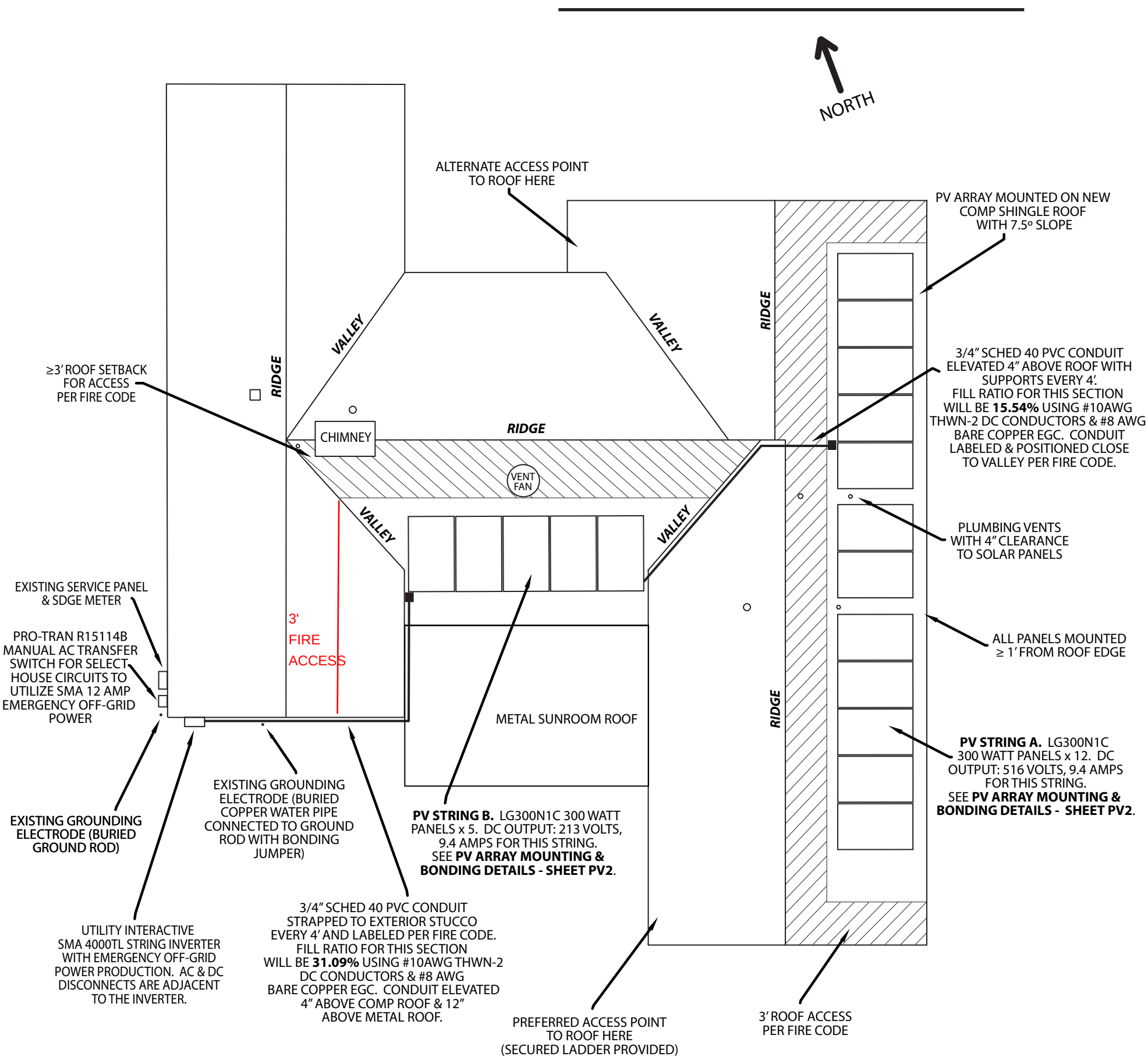
PV ARRAY ROOF PLAN Scale: 1:96 (1/8″ = 1′)

