

ADDRESS: 6337 WOODBINE AVE

Proposal: Install solar panels

Review Requested: Final Approval

Owner: David Mustapha

Applicant: Ariana Kenyon, Velocity Energy and Home Solutions

History: 1918; Walter F. Price; Modern deck at rear.

Individual Designation: None

District Designation: Overbrook Farms Historic District, Contributing, 11/8/2019

Staff Contact: Heather Hendrickson, heather.hendrickson@phila.gov

OVERVIEW: This application proposes installing solar panels on the roof of 6337 Woodbine Avenue, a contributing property to the Overbrook Farms Historic District. This property has a gable-front main roof with four intersecting gable dormers – two on each side – which makes the roof of this property a very visible feature in long views from Woodbine Avenue. The proposed solar panel layout would follow the entire ridge of the roof on the western side and there would be panels on the front slope and rear slope of the eastern side of the main roof.

SCOPE OF WORK:

- Install solar panels on front-gabled roof

STANDARDS FOR REVIEW:

The Secretary of the Interior's Standards for the Treatment of Historic Properties and Guidelines include:

- *Standard 9: New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.*
 - The roof profile is a character defining feature of this historic property. The addition of solar panels would alter the appearance of this defining feature.

STAFF RECOMMENDATION: The staff recommends denial as proposed, but notes that it would recommend approval of an application that proposes solar panels for less conspicuous areas of the roof, pursuant to Standard 9.

View from west, looking east on Woodbine Avenue.



View from east, looking west on Woodbine Avenue.



Velocity Energy and Home Solutions

1547 Delsea Dr Deptford NJ 08096

856-442-9858 ext 408

permits@velocityenergy.us

October 23rd 2024

David Mustapha

6337 Woodbine Ave Philadelphia PA 19151

To whom it may concern,

I am writing to explain the importance of the placement of solar panels on the roof, specifically why they have to be on the front of the house.

The panels on the front of the roof are integral to the homeowner getting the proper offset, which is 92%. As shown in the shade report attached, the front part of the house gets the most sun. This means without the panels there the homeowner would not benefit from solar as their production would significantly decrease.

If there are any further questions please feel free to contact me.

Sincerely,

Ariana Kenyon



7/26/2024

9.78KW SOLAR SYSTEM FOR:

David Mustapha
6337 Woodbine Ave
Philadelphia, PA 19151

To Whom It May Concern:
(23) - Photo TRINA 245 NEO9RC.05 Solar Panels
EcoFasten Mounting System for Solar Panels

Code: Pennsylvania Uniform Construction Code (UCC)

In reviewing the above solar array with respect to the referenced codes, the Photo TRINA 245 NEO9RC.05 solar panels with the EcoFasten Mounting meets the requirements of the 2021 International Building Code, Section 1609, "Wind Loads", and the requirements of the 2021 International Residential Code, Section R301.2.1, "Wind Design Criteria", for the array size and wind speed provided by the installer.

The EcoFasten Mounting submittal states that the uplift strength for their mounting system when installed as directed is at least 50 pounds per square foot. Both above referenced codes refer to ASCE 7-05/7-10, "Minimum Design Loads for Buildings and Other Structures", to determine wind loads. Analysis pursuant to ASCE 7-10, Chapter 28, "Wind Loads on Buildings", for roof angles 0° to 30°, for a given wind speed of 130 mph the worst-case uplift value is substantially less than 50 pounds per square foot. Therefore, the Photo TRINA 245 NEO9RC.05 solar panels with the EcoFasten Mounting meets the IBC and IRC requirements.

The residence's roof was inspected for condition and distance between roof rafters. The roof was found to be in acceptable condition.

The distance between the 2" x 6" framed roof joists within the residence was found to be 16 inches center-to-center. The manufacturer's recommendation is that the center-to-center distance between the mounting points for the solar panels for the EcoFasten Mounting must be less than or equal to 72" inches. Therefore, the above referenced array meets the minimum requirements for the EcoFasten Mounting System.

The system is to be installed pursuant to manufacture recommendations with 4" length x 5/16" Diameter SS lag bolts @ 48" o.c. max. pursuant to the attached detail using the EcoFasten base.

This added dead load and wind load certification applies specifically to the above referenced solar array design. Additionally, it has been determined that the added 2.6 pound per square foot weight load on the roof from the solar array will not exceed the PA standard roof loadings, including a maximum of 30 PSF live load from snow, and it has been therefore determined that the existing roof system can support the new solar array.

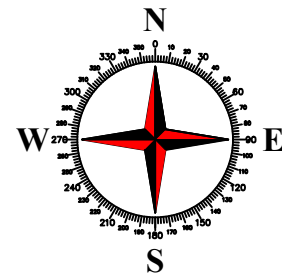
Should you have any questions please contact our office.

Sincerely,



Thomas W. Gillis, AIA, NCARB, LEED AP. Pa. Lic. # 405707

23 Panels
 9.78KWDC & 6.67KWAC Photovoltaic
 Roof Mount System For:
 David Mustapha
 6337 Woodbine Ave
 Philadelphia, PA 19151



BUILDING CODES:
 2018 INTERNATIONAL RESIDENTIAL CODE – PA EDITION
 2017 NATIONAL ELECTRIC CODE
 NFPA 70 FIRE CODE

SYSTEM DATA:

23-TRINA-425-NE09RC.05
 DC INPUT RATED POWER – DC SYSTEM RATING
 (RATED POWER PER MODULE) x (# OF MODULES) = DC SYSTEM SIZE
 (425 W) x (23) = 9.78 W
 23 – ENPHASE IQ8+-72-2-US
 OVERCURRENT PROTECTION CALCULATION
 (MAX OUTPUT CURRENT PER INVERTER x # OF INVERTERS) x 1.25 =
 (OVERCURRENT PROTECTION MINIMUM SIZE) A
 (1.21A x 23) x (1.25) = 34.78A

ROOF LOADS:

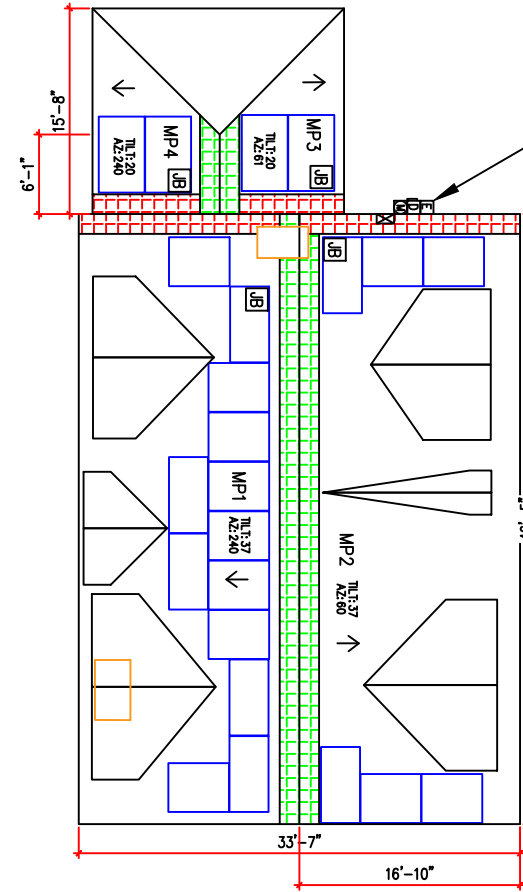
GROUND SNOW FROM ASCE 7-16 25 PSF
 WIND LOAD FROM ASCE 7-16 112 MPH CAT2
 SOLAR ARRAY 4.0 PSF MAX
 AS NOTED IN THE STRUCTURAL PAGE

TILT & AZIMUTH
 MP1: 13 PANELS ON –TILT 37 DEGREES, AZIMUTH 240 DEGREES
 MP2: 6 PANELS ON –TILT 37 DEGREES, AZIMUTH 60 DEGREES
 MP3: 2 PANELS ON –TILT 20 DEGREES, AZIMUTH 61 DEGREES
 MP4: 2 PANELS ON –TILT 20 DEGREES, AZIMUTH 240 DEGREES

–PER NEC 690.8
 –EXISTING HOUSE VOLTAGE IS 240V

RACKING – ECOFASTEN SOLAR

BUS BAR RATING 200 AMP
 INTERCONNECTION METHOD GRID INTERACTIVE
 OCPD MEASURES 40 AMP
 ROOF STRUCTURE 2x6 TRUSS @ 16”
 STRUCTURAL UPGRADES NONE
 ROOF DETAIL GOOD CONDITION
 STRINGING
 1 STRING OF 13
 1 STRING OF 10



MAIN SERVICE PANEL
 AC DISCONNECT
 UTILITY METER
 ENPHASE COMBINER BOX

N 63rd St

Woodbine Ave

GENERAL NOTES:

- PV SYSTEM IS TO BE MOUNTED ON EXISTING ROOF STRUCTURE.
- CONTRACTOR SHALL OBTAIN ALL BUILDING AND ELECTRICAL PERMITS ONCE THE PLANS ARE APPROVED FOR CONSTRUCTION. CONTRACTOR SHALL PRESENT PROOF OF INSURANCE, PROOF OF CONTRACTING LICENSE, AND WILL SUBMIT A CHECK IN EXCHANGE FOR THE NECESSARY PERMITS, ALL FEE SHALL BE REIMBURSED AS PER CONTRACT.
- THIS PV SYSTEM INSTALLATION IS SUBJECT TO INSPECTION BY THE BUILDING OFFICIALS, CONTRACTOR AND OWNERS, OWNER'S REPRESENTATIVES AND MULTIPLE OTHER STAKEHOLDERS.
- THE PROJECT SHALL CONFORM TO ALL STATE GOVERNERING CODES.
- DRAWINGS – THE DRAWINGS ARE INTENDED TO SHOW THE GENERAL ARRANGEMENT AND THE EXTENT OF THE WORK TO BE DONE, HOWEVER, THE EXACT LOCATION AND ARRANGMENT OF ALL COMPONENTS SHALL BE

DETERMINED AS WORK PROGRESSES. DUE TO THE SMALL SCALE USED FOR THE DRAWINGS, ALL REQUIRED OFFSETS, MODIFICATIONS, ETC. AS MAY BE REQUIRED TO CLEAR STRUCTURAL WORK, WORK OF OTHER CONTRACTORS, OR OTHER OBSTRUCTIONS, MAY NOT BE SHOWN. THE CONTRACTOR HOWEVER, SHALL PROVIDE ALL NECESSARY OFFSETS, MODIFICATIONS, ETC. AS REQUIRED TO COMPLETE INSTALLATION AT NO ADDITIONAL COST. THE CONTRACTOR SHALL BE RESPONSIBLE TO INSTALL ALL ITEMS, ACCESSORIES, AUXILLARY SYSTEMS, ETC. CALLED FOR IN THESE DOCUMENTS WHETHER OR NOT SHOWN AS DETAILS ON THE DRAWINGS. ALL ITEMS NOT SPECIFICALLY MENTIONED IN THE DOCUMENTS OR NOTED ON THE DRAWINGS, BUT WHICH ARE NECESSARY TO MAKE A COMPLETE WORKING INSTALLATION, SHALL BE INCLUDED.

