

MONTGOMERY COUNTY HISTORIC PRESERVATION COMMISSION

Address:	7005 Westmoreland Avenue, Takoma Park	Meeting Date:	10/14/2020
Resource:	Contributing Resource Takoma Park Historic District	Report Date:	10/7/2020
Applicant:	Lois Wessel	Public Notice:	9/30/2020
Review:	HAWP	Tax Credit:	n/a
Case No.:	37/03-20YYY	Staff:	Dan Bruechert
Proposal:	Solar Panel Installation		

RECOMMENDATION

Staff recommends the HPC **approve** the HAWP application.

PROPERTY DESCRIPTION

SIGNIFICANCE: Contributing Resource to the Takoma Park Historic District
 STYLE: Craftsman
 DATE: c.1915-1925

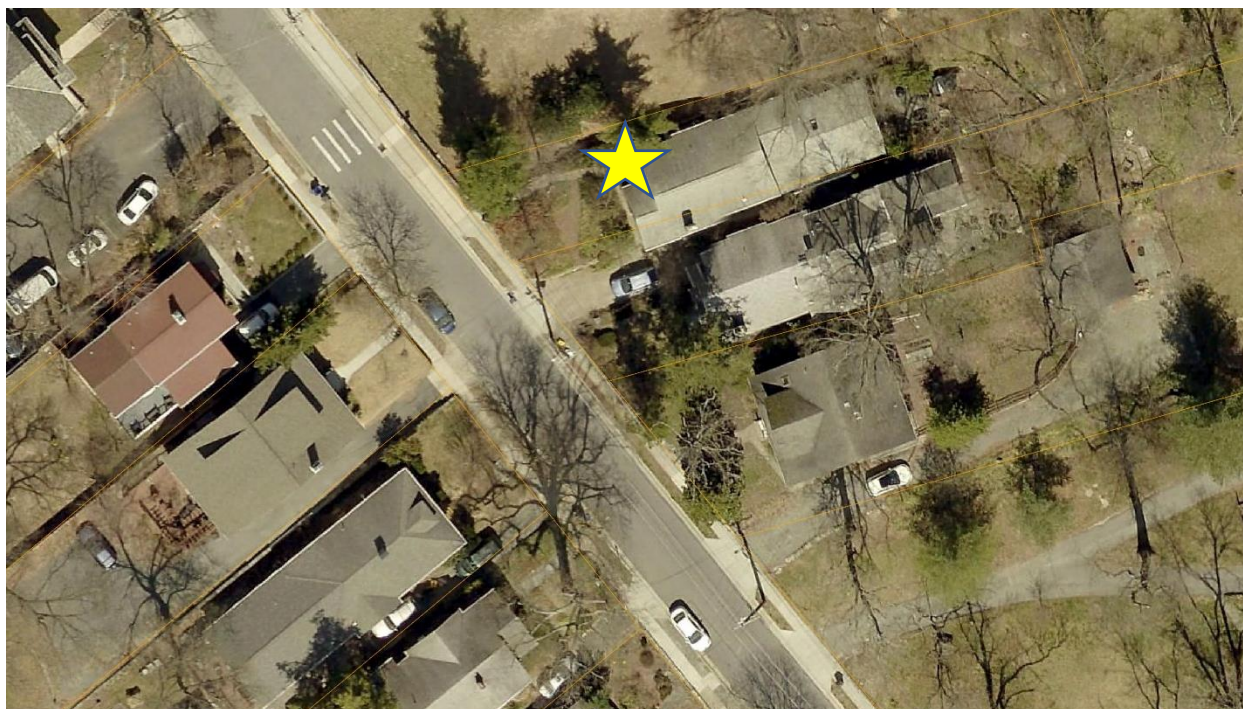


Figure 1: 7005 Westmoreland Ave. is to the south of the Takoma Park Urban Park.

PROPOSAL

The applicant proposes to install 20 (twenty) solar panels on the roof of the house.

APPLICABLE GUIDELINES

When reviewing alterations and new construction within the Takoma Park Historic District several documents are to be utilized as guidelines to assist the Commission in developing their decision. These documents include the historic preservation review guidelines in the approved and adopted amendment for the *Takoma Park Historic District (Guidelines)*, *Montgomery County Code Chapter 24A (Chapter 24A)*, and the *Secretary of the Interior's Standards for Rehabilitation (Standards)*. The work proposed is additionally covered by the adopted policy on solar panels, *Historic Preservation Commission Policy No. 20-01: ADDRESSING EMERGENCY CLIMATE MOBILIZATION THROUGH THE INSTALLATION OF ROOF-MOUNTED SOLAR PANELS*. The pertinent information in these documents is outlined below.

Takoma Park Historic District Guidelines

There are two very general, broad planning and design concepts which apply to all categories. These are:

The design review emphasis will be restricted to changes that are at all visible from the public right-of-way, irrespective of landscaping or vegetation (it is expected that the majority of new additions will be reviewed for their impact on the overall district), and,

The importance of assuring that additions and other changes to existing structures act to reinforce and continue existing streetscape, landscape, and building patterns rather than to impair the character of the district.

Contributing Resources should receive a more lenient review than those structures that have been classified as Outstanding. This design review should emphasize the importance of the resource to the overall streetscape and its compatibility with existing patterns rather than focusing on a close scrutiny of architectural detailing. In general, however, changes to Contributing Resources should respect the predominant architectural style of the resource. As stated above, the design review emphasis will be restricted to changes that are *at all visible from the public right-of-way*, irrespective of landscaping or vegetation.

Some of the factors to be considered in reviewing HAWPs on Contributing Resources include:

- All exterior alterations, including those to architectural features and details, should be generally consistent with the predominant architectural style and period of the resource and should preserve the predominant architectural features of the resource; exact replication of existing details and features is, however, not required
- Minor alterations to areas that do not directly front on a public right-of-way such as vents, metal stovepipes, air conditioners, fences, skylights, etc. – should be allowed as a matter of course; alterations to areas that do not directly front on a public way-of-way which involve the replacement of or damaged to original ornamental or architectural features are discouraged, but may be considered and approved on a case-by-case basis
- Some non-original building materials may be acceptable on a case-by-case basis;

artificial siding on areas visible to the public right-of-way is discouraged where such materials would replace or damage original building materials that are in good condition

- Alterations to features that are not visible from the public right-of-way should be allowed as a matter of course
- All changes and additions should respect existing environmental settings, landscaping, and patterns of open space.

Secretary of the Interior's Standards for Rehabilitation:

2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
9. New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportions, and massing to protect the integrity of the property and its environment.
10. New additions and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

Chapter 24A

(b) The commission shall instruct the director to issue a permit, or issue a permit subject to such conditions as are found to be necessary to insure conformity with the purposes and requirements of this chapter, if it finds that:

- (1) The proposal will not substantially alter the exterior features of an historic site or historic resource within an historic district; or
- (2) The proposal is compatible in character and nature with the historical, archeological, architectural or cultural features of the historic site or the historic district in which an historic resource is located and would not be detrimental thereto or to the achievement of the purposes of this chapter; or
- (3) The proposal would enhance or aid in the protection, preservation and public or private utilization of the historic site or historic resource located within an historic district in a manner compatible with the historical, archeological, architectural or cultural value of the historic site or historic district in which an historic resource is located.
- (6) In balancing the interests of the public in preserving the historic site or historic resource located within an historic district, with the interests of the public from the use and benefit of the alternative proposal, the general public welfare is better served by granting the permit.

