

LOCATION MAP
SCALE N.T.S.



SITE MAP
SCALE N.T.S.

801 MILUK DR SOLAR PV & BATTERY INSTALLATION ELECTRICAL PLAN

SITE ADDRESS:
801 Miluk Dr.
Coos Bay, OR 97420

EPC CONTRACTOR:
GSC CONSTRUCTION

APPLICABLE SPECIFICATIONS AND CODES	
-ELECTRICAL:	NEC-2020
-BUILDING:	ASCE 07-10
-WIND SPEED:	130 mph
-WIND EXPOSURE:	C
-RISK CAT:	II
-SNOW LOAD:	20 lbs/sqft

GSC
CONSTRUCTION

801 MILUK DR.
ROOF MOUNT SOLAR PV & BESS
BATTERY BACK-UP
Coos Bay, OR 97420
TITLE PAGE

FOR
CONSTRUCTION

ENGINEER:
David Brueck, P.E.
GA LICENSE # 038102
Certified NABCEP
PV Installer# 042013-17

DRAFTER:
David Brueck

PROJECT #:
BC-2023-06

SHEET:
001

SCALE:
N/A

NO	DATE	BY	REVISION DESCRIPTION
1	7/13/2023	D.BRUECK	UPDATED MODULE FOR CONSTRUCTION
0	3/16/2023	D.BRUECK	FOR CONSTRUCTION

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ELECTRICAL SPECIFICATIONS

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801 MILUK DR.
ROOF MOUNT SOLAR PV & BESS
BATTERY BACK-UP
Coos Bay, OR 97420
ELECTRICAL SPECIFICATIONS

GENERAL DESIGN

1. ALL AMPACITIES OF CONDUCTORS ENCLOSED IN CONDUIT SHALL BE CALCULATED AT A MAXIMUM OF 75°C INSULATION RATING OR THE TEMPERATURE RATING OF THE TERMINATION, WHICHEVER IS LOWER AS PER NEC TABLE 310.15(B)(16).
2. THE MAX AND MIN AMBIENT TEMPERATURES USED IN THIS DESIGN ARE 37°C AND (-)4°C AND ARE BASED ON DATA PROVIDED BY ASHRAE FOR CAPE ARAGO, OR.

NEW PHOTOVOLTAIC SYSTEM

1. THE PROPOSED PHOTOVOLTAIC SYSTEM IS INTENDED TO OPERATE IN PARALLEL WITH THE UTILITY DISTRIBUTION SYSTEM.
2. THE PHOTOVOLTAIC SYSTEM IS INTENDED TO CONNECT TO THE EXISTING ELECTRICAL SYSTEM ON THE CUSTOMER'S SIDE OF THE METER FOR NET METERING. THIS CONNECTION SHALL BE IN COMPLIANCE WITH THE NEC AND UTILITY STANDARDS.
3. PRIOR TO INSTALLATION, THE CONTRACTOR SHALL SUBMIT AN INTERCONNECTION APPLICATION TO THE UTILITY AND OBTAIN AN INTERCONNECTION AGREEMENT IN COORDINATION WITH LOCAL STANDARDS.
5. THE INVERTER FOR THE PROPOSED PHOTOVOLTAIC SYSTEM SHALL BE IDENTIFIED FOR USE IN SOLAR PHOTOVOLTAIC AND BATTERY BACK-UP SYSTEMS.
6. ALL SOURCE CIRCUITS SHALL HAVE INDIVIDUAL SOURCE CIRCUIT PROTECTION FOR TESTING AND ISOLATION. ALL COMBINER BOXES SHALL HAVE DISCONNECTION MEANS IN OR NEAR THE COMBINER FOR ISOLATION AND TESTING.
7. ALL DISCONNECTS, COMBINERS, PULL/SPLICE BOXES, AND ENCLOSURES SHALL BE UL LISTED FOR ITS PURPOSE.

INVERTER

1. INVERTER SHALL BE HANDLED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND DOCUMENTATION. ALL INSTRUCTIONS AND REFERENCE DOCUMENTS SHALL BE REVIEWED AND UNDERSTOOD BY THE CONTRACTOR PRIOR TO HANDLING AND UNPACKING THE EQUIPMENT.
2. CONTRACTOR SHALL INSPECT ALL PACKAGES FOR DAMAGE UPON DELIVERY. ANY DAMAGED PACKAGES SHALL BE OPENED SO THE INVERTER AND EQUIPMENT CAN BE INSPECTED. ANY DAMAGE TO THE PACKAGING OR EQUIPMENT SHALL BE DOCUMENTED AND REPORTED TO THE OWNER IMMEDIATELY. INVERTERS TO BE STORED SHALL BE PROPERLY REPLACED IN THE PACKAGING FOR STORAGE.
3. INVERTER SHALL BE STORED IN A SECURE AND CLEAN LOCATION PER THE MANUFACTURER'S RECOMMENDATIONS AND DOCUMENTATION. INVERTERS SHALL BE PROTECTED FROM THE ENVIRONMENT SUCH AS HEAT, COLD, MOISTURE, DUST, SNOW, ETC.
4. REFERENCE THE MANUFACTURER'S INSTRUCTIONS FOR UNPACKING THE EQUIPMENT. INVERTERS SHALL BE TRANSPORTED BY MEANS OUTLINED IN THE MANUFACTURER'S DOCUMENTATION ONLY.
5. THE CONTRACTOR IS TO ENSURE THAT WORKING CLEARANCES MEET THE REQUIREMENTS OF ALL APPLICABLE CODES AND THE MANUFACTURERS REQUIREMENTS. ANY DISCREPANCIES SHALL BE REPORTED TO THE OWNER IMMEDIATELY.
6. ALL DISCONNECT SWITCHES SHALL BE IN THE OPEN POSITION DURING INSTALLATION AND SHALL REMAIN IN THE OPEN POSITION UNTIL PROPER TESTING, INSPECTION, AND COMMISSIONING HAS BEEN COMPLETED.
7. DO NOT OPEN THE INVERTER OR ELECTRICAL CABINETS WHEN IT IS RAINING OR HUMIDITY EXCEEDS 95%.
8. ALL FASTENERS SHALL BE TORQUED PER THE MANUFACTURER'S DOCUMENTATION.
9. IT IS PROHIBITED TO MODIFY THE INVERTER OR INSTALL EQUIPMENT NOT EXPLICITLY RECOMMENDED BY THE MANUFACTURER. DO NOT STORE DOCUMENTS, INSTRUCTIONS, PLANS, OR ANY OTHER FOREIGN MATERIAL NOT INTENDED TO BE PART OF THE SYSTEM INSIDE THE INVERTER CABINETS.
10. COMPONENTS OF THE INVERTER MAY BE DAMAGED BY ELECTROSTATIC DISCHARGE (ESD). WHEN HANDLING THE ELECTRICAL COMPONENTS, OBSERVE ALL ESD SAFETY REGULATIONS.
11. ALL CONDUCTORS SHALL BE CONNECTED TO THE INVERTER PER THE MANUFACTURER'S DOCUMENTATION, MAKING NOTE OF RECOMMENDED TERMINATIONS, TORQUE VALUES, AND BOLT STACK UP DETAILS IF PROVIDED. ALL BUSS BARS, CONDUCTORS, AND TERMINATIONS SHALL BE CLEAN PRIOR TO MAKING THE CONNECTION.
12. PHOTOVOLTAIC SYSTEM DC GROUNDING CONFIGURATIONS MAY VARY BY MANUFACTURER AND TECHNOLOGY. THE GROUNDING CONFIGURATION SHALL BE NOTED BY THE CONTRACTOR FOR SAFETY AND PROPER INSTALLATION.
13. CONTRACTOR IS TO OBTAIN ALL ELECTRICAL APPROVALS BY THE AUTHORITIES HAVING JURISDICTION, APPROVAL FROM THE ELECTRIC UTILITY SERVICE PROVIDER, AND APPROVAL FROM THE OWNER PRIOR TO ENERGIZING ANY INVERTERS.
14. COMMISSIONING, INSPECTION, AND TESTING OF THE INVERTER SHALL BE PROPERLY DOCUMENTED AND SUBMITTED TO THE OWNER PRIOR TO ENERGIZING THE INVERTER.

