



## HISTORIC PRESERVATION COMMISSION

Isiah Leggett  
*County Executive*

William Kirwan  
*Chairman*

Date: January 25, 2018

### MEMORANDUM

TO: Diane Schwartz Jones  
Department of Permitting Services

FROM: Dan Bruechert  
Historic Preservation Section  
Maryland-National Capital Park & Planning Commission

SUBJECT: Historic Area Work Permit # 823015: Solar Panel Installation

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The Montgomery County Historic Preservation Commission (HPC) has reviewed the attached application for a Historic Area Work Permit (HAWP). This application was **Approved** at the January 10, 2017 Historic Preservation Commission meeting.

The HPC staff has reviewed and stamped the attached construction drawings.

THE BUILDING PERMIT FOR THIS PROJECT SHALL BE ISSUED CONDITIONAL UPON ADHERENCE TO THE ABOVE APPROVED HAWP CONDITIONS AND MAY REQUIRE APPROVAL BY DPS OR ANOTHER LOCAL OFFICE BEFORE WORK CAN BEGIN.

Applicant: Marianna Diggs  
Address: 11 Montgomery Ave., Takoma Park

This HAWP approval is subject to the general condition that the applicant will obtain all other applicable Montgomery County or local government agency permits. After the issuance of these permits, the applicant must contact this Historic Preservation Office if any changes to the approved plan are made. Once work is complete the applicant will contact Dan Bruechert at 301.563.3408 or dan.bruechert@montgomeryplanning.org to schedule a follow-up site visit.





**GENERAL NOTES**

- 1.1.1 **PROJECT NOTES:**
- 1.1.2 THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (NEC) ARTICLE 690, ALL MANUFACTURERS LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTIONS (A) APPLICABLE CODES.
- 1.1.3 THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION.
- 1.1.4 ALL PV SYSTEM COMPONENTS, MODULES, UTILITY-INTERACTIVE INVERTERS, AND SOURCE CIRCUIT COMBINER BOXES ARE IDENTIFIED AND LISTED FOR USE IN PHOTOVOLTAIC SYSTEMS AS REQUIRED BY NEC 690.4 & NEC 690.6; PV MODULES: UL1703, IEC6170, AND IEC61715, AND NFPA 70 CLASS C FIRE INVERTERS: UL 1741 CERTIFIED, IEEE 1547, 929, 519 CONSUMER BOXES; UL 1703 OR UL 1741 ACCESSORY.
- 1.1.5 NEC 690.35 REFERS SPECIFICALLY TO "UNGROUNDING" PV SYSTEMS, ALSO DESIGNATED AS "TRANSFORMERLESS" BY INVERTER MANUFACTURERS AND "NON-ISOLATED" BY UNDERWRITERS LABORATORY.
- 1.1.6 INVERTER(S) USED IN UNGROUNDING SYSTEM SHALL BE LISTED FOR THIS USE (NEC 690.35 (5)).
- 1.1.7 AS SPECIFIED BY THE AUI, EQUIPMENT USED IN UNGROUNDING SYSTEMS LABELED ACCORDING TO NEC 690.35 (F).
- 1.1.8 MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC. IF UNAVAILABLE, MAX DC VOLTAGE CALCULATED ACCORDING TO NEC 690.7.
- 1.1.9 ALL INVERTERS, PHOTOVOLTAIC MODULES, PHOTOVOLTAIC PANELS, AND SOURCE CIRCUIT COMBINERS INTENDED FOR USE IN A PHOTOVOLTAIC POWER SYSTEM WILL BE IDENTIFIED AND LISTED FOR THE APPLICATION PER 690.4 (D), SHALL BE INSTALLED ACCORDING TO ANY INSTRUCTIONS FROM LISTING OR LABELING (NEC 110.3).
- 1.1.10 ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AUI.
- 1.2.1 **SCOPE OF WORK:**
- 1.2.2 PRIME CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND SPECIFICATIONS OF THE GRID-TIED PHOTOVOLTAIC SYSTEM RETROFIT. PRIME CONTRACTOR WILL BE RESPONSIBLE FOR COLLECTING EXISTING ON-SITE REQUIREMENTS TO DESIGN, SPECIFY, AND INSTALL THE EXTERIOR ROOF-MOUNTED PORTION OF THE PHOTOVOLTAIC SYSTEMS DETAILED IN THIS DOCUMENT.
- 1.3.1 **WORK INCLUDES:**
- 1.3.2 PV ROOF ATTACHMENTS - IRONRIDGE FLASHFOOT
- 1.3.3 PV RACKING SYSTEM INSTALLATION - IRONRIDGE XR100
- 1.3.4 PV MODULE AND INVERTER INSTALLATION - SILFAB SLA300M SOLAR EDGE SE7600A-US (240V)
- 1.3.5 PV EQUIPMENT GROUNDING
- 1.3.6 PV SYSTEM WIRING TO A ROOF-MOUNTED JUNCTION BOX
- 1.3.7 PV LOAD CENTERS (IF INCLUDED)
- 1.3.8 PV METERING/MONITORING (IF INCLUDED)
- 1.3.9 PV DISCONNECTS
- 1.3.10 PV FEEDBACK COMMISSIONING
- 1.3.11 (E) ELECTRICAL EQUIPMENT RETROFIT FOR PV
- 1.3.12 SIGNAGE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE.

