CITY OF ORANGE HISTORIC PRESERVATION COMMISSION
ORANGE CITY HALL
29 North Day Street, Orange, New Jersey 07050
PHONE (973) 952- 6344 FAX (973) 672-6643

RECEIVED
ORANGE CITY CLERK'S OFFICE
2023 MAR -1 A 10:58

CITY OF ORANGE PRESERVATION COMMISSION
APPLICATION FOR CERTIFICATION OF APPROPRIATENESS

DATE RECEIVED 3-1-2023 **APPLICATION #** A3152-23

APPLICANT(S):
Name of Applicant(s): Freedom Forever c/o Melissa Wesley

Address: 43445 Business Park Drive, Temecula CA 92590 **Email:**

Telephone (Day) 848-205-3001 **(Eve)** **(Fax)** 732-967-2682

Relationship of Applicant to Property owner:
☐ **Owner(s)** ☐ **Lessee** ☐ **Property Under Contract** ☑ **Other (Specify)**

Explanation if Other: Contractor

OWNER(S), IF DIFFERENT THAN APPLICANT:
Name(s) of Owner(s): Dwana Waters
Address: 277 Highland Ave Orange NJ 07050 **Email:**
Telephone Number: (Day) **(Eve)**

Street Address of the Property that is subject of Application: 277 Highland Avenue
Orange, NJ 07050
Tax Block: 4802 **Lot:** 29

Name of Historic District in which Property lies: Montrose Seven Oaks Park
☐ **Orange Valley** ☑ **Montrose Seven Oaks Park** ☐ **Main Street** ☐ **St. John's**

Existing use of the Property:
Single Family Residential

Existing zoning of the Property:
Single Family Residential

Describe in detail the proposed work to be done at the Property.

Install 10.27kW roof mount solar. 26-395W panels, 1-7.6kW inverter

Explain how you plan to prevent, minimize and mitigate any adverse effects to this Property, to nearby historically significant properties, and to the Historic District?

No adverse effects — Plan to follow HPC rules and regulations

Each Application must be accompanied by sketches, drawings, photographs, descriptions or other information sufficient to show the proposed alterations, additions, changes or new construction. The Commission may require the subsequent submission of such additional materials as it reasonably requires to make an informed decision. A submission shall include:

- **A photograph of each elevation of the structure.**

- **Three (3) copies of drawings, photographs, material brochures, samples, specifications or information that may be necessary to assist the Commission. Copies may be submitted electronically, or by CD or flash drive.**

- **Three (3) copies of a survey, or if applicable, a site plan showing the location of new and existing structures on the site and their location with respect to the building line, property line, and the front of those buildings or structures immediately adjacent to each side of the lot to be built upon.**

- **Three (3) copies of façade elevation(s), if applicable, of the proposed work in sufficient detail to identify the limits and location of the proposed work, and existing and proposed materials to be used.**

- **$70.00 Application fee (check or money order made to the City of Orange).**

By signing this Application, I hereby certify that the owner of record authorizes the proposed work and I have been authorized by the owner to make this Application as his/her authorized agent. By signing this Application, the owner hereby grants authorization to the Commission members, and its professional and support staff to enter the Property in question for inspection purposes. By signing this application I further agree that the attorney's and professional staff's review of my application is chargeable to me and that I agree to pay for such review separately from the application fee, by depositing an escrow payment of $_____.

Signature of Applicant(s) [signature]

(Print Name) Melissa Wesley

Date 2/27/2023

Signature of Owner(s) (if different than Applicant) By Agent: Melissa Wesley

(Print Name) Diana Waters

Date 2/27/2023

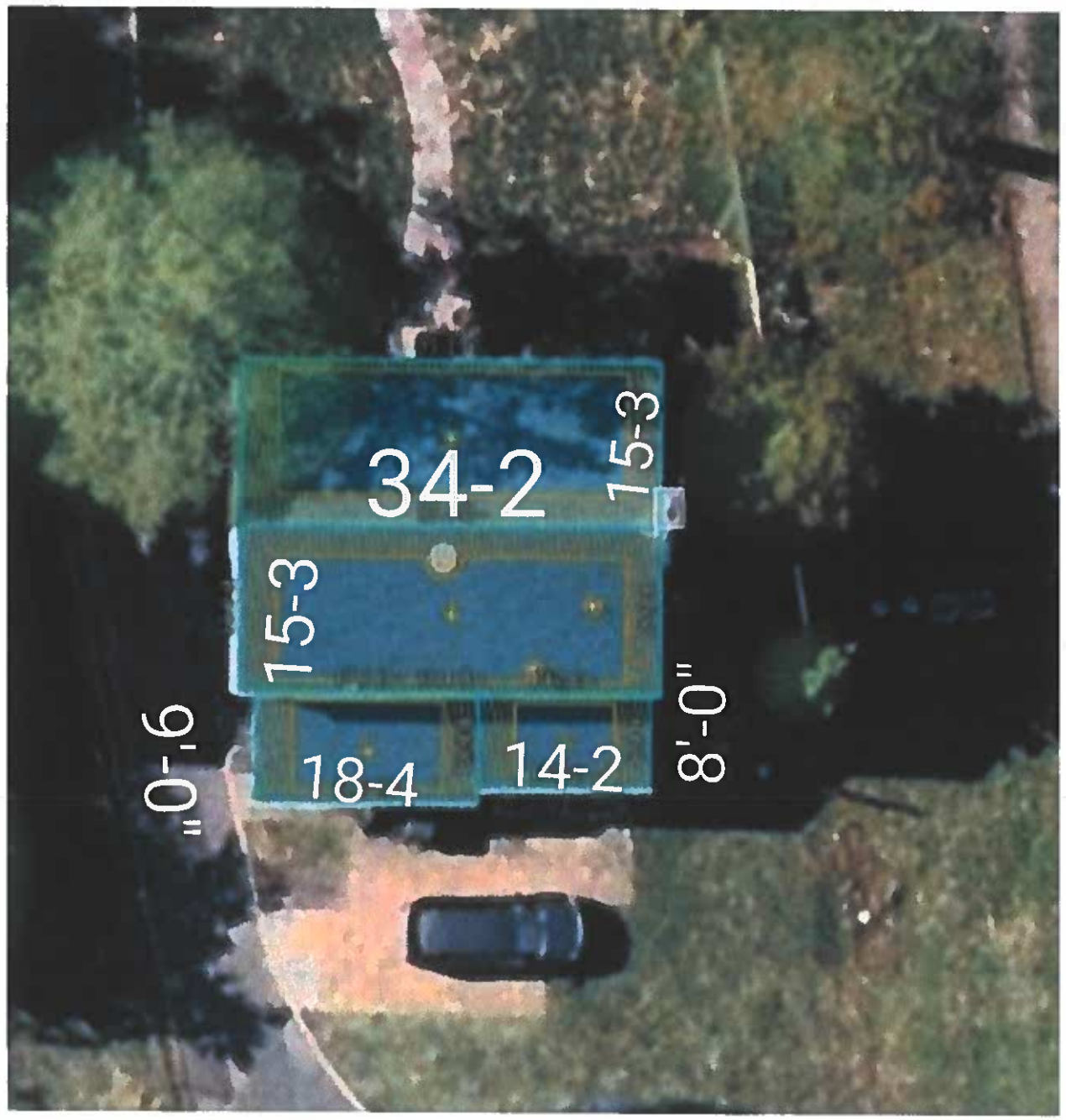
Submittal of this Application form-properly signed, with the indicated copies of documents and the Application fee will constitute a complete Application. Upon receipt of a complete Application, the Board Secretary will schedule the Application with the Commission. The Applicant delays his/her own Application if all of these required items are not submitted. The Commission shall reach a decision on the Application within forty-five (45) days of submission of a complete Application. The Applicant must appear in front of the Commission in order to present the Application during the public hearing on the scheduled date.

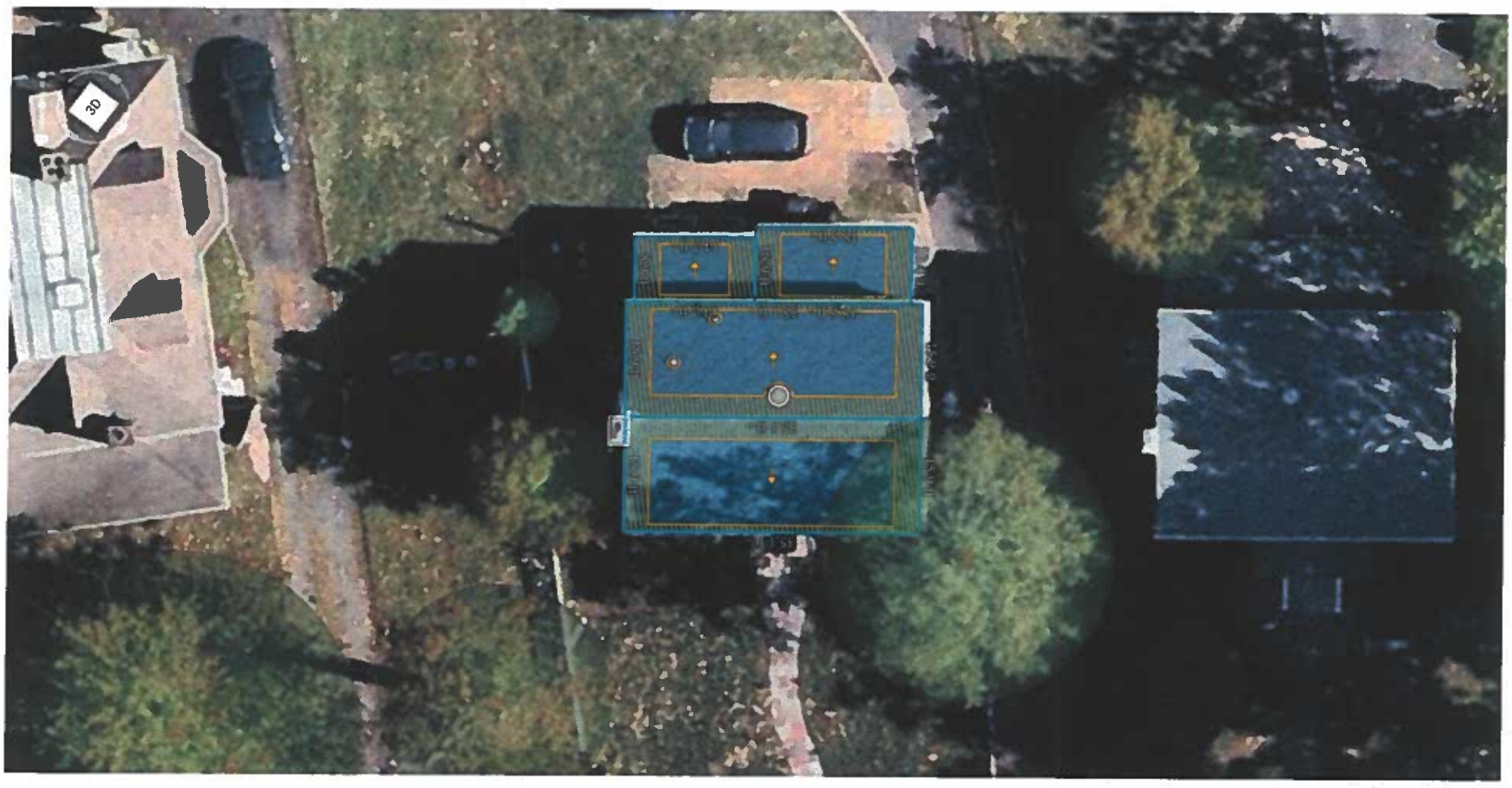
Telephone: 848-205-3001 Fax: 732-947-2082 Website: FreedomForever.com

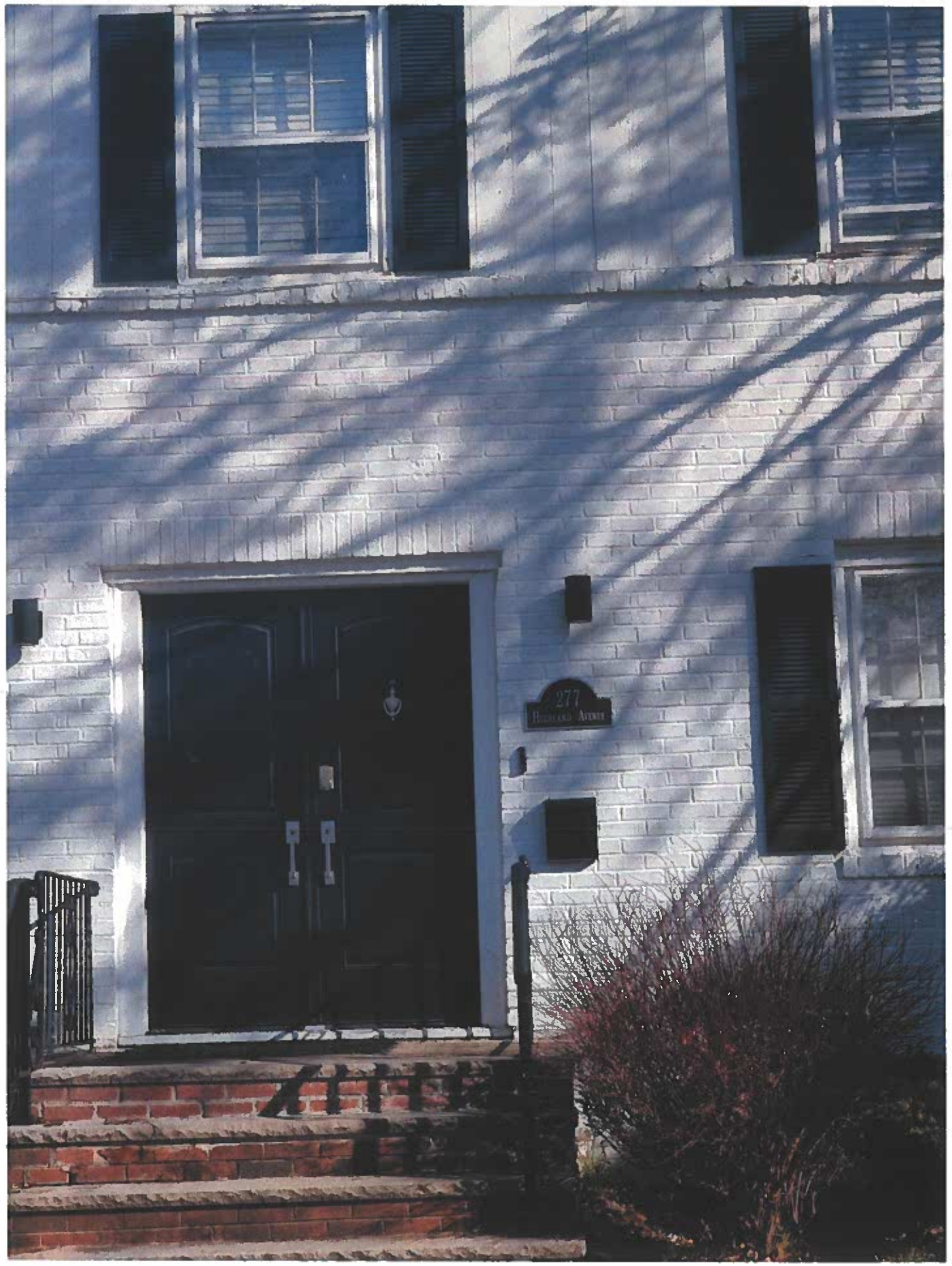
Date payment received: 3-1-2023 Check Number: 18904

Date sent to Finance: 3-1-2023 Receipt Number: _____

Certification of Appropriateness Application Form Adopted 10/21/15, revised 10/6/22.


34-2
15-3
15-3
18-4
14-2
8'-0"
"0-6


3D


277

BARUN CORP

February 17, 2023

RE: CERTIFICATION LETTER

Project Address: DWANA WATERS RESIDENCE
277 HIGHLAND AVENUE
CITY OF ORANGE, NJ 07050

Design Criteria:

- Applicable Codes = 2021 IEBC/IBC NJ Edition, 2021 IRC NJ Edition, ASCE 7-16 and 2018 NDS
- Risk Category = II
- Wind Speed = 115 mph, Exposure Category B, Partially/Fully Enclosed Method
- Ground Snow Load = 25 psf
- Roof 1 & 2: 2 x 6 @ 16" OC, Roof DL = 11 psf, Roof LL/SL = 19 psf (Non-PV), Roof LL/SL = 12.9 psf (PV)

To Whom It May Concern,

A structural evaluation of loading was conducted for the above address based on the design criteria listed above.

