MONTGOMERY COUNTY HISTORIC PRESERVATION COMMISSION
STAFF REPORT

Address:	7300 Maple Avenue, Takoma Park	**Meeting Date:**	1/22/2025
Resource:	Contributing Resource **Takoma Park Historic District**	**Report Date:**	1/15/2025
		Public Notice:	1/8/2025
Applicant:	Michael Blunschi (Lumina Solar Services, Agent)	**Tax Credit:**	No
Review:	HAWP	**Staff:**	Laura DiPasquale
Case No.:	1096389		
Proposal:	Solar panel installation		

STAFF RECOMMENDATION

Staff recommends that the HPC **approve with one (1) condition** the (HAWP) application, with final approval authority delegated to staff:

1. The front-facing panels must be centered on the dormer roof and shifted to the upper offset line limit, away from the front roof edge.

ARCHITECTURAL DESCRIPTION

SIGNIFICANCE: Contributing Resource within the Takoma Park Historic District
STYLE: Colonial Revival Bungalow
DATE: c. 1915-25

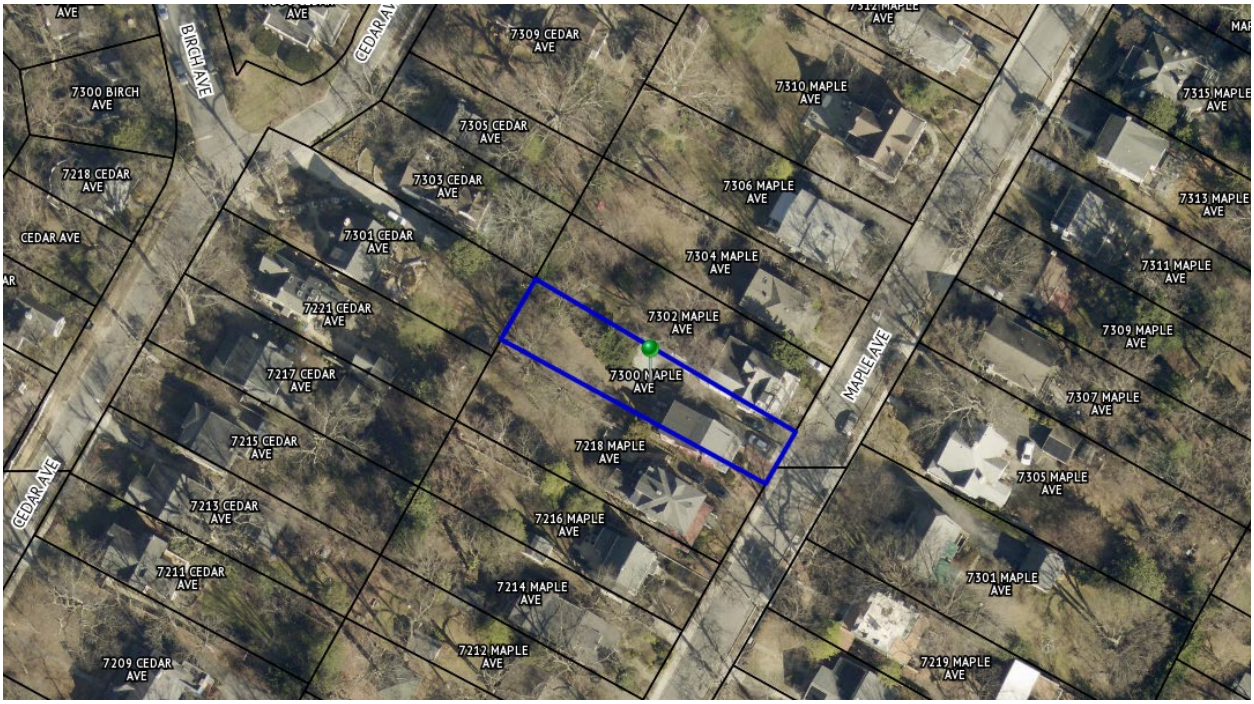


Figure 1: Aerial view of 7300 Maple Avenue within the Takoma Park Historic District.

Figure 2: The front (southeast) elevation of 7300 Maple Avenue.

PROPOSAL

The applicant proposes to install 25 roof-mounted solar panels in three arrays, including six panels proposed on the street-facing front dormer roof and 19 panels on the rear-facing roofs (*Fig*ure 3). The Rec Alpha Pure 2 Series panels will each measure approximately 73.4 inches by 40.9 inches. The panels will be mounted to the asphalt shingle dormer roof with Unirac Sim mounts (*Figure 4*). The load center and disconnect switch are proposed adjacent to the existing utility meter on the right side elevation.

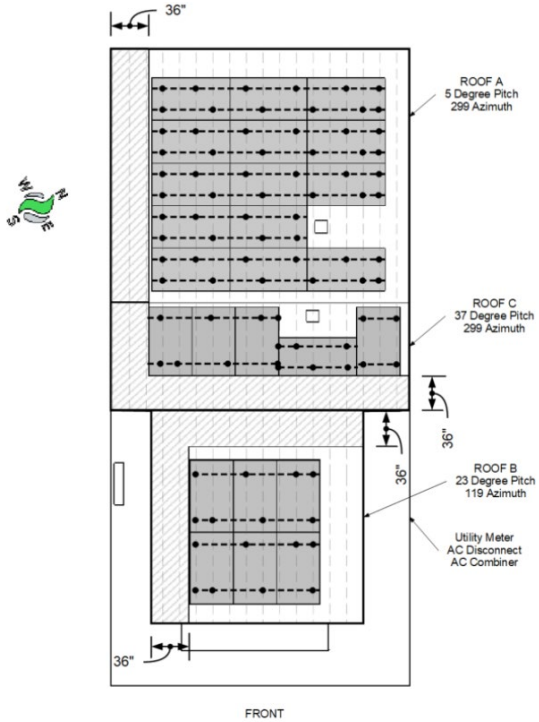


Figure 3: The roof plan shows the proposed location of the solar panels and the equipment location.

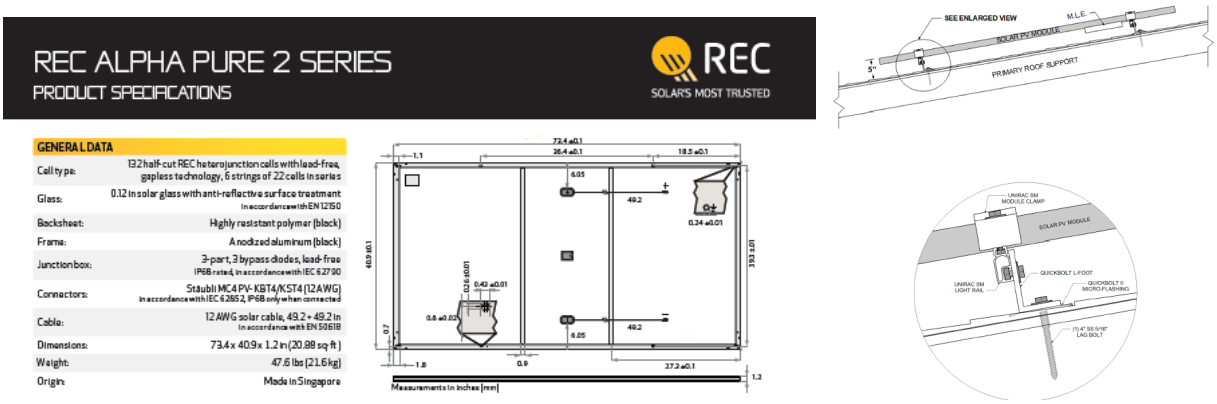


Figure 4: The specifications for the solar panels (left), and the attachment detail for the Unirac Sim Light mounts (right).

APPLICABLE GUIDELINES

The Historic Preservation Office and HPC consult several documents when reviewing alterations and new construction within the Takoma Park Historic District. 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),* and the HPC's *Policy No. 20-01 ADDRESSING EMERGENCY CLIMATE MOBILIZATION THROUGH THE INSTALLATION OF ROOF-MOUNTED SOLAR PANELS.* The pertinent information in these four documents is outlined below.

Takoma Park Historic District Guidelines

There are two broad planning and design concepts that apply to all categories. These are:

- The design review emphasis will be restricted to changes that are 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/g 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 historic district.

A majority of the buildings in the Takoma Park Historic District have been assessed as being "Contributing Resources." While these buildings may not have the same level of architectural or historical significance as Outstanding Resources or may have lost some degree of integrity, collectively, they are the basic building blocks of the historic district. They are important to the overall character of the district and the streetscape due to their size, scale, and architectural qualities, rather than for their particular architectural features.

Contributing Resources should receive a more lenient level of design 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.

The following guidance which pertains to this project are as follows:

- 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 right-of-way which involve the replacement of or damage to original ornamental or architectural features are discouraged but may be considered and approved on a case-by-case basis

- Alterations to features that are not visible at all 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.

Montgomery County Code, Chapter 24A-8

The following guidance which pertains to this project are as follows:

(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 ensure 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;

(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.)

Secretary of the Interior's Standards for Rehabilitation

The Secretary of the Interior defines rehabilitation as "the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features, which convey its historical, cultural, or architectural values." The applicable *Standards* are as follows:

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 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.

10. New additions and adjacent or related new construction shall 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.

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

Staff supports the proposed installation of the 25 solar panels and associated equipment and recommends approval with one minor modification.

According to the *Guidelines*, the design review for Contributing Resources such as the subject property 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. Similarly, Chapter 24A-8(d) states that the HPC "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."

Staff acknowledges that the front-facing panels will be visible from the public right-of-way, but does not find the installation of the panels and associated equipment will affect the surrounding streetscape or landscape and impair the character of the historic district. As presented, the applicant proposes to install the six panels in a symmetrical pattern, which will minimize their visual impact. Staff recommends that, to further reduce their visual impact and be compatible with the symmetrical nature of the dormer below, the applicant center the panels on the dormer roof and shift them slightly farther away from the front roof edge, to the edge of the upper setback requirement(*Figure 5)*.

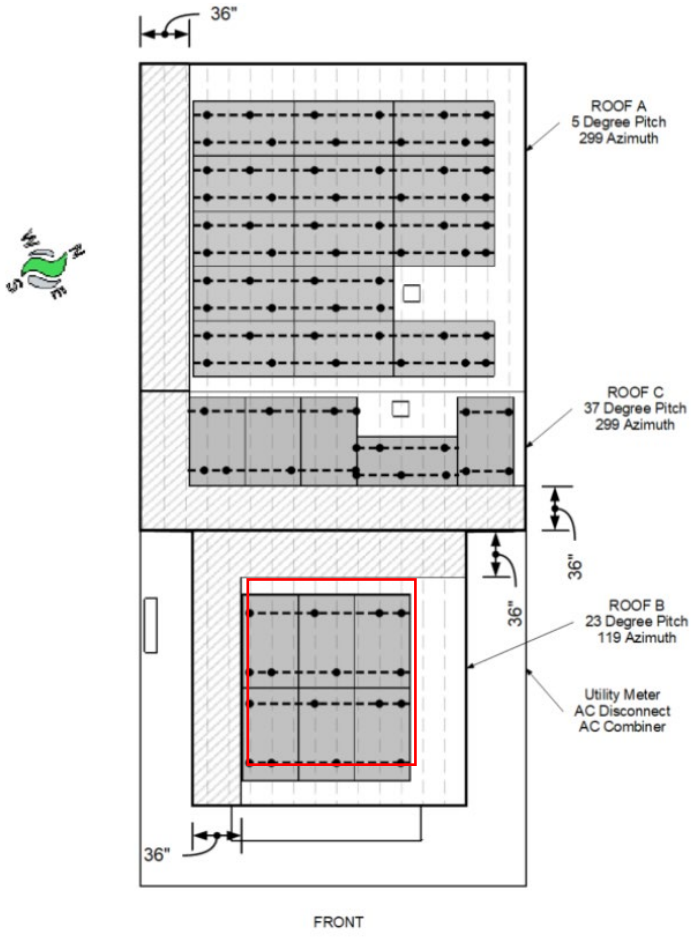
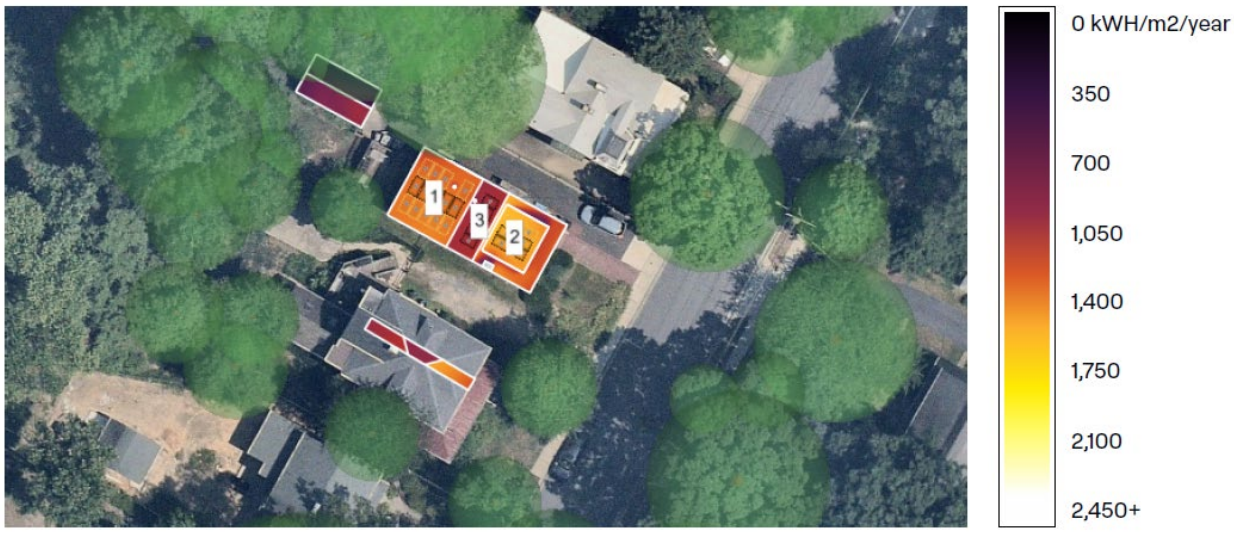


Figure 5: The proposed panel layout with staff-recommended adjustment (shown in red).

