

AERIAL SITE VIEW



JURISDICTION CODES AND STANDARDS

GOVERNING CODES

- 1. ALL WORK SHALL COMPLY WITH:
- 2020 NATIONAL ELECTRIC CODE (NEC)
- 2015 INTERNATIONAL BUILDING CODE (IBC)
- 2015 INTERNATIONAL RESIDENTIAL CODE (IRC)
- 2015 INTERNATIONAL FIRE CODE (IFC)

2018 NORTH CAROLINA STATE CODES  
AND ALL STATE AND LOCAL BUILDING, ELECTRICAL, AND PLUMBING CODES.

SITE CLASSIFICATION NOTES, OSHA REGULATION

OCCUPANCY CLASS: SFR  
CONSTRUCTION CLASS: V-B  
ZONING TYPE: RESIDENTIAL

- 1. A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
- 2. THIS PROJECT HAS BEEN REVIEWED AND WILL NOT DIRECT CONCENTRATED SOLAR RADIATION OR GLARE ONTO NEARBY PROPERTIES OR ROADWAYS.

ELECTRICAL CRITERIA, NOTES

TEMPERATURE SOURCE: ASHRAE  
WEATHER STATION: POPE AFB  
EXTREME MIN. TEMPERATURE: -10  
ASHRAE 2% HIGH TEMP: 36

- 1. DRAWINGS HAVE BEEN DETAILED ACCORDING TO UL LISTING REQUIREMENTS.
- 2. TERMINALS AND LUGS WILL BE TIGHTENED TO MANUFACTURER TORQUE SPECIFICATIONS (WHEN PROVIDED) IN ACCORDANCE WITH NEC 110.14(D) ON ALL ELECTRICAL.
- 3. PV MODULE CERTIFICATIONS WILL INCLUDE UL1703, IEC61646, IEC61730.
- 4. CONDUIT AND WIRE SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS.
- 5. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION [NEC 110.26].
- 6. 1. FOR THE PROPOSED PV ELECTRICAL INSTALLATION, TYPE NM-CABLE SHALL ONLY BE USED WHEN RUNNING ELECTRICAL WIRING THROUGH THE ATTIC SPACE OR INTERIOR OF THE PERMITTED STRUCTURE. INSTALLATION OF TYPE NM-CABLE SHALL COMPLY WITH NEC 334.10 AND NEC 334.12.

STRUCTURAL CRITERIA, NOTES

DESIGN LOAD STANDARD: ASCE 7-10  
WIND EXPOSURE CATEGORY: C  
WIND SPEED (3-SEC GUST): 117 MPH  
GROUND SNOW LOAD: 10 PSF  
DESIGN ROOF SNOW LOAD: 10 PSF  
SEISMIC DESIGN CATEGORY: C  
SEISMIC RISK FACTOR: II

**ION**

CONFIDENTIAL - THE INFORMATION HEREIN CONTAINED SHALL NOT BE USED FOR THE BENEFIT OF ANYONE EXCEPT ION DEVELOPER, LLC NOR SHALL IT BE DISCLOSED IN WHOLE OR IN PART TO OTHERS OUTSIDE RECIPIENTS ORGANIZATION, EXCEPT IN CONNECTION WITH THE SALE AND USE OF THE RESPECTIVE EQUIPMENT, WITHOUT THE WRITTEN PERMISSION OF ION DEVELOPER, LLC.



SCOTT A. GURNEY  
#PV-0117719-015866

ION DEVELOPER, LLC  
4801 N UNIVERSITY AVE #900 PROVO, UT 84604  
888.781.7074

ANTHONY GIOVANNI RIVERA  
LIMITED CLASSIFICATION LICENSE  
L.29168

SITE INFORMATION:

RAJESH GANGONE  
161 LONG MEADOW LANE  
FUQUAY VARINA, NORTH CAROLINA 27526  
(20) SILFAB SOLAR SIL-380 HC 20211101  
(20) ENPHASE IQ7PLUS-72-2-US  
7.6KW DC, 5.8KW STC-AC,  
6.778KW CEC-AC

SCOPE OF WORK

INSTALLATION OF UTILITY INTERACTIVE PHOTOVOLTAIC SOLAR SYSTEM

7.6 kW DC & 5.8 kW AC PHOTOVOLTAIC SOLAR ARRAY

PV MODULES: (20) SILFAB SOLAR SIL-380 HC 20211101

INVERTER(S): (20) ENPHASE IQ7PLUS-72-2-US

ROOF TYPE: COMPOSITION SHINGLE - 1 LAYER(S)

PV MOUNTING HARDWARE: ECOFASTEN CLICKFIT

SHEET LIST

- G-1 COVER SHEET
- V-2 SITE PLAN (AD. LIB)
- S-3 ROOF PLAN
- S-4 STRUCTURAL DETAILS
- S-5 STRUCTURAL CALCULATIONS & NOTES
- E-6 ELECTRICAL DETAILS (LINE DIAGRAM)
- E-7 ELECTRICAL CALCULATIONS & NOTES
- E-8 ELECTRICAL LOAD CALCULATIONS (AD. LIB)
- E-9 ELECTRICAL LABELS & LOCATIONS
- E-10 ELECTRICAL DIRECTORY PLACARD (AD. LIB)



