

SHEET DESCRIPTION

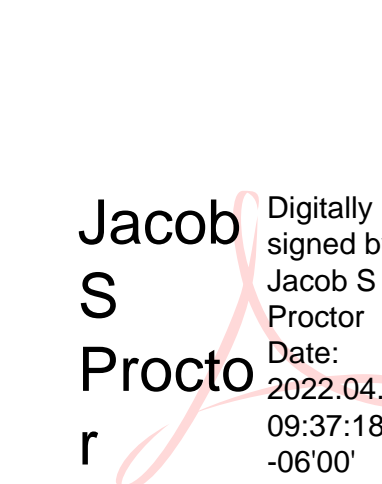
Project Notes
Site Plans and layouts
Roof Mounting layouts
Roof Mounting details
Fire Labels & Equipment
Plate equipment location
Conduit Run & Grounding Details
Single Line Diagram & Calculations
Manufacture Spec. Sheets

SHEET COVER


PV-1
PV-2
PV-2.1
PV-3
PV-3.1
PV-4
PV-5
PV-6

APPLICABLE CODES

-STANDARD BUILDING CODE 2020
-ELECTRICAL CODE , NFPA 70 / NEC 2017



Digitally signed by Jacob S Proctor
Date: 2022.04.21 09:37:18 -06'00'



681 W. GALENA PARK BLVD. STE. 101 PHONE (850) 1-990-1775
DAWSON, FL 34420 WWW.VECTORENG.COM

04/21/2022
VSE Project Number: U3996.0007.221

This item has been digitally signed and sealed by Jacob S. Proctor on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Vector Structural Engineering has reviewed the existing structure with loading from the solar array and stamped capacity to the metal roofing. The design of the racking system, racking connections, and all other structural is by others. Mechanical, architectural, and all other nonstructural aspects of the design are by others. Electrical is by others, unless stamped by Dean Levenson.

See detail in structural letter for additional metal roof connection requirements.



GENERAL BUILDING NOTES

- STRUCTURAL MEMBER LOCATIONS ARE ESTIMATED AND SHOULD BE LOCATED AND VERIFIED AS NECESSARY FOR LAG BOLT OR ANY OTHER TYPE OF PENETRATIONS BY CONTRACTOR.
- SEAL CONNECTION POINTS WITH ROOF GRADE PENETRATIONS ARE SEALED WITH FLASHING ROOF & FLASHING SEALANT, OR ANY OTHER MEAN APPROVED BY THE ATTACHMENT MANUFACTURER.
- PV ARRAY COMBINER/JUNCTION BOX PROVIDES TRANSITION FROM ARRAY WIRING TO CONDUIT WIRING.

GENERAL ELECTRICAL NOTES

- ALL ELECTRICAL WORK SHALL BE IN COMPLIANCE WITH 2012 STANDARD BUILDING CODE AND NFPA 70, 2017 EDITION, NATIONAL ELECTRICAL CODE (NEC).
- UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.
- WORKING CLEARANCES AROUND THE EXISTING AND NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC ARTICLE 110.26.
- ALL EQUIPMENT INSTALLED SHALL BE LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) PER NEC ARTICLE 110.3.
- PV POWER CIRCUIT LABELS SHALL APPEAR ON EVERY SECTION OF THE WIRING SYSTEM THAT IS SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.
- ALL WARNING SIGN(S) OR LABEL(S) SHALL COMPLY WITH NEC ARTICLE 110.21 (B). LABEL WARNINGS SHALL ADEQUATELY WARN OF THE HAZARD, LABELS SHALL BE PERMANENTLY AFFIXED TO THE EQUIPMENT, AND LABELS REQUIRED SHALL BE SUITABLE FOR THE ENVIRONMENT.
- CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.8 (D).
- CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.8 (C).
- EXACT CONDUIT RUN LOCATIONS SUBJECT TO CHANGE.
- PROVIDE GROUND ELECTRODE SYSTEM FROM INVERTER TO EXISTING MAIN SERVICE GROUND ELECTRODE.
- GROUND ELECTRODE CONDUCTOR FROM INVERTER TO GROUND ELECTRODE TO BE MINIMUM PROTECTION OF BARE ARMOR SHEATED CABLE FOR ALL CONDUCTOR SIZES.
- ALL GROUND CONNECTED TO MAIN SERVICE GROUND IN MAIN SERVICE PANEL.
- INVERTER IS LISTED TO UL-1741 "UTILITY INTERACTIVE"
- ALL CONDUCTORS SHALL BE 600V, 90°C STANDARD COPPER.
- ALL CONDUCTORS IN CONDUIT SHALL BE THWN-2.
- MAXIMUM DC/AC VOLTAGE DROP SHALL BE NO MORE THAN 2%
- ALL CONDUCTORS SHALL BE IN CONDUIT UNLESS OTHERWISE NOTED.

