11 Ocean View Farm Road

Town of Chilmark, MA

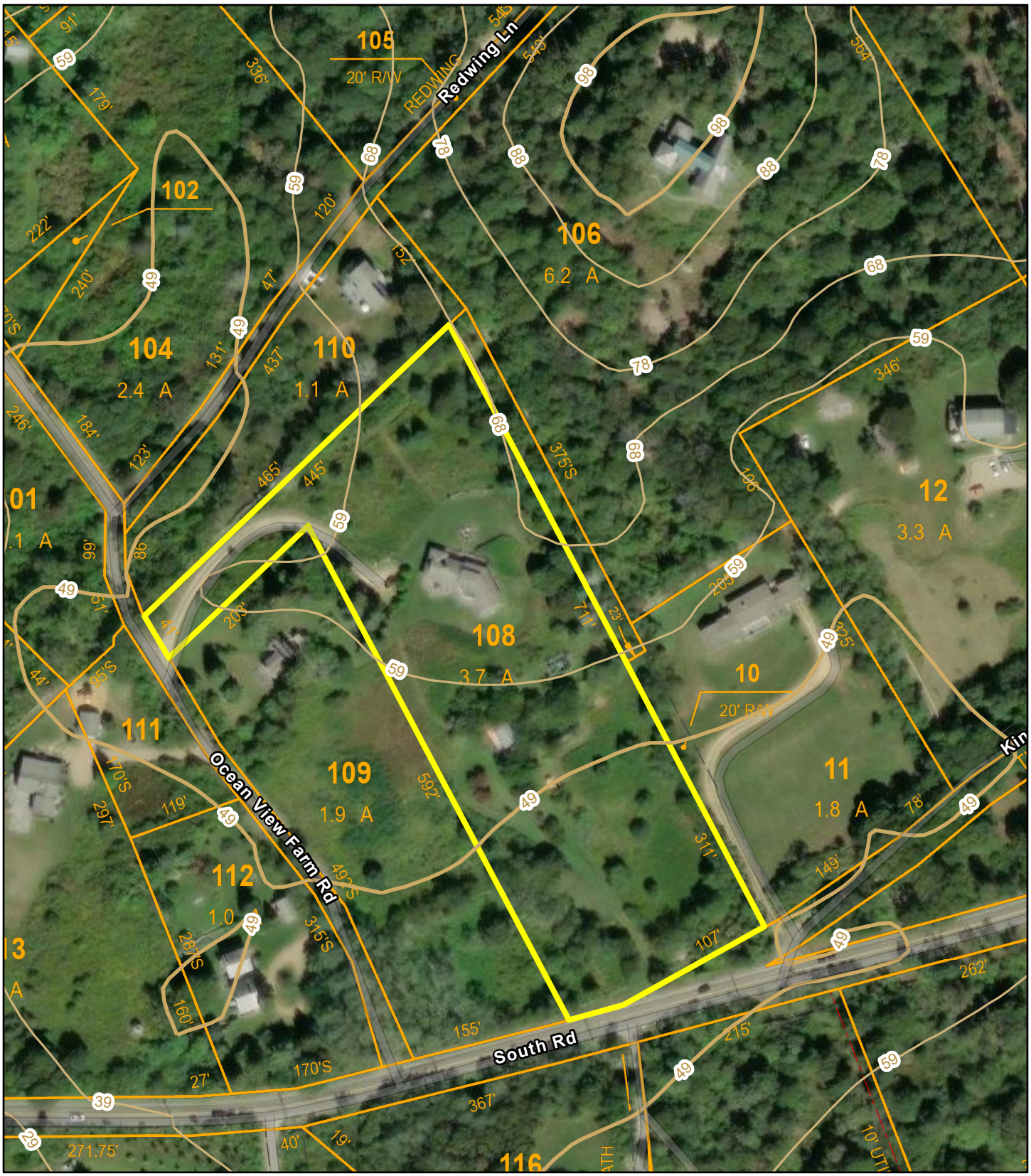
1 inch = 142 Feet

0 142 284 426

April 3, 2024

CAI Technologies
Precision Mapping. Geospatial Solutions.

