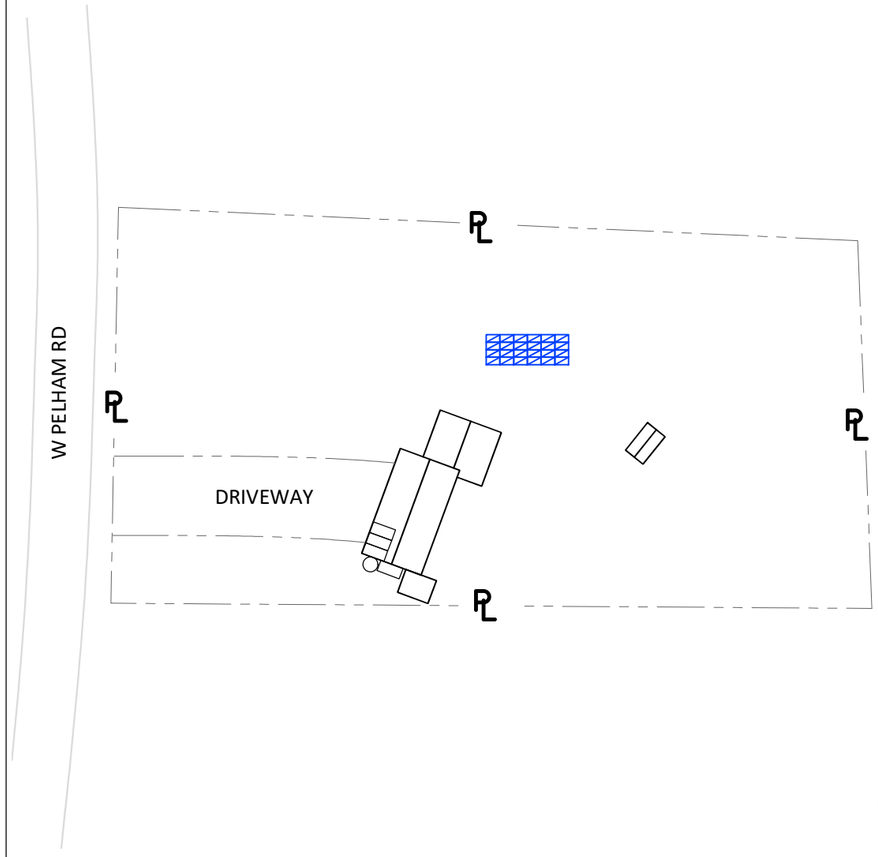
PARCEL MAP

GPS COORDINATES (42.418655,-72.44303)



PROJECT APN:

GOVERNING CODES

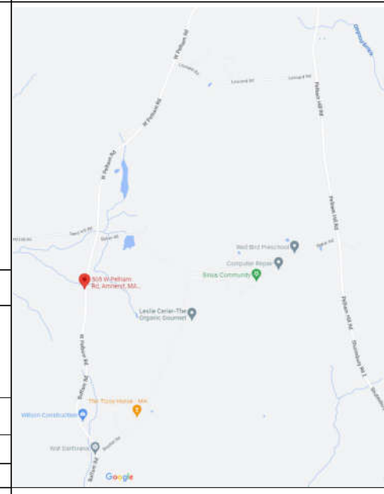
APPLICABLE BUILDING CODES:

2015 INTERNATIONAL BUILDING CODE
2015 INTERNATIONAL RESIDENTIAL CODE
2015 INTERNATIONAL FIRE CODE
2023 NATIONAL ELECTRIC CODE

DESIGN CRITERIA

BUILDING OCCUPANCY: U
RISK CATEGORY: II
ASCE 7-10 WIND SPEED: 117
EXPOSURE CATEGORY: Exposure C
SNOW LOAD: 40
SNOW EXPOSURE: N/A
CONSTRUCTION TYPE: N/A

PROJECT LOCATION



SCOPE OF WORK

GROUND MOUNTED PV (SOLAR) PROJECT GRID-TIED WITH BATTERY STORAGE

PROPOSED SOLAR EQUIPMENT

QTY.	EQUIPMENT	DESCRIPTION/MFG/MODEL
24	MODULES	REC400NP3 Black
1	INVERTER(S)	SolarEdge SE10000H-US EnergyHub
N/A	MOUNTING	Solar Foundations USA FT6L
N/A	STANCHIONS	N/A
N/A	RSD DEVICE	INTEGRATED IN INV & OPT
2	BATTERIES	SolarEdge BAT-10K1P
N/A	COMBINER(S)	N/A
(E)	MSP RATINGS	225A BUS/200A MAIN BREAKER

SITE / PROJECT DETAILS

CONNECTION	LINE-SIDE TAP
SYSTEM SIZE DC	9.600 KW
SYSTEM SIZE AC	10.000 KW
QTY. STRING/CKT.	2
ELECT. SERVICE	120/240V - 1Φ
ROOF COVERING	N/A
MAX ARRAY HGT.	96.25"
TILT	25°
AZIMUTH	180°

SHEET INDEX

SHEET NUMBER	SHEET TITLE
PV-001	COVER SHEET
N-001	GENERAL NOTES
PV-100G	PV ARRAY LAYOUT
PV-101G	DETAILED LAYOUT
S-300	GROUND RACKING LAYOUT
S-301	GROUND RACKING LAYOUT
S-302	GROUND RACKING LAYOUT
S-303	GROUND RACKING LAYOUT
E-001	EQUIP. CALCULATION
E-002	WIRE AND COND. CALCS
E-003	THREE LINE DIAGRAM
E-100	ELECTRICAL LAYOUT
P-001	STANDARD PLACARDS
P-002	DYNAMIC PLACARDS
R-1xx	EQUIP.CUT SHEETS

PROJECT TEAM LIST

CONTRACTOR:
Valley Solar
340 Riverside Dr
Florence, MA 01062
CONTRACTOR LIC #: 21134A
PHONE: (413) 584-8844
CONTACT NAME: Lilian Wanjiku
PHONE: (413) 588-8185
EMAIL: production@valleysolar.solar

DESIGN BY:
Jesse Brekelbaum
PHONE: (413) 588-8185
EMAIL: production@valleysolar.solar

PROJECT DRAFTER:
Advanced Solar Solutions
2372 Morse Ave #912
Irvine, CA 92614
PHONE: 559-321-7000
EMAIL: info@advpermits.com

HOME OWNER PROJECT LOCATION:
Douglas, Damon
530 W Pelham Rd Pole 102, Shutesbury, MA 01072

CONTACT NAME: Douglas, Damon
PHONE:
EMAIL:

ELECTRICAL UTILITY:
National Grid
METER NUMBER: 2505-83008

PHONE:

AUTHORITY HAVING JURISDICTION:
BUILDING: City of Shutesbury
PHONE:

ENGINEERED BY:

LICENSE #:
LICENSE TYPE:
PHONE:
EMAIL:

GENERAL PROJECT & JURISDICTIONAL NOTES

INSPECTION REQUIREMENTS

1. A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH ALL OSHA REGULATIONS.

2. PENDING LOCAL JURISDICTIONAL REQUIREMENTS AND WHEN APPLICABLE ALL ELECTRICAL ENCLOSURE DEAD FRONTS, COVERS, DOORS, ETC. SHALE BE OPEN AND ACCESSIBLE FOR INSPECTIONS. WHEN TRENCH AND ROOF INSPECTIONS ARE REQUIRED WORK SHALL BE OPEN AND ACCESSIBLE FOR INSPECTOR.

JURISDICTIONAL & LISTING REQUIREMENTS

1. WHEN APPLICABLE A SMOKE DETECTOR, APPROVED AND LISTED BY THE STATE FIRE MARSHAL OR ANSI/UL 217 CERTIFIED TO NATIONAL FIRE ALARM AND SIGNALING CODE, NFPA 72 SHALL BE VERIFIED FUNCTIONAL OR INSTALLED IN ALL APPLICABLE CODE REQUIRED LOCATIONS.

2. ALL APPLICABLE EQUIPMENT TO BE UL LISTED OR LISTED BY OTHER JURISDICTIONAL AND UTILITY APPROVED ASSOCIATION OR NATIONALLY RECOGNIZED ORGANIZATION.

3. FULL SCOPE OF WORK SHALL COMPLY WITH ALL APPLICABLE CODES LISTED IN GOVERNING CODES SECTION, ALL MANUFACTURES' LISTINGS, INSTALLATION INSTRUCTIONS AND SPECIFICATIONS AND JURISDICTIONAL REQIREMENTS.

4. REVISED PLANS WILL BE REQUIRED TO BE RESUBMITTED TO THE LOCAL JURISDICTION IF THE INSTALLED ARRAY AND ASSOCIATED EQUIPMENT DOES NOT MATCH THE APPROVED BUILDING PLANS. ADDITIONAL FEES MAY ALSO APPLY.

5. THE PLACEMENT OF A UTILITY PV PRODUCTION METER SHALL BE PROVIDED AND PLACED BY THE CONTRACTOR AS PER APPLICABLE UTILITY OR AHJ REQUIREMENTS.

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REV | DATE | RELEASE
03/10/2023 | SUBMIT FOR PERMIT

PV-001

COVER SHEET

9.600 kW PHOTOVOLTAIC PLANS

NAME: Douglas, Damon
ADDRESS: 530 W Pelham Rd Pole 102
ADDRESS: Shutesbury, MA 01072
APN:

Valley Solar
21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

GENERAL NOTES:*

PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION *NEC 110.26.*

PV SYSTEM COMPONENTS; INCLUDING BUT NOT LIMITED TO, MODULES, INVERTERS AND SOURCE CIRCUIT COMBINERS ARE IDENTIFIED AND LISTED FOR USE IN PV SYSTEMS IN COMPLIANCE WITH *NEC 690.4 AND 690.6* AND *ALL UL, IEC, IEEE* CLASSIFICATIONS AS REQUIREMENTS.

RAPID SHUTDOWN NOTES:*

PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDIDNG SHALL INCLUDE A **RAPID SHUTDOWN FUNCTION** THAT CONTROLS SPECIFIC PV CONDUCTORS IN ACCORDANCE WITH *2023 NEC 690.12(A)-(D)*

EQUIPMENT LOCATIONS & ELECTRICAL NOTES:*

JUNCTION AND PULL BOXES ARE PERMITTED TO BE INSTALLED UNDER PV MODULES IN COMPLIANCE WITH *NEC 690.34*.

ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVICING DISCONNECT. *2023 NEC 690.15(A)*

ALL EQUIPMENT SHALL BE INSTALLED **ACCESSIBLE TO QUALIFIED PERSONNEL** IN COMPLIANCE *WITH NEC* APPLICABLE CODES.

ALL COMPONENTS ARE **LISTED FOR THEIR INTENDED PURPOSE AND RATED FOR OUTDOOR USAGE** WHEN APPLICABLE.

STRUCTURAL AND INSTALLATION NOTES:*

RACKING SYSTEM & PV PANELS MOUNTED ON A ROOFTOP SHALL BE LISTED AND LABELED IN ACCORDANCE WITH *UL 1703* AND SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER INSTALLATION INSTRUCTIONS.

ALL PV RACKING ATTACHMENT POINTS SHALL NOT EXCEED THE PRE-ENGINEERED **MAX SPANS** OUTLINED BY THE RACKING MANUFACTURES ENGINEER OF RECORD.

GROUNDING NOTES:*

IN UNGROUNDED SYSTEMS ONLY THE DC CONDUCTORS ARE UNGROUNDED AND REQUIRE AN EQUIPMENT GROUNDING CONDUCTOR. ALL METAL ELECTRICAL EQUIPMENT AND STRUCTURAL COMPONENTS BONDED TO GROUND, IN COMPLIANCE WITH *NEC 250.134* AND *NEC 250.136(A)*.

PV EQUIPMENT INCLUDING **MODULE FRAMES AND OTHER METAL PARTS SHALL BE GROUNDED** IN COMPLIANCE WITH *NEC 690.43* AND MINIMUM GROUND CONDUCTORS SIZED IN ACCORDANCE WITH *NEC TABLE 250.122*.

CONDUCTIVE PARTS OF MODULE FRAMES, MODULE RACKING, AND ENCLOSURES SHALL BE GROUNDED IN COMPLIANCE WITH *NEC 250.134 AND NEC 250.136(A)*.

UL2703 APPROVED **MODULE AND RACK GROUNDING** SHALL BE USED AND INSTALLED PER MANUFACTURER'S INSTALLATION MANUAL. IF *UL2703* APPROVED GROUNDING IS NOT USED, MODULE GROUNDING LUGS MUST BE INSTALLED AT THE SPECIFIED GROUNDING LUG HOLES PER THE MANUFACTURER'S INSTALLATION REQUIREMENTS.

THE GROUNDING CONNECTION TO A MODULE SHALL BE ARRANGED SUCH THAT THE REMOVAL OF A MODULE DOES NOT INTERRUPT A GROUNDING CONDUCTOR TO ANOTHER MODULE.

THE GROUNDING ELECTRODE SYSTEM COMPLIES WITH *NEC 690.47* AND *NEC 250.50* THROUGH *NEC 250.106*. IF EXISTING SYSTEM IS INACCESSIBLE OR INADEQUATE, A GROUNDING ELECTRODE SYSTEM WILL BE PROVIDED IN COMPLIANCE WITH *NEC 250, NEC 690.47* AND *AHJ*.

PV SYSTEMS SHALL BE PROVIDED WITH **DC GROUND-FAULT PROTECTION** *2023 NEC 690.41(B)*

INTERCONNECTION / POC NOTES:*

ALL LOAD-SIDE INTERCONNECTIONS ARE IN COMPLIANCE WITH *2023 NEC 705.12(B)*

THE TOTAL RATING OF ALL OCPD IN SOLAR LOAD CENTERS SHALL NOT EXCEED THE RATED AMPACITY OF THE BUSBAR EXCLUDING THE OCPD PROTECTING THE BUSBAR IN COMPLIANCE WITH *NEC 705.12(B)(2)(3)(c)*

ALL FEEDER TAP (LOAD SIDE) INTERCONNECTIONS ARE IN COMPLIANCE WITH *2023 NEC 705.12(B)(2)(1)*

THE PV SYSTEM BACK-FEED BREAKER SHALL BE INSTALLED ON THE OPPOSITE END OF THE BUS BAR AND IT SHALL ALSO BE SIZED APPROPRIATELY AS PER *2023 NEC 705.12(B)(2)(3)(b)*

SUPPLY SIDE TAP INTERCONNECTIONS ARE IN COMPLIANCE WITH *NEC 705.12(A)* WITH SERVICE ENTRANCE CONDUCTORS IN COMPLIANCE WITH *NEC 230.42*

BACKFEEDING BREAKER FOR INVERTER OUTPUT IS EXEMPT FROM ADDITIONAL FASTENING *2023 NEC 705.12(B)(5)*

MICROINVERTER BRANCH CIRCUITS SHALL BE CONNECTED TO A SINGLE OCPD IN ACCORDANCE WITH THEIR INSTALLATION INSTRUCTIONS AND *NEC 690.9*

DISCONNECTS AND OCPD NOTES:*

ALL DISCONNECTING SWITCHES WILL BE CONFIGURED SO THAT ALL ENERGIZED CONDUCTORS WHEN DISCONNECT IS OPEN SHALL BE ON THE TERMINALS MARKED, "LINE SIDE" (TYPICALLY THE UPPER TERMINALS)

ALL AC DISCONNECTS SHALL BE LABELED, LOCKABLE, OF VISIBLE BREAK TYPE SWITCH WITH EXTERNAL HANDLE AND ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL.

AC DISCONNECTS SHALL BE A "KNIFE BLADE" TYPE DISCONNECT. IF EXTERIOR, RATED TO NEMA 3R OR BETTER PER *NEC 110.28*

ADDITIONAL AC DISCONNECTS SHALL BE PROVIDED WHERE THE INVERTER IS NOT ADJACENT TO THE UTILITY AC DISCONNECT, OR NOT WIHTIN SIGHT OF THE UTILITY AC DISCONNECT. *2023 NEC 690.15(A)*

BOTH POSITIVE AND NEGATIVE PV CONDUCTORS REMAIN UNGROUNDED. THEREFORE, BOTH SHALL REMAIN OPEN WHERE A DISCONNECT IS REQUIRED IN COMPLIANCE WITH *2023 NEC 690.15(D)*

ALL OCPD RATINGS AND TYPES SPECIFIED SHALL BE IN COMPLIANCE WITH *NEC 690.8, 690.9, 705.12* AND *240*.

BOTH POSITIVE AND NEGATIVE DC PV CONDUCTORS ARE UNGROUNDED; BOTH REQUIRE OVERCURRENT PROTECTION IN COMPLIANCE WITH *NEC 690.9*

ARC FAULT (AFCI) DC CIRCUIT PROTECTION IS REQUIRED FOR ALL PV SYSTEMS ON OR PENETRATING A BUILDING WITH A MAXIMUM SYSTEM VOLTAGE OF 80 VOLTS OR GREATER. ALL DC PV CIRCUITS INSTALLED IN OR ON BUILDINGS WILL BE ARC-FAULT CIRCUIT PROTECTED IN COMPLIANCE WITH *NEC 690.11, UL1699B* AND SHALL BE LISTED AND LABELED IN ACCORDANCE WITH *UL 1699 (B)*.

WIRING & CONDUIT NOTES:*

ALL CONDUIT AND CONDUCTORS SHALL BE APPROVED FOR THEIR INTENDED PURPOSE INCLUDING WET LOCATIONS AND EXPOSED TO SUNLIGHT. CONDUIT AND CONDUCTOR SIZE SPECIFICATIONS ARE BASED ON THE MINIMUM CODE REQUIREMENTS AND ARE NOT LIMITED TO UP SIZING.

ALL CONDUCTORS SHALL BE SIZED IN COMPLIANCE WITH *NEC 690.8, NEC 690.7*.

ALL CONDUCTORS SHALL BE DERATED AS APPLICABLE TO THEIR RESPECTIVE ENVIRONMENT INCLUDING DIRECT SUNLIGHT IN ACCORDANCE WITH *2023 NEC 310.15(B)(3)(4)(c)*

EXPOSED UNGROUNDED DC PV SOURCE AND OUTPUT CIRCUITS SHALL USE CONDUCTORS LISTED AND IDENTIFIED AS PHOTOVOLTAIC (PV) WIRE IN COMPLIANCE *2023 NEC 690.31(C)(1)*. PV MODULES WIRE LEADS SHALL BE LISTED FOR USE WITH UNGROUNDED SYSTEMS IN COMPLIANCE WITH *2023 NEC 690.4(B)*

PV WIRE BLACK WIRE MAY BE FIELD-MARKED WHITE IN COMPLIANCE WITH *NEC 200.6 (A)(6)*.

PV MODULE CONDUCTORS LOCATED UNDER ARRAYS WILL BE SECURED IN A WORKMANLIKE MANNER IN COMPLIANCE WITH *NEC 110.12*.

VOLTAGE DROP CALCULATIONS IN THIS PLAN SET ARE CALCULATED ON CIRCUITS 50' IN LENGTH OR LONGER, THE TOTAL VOLTAGE DROP FROM INVERTER TO POINT OF CONNECTION OR UTILITY TRANSFORMER ARE NOT CALCULATED. ELECTRICAL CONTRACTOR MUST EVALUATE AND FIELD VERIFY INVERTER MANUFACTURES MAX VOLTAGE DROP REQUIREMENTS AND DETERMINE THE TOTAL VOLTAGE DROP WITHIN CIRCUITS AS DIRECTED BY MANUFACTURER AND COMPLY WITH SUCH LIMITATIONS AND REQUIREMENTS, (TYPICALLY 2% FROM INVERTER TO POI/POC, AND 3% FROM INVERTER TO UTILITY TRANSFORMER.)

WATERPROOFING:*

ALL NEW **ROOFTOP PENETRATIONS** SHALL BE SEALED AND MADE WEATHER TIGHT WITH APPROVED CHEMICAL SEALANT AND FLASHINGS WHERE REQUIRED PER CODE AND GENERAL BUILDING AND ROOFING WORKMANSHIP STANDARDS BY A LICENSED CONTRACTOR.

ALL **EXTERIOR ELECTRICAL EQUIPMENT, SHALL BE NEMA 3R** OR BETTER RATED. ALL EXTERIOR CONDUIT AND CONNECTORS SHALL BE RATED FOR WET LOCATIONS.

*ALL NOTES ARE AS APPLICABLE TO THIS PROJECT. DISREGARD ANY NOTES THAT DO NOT APPLY TO THIS PROJECT.