DESIGN DATA

WIND LOADS

- BASIC WIND SPEED 108 MPH. (@ 3 SEC. GUST.)
- RISK CATEGORY I
- WIND EXPOSURE - CATEGORYC
- "EXPOSURE C" SHALL BE ASSUMED UNLESS THE SITE MEETS THE DEFINITION OF ANOTHER TYPE EXPOSURE.

CUSTOMER INFORMATION

Name	Josh and Kendall Hannah
Address	382 SW Dusk Gln. Lake City, FL 32024

PROJECT INFORMATION

Project Latitude	30°06'21.3"N	Min. Ambient Temperature	32F°
Project Longitude	82°43'23.5"W	Max. Ambient Temperature	95F°
Utility Name		Meter Number	----
Wind Exposure Category	C	Wind Speed	140
Risk Category	II	North Direction	0.0°
Interconnection Voltage	240	AHJ	----

ARRAY INFORMATION

ARRAY 1

Module Name	Q.CELL G6+ 350W		
Inverter	SMA SB.7.7		
Tilt Angle 26°	No. of Modules 24	DC String Length 12	No. of Strings 2


ARRAY 2

Module Name	Q.CELL G6+ 350W		
Inverter	SMA SB.7.7		
Tilt Angle 26°	No. of Modules 24	DC String Length 12	No. of Strings 2

ARRAY 3

Module Name	----		
Inverter	-----		
Tilt Angle ----	No. of Modules ----	DC String Length ----	No. of Strings ----

GENERAL NOTES



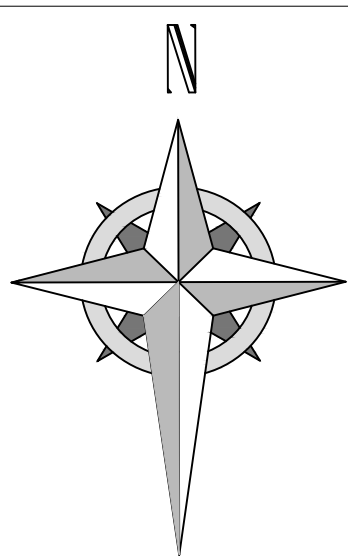
DRAWN BY:
Baker Makarem
Credential ID PV-022018-018876