According to the shade map and corresponding statement provided by the applicant, the panels on the southeast-facing front dormer roof plane has the greatest annual tilt and orientation factor (TOF), annual solar access, and annual total solar resource fraction (TSRF) (*Figure 6*). The load center and disconnect

will be installed on the right-side elevation toward the front wall plane. Staff finds this location to be appropriate based on the existing presence of the electrical panel and meter.

Annual irradiance



Summary

Array ID	Panel count	Azimuth	Pitch	Annual TOF	Annual solar access	Annual TSRF
1	14	299°	5°	83%	86%	71%
2	6	119°	23°	91%	88%	80%
3	5	299°	37°	65%	84%	54%
			Weighted average by panel count:		86.1%	69.8%

Figure 6: Shade map and summary.

Staff finds that, in accordance with the *Standards*, the proposed work will not destroy the historic materials, features, or spatial relationships that characterize the property and will not be detrimental to the existing streetscape, satisfying *Standards* 2 and 9, if removed in the future, the essential form and integrity of the property would be unimpaired, satisfying *Standard* 10.

The HPC and staff also utilize HPC Policy 20-01 regarding solar panels *Policy Guidance #20-01: Solar Technology* as the baseline for their review and to articulate their findings in the review of solar technology. The policy outlines the most to least preferred locations for solar arrays. The most preferred location for solar systems is a freestanding array in the rear yard, but this location is not feasible at the subject property due to the size of the lot and existing tree canopy. The second preferred location is a roof-mounted array on an accessory or non-historic building addition. The application proposes to install panels covering the roofs of the rear addition. The property has a small free-standing accessory building towards the rear of the lot that is substantially covered by the tree canopy. The main roof material itself is not architecturally significant, character-defining, or slate or tile, so therefore, according to the *Policy*, the public welfare is better served by approving a HAWP on all visible side or front slopes under Chapter 24A-8(b)(6).

Five Outstanding resources will be within the viewshed of the panels (*Figure* 7): 7302 Maple Avenue (25 ft. northeast); 7301 Maple Avenue (45 ft. southeast); 7305 Maple Avenue (72 feet. northeast); 7213 Maple Avenue (204 ft. southwest); and 7209 Maple Avenue (310 ft. southwest).

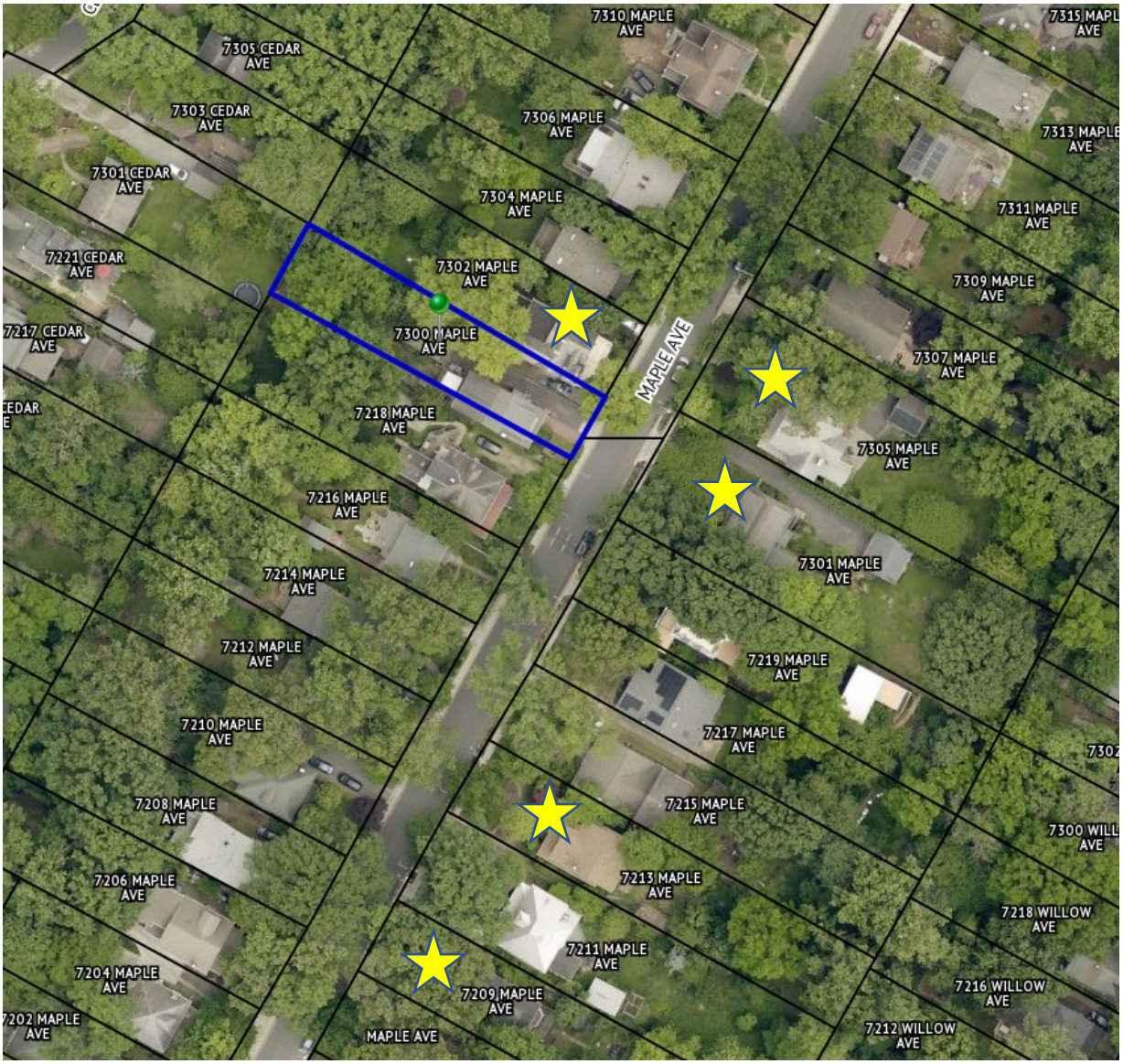


Figure 7: Locations of Outstanding resources (yellow stars) in the viewshed of 7300 Maple Avenue (outlined in blue).

Staff notes that there is a long history of HPC approval of installation of photovoltaic systems on all resource types within the Takoma Park Historic District, making them an established feature in the neighborhood. Examples include the approvals at the Contributing property at 32 Hickory Avenue (*Figure 8*),[1] Contributing property at 20 Montgomery Avenue (*Figure 9*)[2], and Contributing property at 6 Hickory Avenue (*Figure 10*).[3]

[1] HAWP #893866 for 32 Hickory Ave: https://mcatlas.org/tiles6/06_HistoricPreservation_PhotoArchives/HAWP/HAWP%202019/11-13-2019/32%20Hickory%20Ave.,%20Takoma%20Park%20-%20893866%20-%20Approval.pdf

[2] HAWP #919870 for 20 Montgomery Ave: https://mcatlas.org/tiles/06_HistoricPreservation_PhotoArchives/HAWP/9-9-2020/20%20Montgomery%20Ave.,%20Takoma%20Park%20-%20Approval.pdf

[3] HAWP #689642 for 6 Hickory Ave: https://mcatlas.org/tiles6/06_HistoricPreservation_PhotoArchives/HAWP/6%20Hickory%20Avenue,%20Takoma%20Park%20-%20689642%20-%20Approval%20ltr%20app%20docs.pdf

Figure 8: Approved panel location at 32 Hickory Ave (left), and birds-eye view of the installed system (right), approved in 2019.

Figure 9: Approved panel location at 20 Montgomery Ave (left), and Google Streetview image of the installed system (right), approved in 2020.

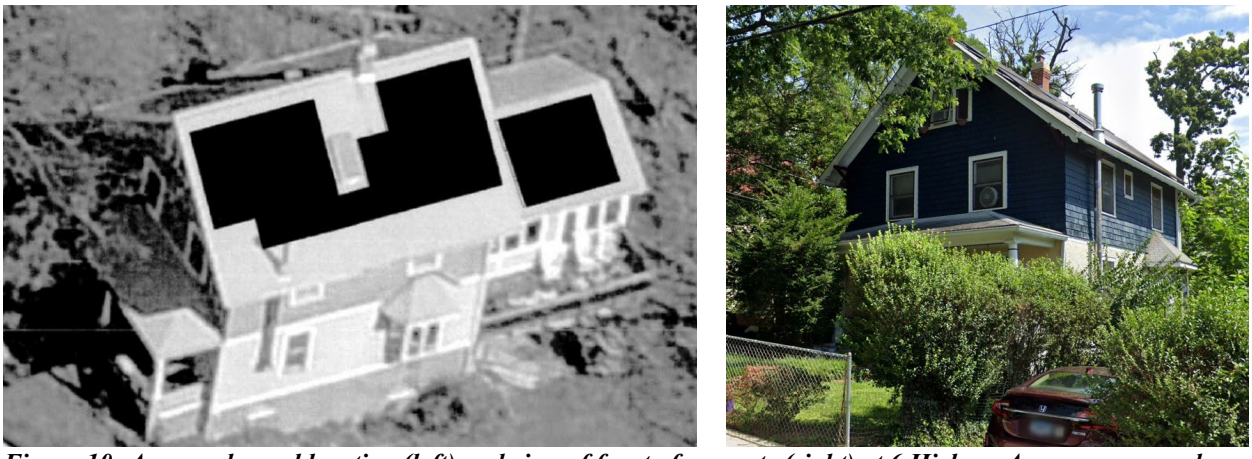


Figure 10: Approved panel location (left) and view of front of property (right) at 6 Hickory Avenue, approved under HAWP #689642 in 2014.

After full and fair consideration of the applicant's submission, staff finds the proposal, as modified by the conditions, consistent with the Criteria for Issuance in Chapter 24A-8(b)(1), (2), and (d), having found the proposal is consistent with the *Secretary of the Interior's Standards for Rehabilitation #2*, *9*, and *10*, and *Takoma Park Historic District Guidelines,* and the HPC's Policy No. 20-01 as outlined above.

STAFF RECOMMENDATION

Staff recommends that the Commission **approve with one (1) condition** the (HAWP) application, with final approval authority delegated to staff:

1. The front-facing panels must be centered on the dormer roof and shifted to the upper offset line limit, away from the front roof edge;

under the Criteria for Issuance in Chapter 24A-8(b)(1), (2), and (6) and Chapter 24A-8(d), having found that the proposal will not substantially alter the exterior features of the historic resource and is compatible in character with the purposes of Chapter 24A;

The Takoma Park Historic District Guidelines;

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

and with the *Historic Preservation Commission Policy No. 20-01: Addressing Emergency Climate Mobilization Through The Installation of Roof-Mounted Solar Panels;*

and with the general condition that the applicant shall present an electronic set of drawings, if applicable, to 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 HPC as a revised HAWP application at staff's discretion;

and with the general condition that the applicant shall notify the HPC 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 301-495-2167 or laura.dipasquale@montgomeryplanning.org to schedule a follow-up site visit.