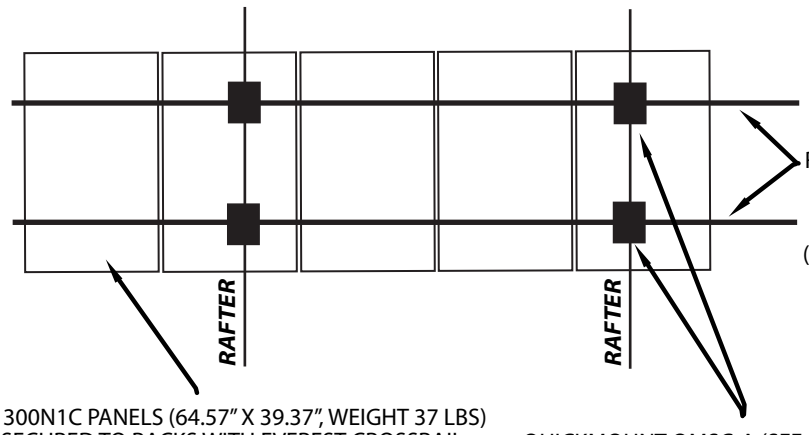


GENERAL NOTES

1. SOLAR PHOTOVOLTAIC SYSTEM TO BE INSTALLED ON SINGLE STORY RESEDENTIAL STRUCTURE. THIS HOUSE IS ONE STORY TALL.
2. DESIGN COMPLIES WITH 2013 EDITION OF CALIFORNIA ELECTRICAL CODE (CEC), CALIFORNIA BUILDING AND RESIDENTIAL CODES (CBC & CRC), CALIFORNIA PLUMBING AND MECHANICAL COES (CPC & CMC), CALFIRE PV INSTALLATION GUIDE, COUNTY OF SAN DIEGO CONSOLIDATED FIRE CODE, & ALL OTHER LOCAL ORDINANCES.
3. THIS SYSTEM IS AN UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES. IT WILL NOT BE CONNECTED TO THE UTITILY GRID UNTIL APPROVAL IS RECEIVED FROM SD COUNTY & SDGE.
4. THIS PV INSTALLATION IS DESIGNED TO WITHSTAND 85 MPG WIND LOAD OR GREATER.
5. THIS PV INSTALLATION WIL NOT OBSTRUCT ANY PLUMBING, MECHANICAL OR ATTIC ROOF VENTS.
6. ALL EXPOSED METAL COMPONENTS (PANELS, RACK, ETC.) WILL BE BONDED TOGETHER AND CONNECTED TO GROUND VIA A DEDICATED 8 AWG EGC THAT TERMINATEES AT THE INVERTER. THE INVERTER WILL THEN BE GROUNDED TO THE GROUNDING ELECTRODE USING 6 AWG BARE COPPER.
7. THIS PV INSTALLATION USES A CODE COMPLIANT TRANSFORMERLESS PV INVERTER.
8. ROOF IS ACCESSIBLE VIA LADDER FROM ANY POINT ON THE GROUND SURROUNDING THE HOUSE. PREFERRED & ALTERNATE ACCESS POINTS TO ROOF ARE INDICATED ON PLAN.
9. THE SLOPE OF THE ROOF WHERE PV STRINGS ARE MOUNTED IS 7.5°.

CONTACT:	PROJECT PROPERTY:	PV SYSTEM:	
T.COLLINS LOGAN	PARCEL #	DC 5.1 kWp AC OUTPUT 4 kW	SHEET PV1

PV ARRAY MOUNTING & BONDING DETAILS



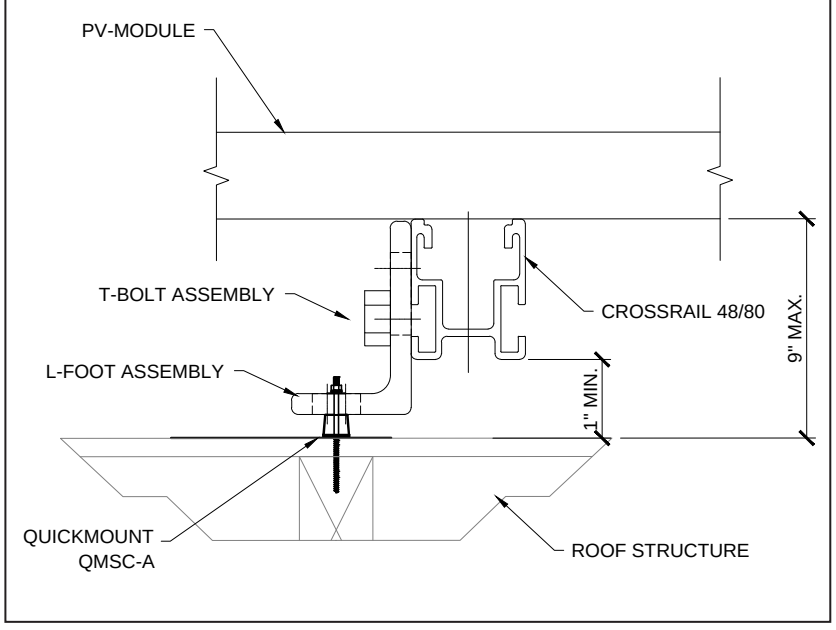
EVEREST CROSSRAIL 80
ROOF MOUNTING SYSTEM
WITH QUICKMOUNT
QMSC-A FLASHED
ROOF MOUNTS
(SEE **EVEREST CROSSRAIL DETAIL**)

