

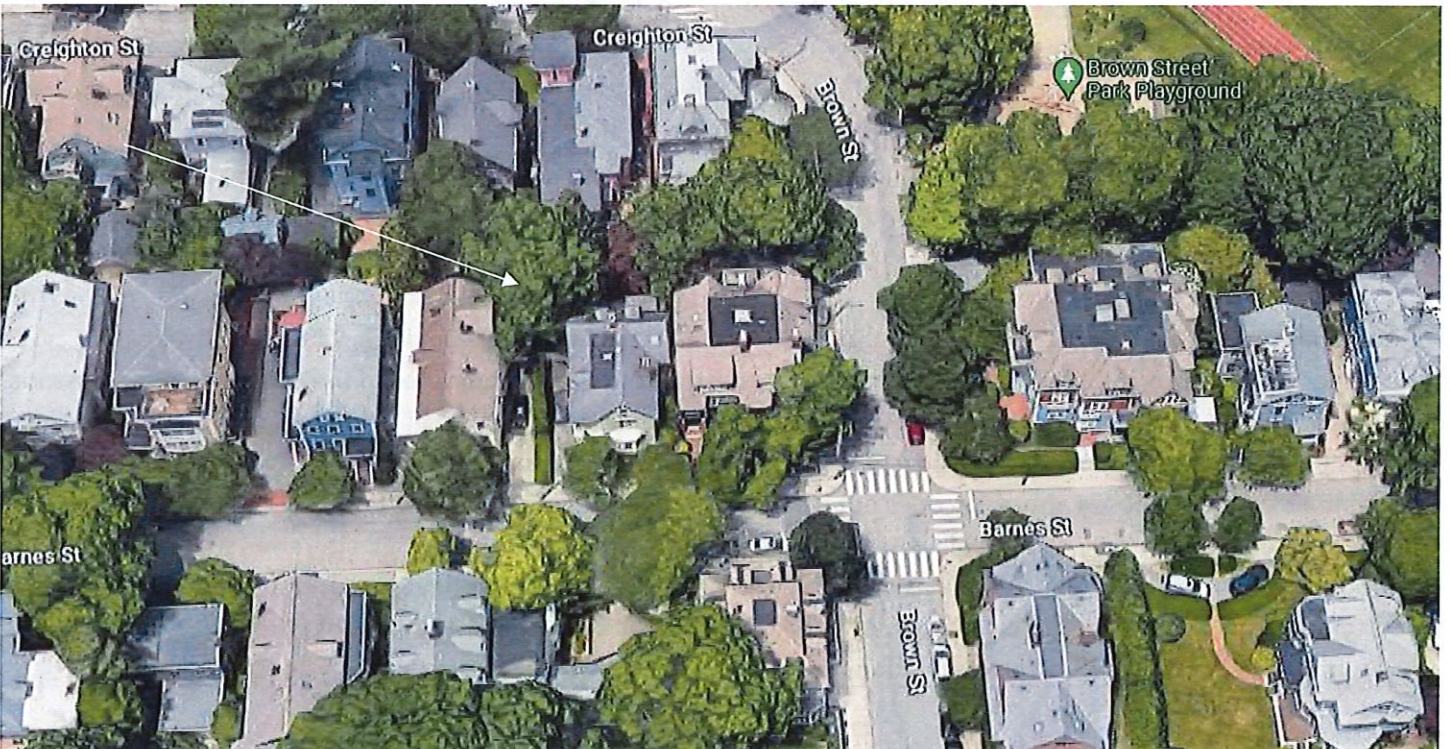
4. CASE 23.016, 24 BARNES STREET, House, 1872 (COLLEGE HILL)

Late Victorian-Modern Gothic; 2-1/2 stories; complex hip and cross gable; clapboard; asymmetrical massing comprising L plan block with infilled corner; recessed corner entrance porch with stickwork and bracketed trim; 1-story polygonal bay window on front; paired windows above bay with molded lintel; front gable trimmed with brackets and vergeboards; side gable and gable side dormer trimmed with stickwork struts in peaks.

CONTRIBUTING



Arrow indicates 24 Barnes Street.



Arrow indicates project location, looking north.

Applicant/Contractor: Rooftop Power, LLC, 275 W Natick Rd, Ste 800, Warwick, RI 02886

Owner: Tamera Bedford, 24 Barnes Street, Providence, RI 02906

Proposal: The scope of work proposed consists of Minor Alterations and includes:

- the installation of 12 solar panels to multiple slopes and flats of the roof.

