAL PLAIN: Very Loose, Brown, Gray, Red, Yellow, Saturated, Very Clayey Coarse SAND (SC) with Fine to Coarse Gravel	5-1-1	28.5		
				30.0	2	
153.5	33.5	Soft, Blackish Gray, Wet, Fine to Medium Sandy Very Silty CLAY (CH) with Trace Mica	3-1-3	33.5		
152.0	35.0	Boring Terminated at 35.0 feet.		35.0	4	

BORING LOG 66B-0122 BORE LOGS.GPJ F&R.GDT 9/29/23

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.



APPENDIX III

FIELD RESISTIVITY TEST RESULTS

LABORATORY TESTING RESULTS



FROEHLING & ROBERTSON

Soil Resistivity Data Sheet

PROJECT NAME:	Gillespie Solar Farm	PROJECT NO.:	66B-0122
CLIENT NAME:	McKim & Creed	DATE:	8/17/2023
PROJECT MANAGER:	Brian McCarthy	TEST PERFORMED BY:	Joshua Davis

A = (ft)	5	10	25	50	-		
Formula	957.56 *R	1915 *R	4788 *R	9576 *R	-		
Area 1 (East to West) Measured Resistance, R (Ω)	453.00	259.00	67.60	40.00	-	Average Resistance, R (Ω)	204.90
Area 1 (East to West) Calculated Resistivity, Δ (Ω - cm)	433773.52	496014.75	323654.41	383022.98	-	Average Resistivity, Δ (Ω - cm)	409116.42
Area 1 (North to South) Measured Resistance, R (Ω)	425.00	211.00	74.10	36.00	-	Average Resistance, R (Ω)	186.53
Area 1 (North to South) Calculated Resistivity, Δ (Ω - cm)	406961.91	404089.24	354775.03	344720.68	-	Average Resistivity, Δ (Ω - cm)	377636.72

Average Measured Resistance, R (Ω)	195.71
Average Calculated Resistivity, Δ (Ω - cm)	393376.57

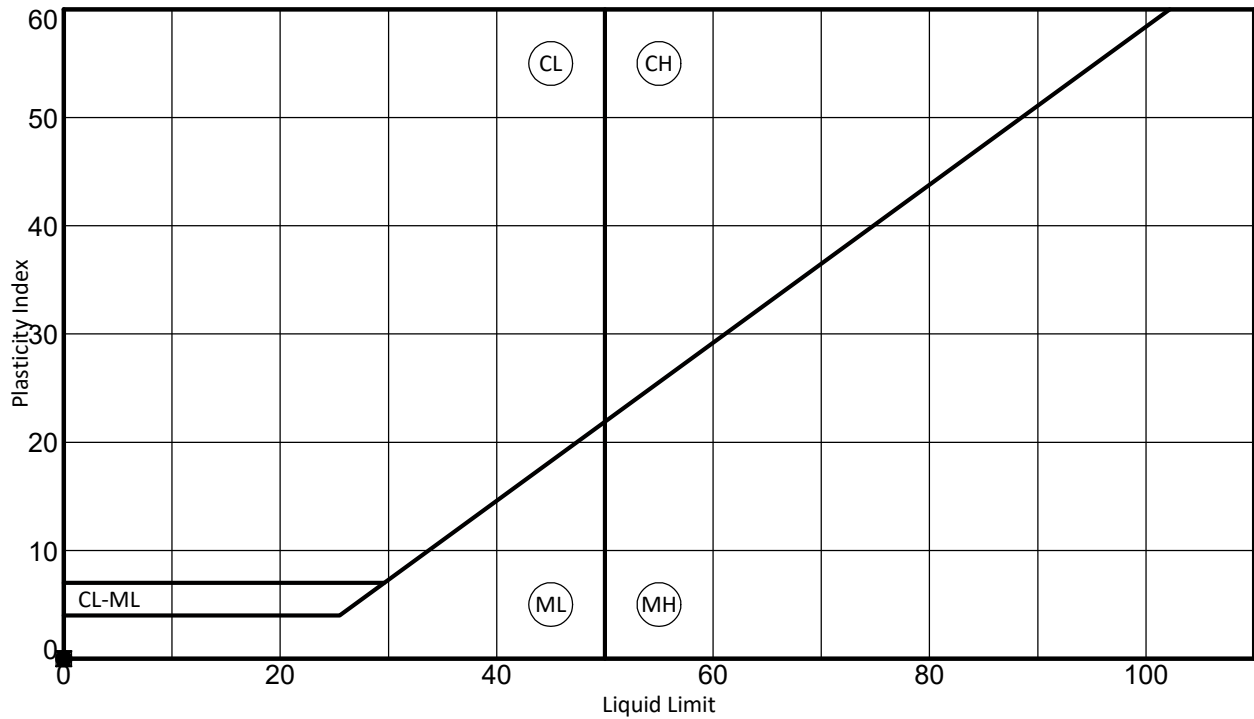


Project No: 66B-0122

Client: McKim & Creed

Project: Gillespie Solar Farm

City/State: Fayetteville, NC



Boring No.	Sample #	Depth	LL	PL	PI	% PASSING #200	Classification	% Natural Water Content
● B-2	BS-1	1.0' - 4.0'	NP	NP	NP	11.1	PG SAND with SILT (SP-SM)	2.3
☒ B-4	BS-2	1.0' - 4.0'	NP	NP	NP	10.1	PG SAND with SILT (SP-SM)	4.1

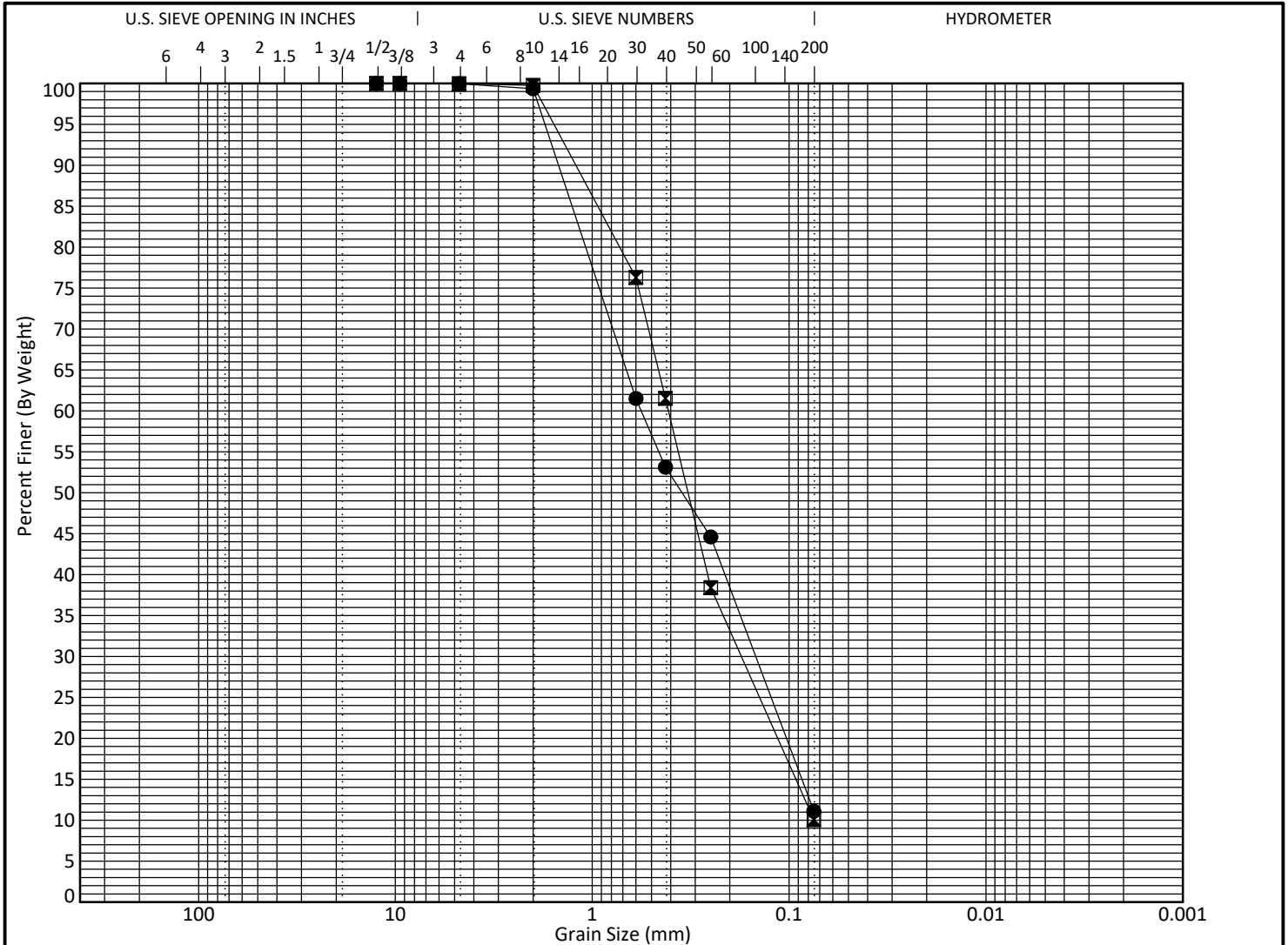


Project No: 66B-0122

Client: McKim & Creed

Project: Gillespie Solar Farm

City/State: Fayetteville, NC



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring No.	Depth	Classification					LL	PL	PI	Cc	Cu
● B-2	1.0' - 4.0'	POORLY GRADED SAND with SILT (SP-SM)					NP	NP	NP	0.54	7.82
■ B-4	1.0' - 4.0'	POORLY GRADED SAND with SILT (SP-SM)					NP	NP	NP	1.00	5.49
Boring No.	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	% Water Content	
● B-2	1.0' - 4.0'	12.5	0.564	0.148		0.0	88.9	11.1		2.3	
■ B-4	1.0' - 4.0'	12.5	0.41	0.175		0.0	89.9	10.1		4.1	

U.S. GRAIN SIZE LAB TESTING.GPJ F&R.GDT 9/29/23

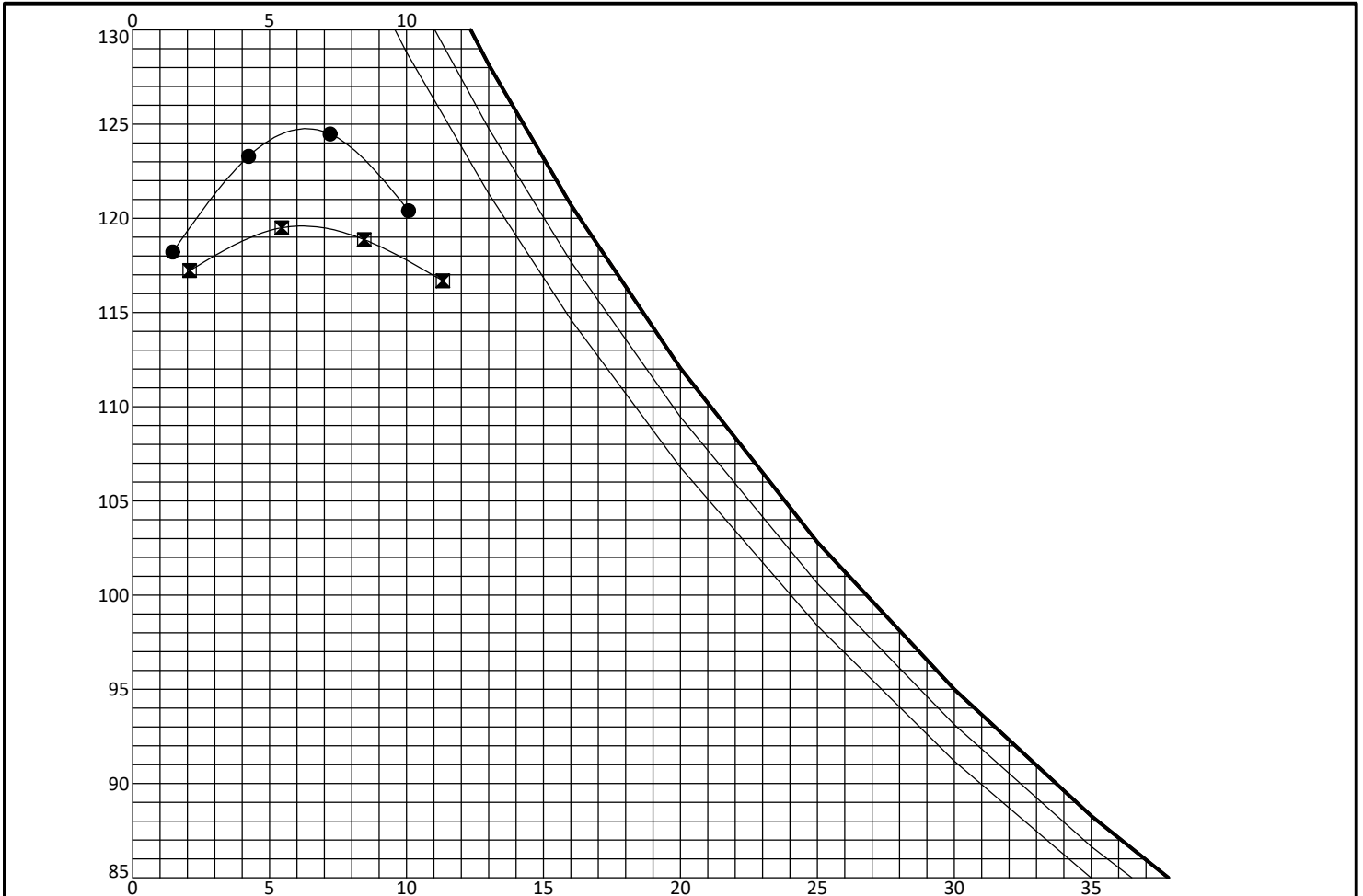


Project No: 66B-0122

Client: McKim & Creed

Project: Gillespie Solar Farm

City/State: Fayetteville, NC



Sample	Depth (ft)	Classification	LL	PL	PI	% GRAVEL (+ #4)	% SAND (#4 - #200)	% FINES (- #200)
● B-2	1.0' - 4.0'	Brown, POORLY GRADED SAND with SILT (SP-SM)	NP	NP	NP	0.0	88.9	11.1
■ B-4	1.0' - 4.0'	Tan, POORLY GRADED SAND with SILT (SP-SM)	NP	NP	NP	0.0	89.9	10.1

Sample	Max Dry Density (pcf)	Optimum Moisture (%)	ASTM	Sample Location	Natural Moisture (%)	Sample Notes
● B-2	124.8	6.3	D-1557 A	B-2	2.3	10.0 lb. Hammer, 18" drop
■ B-4	119.6	6.2	D-1557 A	B-4	4.1	10.0 lb. Hammer, 18" drop

PROCTOR CURVE LAB TESTING.GPJ F&R.GDT 9/13/23

9/20/2023

Froehling & Robertson, Inc. (Raleigh)
Brian McCarthy
310 Hubert Street
Raleigh, NC, 27603

Ref: Analytical Testing
Lab Report Number: 23-250-0101
Client Project Description: Gillespie Solan Farm

Dear Brian McCarthy:

Waypoint Analytical, LLC (Charlotte) received sample(s) on 9/7/2023 for the analyses presented in the following report.

The above referenced project has been analyzed per your instructions. The analyses were performed in accordance with the applicable analytical method.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, method validations, instrumentation maintenance and calibration for all parameters were performed in accordance with guidelines established by the USEPA (including 40 CFR 136 Method Update Rule May 2021) unless otherwise indicated.

Certain parameters (chlorine, pH, dissolved oxygen, sulfite...) are required to be analyzed within 15 minutes of sampling. Usually, but not always, any field parameter analyzed at the laboratory is outside of this holding time. Refer to sample analysis time for confirmation of holding time compliance.

The results are shown on the attached Report of Analysis(s). Results for solid matrices are reported on an as-received basis unless otherwise indicated. This report shall not be reproduced except in full and relates only to the samples included in this report.

Please do not hesitate to contact me or client services if you have any questions or need additional information.

Sincerely,



Angela D Overcash
Senior Project Manager

Certification Summary

Laboratory ID: WP CNC: Waypoint Analytical Carolina, Inc. (C), Charlotte, NC

State	Program	Lab ID	Expiration Date
North Carolina	State Program	37735	07/31/2024
North Carolina	State Program	402	12/31/2023
South Carolina	State Program	99012	07/31/2024
South Carolina	State Program	99012	12/31/2023

Laboratory ID: WP MTN: Waypoint Analytical, LLC., Memphis, TN

State	Program	Lab ID	Expiration Date
Alabama	State Program	40750	02/29/2024
Arkansas	State Program	88-0650	02/07/2024
California	State Program	2904	06/30/2024
Florida	State Program - NELAP	E871157	06/30/2024
Georgia	State Program	C044	11/14/2025
Georgia	State Program	04015	06/30/2024
Illinois	State Program - NELAP	200078	10/31/2024
Kentucky	State Program	80215	06/30/2024
Kentucky	State Program	KY90047	12/31/2023
Louisiana	State Program - NELAP	LA037	12/31/2023
Louisiana	State Program - NELAP	04015	06/30/2024
Mississippi	State Program	MS	11/14/2025
North Carolina	State Program	47701	07/31/2024
North Carolina	State Program	415	12/31/2023
Pennsylvania	State Program - NELAP	68-03195	05/31/2024
South Carolina	State Program	84002	06/30/2023
Tennessee	State Program	02027	11/14/2025
Texas	State Program - NELAP	T104704180	09/30/2023
Virginia	State Program	00106	06/30/2024
Virginia	State Program - NELAP	460181	09/14/2024

Sample Summary Table

Report Number: 23-250-0101
Client Project Description: Gillespie Solan Farm

Lab No	Client Sample ID	Matrix	Date Collected	Date Received	Method	Lab ID
94378	B-1,S-2,S-3	Solids	09/06/2023	09/07/2023		
94378	B-1,S-2,S-3	Solids	09/06/2023	09/07/2023	ASTM-G57-95	WP MTN
94378	B-1,S-2,S-3	Solids	09/06/2023	09/07/2023	9045D	WP MTN
94378	B-1,S-2,S-3	Solids	09/06/2023	09/07/2023	SW-9034	WP MTN
94379	B-2,S-2,S-3-1	Solids	09/06/2023	09/07/2023		
94379	B-2,S-2,S-3-1	Solids	09/06/2023	09/07/2023	9045D	WP MTN
94379	B-2,S-2,S-3-1	Solids	09/06/2023	09/07/2023	ASTM-G57-95	WP MTN
94379	B-2,S-2,S-3-1	Solids	09/06/2023	09/07/2023	SW-9034	WP MTN
94380	B-4,S-2,BS-2	Solids	09/06/2023	09/07/2023		
94380	B-4,S-2,BS-2	Solids	09/06/2023	09/07/2023	SW-9034	WP MTN
94380	B-4,S-2,BS-2	Solids	09/06/2023	09/07/2023	9045D	WP MTN
94380	B-4,S-2,BS-2	Solids	09/06/2023	09/07/2023	ASTM-G57-95	WP MTN

Summary of Detected Analytes

Project: Gillespie Solan Farm

Report Number: 23-250-0101

Client Sample ID	Lab Sample ID				
Method	Parameters	Result	Units	Report Limit	Analyzed
B-1,S-2,S-3	V 94378				
9045D	pH	5.09	s.u.		09/08/2023 14:44
9045D	Oxidation Reduction Potential	255	mV		09/18/2023 09:50
ASTM-G57-95	Resistivity (soil)	3850	ohm-cm		09/18/2023 13:00
SW-9034	Sulfide	34.8	mg/Kg - dry	26.2	09/15/2023 09:24
SW-DRYWT	Moisture	4.63	%		09/08/2023 16:45
B-2,S-2,S-3-1	V 94379				
9045D	pH	4.97	s.u.		09/08/2023 14:44
9045D	Oxidation Reduction Potential	263	mV		09/18/2023 09:50
ASTM-G57-95	Resistivity (soil)	2490	ohm-cm		09/18/2023 13:00
SW-DRYWT	Moisture	2.21	%		09/08/2023 16:45
B-4,S-2,BS-2	V 94380				
9045D	pH	5.00	s.u.		09/08/2023 14:44
9045D	Oxidation Reduction Potential	286	mV		09/18/2023 09:50
ASTM-G57-95	Resistivity (soil)	4460	ohm-cm		09/18/2023 13:00
SW-DRYWT	Moisture	3.42	%		09/08/2023 16:45



Client: Froehling & Robertson, Inc. (Raleigh)
Project: Gillespie Solan Farm66B-0122-00002
Lab Report Number: 23-250-0101
Date: 9/20/2023

CASE NARRATIVE

Sulfide by Titration Method SW-9034

Analyte: Sulfide

QC Batch No: L704739

Matrix spike recovery is outside of control limits. Acceptable LCS recovery indicates the system was in control, but the reported result could be affected by matrix interference.

Anions by Ion Chromatography Method 9056A

Sample 94378 (B-1,S-2,S-3)

Analyte: Sulfate

QC Batch No: V37931/V37906

Relative Percent Difference (RPD) for the duplicate analysis was outside of the allowable QC limits.

Sample 94378 (B-1,S-2,S-3)

Analyte: Sulfate

QC Batch No: V37931/V37906

Matrix spike/matrix spike duplicate recoveries are outside of control limits. Acceptable LCS recovery indicates the system was in control, but the reported result could be affected by matrix interference.

Sample 94379 (B-2,S-2,S-3-1)

Analyte: Sulfate

QC Batch No: V37931/V37906

Matrix spike/matrix spike duplicate recoveries are outside of control limits. Acceptable LCS recovery indicates the system was in control, but the reported result could be affected by matrix interference.

01083

Froehling & Robertson, Inc. (Raleigh)
Brian McCarthy
310 Hubert Street
Raleigh , NC 27603

Project Gillespie Solan Farm
Information :

Report Date : 09/20/2023
Received : 09/07/2023

Report Number : **23-250-0101**

REPORT OF ANALYSIS

Lab No : **94378**

Matrix: **Solids**

Sample ID : **B-1,S-2,S-3**

Sampled: **9/6/2023 0:00**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Resistivity (soil)	3850	ohm-cm		1	09/18/23 13:00	VVP	ASTM-G57-95
Oxidation Reduction Potential	255	mV		1	09/18/23 09:50	TKM	9045D
Moisture	4.63	%		1	09/08/23 16:45	CNC	SW-DRYWT
Chloride	<262	mg/Kg - dry	262	10	09/15/23 15:22	KNC	9056A
pH	5.09	s.u.		1	09/08/23 14:44	EKF	9045D
Sulfate	<367	mg/Kg - dry	367	10	09/15/23 15:22	KNC	9056A
Sulfide	34.8	mg/Kg - dry	26.2	1	09/15/23 09:24	ANV	SW-9034

**Qualifiers/
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit

01083

Froehling & Robertson, Inc. (Raleigh)
Brian McCarthy
310 Hubert Street
Raleigh, NC 27603

Project Gillespie Solan Farm
Information :

Report Date : 09/20/2023
Received : 09/07/2023

Report Number : **23-250-0101**

REPORT OF ANALYSIS

Lab No : **94379**

Matrix: **Solids**

Sample ID : **B-2,S-2,S-3-1**

Sampled: **9/6/2023 0:00**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Resistivity (soil)	2490	ohm-cm		1	09/18/23 13:00	VVP	ASTM-G57-95
Oxidation Reduction Potential	263	mV		1	09/18/23 09:50	TKM	9045D
Moisture	2.21	%		1	09/08/23 16:45	CNC	SW-DRYWT
Chloride	<256	mg/Kg - dry	256	10	09/15/23 15:35	KNC	9056A
pH	4.97	s.u.		1	09/08/23 14:44	EKF	9045D
Sulfate	<358	mg/Kg - dry	358	10	09/15/23 15:35	KNC	9056A
Sulfide	<25.5	mg/Kg - dry	25.5	1	09/15/23 09:24	ANV	SW-9034

**Qualifiers/
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit

01083

Froehling & Robertson, Inc. (Raleigh)
Brian McCarthy
310 Hubert Street
Raleigh, NC 27603

Project Gillespie Solan Farm
Information :

Report Date : 09/20/2023
Received : 09/07/2023

Report Number : **23-250-0101**

REPORT OF ANALYSIS

Lab No : **94380**

Matrix: **Solids**

Sample ID : **B-4,S-2,BS-2**

Sampled: **9/6/2023 0:00**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Resistivity (soil)	4460	ohm-cm		1	09/18/23 13:00	VVP	ASTM-G57-95
Oxidation Reduction Potential	286	mV		1	09/18/23 09:50	TKM	9045D
Moisture	3.42	%		1	09/08/23 16:45	CNC	SW-DRYWT
Chloride	<259	mg/Kg - dry	259	10	09/15/23 15:47	KNC	9056A
pH	5.00	s.u.		1	09/08/23 14:44	EKF	9045D
Sulfate	<362	mg/Kg - dry	362	10	09/15/23 15:47	KNC	9056A
Sulfide	<25.8	mg/Kg - dry	25.8	1	09/15/23 09:24	ANV	SW-9034

**Qualifiers/
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit

Quality Control Data

Client ID: Froehling & Robertson, Inc. (Raleigh)

Project Description: Gillespie Solan Farm

Report No: 23-250-0101

QC Analytical Batch: L704846

Analysis Method: 9045D

Analysis Description: ORP

Laboratory Control Sample LCS

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Oxidation Reduction Potential	mV	200	181	91.0	90-110

Duplicate V 94376-DUP

Parameter	Units	Result	DUP Result	Criteria	Analyzed
Oxidation Reduction Potential	mV	175	183	+/- 20	09/18/23 09:50

Quality Control Data

Client ID: Froehling & Robertson, Inc. (Raleigh)
Project Description: Gillespie Solan Farm
Report No: 23-250-0101

QC Analytical Batch: V37602
Analysis Method: 9045D
Analysis Description: pH in Solids

Laboratory Control Sample LCS

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
pH	s.u.	6.86	6.91	101	3.54-101.4

Duplicate V 94004-DUP

Parameter	Units	Result	DUP Result	RPD	Max RPD	Analyzed
pH	s.u.	8.25	8.25	0.0	20.0	09/08/23 14:44

Quality Control Data

Client ID: Froehling & Robertson, Inc. (Raleigh)

Project Description: Gillespie Solan Farm

Report No: 23-250-0101

QC Prep: V37906	QC Analytical Batch(es): V37931
QC Prep Batch Method: SW-9056A (PREP)	Analysis Method: 9056A
	Analysis Description: Anions by Ion Chromatography

Lab Reagent Blank LRB-V37906 Matrix: SOL
 Associated Lab Samples: 94378, 94379, 94380

Parameter	Units	Blank Result	MQL	Analyzed
Chloride	mg/Kg	<250	250	09/15/23 19:05
Sulfate	mg/Kg	<350	350	09/15/23 19:05

Laboratory Control Sample LCS-V37906

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Chloride	mg/Kg	400	374	94.0	80-120
Sulfate	mg/Kg	400	411	103	80-120

Matrix Spike & Matrix Spike Duplicate V 94378-MS-V37906 V 94378-MSD-V37906

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Chloride	mg/Kg	<250	400	401	419	415	105	103	80-120	0.9	15
Sulfate	mg/Kg	<350	400	401	572	706	143*	176*	80-120	20.9*	15

Matrix Spike & Matrix Spike Duplicate V 94379-MS-V37906 V 94379-MSD-V37906

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Chloride	mg/Kg	<250	400	399	424	421	106	106	80-120	0.7	15
Sulfate	mg/Kg	<350	400	399	542	526	136*	132*	80-120	2.9	15

* QC Fail

Quality Control Data

Client ID: Froehling & Robertson, Inc. (Raleigh)
Project Description: Gillespie Solan Farm
Report No: 23-250-0101

QC Analytical Batch: L704770
Analysis Method: ASTM-G57-95
Analysis Description: Resistivity

Duplicate V 94376-DUP

Parameter	Units	Result	DUP Result	RPD	Max RPD	Analyzed
Resistivity (soil)	ohm-cm	2210	2240	1.3	20.0	09/18/23 13:00

Quality Control Data

Client ID: Froehling & Robertson, Inc. (Raleigh)
Project Description: Gillespie Solan Farm
Report No: 23-250-0101

QC Prep: L704616 **QC Analytical Batch(es):** L704739
QC Prep Batch Method: SW-9030B **Analysis Method:** SW-9034
Analysis Description: Sulfide by Titration

Lab Reagent Blank LRB-L704616 Matrix: SOL
Associated Lab Samples: 94378, 94379, 94380

Parameter	Units	Blank Result	MQL	Analyzed
Sulfide	mg/Kg	<25.0	25.0	09/15/23 09:24

Laboratory Control Sample LCS-L704616

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Sulfide	mg/Kg	248	168	68.0	32-85

Duplicate V 94377-DUP-L704616

Parameter	Units	Result	DUP Result	RPD	Max RPD	Analyzed
Sulfide	mg/Kg	<25.0	<25.0	0.0	20	09/15/23 09:24

Matrix Spike V 94377-MS-L704616

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	%Rec Limits	Max RPD
Sulfide	mg/Kg	<25.0	99.1		80.0		81.0*	25-75	

Quality Control Data

Client ID: Froehling & Robertson, Inc. (Raleigh)

Project Description: Gillespie Solan Farm

Report No: 23-250-0101

QC Analytical Batch: V37617
Analysis Method: SW-DRYWT
Analysis Description: Dry Weight Determination

Duplicate V 94378-DUP

Parameter	Units	Result	DUP Result	RPD	Max RPD	Analyzed
Moisture	%	4.63	4.25	8.5	20.0	09/08/23 16:45

Duplicate V 94389-DUP

Parameter	Units	Result	DUP Result	RPD	Max RPD	Analyzed
Moisture	%	11.7	11.8	0.8	20.0	09/08/23 16:45

Shipment Receipt Form

Customer Number: **01083**

Customer Name: **Froehling & Robertson, Inc. (Raleigh)**

Report Number: **23-250-0101**

Shipping Method

<input type="radio"/> Fed Ex	<input type="radio"/> US Postal	<input checked="" type="radio"/> Lab	<input type="radio"/> Other :	<input type="text"/>
<input type="radio"/> UPS	<input type="radio"/> Client	<input type="radio"/> Courier	Thermometer ID:	<input type="text" value="IRT15 0.7C"/>

Shipping container/cooler uncompromised?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Number of coolers/boxes received	<input type="text" value="1"/>		
Custody seals intact on shipping container/cooler?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Not Present
Custody seals intact on sample bottles?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Not Present
Chain of Custody (COC) present?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
COC agrees with sample label(s)?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
COC properly completed	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Samples in proper containers?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Sample containers intact?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Sufficient sample volume for indicated test(s)?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
All samples received within holding time?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Cooler temperature in compliance?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Cooler/Samples arrived at the laboratory on ice. Samples were considered acceptable as cooling process had begun.	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Water - Sample containers properly preserved	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Water - VOA vials free of headspace	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Trip Blanks received with VOAs	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Soil VOA method 5035 – compliance criteria met	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
<input type="checkbox"/> High concentration container (48 hr)		<input type="checkbox"/> Low concentration EnCore samplers (48 hr)	
<input type="checkbox"/> High concentration pre-weighed (methanol -14 d)		<input type="checkbox"/> Low conc pre-weighed vials (Sod Bis -14 d)	
Special precautions or instructions included?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	

Comments:

Signature:

Date & Time:



449 Springbrook Road • Charlotte, NC 28217
Phone 704/529-6384 • Fax: 704/525-0409

Client Company Name: Freeshling & Robertson

Report To/Contact Name: Brian McCarthy

Reporting Address: 310 Hubert Street

Phone: 919 719 1847 Fax (Yes/No):

Email Address: bmcCarthy@fqrnc.com

EDD Type: PDF Excel Other

Site Location Name: Gillespie

Site Location Physical Address: Fayetteville, NC

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1 QUOTE # TO ENSURE PROPER BILLING:

Project Name: 66B-0122 Gillespie Solar Farm

Short Hold Analysis (Yes) (No) UST Project: (Yes) (No)

*Please ATTACH any project specific reporting (QC LEVEL I III III IV) provisions and/or QC Requirements

Invoice To: Freeshling & Robertson

Address: 310 Hubert Street

Raleigh, NC 27603

Purchase Order No./Billing Reference: 66B-0122-00002

Requested Due Date 1 Day 2 Days 3 Days 4 Days 5 Days

"Working Days" 6-9 Days Standard 10 days Rush Work Must Be Pre Approved

Samples received after 15:00 will be processed next business day. Turnaround time is based on business days, excluding weekends and holidays. (SEE REVERSE FOR TERMS & CONDITIONS REGARDING SERVICES RENDERED BY WAYPOINT ANALYTICAL, LLC TO CLIENT)

LAB USE ONLY

Samples INTACT upon arrival? YES NO N/A

Received IN ICE? YES NO N/A

PROPER PRESERVATIVES indicated? YES NO N/A

Received WITHIN HOLDING TIMES? YES NO N/A

CUSTODY SEALS INTACT? YES NO N/A

VOLATILES rec'd W/OUT HEADSPACE? YES NO N/A

PROPER CONTAINERS used? YES NO N/A

TEMP: Therm ID: 111 Observed 0.7°C (Corr. 0.2°C)

TO BE FILLED IN BY CLIENT/SAMPLING PERSONNEL

Certification: NC SC Other N/A

Water Chlorinated: YES NO

Samples Iced Upon Collection: YES NO

ANALYSIS REQUESTED -
pH
Sulfate
Chloride
electric resistivity
oxidation potential

CLIENT SAMPLE DESCRIPTION	DATE COLLECTED	TIME COLLECTED MILITARY HOURS	MATRIX (SOIL, WATER, OR SLUDGE)	SAMPLE CONTAINER			PRESERVATIVES	PH	Sulfate	Chloride	electric resistivity	oxidation potential	REMARKS	ID NO.
				*TYPE SEE BELOW	NO.	SIZE								
B-1, S-2			S	G	1			1	1	1				
B-1, S-3			S	G	1			1	1	1				
B-2, S-2			S	G	1			1	1	1				
B-2, BS-1			S	G	1			1	1	1				
B-4, S-2			S	G	1			1	1	1				
B-4, RS-2			S	G	1			1	1	1				

PRESS DOWN FIRMLY - 2 COPIES

23-250-0101
01083
09-07-2023
12:14:46

Froehling & Robertson, Inc. (Raleigh)
Gillespie Solar Farm 66B-0122-00002

Sampler's Signature: Brian McCarthy

Sampled By (Print Name):

Affiliate:

Upon relinquishing, this Chain of Custody is your authorization for Waypoint Analytical to proceed with the analyses as requested above. Any changes must be submitted in writing to the Waypoint Analytical Project Manager. There will be charges for any changes after analyses have been initialized.

Relinquished By: (Signature) Brian McCarthy

Received By: (Signature) [Signature]

Date: 9-7-23 Milliliters/hours: 11:00

Relinquished By: (Signature) [Signature]

Received By: (Signature) [Signature]

Date: 9-7-23 Milliliters/hours: 15:40

Relinquished By: (Signature) [Signature]

Received For Waypoint Analytical By: [Signature]

Date: 9-7-23 Milliliters/hours: 15:40

Method of Shipment: **NOTE: ALL SAMPLE COOLERS SHOULD BE TAPED SHUT WITH CUSTODY SEALS FOR TRANSPORTATION TO THE LABORATORY. SAMPLES ARE NOT ACCEPTED AND VERIFIED AGAINST COC UNTIL RECEIVED AT THE LABORATORY.**

NPDES: NC SC UST: NC SC Groundwater: NC SC Drinking Water: NC SC Solid Waste: NC SC RCRA: NC SC Brownfield: NC SC Landfill: NC SC Other: NC SC Fed Ex: UPS Hand-delivered Waypoint Analytical Field Service Other

Site Arrival Time:
Site Departure Time:
Field Tech Fee:
Mileage:

SEE REVERSE FOR TERMS & CONDITIONS

ORIGINAL



APPENDIX IV

GBA DOCUMENT

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled.* No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be, and, in general, if you are the least bit uncertain about the continued reliability of this report, contact your geotechnical engineer before applying it.* A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may

perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old*.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration*. Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. *Geotechnical engineers are not building-envelope or mold specialists*.



Telephone: 301/565-2733

e-mail: info@geoprofessional.org www.geoprofessional.org



7 – Contractor’s Concrete Test Sample Report

SOLAR UTILITY STATION
FOUNDATION AND
CONCRETE REPORT

OWNER: Fayetteville PWC
Fayetteville, NC
PROJECT NAME: GILLESPIE B1.9 SOLAR
UTILITY STATION
PROJECT NO.: P.0574167.R.TE
CONTRACTOR:

Foundation				
Concrete				
Depth of Excavation				
Excavated Material				
Dewatering Required				
Rebar Placed Properly				
Imbedments				
Anchor Bolt				
Size				
Spacing				
Alignment				
Nuts				
Construction Joint				
Chamfer				
Pad / Footing Size				
Pier Diameter / Size				
Pier Length				
Concrete Date				
Time Batched				
Time Arrived				
Time Placed				
Truck No.				
Quantity (C.Y.)				
Slump				
Air Percent				
Concrete Temperature				
Test Cyl. Results				

Remarks:

By:
Date:
Sheet:
Rev.:

8 – Approved Major Equipment List

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

**APPROVED MAJOR EQUIPMENT LIST FOR THE
GILLESPIE B1.9 SOLAR UTILITY STATION**

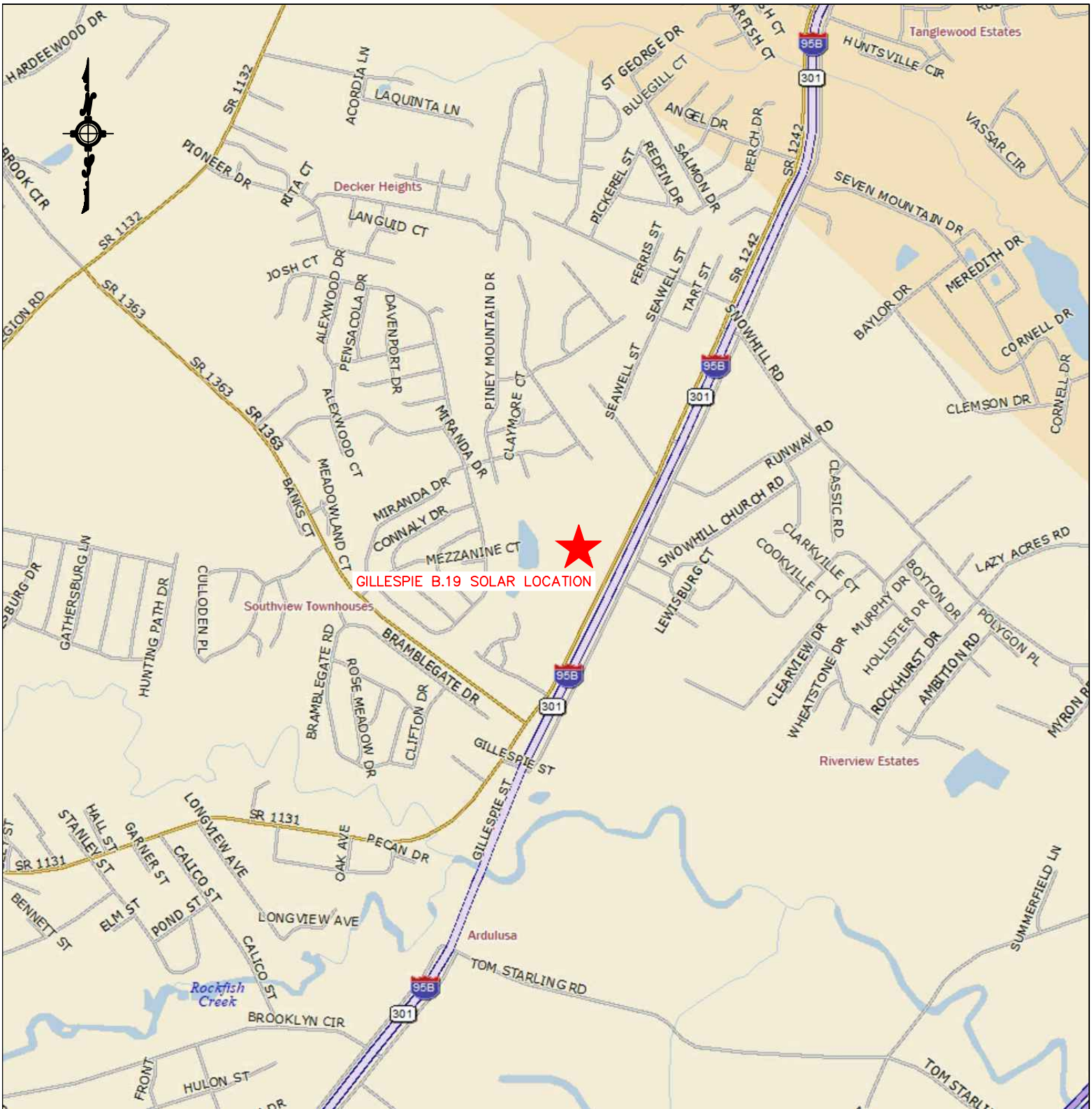
ISSUED FOR BID

Equipment	Quantity
Contractor Furnished PV Module**	TBD by Contractor
Fixed tilt PV module racking**	TBD by Contractor
SUNNY HIGHPOWER PEAK3 125-US*	15
Terrasmart 1500V SolarBOS Disconnect Combiner NEMA 3R*	15
Eaton Pow-R Line XD 480V 3500A minimum rating NEMA 3R*	1
Eaton P48G28B1518CUB Mini Power Center*	1

*Or Approved Equal

**Approval by PWC is Required

9 – Vicinity Map



SITE LOCATION
 3858 GILLESPIE STREET
 FAYETTEVILLE, NC 28306

COORDINATES:
 34°58'28.86"N
 78°54'44.98"W

PWC FAYETTEVILLE
 FAYETTEVILLE, NORTH CAROLINA

GILLESPIE B.19 SOLAR UTILITY STATION
 VICINITY MAP



DWN.	WTD	DATE:	05/05/2023	DWG. NO.
CKD.	AAI	APPD.	AAI	
SCALE:	1"=1500'	FILE:	12548VM	
JOB NO.	P0574167	DATE	REVISION	
© 05/2023				VM-1

10 – Overhead Distribution Specification

a. Staking Sheet

b. Labor and Materials Contract

c. Assembly Drawings

d. Contractor and Owner Furnished Material List

**OVERHEAD DISTRIBUTION SPECIFICATION
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- A. Staking Sheet
- B. Labor and Materials Contract
- C. Assembly Drawings
- D. Contractor and Owner Furnished Material List

OVERHEAD DISTRIBUTION MATERIAL SPECIFICATIONS

1.0 GENERAL

- 1.1 All materials shall be new except items specified for reuse.
- 1.2 All material, unless noted by the Owner, shall be supplied by the Contractor.
- 1.3 All materials issued to or returned by the Contractor must be acknowledged by a material receipt.
- 1.4 Transformers removed must be delivered to the Owner's transformer handling facility.
- 1.5 Materials removed and salvaged must be returned to the Owner's warehouse and a receipt will be issued to the Contractor for materials returned.
- 1.6 The Contractor will be charged for all materials removed which are neither reused nor returned to the Owner's warehouse. Current stock item prices will be used to determine the removed material charge.
- 1.7 A brief description of the materials is furnished hereinafter for the Contractor's information.
- 1.8 Reference to ASTM, NEMA, AWS, SSPC, or ACI Standard implies reference to the latest revision or to its replacement if it has been discontinued.
- 1.9 All removal material that is not designated for salvage by the Owner shall be disposed of by the contractor

2.0 POLES - WOOD

- 2.1 All poles shall meet the requirements of ANSI Standard "Specifications and Dimensions for Wood Poles 05.1," the latest revision thereof.
- 2.2 Poles shall be framed as indicated on the Drawings. All field drilled holes shall be treated with a two percent (2%) solution of copper naphthenate or other EPA approved preservative before framing.
- 2.3 New poles shall be Southern Yellow Pine and shall meet the requirements set forth in ANSI Specification and Dimension for Wood Poles 05.1. Treatment shall be the latest AWWA Standard C4 for the Preservative Treatment of Poles By Waterborne Process. The preservative shall be chromated copper arsenate solution, CCA, conforming to AWWA Specifications P5 or the latest revisions thereof.

3.0 CROSSARMS

Crossarms will be wood or steel as noted on the assembly drawings.

Wood

Wood crossarms shall be either Apitong or treated select structural Douglas Fir. Douglas Fir shall be as described in WCLIB No. 16, latest editions. Treatment shall meet requirements of AWWA Standard P8 and P9, latest edition. Preservatives shall be five percent (5%) solution pentachlorophenol by weight in petroleum carrier. Crossarms shall be roofed and drilled.

Steel

Steel crossarms (10'-0" and 8'-0") shall be rated 8,150 pounds/position for three (3) positions, and steel crossarms (5'-4") shall be rated 8,502 pounds/position for three (3) positions.

4.0 HARDWARE

Hardware shall be hot-dip galvanized.

4.1 Pole-top and crossarm pins shall conform to ANSI Standard C135.17 and C135.22.

4.2 Bolts and nuts for overhead construction shall conform to ANSI Standard C135.1.

Machine, carriage, and double-arming bolts-ANSI Standard C135.1.

Eye bolts-ANSI Standard C135.4.

Lag screws-ANSI Standard C135.3.

4.3 Steel parts shall conform to ASTM Specifications A36.

4.4 Malleable iron shall conform to ASTM Specifications A47.

4.5 Galvanizing shall conform to ASTM Specifications A153.

5.0 GUY WIRE

Guy wire shall be three-eighths inch (3/8”) high strength steel, rated 10,800 pounds ultimate strength.

6.0 ANCHORS

Anchors for guying shall be power installed, screw type, single helix, ten-inch (10”) with one inch (1”) round shaft, with a triple eye, rated 10,000 pounds.

7.0 DEADENDS

Deadends shall be the feed-through bolted type for #1/0 AAAC - Azusa conductors. Preformed (PLP) deadends will not be permitted on primary or secondary conductor.

Automatic deadends of suitable size and ratings may be used on guys.

Guy attachments for distribution guys shall be pole eye plates rated 18,000 pound minimum for 3/8” High Strength Steel.

8.0 SPLICES, CONNECTORS

Splices shall be full-tension compression type. Automatic splices are not permitted. All connectors shall be parallel groove or sleeve-type aluminum compression. Split-bolts are **not** allowed on aluminum. Transformer stirrups for 1/0 AAAC conductor may be compression type, sized to suit conductors.

9.0 TIES

Ties for all aluminum conductors 1/0 AWG AAAC and larger shall be preformed Wraplock ties.

10.0 CONDUCTORS

Distribution conductors shall be:

11.1 Primary & Neutral: 1/0 AWG AAAC-Azusa

11.2 Secondary: #2 Aluminum Triplex-Shrimp

11.3 Pole grounds shall be No. 4 AWG or larger solid soft drawn copper on all distribution wood poles except those with special equipment (e.g., reclosers, regulators, capacitors, etc.) where they shall be No. 2 stranded AWG copper.

11.0 INSULATORS

Pin Insulators

Pin insulators shall conform to ANSI, NEMA, and AIEE Standards for insulators.

<u>Insulator Type</u>	<u>Flashover</u>		<u>Leakage</u>
	<u>Dry</u>	<u>Wet</u>	
25 kV Pin Insulator	65 kV	35 kV	9"

Suspension Insulators

Distribution suspension insulators shall be 25 kV polymer

Insulator Type	Flashover		Leakage	SML
	Dry	Wet		
35 kV Polymer Suspension <u>Fiberglass Guy Strain Insulators</u>	200 kV	160 kV	33"	15,000 lbs.

Fiberglass insulators shall have the following characteristics.

Insulator Type	Flashover		Leakage	ANSI Class
	Dry	Wet		
Fiberglass Insulator	----	----	----	EEI - NEMA 54" 21,000 lbs. Roller/Clevis

Spool Insulators

Spool insulators

Insulator Type	Flashover		Leakage	ANSI Class EEI - NEMA
	Dry	Wet		
Spool, 3"	25kV	12kV vertical 15kV horizontal	----	53-2

12.0 LIGHTNING ARRESTERS

Lightning arresters for all applications other than transformer mounting shall be direct connected, rated as follows:

Nominal Line Voltage	Arrester Rating
12.5/7.2kV M.O.V. Type	10 kV Riser Type Distribution 8.4 kV M.C.O.V.

Arresters shall be polymer, equipped with brackets for pole or crossarm mounting and shall be equipped with a ground lead dis-connector feature in the event of internal arrester failure.

13.0 CUTOUTS

Cutouts shall be 25 kV, 100 Amp, Load break, silicon polymer.

OVERHEAD DISTRIBUTION INSTALLATION SPECIFICATIONS

1.0 GENERAL

- 1.1 The new construction, rearrangements, relocations, modifications, and removals shall be complete in accordance with the Plans, Specifications, Staking Sheets, and Assembly Drawings. All work shall be done in a thorough and workmanlike manner.
- 1.2 The latest edition of the National Electrical Safety Code shall be followed. All construction shall conform to that required for a medium loading district. Deviations from the Plans, Specifications, and Construction Drawings will not be permitted except upon written permission from the Engineer.
- 1.3 The new construction is proposed to be insulated for 25 kV, and operated at 12.47/7.2 kV, three-phase, four-wire grounded wye.

2.0 REMOVALS-N/A

- 2.1 Removals shall consist of removing each and every item designated on the Drawings, the disassembling of structures into material items, and the transportation of the items from the site of the work to the storage area designed by the Owner.
- 2.2 Conductor removal shall include the coiling or reeling of the conductor removed in a workmanlike manner.
- 2.3 Anchor assemblies shall be removed by removing the anchor rod only. If the anchor rod cannot be unscrewed, the rod must be cut or bent down so as to be a minimum of eighteen inches (18") below the ground line. Screw-type anchors shall be completely removed.
- 2.4 The removal shall include any necessary handling, re-sagging, and retying of conductors in those cases where an existing assembly unit will be removed and replaced by a new assembly unit and where any existing conductor is to be retained. Removal will also include any holding or handling of main line or tap conductors at tap lines, angles, and deadends where such is involved and the reinstalling of such conductor, including re-sagging and reconnection. It shall also include reinstalling any conductors temporarily detached.
- 2.5 Removal of overhead assembly units on steel pole structures shall include plugging and/or sealing all holes associated with such assemblies per Manufacturer's recommendation. The Contractor shall be responsible for all labor, material, and equipment associated with such work.
- 2.6 The Contractor shall reinstall, at his own expense, any other items removed by him for his own convenience.
- 2.7 All materials removed as part of the work and not specified to be reused will remain the property of the Owner.

3.0 TRANSFERRING

- 3.1 Transferring shall consist of disconnecting existing material and reinstalling this material in a different location on the same structure or a new structure, provided the new structure is adjacent to the existing structure.
- 3.2 All unused holes in wood poles shall be plugged using treated wood dowel pins. For holes where the hole has been enlarged, the hole will be pressure treated with a two percent (2%) solution of copper naphthenate or other EPA approved preservative compound using a pressure gun prior to plugging.

- 3.3 All unused holes in metal structures shall be plugged per Manufacturer’s recommendations at the Contractor’s expense.
- 3.4 The transfer shall include any necessary handling, re-sagging, and retying of all conductors in those cases where an existing assembly unit will be removed and replaced by a new assembly unit and where any existing conductor is to be retained. Transfer will also include any holding or handling of all conductors at tap lines, angles, and deadends where such is involved and the reinstalling of such conductor, including re-sagging and reconnection. It shall also include reinstalling any conductors temporarily detached.
- 3.5 The Contractor shall reinstall, at his own expense, any other items removed by him for his own convenience.

4.0 POLES – WOOD

4.1 The Contractor shall not install a pole that, in his opinion, or the opinion of the Owner or Engineer, has been damaged or is otherwise unsafe. The Contractor shall promptly report any damaged or questionable pole or other component to the Owner and Engineer and confirm the report in writing.

4.2 Handling of Poles

4.2.1 The Contractor will be responsible for any damage to the poles and arms resulting from his handling, transporting, or storing procedures.

4.2.2 Treated poles shall not be dragged along the ground. Pole tongs, cant hooks, and other pointed tools capable of producing indentations more than one inch (1”) in depth shall not be used in handling the poles. No tools shall be applied to the ground line section of any pole.

4.3 Pole Selection

In distributing poles, extra heavy, choice, close-grained poles shall be reserved for angles, crossings, and deadends.

4.4 Pole Setting

For single-pole wood structures, the minimum setting depths shall be as follows unless noted otherwise on the drawings:

<u>Pole Length</u> (Feet)	<u>Setting Depth</u> (Feet)
30	5.0
35	5.5
40	6.0
45	6.5
50	7.0
55	7.5
60	8.0
65	8.5
70	9.0
75	9.5
80	10.0
85	10.5
90	11.0

Additional embedment may be required for some construction units (See Plan & Profile or Staking Sheets).

- 4.5 On sloping ground, the depth of the hole shall always be measured from the low side of the hole.
- 4.6 Holes shall be approximately eight inches (8") larger than the butt diameter of the pole and shall be at least as large at the bottom as at the top.
- 4.7 Poles shall be set so that alternate crossarm gains face in opposite directions, except at terminals and deadends where the gains of the last two (2) poles shall be on the side facing the terminal or deadend. On unusually long spans, the poles shall be set so that the crossarm comes on the side of the pole away from the long span.
- 4.8 All poles shall be set plumb and in alignment except at line angle points. At line angles where suspension construction is used, poles shall be offset on the bisector of the angle so that conductors will hang directly over the point of intersection in line with the tangent in both directions. All poles shall be plumb after conductors are strung. Where poles are set along the edge of cuts or embankments, or where the soil is liable to be washed out, special precautions shall be taken to ensure durable foundations and the setting depth shall be measured from the lower side of the hole. While backfilling, in no case shall the earth be thrown into a greater depth than six inches (6") without being tamped hard before the next layer is thrown in. The surplus earth shall be placed around the pole in a conical shape and packed tightly in order that water will drain away from the pole.
- 4.9 Where new gains or holes are required in new CCA treated poles, the gains shall be painted with two percent (2%) solution of Copper Naphthenate or other EPA approved preservative compound and holes pressure-treated with the same compound using a pressure gun.
- 4.10 Under no circumstances shall the butt or tops of any pole be cut, unless as specified by the Engineer.
- 4.11 All unused holes in poles shall be plugged prior to erection using treated wood dowel pins. For holes in used poles where the hole has been enlarged, the hole will be pressure-treated with an appropriate preservative compound using a pressure gun prior to plugging.

5.0 ROCK ENCOUNTERED DURING EXCAVATIONS

The Contractor shall be responsible for the removal and disposition of solid rock when encountered in holes for wood poles and tubular steel poles. Solid rock shall be defined as solid, naturally-occurring mineral formations that cannot be effectively removed by conventional trenchers, backhoes, or pressure augers on line trucks. Loose rock or limestone in intermittent layers that result in "difficult digging" shall not be defined as solid rock excavations. "Solid rock" shall require the use of air hammers, blasting or other specialized equipment as approved by the Owner or Engineer.

An adder (M-1 (Rockhole)) will be quoted by the Bidder in the Proposal Section to establish a labor cost for rock excavations, including disposition on a per-cubic-yard basis. Quantities will be agreed upon jointly by the Contractor and the Owner (or Engineer) as the excavations occur. Over excavation to remove rock will not be counted in the quantity of rock excavations. The volume of rock excavation adder will be computed based on the normal pole hole diameter and depth, as if no rock were encountered. Rock adders will not apply to man-made surface treatments, such as asphalt, concrete or gravel.

6.0 CROSSARMS

Crossarms shall be bolted to poles by means of through bolts or threaded rods for large diameter poles while utilizing square washers at both ends. Through bolts and threaded rods shall be of the proper length to extend at least one-half inch (1/2") and not more than two inches (2") beyond the nut after installation is complete. Poles shall be gained so that crossarms are in a vertical position after being installed.

7.0 GUYS AND ANCHORS

- 7.1 Guys shall be attachment type utilizing preformed guy grips. Guys shall be installed in locations specified by the Engineer. Points of attachment to poles shall be as shown on Construction Drawings. Guys shall be installed before conductors or overhead ground wires are strung.
- 7.2 All anchors and rods shall be in line with the strain. All anchors are to be single or multiple helix screw type or expanding rock type and shall be located as staked by the Engineer. Anchor rods shall be so installed that approximately six inches (6") of the rod shall remain out of the ground or extend more than twelve inches (12") out of the ground in cultivated fields. The setting depth of each anchor in regard to depth, torque, and position shall be inspected by the Owner's representative and his approval given in writing.
- 7.3 All anchors shall be installed using torque control tools. The Hydraulic Torque Indicator which provides continuous readouts shall be used and installed torque values shall be recorded for each anchor. Expanding rock type anchors shall be installed per manufacturer's recommendations.
- 7.4 Anchor locations shall be checked and verified by the Contractor prior to installation to assure that guys do not conflict with phase conductors. This is especially critical when transmission guying passes through distribution phase positions. Where fiberglass guy strain insulators are installed in guys, a minimum of twelve inches (12") must be maintained to all phase conductors.
- 7.5 Where multiple fiberglass guy strain insulators are to be installed, in one (1) guy strand, they shall be connected using a chain link of the appropriate size.

8.0 HARDWARE

Hardware shall be installed as indicated on the Drawings. All bolts shall be installed with nuts and locknuts. Bolts shall be long enough to accommodate the necessary nuts, washers, etc. without projecting more than one and one-half inches (1-1/2") or less than one-half inch (1/2") at the free end. They shall not project more than one-fourth inch (1/4") into an eyenut installed.

9.0 INSULATORS

- 9.1 Care shall be exercised in handling and erecting insulators.
- 9.2 All insulators shall be handled with utmost care during storage, transportation, assembly, and installation. Particular care shall be taken to avoid bending stresses in insulator strings during handling. Insulators shall not be dropped. Assembled insulator units shall be handled in such a manner as to avoid axial compressive or torsional loading. Insulators subjected to these, or any other abuses or damage shall be permanently marked and rejected from the job.
- 9.3 All insulators shall be protected from the accumulation of all foreign materials insofar as is possible. Mud, grease, and other foreign materials shall be cleaned from insulators using clean rags. Wire brushes may not be used for the cleaning of any insulator parts. Upon

installation, all insulators shall be clean on all surfaces. Workmen shall not climb on insulators at any time.

10.0 GROUNDING ASSEMBLY

10.1 Pole Grounds

10.1.1 Driven pole grounds shall be installed as indicated on the Staking Sheets.

10.1.2 Refer to the following drawings for the grounding of wood distribution poles:

Wood
M2-1EC and
M2-15REC

10.2 Guys and overhead ground wires shall be attached to the common ground.

10.3 The distribution neutral shall be attached to the common ground.

10.4 Ground rods shall be driven to their full length into undisturbed earth according to the unit assembly drawings. The top of the ground rod shall be located a minimum of one foot (1'-0") below grade or as indicated otherwise on the Assembly Drawings.

10.5 Ground rods shall be 5/8" x 8'-0" copper or copper clad. Extensions shall be added if necessary to obtain a verifiable ground resistance of twenty-five (25) ohms or less.

10.6 Ground wires for distribution wood poles shall be #4 soft drawn copper.

11.0 CONDUCTORS

11.1 Distribution Conductors

11.1.1 Care shall be exercised to avoid kinking, twisting, or abrading the conductor in any manner. Conductors shall not be trampled on, run over by vehicles, or dragged over sharp rocks. The wire on each reel shall be inspected for cuts, kinks, or other injuries. Injured portions or crooked or imperfect splices in the conductor shall be cut out and the wire re-spliced.

11.1.2 Conductors shall be pulled over suitable rollers or stringing blocks properly mounted on the pole or crossarm to prevent binding while stringing.

11.1.3 Installation of conductors and accessories shall be done in accordance with manufacturer's recommendations.

11.1.4 With post and pin-type insulators, the conductors shall be tied in the top groove of the insulator on tangent poles and on the side of the insulator away from the strain at angles greater than ten degrees (10°). Post and pin-type insulators shall be tight on the pins and on tangent construction; the top groove must be in line with the conductor after tying in.

11.1.5 Automatic splices are not permitted on primary, neutral, or secondary conductors.

11.1.6 Utmost care shall be exercised in installing parallel groove clamps. The contact surface of the conductor shall be clean and bright. A steel brush shall be the principal cleaning medium; contact compound shall be used for all connections to aluminum conductors. Those same precautions for cleaning shall also apply to the conductor before splicing.

- 11.1.7 Conductors shall be sagged in accordance with sag and tension charts or tables furnished by the Engineer. Under no circumstances will a decrease in the specified sag be allowed. Sagging by sighting between targets or dynamometer is recommended.
- 11.1.8 The conductor temperature at the time and place of stringing shall be determined by a certified thermometer inserted in a short section of conductor. The temperature at which the conductor is sagged and the spans in which sags are measured shall be recorded and the information given to the Engineer.

12.0 RIGHT-OF-WAY - GENERAL

- 12.1 Access to right-of-way areas shall be from existing public or private roads or along existing Owner rights-of-way. Where private roads or trails are used, the Contractor shall obtain permission in writing from the property owner for their use with copies to be furnished to the Owner and Engineer.
- 12.2 All right-of-way clearing shall be completed for a section of the line before pole setting may begin. No poles shall be set with right-of-way not completely cleared.
- 12.3 All right-of-way clearing will be by the Owner.
- 12.4 At the completion of construction and clean-up the Contractor shall re-grade all disturbed right-of-way areas to their preconstruction contours where practicable. All cuts or fills shall maintain a maximum slope of 3:1 in order to ensure as little run off as possible. Any soil erosion and sedimentation devices required to stabilize and/or reduce further erosion shall be installed. All devices installed during construction and no longer required shall be removed. All disturbed or denuded areas shall be covered with topsoil, if required, fertilized, limed, seeded, strawed, and tacked as necessary. Fertilizer, lime, and seed rates and mixes shall be as specified by the local soil conservation service for the time of year applied. All cost for right-of-way clean-up and restoration shall be borne by the Contractor.
- 12.5 Maintenance Of Existing Rights-of-Way

Existing rights-of-way, both public and private, must be maintained during construction in such a manner so as not to create a hazard. Deep ruts shall be backfilled and graded out. Denuded grass and vegetation areas shall be replanted with a suitable seed mixture. At the end of the construction, the right-of-way should be left in as good or better condition than it was before construction began. All cost of maintaining existing right-of-way and/or reseeding shall be borne by the Contractor.
- 12.6 Temporary Service Or Access Roads
 - 12.6.1 If, during the course of construction it should become necessary for the Contractor to construct, modify, widen, grade, or perform any other earth work in order to provide access to or work areas around any facilities covered in this Contract, he shall do so at his own cost.

The Contractor shall be responsible for all permits required for such construction. He shall also be responsible for the installation and maintenance of any soil erosion and sediment control devices required by local, county, or state agencies.
 - 12.6.2 Any service roads required should follow existing trails, logging roads, maintenance roads, etc., as much as possible. New service road routes should take the best advantage of existing terrains. New service or access roads routes shall be reviewed with the Owner or Engineer prior to beginning construction.
 - 12.6.3 All cost associated with the construction, maintenance, removal, and

rehabilitation of any area associated with the rights-of-way, access roads, service roads, etc., shall be borne by the Contractor. A separate cost item will not be billed for this work.

A – Staking Sheet

CLIENT: Fayetteville PWC										BOOTH & ASSOCIATES, LLC				STAKED BY: HTB				SHEET 1 OF 1											
PROJECT / LOCATION: Gillespie Solar B1.9										CONSULTING ENGINEERS RALEIGH, N.C.				STAKED DATE: 6/21/23				REVISION DATE: 9/14/23											
DESCRIPTION: 12.47kV Operation/25kV Insulation - 3 Phase 1/0ACSR Point of Interconnection										STAKING SHEET				CATEGORY "E R I W" KEY: E = EXISTING, R = REMOVE, I = INSTALL, W = TRANSFER															
Pole Number	E R I W	PRIMARY BACK SPAN	# of Cond.	TOTAL BACK SPAN	Primary Wire Size	RULING SPAN	POLE HT / CL	PRIMARY UNIT		TRANSF. "G"	GND "M2"	GUY "E"		ANCHOR "F"		LINE ANGLE LEAD	SECONDARY				SERVICE			SEC/SER WIRE SIZE	MISCELLANEOUS UNITS		ATTACH-FOR INFO ONLY		REMARKS
								No.	Unit			NO.	UNIT	NO.	UNIT		SPAN		UNIT		SPAN	NO.	"K"		No.	Unit	TELE	CATV	
																	UNDER	SEC	NO.	"J" OR "K"									
PV TF	E E I I									3PH TF (2500)	UG6-2EC												1	UG7-1EC					
																							3	200A Elbow					
1	I I I I						45/3	1	VC7EC		M2-1EC	1	5.1-03	1	F2-10EC	DE 15', 10'							1	UG2-1EC					
		220	3	660	1/0UG																		1	UG11-1EC					
																							220	UG12-4EC					
2	I I I I						45/3	1	VC8-1EC		M2-1EC												1	QD-6EC			PTs Only for QD-6EC		
3	I I I I						45/3	1	VC2EC		M2-1EC												1	REC600HS					
		40	4	160	1/0 AAAC																		3	M5-26EC					
4	I I I I						45/3	1	GOAB	G109EC (.5)	M2-15REC	1	5.1-03	1	F2-10EC	DE 15', 10'		40	1	J1EC			#2AL TX	1	M5-9EC				
5	I I							1	VC7-2EC																				

NOTES

SKETCH REFERENCE
SEE BOOTH & ASSOCIATES DRAWING TITLED

B – Labor and Materials Contract

FAYETTEVILLE PUBLIC WORKS COMMISSION
 FAYETTEVILLE, NORTH CAROLINA

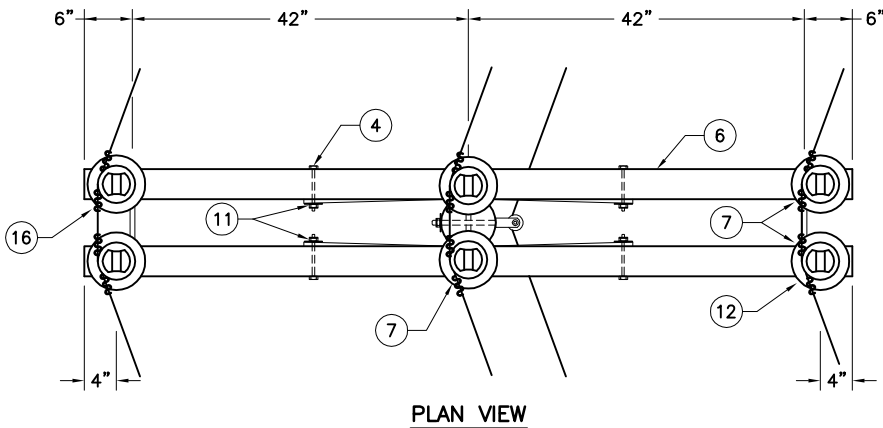
LABOR AND MATERIALS CONTRACT

GILLESPIE B1.9 SOLAR

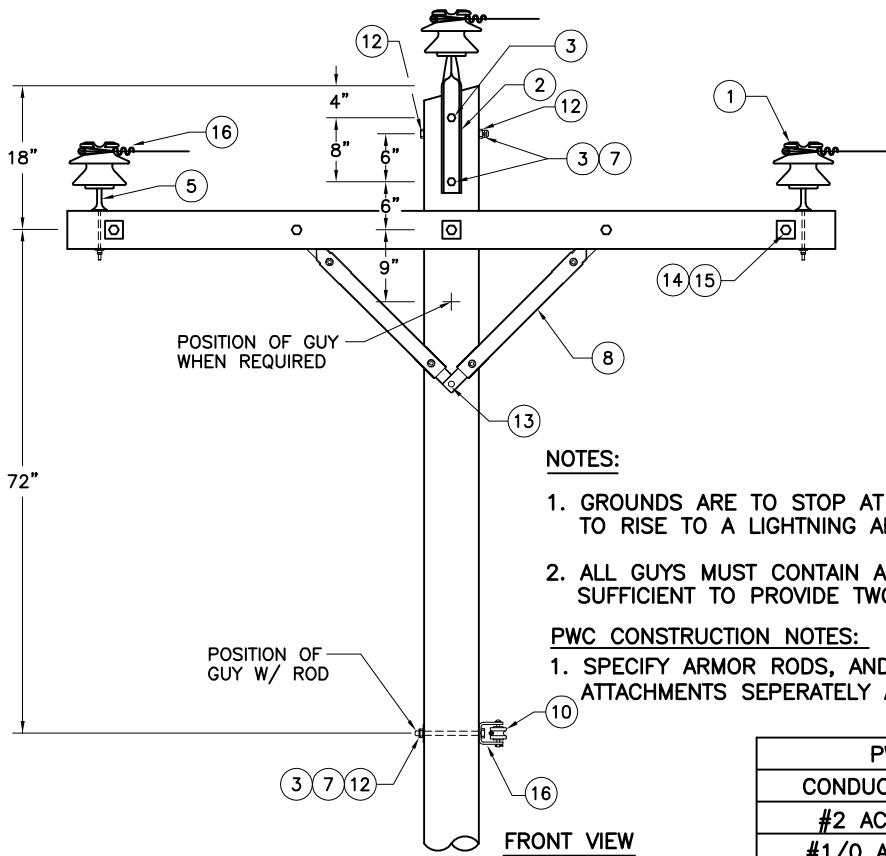
DISTRIBUTION INSTALL

Unit Number	Number of Units	Unit Price			EXTENDED PRICE Labor & Materials
		Labor	Materials	Labor & Materials	
<u>Poles</u>					
45/3	4	\$	\$	\$ -	\$ -
<u>Pole Top Assemblies</u>					
VC2EC	1	\$	\$	\$ -	\$ -
VC7EC	1	\$	\$	\$ -	\$ -
VC7-2EC	1	\$	\$	\$ -	\$ -
VC8-1EC	1	\$	\$	\$ -	\$ -
GOAB	1	\$	\$	\$ -	\$ -
<u>Conductors (ft)</u>					
1/0 UG Pri.	660	\$	\$ /ft	\$ -	\$ -
1/0 AAAC	640	\$	\$ /ft	\$ -	\$ -
#2 AL TX	40	\$	\$ /ft	\$ -	\$ -
<u>Guy & Anchor Assemblies</u>					
5.1-03	2	\$	\$	\$ -	\$ -
F2-10EC	2	\$	\$	\$ -	\$ -
<u>Grounding Assemblies</u>					
M2-1EC	3	\$	\$	\$ -	\$ -
M2-15REC	1	\$	\$	\$ -	\$ -
<u>Transformer Assemblies</u>					
G109EC (.5)	1	\$	\$	\$ -	\$ -
<u>Secondary & Service Assemblies</u>					
J1EC	2	\$	\$	\$ -	\$ -
<u>Miscellaneous Assemblies</u>					
M5-9EC	1	\$	\$	\$ -	\$ -
M5-26EC	3	\$	\$	\$ -	\$ -
QD-6EC	1	\$	\$	\$ -	\$ -
REC600HS	1	\$	\$	\$ -	\$ -
UG2-1EC	1	\$	\$	\$ -	\$ -
UG11-1EC	1	\$	\$	\$ -	\$ -
UG12-4EC	220	\$	\$	\$ -	\$ -
200A Loadbreak Elbows	3	\$	\$	\$ -	\$ -
TOTAL - DISTRIBUTION INSTALL ASSEMBLY UNITS					\$ -

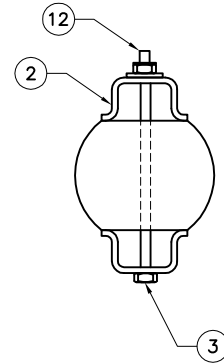
C – Assembly Drawings



PLAN VIEW



FRONT VIEW



POLE TOP PIN ASSEMBLY

NOTES:

1. GROUNDS ARE TO STOP AT THE NEUTRAL POSITION EXCEPT TO RISE TO A LIGHTNING ARRESTER OR TRANSFORMER.
2. ALL GUYS MUST CONTAIN A GUY STRAIN INSULATOR SUFFICIENT TO PROVIDE TWO FEET OF AIR CLEARANCE.

PWC CONSTRUCTION NOTES:

1. SPECIFY ARMOR RODS, AND/OR CONDUCTOR DEADEND ATTACHMENTS SEPERATELY AS REQUIRED.

PWC DESIGN LIMITS	
CONDUCTOR	MAX ANGLE
#2 ACSR	30°
#1/0 AAAC	25°

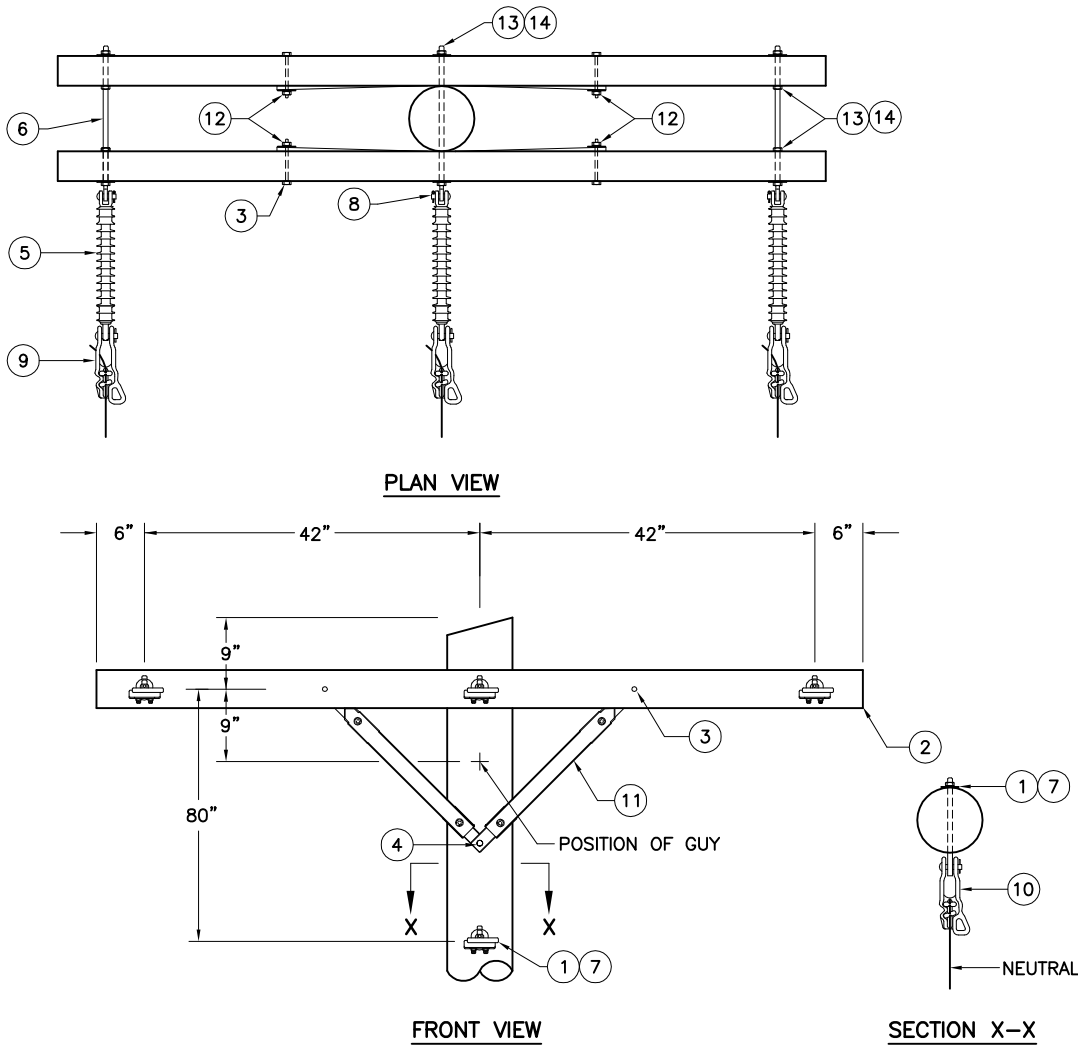
PWC REVISIONS				ITEM	PWC STOCK #	PWC MATERIAL DESCRIPTION	QTY.
0	12/3/07	JLL	PWCOST	1	1160065	INSULATOR, PIN-TYPE, ANSI 55-6	6
REVISED	BY	APPR		2	1100568	PIN, POLE TOP, 20" X 1"	2
				3	1325180	BOLT, MACHINE, 5/8" X 12", w/NUT	4
				4	1325005	BOLT, CARRIAGE, 3/8" X 4-1/2", w/NUT	4
				5	1100562	PIN, CROSSARM, 1", LONG SHANK w/NUT	4
				6	1100010	CROSSARM, 8" WOOD	2
				7	1325733	WASHER, DOUBLE COIL SPRING LOCK, 5/8"	14
				8	1100530	BRACE, CROSSARM, WOOD, 38" X 18"	2
				9	1230010	CLEVIS, INSULATED SECONDARY, DEADEND	1
				10	1160130	INSULATOR, SPOOL, 53-2	1
				11	1325710	WASHER, FLAT, ROUND, 3/8"	4
				12	1325760	WASHER, SQUARE, CURVED, 3"	2
				13	1325145	SCREW, LAG, 1/2" X 4"	2
				14	1325025	BOLT, DOUBLE ARMING, 5/8" X 20", w/NUT	3
				15	1325765	WASHER, SQUARE, FLAT, 5/8"	10
				16	1065010	TIE WIRE, #4 SOLID ALUMINUM	24

**CROSSARM CONSTRUCTION THREE
PHASE, DOUBLE ARM, 25KV**



SCALE
1/2"=1'-0"

DWG.
VC2EC



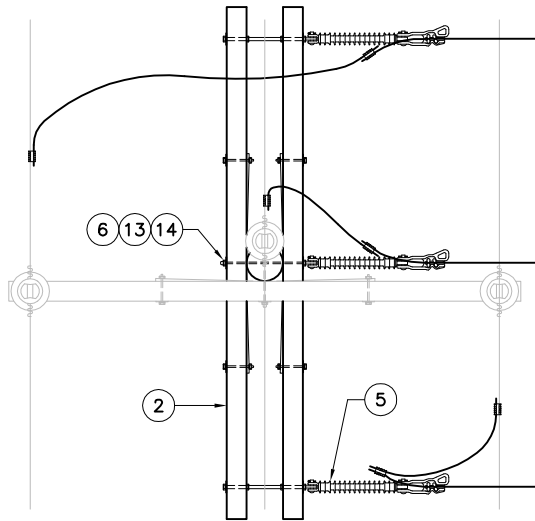
NOTES:

1. GROUNDS ARE TO STOP AT THE NEUTRAL POSITION EXCEPT TO RISE TO A LIGHTNING ARRESTER OR TRANSFORMER.
2. ALL GUYS MUST CONTAIN A GUY STRAIN INSULATOR SUFFICIENT TO PROVIDE TWO FEET OF AIR CLEARANCE.

PWC CONSTRUCTION NOTES:

1. SPECIFY ARMOR RODS, AND/OR CONDUCTOR DEADEND ATTACHMENTS SEPERATELY AS REQUIRED.

				ITEM	PWC STOCK #	PWC MATERIAL DESCRIPTION	QTY.
				1	1325760	WASHER, SQUARE, CURVED, 3"	1
				2	1100010	CROSSARM, 8" WOOD	2
				3	1325005	BOLT, CARRAGE, 3/8" X 4-1/2" w/NUT	4
				4	1325145	SCREW, LAG, 1/2" X 4"	2
				5	1160025	INSULATOR, ONE PIECE, DEADEND, 25 KV	3
				6	1325025	BOLT, DOUBLE ARMING, 5/8" X 20", w/NUT	3
				7	1325080	BOLT, OVAL, EYE, 5/8" X 12"	1
				8	1325530	NUT, EYE, GALV, 5/8"	3
				9	-	CLAMP, AL. STRAIGHT D.E. (AS REQUIRED)	3
				10	-	CLAMP, AL. STRAIGHT D.E. (AS REQUIRED)	1
				11	1100530	BRACE, CROSSARM, WOOD, 38" X 18"	2
				12	1325710	WASHER, FLAT, ROUND, 3/8"	4
				13	1325733	WASHER, DOUBLE COIL, SPRING LOCK, 5/8"	11
				14	1325765	WASHER, SQUARE, FLAT, 5/8"	10
PWC REVISIONS							
3							
2							
1							
0	2/1/05	CADD GRAPHICS	OST				
REVISIONS	BY	APPR.					
CROSSARM CONSTRUCTION, THREE PHASE, DEADEND, 25KV							
SCALE 1/2"=1'-0"						DWG. VC7EC	



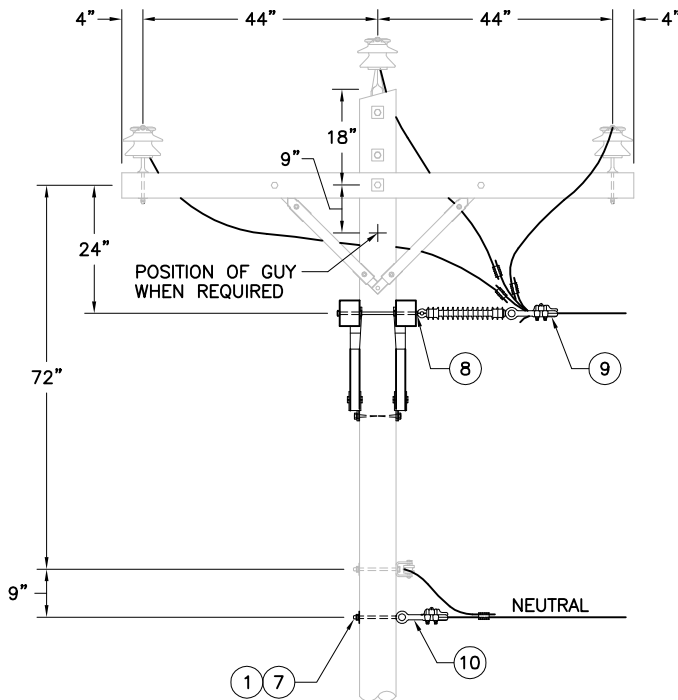
PLAN VIEW

NOTES:

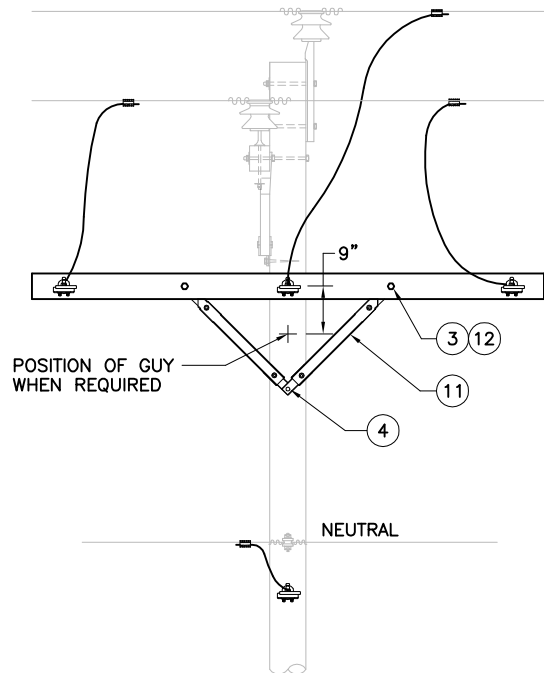
1. GROUNDS ARE TO STOP AT THE NEUTRAL POSITION EXCEPT TO RISE TO A LIGHTNING ARRESTER OR TRANSFORMER.
2. ALL GUYS MUST CONTAIN A GUY STRAIN INSULATOR SUFFICIENT TO PROVIDE TWO FEET OF AIR CLEARANCE.
3. ADD PIN INSULATOR SUPPORT FOR JUMPER CONDUCTORS AS NEEDED.

PWC CONSTRUCTION NOTES:

1. SPECIFY ARMOR RODS, AND/OR CONDUCTOR DEADEND ATTACHMENTS SEPERARELY AS REQUIRED.

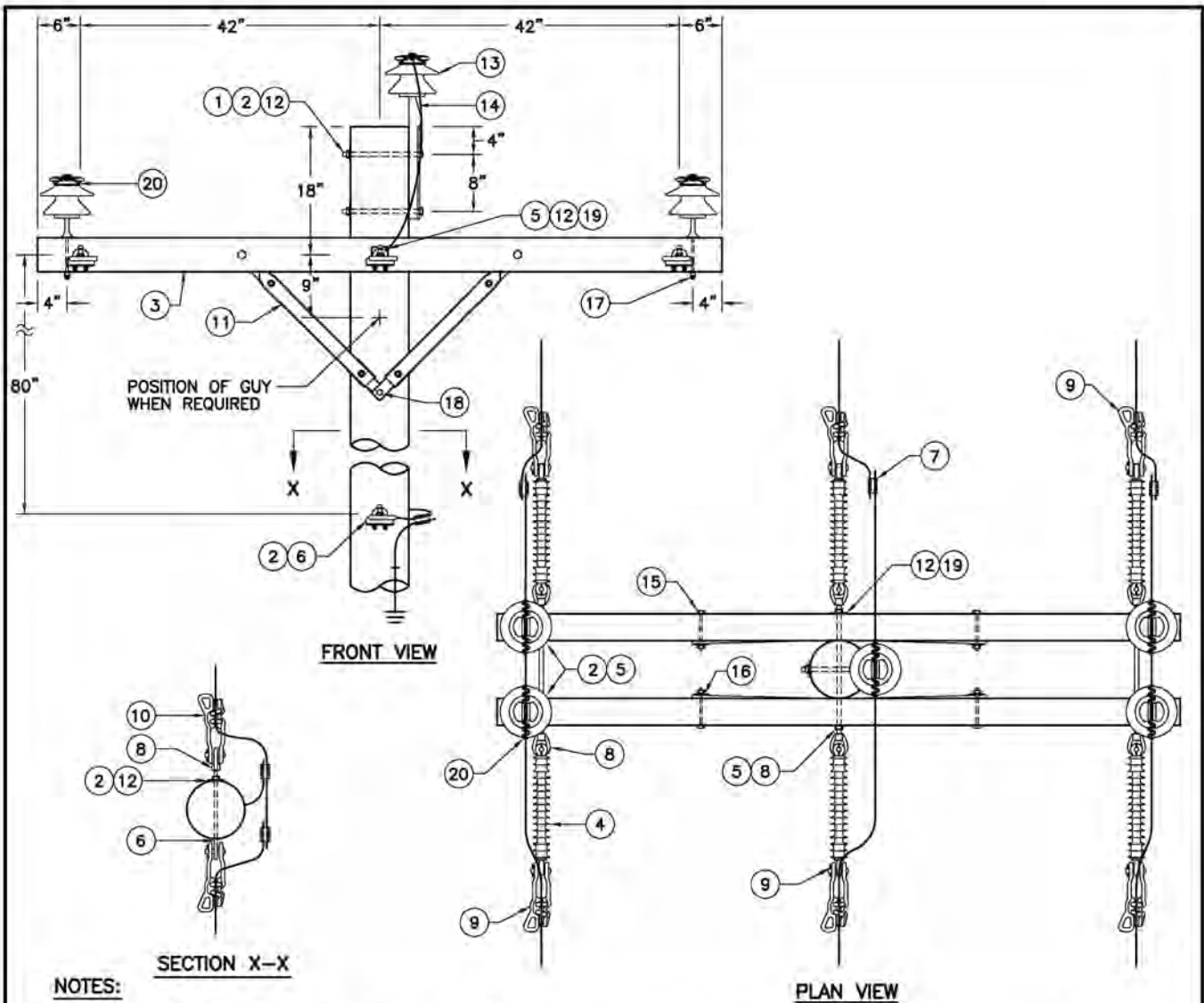


FRONT VIEW



SIDE VIEW

FWC				ITEM	PWC STOCK #	PWC MATERIAL DESCRIPTION	QTY.
				1	1325760	WASHER, SQUARE, CURVED, 3"	1
				2	1100010	CROSSARM, 8" WOOD	2
				3	1325005	BOLT, CARRAGE, 3/8" X 4-1/2" w/NUT	4
				4	1325145	SCREW, LAG, 1/2" X 4"	2
				5	1160025	INSULATOR, ONE PIECE, DEADEND, 25 KV	3
				6	1325025	BOLT, DOUBLE ARMING, 5/8" X 20", w/NUT	3
				7	1325080	BOLT, OVAL, EYE, 5/8" X 12"	1
				8	1325530	NUT, EYE, GALV, 5/8"	3
				9	-	CLAMP, AL. STRAIGHT D.E. (AS REQUIRED)	3
				10	-	CLAMP, AL. STRAIGHT D.E. (AS REQUIRED)	1
				11	1100530	BRACE, CROSSARM, WOOD, 38" X 18"	2
				12	1325710	WASHER, FLAT, ROUND, 3/8"	4
				13	1325733	WASHER, DOUBLE COIL, SPRING LOCK, 5/8"	11
				14	1325765	WASHER, SQUARE, FLAT, 5/8"	10
0	12/3/07	JLL	PWCOST				
REVISED	BY	APPR					
PWC REVISIONS							
3							
2							
1							
0	1/18/07	CADD GRAPHICS	OST				
REVISED	BY	APPR.					
CROSSARM CONSTRUCTION THREE-PHASE TAP ARM, 25KV							
						ELECTRICITIES	
						SCALE 1/2"=1'-6"	DWG. VC7-2EC



NOTES:

1. GROUNDS ARE TO STOP AT THE NEUTRAL POSITION EXCEPT TO RISE TO A LIGHTNING ARRESTER OR TRANSFORMER.
 2. ALL GUYS MUST CONTAIN A GUY STRAIN INSULATOR SUFFICIENT TO PROVIDE TWO FEET OF AIR CLEARANCE.
- PWC CONSTRUCTION NOTES:**
1. SPECIFY ARMOR RODS, AND/OR CONDUCTOR DEADEND ATTACHMENTS SEPERATELY AS REQUIRED.

PWC		ITEM	PWC STOCK #	PWC MATERIAL DESCRIPTION	QTY.		
		1	1325180	BOLT, MACHINE, 5/8" X 12", w/NUT	2		
		2	1325760	WASHER, SQUARE, CURVED, 3"	4		
		3	1100010	CROSSARM, 8" WOOD	2		
		4	1160025	INSULATOR, ONE PIECE, DEADEND, 25 KV	6		
		5	1325025	BOLT, DOUBLE ARMING, 5/8" X 20", w/NUT	3		
		6	1325085	BOLT, OVAL EYE, 5/8" X 14"	1		
		7	1075245	CONNECTOR PRL. GRVE. COMP., #1/7	1		
		8	1325535	NUT, SQUARE, 5/8"	7		
		9	-	CLAMP, AL. STRAIGHT D.E. (AS REQUIRED)	6		
		10	-	CLAMP, AL. STRAIGHT D.E. (AS REQUIRED)	2		
		11	1100530	BRACE, CROSSARM, WOOD, 38" X 18"	2		
		12	1325733	WASHER, DOUBLE COIL, SPRING LOCK, 5/8"	14		
		13	1160065	INSULATOR, PIN-TYPE, ANSI 55-6	5		
		14	1100568	PIN, POLE TOP, 20"	1		
		15	1325005	BOLT, CARRAGE, 3/8" X 4-1/2" w/NUT	4		
		16	1325710	WASHER, FLAT, ROUND, 3/8"	4		
0	12/3/07	JLL	PWCOST	17	1100562	PIN, CROSSARM, 1", LONG SHANK w/NUT	4
REVISED	BY	APPR		18	1325145	SCREW, LAG, 1/2" X 4"	2
				19	1325765	WASHER, SQUARE, FLAT, 5/8"	10
PWC REVISIONS				20	1065010	TIE WIRE, #4 SOLID ALUMINUM	24

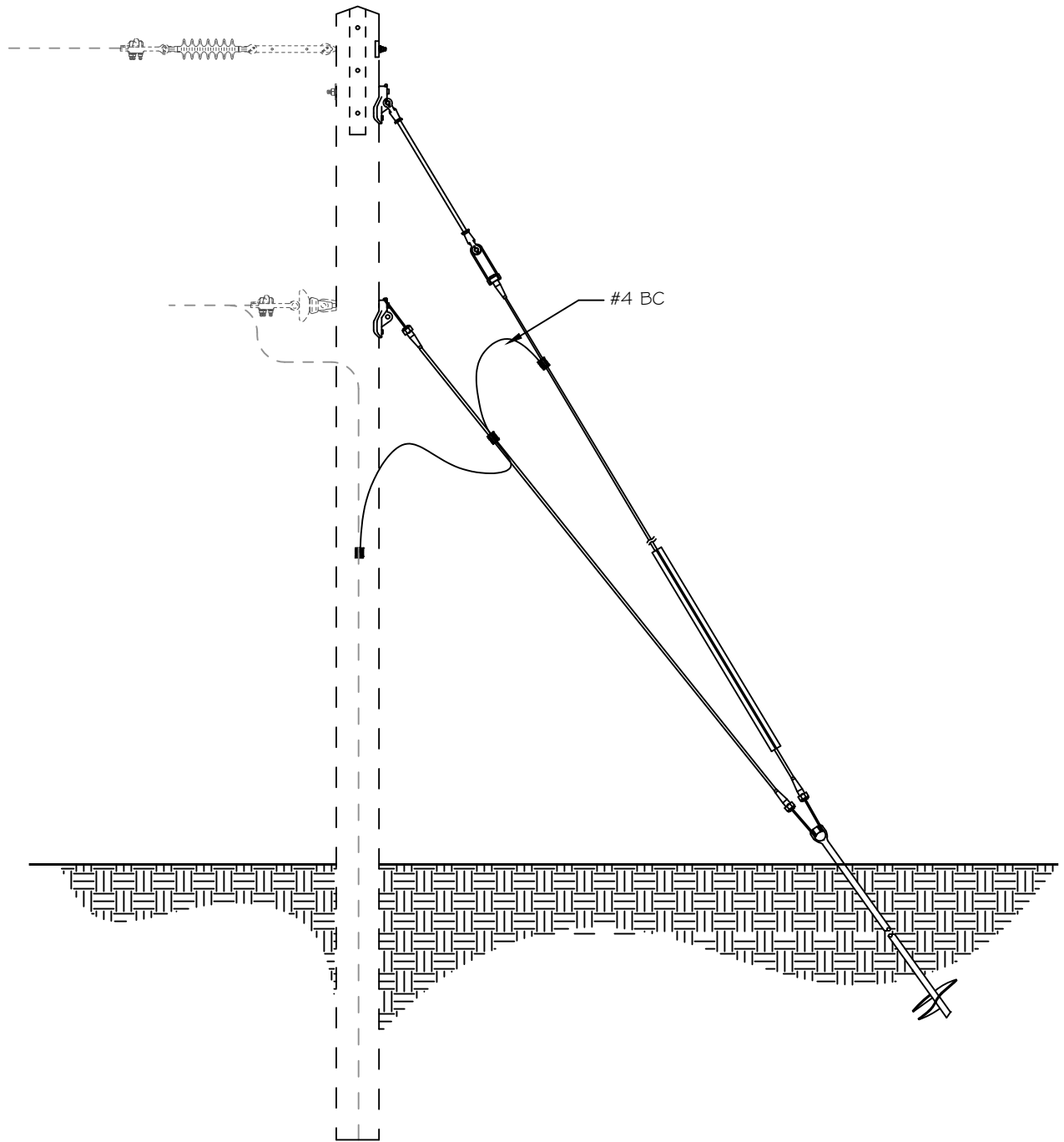
**CROSSARM CONSTRUCTION
THREE PHASE, DOUBLE DEADEND, 25KV**



SCALE
1/2"=1'-0"



DWG.
VC8-1EC

3			
2			
1			
0	11/10/05	CADD GRAPHICS	DST
REVISED	BY	APPR.	

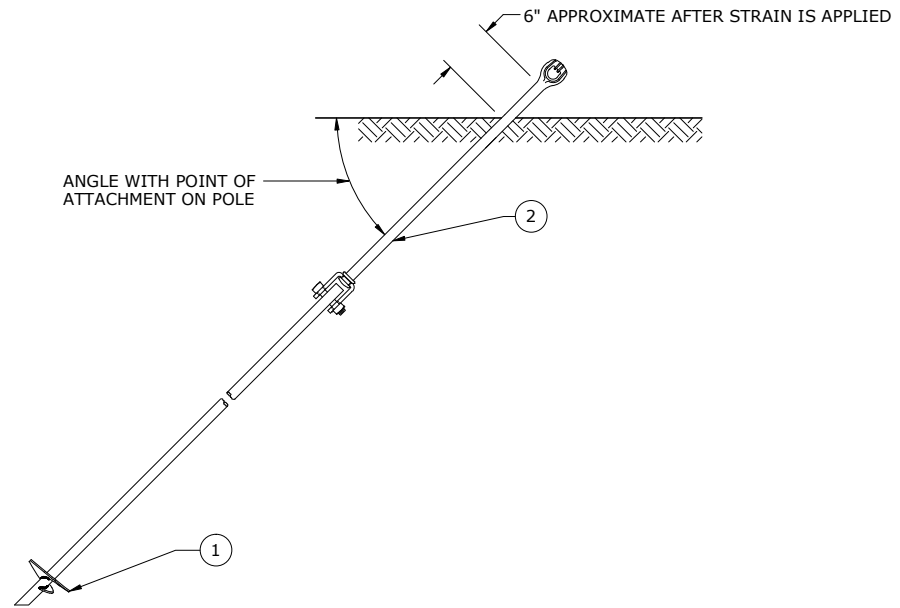


NOTES:

1. ALL GUYS EXTENDING ABOVE THE NEUTRAL POSITION SHALL HAVE A FIBERGLASS GUY STRAIN INSULATOR INSTALLED.
2. A 12" MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN THE FIBERGLASS GUY STRAIN INSULATOR AND ANY ENERGIZED PART OR CONDUCTOR.

REVISED	REV. BY:	<u>Construction and Operation Procedures</u>	FAYETTEVILLE PUBLIC WORKS COMMISSION	
6/23/2020	OST		 	
		SINGLE ANCHOR GUY GROUNDING INSTALLATIONS	DWN. BY: S. COLLINS	
			DATE: JUNE 30, 2001	
		CK'D BY:	APPR. BY:	SCALE: NONE
				DRAWING NO. 5.1-03

RECOMMENDED ANCHOR SIZES				
SIZE "X"	8"	10"	15"	SOIL CLASS
HOLDING STRENGTH	11,000 LBS	13,000 LBS	16,000 LBS	5
HOLDING STRENGTH	9,000 LBS	10,000 LBS	15,000 LBS	6
HOLDING STRENGTH	6,000 LBS	7,000 LBS	12,000 LBS	7



NO.	INVENTORY NO.	QUANTITY	DESCRIPTION
1	10-09-XX	1	SCREW ANCHOR, GUY WIRE
2	10-32-71	1	ROD, EXTENSION, QUANTITY AND LENGTH AS REQUIRED

NOTES:

1. USE THE NUMBER OF EXTENSION RODS NEEDED TO REACH THE DEPTH WHERE MAXIMUM HOLDING POWER IS OBTAINED.
2. GROUNDING OF THE GUY IS NOT RECOMMENDED TO PREVENT CATHODIC CORROSION OF THE ANCHOR.
3. ALL GUYS MUST CONTAIN A GUY STRAIN INSULATOR SUFFICIENT TO PROVIDE TWO FEET OF AIR CLEARANCE.
4. SEE DWG. F1-XEC FOR SOIL CLASSIFICATION DATA.

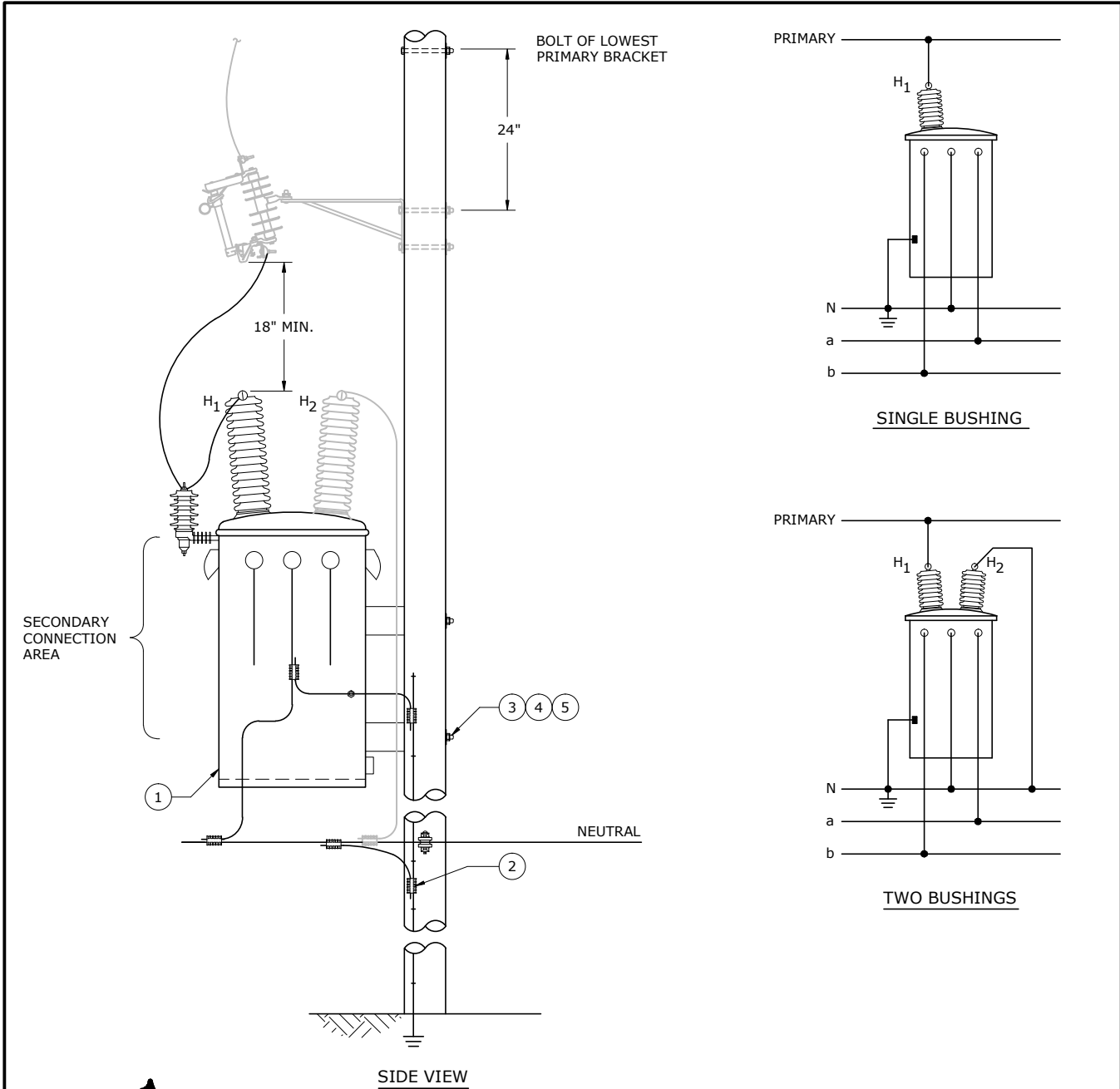
3			
2			
1	10/18/13	CADD GRAPHICS	OST
0	3/11/05	CADD GRAPHICS	OST
REVISED	BY	APPR.	

SCREW ANCHOR ASSEMBLY

ELECTRICITIES
OF NORTH CAROLINA, INC.

SCALE
1/2"=1'-0"

DWG.
F2-XEC



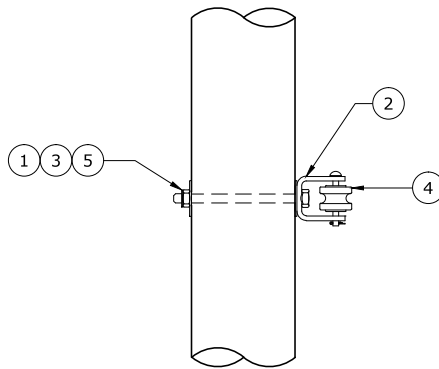
NO.	INVENTORY NO.	QUANTITY	DESCRIPTION
1	05-01-XX	1	TRANSFORMER, REQUIRED SIZE
2	13-01-XX	-	CONNECTOR
3	12-06-XX	2	BOLT, MACHINE
4	10-44-09	2	WASHER, SQUARE FLAT, 2 1/4"
5	10-44-XX	2	WASHER, SQUARE, FLAT

- NOTES:**
1. BOND TRANSFORMER NEUTRAL AND TRANSFORMER GROUND TO SYSTEM NEUTRAL AND SYSTEM GROUND.
 2. TRANSFORMERS MAY BE MOUNTED AT 45° TO THE LINE.
 3. PLACE BIRD GUARDS AND USE INSULATED CONDUCTOR ON ALL PRIMARY LEADS.
 4. MAY USE HARDENED SPIN TOP BUSHINGS IN LIEU OF BIRD GUARDS.
 5. GROUNDS ARE TO STOP AT THE NEUTRAL POSITION EXCEPT TO RISE TO A LIGHTNING ARRESTER OR TRANSFORMER WHEN APPLICABLE.
 6. SEE DRAWING MG-11EC FOR CONDUCTOR SIZE.
 7. TRANS* DENOTES TRANSFORMER KVA SIZE
 8. FUSES AS REQUIRED, SEE DWGS. M5-9EC AND M5-9CLEC.
 9. SEE DWG. M2-1EC FOR TRANSFORMER GROUNDING.

3	10/18/13	CADD GRAPHICS	OST
2	3/20/07	CADD GRAPHICS	OST
1	6/15/06	CADD GRAPHICS	OST
0	11/16/04	CADD GRAPHICS	OST
REVISED	BY	APPR.	

SINGLE-PHASE CONVENTIONAL TRANSFORMER
240/120 VOLT

SCALE 1/2"=1'-0"	DWG. G109EC
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NO.	INVENTORY NO.	QUANTITY	DESCRIPTION
1	10-44-09	1	WASHER, SQUARE FLAT, 2 1/4"
2	10-17-40	1	CLEVIS, INSULATED SECONDARY/DEADEND
3	12-06-XX	1	BOLT, MACHINE
4	08-14-02	1	INSULATOR, SPOOL, CLASS 53-2
5	10-44-33	1	WASHER, LOCK, 5/8"

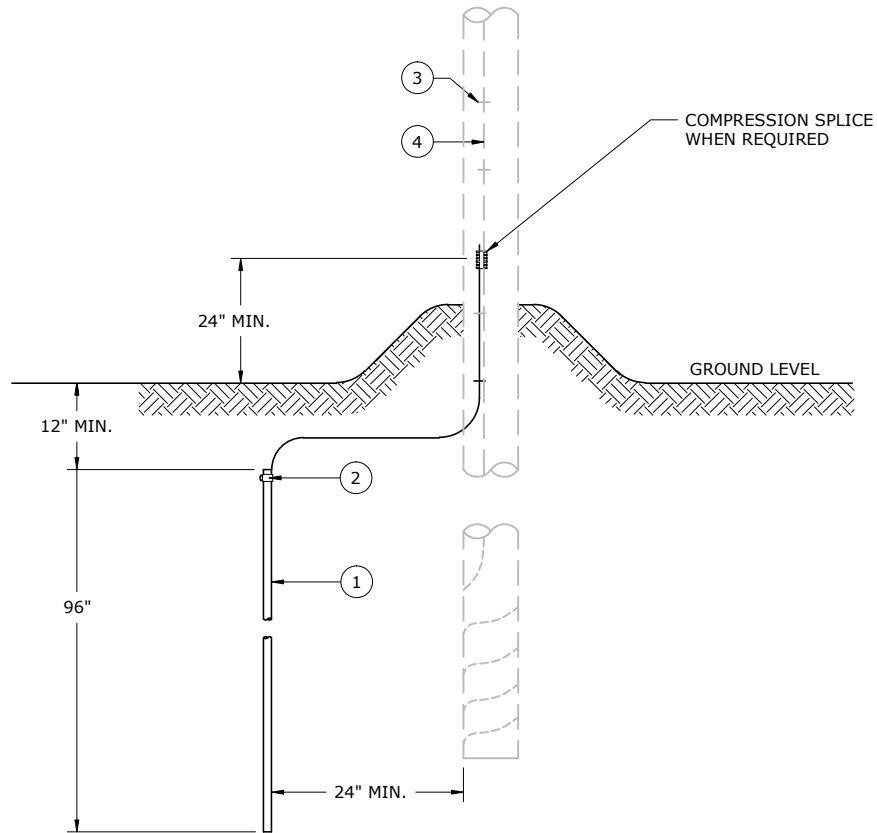
3			
2			
1	8/29/13	CADD GRAPHICS	OST
0	2/25/04	CADD GRAPHICS	OST
REVISED	BY	APPR.	

SECONDARY DEADEND

ELECTRICITIES
OF NORTH CAROLINA, INC.