DRAWING BY  
DANIEL SCHOLLE

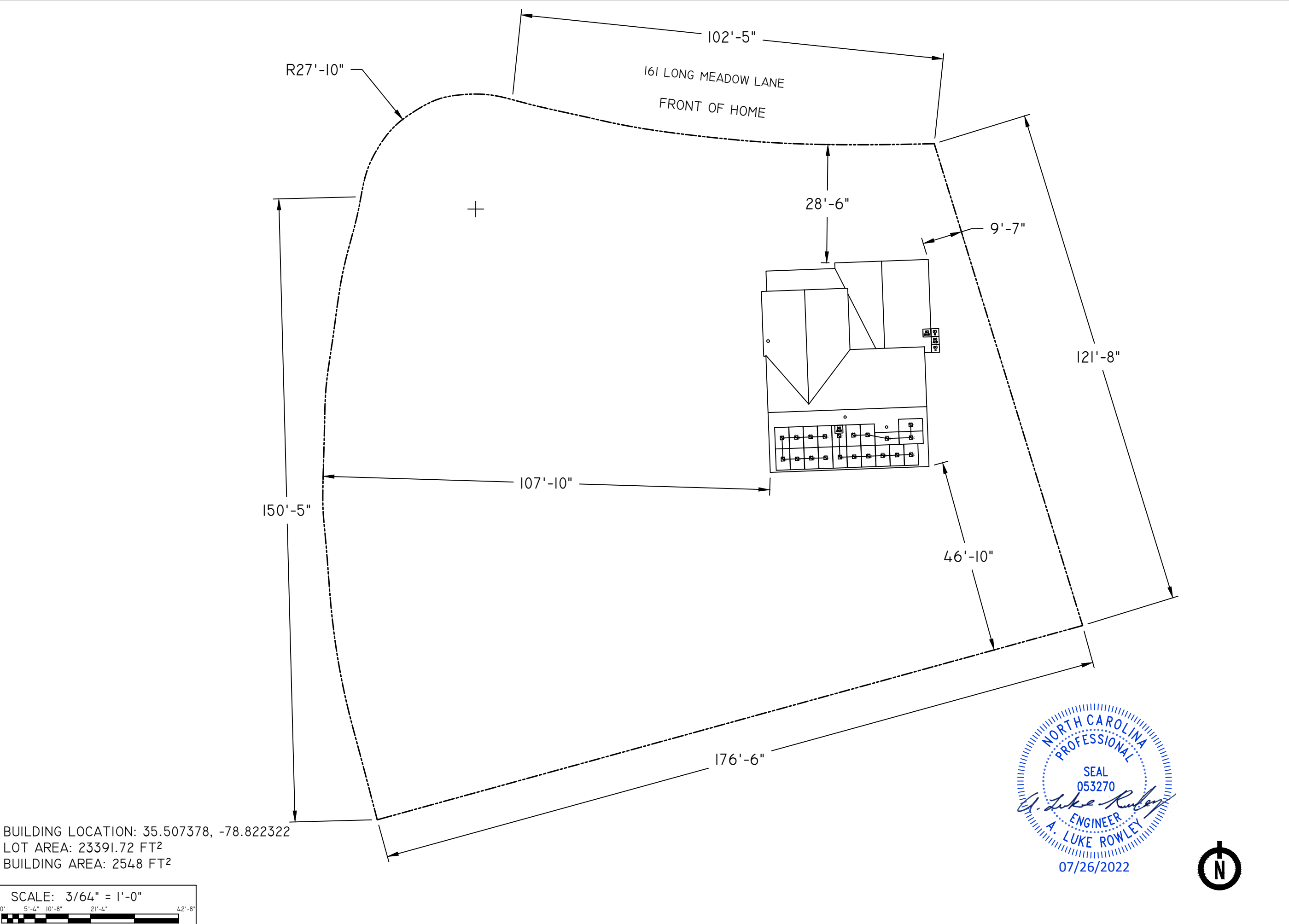
DATE  
14-JUL-22

PROJECT ID  
007E49

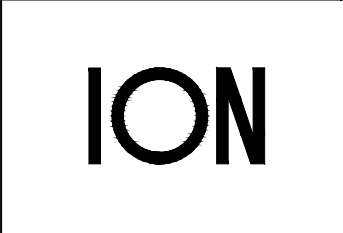
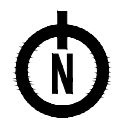
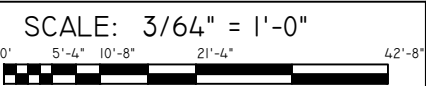
SHEET NAME  
COVER SHEET

SHEET NUMBER  
G-1

REVISION  
0



BUILDING LOCATION: 35.507378, -78.822322  
 LOT AREA: 23391.72 FT<sup>2</sup>  
 BUILDING AREA: 2548 FT<sup>2</sup>



CONFIDENTIAL - THE INFORMATION HEREIN CONTAINED SHALL NOT BE USED FOR THE BENEFIT OF ANYONE EXCEPT ION DEVELOPER, LLC NOR SHALL IT BE DISCLOSED IN WHOLE OR IN PART TO OTHERS OUTSIDE RECIPIENTS ORGANIZATION, EXCEPT IN CONNECTION WITH THE SALE AND USE OF THE RESPECTIVE EQUIPMENT, WITHOUT THE WRITTEN PERMISSION OF ION DEVELOPER, LLC.

**NABCEP**  
**CERTIFIED**  
 PV INSTALLATION  
 PROFESSIONAL

*Signature* SCOTT A. GURNEY  
 #PV-0117719-015866

ION DEVELOPER, LLC  
 4801 N UNIVERSITY AVE #900 PROVO, UT 84604  
 888.781.7074

ANTHONY GIOVANNI RIVERA  
 LIMITED CLASSIFICATION LICENSE  
 L.29168

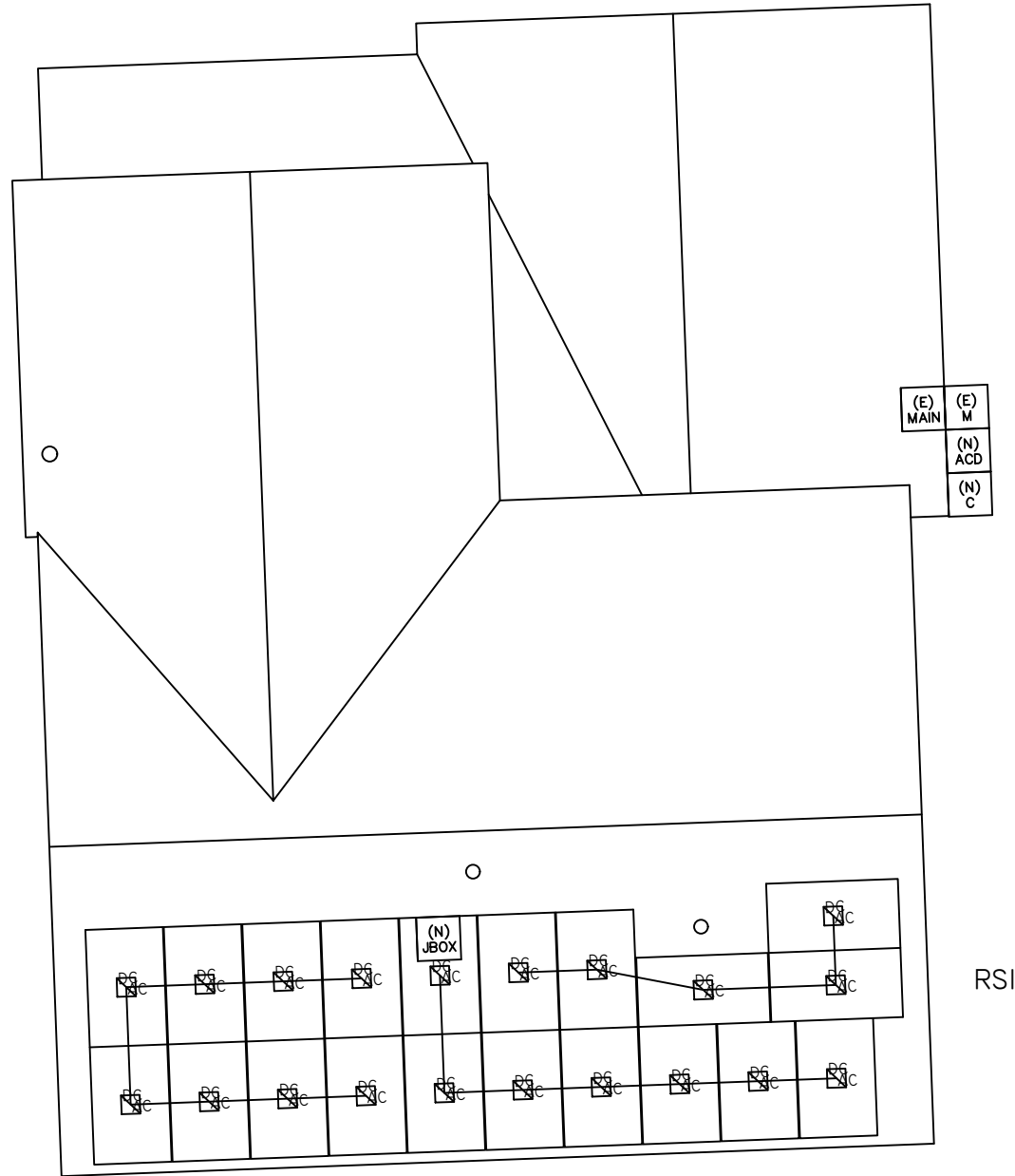
**SITE INFORMATION:**  
 RAJESH GANGONE  
 161 LONG MEADOW LANE  
 FUQUAY VARINA, NORTH CAROLINA 27526

(20) SILFAB SOLAR SIL-380 HC 2021101  
 (20) ENPHASE IQ7PLUS-72-2-US  
 7.6KW DC, 5.8KW STC-AC,  
 6.778KW CEC-AC

DRAWING BY DANIEL SCHOLLE	
DATE 14-JUL-22	
PROJECT ID 007E49	
SHEET NAME SITE PLAN	
SHEET NUMBER V-2	REVISION 0

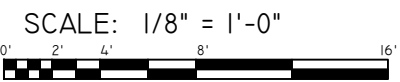
SITE NOTES:

161 LONG MEADOW LANE  
FRONT OF HOME



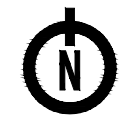
(E) MAIN	(E) M
(N) ACD	(N) C

RSI



SYSTEM LEGEND			
(E) UTILITY METER / MAIN SERVICE PANEL	(N) PV COMBINER PANEL	(N) JUNCTION BOX	SUNEYE LOCATION
(E) MAIN SERVICE PANEL	(N) PV LOAD CENTER	(N) AC DISCONNECT (VISIBLE-OPEN LOCKABLE LABELED DISCONNECT)	FIRE SETBACK
(E) SUBPANEL	(N) PV PRODUCTION METER	(N) MICROINVERTER	(N) PV MODULE
	(N) DC-DC / STRING INVERTER	(N) DC DISCONNECT	

ROOF SECTION CRITERIA AND SPECIFICATIONS				
ROOF SECTION	PV MODULE QTY	AZIMUTH	PITCH	TSRF
RSI	20	178	26	100%



# ION

CONFIDENTIAL - THE INFORMATION HEREIN CONTAINED SHALL NOT BE USED FOR THE BENEFIT OF ANYONE EXCEPT ION DEVELOPER, LLC NOR SHALL IT BE DISCLOSED IN WHOLE OR IN PART TO OTHERS OUTSIDE RECIPIENTS ORGANIZATION, EXCEPT IN CONNECTION WITH THE SALE AND USE OF THE RESPECTIVE EQUIPMENT, WITHOUT THE WRITTEN PERMISSION OF ION DEVELOPER, LLC.



SCOTT A. GURNEY  
#PV-0117719-015866

ION DEVELOPER, LLC  
4801 N UNIVERSITY AVE #900 PROVO, UT 84604  
888.781.7074

ANTHONY GIOVANNI RIVERA  
LIMITED CLASSIFICATION LICENSE  
L.29168

SITE INFORMATION:  
RAJESH GANGONE  
161 LONG MEADOW LANE  
FUQUAY VARINA, NORTH CAROLINA 27526  
(20) SILFAB SOLAR SIL-380 HC 2021101  
(20) ENPHASE IQ7PLUS-72-2-US  
7.6KW DC, 5.8KW STC-AC,  
6.778KW CEC-AC



DRAWING BY  
DANIEL SCHOLLE

DATE  
14-JUL-22

PROJECT ID  
007E49

SHEET NAME  
ROOF PLAN

SHEET NUMBER S-3	REVISION 0
---------------------	---------------

# RACKING INSTALLATION SCHEDULE AND STRUCTURAL CRITERIA

PV RACKING	
RACKING:	ECOFASTEN CLICKFIT
RACKING TYPE:	RAIL
STANDOFF:	CLICKFIT L-FOOT
STANDOFF TYPE:	L-FOOT & FLASHING
FASTENER:	5/16" X 3-1/2" ZINC PLATED STEEL LAG SCREW

SPAN AREA	TAG	SPAN
RAIL - PORTRAIT - MODULE ORIENTATION		
X- SPACING	P-X1	48 IN. O.C. MAX.
X-CANTILEAVER	P-X2	16 IN. MAX.
Y- SPACING	P-Y1	37.4 IN. MIN. - 45.3 IN. MAX.
Y-CANTILEAVER	P-Y2	12.1 IN. MIN. - 16 IN. MAX.

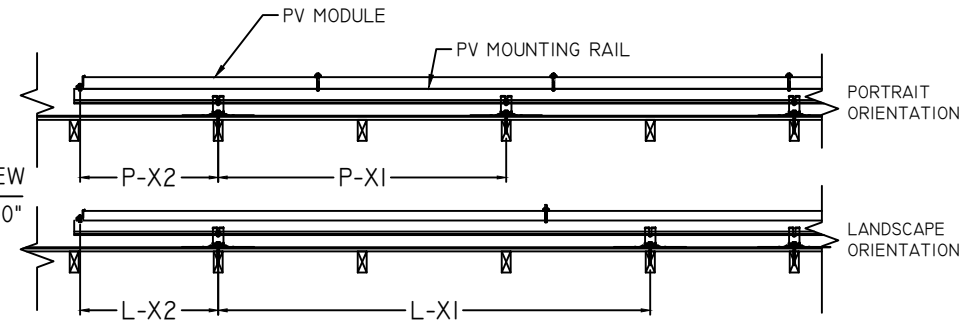
STRUCTURAL	
ROOF TYPE:	COMPOSITION SHINGLE
ROOF SHEATHING TYPE:	7/16" OSB
STRUCTURE TYPE:	MANUFACTURED WOOD TRUSS
RAFTER SIZE:	2x4
RAFTER SPACING:	24

SPAN AREA	TAG	SPAN
RAIL - LANDSCAPE - MODULE ORIENTATION		
X- SPACING	L-X1	72 IN. O.C. MAX.
X-CANTILEAVER	L-X2	23 IN. MAX.
Y- SPACING	L-Y1	21.1 IN. MIN. - 25.1 IN. MAX.
Y-CANTILEAVER	L-Y2	7.9 IN. MIN. - 9.8 IN. MAX.

ARRAY PARAMETERS	
TOTAL ROOF AREA (SQ. FT.)	2195.13
TOTAL PV MODULE AREA (SQ. FT.)	394
% PV MODULE ROOF COVERAGE	18%

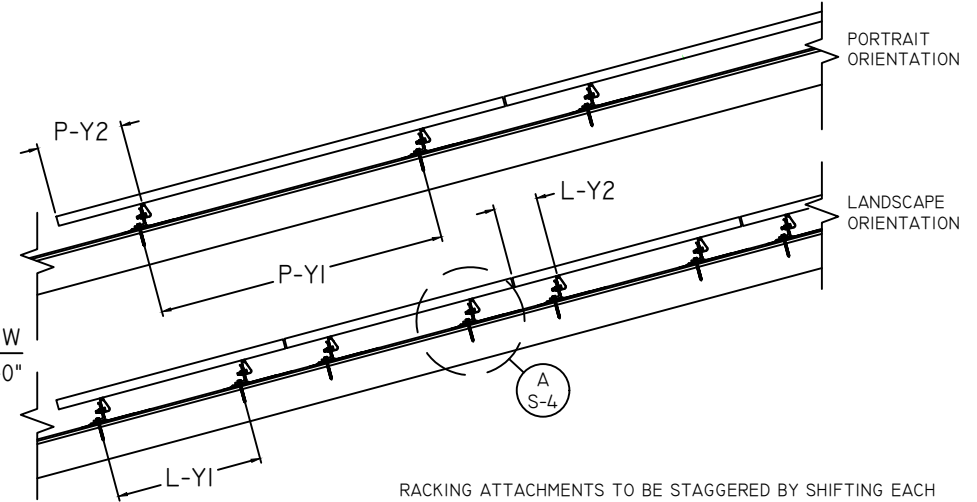
PV ARRAY DETAIL, FRONT VIEW

SCALE: 3/8" = 1'-0"