Issues: The following issues are relevant to this application:

- Some of the modifications as proposed will be (minimally) visible from the public rights-of-way;
- The modifications as proposed meets Minor Alterations: Solar Energy Systems Guidelines, Section 2, in the following manner: Panel layout shall be sympathetic or appropriate to design and scale of building. Rectangular configurations are preferred, with ample setback from edge of roof, dormers, chimneys, etc. (2.A); Panels shall be installed parallel to the existing roof slope and matched as closely as possible to the roof plane (2.B); Panels shall be installed without destroying or replacing original or historic materials or significantly compromising or altering the building's structural integrity (2.C); Panels shall be compatible in color to existing roofing insofar as possible (2.D); Installation of panels shall be as inconspicuous as possible when viewed from public right-of-way (2.E); Installation shall be reversible. Panels shall be removed when no longer viable or functioning and roofing restored to pre-existing conditions (2.F); and,
- Plans, specifications and pictures have been submitted.

Recommendations: The staff recommends the PHDC make the following findings of fact:

- a) 24 Barnes Street is a structure of historical and architectural significance that contributes to the significance of the College Hill local historic district having been recognized as a contributing structure to the College Hill National Historic Landmark District;
- b) The modifications as proposed meets Minor Alterations: Solar Energy Systems Guidelines, Section 2, and the application is considered complete; and,
- c) The work as proposed is in accord with PHDC Standards 8 & 9 as follows: 8) the work will be done so that it does not destroy the historic character of the property or the district as they are not on the primary elevation and will be minimally-to-not visible from the public rights-of-way; and, 9) Whenever possible... alterations to structures shall be done in such a manner that if removed in the future, the essential form and integrity of the structure and the site will be unimpaired.

Staff recommends a motion be made stating that: The application is considered complete. 24 Barnes Street is a structure of historical and architectural significance that contributes to the significance of the College Hill local historic district having been recognized as a contributing structure to the College Hill National Historic Landmark District. The Commission grants Final Approval of the proposal as submitted as the proposed alteration is appropriate having determined that the proposed alteration does not destroy the historic character of the property or the district and are historically and architecturally compatible with the property and district as the proposed alteration meets Minor Alterations: Solar Energy Systems Guidelines, Section 2, is reversible and will not have an adverse effect on the property or district as they are not on the primary elevation and will be minimally visible from the public rights-of-way (Standards 8 & 9), and the recommendations in the staff report, with staff to review any additional required details.

Tamera Bedford

Rooftop Power

Name: Sheena Telan
Email: stelan@rooftoppowerco.com

Prepared For:

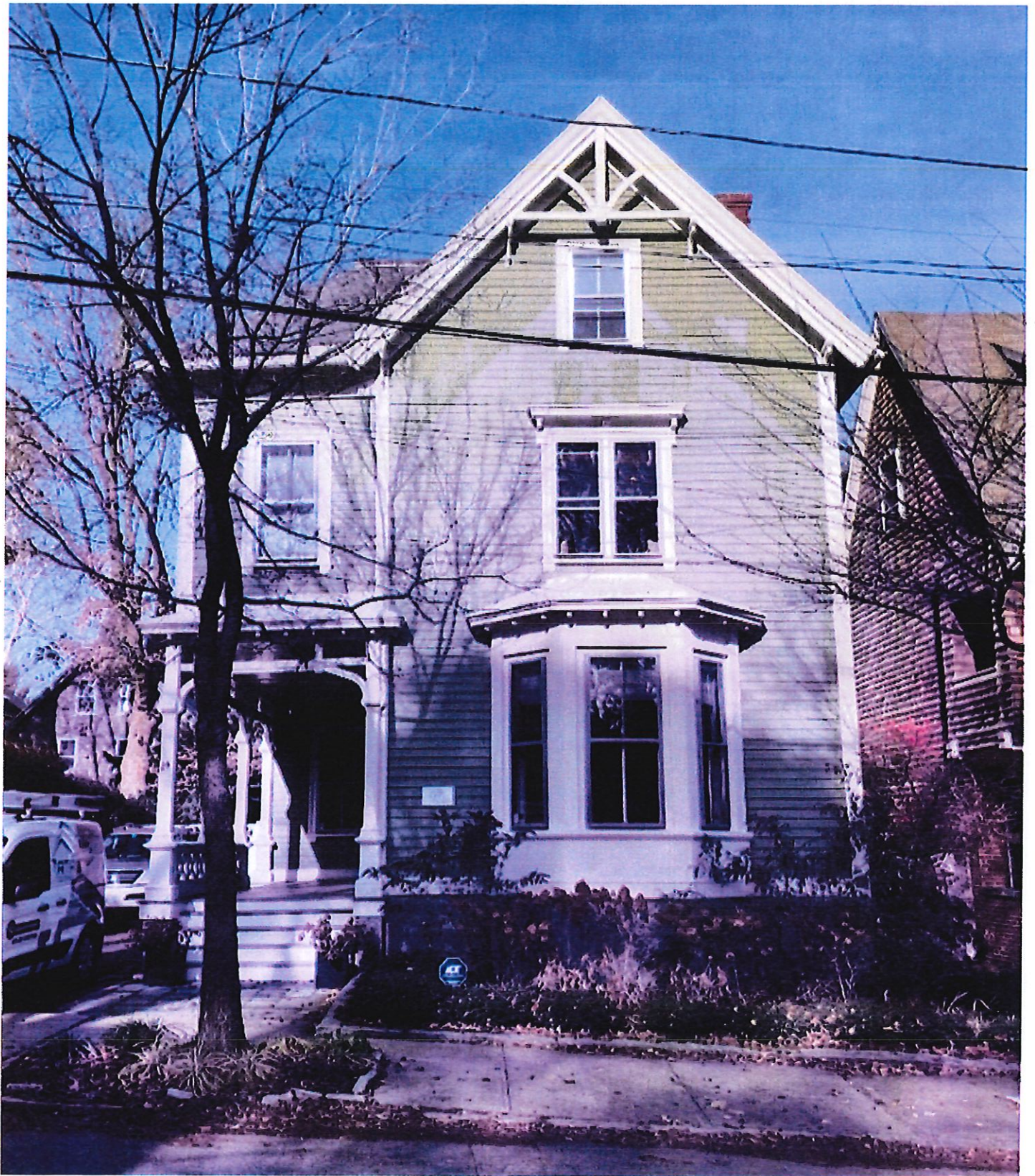
24 Barnes Street,
Providence, Rhode Island
02906, United States