SCALE
1"=1'-0"

DWG.
J1EC



NO.	INVENTORY NO.	QUANTITY	DESCRIPTION
1	10-32-61	1	ROD, GROUND, 5/8" DIA. X 8'-0"
2	10-16-40	1	CLAMP, GROUND ROD, #2 X 5/8 BRONZE
3	10-38-01	-	STAPLE, GROUND WIRE, AS REQUIRED
4	01-20-13	-	CONDUCTOR, BARE COPPER, SOLID, SOFT DRAWN, #4

NOTES:

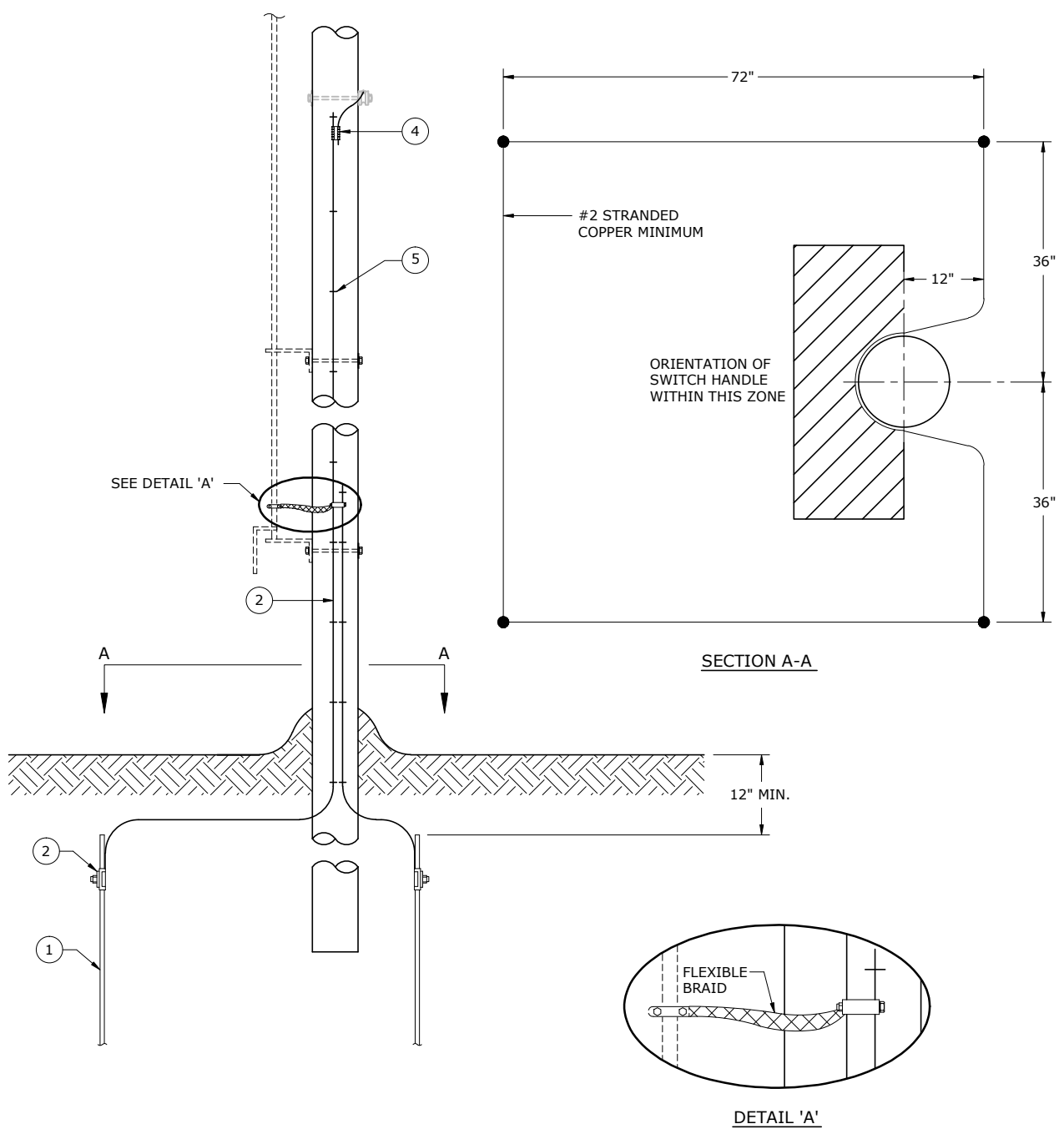
- GROUND WIRE TO BE LOCATED ON SAME SIDE AS NEUTRAL CONDUCTOR AND IN QUADRANT OPPOSITE CLIMBING SPACE OR POLE TOP PIN.
- STAPLES ON GROUND WIRE SHALL BE 2'-0" APART. EXCEPT FOR A DISTANCE OF 8'-0" ABOVE GROUND AND 8'-0" FROM TOP OF POLE, WHERE THEY SHALL BE 6" APART.
- GROUND WIRE TO CLEAR ALL HARDWARE BY 2" MINIMUM, AND SHALL BE STAPLED TO MAINTAIN THIS POSITION.
- GROUND WIRE MOULDING MAY BE INSTALLED AT DISCRETION OF OWNER.
- INSTALL MULTIPLE GROUND RODS (STACKED OR SEPARATED) AS REQUIRED TO ACHIEVE 25 OHM RESISTANCE. MULTIPLE SEPARATED GROUNDS SHALL HAVE A MINIMUM 6 FT. SEPARATION.
- GROUNDS ARE TO STOP AT NEUTRAL POSITION EXCEPT TO RISE TO A LIGHTNING ARRESTER OR TRANSFORMER.

3			
2			
1	10/18/13	CADD GRAPHICS	OST
0	2/2/05	CADD GRAPHICS	OST
REVISED	BY	APPR.	

**GROUNDING ASSEMBLY
GROUND ROD TYPE**

ELECTRICITIES
OF NORTH CAROLINA, INC.


SCALE 1/2"=1'-0"	DWG. M2-1EC
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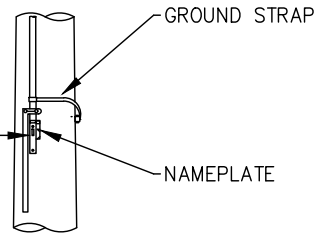
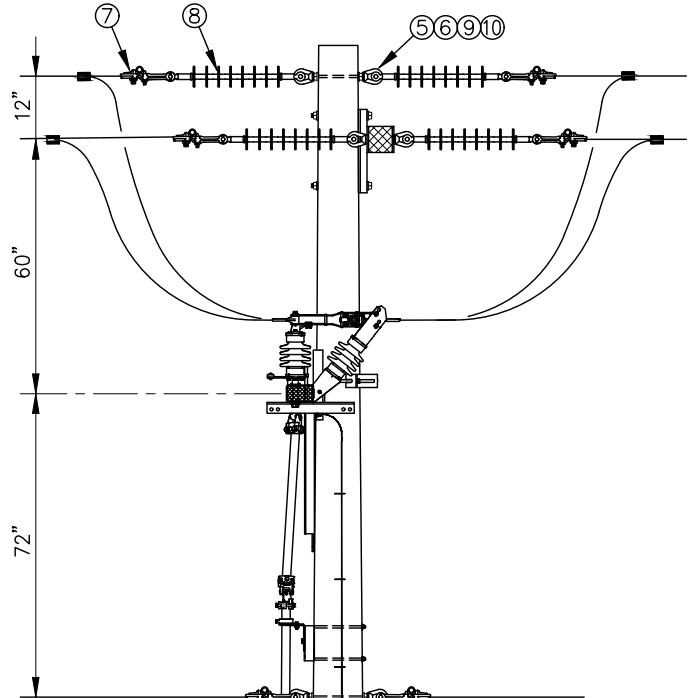
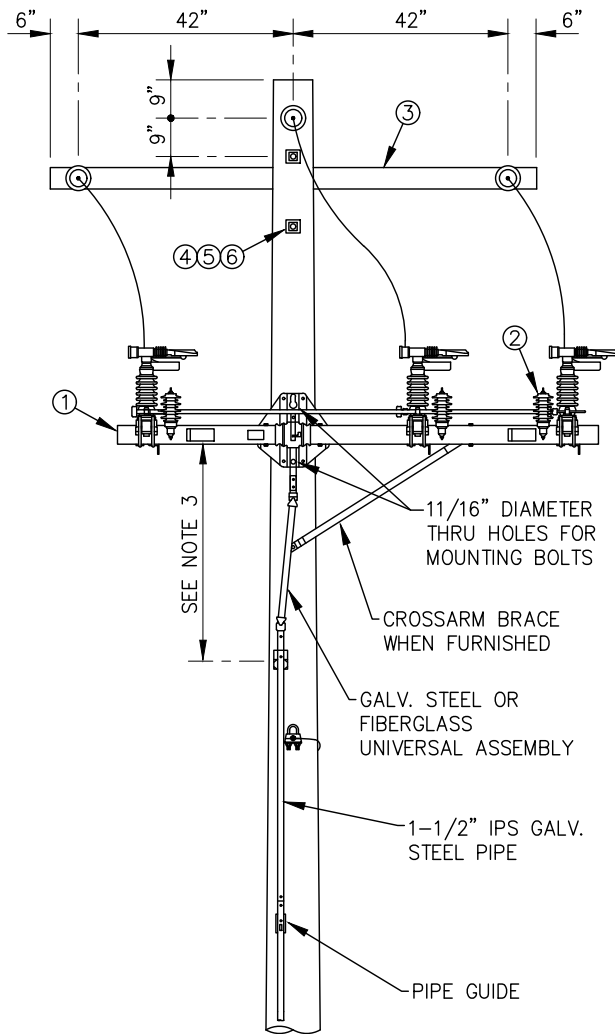
NO.	INVENTORY NO.	QUANTITY	DESCRIPTION
1	10-32-61	4	ROD, GROUND, 5/8" DIA. X 8'-0"
2	10-16-40	4	CLAMP, GROUND ROD, #2 X 5/8 BRONZE
3	01-21-11	-	CONDUCTOR, BARE COPPER, STRANDED, HARD DRAWN, #2
4	13-01-XX	-	CONNECTOR
5	10-38-01	-	STAPLE, GROUND WIRE, AS REQUIRED

3			
2			
1	10/18/13	CADD GRAPHICS	OST
0	2/2/05	CADD GRAPHICS	OST
REVISED	BY	APPR.	

GROUNDING ASSEMBLY
GROUND ROD TYPE FOR SECTIONALIZING
AIR BREAK SWITCH


ELECTRICITIES
of NORTH CAROLINA, INC.

SCALE 1/2"=1'-0"	DWG. M2-15REC
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LOCKING PROVISION FOR
PADLOCKING IN OPEN
OR CLOSED POSITION

GROUND STRAP
NAMEPLATE

NOTES

1. SEE DWG. M2-15REC FOR GROUNDING DETAILS.
2. ARRANGE SWITCH PIPE IN QUADRANT THAT WILL AVOID CONFLICT BETWEEN SWITCH PIPE AND NEUTRAL.
3. INSTALL SWITCH PIPE GUIDES PER MANUFACTURE RECOMMENDED SPACING.

RECOMMENDED HEIGHT
TO GRADE 36" TO 54"

MATERIAL LIST

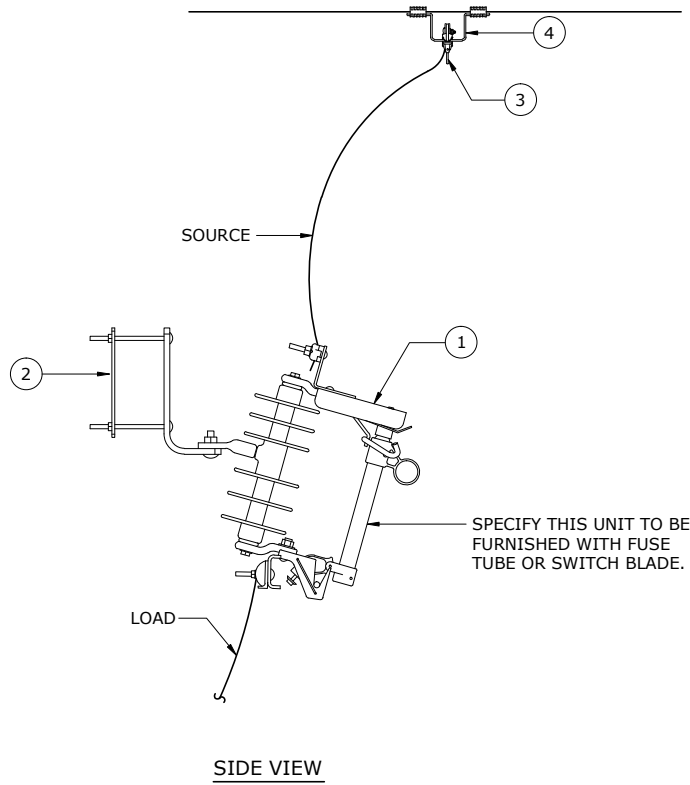
NO.	INVENTORY NO.	QUANTITY	DESCRIPTION
1	09-01-04	1	SWITCH, GOAB, 15 KV, RLB-600, HORIZONTAL
2	07-04-XX	6	ARRESTER, INTERMEDIATE
3	-	1	CROSSARM, 96-INCH, STEEL
4	12-06-XX	2	BOLT, MACHINE
5	10-44-09	6	WASHER, SQUARE FLAT, 2-1/4"
6	10-44-33	6	WASHER, LOCK, 5/8"
7	10-16-XX	8	CLAMP, DEADEND
8	08-04-03	6	INSULATOR, DEADEND, ONE-PIECE, 25 KV
9	12-05-XX	4	BOLT, OVAL EYE
10	10-44-66	4	NUT, OVAL EYE, 5/8"

**15kv, 600A GROUP OPERATED AIR BREAK SWITCH
HORIZONTAL MOUNTING**



DSN.	MDT	DWN.	BLP
CKD.	MDT	APPD.	MDT
SCALE:	NTS	DATE:	07/27/2023
DATE	REVISION		

DWG. NO.
GOAB
© 07/2023



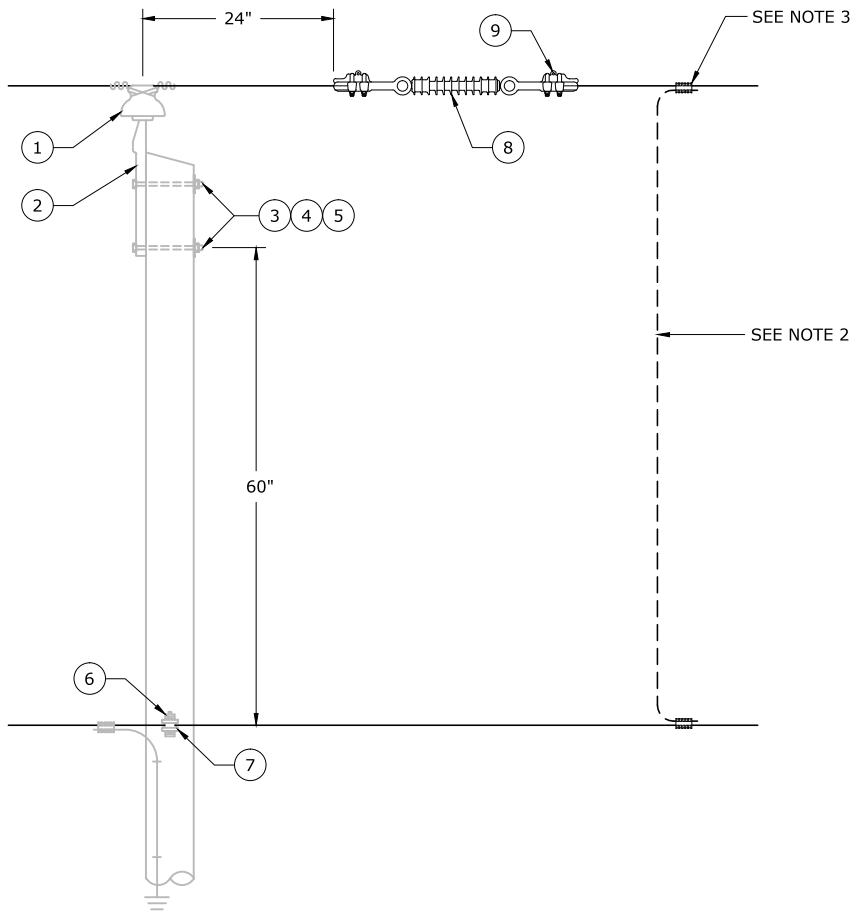
NO.	INVENTORY NO.	QUANTITY	DESCRIPTION
1	03-25-XX	1	SWITCH, FUSED CUTOUT
2	03-21-01	1	BRACKET, CUTOUT/ARRESTER, 1 PH
3	10-16-33	1	CLAMP
4	10-10-XX	1	STIRRUP, SIZE AS REQUIRED

3			
2			
1	10/25/13	CADD GRAPHICS	OST
0	11/10/04	CADD GRAPHICS	OTERSON
REVISED	BY	APPR.	

FUSED CUTOUT ASSEMBLY

ELECTRICITIES
of NORTH CAROLINA, INC.

SCALE 1"=1'-0"	DWG. M5-9EC
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FRONT VIEW

NO.	INVENTORY NO.	QUANTITY	DESCRIPTION
1	08-13-04	1	INSULATOR, PIN-TYPE, TIE TOP, CLASS 55-4
2	10-29-45	1	PIN, POLE TOP, 20" X 1"
3	12-06-XX	3	BOLT, MACHINE
4	10-44-09	3	WASHER, SQUARE FLAT, 2 1/4"
5	10-44-33	3	WASHER, LOCK, 5/8"
6	10-17-40	1	CLEVIS, INSULATED SECONDARY/DEADEND
7	08-14-02	1	INSULATOR, SPOOL, CLASS 53-2
8	08-04-03	1	INSULATOR, DEADEND, ONE-PIECE, 25 KV
9	10-16-XX	2	CLAMP
10	13-01-XX	-	CONNECTOR

NOTES:

1. MAY ONLY BE INSTALLED WHEN SAME SIZE CONDUCTOR IS ON BOTH SIDES OF DEADEND.
2. INSTALL WHEN DEAD SPAN IN REQUIRED AND EXISTING CONDUCTOR IS NOT ALREADY DEADEND ON POLE. INSTALL JUMPER OF APPROPRIATE SIZE IF DEADEND SPAN IS REQUIRED.
3. USE HOT LINE CLAMP IN THE LOCATION IF FREQUENT SWITCHING TO RESTORE SERVICE IS ANTICIPATED.
4. THIS CONSTRUCTION MAY ALSO BE USED IN OPEN-WYE AND THREE-PHASE LINE CONSTRUCTION.

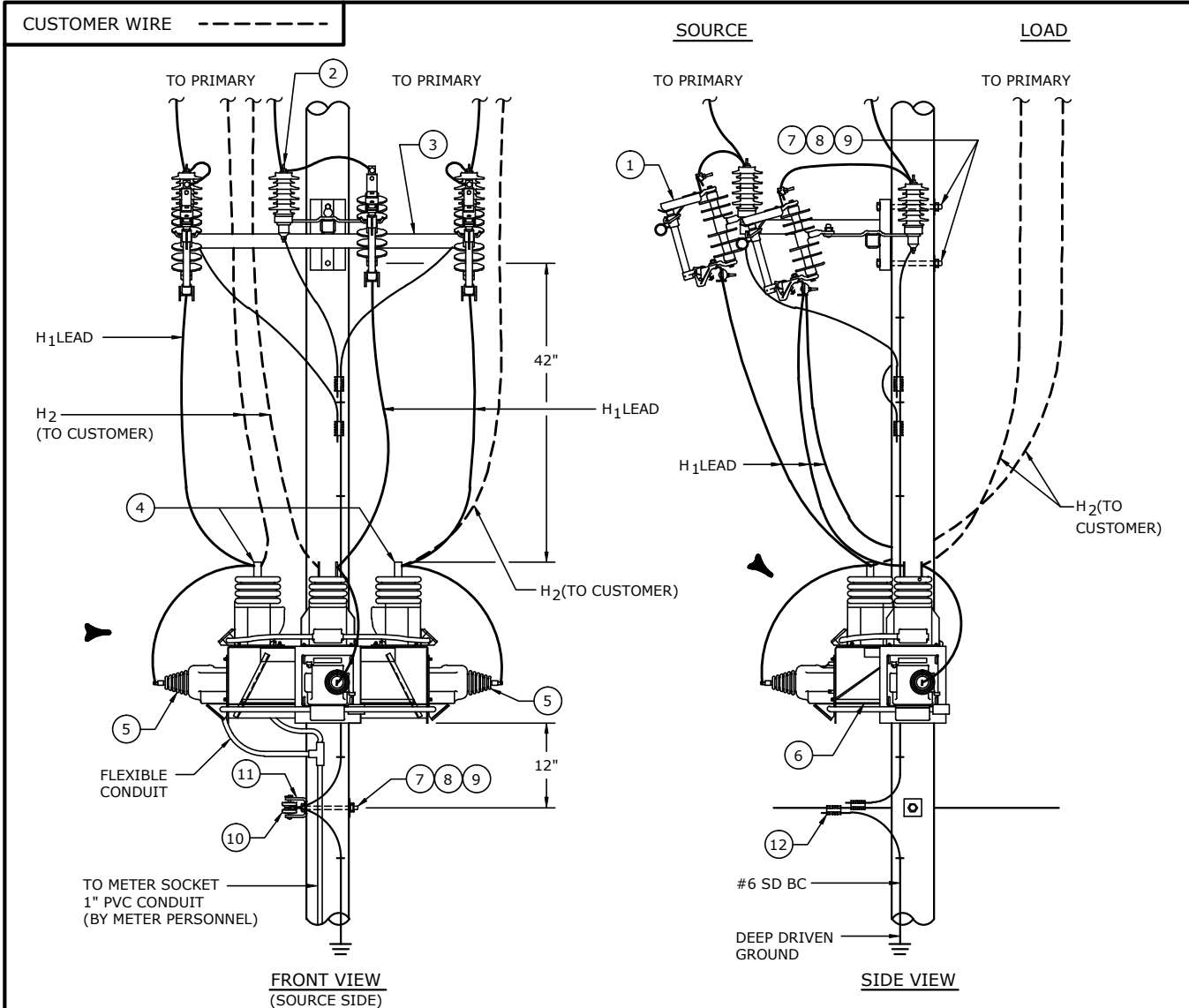
3			
2			
1	10/18/13	CADD GRAPHICS	OST
0	12/12/08	CADD GRAPHICS	OST
REVISED	BY	APPR.	

SINGLE-PHASE PRIMARY CONSTRUCTION
FLOATING DEADEND INSTALLATION



SCALE
1/2"=1'-0"

DWG.
M5-26EC



NO.	INVENTORY NO.	QUANTITY	DESCRIPTION
1	-	3	FUSED CUTOUT
2	-	3	LIGHTNING ARRESTER
3	-	1	MOUNTING BRACKET, THREE-PHASE
4	-	3	CURRENT TRANSFORMER
5	-	3	VOLTAGE TRANSFORMER
6	-	1	MOUNTING BRACKET, TRANSFORMER, THREE-PHASE
7	-	5	BOLT, MACHINE, 5/8" X REQUIRED LENGTH
8	-	6	WASHER, 2-1/4" SQUARE WITH 11/16" HOLE
9	-	6	WASHER, LOCK, 5/8"
10	-	1	INSULATED SPOOL
11	-	1	BRACKET, RIGID CLEVIS
12	-	X	CONNECTORS, AS REQ'D

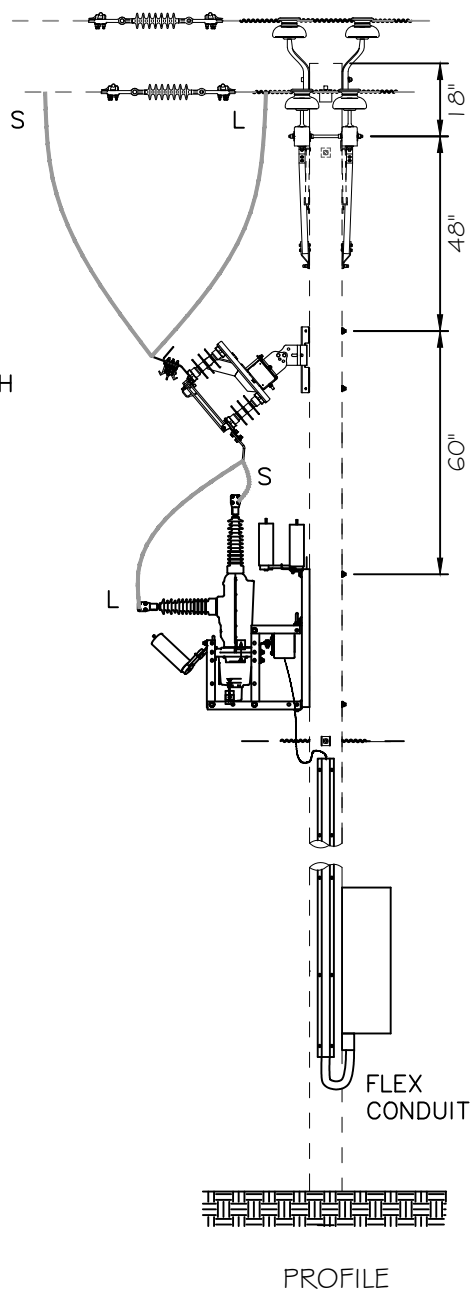
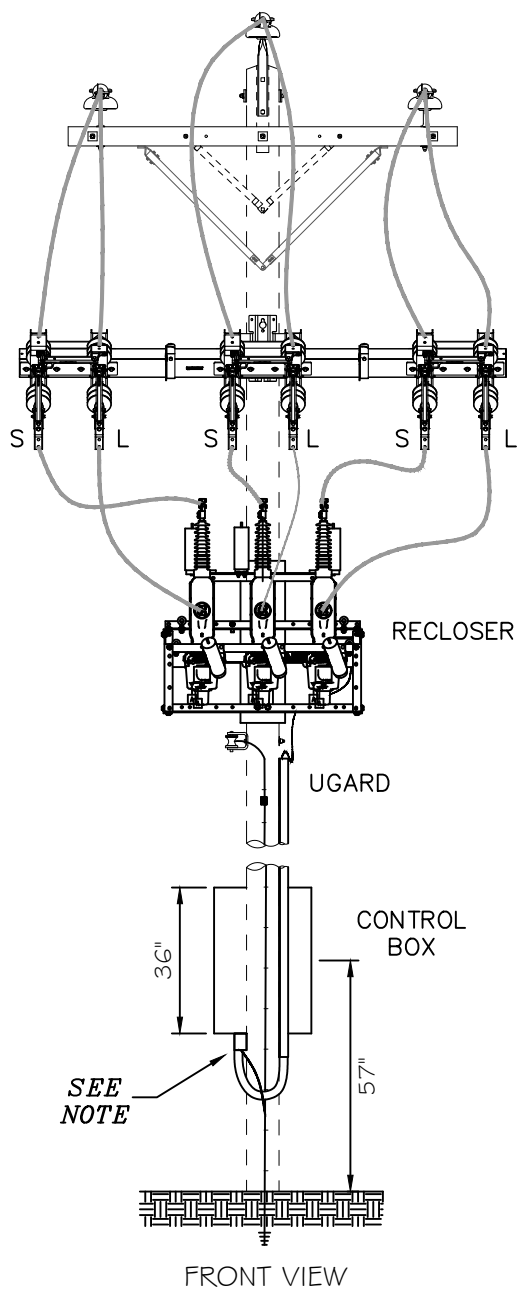
- NOTES:**
1. ALL ARRESTERS, METERING ENCLOSURES AND INSTRUMENT TRANSFORMER CASES ARE TO BE GROUNDED TO THE SYSTEM NEUTRAL OR POLE GROUND.
 2. METER CABINET AND CONDUIT MAY BE MOUNTED ON ANY QUARTER OF POLE AS NECESSARY TO CLEAR OTHER EQUIPMENT.
 3. 600 AMP SOLID BLADE DISCONNECT MAY BE USED AT CITY DISCRETION.

3			
2			
1	3/16/12	CADD GRAPHICS	OST
0	2/2/12	CADD GRAPHICS	OST
REVISED	BY	APPR.	

THREE-PHASE PRIMARY METERING INSTALLATION

ELECTRICITIES
OF NORTH CAROLINA, INC.



SCALE 1/2" = 1'-0" DWG. QD-6EC



*NOTE;
ALL CABLE, FIBER, CONTROL, POWER
SHALL BE ENCLOSED IN EITHER
U.GUARD OR LIQUID TIGHT CONDUIT.

CONTROL CABINET TO BE BONDED TO
POLE GROUND.

FAYETTEVILLE
PUBLIC WORKS COMMISSION

600 AMP ELECTRONIC
CONTROLLED THREE-PHASE
RECLOSER WITH 600 AMP
HORIZONTAL BYPASS SWITCH

STRUCTURE ID.
REC600HS
REC600HF
VREC600HS
VREC600HF



DRAWN BY: S. COLLINS
CHECKED BY:

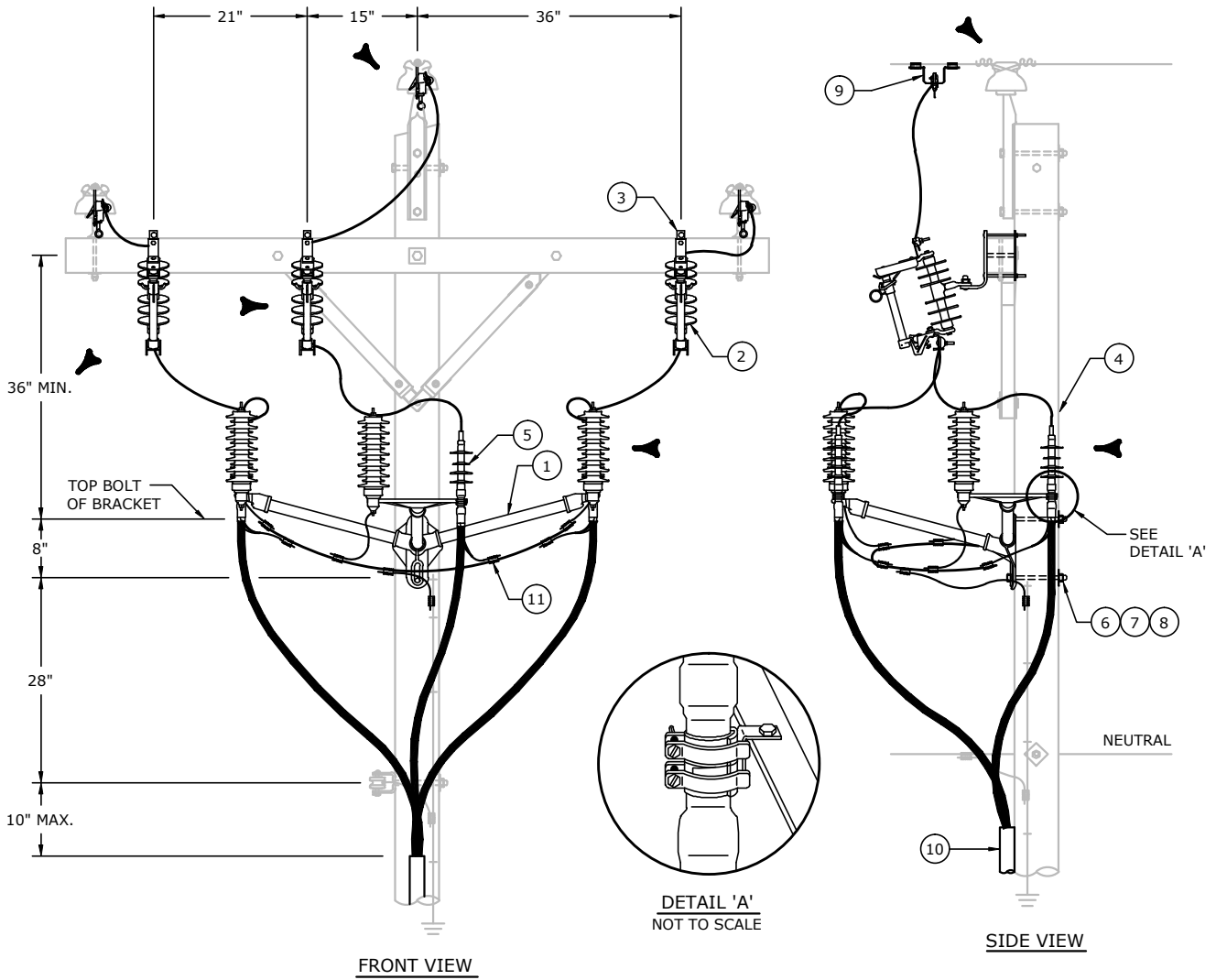
SCALE: NONE
APPROVED BY:

REVISION DATE : SEPTEMBER 9, 2022

MATERIAL LIST

STRUCTURE ID.	ASSEMBLY ID.	STOCK NO.	DESCRIPTION	QUANTITY
REC600HS				
	SWVCR600E15		RECLOSER, 600A, 15 KV, 3-PHASE, TRIPLE/SINGLE, ELECTRONIC	1
		1-280-461	RECLOSER, 600A, 15 KV, 3-PHASE, TRIPLE/SINGLE	1
	CTRLRECVP		RELAY, ELECTRONIC, DISTRIBUTION FEEDER PROTECTION, SEL-651R	1
		1-045-566	RELAY, PARTIAL DISTRIBUTION FEEDER PROTECTION	1
	SW6RECBYPASS		SWITCH, 25 KV, 600 AMP, RECLOSER BYPASS ON FIBERGLASS ARM	1
		1-280-160	SWITCH, RECLOSER BYPASS, CROSSARM	1
	LA10SW		LIGHTNING ARRESTERS, 10 KW, SWITCH POLE	3
		1-170-010	ARRESTER, 10 KV, HEAVY-DUTY	2
	UGARD2		U-GARD, 2", 10'	3
		1-070-032	U-GARD, 2", 10' LENGTH, TRUCK STOCK	1
	GND210S		GROUNDING, DRIVEN, 2-10' RODS	1
		1-255-070	ROD, GROUND, 5/8" X 10' CU-CLAD, TRUCK STOCK	2
	UAXLP500		U/G ALUMINUM POLYETHYLENE INSULATED, 500	60'
		1-065-540	CONDUCTOR, 500 MCM, AL XLP 600V	1'
	FLEX CONDUIT		2" FLEXIBLE CONDUIT FOR CONTROL	10'
		1-070-615	CONDUIT, 2" LIQUID TIGHT, FLEXIBLE (LFMC)	1'
NOTES:				
CONDUCTOR ATTACHMENTS, DOWN GUYS, AND ANCHORS MUST BE SPECIFIED SEPARATELY.				

 <p style="text-align: center;">FAYETTEVILLE PUBLIC WORKS COMMISSION</p> 	<p>15 KV- 600 AMP ELECTRONIC CONTROLLED THREE-PHASE RECLOSER WITH 600 AMP HORIZONTAL BYPASS SWITCH</p>	<p style="text-align: center;">STRUCTURE ID.</p> <p style="text-align: center; font-size: 1.2em;">REC600HS</p>
DRAWN BY: S. COLLINS SCALE: NONE	CHECKED BY: APPROVED BY:	REVISION DATE : SEPTEMBER 9, 2022



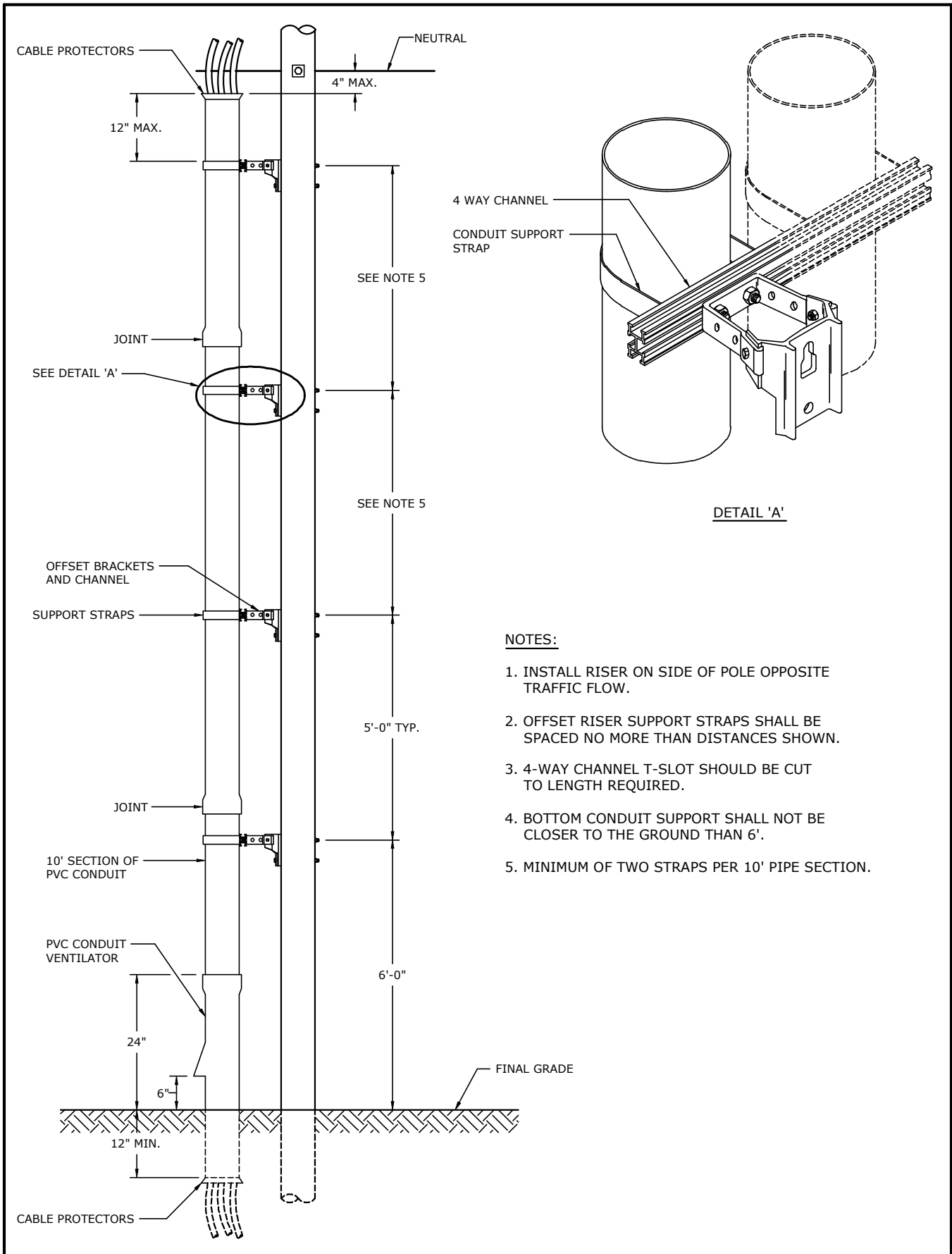
NO.	INVENTORY NO.	QUANTITY	DESCRIPTION
1	-	1	BRACKET, THREE-PHASE, FIBERGLASS
2	-	3	FUSED CUTOUT
3	-	3	MOUNTING BRACKET, CUTOUT
4	-	3	ARRESTER
5	-	3	TERMINATOR
6	-	2	BOLT, MACHINE, 5/8" X REQ'D LENGTH
7	-	2	WASHER, LOCK, 5/8"
8	-	2	WASHER, 2-1/4" SQUARE WITH 11/16" HOLE
9	-	3	CLAMP, HOTLINE, WITH STIRRUP
10	-	X	CONDUIT/U-GUARD, AS REQUIRED
11	-	X	CONNECTORS, AS REQUIRED

3			
2			
1	7/23/07	CADD GRAPHICS	OST
0	5/2/07	CADD GRAPHICS	OST
REVISED	BY	APPR.	

THREE-PHASE PRIMARY RISER
8' CROSSARM WITH FIBERGLASS BRACKET

ELECTRICITIES
OF NORTH CAROLINA, INC.

SCALE 1/2"=1'-0"	DWG. UG2-1EC
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NOTES:

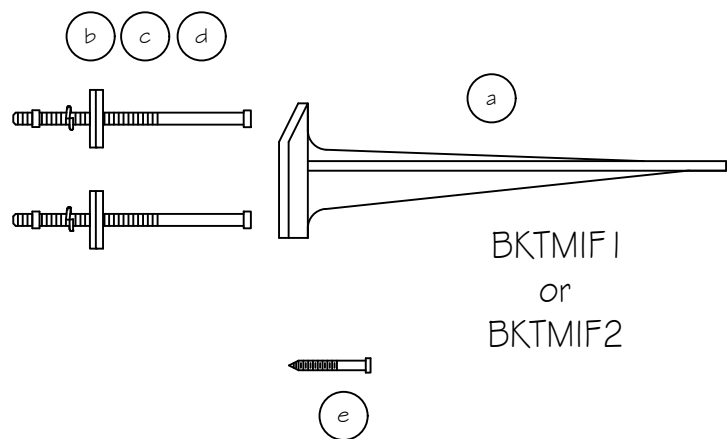
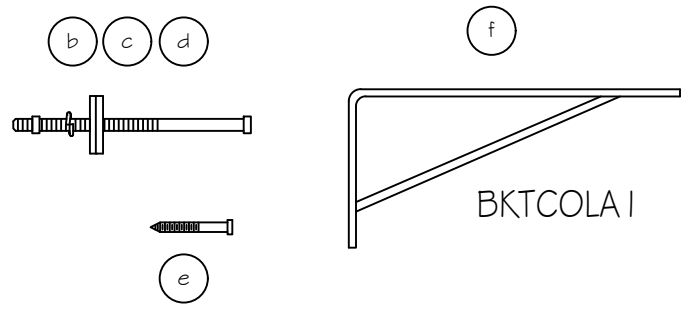
1. INSTALL RISER ON SIDE OF POLE OPPOSITE TRAFFIC FLOW.
2. OFFSET RISER SUPPORT STRAPS SHALL BE SPACED NO MORE THAN DISTANCES SHOWN.
3. 4-WAY CHANNEL T-SLOT SHOULD BE CUT TO LENGTH REQUIRED.
4. BOTTOM CONDUIT SUPPORT SHALL NOT BE CLOSER TO THE GROUND THAN 6\".
5. MINIMUM OF TWO STRAPS PER 10' PIPE SECTION.

3			
2			
1			
0	5/2/07	CADD GRAPHICS	OST
REVISED	BY	APPR.	

PVC CONDUIT OFFSET RISERS

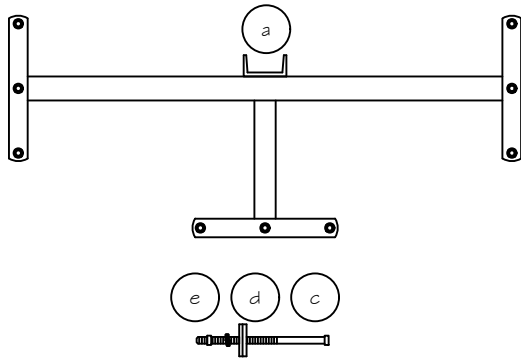
ELECTRICITIES
OF NORTH CAROLINA, INC.

SCALE NO SCALE	DWG. UG11-1EC
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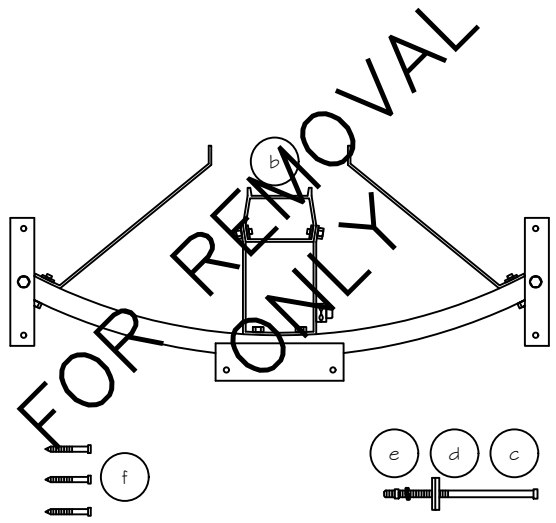


ITEM	MATERIAL DESCRIPTION	PWC STOCK NO.	BKTMIF1	BKTMIF2	BKTCOLA1
			QUANTITY	QUANTITY	QUANTITY
a	BRACKET, MALLEABLE IRON FORGED	1-025-160	1	1	-
b	BOLT, MACHINE, 5/8" x 10" w/NUT	1-325-175	1	2	1
c	WASHER, SQUARE, CURVED, 3"	1-325-760	1	2	1
d	WASHER, LOCK, 5/8"	1-325-740	1	2	1
e	SCREW, LAG, 1/2" x 4"	1-325-145	1	-	1
f	BRACKET, CUTOUT/ARRESTER 1-PHASE	1-170-002	-	-	1

BRACKETS M.I.F. and CO/LA	FAYETTEVILLE PUBLIC WORKS COMMISSION		ASSEMBLY ID. BKTMIF1 BKTMIF2 BKTCOLA1
	DRAWN BY: J. CHAMBERS	DATE: JUNE 30, 2001	
	CHECKED BY:	SCALE: NONE	
	APPROVED BY:		



BKTCOLA3



BKTALUM3

FOR REMOVAL ONLY

ITEM	MATERIAL DESCRIPTION	PWC STOCK NO.	BKTCOLA3	BKTALUM3	
			QUANTITY	QUANTITY	QUANTITY
a	BRACKET, CUTOUT/ARRESTER, 3 PHASE	1-170-006	1	-	
b	BRACKET, CUTOUT / ARRESTER, 3 PH, CURVED SUPPORT	1-170-003	-	1	
c	BOLT, MACHINE, 5/8" x 14", w/NUT	1-325-185	2	1	
d	WASHER, SQUARE, CURVED, 3"	1-325-760	2	1	
e	WASHER, DOUBLE COIL, SPLIT RING, LOCK, 5/8"	1-325-733	2	1	
f	SCREW, LAG, 1/2" x 4"	1-325-145	-	3	

3 PHASE
BRACKETS FOR
ARRESTERS & CUTOUTS

PWC FAYETTEVILLE
PUBLIC WORKS COMMISSION

DRAWN BY: J. CHAMBERS	DATE: JUNE 30, 2001
CHECKED BY: WRW III	SCALE: NONE
APPROVED BY: WRW III	REVISED: JULY 7, 2006

ASSEMBLY ID.
BKTCOLA3
BKTALUM3

D – Contractor and Owner Furnished
Material List

FAYETTEVILLE PWC
 FAYETTEVILLE, NORTH CAROLINA
 GILLESPIE SOLAR
 CONTRACTOR & OWNER FURNISHED MATERIALS
 (SEE NOTES 1, 2 AND 3)

DESCRIPTION	SUGGESTED MANUFACTURER ¹	CATALOG NO. ¹	QUANTITY ²	DELIVERY (WEEKS)	UNIT PRICE	EXTENDED
DISTRIBUTION OVERHEAD - CONTRACTOR FURNISHED MATERIALS						
Crossarm, 10', Steel	Action MFG	AMI-T120EHD	1		\$0.00	\$0.00
Clip, Spring, Stl, Suspension Insulator Shunt	Contacto Choice	Contacto Choice	6		\$0.00	\$0.00
Insulator, Pin-Type, Tie Top, Class 55-4	T&D Insulators	366-ST	10		\$0.00	\$0.00
Pin, Pole Top, 20" x 1"	Maclean Power Systems	J740Z	2		\$0.00	\$0.00
Pin, Crossarm, 1-1/2", Short Shank	Maclean Power Systems	J222Z	5		\$0.00	\$0.00
Insulator, Spool, 3-1/8" Dia X 3" LG, Porcelain, Secondary	PPC USA, Inc	5101	3		\$0.00	\$0.00
Clevis, Insulated Secondary/Deadend	Maclean Power Systems	J093	3		\$0.00	\$0.00
Polyethelene covered line wire 556 AWG (PawPaw) (jumpers) (for VREC)	Southwire					
Stirrup, Compression	Homac	OC-102	13		\$0.00	\$0.00
Clamp, Deadend, Tinned 0.16"-0.57"	Hubbell	ADEZ70N	30		\$0.00	\$0.00
Hook, Guy, Eye Combination, 13/16" Dia Clevis, Galv, Stl	Maclean Power Systems	P345A	4		\$0.00	\$0.00
Deadend, Twisted Loop Guy Grip, 0.337"-0.394" Conductor	Preformed	GDE-2107	8		\$0.00	\$0.00
Guy Marker, Yellow, 8'-0"	Preformed	PG60005C	4		\$0.00	\$0.00
Insulator, Guy Strain, 120" LG, Fiberglass, Thimble-Eye	Hubbell	GS30120CP1	2		\$0.00	\$0.00
Anchor, Single Helix (10") for 1" x 8'-0" Rod, Tripleeye Eye	Maclean Power Systems	J6528WCA	4		\$0.00	\$0.00
Ground - Rod, Galvanized, 5/8" x 8'-0"	Maclean Power Systems	J5328	7		\$0.00	\$0.00
Ground - Rod, CU-Clad, 5/8" x 10'-0" (PWC #1-255-070)	Maclean Power Systems	J5329	2		\$0.00	\$0.00
Ground- Clamp	Thomas & Betts	78378680067	7		\$0.00	\$0.00
Ground- Wire, #2 Solid Copper (ft.)	Seal Wire	2 SD B CU	160		\$0.00	\$0.00
All bolt lengths are standard for distribution wood poles						
Bolt, Eye, 5/8" x Required Length	Contacto Choice	Contacto Choice	7		\$0.00	\$0.00
Bolt, Double Arming, 5/8" x Required Length, w/ Nut	Contacto Choice	Contacto Choice	12		\$0.00	\$0.00
Bolt, Machine, 3/4" x Required Length	Contacto Choice	Contacto Choice	4		\$0.00	\$0.00
Bolt, Machine, 5/8" x Required length	Contacto Choice	Contacto Choice	21		\$0.00	\$0.00
Bolt, Carriage, 1/2" Dia, UNC Rolled, 6" LG, Galv Stl, W/ Nut	Contacto Choice	Contacto Choice	0		\$0.00	\$0.00
Bolt, Carriage, 3/8" Dia, 4-1/2" LG, Galv Stl, W/ Nut	Contacto Choice	Contacto Choice	16		\$0.00	\$0.00
Washer, Double Coil, Spring Lock, 5/8"	Contacto Choice	Contacto Choice	62		\$0.00	\$0.00
Washer, Square Curved Ribbed, 13/16" ID, 3" OD, 3/8" Thk, Galv	Contacto Choice	Contacto Choice	8		\$0.00	\$0.00
Washer, Square, Flat, 5/8"	Contacto Choice	Contacto Choice	57		\$0.00	\$0.00
Washer, Flat, Round, 3/8"	Contacto Choice	Contacto Choice	12		\$0.00	\$0.00
Washer, Lock, Spring, 3/8", 7/16" ID, 1/8" Thk, Galv Stl, GR B	Contacto Choice	Contacto Choice	4		\$0.00	\$0.00
Washer, Lock, 5/8"	Contacto Choice	Contacto Choice	8		\$0.00	\$0.00
Washer, Lock, Dbl Coil Spring, 5/8", Galv Stl, 750 Per Package	Contacto Choice	Contacto Choice	0		\$0.00	\$0.00
Washer, Square, 3/4", 2-1/4" ID, 2-1/4" OD, 3/16" Thk, Galv Stl	Contacto Choice	Contacto Choice	0		\$0.00	\$0.00
Nut, Square, 5/8"	Contacto Choice	Contacto Choice	7		\$0.00	\$0.00
Nut, Eye, 5/8"	Contacto Choice	Contacto Choice	12		\$0.00	\$0.00
Screw, Lag, 1/2"x4"	Contacto Choice	Contacto Choice	21		\$0.00	\$0.00

FAYETTEVILLE PWC
FAYETTEVILLE, NORTH CAROLINA
GILLESPIE SOLAR
CONTRACTOR & OWNER FURNISHED MATERIALS
 (SEE NOTES 1, 2 AND 3)

DESCRIPTION	SUGGESTED MANUFACTURER ¹	CATALOG NO. ¹	QUANTITY ²	DELIVERY (WEEKS)	UNIT PRICE	EXTENDED
<u>DISTRIBUTION UNDERGROUND - OWNER FURNISHED MATERIALS</u>						
Conduit standoff brackets for mounting conduit to risers on pole	Aluma Form	6-CSO-24	3		\$0.00	\$0.00
Cable, 4/0 AL, EPR, 25KV, 1/C, CN (PWC 1-065-514) (mft)	Contractor Choice	Contractor Choice	0.726		\$0.00	\$0.00
<u>DISTRIBUTION - OWNER FURNISHED MATERIALS</u>						
Conductor, #2AL, Tri-Plex "Shrimp" (PWC 1-065-260) (mft.)	Southwire	Shrimp-XL	0.044		\$0.00	\$0.00
Arrester, wildlife Protective Caps	Hubbell	275120-4001	10		\$0.00	\$0.00
Mounting Bracket, Transformer, Single-Phase	Contractor Choice	Contractor Choice	1		\$0.00	\$0.00
Relay, Electronic, Distribution Feeder Protection, SEL-651R	SEL	0651R22DXGAXAE1123B3XX	1		\$0.00	\$0.00
NEMA Cabinet for SEL 651R control	Contractor Choice	Contractor Choice	1		\$0.00	\$0.00
Total						#REF!

- NOTES:
1. Manufacturers and catalog numbers are intended as a basis for design only. Comparable items may be substituted and submitted for approval
 2. Contractor is responsible for ensuring all necessary material and equipment is ordered for a complete workable end product. Quantities shown are estimated and have been provided to assist as a basis of design.
 3. Additional quantities of material may be ordered at Owner's discretion to provide for future construction and maintenance.

11 - PWC Provided Equipment Specifications

ACCURANGE® CURRENT TRANSFORMERS

CMV-S

High accuracy current transformer



Product features

- 600 volt, indoor or outdoor
- 10 kV BIL, 60 Hertz
- 3.5" x 4.5" (88.9 mm x 114.3 mm) oval window
- Designed for pad-mounted distribution transformer metering
- 0.15% accuracy from 1% nominal current through rating factor

Application

The CMV-S is primarily used for pad-mounted distribution transformer metering. It is designed for metering on 600 volt systems inside high ambient temperature environments up to 85°C and can be mounted directly upon the energized busbar. The CMV-S also offers protection when in contact with the mounting bolts for the bus bar by extending the window liner to the back of the transformer. For example, a single 1000:5 ratio unit will meter at 0.15% accuracy from 10 A - 2000 A for extended range metering.

Extended range metering

AccuRange current transformers deliver high accuracy and stable performance over a wide load swing, making them a great fit for variable load applications. Accuracy is guaranteed to be 0.15% from 1% of nominal

The CMV-S current transformer is primarily used for pad-mounted distribution transformer metering and delivers savings through high accuracy and reduced inventory.

current through rating factor. These units deliver savings through improved accuracy metering and reduced inventory.

Construction and insulation

The CMV-S current transformer has an oval shaped ring-type core and fully distributed winding assembled around a glass-filled polyetherimide window liner. The urethane insulating material is permanently molded to the core and coil assembly on both designs, resulting in a compact unit with improved mechanical, thermal, and dielectric characteristics.

Primary

The CMV-S has an oval primary opening to fit over the secondary spade in pad-mounted transformers.

Secondary terminals and cover

The CMV-S is supplied with embedded compression-type secondary terminals, a short circuit device, and a clear, rectangular snap-on cover suitable for locking with a meter seal. This clear plastic cover allows a visual check of connections and is keyed to ensure the shorting clip is across the terminals when no wires are connected. This safety feature avoids dangerous voltages across the secondary terminals if the

primary is energized. Terminals accommodate #14-6 wire and can also serve as a post-type connector by looping wire under the screw head.

Bus bar adapters

Bus bar adapters for attachment to the terminal spade are shipped with the unit. It may be secured to a wall panel or bracket by inserting bolts through any pair of mounting holes in the transformer body. If applicable, be sure to use the adapter, as performance is optimal when the primary conductor is centered in the window.

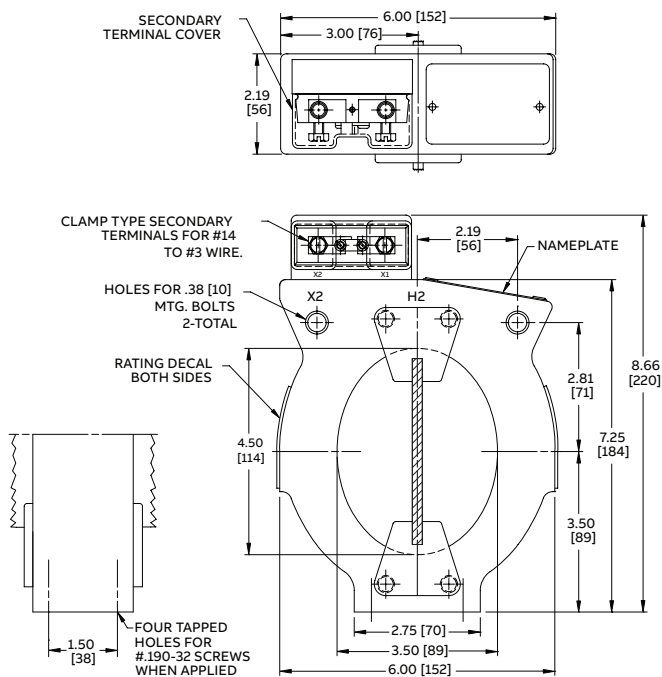
Test reports

Test reports are stored electronically and can be e-mailed in various formats at the time of shipment.

Standards

This unit meets or exceeds all requirements of IEEE C57.13-2016 and can be tested to other standards as requested.

Unit dimensions (inches [mm])



CMV-S selection guide

Primary ampere rating	Rating factor @ 85°C	Metering accuracy	Style number
500	2.0	0.15S B-0.2	923A498G04
600	2.0	0.15S B-0.5	923A498G01
1000	2.0	0.15S B-0.5	923A498G02
2000	2.0	0.15S B-0.5	923A498G03

Approximate weight: 8 lbs. (4 kg)

STANDARD FEATURES	
ITEM	DESCRIPTION
01	PRV W/ 0.25 NPT COUPLING
02	OIL FILL/UPPER FILTER PRESS 1.0 NPT COUPLING
03	HV BUSHING WELL W/FIXED STUD (ECI#9U03DAS125G)
04	LV BUSHING. (HJ# EPC10-090-030E01T01)
05	PARKING STAND W/ STANDOFF
06	LIFTING LUGS X (4) WITH TIE-DOWN PROVISIONS
07	BOLTED COVER
08	SS 2-HOLE GROUND PADS W/CONNECTOR (HUBBELL#GTCL-23A-TP)
09	JACKING PROVISIONS
10	NAMEPLATE LASER-SCRIBED ANODIZED ALUMINUM
11	PAD MOUNTING PROVISION
12	DRAIN VALVE W/SAMPLER
13	12" REMOVABLE SILL
14	PAD LOCKABLE DOOR HANDLE, PENTA-HEAD BOLT DRIP CUPS
16	REMOVABLE LV-HV BARRIER 3" FROM BASE
18	REMOVABLE TAMPER GUARD FOR COVER
23	COPPER X0 GROUND STRAP
24	10-HOLE INTEGRAL SPADE W/SUPPORTS
29	RADIATORS
32	HINGED TOP CABINET W/REMOVABLE COVER
33	CABINET SIDE DOORS W/SECURITY LATCH
34	304SS HINGES FOR MOUNTING MOVABLE CABINET SIDES
37	DV SWITCH
39	FLAPPER VALVE BAYONET W/ ISOLATION LINK CP 4000361C89FV (CP 4038361C04CB HI-AMP 100 & ECI#7580ZB0599 (A5))
42	LIQUID LEVEL GAUGE

CUSTOMER APPROVAL

FOR APPROVAL FOR RECORDS

APPROVED AS IS _____

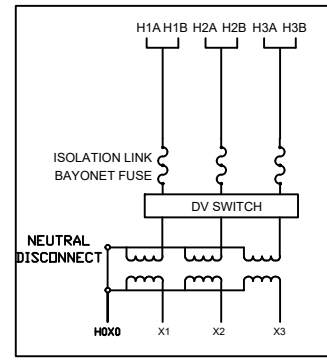
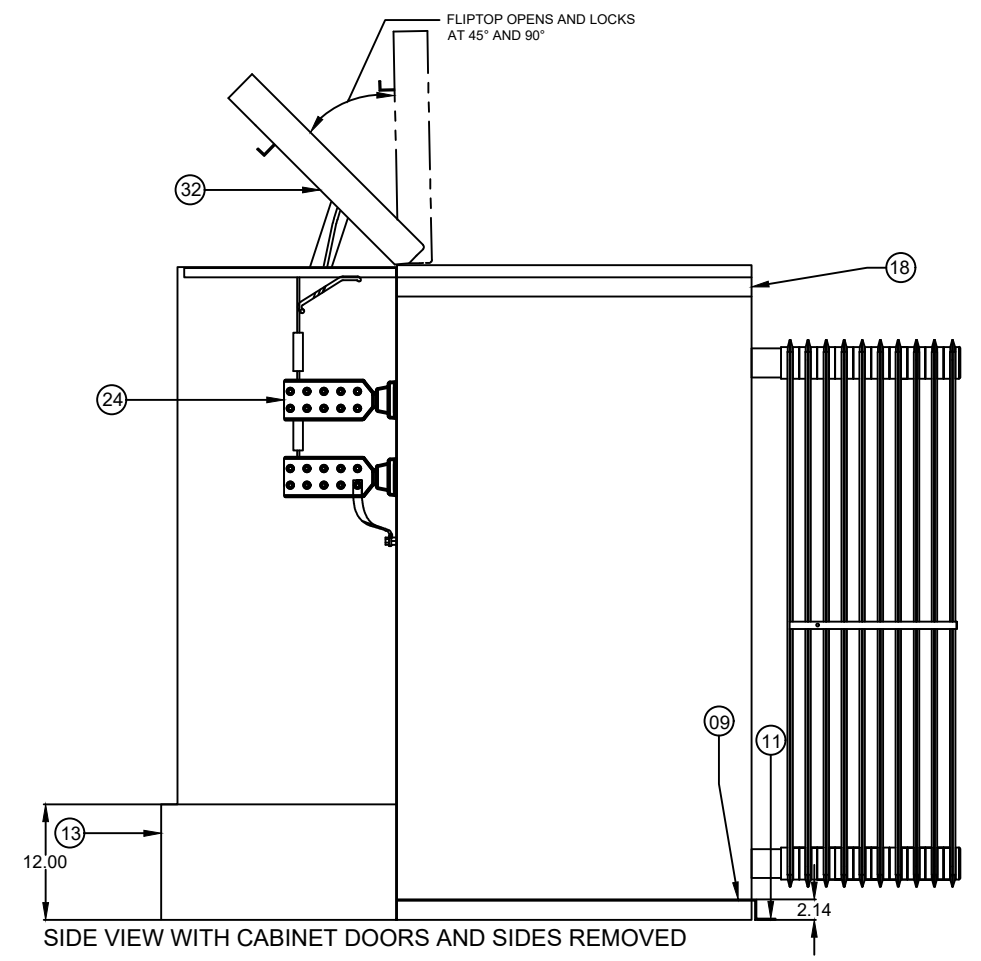
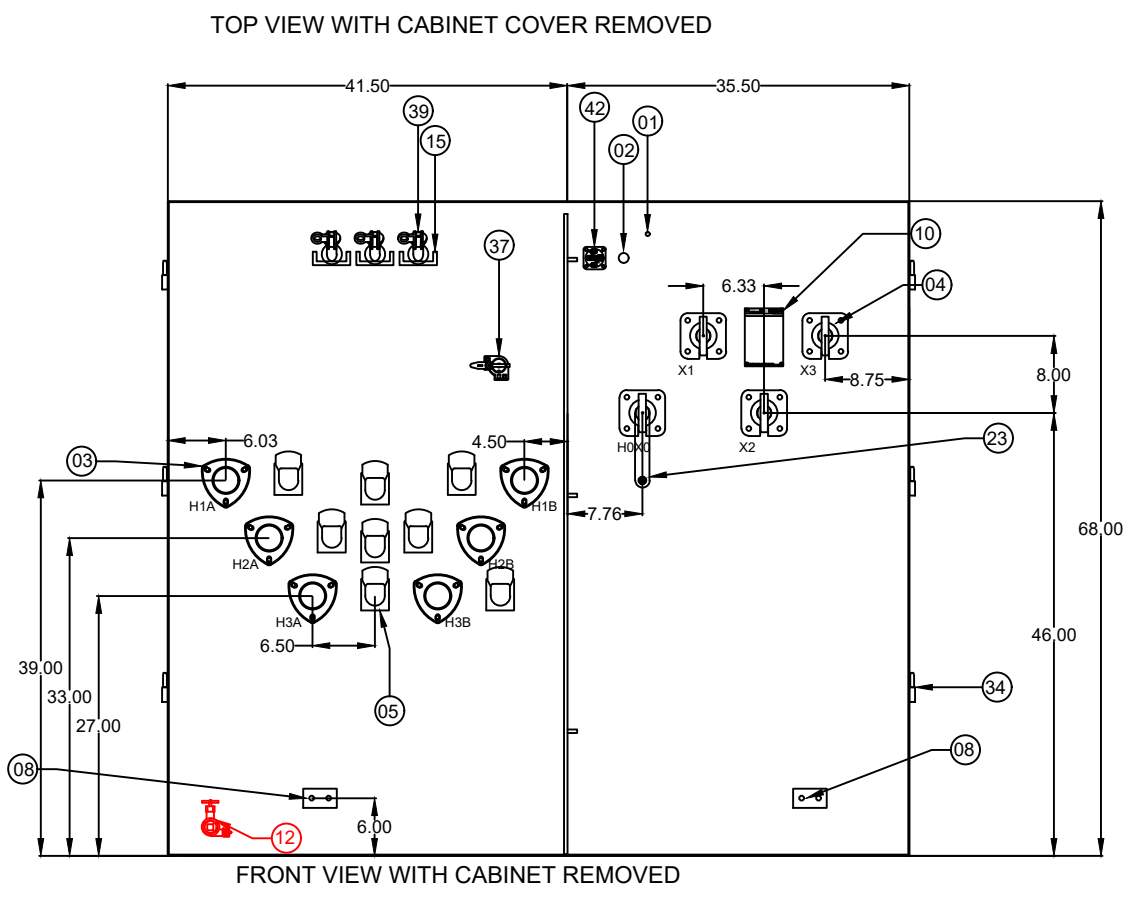
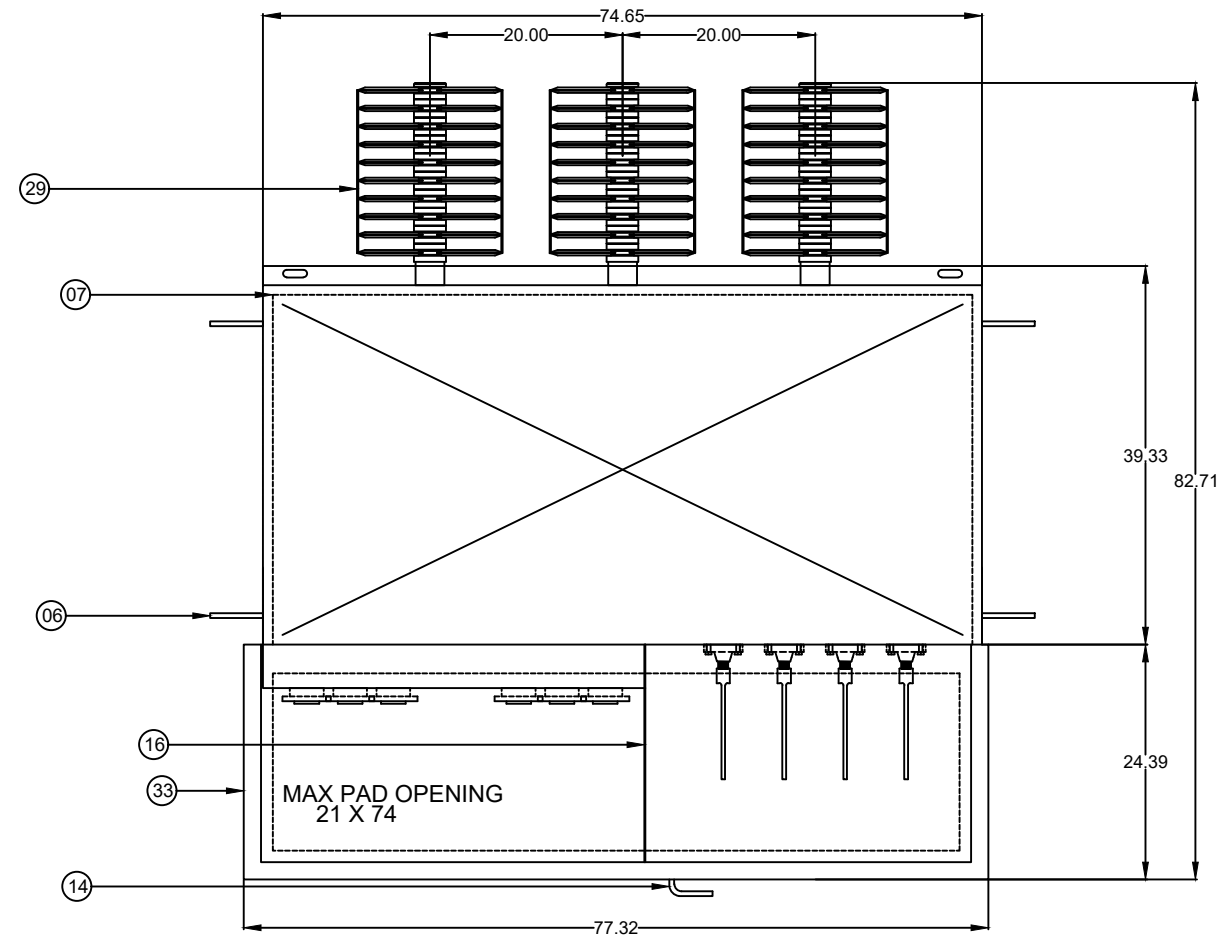
APPROVED AS NOTED _____

NOT APPROVED _____

SEND SIGNED COPY TO :
ERMCO
ATTN: 3 PHASE SALES
2225 INDUSTRIAL RD.
DYERSBURG , TN. 38025

NOTES :

- 1) ALL DIMENSIONS ARE IN INCHES UNLESS NOTED
- 2) FILLED W/MINERAL OIL
- 3) SECOND NP LOCATED INSIDE LV DOOR
- THIRD NP LOCATED ON OUTSIDE REAR CORNER
- 4) MUNSELL 7GY 3.29/1.5 PADMOUNT GREEN
- 5) PWC COMPANY NUMBER LABEL ON PRIMARY DOOR



ERMCO Dyersburg, TN 38025 Phone # (731)285-9121	
3 PHASE PAD OUTLINE	
DWN BY: JAV	DATE: 02/21/20
ISSD BY: PW	DATE: 02/21/20
PO #:	
DWG NO. 553351.011	STOCK #: 1-295-785
CUSTOMER: PWC WHSE FAC. FAYETTEVILLE	
TRANSFORMER PAD-MOUNTED THREE PHASE 9-17-19	
KVA 2500	
HIGH VOLTAGE 12470GY/7200X24940GY/14400	
LOW VOLTAGE 480Y/277	
APPROX. CORE AND COIL WEIGHT	8002 LBS
APPROX. TANK AND ACCESS. WEIGHT	3301 LBS
GAL. OF OIL 540	APPROX. WEIGHT 4051 LBS
APPROX. TOTAL WEIGHT	15354 LBS
REV.	DATE DESCRIPTION APP BY
SCALE:	NTS

REVISION					
REV.	DESCRIPTION	DATE	BY:	DATE	APPD:

ERMCO
 DYERSBURG, TN U.S.A. PAT. 6,667,438
 3 ϕ TRANSFORMER

ONAN - 60 HZ - 65° C RISE
 TYPE II MINERAL OIL
 DOE COMPLIANT



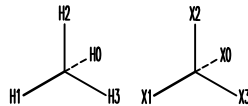
KVA 2500
 HV 12470GY/7200X24940GY/14400
 LV 480Y/277

NUMBER SERY MYYXXXXXXXXX
 MFC. DATE MMY

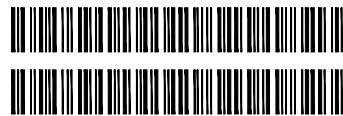
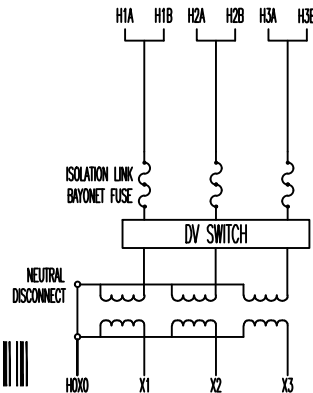
IMP 5.55 % @ 85° C
 % IZ IS @ BASE KVA & RATED VOLTAGE

APPROX. WEIGHT	
CORE & COIL (UNTANKING)	8002 LB
TANK & FIT	3301 LB
FLUID : OIL (GALLONS)	4051 LB 540
TOTAL WGT.	15354 LB

	MAT	KV BIL.
HV	AL	125
HO		30
LV	AL	30



DV SWITCH POSITION	RATED VOLTAGE
1	12470GY/7200
2	24940GY/14400



1-295-785

CAUTION - READ INSTRUCTION MANUAL 103 BEFORE OPERATING
 CONTAINS NO DETECTABLE LEVEL OF PCB (LESS THAN 1PPM) AT THE TIME OF MANUFACTURE

WORK ORDER	XXXXXXXX
SERIAL BEGIN	XXXXXXXX
SERIAL END	XXXXXXXX

UNLESS OTHERWISE NOTED:
 DIMENSIONS ARE IN INCHES
 Tolerances are:
 Decimals:
 One place ±0.03
 Two place ±0.01
 Three place ±0.005
 Angles ±1.0°

E-PAD ERMCO
 Dyersburg, TN 38025
 Phone # (731) 285-9121

TITLE: PWC WHSE FAC. FAYETTEVILLE

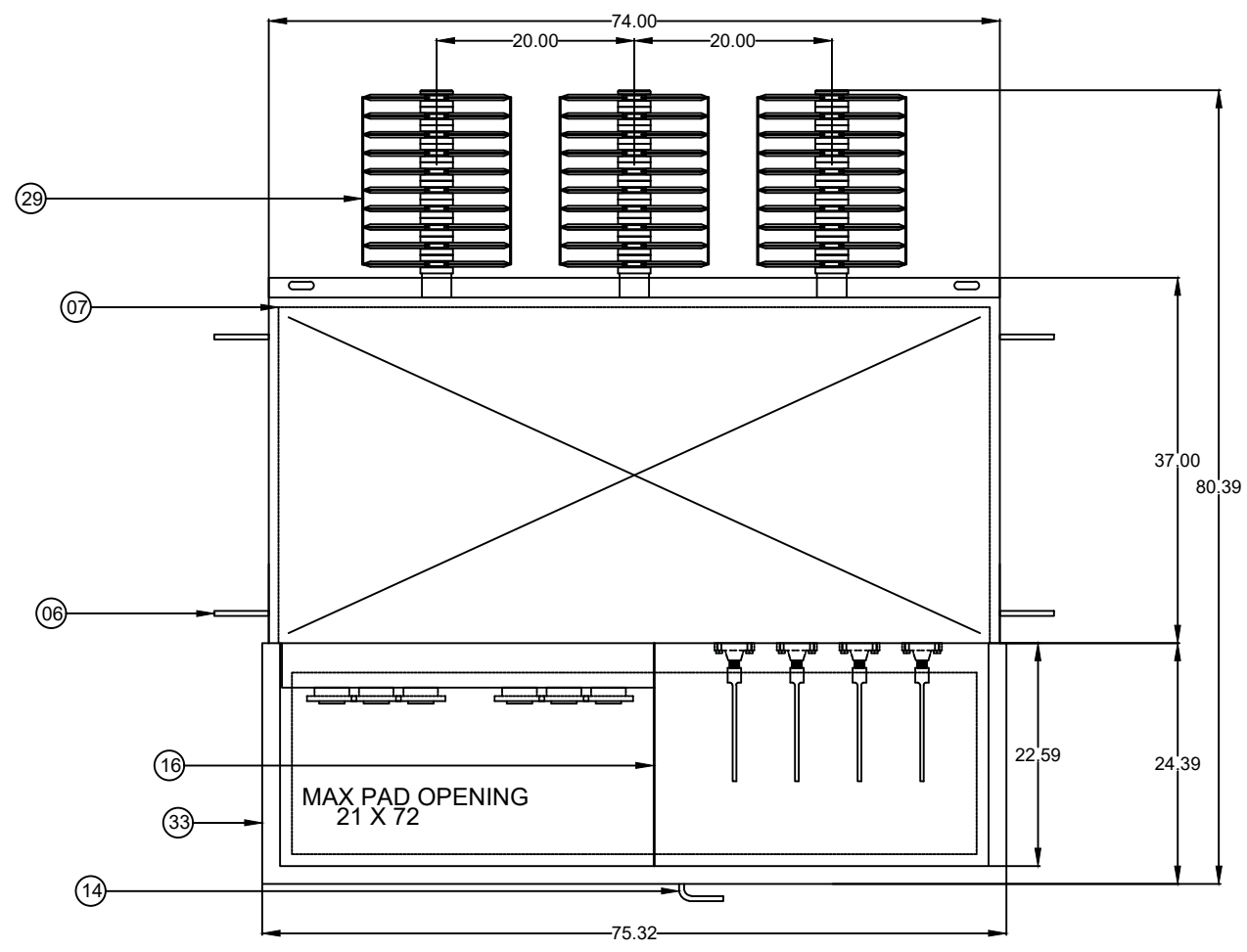
MATERIAL: ANODIZED ALUMINUM	WEIGHT: .044 LBS.	DWN. BY: JAV	DATE: 02/21/20	DRAWING NUMBER
		APPD. BY: RLC	DATE: 02/21/20	NP553351.011
		REV ISSUE DATE:	SCALE: NTS	

3 PHASE PAD OUTLINE

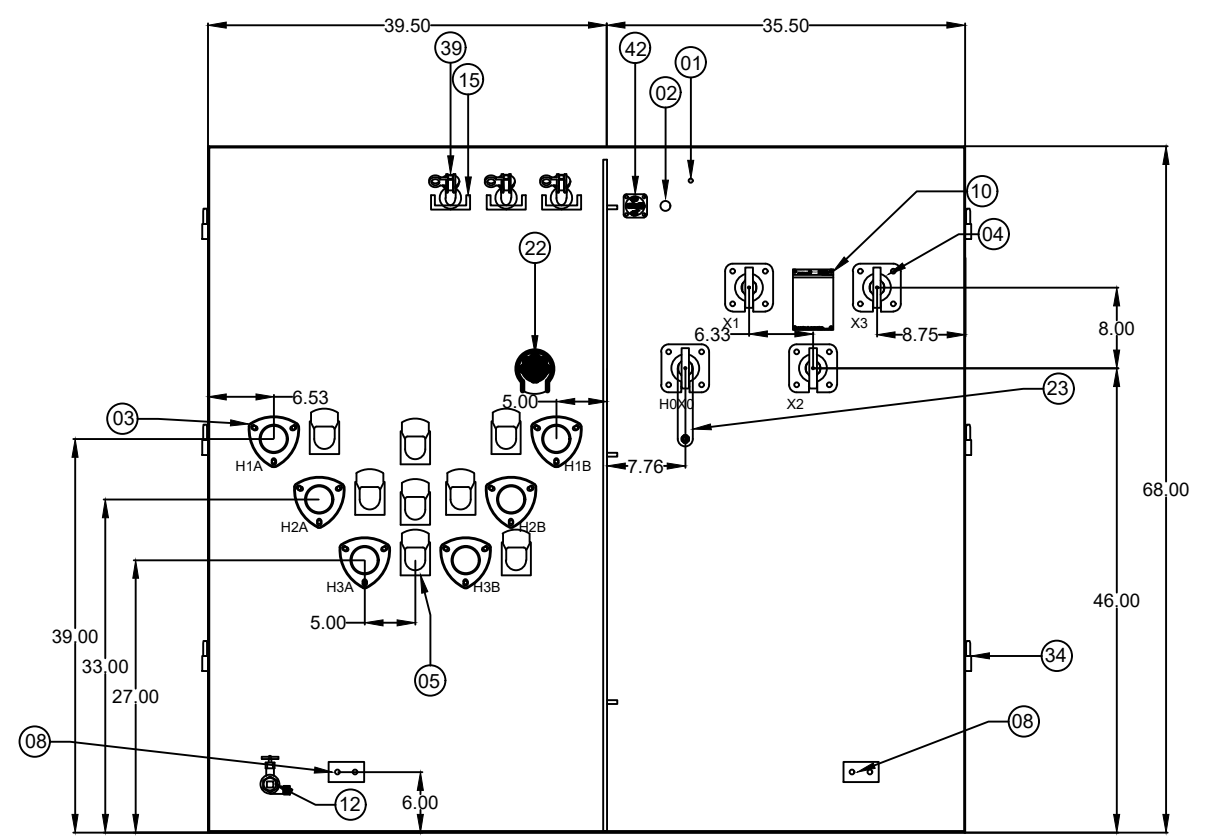
DWN BY: MRD	DATE: 07/27/22		
ISSD BY: BG	DATE: 07/27/22		
PO #:			
DWG NO. 658654.003	STOCK #:		
CUSTOMER: PWC WHSE FAC. FAYETTEVILLE			
SPEC.	DATED		
KVA 2500			
HIGH VOLTAGE 12470GY/7200			
LOW VOLTAGE 480Y/277			
APPROX. CORE AND COIL WEIGHT	7672 LBS		
APPROX. TANK AND ACCESS. WEIGHT	3289 LBS		
GAL. OF OIL 508	APPROX. WEIGHT 3814 LBS		
APPROX. TOTAL WEIGHT	14775 LBS		
REV.	DATE	DESCRIPTION	APP BY
SCALE: NTS			

STANDARD FEATURES

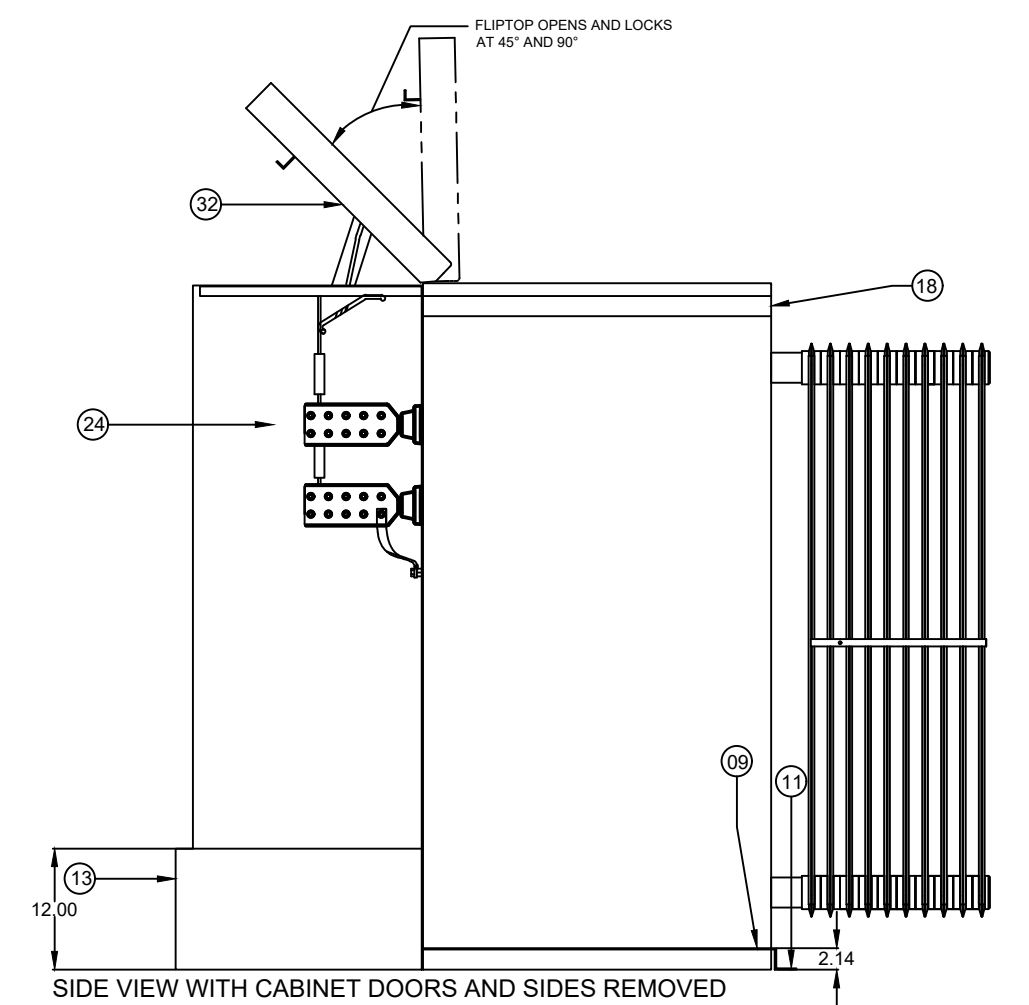
ITEM	DESCRIPTION
01	PRV W/ 0.25 NPT COUPLING
02	OIL FILL/UPPER FILTER PRESS 1.0 NPT COUPLING
03	HV BUSHING WELL W/FIXED STUD (ECI#9U03DAS125G)
04	LV BUSHING, (HJ# EPC10-090-030E01T01)
05	PARKING STAND W/ STANDOFF
06	LIFTING LUGS X (4) WITH TIE-DOWN PROVISIONS
07	BOLTED COVER
08	SS 2-HOLE GROUND PADS W/CONNECTOR (HUBBELL#GTCL-23A-TP)
09	JACKING PROVISIONS
10	NAMEPLATE LASER-SCRIBED ANODIZED ALUMINUM
11	PAD MOUNTING PROVISION
12	1" NPT DRAIN VALVE W/ 3/8" SAMPLER (HJ#DV1000-002-FB)
13	12" REMOVABLE SILL
14	PAD LOCKABLE DOOR HANDLE, SILICON BRONZE
15	PENTA-HEAD BOLT
16	DRIP CUPS
17	REMOVABLE LV-HV BARRIER 3" FROM BASE
18	REMOVABLE TAMPER GUARD FOR COVER
22	TAP CHANGER
23	COPPER X0 GROUND STRAP
24	10-HOLE INTEGRAL SPADE W/SUPPORTS
29	RADIATORS
32	HINGED TOP CABINET W/REMOVABLE COVER
33	CABINET SIDE DOORS W/SECURITY LATCH
34	304SS HINGES FOR MOUNTING MOVABLE CABINET SIDES
39	FLAPPER VALVE BAYONET W/ ISOLATION LINK CP 4000361C89FV
42	(CP 4038361C05CB HI-AMP 125 & ECI#7580ZB0699 (A6)) LIQUID LEVEL GAUGE



TOP VIEW WITH CABINET COVER REMOVED



FRONT VIEW WITH CABINET REMOVED



SIDE VIEW WITH CABINET DOORS AND SIDES REMOVED

CUSTOMER APPROVAL

FOR APPROVAL FOR RECORDS

APPROVED AS IS _____

APPROVED AS NOTED _____

NOT APPROVED _____

SEND SIGNED COPY TO:
ERMCO
ATTN: 3 PHASE SALES
2225 INDUSTRIAL RD.
DYERSBURG, TN, 38025

- NOTES:
- 1) ALL DIMENSIONS ARE IN INCHES UNLESS NOTED
 - 2) FILLED W/MINERAL OIL
 - 3) SECOND NP LOCATED INSIDE LV DOOR
THIRD NP LOCATED OUTSIDE LV DOOR
 - 4) MUNSELL 7GY 3.29/1.5 PADMOUNT GREEN
 - 5) 12GA THICK MILD STEEL CABINET
 - 6) 7GA THICK MILD STEEL TANK
 - 7) 14GA THICK MILD STEEL RADIATORS

REVISION					
REV.	DESCRIPTION	DATE	BY:	DATE	APPD:



ERMCO
 DYERSBURG, TN U.S.A. PAT. 6,667,438
 3Ø TRANSFORMER

ONAN - 60 HZ - 65° C RISE
 TYPE II MINERAL OIL
 DOE COMPLIANT



LIQUID-FILLED DISTRIBUTION TRANSFORMER

KVA 2500
 HV 12470GY/7200
 LV 480Y/277

MFR SER MYXXXXXXXXXX

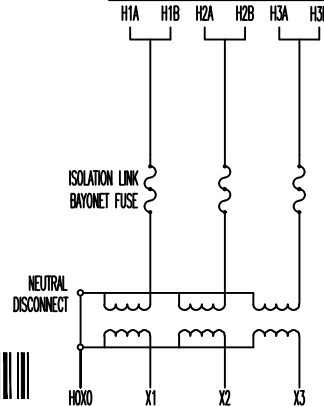
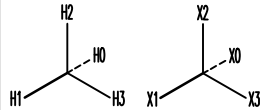
MFG. DATE MMY

IMP 5.75 % @ 85° C
 % IZ IS @ BASE KVA & RATED VOLTAGE

APPROX. WEIGHT	
CORE & COIL (UNTANKING)	7672 LB
TANK & FIT	3289 LB
FLUID : OIL (GALLONS)	3814 LB / 508
TOTAL WGT.	14775 LB

	MAT	KV BIL
HV	AL	95
HO		30
LV	AL	30

TAPS	VOLTAGE	CURRENT
A	13093	110.3
B	12781	113
C	12470	115.8
D	12158	118.8
E	11846	121.9



1-295-785

CAUTION - READ INSTRUCTION MANUAL 103 BEFORE OPERATING
 CONTAINS NO DETECTABLE LEVEL OF PCB (LESS THAN 1PPM) AT THE TIME OF MANUFACTURE

WORK ORDER	XXXXXXXX
SERIAL BEGIN	XXXXXXXX
SERIAL END	XXXXXXXX

UNLESS OTHERWISE NOTED:
 DIMENSIONS ARE IN INCHES

Tolerances are:
 Decimals:
 One place ±0.03
 Two place ±0.01
 Three place ±0.005
 Angles ±1.0°

E-PAD ERMCO
 Dyersburg, TN 38025
 Phone # (731) 285-9121

TITLE: PWC WHSE FAC. FAYETTEVILLE

MATERIAL:
 ANODIZED ALUMINUM

WEIGHT:
 .044 LBS.

DWN. BY: MRD
 APPD. BY: RLC
 REV ISSUE DATE:

DATE: 07/27/22
 DATE: 07/27/22
 SCALE: NTS

DRAWING NUMBER
 NP658654.003



COV-6 600V Metering CT

Applications

600V metering current transformers are used in a wide variety of commercial and industrial applications where revenue class metering is necessary for billing purposes. The COV-6 is specifically engineered to fit on a 4" primary bus found in padmount transformers and can withstand temperatures to 85° C.



High Accuracy, Extended Range

The Alta Series high accuracy, extended range current transformers exceed the IEEE 0.15S accuracy standard. These CTs meet or exceed every 600V metering class CT in the industry with metering class 0.15 from 1% of nominal current through rating factor. The COV-6 is also available in standard accuracy.

Construction

The core is constructed from wound layers of high accuracy, low loss electrical grade steel. The core and coil assembly is encapsulated in polyurethane specifically engineered for premium dielectric, mechanical and thermal properties for use in both indoor and outdoor applications.

Test Reports

Each COV-6 has a unique serial number which allows the customer to track each test record. Certified test reports are stored electronically and provided with every shipment.

Specifications

Insulation: 600V, 10kV BIL

Frequency: 60 Hz

Environment: Indoor/outdoor

Standards: IEEE C57.13 (others upon request)

RUS: The COV-6 is RUS Listed

Cross Reference

ABB AccuRange CMV-S; GE ITI RevenueSense JAB-0S; Ritz DCDW

The Peak Demand™ Advantage

- Current transformer accuracy exceeds the IEEE C57.13-2016 0.15S class
- Accuracy class is 0.15 from 1% of nominal current through rating factor
- Stocking available for just in time delivery
- 90% of orders ship within 24 hours
- Designed and engineered to meet customer specifications
- Fast turn-around time for custom quotations
- Friendly team of industry veterans with decades of experience serving OEM customers

PEAK DEMAND INC.

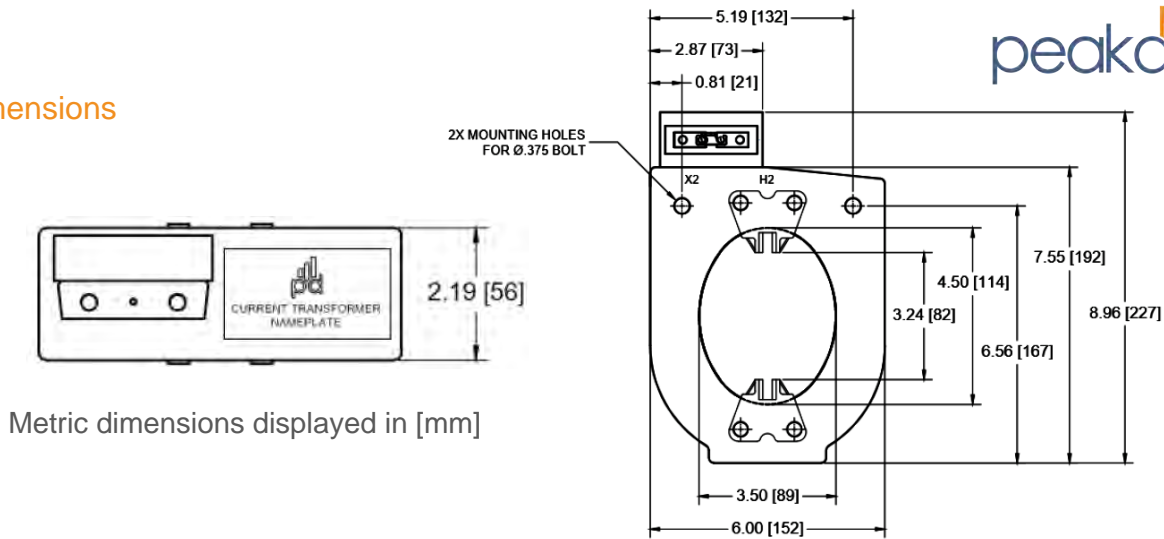
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1.844.PEAK.247 | 1.844.732.5247

605 Tarboro Street Annex SW Wilson, NC 27893 USA


peakdemand™
utility products

Dimensions



Metric dimensions displayed in [mm]

Product Number	Primary Rating	IEEE Metering Accuracy	Rating Factor
Alta Series High Accuracy			85° C
COV0500ANN	500A	0.15SB-0.2	2.0
COV0500ANN-R	500A	0.15SB-0.2	4.0 @ 30°C 3.0 @ 55°C
COV0500ANN-H	500A	0.15SB-0.2	4.0
COV0600ANN	600A	0.15SB-0.5	2.0
COV0600ANN-X	600A	0.15SB-0.2	3.0
COV1000ANN	1000A	0.15SB-0.5	2.0
COV2000ANN	2000A	0.15SB-0.5	2.0
Standard Accuracy			85° C
COV0200SNN	200A	0.3B-0.1	4.0
COV0400SNN	400A	0.3B-0.2	4.0
COV0600SNN	600A	0.3B-0.5	3.0
COV0800SNN	800A	0.3B-0.5	3.0
COV1000SNN	1000A	0.3B-0.5	2.0
COV1200SNN	1200A	0.3B-0.5	2.0
COV1500SNN	1500A	0.3B-0.5	2.0
COV2000SNN	2000A	0.3B-0.5	1.5
COV4000SNN	4000A	0.3B-0.5	1.0

Notes

Alta Series units exceed the 0.15S class. Accurate to 1% of nominal current.

Optional baseplate available. Change second to last letter from "N" to "B".

Approximate weight 6 lbs.

Other ratios available upon request.

Peak Demand Inc. strives to keep the information in this document current and accurate. Please contact Peak Demand if there is any question as to the accuracy or completeness of the information contained in this document. Proper product selection and product application is the sole responsibility of the purchaser. Peak Demand reserves the right to discontinue any product or service at any time.

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Public Works Commission
Fayetteville, NC
Electric Systems Division
Material Specification

TRANSFORMER, PAD-MOUNT ,3-PHASE, 12KV

Revision Date: December 16, 2022
Revised By: Glenn Andersen
Page 1 of 2

(Reference Table 4 on Page 2 for PWC Stock Codes, Ratings and Property Types)

Description: Pad mounted, compartmental-type, loop-feed, ONAN, three-phase 60 hertz dual primary voltage Y-Y secondary voltage distribution transformer for use on 12470GRDY/7200 systems under usual service conditions. Unit will be standard side-by-side, primary/ secondary configuration with inside dimensions according to IEEE C57.12.34 Figure 16 with bails with base dimensions of 50"-70" wide and 48"-70" deep for 750 KVA and below, and 72-92" wide and 92" maximum deep for 1000 KVA, 1500 KVA, and 2500 KVA, and will be constructed in general accordance with IEEE C57.12.34.

Efficiency Standard: All transformers supplied shall meet minimum efficiency standards set forth in the Department of Energy (DOE) 2016 Energy Efficiency Standard of the Energy Policy and Conservation Act.

Bushings and Terminals: Six primary bushing wells (H1A,2A,3A) and (H1B,2B,3B) connected internally per IEEE C57.12.34 to accept separable insulated connector bushings/accessories conforming to ANSI/IEEE Standard 386; and conforming to dimensions as shown in Figure 16 in IEEE C57.12.34; eight single-accessory parking stands; Four low-voltage externally clamped spade type terminals (X0,1,2,3) capable of carrying 150 % of full load current as shown in Figure 8(A) and two (2) 2-hole NEMA tank grounding pads/connectors per IEEE C57.12.34.

Accessory Equipment: Transformer will have a gasketed three-phase dual voltage switch within the primary compartment for de-energized selection of 12470GRDY/7200 primary voltage, lifting provisions per IEEE C57.12.34, three oil-immersed rated load break hook-stick operated Bay-O-Net type fuses sized to remove the transformer from the line in case of severe overload and internal faults, a pressure relief device per IEEE C57.12.34, an oil level indicator, oil drain (located in the lower left corner of the primary compartment), fill and sampling provisions, and a standard diagrammatic nameplate with bar coded serial number, PWC Company number and PWC stock number. A duplicate nameplate shall be placed on the outside rear corner of the transformer. Also, install furnished PWC Company number (3.5" x 9" label) on the lower middle of the primary compartment door. A minimum of one (1) handhole large enough to allow replacement of all primary and secondary bushings, or a bolted cover shall be included.

Taps: 1000kVA, 1500kVA, and 2500kVA Transformers shall have straddle taps, two (2) 2.5% above nominal, and two (2) 2.5% below nominal voltage.

Polarity and Terminal Markings: Per IEEE C57.12.70

Oil Preservation: Per IEEE C57.12.34.

**Public Works Commission
Fayetteville, NC
Electric Systems Division
Material Specification**

TRANSFORMER, PAD-MOUNT, 3-PHASE, 12KV

**Revision Date: December 16, 2022
Revised By: Glenn Andersen
Page 2 of 2**

Tank: Domed or peak-roofed carbon steel welded-seam door and tank with primary and secondary compartments, per IEEE C57.12.34, and conforming to enclosure security requirements per IEEE C57.12.28.

Finish: Wash, primer, and Munsell 7GY 3.29/1.5 Green baked powder finish coat(s) in accordance with IEEE C57.12.28.

Performance Standards: (Per IEEE C57.13.6)

Rated capacity: Per IEEE C57.12.00 (Design Test)
Basic Impulse Level: 95/30 kV Primary/Secondary (Design Test)
Tests: Successful completion of routine tests per IEEE C57.12.00

Delivery Standards: Transformers will be securely strapped to pallets and delivered FOB destination as directed by PWC Warehouse personnel. All transformers shall be accompanied by certified test results in IEEE C57.12.37 format (comma delimited or Excel spreadsheet) electronically and sent to Elbert.Norris@faypwc.com in accordance with PWC Apparatus Shop Specifications. Transformers should be shipped on open-body trailers to be unloaded by crane, line truck or forklift from trailer side. PWC Warehouse personnel will be notified 24 hours in advance of delivery (910-223-4351)

Table 4						
Stock Code	Type	KVA	Primary (kV)	Primary/Secondary BIL (kV)	Secondary (V)	PROPERTY TYPE
1-295-660	3-PHASE, PAD	150	12.47	95/30	208/120	41168
1-295-700	3-PHASE, PAD	300	12.47	95/30	208/120	41568
1-295-720	3-PHASE, PAD	500	12.47	95/30	208/120	41768
1-295-737	3-PHASE, PAD	750	12.47	95/30	208/120	41868
1-295-665	3-PHASE, PAD	150	12.47	95/30	480/277	41171
1-295-705	3-PHASE, PAD	300	12.47	95/30	480/277	41571
1-295-725	3-PHASE, PAD	500	12.47	95/30	480/277	41771
1-295-740	3-PHASE, PAD	750	12.47	95/30	480/277	41871
1-295-750	3-PHASE, PAD	1000	12.47 w/Taps	95/30	480/277	41971
1-295-765	3-PHASE, PAD	1500	12.47 w/Taps	95/30	480/277	42071
1-295-786	3-PHASE, PAD	2500	12.47 w/Taps	95/30	480/277	42171

Specification reviewed by: _____

Fayetteville Public Works Commission
Fayetteville, NC
Electric Systems Division
Material Specification

1-030-825

Revision Date: March 13, 2019
Revised By: Glenn Andersen

INSERT, EXT, LOAD-BREAK BUSHING, 200A, 25 kV

Description:

Extra long type 25 kV loadbreak bushing insert conforming to dimensional and performance minimums in ANSI/IEEE 386 Standard for Separable Insulated Connector Systems. Insert will be suitable to be installed by hand tightening onto mating stud in the bushing well of de-energized dead-front equipment. Insert, when properly installed and used with complementary elbow connectors or bushing plugs, will be dead-front construction. All conducting parts of the insert shall be copper.

Loadbreak bushing insert shall have vents in the housing to minimize the possibility of partial vacuum discharge when breaking load while removing the elbow when energized.

Performance Standards:

Rated Continuous Current: 200 amperes
Rated Maximum Voltage: 26.3Y15.2 kV
AC Withstand: 40 kV for 1 minute
Basic Impulse Level: 125 kV
Minimum Corona Level: 19 kV

Delivery Standards:

Inserts will be shipped in individual packages containing the insert with protective cap, silicone lubricant, and installation data sheet.

Types Accepted:

Manufacturer
ELASTIMOLD

Product
2701EA4

Note: Catalog/Series information is shown for reference use only. Supplier is responsible for conforming to specifications as stated.

Specification reviewed by: _____

**Fayetteville Public Works Commission
Fayetteville, NC
Electric Systems Division
Material Specification**

1-045-565

**Revision Date: February 5, 2020
Revised By: Glenn Andersen**

RELAY, DISTRIBUTION FEEDER AUTOMATION CONTROLLER, SEIMENS, FLISR

Description:

Relay, Distribution Feeder Automation Controller for G&W Viper ST Recloser Switch units used for fault location, isolation and service restoration (FLISR). The control shall be compatible with a decentralized automation system design and shall function without the need of a central computer and or server. The controller must be compatible with software whereby a System Graphical Interface will provide a drag and drop method to build a system topology; will provide a status change with a single mouse click; will provide a spreadsheet to enter values for required protection and control settings; will provide a page to enter control sequences per desired operational sequences; and will interface with the Control device software to create device files containing all inter-device logical connections, device internal logical connections, protection settings communication settings and primary gear interface settings. The system controller shall require no maintenance or service contracts to retain their programmed functionality and performance. The controller shall monitor total line load conditions and user specified capacity limits to prevent operation in a way to exceed the available load budget at the switching point. The controller assembly shall include a backup battery to maintain controller functionality without power for 24 consecutive hours, and periodically perform a battery test to verify its operating condition. The controller shall be compatible with G&W standard 32 and 42 pin control cable interfaces and shall incorporate G&W's proprietary driving electronics assembly. It also shall be housed in a NEMA4 painted aluminum or stainless steel enclosure suitable for pole mounting. The controller shall provide an internal GPS module to for synchronization time stamping of all events and fault records.

Communication:

The controller shall provide IEC 61850 communications protocol as a standard for peer to peer interface connections, provide IEC 61850 and DNP3 communications from a single Ethernet port and provide a direct connection for single mode fiber. Additional conversion devices will not be required. The communication module must have an independent processor to adequately filter "GOOSE" messages by removing unwanted or malicious messages and shall use application secure IEC 61850 GOOSE messaging to transfer digital and analogue information from peer to peer. The controller shall communicate to a SCADA master using the DNP 3.0 or IEC 61850 protocols.

System Monitoring

The controller shall monitor communication system's status and automatically preclude switching operations whenever a communication failure is detected and will provide a primary switch out of service function to address gear failure in the field and/or communication failure to a controller. The controller shall immediately disable automatic operations whenever any local operational controls are executed (e.g "Local-Hot Line Tag"). The controller shall include a means to monitor the operational status of the primary switch units. The controller, as part of the overall system, must maintain FLISR functionality even if one or more of the field devices are out of service due to a communication, device or primary gear failure.

**Fayetteville Public Works Commission
Fayetteville, NC
Electric Systems Division
Material Specification**

Source Transfer

The controller will provide source transfer functionality which shall be user-programmable to execute a transfer in less than 15 cycles and shall provide a sync-check option to facilitate source transfer. Automatic transfer shall be initiated when a source switch, recloser, or circuit breaker for a feeder was opened causing loss of voltage measured from the switch unit's voltage sensors. The controller shall not operate or initiate a transfer sequence if a fault is detected on the load side of the primary switches and the controller operations to be executed in a system operation sequence must be flexible and user defined.

Fault Detection

The controller must provide a differential protection method that shall locate a fault on a line segment in 3 cycles when deployed on fiber and require no additional switching operations to locate a fault.

Restoration

The controller shall have the ability to automatically return to a predetermined, normal state defined by a user-selected feeder normally open point user configurable. The restoration sequence triggers shall be defined by the user as being automatic or manual and either in the open or closed transition. The controller restoration sequences shall operate at the same speed as the source transfer functions.

Simulation Mode

The controller shall provide a means to run and test all programmed fault isolation, source transfer, and restoration sequences in simulation mode and the controller shall not operate the primary switchgear during simulated operations. In the simulated mode, the controller must provide all indications and control feedback to the connected SCADA system which will eliminate the need to send field crews to bypass primary gear during SCADA commissioning.

Performance Standards

Operating temperature: -40C to +85C

Per ANSI 25,27,32, 50P/G/Q, 51N, 59, 59P/G/Q, 79, 67N, 67P/G/Q, 81O/U/R:

Delivery Standards:

Completely packaged and mounted in NEMA4 cabinet for pole mounting.

Types Accepted:

Manufacturer

Siemens

Product

SDFA-FLISR-CNRL-GWVST

Note: Catalog numbers are shown for reference use only. Supplier is responsible for conforming to specifications as stated.

Specification reviewed by: _____

**Fayetteville Public Works Commission
Fayetteville, NC
Electric Systems Division
Material Specification**

1-045-566

**Revision Date: February 5, 2020
Revised By: Glenn Andersen**

RELAY, ELECTRONIC, DISTRIBUTION FEEDER PROTECTION, SEL-651R

Description:

Relay, electronic distribution feeder protection controller for G&W Viper ST Recloser Switch units used for fault location, isolation and service restoration. Totally solid state that will apply a comprehensive mix of overcurrent functions for sensitive protection of phase-to-phase, phase-to-ground faults and fast operation for three-phase faults. Relay shall also offer protection from over- and under- voltage. Relay shall allow analysis of overcurrent protection system performance using built-in System Events Recorder (SER) and oscillographic event reports. Relay shall have a fault locator package, breaker failure package, breaker health, and a breaker control package. Relay shall be complete with at least 1 EIA 232 and 1 EIA 485 interconnection for local/remote access and system integration, and rear mounted, direct connect I/O panels. Relay shall be equipped with accurate metering capabilities for amps, volts, MW, PF, instantaneous peak demand, frequency and battery volts. Also, relay shall be able to record voltage sags, swells and interruptions. 48 VDC, single fiber MM Ethernet port. The controller assembly shall include a backup battery to maintain controller functionality without power for 24 consecutive hours, and periodically perform a battery test to verify its operating condition. The controller shall be compatible with G&W standard 32 and 42 pin control cable interfaces and shall incorporate G&W's proprietary driving electronics assembly. It also shall be housed in a NEMA4 painted aluminum or stainless steel enclosure suitable for pole mounting.

Power quality - Current Total Demand Distortion (TDD), Voltage Total Harmonic Distortion (THD), Voltage Sags (dips), Swells, and Interrupts (VSSI)

Communication:

The controller Relay shall have a DNP communications interface. Relay shall have Digital Relay to Relay Communications "Mirrored Bits". Relay shall include fast messaging and shall be capable of providing IEC 61850 communications protocol as a standard for peer to peer interface connections, provide IEC 61850 and DNP3 communications from a single Ethernet port and provide a direct connection for single mode fiber. Additional conversion devices will not be required. The communication module must have an independent processor to adequately filter "GOOSE" messages by removing unwanted or malicious messages and shall use application secure IEC 61850 GOOSE messaging to transfer digital and analogue information from peer to peer. The controller shall communicate to a SCADA master using the DNP 3.0 or IEC 61850 protocols.

System Monitoring

The controller shall monitor communication system's status and automatically preclude automatic switching operations whenever a communication failure is detected and will provide a primary switch out of service function to address gear failure in the field and/or communication failure to a controller. The controller shall immediately disable automatic operations whenever any local operational controls are executed (e.g "Local-Hot Line Tag"). The controller shall include a means to monitor the operational status of the primary switch units.

Fayetteville Public Works Commission
Fayetteville, NC
Electric Systems Division
Material Specification

Performance Standards

Operating temperature: -40C to +85C

Per ANSI 25,27,32, 50P/G/Q, 51N, 59, 59P/G/Q, 79, 67N, 67P/G/Q, 81O/U/R:

Delivery Standards:

Completely packaged and mounted in NEMA4 cabinet for pole mounting.

Types Accepted:

Manufacturer
SEL

Product
0651R22DXGAXAE1123B3XX

Note: Catalog numbers are shown for reference use only. Supplier is responsible for conforming to specifications as stated.

