STAFF REPORT: NOVEMBER 12, 2020 MEETING PREPARED BY: B. CAGNEY
APPLICATION NUMBER: 20-6929
ADDRESS: 14621 WARWICK
HISTORIC DISTRICT: ROSEDALE PARK
APPLICANT: PETER DeNICOLA / POWER HOME SOLAR
PROPERTY OWNER: JERMEELE WILSON
SCOPE OF WORK: INSTALL ROOF MOUNTED SOLAR PANELS
DATE OF PROVISIONALLY COMPLETE APPLICATION: 10/23/2020
DATE OF STAFF VISIT: 11/5/2020

14621 Warwick, Designation Photo, staff photo.

Existing Conditions
Erected in 1948, 14621 Warwick is a 1-1/2 story, single-family home, located between Eaton Avenue and Lyndon Avenue in the Rosedale Park Historic District. The home features a red brick façade with a side gable roof. A front facing gable projects from the rectangular body of the home, creating a covered entrance in the middle of the front façade. The gable is covered with a synthetic siding material. A single dormer projects from the side of the home with a flat roof. The true divided light windows present in the designation photo were removed, the grey roof was replaced with a reddish-brown roof and landscaping has also been modified. The HDC online database does not indicate that any previous COA's have been issued for this address; BSEED records available to HDC staff did not indicate that the permits for roof or windows were issued, however, staff did find the current permit application was applied for on 9/25/2020.

Proposed Scope of Work:
With the current proposal, the applicant is seeking the Commission's approval to install two new, multi-panel solar arrays at the building's east facing front roof and west facing rear roof. Specifically, the new installations are proposed as per the submitted documents and the following description:

- On the East facing / front elevation roof plane, install (10) ten, *320 BL*, modular solar panels as proposed.

- On the West facing / rear elevation roof plane, install (10) ten, *320 BL*, modular solar panels as proposed.
    - Each panel is described as 1000 x 1700 (assuming millimeters) or approximately 3.2’ x 5.6’.
- Install power inverter at rear of home near existing utility meter and service panel.

Staff Observations and Research:

- Rosedale Park Historic District was designated in 2007.
- The gable roof faces east and west.
- Per the National Park Service Guidelines on the installation of solar panels, there is very clear instructions on the installation of solar panels on buildings in historic districts: *“The roofline of a historic building is often a distinctive feature. Therefore, the installation of solar panels should conform to guidance regarding rooftop additions, i.e. that they be minimally visible, to avoid altering the historic character of the building. Historic buildings with a flat roof or parapet can usually accommodate solar panels because the panels will be hidden, while properties with a hipped or gabled roof are generally not good candidates for a rooftop solar installation. Solar panels on historic buildings should not be visible from the public right of way such as nearby streets, sidewalks or other public spaces.”*

Issues:

- As per the National Park Service guidance regarding solar panels, “an installation that negatively impacts the historic character of a property will not meet the Standards.” However, the National Park Service does allow for the installation of solar panels which are “minimally visible.”
- The proposed plans, renderings and photos provided by the applicant are not sufficient to show that the panel array will be “minimally visible.”
- It is staff’s opinion that the solar panels on the west face of the roof will be highly visible from the Warwick Street Right of Way.
- Per the National Park Service guidelines, the application as proposed does not comply with Secretary of Interior Standards for Rehabilitation.

Recommendation:

It is HDC staff’s opinion that the proposed work items are not appropriate to the defined Elements of Design for the Rosedale Park Historic District, the National Park Service guidance regarding solar panels and the Secretary of the Interior's Standards for Rehabilitation Standard 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.* Staff therefore recommends that the Commission deny the issuance of a Certificate of Appropriateness (COA) for the installation of a multi-panel solar array as proposed by the applicant.

14621 Warwick, Designation Photo, 2007.

14621 Warwick, Staff Photo, 2020.

14621 Warwick, Staff Photo, 2020.

HISTORIC DISTRICT COMMISSION
PROJECT REVIEW REQUEST

CITY OF DETROIT
PLANNING & DEVELOPMENT DEPARTMENT
2 WOODWARD AVENUE, ROOM 808, DETROIT, MI 48226

DATE: _____

PROPERTY INFORMATION

ADDRESS: 14621 Warwick St AKA: _____

HISTORIC DISTRICT: _____

SCOPE OF WORK: (Check ALL that apply)
- ☐ Windows/ Doors
- ☐ Roof/Gutters/ Chimney
- ☐ Porch/ Deck
- ☐ Landscape/Fence/ Tree/Park
- ☐ General Rehab
- ☐ New Construction
- ☐ Demolition
- ☐ Addition
- ☑ Other: Roof mount solar panels

APPLICANT IDENTIFICATION

- ☐ Property Owner/ Homeowner
- ☑ Contractor
- ☐ Tenant or Business Occupant
- ☐ Architect/Engineer/ Consultant

NAME: Peter DeNicola COMPANY NAME: Power Home Solar

ADDRESS: 500 Stephenson Hwy CITY: Troy STATE: MI ZIP: 48083

PHONE: 919.300.7976 MOBILE: _____ EMAIL: permitmi@powerhome.com

PROJECT REVIEW REQUEST CHECKLIST

Please attach the following documentation to your request:
PLEASE KEEP FILE SIZE OF ENTIRE SUBMISSION UNDER 30MB

NOTE:
Based on the scope of work, additional documentation may be required.
See www.detroitmi.gov/hdc for scope-specific requirements.

- ☑ **Completed Building Permit Application** (highlighted portions only)
- ☑ **ePLANS Permit Number** (only applicable if you've already applied for permits through ePLANS)
- ☐ **Photographs** of ALL sides of existing building or site
- ☑ **Detailed photographs** of location of proposed work (photographs to show existing condition(s), design, color, & material)
- ☑ **Description of existing conditions** (including materials and design)
- ☑ **Description of project** (if replacing any existing material(s), include an explanation as to why replacement--rather than repair--of existing and/or construction of new is required)
- ☑ **Detailed scope of work** (formatted as bulleted list)
- ☑ **Brochure/cut sheets** for proposed replacement material(s) and/or product(s), as applicable

Upon receipt of this documentation, staff will review and inform you of the next steps toward obtaining your building permit from the Buildings, Safety Engineering and Environmental Department (BSEED) to perform the work.

SUBMIT COMPLETED REQUESTS TO HDC@DETROITMI.GOV

P2 - BUILDING PERMIT APPLICATION

Date: _____

PROPERTY INFORMATION

Address: 14621 Warwick St Floor: _____ Suite#: _____ Stories: _____

AKA: _____ Lot(s): _____ Subdivision: _____

Parcel ID#(s): 22086427. Total Acres: 0.18 Lot Width: 60 Lot Depth: 130

Current Legal Use of Property: _____ Proposed Use: Residential

Are there any existing buildings or structures on this parcel? ☒ Yes ☐ No

PROJECT INFORMATION

Permit Type: ☐ New ☒ Alteration ☐ Addition ☐ Demolition ☐ Correct Violations

☐ Foundation Only ☐ Change of Use ☐ Temporary Use ☐ Other: _____

☐ Revision to Original Permit #: _____ (Original permit has been issued and is active)

Description of Work (Describe in detail proposed work and use of property, attach work list)

20 roof mounted modules, grid tied, 7.68 kW, solar and back up battery installation on existing residence

☐ MBC use change ☐ No MBC use change

Included Improvements (Check all applicable; these trade areas require separate permit applications)

☐ HVAC/Mechanical ☒ Electrical ☐ Plumbing ☐ Fire Sprinkler System ☐ Fire Alarm

Structure Type

☐ New Building ☒ Existing Structure ☐ Tenant Space ☐ Garage/Accessory Building

☐ Other: _____ Size of Structure to be Demolished (LxWxH) _____ cubic ft.

Construction involves changes to the floor plan? ☐ Yes ☒ No

(e.g. interior demolition or construction to new walls)

Use Group: _____ Type of Construction (per current MI Bldg Code Table 601) _____

Estimated Cost of Construction $ 60040.00 (By Contractor) $ _____ (By Department)

Structure Use

☐ Residential-Number of Units: _____ ☐ Office-Gross Floor Area _____ ☐ Industrial-Gross Floor Area _____

☐ Commercial-Gross Floor Area: _____ ☐ Institutional-Gross Floor Area _____ ☐ Other-Gross Floor Area _____

Proposed No. of Employees: _____ List materials to be stored in the building: _____

PLOT PLAN SHALL BE submitted on separate sheets and shall show all easements and measurements (must be correct and in detail). SHOW ALL streets abutting lot, indicate front of lot, show all buildings, existing and proposed distances to lot lines. (Building Permit Application Continues on Next Page)

For Building Department Use Only

Intake By: _____ Date: _____ Fees Due: _____ DngBld? ☐ No

Permit Description:

Permit #: _____

Current Legal Land Use: _____ Proposed Use: _____

Permit#: _____ Date Permit Issued: _____ Permit Cost: $ _____

Zoning District: _____ Zoning Grant(s): _____

Lots Combined? ☐ Yes ☐ No (attach zoning clearance)

Revised Cost (revised permit applications only) Old $ _____ New $ _____

Structural: _____ Date: _____ Notes: _____

Zoning: _____ Date: _____ Notes: _____

Other: _____ Date: _____ Notes: _____

IDENTIFICATION (All Fields Required)

Property Owner/Homeowner ☐ Property Owner/Homeowner is Permit Applicant

Name: Jermeele Wilson Company Name:

Address: 14621 Warwick St City: Detroit State: MI Zip: 48223

Phone: 313.623.3355 Mobile:

Driver's License #: Email:

Contractor ■ Contractor is Permit Applicant

Representative Name: Peter DeNicola Company Name: Power Home Solar

Address: 500 Stephenson Hwy City: Troy State: MI Zip: 48083

Phone: 919.300.7976 Mobile: Email: permitmi@powerhome.com

City of Detroit License #:

TENANT OR BUSINESS OCCUPANT ☐ Tenant is Permit Applicant

Name: Phone: Email:

ARCHITECT/ENGINEER/CONSULTANT ☐ Architect/Engineer/Consultant is Permit Applicant

Name: State Registration#: Expiration Date:

Address: City: State: Zip:

Phone: Mobile: Email:

HOMEOWNER AFFIDAVIT (Only required for residential permits obtained by homeowner.)

I hereby certify that I am the legal owner and occupant of the subject property and the work described on this permit application shall be completed by me. I am familiar with the applicable codes and requirements of the City of Detroit and take full responsibility for all code compliance, fees and inspections related to the installation/work herein described. I shall neither hire nor sub-contract to any other person, firm or corporation any portion of the work covered by this building permit.

Print Name: Peter DeNicola (Homeowner) Signature: PDG Date: 10/12/20

Subscribed and sworn to before me this ____ day of ____ 20 ____ A.D. ____ County, Michigan

Signature: (Notary Public) My Commission Expires:

PERMIT APPLICANT SIGNATURE

I hereby certify that the information on this application is true and correct. I have reviewed all deed restrictions that may apply to this construction and am aware of my responsibility thereunder. I certify that the proposed work is authorized by the owner of the record and I have been authorized to make this application as the property owner(s) authorized agent. Further I agree to conform to all applicable laws and ordinances of jurisdiction. **I am aware that a permit will expire when no inspections are requested and conducted within 180 days of the date of issuance or the date of the previous inspection and that expired permits cannot be**

Print Name: Peter DeNicola (Permit Applicant) Signature: PDG Date: 10/12/20

Driver's License #: 000036728002 Expiration: 6/5/1967

Subscribed and sworn to before me this ____ day of ____ 20 ____ A.D. ____ County, Michigan

Signature: (Notary Public) My Commission Expires:

Section 23a of the state construction code act of 1972, 1972PA230, MCL 125.1523A, prohibits a person from conspiring to circumvent the licensing requirements of this state relating to persons who are to perform work on a residential building or a residential structure. Visitors of Section 23a are subject to civil fines.

This application can also be completed online. Visit detroitmi.gov/bseed/elaps for more information.

PROJECT DESCRIPTION:

20 X 320 SILFAB SOLAR SIL-320 BL MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES

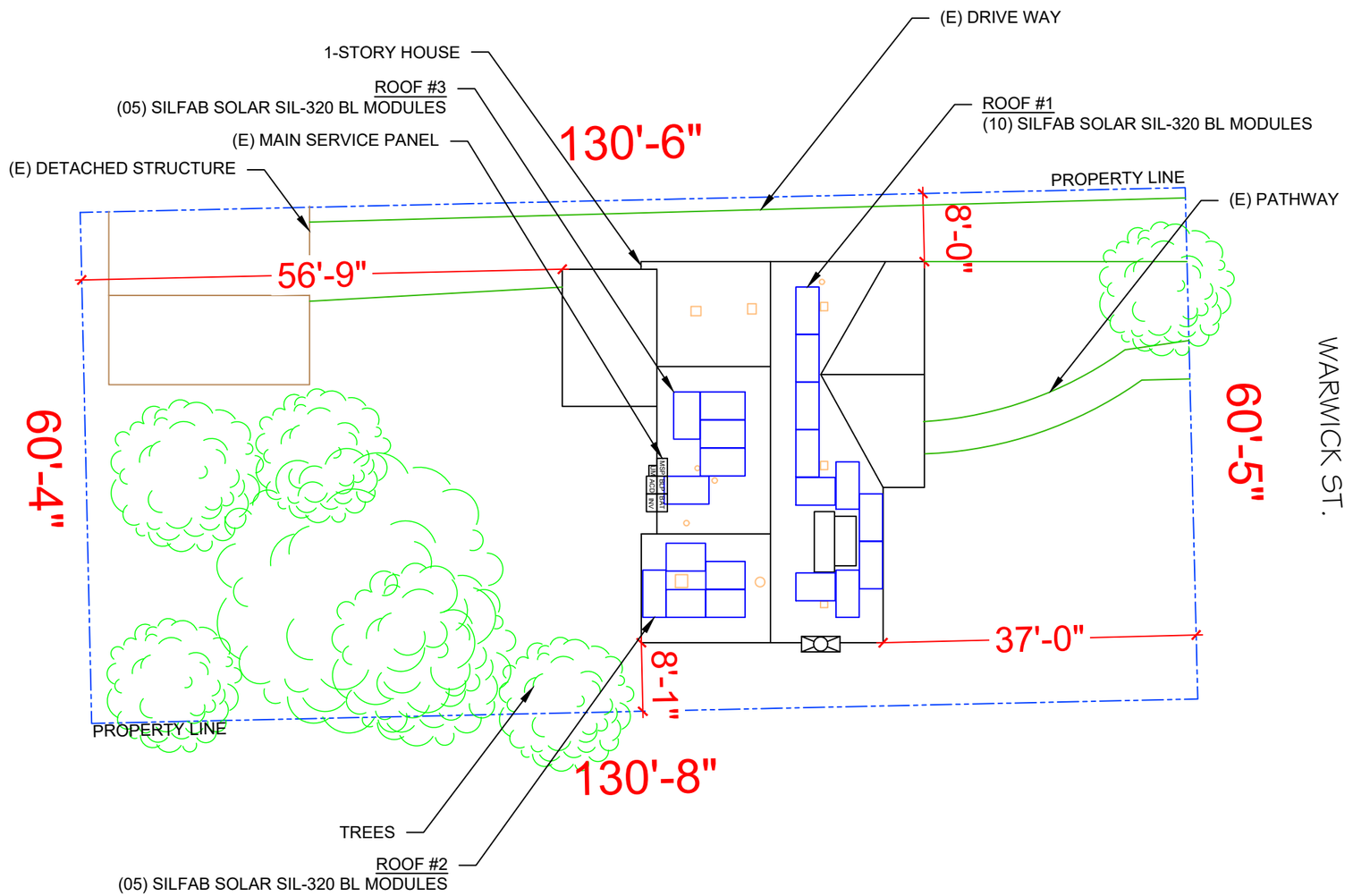
SYSTEM SIZE:6.40 kW DC STC
ARRAY AREA: ROOF#1 - 183.00 SQ FT
ARRAY AREA: ROOF#2 - 91.50 SQ FT
ARRAY AREA: ROOF#3 - 91.50 SQ FT

AUTHORITIES HAVING JURISDICTION
BUILDING : WAYNE COUNTY
ZONING : WAYNE COUNTY
UTILITY : DTE ENERGY

EQUIPMENT SUMMARY
20 SILFAB SOLAR SIL-320 BL MODULES
04 GENERAC PV LINK S2502 POWER OPTIMIZERS
01 GENERAC PWRCELL X7602 7600W INVERTER

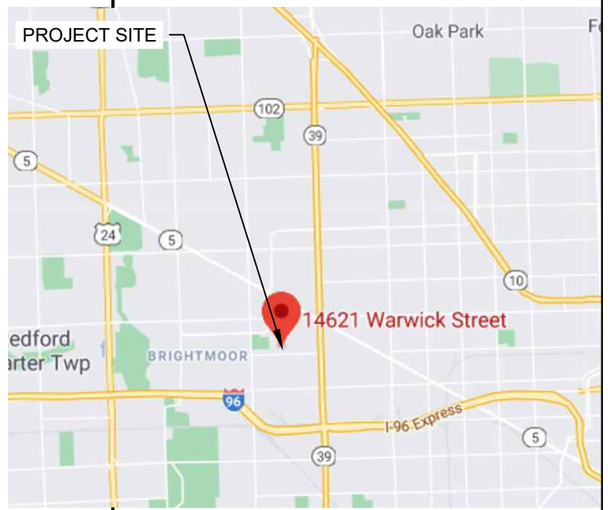
APPLICABLE CODES & STANDARDS
MICHIGAN RESIDENTIAL CODE 2015
NEC 2017

DESIGN SPECIFICATIONS
OCCUPANCY : II
CONSTRUCTION : SINGLE-FAMILY
ZONING : RESIDENTIAL
GROUND SNOW LOAD : SEE STRUCTURAL LETTER
WIND EXPOSURE : SEE STRUCTURAL LETTER
WIND SPEED : SEE STRUCTURAL LETTER



1 PLOT PLAN & VICINITY MAP
PV-1 SCALE: 1/16" = 1'-0"

2 HOUSE PHOTO
PV-1 SCALE: NTS



3 VICINITY MAP
PV-1 SCALE: NTS

SHEET INDEX

PV-1	PLOT PLAN & VICINITY MAP
PV-2	ROOF PLAN & MODULES
PV-2A	STRING LAYOUT
PV-3	ATTACHMENT DETAIL
PV-4	ELECTRICAL LINE DIAGRAM
PV-5	WIRING CALCULATIONS
PV-6 to 12	EQUIPMENT SPECIFICATIONS

POWERHOME
POWER HOME SOLAR, LLC
"POWER YOUR FUTURE"
919 N. MAIN ST.
MOORESVILLE, NC 28115
Phone: 704-800-6591 (OFFICE)
Email: info@powerhome.com
Web: www.powerhome.com

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 9/10/2020

PROJECT NAME & ADDRESS

JERMEELE V WILSON
RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

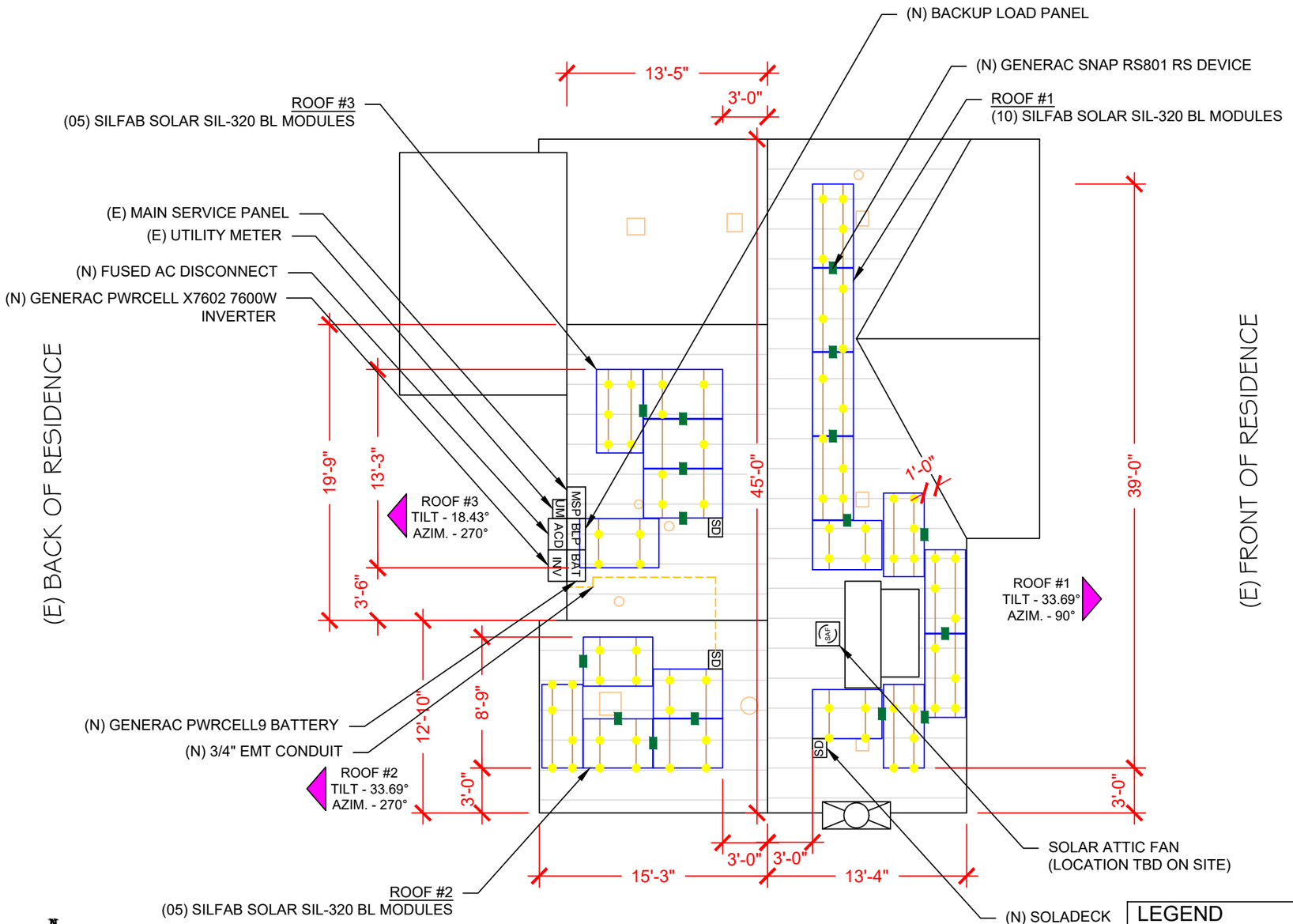
SHEET NAME
PLOT PLAN & VICINITY MAP

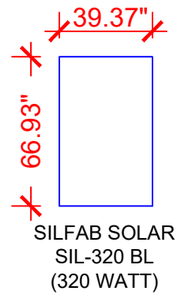
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-1

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 20 MODULES
MODULE TYPE = SILFAB SOLAR SIL-320 BL MODULES
MODULE WEIGHT = 43.00 LBS / 19.5 KG.
MODULE DIMENSIONS = 66.93"x 39.37" = 18.30 SF
UNIT WEIGHT OF ARRAY = 2.35 PSF





SILFAB SOLAR
SIL-320 BL
(320 WATT)

ROOF DESCRIPTION

ROOF TYPE			COMPOSITION SHINGLE	
ROOF	ROOF TILT	AZIMUTH	FRAMING SIZE	FRAMING SPACING
#1	33.69°	90°	SEE STRUCTURAL LETTER	
#2	33.69°	270°		
#3	18.43°	270°		

ARRAY AREA & ROOF AREA CALC'S

ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	10	183.00	498.66	37
#2	05	91.50	196.11	47
#3	05	91.50	264.91	35

(SAF) SOLAR ATTIC FAN

NOTES:
- THE LOCATION OF THE SAF SHOULD BE DETERMINED ON SITE.
- THE SAF SHOULD BE LOCATED 30"-36" FROM THE PEAK OF THE ROOF OR ABOUT 5 ROWS DOWN FROM THE RIDGE.
- THE SAF SHOULD NOT BE MOUNTED ON ANY STRUCTURAL MEMBER LIKE TRUSS/RAFTER.
- "CAN VENTS" CAN BE REPLACED BY SAF.
- SAF CANNOT BE MOUNTED ON A METAL ROOF. PLEASE CARRY GABLE VENT FANS FOR METAL ROOF INSTALLATION (IF APPLICABLE).