REV	DATE	RELEASE
	03/10/2023	SUBMIT FOR PERMIT

N-001 GENERAL NOTES

9.600 kW PHOTOVOLTAIC PLANS

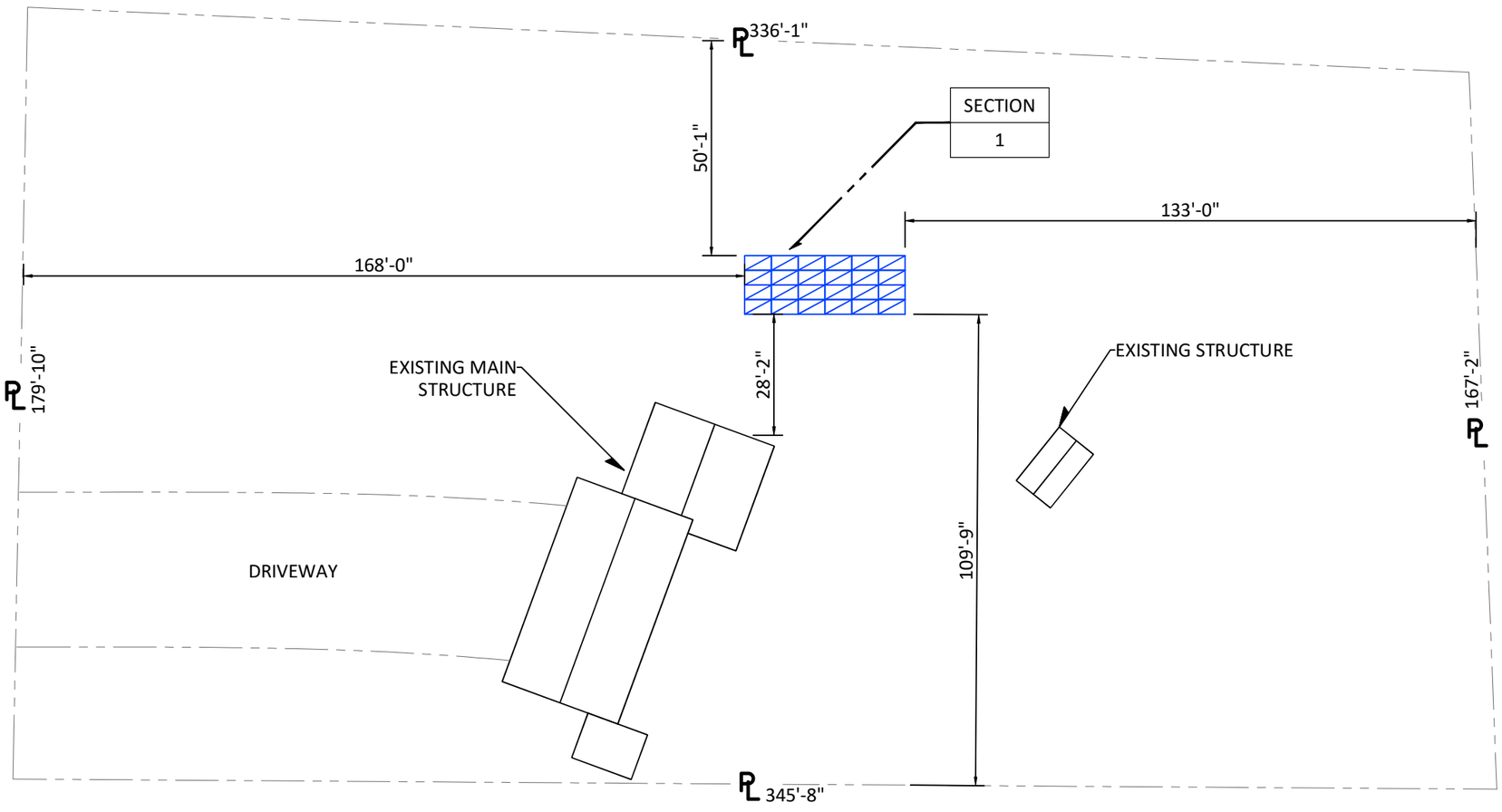
NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

Valley Solar
21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

VALLEY SOLAR

PV AC DISCONNECT LOCATED ON ACCESSIBLE EXTERIOR WALL WITH EXTERNAL HANDLE VISIBLE, LOCKABLE & LABELED WITHIN 10 FEET OF THE METER

NOTE: ALL ELECTRICAL LAYOUT DETAILS ON SHEET E-100



GROUND MOUNT SETBACKS & AHJ NOTES

ALL GROUND MOUNTED STRUCTURES SHALL COMPLY WITH STATE AND LOCAL AHJ REQUIRED SETBACKS TO SEPTIC OR WASTEWATER SYSTEM COMPONENTS, LEACH FIELDS, PROPERTY LINES, ROADS, HIGHWAYS, RIGHT OF WAYS, SIDEWALKS, DRIVEWAYS, OTHER STRUCTURES, WATER WAYS, EASEMENTS, UTILITIES, TREES, FENCES AND FLOOD ZONES.

PV SITE LAYOUT LEGEND

SECTION 1	PV ARRAY TAG SECTION # MODULE GROUP
SA	SITE ACCESS
GA	GATE ACCESS

AZIMUTH AND TILT TABLE

SECTION #	AZIMUTH	ARRAY PITCH / TILT
SECTION-1	180	25°

NORTH

*EXISTING DIMENSIONS ARE APPROX. CONFIRM ALL DIMENSIONS SHOWN

SCALE: 1/32” = 1’0” @ SHEET SIZE A3

QTY 24 REC400NP3 Black MODULES QTY 1 SolarEdge SE10000H-US EnergyHub INVERTER

REV	DATE	RELEASE
	03/10/2023	SUBMIT FOR PERMIT

PV-100G

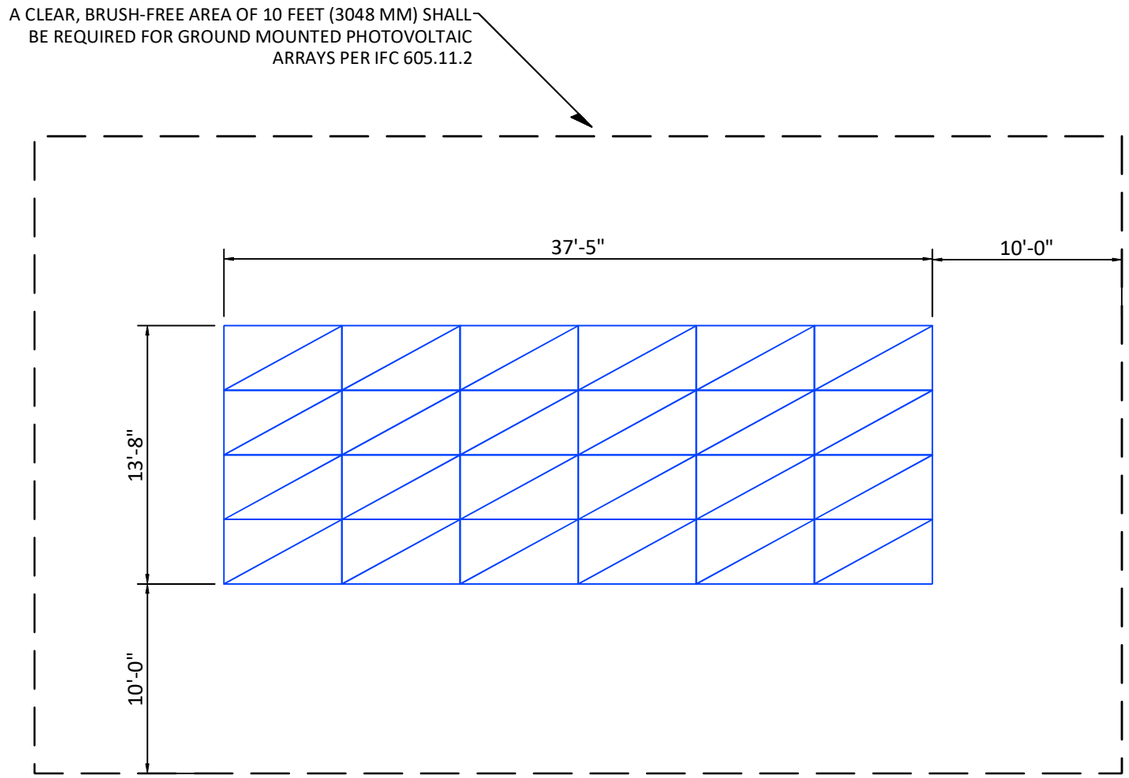
PV ARRAY LAYOUT

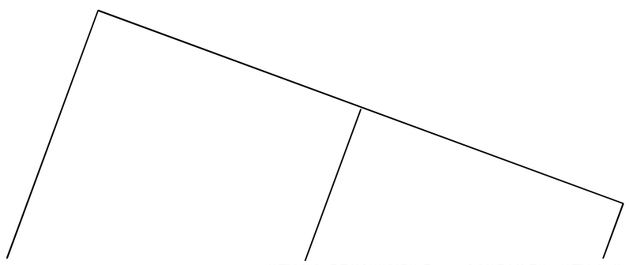
9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

Valley Solar
21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

NOTE: ALL ELECTRICAL LAYOUT DETAILS ON SHEET E-100





QTY 24 REC400NP3 Black MODULES QTY 1 SolarEdge SE10000H-US EnergyHub INVERTER

NORTH

SCALE: 1/8" = 1'0" @ SHEET SIZE A3

REV	DATE	RELEASE
	03/10/2023	SUBMIT FOR PERMIT

PV-101G

DETAILED LAYOUT

9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

Valley Solar

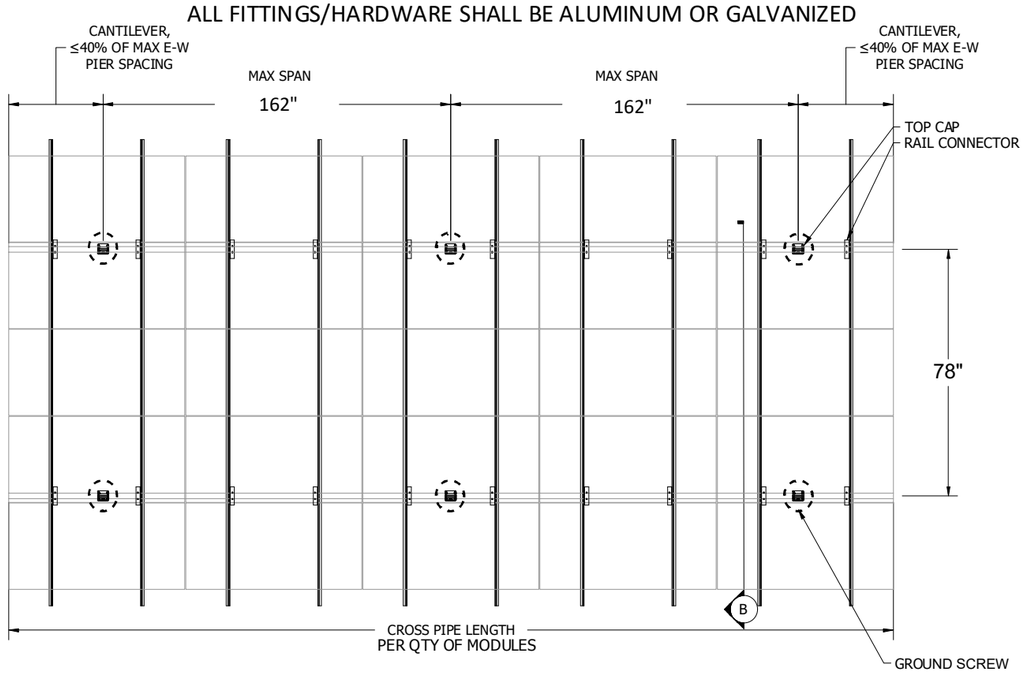
21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

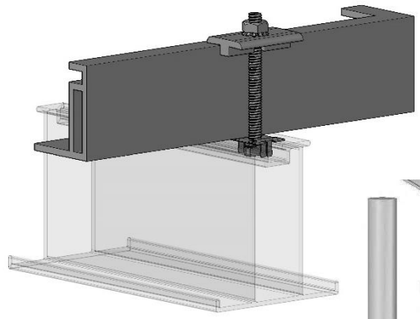
VALLEY SOLAR

ALL PIPE SHALL BE GALVANIZED NOMINAL SCHEDULE 40 ASTM A53 GR B., STEEL PIPE

ALL FITTINGS SHALL BE TORQUED TO MANUFACTURER SPEC'S

ALL FITTINGS/HARDWARE SHALL BE ALUMINUM OR GALVANIZED

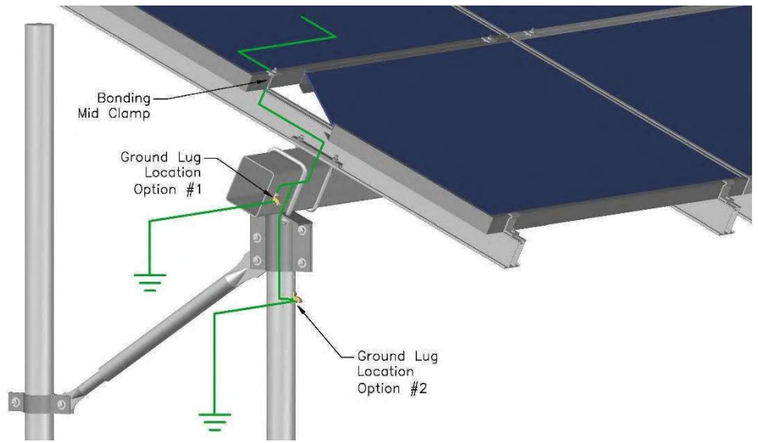




CLAMP ATTACHMENT

PV RACKING LEGEND

- RACKING RAIL
- 2" PIPE BEAM
- FOOTING W/ 2" PIPE
- SECTION / 1 — PV ARRAY TAG SECTION # MODULE GROUP
- * DETAILS IN TOP VIEW



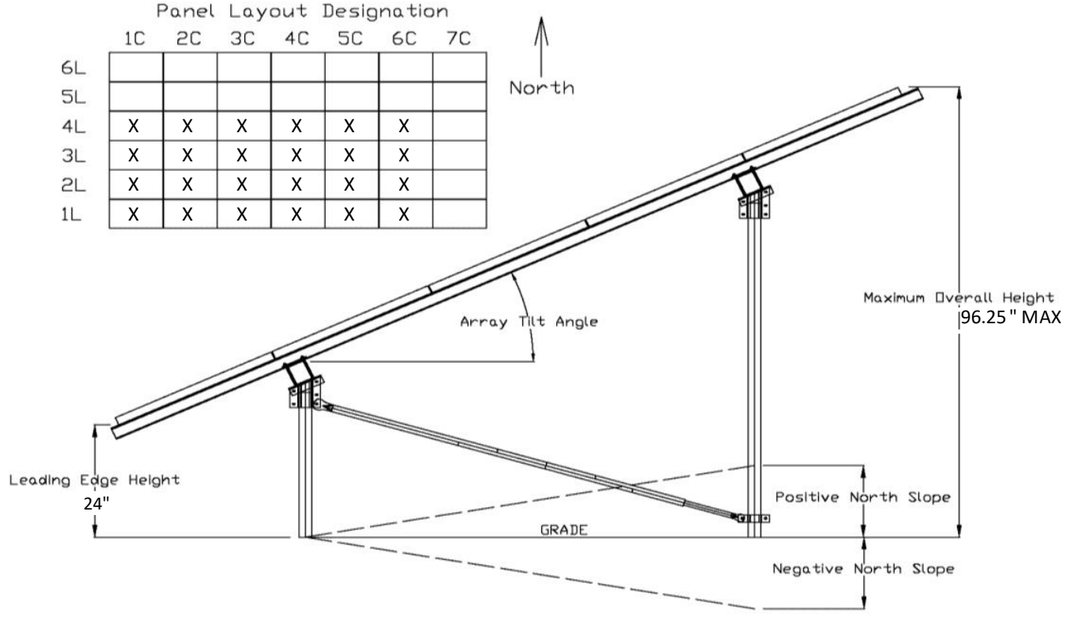
2.5" SCH 40 HDG CONTINUOUS FLIGHT HELICAL PILE

ARRAY AZIMUTH: 180 DEGREES

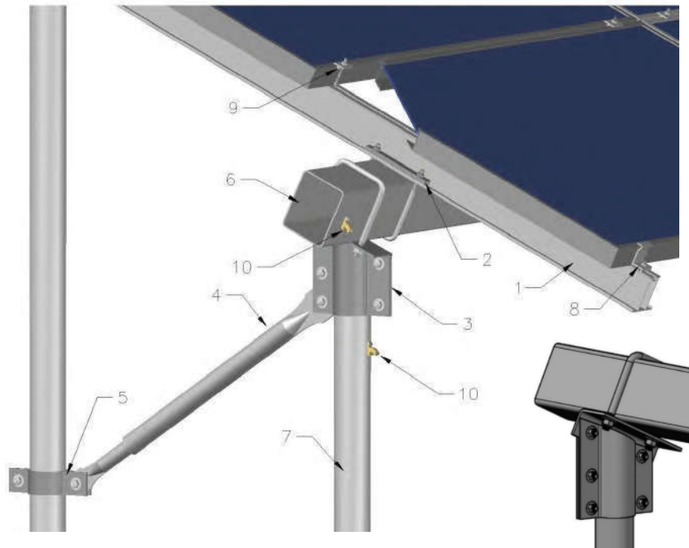
ARRAY TILT: 25 DEGREES

Panel Layout Designation

	1C	2C	3C	4C	5C	6C	7C
6L							
5L							
4L	X	X	X	X	X	X	
3L	X	X	X	X	X	X	
2L	X	X	X	X	X	X	
1L	X	X	X	X	X	X	



QTY 24 REC400NP3 Black MODULES QTY 1 SolarEdge SE10000H-US EnergyHub INVERTER



1. SF RAIL
2. RAIL MOUNTING HARDWARE
3. COLUMN CAP
4. DIAGONAL WIND BRACE (WHEN NEEDED)
5. WIND BRACE COLUMN CONNECTOR (WHEN NEEDED)
6. HORIZONTAL BEAM
7. SUPPORT COLUMN
8. SOLAR MODULE END CLAMP
9. SOLAR MODULE MID CLAMP
10. GROUND LUG

W/O BRACING

W/ BRACING

REV	DATE	RELEASE
	03/10/2023	SUBMIT FOR PERMIT

RACKING LAYOUT

S-300

9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

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340 Riverside Dr
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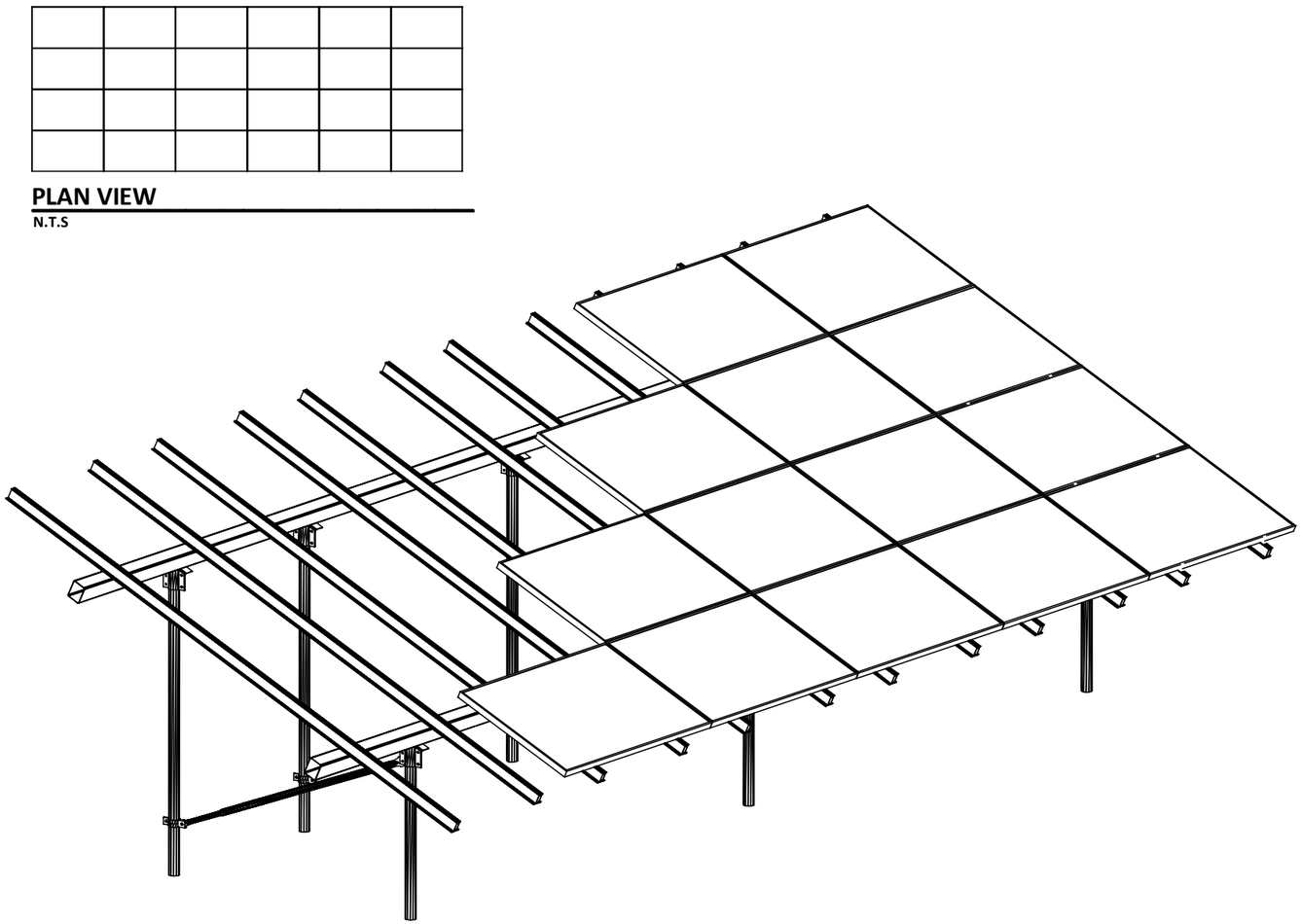
VALLEY SOLAR



PLAN VIEW
N.T.S

Site Design Conditions

Basic Wind Speed: (Risk Category II)	117 MPH	Max. Leg Axial Bearing:	4,175 lbs.
Basic Wind Speed: (Risk Category I)	106 MPH	Max. Leg Uplift:	2,185 lbs.
Exposure Category:	C	Max. Lateral Resistance:	1,540 lbs.
Ground Snow Load:	40 PSF	Top Rail Max. Loading:	140.3 plf
Flat Roof Snow Load: (if applicable)	35 PSF	Helical Pile Depth:	60" Min
Site Contour:	<5 Degree Slope	Lateral Resistance Plate Size:	Not Req'd

All design work has been performed in accordance with the Massachusetts State Building Code, Ninth Edition, Base Volume (780 CMR) including but not limited to the 2015 International Building Code as amended by 780 CMR.