Existing roof structural framing has been reviewed for additional loading due to installation of Solar PV System on the roof. The structural review applies to the sections of roof that is directly supporting the Solar PV System.

Based on this evaluation, I certify that the alteration to the existing structure by installation of the Solar PV System meets the prescriptive compliance requirements of the applicable existing building and/or new building provisions adopted/referenced above.

Additionally, the Solar PV System assembly (including attachment hardware) has been reviewed to be in accordance with the manufacturer's specifications and to meet and/or exceed the requirements set forth by the referenced codes.

Sincerely,

S. M. Mehdi Zomorodian

Digitally signed by S. M. Mehdi Zomorodian
Date: 2023.02.18 09:21:51 -05'00'

STATE OF NEW JERSEY
MEHDI ZOMORODIAN
No. GE57640
LICENSED
PROFESSIONAL ENGINEER

BARUN CORP

RESULTS SUMMARY

DWANA WATERS RESIDENCE, 277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050

MOUNTING PLANE STRUCTURAL EVALUATION			
MOUNTING PLANE	**ROOF PITCH**	**RESULT**	**GOVERNING ANALYSIS**
Roof 1 & 2	30°	OK	IEBC IMPACT CHECK

STANDOFF HARDWARE EVALUATION FOR WIND UPLIFT	
MOUNTING PLANE	**WIND UPLIFT DCR**
Roof 1 & 2	45.5%

Limits of Scope of Work and Liability:

The existing structure has been reviewed based on the assumption that it has been originally designed and constructed per appropriate codes. The structural analysis of the subject property is based on the provided site survey data. The calculations produced for this structure's assessment are only for the roof framing supporting the proposed PV installation referenced in the stamped planset and were made according to generally recognized structural analysis standards and procedures. All PV modules, racking and attachment components shall be designed and installed per manufacturer's approved guidelines and specifications. These plans are not stamped for water leakage or existing damage to the structural component that was not accessed during the site survey. Prior to commencement of work, the PV system installer should verify that the existing roof and connections are in suitable condition and inspect framing noted on the certification letter and inform the Engineer of Record of any discrepancies prior to installation. The installer should also check for any damages such as water damage, cracked framing, etc. and inform the Engineer of Record of existing deficiencies which are unknown and/or were not observable during the time of survey and have not been included in this scope of work. Any change in the scope of the work shall not be accepted unless such change, addition, or deletion is approved in advance and in writing by the Engineer of Record.

BARUN CORP	LOAD CALCULATION
	Roof 1 & 2
DWANA WATERS RESIDENCE, 277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050	

PV PANELS DEAD LOAD (PV-DL)	
PV Panels Weight	= 2.50 psf
Hardware Assembly Weight	= 0.50 psf
Total PV Panels	**PV-DL = 3.00 psf**

ROOF DEAD LOAD (R-DL)			
Existing Roofing Material Weight	Composite Shingle Roof	1 Layer(s)	= 2.50 psf
Underlayment Weight			= 0.50 psf
Plywood/OSB Sheathing Weight			= 1.50 psf
Framing Weight	2 x 6 @ 16 in. O.C.		= 1.72 psf
Vaulted Ceiling Weight			= 3.00 psf
Miscellaneous			= 1.50 psf
Total Roof Dead Load			**R-DL = 10.70 psf**

REDUCED ROOF LIVE LOAD (Lr)	
Roof Live Load	Lo = 20.00 psf
Member Tributary Area	At < 200 ft^2
Roof 1 & 2 Pitch	30° or 7/12
Tributary Area Reduction Factor	R1 = 1.00
Roof Slope Reduction Factor	R2 = 0.85
Reduced Roof Live Load, Lr = Lo (R1) (R2)	**Lr = 17.00 psf**

SNOW LOAD	
Ground Snow Load	pg = 25.00 psf
Effective Roof Slope	30°
Snow Importance Factor	Is = 1.00
Snow Exposure Factor	Ce = 1.00
Snow Thermal Factor	Ct = 1.10
Minimum Flat Roof Snow Load	pf-min = 0.00 psf
Flat Roof Snow Load	**pf = 19.30 psf**

SLOPED ROOF SNOW LOAD ON ROOF (Non-Slippery Surfaces)	
Roof Slope Factor	Cs-roof = 1.00
Sloped Roof Snow Load on Roof	**ps-roof = 19.30 psf**

SLOPED ROOF SNOW LOAD ON PV PANELS (Unobstructed Slippery Surfaces)	
Roof Slope Factor	Cs-PV = 0.67
Sloped Roof Snow Load on PV Panels	**ps-PV = 12.90 psf**

BARUN CORP

IEBC IMPACT CHECK

Roof 1 & 2

DWANA WATERS RESIDENCE, 277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050

	EXISTING	WITH PV PANELS	
Roof Dead Load (DL) =	10.70	13.70	psf
Roof Live Load (Lr) =	17.00	0.00	psf
Roof Snow Load (SL) =	19.30	12.90	psf

	EXISTING	WITH PV PANELS	
(DL + Lr)/Cd =	22.16	15.22	psf
(DL + SL)/Cd =	26.09	23.13	psf
Maximum Gravity Load =	26.09	23.13	psf

Load Increase (%) = -11.33% OK

The requirements of section 805.2 of 2021 IEBC are met and the structure is permitted to remain unaltered.

BARUN CORP

WIND UPLIFT CALCULATION

Roof 1 & 2

DWANA WATERS RESIDENCE, 277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050

SITE INFORMATION			
Ultimate Wind Speed =	115.00 mph	Roof Pitch =	30°
Risk Category =	II	Roof Type =	Gable
Exposure Category =	B	Velocity Pressure Exposure Coefficient, Kz =	0.64
Mean Roof Height =	22.00 ft	Topographic Factor, Kzt =	1.00
Solar Array Dead Load =	3.00 psf	Wind Directionality Factor, Kd =	0.85
a =	3.20 ft	Ground Elevation Factor, Ke =	1.00

DESIGN CALCULATIONS		
Wind Velocity Pressure, qh =	18.45 psf	(0.00256*Kz*Kzt*Kd*Ke*(V^2))
Solar Array Pressure Equalization Factor, ya =	0.60	
Hardware Type =	Rockit mount	
Allowable Load =	655.00 lbs	SPF, 5/16" Lag Screw x 1, 2.5" Embedment
Array Edge Factor, yE =	1.50	Exposed Condition
Max. X - Spacing (Zone 1 - 2r) =	4.00 ft	Effective Wind Area
Max. Y - Spacing (Zone 1 - 2r) =	3.40 ft	13.60 ft²
Max. X - Spacing (Zone 2n & 3r) =	4.00 ft	Effective Wind Area
Max. Y - Spacing (Zone 2n & 3r) =	3.40 ft	13.60 ft²
Max. X - Spacing (Zone 3e) =	4.00 ft	Effective Wind Area
Max. Y - Spacing (Zone 3e) =	3.40 ft	13.60 ft²

ROOF ZONE	GCp (-) UPLIFT	UPLIFT PRESSURE	PULLOUT FORCE
1 - 2r	-1.67	-15.04 psf	204.60 lbs
2n & 3r	-1.90	-17.34 psf	235.89 lbs
3e	-2.36	-21.94 psf	298.35 lbs

NOTE:

- Wind calculation is based on ASCE 7-16, 29.4 - C&C, LC #7: 0.6DL + 0.6WL is used.

July 5, 2022

EcoFasten Solar LLC
4141 W Van Buren St, Ste 2
Phoenix, AZ 85009
TEL: (877) 859-3947

Attn.: Eco Fasten Solar LLC - Engineering Department

Re: Report # 2015-05884HG.07.01 – EcoFasten - RockIt System for Gable and Hip Roofs
Subject: Engineering Certification for the State of New Jersey

PZSE, Inc. – Structural Engineers has provided engineering and span tables for the EcoFasten - RockIt System, as presented in PZSE Report # 2015-05884HG.07.01, "Engineering Certification for the EcoFasten - RockIt System for Gable and Hip Roofs". All information, data, and analysis therein are based on, and comply with, the following building codes and typical specifications:

Building Codes:

1. ASCE/SEI 7-10 & 7-16 Minimum Design Loads for Buildings and Other Structures, by American Society of Civil Engineers
2. 2012, 2015, & 2018 International Building Code
3. 2012, 2015, & 2018 International Residential Code
4. AC428, Acceptance Criteria for Modular Framing Systems Used to Support Photovoltaic (PV) Panels, November 1, 2012 by ICC-ES
5. Aluminum Design Manual 2010 & 2018, by The Aluminum Association, Inc.
6. ANSI/AWC NDS-2015 & 2018, National Design Specification for Wood Construction, by the American Wood Council

Design Criteria:

Risk Category II
Seismic Design Category = A - E
Exposure Category = B, C & D
Basic Wind Speed (ultimate) per ASCE 7-16 = 90 mph to 180 mph
Ground Snow Load = 0 to 60 (psf)

This letter certifies that the loading criteria and design basis for the EcoFasten - RockIt System Span Tables are in compliance with the above codes.

If you have any questions on the above, do not hesitate to call.

Prepared by:
PZSE, Inc. – Structural Engineers
Roseville, CA

DIGITALLY SEALED

STATE OF NEW JERSEY
PAUL K. TACHER
No. GE050868
LICENSED PROFESSIONAL ENGINEER
Exp. 07/30/2023

07/05/2022

1478 Stone Point Drive, Suite 190, Roseville, CA 95661
916.961.3960 916.961.3965 www.pzse.com

0717 Orange City

Mod IV Snapshot
03/09/23

Block: 4802	Lot: 29	Qual:	Old Id: 151-14

Owner	WATERS, DWANA	Property	277 HIGHLAND AVENUE
Address	277 HIGHLAND AVE.	Class	2
City, State	ORANGE, N.J.	Bldg Desc	
Zip	07050	Year Built	1948

Land Value	131,000
Improv Value	363,600
Exemption	0
Net Value	494,600

Land Dimension: 9223 SF

Additional Lot 1:
Additional Lot 2:
Zoning:
Tax Map Page:
Square Foot Living Area: 1820

Sale History

Date	Book-Page	Amount
10/30/18	20180-97112	325,000

Exemptions

Exemption	Amount	Term	Expires

Prev Assessment History

Year	Class	Land	Improve	Net
2022	2	131,000	363,600	494,600
2021	2	79,300	199,200	278,500
2020	2	79,300	179,000	258,300
2019	2	79,300	179,000	258,300

Deductions

Senior Citizen	0
Veteran	0
Widow	0
Surviving Spouse	0
Disabled Person	0

July 5, 2022

EcoFasten Solar LLC
4141 W Van Buren St, Ste 2
Phoenix, AZ 85009
TEL: (877) 859-3947

Attn.: Eco Fasten Solar LLC - Engineering Department

Re: Report # 2015-05884HG.07.01 – EcoFasten - RockIt System for Gable and Hip Roofs
Subject: Engineering Certification for the State of New Jersey

PZSE, Inc. – Structural Engineers has provided engineering and span tables for the EcoFasten - RockIt System, as presented in PZSE Report # 2015-05884HG.07.01, "Engineering Certification for the EcoFasten - RockIt System for Gable and Hip Roofs". All information, data, and analysis therein are based on, and comply with, the following building codes and typical specifications:

Building Codes:

1. ASCE/SEI 7-10 & 7-16 Minimum Design Loads for Buildings and Other Structures, by American Society of Civil Engineers
2. 2012, 2015, & 2018 International Building Code
3. 2012, 2015, & 2018 International Residential Code
4. AC428, Acceptance Criteria for Modular Framing Systems Used to Support Photovoltaic (PV) Panels, November 1, 2012 by ICC-ES
5. Aluminum Design Manual 2010 & 2018, by The Aluminum Association, Inc.
6. ANSI/AWC NDS-2015 & 2018, National Design Specification for Wood Construction, by the American Wood Council

Design Criteria:

Risk Category II
Seismic Design Category = A - E
Exposure Category = B, C & D
Basic Wind Speed (ultimate) per ASCE 7-16 = 90 mph to 180 mph
Ground Snow Load = 0 to 60 (psf)

This letter certifies that the loading criteria and design basis for the EcoFasten - RockIt System Span Tables are in compliance with the above codes.

If you have any questions on the above, do not hesitate to call.

Prepared by:
PZSE, Inc. – Structural Engineers
Roseville, CA

DIGITALLY SEALED

STATE OF NEW JERSEY · PAUL K. ZACHER · No. GE050868 · EXP. 04/30/2024 · LICENSED PROFESSIONAL ENGINEER

07/05/2022

1478 Stone Point Drive, Suite 190, Roseville, CA 95661
T 916.961.3960 F 916.961.3965 W www.pzse.com
Experience | Integrity | Empowerment

ROOF MOUNT PHOTOVOLTAIC SYSTEM

CODES:

THIS PROJECT COMPLIES WITH THE FOLLOWING:
2021 INTERNATIONAL BUILDING CODE
2021 INTERNATIONAL RESIDENTIAL CODE
2020 NATIONAL ELECTRIC CODE
AS ADOPTED BY CITY OF ORANGE TOWNSHIP (ESSEX COUNTY)

VICINITY MAP:

TABLE OF CONTENTS:

CONSTRUCTION NOTES:

CONDUIT AND CONDUCTOR SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS.

ALL SOLAR ENERGY SYSTEM EQUIPMENT SHALL BE SCREENED TO THE MAXIMUM EXTENT POSSIBLE AND SHALL BE PAINTED A COLOR SIMILAR TO THE SURFACE UPON WHICH THEY ARE MOUNTED.

MODULES SHALL BE TESTED , LISTED AND INDENTIFIED WITH FIRE CLASSIFICATION IN ACCORDANCE WITH UL 2703. SMOKE AND CARBON MONOXIDE ALARMS ARE REQUIRED PER SECTION R314 AND 315 TO BE VERIFIED AND INSPECTED BY INSPECTOR IN THE FIELD.

DIG ALERT (811) TO BE CONTACTED AND COMPLIANCE WITH EXCAVATION SAFETY PRIOR TO ANY EXCAVATION TAKING PLACE

PHOTOVOLTAIC SYSTEM GROUND WILL BE TIED INTO EXISTING GROUND AT MAIN SERVICE FROM DC DISCONNECT/INVERTER AS PER CHECK AHJ AC SEC 250.166(A).

SOLAR PHOTOVOLTAIC SYSTEM EQUIPMENT WILL BE INSTALLED IN ACCORDANCE WITH REQUIREMENTS OF ART. 690 OF THE CHECK AHJ AC

THE MAIN SERVICE PANEL WILL BE EQUIPPED WITH A GROUND ROD OR UFER

UTILITY COMPANY WILL BE NOTIFIED PRIOR TO ACTIVATION OF THE SOLAR PV SYSTEM

SOLAREDGE OPTIMIZERS ARE LISTED TO IEC 62109-1 (CLASS II SAFETY) AND UL 1741 STANDARDS

INSTALL CREW TO VERIFY ROOF STRUCTURE PRIOR TO COMMENCING WORK. EMT CONDUIT ATTACHED TO THE ROOF USING CONDUIT MOUNT.