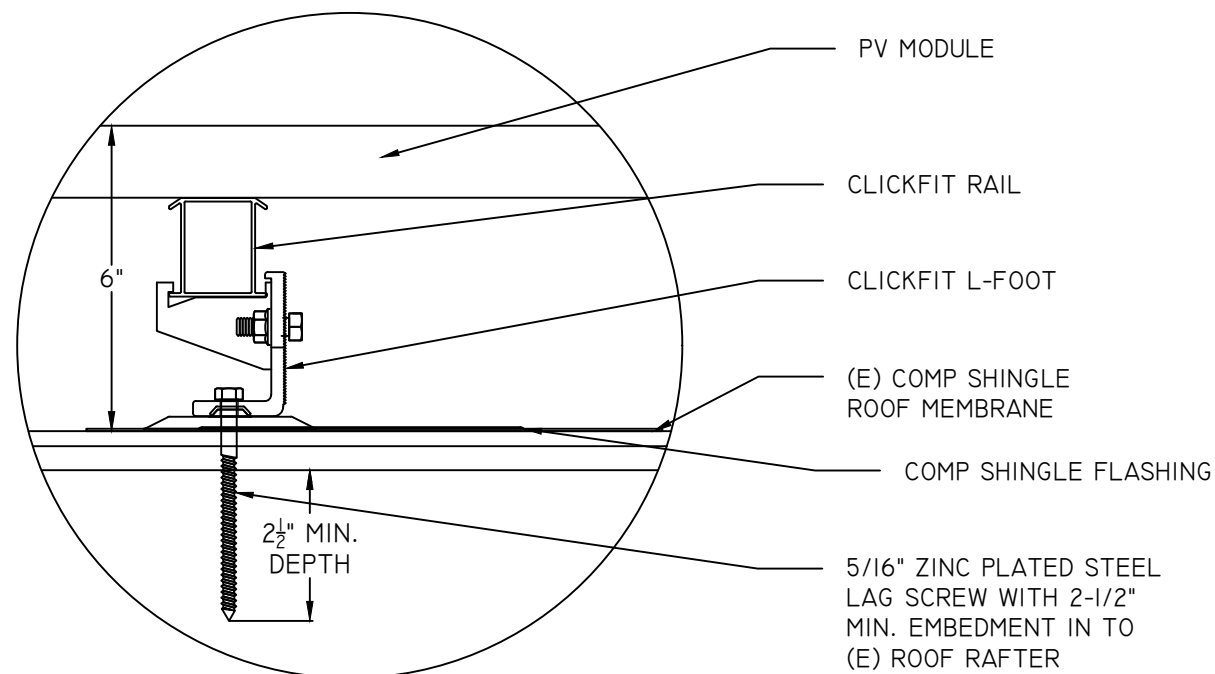


PV ARRAY DETAIL, SIDE VIEW

SCALE: 3/8" = 1'-0"



RACKING ATTACHMENTS TO BE STAGGERED BY SHIFTING EACH SUBSEQUENT ROW OF ATTACHMENTS ONE RAFTER OVER TO DISTRIBUTE LOAD ACROSS ALL FRAMING MEMBERS UNDER PV ARRAY.



A STANDOFF DETAIL  
SCALE: 3" = 1'-0"

# ION

CONFIDENTIAL - THE INFORMATION HEREIN CONTAINED SHALL NOT BE USED FOR THE BENEFIT OF ANYONE EXCEPT ION DEVELOPER, LLC NOR SHALL IT BE DISCLOSED IN WHOLE OR IN PART TO OTHERS OUTSIDE RECIPIENTS ORGANIZATION, EXCEPT IN CONNECTION WITH THE SALE AND USE OF THE RESPECTIVE EQUIPMENT, WITHOUT THE WRITTEN PERMISSION OF ION DEVELOPER, LLC.



SCOTT A. GURNEY  
#PV-0117719-015866

ION DEVELOPER, LLC  
4801 N UNIVERSITY AVE #900 PROVO, UT 84604  
888.781.7074

ANTHONY GIOVANNI RIVERA  
LIMITED CLASSIFICATION LICENSE L.29168

SITE INFORMATION:  
RAJESH GANGONE  
161 LONG MEADOW LANE  
FUQUAY VARINA, NORTH CAROLINA 27526  
(20) SILFAB SOLAR SIL-380 HC 2021101  
(20) ENPHASE IQ7PLUS-72-2-US  
7.6KW DC, 5.8KW STC-AC,  
6.778KW CEC-AC

DRAWING BY  
DANIEL SCHOLLE

DATE  
14-JUL-22

PROJECT ID  
007E49

SHEET NAME  
STRUCTURAL DETAILS

SHEET NUMBER S-4	REVISION 0
---------------------	---------------



**PV SYSTEM STRUCTURAL SPECIFICATIONS AND CALCULATIONS**

**PV SYSTEM EQUIPMENT SPECIFICATIONS**

MODULE MANUFACTURER / TYPE	SILFAB SOLAR SIL-380 HC 20211101
SOLAR MODULE WEIGHT (LBS)	43
SOLAR MODULE LENGTH (IN.)	69.4
SOLAR MODULE WIDTH (IN.)	40.8
SOLAR MODULE AREA (SQ. FT)	19.7
PV RACKING	ECOFASTEN CLICKFIT
PV RACKING TYPE	RAIL
PV ROOF ATTACHMENT	CLICKFIT L-FOOT
PV ROOF ATTACHMENT FASTENER	5/16" X 3-1/2" ZINC PLATED STEEL LAG SCREW
RACKING DEAD LOAD (PSF)	0.8
SOLAR MODULE DEAD LOAD (PSF)	2.18
TOTAL PV ARRAY DEAD LOAD (PSF)	2.98

**PV SYSTEM STRUCTURAL SPECIFICATIONS**

STRUCTURE TYPE - ROOF SHAPE	INHABITED - GABLE / FLAT ROOF
MIN. ROOF SLOPE (DEG.)	26
MEAN ROOF HEIGHT (FT.)	20
PORTRAIT ATT. SPACING (IN. O.C.)	48
LANDSCAPE ATT. SPACING (IN. O.C.)	72
# OF ATTACHMENT POINTS	46
MAX. POINT LOAD (LBS / ATT.)	16.3
MAX. TOTAL PV DEAD LOAD TO RAFTER (LBS)	16.3

**DESIGN WIND PRESSURE AND CONNECTION UPLIFT CALCULATIONS**

DESIGN WIND PRESSURE (PSF) = $P = qH[(GCP)-(GCPI)]$	ASCE 7-10 (C&C)	EQN. 30.4-1
VELOCITY PRESSURE (PSF) = $qH = 0.00256(KH)(Kzt)(Kd)(V^2)$		EQN. 30.3-1
TERRAIN EXPO. CONSTANT (A) = 9.5	TABLE 26.9-1	INTERNAL PRESSURE COEFF. (GCPI) = 0
TERRAIN EXPO. CONSTANT (Zg)(FT) = 900	TABLE 26.9-1	
VP EXPOSURE COEFF.(KH) = 0.90	EQN. 30.3-1	
TOPOGRAPHIC FACTOR (Kzt) = 1.0	EQN. 26.8-1	QH (PSF) = 26.86
WIND DIRECTIONALITY FACTOR (Kd) = 0.85	TABLE 26.6-1	ASCE 7-10 VP (PSF) (0.6) X QH = 16.12

	UPLIFT				FIGURE 30.4-2B
	ZONE 1	ZONE 2	ZONE 3	ALL ZONES	
GABLE / HIP ROOF 7° < θ ≤ 27°					
RAIL - PORTRAIT MODULE ORIENTATION	48 IN. O.C.	48 IN. O.C.	48 IN. O.C.	48 IN. O.C.	
EXTERNAL PRESSURE COEFF. (GCP) =	-0.9	-1.7	-2.6	0.5	
ASD PRESSURE (0.6P)(PSF) =	-14.51	-27.40	-41.91	22.39	
TRIBUTARY AREA (SQ. FT) =	11.6	11.6	8.7		
MAX. UPLIFT (0.6D+0.6P) (LBS) =	-147.1	-296.2	-348.0		
RAIL - LANDSCAPE MODULE ORIENTATION	72 IN. O.C.	72 IN. O.C.	72 IN. O.C.	72 IN. O.C.	
EXTERNAL PRESSURE COEFF. (GCP) =	-0.9	-1.7	-2.6	0.5	
ASD PRESSURE (0.6P)(PSF) =	-14.51	-27.40	-41.91	22.39	
TRIBUTARY AREA (SQ. FT) =	10.20	10.20	5.10		
MAX. UPLIFT (0.6D+0.6P) (LBS) =	-129.7	-174.2	-204.6		