Net design pressures were calculated in accordance with ASCE 7–10 section 27.4.3, "Open Buildings with Monoslope, Pitched, or Troughed Roofs". All load cases were evaluated in determining the limiting design conditions. The data table above provides the results for the limiting load case. Maximum leg reaction forces represent the highest load condition seen by any leg in the structure. All legs in the structure are designed to meet the maximum load conditions.

4Lx6C Sub–Array Design Conditions

Front Pile Height:	31¼"	Array Tilt Angle:	25 Degrees
Rear Pile Height:	67½"	Overall Array East–West Dim:	37'–7"
North–South Pile Spacing:	78"	Number of Modules/Sub–Array:	24
West Span Pile Spacing:	13'–6"	Number of Sub–Arrays:	1
East Span Pile Spacing:	13'–6"	Module Columns/Sub–Array:	6
Quantity Center Spans:	0	Number of Module Rows:	4
Center Span Pile Spacing:	N/A	Module Orientation:	Landscape
East & West Overhang:	4'–6"	Module Column Spacing	⅜"
Overall Beam Length:	36'–0"	Module Row Spacing	¼"
Front Edge Ground Clearance:	24"	Module Model:	REC400NP3 Black
Horizontal Rail Material:	5"x4"x⅛" HSS	Module Size:	40.87" x 74.80"
Top Rail Material:	SF Rails	Individual Module Rating:	400 watt
Qty Rails per Panel:	2	Sub Array Power Rating:	9.60 kw
Top Rail Length:	171"	Total Power Rating:	9.60 kw
Top Rail Center Span:	86"		
Top Rail Overhangs:	42½"		

1 Additional North Column is to be installed per field direction. The Column is to support equipment mounting needs. It is not required for North beam support.

COMMONWEALTH OF MASSACHUSETTS
JAMES C. DOUGLAS
CIVIL
No. 50466
REGISTERED PROFESSIONAL ENGINEER

SHEET 1 OF 3

DATE	REVISION	DRAWN BY:	REVIEW BY:
02/13/2023	ORIGINAL	JB	JD

VALLEY SOLAR, LLC

-PROJECT-
DOUGLAS RESIDENCE
530 WEST PELHAM ROAD
SHUTESBURY, MA 01072

Solar Foundations USA
1142 River Road, New Castle, DE 19720 Ph: (855) 738-7200 Fax: (866) 644-5665

QTY 24 REC400NP3 Black MODULES QTY 1 SolarEdge SE10000H-US EnergyHub INVERTER

REV	DATE	RELEASE
	03/10/2023	SUBMIT FOR PERMIT

S-301

RACKING LAYOUT

9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

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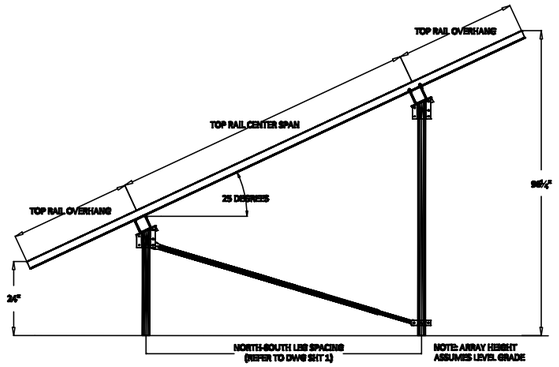
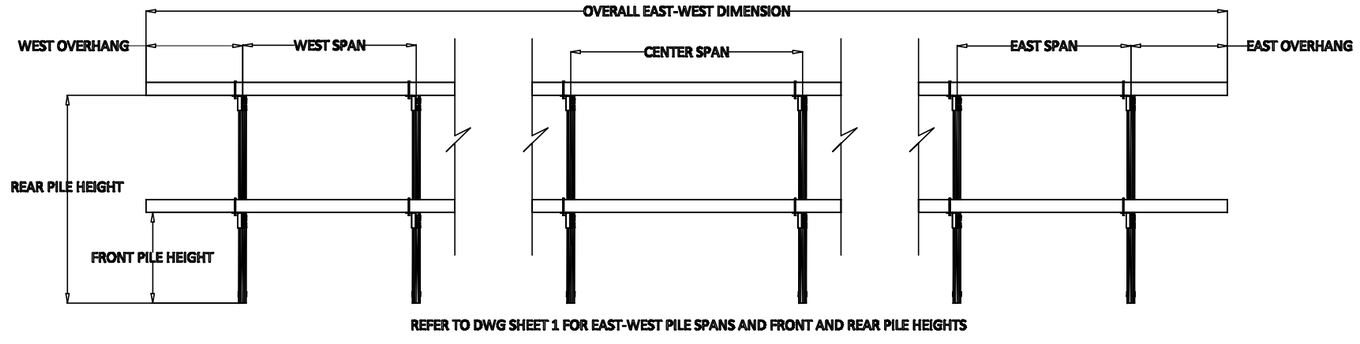
Valley Solar

VALLEY SOLAR

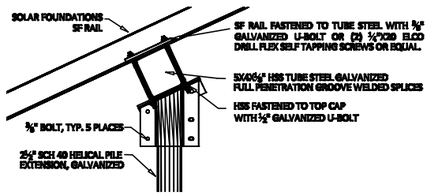


SIDE ELEVATION
N.T.S.

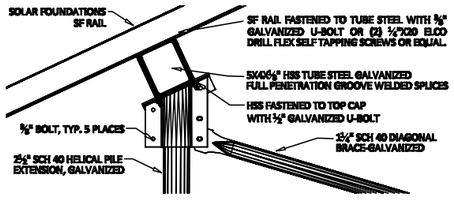


REFER TO DWG SHEET 1 FOR EAST-WEST PILE SPANS AND FRONT AND REAR PILE HEIGHTS

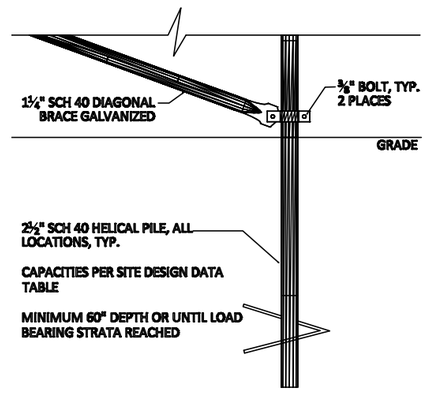
PILE SPACING ELEVATION
N.T.S.



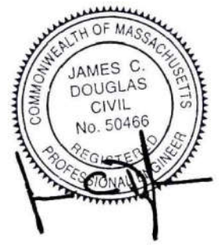
UPPER CAP DETAIL
N.T.S.



LOWER CAP DETAIL
N.T.S.



HELICAL PILE DETAIL
N.T.S.



SHEET 2 OF 3			
DATE	REVISION	DRAWN BY:	REVIEW BY:
02/13/2023	ORIGINAL	JB	JD

VALLEY SOLAR, LLC

-PROJECT-
DOUGLAS RESIDENCE
530 WEST PELHAM ROAD
SHUTESBURY, MA 01072

Solar Foundations USA
1142 River Road, New Castle, DE 19720 Ph: (855) 738-7200 Fax: (866) 644-5665

QTY 24 REC400NP3 Black MODULES QTY 1 SolarEdge SE10000H-US EnergyHub INVERTER

REV	DATE	RELEASE
	03/10/2023	SUBMIT FOR PERMIT

S-302

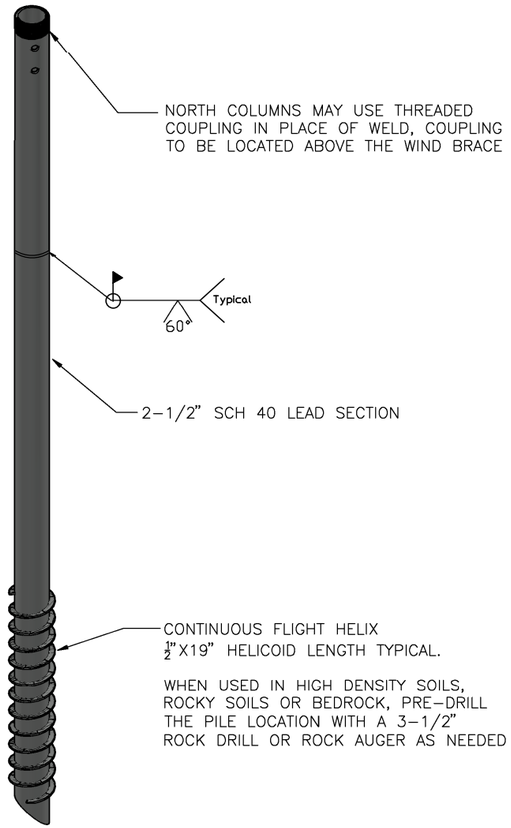
RACKING LAYOUT

9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

Valley Solar



HELICAL PILE DETAIL
N.T.S.

SPECIFICATION REQUIREMENTS:

THE FOLLOWING MATERIAL SPECIFICATION REQUIREMENTS PERTAIN TO THE FABRICATION OF THE SOLAR FOUNDATIONS USA GROUND MOUNT SOLAR SUPPORT STRUCTURE AS INDICATED ON THESE DRAWINGS.

1. SOLAR FOUNDATION ALUMINUM RAILS SHALL CONFORM TO ASTM B221.
2. STRUCTURAL STEEL TUBING SHALL BE ASTM A500 HIGH YIELD (60 KSI).
3. STEEL PIPE FOR PILES SHALL CONFORM TO ASTM A500 GRADE C.
4. STEEL PILE EXTENSIONS SHALL BE ASTM A53 GRADE B.
5. STEEL PIPE FOR DIAGONAL BRACING SHALL BE ASTM A53 GRADE A.
6. FABRICATED STEEL PLATE FOR COLUMN CAP ASSEMBLIES, BRACING CLAMPS, ETC. SHALL BE ASTM A36 OR A1011.
7. STEEL BOLTS FOR CAP FASTENERS SHALL CONFORM TO SAE J429 GRADE 5. ALL OTHER BOLTS SHALL CONFORM TO SAE J429 GRADE 5 OR BETTER.
8. STEEL U-BOLTS SHALL CONFORM TO ASTM 1018.
9. USS FLAT STEEL WASHERS SHALL CONFORM TO ASTM F844 AND NUTS FOR STEEL CONNECTIONS SHALL CONFORM TO ASTM A563 GRADE A.
10. ALL FIELD WELDING SHALL CONFORM TO AWS D1.1/D1.1M -STRUCTURAL WELDING CODE REQUIREMENTS.
11. ALL STEEL SHALL BE HOT-DIP GALVANIZED PER ASTM A123 OR A153 AFTER ALL FABRICATION HAS BEEN COMPLETED.

INSTALLATION REQUIREMENTS:

1. THE MINIMUM AVERAGE INSTALLATION TORQUE REQUIRED TO OBTAIN THE REQUIRED INDICATED CAPACITIES AND THE MINIMUM INSTALLATION DEPTH SHOWN ON THE PLANS SHALL BE SATISFIED PRIOR TO TERMINATION OF THE INSTALLATION. THE INSTALLATION TORQUE SHALL BE AN AVERAGE OF THE INSTALLATION TORQUES INDICATED DURING THE LAST 1 FOOT OF INSTALLATION.

2. THE TORSIONAL STRENGTH RATING OF THE TORQUE ANCHOR SHALL NOT BE EXCEEDED DURING THE INSTALLATION. IF THE TORSIONAL STRENGTH LIMIT OF THE ANCHOR HAS BEEN REACHED, BUT THE ANCHOR HAS NOT REACHED THE TARGET DEPTH, PERFORM THE FOLLOWING:

   2.1. IF THE TORSIONAL STRENGTH LIMIT IS ACHIEVED PRIOR TO REACHING THE TARGET DEPTH, THE INSTALLATION MAY BE ACCEPTABLE IF REVIEWED AND APPROVED BY THE ENGINEER.

   2.2. THE INSTALLER MAY REMOVE THE TORQUE ANCHOR AND INSTALL A NEW ONE WITH SMALLER DIAMETER HELICAL PLATE.

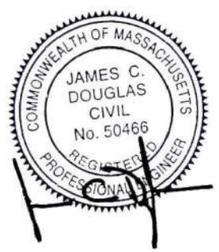
   2.3. IF USING A CONTINUOUS FLIGHT PILE, PRE-DRILL THE PILE LOCATION WITH A 3-1/2" ROCK AUGER OR 3-5/8" ROCK DRILL AS NEEDED.

3. IF THE TARGET DEPTH IS ACHIEVED, BUT THE TORSIONAL REQUIREMENT HAS NOT BEEN MET THE INSTALLER MAY DO ONE OF THE FOLLOWING:

   3.1. INSTALL THE TORQUE ANCHOR DEEPER TO OBTAIN THE REQUIRED CAPACITY

   3.2. REMOVE THE TORQUE ANCHOR AND INSTALL A NEW ONE WITH A LARGER DIAMETER HELICAL PLATE OR ONE WITH MULTIPLE HELICAL PLATES.

   3.3. REDUCE THE LOAD CAPACITY ON THE INDIVIDUAL TORQUE ANCHOR BY PROVIDING ADDITIONAL TORQUE ANCHORS AT A REDUCED SPACING.



SHEET 3 OF 3			
DATE	REVISION	DRAWN BY:	REVIEW BY:
02/13/2023	ORIGINAL	JB	JD

VALLEY SOLAR, LLC

-PROJECT-
DOUGLAS RESIDENCE
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SHUTESBURY, MA 01072

Solar Foundations USA

1142 River Road, New Castle, DE 19720 Ph: (855) 738-7200 Fax: (866) 644-5665

QTY 24 REC400NP3 Black MODULES QTY 1 SolarEdge SE10000H-US EnergyHub INVERTER

REV	DATE	RELEASE
	03/10/2023	SUBMIT FOR PERMIT

S-303

RACKING LAYOUT

9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

Valley Solar

VALLEY SOLAR

PV MODULE #1 SPECIFICATIONS

MANUFACTURER	REC	
MODEL NUMBER	REC400NP3 Black	
WEIGHT	47	lbs
DIMENSIONS	74.8 x 40.9 x 1.2	L" x W" x D"/THICK
PEAK POWER @ STC (Pmax)	400	WATTS
Voc (OPEN-CIRCUIT VOLTAGE)	45	VOLTS DC
Vmp (MAX-POWER VOLTAGE)	37.6	VOLTS DC
isc (SHORT-CIRCUIT CURRENT)	11.39	AMPS
imp (OPERATING CURRENT)	35.2	AMPS
MFR. Voc TEMP COEFFICIENT	-0.26	%/K
MAX SERIES FUSE RATING	25	AMPS
TEMP. CORRECTED Voc	50.4	VOLTS DC

DC/DC OPTIMIZER (IF APPL.)

MANUFACTURER	SolarEdge Technologies	
MODEL NUMBER	S440 Single-HD (240V)	
WEIGHT	1.5	lbs
RATED OUTPUT isc	15	AMPS
MAX OUTPUT VOLTAGE	60	VOLTS
MAX INPUT VOLTAGE Voc	60	VOLTS

BATTERY SPECIFICATIONS (IF APPL.)

MANUFACTURER/MAKE	SolarEdge	
MODEL NUMBER	BAT-10K1P	
QUANTITY	2	
WEIGHT	267	lbs
DIMENSION	31.1 x 46.4 x 9.84	(L x W x D) inch
TOTAL ENERGY	9.7	KWh@25°C
MAX VOLTAGE	450	VOLTS DC
CONTINUOUS OUTPUT POWER	5.00	KW
CONTINUOUS OUTPUT CURRENT	14.3	AMPS @350V

DC COMBINER / DISCONNECT #1

MANUFACTURER	IMO	
MODEL NUMBER	SI32PEL64R4	
OCPD (DISCONNECT TYPE)	SWITCH	
WEIGHT	1.01	lbs
NEMA RATING	3R	
LOCATION OF COMPONENT	AT ARRAY	
DC INPUT		
SERIES FUSE RATING FOR PV MODULES	14.24	AMPS (OCPD)
QUANTITY OF PV SOURCE CIRCUITS	24	QTY
MAX PV MODULE Voc	45	VOLTS DC
MAX # OF MODULES IN CIRCUIT	12	QTY
MAX ALLOWED INPUT VOLTAGE	480	VOLTS DC
MAX INPUT FUSE/BREAKER RATING	32	AMPS
DC OUTPUT		
MAX CIRCUIT OUTPUT CURRENT	32	AMPS
MAX CONT. OUTPUT CURRENT	32	AMPS

DC COMBINER / DISCONNECT #2 (IF APPL.)

MANUFACTURER		
MODEL NUMBER		
OCPD (DISCONNECT TYPE)		
WEIGHT		lbs
NEMA RATING		
LOCATION OF COMPONENT		
DC INPUT		
SERIES FUSE RATING FOR PV MODULES		AMPS (OCPD)
QUANTITY OF PV SOURCE CIRCUITS		QTY
MAX PV MODULE Voc		VOLTS DC
MAX # OF MODULES IN CIRCUIT		QTY
MAX ALLOWED INPUT VOLTAGE		VOLTS DC
MAX INPUT FUSE/BREAKER RATING		AMPS
DC OUTPUT		
MAX CIRCUIT OUTPUT CURRENT		AMPS
MAX CONT. OUTPUT CURRENT		AMPS

DC COMBINER / DISCONNECT #3 (IF APPL.)

MANUFACTURER		
MODEL NUMBER		
OCPD (DISCONNECT TYPE)		
WEIGHT		lbs
NEMA RATING		
LOCATION OF COMPONENT		
DC INPUT		
SERIES FUSE RATING FOR PV MODULES		AMPS (OCPD)
QUANTITY OF PV SOURCE CIRCUITS		QTY
MAX PV MODULE Voc		VOLTS DC
MAX # OF MODULES IN CIRCUIT		QTY
MAX ALLOWED INPUT VOLTAGE		VOLTS DC
MAX INPUT FUSE/BREAKER RATING		AMPS
DC OUTPUT		
MAX CIRCUIT OUTPUT CURRENT		AMPS
MAX CONT. OUTPUT CURRENT		AMPS

PV SYSTEM MAXIMUM VOLTAGE (MODULE Voc_{MAX})

DATA SOURCE	SOLARABCS.ORG/ABOUT/PUBLICATIONS/REPORTS/ EXPEDITED-PERMIT/MAP/											
EXTREME MIN. TEMP. [°C]		STC TEMPERATURE [°C]		CORRECTED TEMPERATURE	MFR. P_{MAX} TEMP COEFFICIENT [-0.#%/C] * 100		FORMULA		CORRECTED TEMP. COEFFICIENT	MODULE Voc [VDC]		TEMPERATURE CORRECTED OPEN CIRCUIT VOLTAGE
-20	-	25	=	-45	* -0.26%	=	0.12	+ 1	1.12	* 45	=	50.4

STRING INVERTER #1 SPECIFICATIONS

MANUFACTURER	SolarEdge	
MODEL NUMBER	SE10000H-US EnergyHub	
QUANTITY	1	INVERTER(S)
NOMINAL POWER RATING	10000	WATT AC
WEIGHT	30.2	lbs.
DC INPUT		
Max INPUT DC VOLTAGE	480	VOLTS DC
Min. MPPT VOLTAGE RANGE	380	VOLTS DC
Max. MPPT VOLTAGE RANGE	480	VOLTS DC
Max INPUT CURRENT	27	AMPS
MPPT QTY	N/A	
INTEGRATED DC DISCONNECT	Yes	COMPLY W/NEC 690.17
INTEGRATED AC DISCONNECT	NO	
AC OUTPUT		
NOMINAL VOLTAGE OUTPUT	240	VOLTS AC
MAX. AC APPARENT POWER	10000	WATTS
MAX OVERCURRENT PROTECTION (OCPD)	60	AMPS
MAX. OUTPUT CURRENT	42	AMPS - MAX

STRING INVERTER #2 SPECIFICATIONS (IF APPL.)