LEGEND

- SD - SOLADECK
- INV - INVERTER
- ACD - AC DISCONNECT
- MSP - MAIN SERVICE PANEL
- BLP - BACKUP LOAD PANEL
- BAT - BATTERY
- OP - PV LINK OPTIMIZER
- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- ROOF ATTACHMENT
- RAFTERS
- CONDUIT
- RAPID SHUTDOWN

1 ROOF PLAN & MODULES
PV-2
SCALE: 1/8" = 1'-0"

ON- SITE CUSTOMER APPROVAL:_____

POWERHOME
POWER HOME SOLAR, LLC
"POWER YOUR FUTURE"
919 N. MAIN ST.
MOORESVILLE, NC 28115
Phone: 704-800-6591 (OFFICE)
Email: info@powerhome.com
Web: www.powerhome.com

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 9/10/2020

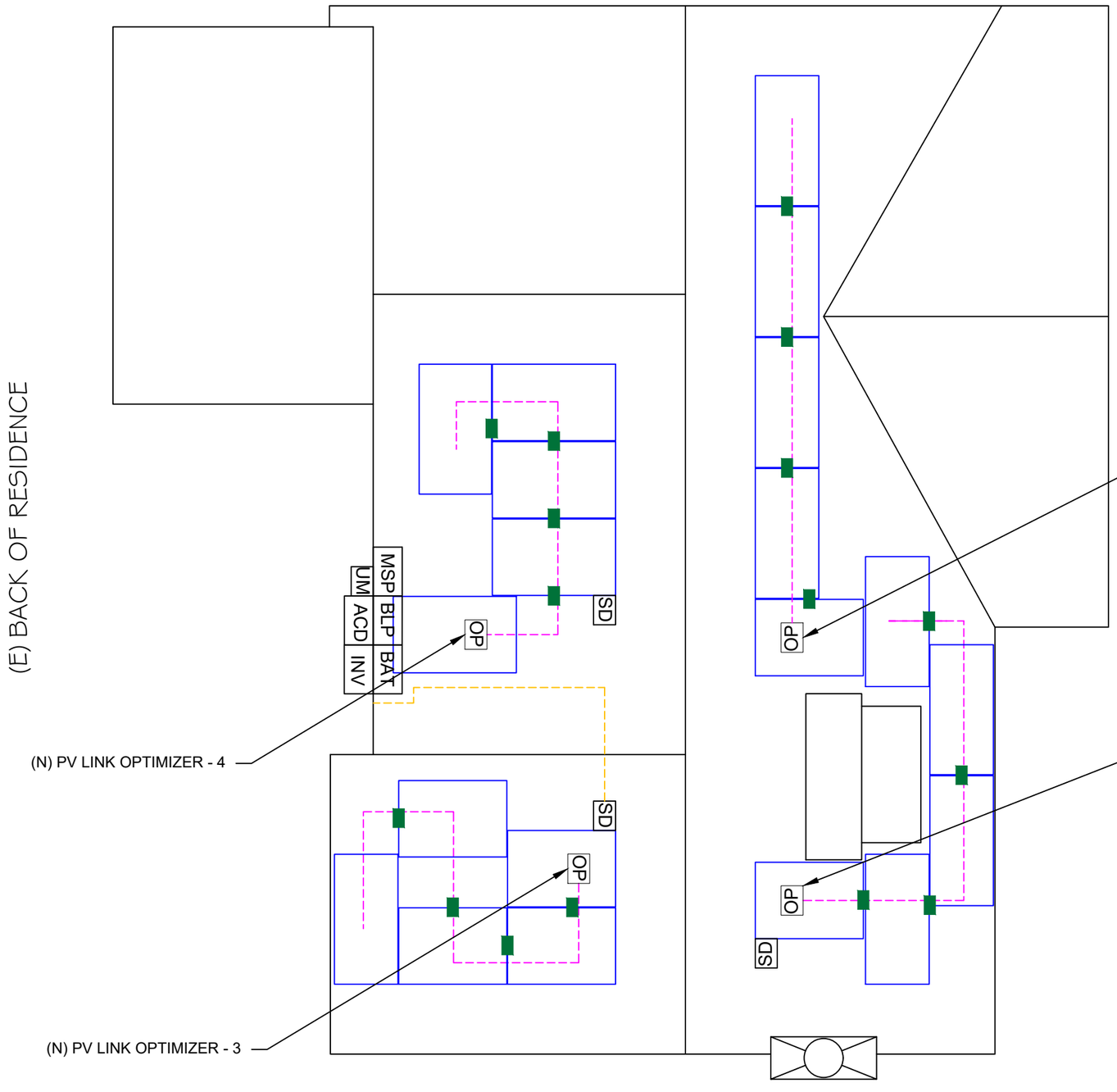
PROJECT NAME & ADDRESS

JERMEELE V WILSON RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
ROOF PLAN & MODULES

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2



1 ROOF PLAN WITH STRING LAYOUT

PV-2A SCALE: 3/16" = 1'-0"

BILL OF MATERIALS

EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	20	SILFAB SOLAR SIL-320 BL MODULES
OPTIMIZER	04	GENERAC PV LINK S2502 POWER OPTIMIZERS
GENERAC SNAP RS	20	GENERAC SNAPRS MODEL RS801
INVERTER	01	GENERAC PWRCELL X7602 7600W INVERTER
AC DISCONNECT	1	60A FUSED, (2) 40A FUSES, 240V, NEMA 3R, UL LISTED
SOLADECK	3	SOLADECKS 600 V, NEMA 3R, UL LISTED
BATTERY	1	GENERAC PWRCELL9 BATTERY
BACKUP PANEL	1	125A, BACKUP PANEL, 240V
RAILS	16	QRAIL LIGHT 14 FT. BLACK
SPLICE KIT	5	QSPLICE INTERNAL LIGHT
WEEB BMC	32	WEEB BMC MILL
MODULE CLAMPS	16	UNIVERSAL MID CLAMP
GROUNDING LUG	12	WEEB LUG W/ T-BOLT
END CLAMPS	48	UNIVERSAL END CLAMPS
ATTACHMENT	73	L-MOUNT ATTACHMENT (QUICKMOUNT)
T-BOLT	77	T-BOLT W/ NUT M8 X 20MM

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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 9/10/2020

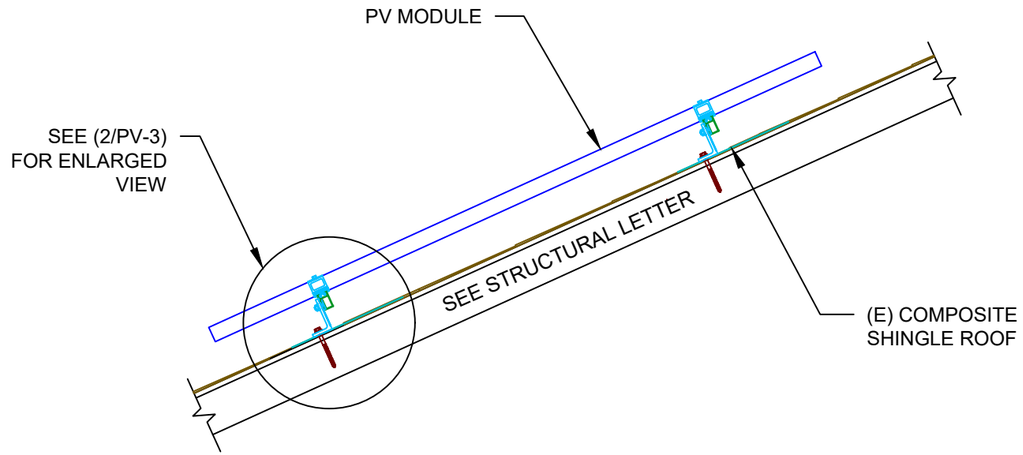
PROJECT NAME & ADDRESS

JERMEELE V WILSON RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
STRING LAYOUT

SHEET SIZE
ANSI B
11" X 17"

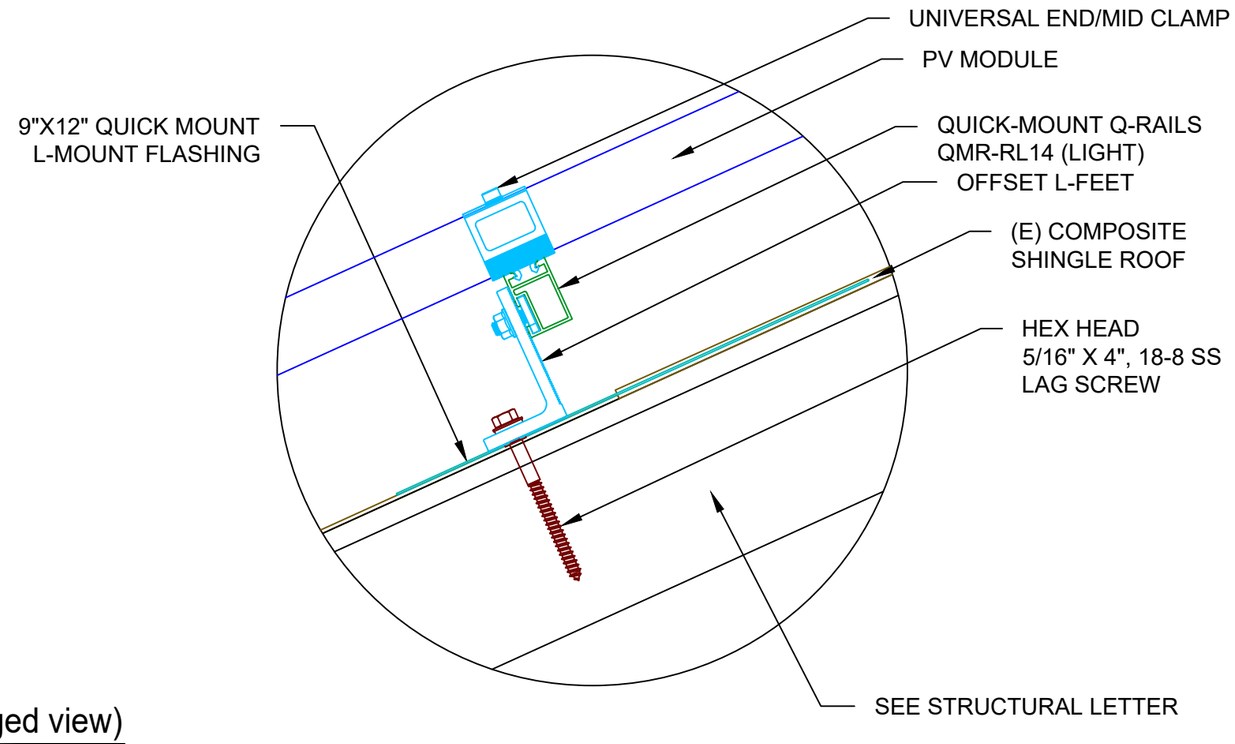
SHEET NUMBER
PV-2A



1 ATTACHMENT DETAIL

PV-3

SCALE: 1" = 1'-0"



2 ATTACHMENT DETAIL (enlarged view)

PV-3

SCALE: NTS

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REVISIONS

DESCRIPTION	DATE	REV

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DATE: 9/10/2020

PROJECT NAME & ADDRESS

JERMEELE V WILSON
RESIDENCE
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DETROIT, MI 48223

SHEET NAME
ATTACHMENT DETAIL

SHEET SIZE
ANSI B
11" X 17"

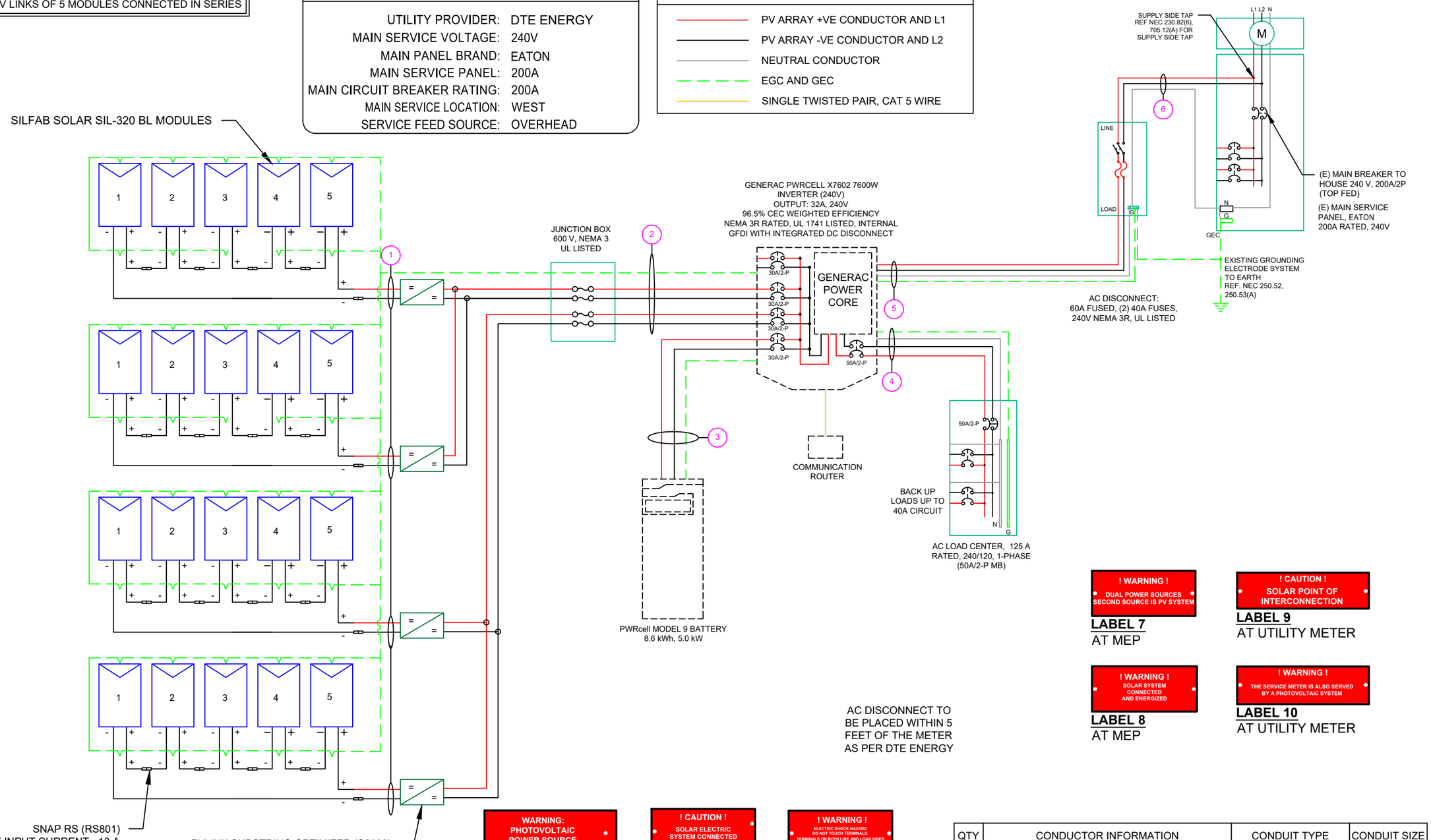
SHEET NUMBER
PV-3

(20) SILFAB SOLAR SIL-320 BL MODULES
(4) PV LINKS OF 5 MODULES CONNECTED IN SERIES

SERVICE INFO	
UTILITY PROVIDER:	DTE ENERGY
MAIN SERVICE VOLTAGE:	240V
MAIN PANEL BRAND:	EATON
MAIN SERVICE PANEL:	200A
MAIN CIRCUIT BREAKER RATING:	200A
MAIN SERVICE LOCATION:	WEST
SERVICE FEED SOURCE:	OVERHEAD

WIRE LEGEND

- PV ARRAY +VE CONDUCTOR AND L1
- PV ARRAY -VE CONDUCTOR AND L2
- NEUTRAL CONDUCTOR
- EGC AND GEC
- SINGLE TWISTED PAIR, CAT 5 WIRE



WARNING: PHOTOVOLTAIC POWER SOURCE
LABEL 1
ON ALL CONDUITS SPACED AT MAX 10FT

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY
LABEL 2
AT INVERTER

! CAUTION ! SOLAR ELECTRIC SYSTEM CONNECTED AND ENERGIZED
LABEL 3
AT INVERTER

PHOTOVOLTAIC DC DISCONNECT
LABEL 4
AT EACH DC DISCONNECT

! WARNING ! ELECTRIC SHOCK HAZARD DO NOT TOUCH TERMINALS. TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION
LABEL 5
AT EACH AC DISCONNECT

PHOTOVOLTAIC AC DISCONNECT
LABEL 6
AT EACH AC DISCONNECT

! WARNING ! DUAL POWER SOURCES SECOND SOURCE IS PV SYSTEM
LABEL 7
AT MEP

! WARNING ! SOLAR SYSTEM CONNECTED AND ENERGIZED
LABEL 8
AT MEP

! CAUTION ! SOLAR POINT OF INTERCONNECTION
LABEL 9
AT UTILITY METER

! WARNING ! THE SERVICE METER IS ALSO SERVED BY A PHOTOVOLTAIC SYSTEM
LABEL 10
AT UTILITY METER

	QTY	CONDUCTOR INFORMATION		CONDUIT TYPE	CONDUIT SIZE
1	(8)	#10AWG -	PV WIRE/USE-2	N/A	N/A
	(1)	#6AWG -	BARE COPPER IN FREE AIR		
2	(4)	#10AWG -	THWN-2	EMT OR FLEX IN ATTIC	3/4"
	(1)	#6AWG -	THWN-2 GND		
3	(2)	#10AWG -	THWN-2	EMT OR FLEX	3/4"
	(1)	#10AWG -	THWN-2 GND		
4	(3)	#6AWG -	THWN-2	EMT OR FLEX	3/4"
	(1)	#6AWG -	THWN-2 GND		
5	(3)	#6AWG -	THWN-2	EMT OR FLEX	3/4"
	(1)	#6AWG -	THWN-2 GND		
6	(3)	#6AWG -	THWN-2	EMT OR FLEX	3/4"

1 ELECTRICAL LINE DIAGRAM
PV-4 SCALE: NTS

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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 9/10/2020

PROJECT NAME & ADDRESS

JERMEELE V WILSON RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-4

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	SILFAB SOLAR SIL-320 BL
VMP	33.85V
IMP	9.46A
VOC	41.9V
ISC	9.92A
TEMP. COEFF. VOC	-0.301%/°C
PTC RATING	286.4W
MODULE DIMENSION	66.93"L x 39.37"W x 1.50"D (In Inch)

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	GENERAC PWRCELL X7602
AC POWER OUTPUT (LOADS/GRID)	7600VA
AC POWER OUTPUT (BACKUP)	8000VA
NOMINAL OUTPUT VOLTAGE	240 VAC
MAX OUTPUT CURRENT @240V (LOADS/GRID)	32A
MAX OUTPUT CURRENT @240V (BACKUP)	50A
NOMINAL DC INPUT VOLTAGE	380Vdc
MAX DC INPUT VOLTAGE	420Vdc
CEC WEIGHTED EFFICIENCY	96.5%
MAX DC POWER (PV)	10000W
MAX INPUT CURRENT (PV)	20Adc
CONT. PEAK POWER (BATTERY)	8000W

SERIES SUB STRING OPTIMIZER SPECIFICATIONS	
MANUFACTURER / MODEL #	PV LINK S2502
RATED POWER	2500W
MPPT VOLTAGE RANGE	60-360 Vmp
MAXIMUM INPUT VOLTAGE	420Voc
MAXIMUM OUTPUT	420 Adc
NOMINAL OUTPUT	380 Vdc
MAXIMUM OUTPUT CURRENT	8 A
MAXIMUM SHORT CIRCUIT CURRENT	18 A