Specification reviewed by: _____

Fayetteville Public Works Commission
Fayetteville, NC
Electric Systems Division
Material Specification

1-065-510

Revision Date: July 15, 2021
Revised By: Glenn Andersen

CABLE, 1/0 AL, EPR, 25KV, 1/C, CN

Description:

Underground primary distribution cable for installation in duct or direct burial rated 90°C, wet or dry, consisting of the following components:

Conductor: Solid, #1/0 AWG, EC-1350 aluminum alloy, ASTM B609

Conductor Shield: Minimum 12 mil, semi-conducting, extruded, compatible, strippable

Insulation: 260 mil, extruded, thermosetting ethylene propylene rubber (EPR)

Insulation Shield: Minimum 30 mil, free-stripping, semi-conducting

Neutral: Bare copper concentric, full neutral (16 x #14 or equivalent)

Outer jacket: 45 mil, linear low-density polyethylene (HMWPE/LLDPE)

Nominal outside diameter: 1.20 inches

Conductor shield, insulation and insulation shield to be applied in a continuous triple extrusion process; bare copper concentric neutral helically applied and uniformly spaced per ICEA S-94-649. Cable shall be identified with manufacturer's name, size and type of conductor, thickness & type of insulation, sequential footage, rated voltage and year of manufacture. Jacket shall be extruded with 3 red stripes. Each reel shall indicate beginning and ending footage on side.

Performance Standards:

Conductor: ASTM B-231

Cable shall meet or exceed requirements of ICEA Standard S-94-649 and AEIC CS8-07.

Delivery Standards:

Cable ends shall be sealed at both ends. Cable will be wound and shipped on 5,000 foot (+/-4%) wooden reels, covered/wrapped during shipment, with a maximum flange diameter of 72 inches and drum diameter as specified by NEMA WC26. The arbor hole shall be reinforced with a steel plate as shown in the photograph on Page 2 of this specification. Cable shall be shipped in an upright **vertical** position on the flanges. It is preferred that cable should be delivered on open bed trailers suitable for unloading from either side.

PWC Warehouse personnel (910-223-4355) will be notified of delivery 24 hours in advance. Deliveries shall be accompanied by certified test reports, partial discharge plots, and engineering information per above ICEA Standards.

Types Accepted:

<i>Manufacturer</i>	<i>Product</i>
OKONITE	161-23-4069
PRYSMIAN	---
KERITE	---

Note - Catalog numbers are shown for reference use only. Supplier is responsible for conforming to the above specifications.

Specification reviewed by: _____

Fayetteville Public Works Commission
Fayetteville, NC
Electric Systems Division
Material Specification

1-065-510

Revision Date: July 15, 2021
Revised By: Glenn Andersen

CABLE, 1/0 AL, EPR, 25KV, 1/C, CN

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Fayetteville Public Works Commission
Fayetteville, NC
Electric Systems Division
Material Specification

1-065-514

Revision Date: July 15, 2021
Revised By: Glenn Andersen

CABLE, 4/0 AL, EPR, 25KV, 1/C, CN

Description:

Underground primary distribution cable for installation in duct or direct burial rated 90°C, wet or dry, consisting of the following components:

Conductor: #4/0 AWG, EC-1350 aluminum alloy, ASTM B-231, 19 strand, Class B, strand-filled

Conductor Shield: Minimum 12 mil, semi-conducting, extruded, compatible, strippable

Insulation: 260 mil, extruded, thermosetting ethylene propylene rubber (EPR)

Insulation Shield: Minimum 30 mil, free-stripping, semi-conducting

Neutral: Bare copper concentric, one-third neutral (11 x #14 or equivalent)

Outer jacket: 45 mil, linear low-density polyethylene (HMWPE/LLDPE)

Nominal outside diameter: 1.40 inches

Conductor shield, insulation and insulation shield to be applied in a continuous triple extrusion process; bare copper concentric neutral helically applied and uniformly spaced per ICEA S-94-649. Cable shall be identified with manufacturer's name, size and type of conductor, thickness & type of insulation, sequential footage, rated voltage and year of manufacture. Jacket shall be extruded with 3 red stripes. Each reel shall indicate beginning and ending footage on side.

Performance Standards:

Conductor: ASTM B-231

Cable shall meet or exceed requirements of ICEA Standard S-94-649 and AEIC CS8-07.

Delivery Standards:

Cable ends shall be sealed at both ends. Cable will be wound and shipped on 3000 foot (+/- 4%) wooden reels, covered/wrapped during shipment, with a maximum flange diameter of 72 inches and drum diameter as specified by NEMA WC26. The arbor hole shall be reinforced with a steel plate as shown in the photograph on Page 2 of this specification. Cable shall be shipped in an upright **vertical** position on the flanges. It is preferred that cable should be delivered on open bed trailers suitable for unloading from either side.

PWC Warehouse personnel (910-223-4355) will be notified of delivery 24 hours in advance.

Deliveries shall be accompanied by certified test reports, partial discharge plots, and engineering information per above ICEA Standards.

Types Accepted:

<i>Manufacturer</i>	<i>Product</i>
OKONITE	162-23-4081
PRYSMIAN	----
KERITE	----

Note - Catalog numbers are shown for reference use only. Supplier is responsible for conforming to the above specifications.

Specification reviewed by: _____

Fayetteville Public Works Commission
Fayetteville, NC
Electric Systems Division
Material Specification

1-065-514

Revision Date: July 15, 2021
Revised By: Glenn Andersen

CABLE, 4/0 AL, EPR, 25KV, 1/C, CN

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Fayetteville Public Works Commission
Fayetteville, NC
Electric Systems Division
Material Specification

1-065-615

Revision Date: June 21, 2023
Revised By: Glenn Andersen

CABLE, URD QUADRUPLEX, 350 MCM AL

Description:

Four-conductor quadruplexed cable assembly, 600 volts, consisting of three 350 MCM 37-strand 1350-H19 aluminum insulated phase conductors and one #4/0 AWG 19-strand 1350-H19 aluminum insulated neutral conductor, all covered by an abrasion-resistant 0.095" cross-linked polyethylene rated at 90°C, wet or dry locations, with a permanent yellow stripe neutral identifier per ICEA S-81-570 Part 4. Insulated phase conductors shall be separately identified throughout cable length and shall be permanently marked with size, manufacturer, sequential footage, year, and phase. Each reel shall show the beginning and ending footage and the reel tare weight on the side of the reel (ideally on a metal tag). Code Word: SLIPPERYROCK.

Performance Standards

General performance requirements per ICEA S-81-570 Parts 3 and 4 and qualification tests per ICEA S-81-570 Part 6 as follows:

Sharp Impact Test: 10 inch-pounds minimum

Blunt Impact Test: 40 inch-pounds minimum

Abrasion Resistance Test: 200 cycles minimum

Crush Test: 650 lbs. minimum

Puncture: 50 lbs. minimum

Scoring: 200 cycles minimum average

Ampacity: 300 Amps (in conduit; 90°C conductor, 20°C earth ambient)

Delivery Standards:

Conductor to be wound and shipped on wooden non-returnable reels with a 72" maximum flange height and a minimum drum diameter to meet NEMA WC26, each containing approximately 1000' of conductor. Cable shall be shipped in an upright **vertical** position on the flanges. Reels shall be secured to a 4-way pallet for unloading and storage. It is preferred that cable should be delivered on open bed trailers suitable for unloading from either side.

Types Accepted:

Manufacturer	Product
SOUTHWIRE	SLIPPERYROCK/XLP
PRYSMIAN/GENERAL CABLE	SLIPPERYROCK/XLP
NEXANS	SLIPPERYROCK/XLP
CME	SLIPPERYROCK/XLP
NEHRING	SLIPPERYROCK/XLP
PRIORITY WIRE	SLIPPERYROCK/XLP
AMERICAN WIRE GROUP	SLIPPERYROCK/XLP

Note: Catalog information is shown for reference use only. Supplier is responsible for conforming to specifications as stated.

Specification reviewed by: _____

**Fayetteville Public Works Commission
Fayetteville, NC
Electric Systems Division
Material Specification**

1-110-015

**Revision Date: March 13, 2019
Revised By: Glenn Andersen**

ELBOW, 25 kV 200 A LB, 1/0 AL

Description:

Molded EPDM rubber, 200-amp class, 25 kV, rod-and-bore, loadbreak elbow connector with reinforced stainless steel hotstick eye and capacitively-coupled test point in complete compliance with ANSI/IEEE 386; Molded EPDM shield covering insulation body in conformance to IEEE 592; field replaceable, tin-plated, pilot lead-threaded copper probe/follower assembly; long-barrel, bimetallic, Class "A," circumferential-die type, compression lug connector (per ANSI C119.4) to accept #1/0 AWG solid primary conductor. Cable entrance/stress relief area to accommodate #1/0 AWG solid primary conductor insulated with 260 Mils of EPR insulation (0.905" nominal OD).

The elbow shall provide increased creepage distance via an insulated sleeve around the top of the copper probe and a layer of EPDM rubber over the conductive internal insert of the elbow.

Performance Standards:

Design Tests:

Single fault closing of 10,000 Amps Symmetrical per IEEE 386
Short time rating: 10,000 Amps for 10 cycles
Load Make/Break: minimum 10 cycles @ 200 Amps; 80% P.F.
Rated Maximum Voltage: 15.2Y26.3 kV
Current Rating: 200 Amps continuous (probe & connector tip)
Current Rating: 161 Amps continuous (connector body)
Basic Impulse Level: 125 kV (1.2 X 50 microsecond wave)

Production Tests:

Corona Extinction Level: 19 kV (3 Pico Coulomb threshold)
One Minute 60 Hz AC Withstand Level: 40 kV

Delivery Standards:

Deliver in individually marked packages with probe, connector, lubricant, probe installation tool and installation instructions. Elbows will be permanently marked with manufacturer's name and year of manufacture.

Types Accepted:

Manufacturer
COOPER

Product
PLE225CC05T

Note: Catalog numbers are shown for reference use only. Supplier is responsible for conforming to specifications as stated.

Specification reviewed by: _____

Fayetteville Public Works Commission
Fayetteville, NC
Electric Systems Division
Material Specification

1-280-461

Revision Date: September 19, 2022
Revised By: Glenn Andersen

RECLOSER, 600A, 15 KV, 3-PHASE, TRIPLE SINGLE

Description:

Three epoxy insulated vacuum interrupter modules with one magnetic actuator per phase providing single or three phase operation and TWO WAY interrupting electronically controlled distribution class recloser FOR POLE MOUNTING. Recloser shall have three source bushings and three load bushings mounted in rows on the tank. Bushing terminals shall accept up to 500 MCM conductor and ground terminals shall be eyebolt type that will accept #4 through 2/0 AWG stranded copper. Recloser shall be suitable for outdoor use and shall be painted light gray with a coating system capable of passing tests outlined in ANSI C57.12.28. All exposed fasteners shall be stainless steel, hot dipped galvanized, or aluminum for corrosion resistance. Control power and tripping shall be accomplished using 120 volts AC 60 hertz provided externally with battery backup. Recloser shall be equipped with three (3) 1000/500:1 current transformers and six (6) capacitively coupled voltage sensors encapsulated within the solid dielectric insulation for use with the recloser controls. This system shall be operated on a 12,470Y/7,200V primary system. Recloser shall be capable of being closed when both feeds are out of service. Recloser shall be equipped with one manual trip and lockout handle with mechanical block per phase capable of physically blocking electronic and manual operation. Recloser shall be equipped with a 40-foot control cable with 32 pin connectors on both ends.

Performance Standards:

Unit shall be tested according to applicable section of ANSI C37.60.
Nominal operating voltage: 12,470Y7,200 v.
Minimum Impulse Level: 110KV
Rated Frequency: 60 Hz
Minimum rated continuous current: 600 Amps
Minimum rated load break current: 600 Amps
Interrupting capacity: 12,500 amps symmetrical @ 12.47/7.2 KV.
Operating temperature: -60C to +65C

Delivery Standards:

Recloser shall be lagged, crated, and shipped with installation/erection instructions.

Types Accepted:

Manufacturer
G & W

Product
VIP378ER-12-1-ST

Note - Catalog numbers are shown for reference use only, supplier is responsible for conforming to specifications as stated..

Specification reviewed by: _____

ELECTRIC SYSTEMS DIVISION
Material Specification

1-290-111

Revision Date: 5-AUG-09

TERMINATOR, COLD SHRINK, FOR 1/0 AL 25 KV, OUTDOOR

Description:

Outdoor/indoor cold shrink Silicone rubber cable terminator to terminate 1/0 Solid aluminum 25 kV solid-dielectric concentric neutral jacketed cable with a 0.905 \pm .030" diameter insulation and 1.217" diameter overall. Terminator shall be supplied with a crimp-on transition connector for #4 stranded to # 1/0 solid, a cold shrink splice insulator for connector, a two bolt cable mounting clamp, mastic tape, instructions and silicone lubricant, as necessary. Insulator skirts to be a maximum of 2-1/2" in diameter.

Performance Standards:

Temperature Rating: 90 degrees Celcius
Current Rating: 151 Amps (minimum)
Voltage: 25KV Operating, 150 KV 1.2 X 50 Impulse
Corona: 30 KV Extinction

Delivery Standards:

Individually packaged with instructions, and clearly marked with application data on boxes/bags.

Types Accepted:

Manufacturer
3M

Product
7652-S-4-TI-PWC

Note - Catalog numbers are shown for reference use only, supplier, is responsible for conforming to specifications as stated.

Specification reviewed by: _____

ELECTRIC SYSTEMS DIVISION
Material Specification

1-295-003
TRANSFORMER, CONV, 1/2 KVA 12.47GRDY/7.2-120V

Revision Date: 27-JUN-01
(PROPERTY TYPE 10018)

Description:

Single-bushing outdoor single-phase 60 hertz single-voltage conventional pole-type non-PCB mineral-oil insulated Class OA copper-wound transformer use as a 120 volt control voltage or street lighting supply on 12470Y/7200 systems under usual service conditions.

Bushings and Terminals:

One top cover-mounted primary bushing with weak-link fuse and 2 secondary clamp-type terminals per ANSI C57.12.20-6.1.

Accessory Equipment: Transformer will have lifting lugs and pressure device.

Polarity and Terminal Markings: Transformer shall have "72" in 2" height numerals ideliby printed on tank side, with other markings per ANSI C57.12.20-63.

Oil Preservation: Per ANSI C57.12.20-6-4

Tank: Cylindrical carbon steel welded-seam wth one-piece removeable self-venting insulated cover, single lug, and tank grounding pad/connector ANSI C57. 12.20-6.5

Tank Finsih: Electrosatically applied zinc-rich primer and Light Gray alkyd finish coat or equivalent TGIC Polyester process coating per ANSI C.57.12.28 completely covering exterior of tank and extending down in tank to a point well below the marked 25 C oil level.

Performance Standards:

Rated Capacity: 0.5 KVA per ANSI C57. 12-3 (Design Test)

Basic Impulse Level: 95/30 kV Primary/Secondary (Design Test)

Maximum impedance: 0.5%

Successful completion of routine tests per ANSI C57.12.00-8.2

Delivery Standards:

Transformers will be securely strapped to pallets in upright position, and delivered FOB destination as directed by Warehouse personnel. Transformers should be shipped on open-body trailers to be unloaded by line trucks or fork lift. PWC Warehouse personnel will be notified 24 hours in advance of delivery (910/223-4355).

Types Accepted:

<i>Manufacturer</i>	<i>Product</i>
Eastern electric specialty Arkansas Electric	P.E.T CONV

Note: Bid Proposals should identify manufacturer and product identification for competitive products; in addition, supplier should have complete specifications for proposed unit available.

Specification reviewed by: _____

12 – Electrical Drawing Set

GILLESPIE-B.19 SOLAR UTILITY STATION

3858 GILLESPIE STREET
 FAYETTEVILLE, NORTH CAROLINA 28306

SOLAR ELECTRIC SYSTEM PROJECT - 2,332.2 KWDC/ 1,875.00 KWAC

34.9757, -78.9119

PROJECT LOCATION:



OWNER INFORMATION
 DAVID DESCHAMPS, PE
 FAYETTEVILLE PUBLIC
 WORKS COMMISSION
 955 OLD WILMINGTON ROAD
 FAYETTEVILLE, NC 28301
 910-223-4909

ENGINEER
 BRADLEY MARTIN, PE
 BOOTH & ASSOCIATES, LLC
 2300 REXWOODS DRIVE, SUITE 300
 RALEIGH, NC 27612
 919-851-8770

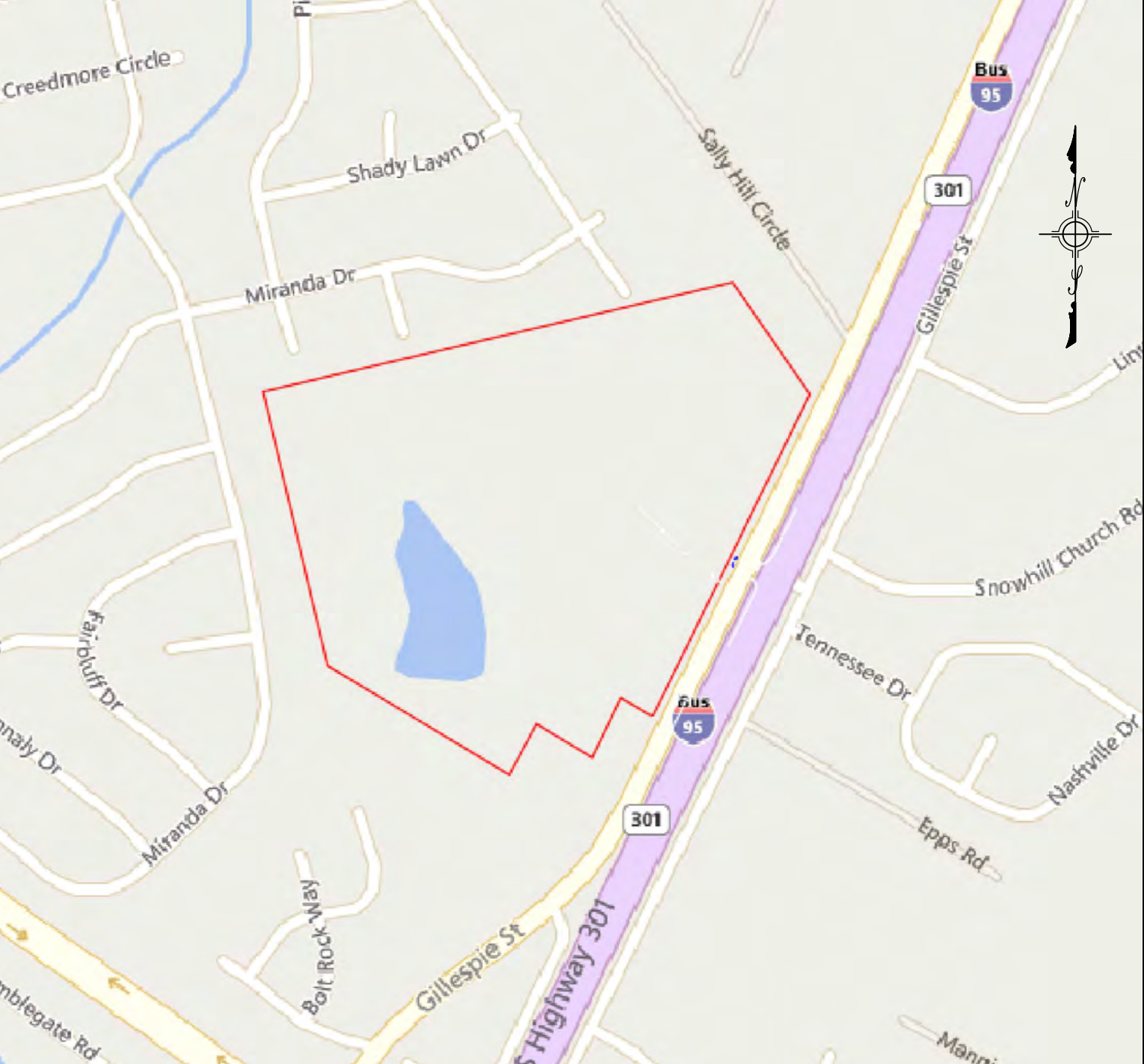
SYSTEM SUMMARY	
MODULE	(5980) 390 W Modules **
INVERTER	(15) 125KW STRING INVERTER **
TRANSFORMER	(1) 2500 KVA 12.47 KV GRD-WYE TO 480 V WYE, 5.75% IZ
RACKING	FIXED TILT 2UP PORTRAIT
AZIMUTH	90°
MAX ROTATION ANGLE OR TILT (°)	35°
GROUND COVERAGE RATIO (%)	50%
CLEAR ROW SPACING	15.375'
TOTAL STRINGS (26 MODS/STR)	230
DC CAPACITY	2,332.20 KW
AC CAPACITY	1,875.00 KW
LOADING RATIO DC/AC (%)	124%
INTERCONNECTION UTILITY	PWC
SITE COORDINATES	34.9757, -78.9119

** EQUIPMENT IS PRELIMINARY. CONTRACTOR TO SPECIFY EQUIPMENT BEING BID. EQUIPMENT MUST MEET ALL NECESSARY TECHNICAL REQUIREMENTS AS OUTLINED IN THE TECHNICAL SPECIFICATIONS.

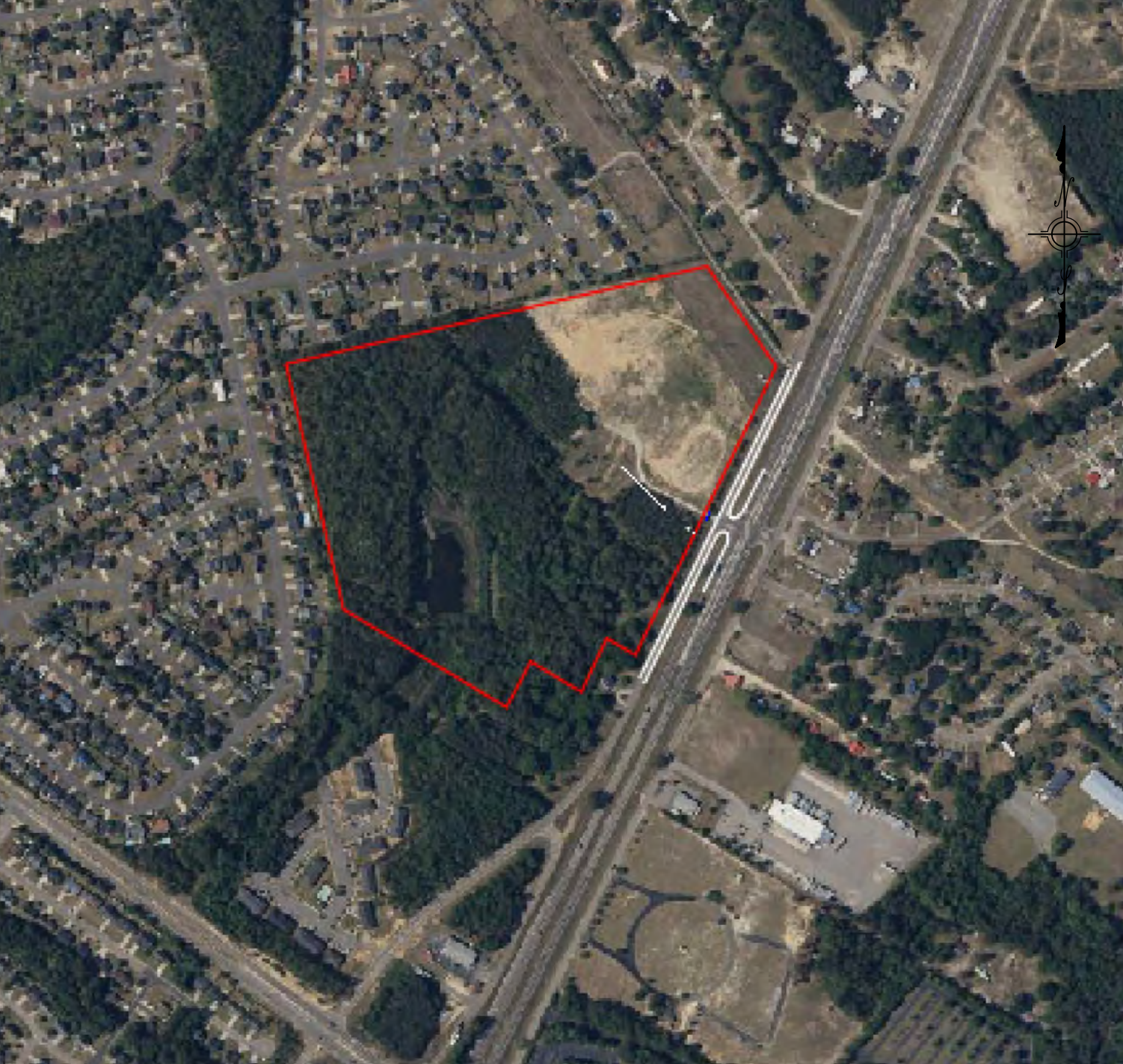
DRAWING INDEX:

DWG NO.	TITLE	REV NO
EP-001	TITLE SHEET	D
EP-100	UTILITIES SINGLE LINE DIAGRAM	F
EP-101	SOLAR SINGLE LINE DIAGRAM	F
EP-102	COMMUNICATION BLOCK DIAGRAM	D
EP-103	EQUIPMENT SCHEDULE AND CALCULATIONS	D
EP-104	CONDUCTOR SCHEDULE	B
EP-110	ELECTRICAL SITE PLAN	D
EP-111A	ARRAY PLAN 1A - PARTIAL	C
EP-111B	ARRAY PLAN 1B - PARTIAL	C
EP-150	DISTRIBUTION OVERHEAD PLAN & PROFILE	D
EP-153	DISTRIBUTION OVERHEAD SAG TABLES	C
EP-154	DISTRIBUTION OVERHEAD DETAILS	C
EP-155	DISTRIBUTION OVERHEAD DETAILS	C
EP-156	DISTRIBUTION OVERHEAD DETAILS	C
EP-251	MODULE WIRING DETAILS	C
EP-252	UNDERGROUND ELECTRICAL DETAILS	D
EP-253	ELECTRICAL DETAILS	C
EP-260	ELECTRICAL GROUNDING DIAGRAM	D
EP-261	ELECTRICAL GROUNDING DETAILS	C
EP-262	PV FENCE GROUNDING DETAILS	C
EP-300	EQUIPMENT PLANS & ELEVATIONS	D
EP-301	CABINET ELEVATIONS & BOM	C
EP-302	EQUIPMENT PAD 1 FOUNDATION DETAILS	B
EP-302A	EQUIPMENT PAD 1 FOUNDATION DETAILS	B
EP-303	EQUIPMENT PAD 2 FOUNDATION DETAILS	B
EP-303A	EQUIPMENT PAD 2 FOUNDATION DETAILS	B
EP-304	SUPPORT STRUCTURE 1 DETAILS	B
EP-305	SUPPORT STRUCTURE 2 DETAILS	B
EP-450	LABELS & MARKINGS	D

STREET MAP:



AERIAL VIEW:



NOT FOR CONSTRUCTION

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NO.	REVISIONS	DATE	ENG.	EDR.	B.M.
A	ISSUED FOR REVIEW	05/04/2023			
B	ISSUED FOR REVIEW 60% - SUBMITTAL	06/09/2023			
C	ISSUED FOR REVIEW 60% - SUBMITTAL	08/04/2023			
D	ISSUED FOR BID - 60%	09/14/2023			

PROJECT NAME:
GILLESPIE-B1.9 SOLAR UTILITY STATION
 DRAWING TITLE:
TITLE SHEET

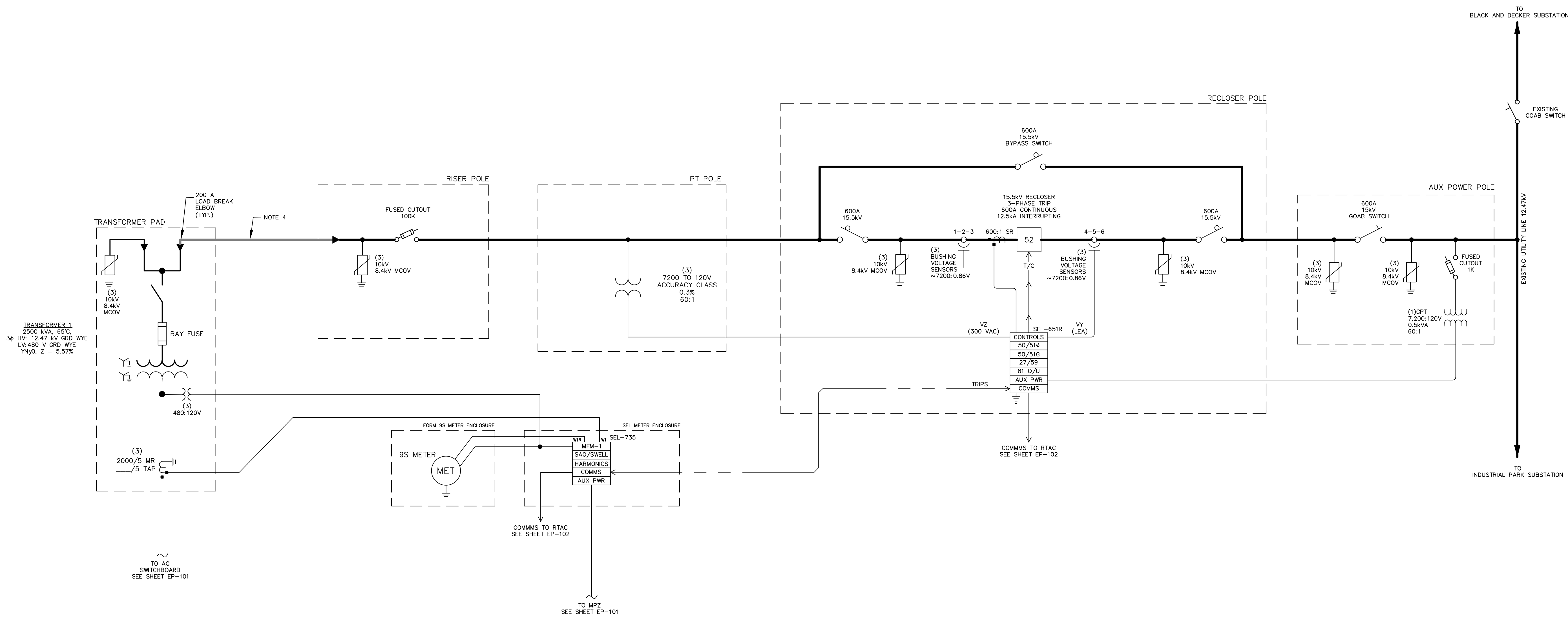
DRAWN BY: ALH
 CHECKED BY: EDR
 APPROVED BY: B.M.
 DATE: 03/29/2023
 SCALE: NONE
 FILE NUMBER: 12548
 SHEET:

EP-001

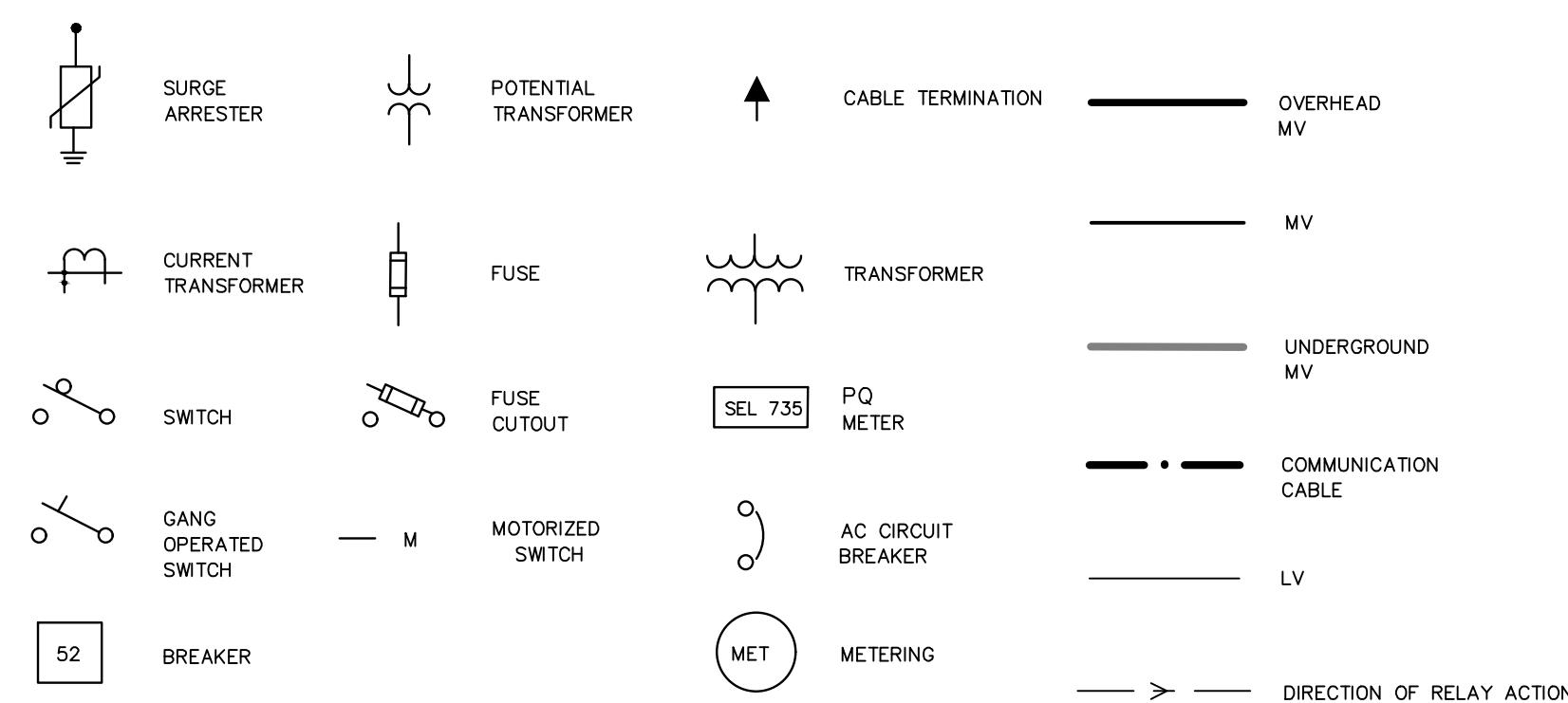
NO.	REVISIONS	DATE
A	ISSUED FOR REVIEW	04/14/2023
B	ISSUED FOR REVIEW	05/04/2023
C	ISSUED FOR REVIEW	06/09/2023
D	ISSUED FOR REVIEW	07/10/2023
E	ISSUED FOR REVIEW 60% - SUBMITTAL	08/25/2023
F	ISSUED FOR BID - 60%	09/14/2023

PROJECT NAME:	GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE:	UTILITIES SINGLE LINE DIAGRAM

DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	03/29/2023
SCALE:	NONE
FILE NUMBER:	12548
SHEET:	



LEGEND



NOTES:

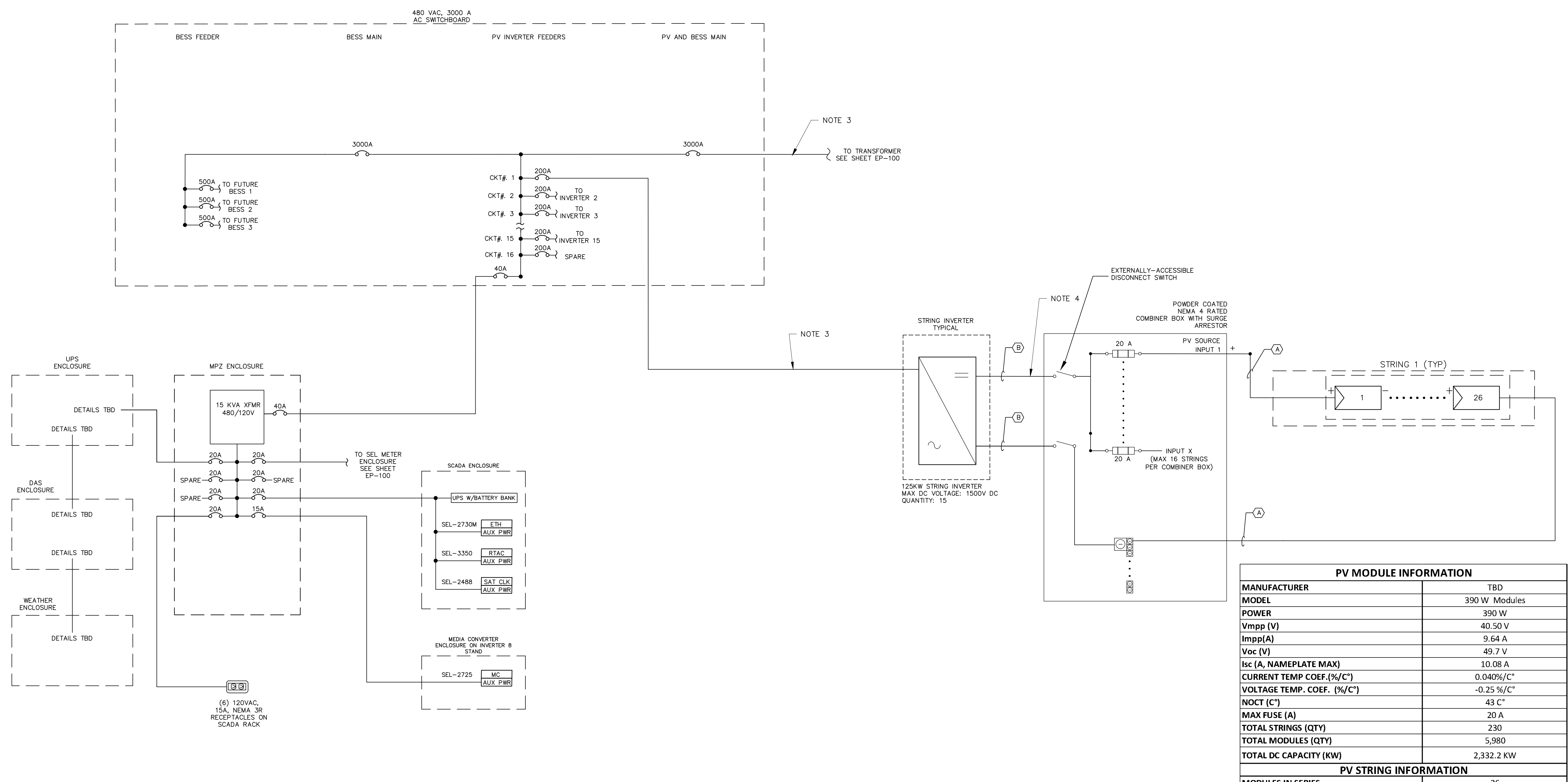
1. THE DC AND LV AC SLD IS TYPICAL.
2. THE DC SYSTEM IS FUNCTIONALLY GROUND.
3. MAXIMUM PHYSICAL AC EXPORT CAPABILITY = 1,875 KW (AC).
4. SEE CONDUCTOR SCHEDULE ON EP-104

SYSTEM SUMMARY

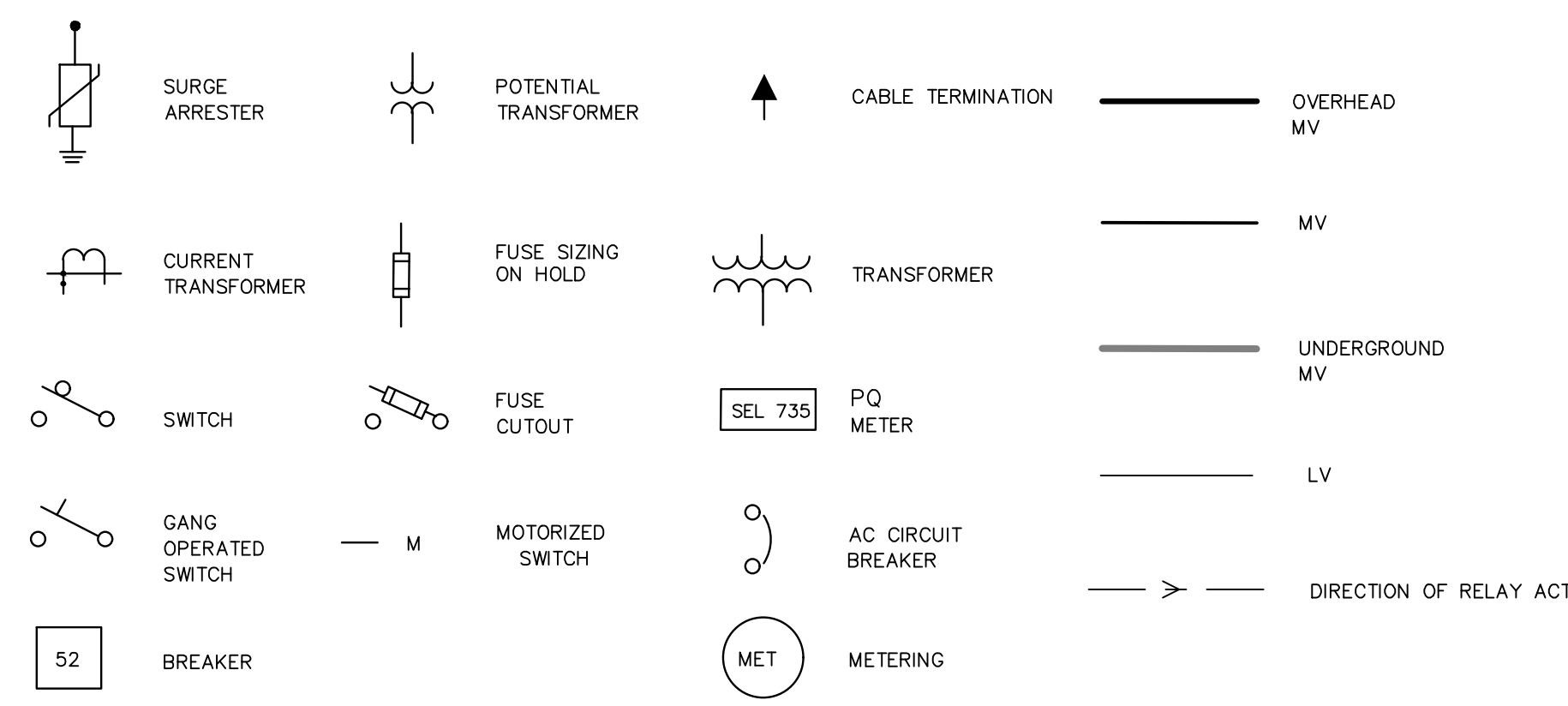
DC CAPACITY	2,332.20 KW
AC CAPACITY	1,875.00 KW
LOADING RATIO DC/AC (%)	124%
TRANSFORMER	(1) 2500 kVA 12.47 kV GRD-WYE TO 480 V WYE, 5.75% I _Z
INTERCONNECTION UTILITY	PWC
INVERTER	(15) 125KW STRING INVERTER
MODULE	(5980) 390 W Modules
MODULE STC RATING	390 W
STRING QUANTITY	230
MODULES/STRING	26

NO.	DATE	REVISIONS
A	04/14/2023	ISSUED FOR REVIEW
B	05/04/2023	ISSUED FOR REVIEW
C	06/09/2023	ISSUED FOR REVIEW
D	07/10/2023	ISSUED FOR REVIEW
E	08/04/2023	ISSUED FOR REVIEW 60% - SUBMITTAL
F	09/14/2023	ISSUED FOR BID - 60%

PROJECT NAME:	GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE:	SOLAR SINGLE LINE DIAGRAM
DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	03/29/2023
SCALE:	NONE
FILE NUMBER:	12548
SHEET:	EP-101



LEGEND



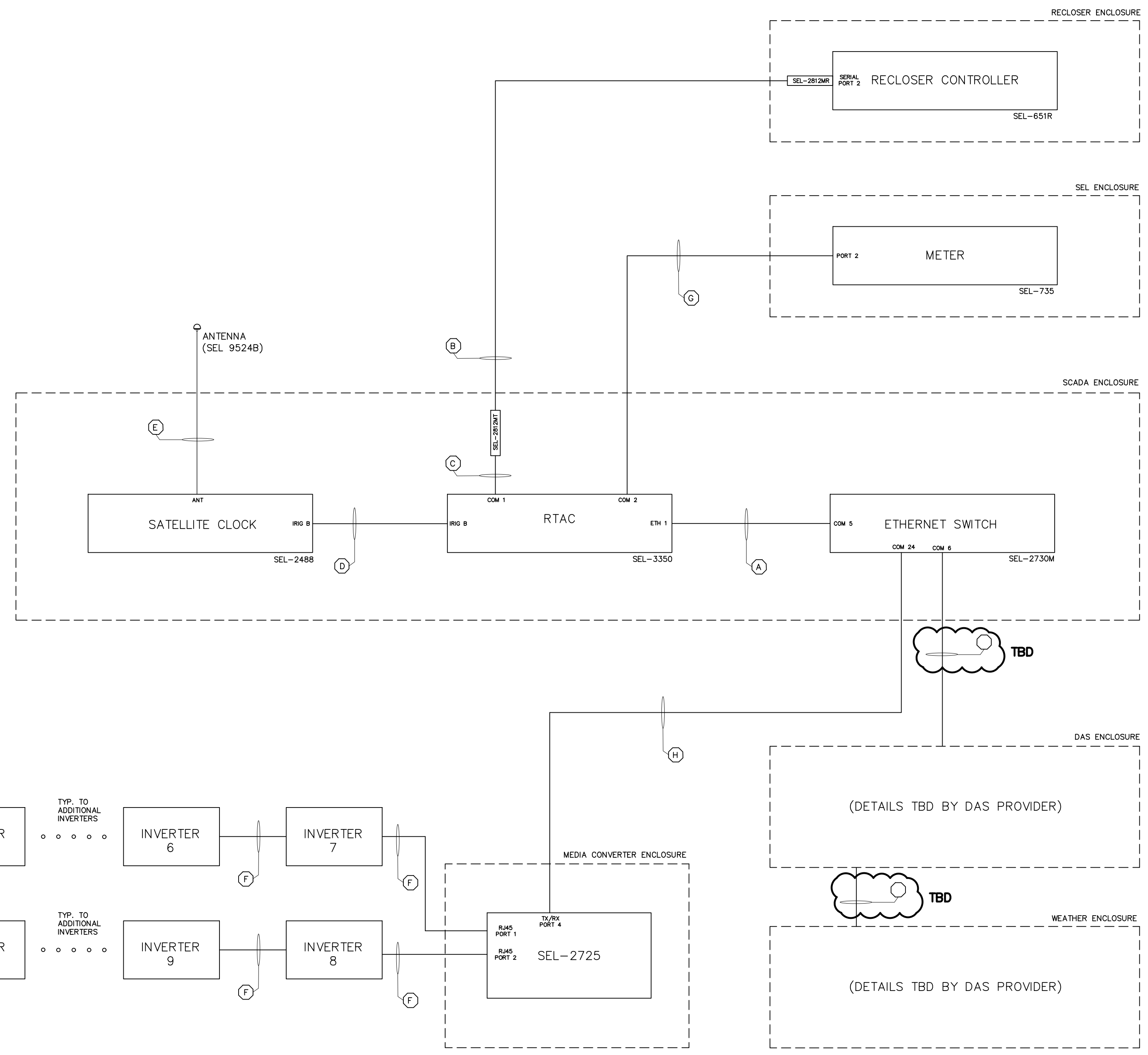
NOTES:

1. THE DC AND LV AC SLD IS TYPICAL.
2. THE DC SYSTEM IS FUNCTIONALLY GROUND.
3. REFER TO EP-104 FOR CONDUCTOR INFORMATION.
4. REFER TO EP-103 FOR DC CONDUCTOR INFORMATION.

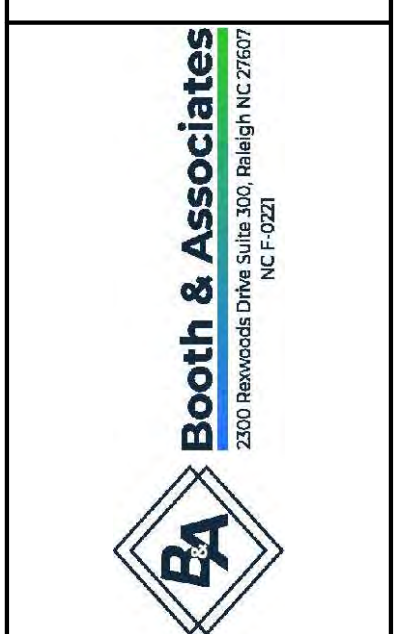
PV MODULE INFORMATION	
MANUFACTURER	TBD
MODEL	390 W Modules
POWER	390 W
Vmpp (V)	40.50 V
Imp(A)	9.64 A
Voc (V)	49.7 V
Isc (A, NAMEPLATE MAX)	10.08 A
CURRENT TEMP COEF. (%/C°)	0.040%/C°
VOLTAGE TEMP. COEF. (%/C°)	-0.25 %/C°
NOCT (C°)	43 C°
MAX FUSE (A)	20 A
TOTAL STRINGS (QTY)	230
TOTAL MODULES (QTY)	5,980
TOTAL DC CAPACITY (KW)	2,332.2 KW

PV STRING INFORMATION	
MODULES IN SERIES	26
STC POWER	10,140 W
Voc (STC)	1292.2 V
Vmax (MINIMUM TEMP)	1405.27 V
Vmpp (STC)	1053. V
Imp (STC)	9.64 A
Isc (STC, NAMEPLATE MAX)	10.08 A
Imax PER NEC 690.8(A)(1)	12.6 A
DESIGN TEMP (HIGH/LOW)	35/-10 C°
TOTAL SYSTEM STRINGS	230

INVERTER INFORMATION	
MANUFACTURER	TBD
MODEL NUMBER	125KW STRING INVERTER
NUMBER OF INVERTERS	15
STC RATED POWER OUTPUT	125 KW
MAX DC VOLTAGE	1500 V
AC OUTPUT VOLTAGE	480 V
MAX AC CURRENT	151 A
CEC WEIGHTED EFFICIENCY	98.5 %



COMMUNICATIONS CABLE LEGEND		
IDENTIFIER	CABLE TYPE	COMMUNICATION PROTOCOL
A	RJ45M TO RJ45M	ETHERNET – SEL FAST METER
B	ST-ST MM FIBER #002KSF-T4130D20	SERIAL – SEL FAST METER
C	RJ45M TO DB9F SEL-C609	SERIAL – SEL FAST METER W/ IRI B
D	BNC TO BNC SEL-C953	IRIG B
E	TNT TO TNC SEL-C961	COXIAL ANT TO SAT CLK
F	RJ45M TO RJ45M	ETHERNET/IP
G	RJ45M TO DB9M SEL-C605	SERIAL – SEL FAST METER W/ IRI B
H	LC-LC MM FIBER	ETHERNET – SEL FAST METER



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NO.	DATE	ENG.	REVISIONS
A	06/09/2023	EDR	ISSUED FOR REVIEW
B	07/10/2023	EDR	ISSUED FOR REVIEW 60% – SUBMITTAL
C	08/04/2023	BJM	ISSUED FOR REVIEW 60% – SUBMITTAL
D	09/14/2023	BJM	ISSUED FOR BID – 60%

PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE: COMMUNICATION BLOCK DIAGRAM

DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	06/09/2023
SCALE:	NONE
FILE NUMBER:	12548
SHEET:	

EQUIPMENT SCHEDULE										
Transformer ID	Inverter ID	Inverter Model	Module	# Strings	# Modules	Max Input Short Circuit Current (A)	STC RATED POWER AC (kW)	Output Voltage (VAC)	Total DC Power (kW)	DC/AC Ratio
XFMR-01	INV-01	125 KW STRING INVERTER	390 W MODULE	16	416	158.88	125	480	152.1	1.30
XFMR-01	INV-02	125 KW STRING INVERTER	390 W MODULE	15	390	148.95	125	480	162.2	1.22
XFMR-01	INV-03	125 KW STRING INVERTER	390 W MODULE	15	390	148.95	125	480	152.1	1.22
XFMR-01	INV-04	125 KW STRING INVERTER	390 W MODULE	16	416	158.88	125	480	162.2	1.30
XFMR-01	INV-05	125 KW STRING INVERTER	390 W MODULE	15	390	148.95	125	480	152.1	1.22
XFMR-01	INV-06	125 KW STRING INVERTER	390 W MODULE	14	364	139.02	125	480	142.0	1.14
XFMR-01	INV-07	125 KW STRING INVERTER	390 W MODULE	16	416	158.88	125	480	162.2	1.30
XFMR-01	INV-08	125 KW STRING INVERTER	390 W MODULE	16	416	158.88	125	480	162.2	1.30
XFMR-01	INV-09	125 KW STRING INVERTER	390 W MODULE	16	416	158.88	125	480	162.2	1.30
XFMR-01	INV-10	125 KW STRING INVERTER	390 W MODULE	16	416	158.88	125	480	162.2	1.30
XFMR-01	INV-11	125 KW STRING INVERTER	390 W MODULE	15	390	148.95	125	480	152.1	1.22
XFMR-01	INV-12	125 KW STRING INVERTER	390 W MODULE	15	390	148.95	125	480	152.1	1.22
XFMR-01	INV-13	125 KW STRING INVERTER	390 W MODULE	15	390	148.95	125	480	152.1	1.22
XFMR-01	INV-14	125 KW STRING INVERTER	390 W MODULE	15	390	148.95	125	480	152.1	1.22
XFMR-01	INV-15	125 KW STRING INVERTER	390 W MODULE	15	390	148.95	125	480	152.1	1.22

DC VOLTAGE DROP TABLE						
Current Type	Max/Average	From	To	Distance (ft), Note 1	Voltage Drop (V)	Voltage Drop (%)
Direct Current	MAX	Strings	Inverter	405	10.62	1.01%
	AVG	Strings	Inverter	140	3.67	0.35%

120 V AC and CT/PT Conductor Schedule							
From	To	Burial Scenario	(Note 1) Distance (FT)	Minimum Conductor Size & Type	Conductor Voltage Rating (V)	Minimum OCPD Size (A)	Equipment Ground Conductor Size
Transformer CTs	SEL Meter Enclosure	2" Conduit	75	(3) #10 AWG CU	600 V	N/A	#10 AWG CU
Transformer PTs			75	(3) #10 AWG CU	600 V	N/A	#10 AWG CU
MPZ Secondary	SEL Meter Enclosure	2" Conduit	75	(2) #10 AWG CU	600 V	15 A	#14 AWG CU
MPZ Secondary	UPS Enclosure	2" Conduit	75	(2) #10 AWG CU	600 V	20 A	#12 AWG CU
MPZ Secondary	SCADA Enclosure	2" Conduit	75	(2) #10 AWG CU	600 V	20 A	#12 AWG CU
MPZ Secondary	Media Converter	2" Conduit	85	(2) #10 AWG CU	600 V	15 A	#14 AWG CU
MPZ Secondary	120VAC Recepticals	2" Conduit	75	(2) #10 AWG CU	600 V	15 A	#14 AWG CU

DC CONDUCTOR CALCULATIONS		
LEGEND	A	B
FROM EQUIPMENT:	SINGLE STRING	DC COMBINER OUTPUT
TO EQUIPMENT:	DC COMBINER INPUT	INVERTER INPUT
NUMBER OF STRINGS:	1	16
WIRE RATING:	90 C°	90 C°
TERMINAL RATING:	90 C°	90 C°
ROUTING LOCATION:	UNDERGROUND	FREE AIR
CONDUCTOR MATERIAL:	COPPER	COPPER
WIRE INSULATION:	PV-WIRE (2000V), EXPOSED, WET, UV RATED	PV-WIRE (2000V), EXPOSED, WET, UV RATED
TEMPERATURE CORRECTION FACTOR:	0.96	0.96
MAXIMUM CIRCUIT CURRENT 690.8(A)(1)(a)(1), (A):	12.6 A	201.6 A
METHOD 1: 125% OF MAX CIRCUIT CURRENT 690.8(B)(1), (A):	15.75 A	252.0 A
METHOD 2: MAX CIRCUIT CURRENT WITH CONDITIONS 690.8(B)(2),(A):	26.25 A	210.0 A
MIN. CABLE AMPACITY REQUIRED:	26.25 A	252.0 A
FUSE SIZE:	20 A	N/A
CHOSEN WIRE SIZE:	#10	1/0
NUMBER OF UNGROUNDED (PHASE) CONDUCTORS:	2	2
NUMBER OF GROUNDED (NEUTRAL) CONDUCTORS:	0	0
EQUIPMENT GROUND CONDUCTOR (EGC):	#6 PV TYPE CU	#4 AWG CU
NUMBER OF EGC IN EACH SET:	1	1
MAX CONDUIT FILL DERATING:	50.0%	100.0%
MINIMUM CONDUIT SIZE:	3"	2"
MAX NUMBER OF SETS PER RACEWAY:	10	1

NOTES

- DISTANCES FOR ENGINEERING PURPOSES ONLY, NOT TO BE USED FOR CONTRACTOR TAKE-OFFS.



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NO.	DATE	REVISIONS
A	05/04/2023	ISSUED FOR REVIEW
B	09/04/2023	ISSUED FOR REVIEW
C	08/04/2023	ISSUED FOR REVIEW 60% - SUBMITTAL
D	09/14/2023	ISSUED FOR BID - 60%

PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE: EQUIPMENT SCHEDULE AND CALCULATIONS

DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	03/29/2023
SCALE:	NONE
FILE NUMBER:	12548
SHEET:	

NO.	REVISIONS	DATE
A	ISSUED FOR REVIEW 60% - SUBMITTAL	09/25/2023
B	ISSUED FOR BID - 60%	09/14/2023

PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE: CONDUCTOR SCHEDULE

DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	03/29/2023
SCALE:	NONE
FILE NUMBER:	12548
SHEET:	

MV CONDUCTOR SCHEDULE

From	To	AC Voltage (V)	Max Operating Line Current (A)	Cont. Current (Max*1.25) (A)	Burial Scenario (Note 1)	Distance (FT)	# of Parallel Sets	Number of Conductors	Conductor Size	Concentric Neutral Size	Conductor Material	Conductor Voltage Rating (V)	Insulation Type	Insulation Rating	Min. Conduit Size Triplexed (Note 2)	AC Voltage Drop (V)	AC Voltage Drop (%)
XFMR	Riser Pole	12470	115.75	144.68	IN CONDUIT	150	1	3	4/0 AWG	1	ALUMINUM	25000	EPR MV-90	100%	5"	3.16	0.03%

LV AC CONDUCTOR SCHEDULE

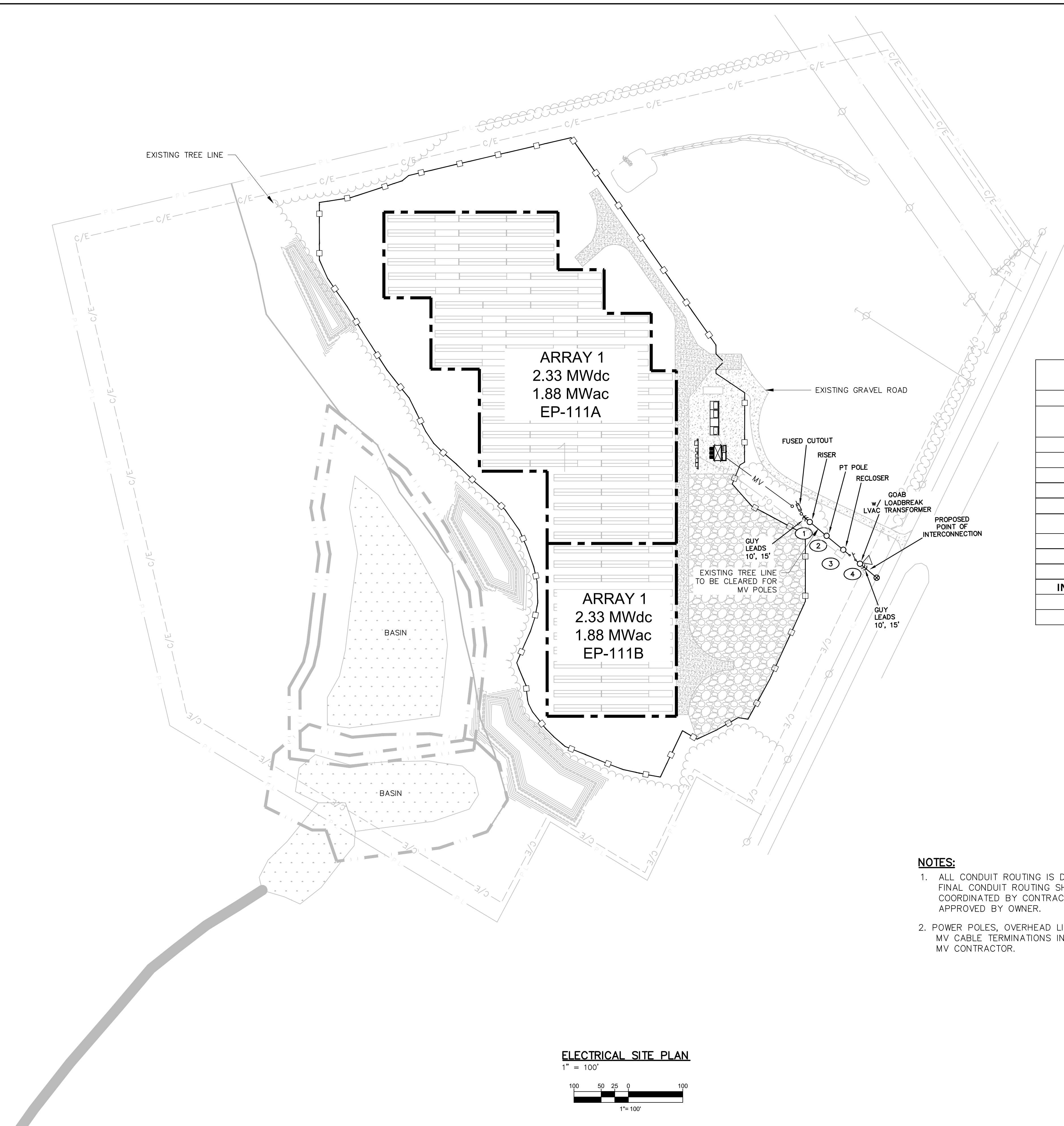
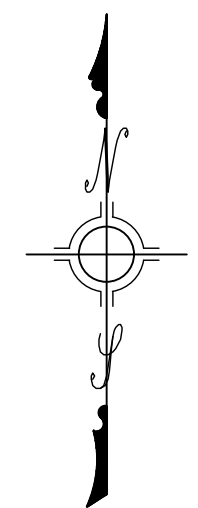
From	To	AC Voltage (V)	Max Operating Line Current (A)	Cont. Current (Max*1.25) (A)	Burial Scenario	Distance (FT)	Minimum Conductor Size & Type	Conductor Voltage Rating (V)	Minimum OCPD Size (A)	Equipment Ground Conductor Size	AC Voltage Drop (V)	AC Voltage Drop (%)
Inverter 1	AC Switchboard	480 V	151 A	189 A	3" Conduit Triplexed	575	(3) 350 MCM AL	600 V	200 A	4/0 AWG CU	9.55	1.99%
Inverter 2	AC Switchboard	480 V	151 A	189 A	3" Conduit Triplexed	550	(3) 350 MCM AL	600 V	200 A	4/0 AWG CU	9.13	1.90%
Inverter 3	AC Switchboard	480 V	151 A	189 A	3" Conduit Triplexed	410	(3) 350 MCM AL	600 V	200 A	4/0 AWG CU	6.81	1.42%
Inverter 4	AC Switchboard	480 V	151 A	189 A	3" Conduit Triplexed	270	(3) 350 MCM AL	600 V	200 A	4/0 AWG CU	4.48	0.93%
Inverter 5	AC Switchboard	480 V	151 A	189 A	3" Conduit Triplexed	250	(3) 350 MCM AL	600 V	200 A	4/0 AWG CU	4.15	0.86%
Inverter 6	AC Switchboard	480 V	151 A	189 A	3" Conduit Triplexed	200	(3) 350 MCM AL	600 V	200 A	4/0 AWG CU	3.32	0.69%
Inverter 7	AC Switchboard	480 V	151 A	189 A	3" Conduit Triplexed	100	(3) 350 MCM AL	600 V	200 A	4/0 AWG CU	1.66	0.35%
Inverter 8	AC Switchboard	480 V	151 A	189 A	3" Conduit Triplexed	80	(3) 350 MCM AL	600 V	200 A	4/0 AWG CU	1.33	0.28%
Inverter 9	AC Switchboard	480 V	151 A	189 A	3" Conduit Triplexed	100	(3) 350 MCM AL	600 V	200 A	4/0 AWG CU	1.66	0.35%
Inverter 10	AC Switchboard	480 V	151 A	189 A	3" Conduit Triplexed	125	(3) 350 MCM AL	600 V	200 A	4/0 AWG CU	2.08	0.43%
Inverter 11	AC Switchboard	480 V	151 A	189 A	3" Conduit Triplexed	205	(3) 350 MCM AL	600 V	200 A	4/0 AWG CU	3.40	0.71%
Inverter 12	AC Switchboard	480 V	151 A	189 A	3" Conduit Triplexed	290	(3) 350 MCM AL	600 V	200 A	4/0 AWG CU	4.82	1.00%
Inverter 13	AC Switchboard	480 V	151 A	189 A	3" Conduit Triplexed	375	(3) 350 MCM AL	600 V	200 A	4/0 AWG CU	6.23	1.30%
Inverter 14	AC Switchboard	480 V	151 A	189 A	3" Conduit Triplexed	450	(3) 350 MCM AL	600 V	200 A	4/0 AWG CU	7.47	1.56%
Inverter 15	AC Switchboard	480 V	151 A	189 A	3" Conduit Triplexed	550	(3) 350 MCM AL	600 V	200 A	4/0 AWG CU	9.13	1.90%
AC Switchboard	Transformer	480 V	2,265 A	2,831 A	5" Conduit Triplexed	20	(7) paralleled sets of (3) 500 MCM CU	600 V	3,000 A	(7) 400 MCM CU	0.42	0.09%
AC Switchboard	MPZ Primary	480 V	31 A	39 A	2" Conduit	75	(2) #8 AWG CU	600 V	40 A	#10 AWG CU	3.79	0.79%

COMMUNICATION CABLE SCHEDULE

Cable	From Device	Port	To Device	Port	Cable Type	Protocol	Procured By	Length (FT)
COM-RTAC-2812-1	RTAC (SEL-3350)	COM1	SERIAL TO FIBER (SEL-2812MT)	n/a	SEL-609	SERIAL - SEL FAST METER W/IRIG B	CONTRACTOR	5
COM-2812-REC-1	FIBER TO SERIAL (SEL-2812MT)	n/a	RECLOSER (SEL-651R) W/SEL-2812MR	SERIAL PORT 2	LST2 ST-ST	SERIAL - SEL FAST METER	CONTRACTOR	300
COM-RTAC-SAT-1	RTAC (SEL-3350)	IRIG	SAT CLOCK (SEL-2488)	IRIG	SEL-C953	IRIG B	CONTRACTOR	5
COM-MED-ETH	MEDIA CONVERTER (SEL-2725)	PORT4	ETH SWITCH (SEL-2730M)	COM16	ST-ST MM FIBER	100BASE-FX	CONTRACTOR	55
COM-ETH-METER-1	RTAC (SEL-3350)	COM2	METER (SEL-735)	COM1	CAT6e	ETHERNET - SEL FAST METER	CONTRACTOR	15
COM-SAT-ANT-1	SAT CLOCK (SEL-2488)	ANT	ANTENNA (SEL-9524B)	n/a	SEL-C961	COXIAL ANT TO SAT CLK	CONTRACTOR	5
COM-RTAC-ETH-1	RTAC (SEL-3350)	ETH1	ETH SWITCH (SEL-2730M)	COM5	CAT6e	ETHERNET - SEL FAST METER	CONTRACTOR	5
COM-ETH-DAS-1	ETH SWITCH (SEL-2730M)	COM6	DAS	TBD	TBD	TBD	CONTRACTOR	10
COM-DAS-WEA-1	DAS	TBD	WEATHER	TBD	TBD	TBD	CONTRACTOR	5
COM-INV1-INV2	INVERTER 1	1	INVERTER 2	2	CAT5e Outdoor 24# AWG	ETHERNET / IP	CONTRACTOR	40
COM-INV2-INV3	INVERTER 2	1	INVERTER 3	2	CAT5e Outdoor 24# AWG	ETHERNET / IP	CONTRACTOR	145
COM-INV3-INV4	INVERTER 3	1	INVERTER 4	2	CAT5e Outdoor 24# AWG	ETHERNET / IP	CONTRACTOR	125
COM-INV4-INV5	INVERTER 4	1	INVERTER 5	2	CAT5e Outdoor 24# AWG	ETHERNET / IP	CONTRACTOR	40
COM-INV5-INV6	INVERTER 5	1	INVERTER 6	2	CAT5e Outdoor 24# AWG	ETHERNET / IP	CONTRACTOR	70
COM-INV6-INV7	INVERTER 6	1	INVERTER 7	2	CAT5e Outdoor 24# AWG	ETHERNET / IP	CONTRACTOR	115
COM-INV7-MED	INVERTER 7	1	MEDIA CONVERTER (SEL-2725)	RJ45 PORT 1	CAT5e Outdoor 24# AWG	ETHERNET / IP	CONTRACTOR	5
COM-INV8-MED	INVERTER 8	1	MEDIA CONVERTER (SEL-2725)	RJ45 PORT 2	CAT5e Outdoor 24# AWG	ETHERNET / IP	CONTRACTOR	5
COM-INV9-INV8	INVERTER 9	1	INVERTER 8	2	CAT5e Outdoor 24# AWG	ETHERNET / IP	CONTRACTOR	70
COM-INV10-INV9	INVERTER 10	1	INVERTER 9	2	CAT5e Outdoor 24# AWG	ETHERNET / IP	CONTRACTOR	40
COM-INV11-INV10	INVERTER 11	1	INVERTER 10	2	CAT5e Outdoor 24# AWG	ETHERNET / IP	CONTRACTOR	95
COM-INV12-INV11	INVERTER 12	1	INVERTER 11	2	CAT5e Outdoor 24# AWG	ETHERNET / IP	CONTRACTOR	95
COM-INV13-INV12	INVERTER 13	1	INVERTER 12	2	CAT5e Outdoor 24# AWG	ETHERNET / IP	CONTRACTOR	95
COM-INV14-INV13	INVERTER 14	1	INVERTER 13	2	CAT5e Outdoor 24# AWG	ETHERNET / IP	CONTRACTOR	95
COM-INV15-INV14	INVERTER 15	1	INVERTER 14	2	CAT5e Outdoor 24# AWG	ETHERNET / IP	CONTRACTOR	95

NOTES:

- ALL METALLIC ENCLOSURES SHALL BE BONDED TO THE GROUND GRID.
- AC/DC POWER SUPPLY AND CONTROL CABLES SHOULD NOT BE INCLUDED IN THE SAME CONDUIT
- CABLE RUNS WITHIN ENCLOSURE
- CABLE AND CONDUIT LENGTHS SHOWN ARE APPROXIMATIONS. ACTUAL LENGTHS SHALL BE DETERMINED BY CONTRACTOR.
- SEE BID SPECIFICATION DOCUMENTS
- DISTANCES FOR ENGINEERING PURPOSES ONLY, NOT TO BE USED FOR CONTRACTOR TAKE-OFFS



SYSTEM DESCRIPTION	
MODULE	(5980) TSM-390DE15H(II)
TRANSFORMER	(1) 2500 kVA 12.47 kV GRD-WYE TO 480 V WYE, 5.75% Iz
INVERTER	(15) SUNNY HIGHPOWER PEAK 3 125-US
RACKING	FIXED AXIS 2UP PORTRAIT
GCR	50%
CLEAR ROW SPACING	15.375'
QTY STRINGS	230
MODULES PER STRING	26
DC CAPACITY	2,332.2 KW
AC CAPACITY	1,875 KW
LOAD RATIO	124.38%
INTERCONNECTION UTILITY	PWC
LAYDOWN ACREAGE	1.50 ACRES
FENCE ACREAGE	13.03 ACRES

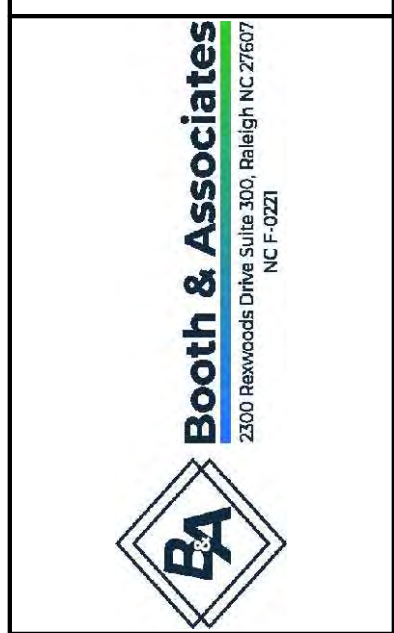
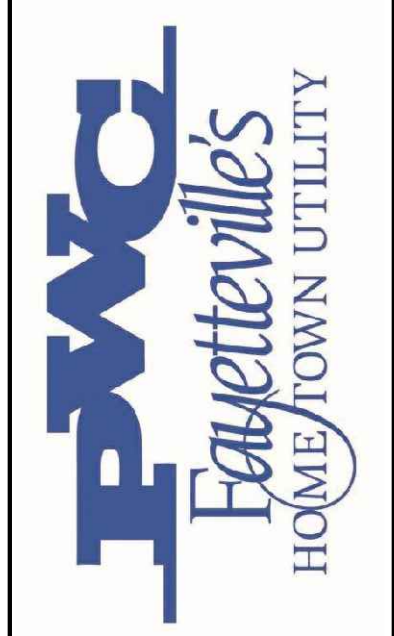
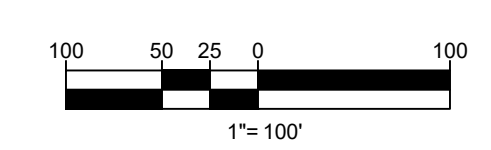
NOTES:

- ALL CONDUIT ROUTING IS DIAGRAMMATIC. FINAL CONDUIT ROUTING SHALL BE FIELD COORDINATED BY CONTRACTOR AND APPROVED BY OWNER.
- POWER POLES, OVERHEAD LINES AND MV CABLE TERMINATIONS INSTALLED BY MV CONTRACTOR.

LEGEND:

	OHE	OVERHEAD POWER LINE
	MV	MEDIUM VOLTAGE TRENCH
	C/E	BUILDING SETBACK LINE
	FO	FIBER OPTIC COMMUNICATIONS
	PL	PROPERTY LINE
		WOODS LINE
		FENCE
		MODULE
		LAYDOWN AREA

ELECTRICAL SITE PLAN
1" = 100'

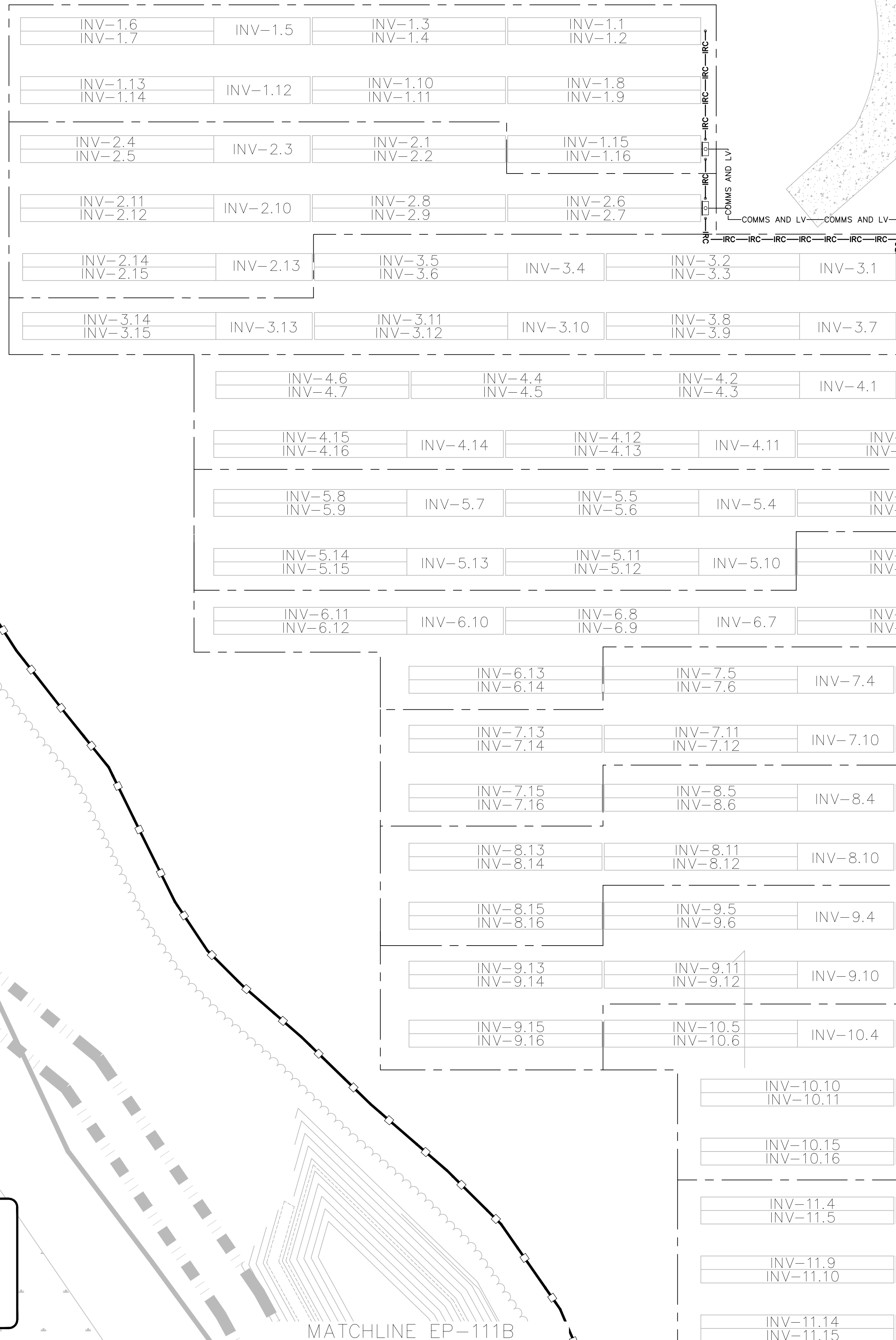
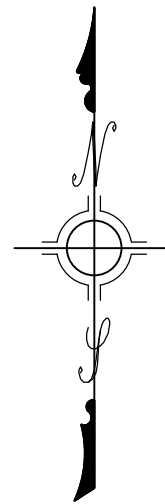


NOT FOR CONSTRUCTION
© 03/2023

NO.	REVISIONS	DATE	ENG.	DR.
A	ISSUED FOR REVIEW	05/04/2023	EDR	EDR
B	ISSUED FOR REVIEW	05/09/2023	EDR	EDR
C	ISSUED FOR REVIEW 60% - SUBMITTAL	05/04/2023	BJM	BJM
D	ISSUED FOR BID - 60%	09/14/2023	BJM	BJM

PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE: ELECTRICAL SITE PLAN

DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	03/29/2023
SCALE:	1"=100'
FILE NUMBER:	12548
SHEET:	



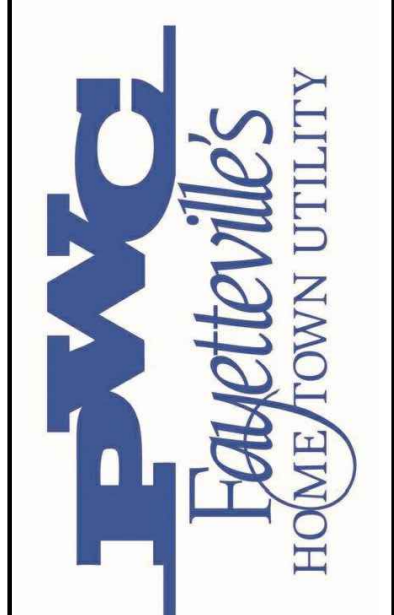
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INV-3	15	INV-8	16	INV-13	15
INV-4	16	INV-9	16	INV-14	15
INV-5	15	INV-10	16	INV-15	15

LEGEND:

- COMMS AND LV — DAS COMMS AND LOW VOLTAGE TRENCH (NOTE 1)
- FO — FIBER OPTIC COMMUNICATIONS
- OHP — OVERHEAD POWER LINE
- IRC — INTER-ROW CONDUIT TRENCH (NOTE 1)
- MV — MEDIUM VOLTAGE TRENCH (NOTE 1)
- LV — LOW VOLTAGE TRENCH (NOTE 1)
- C/E — BUILDING SETBACK LINE
- PL — PROPERTY LINE
- WOODS LINE
- FENCE
- DC COMBINER BOX & INVERTER
- MODULE
- LAYDOWN AREA

NOTES:

1. SEE DWG. EP-104 FOR MINIMUM CONDUIT SIZE.

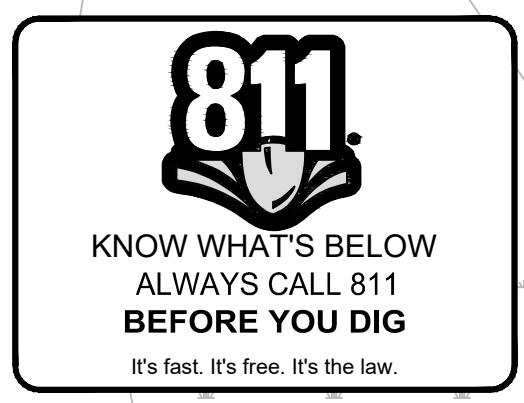


PA Booth & Associates
2000 Rowland Drive Suite 300, Raleigh NC 27607
NC P221

PROFESSIONAL SEAL
044520
BRADLEY J. MARTIN
9/15/2023

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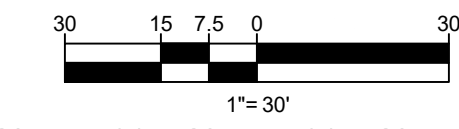
NO.	REVISIONS	DATE	ENG.
A	ISSUED FOR REVIEW	05/04/2023	EDR
B	ISSUED FOR REVIEW 60% - SUBMITTAL	05/04/2023	BJM
C	ISSUED FOR BID - 60%	09/14/2023	BJM



MATCHLINE EP-111B

ARRAY PLAN 1A - PARTIAL

1" = 30'



PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION

DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	04/27/2023
SCALE:	1"=30'
FILE NUMBER:	12548
SHEET:	

EP-111A

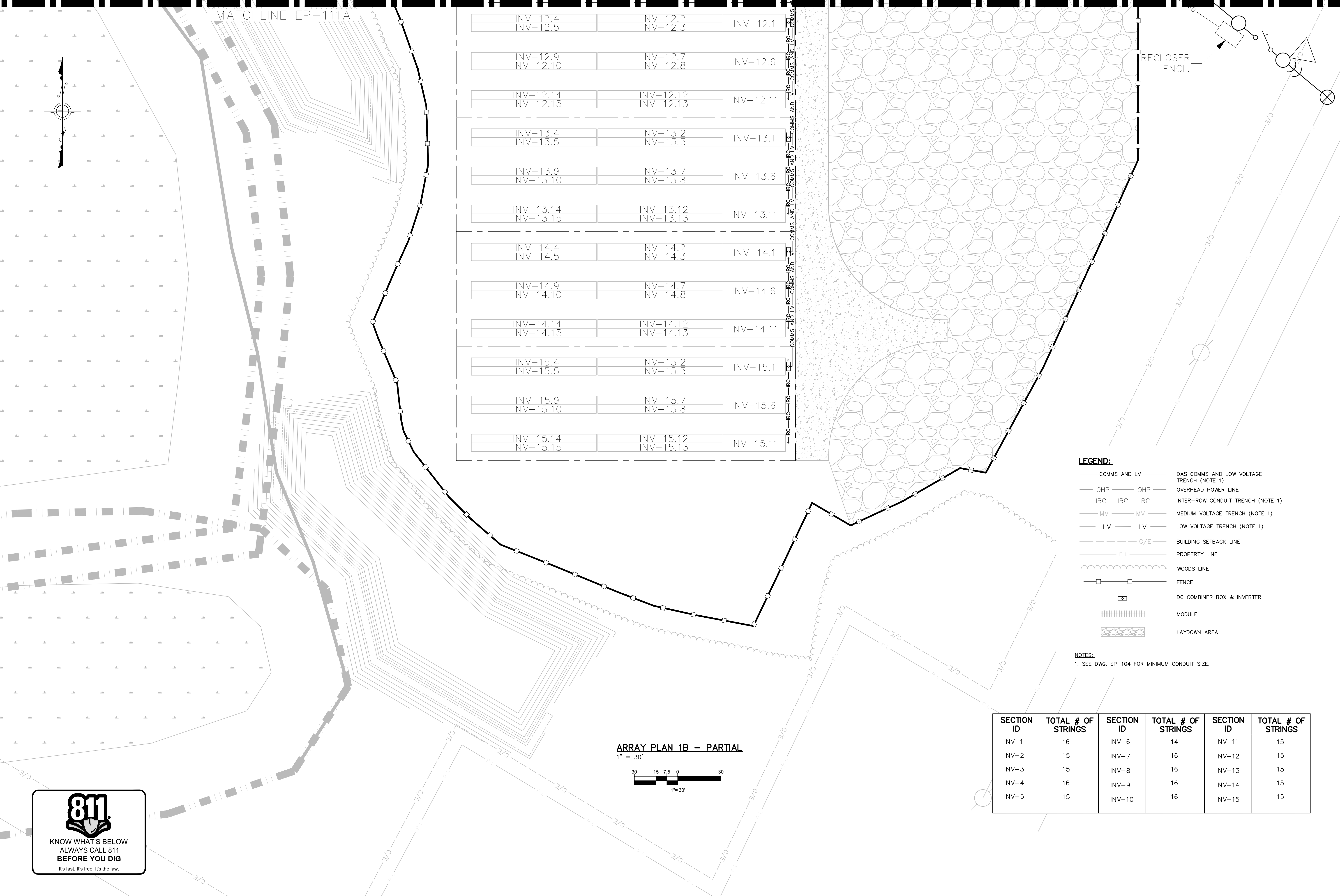
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NO.	REVISIONS	DATE	ENG.	DATE
A	ISSUED FOR REVIEW	05/04/2023	EDR	05/04/2023
B	ISSUED FOR REVIEW	05/09/2023	EDR	05/09/2023
C	ISSUED FOR REVIEW 60% - SUBMITTAL	05/04/2023	BJM	05/04/2023
D	ISSUED FOR BID - 60%	09/08/2023	BJM	09/08/2023

PROJECT NAME:
GILLESPIE-B1.9 SOLAR
UTILITY STATION

DRAWING TITLE:
ARRAY PLAN 1B - PARTIAL

DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	04/27/2023
SCALE:	1"=30'
FILE NUMBER:	12548
SHEET:	EP-111B



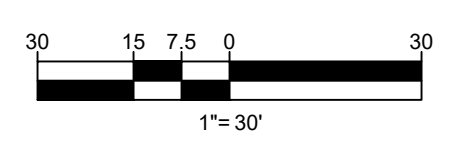
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INV-12.9 INV-12.10	INV-12.7 INV-12.8	INV-12.6
INV-12.14 INV-12.15	INV-12.12 INV-12.13	INV-12.11
INV-13.4 INV-13.5	INV-13.2 INV-13.3	INV-13.1
INV-13.9 INV-13.10	INV-13.7 INV-13.8	INV-13.6
INV-13.14 INV-13.15	INV-13.12 INV-13.13	INV-13.11
INV-14.4 INV-14.5	INV-14.2 INV-14.3	INV-14.1
INV-14.9 INV-14.10	INV-14.7 INV-14.8	INV-14.6
INV-14.14 INV-14.15	INV-14.12 INV-14.13	INV-14.11
INV-15.4 INV-15.5	INV-15.2 INV-15.3	INV-15.1
INV-15.9 INV-15.10	INV-15.7 INV-15.8	INV-15.6
INV-15.14 INV-15.15	INV-15.12 INV-15.13	INV-15.11

- LEGEND:**
- COMMS AND LV — DAS COMMS AND LOW VOLTAGE TRENCH (NOTE 1)
 - OHP — OHP — OVERHEAD POWER LINE
 - IRC — IRC — INTER-ROW CONDUIT TRENCH (NOTE 1)
 - MV — MV — MEDIUM VOLTAGE TRENCH (NOTE 1)
 - LV — LV — LOW VOLTAGE TRENCH (NOTE 1)
 - C/E — BUILDING SETBACK LINE
 - P/L — PROPERTY LINE
 - Woods Line — WOODS LINE
 - Fence — FENCE
 - DC Box — DC COMBINER BOX & INVERTER
 - Module — MODULE
 - Laydown Area — LAYDOWN AREA

NOTES:
1. SEE DWG. EP-104 FOR MINIMUM CONDUIT SIZE.

SECTION ID	TOTAL # OF STRINGS	SECTION ID	TOTAL # OF STRINGS	SECTION ID	TOTAL # OF STRINGS
INV-1	16	INV-6	14	INV-11	15
INV-2	15	INV-7	16	INV-12	15
INV-3	15	INV-8	16	INV-13	15
INV-4	16	INV-9	16	INV-14	15
INV-5	15	INV-10	16	INV-15	15

ARRAY PLAN 1B - PARTIAL
1" = 30'

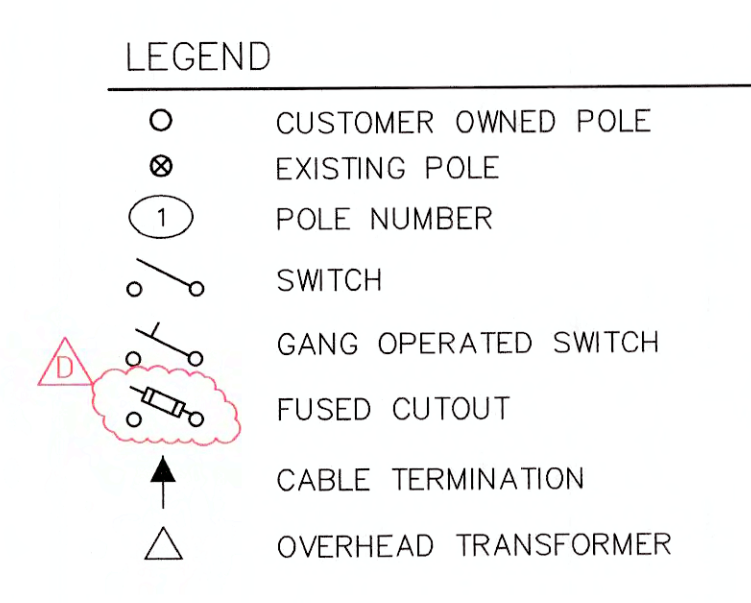
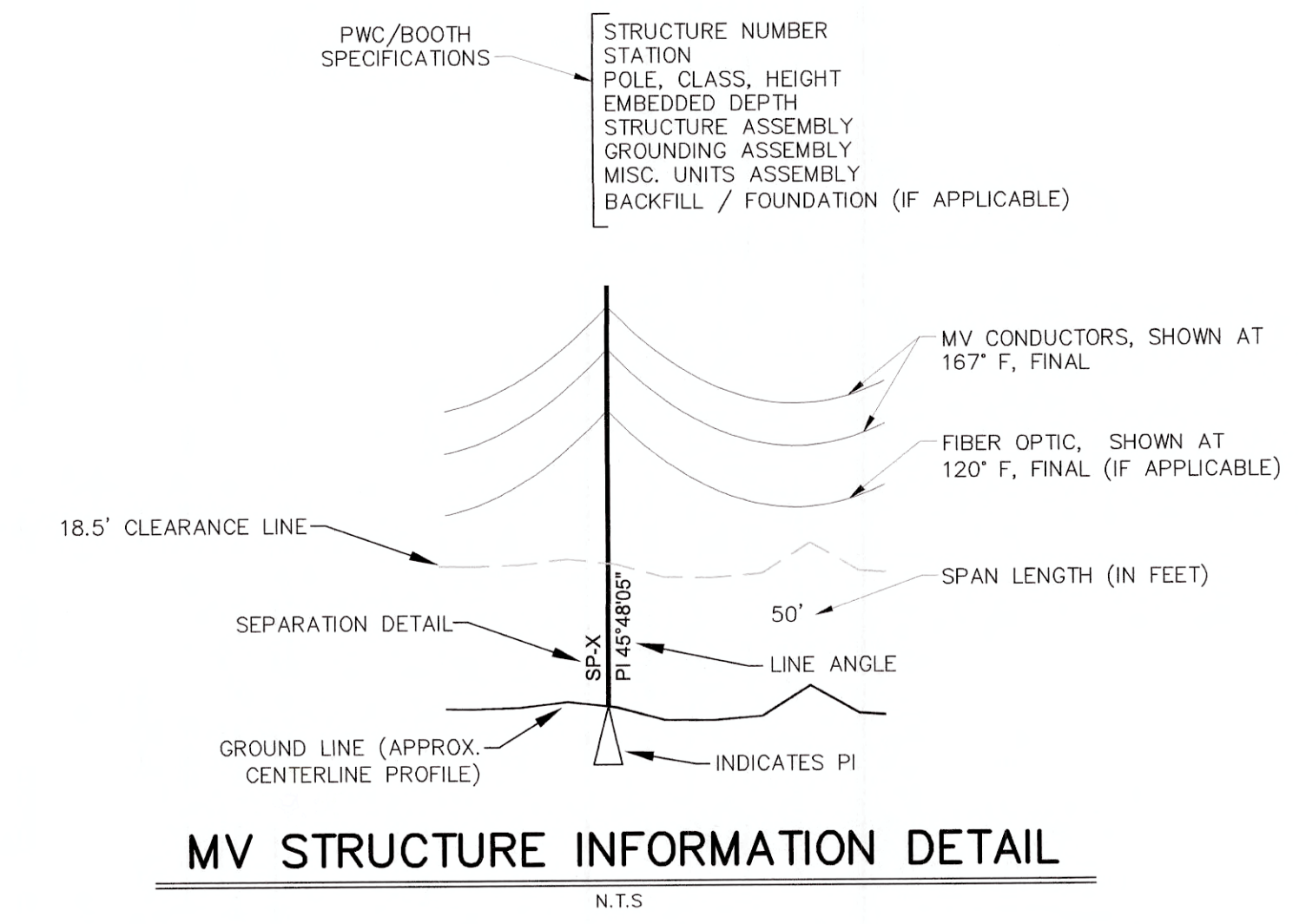
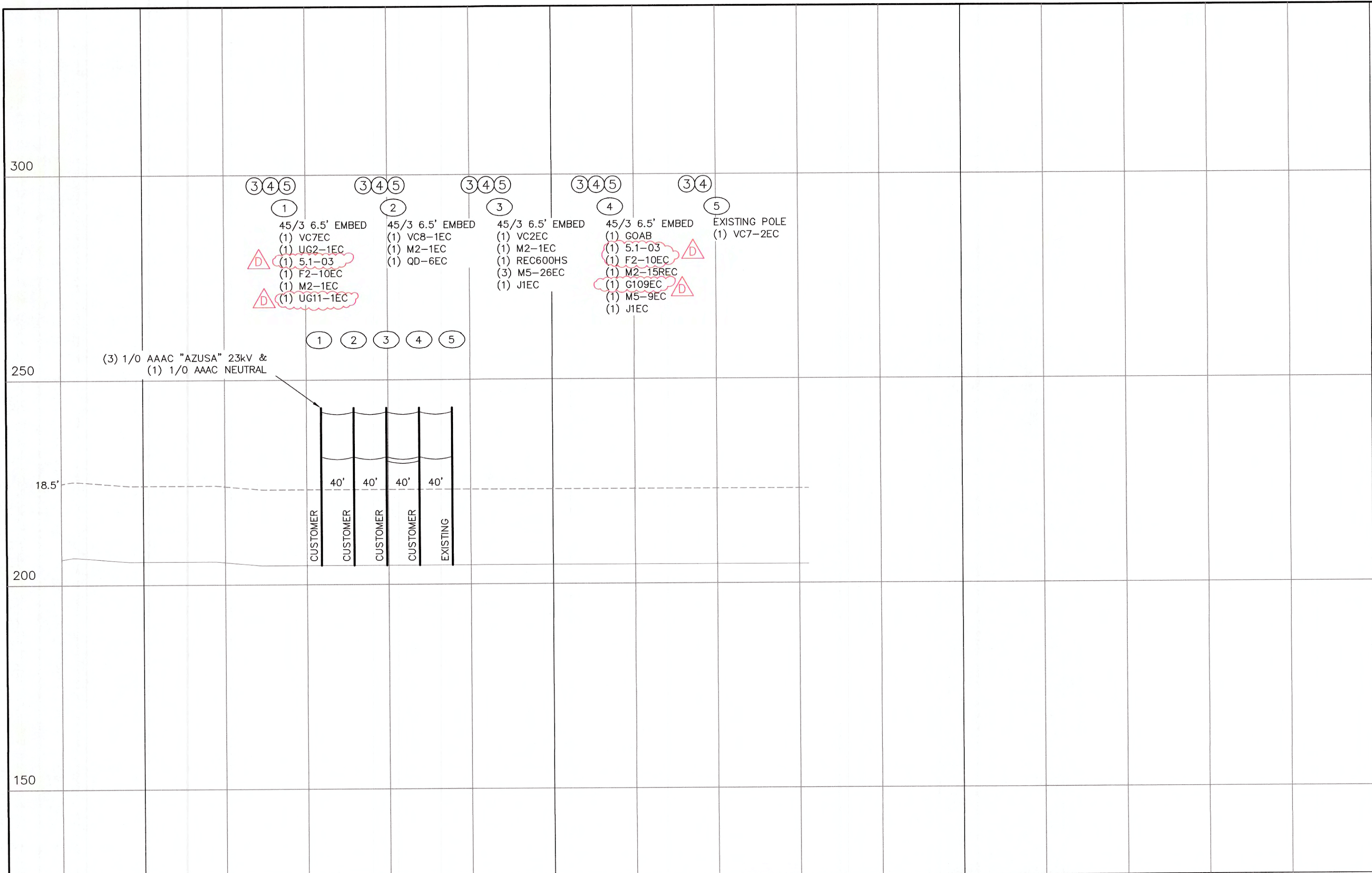


NO.	REVISIONS	DATE	ENG.	DATE
A	ISSUED FOR REVIEW	09/03/2023	MDT	
B	ISSUED FOR REVIEW 60% - SUBMITTAL	09/04/2023	MDT	
C	ISSUED FOR REVIEW 60% - SUBMITTAL	09/29/2023	MDT	
D	ISSUED FOR BID - 60%	09/14/2023	MDT	

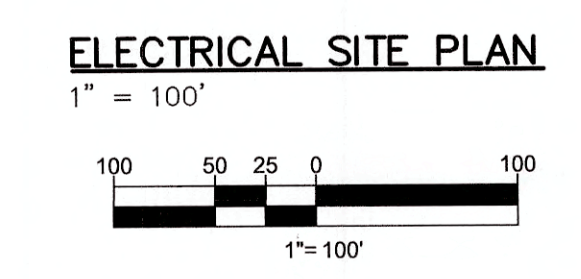
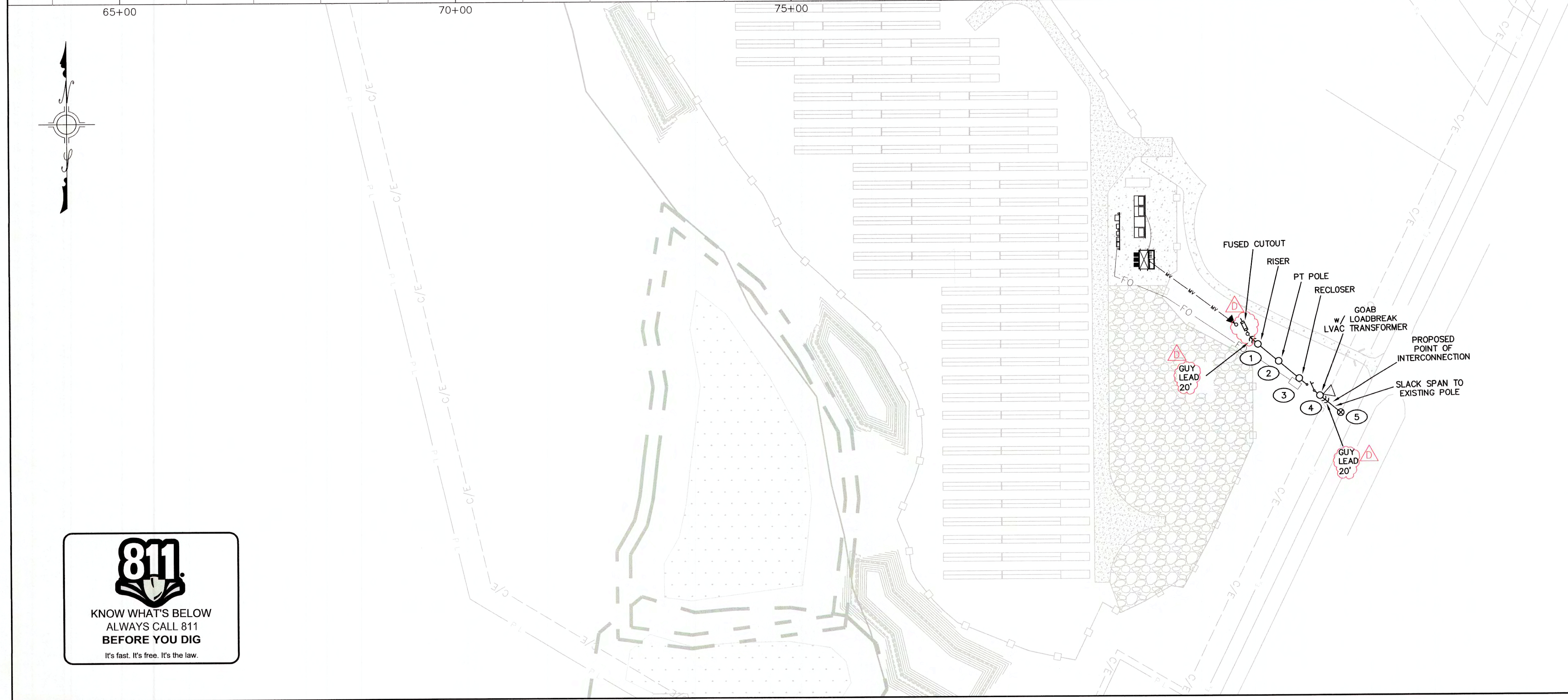
PROJECT NAME:
GILLESPIE-B1.9 SOLAR UTILITY STATION

DRAWING TITLE:
DISTRIBUTION OVERHEAD PLAN & PROFILE

DRAWN BY:	BLP
CHECKED BY:	MT
APPROVED BY:	BJM
DATE:	04/24/2023
SCALE:	1"=100'
FILE NUMBER:	12548
SHEET:	EP-150



- NOTES**
- ① UNLESS OTHERWISE NOTED, COMPLY WITH THE LATEST VERSION OF FAYETTEVILLE PWC APPROVED ELECTRICITIES STRUCTURES SPECIFICATIONS.
 - ② COMPLY WITH ALL APPLICABLE OWNER SPECIFICATIONS AND UTILITY INTERCONNECTION GUIDELINES.
 - ③ FRAME POLES SIMILAR TO FAYETTEVILLE PWC ASSEMBLY DRAWINGS LISTED.
 - ④ SEE EP-153 FOR INITIAL STRINGING SAG CHARTS.
 - ⑤ NEW POLES SHALL BE SOUTHERN YELLOW PINE WOOD UNLESS NOTED OTHERWISE.



TPLX INITIAL STRINGING SAG TABLES

LOADING DISTRICT : MEDIUM
 CONDUCTOR DESCRIPTION : #2 AL TPLX "Strip"
 ULTIMATE STRENGTH : 2800 LBS.
 DESIGN TENSION : 486 LBS.
 PERCENT OF ULTIMATE : 17.36%
 RULING SPAN : 40 FT.

SAG IS SHOWN TO THE NEAREST INCH FOR EACH SPAN AND TEMPERATURE.

SPAN (FT.)	TEMPERATURE (DEGREES F)							
	20	32	40	50	60	70	80	90
10	0	0	0	0	0	0	0	0
20	0	0	1	1	1	1	1	1
30	1	1	1	1	2	2	2	3
40	2	2	2	3	3	4	4	5
50	2	3	3	4	5	6	7	8
60	4	4	5	6	7	8	9	11
70	5	6	7	8	9	11	13	15
80	6	8	9	10	12	14	17	20
TENSION (lbs.)	370	311	275	233	195	164	139	119

SLACK TENSION INITIAL STRINGING SAG TABLES

LOADING DISTRICT : MEDIUM
 CONDUCTOR DESCRIPTION : 10 AAAC "Amica"
 ULTIMATE STRENGTH : 4280 LBS.
 DESIGN TENSION : 127 LBS.
 PERCENT OF ULTIMATE : 2.97%
 RULING SPAN : 40 FT.

SAG IS SHOWN TO THE NEAREST INCH FOR EACH SPAN AND TEMPERATURE.

SPAN (FT.)	TEMPERATURE (DEGREES F)							
	20	32	40	50	60	70	80	90
10	1	1	1	1	1	1	1	1
20	3	3	3	3	3	3	4	4
30	6	7	7	7	7	8	8	8
40	12	12	12	13	13	14	14	15
50	18	19	20	20	21	21	22	23
60	26	27	28	29	30	31	32	33
70	35	37	38	39	41	42	43	44
80	46	48	50	51	53	55	57	58
TENSION (lbs.)	24	23	22	21	21	20	20	19

500 LBS PARTIAL TENSION INITIAL STRINGING SAG TABLES

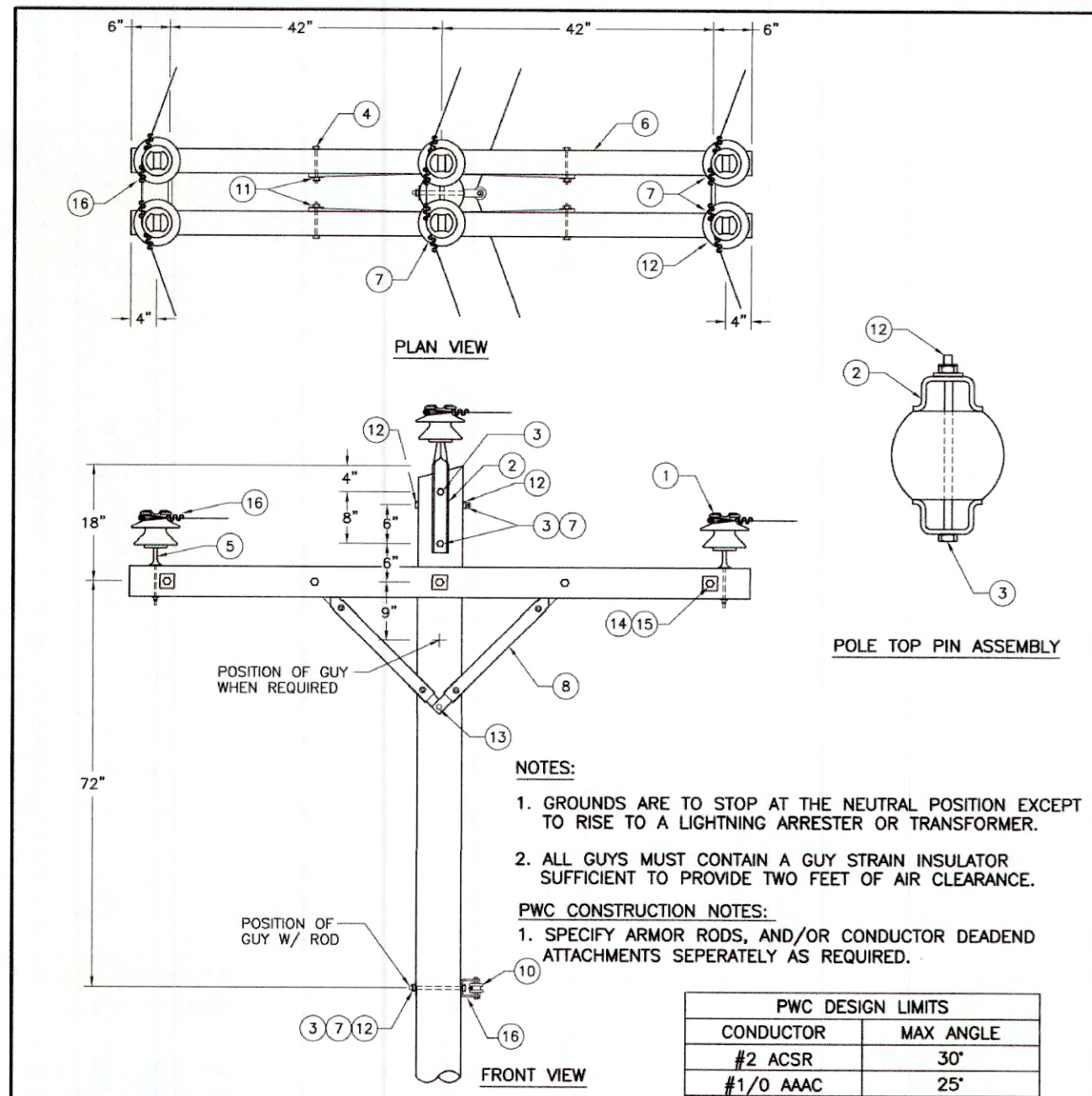
LOADING DISTRICT : MEDIUM
 CONDUCTOR DESCRIPTION : 10 AAAC "Amica"
 ULTIMATE STRENGTH : 4280 LBS.
 DESIGN TENSION : 488 LBS.
 PERCENT OF ULTIMATE : 11.40%
 RULING SPAN : 40 FT.