MANUFACTURER		
MODEL NUMBER		
QUANTITY		INVERTER(S)
NOMINAL POWER RATING		WATT AC
WEIGHT		lbs.
DC INPUT		
Max INPUT DC VOLTAGE		VOLTS DC
Min. MPPT VOLTAGE RANGE		VOLTS DC
Max. MPPT VOLTAGE RANGE		VOLTS DC
Max INPUT CURRENT		AMPS
MPPT QTY		
INTEGRATED DC DISCONNECT		COMPLY W/NEC 690.17
INTEGRATED AC DISCONNECT		
AC OUTPUT		
NOMINAL VOLTAGE OUTPUT		VOLTS AC
MAX. AC APPARENT POWER		WATTS
MAX OVERCURRENT PROTECTION (OCPD)		AMPS
MAX. OUTPUT CURRENT		AMPS - MAX

AC COMBINER #1 (SOLAR LOAD CENTER)

MANUFACTURER		
MODEL NUMBER		
RATED OPERATIONAL VOLTAGE		VOLTS
RATED CURRENT		AMPS
NUMBER OF POLES		P
NEMA RATING		
MAIN BREAKER SIZE		AMPS
TOTAL INPUT CURRENT		AMPS
NUMBER OF BRANCH CIRCUITS		CIRCUITS

AC COMBINER #2 (SOLAR LOAD CENTER)

MANUFACTURER		
MODEL NUMBER		
RATED OPERATIONAL VOLTAGE		VOLTS
RATED CURRENT		AMPS
NUMBER OF POLES		P
NEMA RATING		
MAIN BREAKER SIZE		AMPS
TOTAL INPUT CURRENT		AMPS
NUMBER OF BRANCH CIRCUITS		CIRCUITS

AC DISCONNECT #1 (IF APPL.)

MANUFACTURER	Eaton	
MODEL NUMBER	DG322URB	
QUANTITY	1	AC DISCO.(S)
DISCONNECT DEVICE TYPE	NON-FUSIBLE DISCONNECT	
RATED OPERATIONAL VOLTAGE	240	VOLTS
RATED CURRENT	60	AMPS
NUMBER OF POLES	3	P
NEMA RATING	3R	
FUSE RATING	N/A	AMPS
TOTAL INPUT CURRENT	42	AMPS

AC DISCONNECT #2 (IF APPL.)

MANUFACTURER		
MODEL NUMBER		
QUANTITY		AC DISCO.(S)
DISCONNECT DEVICE TYPE		
RATED OPERATIONAL VOLTAGE		VOLTS
RATED CURRENT		AMPS
NUMBER OF POLES		P
NEMA RATING		
FUSE RATING		AMPS
TOTAL INPUT CURRENT		AMPS

AC SUB-PANEL #1 (IF APPL.)

NEW OR EXISTING		
MAKE / MODEL		
TYPE OF PANEL		
NUMBER OF POLES		P
NEMA RATING		
BUSS BAR RATING		AMPS
SUB-PANEL MAIN BREAKER		AMPS
MAIN SERVICE PANEL P.O.C. BREAKER		AMPS
SUM OF EXISTING CIRCUIT BREAKERS		AMPS
MAX ALLOWABLE SOLAR CURRENT		AMPS
PV BACKFEED BREAKER #1		AMPS (Imax)
PV BACKFEED BREAKER #2		AMPS (Imax)
PV BACKFEED BREAKER #3		AMPS (Imax)
PV BACKFEED BREAKER #4		AMPS (Imax)

MAIN SERVICE PANEL (IF APPL.)

NEW OR EXISTING	EXISTING	
ELECTRICAL SERVICE	120/240V Single Phase	
BUSS BAR RATED CURRENT	225	AMPS
MAIN BREAKER RATED CURRENT	200	AMPS
SUM OF EXISTING CIRCUIT BREAKERS		AMPS
MAX ALLOWABLE SOLAR CURRENT 100%	25	AMPS
MAX ALLOWABLE SOLAR CURRENT 120%	70	AMPS (Imax)
PV BACKFEED BREAKER #1		AMPS (Imax)
PV BACKFEED BREAKER #2		AMPS (Imax)
PV BACKFEED BREAKER #3		AMPS (Imax)
PV BACKFEED BREAKER #4		AMPS (Imax)
ALT. ENERGY BACKFEED BREAKER (IF APPL.)		AMPS (Imax)

REV	DATE	
	03/10/2023	RELEASE SUBMIT FOR PERMIT

E-001

EQUIP. CALCULATIONS

9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

Valley Solar
21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

WIRE AND CONDUCTOR NOTES

1. ANY CONDUCTOR LENGTH UNDER 50' DOESN'T REQUIRE VOLTAGE DROP CALCULATIONS
2. BECAUSE WE ARE UNABLE TO DETERMINE THE EXACT PATH THE INSTALLER WILL RUN CONDUCTORS; WORST CASE SCENARIOS, ROUNDING UP SIZES OF CONDUCTORS THAT ARE DEEMED QUESTIONABLE TO PREVENT ISSUES RELATED TO USING CONDUCTORS THAT ARE IMPROPERLY SIZED.
3. WIRING METHODS IN THESE CALCULATIONS DON'T EXCEED 1000 VOLTS
4. CEC/NEC 310.15(A)(2) (AS APPLICABLE) WHERE TWO DIFFERENT AMPACITIES APPLY TO ADJACENT PORTIONS OF A CIRCUIT, THE HIGHER AMPACITY SHALL BE PERMITTED TO BE USED BEYOND THE POINT OF TRANSITION, A DISTANCE EQUAL TO 10'-0" (3 METERS) OR 10% OF THE CIRCUIT LENGTH FIGURED AT THE HIGHER AMPACITY, WHICHEVER IS LESS. WHEN LESS THAN 10'-0" OR 10% OF THE CIRCUIT LENGTH; THE LESSER AMPACITY MAY BE USED.

WIRE COLOR CODING (2023) NEC SECTIONS 250.119 & 200.6

PV DC WIRING		AC WIRING	
EQUIPMENT GROUND	GREEN OR BARE, OR GREEN/YELLOW	EQUIPMENT GROUND	GREEN OR BARE, OR GREEN/YELLOW
UNGROUNDED CONDUCTOR(S). TYPICALLY POSITIVE	ANY COLOR OTHER THAN GREEN OR WHITE/GRAY	GROUNDED CONDUCTOR (NEUTRAL)	WHITE OR GRAY
	CONVENTION IS RED FOR GROUNDED SYSTEMS	UNGROUNDED CONDUCTOR(S) HOT: L1 AND L2	ANY COLOR OTHER THAN GREEN OR WHITE/GRAY ALLOWED.
	RED (+) AND BLACK (-) FOR UNGROUNDED SYSTEMS		CONVENTION IS L1 BLACK
			CONVENTION IS L2 RED

DC WIRE AND CONDUIT SIZING CHART [SEE SHEET E-003 FOR THREE LINE DIAGRAM]

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS				REQUIRED CONDUCTOR AMPACITY								CONDUCTOR TEMPERATURE DERATING						CONDUIT FILL DERATING		CORRECTED AMPACITY CALCULATION							AMPACITY CHECK		
			QTY IN PARALLEL & MATERIAL	TEMP RATING (°C)	TRADE SIZE	AMPACITY @ 30°C PER 310.16	Isc (AMPS) OR COMPONENT (AMPS)	X	#OF COMBINED PARALLEL STRINGS	X	MAX CURRENT 690.8 (A)(1)	X	CONT. OPERATION 690.8 (B)(1)	=	REQUIRED AMPACITY	CIRCUIT ENVIRONMENT	AMBIENT TEMP. (°C)	HGT. ABOVE ROOF (in)	TEMP. ADDER PER 310.15 (B)(2)(c)	OPERAT. TEMP. (°C)	AMPACITY CORRECTION 310.15 (B)(2)(a)	# OF UNGRND. COND.	AMPACITY CORRECTION 310.15 (B)(3)(a)	COND. AMPACITY	X	TEMP. DERATING	X	CONDUIT FILL DERATING	=	CORRECTED AMPACITY	REQUIRED AMPACITY	≤	CORRECTED AMPACITY
DC1	PV MODULE	DC/DC CONVERTER	(1) CU	90	#12 AWG	30	11.39	X	1	X	1.25	X	1.25	=	17.8	OPEN AIR	35	N/A	0	35	0.96	2	N/A	30	X	0.96	X	1.0	=	28.8	17.8	≤	28.8
DC2	DC/DC CONVERTER	DC DISCONNECT	(1) CU	90	#10 AWG	40	15	X	1	X	1	X	1.25	=	18.75	OPEN AIR	35	N/A	0	35	0.96	4	N/A	40	X	0.96	X	1.0	=	38.4	18.75	≤	38.4
DC3	DC DISCONNECT	INVERTER	(1) CU	90	#10 AWG	40	15	X	1	X	1	X	1.25	=	18.75	UNDERGROUND	30	N/A	0	30	1.00	4	0.80	40	X	1.00	X	0.80	=	32.0	18.75	≤	32.0
DC4	BATTERY	INVERTER	(1) CU	90	#10 AWG	40	14.3	X	2	X	1	X	1.25	=	35.75	EXT WALL	35	N/A	0	35	0.96	2	1.0	40	X	0.96	X	1.0	=	38.4	35.75	≤	38.4
DC5								X		X		X		=											X		X		=			≤	
DC6								X		X		X		=											X		X		=			≤	
DC7								X		X		X		=											X		X		=			≤	
DC8								X		X		X		=											X		X		=			≤	

VOLTAGE DROP CALCULATIONS

%VD = (0.2 x DISTANCE x Imp x DC or AC RESISTANCE) / Vmp

CONDUCTOR RUN	WORST CASE V-DROP	AC/DC
DC DISCONNECT TO INVERTER	1.22%	DC
TOTAL	1.22%	DC

AC WIRE AND CONDUIT FILL DERATE CHART [SEE SHEET E-003 FOR THREE LINE DIAGRAM]

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS				REQUIRED CONDUCTOR AMPACITY					CONDUCTOR TEMPERATURE DERATING						CONDUIT FILL DERATING		CORRECTED AMPACITY CALCULATION							AMPACITY CHECK		
			QTY IN PARALLEL & MATERIAL	TEMP RATING (°C)	TRADE SIZE	AMPACITY @ 30°C PER 310.16	CONT. OPERATION 690.8 (B)(1)	X	MAX INV. OUTPUT CURRENT (AMPS) OR COMPONENT (AMPS)	=	REQUIRED AMPACITY	CIRCUIT ENVIRONMENT	AMBIENT TEMP. (°C)	HGT. ABOVE ROOF (in)	TEMP. ADDER PER 310.15 (B)(2)(c)	OPERAT. TEMP. (°C)	AMPACITY CORRECTION 310.15 (B)(2)(a)	# OF UNGRND. COND.	AMPACITY CORRECTION 310.15 (B)(3)(a)	COND. AMPACITY	X	TEMP. DERATING	X	CONDUIT FILL DERATING	=	CORRECTED AMPACITY	REQUIRED AMPACITY	≤	CORRECTED AMPACITY
AC1	INVERTER	AC DISCONNECT	(1) CU	75	#6 AWG	65	1.25	X	42.0	=	52.5	EXT WALL	35	N/A	0	35	0.94	3	1.0	65	X	0.94	X	1.0	=	61.1	52.5	≤	61.1
AC2	AC DISCONNECT	BACKUP INTERFACE SYSTEM	(1) CU	75	#6 AWG	65	1.25	X	42.0	=	52.5	EXT WALL	35	N/A	0	35	0.94	3	1.0	65	X	0.94	X	1.0	=	61.1	52.5	≤	61.1
AC3	BACKUP INTERFACE SYSTEM	EXISTING SERVICE PANEL	(1) CU	90	#3/0 AWG	225	N/A	X	200	=	200	EXT WALL	35	N/A	0	35	0.96	3	1.0	225	X	0.96	X	1.0	=	216.0	200	≤	216.0
AC4	BACKUP INTERFACE SYSTEM	UTILITY METER	(1) CU	90	#3/0 AWG	225	N/A	X	200	=	200	EXT WALL	35	N/A	0	35	0.96	3	1.0	225	X	0.96	X	1.0	=	216.0	200	≤	216.0
AC5								X		=											X		X		=			≤	
AC6								X		=											X		X		=			≤	
AC7								X		=											X		X		=			≤	
AC8								X		=											X		X		=			≤	
AC9								X		=											X		X		=			≤	
AC10								X		=											X		X		=			≤	

REV | DATE | RELEASE
| | 03/10/2023 | SUBMIT FOR PERMIT

E-002

WIRE AND COND. CALCS.

9.600 kW PHOTOVOLTAIC PLANS

NAME: Douglas, Damon
ADDRESS: 530 W Pelham Rd Pole 102
ADDRESS: Shutesbury, MA 01072
APN

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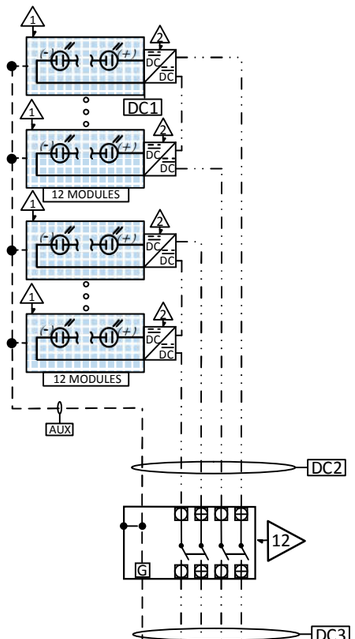
(413) 584-8844

VALLEY SOLAR



MODULE NAMEPLATE
RATING 400W

EQUIPMENT TABLE

TAG	QTY	COMPONENT	
1	24	PV MODULES	REC400NP3 Black
2	24	DC/DC OPTIMIZER	S440 Single-HD (240V)
3	1	DC DISCONNECT	INTEGRATED IN INV
4	0	DC COMBINER BOX	
5	0	JUNCTION BOX	
6	N/A	RAPID SHUTDOWN	INTEGRATED IN INV & OPT
7	1	AC/DC INVERTER	SolarEdge SE10000H-US EnergyHub
8	0	AC/DC INVERTER W/ INTE AC DISC	
9	1	AC DISCONNECT (INDEPENDENT)	Eaton DG322URB
10	0	SOLAR LOAD CENTER	
11	1	EXT RAPID SHUTDOWN DEVICE	GENERIC
12	1	DC DISCONNECT (INDEPENDENT)	SI32PEL64R4
13	0	AC DISCONNECT (FUSIBLE)	
14	1	BACKUP INTERFACE SYSTEM	SolarEdge BI-EUSGN-01
15	1	(E) MAIN SERV PANEL DERATED	225A BUS/200A MB
16	1	EXISTING UTILITY METER	120/240V - 1Φ
17	2	BATTERY	SolarEdge BAT-10K1P
18			

NOTE: EQUIP TAGS MAY NOT BE IN SEQUENTIAL ORDER, N/A USED
SEE SHEET E-001 FOR ADDITIONAL ELECTRICAL SPECIFICATIONS

NOTE: CONDUCTORS AC1, AC2, AC3, & AC4 MAY BE THWN-2 OR SER CABLE

STRING	MODULE QTY	INVERTER #
1	12	INV 1
2	12	INV 1

BACK-FEED SOLAR BREAKER: N/A

CONDUCTOR TABLE

CONDUIT TABLE

TAG	QTY*	SIZE	TYPE	GROUND	SIZE	TYPE
DC1	2	#12 AWG	PV Wire	#6 AWG	N/A	Open Air
DC2	5	#10 AWG	PV Wire	#6 AWG	N/A	Open Air
DC3	5	#10 AWG	THWN-2	#6 AWG	3/4 inch	PVC
DC4	3	#10 AWG	THWN-2	#8 AWG	3/4 inch	EMT
DC5						
DC6						
DC7						
DC8						
AC1	4	#6 AWG	THWN-2	#8 AWG	1 inch	EMT
AC2	4	#6 AWG	THWN-2	#8 AWG	1 inch	EMT
AC3	4	#3/0 AWG	THWN-2	#4 AWG	2 inch	EMT
AC4	3	#3/0 AWG	THWN-2	N/A	1-1/2 inch	EMT
AC5						
AC6						
AC7						
AC8						
AC9						
AC10						

NOTE: ALL LINE SIDE PV CIRCUIT CONNECTIONS INVOLVING TAPS AND OR TRANSFORMERS SHALL INCORPORATE GROUNDING ELECTRODE CONDUCTORS (G-N BONDING) IN ALL LOCATIONS THAT ARE SEPARATELY DERIVED SYSTEMS AS REQUIRED BY CODE AND OR THE AHJ. GROUND BONDING JUMPERS (CONDUCTORS), TO CONNECT ANY APPLICABLE SEPARATELY DERIVED SYSTEMS SHALL BE FIELD VERIFIED BY QUALIFIED ELECTRICAL CONTRACTOR

LEGEND

DC# DC CONDUCTOR TAG — 1 EQUIPMENT TAG
AC# AC CONDUCTOR TAG — GND GROUND CONDUCTOR TAG

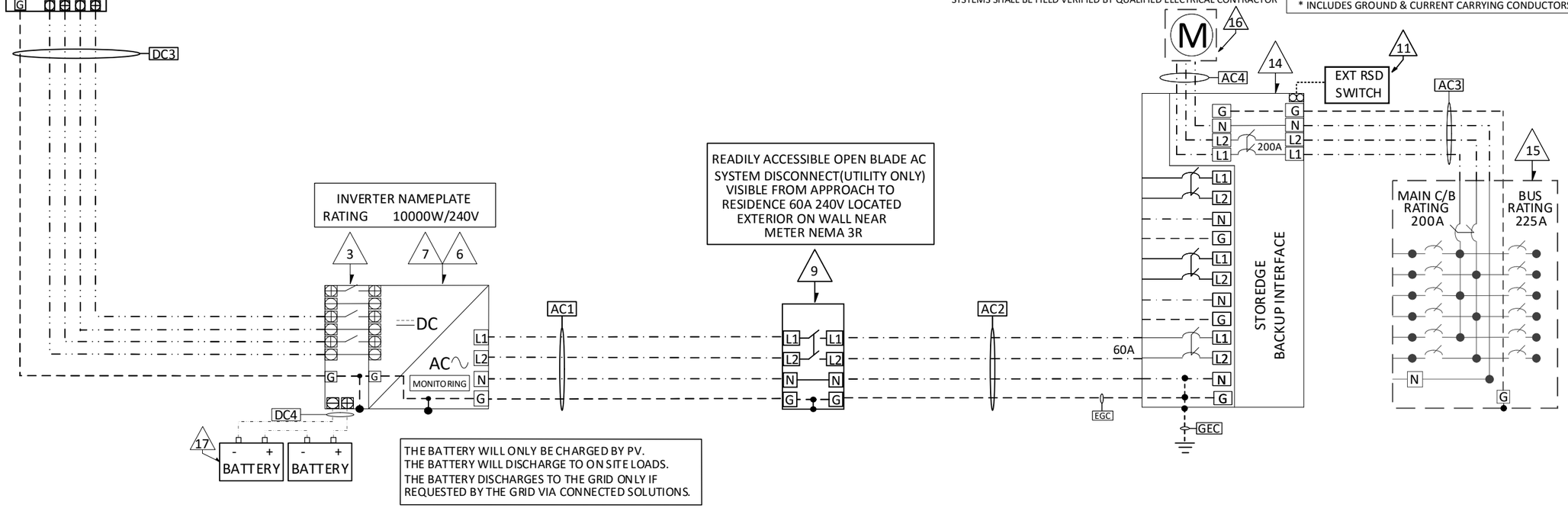
ELECTRICAL NOTES

UNGROUNDED PV SYSTEMS:
- INVERTERS, MODULES, AND DC COMPONENTS MUST BE LISTED FOR USE IN UNGROUNDED SYSTEMS, TYPICALLY TRANSFORMER-LESS (TL)
- OCPD'S WHERE NECESSARY MUST HAVE DISCONNECTING MEANS.
- PV SOURCE CIRCUITS MUST BE EITHER PV WIRE, RATED AND LISTED FOR WET LOCATIONS OR JACKETED MULTI-CONDUCTOR CABLES INSTALLED IN RACEWAY AND RATED PER APPLICABLE VOLTAGE.
- THE AC SIDE IS STILL GROUNDED ON THE NEUTRAL CONDUCTOR.
- REQUIRE EQUIPMENT GROUNDING BUT DOES NOT HAVE SYSTEM GROUNDING; NO DC CURRENT-CARRYING CONDUCTOR IS CONNECTED TO GROUND. THESE CONDUCTORS ARE COLOR CODED DIFFERENTLY THAN GROUNDED PV SYSTEMS.

AC/DC ELECTRICAL NOTES:
- ALL OVERCURRENT PROTECTION DEVICES (OCPDs) MUST BE RATED FOR THE APPLICABLE VOLTS ON THE DC / PV POWER SIDE OF THE INVERTER.
- EXTERIOR ENCLOSURES TO BE NEMA TYPE 3R OR BETTER.
- ALL CONDUIT AND CONDUIT CONNECTIONS SHALL BE RATED FOR WET AND DAMP LOCATIONS WHEN APPLICABLE.

