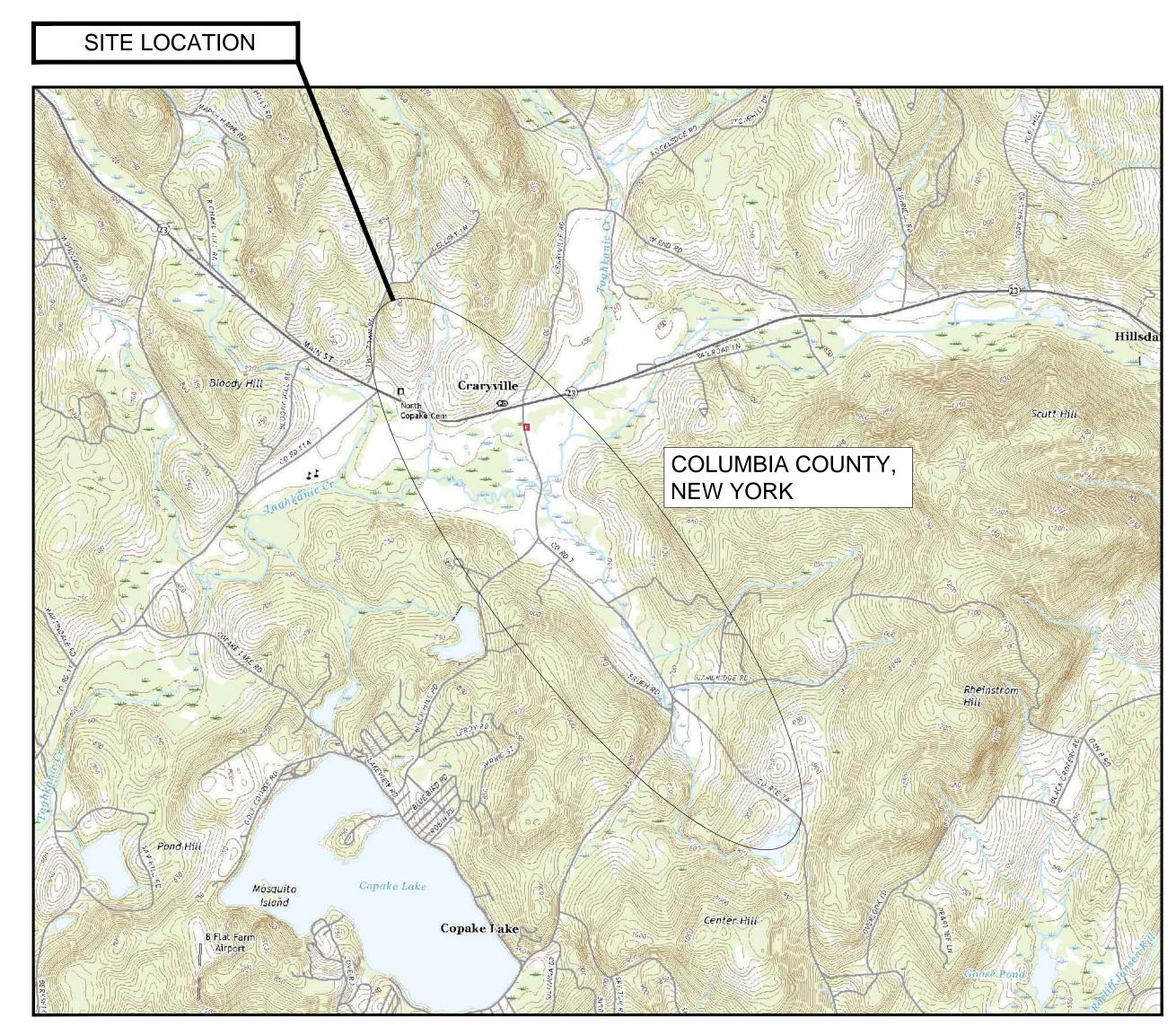
## 42MW SHEPHERD'S RUN SOLAR FACILITY

## TOWN OF COPAKE, NEW YORK APPENDIX 5-2 ELECTRICAL DESIGN DRAWINGS

SYSTEM OWNER: HECATE ENERGY COLUMBIA COUNTY 1 LLC 621 W. RANDOLPH STREET, CHICAGO, IL 60661 (713) 834-7127



CIVIL ENGINEER / LANDSCAPE ARCHITECT: STANTEC CONSULTING SERVICES INC 1599 RT 34 SUITE 3 WALL TOWNSHIP, NJ 07727 (732) 449-0099 WWW.STANTEC.COM



62,192 MODULE QUANTITY #MODULES PER STRING 26 STRING QUANTITY 2,392 CENTER TO CENTER ROW SPACING (FT) 4400kW SUNGROW SG4400UD- MV (QTY: INVERTER TYPE 3300kW SUNGROW SG3300UD- MV (QTY: 5) 2200kW SUNGROW SG2200UD- MV (QTY: 1 INVERTER QUANTITY 48,500 / 42,000 TOTAL SYSTEM SIZE (kWDC / kWAC) GROUND COVERAGE RATIO (GCR)

PROJECT DATA

DRAWING LIST

SHEET TITLE TITLE SHEET

ELECTRICAL ABBREVIATIONS AND NOTES

**ELECTRICAL SPECIFICATIONS** 

OVERALL COLLECTION & CROSSINGS PLAN

ENLARGED COLLECTIONS & CROSSINGS PLAN

ENLARGED COLLECTIONS & CROSSINGS PLAN II

ELECTRICAL WIRING DIAGRAM

ELECTRICAL WIRING DIAGRAM

ELECTRICAL WIRING DIAGRAM III

ELECTRICAL WIRING DIAGRAM IV

ELECTRICAL DETAILS I

ELECTRICAL DETAILS II

ELECTRICAL DETAILS III

ELECTRICAL DETAILS IV

ELECTRICAL LABELS I

ELECTRICAL LABELS II

ELECTRICAL LABELS III

SHEET NUMBER

E- 001 E- 002

E- 300

E- 301

E- 302

E- 400

E- 401

E- 402

E- 403

E- 500

E- 501

E- 502

E- 503

E- 520

E- 521

E- 522

MODULE WATTAGE (W STC)

10

12

AERIAL MAP **SCALE: NTS** 

#### JTILITIES ARE PLOTTED FROM FIELD LOCATION AND ANY RECORD

INFORMATION AVAILABLE, AND SHALL BE CONSIDERED APPROXIMATE. OTHER UTILITIES MAY EXIST WHICH ARE NOT EVIDENT OR FOR WHICH RECORD INFORMATION WAS NOT AVAILABLE. CONTRACTORS MUST CONTACT ALL UTILITY COMPANIES BEFORE EXCAVATING AND DRILLING. ALSO, CALL "NEW YORK ONE CALL" AT 1(800)962-7962. NEW YORK LAW REQUIRES THREE (3) WORKING DAYS NOTICE. WEBSITE: ACCEL.NEWYORKPUBLICSERVICE.COM

CALL BEFORE YOU DIG!

ONE-CALL DATE: DATE

CODE SUMMARY:

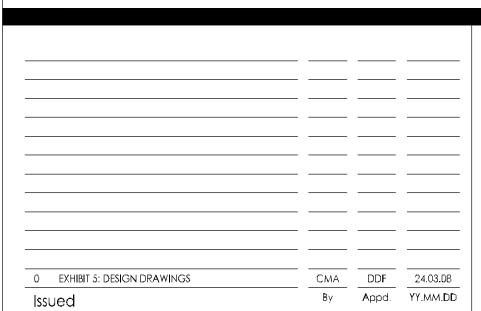
ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL PERTINENT CODES, REGULATIONS, LAWS AND ORDINANCES AS REQUIRED BY THE STATE OF NEW YORK AND THE LOCAL AUTHORITIES HAVING JURISDICTION INCLUDING BUT NOT LIMITED TO:

2017 NATIONAL ELECTRICAL SAFETY CODE (NESC)

UTILITY DISCLAIMER:

UNDERGROUND UTILITY INFORMATION DEPICTED ON THESE PLANS IS BASED ON UTILITY FEATURES OBSERVED AT THE GROUND SURFACE AND/OR UTILITY PLANS PROVIDED BY CLIENT/PROPERTY OWNER (IF PROVIDED). STANTEC DID NOT PERFORM A DETAILED SUBSURFACE UTILITY INVESTIGATION FOR ONSITE UTILITIES. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE PRESENCE/ABSENCE OF SUBSURFACE UTILITIES PRIOR TO COMMENCEMENT OF EXCAVATION ACTIVITIES VIA CONTRACTING WITH A PRIVATE UTILITY COMPANY AND/OR CONTACTING CALL BEFORE YOU DIG IN NEW YORK.

STANTEC ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF UNDERGROUND UTILITIES





DAVID D. FACCAS

NEW YORK LICENSE #099448



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42MW AC SHEPHERD'S RUN SOLAR FACILITY

COPAKE, NY

File Name: G-001 - TITLE SHEET

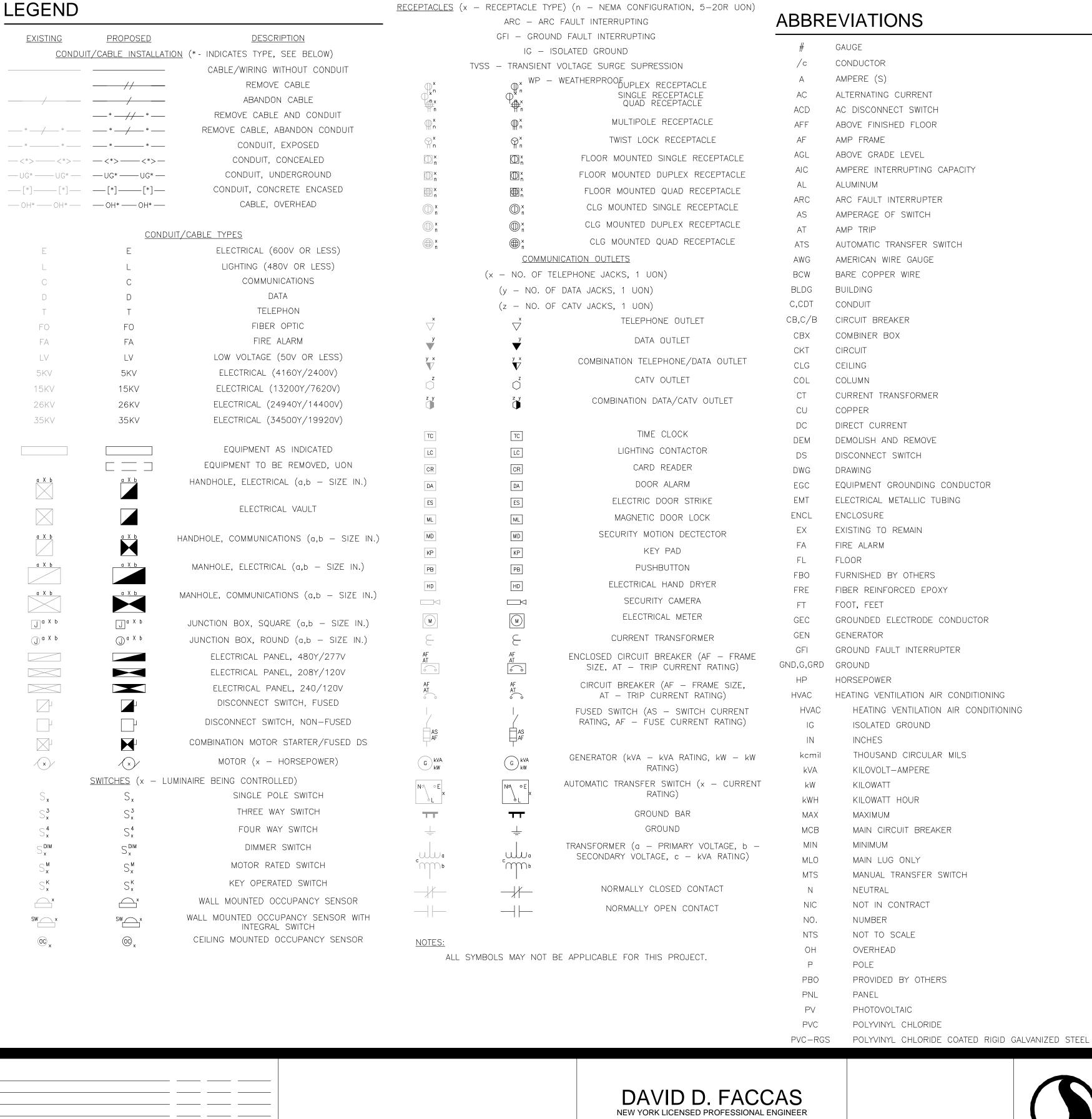
SHEPHERD'S RUN SOLAR FACILITY TITLE SHEET

Project No.	Scale	
198803637 Drawing No.	Sheet	Revision

CMA DDF CMA 24.03.08 Dwn. Chkd. Dsgn. YY.MM.DD

G-001

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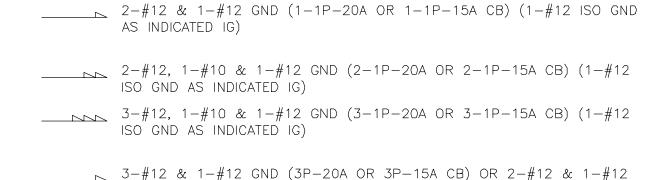
REL REMOVE AND RELOCATE RGS RIGID GALVANIZED STEEL SCH SCHEDULE SPD SURGE PROTECTIVE DEVICE SW SWITCH(ES) TYP TYPICAL UG UNDERGROUND UNDERWRITERS LABORATORY UON UNLESS OTHERWISE NOTED VIF VERIFY IN FIELD VOLT(S) WATT WP WEATHERPROOF

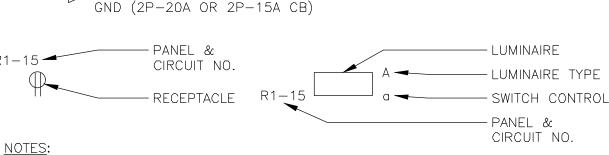
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ALL ABBREVIATIONS MAY NOT BE APPLICABLE FOR THIS PROJECT.

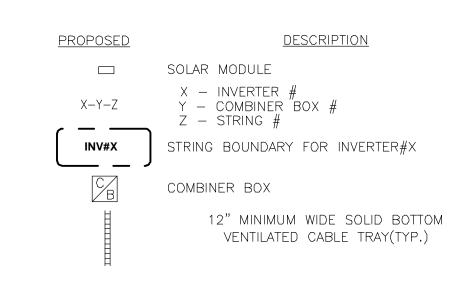
## BRANCH CIRCUIT WIRING LEGEND





- 1. NEUTRAL CONDUCTORS SHALL BE #12 AWG MINIMUM FOR DEDICATED CIRCUITS OR #10 AWG MIN FOR MULTI-CIRCUIT HOMERUNS WITH SHARED NEUTRALS (RECEPTACLES, EQUIPMENT & NON-DIMMING LIGHTING).
- 2. ALL GFI & ARC CIRCUIT BREAKERS AND ALL LIGHTING FIXTURES CONTROLLED BY DIMMERS SHALL BE WIRED TO A CIRCUIT HAVING A DEDICATED NEUTRAL CONDUCTOR. STANDARD SHARED NEUTRAL HOMERUNS ARE NOT PERMITTED.
- 3. CIRCUITS AND HOMERUNS WITH ISOLATED GROUND RECEPTACLES SHALL CONTAIN AN ADDITIONAL #12 AWG INSULATED GROUND CONDUCTOR.
- 4. CONDUCTORS SHALL BE INCREASED FOR VOLTAGE DROP AND DERATING AS PER APPLICABLE ELECTRICAL CODE. FOR CIRCUITS THAT ARE BETWEEN 100' AND 150' IN LENGTH, PHASE AND NEUTRAL CONDUCTORS SHALL BE #10 AWG. FOR CIRCUITS THAT ARE BETWEEN 150' AND 225' IN LENGTH, PHASE AND NEUTRAL CONDUCTORS SHALL BE #8 AWG. FOR LENGTHS GREATER THAN 225' IN LENGTH, VERIFY CONDUCTOR SIZES WITH ENGINEER.

### SOLAR PV LEGEND



NOTES:

ALL SYMBOLS MAY NOT BE APPLICABLE FOR THIS PROJECT.