www.cai-tech.com



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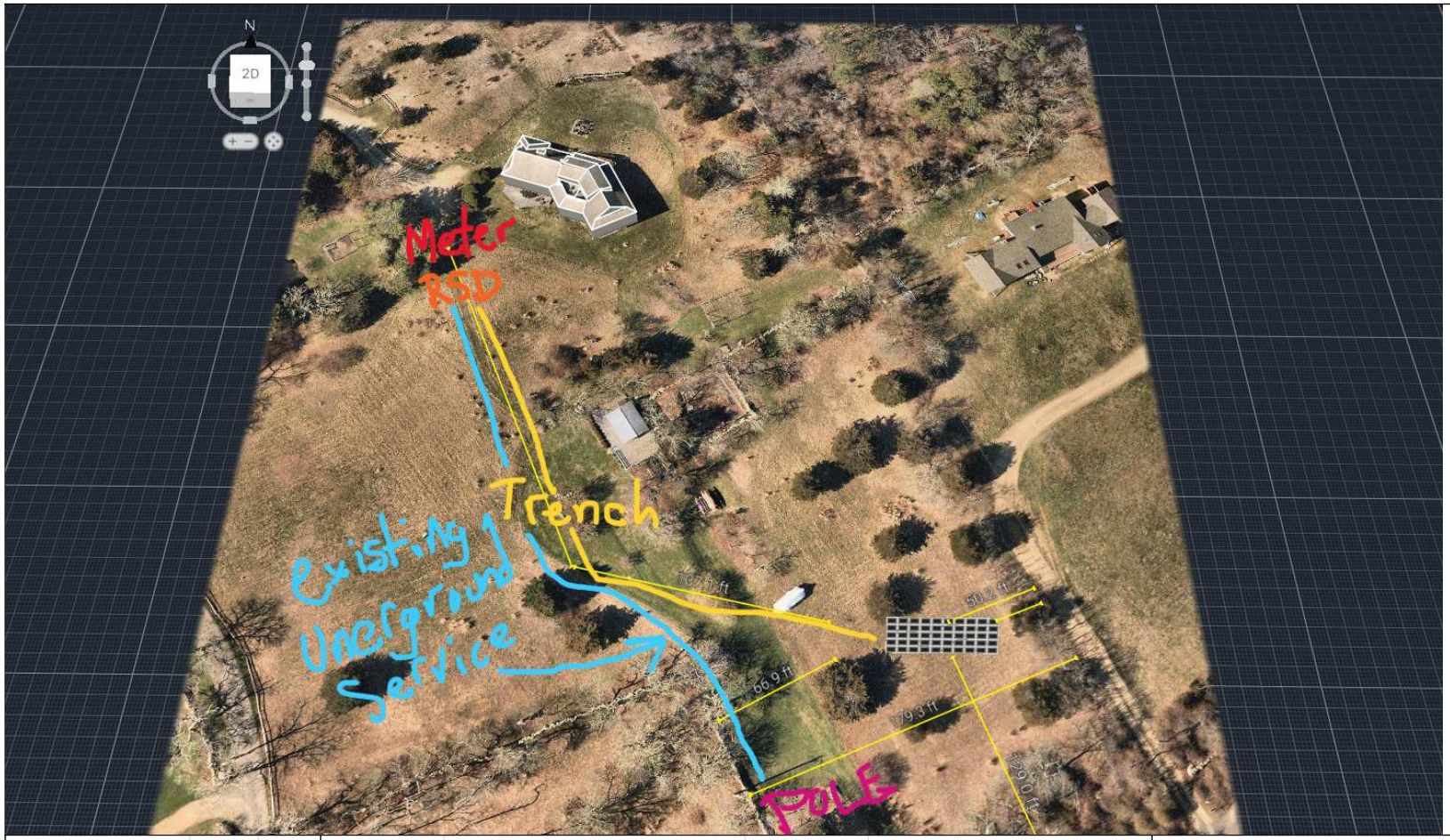


COTUIT SOLAR

PO Box 89
Cotuit, MA
02635

Project: Tris Pough

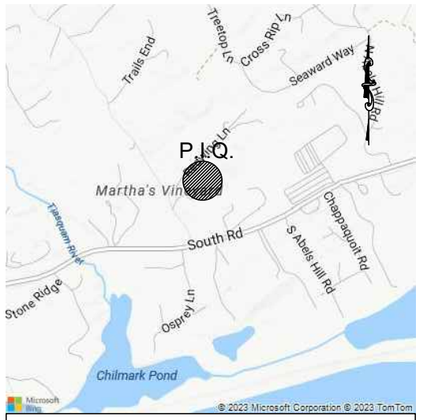
Star Castle LLC

11 Ocean View Farm Road
Chilmark MA
02535

System:

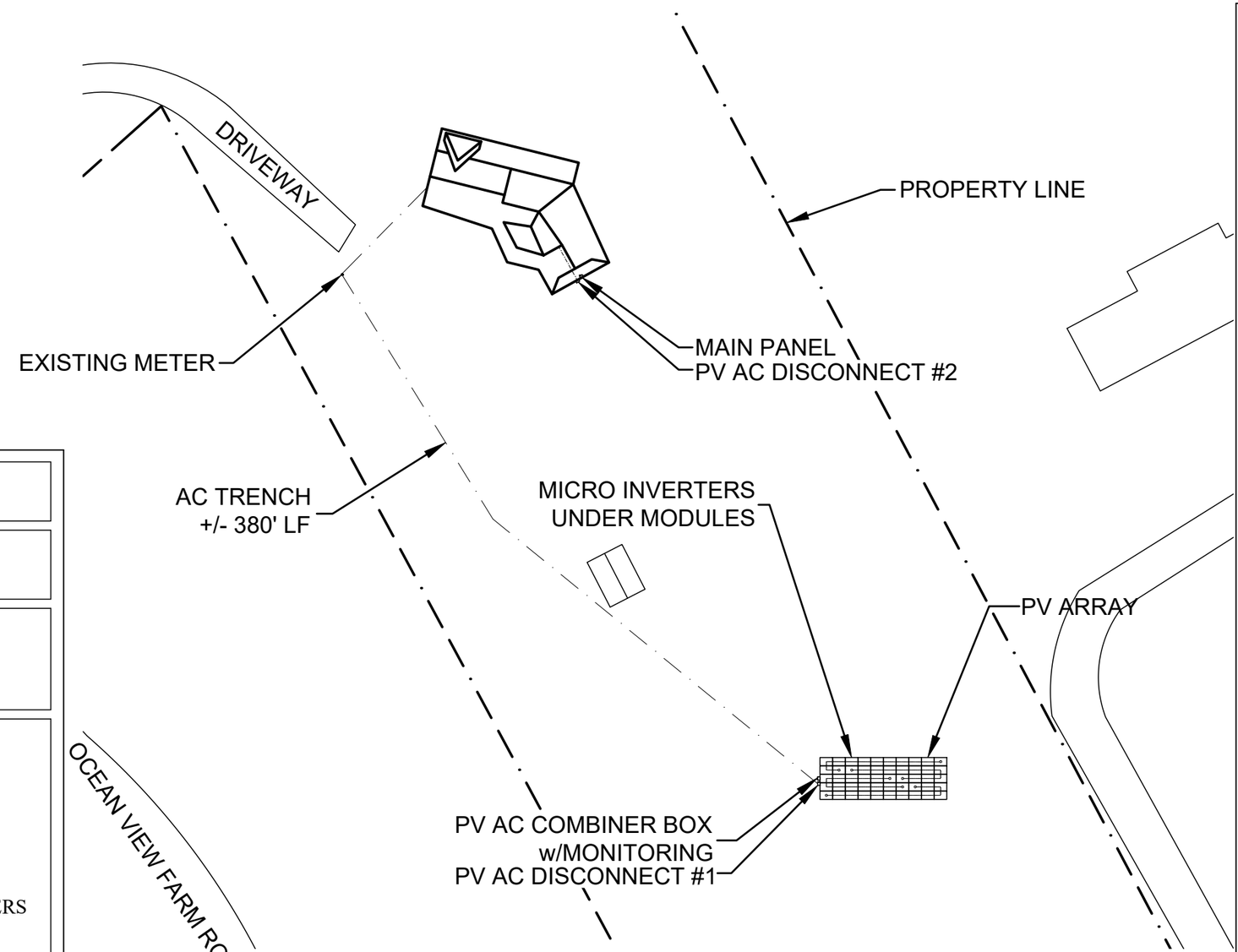
20.0 kW DC
14.5 kW AC
50 Axitec 400
Enphase IQ8+ Microinverter