LG 300N1C PANELS (64.57" X 39.37", WEIGHT 37 LBS)
SECURED TO RACKS WITH EVEREST CROSSRAIL
WEEB MID AND END CLAMPS
(SEE **SYSTEM BONDING DETAIL**)

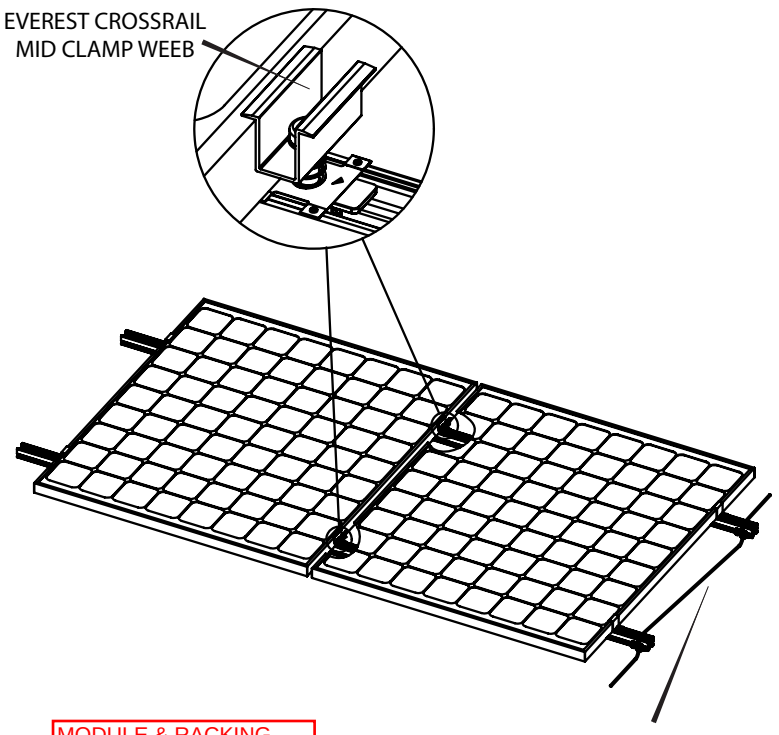
MODULE & RACKING
GROUNDING METHOD:
ILSCO GBL-4DBT OR
EQUALLY UL LISTED
PRODUCT.

QUICKMOUNT QMSC-A (SEE **QMSC-A DETAIL**)
ROOF MOUNTS LAGGED INTO
EXISTING 2X6" RAFTERS
WITH LAG SCREWS EXTENDING
3" INTO RAFTERS. RAFTERS ARE
ROUGHLY 24" ON CENTER, AND
EACH RAIL IS SECURED TO A
RAFTER EVERY 6' OR LESS.