### **DEFINITION OF TERMS**

- 1. WHEREVER IN THE CONTRACT DOCUMENTS THE WORD "CLIENT" IS USED, IT SHALL BE UNDERSTOOD THAT HECATE IS INTENDED.
- 2. WHEREVER IN THE CONTRACT DOCUMENTS THE WORD "ENGINEER" IS USED, IT SHALL BE UNDERSTOOD THAT "STANTEC CONSULTING SERVICES INC." IS INTENDED.
- 3. "WORK" SHALL BE DEEMED TO CONSIST OF ALL LABOR AND OPERATIONS, TRANSPORTATION, HOISTING, MATERIALS, TOOLS, EQUIPMENT, SERVICES, INSPECTIONS, INVESTIGATIONS, COORDINATION AND SUPERVISION REQUIRED AND/OR REASONABLY NECESSARY TO PRODUCE THE CONSTRUCTION REQUIRED BY THE CONTRACT DOCUMENTS.
- 4. "FURNISH" MEANS THE DESIGN, FABRICATION, PURCHASE AND DELIVERY TO THE JOB SITE.
- 5. "INSTALL OR INSTALLATION" MEANS THE ACT OF PHYSICALLY PLACING, APPLYING, SETTING, ERECTING, ANCHORING, SECURING, ETC., CONSTRUCTION MATERIALS, EQUIPMENT, FURNISHINGS, APPLIANCES, AND SIMILAR ITEMS SPECIFIED AND FURNISHED AT THE JOB SITE. INSTALLATION OF SPECIFIED ITEMS SHALL BE COMPLETE IN ALL RESPECTS.
- 6. "PROVIDE" MEANS TO FURNISH AND INSTALL CONSTRUCTION MATERIAL, EQUIPMENT, ETC. AS DEFINED ABOVE.
- THE FOLLOWING ARE DEFINITIONS OF SHOP DRAWING STAMP ACTIONS:
- A. NO EXCEPTIONS TAKEN" MEANS THAT THE SHOP DRAWING IS CORRECT AS TO PERFORMANCE, CAPACITY, ETC. AND SUBSTANTIAL CONFORMANCE TO THE CONTRACT DRAWINGS AND SPECIFICATIONS. FABRICATION AND/OR PURCHASE MAY COMMENCE.
- B. "MAKE CORRECTIONS NOTED" MEANS THAT THE SHOP DRAWING IS CORRECT AS TO PERFORMANCE, CAPACITY, ETC. AND SUBSTANTIAL CONFORMANCE TO THE CONTRACT DRAWINGS AND/OR SPECIFICATIONS, SUBJECT TO AND IN COMPLIANCE WITH THE ANNOTATIONS AND/OR CORRECTIONS INDICATED ON THE SHOP DRAWING, FABRICATION AND/OR PURCHASE MAY COMMENCE WITH THE COMMENTS ADDRESSED.
- C. "AMEND AND RESUBMIT" MEANS THAT THE COMMENTS AND/OR CORRECTION ARE SO EXTENSIVE AND IMPORTANT THAT THE REVIEWER WANTS TO SEE HOW THE COMMENTS AND/OR CORRECTIONS ARE RESOLVED PRIOR TO RELEASE FOR FABRICATION AND/OR PURCHASE. FABRICATIONS AND/OR PURCHASE MAY NOT COMMENCE.
- D. "REJECTED" MEANS THAT THE SHOP DRAWING DOES NOT COMPLY OR CONFORM TO THE CONTRACT DRAWINGS AND/OR SPECIFICATIONS, FABRICATION AND/OR PURCHASE MAY NOT COMMENCE.



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42MW AC SHEPHERD'S RUN SOLAR FACILITY

COPAKE, NY

File Name: E-001 - ELECTRICAL ABBREVIATIONS AND NOTE DF CMA 24.03.08 Dwn. Chkd. Dsgn. YY.MM.DD SHEPHERD'S RUN SOLAR FACILITY ELECTRICAL ABBREVIATIONS AND NOTES

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ORIGINAL SHEET - ANSLO

Issued

0 EXHIBIT 5: DESIGN DRAWINGS

CMA DDF 24.03.08

By Appd. YY.MM.DD

NEW YORK LICENSE #099448

- A. WIRE AND CABLE: PERFORM INSULATION RESISTANCE AND CONTINUITY TESTS FOR ALL CONDUCTORS. THESE SHALL BE COMPLETED PRIOR TO ENERGIZING AND WHILE NOT CONNECTED TO AN ENERGY SOURCE. INVESTIGATE AND TAKE REMEDIAL ACTION WHEN CONTINUITY VALUES EXCEED 1.0 OHM AND/OR INSULATION RESISTANCE TESTS LESS THAN 5 MEGAOHMS.
- B. ALL ELECTRICAL TESTING SHALL BE IN ACCORDANCE WITH NETA STANDARDS FOR 1500VDC RATING.
- C. GROUND RESISTANCE TESTS: RESISTANCE OF THE ELECTRICAL SYSTEM GROUNDING SHALL BE TESTED TO GROUND AT THE MAIN GROUND ELECTRODE CONNECTION AND AT THE CONNECTION TO THE BUILDING STEEL GROUND TO ENSURE THAT GROUND RESISTIVITY VALUES DO NOT EXCEED 5 OHMS.

#### **GROUNDING**

- A. COMPLY WITH REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION, NEC. UL AND IEEE STANDARDS. SIZE GROUND CONDUCTORS IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE EXCEPT WHERE LARGER SIZES ARE INDICATED, ALL GROUND CONDUCTORS SHALL BE COPPER AND NOT SMALLER THAN NO.12 AWG. PROVIDE A COMPLETE ASSEMBLY OF MATERIALS REQUIRED FOR GROUNDING AND BONDING.
- B. GROUNDING BUSHINGS SHALL BE HOT-DIPPED GALVANIZED BODY, MOLDED PHENOLIC INSULATION, RATED AT 150 °C. WITH COPPER-TINNED LAY-IN LUG. PROVIDE FOR ALL INCOMING AND OUTGOING CONDUITS TO THE DISTRIBUTION EQUIPMENT.
- C. GROUND RODS SHALL BE STEEL CORE, COPPER JACKETED TYPE, HIGH STRENGTH STEEL ALLOY CORE WITH A MOLTEN-WELDED COVERING AND CONICAL POINT WITH CHAMFER EDGE AT TOP. DRIVING HEADS SHALL BE USED TO PROTECT TOPS OF RODS DURING DRIVING. MINIMUM SIZE ROD SHALL BE 3/4" INCH DIAMETER AND 10 FOOT LONG. GROUND RODS SHALL BE VERTICALLY DRIVEN TO THEIR FULL LENGTH BELOW DESIGN ELEVATION WITH TOPS 12" BELOW SUB-GRADE.
- D. GROUND CONNECTORS FOR CONNECTING CABLE TO PIPE SHALL BE HIGH COPPER ALLOY OR BRONZE FITTINGS. PROVIDE AN OFFSET STEEL TONGUE FOR CONNECTIONS TO STEEL AND A DRILLED TONGUE FOR CONNECTION TO COPPER BUS BAR.
- E. GROUNDING TEST WELL SHALL BE HANGER GAW910 OR APPROVED EQUAL 10" NPS BY 24" LONG CLAY TILE PIPE WITH BELLED END AND GROUND ROD. PRECAST 3000 PSI CONCRETE COVER WITH 1" DIAMETER HOLE IN CENTER AND 24" X 24" X 14" GAGE STEEL MESH SET FLUSH WITH GRADE.
- F. PARTS OF THE ELECTRICAL INSTALLATION TO BE GROUNDED AND BONDED SHALL INCLUDE BUT NOT BE LIMITED TO ELECTRICAL EQUIPMENT, RACEWAYS, BOXES, CABINETS AND OTHER NON-CURRENT CARRYING METAL PARTS OF THE WIRING SYSTEM, METAL CONDUIT, SWITCHGEAR, HOUSING AND NEUTRALS OF TRANSFORMERS, LIGHTING FIXTURES, PANEL DEVICES, FENCES AROUND ELECTRICAL EQUIPMENT AS APPLICABLE TO EQUIPMENT INSTALLED ON THIS PROJECT.
- G. USE IRREVERSIBLE CRIMPS FOR UNDERGROUND, PERMANENTLY CONCEALED AND INACCESSIBLE CONNECTIONS TO FORM SOLID METAL JOINTS, MAKE ABOVE GRADE GROUND CONNECTIONS WITH MECHANICAL PRESSURE TYPE GROUND CONNECTIONS UNLESS OTHERWISE NOTED.
- H. APPLY CORROSION—RESISTANT FINISH TO FILED—CONNECTIONS. BURIED METALLIC GROUNDING AND BONDING PRODUCTS, AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED, WHICH ARE SUBJECTED TO CORROSIVE ACTION.
- I. GALVANIZATION SHALL BE REMOVED AT ANY MECHANICAL GROUNDING POINTS TO ENSURE A SOLID GROUNDING CONNECTION.

#### CONDUITS AND FITTINGS

- A. ABOVE GRADE STUB UPS FROM PVC TO BE SCHEDULE 80 PVC, ABOVE GROUND: PROVIDE WEATHERPROOF CONDUIT AND FITTINGS PER NEC. CONCRETE TYPE COUPLINGS SHALL BE USED WHERE BURIED IN CONCRETE OR MASONRY. WHERE INSTALLED IN WET LOCATIONS, COUPLINGS SHALL COMPLY WITH NEC 314.15. THREADLESS COUPLINGS AND CONNECTORS SHALL NOT BE USED ON THREADED CONDUIT ENDS UNLESS LISTED FOR THE PURPOSE.
- B. JOIN RACEWAYS WITH FITTINGS DESIGNED AND APPROVED FOR THE PURPOSE AND MAKE JOINTS TIGHT. WHERE JOINTS CANNOT BE MADE TIGHT, USE BONDING JUMPERS TO PROVIDE ELECTRICAL CONTINUITY OF THE RACEWAY SYSTEM. MAKE RACEWAY TERMINATIONS TIGHT. WHERE SUBJECT TO VIBRATION OR DAMPNESS, USE INSULATION BUSHINGS TO PROTECT CONDUCTORS. CUT CONDUIT SQUARE USING SAW OR PIPE CUTTER AND DE-BURR CUT ENDS.
- C. USE CONDUIT HUBS OR SEALING LOCKNUTS TO FASTEN CONDUIT TO BOXES IN DAMP AND WET LOCATIONS.
- D. SUPPORT CONDUIT USING STEEL OR MALLEABLE IRON SINGLE OR DOUBLE HOLE CONDUIT STRAPS, LAY-IN ADJUSTABLE HANGERS, CLEVIS HANGERS AND SPLIT HANGERS AS REQUIRED, FASTEN CONDUIT SUPPORTS TO BUILDING STRUCTURE AND SURFACES. DO NOT ATTACH CONDUIT SUPPORTS TO CEILING SUPPORT WIRES, OR ANY OTHER CONDUIT, PIPE, DUCT, ETC. DO NOT SUPPORT CONDUIT WITH WIRE OR PIPE HANGER STRAPS.
- E. BELOW GRADE: PVC SCHEDULE 40 CONDUIT NEMA TC2 UL 651, WITH MATCHING FITTINGS BY SAME I. CABLE TIES FOR WIRE AND CABLE: PROVIDE CLIPS FROM WILEY ELECTRONICS OR APPROVED EQUAL. MANUFACTURER AS THE CONDUIT. COMPYING WITH NEMA TC 3 AND UL 51413.
- F. CONTRACTOR SHALL USE POLYWATER FST PRODUCTS FOR CONDUIT AND RACEWAY PENETRATIONS MANUFACTURED BY AMERICAN POLYWATER CORPORATION OR APPROVED EQUAL.

### WIRE AND CABLE

- A. CONDUCTOR: BARE, SOLID OR STRANDED ALUMINUM OR COPPER PER ASTM B-3 OR B-8 INSULATION. MEETS OR EXCEED ALL REQUIREMENTS OF ICEA S-66524, NEMA WC-7 AND UL STANDARD 44 AND 854. LISTED BY UL AS TYPE THHN/THWN OR XHHW-2 OR USE-2, CSA RATED
- B. ALL STRING WIRING SHALL BE XLPE COPPER. ALL CABLE RUNS FROM COMBINER BOXES TO INVERTERS SHALL BE XLPE AL. ALL MEDIUM VOLTAGE CABLE RUNS SHALL BE EPR CU OR AL. ALL OTHER LOW VOLTAGE FEEDERS SHALL BE COPPER OR ALUMINUM.
- C. PULL CONDUCTORS SIMULTANEOUSLY WITH UL LISTED PULLING COMPOUND OR LUBRICANT FOR WIRE #4 AWG AND LARGER. USE PULLING MEANS INCLUDING, FISH TAPE, CABLE, ROPE, AND BASKET WEAVE WIRE/CABLE GRIPS WHICH WILL NOT DAMAGE CABLES OR RACEWAYS.

By Appd. YY.MM.DD

D. ALL WIRING SHALL BE FACTORY COLOR CODED, FOR MODIFICATIONS TO EXISTING SYSTEMS, MATCH COLOR CODING SCHEME ALREADY IN PLACE. OTHERWISE FEEDER AND BRANCH CIRCUIT CONDUCTORS SHALL BE COLOR CODED AS FOLLOWS:

<u>208Y/120 VOLTS</u> 480Y/277 VOLTS BLACK BROWN RED ORANGE BLUE YELLOW NEUTRAL WHITE GRAY GROUND GREEN GREEN

- E. ALL WIRING IN PANELS SHALL BE NEATLY TIE-WRAPPED AND TRAINED WITHIN GUTTER SPACES.
- F. ALL WIRING ON DC SIDE TO BE BLACK FOR +V , WHITE FOR -V, AND GREEN/BARE FOR GROUND, AND INSTALLATION SHALL BE MARKED SUNLIGHT RESISTANT.
- G. WIRE SIZES SHOWN ON PLANS MAY BE OVERSIZED TO ACCOMMODATE VOLTAGE DROP. CONTRACTOR MAY ELECT TO TAP DOWN WIRE SIZE WIRE AT SOURCE AND/OR APPLIANCE IN A LISTED MANNER COMPLIANT WITH THE CODE THAT MAY INCLUDE BUT NOT BE LIMITED TO THE INSTALLATION OF JUNCTION BOXES WHICH MAY NOT BE SHOWN ON THE PLAN. NO OFFSET PIGTAIL ADAPTORS SHALL BE USED.

- A. CAST-IRON OR MALLEABLE STEEL BOXES: NEMA FB 1, TYPE FD, IRON ALLOY OR MALLEABLE STEEL, WATERPROOF, WITH THREADED RACEWAY ENTRIES, GASKETED COVER BY BOX MANUFACTURER AND FEATURES AND ACCESSORIES SUITABLE FOR EACH LOCATION, INCLUDING MOUNTING EARS, THREADED SCREW HOLES FOR DEVICES AND CLOSURE PLUGS.
- B. GALVANIZED STEEL PULL BOXES: NEMA OS 1 WITH WELDED SEAMS. WHERE NECESSARY TO PROVIDE A RIGID ASSEMBLY, CONSTRUCT WITH INTERNAL STRUCTURAL STEEL BRACING, HOT-DIP GALVANIZED AFTER FABRICATION. COVER SHALL BE GASKETED. SCREWED OR BOLTED ON OF MATERIAL SAME AS BOX AND SHALL BE OF SIZE AND SHAPE TO SUIT APPLICATION. SIZES SHALL BE ADEQUATE TO MEET NEC VOLUME REQUIREMENTS, BUT IN NO CASE SMALLER THAN SIZES INDICATED. REMOVE SHARP EDGES WHERE THEY MAY COME IN CONTACT WITH WIRING OR PERSONNEL.
- C. FOR INTERIOR DRY LOCATIONS USE GALVANIZED SHEET STEEL, NEMA TYPE 1. FOR LOCATIONS EXPOSED TO WEATHER OR DAMPNESS USE CAST IRON OR MALLEABLE STEEL, NEMA TYPE 3R BOXES, FULLY GASKETED. FOR WET LOCATIONS USE NEMA TYPE 4 BOXES WITH FULLY GASKETED WEATHERPROOF COVERS.
- D. ELECTRICALLY GROUND ALL METAL BOXES TO CONDUIT SYSTEM. WHERE WIRING TO ITEMS INCLUDES A GROUNDING CONDUCTOR, ALSO PROVIDE A GROUNDING TERMINAL IN THE INTERIOR OF THE CABINET, BOX OR ENCLOSURE.

