# ROCKFISH SOLAR UTILITY STATION

## TRACY HALL ROAD

# FAYETTEVILLE, NORTH CAROLINA 28306

# SOLAR ELECTRIC SYSTEM PROJECT - 5,948.8 KWDC/ 4,875.00 KWAC

DRAWING INDEX:

DWG NO.

EP-001

EP-011

EP-156

EP-260

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TITLE

REV NO

34.96195, -78.83766

OWNER INFORMATION
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WORKS COMMISSION
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910-223-4909

ENGINEER
ROBERT MOTTE, PE
BOOTH & ASSOCIATES, LLC
2300 REXWOODS DRIVE, SUITE 300
RALEIGH, NC 27612
919-851-8770

	SYSTEM SUMMARY
MODULE	(10816) SERAPHIM ENERGY SRP 550 BMA-BG 182
INVERTER	(39) SMA SUNNY HIGHPOWER PEAK3 125-US
TRANSFORMER	(2) 2500 kVA 12.47 kV GRD-WYE TO 480 V WYE, 5.75% Iz
RACKING	FIXED TILT 2UP PORTRAIT
AZIMUTH	180°
MAX ROTATION ANGLE OR TILT (°)	21°
GROUND COVERAGE RATIO (%)	50%
CLEAR ROW SPACING	14'
TOTAL STRINGS (26 MODS/STR)	416
DC CAPACITY	5,948.80 KW
AC CAPACITY	4,875.00 KW
LOADING RATIO DC/AC (%)	122%
INTERCONNECTION UTILITY	PWC FAYETTE VILLE
SITE COORDINATES	34.9619509, -78.8376635

STREET MAP:	AERIAL VIEW:
Evans Cemetery	

PROJECT LOCATION:

Dundarrach

(24)

Spring Lake

Pope Field

Fort Liberty

Linden



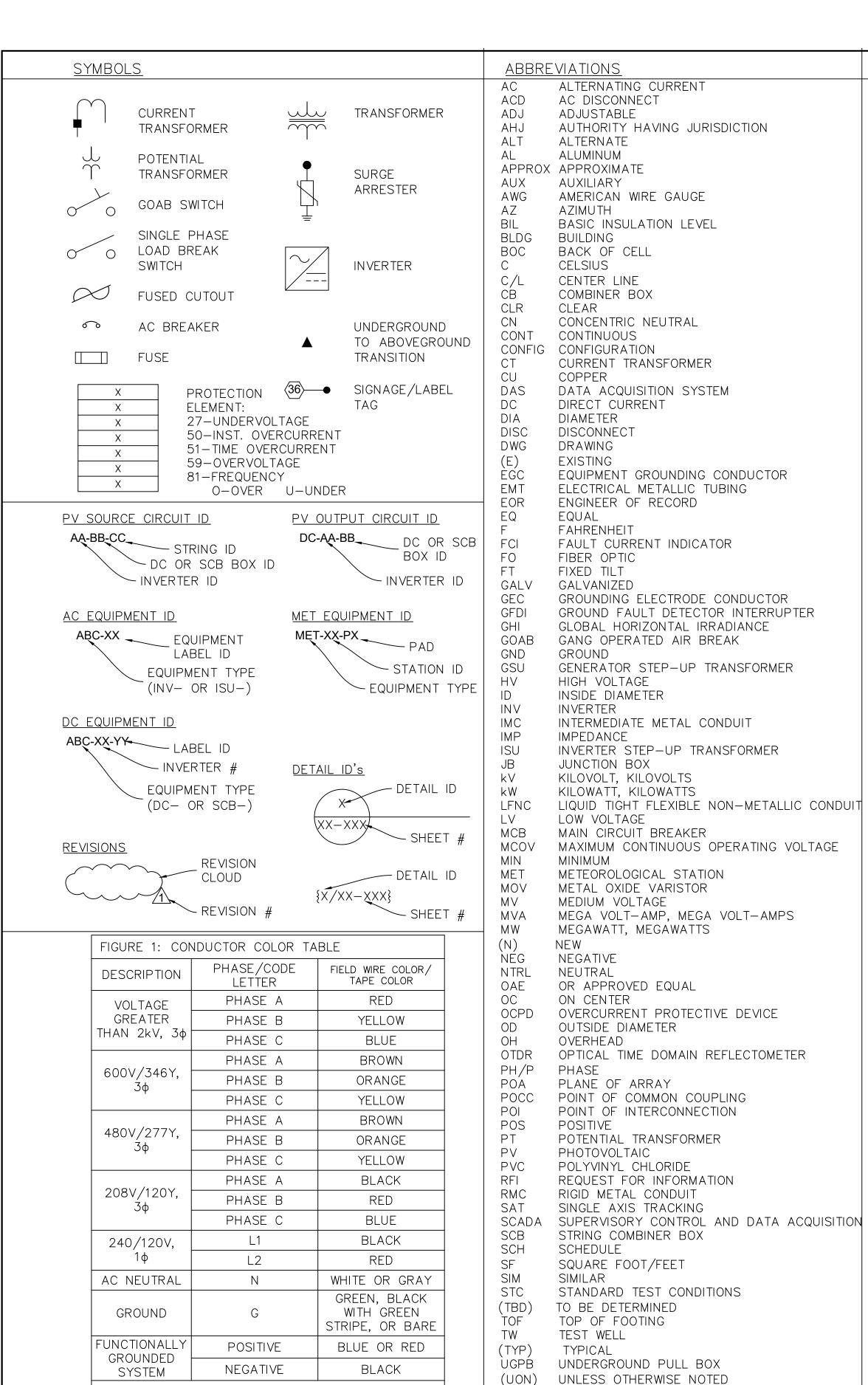




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ROCKFISH SOLAR UTILITY STATION		TITLE SHEET
NAME:	TITLE:	
PROJECT NAME:	DRAWING TITLE:	
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EP-001							
SHEET:							
FILE NUMBER:	12549						
SCALE:	NONE						
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APPROVED BY:	ВЈМ						
CHECKED BY:	EDR						
DRAWN BY:	ALH						



**UPS** 

VA

VAC

VDC

VIF

WP

WS

XFMR

UNINTERRUPTIBLE POWER SUPPLY

VOLTS ALTERNATING CURRENT

VOLT AMP, VOLT AMPS

VOLTS DIRECT CURRENT

VOLT, VOLTS

VERIFY IN FIELD

WEATHERPROOF

TRANSFORMER

WEATHER STATION

NOTE: PV SYSTEMS UNREFERENCED TO GROUND

BATTERY ENERGY STORAGE SYSTEMS, WHETHER

MARKED IN ACCORDANCE WITH NEC [200.6].

OF NEC [690.41].

(NEITHER POSITIVE NOR NEGATIVE DC CONDUCTORS

ARE GROUNDED AT THE INVERTER DURING NORMAL

OPERATION) MUST COMPLY WITH THE REQUIREMENTS

REFERENCED OR UNREFERENCED TO GROUND, MUST

COMPLY WITH THE REQUIREMENTS OF NEC ARTICLES

480 AND 706. GROUNDED CONDUCTORS SHALL BE

### Codes & Standards

NOTES

- 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.
- damage by using approved means such as bollards, fences, shields, or guards.

2.3. All electrical equipment, conduits, and components must be protected adequately from

- 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
- 2.9. All materials potentially exposed to direct or indirect sunlight shall be UV rated.

### **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 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.-dipped galvanized ferrous material that will be subjected to drilling, cutting, pile-driving, or other
- 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
- 3.12. 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
- 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.

### Wire Management

- 5.1. Prior to installation, the Owner must approve all wire management methods and
- 5.2. All wire management must be performed neatly, in an orderly and professional
- 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
- 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
- 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.
- 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

6.10. Lugs must include inspection windows for quality assurance, and lugs without

- 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.

equipment manufacturers.

- 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
- otherwise required by equipment manufacturers. 6.27. All connectors and corresponding crimping tools must be listed for their specific

6.26. All electrical connections must use conical or Belleville lock washers, unless

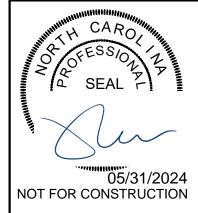
- application. 6.28. If a site uses the same color code for multiple voltages, it is necessary to use a sign or
- labeling to indicate the specific voltage. The color coding to be used shall follow the standard specified in the design documents, unless otherwise indicated:
- 6.28.1. >2KV: Phase A Red, 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

### 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.







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- 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

### 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
- 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.

### DC Combiner / Load Break Disconnect Boxes

- 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
- 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.

### 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
- 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

### 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
- 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
- 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
- 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
- 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
- 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
- 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
- 17.38. HDPE couplings with other types of conduit shall be listed for those conduit types.
- compression fittings shall be used. 17.40. Use Myers (or approved equal) hub for RMC to provide moisture protection for

17.39. PVC glue shall not be used for PVC to HDPE connections. Either epoxy or

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
- 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

barriers of outdoor equipment.

- 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
- 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, indentifying 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.







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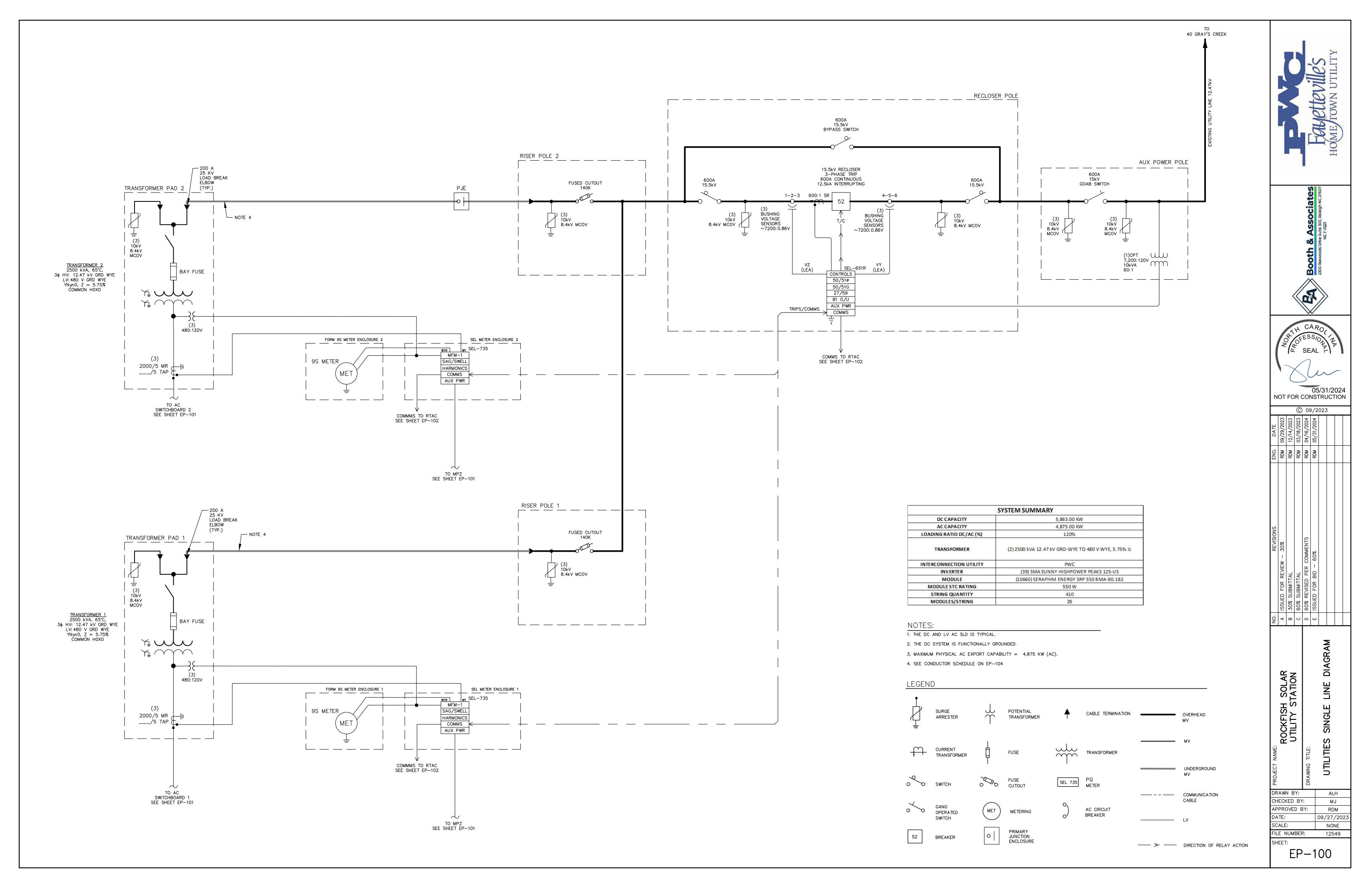
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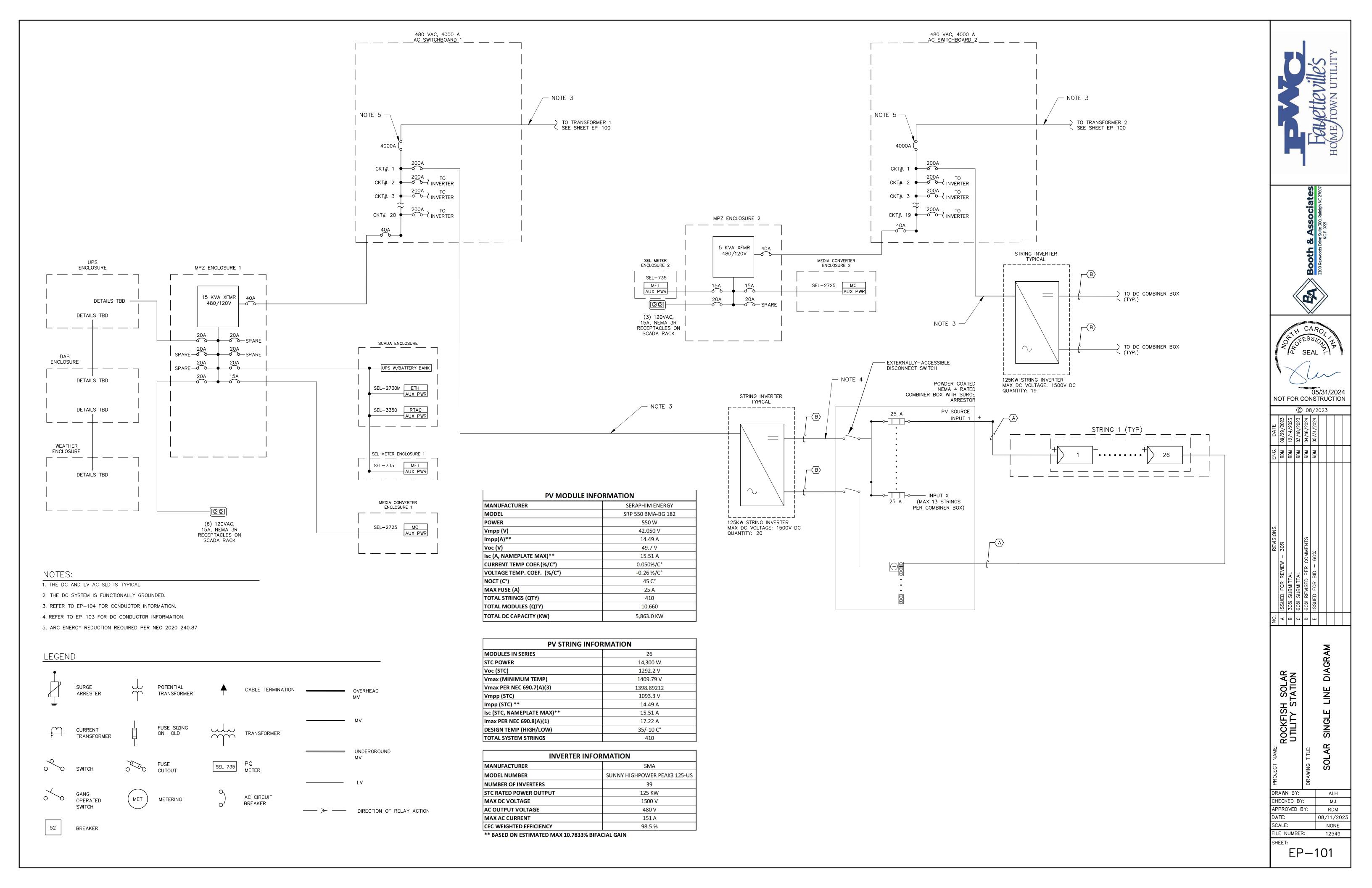
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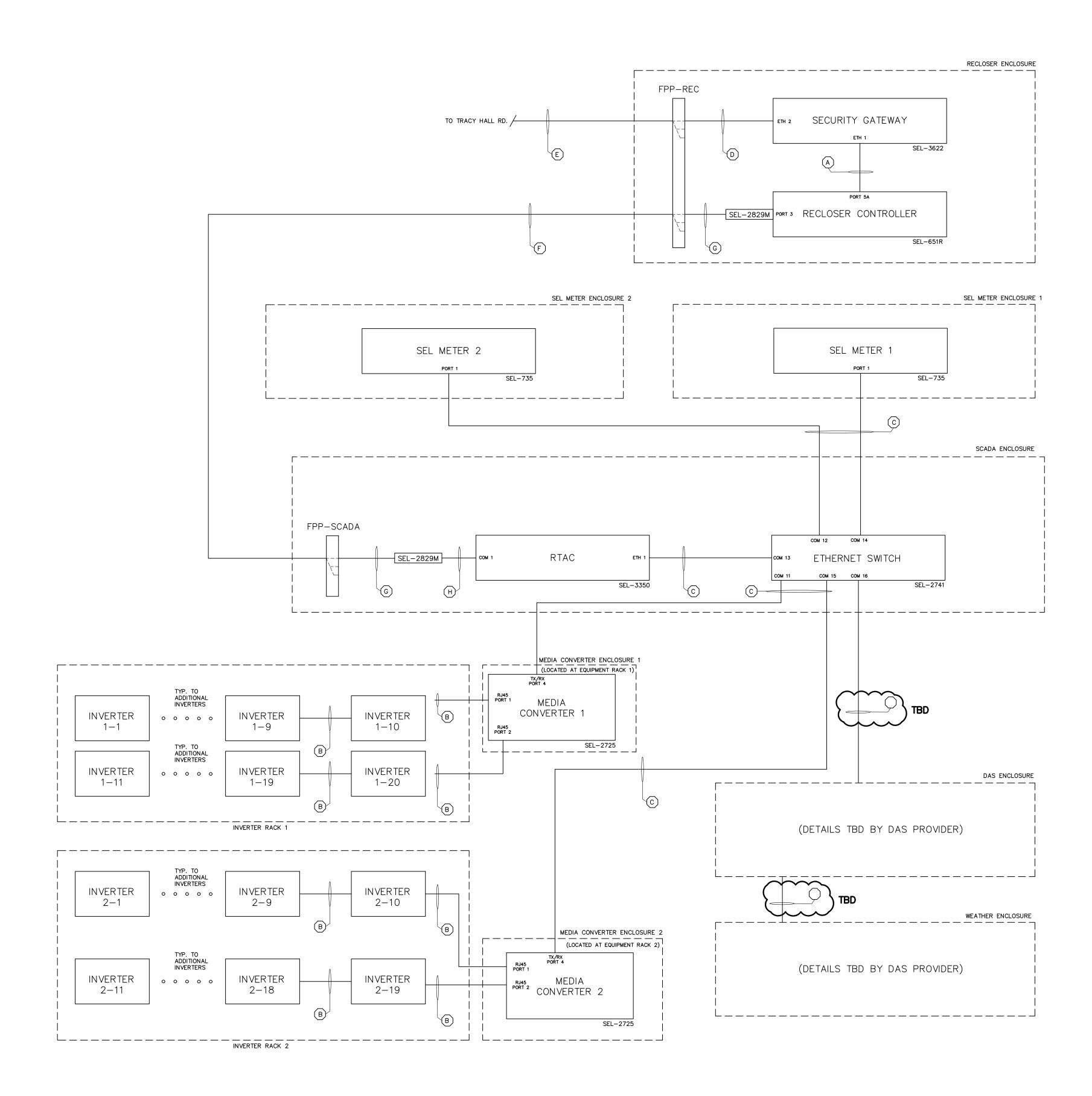
FILE NUMBER:

SCALE:

EP - 011







C	COMMUNICATIONS CABLE LEGEND								
IDENTIFIER	CABLE TYPE	COMMUNICATION PROTOCOL							
А	RJ45M-RJ45M COPPER CAT5E OR HIGHER	ETHERNET							
В	RJ45M-RJ45M COPPER CAT5E OR HIGHER	ETHERNET							
С	LC-LC MM FIBER	ETHERNET							
D	LC-LC SM FIBER	ETHERNET							
E	ADSS6 SM FIBER	ETHERNET							
F	LST6 SM FIBER	SERIAL							
G	ST-LC SM FIBER	SERIAL							
Н	DB9F—RJ45M COPPER	SERIAL							

### NOTES

- 1. SEE CABINET ELEVATIONS & BOM DRAWING EP-301 FOR COMPLETE RELAY AND DEVICE CONFIGURATION ID'S.
- 2. CABLE CONFIGURATION TO BE DETERMINED BY CONTRACTOR.



Booth & Associates
2300 Rexwoods Drive Suite 300, Raleigh NC 2760'
NC F-0221



AME:	S	REVISIONS
ROCKFISH SOLAR	∢	A 60% SUBMITTAL
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MAGNAGA NOCTACINITIN		
MONICATION BLOCK DIAGRAM		

EP-102

CHECKED BY:
APPROVED BY:

FILE NUMBER:

		*		F	quipment Sch	nedule	<del>,</del>	,	*	
Transformer ID	Inverter ID	Inverter Model	Module	# Strings	# Modules	Max Input Short	STC RATED POWER	Output Voltage	Total DC Power (kW)	DC/AC Ratio
XFMR-01	INV-01-01	125 KW STRING INVERTER	550 W MODULE	9	234	Circuit Current (A) 139.59	AC (kW) 125	(VAC) 480	128.7	1.03
COLUMN CHICAGO	INV-01-01	125 KW STRING INVERTER	550 W MODULE	9	234	139.59	125	480	128.7	1.03
<u> </u>	INV-01-02	125 KW STRING INVERTER	550 W MODULE	9	234	139.59	125		128.7	1.03
	INV-01-03	125 KW STRING INVERTER	550 W MODULE	10	260	155.10	125	480 480	143.0	1.14
CAN ASSOCIATION	INV-01-04	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
			550 W MODULE		286		125		157.3	
	INV-01-06	125 KW STRING INVERTER	550 W MODULE	11	+	170.61		480	+	1.26
The second secon	INV-01-07	125 KW STRING INVERTER	Control of the Contro	11	286	170.61	125	480	157.3	1.26
CONTRACTOR CHICAGO	INV-01-08	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
	INV-01-09	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
-	INV-01-10	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
A CONTRACTOR OF THE CONTRACTOR	INV-01-11	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
	INV-01-12	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
	INV-01-13	125 KW STRING INVERTER	550 W MODULE	10	260	155.10	125	480	143.0	1.14
ACTION OF THE RESERVE OF THE PARTY OF THE PA	INV-01-14	125 KW STRING INVERTER	550 W MODULE	10	260	155.10	125	480	143.0	1.14
CONTRACTOR OF CONTRACTOR	INV-01-15	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
0	INV-01-16	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
	INV-01-17	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
A ACCOUNT OF THE SECTION OF THE SECT	INV-01-18	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
Process of the Control of the Contro	INV-01-19	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
1.0077.1	INV-01-20	125 KW STRING INVERTER	550 W MODULE	10	260	155.10	125	480	143.0	1.14
	INV-02-01	125 KW STRING INVERTER	550 W MODULE	12	312	186.12	125	<mark>4</mark> 80	171.6	1.37
- Control of the cont	INV-02-02	125 KW STRING INVERTER	550 W MODULE	12	312	186.12	125	480	<del>171.6</del>	1.37
	INV-02-03	125 KW STRING INVERTER	550 W MODULE	12	312	186.12	125	480	171.6	1.37
XFMR-02	INV-02-04	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-02	INV-02-05	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-02	INV-02-06	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	<mark>480</mark>	<b>157.3</b>	<b>1.26</b>
XFMR-02	INV-02-07	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-02	INV-02-08	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-02	INV-02-09	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-02	INV-02-10	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-02	INV-02-11	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-02	INV-02-12	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	<mark>4</mark> 80	157.3	1.26
XFMR-02	INV-02-13	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-02	INV-02-14	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-02	INV-02-15	125 KW STRING INVERTER	550 W MODULE	10	260	155.10	125	480	143.0	1.14
XFMR-02	INV-02-16	125 KW STRING INVERTER	550 W MODULE	8	208	124.08	125	480	114.4	0.92
XFMR-02	INV-02-17	125 KW STRING INVERTER	550 W MODULE	6	156	93.06	125	480	85.8	0.69
XFMR-02	INV-02-18	125 KW STRING INVERTER	550 W MODULE	10	260	155.10	125	480	143.0	1.14
XFMR-02	INV-02-19	125 KW STRING INVERTER	550 W MODULE	9	234	139.59	125	480	128.7	1.03

