

# ROCKFISH SOLAR UTILITY STATION

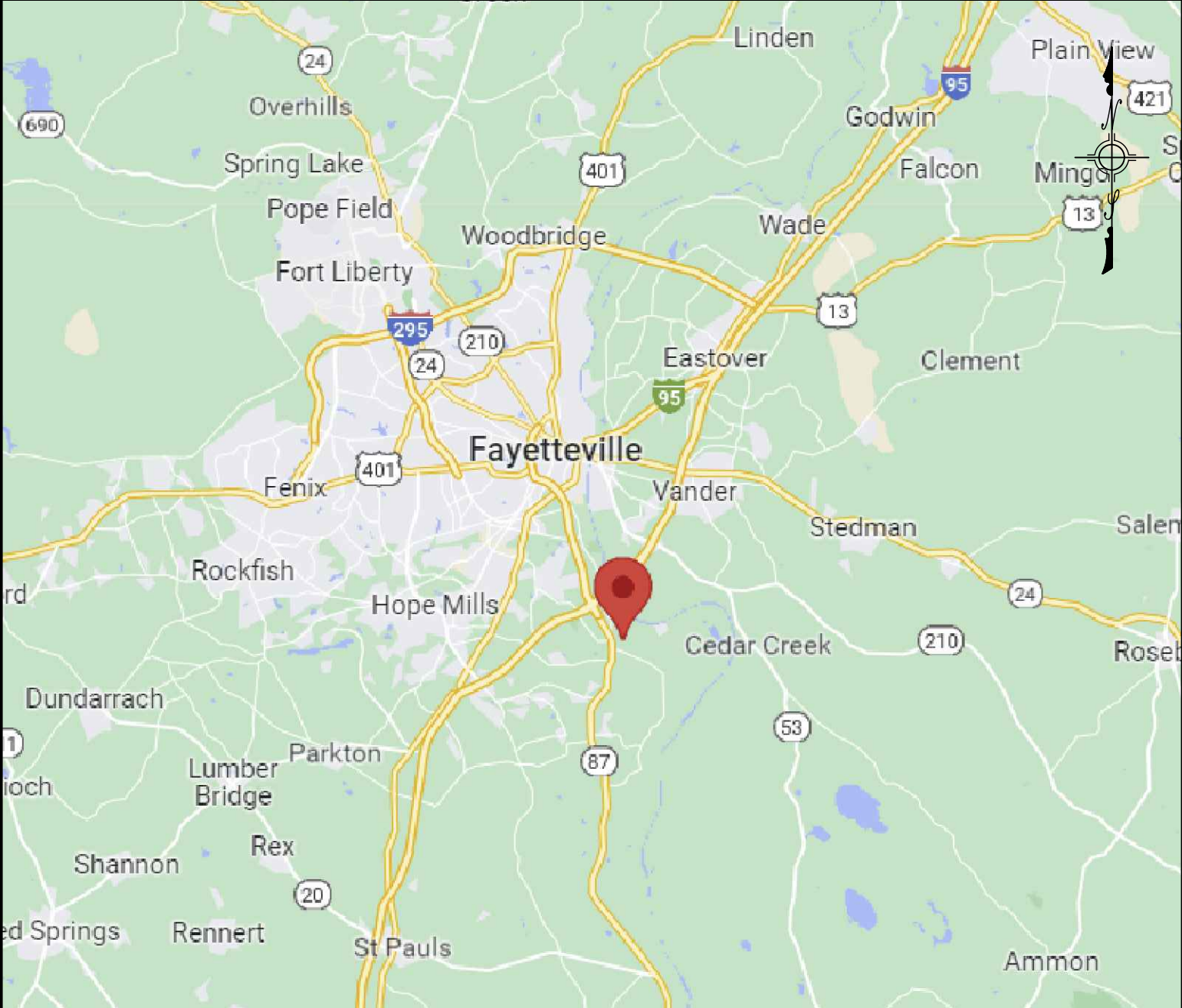
TRACY HALL ROAD

FAYETTEVILLE , NORTH CAROLINA 28306

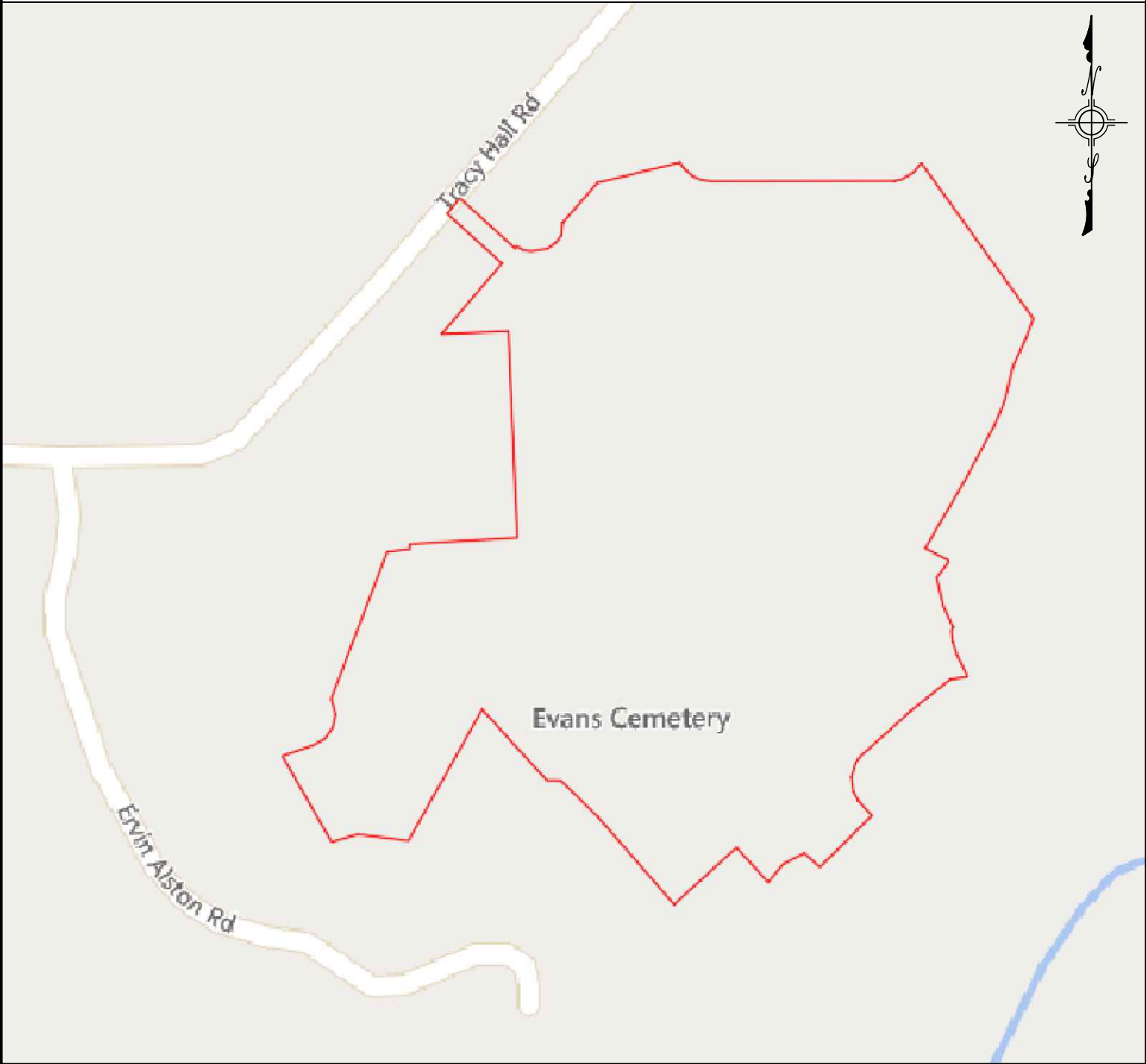
SOLAR ELECTRIC SYSTEM PROJECT - 5,948.8 KWDC/ 4,875.00 KWAC

34.96195, -78.83766

PROJECT LOCATION:



STREET MAP:



AERIAL VIEW:



OWNER INFORMATION

DAVID DESCHAMPS, PE  
FAYETTEVILLE PUBLIC  
WORKS COMMISSION  
955 OLD WILMINGTON ROAD  
FAYETTEVILLE, NC 28301  
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 FAYETTEVILLE
SITE COORDINATES	34.9619509, -78.8376635

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NO.	DATE	ENG.	REVISIONS
A	09/29/2023	RM	ISSUED FOR REVIEW - 30%
B	12/14/2023	RM	30% SUBMITTAL
C	03/18/2024	RM	60% SUBMITTAL
D	04/16/2024	RM	60% REVISED PER COMMENTS
E	05/31/2024	RM	ISSUED FOR BID - 60%
F	07/30/2024	RM	ISSUED FOR BID - REVISED 60%

PROJECT NAME:  
ROCKFISH SOLAR  
UTILITY STATION

DRAWING TITLE:  
TITLE SHEET

DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	08/11/2023
SCALE:	NONE
FILE NUMBER:	12549
SHEET:	

EP-001



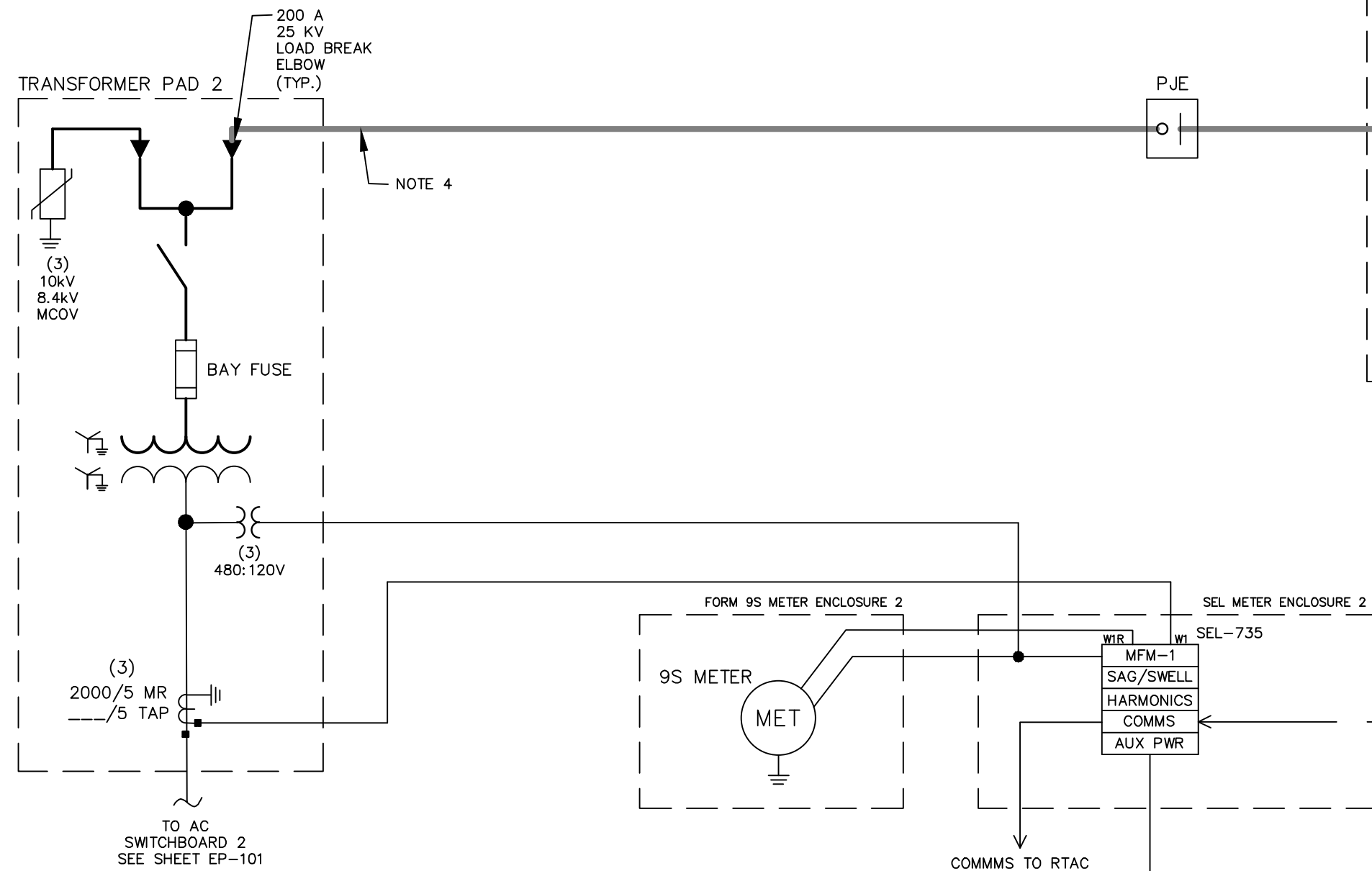




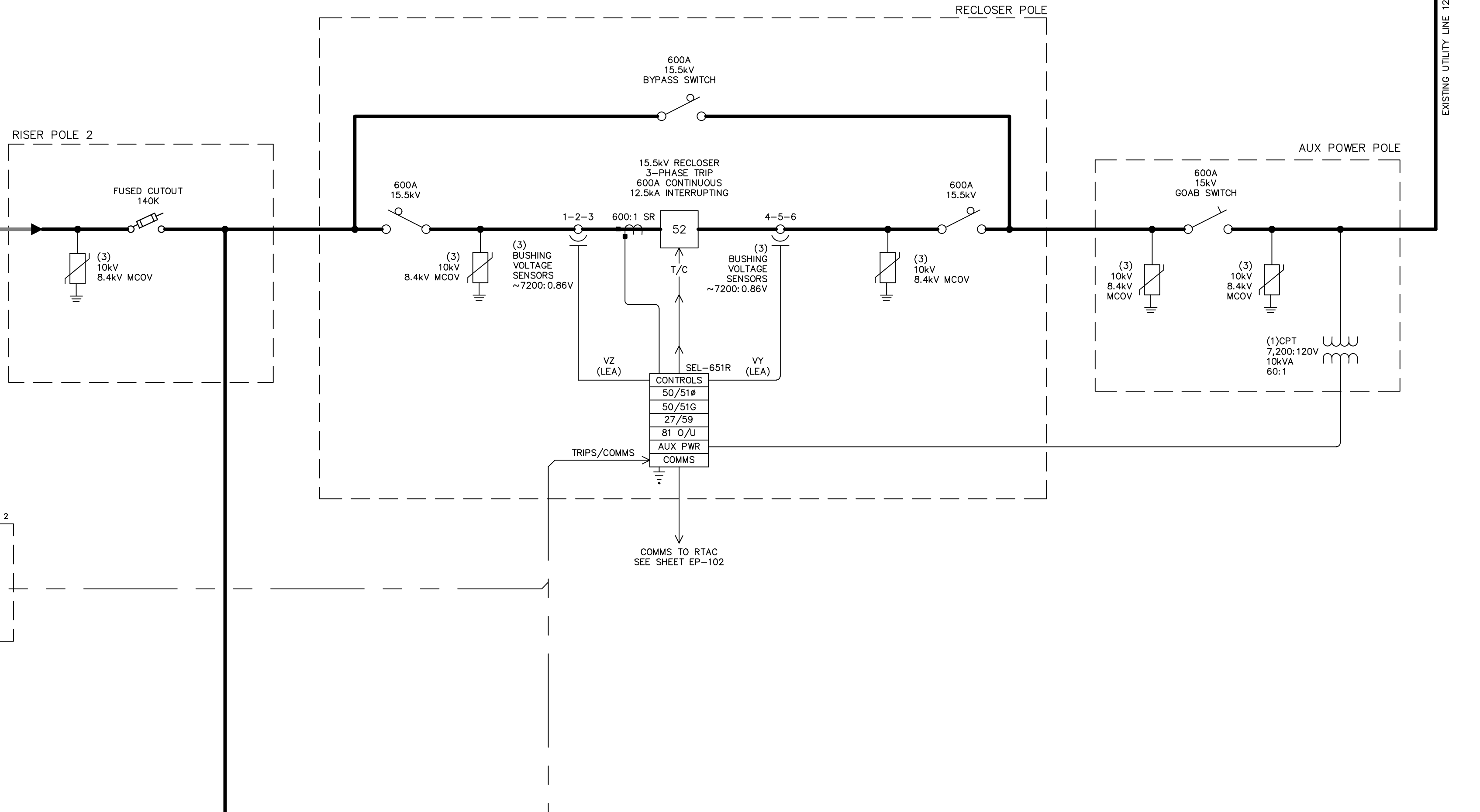
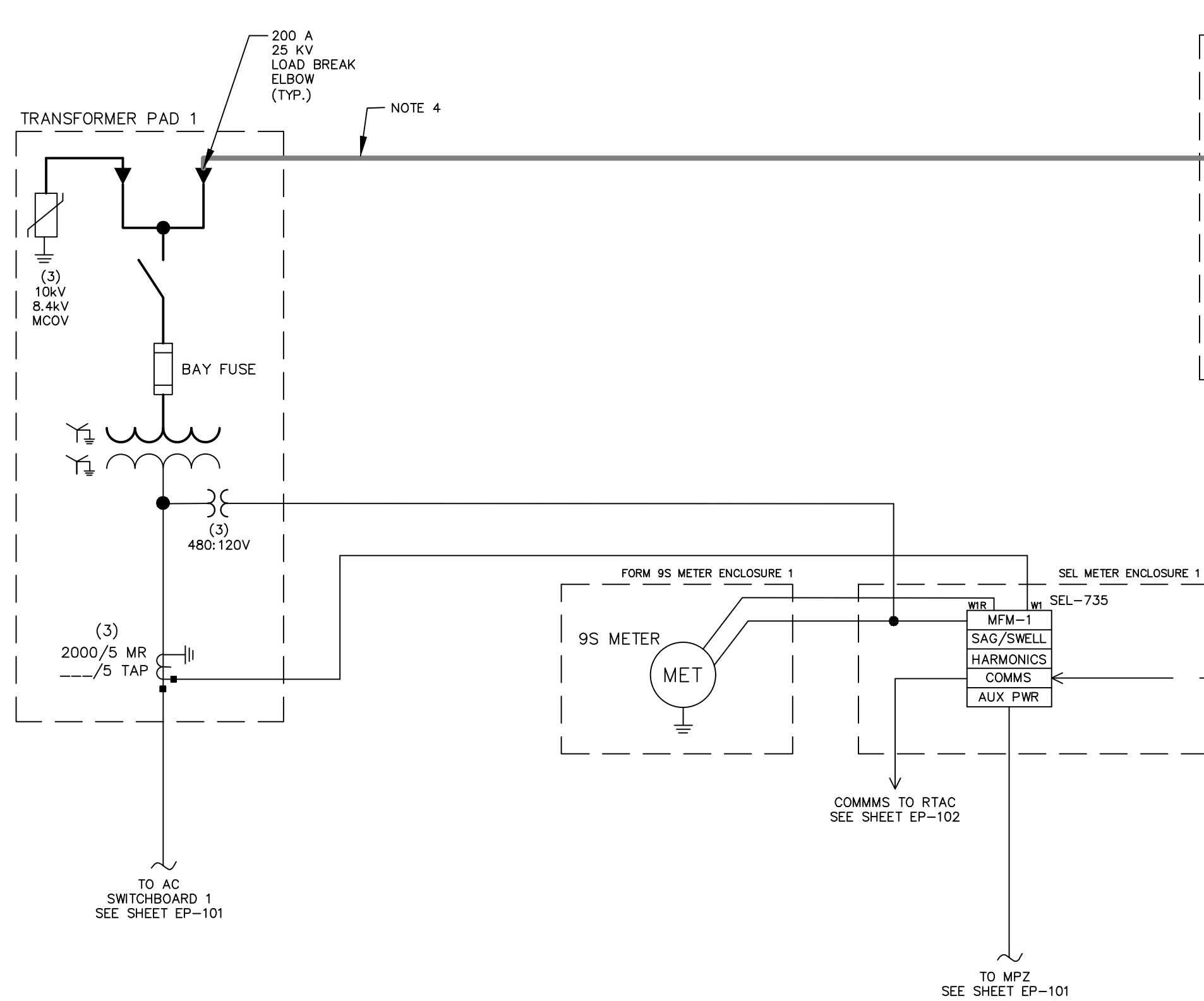
<div>7.12. All DC material must have an NRTL-listed voltage rating equal to, or greater than, the DC system voltage shown in the contract drawings.</div> <div>7.13. Damaged DC Cable must not be repaired without the owner's review and approval. Manufacturer repair instructions must be followed in the case of an owner-approved repair.</div> <div>8. <b>DC Combiner / Load Break Disconnect Boxes</b></div> <div>8.1. When installing conductors, they should be properly secured to avoid contact with sharp edges and to comply with the bending radius requirements.</div> <div>8.2. Mechanical set screw terminations are only approved for combiner box terminations.</div> <div>8.3. Conductor work loops should be provided in the boxes to allow for clamp-on meter ampacity testing and cable contraction/expansion.</div> <div>8.4. The DC disconnect box should have liquid-tight cord grips installed through the bottom of the box to prevent leakage. The boxes must also be thoroughly cleaned to eliminate any debris.</div> <div>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.</div> <div>9. <b>DC Combiner / Load Break Disconnect Boxes</b></div> <div>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.</div> <div>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.</div> <div>9.3. All fuses should be installed in such a way that rating labels are visible.</div> <div>9.4. Circuit breakers subject to reverse power flow should be listed as back feed compatible.</div> <div>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.</div> <div>9.6. All overcurrent protection devices should be installed based on the instructions of associated equipment manufacturers and the assigned application of the Engineer of Record.</div> <div>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.</div> <div>10. <b>Inverters</b></div> <div>10.1. The inverter connection to the transformer shall be installed according to the factory specifications.</div> <div>10.2. To ensure safety and compliance, all direct bus connections must be approved by the inverter and transformer manufacturers.</div> <div>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).</div> <div>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).</div> <div>10.5. Use the manufacturer's recommended lifting locations as indicated in the installation documentation for inverters</div> <div>11. <b>Low Voltage AC Wiring</b></div> <div>11.1. Low Voltage AC conductors minimum conductor and insulation rating shall be specified by the Owner's engineer.</div> <div>11.2. Low Voltage AC conductor terminations on service laterals shall follow the latest version of the utility construction standards.</div> <div>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.</div> <div>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.</div> <div>12. <b>Low Voltage Auxiliary Power Transformers</b></div> <div>12.1. The enclosure for the auxiliary transformer should be made of coated steel and must have a NEMA 3R or 4X rating.</div> <div>12.2. The windings of the transformer should be encapsulated with epoxy.</div> <div>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.</div> <div>12.4. Electrostatic shields should be installed on transformer windings.</div> <div>13. <b>Inverter Step-Up Transformer (ISU)</b></div> <div>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.</div> <div>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.</div> <div>13.3. The temperature, pressure, and liquid level transformer alarm I/O must be wired to the SCADA network.</div> <div>14. <b>Underground Trenches</b></div> <div>14.1. A minimum clearance of 12 inches must be maintained between power and control/communication wiring, unless otherwise noted.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>14.6. After the sand cover, the initial backfill layer should be equal to 12 inches over the conductors or conduit before being compacted. Subsequent backfill layers must be installed in 6-inch lifts, each of which must be compacted to 90% of Standard Proctor Density.</div> <div>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.</div> <div>14.8. Running underground cable under racking or trackers requires explicit approval from the Owner.</div> <div>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.</div> <div>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.</div> <div>14.11. Conduit for cable installation under roads must extend 6 feet beyond the edge of the roadway.</div> <div>15. <b>Electrical Warning Tape</b></div> <div>15.1. The tape shall be red.</div> <div>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.</div> <div>15.3. The width of the warning and tracer tape must be at least 6 inches.</div> <div>15.4. Warning and tracer tape must be placed above pipes, conduits, or cables at depths specified in the approved plans.</div> <div>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.</div> <div>15.6. The contractor must install warning and tracer tape at least once for every 2 feet of trench width, evenly spaced.</div> <div>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.</div> <div>15.8. Unless approved by the Owner's engineer, cable separation must be maintained.</div> <div>16. <b>Grounding and Bonding</b></div> <div>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.</div> <div>16.2. All grounding splices and connections shall be irreversible crimp. If crimping, oxide inhibitor shall be applied before crimping.</div> <div>16.3. For equipment pad ground ring connections, one ground rod shall be installed in an accessible test well. The connection of the ground ring to this ground rod shall be reversible such that the ground rod may be tested with a single connection to this ground ring.</div> <div>16.4. Racking components and structural supports must be electrically bonded together by a listed and approved means.</div> <div>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.</div> <div>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.</div> <div>16.7. Bare copper GEC shall be installed in conduit and shall extend at least 6" out from concrete equipment pad.</div> <div>16.8. Grounding system components shall be listed for their purpose, including but not limited to ground rods, grounding lugs, grounding clamps, etc.</div> <div>16.9. All Equipment Grounding Conductors (EGC's) shall be either insulated or uninsulated copper, or uninsulated tin-plated copper, unless otherwise noted.</div> <div>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.</div> <div>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.</div> <div>16.12. All gates, whether temporary or permanent, shall have grounds installed per the drawing details, and as per follows:</div> <div>16.12.1. Fences shall be grounded at each side of a gate or opening.</div> <div>16.12.2. Fence gates shall be bonded to the grounding conductor, jumper, or fence.</div> <div>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.</div> <div>17. <b>Raceway &amp; Conduit</b></div> <div>17.1. All underground conductors in conduit shall be routed in schedule 40 PVC or HDPE conduit unless otherwise noted.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>17.5. Rigid metal conduit shall be hot-dipped galvanized steel confirming to ANSI C80.1</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>17.11. Conduit sealant shall be Polywater FST 250.</div> <div>17.12. Weatherheads shall be sealed with Polywater AFT.</div> <div>17.13. All conduit fittings shall be listed.</div> <div>17.14. Intermediate and rigid metal conduit fittings, couplings and connectors shall be threaded and galvanized.</div> <div>17.15. Couplings and connectors for electric metallic tubing shall be watertight compression fittings.</div> <div>17.16. Couplings and connectors for PVC and LPMC shall be watertight fittings.</div> <div>17.17. All conduits transitioning from under to above ground and terminating at a combiner box or other raised equipment, shall have an expansion fitting installed at the point of transition.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>17.22. When transitioning conductors from free air to in conduit a fitting with sealant shall be used to prevent the entry of moisture.</div> <div>17.23. Seal all conduits to prevent transmission of humid air between interior and exterior of equipment.</div> <div>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.</div> <div>17.25. Conduits stubbed up from below grade shall be in the appropriate locations and plumb.</div> <div>17.26. Conduits stubbed up shall immediately be capped to prevent water entry during construction.</div> <div>17.27. Tops of conduit shall be a minimum of 4" above the concrete pad or gravel bedding to prevent ingress of water.</div> <div>17.28. Conduits in concrete pads shall be properly secured so they don't displace during pour.</div> <div>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.</div> <div>17.30. All conduits stubbed into or otherwise entering equipment enclosures to be equipped with bushings or approved equal to prevent abrasion.</div> <div>17.31. All conduit passing through fire-rated assemblies shall be sealed with a fire-rated, listed fire stopping product.</div> <div>17.32. All conduit passing through water-tight assemblies shall be sealed with a listed waterproofing product.</div> <div>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.</div> <div>17.34. All conduits and raceways inside buildings/interior locations shall be EMT.</div> <div>17.35. All EMT fittings shall be steel compression type, not set screw type. Cast compression fitting shall not be used.</div> <div>17.36. All raceway fittings in outdoor locations shall be rain-tight compression type, unless otherwise noted.</div> <div>17.37. PVC installed in exposed</div>
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TRANSFORMER 2  
2500 kVA, 65°C,  
3 $\phi$  HV: 12.47 kV GRD WYE  
LV: 480 V GRD WYE  
Yyn0, Z = 5.75%  
COMMON HOXD



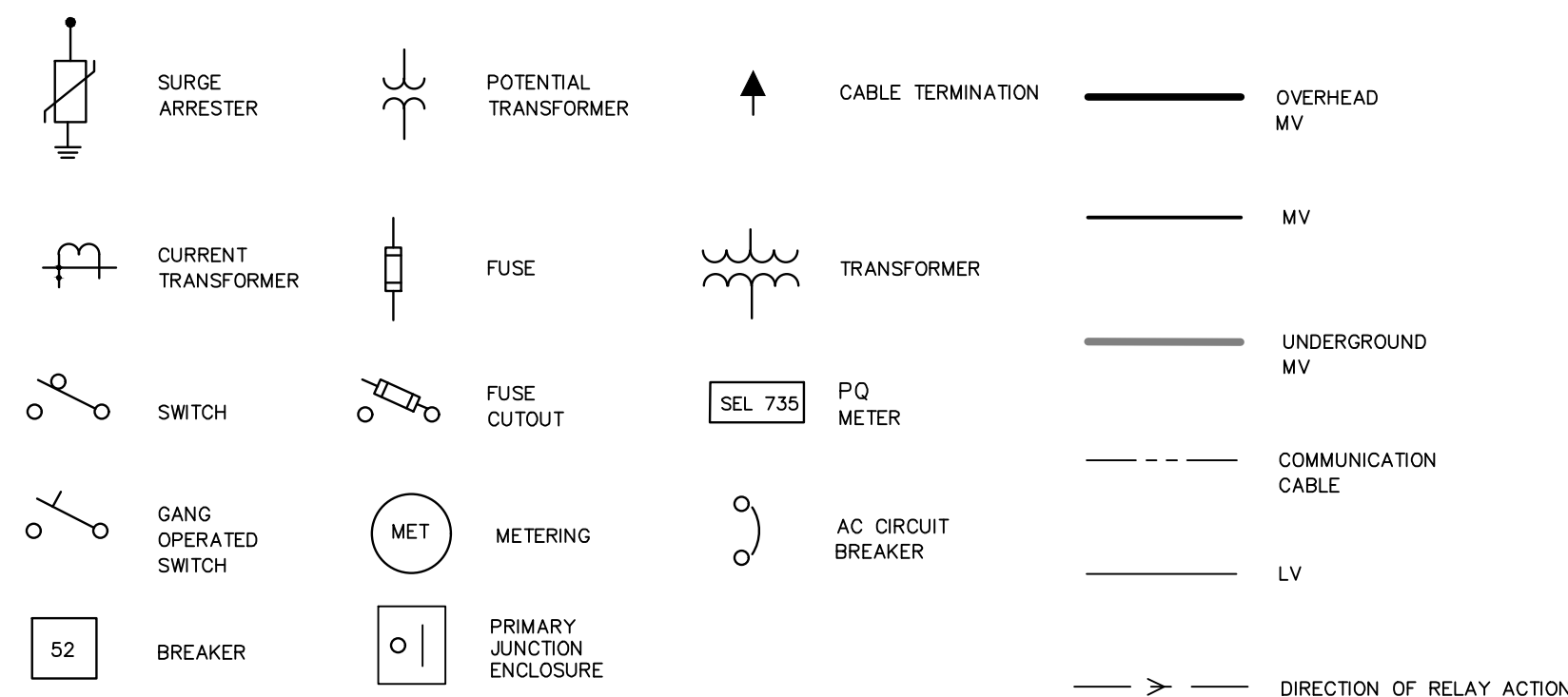
TRANSFORMER 1  
2500 kVA, 65°C,  
3 $\phi$  HV: 12.47 kV GRD WYE  
LV: 480 V GRD WYE  
Yyn0, Z = 5.75%  
COMMON HOXD



SYSTEM SUMMARY	
DC CAPACITY	5,863.00 KW
AC CAPACITY	4,875.00 KW
LOADING RATIO DC/AC (%)	120%
TRANSFORMER	(2) 2500 kVA 12.47 kV GRD-WYE TO 480 V WYE, 5.75% Iz
INTERCONNECTION UTILITY	PWC
INVERTER	(39) SMA SUNNY HIGHPOWER PEAK3 125-U5
MODULE	(10660) SERAPHIM ENERGY SRP 550 BMA-BG 182
MODULE STC RATING	550 W
STRING QUANTITY	410
MODULES/STRING	26

