

ISSUE: Certificate of Appropriateness for alterations

APPLICANT: David Hampton

LOCATION: Old and Historic Alexandria District
203 South West Street

ZONE: RM/Residential Townhouse Zone

STAFF RECOMMENDATION

Staff recommends approval of the Certificate of Appropriateness for solar panels, as submitted.

GENERAL NOTES TO THE APPLICANT

1. **ISSUANCE OF CERTIFICATES OF APPROPRIATENESS AND PERMITS TO DEMOLISH:** Applicants must obtain a copy of the Certificate of Appropriateness or Permit to Demolish PRIOR to applying for a building permit. Contact BAR Staff, Room 2100, City Hall, 703-746-3833, or preservation@alexandriava.gov for further information.
2. **APPEAL OF DECISION:** In accordance with the Zoning Ordinance, if the Board of Architectural Review denies or approves an application in whole or in part, the applicant or opponent may appeal the Board's decision to City Council on or before 14 days after the decision of the Board.
3. **COMPLIANCE WITH BAR POLICIES:** All materials must comply with the BAR's adopted policies unless otherwise specifically approved.
4. **BUILDING PERMITS:** Most projects approved by the Board of Architectural Review require the issuance of one or more construction permits by Department of Code Administration (including signs). The applicant is responsible for obtaining all necessary construction permits after receiving Board of Architectural Review approval. Contact Code Administration, Room 4200, City Hall, 703-746-4200 for further information.
5. **EXPIRATION OF APPROVALS NOTE:** In accordance with Sections 10-106(B) and 10-206(B) of the Zoning Ordinance, any official Board of Architectural Review approval will expire 12 months from the date of issuance if the work is not commenced and diligently and substantially pursued by the end of that 12-month period.
6. **HISTORIC PROPERTY TAX CREDITS:** Applicants performing extensive, certified rehabilitations of historic properties may separately be eligible for state and/or federal tax credits. Consult with the Virginia Department of Historic Resources (VDHR) prior to initiating any work to determine whether the proposed project may qualify for such credits.



N

A horizontal number line with tick marks at 0, 15, 30, and 60. The label "60 Feet" is placed to the right of the 60 tick mark.

I. APPLICANT'S PROPOSAL

The applicant requests a Certificate of Appropriateness for alterations to install solar panels on the existing gable roof, at 203 South West Street.

Certificate of Appropriateness (Alterations)

The applicant proposes to install a 4.725 KW solar photovoltaic system consisting of 15 all black panels. The panels will be located on the east elevation (façade) and will cover approximately 272 square feet (20 percent) of the existing roof and will be mounted on a shallow rack that will be attached directly to the east slope of the existing side-gable roof, matching the 37 degree angle of its slope.

II. HISTORY

203 South West Street was constructed sometime between **1977 and 1989**, when the townhouse first appears on the Sanborn Fire Insurance Map. The footprint of the two-bay, two-story Colonial Revival style brick townhouse has not changed since it was constructed.



Photo 1: Existing Facade of 203 S. West St.

Previous BAR Approvals

1/12/2011 – Staff administratively approved replacement windows (BAR2011-00014).

III. ANALYSIS

Certificate of Appropriateness

The *Design Guidelines* encourages solar panels to be “located on the most visually inconspicuous area of a structure consistent with the requirements of maximum access to the sun.” Solar panels “should be mounted at an angle which is as close to the adjacent roof slope as possible.” The proposed solar panels will be located on the street facing elevation of the existing side-gable roof

and will be visible from South West Street. The angle of the panels will be mounted on a shallow rack which is attached directly to and will match the existing roof slope.



Photo 2: Proposed location of solar panels.

Although the configuration of the panels is consistent with the *Design Guidelines*, the panels will be visible from the street which is discouraged by the *Design Guidelines*. While the Design Guidelines discourage solar panels on a street-facing roof slope, staff supports the installation of the panels in this instance, given that the townhouse is a later building and located more than 15 feet from the front property line and installation will not remove or damage any historic fabric. The utility meter and other mechanical connections relating to the solar panels will be located on the rear elevation and will not be visible from the public street. However, mounting the solar panels to the rear elevation, would not provide the panels with the necessary amount of sun exposure and the roof surface is broken by a large dormer. Staff notes that if the property were in the Parker-Gray district, staff could administratively approve the solar panels on the front (street facing) elevation because of the building's age and location on the site.

Solar panels are closely related to the installation of dormers in regard to how an architectural feature should be installed on an existing building. The *Design Guidelines* state that "...dormers should match the existing proportions of the building and the windows and should be aligned with the existing windows or be centered between the windows". The proposed panels will be installed over one of the two window bays, creating an asymmetric roof profile. However, the townhouse is located in a row of adjoining townhouses with jagged rooflines and the installation of the solar panels will not disturb the overall composition of the rooflines on the blockface.

While solar contractors often recommend that roofing be replaced prior to installing the panels, so that they do not have to be removed and reinstalled a short time later, the property owner in this case has indicated that the existing roofing is in good condition and will not be replaced before the panels are installed. The current brown-colored composition shingle roof is generally discouraged

by the *Design Guidelines*, and staff notes that the proposed solar panels would be less visible if the composition shingle roofing were in the appropriate weathered wood or slate blend colors. Neighboring properties have been replacing original roofs with a composition shingle roof in the appropriate color, and staff encourages the property owner to install an appropriate color shingle roof when it is time to replace the roof so that the solar panels visually blend-in with the roof.

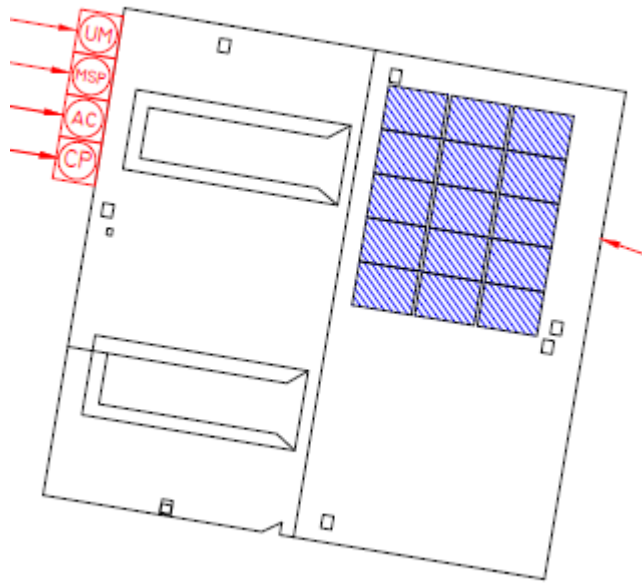


Photo 3: Roof plan of proposed solar panels.

In summary, the installation of solar panels on this later building will provide significant benefits with minimal alterations to the property while being compatible with adjacent historic resources and the overall district. Staff believes that this building is ideal for this particular application given the location of the townhouse set back on the site, the later age of the building, and how minimally invasive the installation will be to the existing roofing. The proposal has been very sensitively designed with the solar panels only covering 20% of the existing roof and minimally impacting the roofing composition of the row of townhouses. Staff recommends approval of the project, as submitted.

Additionally, although this is the first installation of solar panels on the front slope of a roof, the BAR has approved a number of solar panel projects within the historic districts. Some are minimally visible, including the rear slope of the corner property at 100 Quay Street (BAR2014-00275), while others are on flat roofs and are not visible from a public way. To continue to encourage the use of solar power and support the City's green building policy, staff recommends that the BAR adopt a policy to allow administrative approval of solar photovoltaic panels when they are mounted directly to the roof slope (rather than on large racks) and are minimally visible and/or located on the rear elevation of a later building in the Old and Historic Alexandria district. Staff also suggests the possibility of administrative approval of solar panels on the front façade on later buildings in certain conditions the Old and Historic Alexandria District. Installation of panels

on street-facing roof slopes of early buildings in both districts would continue to require BAR review at a public hearing.

STAFF

Amirah Lane, Historic Preservation Planner, Planning & Zoning
Al Cox, FAIA, Historic Preservation Manager, Planning & Zoning

IV. CITY DEPARTMENT COMMENTS

Legend: C- code requirement R- recommendation S- suggestion F- finding

Zoning

F-1 Solar panels meet zoning ordinance requirements.

Code Administration

No comments received.

Transportation and Environmental Services

- R-1 The building permit must be approved and issued prior to the issuance of any permit for demolition, if a separate demolition permit is required. (T&ES)
- R-2 Applicant shall be responsible for repairs to the adjacent city right-of-way if damaged during construction activity. (T&ES)
- R-3 No permanent structure may be constructed over any existing private and/or public utility easements. It is the responsibility of the applicant to identify any and all existing easements on the plan. (T&ES)
- F-1 After review of the information provided, an approved grading plan is not required at this time. Please note that if any changes are made to the plan it is suggested that T&ES be included in the review. (T&ES)
- F-2 If the alley located at the rear of the parcel is to be used at any point of the construction process the following will be required:
For a Public Alley - The applicant shall contact T&ES, Construction Permitting & Inspections at (703) 746-4035 to discuss any permits and accommodation requirements that will be required.
For a Private Alley - The applicant must provide proof, in the form of an affidavit at a minimum, from owner of the alley granting permission of use. (T&ES)
- C-1 The applicant shall comply with the City of Alexandria's Solid Waste Control, Title 5, Chapter 1, which sets forth the requirements for the recycling of materials (Sec. 5-1-99). (T&ES)

- C-2 The applicant shall comply with the City of Alexandria's Noise Control Code, Title 11, Chapter 5, which sets the maximum permissible noise level as measured at the property line. (T&ES)
- C-3 Roof, surface and sub-surface drains be connected to the public storm sewer system, if available, by continuous underground pipe. Where storm sewer is not available applicant must provide a design to mitigate impact of stormwater drainage onto adjacent properties and to the satisfaction of the Director of Transportation & Environmental Services. (Sec.5-6-224) (T&ES)
- C-4 All secondary utilities serving this site shall be placed underground. (Sec. 5-3-3) (T&ES)
- C-5 Any work within the right-of-way requires a separate permit from T&ES. (Sec. 5-2) (T&ES)
- C-6 All improvements to the city right-of-way such as curbing, sidewalk, driveway aprons, etc. must be city standard design. (Sec. 5-2-1) (T&ES)

Alexandria Archaeology

- F-1 No archaeological oversight needed for this project as proposed.

V. ATTACHMENTS

1 – Supplemental Materials

2 – Application for BAR 2019-00392: 203 South West Street

ADDRESS OF PROJECT: 203 S West Street, Alexandria, VA 22314

DISTRICT: ☒ Old & Historic Alexandria ☐ Parker – Gray ☐ 100 Year Old Building

TAX MAP AND PARCEL: 074.01-12-11 ZONING: RM

APPLICATION FOR: *(Please check all that apply)*

☒ CERTIFICATE OF APPROPRIATENESS

☐ PERMIT TO MOVE, REMOVE, ENCAPSULATE OR DEMOLISH
(Required if more than 25 square feet of a structure is to be demolished/impacted)

☐ WAIVER OF VISION CLEARANCE REQUIREMENT and/or YARD REQUIREMENTS IN A VISION
CLEARANCE AREA *(Section 7-802, Alexandria 1992 Zoning Ordinance)*

☐ WAIVER OF ROOFTOP HVAC SCREENING REQUIREMENT
(Section 6-403(B)(3), Alexandria 1992 Zoning Ordinance)

Applicant: ☐ Property Owner ☒ Business *(Please provide business name & contact person)*

Name: Ipsun Power Inc/Erin Lee

Address: 9504 Poplar Leaf Ct

City: Fairfax State: VA Zip: 22031

Phone: 703-239-3386 E-mail: support@ipsunsolar.com

Authorized Agent *(if applicable)*: ☐ Attorney ☐ Architect ☐ _____

Name: _____ Phone: _____

E-mail: _____

Legal Property Owner:

Name: David Hampton

Address: 203 S West Street

City: Alexandria State: VA Zip: 22314

Phone: 205-903-1700 E-mail: djhamptonii@me.com

- ☐ Yes ☒ No Is there an historic preservation easement on this property?
☐ Yes ☒ No If yes, has the easement holder agreed to the proposed alterations?
☐ Yes ☒ No Is there a homeowner's association for this property?
☐ Yes ☒ No If yes, has the homeowner's association approved the proposed alterations?

If you answered yes to any of the above, please attach a copy of the letter approving the project.