(d) In the case of an application for work on an historic resource located within an historic district, the commission shall be lenient in its judgment of plans for structures of little historical or design significance or for plans involving new construction, unless such plans would seriously impair the historic or architectural value of surrounding historic resources or would impair the character of the historic district. (Ord. No. 9-4, § 1; Ord. No. 11-59.)

Historic Preservation Commission Policy No. 20-01: ADDRESSING EMERGENCY CLIMATE MOBILIZATION THROUGH THE INSTALLATION OF ROOF-MOUNTED SOLAR PANELS

Now, THEREFORE:

WHEREAS, Historic Area Work Permit decisions are guided by the criteria in Section 24A, The Secretary of the Interior's Standards for Rehabilitation, and pertinent guidance from applicable master plan amendments and/or site or district-specific studies;

WHEREAS, The Secretary of the Interior's Standards for Rehabilitation as interpreted by the National Park Service limit the placement of rooftop solar panels under Standards 2, 9, and 10 to less conspicuous locations;

WHEREAS, the County Council has established a Climate Emergency;

WHEREAS, the Historic Preservation is a body established by the County Executive and County Council;

WHEREAS, Section 24-8(b)(6) states, "In balancing the interest of the public in preserving the historic site or historic resource located within an historic district, with the interests of the public from the use and benefit of the alternative proposal, the general public welfare is better served by granting the permit;"

WHEREAS, the widespread use of solar panels, both for hot water and for electricity production, will reduce greenhouse gases in the county, in accordance with the aims of the Emergency Climate Mobilization resolution (Resolution No.: 18-974), it shall be the policy of the Historic Preservation Commission that:

1. The preferred locations for solar panel installation(s) on a designated historic site or an historic resource located within an historic district is a) on the rear of the property, b) on non-historic building additions, c) on accessory structures, or d) in ground-mounted arrays;
2. If it is not feasible to install solar panels in one of the identified preferred locations due to resource orientation or other site limitations; and,
3. The roof is determined to be neither architecturally significant, nor a character-defining feature of the resource, nor is it a slate or tile roof, that unless it can be demonstrated that the solar array will be installed without damaging the historic character of the resource or historic fabric; then
4. The public welfare is better served by approving a Historic Area Work Permit for solar panels on all visible side or front roof slopes under Section 24A-8(b)(6).
5. A Historic Area Work Permit (HAWP) is required for all work referenced in this policy.

STAFF DISCUSSION

The subject property is a one-story, front gable bungalow. The right roof slope faces south-southeast. There is a small, non-historic addition to the rear. The applicant proposes installing 20 (twenty) flush-mounted solar panels on the right roof slope.

Staff finds that the resource does not have the space to install a ground-mounted array and lacks an accessory structure to install the panels. In discussion with the solar company, the non-historic rear addition does not get adequate sun due to the large number of mature trees on the two properties to the south (see Fig. 2, below). The proposed solar panels will be installed almost to the front of the right (south-facing) roof slope.



Figure 2: 7005 Westmoreland Ave.

Staff finds the roof of the subject property is not architecturally significant and the extant 3-tab shingle roof is not historically significant. Staff further finds that while it may be preferable to have the array set back from the front wall plane, the panels closest to the street are the ones with the most sun exposure and will generate the most electricity. Eliminating them would frustrate the purpose of installing the array.

Staff finds that the proposed solar array complies with the requirements of the HPC's roof-mounted solar policy and it will not have a significant impact on the character of the house or surrounding district.

STAFF RECOMMENDATIONS

Staff recommends that the Commission approve the HAWP application under the Criteria for Issuance in Chapter 24A-8(b)(1), (6), and (d), having found that the proposal, is consistent with and compatible in character with the purposes of Chapter 24A; The Takoma Park Historic District Design Guidelines; the HPC Policy on Roof-Mounted Solar Panels;

and with the Secretary of the Interior's Standards for Rehabilitation #2, 9, and 10;

and with the general condition that the applicant shall present the **3 permit sets of drawings, if applicable, to Historic Preservation Commission (HPC) staff for review and stamping** prior to submission for the Montgomery County Department of Permitting Services (DPS) building permits;

and with the general condition that final project design details, not specifically delineated by the Commission, shall be approved by HPC staff or brought back to the Commission as a revised HAWP application at staff's discretion;

and with the general condition that the applicant shall notify the Historic Preservation Staff if they propose to make **any alterations** to the approved plans. Once the work is completed the applicant will contact the staff person assigned to this application at 301-563-3400 or dan.bruechert@montgomeryplanning.org to schedule a follow-up site visit.



FOR STAFF ONLY:
HAWP# 927084
DATE ASSIGNED _____

**APPLICATION FOR
HISTORIC AREA WORK PERMIT**
HISTORIC PRESERVATION COMMISSION
301.563.3400

APPLICANT:

Name: LOIS WESSEL
Address: 7005 WESTMORELAND AVE
Daytime Phone: 301.213.6733

E-mail: _____
City: TAKOMA PARK Zip: 20912
Tax Account No.: 13-01061594

AGENT/CONTACT (if applicable):

Name: Jessica Jones
Address: 812 OREGON AVE., STE J
Daytime Phone: 443.301.7228

E-mail: MDPERMITCOORDINATION@SUNRUN.COM
City: LINTHICUM Zip: 21090
Contractor Registration No.: 115875

LOCATION OF BUILDING/PREMISE: MIHP # of Historic Property _____

Is the Property Located within an Historic District? X Yes/District Name GILBERT & WOOD
____ No/Individual Site Name _____

Is there an Historic Preservation/Land Trust/Environmental Easement on the Property? If YES, include a map of the easement, and documentation from the Easement Holder supporting this application.

Are other Planning and/or Hearing Examiner Approvals /Reviews Required as part of this Application? (Conditional Use, Variance, Record Plat, etc.?) If YES, include information on these reviews as supplemental information.

Building Number: 7005 Street: WESTMOORELAND AVE.
Town/City: TAKOMA PARK Nearest Cross Street: CARROLL AVE
Lot: P8 Block: F Subdivision: 0025 Parcel: 0000

TYPE OF WORK PROPOSED: See the checklist on Page 4 to verify that all supporting items for proposed work are submitted with this application. Incomplete Applications will not be accepted for review. Check all that apply:

- | | | |
|---|--|--|
| <input type="checkbox"/> New Construction | <input type="checkbox"/> Deck/Porch | <input type="checkbox"/> Shed/Garage/Accessory Structure |
| <input type="checkbox"/> Addition | <input type="checkbox"/> Fence | <input type="checkbox"/> Solar |
| <input type="checkbox"/> Demolition | <input type="checkbox"/> Hardscape/Landscape | <input type="checkbox"/> Tree removal/planting |
| <input type="checkbox"/> Grading/Excavation | <input type="checkbox"/> Roof | <input type="checkbox"/> Window/Door |
| | | <input checked="" type="checkbox"/> Other: <u>ROOFTOP SOLAR PANELS</u> |

I hereby certify that I have the authority to make the foregoing application, that the application is correct and accurate and that the construction will comply with plans reviewed and approved by all necessary agencies and hereby acknowledge and accept this to be a condition for the issuance of this permit.

JJ
Signature of owner or authorized agent

9/14/2020

Date

Description of Property: Please describe the building and surrounding environment. Include information on significant structures, landscape features, or other significant features of the property:

SINGLE FAMILY HOME WITH DRIVEWAY.