CLIENT:
DWANA WATERS
277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050
AHJ: CITY OF ORANGE TOWNSHIP (ESSEX COUNTY)
UTILITY: PSE&G - PUBLIC SERVICE ELECTRIC & GAS
PHONE: (908) 290-1739
EMAIL: TIFFANYLONG7@YAHOO.COM
FINANCE: SUNRUN

SYSTEM:
SYSTEM SIZE (DC): 26 X 395 = 10.270 kW
SYSTEM SIZE (AC): 7.600 kW @ 240V
MODULES: 26 X HANWHA QCELL: Q.PEAK-DUO-L-G7.3 395
OPTIMIZERS: 26 X SOLAREDGE S440
INVERTER: SOLAREDGE SE7600H-USRGM [S1]

	REVISIONS	
NO:	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

FREEDOM FOREVER LLC
201 COMMERCE DR #5, MOORESTOWN, NJ 08057
Tel: (800) 385-1075
GREG ALBRIGHT
CONTRACTOR LICENSE:
HOME IMPROVEMENT CONTRACTOR
13VH11080100

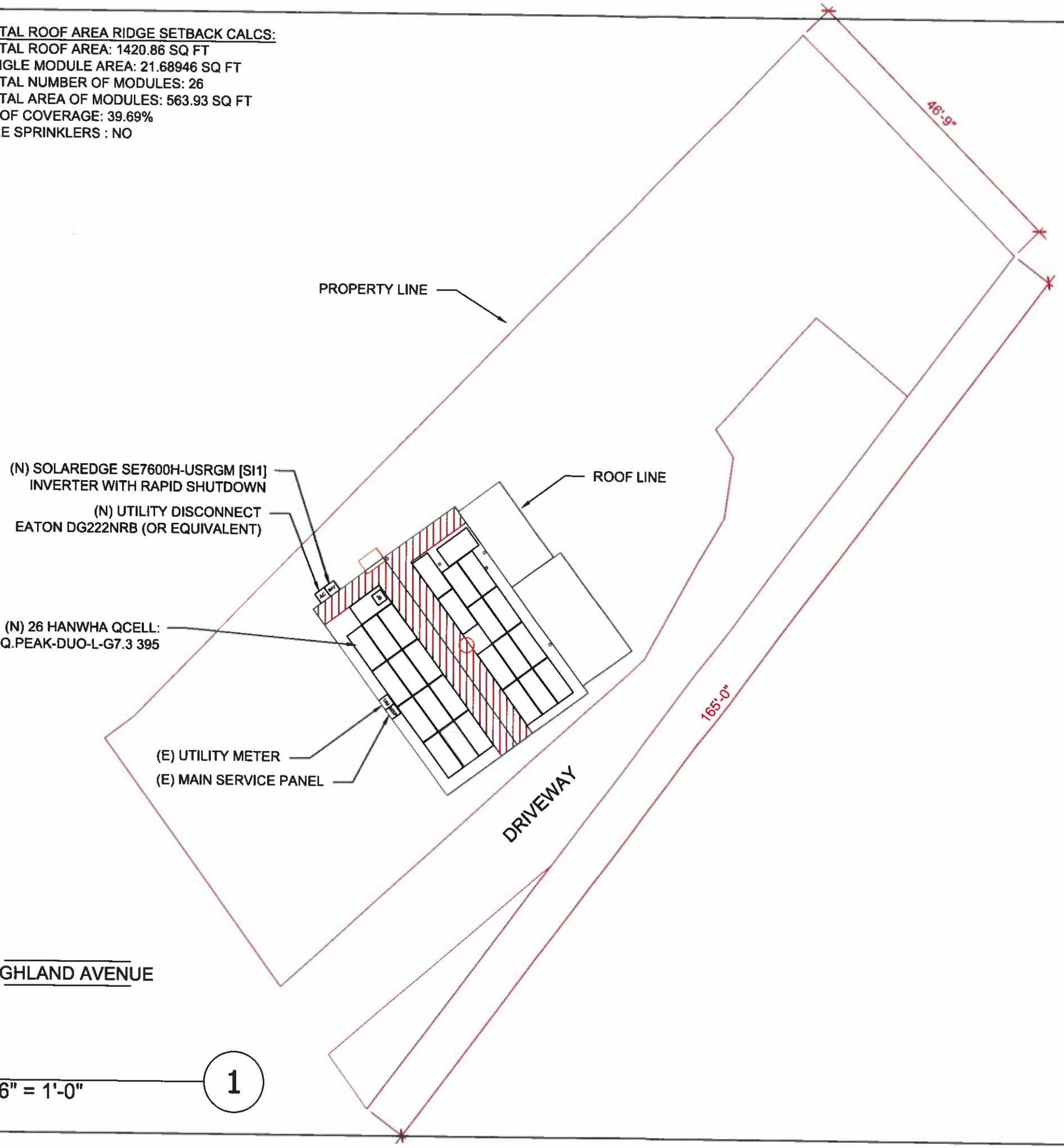
SITE LOCATION

JOB NO:	DATE:	DESIGNED BY:	SHEET:
298406	2/17/2023	N.B.	PV-1

LEGEND:

- CHIMNEY
- PIPE VENT
- MODULES
- CONDUIT
- SETBACK
- AC — AC DISCONNECT
- JB — JUNCTION BOX
- INV — INVERTER
- MSP — MAIN SERVICE PANEL

TOTAL ROOF AREA RIDGE SETBACK CALCS:
TOTAL ROOF AREA: 1420.86 SQ FT
SINGLE MODULE AREA: 21.68946 SQ FT
TOTAL NUMBER OF MODULES: 26
TOTAL AREA OF MODULES: 563.93 SQ FT
ROOF COVERAGE: 39.69%
FIRE SPRINKLERS : NO



SITE PLAN
SCALE: 1/16" = 1'-0"
1

S. M. Mehdi Zomorodian
Digitally signed by S. M. Mehdi Zomorodian
Date: 2023.02.18 09:21:14 -05'00'

STATE OF NEW JERSEY
MEHDI ZOMORODIAN
LICENSED
PROFESSIONAL ENGINEER

ROOF AREA: 1420.86 SQ FT

CLIENT:
DWANA WATERS
277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050
AHJ: CITY OF ORANGE TOWNSHIP (ESSEX COUNTY)
UTILITY: PSE&G - PUBLIC SERVICE ELECTRIC & GAS
PHONE: (908) 290-1739
EMAIL: TIFFANYLONG7@YAHOO.COM
FINANCE: SUNRUN

SYSTEM:
SYSTEM SIZE (DC): 26 X 395 = 10.270 kW
SYSTEM SIZE (AC): 7.600 kW @ 240V
MODULES: 26 X HANWHA QCELL: Q.PEAK-DUO-L-G7.3 395
OPTIMIZERS: 26 X SOLAREDGE S440
INVERTER: SOLAREDGE SE7600H-USRGM [SI1]

NO.	REVISIONS REVISED BY	DATE
-	-	-
-	-	-
-	-	-

freedom FOREVER

FREEDOM FOREVER LLC
201 COMMERCE DR #5, MOORESTOWN, NJ 08057
Tel: (800) 385-1075
GREG ALBRIGHT

CONTRACTOR LICENSE:
HOME IMPROVEMENT CONTRACTOR
13VH11080100

SITE PLAN

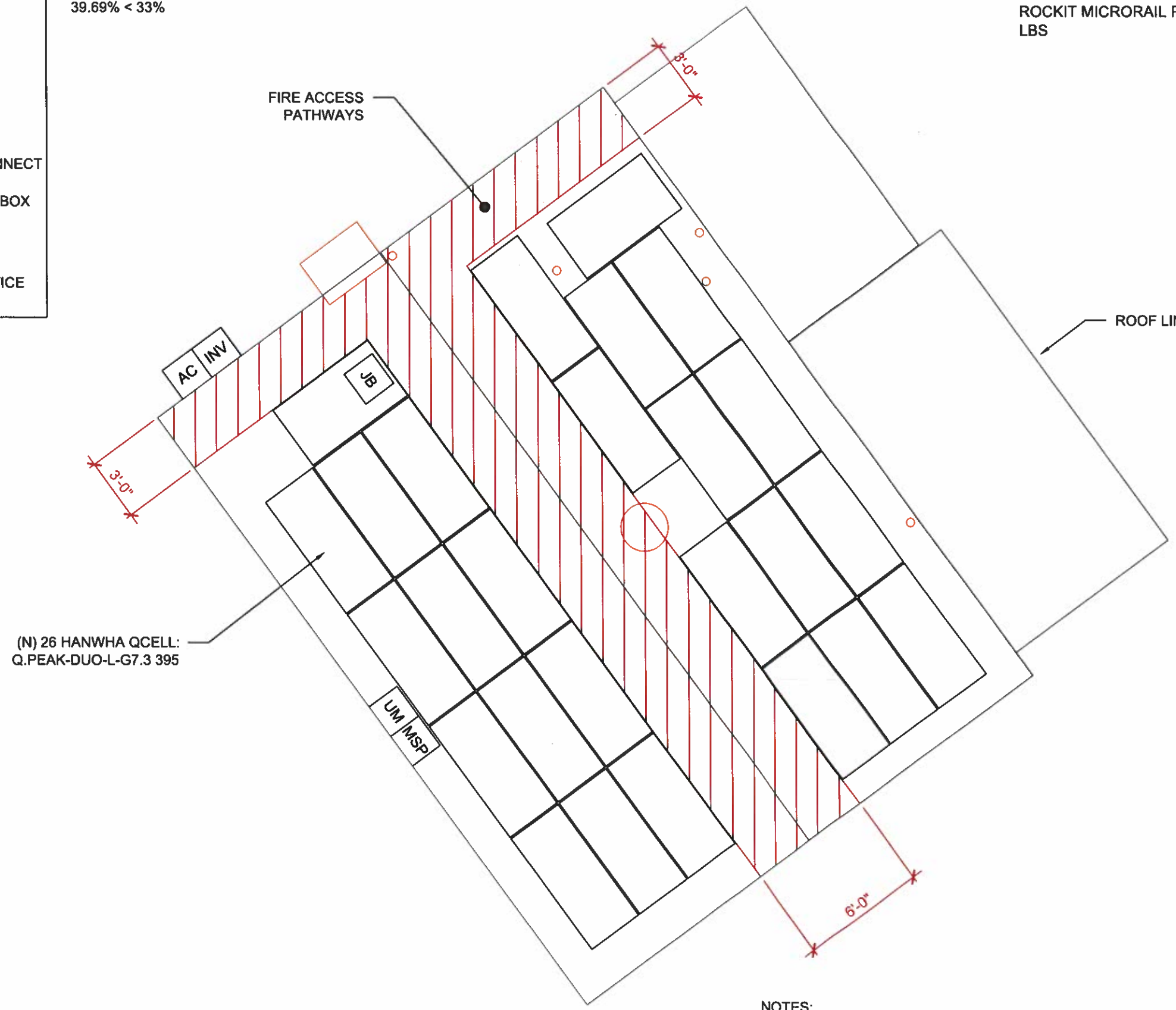
JOB NO:	DATE:	DESIGNED BY:	SHEET:
298406	2/17/2023	N.B.	PV-2

LEGEND:

- CHIMNEY
- PIPE VENT
- MODULES
- CONDUIT
- SETBACK
- AC — AC DISCONNECT
- JB — JUNCTION BOX
- INV — INVERTER
- MSP — MAIN SERVICE PANEL

MODIFIED SETBACKS PROPOSED AT RIDGE:
TOTAL ARRAY AREA = 563.93 SF
TOTAL ROOF AREA = 1420.86 SF
TOTAL ARRAY AREA AS A % TO ROOF AREA = 39.69%
39.69% < 33%

TOTAL ROOF AREA: 1420.86 SQ FT
TOTAL ARRAY AREA: 563.93 SQ FT
ARRAY COVERAGE: 39.69%
SYSTEM DISTRIBUTED WEIGHT: 2.34 LBS
ROCKIT MICRORAIL POINT-LOAD: 22.74 LBS



ROOF PLAN
SCALE: 3/16" = 1'-0"
1

NOTES:
1. EMT CONDUIT ATTACHED TO THE ROOF USING CONDUIT MOUNTS
2. ATTACHED CLAMPS AT 25% FROM THE EDGE AND 50% FROM THE CENTER OF THE MODULES
3. JUNCTION BOX IS MOUNTED TO THE RAIL.

STATE OF NEW JERSEY
S. M. MEHDI ZOMORODIAN
No. GE57640
LICENSED
PROFESSIONAL ENGINEER

ROOF AREA: 1420.86 SQ FT

CLIENT:
DWANA WATERS
277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050
AHJ: CITY OF ORANGE TOWNSHIP (ESSEX COUNTY)
UTILITY: PSE&G - PUBLIC SERVICE ELECTRIC & GAS
PHONE: (908) 290-1739
EMAIL: TIFFANYLONG7@YAHOO.COM
FINANCE: SUNRUN

SYSTEM:
SYSTEM SIZE (DC): 26 X 395 = 10.270 kW
SYSTEM SIZE (AC): 7.600 kW @ 240V
MODULES: 26 X HANWHA QCELL: Q.PEAK-DUO-L-G7.3 395
OPTIMIZERS: 26 X SOLAREDGE S440
INVERTER: SOLAREDGE SE7600H-USRGM [SI1]

NO.	REVISIONS REVISED BY	DATE
-	-	-
-	-	-
-	-	-

freedom FOREVER

FREEDOM FOREVER LLC
201 COMMERCE DR #5, MOORESTOWN, NJ 08057
Tel: (800) 385-1075
GREG ALBRIGHT

CONTRACTOR LICENSE:
HOME IMPROVEMENT CONTRACTOR
13VH11080100

ROOF PLAN WITH MODULES LAYOUT

JOB NO:	DATE:	DESIGNED BY:	SHEET:
298406	2/17/2023	N.B.	PV-2A

ROOF DETAILS:

TOTAL ROOF AREA: 1420.86 SQ FT
TOTAL ARRAY AREA: 563.93 SQFT
ARRAY COVERAGE: 39.69%
SYSTEM DISTRIBUTED WEIGHT: 2.34 LBS
ROCKIT MICRORAIL POINT-LOAD: 22.74 LBS

ROOF AREA STATEMENT						
ROOF	MODULE QUANTITY	ROOF PITCH	ARRAY PITCH	AZIMUTH	ROOF AREA	ARRAY AREA
ROOF 1	13	30	30	234	547.17 SQ FT	281.96 SQ FT
ROOF 2	13	30	30	54	54717 SQ FT	281.96 SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT

STATE OF NEW JERSEY
S. W. MEHDI ZOMORODIAN
No. GE57640
LICENSED
PROFESSIONAL ENGINEER

CLIENT:
DWANA WATERS
277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050
AHJ: CITY OF ORANGE TOWNSHIP (ESSEX COUNTY)
UTILITY: PSE&G - PUBLIC SERVICE ELECTRIC & GAS
PHONE: (908) 290-1739
EMAIL: TIFFANYLONG7@YAHOO.COM
FINANCE: SUNRUN

SYSTEM:
SYSTEM SIZE (DC): 26 X 395 = 10.270 kW
SYSTEM SIZE (AC): 7.600 kW @ 240V
MODULES: 26 X HANWHA QCELL: Q.PEAK-DUO-L-G7.3 395
OPTIMIZERS: 26 X SOLAREDGE S440
INVERTER: SOLAREDGE SE7600H-USRGM [SI1]

NO.	REVISIONS REVISED BY	DATE
-	-	-
-	-	-
-	-	-

freedom FOREVER

FREEDOM FOREVER LLC
201 COMMERCE DR #5, MOORESTOWN, NJ 08057
Tel: (800) 385-1075

GREG ALBRIGHT

CONTRACTOR LICENSE:
HOME IMPROVEMENT CONTRACTOR
13VH11080100

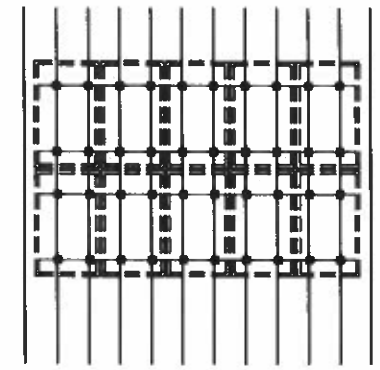
ROOF DETAILS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
298406	2/17/2023	N.B.	PV-2B

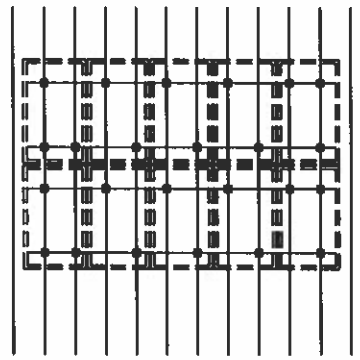
TABLE 1 - ARRAY INSTALLATION

	ROOF PITCH	ROOFING TYPE	ATTACHMENT TYPE	FRAMING TYPE1	MAX UNBRACED LENGTH(FT.)1	RAFTER/TRUSS SISTERING	PENETRATION PATTERN2	MAX ATTACHMENT SPACING (IN.)2	MAX RAIL OVERHANG(IN.)3
ROOF 1	30	COMP SHINGLE	ECOFASTEN ROCKIT SLIDE	2X6 FINISHED ATTIC @ 16" OC	6.00'	NOT REQ'D	STAGGERED	48" OC	16"
ROOF 2	30	COMP SHINGLE	ECOFASTEN ROCKIT SLIDE	2X6 FINISHED ATTIC @ 16" OC	6.00'	NOT REQ'D	STAGGERED	48" OC	16"