NATURE OF PROPOSED WORK: *Please check all that apply*

- ☐ NEW CONSTRUCTION
☒ EXTERIOR ALTERATION: *Please check all that apply.*
 ☐ awning ☐ fence, gate or garden wall ☐ HVAC equipment ☐ shutters
 ☐ doors ☐ windows ☐ siding ☐ shed
 ☐ lighting ☐ pergola/trellis ☐ painting unpainted masonry
 ☒ other rooftop solar install
☐ ADDITION
☐ DEMOLITION/ENCAPSULATION
☐ SIGNAGE

DESCRIPTION OF PROPOSED WORK: *Please describe the proposed work in detail (Additional pages may be attached).*

This is a 4.725 kW rooftop PV solar system installation, consisting of 15 all black panels. The design is attached.

SUBMITTAL REQUIREMENTS:

Items listed below comprise the **minimum supporting materials** for BAR applications. Staff may request additional information during application review. Please refer to the relevant section of the *Design Guidelines* for further information on appropriate treatments.

Applicants must use the checklist below to ensure the application is complete. Include all information and material that are necessary to thoroughly describe the project. Incomplete applications will delay the docketing of the application for review. Pre-application meetings are required for all proposed additions. All applicants are encouraged to meet with staff prior to submission of a completed application.

Electronic copies of submission materials should be submitted whenever possible.

Demolition/Encapsulation : *All applicants requesting 25 square feet or more of demolition/encapsulation must complete this section. Check N/A if an item in this section does not apply to your project.*

- N/A
- ☐ ☐ Survey plat showing the extent of the proposed demolition/encapsulation.
☐ ☐ Existing elevation drawings clearly showing all elements proposed for demolition/encapsulation.
☐ ☐ Clear and labeled photographs of all elevations of the building if the entire structure is proposed to be demolished.
☐ ☐ Description of the reason for demolition/encapsulation.
☐ ☐ Description of the alternatives to demolition/encapsulation and why such alternatives are not considered feasible.

Additions & New Construction: *Drawings must be to scale and should not exceed 11" x 17" unless approved by staff. All plans must be folded and collated into 3 complete 8 1/2" x 11" sets. Additional copies may be requested by staff for large-scale development projects or projects fronting Washington Street. Check N/A if an item in this section does not apply to your project.*

- ☐ ^{N/A} ☐ Scaled survey plat showing dimensions of lot and location of existing building and other structures on the lot, location of proposed structure or addition, dimensions of existing structure(s), proposed addition or new construction, and all exterior, ground and roof mounted equipment.
- ☐ ☐ FAR & Open Space calculation form.
- ☐ ☐ Clear and labeled photographs of the site, surrounding properties and existing structures, if applicable.
- ☐ ☐ Existing elevations must be scaled and include dimensions.
- ☐ ☐ Proposed elevations must be scaled and include dimensions. Include the relationship to adjacent structures in plan and elevations.
- ☐ ☐ Materials and colors to be used must be specified and delineated on the drawings. Actual samples may be provided or required.
- ☐ ☐ Manufacturer's specifications for materials to include, but not limited to: roofing, siding, windows, doors, lighting, fencing, HVAC equipment and walls.
- ☐ ☐ For development site plan projects, a model showing mass relationships to adjacent properties and structures.

Signs & Awnings: *One sign per building under one square foot does not require BAR approval unless illuminated. All other signs including window signs require BAR approval. Check N/A if an item in this section does not apply to your project.*

- ☐ ^{N/A} ☐ Linear feet of building: Front: _____ Secondary front (if corner lot): _____.
- ☐ ☐ Square feet of existing signs to remain: _____.
- ☐ ☐ Photograph of building showing existing conditions.
- ☐ ☐ Dimensioned drawings of proposed sign identifying materials, color, lettering style and text.
- ☐ ☐ Location of sign (show exact location on building including the height above sidewalk).
- ☐ ☐ Means of attachment (drawing or manufacturer's cut sheet of bracket if applicable).
- ☐ ☐ Description of lighting (if applicable). Include manufacturer's cut sheet for any new lighting fixtures and information detailing how it will be attached to the building's facade.

Alterations: *Check N/A if an item in this section does not apply to your project.*

- ☒ ^{N/A} ☐ Clear and labeled photographs of the site, especially the area being impacted by the alterations, all sides of the building and any pertinent details.
- ☒ ☐ Manufacturer's specifications for materials to include, but not limited to: roofing, siding, windows, doors, lighting, fencing, HVAC equipment and walls.
- ☒ ☐ Drawings accurately representing the changes to the proposed structure, including materials and overall dimensions. Drawings must be to scale.
- ☐ ☒ An official survey plat showing the proposed locations of HVAC units, fences, and sheds.
- ☐ ☒ Historic elevations or photographs should accompany any request to return a structure to an earlier appearance.

ALL APPLICATIONS: *Please read and check that you have read and understand the following items:*

- ☒ I have submitted a filing fee with this application. (Checks should be made payable to the City of Alexandria. Please contact staff for assistance in determining the appropriate fee.)
- ☒ I understand the notice requirements and will return a copy of the three respective notice forms to BAR staff at least five days prior to the hearing. If I am unsure to whom I should send notice I will contact Planning and Zoning staff for assistance in identifying adjacent parcels.
- ☒ I, the applicant, or an authorized representative will be present at the public hearing.
- ☒ I understand that any revisions to this initial application submission (including applications deferred for restudy) must be accompanied by the BAR Supplemental form and 3 sets of revised materials.

The undersigned hereby attests that all of the information herein provided including the site plan, building elevations, prospective drawings of the project, and written descriptive information are true, correct and accurate. The undersigned further understands that, should such information be found incorrect, any action taken by the Board based on such information may be invalidated. The undersigned also hereby grants the City of Alexandria permission to post placard notice as required by Article XI, Division A, Section 11-301(B) of the 1992 Alexandria City Zoning Ordinance, on the property which is the subject of this application. The undersigned also hereby authorizes the City staff and members of the BAR to inspect this site as necessary in the course of research and evaluating the application. The applicant, if other than the property owner, also attests that he/she has obtained permission from the property owner to make this application.

APPLICANT OR AUTHORIZED AGENT:

Signature: 

Printed Name: Erin Lee

Date: 9-16-2019

OWNERSHIP AND DISCLOSURE STATEMENT

Use additional sheets if necessary

1. Applicant. State the name, address and percent of ownership of any person or entity owning an interest in the applicant, unless the entity is a corporation or partnership, in which case identify each owner of more than three percent. The term ownership interest shall include any legal or equitable interest held at the time of the application in the real property which is the subject of the application.

	Name	Address	Percent of Ownership
1.	David Hampton	203 S West Street	50%
2.	Allison Grayson	203 S West Street	50%
3.			

2. Property. State the name, address and percent of ownership of any person or entity owning an interest in the property located at 203 S West Street (address), unless the entity is a corporation or partnership, in which case identify each owner of more than three percent. The term ownership interest shall include any legal or equitable interest held at the time of the application in the real property which is the subject of the application.

	Name	Address	Percent of Ownership
1.	David Hampton	203 S West Street	50%
2.	Allison Grayson	203 S West Street	50%
3.			

3. Business or Financial Relationships. Each person or entity listed above (1 and 2), with an ownership interest in the applicant or in the subject property is required to disclose any business or financial relationship, as defined by Section 11-350 of the Zoning Ordinance, existing at the time of this application, or within the 12-month period prior to the submission of this application with any member of the Alexandria City Council, Planning Commission, Board of Zoning Appeals or either Boards of Architectural Review.

	Name of person or entity	Relationship as defined by Section 11-350 of the Zoning Ordinance	Member of the Approving Body (i.e. City Council, Planning Commission, etc.)
1.	N/A		
2.			
3.			

NOTE: Business or financial relationships of the type described in Sec. 11-350 that arise after the filing of this application and before each public hearing must be disclosed prior to the public hearings.

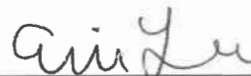
As the applicant or the applicant's authorized agent, I hereby attest to the best of my ability that the information provided above is true and correct.

9-16-2019

Date

Erin Lee

Printed Name



Signature



SOLAR-ROOF-CHECK THE RLA A RIGOROUS LOAD ANALYSIS

P. O. Box 1754, Gualala, CA 95445-1754



Ph: 805-215-8665

DATE: 09-12-2019/Rev A
FOR: Ipsun Power, Inc
9504 Poplar Leaf Court
Fairfax, VA 22031
USA

JOB: DJ Hampton
203 South West Street
Alexandria, VA 22314

To Whom It May Concern

This letter is to certify that we have performed a structural analysis of the existing roof members that are to support photovoltaic panels, as shown on the attached report. The calculations were performed in accordance with the latest editions of IBC, NDS, ASCE/SEI, CBC, and IRC, and the latest edition of the building codes for the state of Virginia.

Our analysis was based on the following design criteria:

Ground Snow (psf)	30 psf
Sloped Snow (psf), reduced per ASCE, Sect. 7.4	15.09 psf
Basic Wind Speed (mph):	115 mph
ASCE Code:	7-10
The PV module orientation:	Portrait
The maximum horizontal roof mount spacing:	4 ft.
The maximum vertical roof mount spacing:	2.708 ft.
Staggered roof mounts required?	Yes

Based on this analysis, we can certify that the individual existing roof framing members that support the PV panels; and the individual roof members as described in the attached report; are adequate to support the design loads as required by the various codes. This includes Dead Loads (including the weight of the PV panels), Live Loads, Snow Loads, and Wind Loads, on the roof members that support the PV panels, combined as required in the codes.

If you have any questions on this or need further clarification, please contact us at your convenience.

Sincerely,
James A. Adams, S.E.



NOTE:

1. Prior to commencement of work, the Solar Installer shall verify that the roof framing sizes, spacing, and spans (between supports), are as noted in these plans. The Engineer of Record must be notified if any discrepancies are discovered, before proceeding.
2. These plans are Stamped for Structural Code compliance of the roof members that support the PV solar system only.
3. These plans are not stamped for rain water leakage prevention.
4. As a precaution, old or wet snow should be removed from the roof, if the snow builds up to 18" or more.

Date of Report: 09-12-2019/Rev A
Data Input by: HumzaArshad
Contact E-mail: humza@ipsunpower.com
Contact Phone: 571-445-4795

Job Name: DJ Hampton
Job Number: IP20190726VA
Job Address: 203 South West Street
Alexandria, VA 22314

ABSTRACT

This Report is based on Engineering calculations using the input data supplied by the user, listed under Current Input Data. The user input has not been independently reviewed by a licensed Professional Engineer for appropriateness or accuracy, unless Stamped by a P.E. This Report indicates Compliance/Non-Compliance with the reference Codes listed below. The following items have been checked for Code Compliance:

- Load Combination #1:

Wind Uplift on the Standoff attachment to the Roof Framing members: Wind Uplift - 0.6 * DL Solar

- Load Combination #2:

Supporting Rafter Strength with: DL Rf + DL Solar + Roof Live Load

- Load Combination #3:

Supporting Rafter Strength with: DL Rf + DL Solar + Wind Down

- Load Combination #4: Supporting Rafter

Strength with: DL Rf + DL Solar + Snow

- Load Combination #5:

Supporting Rafter Strength with: DL Rf + DL Solar + .75Wind + .75Snow

- Load Combination #6: Check Additional Seismic Load

- Load Combination #7:

Supporting Rafter Strength with:
Wind Up - 0.6 * (DL Rf + DL Solar)

Job Information

Data Input By: HumzaArshad
Job Number: IP20190726VA
Job Name: DJ Hampton
Job Address: 203 South West Street
City, State: Alexandria, VA 22314

Current Input Data

Payment Method	Invoice
Roof Type	SingleSpanRafters
Ceiling Type	1/2 gyp. Bd.
Collar Tie Space	0
Coverage %	20
Frame Size	2x10@16
Ground Snow (psf)	30
Sloped Roof Snow Load (psf)	15.09
Lag Screw Diam. (in)	5/16
Lag Screw Embed. (in)	2.5
Overall Span (ft)	38.3
PV Weight (psf)	2
PV Module Orientation	Portrait
Rafter Span (ft)	23
Rail System	2Rail
Roof Mean Height (ft)	30
Roof Slope (degrees)	37
Roofing Type	Asphalt Shingles
Sloped Ceiling	Yes
Max. Horizontal Roof Mount(ft)	4
Max. Vertical Roof Mounts (ft)	2.708
Standoff Staggered	Yes
Wind Exposure	B
Wind Speed (mph)	115

Reference Codes

International Building Code (IBC latest edition)

American Society of Civil Engineers (ASCE/SEI 7-05, 7-10) National Design Spec. for Wood Constr. (NDS latest edition) CBC and NJ Edition

Note: For ASCE 7-10, wind includes (0.6) factor, in loading combinations.