- NOTES:
- THE DC AND LV AC SLD IS TYPICAL.
  - THE DC SYSTEM IS FUNCTIONALLY GROUND.
  - MAXIMUM PHYSICAL AC EXPORT CAPABILITY = 4,875 KW (AC).
  - SEE CONDUCTOR SCHEDULE ON EP-104

#### LEGEND

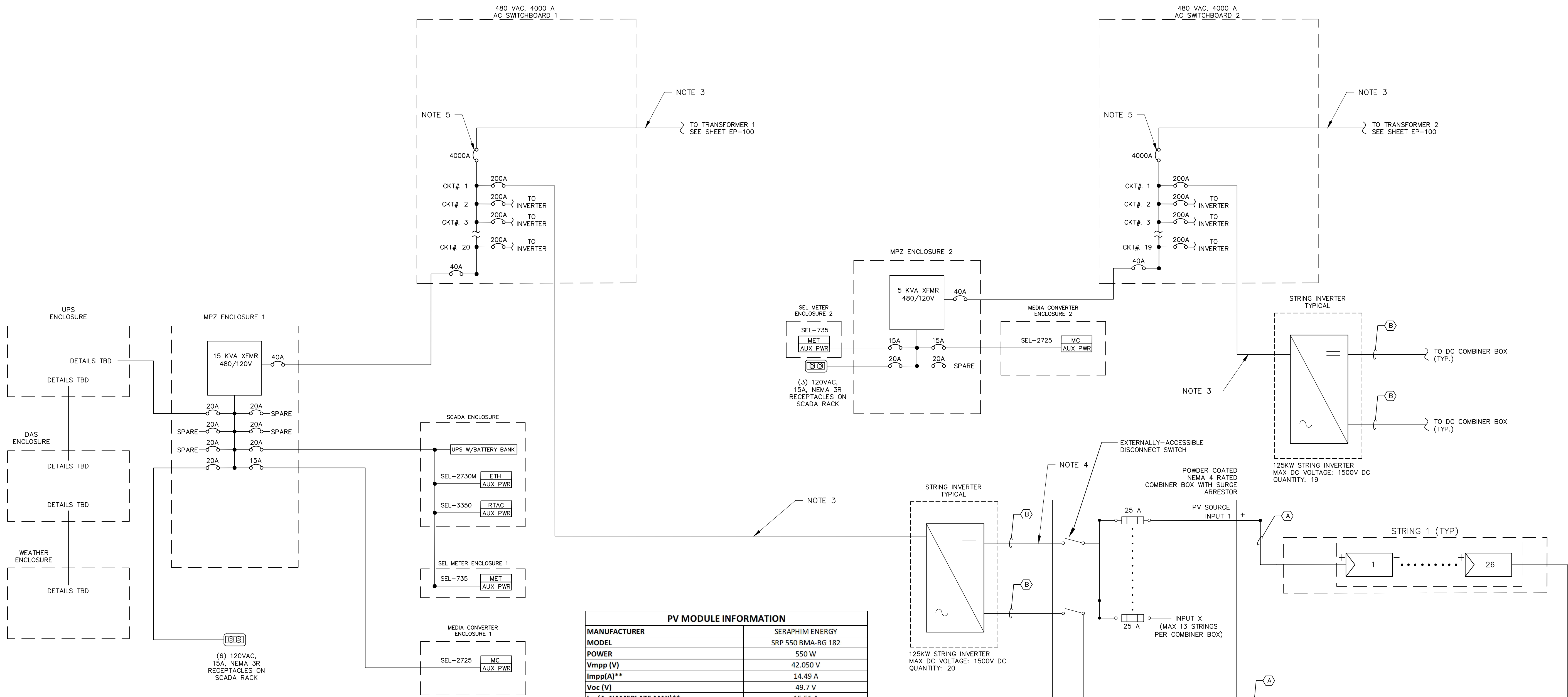


NO.	ENG.	DATE	REVISIONS
A	RM	09/29/2023	ISSUED FOR REVIEW - 30%
B	RM	12/14/2023	30% SUBMITTAL
C	RM	03/18/2023	60% SUBMITTAL
D	RM	04/16/2024	60% REVISED PER COMMENTS
E	RM	05/31/2024	ISSUED FOR BID - 60%

PROJECT NAME:	ROCKFISH SOLAR UTILITY STATION
DRAWING TITLE:	UTILITIES SINGLE LINE DIAGRAM

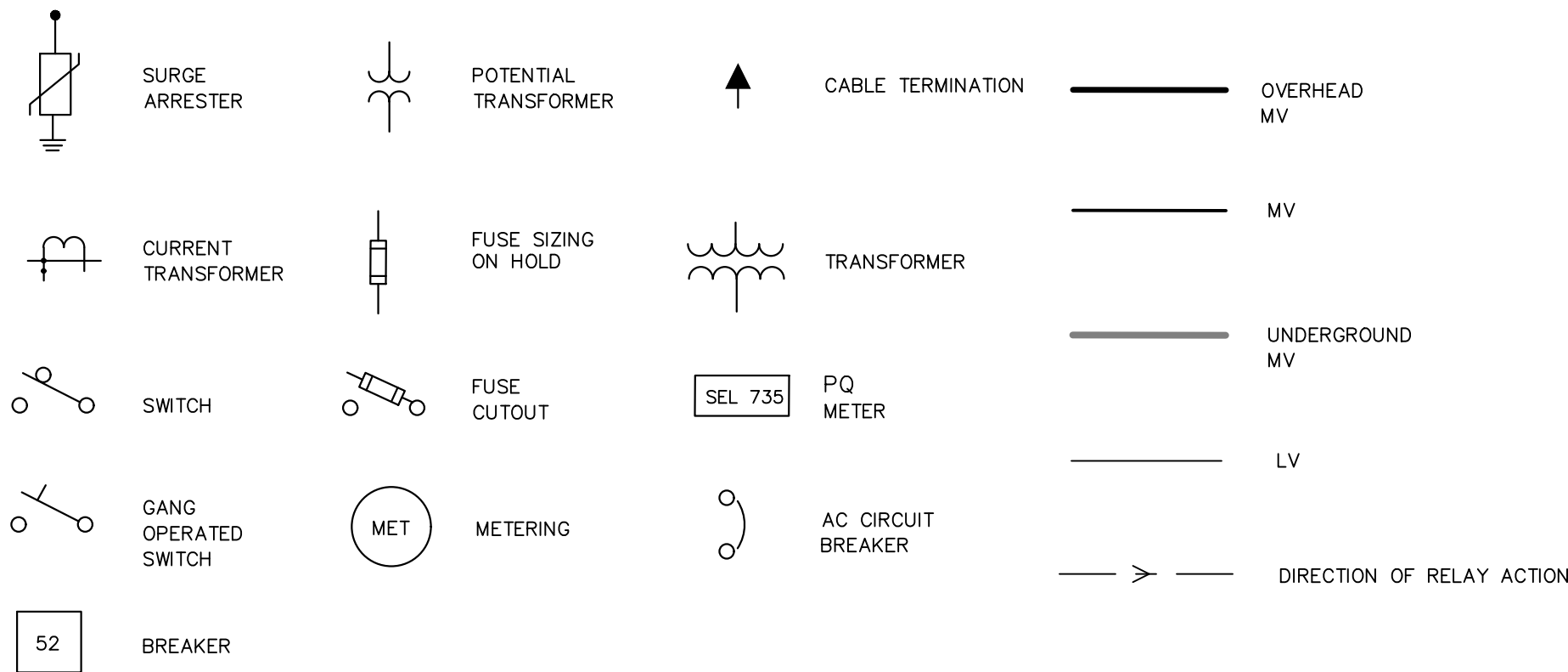
DRAWN BY:	ALH
CHECKED BY:	MJ
APPROVED BY:	RM
DATE:	09/27/2023
SCALE:	NONE
FILE NUMBER:	12549
SHEET:	





- NOTES:
1. THE DC AND LV AC SLD IS TYPICAL.
  2. THE DC SYSTEM IS FUNCTIONALLY GROUND.
  3. REFER TO EP-104 FOR CONDUCTOR INFORMATION.
  4. REFER TO EP-103 FOR DC CONDUCTOR INFORMATION.
  5. ARC ENERGY REDUCTION REQUIRED PER NEC 2020 240.87

LEGEND



PV MODULE INFORMATION	
MANUFACTURER	SERAPHIM ENERGY
MODEL	SRP 550 BMA-BG 182
POWER	550 W
Vmpp (V)	42.050 V
Imp (A)**	14.49 A
Voc (V)	49.7 V
Isc (A, NAMEPLATE MAX)**	15.51 A
CURRENT TEMP COEF. (%/C°)	0.050%/C°
VOLTAGE TEMP. COEF. (%/C°)	-0.26 %/C°
NOCT (C°)	45 C°
MAX FUSE (A)	25 A
TOTAL STRINGS (QTY)	410
TOTAL MODULES (QTY)	10,660
TOTAL DC CAPACITY (KW)	5,863.0 KW

PV STRING INFORMATION	
MODULES IN SERIES	26
STC POWER	14,300 W
Voc (STC)	1292.2 V
Vmax (MINIMUM TEMP)	1409.79 V
Vmax PER NEC 690.7(A)(3)	1398.89212
Vmpp (STC)	1093.3 V
Imp (STC) **	14.49 A
Isc (STC, NAMEPLATE MAX)**	15.51 A
Imax PER NEC 690.8(A)(1)	17.22 A
DESIGN TEMP (HIGH/LOW)	35/-10 C°
TOTAL SYSTEM STRINGS	410

INVERTER INFORMATION	
MANUFACTURER	SMA
MODEL NUMBER	SUNNY HIGHPOWER PEAK3 125-US
NUMBER OF INVERTERS	39
STC RATED POWER OUTPUT	125 KW
MAX DC VOLTAGE	1500 V
AC OUTPUT VOLTAGE	480 V
MAX AC CURRENT	151 A
CEC WEIGHTED EFFICIENCY	98.5 %

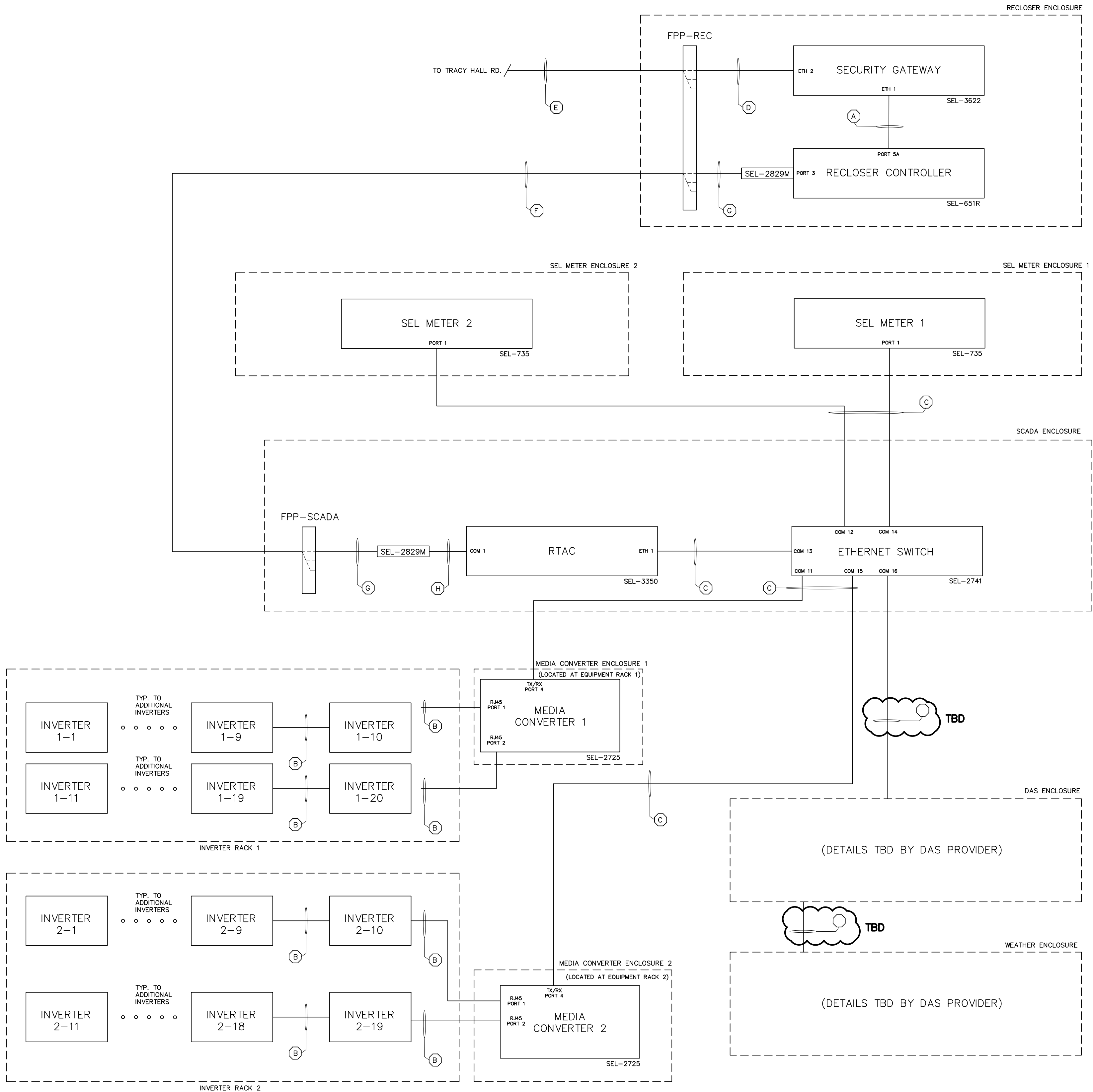
\*\* BASED ON ESTIMATED MAX 10.7833% BIFACIAL GAIN

2200 Remwood Drive Suite 300, Raleigh NC 27607  
NC F-021

NO.	REV.	DATE	DESCRIPTION
A	1	09/29/2023	ISSUED FOR REVIEW - 30%
B	2	12/14/2023	30% SUBMITTAL
C	3	03/18/2024	60% SUBMITTAL
D	4	04/16/2024	60% REVISED PER COMMENTS
E	5	05/31/2024	ISSUED FOR BID - 60%

PROJECT NAME:	ROCKFISH SOLAR UTILITY STATION
DRAWING TITLE:	SOLAR SINGLE LINE DIAGRAM
DRAWN BY:	ALH
CHECKED BY:	MJ
APPROVED BY:	RD
DATE:	08/11/2023
SCALE:	NONE
FILE NUMBER:	12549
SHEET:	EP-101

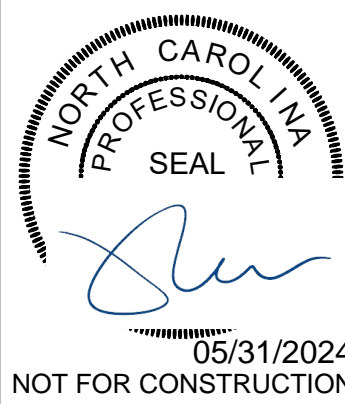




COMMUNICATIONS CABLE LEGEND		
IDENTIFIER	CABLE TYPE	COMMUNICATION PROTOCOL
A	RJ45M-RJ45M COPPER CAT5E OR HIGHER	ETHERNET
B	RJ45M-RJ45M COPPER CAT5E OR HIGHER	ETHERNET
C	LC-LC MM FIBER	ETHERNET
D	LC-LC SM FIBER	ETHERNET
E	ADSS6 SM FIBER	ETHERNET
F	LST6 SM FIBER	SERIAL
G	ST-LC SM FIBER	SERIAL
H	DB9F-RJ45M COPPER	SERIAL

NOTES

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



NO.		DATE		ENG.		REVISIONS	
A		03/18/2023		RDM		60% SUBMITTAL	
B		04/16/2024		RDM		60% REVISED PER COMMENTS	
C		05/31/2024		RDM		ISSUED FOR BID - 60%	





PROJECT NAME:		DRAWING TITLE:	
ROCKFISH SOLAR UTILITY STATION		COMMUNICATION BLOCK DIAGRAM	
DRAWN BY:		ALH	
CHECKED BY:		EDR	
APPROVED BY:		BJM	
DATE:		03/11/2024	
SCALE:		NONE	
FILE NUMBER:		12549	
SHEET:		EP-102	



Equipment Schedule										
Transformer ID	Inverter ID	Inverter Model	Module	# Strings	# Modules	Max Input Short Circuit Current (A)	STC RATED POWER AC (kW)	Output Voltage (VAC)	Total DC Power (kW)	DC/AC Ratio
XFMR-01	INV-01-01	125 KW STRING INVERTER	550 W MODULE	9	234	139.59	125	480	128.7	1.03
XFMR-01	INV-01-02	125 KW STRING INVERTER	550 W MODULE	9	234	139.59	125	480	128.7	1.03
XFMR-01	INV-01-03	125 KW STRING INVERTER	550 W MODULE	9	234	139.59	125	480	128.7	1.03
XFMR-01	INV-01-04	125 KW STRING INVERTER	550 W MODULE	10	260	155.10	125	480	143.0	1.14
XFMR-01	INV-01-05	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-01	INV-01-06	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-01	INV-01-07	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-01	INV-01-08	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-01	INV-01-09	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-01	INV-01-10	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-01	INV-01-11	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-01	INV-01-12	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-01	INV-01-13	125 KW STRING INVERTER	550 W MODULE	10	260	155.10	125	480	143.0	1.14
XFMR-01	INV-01-14	125 KW STRING INVERTER	550 W MODULE	10	260	155.10	125	480	143.0	1.14
XFMR-01	INV-01-15	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-01	INV-01-16	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-01	INV-01-17	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-01	INV-01-18	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-01	INV-01-19	125 KW STRING INVERTER	550 W MODULE	11	286	170.61	125	480	157.3	1.26
XFMR-01	INV-01-20	125 KW STRING INVERTER	550 W MODULE	10	260	155.10	125	480	143.0	1.14
XFMR-02	INV-02-01	125 KW STRING INVERTER	550 W MODULE	12	312	186.12	125	480	171.6	1.37
XFMR-02	INV-02-02	125 KW STRING INVERTER	550 W MODULE	12	312	186.12	125	480	171.6	1.37
XFMR-02	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	480	157.3	1.26
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	480	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

COMMUNICATION CABLE SCHEDULE										
Cable	From Device	Port	To Device	Port	Cable Type	Manufacturer / Part ID	Protocol	Procured By	Length (FT)	Min Conduit Size (IN)
COM-UTL-FPP1-1	Utility Fiber	--	FIBER PATCH PANEL (FPP-REC)	--	ADSS6	DFS #FLT-6-ADSS	ETHERNET	CONTRACTOR	TBD	N/A
COM-FPP1-SEC-1	FIBER PATCH PANEL (FPP-REC)	--	SECURITY GATWAY (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)	--	FIBER PATCH PANEL (FPP-SCADA)	--	LS76 SM FIBER	CORNING #006ESF-T410LDA1	SERIAL	CONTRACTOR	120	2
COM-FPP2-2829-1	FIBER PATCH PANEL (FPP-SCADA)	--	SERIAL TRANSCEIVER (SEL-2829M)	--	ST-ST SM FIBER	CORNING/EQU. #TBD	SERIAL	CONTRACTOR	6	NOTE 3
COM-2829-RTAC-1	RTAC TRANSCEIVER (SEL-2829M)	--	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)	COM16	DAS ENCLOSURE	--	TBD	TBD	TBD	CONTRACTOR	15	2
COM-DAS-WEA-1	DAS ENCLOSURE	--	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	6	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 1-4	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
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	6	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	6	NOTE 3
COM-INV18-INV17-2	INVERTER 2-18	1	INVERTER 2-17	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV19-INV18-2	INVERTER 2-19	1	INVERTER 2-18	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV20-INV19-2	INVERTER 2-20	1	INVERTER 2-19	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	6	NOTE 3
COM-INV20-MED-2	MEDIA CONVERTER (SEL-2725)	PORT 2	INVERTER 2-20	2	CAT5e	Outdoor 24AWG #TBD	ETHERNET / IP	CONTRACTOR	40	2
COM-INV20-MED-3	MEDIA CONVERTER (SEL-2725)	PORT 4	ETH SWITCH (SEL-2741)	COM 15	LC-LC MM FIBER	Outdoor 24AWG #TBD	ETHERNET	CONTRACTOR	1200	2

- NOTES:
- ALL METALLIC ENCLOSURES SHALL BE BONDED TO THE GROUND GRID.
  - AC/DC POWER SUPPLY AND CONTROL CABLES SHOULD NOT BE INCLUDED IN THE SAME CONDUIT
  - CABLE RUNS WITHIN ENCLOSURE
  - CABLE AND CONDUIT LENGTHS SHOWN ARE APPROXIMATIONS. ACTUAL LENGTHS SHALL BE DETERMINED BY CONTRACTOR.
  - SEE BID SPECIFICATION DOCUMENTS
  - DISTANCES FOR ENGINEERING PURPOSES ONLY, NOT TO BE USED FOR CONTRACTOR TAKE-OFFS

DC CONDUCTOR CALCULATIONS				
LEGEND				
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	105.7 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





MV CONDUCTOR SCHEDULE																	
MV Circuit Label	From	To	AC Voltage (V)	Max Operating Line Current (A)	Distance (ft)	Burial Scenario	Number of Conductors	Chosen Conductor Size	Equipment Ground Conductor Size (EGC)	Concentric Neutral Size	Conductor Material	Conductor Voltage Rating (V)	Insulation Type	Insulation Rating	Min. Conduit Size (1 Phase Per Conduit)	AC Voltage Drop (V)	AC Voltage 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 CONDUCTOR SCHEDULE													
MAX/AVG	FROM	TO	DC VOLTAGE (V)	DESIGN IMP (A)	DISTANCE (FT)*	PARALLEL SETS	CONDUCTOR SIZE	CONDUCTOR MATERIAL	GROUND CONDUCTOR SIZE/MATERI AL	CONDUIT SIZE	INSULATION TYPE	VOLTAGE DROP (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 CONDUCTOR SCHEDULE													
FROM	TO	# OF MODULES	DC VOLTAGE (V)	DESIGN IMP (A)	DISTANCE (FT)*	PARALLEL SETS	CONDUCTOR SIZE	CONDUCTOR MATERIAL	GROUND CONDUCTOR SIZE/MATERIAL	CONDUIT SIZE	INSULATION TYPE	VOLTAGE DROP (V)	VOLTAGE 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	INVERTER 2-5	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	INVERTER 2-7	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%

NOTES:  
\* DISTANCES FOR ENGINEERING PURPOSES ONLY, NOT TO BE USED FOR CONTRACTOR TAKE-OFFS.





Booth & Associates  
2000 Rawlwood Drive Suite 300, Raleigh NC 27607  
N.C.F. 0021



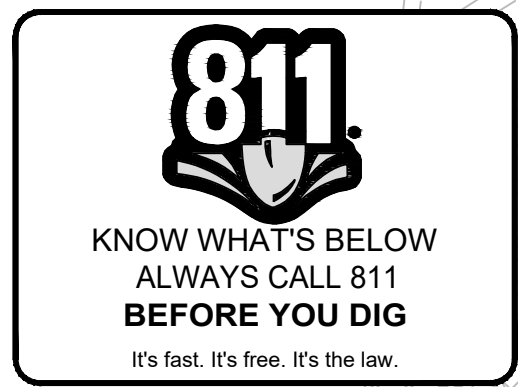
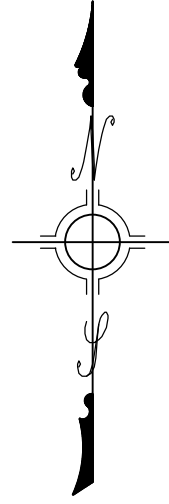
05/31/2024  
NOT FOR CONSTRUCTION

NO.	DATE	ENG.	REVISIONS
A	03/19/2023	ROM	60% SUBMITTAL
B	04/16/2024	ROM	60% REVISED PER COMMENTS
C	05/31/2024	ROM	ISSUED FOR BID - 60%

PROJECT NAME: ROCKFISH SOLAR UTILITY STATION	DRAWING TITLE: CONDUCTOR SCHEDULE
--	--------------------------------------

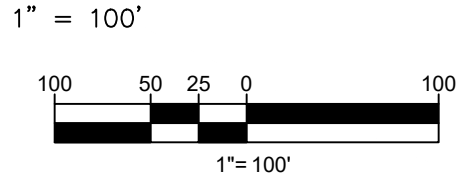
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CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	03/11/2024
SCALE:	NONE
FILE NUMBER:	12549
SHEET:	EP-104





THE LOCATION INFORMATION PROVIDED ON THIS DRAWING WERE DERIVED FROM THE APPARENT INFORMATION FOUND IN AN AUTOCAD DRAWING PROVIDED BY OTHERS. THESE LOCATIONS ARE INCLUDED ON THIS DRAWING AND ARE NOT THE RESULT OF A CERTIFIED SURVEY BY BOOTH. BY PROVIDING THE LOCATIONS, BOOTH MAKES NO CERTIFICATION ABOUT THE COORDINATE BASE UPON WHICH THEY ARE DERIVED; WHETHER STATE PLANE GRID OR PROJECT SITE SPECIFIC. IT IS THE RESPONSIBILITY OF USERS OF THIS DRAWING TO PROPERLY LOCATE AT THE PROJECT SITE THOSE ELEMENTS SHOWN WITH COORDINATES HEREON.

#### ELECTRICAL SITE PLAN



#### LEGEND:

- |  |     |                            |
|--|-----|----------------------------|
|  | OHE | OVERHEAD POWER LINE        |
|  | MV  | MEDIUM VOLTAGE TRENCH      |
|  |     | FENCE                      |
|  |     | DISTURBANCE LIMIT          |
|  |     | MODULE RACK                |
|  |     | BASIN                      |
|  |     | LAYDOWN AREA               |
|  |     | PRIMARY JUNCTION ENCLOSURE |



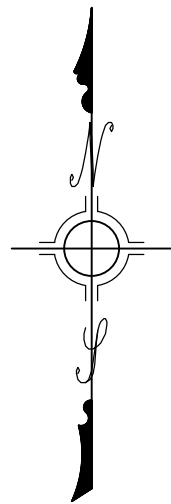
05/31/2024  
NOT FOR CONSTRUCTION

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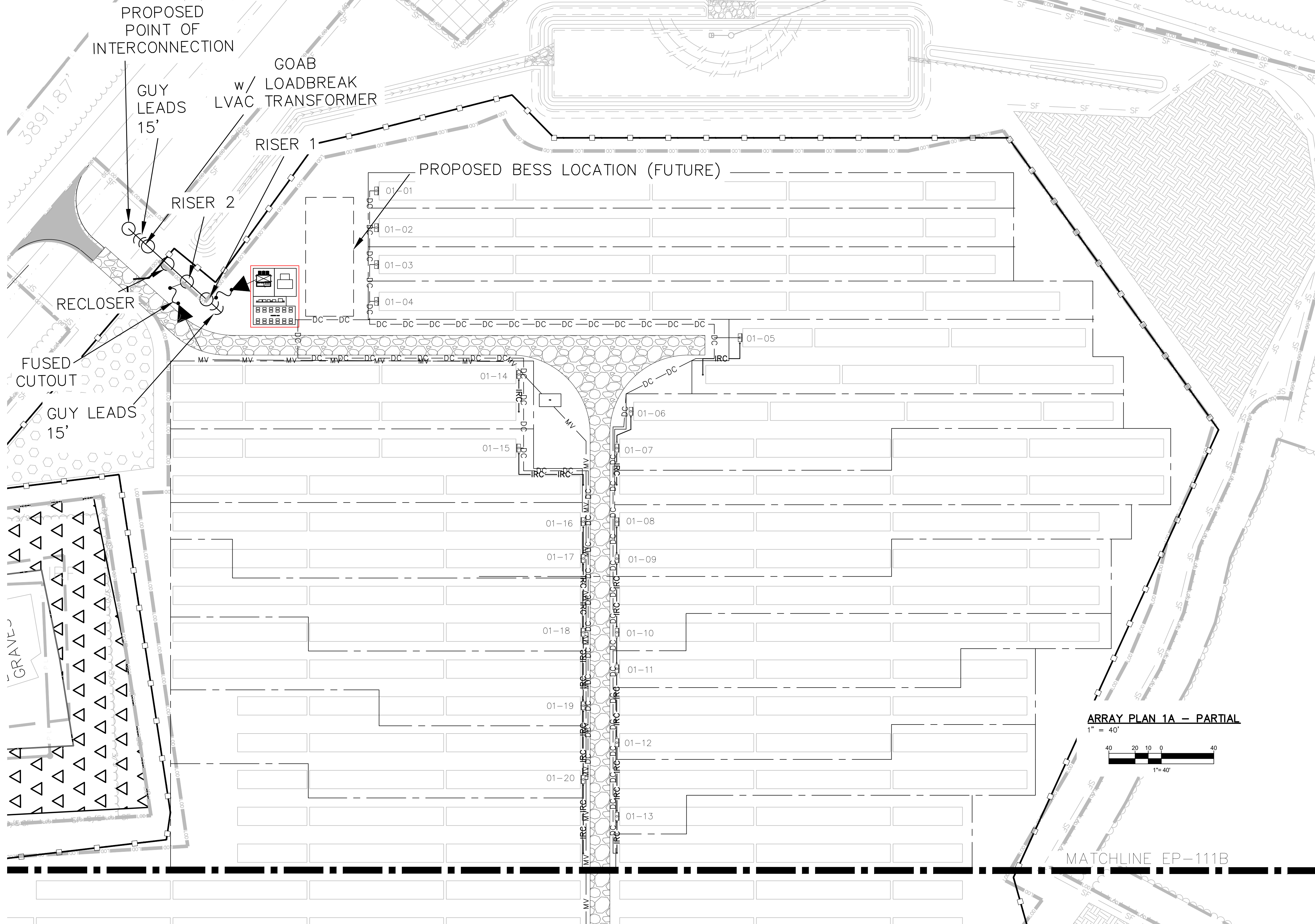
NO.	REVISIONS	DATE	ENG.
A	ISSUED FOR REVIEW - 30%	09/29/2023	RM
B	30% SUBMITTAL	12/14/2023	RM
C	60% SUBMITTAL	03/18/2023	RM
D	60% REVISED PER COMMENTS	04/16/2024	RM
E	ISSUED FOR BID - 60%	05/31/2024	RM

PROJECT NAME: ROCKFISH SOLAR UTILITY STATION	
DRAWING TITLE: ELECTRICAL SITE PLAN	
DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	07/21/2023
SCALE:	1"=100'
FILE NUMBER:	12549
SHEET:	EP-110





SECTION ID	TOTAL # OF STRINGS	SECTION ID	TOTAL # OF STRINGS	SECTION ID	TOTAL # OF STRINGS	SECTION ID	TOTAL # OF STRINGS
INV-01-01	9	INV-01-06	11	INV-01-11	11	INV-01-16	11
INV-01-02	9	INV-01-07	12	INV-01-12	9	INV-01-17	11
INV-01-03	9	INV-01-08	11	INV-01-13	9	INV-01-18	11
INV-01-04	10	INV-01-09	11	INV-01-14	10	INV-01-19	11
INV-01-05	11	INV-01-10	11	INV-01-15	11	INV-01-20	11



LEGEND:	
—DC—DC—DC—	DC TRENCH
—IRC—IRC—IRC—	INTER-ROW CONDUIT TRENCH (NOTE 1)
—MV—MV—	MEDIUM VOLTAGE TRENCH (NOTE 1)
—FENCE—	FENCE
—LOD—LOD—LOD—	DISTURBANCE LIMIT
	DC COMBINER BOX
	MODULE
	BASIN
	LAYDOWN AREA
	PRIMARY JUNCTION ENCLOSURE

NOTES:  
1. SEE DWG. EP-104 FOR MINIMUM CONDUIT SIZE.