Revision: 3/19/2024



LOCATION MAP:

180° MODULE
ORIENTATION
25° TILT



PROJECT DATA

CODES	CMR-780	IRC-2015
	MEC-2020	NEC-2020

BUILDING USE:
EXISTING: R - RESIDENTIAL SINGLE FAMILY
CONST. CLASS 5-B UNPROTECTED

SOLAR ARRAY:

PANEL:	AXITEC AC-400MBT/108V 50 MODULES 2 STRINGS OF 12 2 STRINGS OF 13
RACKING:	GROUND MOUNTED 25° TILT
INVERTER:	(50) ENPHASE IQ8+-72-US MICROINVERTERS
SYSTEM RATING:	20,000 Watts DC - STC 14,500 Watts AC - STC

ROOF LOADS:

GROUND SNOW	25 PSF
WIND LOAD	134 MPH
SOLAR ARRAY	4.0 PSF

POUGH RESIDENCE
Net Metered 20.0-kW DC
14.5-kW AC

ARC DESIGN
SALEM COUNTY OFFICE
409 NORTH MAIN STREET
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(856) 712-2166 FAX: (856) 358-1511

PHOTO-VOLTAIC ARRAY

POUGH RESIDENCE
11 OCEAN VIEW FARM ROAD
CHILMARK, MA 02535

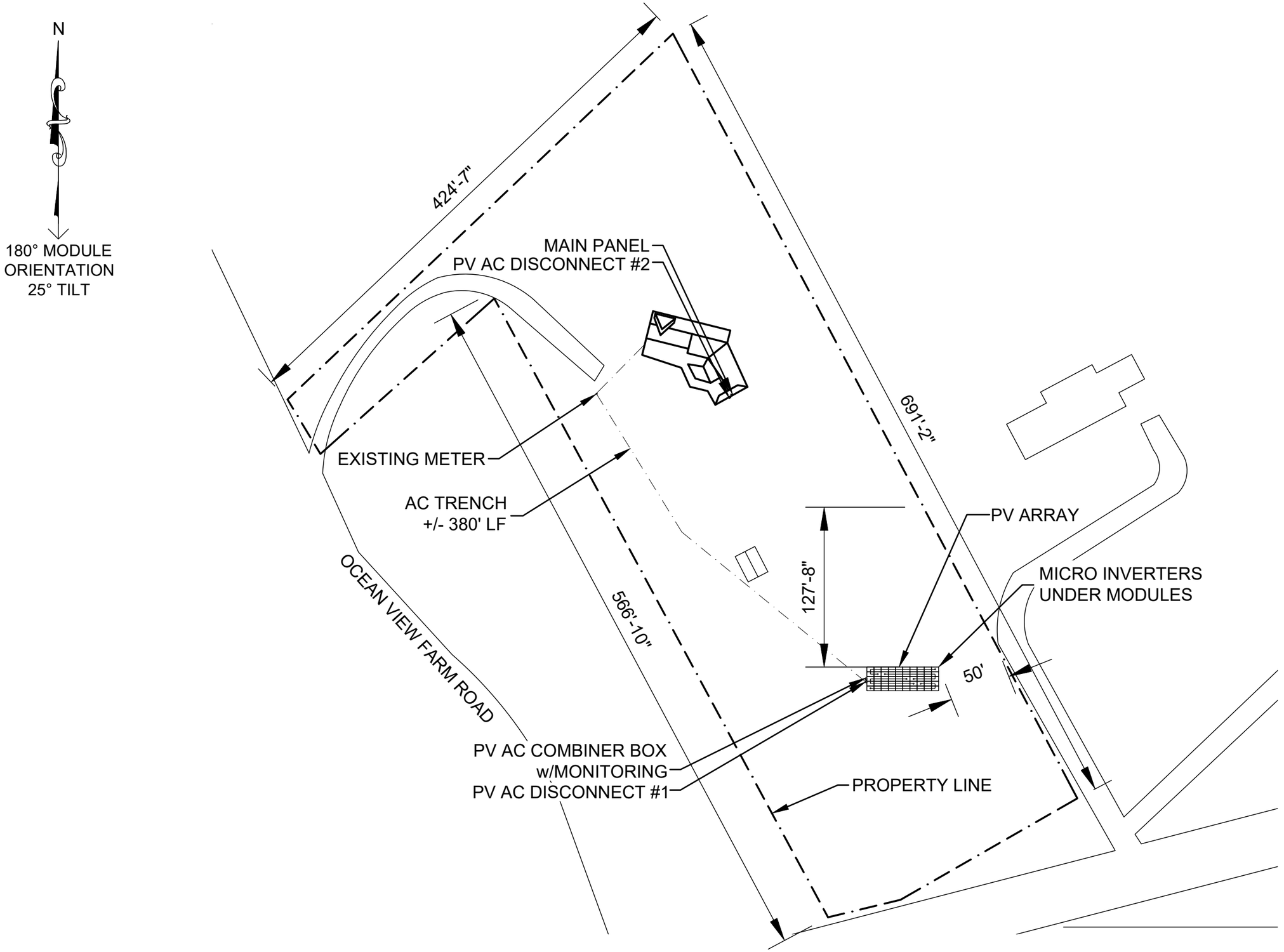
JAMES A. CLANCY
MA. REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO. 46775
COMMONWEALTH OF MASSACHUSETTS
REGISTERED PROFESSIONAL ENGINEER
JAMES A. CLANCY
No. 46775