Rev	Description	Date	Draw By
1	Project Notes and information	04/05	BM

Sheet Name

Project Notes

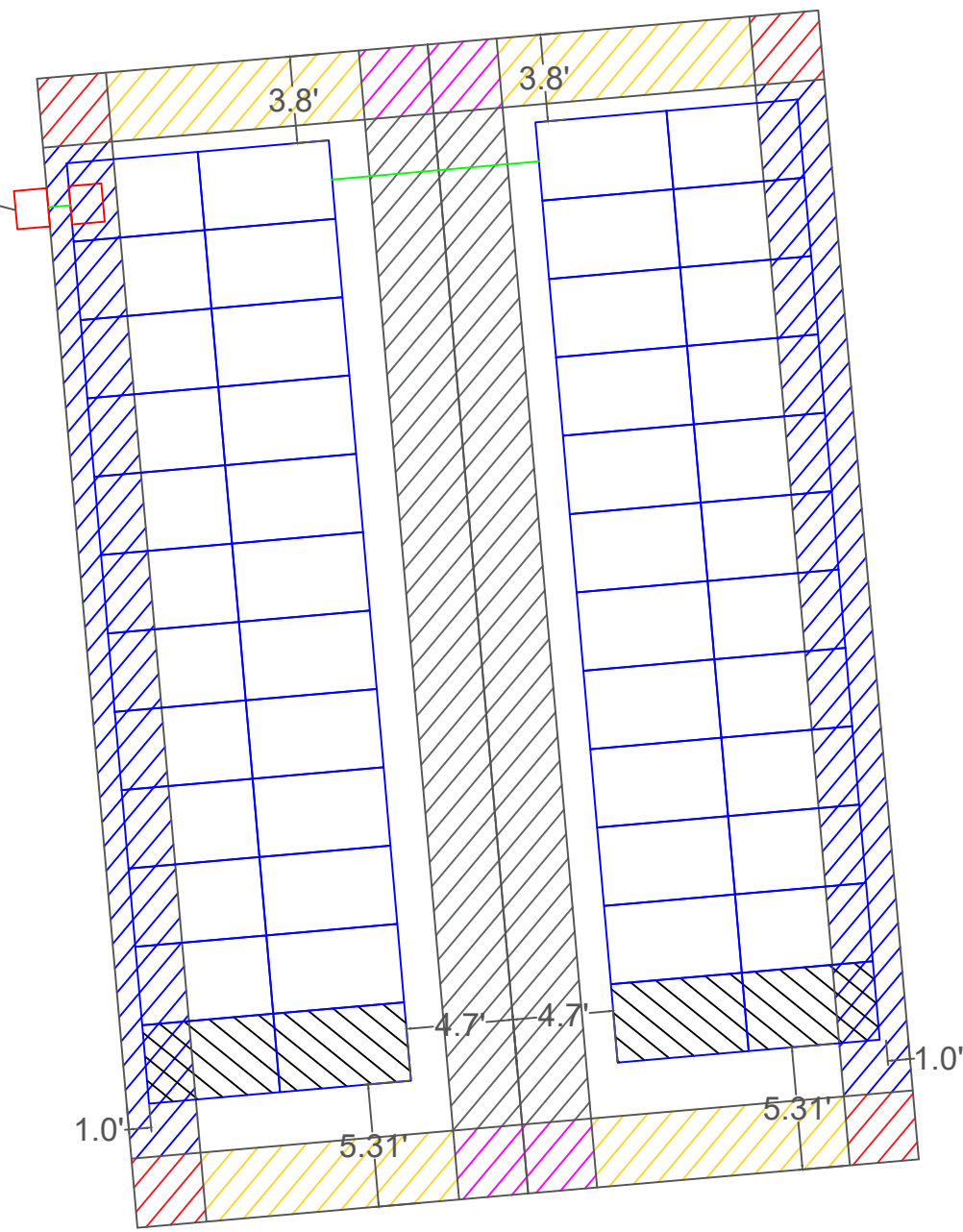
Designed By	----	Sheets	1 of 9	Date	04/05/2022
Project number	BT-2022-GA-07	COVER			