FOR STAFF ONLY:
HAWP# 1096389
DATE ASSIGNED_____

APPLICATION FOR HISTORIC AREA WORK PERMIT

HISTORIC PRESERVATION COMMISSION
301.563.3400

APPLICANT:

Name: Michael Blunschi E-mail: blunschi.michael@gmail.com

Address: 7300 Maple Avenue City: Takoma Park Zip: 20912

Daytime Phone: 909-965-0654 Tax Account No.: 01059818

AGENT/CONTACT (if applicable):

Name: Lumina Solar Services E-mail: permits@fusionss.net

Address: 3600 Commerce Drive City: Baltimore Zip: 21227

Daytime Phone: 4434253023 Contractor Registration No.: 30991

LOCATION OF BUILDING/PREMISE: MIHP # of Historic Property Takoma Park

Is the Property Located within an Historic District? X Yes/District Name Takoma Park
__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: 7300 Street: Maple Ave

Town/City: TAKOMA PARK Nearest Cross Street: Tulip Ave

Lot: P24 Block: 5 Subdivision: GILBERTS SUB 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:

- ☐ New Construction
- ☐ Addition
- ☐ Demolition
- ☐ Grading/Excavation
- ☐ Deck/Porch
- ☐ Fence
- ☐ Hardscape/Landscape
- ☐ Roof
- ☐ Shed/Garage/Accessory Structure
- ☑ Solar
- ☐ Tree removal/planting
- ☐ Window/Door
- ☐ Other:_____

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.

Ola Carew *Ola Carew* 12/19/2024

Signature of owner or authorized agent Date

HAWP APPLICATION: MAILING ADDRESSES FOR NOTIFING [Owner, Owner's Agent, Adjacent and Confronting Property Owners]	
Owner's mailing address 7300 Maple Avenue Takoma Park, MD 20912	**Owner's Agent's** mailing address
Adjacent and confronting Property Owners mailing addresses	
7301 Maple Avenue Takoma Park, MD 20912	7218 Maple Avenue Takoma Park, MD 20912
7219 Maple Avenue Takoma Park, MD 20912	7303 Cedar Avenue Takoma Park, MD 20912
7302 Maple Avenue Takoma Park, MD 20912	7301 Cedar Avenue Takoma Park, MD 20912

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

Home and roof are both in great shape.

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

Install (25) Roof Mounted Solar Panels . 6 Panels will be installed on the front facing roof. 19 Solar Panels will be installed on the rear facing roof.

Work Item 1: _____

Description of Current Condition:	Proposed Work:

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/Landscaing	*	*		*	*	*	*
Tree Removal	*	*		*	*	*	*
Siding/ Roof Changes	*	*	*	*	*		*
Window/ Door Changes	*	*	*	*	*		*
Masonry Repair/ Repoint	*	*	*	*	*		*
Signs	*	*	*	*	*		*

Gmail

Olajumoke Carew <ocarew@luminasolar.com>

7300 Maple HAWP Solar

2 messages

Michael Blunschi <blunschi.michael@gmail.com> Mon, Dec 16, 2024 at 12:07 PM
To: "katieridds@gmail.com" <katieridds@gmail.com>
Cc: Olajumoke Carew <ocarew@luminasolar.com>

Hi Kate Ivcevich (7218 Maple Ave) :

If you can REPLY-ALL when responding to this email, that would be highly appreciated!

I am in the process of having solar installed on my home by Lumina Solar. However, because of where we are located, Montgomery County requires a Historical Area Work Permit (HAWP) approval. All that is required is for me to get confirmation from you that you are ok with me installing solar panels on my home. Your approvals will be supplied along with a HAWP application and then reviewed at the next HAWP meeting. Let me know if there are any questions. I appreciate your help and have a great week!

Sincerely,
Mikey Blunschi

Kate Ivcevich <katieridds@gmail.com> Mon, Dec 16, 2024 at 2:19 PM
To: Michael Blunschi <blunschi.michael@gmail.com>
Cc: Olajumoke Carew <ocarew@luminasolar.com>

Sounds great - hope all goes smoothly.

Kate

> On Dec 16, 2024, at 12:07 PM, Michael Blunschi <blunschi.michael@gmail.com> wrote:
>
> [Quoted text hidden]

Gmail

Olajumoke Carew <ocarew@luminasolar.com>

7300 Maple HAWP Solar

pat rumbaugh <theplaylady@gmail.com> Mon, Dec 16, 2024 at 7:21 PM
To: Mikey Blunschi <blunschi.michael@gmail.com>
Cc: Olajumoke Carew <ocarew@luminasolar.com>, T Rumbaugh <thomas.rum.dc@gmail.com>

Hi Mikey,

I think the panels look nice. Thanks for sharing the visual.

Pat
Pat Rumbaugh, MA
Co-Founder
Let's Play America
301-928-9962
theplaylady@gmail.com
www.letsplayamerica.org
Facebook, Instagram, Twitter@PatRumbaughPlay
.http://letsplayamerica.org/donate/

Everyone deserves to play!

> On Dec 16, 2024, at 6:59 PM, Michael Blunschi <blunschi.michael@gmail.com> wrote:
>
> Hi Pat/Tom
>
> They would be for both the front and front. It would like like this:
>
> <0AE6A840-FEA7-466D-92BC-AA2FA6D9A6C3.png>
>
> The six panels in front are centered and placed centered and symmetrical which hopefully create a more pleasing look. We looked at excluding them, but they really are the most valuable in terms of amount of sunlight hours. I hope that's ok with you, let me know if there's anything else.
>
> Thanks
> Mikey
>
> On Mon, Dec 16, 2024 at 4:46 PM pat rumbaugh <theplaylady@gmail.com> wrote:

Hi Mikey,

Tom and I are okay with you installing solar panels. Can you let us know if they will go on the front or back of your home? Thank you.

Best.

Pat

Pat Rumbaugh, MA

Co-Founder

Let's Play America

301-928-9962

theplaylady@gmail.com

www.letsplayamerica.org

Facebook, Instagram, Twitter@PatRumbaughPlay

.http://letsplayamerica.org/donate/

Everyone deserves to play!

<966BC8D1-EDDF-4AE2-B66C-476019482CF1.png>

[Quoted text hidden]

Gmail

Olajumoke Carew <ocarew@luminasolar.com>

7300 Maple HAWP Solar

2 messages

Michael Blunschi <blunschi.michael@gmail.com> Mon, Dec 16, 2024 at 10:52 AM
To: "ilcarter@gmail.com" <ilcarter@gmail.com>
Cc: Olajumoke Carew <ocarew@luminasolar.com>

Hi Ingrid Carter (7302 Maple Ave) :

If you can REPLY-ALL when responding to this email, that would be highly appreciated!

I am in the process of having solar installed on my home by Lumina Solar. However, because of where we are located, Montgomery County requires a Historical Area Work Permit (HAWP) approval. All that is required is for me to get another confirmation from you that you are ok with me installing solar panels on my home. Your approvals will be supplied along with a HAWP application and then reviewed at the next HAWP meeting. Let me know if there are any questions. I appreciate your help and have a great week!

Sincerely,
Michael Blunschi

--
Michael Blunschi

Ingrid Carter <ilcarter@gmail.com> Wed, Dec 18, 2024 at 2:53 PM
To: Michael Blunschi <blunschi.michael@gmail.com>
Cc: Olajumoke Carew <ocarew@luminasolar.com>

Hi Michael,

We are totally fine with you installing solar panels!

Take care,
Ingrid
[Quoted text hidden]

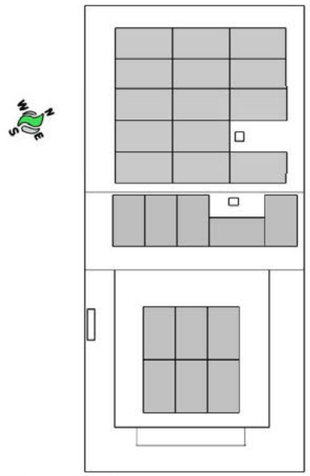
SOLAR PV SYSTEM: 10.5 kWp

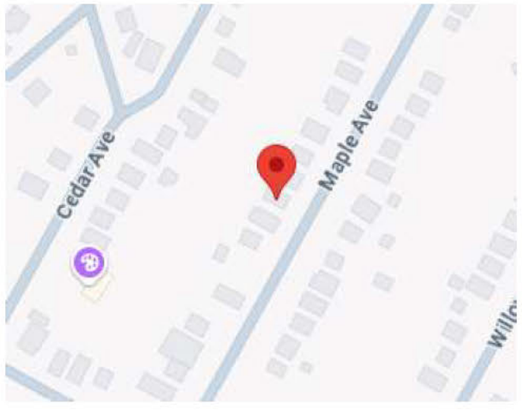
BLUNSCHI RESIDENCE

7300 MAPLE AVENUE, TAKOMA PARK, MD, 20912

PROJECT INFORMATION

OWNER:	MICHAEL BLUNSCHI
ADDRESS:	7300 MAPLE AVENUE, TAKOMA PARK, MD, 20912
AHJ:	MONTGOMERY COUNTY (MD)
ADDRESS:	2425 REEDIE DRIVE SILVER SPRING, MARYLAND 20902
ZONING:	RESIDENTIAL
BUILDING CODE:	IBC 2018
ELECTRICAL CODE:	NEC 2017
ASCE VERSION:	ASCE 7-16
SNOW LOAD:	35 PSF
WIND SPEED:	115 MPH
WIND EXPOSURE:	B
DC RATING:	10.5 kW
AC RATING:	8.125 kW
RACKING:	UNIRAC SM LIGHT RAIL
MODULE:	(25) REC420AA PURE 2
INVERTER:	(25) IQ8M-72-2-US





PROJECT SCOPE

THIS PROJECT INVOLVES THE INSTALLATION OF (25) REC420AA PURE 2 SOLAR MODULES. THE SOLAR MODULES WILL BE RACKED USING A PRE-ENGINEERED RACKING SYSTEM. THE RACKED MODULES WILL BE ELECTRICALLY CONNECTED TO (25) IQ8M-72-2-US DC TO AC POWER INVERTERS, AND INTERCONNECTED TO THE LOCAL UTILITY USING MEANS AND METHODS CONSISTENT WITH THE RULES ENFORCED BY THE LOCAL UTILITY AND PERMITTING JURISDICTION.

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S002	ASSEMBLY & LOAD CALCS
E001	3-LINE DIAGRAM
E002	3-LINE TABLES
E003	WIRE CALCS
E004	CIRCUIT & CONDUIT MAP
E005	EQUIPMENT RATINGS & SIGNAGE

FOR PERMITTING USE ONLY

WORKSITE ADDRESS:

MICHAEL BLUNSCHI
7300 MAPLE AVENUE,
TAKOMA PARK, MD, 20912

CONTRACTOR INFO:

LUMINA
3600 COMMERCE DR
SUITE 601
BALTIMORE, MD 21227
(443) 955-0779

LICENSE NUMBER:

MHIC-30991

REV	DATE
IFC	11-15

COVER

Z001

David C. Hernandez, PE
Digitally sign
Date: 2024.1

FOR ENGINEERING USE ONLY

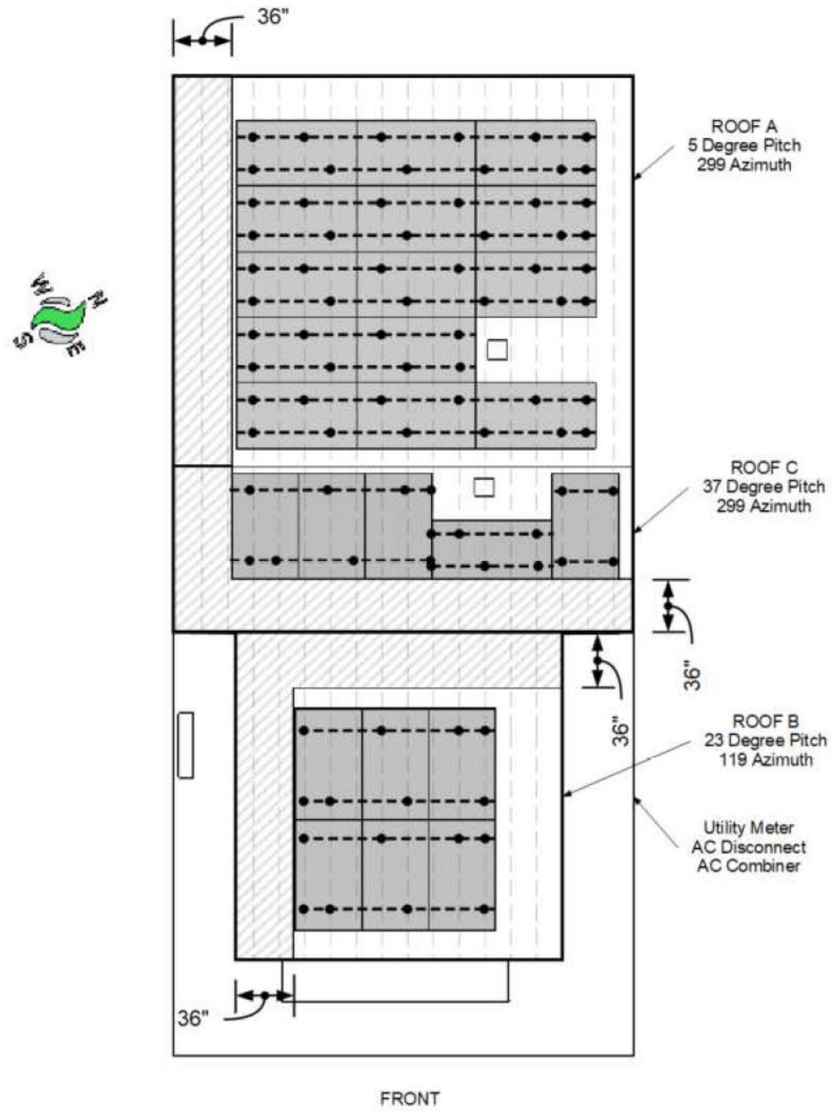
GENERAL NOTES

1) THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (NEC) ARTICLE 690, ALL MANUFACTURERS'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION (AHJ).

2) ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE AND AS REQUIRED BY THE NEC AND AHJ.

3) PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION TO REDUCE SHOCK HAZARD FOR EMERGENCY RESPONDERS

4) THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM, AND THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE.



LEGEND

- ROOF SUPPORT
- MOUNTING RAIL
- ROOF ATTACHMENT
- PV ARRAY
- SETBACK

NOTE: *DRAWING IS NOT TO SCALE. ATTACHMENT SPAN REQUIREMENTS SHOULD BE DERIVED FROM DETAILS LISTED ON PAGES S001-S003*

FOR ENGINEERING USE ONLY

INSTALLATION NOTES

1) ALL SOLAR MODULES SUPPORTED BY ROOF ATTACHMENTS STAGGERED AT 48 IN O.C. (OR AS LISTED ON THE ASSEMBLY DETAILS PAGE(S))

2) SOLAR PHOTOVOLTAIC SYSTEM INSTALLED PARALLEL TO ROOF SURFACE

3) SOLAR PHOTOVOLTAIC SYSTEM INSTALLED AT A MAXIMUM HEIGHT OF 6 IN ABOVE ROOF SURFACE (OR AS INDICATED)

4) ANY ROOFING PENETRATIONS SHALL HAVE PROPER FLASHING SEALANT USED TO PROVIDE WATERTIGHT ASSEMBLY

5) RT-MINI II ATTACHMENTS TO DECKING MAY BE USED AT RAIL ENDS (OR AS NEEDED) TO COMPLY WITH CANTILEVER REQUIREMENTS AND TO KEEP ATTACHMENTS UNDER THE ARRAY. SEE 'SUPPLEMENTARY MOUNTING SYSTEM PROPERTIES' ON [S001]/[S002]

TOTAL ROOF PLAN AREA =	1298.00	SQ.FT
TOTAL SOLAR ARRAY AREA =	521.19	SQ.FT.
ARRAY ROOF COVERAGE =	41.00	%

FOR PERMITTING USE ONLY

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ATTACHMENT PLAN

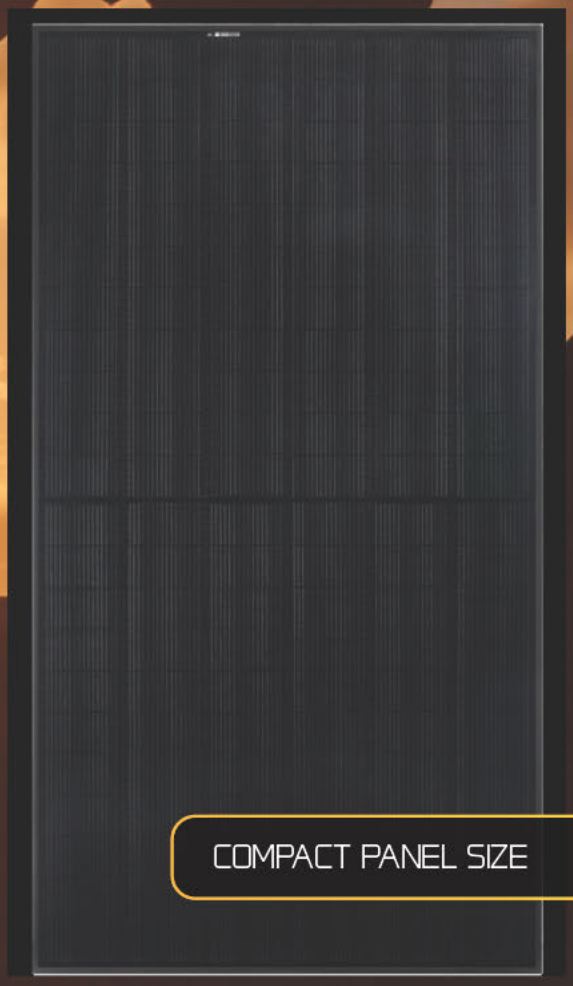
A001

SOLAR'S MOST TRUSTED

REC

REC ALPHA® PURE 2 SERIES

PRODUCT SPECIFICATIONS



COMPACT PANEL SIZE

420 WP

20.1 W/FT²

21.7% EFFICIENCY

PRODUCT REC 25 YEAR ProTrust WARRANTY PERFORMANCE LABOR

ELIGIBLE

LEAD-FREE

ROHS COMPLIANT

EXPERIENCE α PERFORMANCE

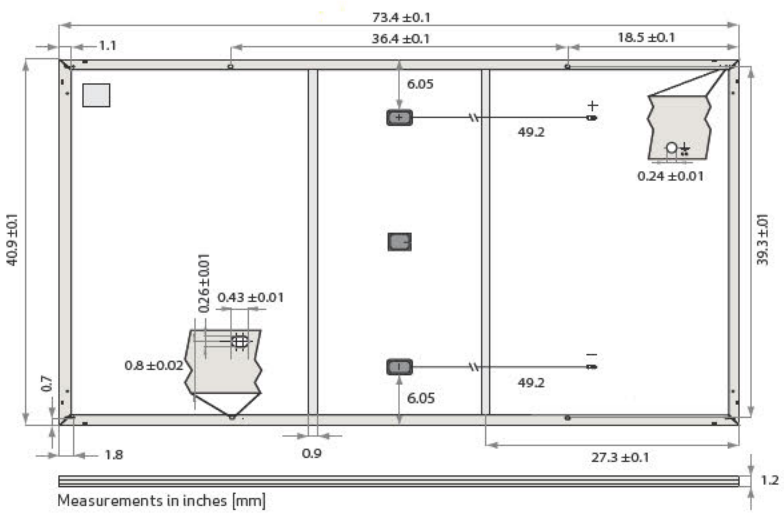
REC ALPHA PURE 2 SERIES

PRODUCT SPECIFICATIONS

REC
SOLAR'S MOST TRUSTED

GENERAL DATA

Cell type:	132 half-cut REC heterojunction cells with lead-free, gapless technology, 6 strings of 22 cells in series
Glass:	0.12 in solar glass with anti-reflective surface treatment in accordance with EN 12150
Backsheet:	Highly resistant polymer (black)
Frame:	Anodized aluminum (black)
Junction box:	3-part, 3 bypass diodes, lead-free IP68 rated, in accordance with IEC 62790
Connectors:	Stäubli MC4 PV-KBT4/KST4 (12 AWG) in accordance with IEC 62852, IP68 only when connected
Cable:	12 AWG solar cable, 49.2 + 49.2 in in accordance with EN 50618
Dimensions:	73.4 x 40.9 x 1.2 in (20.88 sq-ft)
Weight:	47.6 lbs (21.6 kg)
Origin:	Made in Singapore



Measurements in inches [mm]

ELECTRICAL DATA — Product Code*: RECxxxAA PURE 2

STC Power Output - P_{MAX} (Wp)	400	410	420	430
STC Watt Class Sorting - (W)	0/+10	0/+10	0/+10	0/+10
STC Nominal Power Voltage - V_{MPP} (V)	41.1	41.6	42.2	42.8
STC Nominal Power Current - I_{MPP} (A)	9.74	9.86	9.96	10.05
STC Open Circuit Voltage - V_{OC} (V)	48.5	48.8	49.1	49.3
STC Short Circuit Current - I_{SC} (A)	10.60	10.67	10.74	10.81
STC Power Density (W/ft²)	19.2	19.6	20.1	20.6
STC Panel Efficiency (%)	20.6	21.1	21.7	22.2
NMOT Power Output - P_{MAX} (Wp)	304	312	320	327
NMOT Nominal Power Voltage - V_{MPP} (V)	38.7	39.2	39.8	40.3
NMOT Nominal Power Current - I_{MPP} (A)	7.86	7.96	8.05	8.12
NMOT Open Circuit Voltage - V_{OC} (V)	45.7	45.8	46.0	46.2
NMOT Short Circuit Current - I_{SC} (A)	8.50	8.62	8.68	8.73

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

CERTIFICATIONS

IEC 61215:2016, IEC 61730:2016, UL 61730	
IEC 62804	PID
IEC 61701	Salt Mist
IEC 62716	Ammonia Resistance
UL 61730	Fire Type 2
IEC 62782	Dynamic Mechanical Load
IEC 61215-2:2016	Hailstone (35mm)
IEC 62321	Lead-free acc. to RoHS EU 863/2015
ISO 14001, ISO 9001, IEC 45001, IEC 62941	

Intertek Lead-Free

TEMPERATURE RATINGS*

Nominal Module Operating Temperature:	44°C (±2°C)
Temperature coefficient of P_{MAX}:	-0.24 %/°C
Temperature coefficient of V_{OC}:	-0.24 %/°C
Temperature coefficient of I_{SC}:	0.04 %/°C

*The temperature coefficients stated are linear values

MAXIMUM RATINGS

Operational temperature:	-40 ... +85°C
System voltage:	1000 V
Test load (front):	+7000 Pa (146 lbs/ft²)*
Test load (rear):	-4000 Pa (83.5 lbs/ft²)*
Series fuse rating:	25 A
Reverse current:	25 A

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

WARRANTY

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

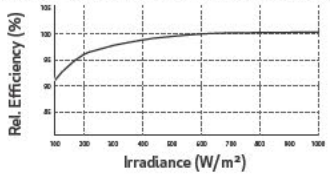
See warranty documents for details. Conditions apply

DELIVERY INFORMATION

Panels per pallet:	33
Panels per 40 ft GP/high cube container:	792 (24 pallets)
Panels per 53 ft truck:	858 (26 pallets)

LOW LIGHT BEHAVIOUR

Typical low irradiance performance of module at STC:



Available from:

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

REC Solar PTE. LTD.
20 Tuas South Ave. 14
Singapore 637312
post@recgroup.com
www.recgroup.com

REC

Specifications subject to change without notice.