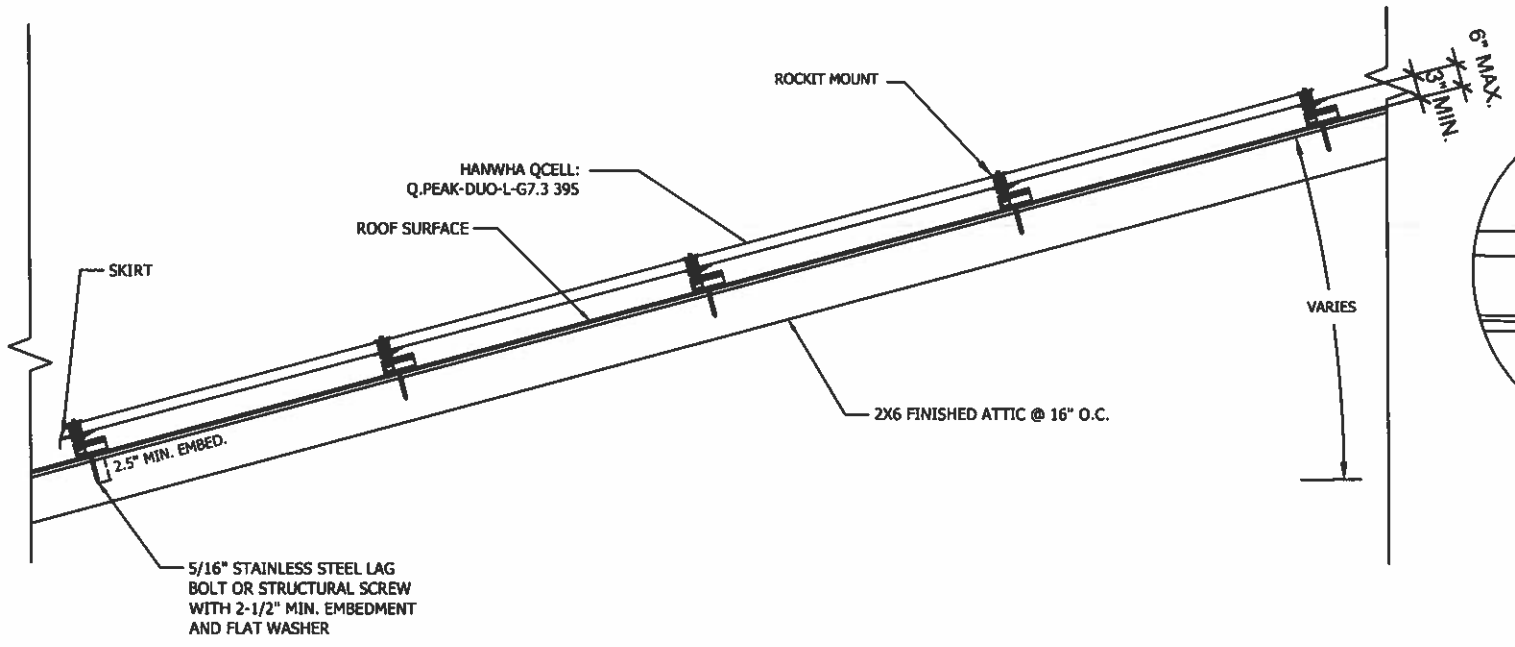
1. CONTRACTOR TO VERIFY FRAMING TYPE AND MAX UNBRACED LENGTH PRIOR TO INSTALLATION. IF THE ABOVE INFORMATION DOES NOT MATCH FIELD CONDITIONS, NOTIFY ENGINEER OF RECORD IMMEDIATELY.
2. WHERE COLLAR TIES OR RAFTER SUPPORTS EXIST, CONTRACTOR SHALL USE RAFTERS WITH COLLAR TIES AS ATTACHMENT POINTS.
3. WHERE APPLICABLE FOR RAILED ATTACHMENT INSTALLATIONS.



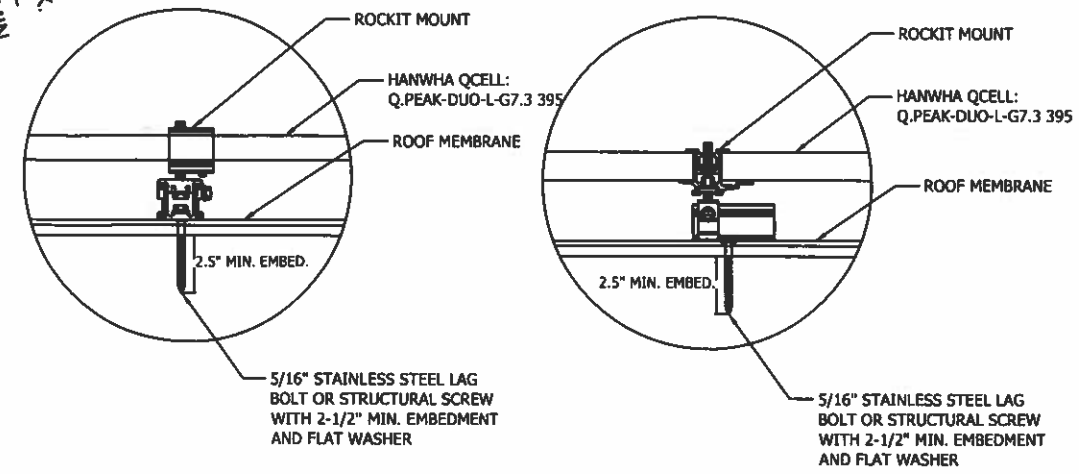
STACKED DETAIL
For Illustration purposes only



STAGGERED DETAIL
For Illustration purposes only



SOLAR PV ARRAY SECTION VIEW
Scale: NTS



ATTACHMENT DETAIL
Scale: NTS

STATE OF NEW JERSEY
S. W. MEHDI ZOMORODIAN
No. GE57640
LICENSED
PROFESSIONAL ENGINEER

CLIENT:
DWANA WATERS
277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050
AHJ: CITY OF ORANGE TOWNSHIP (ESSEX COUNTY)
UTILITY: PSE&G - PUBLIC SERVICE ELECTRIC & GAS
PHONE: (908) 290-1739
EMAIL: TIFFANYLONG7@YAHOO.COM
FINANCE: SUNRUN

SYSTEM:
SYSTEM SIZE (DC): 26 X 395 = 10.270 kW
SYSTEM SIZE (AC): 7.600 kW @ 240V
MODULES: 26 X HANWHA QCELL: Q.PEAK-DUO-L-G7.3 395
OPTIMIZERS: 26 X SOLAREDGE S440
INVERTER: SOLAREDGE SE7600H-USRGM [SI1]

REVISIONS		
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

freedom FOREVER

FREEDOM FOREVER LLC
201 COMMERCE DR #5, MOORESTOWN, NJ 08057
Tel: (800) 385-1075
GREG ALBRIGHT

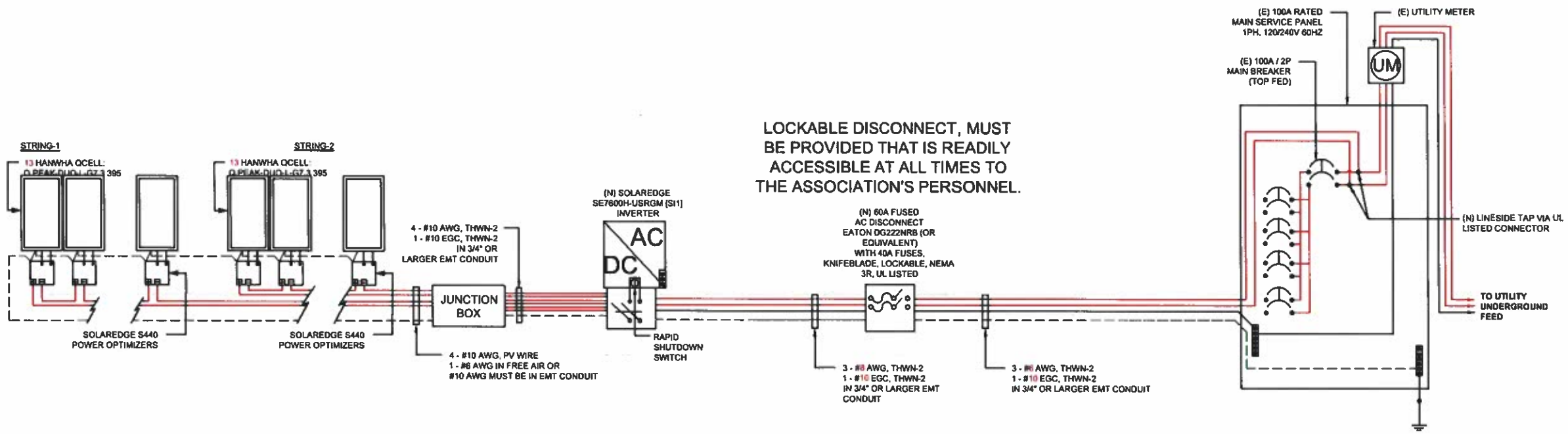
CONTRACTOR LICENSE:
HOME IMPROVEMENT CONTRACTOR
13VH11080100

MOUNTING DETAILS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
298406	2/17/2023	N.B.	PV-3

BACKFEED FUSE SIZING				
MAX. CONTINUOUS OUTPUT 32.00A @ 240V				
32.00	X 1.25	=	40AMPS	40A FUSES - OK

A TAPBOX MAY BE USED IN LIEU OF PERFORMING THE LINESIDE TAP IN THE MAIN SERVICE PANEL. THIS IS DEPENDENT UPON SITE CONDITIONS



NOTE:
CONDUIT AND CONDUCTORS SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS

CLIENT:
DWANA WATERS
277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050
AHJ: CITY OF ORANGE TOWNSHIP (ESSEX COUNTY)
UTILITY: PSE&G - PUBLIC SERVICE ELECTRIC & GAS
PHONE: (908) 290-1739
EMAIL: TIFFANYLONG7@YAHOO.COM
FINANCE: SUNRUN

SYSTEM:
SYSTEM SIZE (DC): 26 X 395 = 10.270 kW
SYSTEM SIZE (AC): 7.600 kW @ 240V
MODULES: 26 X HANWHA QCELL: Q.PEAK-DUO-L-G7.3 395
OPTIMIZERS: 26 X SOLAREDGE S440
INVERTER: SOLAREDGE SE7600H-USRGM [SI1]

	REVISIONS	
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

freedom FOREVER
FREEDOM FOREVER LLC
201 COMMERCE DR #5, MOORESTOWN, NJ 08057
Tel: (800) 385-1075
GREG ALBRIGHT
CONTRACTOR LICENSE:
HOME IMPROVEMENT CONTRACTOR
13VH11080100

THREE LINE DIAGRAM

JOB NO:	DATE:	DESIGNED BY:	SHEET:
298406	2/17/2023	N.B.	PV-4

WIRE SCHEDULE

RACEWAY #	EQUIPMENT				CONDUCTOR QTY.	AWG WIRE SIZE	STARTING ALLOWABLE AMPACITY @ 90°C 310.15(B)(16)	STARTING CURRENT APPLIED TO CONDUCTORS IN RACEWAY	TEMPERATURE CORRECTION FACTOR 310.15(B)(2)(a)	ADJUSTMENT FACTOR FOR MORE THAN 3 CONDUCTORS 310.15(B)(3)(a)	ADJUSTED CONDUCTOR AMPACITY @ 90°C	MAXIMUM CURRENT APPLIED TO CONDUCTORS IN RACEWAY
1	DC	MODULE	TO	OPTIMIZER	2	10	40	12.68	1	1	40.00	15.84
2	DC	OPTIMIZER	TO	JUNCTION BOX	2	10	40	15.00	1	1	40.00	18.75
3	DC	JUNCTION BOX	TO	INVERTER	4	10	40	15.00	1	0.8	32.00	18.75
4	AC	INVERTER	TO	AC DISCONNECT	3	8	55	32.00	1	1	55.00	40.00
5	AC	AC DISCONNECT	TO	POI	3	6	75	32.00	1	1	75.00	40.00

CONDUCTOR AMPACITY CALCULATIONS IN ACCORDANCE WITH AC 690.8.

CLIENT:
DWANA WATERS
277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050
AHJ: CITY OF ORANGE TOWNSHIP (ESSEX COUNTY)
UTILITY: PSE&G - PUBLIC SERVICE ELECTRIC & GAS
PHONE: (908) 290-1739
EMAIL: TIFFANYLONG7@YAHOO.COM
FINANCE: SUNRUN

SYSTEM:
SYSTEM SIZE (DC): 26 X 395 = 10.270 kW
SYSTEM SIZE (AC): 7.600 kW @ 240V
MODULES: 26 X HANWHA QCELL: Q.PEAK-DUO-L-G7.3 395
OPTIMIZERS: 26 X SOLAREDGE S440
INVERTER: SOLAREDGE SE7600H-USRGM [SI1]

REVISIONS		
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

freedom FOREVER
FREEDOM FOREVER LLC
201 COMMERCE DR #5, MOORESTOWN, NJ 08057
Tel: (800) 385-1075
GREG ALBRIGHT

CONTRACTOR LICENSE:
HOME IMPROVEMENT CONTRACTOR
13VH11080100

CONDUCTOR CALCULATIONS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
298406	2/17/2023	N.B.	PV-5

OCPD SIZES:

40A BREAKER

SERVICE LIST:

NONE

MATERIAL LIST:

QTY.	PART	PART #	DESCRIPTION
26	MODULES	Q.PEAK-DUO-L-G7.3 395	HANWHA QCELL: Q.PEAK-DUO-L-G7.3 395
26	OPTIMIZERS	S440	SOLAREDGE S440 POWER OPTIMIZER - FRAME MOUNTED MODULE ADD-ON
1	JUNCTION BOX	480-276	600VDC NEMA 3R UL LISTED JUNCTION BOX
2	CONNECTORS	240-300	STAUBLI / MULTI-CONTACT MC4 CONNECTORS (FEMALE)
2	CONNECTORS	240-301	STAUBLI / MULTI-CONTACT MC4 CONNECTORS (MALE)
1	INVERTER	INV-120-763	SE7600H-US [SI1] RGM 240V INVERTER UL1741 SA CERTIFIED INTEGRATED ARC FAULT PROTECTION AND RAPID SHUTDOWN
1	AC DISCONNECT	323-061	60A RATED 240VAC NEMA 3R UL LISTED
2	FUSES	330-040	40A FUSE 1 PH 240VAC
58	ROOF ATTACHMENT 1	261-602	ROCKIT MICRORAIL
19	TRIM 1	241-253	ROCK-IT TRIM COMP DARK
49	SLIDER 1	261-603	ROCK-IT SLIDER COMP DARK
15	BONDING CLAMP 1	221-100	N/S BONDING CLAMP
6	BONDING CLAMP 1	241-404	TRIM BONDING CLAMP
28	MOUNT ASSEMBLY 1	241-405	MLPE MOUNT ASSY
16	SPLICE 1	261-604	ROCK-IT SPLICE
4	ATTACHED SPLICE 1	211-101	ATTACHED SPLICE 8 INCH
22	TRIMRAIL 1	261-606	TRIMRAIL UNIV CLIP W/ HDW
7	TRIM SPLICE 1	261-605	TRIM SPLICE DRK
12	TRIMRAIL 1	211-115	TRIMRAIL UNIV DRK
26	GROUND LUG 1	260-585	ILSCO GROUND LUG
26	TRIM END CAPS 1	221-200	ROCK-IT TRIM END CAPS

CLIENT:
DWANA WATERS
277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050
AHJ: CITY OF ORANGE TOWNSHIP (ESSEX COUNTY)
UTILITY: PSE&G - PUBLIC SERVICE ELECTRIC & GAS
PHONE: (908) 290-1739
EMAIL: TIFFANYLONG7@YAHOO.COM
FINANCE: SUNRUN

SYSTEM:
SYSTEM SIZE (DC): 26 X 395 = 10.270 kW
SYSTEM SIZE (AC): 7.600 kW @ 240V
MODULES: 26 X HANWHA QCELL: Q.PEAK-DUO-L-G7.3 395
OPTIMIZERS: 26 X SOLAREDGE S440
INVERTER: SOLAREDGE SE7600H-USRGM [SI1]

REVISIONS		
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

FREEDOM FOREVER LLC
201 COMMERCE DR #5, MOORESTOWN, NJ 08057
Tel. (800) 385-1075
GREG ALBRIGHT

CONTRACTOR LICENSE:
HOME IMPROVEMENT CONTRACTOR
13VH11080100

EQUIPMENT & SERVICE LIST

JOB NO:	DATE:	DESIGNED BY:	SHEET:
298406	2/17/2023	N.B.	PV-6

WARNING:
POWER SOURCE OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE.