BATTERY SPECIFICATIONS	
MANUFACTURER / MODEL #	GENERAC PWRCELL9 BATTERY
USABLE ENERGY	8.6kWH
RATED CONTINUOUS POWER	3.4kW
POWER: 60 MINUTES	4.2kW
POWER: 2 MINUTES	5.0kW
REBUS VOLTAGE: INPUT/ OUTPUT	360-420Vdc
MODULE VOLTAGE	46.8Vdc
ROUND-TRIP EFFICIENCY	96.5%

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-19°
AMBIENT TEMP (HIGH TEMP 2%)	34°
CONDUIT HEIGHT	0.5"
ROOF TOP TEMP	56°

DC CONDUCTOR AMPACITY CALCULATIONS:
ARRAY TO JUNCTION BOX:

EXPECTED WIRE TEMP (In Celsius)	56°
TEMP. CORRECTION PER NEC TABLE 310.15 (B)(2)(a)	0.71
NO. OF CURRENT CARRYING CONDUCTORS	8
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	0.7
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE 310.15(B)(16)	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	10A
1.25 X Imax	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	19.88A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (10A) otherwise less the entry for circuit conductor size and ampacity	

FROM JUNCTION BOX TO INVERTER:

EXPECTED WIRE TEMP (In Celsius)	56°
TEMP. CORRECTION PER NEC TABLE 310.15 (B)(2)(a)	0.71
NO. OF CURRENT CARRYING CONDUCTORS	4
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	0.8
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE 310.15(B)(16)	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	20A
1.25 X Imax X # of PV LINKS	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	22.72A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (20A) otherwise less the entry for circuit conductor size and ampacity	

ELECTRICAL NOTES

1.) ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
2.) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.
3.) WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
4.) WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
5.) DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
6.) WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
7.) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
8.) MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
9.) MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
10.) THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE

FROM BATTERY TO INVERTER:

EXPECTED WIRE TEMP (In Celsius)	34°
TEMP. CORRECTION PER NEC TABLE 310.15 (B)(2)(a)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	2
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	1
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE310.15(B)(16)	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	26.25A
1.25 X Imax	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	38.40A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (26.25A) otherwise less the entry for circuit conductor size and ampacity	

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM INVERTER TO BACK-UP PANEL:

No. OF INVERTER	1
EXPECTED WIRE TEMP (In Celsius)	34°
TEMP. CORRECTION PER NEC TABLE 310.15(B)(2)(a)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	3
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	1
CIRCUIT CONDUCTOR SIZE	6 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE 310.15(B)(16)	75A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	42.5A
1.25 X INVERTER OUTPUT CURRENT (BACKUP POWER)	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	72A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (42.5A) otherwise less the entry for circuit conductor size and ampacity	

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM INVERTER TO MEP:

No. OF INVERTER	1
EXPECTED WIRE TEMP (In Celsius)	34°
TEMP. CORRECTION PER NEC TABLE 310.15(B)(2)(a)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	3
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	1
CIRCUIT CONDUCTOR SIZE	6 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE 310.15(B)(16)	75A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	40A
1.25 X MAX INVERTER OUTPUT CURRENT (LOADS/GRID)	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	72A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (40A) otherwise less the entry for circuit conductor size and ampacity	

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Email: info@powerhome.com
Web: www.powerhome.com

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 9/10/2020

PROJECT NAME & ADDRESS

JERMEELE V WILSON
RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
WIRING CALCULATIONS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-5

Silfab SOLAR

BC Series
SIL-320 BL

BAA ARRA · 25 YEAR PRODUCT WARRANTY · AUTOMATED MANUFACTURING · JUST-IN-TIME · DNV·GL TOP PERFORMER · TIER 1 BANKABLE $$$ · HIGH EFFICIENCY

126 Cell
Monocrystalline PV Module

CE · ETL Intertek · cETL Intertek · IEC · CEC LISTED · FSEC · Fraunhofer ISE

CHUBB*
* Chubb provides error and omission insurance to Silfab Solar Inc.

INDUSTRY LEADING WARRANTY
All our products include an industry leading 25-year product workmanship and 30-year performance warranty.

MAXIMUM ENERGY OUTPUT
Silfab BC Series utilizes next generation Back Contact technology to reduce production/manufacturing steps and improve quality while maximizing power. Ideal for residential and commercial projects where maximum power density is preferred.

NORTH AMERICAN QUALITY
Silfab is the largest and most automated solar manufacturer in North America. Utilizing premium quality materials and strict quality control management to deliver the highest efficiency, premium quality PV modules 100% made in North America.

PROVIDES MAXIMUM EFFICIENCY
126 high-efficiency half-cut cells combined with a black conductive back-sheet resulting in a maximum power.

35+ YEARS OF SOLAR INNOVATION
Leveraging over 35+ years of worldwide experience in the solar industry, Silfab is dedicated to superior manufacturing processes and innovations such as Bifacial and Back Contact technologies to ensure our partners have the latest in solar innovation.

BAA / ARRA COMPLIANT
Silfab panels are designed and manufactured to meet Buy American Act Compliance. The US State Department, US Military and FAA have all utilized Silfab panels in their solar installations.

LIGHT AND DURABLE
Engineered to accommodate low load bearing structures up to 5400Pa. The light-weight frame is exclusively designed for wide-ranging racking compatibility and durability.

LOWEST DEFECT RATE
Total automation ensures strict quality controls during the entire manufacturing process at our ISO certified facilities. 48.18 ppm as per December 2018.

DOMESTIC PRODUCTION
Silfab Solar manufactures our PV modules in two automated locations within North America. Our 300+ North American team is ready to help our partners win the hearts and minds of customers, providing customer service and product delivery that is direct, efficient and local.

SUPERIOR POWER
Super power achieved through relocation of tabbing ribbon to reduce shading on module front service and circuit resistance.

AESTHETICALLY PLEASING
Sleek aesthetics from black cells to black back-sheet without tabbing or bus-bar ribbons, ideal for residential applications.

STABLE PERFORMANCE
Enhanced life-time performance through reduced thermal stresses and increased current flow paths.

PID RESISTANT
PID Resistant due to advanced cell technology and material selection. In accordance to IEC 62804-1

Printed on recycled paper.

Electrical Specifications		SIL-320 BL mono PERC MWT Technology	
Test Conditions		STC	NOCT
Module Power (Pmax)	Wp	320	242.1
Maximum power voltage (Vpmax)	V	33.85	30.42
Maximum power current (Ipmax)	A	9.46	7.95
Open circuit voltage (Voc)	V	41.9	38.7
Short circuit current (Isc)	A	9.92	8.13
Module efficiency	%	18.8	17.8
Maximum system voltage (VDC)	V	1000	
Series fuse rating	A	20	
Power Tolerance	Wp	0/+10	

Measurement conditions: STC 1000 W/m2 • AM 1.5 • Temperature 25 °C • NOCT 800 W/m² • AM 1.5 • Measurement uncertainty ≤ 3%
• Sun simulator calibration reference modules from Fraunhofer Institute. Electrical characteristics may vary by ±5% and power by 0/+10W.

Temperature Ratings		SIL-320 BL mono PERC MWT Technology
Temperature Coefficient Isc	%/°C	+0.031
Temperature Coefficient Voc	%/°C	-0.301
Temperature Coefficient Pmax	%/°C	-0.419
NOCT (± 2°C)	°C	40.6
Operating temperature	°C	-40/+85

Mechanical Properties and Components		SIL-320 BL mono PERC MWT Technology
Module weight (± 1 kg)	kg	19.5
Dimensions (H x L x D; ± 1mm)	mm	1700 x 1000 x 38
Maximum surface load (wind/snow)*	Pa	4000 Pa rear load / 5400 Pa front load
Hail impact resistance		ø 25 mm at 83 km/h
Cells		126 high-efficiency half-cut mono-PERC MWT c-Si cells
Glass		3.2 mm high transmittance, tempered, DSM antireflective coating
Backsheet		Multilayer, integrated insulation film and electrically conductive backsheet
Frame		Anodized Al (Black)
Bypass diodes		3 diodes-20SQ040 (45V, 20A)
Cables and connectors		1000 mm ø 5.7 mm (4 mm2), Multicontact MC4 connectors (refer to installation manual)
Junction Box		UL 3730 Certified, IP67 rated

Warranties	SIL-320 BL mono PERC MWT Technology
Module product workmanship warranty	25 years**
Linear power performance guarantee	30 years ≥ 97% end of 1st year ≥ 90% end of 12th year ≥ 82% end of 25th year ≥ 80% end of 30th year

Certifications	SIL-320 BL mono PERC MWT Technology
Product	ULC ORD C1703, UL 1703, FSEC and CEC listed. Product durability proven up to 3 x IEC, climate chamber tests up to DH3000-TC600-HF30 UL Fire Rating: Type 1
Factory	ISO9001:2015

*Please refer to the Safety and Installation Manual for mounting specifications.
**12 year extendable to 25 years subject to registration and conditions outlined under "Warranty" at www.silfabsolar.com.

⚠ Warning: Read the installation and User Manual before handling, installing and operating modules.

- Modules Per Pallet: 26
- Pallets Per Truck: 36
- Modules Per Truck: 936

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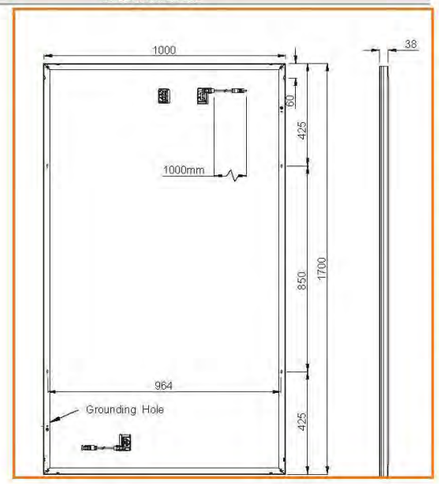

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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 9/10/2020

PROJECT NAME & ADDRESS

JERMEELE V WILSON RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-6

GENERAC

PWRCELL

7.6kW 1Ø, 11.4kW 3Ø PWRcell Inverter with CTs
Model: APKE00014, APKE00013
Certification Model Reference: X7602, X11402

Intertek

Solar + storage is simple with the Generac PWRcell™ Inverter. This bi-directional, REbus™-powered inverter offers a simple, efficient design for integrating smart batteries with solar. Ideal for self-supply, backup power, zero-export and energy cost management, the PWRcell Inverter is the industry's most feature-rich line of inverters, available in single-phase and three-phase models.

FEATURES & BENEFITS

- Single inverter for grid-tied solar with smart battery integration
- Simplified system design: No autotransformer or battery inverter needed
- User-selectable modes for backup power, self-supply, time-of-use and zero-export
- Free system monitoring included via PWRview™ Web Portal and Mobile App

AC OUTPUT/GRID-TIE	MODEL APKE00014	MODEL APKE00013
RATED AC POWER OUTPUT:	7600W	11400W
AC OUTPUT VOLTAGE:	120/240, 1Ø VAC	120/208, 3Ø VAC
AC FREQUENCY:	60 Hz	60 Hz
MAXIMUM CONTINUOUS OUTPUT CURRENT:	32 A, RMS	32 A, RMS
GROUND-FAULT ISOLATION DETECTION:	Included	Included
CHARGE BATTERY FROM AC:	Yes	Yes
THD (CURRENT):	< 2%	< 2%
TYPICAL NIGHTTIME POWER CONSUMPTION:	< 7W	< 7W

DC INPUT	MODEL APKE00014	MODEL APKE00013
DC INPUT VOLTAGE RANGE:	360-420 VDC	360-420 VDC
NOMINAL DC BUS VOLTAGE:	380 VDC	380 VDC
MAX IMPORT CURRENT[1]:	20 A	30 A
MAX INPUT CURRENT[2]:	30 A	30 A
REVERSE-POLARITY PROTECTION:	Yes	Yes
GROUND-FAULT ISOLATION DETECTION:	Yes	Yes
TRANSFORMERLESS, UNGROUNDED:	Yes	Yes
TYPICAL NIGHTTIME POWER CONSUMPTION:	< 7W	< 7W

AC OUTPUT/BACKUP	MODEL APKE00014	MODEL APKE00013
RATED AC BACKUP POWER OUTPUT (ISLANDED):	8000W	8000W
MAXIMUM AC BACKUP POWER OUTPUT:	10000W	10000W
AC BACKUP OUTPUT VOLTAGE:	120/240, 1Ø VAC	120/240, 1Ø VAC
AC FREQUENCY:	60 Hz	60 Hz
AC CIRCUIT BREAKER:	50 A	50 A
THD (VOLTAGE):	< 2%	< 2%
AUTOMATIC SWITCHOVER TIME:	< 1 Seconds	< 1 Seconds
TYPICAL NIGHTTIME POWER CONSUMPTION:	30W	30W

DC INPUT/ BATTERY	MODEL APKE00014	MODEL APKE00013
MAXIMUM CONTINUOUS POWER:	8000W	8000W
INTERNAL DC DISTRIBUTION BREAKERS:	4x 2p30A	4x 2p30A
DC FUSES ON PLUS AND MINUS:	40 A	40 A
2-POLE DISCONNECTION:	Yes	Yes

EFFICIENCY	MODEL APKE00014	MODEL APKE00013
PEAK EFFICIENCY:	97%	98%
CEC WEIGHTED EFFICIENCY:	96.50%	97.50%

[1]Inverter limits DC current import to AC power rating. Total DC current from multiple DC inputs may safely exceed this value up to Max. Input Current. The inverter safely limits the amount utilized
[2]Per input, four DC inputs total

Specifications

FEATURES AND MODES	
ISLANDING[3]:	Yes
GRID SELL:	Yes
SELF CONSUMPTION:	Yes
PRIORITIZED CHARGING FROM RENEWABLES:	Yes
GRID SUPPORT - ZERO EXPORT:	Yes

ADDITIONAL FEATURES	
SUPPORTED COMMUNICATION INTERFACES:	REbus™, CANbus, RS485[4], Ethernet
SYSTEM MONITORING:	PWRview™ Web Portal and Mobile App
BACKUP LOADS DISCONNECT[3]:	Yes
MANUAL INVERTER BYPASS SWITCH:	Automatic
WARRANTY:	10 Years

STANDARDS COMPLIANCE	
SAFETY:	UL1741 SA, CSA 22.2
GRID CONNECTION STANDARDS:	IEEE1547, Rule 21, Rule 14H, CSIP
EMISSIONS:	FCC Part 15 Class B

DIMENSIONS AND INSTALLATION SPECIFICATIONS	
ENCLOSURE KNOCKOUTS - QTY, SIZE - IN (MM):	6 x Combo 3/4" x 1" (19 x 25.4) 7 x Combo 1/2" x 3/4" (12.7 x 19)
DIMENSIONS L x W x H - IN (MM):	24.5" x 19.25" x 8" (622.3 x 488.9 x 203.2)
WEIGHT - LB (KG):	62.7 (28.4)
COOLING:	Forced convection
NOISE:	< 40 dBA
OPERATING TEMPERATURE - FAHRENHEIT (CELSIUS):	-4 to 122 °F (-20 to 50 °C)[5]
PROTECTION RATING:	NEMA 3R

INSTALLATION GUIDELINES	
BATTERY TYPES SUPPORTED:	PWRcell™ Battery
MODULE STRING SIZE PER PV LINK OPTIMIZER:	Varies, refer to PV Link Installation Manual
MAXIMUM RECOMMENDED DC POWER FROM PV:	15kW

[3]3Ø inverters offer islanding for 1Ø loads
[4]Modbus
[5]Reduced power at extreme temperatures

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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 9/10/2020

PROJECT NAME & ADDRESS

JERMEELE V WILSON RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-7

GENERAC

SnapRS™

Inline Disconnect Switch
Model: APKE00011
Certification Model Reference: RS801

Generac SnapRS are a simple way to satisfy rapid shutdown compliance for solar + storage systems. Generac SnapRS are 2017/2020 NEC 690.12 compliant, don't require any extra hardware to mount, and need no pairing or fussy digital communications.

FEATURES & BENEFITS

- Fast, easy, and simple to install
- One SnapRS device per PV module
- Achieves PVRSS Compliance
- Low cost, high efficiency solution

SYSTEM DESIGN

Snap a Generac SnapRS disconnect device (RS) to the negative lead (-) of each module in the solar array for simple module-level rapid shutdown compliance. SnapRS devices isolate array voltage when a rapid shutdown is initiated at a PWRcell™ Inverter. When rapid shutdown is initiated, SnapRS units isolate each PV module in the array, reducing array voltage to <80V in seconds.

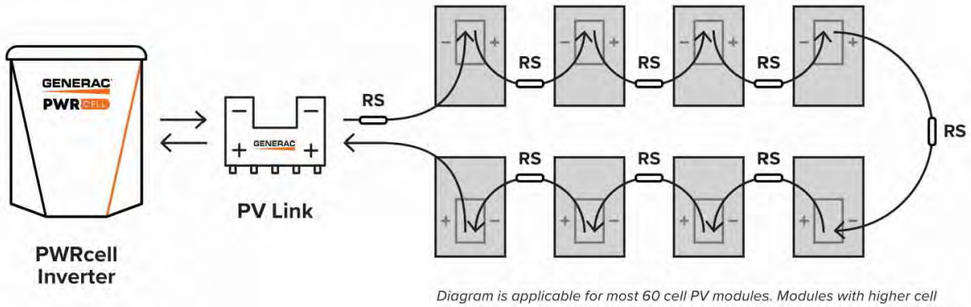

Diagram is applicable for most 60 cell PV modules. Modules with higher cell count may require a different arrangement. Contact Generac for more details.

Specifications

SnapRS™ (APKE00011)	
PV MODULE MAX VOC:	75 V
EFFICIENCY:	99.8%*
MAX INPUT CURRENT:	13 A
SHUTDOWN TIME:	< 10 Seconds
ENCLOSURE RATING:	NEMA 6P
OPERATING TEMPERATURE - FAHRENHEIT (CELSIUS):	-40 to 158 °F (-40 to 70 °C)
CERTIFICATIONS:	UL1741
PROTECTIONS:	PVRSE
WEIGHT - LB (KG):	0.17 (0.08)
DIMENSIONS, L x W x H - IN (MM):	7" x 1" x 1" (177.8 x 25.4 x 25.4)
WARRANTY:	25 Years

**When used with a 50V panel*

Connect one SnapRS device to the negative lead of each PV module in the PV Link controlled array for complete PV Rapid shutdown performance

Generac Power Systems, Inc.
S45 W29290 Hwy. 59, Waukesha, WI 53189
www.Generac.com | 888-GENERAC (436-3722)

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GENERAC

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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 9/10/2020

PROJECT NAME & ADDRESS

JERMEELE V WILSON RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-8

GENERAC

PWRCELL

Model APKE00007, PWRcell Battery Cabinet
Model A0000391219, 2.85kWh PWRcell Battery Module
Certification Model Reference: BJ-DCB05ZKAX
Model APKE00008, PWRcell Spacer Kit
Model APKE00009, PWRcell Upgrade Kit
Certification Model Reference for Battery Configurations:
PWRcell 9, PWRcell 12, PWRcell 15, PWRcell 17

C ETL LISTED US
Intertek

The PWRcell™ Battery Cabinet is a modular smart battery platform that allows for a range of configurations to suit any need, small or large. No other smart battery offers the power and flexibility of PWRcell. Whether for backup power or smart energy management, PWRcell has power and capacity options for every need, without sacrificing flexibility or function.

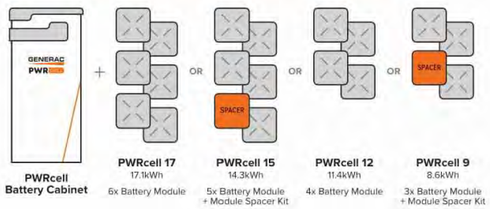
PWRcell BATTERY CABINET DESIGN

The PWRcell Battery Cabinet allows system owners the flexibility to scale from the economical 8.6kWh PWRcell 9 to the massive 17.1kWh PWRcell 17 by installing additional battery modules to the PWRcell Battery Cabinet. When needs change, an existing PWRcell Battery Cabinet can be upgraded with additional modules. Use the graphic below and the chart on the back of this sheet to understand what components you need for your chosen PWRcell configuration.

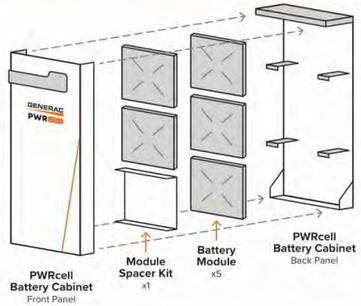
FEATURES & BENEFITS

- Connect 2 PWRcell Battery Cabinets to a single PWRcell Inverter for 34.2kWh of storage
- Best-in-class battery backup power
- Plug-and-play with PWRcell Inverter and PV Link™
- Time-of-use (TOU) and zero-export ready
- Residential and commercial application ready

BATTERY CONFIGURATION GUIDE



BATTERY CABINET ASSEMBLY



Specifications

PWRcell™ BATTERY CONFIGURATIONS	9	12	15	17
BATTERY MODULES:	3	4	5	6
USABLE ENERGY:	8.6kWh	11.4kWh	14.3kWh	17.1kWh
POWER - RATED CONTINUOUS:	3.4kW	4.5kW	5.6kW	6.7kW
POWER - 60 MINUTES:	4.2kW	5.6kW	7.0kW	8.4kW
POWER - 2 MINUTES:	5.0kW	6.7kW	8.4kW	10.0kW
REbus™ VOLTAGE - INPUT/OUTPUT:	360-420 VDC			
MODULE VOLTAGE:	46.8 VDC			
ROUND-TRIP EFFICIENCY:	96.50%			
OPERATING TEMPERATURE - FAHRENHEIT (CELSIUS):	41 to 113 °F (5 to 45 °C)			
RECOMMENDED AMBIENT TEMPERATURE - FAHRENHEIT (CELSIUS):	55 to 86 °F (13 to 30 °C)			
MAXIMUM INSTALLATION ALTITUDE - FT (M):	9834 (3000)			
DIMENSIONS, L x W x H - IN (MM):	22" x 10" x 68" (559 x 254 x 1727)			
WEIGHT, ENCLOSURE - LB (KG):	115 (52)			
WEIGHT, INSTALLED - LB (KG):	280 (127)	335 (152)	390 (178)	445 (202)
WARRANTY - LI-ION MODULES:	10 Years, (7.56MWh)			
WARRANTY - ELECTRONICS AND ENCLOSURE:	10 Years			
COMMUNICATION PROTOCOL:	REbus™ DC Nanogrid™			
COMPLIANCE:	UL 9540, UL 1973, UL 1642, CSA 22.2			

UPGRADING PWRcell

Inside of the PWRcell Battery Cabinet, battery modules are stacked two deep on three levels, allowing for up to six modules to be connected in series. You can upgrade an existing PWRcell Battery Cabinet by adding Battery Modules and a Module Spacer (APKE00008) if required. PWRcell 9 and PWRcell 15 require a module spacer.