Scale: NTS

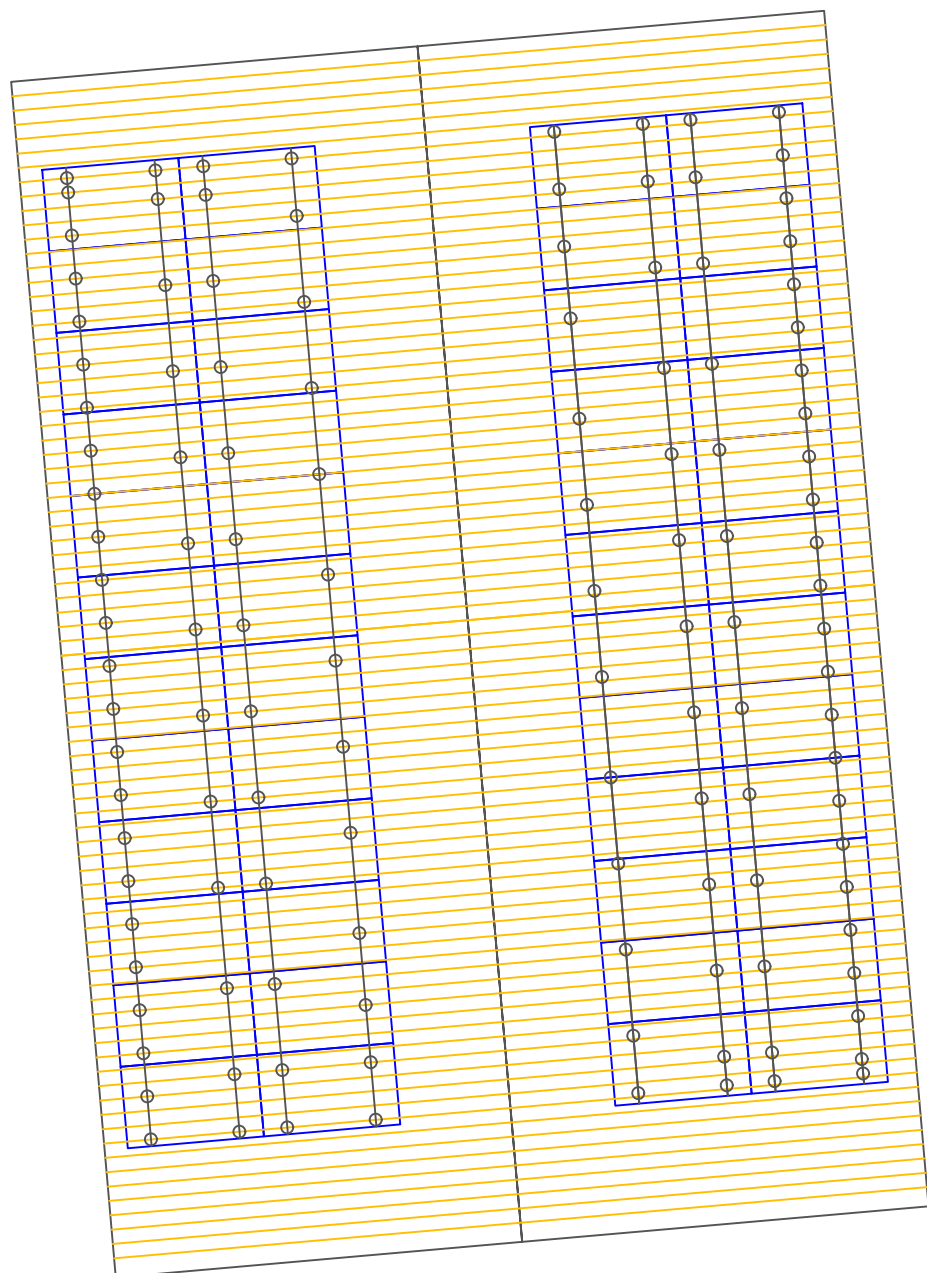
Project number	BT-2022-GA-07	PV-01
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DC Disconnect



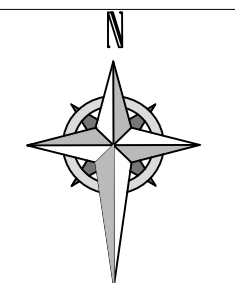
Aerial View: SYSTEM RAIL AND MOUNTING LAYOUT