WIRING AND WIRING METHODS

1. ALL WIRING METHODS AND INSTALLATION PRACTICES SHALL CONFORM TO THE NATIONAL ELECTRIC CODE.
2. EXPOSED PV SOLAR PANEL WIRING WILL BE PV WIRE, 90 DEGREE C, 1000V, WET RATED. ALL EXPOSED CABLES, SUCH AS MODULE LEADS SHALL BE SECURED WITH MECHANICAL OR OTHER SUN-LIGHT RESISTANT MEANS.
3. ALL CONDUCTORS SHALL BE COPPER AND HAVE INSULATION RATING 1000 V, 90 DEGREE C, UNLESS OTHERWISE NOTED.
4. USE THE FOLLOWING COLOR CONVENTION FOR DC CONDUCTORS:
RED - POSITIVE
BLACK - NEGATIVE
GREEN - GROUND
5. ALL FIELD WIRING THAT IS NOT COLOR CODED SHALL BE TAGGED AT BOTH ENDS WITH PERMANENT WIRE MARKERS TO IDENTIFY POLARITY AND GROUND. FACE TAPE SHALL NOT BE USED.
6. FLEXIBLE METAL CONDUIT IS GENERALLY SUITABLE FOR INSTALLATION IN DRY LOCATIONS. SHOULD IT BE EMPLOYED, SUPPORTS WILL BE NO MORE THAN 12 INCHES FROM BOXES (JUNCTION BOX, CABINETS OR CONDUIT FITTING) AND NO MORE THAN 54 INCHES APART.
7. LIQUID TIGHT FLEXIBLE NON-METALLIC CONDUIT SHALL NOT BE USED.
8. EXPOSED PVC CONDUIT SHALL BE SCH 80.
9. LONG STRAIGHT METALLIC AND/OR PVC CONDUIT RUNS, 100 FEET OR MORE, SHALL HAVE EXPANSION FITTINGS.
10. IF USED, ALL WIRENUTS ARE TO BE SILICONE FILLED, EQUIVALENT TO IDEAL BLUE, AND INSTALLED PER MANUFACTURER'S SPECIFICATIONS BY A QUALIFIED/CERTIFIED PERSON. WIRENUTS SHALL NOT BE INSTALLED ALONG THE PATH OF PV POWER GENERATION, OR FOR ANY EQUIPMENT NECESSARY FOR THE GENERATION OF PV POWER. WIRENUTS ARE ONLY ALLOWED FOR AUXILIARY EQUIPMENT.
11. FUSES AND WIRES SUBJECT TO TRANSFORMER INRUSH CURRENT SHALL BE SIZED ACCORDINGLY.
12. ALL DC MATERIALS SHALL BE UL LISTED FOR 1000VDC MINIMUM.
13. WIRING SHALL BE INSTALLED IN APPROVED METAL OR PVC CONDUITS OR RACEWAYS WITH LISTED FITTINGS, AS APPLICABLE, ADEQUATELY STRAP AND SUPPORT ALL CONDUIT WORK PER NEC. IN GENERAL SUPPORT ALL CONDUIT WITHIN THREE FEET (3') OF OUTLET BOX, CABINET OR PANEL AND MAXIMUM OF TEN FEET (10') ON CENTER THEREAFTER, EMT CONDUIT IS TO BE LISTED FOR WET LOCATION, IF USED.
14. THE PHOTOVOLTAIC SOURCE CIRCUITS AND PHOTOVOLTAIC OUTPUT CIRCUITS OF THIS PROPOSED SOLAR SYSTEM SHALL NOT BE CONTAINED IN THE SAME RACEWAY CABLE TRAY, CABLE, OUTLET BOX, JUNCTION BOX, OR SIMILAR FITTING AS FEEDERS OR BRANCH CIRCUITS OF OTHER SYSTEMS UNLESS THE CONDUCTORS OF THE DIFFERENT SYSTEMS ARE SEPARATED BY A PARTITION OR ARE CONNECTED TOGETHER.
15. CONNECTORS TO BE TORQUED PER DEVICE LISTING, OR MANUFACTURERS RECOMMENDATIONS. ONLY 60 TON HYDRAULIC CRIMPS WITH HIGH VOLTAGE HEAT-SHRINK INSULATION ARE ACCEPTABLE.
16. SPLIT BOLTS / SPLICES / CONNECTORS SHALL BE INSULATED WITH APPROVED MEANS. UL LISTED ELECTRICAL TAPE ALONE IS NOT SUITABLE AS THE ONLY INSULATION MEANS. FOLLOW MANUFACTURERS INSTRUCTIONS FOR APPLICATION OF INSULATING PRODUCT.

MARKINGS

1. ALL INTERACTIVE SYSTEM POINTS OF INTERCONNECTION WITH OTHER SOURCES SHALL BE MARKED AT AN ACCESSIBLE LOCATION AT THE DISCONNECTION MEANS.
2. A PERMANENT PLAQUE OR DIRECTORY SHALL BE PROVIDED IDENTIFYING THE LOCATION OF THE SERVICE DISCONNECTION MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTION MEANS, IF NOT LOCATED AT THE SAME LOCATION.
3. PHOTOVOLTAIC MODULES SHALL BE MARKED TO IDENTIFY LEAD POLARITY, DEVICE RATINGS, AND SPECIFICATIONS FOR VOLTAGES, CURRENTS, AND POWER.

REQUIRED SAFETY SIGNS AND LABELS

- REQUIRED SAFETY SIGNS AND LABELS SHALL BE PERMANENTLY ATTACHED BY ADHESIVE, OR OTHER MECHANICAL MEANS. LABELS SHALL COMPLY WITH ARTICLE 690 OF THE NEC OR OTHER APPLICABLE STATE, AND UTILITY CODES. SEE LABELS AND MARKING PAGE FOR MORE INFORMATION.
1. ANY SWITCH, FUSES, OR CIRCUIT BREAKERS THAT CAN BE ENERGIZED IN EITHER DIRECTION SHALL BE LABELED AS FOLLOWS
WARNING:
ELECTRICAL SHOCK HAZARD DO NOT TOUCH TERMINALS.
TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION
 2. THIS PHOTOVOLTAIC SYSTEM WILL BE EQUIPPED WITH A DC DISCONNECT WHICH WILL BE LABELED AS FOLLOWS:
PHOTOVOLTAIC MAINTENANCE
DC DISCONNECT SWITCH
 3. THIS PHOTOVOLTAIC SYSTEM WILL BE EQUIPPED WITH AN AC DISCONNECT WHICH WILL BE LABELED AS FOLLOWS: PHOTOVOLTAIC AC DISCONNECT
 4. A MARKING SPECIFYING THE PHOTOVOLTAIC POWER SOURCE RATED AS FOLLOWS SHALL BE PROVIDED AT AN ACCESSIBLE LOCATION AT THE DISCONNECTION MEANS FOR THE POWER SOURCE:
OPERATING CURRENT (##) AMPS
OPERATING VOLTAGE (##) VOLTS
MAXIMUM SYSTEM VOLTAGE (##) VOLTS
SHORT CIRCUIT CURRENT (##) AMPS
NOTE: ## VALUES TO BE PROVIDED BY CONTRACTOR PER ACTUAL INSTALLATION.
 5. ALL MAJOR EQUIPMENT SHALL BE PROPERLY LABELED WITH ARC-FLASH HAZARD SIGNS AS REQUIRED BY NFPA 70E.