REVISIONS

01-12-2024	PER PLAN REVIEW

DRWN	RCA
CHKD	JAC
SCALE	AS NOTED
DATE	12-18-2023

A-1



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No. 36775
CLANCY
JAMES A.

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CHKD	JAC
SCALE	AS NOTED
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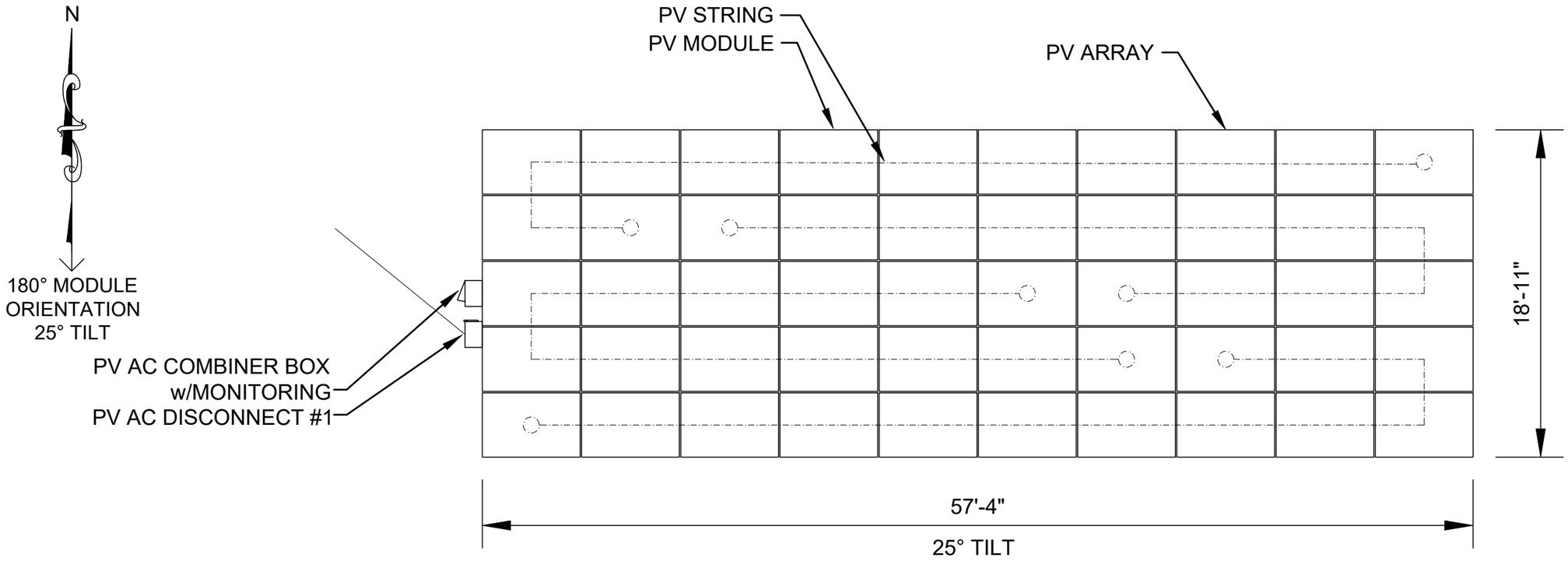
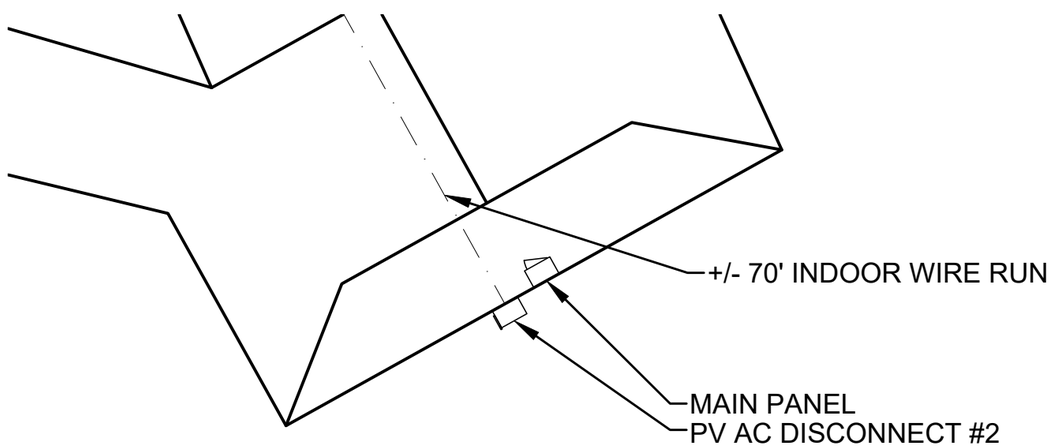
A-2