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



Aerial View: SYSTEM RAIL AND MOUNTING LAYOUT

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



Rails support Deck

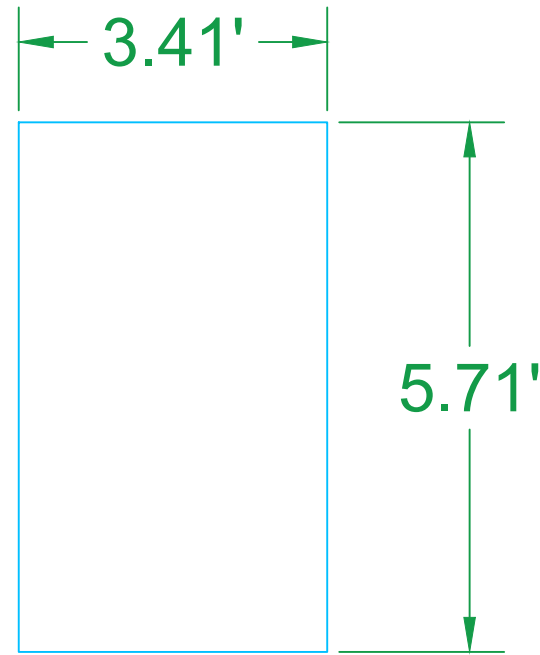
Rails support Rafter

Rails

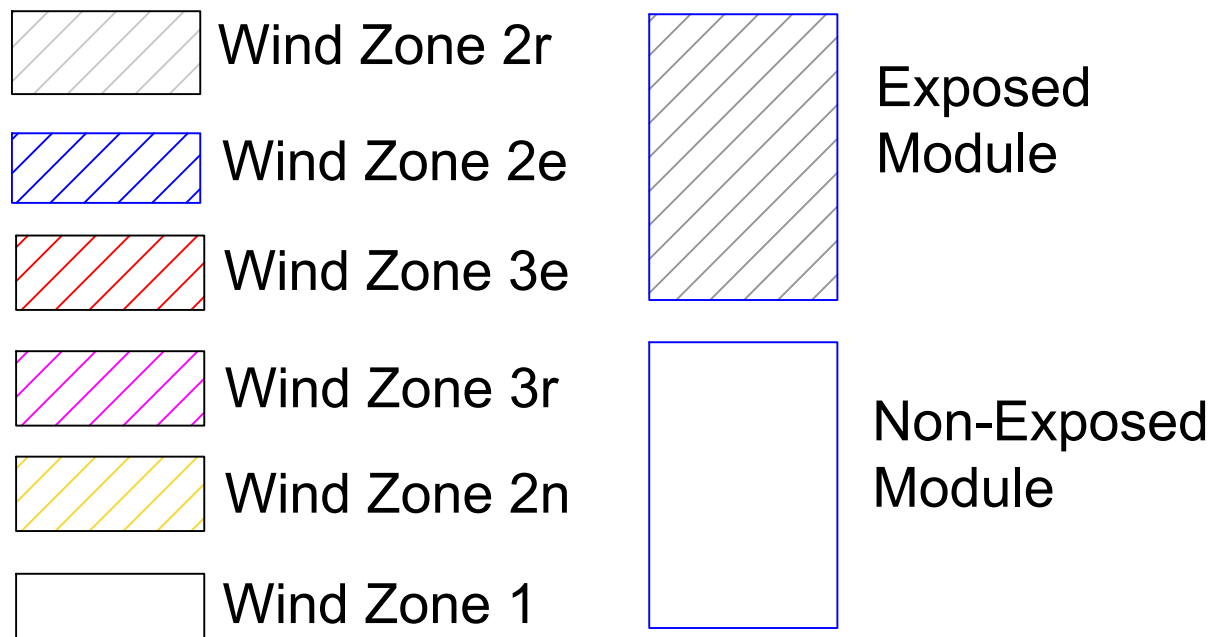
Rafters / Purlins

Junction Box rated Nema 3R

3/4" Conduit



MANUFACTURE:Q.CELL
G6+350 (350W)
MODULES



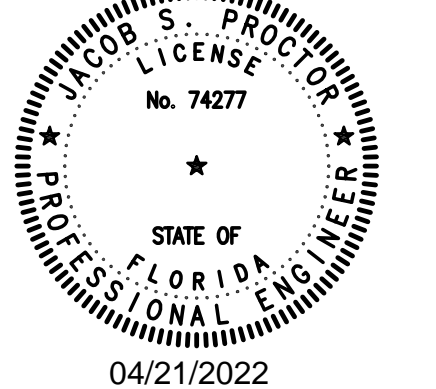
ROOF	MAX VALUES	WIND ZONE 1	WIND ZONE 2e	WIND ZONE 2n
Exposed	Max spam between Attachments	3 Ft	2 Ft	N/A
	Max Cantilever	1 Ft	1 Ft	N/A
Non Exposed	Max spam between Attachments	3 Ft	4 Ft	N/A
	Max Cantilever	1 Ft	1 Ft	N/A

General Notes;

- Existing Residential building is a Metal roof, 7.2"structural box rib.
- Rafters/trusses/ribs At Roof 1 and 2 located each 7.2" inches.
- Equipments must be install as per manufacturer specifications.
- Measurements may vary from drawings. Contractor must verify on site for proper installation.
- Railing System will be SnapNRack ultraRail and S5! Protea Bracket



6511 W. GALENA PARK BLVD. STE. 101 PHONE: (801) 950-1775
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See detail in structural letter for additional metal roof connection requirements.