705.12(B)(2)(3)(b)

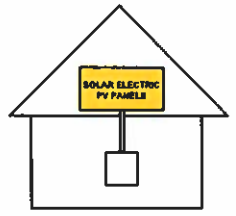
M

"WARNING"
DUAL POWER SOURCES
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM
RATED AC OUTPUT CURRENT - 32.00 AMPS
AC NORMAL OPERATING VOLTAGE - 240 VOLTS

690.54

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



690.56(C)(1)(A)

PV METER

PM

AC

PV SYSTEM AC DISCONNECT
RATED AC OUTPUT CURRENT - **32.00** AMPS
AC NORMAL OPERATING VOLTAGE - 240 VOLTS

690.15, 690.54

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

690.56(C)(3)

INVERTER

MAXIMUM VOLTAGE	480	V
MAXIMUM CIRCUIT CURRENT	20	A
MAX DC-DC CONVERTER OUTPUT CURRENT	15	A

DC

J/B

ARRAY

AC 690.31(G)(3) & (4)

"WARNING"
PHOTOVOLTAIC POWER SOURCE

EVERY 10' ON CONDUIT AND ENCLOSURES

"WARNING"
ELECTRICAL SHOCK HAZARD.
TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION.

690.13 (B)

PV SYSTEM DC DISCONNECT
MAXIMUM VOLTAGE: 480V
MAXIMUM CIRCUIT CURRENT: 20A
MAX RATED OUTPUT CURRENT OF THE CONTROLLER OR DC-TO-DC CONVERTER: 15A

690.53

NOTES:

1. AC ARTICLES 690 AND 705 AND IRC SECTION R324 MARKINGS SHOWN HEREON.
2. ALL MARKING SHALL CONSIST OF THE FOLLOWING:
   A. UV RESISTANT SIGN MATERIAL WITH ENGRAVED OR MACHINE PRINTED LETTERS OR ELECTRO-PLATING.
   B. RED BACKGROUND COLOR WHITE TEXT AND LINE WORK.
   C. ARIAL FONT.
3. ALL SIGNS SHALL BE SIZED APPROPRIATELY AND PLACED IN THE LOCATIONS SPECIFIED. SIGNAGE CANNOT BE HAND-WRITTEN.
4. SIGNS SHALL BE ATTACHED TO THE SERVICE EQUIPMENT WITH POP-RIVETS OR SCREWS

CLIENT:
DWANA WATERS
277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050
AHJ: CITY OF ORANGE TOWNSHIP (ESSEX COUNTY)
UTILITY: PSE&G - PUBLIC SERVICE ELECTRIC & GAS
PHONE: (908) 290-1739
EMAIL: TIFFANYLONG7@YAHOO.COM
FINANCE: SUNRUN

SYSTEM:
SYSTEM SIZE (DC): 26 X 395 = 10.270 kW
SYSTEM SIZE (AC): 7.600 kW @ 240V
MODULES: 26 X HANWHA QCELL: Q.PEAK-DUO-L-G7.3 395
OPTIMIZERS: 26 X SOLAREDGE S440
INVERTER: SOLAREDGE SE7600H-USRGM [SI1]

REVISIONS		
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

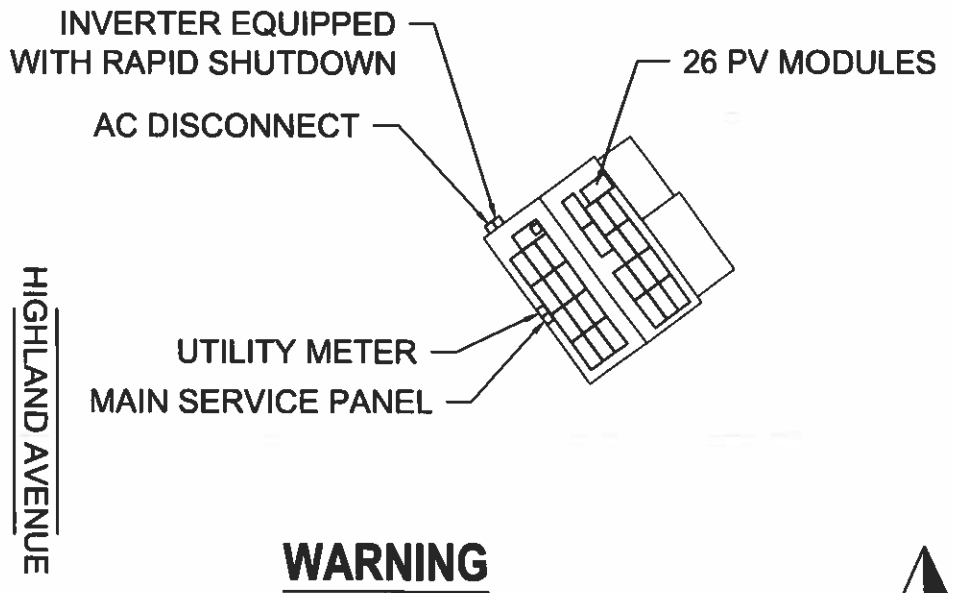
freedom FOREVER
FREEDOM FOREVER LLC
201 COMMERCE DR #5, MOORESTOWN, NJ 08057
Tel: (800) 385-1075
GREG ALBRIGHT
CONTRACTOR LICENSE:
HOME IMPROVEMENT CONTRACTOR
13VH11080100

LABELS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
298406	2/17/2023	N.B.	PV-7

CAUTION:

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS AS SHOWN



WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

N

NOTES:

1. AC ARTICLES 690 AND 705 AND IRC SECTION R324 MARKINGS SHOWN HEREON.
2. ALL MARKING SHALL CONSIST OF THE FOLLOWING:
   A. UV RESISTANT SIGN MATERIAL WITH ENGRAVED OR MACHINE PRINTED LETTERS OR ELECTRO-PLATING.
   B. RED BACKGROUND COLOR WHITE TEXT AND LINE WORK.
   C. AERIAL FONT.
3. ALL SIGNS SHALL BE SIZED APPROPRIATELY AND PLACED IN THE LOCATIONS SPECIFIED. SIGNAGE CANNOT BE HAND-WRITTEN.
4. SIGNS SHALL BE ATTACHED TO THE SERVICE EQUIPMENT WITH POP-RIVETS OR SCREWS.

CLIENT:
DWANA WATERS
277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050
AHJ: CITY OF ORANGE TOWNSHIP (ESSEX COUNTY)
UTILITY: PSE&G - PUBLIC SERVICE ELECTRIC & GAS
PHONE: (908) 290-1739
EMAIL: TIFFANYLONG7@YAHOO.COM
FINANCE: SUNRUN

SYSTEM:
SYSTEM SIZE (DC): 26 X 395 = 10.270 kW
SYSTEM SIZE (AC): 7.600 kW @ 240V
MODULES: 26 X HANWHA QCELL: Q.PEAK-DUO-L-G7.3 395
OPTIMIZERS: 26 X SOLAREDGE S440
INVERTER: SOLAREDGE SE7600H-USRGM [SI1]

	REVISIONS	
NO	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

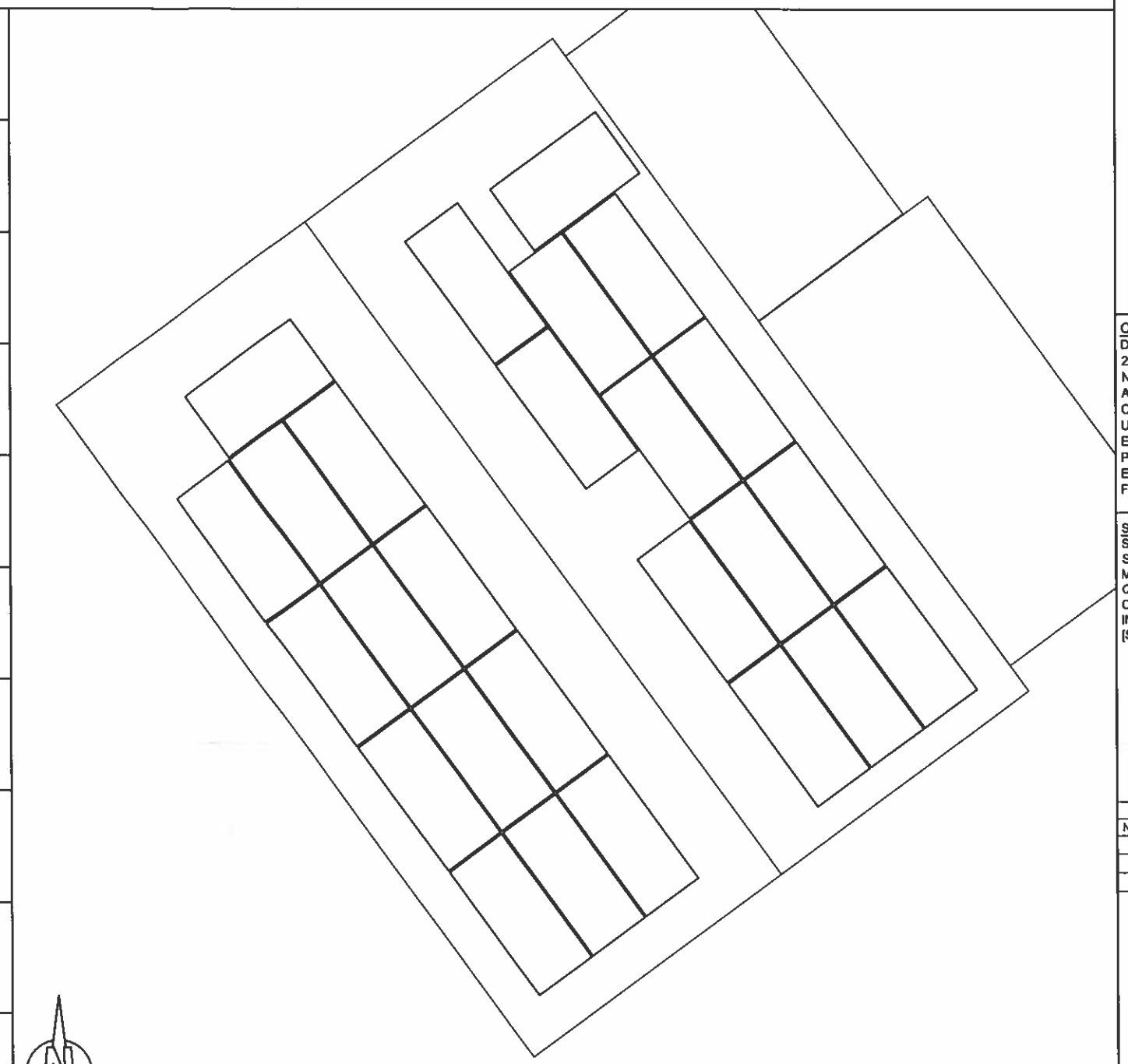
FREEDOM FOREVER LLC
201 COMMERCE DR #5, MOORESTOWN, NJ 08057
Tel: (800) 385-1075
GREG ALBRIGHT
CONTRACTOR LICENSE:
HOME IMPROVEMENT CONTRACTOR
13VH11080100

SITE PLACARD

JOB NO:	DATE:	DESIGNED BY:	SHEET:
298406	2/17/2023	N.B.	PV-7A

SOLAREDGE OPTIMIZER CHART

	1-10	11-20	21-30	31-40	41-50	51-60
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						



CLIENT:
DWANA WATERS
277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050
AHJ: CITY OF ORANGE TOWNSHIP (ESSEX COUNTY)
UTILITY: PSE&G - PUBLIC SERVICE ELECTRIC & GAS
PHONE: (908) 290-1739
EMAIL: TIFFANYLONG7@YAHOO.COM
FINANCE: SUNRUN

SYSTEM:
SYSTEM SIZE (DC): 26 X 395 = 10.270 kW
SYSTEM SIZE (AC): 7.600 kW @ 240V
MODULES: 26 X HANWHA QCELL: Q.PEAK-DUO-L-G7.3 395
OPTIMIZERS: 26 X SOLAREDGE S440
INVERTER: SOLAREDGE SE7600H-USRGM [SI1]

REVISIONS		
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

freedom FOREVER
FREEDOM FOREVER LLC
201 COMMERCE DR #5, MOORESTOWN, NJ 08057
Tel: (800) 385-1075
GREG ALBRIGHT
CONTRACTOR LICENSE:
HOME IMPROVEMENT CONTRACTOR
13VH11080100

OPTIMIZER CHART

JOB NO:	DATE:	DESIGNED BY:	SHEET:
298406	2/17/2023	N.B.	PV-8

SAFETY PLAN

INSTRUCTIONS:

1. USE SYMBOLS IN KEY TO MARK UP THIS SHEET.
2. SAFETY PLAN MUST BE MARKED BEFORE JOB STARTS AS PART OF THE PRE-PLAN
3. DOCUMENT ALL ADDITIONAL HAZARDS ON THIS PAGE & MAKE NOTES ON THE JHA SHEET

INCIDENT REPORTING:

INJURIES - CALL INJURY HOTLINE

(855) 400-7233

**If injury is life threatening, call 911 first THEN the Injury Hotline*

NON-INJURIES - USE MOBILE INCIDENT REPORTING
(Auto, Property Damage, Near Miss)

NEAREST OCCUPATIONAL/INDUSTRIAL CLINIC:

NAME: _____

ADDRESS: _____

NEAREST HOSPITAL:

NAME: _____

ADDRESS: _____

SAFETY COACH CONTACT INFORMATION:

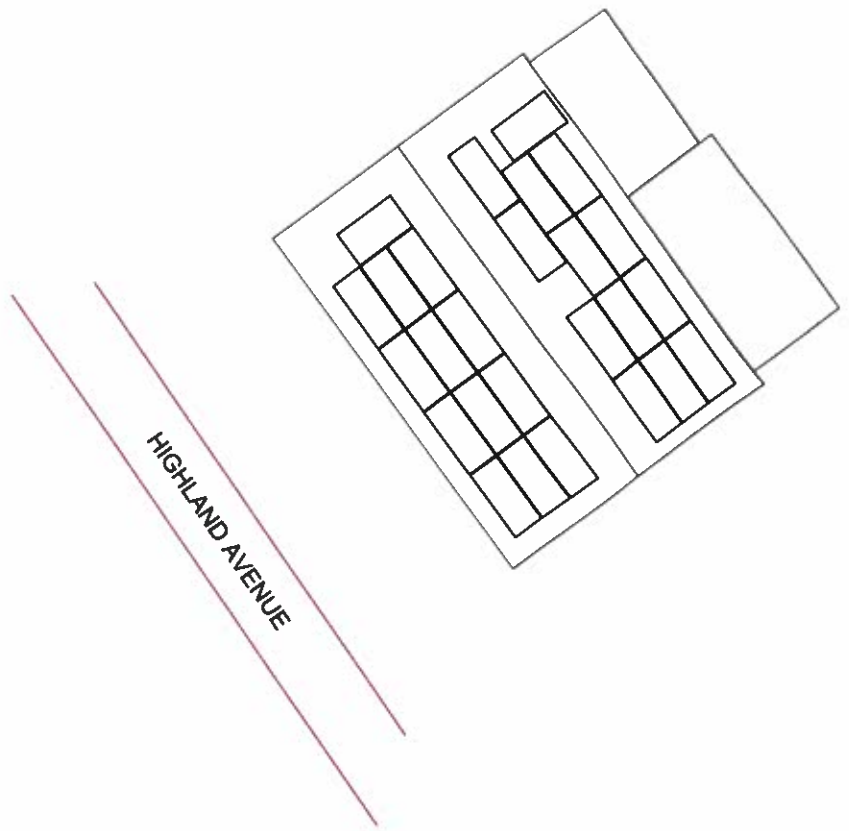
NAME: _____

PHONE NUMBER: _____

ALL EMPLOYEES ON SITE SHALL BE MADE AWARE OF THE SAFETY PLAN AND SIGN INDICATING THAT THEY ARE AWARE OF THE HAZARDS ON-SITE AND THE PLAN FOR WORKING SAFELY.