**ROOF ATTACHMENT FASTENER CHECK**

CLICKFIT L-FOOT - 5/16" X 3-1/2" ZINC PLATED STEEL LAG SCREW				NDS 12.2
LAG SCREW WITHDRAWAL DESIGN VALUE (LBS) = $W = 1800(G^3/2)(D^3/4)$				MANUFACTURER MAX. UPLIFT CAPACITY = 359.6 LBS
ROOF ATTACHMENT FASTENER (D) = 5/16 IN. LAG SCREW				12.2.1
FASTENER QTY PER ATTACHMENT = 1				LUMBER SPECIFIC GRAVITY (G)= 0.42
FASTENER EMBEDMENT DEPTH (IN.) = 2.5				LOAD DURATION FACTOR (Cd) = 1.6
WITHDRAWAL DESIGN VALUE(W)(LBS / IN.) = 204.8				PRYING COEFFICIENT = 1.4
LAG SCREW WITHDRAWAL CAPACITY (LBS) = 585.1				
MAX. ATT. WITHDRAWAL CAPACITY (LBS) = 359.6	>	348.0	MAX UPLIFT DEMAND (LBS)	OK

**DESIGN LOCATION AND SITE SPECIFICATIONS**

JURISDICTION	HARNETT COUNTY
STATE	NORTH CAROLINA
ADOPTED LOAD STANDARD	ASCE 7-10
OCCUPANCY / RISK CATEGORY	II
BASIC WIND SPEED (MPH (3-SEC GUST))	117
WIND EXPOSURE CATEGORY	C
GROUND SNOW LOAD (PSF) (Pg)	10
BASE ELEVATION (FT)	188

**DESIGNED ROOF SNOW LOAD CALCULATIONS**

ASCE 7-10 (C&C)	
SLOPED ROOF SNOW LOAD (PSF)	EQN. 7.4-1
= $P_s = (C_s)(0.7)(C_e)(C_t)(I_s)(P_g)$	
EXPOSURE FACTOR (Ce) = 1.0	TABLE 7.3-1
THERMAL FACTOR (Ct) = 1.0	TABLE 7.3-2
IMPORTANCE FACTOR (Is) = 1.0	TABLE 1.5-2
SLOPE FACTOR (Cs) = 1.0	FIG. 7.4-1
Ps (PSF) = 10	OK

**GRAVITY LOAD / FRAMING CALCULATIONS**

DEAD LOAD (PSF)	RSI
ROOF MEMBRANE	COMPOSITION SHINGLE 4.0
SHEATHING	7/16" OSB 1.7
FRAMING	MANUFACTURED WOOD TRUSS - TOP CHORD 2X4 @ 24 IN. 1.0
	O.C. - SPF #2 @6.5 FT. MAX SPAN
TOTAL ROOF DEAD LOAD (PSF)	6.7
ADJUSTED TO SLOPED ROOF (PSF)	7.5
PV ARRAY ADJ. TO ROOF SLOPE (PSF)	3.3
ROOF LIVE LOAD > ROOF SNOW LOAD (PSF)	20.0
TOTAL LOAD (PSF)	30.9
RAFTER / TOP CHORD MEMBER PROPERTIES	SPF #2 - 2x4
SECTION MODULUS (S)(IN^3)	3.06
MOMENT OF INERTIA (I)(IN^4)	5.36
TOTAL LOAD ON MEMBER (W) (PLF)	61.7
MAX. MEMBER SPAN (L) (FT)	6.5
MODULUS OF ELASTICITY (E) (PSI)	1400000
SHEAR (Fv) (PSI)	135
AREA (A) (IN^2)	5.25
MAX BENDING STRESS CHECK	(Fb)(Cd)(Cf)(Cr)
BENDING (Fb) (PSI)	875
LOAD DURATION FACTOR (Cd)	1.25
SIZE FACTOR (Cf)	1.50
REPETITIVE MEMBER FACTOR (Cr)	1.15
ALLOWABLE BENDING STRESS (PSI)	1886.7
ACTUAL BENDING STRESS (PSI) = $(WL^2)/(8(S))$	1277.3
	68% OK
MAX DEFLECTION CHECK - TOTAL LOAD	UNIFORM DISTRIBUTED
ALLOWABLE DEFLECTION	L / 180
	0.433 IN.
ACTUAL MAX DEFLECTION	$(W)(L)^4 / 185(E)(I)$
	0.137 IN.
	32% OK
MAX DEFLECTION CHECK - LIVE LOAD	
ALLOWABLE DEFLECTION	L / 240
	0.325 IN.
ACTUAL MAX DEFLECTION	$(W)(L)^4 / 185(E)(I)$
	0.137 IN.
	42% OK
MAX SHEAR CHECK	Fv (A)
ALLOWABLE SHEAR	708.75 LBS.
	$(w)(L)/2$
	201 LBS.
ACTUAL MAX SHEAR	28% OK



CONFIDENTIAL - THE INFORMATION HEREIN CONTAINED SHALL NOT BE USED FOR THE BENEFIT OF ANYONE EXCEPT ION DEVELOPER, LLC NOR SHALL IT BE DISCLOSED IN WHOLE OR IN PART TO OTHERS OUTSIDE RECIPIENTS ORGANIZATION, EXCEPT IN CONNECTION WITH THE SALE AND USE OF THE RESPECTIVE EQUIPMENT, WITHOUT THE WRITTEN PERMISSION OF ION DEVELOPER, LLC.

**NABCEP CERTIFIED**  
**PV INSTALLATION PROFESSIONAL**  
 SCOTT A. GURNEY  
 #PV-0117719-015866  
 ION DEVELOPER, LLC  
 4801 N UNIVERSITY AVE #900 PROVO, UT 84604  
 888.781.7074  
 ANTHONY GIOVANNI RIVERA  
 LIMITED CLASSIFICATION LICENSE L.29168

**SITE INFORMATION:**  
 RAJESH GANGONE  
 161 LONG MEADOW LANE  
 FUYQUAY VARINA, NORTH CAROLINA 27526  
 (20) SILFAB SOLAR SIL-380 HC 20211101  
 (20) ENPHASE IQ7PLUS-72-2-US  
 7.6KW DC, 5.8KW STC-AC,  
 6.778KW CEC-AC