INTERCONNECTION NOTES:
- 705.12(B)(4) CIRCUIT BREAKERS MUST BE SUITABLE FOR BACKFEEDING. NEC INFORMATIONAL NOTE: FUSED DISCONNECTS, UNLESS OTHERWISE MARKED, ARE SUITABLE FOR BACKFEEDING.
- 690.13(F)(2) DEVICES MARKED WITH "LINE" AND "LOAD" SHALL NOT BE PERMITTED FOR BACKFEED OR REVERSE CURRENT
- 705.12(B)(5) CIRCUIT BREAKERS BACK FEED FROM UTILITY INTERACTIVE INVERTERS (ANTI-ISLANDING, UL 1741 CERTIFIED)
- **NO CENTER-FED MAIN BREAKER. PANEL CONFIGURED PER NEC 705.12(A)**

* INCLUDES GROUND & CURRENT CARRYING CONDUCTORS



REV	DATE	RELEASE
	03/10/2023	SUBMIT FOR PERMIT

E-003

THREE LINE DIAGRAM

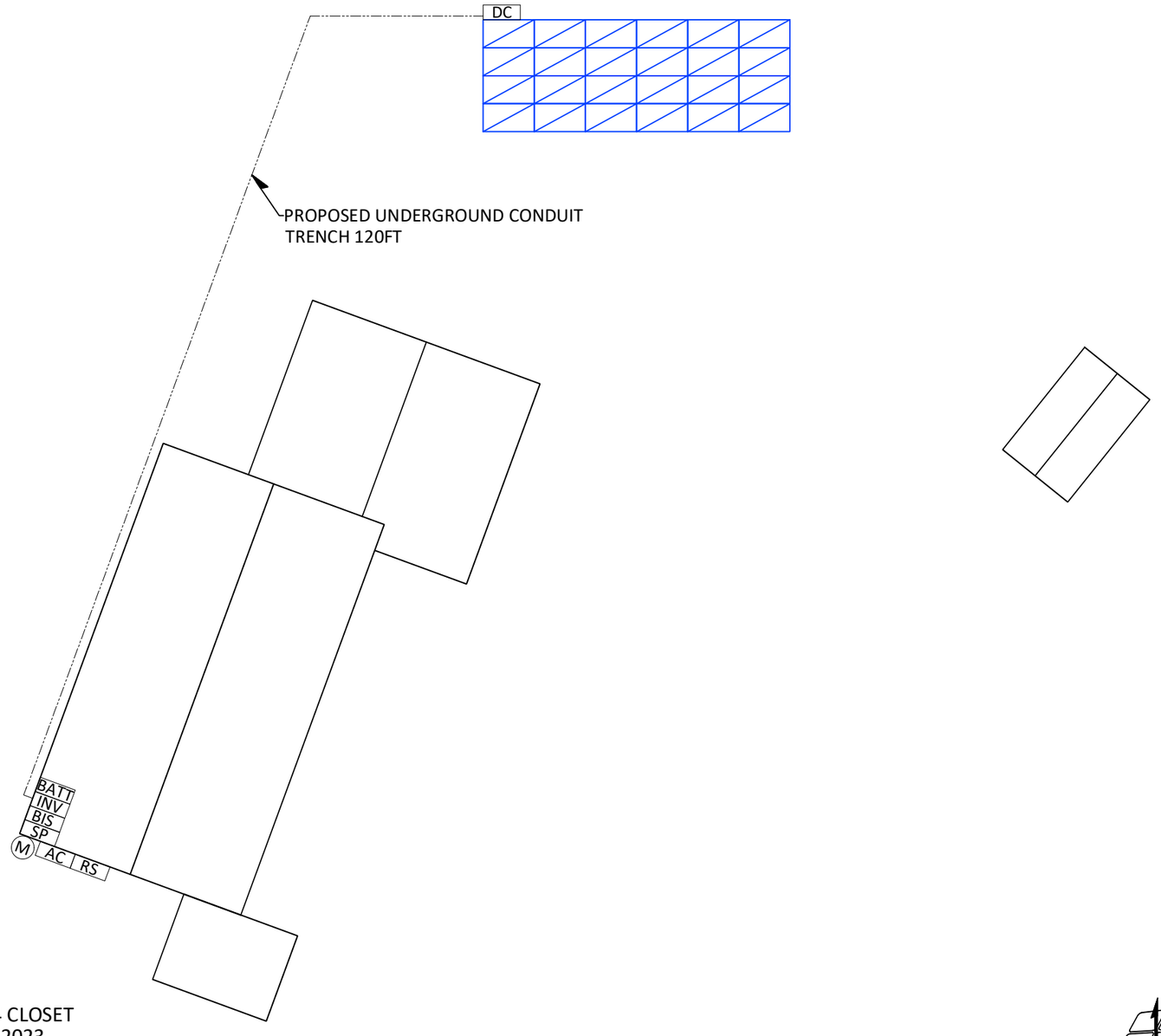
9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

Valley Solar

21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

VALLEY SOLAR



NOTE: BATTERY INSTALLED IN 4x4 CLOSET
IN ACCORDANCE WITH NFPA 855 2023

QTY 24 REC400NP3 Black MODULES QTY 1 SolarEdge SE10000H-US EnergyHub INVERTER

NORTH

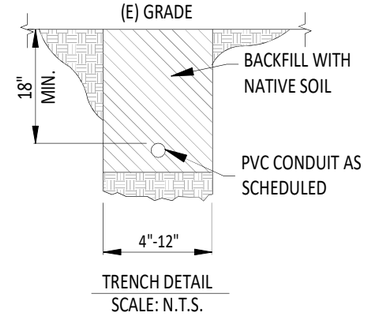
EQUIPMENT GROUNDING

1. METAL PV MODULE FRAMES MUST BE CONNECTED TO THE EGC (EQUIPMENT GROUNDING CONDUCTOR).
   - 1.1. WEEBS MAY BE USED IN LIEU OF MODULE GROUND CLAMPS OR LUGS, WITH APPROVAL OF AHJ AND RACKING MFG. WEEBS ARE ONE TIME USE ONLY. SEE "we-llc.com" FOR RACKING SPECIFIC WEEB, INSTALL INSTRUCTIONS, AND UL 2703 CERT.
   - 1.2. FOR "LAY-IN" LUG MODULE GROUNDING; CORRECT HARDWARE OF PROPER METAL MATERIAL TO AVOID CORROSION MUST BE USED. TYPICALLY DIRECT BURIAL RATED, TINNED, OR STAINLESS STEEL. GROUNDING LUGS MUST BE ATTACHED AT MARKED LOCATION ON EACH MODULE.
2. THE EGC (EQUIPMENT GROUNDING CONDUCTOR) IS USED TO BOND ALL NON-CURRENT CARRYING CONDUCTORS AND EXPOSED METAL PARTS THAT MIGHT COME INTO CONTACT WITH CURRENT-CARRYING CONDUCTORS, INCLUDING THE FOLLOWING:
   - 2.1. PV MODULES FRAMES, ARRAY MOUNTING RACKING; THE METAL CHASSIS OF EQUIPMENT SUCH AS INVERTERS, DISCONNECTS, METERS, JUNCTION BOXES AND COMBINER BOXES; AND METAL CONDUIT HOLDING CIRCUITS > 250 VOLTS TO GROUND PER NEC 250.97
3. THE GEC (GROUNDING ELECTRODE CONDUCTOR) IS THE CONDUCTOR USED TO CONNECT THE GE OR GE SYSTEM TO THE SYSTEM GC, TO THE EGC, OR TO BOTH.
4. THE GE (GROUNDING ELECTRODE) IS A CONDUCTING OBJECT, OFTEN A ROD, RING, OR PLATE ESTABLISHING A DIRECT CONNECTION TO EARTH. THE AC SYSTEM GROUND IS EXISTING, USUALLY AT THE EXISTING MAIN PANEL AND/OR UTILITY METER. THE GROUND CAN ONLY OCCUR IN ONE PLACE AND MUST NOT BE DUPLICATED IN SUB-PANELS OR ANYWHERE ELSE ON AC SIDE.

ELECTRICAL SYMBOL LEGEND

CB	DC COMBINER BOX	ATF	AUTO TRANSFORMER
DCB	DC DISCONNECTING COMBINER BOX	SLC	SOLAR LOAD CENTER
		BIS	BACKUP INTERFACE SYSTEM
DC	DC DISCONNECT	BATT	BATTERY
INV#	DC/AC STRING INVERTER	AC	AC DISCONNECT
CLP	CRITICAL LOADS PANEL	SP	SERVICE PANEL
RSD	RAPID SHUTDOWN	P	PERFORMANCE METER
SUB	SUB-PANEL	M	UTILITY METER
EB	EMERGENCY BATTERY DISCONNECT	XFMR	TRANSFORMER
		JB	JUNCTION BOX
RS	EMERGENCY RSD SWITCH	ATS	AUTO TRANSFER SWITCH
CBD	CIRCUIT BREAKER DISCONNECT	STS	SMART TRANSFER SWITCH
		TGW	TESLA GATEWAY
SECTION / 1	PV ARRAY TAG SECTION # MODULE GROUP	TPW	TESLA POWERWALL
		GEN	GENERATOR
			EXISTING EQUIPMENT

PV AC DISCONNECT LOCATED ON ACCESSIBLE EXTERIOR WALL WITH EXTERNAL HANDLE VISIBLE, LOCKABLE & LABELED WITHIN 10 FEET OF THE METER.



TRENCH DETAIL
SCALE: N.T.S.

NOTE: CONDUITS UNDER AREAS OF VEHICLE TRAFFIC REQUIRE 24" OF COVER

SCALE: 1/16"= 1'0" @ SHEET SIZE A3

REV	DATE	RELEASE
	03/10/2023	SUBMIT FOR PERMIT

E-100 ELECTRICAL LAYOUT

9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

Valley Solar
21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

VALLEY SOLAR

1 CONDUIT, RACEWAY, J-BOX, AND PULL BOXES

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

WARNING: PHOTOVOLTAIC POWER SOURCE

1. PLACE ON CONDUIT AND/OR RACE WAYS EVERY 10' (60"), 12" FROM BENDS, 12" ABOVE AND BELOW PENETRATIONS.
2. CODE REFERENCE: NEC 690.31(G)(3)
3. MINIMUM OF 1 1/8" x 5 3/4"
4. FONT: 3/8" AND .8 WIDTH FACTOR.
5. REFLECTIVE WHITE LETTERS ON A RED BACKGROUND.

2 DC DISCONNECTS

SCALE: 1/4" = 1'-0"

⚠WARNING

ELECTRICAL SHOCK HAZARD

TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENGERGIZED IN THE OPEN POSITION

1. PLACED ON DC DISCONNECT(S) AND ON ANY EQUIPMENT THAT STAYS ENERGIZED IN THE OFF POSITION FROM THE PV SUPPLY.
2. CODE REFERENCE: NEC 690.13(B)
3. MINIMUM OF 3 1/2" x 10"
4. FONT: 3/8"
5. WARNING LABEL IS WHITE AND ORANGE

3 INVERTER(S)

SCALE: 1/4" = 1'-0"

⚠WARNING

THE DISCONNECTION OF THE GROUNDED CONDUCTOR(S) MAY RESULT IN OVERVOLTAGE ON THE EQUIPMENT

1. MINIMUM OF 3 1/2" x 10 1/2"
2. FONT: 3/8"
3. WARNING LABEL IS WHITE AND ORANGE

SHEET NOTES

CODE ABBREVIATIONS:
NATIONAL ELECTRICAL CODE (NEC)
INTERNATIONAL BUILDING CODE (IBC)
INTERNATIONAL RESIDENTIAL CODE (IRC)
INTERNATIONAL FIRE CODE (IFC)
UNDERWRITERS LABORATORY (UL)

1. COMBINATION PLACARDS MAY BE USED IN PLACE OF MULTIPLE PLACARDS FOR THE SAME DEVICE. ALL INFORMATION FROM THE MULTIPLE PLACARDS MUST BE PRESENT.
2. BLACK LETTERS WITH YELLOW BACKGROUND MAY BE USED IN PLACE OF THE STANDARD WHITE LETTERS WITH RED BACKGROUND WITH AHJ APPROVAL.
3. ALL INTERIOR AND EXTERIOR DC CONDUIT, ENCLOSURES, RACEWAYS, CABLE ASSEMBLIES, JUNCTION BOXES, COMBINER BOXES AND DISCONNECTS ARE MARKED. (NEC 690.31[G], NEC 690.13 & 690.53)
4. THE MARKINGS ON THE CONDUITS, RACEWAYS AND CABLE ASSEMBLIES ARE EVERY 10 FEET, WITHIN ONE FOOT OF ALL TURNS OR BENDS AND WITHIN ONE FOOT ABOVE AND BELOW ALL PENETRATIONS OF ROOF/CEILING ASSEMBLIES, WALLS AND BARRIERS. (IFC 605.11.1.4, NEC 690.31[G][3])
5. WHERE PV CIRCUITS ARE EMBEDDED IN BUILT-UP, LAMINATE OR MEMBRANE ROOFING MATERIALS IN ROOF AREAS NOT COVERED BY PV MODULES AND ASSOCIATED EQUIPMENT, THE LOCATION OF CIRCUITS SHALL BE CLEARLY MARKED.
6. REQUIRED LABELS SHALL BE PERMANENT AND SUITABLE FOR THE ENVIRONMENT. MATERIALS USED FOR MARKING MUST BE WEATHER RESISTANT. UL STANDARD IS RECOMMENDED TO DETERMINE WEATHER RATING. UL LISTING OF MARKINGS IS NOT REQUIRED. SEE UL LABELING SYSTEM 969 (UL 969)
7. MARKING CONTENT AND FORMAT:
   - 7.1. ARIAL OR SIMILAR FONT, NON-BOLD.
   - 7.2. MINIMUM 3/8" LETTER HEIGHT FOR HEADERS.
   - 7.3. MINIMUM 1/16" LETTER HEIGHT FOR DATA
   - 7.4. CONTRASTING BACKGROUND AND LETTERING.
   - 7.5. ALL CAPITAL LETTERS.
   - 7.6. CONTRASTING SPACE BETWEEN ROWS OF TEXT
   - 7.7. DIMENSIONS OF PLACARDS ARE APPROXIMATE. MAY BE REDUCED AND / OR INCREASED TO UL APPROVED MANUFACTURED PRODUCT

ENGINEERING STAMP (if appl.)

4 NON-LOAD BREAK DC COMBINER / J-BOX

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

DO NOT OPEN UNDER LOAD

1. CODE REFERENCE: NEC 690.13(C)
2. USE ON NON-LOAD BREAK RATED DISCONNECTION.
3. MINIMUM OF 1" x 6"
4. FONT: 3/8" AND .8 WIDTH FACTOR
5. WHITE LETTERS ON A RED BACKGROUND.

DO NOT DISCONNECT UNDER LOAD

5 DC COMBINER BOX

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

DC COMBINER BOX

COMBINER # 1

1. USE PLACARD "COMBINER # 1" WHEN MORE THAN 1 DC COMBINER IS USED. NUMBER ACCORDING TO THREE LINE DIAGRAM AND CALCULATIONS.
2. MINIMUM OF 1" x 4"
3. FONT: 3/8" AND .75 TO .8 WIDTH FACTOR
4. WHITE LETTERS ON A RED BACKGROUND.

6 SWITCHBOARDS

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

⚠WARNING

ARC FLASH HAZARD
APPROPRIATE PPE REQUIRED
FAILURE TO COMPLY CAN RESULT IN DEATH OR INJURY
REFER TO NFPA 70E

1. VERIFY WHICH PLACARD IS REQUIRED WITH AHJ.
2. MINIMUM OF 1" x 4"
3. FONT: 3/8" AND .8 WIDTH FACTOR
4. WARNING LABEL IS WHITE AND ORANGE
5. DATA COLLECTED FROM AS-BUILT INFO, PRIOR TO PTO, BY OTHERS.

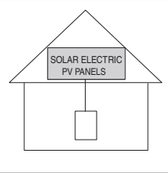
7 MAIN SERVICE PANEL

SCALE: 1/4" = 1'-0"

1. LOCATE NO MORE THAN 1 m FROM THE SERVICE DISCONNT MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATION OF ALL IDENTIFIED RAPID SHUTDOWN SWITCHES IF NOT AT THE SAME LOCATION.

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY.



2. CODE REFERENCE: NEC 690.56(C)(1)(a)
3. TITLE: MIN. 3/8" BLACK CHARACTERS ON YELLOW BACKGROUND, REMAINING CHARACTERS MIN. 3/16" IN BLACK ON WHITE BACKGROUND.

8 AC AND DC DISCONNECTS

SCALE: 1/4" = 1'-0"

AC DISCONNECT # 1

DC DISCONNECT # 1

USE PLACARD "[AC][DC] DISCONNECT # 1" WHEN MORE THAN ONE DISCONNECT IS USED. NUMBER ACCORDING TO THREE LINE DIAGRAM AND CALCULATIONS.

PHOTOVOLTAIC	PHOTOVOLTAIC
DC DISCONNECT	AC DISCONNECT

1. PLACE ON ALL AC AND DC DISCONNECTS
2. CODE REFERENCE: NEC 690.13(B)
3. MINIMUM OF 1" x 10 1/2"
4. FONT: 3/8"
5. WHITE LETTERS ON A RED BACKGROUND.

9 J-BOX, DC COMBINER, AND DC DISCONNECT

SCALE: 1/4" = 1'-0"

⚠WARNING

ELECTRICAL SHOCK HAZARD

TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENGERGIZED IN THE OPEN POSITION

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

1. ONLY FOR UNGROUNDED SYSTEMS.
2. PLACED ON ALL ENCLOSURES WITH UNGROUNDED CIRCUITS OR DEVICES WHICH ARE ENERGIZED AND MAY BE EXPOSED DURING SERVICE.
3. MINIMUM OF 3" x 10 1/2"
4. FONT: 3/8"
5. WARNING LABEL IS WHITE AND ORANGE

10 INVERTER(S)

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

INVERTER # 1

1. USE PLACARD "INVERTER # 1" WHEN MORE THAN 1 INVERTER IS USED. NUMBER ACCORDING TO THREE LINE DIAGRAM AND CALCULATIONS.
2. MINIMUM OF 1" x 4"
3. FONT: 3/8"
4. WHITE LETTERS ON A RED BACKGROUND.

11 RAPID SHUTDOWN SWITCH

SCALE: 1/4" = 1'-0"

1. A RAPID SHUTDOWN SWITCH SHALL HAVE A LABEL LOCATED ON OR NO MORE THAN 1M (3 FT) FROM THE SWITCH THAT INCLUDES THE FOLLOWING:

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

2. THE LABEL SHALL BE REFLECTIVE WITH ALL LETTERS CAPITALIZED AND HAVING A MINIMUM HEIGHT OF 9.5 MM (3⁄8 IN.), IN WHITE ON RED BACKGROUND.

QTY 24 REC400NP3 Black MODULES QTY 1 SolarEdge SE10000H-US EnergyHub INVERTER

REV	DATE	RELEASE
	03/10/2023	SUBMIT FOR PERMIT

P-001 STANDARD PLACARDS

9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

Valley Solar

1 DC DISCONNECTS & DISCO. COMBINER

SCALE: 1/4" = 1'-0"

PV SYSTEM DC DISCONNECT
MAXIMUM CIRCUIT CURRENT 30.0 ADC
MAXIMUM VOLTAGE 480 VDC
#1

PHOTOVOLTAIC SYSTEM
DC DISCONNECT
MAX. CIRCUIT CURRENT 30.0 ADC
MAXIMUM VOLTAGE 480 VDC

PV SYSTEM DC DISCONNECT
MAXIMUM CIRCUIT CURRENT ADC
MAXIMUM VOLTAGE VDC
#2

PHOTOVOLTAIC SYSTEM
DC DISCONNECT
MAX. CIRCUIT CURRENT ADC
MAXIMUM VOLTAGE VDC

PV SYSTEM DC DISCONNECT
MAXIMUM CIRCUIT CURRENT ADC
MAXIMUM VOLTAGE VDC
#3

PHOTOVOLTAIC SYSTEM
DC DISCONNECT
MAX. CIRCUIT CURRENT ADC
MAXIMUM VOLTAGE VDC

1. PLACARD PLACED ON EACH DISCONNECT, IF MORE THAN ONE PRESENT.
2. VALUES MUST MATCH EQUIPMENT CALCULATIONS.
   SEE SHEET "E-001 / DC DISCONNECT [#]"
3. CODE REFERENCE: NEC 690.53
4. MINIMUM OF 2 1/2" x 8" OR 5" x 2 1/2" RESPECTIVELY.
5. FONT: 3/8" HEADER, 3/16" DATA
6. WHITE LETTERS ON A RED BACKGROUND.
7. IN SOME CASES TWO LABELS MAY BE REQUIRED. AN INVERTER WITH INTEGRATED DC DISCONNECT UTILIZING TWO MPPT TRACKERS; IF CONFIGURATION USES DIFFERENT MODULES.