EVEREST CROSSRAIL DETAIL



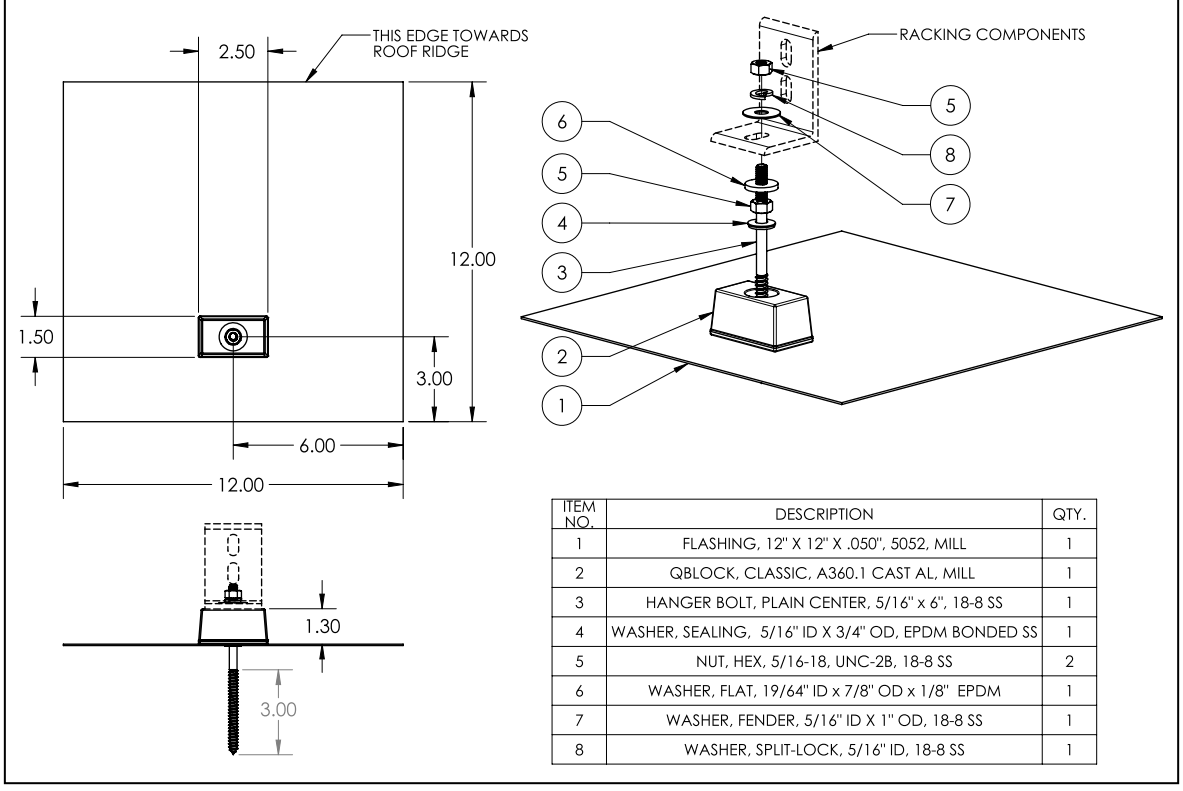
SYSTEM BONDING DETAIL



MODULE & RACKING
GROUNDING METHOD:
ILSCO GBL-4DBT OR
EQUALLY UL LISTED
PRODUCT.

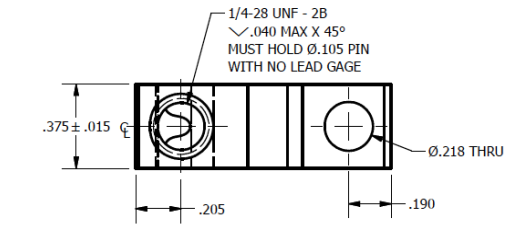
8 AWG EQUIPMENT GROUND CONDUCTOR
BONDED TO ALL RACK SEGMENTS USING
ILSCO GBL-4DBT GROUNDING LUGS
(SEE **GROUNDING LUG DETAIL**)

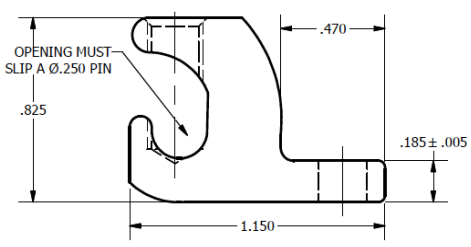
QUICKMOUNT QMSC-A DETAIL



ITEM NO.	DESCRIPTION	QTY.
1	FLASHING, 12" X 12" X .050", 5052, MILL	1
2	QBLOCK, CLASSIC, A360.1 CAST AL, MILL	1
3	HANGER BOLT, PLAIN CENTER, 5/16" x 6", 18-8 SS	1
4	WASHER, SEALING, 5/16" ID X 3/4" OD, EPDM BONDED SS	1
5	NUT, HEX, 5/16-18, UNC-2B, 18-8 SS	2
6	WASHER, FLAT, 19/64" ID x 7/8" OD x 1/8" EPDM	1
7	WASHER, FENDER, 5/16" ID X 1" OD, 18-8 SS	1
8	WASHER, SPLIT-LOCK, 5/16" ID, 18-8 SS	1