Generac offers a convenient PWRcell Battery Upgrade Kit (APKE00009) to help replace lost or misplaced hardware. A PWRcell Battery Upgrade Kit may be purchased from your Generac distributor.

Refer to the table to the right for material requirements related to upgrading the PWRcell Battery Cabinet.

UPGRADE MATERIAL REQUIREMENTS

STARTING CONFIGURATION	ENDING CONFIGURATION: PWRcell 17	PWRcell 15	PWRcell 12
PWRcell 9	+ 3 x PWRCell Mod + 2 x APKE00009*	+ 2 x PWRCell Mod + 1 x APKE00009*	+ 1 x PWRCell Mod + 1 x APKE00009*
PWRcell 12	+ 2 x PWRCell Mod + 1 x APKE00009*	+ 1 x PWRCell Mod + 1 x APKE00008	
PWRcell 15	+ 1 x PWRCell Mod + 1 x APKE00009*		

**APKE00009 (Upgrade kit) only required if original hardware is unavailable*

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S45 W29290 Hwy. 59, Waukesha, WI 53189
www.Generac.com | 888-GENERAC (436-3722)

A0000528139 REV C

GENERAC

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Email: info@powerhome.com
Web: www.powerhome.com

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 9/10/2020

PROJECT NAME & ADDRESS

JERMEELE V WILSON
RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-9

GENERAC

PV Link™

2500W MPPT Substring Optimizer
Model: APKE00010
Certification Model Reference: S2502

PV Link is the simple solar optimizer for quick installation and long-lasting performance. Connect PV modules to each PV Link to overcome shading and challenging roof lines.

FEATURES & BENEFITS

- Fast, simple installation
- Lower failure risk than module-level optimizers
- 2017/2020 NEC rapid shutdown compliant with SnapRS™
- Quick connections with MC4 connectors
- Exports up to 2500W
- Compatible with PWRcell™ Inverters
- Cost-effective solution for high-performance PV
- Ground-fault protection

SINGLE-STRING PV ARRAY WITH SnapRS DEVICES

Where PV module-level rapid shutdown is required (NEC 690.12), a SnapRS device (RS) is installed to negative (-) lead of each PV module.

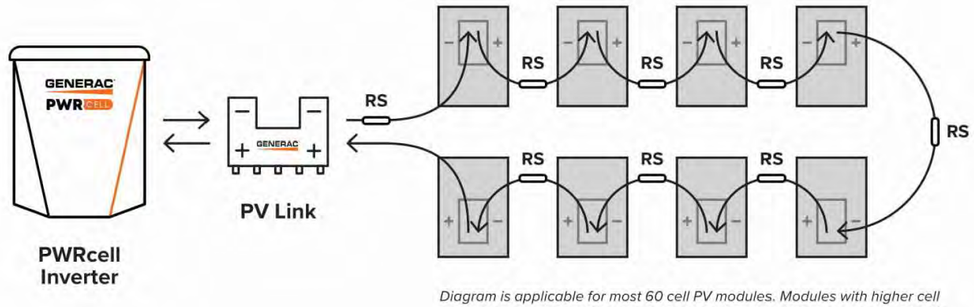

Diagram is applicable for most 60 cell PV modules. Modules with higher cell count may require a different arrangement. Contact Generac for more details.

Specifications

PV Link™ (APKE00010)	
RATED POWER*:	2500W
PEAK EFFICIENCY:	99%
MPPT VOLTAGE RANGE:	60-360 VMP
MAX INPUT VOLTAGE:	420 VOC; max when cold
MAX OUTPUT:	420 VOC
NOMINAL OUTPUT (REbus™):	380 VDC
MAX OUTPUT CURRENT (CONTINUOUS):	8 A
MAX OUTPUT CURRENT (FAULT):	10 A
MAX INPUT CURRENT (CONTINUOUS):	13 A @ 50°C, 10 A @ 70°C
MAX INPUT SHORT CIRCUIT CURRENT (ISC):	18 A
STANDBY POWER:	< 1 W
PROTECTIONS:	Ground-fault, Arc-fault (Arc-fault Type 1 AFCI, Integrated), PVRSE
MAX OPERATING TEMP: FAHRENHEIT (CELSIUS)	158 °F (70 °C)
SYSTEM MONITORING:	PWRview™ Web Portal and Mobile App
ENCLOSURE:	Type 3R
WEIGHT - LB (KG):	7.3 lb (3.3 kg)
DIMENSIONS, L x W x H - IN (MM):	15.4" x 2" x 9.6" (391.2 x 50.8 x 243.8)
COMPLIANCE:	UL 1741, CSA 22.2
WARRANTY:	25 Years

**PV Link can tolerate higher than rated power at its input if Max Input Voltage and Short Circuit Current specifications are not exceeded*

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GENERAC

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DESCRIPTION	DATE	REV

Signature with Seal

DATE: 9/10/2020

PROJECT NAME & ADDRESS

JERMEELE V WILSON RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-10

QRail™— Fully Integrated Mounting and Racking System

The QRail Series is a strong and versatile solar array mounting system that provides unrivaled benefits to solar designers and installers. Combined with Quick Mount PV's industry-leading waterproof mounts, QRail offers a complete racking solution for mounting solar modules on any roof.

Easily design array configurations with the QDesign software application. Generate complete engineering reports and calculate a precise bill of materials for all the mounting, racking and accessories needed for a complete solar array.

Comprehensive, One-Source Solution

QRail, together with Quick Mount PV's waterproof mounting products, provides the benefit of a single-sourced, seamlessly integrated rooftop installation that works with all roof types — composition/asphalt shingles, flat or curved tile, metal shingle, shake, slate and low slope roofs. The QRail system also works with any roof attachment system for maximum flexibility.

Superior Strength and Versatility

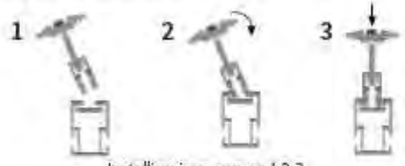
QRail is engineered for optimal structural performance. The system is certified to UL 2703, fully code compliant and backed by a 25-year warranty. QRail is available in Light, Standard and Heavy versions to match all geographic locations. QRail is compatible with virtually all modules and works on a wide range of pitched roof surfaces. Modules can be mounted in portrait or landscape orientation in standard or shared-rail configurations.

QRails come in two lengths — 168 inches (14 ft) and 208 inches (17.3 ft) Mill and Black Finish

Fast, Simple Installation: It Just Clicks

QClick Technology™

The universal mid and end clamps use QClick technology to simply "click" into the rail channel and remain upright, ready to accept the module. The pre-assembled clamps fit virtually all module frames and require no extra hardware, eliminating pre-loading and reducing installation time.



Installing is as easy as 1-2-3

Universal End Clamp

2 clamps for modules from 30-45mm or 38-50mm thick

Universal Bonded Mid Clamp

2 clamps for modules from 30-45mm or 38-50mm thick

QSplice™ Technology

QRail's innovative internal QSplice installs in seconds, requiring no tools or screws. Simply insert QSplice into the rail and slide the other rail on to create a fully structural, bonded splice. An external splice is also available.

Installs in seconds — no tools or hardware required

Fully Integrated Electrical Bonding

The QRail system provides an integrated electrical bonding path, ensuring that all exposed metal parts and the solar module frames are electrically connected. All electrical bonds are created when the components are installed and tightened down.

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DATE: 9/10/2020

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RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11

QRail™ Configurations

Item Code	Part Number	Description	Finish
QMR-RL14A60	800	QRail Light, 14 ft., 60 Pack	Mill
QMR-RL17.3A60	801	QRail Light, 17.3 ft, 60 Pack	Mill
QMR-RL14B60	805	QRail Light, 14 ft., 60 Pack	Black
QMR-RL17.3B60	806	QRail Light, 17.3 ft, 60 Pack	Black
QMR-RS14A60	810	QRail Standard, 14 ft., 60 Pack	Mill
QMR-RS17.3A60	811	QRail Standard, 17.3 ft, 60 Pack	Mill
QMR-RS14B60	815	QRail Standard, 14 ft., 60 Pack	Black
QMR-RS17.3B60	816	QRail Standard, 17.3 ft, 60 Pack	Black
QMR-RH14A60	820	QRail Heavy, 14 ft., 60 Pack	Mill
QMR-RH17.3A60	821	QRail Heavy, 17.3 ft, 60 Pack	Mill
QMR-RH14B60	825	QRail Heavy, 14 ft, 60 Pack	Black
QMR-RH17.3B60	826	QRail Heavy, 17.3 ft, 60 Pack	Black

QSplice™ Internal Structural Splice

Item Code	Part Number	Description	Finish
QMR-ISLA15	830	QSplice Internal, Light, 15 Pack	Mill
QMR-ISSA15	831	QSplice Internal, Standard, 15 Pack	Mill
QMR-ISHA15	832	QSplice Internal, Heavy, 15 Pack	Mill

QSplice™ External Structural Splice

Item Code	Part Number	Description	Finish
QMR-ESSA15	834	QSplice External, Standard, 15 Pack	Mill
QMR-ESHA15	835	QSplice External, Heavy, 15 Pack	Mill

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DETROIT, MI 48223

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11A

Universal End Clamp with QClick™ Technology

Black *Mill*

Item Code	Part Number	Description	Finish
QMR-UEC3045A20	860	Universal End Clamp, 30-45mm, 20 Pack	Mill
QMR-UEC3850A20	861	Universal End Clamp, 38-50mm, 20 Pack	Mill
QMR-UEC3045B20	865	Universal End Clamp, 30-45mm, 20 Pack	Black
QMR-UEC3850B20	866	Universal End Clamp, 38-50mm, 20 Pack	Black
QMR-UEC3045BPA20	862	Universal End Clamp, 30-45mm, w/ Bonding, 20 Pack	Mill
QMR-UEC3850BPA20	863	Universal End Clamp, 38-50mm, w/ Bonding, 20 Pack	Mill
QMR-UEC3045BPB20	867	Universal End Clamp, 30-45mm, w/ Bonding, 20 Pack	Black
QMR-UEC3850BPB20	868	Universal End Clamp, 38-50mm, w/ Bonding, 20 Pack	Black

Mid Clamp with QClick™ Technology

Black *Mill*

Item Code	Part Number	Description	Finish
QMR-UMC3045BP1.2A20	872	Universal Mid Clamp, 30-45mm, w/ Bonding, 20 Pack	Mill
QMR-UMC3850BP1.2A20	873	Universal Mid Clamp, 38-50mm, w/ Bonding, 20 Pack	Mill
QMR-UMC3045BP1.2B20	877	Universal Mid Clamp, 30-45mm, w/ Bonding, 20 Pack	Black
QMR-UMC3850BP1.2B20	878	Universal Mid Clamp, 38-50mm, w/ Bonding, 20 Pack	Black

Single-Slot L-Foot

Item Code	Part Number	Description	Finish
QMC-LF A12	692	Single-slot L-foot, 12 Pack	Mill
QMC-LF B12	693	Single-slot L-foot, 12 Pack	Black

End Caps

Heavy *Standard* *Light*

Item Code	Part Number	Description	Finish
QMR-CPL B50	885	End Cap Light, 50 Pack	Black
QMR-CPS B50	886	End Cap Standard, 50 Pack	Black
QMR-CPH B50	887	End Cap Heavy, 50 Pack	Black

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DETROIT, MI 48223

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11B

T-Bolt

Item Code	Part Number	Description	Finish
QMR-TB A 300	880	T-Bolt w/ Nut, 300 Pack	stainless steel

Wire Clip

Works with both PV and Trunk Cabling

Item Code	Part Number	Description	Finish
QMR-WC A 300	892	Trunk/PV Cable, 300 Pack	stainless steel

Grounding Lug

Item Code	Part Number	Description	Finish
QMR-GL A 50	890	WEEB Lug w/ T-Bolt, 50 Pack	n/a

WEEB BMC

Item Code	Part Number	Description	Finish
QMR-ECW A 50	891	WEEB BMC, 50 Pack	stainless steel

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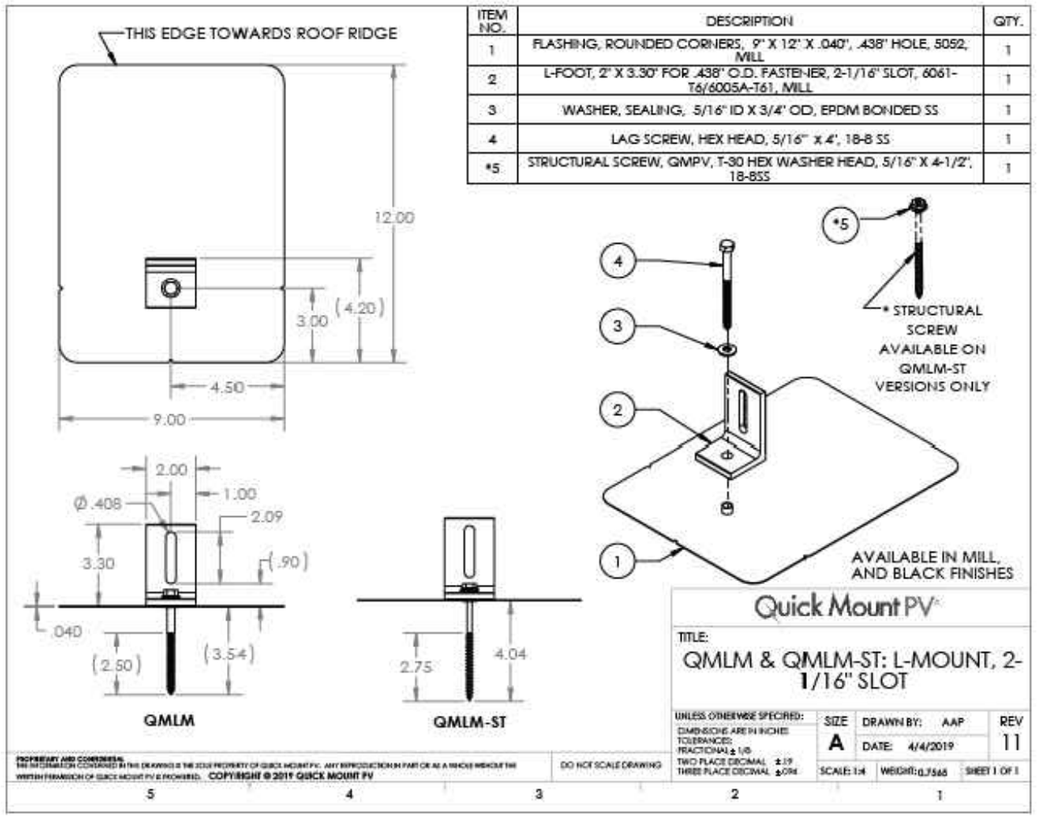
SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11C

L-Mount | QMLM / QMLM-ST

Elevated Water Seal Technology®



ITEM NO.	DESCRIPTION	QTY.
1	FLASHING, ROUNDED CORNERS, 9" X 12" X .040", .438" HOLE, 5052, MILL	1
2	L-FOOT, 2" X 3.30" FOR .438" O.D. FASTENER, 2-1/16" SLOT, 6061-T6/6005A-T61, MILL	1
3	WASHER, SEALING, 5/16" ID X 3/4" OD, EPDM BONDED SS	1
4	LAG SCREW, HEX HEAD, 5/16" x 4", 18-8 SS	1
*5	STRUCTURAL SCREW, QMPV, T-30 HEX WASHER HEAD, 5/16" X 4-1/2", 18-8SS	1

Quick Mount PV

TITLE: QMLM & QMLM-ST: L-MOUNT, 2-1/16" SLOT

UNLESS OTHERWISE SPECIFIED:	SIZE	DRAWN BY: AAP	REV
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± 1/6 TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.014	A	DATE: 4/4/2019	11
		SCALE: 1:4 WEIGHT: 0.7568	SHEET 1 OF 1

5 4 3 2 1

Quick Mount PV®
RESPECT THE ROOF

L-Mount Installation Instructions

Installation Tools Required: tape measure, roofing bar, chalk line, stud finder, caulking gun, sealant compatible with roofing materials, drill with 7/32" or 1/8" bit, drill or impact gun with 1/2" socket.

WARNING: Quick Mount PV products are NOT designed for and should NOT be used to anchor fall protection equipment.

Locate, choose, and mark centers of rafters to be mounted. Select the courses of shingles where mounts will be placed.

Carefully lift composition roof shingle with roofing bar, just above placement of mount. Remove nails as required and backfill holes with aproved sealant. See "Proper Flashing Placement" on next page.

Insert flashing between 1st and 2nd course. Slide up so top edge of flashing is at least ¾" higher than the butt-edge of the 3rd course and lower flashing edge is above the butt-edge of 1st course. Mark center for drilling.

If attaching with lag bolt use a 7/32" bit (Lag). Use a 1/8" bit (ST) for attaching with the structural screw. Drill pilot hole into roof and rafter, taking care to drill square to the roof. Do not use mount as a drill guide. Drill a 2" deep hole into rafter.

Clean off any sawdust, and fill hole with sealant compatible with roofing materials.

Place L-foot onto elevated flute and rotate L-foot to desired orientation.

Prepare lag bolt or structural screw with sealing washer. Using a ½-inch socket on an impact gun, drive prepared lag bolt through L-foot until L-foot can no longer easily rotate. **DO NOT over-torque.** NOTE: Structural screw can be driven with T-30 hex head bit.

BI 7.2.3-44

You are now ready for the rack of your choice. Follow all the directions of the rack manufacturer as well as the module manufacturer. NOTE: Make sure top of L-Foot makes solid contact with racking.

All roofing manufacturers' written instructions must also be followed by anyone modifying a roof system. Consult the roof manufacturer's specs and instructions prior to working on the roof.

Apr-2019 Rev 6

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PROJECT NAME & ADDRESS

JERMEELE V WILSON RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

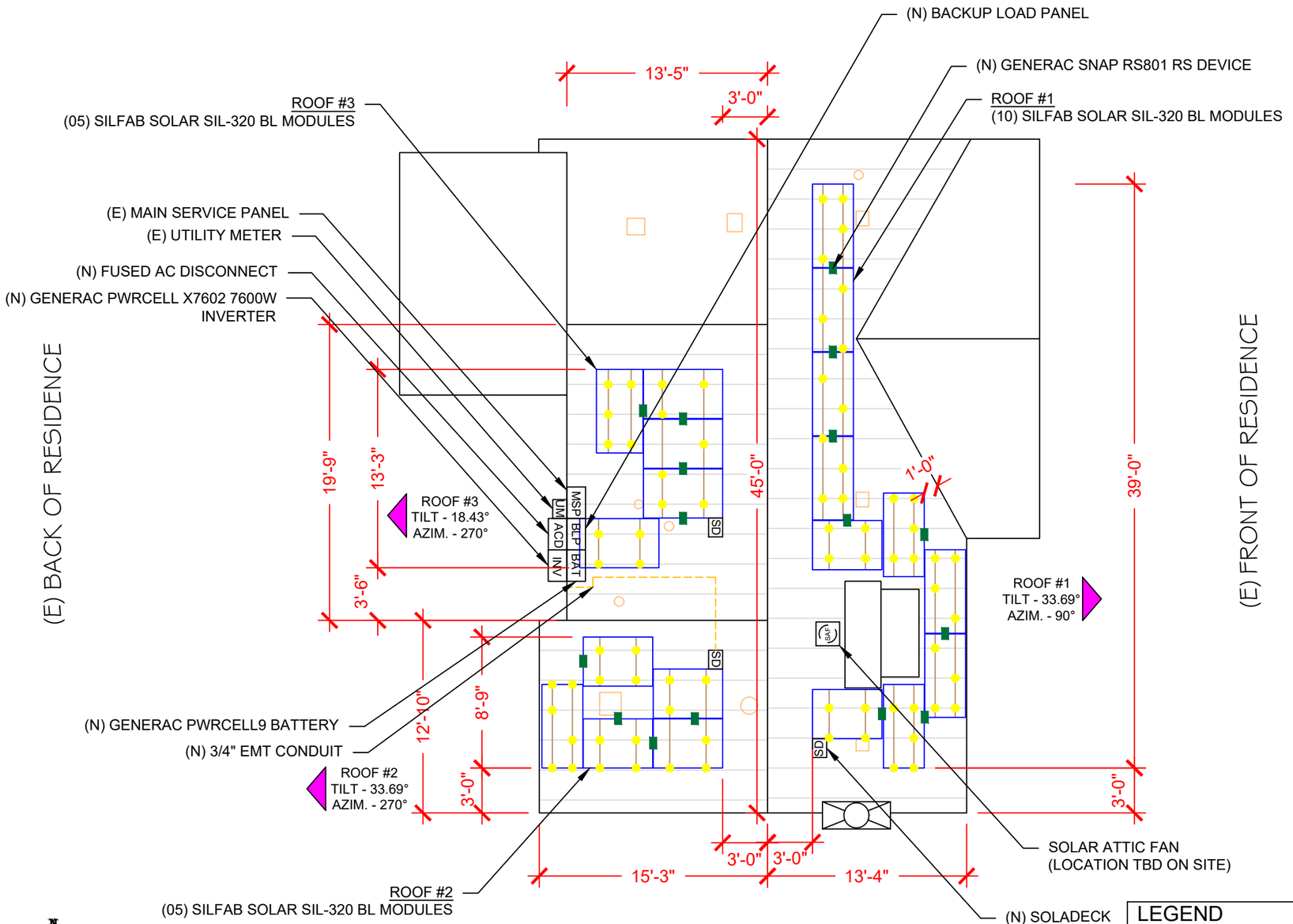
SHEET NAME
EQUIPMENT SPECIFICATION

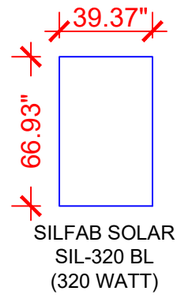
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-12

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 20 MODULES
MODULE TYPE = SILFAB SOLAR SIL-320 BL MODULES
MODULE WEIGHT = 43.00 LBS / 19.5 KG.
MODULE DIMENSIONS = 66.93"x 39.37" = 18.30 SF
UNIT WEIGHT OF ARRAY = 2.35 PSF





SILFAB SOLAR
SIL-320 BL
(320 WATT)

ROOF DESCRIPTION

ROOF TYPE			COMPOSITION SHINGLE	
ROOF	ROOF TILT	AZIMUTH	FRAMING SIZE	FRAMING SPACING
#1	33.69°	90°	SEE STRUCTURAL LETTER	
#2	33.69°	270°		
#3	18.43°	270°		

ARRAY AREA & ROOF AREA CALC'S

ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	10	183.00	498.66	37
#2	05	91.50	196.11	47
#3	05	91.50	264.91	35

(SAF) SOLAR ATTIC FAN

NOTES:
- THE LOCATION OF THE SAF SHOULD BE DETERMINED ON SITE.
- THE SAF SHOULD BE LOCATED 30"-36" FROM THE PEAK OF THE ROOF OR ABOUT 5 ROWS DOWN FROM THE RIDGE.
- THE SAF SHOULD NOT BE MOUNTED ON ANY STRUCTURAL MEMBER LIKE TRUSS/RAFTER.
- "CAN VENTS" CAN BE REPLACED BY SAF.
- SAF CANNOT BE MOUNTED ON A METAL ROOF. PLEASE CARRY GABLE VENT FANS FOR METAL ROOF INSTALLATION (IF APPLICABLE).