6. DIMENSIONS – NO WORK SHALL BE EXECUTED FROM DIMENSIONS OBTAINED

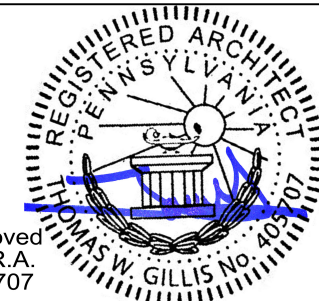
BY SCALING ANY DRAWINGS. EXACT DIMENSIONS WHERE NEEDED, SHALL BE OBTAINED FROM ACTUAL FIGURES ON THE ARCHITECTURAL DRAWINGS AND SHALL BE SUPPLEMENTED BY VERIFICATION OF MEASUREMENTS AT THE SITE. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS AND FIELD CONDITIONS BEFORE STARTING WORK AND SHALL NOTIFY THE ARCHITECT/ENGINEER OR OWNER'S REPRESENTATIVE OF ANY DISCREPANCIES. IF NO DISCREPANCIES ARE BROUGHT TO THEIR ATTENTIONS, THE CONTRACTOR ASSUMES FULL RESPONSIBILITY.

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COVER PAGE	DESIGNER:	ZJ
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9.78KW SOLAR SYSTEM FOR:

David Mustapha
 6337 Woodbine Ave
 Philadelphia, PA 19151



Reviewed and Approved
 Thomas W. Gillis, R.A.
 Pa. License No.405707



Velocity Energy &
 Home Solutions
 1547 Delsea Drive
 Deptford, NJ 08096

RACKING SPECS.

SYSTEM: FLUSH-MOUNT SYSTEM
 MATERIALS: ALUMINUM WITH STAINLESS HARDWARE
 FLASHING VALIDATION: ICC-ES AC286/UL441 RAIN TEST FOR ROOF FLASHING
 GROUNDING/BONDING CERTIFICATION: UL2703 CERTIFIED – SEE INSTALLATION MODULES FOR OFFICIAL MODULE APPROVALS
 ORIENTATION: LANDSCAPE OR PORTRAIT
 TILT ANGLE: PROJECT DEPENDENT
 ROOF PITCH: 0-90°
 MECHANICAL LOAD CERTIFICATION: UL2703 CERTIFIED – SEE INSTALLATION MODULES FOR OFFICIAL MODULE APPROVALS
 ADJUSTABILITY: 1" VERTICAL RANGE, 3.5" UP/DOWNHILL
 LIMITED SIDE TO SIDE WARRANTY: 15 YEARS
 ATTACHMENT: ATTACH TO RAFTER WITH LAG SCREW
 FIRE RESISTANCE VALIDATION: UL2703/1703 CERTIFIED, CLASS A, TYPE 1 & 2

THE HEIGHT OF THE STRUCTURE WILL NOT INCREASE THE HEIGHT OF THE HOME

COMPLIANCE WITH PA IRC 2018 SECTION R324.6.2.2

LEGEND

FIRE PATHWAY:
 18" PATHWAY FROM EAVE TO RIDGE ON HIP & VALLEY
 36" PATHWAY FROM EAVE TO RIDGE FROM RAKE

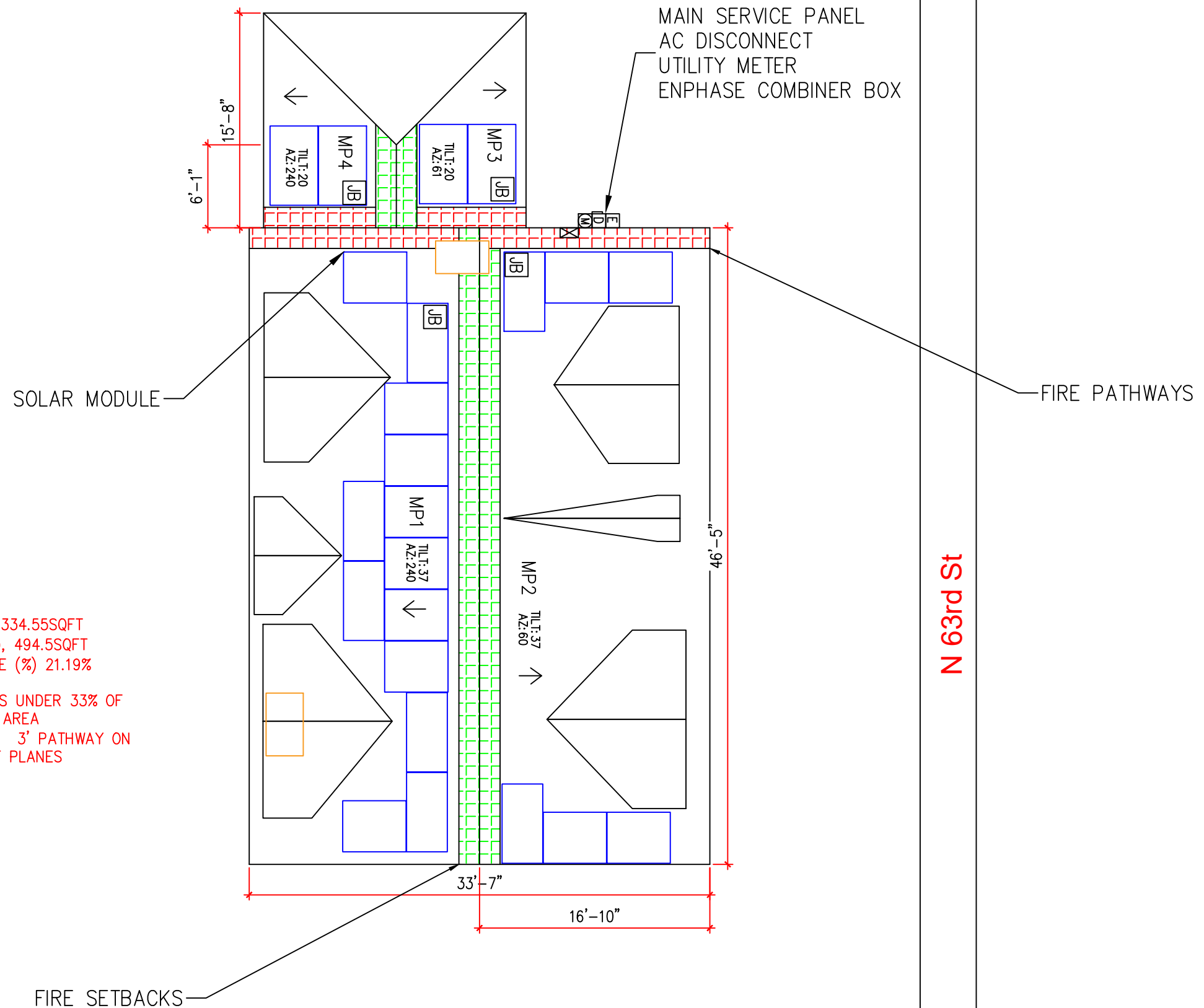
FIRE SETBACKS:
 36" FROM RIDGE COVERING MORE THEN 33% OF ROOF SURFACE
 18" FROM RIDGE COVERING LESS THEN 33% OF ROOF SURFACE

- MAIN SERVICE PANEL
- SUB SERVICE PANEL
- GENERATOR TRANSFER SWITCH
- AC DISCONNECT
- UTILITY METER
- ENPHASE COMBINER BOX
- SOLAREGE INVERTER
- JUNCTION BOX

MP1: 13 PANELS ON -TILT 37 DEGREES, AZIMUTH 240 DEGREES
 MP2: 6 PANELS ON -TILT 37 DEGREES, AZIMUTH 60 DEGREES
 MP3: 2 PANELS ON -TILT 20 DEGREES, AZIMUTH 61 DEGREES
 MP4: 2 PANELS ON -TILT 20 DEGREES, AZIMUTH 240 DEGREES

AREA (FT SQ), 2334.55SQFT
 MODULES (FT SQ), 494.5SQFT
 MODULE COVERAGE (%) 21.19%

PANEL INSTALLATION IS UNDER 33% OF THE ROOF AREA
 18' FROM RIDGE AND A 3' PATHWAY ON SIDE OF ROOF PLANES



Woodbine Ave

Scale: 1"=1'-0"

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ROOF ARRAY LAYOUT	DESIGNER:	ZJ
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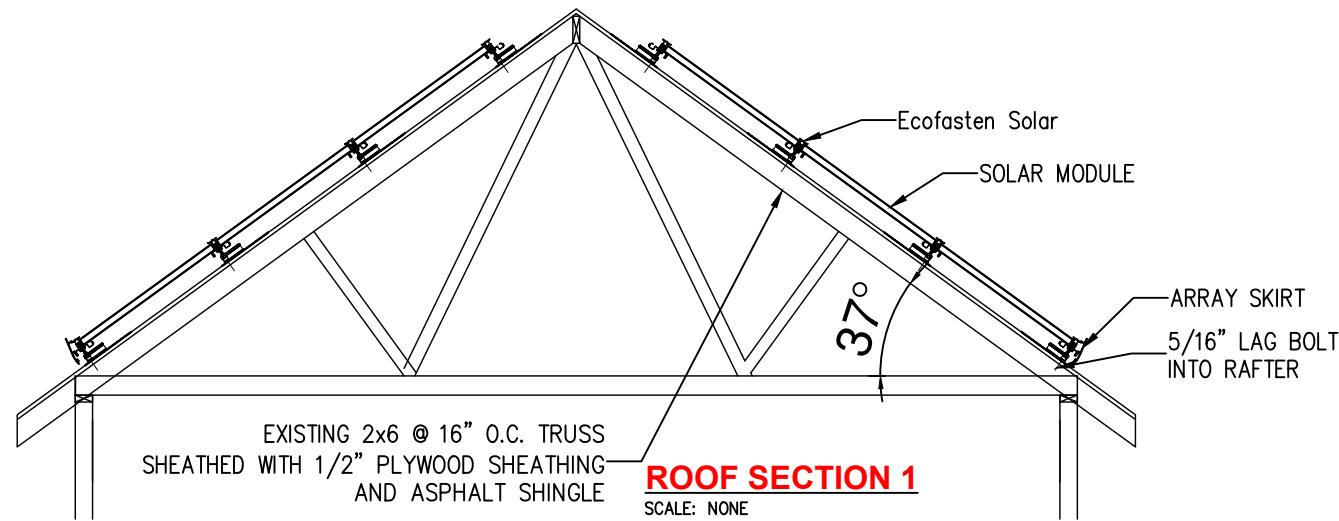
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 Philadelphia, PA 19151