PV System Info

Size: 4.800kW DC STC - Annual Production: 4,787kWh - Annual Solar Access: 83% - Offset: 0%



[GO TO 3D MODEL OF DESIGN](#)





PHOTOVOLTAIC ROOF MOUNT SYSTEM

12 MODULES-ROOF MOUNTED - 4.80 KWDC, 3.48 KWAC
24 BARNES ST, PROVIDENCE, RI 02906 USA

SYSTEM SUMMARY:

- (N) 12 - REC SOLAR REC400N1P3 BLACK (400W) MODULES
- (N) 12 - ENPHASE ENERGY IQ8P-LUIS-72-2-US MICRO-INVERTERS
- (N) JUNCTION BOX
- (E) 200A MAIN SERVICE PANEL WITH (E) 200A MAIN BREAKER
- (N) 30A NON-FUSED AC DISCONNECT
- (N) ENPHASE IQ COMBINER BOX 4

DESIGN CRITERIA:

- ROOF TYPE: - COMP SHINGLE & ROLLED COMP
- NUMBER OF LAYERS: - 01
- ROOF FRAME: - 2"x6" RAFTER @24" O.C.
- STORY: - TWO STORY
- SNOW LOAD: - .35 PSF
- WIND SPEED: - 125 MPH
- WIND EXPOSURE: - B
- EXPOSURE CATEGORY: - II
- COORDINATE: 41.837241, -71.404722

GOVERNING CODES:

- 2020 NATIONAL ELECTRICAL CODE (NEC)
- 2018 INTERNATIONAL BUILDING CODE (IBC)
- 2018 INTERNATIONAL MECHANICAL CODE (IMC)
- 2018 INTERNATIONAL RESIDENTIAL CODE (IRC)
- 2018 INTERNATIONAL PLUMBING CODE (IPC)

SHEET INDEX

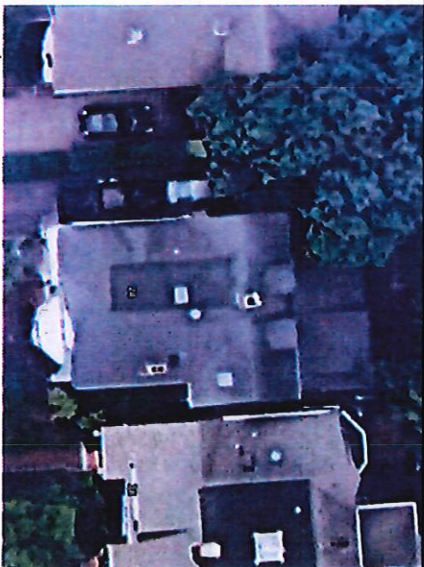
- PV-0 COVER SHEET
- PV-1 SITE PLAN WITH ROOF PLAN
- PV-2 ROOF PLAN WITH MODULES
- PV-3 ATTACHMENT DETAILS
- PV-3-1 ATTACHMENT DETAILS
- PV-4 ELECTRICAL LINE DIAGRAM
- PV-4-1 ELECTRICAL LINE DIAGRAM
- PV-5 PLACARDS & WARNING LABELS
- PV-6+ EQUIPMENT SPEC SHEETS