DJ HAMPTON RESIDENCE : 203 S WEST ST, ALEXANDRIA, VA 22314**SOLAR PHOTOVOLTAIC SYSTEM: 4.725 KW****EQUIPMENT SUMMARY:**

SOLAR MODULES: 15 x Q CELLS 315 QPEAK DUO BLK G5 - 315W MODULES

INVERTER(S): 15 x - ENPHASE - IQ7 60-2-US MICROINVERTERS

RACKING: SnapNrack UR

SHEET INDEX:

G001 COVER SHEET

G002 GENERAL NOTES

Z001 EQUIPMENT

Z002 PV LAYOUT

Z003 STRING LAYOUT

Z004 ATTACHMENT LAYOUT

S001 ATTACHMENT DETAILS

E001 ELECTRICAL THREE LINE DIAGRAM

E002 BOQ & SYSTEM DETAILS

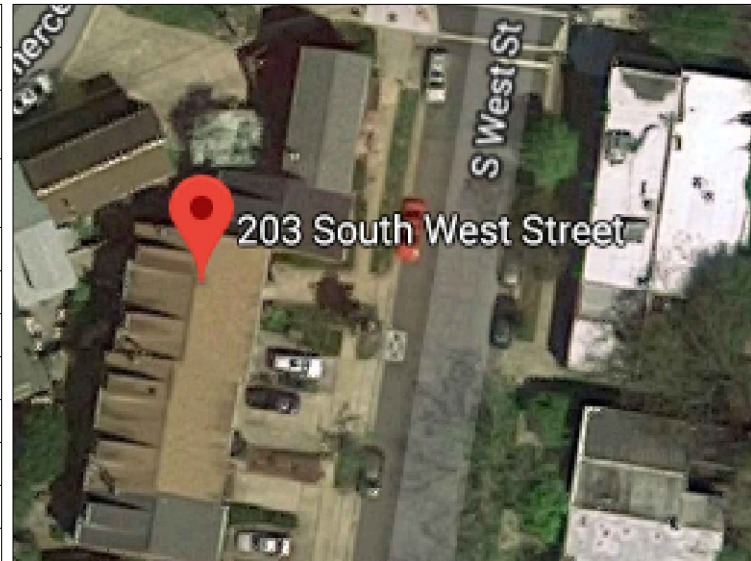
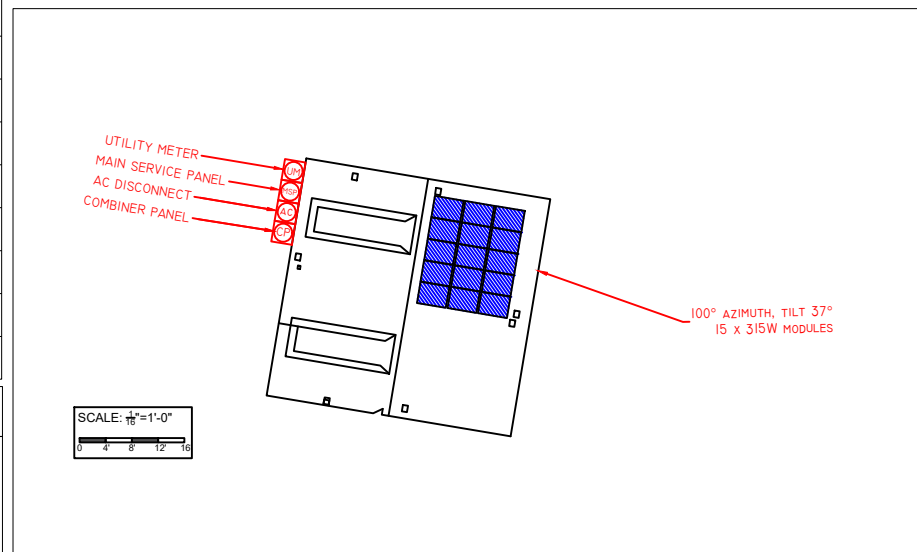
E003 SYSTEM LABELING DETAILS

APPLICABLE CODES AND STANDARDS:

BUILDING: VCC 2015, 12-2013, ASCE 7-10, NDS2015

ELECTRICAL: NEC 2014

FIRE: NFPA 2015

ADDRESSOWNER:
DJ HAMPTON
203 S WEST ST
ALEXANDRIA, VA 22314INSTALLER:
IPSUN SOLAR
9504 POPLAR LEAF CT
FAIRFAX
VA 22031[MAP](#)[PV ARRAY](#)

9/25/2019	G001	1
DATE	SHEET	PAGE No
1	JM	HA
REVIEW	DRAWING BY	CHK'D BY

INSTALLER:
IPSUN SOLAR
9504 POPLAR LEAF CT
FAIRFAX
VA 22031

OWNER:
DJ HAMPTON
203 S WEST ST
ALEXANDRIA, VA 22314

ELECTRICAL CONSTRUCTION GENERAL NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE NEC (NATIONAL ELECTRIC CODE), NFPA (NATIONAL FIRE PROTECTION ASSOCIATION), AND ALL APPLICABLE LOCAL, STATE AND FEDERAL CODES, LAWS AND REGULATIONS. ALL WORK SHALL CONFORM TO APPLICABLE STATE AND FEDERAL SAFETY CODES INCLUDING OSHA.
2. WORK UNDER THIS CONTRACT SHALL INCLUDE, BUT NOT BE LIMITED TO, FURNISHING, INSTALLING AND CONNECTION OF ALL ELECTRICAL EQUIPMENT AND TESTING OF ALL SYSTEMS AND SUB-SYSTEMS WITHIN THE SCOPE OF THIS CONTRACT. ANY ERRORS, OMISSION, OR UNCERTAINTY SHALL BE BROUGHT TO THE ATTENTION OF THE PRIME CONTRACTOR AND OR OWNER PRIOR TO CONSTRUCTION.
3. CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY AND SECURITY OF THE WORKSITE. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
4. DO NOT SCALE DRAWINGS. LARGER SCALE DRAWINGS HAVE PRECEDENCE OVER SMALL SCALE DRAWINGS. SPECIFICATIONS HAVE PRECEDENCE OVER DRAWINGS. NOTIFY THE PRIME CONTRACTOR IMMEDIATELY AFTER DISCOVERY OF ANY DISCREPANCY BETWEEN DRAWINGS, SPECIFICATIONS OR FIELD CONDITIONS.
5. NOTIFY THE PRIME CONTRACTOR OR OWNER IMMEDIATELY AFTER DISCOVERING ANY HAZARDOUS MATERIAL LIKE ASBESTOS.
6. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED. VERIFY THE EXACT LOCATIONS AND CONDITIONS OF ALL EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS PRIOR TO ANY WORK. LOCATIONS FOR EQUIPMENT SHALL BE TAKEN FROM THE OTHER SHEETS WHERE THEY OCCUR. EXTEND WIRING FROM ALL JUNCTION BOXES, CONTROL PANELS, PUMPS, RECEPTACLES, SWITCHES, ETC. AND MAKE ALL FINAL CONNECTIONS TO EQUIPMENT AS REQUIRED.
7. THE INTENT OF THESE DRAWINGS IS FOR A COMPLETE ELECTRICAL SYSTEM. ANY ERRORS OR UNCERTAINTY SHALL BE BROUGHT TO THE ATTENTION OF THE PRIME CONTRACTOR AND ENGINEER AS SOON AS FOUND.
8. THE COMPLETE ELECTRICAL INSTALLATION SHALL BE TESTED AS A COMPLETE WORKING SYSTEM.
9. WE WILL RESTORE ALL DAMAGES RESULTING FROM WORK AND LEAVE PREMISES IN CLEAN CONDITION WHEN FINISHED WITH WORK.
10. ALL ITEMS ARE NEW (NEW) UNLESS NOTED AS EXISTING (EXIST) AS MARK IN THE TABLE.
11. ALL CONDUITS SHALL BE EMT, INTERMEDIATE METAL CONDUIT, OR RIGID STEEL. MINIMUM SIZE SHALL BE 1/2". ALL CONDUIT, BOXES AND ELECTRICAL FITTINGS SHALL BE STEEL.
12. ALL EXTERIOR EQUIPMENT SHALL BE IN WEATHERPROOF (NEMA 3R) ENCLOSURES. ALL NEW WIRING SHALL BE IN CONDUIT, SUITABLE FOR SUN EXPOSURE AND WET LOCATIONS. FIELD APPLIED COATING ARE NOT ACCEPTABLE.
13. INVERTERS MUST COMPLY WITH UL 1741 TO PREVENT ISLANDING ON POWER FAILURE. THE INVERTER SHALL PUT NOT POWER ON TO THE GRID IF THE GRID IS OFF-LINE. ALL SYSTEM COMPONENTS (MODULES AND INVERTERS ETC) SHALL BE UL LISTED.
14. MOUNT TO ROOF USING UL APPROVED MOUNTING HARDWARE. FOLLOWING MANUFACTURERS DIRECTIONS. MOUNTING HARDWARE EVERY 4' ON CENTER UNLESS OTHERWISE NOTED.
15. OBTAIN THE BEST INFORMATION ON UNDERGROUND UTILITIES IN AREAS BEING TRENCHED. USE "DIG ALERT" OR OTHER LOCATING SERVICE BEFORE DIGGING.

STORM WATER PREVENTION NOTES:

STORM WATER POLLUTION PREVENTION DEVICES AND PRACTICES SHALL BE INSTALLED AND/OR INSTITUTED AS NECESSARY TO ENSURE COMPLIANCE WITH THE CITY WATER QUALITY STANDARDS CONTAINED IN LOCAL REGULATIONS, FEDERAL REGULATIONS AND ANY EROSION CONTROL PLAN ASSOCIATED WITH THIS PROJECT. ALL SUCH DEVICES AND PRACTICES SHALL BE MAINTAINED, INSPECTED AND/OR MONITORED TO ENSURE ADEQUACY AND PROPER FUNCTION THROUGHOUT THE DURATION OF THE CONSTRUCTION PROJECT.

COMPLIANCE WITH THE WATER QUALITY STANDARDS AND ANY EROSION CONTROL PLAN ASSOCIATED WITH THIS PROJECT INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:

1. ALL POLLUTANTS SHALL BE RETAINED ON SITE UNTIL PROPERLY DISPOSED OF, AND MAY NOT BE TRANSPORTED FROM THE SITE VIA SHEET FLOW, SWALES, AREA DRAINS, NATURAL DRAINAGE COURSES OR WIND.
2. STOCKPILES OF CONSTRUCTION-RELATED MATERIALS SHALL BE PROTECTED FROM BEING TRANSPORTED FROM THE SITE BY FORCES OF WIND OR WATER FLOW.
3. TRASH AND CONSTRUCTION SOLID WASTES SHALL BE DEPOSITED INTO COVERED RECEPTACLE TO PREVENT CONTAMINATION OF RAINWATER AND DISPERSAL BY WIND.

GROUNDING NOTES

1. ALL EQUIPMENT SHALL BE PROPERLY GROUNDED PER THE REQUIREMENTS OF NEC ARTICLES 250 & 690.
2. PV MODULES SHALL BE GROUNDED TO MOUNTING RAILS USING MODULE LUGS OR RACKING INTEGRATED GROUNDING CLAMPS AS ALLOWED BY LOCAL JURISDICTION. ALL OTHER EXPOSED METAL PARTS SHALL BE GROUNDED USING UL-LISTED LAY-IN LUGS.
3. IF THE EXISTING MAIN SERVICE PANELS DOES NOT HAVE A VERIFIABLE GROUNDING ELECTRODE, IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSTALL A SUPPLEMENTAL GROUNDING ELECTRODE.
4. EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED ACCORDING TO NEC ARTICLE 690.45, AND BE A MINIMUM OF #10AWG WHEN NOT EXPOSED TO DAMAGE, AND #3AWG SHALL BE USED WHEN EXPOSED TO DAMAGE.