DRAWING BY	DANIEL SCHOLLE
DATE	14-JUL-22
PROJECT ID	007E49
SHEET NAME	STRUCTURAL CALCS
SHEET NUMBER	S-5
REVISION	0

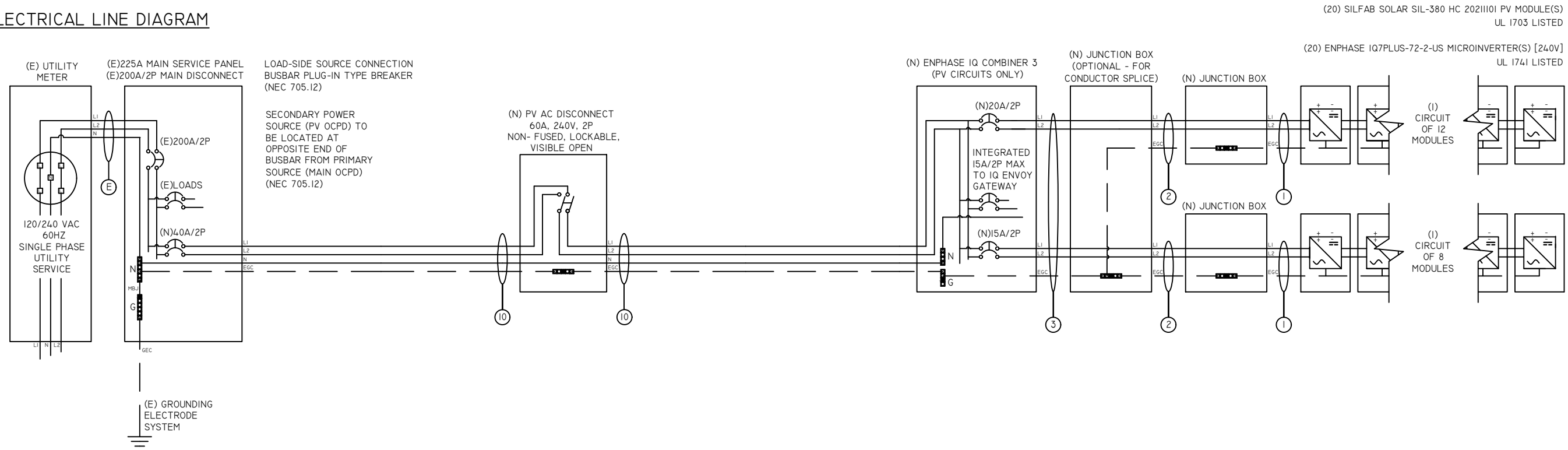
# CONDUCTOR AND RACEWAY SCHEDULE

TAG	QTY	SIZE - #	TYPE	DESIGNATOR	I / V	TAG	QTY	SIZE - #	TYPE	DESIGNATOR	I / V	TAG	QTY	SIZE - #	TYPE	DESIGNATOR	I / V	TAG	QTY	SIZE - #	TYPE	DESIGNATOR	I / V
10	(1)	8 AWG	THHN / THWN, CU.	BLACK (L1)	24.2 A AC (MAX)	3	(2)	10 AWG	THHN / THWN, CU.	BLACK (L1)	14.5 A AC (MAX)	2	(1)	10 AWG	2C, NM-B W/G, CU.	(L1, L2, EGC)	14.5 A AC (MAX)	1	(1)	12 AWG	2C, TC-ER, CU.	(L1, L2)	14.5 A AC (MAX)
	(1)	8 AWG	THHN / THWN, CU.	RED (L2)	240 V AC		(2)	10 AWG	THHN / THWN, CU.	RED (L2)	240 V AC		(1)	6 AWG	SOLID BARE CU.	(EGC)	240 V AC		(1)	6 AWG	SOLID BARE CU.	(EGC)	240 V AC
	(1)	10 AWG	THHN / THWN, CU.	WHITE (N)			(1)	10 AWG	THHN / THWN, CU.	GREEN (EGC)			(1)	3/4 IN.	EMT OR FREE AIR	(RACEWAY)			(1)	3/4 IN.	EMT OR FREE AIR	(RACEWAY)	
	(1)	10 AWG	THHN / THWN, CU.	GREEN (EGC)																			
	(1)	3/4 IN.	EMT	(RACEWAY)	EXTERIOR																		EXTERIOR



CONFIDENTIAL - THE INFORMATION HEREIN CONTAINED SHALL NOT BE USED FOR THE BENEFIT OF ANYONE EXCEPT ION DEVELOPER, LLC NOR SHALL IT BE DISCLOSED IN WHOLE OR IN PART TO OTHERS OUTSIDE RECIPIENTS ORGANIZATION, EXCEPT IN CONNECTION WITH THE SALE AND USE OF THE RESPECTIVE EQUIPMENT, WITHOUT THE WRITTEN PERMISSION OF ION DEVELOPER, LLC.

# ELECTRICAL LINE DIAGRAM



# ELECTRICAL LINE DIAGRAM NOTES

1. FOR THE PROPOSED PV ELECTRICAL INSTALLATION, TYPE NM-CABLE SHALL ONLY BE USED WHEN RUNNING ELECTRICAL WIRING THROUGH THE ATTIC SPACE OR INTERIOR OF THE PERMITTED STRUCTURE. INSTALLATION OF TYPE NM-CABLE SHALL COMPLY WITH NEC 334.10 AND NEC 334.12.

MICROINVERTER CEC PEAK OUTPUT POWER: 290W

**NABCEP CERTIFIED**  
**PV INSTALLATION PROFESSIONAL**  
 SCOTT A. GURNEY  
 #PV-0117719-015866  
 ION DEVELOPER, LLC  
 4801 N UNIVERSITY AVE #900 PROVO, UT 84604  
 888.781.7074  
 ANTHONY GIOVANNI RIVERA  
 LIMITED CLASSIFICATION LICENSE L.29168

**SITE INFORMATION:**  
 RAJESH GANGONE  
 161 LONG MEADOW LANE  
 FUQUAY VARINA, NORTH CAROLINA 27526  
 (20) SILFAB SOLAR SIL-380 HC 2021101  
 (20) ENPHASE IQ7PLUS-72-2-US  
 7.6KW DC, 5.8KW STC-AC,  
 6.778KW CEC-AC

DRAWING BY	DANIEL SCHOLLE
DATE	14-JUL-22
PROJECT ID	007E49
SHEET NAME	ELEC. LINE DIAG.
SHEET NUMBER	E-6
REVISION	0

**PV SYSTEM ELECTRICAL SPECIFICATIONS AND CALCULATIONS**

DESIGN LOCATION AND TEMPERATURES

TEMPERATURE DATA SOURCE	ASHRAE
STATE	NORTH CAROLINA
JURISDICTION	HARNETT COUNTY
WEATHER STATION	POPE AFB
ASHRAE EXTREME LOW TEMP (°C)	-10
ASHRAE 2% HIGH TEMP (°C)	36
DESIGNED MAX. SYSTEM VDROPP / VRISE	4.00%

PV MODULE SPECIFICATIONS

SILFAB SOLAR SIL-380 HC 20211101	
RATED POWER (P <sub>MAX</sub> ) (W)	380
MAXIMUM POWER VOLTAGE (V <sub>MP</sub> )	35.32
MAXIMUM POWER CURRENT (I <sub>MP</sub> )	10.77
OPEN CIRCUIT VOLTAGE (V <sub>OC</sub> )	42.17
SHORT CIRCUIT CURRENT (I <sub>SC</sub> )	11.36
PMP/VMP TEMP. COEFFICIENT	-0.36
VOC TEMP. COEFFICIENT	-0.28
SERIES FUSE RATING	20
ADJ. MODULE VOC @ ASHRAE LOW TEMP	46.3
ADJ. MODULE VMP @ ASHRAE 2% AVG. HIGH TEMP	29.9

INVERTER SPECIFICATIONS

ENPHASE IQ7PLUS-72-2-US	
TYPE	MICROINVERTER
MAX. OR RECOMMENDED MODULE POWER (W)	440
MAXIMUM INPUT DC OPEN-CIRCUIT VOLTAGE (V <sub>OC</sub> )	60
MINIMUM START VOLTAGE (V)	22
MAXIMUM START VOLTAGE(V)	60
MAXIMUM INPUT CURRENT (I <sub>SC</sub> ) (A)	15
CEC PEAK OUTPUT POWER (W)	290
MAX. CONTINUOUS OUTPUT CURRENT (A)	1.21
NOMINAL (L-L) OUTPUT VOLTAGE	240
CEC WEIGHTED EFFICIENCY (%)	97.0%