Description of Work Proposed: Please give an overview of the work to be undertaken:

**20 FLUSH-MOUNTED SOLAR PANELS TO BE INSTALLED ON SOUTH FACING ROOF OF DWELLING. TOTAL SYSTEM SIZE OF 6.6KW
NO ADDITIONAL STRUCTURES TO BE BUILT OR ALTERED.
PLEASE SEE ATTACHED PLANS.**

Work Item 1: **SOLAR PANELS**

Description of Current Condition:

SINGLE
FAMILY HOME

Proposed Work:

SINGLE FAMILY HOME WITH
ADDITION OF SOLAR PANELS ON
ROOF.

Work Item 2: _____

Description of Current Condition:

Proposed Work:

Work Item 3: _____

Description of Current Condition:

Proposed Work:

HISTORIC AREA WORK PERMIT CHECKLIST OF APPLICATION REQUIREMENTS

	Required Attachments						
Proposed Work	I. Written Description	2. Site Plan	3. Plans/ Elevations	4. Material Specifications	5. Photographs	6. Tree Survey	7. Property Owner Addresses
New Construction	*	*	*	*	*	*	*
Additions/ Alterations	*	*	*	*	*	*	*
Demolition	*	*	*		*		*
Deck/Porch	*	*	*	*	*	*	*
Fence/Wall	*	*	*	*	*	*	*
Driveway/ Parking Area	*	*		*	*	*	*
Grading/Excavation/ Landscaping	*	*		*	*	*	*
Tree Removal	*	*		*	*	*	*
Siding/ Roof Changes	*	*	*	*	*		*
Window/ Door Changes	*	*	*	*	*		*
Masonry Repair/ Repoint	*	*	*	*	*		*
Signs	*	*	*	*	*		*

SCOPE OF WORK

- SYSTEM SIZE: 6600W DC, 4800W AC
- MODULES: (20) LG ELECTRONICS: LG330N1C-A5
- INVERTERS: (20) ENPHASE ENERGY: IQ7-60-2-US
- RACKING: SNAPRACK RLU; RL UNIVERSAL, SPEEDTRACK, SEE DETAIL SNR-DC-00436

GENERAL NOTES

- ALL WORK SHALL COMPLY WITH 2018 IRC/IBC/IEBC, MUNICIPAL CODE, AND ALL MANUFACTURERS' LISTINGS AND INSTALLATION INSTRUCTIONS.
- PHOTOVOLTAIC SYSTEM WILL COMPLY WITH NEC 2017.

- ELECTRICAL SYSTEM GROUNDING WILL COMPLY WITH NEC 2017.

- PHOTOVOLTAIC SYSTEM IS UNGROUNDED. NO CONDUCTORS ARE SOLIDLY GROUNDED IN THE INVERTER. SYSTEM COMPLIES WITH 690.35.

- MODULES CONFORM TO AND ARE LISTED UNDER UL 1703.

- INVERTER CONFORMS TO AND IS LISTED UNDER UL 1741.

- RACKING CONFORMS TO AND IS LISTED UNDER UL 2703.

- SNAPRACK RACKING SYSTEMS, IN COMBINATION WITH TYPE I, OR TYPE II MODULES, ARE CLASS A FIRE RATED.

- RAPID SHUTDOWN REQUIREMENTS MET WHEN INVERTERS AND ALL CONDUCTORS ARE WITHIN ARRAY BOUNDARIES PER NEC 690.12(1).

- CONSTRUCTION FOREMAN TO PLACE CONDUIT RUN PER 690.31(G).

- ARRAY DC CONDUCTORS ARE SIZED FOR DERATED CURRENT.

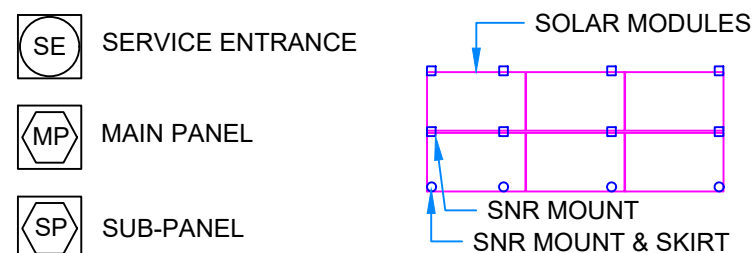
- 10.45 AMPS MODULE SHORT CIRCUIT CURRENT.

















- 16.32 AMPS DERATED SHORT CIRCUIT CURRENT [690.8 (a) & 690.8 (b)].
- THE INSTALLATIONS AND ASSEMBLY OF THE ROOF TOP AND OR GROUND MOUNTED SOLAR PANELS SHALL BE IN COMPLIANCE WITH IRC 2018 SECTIONS R-324, R-907 AND NEC 2017 OR AS ENGINEERED PER IRC 2018 SECTION R-301.1.3.
- BUILDING INSPECTOR SHALL VERIFY INSTALLATIONS OF BOTH PANELS AND ELECTRICAL CONNECTIONS PER FULL COMPLIANCE WITH THE ABOVE CITED CODE SECTIONS AND IRC 2015 SECTION R-102.7.1.


VICINITY MAP



LEGEND AND ABBREVIATIONS



- | | | | |
|---|--------------------|---|------------------|
|  | PV LOAD CENTER |  | CHIMNEY |
|  | SUNRUN METER |  | ATTIC VENT |
|  | DEDICATED PV METER |  | FLUSH ATTIC VENT |
|  | INVERTER(S) |  | PVC PIPE VENT |
|  | AC DISCONNECT(S) |  | METAL PIPE VENT |
|  | DC DISCONNECT(S) |  | T-VENT |
|  | IQ COMBINER BOX |  | SATELLITE DISH |
| | |  | FIRE SETBACKS |
| | |  | HARDSCAPE |

- INTERIOR EQUIPMENT — PL— PROPERTY LINE
 SHOWN AS DASHED

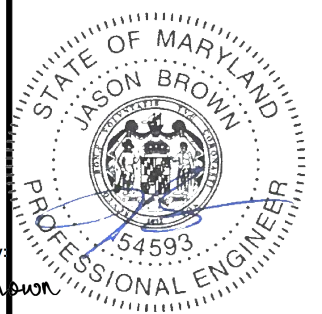
SCALE: NTS

- | | |
|---------|-------------------------------|
| A | AMPERE |
| AC | ALTERNATING CURRENT |
| AFCI | ARC FAULT CIRCUIT INTERRUPTER |
| AZIM | AZIMUTH |
| COMP | COMPOSITION |
| DC | DIRECT CURRENT |
| (E) | EXISTING |
| ESS | ENERGY STORAGE SYSTEM |
| EXT | EXTERIOR |
| INT | INTERIOR |
| LBW | LOAD BEARING WALL |
| MAG | MAGNETIC |
| MSP | MAIN SERVICE PANEL |
| (N) | NEW |
| NTS | NOT TO SCALE |
| OC | ON CENTER |
| PRE-FAB | PRE-FABRICATED |
| PSF | POUNDS PER SQUARE FOOT |
| PV | PHOTOVOLTAIC |
| TL | TRANSFORMERLESS |
| TYP | TYPICAL |
| V | VOLTS |
| W | WATTS |

REV	NAME	DATE	COMMENTS

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PV-2.0	SITE PLAN
PV-3.0	LAYOUT
PV-3.1	MOUNTING DETAIL
PV-4.0	ELECTRICAL
PV-5.0	SIGNAGE



DocuSigned by:
Jason Brown
3486735A926F42
Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No. 54593, Expiration Date: 06/25/2021