CLIENT NOTES**ADDERS**

Squirrel Guard	X
U-Anchor	
Skirt	X
Float	
Trenching	
EV charger	
Breaker Box upgrade	
Supply Side Connection	
Pipe Standoffs	
GSM Kit	
Battery Storage	
Consumption meter	
Breaker Brand and Size	
Extended Inverter Warranty	
Multiple Arrays	
Zilla Flashing	

BILL OF MATERIALS

15 No's ENPHASE IQ7
15 No's Q CELLS 315
3 x OCPD 20 + 1 x OCPD 30
WIRE #12 AWG + WIRE #10 AWG
+ GROUND #10 AWG + GROUND #6 AWG



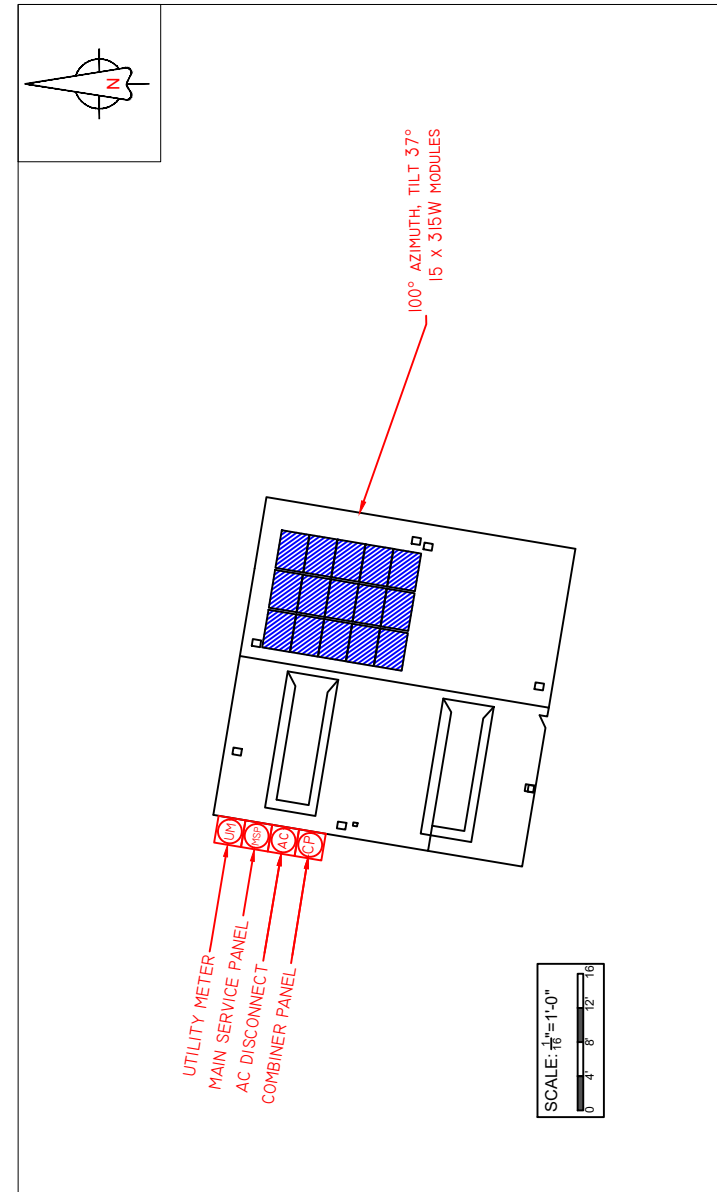
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PROPERTY LAYOUT



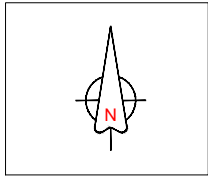
ROOF MAP



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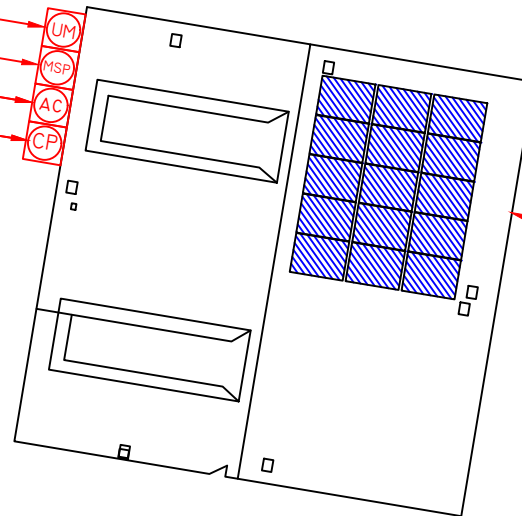


ROOF		
ROOF ATTACHMENT	Flush	
ROOF TYPE	Asphalt Shingles	
RAFTER SIZE	2x10 @ 16"	
ROOF AREA	1385	Sq. ft
ARRAY AREA	272.06	Sq. ft
pv % AREA	20%	
LAG PENETRATION	2.5	inches

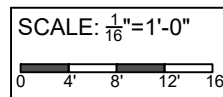
WEATHER	
SNOW	30psf
RISK CATEGORY	II
WIND EXPOSURE CATEGORY	B
WIND SPEED	115MPH

ROOF SIZE		
RAFTER LENGTH	24	ft
DEGREES	37	"
RUN	19.2	ft
TOTAL WIDTH	38.3	ft

UTILITY METER
MAIN SERVICE PANEL
AC DISCONNECT
COMBINER PANEL



100° AZIMUTH, TILT 37°
15 x 315W MODULES



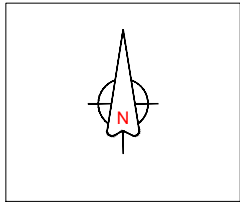
PV LAYOUT




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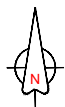
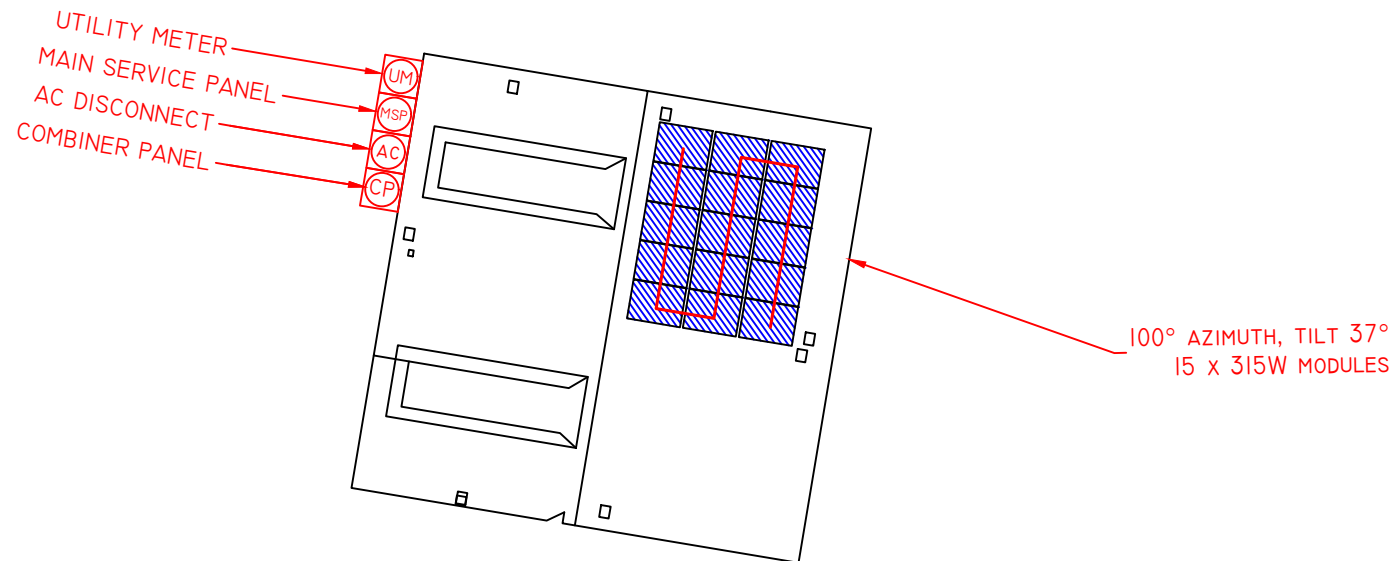
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THE MAXIMUM CAPACITY OF MODULES ON 1 STRING	
ENPHASE	
ENPHASE IQ7	
16 Modules	

LEGEND:
 : string



SCALE: $\frac{1}{16}" = 1'-0"$


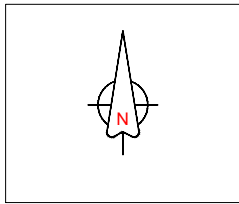
STRING LAYOUT



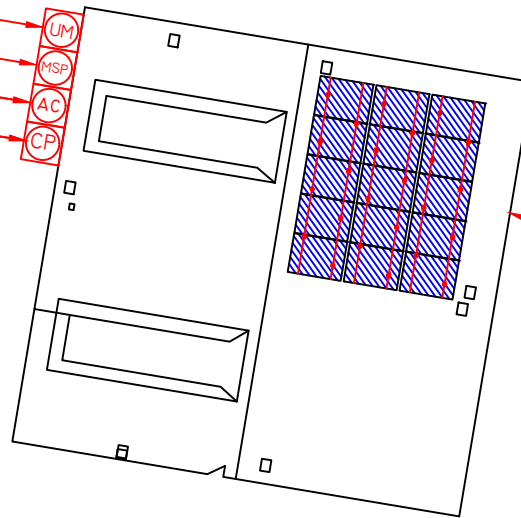
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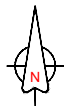
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UTILITY METER
MAIN SERVICE PANEL
AC DISCONNECT
COMBINER PANEL



100° AZIMUTH, TILT 37°
15 x 315W MODULES



SCALE: $\frac{1}{16}" = 1'-0"$
0 4' 8' 12' 16'