SYSTEM ELECTRICAL SPECIFICATIONS

	CIR 1	CIR 2
NUMBER OF MODULES PER CIRCUIT	12	8
DC POWER RATING PER CIRCUIT (STC)(W DC)	4560	3040
TOTAL MODULE QUANTITY	20 PV MODULES	
STC DC POWER RATING OF ARRAY	7600W DC	
INVERTER OUTPUT CIRCUIT CURRENT(A AC)	14.52	9.68
I25% INVERTER OUTPUT CIRCUIT CURRENT(A AC)	18.15	12.1
CIRCUIT OCPD RATING (A)	20	15
COMBINED INVERTER CONTINUOUS OUTPUT CURRENT	24.2A AC	
PV POWER PRODUCTION SYSTEM OCPD RATING (X125%)	40A	
MAX. ARRAY STC-AC POWER (W)	5800W AC (STC)	
MAX. ARRAY CEC-AC POWER (W)	6778W AC (CEC)	

AC VOLTAGE RISE CALCULATIONS

	DIST (FT)	COND.	VRISE(V)	VEND(V)	%VRISE
VRISE SEC. 1 (MICRO TO JBOX) *	28.8	12 Cu.	1.7	241.7	0.70%
VRISE SEC. 2 (JBOX TO COMBINER BOX)	50	10 Cu.	1.7	241.7	0.73%
VRISE SEC. 3 (COMBINER BOX TO POI)	10	8 Cu.	0.4	240.4	0.16%
TOTAL VRISE			3.8	243.8	1.58% OK

\* 8 MICROINVERTER MAX SUB-BRANCH CIRCUIT SIZE TO COMPLY WITH VRISE CALCULATIONS.

RACEWAY / CONDUCTOR CALCULATIONS

MICROINV. TO JUNCTION BOX (1)

MAX INVERTER OUTPUT CIRCUIT CURRENT =	14.5 A AC
MAX CURRENT X125%=	18.0 A AC
PER NEC 690.8(B)(1)(W/OUT CORRECTION FACTORS)	
CONDUCTOR SIZE / INSULATION / TYPE =	12 AWG 2C, TC-ER, CU.
CONDUCTOR AMP. RATING @ 90°C =	30 A
AMB. TEMP. AMP. CORRECTION =	NOT APPLIED
ADJUSTED AMPACITY COMPLIANCE (A) =	30 > 18.0 <b>OK</b>
RACEWAY SIZE / TYPE =	3/4 IN. EMT OR FREE AIR
CROSS-SECTIONAL AREA OF CONDUCTOR(S) / CABLE(S)(IN.^2) =	0.142 IN.^2
CROSS-SECTIONAL AREA OF RACEWAY(IN.^2) =	0.533 IN.^2
% ALLOWABLE RACEWAY FILL (NEC CHAPTER 9, TABLE 1) =	53% > 27% <b>OK</b>

JUNCTION BOX TO JUNCTION BOX (2)

MAX INVERTER OUTPUT CIRCUIT CURRENT =	14.5 A AC
MAX CURRENT X125% =	18 A AC
PER NEC 690.8(B)(1)(W/OUT CORRECTION FACTORS)	
CONDUCTOR SIZE / INSULATION / TYPE =	10 AWG 2C, NM-B W/G, CU.
CONDUCTOR AMP. RATING @60°C =	30 A
# OF CONDUCTORS IN RACEWAY CORRECTION =	NOT APPLIED
AMB. TEMP. AMP. CORRECTION =	NOT APPLIED
ADJUSTED AMPACITY COMPLIANCE (A) =	30 > 18.0 <b>OK</b>
RACEWAY SIZE / TYPE =	FREE AIR

JUNCTION BOX TO COMBINER BOX (3)

MAX INVERTER OUTPUT CIRCUIT CURRENT =	14.5 A AC
PER NEC 690.8(B)(2)(WITH CORRECTION FACTORS)	
CONDUCTOR SIZE / INSULATION / TYPE =	10 AWG THHN / THWN, CU.
CONDUCTOR AMP. RATING @60°C =	35 A
# OF CONDUCTORS IN RACEWAY CORRECTION =	0.8
AMB. TEMP. AMP. CORRECTION =	0.88
ADJUSTED AMPACITY COMPLIANCE (A) =	24.64 > 14.5 <b>OK</b>
RACEWAY SIZE / TYPE =	3/4 IN. EMT
CROSS-SECTIONAL AREA OF CONDUCTOR(S) / CABLE(S)(IN.^2) =	0.106 IN.^2
CROSS-SECTIONAL AREA OF RACEWAY(IN.^2) =	0.533 IN.^2
% ALLOWABLE RACEWAY FILL (NEC CHAPTER 9, TABLE 1) =	40% > 20% <b>OK</b>

COMBINER BOX TO MAIN PV OCPD (10)

COMBINED INVERTER CONTINUOUS OUTPUT CURRENT =	24.2 A AC
MAX CURRENT X125% =	30.0 A AC
PER NEC 690.8(B)(1)(W/OUT CORRECTION FACTORS)	
CONDUCTOR SIZE / INSULATION / TYPE =	8 AWG THHN / THWN, CU.
CONDUCTOR AMP. RATING @75°C =	50 A
# OF CONDUCTORS IN RACEWAY CORRECTION =	NOT APPLIED
AMB. TEMP. AMP. CORRECTION =	NOT APPLIED
ADJUSTED AMPACITY COMPLIANCE (A) =	50.0 > 30.0 <b>OK</b>
RACEWAY SIZE / TYPE =	3/4 IN. EMT
CROSS-SECTIONAL AREA OF CONDUCTOR(S) / CABLE(S)(IN.^2) =	0.146 IN.^2
CROSS-SECTIONAL AREA OF RACEWAY(IN.^2) =	0.533 IN.^2
% ALLOWABLE RACEWAY FILL (NEC CHAPTER 9, TABLE 1) =	40% > 27% <b>OK</b>



CONFIDENTIAL - THE INFORMATION HEREIN CONTAINED SHALL NOT BE USED FOR THE BENEFIT OF ANYONE EXCEPT ION DEVELOPER, LLC NOR SHALL IT BE DISCLOSED IN WHOLE OR IN PART TO OTHERS OUTSIDE RECIPIENTS ORGANIZATION, EXCEPT IN CONNECTION WITH THE SALE AND USE OF THE RESPECTIVE EQUIPMENT, WITHOUT THE WRITTEN PERMISSION OF ION DEVELOPER, LLC.



SCOTT A. GURNEY  
#PV-0117719-015866  
ION DEVELOPER, LLC  
4801 N UNIVERSITY AVE #900 PROVO, UT 84604  
888.781.7074  
ANTHONY GIOVANNI RIVERA  
LIMITED CLASSIFICATION LICENSE  
L.29168

**SITE INFORMATION:**  
RAJESH GANGONE  
161 LONG MEADOW LANE  
FUYQUAY VARINA, NORTH CAROLINA 27526  
(20) SILFAB SOLAR SIL-380 HC 20211101  
(20) ENPHASE IQ7PLUS-72-2-US  
7.6KW DC, 5.8KW STC-AC,  
6.778KW CEC-AC

DRAWING BY  
**DANIEL SCHOLLE**

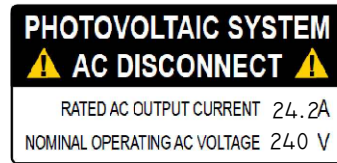
DATE  
**14-JUL-22**

PROJECT ID  
**007E49**

SHEET NAME  
**ELECTRICAL CALCS.**

SHEET NUMBER <b>E-7</b>	REVISION <b>0</b>
----------------------------	----------------------

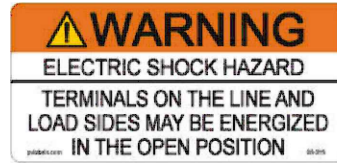
ELECTRICAL FIELD-APPLIED HAZARD MARKINGS



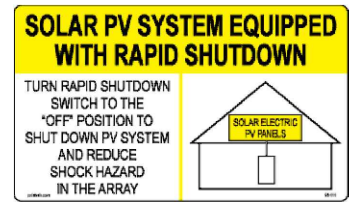
A AT EACH PV SYSTEM DISCONNECTING MEANS. [NEC 690.54, NEC 690.13(B)]



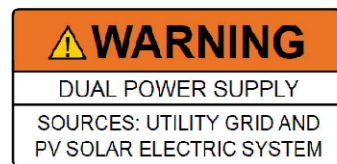
F SIGN LOCATED ON OR NO MORE THAN 3 FT FROM THE RAPID SHUT DOWN DISCONNECT SWITCH [NEC 690.56(C)].