SAG IS SHOWN TO THE NEAREST INCH FOR EACH SPAN AND TEMPERATURE.

SPAN (FT.)	TEMPERATURE (DEGREES F)							
	20	32	40	50	60	70	80	90
10	0	0	0	0	0	0	0	0
20	0	0	0	0	1	1	1	1
30	0	1	1	1	1	2	2	3
40	1	1	1	2	2	3	4	5
50	1	2	2	3	4	5	7	8
60	2	2	3	4	5	7	10	12
70	2	3	4	5	7	10	13	16
80	3	4	5	7	10	13	17	21
TENSION (lbs.)	380	289	233	169	117	83	64	52

NO.	REVISIONS	DATE	ENG.
A	ISSUED FOR REVIEW	09/03/2023	MDT
B	ISSUED FOR REVIEW 60% - SUBMITTAL	09/28/2023	MDT
C	ISSUED FOR BID - 60%	09/14/2023	MDT

PROJECT NAME:	GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE:	DISTRIBUTION OVERHEAD SAG TABLES
DRAWN BY:	BLP
CHECKED BY:	MDT
APPROVED BY:	BJM
DATE:	06/28/2023
SCALE:	NONE
FILE NUMBER:	12548EP-153
SHEET:	



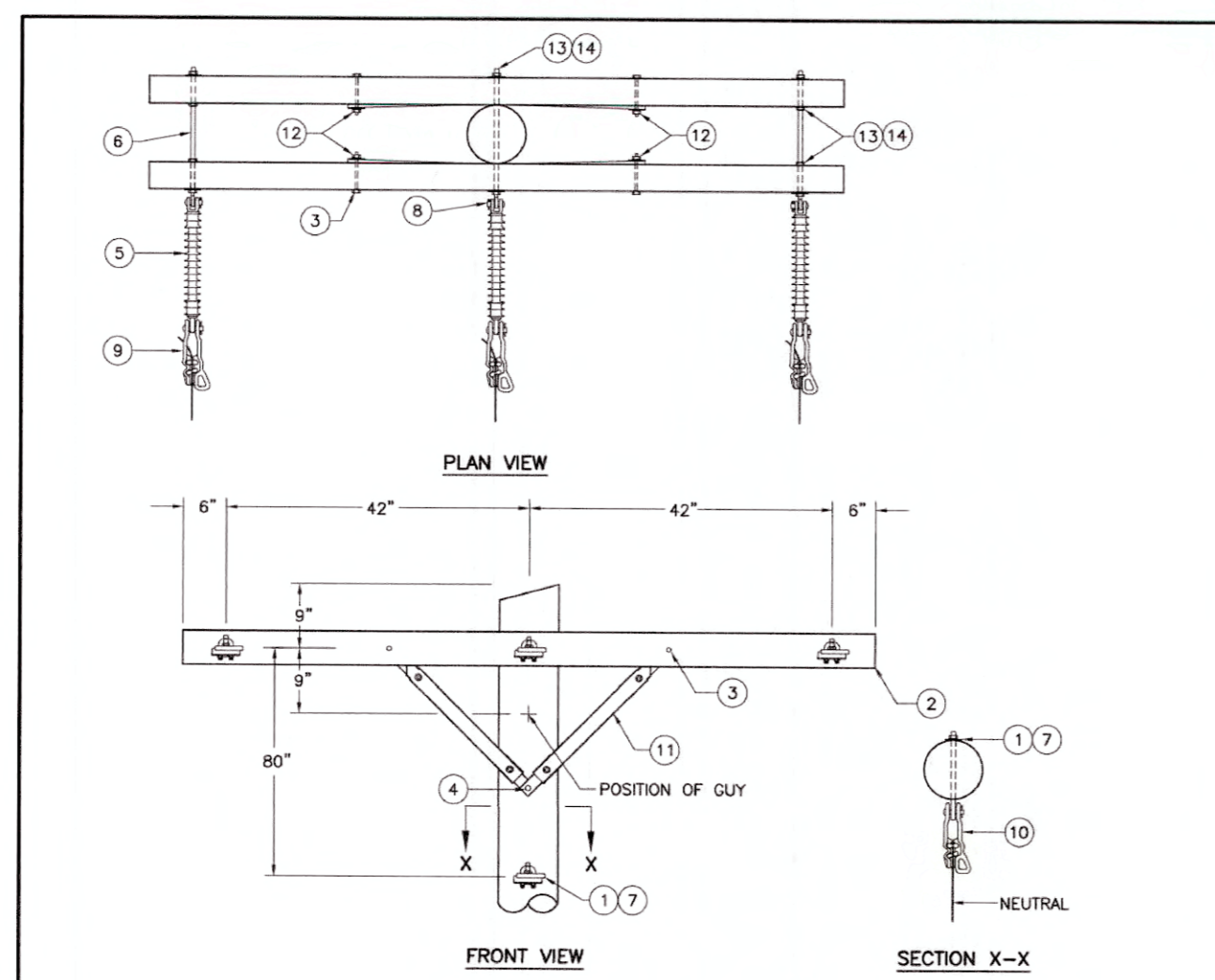
- NOTES:**
1. GROUNDS ARE TO STOP AT THE NEUTRAL POSITION EXCEPT TO RISE TO A LIGHTNING ARRESTER OR TRANSFORMER.
 2. ALL GUYS MUST CONTAIN A GUY STRAIN INSULATOR SUFFICIENT TO PROVIDE TWO FEET OF AIR CLEARANCE.
- PWC CONSTRUCTION NOTES:**
1. SPECIFY ARMOR RODS, AND/OR CONDUCTOR DEADEND ATTACHMENTS SEPARATELY AS REQUIRED.

PWC DESIGN LIMITS		
CONDUCTOR	MAX ANGLE	
#2 ACSR	30°	
#1/0 AAAC	25°	

ITEM	PWC STOCK #	PWC MATERIAL DESCRIPTION	QTY.
1	1160985	INSULATOR, PIN-TYPE, ANSI 55-6	6
2	1160966	PIN, POLE TOP, 20" X 1"	2
3	1325180	BOLT, MACHINE, 5/8" X 12", W/NUT	4
4	1325005	BOLT, CARRIAGE, 5/8" X 4-1/2", W/NUT	4
5	1160969	PIN, CROSSARM, 1" LONG SHANK, W/NUT	4
6	1160010	CROSSARM, B" WOOD	2
7	1325133	WASHER, DOUBLE COIL SPRING LOCK, 5/8"	2
8	1160025	BRACE, CROSSARM, WOOD, 3/8" X 18"	14
9	1230010	CLEVIS, INSULATED SECONDARY, DEADEND	1
10	1160130	INSULATOR, SPOOL, 53-2	1
11	1325710	WASHER, FLAT, ROUND, 5/8"	4
12	1325760	WASHER, SQUARE, CURVED, 3"	2
13	1325145	SCREW, LAG, 1/2" X 4"	2
14	1325025	BOLT, DOUBLE ARMING, 5/8" X 20", W/NUT	3
15	1325765	WASHER, SQUARE, FLAT, 5/8"	10
16	1063010	TIE WIRE, #4 SOLID ALUMINUM	24

CROSSARM CONSTRUCTION THREE PHASE, DOUBLE ARM, 25KV

SCALE: 1/2"=1'-0" DWG: VC2EC

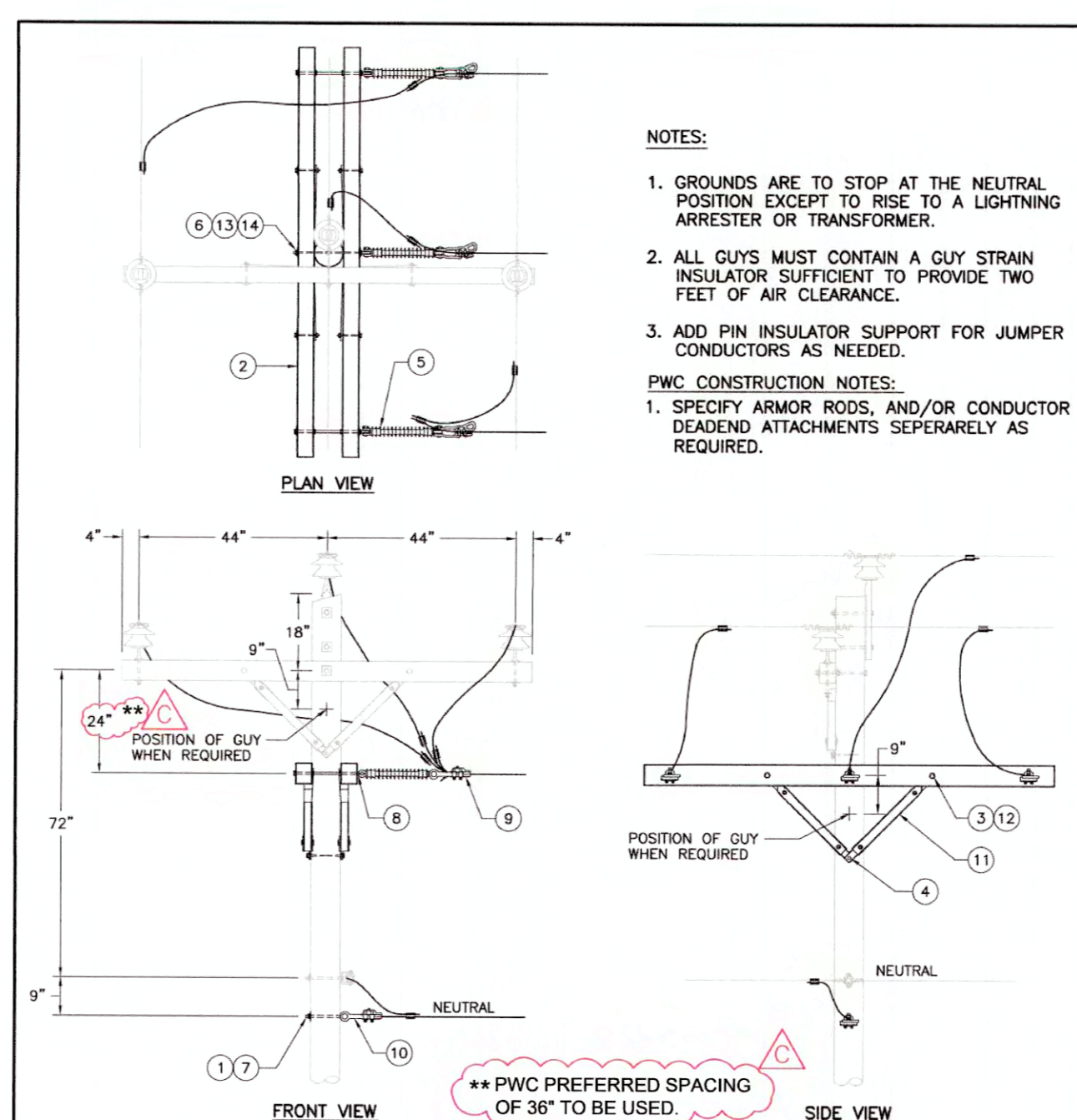


- NOTES:**
1. GROUNDS ARE TO STOP AT THE NEUTRAL POSITION EXCEPT TO RISE TO A LIGHTNING ARRESTER OR TRANSFORMER.
 2. ALL GUYS MUST CONTAIN A GUY STRAIN INSULATOR SUFFICIENT TO PROVIDE TWO FEET OF AIR CLEARANCE.
- PWC CONSTRUCTION NOTES:**
1. SPECIFY ARMOR RODS, AND/OR CONDUCTOR DEADEND ATTACHMENTS SEPARATELY AS REQUIRED.

ITEM	PWC STOCK #	PWC MATERIAL DESCRIPTION	QTY.
1	1325760	WASHER, SQUARE, CURVED, 3"	1
2	1160010	CROSSARM, B" WOOD	2
3	1325005	BOLT, CARRIAGE, 5/8" X 4-1/2", W/NUT	4
4	1325145	SCREW, LAG, 1/2" X 4"	2
5	1160025	INSULATOR, ONE PIECE, DEADEND, 25 KV	3
6	1325025	BOLT, DOUBLE ARMING, 5/8" X 20", W/NUT	3
7	1325080	BOLT, OVAL, EYE, 5/8" X 12"	1
8	1325530	NUT, EYE, GALV, 5/8"	3
9	---	CLAMP, AL, STRAIGHT D.E. (AS REQUIRED)	3
10	---	CLAMP, AL, STRAIGHT D.E. (AS REQUIRED)	1
11	1160030	BRACE, CROSSARM, WOOD, 3/8" X 18"	2
12	1325710	WASHER, FLAT, ROUND, 5/8"	4
13	1325733	WASHER, DOUBLE COIL SPRING LOCK, 5/8"	11
14	1325765	WASHER, SQUARE, FLAT, 5/8"	10

CROSSARM CONSTRUCTION, THREE PHASE, DEADEND, 25KV

SCALE: 1/2"=1'-0" DWG: VC7EC

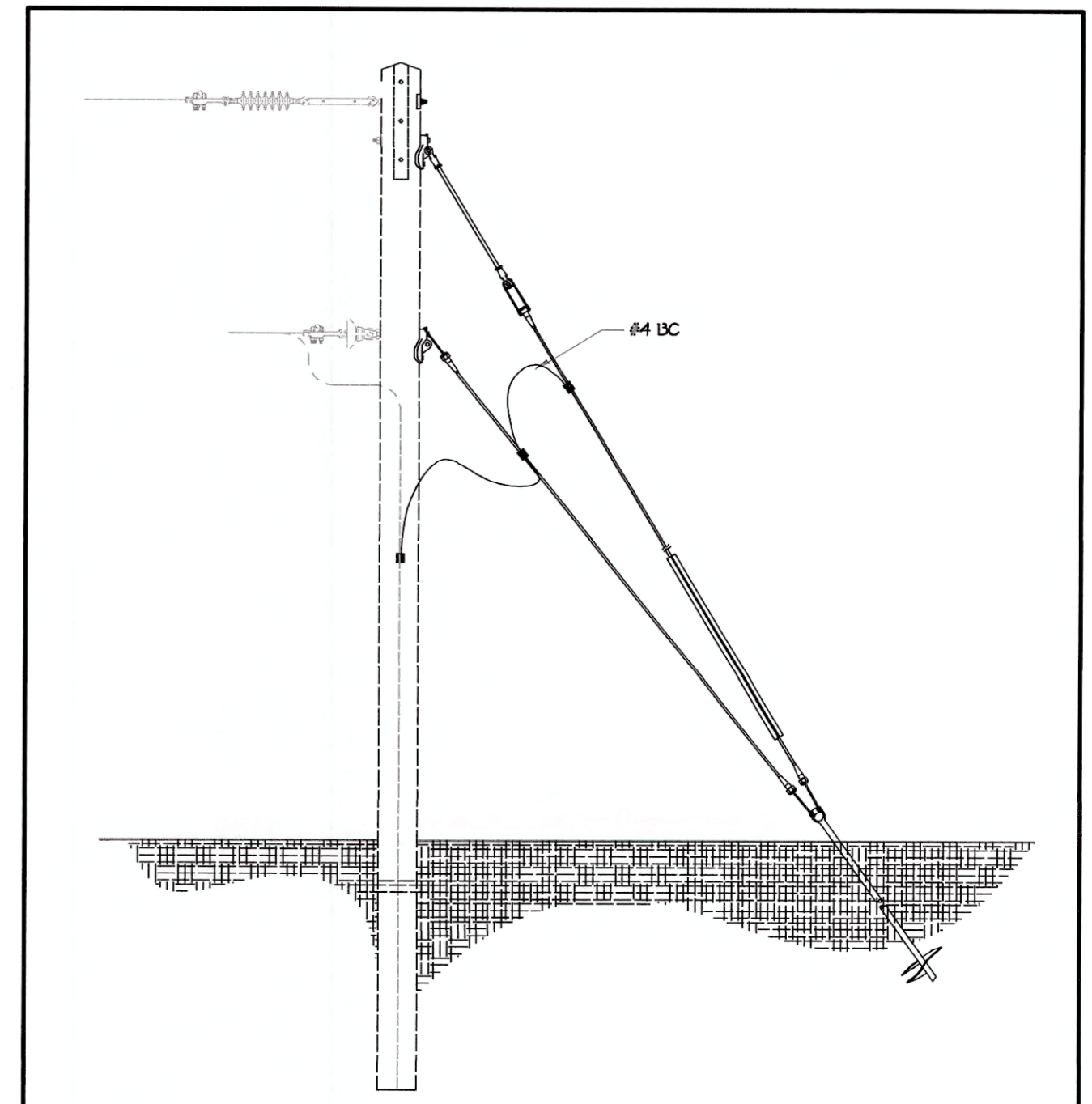


- NOTES:**
1. GROUNDS ARE TO STOP AT THE NEUTRAL POSITION EXCEPT TO RISE TO A LIGHTNING ARRESTER OR TRANSFORMER.
 2. ALL GUYS MUST CONTAIN A GUY STRAIN INSULATOR SUFFICIENT TO PROVIDE TWO FEET OF AIR CLEARANCE.
 3. ADD PIN INSULATOR SUPPORT FOR JUMPER CONDUCTORS AS NEEDED.
- PWC CONSTRUCTION NOTES:**
1. SPECIFY ARMOR RODS, AND/OR CONDUCTOR DEADEND ATTACHMENTS SEPARATELY AS REQUIRED.

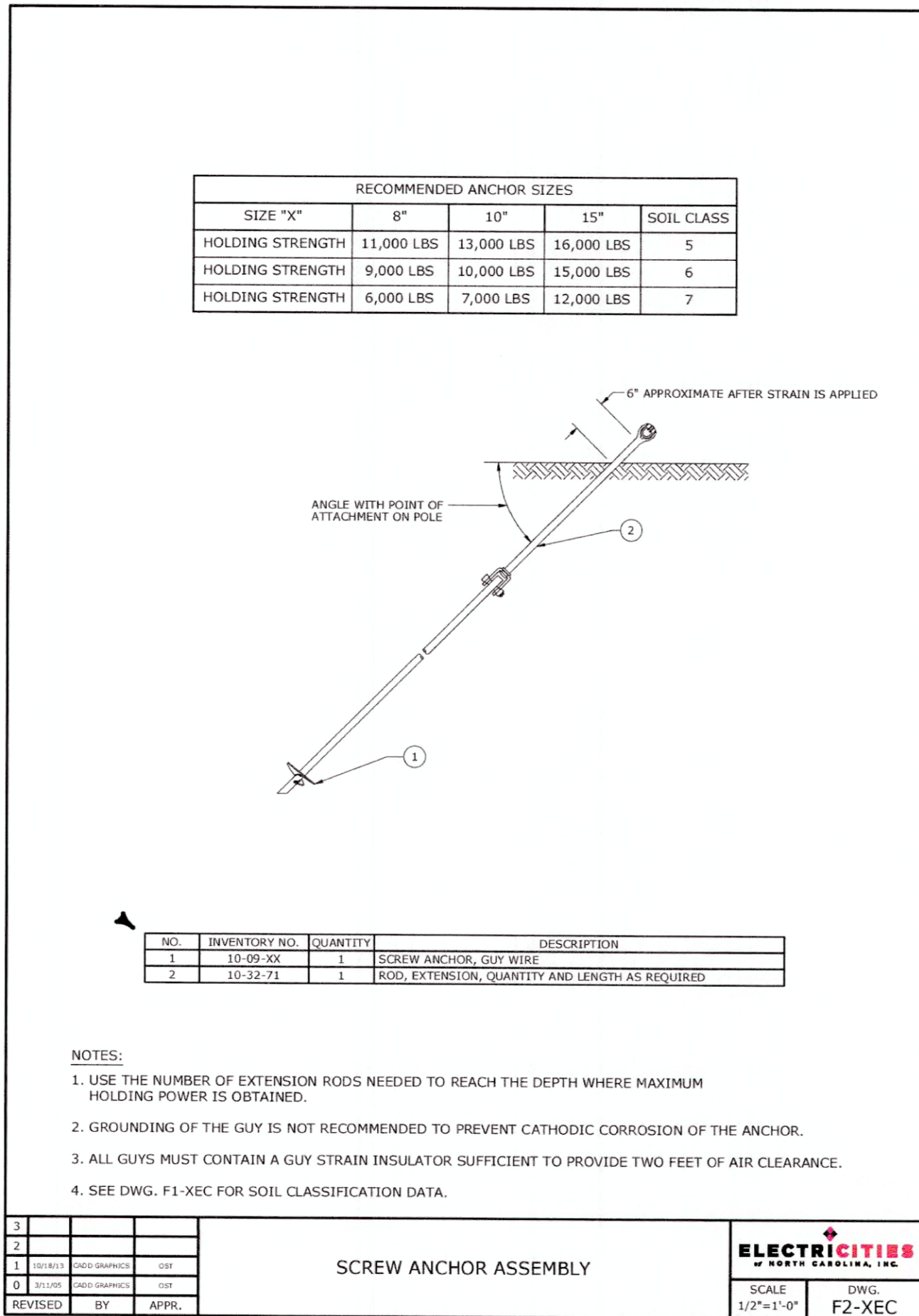
ITEM	PWC STOCK #	PWC MATERIAL DESCRIPTION	QTY.
1	1325760	WASHER, SQUARE, CURVED, 3"	1
2	1160010	CROSSARM, B" WOOD	2
3	1325005	BOLT, CARRIAGE, 5/8" X 4-1/2", W/NUT	4
4	1325145	SCREW, LAG, 1/2" X 4"	2
5	1160025	INSULATOR, ONE PIECE, DEADEND, 25 KV	3
6	1325025	BOLT, DOUBLE ARMING, 5/8" X 20", W/NUT	3
7	1325080	BOLT, OVAL, EYE, 5/8" X 12"	1
8	1325530	NUT, EYE, GALV, 5/8"	3
9	---	CLAMP, AL, STRAIGHT D.E. (AS REQUIRED)	3
10	---	CLAMP, AL, STRAIGHT D.E. (AS REQUIRED)	1
11	1160030	BRACE, CROSSARM, WOOD, 3/8" X 18"	2
12	1325710	WASHER, FLAT, ROUND, 5/8"	4
13	1325733	WASHER, DOUBLE COIL SPRING LOCK, 5/8"	11
14	1325765	WASHER, SQUARE, FLAT, 5/8"	10

CROSSARM CONSTRUCTION THREE-PHASE TAP ARM, 25KV

SCALE: 1/2"=1'-0" DWG: VC7-2EC



- NOTES:**
1. ALL GUYS EXTENDING ABOVE THE NEUTRAL POSITION SHALL HAVE FIBERGLASS GUY STRAIN INSULATOR INSTALLED.
 2. A 12" MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN THE FIBERGLASS GUY STRAIN INSULATOR AND ANY ENERGIZED PART OR CONDUCTOR.
- Construction and Operation Procedures**
- SINGLE ANCHOR GUY GROUNDING INSTALLATIONS**
- SCALE: NONE
- DATE: JUNE 30, 2001
- DRAWING NO. 5.1-03



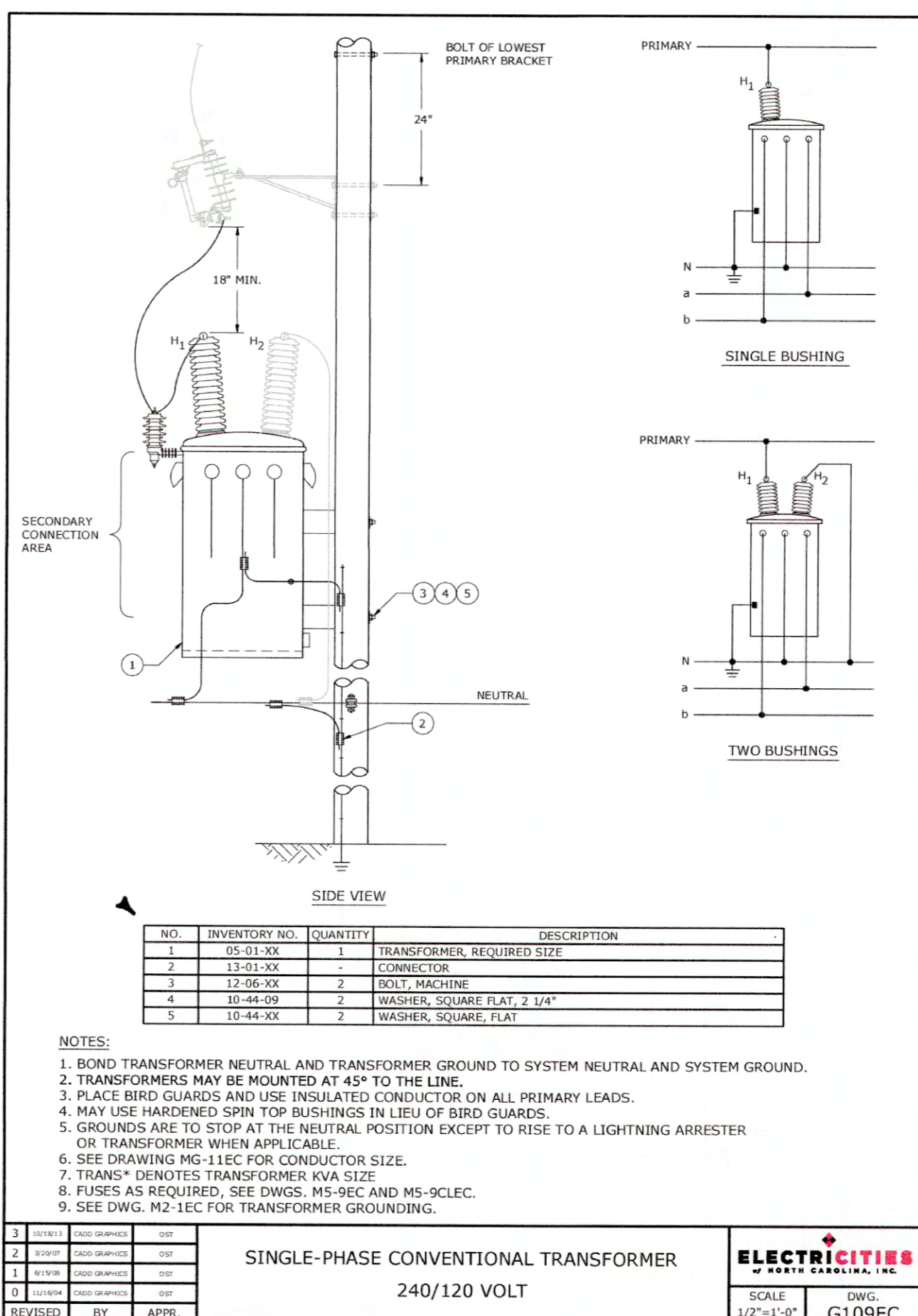
RECOMMENDED ANCHOR SIZES				
SIZE "X"	8"	10"	15"	SOIL CLASS
HOLDING STRENGTH	11,000 LBS	13,000 LBS	16,000 LBS	5
HOLDING STRENGTH	9,000 LBS	10,000 LBS	15,000 LBS	6
HOLDING STRENGTH	6,000 LBS	7,000 LBS	12,000 LBS	7

NO.	INVENTORY NO.	QUANTITY	DESCRIPTION
1	10-09-XX	1	SCREW ANCHOR, GUY WIRE
2	10-22-71	1	ROD, EXTENSION, QUANTITY AND LENGTH AS REQUIRED

- NOTES:**
1. USE THE NUMBER OF EXTENSION RODS NEEDED TO REACH THE DEPTH WHERE MAXIMUM HOLDING POWER IS OBTAINED.
 2. GROUNDING OF THE GUY IS NOT RECOMMENDED TO PREVENT CATHODIC CORROSION OF THE ANCHOR.
 3. ALL GUYS MUST CONTAIN A GUY STRAIN INSULATOR SUFFICIENT TO PROVIDE TWO FEET OF AIR CLEARANCE.
 4. SEE DWG. F1-XEC FOR SOIL CLASSIFICATION DATA.

SCREW ANCHOR ASSEMBLY

SCALE: 1/2"=1'-0" DWG: F2-XEC



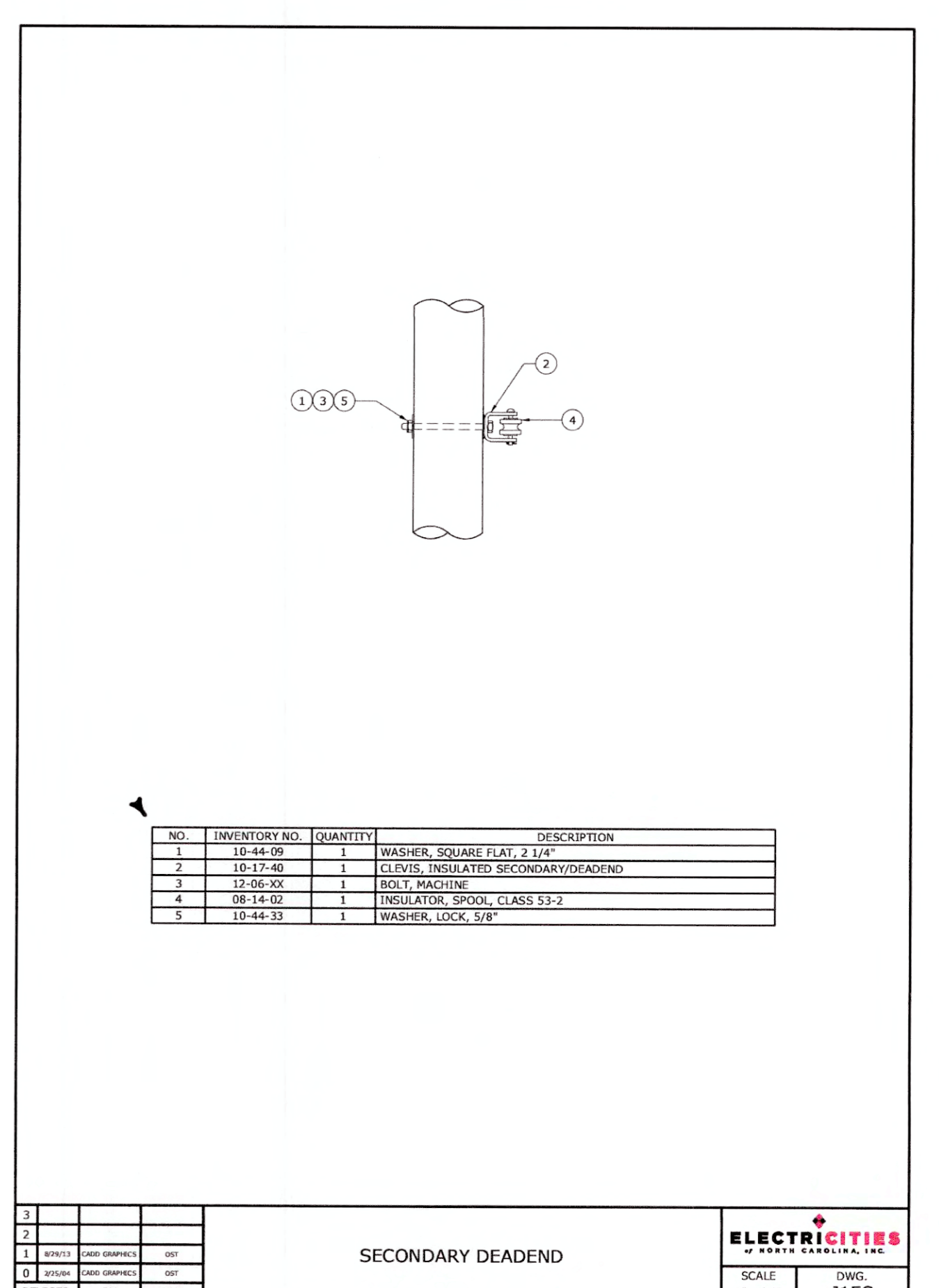
NO.	INVENTORY NO.	QUANTITY	DESCRIPTION
1	05-03-XX	1	TRANSFORMER, REQUIRED SIZE
2	13-03-XX	1	CONNECTOR
3	12-06-XX	2	BOLT, MACHINE
4	20-48-09	2	WASHER, SQUARE FLAT, 2 1/4"
5	10-44-XX	2	WASHER, SQUARE, FLAT

- NOTES:**
1. BOND TRANSFORMER NEUTRAL AND TRANSFORMER GROUND TO SYSTEM NEUTRAL AND SYSTEM GROUND.
 2. TRANSFORMERS MAY BE MOUNTED AT 45° TO THE LINE.
 3. PLACE BIRD GUARDS AND USE INSULATED CONDUCTOR ON ALL PRIMARY LEADS.
 4. MAY USE HARDENED SPIN TOP BUSHINGS IN LIEU OF BIRD GUARDS.
 5. GROUNDS ARE TO STOP AT THE NEUTRAL POSITION EXCEPT TO RISE TO A LIGHTNING ARRESTER OR TRANSFORMER WHEN APPLICABLE.
 6. SEE DRAWING MD-11EC FOR CONDUCTOR SIZE.
 7. TRANS* DENOTES TRANSFORMER KVA SIZE.
 8. FUSES AS REQUIRED, SEE DWGS. M5-9EC AND M5-9CLC.
 9. SEE DWG. M2-1EC FOR TRANSFORMER GROUNDING.

SINGLE-PHASE CONVENTIONAL TRANSFORMER

240/120 VOLT

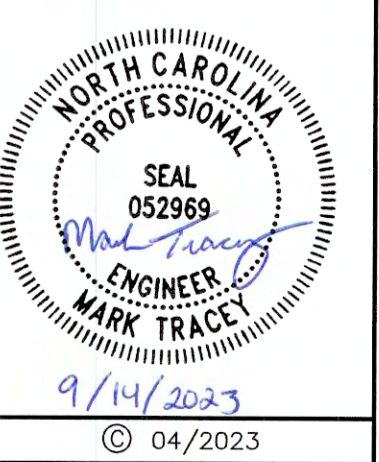
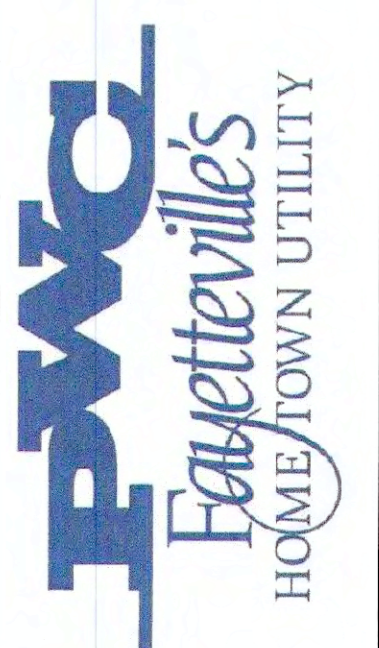
SCALE: 1/2"=1'-0" DWG: G109EC



NO.	INVENTORY NO.	QUANTITY	DESCRIPTION
1	10-44-99	1	WASHER, SQUARE FLAT, 2 1/4"
2	10-17-40	1	CLEVIS, INSULATED SECONDARY/DEADEND
3	12-06-09	1	BOLT, MACHINE
4	08-14-02	1	INSULATOR, SPOOL, CLASS 53-2
5	10-44-33	1	WASHER, LOCK, 5/8"

SECONDARY DEADEND

SCALE: 1"=1'-0" DWG: J1EC



NO.	DATE	REVISIONS
A	08/03/2023	ISSUED FOR REVIEW
B	08/28/2023	ISSUED FOR REVIEW 60% - SUBMITTAL
C	09/14/2023	ISSUED FOR BID - 60%

PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION

DRAWING TITLE: DISTRIBUTION OVERHEAD DETAILS

DRAWN BY: BLP

CHECKED BY: MDT

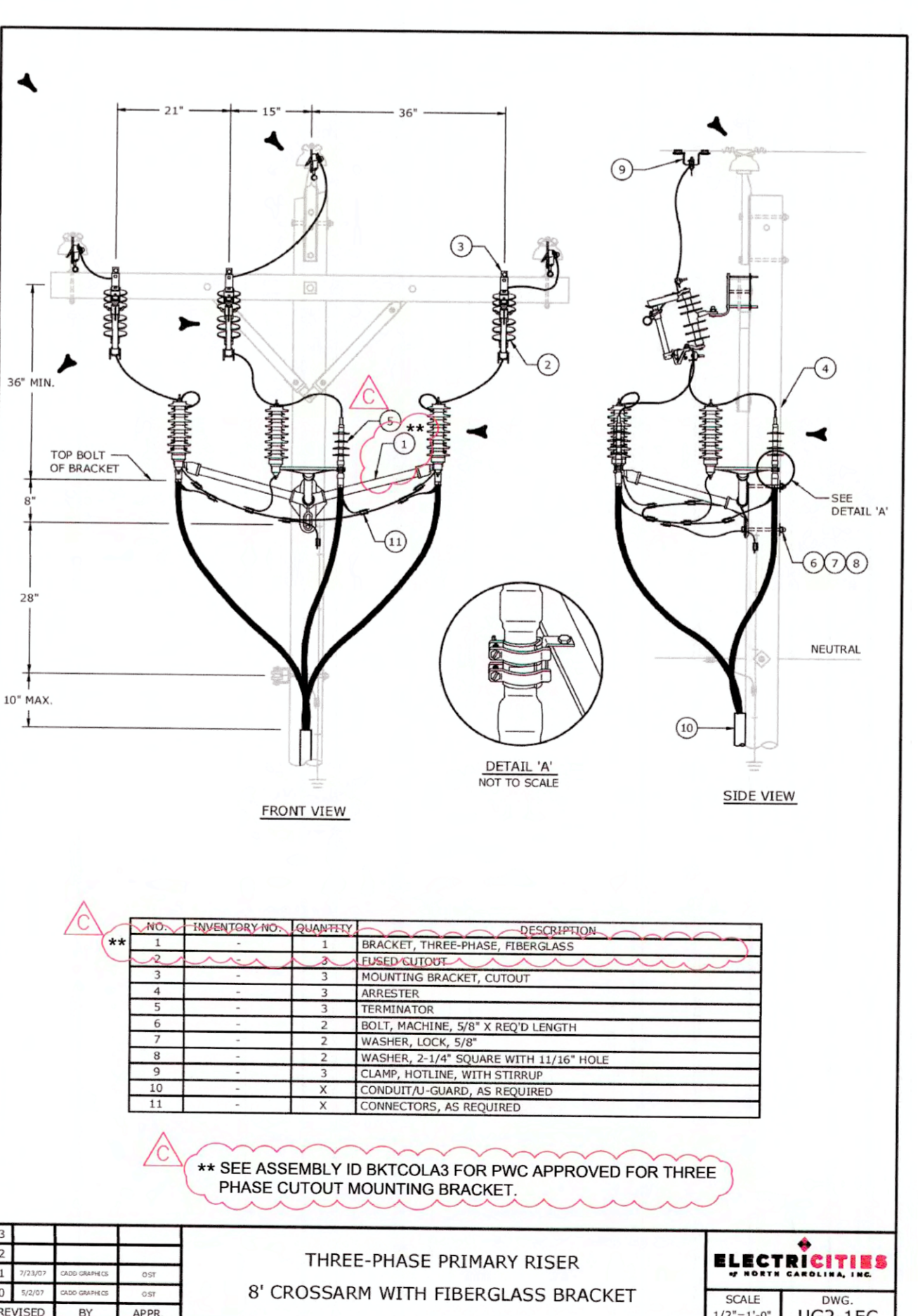
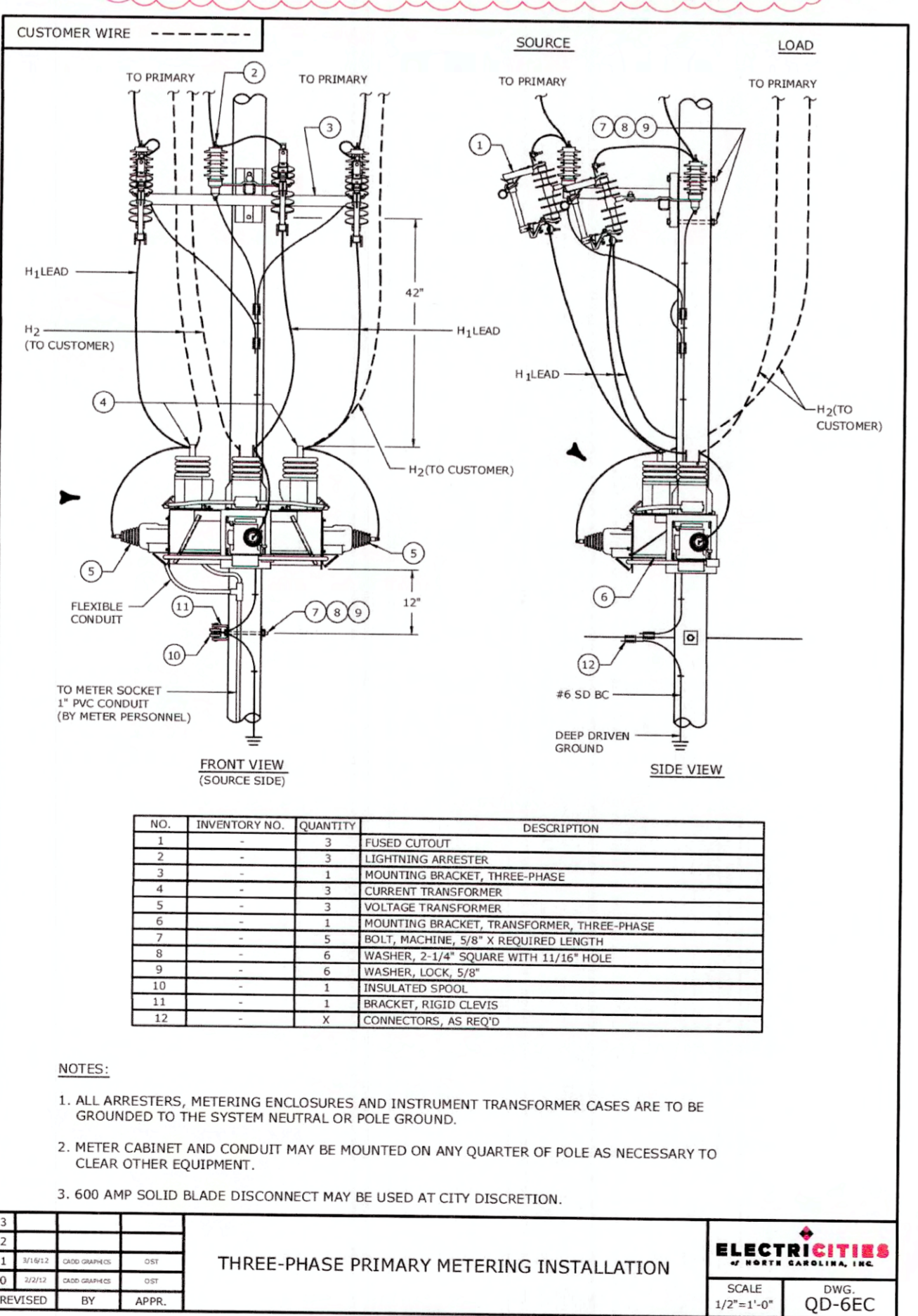
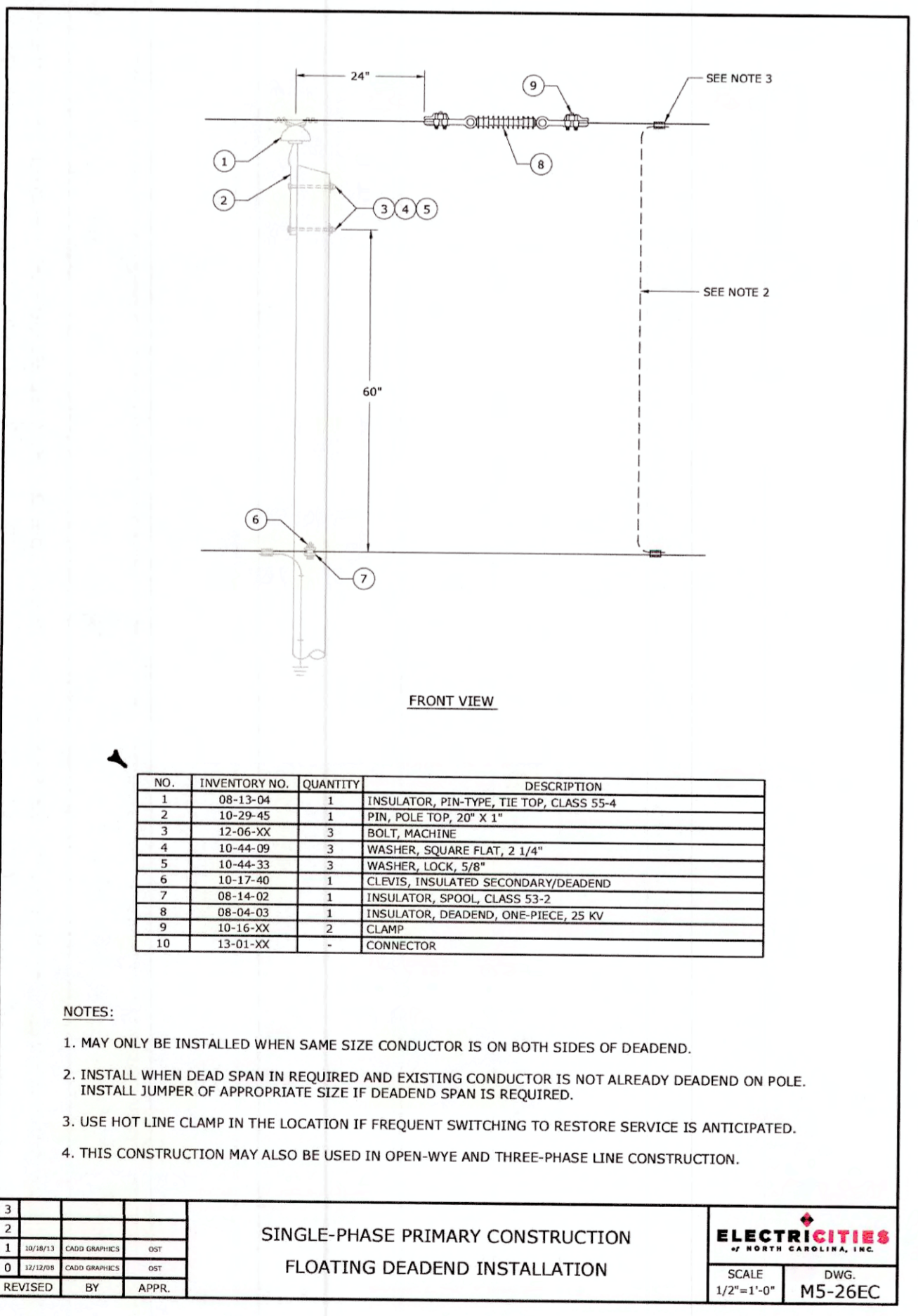
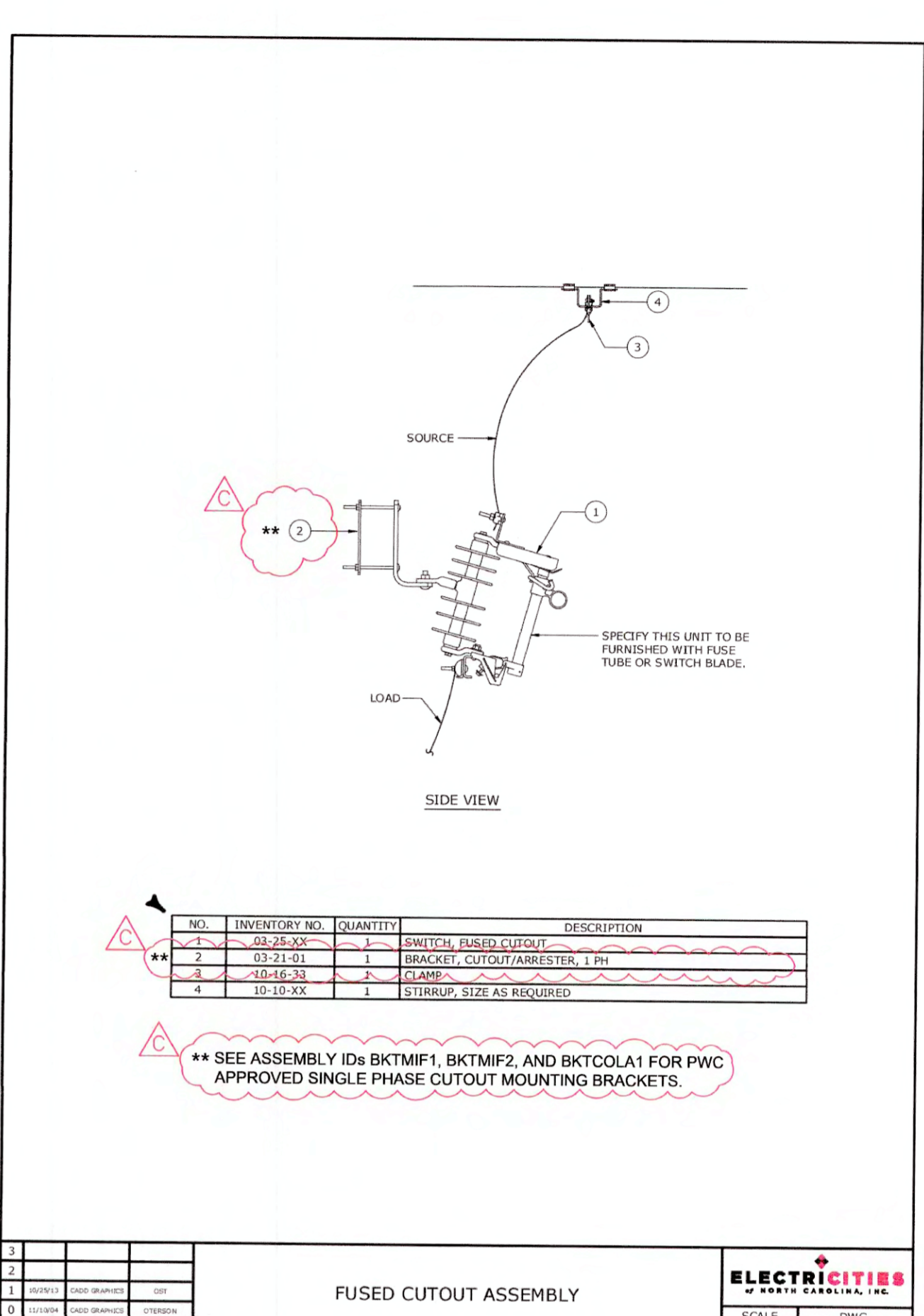
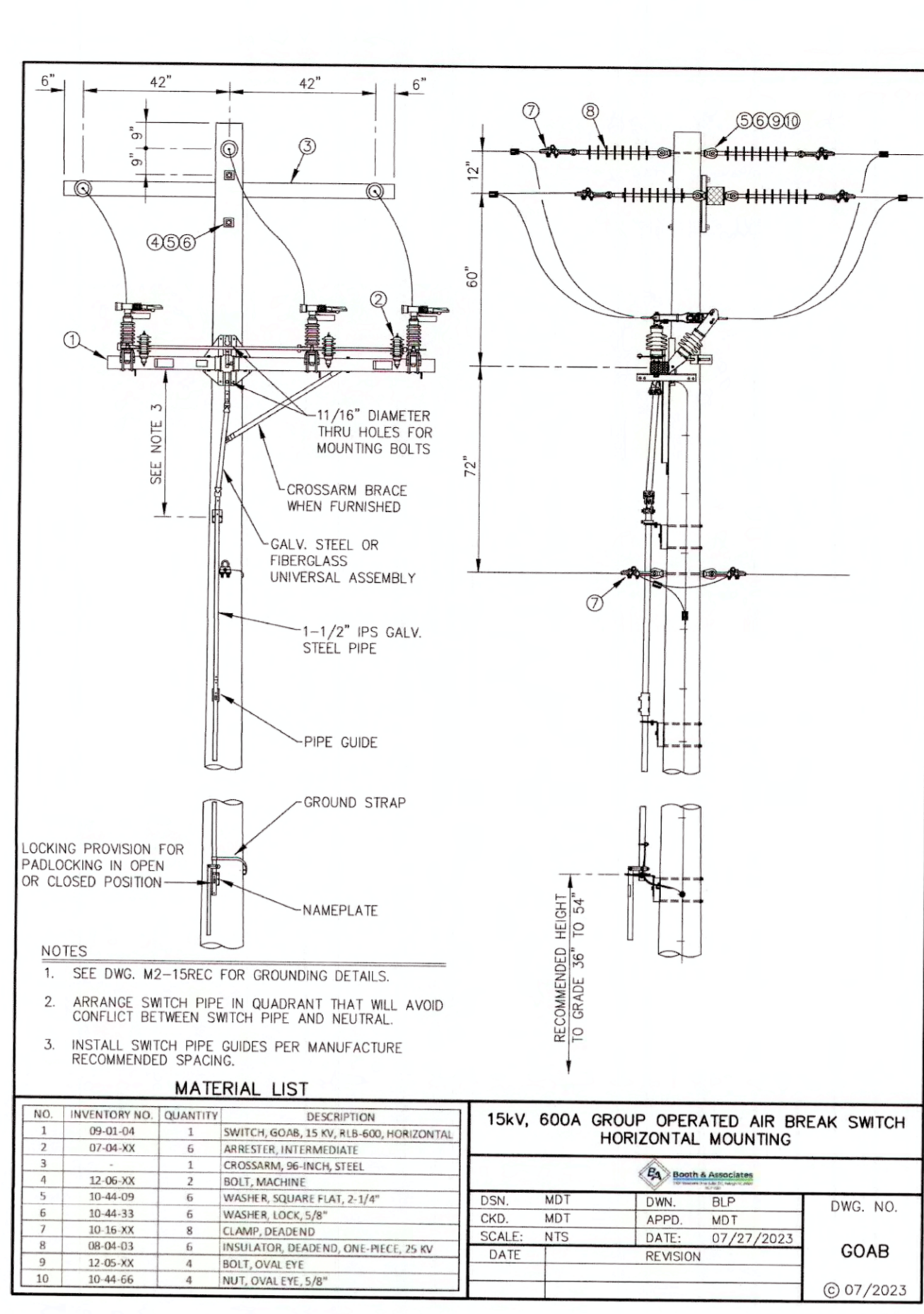
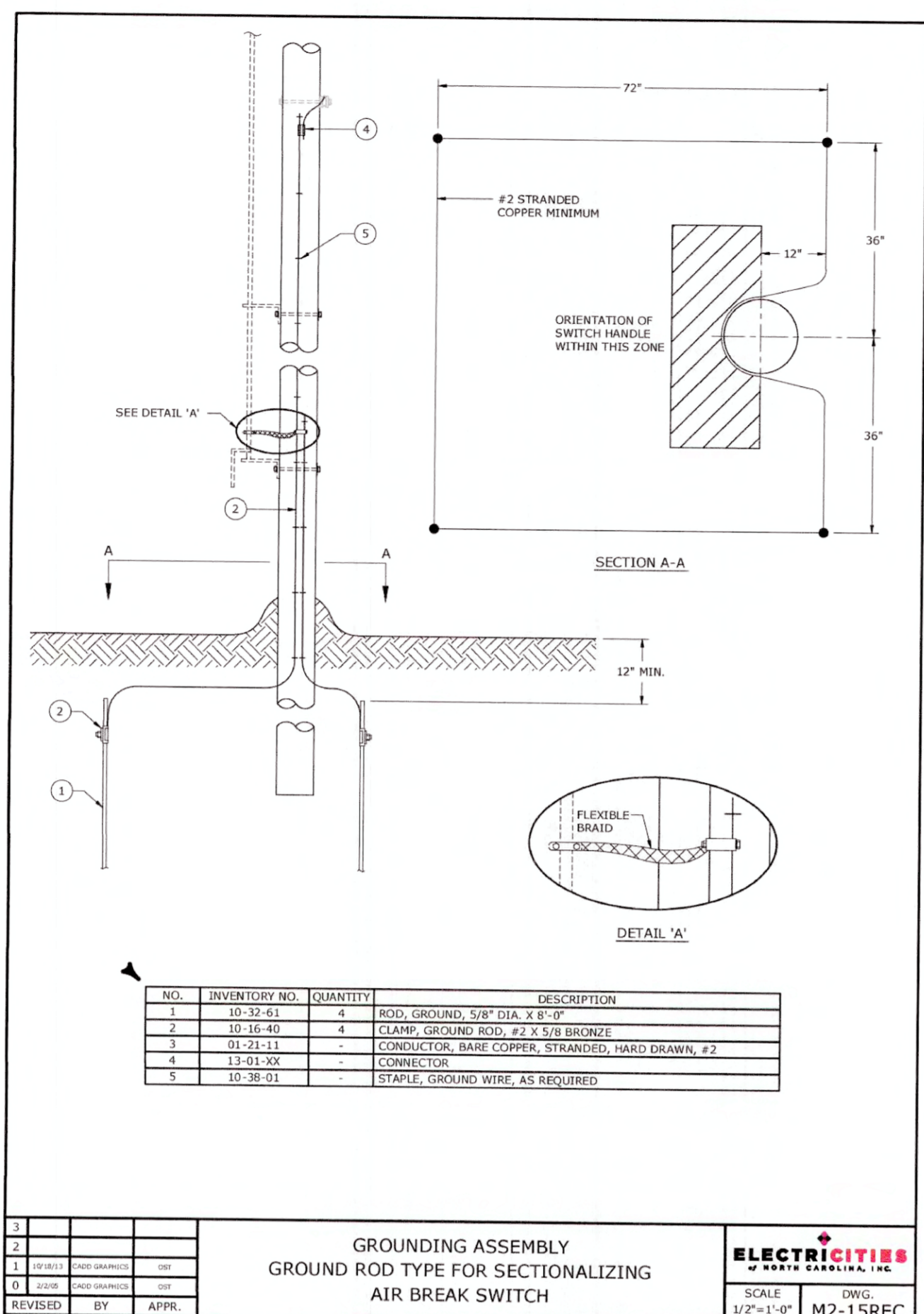
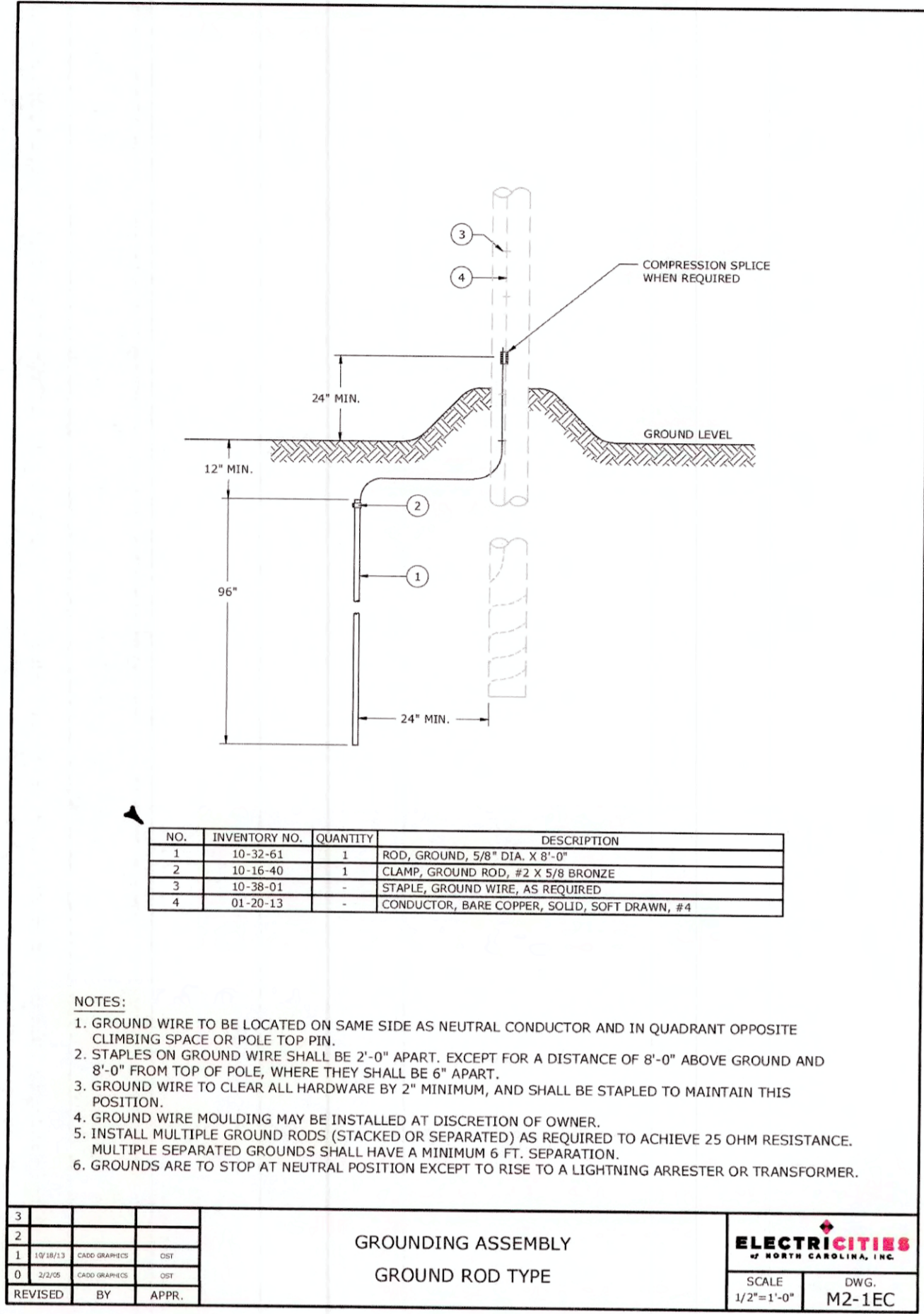
APPROVED BY: BJM

DATE: 06/28/2023

SCALE: NONE

FILE NUMBER: 12548EP-153

SHEET: EP-154



PWC Fayetteville's HOME TOWN UTILITY

Booth & Associates
2000 Remondale Ln, Suite 300, Raleigh, NC 27607
NC F021

PA

SEAL 052969
NORTH CAROLINA PROFESSIONAL ENGINEER
MARK TRACY
9/14/2023

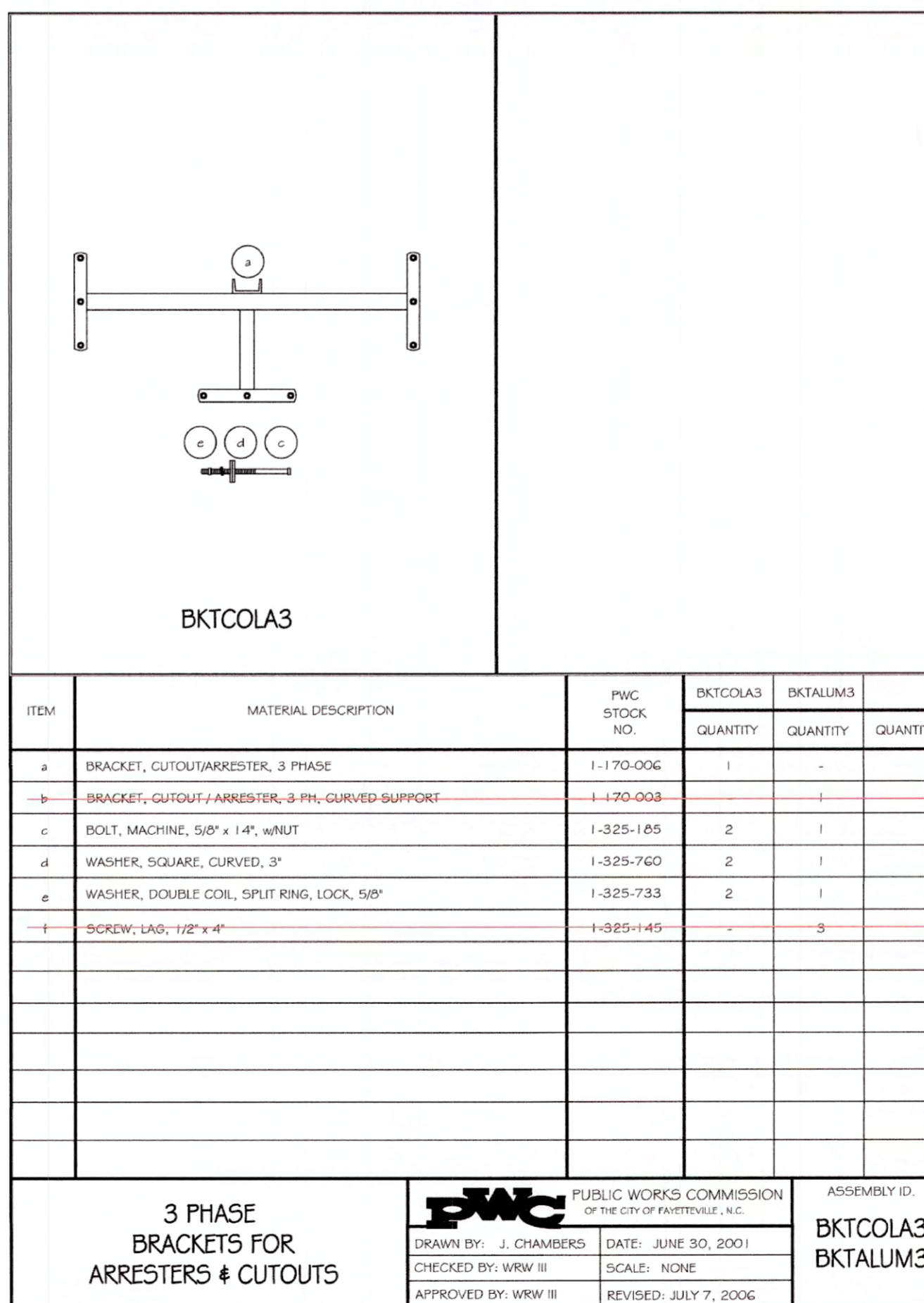
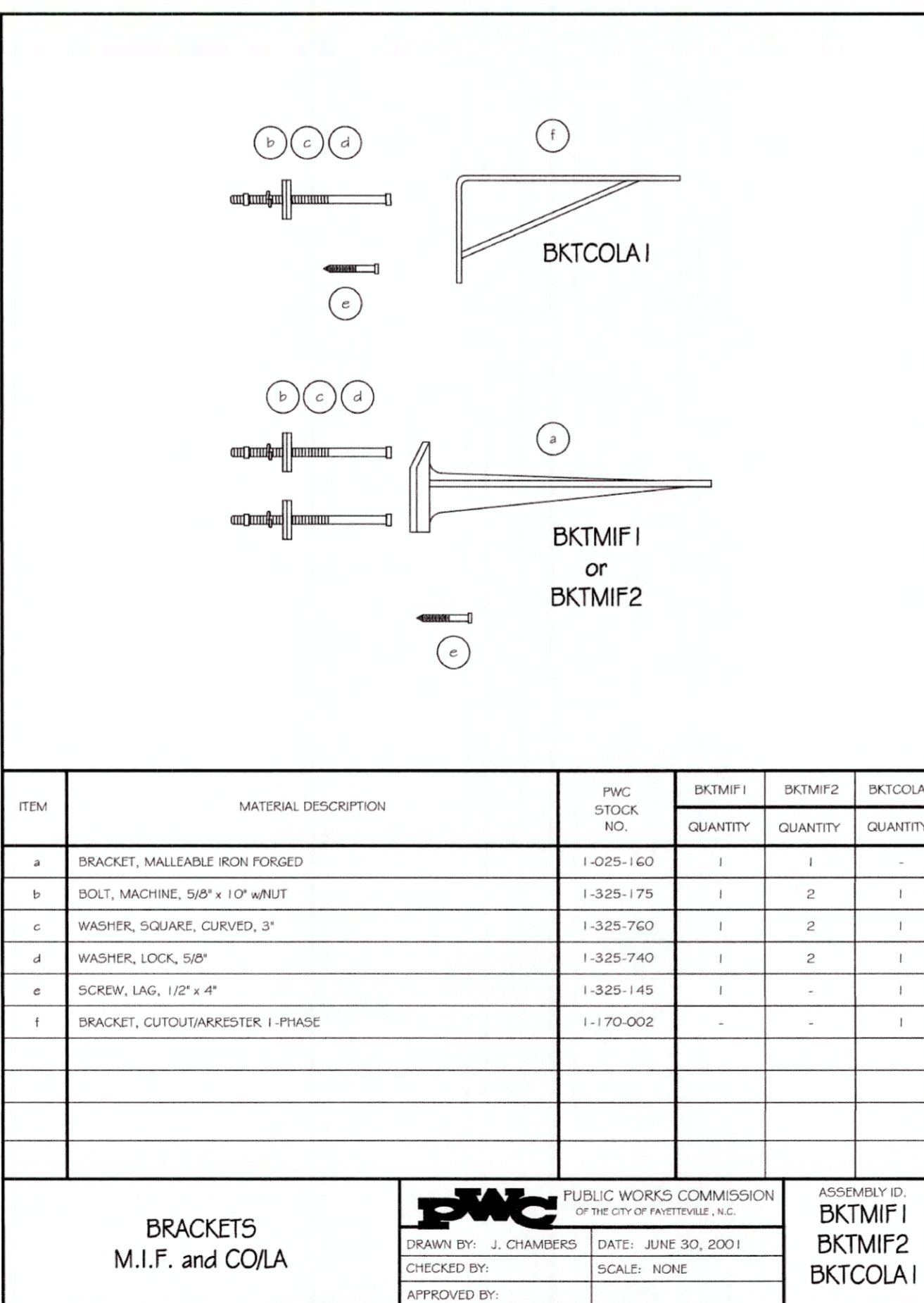
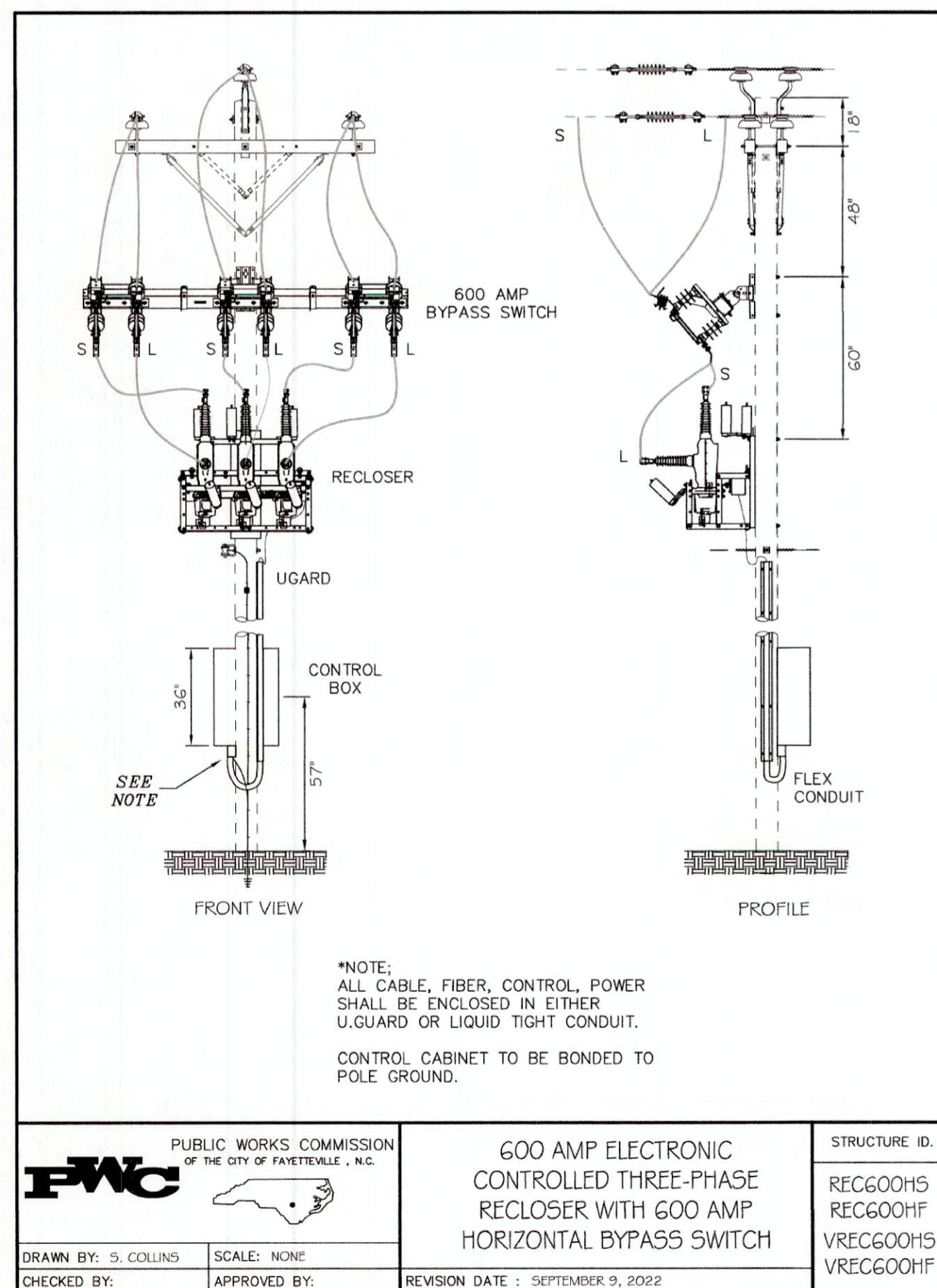
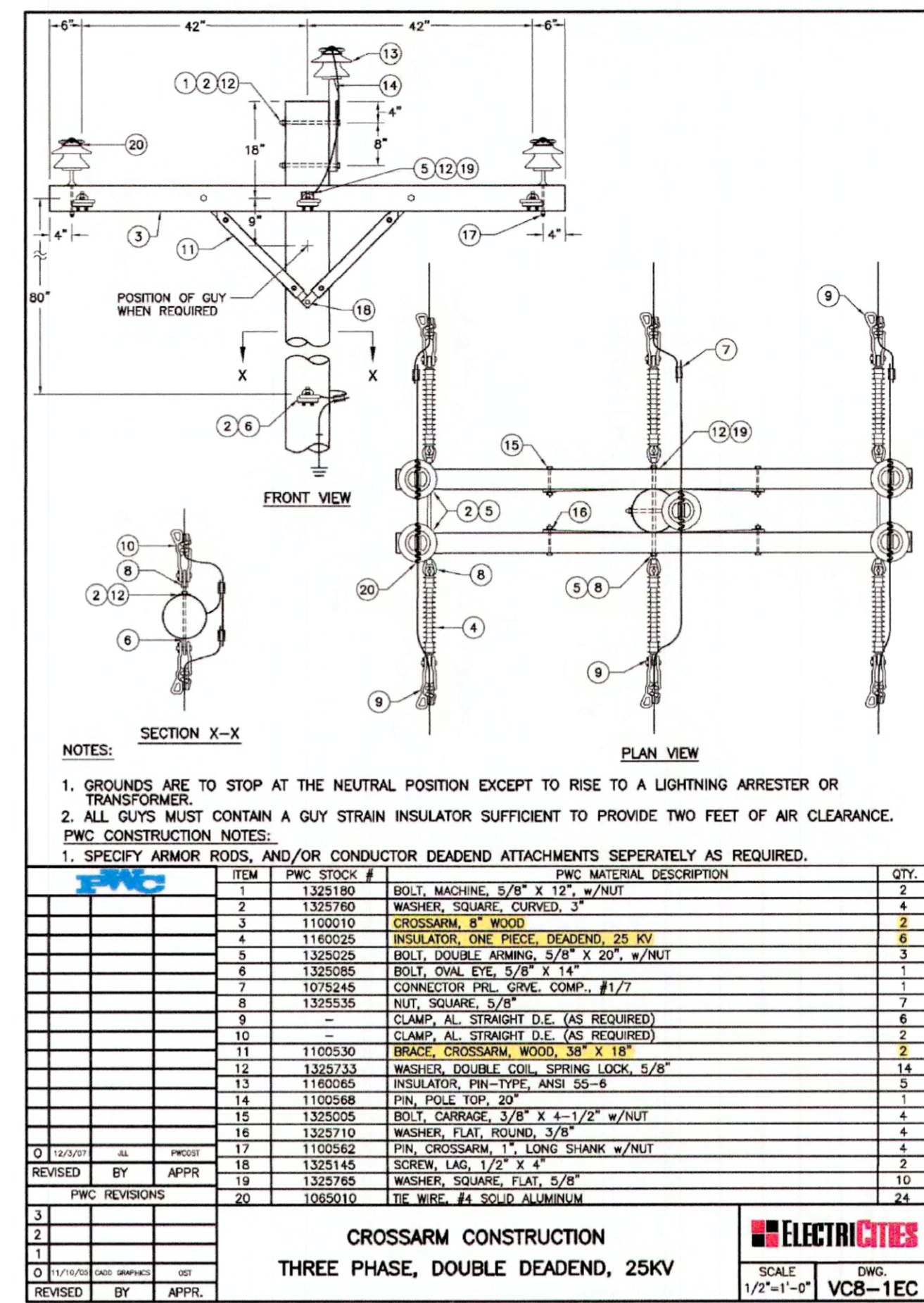
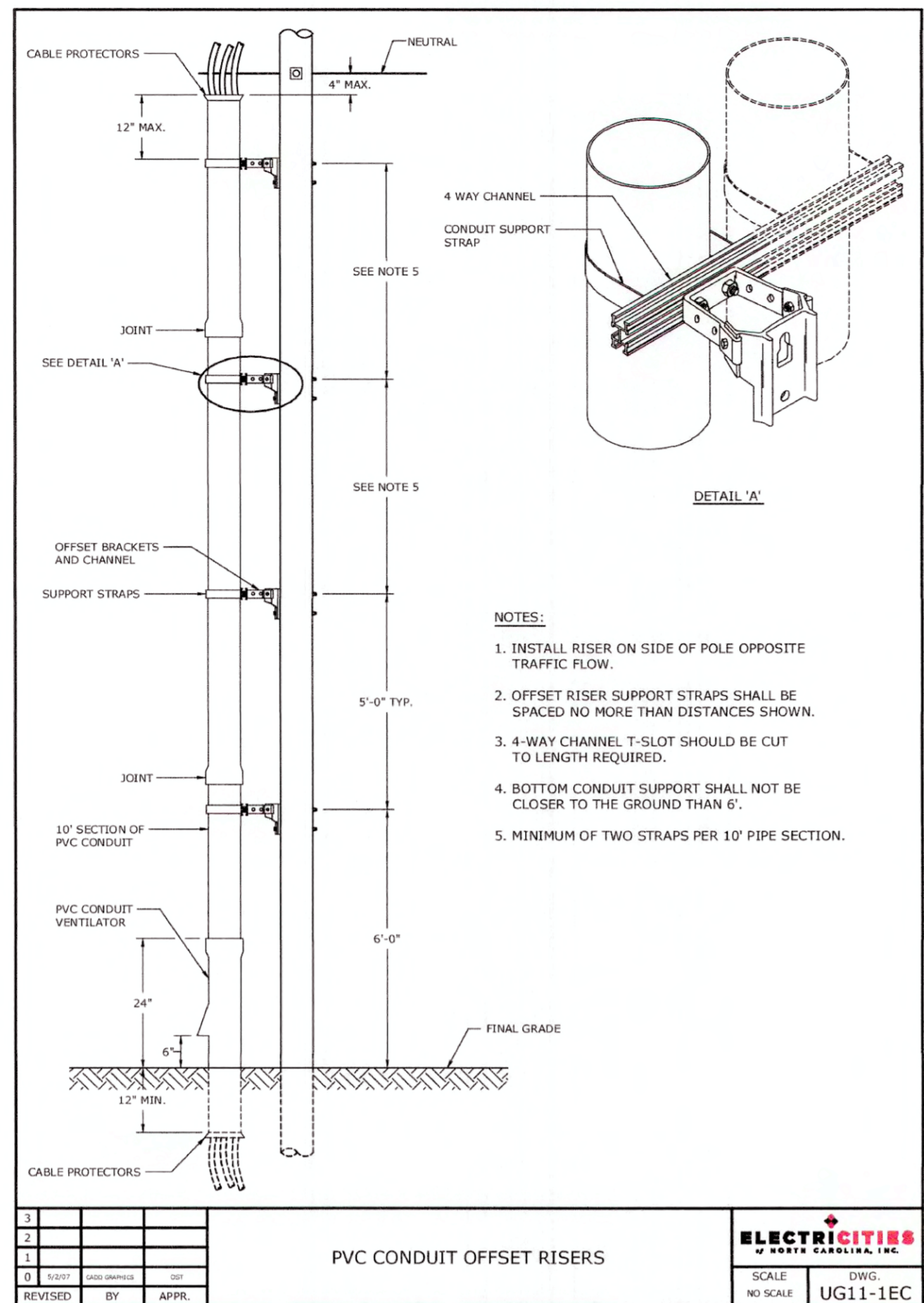
PROJECT NAME: GILLESPIE-BI.9 SOLAR UTILITY STATION
DRAWING TITLE: DISTRIBUTION OVERHEAD DETAILS

DRAWN BY: BLP
CHECKED BY: MDT
APPROVED BY: BJM
DATE: 06/28/2023
SCALE: NONE
FILE NUMBER: 12548EP-15.3
SHEET: EP-155

MATERIAL LIST				
STRUCTURE ID.	ASSEMBLY ID.	STOCK NO.	DESCRIPTION	QUANTITY
REC600HS				
	SWVCR600E15		RECLOSER, 600A, 15 KV, 3-PHASE, TRIPLE/SINGLE, ELECTRONIC	1
		1-280-461	RECLOSER, 600A, 15 KV, 3-PHASE, TRIPLE/SINGLE	1
	CTRLRECVP		RELAY, ELECTRONIC, DISTRIBUTION FEEDER PROTECTION, SEL-451R	1
		1-045-566	RELAY, PARTIAL DISTRIBUTION FEEDER PROTECTION	1
	SWIRECBYPASS		SWITCH, 25 KV, 600 AMP, RECLOSER BYPASS ON FIBERGLASS ARM	1
		1-280-160	SWITCH, RECLOSER BYPASS, CROSSARM	1
	LA10SW		LIGHTNING ARRESTERS, 10 KV, SWITCH POLE	3
		1-170-010	ARRESTER, 10 KV, HEAVY-DUTY	2
	UGARD2		U-GARD, 2", 10'	3
		1-070-032	U-GARD, 2", 10' LENGTH, TRUCK STOCK	1
	GND210S		GROUNDING, DRIVEN, 2-1/2" RODS	1
		1-255-070	ROD, GROUND, 5/8" X 10' CU-CLAD, TRUCK STOCK	2
	UAXL500		UG ALUMINUM POLYETHYLENE INSULATED, 500	60'
		1-065-540	CONDUCTOR, 500 MCM, AL XLP 600V	1'
	FLEX CONDUIT		2" FLEXIBLE CONDUIT FOR CONTROL	10'
		1-070-615	CONDUIT, 2" LIQUID TIGHT, FLEXIBLE (LFMC)	1'

NOTES:
CONDUCTOR ATTACHMENTS, DOWN GUYS, AND ANCHORS MUST BE SPECIFIED SEPARATELY.

DRAWN BY: S. COLLINS	SCALE: NONE	REVISION DATE: SEPTEMBER 9, 2022	STRUCTURE ID. REC600HS
CHECKED BY:	APPROVED BY:		



PWC Fayetteville's HOME/TOWN UTILITY

Booth & Associates
2300 Remondos Drive, Suite 300, Raleigh, NC 27607
N.C. 14221

PROFESSIONAL ENGINEER
MARK TRACY
9/14/2023
04/2023

NO.	REVISIONS	DATE
A	ISSUED FOR REVIEW	06/05/2023
B	ISSUED FOR REVIEW 60% - SUBMITTAL	06/29/2023
C	ISSUED FOR BID - 60%	09/14/2023

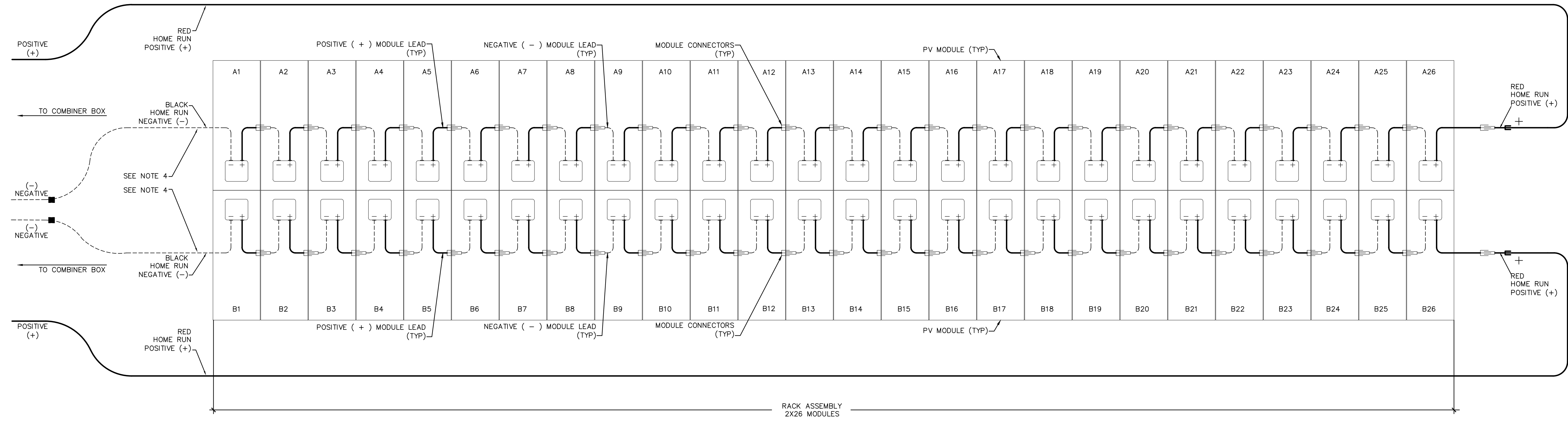
PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE: DISTRIBUTION OVERHEAD DETAILS

DRAWN BY: BLP
CHECKED BY: MDT
APPROVED BY: BJM
DATE: 06/28/2023
SCALE: NONE
FILE NUMBER: 12548EP-153
SHEET: EP-156

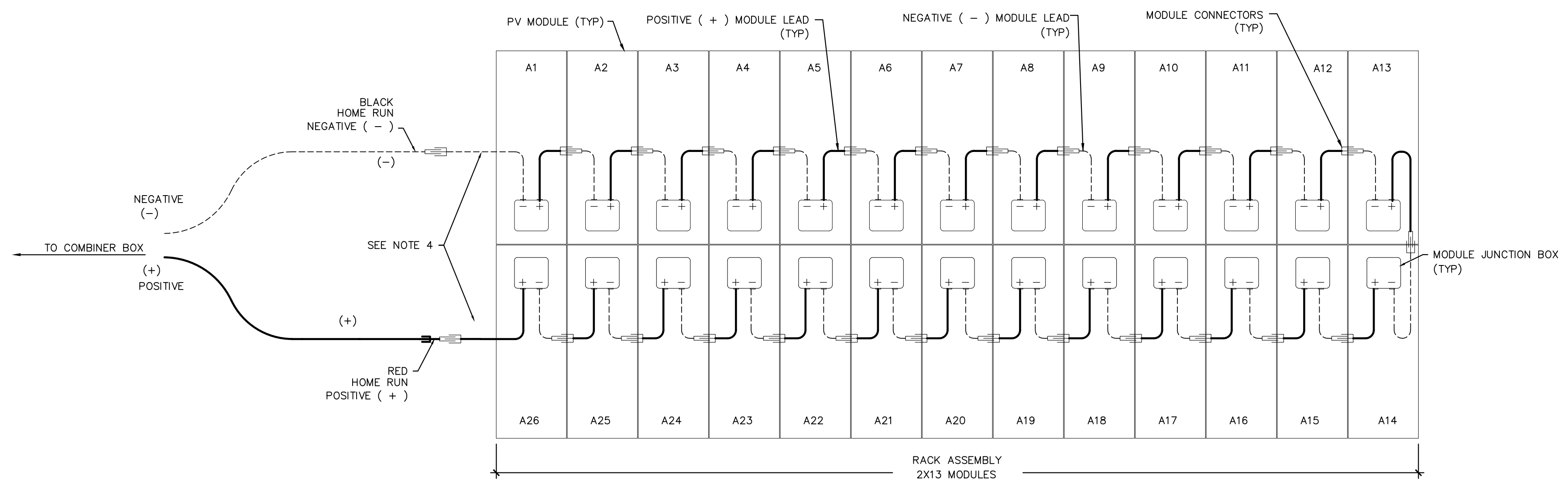
NO.	REVISIONS	DATE	ENG.	DATE
A	ISSUED FOR REVIEW	05/04/2023	EDR	05/04/2023
B	ISSUED FOR REVIEW 60% - SUBMITTAL	08/04/2023	BJM	08/04/2023
C	ISSUED FOR BID - 60%	09/14/2023	BJM	09/14/2023

PROJECT NAME: **GILLESPIE-B1.9 SOLAR UTILITY STATION**
DRAWING TITLE: **MODULE WIRING DETAILS**

DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	03/29/2023
SCALE:	NONE
FILE NUMBER:	12548
SHEET:	



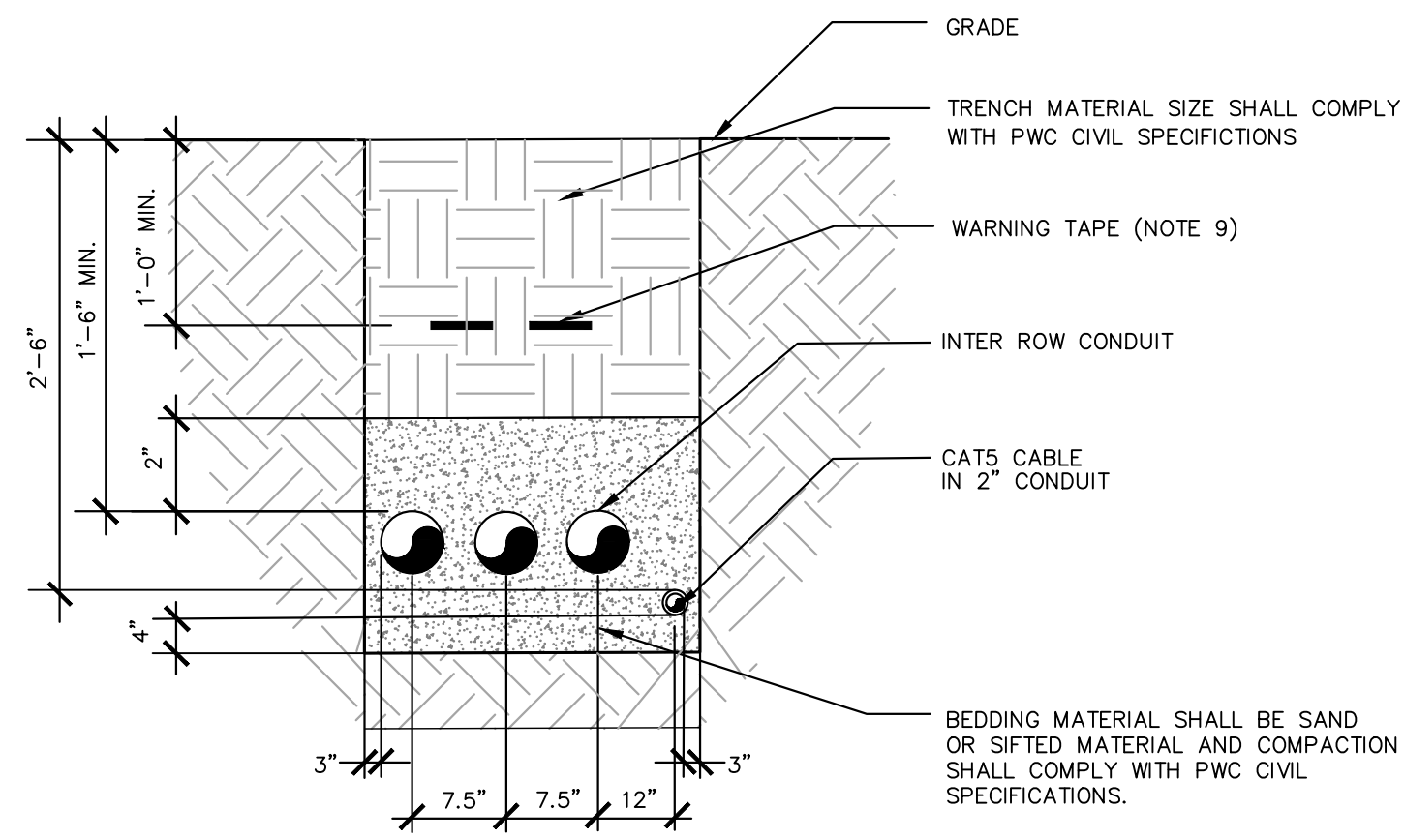
A 2X26 SOURCE CIRCUIT STRINGING DETAIL
SCALE: NTS



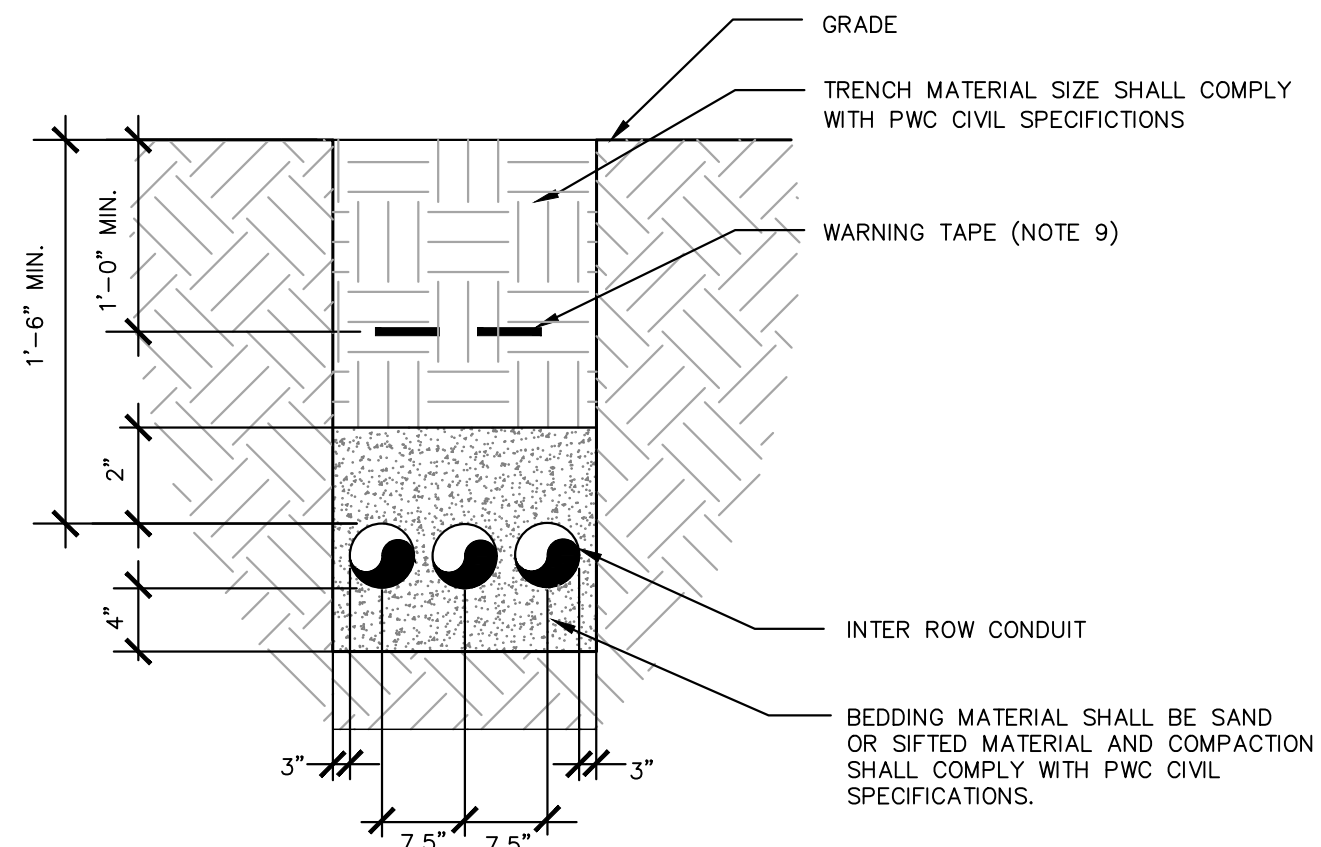
B 2X13 SOURCE CIRCUIT STRINGING DETAIL
SCALE: NTS

NOTES:

- DIRECTION OF WIRING MAY CHANGE DEPENDING ON LOCATION OF MODULES RELATIVE TO ASSOCIATED INVERTER LOCATION. INSTALL WIRING DIRECTION ACCORDINGLY.
- LEADS MUST BE SECURED 12" FROM THE JUNCTION BOX AND A MINIMUM OF 36" ALONG STRAIGHT RUNS.
- PROVIDE ADEQUATE STRAIN RELIEF AT MODULE JUNCTION BOXES.
- MODULE CONNECTORS CAN JUMP BETWEEN TABLES IF PROTECTED BY UV RATED SPLIT LOOM. ANY CONDUCTORS COMING OFF THE TABLE TO IRC MUST BE PROTECTED WITH UV RATED SPLIT LOOM.
- MODULE CONNECTORS MUST BE AN EXACT MATCH WITH THE MODULE SIDE OF THE HARNESS CONNECTORS.
- LABEL BOTH ENDS OF SOURCE CIRCUIT PER SPEC.
- SKIP STRINGING IS PERMISSIBLE IF MODULE LEADS HAVE ADEQUATE LENGTH.
- WIRING BETWEEN RACKS SHALL BE TRANSITIONED AND FASTENED ON RACKING STRUCTURE.



1 INTER ROW CONDUIT AND CAT5 CONDUITS
SCALE: NTS

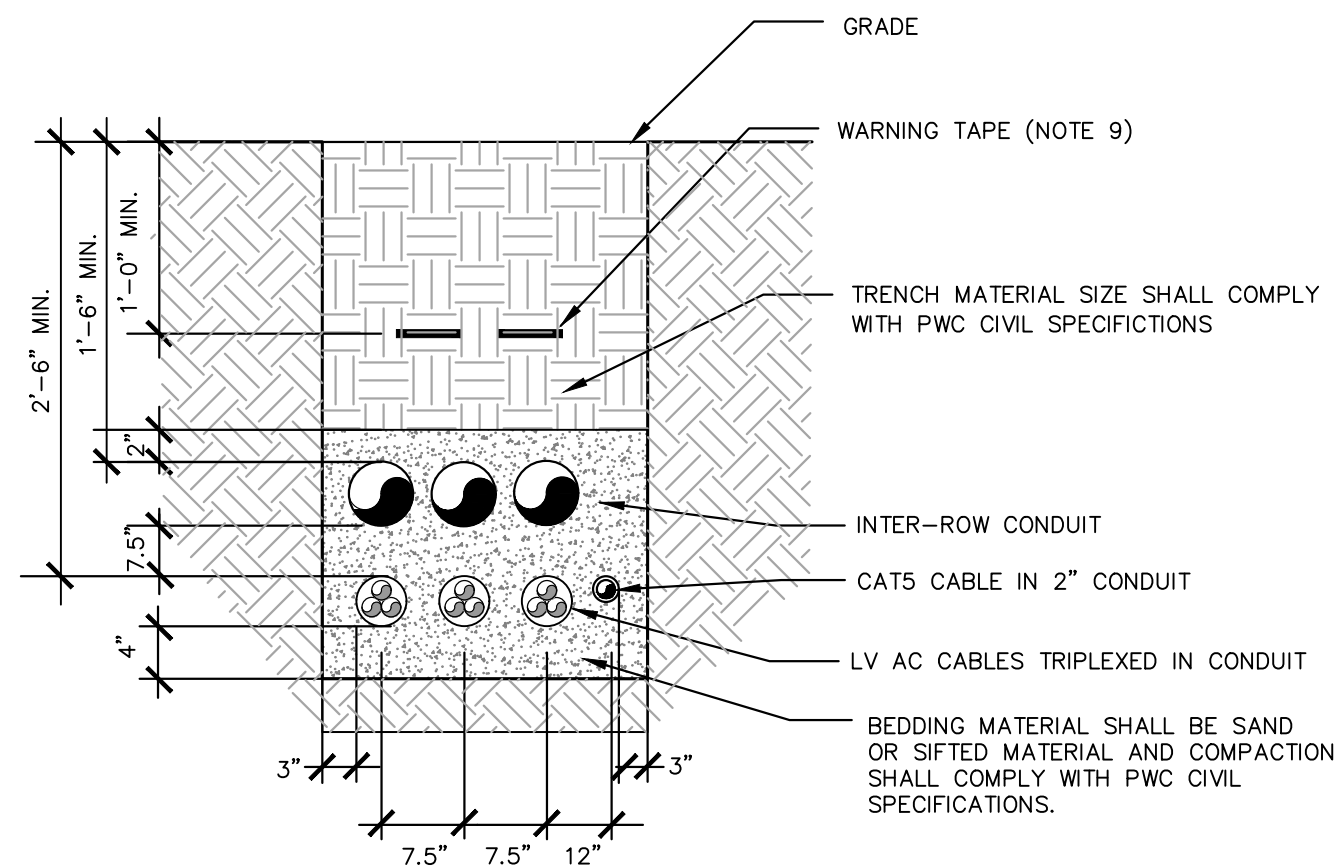


2 INTER ROW CIRCUIT TRENCH
SCALE: NTS

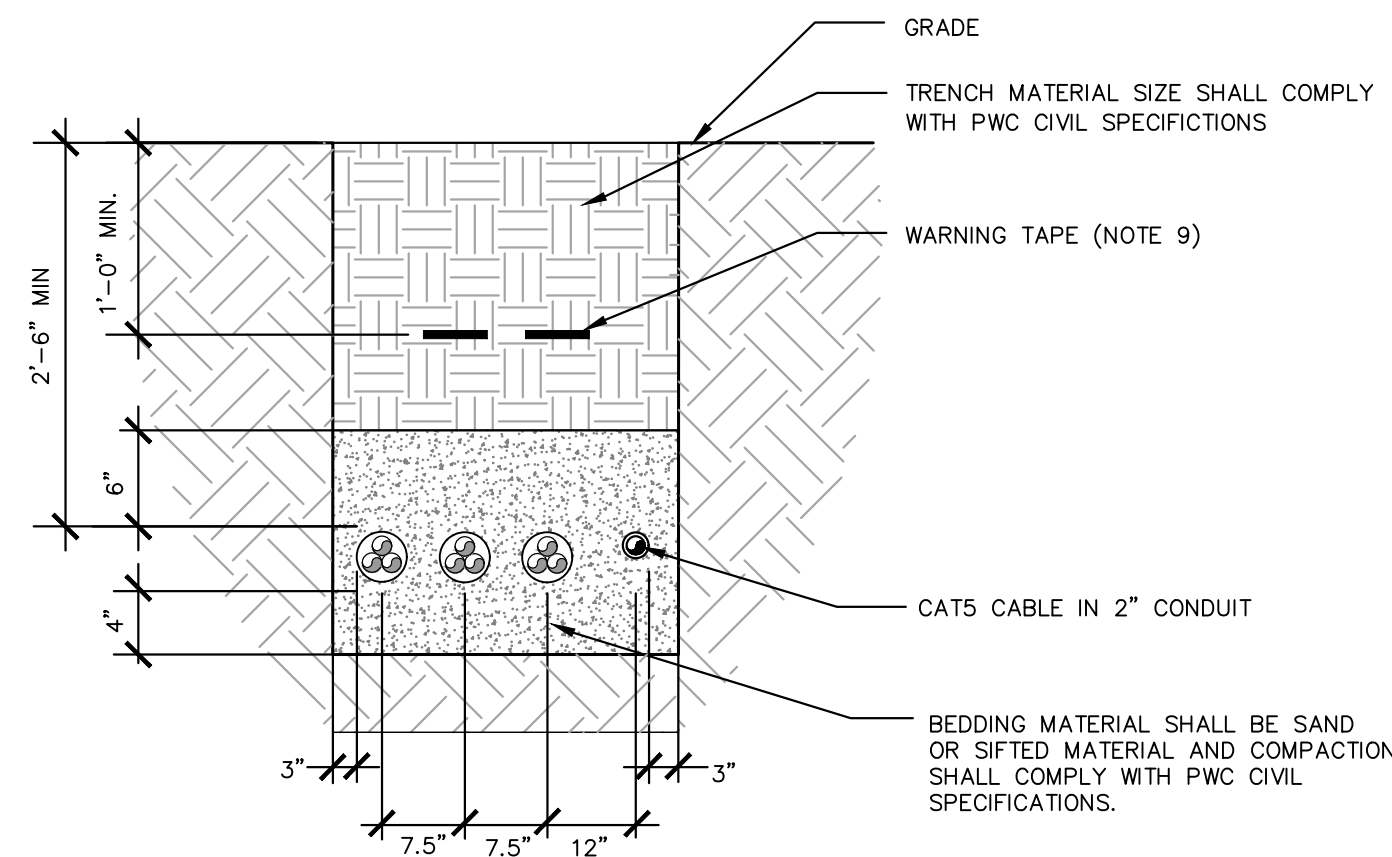
TRENCHING NOTES:

1. BACKFILL SHALL BE FREE OF ROCKS AND MATERIALS THAT CAN DAMAGE THE CONDUIT/CABLE AND SHALL MATCH ORIGINAL SOIL THERMAL RESISTIVITY VALUE.
2. THE DISTANCE BETWEEN EDGE OF TRENCH AND RACKING SUPPORT PILE SHALL BE 3' OR PER RACKING MANUFACTURER SPECIFICATIONS, WHICHEVER IS GREATER.
3. 12" MIN. CLEARANCE SHALL BE MAINTAINED BETWEEN POWER AND CONTROL / COMMUNICATION WIRING.
4. NECESSARY COMPACTION OF TRENCHING SHALL OCCUR AFTER A MAXIMUM OF BACKFILL (TYPICALLY 8"-12") HAS BEEN APPLIED AND SHALL BE COMPACTED AND TESTED PER GEOTECH REQUIREMENTS.
5. THE NUMBER OF CABLES/CONDUITS SHOWN IS REPRESENTATIVE AND MAY VARY PER THE SITE TRENCHING PLAN.
6. EDGE OF TRENCH SHALL BE MIN. OF 36" OFF THE EDGE OF ANY PAD UNLESS APPROVED BY E.O.R.
7. TRENCH BACKFILL MATERIAL REQUIREMENTS:
 - 7.1. INITIAL BACKFILL: PLACE AND COMPACT INITIAL BACKFILL FREE OF ANY ANGULAR PARTICLES OF ANY SIZE, ORGANIC OR DELETERIOUS MATERIALS, AND ANY NON-ANGULAR PARTICLES LARGER THAN 3/4-INCH IN ANY DIMENSION FOR UNDERGROUND CONDUIT AND 1/2-INCH IN ANY DIMENSION FOR DIRECT BURIED CONDUCTORS, TO A HEIGHT OF 12-INCHES OVER THE CONDUIT OR CONDUCTORS
 - 7.2. FINAL BACKFILL: PLACE AND COMPACT FINAL BACKFILL FREE OF ORGANIC OR DELETERIOUS MATERIALS, AND OF ANY PARTICLES LARGER THAN 1" TO FINAL SUBGRADE ELEVATION.
8. TRENCH COMPACTION REQUIREMENTS:
 - 8.1. COMPACT SOIL MATERIALS TO NOT LESS THAN THE FOLLOWING PERCENTAGES OF MAXIMUM DRY UNIT WEIGHT ACCORDING TO STANDARD PROCTOR.
 - 8.1.1. FOR UTILITY TRENCHES, COMPACT EACH LAYER OF INITIAL AND FINAL BACKFILL SOIL MATERIAL AT 85% OR 95% UNDER ROADS.
9. WARNING TAPE SHALL BE METAL DETECTABLE AND MIN. 6" WIDTH.
10. HANDHOLES SHALL BE PROVIDED BY CONTRACTOR. QUANTITY, SIZE AND LOCATION SHALL BE DETERMINED BY CONTRACTOR PER NEC REQUIREMENTS, VENDOR SPECIFICATIONS AND BEST PRACTICES.
11. SEE DRAWING EP-102 FOR PC, MV, AND EGC CABLE RATINGS.