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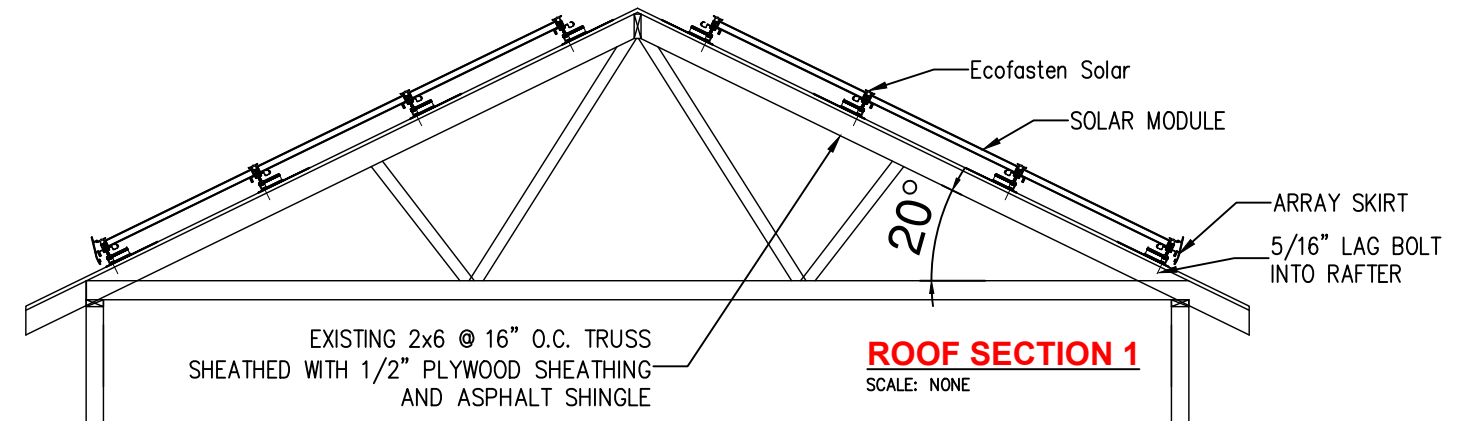
MP1

MP2

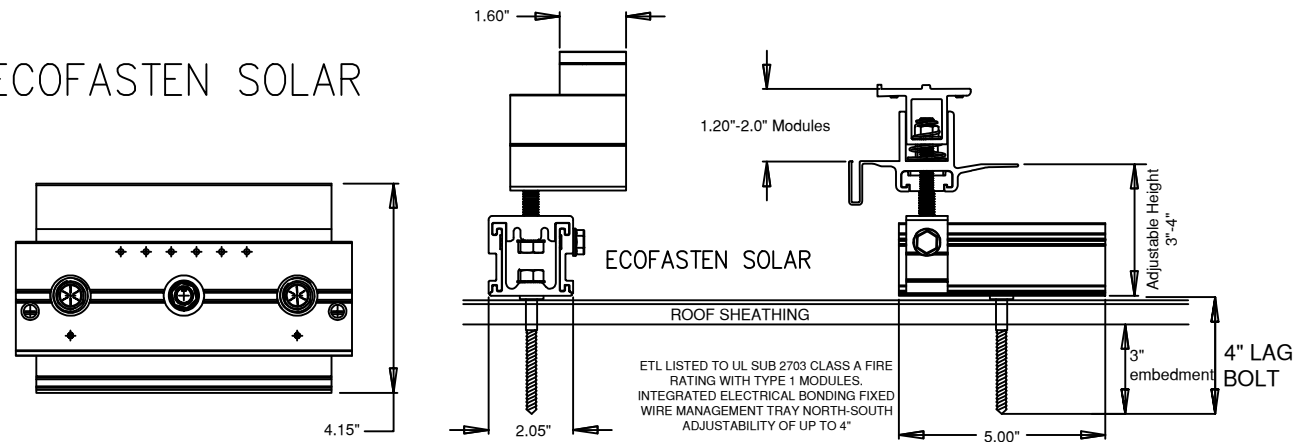


MP4

MP3



ECOFASTEN SOLAR



TECHNICAL RACKING SPECIFICATIONS – ECOFASTEN SOLAR

MATERIALS	RACKING COMPONENTS: ALUMINUM, STAINLESS HARDWARE, DARK BRONZE ANODIZED UPPER SURFACE, MILL FINISH LOWER SURFACES FLASHINGS: ALUMINUM, BLACK POWDER COATED FINISH
GROUNDING/BONDING VALIDATION	UL2703 – SEE INSTALLATION MANUAL FOR SPECIFIC MODULE APPROVALS
FIRE RESISTANCE VALIDATION	UL2703 – CLASS A, TYPE 1 AND TYPE 2 MODULES
MECHANICAL LOAD VALIDATION	UL2703 – SEE INSTALLATION MANUAL FOR SPECIFIC MODULE APPROVALS
FLASHING VALIDATION	ICC-ES AC286/UL441 RAIN TEST FOR ROOF FLASHING
ADJUSTABILITY	1" VERTICAL RANGE, 3.5" NORTH/SOUTH RANGE, CONNECT ANYWHERE IN EAST/WEST DIRECTION
WARRANTY	15 YEARS

FRAMING ANALYSIS

THE STRUCTURE OF THE BUILDING HAS BEEN EVALUATED FOR THE ADDITIONAL LOAD OF SOLAR PANELS TO BE INSTALLED AND WAS FOUND TO BE ACCEPTABLE.

THE ROOF FRAMING WAS FOUND TO BE CONSTRUCTED OF THE FOLLOWING:

2x6 TRUSS @ 16" ON CENTER WITH 1/2" PLYWOOD SHEATHING AND ASPHALT SHINGLE

THE ADDITIONAL SOLAR PANEL LOAD TO THE BUILDING'S ROOF HAS BEEN CALCULATED BELOW.

THE NEW SUPERIMPOSED LOAD IS UNDER THE RECOMMENDED MAXIMUM VALUE OF 4 LBS. PER SQ. FOOT, THUS MAKING THE ROOF CAPABLE OF SUPPORTING THE ADDITIONAL LOAD. LOAD TABULATION WAS EVALUATED AS FOLLOWS:

23 MOUNTING POINTS WITH A POINT LOAD OF 21 LBS. PER LAG PIN

PANEL COUNT X WEIGHT PER PANEL = TOTAL WEIGHT

23 X 47 = 1081

PANEL COUNT X AREA PER PANEL = TOTAL AREA

23 X 21.50 = 494.5

TOTAL WEIGHT / TOTAL AREA = LBS. PER SQ. FOOT

1081 / 494.5 = 2.18

25 PSF

112 MPH CAT2

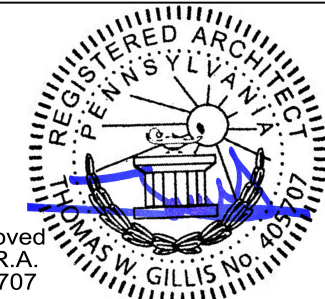
MOUNTING BRACKET SPACING MAY VARY FROM 20" – 48" O.C. CONTRACTOR TO VERIFY PANEL MANUFACTURER'S SPECIFICATIONS AND INSTALLATION REQUIREMENTS. FOOT SPACING SHALL BE MAX. 4'-0" O.C.

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9.78KW SOLAR SYSTEM FOR:

David Mustapha
6337 Woodbine Ave
Philadelphia, PA 19151



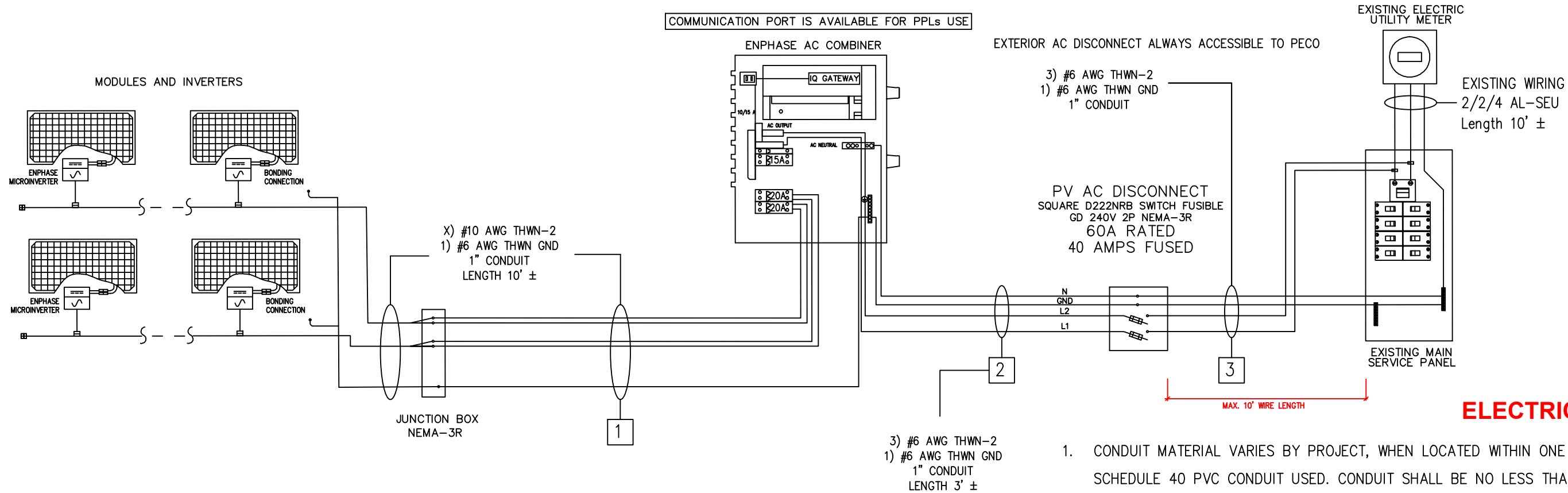
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1547 Delsea Drive
Deptford, NJ 08096

MODULES	STRINGING	INVERTER	JUNCTION BOX	AC COMBINER BOX	PV AC DISCONNECT	INTERCONNECTION	EXISTING ELECTRICAL EQUIPMENT
TRINA-425-NE09RC.05	1 STRING OF 13 1 STRING OF 10	ENPHASE IQ8+-72-2-US (240V)	JUNCTION BOX	ENPHASE AC COMBINER WITH X-IQ-AM1-240-5 METERED WITH INTEGRATED RGM	60A RATED 40 AMPS FUSED 120v / 240v	LINE SIDE TAP	UTILITY METER MAIN SERVICE PANEL 120v / 240v
#10 PV WIRE #6 GROUND	*	ENPHASE Q TRUNK CABLE #10 AWG THWN-2 1" CONDUIT	1 Length 10' ± X) #10 AWG THWN-2 1) #6 AWG THWN GND. 1" CONDUIT	2 Length 3' ± 3) #6 AWG THWN-2 1) #6 AWG THWN GND. 1" CONDUIT	3 Length Max. 10' 3) #6 AWG THWN-2 1) #6 AWG THWN GND. 1" CONDUIT	(2) IDEAL BTC 4/0-10 IDEAL CONNECTOR MAIN: 4/0 - 6 AWG 600v	MAIN BREAKER 200A

* CONDUCTORS SHALL BE OUTGOING FROM EQUIPMENT LISTED DIRECTLY ABOVE.