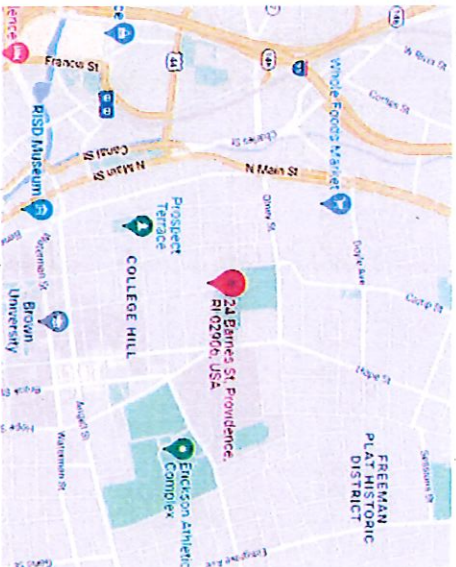
12/27/2022
Firm License Number: PE001LIC86COA
VSE Project Number: U3227.1215.221

CONSTRUCTION NOTE:

- A LADDER SHALL BE IN PLACE FOR INSPECTION THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY GRID INTERACTIVE SYSTEM
- A GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH NEC 680-47 AND 250-50 THROUGH 60 250-166 SHALL BE PROVIDED PER NEC.
- GROUNDING ELECTRODE SYSTEM OR EXISTING BUILDING MAY BE USED AND BONDED TO AT THE SERVICE ENTRANCE. IF EXISTING SYSTEM IS NOT SUITABLE OR INADEQUATE, OR IS ONLY METALLIC WATER PIPING, A SUBSTANTIAL GROUNDING ELECTRODE WILL BE USED AT THE INVERTER LOCATION. GROUNDING ELECTRODE CONDUCTORS SHALL BE NO LESS THAN #6 AWG AND NO SMALLER THAN #8 AWG COPPER AND BONDED TO THE EXISTING GROUNDING TO PROVIDE OR A COMPLETE GROUND.
- EACH MODULE WILL BE GROUNDING USING THE SUPPLIED GROUNDING POINTS IDENTIFIED BY THE MANUFACTURER.
- EXPOSED NON-CURRENT CARRYING METAL PARTS OF MODULE FRAMES, EQUIPMENT, AND CONDUCTOR ENCLOSURES SHALL BE GROUNDED, REGARDLESS OF VOLTAGE.
- PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED.
- ALL SIGNAGE WILL BE INSTALLED AS REQUIRED BY AND 2020 NEC.
- HEIGHT OF INTEGRATED ACDC DISCONNECT SHALL NOT EXCEED 6' 7" FROM PHYSICAL DAMAGE BETWEEN THE GROUNDING ELECTRODE AND THE PANEL (OR INVERTER) IF SMALLER THAN #6 AWG COPPER WIRE. THE GROUNDING ELECTRODE CONDUCTOR WILL BE CONTINUOUS, EXCEPT FOR SPLICES OR JOINTS AT BUSBARS WITHIN LISTED EQUIPMENT.
- ALL EXTERIOR CONDUIT SHALL BE PAINTED TO MATCH ADJACENT SURFACES.
- THE PV CONNECTION IN THE PANEL BOARD SHALL BE POSITIONED AT THE OPPOSITE (LOAD) END FROM THE INPUT FEEDER LOCATION OR MAIN CIRCUIT LOCATION.
- SITE CONDITIONS SHALL PREVAIL IF NO SCALE IS GIVEN. DRAWINGS ARE NOT NECESSARILY TO SCALE. ALL DIMENSIONS SHALL BE VERIFIED BY SUBCONTRACTOR UPON COMMENCEMENT OF CONSTRUCTION.
- ELECTRICAL NOTES
- EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION
- ALL CONDUCTORS SHALL BE COPPER, RATED FOR 900 V AND 90 DEGREE C WET ENVIRONMENT
- 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.
- WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
- WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
- MODULE SUPPORT RAIL, TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR LISCO GAL-48BT LAY-IN LUG.
- THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE



1 AERIAL PHOTO
SCALE: NTS



2 VICINITY MAP
SCALE: NTS



RTIP
ROOF TOP POWER
24 BARNES ST, 02906
PROVIDENCE, RI 02906
TEL: (401) 763-7887
LIC# A040027
EMAIL: sales@rooftoppower.com

VERSION		
DESCRIPTION	DATE	REV
INITIAL RELEASE	12/26/2022	UR

PROJECT NAME
TAMERA BEDFORD
24 BARNES ST,
PROVIDENCE, RI 02906 USA
APN# PROV9L386
UTILITY: RHODE ISLAND ENERGY
AHJ: CITY OF PROVIDENCE

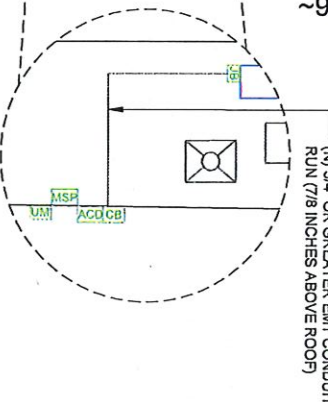
SHEET NAME
COVER SHEET
SHEET SIZE
ANSI B
11" X 17"
SHEET NUMBER
PV-0

● ROOF ACCESS POINT SHALL BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS, AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION IN LOCATIONS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREE LIMBS, WIRES OR SIGNS.

(E) TREES (TYP.)



Firm License Number: PE.001LC86-COA
 12/27/2022
 VSE Project Number: U32271215.221
 Vector Structural Engineering has reviewed the existing structure with loading from the solar array and solar mounting system, including wind loads. The design of the structure is by others. Mechanical, electrical, and all other nonstructural aspects of the design are by others. Checked by others, unless stamped by Dean Anderson.



NOTE:
 A. ALL ELECTRICAL EQUIPMENT, COMBINER, DISCONNECTS, MAIN SERVICE PANELS, ETC. SHALL NOT BE INSTALLED WITHIN 3' OF THE GAS METERS' SUPPLY OR DEMAND PIPING.

LEGEND	
	UTILITY METER
	MAIN SERVICE PANEL
	AC DISCONNECT
	ENPHASE COMBINER BOX 4
	CONDUIT
	FENCE
	CHIMNEY
	VENT. ATTIC FAN (ROOFOBSTRUCTION)

TAMERA BEDFORD
 24 BARNES ST,
 PROVIDENCE, RI 02906 USA
 APN# PROV9L386
 UTILITY: RHODE ISLAND ENERGY
 AHJ: CITY OF PROVIDENCE

PROJECT NAME

SHEET NAME
 SITE PLAN WITH
 ROOF PLAN

SHEET SIZE
 ANSIB
 11" X 17"

SHEET NUMBER
 PV-1

VERSION

DESCRIPTION	DATE	REV
INITIAL RELEASE	12/15/2022	UR

RTIP
 RHOODE ISLAND TRIP
 ROOF TOP COVER
 1100 BARNES ST
 WARREN, RI 02886
 TEL: (401) 767-7807
 FAX: (401) 767-7807
 EMAIL: info@rtipri.com

41.837241, -71.404722

1 SITE PLAN WITH ROOF PLAN

SCALE: 3/32" = 1'-0"

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 12 MODULES
 MODULE TYPE = REC SOLAR REC400NP3 BLACK (400W) MODULES
 MODULE WEIGHT = 47.0 LBS / 21.4 KG.
 MODULE DIMENSIONS = 74.8"X 40.9" = 21.25 SF
 UNIT WEIGHT OF ARRAY = 2.21 PSF
 DISTRIBUTED DEAD LOAD = 2.65 PSF
 AVERAGE ROOF POINT DEAD LOAD = 14.07 LBS
 TOTAL SYSTEM WEIGHT: 675.14 LBS
 AVERAGE ROOF HEIGHT (GROUND TO EAVE) = -25 FT.



651 W. SALMON PARK BLVD. STE. 101 PROVIDENCE, RI 02908-1775
 BARNHURST, UTAH 84020 PHONE: (603) 990-1775 WWW.VECTORENG.COM