KNOW WHAT'S BELOW  
ALWAYS CALL 811  
BEFORE YOU DIG  
It's fast. It's free. It's the law.



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NCE-0221



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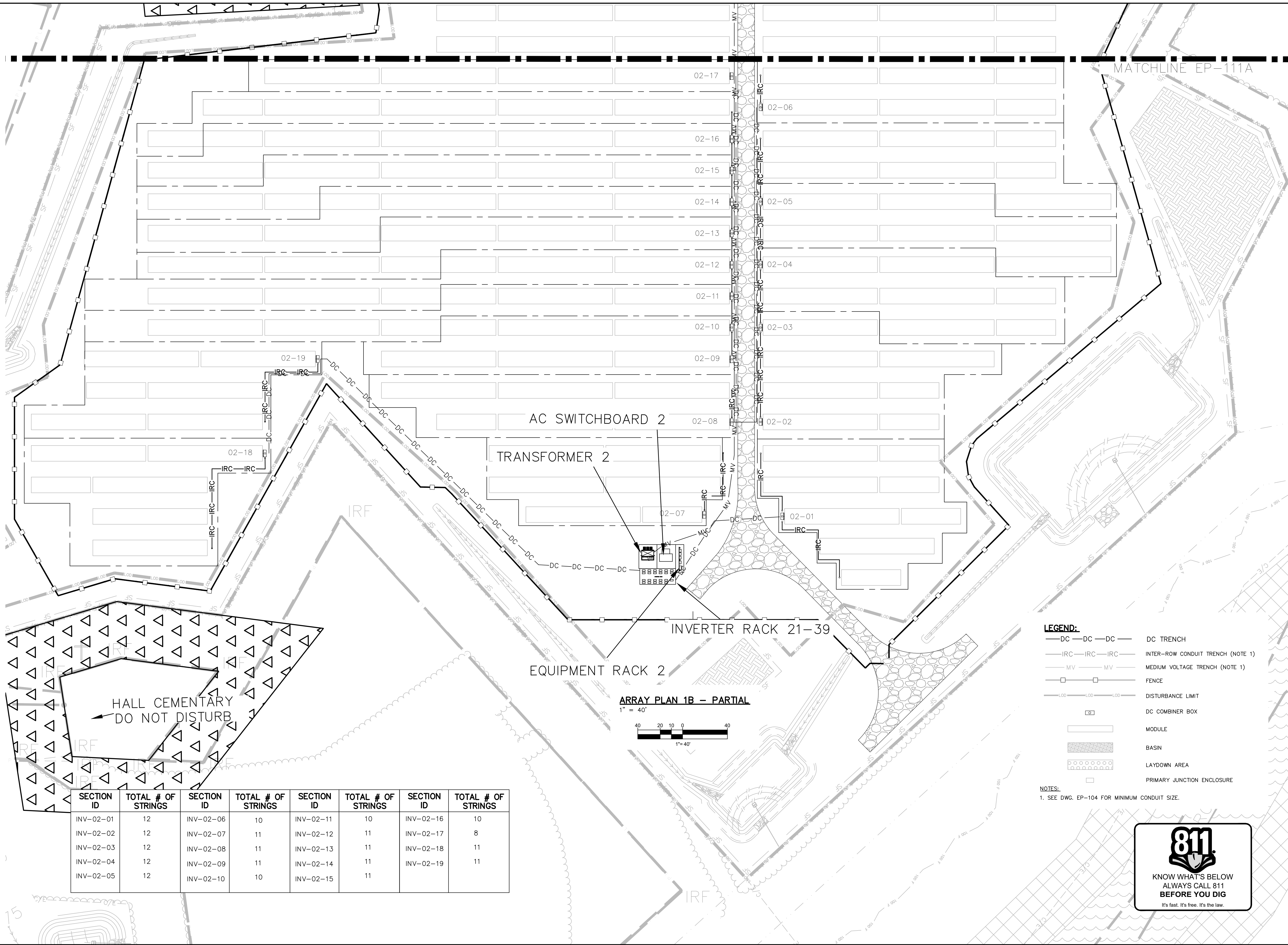
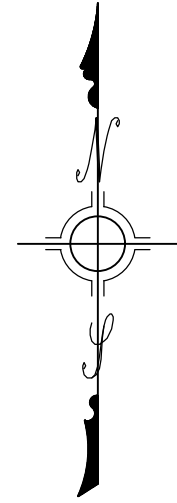
NO.	DATE	ENG.	REVISIONS
A	03/18/2023	RM	60% SUBMITTAL
B	04/16/2024	RM	60% REVISED PER COMMENTS
C	05/31/2024	RM	ISSUED FOR BID - 60%

PROJECT NAME:	ROCKFISH SOLAR UTILITY STATION
DRAWING TITLE:	ARRAY PLAN 1A - PARTIAL

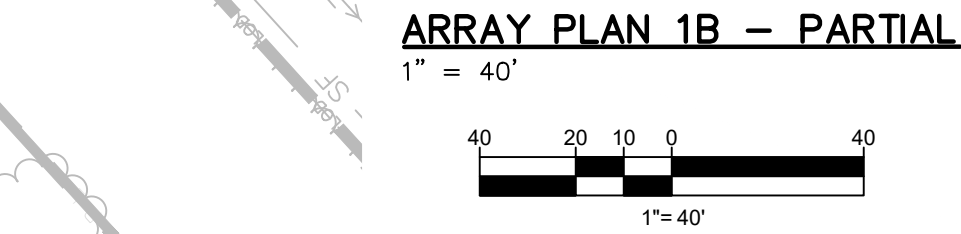
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CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	03/11/2024
SCALE:	1"=40'
FILE NUMBER:	12549
SHEET:	

EP-111A





SECTION ID	TOTAL # OF STRINGS	SECTION ID	TOTAL # OF STRINGS	SECTION ID	TOTAL # OF STRINGS	SECTION ID	TOTAL # OF STRINGS
INV-02-01	12	INV-02-06	10	INV-02-11	10	INV-02-16	10
INV-02-02	12	INV-02-07	11	INV-02-12	11	INV-02-17	8
INV-02-03	12	INV-02-08	11	INV-02-13	11	INV-02-18	11
INV-02-04	12	INV-02-09	11	INV-02-14	11	INV-02-19	11
INV-02-05	12	INV-02-10	10	INV-02-15	11		



- LEGEND:**
- DC—DC—DC— DC TRENCH
  - IRC—IRC—IRC— INTER-ROW CONDUIT TRENCH (NOTE 1)
  - MV—MV— MEDIUM VOLTAGE TRENCH (NOTE 1)
  - FENCE
  - LOD—LOD—LOD— DISTURBANCE LIMIT
  - [Symbol] DC COMBINER BOX
  - [Symbol] MODULE
  - [Symbol] BASIN
  - [Symbol] LAYDOWN AREA
  - [Symbol] PRIMARY JUNCTION ENCLOSURE

**NOTES:**  
1. SEE DWG. EP-104 FOR MINIMUM CONDUIT SIZE.

KNOW WHAT'S BELOW  
ALWAYS CALL 811  
BEFORE YOU DIG  
It's fast. It's free. It's the law.

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NC F-021

05/31/2024  
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NO.	DATE	ENG.	REVISIONS
A	03/18/2023	RM	60% SUBMITTAL
B	04/16/2024	RM	60% REVISED PER COMMENTS
C	05/31/2024	RM	ISSUED FOR BID - 60%

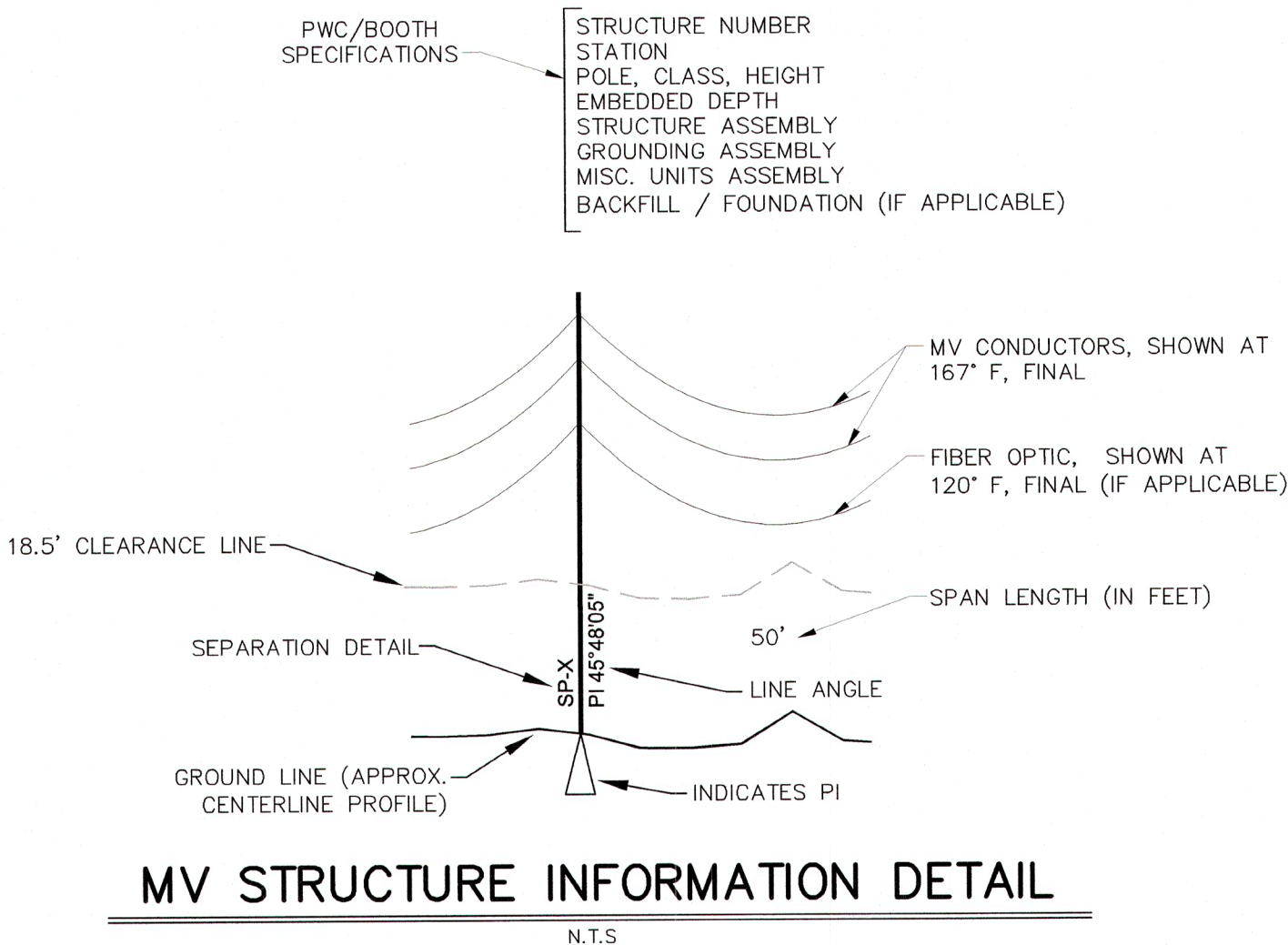
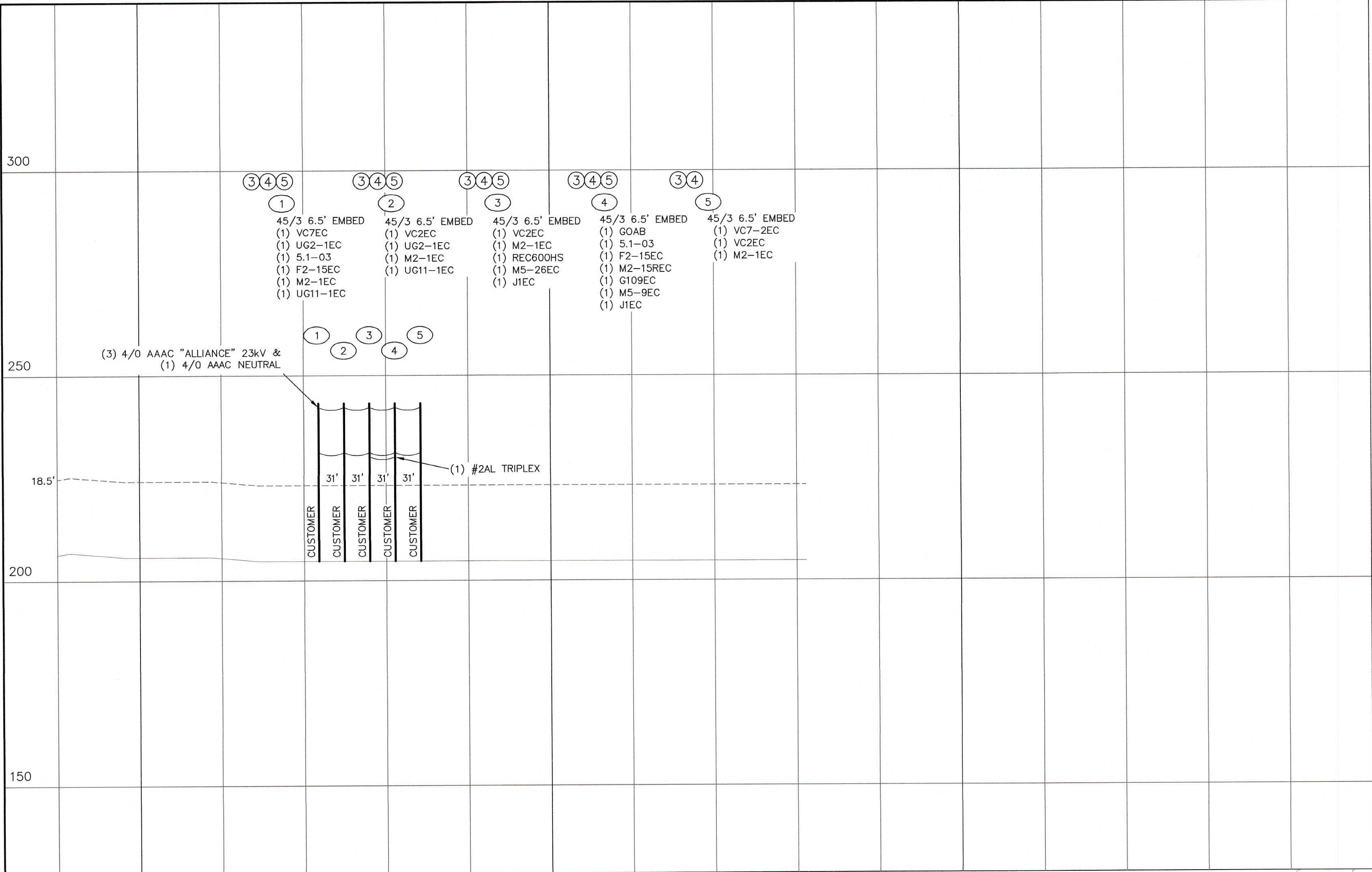
PROJECT NAME:  
ROCKFISH SOLAR  
UTILITY STATION

DRAWING TITLE:  
ARRAY PLAN 1B - PARTIAL

DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	03/11/2024
SCALE:	1"=40'
FILE NUMBER:	12549
SHEET:	

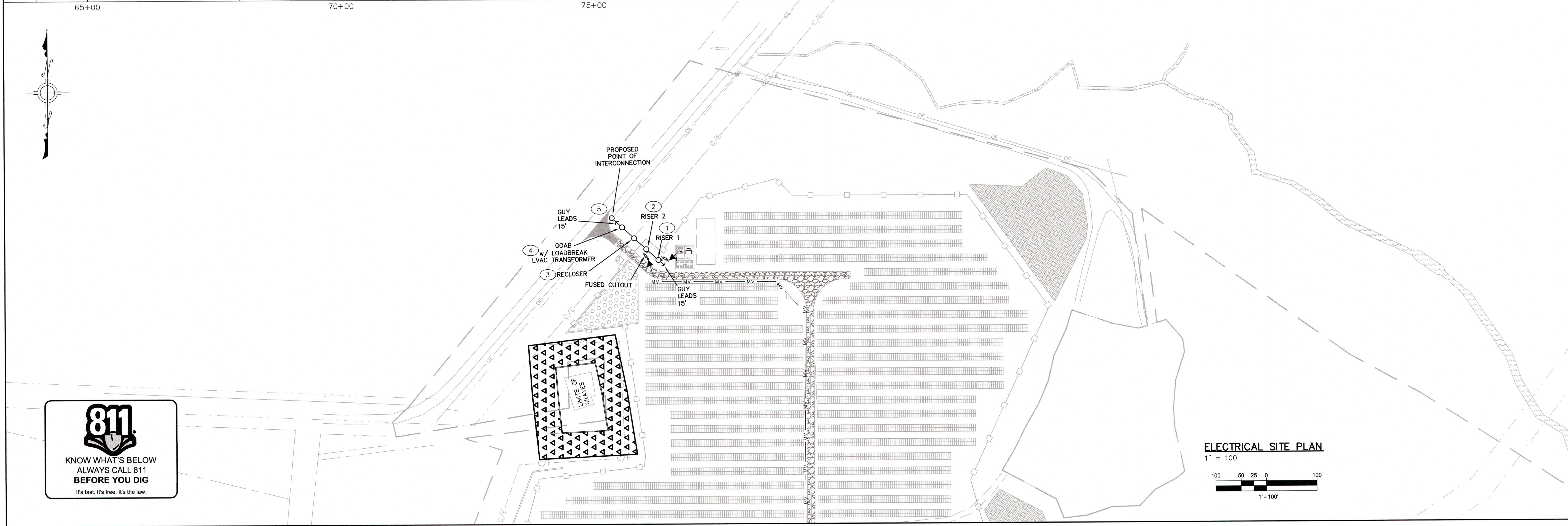
EP-111B





- LEGEND**
- CUSTOMER OWNED POLE
  - ⊗ EXISTING POLE
  - ① POLE NUMBER
  - ⚡ SWITCH
  - ⚡ GANG OPERATED SWITCH
  - ⚡ FUSED CUTOUT
  - ⬆ CABLE TERMINATION
  - △ OVERHEAD TRANSFORMER

- NOTES**
- UNLESS OTHERWISE NOTED, COMPLY WITH THE LATEST VERSION OF FAYETTEVILLE PWC APPROVED ELECTRICITIES STRUCTURES SPECIFICATIONS.
  - COMPLY WITH ALL APPLICABLE OWNER SPECIFICATIONS AND UTILITY INTERCONNECTION GUIDELINES.
  - FRAME POLES SIMILAR TO FAYETTEVILLE PWC ASSEMBLY DRAWINGS LISTED.
  - SEE EP-153 FOR INITIAL STRINGING SAG CHARTS.
  - NEW POLES SHALL BE SOUTHERN YELLOW PINE WOOD UNLESS NOTED OTHERWISE.



**PA Booth & Associates**  
2000 Newwood Drive Suite 300 Raleigh NC 27607  
NC F-021

NO.	DATE	REVISIONS
A	05/31/2024	ISSUED FOR BID

PROJECT NAME: **ROCKFISH SOLAR UTILITY STATION**

DRAWING TITLE: **DISTRIBUTION OVERHEAD PLAN & PROFILE**

DRAWN BY:	BLP
CHECKED BY:	MDT
APPROVED BY:	BJM
DATE:	03/11/2024
SCALE:	1"=100'
FILE NUMBER:	12549
SHEET:	EP-150



LOADING DISTRICT	:	MEDIUM	
CONDUCTOR DESCRIPTION	:	40 AAAC "Alliance"	
ULTIMATE STRENGTH	:	8560	LBS.
DESIGN TENSION	:	1000	LBS.
PERCENT OF ULTIMATE	:	1168%	
RULING SPAN	:	31	FT.

[illegible]

Booth &amp; Associates, Inc.

LOADING DISTRICT	:	MEDIUM	
CONDUCTOR DESCRIPTION	:	40 AAAC "Alliance"	
ULTIMATE STRENGTH	:	8560	LBS.
DESIGN TENSION	:	95	LBS.
PERCENT OF ULTIMATE	:	1.11%	
RULING SPAN	:	31	FT.

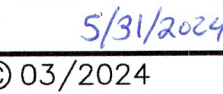
SPAN (FT.)	TEMPERATURE (DEGREES F)							
	20	32	40	50	60	70	80	90
10	1	1	1	1	1	1	1	1
20	5	5	5	5	5	6	6	6
30	11	12	12	12	12	13	13	13
40	20	21	21	22	22	22	23	23
TENSION (lbs.)	27	27	26	26	25	25	24	24

Booth &amp; Associates, Inc.

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.

SPAN (FT.)	TEMPERATURE (DEGREES F)							
	20	32	40	50	60	70	80	90
10	0	0	0	0	0	0	0	0
20	0	0	0	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

Booth &amp; Associates, Inc.

[illegible]