LEGEND

- SD - SOLADECK
- INV - INVERTER
- ACD - AC DISCONNECT
- MSP - MAIN SERVICE PANEL
- BLP - BACKUP LOAD PANEL
- BAT - BATTERY
- OP - PV LINK OPTIMIZER
- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- ROOF ATTACHMENT
- RAFTERS
- CONDUIT
- RAPID SHUTDOWN

1 ROOF PLAN & MODULES
PV-2
SCALE: 1/8" = 1'-0"

ON- SITE CUSTOMER APPROVAL:_____

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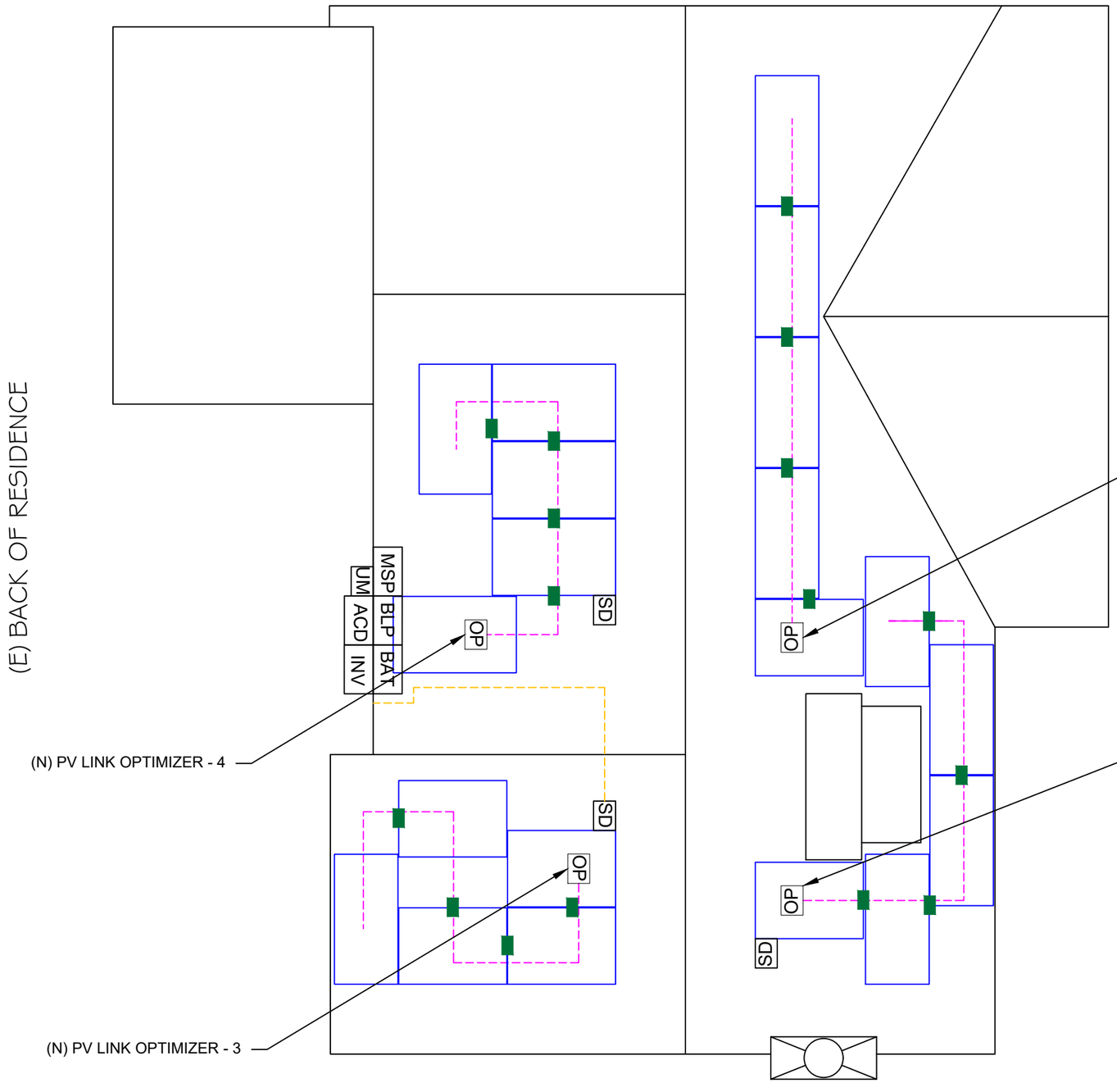
DETROIT, MI 48223

SHEET NAME
ROOF PLAN & MODULES

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2



1 ROOF PLAN WITH STRING LAYOUT

PV-2A SCALE: 3/16" = 1'-0"

BILL OF MATERIALS

EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	20	SILFAB SOLAR SIL-320 BL MODULES
OPTIMIZER	04	GENERAC PV LINK S2502 POWER OPTIMIZERS
GENERAC SNAP RS	20	GENERAC SNAPRS MODEL RS801
INVERTER	01	GENERAC PWRCELL X7602 7600W INVERTER
AC DISCONNECT	1	60A FUSED, (2) 40A FUSES, 240V, NEMA 3R, UL LISTED
SOLADECK	3	SOLADECKS 600 V, NEMA 3R, UL LISTED
BATTERY	1	GENERAC PWRCELL9 BATTERY
BACKUP PANEL	1	125A, BACKUP PANEL, 240V
RAILS	16	QRAIL LIGHT 14 FT. BLACK
SPLICE KIT	5	QSPLICE INTERNAL LIGHT
WEEB BMC	32	WEEB BMC MILL
MODULE CLAMPS	16	UNIVERSAL MID CLAMP
GROUNDING LUG	12	WEEB LUG W/ T-BOLT
END CLAMPS	48	UNIVERSAL END CLAMPS
ATTACHMENT	73	L-MOUNT ATTACHMENT (QUICKMOUNT)
T-BOLT	77	T-BOLT W/ NUT M8 X 20MM

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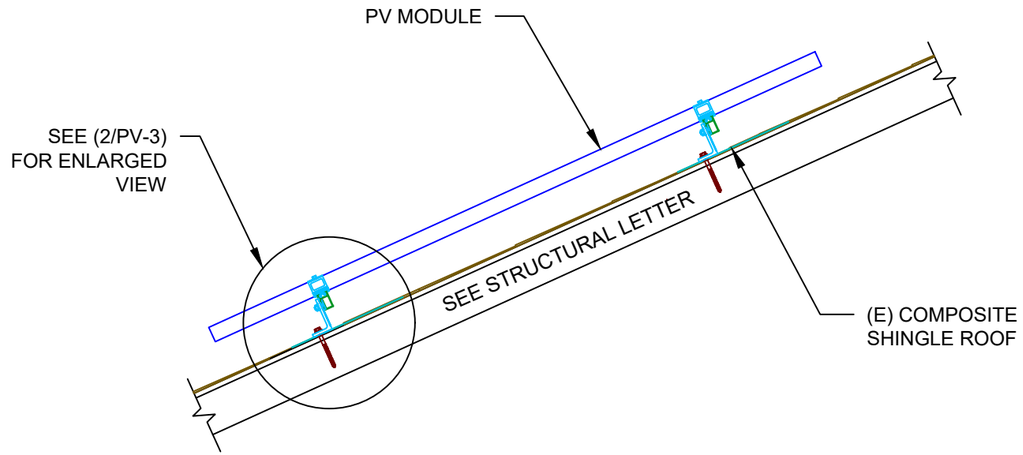
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
STRING LAYOUT

SHEET SIZE
ANSI B
11" X 17"

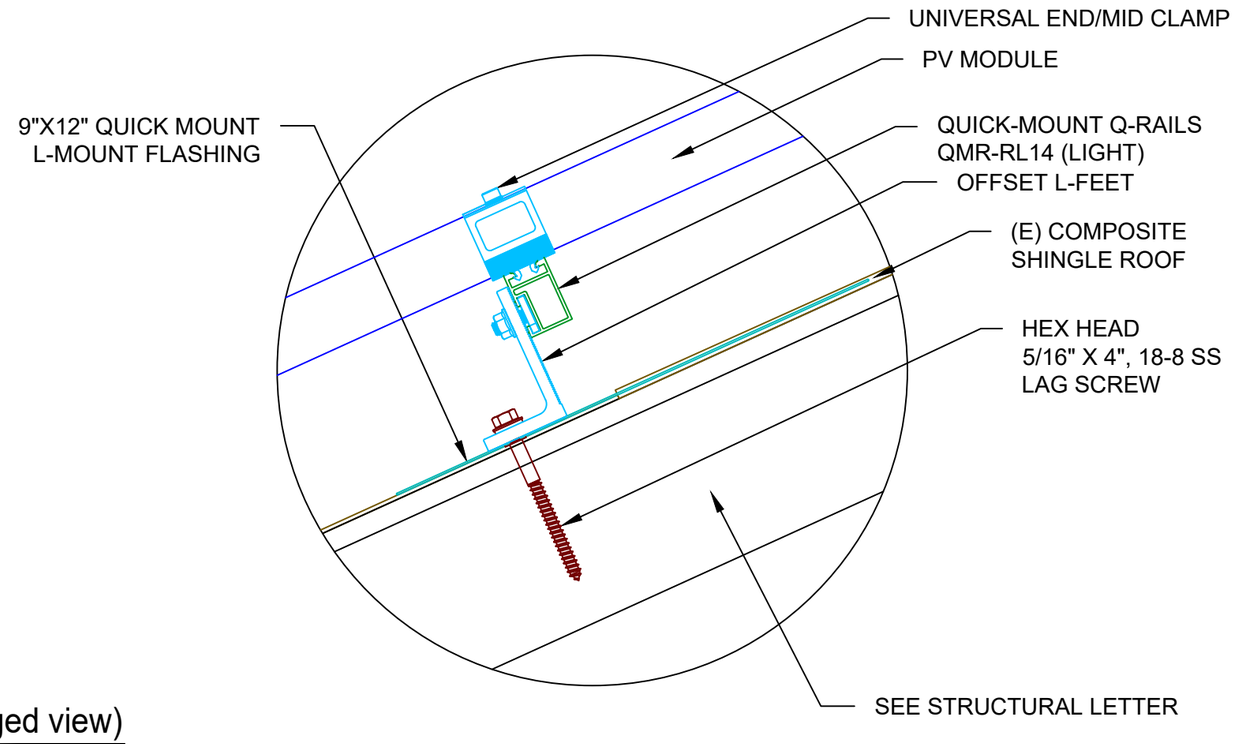
SHEET NUMBER
PV-2A



1 ATTACHMENT DETAIL

PV-3

SCALE: 1" = 1'-0"



2 ATTACHMENT DETAIL (enlarged view)

PV-3

SCALE: NTS

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SHEET NAME
ATTACHMENT DETAIL

SHEET SIZE
ANSI B
11" X 17"

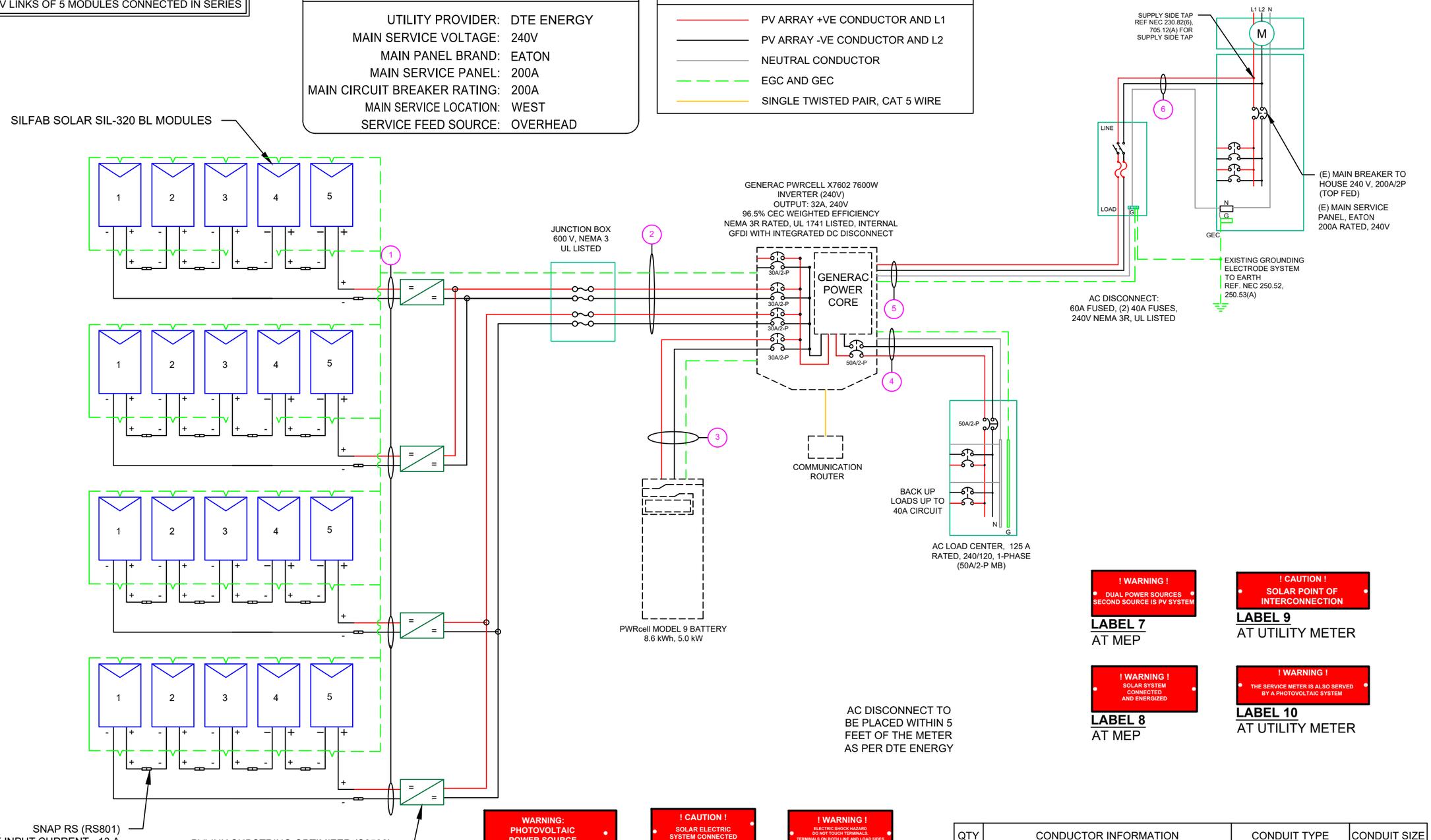
SHEET NUMBER
PV-3

(20) SILFAB SOLAR SIL-320 BL MODULES
(4) PV LINKS OF 5 MODULES CONNECTED IN SERIES

SERVICE INFO	
UTILITY PROVIDER:	DTE ENERGY
MAIN SERVICE VOLTAGE:	240V
MAIN PANEL BRAND:	EATON
MAIN SERVICE PANEL:	200A
MAIN CIRCUIT BREAKER RATING:	200A
MAIN SERVICE LOCATION:	WEST
SERVICE FEED SOURCE:	OVERHEAD

WIRE LEGEND

- PV ARRAY +VE CONDUCTOR AND L1
- PV ARRAY -VE CONDUCTOR AND L2
- NEUTRAL CONDUCTOR
- EGC AND GEC
- SINGLE TWISTED PAIR, CAT 5 WIRE



WARNING: PHOTOVOLTAIC POWER SOURCE
LABEL 1
ON ALL CONDUITS SPACED AT MAX 10FT

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY
LABEL 2
AT INVERTER

! CAUTION ! SOLAR ELECTRIC SYSTEM CONNECTED AND ENERGIZED
LABEL 3
AT INVERTER

PHOTOVOLTAIC DC DISCONNECT
LABEL 4
AT EACH DC DISCONNECT

! WARNING ! ELECTRIC SHOCK HAZARD DO NOT TOUCH TERMINALS. TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION
LABEL 5
AT EACH AC DISCONNECT

PHOTOVOLTAIC AC DISCONNECT
LABEL 6
AT EACH AC DISCONNECT

! WARNING ! DUAL POWER SOURCES SECOND SOURCE IS PV SYSTEM
LABEL 7
AT MEP

! WARNING ! SOLAR SYSTEM CONNECTED AND ENERGIZED
LABEL 8
AT MEP

! CAUTION ! SOLAR POINT OF INTERCONNECTION
LABEL 9
AT UTILITY METER

! WARNING ! THE SERVICE METER IS ALSO SERVED BY A PHOTOVOLTAIC SYSTEM
LABEL 10
AT UTILITY METER

	QTY	CONDUCTOR INFORMATION		CONDUIT TYPE	CONDUIT SIZE
1	(8)	#10AWG -	PV WIRE/USE-2	N/A	N/A
	(1)	#6AWG -	BARE COPPER IN FREE AIR		
2	(4)	#10AWG -	THWN-2	EMT OR FLEX IN ATTIC	3/4"
	(1)	#6AWG -	THWN-2 GND		
3	(2)	#10AWG -	THWN-2	EMT OR FLEX	3/4"
	(1)	#10AWG -	THWN-2 GND		
4	(3)	#6AWG -	THWN-2	EMT OR FLEX	3/4"
	(1)	#6AWG -	THWN-2 GND		
5	(3)	#6AWG -	THWN-2	EMT OR FLEX	3/4"
	(1)	#6AWG -	THWN-2 GND		
6	(3)	#6AWG -	THWN-2	EMT OR FLEX	3/4"

1 ELECTRICAL LINE DIAGRAM
PV-4 SCALE: NTS

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Web: www.powerhome.com

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 9/10/2020

PROJECT NAME & ADDRESS

JERMEELE V WILSON RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-4

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	SILFAB SOLAR SIL-320 BL
VMP	33.85V
IMP	9.46A
VOC	41.9V
ISC	9.92A
TEMP. COEFF. VOC	-0.301%/°C
PTC RATING	286.4W
MODULE DIMENSION	66.93"L x 39.37"W x 1.50"D (In Inch)

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	GENERAC PWRCELL X7602
AC POWER OUTPUT (LOADS/GRID)	7600VA
AC POWER OUTPUT (BACKUP)	8000VA
NOMINAL OUTPUT VOLTAGE	240 VAC
MAX OUTPUT CURRENT @240V (LOADS/GRID)	32A
MAX OUTPUT CURRENT @240V (BACKUP)	50A
NOMINAL DC INPUT VOLTAGE	380Vdc
MAX DC INPUT VOLTAGE	420Vdc
CEC WEIGHTED EFFICIENCY	96.5%
MAX DC POWER (PV)	10000W
MAX INPUT CURRENT (PV)	20Adc
CONT. PEAK POWER (BATTERY)	8000W

SERIES SUB STRING OPTIMIZER SPECIFICATIONS	
MANUFACTURER / MODEL #	PV LINK S2502
RATED POWER	2500W
MPPT VOLTAGE RANGE	60-360 Vmp
MAXIMUM INPUT VOLTAGE	420Voc
MAXIMUM OUTPUT	420 Adc
NOMINAL OUTPUT	380 Vdc
MAXIMUM OUTPUT CURRENT	8 A
MAXIMUM SHORT CIRCUIT CURRENT	18 A

BATTERY SPECIFICATIONS	
MANUFACTURER / MODEL #	GENERAC PWRCELL9 BATTERY
USABLE ENERGY	8.6kWH
RATED CONTINUOUS POWER	3.4kW
POWER: 60 MINUTES	4.2kW
POWER: 2 MINUTES	5.0kW
REBUS VOLTAGE: INPUT/ OUTPUT	360-420Vdc
MODULE VOLTAGE	46.8Vdc
ROUND-TRIP EFFICIENCY	96.5%

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-19°
AMBIENT TEMP (HIGH TEMP 2%)	34°
CONDUIT HEIGHT	0.5"
ROOF TOP TEMP	56°

DC CONDUCTOR AMPACITY CALCULATIONS:
ARRAY TO JUNCTION BOX:

EXPECTED WIRE TEMP (In Celsius)	56°
TEMP. CORRECTION PER NEC TABLE 310.15 (B)(2)(a)	0.71
NO. OF CURRENT CARRYING CONDUCTORS	8
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	0.7
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE 310.15(B)(16)	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	10A
1.25 X Imax	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	19.88A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (10A) otherwise less the entry for circuit conductor size and ampacity	

FROM JUNCTION BOX TO INVERTER:

EXPECTED WIRE TEMP (In Celsius)	56°
TEMP. CORRECTION PER NEC TABLE 310.15 (B)(2)(a)	0.71
NO. OF CURRENT CARRYING CONDUCTORS	4
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	0.8
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE 310.15(B)(16)	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	20A
1.25 X Imax X # of PV LINKS	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	22.72A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (20A) otherwise less the entry for circuit conductor size and ampacity	

ELECTRICAL NOTES

1.) ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
2.) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.
3.) WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
4.) WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
5.) DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
6.) WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
7.) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
8.) MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
9.) MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
10.) THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE

FROM BATTERY TO INVERTER:

EXPECTED WIRE TEMP (In Celsius)	34°
TEMP. CORRECTION PER NEC TABLE 310.15 (B)(2)(a)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	2
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	1
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE310.15(B)(16)	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	26.25A
1.25 X Imax	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	38.40A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (26.25A) otherwise less the entry for circuit conductor size and ampacity	

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM INVERTER TO BACK-UP PANEL:

No. OF INVERTER	1
EXPECTED WIRE TEMP (In Celsius)	34°
TEMP. CORRECTION PER NEC TABLE 310.15(B)(2)(a)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	3
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	1
CIRCUIT CONDUCTOR SIZE	6 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE 310.15(B)(16)	75A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	42.5A
1.25 X INVERTER OUTPUT CURRENT (BACKUP POWER)	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	72A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (42.5A) otherwise less the entry for circuit conductor size and ampacity	

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM INVERTER TO MEP:

No. OF INVERTER	1
EXPECTED WIRE TEMP (In Celsius)	34°
TEMP. CORRECTION PER NEC TABLE 310.15(B)(2)(a)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	3
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	1
CIRCUIT CONDUCTOR SIZE	6 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE 310.15(B)(16)	75A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	40A
1.25 X MAX INVERTER OUTPUT CURRENT (LOADS/GRID)	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	72A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (40A) otherwise less the entry for circuit conductor size and ampacity	

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DESCRIPTION	DATE	REV

Signature with Seal

DATE: 9/10/2020

PROJECT NAME & ADDRESS

JERMEELE V WILSON
RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
WIRING CALCULATIONS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-5

Silfab SOLAR

BC Series
SIL-320 BL

BAA ARRA · 25 YEAR PRODUCT WARRANTY · AUTOMATED MANUFACTURING · JUST-IN-TIME · DNV·GL TOP PERFORMER · TIER 1 BANKABLE $$$ · HIGH EFFICIENCY

126 Cell
Monocrystalline PV Module

CE · ETL Intertek · cETL Intertek · IEC · CEC LISTED · FSEC · Fraunhofer ISE

CHUBB*
* Chubb provides error and omission insurance to Silfab Solar Inc.