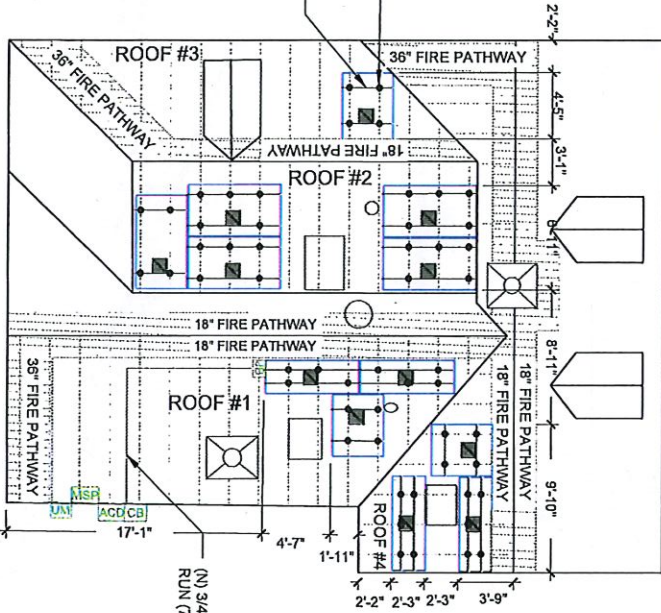


12/27/2022

Firm License Number: PE001LC86-COA

VSE Project Number: PE3227.1215.221
 Vendor should confirm that the structure with leading from the solar array and secure connections to the existing framing. The design of the structure is by others. Mechanical, electrical, and all other nonstructural aspects of the design are by others. Electrical is by others, unless stamped by Dean Loveman.

(N) (50) UNIRAC FLASHKIT PRO ATTACHMENTS SPACED AT 48" O.C.
 (N) UNIRAC SM LIGHT RAIL (TYP)



(N) 3/4" OR GREATER EMT CONDUIT RUN (7/8 INCHES ABOVE ROOF)

FRONT YARD
 BARNES ST

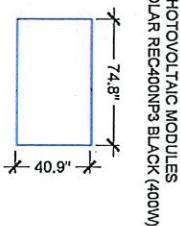
REAR YARD

1 ROOF PLAN WITH MODULES
 SCALE: 1/8" = 1'-0"

41.837241, -71.404722

PLUMBING VENTS, SKYLIGHTS AND MECHANICAL VENTS SHALL NOT BE COVERED, MOVED, RE-ROUTED OR RE-LOCATED.
 NOTE: ACTUAL ROOF CONDITIONS AND RAFTERS (OR SEAM) LOCATIONS MAY VARY. INSTALL PER MANUFACTURER(S) INSTALLATION GUIDELINES AND ENGINEERED SPANS FOR ATTACHMENTS

LEGEND	
	UTILITY METER
	MAIN SERVICE PANEL
	AC DISCONNECT
	ENPHASE COMBINER BOX
	MICRO INVERTER
	IOB PLUS-72-2-US JUNCTION BOX
	CONDUIT
	RAFTER
	FENCE
	CHIMNEY
	VENT ATTIC FAN (ROOFBSTRUCTION)
	FIRE SETBACK



BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
RAIL	10	UNIRAC SM LIGHT RAIL, 168" DARK (C15168B0)
MID CLAMP	02	UNIVERSAL AF SERIES MID CLAMPS DRK (302045D)
END CLAMP	44	PRO SERIES END CLAMPS (302035M)
FLASHING	54	UNIRAC FLASHKIT PRO DRK 10PK (GROUNDING LUG)
GROUNDING LUG	11	ILSCO LAY IN LUG (GBL40B1)

ROOF DESCRIPTION					
ROOF #	ROOF TYPE	COMP SHINGLE & ROLLED COMP ROOF	RAFTER SIZE	RAFTER SPACING	RAFTER O.C.
#1	03	45°	90°	2"x6"	24" O.C.
#2	05	08°	270°	2"x6"	24" O.C.
#3	01	49°	270°	2"x6"	24" O.C.
#4	03	45°	180°	2"x6"	24" O.C.

ARRAY AREA & ROOF AREA CALC'S			
AREA OF NEW ARRAY (Sq. Ft.)	AREA OF ROOF/PLAN (VEN) (Sq. Ft.)	TOTAL ROOF AREA COVERED BY ARRAY %	14.12%
254.84	1805.48		
14.12%	ROOF AREA (ARRAY <35% OF ROOF AREA)		

TAMERA BEDFORD
 24 BARNES ST,
 PROVIDENCE, RI 02906 USA
 APN# PROV9L386
 UTILITY: RHODE ISLAND ENERGY
 AHJ: CITY OF PROVIDENCE