GROUNDING

1. SEE ELECTRICAL DIAGRAM AND ELECTRICAL DETAILS FOR MORE GROUNDING INFORMATION.
2. ONLY ONE CONNECTION TO AC CIRCUITS SHALL BE USED FOR SYSTEM GROUNDING.
3. EQUIPMENT GROUNDING CONDUCTORS AND SYSTEM GROUNDING CONDUCTORS SHALL HAVE AS SHORT A DISTANCE TO GROUND AS POSSIBLE AND A MINIMUM NUMBER OF TURNS.
4. NON-CURRENT CARRYING METAL PARTS SHALL BE CHECKED FOR PROPER GROUNDING; NOTING THAT TERMINAL LUGS BOLTED ON AN ENCLOSURE'S FINISHED SURFACE MAY BE INSULATED BECAUSE OF PAINT/FINISH. PAINT/FINISH AT POINT OF CONTACT SHALL BE PROPERLY REMOVED AND TREATED FOR RUST PREVENTION.
5. PV MODULE FRAMES SHALL BE BONDED TO RACKING STRUCTURE USING A METHOD APPROVED BY THE MODULE MANUFACTURER AND WITH A MEANS OF BONDING LISTED FOR THIS PURPOSE.
6. THE CONNECTION TO THE MODULE OR PANEL OF THIS PROPOSED SOLAR ELECTRIC SYSTEM SHALL BE SO ARRANGED THAT REMOVAL OF A MODULE OR A PANEL FROM THE PHOTOVOLTAIC SOURCE CIRCUIT DOES NOT INTERRUPT A GROUNDING CONDUCTOR TO ANOTHER PHOTOVOLTAIC SOURCE CIRCUIT. SETS OF MODULES INTERCONNECTED AS SYSTEMS RATED AT 50 VOLTS OR HIGHER, WITH OR WITHOUT BLOCKING DIODES, AND HAVING A SINGLE OVER CURRENT DEVICE SHALL BE CONSIDERED AS A SINGLE SOURCE CIRCUIT.
7. GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, INCLUDING BUT NOT LIMITED TO GROUND RODS, GROUNDING LUGS, GROUNDING CLAMPS, ETC. GROUNDING DEVICES EXPOSED TO THE ENVIRONMENT SHALL BE RATED FOR DIRECT BURIAL. GROUNDING LUGS SHALL BE LISTED FOR DIRECT-BURIAL, IL500 GBL4-DBT OR EQUAL.
8. ALL FLEXIBLE CONDUITS SHALL HAVE AN EXTERIOR GROUND WIRE BETWEEN THE CONNECTORS AT BOTH ENDS. GROUND WIRE SHALL RUN ALONG THE CONDUIT.
9. ALL GROUNDING SYSTEMS FOR THE SOLAR PV INSTALLATION SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE, AND LOCAL STANDARDS.

PROTECTION

1. PHOTOVOLTAIC INVERTERS SHALL BE EQUIPPED WITH DC GROUND FAULT PROTECTION TO REDUCE FIRE HAZARDS. INVERTERS ARE ALSO EQUIPPED WITH ANTI-ISLANDING CIRCUITRY.
2. PHOTOVOLTAIC INVERTERS SHALL BE EQUIPPED WITH PV ARC FAULT PROTECTION TO REDUCE FIRE HAZARDS.
3. PHOTOVOLTAIC SYSTEM SHALL BE EQUIPPED WITH RAPID SHUTDOWN.

EQUIPMENT

1. EQUIPMENT AND COMPONENTS SHALL BE UL LISTED AND LABELED.
2. PROVIDE DANGER, WARNING, AND CAUTION LABELS AS REQUIRED BY NEC, NFPA, OR OSHA STANDARDS ON EQUIPMENT ENCLOSURES, DOORS, ACCESS PLATES, AND BARRIERS AND LABEL ALL LOW VOLTAGE EQUIPMENT WITH THE OPERATING VOLTAGE.
3. EQUIPMENT SHALL BE ANCHORED TO CONCRETE PADS, FOUNDATIONS, OR WALLS PER MANUFACTURER'S INSTRUCTIONS.
4. EQUIPMENT SHALL BE INSTALLED IN APPROPRIATE ENVIRONMENT PER ITS NEMA RATING.
5. ALL OPENINGS INTO EQUIPMENT SHALL BE SEALED WITH GALVANIZED STEEL PLATE OR SCREEN TO PREVENT ENTRY OF INSECTS AND RODENTS.

DISCONNECTING MEANS

1. MEANS SHALL BE PROVIDED TO DISCONNECT ALL CURRENT CARRYING CONDUCTORS OF THE PHOTOVOLTAIC POWER SOURCE FROM ALL OTHER CONDUCTORS.
2. WHERE A CIRCUIT GROUNDING CONNECTION IS NOT DESIGNED TO BE AUTOMATICALLY INTERRUPTED AS PART OF THE GROUND-FAULT PROTECTION SYSTEM REQUIRED BY NEC ARTICLE 690-5, A SWITCH OR CIRCUIT BREAKER USED AS A DISCONNECTING MEANS SHALL NOT HAVE A POLE IN THE GROUNDED CONDUCTOR.
3. THE GROUNDED CONDUCTOR MAY HAVE A BOLTED OR TERMINAL DISCONNECTING MEANS TO ALLOW MAINTENANCE OR TROUBLESHOOTING BY QUALIFIED PERSONNEL.
4. THE DISCONNECTING MEANS SHALL NOT BE REQUIRED TO BE SUITABLE AS SERVICE EQUIPMENT AND SHALL BE RATED IN ACCORDANCE WITH NEC ARTICLE 690-17.
5. EQUIPMENT SUCH AS PHOTOVOLTAIC SOURCE CIRCUITS, OVER CURRENT DEVICES, AND BLOCKING DIODES SHALL BE PERMITTED ON THE PHOTOVOLTAIC SIDE OF THE PHOTOVOLTAIC DISCONNECTING MEANS.
6. MEANS SHALL BE PROVIDED TO DISCONNECT EQUIPMENT SUCH AS INVERTERS, BATTERIES, CHARGE CONTROLLERS, AND THE LIKE FROM ALL UNGROUNDED CONDUCTORS OF ALL SOURCES. IF THE EQUIPMENT IS ENERGIZED FROM MORE THAN ONE SOURCE, THE DISCONNECTING MEANS SHALL BE GROUPED AND IDENTIFIED.
7. A SINGLE DISCONNECTING MEANS SHALL BE PERMITTED FOR THE COMBINED AC OUTPUT OF ONE OR MORE INVERTERS IN AN INTERACTIVE SYSTEM.
8. NEC 690-16. FUSES. DISCONNECTING MEANS SHALL BE PROVIDED TO DISCONNECT A FUSE FROM ALL SOURCES OF SUPPLY IF THE FUSE IS ENERGIZED FROM BOTH DIRECTIONS AND IS ACCESSIBLE TO OTHER THAN QUALIFIED PERSONS. SUCH A FUSE IN A PHOTOVOLTAIC SOURCE CIRCUIT SHALL BE CAPABLE OF BEING DISCONNECTED INDEPENDENTLY OF FUSES IN OTHER PHOTOVOLTAIC SOURCE CIRCUITS.

FOR
CONSTRUCTION

ENGINEER:
David Brueck, P.E.
GA LICENSE # 038102
Certified NABCEP
PV Installer# 042013-17

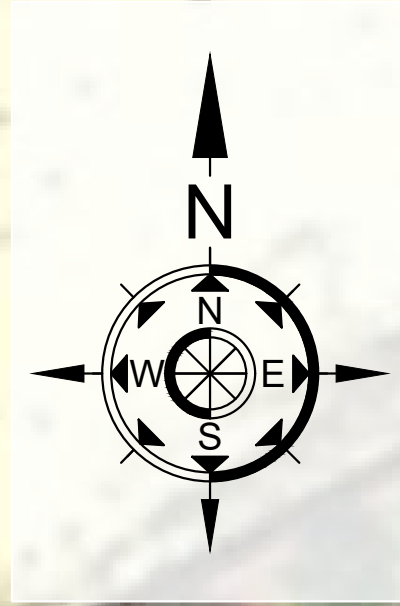
DRAFTER:
David Brueck

PROJECT #:
BC-2023-06

SHEET:
002

SCALE:
N/A

NO	DATE	BY	REVISION DESCRIPTION
1	7/13/2023	D.BRUECK	UPDATED MODULE FOR CONSTRUCTION
0	3/16/2023	D.BRUECK	FOR CONSTRUCTION