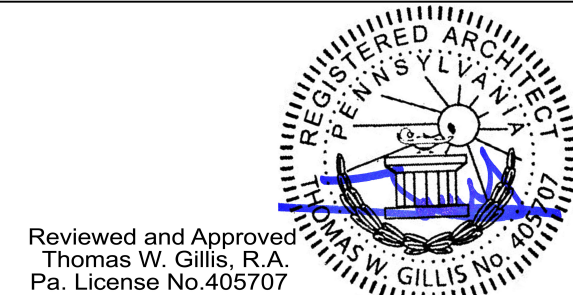


ELECTRICAL NOTES

1. CONDUIT MATERIAL VARIES BY PROJECT, WHEN LOCATED WITHIN ONE MILE OF SEA WATER SCHEDULE 40 PVC CONDUIT USED. CONDUIT SHALL BE NO LESS THAN 7/8" ABOVE ROOF.
2. ALL INVERTERS AND MODULES ARE LOCATED ON ROOF MOUNTED ATTACHMENT SYSTEM.
3. CONDUCTORS ARE COPPER UNLESS OTHERWISE NOTED
4. CONFIRM LINE SIDE VOLTAGE AT ELECTRIC UTILITY SERVICE ENTRANCE BEFORE CONNECTING INVERTER AND ENSURE PROPER OPERATIONAL RANGE.
5. INTERCONNECTION TO UTILITY AND SYSTEM GROUNDING PER STATE'S NEC CODES.
6. ALL OUTDOOR EQUIPMENT, CONDUIT, AND FITTINGS SHALL BE MINIMUM OF NEMA-3R RATED
7. PV CIRCUITS ONLY, NO OTHER LOADS SHALL BE APPLIED TO THIS PANEL OTHER THEN PC COMPONENTS AS PER NEC ARTICLE 690.

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ELECTRICAL DIAGRAM	DESIGNER:	ZJ
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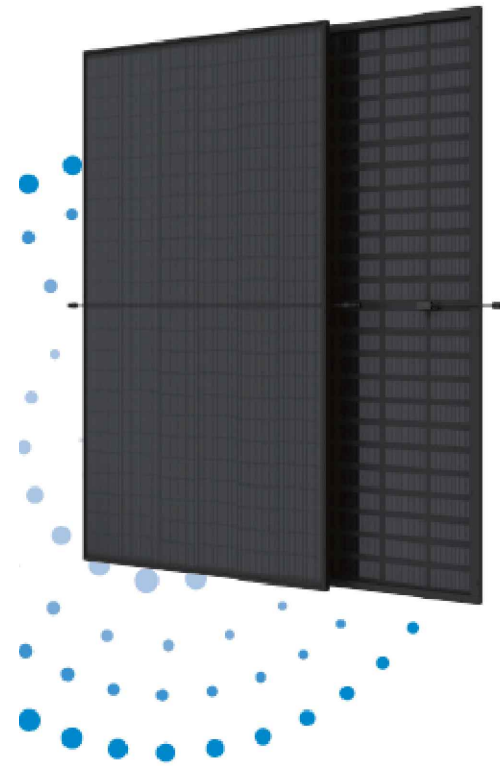
BACKSHEET MONOCRYSTALLINE MODULE

PRODUCT: TSM-NE09RC05
PRODUCT RANGE: 400-430W

430W
MAXIMUM POWER OUTPUT

0~+5W
POSITIVE POWER TOLERANCE

21.5%
MAXIMUM EFFICIENCY



Small in size, bigger on power

- Up to 430W, 21.5% module efficiency with high density interconnect technology
- Reduce installation cost with higher power bin and efficiency
- Boost performance in warm weather with low temperature coefficient and operating temperature



High Reliability

- Innovative non-destructive cutting for improved mechanical resistance and strength
- Excellent fire rating, weather resistance, salt spray, sand dust, ammonia performance which is fully applicable in coastal, high temperature, humidity area and harsh environment



Ultra-low Degradation, longer warranty, higher output

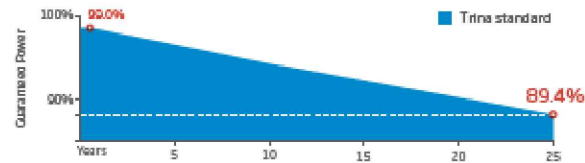
- First-year degradation 1% and annual degradation at 0.4%
- Up to 25 years product warranty and 25 years power warranty



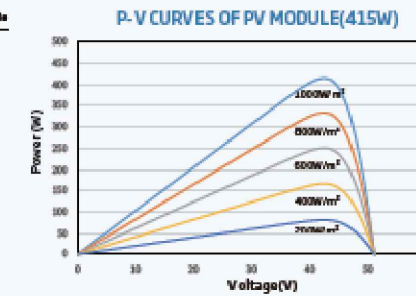
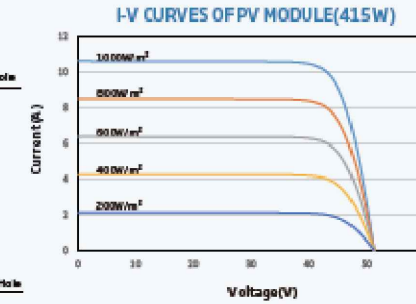
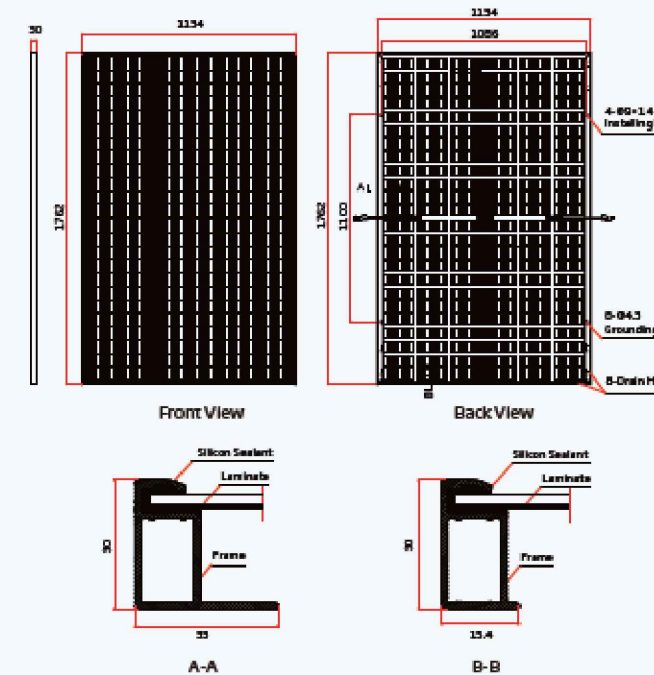
Universal solution for residential and C&I rooftops

- Easy for integration, designed for compatibility with existing mainstream inverters and diverse mounting systems
- Perfect size and low weight for handling and installation
- Most valuable solution on low load capacity rooftops (weight similar to backsheet version)
- Mechanical performance up to 6000 Pa positive load and 4000 Pa negative load

Trina Solar's Vertex Bifacial Backsheet Performance Warranty



DIMENSIONS OF PV MODULE(mm)



ELECTRICAL DATA (STC)

Peak Power Wp-Peak (Wp)†	400	405	410	415	420	425	430
Power Tolerance-PPeak (W)	0 ~ +5						
Maximum Power Voltage-Vmp (V)	41.3	41.7	42.1	42.5	42.8	43.2	43.6
Maximum Power Current-Imp (A)	9.68	9.71	9.73	9.77	9.80	9.84	9.87
Open Circuit Voltage-Voc (V)	49.2	49.6	50.1	50.5	50.9	51.4	51.8
Short Circuit Current-Isc (A)	10.30	10.33	10.37	10.40	10.43	10.47	10.50
Module Efficiency-ηm (%)	20.0	20.3	20.5	20.8	21.0	21.3	21.5

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass 1.5, -Meaning tolerance ±0.5%

Electrical characteristics with different power bin (reference to 10% irradiance ratio)

Total Equivalent power-Peak (Wp)	426	431	437	442	447	453	459
Maximum Power Voltage-Vmp (V)	41.3	41.7	42.1	42.5	42.8	43.2	43.6
Maximum Power Current-Imp (A)	10.31	10.34	10.36	10.41	10.44	10.48	10.51
Open Circuit Voltage-Voc (V)	49.2	49.6	50.1	50.5	50.9	51.4	51.8
Short Circuit Current-Isc (A)	10.07	11.00	11.04	11.08	11.11	11.15	11.18
Irradiance ratio (rear/front)	10%						
Power Efficiency-η_L (%)							

ELECTRICAL DATA (NOCT)

Maximum Power-Peak (Wp)	312	308	312	316	319	324	328
Maximum Power Voltage-Vmp (V)	38.6	39.0	39.3	39.7	40.0	40.4	40.7
Maximum Power Current-Imp (A)	7.88	7.91	7.93	7.96	7.98	8.01	8.04
Open Circuit Voltage-Voc (V)	46.6	47.0	47.5	47.8	48.2	48.7	49.1
Short Circuit Current-Isc (A)	8.30	8.32	8.36	8.38	8.41	8.44	8.46

NOCT: Irradiance 800W/m², Ambient Temperature 25°C, Wind Speed 1m/s.