2 A-3 HOUSE DETAIL
SCALE: N.T.S.

2-1	STRING LABEL (INVERTER-STRING)
G	RACKING GROUND CONNECTION
	INVERTER
	AC LOADCENTER
	AC DISCONNECT
	METER

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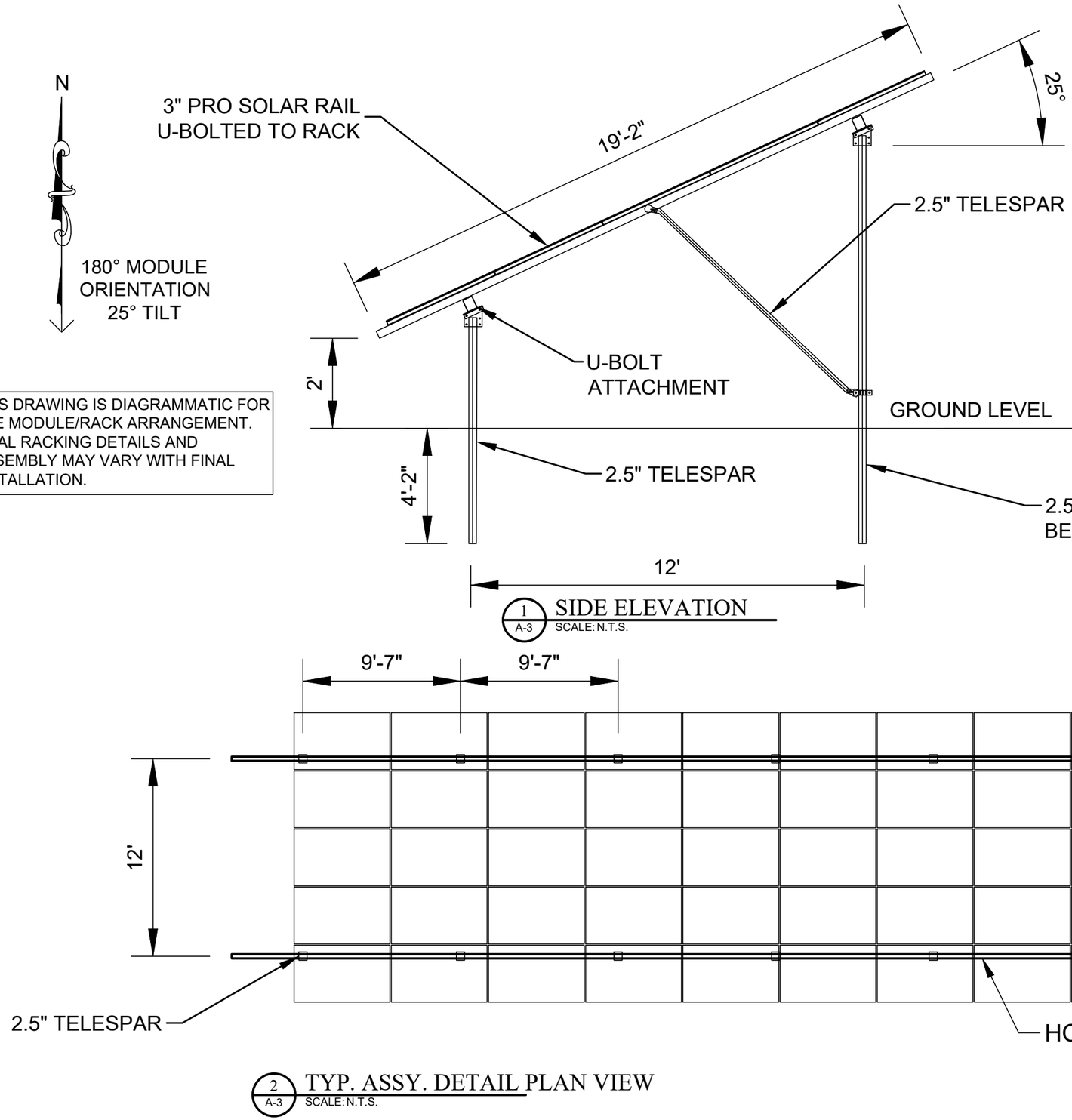
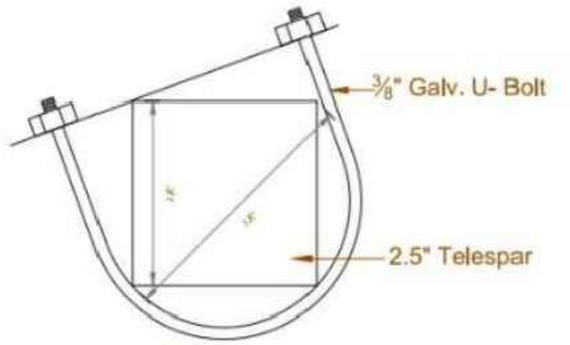
A-3



THIS DRAWING IS DIAGRAMMATIC FOR THE MODULE/RACK ARRANGEMENT. FINAL RACKING DETAILS AND ASSEMBLY MAY VARY WITH FINAL INSTALLATION.