ELECTRICAL ROOM:
800A, 120/208V, 3PH, 4W MDP

SUB PANEL 'P1' LOCATED INSIDE BUILDING ON GROUND FLOOR. INVERTERS AND BATTERIES LOCATED ON SECOND FLOOR DIRECTLY ABOVE 'P1':
-(2) x SOL-ARK 15kW INVERTERS
-(1) x EG4-LL LITHIUM BATTERIES KIT (V2) 30.72kWh, 6 BATTERY RACK IN PRE-ASSEMBLED ENCLOSURE

(180) x 370W PV MODULES

SUB PANEL 'P2', INVERTERS AND BATTERIES LOCATED INSIDE BUILDING ON GROUND FLOOR:
-(2) x SOL-ARK 15kW INVERTERS
-(1) x EG4-LL LITHIUM BATTERIES KIT (V2) 30.72kWh, 6 BATTERY RACK IN PRE-ASSEMBLED ENCLOSURE

GSC CONSTRUCTION

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ROOF MOUNT SOLAR PV & BESS
BATTERY BACK-UP
Coos Bay, OR 97420
SYSTEM OVERVIEW LAYOUT

FOR CONSTRUCTION

ENGINEER:
David Brueck, P.E.
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DRAFTER:
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PROJECT #:
BC-2023-06

SHEET:
003

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CONDUIT FILL CALCULATION (DC CIRCUITS ONLY)

PER NEC ART. 352.22 FOR PVC AND 358.22 FOR EMT
AREA OF 1000 VOLT #10PV WIRE = 0.0543 SQ. IN.
AREA OF 1000 VOLT #6PV WIRE = 0.0956 SQ. IN.

EXAMPLE:
(12) x 0.0543 (#10 PV WIRES) = 0.66 SQ. IN.
(1) x 0.0956 (#6 PV WIRES) = 0.0956 SQ. IN.
TOTAL = 0.76 SQ. IN.

-FROM NEC CHAPTER 9, TABLE 4 FOR RMC CONDUIT @ 40%
FILL: 1-1/2" CONDUIT = 0.829 SQ. IN. AVAILABLE.
-0.76 SQ. IN. IS LESS THAN 0.829 SQ. IN., SO 1-1/2" CONDUIT
WORKS FOR DC CONDUIT WITH UP TO (12) #10 CU PV WIRES.
*USE TABLE 4 IN NEC CHAPTER 9 FOR RMC CONDUIT. USE
COLUMN FOR "OVER 2 WIRES 40%" TO DETERMINE MAX
CROSS-SECTIONAL AREA AVAILABLE FOR WIRES AND MAKE SURE
TOTAL WIRE CROSS-SECTIONAL AREA IS LESS THAN CONDUIT
SIZE CROSS-SECTIONAL AREA AVAILABLE AT 40%

Table with 2 columns: Parameter, Value. SUB SYSTEM #1 Overview. PV Module Manufacturer/Model: BOVIET BVM6610M(S)-HC-BF. PV Module Size (W): 370 watts. Total (#) of Modules: 90. Inverter Manufacturer/Model: Sol-Ark "Limitless 15kV-LV". Inverter Size (VA): 15,000. Total (#) of Inverters: 2. Batteries Model: EG4-LL Lithium Battery Rack (V2). Battery Bank Size: (6) x 100Ah = 600Ah, 48V. Total (#) Battery Banks: 1. PV System Size (DC): 33,300 W. System Size (AC): 30,000 W.

Table with 2 columns: Parameter, Value. SUB SYSTEM #2 Overview. PV Module Manufacturer/Model: BOVIET BVM6610M(S)-HC-BF. PV Module Size (W): 370 watts. Total (#) of Modules: 90. Inverter Manufacturer/Model: Sol-Ark "Limitless 15kV-LV". Inverter Size (VA): 15,000. Total (#) of Inverters: 2. Batteries Model: EG4-LL Lithium Battery Rack (V2). Battery Bank Size: (6) x 100Ah = 600Ah, 48V. Total (#) Battery Banks: 1. PV System Size (DC): 33,300 W. System Size (AC): 30,000 W.

Table with 2 columns: Parameter, Value. TOTAL SYSTEM Overview. PV Module Manufacturer/Model: BOVIET BVM6610M(S)-HC-BF. PV Module Size (W): 370 watts. Total (#) of Modules: 180. Inverter Manufacturer/Model: Sol-Ark "Limitless 15kV-LV". Inverter Size (VA): 15,000. Total (#) of Inverters: 4. Batteries Model: EG4-LL Lithium Battery Rack (V2). Battery Bank Size: (6) x 100Ah = 600Ah, 48V. Total (#) Battery Banks: 2. PV System Size (DC): 66,600 W. System Size (AC): 60,000 W.

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ROOF MOUNT SOLAR PV & BESS
BATTERY BACK-UP
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SCHEDULES

FOR CONSTRUCTION

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Certified NABCEP
PV Installer# 042013-17

DRAFTER:
David Brueck

PROJECT #
BC-2023-06

SHEET:
005

SCALE:
N/A

Table with 4 columns: NO, DATE, BY, REVISION DESCRIPTION. Includes revision history for construction updates.

EQUIPMENT SCHEDULE

Table with 5 columns: EQUIPMENT DESIGNATION, MANUFACTURER, MODEL #, QTY, DESCRIPTION. Lists equipment items A through F including solar modules, inverters, battery banks, and panels.

CONDUCTOR SCHEDULE - DC SIDE (PV STRINGS)

Table with 4 main columns: GENERAL, OCPD, VOLTAGE DROP CALCULATIONS, CONDUCTOR & CONDUIT SCHEDULE. Details conductor and conduit requirements for PV strings.

CONDUCTOR SCHEDULE - DC SIDE (BATTERY BANK)

Table with 4 main columns: GENERAL, OCPD, VOLTAGE DROP CALCULATIONS, CONDUCTOR & CONDUIT SCHEDULE. Details conductor and conduit requirements for the battery bank.

CONDUCTOR SCHEDULE - AC SIDE

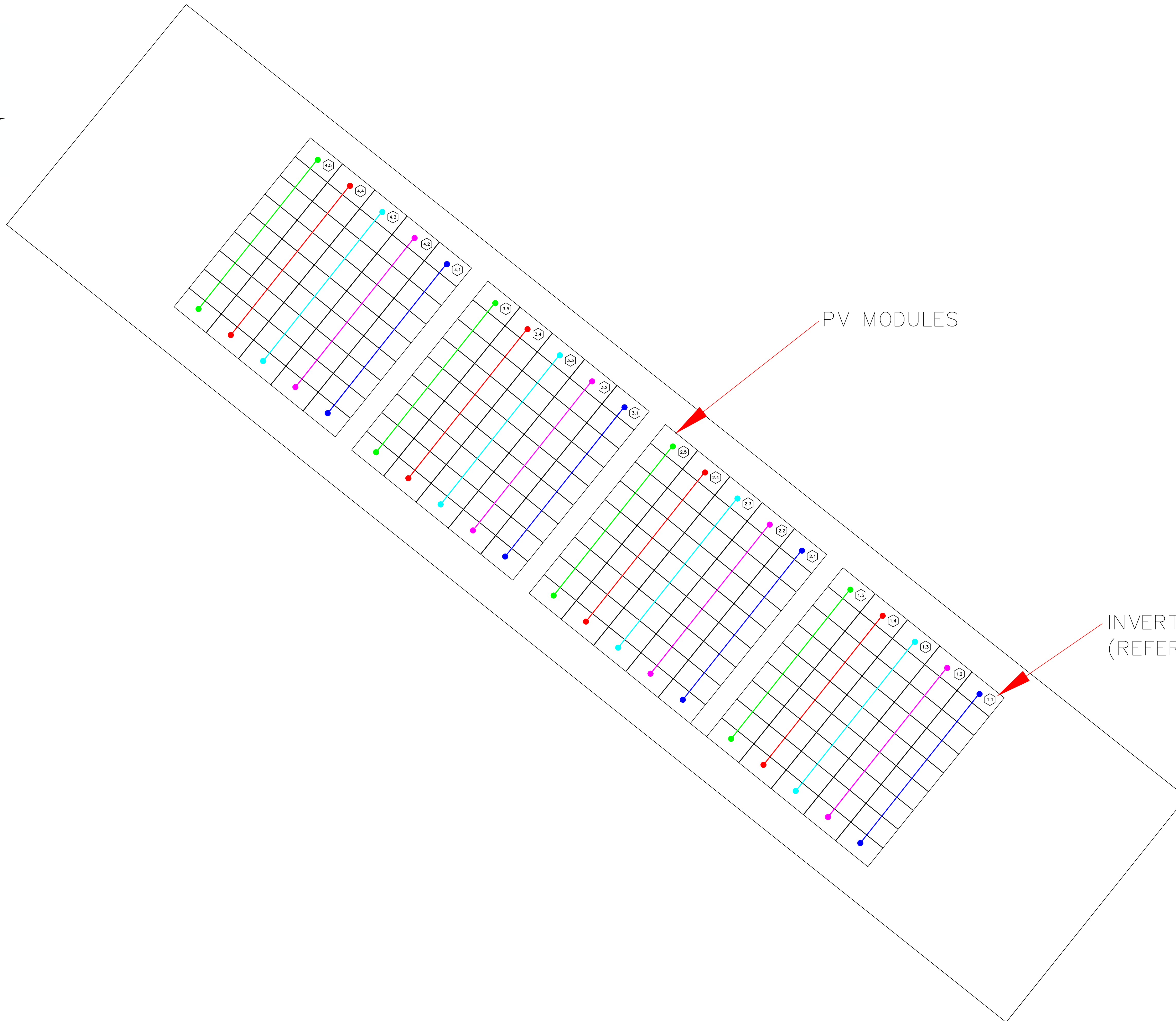
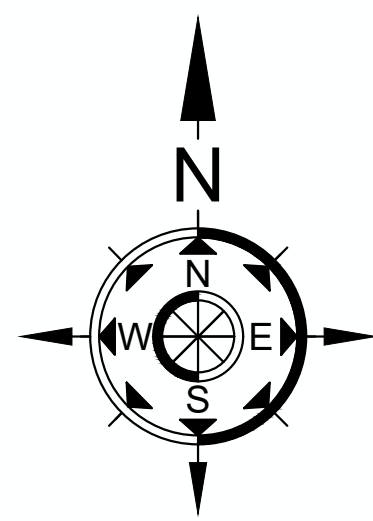
Table with 4 main columns: GENERAL, OCPD, VOLTAGE DROP CALCULATIONS, CONDUCTOR & CONDUIT SCHEDULE. Details conductor and conduit requirements for AC side connections.