ATTACHMENT LAYOUT

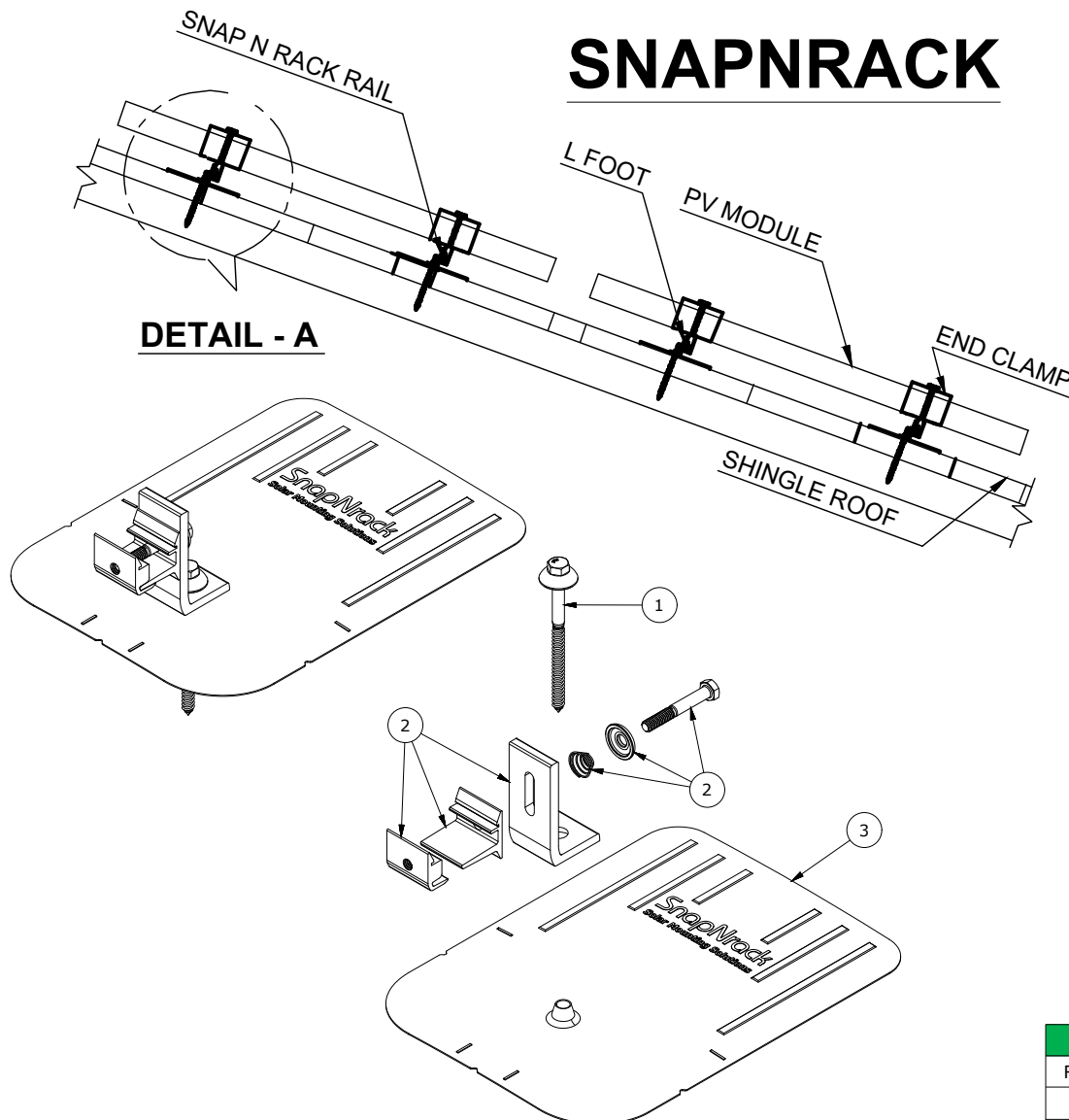


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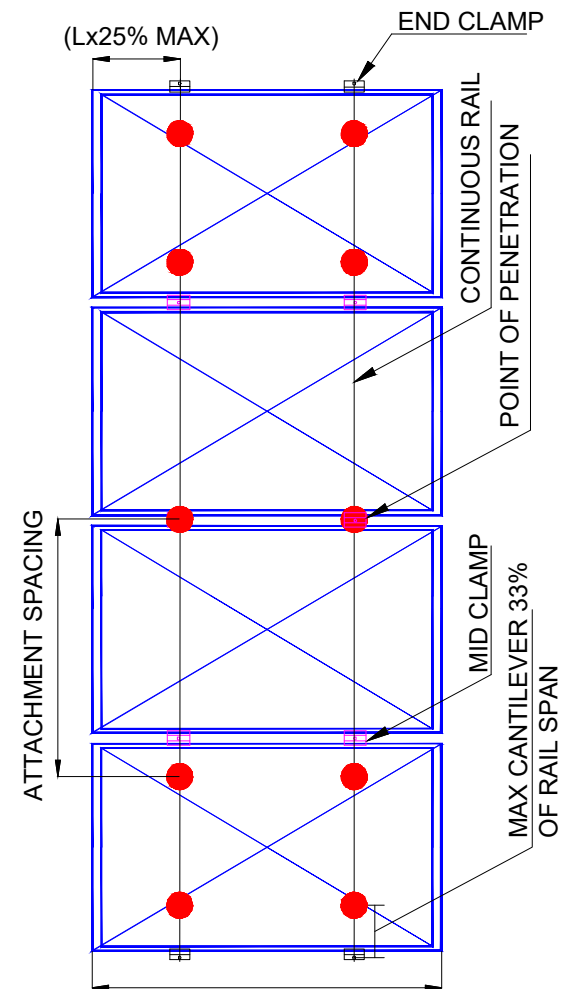
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SNAPNRACK



MODULE SURFACE 4" ABOVE ROOF SURFACE



ROOF		
ROOF ATTACHMENT	Flush	
ROOF TYPE	Asphalt Shingles	
RAFTER SIZE	2x10 @ 16"	
ROOF AREA	1385	Sq. ft
ARRAY AREA	272.06	Sq. ft
pv % AREA	20%	
LAG PENETRATION	2.5	inches

ATTACHMENT DETAILS



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DJ HAMPTON RESIDENCE : 203 S WEST ST, ALEXANDRIA, VA 22314

SOLAR PHOTOVOLTAIC SYSTEM: 4.725 KW

MICROINVERTERS SYSTEM

15 x - ENPHASE - IQ7 60-2-US MICROINVERTERS

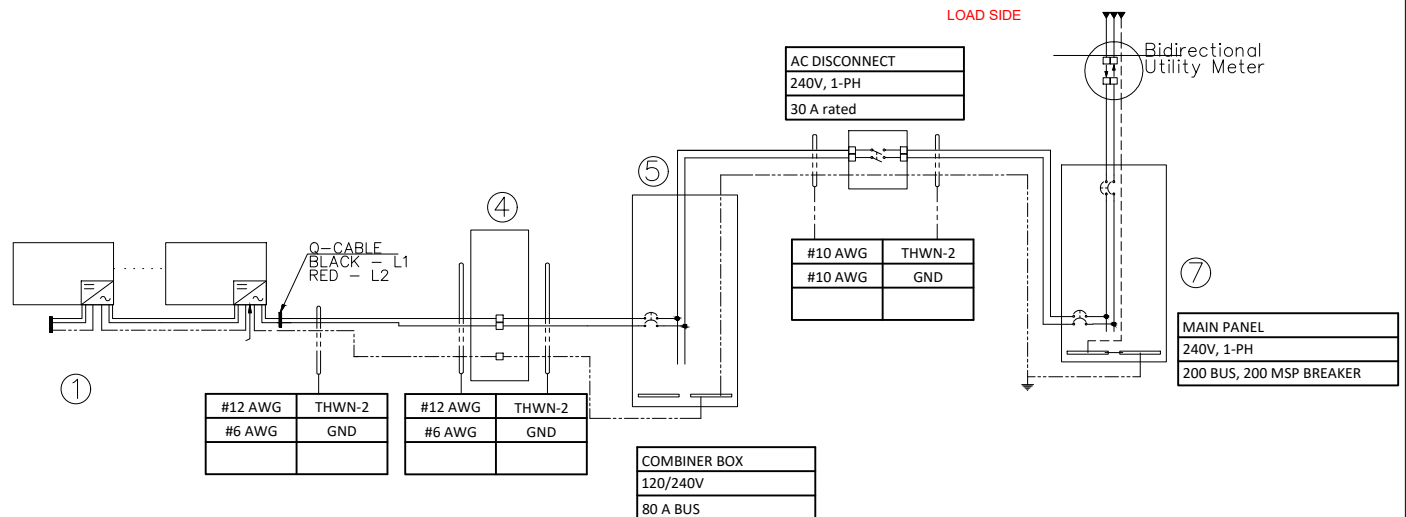
LOAD SIDE

ELECTRICAL THREE LINE DIAGRAM

ITEM	DESCRIPTION	BREAKERS (A)	WIRE SIZE
1	Q CELLS 315		#12 AWG
4	TO JUNCTION BOX	20	#12 AWG
5	TO IQ COMBINER BOX	20	#10 AWG
6	TO AC DISCONNECT	30	#10 AWG
7	TO THE MAIN SERVICE PANEL	20	#10 AWG

System Configuration		
Number of strings	1	No's
Number of Modules	15	No's
Max Modules on 1 string	15	
Number of Inverter	15	No's
Module Model	QPEAK DUO BLK G5	
Inverter Model	IQ7 60-2-US	
PV Service Disconnect		A
DC Watts STC	4,725.00	W
Max AC Output Current	15	A
Operating AC Voltage	240	V

4.725 kW DC PROPOSED PV SYSTEM THREE LINE DIAGRAM						
New	1	SOLAR MODULES	1 string(s)	15	No of modules	4.725 kW Total Output
New	4	JUNCTION BOX	600 V			
New		INVERTER	ENPHASE			IQ7 60-2-US
New	6	AC DISCONNECT	30	A rated		
New	5	IQ COMBINER BOX	120/240 V	80	AMPS	
Existing	7	MSP	240 V	200	A rated	LOAD SIDE
New	8	MONITORING	Enphase Envoy			
No	9	BATTERY				



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SOLAR PHOTOVOLTAIC SYSTEM: 4.725 KW

MICROINVERTERS SYSTEM

15 x - ENPHASE - IQ7 60-2-US MICROINVERTERS

ITEM		DESCRIPTION	BREAKERS (A)	WIRE SIZE

MICROINVERTERS SYSTEM	
15 x - ENPHASE - IQ7 60-2-US MICROINVERTERS	

1st Inverter Rating Specs		
ENPHASE	IQ7 60-2-US	
Nominal Input		A DC
Max. Short Circuit I/P	15	A DC
Output Voltage	240	V AC
Imax	1	A AC
Inec	1.25	A @ (125%)
Outdoor	NEMA 6	Enclosure
UL 1741 / IEEE 1547		
2nd Inverter Rating Specs		

BILL OF MATERIAL										
	REF. DES.	QTY.	MANUFACTURER	MODEL NUMBER	DESCRIPTION					
1	SOLAR MODULES	15	Q CELLS 315	QPEAK DUO BLK GS	SOLAR PANEL	315	W	1000	V (UL)	
4	JUNCTION BOX	1	TBD	TBD	ARRAY JUNCTION BOX	600	V			
	INVERTER	15	ENPHASE	IQ7 60-2-US	INVERTERS	0.24	WW		NEMA 6	240
6	AC DISCONNECT	1	TBD	TBD	AC DISCONNECT	0.3	A		NON-FUSED	
5	IQ COMBINER BOX	1	120/240	V	200	AMPS				
7	MSP	1	TBD	TBD	MAIN SERVICE PANEL	200	A		LOAD SIDE	240
8	MONITORING	1	Enphase Envoy							

PV System DC Disconnect			
Operating Current		x	A DC
Operating Voltage			V DC
Max. System Voltage			V DC
Short Circuit Current		x	A DC

[illegible]

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SYSTEM LABELING DETAIL:

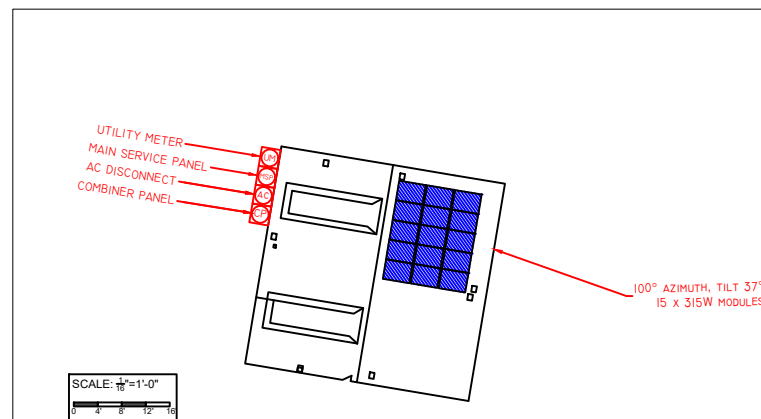
Alternate Power Source Placard shall be metallic or plastic with engraved or machine printed letters in a contrasting color to the plaque, include the location of meter, disconnects, inverter, the array and a footprint of the entire building and site. This plaque will be attached by pop rivets, screws or other approved fasteners. If exposed to sunlight, it shall be UV resistant.

Photovoltaic DC conductors entering the building shall be installed in a metallic raceway and shall be identified every 5 feet -- and within 1 foot of turns or bends and within 1 foot above and below penetrations of roof/ceiling assemblies, walls, or barriers labeled

SIGNAGE REQUIREMENT :

Red back ground. White lettering. ("WARNING"-3/8" LETTERS). All capital letters. Arial or similar font. Weather-resistant material UL 969.

DC DISCONNECT WARNING			AC DISCONNECT WARNING		
PHOTOVOLTIC SYSTEM DC DISCONNECT			PHOTOVOLTIC SYSTEM AC DISCONNECT		
OPERATING VOLTAGE		V DC	OPERATING VOLTAGE	240	V AC
OPERATING CURRENT		A DC	OPERATING CURRENT	15	Amps
MAX SYSTEM VOLTAGE		V DC			
SHORT CIRCUIT CURRENT		A DC			
WARNING			WARNING		
ELECTRIC SHOCK HAZARD			ELECTRIC SHOCK HAZARD		
DO NOT TOUCH TERMINALS; TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION			DO NOT TOUCH TERMINALS; TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION		
PER NEC 680.14 (c.)(2), 680.17(4), 680.54			PER NEC 680.14 (c.)(2), 680.17(4), 680.54		
Per NEC 690.53 operating voltage, operating current, max system voltage, short circuit current, and maximum output current of the charge controller if one is installed			Per NEC 690.54 operating voltage, operating current		
PLACE ON: Main Solar Disconnect			PLACE ON: Inverter Breaker Panel if sum of breaker exceeds panel rating		
PHOTOVOLTIC SYSTEM DISCONNECT			WARNING		
"PV System Disconnect" label NEC 690.14(c.)(2) Required Disconnect Markings			INVERTER OUTPUT CONNECTION		
			DO NOT RELOCATE THIS OVER CURRENT DEVICE		
			Inverter output connection "label NEC 705.12(7) Point of Connection		
DC LABELS					
PLACE ON 1. DC Junction Boxes 2. DC Combiner Boxes					
WARNING			OTHERS		
ELECTRIC SHOCK HAZARD			PLACE ON: All DC Source Markings and System Output Conductor Raceways		
THE DC CONDUCTORS OF THIS PHOTOVOLTIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED			PLACE ON: Next to Inverter Interconnection Breaker, Load center, & Service Panel		
"Electric shock hazard" label NEC 690.35(F) ungrounded PV system			PV SOLAR BREAKER		
PLACE ON 1. DC Junction Boxes 2. DC Combiner Boxes			DO NOT RELOCATE THIS OVER CURRENT DEVICE		
PHOTOVOLTIC POWER SOURCE			PHOTOVOLTIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN		
"PV Power Source" label NEC 690.31(E)(3) DC-PV Source Conductor			Label NEC 690.56(c.)		
			PLACE ON: Inverter		
			PLACE ON: Next GFI Reset		
			WARNING		
			ELECTRIC SHOCK HAZARD		
			IF GROUND FAULT IS INDICATED, ALL NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED		
			"Ground Fault Indicated" label NEC 690.5(c.) Ground Fault Protection		