#### SUPPORTING DEVICES

- A. PROVIDE MATERIALS, SIZES AND TYPES OF ANCHORS, FASTENERS AND SUPPORTS TO CARRY THE LOADS OF EQUIPMENT AND CONDUIT, CONSIDER THE WEIGHT OF WIRE IN CONDUIT WHEN SELECTING PRODUCTS. ATTACHMENTS SHALL BE RATED BY AN INDEPENDENT TESTING LABORATORY FOR THE RATED LOADING WITH A SAFETY FACTOR OF FIVE. USE VIBRATION AND SHOCK-RESISTANT FASTENERS FOR ATTACHMENTS TO CONCRETE SLABS. DO NOT USE SPRING STEEL CLIPS AND CLAMPS, POWDER-ACTUATED ANCHORS, TESTING FOR CONCRETE AND STEEL ATTACHMENTS SHALL BE IN ACCORDANCE WITH TEST CRITERIA ESTABLISHED BY UL SUPPORTS, SUPPORT HARDWARE, AND FASTENERS SHALL BE PROTECTED WITH ZINC COATING OR WITH TREATMENT OF EQUIVALENT CORROSION RESISTANCE. PRODUCTS FOR USE OUTDOORS SHALL BE HOT-DIP GALVANIZED. IN CORROSIVE AREAS, PRODUCTS SHALL BE TREATED WITH 15 MIL PVC COATING. ALL PRODUCTS SHALL BE TREATED AFTER CUTTING AND THREADING.
- B. PROVIDE SUPPORTS FOR ALL RACEWAYS INCLUDING U-CHANNEL SYSTEMS, RISER CLAMPS, CONDUIT STRAPS, THREADED C-CLAMPS WITH RETAINERS AND WALL BRACKETS.
- C. STEEL SURFACES: MACHINE SCREWS, WELDED THREADED STUDS, OR SPRING-TENSION CLAMPS.
- D. PARTITIONS OF LIGHT STEEL CONSTRUCTION: SHEET METAL SCREWS.
- E. WOOD ELEMENTS: USE WOOD SCREWS.
- F. U-CHANNEL SYSTEMS: 12 GAUGE CARBON STEEL CHANNELS. WITH 9/16" X 7/8" HOLES IN TOP SURFACE, 2 INCHES ON CENTER. PROVIDE FITTINGS AND ACCESSORIES THAT MATE AND MATCH WITH U-CHANNEL AND ARE OF THE SAME MANUFACTURER. PROVIDE ANGLES AND OTHER STANDARD STRUCTURAL SHAPES, CONNECT WITH WELDS OR MACHINE BOLTS TO FORM RIGID SUPPORTS.
- G. A HANGER OR SUPPORT SHALL BE INSTALLED CLOSE TO THE POINT OF A CHANGE IN DIRECTION OF ALL CONDUIT RUNS, IN EITHER A HORIZONTAL OR VERTICAL PLANE.
- H. SPACING OF CONDUIT SUPPORTS AS PER NEC REQUIREMENTS.

- A. WIRE DESIGNATION MARKERS: PROVIDE FUNGUS RESISTANT, VINYL OR VINYL-CLOTH CONDUCTOR MARKERS IN OUTLET, JUNCTION AND PULL BOXES INDICATING WIRE USAGE (I.E SWITCH LEG, POWER FEED, TRAVELERS, ETC). THIS IS IN ADDITION TO WIRE CIRCUIT IDENTIFICATION REQUIREMENTS AND IS INTENDED TO CLARIFY WIRING WITHIN BOXES.
- B. CIRCUIT IDENTIFICATION: PROVIDE WIRE MARKERS ON EACH CONDUCTOR IN PANELBOARD GUTTERS, PULL BOXES, OUTLET AND JUNCTION BOXES, AND AT LOAD CONNECTION. IDENTIFY BRANCH CIRCUIT OR FEEDER NUMBER FOR POWER AND LIGHTING CIRCUITS, AND WIRE DESIGNATION INDICATED ON EQUIPMENT MANUFACTURER'S SHOP DRAWING FOR CONTROL WIRING. MAINTAIN CONSISTENCY WITH SIMILAR PREVIOUSLY ESTABLISHED IDENTIFICATION SCHEMES FOR THE FACILITY'S ELECTRICAL INSTALLATIONS.
- C. NAMEPLATES: PROVIDE ENGRAVED, MELAMINE PLASTIC LAMINATE NAMEPLATES, 1/16-INCH MINIMUM THICK FOR SIGNS UP TO 20 IN2 AND 1/8" THICK FOR LARGER SIZES. PROVIDE ENGRAVED LEGEND IN BLACK LETTERS ON YELLOW (106) FOR CAUTION LABELS AND ORANGE (152) FOR WARNING LABELS. ADHESIVE MOUNTING IS TO BE PROVIDED WHEREVER NAME PLATES ARE USED IN LOCATIONS EXPOSED TO WEATHER AND THEY SHALL BE WEATHER PROOF AND DURABLE. LETTERS SHALL BE 1/2" HIGH AND STANDARD ENGRAVER'S STYLE. FASTENERS SHALL BE SELF—TAPPING STAINLESS STEEL SCREWS OR NUMBER 10/32 STAINLESS STEEL MACHINE SCREWS WITH NUTS AND FLAT AND LOCK WASHERS. PROVIDE NAMEPLATES ON ALL MAJOR EQUIPMENT INCLUDING BUT NOT LIMITED TO PANELBOARDS, CABINETS, COMBINER BOXES, TRANSFORMERS, ENCLOSURES, SWITCHGEAR, SWITCHBOARD, DISCONNECT SWITCHES, AND INVERTERS.

## **GENERAL NOTES**

- 1. THE CONTRACTOR/INSTALLER OF THE SOLAR PV SYSTEM SHALL CONFORM TO OSHA REQUIREMENTS DURING THE CONSTRUCTION PHASE. JOB SITE SAFETY AND CONSTRUCTION PROCEDURES ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR/INSTALLER.
- 2. REFER TO ELECTRICAL DRAWING FOR DETAILED PANEL INFORMATION.
- 3. IN CASE OF CONFLICT BETWEEN THE STRUCTURAL DRAWINGS AND THE ELECTRICAL DRAWINGS, THE MOST RIGID REQUIREMENTS SHALL GOVERN.
- 4. THE CONTRACTOR/INSTALLER SHALL VERIFY ALL EXISTING INFORMATION SHOWN (DIMENSIONS, OBSTRUCTIONS, ETC.) AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATIONS OF THE PV SYSTEM.
- 5. IN CASE OF CONFLICT BETWEEN THE CONTRACT DRAWINGS AND THE SPECIFICATIONS, THE MOST RIGID REQUIREMENTS SHALL GOVERN.
- 6. ALL COSTS OF INVESTIGATION AND/OR REDESIGN DUE TO CONTRACTOR IMPROPER INSTALLATION OF THE PV SYSTEM OR OTHER ITEMS NOT IN CONFORMANCE WITH THE CONTRACT DOCUMENTS SHALL BE AT THE CONTRACTOR/INSTALLER'S EXPENSE.
- 7. ALL CONSTRUCTION IS TO BE PERFORMED IN STRICT CONFORMANCE WITH ALL APPLICABLE TOWN, COUNTY & STATE AND/OR ANY OTHER GOVERNING BODY STANDARDS.
- 8. DO NOT SCALE THESE DRAWINGS, USE DIMENSIONS. CONTRACTOR MUST VERIFY DIMENSIONS SHOWN ON PLAN PRIOR TO INSTALLATION. IF THERE IS A DISCREPANCY IT IS CONTRACTOR/INSTALLER'S RESPONSIBILITY TO NOTIFY THE ENGINEER IMMEDIATELY.
- 9. CONTRACTOR SHALL MEGGER ENTIRE SYSTEM WITH 1000 VOLTS INSTRUMENT AND SUBMIT RESULTS TO THE ENGINEER PRIOR TO COMMISIONING. SEE ELECTRICAL SPECIFICATIONS FOR MORE INFORMATION ON TESTING.
- 10. PROVIDE ALL MATERIALS LABOR, EQUIPMENT AND SERVICES AND PERFORM ALL OPERATIONS IN CONNECTION WITH THE ELECTRICAL WORK. IT IS THE INTENT THAT THESE DRAWINGS PROVIDE THE WORK REQUIRED FOR AN ELECTRICAL INSTALLATION THAT IS COMPLETE IN EVERY RESPECT, READY FOR OPERATION.
- 11. THE DRAWINGS, AND GENERAL REQUIREMENTS CONTAINED IN THE CONTRACT, GOVERN THIS WORK. WHERE ITEMS OF GENERAL CONDITIONS ARE REPEATED HEREIN, IT IS INTENDED TO QUALIFY OR TO CALL PARTICULAR ATTENTION TO THEM; IT IS NOT INTENDED THAT ANY OTHER PARTS OF THE GENERAL CONDITIONS SHALL BE ASSUMED TO BE OMITTED.
- 12. ALL WORK SHALL COMPLY WITH ALL LOCAL, STATE AND FEDERAL CODES AND THE REQUIREMENTS OF ANY OTHER AUTHORITIES HAVING JURISDICTION. ALL MATERIAL AND EQUIPMENT SHALL BE UL LISTED AND SHALL BEAR THE UL INSPECTION LABEL WHEREVER STANDARDS HAVE BEEN ESTABLISHED. AT THE COMPLETION OF THE WORK, SECURE CERTIFICATES OF APPROVAL FROM THE VARIOUS AUTHORITIES HAVING JURISDICTION AND DELIVER SAME TO ("THE ENGINEER").
- 13. ALL WORK SHALL COMPLY WITH NECA STANDARD OF INSTALLATION (PUBLISHED BY THE NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION) AND NFPA 70 - NATIONAL ELECTRICAL CODE (NEC) AND ALL APPLICABLE SAFETY STANDARDS. COMPLY WITH APPLICABLE STANDARDS THE OWNER HAS DEVELOPED AS THEY PERTAIN TO THIS WORK.
- 14. BEFORE SUBMITTING THE BID, VISIT EACH SITE WHERE WORK IS REQUIRED, SURVEY THE EXISTING CONDITIONS AND BECOME FAMILIAR WITH THE DIFFICULTIES WHICH WILL AFFECT THE EXECUTION AND COMPLETION OF THE WORK. INVESTIGATE THE NATURE AND LOCATION OF THE WORK, THE GENERAL AND LOCAL CONDITIONS, PARTICULARLY THOSE BEARING UPON THE WORK REQUIRED, TRANSPORTATION, DISPOSAL, HANDLING AND STORAGE OF MATERIALS, AVAILABILITY OF LABOR, WATER, ELECTRIC POWER, ROADS AND PHYSICAL CONDITIONS AT THE SITE NEEDED FOR THE PROSECUTION OF THE WORK AND ALL OTHER MATTERS UPON WHICH INFORMATION IS REASONABLY OBTAINABLE AND WHICH CAN IN ANY WAY AFFECT THE WORK OR THE COST THEREOF UNDER THE CONTRACT.
- 15. PROCURE AND PAY FOR ALL CERTIFICATES, FEES, TESTS, INSPECTIONS, BONDS, DEPOSITS AND ESCROW ACCOUNTS, REQUIRED FOR COMPLETE INSTALLATION OF THE WORK. GIVE ALL NOTICES REQUIRED BY LAW, ORDINANCES, OR THE RULES AND REGULATIONS OF THE VARIOUS AUTHORITIES. COMPLY WITH ALL ORDERS OF THE LOCAL DEPARTMENT OF BUILDINGS, COUNTY DEPARTMENT OF HEALTH, FIRE MARSHAL, ETC. DELIVER TO THE OWNER'S REPRESENTATIVE ALL PERMITS AND CERTIFICATES OF APPROVAL ISSUED BY ALL TOWN, COUNTY, AND STATE AGENCIES HAVING JURISDICTION IN CONNECTION WITH THIS WORK, BEFORE THE CERTIFICATE FOR THE FINAL PAYMENT IS ISSUED.
- 16. NO WORK SHALL BE COVERED OVER UNTIL TESTS HAVE BEEN PERFORMED AND THE AUTHORITIES HAVING JURISDICTION HAVE EXAMINED, INSPECTED AND APPROVED THE TESTS AND THE WORK. PROVIDE ALL CONTROLLED INSPECTIONS CONTROLLED REQUIRED BY THE REGULATIONS OF TOWN, COUNTY, AND STATE. THE CONTROLLED INSPECTIONS SHALL BE MADE BY AN INSPECTOR MEETING THE PROFESSIONAL REQUIREMENTS SET FORTH BY STATE AND LOCAL LAWS AND SHALL BE CARRIED OUT IN ACCORDANCE WITH APPLICABLE TOWN, COUNTY, AND STATE BUILDING CODES.
- 17. TAKE OUT ALL NECESSARY INSURANCE, FREE OF EXTRA CHARGE AND AGREE TO INDEMNIFY AND SAVE HARMLESS THE PARTY CONTRACTING FOR SERVICES, AGAINST LOSS OR EXPENSE.
- 18. THE DRAWINGS DO NOT UNDERTAKE TO ILLUSTRATE OR SET FORTH EVERY ITEM NECESSARY FOR THE WORK, AS IT IS ASSUMED THAT WITH THIS BID SUBMISSION, THE CONTRACTOR ACKNOWLEDGES THAT HE IS EXPERT IN THE SEVERAL LINES OF THE WORK AND IS CAPABLE OF INTERPRETING THEM. WHERE NO SPECIFIED MANUFACTURER OR QUALITY OF MATERIAL IS GIVEN, A FIRST-CLASS STANDARD ARTICLE AS APPROVED BY THE ENGINEER SHALL BE FURNISHED.
- 19. THE DRAWINGS ARE GENERALLY DIAGRAMMATIC AND ARE INTENDED TO CONVEY THE SCOPE OF WORK AND INDICATE GENERAL ARRANGEMENT OF EQUIPMENT, CONDUITS, PANELS, FIXTURES, ETC. THE LOCATION OF ALL ITEMS SHOWN THAT ARE NOT DEFINITELY FIXED BY DIMENSIONS ARE APPROXIMATE. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED AT THE PROJECT AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.
- 20. MAINTAIN AND PROTECT ALL EQUIPMENT, MATERIALS AND TOOLS FROM LOSS OR DAMAGE FROM ALL CAUSES UNTIL FINAL ACCEPTANCE BY THE OWNER.
- 21. THE OWNER'S REPRESENTATIVE SHALL BE NOTIFIED, IN WRITING, WHEN INTERRUPTION OF THE PRESENTLY MAINTAINED SERVICES, MECHANICAL, ELECTRICAL OR OTHERWISE IS REQUIRED, WRITTEN PERMISSION SHALL BE OBTAINED FROM THE OWNER'S REPRESENTATIVE PRIOR TO COMMENCING WITH THE SHUT-DOWN.

- 22. PROVIDE ALL NECESSARY TRAILERS, EXTENSION CORDS AND LAMPS, TO PROVIDE TEMPORARY LIGHT AND POWER FOR THE PROPER EXECUTION OF ALL WORK.
- 23. PROVIDE ALL SCAFFOLDING, RIGGING, HOISTING, AND SERVICES NECESSARY FOR ERECTION AND DELIVERY INTO THE PREMISES OF ANY EQUIPMENT AND APPARATUS, FURNISHED. REMOVE SAME FROM PREMISES WHEN NO LONGER REQUIRED.
- 24. ALL WORK SHOWN ON THE DRAWINGS THAT IS NOT SPECIFICALLY INDICATED AS BEING EXISTING SHALL BE ASSUMED TO BE NEW.

25. ALL LABELING SHALL COMPLY WITH REQUIREMENTS OF NEC 690, UL, AND NFPA 70E.

- 26. TEXT ON ALL LABELS SHALL BE OF ARIAL FONT—IT SHALL BE LEGIBLE AND CLEAR.
- 27. TEXT SIZE SHALL BE AS SHOWN BUT IN NO CASE TEXT SHALL BE SMALLER THAN %" FOR TITLES (I.E. "WARNING") AND  $\frac{3}{16}$ " HIGH FOR DATA.
- 28. THE TONE OF THE BACKGROUND COLOR SHALL BE BRIGHT TO ATTRACT ATTENTION.
- 29. SUBMIT ALL LABEL STENCILS WITH DIMENSIONS TO ENGINEER PRIOR TO PURCHASE.
- 30. LABELS SHALL BE EITHER ENGRAVED, MACHINE PRINTED OR ELECTRO-PHOTO PLATED AND BE OF METALLIC OR PLASTIC CONSTRUCTION. SIGNAGE SHALL BE WEATHERPROOF, CORROSION PROOF, UV-STABILZED AND FADE RESISTANT.
- 31. LABELS SHALL BE SECURELY FASTENED TO SPECIFIED LOCATIONS BY USING A WEATHER PROOF & DURABLE ADHESIVE SUITABLE FOR THE MATERIAL OF THE LABEL & LOCATION.
- 32. THE LABELS SHALL BE POSTED AT THE LOCATIONS SPECIFIED. IF FOR REASONS OF REDUCED ACCESS OR SPACE, THE LABELS SHALL BE POSTED AT THE CLOSEST LOCATION THAT BEST SERVES THE INTENT OF THE LABEL. NOTIFY THE ENGINEER/SUPIVISOR IN SUCH A CASE BEFORE ATTACHING.
- 33. ALL LABELS SHALL COMPLY WITH THE FOLLOWING COLOR SCHEMES UNLESS SPECIFICALLY INDICATED:

<u>TEXT</u> BACKGROUND <u>label</u> WHITE INFORMATIONAL BLACK UTILITY/CAUTION BLACK YELLOW RED WARNING WHITE

- 34. PURSUANT TO 19 NYCRR \$900-3(A)(2), IF PREVIOUSLY UNKNOWN OIL AND/OR NATURAL GAS WELLS ARE CONFIRMED WITHIN THE FACILITY SITE DURING CONSTRUCTION OF THE FACILITY, THE CONTRACTOR SHALL IMMEDIATELY CEASE CONSTRUCTION ACTIVITIES IN THE IMMEDIATE AREA SURROUNDING THE WELL AND SHALL NOTIFY AND CONSULT WITH THE OFFICE AND NYSDEC DIVISION OF MINERAL RESOURCES, REGIONAL MINERALS MANAGER, (CENTRAL OFFICE, ALBANY, NY).
- 35. BLASTING SHALL NOT BE PERFORMED WITHOUT AN APPROVAL FROM THE OFFICE OF RENEWABLE ENERGY SITING.
- 36. THE PROJECT SHALL BE CONSTRUCTED IN ACCORDANCE WITH NYS DEPARTMENT OF AGRICULTURE AND MARKETS GUIDELINES FOR SOLAR ENERGY PROJECTS — CONSTRUCTION MITIGATION FOR AGRICULTURAL LANDS (2019) AND THE APPROVED AGRICULTURAL PLAN.