	_		COMINION	ICATION CAB	LE SCHEDULE				•	T
Cable	From Device	Port	To Device	Port	Cable Type	Manufacturer / Part ID	Protocol	Procured By	Length (FT)	Min Conduit Siz (IN)
COM-UTL-FPP1-1	Utility Fiber	(##	FIBER PATCH PANEL (FPP-REC)		ADSS6	OFS #FLT-6-ADSS	ETHERNET	CONTRACTOR	TBD	N/A
COM-FPP1-SEC-1	FIBER PATCH PANEL (FPP-REC)		SECURITY GATEWAY (SEL-3622)	ETH 2	LC-LC SM FIBER	CORNING/EQU. #TBD	ETHERNET	CONTRACTOR	6	NOTE 3
COM-SEC-REC-1	SECURITY GATEWAY (SEL-3622)	ETH 1	RECLOSER CONTROLLER (SEL-651R)	PORT 5A	RJ45M-RJ45M	CORNING/EQU. #TBD	ETHERNET	CONTRACTOR	2	NOTE 3
COM-2829-FPP1-1	RECLOSER TRANSCEIVER (SEL-2829M)	(#	FIBER PATCH PANEL (FPP-REC)	=	ST-ST SM FIBER	CORNING/EQU. #TBD	SERIAL	CONTRACTOR	6	NOTE 3
COM-FPP1-FPP2-1	FIBER PATCH PANEL (FPP-REC)	( <u>444</u>	FIBER PATCH PANEL (FPP-SCADA)		LST6 SM FIBER	CORNING #006ESF-T4101DA1	SERIAL	CONTRACTOR	120	2
COM-FPP2-2829-1	FIBER PATCH PANEL (FPP-SCADA)	( <del></del>	SERIAL TRANSCEIVER (SEL-2829M)		ST-ST SM FIBER	CORNING/EQU. #TBD	SERIAL	CONTRACTOR	6	NOTE 3
COM-2829-RTAC-1	RTAC TRANSCEIVER (SEL-2829M)	( <del></del>	RTAC (SEL-3350)	COM1	DB9F-RJ45M	SEL#478A	SERIAL	CONTRACTOR	6	NOTE 3
COM-RTAC-ETH-1	RTAC (SEL-3350)	ETH1	ETH SWITCH (SEL-2741)	COM13	LC-LC MM FIBER	CORNING/EQU. #TBD	ETHERNET	CONTRACTOR	6	NOTE 3
COM-ETH-MET-1	ETH SWITCH (SEL-2741)	COM14	SEL METER 1 (SEL-735)	PORT 1	LC-LC MM FIBER	CORNING/EQU. #TBD	ETHERNET	CONTRACTOR	6	NOTE 3
COM-ETH-MET-2	ETH SWITCH (SEL-2741)	COM 12	SEL METER 2 (SEL-735)	PORT 1	LC-LC MM FIBER	CORNING/EQU. #TBD	ETHERNET	CONTRACTOR	1200	2
COM-ETH-DAS-1	ETH SWITCH (SEL-2741)	COM12	DAS ENCLOSURE	FORT 1	TBD	TBD	TBD	CONTRACTOR	15	2
COM-DAS-WEA-1	DAS ENCLOSURE	COIVITO	WEATHER ENCLOSURE		TBD	TBD	TBD	CONTRACTOR	15	2
COM-ETH-MED	ETH SWITCH (SEL-2741)	COM15	MEDIA CONVERTER (SEL-2725)	PORT 4	LC-LC MM FIBER	CORNING OR EQU. #TBD	ETHERNET	CONTRACTOR	1200	2
COM-INV1-INV2-1	INVERTER 1-1	1	INVERTER 1-2	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	5	NOTE 3
COM-INV2-INV3-1	INVERTER 1-2	1	INVERTER 1-3	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV3-INV4-1	INVERTER 1-3	1	INVERTER 1-5	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
AND THE PROPERTY OF THE PROPER	TO AND THE PROPERTY OF THE PRO	1	AND APPEAR OF THE PARTY OF THE		The state of the s	Experience of the Control of the Con			6	
COM-INV4-INV5-1	INVERTER 1-4	1	INVERTER 1-5	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV5-INV6-1	INVERTER 1-5	1	INVERTER 1-6	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV6-INV7-1	INVERTER 1-6	1	INVERTER 1-7	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV7-INV8-1	INVERTER 1-7	1	INVERTER 1-8	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV8-INV9-1	INVERTER 1-8	1	INVERTER 1-9	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV9-INV10-1	INVERTER 1-9	1	INVERTER 1-10	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR		NOTE 3
COM-INV10-ETH-1	ETH SWITCH (SEL-2741)	COM 1	INVERTER 10	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	40	2
COM-INV12-INV11-1	INVERTER 1-12	1	INVERTER 1-11	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV13-INV12-1	INVERTER 1-13	1	INVERTER 1-12	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV14-INV13-1	INVERTER 1-14	1	INVERTER 1-13	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV15-INV14-1	INVERTER 1-15	1	INVERTER 1-14	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV16-INV15-1	INVERTER 1-16	1	INVERTER 1-15	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV17-INV16-1	INVERTER 1-17	1	INVERTER 1-16	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV18-INV17-1	INVERTER 1-18	1	INVERTER 1-17	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV19-INV18-1	INVERTER 1-19	1	INVERTER 1-18	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV20-INV19-1	INVERTER 1-20	1	INVERTER 1-19	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV20-ETH-1	ETH SWITCH (SEL-2741)	COM 2	INVERTER 1-20	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	40	2
COM-INV1-INV2-2	INVERTER 2-1	1	INVERTER 2-2	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV2-INV3-2	INVERTER 2-2	1	INVERTER 2-3	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV3-INV4-2	INVERTER 2-3	1	INVERTER 2-4	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV4-INV5-2	INVERTER 2-4	1	INVERTER 2-5	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV5-INV6-2	INVERTER 2-5	1	INVERTER 2-6	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV6-INV7-2	INVERTER 2-6	1	INVERTER 2-7	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV7-INV8-2	INVERTER 2-7	1	INVERTER 2-8	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV8-INV9-2	INVERTER 2-8	1	INVERTER 2-9	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV9-INV10-2	INVERTER 2-9	1	INVERTER 2-10	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV10-MED-2	MEDIA CONVERTER (SEL-2725)	PORT 1	INVERTER 2-10	1	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	40	2
COM-INV12-INV11-2	INVERTER 2-12	1	INVERTER 2-11	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV13-INV12-2	INVERTER 2-13	1	INVERTER 2-12	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV14-INV13-2	INVERTER 2-14	1	INVERTER 2-13	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV15-INV14-2	INVERTER 2-15	1	INVERTER 2-14	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET/IP	CONTRACTOR	6	NOTE 3
COM-INV16-INV15-2	INVERTER 2-16	1	INVERTER 2-15	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV17-INV16-2	INVERTER 2-17	1	INVERTER 2-16	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	5	NOTE 3
COM-INV18-INV17-2	INVERTER 2-18	1	INVERTER 2-10	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV19-INV18-2	INVERTER 2-19	1	INVERTER 2-17	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET/IP	CONTRACTOR	5	NOTE 3
COM-INV20-INV19-2	INVERTER 2-20	1	INVERTER 2-19	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	5	NOTE 3
COM-INV20-MED-2	MEDIA CONVERTER (SEL-2725)	PORT 2	INVERTER 2-19	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET/IP	CONTRACTOR	40	2
COM HAY ZO WILD Z		TONTE	THE PARTY OF THE P	4	CAIDC	OGGGOOD ETANYON TOU	errientel / II	CONTINUEDIN	70	

### NOTES:

- ALL METALLIC ENCLOSURES SHALL BE BONDED TO THE GROUND GRID.
- 2. 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.
- 5. SEE BID SPECIFICATION DOCUMENTS
  6. DISTANCES FOR ENGINEERING PURPOSES ONLY, NOT TO BE USED FOR CONTRACTOR TAKE-OFFS

DC CONDUCTOR CALCULATIONS										
LEGEND	A	⟨B⟩	(C)	D						
FROM EQUIPMENT:	SINGLE STRING	DC COMBINER OUTPUT	INVERTER OUTPUT	AC SWITCHBOARD OUTPUT						
TO EQUIPMENT:	DC COMBINER INPUT	INVERTER INPUT	AC SWITCHBOARD INPUT	TRANSFORMER INPUT						
NUMBER OF STRINGS:	1	12	N/A	N/A						
WIRE RATING:	90 C°	90 C°	90 C°	90 C°						
TERMINAL RATING:	90 C°	90 C°	90 C°	90 C°						
ROUTING LOCATION:	UNDERGROUND	UNDERGROUND	UNDERGROUND	UNDERGROUND						
CONDUCTOR MATERIAL:	COPPER	ALUMINUM	ALUMINUM	COPPER						
WIRE INSULATION:	PV-WIRE (2000V), EXPOSED, WET, UV RATED	PV-WIRE (2000V), EXPOSED, WET, UV RATED	XHHW (600V)	XHHW (600V)						
TEMPERATURE CORRECTION FACTOR:	0.96	0.96	0.96	0.96						
MAXIMUM CIRCUIT CURRENT 690.8(A)(1)(a)(1), (A):	19.39 A	232.64 A	151.0 A	3020.0 A						
MAXIMUM CIRCUIT CURRENT PER SAM STUDY 690.8(A)(1)(a)(2), (A):	17.22 A	206.58 A	188.75 A	3775. A						
70% OF 690.8(A)(1)(a)(1), (A):	13.57 A	162.85 A	105. <mark>7</mark> A	2114. A						
METHOD 1: 125% OF MAX CIRCUIT CURRENT 690.8(B)(1), (A):	21.52 A	258.23 A	188.75 A	3775. A						
METHOD 2: MAX CIRCUIT CURRENT WITH CONDITIONS 690.8(B)(2),(A):	35.86 A	215.19 A	157.29 A	3932.29 A						
MIN. CABLE AMPACITY REQUIRED:	35.86 A	258.23 A	188.75 A	3932.29 A						
FUSE SIZE:	25 A	N/A	200 A	3,500 A						
CHOSEN WIRE SIZE:	#10	350 MCM	4/0	(9 SETS) 500 MCM						
NUMBER OF UNGROUNDED (PHASE) CONDUCTORS:	2	2	3	3						
NUMBER OF GROUNDED (NEUTRAL) CONDUCTORS:	0	0	0	0						
EQUIPMENT GROUND CONDUCTOR (EGC):	#6 PV TYPE CU	#3 AWG CU	#3 AWG CU	500 MCM CU						
NUMBER OF EGC IN EACH SET:	1	1	1	1						
NUMBER OF PARALLELED SETS:	1	1	1	1						
MAX CONDUIT FILL DERATING:	50.0%	100.0%	100.0%	100.0%						
MINIMUM CONDUIT SIZE:	2"	2"	2"	4"						
MAX NUMBER OF <u>SETS</u> PER RACEWAY:	10	1	1	1						
CHOSEN WIRE AMPACITY PER NEC CONDUCTOR TABLE:	40 A	280 A	205 A	#N/A						

120 V AC and CT/PT Conductor Schedule											
			(Note 1)	Minimum	Conductor	Minimum	Equipment				
		Burial	Distance	Conductor Size &	Voltage	OCPD Size	Ground				
From	То	Scenario	(FT)	Type	Rating (V)	(A)	Conductor Size				
Transformer CTs	SEL Meter Enclosure	2" Conduit	75	(3) #10 AWG CU	600 V	N/A	#10 AWG CU				
Transformer PTs	SEL Meter Eliciosure	2 Conduit	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				

### <u>NOTES</u>

 DISTANCES FOR ENGINEERING PURPOSES ONLY, NOT TO BE USED FOR CONTRACTOR TAKE—OFFS.



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NC F-0221



OCKFISH SOLAR
ITILITY STATION
IPMENT SCHEDULE

DRAWN BY:
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EDR
APPROVED BY:
BJM
DATE:
03/11/2024
SCALE:
NONE
FILE NUMBER:
12549

FILE NUMBER: SHEET:

								MV COND	OUCTOR SCH	EDULE							
									Equipment								
MV			AC					Chosen	Ground	Concentric		Conductor			Min. Conduit	AC	AC
Circuit			Voltage	Max Operating		Burial	Number of	Conductor	Conductor	Neutral	Conductor	Voltage			Size (1 Phase Per	Voltage	Voltage
Label	From	То	(V)	Line Current (A)	Distance (ft)	Scenario	Conductors	Size	Size (EGC)	Size	Material	Rating (V)	Insulation Type	Insulation Rating	Conduit)	Drop (V)	Drop (%)
MV-01-01	RISER 1	XFMR1	12470	115.75	70.00	IN CONDUIT	3	4/0 AWG	N/A	1/3	ALUMINUM	25000	EPR MV-90	260 MIL, 100%	3"	1.47	0.01%
MV-01-02	RISER 2	XFMR2	12470	115.75	1300.00	IN CONDUIT	3	4/0 AWG	N/A	1/3	ALUMINUM	25000	EPR MV-90	260 MIL, 100%	3"	31.58	0.25%

						DC CC	NDUCTOR SCH	EDULE					
									GROUND				
									CONDUCTOR				
				DESIGN	DISTANCE	PARALLEL	CONDUCTOR	CONDUCTOR	SIZE/MATERI		INSULATION	VOLTAGE DROP	
MAX/AVG	FROM	ТО	DC VOLTAGE (V)	IMP (A)	(FT)*	SETS	SIZE	MATERIAL	AL	CONDUIT SIZE	TYPE	(V)	VOLTAGE DROP (%) (NOTE 3)
MAX	STRING	DC DISCONNECT	1135.35	14.49	520	1	10 AWG	COPPER	6 AWG	2"	PV WIRE	19.59	1.73%
AVG	STRING	DC DISCONNECT	1135.35	14.49	260	1	10 AWG	COPPER	6 AWG	2"	PV WIRE	9.80	0.86%

				[	DC CONDUCT	OR SCHEDUI	E						
			DC VOLTAGE		DISTANCE	PARALLEL	CONDUCTOR	CONDUCTOR	GROUND CONDUCTOR		INSULATION		VOLTAGE
FROM	ТО	# OF MODULES	(V)	(A)	(FT)*	SETS	SIZE	MATERIAL	SIZE/MATERIAL	CONDUIT SIZE	TYPE		DROP (%)
DC DISCONNECT 1-1	INVERTER 1-1	234	1135.35	130.41	189	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	3.13	0.28%
DC DISCONNECT 1-2	INVERTER 1-2	234	1135.35	125.58	151	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	2.41	0.21%
DC DISCONNECT 1-3	INVERTER 1-3	234	1135.35	125.58	121	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	1.93	0.17%
DC DISCONNECT 1-4	INVERTER 1-4	260	1135.35	139.53	95	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	1.68	0.15%
DC DISCONNECT 1-5	INVERTER 1-5	286	1135.35	153.49	378	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	7.37	0.65%
DC DISCONNECT 1-6	INVERTER 1-6	286	1135.35	153.49	368	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	7.17	0.63%
DC DISCONNECT 1-7	INVERTER 1-7	286	1135.35	153.49	378	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	7.37	0.65%
DC DISCONNECT 1-8	INVERTER 1-8	286	1135.35	153.49	494	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	9.63	0.85%
DC DISCONNECT 1-9	INVERTER 1-9	286	1135.35	153.49	525	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	10.23	0.90%
DC DISCONNECT 1-10	INVERTER 1-10	286	1135.35	153.49	583	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	11.36	1.00%
DC DISCONNECT 1-11	INVERTER 1-11	286	1135.35	153.49	646	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	12.59	1.11%
DC DISCONNECT 1-12	INVERTER 1-12	286	1135.35	153.49	704	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	13.72	1.21%
DC DISCONNECT 1-13	INVERTER 1-13	260	1135.35	139.53	762	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	13.50	1.19%
DC DISCONNECT 1-14	INVERTER 1-14	260	1135.35	139.53	226	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	4.00	0.35%
DC DISCONNECT 1-15	INVERTER 1-15	286	1135.35	153.49	284	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	5.54	0.49%
DC DISCONNECT 1-16	INVERTER 1-16	286	1135.35	153.49	378	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	7.37	0.65%
DC DISCONNECT 1-17	INVERTER 1-17	286	1135.35	153.49	410	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	7.99	0.70%
DC DISCONNECT 1-18	INVERTER 1-18	286	1135.35	153.49	468	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	9.12	0.80%
DC DISCONNECT 1-19	INVERTER 1-19	286	1135.35	153.49	525	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	10.23	0.90%
DC DISCONNECT 1-20	INVERTER 1-20	260	1135.35	139.53	583	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	10.33	0.91%
DC DISCONNECT 2-1	INVERTER 2-1	312	1135.35	167.44	147	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	3.13	0.28%
DC DISCONNECT 2-2	INVERTER 2-2	312	1135.35	167.44	268	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	5.70	0.50%
DC DISCONNECT 2-3	INVERTER 2-3	312	1135.35	167.44	368	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	7.82	0.69%
DC DISCONNECT 2-4	INVERTER 2-4	286	1135.35	153.49	424	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	8.26	0.73%
DC DISCONNECT 2-5	<b>INVERTER 2-5</b>	286	1135.35	153.49	483	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	9.41	0.83%
DC DISCONNECT 2-6	INVERTER 2-6	286	1135.35	153.49	546	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	10.64	0.94%
DC DISCONNECT 2-7	<b>INVERTER 2-7</b>	286	1135.35	153.49	95	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	1.85	0.16%
DC DISCONNECT 2-8	INVERTER 2-8	286	1135.35	153.49	189	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	3.68	0.32%
DC DISCONNECT 2-9	INVERTER 2-9	286	1135.35	153.49	247	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	4.81	0.42%
DC DISCONNECT 2-10	INVERTER 2-10	286	1135.35	153.49	273	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	5.32	0.47%
DC DISCONNECT 2-11	INVERTER 2-11	286	1135.35	153.49	305	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	5.94	0.52%
DC DISCONNECT 2-12	INVERTER 2-12	286	1135.35	153.49	336	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	6.55	0.58%
DC DISCONNECT 2-13	INVERTER 2-13	286	1135.35	153.49	368	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	7.17	0.63%
DC DISCONNECT 2-14	INVERTER 2-14	286	1135.35	153.49	394	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	7.68	0.68%
DC DISCONNECT 2-15	INVERTER 2-15	260	1135.35	139.53	423	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	7.50	0.66%
DC DISCONNECT 2-16	INVERTER 2-16	208	1135.35	111.63	483	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	6.85	0.60%
DC DISCONNECT 2-17	INVERTER 2-17	156	1135.35	83.72	515	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	5.48	0.48%
DC DISCONNECT 2-18	INVERTER 2-18	260	1135.35	139.53	436	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	7.73	0.68%
DC DISCONNECT 2-19	INVERTER 2-19	234	1135.35	125.58	431	1	350 MCM	ALUMINUM	#3 CU	2"	PV WIRE	6.87	0.61%



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NC F-0221



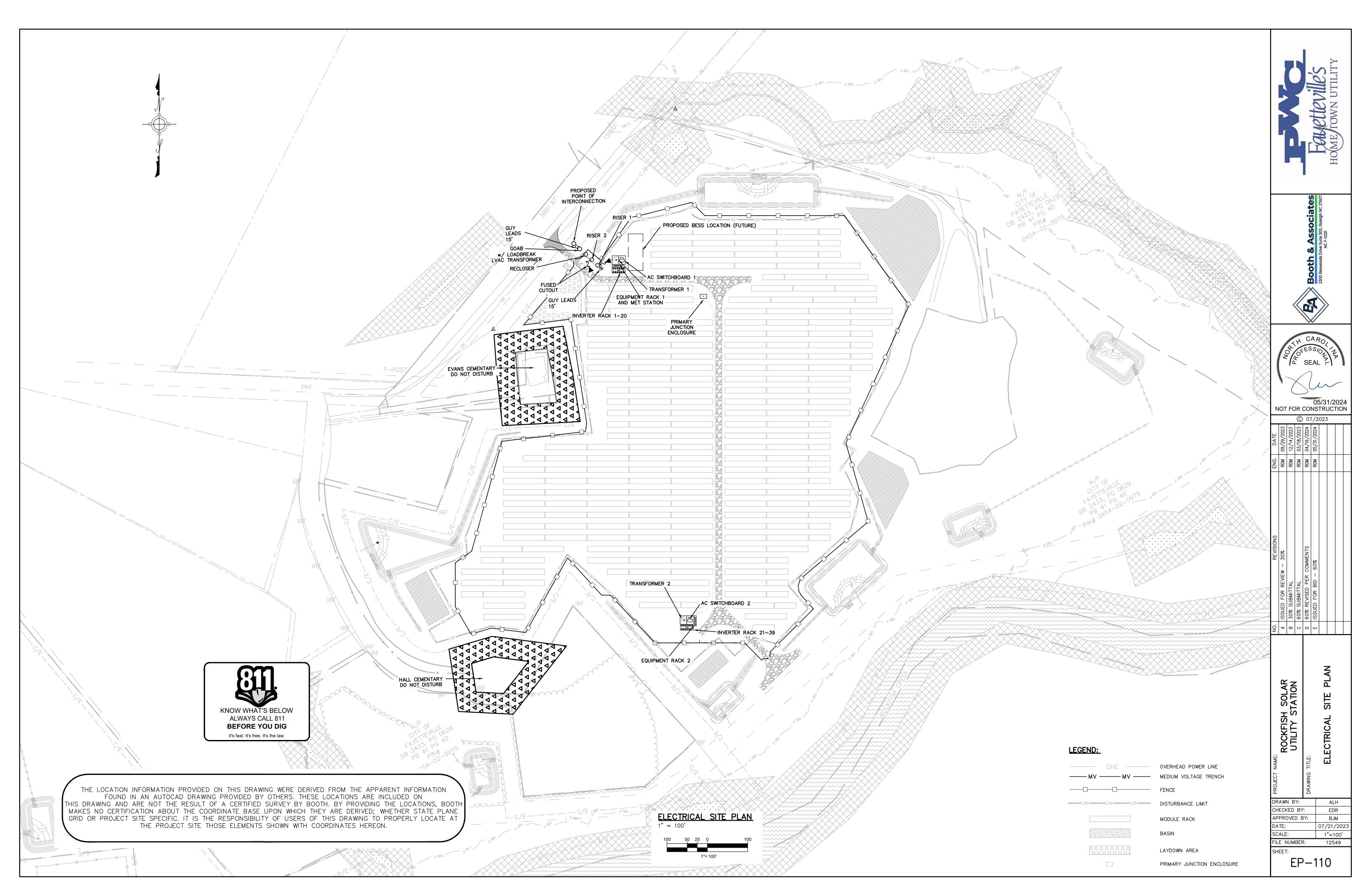
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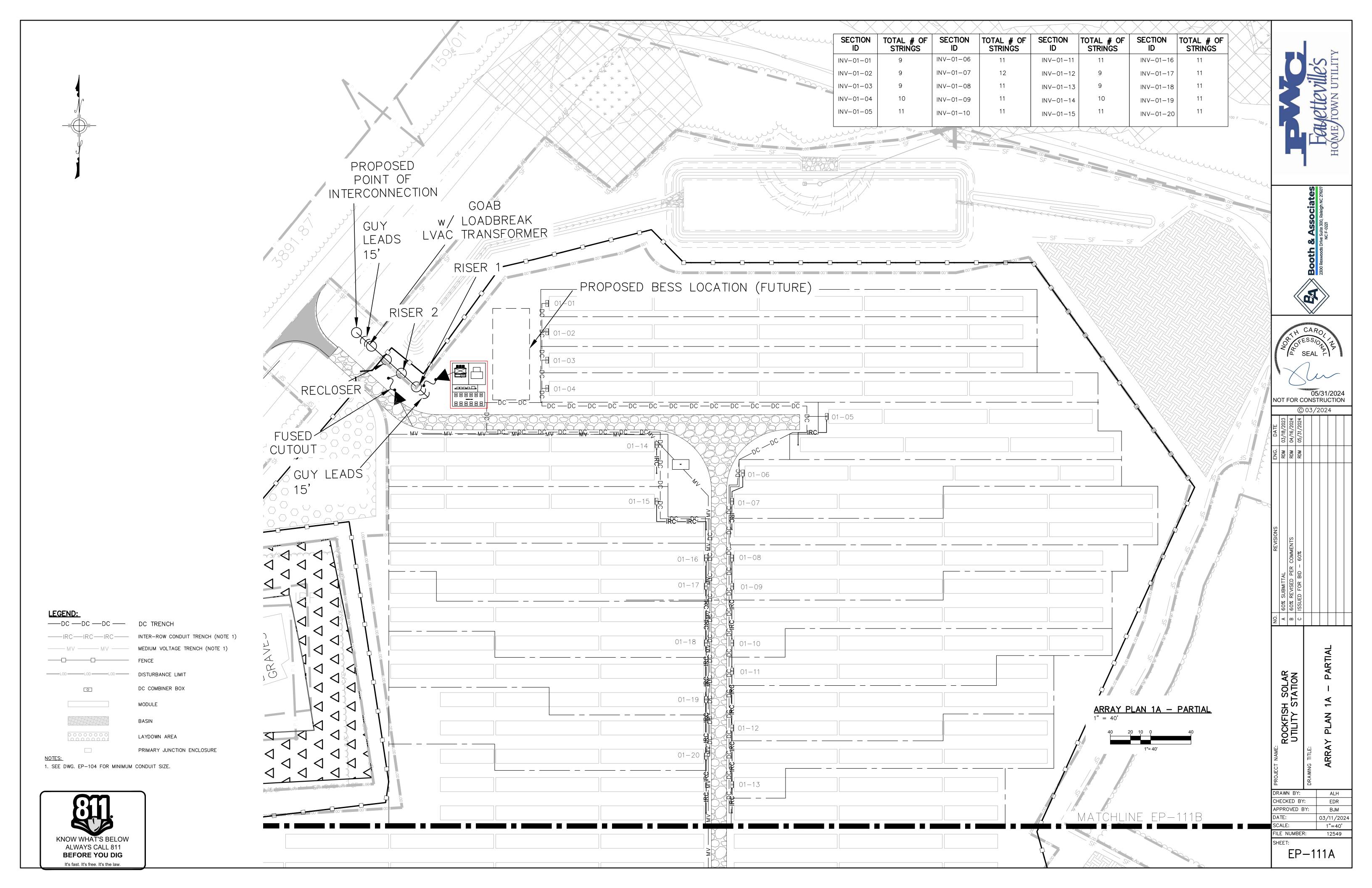
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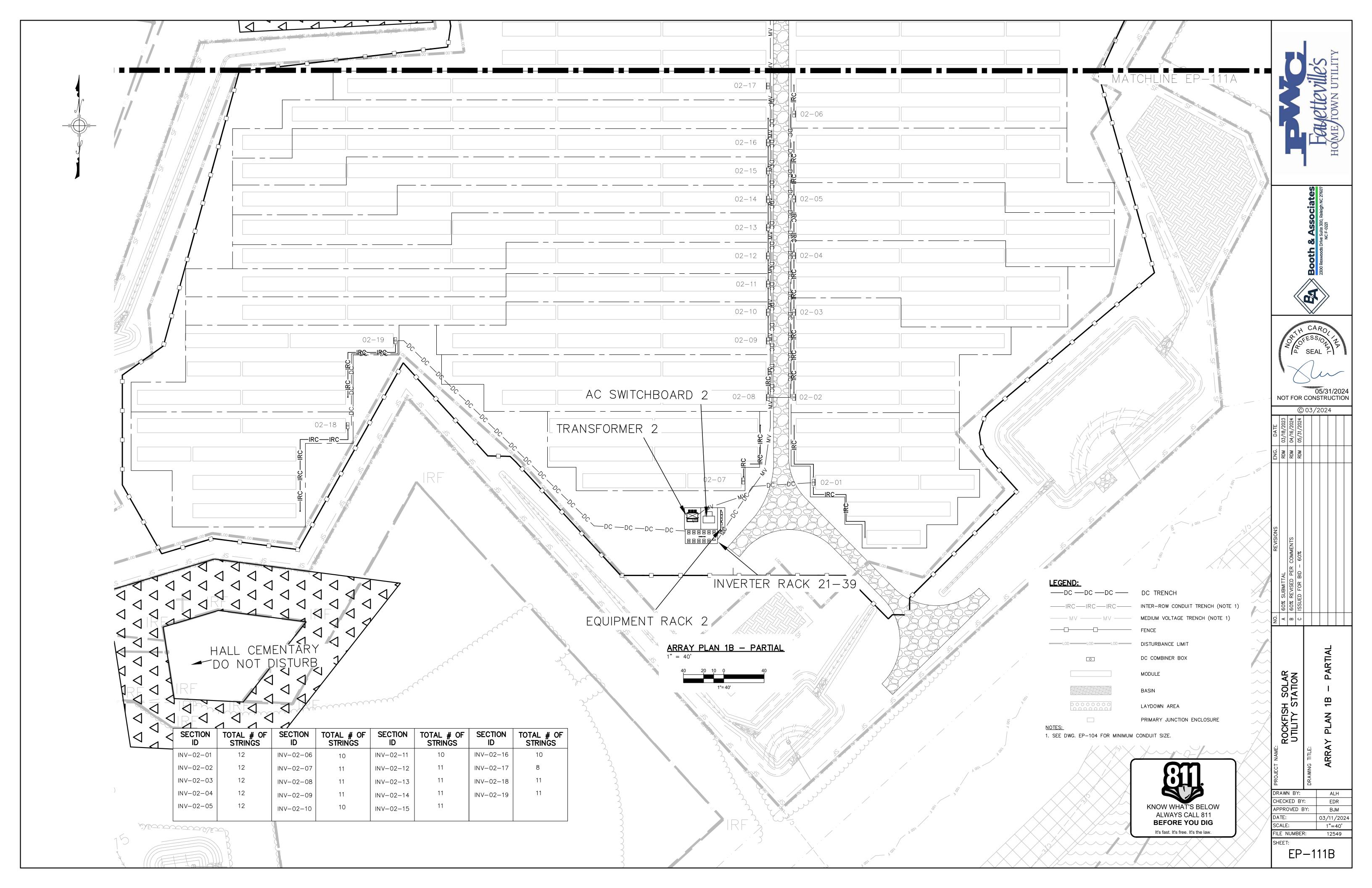
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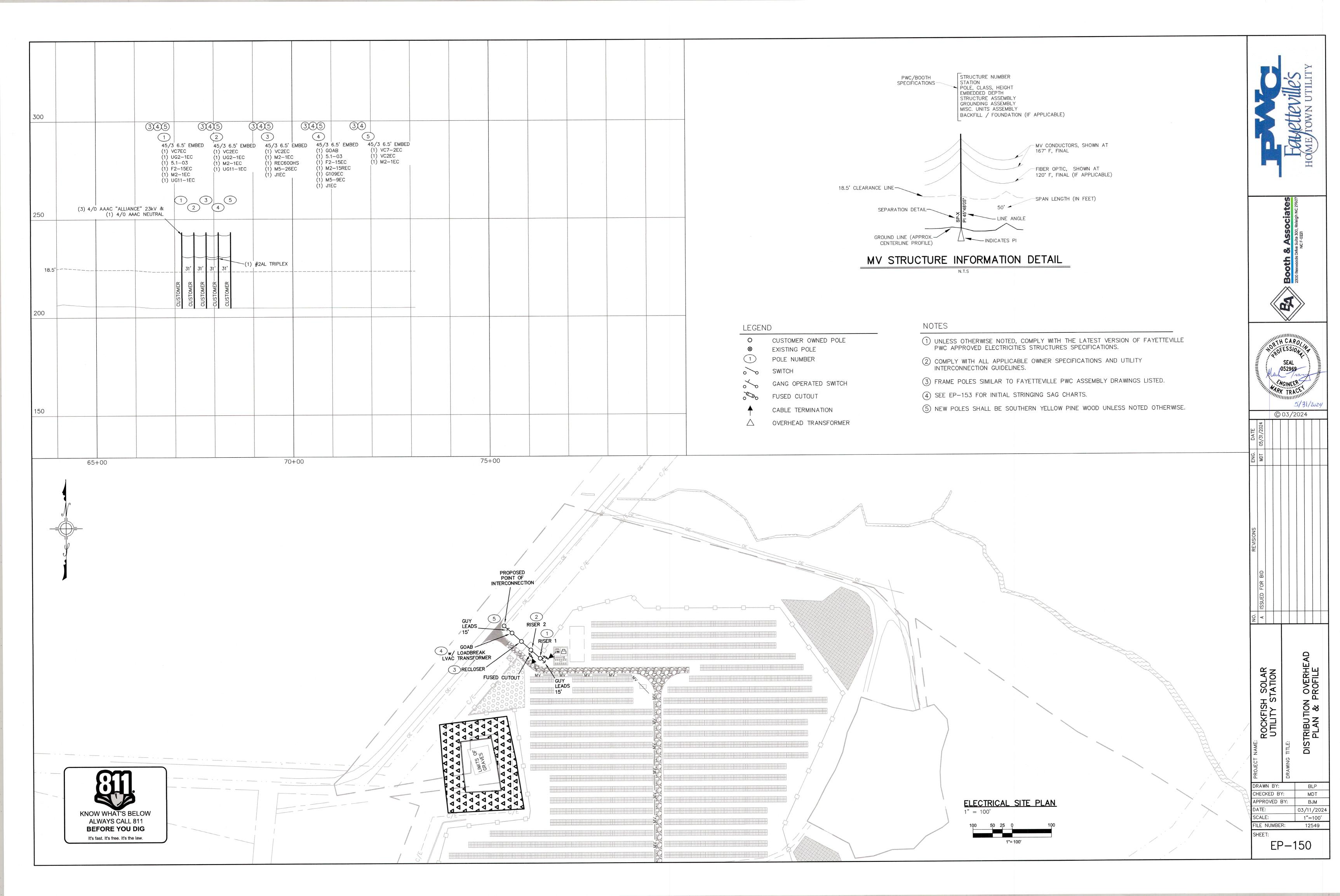
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<sup>\*</sup> DISTANCES FOR ENGINEERING PURPOSES ONLY, NOT TO BE USED FOR CONTRACTOR TAKE-OFFS.