2 AC DISCONNECT, AC SUB-PANEL

SCALE: 1/4" = 1'-0"

AC DISCONNECT #1 - INDEPENDENT/ SEPARATE

PV SYSTEM AC DISCONNECT
RATED AC OUTPUT CURRENT 42.0 AMPS
AC NORMAL OPERATING VOLTAGE 240 VOLTS

PHOTOVOLTAIC SYSTEM
AC DISCONNECT
RATED AC OUTPUT CURRENT 42.0 AMPS
AC NORMAL OPERATING VOLTAGE 240 VOLTS

STRING INVERTER #1 - INTEGRATED AC DISCONNECT

PV SYSTEM AC DISCONNECT
RATED AC OUTPUT CURRENT 42.0 AMPS
AC NORMAL OPERATING VOLTAGE 240 VOLTS

PHOTOVOLTAIC SYSTEM
AC DISCONNECT
RATED AC OUTPUT CURRENT 42.0 AMPS
AC NORMAL OPERATING VOLTAGE 240 VOLTS

STRING INVERTER #2 - INTEGRATED AC DISCONNECT

PV SYSTEM AC DISCONNECT
RATED AC OUTPUT CURRENT AMPS
AC NORMAL OPERATING VOLTAGE VOLTS

PHOTOVOLTAIC SYSTEM
AC DISCONNECT
RATED AC OUTPUT CURRENT AMPS
AC NORMAL OPERATING VOLTAGE VOLTS

AC SUB-PANEL #1

PV SYSTEM AC DISCONNECT
RATED AC OUTPUT CURRENT AMPS
AC NORMAL OPERATING VOLTAGE VOLTS

PHOTOVOLTAIC SYSTEM
AC DISCONNECT
RATED AC OUTPUT CURRENT AMPS
AC NORMAL OPERATING VOLTAGE VOLTS

SOLAR LOAD CENTER

PV SYSTEM AC DISCONNECT
RATED AC OUTPUT CURRENT AMPS
AC NORMAL OPERATING VOLTAGE VOLTS

PHOTOVOLTAIC SYSTEM
AC DISCONNECT
RATED AC OUTPUT CURRENT AMPS
AC NORMAL OPERATING VOLTAGE VOLTS

1. PLACARD PLACED ON EACH SOLAR SYSTEM DISCONNECTING COMPONENT.
2. VALUES MUST MATCH EQUIPMENT CALCULATIONS.
   SEE SHEET "E-001 / AC DISCONNECT [#]"
3. CODE REFERENCE: NEC 690.54
4. MINIMUM OF 1 1/2" x 8 1/2" OR 1 3/4" x 6 1/2" RESPECTIVELY.
5. FONT: 3/8" HEADER, 3/16" DATA
6. WHITE LETTERS ON A RED BACKGROUND.

3 UTILITY METER, SERVICE PANEL, SUB-PANEL

SCALE: 1/4" = 1'-0"

WARNING
DUAL POWER SOURCES
RATED AC OUTPUT CURRENT 42.0 AMPS
AC NORMAL OPERATING VOLTAGE 240 VOLTS
#1

BUILDING CONTAINS TWO SOURCES OF POWER: UTILITY, SOLAR PV UTILITY SERVICE DISCONNECT LOCATED BELOW. SOLAR PV SYSTEM DISCONNECT LOCATED [N/E/S/W] WALL OF BUILDING
#2

BUILDING CONTAINS TWO SOURCES OF POWER: UTILITY, SOLAR PV UTILITY SERVICE DISCONNECT LOCATED BELOW. SOLAR PV SYSTEM DISCONNECT LOCATED [N/E/S/W] WALL OF BUILDING
#3

1. (#1) PLACARD PLACED AT MAIN UTILITY SERVICE DISCONNECT/BREAKER AND PV SYSTEM SUPPLY BREAKER AT POINT OF INTERCONNECTION. (#2 & #3) PLACARD(S) REQUIRED WITH #1 PLACARD WHEN UTILITY SERVICE AND PV SYSTEM DISCONNECT(S) ARE NOT LOCATED NEXT TO EACH OTHER. MAP PLACARD REQUIRED AS SPECIFIED.
2. VALUES MUST MATCH EQUIPMENT CALCULATIONS.
   2.1. VALUES WILL MATCH LOAD CENTER OR SUB-PANEL VALUES IF INSTALLED AFTER INVERTERS. IF AC CONNECTION TO SERVICE PANEL COMES FROM INVERTERS; SEE SHEET "E-001 / STRING INVERTER[#] SPECIFICATIONS".
      2.1.1. INVERTERS ARE PARALLEL CONNECTIONS.
      2.1.2. "RATED AC OUTPUT CURRENT" WILL BE THE SUM OF THE INVERTERS
      2.1.3. "AC NORMAL OPERATING VOLTAGE" WILL BE THE NAME PLATE RATING OF THE INVERTER
3. CODE REFERENCE: NEC 690.54, NEC 705.12(B)(3)
4. MINIMUM OF 2" x 6 1/2" (#1), VARIES (#2 & #3)
5. FONT: 3/8" HEADER, 3/16" DATA (#1), 1/4" (#2 & #3)
6. WHITE LETTERS ON A RED BACKGROUND.

SHEET NOTES

CODE ABBREVIATIONS:
NATIONAL ELECTRICAL CODE (NEC)
INTERNATIONAL BUILDING CODE (IBC)
INTERNATIONAL RESIDENTIAL CODE (IRC)
INTERNATIONAL FIRE CODE (IFC)
UNDERWRITERS LABORATORY (UL)

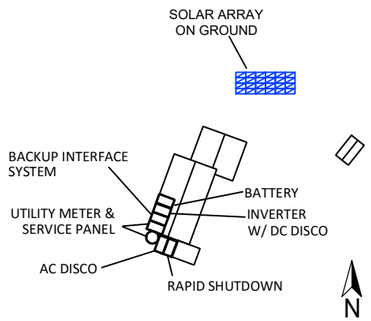
1. COMBINATION PLACARDS MAY BE USED IN PLACE OF MULTIPLE PLACARDS FOR THE SAME DEVICE. ALL INFORMATION FROM THE MULTIPLE PLACARDS MUST BE PRESENT.
2. BLACK LETTERS WITH YELLOW BACKGROUND MAY BE USED IN PLACE OF THE STANDARD WHITE LETTERS WITH RED BACKGROUND WITH AHJ APPROVAL.
3. ALL INTERIOR AND EXTERIOR DC CONDUIT, ENCLOSURES, RACEWAYS, CABLE ASSEMBLIES, JUNCTION BOXES, COMBINER BOXES AND DISCONNECTS ARE MARKED. (NEC 690.31[E][3], NEC 690.31[E][4] & 690.53)
4. REQUIRED LABELS SHALL BE PERMANENT AND SUITABLE FOR THE ENVIRONMENT. MATERIALS USED FOR MARKING MUST BE WEATHER RESISTANT. UL STANDARD IS RECOMMENDED TO DETERMINE WEATHER RATING. UL LISTING OF MARKINGS IS NOT REQUIRED. SEE UL LABELING SYSTEM 969 (UL 969)
5. MARKING CONTENT AND FORMAT:
   5.1. ARIAL OR SIMILAR FONT, NON-BOLD.
   5.2. MINIMUM 3/8" LETTER HEIGHT FOR HEADERS.
   5.3. MINIMUM 1/16" LETTER HEIGHT FOR DATA
   5.4. CONTRASTING BACKGROUND AND LETTERING.
   5.5. ALL CAPITAL LETTERS.
   5.6. CONTRASTING SPACE BETWEEN ROWS OF TEXT
   5.7. DIMENSIONS OF PLACARDS ARE APPROXIMATE. MAY BE REDUCED AND / OR INCREASED TO UL APPROVED MANUFACTURED PRODUCT
6. ANSI Z535.4 PRODUCT SAFETY SIGNS AND LABELS: THIS INFORMATIONAL NOTE AND ITS REQUIREMENTS FOR PLACARDS MAY BE USED WITH PRIOR APPROVAL OF THE AHJ. MOST NOTABLE DIFFERENCES IS COLOR OF PLACARDS AND USE OF HAND WRITTEN VALUES WITH INDUSTRIAL MARKERS ON STANDARD PLACARDS WHERE THE VALUE MAY CHANGE AT A FUTURE DATE. I.E. ADDING MODULES AT A FUTURE DATE, OR STANDARD PLACARD MANUFACTURER INSTALLED ON ELECTRICAL COMPONENT. AHJ APPROVAL REQUIRED. (SEE NOTE #1 FOR INDIVIDUAL PLACARDS)

4 MAP PLACARD: MAIN SERVICE PANEL AND PV INVERTER (IF NOT SAME LOCATION)

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

(WITH COMBINED WARNING PLACARD IF REQUIRED. EXAMPLE: LADWP)

CAUTION
POWER TO THIS BUILDING IS SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN:



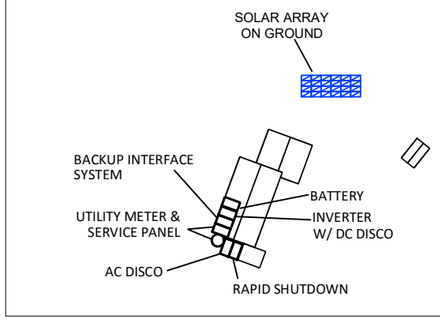
WARNING
ELECTRIC SHOCK HAZARD - DO NOT TOUCH TERMINALS
TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

1. PLACARD PLACED AT ELECTRICAL SERVICE AND AT THE PV INVERTER AND PV DISCONNECTS IF NOT AT THE SAME LOCATION.
2. MAP PLACARD PROVIDES A DIRECTORY OF THE SERVICE DISCONNECTING MEANS AND PHOTOVOLTAIC SYSTEM DISCONNECTION MEANS.
3. CODE REFERENCE: NEC 690.56(A)(B), 705.10
4. WHITE LETTERS ON A RED BACKGROUND.
5. MINIMUM OF 7 3/4" x 5"
6. FONT: 3/4" "CAUTION", 1/4" "WARNING", 3/16" HEADER, 1/8" DATA AND NOTES
7. PLACARD WILL BE PLACED ADJACENT TO THE MAIN SERVICE DISCONNECT IN A LOCATION CLEARLY VISIBLE FROM WHERE THE DISCONNECT IS OPERATED. (IFC 605.11.1.3)

5 MAP PLACARD: MAIN SERVICE PANEL AND PV INVERTER (IF NOT SAME LOCATION)

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

CAUTION
POWER TO THIS BUILDING IS SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN:



1. PLACARD PLACED AT ELECTRICAL SERVICE AND AT THE PV INVERTER AND PV DISCONNECTS IF NOT AT THE SAME LOCATION.
2. MAP PLACARD PROVIDES A DIRECTORY OF THE SERVICE DISCONNECTING MEANS AND PHOTOVOLTAIC SYSTEM DISCONNECTION MEANS.
3. CODE REFERENCE: NEC 690.56(A)(B), 705.10
4. WHITE LETTERS ON A RED BACKGROUND.
5. MINIMUM OF 6 1/2" x 6 1/2"
6. FONT: 3/4" "CAUTION", 1/4" HEADER, 1/8" DATA AND NOTES
7. PLACARD WILL BE PLACED ADJACENT TO THE MAIN SERVICE DISCONNECT IN A LOCATION CLEARLY VISIBLE FROM WHERE THE DISCONNECT IS OPERATED. (IFC 605.11.1.3)

RESPONSIBILITY NOTES

1. PRIME CONTRACTOR / PERMIT APPLICANT SIGNER IS RESPONSIBLE FOR THE DESIGN AND SPECIFICATIONS OF THE PHOTOVOLTAIC SYSTEM INSTALLATION. PRIME CONTRACTOR / PERMIT APPLICANT SIGNER WILL BE RESPONSIBLE FOR COLLECTION OF EXISTING ONSITE INFORMATION REQUIREMENTS TO DESIGN, SPECIFY, AND INSTALL THE EXTERIOR MOUNTED PORTION OF THE PHOTOVOLTAIC SYSTEM DETAILED IN THIS DOCUMENT.
2. ADVANCED SOLAR SOLUTIONS, INC IS RESPONSIBLE FOR APPLYING SUPPLIED INFORMATION INTO A SET OF PERMIT DRAWINGS. ANY CHANGES TO DRAWINGS ARE SUBJECT TO CONTRACT CONDITIONS BETWEEN THE CLIENT AND ADVANCED SOLAR SOLUTIONS, INC. IN ACCORDANCE WITH THE REQUIREMENTS OF THE AHJ.

REV	DATE	
	03/10/2023	SUBMIT FOR PERMIT

DYNAMIC PLACARDS

P-002

9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

Valley Solar

VALLEY SOLAR

SOLAR'S MOST TRUSTED

REC N-PEAK 3 BLACK SERIES

PREMIUM FULL BLACK MONO N-TYPE SOLAR PANELS

MONO N-TYPE: THE MOST EFFICIENT C-SI TECHNOLOGY

NO LIGHT INDUCED DEGRADATION

SUPER-STRONG FRAME UP TO 7000 PA SNOW LOAD

FLEXIBLE INSTALLATION OPTIONS

FEATURING REC'S PIONEERING TWIN DESIGN

BIFACIAL CELLS CAN PRODUCE ENERGY FROM BOTH SIDES

400 WP POWER

PRODUCT REC 25 YEAR ProTrust WARRANTY PERFORMANCE LABOR

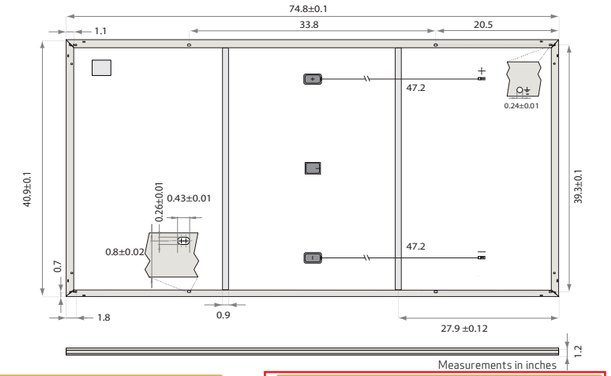
ELIGIBLE

REC N-PEAK 3 BLACK SERIES

PRODUCT SPECIFICATIONS

REC SOLAR'S MOST TRUSTED

GENERAL DATA	
Cell type:	132 half-cut mono c-Si n-type cells 6 strings of 22 cells in series
Glass:	0.13 in solar glass with anti-reflective surface treatment in accordance with EN 12150
Backsheet:	Highly resistant polymer (black)
Frame:	Anodized aluminum (black) with silver support bars
Junction box:	3-part, 3 bypass diodes, lead-free IP68 rated, in accordance with IEC 62790
Connectors:	Stäubli MC4 PV-KBT4/KST4 (4 mm²) in accordance with IEC 62852, IP68 only when connected
Cable:	12 AWG (4 mm²) PV wire, 47.2+ 47.2 in in accordance with EN 50618
Dimensions:	74.8 x 40.9 x 1.2 in (19.7 sq-ft)
Weight:	47.0 lbs
Origin:	Made in Singapore



ELECTRICAL DATA	Product Code*: RECxxxNP3 Black	
STC		
Power Output - P_{MAX} (Wp)	390	400
Watt Class Sorting - (W)	0/+10	0/+10
Nominal Power Voltage - V_{MPP} (V)	36.8	37.6
Nominal Power Current - I_{MPP} (A)	10.60	10.64
Open Circuit Voltage - V_{OC} (V)	44.8	45.0
Short Circuit Current - I_{SC} (A)	11.31	11.39
Panel Efficiency (%)	19.8	20.3
NMOT		
Power Output - P_{MAX} (Wp)	295	302
Nominal Power Voltage - V_{MPP} (V)	34.4	35.2
Nominal Power Current - I_{MPP} (A)	8.56	8.59
Open Circuit Voltage - V_{OC} (V)	41.9	42.1
Short Circuit Current - I_{SC} (A)	9.13	9.20

Values at standard test conditions (STC: air mass AM 1.5, irradiance 1075 W/sq ft (1000 W/m²), temperature 77°F (25°C), based on a production spread with a tolerance of P_{MAX}, V_{OC} & I_{SC} ±3% within one watt class. Nominal module operating temperature (NMOT: air mass AM1.5, irradiance 800 W/m², temperature 68°F (20°C), windspeed 3.3 ft/s (1 m/s). * Where xxx indicates the nominal power class (P_{MAX}) at STC above.

CERTIFICATIONS (PENDING)	
IEC 61215:2016, IEC 61730:2016, UL 61730	
IEC 62804	PID
IEC 61701	Salt Mist
IEC 62716	Ammonia Resistance
UL 61730	Fire Type Class 2
IEC 62782	Dynamic Mechanical Load
IEC 61215-2:2016	Hailstone (1.37in)
ISO 14001, ISO 9001, IEC 45001, IEC 62941	

TEMPERATURE RATINGS*	
Nominal Module Operating Temperature:	44.3°C (±2°C)
Temperature coefficient of P_{MAX}:	-0.34 %/°C
Temperature coefficient of V_{OC}:	-0.26 %/°C
Temperature coefficient of I_{SC}:	0.04 %/°C

*The temperature coefficients stated are linear values

MAXIMUM RATINGS	
Operational temperature:	-40 ... +185°F
Maximum system voltage:	1000 V
Maximum test load (front):	+7000 Pa (146 lbs/sq-ft)*
Maximum test load (rear):	-4000 Pa (83.5 lbs/sq-ft)*
Max series fuse rating:	25 A
Max reverse current:	25 A

*See installation manual for mounting instructions. Design load = Test load / 1.5 (safety factor)

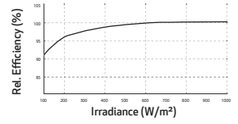
WARRANTY	Standard	REC ProTrust	
Installed by an REC Certified Solar Professional	No	Yes	Yes
System Size	All	≤25 kW	25-500 kW
Product Warranty (yrs)	20	25	25
Power Warranty (yrs)	25	25	25
Labor Warranty (yrs)	0	25	10
Power in Year 1	98%	98%	98%
Annual Degradation	0.25%	0.25%	0.25%
Power in Year 25	92%	92%	92%

See warranty documents for details. Conditions apply

DELIVERY INFORMATION	
Panels per pallet:	33
Panels per 40 ft GP/high cube container:	792 (24 pallets)
Panels per 53 ft truck:	TBD

LOW LIGHT BEHAVIOUR

Typical low irradiance performance of module at STC:



Available from:

Founded in 1996, REC Group is an international pioneering solar energy company dedicated to empowering consumers with clean, affordable solar power. As Solar's Most Trusted, REC is committed to high quality, innovation, and a low carbon footprint in the solar materials and solar panels it manufactures. Headquartered in Norway with operational headquarters in Singapore, REC also has regional hubs in North America, Europe, and Asia-Pacific.

REC www.recgroup.com

Ref: PM-DS-11-04-Rev- A 07.22

REV	DATE	
	03/10/2023	RELEASE
		SUBMIT FOR PERMIT

R-100

EQUIP. CUT SHEETS

9.600 kW PHOTOVOLTAIC

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

Valley Solar

21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

VALLEY SOLAR

Single Phase Energy Hub Inverter with Prism Technology

For North America

SE3000H-US / SE3800H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US(1)

HOME BACKUP

Optimized battery storage with HD-Wave technology

- Record-breaking 99% weighted efficiency with 200% DC oversizing
- Small, lightweight, and easy to install
- Modular design, future ready with optional upgrades to:
  - DC-coupled storage for full or partial home backup
  - Built-in consumption monitoring
  - Direct connection to the SolarEdge smart EV charger
- Multi-inverter, scalable storage solution
  - With enhanced battery power up to 10kW
- Integrated arc fault protection and rapid shutdown for NEC 2014, NEC 2017 and NEC 2020, per article 690.11 and 690.12
- Embedded revenue grade production data, ANSI C12.20 Class 0.5

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Single Phase Energy Hub Inverter with Prism Technology

For North America

SE3000H-US / SE3800H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US(1)

	SE3000H-US	SE3800H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	UNITS
OUTPUT - AC ON GRID							
Rated AC Power	3000	3800 @ 240V 3300 @ 208V	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	W
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	W
AC Frequency Range (min - nom - max)	59.3 - 60 - 60.5(2)						Hz
Maximum Continuous Output Current @ 240V	12.5	16	25	32	42	47.5	A
Maximum Continuous Output Current @ 208V	-	16	24	-	-	48.5	A
GFDI Threshold	1						A
Total Harmonic Distortion (THD)	<3						%
Power Factor	1, adjustable -0.85 to 0.85						
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes						
Charge Battery from AC (if allowed)	Yes						
Typical Nighttime Power Consumption	<2.5						W
OUTPUT - AC BACKUP(3)							
Rated AC Power in Backup Operation(4)	3000	3800 7600*	6000	7600 10300*	10000	10300	W
AC L-L Output Voltage Range in Backup	211 - 264						Vac
AC L-N Output Voltage Range in Backup	105 - 132						Vac
AC Frequency Range in Backup (min - nom - max)	55 - 60 - 65						Hz
Maximum Continuous Output Current in Backup Operation	12.5	16 32*	25	32 43*	42	43	A
GFDI	1						A
THD	<5						%
OUTPUT - SMART EV CHARGER AC							
Rated AC Power	9600						W
AC Output Voltage Range	211 - 264						Vac
On-Grid AC Frequency Range (min - nom - max)	59.3 - 60 - 60.5						Hz
Maximum Continuous Output Current @240V (grid, PV and battery)	40						Aac
INPUT - DC (PV AND BATTERY)							
Transformer-less, Ungrounded	Yes						
Max Input Voltage	480						Vdc
Nom DC Input Voltage	380						Vdc
Reverse-Polarity Protection	Yes						
Ground-Fault Isolation Detection	600kΩ Sensitivity						
INPUT - DC (PV)							
Maximum DC Power @ 240V	6000	7600 15200*	12000	15200 22800*	22000	22800	W
Maximum DC Power @ 208V	-	6600	10000	-	-	20000	W
Maximum Input Current(5) @ 240V	8.5	10.5 20*	16.5	20 31*	27	31	Adc
Maximum Input Current(5) @ 208V	-	9	13.5	-	-	27	Adc
Max. Input Short Circuit Current	45						Adc
Maximum Inverter Efficiency	99	99.2					%
CEC Weighted Efficiency	99					99 @ 240V 98.5 @ 208V	%
2-pole Disconnection	Yes						

* Supported with PN SExxxxH-USMMxxxxxx or SExxxxH-USMNxxxxxx

(1) These specifications apply to inverters with part numbers SExxxxH-USSMxxxxx or SExxxxH-USSNxxxxxx and connection unit model number DCD-1PH-US-PxH-F-x