0 EXHIBIT 5: DESIGN DRAWINGS CMA DDF 24.03.08



DAVID D. FACCAS NEW YORK LICENSED PROFESSIONAL ENGINEER

NEW YORK LICENSE #099448



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Client/Project

42MW AC SHEPHERD'S RUN SOLAR FACILITY COPAKE, NY

HECATE ENERGY

COLUMBIA COUNTY 1 LLC

File Name: E-002 - ELECTRICAL SPECIFICATIONS CMA DDF CMA 24.03.08 Dwn. Chkd. Dsgn. YY.MM.DD

SHEPHERD'S RUN SOLAR FACILITY **ELECTRICAL SPECIFICATIONS** 

Project No. Scale 198803637 Drawing No.

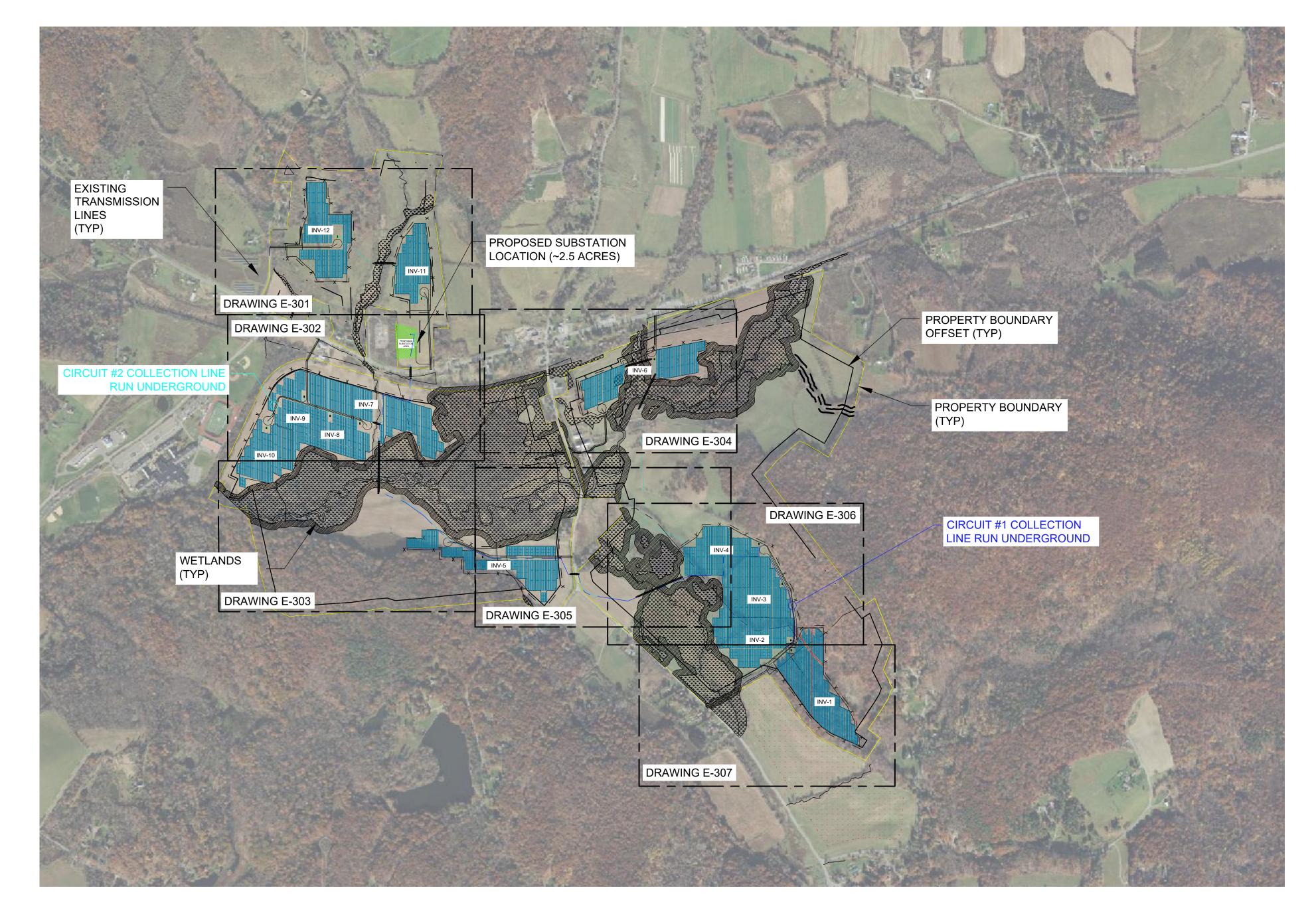
3 of 22

Revision

ORIGINAL SHEET - ANSI D

Issued

- 1. BASE IMAGERY COPYRIGHT MICROSOFT AND DIGITAL GLOBE 2020.
- 2. 20' INTERIOR ROADS
- 3. MINIMUM SETBACKS CONSIDERED:
- a. 25' MINIMUM FROM FENCE TO PV ARRAY b. 53' RADIUS ALLOWED FOR TURNAROUNDS



	LEGEND		
	PROJECT BOUNDARY		
	LAYDOWN AREA		
	SOLAR ARRAY		
====	MV FEEDER RUNS		
	HDD BORE		

CONCEPTUAL PLAN
SCALE: 1" = 800'-0"





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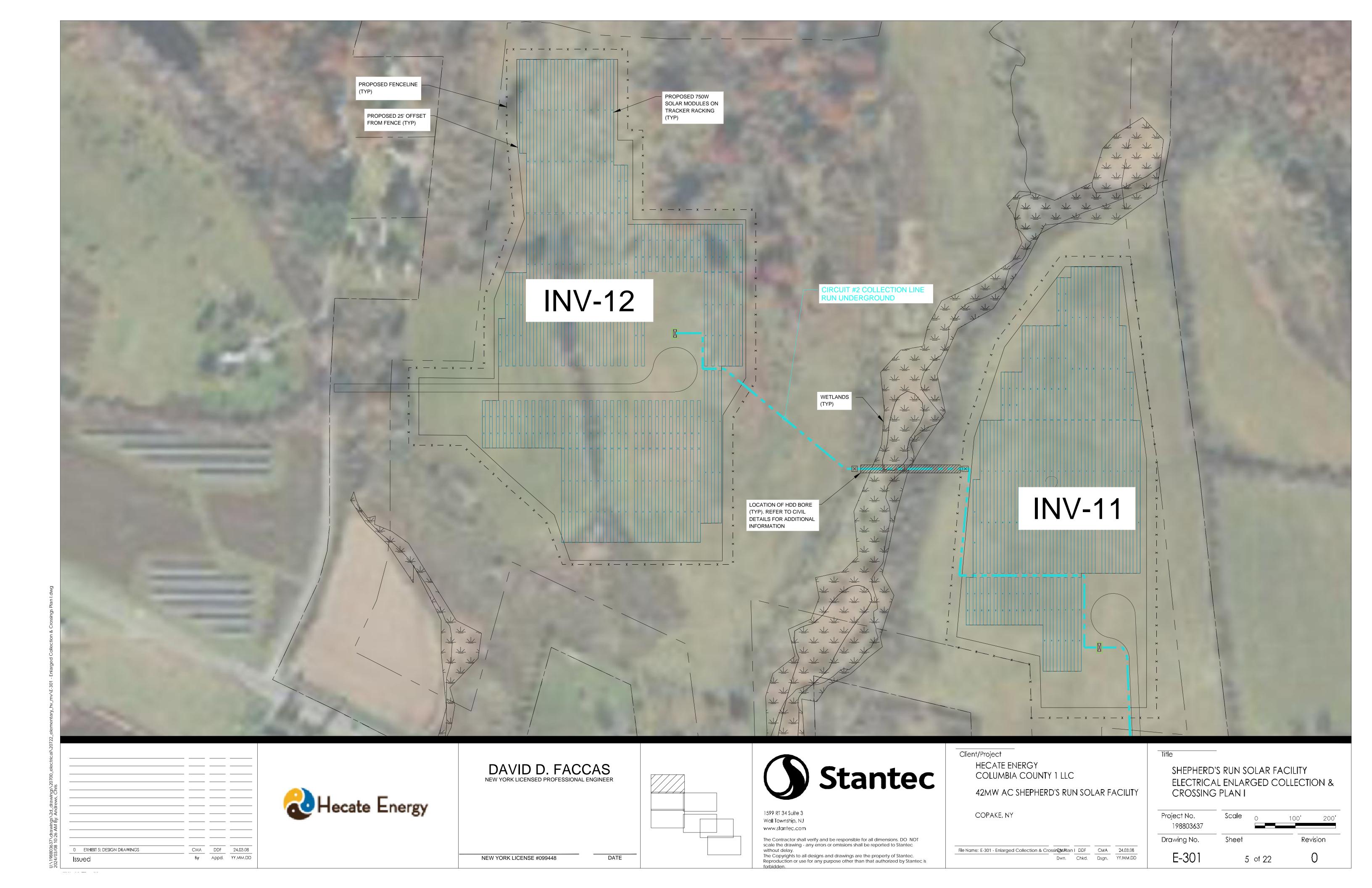
42MW AC SHEPHERD'S RUN SOLAR FACILITY

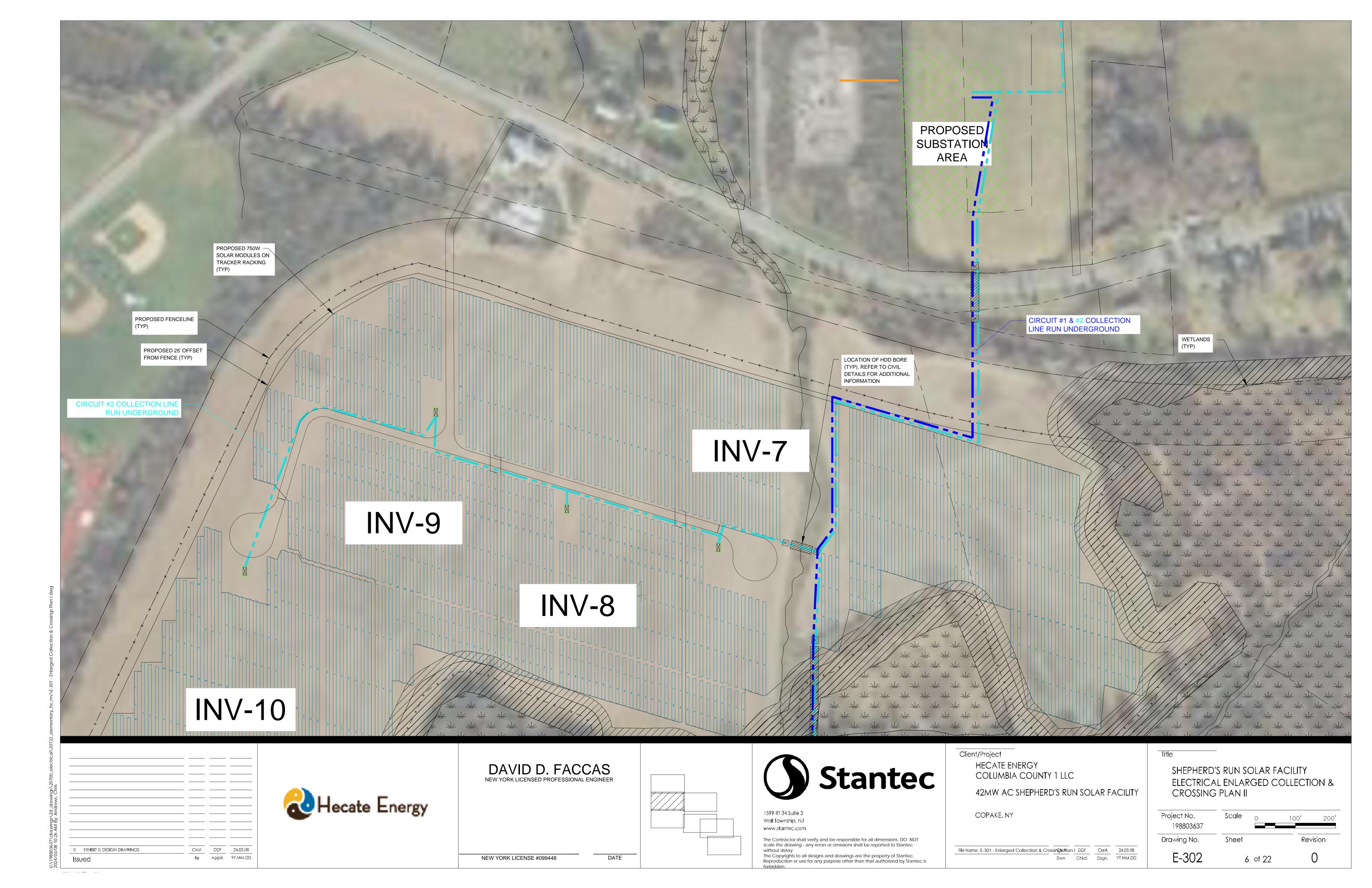
COPAKE, NY

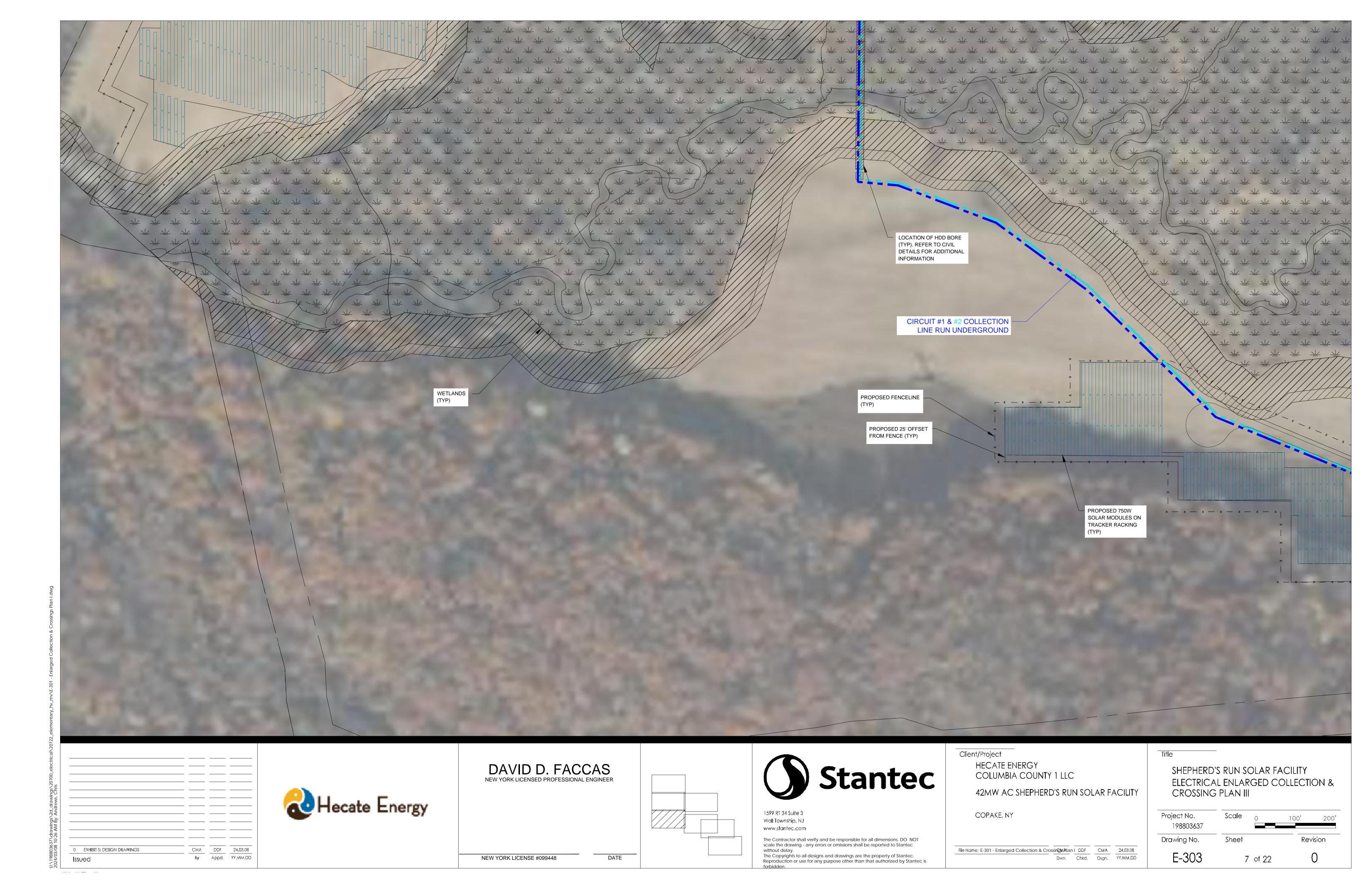
File Name: E-300 - Overall Collection & Crossing©Mén DDF CMA 24.03.08