### 1000 LBS PARTIAL TENSION INITIAL STRINGING SAG TABLES

LOADING DISTRICT : MEDIUM

CONDUCTOR DESCRIPTION : 4/0 AAAC "Alliance"

ULTIMATE STRENGTH : 8560 LBS.

DESIGN TENSION : 1000 LBS.

PERCENT OF ULTIMATE : 11.68%

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RULING SPAN : 31 FT.

SPAN (FT.)			TE	EMPERATURI	E (DEGREES F	)		
	20	32	40	50	60	70	80	90
10	0	0	0	0	0	0	0	0
20	0	0	0	0	0	1	1	1
30	0	0	1	1	1	2	2	3
40	1	1	1	1	2	3	4	6
50	1	1	2	2	3	4	7	9
60	1	2	2	3	4	6	9	13
70	2	2	3	4	6	9	13	17
80	2	3	4	5	7	11	17	22
	200	600	579	12.4	204	100	124	100

Page 1 of 3

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### SLACK TENSION INITIAL STRINGING SAG TABLES

LOADING DISTRICT : MEDIUM

CONDUCTOR DESCRIPTION : 4/0 AAAC "Alliance"

ULTIMATE STRENGTH : 8560 LBS.

DESIGN TENSION : 95 LBS.

PERCENT OF ULTIMATE : 1.11%

RULING SPAN : 31 FT.

SAG IS SHOWN TO THE NEAREST INCH FOR EACH SPAN AND TEMPERATURE.

SPAN (FT.)			TI	EMPERATUR	E (DEGREES F	?)		
	20	32	40	50	60	70	80	90
10	1	1	1	1	1	1	1	1
20	5	5	5	5	5	6	6	6
30	11	12	12	12	12	13	13	13
40	20	21	21	22	22	22	23	23
TENSION (lbs.)	27	27	26	26	25	25	24	24

Page 2 of 3

Booth & Associates, Inc.

### TPLX INITIAL STRINGING SAG TABLES

LOADING DISTRICT : MEDIUM

CONDUCTOR DESCRIPTION : #2 AL TPLX "Shrimp"

ULTIMATE STRENGTH : 2800 LBS.

DESIGN TENSION : 486 LBS.

PERCENT OF ULTIMATE : 17.36%

RULING SPAN : 31 FT.

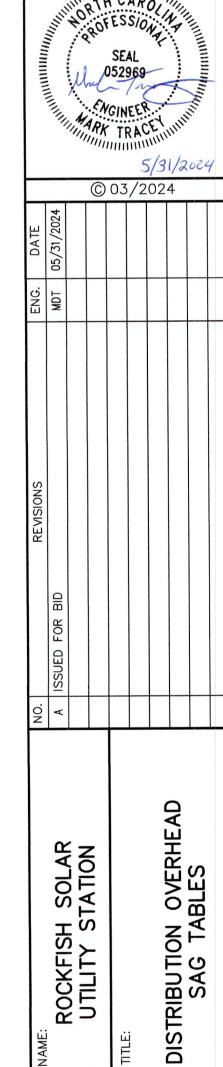
SAG IS SHOWN TO THE NEAREST INCH FOR EACH SPAN AND TEMPERATURE.

SPAN (FT.)			TE	<b>EMPERATURE</b>	(DEGREES F	)		
	20	32	40	50	60	70	80	90
10	0	0	0	0	0	0	0	0
20	0	0	0	1	1	1	1	1
30	1	1	1	1	2	2	2	3
40	1	2	2	2	3	3	4	5
50	2	3	3	3	4	5	7	8
60	3	4	4	5	6	8	9	11
70	4	6	6	7	9	10	13	15
80	6	7	8	9	11	14	17	20
ENSION (lbs.)	404	342	303	256	212	174	142	116

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BJM

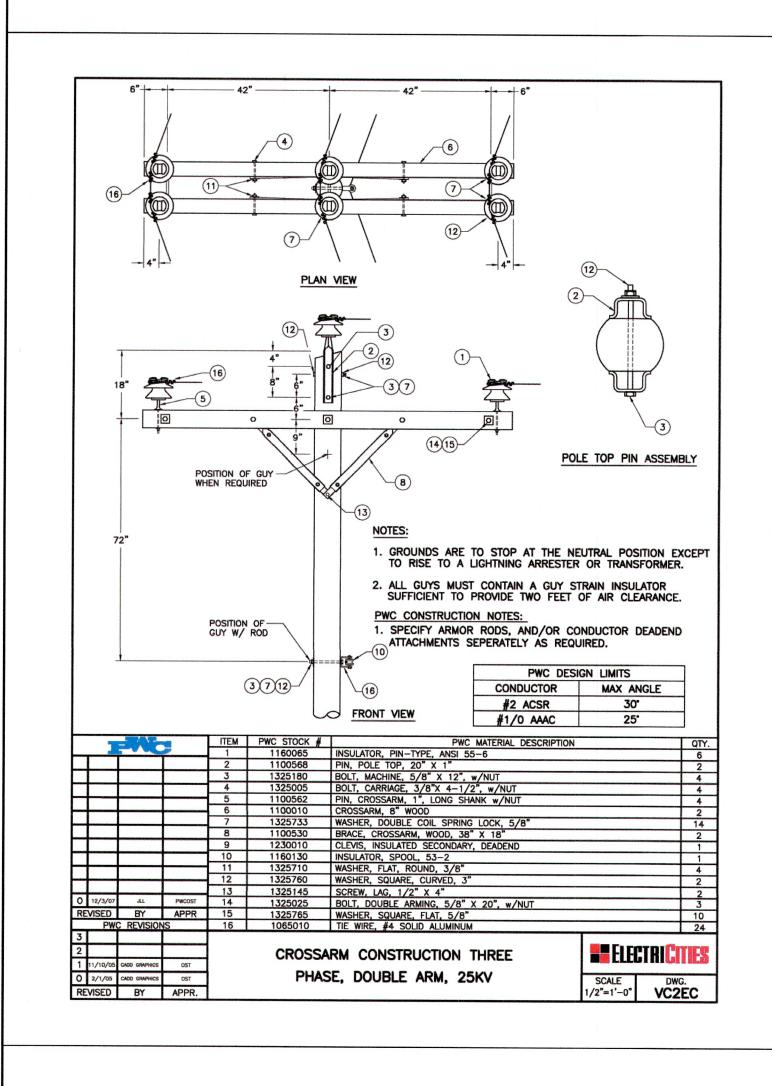
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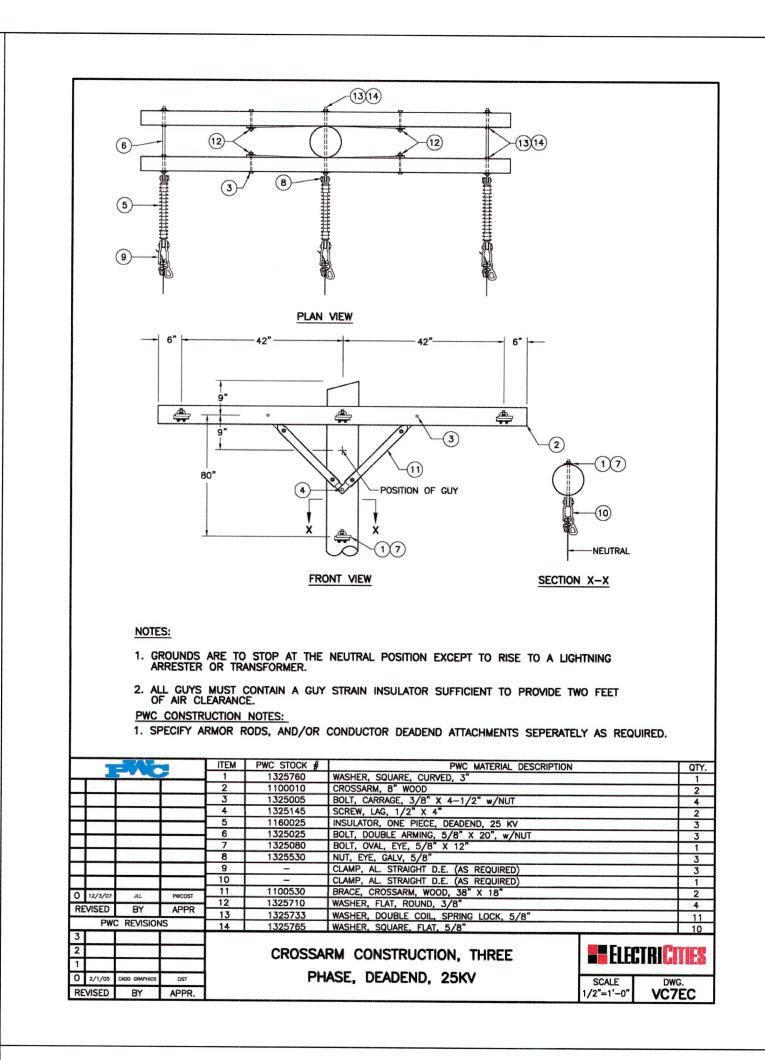
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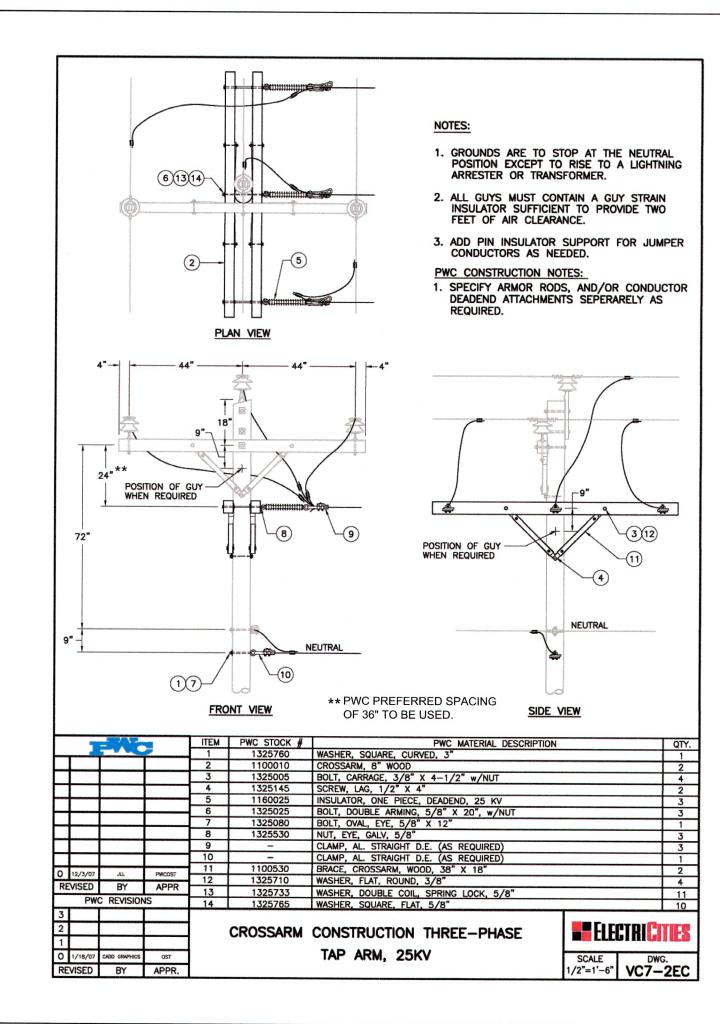
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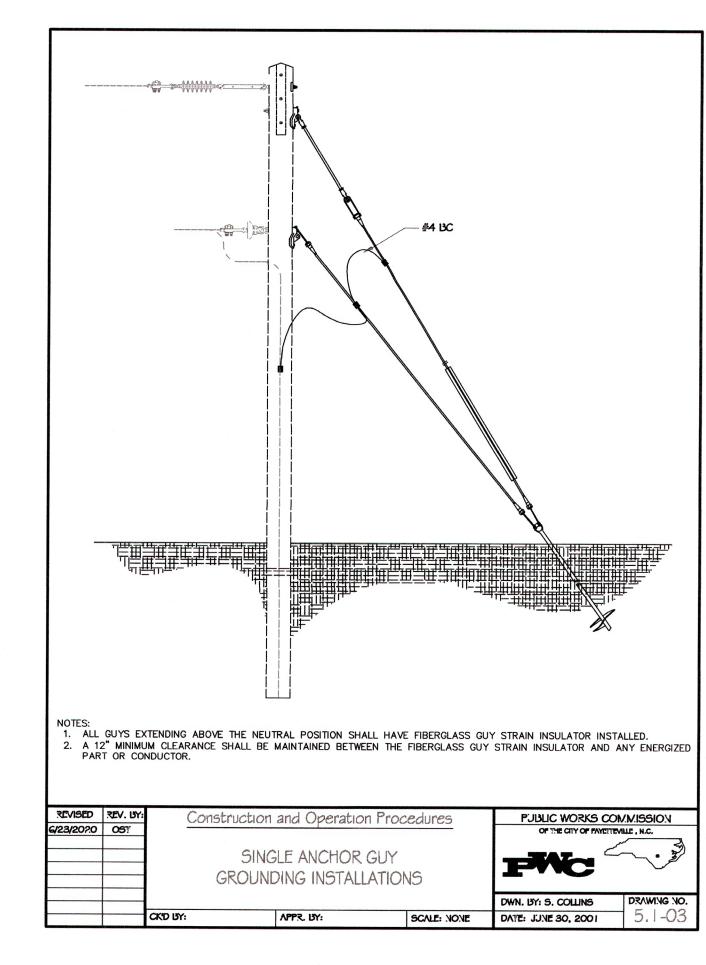
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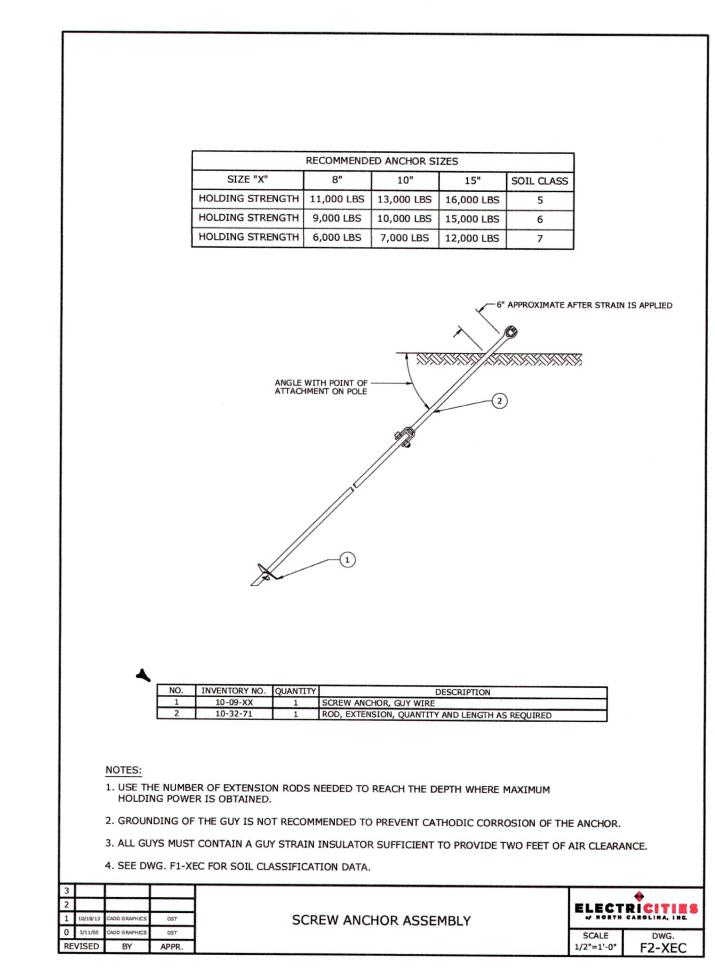
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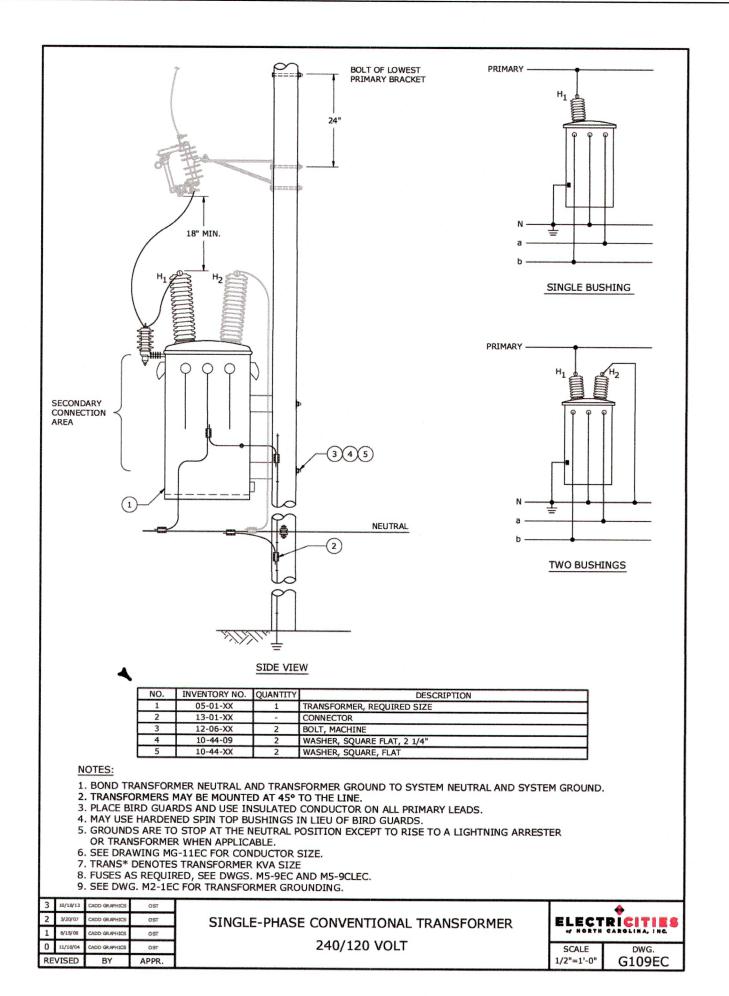