(2) For other regional settings please contact SolarEdge support

(3) Not designed for standalone applications and requires AC for commissioning. Backup functionality is only supported for 240V grid

(4) Rated AC power in Backup Operation are valid for installations with multiple inverters. For a single backup inverter operation, rated AC power in Backup is 90% of the value stated

(5) A higher current source may be used; the inverter will limit its input current to the values stated

REV	DATE	RELEASE
	03/10/2023	SUBMIT FOR PERMIT

EQUIP. CUT SHEETS

R-101

9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102 Shutesbury, MA 01072
ADDRESS	
APN	

Valley Solar

21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

VALLEY SOLAR

Single Phase Energy Hub Inverter with Prism Technology

For North America

SE3000H-US / SE3800H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US[1]

	SE3000H-US	SE3800H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	UNITS
INPUT - DC (BATTERY)							
Supported Battery Types	SolarEdge Energy Bank, LG RESU Prime[6]						
Number of Batteries per Inverter	Up to 3 SolarEdge Energy Bank, up to 2 LG RESU Prime						
Continuous Power[7]	6000	7600	10000				W
Peak Power[7]	6000	7600	10000				W
Max Input Current	16	20	26.5				Adc
2-pole Disconnection	Yes						
SMART ENERGY CAPABILITIES							
Consumption Metering	Built - in[8]						
Backup & Battery Storage	With Backup Interface (purchased separately) for service up to 200A; Up to 3 inverters						
EV Charging	Direct connection to Smart EV charger						
ADDITIONAL FEATURES							
Supported Communication Interfaces	RS485, Ethernet, Cellular[9], Wi-Fi (optional),SolarEdge Energy Net (optional)						
Revenue Grade Metering, ANSI C12.20	Built - in[8]						
Integrated AC, DC and Communication Connection Unit	Yes						
Inverter Commissioning	With the SetApp mobile application using built-in Wi-Fi Access Point for local connection						
DC Voltage Rapid Shutdown (PV and Battery)	Yes, according to NEC 2014, NEC 2017 and NEC 2020 690.12						
STANDARD COMPLIANCE							
Safety	UL1741, UL1741 SA, UL1741 PCS, UL1699B, UL1998, UL9540, CSA 22.2						
Grid Connection Standards	IEEE1547, Rule 21, Rule 14H						
Emissions	FCC part 15 class B						
INSTALLATION SPECIFICATIONS							
AC Output and EV AC Output Conduit Size / AWG Range	1" maximum / 14-4 AWG						
DC Input (PV and Battery) Conduit Size / AWG Range	1" maximum / 14-6 AWG						
Dimensions with Connection Unit (H x W x D)	17.7 x 14.6 x 6.8 / 450 x 370 x 174			17.7 x 14.6 x 6.8 / 450 x 370 x 174 17.7 x 14.6 x 6.8 / 450 x 370 x 174*		17.7 x 14.6 x 6.8 / 450 x 370 x 174	in / mm
Weight with Connection Unit	26 / 11.8			26 / 11.8 30.2 / 13.7*		30.2 / 13.7	lb / kg
Noise	< 25	< 25 < 50*	< 25	< 50			dBA
Cooling	Natural Convection						
Operating Temperature Range	-40 to +140 / -40 to +60[10]						°F / °C
Protection Rating	NEMA 4						

(6) The part numbers SExxxxH-USxMxxxxx only support the SolarEdge Energy Bank. The part numbers SExxxxH-USxNxxxxx support both SolarEdge Energy Bank and LG RESU Prime batteries
Requires supporting inverter firmware
(7) Discharge power is limited up to the inverter rated AC power for on-grid and backup applications
(8) For consumption metering current transformers should be ordered separately: SECT-SPL-225A-T-20 or SEACT0750-400NA-20 units per box. Revenue grade metering is only for production metering
(9) Information concerning the Data Plan's terms & conditions is available in the following link:
https://www.solaredge.com/sites/default/files/se-communication-plan-terms-and-conditions-eng.pdf
(10) Full power up to at least 50°C / 122°F; for power de-rating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf

RoHS

REV | DATE | RELEASE
 | 03/10/2023 | SUBMIT FOR PERMIT

EQUIP. CUT SHEETS

R-102

9.600 kW PHOTOVOLTAIC PLANS

NAME: Douglas, Damon
ADDRESS: 530 W Pelham Rd Pole 102
ADDRESS: Shutesbury, MA 01072
APN:

Valley Solar
21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

VALLEY SOLAR

Power Optimizer

S440, S500

25 YEAR WARRANTY

POWER OPTIMIZER

PV power optimization at the module level

- Specifically designed to work with SolarEdge residential inverters
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch loss, from manufacturing tolerance to partial shading
- Faster installations with simplified cable management and easy assembly using a single bolt
- Detects abnormal PV connector behavior, preventing potential safety issues*
- Module-level voltage shutdown for installer and firefighter safety
- Flexible system design for maximum space utilization
- Compatible with bifacial PV modules

* Functionality subject to inverter model and firmware version

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/ Power Optimizer

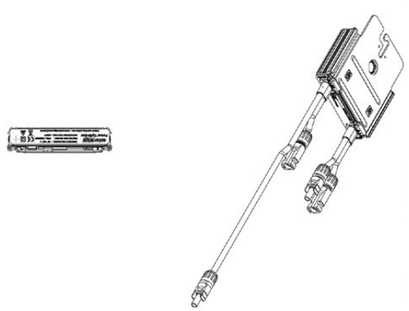
S440 S500

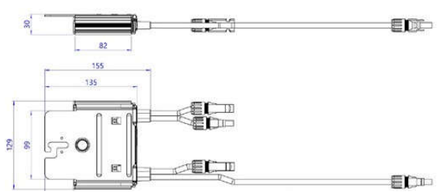
	S440	S500	UNIT
INPUT			
Rated Input DC Power(1)	440	500	W
Absolute Maximum Input Voltage (Voc)	60		Vdc
MPPT Operating Range	8 - 60		Vdc
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5		Adc
Maximum Efficiency	99.5		%
Weighted Efficiency	98.6		%
Overvoltage Category	II		
OUTPUT DURING OPERATION			
Maximum Output Current	15		Adc
Maximum Output Voltage	60		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)			
Safety Output Voltage per Power Optimizer	1		Vdc
STANDARD COMPLIANCE			
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3, CISPR11, EN-55011		
Safety	IEC62109-1 (class II safety), UL1741		
Material	UL94 V-0, UV Resistant		
RoHS	Yes		
Fire Safety	VDE-AR-E 2100-712:2013-05		
INSTALLATION SPECIFICATIONS			
Maximum Allowed System Voltage	1000		Vdc
Dimensions (W x L x H)	129 x 153 x 30		mm
Weight (including cables)	655 / 1.5		gr / lb
Input Connector	MC4(2)		
Input Wire Length	0.1		m
Output Connector	MC4		
Output Wire Length	(+) 2.3, (-) 0.10		m
Operating Temperature Range(3)	-40 to +85		°C
Protection Rating	IP68 / NEMA6P		
Relative Humidity	0 - 100		%

(1) Rated power of the module at STC will not exceed the power optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed
(2) For other connector types please contact SolarEdge
(3) For ambient temperature above +70°C / +158°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details

PV System Design Using a SolarEdge Inverter		Single Phase HD-Wave	Single Phase	Three Phase	Three Phase for 277/480V grid	
Minimum String Length (Power Optimizers)	S440, S500	8		16	18	
Maximum String Length (Power Optimizers)		25		50		
Maximum Nominal Power per String(4)		5700	5250	11250(5)	12750(6)	W
Parallel Strings of Different Lengths or Orientations		Yes				

(4) If the inverters rated AC power ≤ maximum nominal power per string, then the maximum power per string will be able to reach up to the inverters maximum input DC power
Refer to: https://www.solaredge.com/sites/default/files/se-power-optimizer-single-string-design-application-note.pdf
(5) For the 230/400V grid: it is allowed to install up to 13,500W per string when the maximum power difference between each string is 2,000W
(6) For the 277/480V grid: it is allowed to install up to 15,000W per string when the maximum power difference between each string is 2,000W
(7) It is not allowed to mix S-series and P-series power optimizers in new installations





CE RoHS

REV | DATE | RELEASE
03/10/2023 | SUBMIT FOR PERMIT

EQUIP. CUT SHEETS

R-103

9.600 kW PHOTOVOLTAIC PLANS

NAME: Douglas, Damon
ADDRESS: 530 W Pelham Rd Pole 102
ADDRESS: Shutesbury, MA 01072
APN:

Valley Solar
21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

VALLEY SOLAR

SolarEdge Energy Bank 10kWh Battery

For North America

10 YEAR WARRANTY

HOME BACKUP

Optimized for SolarEdge Energy Hub Inverters(1)

- Maximized system performance, gaining more energy to store and use for on-grid and backup power applications
- Integrates with the complete SolarEdge residential offering, providing a single point of contact for warranty, support, training, and simplified logistics & operations
- DC coupled battery featuring superior overall system efficiency, from PV to battery to grid
- Scalable solution for increased power and capacity with multiple SolarEdge inverters and batteries
- Solar, storage, EV charging, and smart devices all monitored and managed by a single app to optimize solar production, consumption and backup* power
- Wireless communication to the inverter, reducing wiring, labor and installation faults
- Simple plug and play installation, with automatic SetApp-based configuration
- Includes multiple safety features for battery protection

* Backup application are subject to local regulation and may require additional components and firmware upgrade

solaredge.com

solaredge

SolarEdge Energy Bank 10kWh Battery

For North America

	BAT-10K1P(2)	
BATTERY SPECIFICATION		
Usable Energy (100% depth of discharge)	9700	Wh
Continuous Output Power	5000	W
Peak Output Power (for 10 seconds)	7500	W
Peak Roundtrip Efficiency	>94.5	%
Warranty(3)	10	Years
Voltage Range	350-450	Vdc
Communication Interfaces	Wireless*	
Batteries per Inverter	Up to 3(4)	
STANDARD COMPLIANCE		
Safety	UL1642, UL1973, UL9540, UN38.3	
Emissions	FCC Part 15 Class B	
MECHANICAL SPECIFICATIONS		
Dimensions (W x H x D)	31.1 x 46.4 x 9.84 / 790 x 1179 x 250	in / mm
Weight	267 / 121	lb / kg
Mounting(5)	Floor or wall mount(6)	
Operating Temperature(7)	+14 to +122 / -10 to +50	°F / °C
Storage Temperature (more than 3 months)	+14 to +86 / -10 to +30	°F / °C
Storage Temperature (less than 3 months)	-22 to + 140 / -30 to +60	°F / °C
Altitude	6562 / 2000	ft / m
Enclosure Protection	IP55 / NEMA 3R - indoor and outdoor (water and dust protection)	
Cooling	Natural convection	
Noise (at 1m distance)	<25	dBA

* The SolarEdge Energy Bank is designed for use with SolarEdge Energy Net for wireless communication. The inverter might require a matching SolarEdge Energy Net Plug-in (more details below). Using RS485 could reduce the usable energy to 9500Wh.

(1) Please refer to the SolarEdge Energy Bank battery connections and configuration application note for compatible inverters.
(2) These specifications apply to part number BAT-10K1PS0B-01.
(3) For warranty details please refer to the SolarEdge Energy Bank battery Limited Warranty.
(4) Installations with multiple SolarEdge Energy Bank batteries connected to a single inverter require a pair of branch connectors (DC + and DC -) per battery excluding the last battery. Support for 3 batteries is pending supporting inverter firmware. The branch connectors should be purchased separately.
(5) Installation and mounting requires handles that should be purchased separately. Please refer to the Accessories' PN table below.
(6) The floor stand is purchased separately. One floor stand is required per SolarEdge Energy Bank battery. Please refer to the Accessories' PN table below.
(7) Please note that operating the SolarEdge Energy Bank at extreme temperatures for extended durations of time may void the Energy Bank's warranty coverage. Please see the Energy Bank Limited Product Warranty for additional details.

SolarEdge Energy Bank Battery – Accessories (purchased separately)

Accessory	PN
Floor stand	IAC-RBAT-FLRSTD-01
Branch connectors set (includes a pair of DC + and DC - connectors) Required for installations with multiple SolarEdge Energy Bank batteries with a single inverter	IAC-RBAT-USYCBL-01
Handles	IAC-RBAT-HANDLE-01
SolarEdge Energy Net Plug-in	ENET-HBNP-01
Battery inverter extension cable 2m long (MC4 to terminal block)	IAC-RBAT-10M420-01

CE RoHS

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EQUIP. CUT SHEETS

R-104

9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

Valley Solar

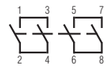
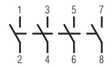
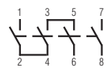
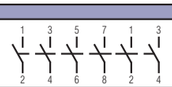
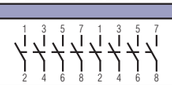
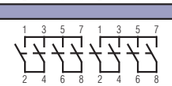
21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

VALLEY SOLAR

Rotary Actuator Switch - Lockable Off in Plastic Enclosure

- Rotary Actuator Switch
- Lockable Off - Safe-Lock
- Self-Extinguishing Plastic Enclosure
- M25 Cable Gland Entry Option
- NEMA Type 3R
- IP66

SAFE-LOCK

DC21A IEC60947-3				UL Ratings UL508i				Poles in series	No. of Strings	Weight Kg/pcs.	Part Number	Contact Configuration
600V	800V	1000V	1500V	350V	500V	600V	1000V					
16A	16A	9A	3A	16A	16A	16A	-	2	1	0.43	**SI16 PEL64R 2**	
25A	20A	11A	4A	20A	20A	20A	-	2	1	0.43	**SI25 PEL64R 2**	
32A	23A	13A	5A	25A	25A	25A	-	2	1	0.43	**SI32 PEL64R 2**	
40A	30A	20A	6A	40A	40A	40A	16A	2	1	1.59	**SI40 PEL64R 2**	
55A	45A	36A*	8A	55A	55A	55A	20A	2	1	1.59	**SI55 PEL64R 2**	
29A	16A	9A	3A	29A	29A	21A	-	2	1	0.49	**SI16 PEL64R 2H**	
45A	20A	11A	4A	45A	38A	23A	-	2	1	0.49	**SI25 PEL64R 2H**	
50A	23A	13A	5A	58A	40A	25A	-	2	1	0.49	**SI32 PEL64R 2H**	
64A	30A	20A	6A	72A	53A	42A	22A	2	1	1.74	**SI40 PEL64R 2H**	
80A	45A	25A	8A	85A	66A	55A	25A	2	1	1.74	**SI55 PEL64R 2H**	
16A	16A	9A	3A	16A	16A	16A	-	2	2	0.46	**SI16 PEL64R 4**	
25A	20A	11A	4A	20A	20A	20A	-	2	2	0.46	**SI25 PEL64R 4**	
32A	23A	13A	5A	25A	25A	25A	-	2	2	0.46	**SI32 PEL64R 4**	
40A	30A	20A	6A	40A	40A	40A	16A	2	2	1.67	**SI40 PEL64R 4**	
55A	45A	36A*	8A	55A	55A	55A	20A	2	2	1.67	**SI55 PEL64R 4**	
16A	16A	16A	16A	16A	16A	16A	-	4	1	0.47	**SI16 PEL64R 4S**	
25A	25A	25A	20A	25A	25A	25A	-	4	1	0.47	**SI25 PEL64R 4S**	
32A	32A	32A	23A	32A	32A	32A	-	4	1	0.47	**SI32 PEL64R 4S**	
40A	40A	40A	30A	40A	40A	40A	40A	4	1	1.70	**SI40 PEL64R 4S**	
55A	55A	55A	40A	55A	55A	55A	55A	4	1	1.70	**SI55 PEL64R 4S**	
16A	16A	9A	3A	16A	16A	16A	-	2	3	1.53	**SI16 PEL64R 6**	
25A	20A	11A	4A	20A	20A	20A	-	2	3	1.53	**SI25 PEL64R 6**	
32A	23A	13A	5A	25A	25A	25A	-	2	3	1.53	**SI32 PEL64R 6**	
16A	16A	9A	3A	16A	16A	16A	-	2	4	1.58	**SI16 PEL64R 8**	
25A	20A	11A	4A	20A	20A	20A	-	2	4	1.58	**SI25 PEL64R 8**	
32A	23A	13A	5A	25A	25A	25A	-	2	4	1.58	**SI32 PEL64R 8**	
29A	29A	29A	16A	29A	29A	29A	-	4	1	1.63	**SI16 PEL64R 4H**	
45A	45A	45A*	20A	45A	45A	45A	-	4	1	1.63	**SI25 PEL64R 4H**	
58A	58A*	58A*	23A	58A	58A	50A	-	4	1	1.63	**SI32 PEL64R 4H**	

4T / 4B configuration also available. For ratings refer to 4S configuration. (See page 17)
* **DC21B**

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R-105

EQUIP. CUT SHEETS

9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

Valley Solar

21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

VALLEY SOLAR

Product specifications

Eaton DG322URB

Catalog Number: DG322URB

Eaton General duty non-fusible safety switch, single-throw, 60 A, NEMA 3R, Rainproof, Painted galvanized steel, Three-pole, Three-wire, 240 V

General specifications

Product Name
Eaton general duty non-fusible safety switch

Catalog Number
DG322URB

UPC
782113144313

Product Length/Depth
7.38 in

Product Height
14.19 in

Product Width
8.69 in

Product Weight
9 lb

Warranty
Eaton Selling Policy 25-000, one (1) year from the date of installation of the Product or eighteen (18) months from the date of shipment of the Product, whichever occurs first.

Certifications
UL Listed

Catalog Notes
WARNING! Switch is not approved for service entrance unless a neutral kit is installed.

Product specifications

Product Category
General duty safety switch

Enclosure material
Painted galvanized steel

Type
Non-fusible, single-throw

Fuse configuration
Non-fusible

Number of wires
3

Enclosure
NEMA 3R

Voltage rating
240V

Amperage Rating
60A

Number Of Poles
Three-pole

Resources

Catalogs
Eaton's Volume 2—Commercial Distribution

Multimedia
Double Up on Safety

Switching Devices Flex Center

Specifications and datasheets
Eaton Specification Sheet - DG322URB

Eaton Corporation plc
Eaton House
30 Pembroke Road
Dublin 4, Ireland
Eaton.com

Eaton.com/socialmedia

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R-106

EQUIP. CUT SHEETS

9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

Valley Solar
21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

Backup Interface
for North America

BI-EUSGN-01 / BI-NUSGN-01

STOREDGE®

Backup Interface for Flexible Backup

- Automatically provides backup power to home loads in the event of grid interruption
- Full flexibility in which loads to backup - the entire home or selected loads
- Scalable solution to support higher power & higher capacity(*)
- Built-in Auto Transformer and Energy Meter for easier and faster installation
- Seamless integration with the Energy Hub Inverter with Prism Technology to manage and monitor both PV generation and energy storage
- Generator connection support(*)

(*) Requires supporting inverter firmware

solaredge.com

solaredge

Backup Interface for North America

BI-EUSGN-01 / BI-NUSGN-01

	BI-EUSGN-01	BI-NUSGN-01	
INPUT FROM GRID			
AC Current Input	200		A
AC Output Voltage (Nominal)	240		Vac
AC Output Voltage Range	211 - 264		Vac
AC Frequency (Nominal)	60		Hz
AC Frequency Range	59.3 - 60.5		Hz
Microgrid Interconnection Device Rated Current	200		A
Service Side AC Main Circuit Breaker Rated Current	200	N/A	A
Service Side AC Main Circuit Breaker Interrupt Current	10k	N/A	A
Grid Disconnection Switchover Time	<100		ms
OUTPUT TO MAIN DISTRIBUTION PANEL			
Maximum AC Current Output	200		A
AC L-L Output Voltage (Nominal)	240		Vac
AC L-L Output Voltage Range	211 - 264		Vac
AC Frequency (Nominal)	60		Hz
AC Frequency Range	59.3 - 60.5		Hz
Maximum Inverters AC Current Output in Backup Operation	78		A
Imbalance Compensation in Backup Operation	5000		W
AC L-N Output Voltage in Backup (Nominal)	120		V
AC L-N Output Voltage Range in Backup	105 - 132		V
AC Frequency Range in Backup	55 - 65		Hz
INPUT FROM INVERTER			
Number of Inverter Inputs	3		#
Rated AC Power	7,600		W
Maximum Continuous Input Current @ 240V	32		A
Rated AC Power in Continuous Backup Operation	6,100		W
Maximum Continuous Input Current in Backup Operation	26		A
Peak AC Power (<10 sec) in Backup Operation	7,000		W
Peak AC Current (<10 sec) in Backup Operation	30		A
Inverter Input AC Circuit Breaker	40		A
Upgradability	Up to 3 X 63A CB(1)		
GENERATOR(2)			
Maximum Rated AC Power	15,000		W
Maximum Continuous Input Current	63		Adc
Dry Contact Switch Voltage Rating	250/30		Vac/Vdc
Dry Contact Switch Current Rating	5		A
2-wire Start Switch	Yes		
ADDITIONAL FEATURES			
Installation Type	Suitable for use as service equipment	For main lug only	
Number of Communication Inputs	2		
Communication	RS485		
Energy Meter (for Import/Export)	1% accuracy		
Manual Control Over Microgrid Interconnection Device	Yes		