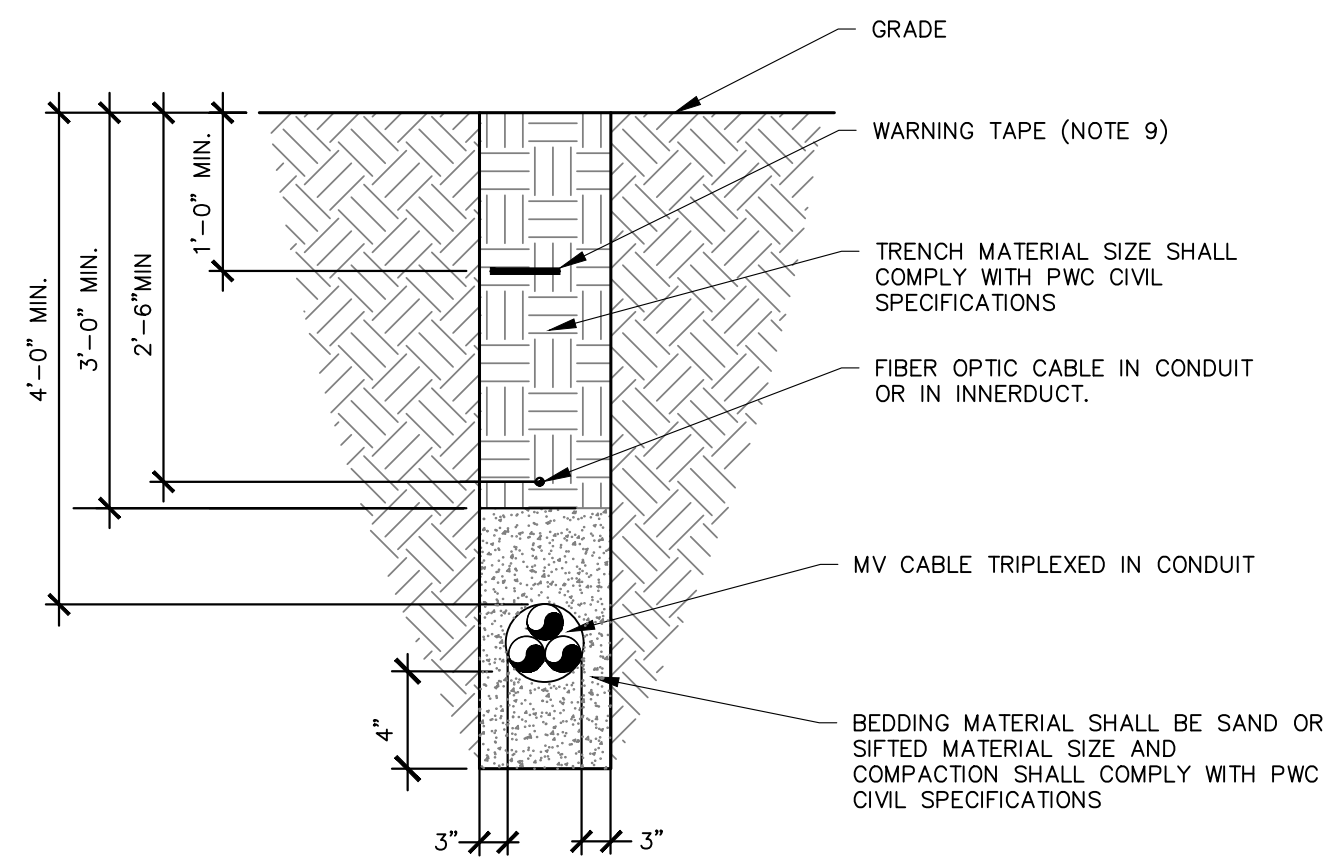
****HOLD ALL TRENCHING UNTIL 30% THERMAL AMPACITY STUDY IS COMPLETE.**



3 LV & INTER-ROW CONDUIT TRENCH
SCALE: NTS



5 LV AC TRENCH
SCALE: NTS

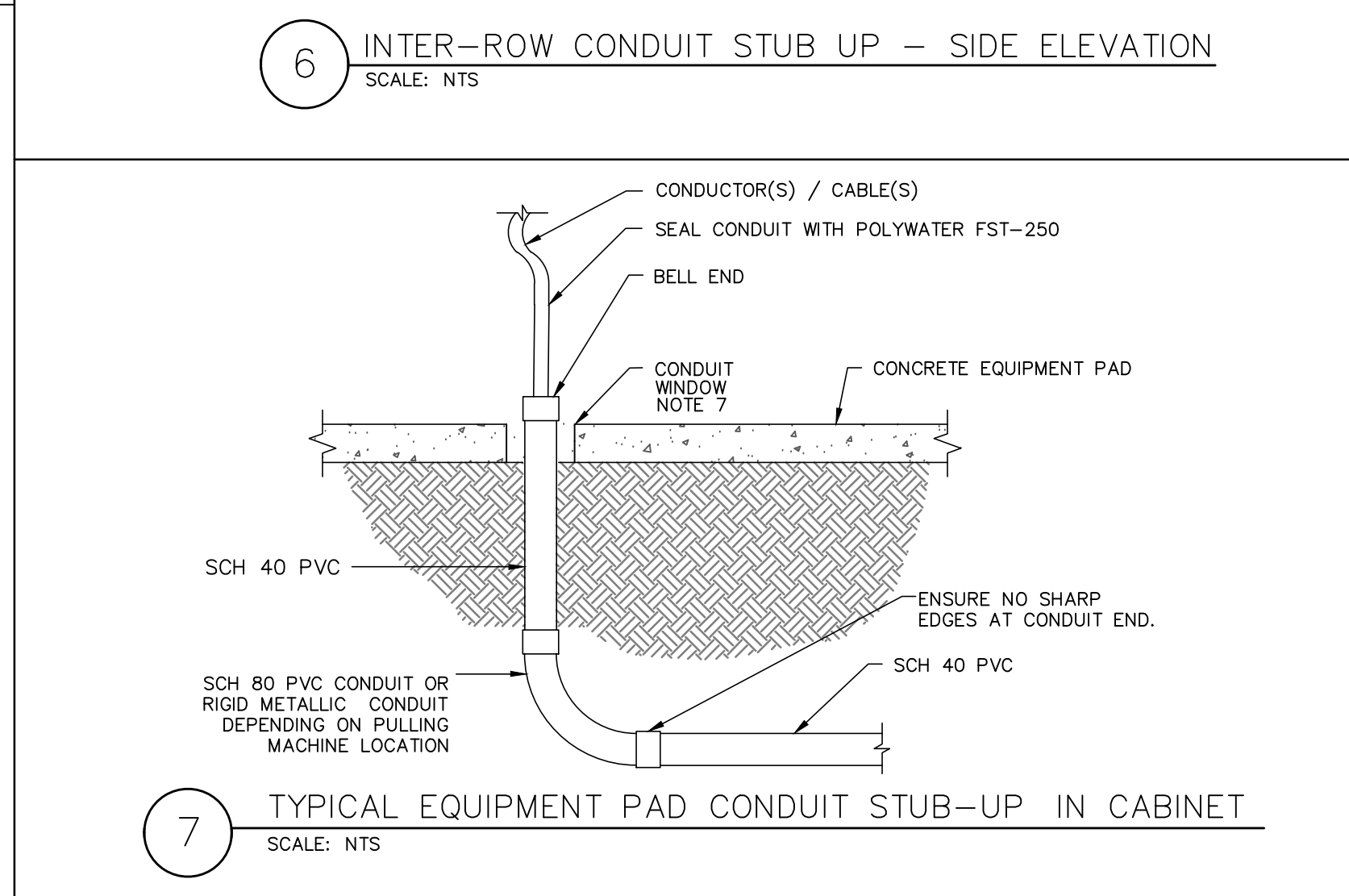
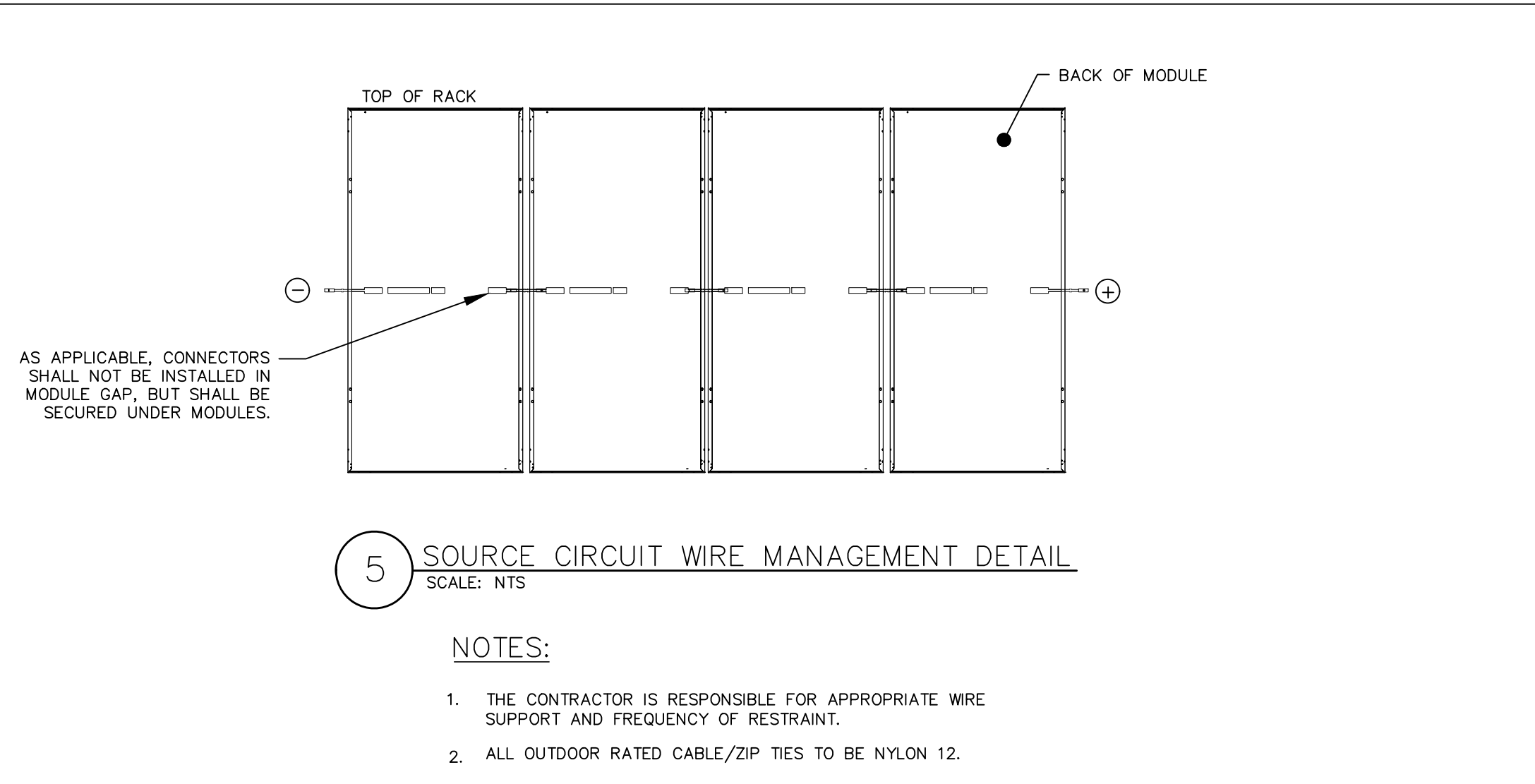
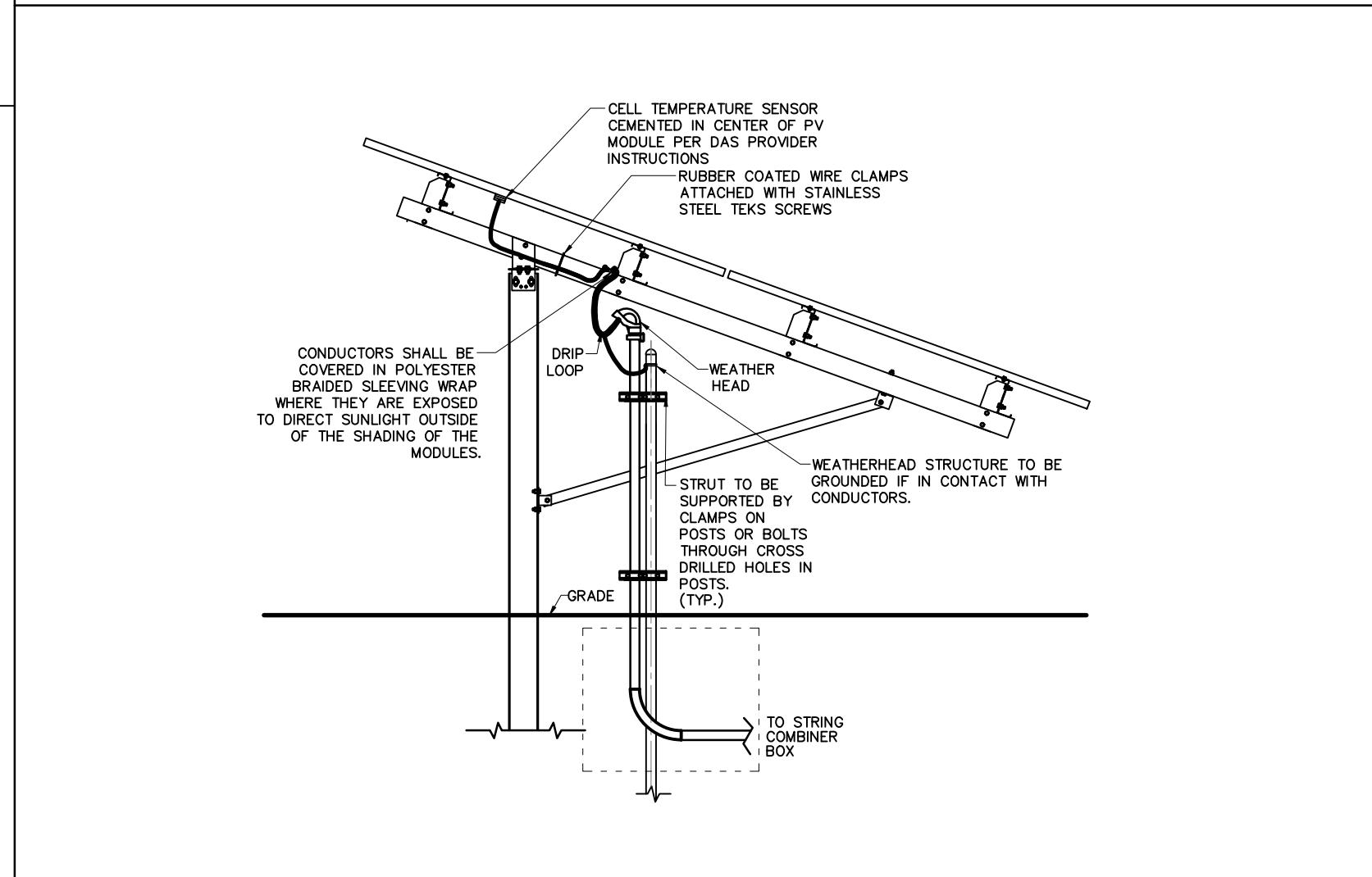
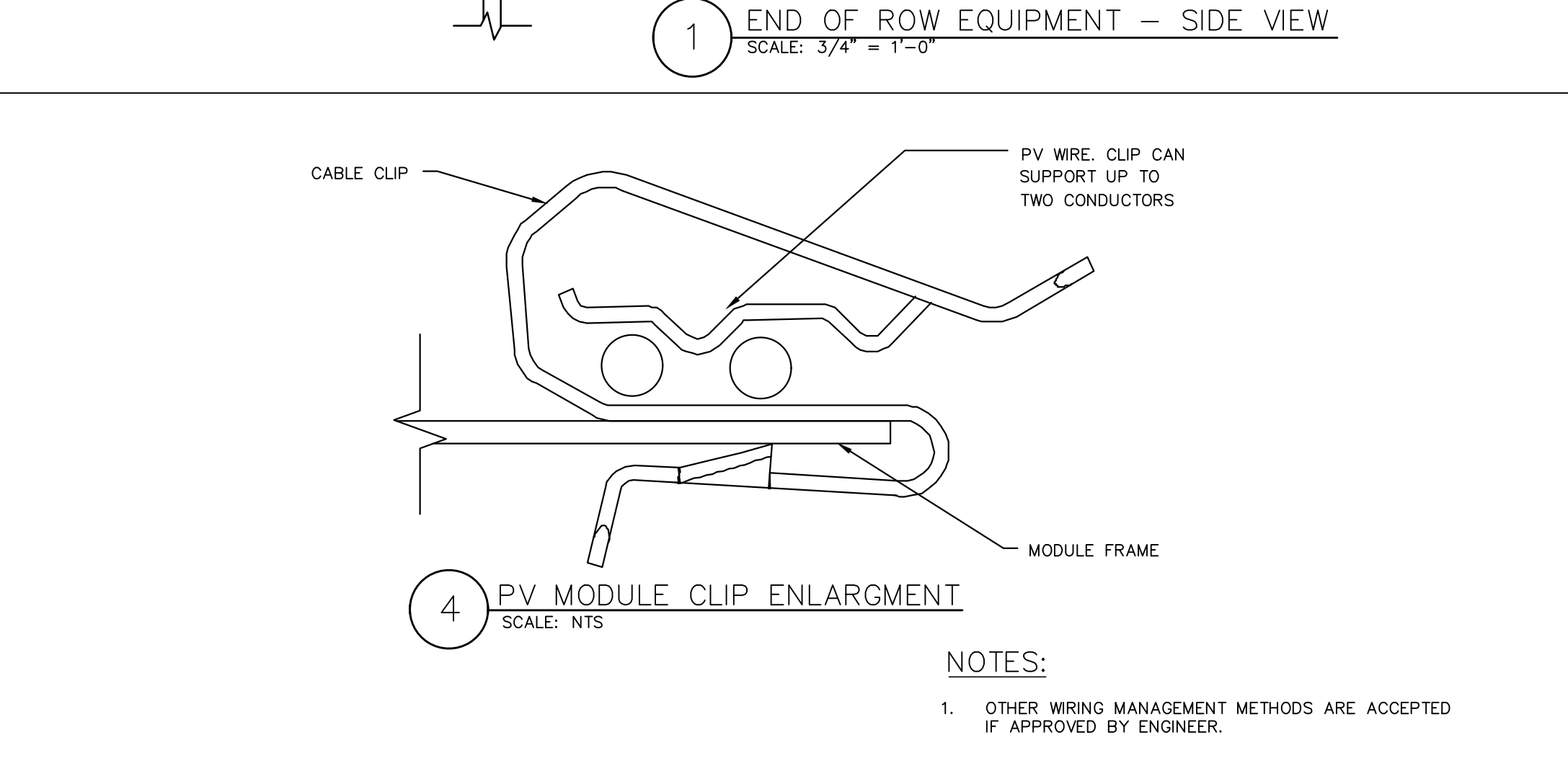
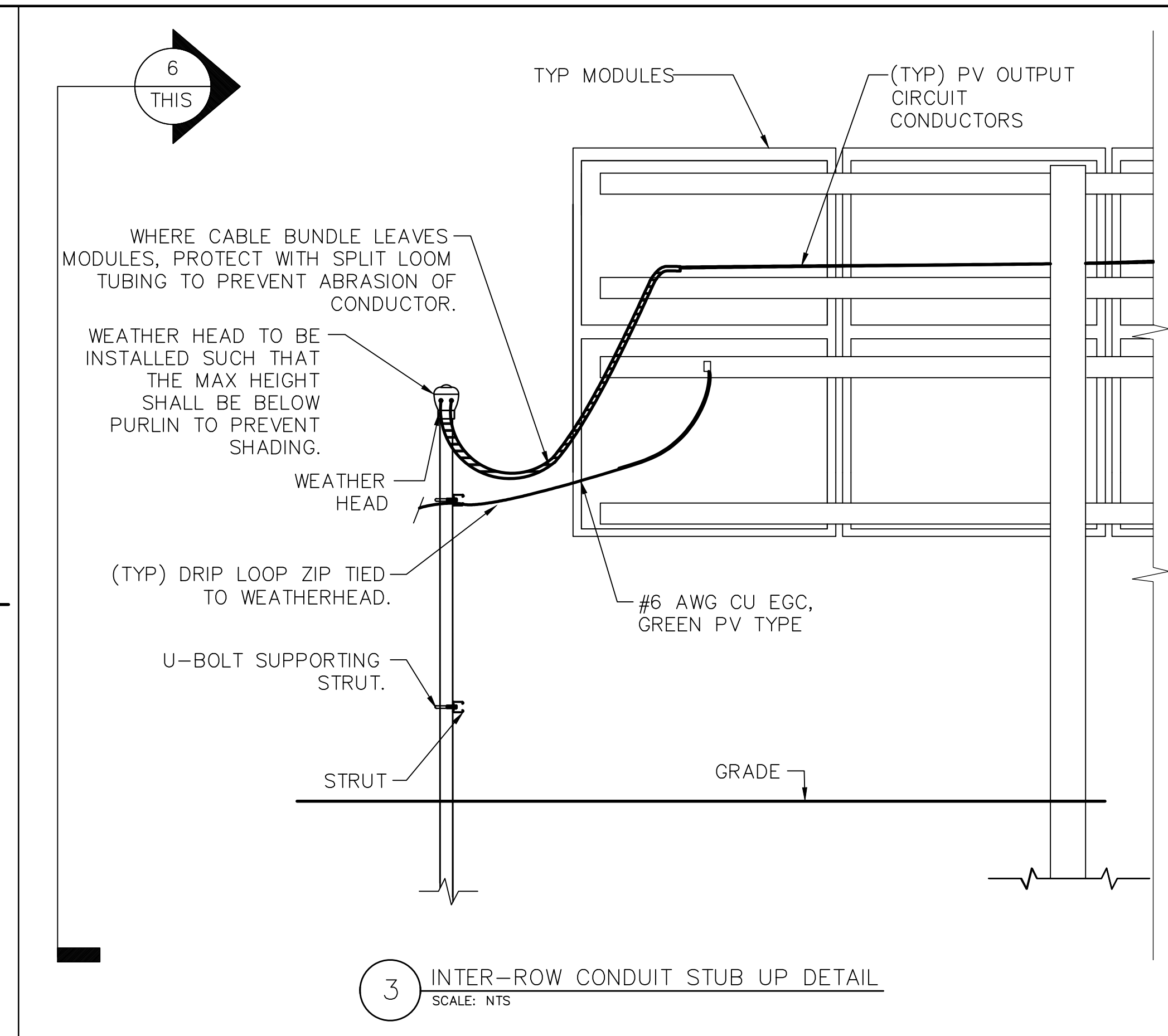
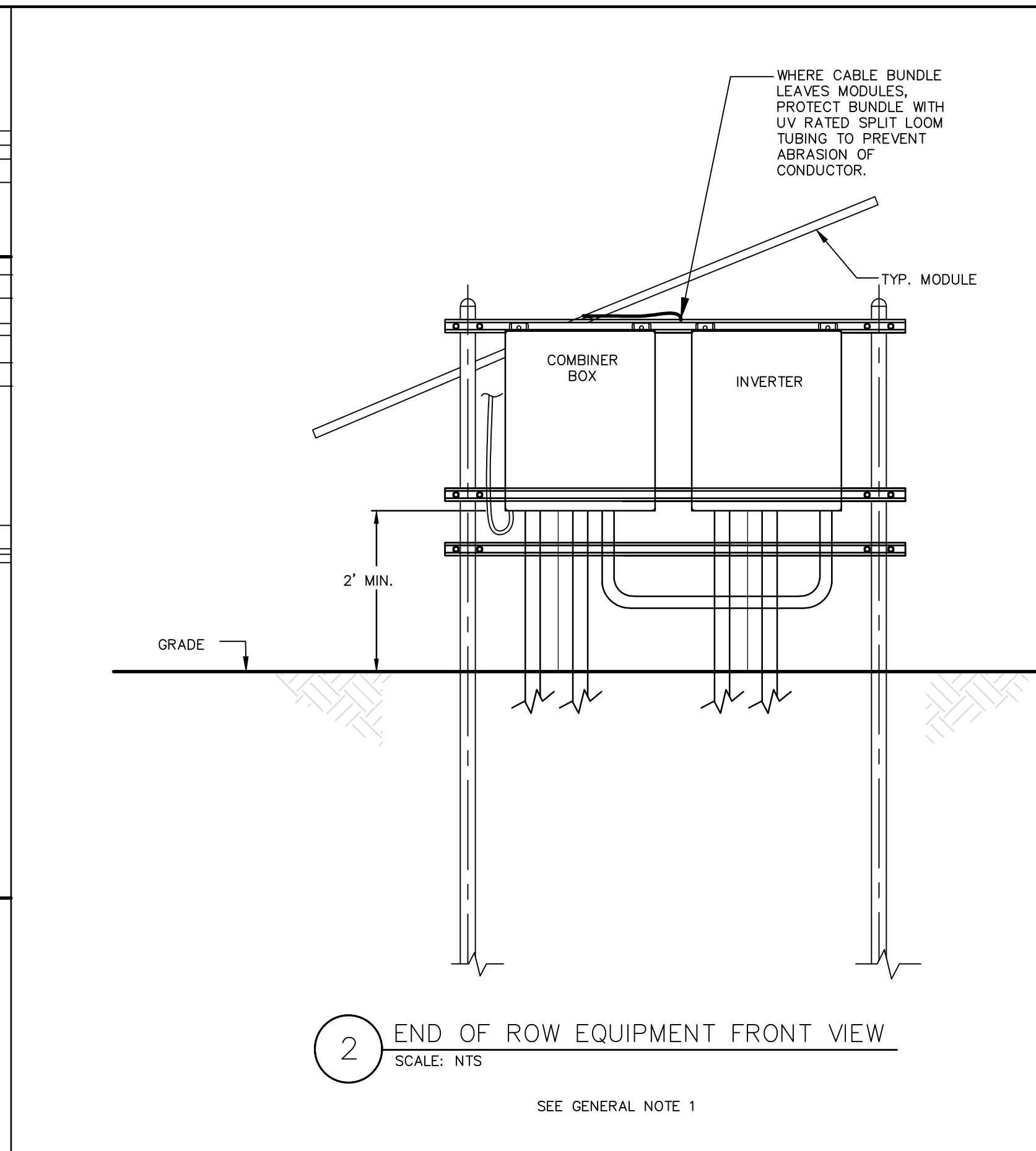
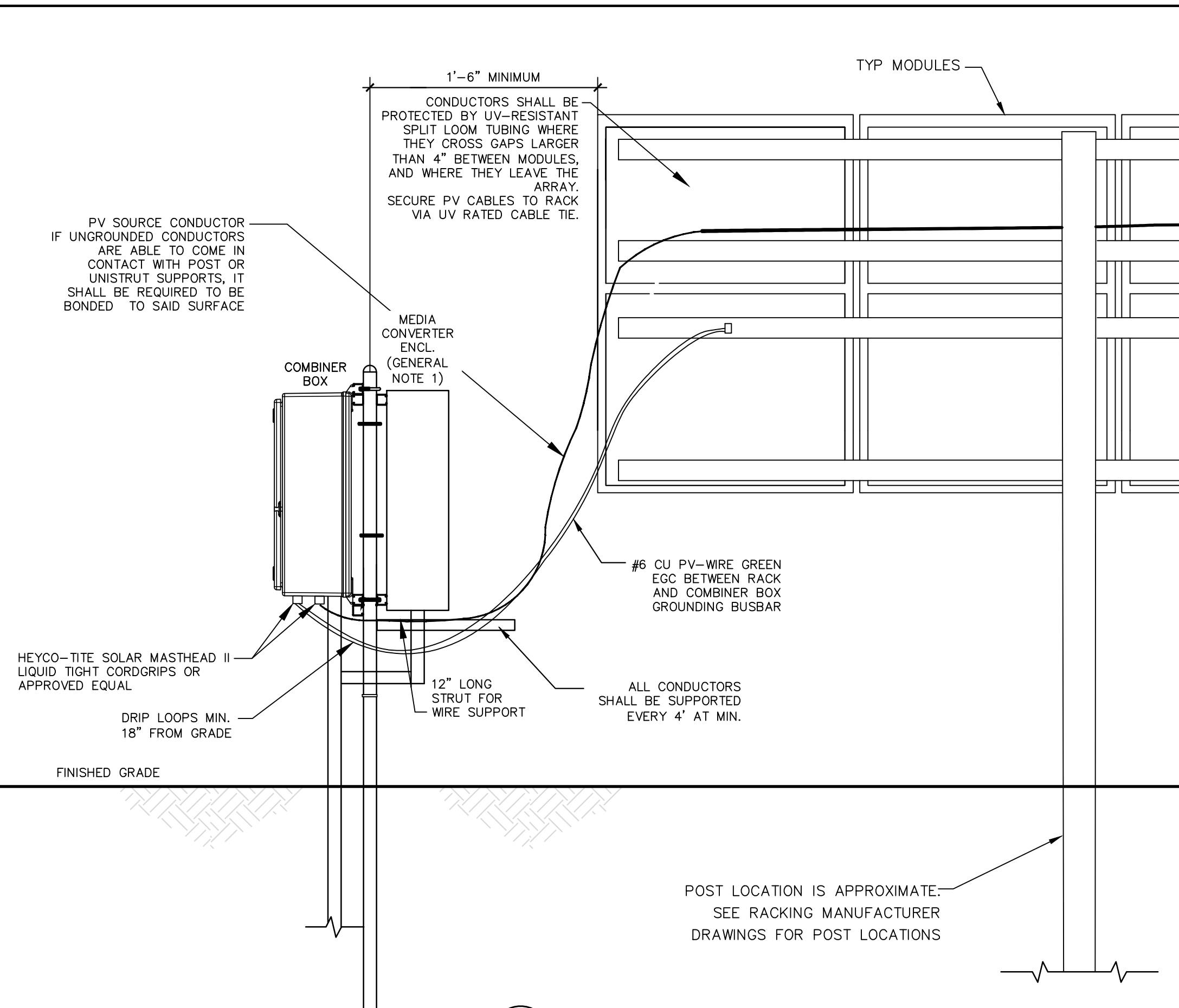


6 MV/FO (SINGLE CIRCUIT)
SCALE: NTS

NO.	REVISIONS	DATE	ENG.
A	ISSUED FOR REVIEW	05/04/2023	BRD
B	ISSUED FOR REVIEW 60% - SUBMITTAL	06/09/2023	EDR
C	ISSUED FOR REVIEW 60% - SUBMITTAL	08/25/2023	BJM
D	ISSUED FOR BID - 60%	09/14/2023	BJM

PROJECT NAME:	GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE:	UNDERGROUND ELECTRICAL DETAILS

DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	03/29/2023
SCALE:	NONE
FILE NUMBER:	12548
SHEET:	



- GENERAL NOTES:
- MEDIA CONVERTER ENCLOSURE ONLY MOUNTED AT INV-08.
- TRANSITION NOTES:
- THE WIDTH OF THE UNISTRUT SUPPORT MAY BE ADJUSTED TO SUIT THE NUMBER OF CONDUITS BEING SUPPORTED.
 - THE 90° ELBOWS MAY BE ROTATED TO SUIT DIRECTION OF TRANSITION.
 - ABOVE GROUND CONDUIT AND FITTINGS WILL BE SCH 80 WHEN EXPOSED AND SCH 40 WHEN INSIDE CABINET, BELOW GROUND ALL WILL BE SCH 40.
 - EACH CONDUIT IS TO HAVE ITS OWN INDIVIDUAL GROUNDING CONDUCTOR.
- CONDUIT NOTES:
- 90° ELBOW SHALL BE INSTALLED WITH THE FLARED END UP.
 - TRENCHES WILL BE MARKED WITH FLAGS PRIOR TO CONSTRUCTION.
 - LOCATION OF INTER ROW STUB UP SUPPORTS WILL BE MARKED WITH A STAKE BY SURVEYOR PRIOR TO CONSTRUCTION.
 - TOTAL DEPTH OF TRENCH TO BE DETERMINED BY THE FIELD.
 - FIELD TO APPLY TAPE AS NEEDED TO GROUP CONDUCTORS WHILE LAYING IN TRENCH.
 - ALL CONDUIT SLEEVES SHALL BE FOAMED BEFORE CLOSE OF CONSTRUCTION USING POLYWATER SEALANT.
 - FILL ALL CONDUIT WINDOWS WITH GROUT AFTER CONDUIT AND EQUIPMENT IS INSTALLED (TYP).

EMC
Fayetteville's
HOME TOWN UTILITY

PA Booth & Associates
2300 Rowlands Drive Suite 300, Raleigh NC 27607
NC E-0221

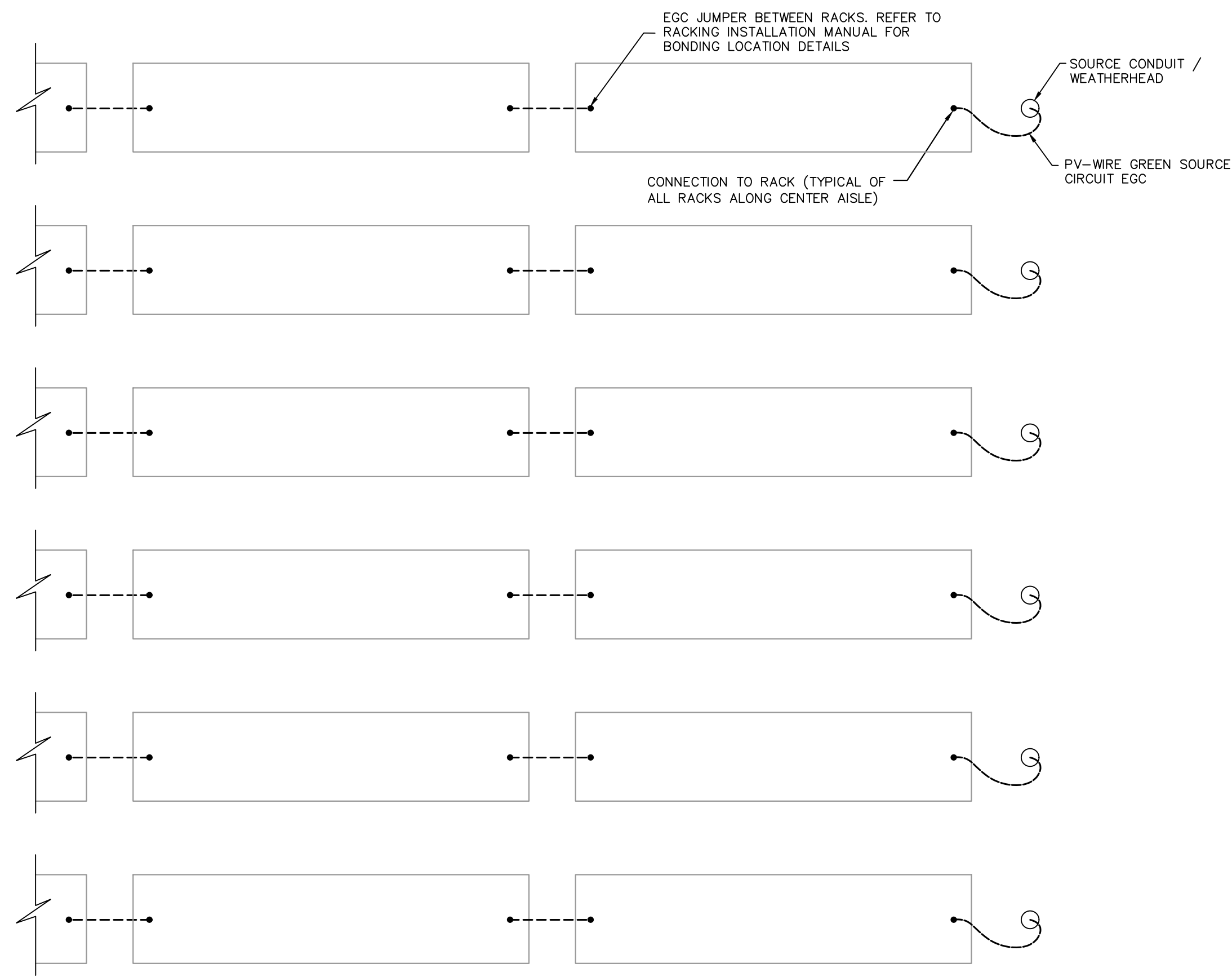
PA
NORTH CAROLINA PROFESSIONAL SEAL
044520
BRADLEY J. MARTIN
9/15/2023

NOT FOR CONSTRUCTION
© 03/2023

NO.	DATE	ENG.	REVISIONS
A	05/04/2023	EDR	ISSUED FOR REVIEW
B	08/04/2023	BJM	ISSUED FOR REVIEW 60% - SUBMITTAL
C	09/14/2023	BJM	ISSUED FOR BID - 60%

PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE: ELECTRICAL DETAILS

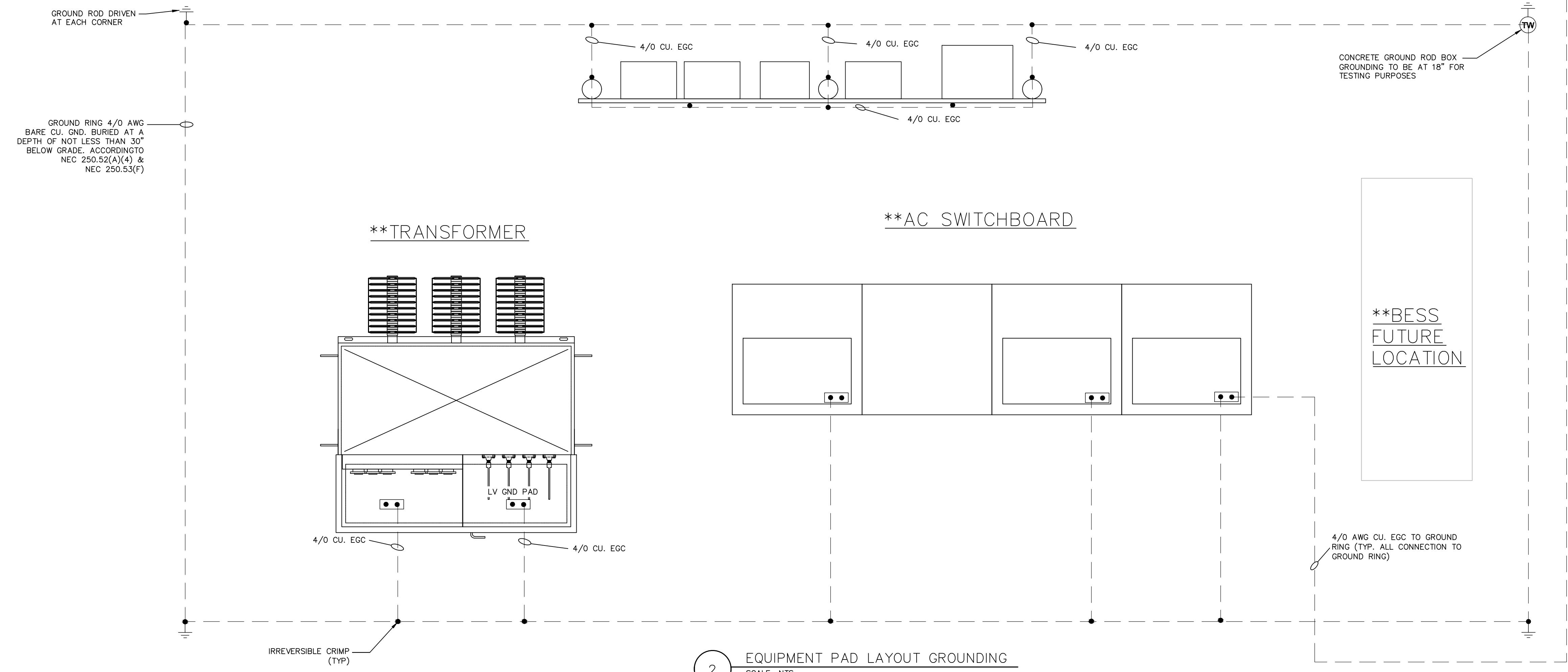
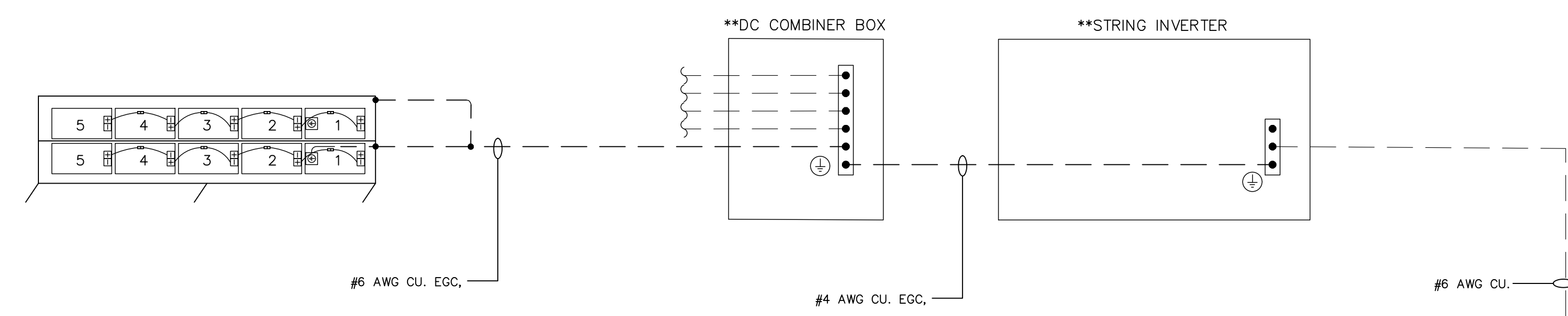
DRAWN BY: ALH
CHECKED BY: EDR
APPROVED BY: BJM
DATE: 03/29/2023
SCALE: NONE
FILE NUMBER: 12548
SHEET: EP-253



1 PV ARRAY FIELD GROUNDING DIAGRAM
SCALE: NTS

**HOLD FOR VENDOR DRAWINGS

- NOTES
- REFER TO MANUFACTURER OPERATING MANUAL FOR GROUNDING INSTRUCTIONS.
 - ARRANGEMENTS ARE GENERAL. REFER TO EP-300 FOR MORE PAD INFORMATION.



2 EQUIPMENT PAD LAYOUT GROUNDING
SCALE: NTS



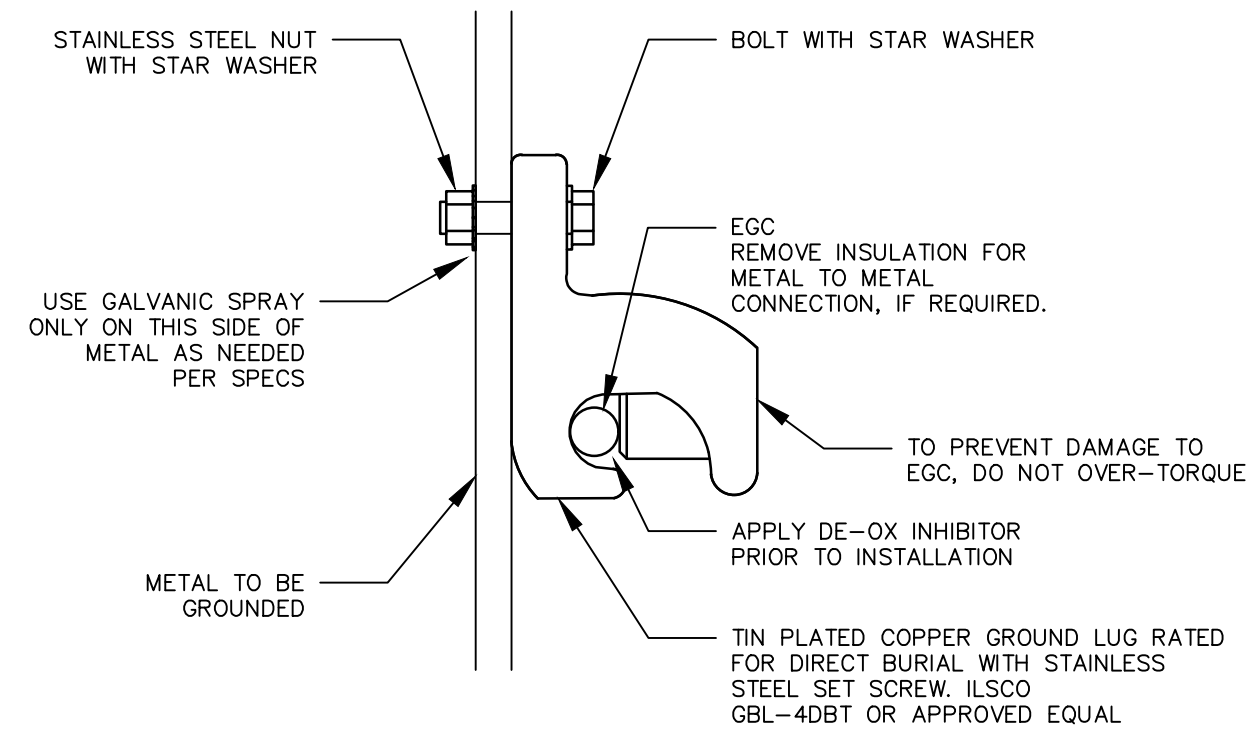
NOT FOR CONSTRUCTION
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NO.	REVISIONS	ENG.	DATE
A	ISSUED FOR REVIEW	EDR	05/04/2023
B	ISSUED FOR REVIEW 60% - SUBMITTAL	EDR	06/09/2023
C	ISSUED FOR REVIEW 60% - SUBMITTAL	BJM	08/04/2023
D	ISSUED FOR BID - 60%	BJM	09/14/2023

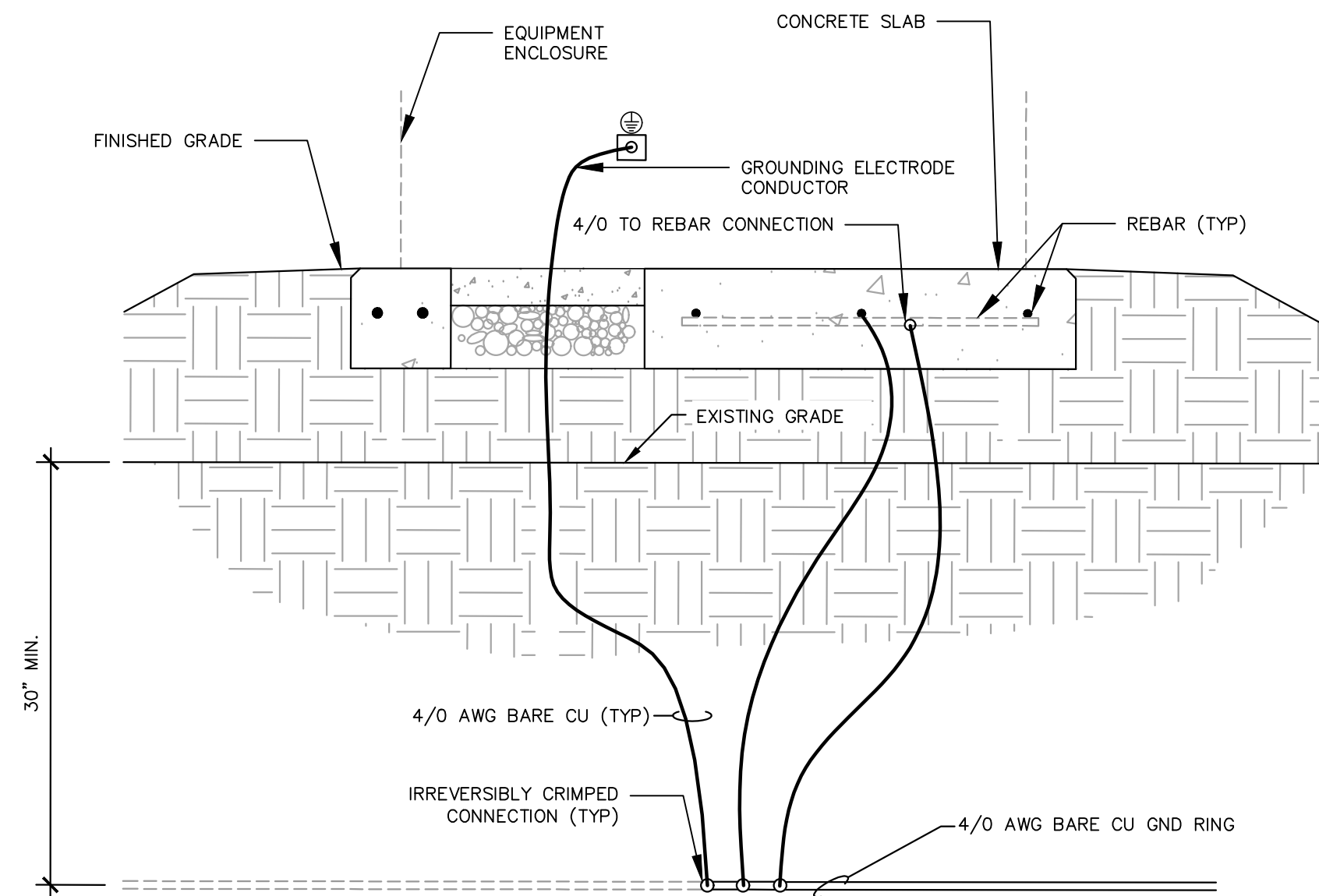
PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE: ELECTRICAL GROUNDING DIAGRAM

DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	03/29/2023
SCALE:	NONE
FILE NUMBER:	12548
SHEET:	

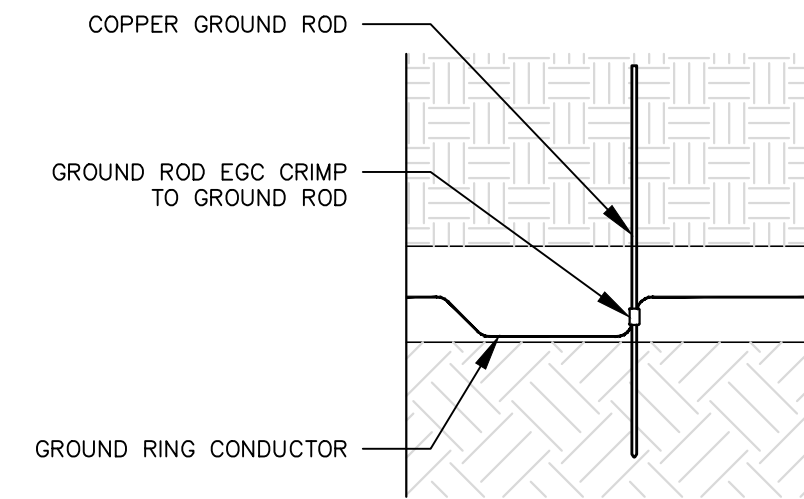
EP-260



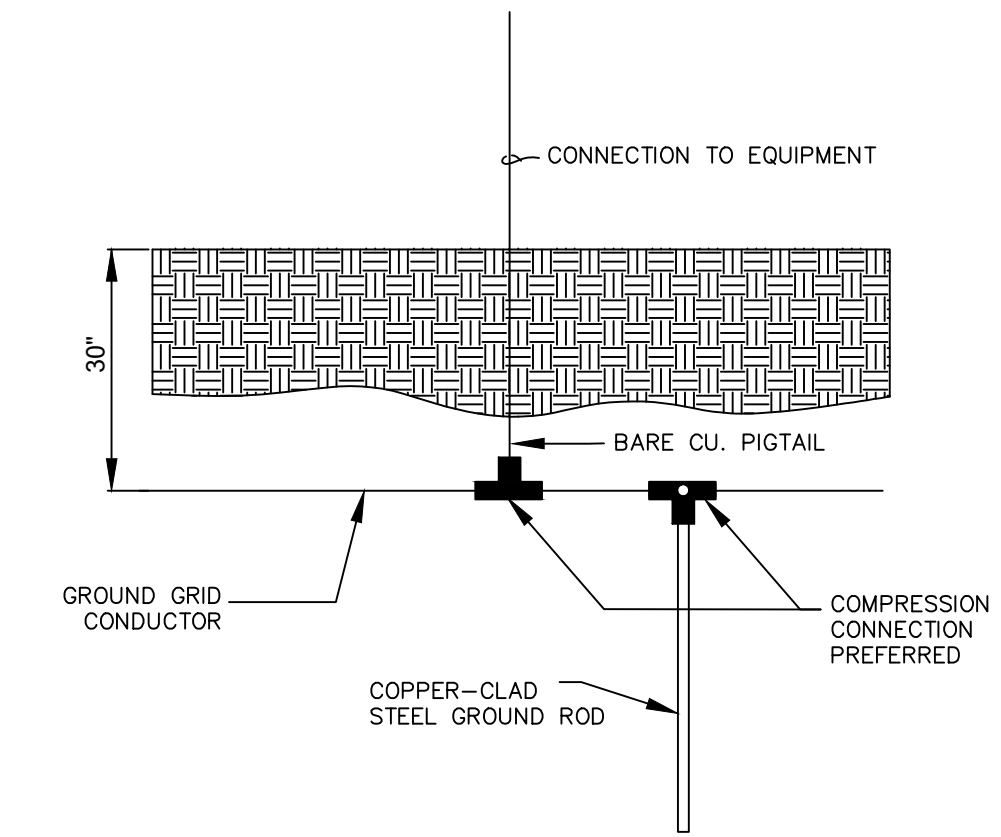
9 LAY-IN- LUG GROUNDING DETAIL
SCALE: 3/4" = 1'-0"



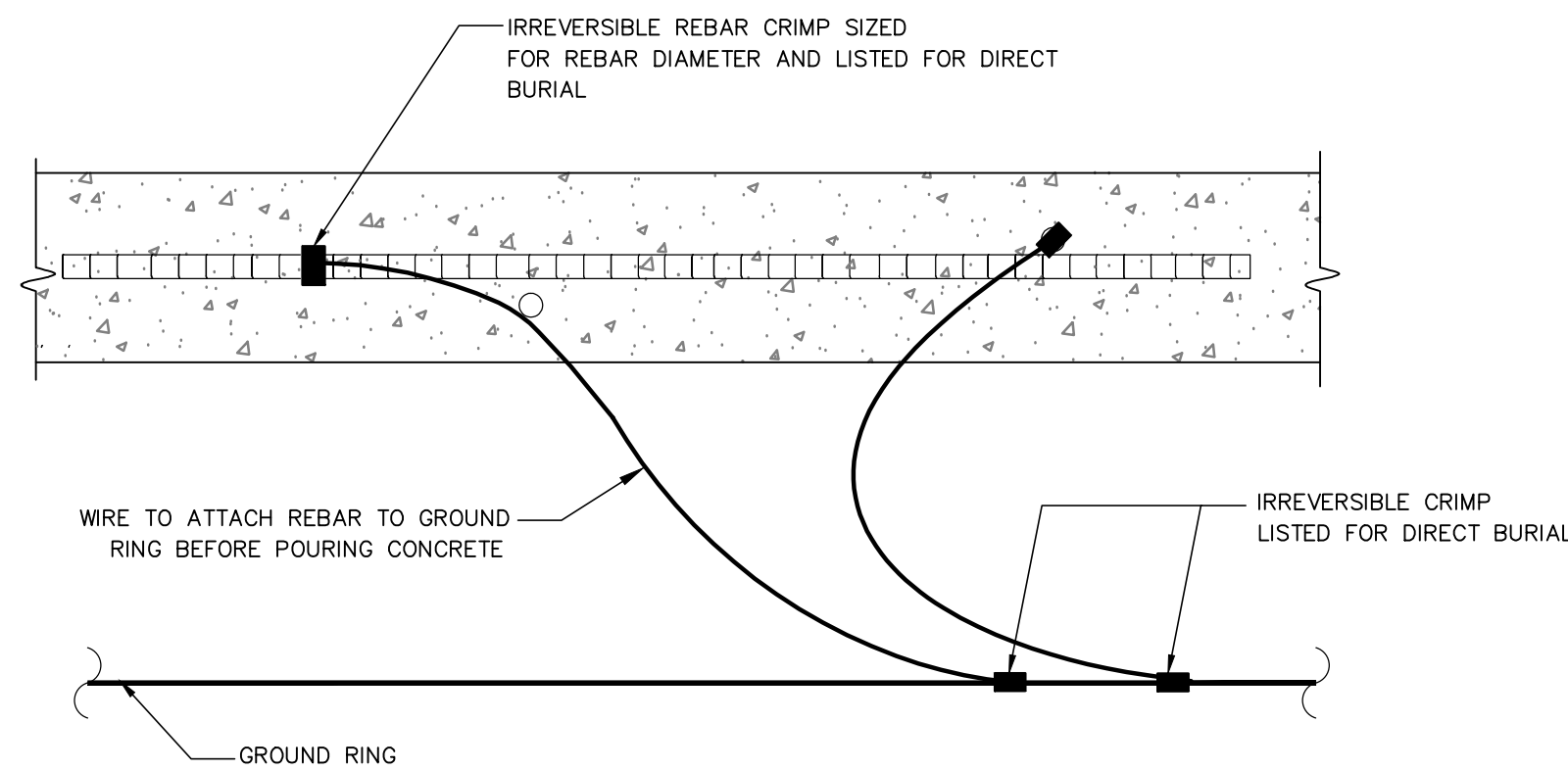
7 EQUIPMENT GROUNDING DETAIL
SCALE: 1" = 1'-0"



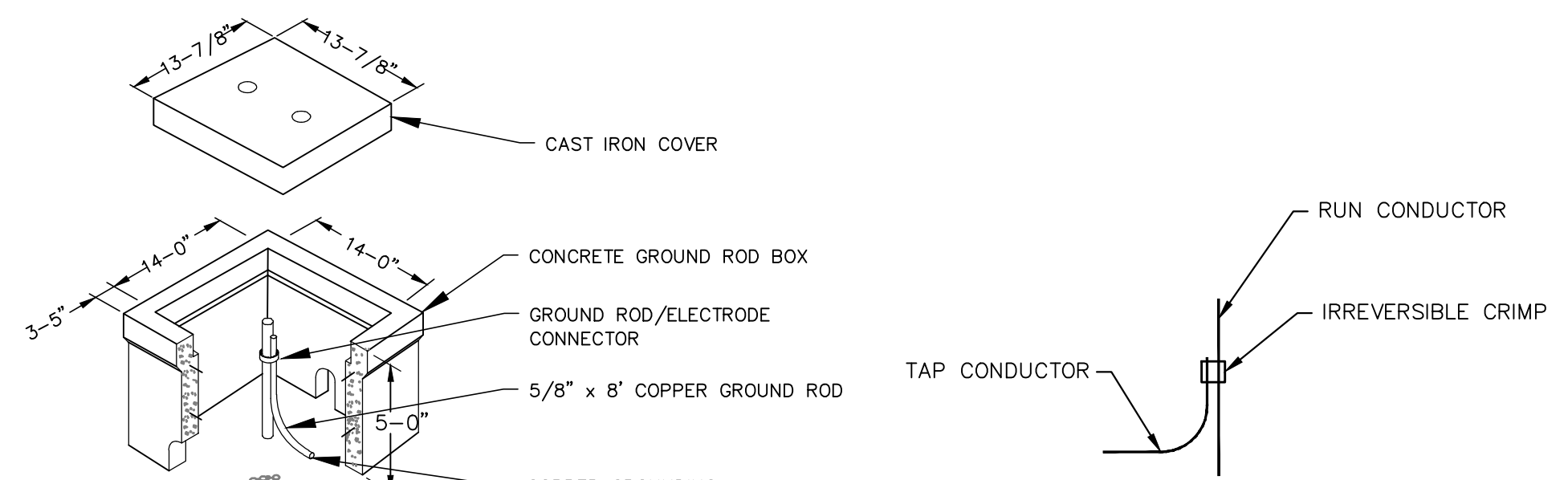
4 GROUND RING GROUND ROD DETAIL
SCALE: 1/2" = 1'-0"



3 GROUND ROD DETAIL
SCALE: 1/2" = 1'-0"

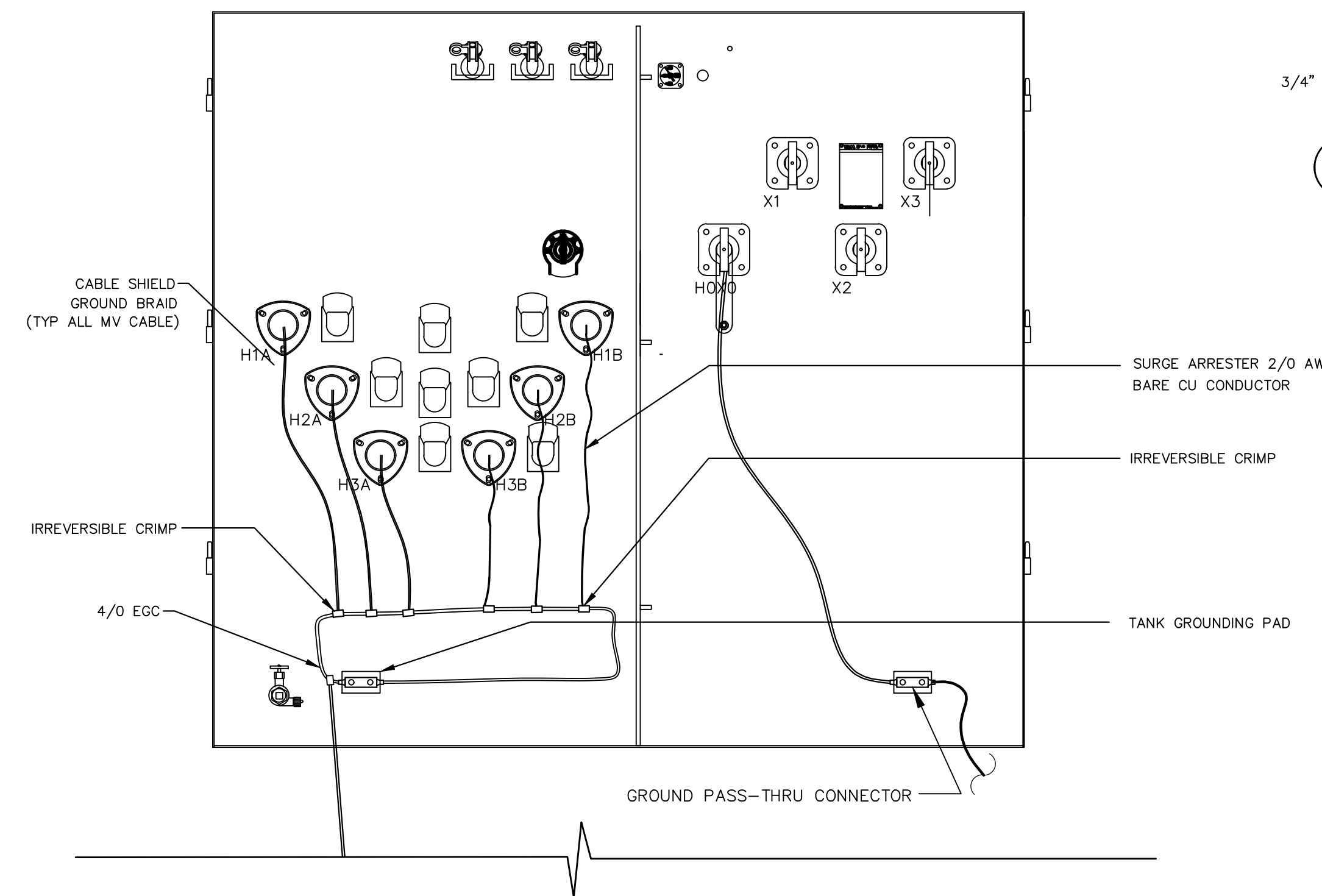


8 EQUIPMENT PAD GROUNDING
SCALE: NTS

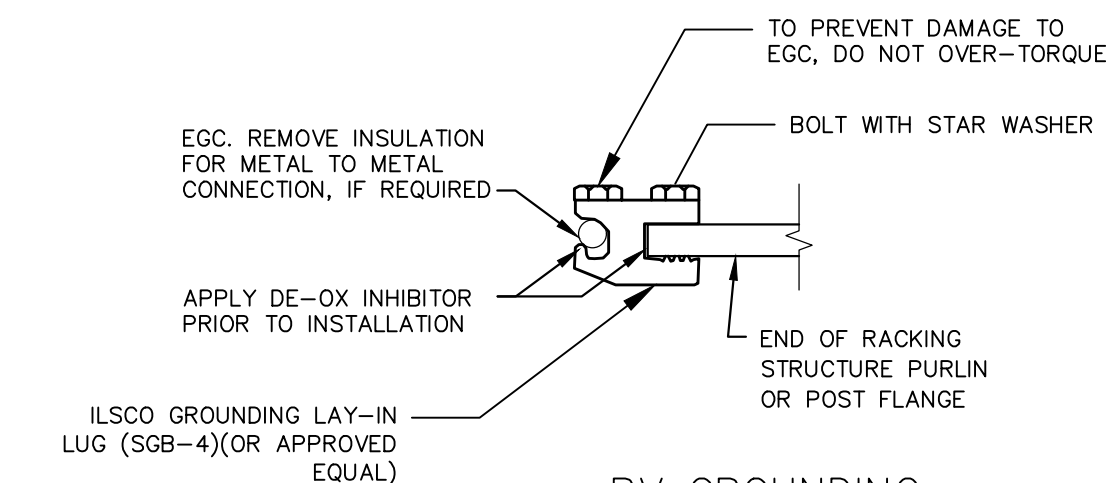


5 CONCRETE GROUND ROD BOX
SCALE: NTS

2 IRREVERSIBLE CRIMP GROUND ROD DETAIL
SCALE: NTS



6 ISU TRANSFORMER GROUNDING DETAIL
SCALE: 1" = 1'-0"



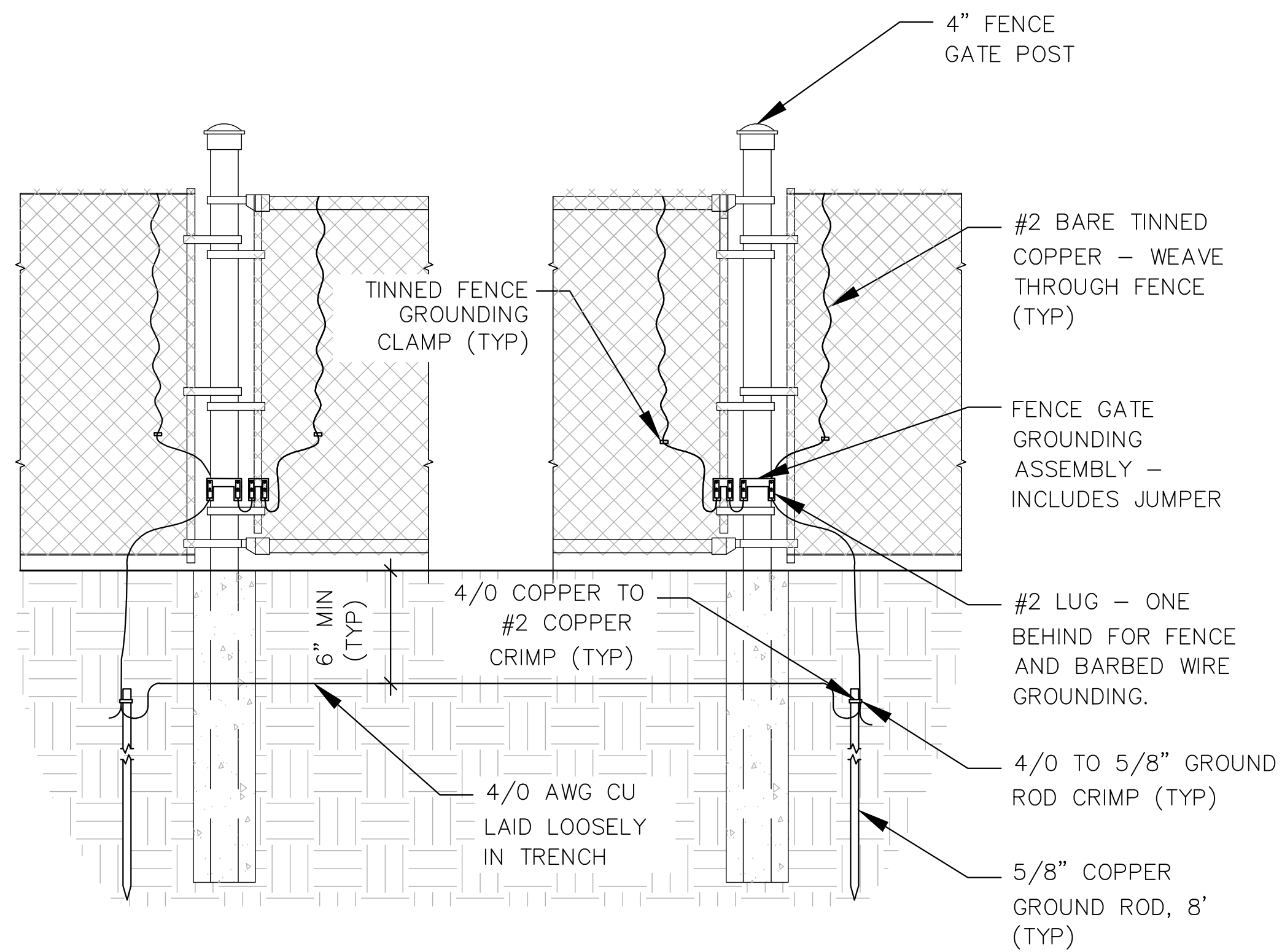
1 PV GROUNDING LAY-IN LUG DETAIL
SCALE: NTS

NOTES:
1. ALL IRREVERSIBLY CRIMPED CONDUCTORS SHALL FIRST BE BRUSHED CLEAN OF DIRT AND FOREIGN PARTICLES PRIOR TO CRIMPING.

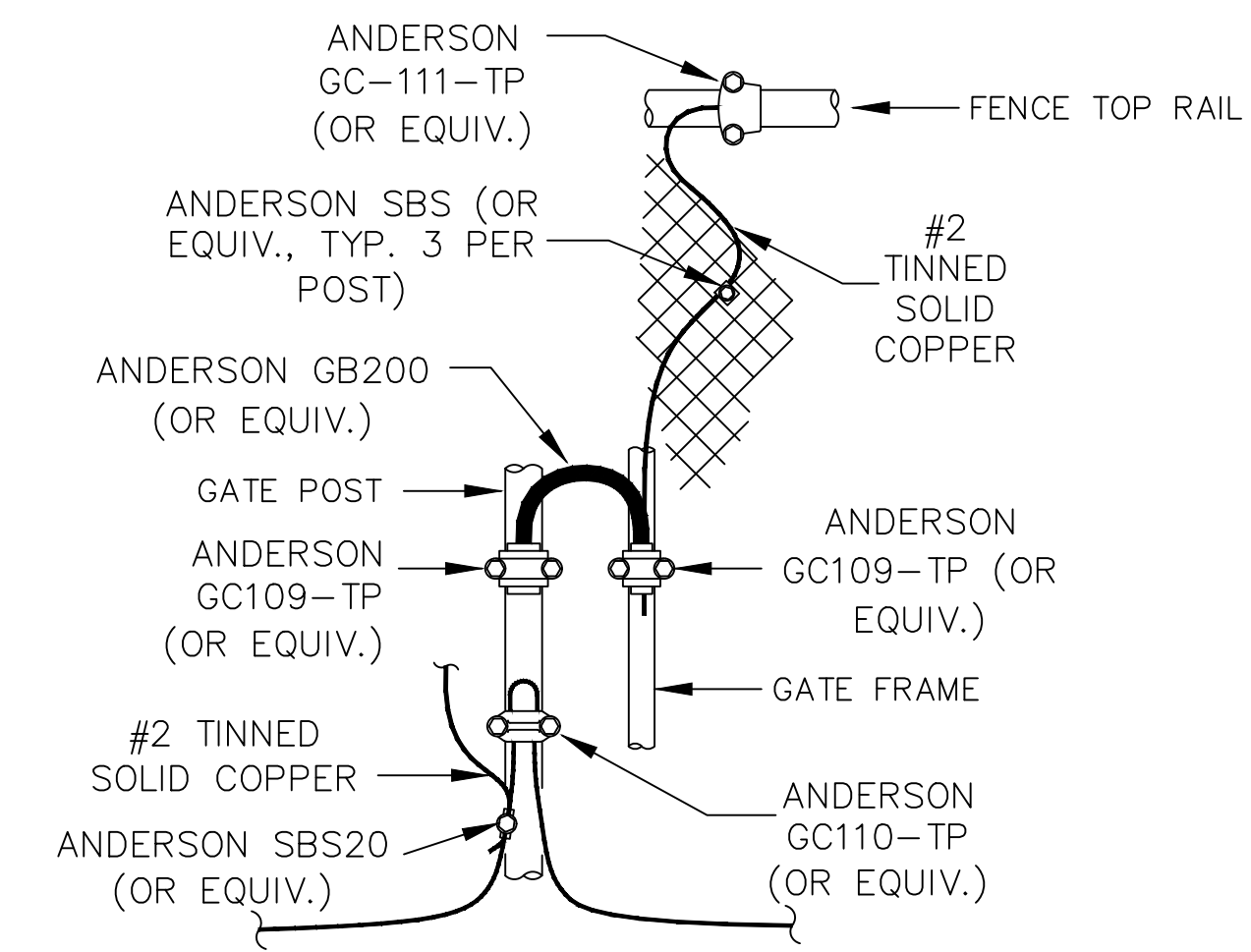
NO.	DATE	REVISIONS
A	05/04/2023	ISSUED FOR REVIEW
B	08/04/2023	ISSUED FOR REVIEW 60% - SUBMITTAL
C	09/14/2023	ISSUED FOR BID - 60%

PROJECT NAME: **GILLESPIE-B1.9 SOLAR UTILITY STATION**
DRAWING TITLE: **ELECTRICAL GROUNDING DETAILS**

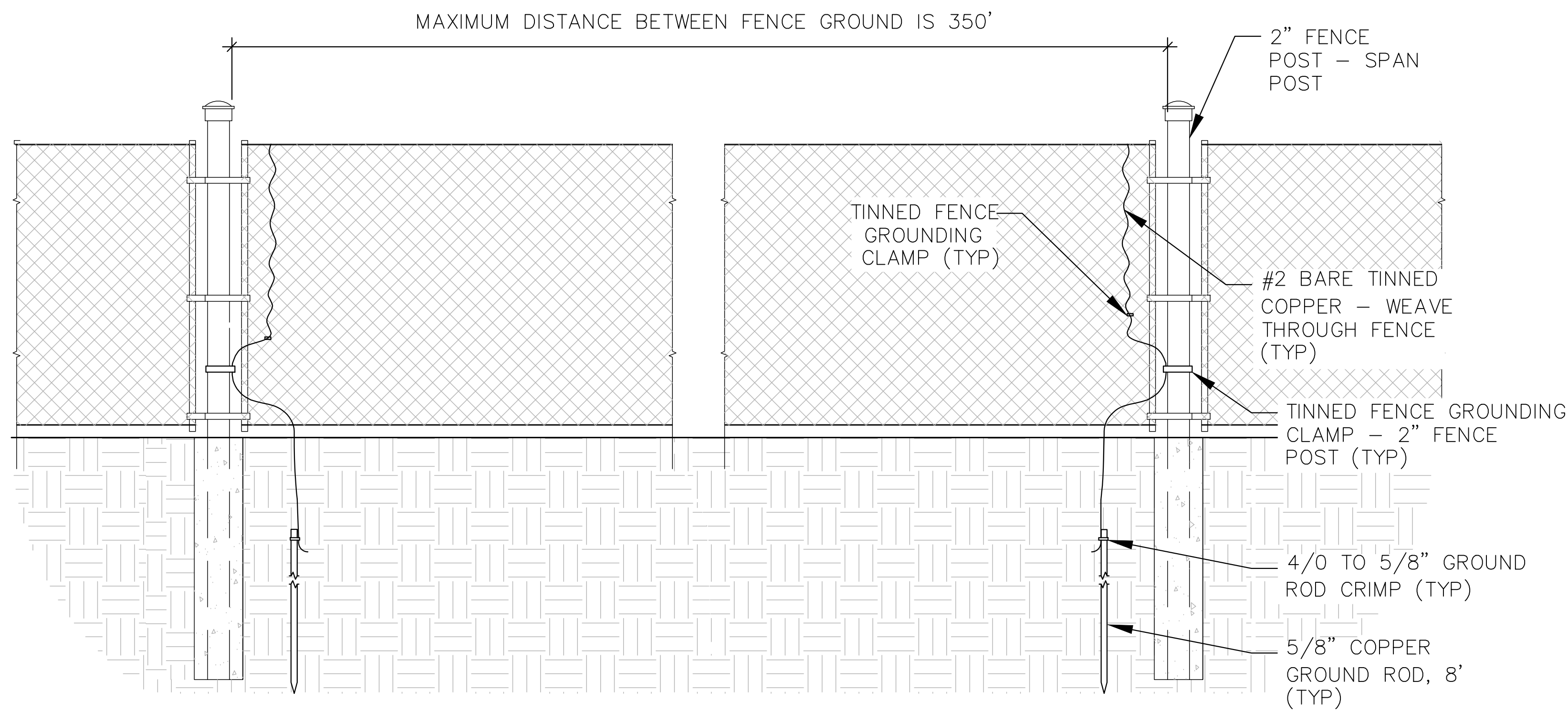
DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	03/29/2023
SCALE:	NONE
FILE NUMBER:	12548
SHEET:	



1 GROUNDING GATE SECTION DETAIL
NTS



2 TYPICAL FENCE FITTING DETAIL
NTS



3 GROUNDING FENCE SECTION DETAIL
NTS

GENERAL NOTES:

1. REFERENCE CIVIL SET FOR FENCE DESIGN AND FOUNDATIONS.

NO.	REVISIONS	DATE
A	ISSUED FOR REVIEW	05/04/2023
B	ISSUED FOR REVIEW 60% - SUBMITTAL	06/04/2023
C	ISSUED FOR BID - 60%	09/14/2023

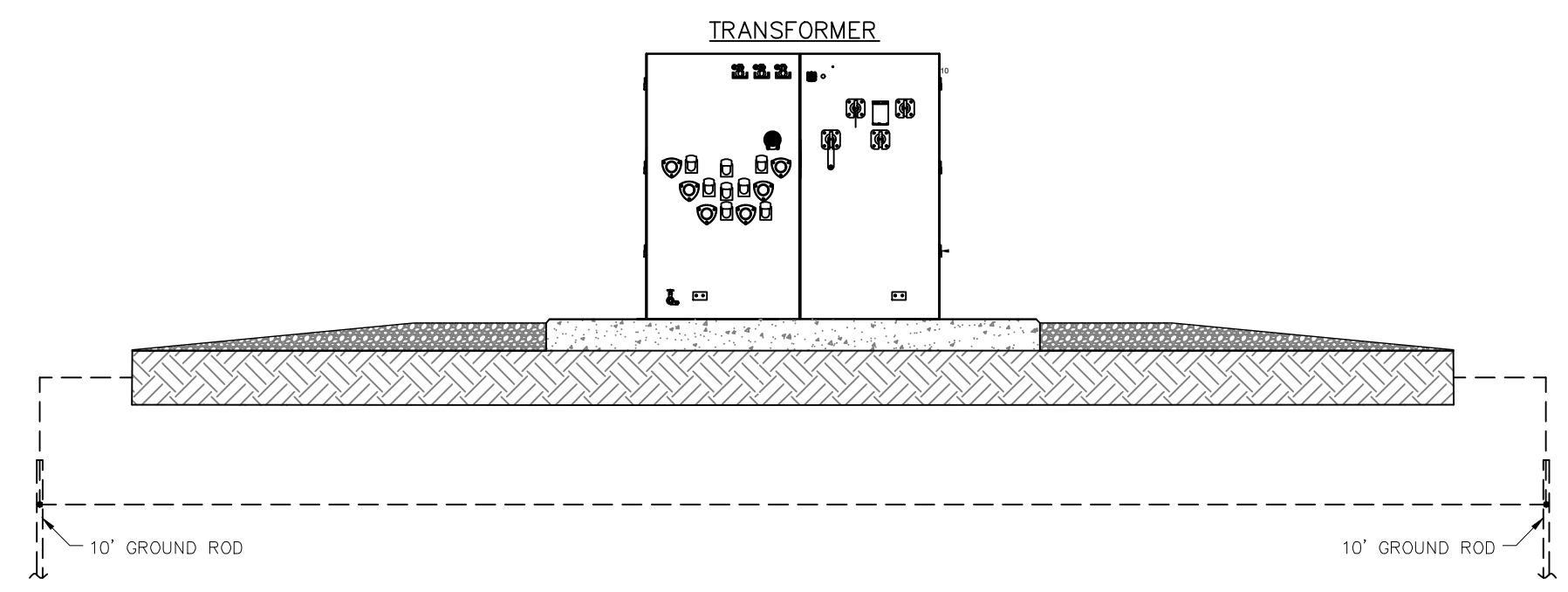
PROJECT NAME:	GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE:	PV FENCE GROUNDING DETAILS

DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	03/29/2023
SCALE:	NONE
FILE NUMBER:	12548
SHEET:	

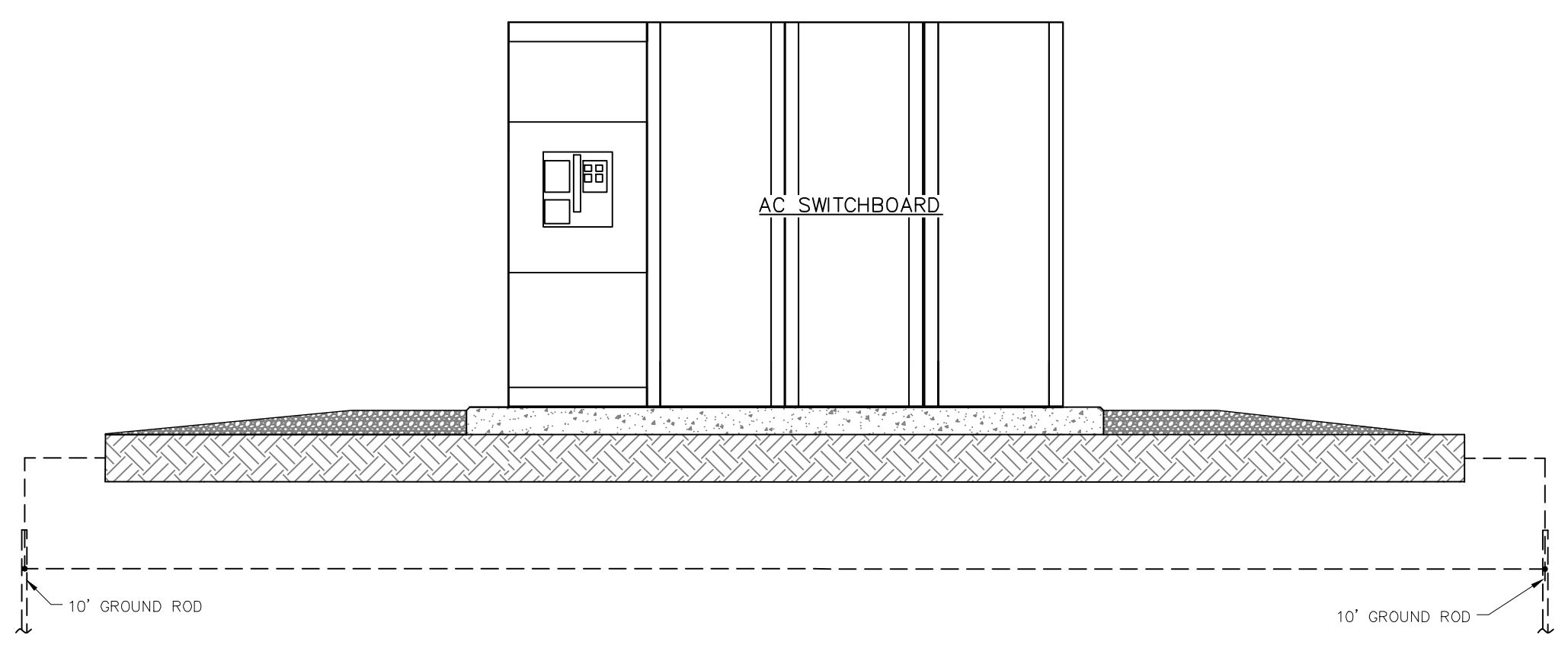
NO.	REVISIONS	DATE	ENG.	DATE
A	ISSUED FOR REVIEW	05/04/2023	EDR	05/04/2023
B	ISSUED FOR REVIEW	06/09/2023	EDR	06/09/2023
C	ISSUED FOR REVIEW 60% - SUBMITTAL	08/04/2023	BJM	08/04/2023
D	ISSUED FOR BID - 60%	09/14/2023	BJM	09/14/2023

PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE: EQUIPMENT PLANS & ELEVATIONS

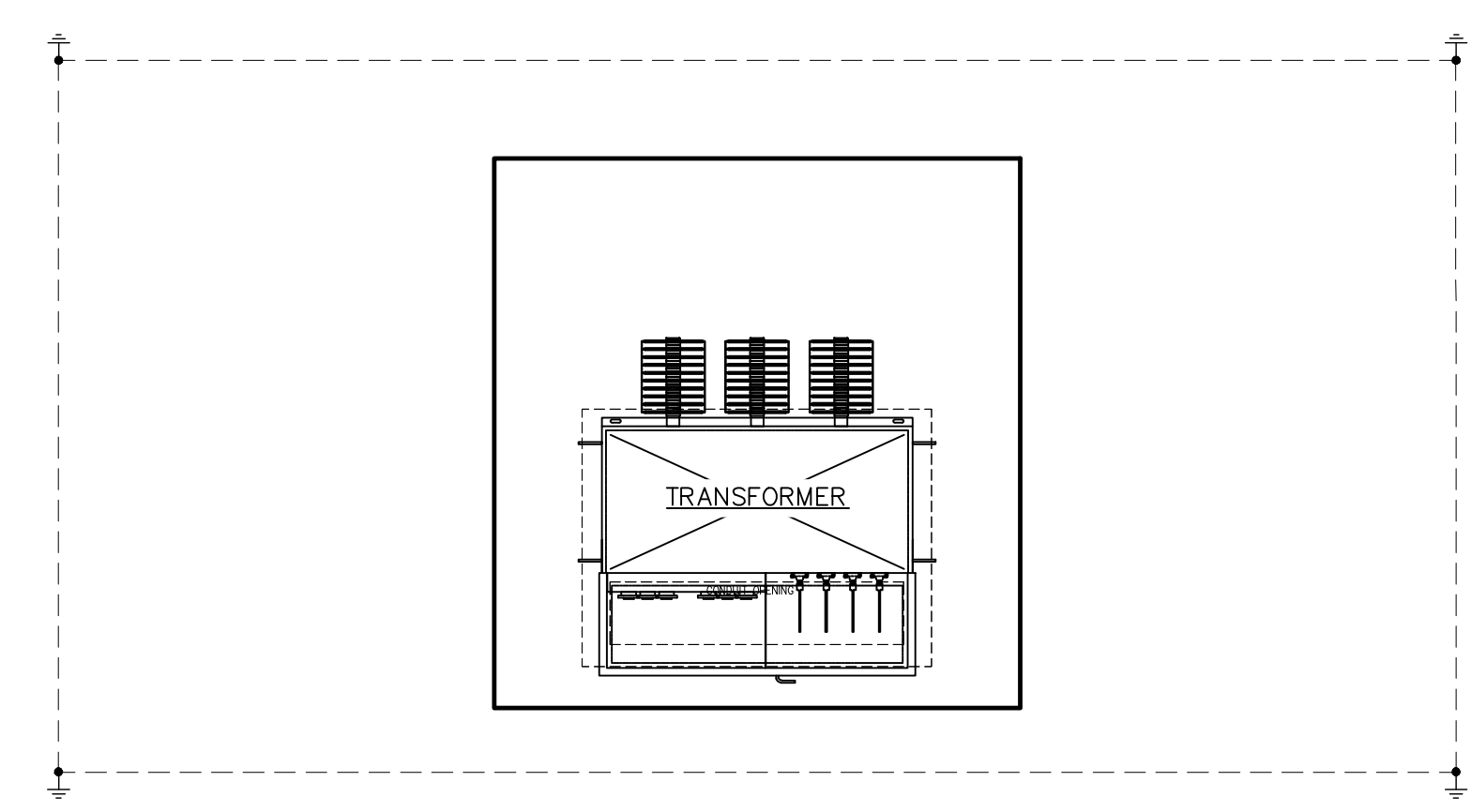
DRAWN BY: ALH
CHECKED BY: EDR
APPROVED BY: BJM
DATE: 03/29/2023
SCALE: NONE
FILE NUMBER: 12548
SHEET:



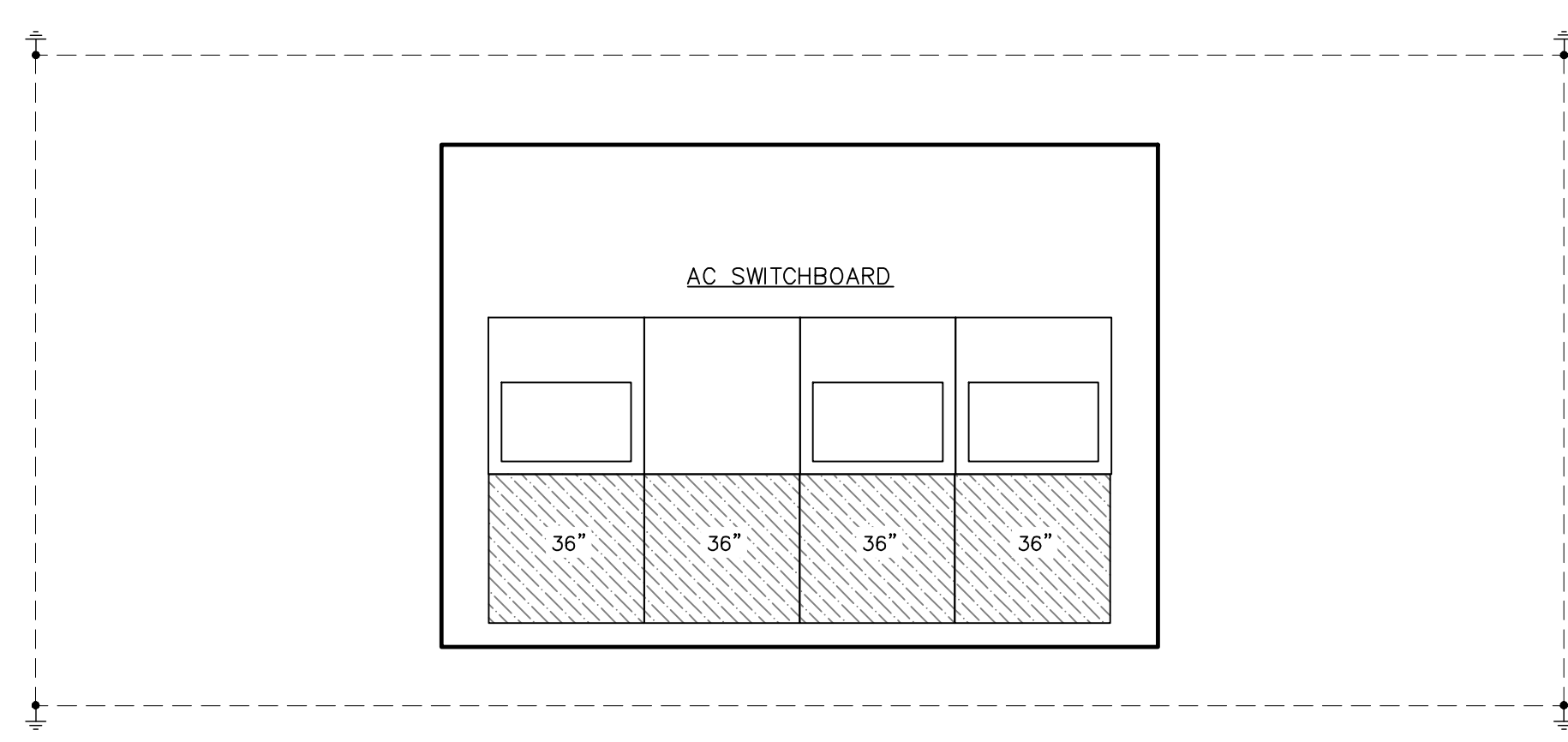
1A EQUIPMENT PAD 1 - ELEVATION VIEW
SCALE: NTS



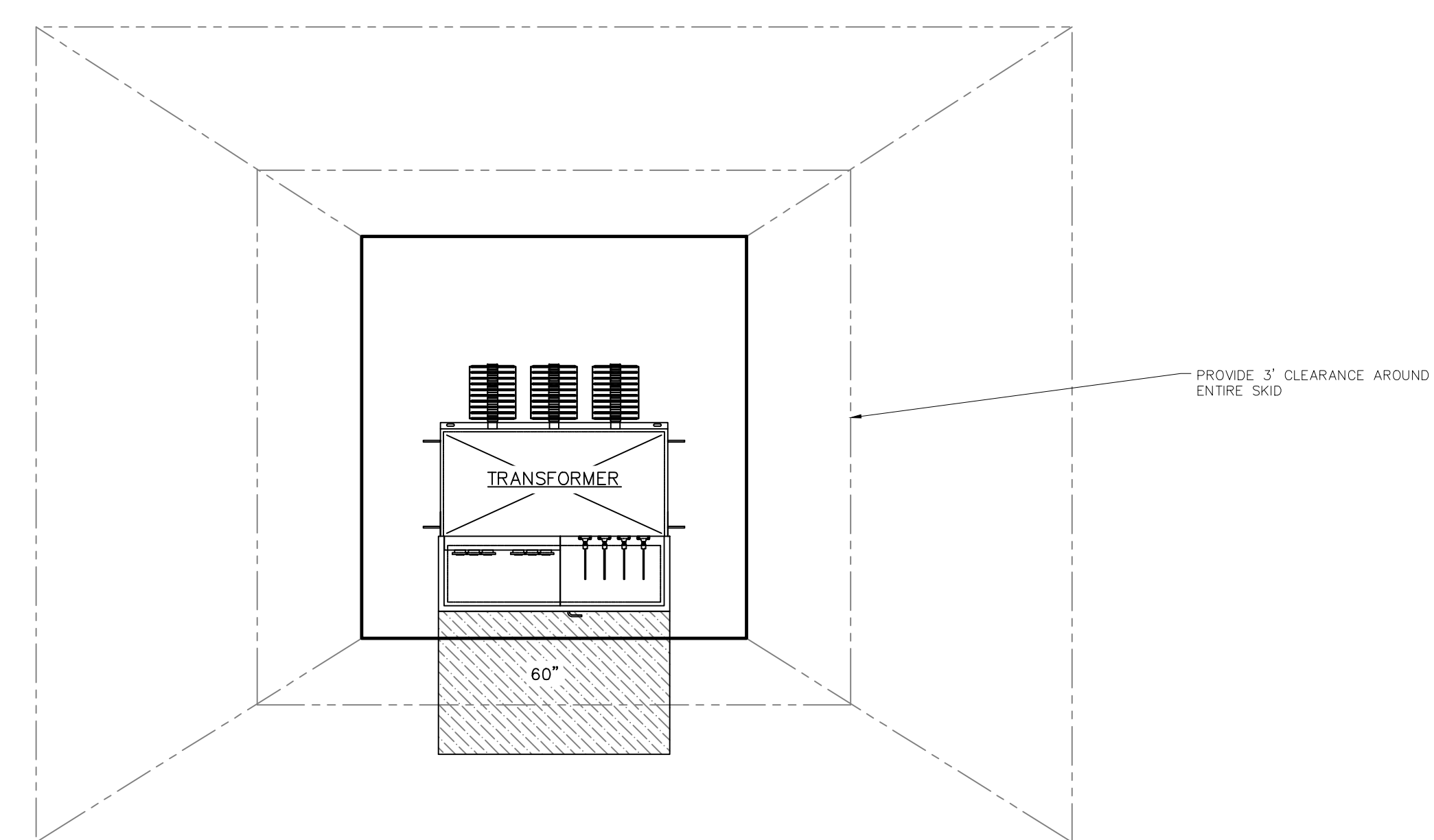
1B EQUIPMENT PAD 2 - ELEVATION VIEW
SCALE: NTS



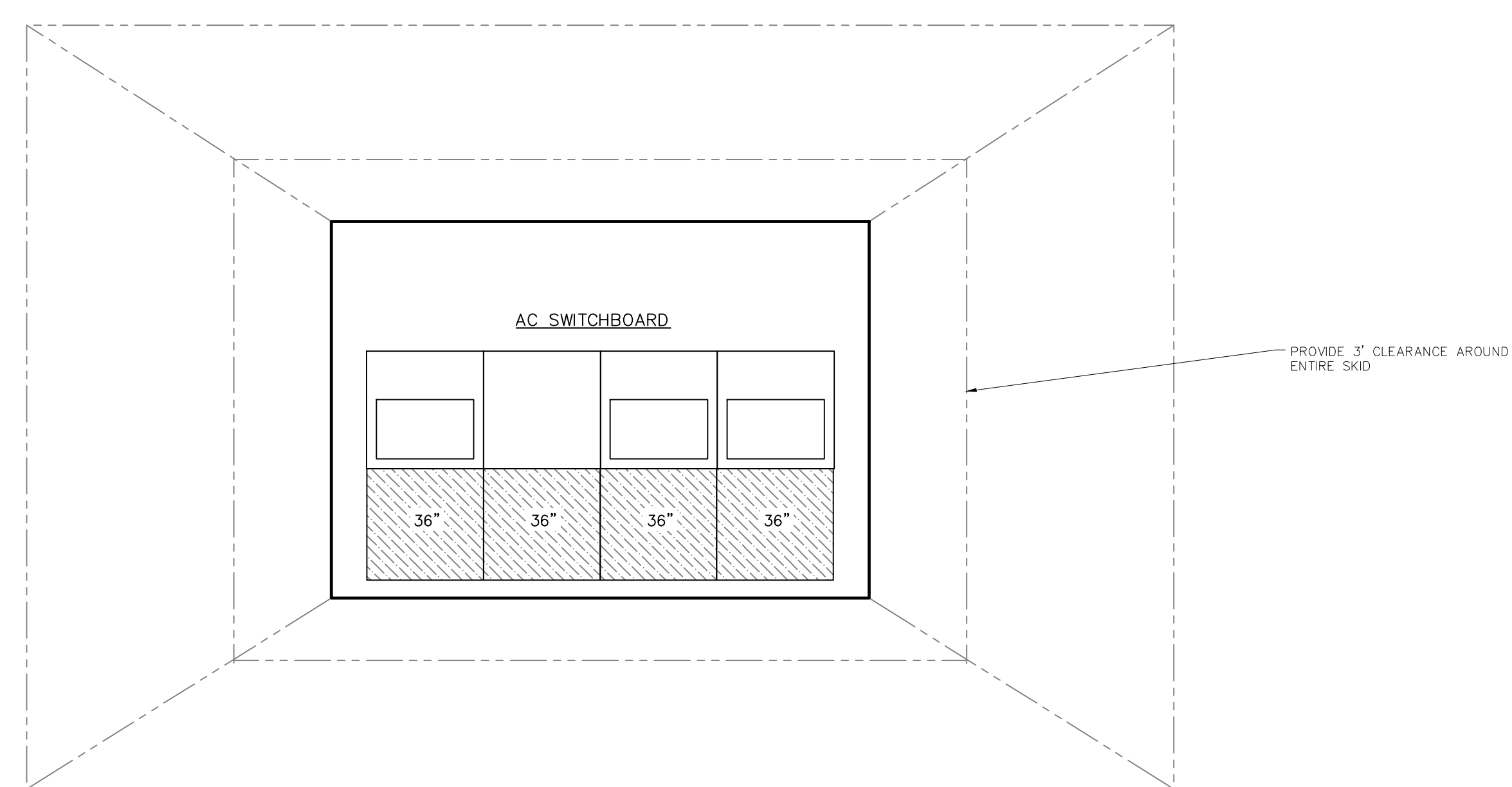
2A EQUIPMENT PAD 1 - PLAN VIEW WITH CONDUIT ROUTING
SCALE: NTS



2B EQUIPMENT PAD 2 - PLAN VIEW WITH CONDUIT ROUTING
SCALE: NTS



3A PAD 1 WORKING CLEARANCE PLAN
SCALE: NTS

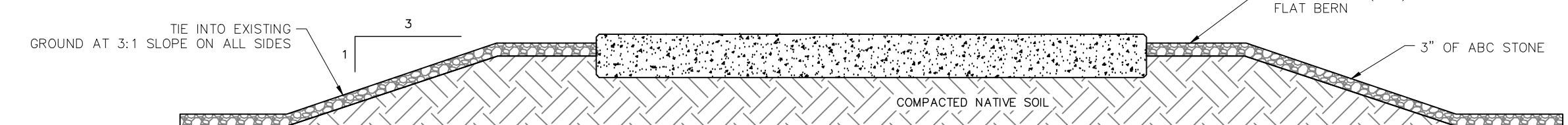
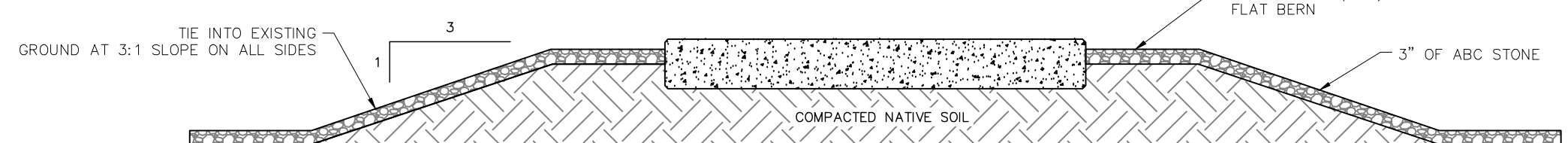


3B PAD 2 WORKING CLEARANCE PLAN
SCALE: NTS

**** HOLD UNTIL VENDOR DRAWINGS ARE PROVIDED**

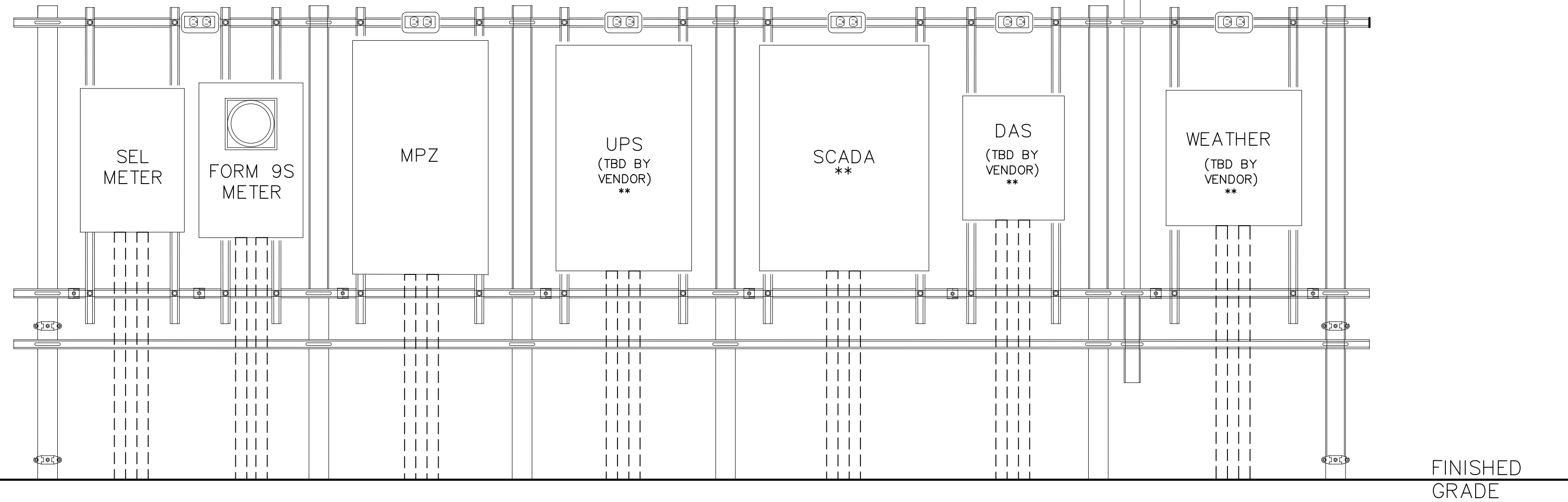
NOTES:

- SEE ARRAY WIRING PLAN(S) FOR EQUIPMENT PAD LOCATIONS ON SITE.
- REFER TO SHEET EP-260 FOR GROUNDING DETAILS AND REQUIREMENTS.
- ALL CONDUIT ROUTING IS DIAGRAMMATIC. FINAL CONDUIT ROUTING SHALL BE FIELD COORDINATED BY CONTRACTOR AND APPROVED BY OWNER.
- REFER TO VENDOR RECORD DRAWINGS FOR ALL EQUIPMENT WINDOWS TO PROPERLY PLACE CONDUIT LOCATIONS ENTERING EQUIPMENT.
- ALL CONDUIT SLEEVES SHALL BE FOAMED BEFORE CLOSE OF CONSTRUCTION USING DUCT SEAL. DUCT SEAL SHALL NOT EXCEED DEPTH OF 4" FROM THE CONDUIT OPENING.
- FILL ALL CONDUIT WINDOWS WITH GROUT AFTER CONDUIT AND EQUIPMENT IS INSTALLED (TYP).
- RMC MUST BE EITHER PAINTED OR VINYL TAPED WITH SUBMITTED AND APPROVED MATERIALS.



MET STATION
(TBD BY VENDOR)
**

** EQUIPMENT VIEW IS PRELIMINARY WAITING ON VENDER DRAWINGS

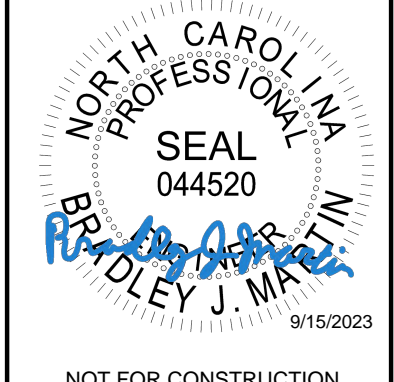


EQUIPMENT LAYOUT
N.T.S.

ENCLOSURE BILL OF MATERIALS			
ENCLOSURE	DESCRIPTION	DEVICE(S)	PART CONFIGURATION ID#
SCADA (NOTE 2)	OUTDOOR ENCLOSURE 120 VAC UPS RTAC SERIAL TO FIBER T SERIAL TO FIBER R SAT CLOCK ANTENNA BNC TEE CONNECTOR MANAGED ETHERNET SWITCH	SEL ENCLOSURE ACCESSORY SEL-3350 SEL-2812MT SEL-2812MR SEL-2488 SEL-9524B SEL 240-1801 SEL-2730M	TBD BY VENDOR TBD BY VENDOR SEL 3350#NOAP SEL-2812MT SEL-2812MR SEL 2488PPAX1281AX2XX SEL-9524B SEL 240-1801 SEL 2730M0APAX1112AAAAAXO
SEL METER (NOTE 2)	OUTDOOR ENCLOSURE METER TEST SWITCH FUSE BLOCK TERMINAL BLOCK	SEL METER ENCLOSURE SEL-735 ABB FT1 MARATHON RF30 MARATHON EB25	SEL 915900066 SEL 0735BX00944CFXA4XX16101CX ABB 774B430G20 RF30A3S EB25B12W
MEDIA CONVERTER (NOTES 2,4)	OUTDOOR ENCLOSURE SWITCH & MEDIA CONVERTER	SEL ENCLOSURE SEL-2725	TBD BY VENDOR SEL-2725#2KJK
RECLOSER	RECLOSER CONTROLLER	SEL ENCLOSURE/CONTROLLER	SEL 0651R22DXGAXAE1123B3XX
FORM 9S	SOCKET ENCLOSURE (METER SUPPLIED BY OTHERS)	NEMA 3R 9S SOCKET METER ENCLOSURE	EI-602U3010C13-1484
MPZ	MINI POWER ZONE 15KVA 480 TO 120/240V W/ BREAKER PANEL	EATON DRY-TYPE TRANSFORMER	P48G11B1530CUB
UPS (NOTE 3)	UNINTERRUPTIBLE POWER SUPPLY	TBD BY VENDOR	TBD BY VENDOR
DAS (NOTE 3)	DATA ACQUISITION SYSTEM	TBD BY VENDOR	TBD BY VENDOR
WEATHER (NOTE 3)	WEATHER/MET STATION	TBD BY VENDOR	TBD BY VENDOR

NOTES

1. SEE CONDUIT PLAN FOR CONDUIT SIZE AND QUANTITY
2. BIDDER TO SOURCE FULLY ASSEMBLED AND FURNISHED SCADA AND SEL METER ENCLOSURES FROM SEL NATIONAL ENCLOSURES, CONTACT: NEIL PETERKEN AT ATLANTIC POWER SALES.
3. BIDDER TO SOURCE DAS AND MET STATION ENCLOSURES FROM ALSO ENERGY, CONTACT: WHITNEY BURRESS AT ALSO ENERGY.
4. MEDIA CONVERTER BOX LOCATED AT INV-08 ONLY.