INDUSTRY LEADING WARRANTY
All our products include an industry leading 25-year product workmanship and 30-year performance warranty.

MAXIMUM ENERGY OUTPUT
Silfab BC Series utilizes next generation Back Contact technology to reduce production/manufacturing steps and improve quality while maximizing power. Ideal for residential and commercial projects where maximum power density is preferred.

NORTH AMERICAN QUALITY
Silfab is the largest and most automated solar manufacturer in North America. Utilizing premium quality materials and strict quality control management to deliver the highest efficiency, premium quality PV modules 100% made in North America.

PROVIDES MAXIMUM EFFICIENCY
126 high-efficiency half-cut cells combined with a black conductive back-sheet resulting in a maximum power.

35+ YEARS OF SOLAR INNOVATION
Leveraging over 35+ years of worldwide experience in the solar industry, Silfab is dedicated to superior manufacturing processes and innovations such as Bifacial and Back Contact technologies to ensure our partners have the latest in solar innovation.

BAA / ARRA COMPLIANT
Silfab panels are designed and manufactured to meet Buy American Act Compliance. The US State Department, US Military and FAA have all utilized Silfab panels in their solar installations.

LIGHT AND DURABLE
Engineered to accommodate low load bearing structures up to 5400Pa. The light-weight frame is exclusively designed for wide-ranging racking compatibility and durability.

LOWEST DEFECT RATE
Total automation ensures strict quality controls during the entire manufacturing process at our ISO certified facilities. 48.18 ppm as per December 2018.

DOMESTIC PRODUCTION
Silfab Solar manufactures our PV modules in two automated locations within North America. Our 300+ North American team is ready to help our partners win the hearts and minds of customers, providing customer service and product delivery that is direct, efficient and local.

SUPERIOR POWER
Super power achieved through relocation of tabbing ribbon to reduce shading on module front service and circuit resistance.

AESTHETICALLY PLEASING
Sleek aesthetics from black cells to black back-sheet without tabbing or bus-bar ribbons, ideal for residential applications.

STABLE PERFORMANCE
Enhanced life-time performance through reduced thermal stresses and increased current flow paths.

PID RESISTANT
PID Resistant due to advanced cell technology and material selection. In accordance to IEC 62804-1

Printed on recycled paper.

Electrical Specifications		SIL-320 BL mono PERC MWT Technology	
Test Conditions		STC	NOCT
Module Power (Pmax)	Wp	320	242.1
Maximum power voltage (Vpmax)	V	33.85	30.42
Maximum power current (Ipmax)	A	9.46	7.95
Open circuit voltage (Voc)	V	41.9	38.7
Short circuit current (Isc)	A	9.92	8.13
Module efficiency	%	18.8	17.8
Maximum system voltage (VDC)	V	1000	
Series fuse rating	A	20	
Power Tolerance	Wp	0/+10	

Measurement conditions: STC 1000 W/m2 • AM 1.5 • Temperature 25 °C • NOCT 800 W/m² • AM 1.5 • Measurement uncertainty ≤ 3%
• Sun simulator calibration reference modules from Fraunhofer Institute. Electrical characteristics may vary by ±5% and power by 0/+10W.

Temperature Ratings		SIL-320 BL mono PERC MWT Technology
Temperature Coefficient Isc	%/°C	+0.031
Temperature Coefficient Voc	%/°C	-0.301
Temperature Coefficient Pmax	%/°C	-0.419
NOCT (± 2°C)	°C	40.6
Operating temperature	°C	-40/+85

Mechanical Properties and Components		SIL-320 BL mono PERC MWT Technology
Module weight (± 1 kg)	kg	19.5
Dimensions (H x L x D; ± 1mm)	mm	1700 x 1000 x 38
Maximum surface load (wind/snow)*	Pa	4000 Pa rear load / 5400 Pa front load
Hail impact resistance		ø 25 mm at 83 km/h
Cells		126 high-efficiency half-cut mono-PERC MWT c-Si cells
Glass		3.2 mm high transmittance, tempered, DSM antireflective coating
Backsheet		Multilayer, integrated insulation film and electrically conductive backsheet
Frame		Anodized Al (Black)
Bypass diodes		3 diodes-20SQ040 (45V, 20A)
Cables and connectors		1000 mm ø 5.7 mm (4 mm2), Multicontact MC4 connectors (refer to installation manual)
Junction Box		UL 3730 Certified, IP67 rated

Warranties	SIL-320 BL mono PERC MWT Technology
Module product workmanship warranty	25 years**
Linear power performance guarantee	30 years ≥ 97% end of 1st year ≥ 90% end of 12th year ≥ 82% end of 25th year ≥ 80% end of 30th year

Certifications	SIL-320 BL mono PERC MWT Technology
Product	ULC ORD C1703, UL 1703, FSEC and CEC listed. Product durability proven up to 3 x IEC, climate chamber tests up to DH3000-TC600-HF30 UL Fire Rating: Type 1
Factory	ISO9001:2015

*Please refer to the Safety and Installation Manual for mounting specifications.
**12 year extendable to 25 years subject to registration and conditions outlined under "Warranty" at www.silfabsolar.com.

⚠ Warning: Read the installation and User Manual before handling, installing and operating modules.

- Modules Per Pallet: 26
- Pallets Per Truck: 36
- Modules Per Truck: 936

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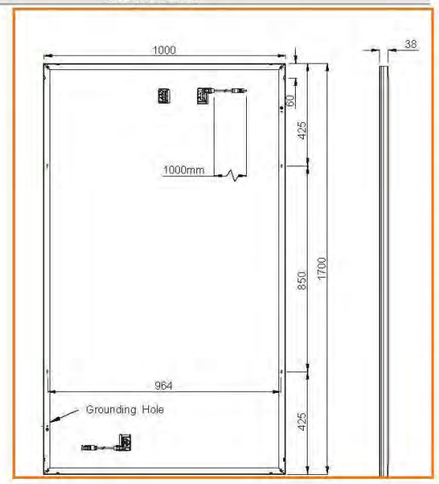

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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 9/10/2020

PROJECT NAME & ADDRESS

JERMEELE V WILSON RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-6

GENERAC

PWRCELL

7.6kW 1Ø, 11.4kW 3Ø PWRcell Inverter with CTs
Model: APKE00014, APKE00013
Certification Model Reference: X7602, X11402

Intertek

Solar + storage is simple with the Generac PWRcell™ Inverter. This bi-directional, REbus™-powered inverter offers a simple, efficient design for integrating smart batteries with solar. Ideal for self-supply, backup power, zero-export and energy cost management, the PWRcell Inverter is the industry's most feature-rich line of inverters, available in single-phase and three-phase models.

FEATURES & BENEFITS

- Single inverter for grid-tied solar with smart battery integration
- Simplified system design: No autotransformer or battery inverter needed
- User-selectable modes for backup power, self-supply, time-of-use and zero-export
- Free system monitoring included via PWRview™ Web Portal and Mobile App

AC OUTPUT/GRID-TIE	MODEL APKE00014	MODEL APKE00013
RATED AC POWER OUTPUT:	7600W	11400W
AC OUTPUT VOLTAGE:	120/240, 1Ø VAC	120/208, 3Ø VAC
AC FREQUENCY:	60 Hz	60 Hz
MAXIMUM CONTINUOUS OUTPUT CURRENT:	32 A, RMS	32 A, RMS
GROUND-FAULT ISOLATION DETECTION:	Included	Included
CHARGE BATTERY FROM AC:	Yes	Yes
THD (CURRENT):	< 2%	< 2%
TYPICAL NIGHTTIME POWER CONSUMPTION:	< 7W	< 7W

DC INPUT	MODEL APKE00014	MODEL APKE00013
DC INPUT VOLTAGE RANGE:	360-420 VDC	360-420 VDC
NOMINAL DC BUS VOLTAGE:	380 VDC	380 VDC
MAX IMPORT CURRENT[1]:	20 A	30 A
MAX INPUT CURRENT[2]:	30 A	30 A
REVERSE-POLARITY PROTECTION:	Yes	Yes
GROUND-FAULT ISOLATION DETECTION:	Yes	Yes
TRANSFORMERLESS, UNGROUNDED:	Yes	Yes
TYPICAL NIGHTTIME POWER CONSUMPTION:	< 7W	< 7W

AC OUTPUT/BACKUP	MODEL APKE00014	MODEL APKE00013
RATED AC BACKUP POWER OUTPUT (ISLANDED):	8000W	8000W
MAXIMUM AC BACKUP POWER OUTPUT:	10000W	10000W
AC BACKUP OUTPUT VOLTAGE:	120/240, 1Ø VAC	120/240, 1Ø VAC
AC FREQUENCY:	60 Hz	60 Hz
AC CIRCUIT BREAKER:	50 A	50 A
THD (VOLTAGE):	< 2%	< 2%
AUTOMATIC SWITCHOVER TIME:	< 1 Seconds	< 1 Seconds
TYPICAL NIGHTTIME POWER CONSUMPTION:	30W	30W

DC INPUT/ BATTERY	MODEL APKE00014	MODEL APKE00013
MAXIMUM CONTINUOUS POWER:	8000W	8000W
INTERNAL DC DISTRIBUTION BREAKERS:	4x 2p30A	4x 2p30A
DC FUSES ON PLUS AND MINUS:	40 A	40 A
2-POLE DISCONNECTION:	Yes	Yes

EFFICIENCY	MODEL APKE00014	MODEL APKE00013
PEAK EFFICIENCY:	97%	98%
CEC WEIGHTED EFFICIENCY:	96.50%	97.50%

[1]Inverter limits DC current import to AC power rating. Total DC current from multiple DC inputs may safely exceed this value up to Max. Input Current. The inverter safely limits the amount utilized
[2]Per input, four DC inputs total

Specifications

FEATURES AND MODES	
ISLANDING[3]:	Yes
GRID SELL:	Yes
SELF CONSUMPTION:	Yes
PRIORITIZED CHARGING FROM RENEWABLES:	Yes
GRID SUPPORT - ZERO EXPORT:	Yes

ADDITIONAL FEATURES	
SUPPORTED COMMUNICATION INTERFACES:	REbus™, CANbus, RS485[4], Ethernet
SYSTEM MONITORING:	PWRview™ Web Portal and Mobile App
BACKUP LOADS DISCONNECT[3]:	Yes
MANUAL INVERTER BYPASS SWITCH:	Automatic
WARRANTY:	10 Years

STANDARDS COMPLIANCE	
SAFETY:	UL1741 SA, CSA 22.2
GRID CONNECTION STANDARDS:	IEEE1547, Rule 21, Rule 14H, CSIP
EMISSIONS:	FCC Part 15 Class B

DIMENSIONS AND INSTALLATION SPECIFICATIONS	
ENCLOSURE KNOCKOUTS - QTY, SIZE - IN (MM):	6 x Combo 3/4" x 1" (19 x 25.4) 7 x Combo 1/2" x 3/4" (12.7 x 19)
DIMENSIONS L x W x H - IN (MM):	24.5" x 19.25" x 8" (622.3 x 488.9 x 203.2)
WEIGHT - LB (KG):	62.7 (28.4)
COOLING:	Forced convection
NOISE:	< 40 dBA
OPERATING TEMPERATURE - FAHRENHEIT (CELSIUS):	-4 to 122 °F (-20 to 50 °C)[5]
PROTECTION RATING:	NEMA 3R

INSTALLATION GUIDELINES	
BATTERY TYPES SUPPORTED:	PWRcell™ Battery
MODULE STRING SIZE PER PV LINK OPTIMIZER:	Varies, refer to PV Link Installation Manual
MAXIMUM RECOMMENDED DC POWER FROM PV:	15kW

[3]3Ø inverters offer islanding for 1Ø loads
[4]Modbus
[5]Reduced power at extreme temperatures

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S45 W29290 Hwy. 59, Waukesha, WI 53189
www.Generac.com | 888-GENERAC (436-3722)

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GENERAC

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DESCRIPTION	DATE	REV

Signature with Seal

DATE: 9/10/2020

PROJECT NAME & ADDRESS

JERMEELE V WILSON RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-7

GENERAC

SnapRS™

Inline Disconnect Switch
Model: APKE00011
Certification Model Reference: RS801

Generac SnapRS are a simple way to satisfy rapid shutdown compliance for solar + storage systems. Generac SnapRS are 2017/2020 NEC 690.12 compliant, don't require any extra hardware to mount, and need no pairing or fussy digital communications.

FEATURES & BENEFITS

- Fast, easy, and simple to install
- One SnapRS device per PV module
- Achieves PVRSS Compliance
- Low cost, high efficiency solution

SYSTEM DESIGN

Snap a Generac SnapRS disconnect device (RS) to the negative lead (-) of each module in the solar array for simple module-level rapid shutdown compliance. SnapRS devices isolate array voltage when a rapid shutdown is initiated at a PWRcell™ Inverter. When rapid shutdown is initiated, SnapRS units isolate each PV module in the array, reducing array voltage to <80V in seconds.

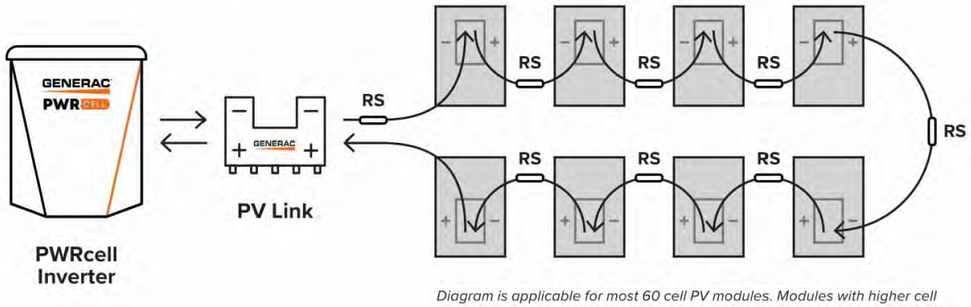

Diagram is applicable for most 60 cell PV modules. Modules with higher cell count may require a different arrangement. Contact Generac for more details.

Specifications

SnapRS™ (APKE00011)	
PV MODULE MAX VOC:	75 V
EFFICIENCY:	99.8%*
MAX INPUT CURRENT:	13 A
SHUTDOWN TIME:	< 10 Seconds
ENCLOSURE RATING:	NEMA 6P
OPERATING TEMPERATURE - FAHRENHEIT (CELSIUS):	-40 to 158 °F (-40 to 70 °C)
CERTIFICATIONS:	UL1741
PROTECTIONS:	PVRSE
WEIGHT - LB (KG):	0.17 (0.08)
DIMENSIONS, L x W x H - IN (MM):	7" x 1" x 1" (177.8 x 25.4 x 25.4)
WARRANTY:	25 Years

**When used with a 50V panel*

Connect one SnapRS device to the negative lead of each PV module in the PV Link controlled array for complete PV Rapid shutdown performance

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S45 W29290 Hwy. 59, Waukesha, WI 53189
www.Generac.com | 888-GENERAC (436-3722)

A0000528183 REV C

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Web: www.powerhome.com

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 9/10/2020

PROJECT NAME & ADDRESS

JERMEELE V WILSON RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-8

GENERAC

PWRCELL

Model APKE00007, PWRcell Battery Cabinet
Model A0000391219, 2.85kWh PWRcell Battery Module
Certification Model Reference: BJ-DCB05ZKAX
Model APKE00008, PWRcell Spacer Kit
Model APKE00009, PWRcell Upgrade Kit
Certification Model Reference for Battery Configurations:
PWRcell 9, PWRcell 12, PWRcell 15, PWRcell 17

C ETL LISTED US
Intertek

The PWRcell™ Battery Cabinet is a modular smart battery platform that allows for a range of configurations to suit any need, small or large. No other smart battery offers the power and flexibility of PWRcell. Whether for backup power or smart energy management, PWRcell has power and capacity options for every need, without sacrificing flexibility or function.

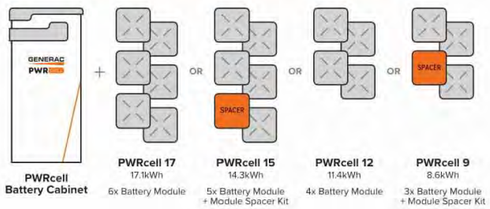
PWRcell BATTERY CABINET DESIGN

The PWRcell Battery Cabinet allows system owners the flexibility to scale from the economical 8.6kWh PWRcell 9 to the massive 17.1kWh PWRcell 17 by installing additional battery modules to the PWRcell Battery Cabinet. When needs change, an existing PWRcell Battery Cabinet can be upgraded with additional modules. Use the graphic below and the chart on the back of this sheet to understand what components you need for your chosen PWRcell configuration.

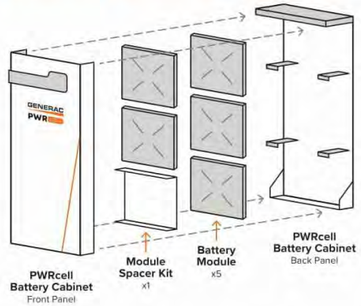
FEATURES & BENEFITS

- Connect 2 PWRcell Battery Cabinets to a single PWRcell Inverter for 34.2kWh of storage
- Best-in-class battery backup power
- Plug-and-play with PWRcell Inverter and PV Link™
- Time-of-use (TOU) and zero-export ready
- Residential and commercial application ready

BATTERY CONFIGURATION GUIDE



BATTERY CABINET ASSEMBLY



Specifications

PWRcell™ BATTERY CONFIGURATIONS	9	12	15	17
BATTERY MODULES:	3	4	5	6
USABLE ENERGY:	8.6kWh	11.4kWh	14.3kWh	17.1kWh
POWER - RATED CONTINUOUS:	3.4kW	4.5kW	5.6kW	6.7kW
POWER - 60 MINUTES:	4.2kW	5.6kW	7.0kW	8.4kW
POWER - 2 MINUTES:	5.0kW	6.7kW	8.4kW	10.0kW
REbus™ VOLTAGE - INPUT/OUTPUT:	360-420 VDC			
MODULE VOLTAGE:	46.8 VDC			
ROUND-TRIP EFFICIENCY:	96.50%			
OPERATING TEMPERATURE - FAHRENHEIT (CELSIUS):	41 to 113 °F (5 to 45 °C)			
RECOMMENDED AMBIENT TEMPERATURE - FAHRENHEIT (CELSIUS):	55 to 86 °F (13 to 30 °C)			
MAXIMUM INSTALLATION ALTITUDE - FT (M):	9834 (3000)			
DIMENSIONS, L x W x H - IN (MM):	22" x 10" x 68" (559 x 254 x 1727)			
WEIGHT, ENCLOSURE - LB (KG):	115 (52)			
WEIGHT, INSTALLED - LB (KG):	280 (127)	335 (152)	390 (178)	445 (202)
WARRANTY - LI-ION MODULES:	10 Years, (7.56MWh)			
WARRANTY - ELECTRONICS AND ENCLOSURE:	10 Years			
COMMUNICATION PROTOCOL:	REbus™ DC Nanogrid™			
COMPLIANCE:	UL 9540, UL 1973, UL 1642, CSA 22.2			

UPGRADING PWRcell

Inside of the PWRcell Battery Cabinet, battery modules are stacked two deep on three levels, allowing for up to six modules to be connected in series. You can upgrade an existing PWRcell Battery Cabinet by adding Battery Modules and a Module Spacer (APKE00008) if required. PWRcell 9 and PWRcell 15 require a module spacer.