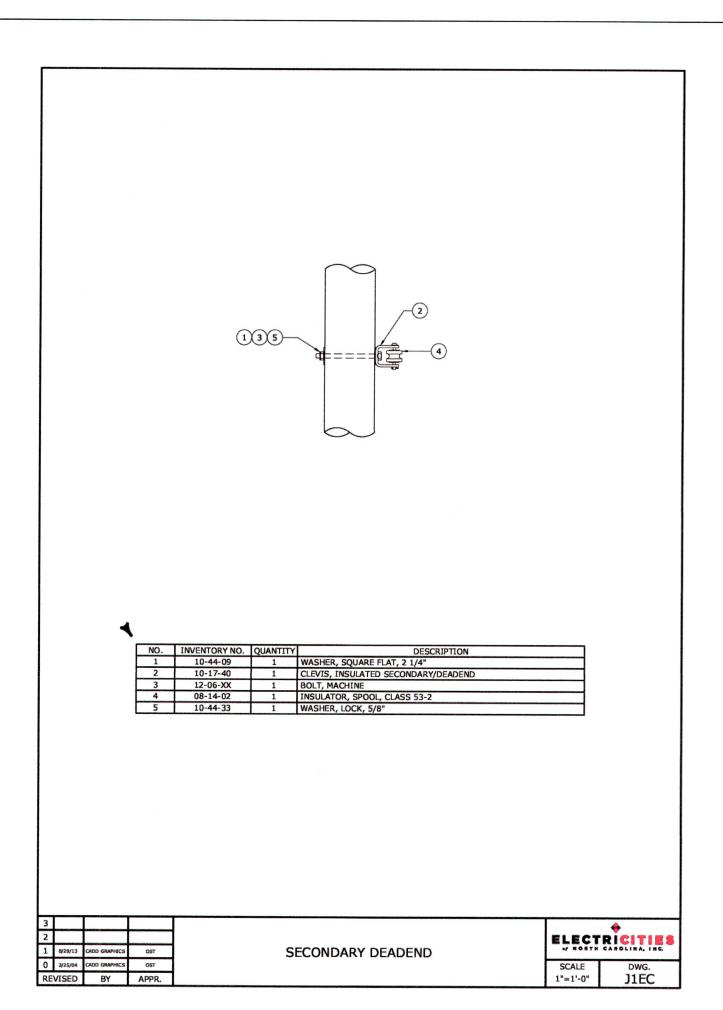


















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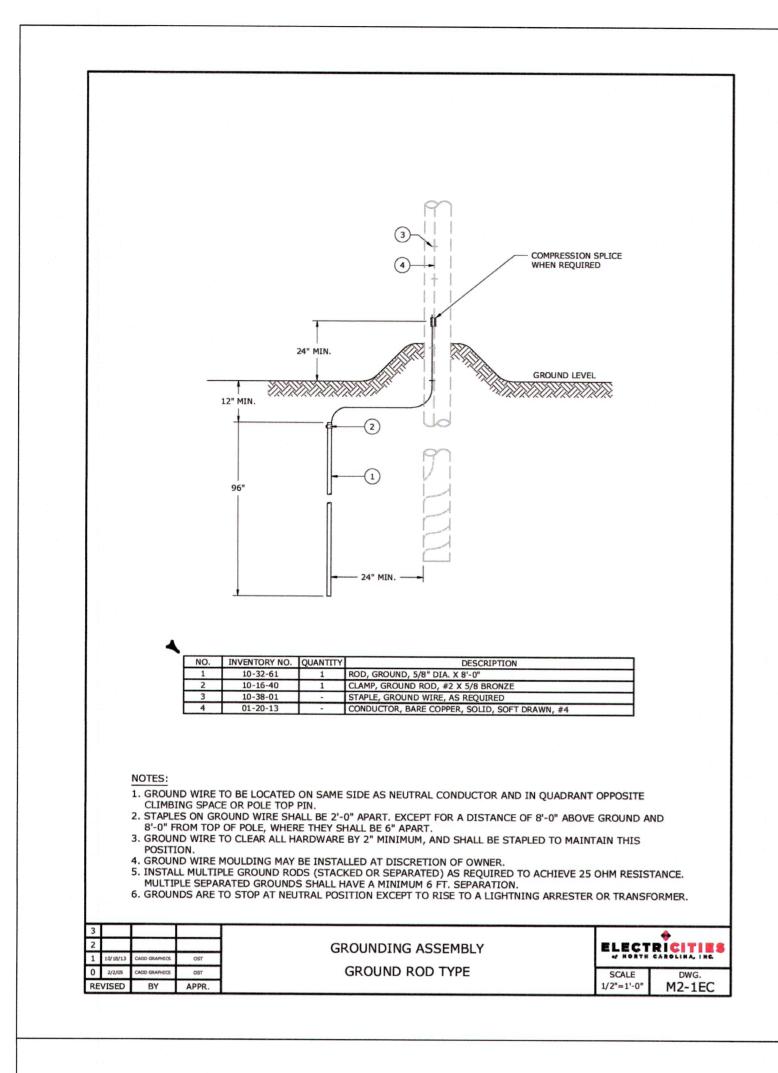
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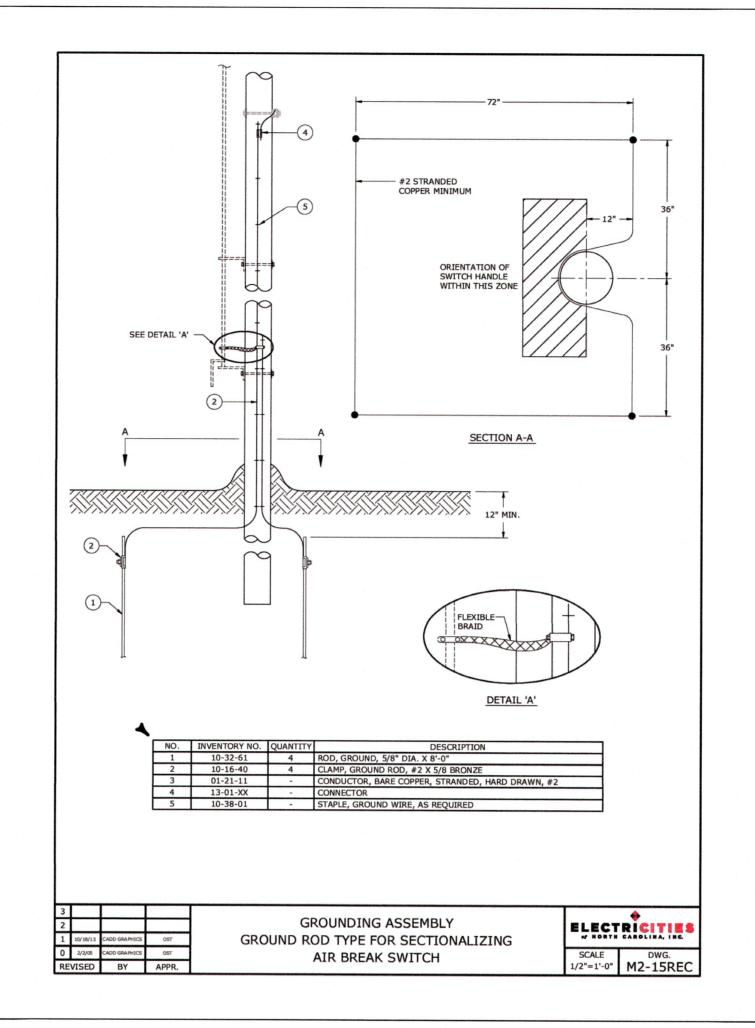
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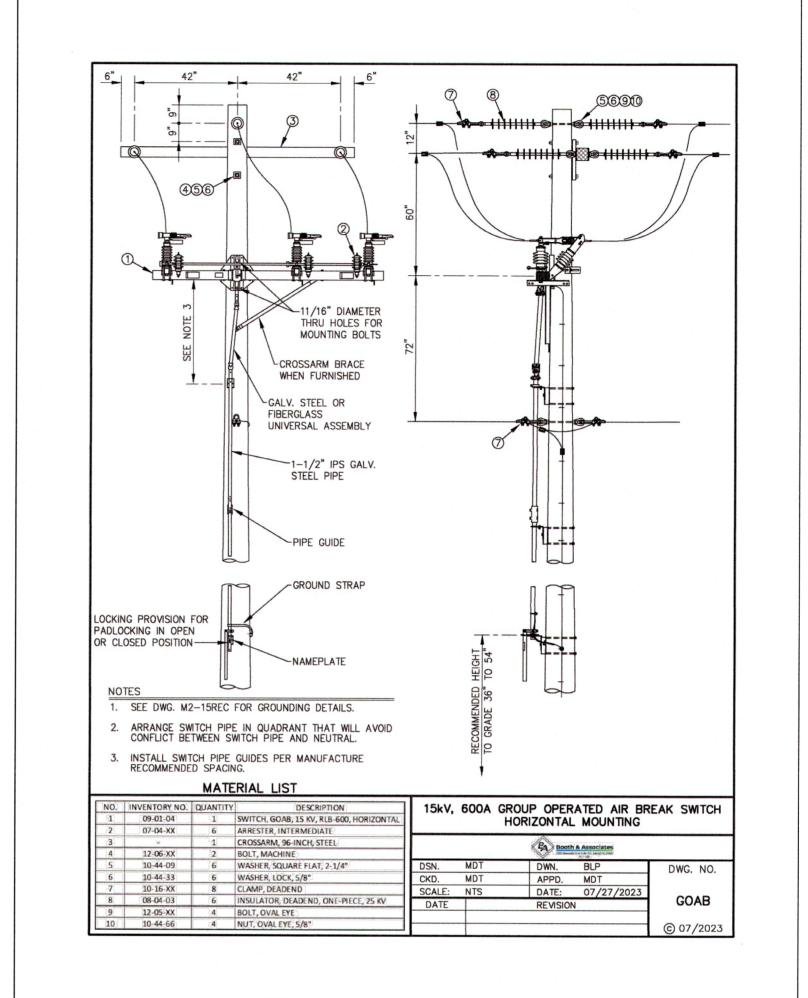
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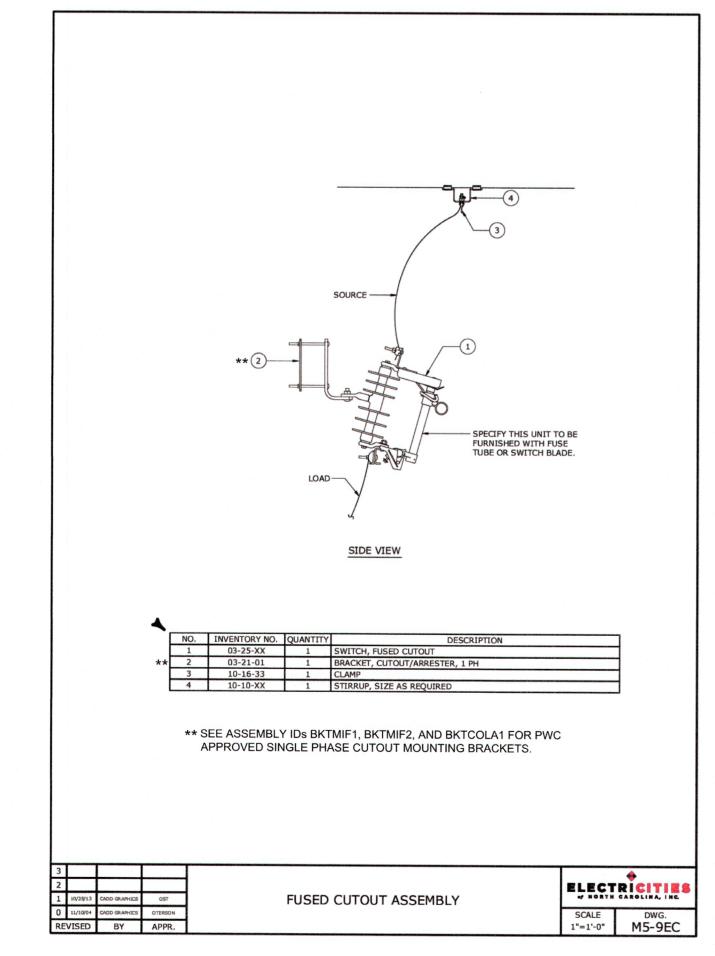
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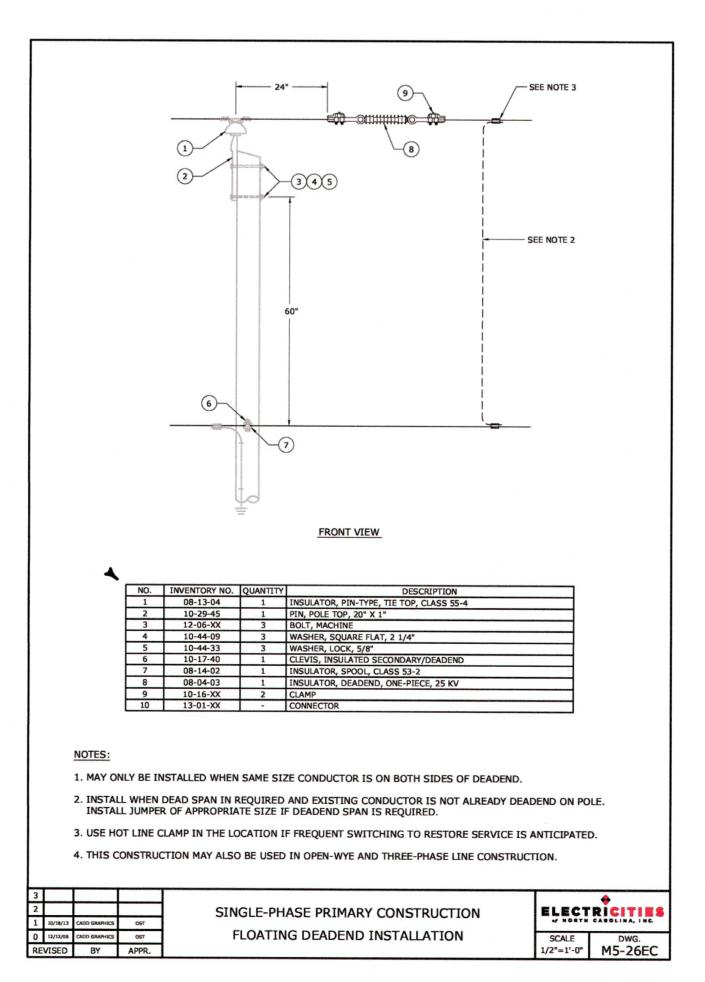
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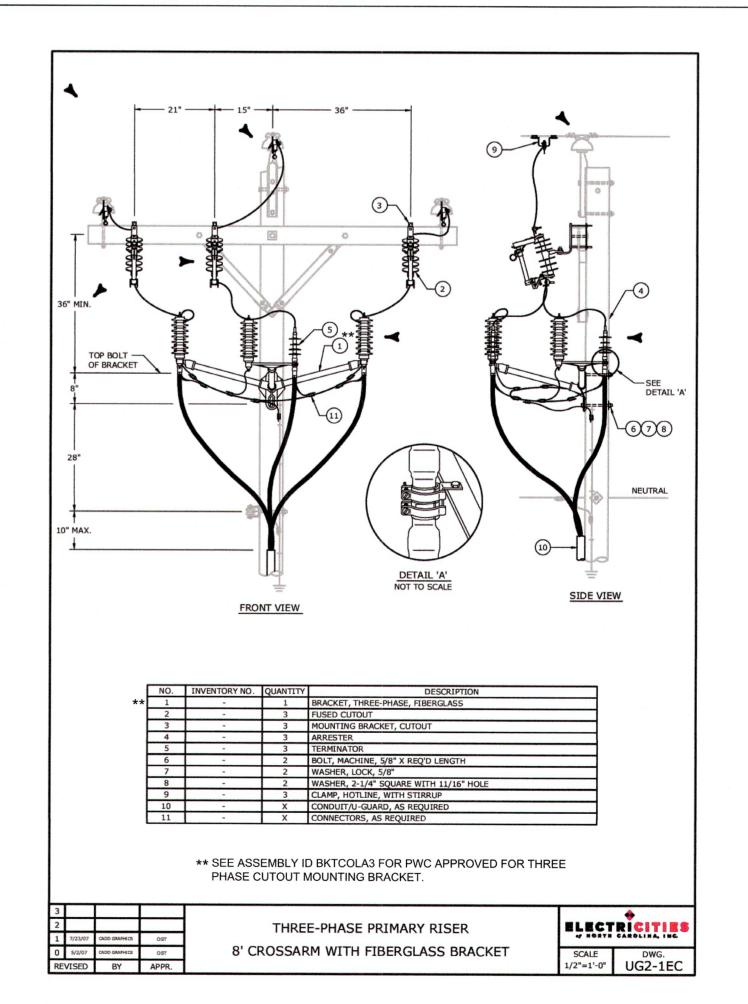






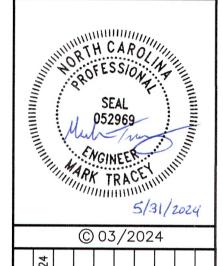












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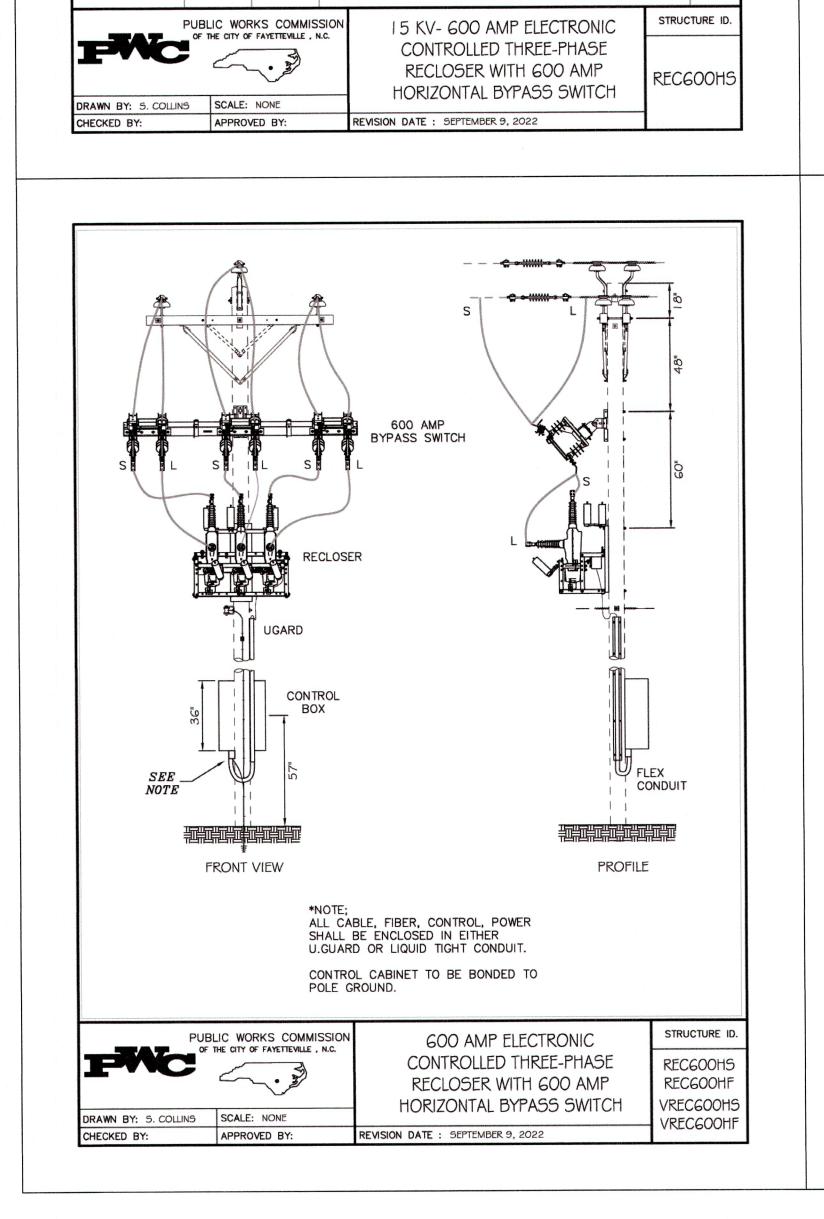
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FILE NUMBER:

APPROVED BY:



MATERIAL LIST

1-280-461 RECLOSER, 600A, 15 KV, 3-PHASE, TRIPLE/SINGLE

1-045-566 RELAY, PARTIAL DISTRIBUTION FEEDER PROTECTION

LIGHTNING ARRESTERS, 10 KW, SWITCH POLE

1-255-070 ROD, GROUND, 5/8" X 10' CU-CLAD, TRUCK STOCK

U/G ALUMINUM POLYETHYLENE INSULATED, 500

CONDUCTOR ATTACHMENTS, DOWN GUYS, AND ANCHORS MUST BE SPECIFIED SEPARATELY.

1-280-160 SWITCH, RECLOSER BYPASS, CROSSARM

1-070-032 U-GARD, 2", 10' LENGTH, TRUCK STOCK

GROUNDING, DRIVEN, 2-10' RODS

1-065-540 CONDUCTOR, 500 MCM, AL XLP 600V

2" FLEXIBLE CONDUIT FOR CONTROL

1-070-615 CONDUIT, 2" LIQUID TIGHT, FLEXIBLE (LFMC)

1-170-010 ARRESTER, 10 KV, HEAVY-DUTY

DESCRIPTION

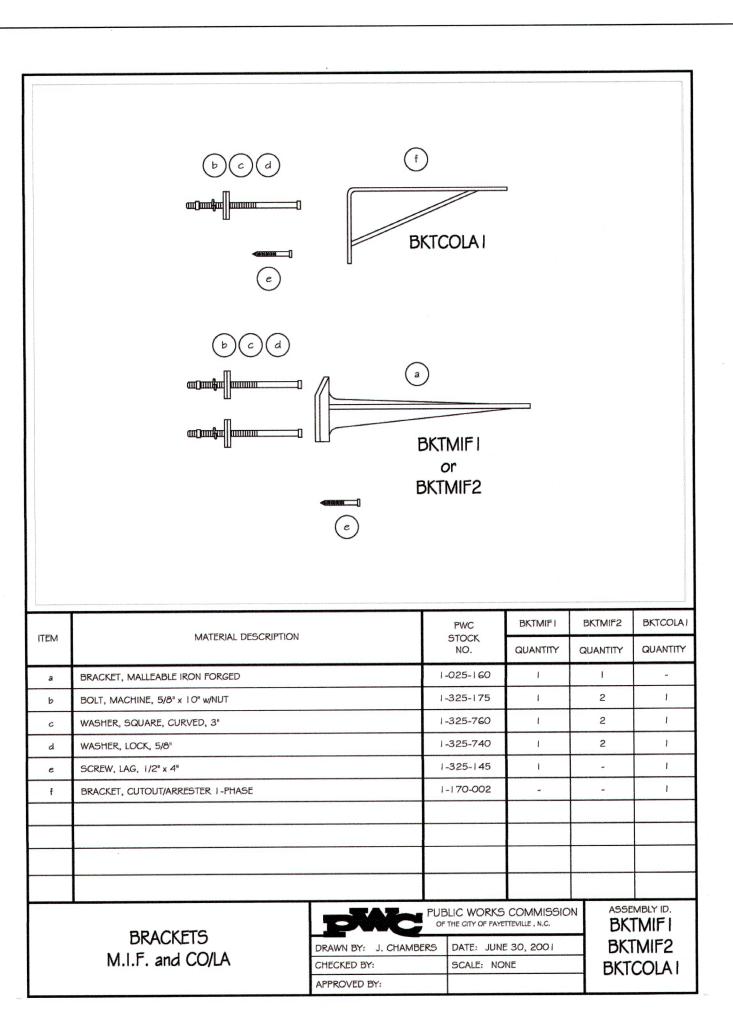
RECLOSER, 600A, 15 KV, 3-PHASE, TRIPLE/SINGLE, ELECTRONIC

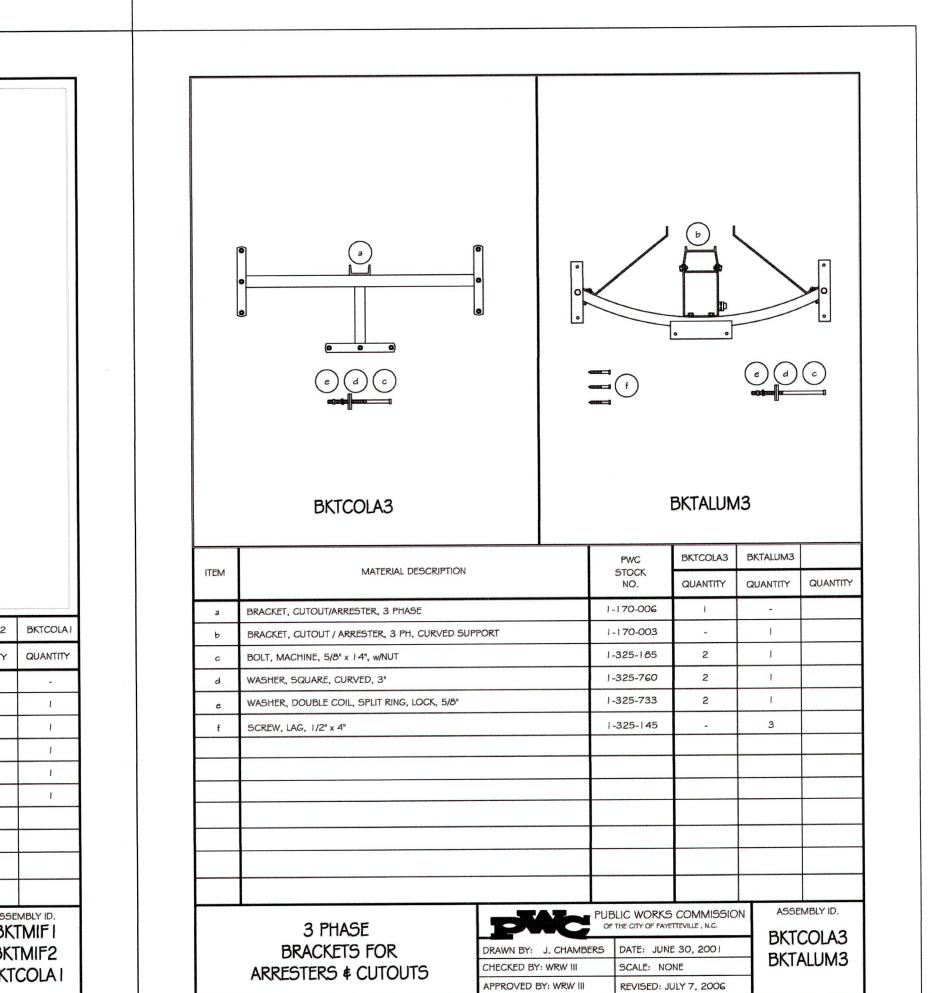
RELAY, ELECTRONIC, DISTRIBUTION FEEDER PROTECTION, SEL-651R

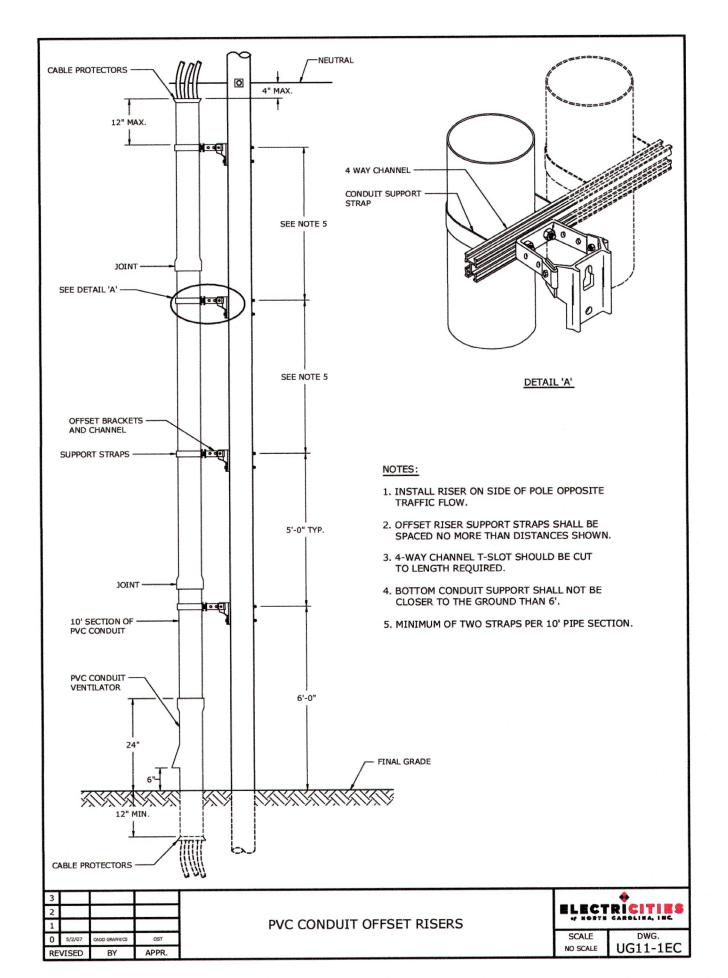
SWITCH, 25 KV, 600 AMP, RECLOSER BYPASS ON FIBERGLASS ARM

STRUCTURE ID. ASSEMBLY STOCK NO.