NAME	SIGNATURE

DATE: _____ TIME: _____



MARK UP KEY

- (P) PERMANENT ANCHOR
- (T) TEMPORARY ANCHOR
- (IL) INSTALLER LADDER
- (B) JUNCTION / COMBINER BOX
- (S) STUB-OUT
- SKYLIGHT
- NO LADDER ACCESS (STEEP GRADE OR GROUND LEVEL OBSTRUCTIONS)
- RESTRICTED ACCESS
- CONDUIT
- (GAS) GAS SHUT OFF
- (H_2O) WATER SHUT OFF
- (7) SERVICE DROP
- (Z) POWER LINES

BREAK AND WATER LOG

THIS LOG IS TO BE FILLED OUT ANY TIME THE TEMP EXCEEDS **90** DEGREES. THE CREW LEAD AND ROOF LEAD ARE RESPONSIBLE FOR ENSURING THIS IS COMPLETED AND UPLOADED AT THE END OF EVERYDAY WHEN TEMPS EXCEED **90** DEGREES

NAME	0800HRS	0900HRS	1000HRS	1100HRS	1200HRS	1300HRS	1400HRS	1500HRS	1600HRS

CLIENT:
DWANA WATERS
277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050
AHJ: CITY OF ORANGE TOWNSHIP (ESSEX COUNTY)
UTILITY: PSE&G - PUBLIC SERVICE ELECTRIC & GAS
PHONE: (908) 290-1739
EMAIL: TIFFANYLONG7@YAHOO.COM
FINANCE: SUNRUN

SYSTEM:
SYSTEM SIZE (DC): 26 X 395 = 10.270 kW
SYSTEM SIZE (AC): 7.600 kW @ 240V
MODULES: 26 X HANWHA QCELL: Q.PEAK-DUO-L-G7.3 395
OPTIMIZERS: 26 X SOLAREDGE S440
INVERTER: SOLAREDGE SE7600H-USRGM [SI1]

REVISIONS		
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

freedom FOREVER
FREEDOM FOREVER LLC
201 COMMERCE DR #5, MOORESTOWN, NJ 08057
Tel: (800) 385-1075
GREG ALBRIGHT
CONTRACTOR LICENSE:
HOME IMPROVEMENT CONTRACTOR
13VH11080100

SAFETY PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
298406	2/17/2023	N.B.	PV-9

JOB HAZARD ANALYSIS

Crew leader to fill out all sections below, hold a pre-job safety meeting with all personnel, and upload this completed document and the Safety Plan to Site Capture

Ladder Access
- Ladders must be inspected before each use.
- Extension ladders must be set up on a firm and level surface at a 4-to-1 rise to run angle (or 75 degrees) and the top must be secured to the structure. Extension style ladders placed on uneven, loose or slippery surfaces must additionally have the base firmly anchored or lashed so the base will not slip out.
- Extension ladders must be used with walk-through devices or the ladder must extend 36" above the stepping off point.
- A-frame ladders must only be climbed with the ladder spreader bars locked in the open position; A-frame ladders shall not be climbed while in the closed position (ex, closed and used while leaned against a structure).

- Additional notes:

Mobile Equipment
- Only Qualified operators will operate equipment; operators must maintain a certification on their person for the equipment being operated.
- Type(s) of mobile equipment (Type/Make/Model):
- Qualified operator(s):

Material Handling and Storage
- Materials will be staged/stored in a way that does not present a hazard to client, personnel or public. Materials stored on the roof will be physically protect from failing or sliding off.

Fall Protection
- A site-specific plan for fall prevention and protection is required prior to starting work and must remain onsite at all times until work is complete; a fall rescue plan must be outlined and discussed among the crew prior to work start.
- First-person-Up (FPU) must install their anchor and connect before any other task, including installing other anchors. The Last-Person-Down (LPD) must be the only person on a roof uninstalling fall protection.

- FPCP (name and title):
- FPU and LPD (name and title):

Electrical Safety
- The Electrical Qualified Person (EQP) is required onsite to perform electrical work.
- All electrical work will be performed with equipment in an electrically safe condition (de-energized) unless approval has been granted prior to work.
- Service drops and overhead electrical hazards will be indentified and protected from contact, as neccessary.

- EQP (name and tile):

Public Protection
- The safety of the Client and Public must be maintained at all times.
- The Client and the Public shall be prevented from entering the work zone through the use of barriers and/or signage, as required.
- Company, Client and Public property shall be protected from falling objects.
- Pets (including dogs) shall be secured by their owners prior to work start.
- The Client should not leave pets, family members, or others in charge or care of Employees, Contractors, or Temporary Workers.

- Crew leader responsible for communication with the client:
- Client and public is excluded from work area by barricades (N/A, Yes, No):

Training and Pre-Job Safety Briefing
- All employees onsite shall be made aware of the specific hazards of this project and review this HJA during a pre-job briefing, and their signature indicates awareness of site conditions and the plan to eliminate any hazards identified prior to and during the project.

- Crew leader (name/title):
- Crew member (name/title):
- Crew member (name/title):
- Crew member (name/title):
- Crew member (name/title):
- Crew member (name/title):

Airborne Contaminants:
- Asbestos-containing (Transite) piping (ACP) - Do not disturb (move, drill, cut fracture, etc.)
- Asbestos-containing thermal insulation (ACI) and Asbestos-containing duct wrapping (ACW) - do not disturb, no attic or crawlspace access is allowed if work to be performed could cause exposure to personnel, client or public.

- If yes, list specific tasks and protection in place:

Weather and Environment
- The site supervisor shall forecast the weather conditions at the job site, prior to crew arrival, in order to mitigate any hazards associated with inclement weather (heat, cold, wind, rain, etc.)
- The site supervisor will utilized a portable wind meter (anemometer) to verify actual onsite wind conditions, by checking at the ground and on any elevated work surface (ex, rooftop) prior to work start, at midday and prior to solar panel staging on a roof.
- Elevated work involving the moving or maneuvering of solar panels shall cease at 25mph (sustained wind) until wind subsides.

- Forecasted weather maximum temp (degrees f):

Heat Related Illness Prevention
- Employees shall have access to potable drinking water that is fresh, pure, and suitably cool. The water shall be located as close as practicable to the areas where employees are working. Water shall be supplied in sufficient quantity at the beginning of the work shift to provide at least one quart per employee per hour for drinking for the entire shift. Employees may begin the shift with smaller quantities of water if they identify the location and have effective means for replenishment during the shift to allow employees to drink on quart or more per hour. The frequent drinking of water shall be encouraged.
- Shade shall be present when temperature exceeds 80 degrees Fahrenheit. When the outdoor temperature in the work exceeds 80 degrees Fahrenheit, employees shall have and maintain one or more areas with shade at all times.
- New employees must be acclimatized. New employees will be monitored by their Crew Leader (site supervisor) for the first two (2) weeks of employment or longer when necessary.
- Employees will be allowed and encouraged to implement scheduled breaks during each shift. Employees must take cool-down breaks in the shade any time they feel the need to do so to protect them from overheating. Supervisors are REQUIRED to allow employees any break period they need during high heat conditions.
- Cool Vests are encouraged for all employees at all times during periods of high heat.
- Identify the location of the closet Occupational/Industrial Clinic or Hospital in case a crew member becomes ill.

What is the specific plan to provide and replenish sufficient water for all employees on site?
- If offsite replenish is necessary, where will you go to replenish water (location/address):
- Who will replenish the drinking water (name):

Restroom facilities
- Employees shall have access to restroom facilities with hand-washing stations. Use of onsite restroom is at the client's discretion (location is annotated below). If client does not give permission, location of suitable restroom facilities with hand-washing stations offsite will be provided. The onsite supervisor will identify location and make arrangements to ensure all employees have access at any point.

- Restroom facilities will be (circle one): Onsite - Offsite
- If Offsite, add location name and address:

Incident Reporting Procedure
- Contact your Site Supervisor
  - Name:
  - Phone:
- Contact your Manager
  - Name:
  - Phone:
- Contact your Site Supervisor
  - Name:
  - Phone:

With: Your full name, phone number, office location, brief description of what happen and when.

NOTE ADDITIONAL HAZARDS NOT ADDRESSED ABOVE
(add as many as necessary by using additional sheets)

Define the Hazard:	Method/steps to prevent incident:
Define the Hazard:	Method/steps to prevent incident:
Define the Hazard:	Method/steps to prevent incident:
Define the Hazard:	Method/steps to prevent incident:

CLIENT:
DWANA WATERS
277 HIGHLAND AVENUE, CITY OF ORANGE, NJ 07050
AHJ: CITY OF ORANGE TOWNSHIP (ESSEX COUNTY)
UTILITY: PSE&G - PUBLIC SERVICE ELECTRIC & GAS
PHONE: (908) 290-1739
EMAIL: TIFFANYLONG7@YAHOO.COM
FINANCE: SUNRUN

SYSTEM:
SYSTEM SIZE (DC): 26 X 395 = 10.270 kW
SYSTEM SIZE (AC): 7.600 kW @ 240V
MODULES: 26 X HANWHA QCELL: Q.PEAK-DUO-L-G7.3 395
OPTIMIZERS: 26 X SOLAREDGE S440
INVERTER: SOLAREDGE SE7600H-USRGM [SI1]

REVISIONS		
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

FREEDOM FOREVER LLC
201 COMMERCE DR #5, MOORESTOWN, NJ 08057
Tel: (800) 385-1075
GREG ALBRIGHT
CONTRACTOR LICENSE:
HOME IMPROVEMENT CONTRACTOR
13VH11080100

SAFETY PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
298406	2/17/2023	N.B.	PV-10

Q.PEAK DUO L-G7.3

385-405

ENDURING HIGH PERFORMANCE

LOW ELECTRICITY GENERATION COSTS
Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 20.3%.

INNOVATIVE ALL-WEATHER TECHNOLOGY
Optimal yields, whatever the weather with excellent low-light and temperature behaviour.

ENDURING HIGH PERFORMANCE
Long-term yield security with Anti LID Technology, Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING
High-tech aluminium alloy frame, certified for high snow (5400Pa) and wind loads (2400Pa).

A RELIABLE INVESTMENT
Inclusive 12-year product warranty and 25-year linear performance warranty[2].

STATE OF THE ART MODULE TECHNOLOGY
Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

[1] APT test conditions according to IEC/TS 62804-1:2015, method B (−1500V, 168h)
[2] See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:

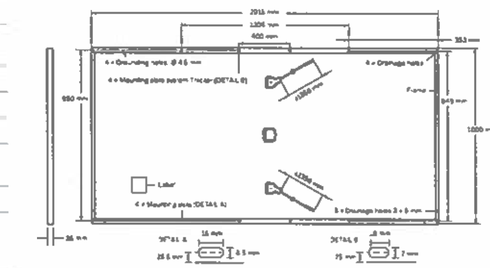
- Rooftop arrays on commercial/industrial buildings
- Ground-mounted solar power plants

Engineered in Germany

QCELLS

MECHANICAL SPECIFICATION

Format	2015mm × 1000mm × 35mm (including frame)
Weight	23kg
Front Cover	3.2mm thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Anodised aluminium
Cell	6 × 24 monocrystalline Q.ANTUM solar half cells
Junction box	53-101mm × 32-60mm × 15-18mm Protection class IP67, with bypass diodes
Cable	4mm² Solar cable; (+) ≥1350mm, (−) ≥1350mm
Connector	Staubli MC4-Evo2, Hanwha Q CELLS HQC4, Amphenol UTX, Renhe 05-8, JMTHY JM601A, Tongling Cable01S-F; IP68 or Friends PV2e; IP67

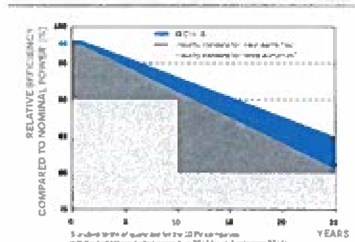


ELECTRICAL CHARACTERISTICS

POWER CLASS			385	390	395	400	405
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5W / −0W)							
Power at MPP[1]	P_{MPP}	[W]	385	390	395	400	405
Short Circuit Current[1]	I_{SC}	[A]	10.05	10.10	10.14	10.19	10.23
Open Circuit Voltage[1]	V_{OC}	[V]	48.17	48.44	48.70	48.96	49.22
Current at MPP	I_{MPP}	[A]	9.57	9.61	9.66	9.70	9.75
Voltage at MPP	V_{MPP}	[V]	40.24	40.57	40.90	41.23	41.56
Efficiency[1]	η	[%]	≥19.1	≥19.4	≥19.6	≥19.9	≥20.1
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]							
Power at MPP	P_{MPP}	[W]	288.3	292.1	295.8	299.6	303.3
Short Circuit Current	I_{SC}	[A]	8.10	8.14	8.17	8.21	8.24
Open Circuit Voltage	V_{OC}	[V]	45.42	45.67	45.92	46.17	46.41
Current at MPP	I_{MPP}	[A]	7.53	7.57	7.60	7.64	7.67
Voltage at MPP	V_{MPP}	[V]	38.29	38.60	38.92	39.23	39.54

[1] Measurement tolerances P_{MPP} ±3%; I_{SC}; V_{OC} ±5% at STC: 1000W/m², 25±2°C, AM 1.5 according to IEC 60904-3 • [2] 800W/m², NMOT, spectrum AM 1.5

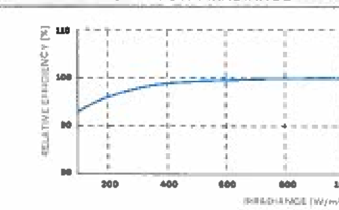
Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.54% degradation per year. At least 93.1% of nominal power up to 10 years. At least 85% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25°C, 1000W/m²)

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	Temperature Coefficient of V_{OC}	β	[%/K]	−0.27
Temperature Coefficient of P_{MPP}	γ	[%/K]	−0.35	Normal Module Operating Temperature	NMOT	[°C]	43±3

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage	V_{SYS}	[V]	1500 (IEC)/1500 (UL)	Safety Class	II
Maximum Reverse Current	I_R	[A]	20	Fire Rating based on ANSI/UL 1703	C/TYPE 1
Max. Design Load, Push/Pull		[Pa]	3600/1600	Permitted Module Temperature on Continuous Duty	−40°C - +85°C
Max. Test Load, Push/Pull		[Pa]	5400/2400		

QUALIFICATIONS AND CERTIFICATES

IEC 61215:2016; IEC 61730:2016, Application Class II;
This data sheet complies with DIN EN 50380.

PACKAGING INFORMATION

Number of Modules per Pallet	29
Number of Pallets per Trailer (24t)	24
Number of Pallets per 40' HC-Container (26t)	22
Pallet Dimensions (L × W × H)	2080 × 1150 × 1185mm
Pallet Weight	727kg

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS GmbH
Sonnenallee 17-21, 06766 Bitterfeld-Wolfen, Germany | **TEL** +49 (0)3494 66 99-23444 | **FAX** +49 (0)3494 66 99-23000 | **EMAIL** sales@q-cells.com | **WEB** www.q-cells.com

Engineered in Germany

QCELLS

Specifications subject to technical changes © Q CELLS Q.PEAK DUO L-G7.3 385-405 2019-05 Rev02 EN

Power Optimizer

For North America

S440, S500

POWER OPTIMIZER

PV power optimization at the module level

- Specifically designed to work with SolarEdge residential inverters
- Detects abnormal PV connector behavior, preventing potential safety issues*
- Module-level voltage shutdown for installer and firefighter safety
- 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
- Flexible system design for maximum space utilization
- Compatible with bifacial PV modules
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)

* Expected availability in 2022

solaredge.com

solaredge

/ Power Optimizer

For North America

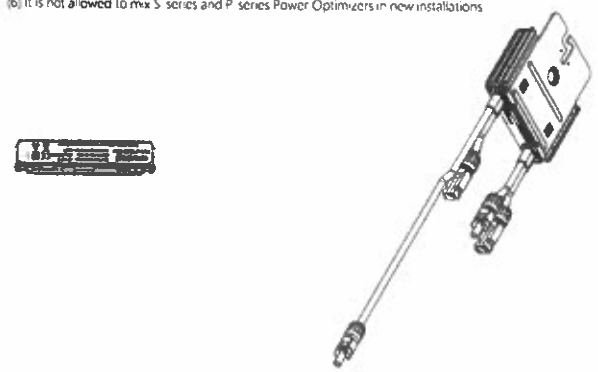
S440, S500

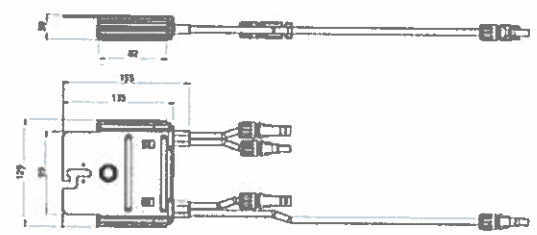
	S440	S500	Unit
INPUT			
Rated Input DC Power(1)	440	500	W
Absolute Maximum Input Voltage (Voc)	60		Vdc
MPPT Operating Range	8 - 60		Vdc
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5	15	Adc
Maximum Efficiency	99.5		%
Weighted Efficiency	98.6		%
Overvoltage Category	II		
OUTPUT DURING 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+/-0.1		Vdc
STANDARD COMPLIANCE			
Photovoltaic Rapid Shutdown System	NEC 2014, 2017 & 2020		
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3		
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 / 5.07 x 6.02 x 1.18		mm / in
Weight (including cables)	655 / 1.5		gr / lb
Input Connector	MC4(2)		
Input Wire Length	0.1 / 0.32		m / ft
Output Connector	MC4		
Output Wire Length	(+) 2.3, (-) 0.10 / (+) 7.54, (-) 0.32		m / ft
Operating Temperature Range(3)	-40 to +85		°C
Protection Rating	IP68 / Type6B		
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	Three Phase for 208V grid	Three Phase for 277/480V grid	
Minimum String Length (Power Optimizers)	S440, S500	8	14	18	
Maximum String Length (Power Optimizers)		25		50(4)	
Maximum Nominal Power per String		5700 (6000 with SE7600-US-SE11400-U)	6000	12750	W
Maximum Allowed Connected Power per String(5) (Permitted only when the difference in connected power between strings is 1,000W or less)		Refer to Footnote 5	One String 7200W	15,000W	
			Two strings or more 7800W		
Parallel Strings of Different Lengths or Orientations		Y			