SYSTEM LABELING DETAILS

LEGEND	
1	SOLAR MODULES
2	JUNCTION BOX
3	AC DISCONNECT
4	DC COMBINER BOX
5	INVERTER



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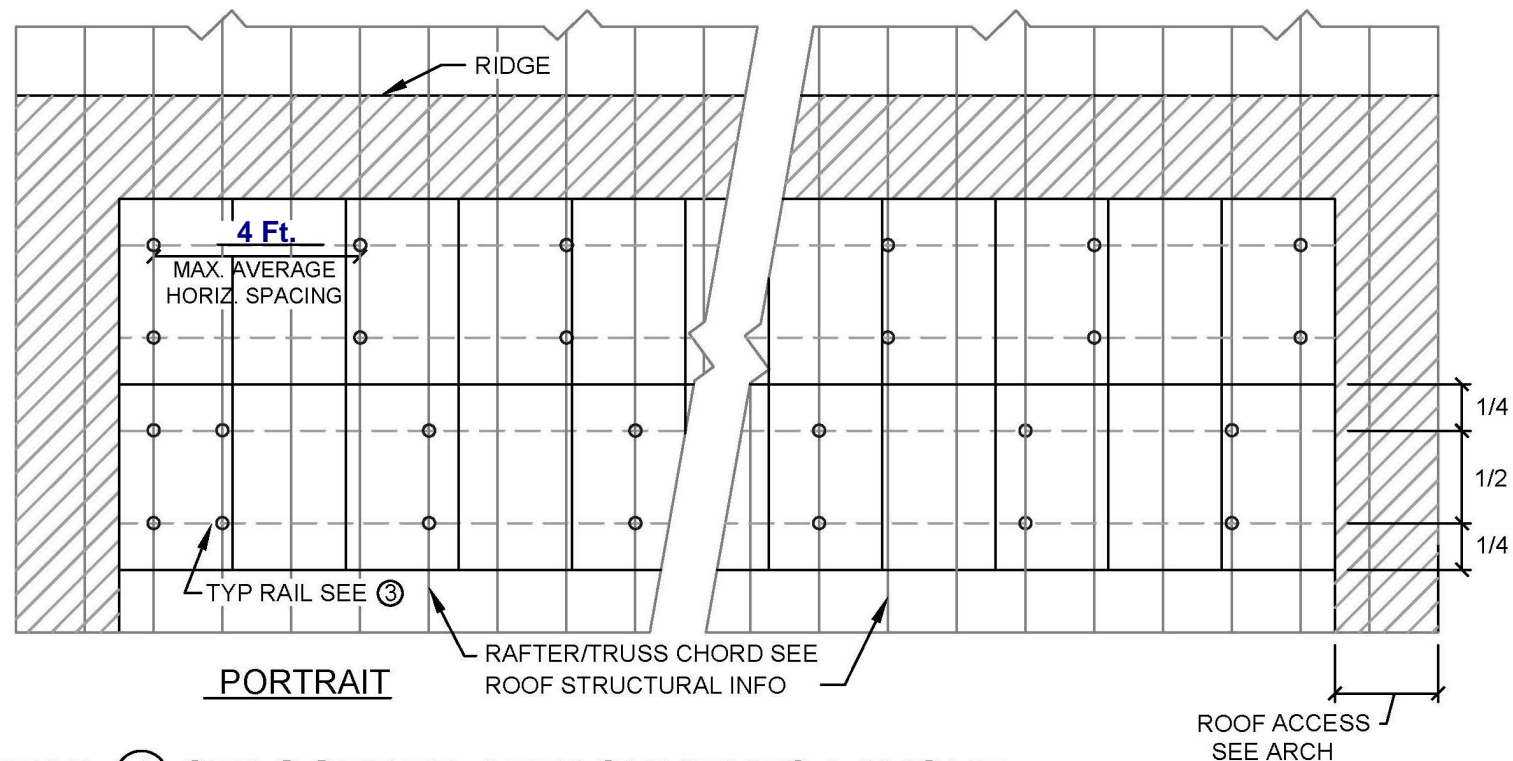
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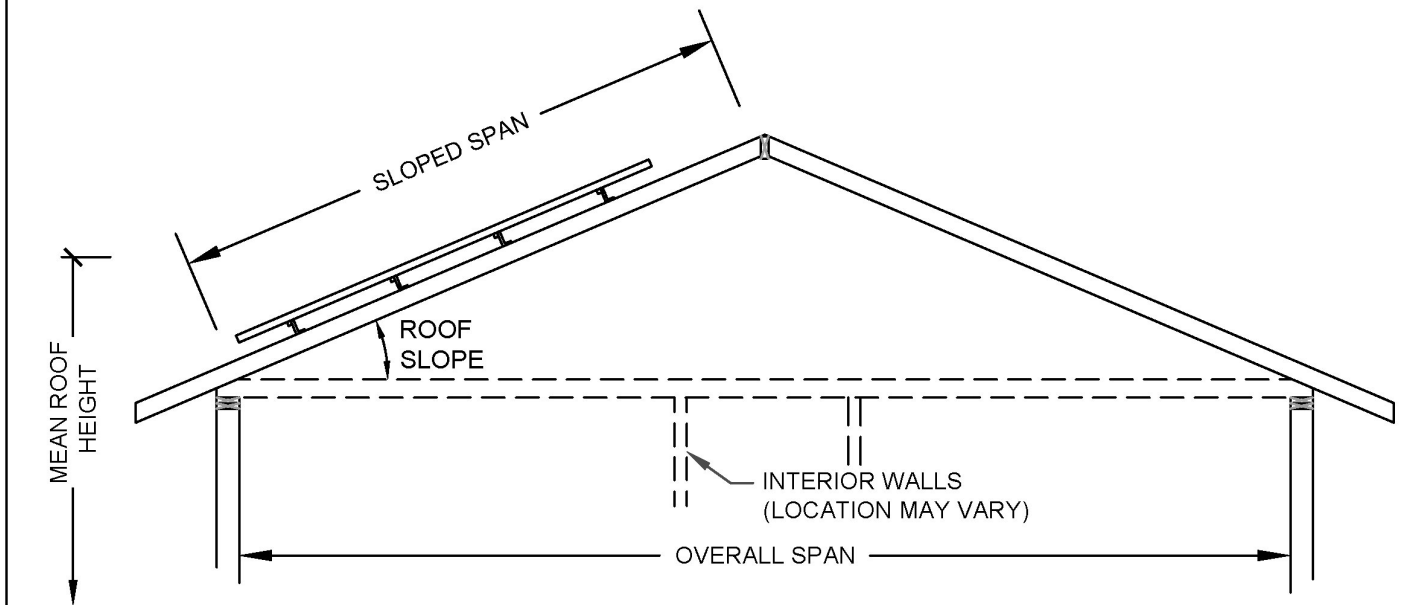
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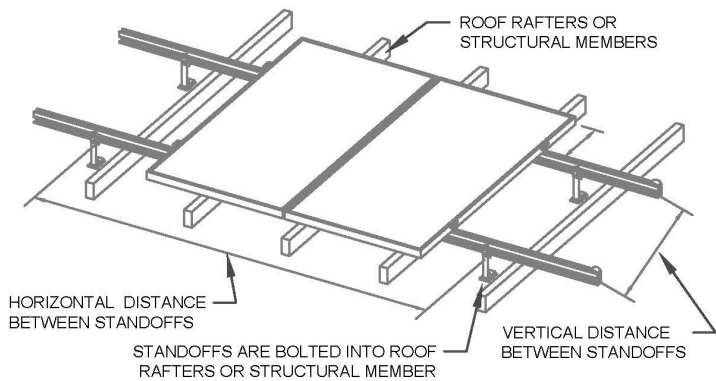
DETAIL ① STAGGERED ATTACHMENTS LAYOUT

See PV drawings for distance to edge of roof.

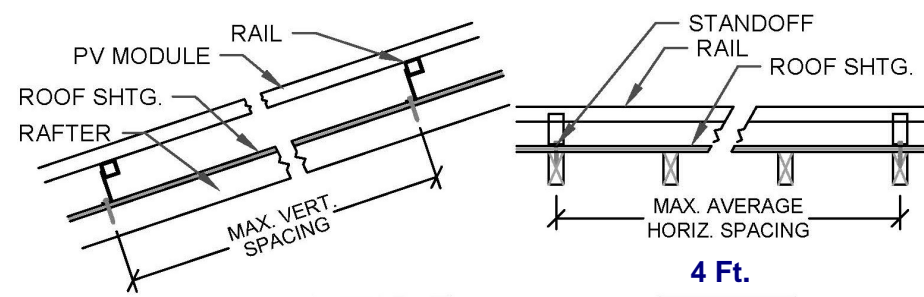
1. Installers to verify rafter size, spacing and sloped spans, and notify the E.O.R of any discrepancies before proceeding.
2. Any rotted or damaged rafters shall be replaced prior to proceeding.
3. As a precaution, old or wet snow should be removed from the roof, if the snow builds up to 18" or more.



DETAIL ② ROOF TYPE - SINGLE SPAN RAFTERS



TYPICAL 2-RAIL SYSTEM



DETAIL ③ FLUSHMOUNT



④ STRUCTURAL INFORMATION

SRC Job Id:	24983
Ceiling Type:	1/2 gyp. Bd.
Collar Tie Space:	0
Coverage %:	20
Frame Size:	2x10@16
Ground Snow (psf):	30
Sloped Roof Snow Load (psf):	15.09
Lag Screw Diameter (in):	5/16
Lag Screw Embedment (in):	2.5
Overall Span (ft):	38.3
PV Orientation:	Portrait
PV Weight (psf):	2
Rafter Sloped Span (ft):	23
Rail System:	2Rail
Roofing Type:	Asphalt Shingles
Roof Mean Height (ft):	30
Roof Slope (degrees):	37
Roof Type:	SingleSpanRafters
Sloped Ceiling?:	Yes
Standoff Max. Horz. Space (ft):	4
Standoff Max. Vert. Space (ft):	2.708
Standoff Staggered?:	Yes
Wind Exposure:	B
Wind Speed (mph):	115

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SOLAR-ROOF-CHECK.COM











Q.PEAK DUO BLK-G5 300-320

Q.ANTUM SOLAR MODULE

The new **Q.PEAK DUO BLK-G5** solar module from **Q CELLS** impresses with its outstanding visual appearance and particularly high performance on a small surface thanks to the innovative **Q.ANTUM DUO** Technology. **Q.ANTUM**'s world-record-holding cell concept has now been combined with state-of-the-art circuitry half cells and a six-busbar design, thus achieving outstanding performance under real conditions — both with low-intensity solar radiation as well as on hot, clear summer days.



Q.ANTUM TECHNOLOGY: LOW LEVELIZED COST OF ELECTRICITY

Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 19.3%.



INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behavior.



ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology¹, Hot-Spot Protect and Traceable Quality Tra.Q™.



EXTREME WEATHER RATING

High-tech aluminum alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa) regarding IEC.



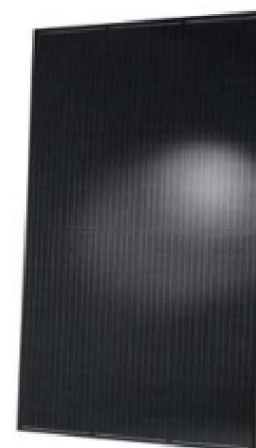
A RELIABLE INVESTMENT

Inclusive 12-year product warranty and 25-year linear performance guarantee².



STATE OF THE ART MODULE TECHNOLOGY

Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with **Q.ANTUM** Technology.