REC600HS











ROCKFISH SOLAR UTILITY STATION

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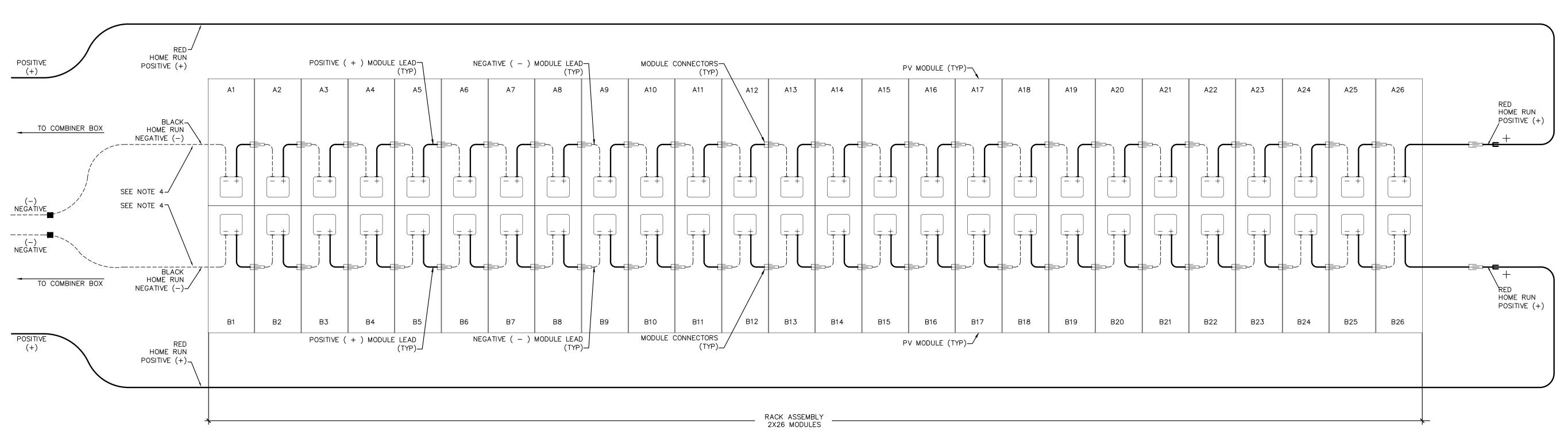
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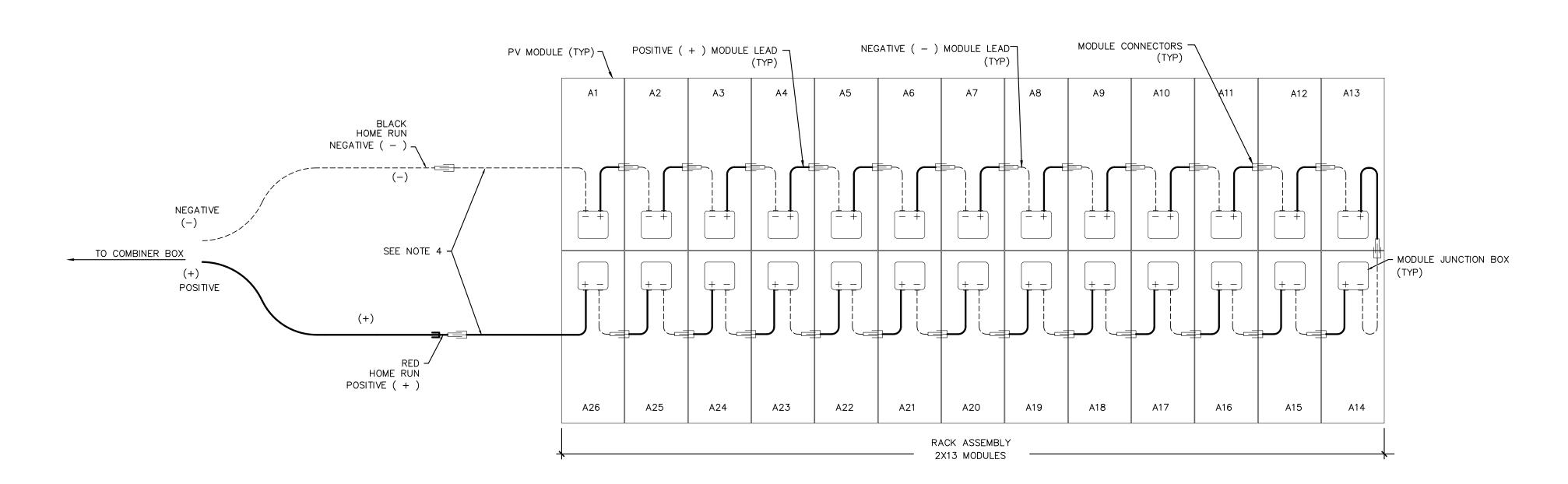
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A 2X26 SOURCE CIRCUIT STRINGING DETAIL SCALE: NTS



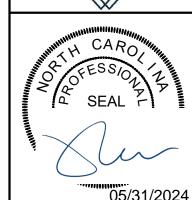
B 2X13 SOURCE CIRCUIT STRINGING DETAIL SCALE: NTS

NOTES:

- DIRECTION OF WIRING MAY CHANGE DEPENDING ON LOCATION OF MODULES RELATIVE TO ASSOCIATED INVERTER LOCATION. INSTALL WIRING DIRECTION ACCORDINGLY.
- 2. LEADS MUST BE SECURED 12" FROM THE JUNCTION BOX AND A MINIMUM OF 36" ALONG STRAIGHT RUNS.
- 3. PROVIDE ADEQUATE STRAIN RELIEF AT MODULE JUNCTION BOXES.
- 4. 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.
- 5. MODULE CONNECTORS MUST BE AN EXACT MATCH WITH THE MODULE SIDE OF THE HARNESS CONNECTORS.
- 6. LABEL BOTH ENDS OF SOURCE CIRCUIT PER SPEC.
- 7. SKIP STRINGING IS PERMISSIBLE IF MODULE LEADS HAVE ADEQUATE LENGTH.
- 8. WIRING BETWEEN RACKS SHALL BE TRANSITIONED AND FASTENED ON RACKING STRUCTURE.



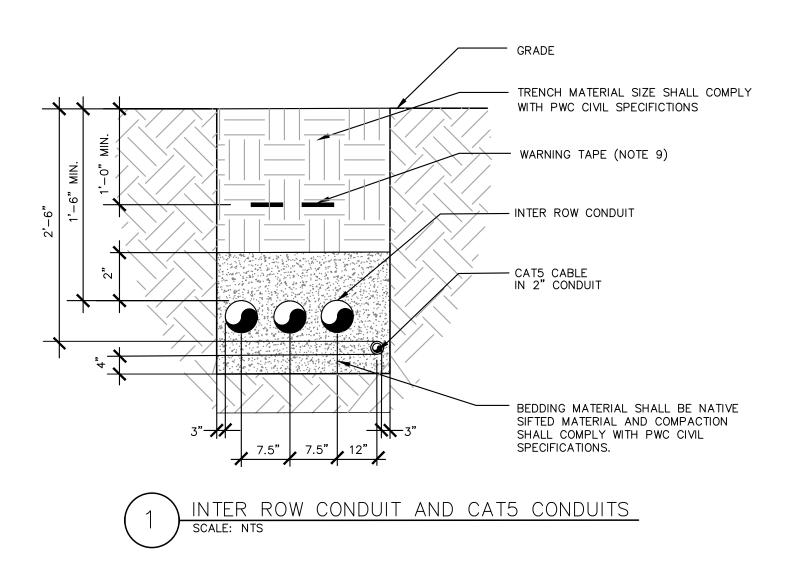
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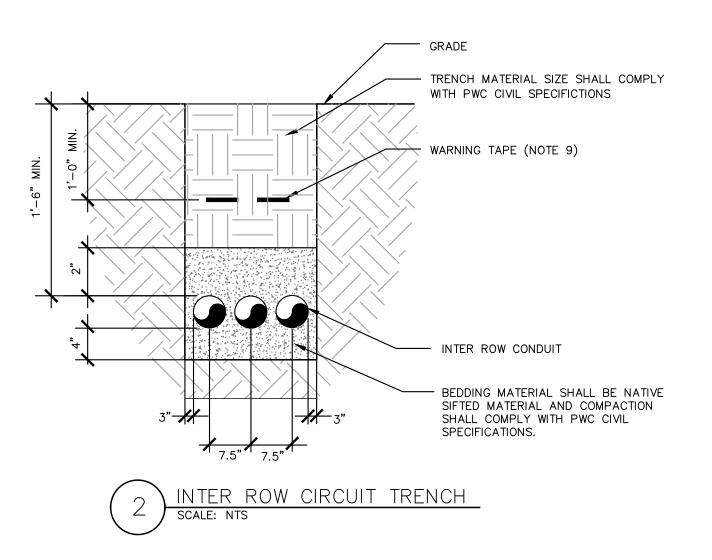


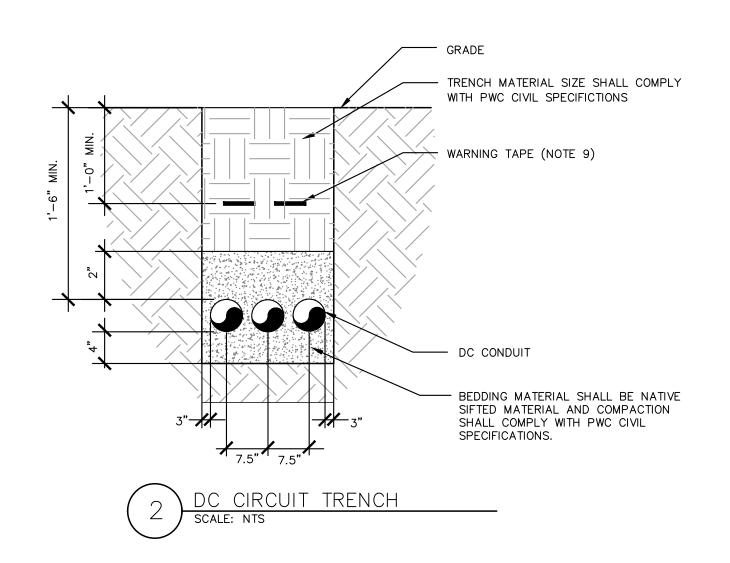
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CHECKED BY: EDR
APPROVED BY: BJM
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SCALE: NONE

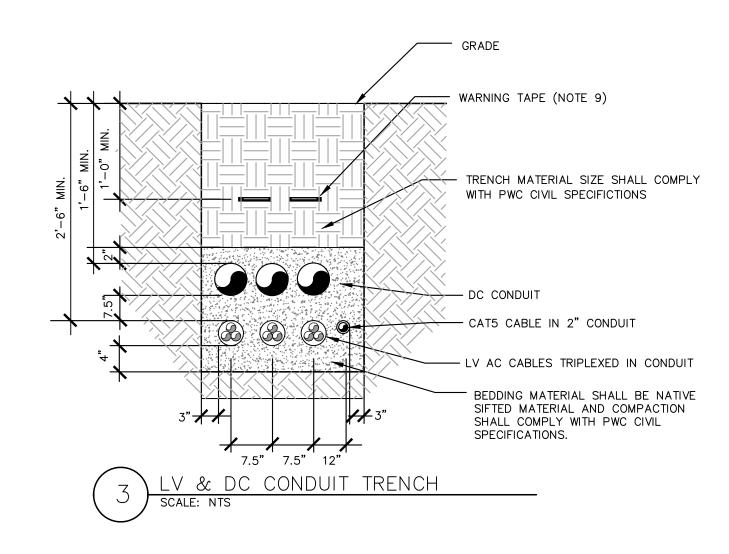
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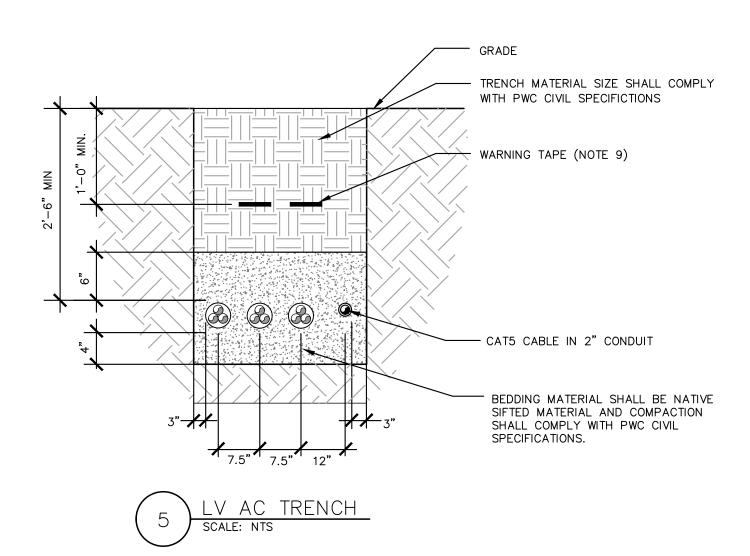
EP-251

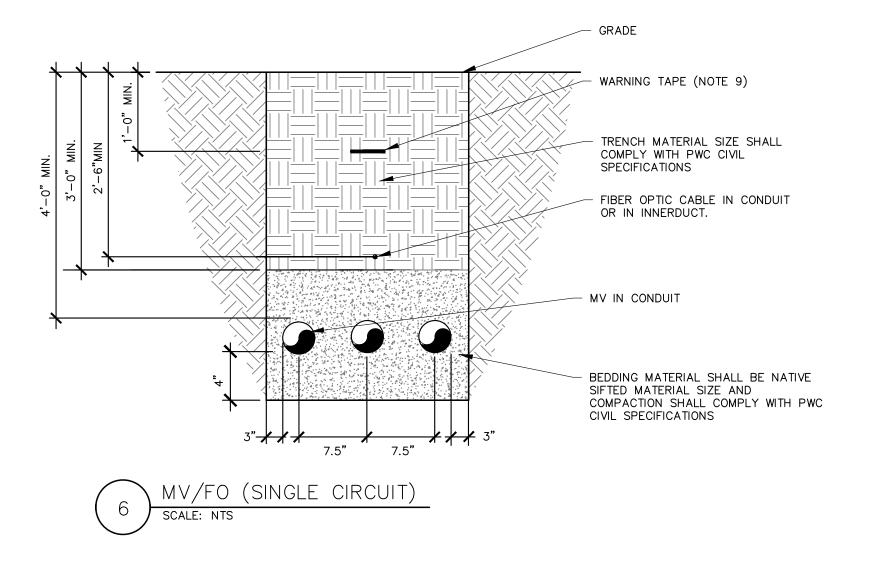












### TRENCHING NOTES:

- 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.



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2300 Rexwoods Drive Suite 300, Raleigh NC 27

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ROCKFISH SOLAR
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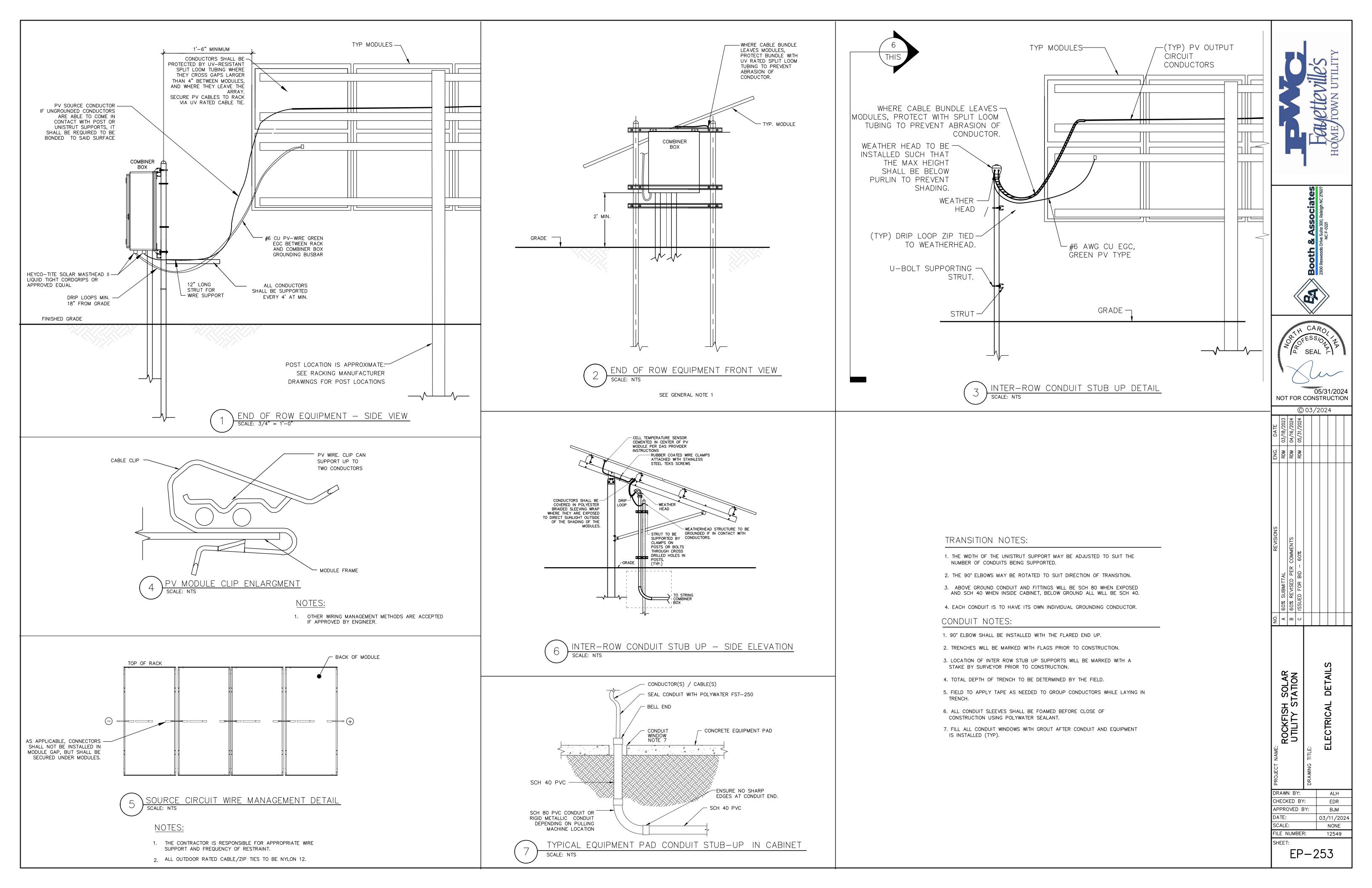
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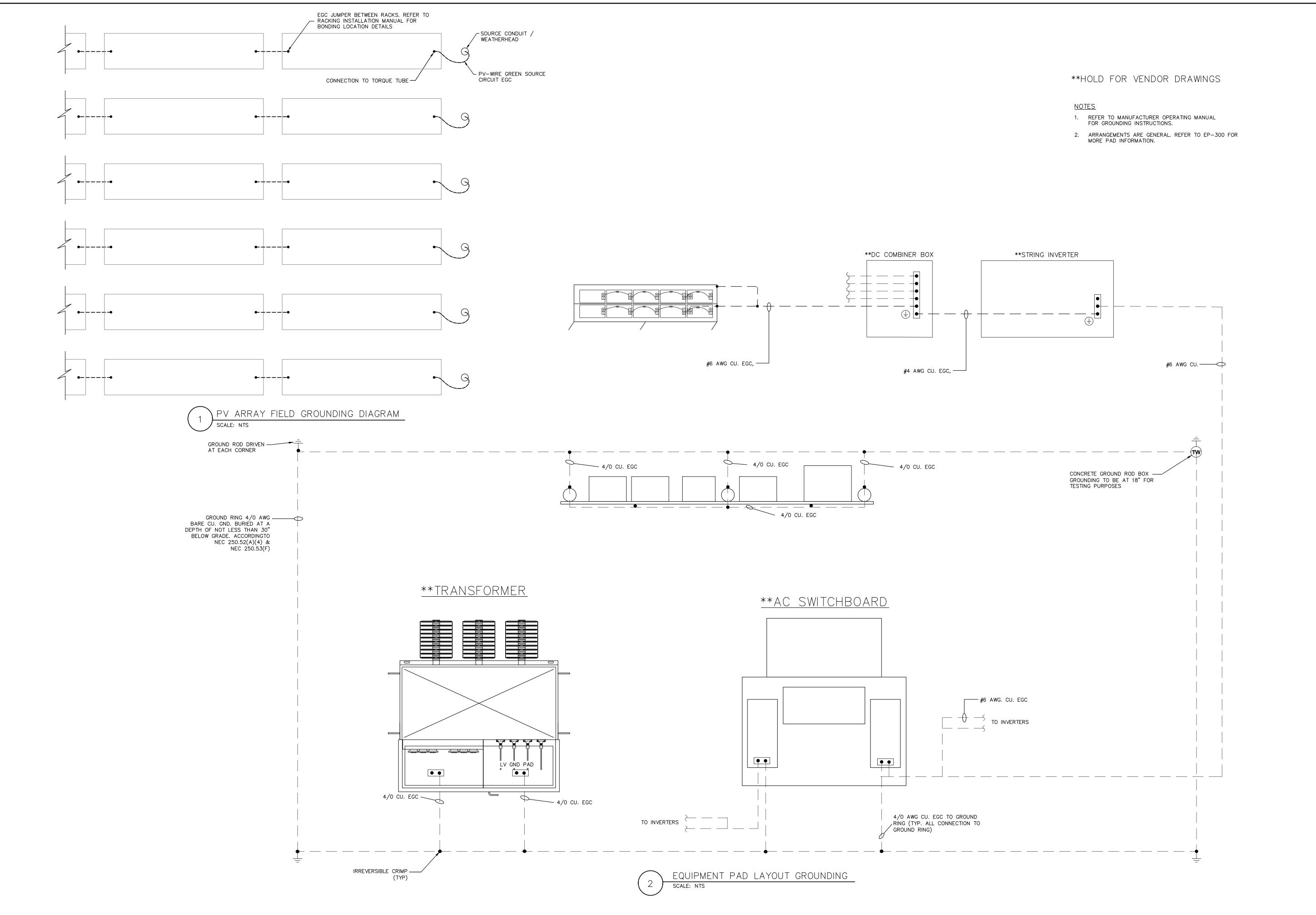
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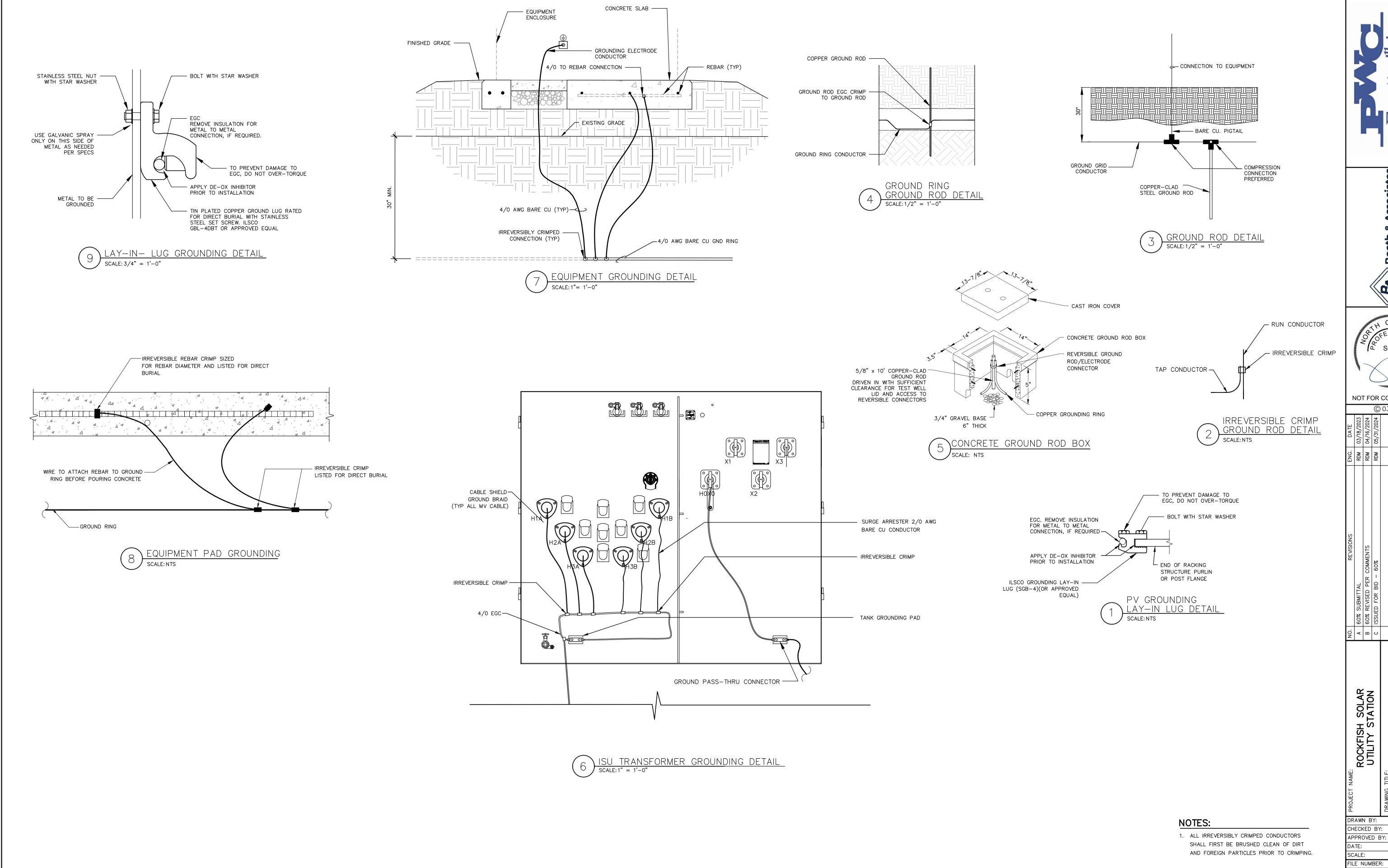
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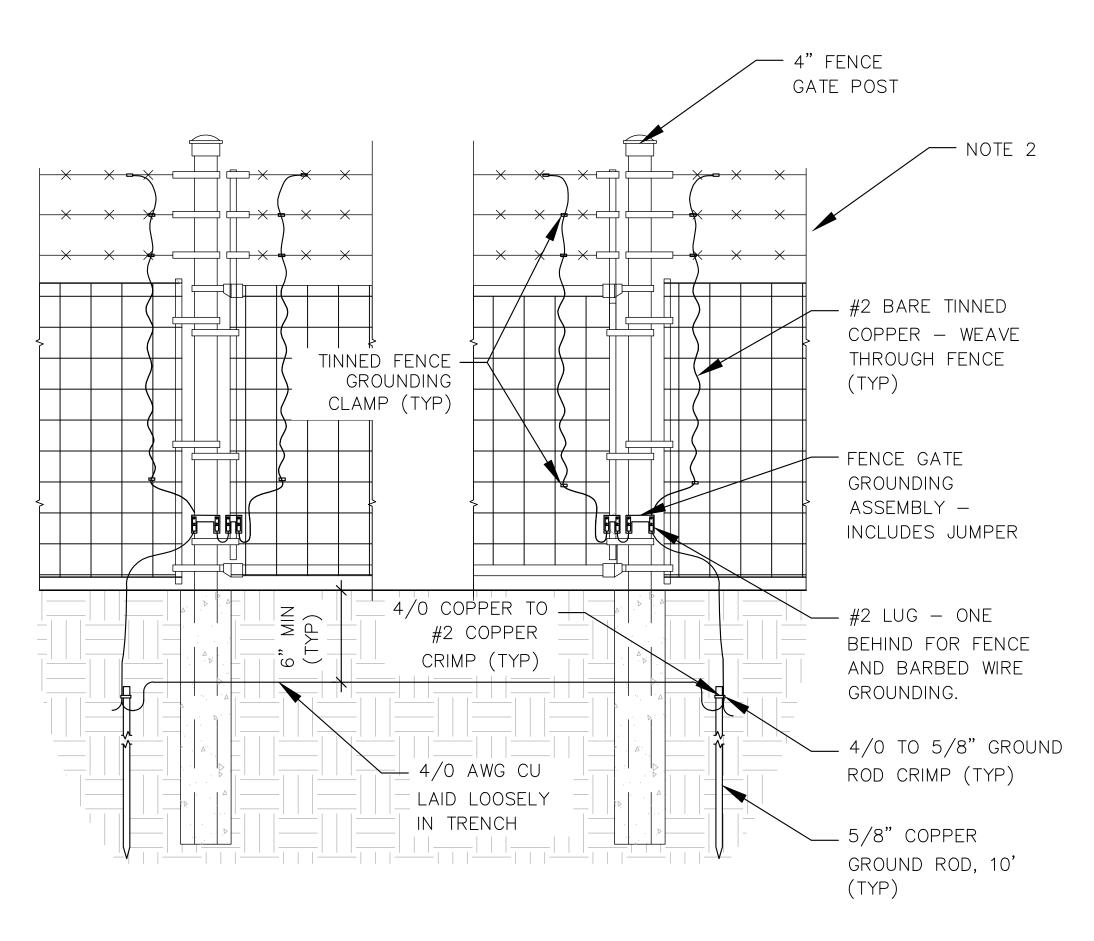
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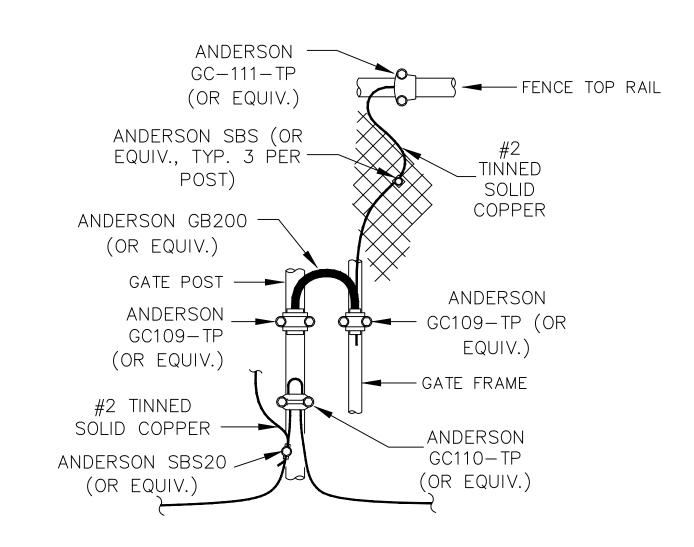
GROUNDING

EDR BJM 03/11/2024 NONE 12549

SHEET: EP-261









### GENERAL NOTES:

- 1. REFERENCE CIVIL SET FOR FENCE DESIGN AND FOUNDATIONS.
- 2, BARBED WIRE NOT REQUIRED IF FENCE HEIGHT IS MINIMUM 7FT.