PV MODULE SPECIFICATIONS

Table with 2 columns: Parameter, Value. BOVIET BVM6610M(S)-HC-BF. STC Power Rating (W): 370 watts. Voc (V): 40.6. Vmp (V): 33.8. Isc (A): 11.54. Imp (A): 10.96. Module Efficiency: 19.70%.

INVERTER ELECTRICAL SPECIFICATIONS

Table with 2 columns: Parameter, Value. Sol-Ark 15k-2P-N. Inverter Name: Sol-Ark 15k-2P-N. DC Input (Solar PV): Max DC Voltage (Voc): 500V. MPPT Voltage Range (V): 125 - 425V. Starting Voltage (V): 125V. Number of MPPT: 3. Max Solar Strings per MPPT: 2. Max DC Current per MPPT (A): 26A. Output (AC): Rated Power (VA): 15,000. Nominal AC Voltage (V): 120/240/208V Split Phase. AC Frequency (Hz): 60. Max Output Current w/ PV (A): 72.2 L-L (208V). Max Output Current w/ Battery (A): 58A L-L (208V). Max Output Current w/ Grid (A): 200A L-L (208V). PV DC Disconnect Switch: Integrated. Ground Fault Detection: Integrated. PV Rapid Shutdown: Integrated. PV Arc Fault Detection: Integrated. PV Input Lightning Protection: Integrated. PV String Input Reverse Polarity Protection: Integrated. AC Output Breakers: Integrated. 200A x 2 Battery Breaker / Disconnect: Integrated. Surge Protection: DC Type II / AC Type II.



GSC CONSTRUCTION

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 ROOF MOUNT SOLAR PV & BESS
 BATTERY BACK-UP
 Coos Bay, OR 97420
 STRING LAYOUT

FOR CONSTRUCTION

ENGINEER:
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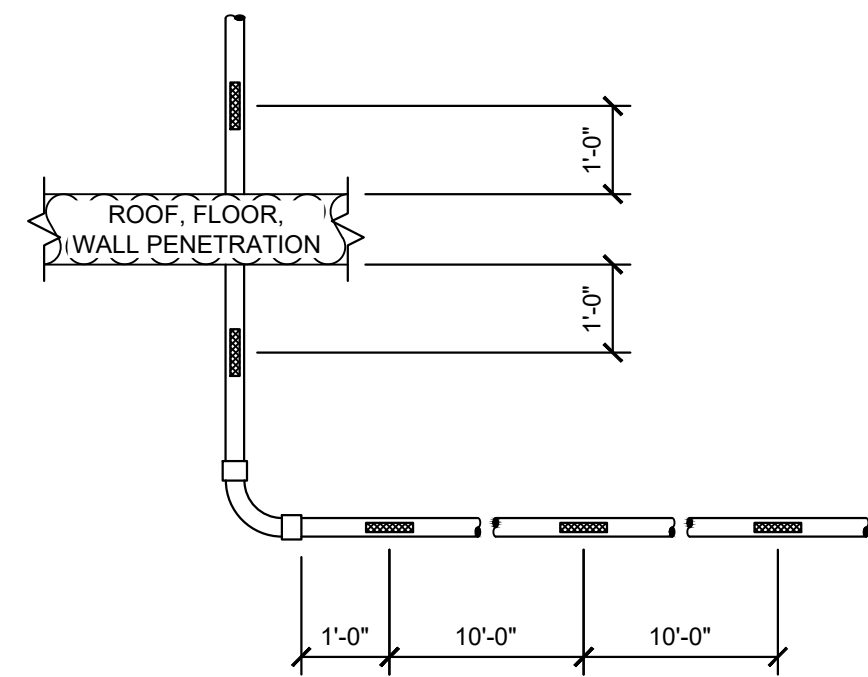
DRAFTER:
 David Brueck

PROJECT #:
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 006

SCALE:
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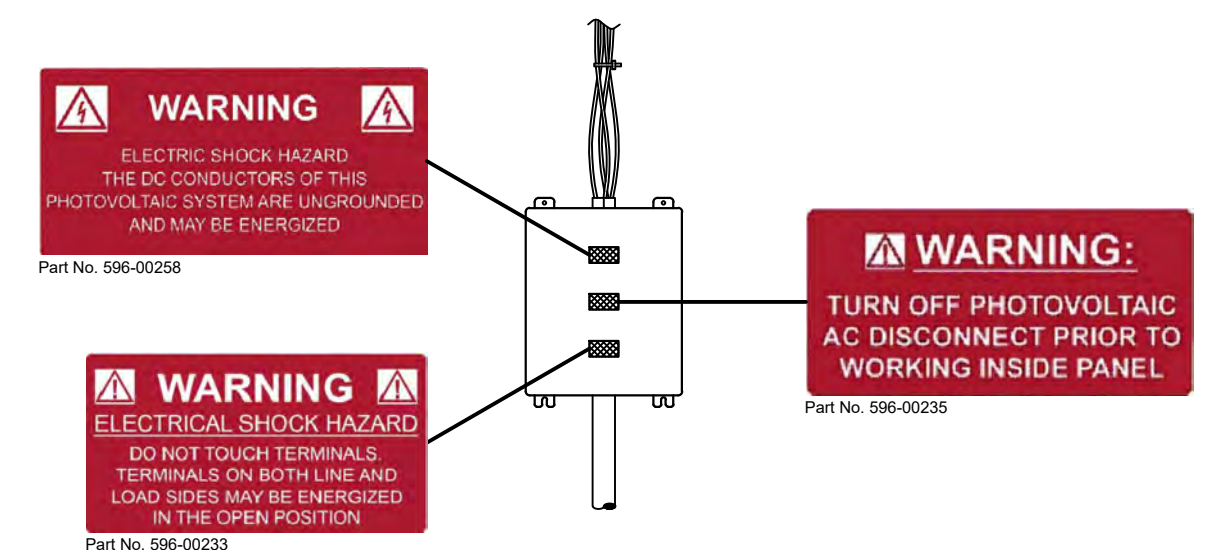


PHOTOVOLTAIC POWER SOURCE
Part No. 596-00206

CAUTION SOLAR CIRCUIT
Part No. 596-00247

DETAIL "1" NOTES:
1. THE MATERIALS USED FOR MARKING SHALL BE REFLECTIVE, WEATHER RESISTANT AND SUITABLE FOR THE ENVIRONMENT.