PROJECT NUMBER  
ROCKFISH SOLAR  
UTILITY STATION

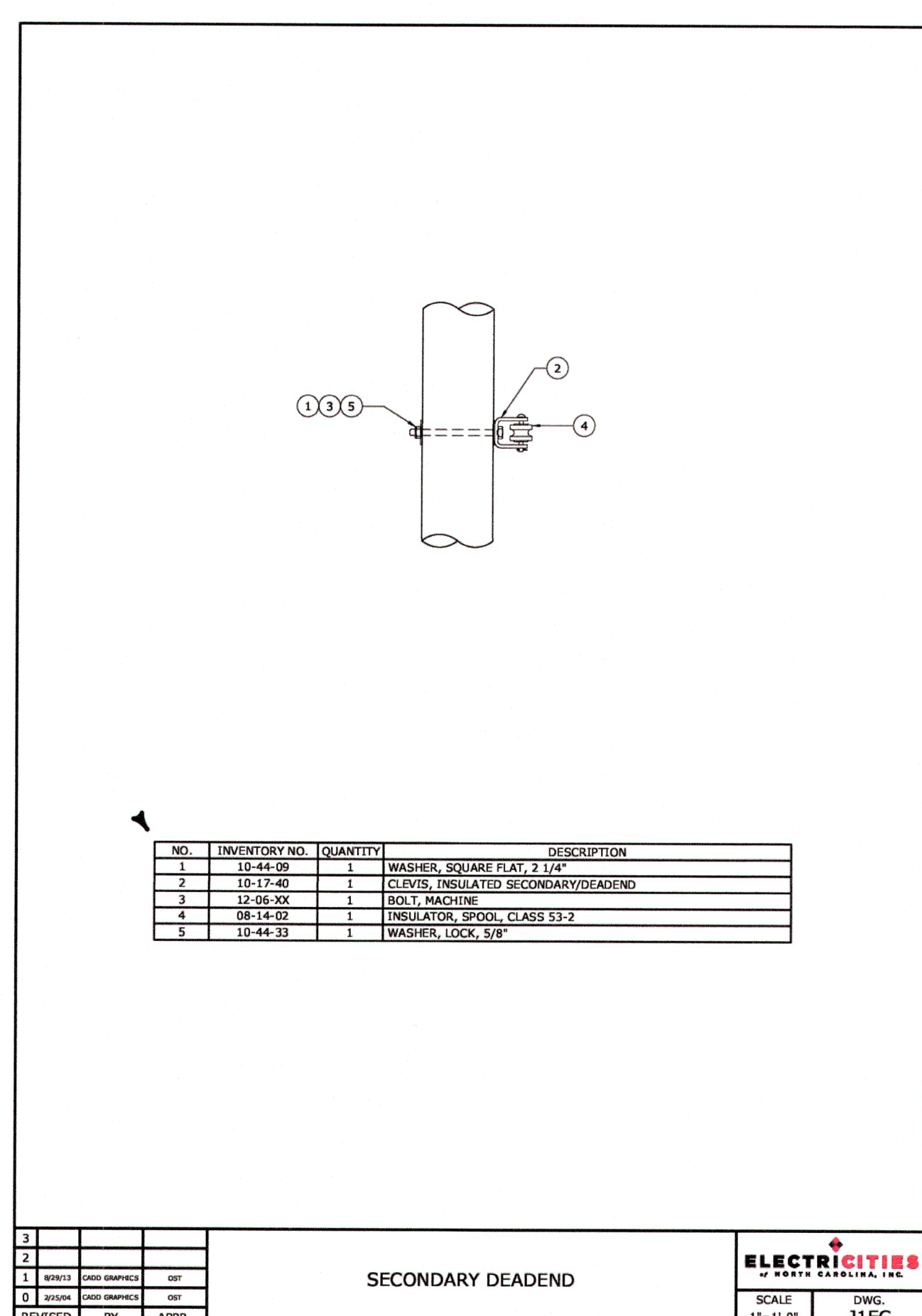
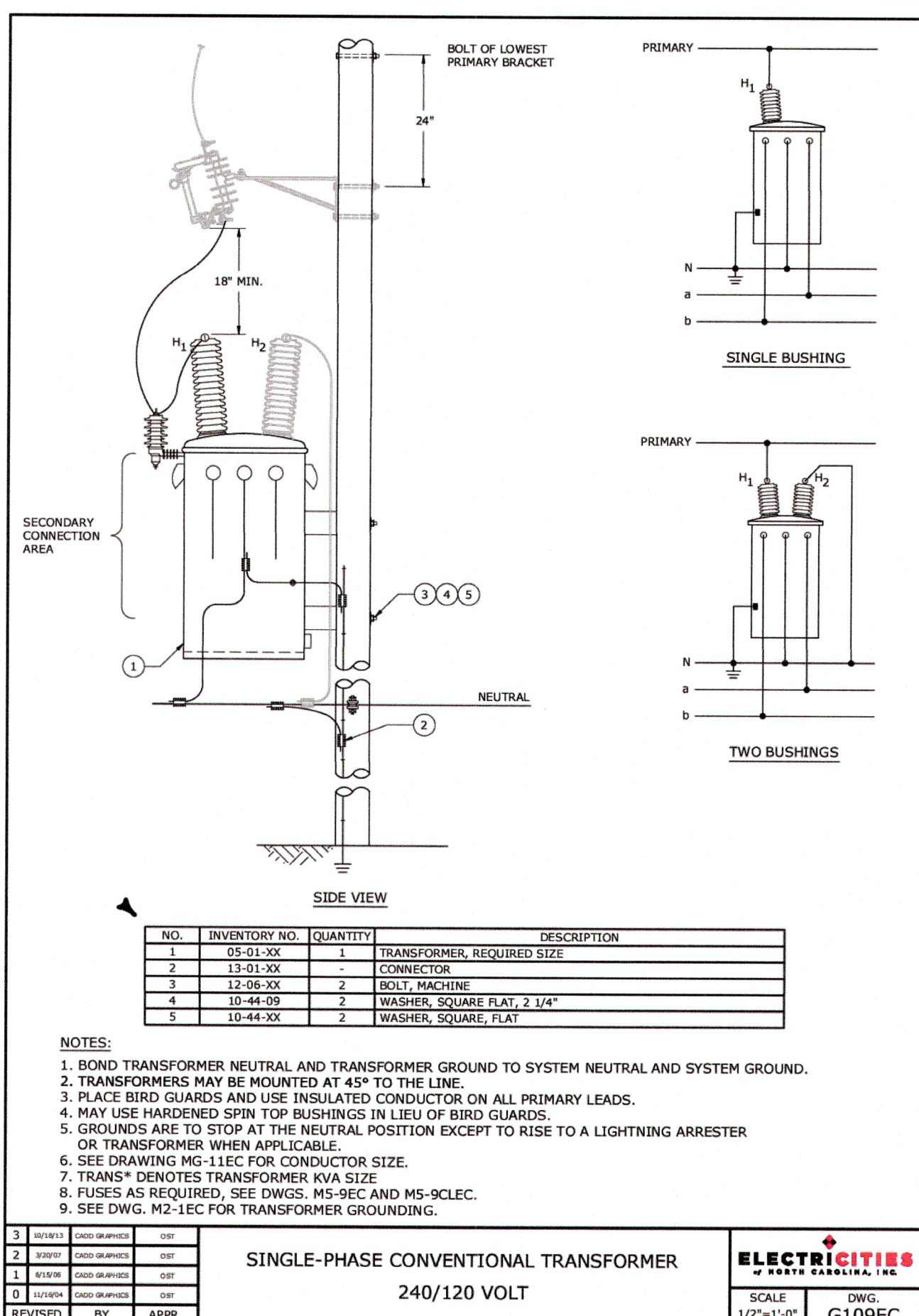
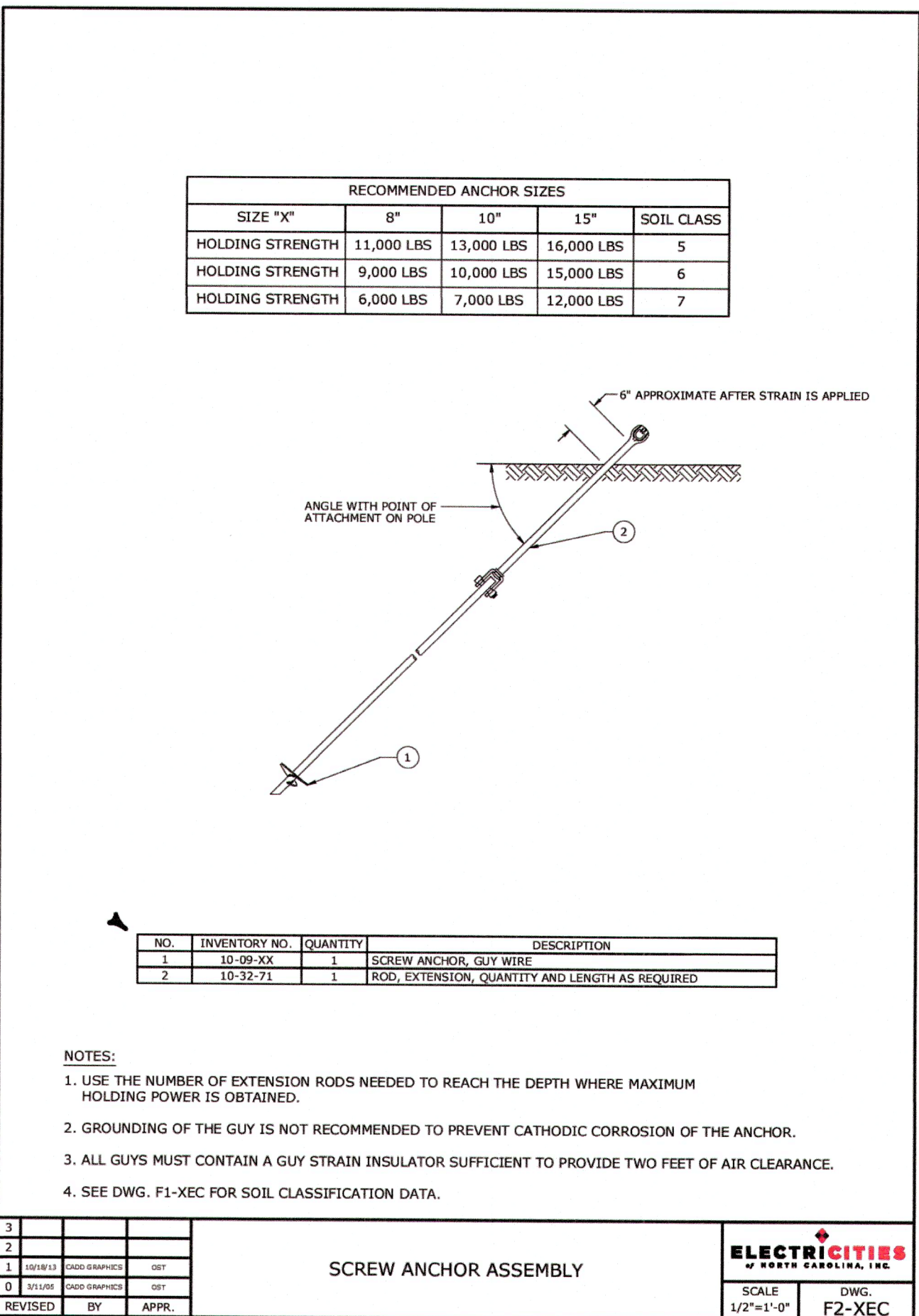
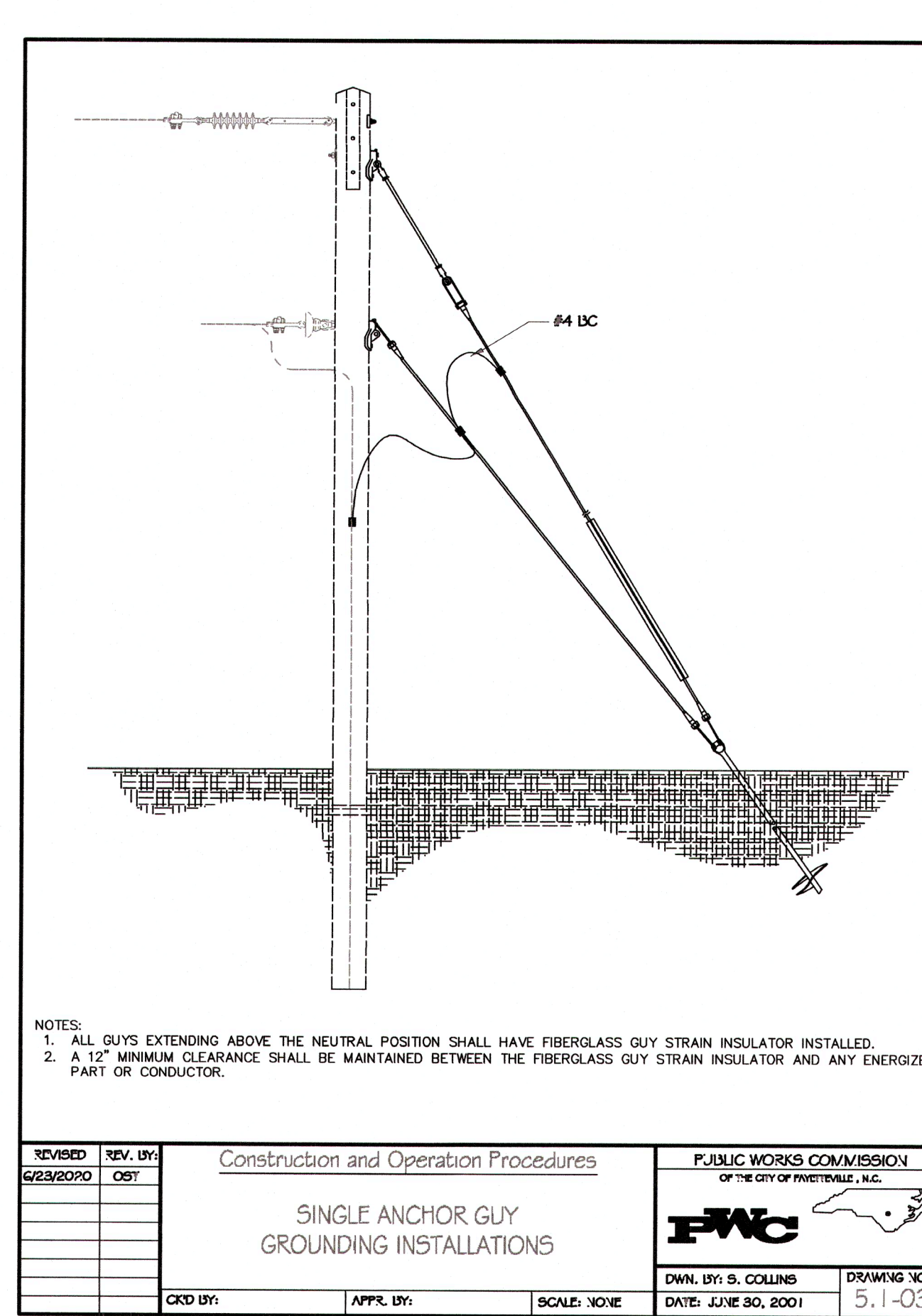
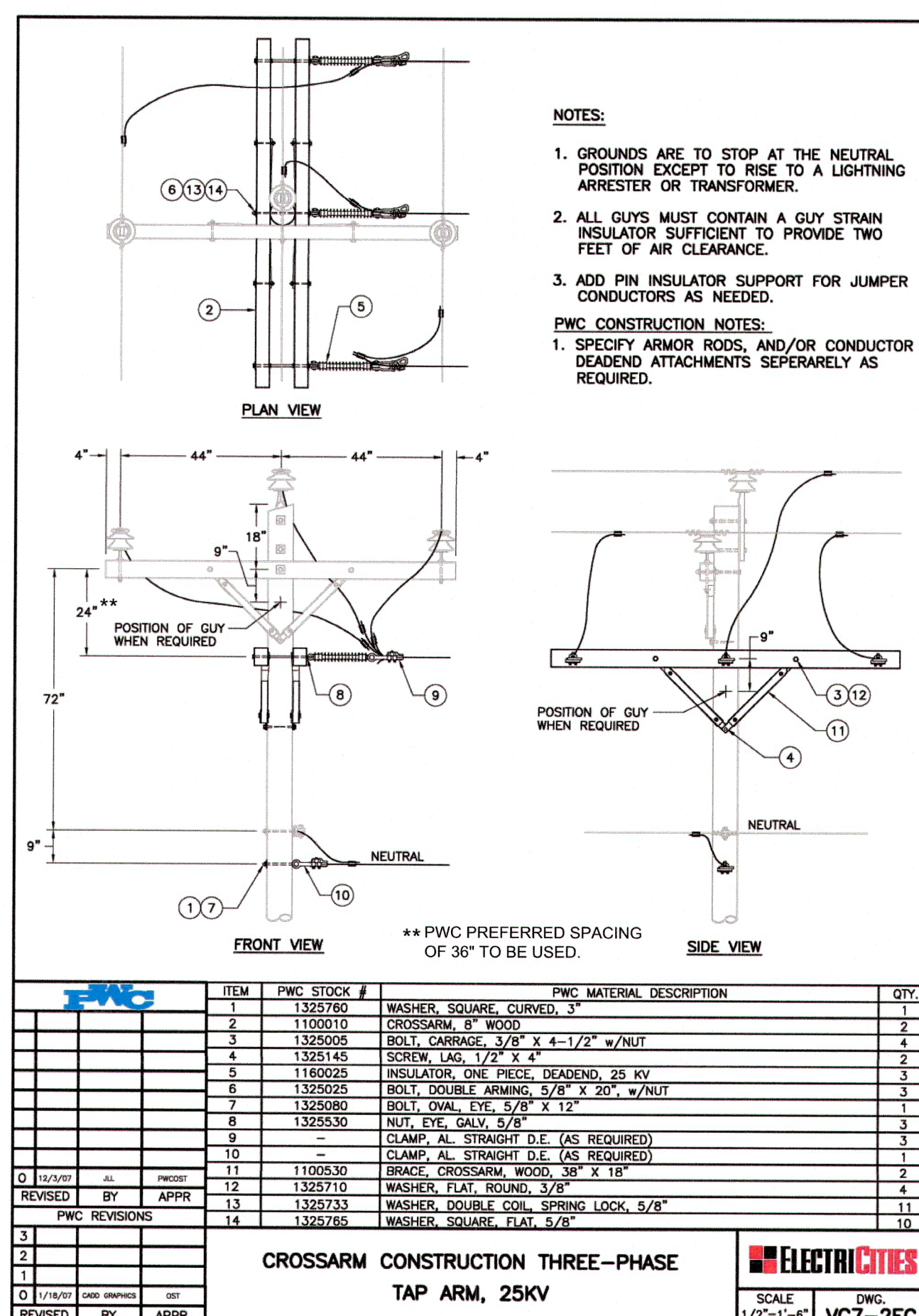
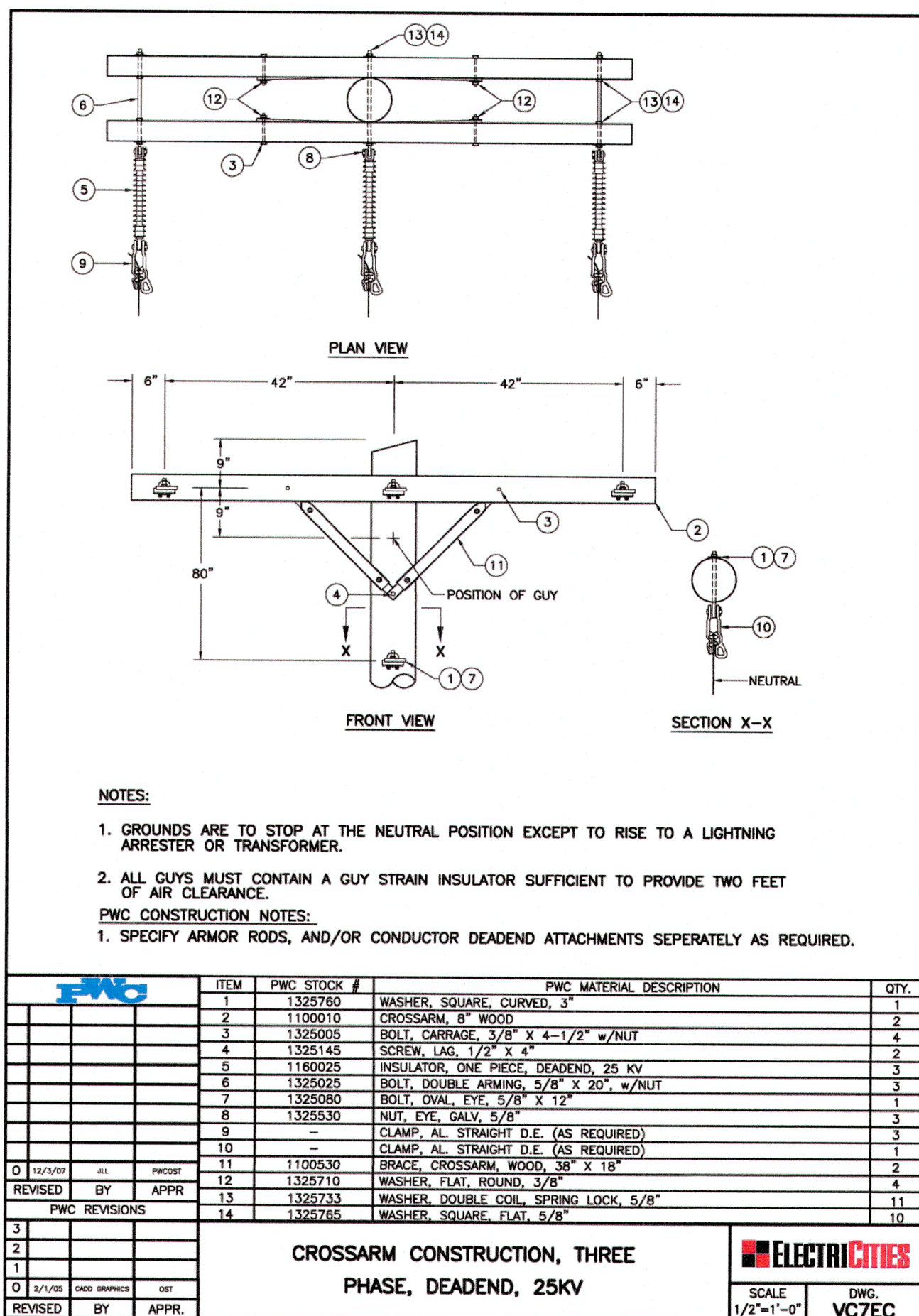
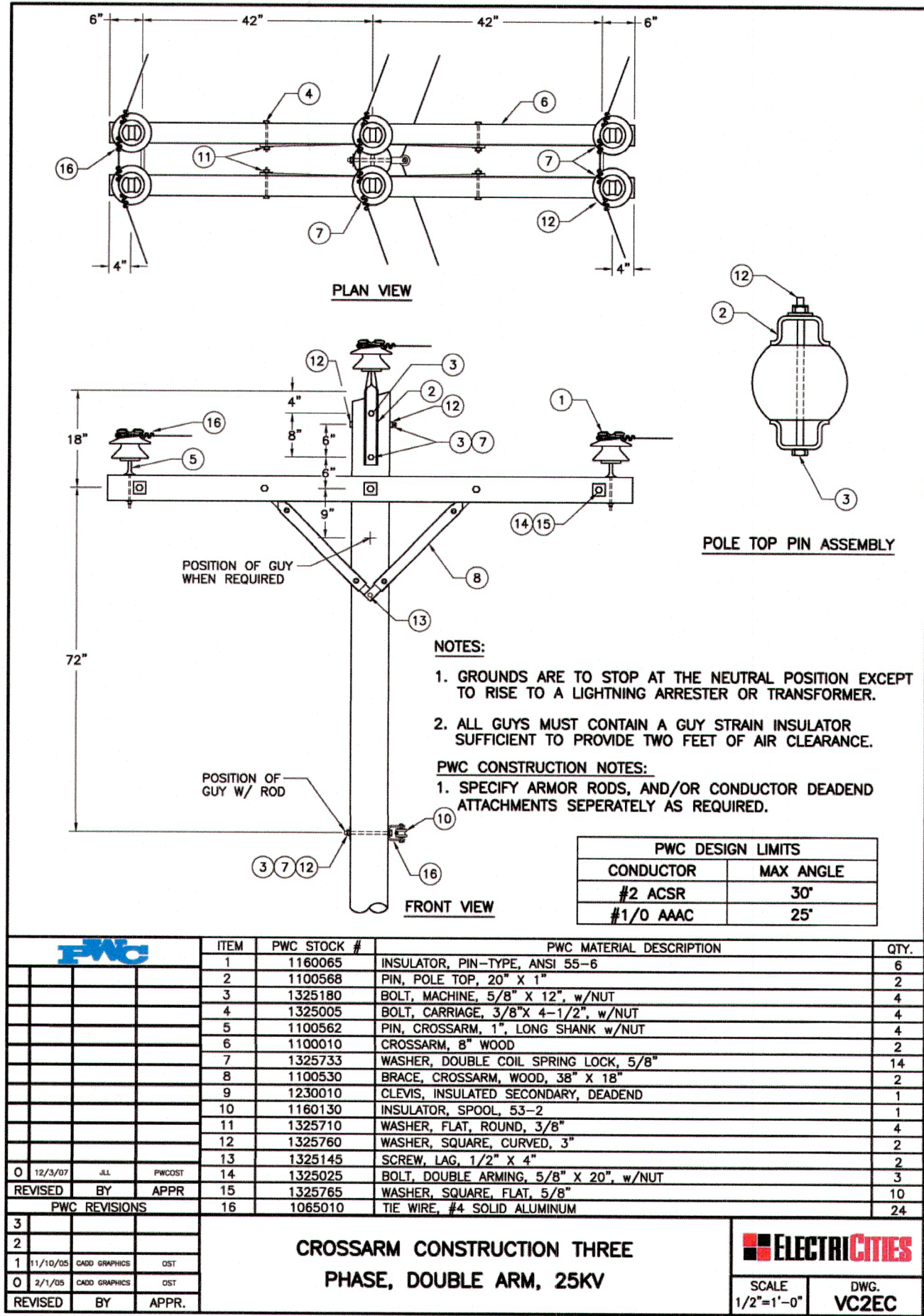
# DISTRIBUTION OVERHEAD SAG TABLES

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CHECKED BY:	MDT
APPROVED BY:	BJM
DATE:	03/11/20
SCALE:	NONE
FILE NUMBER:	12549
SHEET:	

SHEET: \_\_\_\_\_

EP-153





**Booth & Associates**

2500 REMONDOS DRIVE, SUITE 300, RALEIGH, NC 27607

NC 7-0221

**PROFESSIONAL ENGINEER**

SEAL 052969

5/31/2024

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PROJECT NAME: **ROCKFISH SOLAR UTILITY STATION**

DRAWING TITLE: **DISTRIBUTION OVERHEAD DETAILS**

DRAWN BY: BLP

CHECKED BY: MDT

APPROVED BY: BJM

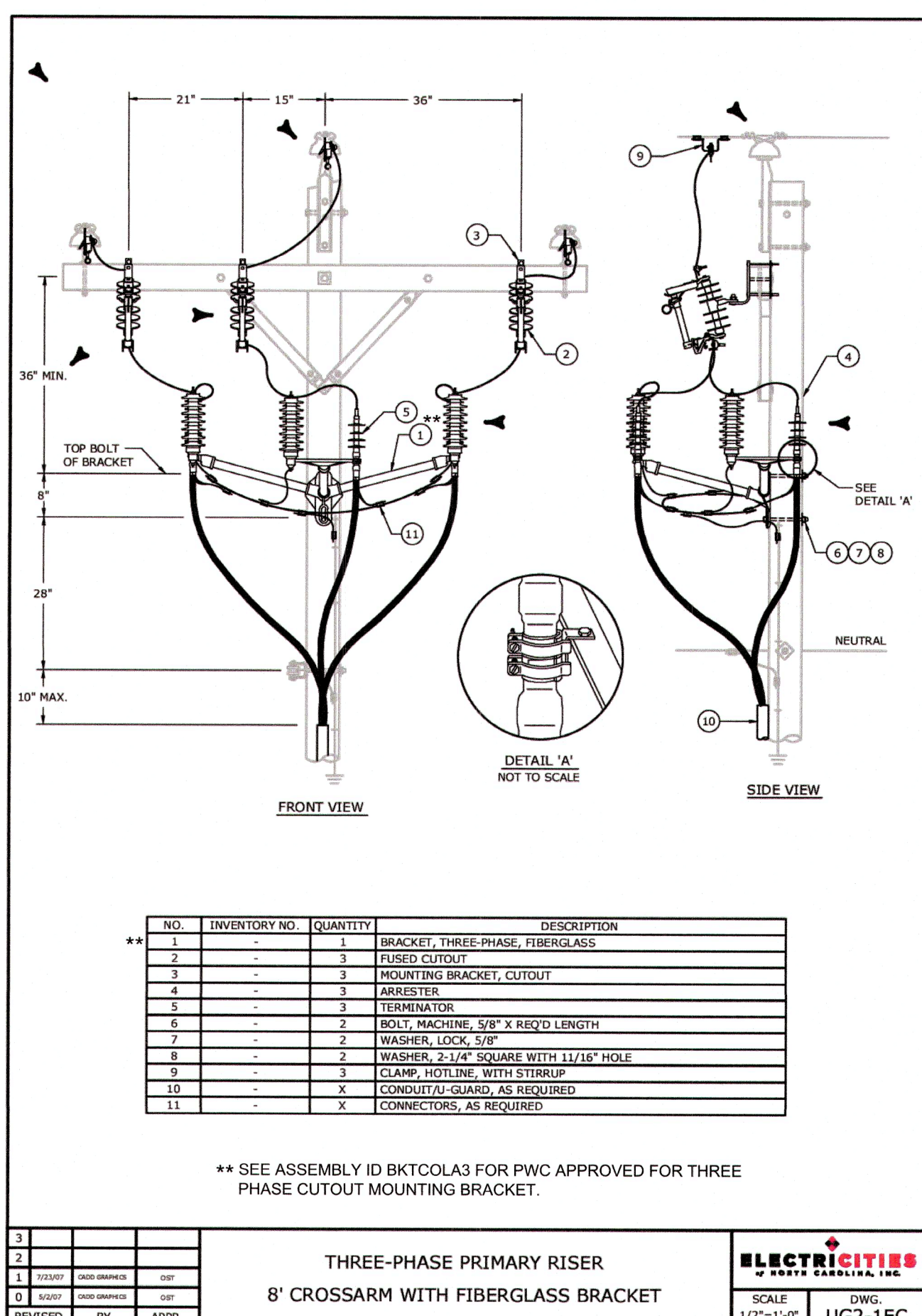
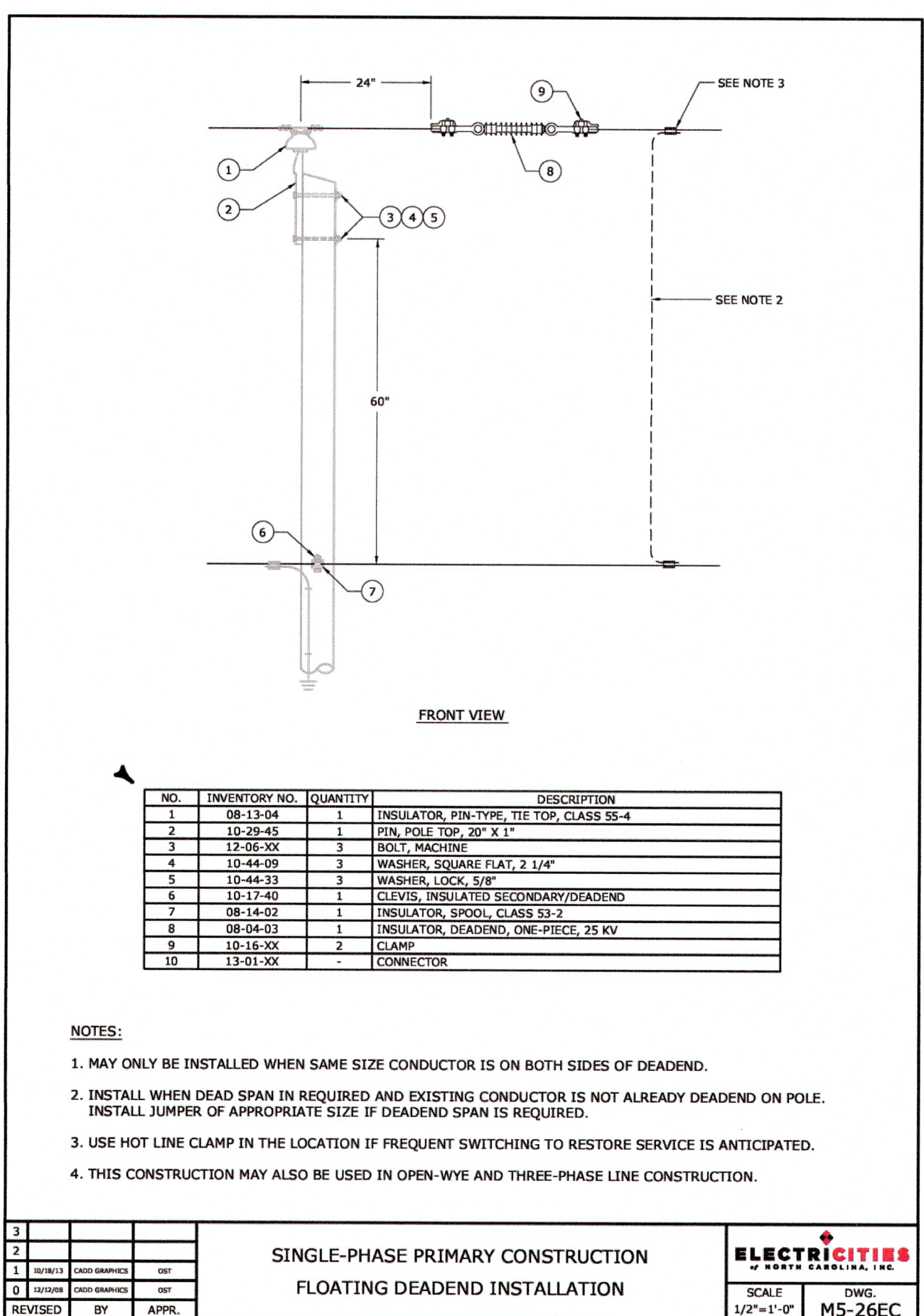
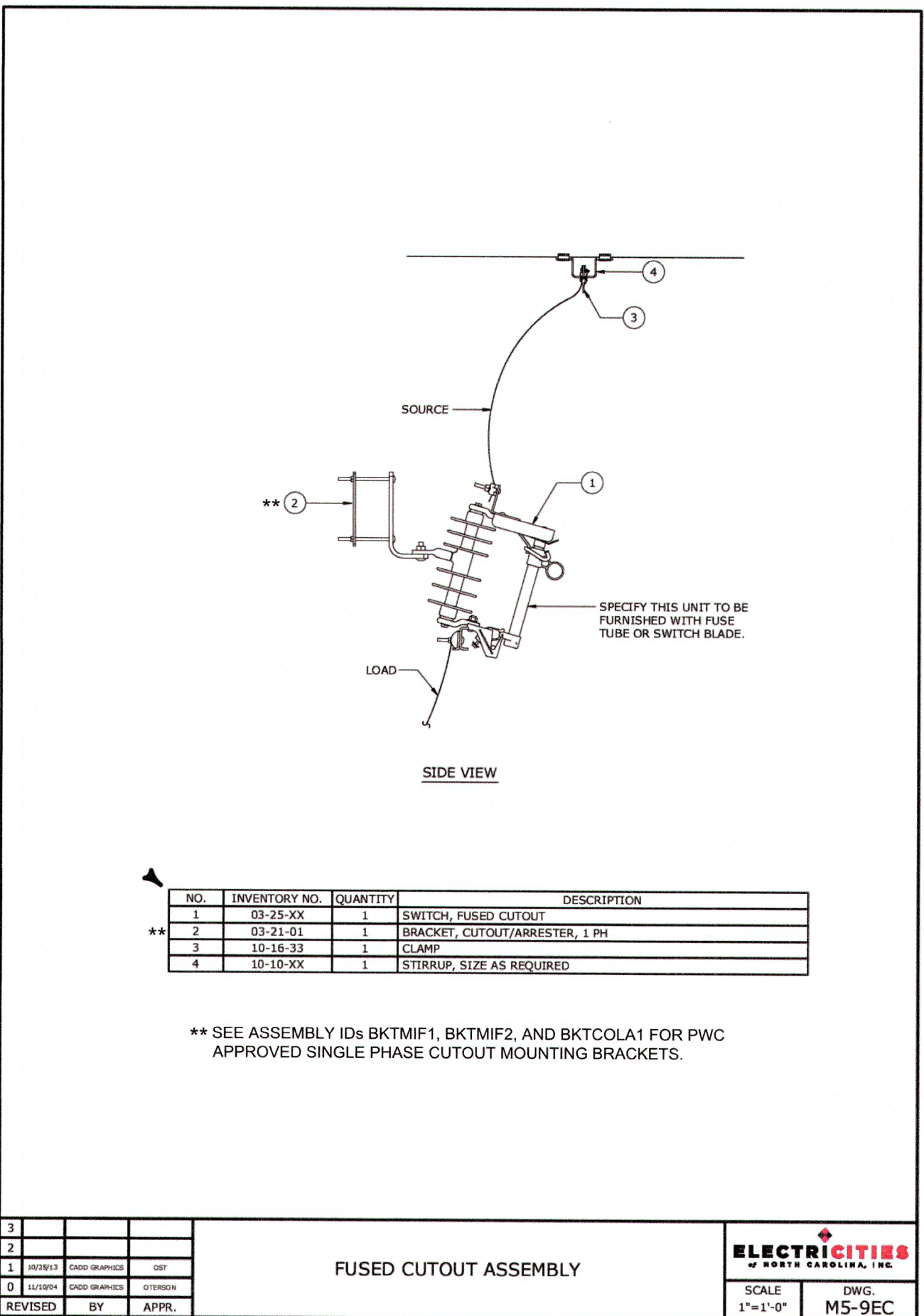
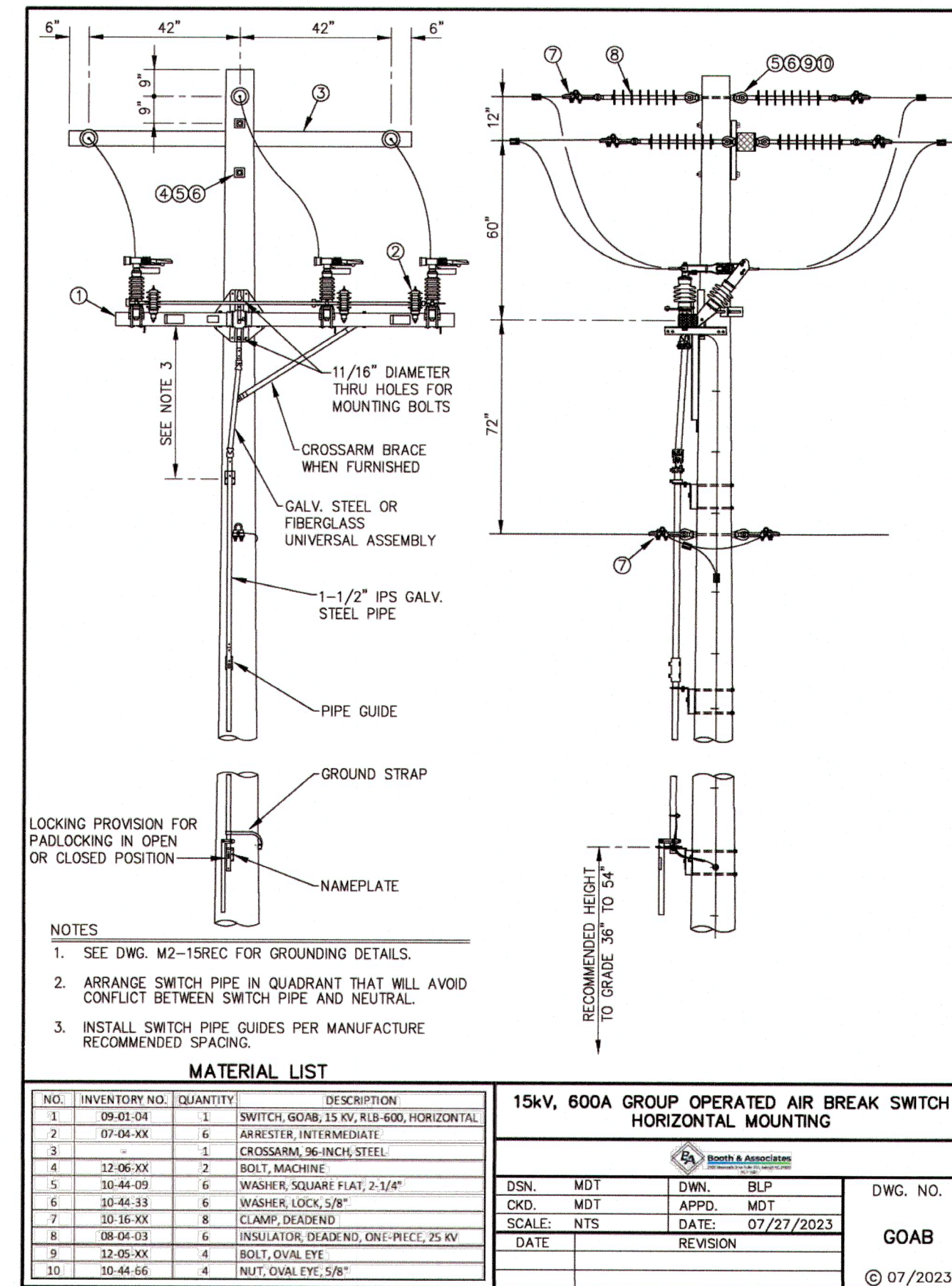
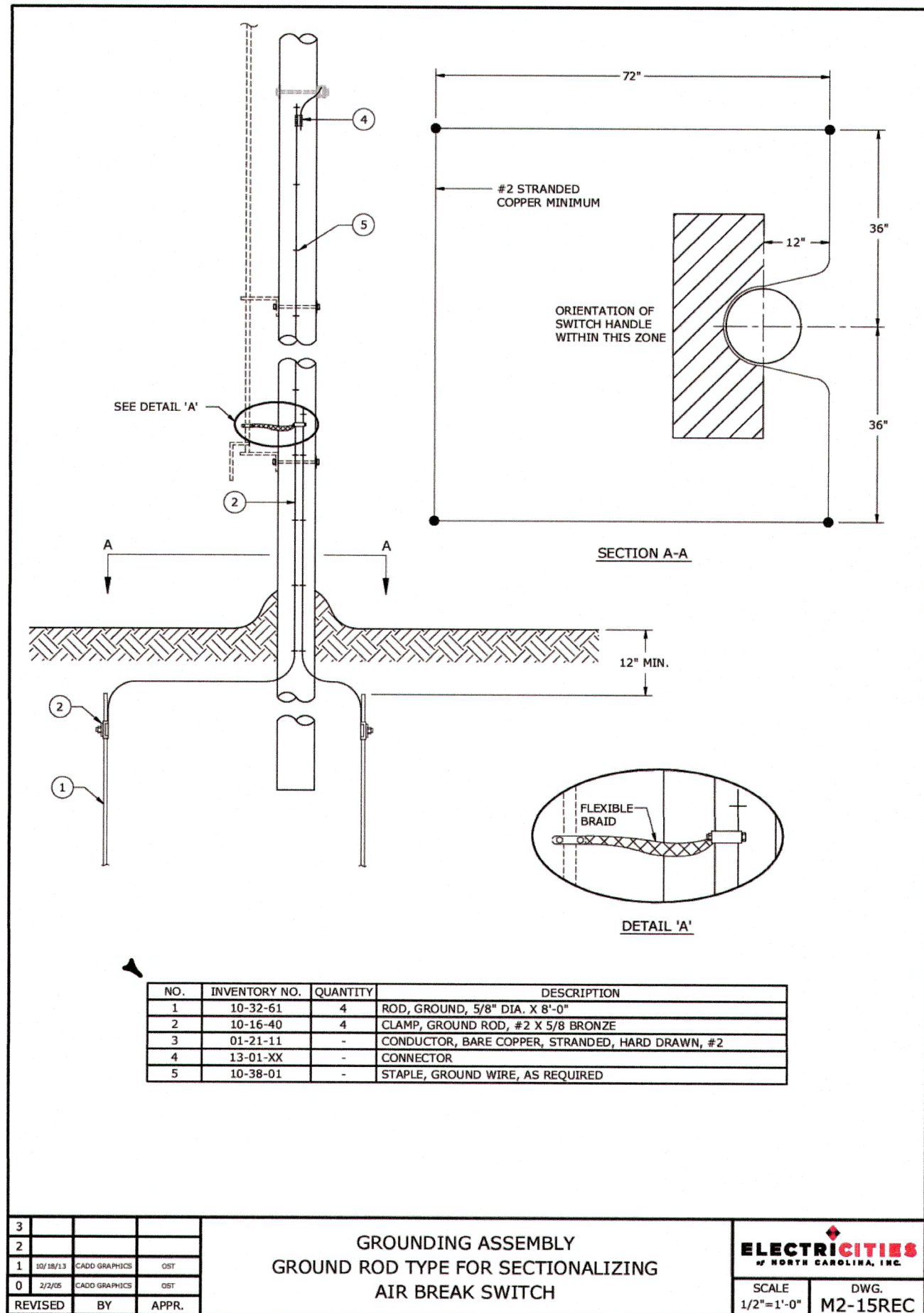
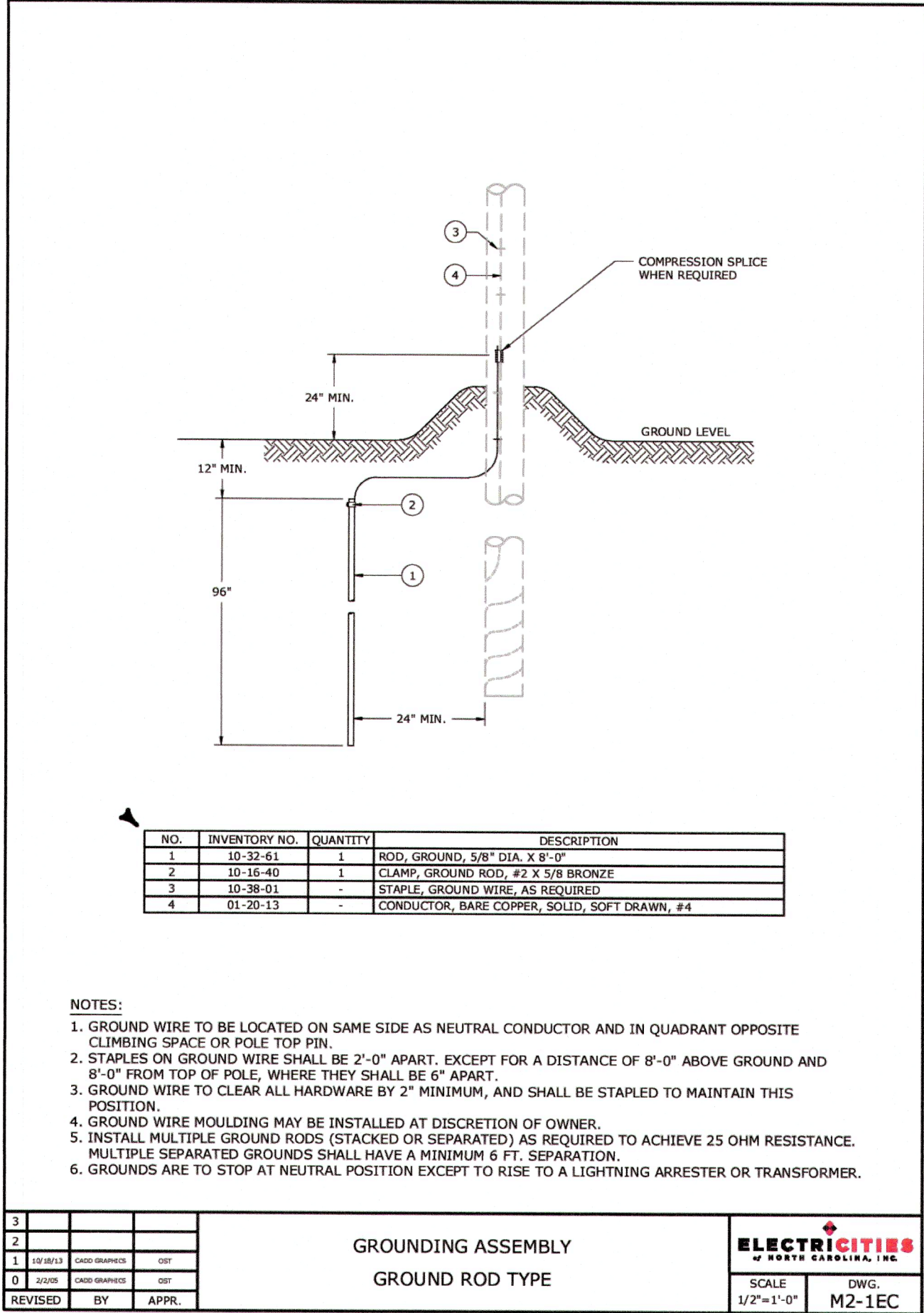
DATE: 03/11/2024