1 A-3 SIDE ELEVATION
SCALE: N.T.S.

2 A-3 TYP. ASSY. DETAIL PLAN VIEW
SCALE: N.T.S.



Detail A:
U-bolt Telespar Beams to Rack

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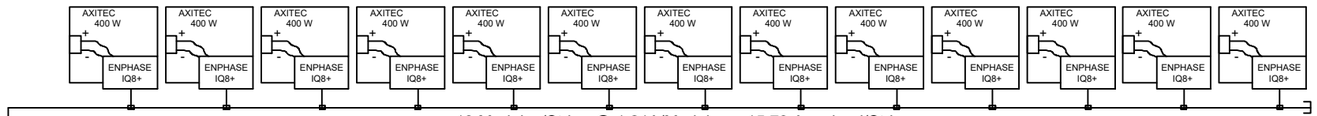
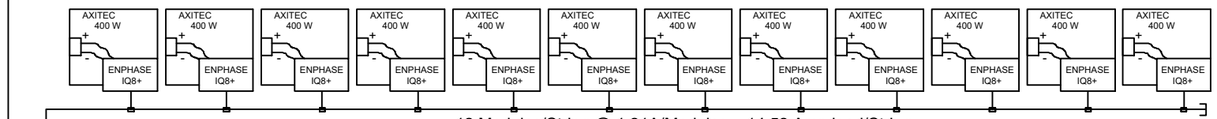
A-4

SYSTEM SIZE = 20,000 W DC
14,500 W AC

AC & DC GROUNDING CONDUCTORS PER NEC ARTICLE 690.43 (A) thru (F) CONNECTED AS PER 690.45(A), 690.46, & SIZED PER 250.122



13 Modules/String @ 1.21A/Modules = 15.73 Amp load/String
15.73 Amp x 1.25 Cont Duty = 19.6625 Amps (Wire Ampacity Min.)



12 Modules/String @ 1.21A/Modules = 14.52 Amp load/String
14.52 Amp x 1.25 Cont Duty = 18.15 Amps (Wire Ampacity Min.)

(8 Wires) #10 THWN-2
#8 GND
1" CONDUIT

AC CIRCUIT 1
ENPHASE Q CABLE

AC CIRCUIT 2
ENPHASE Q CABLE
(TYP. OF AC CIRCUIT 1)

AC CIRCUIT 3
ENPHASE Q CABLE

AC CIRCUIT 4
ENPHASE Q CABLE
(TYP. OF AC CIRCUIT 3)

#6 GND
TO RACKING

JB

ENPHASE AC
COMBINER
W/ ENVOY
X-IQ-AM1-240-3-ES
REVENUE GRADE
METERING
20A BREAKERS

M

(3 wires) #4 THWN-2
#8 GND
1" CONDUIT

100A RATED
NON FUSED
DISCONNECT
120/240V

(3 wires) 250 KCMIL
#8 GND
2 1/2" CONDUIT
AC TRENCH + INDOOR
WIRE RUN +/- 450'
VOLTAGE DROP = 1.16%

100A RATED
80A FUSED
DISCONNECT
120/240V

(3 wires) #4 THWN-2
#6 GND
1" CONDUIT

10'
MAX. CONDUCTOR
LENGTH

2P/200A

EXISTING WIRING

L1
L2
GND
N

M

TO UTILITY

EXISTING ELECTRIC
UTILITY METER

EXTERIOR LINE TAP
INSIDE NEW TAP BOX

EXISTING 200A
MAIN SVC PANEL
120/240V

GND

ALL CONDUCTORS ARE COPPER UNLESS NOTED OTHERWISE.

ALL EXTERIOR MOUNTED COMBINERS, JUNCTION BOXES, TROUGHS, DISCONNECTS, ETC. SHALL BE MIN. NEMA 3R RATED.

WIRE AMPACITY
NEC TABLE 310.15(B)(16)
#10 THWN Cu 35A RATED
8 THWN Cu 50A RATED
6 THWN Cu 65A RATED

Confirm line side voltage at electric utility service entrance BEFORE connecting inverter and ensure proper operational range required by system inverter.

ALL DC CONDUCTORS TO MODULES OR INVERTERS MUST BE OF MATCHING MANUFACTURER BRAND AND STYLE. DO NOT USE 'COMPATIBLE' CONNECTORS WHICH HAVE NOT BEEN UL TESTED FOR COMPATIBILITY. PERFORMANCE AND FIRE DAMAGE MAY RESULT FROM MIS-MATCHED CONNECTOR USAGE.

-Electrical contractor to verify interconnection requirements with Electrical Utility for connection location and standards.
-Electrical Contractor to provide expansion joints and anchoring of all conduit runs as per NEC requirements.
-Provide label/placard at existing utility connection with "WARNING - CUSTOMER OWNED ELECTRICAL GENERATION EQUIPMENT CONNECTED" with appropriate hazard and output ratings of PV System.

Interconnection to Utility and System Grounding per NEC-2020 Article 690

Provide signage as req'd by NEC-2020 Article 690.