Generac offers a convenient PWRcell Battery Upgrade Kit (APKE00009) to help replace lost or misplaced hardware. A PWRcell Battery Upgrade Kit may be purchased from your Generac distributor.

Refer to the table to the right for material requirements related to upgrading the PWRcell Battery Cabinet.

UPGRADE MATERIAL REQUIREMENTS

STARTING CONFIGURATION	ENDING CONFIGURATION: PWRcell 17	PWRcell 15	PWRcell 12
PWRcell 9	+ 3 x PWRCell Mod + 2 x APKE00009*	+ 2 x PWRCell Mod + 1 x APKE00009*	+ 1 x PWRCell Mod + 1 x APKE00009*
PWRcell 12	+ 2 x PWRCell Mod + 1 x APKE00009*	+ 1 x PWRCell Mod + 1 x APKE00008	
PWRcell 15	+ 1 x PWRCell Mod + 1 x APKE00009*		

**APKE00009 (Upgrade kit) only required if original hardware is unavailable*

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RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-9

GENERAC

PV Link™

2500W MPPT Substring Optimizer
Model: APKE00010
Certification Model Reference: S2502

PV Link is the simple solar optimizer for quick installation and long-lasting performance. Connect PV modules to each PV Link to overcome shading and challenging roof lines.

FEATURES & BENEFITS

- Fast, simple installation
- Lower failure risk than module-level optimizers
- 2017/2020 NEC rapid shutdown compliant with SnapRS™
- Quick connections with MC4 connectors
- Exports up to 2500W
- Compatible with PWRcell™ Inverters
- Cost-effective solution for high-performance PV
- Ground-fault protection

SINGLE-STRING PV ARRAY WITH SnapRS DEVICES

Where PV module-level rapid shutdown is required (NEC 690.12), a SnapRS device (RS) is installed to negative (-) lead of each PV module.

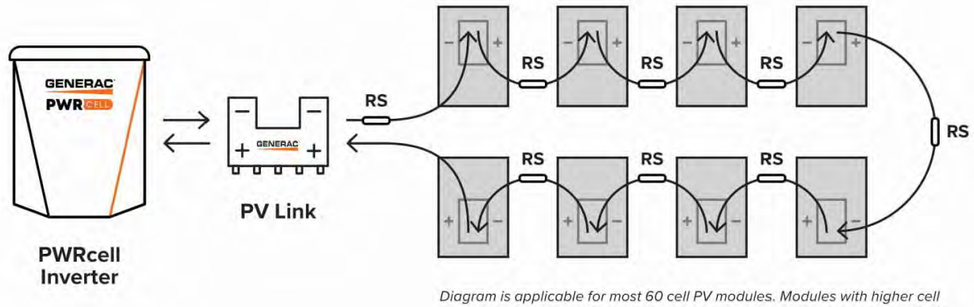

Diagram is applicable for most 60 cell PV modules. Modules with higher cell count may require a different arrangement. Contact Generac for more details.

Specifications

PV Link™ (APKE00010)	
RATED POWER*:	2500W
PEAK EFFICIENCY:	99%
MPPT VOLTAGE RANGE:	60-360 VMP
MAX INPUT VOLTAGE:	420 VOC; max when cold
MAX OUTPUT:	420 VOC
NOMINAL OUTPUT (REbus™):	380 VDC
MAX OUTPUT CURRENT (CONTINUOUS):	8 A
MAX OUTPUT CURRENT (FAULT):	10 A
MAX INPUT CURRENT (CONTINUOUS):	13 A @ 50°C, 10 A @ 70°C
MAX INPUT SHORT CIRCUIT CURRENT (ISC):	18 A
STANDBY POWER:	< 1 W
PROTECTIONS:	Ground-fault, Arc-fault (Arc-fault Type 1 AFCI, Integrated), PVRSE
MAX OPERATING TEMP: FAHRENHEIT (CELSIUS)	158 °F (70 °C)
SYSTEM MONITORING:	PWRview™ Web Portal and Mobile App
ENCLOSURE:	Type 3R
WEIGHT - LB (KG):	7.3 lb (3.3 kg)
DIMENSIONS, L x W x H - IN (MM):	15.4" x 2" x 9.6" (391.2 x 50.8 x 243.8)
COMPLIANCE:	UL 1741, CSA 22.2
WARRANTY:	25 Years

**PV Link can tolerate higher than rated power at its input if Max Input Voltage and Short Circuit Current specifications are not exceeded*

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JERMEELE V WILSON RESIDENCE
14621 WARWICK ST.,
DETROIT, MI 48223

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-10

QRail™— Fully Integrated Mounting and Racking System

The QRail Series is a strong and versatile solar array mounting system that provides unrivaled benefits to solar designers and installers. Combined with Quick Mount PV's industry-leading waterproof mounts, QRail offers a complete racking solution for mounting solar modules on any roof.

Easily design array configurations with the QDesign software application. Generate complete engineering reports and calculate a precise bill of materials for all the mounting, racking and accessories needed for a complete solar array.

Comprehensive, One-Source Solution

QRail, together with Quick Mount PV's waterproof mounting products, provides the benefit of a single-sourced, seamlessly integrated rooftop installation that works with all roof types — composition/asphalt shingles, flat or curved tile, metal shingle, shake, slate and low slope roofs. The QRail system also works with any roof attachment system for maximum flexibility.

Superior Strength and Versatility

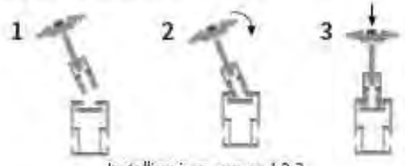
QRail is engineered for optimal structural performance. The system is certified to UL 2703, fully code compliant and backed by a 25-year warranty. QRail is available in Light, Standard and Heavy versions to match all geographic locations. QRail is compatible with virtually all modules and works on a wide range of pitched roof surfaces. Modules can be mounted in portrait or landscape orientation in standard or shared-rail configurations.

QRails come in two lengths — 168 inches (14 ft) and 208 inches (17.3 ft) Mill and Black Finish

Fast, Simple Installation: It Just Clicks

QClick Technology™

The universal mid and end clamps use QClick technology to simply "click" into the rail channel and remain upright, ready to accept the module. The pre-assembled clamps fit virtually all module frames and require no extra hardware, eliminating pre-loading and reducing installation time.



Installing is as easy as 1-2-3

Universal End Clamp

2 clamps for modules from 30-45mm or 38-50mm thick

Universal Bonded Mid Clamp

2 clamps for modules from 30-45mm or 38-50mm thick

QSplice™ Technology

QRail's innovative internal QSplice installs in seconds, requiring no tools or screws. Simply insert QSplice into the rail and slide the other rail on to create a fully structural, bonded splice. An external splice is also available.

Installs in seconds — no tools or hardware required

Fully Integrated Electrical Bonding

The QRail system provides an integrated electrical bonding path, ensuring that all exposed metal parts and the solar module frames are electrically connected. All electrical bonds are created when the components are installed and tightened down.

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SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11

QRail™ Configurations

Item Code	Part Number	Description	Finish
QMR-RL14A60	800	QRail Light, 14 ft., 60 Pack	Mill
QMR-RL17.3A60	801	QRail Light, 17.3 ft, 60 Pack	Mill
QMR-RL14B60	805	QRail Light, 14 ft., 60 Pack	Black
QMR-RL17.3B60	806	QRail Light, 17.3 ft, 60 Pack	Black
QMR-RS14A60	810	QRail Standard, 14 ft., 60 Pack	Mill
QMR-RS17.3A60	811	QRail Standard, 17.3 ft, 60 Pack	Mill
QMR-RS14B60	815	QRail Standard, 14 ft., 60 Pack	Black
QMR-RS17.3B60	816	QRail Standard, 17.3 ft, 60 Pack	Black
QMR-RH14A60	820	QRail Heavy, 14 ft., 60 Pack	Mill
QMR-RH17.3A60	821	QRail Heavy, 17.3 ft, 60 Pack	Mill
QMR-RH14B60	825	QRail Heavy, 14 ft, 60 Pack	Black
QMR-RH17.3B60	826	QRail Heavy, 17.3 ft, 60 Pack	Black

QSplice™ Internal Structural Splice

Item Code	Part Number	Description	Finish
QMR-ISLA15	830	QSplice Internal, Light, 15 Pack	Mill
QMR-ISSA15	831	QSplice Internal, Standard, 15 Pack	Mill
QMR-ISHA15	832	QSplice Internal, Heavy, 15 Pack	Mill

QSplice™ External Structural Splice

Item Code	Part Number	Description	Finish
QMR-ESSA15	834	QSplice External, Standard, 15 Pack	Mill
QMR-ESHA15	835	QSplice External, Heavy, 15 Pack	Mill

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SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11A

Universal End Clamp with QClick™ Technology

Black *Mill*

Item Code	Part Number	Description	Finish
QMR-UEC3045A20	860	Universal End Clamp, 30-45mm, 20 Pack	Mill
QMR-UEC3850A20	861	Universal End Clamp, 38-50mm, 20 Pack	Mill
QMR-UEC3045B20	865	Universal End Clamp, 30-45mm, 20 Pack	Black
QMR-UEC3850B20	866	Universal End Clamp, 38-50mm, 20 Pack	Black
QMR-UEC3045BPA20	862	Universal End Clamp, 30-45mm, w/ Bonding, 20 Pack	Mill
QMR-UEC3850BPA20	863	Universal End Clamp, 38-50mm, w/ Bonding, 20 Pack	Mill
QMR-UEC3045BPB20	867	Universal End Clamp, 30-45mm, w/ Bonding, 20 Pack	Black
QMR-UEC3850BPB20	868	Universal End Clamp, 38-50mm, w/ Bonding, 20 Pack	Black

Mid Clamp with QClick™ Technology

Black *Mill*

Item Code	Part Number	Description	Finish
QMR-UMC3045BP1.2A20	872	Universal Mid Clamp, 30-45mm, w/ Bonding, 20 Pack	Mill
QMR-UMC3850BP1.2A20	873	Universal Mid Clamp, 38-50mm, w/ Bonding, 20 Pack	Mill
QMR-UMC3045BP1.2B20	877	Universal Mid Clamp, 30-45mm, w/ Bonding, 20 Pack	Black
QMR-UMC3850BP1.2B20	878	Universal Mid Clamp, 38-50mm, w/ Bonding, 20 Pack	Black

Single-Slot L-Foot

Item Code	Part Number	Description	Finish
QMC-LF A12	692	Single-slot L-foot, 12 Pack	Mill
QMC-LF B12	693	Single-slot L-foot, 12 Pack	Black

End Caps

Heavy *Standard* *Light*

Item Code	Part Number	Description	Finish
QMR-CPL B50	885	End Cap Light, 50 Pack	Black
QMR-CPS B50	886	End Cap Standard, 50 Pack	Black
QMR-CPH B50	887	End Cap Heavy, 50 Pack	Black

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SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11B

T-Bolt

Item Code	Part Number	Description	Finish
QMR-TB A 300	880	T-Bolt w/ Nut, 300 Pack	stainless steel

Wire Clip

Works with both PV and Trunk Cabling

Item Code	Part Number	Description	Finish
QMR-WC A 300	892	Trunk/PV Cable, 300 Pack	stainless steel

Grounding Lug

Item Code	Part Number	Description	Finish
QMR-GL A 50	890	WEEB Lug w/ T-Bolt, 50 Pack	n/a

WEEB BMC

Item Code	Part Number	Description	Finish
QMR-ECW A 50	891	WEEB BMC, 50 Pack	stainless steel

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ANSI B
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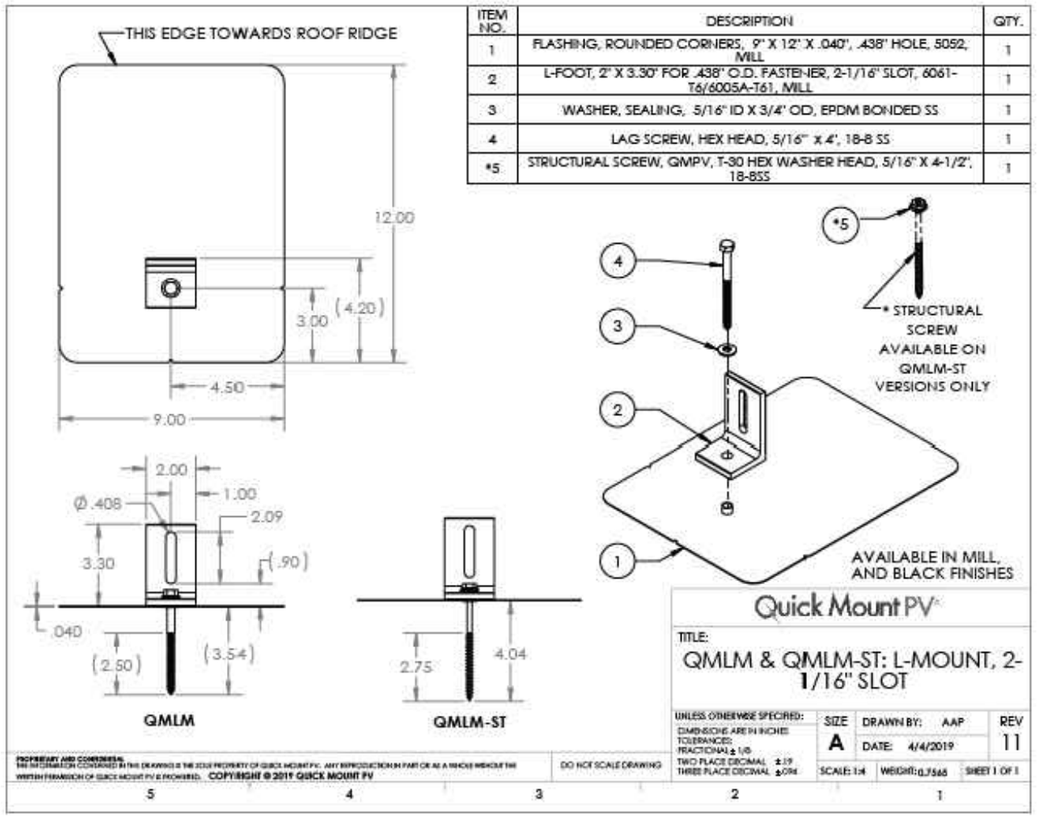
SHEET NUMBER
PV-11C

L-Mount | QMLM / QMLM-ST

Elevated Water Seal Technology®



ITEM NO.	DESCRIPTION	QTY.
1	FLASHING, ROUNDED CORNERS, 9" X 12" X .040", .438" HOLE, 5052, MILL	1
2	L-FOOT, 2" X 3.30" FOR .438" O.D. FASTENER, 2-1/16" SLOT, 6061-T6/6005A-T61, MILL	1
3	WASHER, SEALING, 5/16" ID X 3/4" OD, EPDM BONDED SS	1
4	LAG SCREW, HEX HEAD, 5/16" x 4", 18-8 SS	1
*5	STRUCTURAL SCREW, QMPV, T-30 HEX WASHER HEAD, 5/16" X 4-1/2", 18-8SS	1

Quick Mount PV

TITLE: QMLM & QMLM-ST: L-MOUNT, 2-1/16" SLOT

UNLESS OTHERWISE SPECIFIED:	SIZE	DRAWN BY: AAP	REV
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± 1/6 TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.014	A	DATE: 4/4/2019	11
		SCALE: 1:4 WEIGHT: 0.7568	SHEET 1 OF 1

5 4 3 2 1

Quick Mount PV®
RESPECT THE ROOF

L-Mount Installation Instructions

Installation Tools Required: tape measure, roofing bar, chalk line, stud finder, caulking gun, sealant compatible with roofing materials, drill with 7/32" or 1/8" bit, drill or impact gun with 1/2" socket.

WARNING: Quick Mount PV products are NOT designed for and should NOT be used to anchor fall protection equipment.

Locate, choose, and mark centers of rafters to be mounted. Select the courses of shingles where mounts will be placed.

Carefully lift composition roof shingle with roofing bar, just above placement of mount. Remove nails as required and backfill holes with aproved sealant. See "Proper Flashing Placement" on next page.

Insert flashing between 1st and 2nd course. Slide up so top edge of flashing is at least ¾" higher than the butt-edge of the 3rd course and lower flashing edge is above the butt-edge of 1st course. Mark center for drilling.

If attaching with lag bolt use a 7/32" bit (Lag). Use a 1/8" bit (ST) for attaching with the structural screw. Drill pilot hole into roof and rafter, taking care to drill square to the roof. Do not use mount as a drill guide. Drill a 2" deep hole into rafter.

Clean off any sawdust, and fill hole with sealant compatible with roofing materials.

Place L-foot onto elevated flute and rotate L-foot to desired orientation.

Prepare lag bolt or structural screw with sealing washer. Using a ½-inch socket on an impact gun, drive prepared lag bolt through L-foot until L-foot can no longer easily rotate. **DO NOT over-torque.** NOTE: Structural screw can be driven with T-30 hex head bit.

BI 7.2.3-44

You are now ready for the rack of your choice. Follow all the directions of the rack manufacturer as well as the module manufacturer. NOTE: Make sure top of L-Foot makes solid contact with racking.

All roofing manufacturers' written instructions must also be followed by anyone modifying a roof system. Consult the roof manufacturer's specs and instructions prior to working on the roof.