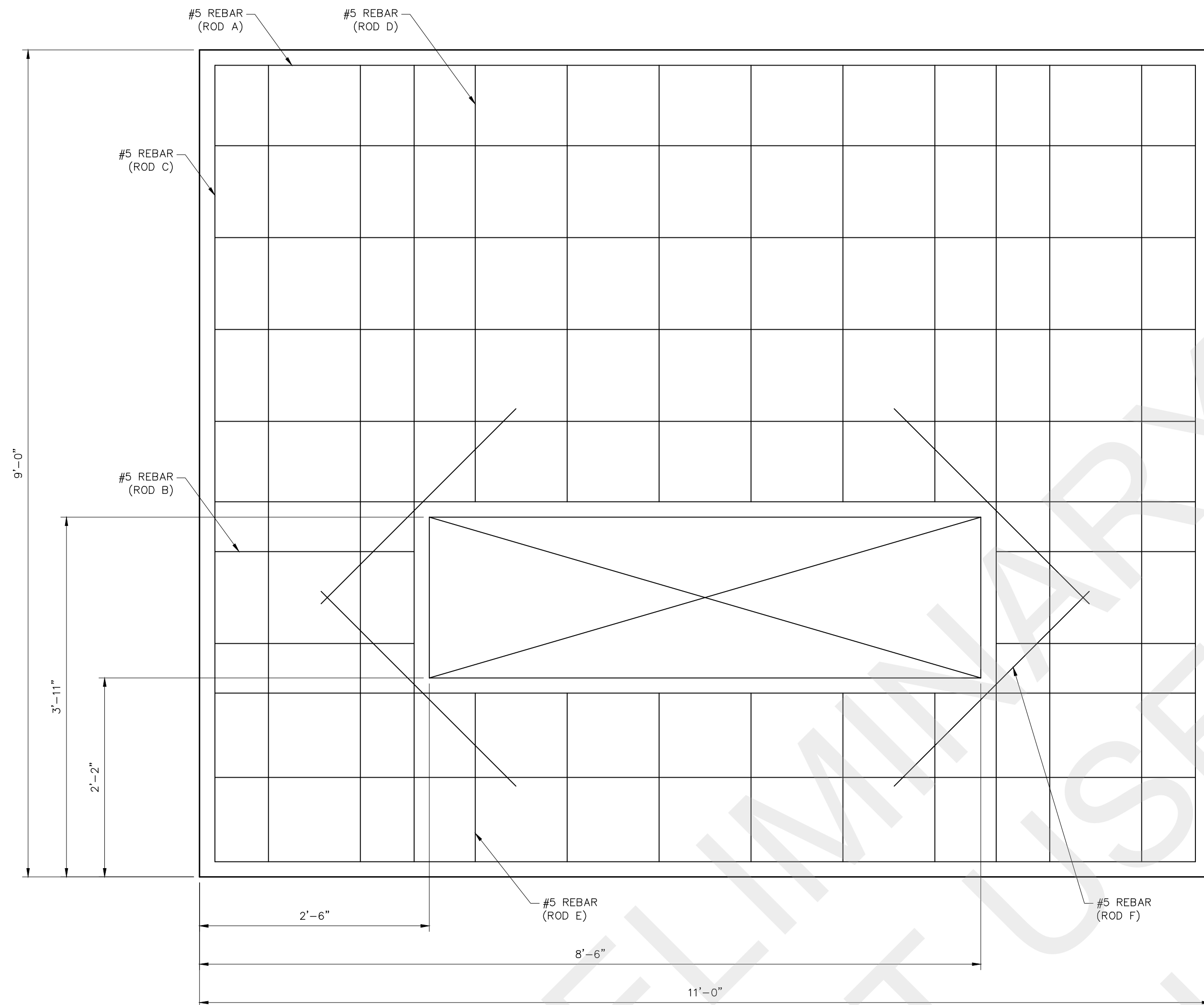


NOT FOR CONSTRUCTION
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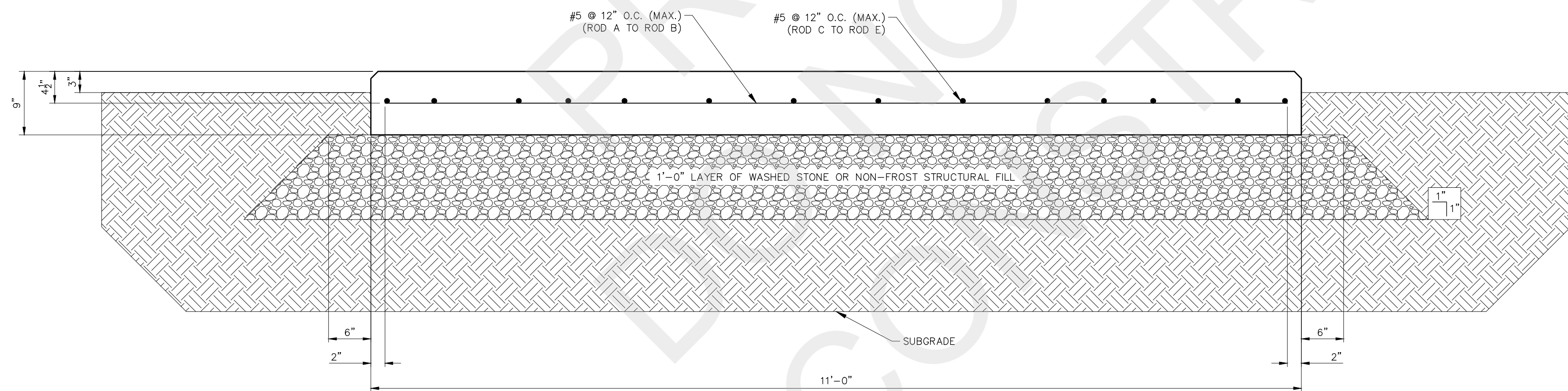
NO.	DESCRIPTION	DATE
1	ISSUED FOR REVIEW	07/10/2023
2	ISSUED FOR REVIEW 60% - SUBMITTAL	08/04/2023
3	ISSUED FOR BID - 60%	09/14/2023

PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE: CABINET ELEVATIONS & BOM

DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	06/30/2023
SCALE:	NONE
FILE NUMBER:	12548
SHEET:	



PLAN



SECTION

EQUIPMENT PAD 1

NOTE: ALL REINFORCEMENT SPACING AT 1'-0" MAX.
SCALE: 1"=1'-0"

SCHEDULE FOR TYPICAL PAD DETAIL						
PAD NO.	TOTAL REQ'D	PAD SIZE		ANCHOR BOLT PLAN	CU YDS CONCRETE	
		LENGTH x WIDTH	DEPTH		PER FDN	TOTAL
1	1	11'-0" x 9'-0"	0'-9"	-	2.75	2.75

REBAR SUMMARY						
PAD No. 1			TOTAL No. REQ'D. - 1			
ROD TYPE	SIZE OF REBAR	NO. REQ'D PER FDN	LENGTH		TOTAL REBAR	
			DIM A	DIM B		
A	#5	9	10'-8"	-	10'-8"	
B	#5	4	2'-2"	-	2'-2"	
C	#5	8	8'-8"	-	8'-8"	
D	#5	6	4'-9"	-	4'-9"	
E	#5	6	1'-10"	-	1'-10"	
F	#5	4	3'-0"	-	3'-0"	

-FOUNDATIONS HAVE BEEN DESIGNED TO REST ON UNDISTURBED SOIL WITH A MINIMUM ALLOWABLE BEARING CAPACITY OF 2,000 PSF. IF UNDESIRABLE SOIL CONDITIONS ARE ENCOUNTERED THE ENGINEER OF RECORD SHALL BE NOTIFIED.
-ALL EQUIPMENT SHALL BE MOUNTED AS RECOMMENDED BY THE MANUFACTURER.

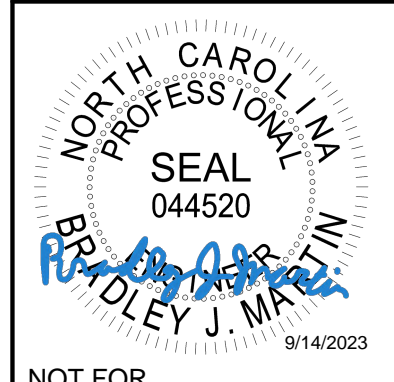
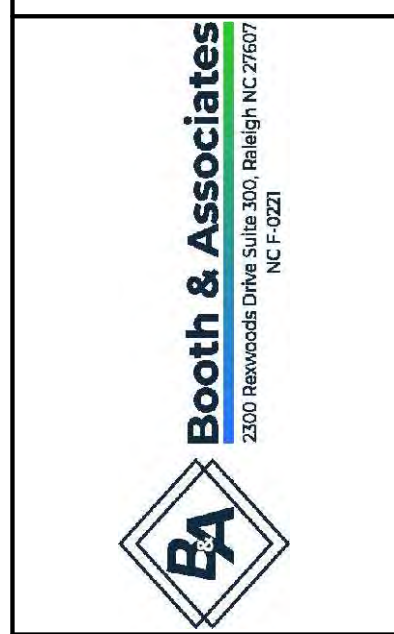
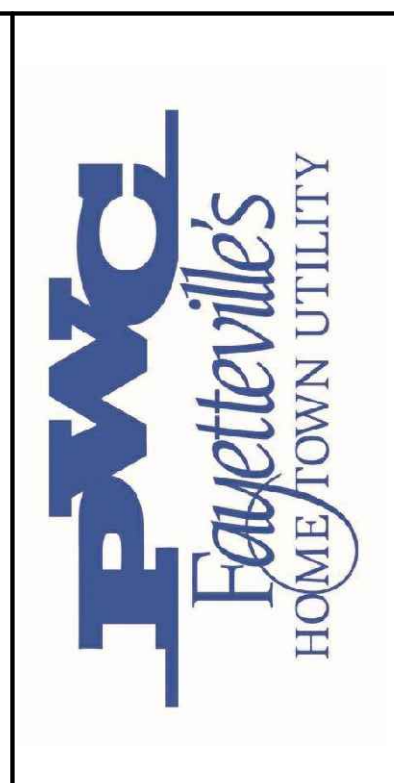
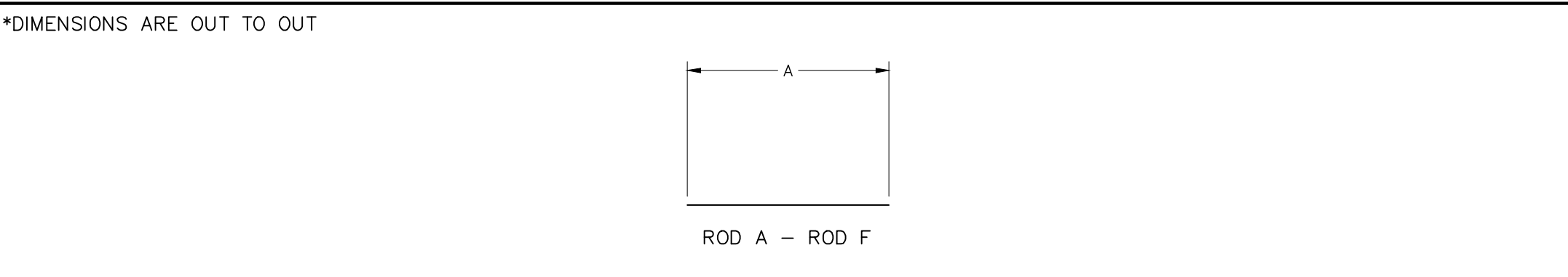
NOTES

1. THE FOUNDATION CONTRACTOR SHALL AT ALL TIMES FULLY COMPLY WITH ALL OSHA STANDARDS AS WELL AS THE OWNER'S SAFETY STANDARDS, AS A MINIMUM, ESPECIALLY WITH REGARD TO SHORING OF ALL EXCAVATIONS. THE ENGINEER OR OWNER WILL IMMEDIATELY HALT CONSTRUCTION ACTIVITIES IF THE CONTRACTOR DOES NOT COMPLY WITH THESE STANDARDS. FAILURE TO COMPLY AT ALL TIMES WITH THESE STANDARDS WILL RESULT IN DISMISSAL FROM THE PROJECT.
2. THE FOUNDATION CONTRACTOR IS RESPONSIBLE FOR OBTAINING COPIES OF OSHA STANDARDS AS WELL AS THE OWNER'S SAFETY STANDARDS. COPIES SHALL BE AVAILABLE ON SITE AT ALL TIMES DURING CONSTRUCTION.
3. ALL FOUNDATIONS TO BE CARRIED TO FIRM UNDISTURBED EARTH OR COMPACTED FILL.
4. WASHED STONE AND STRUCTURAL FILL SHALL BE COMPACTED AS SPECIFIED IN THE FOUNDATION SPECIFICATIONS.
5. REINFORCING STEEL SHALL BE GRADE 60 ASTM A-615 OR A-617.
6. FOR QUANTITY, LENGTH & SHAPE OF RODS SEE REBAR SUMMARY AND ROD BENDING LEGEND.
7. CONCRETE SHALL BE 4500 P.S.I. @ 28 DAYS. CONCRETE SHALL BE AIR ENTRAINED WITH AN AIR CONTENT BETWEEN FIVE AND SEVEN PERCENT (5%-7%).
8. CONCRETE SLUMP SHALL BE 4" ± 1". THE CONTRACTOR SHALL MAKE OR HAVE MADE A MINIMUM OF ONE (1) SLUMP TEST IN ACCORDANCE WITH ASTM C 143 FOR EACH TRUCKLOAD OF CONCRETE DELIVERED.
9. CONCRETE COVER OVER REINFORCING STEEL SHALL BE THREE INCHES (3") MINIMUM UNLESS OTHERWISE NOTED.
10. ALL CONCRETE TO BE THOROUGHLY VIBRATED DURING PLACEMENT INTO FORMS TO ENSURE ALL VOIDS ARE FILLED.
11. ALL FOUNDATIONS SHALL BE CHAMFERED ONE INCH (1") AROUND ALL TOP EDGES. UNLESS OTHERWISE SHOWN.
12. CONTRACTOR IS RESPONSIBLE TO COORDINATE INSTALLATION OF ANY CONDUITS LOCATED UNDERNEATH OR PROTRUDING THROUGH FOUNDATIONS. SEE CONDUIT PLAN AND DETAILS FOR CONDUIT LOCATIONS.
13. ALL CONDUITS, WHEN REQUIRED, ARE TO BE PLUGGED OR CAPPED DURING INITIAL CONSTRUCTION TO PREVENT CONTAMINATION.
14. A CONCRETE BONDING AGENT CONFORMING TO ASTM C1059 SHALL BE APPLIED TO ALL ROUGHENED SURFACES PRIOR TO PLACING FRESH CONCRETE.
15. THE CONTRACTOR SHALL PREPARE, OR HAVE PREPARED, IN ACCORDANCE WITH ASTM C-31, THREE (3) TEST CYLINDERS FOR EACH CONCRETE PAD. WITHIN 20-24 HOURS AFTER BEING PREPARED, THE CYLINDERS SHALL BE DELIVERED TO A QUALIFIED TESTING LABORATORY AND TESTED IN ACCORDANCE WITH THE CONCRETE SPECIFICATIONS AND ASTM C-39. TEST RESULTS ARE TO BE PROVIDED TO THE ENGINEER FOR EVALUATION AND DIRECTION OF CORRECTIVE ACTION IF NEEDED.
16. THE CONTRACTOR SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE CONCRETE SPECIFICATIONS.

FOUNDATION ANCHOR BOLT SUMMARY

FDN. DESIGNATION	SERVICE	No. OF REQ'D. STRUCT.'s	No. OF FDN. REQ'D. PER STRUCT.	ITEM No.	QTY./ FDN.	TOTAL QTY. REQ'D.	DIA.	ANCHOR BOLTS				WASHER QTY.-DESC.	NUT QTY.-DESC.	NOTES
								LENGTH						
								EMBED	THREAD MIN.	PROJECTION ABOVE PAD	HOOK			

ROD BENDING LEGEND (NOT TO SCALE)



NOT FOR CONSTRUCTION

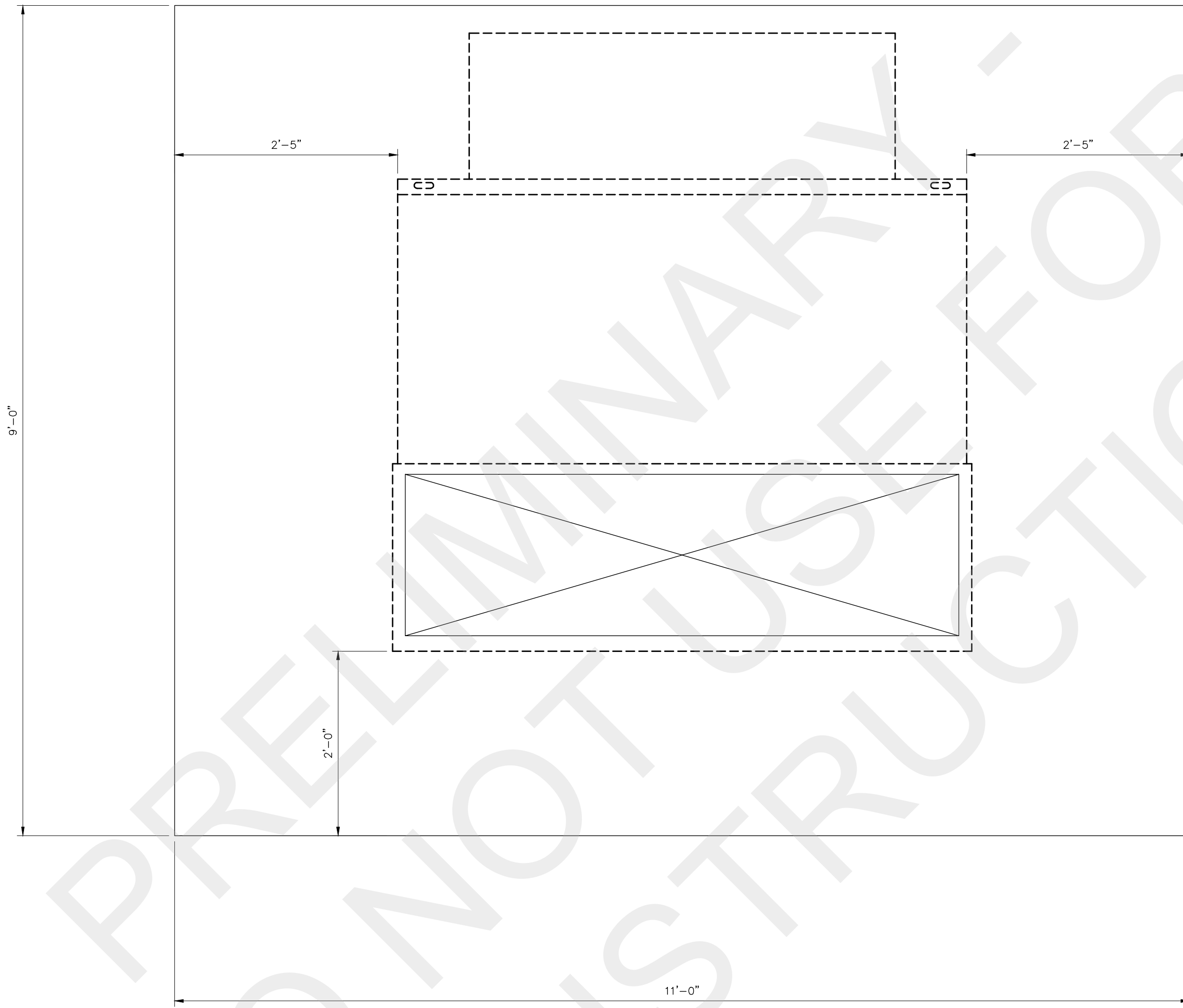
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NO.	DATE	ENG.	CHK.	BY	REVISIONS
A	07/21/2023	VK	BJM		ISSUED FOR BIDS
B	09/14/2023				ISSUED FOR BIDS

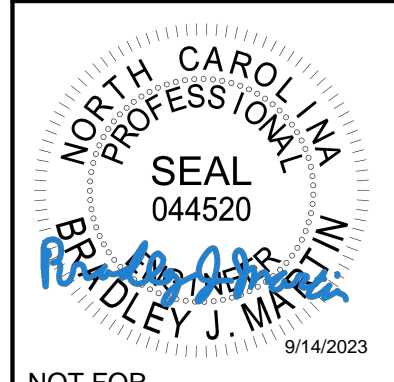
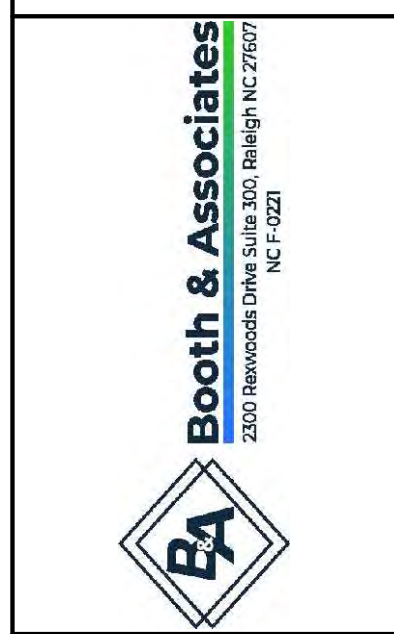
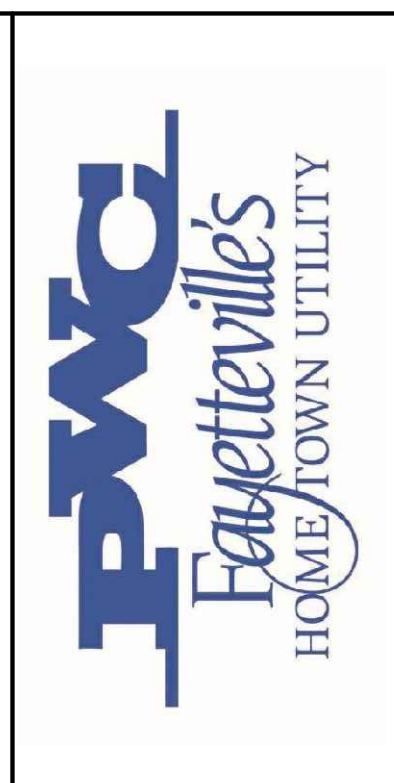
PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE: EQUIPMENT PAD 1 FOUNDATION DETAILS

DRAWN BY:	DJD
CHECKED BY:	VK
APPROVED BY:	BJM
DATE:	07/21/2023
SCALE:	1"=1'-0"
FILE NUMBER:	12548
SHEET:	

EP-302



EQUIPMENT OVERLAY - PAD 1
SCALE: 1"=1'-0"



NOT FOR CONSTRUCTION
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NO.	REVISIONS	ENG.	DATE
A	ISSUED FOR BIDS	VK	07/21/2023
B	ISSUED FOR BIDS	BJM	09/14/2023

PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE: EQUIPMENT PAD 1 FOUNDATION DETAILS

DRAWN BY:	DJD
CHECKED BY:	VK
APPROVED BY:	BJM
DATE:	07/21/2023
SCALE:	1"=1'-0"
FILE NUMBER:	12548
SHEET:	EP-302A

NO.	DATE	ENG.	REVISIONS
A	07/21/2023	VK	ISSUED FOR BIDS
B	09/14/2023	BJM	ISSUED FOR BIDS

PROJECT NAME: **GILLESPIE-B1.9 SOLAR UTILITY STATION**
DRAWING TITLE: **EQUIPMENT PAD 2 FOUNDATION DETAILS**

DRAWN BY: DJD
CHECKED BY: VK
APPROVED BY: BJM
DATE: 07/21/2023
SCALE: 1"=1'-0"
FILE NUMBER: 12548
SHEET:

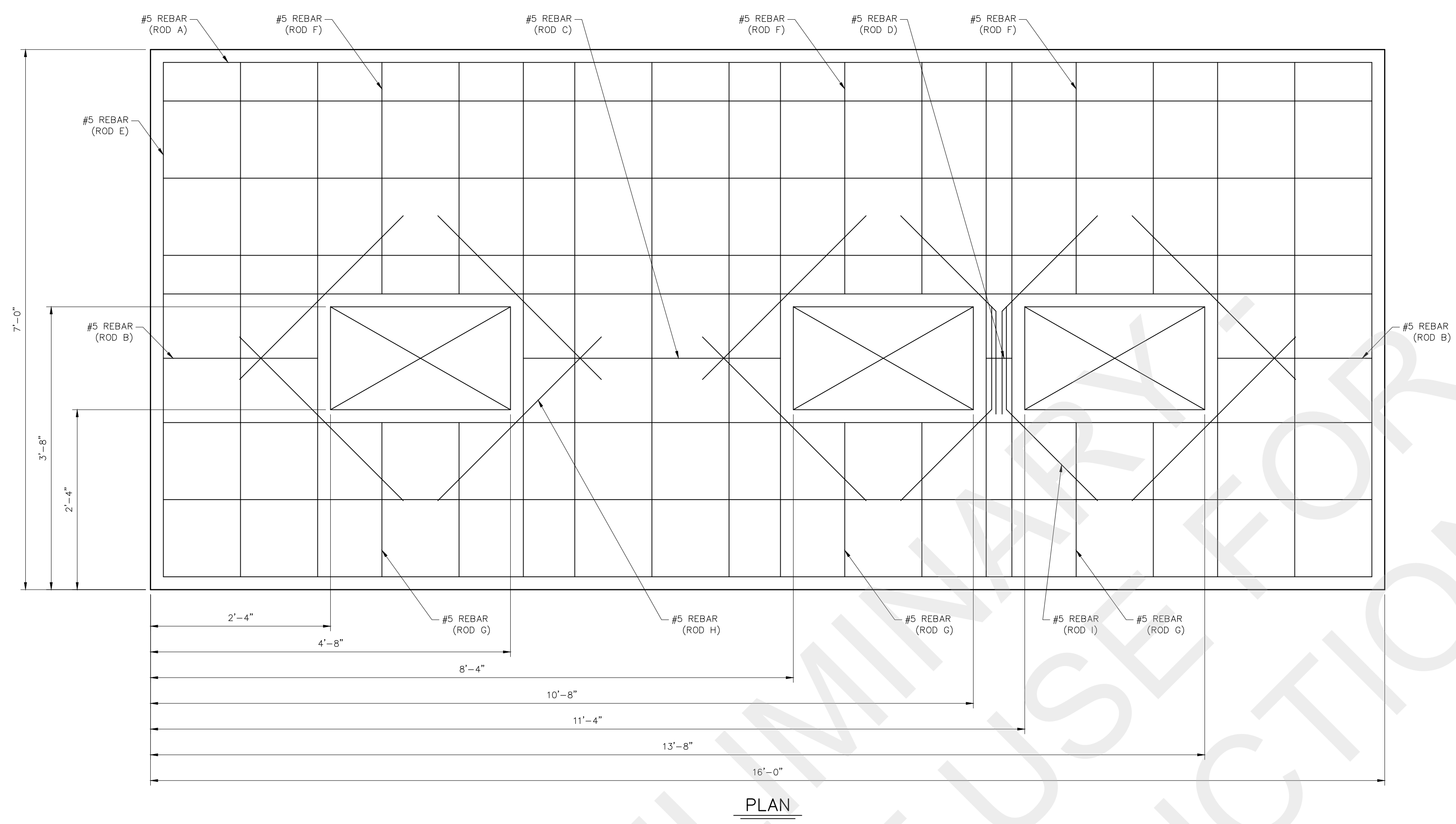
PAD NO.	TOTAL REQ'D	PAD SIZE		ANCHOR BOLT PLAN	CU YDS CONCRETE PER FDN	TOTAL
		LENGTH x WIDTH	DEPTH			
2	1	16'-0" X 7'-0"	0'-9"	-	3.11	3.11

PAD No. "2"		TOTAL No. REQ'D.-					1
ROD TYPE	SIZE OF REBAR	NO. REQ'D PER FDN	LENGTH			TOTAL REBAR	
			DIM A	DIM B	DIM C		
A	#5	8	15'-8"	-	-	15'-8"	
B	#5	2	2'-0"	-	-	2'-0"	
C	#5	1	3'-4"	-	-	3'-4"	
D	#5	1	0'-4"	-	-	0'-4"	
E	#5	13	6'-8"	-	-	6'-8"	
F	#5	6	3'-0"	-	-	3'-0"	
G	#5	6	2'-0"	-	-	2'-0"	
H	#5	8	3'-0"	-	-	3'-0"	
I	#5	4	1'-8"	1'-4"	0'-11 1/4"	3'-0"	

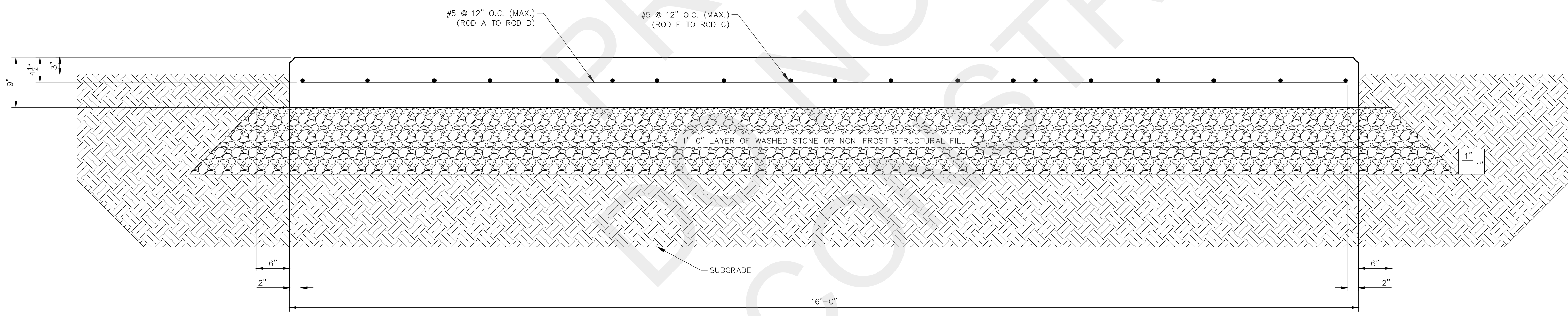
-FOUNDATIONS HAVE BEEN DESIGNED TO REST ON UNDISTURBED SOIL WITH A MINIMUM ALLOWABLE BEARING CAPACITY OF 2,000 PSF. IF UNDESIRE SOIL CONDITIONS ARE ENCOUNTERED THE ENGINEER OF RECORD SHALL BE NOTIFIED.
-ALL EQUIPMENT SHALL BE MOUNTED AS RECOMMENDED BY THE MANUFACTURER.

NOTES

- THE FOUNDATION CONTRACTOR SHALL AT ALL TIMES FULLY COMPLY WITH ALL OSHA STANDARDS AS WELL AS THE OWNER'S SAFETY STANDARDS, AS A MINIMUM, ESPECIALLY WITH REGARD TO SHORING OF ALL EXCAVATIONS. THE ENGINEER OR OWNER WILL IMMEDIATELY HALT CONSTRUCTION ACTIVITIES IF THE CONTRACTOR DOES NOT COMPLY WITH THESE STANDARDS. FAILURE TO COMPLY AT ALL TIMES WITH THESE STANDARDS WILL RESULT IN DISMISSAL FROM THE PROJECT.
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- ALL FOUNDATIONS TO BE CARRIED TO FIRM UNDISTURBED EARTH OR COMPACTED FILL.
- WASHED STONE AND STRUCTURAL FILL SHALL BE COMPACTED AS SPECIFIED IN THE FOUNDATION SPECIFICATIONS.
- REINFORCING STEEL SHALL BE GRADE 60 ASTM A-615 OR A-617.
- FOR QUANTITY, LENGTH & SHAPE OF RODS SEE REBAR SUMMARY & ROD BENDING LEGEND.
- CONCRETE SHALL BE 4500 P.S.I. @ 28 DAYS. CONCRETE SHALL BE AIR ENTRAINED WITH AN AIR CONTENT BETWEEN FIVE AND SEVEN PERCENT (5%-7%).
- CONCRETE SLUMP SHALL BE 4" ± 1". THE CONTRACTOR SHALL MAKE OR HAVE MADE A MINIMUM OF ONE (1) SLUMP TEST IN ACCORDANCE WITH ASTM C 143 FOR EACH TRUCKLOAD OF CONCRETE DELIVERED.
- CONCRETE COVER OVER REINFORCING STEEL SHALL BE THREE INCHES (3") MINIMUM UNLESS OTHERWISE NOTED.
- ALL CONCRETE TO BE THOROUGHLY VIBRATED DURING PLACEMENT INTO FORMS TO ENSURE ALL VOIDS ARE FILLED.
- ALL FOUNDATIONS SHALL BE CHAMFERED ONE INCH (1") AROUND ALL TOP EDGES, UNLESS OTHERWISE SHOWN.
- CONTRACTOR IS RESPONSIBLE TO COORDINATE INSTALLATION OF ANY CONDUITS LOCATED UNDERNEATH OR PROTRUDING THROUGH FOUNDATIONS. SEE CONDUIT PLAN AND DETAILS FOR CONDUIT LOCATIONS.
- ALL CONDUITS, WHEN REQUIRED, ARE TO BE PLUGGED OR CAPPED DURING INITIAL CONSTRUCTION TO PREVENT CONTAMINATION.
- A CONCRETE BONDING AGENT CONFORMING TO ASTM C1059 SHALL BE APPLIED TO ALL ROUGHENED SURFACES PRIOR TO PLACING FRESH CONCRETE.
- THE CONTRACTOR SHALL PREPARE, OR HAVE PREPARED, IN ACCORDANCE WITH ASTM C-31, THREE (3) TEST CYLINDERS FOR EACH CONCRETE PAD, WITHIN 20-24 HOURS AFTER BEING PREPARED, THE CYLINDERS SHALL BE DELIVERED TO A QUALIFIED TESTING LABORATORY AND TESTED IN ACCORDANCE WITH THE CONCRETE SPECIFICATIONS AND ASTM C-39. TEST RESULTS ARE TO BE PROVIDED TO THE ENGINEER FOR EVALUATION AND DIRECTION OF CORRECTIVE ACTION IF NEEDED.
- THE CONTRACTOR SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE CONCRETE SPECIFICATIONS.



PLAN



SECTION

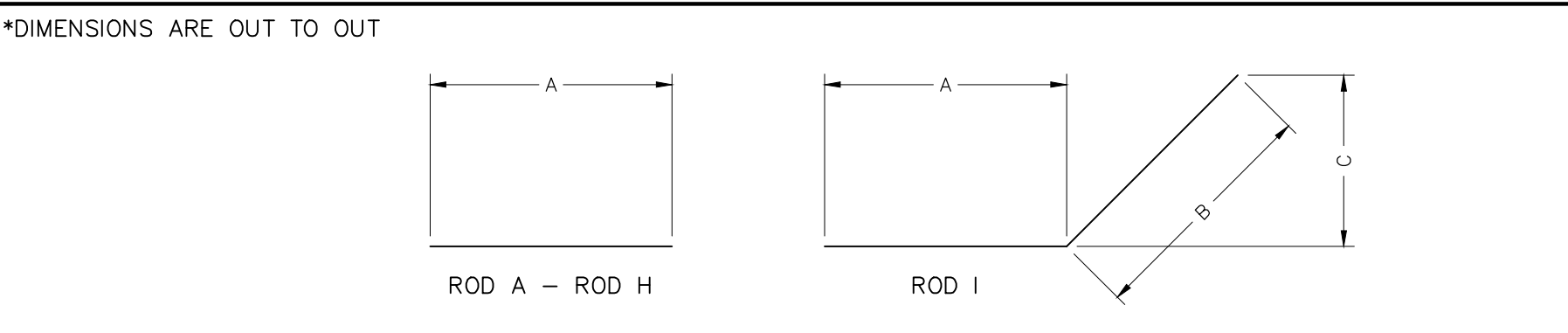
EQUIPMENT PAD 2

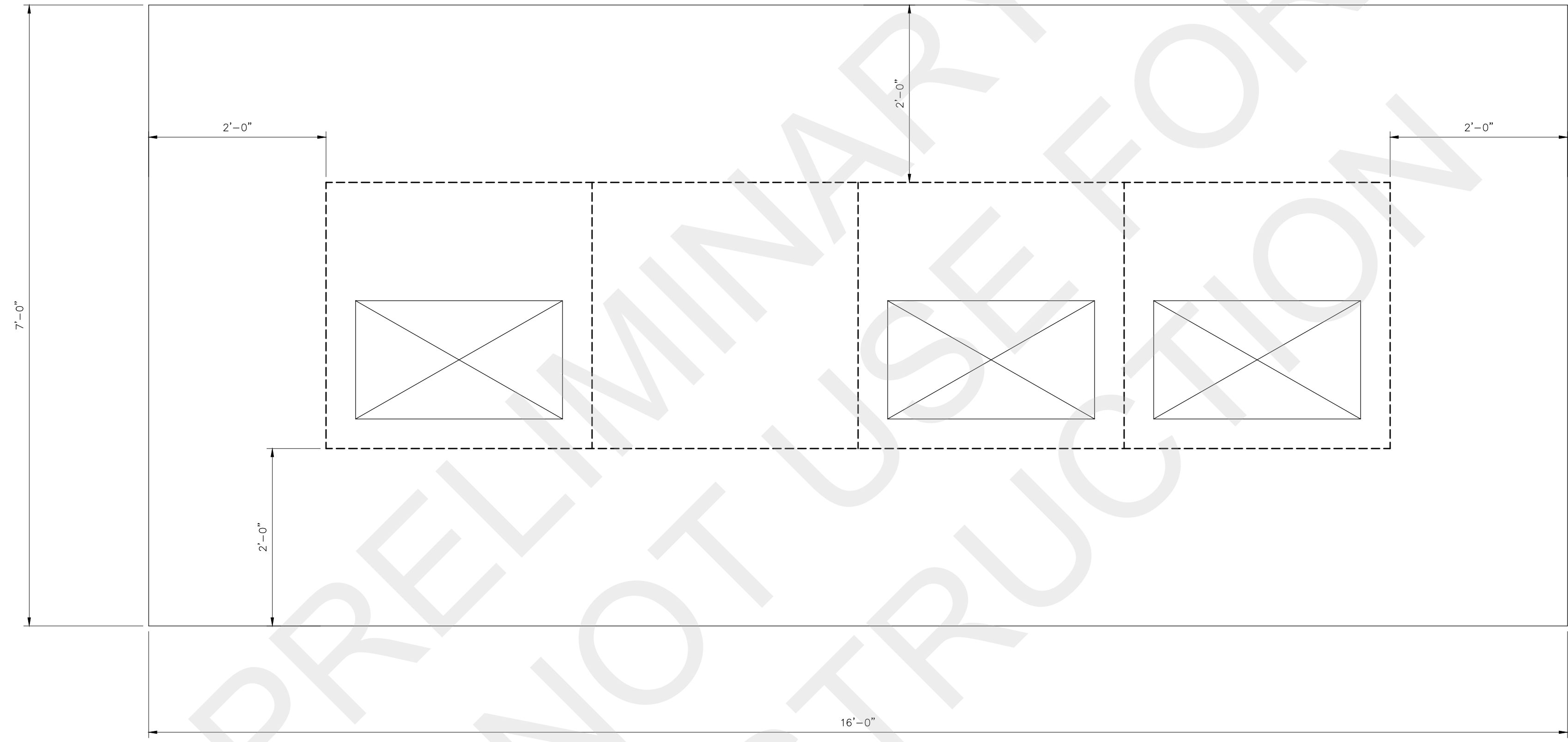
NOTE: ALL REINFORCEMENT SPACING AT 1'-0" MAX.
SCALE: 1"=1'-0"

FOUNDATION ANCHOR BOLT SUMMARY

FDN. DESIGNATION	SERVICE	No. OF REQ'D. STRUCT.'s	No. OF FDN. REQ'D. PER STRUCT.	ITEM No.	QTY. FDN.	TOTAL QTY. REQ'D.	DIA.	ANCHOR BOLTS				WASHER QTY.-DESC.	NUT QTY.-DESC.	NOTES
								LENGTH						
								EMBED	THREAD MIN.	PROJECTION ABOVE PAD	HOOK			

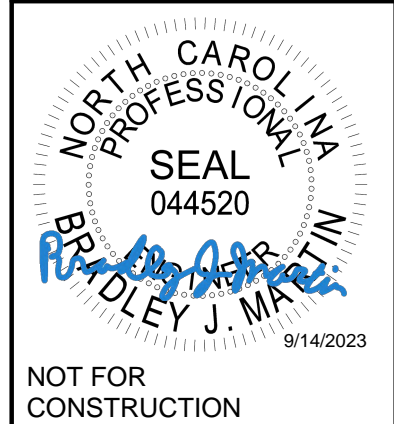
ROD BENDING LEGEND (NOT TO SCALE)





EQUIPMENT OVERLAY – PAD 2
SCALE: 1"=1'-0"

PRELIMINARY - DO NOT USE FOR CONSTRUCTION



NOT FOR CONSTRUCTION
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NO.	REVISIONS	ENG.	DATE
A	ISSUED FOR BIDS	VK	07/21/2023
B	ISSUED FOR BIDS	BJM	09/14/2023

PROJECT NAME:	GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE:	EQUIPMENT PAD 2 FOUNDATION DETAILS
DRAWN BY:	DJD
CHECKED BY:	VK
APPROVED BY:	BJM
DATE:	07/21/2023
SCALE:	1"=1'-0"
FILE NUMBER:	12548
SHEET:	EP-303A

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NO.	REVISIONS	DATE	ENG	DATE
A	ISSUED FOR BIDS	09/07/2023	VK	09/07/2023
B	ISSUED FOR BIDS	09/14/2023	BM	09/14/2023

PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION

DRAWING TITLE: SUPPORT STRUCTURE 1 DETAILS

DRAWN BY:	DJD
CHECKED BY:	VK
APPROVED BY:	BMJ
DATE:	08/01/2023
SCALE:	AS NOTED
FILE NUMBER:	12548
SHEET:	EP-304

NOTES

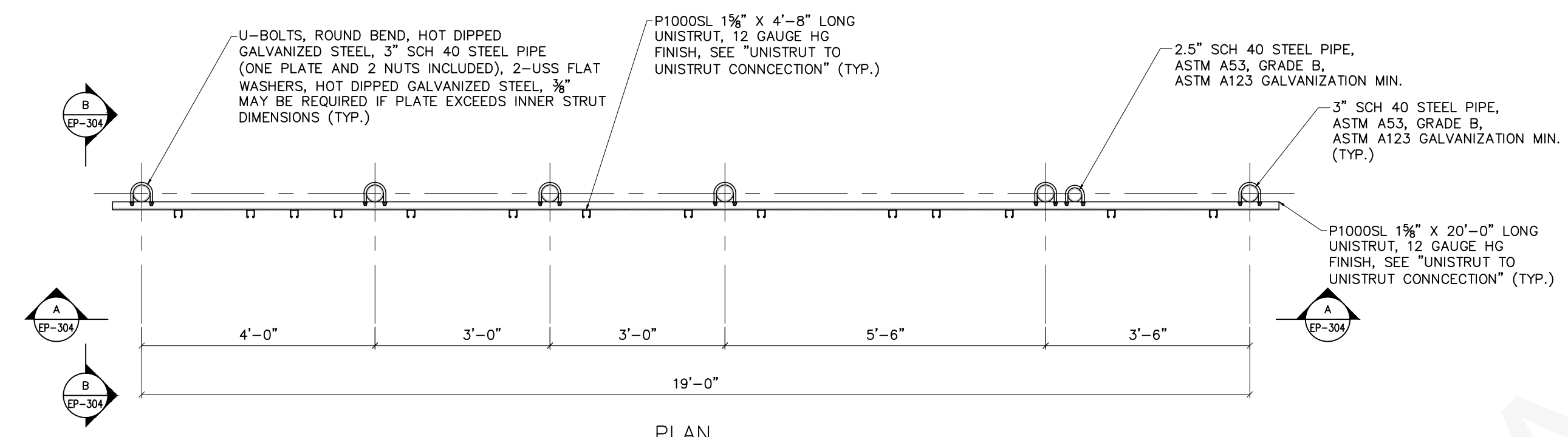
1. THE DISTANCE BETWEEN THE CENTERLINE OF ANY PIPE TO ANY EQUIPMENT MOUNTING HOLES SHALL BE A MINIMUM OF 6".
2. FOR MOUNTING BRACKET HOLES CONTRACTOR SHALL VERIFY WITH EQUIPMENT SPECIFICATIONS.

BILL OF MATERIAL - SUPPORT STRUCTURE DESIGN

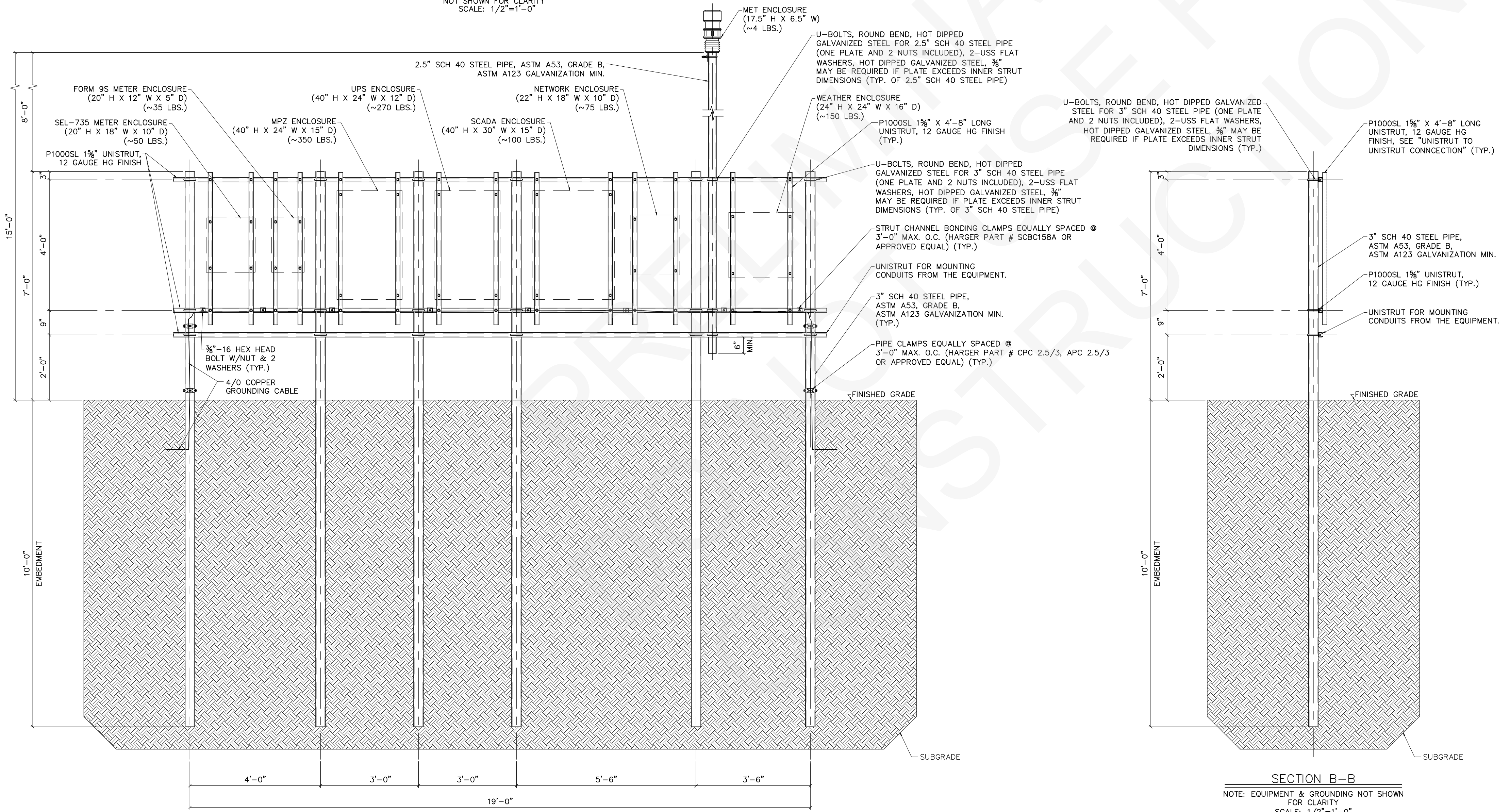
ITEM	NAME	DESCRIPTION	LENGTH PER UNIT	QUANTITY
1	EMBEDDED SUPPORT PIPE	3" SCH 40 STEEL PIPE, ASTM A53, GRADE B, ASTM A123 GALVANIZATION MIN.	17'-0"	6
2	SUPPORT PIPE TO UNISTRUT ROUND U-BOLT	ROUND BEND U-BOLT, HOT DIPPED GALVANIZED STEEL FOR 3" SCH 40 STEEL PIPE	-	18
3	MET ENCLOSURE RISER PIPE	2.5" SCH 40 STEEL PIPE, ASTM A53, GRADE B, ASTM A123 GALVANIZATION MIN.	13'-7"	1
4	SUPPORT PIPE TO UNISTRUT ROUND U-BOLT	ROUND BEND U-BOLT, HOT DIPPED GALVANIZED STEEL FOR 2.5" SCH 40 STEEL PIPE	-	3
5	HORIZONTAL STRUT	P1000SL, 1 5/8" UNISTRUT, 12 GAUGE, HD FINISH	20'-0"	3
6	VERTICAL STRUT	P1000SL, 1 5/8" UNISTRUT, 12 GAUGE, HD FINISH	4'-8"	14
7	STRUT TO STRUT BOLT	3/8"-16 HEX BOLT, HOT DIPPED GALVANIZED STEEL, 1" THREADED MIN.	-	28
8	STRUT TO STRUT BOLT HEAD WASHER	USS 3/8" FLAT WASHER, HOT DIPPED GALVANIZED STEEL	-	28
9	STRUT TO STRUT NUT WASHER	USS 3/8" FLAT WASHER, HOT DIPPED GALVANIZED STEEL	-	28
10	STRUT TO STRUT PILE NUT	3/8"-16 HEX NUTS, HOT DIPPED GALVANIZED STEEL	-	28
11	STRUT CHANNEL BONDING CLAMPS	HARGER PART # SCBC158A OR APPROVED EQUAL	-	8
12	PIPE CLAMPS	HARGER PART # CPC 2.5/3 OR APPROVED EQUAL	-	4
13	GROUNDING CABLE	4/0 COPPER GROUNDING CABLE	LENGTH AS REQUIRED	-

UNISTRUT TORQUE SPECIFICATIONS WITH STRUT NUT

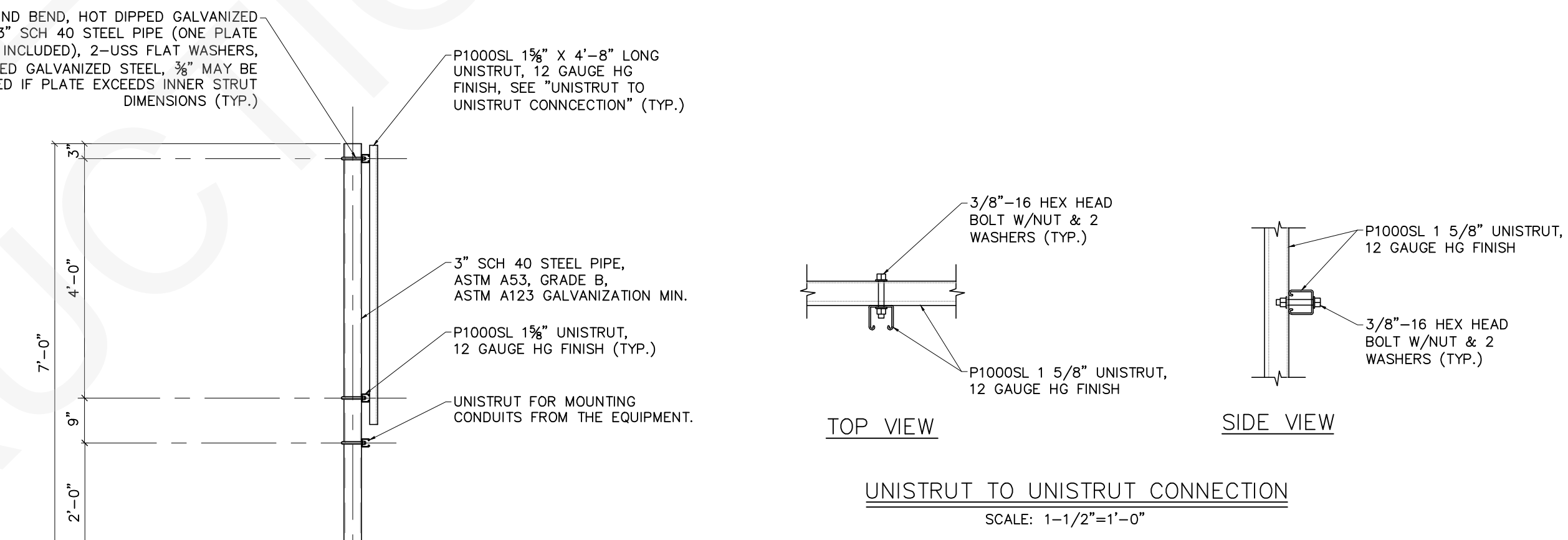
SIZE	TORQUE
3/8"	19 TO 25 LB-FT



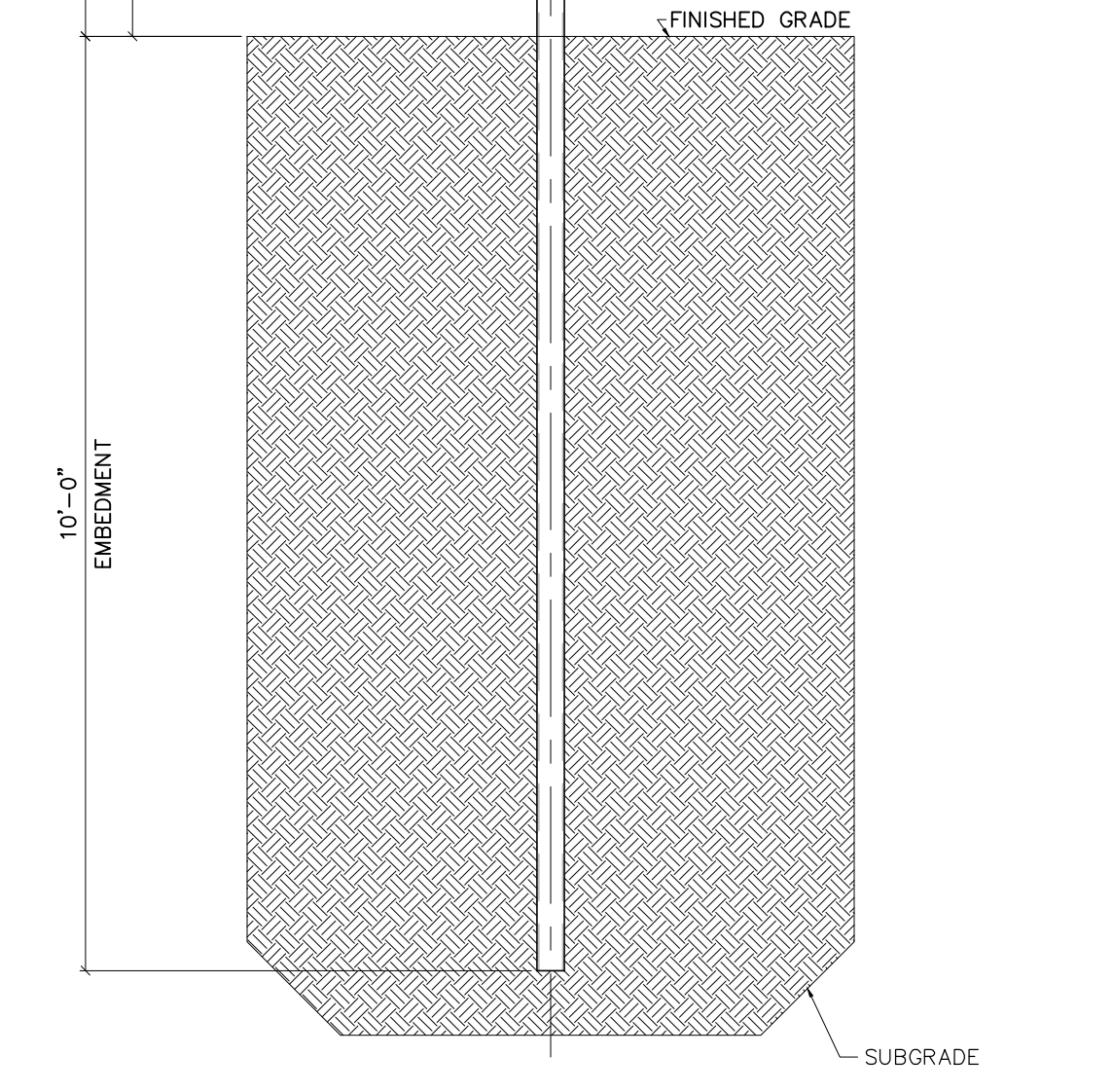
PLAN
NOTE: EQUIPMENT & GROUNDING NOT SHOWN FOR CLARITY
SCALE: 1/2"=1'-0"



SECTION A-A
SCALE: 1/2"=1'-0"



UNISTRUT TO UNISTRUT CONNECTION
SCALE: 1-1/2"=1'-0"

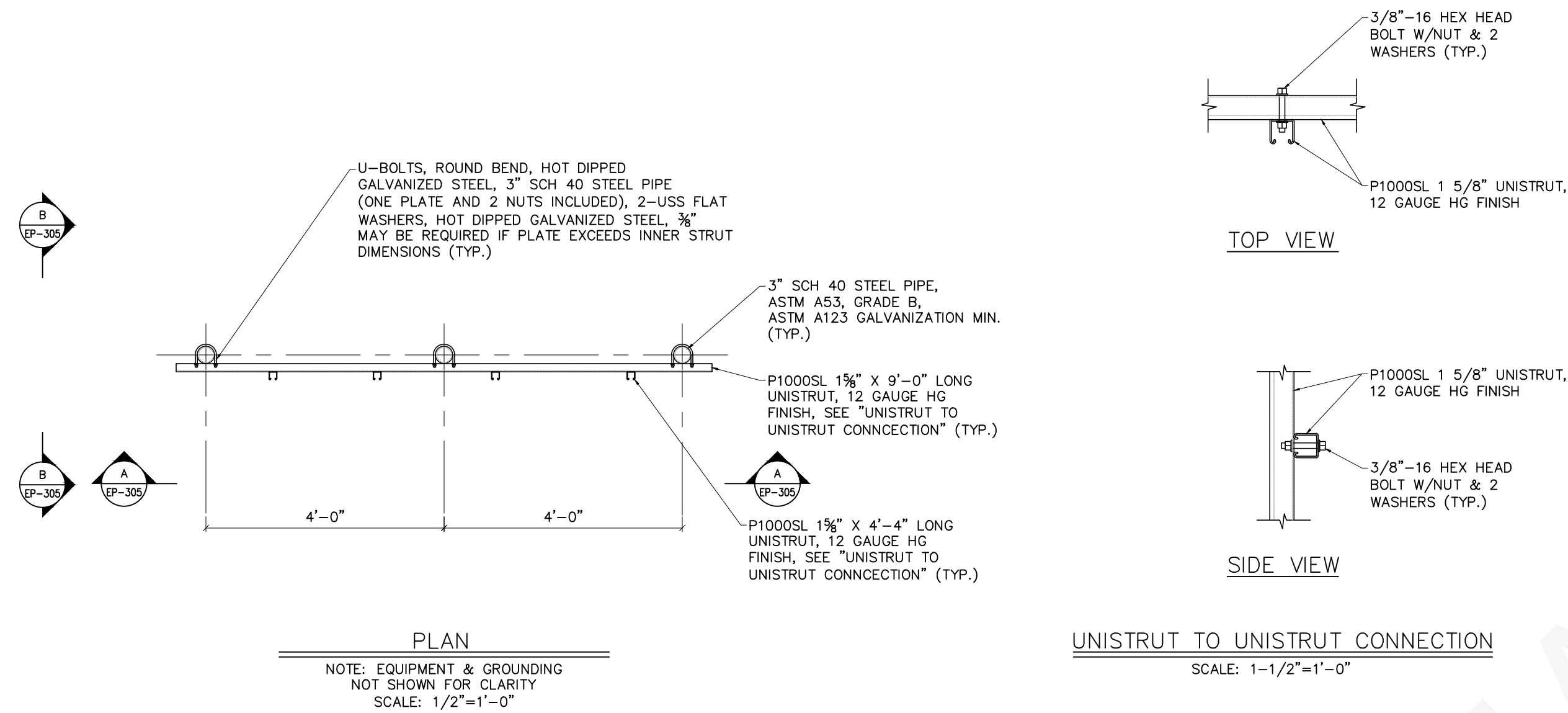


SECTION B-B
NOTE: EQUIPMENT & GROUNDING NOT SHOWN FOR CLARITY
SCALE: 1/2"=1'-0"

SUPPORT STRUCTURE 1 - ENCLOSURES SUPPORT

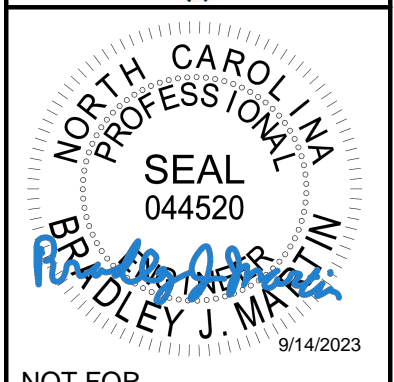
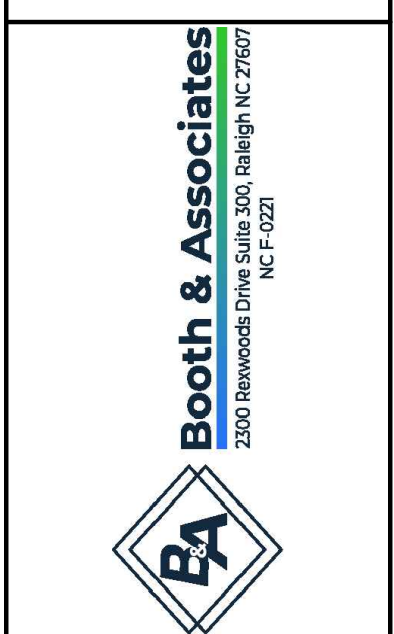
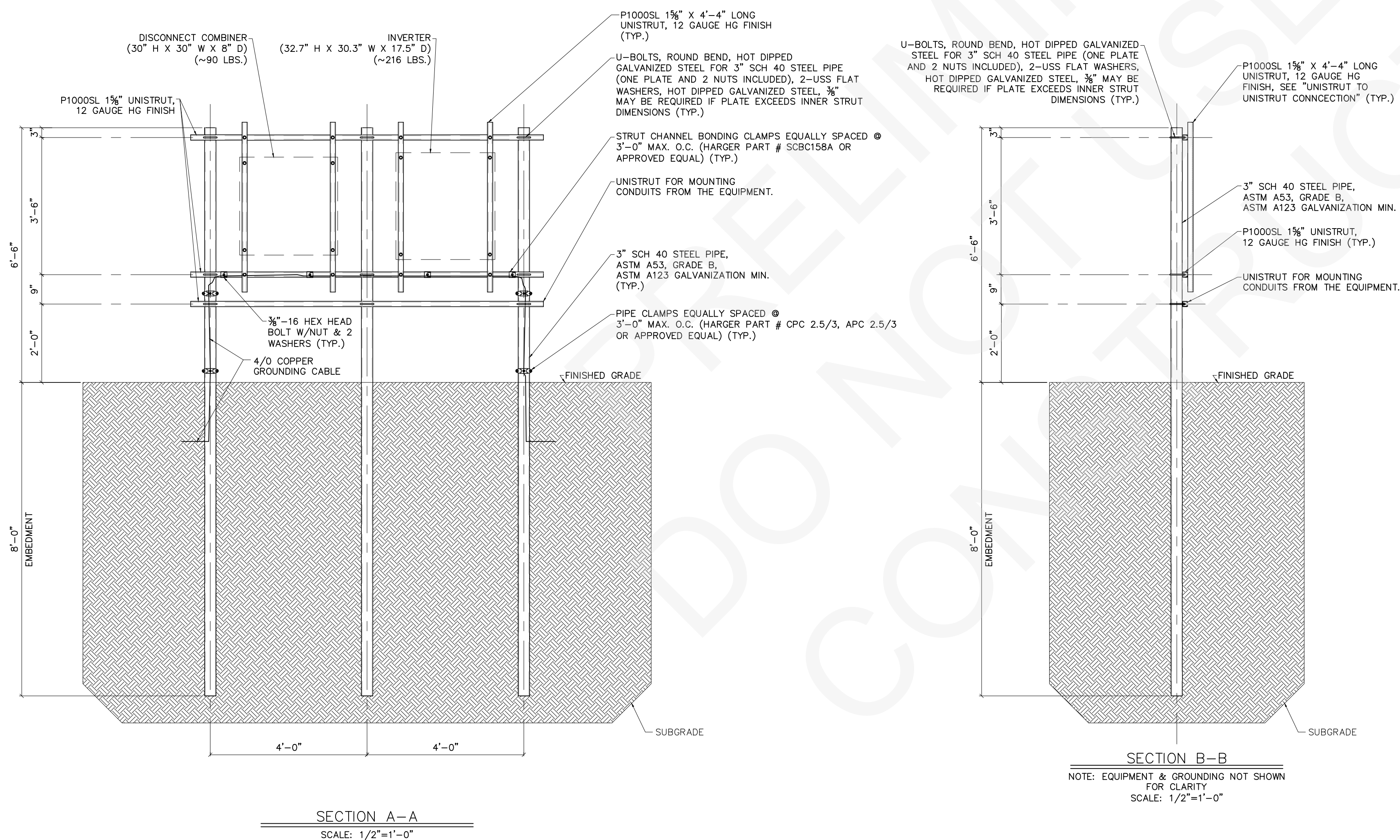
NOTES

1. THE DISTANCE BETWEEN THE CENTERLINE OF ANY PIPE TO ANY EQUIPMENT MOUNTING HOLES SHALL BE A MINIMUM OF 6".
2. FOR MOUNTING BRACKET HOLES CONTRACTOR SHALL VERIFY WITH EQUIPMENT SPECIFICATIONS.



SIZE	TORQUE
3/8"	19 TO 25 LB-FT

ITEM	NAME	DESCRIPTION	LENGTH PER UNIT	QUANTITY
1	EMBEDDED SUPPORT PIPE	3" SCH 40 STEEL PIPE, ASTM A53, GRADE B, ASTM A123 GALVANIZATION MIN.	14'-6"	3
2	SUPPORT PIPE TO UNISTRUT ROUND U-BOLT	ROUND BEND U-BOLT, HOT DIPPED GALVANIZED STEEL FOR 3" SCH 40 STEEL PIPE	-	9
3	HORIZONTAL STRUT	P1000SL, 1 5/8" UNISTRUT, 12 GAUGE, HD FINISH	9'-0"	3
4	VERTICAL STRUT	P1000SL, 1 5/8" UNISTRUT, 12 GAUGE, HD FINISH	4'-4"	4
5	STRUT TO STRUT BOLT	3/8"-16 HEX BOLT, HOT DIPPED GALVANIZED STEEL, 1" THREADED MIN.	-	8
6	STRUT TO STRUT BOLT HEAD WASHER	USS 3/8" FLAT WASHER, HOT DIPPED GALVANIZED STEEL	-	8
7	STRUT TO STRUT NUT WASHER	USS 3/8" FLAT WASHER, HOT DIPPED GALVANIZED STEEL	-	8
8	STRUT TO STRUT PILE NUT	3/8"-16 HEX NUTS, HOT DIPPED GALVANIZED STEEL	-	8
9	STRUT CHANNEL BONDING CLAMPS	HARGER PART # SCBC158A OR APPROVED EQUAL	-	4
10	PIPE CLAMPS	HARGER PART # CPC 2.5/3 OR APPROVED EQUAL	-	4
11	GROUNDING CABLE	4/0 COPPER GROUNDING CABLE	LENGTH AS REQUIRED	-



NOT FOR CONSTRUCTION

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NO.	REVISIONS	ENG.	DATE
A	ISSUED FOR BIDS	VK	09/01/2023
B	ISSUED FOR BIDS	BJM	09/14/2023

PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION
 DRAWING TITLE: SUPPORT STRUCTURE 2 DETAILS

DRAWN BY:	DJD
CHECKED BY:	VK
APPROVED BY:	BJM
DATE:	08/01/2023
SCALE:	AS NOTED
FILE NUMBER:	12548
SHEET:	

EP-305

SUPPORT STRUCTURE 2 - DISCONNECT COMBINER & INVERTER SUPPORT

DANGER

ARC FLASH AND SHOCK HAZARD
APPROPRIATE PPE REQUIRED

Incident Energy at XX inches Nominal System Voltage	XXX XXX	Cal/cm ² VDC
Arc Flash Boundary (PPE Required)	XXX	inches
Limited Approach (Qualified Personnel Only)	XXX	inches
Restricted Approach (PPE Required)	XXX	inches

Equipment Name: Inverter XX-XX

DANGER

ARC FLASH AND SHOCK HAZARD
APPROPRIATE PPE REQUIRED

Incident Energy at XX inches Nominal System Voltage	XXX XXX	Cal/cm ² VDC
Arc Flash Boundary (PPE Required)	XXX	inches
Limited Approach (Qualified Personnel Only)	XXX	inches
Restricted Approach (PPE Required)	XXX	inches

Equipment Name: Inverter XX-XX

DANGER

ARC FLASH AND SHOCK HAZARD
APPROPRIATE PPE REQUIRED

Incident Energy at XX inches Nominal System Voltage	XXX XXX	Cal/cm ² VAC
Arc Flash Boundary (PPE Required)	XXX	inches
Limited Approach (Qualified Personnel Only)	XXX	inches
Restricted Approach (PPE Required)	XXX	inches

Equipment ID: Inverter XX-XX

DANGER

ARC FLASH AND SHOCK HAZARD
APPROPRIATE PPE REQUIRED

Incident Energy at XX inches Nominal System Voltage	XXX XXX	Cal/cm ² VAC
Arc Flash Boundary (PPE Required)	XXX	inches
Limited Approach (Qualified Personnel Only)	XXX	inches
Restricted Approach (PPE Required)	XXX	inches

Equipment ID: AC Switchboard

NOTE:
1. DETAILED LABEL TO BE PROVIDED AFTER ARC FLASH STUDY.
2. SEE CORRESPONDING LABEL SCHEDULE FOR LABEL VALUE AND QUANTITY.
3. SEE CORRESPONDING LABEL TAB FOR PRINTING PURPOSES.
4. ALL LABELS SHALL BE ENGRAVED, UNLESS EXPLICITLY APPROVED BY OWNER.

1 DC COMBINER BOX
ARC FLASH LABEL, DC
SCALE: NTS

NOTE:
1. DETAILED LABEL TO BE PROVIDED AFTER ARC FLASH STUDY.
2. SEE CORRESPONDING LABEL SCHEDULE FOR LABEL VALUE AND QUANTITY.
3. SEE CORRESPONDING LABEL TAB FOR PRINTING PURPOSES.
4. ALL LABELS SHALL BE ENGRAVED, UNLESS EXPLICITLY APPROVED BY OWNER.

2 INVERTER
ARC FLASH LABEL, DC
SCALE: NTS

NOTE:
1. DETAILED LABEL TO BE PROVIDED AFTER ARC FLASH STUDY.
2. SEE CORRESPONDING LABEL SCHEDULE FOR LABEL VALUE AND QUANTITY.
3. SEE CORRESPONDING LABEL TAB FOR PRINTING PURPOSES.
4. ALL LABELS SHALL BE ENGRAVED, UNLESS EXPLICITLY APPROVED BY OWNER.

3 INVERTER
ARC FLASH LABEL, AC
SCALE: NTS

NOTE:
1. DETAILED LABEL TO BE PROVIDED AFTER ARC FLASH STUDY.
2. SEE CORRESPONDING LABEL SCHEDULE FOR LABEL VALUE AND QUANTITY.
3. SEE CORRESPONDING LABEL TAB FOR PRINTING PURPOSES.
4. ALL LABELS SHALL BE ENGRAVED, UNLESS EXPLICITLY APPROVED BY OWNER.

4 AC SWITCHBOARD
ARC FLASH LABEL, AC
SCALE: NTS

DANGER

ARC FLASH AND SHOCK HAZARD
APPROPRIATE PPE REQUIRED

Incident Energy at XX inches Nominal System Voltage	XXX XXX	Cal/cm ² VAC
Arc Flash Boundary (PPE Required)	XXX	inches
Limited Approach (Qualified Personnel Only)	XXX	inches
Restricted Approach (PPE Required)	XXX	inches

Equipment ID: Transformer XX-HV

DANGER

ARC FLASH AND SHOCK HAZARD
APPROPRIATE PPE REQUIRED

Incident Energy at XX inches Nominal System Voltage	XXX XXX	Cal/cm ² VAC
Arc Flash Boundary (PPE Required)	XXX	inches
Limited Approach (Qualified Personnel Only)	XXX	inches
Restricted Approach (PPE Required)	XXX	inches

Equipment ID: Transformer XX-LV

NOTE:
1. DETAILED LABEL TO BE PROVIDED AFTER ARC FLASH STUDY.
2. SEE CORRESPONDING LABEL SCHEDULE FOR LABEL VALUE AND QUANTITY.
3. SEE CORRESPONDING LABEL TAB FOR PRINTING PURPOSES.
4. ALL LABELS SHALL BE ENGRAVED, UNLESS EXPLICITLY APPROVED BY OWNER.

6 TRANSFORMER (HV)
ARC FLASH LABEL, AC
SCALE: NTS

NOTE:
1. DETAILED LABEL TO BE PROVIDED AFTER ARC FLASH STUDY.
2. SEE CORRESPONDING LABEL SCHEDULE FOR LABEL VALUE AND QUANTITY.
3. SEE CORRESPONDING LABEL TAB FOR PRINTING PURPOSES.
4. ALL LABELS SHALL BE ENGRAVED, UNLESS EXPLICITLY APPROVED BY OWNER.

7 TRANSFORMER (LV)
ARC FLASH LABEL, AC
SCALE: NTS

PHOTOVOLTAIC AC DISCONNECT

AC VOLTAGE: 480 V AC
AC CURRENT: 180 A AC

INVERTER AC DISCONNECT
(QTY:15)

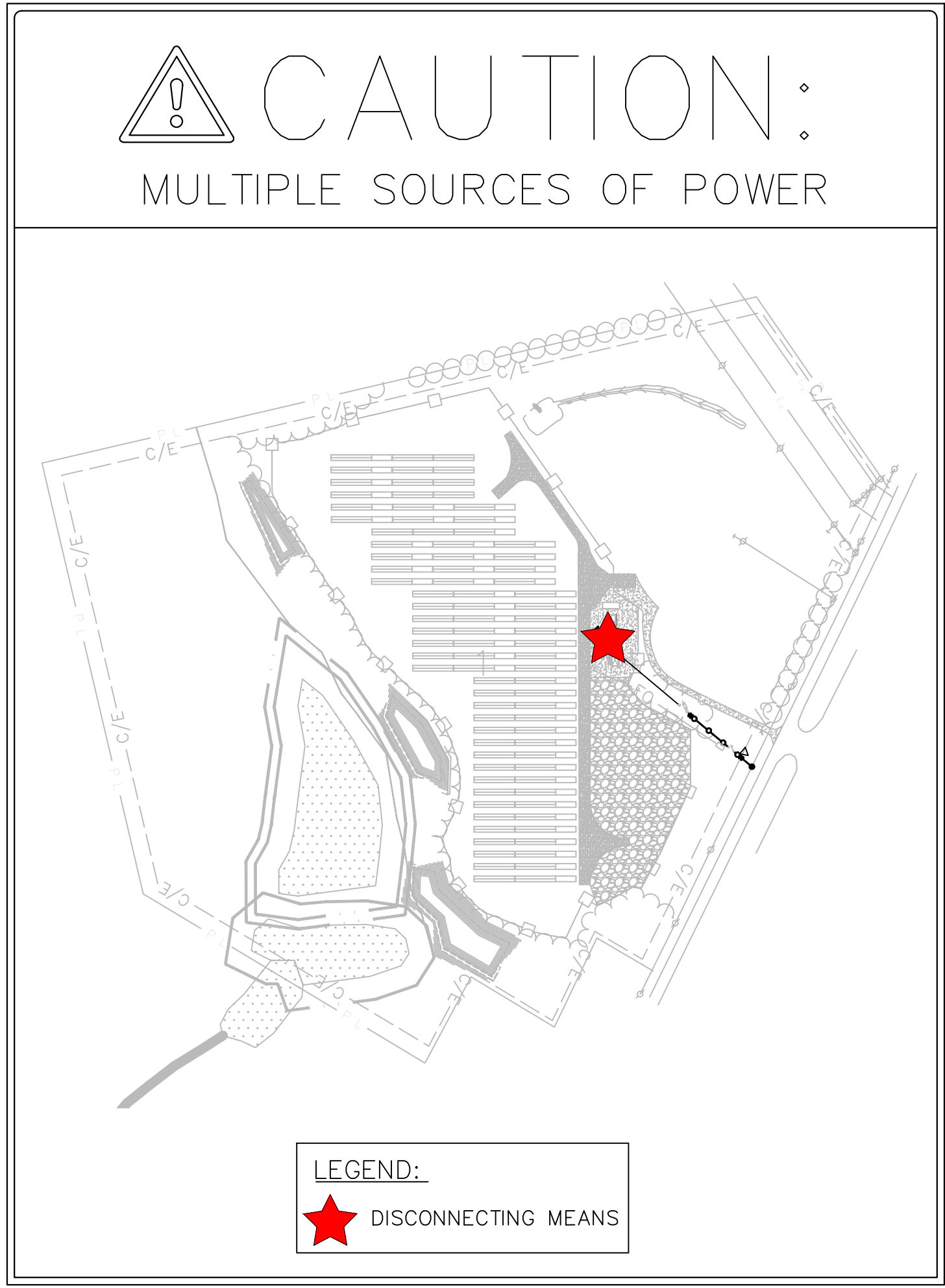
PHOTOVOLTAIC DC DISCONNECT

MAX SYSTEM VOLTAGE: TBD
MAX CURRENT: TBD

INVERTER DC DISCONNECT
(QTY:15)

NOTE:
1. TO BE INSTALLED ON COVER OF INVERTER XX-XX ENCLOSURE.
2. SEE CORRESPONDING LABEL SCHEDULE FOR LABEL VALUE AND QUANTITY.
3. SEE CORRESPONDING LABEL TAB FOR PRINTING PURPOSES.
4. ALL LABELS SHALL BE ENGRAVED, UNLESS EXPLICITLY APPROVED BY OWNER.

8 INVERTER WITH INTEGRATED DC DISCONNECT, LABELS
SCALE: NTS



11 MULTIPLE SOURCES LABEL
SCALE: NTS

NOTE:
1. TO BE INSTALLED AT ALL INVERTER SKIDS AND MAIN GOAB.

NOTES:
ALL LABELS AND SIGNAGE SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS, OAE:
MATERIAL: 0.010 HP12W
UV LAMINATE
BLACK & COLOR PRINT ON WHITE BACKGROUND
ALL LABELS SHALL USE 467MP ADHESIVE, OAE.
ALL LABELS SHALL BE PRODUCED AT A UL APPROVED LABEL SHOP, SUCH AS BRADLEY NAMEPLATE, LUSTRECAL, OAE.

DC COMBINER BOX XX
DC COMBINER BOX LABELS
(QTY:15)

PHOTOVOLTAIC DC DISCONNECT

MAX SYSTEM VOLTAGE: TBD
MAX CURRENT: TBD

DC COMBINER BOX
(QTY:15)

NOTE:
1. TO BE INSTALLED ON COVER OF DC COMBINER BOX XX-XX ENCLOSURE.
2. SEE CORRESPONDING LABEL SCHEDULE FOR LABEL VALUE AND QUANTITY.
3. SEE CORRESPONDING LABEL TAB FOR PRINTING PURPOSES.
4. ALL LABELS SHALL BE ENGRAVED, UNLESS EXPLICITLY APPROVED BY OWNER.

9 DC COMBINER BOX
SCALE: NTS

TRANSFORMER AC DISCONNECT

RATED AC VOLTAGE: 12,470 V AC
RATED AC CURRENT: 115.75 A AC

TRANSFORMER AC DISCONNECT
(QTY:1)

NOTE:
PLACE ABOVE TRANSFORMER LOAD BREAK SWITCH ENCLOSURE

METEOROLOGICAL STATION

METEOROLOGICAL STATION
(QTY:1)

ROW XXX
MODULE ROWS (NOTE 1)

DAS CABINET
DAS CABINETS
(QTY:1)

CB X-X.XX
PV CIRCUIT LABELS (NOTE 1)

10 EQUIPMENT LABELS
SCALE: NTS

INVERTER XX
INVERTER LABELS
(QTY:15)

XFMR 01
TRANSFORMER

NOTE:
1. SEE CORRESPONDING LABEL SCHEDULE FOR LABEL VALUE AND QUANTITY.
2. ROW LABELS SHALL BE VINYL STICKERS. LABEL SHALL BE PLACED ON THE LAST RACK POST OF EVERY ROW ADJACENT TO MAIN AISLE.
3. SEE CORRESPONDING LABEL TAB FOR PRINTING PURPOSES.
4. ALL LABELS SHALL BE ENGRAVED, UNLESS EXPLICITLY APPROVED BY OWNER.

PAW
Fayetteville's HOME TOWN UTILITY

Booth & Associates
2300 Rowlands Drive Suite 300, Raleigh NC 27607
NC E-0221

PROFESSIONAL SEAL
044520
BRADLEY J. MARSH
9/15/2023

NOT FOR CONSTRUCTION
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NO.	REVISIONS	DATE
A	ISSUED FOR REVIEW	05/04/2023
B	ISSUED FOR REVIEW	06/09/2023
C	ISSUED FOR REVIEW 60% - SUBMITTAL	08/04/2023
D	ISSUED FOR BID - 60%	09/14/2023













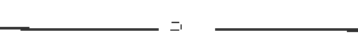

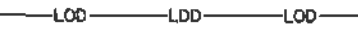




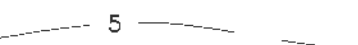












PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE: LABELS & MARKINGS

DRAWN BY: ALH
CHECKED BY: EDR
APPROVED BY: BJM
DATE: 03/29/2023
SCALE: NONE
FILE NUMBER: 12548
SHEET:

EP-450

13 – Civil Drawing Set

LEGEND

-  SILT FENCE OUTLET
-  CONCRETE WASHOUT PIT
-  POWER POLE
-  GUY AND ANCHOR COMBINATION
-  EDGE OF PAVED ROAD
-  OVERHEAD POWER LINE
-  SILT FENCE
-  EXISTING SILT FENCE
-  DITCH CENTERLINE
-  BUILDING SETBACK LINE
-  ADJOINING PARCEL LINE
-  WOODS LINE
-  FENCE LINE
-  PROPERTY LINE
-  EDGE OF UTILITY EASEMENT
-  DISTURBANCE LIMIT
-  50' WETLANDS OFFSET
-  DRAINAGE AREA BOUNDARY
-  SITE SOILS BOUNDARY
-  BAFFLE
-  EDGE OF PUBLIC ROAD RIGHT-OF-WAY
-  EXISTING CONTOURS, 1.0FT INTERVAL
-  PROPOSED CONTOURS, 1.0FT INTERVAL
-  GRAVEL DRIVE
-  CONSTRUCTION ENTRANCE
-  RIPRAP APRON
-  STOCKPILE LOCATION
-  LAY DOWN AREA
-  POST-CONSTRUCTION ASPHALT APRON
-  WETLANDS/ WATER BODIES
-  AREA OF TEMPORARY SEEDING
-  AREA OF PERMANENT SEEDING

CONSTRUCTION SEQUENCE

- PHASE 1**
1. OBTAIN REQUIRED PERMITS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. OWNER'S ENGINEER TO CONTACT NCDOT FAYETTEVILLE REGIONAL OFFICE AT 910-4343-3300 AND NCDOT HIGHWAY DIVISION 6 AT 910-364-0600 TO INVITE TO THE PRE-CONSTRUCTION MEETING AT LEAST 72 HOURS PRIOR TO PROJECT ACTIVATION.
 2. UNDERGROUND UTILITIES NOT SHOWN ON THIS DRAWING MAY EXIST; CONTRACTOR SHALL VERIFY LOCATION OF BURIED UTILITIES PRIOR TO START OF CONSTRUCTION.
 3. INSTALL STORM WATER INSPECTION BOX WITH RAIN GAUGE, STORM WATER INSPECTION REPORT, AND A COPY OF THE PERMITS. THE INSPECTION BOX WILL BE PLACED IN A PROMINENT LOCATION BY THE MAIN ROAD AND DRIVEWAY. THE SELF-INSPECTION RECORDS FOR LAND DISTURBING ACTIVITIES PER G.S. 113A-54.1 MUST BE COMPLETED WEEKLY AND AFTER EACH SIGNIFICANT RAINFALL (ONE INCH OR GREATER WITHIN TWENTY-FOUR HOURS). THIRTY (30) DAYS OF SELF-INSPECTION REPORTS SHALL BE MAINTAINED IN THE INSPECTION BOX AT ALL TIMES. EXTRA COPIES OF THE SELF-INSPECTION FORMS SHOULD BE PLACED IN THE INSPECTION BOX.
 4. SITE TO BE CLEARED, GRADED, AND STABILIZED WITHIN SIXTY (60) CALENDAR DAYS.
 5. INSTALL CONSTRUCTION ENTRANCE PRIOR TO ANY ADDITIONAL LAND DISTURBING ACTIVITIES.
 6. FLAG CONSTRUCTION LIMITS AND CLEAR WHAT IS NECESSARY TO INSTALL NEW SILT FENCING AND NEW SILT FENCE OUTLETS.
 7. REMOVE EXISTING SILT FENCE AND SILT FENCE OUTLETS AS OUTLINED ON SHEET CG200 OF THE APPROVED PLAN SET. INSTALL NEW SILT FENCING AND NEW SILT FENCE OUTLETS ALONG NORTHERN AND WESTERN PROJECT LIMIT AS OUTLINED ON THIS SAME SHEET. ANY EXISTING SILT FENCE NOT IN ADEQUATE CONDITION SHALL BE REPLACED REGARDLESS OF WHETHER OR NOT IT IS SPECIFIED AS BEING REPLACED ON THE PLANS.
 8. CLEAR AND GRUB WITHIN CONSTRUCTION LIMITS. ALL DEBRIS/SPOILS TO BE REMOVED AND STORED AT AN NCDOT APPROVED LOCATION. TREES CAN BE CUT AND HAULED AWAY OR DISPOSED OF WITH A CONTROLLED BURN.
 9. COMPLETE THE REMAINDER OF THE SITE CLEARING WITHIN THE CONSTRUCTION LIMITS THEN MULCH AND SEED.
- PHASE 2**
10. INSTALL TEMPORARY SKIMMER BASINS #1 - #2, SEDIMENT BASIN #1, AND TRAPEZOIDAL DRAINAGE CHANNELS #1 - #5. IMMEDIATELY STABILIZE BASIN SIDE SLOPES AND CHANNELS WITH ROLLED EROSION CONTROL PRODUCT.
 11. INSTALL STOCKPILE LOCATION AND ASSOCIATED PERIMETER SILT FENCE.
 12. ADD ADDITIONAL GRAVEL TO SURFACE LEVEL OF EXISTING GRAVEL ACCESS DRIVE, DRESS/GRADE AS NEEDED TO MATCH PROPOSED ACCESS DRIVE DETAIL ON SHEET CG500. (2% CROSS-SLOPE FROM CROWN)
 13. INSTALL LAY DOWN AREA.
 14. INSTALL CONCRETE WASHOUT PIT.
 15. STABILIZE AREA WITH WITH LIME, SEED, FERTILIZER, STRAW AND TACK ACCORDING TO THE APPROVED SEEDING APPLICATION RATES AND SPEC. SEED GRADED SLOPES AND DENuded AREAS FOLLOWING INITIAL SOIL DISTURBANCE.
 16. SEEDING MUST BE DONE WITHIN 7 DAYS FOR SLOPES 3:1 OR GREATER AND 14 DAYS FOR ALL OTHERS.
 17. HAUL AWAY OR DISPOSE OF ANY EXCESS SOILS NOT NEEDED TO BALANCE SITE. IF ANY TOPSOIL IS TO REMAIN STOCKPILED, PROTECT WITH SILT FENCING AROUND PERIMETER.
 18. GRADING CONTRACTOR TO DEMOBILIZE ONCE SITE IS TEMPORARILY STABILIZED. OTHER CONTRACTOR(S) SHALL THEN COME TO THE SITE FOR INSTALLATION OF SOLAR ARRAY AND ASSOCIATED EQUIPMENT. GRADING CONTRACTOR WILL STILL BE RESPONSIBLE FOR EROSION CONTROL INSPECTIONS DURING THE PERIOD IN WHICH ELECTRICAL EQUIPMENT IS BEING INSTALLED.
 19. ALL EROSION AND SEDIMENT CONTROL PROPERTIES WILL BE INSPECTED WEEKLY AND AFTER EACH SIGNIFICANT RAINFALL EVENT. NEEDED REPAIRS WILL BE MADE IMMEDIATELY, WEEKLY AND AFTER EACH SIGNIFICANT RAINFALL EVENT (ONE INCH OR GREATER WITHIN TWENTY-FOUR HOURS).
 20. SUBMIT ALL DOCUMENTATION REQUIRED UNDER THE SITE NPDES STORM WATER PERMIT TO STORM WATER CONTROL INSPECTIONS THROUGHOUT THE PROJECT.
- PHASE 3**
21. AFTER ELECTRICAL EQUIPMENT HAS BEEN INSTALLED, CONTRACTOR TO RETURN TO SITE & ENSURE THAT ALL EROSION CONTROL MEASURES & THE SITE GENERALLY IS STABILIZED PER NCDOT STANDARDS.
 22. AFTER SITE STABILIZATION IS APPROVED BY NCDOT, OWNER, AND ENGINEER, REMOVE THE TEMPORARY SKIMMER BASINS AND TEMPORARY SEDIMENT BASIN AND STABILIZE THE DISTURBED AREAS APPROPRIATELY.
 - 22.1 DECOMMISSIONING A SEDIMENT BASIN
 - 22.1.1 CALL BOOTH AND ASSOCIATES, LLC FOR DETERMINATION/MEETING WHEN REQUESTING TO DECOMMISSION/PHASE OUT TEMPORARY BASINS.
 - 22.1.2 ONCE IT HAS BEEN AGREED THAT THE TEMPORARY BASINS CAN COME OUT THEY MUST BE MARKED AND INITIALED BY THE INSPECTOR ON THE APPROVED SET OF EROSION CONTROL PLANS.
 - 22.1.3 IF THE BASINS HAVE WATER IN THEM, THE WATER MUST BE PUMPED OUT FROM THE SURFACE INTO A FILTER BAG ON A LEVEL AREA FREE OF DEBRIS.
 - 22.1.4 REMOVE SKIMMERS, RISER, BARREL, AND ALL BAFFLE MATERIALS.
 - 22.1.5 IF THERE IS A LOT OF SEDIMENT/SILT IN THE BOTTOM OF THE BASINS TO BE HAULED, MIX WITH DRY MATERIAL OR SET ASIDE TO DRY THEN HAUL OFF.
 - 22.1.6 FILL OR CONVERT BASINS AS TO THE APPROVED ELEVATION OR PRODUCT ON THE APPROVED PLANS.
 - 22.1.7 IMMEDIATELY SEED AND STABILIZE THE AREA OF THE REMOVED BASIN WITH ROLLED EROSION CONTROL PRODUCT.
 23. HAUL AWAY OR DISPOSE OF ANY ADDITIONAL EXCESS SOILS NOT NEEDED TO BALANCE SITE.
 24. AFTER FINAL GRADING HAS BEEN COMPLETED, AREA MUST BE STABILIZED WITH LIME, SEED, FERTILIZER, STRAW AND TACK ACCORDING TO THE APPROVED SEEDING APPLICATION RATES AND SPEC.
 25. AFTER CONSTRUCTION IS OVER AND THE SITE IS STABILIZED, INSTALL PERMANENT VEGETATION ON DISTURBED AREAS. THE PERIMETER SILT FENCING SHALL REMAIN UNTIL PERMANENT VEGETATION IS ESTABLISHED (APPROXIMATELY 80% COVERAGE, 100% ON 3:1+ SLOPES). CONTRACTOR'S SCOPE SHALL INCLUDE REPAIRS, RESEEDING, & REVEGETATING UNTIL THIS COVERAGE REQUIREMENT HAS BEEN MET, AS DETERMINED BY OWNER, ENGINEER, & NCDOT.
 26. SEEDING MUST BE DONE WITHIN 7 DAYS FOR SLOPES GREATER THAN 3:1 AND 14 DAYS FOR ALL OTHERS.
 27. THE POST-CONSTRUCTION ASPHALT APRON LOCATED AT THE PROJECT ENTRANCE SHALL BE INSTALLED AFTER THE DELIVERY OF ALL MAJOR EQUIPMENT AND IN COORDINATION WITH BOOTH & ASSOCIATES, LLC.
 28. ALL FINAL INSPECTION DOCUMENTS SHALL BE PROVIDED TO OWNER & ENGINEER FOR PERMIT CLOSE OUT. ALL AS-BUILT DEVIATIONS FROM THE DESIGN SHOWN IN THE APPROVED PLAN SET SHALL BE CAPTURED IN INITIALED RED-LINE MARKUPS OF ALL PLAN SHEETS AND PROVIDED TO OWNER & ENGINEER RECORD DRAWING ISSUANCE.

GENERAL NOTES

1. PERMITS PENDING.
2. CONTACT NCDOT FAYETTEVILLE REGIONAL OFFICE AT 910-4343-3300 AND NCDOT HIGHWAY DIVISION 6 AT 910-364-0600 TO SCHEDULE A PRE-CONSTRUCTION MEETING AT LEAST 72 HOURS PRIOR TO PROJECT ACTIVATION.
3. THE FOLLOWING MUST BE KEPT ON SITE UNTIL THE E.S.C. PLAN HAS BEEN CLOSED OUT BY LAND QUALITY:
 - 3.1.1.1. 30 DAYS OF SELF INSPECTION RECORDS.
 - 3.1.1.2. RAIN GAUGE.
 - 3.1.1.3. APPROVAL CERTIFICATE/LETTER.
 - 3.1.1.4. APPROVED PLAN AND NPDES PERMIT.
 THESE ITEMS SHOULD BE LOCATED NEAR THE MAIN CONSTRUCTION ENTRANCE. FAILURE TO MAINTAIN THESE ITEMS ON SITE VIOLATES THE NPDES PERMIT.
4. PROPOSED CUT/FILL SIDE SLOPES ARE 3H:1V.
5. ALL STOCKPILES SHALL BE SURROUNDED BY SILT FENCE ON ALL SIDES EXCEPT FOR THE INGRESS/EGRESS. (3 SIDES) ALL STOCKPILES MUST HAVE A MINIMUM 5' SEPARATION FROM STOCKPILE TOE TO SILT FENCE AND OTHER EROSION CONTROL MEASURES.
6. CONTRACTOR IS RESPONSIBLE TO REVIEW ANY GEOTECHNICAL REPORT ATTACHED TO THE GRADING SPECIFICATIONS FOR SITE SOILS INFORMATION.
7. SITE TO BE CLEARED, GRADED AND STABILIZED FOR INSTALLATION OF SOLAR ARRAY & ASSOCIATED EQUIPMENT WITHIN SIXTY (60) CALENDAR DAYS.
8. AFTER ELECTRICAL EQUIPMENT HAS BEEN INSTALLED, EROSION CONTROL MEASURES TO BE REMOVED & SITE TO BE PERMANENTLY STABILIZED & APPROVED BY NCDOT WITHIN NINETY (90) CALENDAR DAYS.
9. ALL BARE SOILS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE NPDES PERMIT, OR, IF IN A CRITICAL AREA, BY THE END OF THE DAY.
10. PERMANENT GROUND COVER WILL BE PROVIDED FOR ALL DISTURBED AREAS WITHIN 14 WORKING DAYS OR NO MORE THAN 90 CALENDAR DAYS, WHICHEVER IS SHORTER. G.S. 113A-57(3).
11. STABILIZATION WILL BE PROVIDED FOR ALL DISTURBED AREAS WITHIN 14 DAYS AFTER CONSTRUCTION ACTIVITY IS COMPLETE UNLESS CONSTRUCTION ACTIVITY IS GOING TO RESUME WITHIN 21 DAYS, SLOPES 3H:1V OR STEEPER TO BE STABILIZED WITHIN 7 DAYS.
12. ADDITIONAL PERTINENT EROSION CONTROL MEASURES TO BE DETAILED IN OVERALL SITE GRADING AND EROSION CONTROL PLAN, PHASES I-III.
13. ALL SUBGRADE, FILL, AND STONE SHALL BE COMPACTED AS SPECIFIED IN THE GRADING SPECIFICATIONS.
14. FOLLOW CONSTRUCTION SEQUENCE NOTES FOR GENERAL PROCESS.
15. LAT/LONG COORDINATES SHOWN IN THIS PLAN SET WERE DERIVED FROM NORTH CAROLINA STATE PLANE COORDINATE SYSTEM. (NAD83/2011, US SURVEY FEET) DISTANCES SHOWN ARE US SURVEY FOOT GRID DISTANCES.
16. TOPOGRAPHIC AND PHYSICAL DATA ON SITE AND ALONG GILLESPIE STREET WERE DERIVED FROM A SURVEY PERFORMED BY BOOTH & ASSOCIATES, LLC ON MARCH 22-23, 2023. OFFSITE TOPOGRAPHIC DATA WAS DERIVED FROM PUBLICLY AVAILABLE LIDAR DATA AT THE "CONNECT NCDOT" WEB SITE. WETLANDS AREAS DERIVED FROM "NATIONAL WETLANDS INVENTORY". BOUNDARY, OWNERSHIP, AND RIGHT-OF-WAY DATA WAS DERIVED FROM A SURVEY PREPARED BY MOORMAN, KIZER, AND REITZEL, INC., 115 BROADFOOT AVENUE, FAYETTEVILLE, NC, 28305, BEARING A SEAL DATE OF FEBRUARY 1, 2018. (JOB# 17-1079-03; PLAT BOOK 140, PAGE 127)
17. CLARIFICATIONS CAN BE ADDRESSED BY CONTACTING LAURA HARRIS, P.E. Email: LAURA.HARRIS@BOOTH-ASSOC.COM / Phone: (919) 851-8770

EROSION AND SEDIMENT CONTROL NOTES

1. CONSTRUCTION OF EROSION AND SEDIMENT CONTROL DEVICES IS TO BE CARRIED OUT AS DESCRIBED IN THE CONSTRUCTION SEQUENCE AND THEIR LOCATION IS TO BE AS SHOWN ON THE DRAWINGS. CERTAIN DEVICES ARE TO BE CONSTRUCTED BEFORE GRADING OPERATIONS BEGIN. ALL DEVICES ARE TO BE MAINTAINED DURING CONSTRUCTION AND TEMPORARY ONES REMOVED AFTERWARD.
2. INSPECT SILT FENCE OUTLETS WEEKLY AFTER EACH SIGNIFICANT RAINFALL EVENT (ONE INCH OR GREATER WITHIN TWENTY-FOUR HOURS) CLEAR MESH WIRE OF DEBRIS OR OTHER OBJECTS TO PROVIDE ADEQUATE FLOW FOR SUBSEQUENT RAINS. TAKE CARE NOT TO DAMAGE OR UNDERCUT THE WIRE MESH DURING SEDIMENT REMOVAL. REPLACE STONE AS NEEDED.
3. ADD ADDITIONAL SILT FENCE SECTIONS AS NEEDED IN ORDER TO ENSURE ADEQUATE EROSION PROTECTION AND SILT FENCE INTEGRITY.
4. ADD SEED AND MULCH TO ANY DISTURBED SLOPES AS NEEDED. ALL SEEDED AREAS WILL BE CHECKED REGULARLY TO SEE THAT A GOOD STAND IS MAINTAINED. AREAS WILL BE FERTILIZED AND RESEEDED AS NEEDED.
5. ADD COIR WATLES THROUGHOUT SITE AS NEEDED AS SLOPE BREAKS AND WHERE EXCESSIVE STORM WATER VELOCITIES AND SCOURING ARE OBSERVED.
6. ALL BARE SOILS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT, OR, IF IN A CRITICAL AREA, BY THE END OF THE DAY. ALL DISTURBED AREAS FLATTER THAN 3:1 TO BE STABILIZED WITHIN 14 DAYS. SLOPES 3:1 OR STEEPER TO BE STABILIZED WITHIN 7 DAYS.
7. PERMANENT GROUND COVER TO BE INSTALLED IN ACCORDANCE WITH NCDOT CONSTRUCTION STORMWATER GENERAL PERMIT NCG010000 FOR ALL DISTURBED AREAS WITHIN 14 WORKING DAYS OR 90 CALENDAR DAYS (WHICHEVER IS SHORTER) FOLLOWING COMPLETION OF CONSTRUCTION OR DEVELOPMENT.
8. PERIMETER SEDIMENT CONTAINMENT DEVICES ARE TO REMAIN IN OPERATING CONDITION UNTIL PERMANENT VEGETATION IS ESTABLISHED.
9. THE CONTACT PERSON RESPONSIBLE FOR EROSION CONTROL MAINTENANCE FOR PWC FAYETTEVILLE IS DAVID DESCHAMPS. PHONE: (910) 263-1453 - EMAIL: DAVID.DESCHAMPS@FAYPWC.COM

GRADING NOTES

1. CONTRACTOR WILL BE RESPONSIBLE FOR INSTALLING AND MAINTAINING GRADE STAKES AND REFERENCE STAKES. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER OR THEIR ENGINEER IF ANY STAKES ARE LOST OR DESTROYED AS THE RESULT OF VANDALISM OR ACTIONS TAKEN BY SOMEONE OTHER THAN THE CONTRACTOR. UPON NOTIFICATION, THE OWNER OR THE ENGINEER WILL REPLACE THESE STAKES.
2. CONSTRUCTION OF EROSION AND SEDIMENT CONTROL DEVICES IS TO BE CARRIED OUT AS DESCRIBED IN THE CONSTRUCTION SEQUENCE AND THEIR LOCATION IS TO BE AS SHOWN ON THE DRAWINGS. CERTAIN DEVICES ARE TO BE CONSTRUCTED BEFORE GRADING OPERATIONS BEGIN. ALL DEVICES ARE TO BE MAINTAINED DURING CONSTRUCTION AND TEMPORARY ONES REMOVED AFTERWARD.
3. ALL VEGETATION AND DEBRIS SHOULD BE REMOVED FROM THE SITE. ALL SUBGRADE SOILS SHALL BE FREE OF ORGANIC MATERIAL FROM GRADING ACTIVITY AND BE COMPACTED, AND INSPECTED BY AN APPROVED GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF FILL MATERIAL. ANY MATERIAL TO BE STOCKPILED ON SITE SHALL BE STOCKPILED WITHIN THE CONSTRUCTION LIMITS AND IN DESIGNATED AREAS.
4. EXPOSED SUBGRADE SHALL BE COMPACTED TO AT LEAST NINETY FIVE PERCENT (95%) OF THE MAXIMUM DRY DENSITY WITHIN ±2 FROM THE OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D698.
5. COMPACTED SUBGRADE SHALL BE EXAMINED BY AN APPROVED GEOTECHNICAL ENGINEER OR CERTIFIED TESTING FIRM. FIELD COMPACTION TESTS SHOULD BE CONDUCTED EVERY TWO THOUSAND SQUARE FEET (2,000 FT²). VIRGIN SUBGRADE SOILS CAN BE PROOFROLLED TO DETECT ZONES OF SOFT OR LOOSE SOILS. ANY REPORTS BY GEOTECHNICAL ENGINEER TO BE FORWARDED TO BOOTH & ASSOCIATES, LLC, ENGINEER.
6. PROOFROLLING SHOULD BE DONE IN THE PRESENCE OF AN APPROVED GEOTECHNICAL ENGINEER. PROOFROLLING MAY BE ACCOMPLISHED BY WITH A LIGHTLY TO MODERATELY LOADED DUMP TRUCK OR SIMILAR CONSTRUCTION EQUIPMENT. ANY SOILS WHICH CONTINUE TO RUT OR DEFLECT EXCESSIVELY UNDER THE ROLLING OPERATIONS SHOULD BE UNDERCUT TO SUITABLE SOILS AND REPLACED WITH COMPACTED FILL MATERIAL AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
7. ANY OFF-SITE BORROW AND WASTE REQUIRED FOR THIS PROJECT MUST COME FROM A SITE WITH AN APPROVED EROSION CONTROL PLAN, A SITE REGULATED UNDER THE MINING ACT OF 1971, OR A LANDFILL REGULATED BY THE DIVISION OF SOLID WASTE MANAGEMENT. TRASH/DEBRIS AND OTHER SPOILS FROM DEMOLITION ACTIVITIES MUST BE DISPOSED OF AT A FACILITY REGULATED BY THE DIVISION OF SOLID WASTE MANAGEMENT. [15A NCAC 48.0110]
8. CONTRACTOR WILL BE RESPONSIBLE FOR HIRING A REPUTABLE GEOTECHNICAL ENGINEERING FIRM TO PERFORM TESTING.

DRIVEWAY NOTES

1. THE ACCESS DRIVE SHALL BE SURFACED PER THE DETAIL ON SHEET CG500.
2. THE SUBGRADE, DIRECTLY BELOW ACCESS DRIVE AND TWO (2) FEET OUTSIDE OF THE DRIVEWAYS SHALL BE MECHANICALLY COMPACTED IN THE TOP 12" TO AT LEAST NINETY-FIVE PERCENT (95%) OF THE MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D698. THE DRIVEWAY SUBGRADE SHALL BE MECHANICALLY COMPACTED DIRECTLY BELOW ONLY IN THE TOP 12" TO AT LEAST NINETY-FIVE PERCENT (95%) OF THE MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D698.
3. ACCESS DRIVE AS SHOWN ON THE DRAWINGS SHALL HAVE CRUSHER RUN PLACED IN TWO FOUR INCH (4") LAYERS AND COMPACTED TO NINETY-EIGHT PERCENT (98%) OF THE MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D1557.
4. MINIMUM GRAVEL DRIVEWAY THICKNESS SHALL BE EIGHT INCHES (8"). AGGREGATE SHALL BE PLACED IN TWO (2) COMPACTED LAYERS WITH A MINIMUM LIFT OF FOUR INCHES (4"), WITH A TOLERANCE OF PLUS OR MINUS HALF INCH (± 0.5")
5. COMPACTION TESTING SHOULD BE PERFORMED ONCE PER ONE-HUNDRED LINEAL FEET (100') MINIMUM.
6. COORDINATE PAVING OF ASPHALT APRON WITH NCDOT AT END OF CONSTRUCTION PER SHEET CG501 DETAIL.

BACKFILL NOTES

1. SAMPLES OF THE PROPOSED BACKFILL MATERIAL SHOULD BE TAKEN BY THE APPROVED GEOTECHNICAL ENGINEER BEFORE FILLING OPERATIONS BEGIN. ANY REPORTS BY GEOTECHNICAL ENGINEER TO BE FORWARDED TO BOOTH & ASSOCIATES, LLC, ENGINEER.
2. MATERIAL FOR BACKFILL SHALL BE COMPOSED OF EARTH FREE OF WOOD, GRASS, ROOTS, BROKEN CONCRETE, LARGE STONES, TRASH, OR DEBRIS OF ANY KIND. NO ROCK MATERIAL LARGER THAN SIX INCHES (6") IN MAXIMUM DIMENSION SHALL BE IN THE TOP TWENTY-FOUR INCHES (24") OF FILL.
3. A STANDARD PROCTOR COMPACTION TEST SHALL BE PERFORMED ON THE PROPOSED BACKFILL MATERIAL. SAMPLES SHOULD BE TESTED TO DETERMINE THE MAXIMUM DRY DENSITY, OPTIMUM MOISTURE CONTENT AND NATURAL MOISTURE CONTENT. THESE TEST RESULTS ARE TO BE USED TO ENSURE PROPER COMPACTION DURING BACKFILLING PROCEDURES.
4. ALL FILL MATERIAL SHALL BE PLACED IN LIFTS NOT TO EXCEED EIGHT INCHES (8") IN UN-COMPACTED THICKNESS AND BE FREE OF ALL ORGANIC MATERIAL.
 - 4.1. FILL SHALL NOT BE PLACED IN HEAVY RAIN.
 - 4.2. FILL SHALL NOT BE PLACED ON FROZEN GROUND AND FROZEN MATERIAL SHALL NOT BE USED AS FILL.
5. FIELD COMPACTION TESTS SHALL BE TAKEN BY THE APPROVED GEOTECHNICAL ENGINEER OR CERTIFIED TESTING FIRM (TYP). FROM EACH FILL VOLUME MEASURING 2,000 SQUARE FEET MAXIMUM BY TWELVE INCHES (12") DEEP.
6. IF TESTING RESULTS INDICATE THAT COMPACTION DOES NOT MEET SPECIFIED REQUIREMENTS, FILL MATERIALS SHALL BE REMOVED, REPLACED AS REQUIRED, AND COMPACTED AND RETESTED UNTIL ACCEPTABLE.
7. ALL FILL AREAS SHALL BE MECHANICALLY COMPACTED TO AT LEAST NINETY-FIVE PERCENT (95%) OF THE MAXIMUM DRY DENSITY WITHIN ±2 PERCENT FROM THE OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D698, EXCEPT IN THE FINAL FOOT WHICH SHALL BE INCREASED TO NINETY-EIGHT PERCENT (98%).
8. COMPACTED SUBGRADE SHALL BE APPROVED FOR 3,000 LBS PER SQUARE FOOT BEARING CAPACITY BY GEOTECHNICAL ENGINEER.

BACKFILL MATERIAL

1. MATERIAL FOR BACKFILL SHALL BE COMPOSED OF EARTH THAT IS FREE OF WOOD, GRASS, ROOTS, BROKEN CONCRETE, LARGE STONES, TRASH, OR DEBRIS OF ANY KIND AND COMPACTED PRIOR TO PLACEMENT.
2. THE GRADING CONTRACTOR SHALL BE RESPONSIBLE FOR HIRING A REPUTABLE GEOTECHNICAL ENGINEERING FIRM, APPROVED BY THE OWNER OR ENGINEER, TO PERFORM LABORATORY AND FIELD TESTING OF BACKFILL MATERIAL AT THE CONTRACTOR'S EXPENSE.
3. BACKFILL SHALL BE PLACED IN LIFTS NOT TO EXCEED 8" IN UN-COMPACTED THICKNESS AND MECHANICALLY COMPACTED TO AT LEAST 95% OF THE MAXIMUM DENSITY AT ±2% OPTIMUM MOISTURE CONTENT ACCORDING TO ASTM D698. DENSITY TESTING SHALL BE COMPLETED AND FILED FOR EVALUATION.
4. ALL FILL MATERIAL USED AT THE SITE SHALL UTILIZE A LOW PLASTICITY SOIL. (LIQUID LIMIT LESS THAN 50, PLASTICITY INDEX LESS THAN 25).
5. A STANDARD PROCTOR COMPACTION TEST SHALL BE PERFORMED BY THE APPROVED GEOTECHNICAL ENGINEERING FIRM ON THE MATERIAL TO BE USED AS BACKFILL.