(4) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements, safety voltage will be above the 30V requirement
(5) If the inverter's rated AC power < maximum nominal power per string, then the maximum power per string will be able to reach up to the inverter's maximum input DC power. Refer to https://www.solaredge.com/sites/default/files/se-power-optimizer-single-string-design-application-note.pdf
(6) It is not allowed to mix S series and P series Power Optimizers in new installations





c ETL us Intertek

RoHS

Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US /
SE7600H-US / SE10000H-US / SE11400H-US

INVERTERS

12-25 YEAR WARRANTY

Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking 99% weighted efficiency
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014, NEC 2017 and NEC 2020 per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Small, lightweight, and easy to install both outdoors or indoors
- Built-in module-level monitoring
- Optional: Faster installations with built-in consumption metering (1% accuracy) and production revenue grade metering (0.5% accuracy, ANSI C12.20)

solaredge.com

solaredge

Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/
SE7600H-US / SE10000H-US / SE11400H-US

MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXXXH-XXXXXBXX4							
OUTPUT								
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5(1)							Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A
Power Factor	1, Adjustable - 0.85 to 0.85							
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
INPUT								
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W
Transformer-less, Ungrounded	Yes							
Maximum Input Voltage	480							Vdc
Nominal DC Input Voltage	380				400			Vdc
Maximum Input Current @240V(2)	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V(2)	-	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600kΩ Sensitivity							
Maximum Inverter Efficiency	99	99.2						%
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5							W

(1) For other regional settings please contact SolarEdge support
(2) A higher current source may be used; the inverter will limit its input current to the values stated

Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/ SE7600H-US / SE10000H-US / SE11400H-US

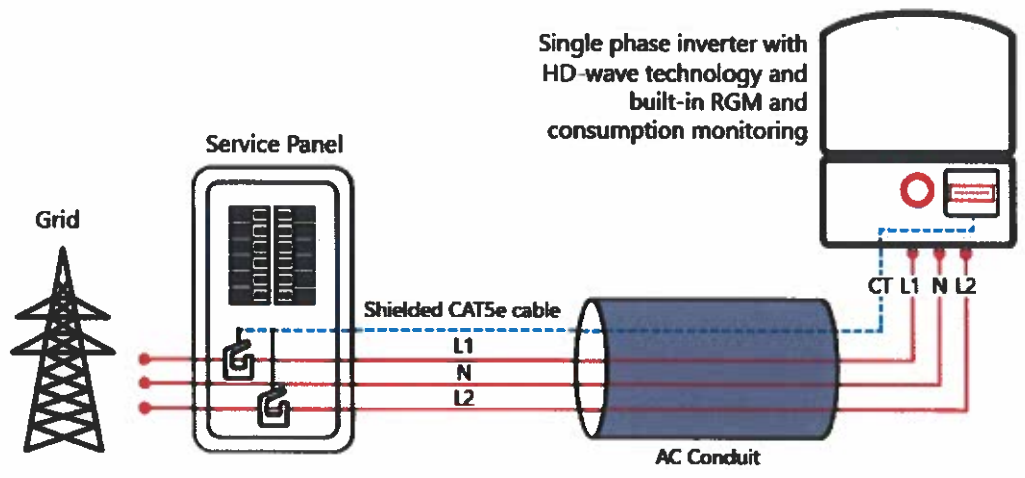
MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
ADDITIONAL FEATURES								
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)							
Revenue Grade Metering, ANSI C12.20	Optional [3]							
Consumption metering								
Inverter Commissioning	With the SetApp mobile application using Built-in Wi-Fi Access Point for Local Connection							
Rapid Shutdown - NEC 2014, NEC 2017 and NEC 2020, 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect							
STANDARD COMPLIANCE								
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07							
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)							
Emissions	FCC Part 15 Class B							
INSTALLATION SPECIFICATIONS								
AC Output Conduit Size / AWG Range	1" Maximum / 14-6 AWG					1" Maximum / 14-4 AWG		
DC Input Conduit Size / # of Strings / AWG Range	1" Maximum / 1-2 strings / 14-6 AWG					1" Maximum / 1-3 strings / 14-6 AWG		
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174					21.3 x 14.6 x 7.3 / 540 x 370 x 185		in / mm
Weight with Safety Switch	22 / 10		25.1 / 11.4		26.2 / 11.9	38.8 / 17.6		lb / kg
Noise	< 25				<50			dBA
Cooling	Natural Convection							
Operating Temperature Range	-40 to +140 / -40 to +60[4]							°F / °C
Protection Rating	NEMA 4X (Inverter with Safety Switch)							

(3) Inverter with Revenue Grade Meter P/N: SExxxxH-US000BNC4; Inverter with Revenue Grade Production and Consumption Meter P/N: SExxxxH-US000BNI4. For consumption metering, current transformers should be ordered separately: SEACT0750-200NA-20 or SEACT0750-400NA-20. 20 units per box

(4) 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

How to Enable Consumption Monitoring

By simply wiring current transformers through the inverter's existing AC conduits and connecting them to the service panel, homeowners will gain full insight into their household energy usage helping them to avoid high electricity bills



RoHS

pe.eaton.com

Eaton general duty cartridge fuse safety switch

DG222NRB

UPC:782113144221

Dimensions:

- **Height:** 14.37 IN
- **Length:** 7.35 IN
- **Width:** 8.4 IN

Weight:10 LB

Notes: Maximum hp ratings apply only when dual element fuses are used. 3-Phase hp rating shown is a grounded B phase rating, UL listed.

Warranties:

- 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.

Specifications:

- **Type:** General duty, cartridge fused
- **Amperage Rating:** 60A
- **Enclosure:** NEMA 3R
- **Enclosure Material:** Painted galvanized steel
- **Fuse Class Provision:** Class H fuses
- **Fuse Configuration:** Fusible with neutral
- **Number Of Poles:** Two-pole
- **Number Of Wires:** Three-wire
- **Product Category:** General duty safety switch
- **Voltage Rating:** 240V

Supporting documents:

- Eatons Volume 2-Commercial Distribution
- Eaton Specification Sheet - DG222NRB

Certifications:

- UL Listed

Product compliance: No Data

EcoFasten
For Installers. By Installers.

ROCKIT

COMPLETE RAIL-LESS RACKING SYSTEM

The RockIt system is the industry's premier rail-less PV racking system for composition shingle, tile, and metal roofs. Designed in conjunction with the needs of installers, RockIt quickly & easily installs with a single tool. Featuring an easy-to-position alignment slide and a top-down leveling system, RockIt is logistically intelligent with no need to ship or transport long rails. Components are available in a black finish that complements both commercial and residential applications. Conforms to UL 2703.

FEATURES & BENEFITS

- Patented watertight technology
- Fully integrated bonding
- Top-down leveling system
- North-South adjustability
- Single tool install

STREAMLINED INSTALLATION WITH MINIMAL ROOF PENETRATIONS

ROOF TYPE — **Composition Shingle, Tile, Metal**

RACKING — **Rail-Less**

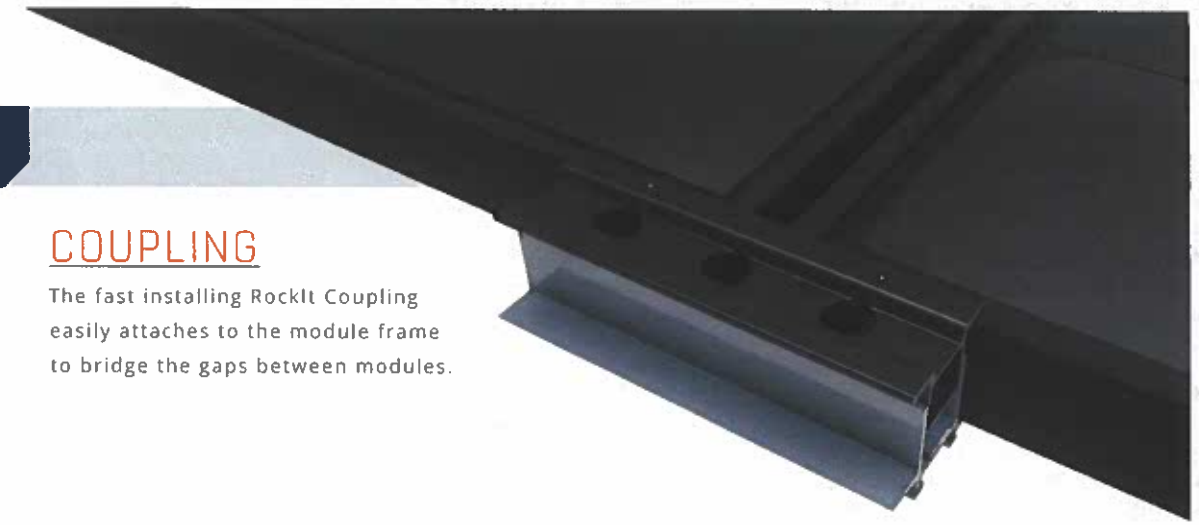
ATTACHMENT — **Structural-Attach Direct-Attach**

WATER TIGHT TECHNOLOGY

25 YEAR WARRANTY

ECOFASTENSOLAR.COM

ROCKIT

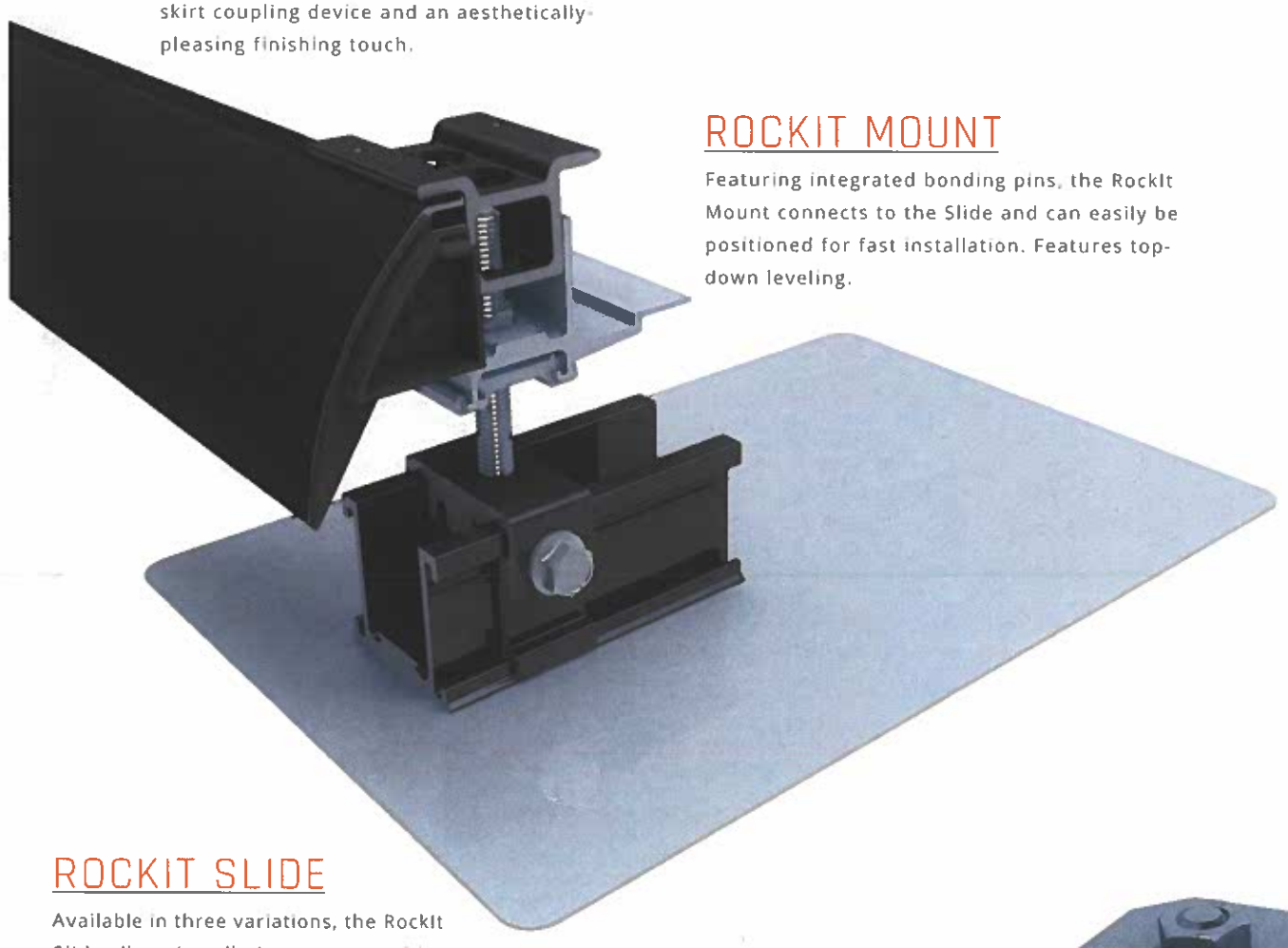


COUPLING

The fast installing RockIt Coupling easily attaches to the module frame to bridge the gaps between modules.

SKIRT

The sleek black Skirt installs first and acts as an alignment guide for the entire array. The Skirt End Cap does double duty as a skirt coupling device and an aesthetically-pleasing finishing touch.



ROCKIT MOUNT

Featuring integrated bonding pins, the RockIt Mount connects to the Slide and can easily be positioned for fast installation. Features top-down leveling.

ROCKIT SLIDE

Available in three variations, the RockIt Slide allows installation on composition shingle, tile, and metal roofs.

FRAME MLPE MOUNT

Attaches and fully bonds MLPE's (Module Level Power Electronics) to the module frame with a single bolt clip.

COMPATIBLE MODULES

The Rockit System has been tested and evaluated to UL 2703 for bonding, grounding, mechanical loading and fire classification, and may be used to ground and/or mount PV modules listed to UL 1703 or UL 61730. A list of approved modules is included below.

Unless otherwise noted, "xxx" refers to the module power rating and both black and silver frames are included in the certification.

*Class A System fire rating with Type 1, 2, and 29 PV modules with no skirt required.

NOTE: Modules with flange widths shorter than 22mm cannot be installed in portrait.

TYPE 1, 2 & 29 MODULES

MANUFACTURER	LIST OF UL 2703 APPROVED TYPE 1, 2 & 29 PV MODULES*
Adani	Adani modules with 35 and 40mm frames ASX-Y-ZZ-xxx Where "X" can be B, M or P, "Y" can be 6 or 7, and "ZZ" can be blank, PERC, B-PERC, or AB-PERC
AIONRISE	Aionrise modules with 35 and 40mm frames AIONyyG1-xxx Where "yy" can be 60 or 72
Aptos Solar	Aptos modules with 35 and 40 mm frames DNA-yy-zzaa-xxx Where "yy" can be 108, 120 or 144; "zz" can be MF or BF; and "aa" can be 10, 23 or 26
Astronergy Solar	Astronergy modules with 35 and 40 mm frames CHSMbbyyC/zz-xxx Where "bb" can be 60, 66, or 72; "yy" can be blank, 10 or 12; "C" can be M, M(BL), M-HC, P, P(BL) or P-HC ; and "zz" can be blank or HV
Auxin	Auxin modules with 40 mm frames AXN6M6YYMxxxZ Where "YY" can be 10 or 12; "Z" can be blank, A, B or C
Axitec	Axitec Modules with 30 and 35 mm frames AC-xxxY/aaZZ "Y" can be M, P, MH or MBT; and "aa" can be blank, 125 or 156; and "ZZ" can be 60S, 108V, 108VB, 120S, 120V or 120VB

REVISION DATE: 12/2/22 | VERSION: v3.1
ROCKIT INSTALLATION GUIDE
EcoFasten For Installers. By Installers.