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GROUNDING DETAILS

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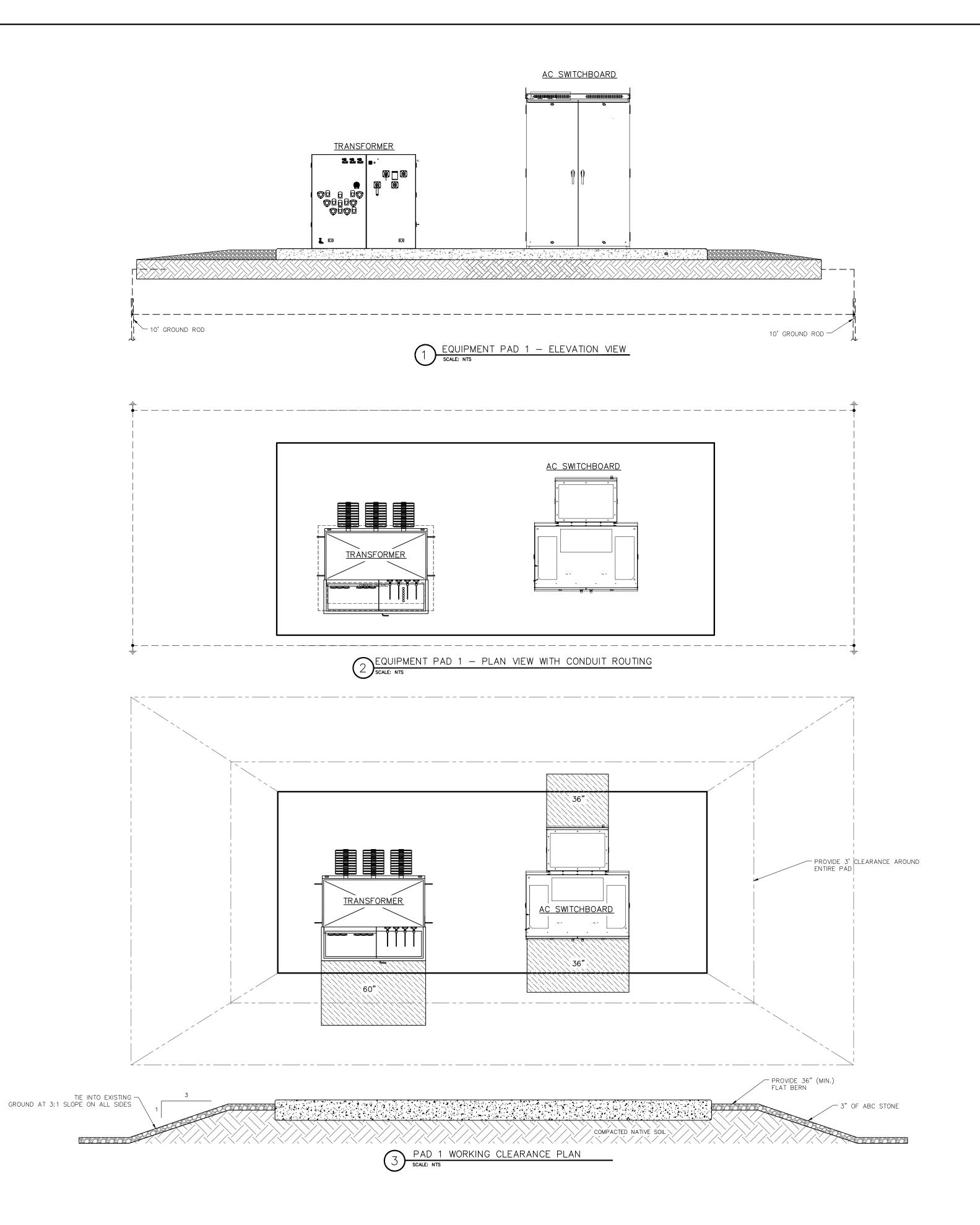
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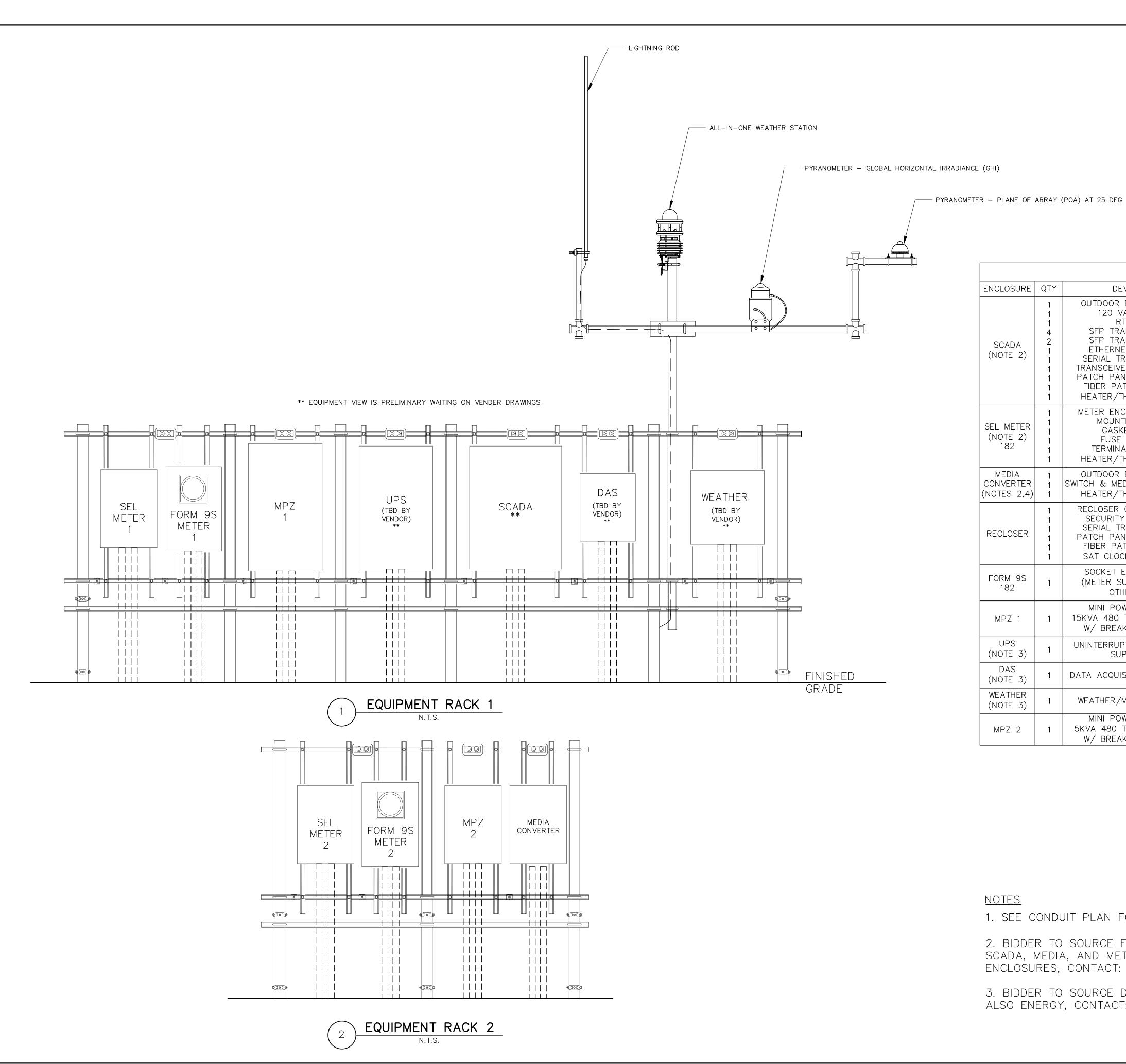
### IOTES:

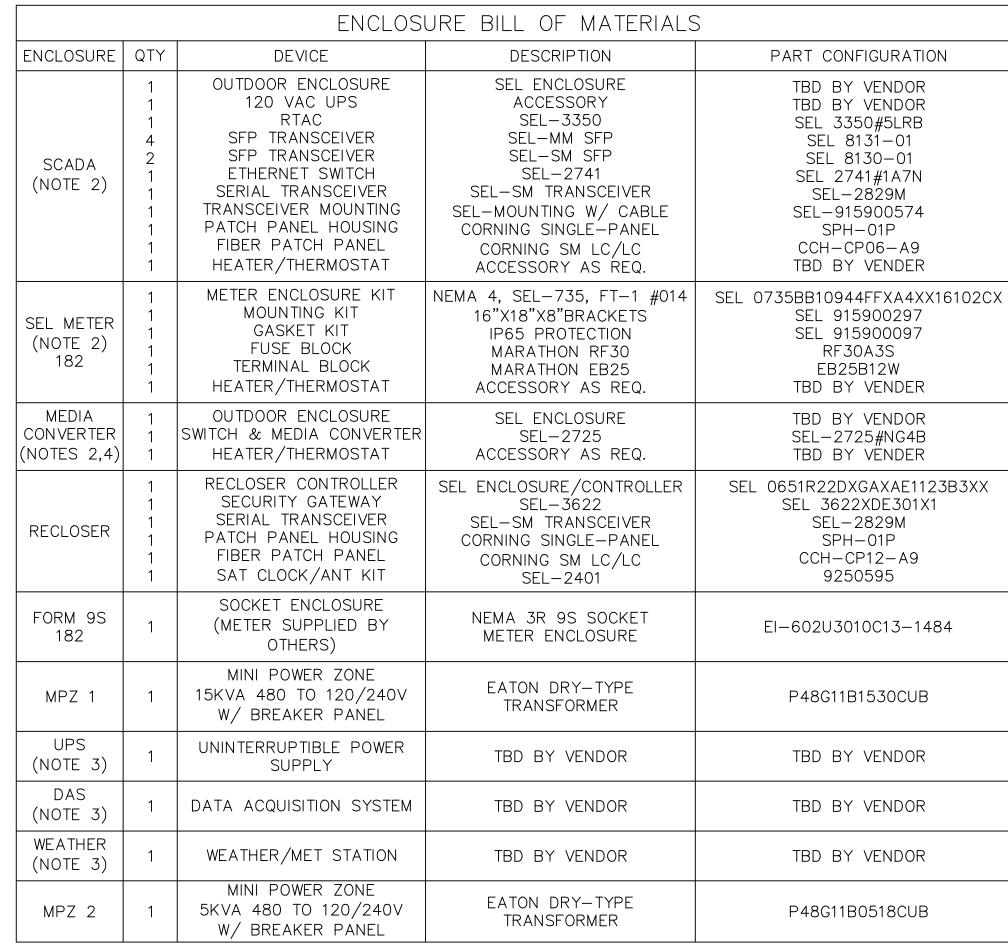
 SEE ARRAY WIRING PLAN(S) FOR EQUIPMENT PAD LOCATIONS ON SITE.

\*\* HOLD UNTIL VENDOR DRAWINGS ARE PROVIDED

- REFER TO SHEET EP-260 FOR GROUNDING DETAILS AND REQUIREMENTS.
- 3. 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.

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### <u>NOTES</u>

- 1. SEE CONDUIT PLAN FOR CONDUIT SIZE AND QUANTITY
- 2. BIDDER TO SOURCE FULLY ASSEMBLED AND FURNISHED (NEMA 4) SCADA, MEDIA, AND 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 BURRES AT ALSO ENERGY.

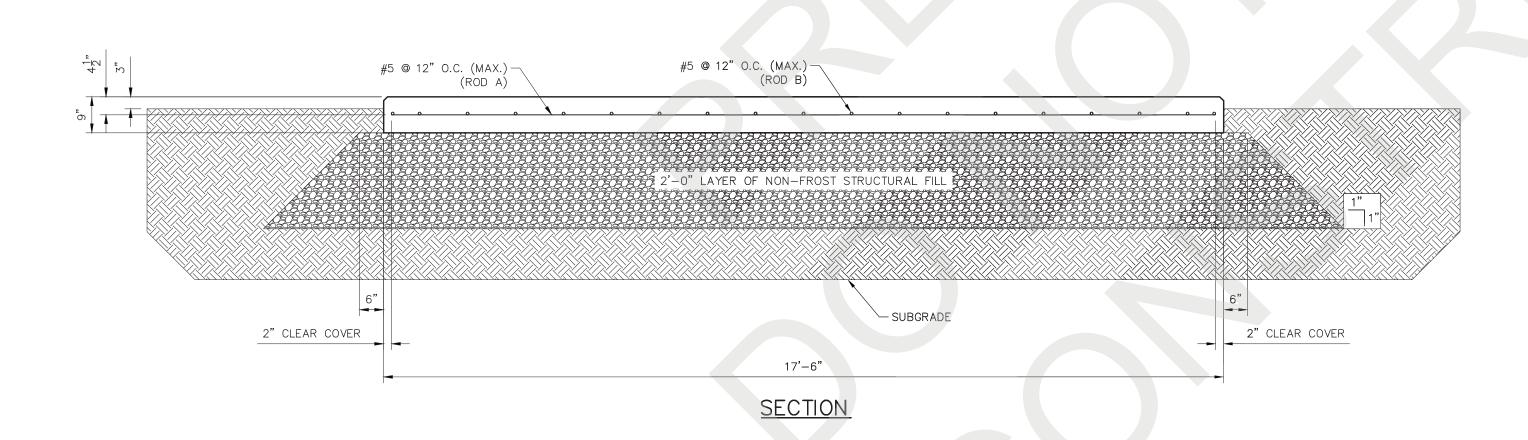


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#5 @ 12" O.C. (M. (ROE	AX.) —									



PAD 1 - EQUIPMENT PAD

SCHEDULE FOR TYPICAL PAD DETAIL

PAD TOTAL		PAD	PAD SIZE		CU YDS CONCRE		
NO.	REQ'D	LENGTH x WIDTH	DEPTH	BOLT PLAN	PER FDN	TOTAI	
1	2	17'-6" X 10'-0"	0'-9"	_	4.86	9.72	

REBAR SUMMARY								
PA	) No.	. 1	ТО	TAL No. REC	o'D 2			
ROD TYPE	SIZE OF REBAR	NO. REQ'D PER FDN	DIM A	LENGTH DIM B	TOTAL REBAR			
Α	#5	11	17'-2"	-	17'-2"			
В	<b>#</b> 5	19	9'-8"	-	9'-8"			

- 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 & 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"  $\pm$  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
- 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.
- 17. MINIMUM REBAR LAP SPLICE LENGTH SHALL BE 36".
- 18. ALL EQUIPMENT SHALL BE MOUNTED AS RECOMMENDED BY THE MANUFACTURER.

REFERENCES

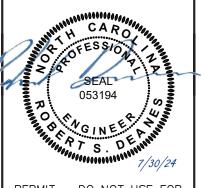
EQUIPMENT PLANS & ELEVATIONS\_\_\_

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FOUNDATION ANCHOR BOLT SUMMARY							ROD BENDING LEGEND (NOT TO SCALE)			
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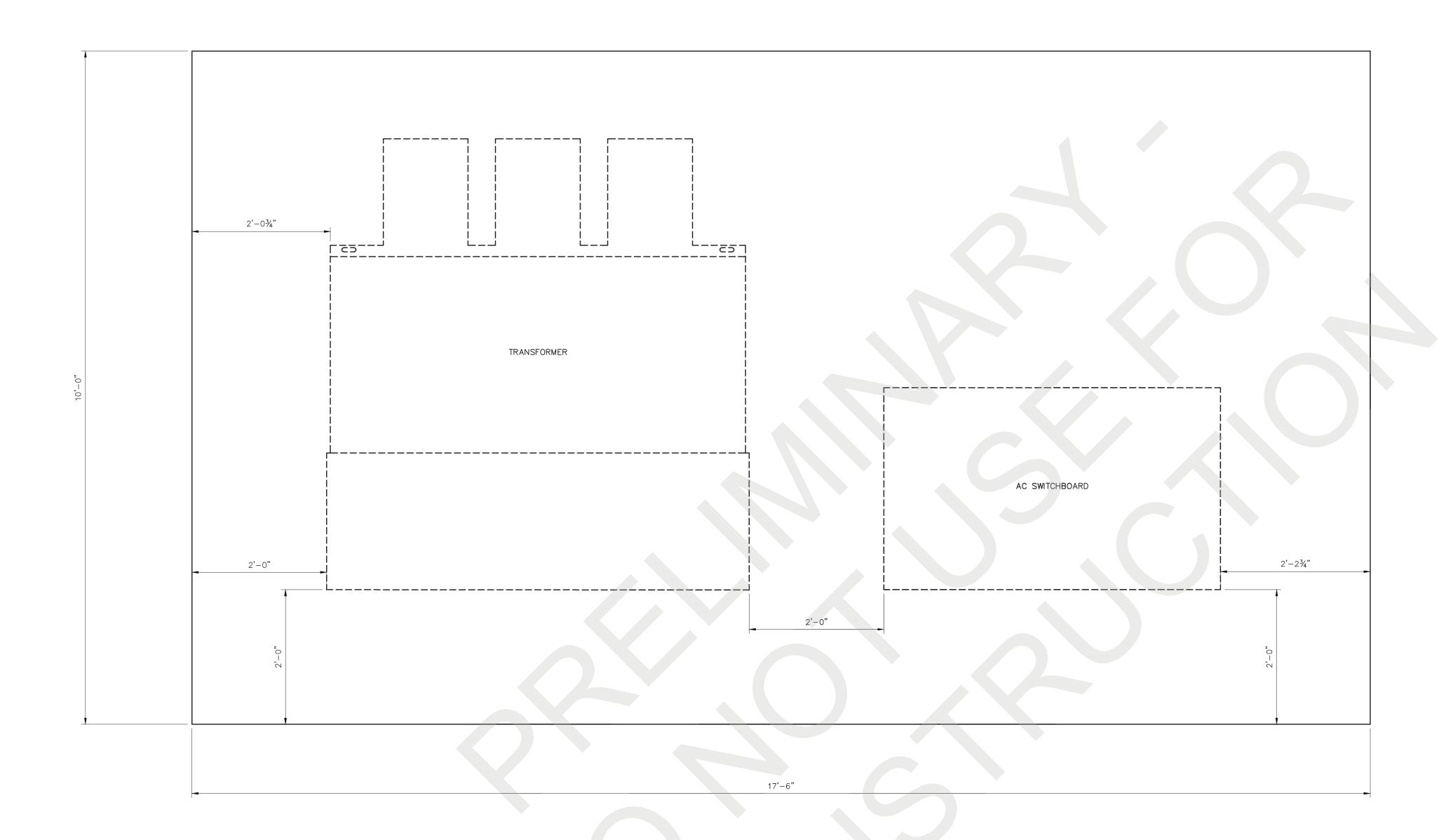




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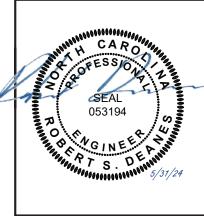


EQUIPMENT OVERLAY

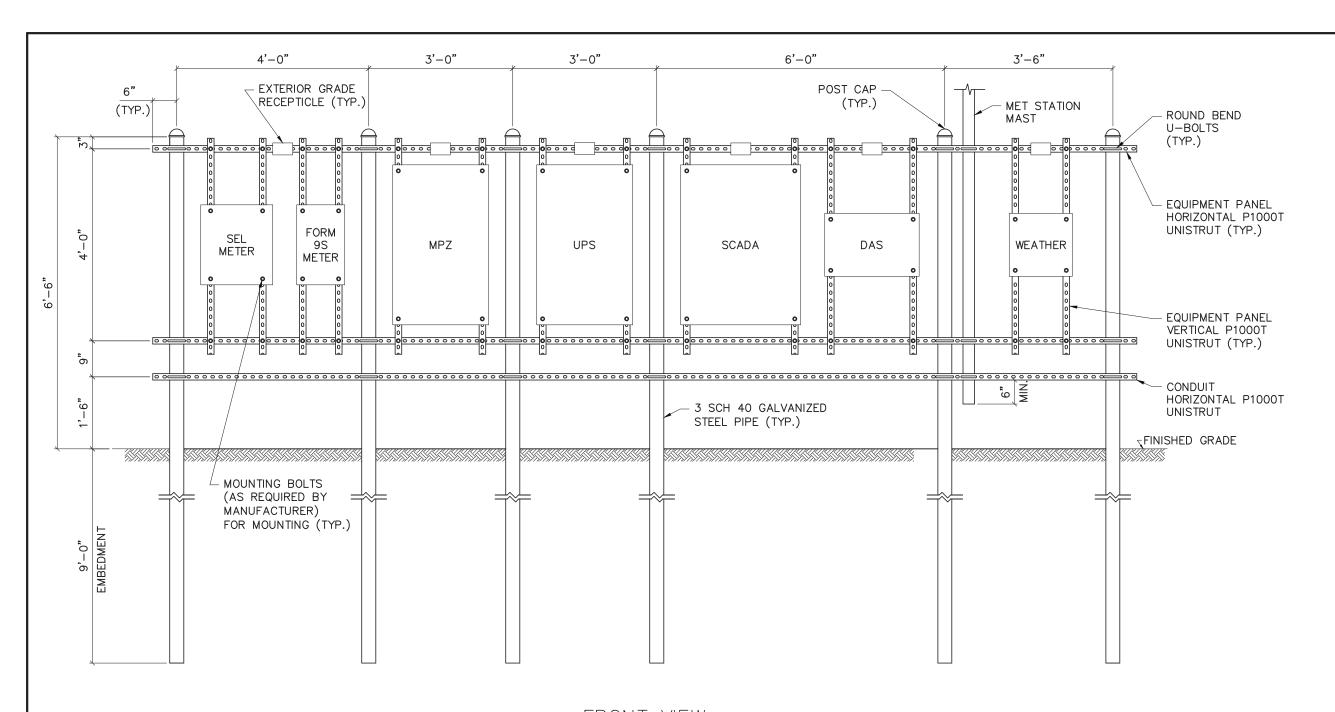
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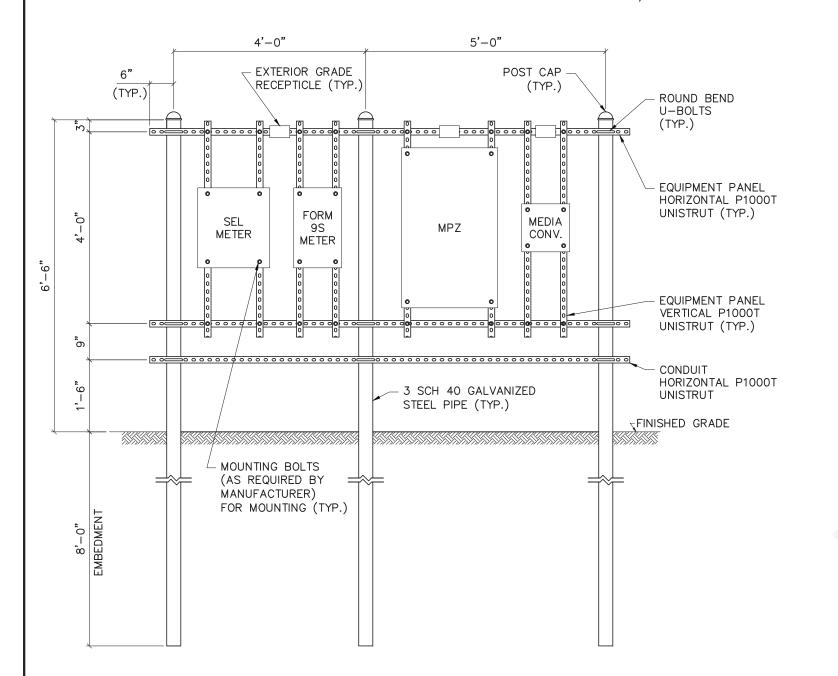


PROJECT NAME: ROCKFISH SOLAR		DRAWING TITLE:	PAD 1 EQUIPMENT PAD DETAI		
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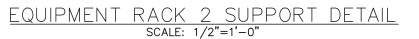


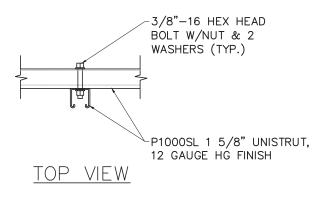
FRONT VIEW

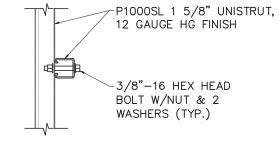
EQUIPMENT RACK 1 SUPPORT DETAIL



FRONT VIEW

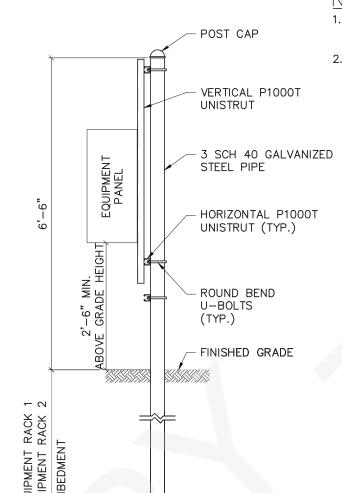






SIDE VIEW

UNISTRUT TO UNISTRUT CONNECTION SCALE: 1-1/2"=1'-0"