SCALE: NONE

FILE NUMBER: 12549


SHEET: EP-154

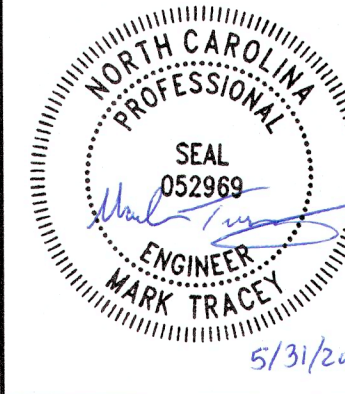
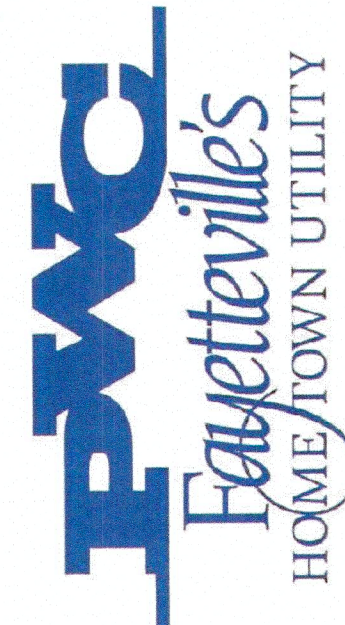
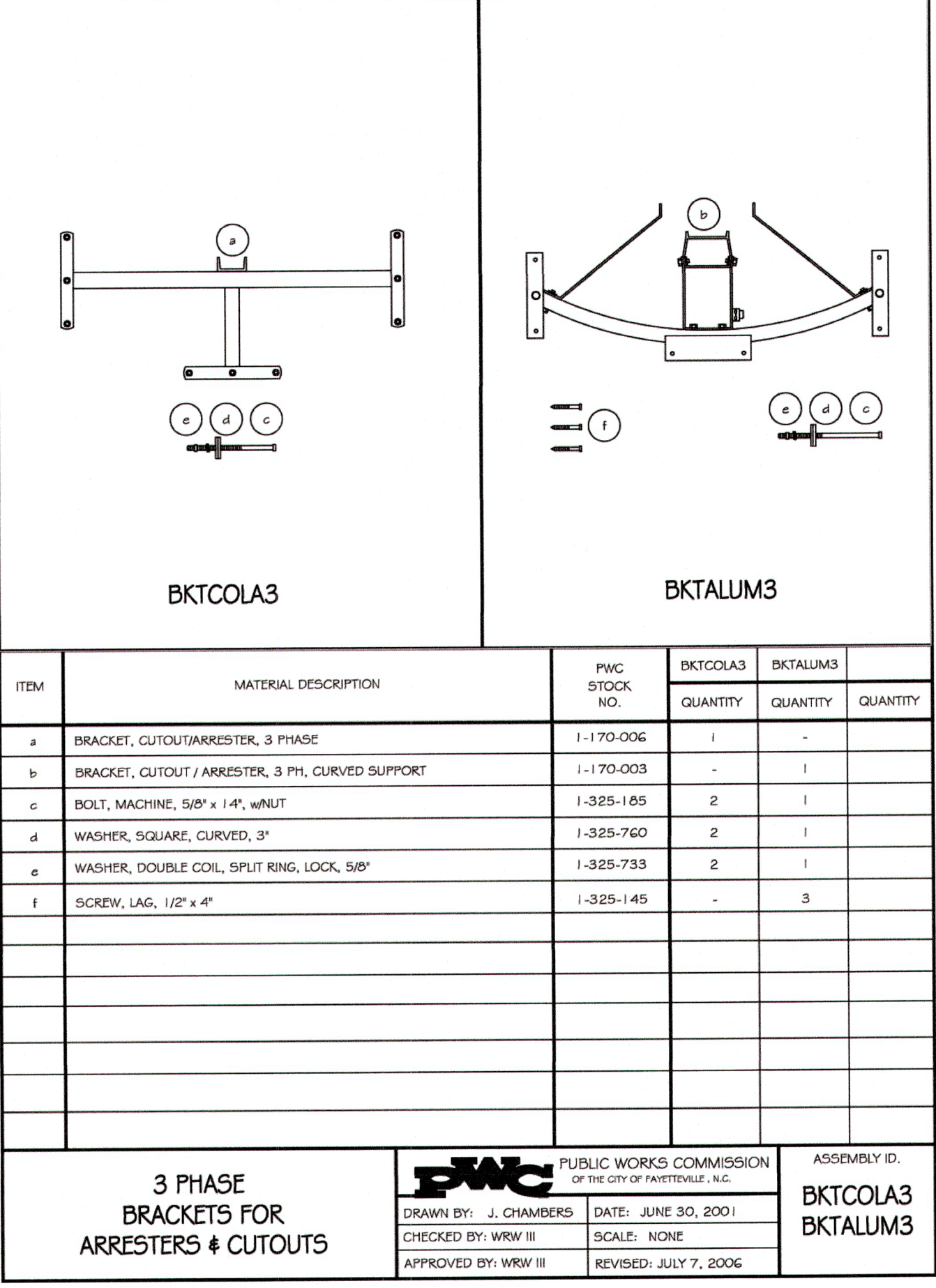
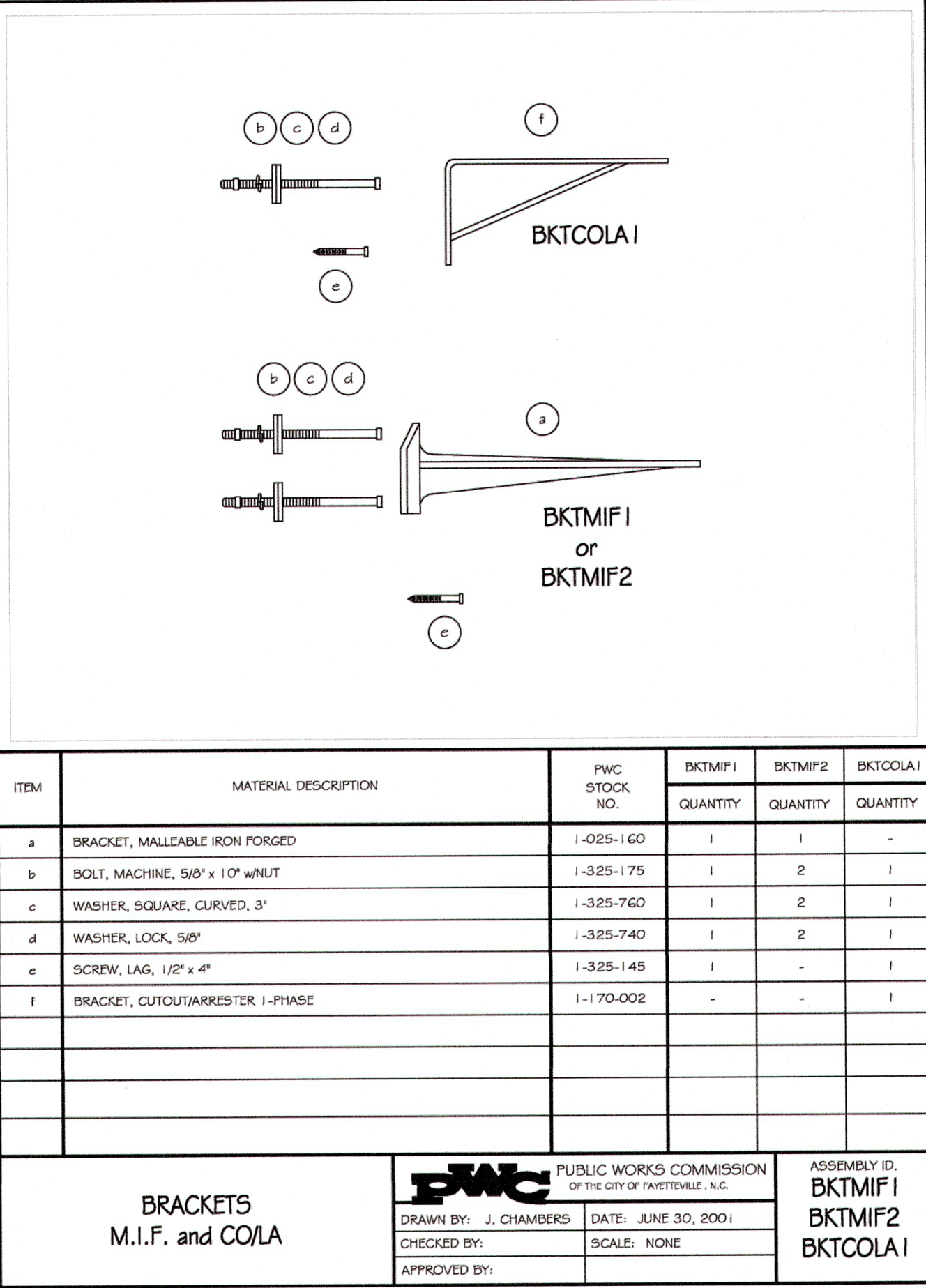
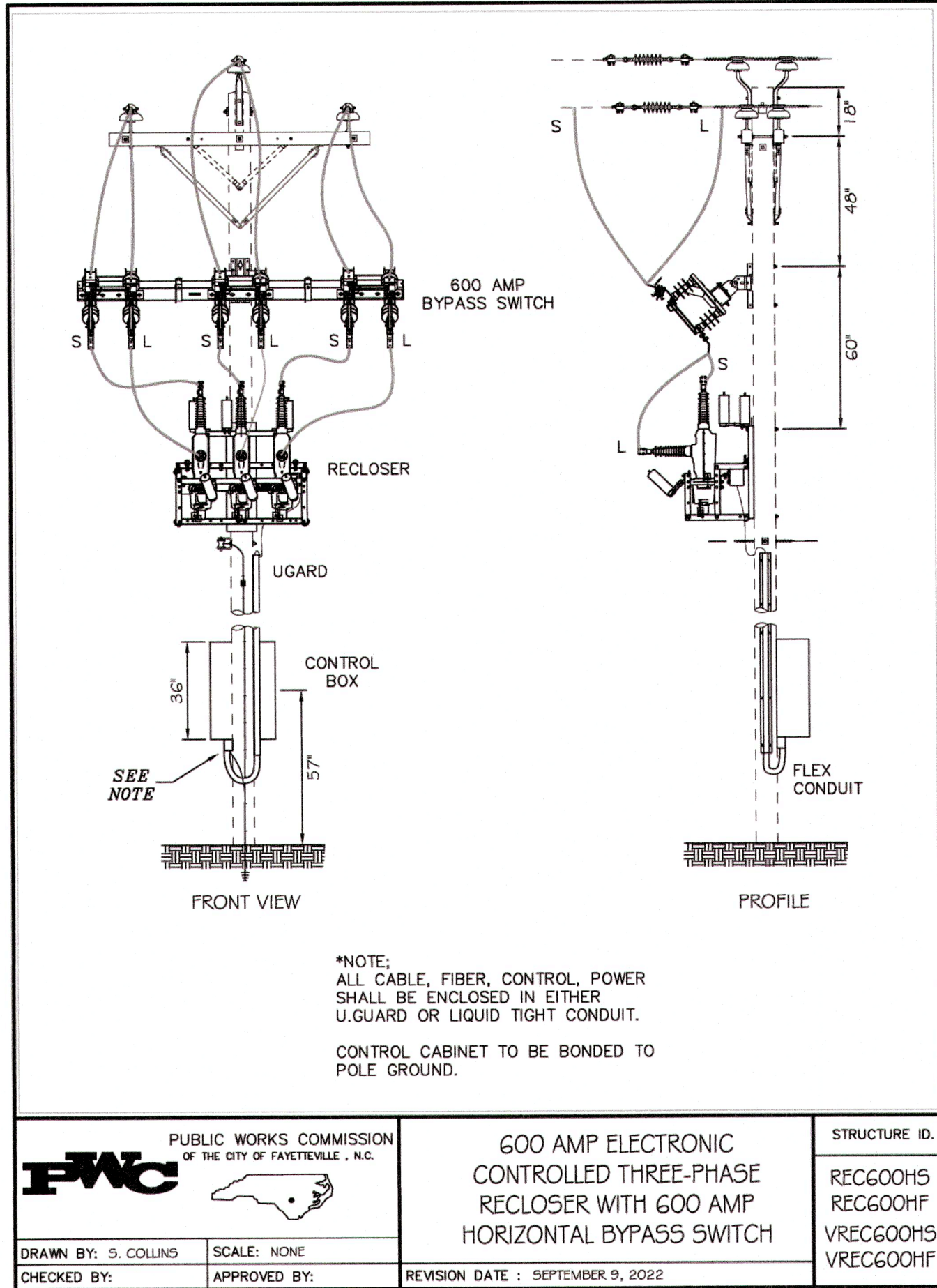
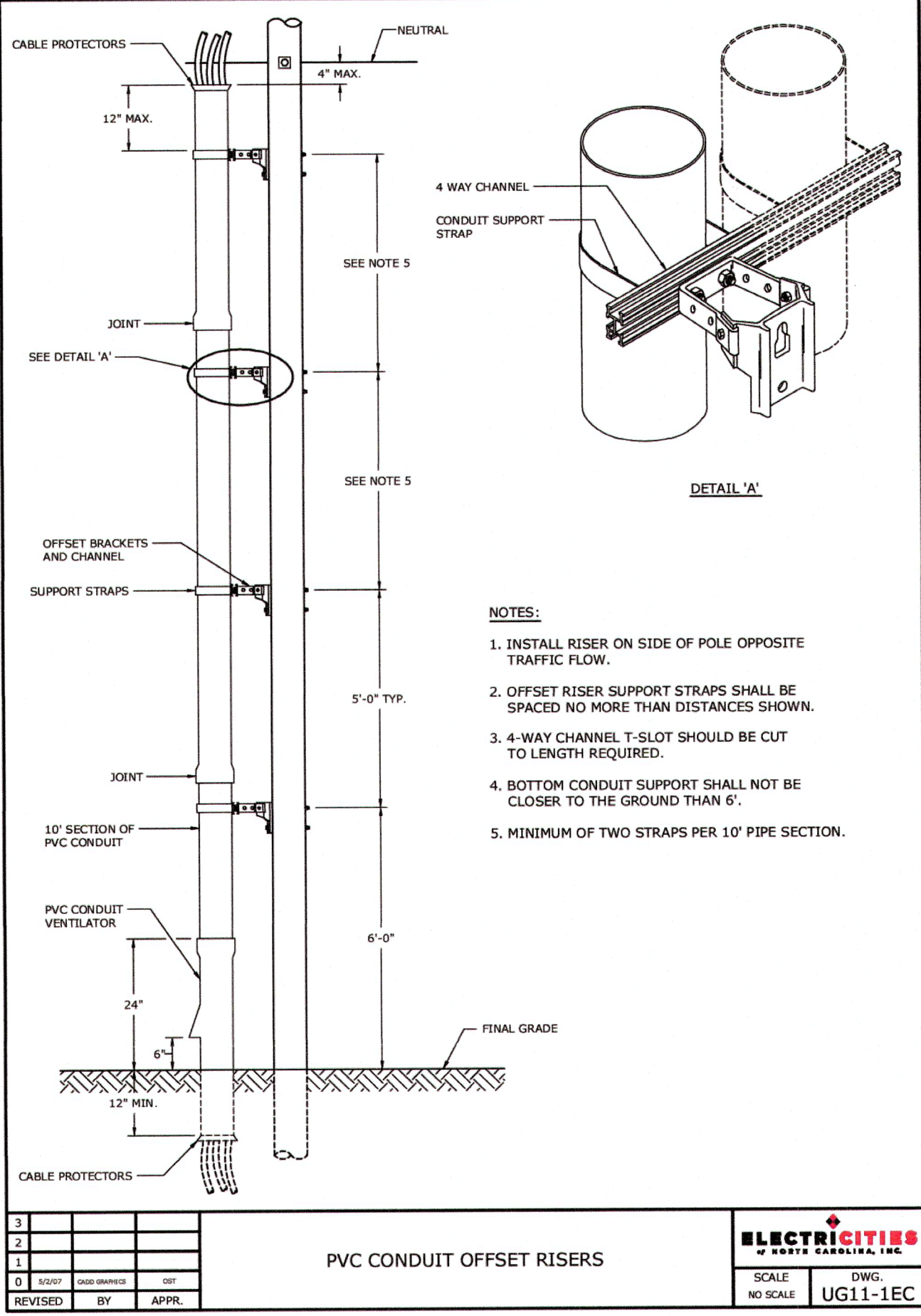




NO.	DATE	ENG.	MDT	REVISIONS
1	03/11/2024			
2				
3				
4				
5				
6				
7				
8				
9				
10				



MATERIAL LIST				
STRUCTURE ID.	ASSEMBLY ID.	STOCK NO.	DESCRIPTION	QUANTITY
<b>REC600HS</b>				
	SWVCR600E15		RECLOSER, 600A, 15 KV, 3-PHASE, TRIPLE/SINGLE, ELECTRONIC	1
	1-280-461		RECLOSER, 600A, 15 KV, 3-PHASE, TRIPLE/SINGLE	1
	CTRLRECVPK		RELAY, ELECTRONIC, DISTRIBUTION FEEDER PROTECTION, SEL-451R	1
	1-045-566		RELAY, PARTIAL DISTRIBUTION FEEDER PROTECTION	1
	SWRRCBYPAS		SWITCH, 25 KV, 600 AMP, RECLOSER BYPASS ON FIBERGLASS ARM	1
	1-280-160		SWITCH, RECLOSER BYPASS, CROSSARM	1
	LA10SW		LIGHTNING ARRESTERS, 10 KW, SWITCH POLE	3
	1-170-010		ARRESTER, 10 KV, HEAVY-DUTY	2
	UGARD2		U-GARD, 2", 10'	3
	1-070-032		U-GARD, 2", 10' LENGTH, TRUCK STOCK	1
	GND210S		GROUNDING, DRIVEN, 2-10' RODS	1
	1-255-070		ROD, GROUND, 5/8" X 10' CU-CLAD, TRUCK STOCK	2
	UAXLP500		UIG ALUMINUM POLYETHYLENE INSULATED, 500	60'
	1-065-540		CONDUCTOR, 500 MCM, AL XLP 600V	1"
	FLEX CONDUIT		2" FLEXIBLE CONDUIT FOR CONTROL	10'
	1-070-615		CONDUIT, 2" LIQUID TIGHT, FLEXIBLE (LFWC)	1"
<b>NOTES:</b> CONDUCTOR ATTACHMENTS, DOWN GUYS, AND ANCHORS MUST BE SPECIFIED SEPARATELY.				
 PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE, N.C.			15 KV- 600 AMP ELECTRONIC CONTROLLED THREE-PHASE RECLOSER WITH 600 AMP HORIZONTAL BYPASS SWITCH	STRUCTURE ID.  REC600HS
DRAWN BY: S. COLLINS	SCALE: NONE			
CHECKED BY:	APPROVED BY:	REVISION DATE : SEPTEMBER 9, 2022		

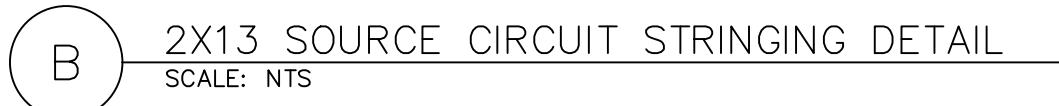


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NO.	DATE	ENG.	MT	REVISIONS
A	05/31/2024			

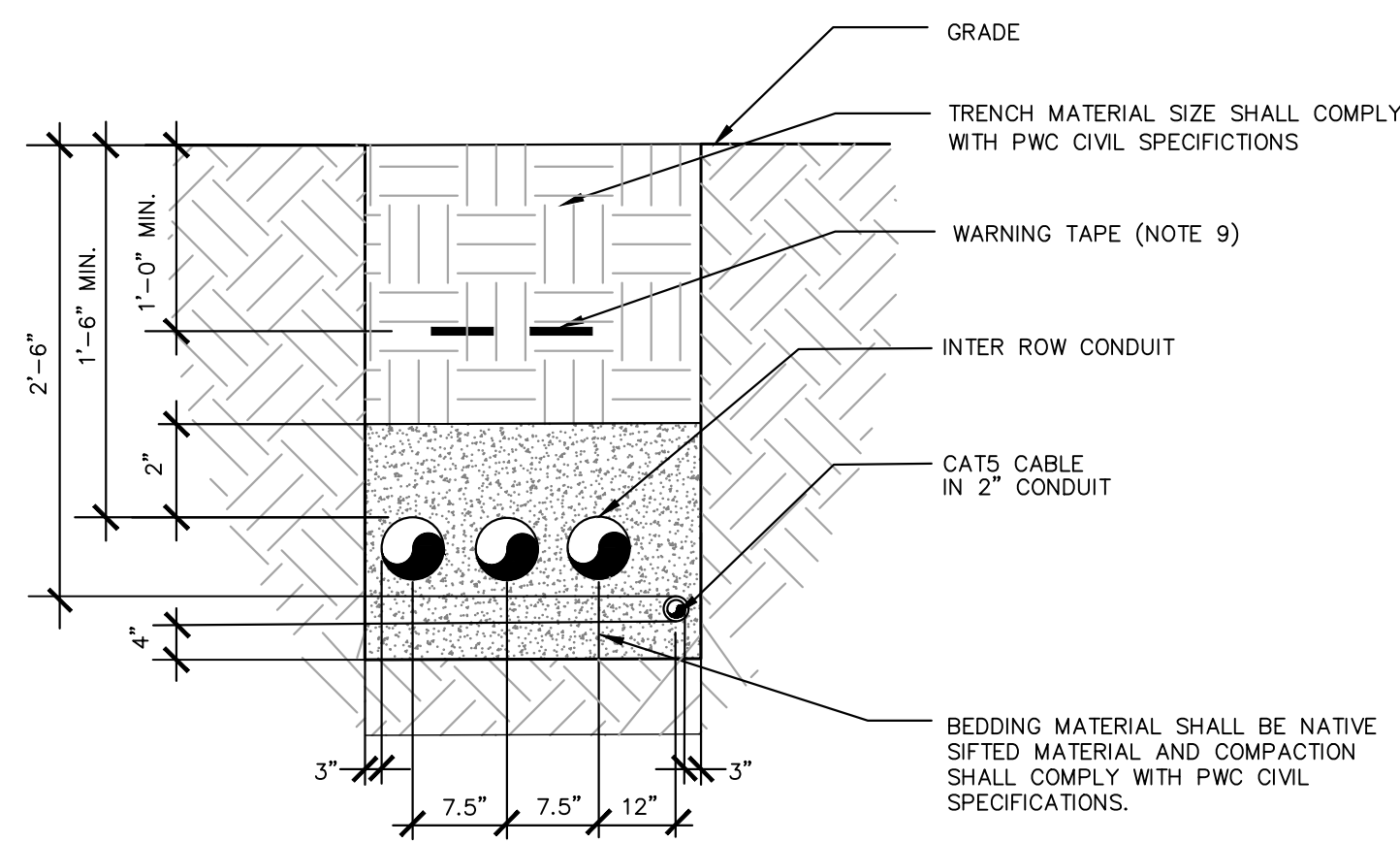
PROJECT NAME: <b>ROCKFISH SOLAR UTILITY STATION</b>	DRAWING TITLE: <b>DISTRIBUTION OVERHEAD DETAILS</b>
DRAWN BY: BLP	CHECKED BY: MDT
APPROVED BY: BJM	DATE: 03/11/2024
SCALE: NONE	FILE NUMBER: 12549
SHEET: <b>EP-156</b>	



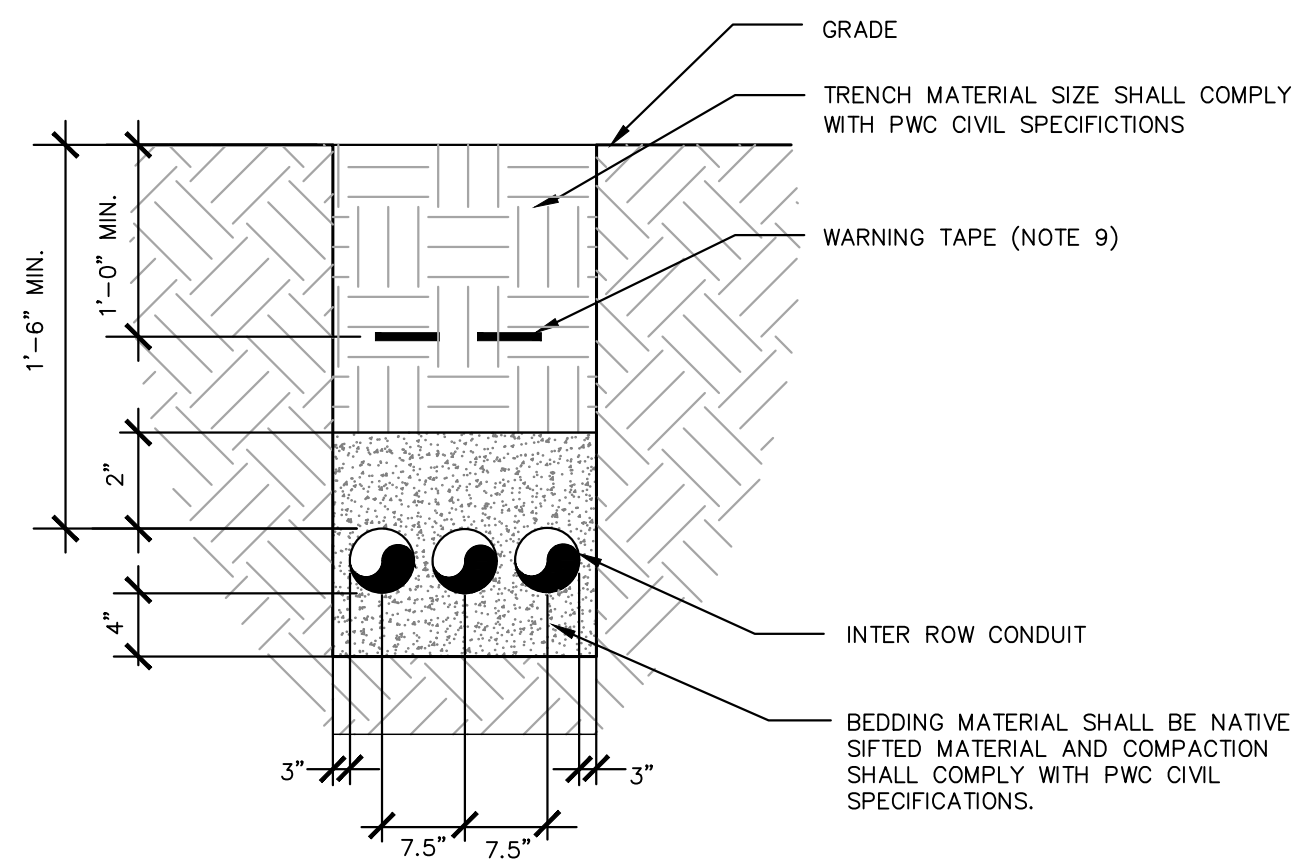


1. DIRECTION OF WIRING MAY CHANGE DEPENDING ON LOCATION OF MODULES RELATIVE TO ASSOCIATED INVERTER LOCATION. INSTALL WIRING DIRECTION ACCORDINGLY.
2. LEADS MUST BE SECURED 12" FROM THE JUNCTION BOX AND A MINIMUM OF 36" ALONG STRAIGHT RUNS.
3. PROVIDE ADEQUATE STRAIN RELIEF AT MODULE JUNCTION BOXES.
4. 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.