ILSCO GBL-4DBT GROUNDING LUG DETAIL



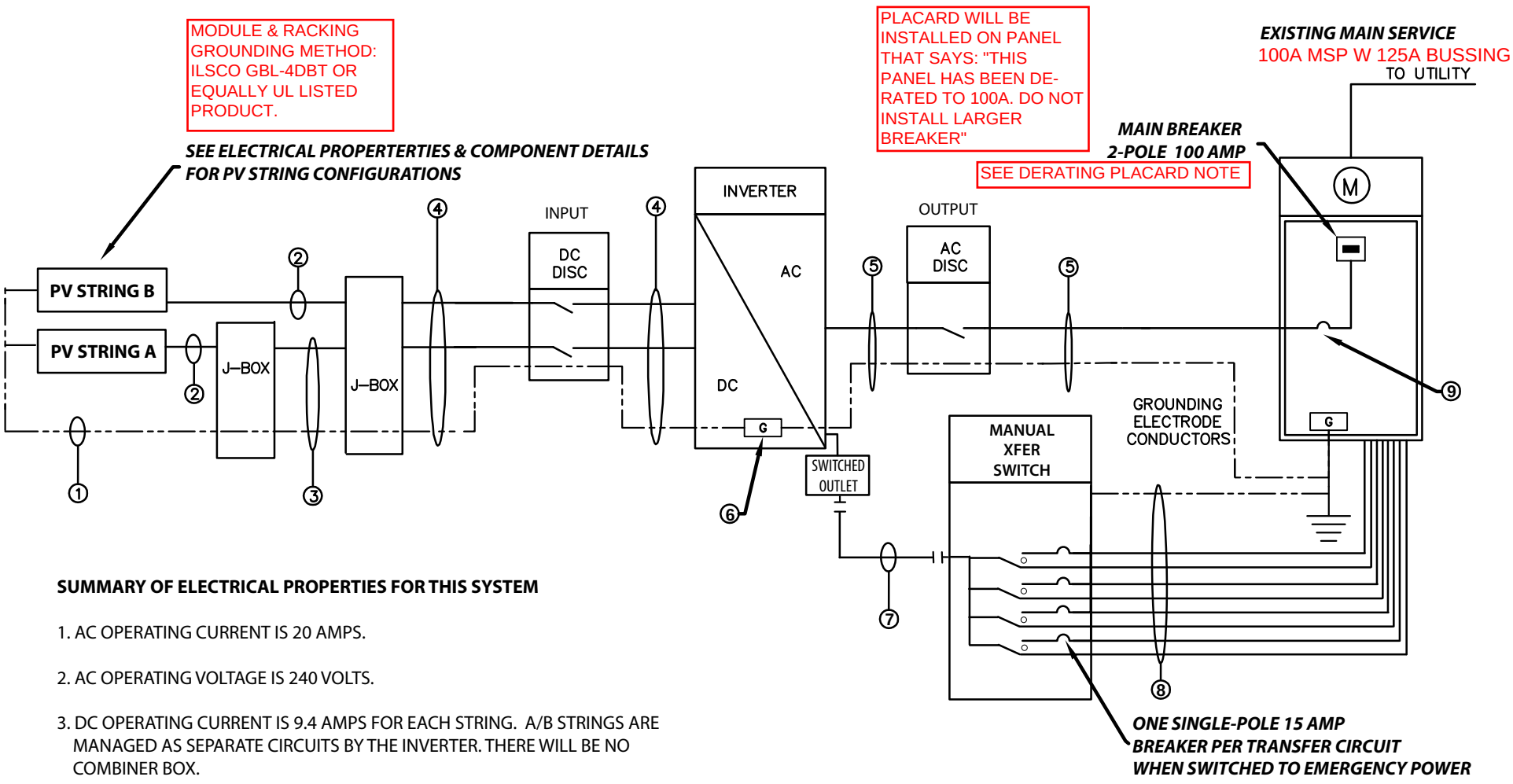


GENERAL NOTES

1. ALL LAGS, LUGS, WEEBS AND BOLTS TO BE TORQUED TO EQUIPMENT MANUFACTURER SPECIFICATIONS.
2. THE EQUIPMENT GROUND CONDUCTOR SHALL BE CONTIGUOUS OR IRREVERSIBLY SPLICED.
3. ALL ROOF PENETRATIONS SHALL BE SECURE AND WEATHER TIGHT.
4. THE TOTAL ROOF LOAD, INCLUSIVE OF COMPOSITION ROOFING MATERIALS, RACKING & PANELS, SHALL BE 4.2 LBS PER SQUARE FOOT OR LESS.