1 'PV' LABELS - 'DC' CONDUIT
9.0 DIAGRAM SCALE: NTS
LABEL SCALE: HALF



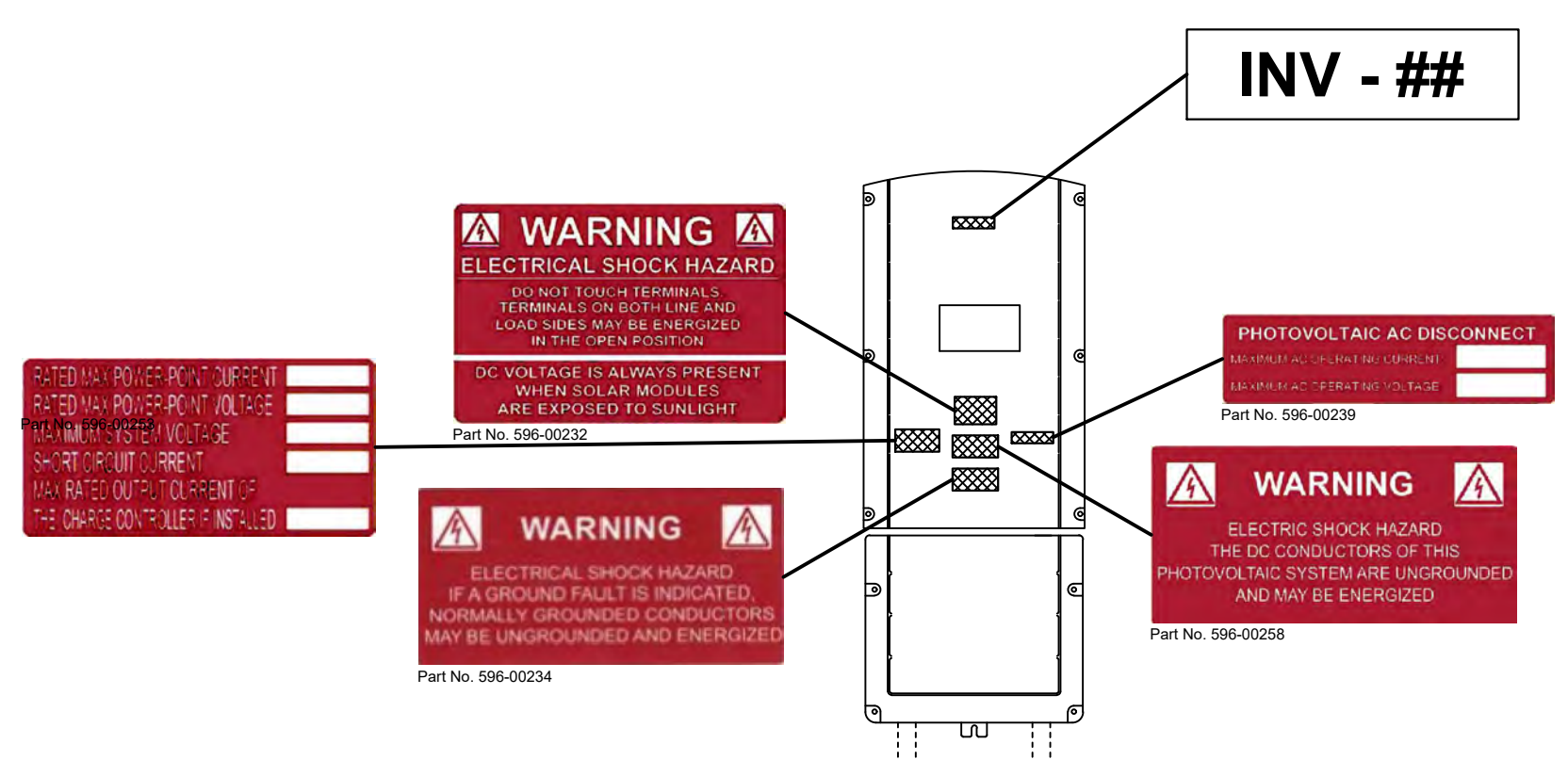
2 'PV' LABELS - PASS THROUGH BOX
9.0 DIAGRAM SCALE: NTS
LABEL SCALE: HALF

GENERAL NOTES:

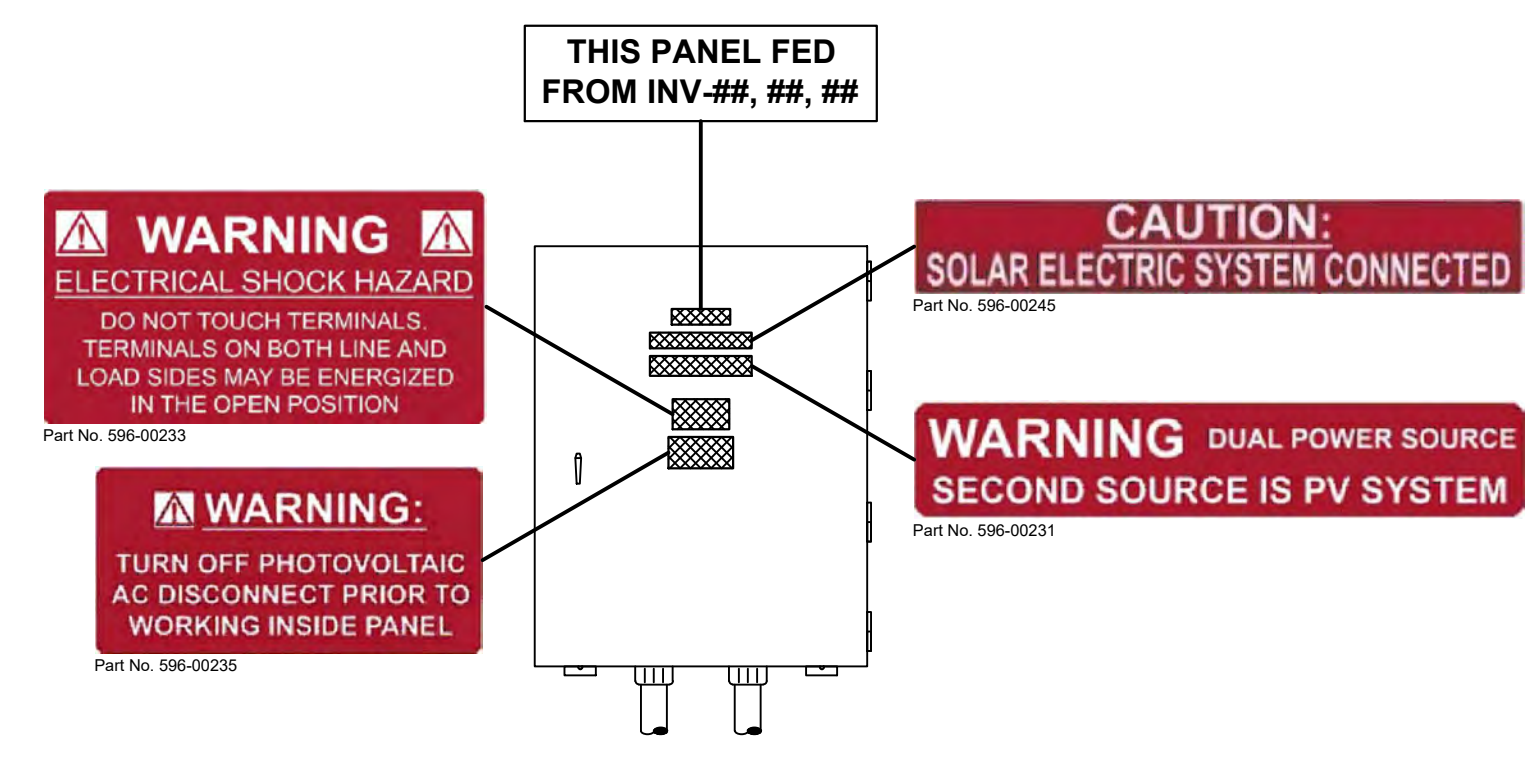
1. LABELS AND MARKINGS SHALL BE APPLIED TO THE APPROPRIATE COMPONENTS IN ACCORDANCE WITH NEC.
2. SOLAR MODULES ARE SUPPLIED FROM THE MANUFACTURER WITH MARKINGS PRE-APPLIED TO MEET THE REQUIREMENTS OF THE NEC.
3. THE INVERTER, DC RECOMBINER, AND DC DISCONNECT COMBINERS ARE SUPPLIED FROM THE MANUFACTURER WITH THE APPROPRIATE LABELS AND MARKINGS TO MEET THE REQUIREMENTS OF THE NEC.
4. TEXT LABELS WILL BE ETCHED WITH WHITE GRAPHICS ONTO 1/16" RED PLASTIC PLACARDS. THE LABEL WILL BE ATTACHED TO THE APPROPRIATE COMPONENT ENCLOSURES IN CONSPICUOUS PLACES USING TWO PART EPOXY.
5. PROPERLY LABEL IN NUMERICAL ORDER ALL DC DISCONNECTS, INVERTERS, AND AC DISCONNECTS.
6. REFER TO NATIONAL ELECTRIC CODE 2020 EDITION FOR APPROPRIATE SIZES OF LABELS AND TEXT.