SIDE VIEW

### TYPICAL EQUIPMENT RACK SUPPORT DETAIL SCALE: 1/2"=1'-0"

BILL OF MATERIAL — EQUIPMENT RACK 1							
ITEM	NAME	DESCRITPTION	LENGTH PER UNIT	QUANTITY			
1	EMBEDDED SUPPORT PIPE	3 SCH 40 STEEL PIPE, ASTM A53, GRADE B, ASTM A123 GALVANIZATION MIN.	15'-6"	6			
2	POST CAP	3 SCH 40 STEEL, ASTM A53, GRADE B, ASTM A123 GALVANIZATION MIN.	-	6			
3	SUPPORT PIPE TO UNISTRUT ROUND U-BOLT	ROUND BEND U-BOLT, HOT DIPPED GALVANIZED STEEL FOR 3" SCH 40 STEEL PIPE	-	18			
4	MET ENCLOSURE RISER PIPE	2½ SCH 40 STEEL PIPE, ASTM A53, GRADE B, ASTM A123 GALVANIZATION MIN.	13'-7"	1			
5	MET SUPPORT PIPE TO UNISTRUT ROUND U-BOLT	ROUND BEND U-BOLT, HOT DIPPED GALVANIZED STEEL FOR 2.5" SCH 40 STEEL PIPE	-	3			
67	HORIZONTAL STRUT	P1000T, 1 5/8" UNISTRUT, 12 GAUGE, HD FINISH	20'-6"	3			
6	VERTICAL STRUT	P1000T, 1 5/8" UNISTRUT, 12 GAUGE, HD FINISH	4'-6"	14			
8	STRUT TO STRUT BOLT	3/8"-16 HEX BOLT, HOT DIPPED GALVANIZED STEEL, 1" THREADED MIN.	_	28			
9	STRUT TO STRUT BOLT HEAD WASHER	USS 3/8" FLAT WASHER, HOT DIPPED GALVANIZED STEEL	_	28			
10	STRUT TO STRUT NUT WASHER	USS 3/8" FLAT WASHER, HOT DIPPED GALVANIZED STEEL	_	28			
11	STRUT TO STRUT PILE NUT	3/8"-16 HEX NUTS, HOT DIPPED GALVANIZED STEEL	_	28			

	BILL OF MATERIAL — EQUIPMENT RACK 2						
ITEM	NAME	DESCRITPTION	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	POST CAP	3 SCH 40 STEEL, ASTM A53, GRADE B, ASTM A123 GALVANIZATION MIN.	_	3			
3	SUPPORT PIPE TO UNISTRUT ROUND U-BOLT	ROUND BEND U-BOLT, HOT DIPPED GALVANIZED STEEL FOR 3" SCH 40 STEEL PIPE	-	9			
4	HORIZONTAL STRUT	P1000T, 1 5/8" UNISTRUT, 12 GAUGE, HD FINISH	10'-0"	3			
5	VERTICAL STRUT	P1000T, 1 5/8" UNISTRUT, 12 GAUGE, HD FINISH	4'-6"	8			
6	STRUT TO STRUT BOLT	3/8"-16 HEX BOLT, HOT DIPPED GALVANIZED STEEL, 1" THREADED MIN.	-	16			
7	STRUT TO STRUT BOLT HEAD WASHER	USS 3/8" FLAT WASHER, HOT DIPPED GALVANIZED STEEL	_	16			
8	STRUT TO STRUT NUT WASHER	USS 3/8" FLAT WASHER, HOT DIPPED GALVANIZED STEEL	_	16			
9	STRUT TO STRUT PILE NUT	3/8"-16 HEX NUTS, HOT DIPPED GALVANIZED STEEL	_	16			

UNISTRUT TORQUE S STRUT	SPECIFICATIONS WITH NUT
SIZE	TORQUE
3/8"	19 TO 25 LB-FT

- 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.
- GENERAL NOTES
- 1. THE NOTES ON THIS SHEET ARE GENERAL. IF THERE ARE QUESTIONS, THEY SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE AND ANSWERED IN WRITING PRIOR TO CONSTRUCTION.
- 2. ALL WORK ASSOCIATED WITH THE CONSTRUCTION OF THIS PROJECT SHALL COMPLY WITH 2018 NORTH CAROLINA STATE BUILDING CODE, THE 2015 IBC, AND ASCE 7—10 AS ADOPTED AND AMENDED BY THE LOCAL AUTHORITY, AND ALL OTHER APPLICABLE CODES ORDINANCES AND LAWS.
- 3. THE CONTRACTOR SHALL VERIFY THE ASSUMED CONDITIONS AS DESCRIBED HEREIN BY ACTUAL FIELD MEASUREMENTS AND INSPECTIONS PRIOR TO FABRICATION OF ANY MATERIALS AND START OF CONSTRUCTION WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER FOR CORRECTIVE MEASURES.
- 4. SECTIONS AND DETAILS SHOWN ARE INTENDED TO ESTABLISH THE GENERAL TYPES OF DETAILS TO BE USED THROUGHOUT. IF THE CONTRACTOR WISHES TO USE DETAILS OTHER THAN THOSE SHOWN ON THE DRAWINGS, SUCH DETAILS SHALL BE SUBMITTED FOR APPROVAL, AND APPROVAL CONFIRMED, BEFORE SHOP DRAWINGS ARE COMMENCED.
- 5. ENGINEER IS NOT RESPONSIBLE FOR WORK THAT ENGINEER DOES NOT REVIEW AND/OR WORK NOT COMPLETED IN ACCORDANCE WITH ENGINEER'S PLANS AND/OR INSTRUCTIONS.
- 6. THE MET STATION COMPONENTS SHALL BE MOUNTED PER THE INSTALLATION MANUAL AS RECOMMENDED BY THE MANUFACTURER.

### COORDINATION

- 1. PLANS SHALL BE VERIFIED WITH ELECTRICAL AND CIVIL PLANS PRIOR TO CONSTRUCTION.
- 2. IT IS SOLELY THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ERECTION PROCEDURE AND THEIR COMPONENT PARTS DURING ERECTION. DESIGN IS VOID AFTER TWO YEARS FROM ORIGINAL DATE OF ISSUE, UNLESS UPDATED TO ACCEPTABLE CODES AND PRACTICES AT THAT TIME.
- 3. IF DESIGN IS NOT CONSTRUCTED WITHIN TWO YEARS FROM ORIGINAL DATE OF ISSUE, CONTACT ENGINEER TO UPDATE TO ACCEPTABLE CODES AND PRACTICES AT THAT TIME.

### STEEL PILES

PILE MATERIALS

a. SIZE PER SCHEDULE

- ENDS OF PILES TO BE MACHINE CUT AND SQUARE MAKING AN ANGLE OF 90 DEGREES WITH THE LONGITUDINAL AXIS OF THE PILE.
- 3. TOLERANCES:
- a. PILE FABRICATION TOLERANCES: CONFORM TO REQUIREMENTS OF ASTM A53, GRADE B.4. ALL STEEL PILES TO BE GALVANIZED IN ACCORDANCE WITH ASTM A123.
- 5. IF PILE FAILS TO ACHIEVE DESIGN EMBEDMENT, ENGINEER SHALL BE CONTACTED TO PROVIDE RECOMMENDED ALTERNATIVES TO ACHIEVE PILE PERFORMANCE.
- 6. DO NOT BEGIN PILE INSTALLATION UNTIL THE EARTHWORK IN THE AREA WHERE PILES ARE TO BE INSTALLED HAS BEEN COMPLETED.
- 7. DRIVEN PILES SHALL BE INSTALLED USING IMPACT OR VIBRATORY EQUIPMENT. PILES SHALL BE INSTALLED AS ONE (1) CONTINUOUS MEMBER WITHOUT SPLICE.
- 8. EACH PILE TO BE FREE FROM DEFECTS AND DAMAGE DUE TO CONSTRUCTION, FABRICATION, DELIVERY, INSTALLATION OR OTHER
- CONSTRUCTION, FABRICATION, DELIVERY, INSTALLATION OR OTHER CAUSES.

  a. REPLACE DAMAGED PILES. DAMAGED PILES INCLUDE BUT NOT
- NECESSARILY LIMITED TO PILES BENT, BUCKLED, CRACKED, WITH FABRICATION TOLERANCES BEYOND THOSE INDICATED ABOVE, OR WITH ANY OTHER DEFECT AS DETERMINED BY ENGINEER THAT
- WOULD WEAKEN THE PILE.

  b. CORRECT ANY PILE OR OTHER CONSTRUCTION THAT HAS BEEN DAMAGED BY PILE INSTALLATION.
- 9. PILE INSTALLATION LOGS SHALL BE MAINTAINED DAILY BY THE INSTALLATION CONTRACTOR THAT DETAIL PILE LOCATION, INSTALLATION, DATE, INSTALLATION DEPTH, UNUSUAL DRIVING TIME OR ANY INSTALLATION ABNORMALITIES.
- 10. A HORIZONTAL TRANSLATION DEFLECTION CRITERIA OF UP TO 1" INCH HAS BEEN ASSUMED.

### STRUCTURAL STEEL

- 1. ALL STRUCTURAL STEEL WORK SHALL BE IN CONFORMANCE
  WITH "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF
  STRUCTURAL STEEL FOR BUILDINGS", AISC.
- 2. MATERIAL STANDARDS: (UNLESS NOTED OTHERWISE)
  - a. WIDE FLANGES: ASTM A992, YIELD STRESS = 50 KSI b. HSS ROUND TUBE: ASTM A500, GRADE A.
  - c. STEEL PIPE: ASTM A53, GRADE B. d. HSS SQUARE/RECTANGULAR TUBE: ASTM A500, GRADE B.
  - e. BOLTS: ASTM A307 GRADE A OR C MIN.
  - f. THREADED ROD: ASTM A36 MIN. g. ALL OTHER SHAPES: A36 MINIMUM UNLESS NOTED OTHERWISE.
- 3. FIELD CONNECTIONS SHALL BE WELDED OR BOLTED (A325X). MINIMUM SIZE WELD, UNLESS OTHERWISE NOTED, IS TO BE 3/16 INCH FILLET, E70XX ELECTRODES. ELECTRODES SHALL BE SUITED TO GRADE STEEL. WHERE FIELD—WELDING IS NOTED, IT SHOULD BE PERFORMED BY CERTIFIED WELDERS ONLY.

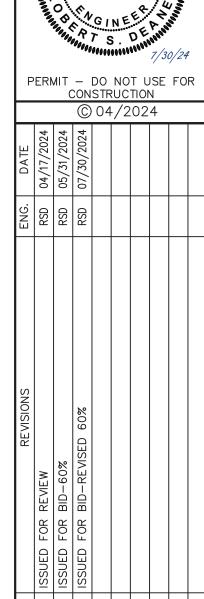
REFERENCES

CABINET ELEVATIONS & BOM....





053194



ROCKFISH SOLAR
UTILITY STATION

IG TITE:

EQUIPMENT RACK
UPPORT STRUCTURE DETAILS

ON B O

...12549 EP-301

DRAWN BY: DJD

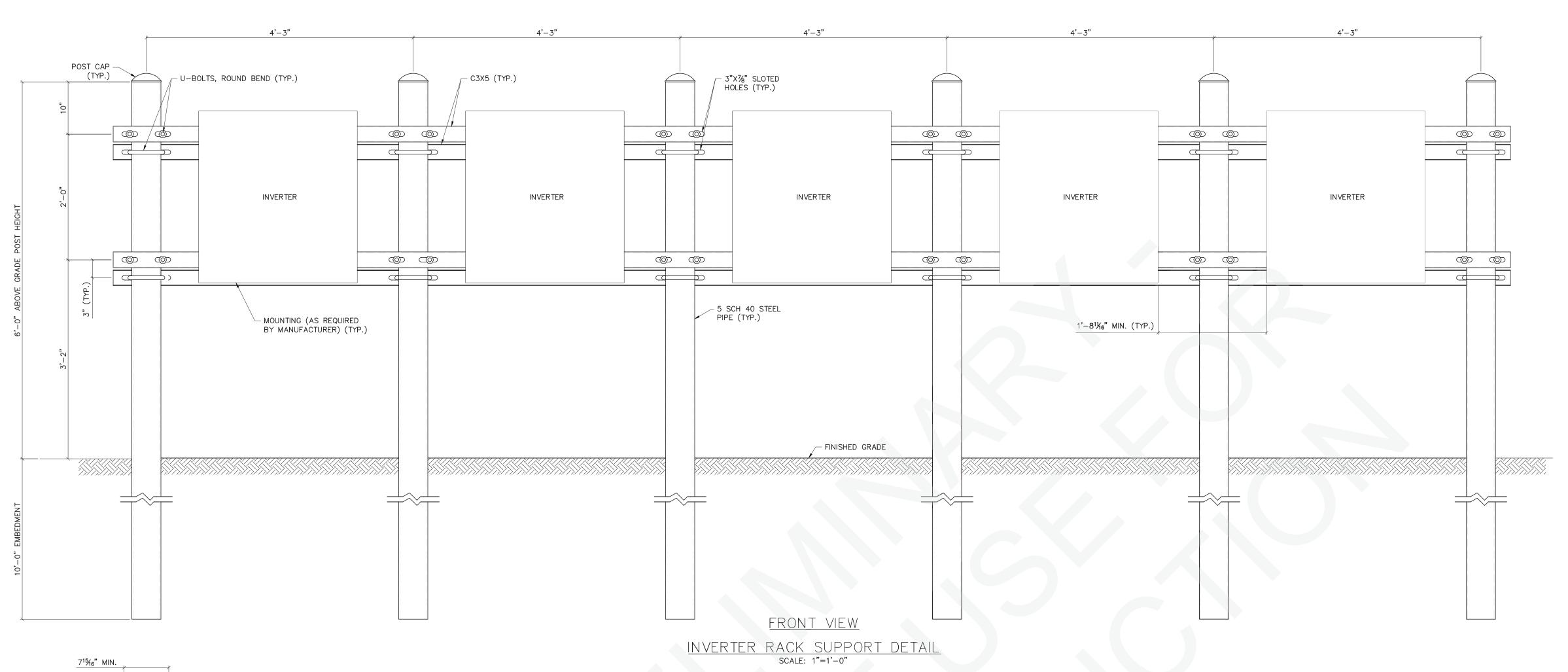
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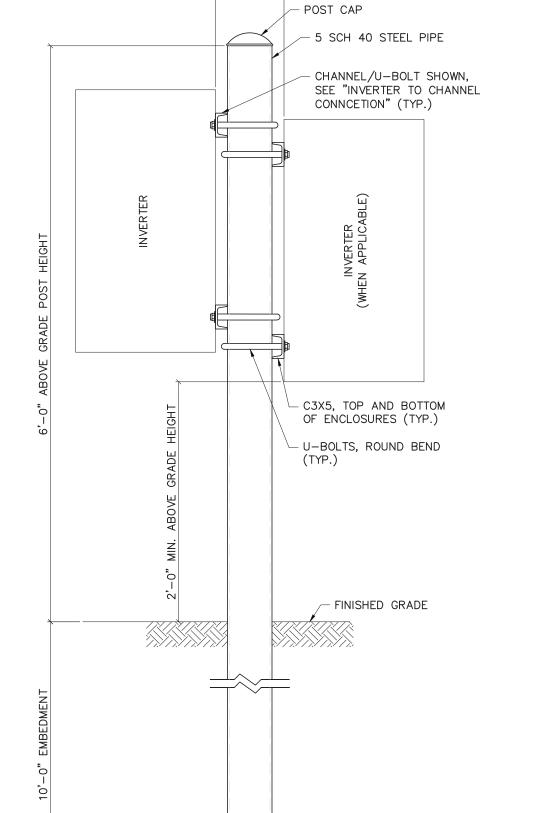
APPROVED BY: RSD

DATE: 04/17/2024

SCALE: 1/2"=1'-0"

FILE NUMBER: 12549





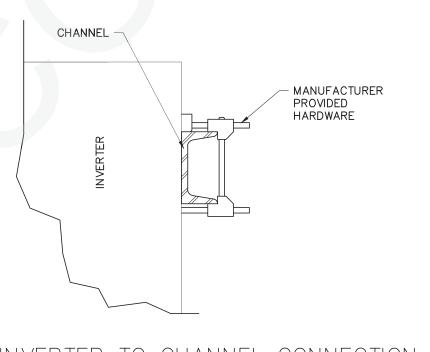
SIDE VIEW

INVERTER RACK SUPPORT DETAIL

SCALE: 1"=1'-0"

	TORQUE SPE	CIFICATIONS -	COARSE THREAD	
SIZE	GRADE 2	GRADE 5	GRADE 8	STAINLESS STEEL
1/4"	4 LB-FT	6.3 LB-FT	9 LB-FT	6.3 LB-FT
3/8"	15 LB-FT	23 LB-FT	33 LB-FT	20 LB-FT
1/2"	37 LB-FT	57 LB-FT	80 LB-FT	43 LB-FT
5/8"	73 LB-FT	112 LB-FT	159 LB-FT	93 LB-FT

		BILL OF MATERIAL - INVERTER RACK SUPPORT STRUCTURE		
ITEM	NAME	DESCRITPTION	LENGTH PER UNIT	QUANTITY
1	EMBEDDED SUPPORT PILE	5 SCH 40 STEEL PIPE, ASTM A53, GRADE B, ASTM A123 GALVANIZATION MIN.	16'-0"	6
2	POST CAP	5 SCH 40 STEEL, ASTM A53, GRADE B, ASTM A123 GALVANIZATION MIN.	-	6
3	HORIZONTAL STRUT	C3X5, ASTM A36, ASTM A123 GALVANIZATION MIN.	22'-3"	4
4	SUPPORT PIPE TO CHANNEL ROUND U-BOLTS	ø¾" ROUND U-BOLT, 2 NUT & WASHERS, GRADE 2, HOT DIPPED GALVANIZED STEEL	-	24



INVERTER TO CHANNEL CONNECTION SCALE: N.T.S

GENERAL NOTES

- 1. THE NOTES ON THIS SHEET ARE GENERAL. IF THERE ARE QUESTIONS, THEY SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE AND ANSWERED IN WRITING PRIOR TO CONSTRUCTION.
- 2. ALL WORK ASSOCIATED WITH THE CONSTRUCTION OF THIS PROJECT SHALL COMPLY WITH 2018 NORTH CAROLINA STATE BUILDING CODE, THE 2015 IBC, AND ASCE 7-10 AS ADOPTED AND AMENDED BY THE LOCAL AUTHORITY, AND ALL OTHER APPLICABLE CODES ORDINANCES AND LAWS.
- 3. THE CONTRACTOR SHALL VERIFY THE ASSUMED CONDITIONS AS DESCRIBED HEREIN BY ACTUAL FIELD MEASUREMENTS AND INSPECTIONS PRIOR TO FABRICATION OF ANY MATERIALS AND START OF CONSTRUCTION WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER FOR CORRECTIVE MEASURES.
- 4. SECTIONS AND DETAILS SHOWN ARE INTENDED TO ESTABLISH THE GENERAL TYPES OF DETAILS TO BE USED THROUGHOUT. IF THE CONTRACTOR WISHES TO USE DETAILS OTHER THAN THOSE SHOWN ON THE DRAWINGS, SUCH DETAILS SHALL BE SUBMITTED FOR APPROVAL, AND APPROVAL CONFIRMED, BEFORE SHOP DRAWINGS ARE COMMENCED.
- 5. ENGINEER IS NOT RESPONSIBLE FOR WORK THAT ENGINEER DOES NOT REVIEW AND/OR WORK NOT COMPLETED IN ACCORDANCE WITH ENGINEER'S PLANS AND/OR INSTRUCTIONS.
- 6. THE MET STATION COMPONENTS SHALL BE MOUNTED PER THE INSTALLATION MANUAL AS RECOMMENDED BY THE MANUFACTURER.

- 1. PLANS SHALL BE VERIFIED WITH ELECTRICAL AND CIVIL PLANS PRIOR TO CONSTRUCTION.
  - 2. IT IS SOLELY THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ERECTION PROCEDURE AND THEIR COMPONENT PARTS DURING ERECTION. DESIGN IS VOID AFTER TWO YEARS FROM ORIGINAL DATE OF ISSUE, UNLESS UPDATED TO ACCEPTABLE CODES AND PRACTICES AT
  - 3. IF DESIGN IS NOT CONSTRUCTED WITHIN TWO YEARS FROM ORIGINAL DATE OF ISSUE, CONTACT ENGINEER TO UPDATE TO ACCEPTABLE CODES AND PRACTICES AT THAT TIME.

### STEEL PILES 1. PILE MATERIALS a. SIZE PER SCHEDULE

- 2. ENDS OF PILES TO BE MACHINE CUT AND SQUARE MAKING AN ANGLE OF 90 DEGREES WITH THE LONGITUDINAL AXIS OF THE PILE.
- 3. TOLERANCES: a. PILE FABRICATION TOLERANCES: CONFORM TO REQUIREMENTS OF ASTM A53, GRADE B.
- 4. ALL STEEL PILES TO BE GALVANIZED IN ACCORDANCE WITH ASTM A123.
- 5. IF PILE FAILS TO ACHIEVE DESIGN EMBEDMENT, ENGINEER SHALL BE CONTACTED TO PROVIDE RECOMMENDED ALTERNATIVES TO ACHIEVE PILE PERFORMANCE.
- 6. DO NOT BEGIN PILE INSTALLATION UNTIL THE EARTHWORK IN THE AREA WHERE PILES ARE TO BE INSTALLED HAS BEEN COMPLETED.
- 7. DRIVEN PILES SHALL BE INSTALLED USING IMPACT OR VIBRATORY EQUIPMENT. PILES SHALL BE INSTALLED AS ONE (1) CONTINUOUS MEMBER
- 8. EACH PILE TO BE FREE FROM DEFECTS AND DAMAGE DUE TO
- CONSTRUCTION, FABRICATION, DELIVERY, INSTALLATION OR OTHER a. REPLACE DAMAGED PILES. DAMAGED PILES INCLUDE BUT NOT
- NECESSARILY LIMITED TO PILES BENT, BUCKLED, CRACKED, WITH FABRICATION TOLERANCES BEYOND THOSE INDICATED ABOVE, OR WITH ANY OTHER DEFECT AS DETERMINED BY ENGINEER THAT WOULD WEAKEN THE PILE.

  b. CORRECT ANY PILE OR OTHER CONSTRUCTION THAT HAS BEEN
  - DAMAGED BY PILE INSTALLATION.
- 9. PILE INSTALLATION LOGS SHALL BE MAINTAINED DAILY BY THE INSTALLATION CONTRACTOR THAT DETAIL PILE LOCATION, INSTALLATION, DATE, INSTALLATION DEPTH, UNUSUAL DRIVING TIME OR ANY INSTÁLLATION ABNORMALITIÉS.
- 10. A HORIZONTAL TRANSLATION DEFLECTION CRITERIA OF UP TO 1" INCH HAS BEEN ASSUMED.

### STRUCTURAL STEEL

- 1. ALL STRUCTURAL STEEL WORK SHALL BE IN CONFORMANCE WITH "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS", AISC.
- 2. MATERIAL STANDARDS: (UNLESS NOTED OTHERWISE)
  a. WIDE FLANGES: ASTM A992, YIELD STRESS = 50 KSI
  b. HSS ROUND TUBE: ASTM A500, GRADE A.
  - c. STEEL PIPE: ASTM A53, GRADE B.
  - d. HSS SQUARE/RECTANGULAR TUBE: ASTM A500, GRADE B. e. BOLTS: ASTM A307 GRADE A OR C MIN. f. THREADED ROD: ASTM A36 MIN.
  - g. ALL OTHER SHAPES: A36 MINIMUM UNLESS NOTED OTHERWISE.
- 3. FIELD CONNECTIONS SHALL BE WELDED OR BOLTED (A325X). MINIMUM SIZE WELD, UNLESS OTHERWISE NOTED, IS TO BE 3/16 INCH FILLET, E70XX ELECTRODES. ELECTRODES SHALL BE SUITED TO GRADE STEEL. WHERE FIELD-WELDING IS NOTED, IT SHOULD BE PERFORMED BY CERTIFIED WELDERS ONLY.

REFERENCES

ELECTRICAL SITE PLAN...

\_\_\_12549 EP-110



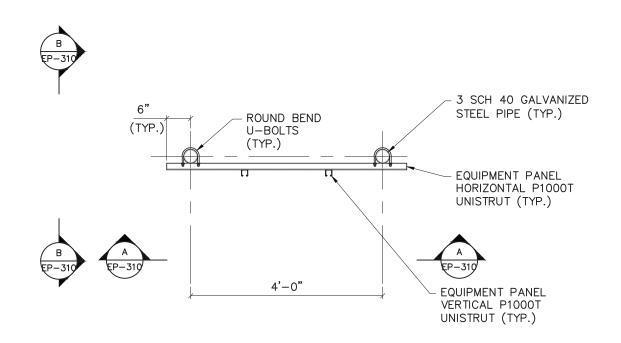


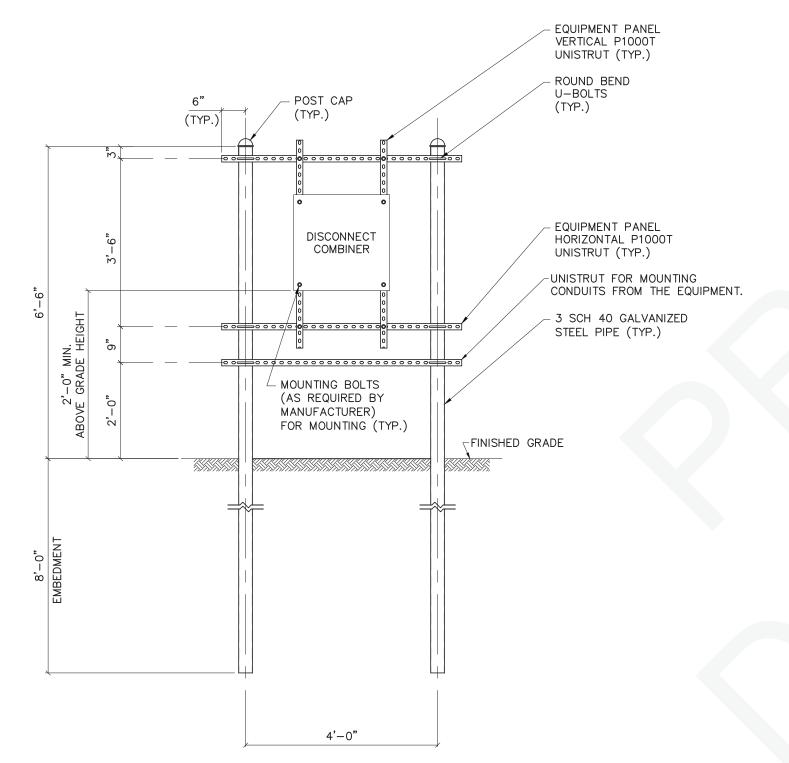
CONSTRUCTION

© 04/2024

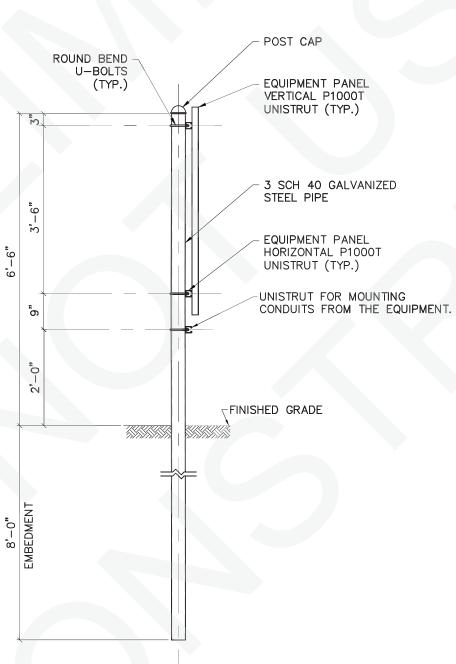
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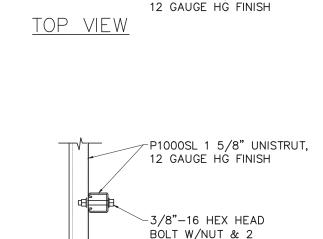
BILL OF MATERIAL — EQUIPMENT RACK 3						
ITEM	NAME	DESCRITPTION	LENGTH PER UNIT	QUANTITY		
1	EMBEDDED SUPPORT PIPE	3 SCH 40 STEEL PIPE, ASTM A53, GRADE B, ASTM A123 GALVANIZATION MIN.	14'-6"	2		
2	POST CAP	3 SCH 40 STEEL, ASTM A53, GRADE B, ASTM A123 GALVANIZATION MIN.	_	2		
3	SUPPORT PIPE TO UNISTRUT ROUND U-BOLT	ROUND BEND U-BOLT, HOT DIPPED GALVANIZED STEEL FOR 3" SCH 40 STEEL PIPE	_	6		
4	HORIZONTAL STRUT	P1000SL, 1 5/8" UNISTRUT, 12 GAUGE, HD FINISH	5'-0"	3		
5	VERTICAL STRUT	P1000SL, 1 5/8" UNISTRUT, 12 GAUGE, HD FINISH	4'-4"	2		
6	STRUT TO STRUT BOLT	3/8"-16 HEX BOLT, HOT DIPPED GALVANIZED STEEL, 1" THREADED MIN.	_	4		
7	STRUT TO STRUT BOLT HEAD WASHER	USS 3/8" FLAT WASHER, HOT DIPPED GALVANIZED STEEL	_	4		
8	STRUT TO STRUT NUT WASHER	USS 3/8" FLAT WASHER, HOT DIPPED GALVANIZED STEEL	_	4		
9	STRUT TO STRUT PILE NUT	3/8"-16 HEX NUTS, HOT DIPPED GALVANIZED STEEL	_	4		





SECTION A-A





WASHERS (TYP.)