STRUCTURAL ONLY

SUNRUN

MHIC #132591

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FAX 0

CUSTOMER RESIDENCE:
LOIS WESSEL
7005 WESTMORELAND AVE,
TAKOMA PARK, MD, 20912

TEL. (301) 213-6733
APN #: 13-01061594

PROJECT NUMBER:
251R-005WESS

DESIGNER: (415) 580-6920 ex3
JAKE TAYLOR

SHEET
COVER SHEET

REV: A	7/29/2020
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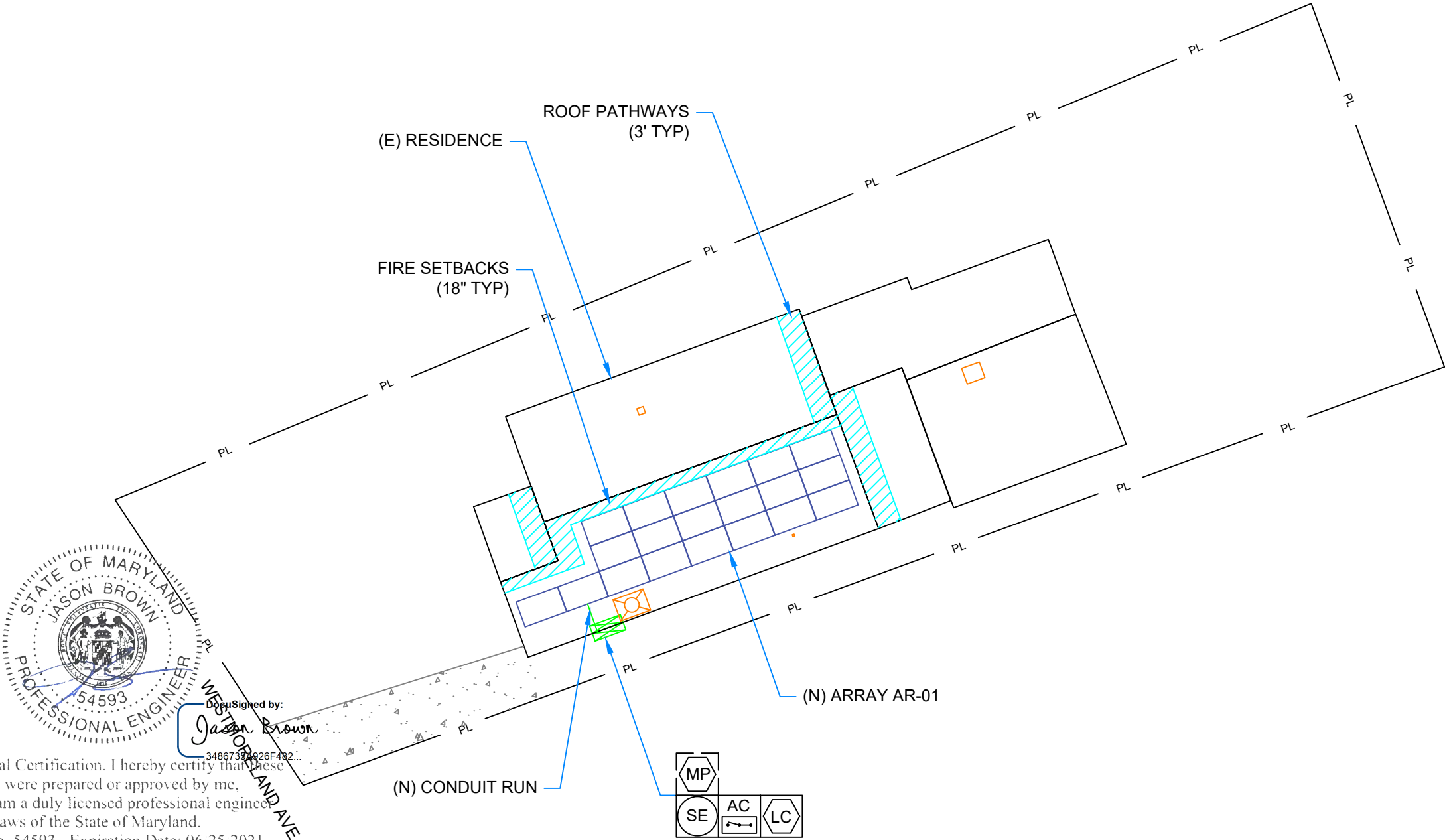
PAGE PV-1.90

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



	ARRAY PITCH	TRUE AZIM	MAG AZIM	PV AREA (SQFT)
AR-01	25°	160°	171°	368.8

- ARRAY DETAILS:**
- TOTAL ROOF SURFACE AREA: 2207 SQFT.
 - TOTAL PV ARRAY AREA: 368.8 SQ FT.
 - PERCENTAGE PV COVERAGE:
(TOTAL PV ARRAY AREA/TOTAL ROOF SURFACE AREA) * 100 = 16.7%



STATE OF MARYLAND

JASON BROWN

PROFESSIONAL ENGINEER

54593

Westmoreland Ave

348673324026F432...

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 54593, Expiration Date: 06/25/2021

DocuSigned by:

Jason Brown

NOTE: MICRO-INVERTERS INSTALLED UNDER EACH MODULE

Sunrun

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SHEET

SITE PLAN

REV: A

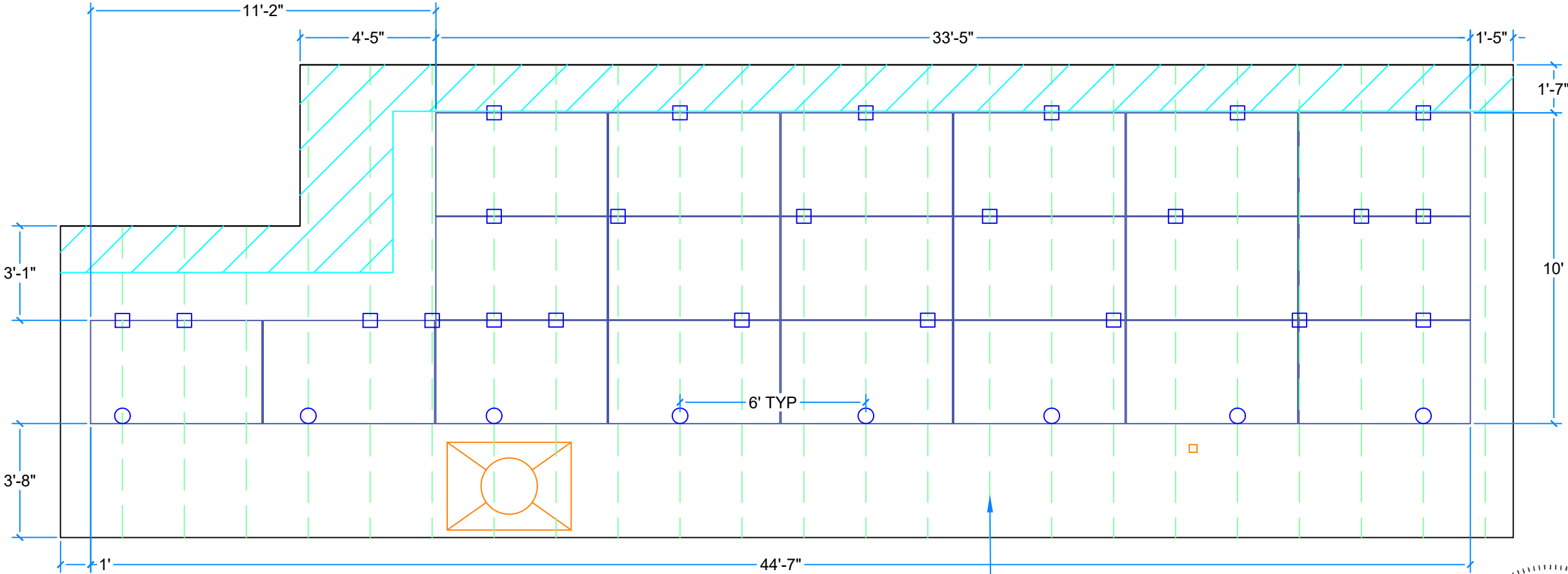
7/29/2020

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PV-2.0₁

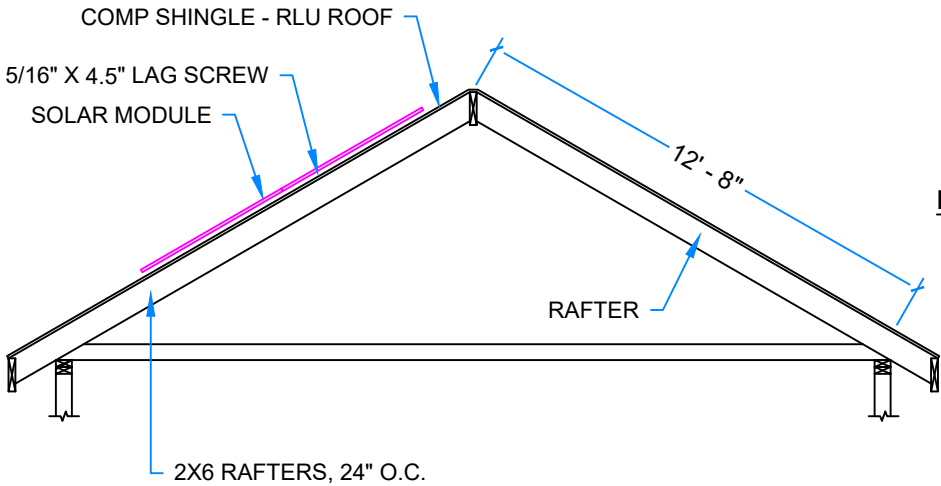
ROOF INFO			FRAMING INFO			ATTACHMENT INFORMATION					
Name	Type	Height	Type	Max Span	OC Spacing	Detail	Max Landscape OC Spacing	Max Landscape Overhang	Max Portrait OC Spacing	Max Portrait Overhang	Configuration
AR-01	COMP SHINGLE - RLU	1-Story	2X6 RAFTERS	12' - 8"	24"	RL UNIVERSAL, SPEEDTRACK, SEE DETAIL SNR-DC-00436	6' - 0"	1' - 5"	4' - 0"	1' - 0"	STAGGERED

D1 - AR-01 - SCALE: 1/4" = 1'-0"
PITCH: 25°
AZIM: 160°

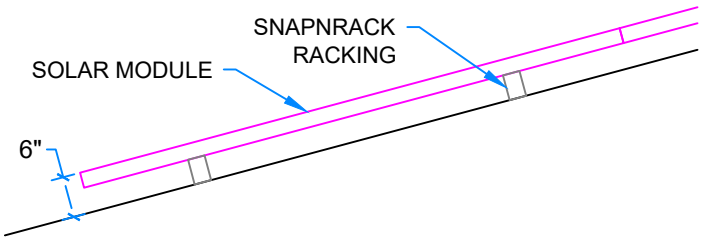


ROOF FRAMING DETAIL - SCALE: NTS

RAFTER



MODULE ELEVATION DETAIL - SCALE: NTS



2 X 6 RAFTER 24" OC

DocuSigned by:
Jason Brown
3486735A926F482...
Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 54593, Expiration Date: 06/25/2021



DESIGN CRITERIA

MAX DISTRIBUTED LOAD: 3 PSF
SNOW LOAD: 30 PSF
WIND SPEED: 111 MPH 3-SEC GUST.
S.S. LAG SCREWS: 5/16": 2.5" MIN EMBEDMENT

STRUCTURAL NOTES:

- INSTALLERS TO VERIFY RAFTER SIZE, SPACING AND SLOPED SPANS, AND NOTIFY E.O.R. OF ANY DISCREPANCIES BEFORE PROCEEDING.
- IF ARRAY (EXCLUDING SKIRT) IS WITHIN 12" BOUNDARY REGION OF ANY ROOF PLANE EDGES (EXCEPT VALLEYS), THEN ATTACHMENTS NEED TO BE ADDED AND OVERHANG REDUCED WITHIN THE 12" BOUNDARY REGION ONLY AS FOLLOWS:
 - ALLOWABLE ATTACHMENT SPACING INDICATED ON PLANS TO BE REDUCED BY 50%
 - ALLOWABLE OVERHANG INDICATED ON PLANS TO BE 1/5TH OF ALLOWABLE ATTACHMENT SPACING INDICATED ON PLANS

SUNRUN

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PROJECT NUMBER:
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DESIGNER: (415) 580-6920 ex3
JAKE TAYLOR