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Risk Category	II	North Direction	0.0°
Interconnection Voltage	240	AHJ	----

ARRAY INFORMATION

ARRAY 1			
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Inverter	SMA SB 7.7		
Tilt Angle 26°	No. of Modules 24	DC String Length 12	No. of Strings 2
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Inverter	SMA SB 7.7		
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ARRAY 3			
Module Name			
Inverter			
Tilt Angle ----	No. of Modules ----	DC String Length ----	No. of Strings ----

GENERAL NOTES



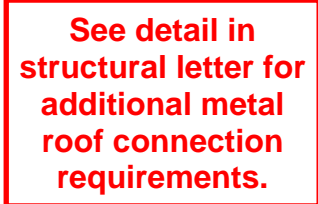
DRAWN BY
Baker Makarem
Credential ID PV-022018-018876

Rev	Description	Date	Draw By
1	Roof mounting and accesories layout	04/05	BM

Sheet Name

Roof Mounting layouts

Designed By	----	Sheets	3 of 9	Date	04/05/2022
Project number	BT-2022-GA-07	PV-02			



Sheet Name			Roof Mounting details		
Designed By		----	Sheets		4 of 9
			Date		04/05/2022
Project number		BT-2022-GA-07		PV-02.1	

WARNING
ELECTRIC SHOCK HAZARD
THE DC CONDUCTORS OF
THIS PHOTOVOLTAIC SYSTEM
ARE UNGROUNDED AND
MAY BE ENERGIZED



MAXIMUM VOLTAGE	450
MAXIMUM CIRCUIT CURRENT	10
MAX. RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER OR DC-TO-DC CONVERTER (IF INSTALLED)	N/A