MECHANICAL DATA

Solar Cells	Topcon Bifacial
No. of cells	144 cells
Module Dimensions	1762*1134*30mm (69.37*44.65*1.18 inches)
Weight	21.3kg (47.0 lb)
Front Glass	3.2mm (0.125 inches), High Transmittance, Tempered Glass
Encapsulation material	POE/EVA
Backsheet	Black Grid Transparent Backsheet
Frame	30mm (1.18 inches) Anodized Aluminium Alloy, Black
J-Box	IP68 rated
Cables	Photovoltaic Technology Cable 4.0mm² (0.006 inches²) Landscape 1100mm* P1100mm (43.31*43.31 inches)
Connector	MCA Bv02
Fire Type	Type 1 or Type 2

TEMPERATURE RATINGS

NOCT (max. operating temperature)	43°C (±2°C)
Temperature Coefficient of Pmax	-0.30%/°C
Temperature Coefficient of Voc	-0.24%/°C
Temperature Coefficient of Isc	0.04%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC)
Max Series Fuse Rating	25 A

WARRANTY

- 25 year Product Workmanship Warranty
- 25 year Power Warranty
- 1% first-year degradation
- 0.4% Annual Power Attenuation

(Please refer to specific warranty for details)

PACKAGING CONFIGURATION

- Modules per box: 36 pieces
- Modules per 40' container: 702 pieces
- Pallet dimensions (L x W x H): 1800 x 1135 x 1250 mm
- Pallet weight: 829 kg (1827 lb)

Comprehensive Products and System Certificates



CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

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Version number: TSM_NA_EN_2023_A

www.trinasolar.com

PAGE TITLE: SPEC SHEETS

SCALE: AS LISTED

DESIGNER: ZJ

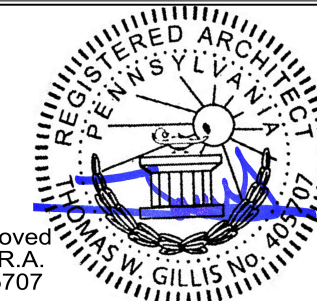
DATE: 07-26-2024

REVISIONS:

PAGE NO. E-2

9.78KW SOLAR SYSTEM FOR:

David Mustapha
6337 Woodbine Ave
Philadelphia, PA 19151



Reviewed and Approved
Thomas W. Gillis, R.A.
Pa. License No.405707



Velocity Energy &
Home Solutions
1547 Delsea Drive
Deptford, NJ 08096



IQ8 and IQ8+ Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has super-fast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the Enphase IQ Battery, Enphase IQ Gateway, and the Enphase App monitoring and analysis software.



IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.



Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.



IQ8 Series Microinverters are UL Listed as PV Rapid Shut Down Equipment and conform with various regulations, when installed according to manufacturer's instructions.

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IQ8SP-DS-0002-01-EN-US-2022-03-17

Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

* Only when installed with IQ System Controller 2, meets UL 1741.

** IQ8 and IQ8Plus supports split phase, 240V installations only.

IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings ¹	W	235 – 350	235 – 440
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell
MPPT voltage range	V	27 – 37	29 – 45
Operating range	V	25 – 48	25 – 58
Min/max start voltage	V	30 / 48	30 / 58
Max input DC voltage	V	50	60
Max DC current ² [module Isc]	A		15
Overvoltage class DC port			II
DC port backfeed current	mA		0
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT DATA (AC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Peak output power	VA	245	300
Max continuous output power	VA	240	290
Nominal (L-L) voltage/range ³	V	240 / 211 – 264	
Max continuous output current	A	1.0	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	50 – 68	
AC short circuit fault current over 3 cycles	A _{rms}	2	
Max units per 20 A (L-L) branch circuit ⁴		16	13
Total harmonic distortion		<5%	
Overvoltage class AC port		III	
AC port backfeed current	mA	30	
Power factor setting		1.0	
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging	
Peak efficiency	%	97.5	97.6
CEC weighted efficiency	%	97	97
Night-time power consumption	mW	60	
MECHANICAL DATA			
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)	
Relative humidity range		4% to 100% (condensing)	
DC Connector type		MC4	
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")	
Weight		1.08 kg (2.38 lbs)	
Cooling		Natural convection – no fans	
Approved for wet locations		Yes	
Pollution degree		PD3	
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure	
Environ. category / UV exposure rating		NEMA Type 6 / outdoor	
COMPLIANCE			
		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01	
Certifications		This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.	

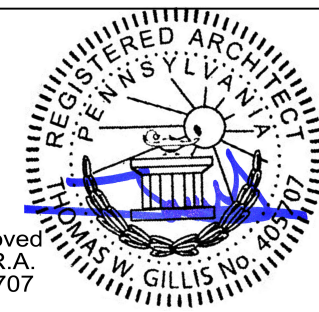
(1) No enforced DC/AC ratio. See the compatibility calculator at <https://link.enphase.com/module-compatibility>
 (2) Maximum continuous input DC current is 10.6A (3) Nominal voltage range can be extended beyond nominal if required by the utility. (4) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SP-DS-0002-01-EN-US-2022-03-17

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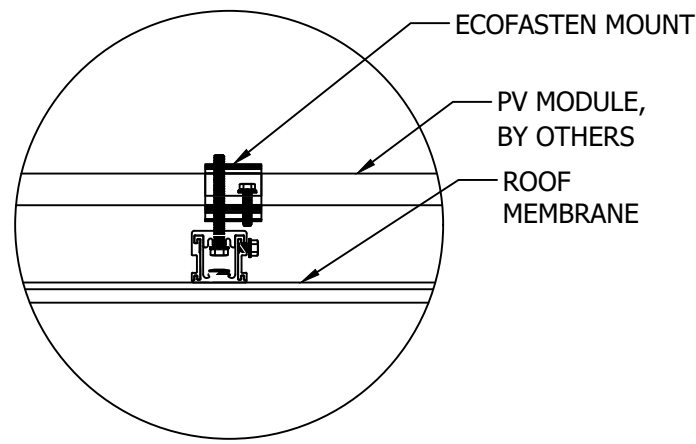
9.78KW SOLAR SYSTEM FOR:
 David Mustapha
 6337 Woodbine Ave
 Philadelphia, PA 19151



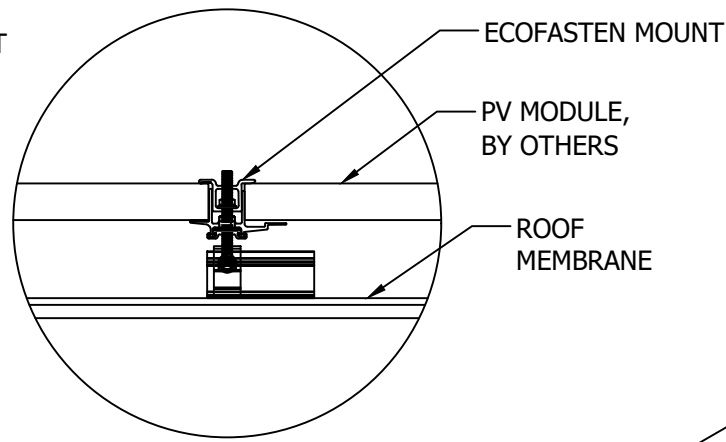
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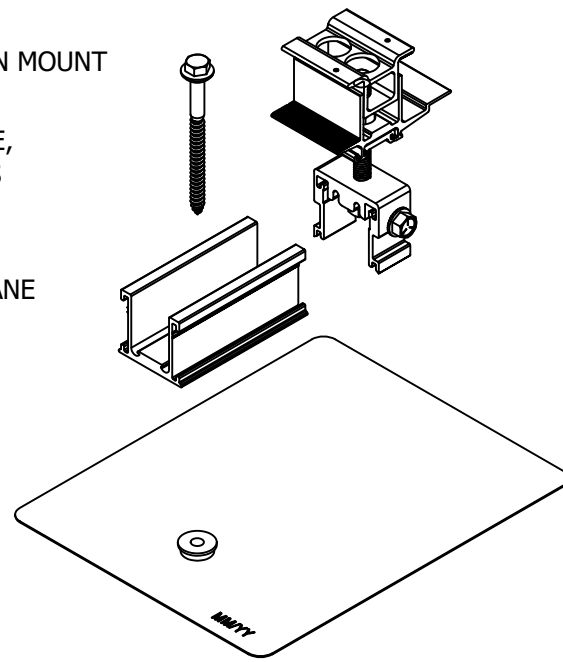
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 Home Solutions
 1547 Delsea Drive
 Deptford, NJ 08096