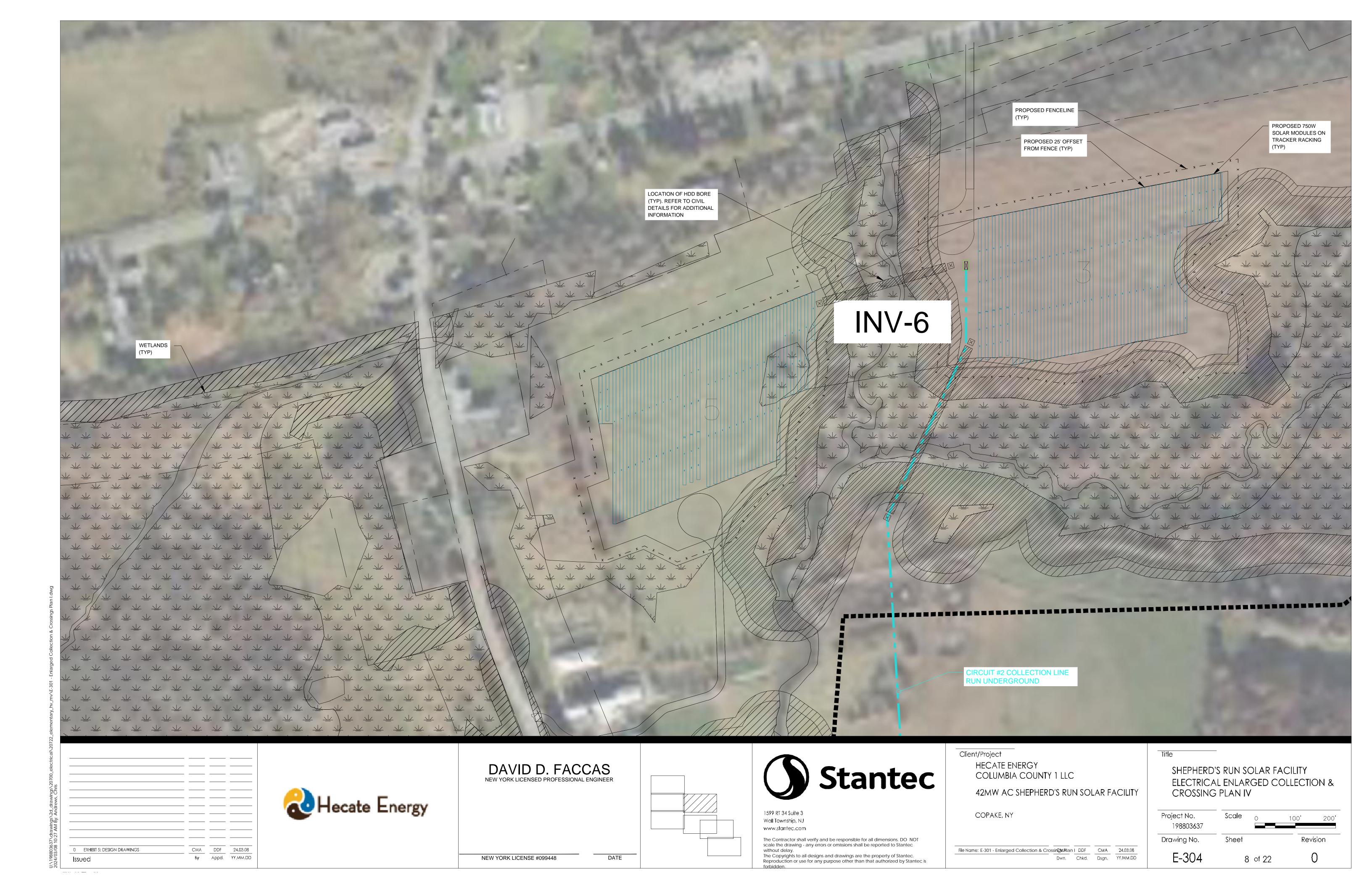
SHEPHERD'S RUN SOLAR FACILITY ELECTRICAL OVERALL COLLECTION & CROSSING PLAN Project No. Scale 198803637

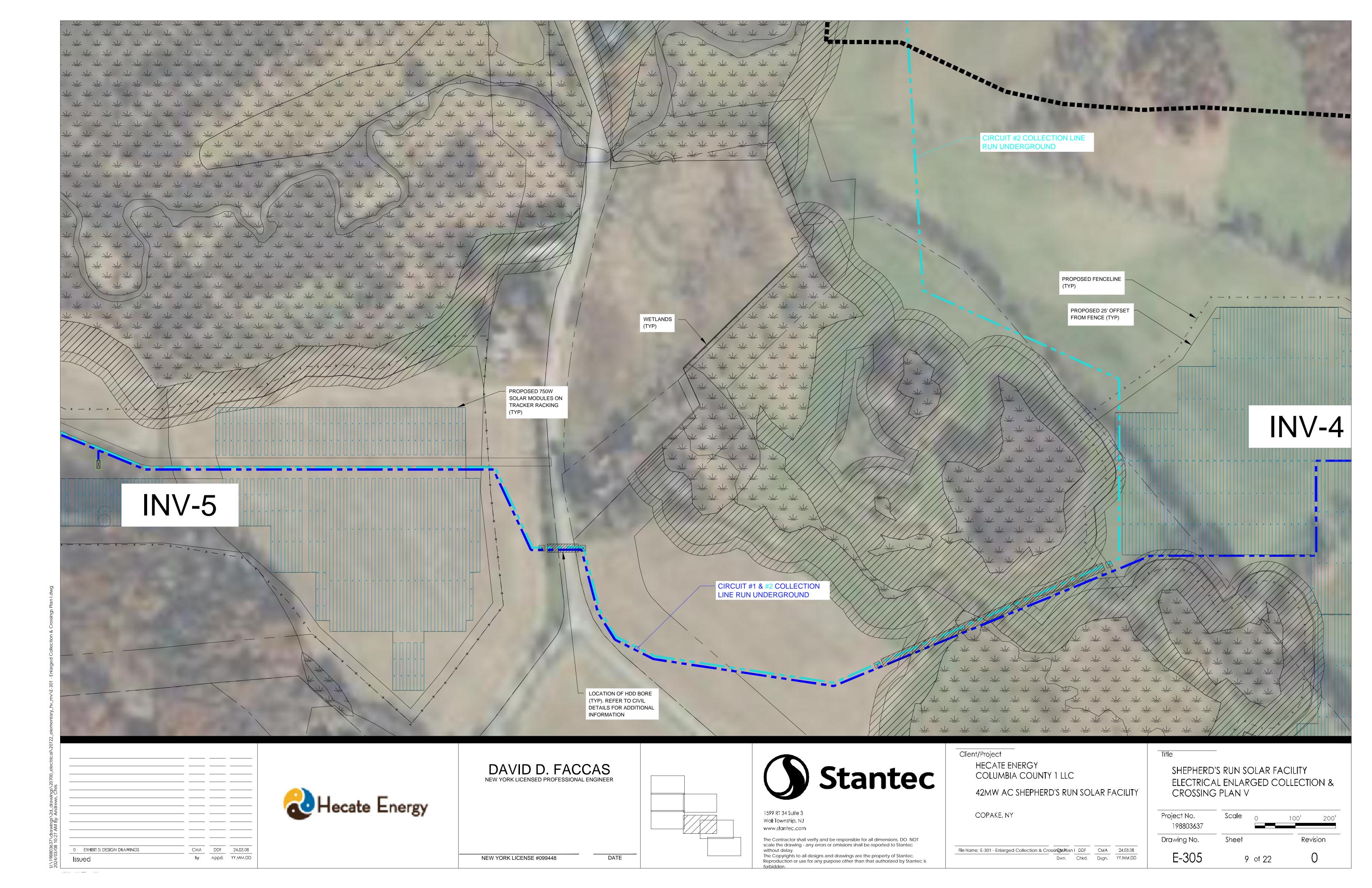
Revision Drawing No. E-300 4 of 22 Dwn. Chkd. Dsgn. YY.MM.DD