MANUFACTURER	LIST OF UL 2703 APPROVED TYPE 1, 2 & 29 PV MODULES*
Bluesun Solar	Bluesun modules with 30 and 35mm frames BSMxxxM-AAA Where "AAA" can be 60HPH or 72HBD
Boviet	Boviet modules with 35 and 40mm frames BVM66aaYY-xxxBcc Where "aa" can be 9, 10 or 12; "YY" is M, or P; and "B" can be blank, L or S; and "cc" can be blank, H, H-BF, H-HC or HC-BF
Canadian Solar	Canadian Solar modules with 35 and 40 mm frames CSbY-xxxZ Where "b" can be 1, 3 or 6; "Y" can be H, K, L, N, P, R, V or Y; and "Z" can be M, MS, M-SD, MS-HL, MS-SD, P, PX, or P-SD
CertainTeed	CertainTeed modules with 35 and 40mm frames CTxxxYZZ-AA Where "Y" can be M, HC; "ZZ" can be 00, 10, 11; and "AA" can be 04 or 06
CSUN	CSUN modules with 35 and 40 mm frames CSUNxxx-zzAbb Where "zz" is 60 or 72; and "A" is M or MM; "bb" is blank or 5BB
Dehui	Dehui modules with 35 and 40mm frames DH-MYYYZ-xxx Where "YYY" can be 760, 772, 860, 872; and "Z" can be B or W
ET Solar	ET Solar modules with 35 and 40mm frames ET-YZZZxxxAA Where "Y" can be P, L, or M; "ZZZ" can be 660, 660BH, 672, 672BH, or 754BH; and "AA" can be TB, TW, WB, WW, BB, WBG, WWG, WBAC, WBCO, WWCO, WWBCO or BBAC
Freedom Forever	Freedom Forever modules with 35mm frames FF-MPa-BBB-xxx Where "a" can be blank or 1
Freevolt	Freevolt modules with 35mm frames ECP-PVGRAF-144HC-xxx

MANUFACTURER	LIST OF UL 2703 APPROVED TYPE 1, 2 & 29 PV MODULES*
Hanwha Q CELLS	Hanwha Q CELLS Modules with 32, 35 and 40mm frames aaYY-ZZ-xxx where "aa" can be Q. or B.; "YY" can be PLUS, PRO, PEAK, LINE PRO, LINE PLUS, PLUS DUO or PEAK DUO; and "ZZ" can be G3, G3.1, G4, G4.1, L-G2, L-G2.3, L-G3, L-G3.1, L-G3y, L-G4, L-G4.2, L-G4y, LG4.2/TAA, BFR-G3, BLK-G3, BFR-G3.1, BLK-G3.1, BFR-G4, BFR-G4.1, BFR G4.3, BLK-G4.1, G4/SC, G4.1/SC, G4.1/TAA, G4.1/MAX, BFR G4.1/TAA, BFR G4.1/MAX, BLK G4.1/TAA, BLK G4.1/SC, EC-G4.4, G5, G5/SC, G5/TS, BLK-G5, BLK-G5/SC, BLK-G5/TS, L-G5, L-G5.1, L-G5.2, L-G5.2/H, L-G5.3, G6, G6/SC, G6/TS, G6+, G6+/TS, BLK-G6, G7, BLK-G6+, BLK-G6+/AC, BLK-G6+/HL, BLK-G6+/SC, BLK-G6/TS, BLK-G6+/TS, BLK-G7, G7.2, G8, BLK-G8, G8+, BLK-G8+ L-G7, L-G7.1, L-G7.2, L-G7.3, BLK ML-G9, ML-G9+, BLK ML-G9+, ML-G9, BLK-G10+, BLK-G10+/AC, ML-G10, BLK ML-G10, ML-G10+, BLK ML-G10+, ML-G10.a, BLK ML-G10.a, ML-G10.a+ or BLK ML-G10.a+
Heliene	Heliene modules with 35 and 40 mm frames YYZZxxxA Where "YY" can be 60, 72, 108 or 120; "ZZ" can be HC, M or P; and "A" can be blank, M10-SL, M10-SL-BLK or M10-SL-Bifacial
HT-SAAE	HT-SAAE modules with 35 and 40 mm frames HTyy-aaaZ-xxx Where "yy" can be 60 or 72, "aaa" can be 156 or 166, "Z" can be M, M(V), M(S), M(VS), M-C, M(V)-C, P or P(V)
Hyperion	Hyperion modules with 35mm frames HY-DH108P8-xxx
Hyundai	Huyndai modules with 32, 35 and 40 mm frames HiY-SxxxZZ Where "Y" can be A or S; "S" can be M or S; and "ZZ" can be HG, KI, MF, MG, PI, SG, RG, RG (BK), TG or YH(BK) or XG(BK)
Itek	Itek Modules with 40 mm frames IT-xxx-YY "YY" can be blank, HE, or SE
JA Solar	JA Solar modules with 30, 35 and 40mm frames JAyyzz-bbww-xxx/aa Where "yy" can be M, P, M6 or P6; "zz" can be blank, (K), (L), (R), (V), (BK), (FA), (SE), (TG), (FA)(R), (K)(SE), (K)(TG), (L)(BK), (L)(TG), (R)(BK), (R)(TG), (V)(BK), (BK) (TG), or (L)(BK)(TG); "bb" can be 54, 60 or 72; "ww" can be blank, D30, S01, S02, S03, S09, S10, S17, S30 or S31; and "aa" can be MR, SI, SC, PR, RE, 3BB, 4BB, 4BB/RE, 4BB/1500V, PR/1500V, 5BB

REVISION DATE: 12/2/22 | VERSION: v3.1

ROCKIT INSTALLATION GUIDE

EcoFasten For Installers. By Installers.

MANUFACTURER	LIST OF UL 2703 APPROVED TYPE 1, 2 & 29 PV MODULES*
Jinko	Jinko modules with 35 and 40 mm frames JKMYxxxZZ-aa Where "Y" can either be blank or S; "ZZ" can be M, P, PP, or -V; and "aa" can be blank, 60, 60B, 60H, 60HB, 60L, 60BL, 60HL, 60HBL, 60-J4, 60B-J4, 60B-EP, 60(Plus), 60-V, 60-MX, 72H, 72H-V, 72HL-V, 72HBL-V, 72L-V, 6RL3, 6RL3-B or 6TL3-B
LG	LG modules with 40mm frames LGxxxyaz-bb "y" can be A, E, M, N, Q, or S; "a" can be A, 1, 2 or 3; "z" can be C, K or W; and "bb" can be G4, A5, A6, B6, E6, E6.AW5, L5, N5, v5, V6
Longi	Longi modules with 35 and 40 mm frames LRa-YYZZ-xxxM Where "a" can be 4, 5 or 6; "YY" can be 54, 60 or 66 "ZZ" can be blank, BK, PB, PE, PH, HPB, or HPH
Maxeon	Maxeon modules with 35, 40 and 46mm frames SPR-AAAY-xxx-zzz Where "AAA" can be MAX or X; "Y" can be 3, 5, 6, 21 or 22; and "zzz" can be R, BLK or COM
Meyer Burger	Meyer Burger Modules with 35mm frames Meyer Burger Glass
Mission Solar	Mission Solar modules with 35, 40 mm frames YYYbb-xxxZZaa Where "YYY" can be MSE or TXS; "bb" can be blank, 6 or 60A; "ZZ" can be blank, SO, SQ, SX, 120 or 144; and "aa" can be blank, BB, BW, 4J, 4S, 5K, 5R, 5T, 8T, 8K, 9R or 9Z
Next Energy Alliance	Next Energy Alliance modules with 35 and 40mm frames yyNEA-xxxZZ where "yy" can be blank or US; "ZZ" can be M, MB or M-60
NE Solar	NE Solar modules with 30, 35 and 40mm frames NESExxx-zzMH-yy Where "zz" can be 54 or 60; and "yy" can be M6 or M10
Panasonic (HIT)	Panasonic modules with 40 mm frames VBHNxxxYYzzA "YY" can be either SA or KA; "zz" can be either 03, 04, 17 or 18; and "A" can be blank, E or G

MANUFACTURER	LIST OF UL 2703 APPROVED TYPE 1, 2 & 29 PV MODULES*
Panasonic (EverVolt)	Panasonic modules with 30 mm frames EVPVxxxA Where "A" can be blank or H, K or PK
Philadelphia Solar	Philadelphia modules with 35 and 40 mm frames PS-YzzAA-xxx Where "Y" can be M or P; "zz" can be 60, 72 or 144; and "AA" can be blank, (BF), (HC) or (HCBF)
Phono Solar	Phono Solar modules with 30 and 35 mm frames PSxxxY-ZZ/A Where "Y" can be M4, M4H, M5GF, M5GFH, M6, M6H, M8GF or M8GFH; "ZZ" can be 18, 20 or 24; and "A" can be TH, UHB, VH or VHB
Prism Solar	Prism Solar modules with 35mm frames PST-xxxW-M72Y Where "Y" can be H, HB or HBI
REC	REC modules with 30 and 38 mm frames RECxxxYYZZ Where "YY" can be AA, M, NP, NP2, PE, PE72, TP, TP2, TP2M, TP2SM, TP2S, TP3M or TP4; and "ZZ" can be blank, Black, BLK, BLK2, SLV, 72, Pure or Pure-R
Recom	Recom modules with 35 and 40 mm frames RCM-xxx-6yy Where "yy" can be MA, MB, ME or MF
Renesola	ReneSola 60-cell modules with 40 mm frames JCxxxY-ZZ "Y" can be F, M or S; and "ZZ" can be Ab, Ab-b, Abh, Abh-b, Abv, Abv-b, Bb, Bb-b, Bbh, Bbh-b, Bbv, Bbv-b, Db, or Db-b
S-Energy	S-Energy modules with 35 and 40mm frames SABB-CCYYY-xxxZ Where "A" can be C, L or N; "BB" can be blank, 20, 40 or 45; "CC" can be blank, 60 or 72; "YYY" can be blank, MAE, MAI, MBE, MBI, MCE or MCI; and "Z" can be V, M-10, P-10 or P-15
Seraphim USA	Seraphim modules with 35 and 40 mm frames SRP-xxx-YYY-ZZ Where "YYY" can be 6MA, 6MB, 6PA, 6PB, or BMD; "ZZ" is blank or HV

REVISION DATE: 12/2/22 | VERSION: v3.1

ROCKIT INSTALLATION GUIDE

EcoFasten For Installers. By Installers.

MANUFACTURER	LIST OF UL 2703 APPROVED TYPE 1, 2 & 29 PV MODULES*
SEG Solar	SEG Solar Modules with 35 and 40mm frames SEG-xxx-YYY-ZZ Where "YYY" can be BMB, BMD or 6MA; "ZZ" can be BB, BW, HV, TB, WB or WW
Shinsung E&G	Shinsung Modules with 35mm frames SSVxxx-144MH
Silfab	Silfab Modules with 35 and 38 mm frames SYY-Z-xxxAb Where "YY" can be IL, SA, LA, SG or LG; "Z" can be blank, M, P, or X; "A" can be blank, B, H, M, N; and "b" can be A, C, C+, G, K, L, N, T, U or X
Solar4America	Solar4America modules with 35 and 40mm frames S4Axxx-72yy Where "yy" can be MH5 or MH5BB
Solarever	Solarever modules with 35mm frames SE-zzz*yy-xxxM-aaa Where "zzz" can be 166 or 182; "yy" can be 83 or 91; and "aaa" can be 108 or 144
Solaria	Solaria modules with 35 and 40 mm frames PowerA-xxxR-ZZ Where "A" can be XT or X; and "ZZ" can be blank, AC, BD, BX, BY, PD, PL, PX, PZ, WX or WZ
SolarTech	SolarTech modules with 40 mm frames AAA-xxx Where "AAA" can be PERCB-B, PERCB-W, HJTB-B or HJTB-W
Sonali	Sonali Modules with 35mm frames SS-M-xxx
Star Solar	Star Solar modules with 35mm frames Star-xxxYYY-ZZZ Where "YYY" can be M60H or M60HB; and "ZZZ" can be blank or M10
Sunmac Solar	Sunmac modules with 30 and 35mm frames SMxxxMaaaZZ-BB Where "aaa" can be 660 or 754; and "ZZ" can be NH or SH
Sunpower	Sunpower modules with 35 and 40 mm frames SPR-A-xxx-YY Where "A" can be A or M; and "YY" can be blank , COM, G-AC, BLK-G-AC, H-AC or BLK-H-AC
Sunpreme	Sunpreme Modules with 40mm frames GxB-xxxT

MANUFACTURER	LIST OF UL 2703 APPROVED TYPE 1, 2 & 29 PV MODULES*
Sunspark	Sunspark modules with 40 mm frames SYY-xxxZ-A Where "YY" can be MX or ST; and "Z" can be M, MB, M3, M3B, P or W; and "A" can be 60 or 72
Suntech	Suntech Modules with 35mm frames STPxxxS-zz/aa Where "zz" can be B60 or B72; and "aa" can be Vnh or Wnhb
Talesun	Talesun modules with 30mm frames TD6y72M-xxx Where "y" can be G or I
Tesla	Tesla modules with 40 mm frames TxxxY Where "Y" can be H or S
Trina	Trina modules with 30, 35 and 40 mm frames TSM-xxxYYZZ "YY" can be DD05, DD05A, DD06, DE05, DE09, DX05A, DE06X, PA05, PC05, PD05, PE14 or PX05; and "ZZ" can be blank or A, .05, .05(II), .08, A.05, A.08, A(II), A.05(II), A.08(II), C.05, C.07, C.05(II), C.07(II), H, H.05, H.08, H.05(II), H.08 (II), M, M(II) or M.05(II)
Universal	Universal Solar Modules with 35mm frames UNI-xxx-yyyZZZ-aa Where "yyy" can be 108, 120 or 144; "ZZZ" can be M, MH or BMH; and "aa" can be blank, BB or DG
URE	URE modules with 35 mm frames DyMxxxaa Where "D" can be D or F, "y" can be A, B, 6 or 7; "M" can be K or M; and "aa" can be C8G, H3A, H4A, H8A, E7G-BB or MFG-BB
Vikram	Vikram solar modules with 35 and 40 mm frames XVSyy.ZZ.AAA.bb Where "X" can be blank, Paradea, Prexos or Somera; "yy" can be MDH, MDHT, MH or MHBB; "ZZ" can be 60 or 72; "AAA" is the module power rating; and "bb" can be 05
VSUN	VSUN modules with 30, 35 and 40 mm frames VSUNxxx-YYz-aa Where "YY" can be 108 or 120; "z" can be BMH or M; and "aa" can be blank, BB or BW
Waaree	Waaree modules with 40mm frames WSyy-xxx where "yy" can be blank, M or MB

REVISION DATE: 12/2/22 | VERSION: v3.1
ROCKIT INSTALLATION GUIDE
EcoFasten For Installers. By Installers.

MANUFACTURER	LIST OF UL 2703 APPROVED TYPE 1, 2 & 29 PV MODULES*
Yingli	Yingli modules with 35 and 40 mm frames YLxxxZ-yy Where "Z" can be D or P; "yy" can be 29b, 30b, 34d, 35b, 36b or 40d
Yotta	Yotta modules with 30mm frames YSM-Bxxx-06-72-1
Zeus	Zeus Solar Modules with 40mm frames ZxxxM-HB
ZN Shine	ZN Shine modules with 35mm frames ZXM6-AAA-xxx/M Where "AAA" can be 72, NH120 or NHDB144

TYPE 4 & 5 MODULES

**Class A System fire rating with Type 4 and 5 modules with south edge skirt required. Class B System fire rating with Type 4 and 5 modules, no skirt required. Any roof-to-module gap is permitted. This rating is applicable with any roof attachment.

MANUFACTURER	LIST OF UL 2703 APPROVED TYPE 4, & 5 PV MODULES**
Bluesun Solar	Bluesun modules with 35mm frames BSMxxxM10-54HPH
Meyer Burger	Meyer Burger Modules with 35mm frames Meyer Burger Black or White
Talesun	Talesun modules with 30mm frames TP7G54M(H)xxx