Apr-2019 Rev 6

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SHEET NAME
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SHEET SIZE
ANSI B
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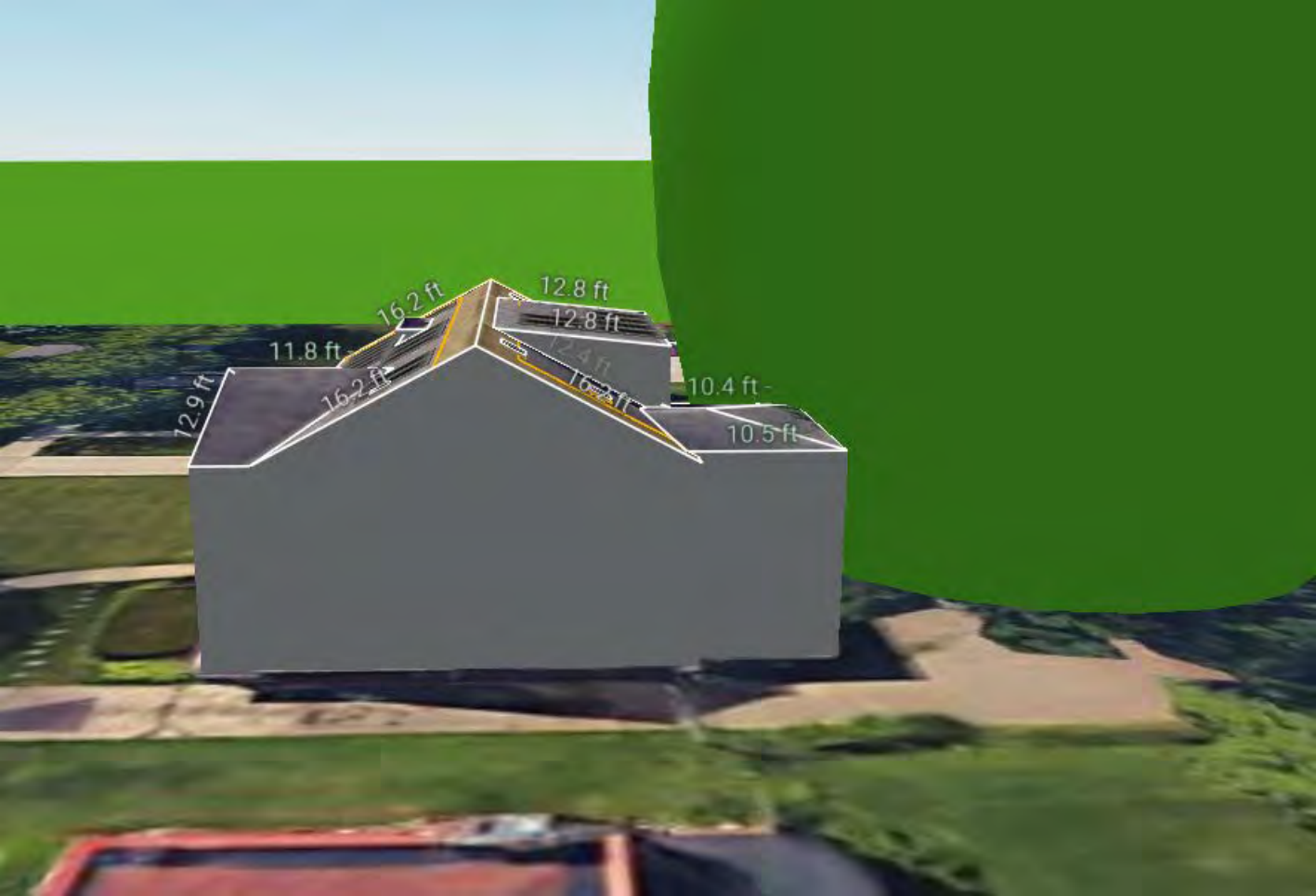
SHEET NUMBER
PV-12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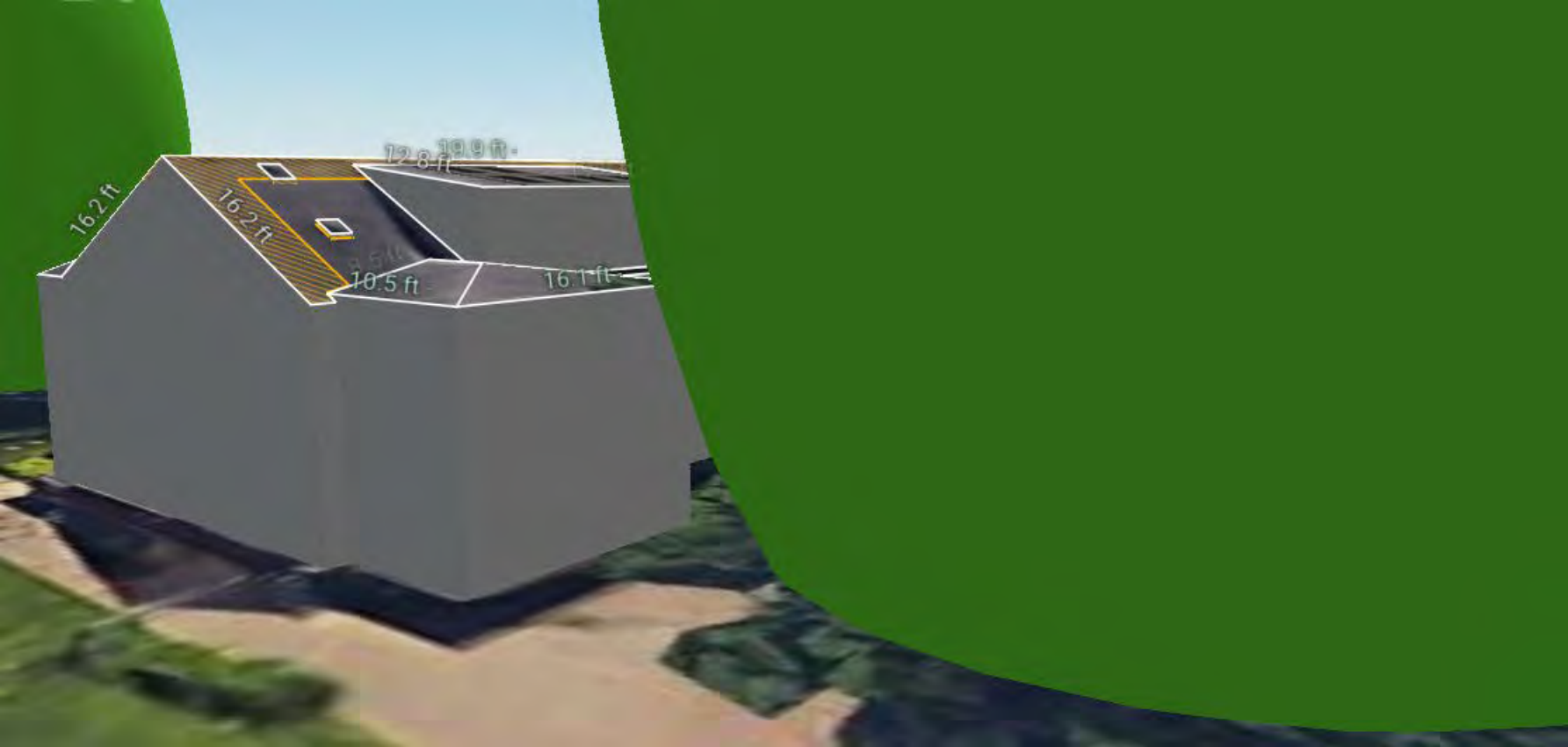
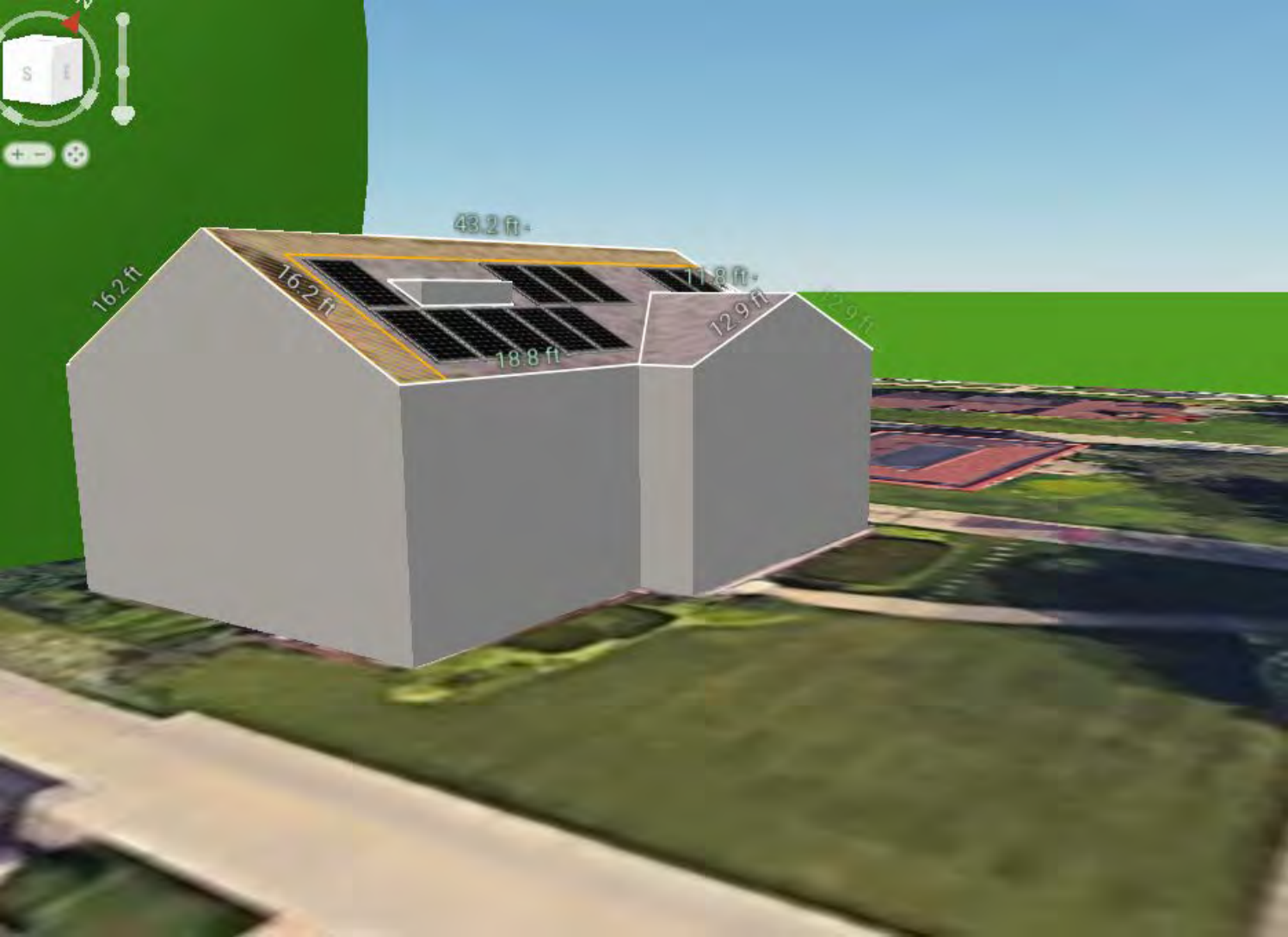
12.8 ft
12.8 ft
11.8 ft
16.2 ft
12.9 ft
10.4 ft
10.5 ft


43.2 ft -


16.2 ft
16.2 ft
12.8 ft
19.9 ft
10.5 ft
16.1 ft


43.2 ft
16.2 ft
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12.9 ft
18.8 ft
12.9 ft


43.2 ft
12.8 ft
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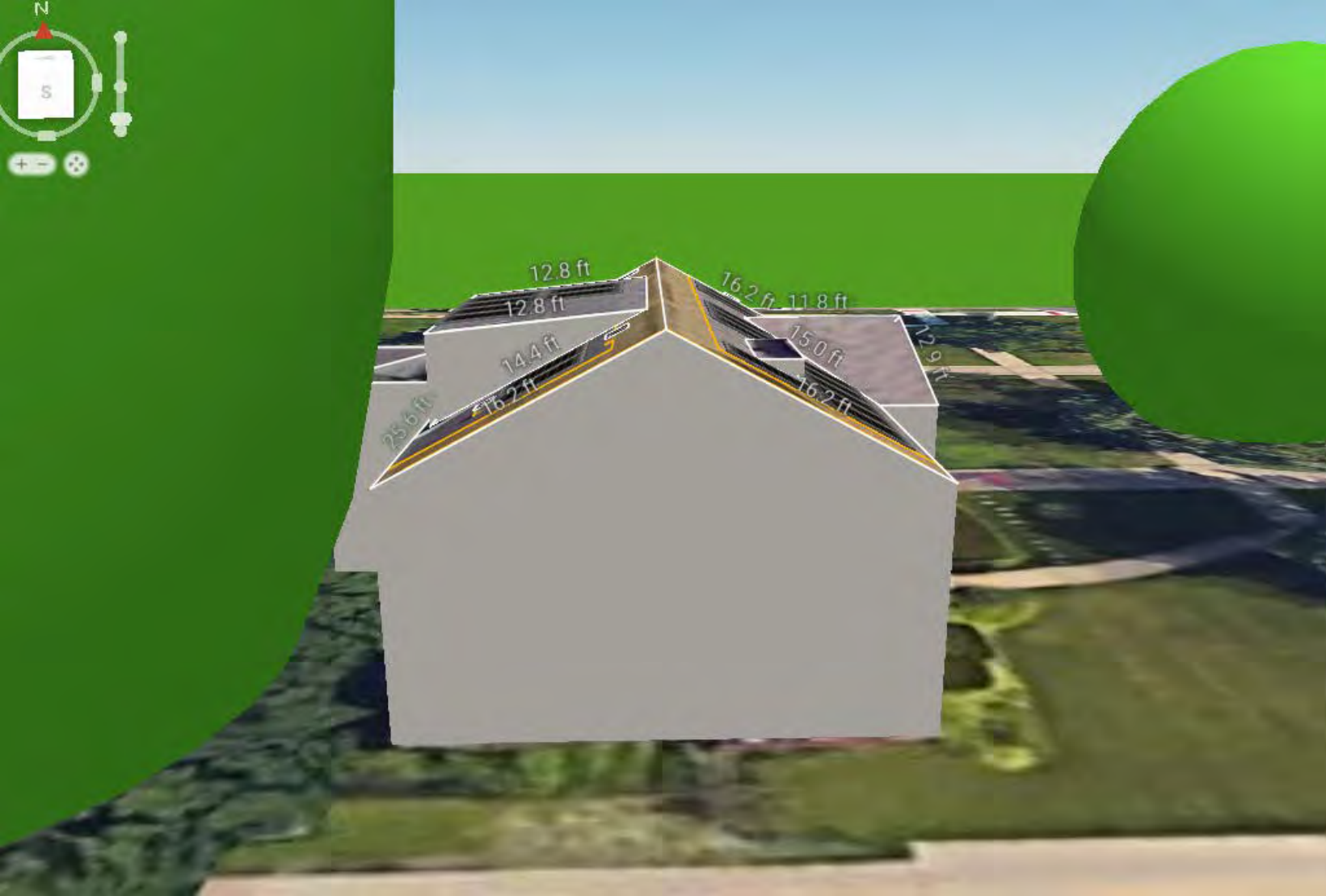

N
S
12.8 ft
12.8 ft
14.4 ft
16.2 ft
25.6 ft
16.2 ft
11.8 ft
15.0 ft
16.2 ft
12.9 ft

How do I….install solar panels?

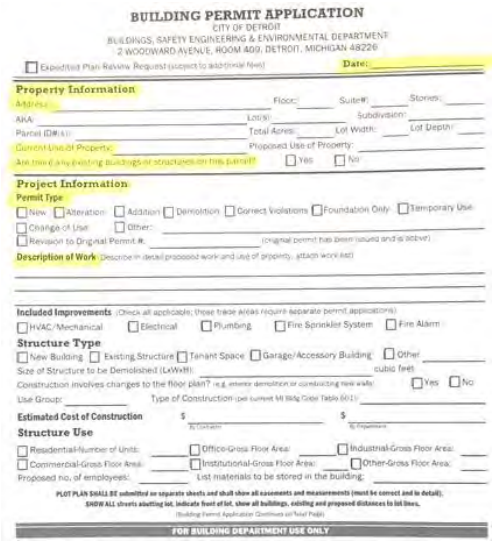
Information needed for HDC review (only)

Note: BSEED requirements are not included below

1. Provide pictures of the house and site, where the proposed installation is to occur.
   Photos here are for illustrative purposes only; digital photos must be provided

- The Commission will not consider a roof mounted proposal, unless: it is proposed for a flat roof, and/or proposed for the rear elevation of a gable roof, so long as the panels will not be visible from the public right-of-way. Photographs of the flat and/or gable roof, confirming its location, and visibility to the right-of-way must be submitted. Additionally, only flat-mounted panels (not angle-mount), with minimal height/profile will be considered. The panels and frame must have a matte, dark finish. Installing a lip along the perimeter of the panels to further hide them from view should be considered.

2. Provide information within all the highlighted portions of the building permit application.



BUILDING PERMIT APPLICATION
CITY OF DETROIT
BUILDINGS, SAFETY ENGINEERING & ENVIRONMENTAL DEPARTMENT
2 WOODWARD AVENUE, ROOM 409, DETROIT, MICHIGAN 48226

Expedited Plan Review Request (subject to additional fees) Date:

Property Information
Address: Floor: Suite#: Stories:
AKA: Lot(s): Subdivision:
Parcel ID(s): Total Acres: Lot Width: Lot Depth:
Current Use of Property: Proposed Use of Property:
Are there any existing buildings or structures on this parcel? Yes No

Project Information
Permit Type
New Alteration Addition Demolition Correct Violations Foundation Only Temporary Use
Change of Use Other:
Revision to Original Permit #: (original permit has been issued and is active)
Description of Work (Describe in detail proposed work and use of property. attach work list)

Included Improvements (Check all applicable; those trade areas require separate permit applications)
HVAC/Mechanical Electrical Plumbing Fire Sprinkler System Fire Alarm

Structure Type
New Building Existing Structure Tenant Space Garage/Accessory Building Other
Size of Structure to be Demolished (LxWxH): cubic feet
Construction involves changes to the floor plan? (e.g. interior demolition or constructing new walls) Yes No
Use Group: Type of Construction (per current MI Bldg Code Table 601):

Estimated Cost of Construction $ (By Contractor) $ (By Applicant)

Structure Use
Residential-Number of Units: Office-Gross Floor Area: Industrial-Gross Floor Area:
Commercial-Gross Floor Area: Institutional-Gross Floor Area: Other-Gross Floor Area:
Proposed no. of employees: List materials to be stored in the building:

PLOT PLAN SHALL BE submitted on separate sheets and shall show all easements and measurements (must be correct and to detail).
SHOW ALL streets abutting lot, indicate front of lot, show all buildings, existing and proposed distances to lot lines.
(Building Permit Application Continued on Next Page)

FOR BUILDING DEPARTMENT USE ONLY

BUILDING PERMIT APPLICATION
CITY OF DETROIT BUILDINGS, SAFETY ENGINEERING & ENVIRONMENTAL DEPARTMENT Page 2

Identification (All Fields Required)

Property Owner / Homeowner Property Owner/Homeowner is Permit Applicant
Name: Company Name:
Address: City: State: Zip:
Phone: Mobile:
Driver's License#: Email:

Contractor Contractor is Permit Applicant
Representative Name: Company Name:
Address: City: State: Zip:
Phone: Mobile: Email:
City of Detroit License#:

Tenant or Business Occupant Tenant is Permit Applicant
Name: Phone: Email:

Architect/ Engineer/ Consultant Architect/Engineer/Consultant is Permit Applicant
Name: State Registration#: Expiration Date:
Address: City: State: Zip:
Phone: Mobile: Email:

Homeowner Affidavit (Only required for residential permits obtained by homeowner.)
I hereby certify that I am the legal owner and occupant of the subject property and the work described on this permit application shall be completed by me. I am familiar with the applicable codes and requirements of the City of Detroit and take full responsibility for all code compliance, fees and inspections related to the installation/work herein described. I shall neither hire nor sub-contract to any other person, firm or corporation any portion of the work covered by this building permit.

Print Name: Signature: Date:

Subscribed and sworn to before me this day of 20 A.D. County, Michigan

CITY OF DETROIT
HISTORIC DISTRICT COMMISSION
COLEMAN A. YOUNG MUNICIPAL CENTER
2 WOODWARD, SUITE 808
DETROIT, MICHIGAN 48226
PHONE 313-224-8907 / 313-224-6543

How do I….install solar panels? (continued)

3. Provide full scope of work:
   - Narrative to explain what is being installed and why
   - Catalog cuts detailing the panels, frame, installation method, materials, color, finish, etc.
   - List any and all other related work to be completed:
     - If a roof mount, include: a roof plan showing proposed panel location (with dimensions from edges of roof noted) and finish height
     - If a ground mount, include: a site plan showing proposed panel location with setbacks from property lines and adjacent buildings on property (i.e., garage, rear of house); an elevation confirming all dimensions, including overall height and distance between grade and the bottom of the panels, material and finish specification for panel frame/pergola.

ADDITIONAL INFORMATION:

The National Park Service's website goes into detail on solar installations in historic districts: https://www.nps.gov/tps/sustainability/new-technology/solar-on-historic.htm

The National Park Service, Dept. of the Interior, Technical Preservation Services published the document entitled, "*Incorporating Solar Panels in a Rehabilitation Project*" (ITS Number 52). A copy is attached to this informational sheet.

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National Park Service
U.S. Department of the Interior
Technical Preservation Services

ITS
NUMBER 52

Interpreting
The Secretary of the Interior's Standards for Rehabilitation

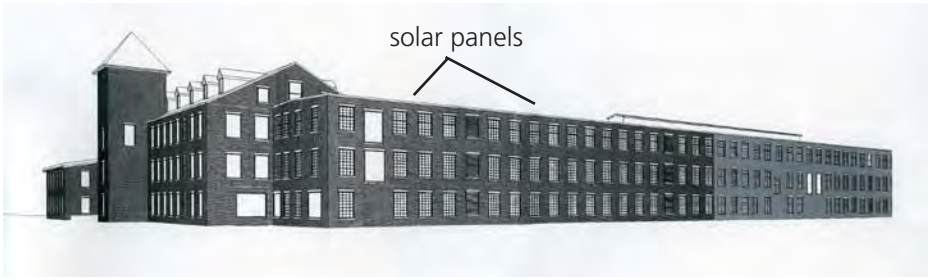
Subject: Incorporating Solar Panels in a Rehabilitation Project

Applicable Standards:
2. Retention of Historic Character
9. Compatible Additions/Exterior Alterations

Issue: Enhancing the energy efficiency of a historic building is important. To that end, it is often possible to install features such as solar panels and photovoltaic cells provided they are installed in a sensitive manner. Because these elements must be positioned to take advantage of unobstructed sunlight, the roof of a historic structure is an obvious location. The roofline of a historic building is often a distinctive feature. Therefore, the installation of solar panels should conform to guidance regarding rooftop additions, i.e. that they be minimally visible, to avoid altering the historic character of the building. Historic buildings with a flat roof or parapet can usually accommodate solar panels because the panels will be hidden, while properties with a hipped or gabled roof are generally not good candidates for a rooftop solar installation. Solar panels on historic buildings should not be visible from the public right of way such as nearby streets, sidewalks or other public spaces.

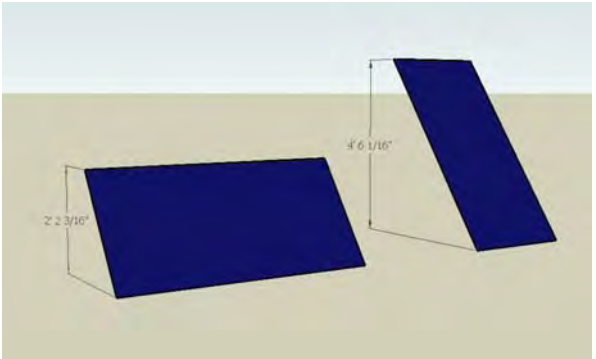
In circumstances where solar collectors are not placed on rooftops, they should only be positioned in limited or no-visibility locations in secondary areas of the property. Vegetation or a compatible screen may also be an option to further reduce the impact of these features on a historic property. For some historic buildings, it may not be possible to incorporate solar panels and meet the Secretary of the Interior's Standards for Rehabilitation.

Application 1 (*Compatible treatment*): The rehabilitation of this mid-nineteenth century mill incorporated a large, roof-mounted photovoltaic installation. Although the historic building does not have a parapet wall at the roofline, the height of the building and the arrangement of the panels render the entire installation invisible from the ground. It is important to note that the panels are placed horizontally. Had the panels been installed with a vertical tilt, the angle required to maximize efficiency would have caused the panels to extend significantly higher above the roof. Simply changing the direction in which the panels are tilted can affect their visibility and reduce their impact on the character of the historic property.



Because of the size of this historic mill, a large array of solar panels could be installed on the flat roof without being seen from the ground.

Solar panels installed on the flat roof.



By placing the panels horizontally, the overall height of the installation and its visibility is reduced.

Application 2 (*Incompatible treatment*): During the rehabilitation of this late-nineteenth century commercial building, a conspicuous rooftop monitor with prominent solar panels and skylights was constructed on the one-story structure. The size and finish of this rooftop addition are incompatible with the historic character of the building. However, the building could have accommodated both skylights and solar panels if they had been installed differently. An alternative design that could have met the Standards would have included low-profile skylights and solar panels concealed behind the parapet wall.

The addition of a large rooftop monitor featuring skylights on the front slope and solar panels on the rear slope is not compatible with the historic character of this small, one-story commercial building.

Application 3 (*Compatible treatment*): The rehabilitation of this historic post office incorporated solar panels as dual-function features: generation of electricity and shading for south-facing windows. In this instance, the southern elevation of the building is also a secondary elevation with limited visibility from the public right of way. Additionally, because this area of the building is immediately next to the post office's loading dock, it has a more utilitarian character than the primary facades and, therefore, can better accommodate solar panels. Because the panels are in a suitable location at the rear of the property and are appropriately sized to serve as awnings, they do not affect the overall historic character of the property. Additionally, a screen of tall plantings shields the solar panels from view from the front of the building, further limiting their visibility.

Above: *Shown from the rear of the property, these solar panels serve a secondary function as awnings to shade south-facing windows. Because of their location at the back of the building immediately adjacent to a loading dock, the installation of these panels does not affect the historic character of the property.*

Left: *The solar panels are not visible from the front of the building. Additionally, even if the vegetation were removed, the installation would only be minimally visible along an alley at the rear of a secondary side elevation.*

Jenny Parker, Technical Preservation Services, National Park Service