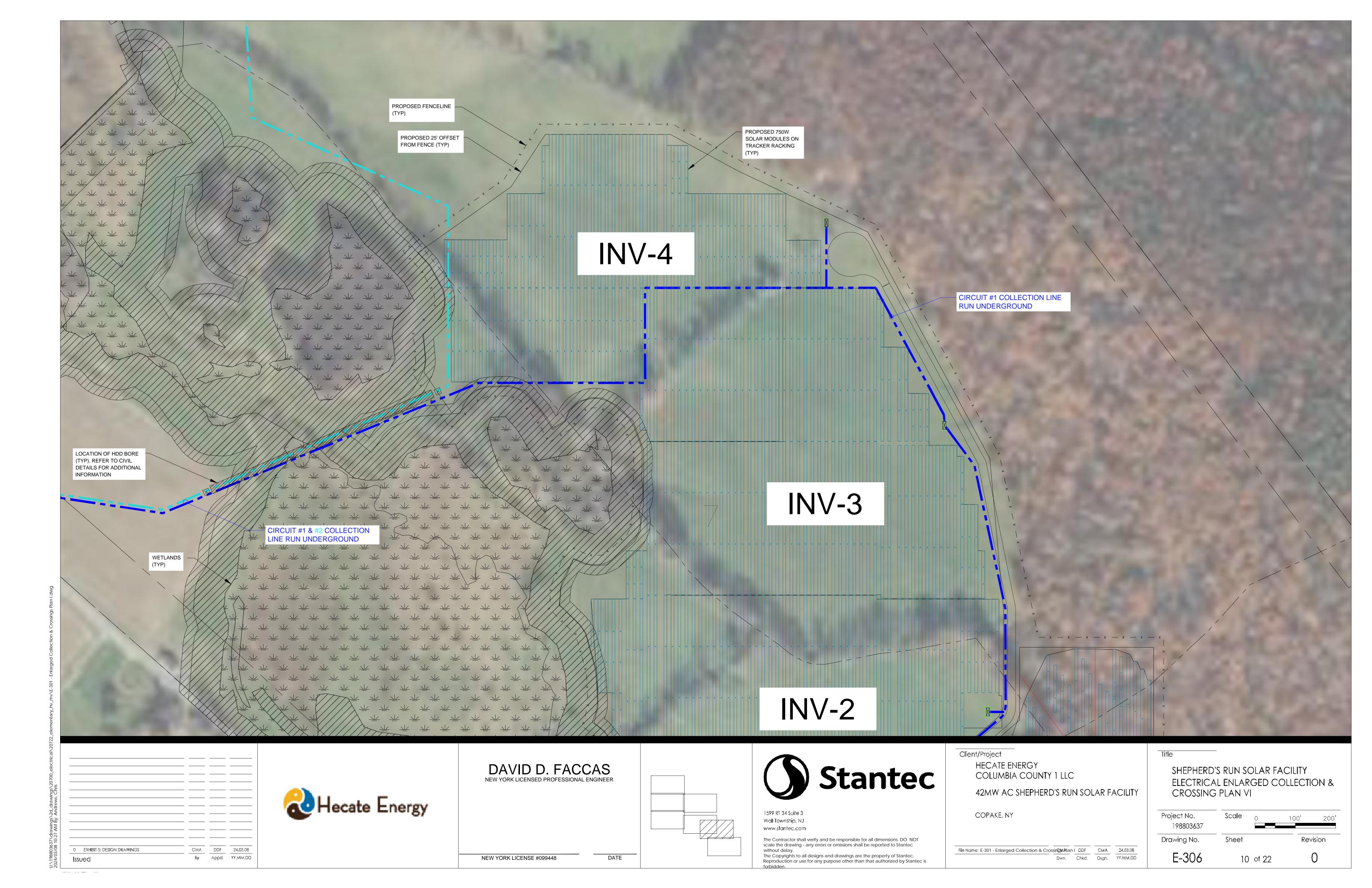


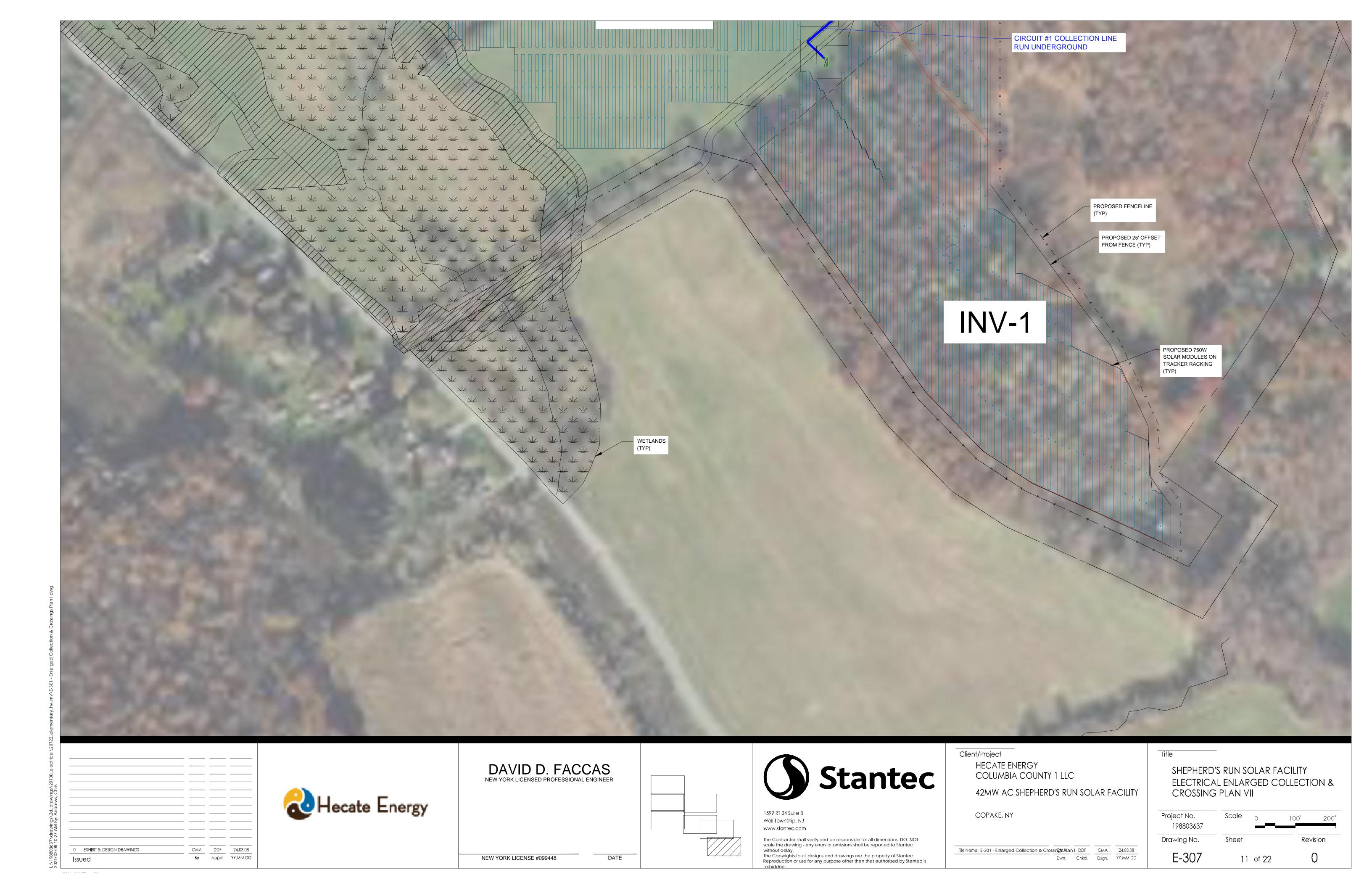


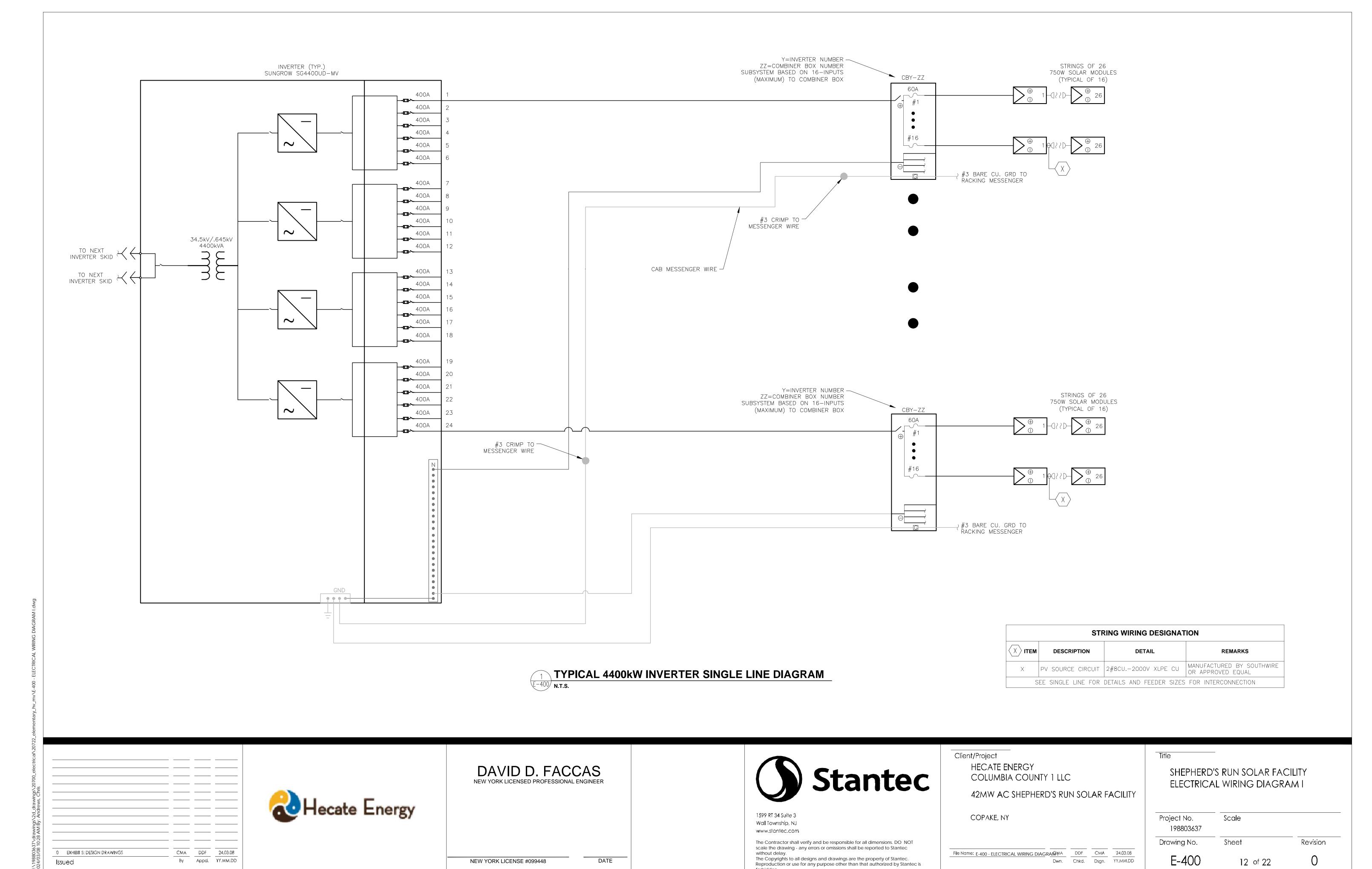


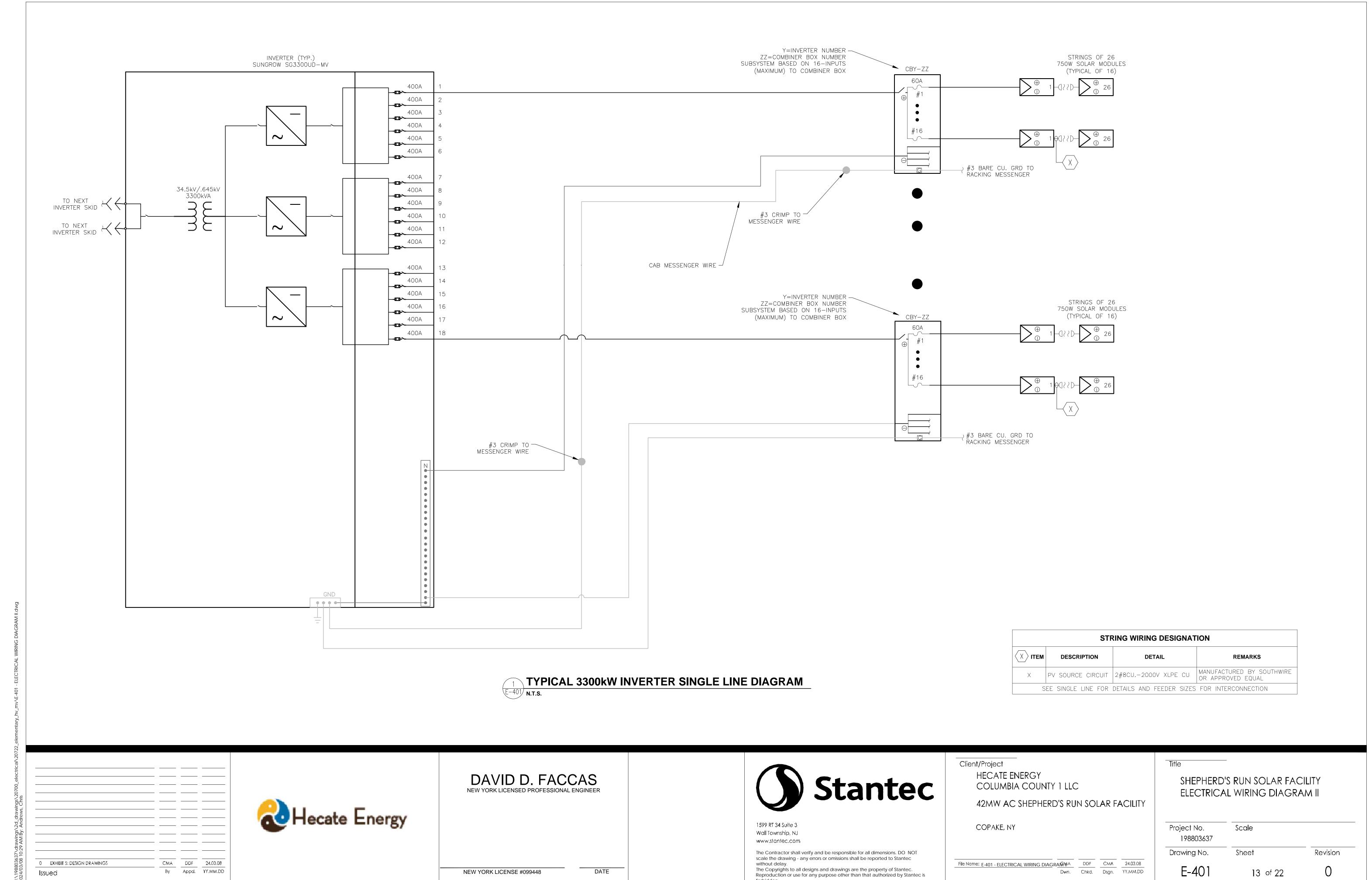


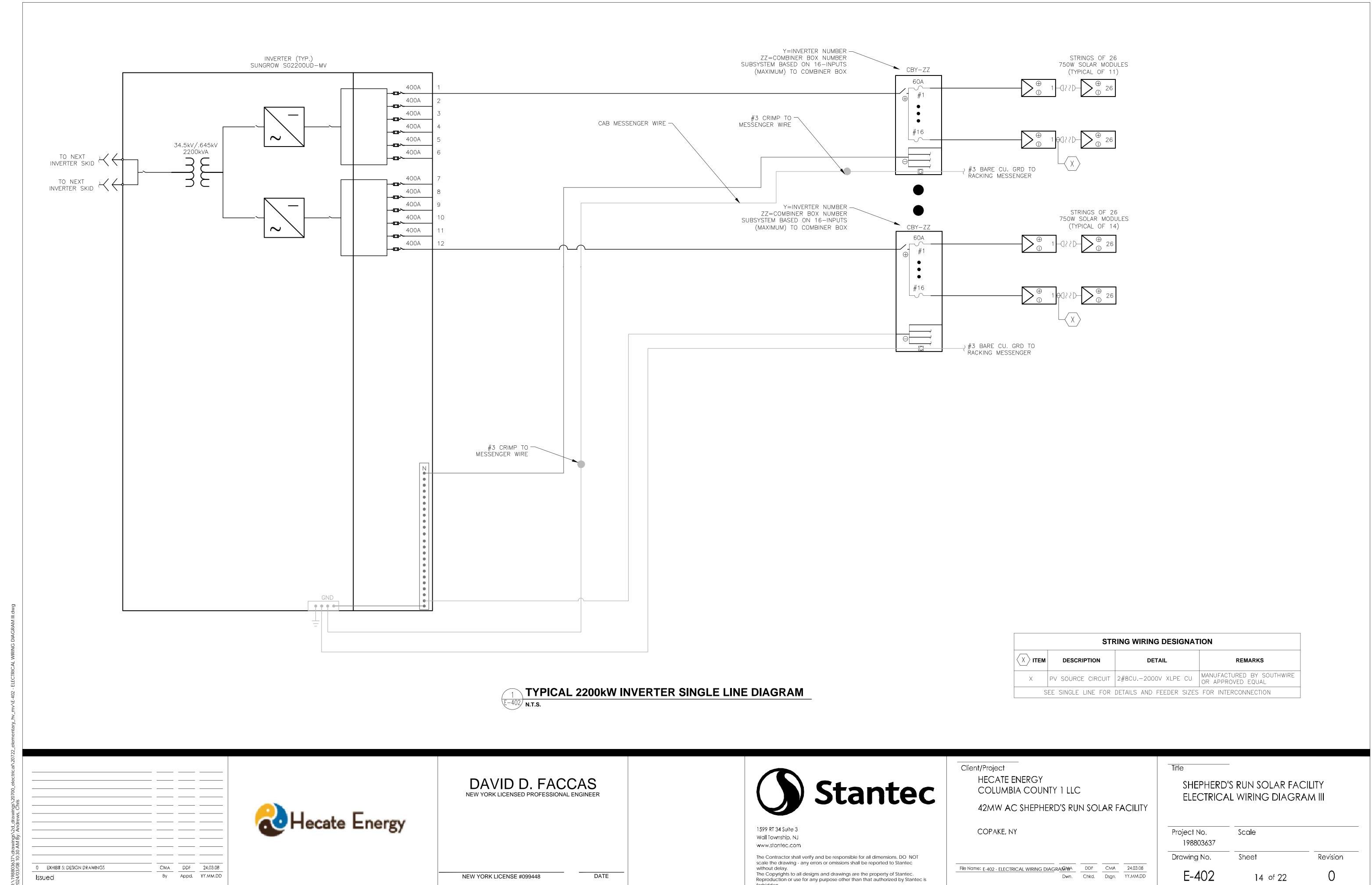


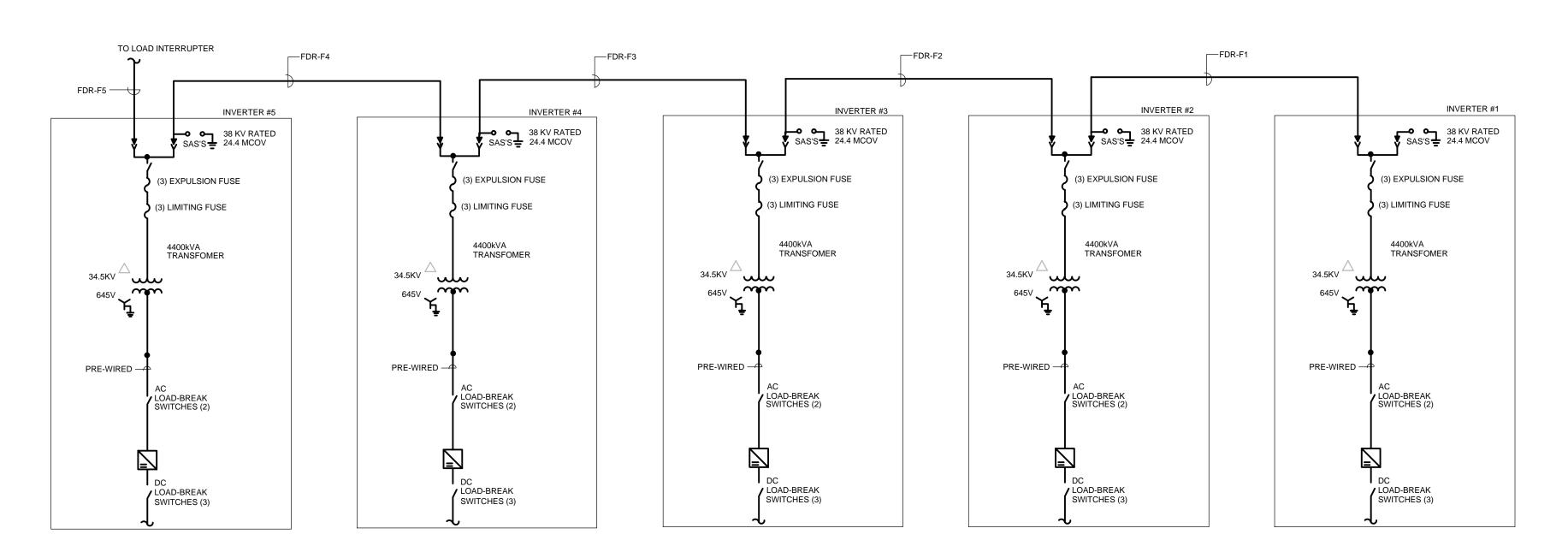




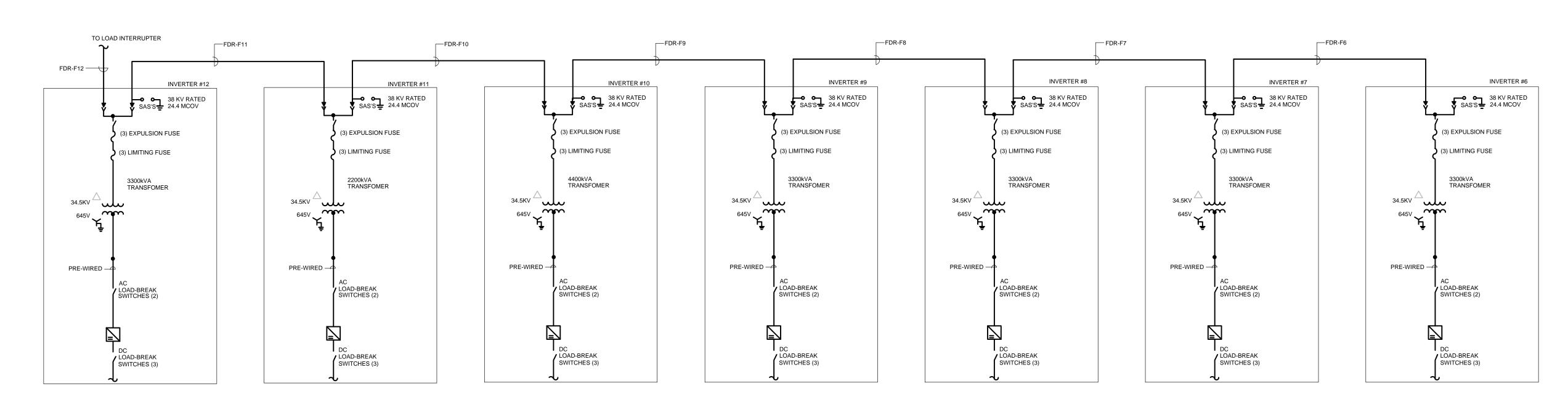




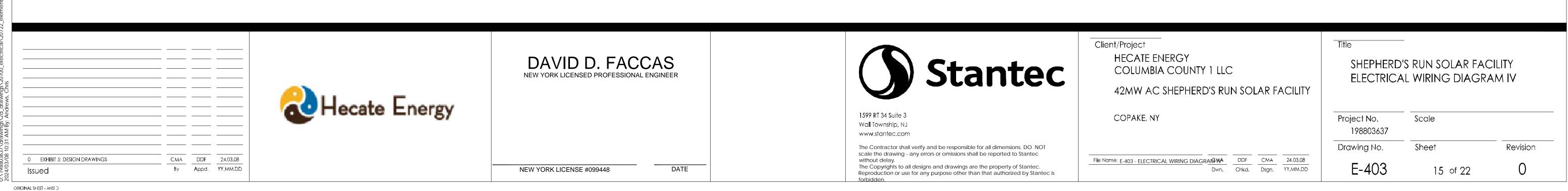




## CIRCUIT #1 AC ELECTRICAL SINGLE LINE DIAGRAM



## CIRCUIT #2 AC ELECTRICAL SINGLE LINE DIAGRAM E-403 **N.T.S.**

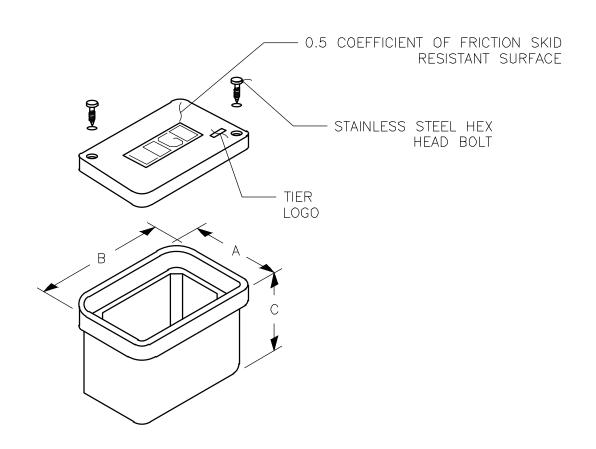


ALLOW BENDING RADIUS OF AT LEAST 5X — THE DIAMETER OF THE CABLE IS REQUIRED (1.5" TYP. FOR #12 PV WIRE)

#### NOTF.

- 1. PANEL HOME RUNS WIRES SHOULD BE ROUTED INSIDE CAB SYSTEM OR CONDUIT AT THE EARLIEST AVAILABILITY
- 2. TERMINATE AT CENTER OF ROW WHEN INVERTERS LOCATED NORTH OR SOUTH OF STRINGS
- 3. CONTRACTOR SHALL UTILIZE ABOVE STRING METHODS TO REDUCE HOMERUN WIRE LENGTH TO THEIR DESIGNATED COMBINER BOXES.