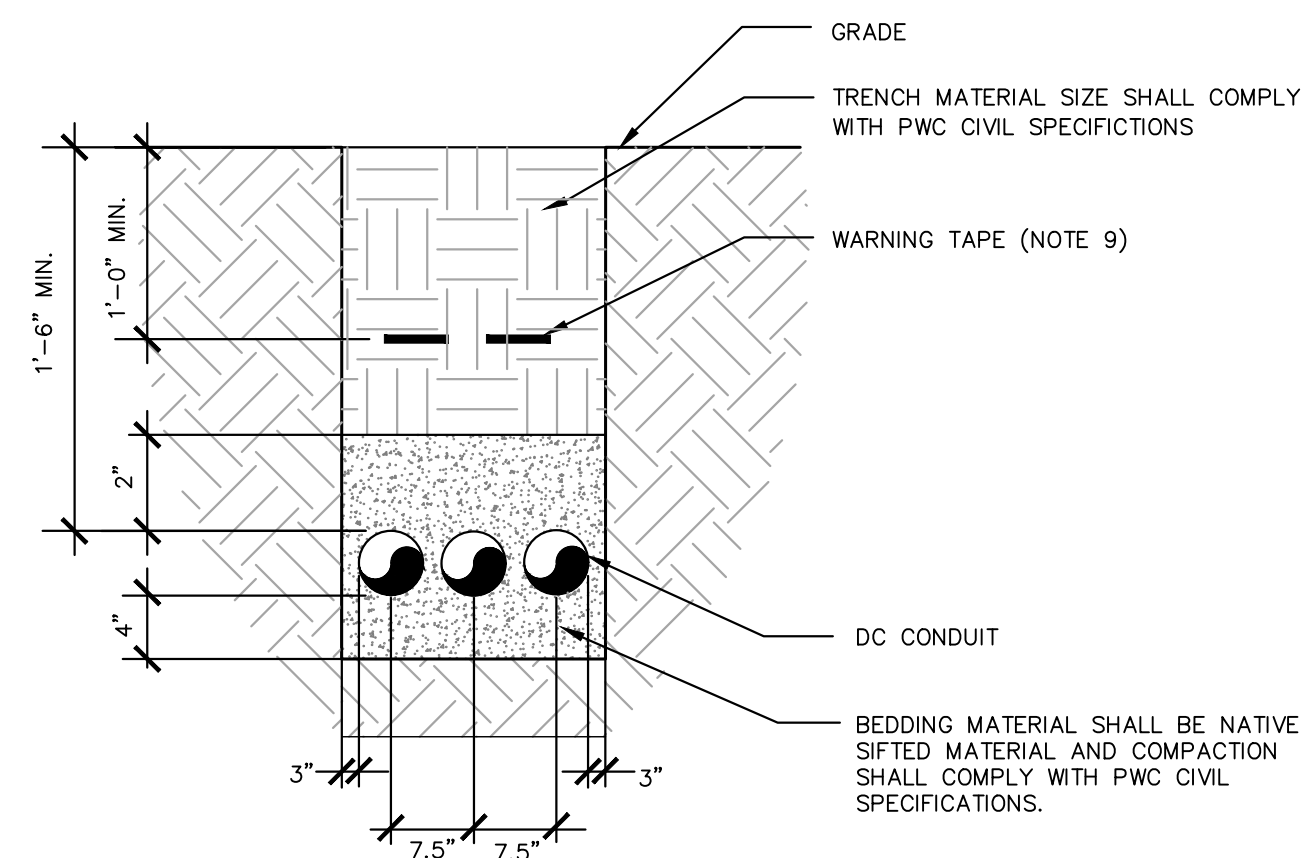




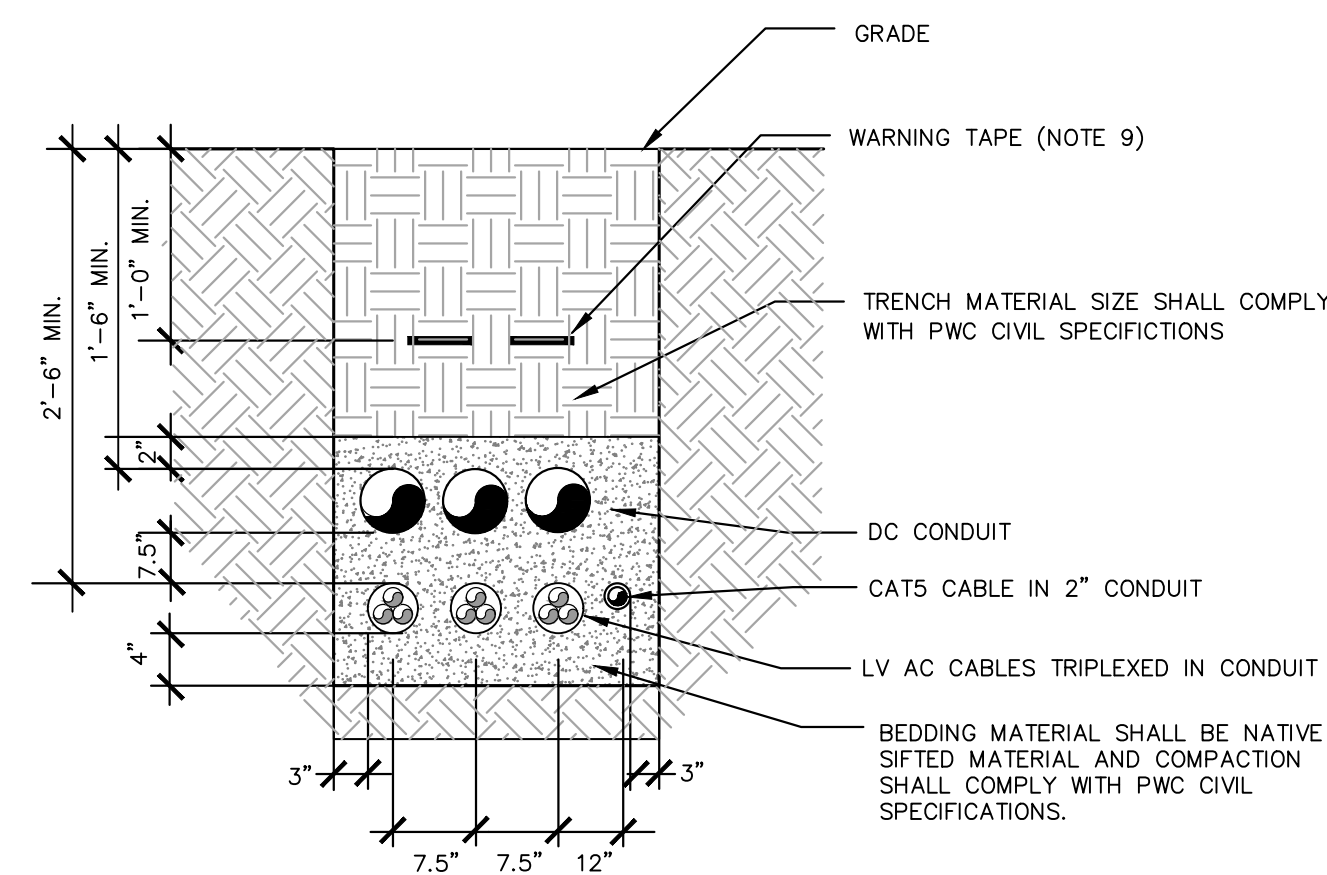
1 INTER ROW CONDUIT AND CAT5 CONDUITS  
SCALE: NTS



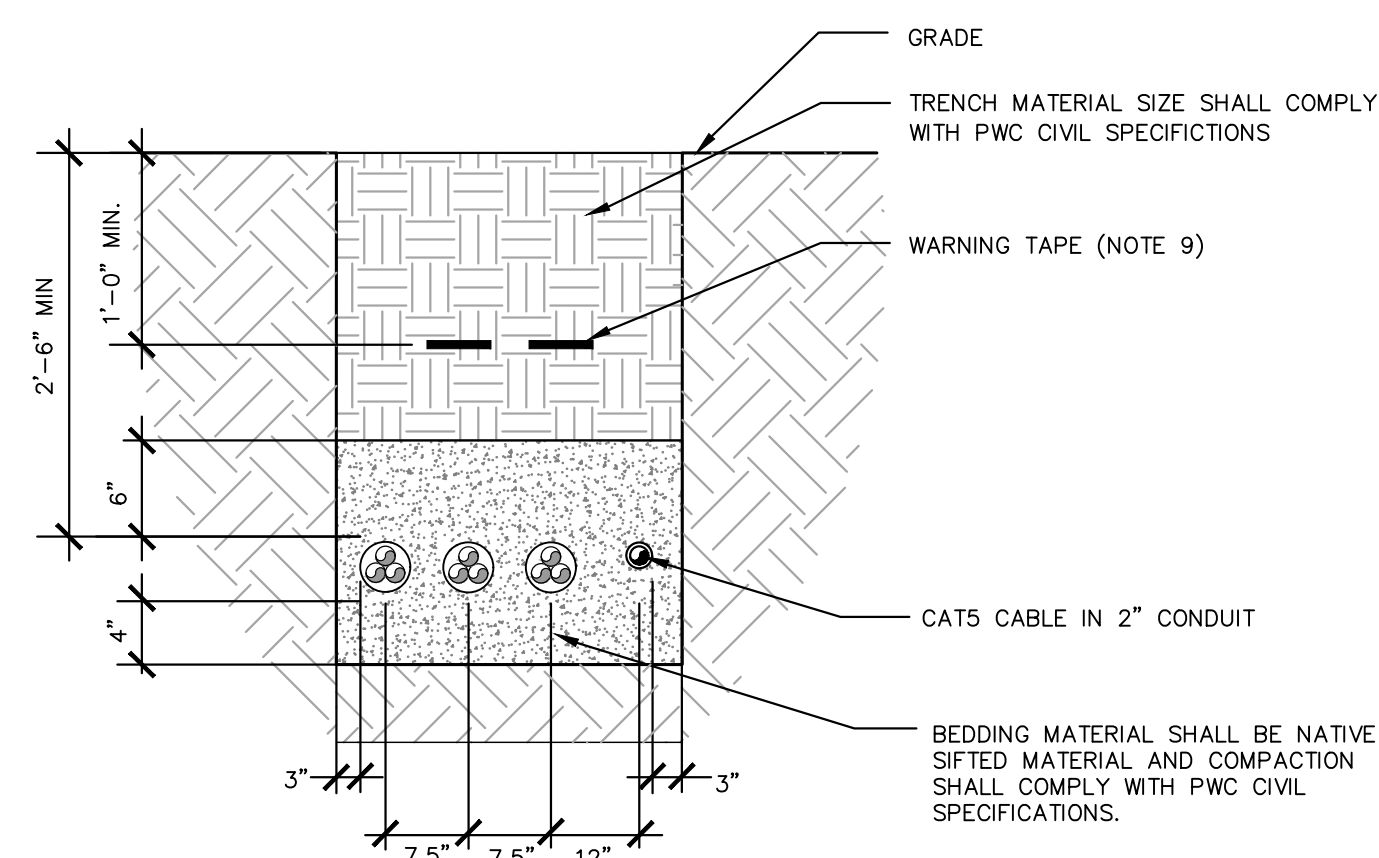
2 INTER ROW CIRCUIT TRENCH  
SCALE: NTS



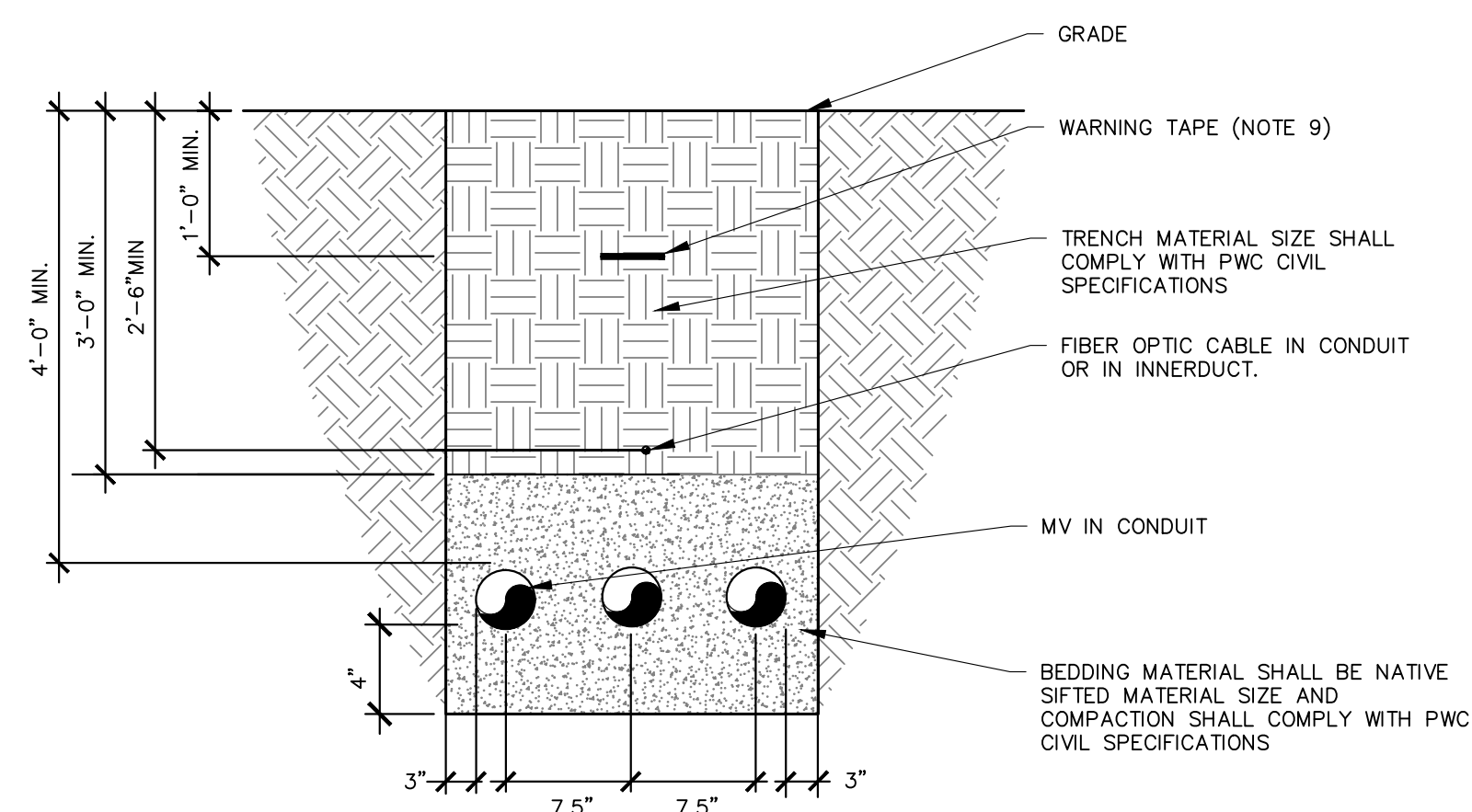
2 DC CIRCUIT TRENCH  
SCALE: NTS



3 LV & DC CONDUIT TRENCH  
SCALE: NTS



5 LV AC TRENCH  
SCALE: NTS



6 MV/FO (SINGLE CIRCUIT)  
SCALE: NTS

TRENCHING NOTES:

1. BACKFILL SHALL BE FREE OF ROCKS AND MATERIALS THAT CAN DAMAGE THE CONDUIT/CABLE AND SHALL MATCH ORIGINAL SOIL THERMAL RESISTIVITY VALUE.
2. THE DISTANCE BETWEEN EDGE OF TRENCH AND RACKING SUPPORT PILE SHALL BE 3' OR PER RACKING MANUFACTURER SPECIFICATIONS, WHICHEVER IS GREATER.
3. 12" MIN. CLEARANCE SHALL BE MAINTAINED BETWEEN POWER AND CONTROL / COMMUNICATION WIRING.
4. NECESSARY COMPACTION OF TRENCHING SHALL OCCUR AFTER A MAXIMUM OF BACKFILL (TYPICALLY 8"-12") HAS BEEN APPLIED AND SHALL BE COMPACTED AND TESTED PER GEOTECH REQUIREMENTS.
5. THE NUMBER OF CABLES/CONDUITS SHOWN IS REPRESENTATIVE AND MAY VARY PER THE SITE TRENCHING PLAN.
6. EDGE OF TRENCH SHALL BE MIN. OF 36" OFF THE EDGE OF ANY PAD UNLESS APPROVED BY E.O.R.
7. TRENCH BACKFILL MATERIAL REQUIREMENTS:
  - 7.1. INITIAL BACKFILL: PLACE AND COMPACT INITIAL BACKFILL FREE OF ANY ANGULAR PARTICLES OF ANY SIZE, ORGANIC OR DELETERIOUS MATERIALS, AND ANY NON-ANGULAR PARTICLES LARGER THAN 3/4-INCH IN ANY DIMENSION FOR UNDERGROUND CONDUIT AND 1/2-INCH IN ANY DIMENSION FOR DIRECT BURIED CONDUCTORS, TO A HEIGHT OF 12-INCHES OVER THE CONDUIT OR CONDUCTORS
  - 7.2. FINAL BACKFILL: PLACE AND COMPACT FINAL BACKFILL FREE OF ORGANIC OR DELETERIOUS MATERIALS, AND OF ANY PARTICLES LARGER THAN 1" TO FINAL SUBGRADE ELEVATION.
8. TRENCH COMPACTION REQUIREMENTS:
  - 8.1. COMPACT SOIL MATERIALS TO NOT LESS THAN THE FOLLOWING PERCENTAGES OF MAXIMUM DRY UNIT WEIGHT ACCORDING TO STANDARD PROCTOR.
    - 8.1.1. FOR UTILITY TRENCHES, COMPACT EACH LAYER OF INITIAL AND FINAL BACKFILL SOIL MATERIAL AT 85%, OR 95% UNDER ROADS.
9. WARNING TAPE SHALL BE METAL DETECTABLE AND MIN. 6" WIDTH.
10. HANDHOLES SHALL BE PROVIDED BY CONTRACTOR. QUANTITY, SIZE AND LOCATION SHALL BE DETERMINED BY CONTRACTOR PER NEC REQUIREMENTS, VENDOR SPECIFICATIONS AND BEST PRACTICES.
11. SEE DRAWING EP-102 FOR PC, MV, AND EGC CABLE RATINGS.

**\*\*HOLD ALL TRENCHING UNTIL 30% THERMAL AMPACITY STUDY IS COMPLETE.**



05/31/2024  
FOR CONSTRUCTION

03/2024

	B	60% REVISED PER COMMENTS	04/16/2024
	C	ISSUED FOR BID – 60%	05/31/2024

ROCKFISH SOLE  
UTILITY STATION




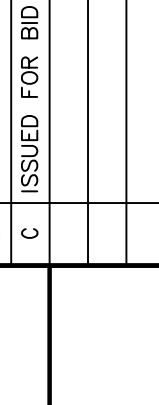
DRAWING TITLE:

UNDERGROUND ELECTRICAL DETAILS

OWN BY:	ALH
BOOKED BY:	EDR
APPROVED BY:	BJM
DATE:	03/11/2024
REASON:	NONE
INVOICE NUMBER:	12549
REMARKS:	

CP-252

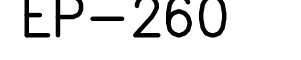


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<div style="display: flex; justify-content: space-around; align-items: center;"><div style="text-align: center;"> <b>BA</b></div><div><b>Booth &amp; Associates</b> 2300 Remewoods Drive Suite 300, Raleigh NC 27607 NC F-0221</div></div>					
<div style="display: flex; justify-content: space-between; align-items: center;"><div style="text-align: center;"> <b>NORTH CAROLINA PROFESSIONAL SEAL</b></div><div style="text-align: right;">05/31/2024 NOT FOR CONSTRUCTION</div></div>					
© 03/2024					
PROJECT NAME: <b>ROCKFISH SOLAR UTILITY STATION</b>	NO.	REVISIONS	ENG.	DATE	
	A	60% SUBMITTAL	ROM	03/18/2023	
	B	60% REVISED PER COMMENTS	ROM	04/16/2024	
	C	ISSUED FOR BID - 60%	ROM	05/31/2024	
DRAWING TITLE: <b>ELECTRICAL DETAILS</b>					
DRAWN BY:			ALH		
CHECKED BY:			EDR		
APPROVED BY:			BJM		
DATE:			03/11/2024		
SCALE:			NONE		
FILE NUMBER:			12549		
SHEET:	<b>EP-253</b>				

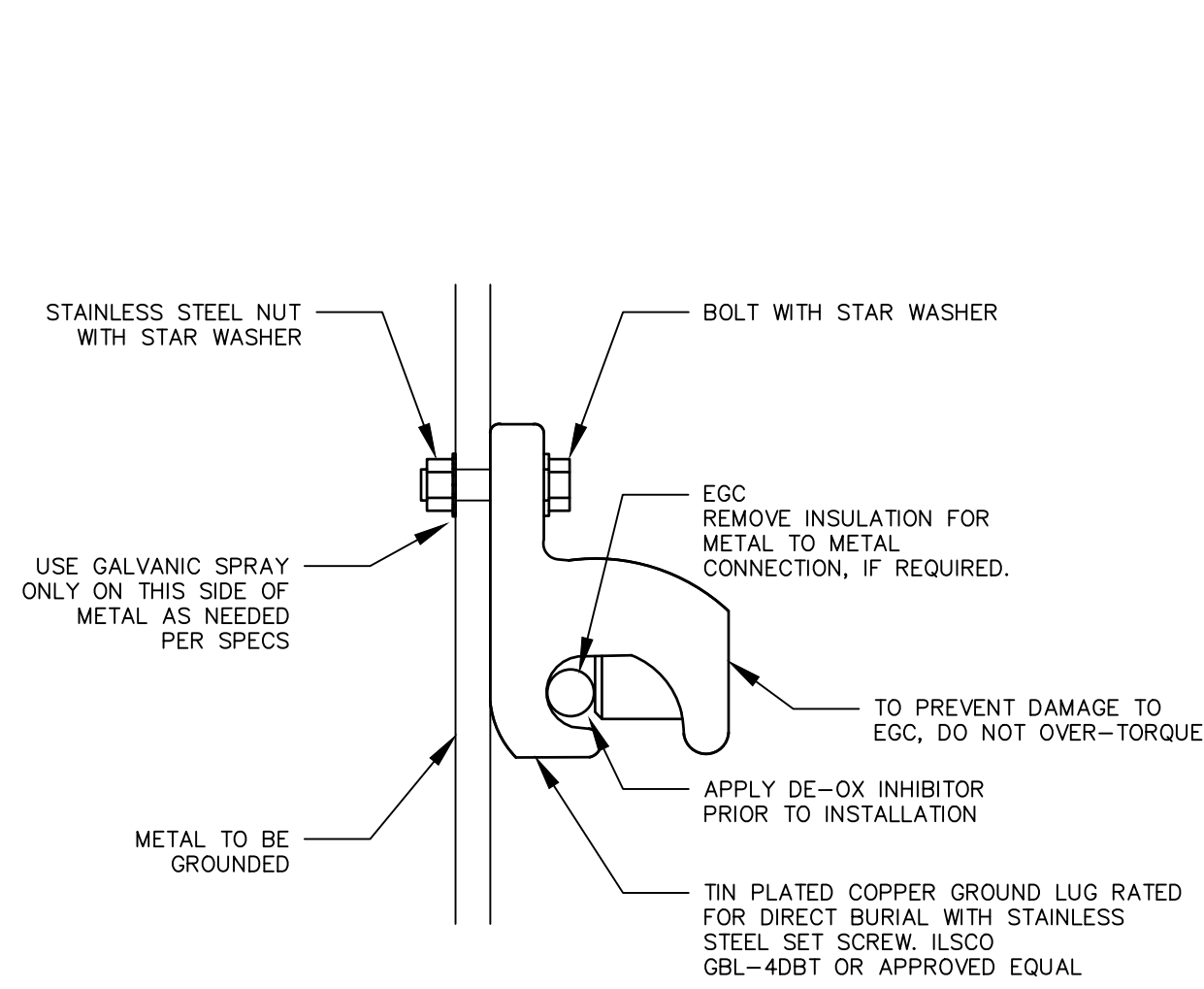




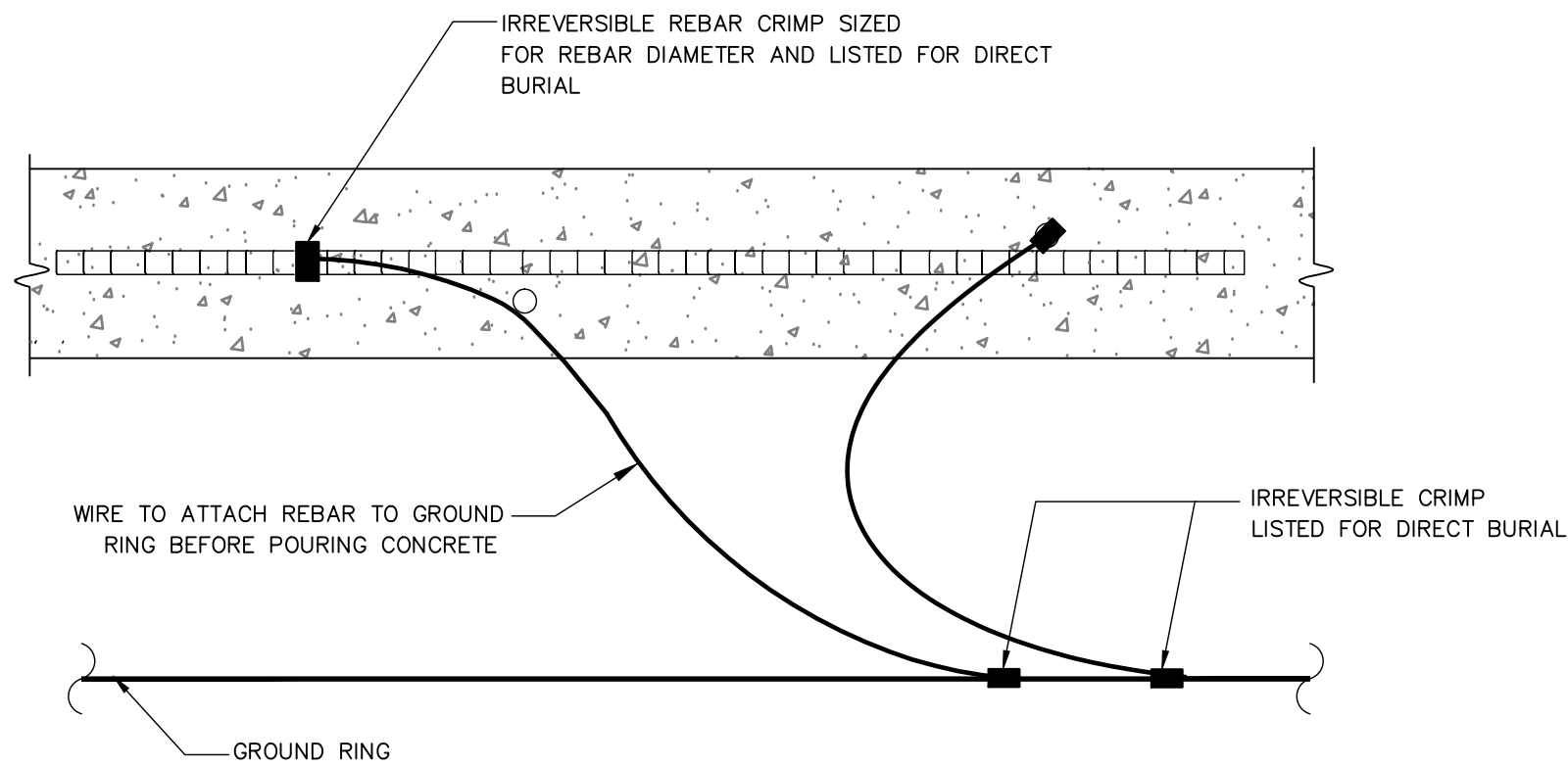
1. REFER TO MANUFACTURER OPERATING MANUAL FOR GROUNDING INSTRUCTIONS.
2. ARRANGEMENTS ARE GENERAL. REFER TO EP-300 FOR MORE PAD INFORMATION.