VERSION: _____
 DESCRIPTION: _____
 DATE: _____
 INITIAL RELEASE: 12/15/2022
 UR

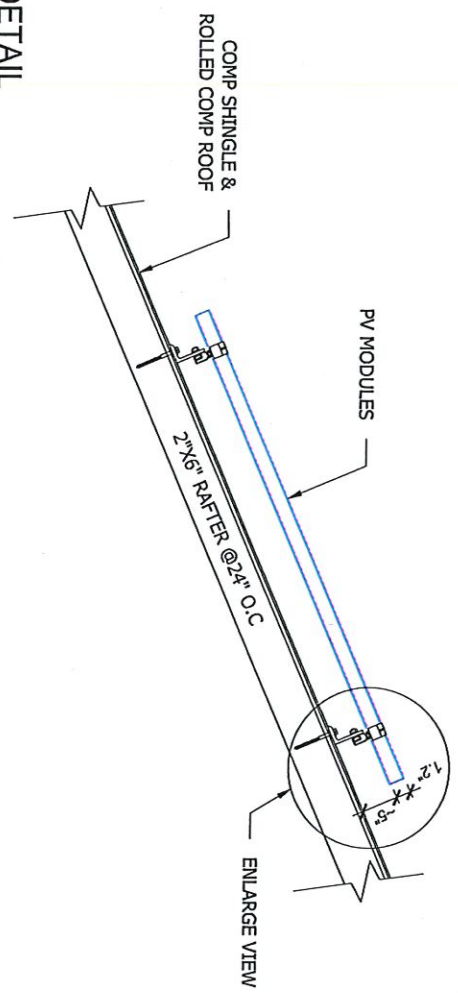
SHEET NAME: ROOF PLAN WITH MODULES
 SHEET SIZE: ANSIB
 11" X 17"
 SHEET NUMBER: PV-2

RTP
 ROOF TOP POWER
 225 W. MARCK RD
 TEL: (858) 787-2889
 FAX: (858) 787-2899
 Lic# A-40427
 E-MAIL: info@rtproofing.com

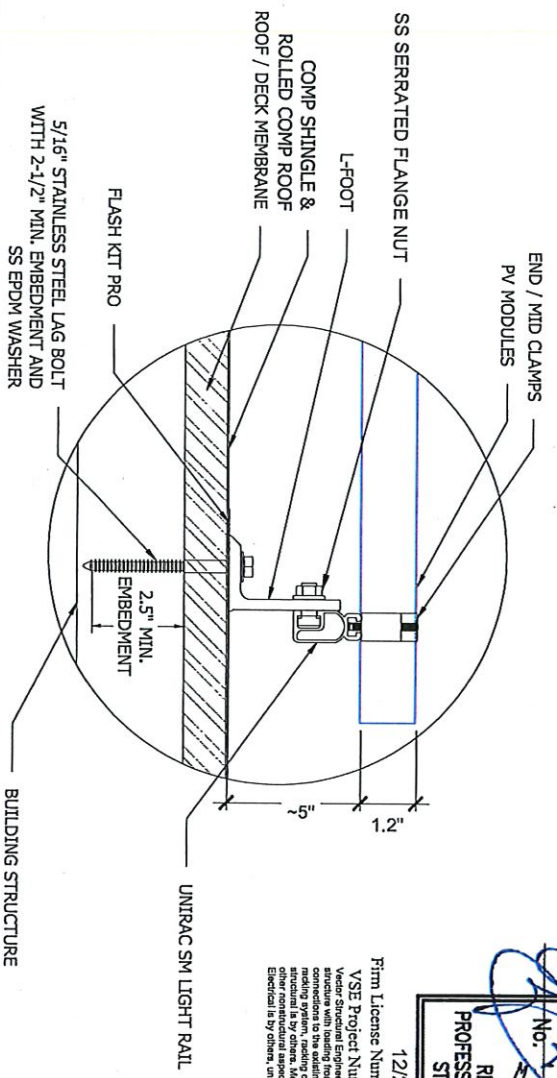
NOTE: ACTUAL ROOF CONDITIONS AND RAFTERS (OR SEAM) LOCATIONS MAY VARY. INSTALL PER MANUFACTURER(S) INSTALLATION GUIDELINES AND ENGINEERED SPANS FOR ATTACHMENTS



ROOF TOP POWER
227 W MAIN ST
PROVIDENCE, RI 02902
TEL: (401) 762-7007
LIC: A-00027
EMAIL: info@rooftoppower.com



1 ATTACHMENT DETAIL
SCALE: NTS



2 ATTACHMENT DETAIL (ENLARGED VIEW)
SCALE: NTS



631 W. GALENA PARK BLVD., STE. 101 PHOENIX, AZ 85026
DANAHER, UTM 844220 WWW.VECTOR.COM

WELLS L. HOLMES
REGISTERED PROFESSIONAL ENGINEER
STRUCTURAL
No. 13066

Firm License Number: PE.001LC86-COA
12/27/2022
VSE Project Number: U3227.1215.221
Vector Structural Engineering has reviewed the existing structure with loading from the solar array and screw mounting system, finding no deficiencies. The structural is by others, mechanical, architectural, and all individual aspects of the design are by others. Specified in by others, unless stamped by Vector Structural.