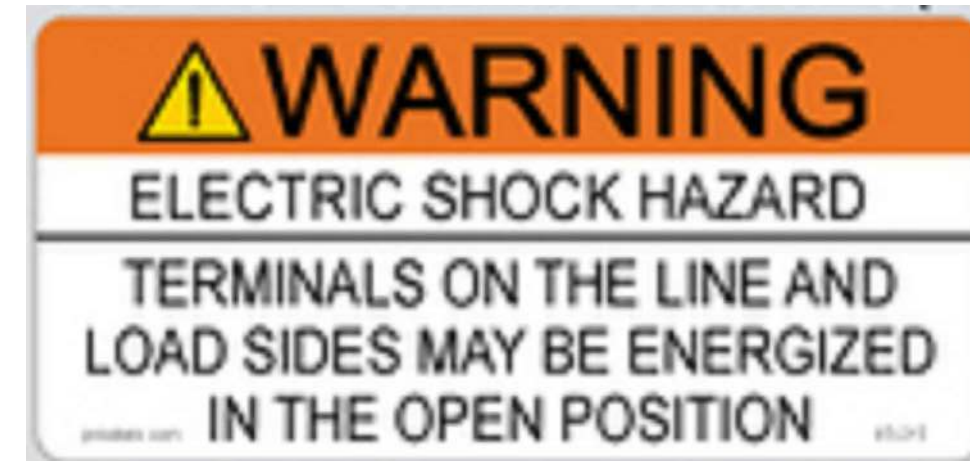
**WARNING: PHOTOVOLTAIC
POWER SOURCE**



PHOTOVOLTAIC SYSTEM
⚠ AC DISCONNECT ⚠

RATED AC OUTPUT CURRENT 64 A
NOMINAL OPERATING AC VOLTAGE 240 V

2019-12-12 10:10:10 10/10/2019 10:10:10



WARNING
DUAL POWER SUPPLY
SOURCES: UTILITY GRID AND
PV SOLAR ELECTRIC SYSTEM



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Inverter	SMA SB.7.7		
Tilt Angle 26°	No. of Modules 24	DC String Length 12	No. of Strings 2
ARRAY 3			
Module Name			
Inverter	----		
Tilt Angle ----	No. of Modules ----	DC String Length ----	No. of Strings
CONTRACTOR INFORMATION			
RevDescriptionDateDraw By			
1	Fire labels and location in equipments and conduits.	04/05	BM
Sheet Name			
Fire Labels & Equipment			
Designed By ----		Sheets 5 of 9	Date 04/05/2022
Project number BT-2022-GA-07		PV-03	



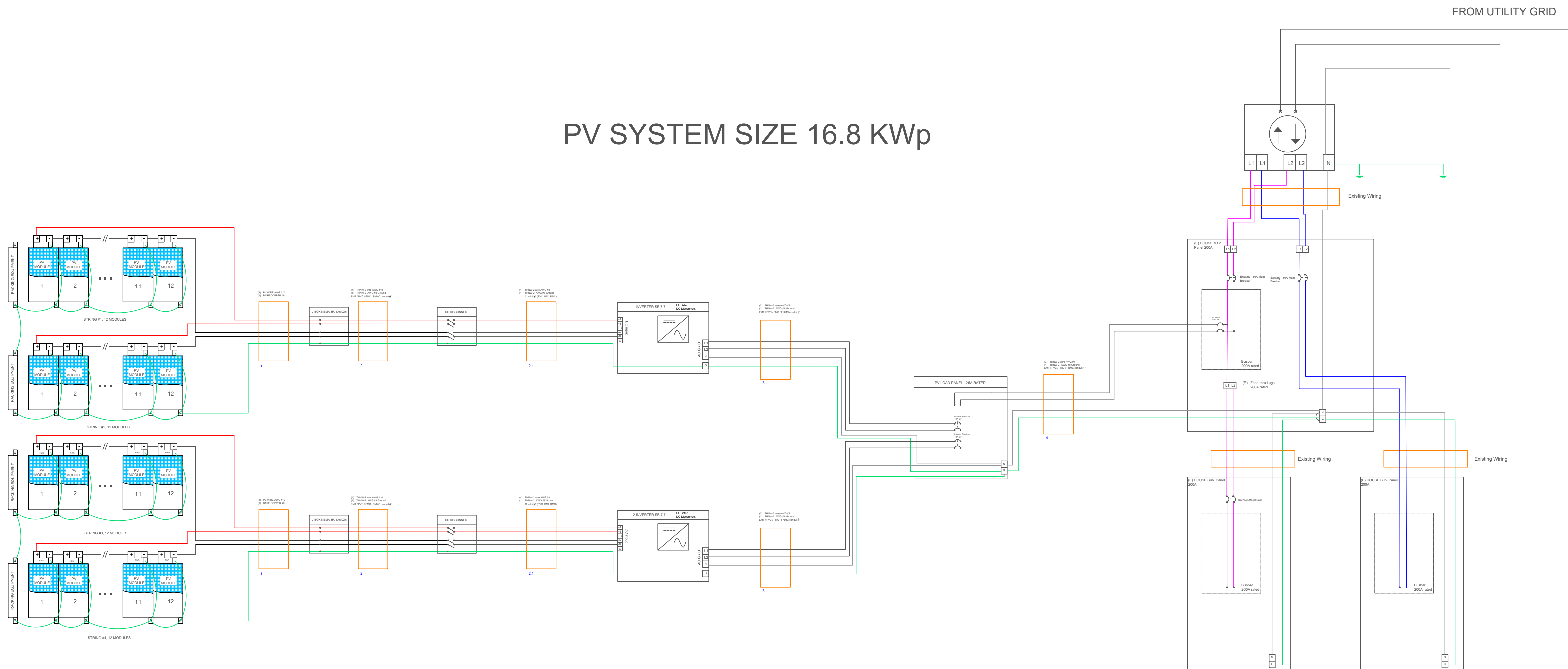
Diagram illustrating the layout of a house and a PV array, showing the connection points for the PV system components:

- House Main Panel**
- Utility Meter**
- PV AC disconnect**
- Inverters**
- PV load**
- DC disconnects**
- PV modules**

1.THE PLAQUE SHALL BE METAL OR PLASTIC, WITH ENGRAVED OR MACHINE PRINTED LETTERS, IN CONTRASTING COLOR TO THE PLAQUE. THIS PLAQUE WILL BE ATTACHED BY POP/RIVETS, SCREWS OR OTHER APPROVED FASTENERS.