SHEET
LAYOUT

REV: A 7/29/2020

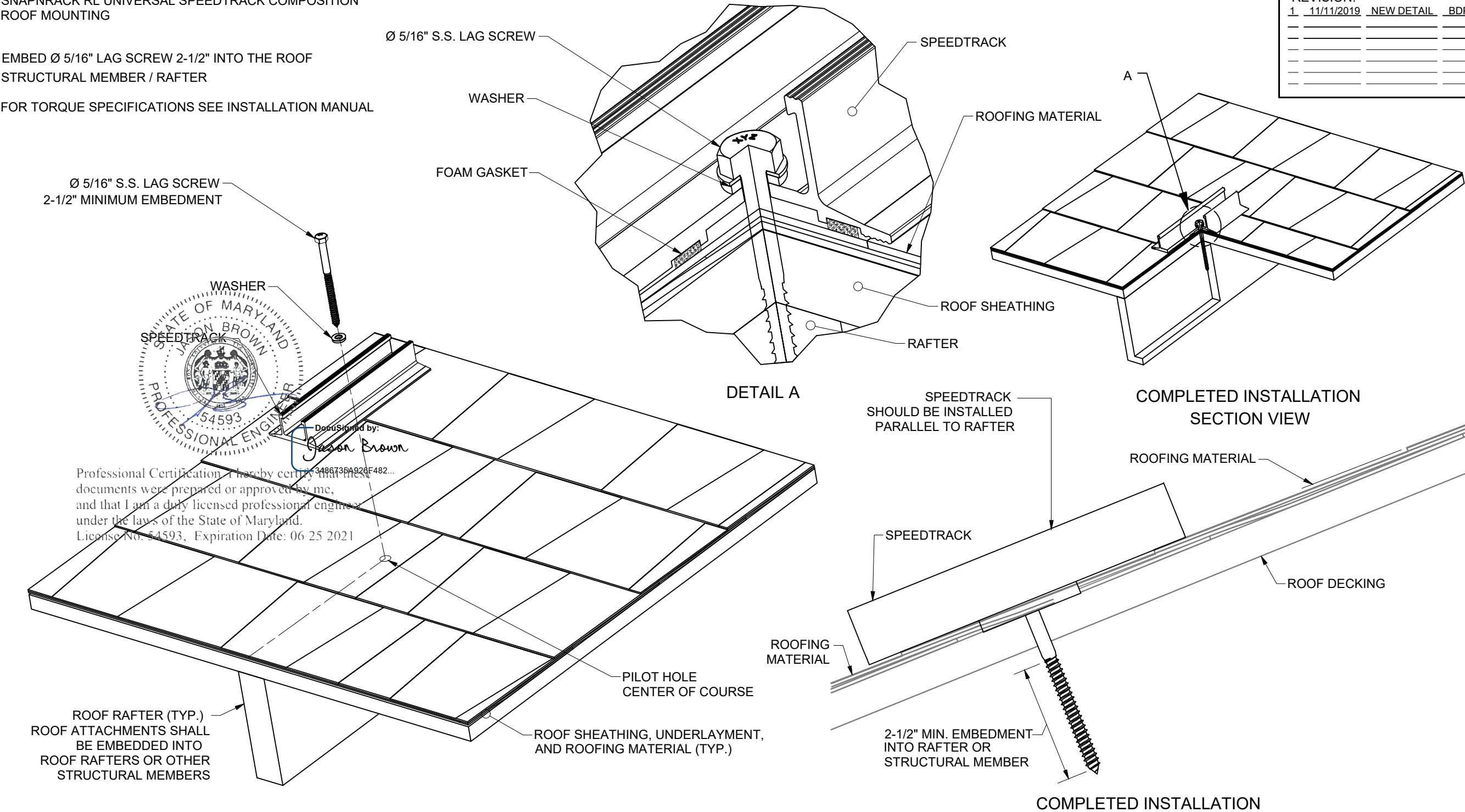
PAGE
PV-3.9₂

SNAPNRACK RL UNIVERSAL SPEEDTRACK COMPOSITION
ROOF MOUNTING

EMBED Ø 5/16" LAG SCREW 2-1/2" INTO THE ROOF
STRUCTURAL MEMBER / RAFTER

FOR TORQUE SPECIFICATIONS SEE INSTALLATION MANUAL

REVISION:		
1	11/11/2019	NEW DETAIL BDP



Professional Certification I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 54593, Expiration Date: 06/25/2021

DocuSigned by:
Jason Brown

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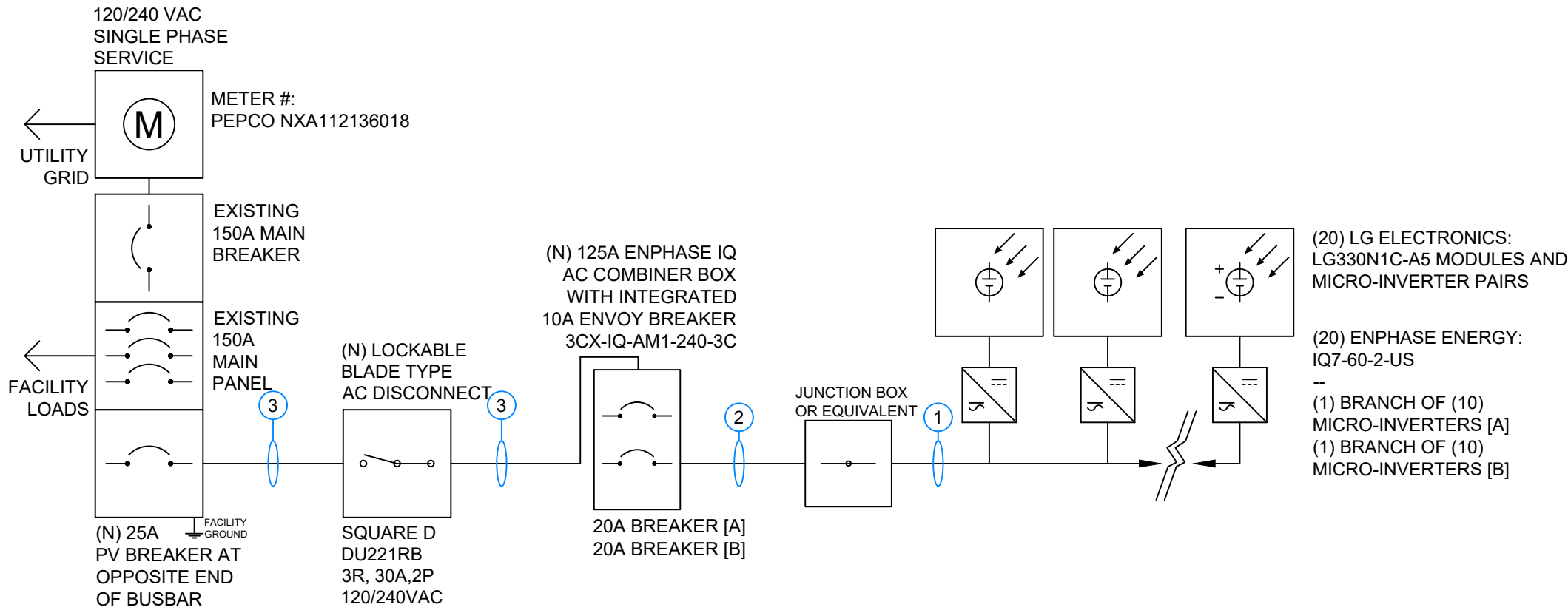
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JAKE TAYLOR

SHEET
MOUNTING DETAIL

REV: A 7/29/2020

PAGE PV-3.13



CONDUIT SCHEDULE

#	CONDUIT	CONDUCTOR	NEUTRAL	GROUND
1	NONE	(2) 12 AWG PER ENPHASE Q CABLE BRANCH	NONE	(1) 10 AWG BARE COPPER
2	3/4" EMT OR EQUIV.	(4) 10 AWG THHN/THWN-2	NONE	(1) 8 AWG THHN/THWN-2
3	3/4" EMT OR EQUIV.	(2) 10 AWG THHN/THWN-2	(1) 10 AWG THHN/THWN-2	(1) 8 AWG THHN/THWN-2

MODULE CHARACTERISTICS

LG ELECTRONICS: LG330N1C-A5:	330 W
OPEN CIRCUIT VOLTAGE:	40.9 V
MAX POWER VOLTAGE:	33.7 V
SHORT CIRCUIT CURRENT:	10.45 A

SUNRUN

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JAKE TAYLOR

SHEET
ELECTRICAL

REV: A 7/29/2020

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PV-4.94

⚠

WARNING

ELECTRICAL SHOCK HAZARD

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

LABEL LOCATION:
INVERTER(S), AC DISCONNECT(S), AC COMBINER PANEL (IF APPLICABLE).
PER CODE(S): NEC 2020: 690.13(B), NEC 2017: 690.13(B), NEC 2014: 690.17(E), NEC 2011: 690.17(4)

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WARNING

PHOTOVOLTAIC SYSTEM COMBINER PANEL

DO NOT ADD LOADS

LABEL LOCATION:
PHOTOVOLTAIC AC COMBINER (IF APPLICABLE).
PER CODE(S): CEC 2019: 705.12(B)(2)(3)(c), NEC 2017: 705.12(B)(2)(3)(c), NEC 2014: 705.12(D)(2)(3)(c), NEC 2011: 705.12(D)(4)

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

LABEL LOCATION:
UTILITY SERVICE ENTRANCE/METER, INVERTER/DC DISCONNECT IF REQUIRED BY LOCAL AHJ, OR OTHER LOCATIONS AS REQUIRED BY LOCAL AHJ.
PER CODE(S): CEC 2019: 690.56(C)(3), NEC 2017: 690.56(C)(3), NEC 2014: 690.12, NEC 690.56, IFC 2012: 605.11.1, IFC 2018: 1204.5.3, CFC 2019: 1204.5.3

⚠

WARNING

POWER SOURCE OUTPUT CONNECTION

DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION:
ADJACENT TO PV BREAKER AND ESS OCPD (IF APPLICABLE).
PER CODE(S): NEC 2020: 705.12(B)(3)(2), CEC 2019: 705.12(B)(2)(3)(b), NEC 2017: 705.12(B)(2)(3)(b), CEC 2019: 705.12(B)(3), NEC 2017: 705.12(B)(3), NEC 2014: 705.12(B)(3), NEC 2011: 705.12(D)(7)

PHOTOVOLTAIC AC DISCONNECT

MAXIMUM AC OPERATING CURRENT: 20.00 AMPS

NOMINAL OPERATING AC VOLTAGE: 240 VAC

LABEL LOCATION:
AC DISCONNECT(S), PHOTOVOLTAIC SYSTEM POINT OF INTERCONNECTION.
PER CODE(S): CEC 2019: 690.54, NEC 2017: 690.54, NEC 2014: 690.54, NEC 2011: 690.54

4"

3"

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.