GSC CONSTRUCTION

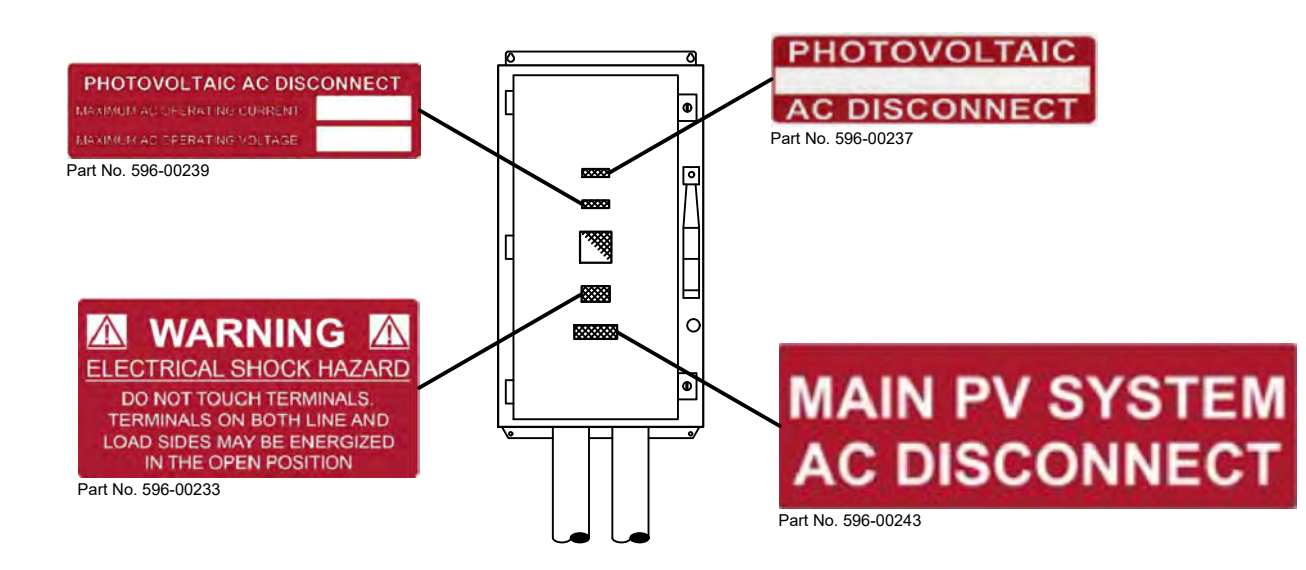
801 MILUK DR.
ROOF MOUNT SOLAR PV & BESS
BATTERY BACK-UP
Coos Bay, OR 97420
SAFETY LABELS



3 'PV' LABELS - INVERTER
9.0 DIAGRAM SCALE: NTS
LABEL SCALE: HALF



4 'PV' LABELS - INVERTER AC BREAKER PANEL
9.0 DIAGRAM SCALE: NTS
LABEL SCALE: HALF



5 'PV' LABELS - AC DICONNECT
9.0 DIAGRAM SCALE: NTS
LABEL SCALE: HALF

FOR CONSTRUCTION

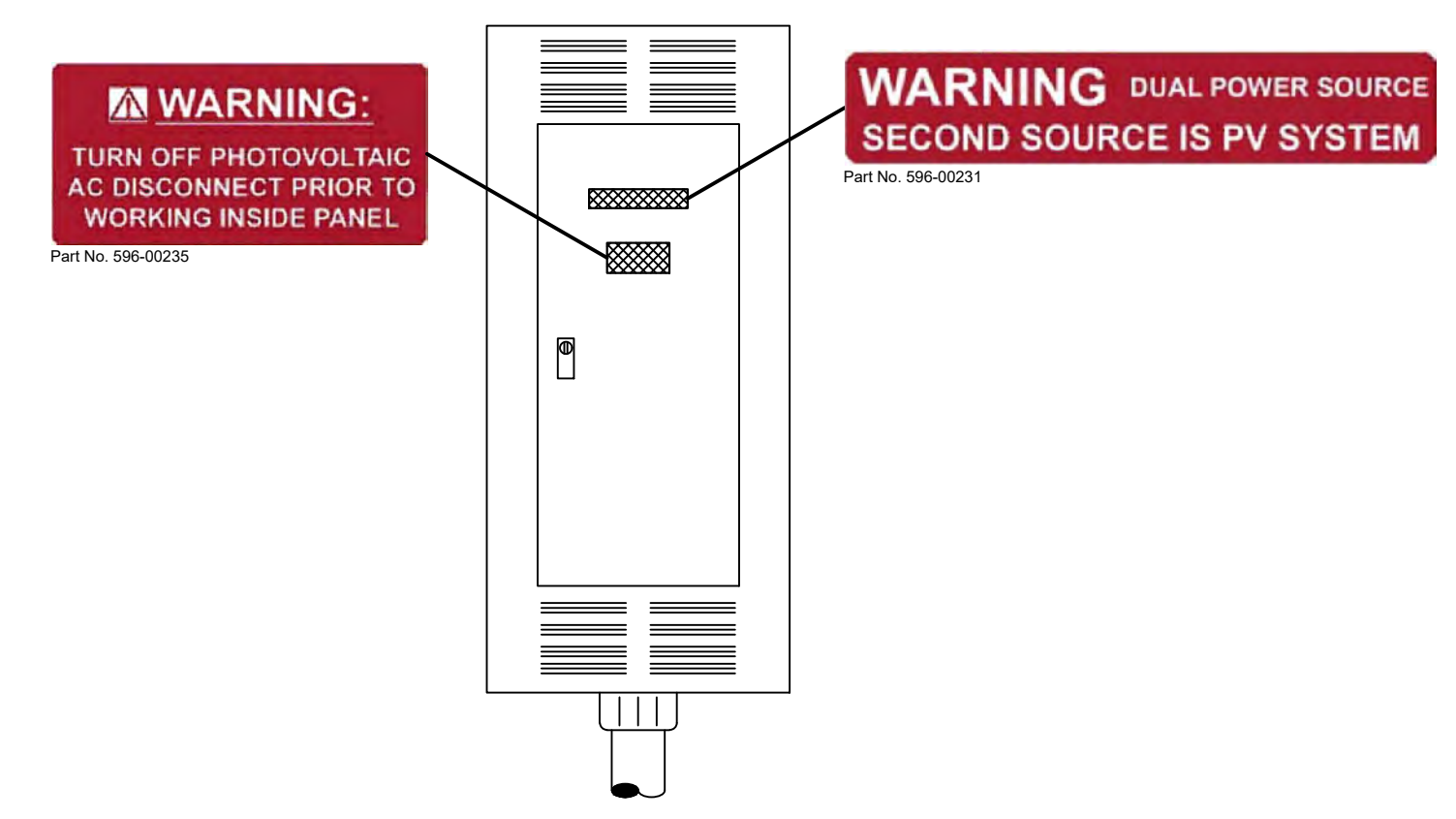
ENGINEER: David Brueck, P.E.
GA LICENSE # 038102
Certified NABCEP
PV Installer# 042013-17