Ref: PD-DS-AAPR Rev 1.4 08.23

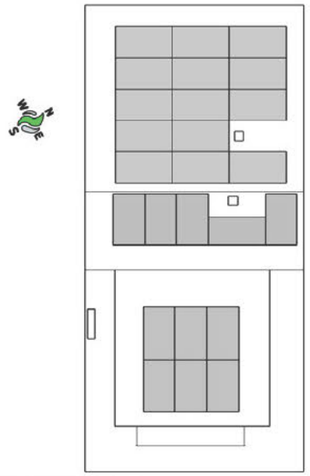
SOLAR PV SYSTEM: 10.5 kWp

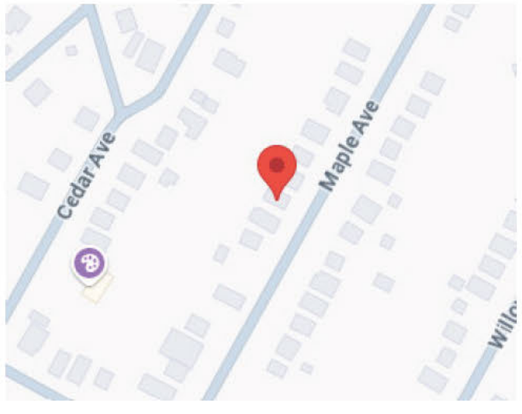
BLUNSCHI RESIDENCE

7300 MAPLE AVENUE, TAKOMA PARK, MD, 20912

PROJECT INFORMATION

OWNER:	MICHAEL BLUNSCHI
ADDRESS:	7300 MAPLE AVENUE, TAKOMA PARK, MD, 20912
AHJ:	MONTGOMERY COUNTY (MD)
ADDRESS:	2425 REEDIE DRIVE SILVER SPRING, MARYLAND 20902
ZONING:	RESIDENTIAL
BUILDING CODE:	IBC 2018
ELECTRICAL CODE:	NEC 2017
ASCE VERSION:	ASCE 7 16
SNOW LOAD:	35 PSF
WIND SPEED:	115 MPH
WIND EXPOSURE:	B
DC RATING:	10 5 kW
AC RATING:	8 125 kW
RACKING:	UNIRAC SM LIGHT RAIL
MODULE:	(25) REC420AA PURE 2
INVERTER:	(25) IQ8M 72 2 US





FOR PERMITTING USE ONLY

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COVER

Z001

David C. Hernandez, PE
Digitally sign
Date: 2024.1

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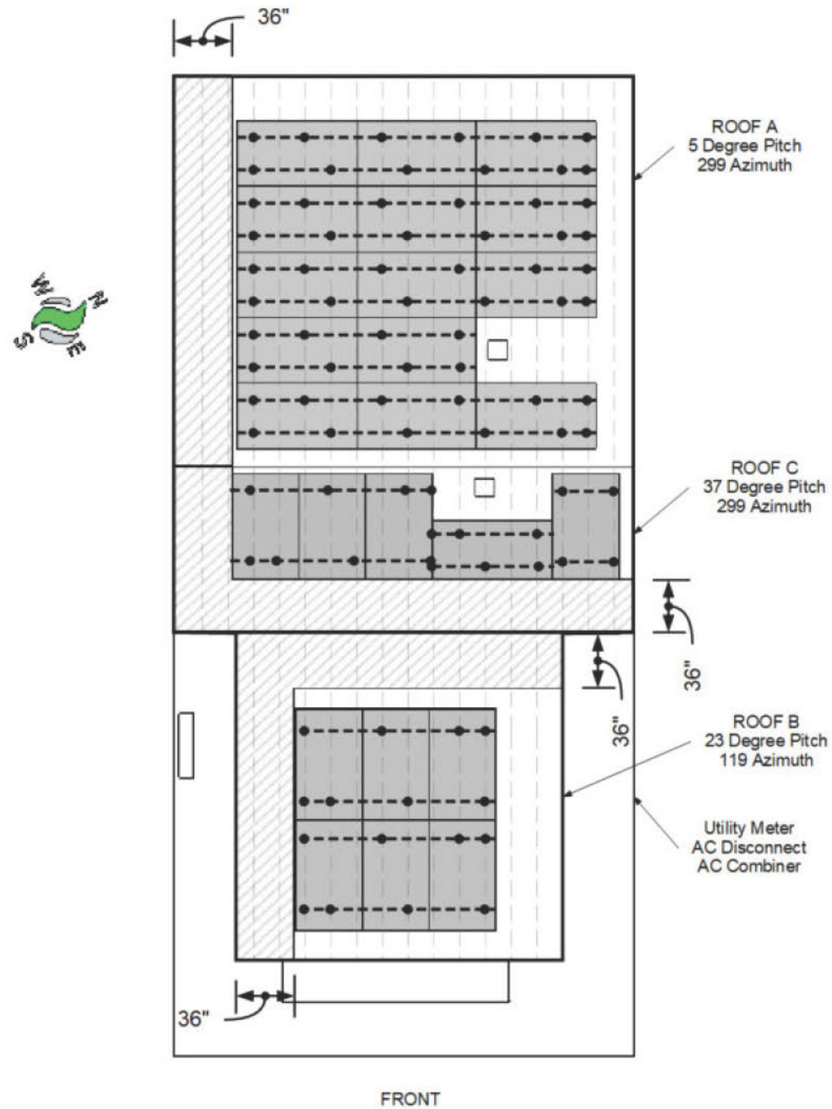

LEGEND

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- PV ARRAY
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ATTACHMENT PLAN

A001

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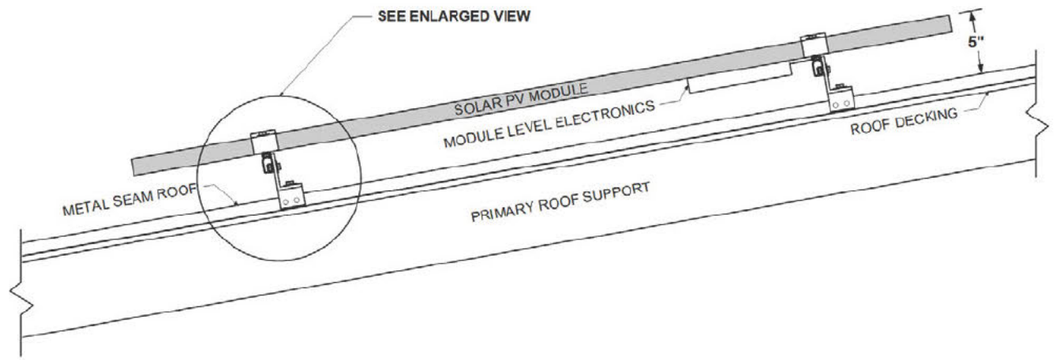
TOTAL ROOF PLAN AREA =	1298.00	SQ.FT
TOTAL SOLAR ARRAY AREA =	521.19	SQ.FT.
ARRAY ROOF COVERAGE =	41.00	%

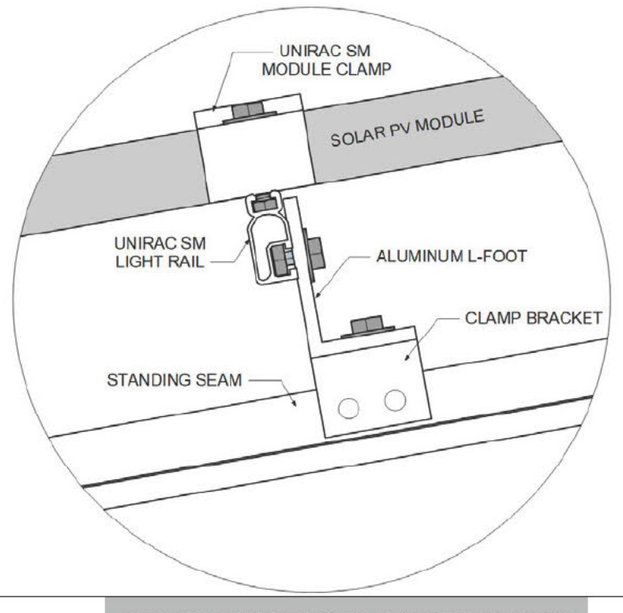
ROOF PROPERTIES

ROOF LABEL	A	B	C
# OF MODULES	14	6	5
MATERIAL	Stand Seam Metal	Architect. Shingle	Architect. Shingle
PITCH (DEG.)	5	23	37
AZIMUTH (DEG.)	299	119	299
SPAN (FT)	17	15	8
MEAN HEIGHT (FT)	15	25	25
PRIMARY SUPPORT	2x6 Rafter	2x6 Rafter	2x6 Rafter
SUPPORT SPACING (IN)	16	16	16
STANDOFF	S5! Clamp	Quickbolt	Quickbolt
RACKING	UniracSM	UniracSM	UniracSM

DEAD & POINT LOAD CALCULATIONS

MODULE WEIGHT (LBS)	666.4	285.6	238
M.L.E. WEIGHT (LBS)	33.32	14.28	11.90
RACKING WEIGHT (LBS)	138.73	59.45	49.55
STANDOFF WEIGHT (LBS)	21.00	9.00	7.50
ARRAY AREA (SQ.FT.)	291.87	125.09	104.24
DISTRIB. LOAD (PSF)	2.94	2.94	2.94
APPROX. # OF STANDOFFS	35	15	13
POINT LOAD (LBS)	24.56	24.56	23.61





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LOAD CALCS & ASSEMBLY DETAILS

S001

STATE OF MARYLAND
DAVID E. HERNANDEZ
49993
PROFESSIONAL ENGINEER

FOR ENGINEERING USE ONLY

INSTALLATION NOTES

1) ALL RACKING SHALL BE INSTALLED PER MANUFACTURER SPECIFICATIONS

2) M.L.E.'S = MODULE LEVEL ELECTRONICS (IE, POWER OPTIMIZERS, MICRO-INVERTERS, CABLES, ETC)

3) TIGHTEN THE SETSCREW TO THE SPECIFIED TORQUE USING A SCREW GUN AND THE INCLUDED SCREW GUN BIT TIP. THE SETSCREW WILL DIMPLE THE SEAM MATERIAL BUT WILL NOT PENETRATE IT.

PRIMARY MOUNTING SYSTEM PROPERTIES	
RACKING	Unirac SM Light Rail
STANDOFF	S5! Clamp to Seam
MAX RAIL SPAN (IN)	45
MIN FASTENER DEPTH (IN)	N/A
MAX RAIL CANTILEVER (in)	15
MAX ARRAY HEIGHT (IN)	6

ROOF PROPERTIES

ROOF LABEL	A	B	C
# OF MODULES	14	6	5
MATERIAL	Stand Seam Metal	Architect. Shingle	Architect. Shingle
PITCH (DEG.)	5	23	37
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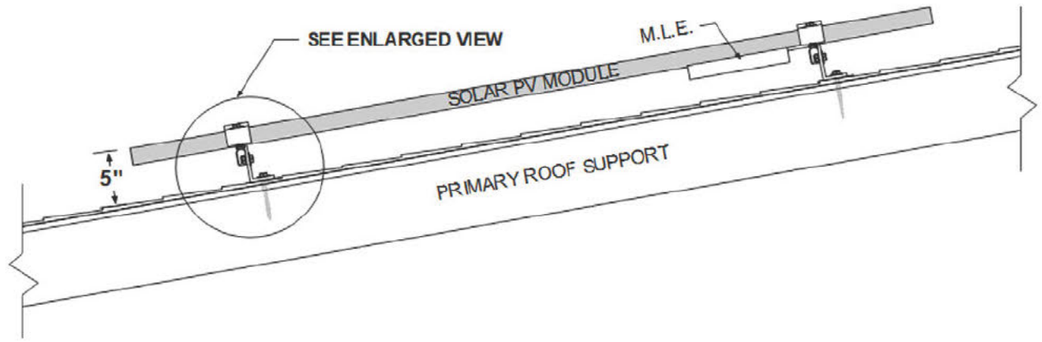

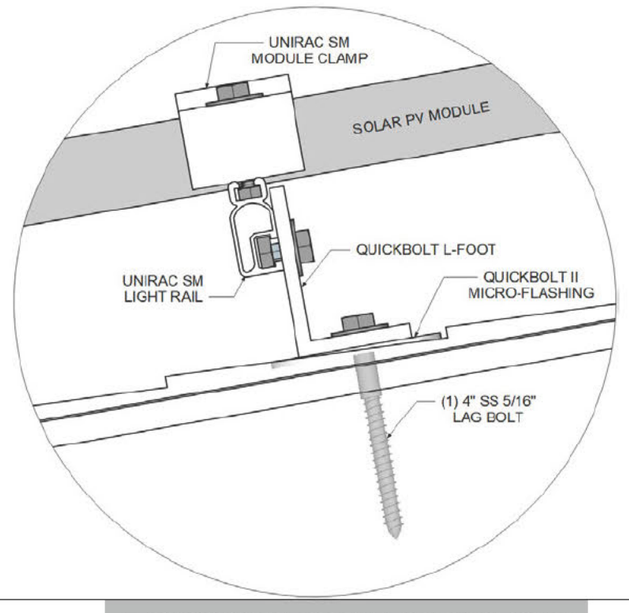

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LOAD CALCS & ASSEMBLY DETAILS