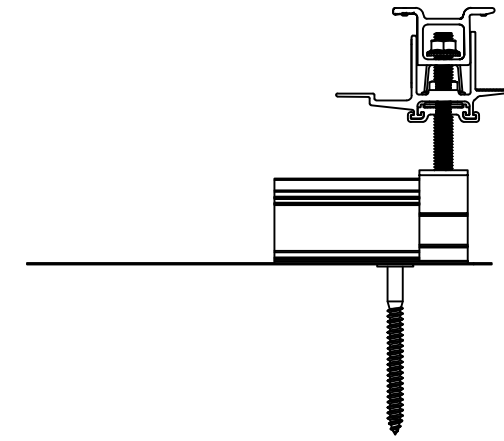
ECOFASTEN DETAIL FRONT



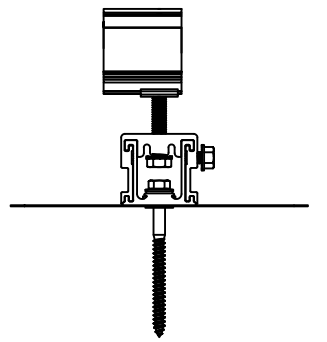
ECOFASTEN DETAIL SIDE



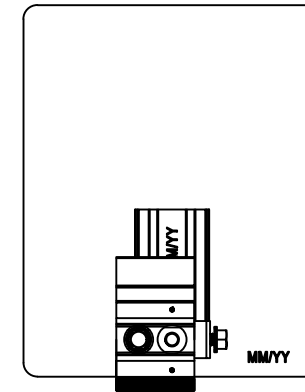
ECOFASTEN ROCKIT



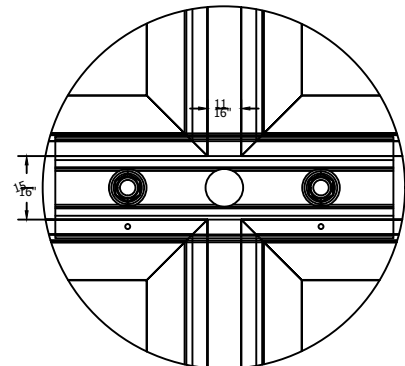
ECOFASTEN, SIDE VIEW



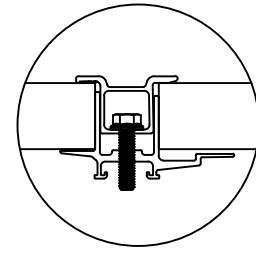
ECOFASTEN, FRONT VIEW



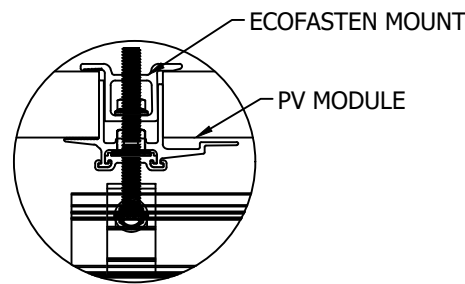
ECOFASTEN, PLAN VIEW



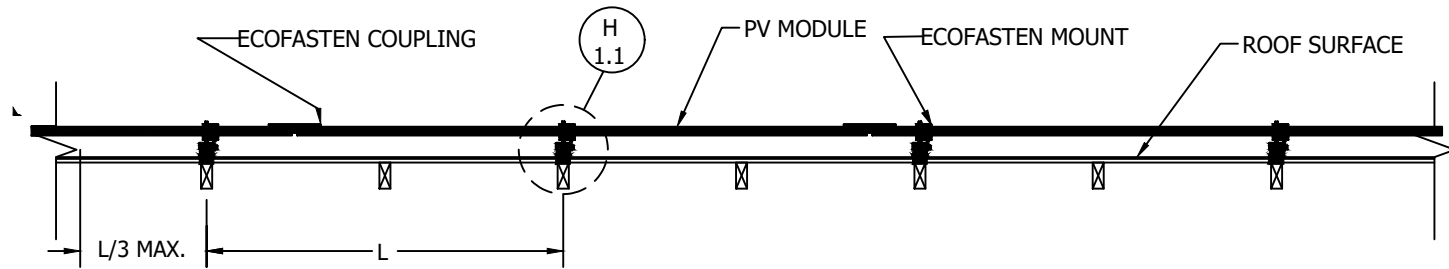
DETAIL, ECOFASTEN COUPLING SIDE



DETAIL, ECOFASTEN COUPLING PLAN

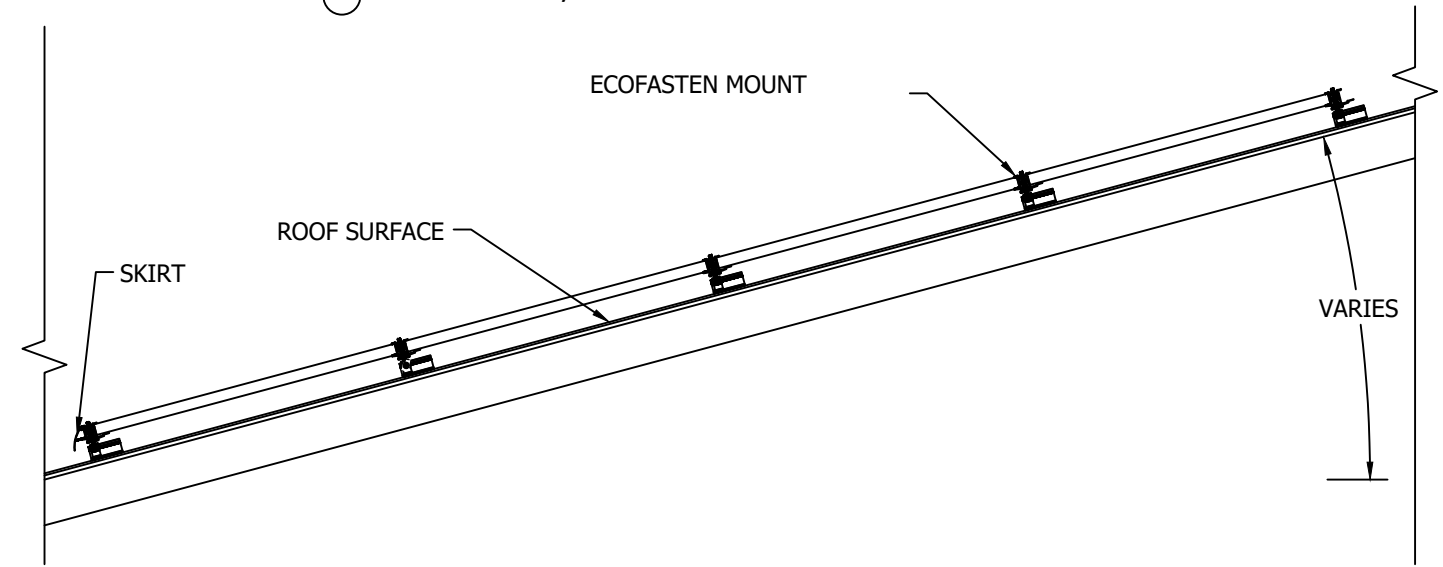


DETAIL, ECO FASTEN MOUNT SIDE



FRONT VIEW, ECOFASTEN ASSEMBLY, LANDSCAPE MODULE

Scale: 1"=1'-0"

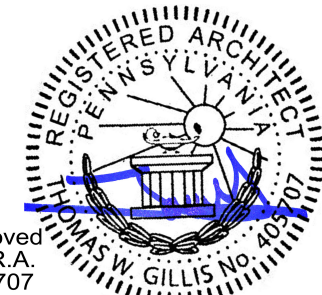


SIDE VIEW, ECOFASTEN ASSEMBLY, LANDSCAPE MODULE

PAGE TITLE:	SCALE: AS LISTED
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9.78KW SOLAR SYSTEM FOR:
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 6337 Woodbine Ave
 Philadelphia, PA 19151



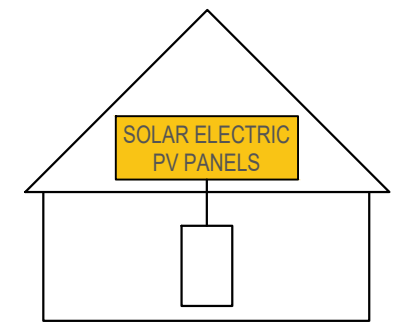
Reviewed and Approved
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SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

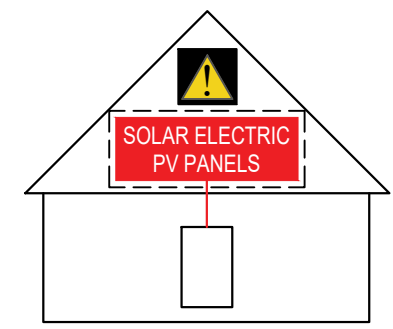
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY



THIS WILL BE PLACED ON THE MAIN SERVICE DISCONNECT, NEC 690.56(C)(1)(a)

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN CONDUCTORS OUTSIDE THE ARRAY CONDUCTORS WITHIN THE ARRAY REMAIN ENERGIZED IN SUNLIGHT



THIS WILL BE PLACED ON THE MAIN SERVICE DISCONNECT, NEC 690.56(C)(1)(b)

CAUTION SOLAR CIRCUIT

THIS WILL BE PLACED ON THE CONDUIT, NEC 690.31(G)(3)(4)

WARNING DC COMBINER BOX

THIS WILL BE PLACED ON THE JUNCTION BOX(S), NEC 690.31(B)

PHOTOVOLTAIC SYSTEM AC DISCONNECT

OPERATING VOLTAGE: 240 V VOLTS
OPERATING CURRENT: 34.78 A AMPS

NEC 690.54 APPLY TO AC DISCONNECT

WARNING ELECTRIC SHOCK HAZARD

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

THIS WILL BE PLACED ON THE DC DISCONNECT & COMBINER BOX(S), NEC 690.31(B)

WARNING ELECTRIC SHOCK HAZARD

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

THIS WILL BE PLACED ON THE AC DISCONNECT & COMBINER BOX(S), NEC 690.17(E)

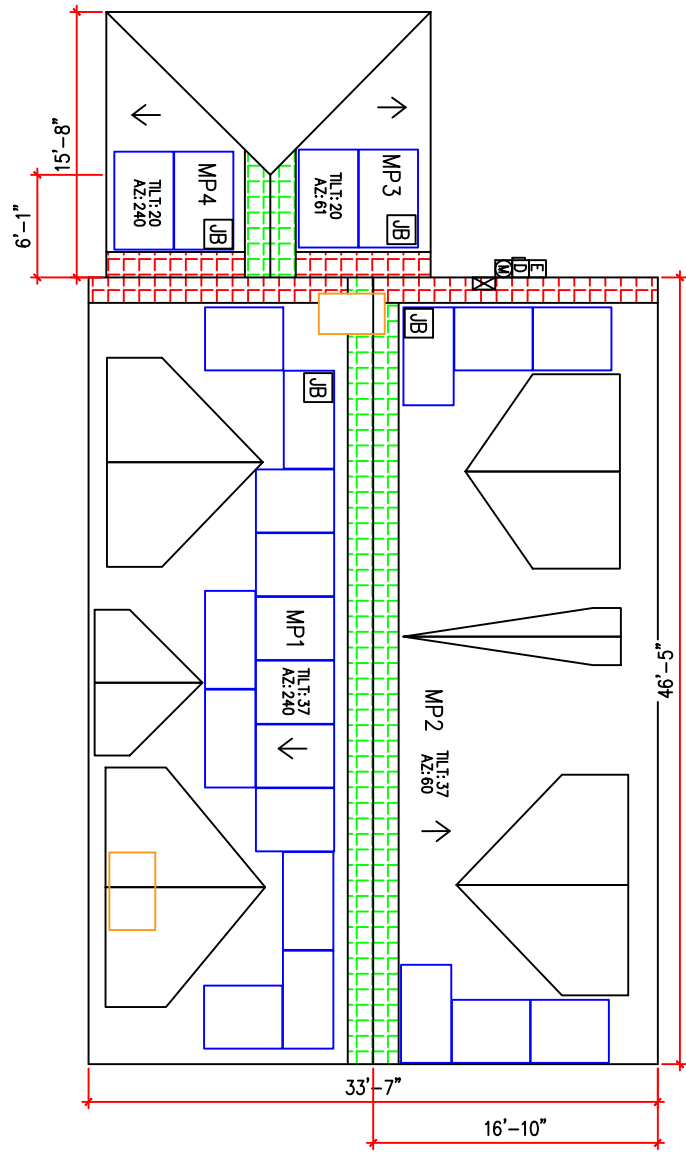
WARNING DUAL POWER SUPPLY

SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

THIS WILL BE PLACED ON THE MAIN SERVICE PANEL

PHOTOVOLTAIC SYSTEM COMBINER PANEL DO NOT ADD LOADS

THIS WILL BE PLACED ON THE PV COMBINER BOX, NEC 690.13(B)



N 63rd St

Woodbine Ave

NOTES
 ALL INSTALLER CREW MEMBERS ON SITE MUST WEAR HARD-HAT WHEN IN RESTRICTED AREAS.
 ALL INSTALLERS ON ROOF MUST REMAIN ATTACHED TO FALL RESTRAINT SYSTEM WHILE ON ROOF, EXCEPT WHEN ASCENDING ROOF FROM LADDER.
 INSTALLER TO NOTE LOCATION OF POWER LINES ON PLAN IF NOT SUPPLIED ON THESE DRAWINGS.
 INSTALLER TO NOTE DISTANCE FROM GRADE TO ROOF GUTTER LINE AT LOCATION OF WORK TO BE PERFORMED IF NOT SUPPLIED ON THESE DRAWINGS.
 INSTALLER TO NOTE LOCATION OF JUNCTION BOX IF NOT SUPPLIED ON THESE DRAWINGS.