VERSION	DESCRIPTION	DATE	REV
INITIAL RELEASE	12/15/2022	UR	

PROJECT NAME
TAMERA BEDFORD
24 BARNES ST,
PROVIDENCE, RI 02906 USA
APN# PROV09L386
UTILITY: RHODE ISLAND ENERGY
AHJ: CITY OF PROVIDENCE

SHEET NAME ATTACHMENT DETAIL
SHEET SIZE ANSI B 11" X 17"
SHEET NUMBER PV-3

REC N-PEAK 3 BLACK SERIES
PRODUCT SPECIFICATIONS

REC TOP POWER
225 WATT PER SQ
WARRANTY: RI, 02280
TEL: (800) 770-7287
EMAIL: sales@recsolar.com

REC N-PEAK 3 BLACK SERIES

PREMIUM FULL BLACK MONO N-TYPE SOLAR PANELS



MONO N-TYPE FULL BLACK TECHNOLOGY



NO LIGHT INDUCED DEGRADATION



10 YEAR FRAMING FRONT UP TO 2000 PA SNOW LOAD



5 YEAR WARRANTY ON PRODUCT FROM 0.5% DEFECTS



FEATURING REC'S PROTECTIVE MAIN DESIGN



DIFFERENTIAL CELL DESIGN FOR OPTIMAL PERFORMANCE

400 WP POWER

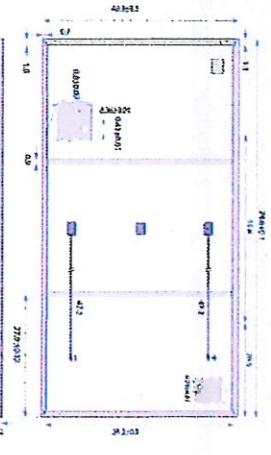


ELITE



GENERAL DATA

Cell type:	120-cell monocrystalline PERC type
Glass:	5-layer 3.2mm thick high-strength tempered glass
Backsheet:	Highly resistant polypropylene (PP) with anti-reflection coating
Frame:	40mm extruded aluminum profile
Max. Panel Size:	3.0m High x 1.65m Wide
Weight:	22.8kg (50.27lb)
Dimensions:	1745mm (57.28in) x 1652mm (65.08in) x 40mm (1.57in)
Origin:	Malaysia



ELECTRICAL DATA

Power Output P _{max} (W)	400
Max. Cell String (V)	0/10
Max. Cell String (W)	36.8
Max. Cell String (A)	10.60
Max. Cell String (V _{oc}) (V)	41.8
Max. Cell String (I _{sc}) (A)	11.31
Max. Cell String (P _{max}) (W)	19.8
Max. Cell String (V _{mp}) (V)	31.4
Max. Cell String (I _{mp}) (A)	0.55
Max. Cell String (P _{max}) (W)	4.21
Max. Cell String (V _{oc}) (V)	9.30
Max. Cell String (I _{sc}) (A)	9.18

MAXIMUM RATINGS

Operating Temperature	-40 ~ +85°C
Max. System Voltage	1000V
Max. System Current	10A
Max. System Power	4000W
Max. System Voltage (V _{oc})	42.5V
Max. System Current (I _{sc})	9.18A
Max. System Power (P _{max})	39.8W

WARRANTY

Standard	REC
Product Defect	5 Years
Power Output	5 Years
Material	10 Years
System	10 Years

TEMPERATURE RATINGS

Normal Module Operating Temperature	44.3°C (112°C)
Temperature Coefficient of P _{max}	-0.34%/°C
Temperature Coefficient of V _{oc}	-0.24%/°C
Temperature Coefficient of I _{sc}	0.04%/°C

LOW LIGHT BEHAVIOUR

REC PV6-1745-1652-40 Rev. A 07.22

VERSION	DATE	REV
DESCRIPTION	12/12/2022	UR
INITIAL RELEASE		
PROJECT NAME	TAMERA BEDFORD 24 BARNES ST, PROVIDENCE, RI 02906 USA APN# PROV09L386 UTILITY: RHODE ISLAND ENERGY AHJ: CITY OF PROVIDENCE	
SHEET NAME	SHEET NUMBER PV-6	
SPEC SHEETS	ANSI B 11" X 17"	