(1) Each 40A CB supports up to one 7.6kW inverter, with each 63A CB supporting one 10kW and one 11.4kW inverter. The CB upgrade kit is available with the following part numbers: for 40A CB, CB-UPG-40-01; for 63A, CB CB-UPG-63-01
(2) Requires supporting inverter firmware

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EQUIP. CUT SHEETS

9.600 kW PHOTOVOLTAIC PLANS

NAME: Douglas, Damon
ADDRESS: 530 W Pelham Rd Pole 102
ADDRESS: Shutesbury, MA 01072
APN:

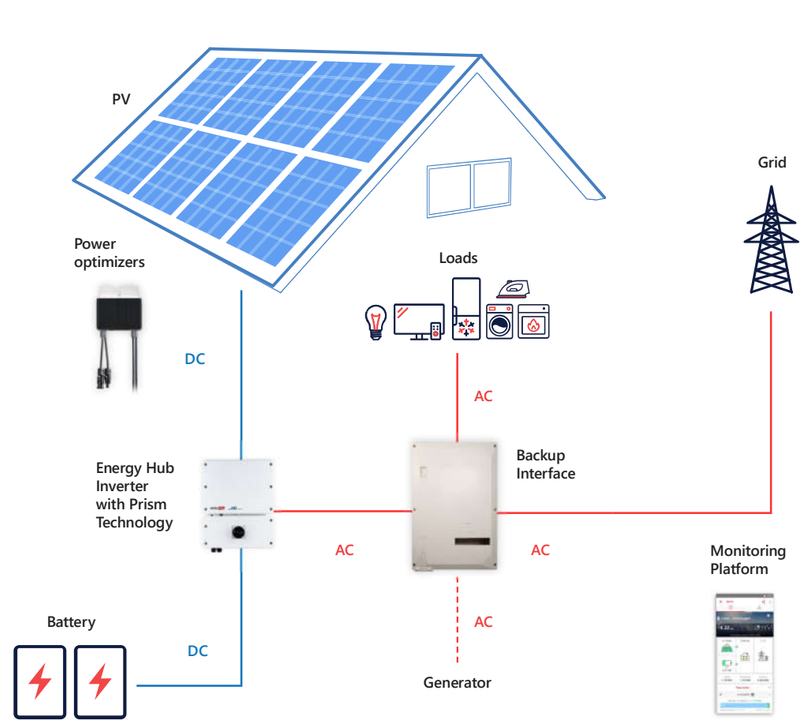
Valley Solar
21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

VALLEY SOLAR

/ Backup Interface for North America

BI-EUSGN-01 / BI-NUSGN-01

	BI-EUSGN-01	BI-NUSGN-01	
STANDARD COMPLIANCE			
Safety	UL1741, CSA 22.2 NO. 107		
	UL869A	N/A	
Emissions	FCC part 15 class B		
INSTALLATION SPECIFICATIONS			
Supported Inverters	StorEdge single phase inverter, Single phase Energy Hub inverter with Prism technology		
AC From Grid Conduit Size / AWG Range	2'' conduits / #0 - 4/0 AWG		
AC Inverter Conduit Size / AWG Range	1'' conduit / 14 - 4 AWG		
AC Generator Input Conduit Size / AWG Range	1'' conduit / 8 - 3 AWG		
Communication Conduit Size / AWG Range	3/4'' / 24 - 10 AWG		
Weight	73 / 33		lb / Kg
Cooling	Fan (user replaceable)		
Noise	< 50		dBA
Operating Temeprature Range	-40 to +122 / -40 to +50		°F / °C
Protection Rating	NEMA 3R, IP44		
Dimensions (HxWxD)	20.59 x 13.88 x 8.62 / 523.5 x 352.5 x 219		in / mm



CE ETL FC

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03/10/2023 | SUBMIT FOR PERMIT

R-108

EQUIP. CUT SHEETS

9.600 kW PHOTOVOLTAIC PLANS

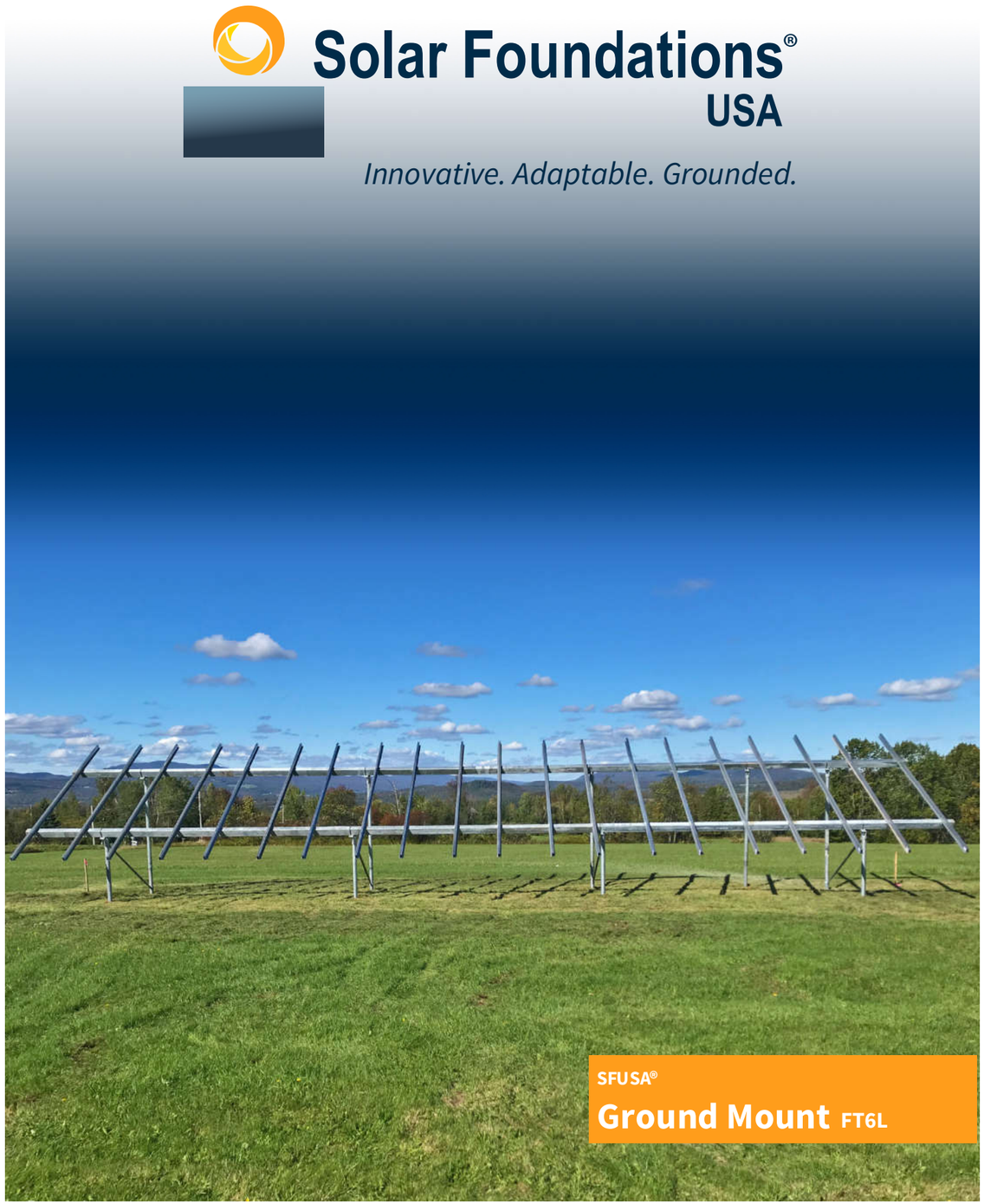
NAME: Douglas, Damon
ADDRESS: 530 W Pelham Rd Pole 102
ADDRESS: Shutesbury, MA 01072
APN:

Valley Solar
21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

VALLEY SOLAR

Solar Foundations® USA

Innovative. Adaptable. Grounded.



Adaptable Ground Screw Fixed Tilt System

The SFUSA® Ground Mount system is the optimal solution for residential and light commercial solar projects. By custom designing and manufacturing components in-house, Solar Foundations' structure fits and functions together seamlessly, installs in far less time and with greater strength. The highest quality materials such as high-grade steel fully galvanized in accordance with ASTM standards and high-strength aluminum alloys for our panel support rails are utilized for long-term durability. Designed to withstand high snow and wind areas, the UL 2703 classified system has an expected lifespan that exceeds multiple panel lifecycles. Thus, Solar Foundations' product maximizes the residual investment of your ground mount structure.

Features

Solar Foundations' patented rail design offers a simple connection detail between the panel support rail and the horizontal support beams.

The patented telescopic design of the SFUSA Wind Brace allows quick and easily adaptable length changes to match installation conditions where significant adjustability is required.

A two-man crew can typically install up to about a 25kW residential structure in a single day.

SFUSA has developed processes and equipment that permits the installation of our patent pending ground screws in any soil conditions including solid rock.

Our foundations feature wider spans between support columns and stronger members. We engineered our system to obtain a better balance between all of the system components, resulting in less ground penetrations, a lower installed cost and has allowed us to offer further cost optimizations and array configurations that are not typically available in the industry.

✓ *Allows for mounting panels in four-, five- or six-high in landscape orientation and can be adapted to custom configurations*

✓ *Durable design enables any wind speed and snow load*

✓ *0° to 40° tilt with multiple inter-row spacing options*

✓ *Compatible with a wide range of modules*

✓ *Pile verification report available after the installation has been completed*

✓ *25-year guarantee against failure*

SFUSA®
Ground Mount

REV	DATE	RELEASE
	03/10/2023	SUBMIT FOR PERMIT

R-109

EQUIP. CUT SHEETS

9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

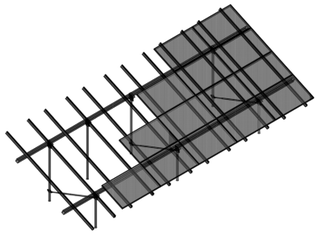
Valley Solar

VALLEY SOLAR

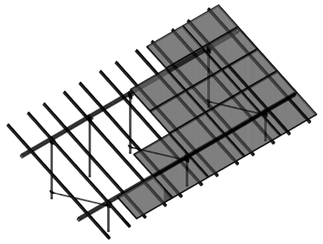
Let us simplify your ground mount structure process.

We're more than just a racking company.

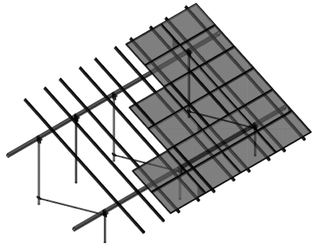
FT4L
Fixed Tilt 4 Landscape



FT5L
Fixed Tilt 5 Landscape

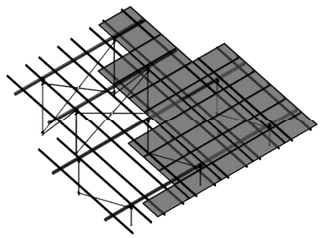


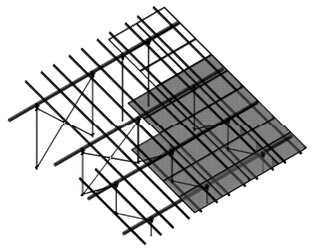
FT6L
Fixed Tilt 6 Landscape



Custom

SFUSA® has the ability to come up with creative structures and products outside of our standard systems for unique situations.





Materials	Hot-dipped galvanized steel, aluminum, stainless-steel mounting hardware
Tilt Angle	0° - 40°
Module Orientation	Landscape
Finishes	Galvanized
Foundation Options	Ground Screw - All soils including rock drilling
Grounding	Integrated or WEEB Bonding
Maximum Grade of Terrain	15°
Design Services	Signed & sealed structural drawings
Certifications	UL 2703
Warranty	25 years
Installation Services	Material, foundations, racking

LESS PILES
LARGER SPANS

UP TO 15°
TERRAIN SLOPES

Substructure Assembly

Horizontal Support Beam

We provide maximum support for our structure by utilizing high yield strength hollow structural steel sections on our racking systems.

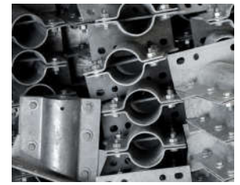
Diagonal Wind Brace and Insert

Our patented telescopic design allows quick and easily adaptable length changes to match installation conditions.

Diagonal Wind Brace Column Connector

SolarFoundations' hot-dipped galvanized custom Wind Brace Column Connectors fasten the Diagonal Wind Brace to a vertical column.

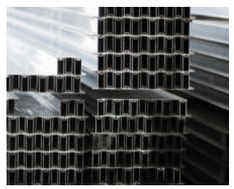
Column Caps



Our unique design allows a straightforward connection to the horizontal steel support beam.

Racking Assembly

Ground Mount Rail



Solar Foundations' patented rail design offers a simple connection detail between the panel support rail and the horizontal support beams, allowing 6 modules per column in landscape orientation.

Module End Clamp

Our end clamp design securely fastens the top and bottom edges of a column of solar panels to the SF Rail.

Module Mid Clamp

The mid clamp fastens two adjoining solar panels in a column of solar panels to the SF Rail. Our sleek design with multiple serrations increases the holding power of the modules to our SF Rails.

Grounding

Our UL 2703 Certification encompasses the rail to beam and beam to pile connections, permitting the use of a single grounding lug for the entire racking system.

Contact us at **info@solarfoundationsusa.com** or **(855) 738-7200**.

Solar Foundations USA®, Inc.
1142 River Road, New Castle, DE 19720
Phone (855) 738-7200
Fax (866) 644-5665
www.solarfoundationsusa.com

Solar Foundations® USA

REV	DATE	RELEASE
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R-110

EQUIP. CUT SHEETS

9.600 kW PHOTOVOLTAIC PLANS

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APN	

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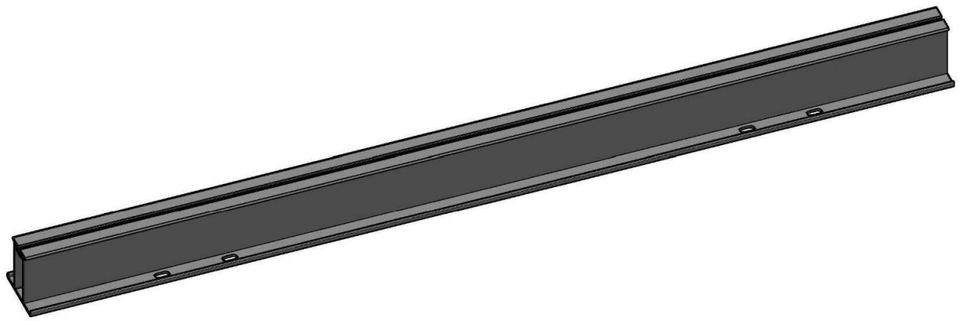
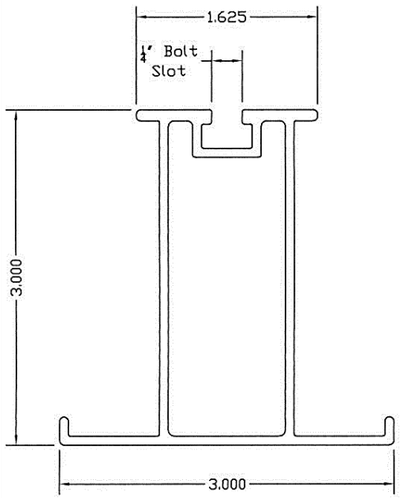
VALLEY SOLAR

Solar Foundations® USA

SFUSA®
Ground Mount Rail





Rail Section Properties	
Axis X-X	**Value**
I (Moment of Inertia)	1.272 in^4
S (Section Modulus)	0.802 in^3
R (Radius of Gyration)	1.152 in
Axis Y-Y	**Value**
I (Moment of Inertia)	0.418 in^4
S (Section Modulus)	0.278 in^3
R (Radius of Gyration)	0.664 in
Area	0.947 in^2
Weight	1.085 lb/LF

Item Number	Part Number	Description & Length	Panel Width	Typical Configuration	Material	Weight	Patent
1	R162	SFUSA Ground Mount Rail, 162"	38.58" – 39.41"	4 Panels High in Landscape	Aluminum 6005A – T61	15.3 lbs.	Patent No. 8,776,454 Patent No. 9,249,994 Patent No. 9,660,569
2	R171	SFUSA Ground Mount Rail, 171"	39.42" – 41.20"	4 Panels High in Landscape		16.1 lbs.	
3	R202	SFUSA Ground Mount Rail, 202"	38.58" – 39.41"	5 Panels High in Landscape		19.0 lbs.	
4	R212	SFUSA Ground Mount Rail, 212"	39.42" – 41.20"	5 Panels High in Landscape		20.0 lbs.	
5	R242	SFUSA Ground Mount Rail, 242"	38.58" – 39.41"	6 Panels High in Landscape		22.8 lbs.	
6	R254	SFUSA Ground Mount Rail, 254"	39.42" – 41.20"	6 Panels High in Landscape		23.9 lbs.	
7	R288	SFUSA Ground Mount Rail, 288"	39.42" – 41.20"	Custom		27.1 lbs.	

PROTECT
AGAINST CORROSION

CLEAN
& PROFESSIONAL LOOK

SIMPLE
CONNECTIONS

Solar Foundations® USA

Additional Options for SFUSA
Ground Mount Structures

Solar Foundations USA offers a number of beneficial add-ons for the SFUSA Ground Mount System. These features include equipment support columns for mounting electrical equipment, black panel mounting hardware for a sleek appearance, micro-inverter mounting hardware for a secure and simple connection and torque limiters to maintain precise control when mounting solar panels to our structures.

Solar Foundations USA®, Inc.

www.solarfoundationsusa.com

INNOVATIVE. ADAPTABLE. GROUNDED.

1142 River Road, New Castle, DE 19720 | Phone (855) 738-7200 | Fax (866) 644-5665 | **www.solarfoundationsusa.com**

REV	DATE	RELEASE
	03/10/2023	SUBMIT FOR PERMIT

EQUIP. CUT SHEETS

R-111

9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

Valley Solar
21134A
340 Riverside Dr
Florence, MA 01062
(413) 584-8844

VALLEY SOLAR

Additional Options for SFUSA Ground Mount Structures

Equipment Support Column (ESC)

Solar Foundations provides an optional ground screw designed to support the typical weight of electrical equipment. This additional ground screw is placed adjacent to a north column main support to reduce the span between columns. This permits UNISTRUT® (or similar channel) to span between the columns.

Every ESC includes a set of U-bolt mounting hardware that has the correct 2⅞" ID of the posts to mount the UNISTRUT® (or similar channel) to the support.

- (8) 2½" ESC U-Bolt (⅜"x4¼" Long)
- (17) ⅜" Hex Nut, HDG
- (17) ⅜" Washer, HDG

$265.00 - $290.00 each
Prices and product availability are subject to change without notice.

Equipment Support Column (ESC) & Mounting Hardware

Micro-Inverter Mounting Hardware

The Micro-Inverter Mounting kit is used to attach a micro inverter to a SFUSA Ground Mount Rail, providing a secure and simple connection. The T-Head style bolts permits installation and removal at any time without the need to remove solar panels.

The inverter mounting hardware includes:

- SFUSA T-Head Bolts, 0.75" Long (1/4-20, 18-8 Stainless)
- K-Lock Nuts (1/4-20, 18-8 Stainless)
- ¼" Oversized Washers (0.05" Thick x 1.0" OD, 18-8 Stainless)

***$73.00 for a pack of 100**
Prices and product availability are subject to change without notice.

Micro-Inverter Mounting Hardware

Additional Options for SFUSA Ground Mount Structures

Black Panel Hardware

Solar Foundations' End Clamps and Mid Clamps are available in a Black Anodized finish along with our stainless-steel K-Lock Nuts available in a Black Oxide finish for protection against corrosion and sleek appearance.

- Our black anodized end clamps accommodate a comprehensive range of frame heights from 30 to 47 mm
- Solar Foundations' black panel hardware is extremely resistant to fading in high UV environments and offers long-lasting resistance to abrasion

Black End Clamp w/ Black K-Lock Nut adds $1.30/unit
Black Mid Clamp w/ Black K-Lock Nut adds $1.15/unit
Prices and product availability are subject to change without notice.

Black Panel Hardware

120 in-lbs Inline Preset Torque Limiter

Solar Foundations' custom Inline Preset Torque Limiter improves productivity and efficiency while maintaining precise torque control when mounting solar panels to our structures. Our preset click-type torque limiter ensures that the solar panel mounting fasteners and SFUSA rail holdowns are tightened to the correct specifications.

- Compatible with any standard 1/2-inch chuck cordless drill
- Utilizes 3/8-inch drive sockets with retaining pin thru hole
- An audible 'click' indicates that the preset 120 in-lbs of torque has been reached
- Custom torque settings are available in therange of 30 to 180 in-lbs
- Slip-resistant drive adaptor
- Compact design helps maintain drill balance

$145.00 each
Prices and product availability are subject to change without notice.

120 in-lbs Inline Preset Torque Limiter

REV	DATE	RELEASE
	03/10/2023	SUBMIT FOR PERMIT

R-112

EQUIP. CUT SHEETS

9.600 kW PHOTOVOLTAIC PLANS

NAME	Douglas, Damon
ADDRESS	530 W Pelham Rd Pole 102
ADDRESS	Shutesbury, MA 01072
APN	

Valley Solar
21134A
340 Riverside Dr
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