PAGE TITLE:	SCALE:	AS LISTED
ELECTRICAL LABELING	DESIGNER:	ZJ
	DATE:	07-26-2024
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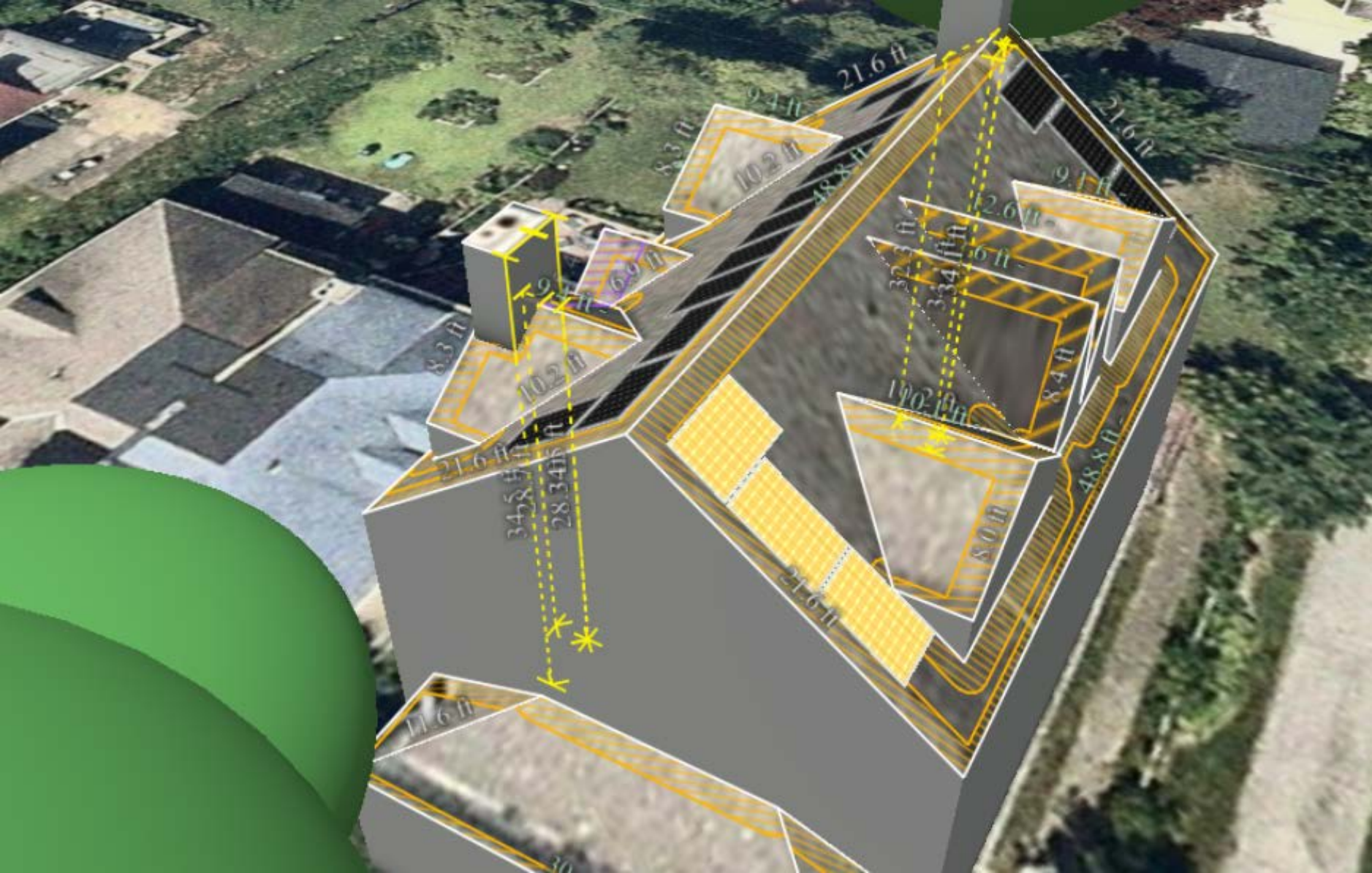
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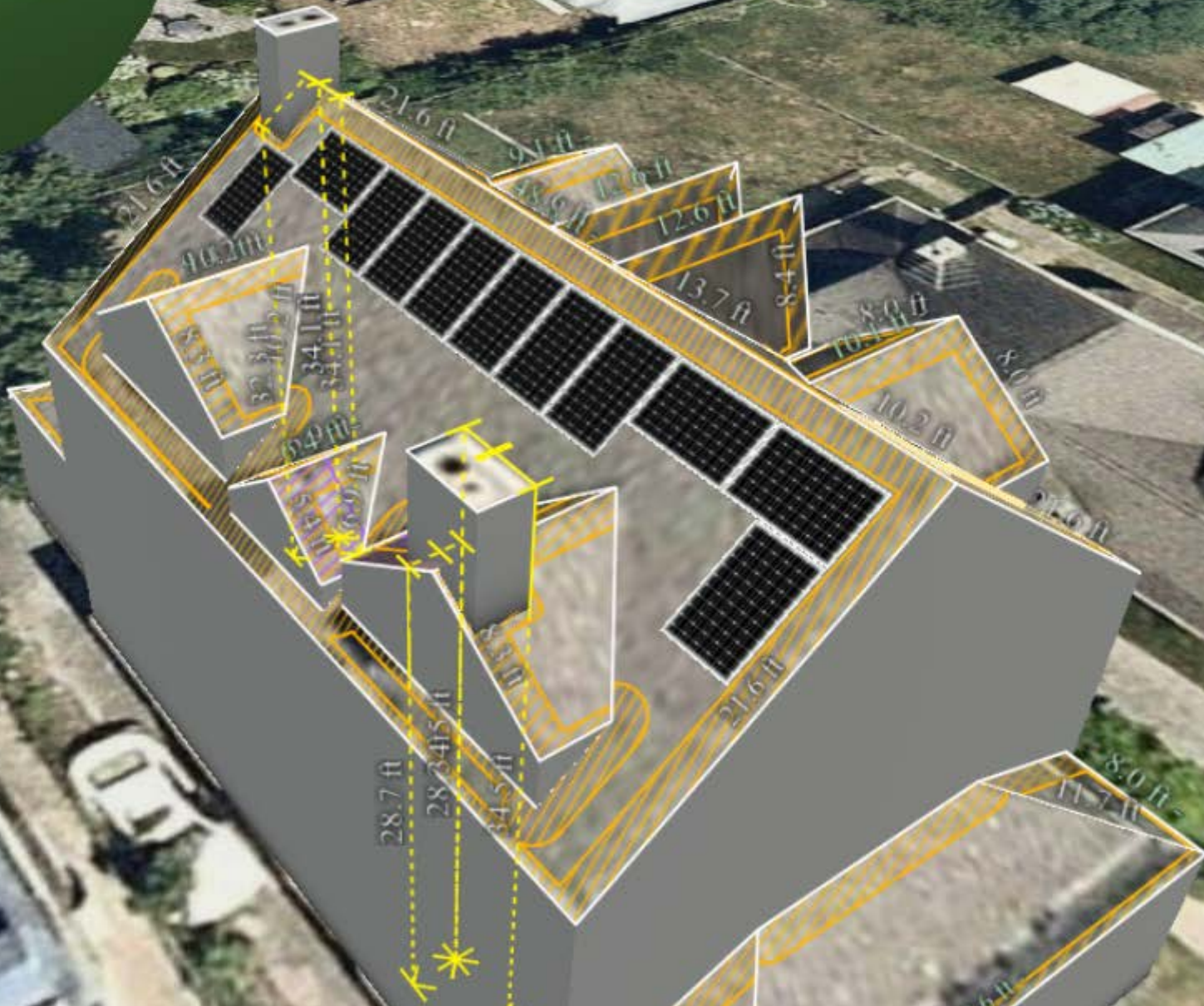
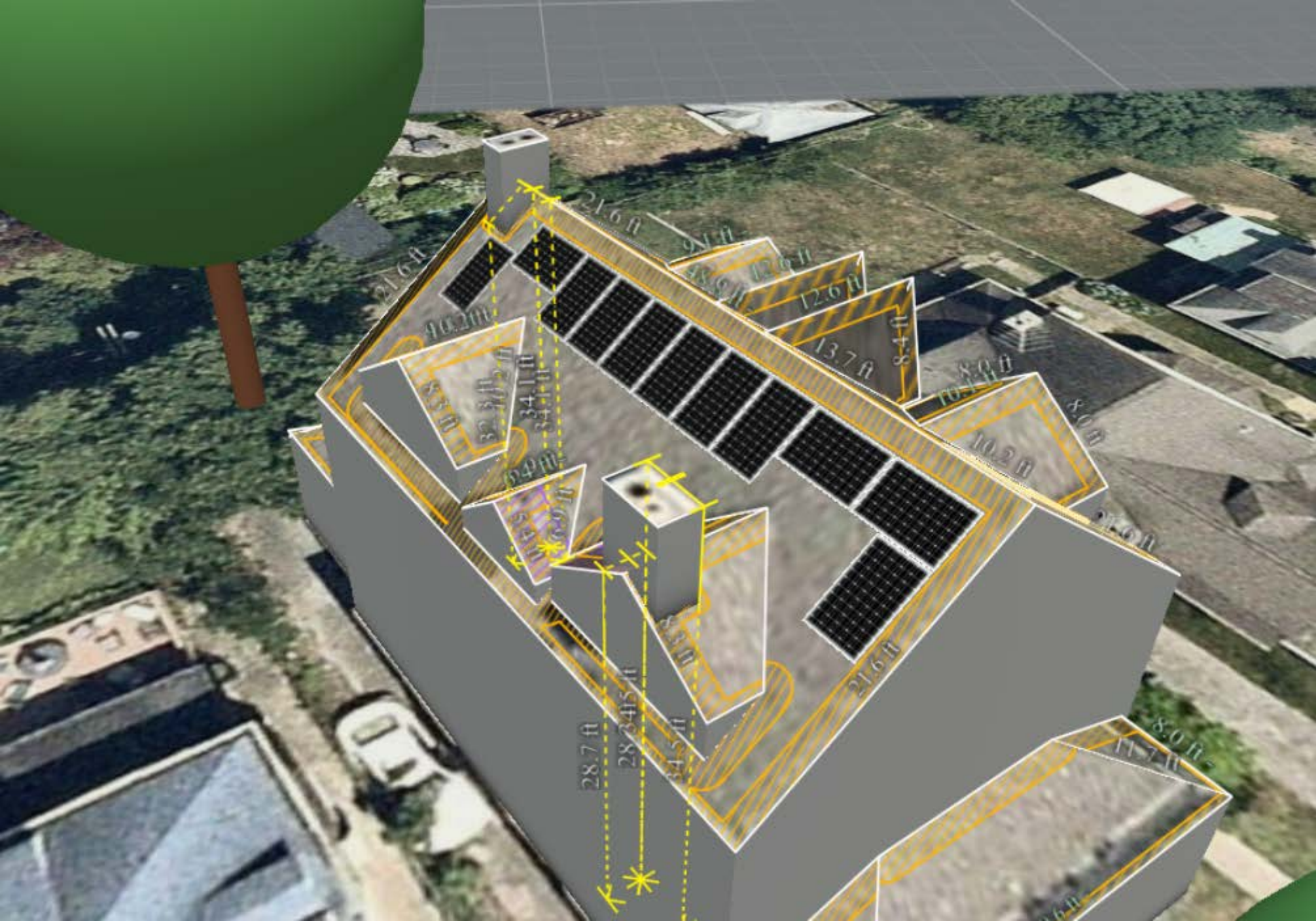
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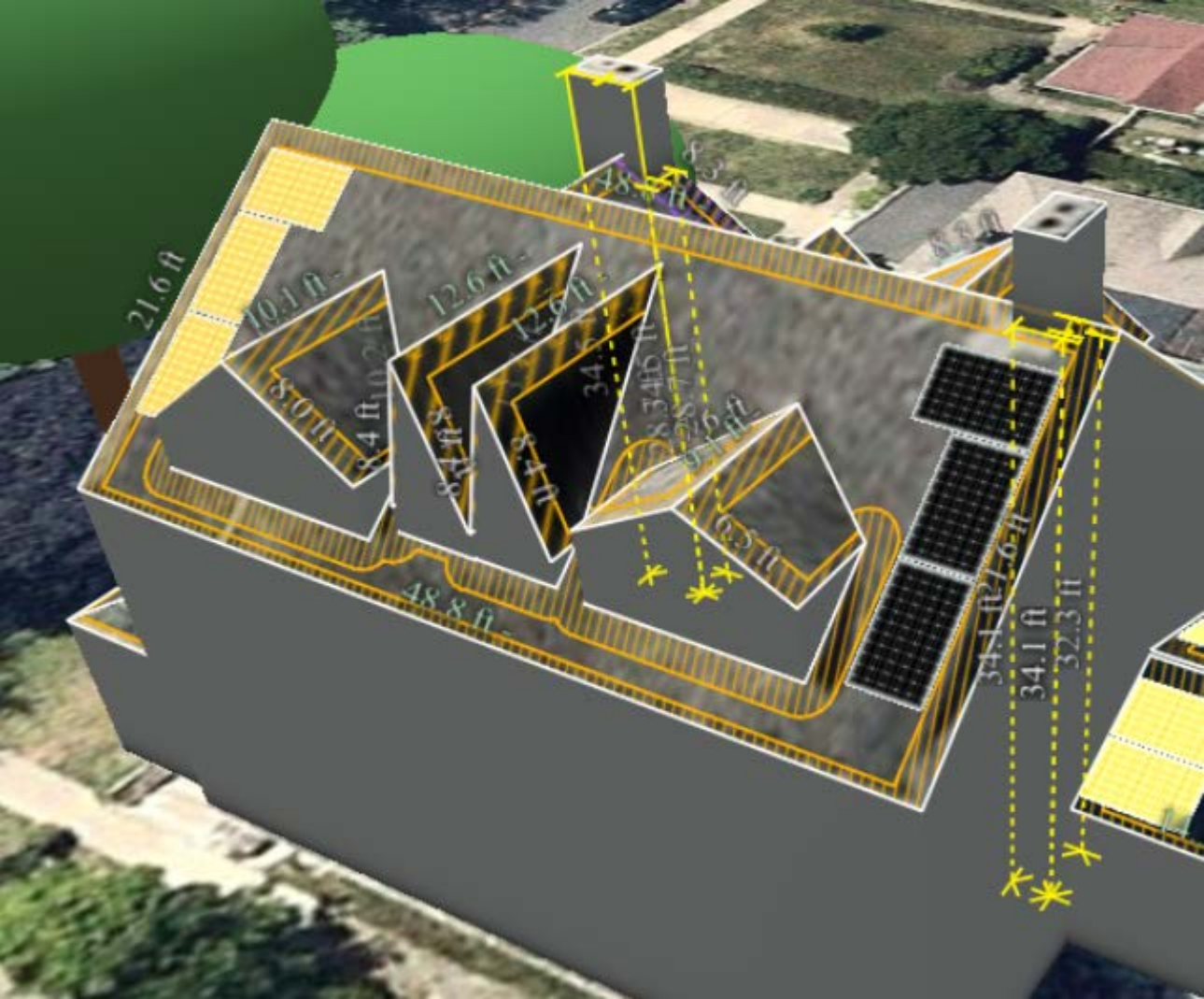