S002

FOR ENGINEERING USE ONLY

INSTALLATION NOTES

1) ALL RACKING SHALL BE INSTALLED PER MANUFACTURER SPECIFICATIONS

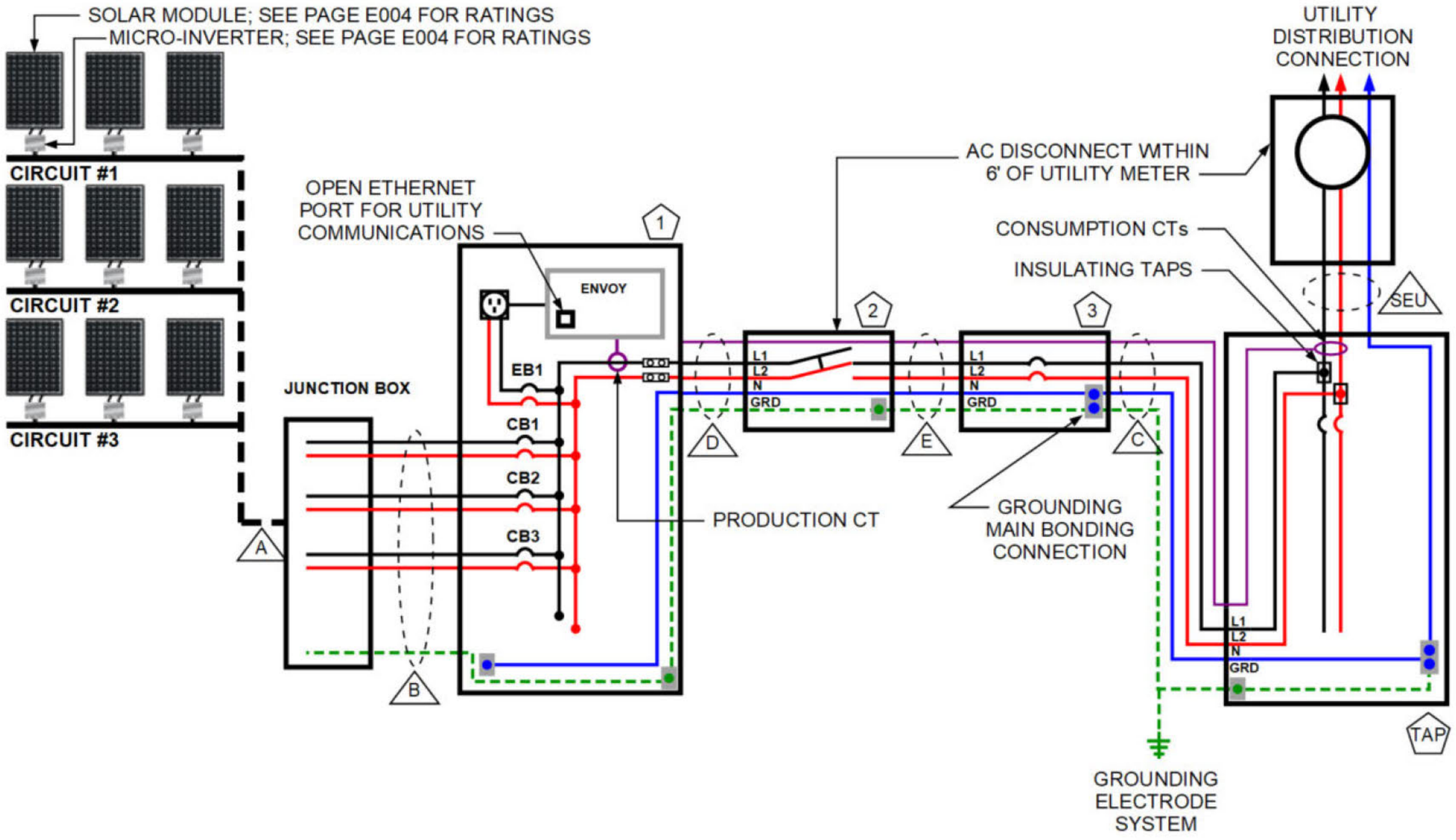
2) M.L.E.'S = MODULE LEVEL ELECTRONICS (IE, POWER OPTIMIZERS, MICRO-INVERTERS, CABLES, ETC)

3) USE 5/16" X 4"HEX HEAD STAINLESS STEEL LAG SCREWS

PRIMARY MOUNTING SYSTEM PROPERTIES	
RACKING	Unirac SM Light Rail
STANDOFF	Quickbolt to Primary Support
MAX RAIL SPAN (IN)	48
MIN FASTENER DEPTH (IN)	2.5
MAX RAIL CANTILEVER (in)	16.00
MAX ARRAY HEIGHT (IN)	6

SUPPLEMENTARY MOUNTING SYSTEM PROPERTIES	
RACKING	Unirac SM Light Rail
STANDOFF	RT Mini (5 Screws) to Decking/Purlin
MAX RAIL SPAN (in)	24
MIN. FASTENER DEPTH (in)	0.5
MAX RAIL CANTILEVER (in)	8
MAX ARRAY HEIGHT (in)	6

Note: The distance (span) from a deck-mounted Rt-Mini to adjacent attachments can not exceed 24" even if those adjacent attachments are rafter/truss-mounted.



Enphase IQ8M Ratings	
Max # Per String	11
Imax (ac)	1.35 A
Vmax (dc)	60 V
Pmax	325 W
Nom AC Voltage	240 V
OCPD	20 A
Weight (Optimizer)	2.38 lbs
Imax (Input)	20 A
Pmax (dc) Input	460 W
Ppeak (AC)	330 W

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NOTES

1) WHEN THE AC UTILITY SOURCE IS REMOVED FROM THE INVERTER OUTPUT CIRCUITS VIA ANY MEANS, SUCH AS AN AC BREAKER, AC DISCONNECT, OR REMOVAL OF THE SOLAR OR MAIN UTILITY SERVICE METER, THIS EQUIPMENT PERFORMS THE RAPID SHUTDOWN FUNCTION PER 690 12

2) ARRAY BONDED WITH #6 BARE Cu

3) TWO UNGROUNDED CONDUCTORS PER CIRCUIT OF INVERTERS (TYP)

4) ALL CONDUIT SIZING WILL BE IN ACCORDANCE TO THE NEC, CHAPTER 9

5) PVC OR LFMC MAY BE USED INSTEAD OF EMT CONDUIT

6) THE AC DISCONNECT IS LOCKABLE, TAGGABLE, 24/7 UTILITY ACCESSIBLE, LOAD BREAK CAPABLE, AND HAS VISIBLE BREAK

3-LINE DIAGRAM

E001

CONDUCTOR AND CONDUIT SCHEDULE

TAG	WIRE SIZE (AWG)	GROUND SIZE (AWG)	WIRE TYPE		DESCRIPTION	CONDUIT SIZE (in)	CONDUIT TYPE	LENGTH (ft)
SEU	#4/0	N/A	SEU	Al	(2) PHASE CONDUCTORS & (1) NEUTAL	N/A	N/A	5'
A	#12	#6	Q-Cable	Cu	(2) PHASE CONDUCTORS & (1) BARE COPPER IN FREE AIR	N/A	N/A	77' MAX
B	#10	#8	THHN/THWN	Cu	(6) PHASE CONDUCTORS & (1) GROUND	0 75	EMT	40
C	#6	#8	THHN/THWN	Cu	(2) PHASE CONDUCTORS & (1) NEUTRAL & (1) GROUND	0 75	FMC	15
D	#8	#8	THHN/THWN	Cu	(2) PHASE CONDUCTORS & (1) NEUTRAL & (1) GROUND	0 75	LFMC	5
E	#8	#8	THHN/THWN	Cu	(2) PHASE CONDUCTORS & (1) NEUTRAL & (1) GROUND	0 75	LFMC	10

CIRCUIT SCHEDULE

CIRCUIT	INVERTER COUNT	AMPERAGE CALCULATION	BREAKER SIZE
		ENVOY BREAKER	*15 AMP (EB1)*
#1	6	6 x 1 35 x 125% 10 13 A	15 AMP (CB1)
#2	8	8 x 1 35 x 125% 13 5 A	15 AMP (CB2)
#3	11	11 x 1 35 x 125% 18 56 A	20 AMP (CB3)

EQUIPMENT SCHEDULE

TAG	EQUIPMENT DETAILS	MOUNTING LOCATION
TAP	200 AMP SQUARE D HOM MAIN SERVICE PANEL WITH 200 AMP MAIN BREAKER (200 AMP SERVICE)	SURFACE MOUNTED ON WALL OPPOSITE UTILITY METER
1	ENPHASE COMBINER (MODEL #X IQ AM1 240 5) WITH CIRCUITS AS LISTED IN CIRCUIT SCHEDULE & 3-LINE DIAGRAM [E001]	MOUNTED ADJACENT TO UTILITY METER
2	SERVICE RATED 60A NON-FUSED DISCO (MODEL #DU222RB)	MOUNTED ADJACENT TO UTILITY METER
3	70A MBE (MODEL #SQDHOM24L70F) WITH 2-POLE, 45 AMP BREAKER	MOUNTED ADJACENT TO MAIN SERVICE PANEL

NOTES

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WORKSITE ADDRESS:

MICHAEL BLUNSCHI

7300 MAPLE AVENUE,
TAKOMA PARK, MD, 20912

CONTRACTOR INFO:

LUMINA
3600 COMMERCE DR
SUITE 601
BALTIMORE, MD 21227
(443) 955-0779

LICENSE NUMBER:

MHIC-30991

REV	DATE
IFC	11-15

3-LINE TABLES

E002

CALCULATION FOR PV BREAKER					
SYSTEM CURRENT (Amps)	1.35	X	25	=	33.75
DESIGN CURRENT (Amps)	33.75	X	125%	=	42.19
BUSBAR RATING (120% RULE)	200	X	120%	=	240
EXISTING MAIN BREAKER				=	200
MAX SOLAR BREAKER (Amps)	240	-	200	=	40

ARRAY TO COMBINER	
Conductor Type	THHN/THWN
Conductor Material	COPPER
Largest Circuit Amperage	14.85
Qty. of Current-Carrying Conductors	6
Load Duty Mulitplier	1.25
Ambient Temp Derate Factor	0.58
Qty. of Conductors Derate Factor	0.80
Minimum Required Terminal Ampacity	18.56
Minimum Required Conductor Ampacity	20
Selected Conductor Size (AWG)	**10**
Selected Conductor Ampacity	**30**
Ohms/MilFt	1.240
Length of Run (ft)	40
Voltage Drop	1.47
Percent Voltage Drop	***0.62%***

INTERCONNECTION (LINE SIDE TAP)	
Conductor Type	THHN/THWN
Conductor Material	COPPER
Largest Circuit Amperage	33.75
Qty. of Current-Carrying Conductors	3
Load Duty Mulitplier	1.25
Ambient Temp Derate Factor	1.00
Qty. of Conductors Derate Factor	1.00
Minimum Required Terminal Ampacity	42.19
Minimum Required Conductor Ampacity	43
Selected Conductor Size (AWG)	**6**
Selected Conductor Ampacity	**65**
Ohms/MilFt	0.491
Length of Run (ft)	15
Voltage Drop	0.497
Percent Voltage Drop	***0.21%***

NOTES

1) 1) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 75ºC AND WET ENVIRONMENT, UNLESS OTHERWISE NOTED

2) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE

3) MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER MANUFACTURER'S INSTRUCTION.