ALL outdoor equipment shall be a minimum of NEMA-3R rated.

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PHOTO-VOLTAIC ARRAY

POUGH RESIDENCE
11 OCEAN VIEW FARM ROAD
CHILMARK, MA 02535

JAMES A. CLANCY
COMMONWEALTH OF MASSACHUSETTS
REGISTERED PROFESSIONAL ENGINEER
No. 46775

REVISIONS	
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DRWN	RCA
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A-5

⚠ WARNING

ELECTRIC SHOCK HAZARD

IF A GROUND FAULT IS INDICATED NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

LABEL LOCATION:
DC DISCONNECT, INVERTER
(PER CODE: NEC 690.35(F))
[To be used when inverter is ungrounded]

⚠ WARNING

ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: NEC 690.17(E))

⚠ WARNING

ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
PER CODE: NEC 690.17(E), CB

WARNING - Electric Shock Hazard
No user serviceable parts inside
Contact authorized service provider for assistance

LABEL LOCATION:
INVERTER, JUNCTION BOXES (ROOF), AC DISCONNECT
(PER CODE: NEC690.13.G.3 & NEC 690.13.G.4)

WARNING: PHOTOVOLTAIC POWER SOURCE

LABEL LOCATION:
CONDUIT, COMBINER BOX
(PER CODE: NEC690.31(G)(3)(4) & NEC 690.13(G)(4)

⚠ WARNING

ELECTRIC SHOCK HAZARD

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

LABEL LOCATION:
DC DISCONNECT, INVERTER
(PER CODE: NEC 690.35(F))
[To be used when inverter is ungrounded]

PHOTOVOLTAIC SYSTEM AC DISCONNECT
RATED AC OPERATING CURRENT 60.5 AMPS
AC NOMINAL OPERATING VOLTAGE 240 VOLTS

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: NEC690.54)

SOLAR DISCONNECT

LABEL LOCATION:
DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: NEC690.13(B))

PHOTOVOLTAIC SYSTEM
DISCONNECT FOR
UTILITY OPERATION

WARNING
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 RATING

RATED OPERATING CURRENT	60.5	AMP
NORMAL OPERATING VOLTAGE	240	VAC

SYSTEM INSTALLER: _____
FOR SERVICE CALL: _____

UTILITY DISCONNECT WARNING LABEL

CAUTION: SOLAR CIRCUIT

LABEL LOCATION:
MARKINGS PLACED ON ALL INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES, AND CABLE ASSEMBLIES AT LEAST EVERY 1O FT, AT TURNS AND ABOVE/BELOW PENETRATIONS AND ALL COMBINER/JUCTION BOXES. (PER CODE: IFC605.11.1.4)

⚠ WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION:
POINT OF INTERCONNECTION
(PER CODE: CEC 705.12(D)(4))

CAUTION: SOLAR ELECTRIC SYSTEM CONNECTED

LABEL LOCATION:
POINT OF INTERCONNECTION
(PER CODE: CEC690.15, 690.13(B))

WARNING
INVERTER OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION:
POINT OF INTERCONNECTION
(PER CODE: NEC 705.12(D)(7))
[Not required if panelboard is rated not less than sum of ampere ratings of all overcurrent devices supplying it]

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

ADHESIVE FASTENED SIGNS:
- THE LABEL SHALL BE SUITABLE FOR THE ENVIRONMENT WHERE IT IS INSTALLED.
- WHERE REQUIRED ELSEWHERE IN THIS CODE, ALL FIELD APPLIED LABELS, WARNINGS, AND MARKINGS SHOULD COMPLY WITH ANSI Z535.4 [NEC 110.21(B) FIELD MARKING].
- ADHESIVE FASTENED SIGNS MAY BE ACCEPTABLE IF PROPERLY ADHERED. VINYL SIGNS SHALL BE WEATHER RESISTANT [IFC 605.11.1.3]

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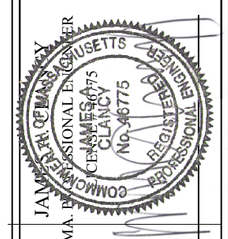

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A-6

AXITEC®

AXIblackbipremium XXL HC 390 - 410 Wp

Electrical data (at standard conditions (STC) irradiance 1000 watt/m², spectrum AM 1.5 at a cell temperature of 25°C)

Type	AC-390MBT/108V	AC-395MBT/108V	AC-400MBT/108V	AC-405MBT/108V	AC-410MBT/108V
Nominal output	**390 Wp**	**395 Wp**	**400 Wp**	**405 Wp**	**410 Wp**
Nominal voltage Umpp	30.64 V	30.84 V	31.01 V	31.21 V	31.45 V
Nominal current Impp	12.73 A	12.81 A	12.90 A	12.98 A	13.04 A
Short circuit current Isc	13.61 A	13.7 A	13.79 A	13.87 A	13.95 A
Open circuit voltag Uoc	36.85 V	36.98 V	37.07 V	37.23 V	37.32 V
Module conversion efficiency	19.97 %	20.23 %	20.48 %	20.74 %	21.00 %
Bifacial output - Backside Power gain					
10% Power output	429.00 Wp	434.50 Wp	440.00 Wp	445.50 Wp	451.00 Wp
Module Effiency	21.97 %	22.25 %	22.53 %	22.81 %	23.10 %
15% Power output	448.50 Wp	454.25 Wp	460.00 Wp	465.75 Wp	471.50 Wp
Module Effiency	22.97 %	23.26 %	23.56 %	23.85 %	24.15 %
20% Power output	468.00 Wp	474.00 Wp	480.00 Wp	486.00 Wp	492.00 Wp
Module Effiency	23.97 %	24.27 %	24.58 %	24.89 %	25.20 %
25% Power output	487.50 Wp	493.75 Wp	500.00 Wp	506.25 Wp	512.50 Wp
Module Effiency	24.96 %	25.28 %	25.60 %	25.93 %	26.25 %