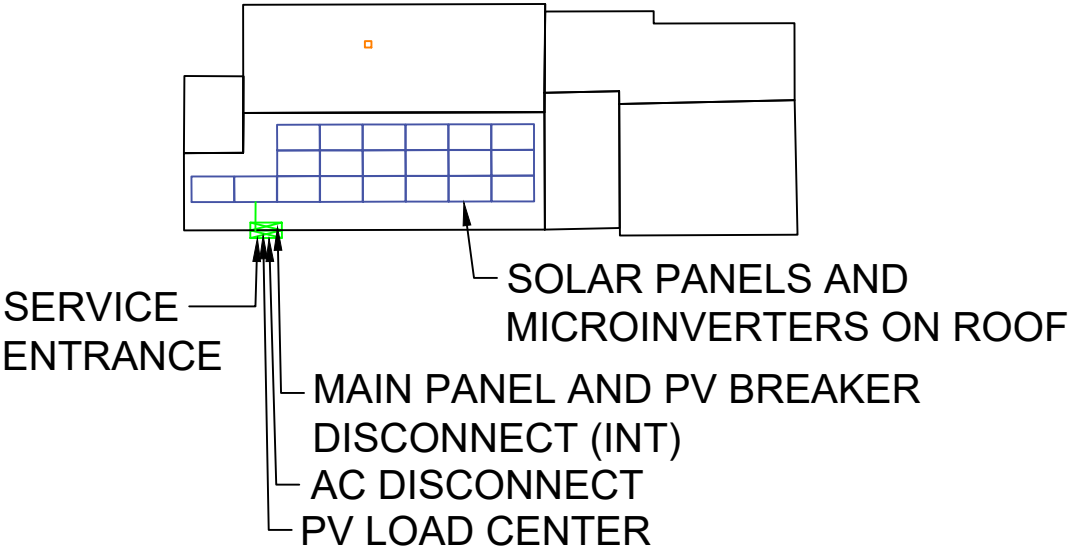
SOLAR ELECTRIC PV PANELS

LABEL LOCATION:
ON OR NO MORE THAT 1 M (3 FT) FROM THE SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED.
PER CODE(S): CEC 2019: 690.56(C)(1)(a), NEC 2017: 690.56(C)(1)(a)

- NOTES AND SPECIFICATIONS:
- SIGNS AND LABELS SHALL MEET THE REQUIREMENTS OF THE NEC 2017 ARTICLE 110.21(B), UNLESS SPECIFIC INSTRUCTIONS ARE REQUIRED BY SECTION 690, OR IF REQUESTED BY THE LOCAL AHJ.
 - SIGNS AND LABELS SHALL ADEQUATELY WARN OF HAZARDS USING EFFECTIVE WORDS, COLORS AND SYMBOLS.
 - LABELS SHALL BE PERMANENTLY AFFIXED TO THE EQUIPMENT OR WIRING METHOD AND SHALL NOT BE HAND WRITTEN.
 - LABEL SHALL BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED.
 - SIGNS AND LABELS SHALL COMPLY WITH ANSI Z535.4-2011, PRODUCT SAFETY SIGNS AND LABELS, UNLESS OTHERWISE SPECIFIED.
 - DO NOT COVER EXISTING MANUFACTURER LABELS.

CAUTION:

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



7005 WESTMORELAND AVE, TAKOMA PARK, MD, 20912

sunrun

MHIC #132591

812 OREGON AVE, STE J, LINTHICUM HEIGHTS, MD 21090
PHONE 443-457-5012
FAX 0

CUSTOMER RESIDENCE:
LOIS WESSEL
7005 WESTMORELAND AVE,
TAKOMA PARK, MD, 20912

TEL. (301) 213-6733
APN #: 13-01061594

PROJECT NUMBER:
251R-005WESS

DESIGNER: (415) 580-6920 ex3
JAKE TAYLOR

SHEET
SIGNAGE

REV: A 7/29/2020

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Structural Calculations for the Lois Wessel Residence PV Installation

Date: 8/3/2020
 Job Address: 7005 Westmoreland Ave
 Takoma Park, MD, 20912
 Job Number: 251R-005WESS

Scope of Work

These calculations are for the existing roof framing which supports the new PV modules as well as the attachment of the PV system to existing roof framing. All PV mounting equipment shall be designed and installed per manufacturer's approved installation specifications.

Calculation Index

Sheet Description

- 2 Structural Geometry, Live Load, Snow Load, Wind Load, & Dead Load
- 3 Roof (1) Framing Check
- 4 Roof Attachment Check, Seismic Check, & Scope of Work

Engineering Calculations Summary

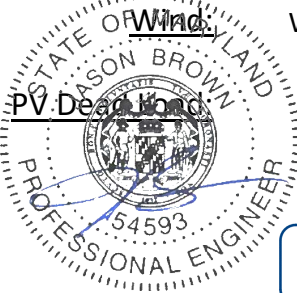
Code: 2018 IBC/IEBC/IRC w/ DHCD Modificaitons, ASCE 7-16, 2018 NDS

Snow Load: S = 30 psf

Live Load: LL = 20 psf

Wind: Wind Speed Ult. (V) = 111 mph Exp. = B

PV Dead Load: DPV = 3.0 psf



DocuSigned by:

Jason Brown

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Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
 License No. 54593, Expiration Date: 06/25/2021



Address: 7005 Westmoreland Ave
Takoma Park, MD, 20912
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Structure Geometry:

Mean Roof Height, h_n	=	13 ft
Eave Height, h_e	=	8 ft
Building Length, L	=	80 ft
Building Width, B	=	30 ft
Module Area	=	20 ft ²
Roof Pitch, θ	=	25 degrees

Live Load:

Roof Live Load, L_r	=	20.00 psf	Equation 4.8-1
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Snow Load:

Ground Snow Load, p_g	=	30 psf	Fig. 7-1
Snow Importance Factor, I_s	=	1	Table 1.5-1
Thermal Factor, C_t	=	1.1	Table 7-3
Exposure Factor, C_e	=	0.9	Table 7-2
Roof Slope Factor, C_s	=	0.75	Figure 7-2c
Flat Snow Load, P_f	=	20.8 psf	Equation 7.3-1
Sloped Roof Snow Loads, P_s	=	15.6 psf	Equation 7.4-1
Is the width of the roof > 20ft?		Yes	
Drift Height, h_d	=	1.44 ft	Figure 7-9
Roof slope for a rise of one, S		2.14	
Unbalanced Width	=	5.61 ft	Fig 7-5
γ	=	18 pcf	Equation 7.7-1
Unbalanced Snow Load	=	33.14 psf	Fig 7-5

Wind Load:

Basic Wind Speed (3s-gust), V	=	111.0 mph	Figure 26.5-1A
VASD	=	86 mph	
Building Occupancy Category	=	2	Table 1.5-1
Exposure Category	=	B	Sec 26.7.3
Topographic Factor, K_{zt}	=	1.00	Equation 26.8-1
Adjustment Factor, λ	=	1.00	Figure 30.5-1
Edge Zone, a	=	3.00 ft	Figure 30.5-1

Uplift (0.6W)

		<u>Zone 1 (psf)</u>	<u>Zone 2 (psf)</u>	<u>Zone 3 (psf)</u>	
	$G C_p$	-1.22	-1.77	-1.77	Table C30.3-8
P716 = .6 x q_h x $G C_{p_{zone}}$ x Y_e x Y_a	=	-9.60	-13.44	-13.44	Equation 29.4-7

Downward (0.6W)

	$G C_p$	0.58	0.58	0.58	Table C30.3-8
P716 = .6 x q_h x $G C_{p_{zone}}$ x Y_e x Y_a	=	9.60	9.60	9.60	Equation 29.4-7

Dead Load:

Roof (1):

Roof		Walls - Exterior	
Composition Shingle	3.0 psf	Wood	5.0 psf
5/8 OSB Sheathing	2.0	2x4 Studs @ 16"	2.0
2x6 Rafter @ 24" OC	1.0	Gypsum	3.0
Misc. (Ceiling, Insulation, etc.)	1.0	Misc. (Insulation, etc.)	2.0
PV System, P_{pv}	3.0		
Total Roof DL =	10.0 psf	Total Wall DL =	12.0 psf



Address: 7005 Westmoreland Ave
Takoma Park, MD, 20912
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Roof (1) Framing Check:

Roof Framing	=	2x6 Rafter @ 24" OC
Timber Species	=	Southern Pine #2
Max Beam Span	=	12.67 ft
b	=	1.5 in
d	=	5.50 in
Moment of Inertia, I _x	=	20.80 in ⁴
Section Modulus, S _x	=	7.56 in ³
Bending Stress, F _b	=	750 psi
Elastic Modulus, E _{min}	=	580000 psi

Wood Adjustment Factors:

C _D (Wind)	C _D (Snow)	C _{LS}	C _M	C _t
1.60	1.15	1.16	1.00	1.00
C _L	C _F	C _{fu}	C _i	C _r
1.00	1.30	1.00	1.00	1.15

PV Tributary Width, W _{PV}	=	3.30 ft
PV Tributary Length, L _{PV}	=	6.0 ft
PV Tributary Area, A _t	=	19.8 ft ²
PV Dead Point Load, P _D = P _{PV} x A _t	=	54 lb
Roof Distributed Load, wDL	=	13 plf

Load Case: 0.6DL + 0.6W (CD = 1.6)

Roof Zone	=	1
P _{up} = P _{net} x A _t + 0.6 x P _D x cos(θ)	=	158 lb
M _{b(wind_up)}	=	167 lb-ft
F _{b'} (wind) = F _b x C _D x C _{LS} x C _M x C _t x C _L x C _F x C _{fu} x C _i x C _r	=	2081 psi
Mallowable = S _x x F _{b'} (wind)	=	1311 lb-ft
	>	167
		OK

Load Case: DL + 0.6W (CD = 1.6)

P _{down} = P _{net} x A _t + P _D x cos(θ)	=	244 lb
M _{b(wind_down)}	=	749 lb-ft
F _{b'} (wind) = F _b x C _D x C _{LS} x C _M x C _t x C _L x C _F x C _{fu} x C _i x C _r	=	2081 psi
Mallowable = S _x x F _{b'} (wind)	=	1311 lb-ft
	>	749
		OK

Load Case: DL + 0.75(0.6W) + 0.75S (CD = 1.6)

Roof Snow Distributed Load, wSL	=	42 plf
P _{snow} = P _s x A _t	=	280 lb
M _{b(wind_snow)}	=	1078 lb-ft
F _{b'} (wind) = F _b x C _D x C _{LS} x C _M x C _t x C _L x C _F x C _{fu} x C _i x C _r	=	2081 psi
Mallowable = S _x x F _{b'} (snow)	=	1311 lb-ft
	>	1078
		OK

Load Case: DL + S (CD = 1.15)

Roof Snow Distributed Load, wSL	=	42 plf
P _{snow} = P _s x A _t	=	280 lb
M _{b(snow)}	=	931 lb-ft
F _{b'} (snow) = F _b x C _D x C _{LS} x C _M x C _t x C _L x C _F x C _{fu} x C _i x C _r	=	1496 psi
Mallowable = S _x x F _{b'} (snow)	=	943 lb-ft
	>	931
		OK



Address: 7005 Westmoreland Ave
Takoma Park, MD, 20912
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Rafter Attachments: 0.6D+0.6W (Zone 2)

Puplift = At X Pnet	=	234 lb			
Connector Uplift Capacity per SnapNRack Test Results	=	604 lb	>	234	OK
5/16" Lag Screw Withdrawl Value	=	307 lb/in		Table 12.2A - NDS	
Lag Screw Penetration	=	2.5 in			
Allowable Capacity with Cd	=	1228 lb	>	234	OK

Seismic Check:

Existing Dead Load:		Solar Dead Load:	
Aroofexisting	= 2400 ft ²	Wpanel	= 42 lb
Wroofexisting	= 16800 lb	Numpanel	= 20
Awallexisting	= 1760 ft ²	Wpanel_tot	= 840 lb
Wwallexisting	= 21120 lb	Wbos	= 196 lb
Wtotal	= 37920 lb	Warray	= 1036 lb

$$\% \text{Increase} = (W_{\text{total}} + W_{\text{array}}) / W_{\text{total}} = \frac{38956}{37920} * 100\% - 100\% = 2.73\% **$$

**The increase in weight as a result of the solar system is less than 10% of the existing structure and therefore no further seismic analysis is required.

Limits of Scope of Work and Liability

We have based our structural capacity determination on applicable building codes, professional engineering inspection and design experience, opinions and judgments. The calculations produced for this dwelling's assessment are only for the proposed solar panel installation referenced in the stamped plan set and were made according to generally recognized structural analysis standards and procedures.



August 3, 2020

Subject: Structural Certification for Proposed Residential Solar Installation.

Job Number: 251R-005WESS;Rev A, Dated 7/29/2020

Client: Lois Wessel

Address: 7005 Westmoreland Ave, Takoma Park, MD, 20912

Attn: To Whom It May Concern

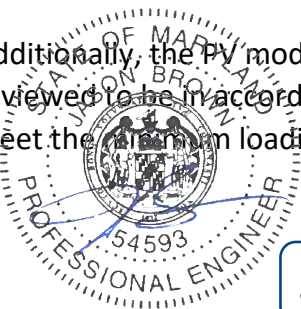
A field observation was performed by a Sunrun qualified technician to document the existing conditions of the above mentioned address. Structural evaluation of loading was based on review of site observations and the design criteria listed below.

Design Criteria:

- 2018 IBC/IEBC/IRC w/ DHCD Modificaitons, ASCE 7-16, 2018 NDS
- Basic Wind Speed Vult = 111 mph (Vasd = 86 mph), Exposure B
- Ground Snow Load = 30 psf

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

Additionally, the PV module assembly and hardware supporting it have been reviewed to be in accordance with manufacturer's specifications and verified to meet the minimum loading requirements referenced above.



DocuSigned by:

Jason Brown

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Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No. 54593, Expiration Date: 06/25/2021