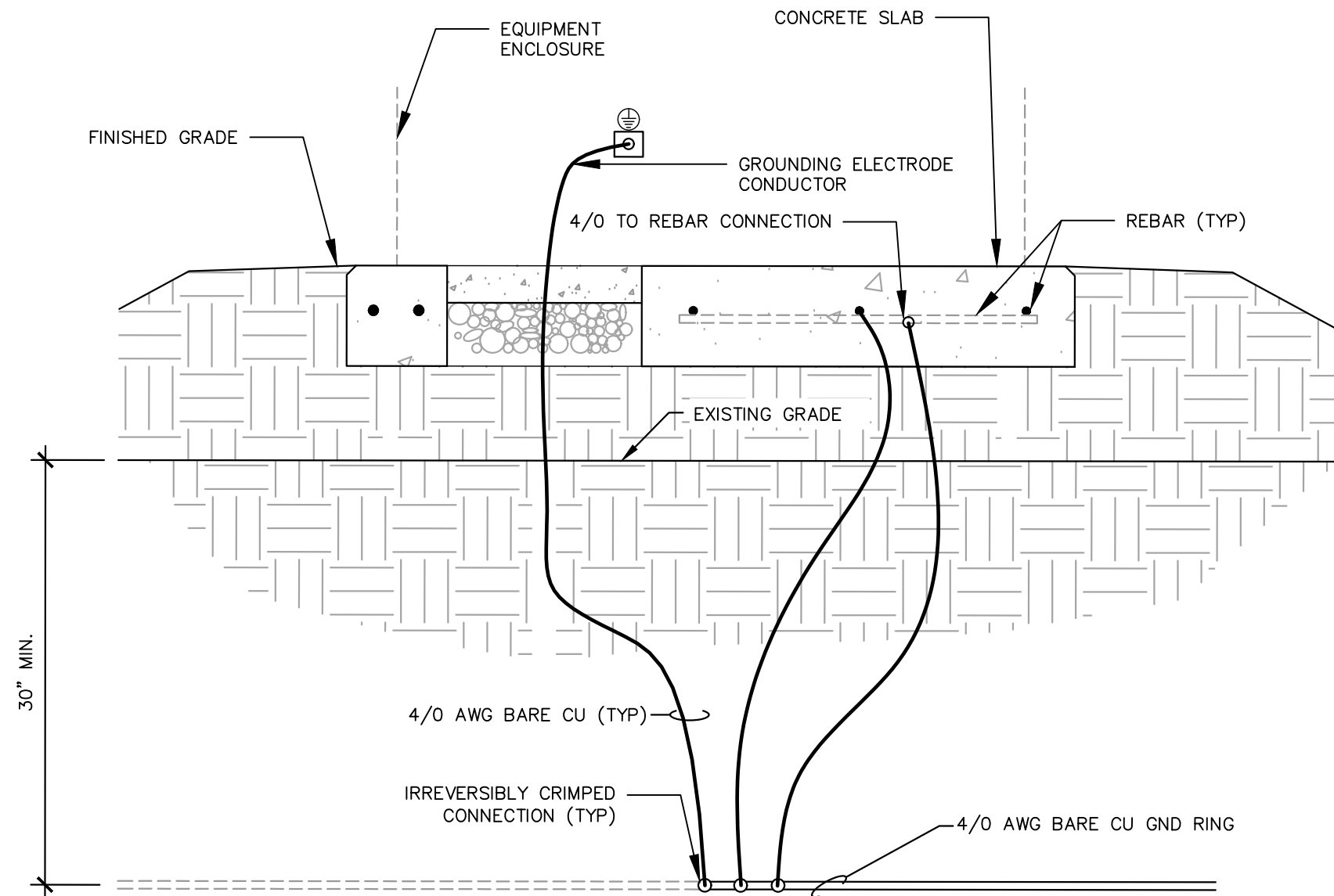




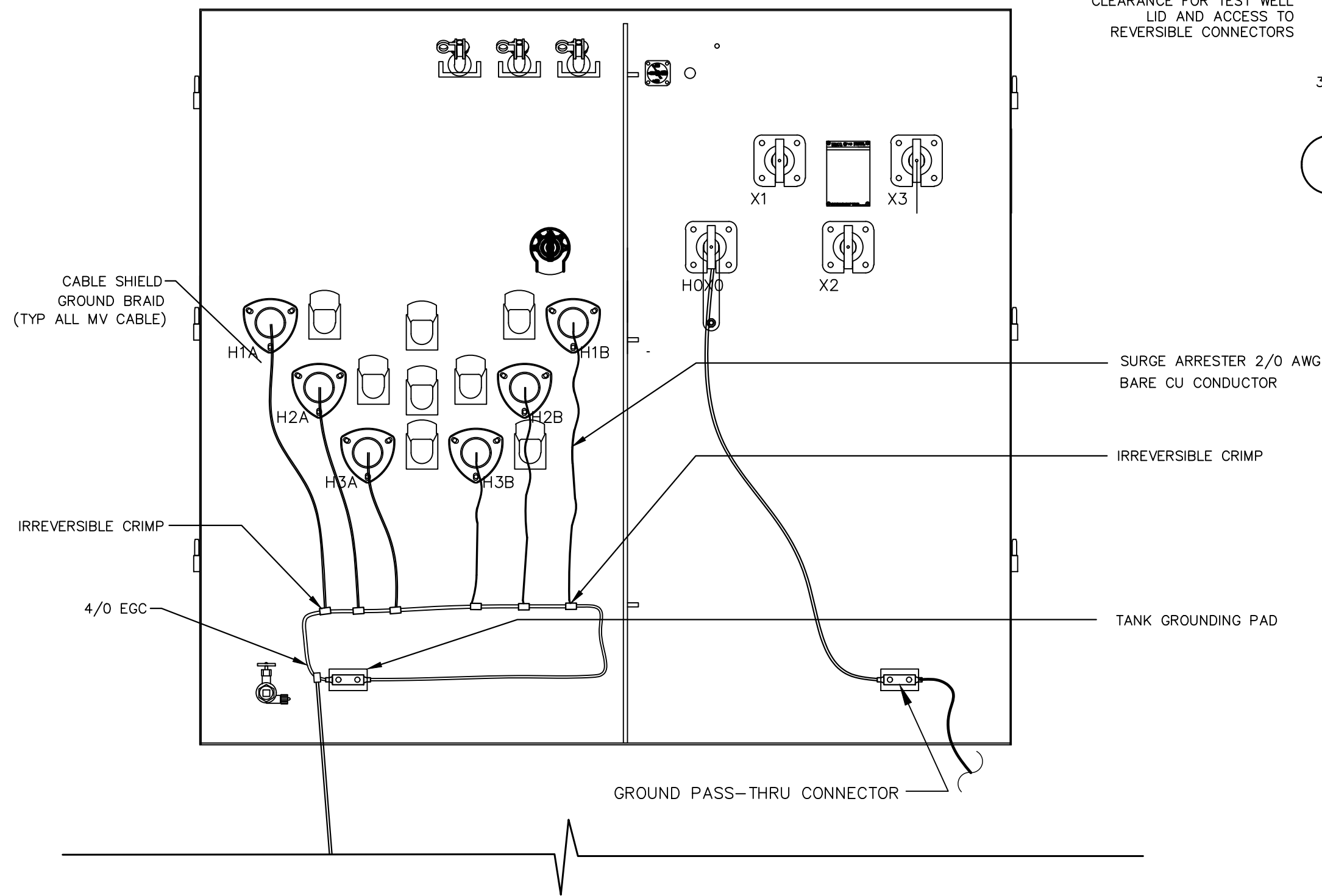
9 LAY-IN- LUG GROUNDING DETAIL  
SCALE: 3/4" = 1'-0"



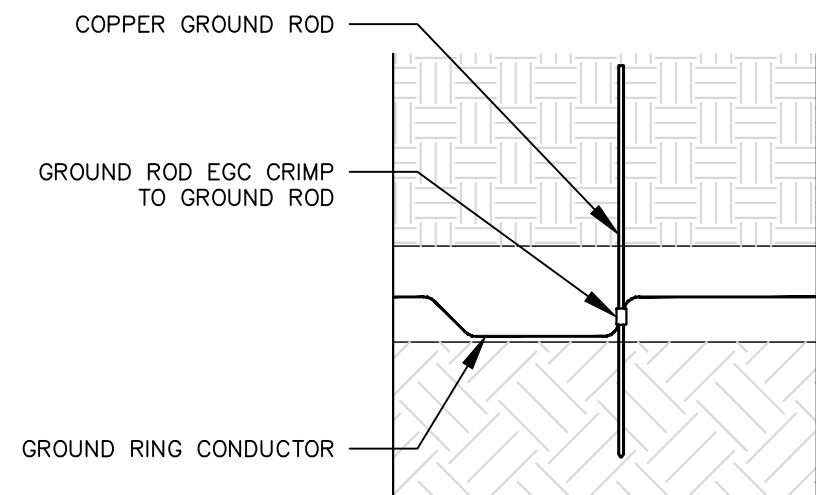
8 EQUIPMENT PAD GROUNDING  
SCALE: NTS



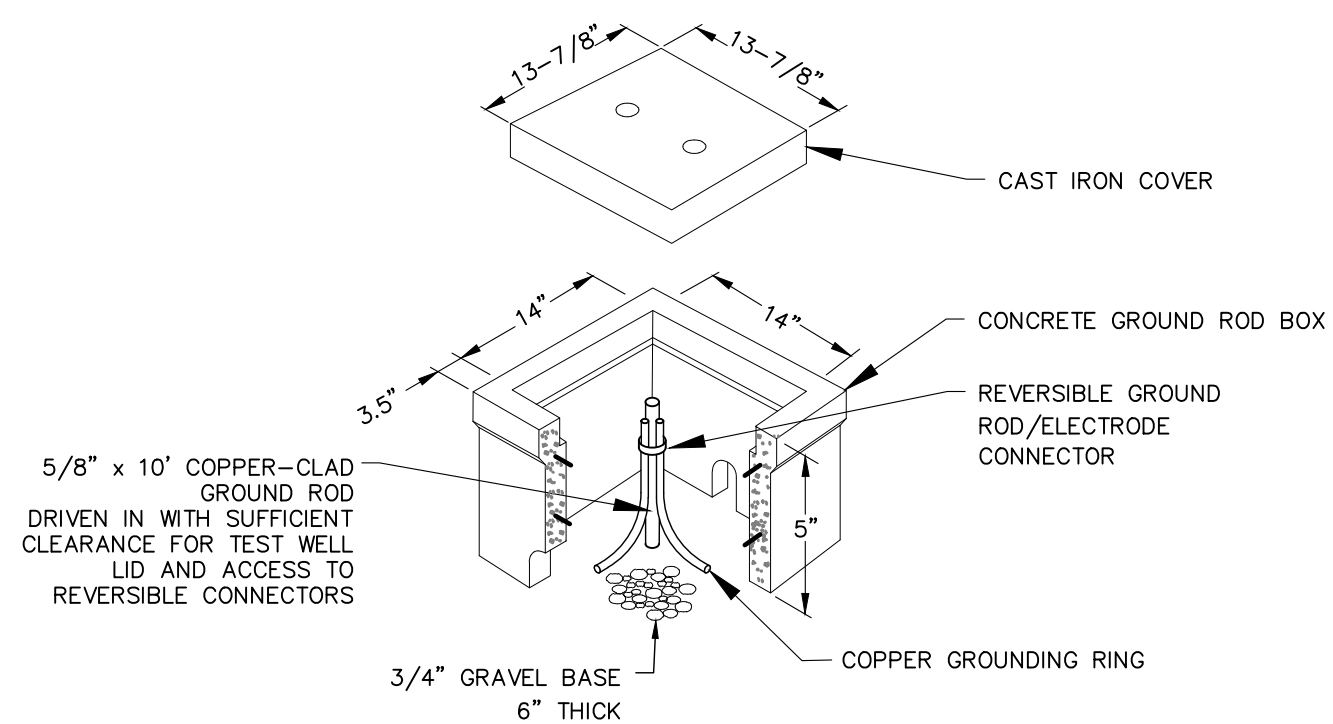
7 EQUIPMENT GROUNDING DETAIL  
SCALE: 1" = 1'-0"



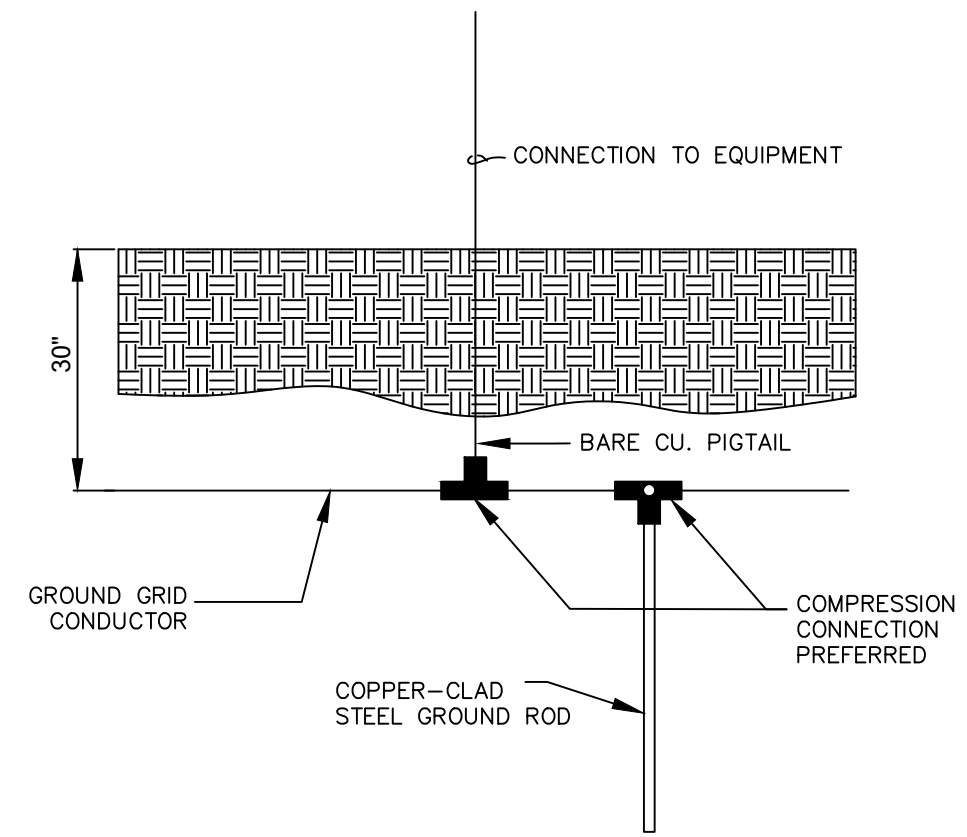
6 ISU TRANSFORMER GROUNDING DETAIL  
SCALE: 1" = 1'-0"



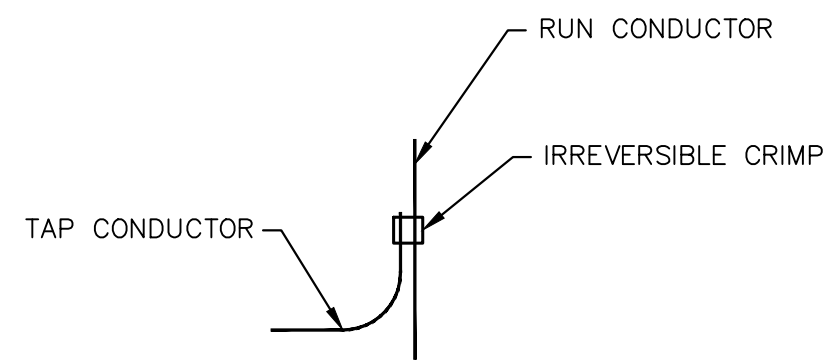
4 GROUND RING GROUND ROD DETAIL  
SCALE: 1/2" = 1'-0"



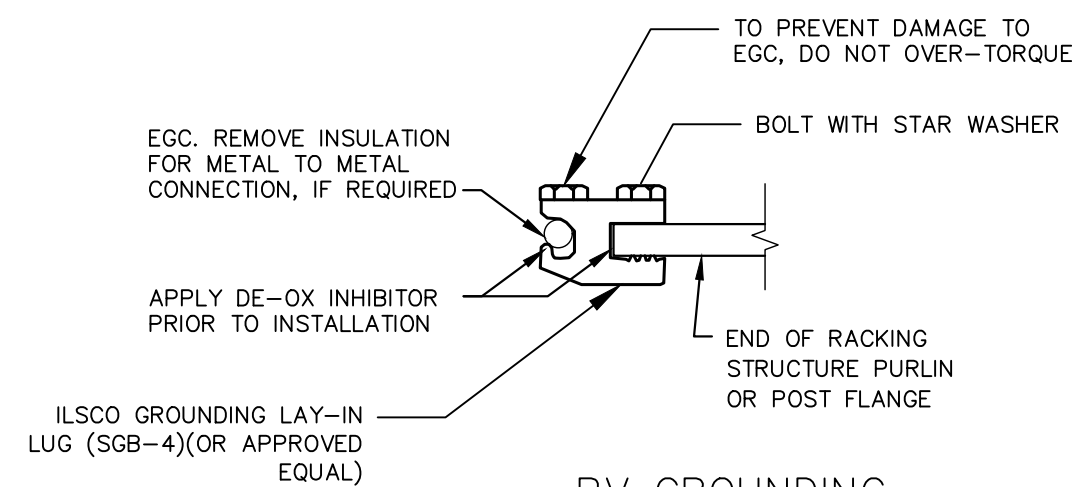
5 CONCRETE GROUND ROD BOX  
SCALE: NTS



3 GROUND ROD DETAIL  
SCALE: 1/2" = 1'-0"



2 IRREVERSIBLE CRIMP GROUND ROD DETAIL  
SCALE: NTS



1 PV GROUNDING LAY-IN LUG DETAIL  
SCALE: NTS

**NOTES:**

1. ALL IRREVERSIBLY CRIMPED CONDUCTORS SHALL FIRST BE BRUSHED CLEAN OF DIRT AND FOREIGN PARTICLES PRIOR TO CRIMPING.

NO.	DATE	ENG.	REVISIONS
A	03/18/2023	RM	
B	04/16/2024	RM	
C	05/31/2024	RM	

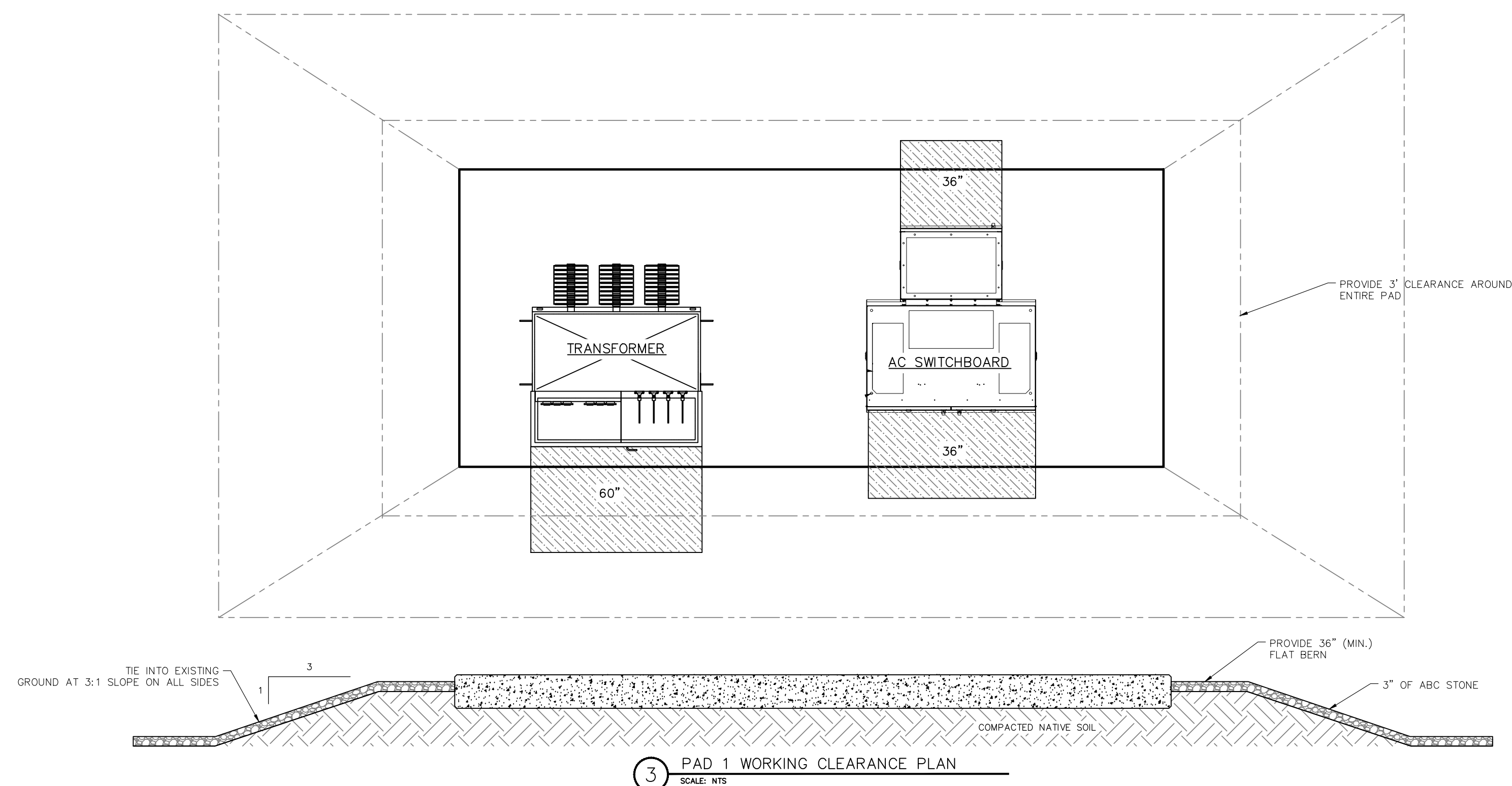
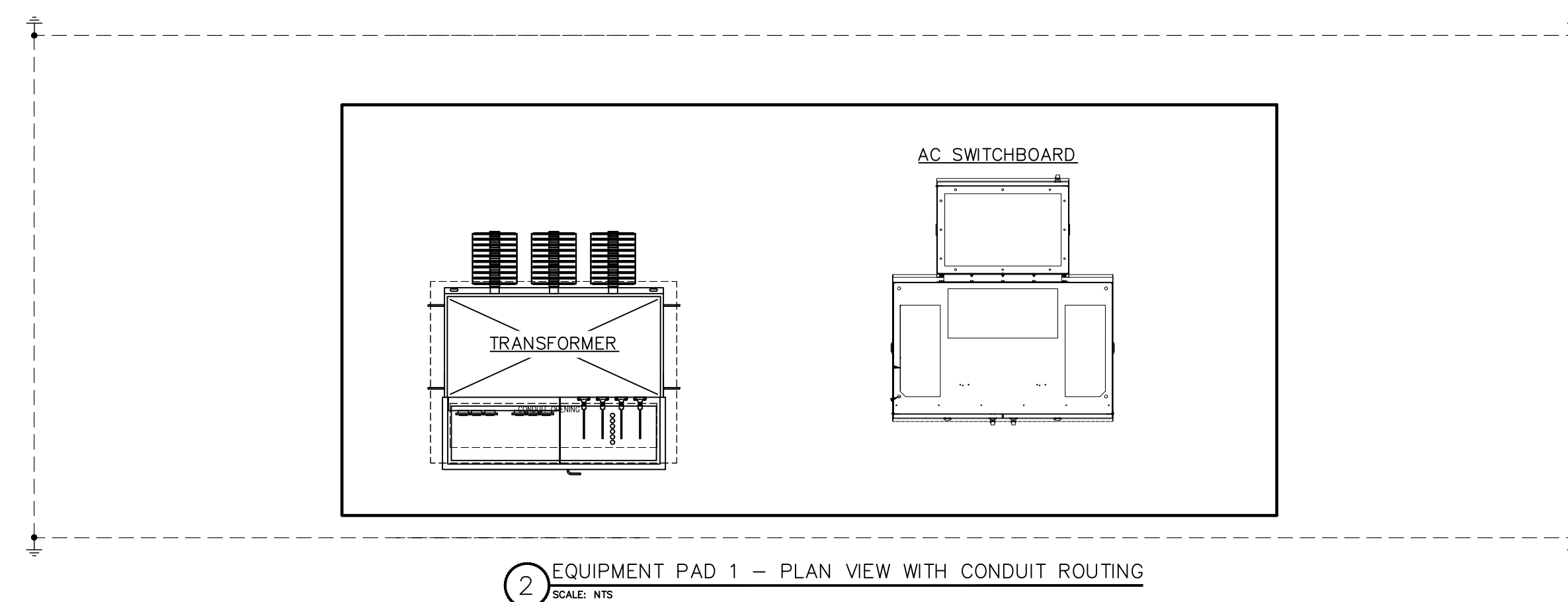
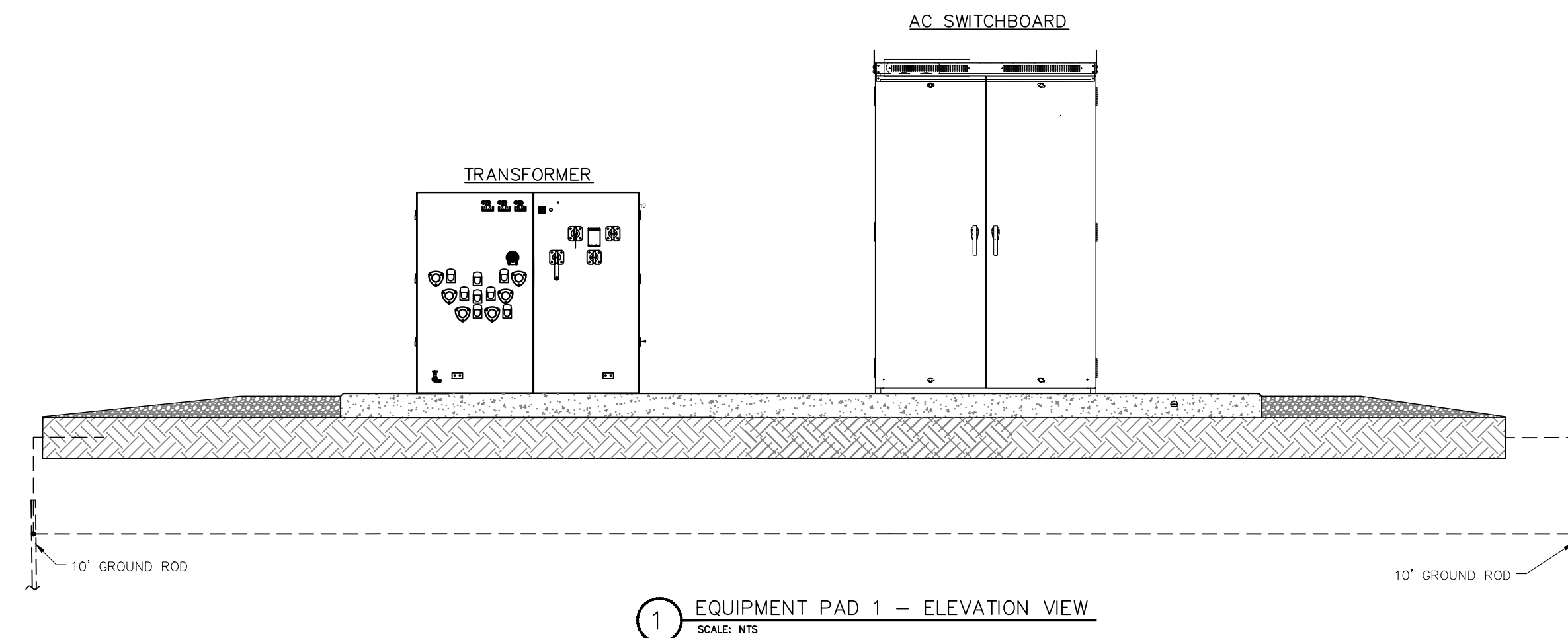
PROJECT NAME:	ROCKFISH SOLAR UTILITY STATION
DRAWING TITLE:	ELECTRICAL GROUNDING DETAILS

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





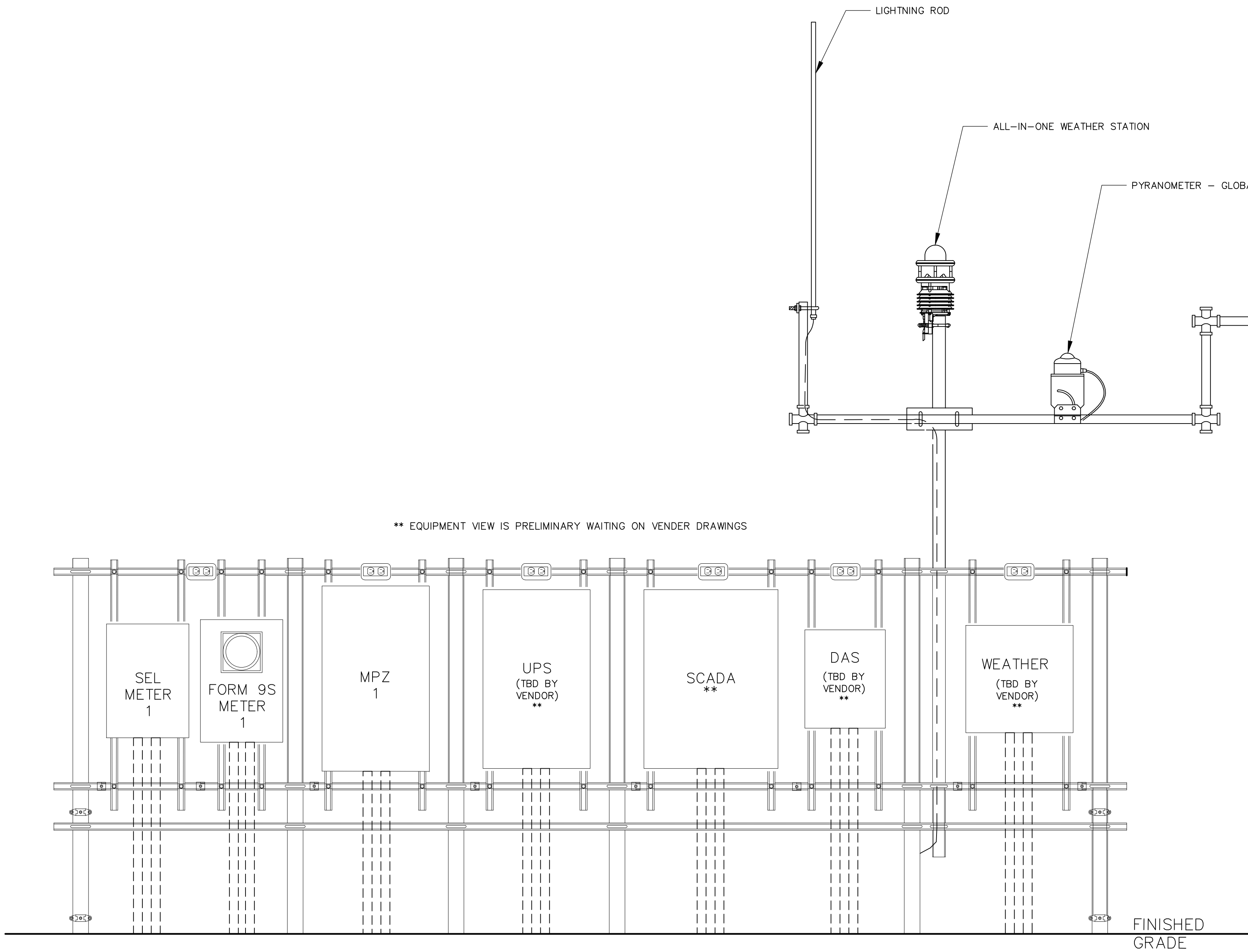




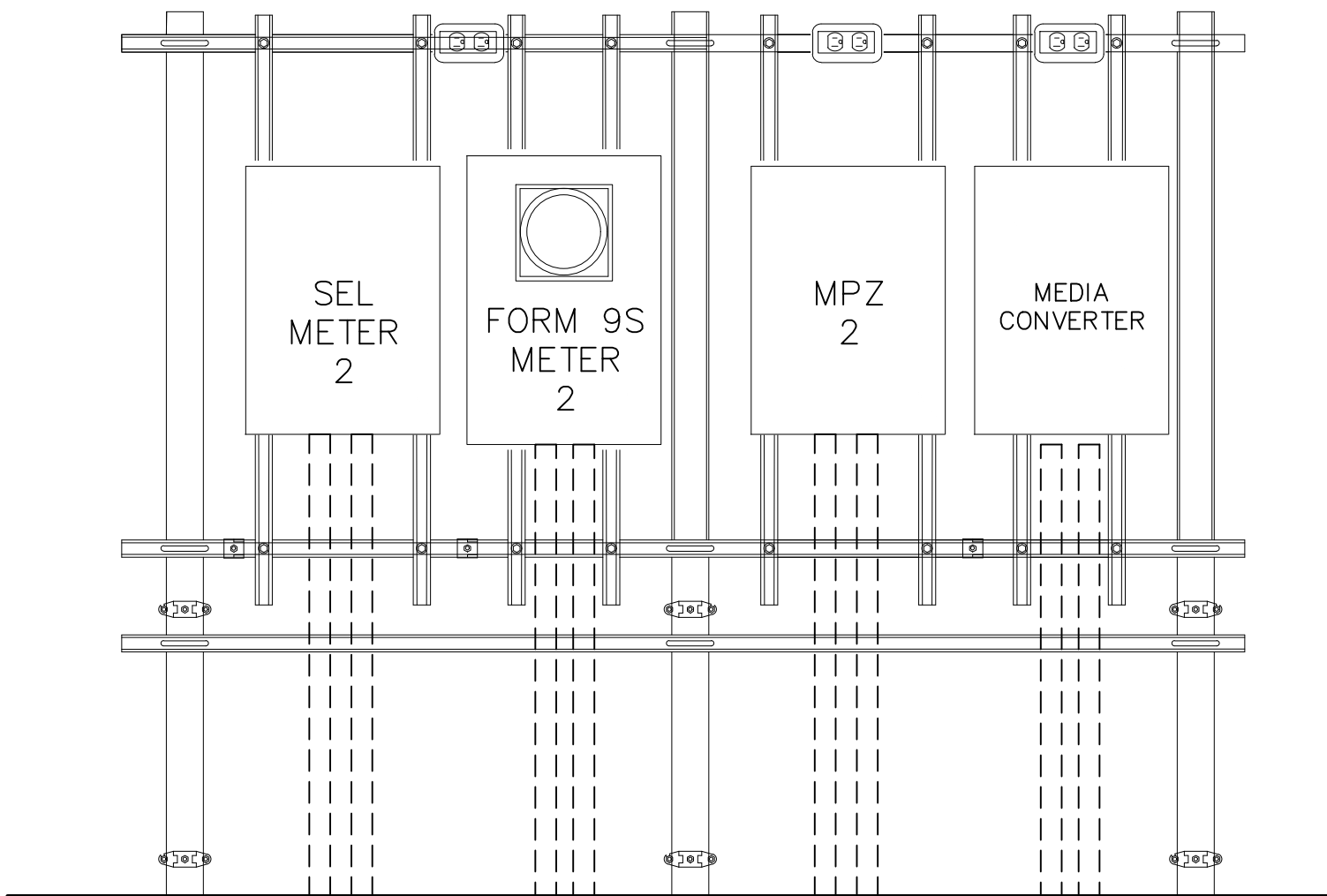
**\*\* HOLD UNTIL VENDOR  
DRAWINGS ARE PROVIDED**

- NOTES:**
1. SEE ARRAY WIRING PLAN(S) FOR EQUIPMENT PAD LOCATIONS ON SITE.
  2. 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.
  4. REFER TO VENDOR RECORD DRAWINGS FOR ALL EQUIPMENT WINDOWS TO PROPERLY PLACE CONDUIT LOCATIONS ENTERING EQUIPMENT.
  5. 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.
  6. FILL ALL CONDUIT WINDOWS WITH GROUT AFTER CONDUIT AND EQUIPMENT IS INSTALLED (TYP).
  7. RMC MUST BE EITHER PAINTED OR VINYL TAPED WITH SUBMITTED AND APPROVED MATERIALS.