NO.	DATE	REVISIONS
0	09/15/2023	ISSUED FOR BIDS - 60%

PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION

DRAWING TITLE: CONSTRUCTION SEQUENCE, LEGEND, AND NOTES

DRAWN BY:	MCW
CHECKED BY:	LRH
APPROVED BY:	LRH
DATE:	08/04/2023
SCALE:	N.T.S.
FILE NUMBER:	12548SCG
SHEET:	CG002

GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT

Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

SECTION E: GROUND STABILIZATION

Required Ground Stabilization Timeframes		
Site Area Description	Stabilize within this many calendar days after ceasing land disturbance	Timeframe variations
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b) High Quality Water (HQW) Zones	7	None
(c) Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
(d) Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed
(e) Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed unless there is zero slope

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

GROUND STABILIZATION SPECIFICATION

Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below:

Temporary Stabilization	Permanent Stabilization
<ul style="list-style-type: none"> Temporary grass seed covered with straw or other mulches and tackifiers Hydroseeding Rolled erosion control products with or without temporary grass seed Appropriately applied straw or other mulch Plastic sheeting 	<ul style="list-style-type: none"> Permanent grass seed covered with straw or other mulches and tackifiers Geotextile fabrics such as permanent soil reinforcement matting Hydroseeding Shrubs or other permanent plantings covered with mulch Uniform and evenly distributed ground cover sufficient to restrain erosion Structural methods such as concrete, asphalt or retaining walls Rolled erosion control products with grass seed

POLYACRYLAMIDES (PAMS) AND FLOCCULANTS

- Select flocculants that are appropriate for the soils being exposed during construction, selecting from the *NC DWR List of Approved PAMS/Flocculants*.
- Apply flocculants at or before the inlets to Erosion and Sediment Control Measures.
- Apply flocculants at the concentrations specified in the *NC DWR List of Approved PAMS/Flocculants* and in accordance with the manufacturer's instructions.
- Provide ponding area for containment of treated Stormwater before discharging offsite.
- Store flocculants in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures.

EQUIPMENT AND VEHICLE MAINTENANCE

- Maintain vehicles and equipment to prevent discharge of fluids.
- Provide drip pans under any stored equipment.
- Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
- Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
- Remove leaking vehicles and construction equipment from service until the problem has been corrected.
- Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products to a recycling or disposal center that handles these materials.

LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE

- Never bury or burn waste. Place litter and debris in approved waste containers.
- Provide a sufficient number and size of waste containers (e.g dumpster, trash receptacle) on site to contain construction and domestic wastes.
- Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
- Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
- Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers.
- Anchor all lightweight items in waste containers during times of high winds.
- Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow.
- Dispose waste off-site at an approved disposal facility.
- On business days, clean up and dispose of waste in designated waste containers.

PAINT AND OTHER LIQUID WASTE

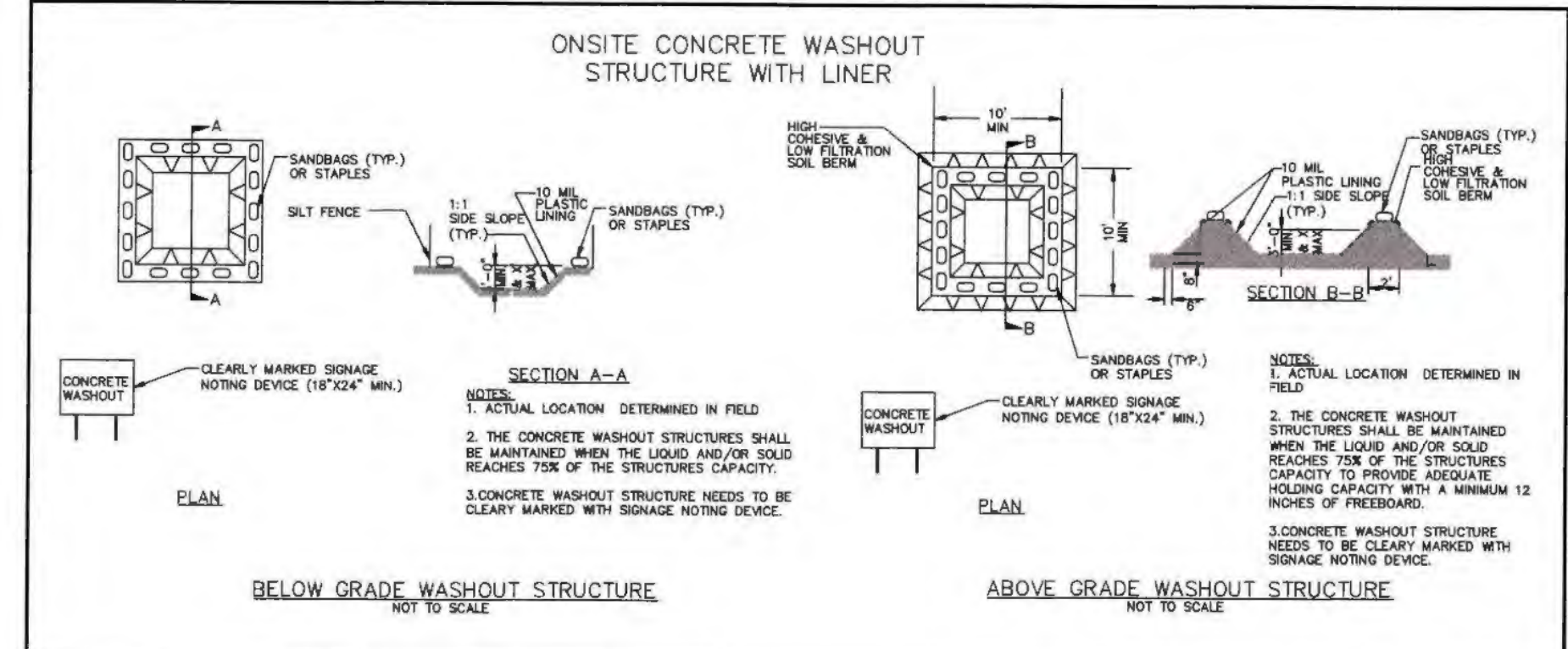
- Do not dump paint and other liquid waste into storm drains, streams or wetlands.
- Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
- Contain liquid wastes in a controlled area.
- Containment must be labeled, sized and placed appropriately for the needs of site.
- Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

PORTABLE TOILETS

- Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags.
- Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas.
- Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

EARTHEN STOCKPILE MANAGEMENT

- Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably available.
- Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile.
- Provide stable stone access point when feasible.
- Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.



CONCRETE WASHOUTS

- Do not discharge concrete or cement slurry from the site.
- Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
- Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.
- Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.
- Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.
- Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
- Locate washouts in an easily accessible area, on level ground and install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority.
- Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.
- Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions.
- At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

HERBICIDES, PESTICIDES AND RODENTICIDES

- Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions.
- Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.
- Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.
- Do not stockpile these materials onsite.

HAZARDOUS AND TOXIC WASTE

- Create designated hazardous waste collection areas on-site.
- Place hazardous waste containers under cover or in secondary containment.
- Do not store hazardous chemicals, drums or bagged materials directly on the ground.

NO.	DATE	REVISIONS
0	09/15/2023	ISSUED FOR BIDS - 60%

PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE: GROUND STABILIZATION AND MATERIALS HANDLING

DRAWN BY:	MCW
CHECKED BY:	LRH
APPROVED BY:	LRH
DATE:	08/04/2023
SCALE:	N.T.S.
FILE NUMBER:	12548SCG
SHEET:	

**PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING**

SECTION A: SELF-INSPECTION

Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.

Inspect	Frequency (during normal business hours)	Inspection records must include:
(1) Rain gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those unattended days (and this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "zero." The permittee may use another rain-monitoring device approved by the Division.
(2) E&SC Measures	At least once per 7 calendar days and within 24 hours of a rain event \geq 1.0 inch in 24 hours	1. Identification of the measures inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Indication of whether the measures were operating properly, 5. Description of maintenance needs for the measure, 6. Description, evidence, and date of corrective actions taken.
(3) Stormwater discharge outfalls (SDOs)	At least once per 7 calendar days and within 24 hours of a rain event \geq 1.0 inch in 24 hours	1. Identification of the discharge outfalls inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration, 5. Indication of visible sediment leaving the site, 6. Description, evidence, and date of corrective actions taken.
(4) Perimeter of site	At least once per 7 calendar days and within 24 hours of a rain event \geq 1.0 inch in 24 hours	If visible sedimentation is found outside site limits, then a record of the following shall be made: 1. Actions taken to clean up or stabilize the sediment that has left the site limits, 2. Description, evidence, and date of corrective actions taken, and 3. An explanation as to the actions taken to control future releases.
(5) Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event \geq 1.0 inch in 24 hours	If the stream or wetland has increased visible sedimentation or a stream has visible increased turbidity from the construction activity, then a record of the following shall be made: 1. Description, evidence and date of corrective actions taken, and 2. Records of the required reports to the appropriate Division Regional Office per Part III, Section C, Item (2)(a) of this permit.
(6) Ground stabilization measures	After each phase of grading	1. The phase of grading (installation of perimeter E&SC measures, clearing and grubbing, installation of storm drainage facilities, completion of all land-disturbing activity, construction or redevelopment, permanent ground cover). 2. Documentation that the required ground stabilization measures have been provided within the required timeframe or an assurance that they will be provided as soon as possible.

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

**PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING**

SECTION B: RECORDKEEPING

1. E&SC Plan Documentation

The approved E&SC plan as well as any approved deviation shall be kept on the site. The approved E&SC plan must be kept up-to-date throughout the coverage under this permit. The following items pertaining to the E&SC plan shall be kept on site and available for inspection at all times during normal business hours.

Item to Document	Documentation Requirements
(a) Each E&SC measure has been installed and does not significantly deviate from the locations, dimensions and relative elevations shown on the approved E&SC plan.	Initial and date each E&SC measure on a copy of the approved E&SC plan or complete, date and sign an inspection report that lists each E&SC measure shown on the approved E&SC plan. This documentation is required upon the initial installation of the E&SC measures or if the E&SC measures are modified after initial installation.
(b) A phase of grading has been completed.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate completion of the construction phase.
(c) Ground cover is located and installed in accordance with the approved E&SC plan.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate compliance with approved ground cover specifications.
(d) The maintenance and repair requirements for all E&SC measures have been performed.	Complete, date and sign an inspection report.
(e) Corrective actions have been taken to E&SC measures.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate the completion of the corrective action.

2. Additional Documentation to be Kept on Site

In addition to the E&SC plan documents above, the following items shall be kept on the site and available for inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical:

- (a) This General Permit as well as the Certificate of Coverage, after it is received.
- (b) Records of inspections made during the previous twelve months. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.

3. Documentation to be Retained for Three Years

All data used to complete the e-NOI and all inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]

**PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING**

SECTION C: REPORTING

1. Occurrences that Must be Reported

- Permittees shall report the following occurrences:
- (a) Visible sediment deposition in a stream or wetland.
 - (b) Oil spills if:
 - They are 25 gallons or more,
 - They are less than 25 gallons but cannot be cleaned up within 24 hours,
 - They cause sheen on surface waters (regardless of volume), or
 - They are within 100 feet of surface waters (regardless of volume).
 - (c) Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.
 - (d) Anticipated bypasses and unanticipated bypasses.
 - (e) Noncompliance with the conditions of this permit that may endanger health or the environment.

2. Reporting Timeframes and Other Requirements

After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requirements listed below. Occurrences outside normal business hours may also be reported to the Department's Environmental Emergency Center personnel at (800) 858-0368.

Occurrence	Reporting Timeframes (After Discovery) and Other Requirements
(a) Visible sediment deposition in a stream or wetland	<ul style="list-style-type: none"> • Within 24 hours, an oral or electronic notification. • Within 7 calendar days, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. • If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions.
(b) Oil spills and release of hazardous substances per Item 1(b)-(c) above	<ul style="list-style-type: none"> • Within 24 hours, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release.
(c) Anticipated bypasses [40 CFR 122.41(m)(3)]	<ul style="list-style-type: none"> • A report at least ten days before the date of the bypass, if possible. The report shall include an evaluation of the anticipated quality and effect of the bypass.
(d) Unanticipated bypasses [40 CFR 122.41(m)(3)]	<ul style="list-style-type: none"> • Within 24 hours, an oral or electronic notification. • Within 7 calendar days, a report that includes an evaluation of the quality and effect of the bypass.
(e) Noncompliance with the conditions of this permit that may endanger health or the environment [40 CFR 122.41(l)(7)]	<ul style="list-style-type: none"> • Within 24 hours, an oral or electronic notification. • Within 7 calendar days, a report that contains a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40 CFR 122.41(l)(6). • Division staff may waive the requirement for a written report on a case-by-case basis.

**PART II, SECTION G, ITEM (4)
DRAW DOWN OF SEDIMENT BASINS FOR MAINTENANCE OR CLOSE OUT**

Sediment basins and traps that receive runoff from drainage areas of one acre or more shall use outlet structures that withdraw water from the surface when these devices need to be drawn down for maintenance or close out unless this is infeasible. The circumstances in which it is not feasible to withdraw water from the surface shall be rare (for example, times with extended cold weather). Non-surface withdrawals from sediment basins shall be allowed only when all of the following criteria have been met:

- (a) The E&SC plan authority has been provided with documentation of the non-surface withdrawal and the specific time periods or conditions in which it will occur. The non-surface withdrawal shall not commence until the E&SC plan authority has approved these items,
- (b) The non-surface withdrawal has been reported as an anticipated bypass in accordance with Part III, Section C, Item (2)(c) and (d) of this permit,
- (c) Dewatering discharges are treated with controls to minimize discharges of pollutants from stormwater that is removed from the sediment basin. Examples of appropriate controls include properly sited, designed and maintained dewatering tanks, weir tanks, and filtration systems,
- (d) Vegetated, upland areas of the sites or a properly designed stone pad is used to the extent feasible at the outlet of the dewatering treatment devices described in Item (c) above,
- (e) Velocity dissipation devices such as check dams, sediment traps, and riprap are provided at the discharge points of all dewatering devices, and
- (f) Sediment removed from the dewatering treatment devices described in Item (c) above is disposed of in a manner that does not cause deposition of sediment into waters of the United States.



Booth & Associates
2000 Newwoods Drive Suite 200, Raleigh NC 27607
NC 10221



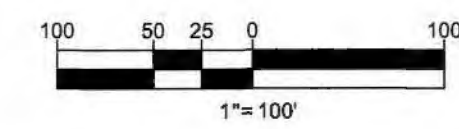
07/15/2023
© 08/2023

NO.	ISSUED FOR BIDS - 60X	REVISIONS	DATE
0			09/15/2023

PROJECT NAME: **GILLESPIE-B1.9 SOLAR UTILITY STATION**
DRAWING TITLE: **SELF-INSPECTION, RECORD KEEPING, AND RECORDING**

DRAWN BY:	MCW
CHECKED BY:	LRH
APPROVED BY:	LRH
DATE:	08/04/2023
SCALE:	N.T.S.
FILE NUMBER:	12548SCG

SHEET: **CG004**



REFERENCES

CONSTRUCTION SEQUENCE, LEGEND, AND NOTES.....CG002



09/15/2023
© 08/2023

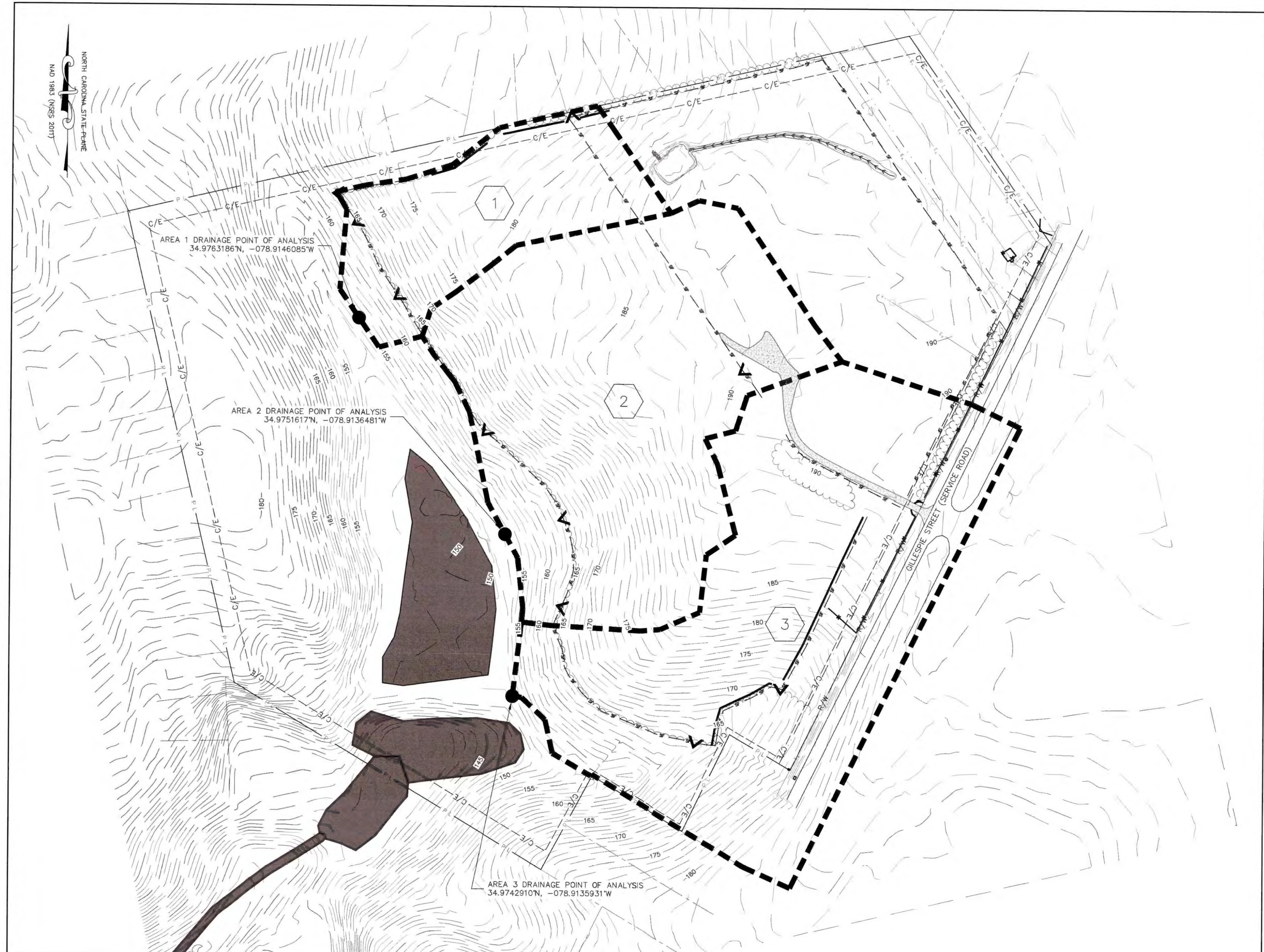
NO.	ISSUED FOR BIDS - 60%	REVISIONS	ENG. LRH	DATE 09/15/2023
0				

PROJECT NAME:	GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE:	EXISTING SITE CONDITIONS

DRAWN BY:	MCW
CHECKED BY:	LRH
APPROVED BY:	LRH
DATE:	08/04/2023
SCALE:	1" = 100'
FILE NUMBER:	12548SCG

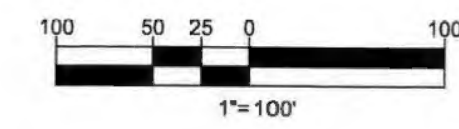
SHEET: CG100

NORTH CAROLINA STATE PLUMBING
NA01 1983 (NSRS 2017)



PRE-CONSTRUCTION DRAINAGE SUMMARY

Drainage Area	Size (Acres)	Runoff Coefficient (C)	Time of Concentration (Tc)	Length of Travel (ft)	Height of Most Remote Point Above Outlet (ft)	Average Slope (ft/ft)	Percent Impervious
1	3.40	0.32	3.501938519	640	34.00	0.053125	0.00%
2	9.56	0.33	4.530107858	830	38.00	0.045783133	1.26%
3	11.29	0.37	8.621287493	1480	40.50	0.027364865	10.87%



DRAINAGE AREAS

1 = DRAINAGE AREA 1

REFERENCES

CONSTRUCTION SEQUENCE, LEGEND, AND NOTES.....CG002



NO.	ISSUED FOR BIDS - 60%	REVISIONS	ENG. LRH	DATE 09/15/2023
0				



PROJECT NAME:	GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE:	PRE-CONSTRUCTION PROJECT DRAINAGE ANALYSIS
DRAWN BY:	MCW
CHECKED BY:	LRH
APPROVED BY:	LRH
DATE:	08/04/2023
SCALE:	1" = 100'
FILE NUMBER:	12548SCG
SHEET:	CG101

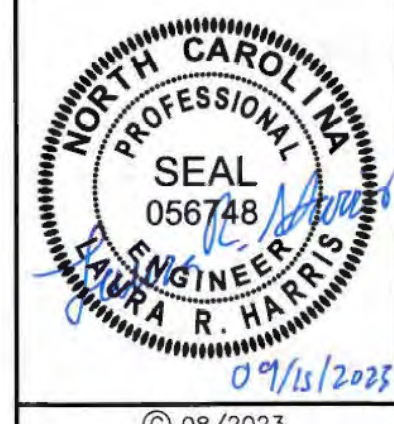


Cumberland County, North Carolina (NC051)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BaB	Blaney loamy sand, 2 to 8 percent slopes	2.6	6.00%
CaD	Candor sand, 8 to 15 percent slopes	9.3	21.10%
LaB	Lakeland sand, 1 to 8 percent slopes	4	9.20%
LbB	Lakeland-Urban land complex, 1 to 8 percent slopes	25.5	58.20%
W	Water	2.3	5.20%
WgB	Wagram-Urban land complex, 0 to 8 percent slopes	0.2	0.40%
Totals for Area of Interest		43.8	100.00%

SOIL TYPES

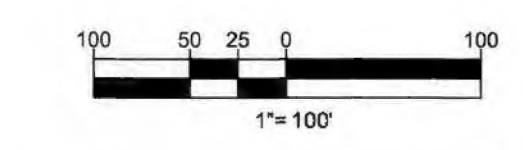
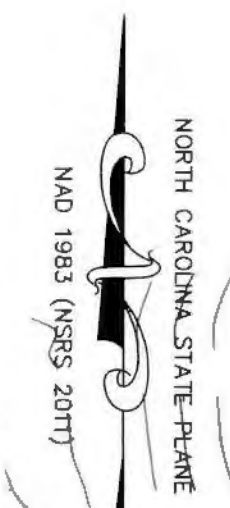
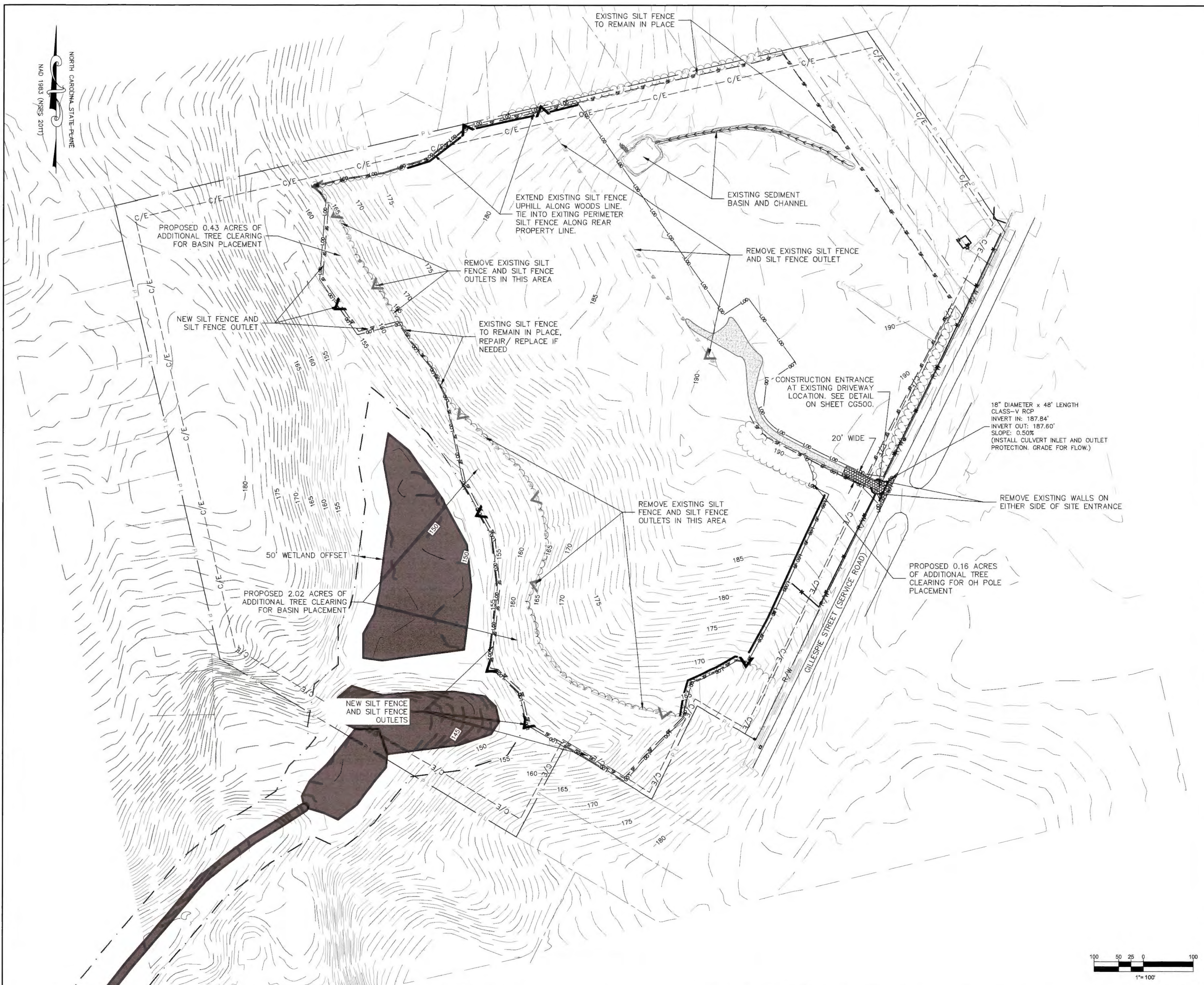
 SOIL TYPE IDENTIFIER
 HYDROLOGIC SOIL GROUP



NO.	REVISIONS	DATE
0	ISSUED FOR BIDS - 60%	08/15/2023

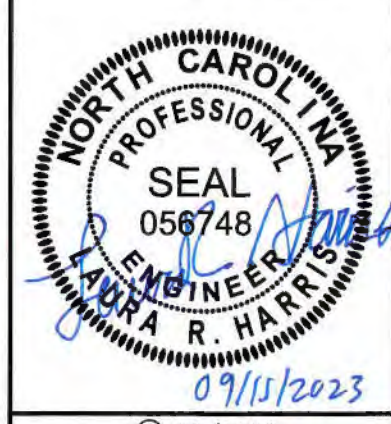
PROJECT NAME:	GILLESPIE-BI.9 SOLAR UTILITY STATION
DRAWING TITLE:	SITE SOILS
DRAWN BY:	MCW
CHECKED BY:	LRH
APPROVED BY:	LRH
DATE:	08/04/2023
SCALE:	1" = 100'
FILE NUMBER:	12548SCG
SHEET:	CG102

REFERENCES
 CONSTRUCTION SEQUENCE, LEGEND, AND NOTES.....CG002



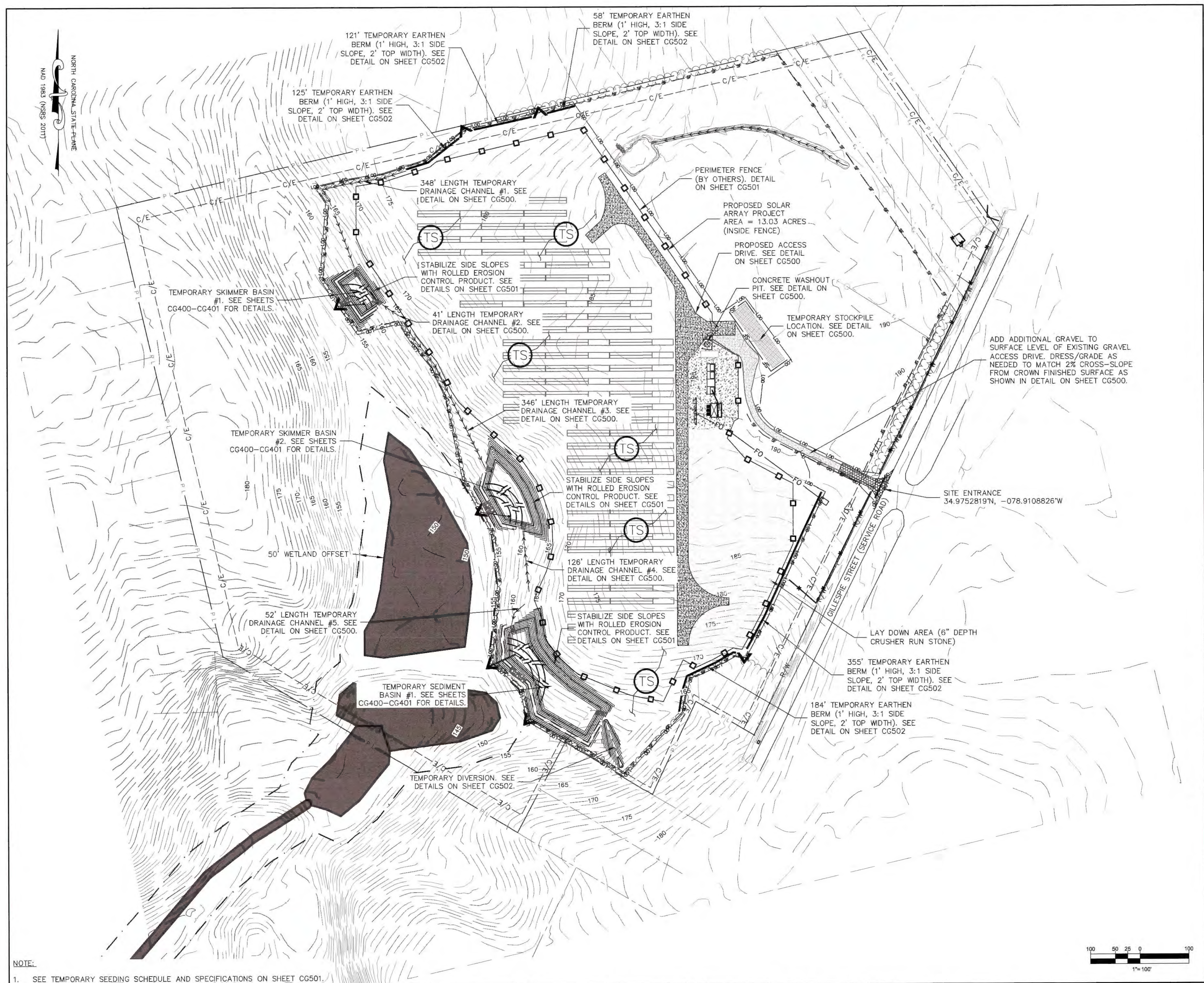
REFERENCES

CONSTRUCTION SEQUENCE, LEGEND, AND NOTES.....CG002

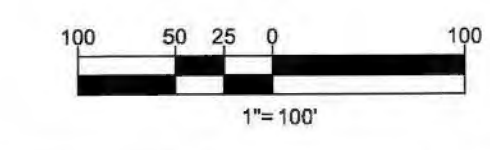


NO.	DATE	REVISIONS
0	09/15/2023	ISSUED FOR BIDS - 60%

PROJECT NAME:	GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE:	EROSION AND SEDIMENT CONTROL PLAN - PHASE I
DRAWN BY:	MCW
CHECKED BY:	LRH
APPROVED BY:	LRH
DATE:	08/04/2023
SCALE:	1" = 100'
FILE NUMBER:	12548SCG
SHEET:	CG200



NOTE:
 1. SEE TEMPORARY SEEDING SCHEDULE AND SPECIFICATIONS ON SHEET CG501.



REFERENCES
 CONSTRUCTION SEQUENCE, LEGEND, AND NOTES.....CG002

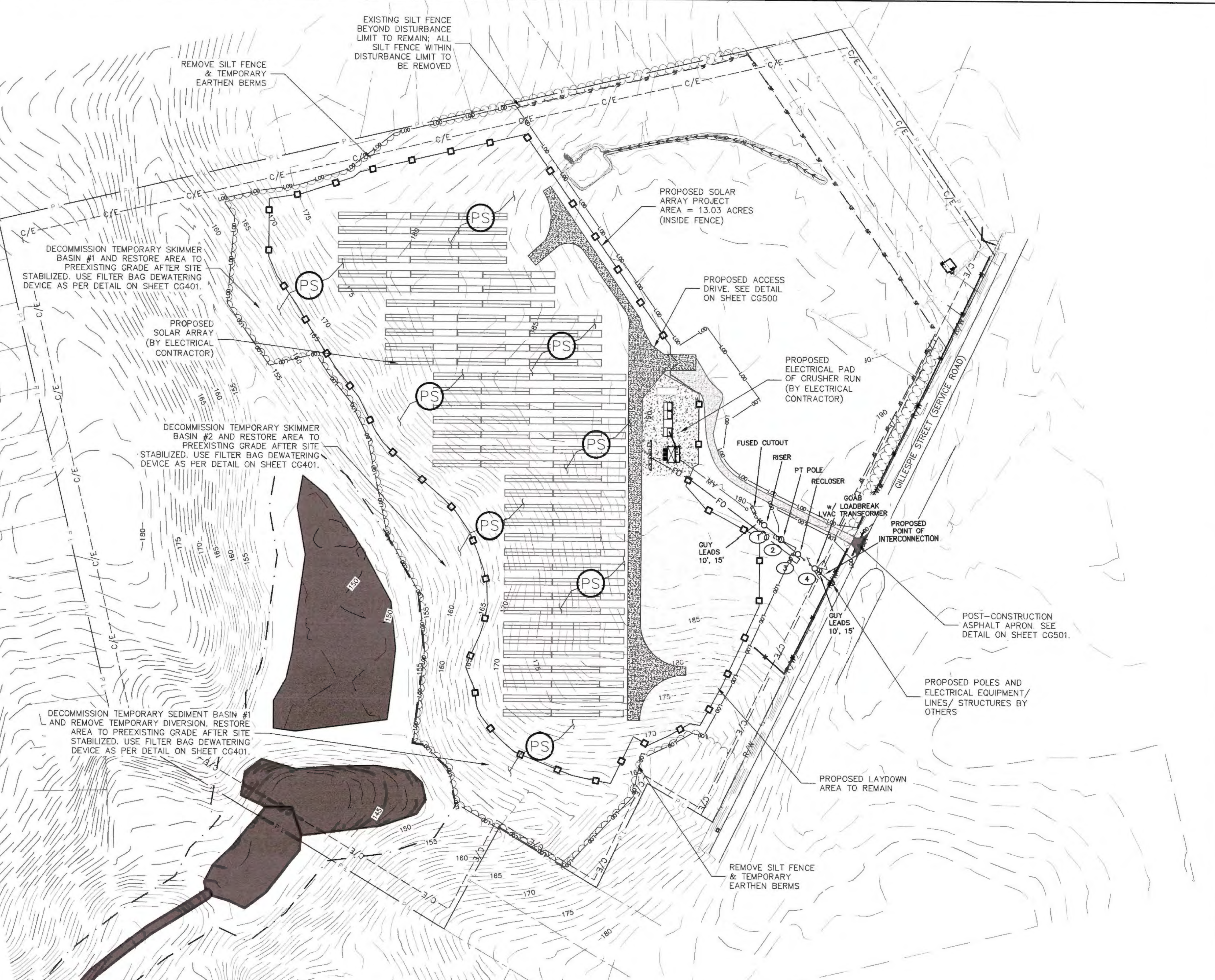
NO.	REVISIONS	DATE
0	ISSUED FOR BIDS - 60%	09/15/2023

PROJECT NAME:
**GILLESPIE-B1.9 SOLAR
 UTILITY STATION**

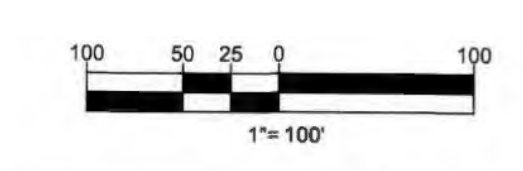
DRAWING TITLE:
**EROSION AND SEDIMENT
 CONTROL PLAN - PHASE II**

DRAWN BY:	MCW
CHECKED BY:	LRH
APPROVED BY:	LRH
DATE:	08/04/2023
SCALE:	1" = 100'
FILE NUMBER:	12548SCG
SHEET:	CG201

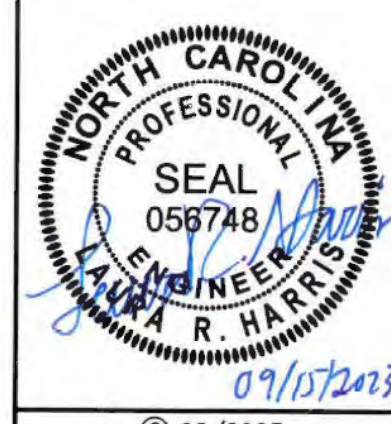
NORTH CAROLINA STATE PLANE
NAD 1983 (NRSN 2017)



- NOTE:
1. SEE PERMANENT SEEDING SCHEDULE AND SPECIFICATIONS ON SHEET CG501.
 2. PERMANENT SEEDING TO BE A MIX OF TALL FESCUE & WHITE CLOVER AT THE RATES GIVEN ON SHEET CG501. SEED MIXES OR RATES VARYING FROM THOSE PROVIDED WILL REQUIRE APPROVAL FROM OWNER & OWNER'S ENGINEER. SHEET CG501 ALSO PROVIDES GENERAL PERMANENT SEEDING RECOMMENDATIONS, WHICH MAY AID CONTRACTOR IN POTENTIAL SEEDING VARIANCE REQUESTS.



REFERENCES
CONSTRUCTION SEQUENCE, LEGEND, AND NOTES.....CG002



NO.	0	ISSUED FOR BIDS - 60%
REVISIONS		
ENG.	LRH	09/15/2023
DATE		

PROJECT NAME:	GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE:	EROSION AND SEDIMENT CONTROL PLAN - PHASE III
DRAWN BY:	MCW
CHECKED BY:	LRH
APPROVED BY:	LRH
DATE:	08/04/2023
SCALE:	1" = 100'
FILE NUMBER:	12548SCG
SHEET:	CG202

NORTH CAROLINA STATE PLANE
 NAD 1983 (NRS 2011)



AREA 1 DRAINAGE POINT OF ANALYSIS
 34.9763186°N, -078.9146085°W

AREA 2 DRAINAGE POINT OF ANALYSIS
 34.9751617°N, -078.9136481°W

AREA 3 DRAINAGE POINT OF ANALYSIS
 34.9742910°N, -078.9135931°W

PROPOSED SOLAR
 ARRAY PROJECT
 AREA = 13.03 ACRES
 (INSIDE FENCE)

FUSED CUTOUT
 RISER
 PT POLE
 RECLOSER

GOAB
 LVAC TRANSFORMER
 LOADBREAK

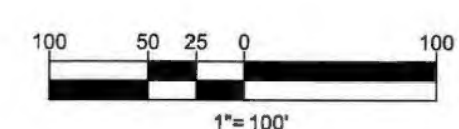
PROPOSED POINT OF
 INTERCONNECTION

GUY LEADS
 10', 15'

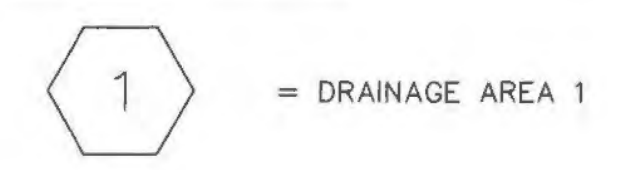
GUY LEADS
 10', 15'

POST-CONSTRUCTION DRAINAGE SUMMARY

Drainage Area	Size (Acres)	Runoff Coefficient (C)	Time of Concentration (Tc)	Length of Travel (ft)	Height of Most Remote Point Above Outlet (ft)	Average Slope (ft/ft)	Percent Impervious
1	3.40	0.35	3.501938519	640	34.00	0.053125	0.00%
2	9.56	0.35	4.530107858	830	38.00	0.045783133	0.00%
3	11.29	0.39	8.621287493	1480	40.50	0.027364865	10.51%



DRAINAGE AREAS



REFERENCES

CONSTRUCTION SEQUENCE, LEGEND, AND NOTES.....CG002



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 2300 Reawoods Drive Suite 300, Raleigh NC 27607
 NC E-021

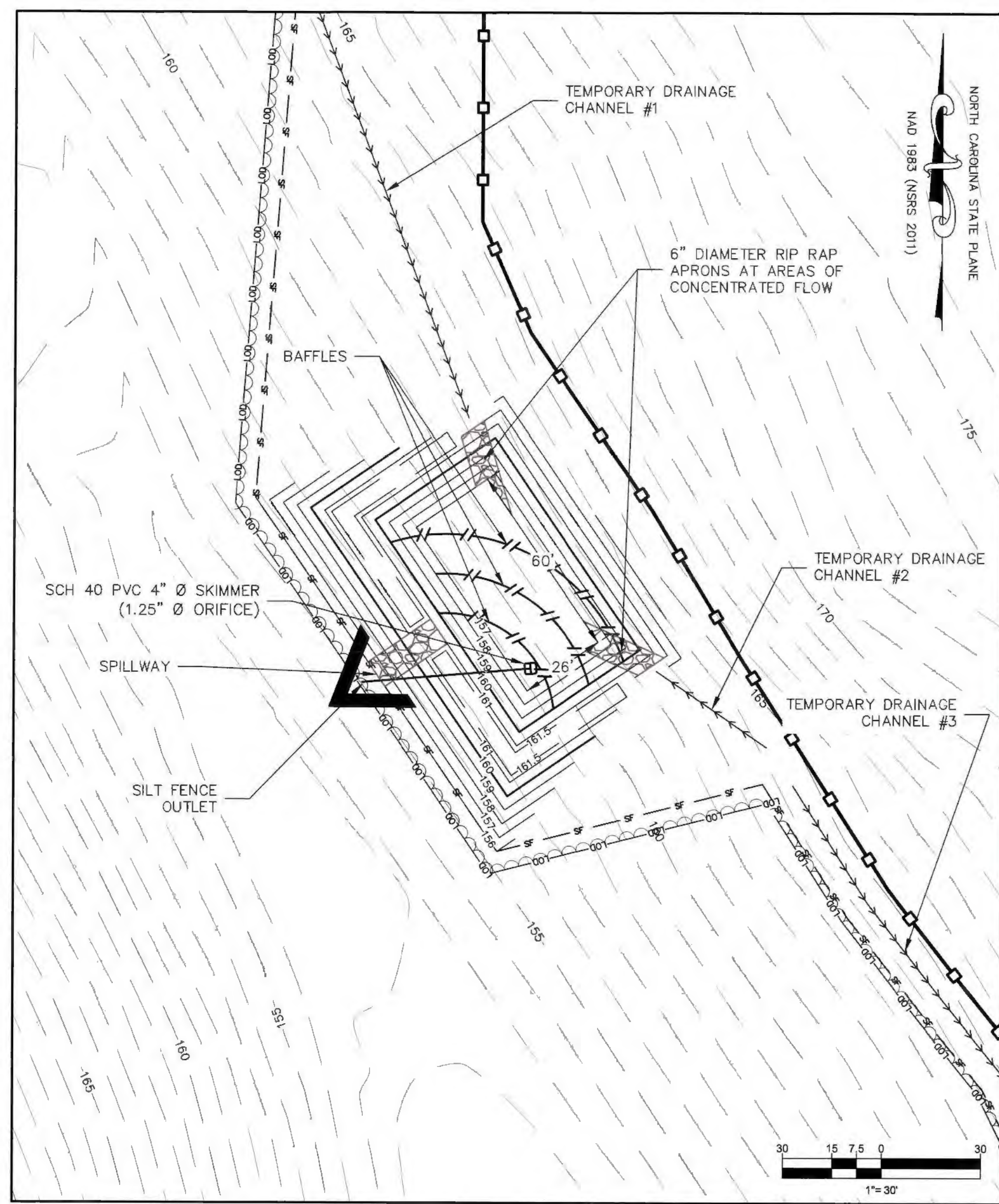


NO.	ISSUED FOR BIDS	REVISIONS	DATE
0		50%	09/15/2023

PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION
 DRAWING TITLE: POST-CONSTRUCTION PROJECT DRAINAGE ANALYSIS

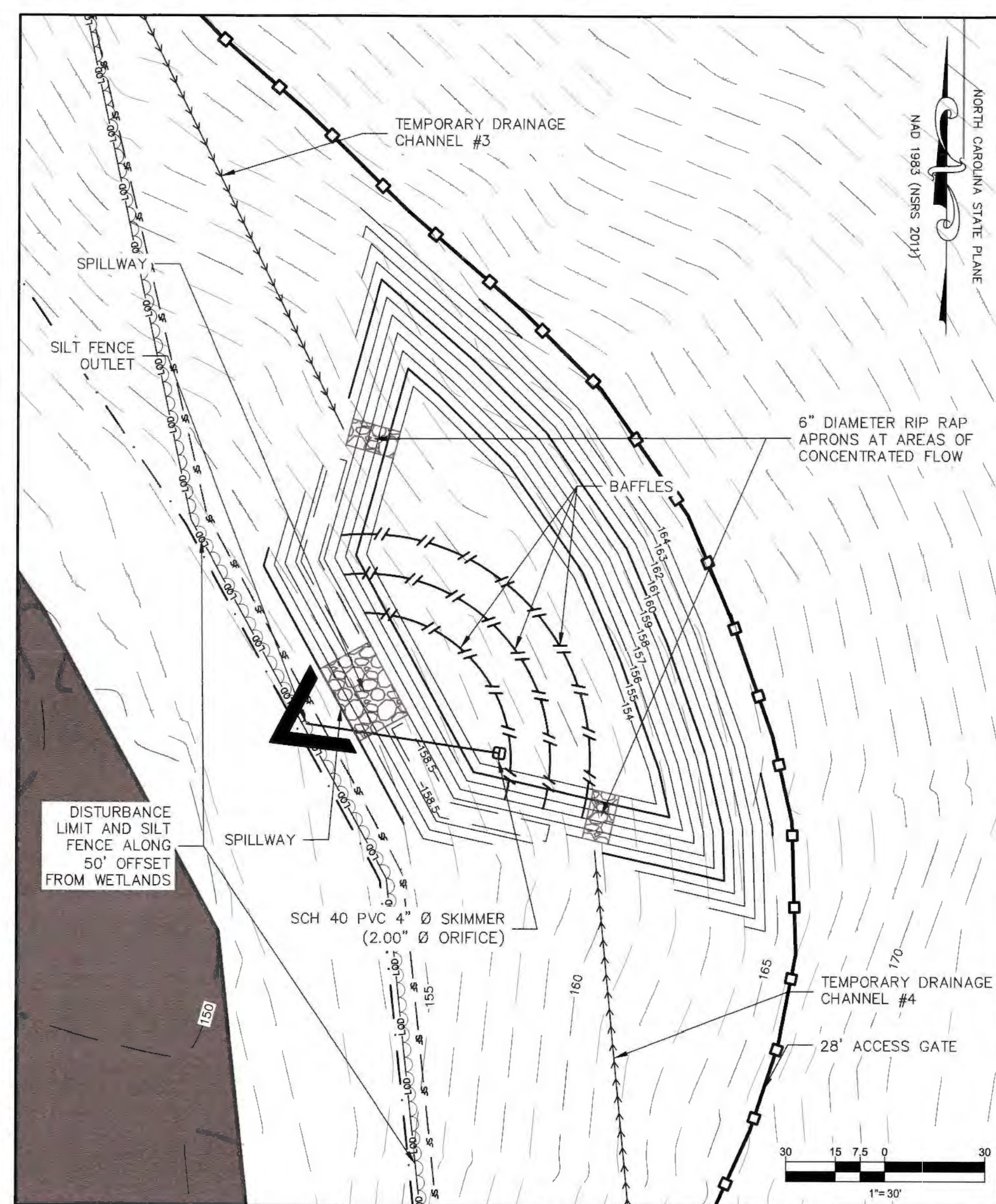
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CHECKED BY:	LRH
APPROVED BY:	LRH
DATE:	08/04/2023
SCALE:	1" = 100'
FILE NUMBER:	12548SCG

SHEET: CG300



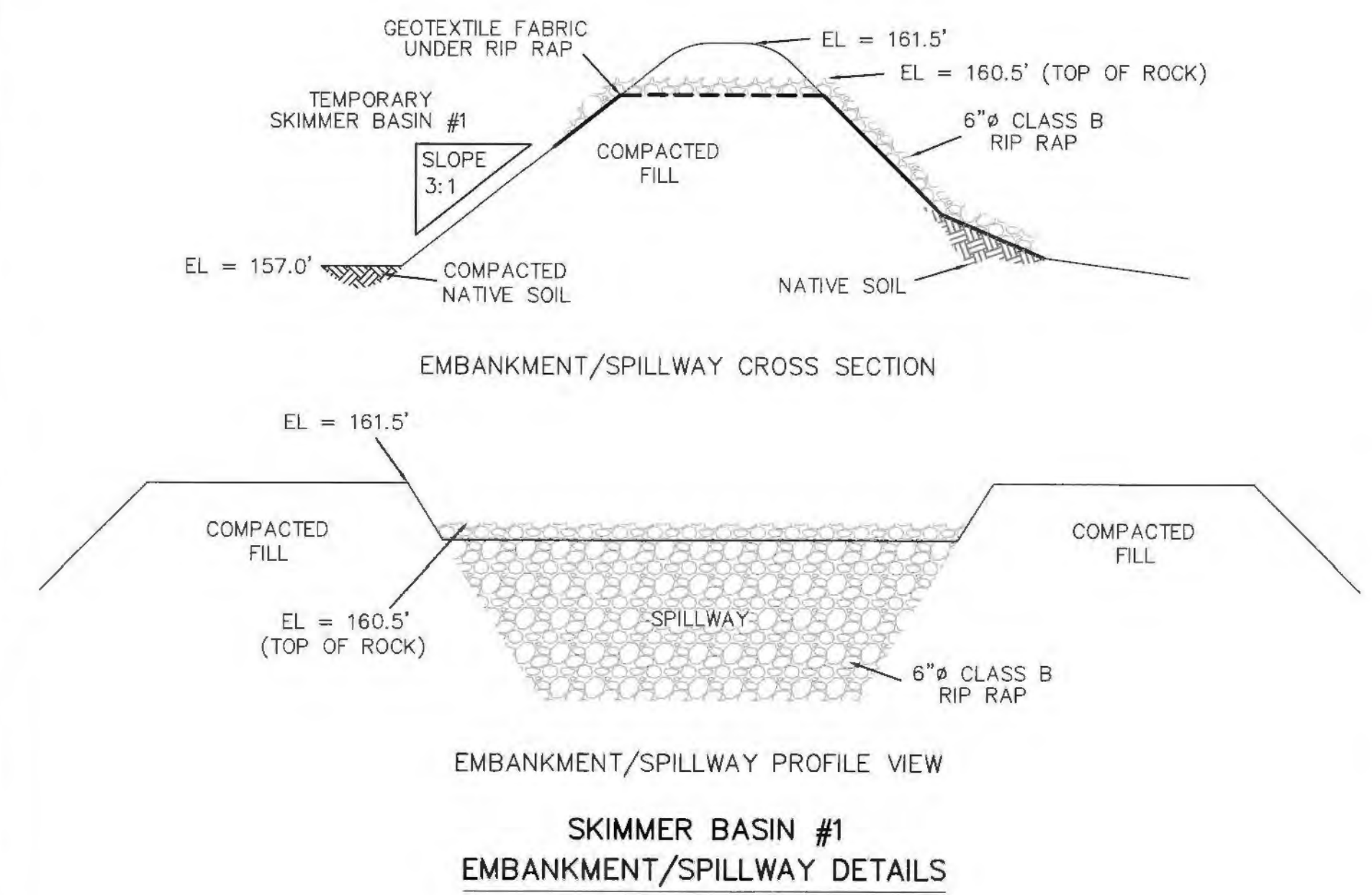
SKIMMER BASIN #1 PLAN VIEW

SCALE: 1" = 30'



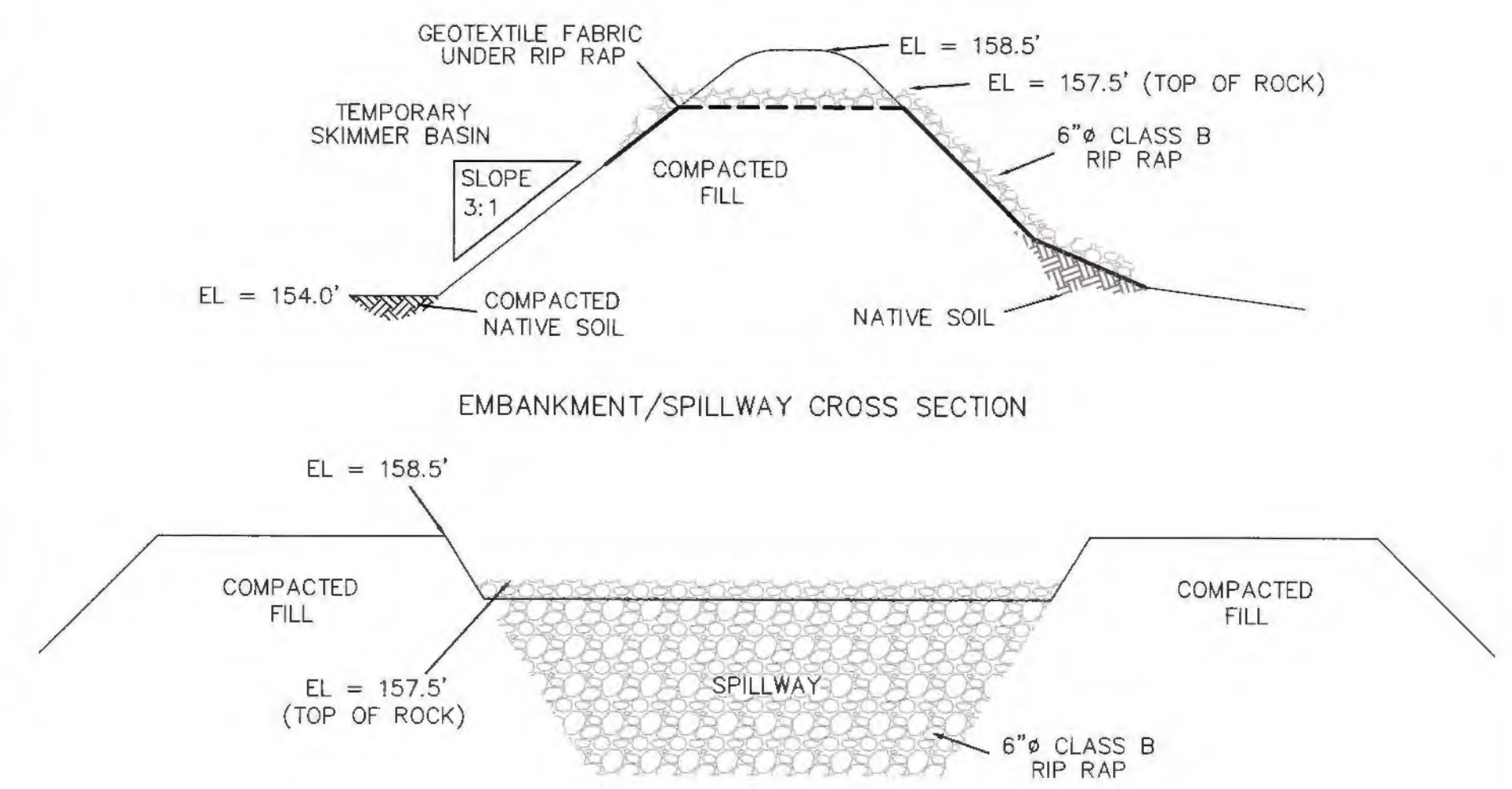
SKIMMER BASIN #2 PLAN VIEW

SCALE: 1" = 30'



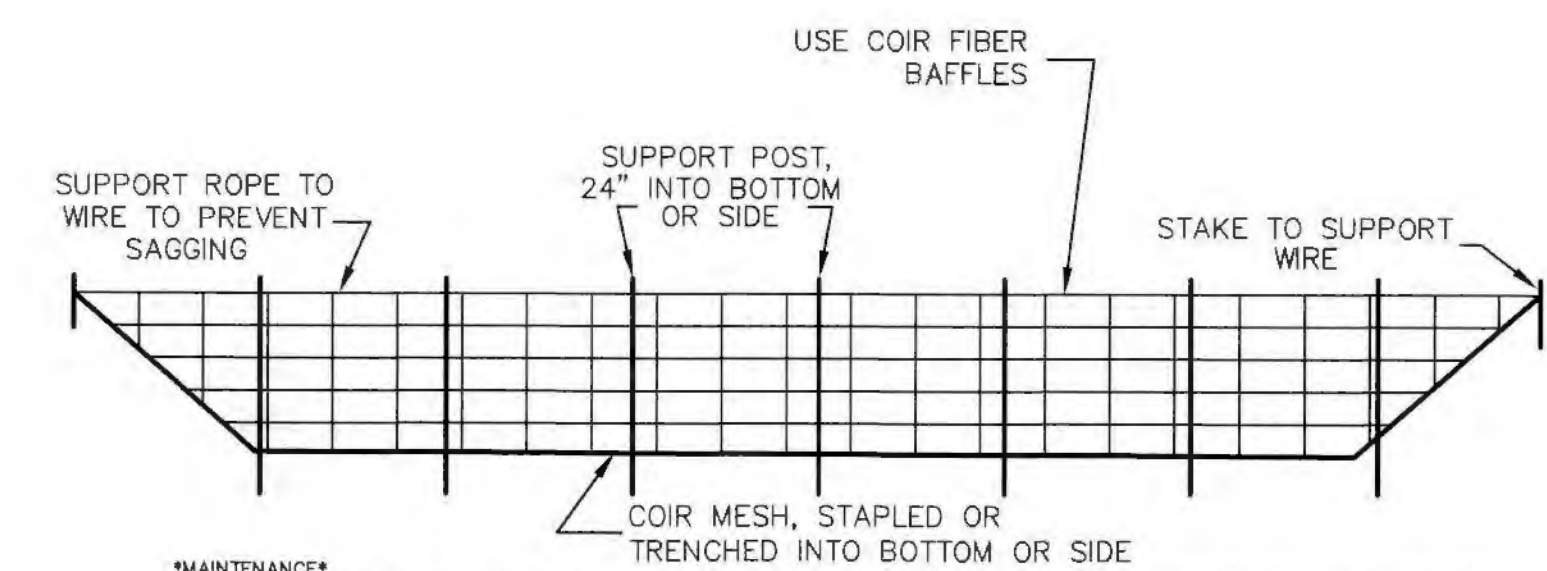
SKIMMER BASIN #1
EMBANKMENT/SPILLWAY DETAILS

N.T.S.



SKIMMER BASIN #2
EMBANKMENT/SPILLWAY DETAILS

N.T.S.



MAINTENANCE
INSPECT BAFFLES AT LEAST ONCE A WEEK AND AFTER EACH RAINFALL. MAKE ANY REPAIRS IMMEDIATELY. BE SURE TO MAINTAIN ACCESS TO THE BAFFLES. SHOULD THE FABRIC OF THE BAFFLES COLLAPSE, TEAR, DECOMPOSE, OR BECOME INEFFECTIVE, REPLACE IT PROMPTLY. REMOVE SEDIMENT DEPOSITS WHEN IT REACHES HALF FULL TO PROVIDE ADEQUATE STORAGE VOLUME FOR THE NEXT RAIN AND TO REDUCE PRESSURE ON THE BAFFLES. TAKE CARE TO AVOID DAMAGING THE BAFFLES DURING CLEANOUT. SEDIMENT DEPTH SHOULD NEVER EXCEED HALF THE DESIGNED STORAGE DEPTH. AFTER THE CONTRIBUTING DRAINAGE HAS BEEN PROPERLY STABILIZED, REMOVE ALL BAFFLE MATERIALS AND UNSTABLE SEDIMENT DEPOSITS, BRING THE AREA TO GRADE AND STABILIZE IT.

BAFFLE DETAIL

N.T.S.

REFERENCES

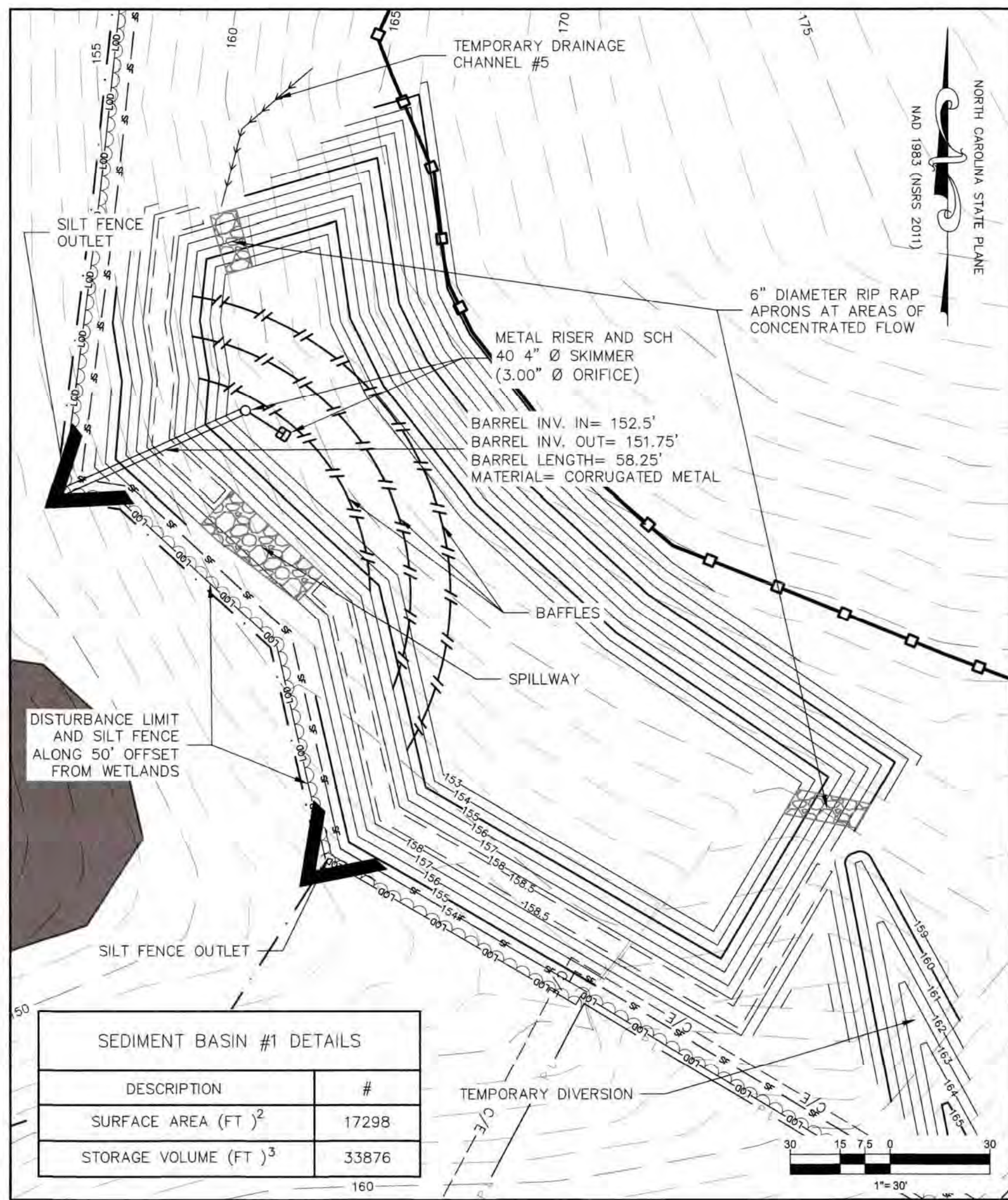
CONSTRUCTION SEQUENCE, LEGEND, AND NOTES.....CG002

SKIMMER BASIN #1 DETAILS			
DESCRIPTION	#	DESCRIPTION	#
BOTTOM ELEVATION	157.0'	SURFACE AREA (FT) ²	3432
POOL ELEVATION	160.0'	STORAGE VOLUME (FT) ³	7306
EMERGENCY SPILLWAY ELEVATION	160.5'	OUTLET PIPE LENGTH 4" SCHEDULE 40 PVC BARREL	49.5'
TOP OF BANK ELEVATION	161.5'	OUTLET PIPE INLET INVERT ELEV. SKIMMER DEWATERING DEVICE	157.0'
SIDE SLOPE RATIO	3H:1V	OUTLET PIPE OUTLET INVERT ELEV. LOW END	155.0'
SPILLWAY WIDTH	9.0'	SKIMMER ORIFICE PLATE Ø FOR 3 DAY DRAW DOWN	1.25"

SKIMMER BASIN #2 DETAILS			
DESCRIPTION	#	DESCRIPTION	#
BOTTOM ELEVATION	154.0'	SURFACE AREA (FT) ²	8712
POOL ELEVATION	157.0'	STORAGE VOLUME (FT) ³	21088
EMERGENCY SPILLWAY ELEVATION	157.5'	OUTLET PIPE LENGTH 4" SCHEDULE 40 PVC BARREL	57.0'
TOP OF BANK ELEVATION	158.5'	OUTLET PIPE INLET INVERT ELEV. SKIMMER DEWATERING DEVICE	154.0'
SIDE SLOPE RATIO	3H:1V	OUTLET PIPE OUTLET INVERT ELEV. LOW END	153.3'
SPILLWAY WIDTH	25.0'	SKIMMER ORIFICE PLATE Ø FOR 3 DAY DRAW DOWN	2.00"

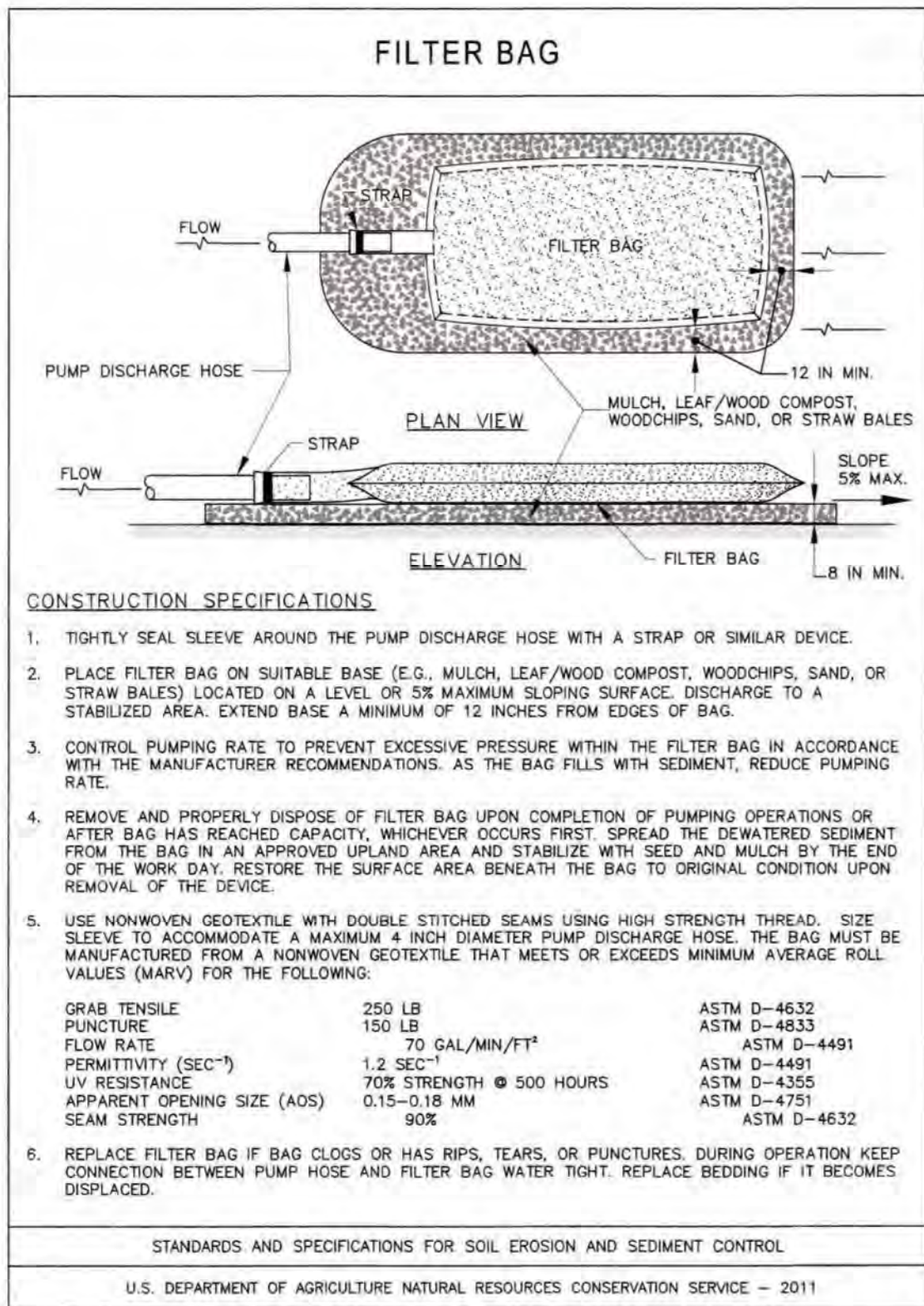
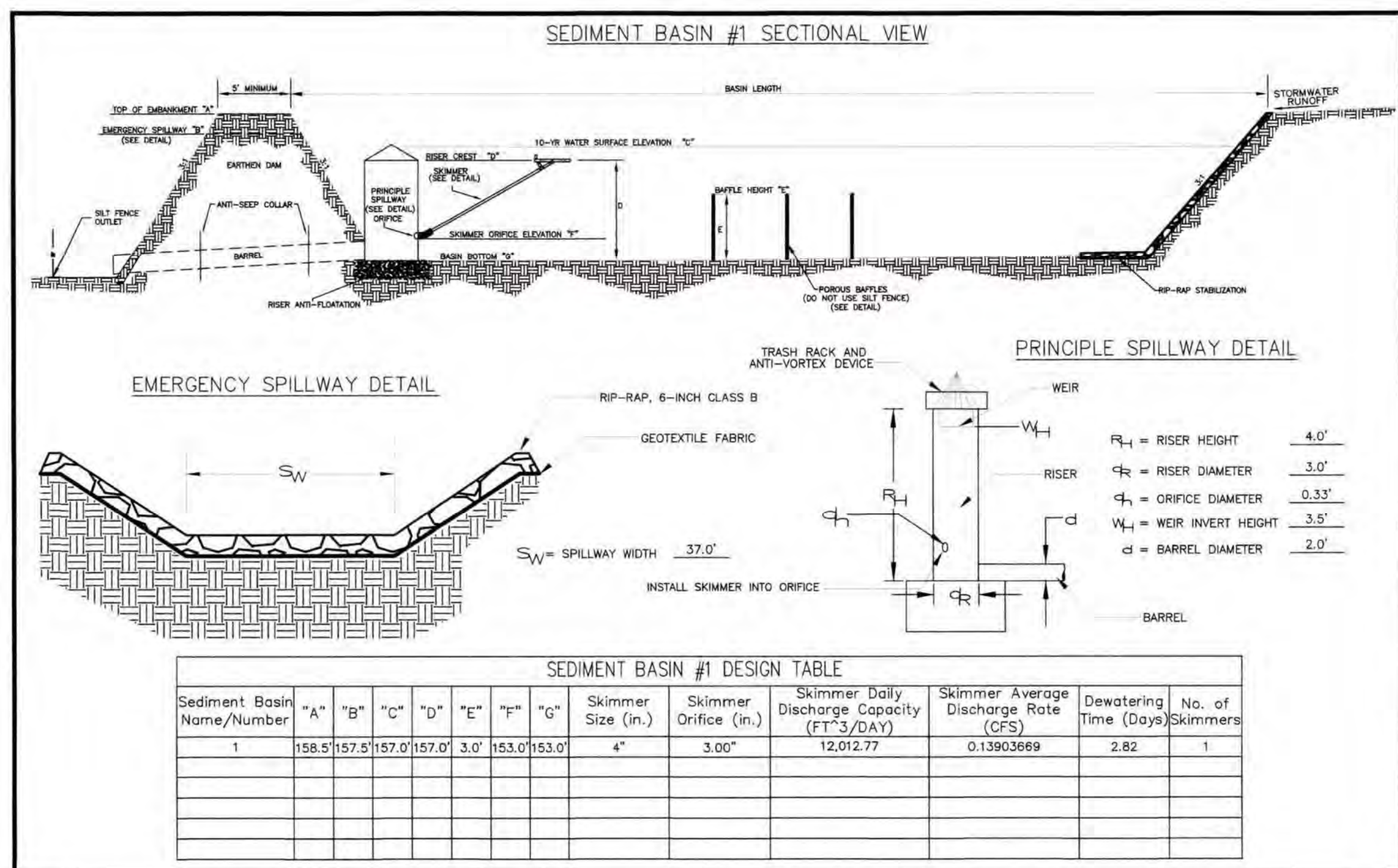
NO.	REVISIONS	DATE
0	ISSUED FOR BIDS - 60%	09/15/2023

PROJECT NAME:	GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE:	BASIN DETAILS
DRAWN BY:	MCW
CHECKED BY:	LRH
APPROVED BY:	LRH
DATE:	08/04/2023
SCALE:	AS SHOWN
FILE NUMBER:	12548SCG
SHEET:	CG400



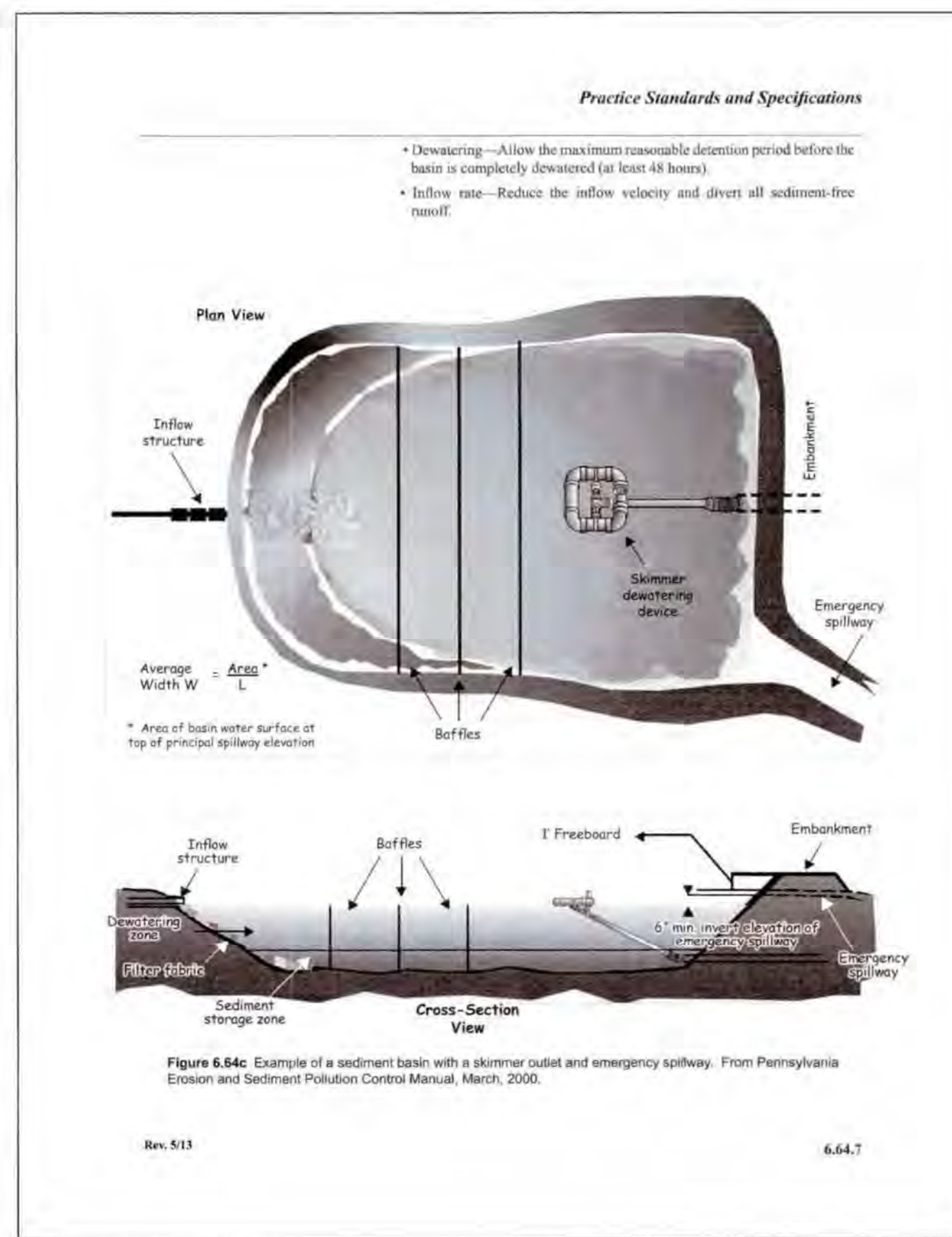
SEDIMENT BASIN #1 PLAN VIEW

SCALE: 1" = 30'



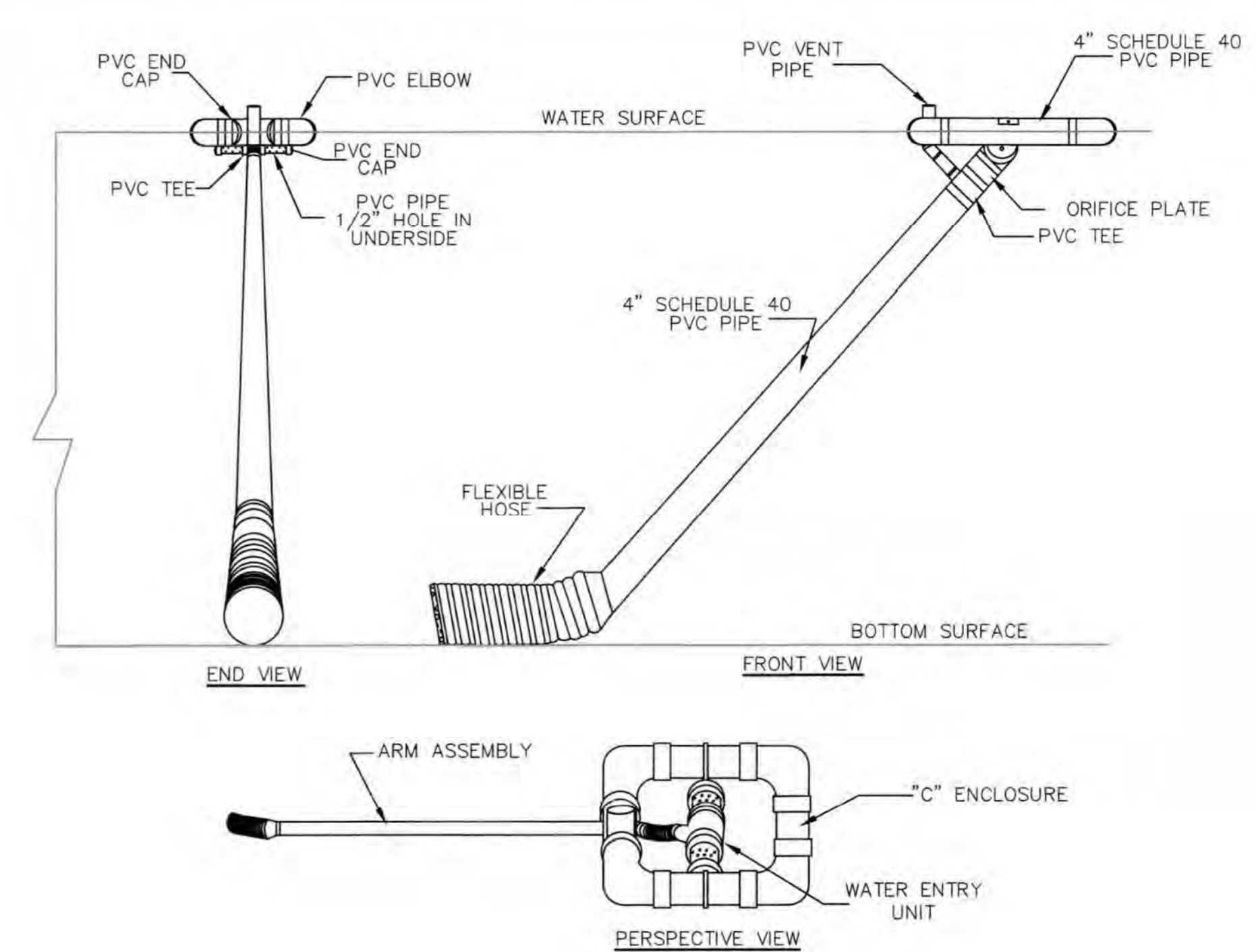
FILTER BAG DEWATERING DEVICE

N.T.S.



SKIMMER BASIN (TYP.)

N.T.S.



CONSTRUCTION SPECIFICATIONS:

- CLEAR, GRUB, AND STRIP THE AREA UNDER THE EMBANKMENT OF ALL VEGETATION AND ROOT MAT. REMOVE ALL SURFACE SOIL CONTAINING HIGH AMOUNTS OF ORGANIC MATTER AND STOCKPILE OR DISPOSE OF IT PROPERLY. HAUL ALL OBJECTIONABLE MATERIAL TO THE DESIGNATED DISPOSAL AREA. PLACE TEMPORARY SEDIMENT CONTROL MEASURES BELOW BASIN AS NEEDED.
- ENSURE THAT FILL MATERIAL FOR THE EMBANKMENT IS FREE OF ROOTS, WOODY VEGETATION, ORGANIC MATTER, AND OTHER OBJECTIONABLE MATERIAL. PLACE THE FILL IN LIFTS NOT TO EXCEED 9 INCHES, AND MACHINE COMPACT IT. OVER FILL THE EMBANKMENT 6 INCHES TO ALLOW FOR SETTLEMENT.
- SHAPE THE BASIN TO THE SPECIFIED DIMENSIONS. PREVENT THE SKIMMING DEVICE FROM SETTLING INTO THE MUD BY EXCAVATING A SHALLOW PIT UNDER THE SKIMMER OR PROVIDING A LOW SUPPORT UNDER THE SKIMMER OF STONE AND TIMBER.
- PLACE THE BARREL (TYP. 4" SCH. 40 PVC PIPE) ON A FIRM, SMOOTH FOUNDATION OF IMPERVIOUS SOIL. DO NOT USE PERVIOUS MATERIAL SUCH AS SAND, GRAVEL, OR CRUSHED STONE AS BACKFILL AROUND THE PIPE. PLACE THE FILL MATERIAL AROUND THE PIPE SPILLWAY IN 4" LAYERS AND COMPACT IT UNDER AND AROUND THE PIPE TO AT LEAST THE SAME DENSITY AS THE ADJACENT EMBANKMENT. CARE MUST BE TAKEN NOT TO RAISE THE PIPE FROM THE FIRM CONTACT WITH ITS FOUNDATION WHEN COMPACTING UNDER THE PIPE HAUNCHES. PLACE A MINIMUM DEPTH OF 2' OF COMPACTED BACKFILL OVER THE PIPE SPILLWAY BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT. IN NO CASE SHOULD BE PIPE CONDUIT BE INSTALLED BY CUTTING A TRENCH THROUGH THE DAM AFTER THE EMBANKMENT IS COMPLETE.
- ASSEMBLE THE SKIMMER FOLLOWING THE MANUFACTURER'S INSTRUCTIONS, OR AS DESIGNED.
- LAY THE ASSEMBLED SKIMMER ON THE BOTTOM OF THE BASIN WITH THE FLEXIBLE JOINT AT THE INLET OF THE BARREL PIPE. ATTACH THE FLEXIBLE JOINT TO THE BARREL PIPE AND POSITION THE SKIMMER OVER THE EXCAVATED PIT OR SUPPORT. BE SURE TO ATTACH A ROPE TO THE SKIMMER AND ANCHOR IT TO THE SIDE OF THE BASIN. THIS WILL BE USED TO PULL THE SKIMMER TO THE SIDE FOR MAINTENANCE.
- EARTHEN SPILLWAYS - INSTALL THE SPILLWAY IN UNDISTURBED SOIL TO THE GREATER EXTENT POSSIBLE. THE ACHIEVEMENT OF PLANNED ELEVATIONS, GRADE, DESIGN WIDTH, AND ENTRANCE AND EXIT CHANNEL SLOPES ARE CRITICAL TO THE SUCCESSFUL OPERATION OF THE SPILLWAY. THE SPILLWAY SHOULD BE LINED WITH LAMINATED PLASTIC OR IMPERMEABLE GEOTEXTILE FABRIC. THE FABRIC MUST BE WIDE AND LONG ENOUGH TO COVER THE BOTTOM AND SIDES AND EXTEND ONTO THE TOP OF THE DAM FOR ANCHORING IN A TRENCH. THE EDGES MAY BE SECURED WITH 8" STAPLES OR PINS. THE FABRIC MUST BE LONG ENOUGH TO EXTEND DOWN THE SLOPE AND EXIT ONTO STABLE GROUND. THE WIDTH OF THE FABRIC MUST BE ONE PIECE, NOT JOINED OR SPLICED; OTHERWISE WATER CAN GET UNDER THE FABRIC. IF THE LENGTH OF THE FABRIC IS INSUFFICIENT FOR THE ENTIRE LENGTH OF THE SPILLWAY, MULTIPLE SECTIONS, PLANNING THE COMPLETE WIDTH, MAY BE USED. THE UPPER SECTION(S) SHOULD OVERLAP THE LOWER SECTION(S) SO THAT WATER CANNOT FLOW UNDER THE FABRIC. SECURE THE UPPER EDGE AND SIDES OF THE FABRIC IN A TRENCH WITH STAPLES OR PINS.
- INLETS - DISCHARGE WATER INTO THE BASIN IN A MANNER TO PREVENT EROSION. USE TEMPORARY SLOPE DRAINS OR DIVERSIONS WITH OUTLET PROTECTION TO DIVERT SEDIMENT-LADEN WATER TO THE UPPER END OF THE POOL AREA TO IMPROVE BASIN TRAP EFFICIENCY.
- EROSION CONTROL - CONSTRUCT THE STRUCTURE SO THAT THE DISTURBED AREA IS MINIMIZED. DIVERT SURFACE WATER AWAY FROM BARE AREAS. COMPLETE THE EMBANKMENT BEFORE THE AREA IS CLEARED. STABILIZE THE EMERGENCY SPILLWAY EMBANKMENT AND ALL OTHER DISTURBED AREAS ABOVE THE ORFICE OF THE PRINCIPAL SPILLWAY IMMEDIATELY AFTER CONSTRUCTION.
- INSTALL POROUS BAFFLES AS SPECIFIED IN BAFFLE DETAIL.
- AFTER ALL THE SEDIMENT-PRODUCING AREAS HAVE BEEN PERMANENTLY STABILIZED, MOVE THE STRUCTURE AND ALL THE UNSTABLE SEDIMENT. SMOOTH THE AREA TO BLEND WITH THE ADJOINING AREAS AND STABILIZE PROPERLY.

MAINTENANCE NOTES:

- INSPECT SKIMMER SEDIMENT BASINS AT LEAST WEEKLY AND AFTER EACH SIGNIFICANT (1 INCH OR GREATER) RAINFALL EVENT AND REPAIR IMMEDIATELY. REMOVE SEDIMENT AND RESTORE THE BASIN TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT ACCUMULATES TO ONE-HALF THE HEIGHT OF THE FIRST BAFFLE. PULL THE SKIMMER TO ONE SIDE SO THAT THE SEDIMENT UNDERNEATH IT CAN BE EXCAVATED. EXCAVATE THE SEDIMENT FROM THE ENTIRE BASIN, NOT JUST AROUND THE SKIMMER OR THE FIRST CELL. MAKE SURE THE VEGETATION GROWING IN THE BOTTOM OF THE BASIN DOES NOT HOLD DOWN THE SKIMMER.
- REPAIR THE BAFFLES IF THEY ARE DAMAGED. RE-ANCHOR BAFFLES IF WATER IS FLOWING UNDERNEATH OR AROUND THEM.
- IF THE SKIMMER IS CLOGGED WITH TRASH AND THERE IS WATER IN THE BASIN, USUALLY JERKING ON THE ROPE WILL MAKE THE SKIMMER BOB UP AND DOWN AND DISLODGE THE DEBRIS AND RESTORE FLOW. IF THIS DOES NOT WORK, PULL THE SKIMMER OVER TO THE SIDE OF THE BASIN AND REMOVE THE DEBRIS. ALSO CHECK THE ORFICE INSIDE THE SKIMMER TO SEE IF IT IS CLOGGED; IF SO REMOVE THE DEBRIS.
- IF THE SKIMMER ARM OR BARREL PIPE IS CLOGGED, THE ORFICE CAN BE REMOVED AND THE OBSTRUCTION CLEARED WITH A PLUMBER'S SNAKE OR BY FLUSHING WITH WATER. BE SURE AND REPLACE THE ORFICE BEFORE REPOSITIONING THE SKIMMER.
- CHECK THE FABRIC LINED SPILLWAY FOR DAMAGE AND MAKE ANY REQUIRED REPAIRS WITH FABRIC THAT SPANS THE FULL WIDTH OF THE SPILLWAY. CHECK THE EMBANKMENT, SPILLWAYS, AND OUTLET FOR EROSION DAMAGE AND INSPECT THE EMBANKMENT FOR PIPING AND SETTLEMENT. MAKE ALL NECESSARY REPAIRS IMMEDIATELY. REMOVE ALL TRASH AND OTHER DEBRIS FROM THE SKIMMER AND POOL AREAS. FREEZING WEATHER CAN RESULT IN ICE FORMING IN THE BASIN. SOME SPECIAL PRECAUTIONS SHOULD BE TAKEN IN THE WINTER TO PREVENT THE SKIMMER FROM PLUGGING WITH ICE.

SKIMMER DEWATERING DEVICE

N.T.S.

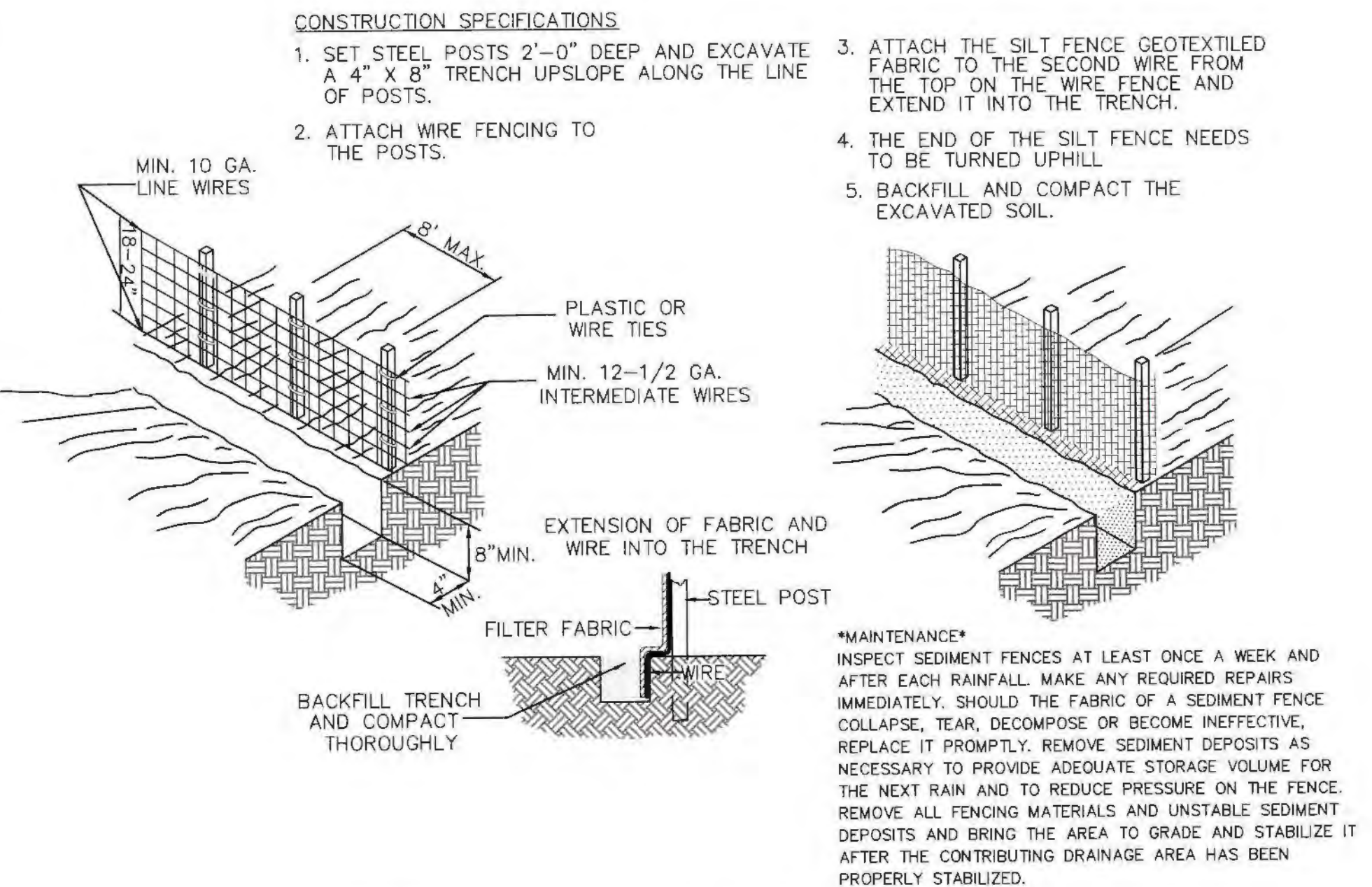
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CONSTRUCTION SEQUENCE, LEGEND, AND NOTES.....CG002

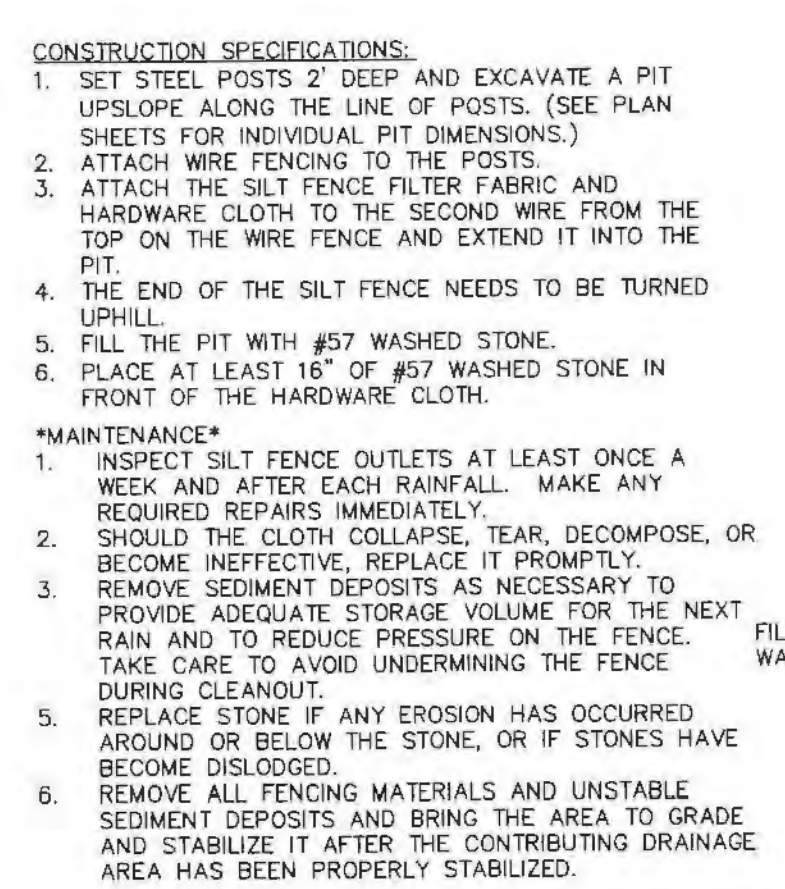
NO.	ISSUED FOR	REVISIONS	DATE	
			ENG	LRH
0	ISSUED FOR BIDS - 60%	60%	09/15/2023	

NO.	REVISIONS	DATE
0	ISSUED FOR BIDS - 60%	08/15/2023

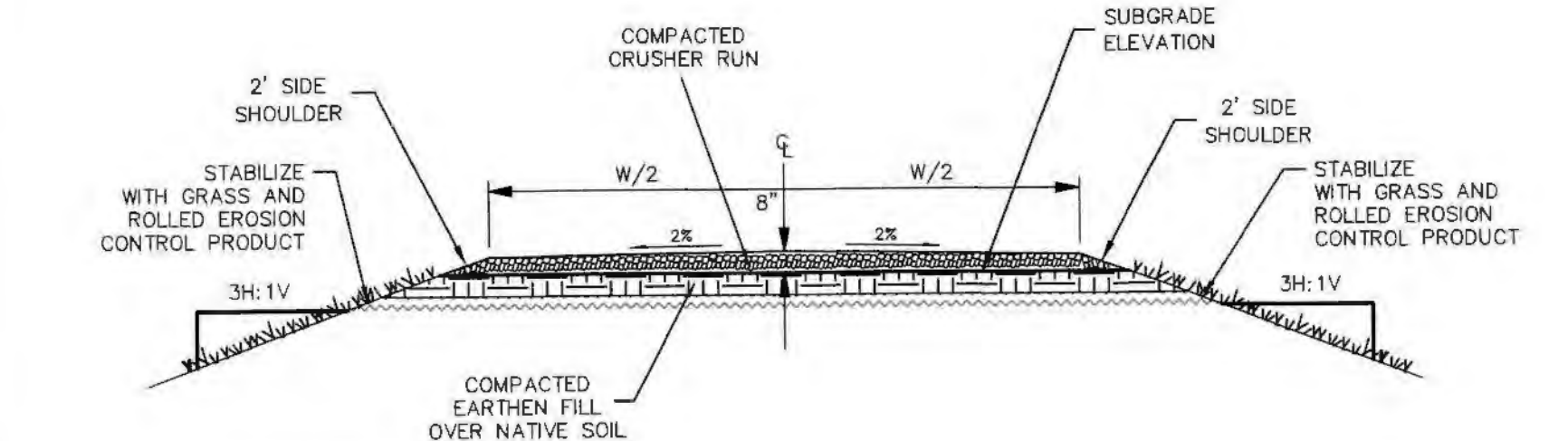
PROJECT NAME:	GILLESPIE-BI.9 SOLAR UTILITY STATION
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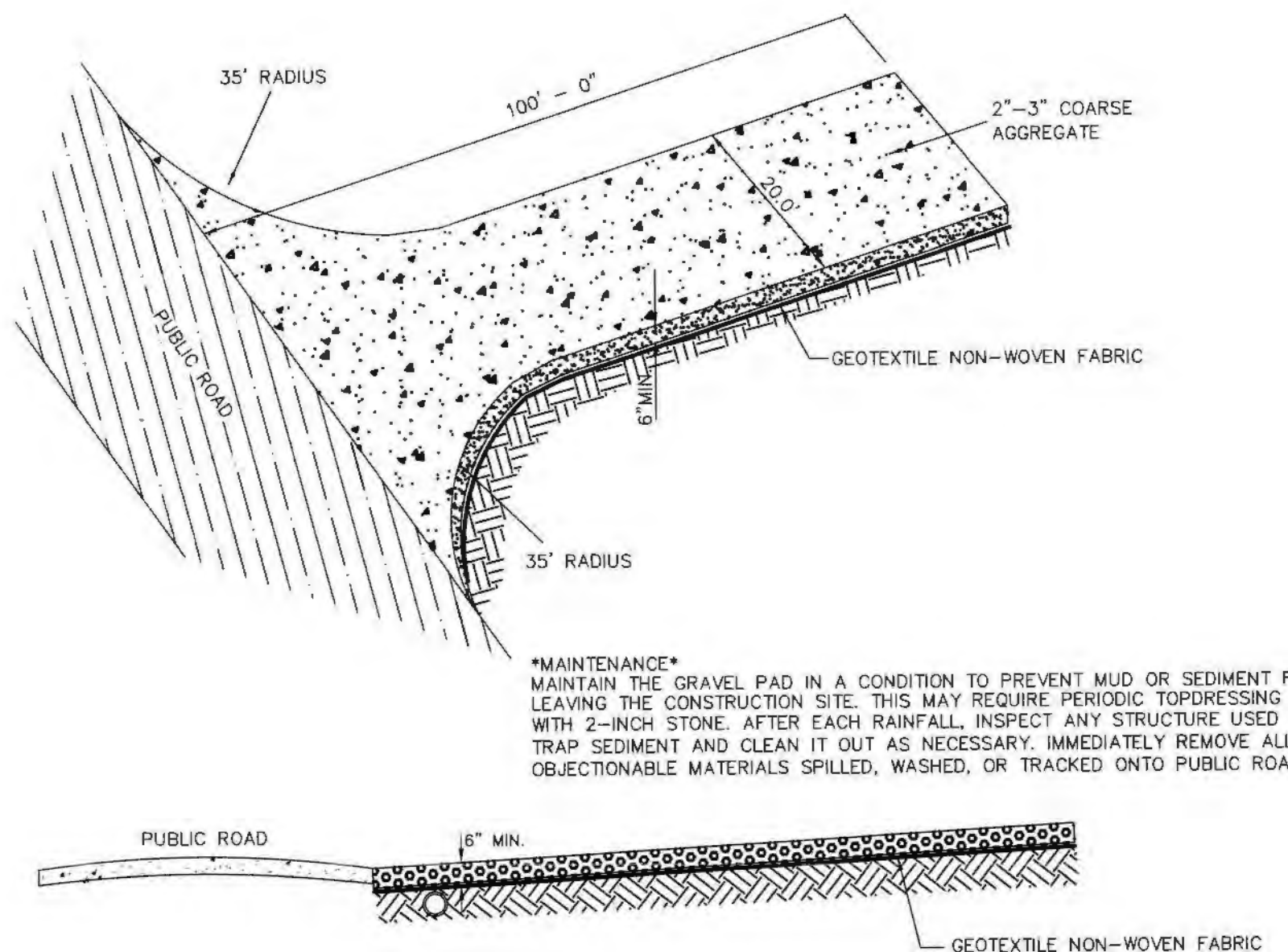
CONSTRUCTION OF A SILT FENCE
N.T.S.



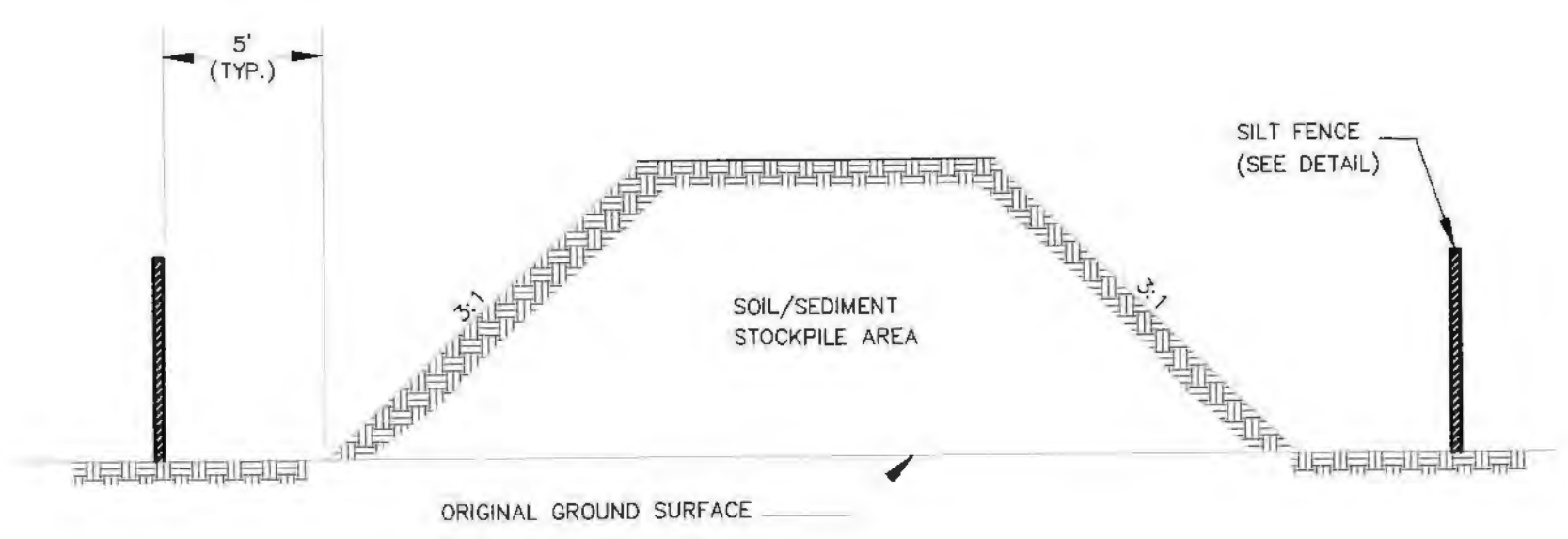
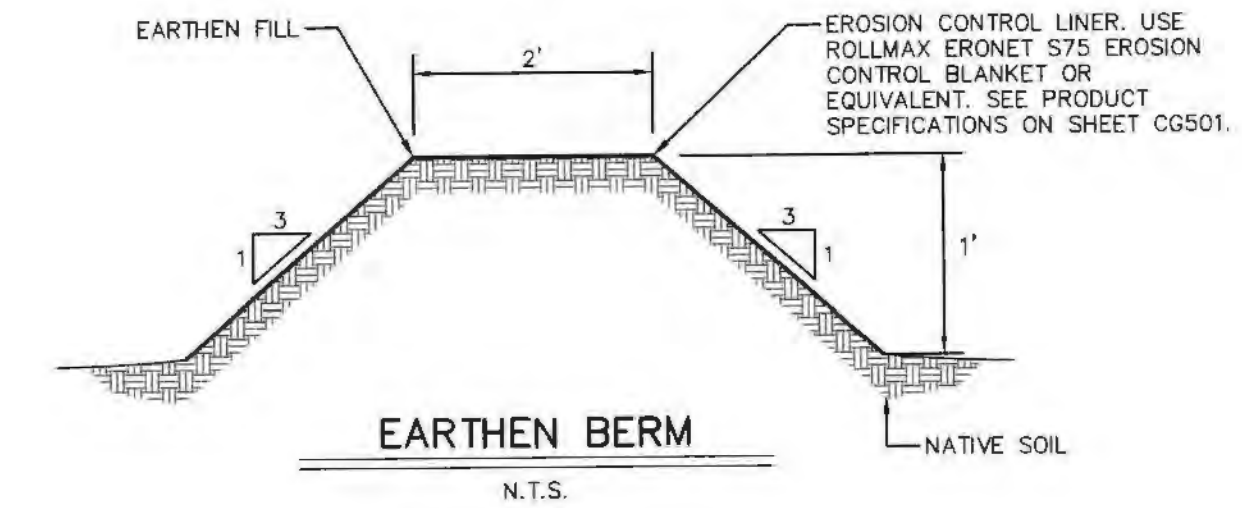
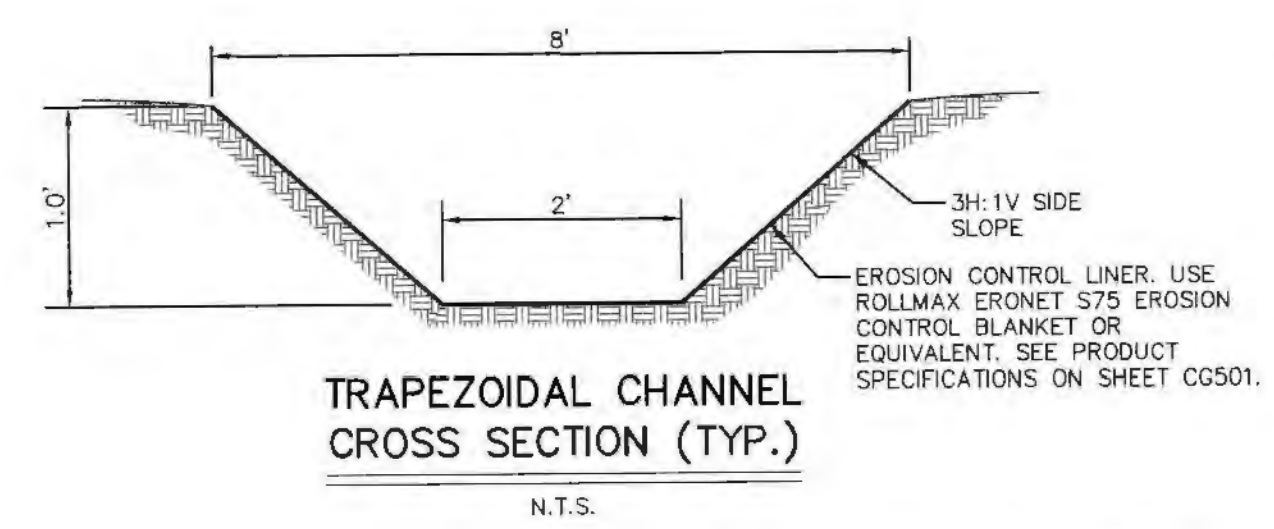
SILT FENCE OUTLET
N.T.S.



GRAVEL ACCESS DRIVE DETAIL
N.T.S.