Design

Frontside	0.13 inch (3.2 mm) hardened, low-reflection white glass
Cells	108 monocrystalline high efficiency cells
Backside	Composite film, cell gaps black
Frame	1.18 inch (30 mm) black aluminium frame

Mechanical data

L x W x H	67.80 x 44.65 x 1.18 inch (1722 x 1134 x 30 mm)
Weight	47.40 lbs (21.5 kg) with frame

Mechanical load

Design load (pressure/suction)	75.3 PSF / 33.3 PSF
Test load (pressure/suction)	113 PSF / 50 PSF

Power connection

Socket	Protection Class IP68
Wire	47.25 inch, AWG 12
Plug-in system	Plug/socket IP68, Stäubli EVO2 / EVO2 pluggable

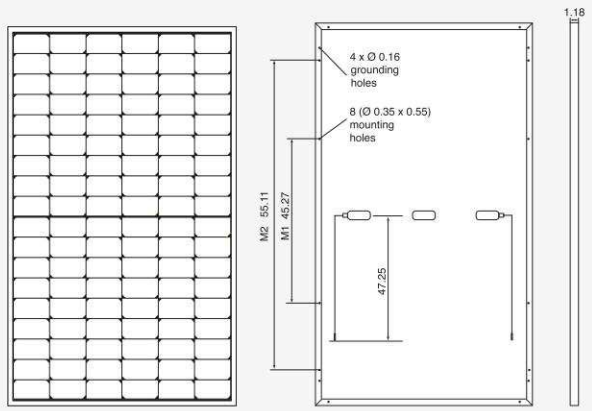

Fig. principle sketch

All dimensions in inch

Limit values

System voltage	1500 VDC (UL) 1500 VDC (IEC)
Module Fire Performance	TYPE 1 (UL 1703) or CLASS C (IEC 61730)
NOCT (nominal operating cell temperature)*	45°C +/-2K
Reverse current feed IR	25.0 A
Permissible operating temperature	-40°C to 85°C / -40F to 185F
Bifaciality	70 % ± 10 %

(No external voltages greater than Vo may be applied to the module)

* NOCT, irradiance 800 W/m2; AM 1.5; wind speed 1 m/s; Temperature 20°C

Temperature coefficients

Voltage Uoc	-0.28 %/K
Current Isc	0.045 %/K
Output Pmpp	-0.35 %/K

Low-light performance without Bifacial-effect (Example for AC-410MBT/108V)

I-U characteristic curve	Current Ipp	Voltage Upp
200 W/m²	2.66 A	30.27 V
400 W/m²	5.38 A	30.62 V
600 W/m²	8.03 A	30.86 V
800 W/m²	10.62 A	31.12 V
1000 W/m²	13.04 A	31.45 V

Packaging

Module pieces per pallet	36
Module pieces per HC-container	936

IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings[1]	W	235 – 350	235 – 440
Module compatibility		60-cell / 120 half-cell	54-cell / 108 half-cell, 60-cell / 120 half-cell, 66-cell / 132 half-cell and 72-cell / 144 half-cell
MPPT voltage range	V	27 – 37	27 – 45
Operating range	V	16 – 48	16 – 58
Min. / Max. start voltage	V	22 / 48	22 / 58
Max. input DC voltage	V	50	60
Max. continuous input DC current	A	10	12
Max. input DC short-circuit current	A	25	
Max. module I_{sc}	A	20	
Overvoltage class DC port		II	
DC port backfeed current	mA	0	
PV array configuration		1 x 1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	

OUTPUT DATA (AC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Peak output power	VA	245	300
Max. continuous output power	VA	240	290
Nominal (L-L) voltage / range[2]	V	240 / 211 – 264	
Max. continuous output current	A	1.0	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	47 – 68	
AC short circuit fault current over 3 cycles	Arms	2	
Max. units per 20 A (L-L) branch circuit[3]		16	13
Total harmonic distortion		<5%	
Overvoltage class AC port		III	
AC port backfeed current	mA	30	
Power factor setting		1.0	
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging	
Peak efficiency	%	97.7	
CEC weighted efficiency	%	97	
Night-time power consumption	mW	60	

MECHANICAL DATA	
Ambient temperature range	-40°C to +60°C (-40°F to +140°F)
Relative humidity range	4% to 100% (condensing)
DC Connector type	MC4
Dimensions (H x W x D)	212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")
Weight	1.08 kg (2.38 lbs)
Cooling	Natural convection – no fans
Approved for wet locations	Yes
Pollution degree	PD3
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure
Environ. category / UV exposure rating	NEMA Type 6 / outdoor

COMPLIANCE	
Certifications	CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 (UL 1741-SB 3rd Ed.), FCC Part 15 Class B, ICES-0003 Class B, CAN / CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shutdown Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.

(1) Pairing PV modules with wattage above the limit may result in additional clipping losses. See the compatibility calculator at https://link.enphase.com/module-compatibility.
(2) Nominal voltage range can be extended beyond nominal if required by the utility. (3) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SP-12A-DS-0067-03-EN-US-2022-12-27

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