1 EQUIPMENT RACK 1  
N.T.S.



2 EQUIPMENT RACK 2  
N.T.S.

ENCLOSURE BILL OF MATERIALS				
ENCLOSURE	QTY	DEVICE	DESCRIPTION	PART CONFIGURATION
SCADA (NOTE 2)	1	OUTDOOR ENCLOSURE	SEL ENCLOSURE	TBD BY VENDOR
	1	120 VAC UPS	ACCESSORY	TBD BY VENDOR
	1	RTAC	SEL-3350	SEL 3350#5LRB
	4	SFP TRANSCEIVER	SEL-MM SFP	SEL 8131-01
	2	SFP TRANSCEIVER	SEL-SM SFP	SEL 8130-01
	1	ETHERNET SWITCH	SEL-2741	SEL 2741#1A7N
	1	SERIAL TRANSCEIVER	SEL-SM TRANSCEIVER	SEL-2829M
	1	TRANSCEIVER MOUNTING	SEL-MOUNTING W/ CABLE	SEL-915900574
	1	PATCH PANEL HOUSING	CORNING SINGLE-PANEL	SPH-01P
	1	FIBER PATCH PANEL	CORNING SM LC/LC	CCH-CP06-A9
	1	HEATER/THERMOSTAT	ACCESSORY AS REQ.	TBD BY VENDER
SEL METER (NOTE 2) 182	1	METER ENCLOSURE KIT	NEMA 4, SEL-735, FT-1 #014	SEL 0735BB10944FFXA4XX16102CX
	1	MOUNTING KIT	16"X18"X8"BRACKETS	SEL 915900297
	1	GASKET KIT	IP65 PROTECTION	SEL 915900097
	1	FUSE BLOCK	MARATHON RF30	RF30A3S
	1	TERMINAL BLOCK	MARATHON EB25	EB25B12W
	1	HEATER/THERMOSTAT	ACCESSORY AS REQ.	TBD BY VENDER
MEDIA CONVERTER (NOTES 2,4)	1	OUTDOOR ENCLOSURE	SEL ENCLOSURE	TBD BY VENDOR
	1	SWITCH & MEDIA CONVERTER	SEL-2725	SEL-2725#NG4B
RECLOSER	1	HEATER/THERMOSTAT	ACCESSORY AS REQ.	TBD BY VENDER
	1	RECLOSER CONTROLLER	SEL ENCLOSURE/CONTROLLER	SEL 0651R22DXGAXAE1123B3XX
	1	SECURITY GATEWAY	SEL-3622	SEL 3622XDE301X1
	1	SERIAL TRANSCEIVER	SEL-SM TRANSCEIVER	SEL-2829M
	1	PATCH PANEL HOUSING	CORNING SINGLE-PANEL	SPH-01P
	1	FIBER PATCH PANEL	CORNING SM LC/LC	CCH-CP12-A9
FORM 9S 182	1	SAT CLOCK/ANT KIT	SEL-2401	9250595
	1	SOCKET ENCLOSURE (METER SUPPLIED BY OTHERS)	NEMA 3R 9S SOCKET METER ENCLOSURE	EI-602U3010C13-1484
MPZ 1	1	MINI POWER ZONE 15KVA 480 TO 120/240V W/ BREAKER PANEL	EATON DRY-TYPE TRANSFORMER	P48G11B1530CUB
UPS (NOTE 3)	1	UNINTERRUPTIBLE POWER SUPPLY	TBD BY VENDOR	TBD BY VENDOR
DAS (NOTE 3)	1	DATA ACQUISITION SYSTEM	TBD BY VENDOR	TBD BY VENDOR
WEATHER (NOTE 3)	1	WEATHER/MET STATION	TBD BY VENDOR	TBD BY VENDOR
MPZ 2	1	MINI POWER ZONE 5KVA 480 TO 120/240V W/ BREAKER PANEL	EATON DRY-TYPE TRANSFORMER	P48G11B0518CUB

NOTES

- SEE CONDUIT PLAN FOR CONDUIT SIZE AND QUANTITY
- 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.
- BIDDER TO SOURCE DAS AND MET STATION ENCLOSURES FROM ALSO ENERGY, CONTACT: WHITNEY BURREN AT ALSO ENERGY.

PROJECT NAME:  
ROCKFISH SOLAR  
UTILITY STATION

DRAWING TITLE:  
CABINET ELEVATIONS & BOM

DRAWN BY: ALH

CHECKED BY: EDR

APPROVED BY: BJM

DATE: 03/11/2024

SCALE: NONE

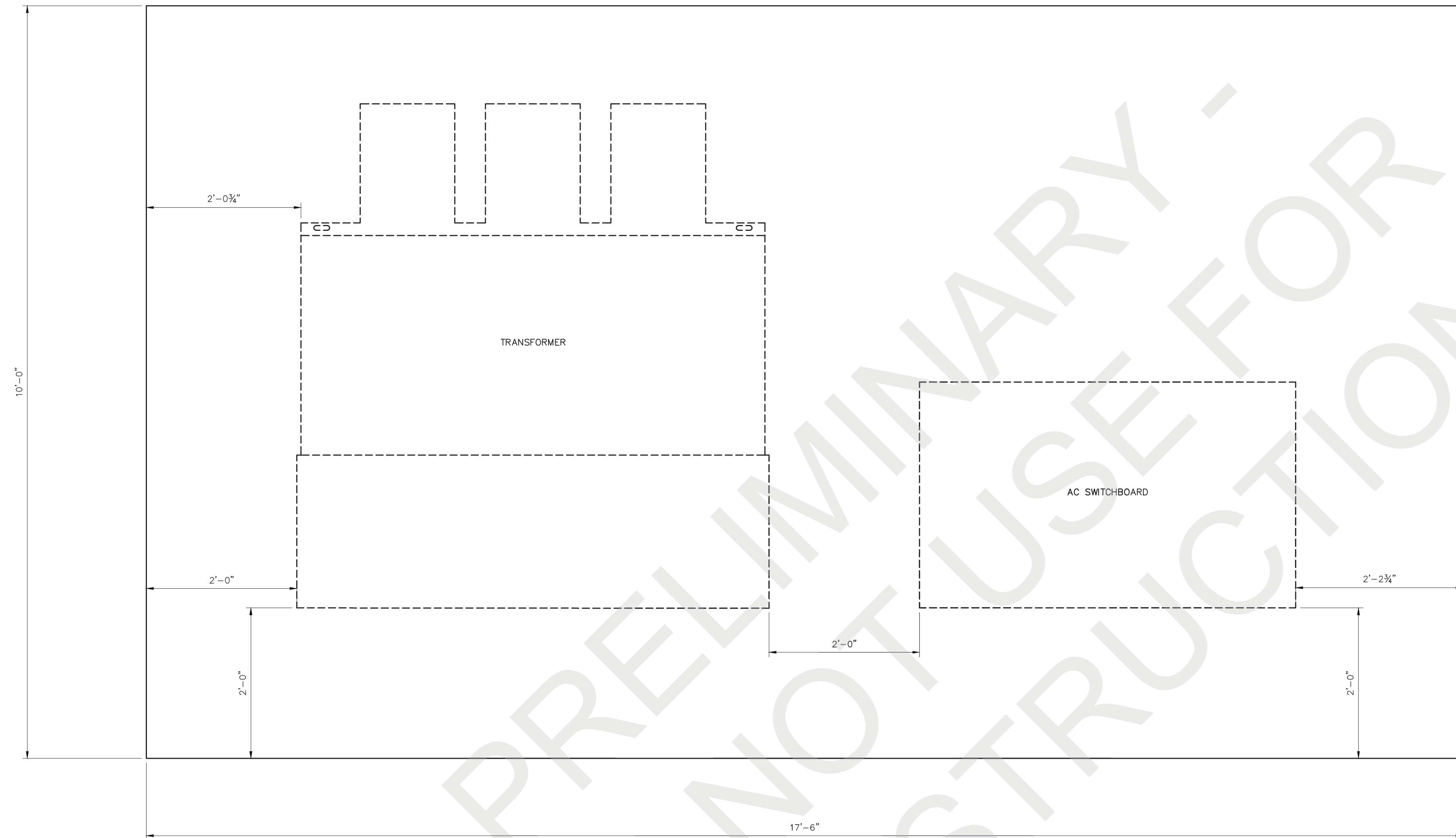
FILE NUMBER: 12549

SHEET: EP-301





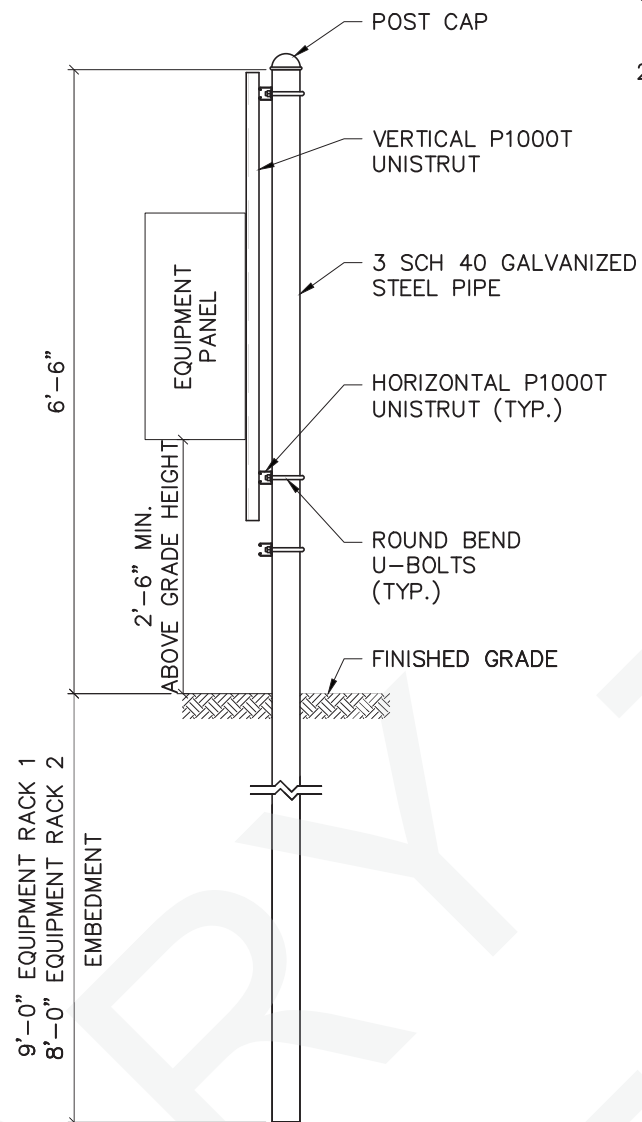


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PROJECT NAME: ROCKFISH SOLAR UTILITY STATION	DRAWING TITLE: PAD 1 EQUIPMENT PAD DETAILS
--	--

DRAWN BY:	DJD
CHECKED BY:	IDO
APPROVED BY:	RSD
DATE:	05/31/20
SCALE:	1"=1'-0"
FILE NUMBER:	1254
SHEET:	

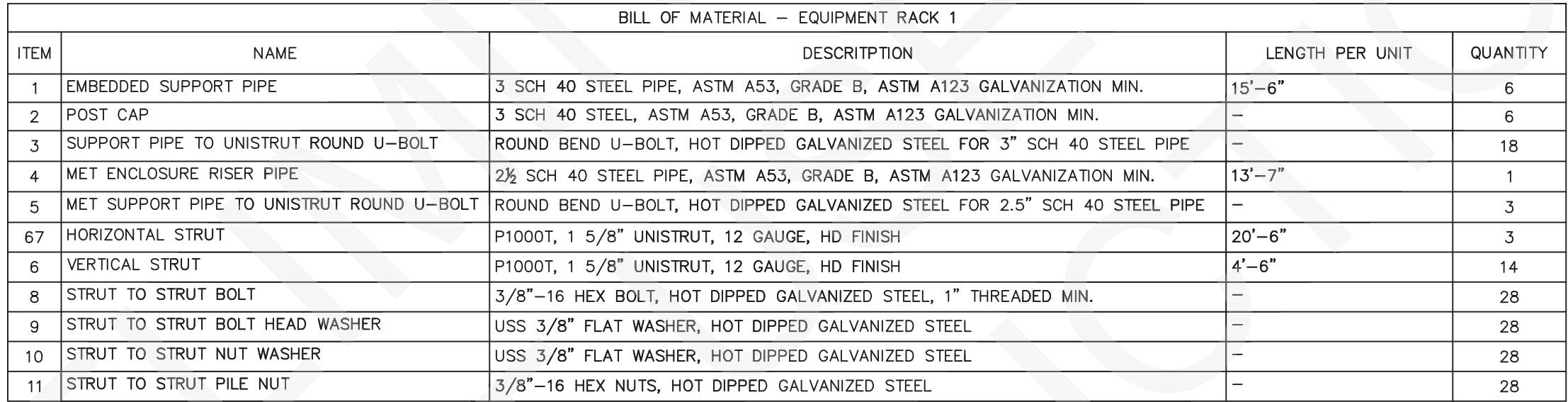




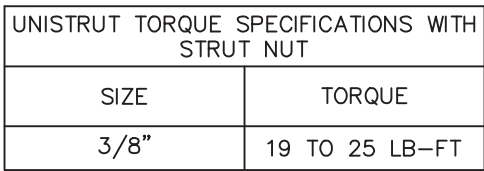
SIDE VIEW

TYPICAL EQUIPMENT RACK SUPPORT DETAIL

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



BILL OF MATERIAL - EQUIPMENT RACK 2				
ITEM	NAME	DESCRIPTION	LENGTH PER UNIT	QUANTITY
1	EMBEDDED SUPPORT PIPE	3 SCH 40 STEEL PIPE, ASTM A53, GRADE B, ASTM A123 GALVANIZATION MIN.	14'-6"	3
2	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



## 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 2018 NORTH CAROLINA STATE PLUMBING CODE, 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

3. 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 WITHOUT SPLICE.
8. EACH PILE TO BE FREE FROM DEFECTS AND DAMAGE DUE TO 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. WELDE FLANGES: ASTM A992, YIELD STRESS = 50 KSI
  - b. HSS ROUND TUBE: ASTM A500, GRADE B.
  - 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 ELECTRODE. IF ELECTRODES ARE NOT SUITED TO GRADE STEEL, WHERE FIELD-WELDING IS NOTED, IT SHOULD BE PERFORMED BY CERTIFIED WELDERS ONLY.

## REFERENCES

CABINET ELEVATIONS &amp; BOM\_\_\_\_\_12549 EP-301

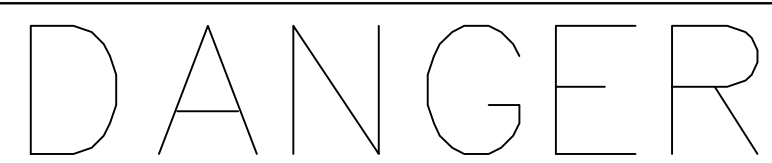












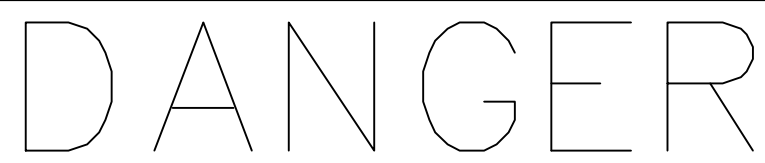
Equipment Name      Combiner Box XX-XX

1 DC COMBINER BOX  
ARC FLASH LABEL, DC  
SCALE: NTS



Equipment Name      Inverter XX-XX

2 INVERTER  
ARC FLASH LABEL, DC  
SCALE: NTS



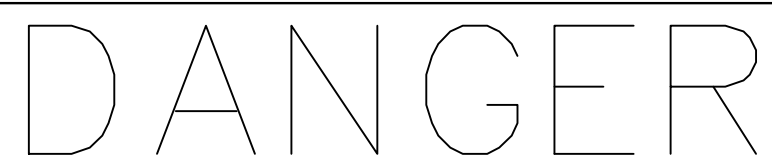
Equipment ID: Inverter XX-XX

3 INVERTER  
ARC FLASH LABEL, AC  
SCALE: NTS



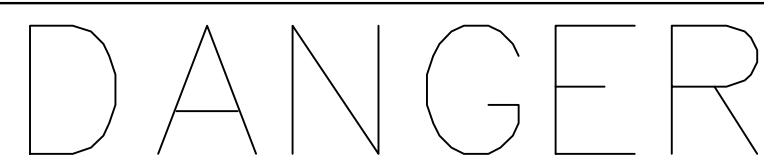
Equipment ID: AC Switchboard

4 AC SWITCHBOARD  
ARC FLASH LABEL, AC  
SCALE: NTS



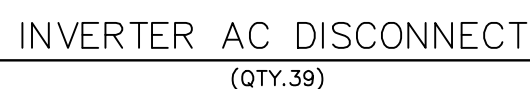
Equipment ID: Transformer XX-HV

6 TRANSFORMER (HV)  
ARC FLASH LABEL, AC  
SCALE: NTS



Equipment ID: Transformer XX-LV

7 TRANSFORMER (LV)  
ARC FLASH LABEL, AC  
SCALE: NTS



8 INVERTER LABELS  
SCALE: NTS

DC COMBINER BOX  
(QTY.39)

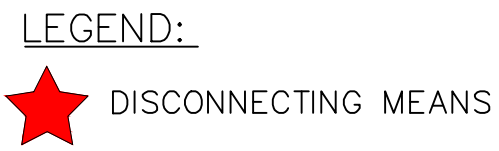
9) DC COMBINER BOX  
SCALE: NTS

METEOROLOGICAL STATION  
(QTY.1)

10 EQUIPMENT LABELS  
SCALE: NTS

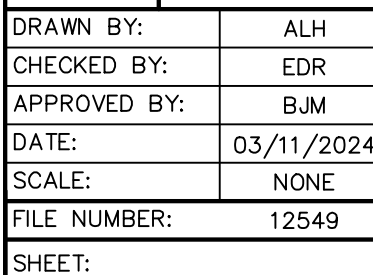
## TRANSFORMER

 CAUTION:  
MULTIPLE SOURCES OF POWER



11 MULTIPLE SOURCES LABEL  
SCALE: NTS

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



EP-450



## GLIDE Wave

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	Accommodates 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

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## YUKON Series

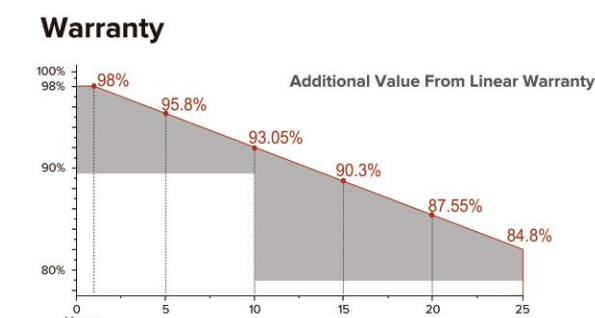
Half-Cell  
Transparent Backsheet Module

540-555Wp | 21.48%  
Module Power Output | Max Efficiency



### Key Features

- High module conversion efficiency
- Better temperature coefficient
- Super multi busbar technology
- Low attenuation long warranty
- Superior load capacity
- Higher bifaciality
- USA based liability insurance
- Houston, Texas based company



### Product Certification

IEC61215:2016, IEC 61730:2016, UL1703, UL61730	
IEC62804	PID
IEC61701	Salt Mist
IEC62716	Ammonia Resistance
IEC60068	Dust and Sand
IEC61215	Hailstone
Fire Type (UL61730):Type1	
ISO14001:2015, ISO9001:2015, ISO45001:2018	
UL, PV CYCLE, CE, TUV, FSEC, CALIFORNIA ENERGY COMMISSION	

About SEG Solar  
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 help customers reduce their energy costs and carbon footprint.



Download Datasheet



### YUKON Series SEG-XXX-BMA-TB(144Cells)

#### Electrical Characteristics

Module Type	SEG-540-BMA-TB			SEG-545-BMA-TB			SEG-550-BMA-TB			SEG-555-BMA-TB		
	Front etc.	Front MPP	Back etc.	Front etc.	Front MPP	Back etc.	Front etc.	Front MPP	Back etc.	Front etc.	Front MPP	Back etc.
Maximum Power -Pmp(Wp)	540	405	378	545	409	382	550	414	385	555	418	389
Open Circuit Voltage -Voc(V)	49.50	46.08	43.48	49.60	46.32	43.58	49.70	46.40	43.68	49.80	46.47	43.78
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 Efficiency(%)	20.90			21.10			21.29			21.48		
Power Tolerance							(0, +3%)					
Maximum System Voltage							1500V DC					
Maximum Series Fuse Rating							30 A					
Bifaciality							70%±10%					

STC: Irradiance 1000 W/m², module temperature 25°C AM-1.5

NOCT: Irradiance 800W/m², ambient temperature 20°C, module temperature 45°C, wind speed 1m/s

#### Mechanical Specifications

External Dimension	2278 x 1134 x 35 mm
Weight	27.0 kg
Solar Cells	PERC Mono 182 x 91mm(144 pcs)
Front Glass	3.2 / mm AR coating tempered glass / low iron
Frame	Anodized aluminium alloy
Junction Box	IP68 / 3 diodes
Connector Type	PV-C002-xy
Cable Type	12 AWG PV Wire (UL)
Cable Length	Portrait: 400 mm(+) / 200 mm(-) Landscape: 1200 mm(+) / 1200 mm(-) or customized length
Mechanical Load(Front)	5400 Pa / 113 psf*
Mechanical Load(Rear)	2400 Pa / 50 psf*

\*Refer to SEG Installation Manual for details

#### Packing Configuration

Container	20'GP	40'HQ
Pieces per Pallet	31	31
Pallets per Container	4	20
Pieces per Container	124	620

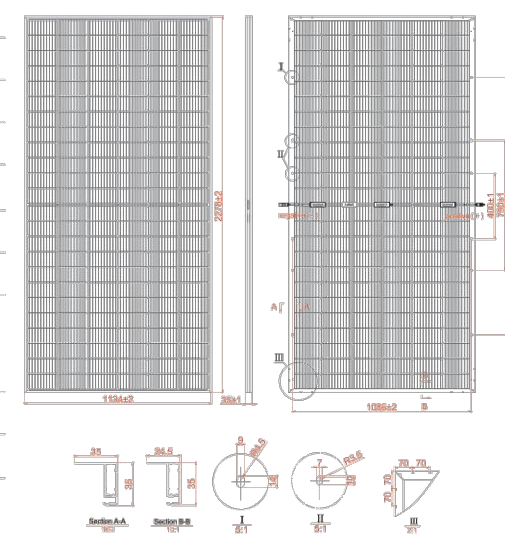
#### Temperature Characteristics

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 °C

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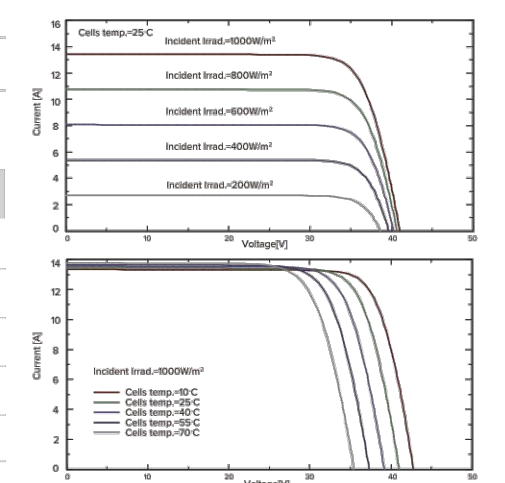
Specifications subject to technical changes SEG\_DS\_EN\_2023V4.0 © Copyright 2023 SEG Solar

#### Technical Drawing



\*Refer to SEG Installation Manual for details

#### I-V Curve



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



- Cost effective**
  - Modular architecture reduces BOS and maximizes system uptime
  - Compact design and high power density maximize transportation and logistical efficiency
- Maximum flexibility**
  - Scalable 1,500 VDC building block with best-in-class performance
  - Flexible architecture creates scalability while maximizing land usage
- Simple install, commissioning**
  - Ergonomic handling and simple connections enable quick installation
  - Centralized commissioning and control with SMA Data Manager
- Highly innovative**
  - SMA Smart Connected reduces O&M costs and simplifies field service
  - Powered by award winning ennexOS cross sector energy management platform

### SUNNY HIGHPOWER PEAK3

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.

Technical Data	Sunny Highpower PEAK3 125-US	Sunny Highpower PEAK3 150-US	Sunny Highpower PEAK3 165-US	Sunny Highpower PEAK3 172-US
<b>Input [DC]</b>				
Maximum array power 1)	250 kWp	300 kWp	330 kWp	344 kWp
Maximum system voltage			1500 Vdc	
Rated MPPT 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
MPPT trackers			1	
Maximum operating input current			180 A	
Maximum input short-circuit current			325 A	
<b>Output [AC]</b>				
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 PE	
Nominal AC voltage	480 V	600 V	630 V	660 V
Compatible transformer winding configuration			Wye-grounded	
Maximum output current			151 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 ... 0.8 lagging		
Harmonics (THD)			<3%	
<b>Efficiency</b>				
CEC efficiency	98.5 %	99.0 %	99.0 %	99.0 %
<b>Protection and safety features</b>				
Ground fault monitoring: Rise / Differential current		● / ●		
DC reverse polarity protection		●		
AC short circuit protection		●		
Monitored surge protection (Type 2): DC / AC		● / ●		
Protection class / overvoltage category (as per UL 840)		1 / IV		
<b>General data</b>				
Device dimensions (W / H / D)		770 / 830 / 462 mm (30.3 / 32.7 / 18.2 in)		
Device weight		99 kg (218 lbs)		
Operating temperature range		-25°C ... +60°C (-13°F ... +140°F)		
Storage temperature range		-40°C ... +70°C (-40°F ... +158°F)		
Audible noise emission (full power @ 1m and 25°C)		< 69 dB(A)		
Internal consumption at night		< 5 W		
Topology		Transformerless		
Cooling concept		OptiCool (forced convection, variable speed fans)		
Enclosure protection rating		Type 4X		
Maximum permissible relative humidity (non-condensing)		100%		
<b>Additional information</b>				
Mounting		Rack mount		
DC connection		Terminal lug (up to 600 kcmil CU/Al)		
AC connection		Screw terminal (up to 300 kcmil CU/Al)		
LED indicators (Status/Fault/Communication)		●		
SMA Speedwire (Ethernet network interface)		● (2 x RJ45 ports)		
Data protocols: SMA Modbus / SunSpec Modbus		● / ●		
Integrated Plant Control / Q on Demand 24/7		● / ●		
Off-grid capable / SMA Hybrid Controller compatible		- / ●		
<b>Monitoring</b>				
SMA Sunny Portal (monitoring portal)		No cost for the lifetime of the system		
SMA Smart Connected (monitoring and remote O&M service)		No cost on inverters under warranty		
Supported protocols for outboard data		SMA external API, Modbus, FTP		
<b>Certifications</b>				
Certifications and approvals (pending)		UL 62109, UL 1998, CAN/CSA-C22.2 No.62109		
Manufacturer's Declaration of Design Life		25 years		
FCC compliance		FCC Part 15, Class A		
Grid interconnection standards		IEEE 1547-2018, UL 1741 SA - CA Rule 21, HECO Rule 14H, UL1741SB		
Advanced grid support capabilities		L/HVRT, L/HVRT, Volt/VAr, Volt/VAr, Frequency-Watt, Ramp Rate Control, Fixed Power Factor		
<b>Warranty</b>				
Standard		5 years		
Optional extensions		10 / 15 / 20 / 25 years		
1) Higher DC array power permitted via site inverter load modeling in SMA Sunny Design				
Type designation	SHP 125US21	SHP 150US21	SHP 165US21	SHP 172US21
● Standard features ○ Optional features - Not available				

Toll Free +1 888 4 SMA USA  
www.SMA-America.com

SMA America, LLC



Booth & Associates  
2020 Rawlwood Drive Suite 300, Raleigh NC 27607  
NC F-0221



05/31/2024  
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NO.	DATE	ENG.	REV.	ISSUED FOR BID - 60%
A	05/31/2024			

PROJECT NAME: ROCKFISH SOLAR UTILITY STATION  
DRAWING TITLE: EQUIPMENT SPECIFICATIONS

DRAWN BY:	ALH
CHECKED BY:	EDR
APPROVED BY:	BJM
DATE:	05/29/2024
SCALE:	NONE
FILE NUMBER:	12549
SHEET:	

EP-451