DRAFTER: David Brueck

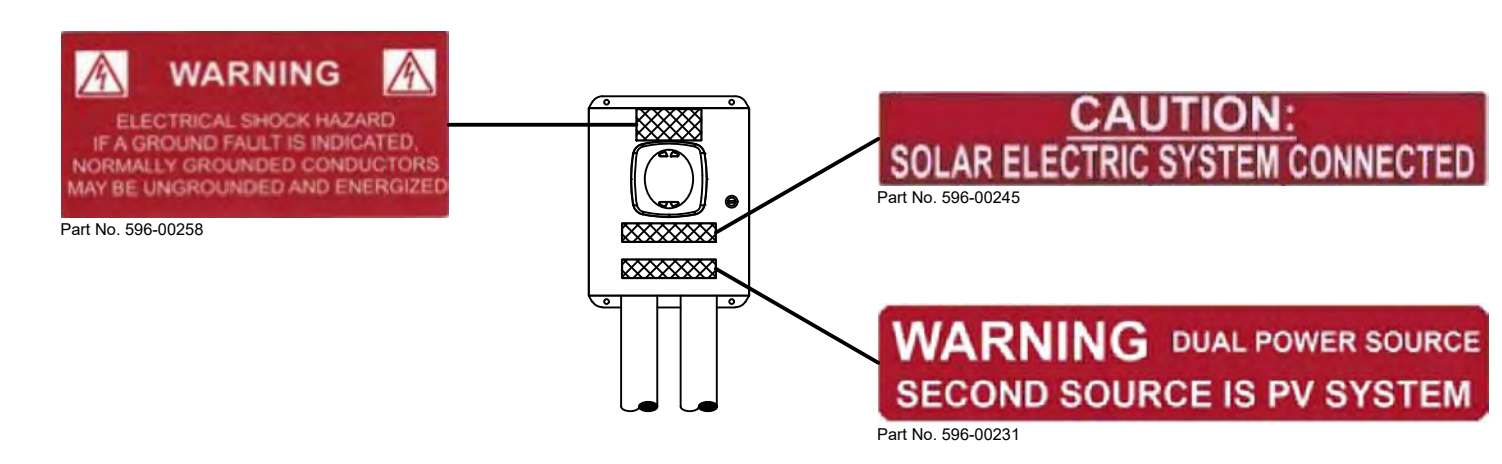
PROJECT #: BC-2023-06

SHEET: 007

SCALE: N/A



6 'PV' LABELS - BUILDING MDP
9.0 DIAGRAM SCALE: NTS
LABEL SCALE: HALF



7 'PV' LABELS - BI-DIRECTINAL REVENUE METER
9.0 DIAGRAM SCALE: NTS
LABEL SCALE: HALF



Part No. 558-00330

DETAIL "5" NOTES:
1. ARC FLASH AND SHOCK HAZARD WARNING LABEL TO BE PLACED ON ALL EQUIPMENT THAT HAS EXPOSED LIVE PARTS WHEN ENCLOSURE IS OPEN FOR SERVICING.

8 'PV' LABELS - ARC FLASH HAZARD
9.0 LABEL SCALE: HALF

NO	DATE	BY	REVISION DESCRIPTION
1	7/13/2023	D.BRUECK	UPDATED MODULE FOR CONSTRUCTION
0	3/16/2023	D.BRUECK	FOR CONSTRUCTION

Table with columns for NO, DATE, BY, REVISION DESCRIPTION, and revision history entries.

BOVIET SOLAR USA Bifacial Module 360-370W(9BB) BVM6610M(S)-HC-BF. Advancing the Power of the Sun. 0~5W Power Tolerance, 19.7% Maximum Efficiency, 360-370W Power Output Range.

IRONRIDGE XR Rail Family. Solar Is Not Always Sunny. XR Rails are the structural backbone preventing these results. They resist uplift, protect against buckling and safety and efficiently transfer loads into the building structure.

APsmart RSD-S-PLC. The RSD-S-PLC meets SunSpec requirements, maintaining normal function by continually receiving a heartbeat signal from the APsmart Transmitter. RSD-S-PLC Wiring Diagram and Working Schematic Diagram.

EG4 Electronics | Specification Sheet EG4-LL 48V 100AH BATTERY. Built in BMS 100A, Storage Capacity 5.12 KWH, 10 Year Warranty, UL 1973 Listed UL 9540A Compliant.

Sol-Ark 15K-2P-N "Limitless 15K-LV" UL Model. Battery (optional) Output Power 12,000W. Solar Input Power 19,500W. AC Output Power 15kW On-Grid & Off-Grid.

Electrical Characteristics STC and NOCT tables for BVM6610M-3055-H-NC-BF, BVM6610M-3055-H-NC-BF, and BVM6610M-3705-H-NC-BF modules.

IRONRIDGE XR Rail Family. Raising the bar in innovative DC MLPE solar power systems. RSD-S-PLC. XR10, XR100, XR1000. Rail Selection table showing Load vs Rail Span for XR10, XR100, and XR1000.

APsmart RSD-S-PLC Technical Data. Model, Input Data (DC), Output Data (DC), Mechanical Data, BMS Parameters, and Safety Compliance.

EG4 Electronics | Specification Sheet EG4-LL 48V 100AH BATTERY. Nominal Operating Parameters, Environmental Parameters, BMS Parameters, Discharge, and Temperature Derating.

Sol-Ark 15K Torque Values Application Note. Load Terminal Block, Grid Terminal Block, Gen Terminal Block, Neutral / Ground Busbars, Cover Screws, Battery Connection torque values.

Coquille IHA**Project Address**

801 Miluk Dr
Coos Bay Oregon 97420

801 Miluk Dr
Coos Bay Oregon 97420

GSC Inc. will design and install:

66 Kilowatt Non-Penetrating Roof Mount System
A solar photovoltaic (PV) Generator. The system will comply with or exceed OSISC, and local building codes. This estimate is for a Grid Tied System that is independent of utility power.
66 KW of Commercial Solar Photovoltaic modules.
Sol-Ark Hybrid Inverters (QTY 4) 15KW w/ (QTY 2) 30KWH LiFePo4 battery racks
Mounting Hardware designed to 130mph wind load.
25 year production warranty on PV Modules.
10 year warranty on inverter system.
5 year labor warranty.
Customer is responsible for providing Hi-Speed internet connection for monitoring system.
This MOU does not include movement of fencing that may be required nor 3rd party electrical inspector fees. Standard 200 amp AC Disconnects included.

<i>NonRefundable Engineer & Design Fee (Included in total cost of system)</i>	PAID	\$2,000.00
<i>Total cost including shipping and installation*</i>		\$242,590.00
<i>Less potential Energy Trust Incentive</i>		\$50,000.00
<i>Less potential ODE rebate</i>		\$45,000.00
<i>Less potential Federal Tax Credit</i>		\$97,036.00
<i>Estimated PV system net cost to buyer after credits</i>		<u>\$50,554.00</u>

Pay Schedule

<i>Equipment Draw to begin Project</i>	\$194,072.00
<i>Final Balance</i>	\$46,518.00
<i>Design Fee</i>	\$2,000.00
Total Cost	<u>\$242,590.00</u>

By placing your signature below this quote becomes a contract.

GSC Inc. Representative

Date

Signature of Client

Date

*This proposal is based on material cost at the time of quote. GSC Inc. guarantees this price per watt for 30 days from the date above. Incentives are subject to change.

**The tax credit information represented is not intended as tax advice. GSC Inc. suggests you contact a tax advisor with questions regarding your specific situation.