√3/8"-16 HEX HEAD BOLT W/NUT & 2

-P1000SL 1 5/8" UNISTRUT,

WASHERS (TYP.)

SIDE VIEW

UNISTRUT TO UNISTRUT CONNECTION SCALE: 1-1/2"=1'-0"

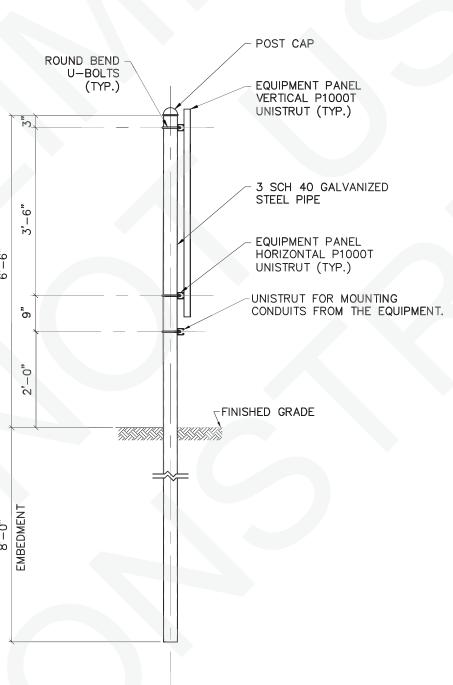
UNISTRUT TORQUE SPECIFICATIONS WITH STRUT NUT

SIZE

3/8"

TORQUE

19 TO 25 LB-FT



SECTION B-B

- 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.

GENERAL NOTES

- 1. THE NOTES ON THIS SHEET ARE GENERAL. IF THERE ARE QUESTIONS, THEY SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE AND ANSWERED IN WRITING PRIOR TO CONSTRUCTION.
- 2. ALL WORK ASSOCIATED WITH THE CONSTRUCTION OF THIS PROJECT SHALL COMPLY WITH 2018 NORTH CAROLINA STATE BUILDING CODE, THE 2015 IBC, AND ASCE 7-10 AS ADOPTED AND AMENDED BY THE LOCAL AUTHORITY, AND ALL OTHER APPLICABLE CODES ORDINANCES AND LAWS.
- 3. THE CONTRACTOR SHALL VERIFY THE ASSUMED CONDITIONS AS DESCRIBED HEREIN BY ACTUAL FIELD MEASUREMENTS AND INSPECTIONS PRIOR TO FABRICATION OF ANY MATERIALS AND START OF CONSTRUCTION WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER FOR CORRECTIVE MEASURES.
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- 5. ENGINEER IS NOT RESPONSIBLE FOR WORK THAT ENGINEER DOES NOT REVIEW AND/OR WORK NOT COMPLETED IN ACCORDANCE WITH ENGINEER'S PLANS AND/OR INSTRUCTIONS.
- 6. THE MET STATION COMPONENTS SHALL BE MOUNTED PER THE INSTALLATION MANUAL AS RECOMMENDED BY THE MANUFACTURER.

- 1. PLANS SHALL BE VERIFIED WITH ELECTRICAL AND CIVIL PLANS PRIOR TO CONSTRUCTION.
- 2. IT IS SOLELY THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ERECTION PROCEDURE AND THEIR COMPONENT PARTS DURING ERECTION. DESIGN IS VOID AFTER TWO YEARS FROM ORIGINAL DATE OF ISSUE, UNLESS UPDATED TO ACCEPTABLE CODES AND PRACTICES AT
- 3. IF DESIGN IS NOT CONSTRUCTED WITHIN TWO YEARS FROM ORIGINAL DATE OF ISSUE, CONTACT ENGINEER TO UPDATE TO ACCEPTABLE CODES AND PRACTICES AT THAT TIME.

### STEEL PILES 1. PILE MATERIALS

a. SIZE PER SCHEDULE

WITHOUT SPLICE.

- 2. ENDS OF PILES TO BE MACHINE CUT AND SQUARE MAKING AN ANGLE OF 90 DEGREES WITH THE LONGITUDINAL AXIS OF THE PILE.
- TOLERANCES: a. PILE FABRICATION TOLERANCES: CONFORM TO REQUIREMENTS OF ASTM A53, GRADE B.
- 4. ALL STEEL PILES TO BE GALVANIZED IN ACCORDANCE WITH ASTM A123.
- 5. IF PILE FAILS TO ACHIEVE DESIGN EMBEDMENT, ENGINEER SHALL BE CONTACTED TO PROVIDE RECOMMENDED ALTERNATIVES TO ACHIEVE PILE
- PERFORMANCE. 6. DO NOT BEGIN PILE INSTALLATION UNTIL THE EARTHWORK IN THE AREA
- WHERE PILES ARE TO BE INSTALLED HAS BEEN COMPLETED.
- 7. DRIVEN PILES SHALL BE INSTALLED USING IMPACT OR VIBRATORY EQUIPMENT. PILES SHALL BE INSTALLED AS ONE (1) CONTINUOUS MEMBER
- 8. EACH PILE TO BE FREE FROM DEFECTS AND DAMAGE DUE TO CONSTRUCTION, FABRICATION, DELIVERY, INSTALLATION OR OTHER
- a. REPLACE DAMAGED PILES. DAMAGED PILES INCLUDE BUT NOT NECESSARILY LIMITED TO PILES BENT, BUCKLED, CRACKED, WITH FABRICATION TOLERANCES BEYOND THOSE INDICATED ABOVE,
- OR WITH ANY OTHER DEFECT AS DETERMINED BY ENGINEER THAT WOULD WEAKEN THE PILE. b. CORRECT ANY PILE OR OTHER CONSTRUCTION THAT HAS BEEN
- DAMAGED BY PILE INSTALLATION. 9. PILE INSTALLATION LOGS SHALL BE MAINTAINED DAILY BY THE INSTALLATION CONTRACTOR THAT DETAIL PILE LOCATION, INSTALLATION, DATE, INSTALLATION DEPTH, UNUSUAL DRIVING TIME OR ANY
- 10. A HORIZONTAL TRANSLATION DEFLECTION CRITERIA OF UP TO 1" INCH

### STRUCTURAL STEEL

HAS BEEN ASSUMED.

INSTALLATION ABNORMALITIES.

- ALL STRUCTURAL STEEL WORK SHALL BE IN CONFORMANCE
  WITH "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF
  STRUCTURAL STEEL FOR BUILDINGS", AISC.
- 2. MATERIAL STANDARDS: (UNLESS NOTED OTHERWISE)
  a. WIDE FLANGES: ASTM A992, YIELD STRESS = 50 KSI
  b. HSS ROUND TUBE: ASTM A500, GRADE A.

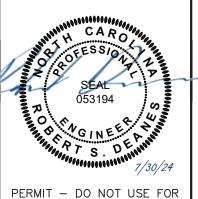
  - c. STEEL PIPE: ASTM A53, GRADE B. d. HSS SQUARE/RECTANGULAR TUBE: ASTM A500, GRADE B.
  - e. BOLTS: ASTM A307 GRADE A OR C MIN. f. THREADED ROD: ASTM A36 MIN.
  - g. ALL OTHER SHAPES: A36 MINIMUM UNLESS NOTED OTHERWISE.
- 3. FIELD CONNECTIONS SHALL BE WELDED OR BOLTED (A325X). MINIMUM SIZE WELD, UNLESS OTHERWISE NOTED, IS TO BE 3/16 INCH FILLET, E70XX ELECTRODES. ELECTRODES SHALL BE SUITED TO GRADE STEEL. WHERE FIELD-WELDING IS NOTED, IT SHOULD BE PERFORMED BY CERTIFIED WELDERS ONLY.

REFERENCES

ELECTRICAL SITE PLAN...

\_\_12549 EP-110





CONSTRUCTION

	2	NO O O		7 7
	⋖	ISSUED FOR BID-REVISED 60%	RSD	07/30/2024
ILS				

DRAWN BY: CHECKED BY: IDO APPROVED BY: RSD 07/30/2024 SCALE: AS NOTED FILE NUMBER: 12549



ARC FLASH AND SHOCK HAZARD APPROPRIATE PPE REQUIRED

XXX Incident Energy at XX inches Nominal System Voltage XXX VDC

Arc Flash Boundary (PPE Required) Limited Approach (Qualifed Personnnel Only) XXX inches Restricted Approach (PPE Required) XXX

Equipment Name Combiner Box XX-XX

1. DETAILED LABEL TO BE PROVIDED AFTER ARC FLASH STUDY.

2. SEE CORRESPONDING LABEL SCHEDULE FOR LABEL VALUE 3. SEE CORRESPONDING LABEL TAB FOR PRINTING PURPOSES.

DC COMBINER BOX

4. ALL LABELS SHALL BE ENGRAVED, UNLESS EXPLICITLY APPROVED BY OWNER.

ARC FLASH LABEL, DC



XXX inches

ARC FLASH AND SHOCK HAZARD APPROPRIATE PPE REQUIRED

Incident Energy at XX inches XXX Cal/cm² Nominal System Voltage XXX

Arc Flash Boundary (PPE Required) XXX Limited Approach (Qualifed Personnnel Only) XXX inches

Equipment ID: Transformer XX—HV

Restricted Approach (PPE Required)

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.

TRANSFORMER (HV) ARC FLASH LABEL, AC



ARC FLASH LABEL, DC

ARC FLASH AND SHOCK HAZARD

APPROPRIATE PPE REQUIRED

Incident Energy at XX inches

Arc Flash Boundary (PPE Required)

Restricted Approach (PPE Required)

NOTE:
1. DETAILED LABEL TO BE PROVIDED AFTER ARC FLASH STUDY.
2. SEE CORRESPONDING LABEL SCHEDULE FOR LABEL VALUE

3. SEE CORRESPONDING LABEL TAB FOR PRINTING PURPOSES.

Limited Approach (Qualifed Personnnel Only) XXX

Equipment Name Inverter XX-XX

4. ALL LABELS SHALL BE ENGRAVED, UNLESS EXPLICITLY APPROVED BY OWNER.

Nominal System Voltage

XXX

inches

Incident Energy at XX inches XXX

Arc Flash Boundary (PPE Required) XXX Limited Approach (Qualifed Personnnel Only) XXX inches Restricted Approach (PPE Required)

Equipment ID: Transformer XX-LV

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.

ARC FLASH LABEL, AC



ARC FLASH AND SHOCK HAZARD APPROPRIATE PPE REQUIRED

Cal/cm² XXX Nominal System Voltage

XXX inches

1. DETAILED LABEL TO BE PROVIDED AFTER ARC FLASH STUDY.

TRANSFORMER (LV)



ARC FLASH AND SHOCK HAZARD APPROPRIATE PPE REQUIRED

XXX Cal/cm² Incident Energy at XX inches Nominal System Voltage XXX VAC

Arc Flash Boundary (PPE Required) Limited Approach (Qualifed Personnnel Only) XXX Restricted Approach (PPE Required) XXX inches

Equipment ID: Inverter XX-XX

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.

ARC FLASH LABEL, AC



AC VOLTAGE: 480 V AC AC CURRENT: 180 A AC

INVERTER AC DISCONNECT

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.



### DC COMBINER BOX XX

DC COMBINER BOX LABELS

PHOTOVOLTAIC DC DISCONNECT

MAX SYSTEM VOLTAGE: 1398.89 V DC 232.64 A DC MAX CURRENT:

DC COMBINER BOX

NOTE: 1. TO BE INSTALLED ON COVER OF DC COMBINER BOX XX-XX ENCLOSURE. 2. SEE CORRESPONDING LABEL SCHEDULE FOR LABEL VALUE AND 3. SEE CORRESPONDING LABEL TAB FOR PRINTING PURPOSES.
4. ALL LABELS SHALL BE ENGRAVED, UNLESS EXPLICITLY APPROVED BY OWNER.

TRANSFORMER AC DISCONNECT

RATED AC VOLTAGE: 12,470 V AC RATED AC CURRENT: 115.75 A AC

TRANSFORMER AC DISCONNECT

PLACE ABOVE TRANSFORMER LOAD BREAK SWITCH ENCLOSURE

METEOROLOGICAL STATION

METEOROLOGICAL STATION

ROW XXX

MODULE ROWS (NOTE 1)

DAS CABINET

DAS CABINETS

CB X-X.XX

PV CIRCUIT LABELS (NOTE 1)

INVERTER XX

<u>INVERTER LABELS</u> (QTY.39)

XFMR XX

TRANSFORMER

SEE CORRESPONDING LABEL SCHEDULE FOR LABEL VALUE AND QUANTITY. 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.



ARC FLASH AND SHOCK HAZARD APPROPRIATE PPE REQUIRED

Incident Energy at XX inches XXX Cal/cm<sup>2</sup> XXX Nominal System Voltage

Arc Flash Boundary (PPE Required) XXX Limited Approach (Qualifed Personnnel Only) XXX Restricted Approach (PPE Required) XXX inches

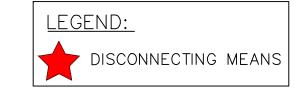
Equipment ID: AC Switchboard

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. TO BE INSTALLED AT ALL INVERTER SKIDS AND MAIN GOAB.

### NOTES:

UV LAMINATE

ALL LABELS AND SIGNAGE SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS, OAE: MATERIAL: 0.010 HP12W

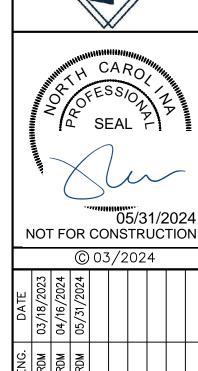
ALL LABELS SHALL USE 467MP ADHESIVE, OAE.

BLACK & COLOR PRINT ON WHITE BACKGROUND

ALL LABELS SHALL BE PRODUCED AT A UL APPROVED LABEL SHOP, SUCH AS BRADLEY NAMEPLATE, LUSTRECAL, OAE.







O B V

MARKINGS ROCKFISH SOLAR UTILITY STATION

ALH

DRAWN BY: CHECKED BY: EDR APPROVED BY: BJM 03/11/2024 SCALE: NONE FILE NUMBER: 12549

EP-450

SHEET:



When EPCs and developers need a dependable, low-maintenance fixed-tilt ground mount system, they turn to GLIDE Wave. With over 5 GW of projects deployed across the U.S., our flexible design can be adapted to meet the project specific needs on any site, no matter the challenges.

### Value Engineered

- Multiple foundation types are available to meet any unique underground soil conditions.
- Arrays are designed using continuous rows to follow the existing terrain and minimize the number of foundations required.
- Raised purlin are utilized as an integrated bonding and grounding method, which is UL 2703 listed, eliminating the need for additional grounding clips or washers.
- Parts and components are domestically sourced and manufactured for faster turnaround times.

### **Efficient Installation**

- Pre-assembled parts and components reduce the number of connections needed at each table/bay by up to 50%.
- Components are designed with adjustable tolerances to make field installation a smoother process.
- Dedicated project management and in-house installation teams capable of completing full structural installation of an array.
- Integrated wire management and equipment posts available to simplify eBOS installation.

### **Specifications**

Wind Loads	170 mph+
Snow Loads	90 psf+
Pre-Assembled Parts	Reduced installation time
Slope	Accomodates up to 30%
Warranty	20 years
Post Type	Cee posts or I-beam options available
Module Configuration	Portrait or landscape (all module frame types)
Raised Purlin	Integrated bonding and grounding
Listing	UL 2703

### www.terrasmart.com | info@terrasmart.com

**SUNNY HIGHPOWER PEAK3** 125-US / 150-US / 165-US / 172-US





### **SUNNY HIGHPOWER PEAK3**

Scalable 1,500 VDC building

Flexible architecture creates

block with best-in-class performance

scalability while maximizing land

Modular architecture reduces BOS

and maximizes system uptime

Compact design and high power

and logistical efficiency

density maximize transportation

125-US / 150-US / 165-US / 172-US A superior modular solution for large-scale power plants

The PEAK3 1,500 VDC inverter offers high power density in a modular architecture that achieves a cost-optimized solution for large-scale PV integrators. With fast, simple installation and commissioning, the Sunny Highpower PEAK3 is accelerating the path to energization. SMA has also brought its field-proven Smart Connected technology to the PEAK3, which simplifies O&M and contributes to lower lifetime service costs. The PEAK3 power plant solution is powered by the ennexOS cross sector energy management platform, 2018 winner of the Intersolar smarter E AWARD.

Ergonomic handling and simple con-

nections enable quick installation

Centralized commissioning and con-

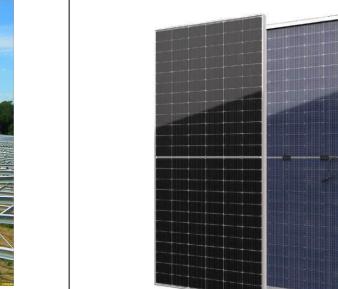
trol with SMA Data Manager

 SMA Smart Connected reduces O&M costs and simplifies field-

Powered by award winning ennexOS

cross sector energy management





# **Key Features**

### High module conversion efficiency Better temperature







Superior load capacity



# Warranty Additional Value From Linear Warranty 15 Guarantee on product material and workmanship 25 Syears coutput warranty

help customers reduce their energy costs and carbon footprint.

www.SMA-America.com

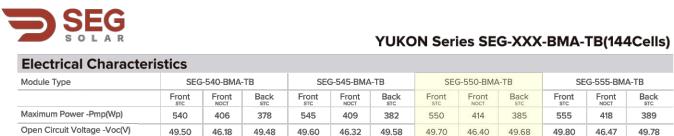
### **Product Certification** IEC61215:2016; IEC 61730:2016; UL1703; UL61730 IEC62804 IEC61701 Salt Mist IEC62716 Ammonia Resistance IEC60068 Dust and Sand IEC61215 Fire Type (UL61730):Type1 ISO14001:2015; ISO9001:2015; ISO45001:2018 PV CYCLE (E STATE OF SEC SALIFORNIA ENERGY COMMISSION

SEG Solar is a leading manufacturer of high-performance solar panels for residential, commercial, and utility applications. The company, headquartered in Houston, Texas, is committed to providing cost-effective and reliable solar solutions that



SMA America, LLC

Technical Data	Sunny Highpower PEAK3 125-US	Sunny Highpower PEAK3 150-US	Sunny Highpower PEAK3 165-US	Sunny Highpowe PEAK3 172-US
Input (DC)				
Maximum array power 1)	250 kWp	300 kWp	330 kWp	344 kWp
Maximum system voltage		1500	Vdc	
Rated MPP voltage range	705 V 1450 V	880 V 1450 V	924 V 1450 V	968 V 1450 V
MPPT operating voltage range	684 V 1500 V	855 V 1500 V	898 V 1500 V	941 V 1500 V
MPP trackers		1		
Maximum operating input current		180	) A	
Maximum input short-circuit current		325	5 A	
Output (AC)				
Nominal AC power	125 kW	150 kW	165 kW	172 kW
Maximum apparent power	125 kVA	150 kVA	165 kVA	172 kVA
Output phases / line connections		3/3	3-PE	
Nominal AC voltage	480 V	600 V	630 V	660 V
Compatible transformer winding configuration		Wye-gro	ounded	
Maximum output current		151	I A	
Rated grid frequency		60	Hz	
Grid frequency / range		50 Hz, 60 Hz /	-6 Hz +6 Hz	
Power factor at rated power / adjustable displacement		1 / 0.8 leading		
Harmonics (THD)		<3		
Efficiency				
CEC efficiency	98.5 %	99.0 %	99.0 %	99.0 %
Protection and safety features		<del>,</del>		
Ground fault monitoring: Riso / Differential current		• /	· •	
DC reverse polarity protection			,	
AC short circuit protection		•	1	
Monitored surge protection (Type 2): DC / AC		• /	· •	
Protection class / overvoltage category (as per UL 840)		ı/		
General data		•		
Device dimensions (W / H / D)		770 / 830 / 462 mm (	30.3 / 32.7 / 18.2 in)	
Device weight		99 kg (2		
Operating temperature range		-25°C +60°C (-		
Storage temperature range		-40°C +70°C (-		
Audible noise emission (full power @ 1 m and 25°C)		< 69 (		
Internal consumption at night		< 5		
Topology		Transfor		
Cooling concept		OptiCool (forced convect		
Enclosure protection rating		Туре		
Maximum permissible relative humidity (non-condensing)		100		
Additional information		100	570	
Mounting		Rack n	nount	
DC connection		Terminal lug (up to		
AC connection		Screw terminal (up to		
LED indicators (Status/Fault/Communication)		Sciew leitilliar (op ic		
SMA Speedwire (Ethernet network interface)		● (2 x RJ4		
Data protocols: SMA Modbus / SunSpec Modbus		• (2 X N/		
Integrated Plant Control / Q on Demand 24/7		• /		
Off-grid capable / SMA Hybrid Controller compatible		-/		
Monitoring		NI f at life	time of the contract	
SMA Smart Connected (monitoring portal)		No cost for the life		
SMA Smart Connected (monitoring and remote O&M service)		No cost on inverte		
Supported protocols for outbound data		SMA external Al	ri, Modbus, FIP	
Certifications		III 40100 III 1000 CII	L/CCA COO O N. (0100	
Certifications and approvals (pending)		UL 62109, UL 1998, CAN		
Manufacturer's Declaration of Design Life		25 y		
FCC compliance	IEEE 1.E	FCC Part 1		7.4.1.CD
Grid interconnection standards			ule 21, HECO Rule 14H, UL17	
Advanced grid support capabilities	L/HFKI, L/HVRI,	voir-var, volt-vvatt, Frequency	-Watt, Ramp Rate Control, Fixe	a rower ractor
Warranty				
Standard		5 ye		
Optional extensions		10 / 15 / 20	J / 25 years	
1) Higher DC array power permitted via site inverter load moo	deling in SMA Sunny Design			
Type designation	SHP 125-US-21	SHP 150-US-21	SHP 165-US-21	SHP 172-US-21
• Standard features Optional features - Not available				



Module Type	SEG	6-540-BMA	-TB	SE	G-545-BM/	A-TB	SEC	G-550-BMA	1-1B	SE	G-555-BM	4-ТВ
	Front stc	Front	Back	Front stc	Front	Back src	Front	Front	Back	Front src	Front	Back stc
Maximum Power -Pmp(Wp)	540	406	378	545	409	382	550	414	385	555	418	389
Open Circuit Voltage -Voc(V)	49.50	46.18	49.48	49.60	46.32	49.58	49.70	46.40	49.68	49.80	46.47	49.78
Short Circuit Current -Isc(A)	13.81	11.16	9.74	13.91	11.23	9.80	14.01	11.32	9.87	14.10	11.40	9.94
Maximum Power Voltage -Vmp(V)	41.55	38.39	41.61	41.81	38.41	41.86	42.07	38.58	42.10	42.31	38.75	42.35
Maximum Power Current -Imp(A)	13.00	10.59	9.09	13.04	10.65	9.13	13.08	10.73	9.15	13.12	10.79	9.19
Module E°ciency(%)		20.90			21.10			21.29			21.48	
Power Tolerance							(0, +3%)					
Maximum System Voltage						4	1500V DC					
Maximum Series Fuse Rating							30 A					
Bifaciality							70%±10%					

STC: Irradiance 1000 W/m <sup>2</sup> module temperature 25°C AM=1.5	NOCT: Irradiance 800W/m <sup>2</sup> ambient temperature 20°C module temperature 45°C wind speed: 1m/s

Mechanical Specifica	ations		Technical Drawing
External Dimension	2278 x 113	4 x 35 mm	
Weight	27.0	) kg	
Solar Cells	PERC Mono 182	x 91mm(144 pcs)	
Front Glass	3.2 / mm AR coating ter	mpered glass / low iron	
Frame	Anodized alu	minium alloy	
Junction Box	IP68 / 3	diodes	
Connector Type	PV-CO	02-xy	
Cable Type Cable Length	Landscape: 1200 n	Wire (UL) n(+) / 200 mm(-) nm(+) / 1200 mm(-) ized length	AF I
Mechanical Load(Front)	5400 Pa	/ 113 psf*	1134e2 3891 1086e2 B
Mechanical Load(Rear)	2400 Pa	/ 50 psf*	
*Refer to SEG installation Manual for details	`		Section 24 Landscape Advantage Advan
Packing Configuration	on		*Refer to SEG installation Manual for details
Container	20'GP	40'HQ	
Pieces per Pallet	31	31	I-V Curve

Incident Irrad.=400W/m<sup>2</sup>

Incident Irrad,=200W/m<sup>2</sup>

Incident irrad.=1000W/m<sup>2</sup>

Temperature Characteristics	
Pmax Temperature Coefficient	-0.35 %/°C
Voc Temperature Coefficient	-0.27 %/°C
Isc Temperature Coefficient	+0.05 %/°C
Operating Temperature	-40~+85 °C
Nominal Operating Cell Temperature (NOCT)	45±2 ℃

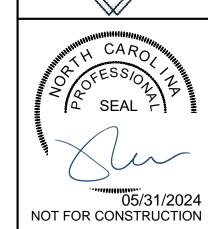
Pallets per Container

Pieces per Container

www.segsolar.com Specifications subject to technical changes SEG\_DS\_EN\_2023V4.0 © Copyright 2023 SEG Solar



Booth & Associate 2300 Rexwoods Drive Sulte 300, Raleigh NC 276



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