# 1 STRING WIRE MANAGEMENT N.T.S.



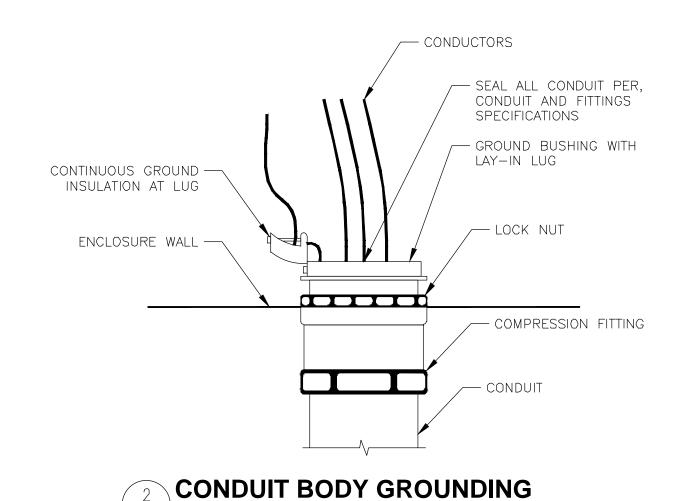
#### NOTES:

- 1. THE JUNCTION BOX AND COVER SHALL BE CONSTRUCTED OF PRECAST
- POLYMER CONCRETE AND SHALL BE UL LISTED TO MEET ANSI 77, TIER 22.

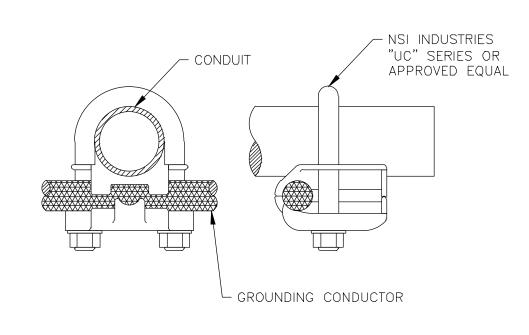
  2. THE LOGO SHALL READ "PV COMMS" FOR ALL COMM BOXES AND "PV ELECTRIC" FOR ELECTRICAL SERVICE BOXES.
- 3. JUNCTION BOX SHALL SIT ON 1' DEEP BED OF GRAVEL EXTENDING 6"
  BEYOND DIMENSIONS OF JUNCTION BOX. USE FILTER MATERIAL TO SEPARATE
  GRAVEL FROM EARTH.
- 4. ALL EMPTY CONDUIT SHALL BE CAPPED AND SEALED WITH A NYLON PULL CORD.



NOTE: CONTRACTOR SHALL UTILIZE JUNCTION BOXES AS NEEDED

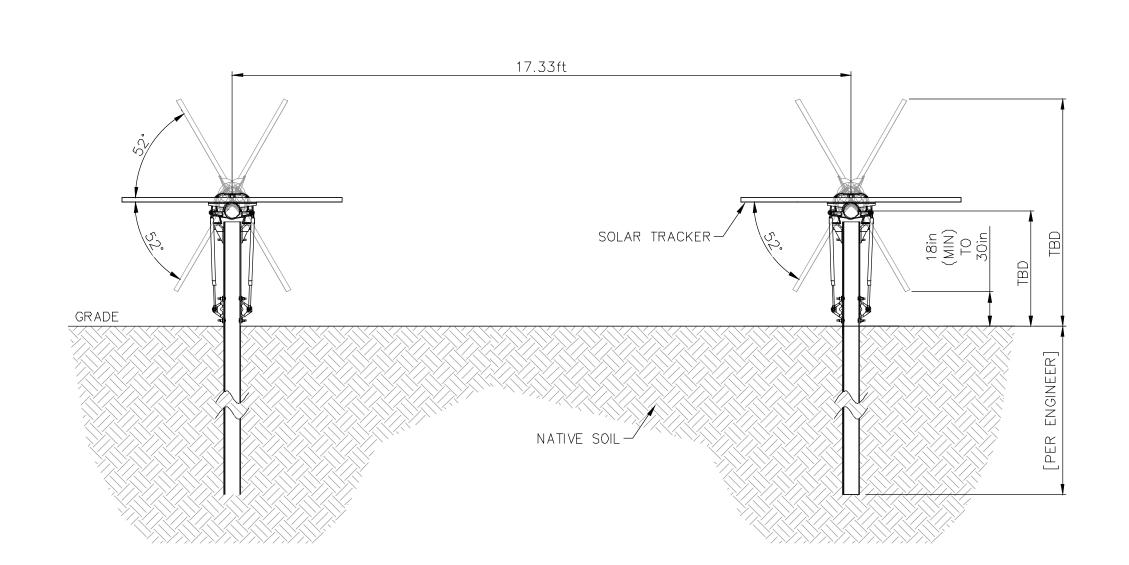


 $\sqrt{E-500}$  N.T.S.

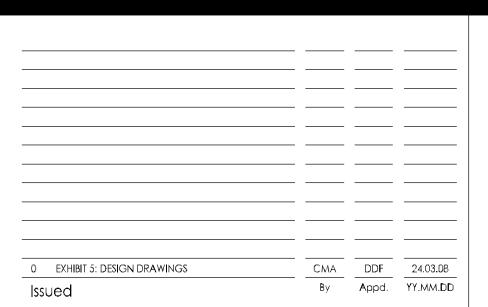


GROUNDING CLAMPS FOR HORIZONTAL PIPES

E-500 N.T.S.



## 5 EAST-WEST SINGLE AXIS SELF-POWERED TRACKER ROW TO ROW SPACING N.T.S.





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42MW AC SHEPHERD'S RUN SOLAR FACILITY

COPAKE, NY

File Name: E-500 - ELECTRICAL DETAILS I

 CMA
 DDF
 CMA
 24.03.08

Dwn. Chkd. Dsgn. YY.MM.DD

SHEPHERD'S RUN SOLAR FACILITY
ELECTRICAL DETAILS I

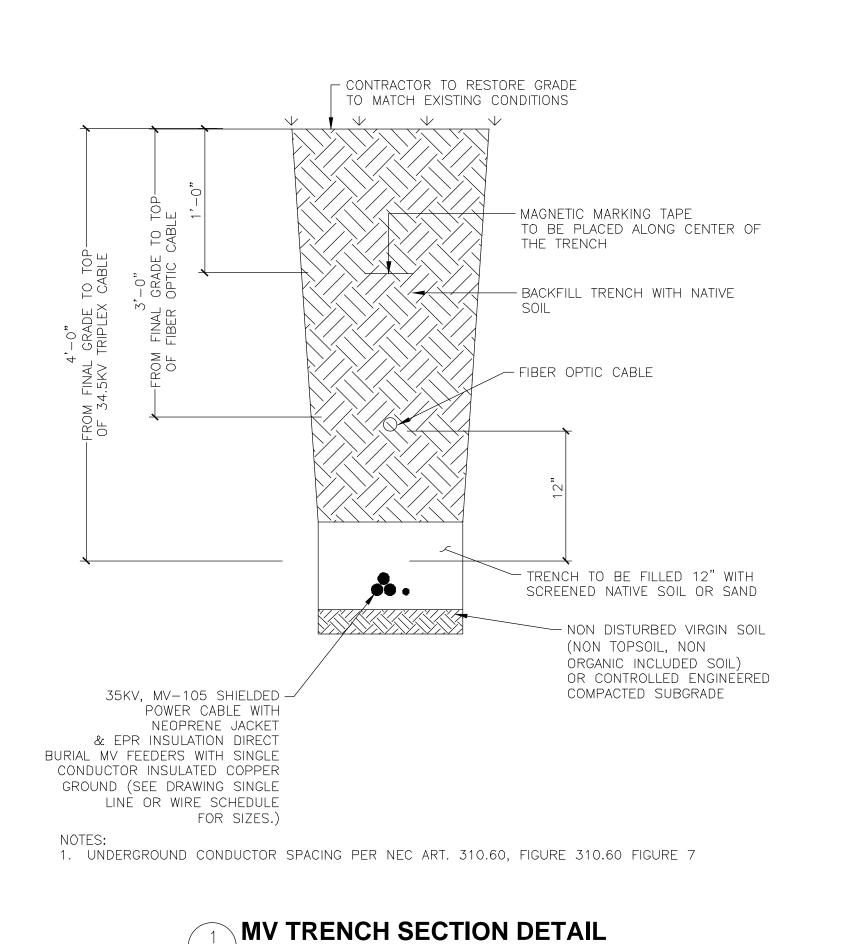
Project No. Scale
198803637

Project No. Scale

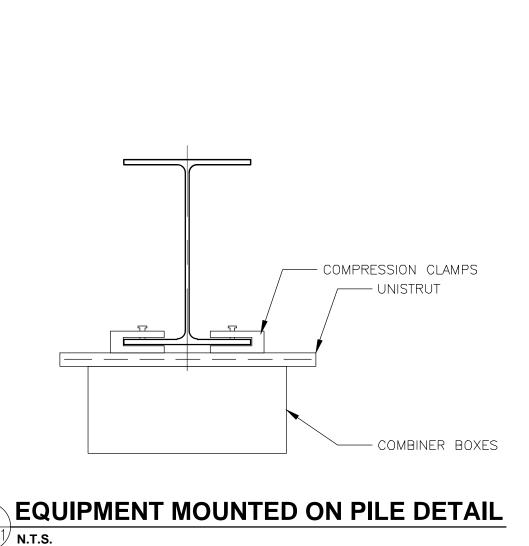
198803637

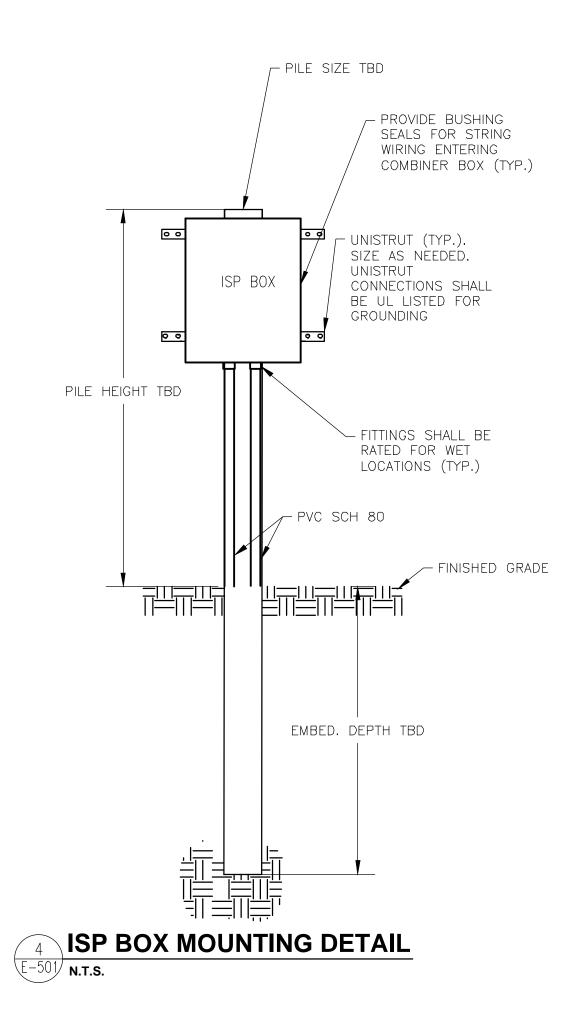
Drawing No. Sheet Revision

E-500 16 of 22 0



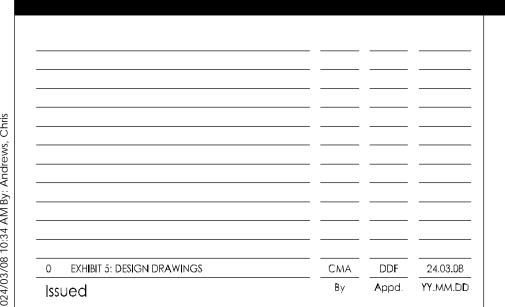
— UNISTRUT ATTACHED WITH COMPRESSION CLAMPS — COMBINER BOX ATTACH TO UNISTRUT BELL END -- DC FEEDER IN CONDUIT OR CAB WIREWAY TO INVERTER AS REQUIRED → PILE SIZE TBD COMBINER BOX PILE MOUNTING DETAIL E-501 N.T.S.