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 1547 Delsea Drive
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21.6 ft

10.1 ft

12.6 ft

12.6 ft

8.4 ft

8.4 ft

8.4 ft

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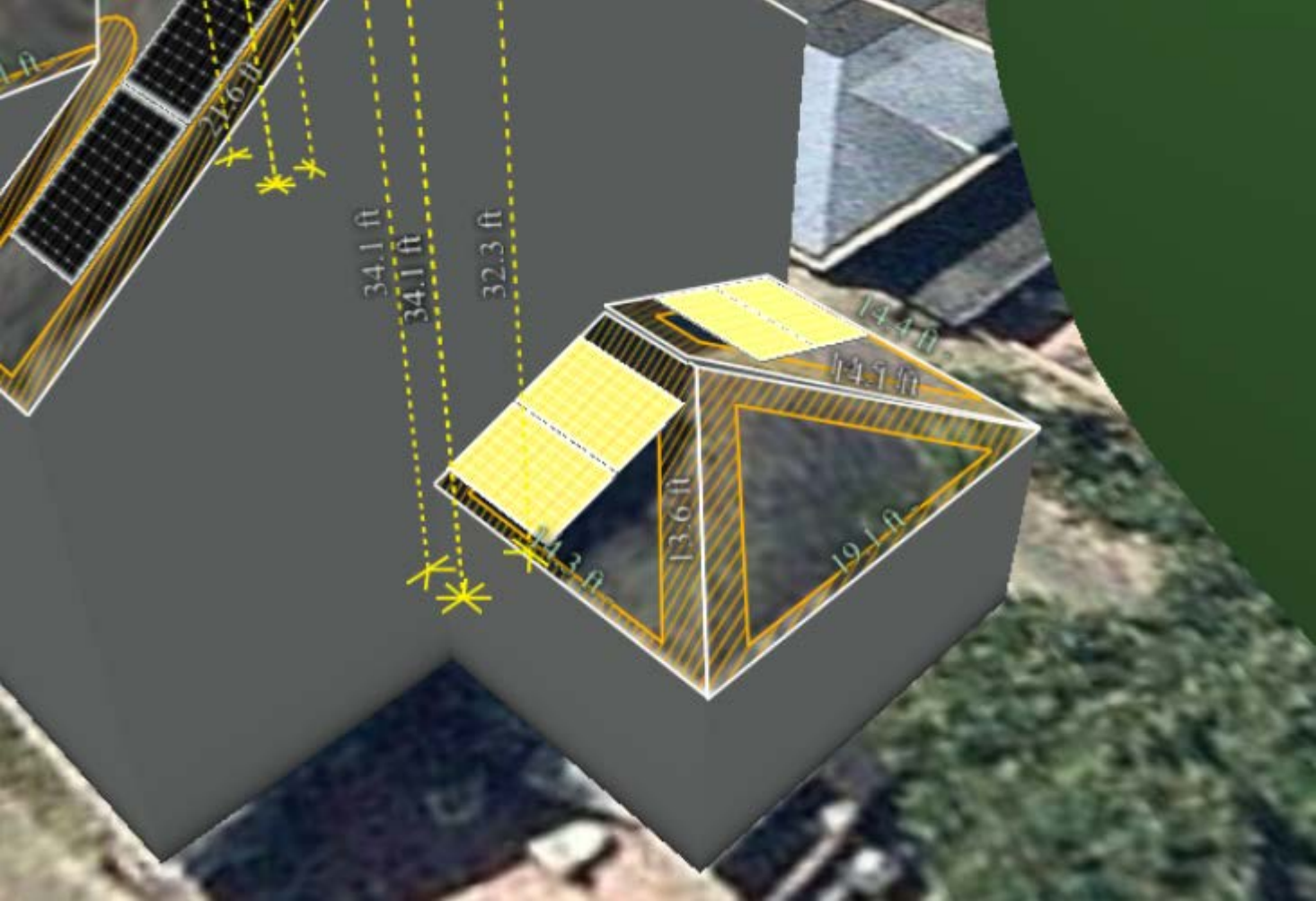
8.4 ft

48.8 ft

34.1 ft

32.3 ft

32.3 ft



34.1 ft

34.1 ft

32.3 ft

14.6 ft

14.4 ft

14.1 ft

13.6 ft

19.1 ft

14.3 ft