DESIGN VARIABLES	
Ambient Indoor Temp (ºC)	26-30
Ambient Outdoor Temp (ºF)	94
Outdoor Temp Adder (ºF)	40
Adjusted Outdoor Temp (ºF)	134
Terminal Temp Rating (ºC)	75

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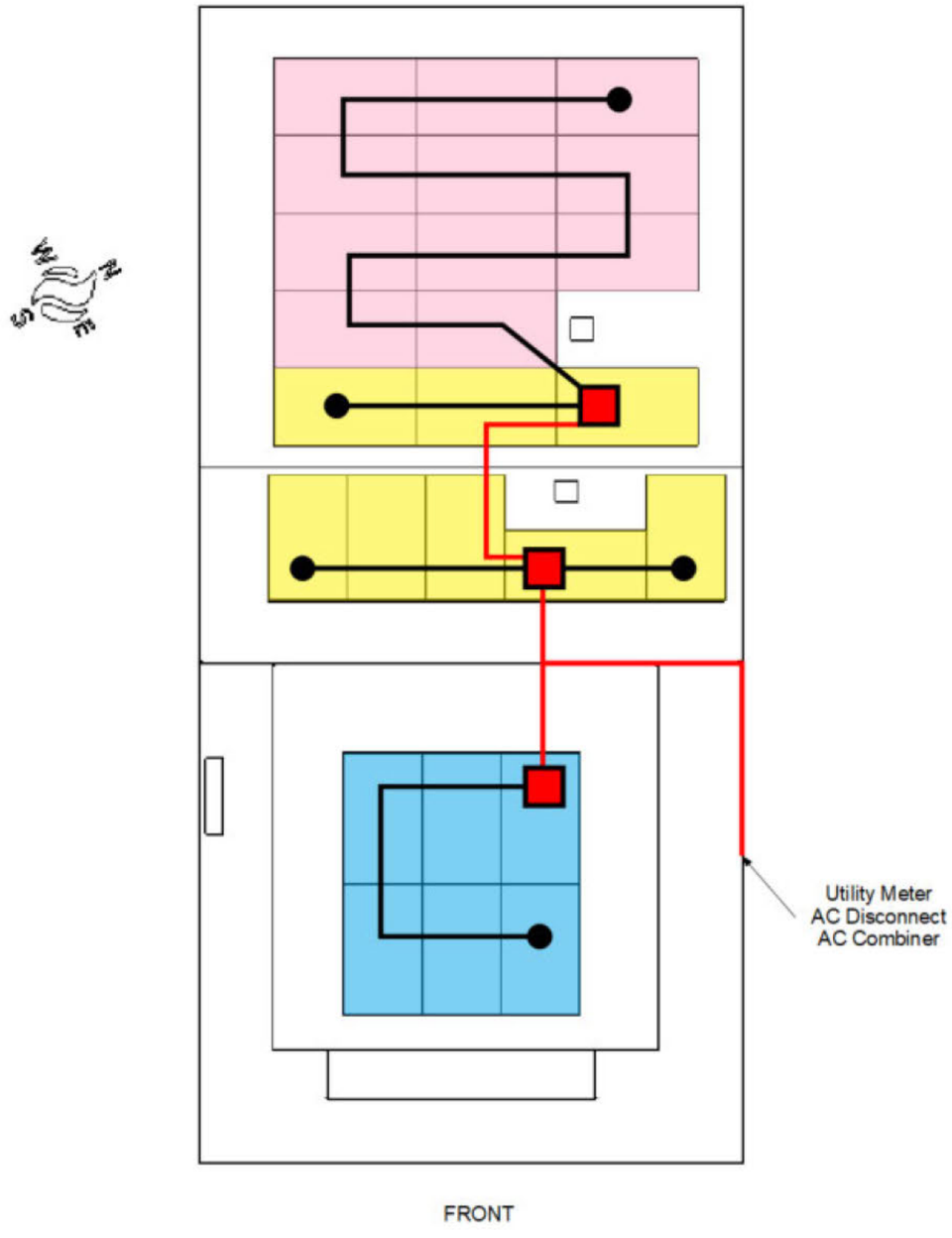
WIRE CALCS

E003



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Color	Circuit	Mod. Count
	#1	6
	#2	8
	#3	11

LEGEND

- JUNCTION BOX
- SOLADECK
- END CAP
- EXTERIOR CONDUIT
- ATTIC CONDUIT
- INTERIOR CONDUIT
- CRITTER GUARDS
- TRUNK CABLE

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NOTES

CRITTER GUARDS ARE NOT A COMPONENT OF THIS INSTALLATION.

CIRCUIT & CONDUIT MAP

E004

Solar Module Ratings		
REC420AA PURE 2		
Length:	73.4	in
Width:	40.9	in
Thickness:	1.2	in
Weight:	47.6	lbs
Imp:	9.96	A
Vmp:	42.2	V
Voc:	49.1	V
Isc:	10.74	A
OCPD:	25	A
Pmax:	420	W
Vmax:	1000	V
Temp. Coefficient:	-0.24	%Voc/ºC
Square Footage:	20.85	sq.ft.

Inverter Ratings		
IQ8M-72-2-US		
Max # Per String:	11	
Imax (ac):	1.35	A
Vmax (dc):	60	V
Pmax:	325	W
Nom. AC Voltage:	240	V
OCPD:	20	A
Weight:	2.38	lbs
Imax (Input):	20	A
Pmax (dc) Input:	460	V
Ppeak (AC):	330	W

1

WARNING: PHOTOVOLTAIC POWER SOURCE

2

PHOTOVOLTAIC DC DISCONNECT

3

PHOTOVOLTAIC AC DISCONNECT

4

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

5

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

6

INTERACTIVE PHOTOVOLTAIC SYSTEM CONNECTED

7

WARNING

DUAL POWER SOURCE. SECOND SOURCE IS PHOTOVOLTAIC SYSTEM.

8

WARNING

INVERTER OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE.

9

WARNING

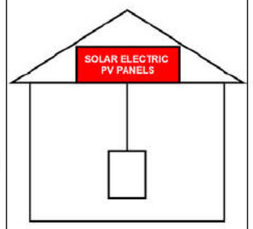
ELECTRICAL SHOCK HAZARD

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

10

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 ARRAY.



11

SOLAR PV SYSTEM DISCONNECT

RATED AC OUTPUT CURRENT: 33.75 A
NOM. OPERATING AC VOLTAGE: 240 V

12

WARNING

ELECTRICAL SHOCK HAZARD

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

13

SOLAR PV LOADCENTER

10.5 kW DC SOLAR ARRAY
240 VOLT AC SYSTEM

INSTALLED COMPONENTS
(25) REC420AA PURE 2 Solar Modules
(25) Enphase IQ8M Microinverters

EMERGENCY CONTACT:
LUMINA SOLAR 800-971-6118

CIRCUIT CALCULATIONS

SYSTEM CURRENT:	1.35 x	25 =	33.75 A
DESIGN AMPERAGE:	33.75 x	125% =	42.19 A
CIRCUIT #1 =	6 x	1.35 =	8.1 A
CIRCUIT #2 =	8 x	1.35 =	10.8 A
CIRCUIT #3 =	11 x	1.35 =	14.85 A

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NOTES

1) Label to be installed at exposed raceways, cabletrays, and other wiring methods; spaced at maximum 10ft sections or where separated by enclosures, walls, partitions, ceilings, or floors.
2) Label to be installed at each DC disconnecting means.
3) Label to be installed at each AC disconnecting means.
4) Label to be installed at Rapid Shutdown Switch (RSD).
5) Label to be installed on, or no more than 3ft from, the RSD.
6) Label to be installed at utility meter.
7) Label to be installed on exterior of main electrical panel.
8) Label to be applied to the distribution equipment.
9) Label to be applied at each disconnect means for the PV equipment.
10) Label to be installed on, or no more than 3ft from, the service disco.
11) Label to be installed at an accessible location at the disco means.
12) Label to be applied at each disconnect means for the PV equipment.
13) Label to be applied at the main PV combiner panel.
14) All plaques and labels shall have a red background (or as shown here)
15) All lettering shall be white & have a minimum height of 3/8" (or as shown here)
16) Font shall be arial (or similar) and all lettering shall be capitalized.
17) All plaques and labels shall be of a material suitable for the environment installed

EQUIP. RATINGS & SIGNAGE

E005

PRODUCT	QTY
Modules & Inverters	
REC420AA PURE 2	25
IQ8M-72-2-US	25
Rails	
14' Light Rail DRK (315168D)	10
20' Light Rail DRK (315240D)	8
Racking, Attachments & Related Items	
Micro-Inverter Mounting Assembly (Bolt+Nut+Washer)	25
Enphase Terminator Cap	5
Enphase Seal Cap	2
Grounding Weeblug	10
TBRW-80 T-bolts + Nuts	91
Small Endclamps 30-32mm	40
Small Midclamps 30-36mm	30
QB II 3in + 5/16x4in SS Lag Bolt + 85mm L-Foot	34 ea.
M8-1.25 Flanged Bolt + Nut	57
Enphase IQ Trunk Cable, Landscape	27
S-5-U Clamp	57
Combiners, Disconnects, Enclosures	
5x5x2 PVC Junction Box	3
Enphase Combiner (Model #X-IQ-AM1-240-5)	1
Service Rated 60A Non-Fused Disco (Model #DU222RB)	1
70A MBE (Model #SQDHOM24L70F)	1
Miscellaneous & Manual Additions	
Lumina Salesperson Yard Sign	1
Enphase Consumption CTs	2

PRODUCT	QTY
Breakers, Fuses, Taps	
2 pole, 15 Amp Breaker (For Combiner; check 3-line for type)	2
2 pole, 20 Amp Breaker (For Combiner; check 3-line for type)	1
4/0-10 Insulating Taps	2
2-POLE, 45 AMP BREAKER	1

Please note that duplicate line items are not a mistake

CONDUCTOR SCHEDULE

SIZE (AWG)	THWN-2 RED (FT)	THWN-2 BLACK (FT)	THWN-2 WHITE (FT)	THWN-2 GREEN (FT)	XHHW-2 RED (FT)	XHHW-2 BLACK (FT)	XHHW-2 WHITE (FT)	XHHW-2 GREEN (FT)
10	45	45	45					
8	15	15	15	65				
6	5	5	5					

#6 Bare Copper Ground	65 FT
#18 AWG Cu, 7 Strand (CT Wiring)	30 FT

CONDUIT SCHEDULE

SIZE (IN)	TYPE AND LENGTH (FT) EMT	FMC	LFMC	Sch80PVC	Sch40PVC
0.75	45	5	15		

EMT/FMC CONDUIT & ENCLOSURE FITTINGS

PRODUCT	SIZE (IN) & QUANTITY 0.5	0.75	1	1.25	1.5	2	2.5	3
FMC (Greenfield) Straps		2						
Straight Connector - Squeeze Clamp with Locknut		4						
One-Hole Rigid Conduit Straps		22						
Rigid Conduit Compression Coupler		5						
EMT Compression Connector with Locknut & Rubber Gasket		15						
LB-Type EMT Conduit Body		1						
LL/LR-Type EMT Conduit Body		2						
Square D B-Hub		2						
EMT Grounding Locknut		10						
Exterior Conduit Roof Mount Assemblies (RTs, RT Screws (5 per) OR Metal Brackets for Metal Roofs OR Foam Blocks)								7
Strain Relief Cord Connector with Insulating Plastic Bushing								6

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SOLAR BOM

X001

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SERVICE BOM

X002

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RAIL AND SPLICE QUANTITY COUNTING METHOD

Module Count	PORTRAIT			LANDSCAPE		
	14' Rail	20' Rail	Splice	14' Rail	20' Rail	Splice
1	1			1		
2		1		2		
3	2				2	
4	1	1	1	4		2
5		2		2	2	2
6	2	1	2		4	2
7	1	2	2	2	3	4
8		3	2			
9	2	2	2			
10		4	2			
11		4	2			
12	2	3	4			