2.5FT 2.5FT 5FT FINISHED GRADE 1250KCMIL 1250KCMIL

## TYPICAL PARALLEL MV TRENCH SECTION DETAIL E-501 **N.T.S.**



\E-501∕ **n.t.s.** 



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SHEPHERD'S RUN SOLAR FACILITY ELECTRICAL DETAILS II

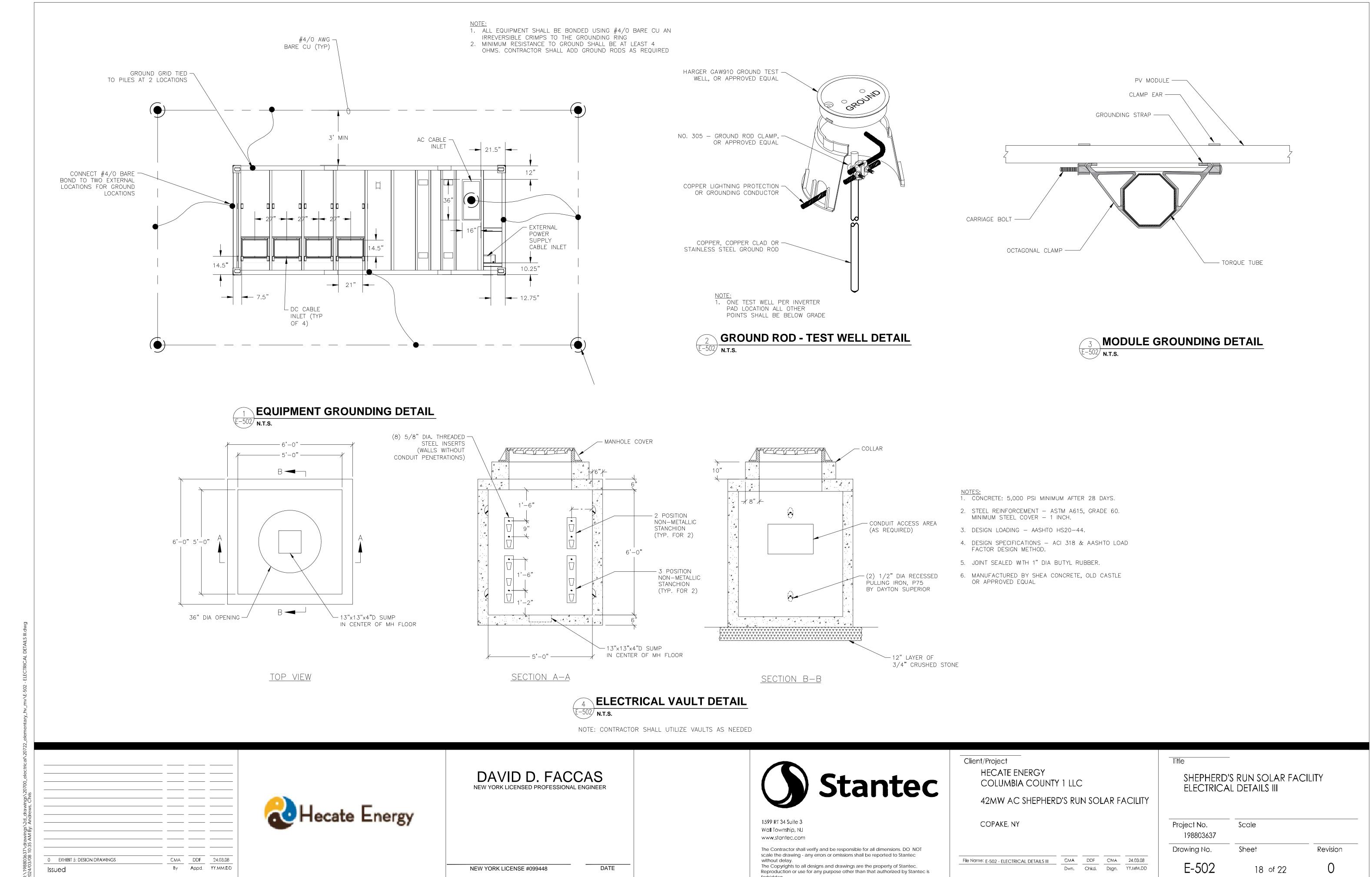
17 of 22

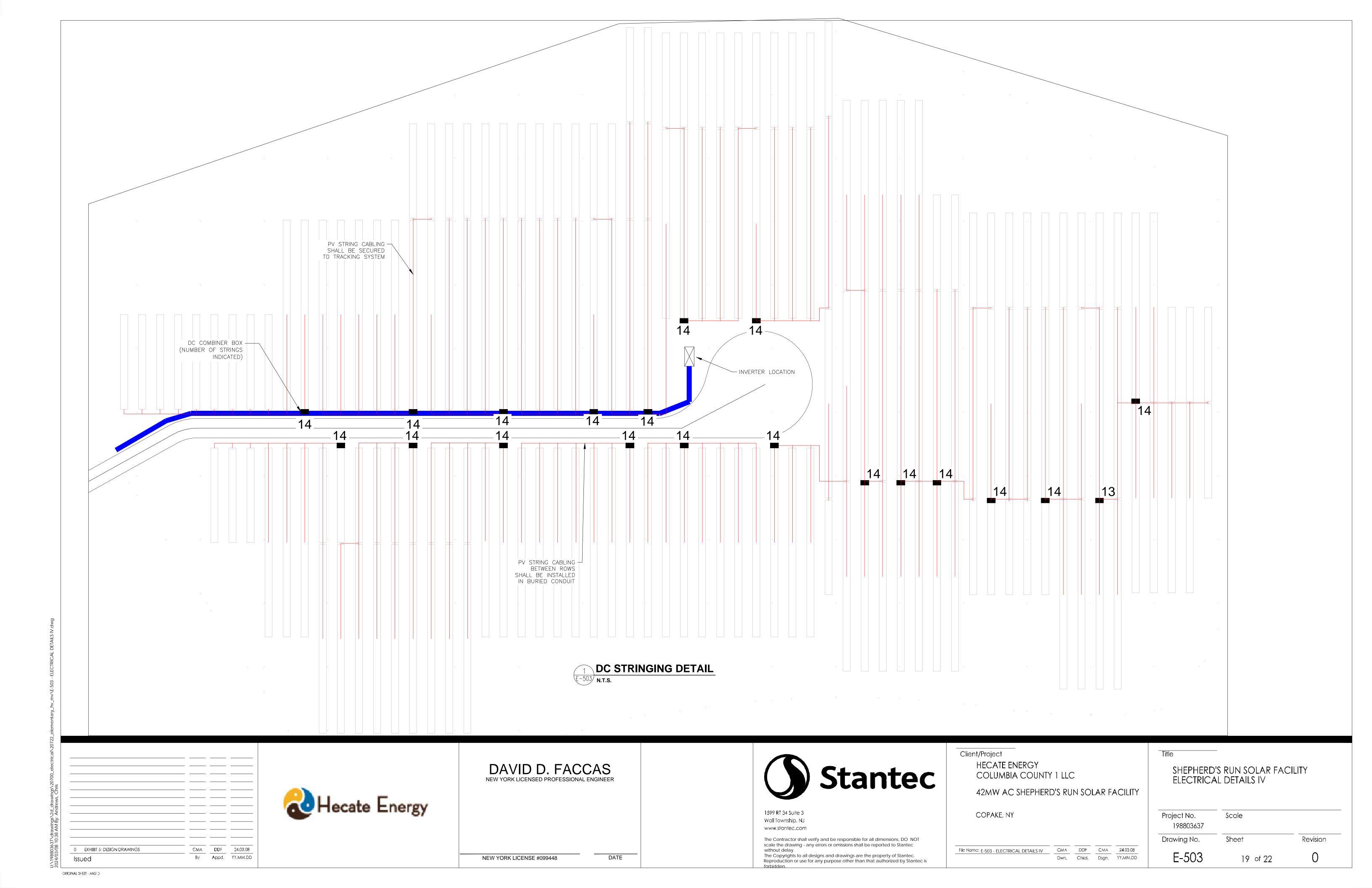
Revision

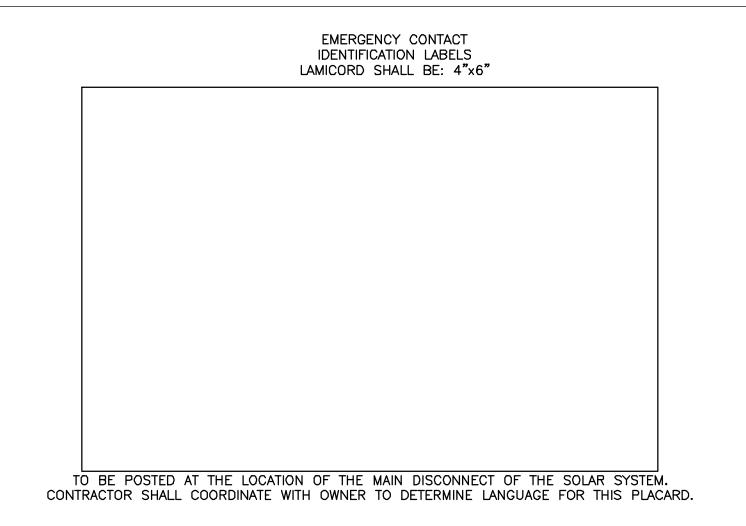
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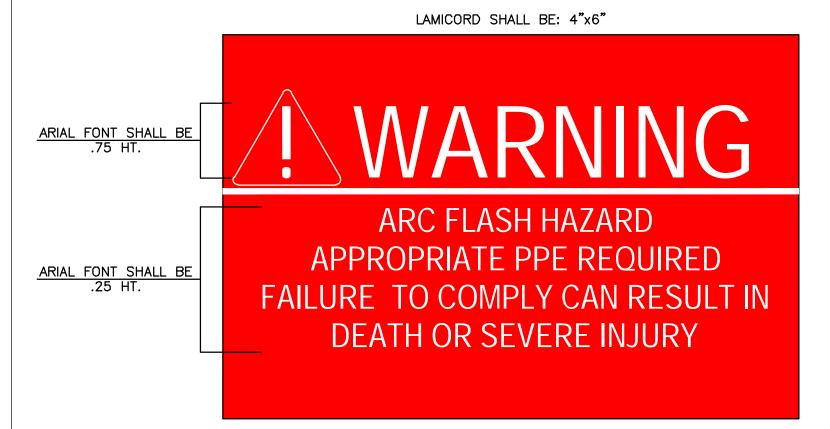
E-501

CMADDFCMA24.03.08Dwn.Chkd.Dsgn.YY.MM.DD File Name: E-501 - ELECTRICAL DETAILS II









TO BE POSTED ON COMBINER BOXES PER NFPA 70 E & NEC 110.16

LAMICORD SHALL BE: 81/2" "x11"

# !\WARNING HIGH VOLTAGE

DO NOT ENTER FOR QUALIFIED **PERSONNEL ONLY** (PHOTOVOLTAIC **INSTALLATION)** 

TO BE POSTED AT THE DOOR OF THE FENCE PER NEC 110.27 (C)

DC COMBINER BOX IDENTIFICATION LABELS LAMICORD SHALL BE: 6"x6" (1 PER COMBINER BOX)

# **PHOTOVOLTAIC** DC COMBINER BOX CB-X-X

### PHOTOVOLTAIC POWER SOURCE RATINGS

**INPUTS** 

--- ADC RATED MAX. POWER POINT CURRENT ---- VDC RATED MAX. POWER POINT VOLTAGE ----VDC MAX. SYSTEM VOLTAGE --- ADC SHORT CIRCUIT CURRENT

> SEE TABLE THIS DRAWING PER NEC 690.53

SERVICE EQUIPMENT LABEL LAMICORD SHALL BE: 4"x6"

UTILITY COMPANY:

UTILITY FAULT CURRENT:

**ENGINEER: STANTEC CONSULTING SERVICES, INC.** 

TO BE POSTED ON SERVICE EQUIPMENT/SWITCHGEAR PER NEC 110.24(A)

LAMICORD SHALL BE: 14"x20"



TO BE POSTED ON GATE AT ALL THREE ARRAYS.

CMA DDF 24.03.08 By Appd. YY.MM.DD Issued



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42MW AC SHEPHERD'S RUN SOLAR FACILITY

COPAKE, NY

File Name: E-520 - ELECTRICAL LABELS I Dwn. Chkd. Dsgn. YY.MM.DD

SHEPHERD'S RUN SOLAR FACILITY ELECTRICAL LABELS I

Scale Project No. 198803637

Drawing No. Revision E-520 20 of 22

ELECTRICAL SHOCK HAZARD

DO NOT TOUCH TERMINALS.

TERMINALS ON BOTH THE LINE & LOAD

WARNING



**ELECTRICAL SHOCK HAZARD** IF A GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

TO BE POSTED ON INVERTER

PER NEC 690.5 (C)

LAMICORD SHALL BE: 4"x6"

POWER TO THIS SERVICE IS ALSO

SUPPLIED FROM ON-SITE

PHOTOVOLTAIC GENERATION

SIDES MAY BE ENERGIZED IN THE OPEN **POSITION** 

TO BE POSTED ON INVERTER AC/DC DISCONNECTS AND COMBINERS PER NEC 690.17 (E)

LAMICORD SHALL BE: 4"x6"

LAMICORD SHALL BE: 4"x6"



THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED

TO BE POSTED ON ALL JUNCTION BOX, COMBINER BOX, AND DISCONNECTS PER NEC 690.35 (F)

# WARNING

ELECTRICAL SHOCK HAZARD IF A GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNDERGROUND AND **ENERGIZED** 

TO BE POSTED NEXT TO THE GROUND FAULT INDICATOR ON A UTILITY-INTERACTIVE INVERTER, PER NEC 690.5 (C)



INVERTER OUTPUT CONNECTION DO NOT ADD LOADS TO THIS **SWITCHBOARD** 

TO BE APPLIED TO NEW 208V OR 480V PANELBOARD

## PHOTOVOLTAIC kW INVERTER #

THE INVERTER INTERCONNECTS AT NEW POLE ON LINE V-XXX THROUGH A DEDICATED POLE MOUNTED GANG OPERATED LOAD BREAK SWITCH.

> TO BE POSTED AT INVERTER #--PER NEC 690.54

INVERTER IDENTIFICATION LABELS LAMICORD SHALL BE: 1 1/2"x6" TEXT SIZE SHALL BE 1/2" (1 PER INVERTER)

# **INVERTER #X**

IDENTIFICATION PLACARD PER NEC 230.3(E) TO BE PLACED ON SERVICE SWITCH (1) AT EACH SERVICE

LAMICORD SHALL BE: 4"x6"

STUDY COMPLETED ON

ARIAL FONT SHALL BE .25 HT.

ARIAL FONT SHALL BE

ARIAL FONT SHALL .75 HT.

ARIAL FONT SHALL BE

TO BE POSTED ON UTILITY METER PAN

PER NEC 230.2(E)

ARC FLASH HAZARD APPROPRIATE PPE REQUIRED FAILURE TO COMPLY CAN RESULT IN DEATH OR SEVERE INJURY

NOMINAL SYSTEM VOLTAGE ARC FLASH BOUNDARY AVAILABLE INCIDENT ENERGY WORKING DISTANCE MINIMUM ARC RATING OF CLOTHING\_ LEVEL OF PPE\_ LIMITED APPROACH RESTRICTED APPROACH LOCATION ID\_ STUDY COMPLETED BY

> TO BE POSTED ON ALL ELECTRICAL PANELS & EQUIPMENT. INCLUDING BUT NOT LIMITED TO PANELBOARDS. DISCONNECT SWITCHES, CONTROL PANELS & METER SOCKET PER NFPA 70 E & NEC 110.16

LAMICORD SHALL BE: 6"x5"



IDENTIFICATION OF MULTIPLE SERVICE DISCONNECTS

A SECOND POWER SOURCE IS PRESENT IN THIS EQUIPMENT PV SYSTEM DISCONNECT LOCATED

IDENTIFICATION PLACARD PER NEC 230.2(E) TO

LAMICORD SHALL BE: 4"x6"



TO BE POSTED BY THE SWITCHGEAR PER NEC 705.10

AC VISIBLE DISCONNECT IDENTIFICATION LABEL LAMICORD SHALL BE: 6"x5" (1 PER DISCONNECT)

# CAUTION SOLAR GENERATION UTILITY AC DISCONNECT

**ELECTRIC SHOCK HAZARD.** DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

**INTERACTIVE SOLAR PV SYSTEM RATINGS** 

**MAX. OPERATING CURRENT OPERATING VOLTAGE** 

--- AMPS 34.500 VAC

BE PLACED ADJACENT TO PV SOURCE BREAKERS

0 EXHIBIT 5: DESIGN DRAWINGS CMA DDF By Appd. YY.MM.DD



DAVID D. FACCAS

NEW YORK LICENSE #099448

DATE



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COLUMBIA COUNTY 1 LLC 42MW AC SHEPHERD'S RUN SOLAR FACILITY

COPAKE, NY

File Name: E-521 - ELECTRICAL LABELS II CMA DDF CMA 24,03,08 Dwn. Chkd. Dsgn. YY.MM.DD

SHEPHERD'S RUN SOLAR FACILITY ELECTRICAL LABELS II

Project No. Scale 198803637

Drawing No.

E-521

21 of 22

Revision

ORIGINAL SHEET - ANSLO

Issued

LAMICORD SHALL BE: 4"x6"

# WARNING

SHOCK HAZARD. TURN OFF DC DISCONNECT AT RECOMBINER/INVERTER BEFORE WORKING

TO BE POSTED AT ALL COMBINER BOXES

LAMICORD SHALL BE: 4"x6"

# MEDIUM VOLTAGE TRANSFORMER

--- KVA PRIMARY VOLTAGE = SECONDARY VOLTAGE =

TO BE POSTED AT THE TRANSFORMER 1

LAMICORD SHALL BE: 4"x6"



TO BE POSTED AT EACH MEDIUM VOLTAGE TRANSFORMER & INVERTER ON THE LOW VOLTAGE SIDE

LAMICORD SHALL BE: 6"x5"

THE PHOTOVOLTAIC **OUTPUT IS** CONNECTED TO THE LOW VOLTAGE SIDE OF THIS TRANSFORMER

LAMICORD SHALL BE: 4"x6"

PHOTOVOLTAIC **ELECTRIC SYSTEM** DISCONNECT

TO BE POSTED AT MAIN SERVICE DISCONNECT

LAMICORD SHALL BE: 4"x6"

SHOCK, ARC FLASH, AND ARC BLAST HAZARD APPROPRIATE PPE REQUIRED FAILURE TO COMPLY CAN RESULT IN INJURY OR DEATH REFER TO UFC 3-560-01

TO BE POSTED AT EACH COMBINER BOX AND RECOMBINER AND INVERTER

LAMICORD SHALL BE: 4"x6"

DO NOT OPEN, REMOVE OR REPLACE FUSES UNDER LOAD

TO BE POSTED AT ALL COMBINER BOXES AND ALL OTHER FUSED LOCATIONS

LAMICORD SHALL BE: 4"x6"

LAMICORD SHALL BE: 4"x6"

PHOTOVOLTAIC AC DISCONNECT VOLTAGE = CURRENT =

TO BE POSTED AT THE INVERTER 1 DISCONNECT

**AUTHORIZED PERSONNEL** ONLY

TO BE POSTED AT THE GATES

LAMICORD SHALL BE: 4"x6"

# DATA ACQUISITION **CABINET**

TO BE POSTED AT THE DAS CABINETS

DANGER

**HIGH VOLTAGE TRESPASSING** 



**ALTO VOLTAGE** NO **TRESPASAR** 

0 EXHIBIT 5: DESIGN DRAWINGS CMA DDF By Appd. YY.MM.DD Issued

DAVID D. FACCAS

NEW YORK LICENSE #099448

Stantec

Wall Township, NJ www.stantec.com

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is

Client/Project

**HECATE ENERGY** COLUMBIA COUNTY 1 LLC

42MW AC SHEPHERD'S RUN SOLAR FACILITY

COPAKE, NY

File Name: E-522 - ELECTRICAL LABELS III CMA DDF CMA 24.03.08 Dwn. Chkd. Dsgn. YY.MM.DD SHEPHERD'S RUN SOLAR FACILITY ELECTRICAL LABELS III

Project No. 198803637

Scale

Revision Drawing No. E-522

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ORIGINAL SHEET - ANSLO