THE IDEAL SOLUTION FOR:



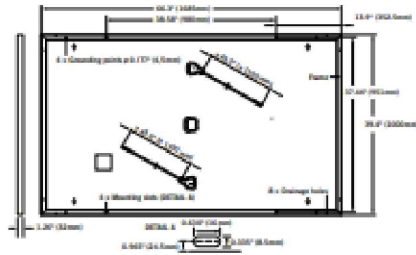
Rooftop arrays on residential buildings

Engineered in **Germany**

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

Q CELLS

Formal	66.31in x 39.41in x 1.26in (including frame) (1685mm x 1000mm x 32mm)
Weight	41.2lbs (18.7kg)
Front Cover	0.13in (3.2mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6 x 20 monocrystalline Q-ANTUM solar half-cells
Junction box	2.76-3.35in x 1.97-2.76in x 0.51-0.83in (70-85mm x 50-70mm x 13-21 mm), decentralized, IP67
Cable	4mm ² Solar cable; (+) ≥43.3in (1100mm), (-) ≥43.3in (1100mm)
Connector	Multi-Contact MC4, IP68



POWER CLASS				300	305	310	315	320
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE $\pm 5\%$ / -0%)								
Minimum	Power at MPP ¹	P_{MPP}	[W]	300	305	310	315	320
	Short Circuit Current ¹	I_{SC}	[A]	9.72	9.78	9.83	9.89	9.94
	Open Circuit Voltage ¹	V_{OC}	[V]	39.48	39.75	40.02	40.29	40.56
	Current at MPP	I_{MPP}	[A]	9.25	9.31	9.36	9.41	9.47
	Voltage at MPP	V_{MPP}	[V]	32.43	32.78	33.12	33.46	33.80
	Efficiency ¹	η	[%]	≥ 17.8	≥ 18.1	≥ 18.4	≥ 18.7	≥ 19.0
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²								
Minimum	Power at MPP	P_{MPP}	[W]	224.1	227.8	231.6	235.3	239.1
	Short Circuit Current	I_{SC}	[A]	7.83	7.88	7.92	7.97	8.01
	Open Circuit Voltage	V_{OC}	[V]	37.15	37.40	37.66	37.91	38.17
	Current at MPP	I_{MPP}	[A]	7.28	7.32	7.37	7.41	7.45
	Voltage at MPP	V_{MPP}	[V]	30.78	31.11	31.44	31.76	32.08

¹Measurement tolerances $P_{ref} \pm 3\%$, I_{sc} , $V_{oc} \pm 5\%$ at STC: 1000 W/m², 25 ± 2 °C, AM 1.5G according to IEC 60904-3. ²800 W/m², NMOT, spectrum AM 1.5G

Figure 1 is a line graph titled "Evolution of the relative price of PV compared to the standard term of guarantee for the 10 PV companies". The Y-axis is labeled "RELATIVE PRICE OF PV COMPARED TO THE STANDARD TERM OF GUARANTEE, p = 0.01 (%)" and ranges from 70 to 120. The X-axis is labeled "Standard term of guarantee for the 10 PV companies, with the lowest production capacity in 2014 (in % - September 2014)" and ranges from 0 to 100. The graph shows three lines: a solid blue line for "CO2-EA", a dashed blue line for "Industry standard for linear expansion", and a solid black line for "Industry standard for fixed expansion". The CO2-EA line starts at approximately 115% and decreases linearly to about 85% at 100% standard term. The industry standards are horizontal lines at approximately 105% (linear) and 95% (fixed).

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

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

Iterations	Relative Efficiency (%)
0	85
2000	95
4000	100
6000	100
8000	100
10000	100

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

Temperature Coefficient of I_{sc}	α	[%/K]	+0.04	Temperature Coefficient of V_{oc}	β	[%/K]	-0.28
Temperature Coefficient of P_{max}	γ	[%/K]	-0.37	Normal Operating Module Temperature	NMOT	[°F]	109 ± 5.4 (43 ± 3°C)

Maximum System Voltage V_{in}	[V]	1000 (IEC) / 1000 (UL)	Safety Class	II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating	C (IEC) / TYPE 1 (UL)
Max. Design Load, Push / Pull (UL) ²	[lbs./in ²]	75 (3600 Pa) / 55 (2667 Pa)	Permitted module temperature on continuous duty	-40°F up to +185°F (-40°C up to +85°C)
Max. Test Load, Push / Pull (UL) ²	[lbs./in ²]	113 (5400 Pa) / 84 (4000 Pa)	² see installation manual	

UL 1709; VDE Quality Tested; CE-compliant;
IEC 61215:2016; IEC 61730:2016, Application class A



Number of Modules per Pallet	32
Number of Pallets per 53' Trailer	30
Number of Pallets per 40' High Cube Container	26
Pallet Dimensions (L x W x H)	69.3 in x 45.3 in x 46.9 in (1760 mm x 1150 mm x 1190 mm)
Pallet Weight	1415 lbs (642 kg)

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

Harrold & GILLIS, America Inc.

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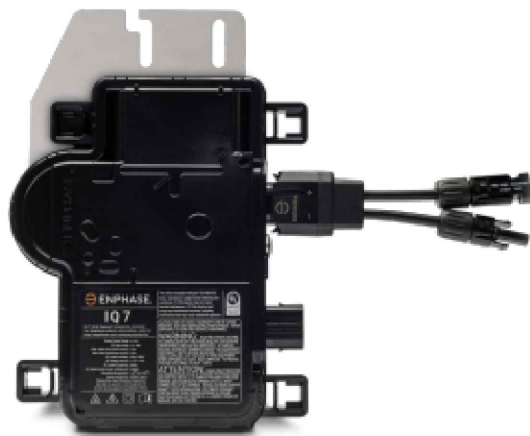
Specifications subject to technical changes © Marubeni OIL & GAS CO., LTD. 2018-03, P. 02/02, R-4

Enphase IQ 7 and IQ 7+ Microinverters

The high-powered smart grid-ready **Enphase IQ 7 Micro™** and **Enphase IQ 7+ Micro™** dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.



Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

Productive and Reliable

- Optimized for high powered 60-cell and 72-cell* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

* The IQ 7+ Micro is required to support 72-cell modules.



To learn more about Enphase offerings, visit enphase.com



Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)		IQ7-60-2-US		IQ7PLUS-72-2-US	
Commonly used module pairings ¹	235 W - 350 W +		235 W - 440 W +		
Module compatibility	60-cell PV modules only		60-cell and 72-cell PV modules		
Maximum input DC voltage	48 V		60 V		
Peak power tracking voltage	27 V - 37 V		27 V - 45 V		
Operating range	16 V - 48 V		16 V - 60 V		
Min/Max start voltage	22 V / 48 V		22 V / 60 V		
Max DC short circuit current (module Isc)	15 A		15 A		
Overvoltage class DC port	II		II		
DC port backfeed current	0 A		0 A		
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit				
OUTPUT DATA (AC)		IQ 7 Microinverter		IQ 7+ Microinverter	
Peak output power	250 VA		295 VA		
Maximum continuous output power	240 VA		290 VA		
Nominal (L-L) voltage/range ²	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V	
Maximum continuous output current	1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)	
Nominal frequency	60 Hz		60 Hz		
Extended frequency range	47 - 68 Hz		47 - 68 Hz		
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms		
Maximum units per 20 A (L-L) branch circuit ³	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)	
Overvoltage class AC port	III		III		
AC port backfeed current	0 A		0 A		
Power factor setting	1.0		1.0		
Power factor (adjustable)	0.85 leading ... 0.85 lagging		0.85 leading ... 0.85 lagging		
EFFICIENCY	@240 V	@208 V	@240 V	@208 V	
Peak efficiency	97.6 %	97.6 %	97.5 %	97.3 %	
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %	
MECHANICAL DATA					
Ambient temperature range	-40°C to +65°C				
Relative humidity range	4% to 100% (condensing)				
Connector type (IQ7-60-2-US & IQ7PLUS-72-2-US)	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)				
Dimensions (WxHxD)	212 mm x 175 mm x 30.2 mm (without bracket)				
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				
Environmental category / UV exposure rating	NEMA Type 6 / outdoor				
FEATURES					
Communication	Power Line Communication (PLC)				
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.				
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.				
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 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.				

1. No enforced DC/AC ratio. See the compatibility calculator at <https://enphase.com/en-us/support/module-compatibility>.

2. Nominal voltage range can be extended beyond nominal if required by the utility.

3. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit enphase.com

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2019-3-26



STRUCTURAL CALCULATIONS FOR PV INSTALLATION

Prepared for



Solar-Roof-Check

Ipsun Power, Inc
9504 Poplar Leaf Court
Fairfax VA, 22031
USA
866-484-7786

USER:	HumzaArshad
COMPANY NAME:	Ipsun Power, Inc
SRC JOB ID:	24983
JOB REPORT DATE:	2019-09-12/Rev A
JOB NUMBER:	IP20190726VA
JOB NAME:	DJ Hampton
JOB ADDRESS:	203 South West Street Alexandria, VA 22314



Program Version: 2019-07-24:7

Contact: jadams@solar-roof-check.com | Phone: 805.215.8665

LOAD COMBINATIONS: ASCE 7- 05: IBC 2009 (NOT APPLICABLE IN CA)

- LOADING COMB. #1: WIND UPLIFT - 0.6DL SOLAR AT STANDOFF ($C_d=1.6$) ZONE 2
- LOADING COMB. #2: DL Rf + DL SOLAR + Rf LL ($C_d=1.25$).
- LOADING COMB. #3: DL Rf + DL SOLAR + WIND DOWN ($C_d=1.6$). ZONE 1
- LOADING COMB. #4: DL Rf + DL SOLAR + SNOW ($C_d=1.15$).
- LOADING COMB. #5: DL Rf + DL SOLAR +.75WIND +.75SNOW ($C_d=1.6$) ZONE 1
- LOADING COMB. #6: CHECK SEISMIC FOR SECT. 3404.4 ALTERATIONS.
- LOADING COMB. #7: (0.6)(DL Rf + DL SOLAR) + WIND UP ($C_d=1.6$). ZONE 1

LOAD COMBINATIONS: ASCE 7-10: IBC 2015, CBC 2016

- LOADING COMB. #1: (0.6)WIND UPLIFT - 0.6DL SOLAR AT STANDOFF ($C_d=1.6$) ZONE 2
- LOADING COMB. #2: DL Rf + DL SOLAR + Rf LL ($C_d=1.25$).
- LOADING COMB. #3: DL Rf + DL SOLAR + (0.6)WIND DOWN ($C_d=1.6$) ZONE 1
- LOADING COMB. #4: DL Rf + DL SOLAR + SNOW ($C_d=1.15$)
- LOADING COMB. #5: DL Rf + DL SOLAR +.75(0.6)WIND +.75SNOW ($C_d=1.6$) ZONE 1
- LOADING COMB. #6: CHECK SEISMIC FOR SECT. 3404.4 ALTERATIONS
- LOADING COMB. #7: (0.6)WIND UP-0.6(DL Rf + DL SOLAR) ($C_d=1.6$) ZONE 1

REFERENCES: NJ, NDS LATEST EDITION

Duration Factors	Section Modules	Size Form Factor
$C_{d_{Wind}} := 1.6$	$S_{2 \times 2} := 0.563$ $S_{4 \times 4} := 7.150$	$C_{f_{2 \times 2}} := 1.5$ $C_{f_{4 \times 4}} := 1.5$
$C_{d_{Snow}} := 1.15$	$S_{2 \times 4} := 3.063$ $S_{4 \times 6} := 17.650$	$C_{f_{2 \times 4}} := 1.5$ $C_{f_{4 \times 6}} := 1.3$
$C_{d_{DL}} := 0.9$	$S_{2 \times 6} := 7.563$ $S_{4 \times 8} := 30.660$	$C_{f_{2 \times 6}} := 1.3$ $C_{f_{4 \times 8}} := 1.3$
$C_{d_{LL}} := 1.25$	$S_{2 \times 8} := 13.14$ $S_{4 \times 10} := 49.900$	$C_{f_{2 \times 8}} := 1.2$ $C_{f_{4 \times 10}} := 1.2$
	$S_{2 \times 10} := 21.39$ $S_{4 \times 12} := 73.800$	$C_{f_{2 \times 10}} := 1.1$ $C_{f_{4 \times 12}} := 1.1$
$F_b := 1000 \text{ psi}$	$S_{2 \times 12} := 31.64$	$C_{f_{2 \times 12}} := 1.0$

USER INPUT:

1. Ceiling Type:	1/2 gyp. Bd.
2. Collar Tie Space:	0
3. Coverage %:	20
4. Frame Size:	2x10@16
5. Ground Snow (psf):	30
6. Vertical Snow Load on slope (psf):	15.09
7. Lag Screw Diameter (in):	5/16
8. Lag Screw Embedment (in):	2.5
9. Overall Span (ft):	38.3
10. PV Weight (psf):	2
11. Rafter Sloped Span (ft):	23
12. Rail System:	2Rail
13. Roofing Type:	Asphalt Shingles
14. Roof Mean Height (ft):	30
15. Roof Slope (degrees):	37
16. Roof Type:	SingleSpanRafters
17. Sloped Ceiling?:	Yes
18. Standoff Max. Horz. Space (ft):	4
19. Standoff Max. Vert. Space (ft):	2.708
20. Standoff Staggered?:	Yes
21. Wind Exposure:	B
22. Wind Speed (mph):	115
23. wr = Weight of RoofType (psf):	2.00
24. wra = Weight of Rafter (psf):	2.55
25. wc = Weight of CeilingType:	2.20
26. wcj = Weight of Ceiling Joists (psf):	0.65
27. s = Rafter spacing (ft.):	1.33
28. PV Orientation:	Portrait

SLOPED/VAULTED CEILING - CARRIED BY THE TOP CHORD/RAFTER:

$DL_{tc} :=$ Deadload Top Chord (Rafter)
 $DL_{bc} :=$ Deadload Bottom Chord (Ceiling)

FLAT CEILING - CARRIED BY THE CEILING JOISTS:

$DL_{tc} :=$ Deadload Top Chord (Rafter)
 $DL_{bc} :=$ Deadload Bottom Chord (Ceiling)
 $wDL_{tc} := DL_{tc} \times s$ (plf) 13.00
 $wDL_{bc} := DL_{bc} \times s$ (plf) 0
 TA = Horizontal spacing x Vertical spacing (sf) 10.83
Topographic Factor
 Assume Roof is not on top of a hill, bluff, or mountain ridge. 1.0
 Sect. 6.5.7.2, pg. 26
 C_{LS} 2.00

COMPONENTS AND CLADDING:

ASCE 7-05:

Zone 1: Net Wind Pressure - See Figure 6-3, pg. 42 N/A
 Zone 2: Net Wind Pressure - See Figure 6-3, pg. 42 N/A
 Adjustment Factor for Height and Exposure - See Figure 6-3, pg. 44 N/A

ASCE 7-10:

Zone 1: Net Wind Pressure - See Figure 30.5-1 22.60
 Zone 2: Net Wind Pressure - See Figure 30.5-1, 26.60
 Adjustment Factor for Height and Exposure - See Figure 30.5-1, 1.00

 $p_{Zone1\ up} =$ Net Wind Pressure x Adj. Factor (psf) = 22.60
 $p_{Zone2\ up} =$ Net Wind Pressure x Adj. Factor (psf) = 26.60
 $p_{Zone1\ dn} =$ Net Wind Pressure x Adj. Factor (psf) = 21.20

Note: For ASCE 7-10 the wind forces have been multiplied by 0.6

LOADING COMBINATION #1: WIND UPLIFT CONNECTION TO RAFTER - ZONE 2

$P_1 := TA \times (P_{up} - 6 \times DL_{Solar} \times \cos(\theta))$ uplift Zone 1	136.50
$P_2 := TA \times (P_{up} - 6 \times DL_{Solar} \times \cos(\theta))$ uplift Zone 2	162.50
d= Diam.lag screws User Input	5/16
t= lb/inch Withdrawal NDS 2015, Table 12.2A, pg. 77	235.00
e= Threaded embedment into wood User Input	2.50
W= Total withdrawal capacity	
$W := C_d W_{ind} \times t \times e$	940.00
$\% := \frac{W \times 100}{P_1}$	578.47
<< If equal to or more than 100% Code Compliant, OK!	

Table 3 represents the maximum Moment ($M = PL/a$) resulting from point loads (standoffs), for any spans (L) listed.

a= 2.09

Table 3 (The Moment Factor "a" for a 2 Rail system)

Length	Staggered		Unstaggered	
	Portrait	Landscape	Portrait	Landscape
L = 4'	4.00	4.00	4.00	2.91
L = 5'	4.00	3.50	3.72	2.50
L = 6'	4.00	3.00	3.43	2.09
L = 7'	3.60	2.84	2.95	1.83
L = 8'	3.20	2.67	2.46	1.56
L = 9'	3.03	2.59	2.34	1.44
L = 10'	2.86	2.50	2.22	1.31
L = 11'	2.77	2.25	2.04	1.19
L = 12'	2.67	2.00	1.85	1.07
L = 13'	2.61	1.88	1.74	0.90
L = 14'	2.55	1.75	1.62	0.92
L = 15'	2.51	1.68	1.50	0.86
L = 16'	2.46	1.60	1.38	0.81
L = 17'	2.43	1.45	1.31	0.76
L = 18'	2.40	1.29	1.23	0.72
L = 19'	2.38	1.24	1.17	0.68
L = 20'	2.35	1.18	1.11	0.65
L = 21'	2.22	1.14	1.06	0.62
L = 22'	2.09	1.10	1.00	0.59

Table 3 (The Moment Factor "a" for a Railless system)

Length	Staggered		Unstaggered	
	Portrait	Landscape	Portrait	Landscape
L = 4'	5.00	5.00	5.00	5.00
L = 5'	5.00	5.00	5.00	5.00
L = 6'	5.00	5.00	5.00	5.00
L = 7'	4.50	4.50	4.50	4.19
L = 8'	4.00	4.00	4.00	3.37
L = 9'	4.00	4.00	4.00	3.12
L = 10'	4.00	4.00	3.84	2.86
L = 11'	4.00	4.00	3.59	2.48
L = 12'	4.00	4.00	3.33	2.09
L = 13'	4.00	3.87	3.11	1.98
L = 14'	4.00	3.73	2.88	1.87
L = 15'	4.00	3.32	2.67	1.78
L = 16'	4.00	2.90	2.46	1.68
L = 17'	4.00	2.74	2.36	1.57
L = 18'	4.00	2.57	2.25	1.45
L = 19'	4.00	2.46	2.24	1.38
L = 20'	3.77	2.35	2.24	1.30
L = 21'	3.66	2.28	2.11	1.25
L = 22'	3.55	2.20	1.98	1.20

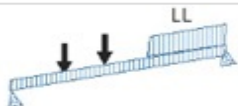
Note: For ASCE 7-10 the wind forces have been multiplied by 0.6

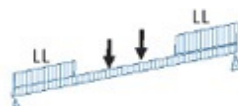
COMBINATION #2:

DL RF + DL SOLAR + RF LL (Cd=1.25) with LL= 14.96 psf

$$w := LL \times s \text{ plf} \quad (\text{plf}) := 19.94 \quad P := TA \times DL_{\text{Solar}} \quad 21.66$$

$$c := \frac{(L - 5.5)}{2} \quad (\text{ft}) := 8.75 \quad M_{DL} := \left(wDL_{tc} \times \frac{L^2}{8} + P_{sp} \times \frac{L}{a} \right) \times \cos(\theta) \quad 876.93$$

For Spans < 10.0 ft 
$$M_{LL} := \frac{\left[\left(w \times \frac{3}{2 \times L} \right) \times (2 \times L - 3) \right]^2 \times \cos(\theta)}{2 \times w} \quad \text{N/A}$$

For Spans = >10.0 ft 
$$M_{LL} := \frac{\left[\frac{w \times c \times (2 \times L - c) + w \times c^2}{2 \times L} \right]^2 \times \cos(\theta)}{2 \times w} \quad 609.72$$

$$M := M_{DL} + M_{LL} \quad (\text{lb-ft}) := 1486.64 \quad S_r := M \times \frac{12}{Fb \times Cd_{LL} \times Cf_x \times C_r \times C_{LS}} \quad 5.64$$

$$\% := \frac{S_x}{S_r} \times 100 \quad << \text{IF EQUAL TO OR MORE THAN 100\% CODE COMPLIANT, OK!} \quad 379.19$$

COMBINATION #3: ZONE 1

DL RF + DL SOLAR + WIND DOWN (Cd=1.6)

$$P_3 := TA \times (p_{dn} + DL_{\text{Solar}} \times \cos(\theta)) \quad 155.08$$

$$M_3 := \left(wDL_{tc} \times \frac{L^2}{8} \right) \times \cos(\theta \times \text{deg}) + P_3 \times \frac{L}{a} \quad 2393.20$$

$$S_r := M_3 \times \frac{12}{Fb \times Cd_{\text{Wind}} \times Cf_x \times C_r \times C_{LS}} \quad 7.09$$

$$\% := \frac{S_x \times 100}{S_r} \quad << \text{IF EQUAL TO OR MORE THAN 100\% CODE COMPLIANT, OK!} \quad 301.50$$

COMBINATION #4:

DL RF + DL SOLAR + SNOW (Cd=1.15)

$$S = \text{Sloped Roof Snow Load (psf)} \quad 15.09$$

$$P_4 := TA \times (S + DL_{\text{Solar}}) \quad 185.12$$

$$M_4 := \left(wDL_{tc} \times \frac{L^2}{8} + P_4 \times \frac{L}{a} \right) \times \cos(\theta) \quad 2313.50$$

$$S_r := M_4 \times \frac{12}{Fb \times Cd_{\text{Snow}} \times Cf_x \times C_r \times C_{LS}} \quad 9.54$$

$$\% := \frac{S_x \times 100}{S_r} \quad << \text{IF EQUAL TO OR MORE THAN 100\% CODE COMPLIANT, OK!} \quad 224.17$$

Note: For ASCE 7-10 the wind forces have been multiplied by 0.6

LOADING COMBINATION #5: ZONE 1		DL_{Rf} + DL_{Solar} + .75WIND + .75SNOW (C_D=1.6)
S = Sloped Roof Snow Load (psf)		15.09
$P_5 := TA \times (.75 \times S + DL_{Solar}) \times \cos(\theta) + (TA \times .75 \times p_{dn})$		218.54
$M_5 := \left(wDL_{tc} \times \frac{L^2}{8} + P_5 \times \frac{L}{a} \right) \times \cos(\theta)$		3091.56
$S_r := M_5 \times \frac{12}{Fb \times Cd_{Wind} \times Cf_x \times C_r \times C_{LS}}$		9.16
$\% := \frac{S_x \times 100}{S_r} \quad << \text{IF EQUAL TO OR MORE THAN 100\% CODE COMPLIANT, OK!}$		233.40

LOADING COMBINATION #6: CHECK SEISMIC LOADING:	
ExistingDL := DL _{Rf} + Walls	Walls := 5.5 psf 15.25
ProposedDL := ExistingDL + DL _{Solar} × C	15.65
SeismicIncrease := $100 \times \left(\frac{\text{ProposedDL}}{\text{ExistingDL}} \right) - 100$	2.62
<< IF EQUAL TO OR LESS THAN 10% CODE COMPLIANT, OK!	

SEISMIC SUMMARY

Sect. 3404.3 Alterations (See Exception):

The addition of the Solar Panels, meets the following:

The design strength of existing elements required to resist seismic forces is not reduced.

The seismic force to any existing lateral load-carrying structural element is not substantially increased.

No new lateral load-carrying structural elements are being added.

New nonstructural elements are being connected to existing structure per Chapter 16.

Alterations do not create structural irregularities.

Note: For ASCE 7-10 the wind forces have been multiplied by 0.6

LOADING COMBINATION #7: ZONE 1		(0.6)(DL_{Rf} + DL_{Solar}) + Wind Up	(C_D=1.6)
$P_7 := TA \times (p_{up} - 0.6 \times DL_{Solar} \times \cos(\theta))$			136.50
$M_7 := \left(P_7 \times \frac{L}{a} \right) - wDL_{tc} \times \frac{L^2}{8} \times \cos(\theta)$			1090.25
$S_r := M_7 \times \frac{12}{F_b \times C_{d_{Wind}} \times C_{f_x} \times C_r \times C_{LS}}$			3.23
$\% := \frac{S_x \times 100}{S_r} \ll \text{If EQUAL TO OR MORE THAN 100\% CODE COMPLIANT, OK!}$			661.83

LIMITS OF SCOPE OF WORK AND LIABILITY

Existing deficiencies which are unknown and not observable due to their being concealed inside walls, or sandwiched behind gypsum board ceilings at the time of inspection are not included in this scope of work. These calculations are for the roof framing which supports the new PV modules. These calculations do not include a complete lateral analysis of the building, nor a prediction of the life expectancy of the existing building.

NOTE:

1. Prior to commencement of work, the Solar Installer shall verify that the roof framing sizes, spacing, and spans (between supports), are as noted in these plans. The Engineer of Record must be notified if any discrepancies are discovered, before proceeding.
2. These plans are Stamped for Structural Code compliance of the roof members that support the PV solar system only.
3. These plans are not stamped for rain water leakage prevention.
4. As a precaution, old or wet snow should be removed from the roof, if the snow builds up to 18" or more.