CONTACT: T.COLLINS LOGAN	**PROJECT PROPERTY:** PARCEL #	**PV SYSTEM:** DC 5.1 kWp AC OUTPUT 4 kW	SHEET PV2

PV ARRAY WITH OFF-GRID SOLAR EMERGENCY POWER SINGLE LINE DRAWING



SUMMARY OF ELECTRICAL PROPERTIES FOR THIS SYSTEM

1. AC OPERATING CURRENT IS 20 AMPS.

2. AC OPERATING VOLTAGE IS 240 VOLTS.

3. DC OPERATING CURRENT IS 9.4 AMPS FOR EACH STRING. A/B STRINGS ARE MANAGED AS SEPARATE CIRCUITS BY THE INVERTER. THERE WILL BE NO COMBINER BOX.

4. DC OPERATING VOLTAGE IS 516 VOLTS FOR **PV STRING A**, AND 213 VOLTS FOR **PV STRING B** (USING A TEMPERATURE CORRECTION FACTOR OF 1.08).

5. MAX DC SYSTEM VOLTAGE IS 600 VOLTS.

6. SHORT CIRCUIT CURRENT IS 9.98 AMPS.

7. MAX EMERGENCY POWER INPUT TO MANUAL TRANSFER SWITCH IS 15 AMPS @ 125 VOLTS. 4 OUTPUT CIRCUITS (SINGLE POLE).

8. MAX OUTPUT OF SMA INVERTER EMERGENCY BACKUP CIRCUIT IS 12 AMPS @ 125 VOLTS. ***INVERTER CIRCUIT INCLUDES BUILT-IN OVERCURRENT PROTECTION.***

COMPONENT DESCRIPTIONS

1. PV ARRAY CONSISTS OF TWO STRINGS OF LG300N1C 300 WATT PANELS, GENERATING 5.1 kWp PEAK POWER. **PV STRING A** IS 12 PANELS, **PV STRING B** IS 5 PANELS.

2. ARRAY CONNECTS TO A STRING INVERTER, SMA MODEL 4000TL -US-22, WITH AN AC OUTPUT OF 240 VOLTS, 20 AMPS.

3. THE EXISTING SERVICE PANEL (SIEMENS MC1224MB1100S, Series E) BUSS RATING IS 125 AMPS, THE PANEL MAIN BREAKER IS 100 AMPS, AND THE PV BACKFEED BREAKER IS 25 AMPS.

4. THE MANUAL TRANSFER SWITCH FOR SELECT HOUSE CIRCUITS IS A RELIANCE PRO-TRAN MODEL R15114B, RATED FOR 1875 WATTS, WHICH CAN BE MANUALLY CONNECTED TO THE 1500 WATT SMA INVERTER EMERGENCY POWER OUTLET IN THE EVENT OF A DAYTIME UTILITY POWER OUTAGE. THE SMA EMERGENCY OUTLET ("SECURE POWER SUPPLY") WILL ONLY FUNCTION IN OFFLINE MODE, WHEN BOTH THE UTILITY GRID AND THE INVERTER BACKFEED CIRCUIT ARE DISSCONNECTED. THE PRO-TRAN TRANSFER SWITCH ISOLATES FROM THE GRID ALL CIRCUITS BEING ENERGIZED BY THE INVERTER'S "SECURE POWER SUPPLY."

5. THE SYSTEM SHALL BE GROUNDED TO TWO EXISTING GROUNDING ELECTRODES - A BURIED GROUND ROD AND A BURIED COPPER WATER PIPE - WHICH HAVE BEEN BONDED TOGETHER WITH A BONDING JUMPER, AND ARE 16' APART.

SPECIFIC NOTES

1. BARE COPPER #8 AWG EQUIPMENT GROUND CONDUCTOR BONDED TO RACK COMPONENTS BENEATH ARRAY.

2. TWO #10 AWG PV WIRE WITH MC4 TERMINATIONS. PV WIRE SECURED TO RACK COMPONENTS 4" ABOVE ROOF. WHERE EXPOSED (FOR EXAMPLE AT STRING GAPS THAT ACCOMMODATE ROOF VENTS) PV WIRE IS FED THROUGH 1" SCHED 40 PVC WITH OPEN ENDS. WHERE PV WIRE ENTERS J-BOXES IT IS SECURED INDIVIDUALLY WITH ARLINGTON LPCG50-1 EXTERIOR STRAIN RELIEF BUSHINGS. ALL TRANSITIONS TO THWN-2 IN J-BOXES VIA POLARIS CONNECTORS.