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PROJECT NOTES

X003

Shade Report - Michael Blunschi

Customer
Michael Blunschi

Designer
Alexander Fegley

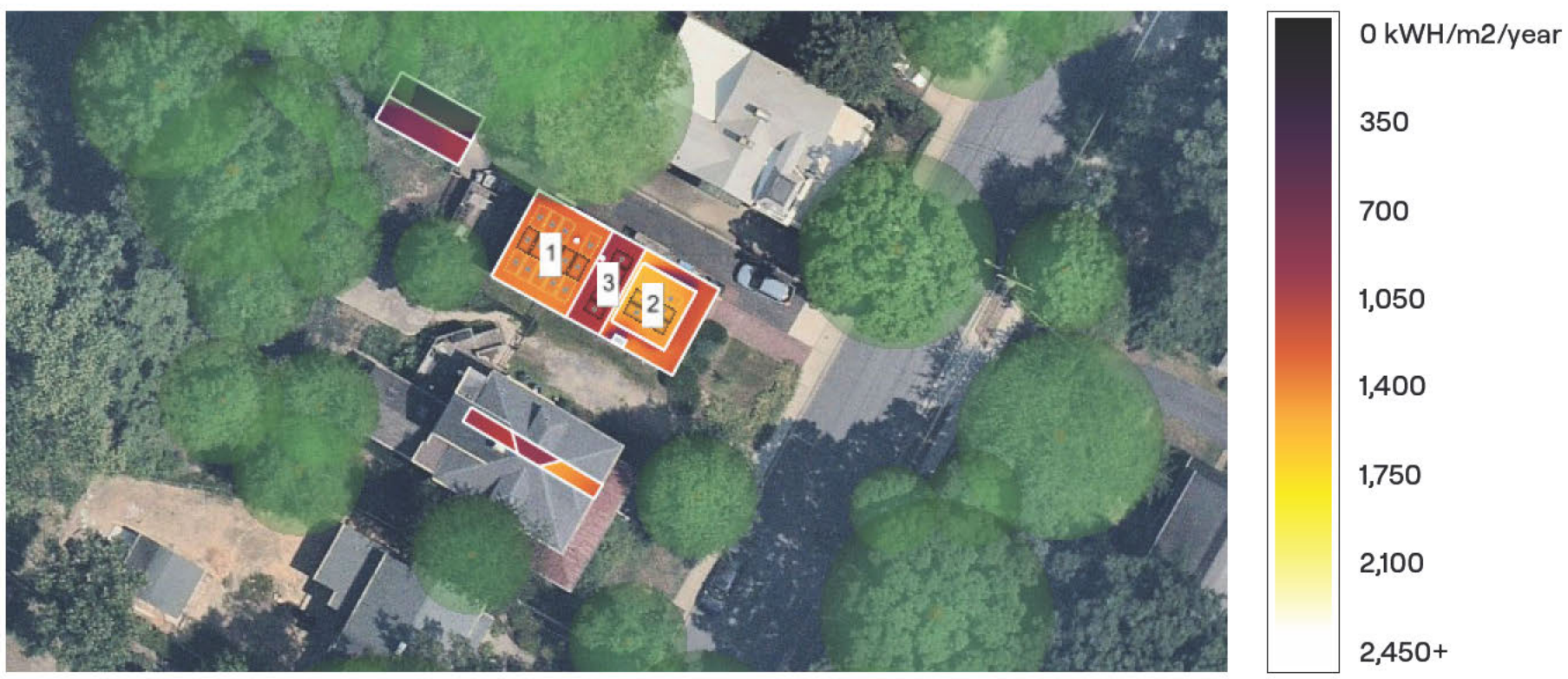
Organization
Lumina Solar

Address
7300 Maple Avenue,Takoma Park,MD,20912

Coordinates
38.978288, -77.012706

Date
9/19/2024

Annual irradiance



Summary

Array ID	Panel count	Azimuth	Pitch	Annual TOF	Annual solar access	Annual TSRF
1	14	299°	5°	83%	86%	71%
2	6	119°	23°	91%	88%	80%
3	5	299°	37°	65%	84%	54%
			Weighted average by panel count:		86.1%	69.8%

Monthly solar access % across arrays

Array ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	81	85	88	88	86	86	87	87	89	87	83	78
2	72	84	94	93	92	91	92	93	93	89	67	68
3	77	85	85	85	83	83	83	84	87	85	83	74

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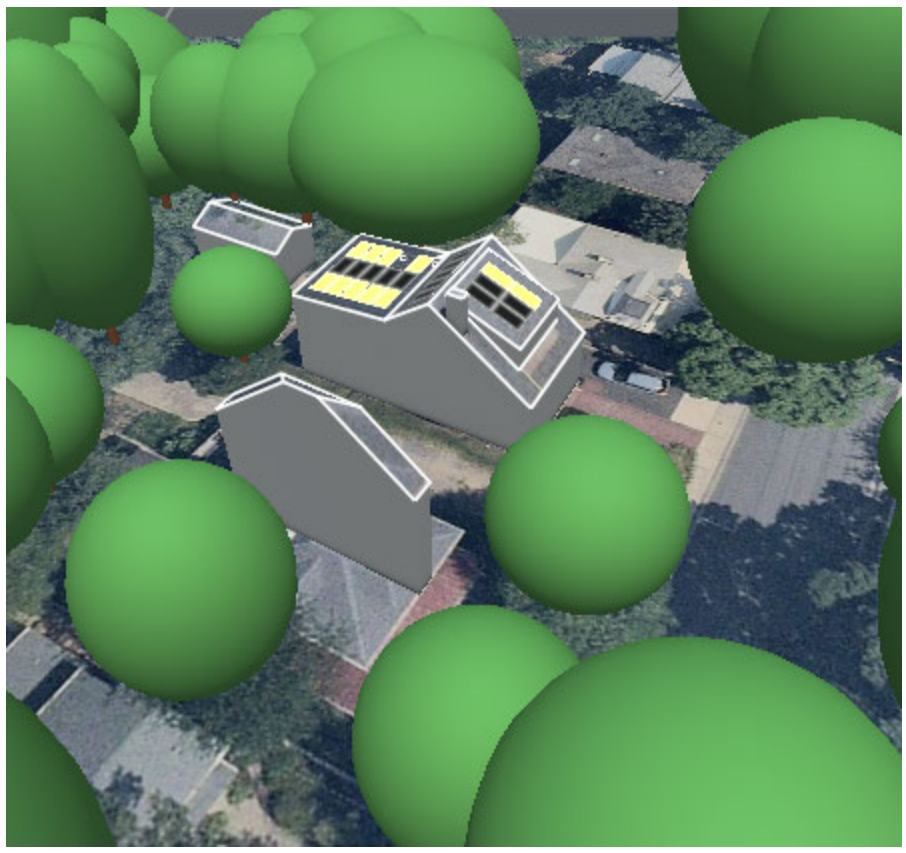
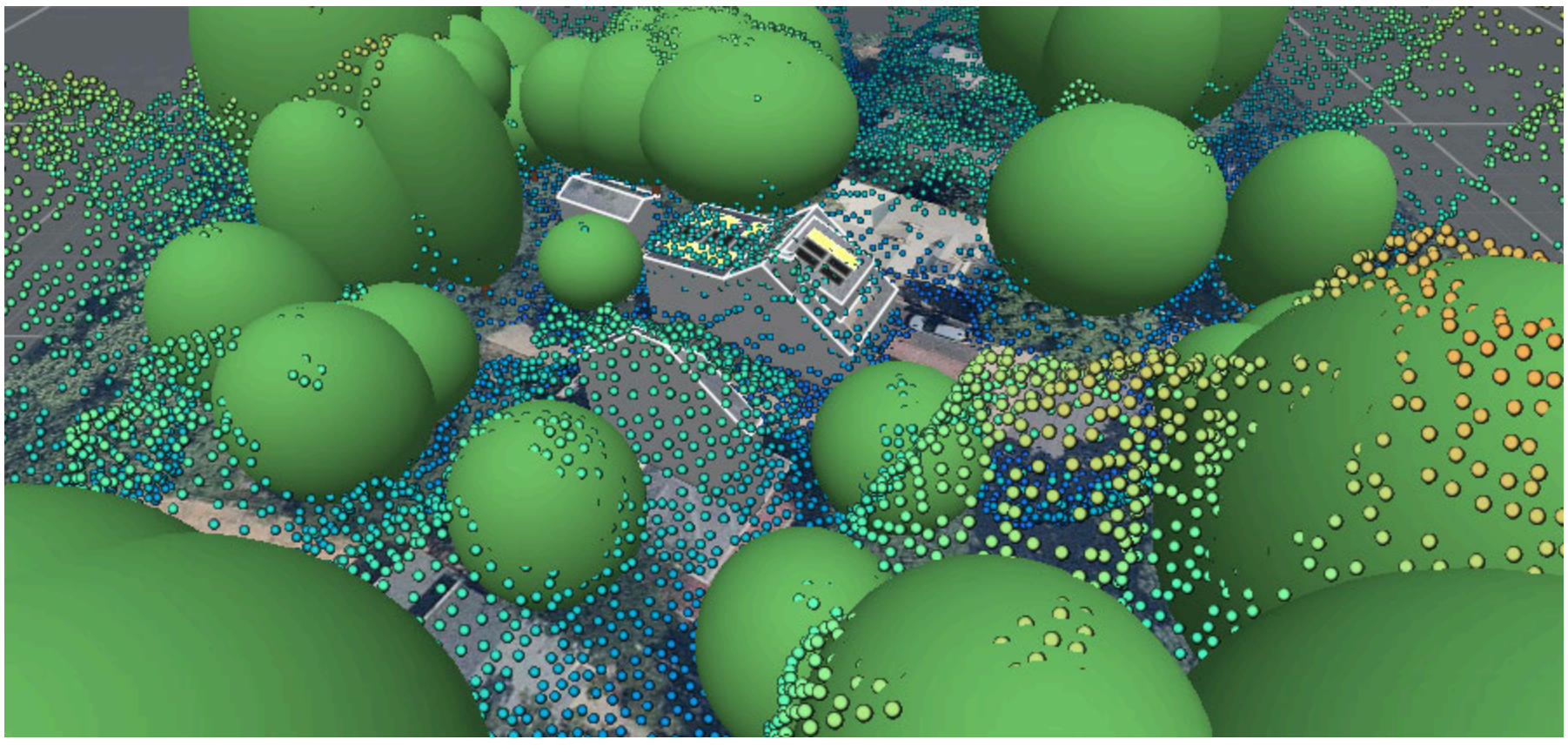
Zoomed out satellite view

3D model



3D model with LIDAR overlay



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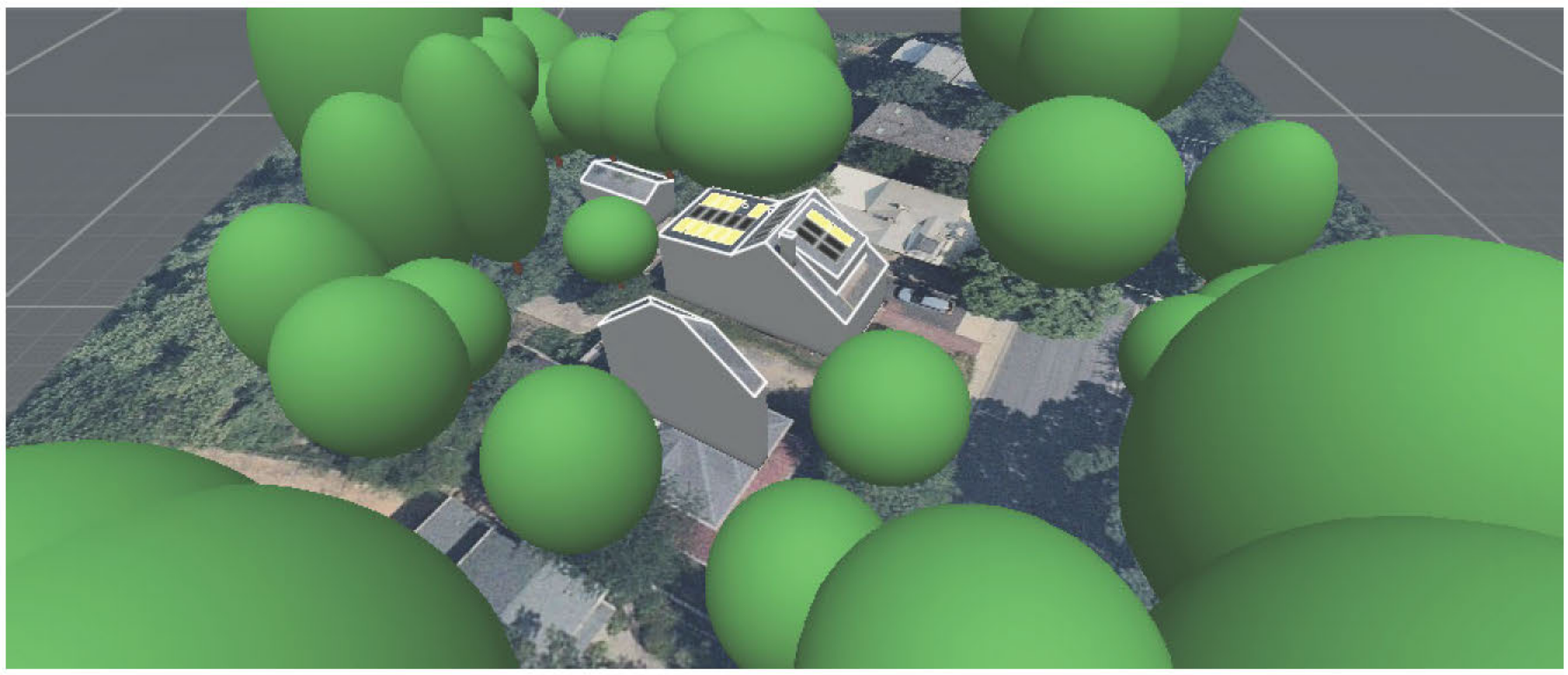
Street view with corresponding 3D model



I, **Alexander Fegley**, certify that I have generated this shading report to the best of my abilities, and I believe its contents to be accurate.