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Inverter	-----				
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<div>CONTRACTOR INFORMATION</div>					
<div>Plate equipment location</div>					
Designed By -----		Sheets <div>6 of 9</div>		Date 04/05/2022	
Project number BT-2022-GA-07		PV-03.1			

PV SYSTEM SIZE 16.8 KWp



TAG	DESCRIPTION	Conductor size	Ground Conductor
1	PV source Circuit	PV wire #10	Bare Copper #6
2	PV Source Circuit	THHN wire #10	THHN #8
2.1	PV Source Circuit	THWN-2 #8	THWN-2 #8
3	Inverter AC Circuit	THHN #8	THHN #8
4	Inverter AC Circuit	THHN #4	THHN #8

Max Vmp: 450 Vdc
Max Voc: 538 Vdc

Wire Ampacity Calculation						Voltage Drop Calculation (%)				
Output Current	Irradiance Current 125%	80% Conductor Ampacity	(Wire Rating)x(Ambient Temp Factor)x(# Conduct Factor)			Voltage	Length (Feet)	Ω (ohm/KFt)	Voltage Drop expressed in %	
10.73A	13.41A	16.77A	40X0.91X1=36.4A	PASS		450V	140	1.24	0.72	PASS
10.73A	13.41A	16.77A	40X0.91X0.8=29.1A	PASS		450V	30	1.24	0.08	PASS
10.73A	13.41A	16.77A	55X0.91X0.8=50.05A	PASS		450V	400	0.778	0.74	PASS
32A	N/A	40A	55X0.91X1=50A	PASS		240V	20	0.778	0.21	PASS
64A	N/A	80A	55X0.91X1=50A	PASS		240V	40	0.308	0.33	PASS

PV MODULE ESPECIFICATION	
Manufactured	Q.CELL
Model	G6+ 350W
Peak Power	350W
Rated Voltage (Vmp)	34.07 V
Rated Current (Imp)	10.22 A
Short Circuit Current (Isc)	10.73 A
Open Circuit Voltage (Voc)	40.73 V

INVERTER 1 SPECIFICATION		SPS
Manufactured	SMA	
Model	SB 7.7	
Max Input Voltage	600 Vdc	
Max Input Curret	18 Adc	
Max DC Input Power	12,320 W	
Nominal Output Voltage	240 V	
Max Output Current	32 A	
Maximun output Power	2000 W	
Max Output Current @120 V	16 A	

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Module Name			
Inverter	----		
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GENERAL NOTES			
1.-ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.			
2.-ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.			
3.-WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.			
4.-WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.			
5.-ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE			
6.-MODULES CONFORM TO AND ARE LISTED UNDER UL 1703.			
7.-CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) ANDARTICLE 310.10 (D).			
8.-CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C)			
9.-ALL DC CONDUCTORS ENTERING THE BUILDING PRIOR TO INVERTER DC DISCONNECT, SHALL BE RUN IN METAL RACEWAY PER NEC 690.31			
10.-THE SUM OF ALL PV OVERCURRENT PROTECTION DEVICES CONNECTED, SHALL NOT EXCEED THE RATING OF THE SERVICE.			
11.- FOR BACKUP SYSTEMS AND BACKUP LOADS SHALL COMPLY WITH NEC 2017 710.15(A). THE CAPACITY OF THE STAND ALONE SUPPLY SHALL BE EQUAL TO OR GREATER THAN THE LOAD POSED BY THE LARGEST SINGLE UTILIZATION EQUIPMENT CONNECTED TO THE SYSTEM.			