3. TWO #10 AWG THWN-2 & SINGLE BARE #8 AWG EGC IN 3/4" SCHED 40 PVC CONDUIT. CONDUIT IS ELEVATED 4" OFF ROOF AND CONDUIT FILL IS **15.54%** FOR THIS SEGMENT. CONDUCTOR AMPACITY DERATED BY A FACTOR OF .77 FROM CEC TABLE 310.15.(B)(2)(B).

4. FOUR #10 AWG THHN-2 & TWO BARE 8 AWG EGC IN 3/4" SCHED 40 PVC CONDUIT. CONDUIT IS ELEVATED 4" OFF ROOF AND CONDUIT FILL IS **31.09%** FOR THIS SEGMENT. CONDUCTOR AMPACITY DERATED BY A FACTOR OF .77 FROM CEC TABLE 310.15.(B)(2)(B) PLUS AN 80% ADJUSTMENT FROM CEC 310.15(B)(3)(A).16

5. SINGLE #6 AWG BARE COPPER GROUNDING ELECTRODE CONDUCTOR & TWO #10 AWG THWN-2 IN 3/4" SCHED 40 PVC CONDUIT. FILL RATIO IS **18.33%** FOR THIS SEGMENT.

6. EGC TERMINATION.

7. 25' #12 AWG EXTERIOR RATED EXTENSION CORD, CONNECTED ONLY WHEN SMA EMERGENCY OUTLET IS ACTIVE (I.E. OFF-GRID POWER ENGAGED) TO ENERGIZE MANUAL TRANSFER SWITCH.

8. TEN #12 AWG THHN-2 (INCLUDING GROUND) IN 3/4" LIQUID-TUFF FLEX CONDUIT. FILL RATIO IS **30%**.

9. OCPD LOCATIONS ARE CODE COMPLIANT. AS 125 AMP-RATED BUSS IS CENTER-FED, SUM OF PV BACKFEED BREAKER (25 AMPS) & MAIN BREAKER (100 AMPS) DOES NOT EXCEED 100% OF BUSS RATING PER CEC 705.12.

GENERAL NOTES

1. ALL ALTERNATE POWER SOURCE PLAQUES AND SIGNAGE REQUIRED BY LATEST ELECTRICAL, FIRE & LOCAL CODES SHALL BE INSTALLED. (FOR EXAMPLE: PLASTIC OR METAL PLACARD, WITH ENGRAVED CONTRASTING LETTERS, SPECIFYING PV ARRAY & LOCATIONS OF METER, DISCONNECTS, INVERTER, ETC. ON A SITE DIAGRAM, AND AFFIXED TO SERVICE DISCONNECT WITH SCREWS OR RIVETS; CONDUIT LABELED EVERY 10' OR WITHIN 1' OF BENDS & PENETRATIONS).

2. ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S APPROVED INSTALLATION INSTRUCTIONS. COPIES OF THESE INSTRUCTIONS ARE INCLUDED WITH THIS PLAN.

3. ALL SYSTEM WIRING SHALL BE OF COPPER MATERIAL, AND KEPT OUTSIDE OF THE RESIDENTIAL STRUCTURE.

4. ALL EQUIPMENT TO BE GROUNDED IN ACCORDANCE WITH CEC & MANUFACTURER'S INSTALLATION INSTRUCTIONS.

5. APPROVED PLANS & ALL REFERENCE DOCUMENTS SHALL BE AVAILABLE ON SITE FOR INSPECTION VERIFICATION. ALL MANUFACTURER'S TECHNICAL CUT SHEETS & INSTALLATION MANUALS FOR ALL EQUIPMENT & COMPONENTS SHALL BE PROVIDED ON SITE.

6. ALL TERMINALS OF THE DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION.

CONTACT: T.COLLINS LOGAN	**PROJECT PROPERTY:** PARCEL #	**PV SYSTEM:** DC 5.1 kWp AC OUTPUT 4 kW	SHEET PV3