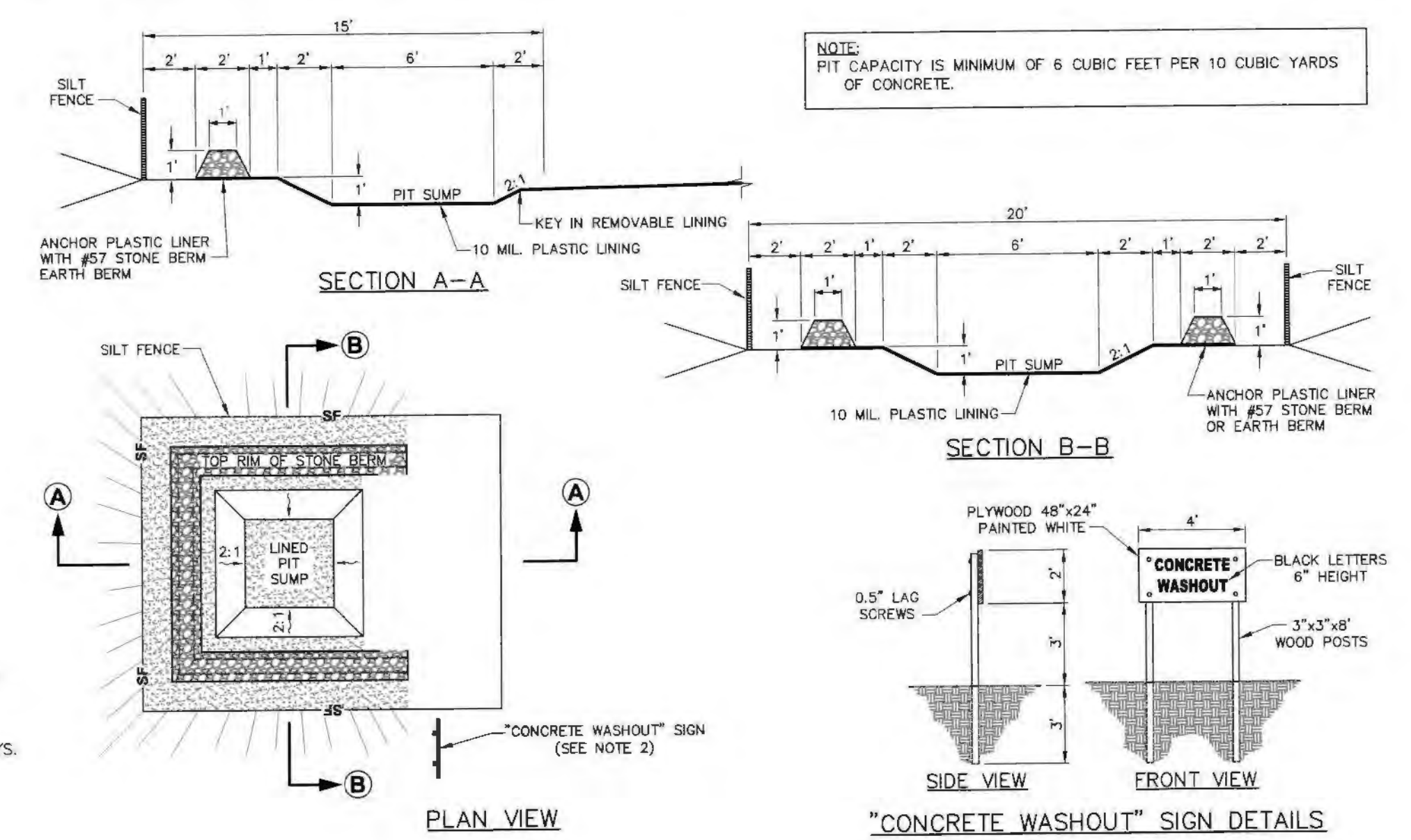


TEMPORARY CONSTRUCTION ENTRANCE DETAIL
N.T.S.



- NOTES:**
- SILT FENCE TO EXTEND AROUND THREE SIDES OF ANY STOCKPILE, OR IF STOCKPILE AREA IS LOCATED ON/NEAR A SLOPE THE SILT FENCE IS TO EXTEND ALONG CONTOURS OF THE DOWN-GRADIENT AREA.
 - IF STOCKPILE IS TO REMAIN FOR MORE THAN 14 DAYS, TEMPORARY STABILIZATION MEASURES MUST BE IMPLEMENTED.
 - STOCKPILE SILT FENCE SHALL BE MAINTAINED UNTIL STOCKPILE AREA HAS EITHER BEEN REMOVED OR PERMANENTLY STABILIZED.
 - THE KEY TO FUNCTIONAL TEMPORARY STOCKPILE AREAS IS WEEKLY INSPECTIONS, ROUTINE MAINTENANCE, AND REGULAR SEDIMENT REMOVAL.

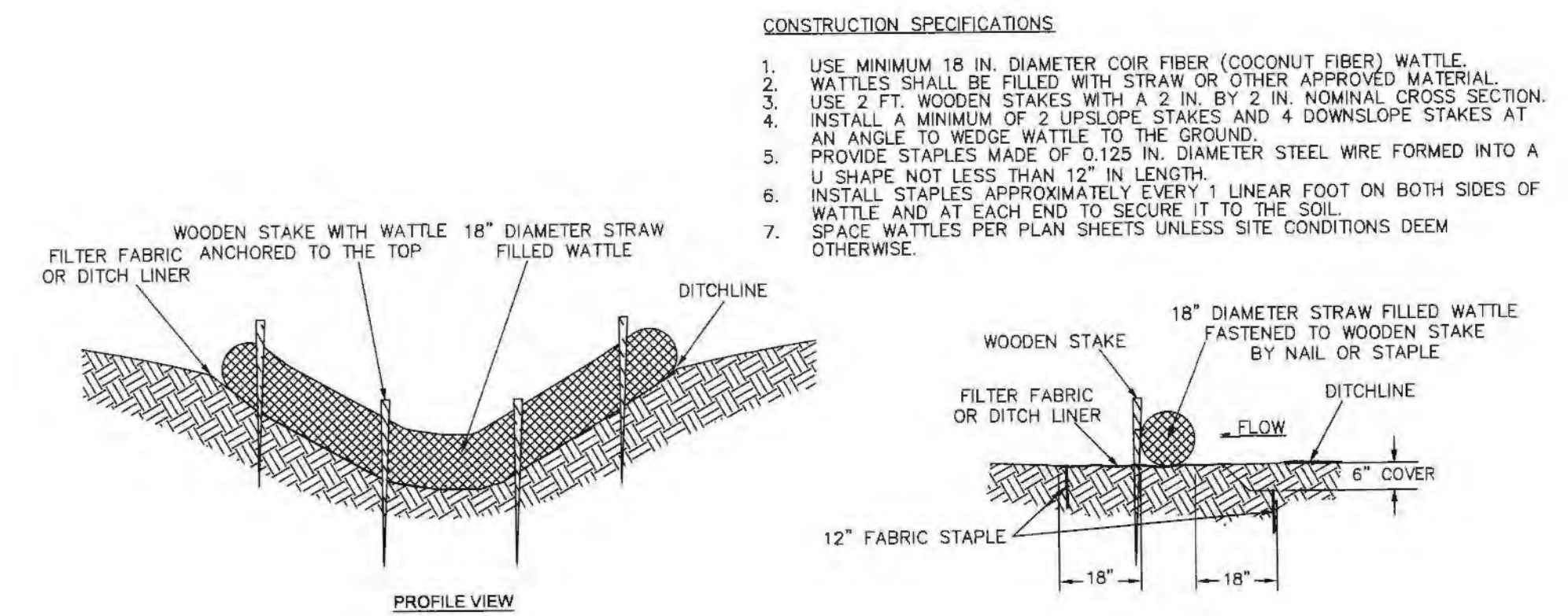
TEMPORARY STOCKPILE
N.T.S.



CONSTRUCTION SPECIFICATIONS AND MAINTENANCE NOTES:

- INSTALL CONCRETE WASHOUT PIT AT LOCATION(S) SHOWN ON PLANS.
- LINE PIT WITH IMPERVIOUS FABRIC OR POLYETHYLENE SHEET. ANCHOR FABRIC INTO GROUND OUTSIDE PIT AS SHOWN.
- MAXIMUM WATER AND SEDIMENT DEPTH IS 12". PIT MUST BE EXCAVATED AND RE-LINED WHEN DEPTH OF SEDIMENT REACHES 12" OR COMBINED WATER/SEDIMENT DEPTH EXCEEDS 12" FOLLOWING WASHOUT OF CONCRETE TRUCK.
- ALLOW WATER TO EVAPORATE COMPLETELY PRIOR TO EXCAVATING PIT.
- WASHOUT PIT MAY BE LOCATED NO CLOSER THAN 50' TO DRAINS, INLETS, OR SURFACE WATERS. CONCRETE MATERIALS ON-SITE, INCLUDING EXCESS CONCRETE, MUST BE CONTROLLED AND MANAGED TO AVOID CONTACT WITH SURFACE WATERS, WETLANDS OR BUFFERS. NO CONCRETE OR CEMENT SLURRY SHALL BE DISCHARGED FROM THE SITE.
- ALL LIQUID AND SOLID WASTES GENERATED BY CONCRETE WASHOUT OPERATIONS MUST BE CONTAINED IN A LEAK-PROOF CONTAINMENT FACILITY OR IMPERMEABLE LINER. PLASTIC LINING MATERIAL SHOULD BE A MINIMUM OF 10MIL POLYETHYLENE SHEETING, OR SIMILAR-STRENGTH MATERIAL, AND FREE OF HOLES OR TEARS THAT COMPROMISE THE IMPERMEABILITY OF THE MATERIAL.
- ALL WASHOUT OPERATIONS MUST BE AT LEAST 50 FEET FROM STORM DRAINS OR WATERBODIES UNLESS INDIVIDUAL SITE DIFFICULTIES MAKE THIS REQUIREMENT IMPRACTICAL. A REDUCTION OF THIS DISTANCE REQUIREMENT WILL BE ALLOWED ON A CASE-BY-CASE BASIS IF THE PERMITTING AUTHORITY DETERMINES THAT THE WASHOUT FACILITY WITH A REDUCED BUFFER WILL ADEQUATELY PROTECT THE WATER QUALITY IN ADJACENT STREAMS.
- WASHOUT OF CONCRETE TRUCKS SHALL BE PERFORMED DESIGNATED AREAS ONLY.
- A SIGN MUST BE INSTALLED ADJACENT TO EACH WASHOUT FACILITY TO INFORM CONCRETE EQUIPMENT OPERATORS ABOUT THE REQUIREMENT TO USE THE FACILITY.
- THE HARDENED RESIDUE FROM THE CONCRETE WASHOUT WILL BE DISPOSED OF IN THE SAME MANNER AS OTHER NON-HAZARDOUS CONSTRUCTION WASTE MATERIALS OR MAY BE BROKEN UP AND USED ON-SITE AS DEEMED APPROPRIATE BY THE CONTRACTOR. MAINTENANCE OF THE WASHOUT IS TO INCLUDE REMOVAL OF HARDENED CONCRETE. FACILITY SHALL HAVE SUFFICIENT VOLUME TO CONTAIN ALL THE CONCRETE WASTE RESULTING FROM WASHOUT AND A MINIMUM FREEBOARD OF 12 INCHES. FACILITY SHALL NOT BE FILLED BEYOND 95% CAPACITY AND SHALL BE CLEANED OUT ONCE 75% FULL UNLESS A NEW FACILITY IS CONSTRUCTED.
- PORTABLE, REMOVABLE CONTAINERS MAY BE USED AS ABOVE GRADE CONCRETE WASHOUTS PROVIDED TRUCK OPERATORS ARE ABLE TO WASH INDIVIDUAL CHUTE SECTIONS OUT OVER THE WASHOUT.
- IF STORED LIQUIDS HAVE NOT EVAPORATED AND THE WASHOUT IS NEARING CAPACITY, THE LIQUIDS MAY BE VACUUMED AND DISPOSED OF OFF-SITE IN A LEGALLY ACCEPTABLE MANNER OR DISPOSED ON-SITE IN A MANNER AND LOCATION THAT IT WILL NOT REACH STREAMS AND OTHER BODIES OF WATER. ON-SITE PITS AND OTHER INFILTRATION DEVICES WILL BE ACCEPTABLE IF THE DEVICE IS DESIGNED TO INFILTRATE THE ANTICIPATED VOLUME OF WATER AND APPROVED PRIOR TO ITS USE BY THE PERMITTING AUTHORITY.

CONCRETE WASHOUT PIT
N.T.S.



- *MAINTENANCE***
WATTLES SHOULD BE INSPECTED REGULARLY AND AFTER EACH SIGNIFICANT RAINFALL. SEDIMENT, DEBRIS, STRAW, AND OTHER ITEMS SHOULD BE REMOVED FROM THE WATTLE. IF THE NATURAL FIBERS OF THE WATTLE BECOME TOO SATURATED WITH DEBRIS AND SEDIMENT AND REMOVAL OF THE ITEMS IS NOT POSSIBLE THEN THE WATTLE SHOULD BE REPLACED. VERIFY PROPER INSTALLATION OF ANCHORS TO SECURE WATTLES TO THE GROUND TO PREVENT SCOURING AND WASHOUT DURING STORM EVENTS.

COIR FIBER WATTLE DETAIL
N.T.S.

NO.	DATE	REVISIONS
0	09/15/2023	ISSUED FOR BIDS - 60%

PROJECT NAME: **GILLESPIE-B1.9 SOLAR UTILITY STATION**
DRAWING TITLE: **GRADING AND EROSION CONTROL DETAILS**

DRAWN BY:	MCW
CHECKED BY:	LRH
APPROVED BY:	LRH
DATE:	08/04/2023
SCALE:	N.T.S.
FILE NUMBER:	12548SCG
SHEET:	CG501

TEMPORARY SEEDING IN NORTH CAROLINA

	SPECIES	SEEDING MIXTURE	RATE (LB/ACRE)
SUMMER	GERMAN MILLET		40
FALL, LATE WINTER, & EARLY SPRING	RYE (GRAIN)		120
LATE WINTER & EARLY SPRING	SEEDING DATES:		
	MOUNTAINS - ABOVE 2500 ft:	FEB. 15 - MAY 15	
	BELOW 2500 ft:	FEB. 1 - MAY 1	
	PIEDMONT - JAN. 1 - MAY 1		
	COASTAL PLAIN - DEC. 1 - APR. 15		
SUMMER	MOUNTAINS - MAY 15 - AUG. 15		
	PIEDMONT - MAY 1 - AUG. 15		
	COASTAL PLAIN - APR. 15 - AUG. 15		
FALL	MOUNTAINS - AUG. 15 - DEC. 15		
	COASTAL PLAIN AND PIEDMONT - AUG. 15 - DEC. 30		

SOIL AMENDMENTS
FOLLOW RECOMMENDATIONS OF SOIL TESTS OR APPLY 2,000 LB/ACRE GROUND AGRICULTURAL LIMESTONE AND 750 LBS/ACRE 10-10-10 FERTILIZER.

MULCH
APPLY 4,000 LB/ACRE STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT OR NETTING.

MAINTENANCE
REFERTILIZE IF GROWTH IS NOT FULLY ADEQUATE. RESEED, FERTILIZE AND MULCH IMMEDIATELY FOLLOWING EROSION OR OTHER DAMAGE.

SEEDBED PREPARATION

MAINTENANCE:
NEW SEEDLINGS SHOULD BE INSPECTED FREQUENTLY AND MAINTENANCE PERFORMED AS NEEDED. IF RILLS AND GULLIES DEVELOP, THEY MUST BE FILLED, RE-SEED, AND MULCHED AS SOON AS POSSIBLE. DIVERSIONS MAY BE NEEDED UNTIL NEW PLANTS TAKE HOLD.

DAMAGE TO VEGETATION FROM DISEASE, INSECTS, TRAFFIC, ETC., CAN OCCUR AT ANY TIME. HERBICIDES AND REGULAR MOWING MAY BE NEEDED TO CONTROL WEEDS. DUST AND SPRAYS MAY BE NEEDED TO CONTROL INSECTS.

WEAK OR DAMAGED SPOTS MUST BE RELIMED, FERTILIZED, MULCHED, AND RESEED AS PROMPTLY AS POSSIBLE.

PERMANENT SEEDING IN NORTH CAROLINA

SPECIES	SEEDING MIXTURE	RATE (LB/ACRE)
TALL FESCUE		80
WHITE CLOVER		4

PLANT A MIX OF TALL FESCUE AND WHITE CLOVER FOR THE ENTIRE SITE AT THE PROVIDED RATES. ANY CHANGE IN SEEDING MIX OR RATES WILL REQUIRE NOTIFICATION AND APPROVAL FROM OWNER AND OWNER'S ENGINEER.

NURSE PLANTS
BETWEEN MAY 1 AND AUGUST 15, ADD 10 LB/ACRE GERMAN MILLET OR 15LB/ACRE SUDAGRASS. PRIOR TO MAY 1 OR AFTER AUGUST 15 ADD 40 LB/ACRE RYE (GRAIN).

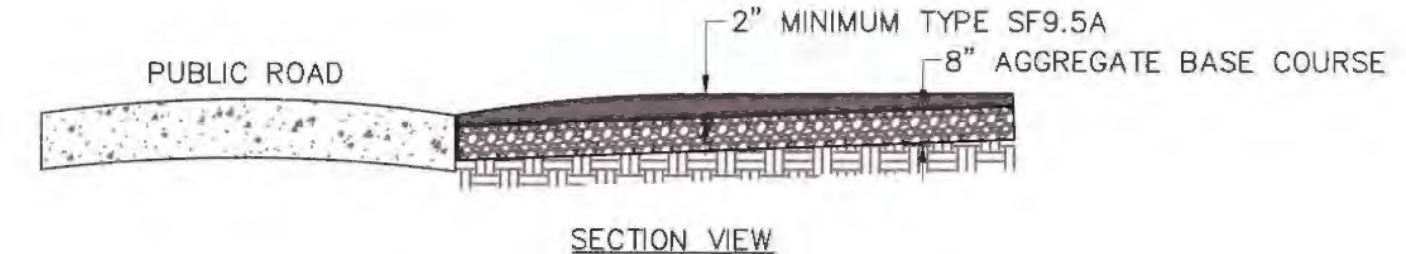
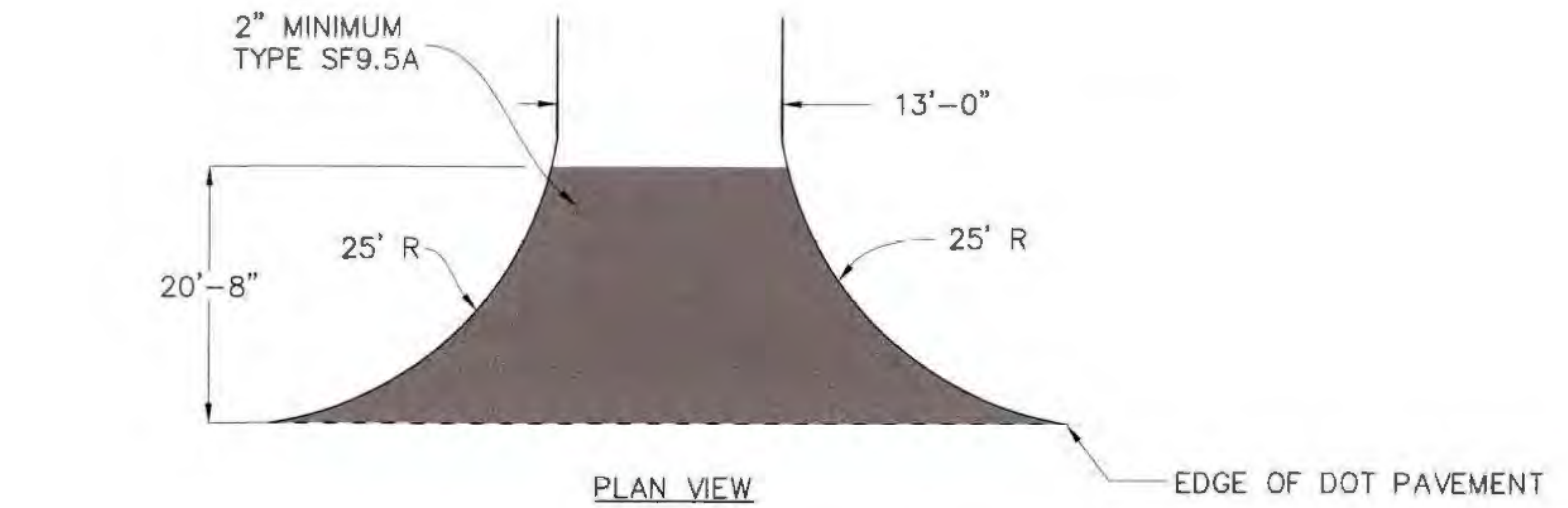
SEEDING DATES:

	BEST	POSSIBLE
FALL:	AUGUST 25 - SEPTEMBER 15	AUGUST 20 - OCTOBER 25
LATE WINTER:	FEBRUARY 15 - MARCH 21	FEBRUARY 1 - APRIL 15

SEEDING SCHEDULE

- CHISEL COMPACTED AREAS AND SPREAD TOPSOIL 3 INCHES DEEP OVER ADVERSE SOIL CONDITIONS, IF AVAILABLE.
- RIP THE ENTIRE AREA TO 6 INCHES DEPTH.
- REMOVE ALL LOOSE ROCK, ROOTS, AND OTHER OBSTRUCTIONS LEAVING SURFACE REASONABLY SMOOTH AND UNIFORM.
- APPLY AGRICULTURAL LIME, FERTILIZER, AND UNIFORMLY MIX WITH SOIL (SEE BELOW).
- CONTINUE TILLAGE UNTIL A WELL-PULVERIZED, FIRM, REASONABLY UNIFORM SEEDBED IS PREPARED.
- SEED ON A FRESHLY PREPARED SEEDBED AND SEED LIGHTLY WITH SEEDING EQUIPMENT OR CULTIPACK.
- MULCH IMMEDIATELY AFTER SEEDING.
- INSPECT ALL SEEDING AREAS AND MAKE NECESSARY RESEEDINGS WITHIN THE PLANTING SEASON, IF POSSIBLE. SHOULD AREAS BE OVER 60% DAMAGED, REESTABLISH ORIGINAL LIME, FERTILIZER AND SEEDING RATES.
- CONSULT CONSERVATION INSPECTOR ON MAINTENANCE AND FERTILIZATION AFTER PERMANENT COVER IS ESTABLISHED.

* APPLY:
AGRICULTURAL LIMESTONE - 3 TONS/ACRE
FERTILIZER - 1,000 lb/ACRE - 10-10-10
SUPERPHOSPHATE - 500 lb/ACRE - 20% ANALYSIS
MULCH - 2 TONS/ACRE (5,000 lb/ACRE FOR STEEP SLOPES) - SMALL GRAIN STRAW
ANOTHER - ASPHALT EMULSION @ 400 GAL/ACRE



POST-CONSTRUCTION PAVED ENTRANCE DETAIL

N.T.S.

ROLLMAX™
ROLLED EROSION CONTROL

Specification Sheet

EroNet™ S75[®] Erosion Control Blanket

DESCRIPTION

The short-term single net erosion control blanket shall be a machine-produced mat of 100% agricultural straw with a functional longevity of up to 12 months. (NOTE: functional longevity may vary depending upon climatic conditions, soil, geographical location, and elevation). The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the mat. The blanket shall be covered on the top side with a lightweight photodegradable polypropylene netting having an approximate 0.50 x 0.50 inch (1.27 x 1.27 cm) mesh. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread. The blanket shall be manufactured with a colored thread stitched along both outer edges (approximately 2-5 inches [5-12.5 cm] from the edge) as an overlap guide for adjacent mats.

The S75 shall meet Type 2 C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.17

Material Content		
Matrix	100% Straw Fiber	0.5 lbs/sq yd (0.27 kg/sqm)
Netting	Top side only, lightweight photodegradable	1.5 lb/1000 sq ft (0.73 kg/100 sqm)
Thread	Degradable	

Standard Roll Sizes		
Width	5.67 ft (2.03 m)	8.0 ft (2.4 m)
Length	108 ft (32.92 m)	112 ft (34.14 m)
Weight ± 10%	40 lbs (18.14 kg)	50 lbs (22.68 kg)
Area	80 sq yd (66.9 sqm)	200 sq yd (167.22 sqm)

Design Permissible Shear Stress		
Unvegetated Shear Stress	1.55 psf (74 Pa)	
Unvegetated Velocity	5.00 fps (1.52 m/s)	

Slope Design Data: C Factors		
Slope Length (L)	≤ 3:1	3:1 - 2:1
	≤ 20 ft (6 m)	0.029
	20-50 ft	0.11
≥ 50 ft (15.2 m)	0.19	N/A

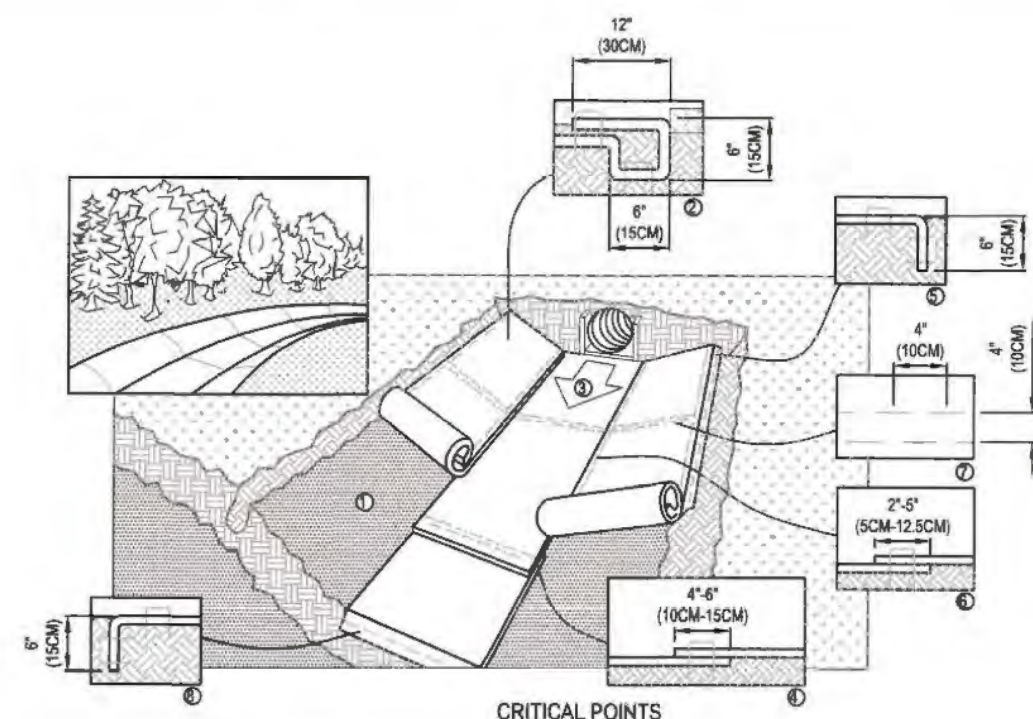
NTPEP Large-Scale Slope Testing
ASTM D6459 - C-factor = 0.012

Roughness Coefficients - Unveg.		
Flow Depth	Manning's n	
≤ 0.50 ft (0.15 m)	0.055	
0.50 - 2.0 ft	0.055-0.021	
≥ 2.0 ft (0.60 m)	0.021	

Western Green
4609 E. Boomville-New Harmony Rd.
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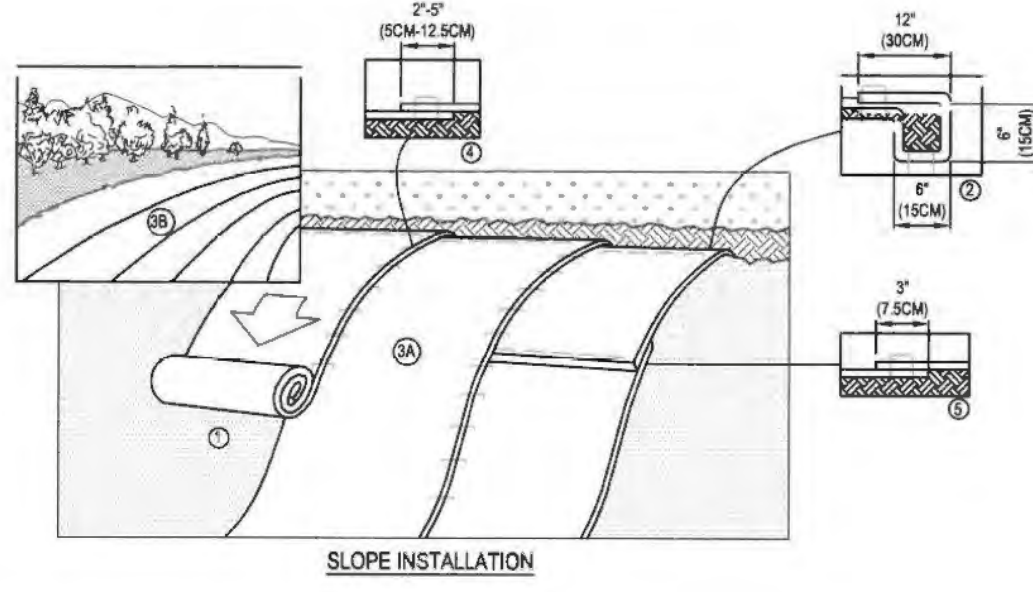


CRITICAL POINTS

- A OVERLAPS AND SEAMS
 - B PROJECTED WATER LINE
 - C CHANNEL BOTTOMSIDE SLOPE VERTICES
- * HORIZONTAL STAPLE SPACING SHOULD BE ALTERED IF NECESSARY TO ALLOW STAPLES TO SECURE THE CRITICAL POINTS ALONG THE CHANNEL SURFACE.
- ** IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY ANCHOR THE BLANKETS.

NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

ROLLED EROSION CONTROL PRODUCT



SLOPE INSTALLATION

CONSTRUCTION SPECIFICATIONS:

- PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-0-SEED DO NOT SEED PREPARED AREA. CELL-0-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
- BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" (15CM) DEEP X 6" (15CM) WIDE TRENCH WITH APPROXIMATELY 12" (30CM) OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30CM) PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30CM) ACROSS THE WIDTH OF THE BLANKET.
- ROLL THE BLANKETS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/ STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING OPTIONAL DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
- THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2"-5" (5CM-12.5CM) OVERLAP DEPENDING ON BLANKET TYPE. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE PREVIOUSLY INSTALLED BLANKET.
- CONSECUTIVE BLANKETS SPICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30CM) APART ACROSS ENTIRE BLANKET WIDTH.

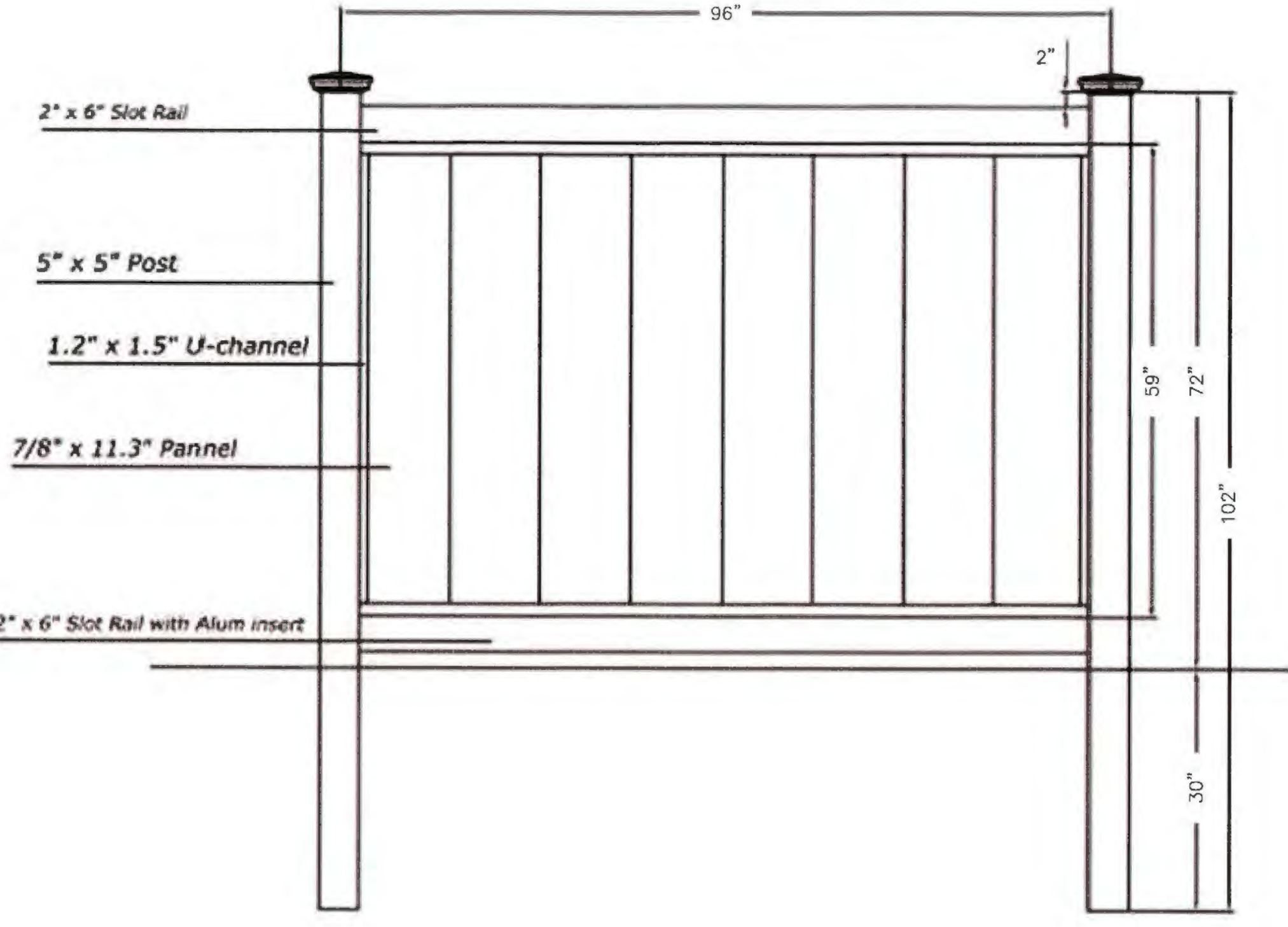
- PRODUCT MAINTENANCE**
- INSPECT ROLLED EROSION CONTROL PRODUCTS AT LEAST WEEKLY AND AFTER EACH SIGNIFICANT (1 INCH OR GREATER) RAIN FALL EVENT REPAIR IMMEDIATELY.
 - GOOD CONTACT WITH THE GROUND MUST BE MAINTAINED, AND EROSION MUST NOT OCCUR BENEATH THE RECP. ANY AREAS OF THE RECP THAT ARE DAMAGED OR NOT IN CLOSE CONTACT WITH THE GROUND SHALL BE REPAIRED AND STAPLED.
 - CHECK FOR GENERAL SIGNS OF EROSION, INCLUDING VOIDS BENEATH THE MAT. IF VOIDS ARE APPARENT, FILL THE VOID WITH SUITABLE SOIL AND REPLACE THE EROSION CONTROL BLANKET, FOLLOWING THE APPROPRIATE STAKING PATTERN.
 - CHECK FOR DAMAGED OR LOOSE STAPLES AND SECURE LOOSE PORTIONS OF THE BLANKET.
 - IF EROSION OCCURS DUE TO POORLY CONTROLLED DRAINAGE, THE PROBLEM SHALL BE FIXED AND THE ERODED AREA PROTECTED.
 - MONITOR AND REPAIR THE RECP AS NECESSARY UNTIL GROUND COVER IS ESTABLISHED.

NOTES:

- INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
- IN LOOSE SOIL CONDITIONS THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15CM) MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.
- NO PLASTIC LINER IS TO BE USED IN WETLANDS OR RIPARIAN BUFFERS.

ROLLED EROSION CONTROL PRODUCT INSTALLATION

N.T.S.



PERIMETER FENCE DETAIL (PVC)

N.T.S.

ROLLED EROSION CONTROL PRODUCT SPECIFICATIONS

N.T.S.

6.20

TEMPORARY DIVERSIONS

Definition A temporary ridge or excavated channel or combination ridge and channel constructed across sloping land on a predetermined grade.

Purpose To protect work areas from upslope runoff, and to divert sediment-laden water to appropriate traps or stable outlets.

Conditions Where Practice Applies This practice applies to construction areas where runoff can be diverted and disposed of properly to control erosion, sedimentation, or flood damage. Specific locations and conditions include:

- above disturbed existing slopes, and above cut or fill slopes to prevent runoff over the slope;
 - across unprotected slopes, as slope breaks, to reduce slope length;
 - below slopes to divert excess runoff to stabilized outlets;
 - where needed to divert sediment-laden water to sediment traps;
 - at or near the perimeter of the construction area to keep sediment from leaving the site; and
 - above disturbed areas before stabilization to prevent erosion, and maintain acceptable working conditions.
- Temporary diversions may also serve as sediment traps when the site has been overexcavated on a flat grade; they may also be used in conjunction with a sediment fence.

Planning Considerations It is important that diversions are properly designed, constructed and maintained since they concentrate water flow and increase erosion potential (Figure 6.20a). Particular care must be taken in planning diversion grades. Too much slope can result in erosive velocity in the diversion channel or at the outlet. A change of slope from steeper grade to flatter may cause deposition to occur. The deposition reduces carrying capacity, and may cause overtopping and failure. Frequent inspection and timely maintenance are essential to the proper functioning of diversions.

Sufficient area must be available to construct and properly maintain diversions. It is usually less costly to excavate a channel and form a ridge or dike on the

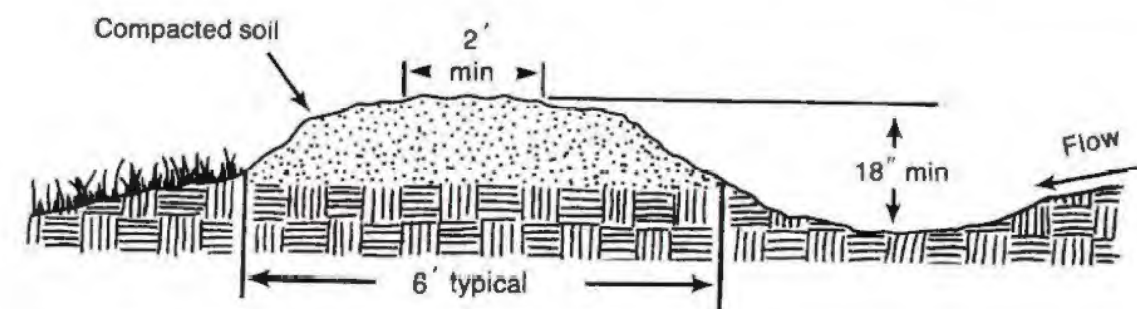


Figure 6.20a Temporary earthen diversion dike.

6.20.1

6

downhill side with the spoil than to build diversions by other methods. Where space is limited, it may be necessary to build the ridge by hauling in diking material, or using a silt fence to divert the flow. Use gravel to form the diversion dike when vehicles must cross frequently (Figure 6.20b).

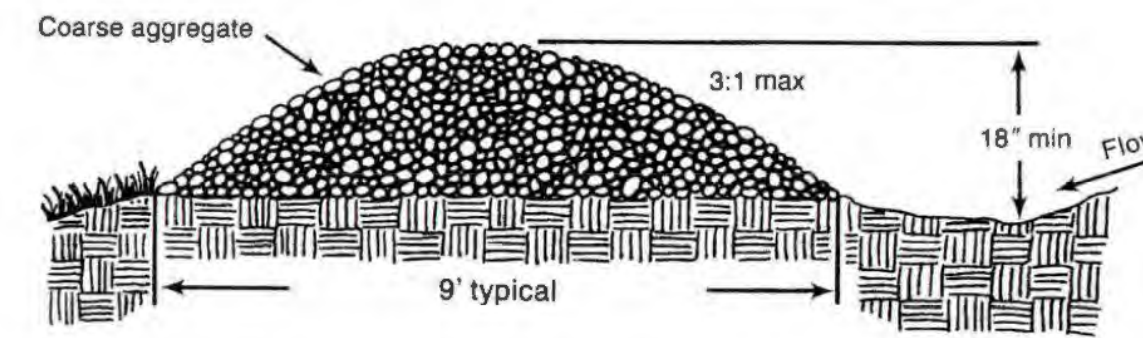


Figure 6.20b Temporary gravel diversion dike for vehicle crossing (modified from Va SWCC).

Plan temporary diversions to function 1 year or more, or they may be constructed anew at the end of each day's grading operation to protect new fill. Diversions that are to serve longer than 30 working days should be seeded and mulched as soon as they are constructed to preserve dike height and reduce maintenance.

Where design velocities exceed 2 ft/sec, a channel liner is usually necessary to prevent erosion (Table 8.05a, Appendix 8.05).

Temporary diversions may serve as in-place sediment traps if overexcavated 1 to 2 feet and placed on a nearly flat grade. The dike serves to divert water as the stage increases. A combination silt fence and channel in which fill from the channel is used to stabilize the fence can trap sediment and divert runoff simultaneously.

Wherever feasible, build and stabilize diversions and outlets before initiating other land-disturbing activities.

Design Criteria **Drainage area**—5 acres or less.

Capacity—peak runoff from 10-year storm.

Velocity—See Table 8.05a, Permissible Velocities for Erosion Protection, Appendix 8.05.

Ridge design— side slope: 2:1 or flatter
 3:1 or flatter at points where cross
 top width: 2 ft minimum
 freeboard: 0.3 ft minimum
 settlement: 10% of total fill height minimum

6.20.2

Channel design— shape: parabolic, trapezoidal, or V-shaped
 side slope: 2:1 or flatter
 3:1 or flatter where vehicles cross

Grades— Either a uniform or a gradually increasing grade is preferred. Sudden decreases in grade accumulate sediment and should be expected to cause overtopping. A large increase in grade may erode.

Outlet—Design the outlet to accept flow from the diversion plus any other contributing areas. Divert sediment-laden runoff and release through a sediment-trapping device (Practice 6.60, *Temporary Sediment Trap* and Practice 6.61, *Sediment Basin*). Flow from undisturbed areas can be dispersed by a level spreader (Practice 6.40, *Level Spreader*).

Small diversions—Where the diversion channel grade is between 0.2 and 3%, a permanent vegetative cover is required. A parabolic channel and ridge 1.5 feet deep and 12 feet wide may be used for diversions with flows up to 5 cfs. This depth does not include freeboard or settlement. Side slopes should be 3:1 or flatter, and the top of the dike must be at least 2 feet wide.

Construction Specifications 1. Remove and properly dispose of all trees, brush, stumps, and other objectionable material.

2. Ensure that the minimum constructed cross section meets all design requirements.

3. Ensure that the top of the dike is not lower at any point than the design elevation plus the specified settlement.

4. Provide sufficient room around diversions to permit machine regrading and cleanout.

5. Vegetate the ridge immediately after construction, unless it will remain in place less than 30 working days.

Maintenance Inspect temporary diversions once a week and after every rainfall. Immediately remove sediment from the flow area and repair the diversion ridge. Carefully check outlets and make timely repairs as needed. When the area protected is permanently stabilized, remove the ridge and the channel to blend with the natural ground level and appropriately stabilize it.

References *Surface Stabilization*
 6.10, Temporary Seeding
 6.11, Permanent Seeding
 6.14, Mulching

Outlet Protection
 6.40, Level Spreader
 6.41, Outlet Stabilization Structure

6.20.3

TEMPORARY DIVERSIONS

N.T.S.



07/15/2023

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0				09/15/2023

PROJECT NAME: **GILLESPIE-B1.9 SOLAR UTILITY STATION**

DRAWING TITLE: **GRADING AND EROSION CONTROL DETAILS**

DRAWN BY:	MCW
CHECKED BY:	LRH
APPROVED BY:	LRH
DATE:	08/04/2023
SCALE:	N.T.S.
FILE NUMBER:	12548SCG
SHEET:	CG502

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Temporary Grass Lined Channel #1

Green Values = Inputs, Channel Design Dimension Inputs at Bottom of Sheet 2
(Source: North Carolina Erosion and Sediment Control Planning and Design Manual)

a) Estimate Drainage Area and Determine Peak Flow Into Channel:

Peak Runoff: Q = CIA

- 1) Drainage Area: **1.83** Acres (Entire drainage area to be serviced by channel)
- 2) Runoff Coefficient (C) = **0.35** (TABLE #1)
- 3) Time of Concentration (Tc) = **2.438182** Minutes
Length of Travel = **340** ft
Height of Most Remote Point Above Outlet = **14.00** ft
Average Slope = **0.0402299**
- 4) Rainfall Intensity Factor (I) = **7.97** in/hr (TABLE #2)
- 10-Year Storm
- Appropriate Rainfall Duration (From Tc)
- 5) Peak Runoff: Q₁₀ = **5.105** cfs

b) Proposed Channel Grade: **4.02%**

c) Proposed Vegetation: **Bahiagrass**

d) Soil: **Blenny Loamy Sand, Lakeland-Urban Land Complex**

e) Permissible Velocity (Vp): **4.0** ft/s (TABLE #3)

f) Retardance Class: **D** (Mowed) (TABLE #4 - Avg. Veg. Length) **B** (Unmowed) (TABLE #4 - Avg. Veg. Length)

g) Trapezoidal Channel Dimensions:

Try:	Depth (d) =	Bottom Width (b) =	Side Slope (z) =	Roughness Coeff. (n)	V Max (fps)	Q Max (cfs)
5.00	8.32	8.60	3.0	0.043	4.95	24.74

Depth from Q₁₀ (ft) (Use n=0.05): **0.42**

Comments: **Q Max > Q10, OK** **V10 < Vp, OK**

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h) Evaluate Protective Channel Lining For High Velocity Channels (If V>Vp)

Permissible Velocity (Vp): **5.0** ft/s (TABLE #3 or Product Spec Sheet)

Rainfall Intensity Factor (I) = **7.97** in/hr

Peak Runoff: Q₁₀ = **5.105** cfs

Channel Lining: **Rollmax S75 Erosion Control Blanket or Equivalent**

Try:	Depth (d) =	Bottom Width (b) =	Side Slope (z) =	Lining Rough Coeff. (n)	V Max Lined (fps)	Q Max Lined (cfs)
5.00	8.32	8.60	3.0	0.055	3.87	19.34

Depth from Q₁₀ Lined (ft) (Use n=0.05): **0.53**

Comments: **Q Max Lined > Q10, OK** **V10 < Vp, Adequate**

Channel Lining Velocity Capacity is Adequate

i) Calculate Rolled Erosion Control Product and Turf Mat Shear Stress for Q₁₀ =

Rip Rap Channel? (Yes/No) **No**

Temporary Liner: **Rollmax S75 Erosion Control Blanket or Equivalent**

Shear Stress (T): T = yds = **1.33** lb/ft²

Permissible Unit Shear Stress (Td): **1.55** lb/ft²

Rip Rap Diameter (N/A OR ft) **N/A**

Channel Lining Shear Stress Capacity is Adequate

Trapezoidal Channel Design Data

Bottom Width = 2.0 ft.	Temporary Liner: (TABLE #3 or Product Spec Sheet)	Rollmax S75 Erosion Control Blanket or Equivalent
Side Slopes = 3.0 ft./ft.		
Depth = 1.00 ft.		

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Temporary Grass Lined Channel #2

Green Values = Inputs, Channel Design Dimension Inputs at Bottom of Sheet 2
(Source: North Carolina Erosion and Sediment Control Planning and Design Manual)

a) Estimate Drainage Area and Determine Peak Flow Into Channel:

Peak Runoff: Q = CIA

- 1) Drainage Area: **0.29** Acres (Entire drainage area to be serviced by channel)
- 2) Runoff Coefficient (C) = **0.35** (TABLE #1)
- 3) Time of Concentration (Tc) = **0.4753015** Minutes
Length of Travel = **81** ft
Height of Most Remote Point Above Outlet = **1.60** ft
Average Slope = **0.0390244**
- 4) Rainfall Intensity Factor (I) = **7.97** in/hr (TABLE #2)
- 10-Year Storm
- Appropriate Rainfall Duration (From Tc)
- 5) Peak Runoff: Q₁₀ = **0.809** cfs

b) Proposed Channel Grade: **3.90%**

c) Proposed Vegetation: **Bahiagrass**

d) Soil: **Lakeland-Urban Land Complex**

e) Permissible Velocity (Vp): **4.0** ft/s (TABLE #3)

f) Retardance Class: **D** (Mowed) (TABLE #4 - Avg. Veg. Length) **B** (Unmowed) (TABLE #4 - Avg. Veg. Length)

g) Trapezoidal Channel Dimensions:

Try:	Depth (d) =	Bottom Width (b) =	Side Slope (z) =	Roughness Coeff. (n)	V Max (fps)	Q Max (cfs)
5.00	8.32	8.60	3.0	0.043	4.87	24.36

Depth from Q₁₀ (ft) (Use n=0.05): **0.16**

Comments: **Q Max > Q10, OK** **V10 < Vp, OK**

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h) Evaluate Protective Channel Lining For High Velocity Channels (If V>Vp)

Permissible Velocity (Vp): **5.0** ft/s (TABLE #3 or Product Spec Sheet)

Rainfall Intensity Factor (I) = **7.97** in/hr

Peak Runoff: Q₁₀ = **0.809** cfs

Channel Lining: **Rollmax S75 Erosion Control Blanket or Equivalent**

Try:	Depth (d) =	Bottom Width (b) =	Side Slope (z) =	Lining Rough Coeff. (n)	V Max Lined (fps)	Q Max Lined (cfs)
5.00	8.32	8.60	3.0	0.055	3.81	19.05

Depth from Q₁₀ Lined (ft) (Use n=0.05): **0.20**

Comments: **Q Max Lined > Q10, OK** **V10 < Vp, Adequate**

Channel Lining Velocity Capacity is Adequate

i) Calculate Rolled Erosion Control Product and Turf Mat Shear Stress for Q₁₀ =

Rip Rap Channel? (Yes/No) **No**

Temporary Liner: **Rollmax S75 Erosion Control Blanket or Equivalent**

Shear Stress (T): T = yds = **0.49** lb/ft²

Permissible Unit Shear Stress (Td): **1.55** lb/ft²

Rip Rap Diameter (N/A OR ft) **N/A**

Channel Lining Shear Stress Capacity is Adequate

Trapezoidal Channel Design Data

Bottom Width = 2.0 ft.	Temporary Liner: (TABLE #3 or Product Spec Sheet)	Rollmax S75 Erosion Control Blanket or Equivalent
Side Slopes = 3.0 ft./ft.		
Depth = 1.00 ft.		

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Temporary Grass Lined Channel #3

Green Values = Inputs, Channel Design Dimension Inputs at Bottom of Sheet 2
(Source: North Carolina Erosion and Sediment Control Planning and Design Manual)

a) Estimate Drainage Area and Determine Peak Flow Into Channel:

Peak Runoff: Q = CIA

- 1) Drainage Area: **3.88** Acres (Entire drainage area to be serviced by channel)
- 2) Runoff Coefficient (C) = **0.35** (TABLE #1)
- 3) Time of Concentration (Tc) = **3.546187** Minutes
Length of Travel = **346** ft
Height of Most Remote Point Above Outlet = **3.20** ft
Average Slope = **0.0150289**
- 4) Rainfall Intensity Factor (I) = **7.97** in/hr (TABLE #2)
- 10-Year Storm
- Appropriate Rainfall Duration (From Tc)
- 5) Peak Runoff: Q₁₀ = **10.823** cfs

b) Proposed Channel Grade: **1.50%**

c) Proposed Vegetation: **Bahiagrass**

d) Soil: **Candler Sand, Lakeland-Urban Land Complex**

e) Permissible Velocity (Vp): **4.0** ft/s (TABLE #3)

f) Retardance Class: **D** (Mowed) (TABLE #4 - Avg. Veg. Length) **B** (Unmowed) (TABLE #4 - Avg. Veg. Length)

g) Trapezoidal Channel Dimensions:

Try:	Depth (d) =	Bottom Width (b) =	Side Slope (z) =	Roughness Coeff. (n)	V Max (fps)	Q Max (cfs)
5.00	8.32	8.60	3.0	0.043	3.02	15.12

Depth from Q₁₀ (ft) (Use n=0.05): **0.78**

Comments: **Q Max > Q10, OK** **V10 < Vp, OK**

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h) Evaluate Protective Channel Lining For High Velocity Channels (If V>Vp)

Permissible Velocity (Vp): **5.0** ft/s (TABLE #3 or Product Spec Sheet)

Rainfall Intensity Factor (I) = **7.97** in/hr

Peak Runoff: Q₁₀ = **10.823** cfs

Channel Lining: **Rollmax S75 Erosion Control Blanket or Equivalent**

Try:	Depth (d) =	Bottom Width (b) =	Side Slope (z) =	Lining Rough Coeff. (n)	V Max Lined (fps)	Q Max Lined (cfs)
5.00	8.32	8.60	3.0	0.055	2.36	11.82

Depth from Q₁₀ Lined (ft) (Use n=0.05): **0.97**

Comments: **Q Max Lined > Q10, OK** **V10 < Vp, Adequate**

Channel Lining Velocity Capacity is Adequate

i) Calculate Rolled Erosion Control Product and Turf Mat Shear Stress for Q₁₀ =

Rip Rap Channel? (Yes/No) **No**

Temporary Liner: **Rollmax S75 Erosion Control Blanket or Equivalent**

Shear Stress (T): T = yds = **0.91** lb/ft²

Permissible Unit Shear Stress (Td): **1.55** lb/ft²

Rip Rap Diameter (N/A OR ft) **N/A**

Channel Lining Shear Stress Capacity is Adequate

Trapezoidal Channel Design Data

Bottom Width = 2.0 ft.	Temporary Liner: (TABLE #3 or Product Spec Sheet)	Rollmax S75 Erosion Control Blanket or Equivalent
Side Slopes = 3.0 ft./ft.		
Depth = 1.00 ft.		

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Temporary Grass Lined Channel #4

Green Values = Inputs, Channel Design Dimension Inputs at Bottom of Sheet 2
(Source: North Carolina Erosion and Sediment Control Planning and Design Manual)

a) Estimate Drainage Area and Determine Peak Flow Into Channel:

Peak Runoff: Q = CIA

- 1) Drainage Area: **0.85** Acres (Entire drainage area to be serviced by channel)
- 2) Runoff Coefficient (C) = **0.35** (TABLE #1)
- 3) Time of Concentration (Tc) = **1.253219** Minutes
Length of Travel = **126** ft
Height of Most Remote Point Above Outlet = **3.75** ft
Average Slope = **0.0297619**
- 4) Rainfall Intensity Factor (I) = **7.97** in/hr (TABLE #2)
- 10-Year Storm
- Appropriate Rainfall Duration (From Tc)
- 5) Peak Runoff: Q₁₀ = **2.371** cfs

b) Proposed Channel Grade: **2.98%**

c) Proposed Vegetation: **Bahiagrass**

d) Soil: **Lakeland-Urban Land Complex**

e) Permissible Velocity (Vp): **4.0** ft/s (TABLE #3)

f) Retardance Class: **D** (Mowed) (TABLE #4 - Avg. Veg. Length) **B** (Unmowed) (TABLE #4 - Avg. Veg. Length)

g) Trapezoidal Channel Dimensions:

Try:	Depth (d) =	Bottom Width (b) =	Side Slope (z) =	Roughness Coeff. (n)	V Max (fps)	Q Max (cfs)
5.00	8.32	8.60	3.0	0.043	4.26	21.28

Depth from Q₁₀ (ft) (Use n=0.05): **0.30**

Comments: **Q Max > Q10, OK** **V10 < Vp, OK**

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h) Evaluate Protective Channel Lining For High Velocity Channels (If V>Vp)

Permissible Velocity (Vp): **5.0** ft/s (TABLE #3 or Product Spec Sheet)

Rainfall Intensity Factor (I) = **7.97** in/hr

Peak Runoff: Q₁₀ = **2.371** cfs

Channel Lining: **Rollmax S75 Erosion Control Blanket or Equivalent**

Try:	Depth (d) =	Bottom Width (b) =	Side Slope (z) =	Lining Rough Coeff. (n)	V Max Lined (fps)	Q Max Lined (cfs)
5.00	8.32	8.60	3.0	0.055	3.33	16.64

Depth from Q₁₀ Lined (ft) (Use n=0.05): **0.39**

Comments: **Q Max Lined > Q10, OK** **V10 < Vp, Adequate**

Channel Lining Velocity Capacity is Adequate

i) Calculate Rolled Erosion Control Product and Turf Mat Shear Stress for Q₁₀ =

Rip Rap Channel? (Yes/No) **No**

Temporary Liner: **Rollmax S75 Erosion Control Blanket or Equivalent**

Shear Stress (T): T = yds = **0.72** lb/ft²

Permissible Unit Shear Stress (Td): **1.55** lb/ft²

Rip Rap Diameter (N/A OR ft) **N/A**

Channel Lining Shear Stress Capacity is Adequate

Trapezoidal Channel Design Data

Bottom Width = 2.0 ft.	Temporary Liner: (TABLE #3 or Product Spec Sheet)	Rollmax S75 Erosion Control Blanket or Equivalent
Side Slopes = 3.0 ft./ft.		
Depth = 1.00 ft.		

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Temporary Grass Lined Channel #5

Green Values = Inputs, Channel Design Dimension Inputs at Bottom of Sheet 2
(Source: North Carolina Erosion and Sediment Control Planning and Design Manual)

a) Estimate Drainage Area and Determine Peak Flow Into Channel:

Peak Runoff: Q = CIA

- 1) Drainage Area: **0.04** Acres (Entire drainage area to be serviced by channel)
- 2) Runoff Coefficient (C) = **0.35** (TABLE #1)
- 3) Time of Concentration (Tc) = **0.4420871** Minutes
Length of Travel = **52** ft
Height of Most Remote Point Above Outlet = **1.84** ft
Average Slope = **0.075692**
- 4) Rainfall Intensity Factor (I) = **7.97** in/hr (TABLE #2)
- 10-Year Storm
- Appropriate Rainfall Duration (From Tc)
- 5) Peak Runoff: Q₁₀ = **0.112** cfs

b) Proposed Channel Grade: **7.58%**

c) Proposed Vegetation: **Bahiagrass**

d) Soil: **Candler Sand, Lakeland-Urban Land Complex**

e) Permissible Velocity (Vp): **4.0** ft/s (TABLE #3)

f) Retardance Class: **D** (Mowed) (TABLE #4 - Avg. Veg. Length) **B** (Unmowed) (TABLE #4 - Avg. Veg. Length)

g) Trapezoidal Channel Dimensions:

Try:	Depth (d) =	Bottom Width (b) =	Side Slope (z) =	Roughness Coeff. (n)	V Max (fps)	Q Max (cfs)
5.00	8.32	8.60	3.0	0.043	6.79	33.95

Depth from Q₁₀ (ft) (Use n=0.05): **0.04**

Comments: **Q Max > Q10, OK** **V10 < Vp, OK**

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h) Evaluate Protective Channel Lining For High Velocity Channels (If V>Vp)

Permissible Velocity (Vp): **5.0** ft/s (TABLE #3 or Product Spec Sheet)

Rainfall Intensity Factor (I) = **7.97** in/hr

Peak Runoff: Q₁₀ = **0.112** cfs

Channel Lining: **Rollmax S75 Erosion Control Blanket or Equivalent**

Try:	Depth (d) =	Bottom Width (b) =	Side Slope (z) =	Lining Rough Coeff. (n)	V Max Lined (fps)	Q Max Lined (cfs)
5.00	8.32	8.60	3.0	0.055	5.31	26.54

Depth from Q₁₀ Lined (ft) (Use n=0.05): **0.05**

Comments: **Q Max Lined > Q10, OK** **V10 < Vp, Adequate**

Channel Lining Velocity Capacity is Adequate

i) Calculate Rolled Erosion Control Product and Turf Mat Shear Stress for Q₁₀ =

Rip Rap Channel? (Yes/No) **No**

Temporary Liner: **Rollmax S75 Erosion Control Blanket or Equivalent**

Shear Stress (T): T = yds = **0.24** lb/ft²

Permissible Unit Shear Stress (Td): **1.55** lb/ft²

Rip Rap Diameter (N/A OR ft) **N/A**

Channel Lining Shear Stress Capacity is Adequate

Trapezoidal Channel Design Data

Bottom Width = 2.0 ft.	Temporary Liner: (TABLE #3 or Product Spec Sheet)	Rollmax S75 Erosion Control Blanket or Equivalent
Side Slopes = 3.0 ft./ft.		
Depth = 1.00 ft.		

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PWC Fayetteville's HOME TOWN UTILITY

Booth & Associates
2309 Newwood Drive, Suite 300, Raleigh, NC 27607
N.C. EIT 4927

PROFESSIONAL SEAL
056749
NORTH CAROLINA PROFESSIONAL ENGINEER
MARA R. HARRIS
07/15/2023

DATE: 09/15/2023

ENG. LHR

NO. 0

ISSUED FOR BIDS - 60%

REVISIONS:

PROJECT NAME: **GILLESPIE-B1.9 SOLAR UTILITY STATION**

DRAWING TITLE: **CHANNEL CALCULATIONS**

DRAWN BY: MCW

CHECKED BY: LHR

APPROVED BY: LHR

DATE: 08/04/2023

SCALE: N.T.S.

FILE NUMBER: 12548SCG

SHEET: CG600

Skimmer Basin #1		PWC - Gillespie	
3.4 Drainage Area (Acres)	9.4843	Peak Flow from 10-year Storm (cfs)	
6120 Required Volume (ft ³)		Required Volume = 3.4 * 1800	
3062.39750 Required Surface Area (ft ²)		Required Surface Area = 9.4843 * 325	
39.25610 Suggested Width (ft)		Suggested Width = $\sqrt{(3062.3975 / 2)}$	
76.5 Suggested Length (ft)		Suggested Length = 39.2561042588661 * 2	
44 Trial Top Width at Impoundment Level (ft)			
78 Trial Top Length at Impoundment Level (ft)			
3 Trial Side Slope Ratio Z:1 (ft)			
3 Trial Depth (ft)			
26 Bottom Width (ft)		Bottom Width = 44 - (3 * 3 * 2)	
60 Bottom Length (ft)		Bottom Length = 78 - (3 * 3 * 2)	
1560 Bottom Area (ft ²)		Bottom Area = 26 * 60	
7306 Actual Volume (ft ³)	Okay	Volume = 1/3 * 3 * ((1560 + 3432) + ($\sqrt{(1560 + 3432)}$))	
3432 Actual Surface Area (ft ²)	Okay	Surface Area = 44 * 78	
9 Trial Weir Length (ft)			
0.5 Trial Depth of Flow (ft)			
9.5 Spillway Capacity (cfs)	Okay	Q = 3 * 9 * (0.5*1.5), Capacity > Peak Flow = Okay	
4 Skimmer Size (in)			
0.333 Head on Skimmer (ft)			
1.25 Orifice Diameter Size (1/4 in. increments)			
2.04 Dewatering (days) VOL/(2310*(D^2)*(√H) (Suggest +/- 3 days)			
Dewatering Time = 6120 / (2310 * (1.25^2) * (√0.333))			
Note: Use Basin Riser & Spillway Calc To Determine Spillway Width			
Blue = Inputs			
Red = Calculated Values			

Skimmer Basin #2		PWC - Gillespie	
9.56 Drainage Area (Acres)	26.66762	Peak Flow from 10-year Storm (cfs)	
17208 Required Volume (ft ³)		Required Volume = 9.56 * 1800	
8666.97650 Required Surface Area (ft ²)		Required Surface Area = 26.66762 * 325	
65.82924 Suggested Width (ft)		Suggested Width = $\sqrt{(8666.9765 / 2)}$	
131.7 Suggested Length (ft)		Suggested Length = 65.8292355264741 * 2	
66 Trial Top Width at Impoundment Level (ft)			
132 Trial Top Length at Impoundment Level (ft)			
3 Trial Side Slope Ratio Z:1 (ft)			
3 Trial Depth (ft)			
48 Bottom Width (ft)		Bottom Width = 66 - (3 * 3 * 2)	
114 Bottom Length (ft)		Bottom Length = 132 - (3 * 3 * 2)	
5472 Bottom Area (ft ²)		Bottom Area = 48 * 114	
21088 Actual Volume (ft ³)	Okay	Volume = 1/3 * 3 * ((5472 + 8712) + ($\sqrt{(5472 + 8712)}$))	
8712 Actual Surface Area (ft ²)	Okay	Surface Area = 66 * 132	
25 Trial Weir Length (ft)			
0.5 Trial Depth of Flow (ft)			
25.8 Spillway Capacity (cfs)	Too Small!	Q = 3 * 25 * (0.5*1.5), Capacity > Peak Flow = Okay	
4 Skimmer Size (in)			
0.333 Head on Skimmer (ft)			
2 Orifice Diameter Size (1/4 in. increments)			
3.23 Dewatering (days) VOL/(2310*(D^2)*(√H) (Suggest +/- 3 days)			
Dewatering Time = 17208 / (2310 * (2^2) * (√0.333))			
Note: Use Basin Riser & Spillway Calc To Determine Spillway Width			
Blue = Inputs			
Red = Calculated Values			

Sediment Basin #1		PWC - Gillespie	
11.29 Drainage Area (Acres)	39.192475	Peak Flow from 10-year Storm (cfs)	
20322 Required Volume (ft ³)		Required Volume = 11.29 * 1800	
17072.24211 Required Surface Area (ft ²)		Required Surface Area = 39.192475 * 435.6	
82.39113 Suggested Width (ft)		Suggested Width = $\sqrt{(17072.24211 / 2)}$	
164.8 Suggested Length (ft)		Suggested Length = 92.3911308243383 * 2	
93 Trial Top Width at Impoundment Level (ft)			
186 Trial Top Length at Impoundment Level (ft)			
3 Trial Side Slope Ratio Z:1 (ft)			
4 Trial Depth from Impoundment Level (ft)			
69 Bottom Width (ft)		Bottom Width = 93 - (3 * 4 * 2)	
162 Bottom Length (ft)		Bottom Length = 186 - (3 * 4 * 2)	
11170 Bottom Area (ft ²)		Bottom Area = 69 * 162	
33876 Actual Volume (ft ³)	Okay	Volume = 1/3 * 4 * (93 + 186 + 69 * 162 + (93 * 162 + 69 * 186) / 2)	
17296 Actual Surface Area (ft ²)	Okay	Surface Area = 93 * 186	
37 Trial Weir Length (ft)			
0.5 Trial Depth of Flow (ft)			
39.2 Spillway Capacity (cfs)	Okay	Q = 3 * 37 * (0.5*1.5), Capacity > Peak Flow = Okay	
Note: Use Basin Riser & Spillway Calc To Determine Spillway Width & Barrel Size			
Blue = Inputs			
Red = Calculated Values			


Site Data Inputs	
Drainage Area Into Basin (acres)	11.29
C total (Runoff coeff.)	0.435562445 (From Tab #2)
Longest Channel Into Basin (ft)	1060
Drainage Area Elev. Change (ft)	36
Time of Concentration (min)	6.135385307
Rainfall Intensity (in/hr, 10-yr)	7.97 (From Tab #3)


Date: 04/03/2023 By: MCW
Checked: By


Temporary Sediment Basin #1 Spillway Capacity Spreadsheet

Pipe Flow (Outlet Control)				Pipe Flow (Inlet Control)		Weir Flow (Riser)		Orifice Flow (Riser)		Primary Barrel Spillway Flow	Emergency Spillway Flow			Total Spillway Capacity			
Full				Co	0.6	Crest Elev.	157	Crest Elev.	157		Bottom Elevation	157.5	Bottom Width	37	Q cfs	Elevation	Elevation Notes
Inlet Invert = 152.50																	
Outlet Invert = 151.75																	
Material = Cor. Metal																	
Diameter (ins) = 24																	
Ke = 0.36																	
n for Pipe = 0.024																	
Length (ft) = 58.25																	
Kp = 0.04237																	
Area (sq ft) = 3.14159																	
Elevation	H	Q CFS	Outlet V	H	Q CFS	H	Q CFS	H	Q CFS	Q max CFS	Elevation	Head	Q	Q cfs	Elevation	Elevation Notes	
157.00	4.25	26.55	8.45	3.50	28.28	0.00	0.00	0.00	0.00	0.00	157.00	0.00	0.00	0.00	157.00	Riser Crest	
157.50	4.75	28.07	8.93	4.00	30.23	0.50	10.33	0.50	24.05	10.33	157.50	0.00	0.00	10.33	157.50	Emergency Spillway	
158.50	5.75	30.88	9.83	5.00	33.80	1.50	53.67	1.50	41.66	30.88	158.50	1.00	103.60	134.48	158.50	1 ft freeboard	

n VALUE - PIPE FRICTION COEFFICIENT		Ke - FRICTION LOSS RESISTANCE COEFFICIENT							
PIPE	COEFFICIENT	NOMINAL PIPE DIAMETER IN INCHES (RISER INTO OUTLET PIPE, USE LARGEST WIDTH)							
SMOOTH CEMENT	0.013	2"-4"	4"-6"	6"-8"	8"-10"	12"-18"	18" +		
ROUGH CEMENT	0.015								
CORRUGATED METAL	0.024								
SMOOTH STEEL	0.013								
RIVETED STEEL	0.016								
CAST IRON	0.014								
		Ke VALUE							
		STANDARD ELBOW	90° TO 135° BEND ANGLE	0.57	0.51	0.45	0.42	0.39	0.36
			135°+ BEND ANGLE	0.30	0.27	0.24	0.22	0.21	0.19







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NO.	ISSUED FOR	REVISIONS	DATE
0	ISSUED FOR BIDS - 60%		08/15/2023

PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION

DRAWING TITLE: SKIMMER AND SEDIMENT BASIN CALCULATIONS

DRAWN BY: MCW
CHECKED BY: LRH
APPROVED BY: LRH
DATE: 08/04/2023
SCALE: N.T.S.
FILE NUMBER: 12548SCG
SHEET: CG601

14 – Civil Driveway Permit Drawing Set

GENERAL NOTES

- OBTAIN ALL APPLICATION PERMITS PRIOR TO CONSTRUCTION, INCLUDING NCDOT DRIVEWAY PERMIT. OWNERS ENGINEER TO CONTACT NCDOT FAYETTEVILLE REGIONAL OFFICE AT 910-4343-3300 AND NCDOT HIGHWAY DIVISION 6 AT 910-384-0600 TO INVITE TO THE PRE-CONSTRUCTION MEETING AT LEAST 72 HOURS PRIOR TO PROJECT ACTIVATION.
- ALL WORK WILL BE PERFORMED OUTSIDE ANY WETLAND AREAS.
- ANY STOCKPILE SHALL HAVE A SURROUNDING SILT FENCE EXCEPT FOR THE INGRESS/EGRESS. (3 SIDES)
- CONTRACTOR SHALL ENSURE THAT THERE IS PROPER COVER AND PROTECTION OVER ALL CULVERTS.
- PERMANENT GROUND COVER WILL BE PROVIDED FOR ALL DISTURBED AREAS WITHIN 14 WORKING DAYS OR NO MORE THAN 90 CALENDAR DAYS, WHICHEVER IS SHORTER. G.S. 113A-57(3).
- TOPOGRAPHIC AND PHYSICAL DATA ON SITE AND ALONG GILLESPIE STREET WERE DERIVED FROM A SURVEY PERFORMED BY BOOTH & ASSOCIATES, LLC ON MARCH 22-23, 2023. OFFSITE TOPOGRAPHIC DATA WAS DERIVED FROM PUBLICLY AVAILABLE LIDAR DATA AT THE "CONNECT NCDOT" WEB SITE. WETLANDS AREAS DERIVED FROM "NATIONAL WETLANDS INVENTORY" BOUNDARY, OWNERSHIP, AND RIGHT-OF-WAY DATA WAS DERIVED FROM A SURVEY PREPARED BY MOORMAN, KIZER, AND REITZEL, INC., 115 BROADFOOT AVENUE, FAYETTEVILLE, NC, 28305, BEARING A SEAL DATE OF FEBRUARY 1, 2018. (JOB# 17-1079-03; PLAT BOOK 140, PAGE 127)
- NO LIGHTING IS PROPOSED FOR THIS SITE.
- LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE AND MUST BE FIELD VERIFIED. CALL NC ONE CALL CENTER BEFORE DIGGING AT 811.
- CLARIFICATIONS CAN BE ADDRESSED BY CONTACTING LAURA HARRIS: email: HARRISLR@BOOTH-ASSOC.COM/ phone: (919) 851-8770 x179.

SITE DESCRIPTION

THE PROPERTY IS OWNED BY CITY OF FAYETTEVILLE, WHO WILL OPERATE A SOLAR FARM TO MEET THE POWER DEMANDS OF THE CUMBERLAND COUNTY AREA.

THE DRIVEWAY WILL HAVE A GRAVELED CONSTRUCTION ENTRANCE WITH 60' RADII AND A PERMANENT ASPHALT ENTRANCE WITH 30' RADII THAT WILL CONNECT TO GILLESPIE STREET (SR 1242). THE DRIVEWAY WILL BE 20' WIDE AS SHOWN IN THE DETAILS. THE SITE WILL EXPERIENCE A LOW FREQUENCY OF TRAFFIC. THE SIGHT DISTANCES FROM THE PROPOSED DRIVEWAY ARE AS SHOWN IN THE SIGHT DISTANCE DETAILS. THE NEIGHBORING PROPERTIES ARE RESIDENTIAL AND AGRICULTURAL.

DURING THE CONSTRUCTION PHASE OF THE PROJECT, A 20' WIDE TEMPORARY GRAVEL CONSTRUCTION ENTRANCE WILL BE CONSTRUCTED TO ALLOW NECESSARY EQUIPMENT AND TRUCKS TO ENTER AND LEAVE THE SITE.

EROSION AND SEDIMENT CONTROL PRACTICES APPROVED BY NCDOT WILL BE FOLLOWED THROUGHOUT THE CONSTRUCTION AND POST-DEVELOPMENT PHASES OF THE PROJECT.

DRIVEWAY NOTES

- THE DRIVEWAY SHALL BE INSTALLED & SURFACED PER THE DETAIL SHEET.
- THE SUBGRADE, DIRECTLY BELOW THE DRIVEWAY AND TWO (2) FEET OUTSIDE OF THE DRIVEWAY, SHALL BE MECHANICALLY COMPACTED IN THE TOP 12" TO AT LEAST NINETY-FIVE PERCENT (95%) OF THE MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D698.
- ACCESS DRIVES AS SHOWN ON THE DRAWINGS SHALL HAVE CRUSHER RUN PLACED IN TWO FOUR INCH (4") LAYERS AND COMPACTED TO NINETY-EIGHT PERCENT (98%) OF THE MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D1557.
- MINIMUM GRAVEL DRIVEWAY THICKNESS SHALL BE EIGHT INCHES (8").
- COMPACTION TESTING SHOULD BE PERFORMED PER ONE-HUNDRED LINEAL FEET (100') MINIMUM.

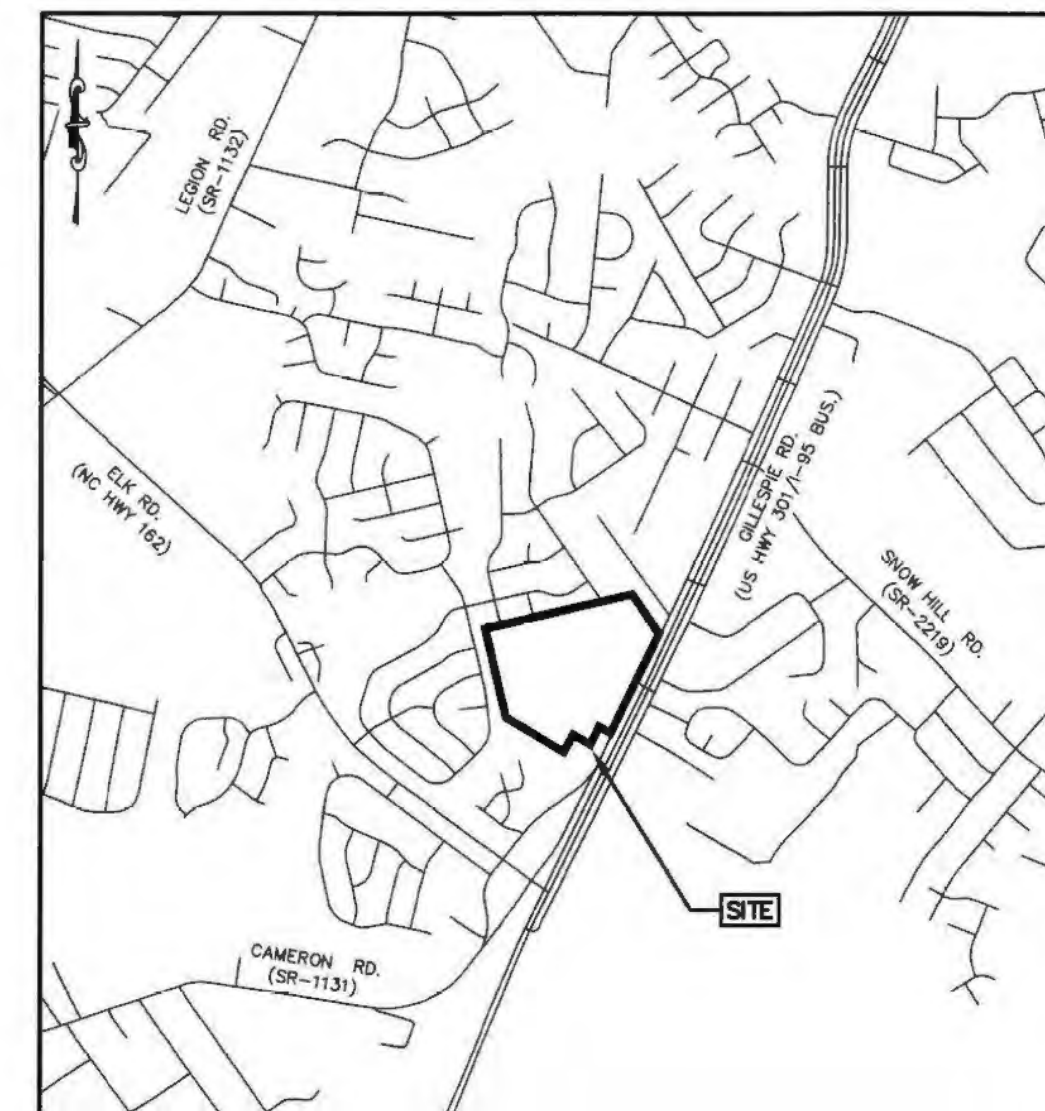
DRIVEWAY PERMIT NOTES

- DRIVEWAY USE: INFREQUENT USE BY PWC FAYETTEVILLE PERSONNEL AND THEIR CONTRACTORS FOR MAINTENANCE AND DELIVERY OF EQUIPMENT AND GROUNDS KEEPING.
- SPEED LIMIT: GILLESPIE STREET (SR 1242) = 45 MPH
- DRIVEWAY ENTRANCE: GRAVEL (TEMPORARY), ASPHALT (PERMANENT)
- DRIVEWAY RADII: 35' (TEMPORARY)
25' (PERMANENT)
- DRIVEWAY WIDTH: 20' (TEMPORARY)
13' (PERMANENT)
- LOCATION: APPROX. 1.6 MILES SOUTH OF THE INTERSECTION OF GILLESPIE STREET ROAD (SR 1242) AND DEPARTURE DRIVE.

LEGEND

	EXISTING POWER POLE		GRAVEL DRIVE
	GUY AND ANCHOR COMBINATION		CONSTRUCTION ENTRANCE
	EXISTING OVERHEAD ELECTRIC LINE		POST-CONSTRUCTION ASPHALT APRON
	PROPOSED OVERHEAD ELECTRIC LINE		
	PROPOSED MEDIUM VOLTAGE ELECTRIC		
	LEASE LINE		
	EDGE OF EXISTING UTILITY EASEMENT		
	PROPERTY SETBACK LINE		
	EDGE OF PAVEMENT		
	DOT RIGHT-OF-WAY		
	PROPOSED DISTURBANCE LIMIT		
	PROPOSED SILT FENCE		
	EXISTING TREE LINE		
	EXISTING FENCE		
	EXISTING CONTOURS, 1.0 FT INTERVAL		

GILLESPIE - B1.9 SOLAR UTILITY STATION ACCESS DRAWINGS FOR PWC FAYETTEVILLE 3858 GILLESPIE STREET FAYETTEVILLE, NORTH CAROLINA 28306



VICINITY MAP
CUMBERLAND COUNTY, FAYETTEVILLE, NC
SCALE: 1"=2000'



SHEET INDEX	
No.	DESCRIPTION
CG700	DRIVEWAY PERMIT DRAWINGS COVER SHEET
CG701	DRIVEWAY PLAN AND SIGHT DISTANCES
CG702	DRIVEWAY DETAILS

PREPARED BY:

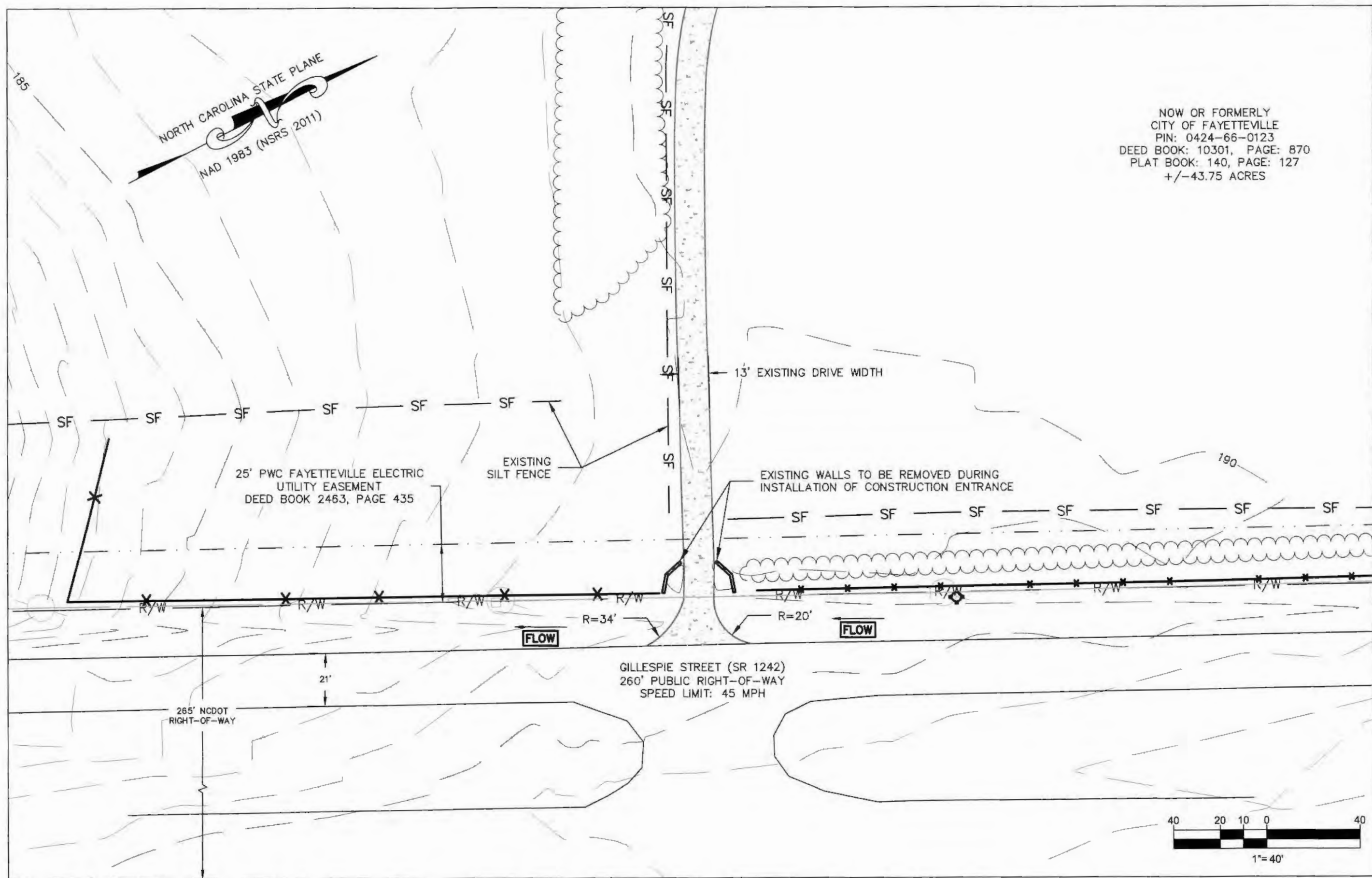
Booth & Associates
2300 Rexwoods Drive Suite 300, Raleigh NC 27607
NC F-0221



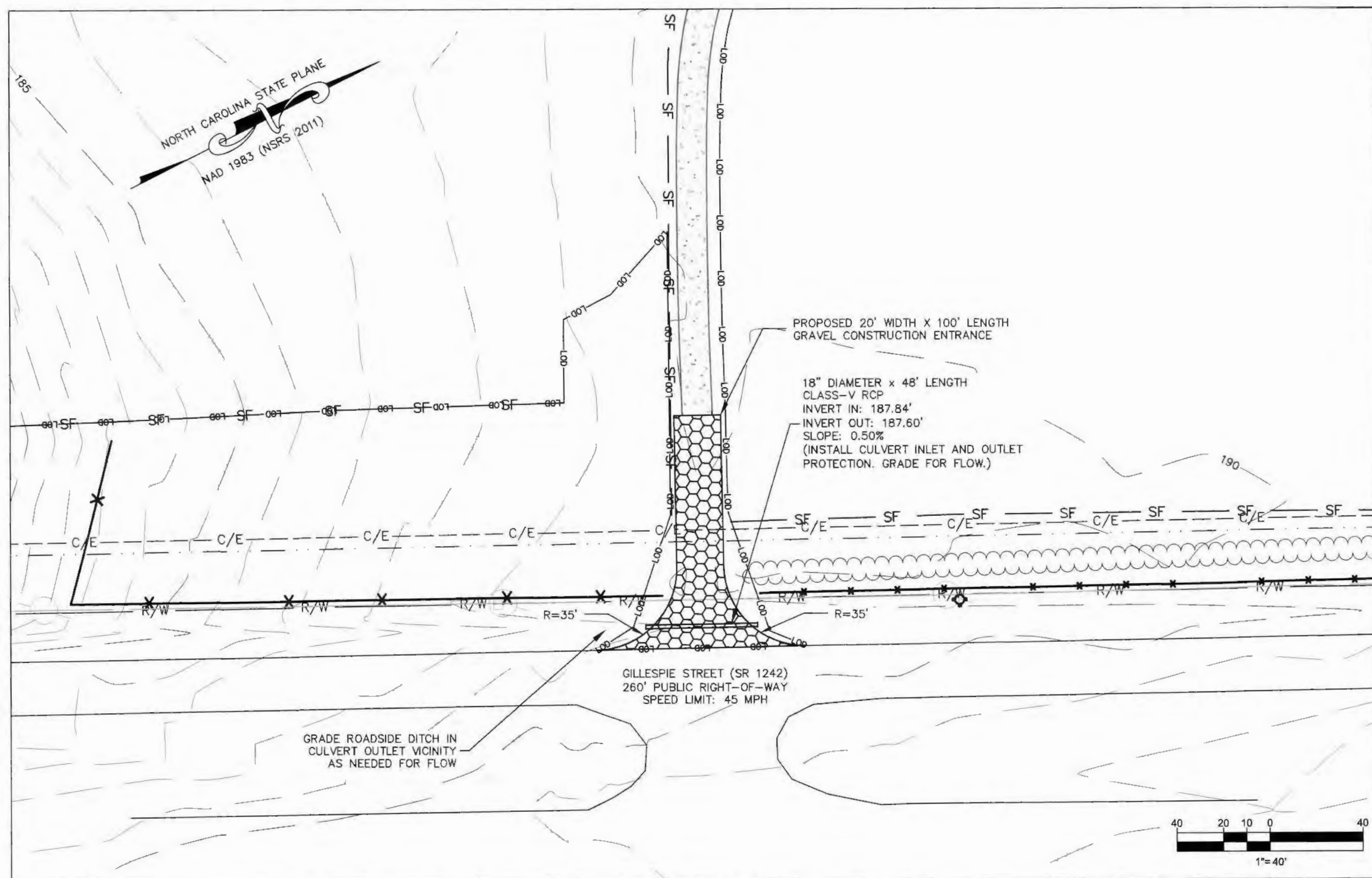
NO.	DATE	REVISIONS
A	09/15/2023	ISSUED FOR BIDS - 80%

PROJECT NAME: GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE: DRIVEWAY PERMIT DRAWINGS COVER SHEET

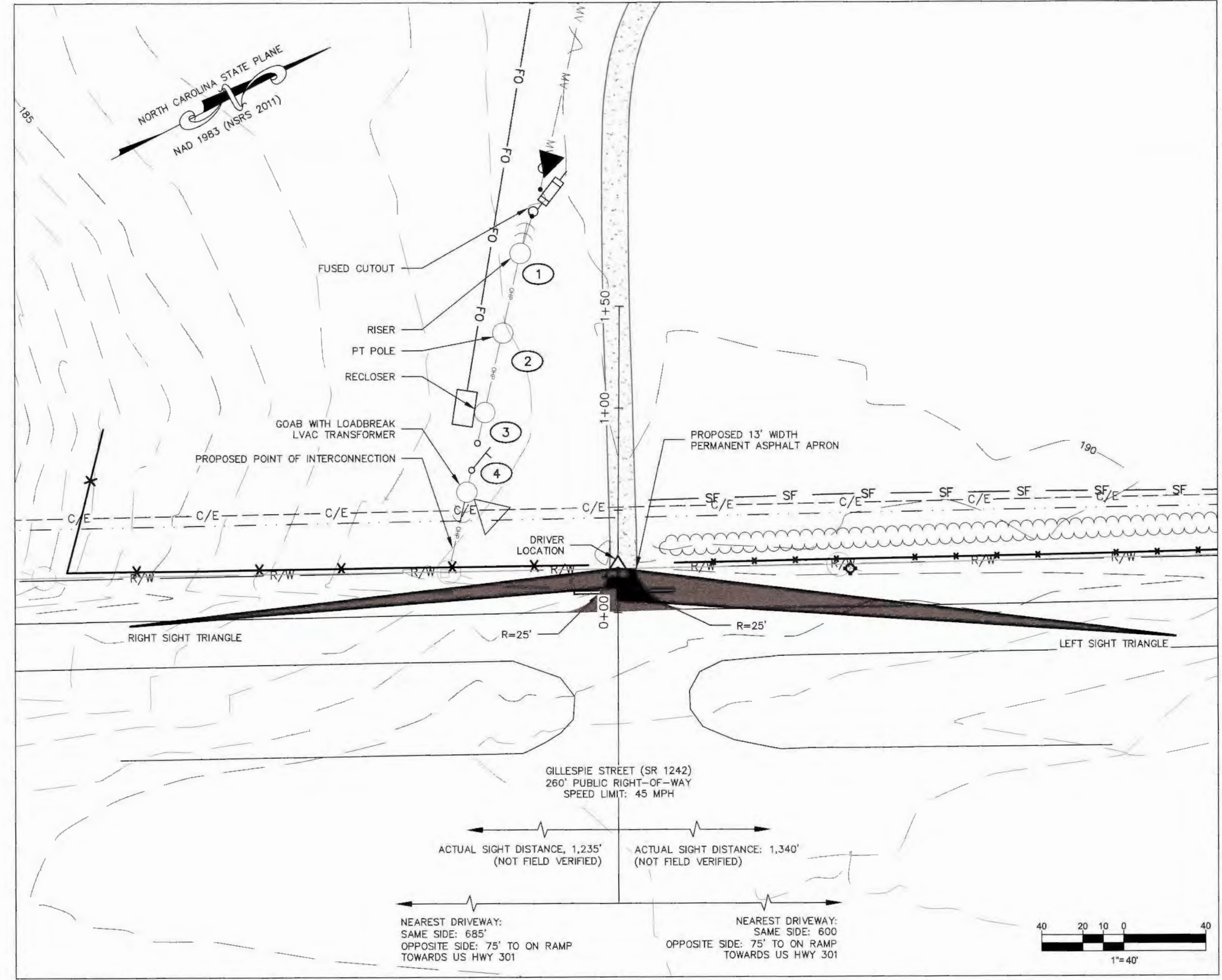
DRAWN BY:	AAI
CHECKED BY:	LRH
APPROVED BY:	LRH
DATE:	08/04/2023
SCALE:	AS SHOWN
FILE NUMBER:	12548SDOT
SHEET:	CG700



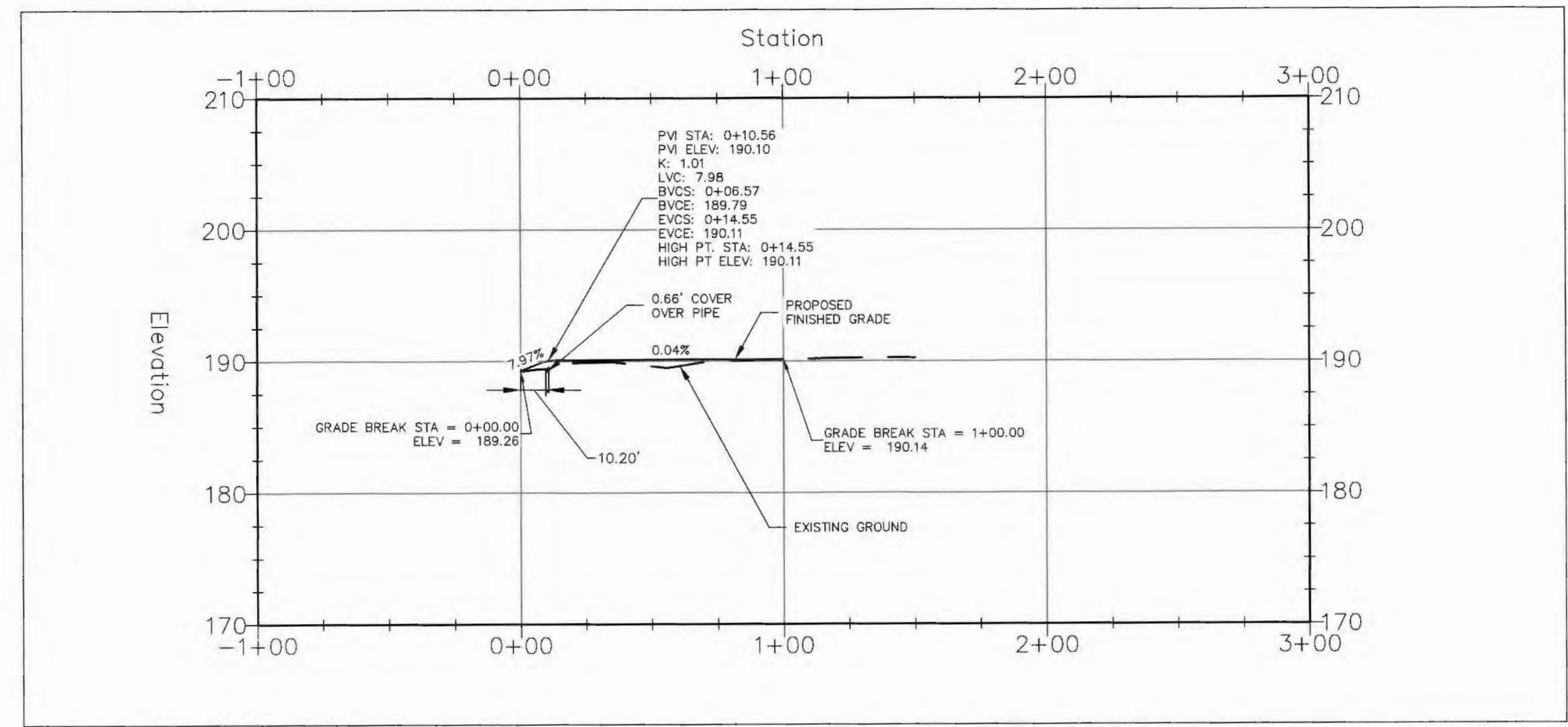
EXISTING DRIVEWAY CONDITIONS
SCALE: 1" = 40'



TEMPORARY DRIVEWAY CONDITIONS
SCALE: 1" = 40'



PERMANENT DRIVEWAY CONDITIONS AND SIGHT DISTANCES
SCALE: 1" = 40'



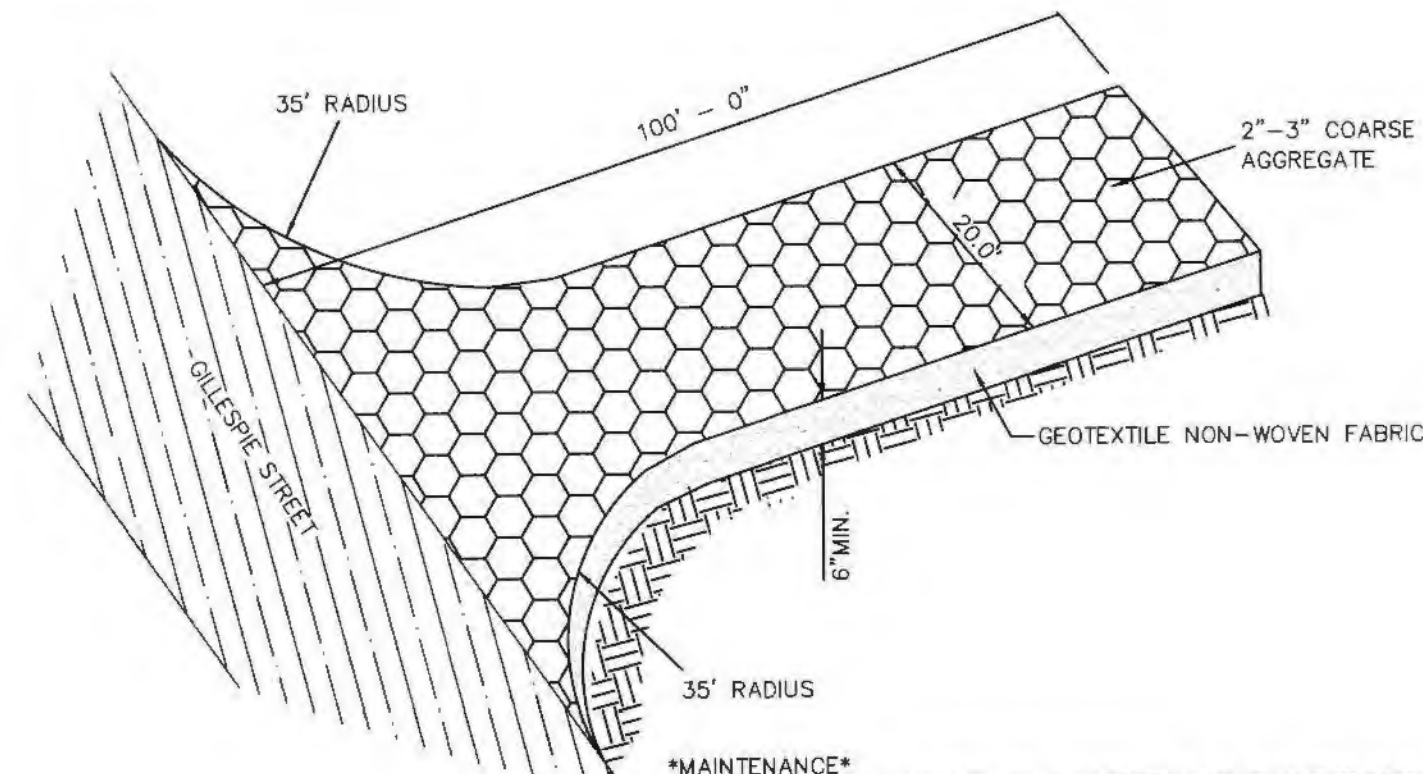
DRIVEWAY PROFILE VIEW
HORIZONTAL SCALE: 1" = 40', VERTICAL SCALE: 1" = 8'

NO.	ENC.	DATE	REVISIONS	
			ISSUED FOR BIDS - 60%	
A	LRH	08/15/2023		

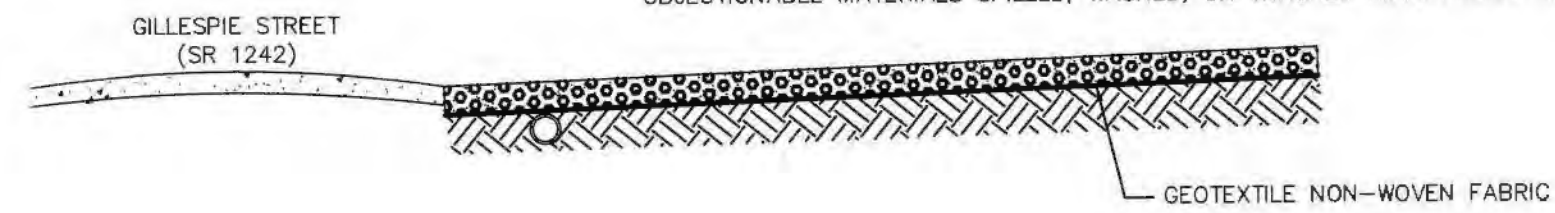
PROJECT NAME: **GILLESPIE-B1.9 SOLAR UTILITY STATION**
DRAWING TITLE: **DRIVEWAY PLAN AND SIGHT DISTANCES**

DRAWN BY: AAI
CHECKED BY: LRH
APPROVED BY: LRH
DATE: 08/04/2023
SCALE: 1" = 100'
FILE NUMBER: 12548SDOT

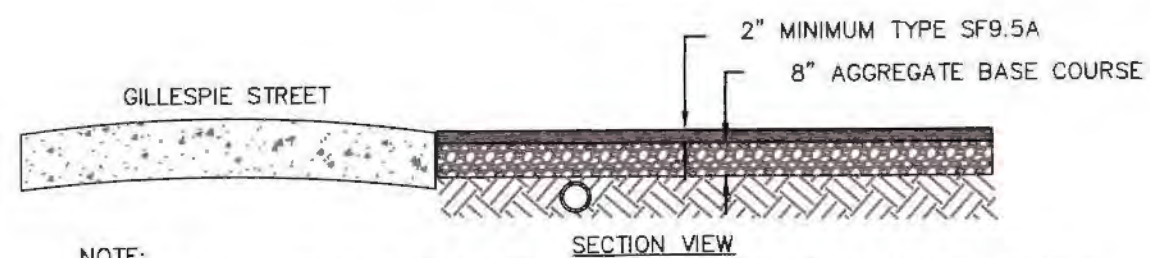
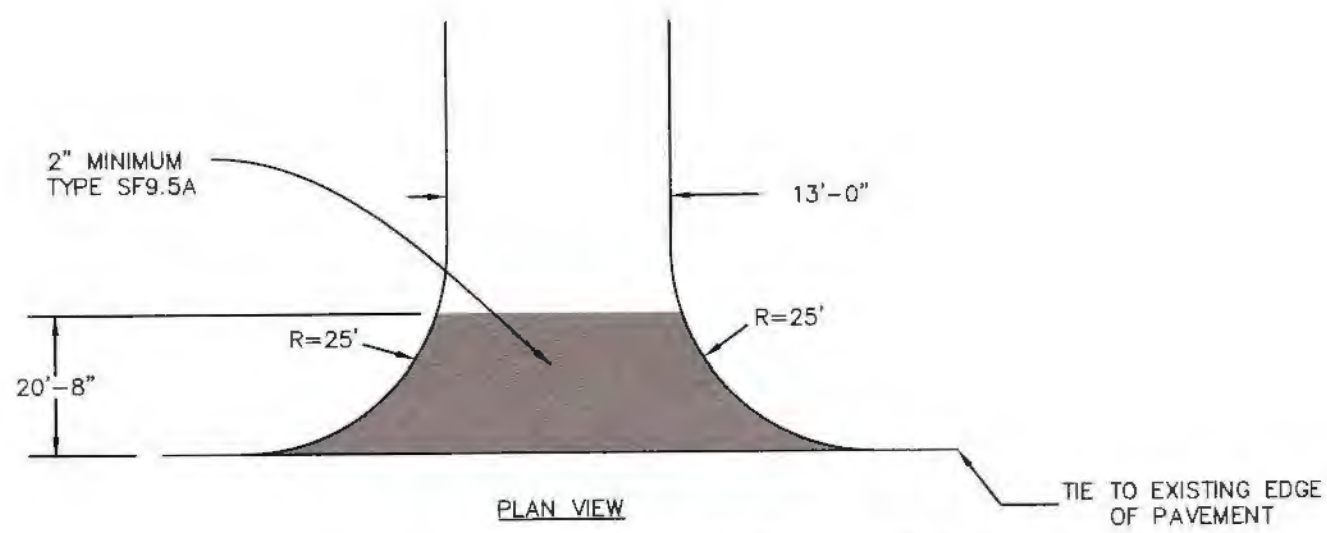
SHEET: **CG701**



MAINTENANCE
 MAINTAIN THE GRAVEL PAD IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING THE CONSTRUCTION SITE. THIS MAY REQUIRE PERIODIC TOPDRESSING WITH 2-INCH STONE. AFTER EACH RAINFALL, INSPECT ANY STRUCTURE USED TO TRAP SEDIMENT AND CLEAN IT OUT AS NECESSARY. IMMEDIATELY REMOVE ALL OBJECTIONABLE MATERIALS SPILLED, WASHED, OR TRACKED ONTO PUBLIC ROADWAYS.

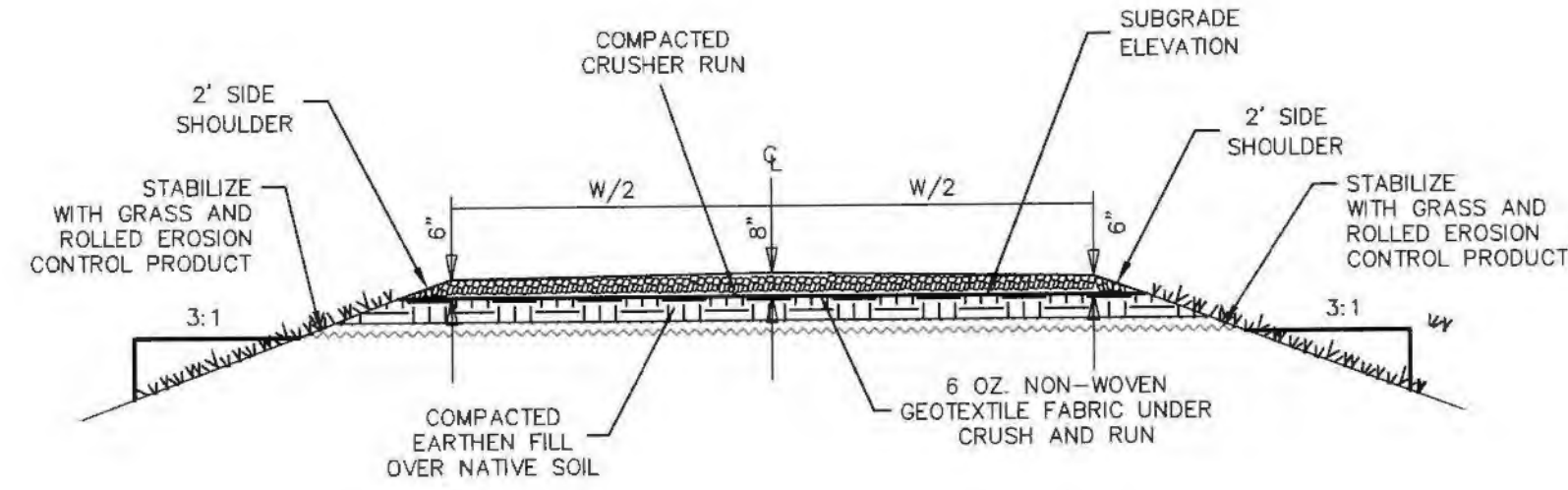


TEMPORARY CONSTRUCTION ENTRANCE DETAIL
 SCALE: N.T.S.



NOTE:
 IF PAVED ENTRANCE WIDTH IS LESS THAN THE CONSTRUCTION ENTRANCE, EXCESS STONE AND PIPE IS TO BE REMOVED PER INSTRUCTION FROM NCDOT. FOLLOW NCDOT APPROVED DRIVEWAY PERMIT INSTRUCTIONS, INCLUDING CONTACTING REGIONAL DOT ENGINEER BEFORE START OF DRIVE CONSTRUCTION.

POST-CONSTRUCTION SUBSTATION ENTRANCES DETAIL
 SCALE: N.T.S.



MAINTENANCE
 INSPECT CONSTRUCTION ROADS AND PARKING AREAS PERIODICALLY FOR CONDITION OF SURFACE. TOPDRESS WITH NEW GRAVEL AS NEEDED. CHECK ROAD DITCHES AND OTHER SEEDING AREAS FOR EROSION AND SEDIMENTATION AFTER RUNOFF-PRODUCING RAINS. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION. SEDIMENT-PRODUCING AREAS SHOULD BE TREATED IMMEDIATELY.

SUBSTATION GRAVEL ACCESS DRIVE DETAIL
 SCALE: N.T.S.



Booth & Associates
 2305 Remondino Drive, Suite 300, Raleigh, NC 27607
 N.C. #021



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NO.	ISSUED FOR BIDS - 60%	REVISIONS	ENG. LRB	DATE
1			LRB	09/15/2023

PROJECT NAME:	GILLESPIE-B1.9 SOLAR UTILITY STATION
DRAWING TITLE:	DRIVEWAY DETAILS
DRAWN BY:	AAI
CHECKED BY:	LRH
APPROVED BY:	LRH
DATE:	08/04/2023
SCALE:	1" = 100'
FILE NUMBER:	12548SDOT
SHEET:	CG702