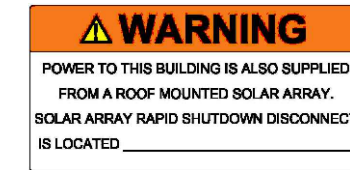
B FOR PV DISCONNECTING MEANS WHERE ALL TERMINALS OF THE DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION. [NEC 690.13(B), NEC 705.22]



G FOR BUILDINGS WITH PV SYSTEMS. TO BE LOCATED AT EACH SERVICE EQUIPMENT LOCATION TO WHICH THE PV SYSTEM IS CONNECTED. [NEC 690.56(C)]



C AT EQUIPMENT CONTAINING OVERCURRENT DEVICES IN CIRCUITS SUPPLYING POWER TO A BUSBAR OR CONDUCTOR SUPPLIED FROM MULTIPLE SOURCES. [NEC 705.12(C)]



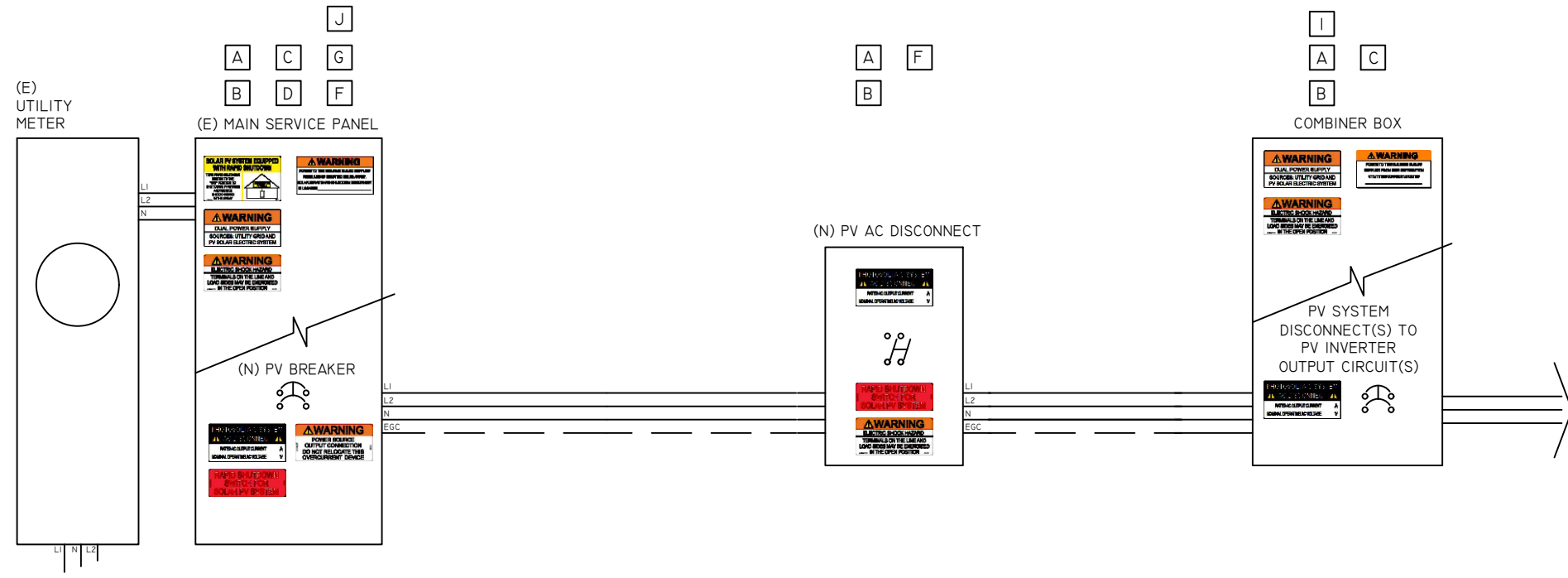
J PERMANENT DIRECTORY TO BE LOCATED AT MAIN SERVICE EQUIPMENT DENOTING THE LOCATION OF THE PV RAPID SHUTDOWN SYSTEM DISCONNECTING MEANS IF SOLAR ARRAY RAPID SHUT DOWN DISCONNECT SWITCH IS NOT GROUPED AND WITHIN LINE OF SITE OF MAIN SERVICE DISCONNECTING MEANS. [NEC 705.10, NEC 690.56(C)(1)]



D PLACED ADJACENT TO PV SYSTEM PLUG-IN TYPE BREAKER TO A BUSBAR FOR A LOAD SIDE CONNECTION. [NEC 705.12(B)(3)(2)]



I PERMANENT DIRECTORY TO BE LOCATED AT SOLAR ARRAY RAPID SHUTDOWN SWITCH DENOTING THE LOCATION OF THE SERVICE EQUIPMENT LOCATION IF SOLAR ARRAY RAPID SHUT DOWN DISCONNECT SWITCH IS NOT GROUPED AND WITHIN LINE OF SITE OF MAIN SERVICE DISCONNECTING MEANS. [NEC 705.10]



- ALL CAUTION, WARNING, OR DANGER SIGNS OR LABELS SHALL:
1. COMPLY WITH ANSI Z535.4-2011 STANDARDS.
  2. BE PERMANENTLY AFFIXED TO THE EQUIPMENT OR WIRING METHOD AND SHALL NOT BE HANDWRITTEN.
  3. SHALL BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED.
  4. UNLESS OTHERS SPECIFIED MINIMUM TEXT HEIGHT TO BE 1/8" (3MM).

ION

CONFIDENTIAL - THE INFORMATION HEREIN CONTAINED SHALL NOT BE USED FOR THE BENEFIT OF ANYONE EXCEPT ION DEVELOPER, LLC NOR SHALL IT BE DISCLOSED IN WHOLE OR IN PART TO OTHERS OUTSIDE RECIPIENTS ORGANIZATION, EXCEPT IN CONNECTION WITH THE SALE AND USE OF THE RESPECTIVE EQUIPMENT, WITHOUT THE WRITTEN PERMISSION OF ION DEVELOPER, LLC.



ION DEVELOPER, LLC  
4801 N UNIVERSITY AVE #900 PROVO, UT 84604  
888.781.7074  
ANTHONY GIOVANNI RIVERA  
LIMITED CLASSIFICATION LICENSE L.29168

SITE INFORMATION:  
RAJESH GANGONE  
161 LONG MEADOW LANE  
FUQUAY VARINA, NORTH CAROLINA 27526  
(20) SILFAB SOLAR SIL-380 HC 2021101  
(20) ENPHASE IQ7PLUS-72-2-US  
7.6KW DC, 5.8KW STC-AC,  
6.778KW CEC-AC

DRAWING BY DANIEL SCHOLLE	
DATE 14-JUL-22	
PROJECT ID 007E49	
SHEET NAME ELECTRICAL LABELS	
SHEET NUMBER E-9	REVISION 0