**SCOPE OF WORK**

SYSTEM SIZE: STC: 16 x 300W = 4.800kW  
 PTC: 16 x 270.W = 4.326kW DC  
 (16) SILFAB SLA300M  
 (1) SOLAR EDGE SE7600A-US (240V)

ATTACHMENT TYPE: IRONRIDGE FLASHFOOT

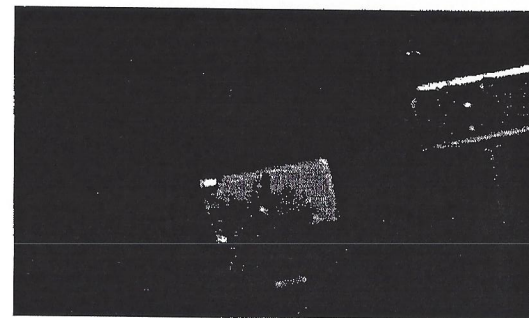
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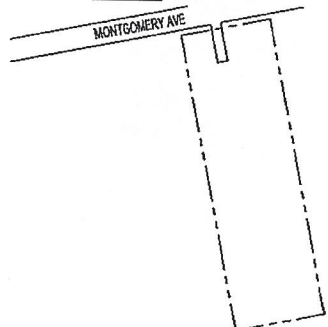
**NEW PV SYSTEM: 4.800 kWp**

**DIGGS RESIDENCE**

11 MONTGOMERY AVE  
 TAKOMA PARK, MD 20912  
 ASSESSOR'S #: 1301075820



**01 AERIAL PHOTO**  
 NOT TO SCALE



**02 PLAT MAP**  
 NOT TO SCALE



**SHEET LIST TABLE**

SHEET NUMBER	SHEET TITLE
T-001	COVER PAGE
G-001	NOTES
A-101	SITE PLAN
A-102	ELECTRICAL PLAN
A-103	SOLAR ATTACHMENT PLAN
E-501	LINE DIAGRAM
E-502	DESIGN TABLES
E-503	PLACARDS
S-501	ASSEMBLY DETAILS
R-001	RESOURCE DOCUMENT
R-002	RESOURCE DOCUMENT
R-003	RESOURCE DOCUMENT
R-004	RESOURCE DOCUMENT
R-005	RESOURCE DOCUMENT

**PROJECT INFORMATION**

**OWNER**  
 NAME: MARIANNA DIGGS

**PROJECT MANAGER**  
 NAME: ANTOINE GRANT  
 PHONE: 2028126463

**CONTRACTOR**  
 NAME: ENERBLU GRID SERVICES  
 PHONE: 2028126463

**AUTHORITIES HAVING JURISDICTION**  
 BUILDING: MONTGOMERY COUNTY  
 ZONING: MONTGOMERY COUNTY  
 UTILITY: PEPCO

**DESIGN SPECIFICATIONS**  
 OCCUPANCY: II  
 CONSTRUCTION: SINGLE-FAMILY  
 ZONING: RESIDENTIAL  
 GROUND SNOW LOAD: 30 PSF  
 WIND EXPOSURE: B  
 WIND SPEED: 115 MPH

**APPLICABLE CODES & STANDARDS**  
 BUILDING: IRC 2015 IRC 2015  
 ELECTRICAL: NEC 2014  
 FIRE: IFC 2015



**CONTRACTOR**

ENERBLU GRID SERVICES

PHONE: 2028126463  
 ADDRESS: 401 NEW YORK AVE NE  
 WASHINGTON DC, DISTRICT OF  
 COLUMBIA 20002

LIC. NO.: MHIC 127519  
 HIC. NO.:  
 ELE. NO.:

UNAUTHORIZED USE OF THIS DRAWING SET WITHOUT WRITTEN PERMISSION FROM CONTRACTOR IS IN VIOLATION OF U.S. COPYRIGHT LAWS AND WILL BE SUBJECT TO CIVIL DAMAGES AND PROSECUTIONS.

**NEW PV SYSTEM: 4.800 kWp**

**DIGGS RESIDENCE**

11 MONTGOMERY AVE  
 TAKOMA PARK, MD 20912  
 APN: 1301075820

**ENGINEER OF RECORD**

PAPER SIZE: 11" x 17" (ANSI B)

**COVER PAGE**

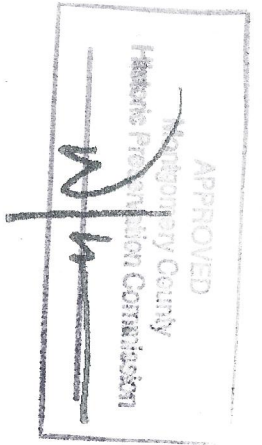
DATE: 11.12.017

DESIGN BY: E.N.

CHECKED BY: M.J.

REVISIONS

**T-001.00**  
 (SHEET 1)



**CONTRACTOR**

ENERBIO GRID SERVICES

PHONE: 2026125483  
ADDRESS: 401 NEWYORK AVE NE  
COLUMBIA, DC DISTRICT OF

LIC. NO.: MHC 027919

HE. NO.:  
E.E. NO.:

UNEMPLOYED OR HAS PERMISSION FROM GOVERNMENT OR VOLUNTARILY LEFT THE INDUSTRY TO WORK AS AN INDEPENDENT CONTRACTOR  
DATE OF BIRTH: 11/12/1977

**DIGGS**

**RESIDENCE**

11 MONTGOMERY AVE  
TAKOMA PARK, MD 20912  
APN: 1301075820

**ENGINEER OF RECORD**

**NOTES**

DATE: 11/20/17  
DESIGN BY: EJA  
CHECKED BY: MAL  
REVISIONS

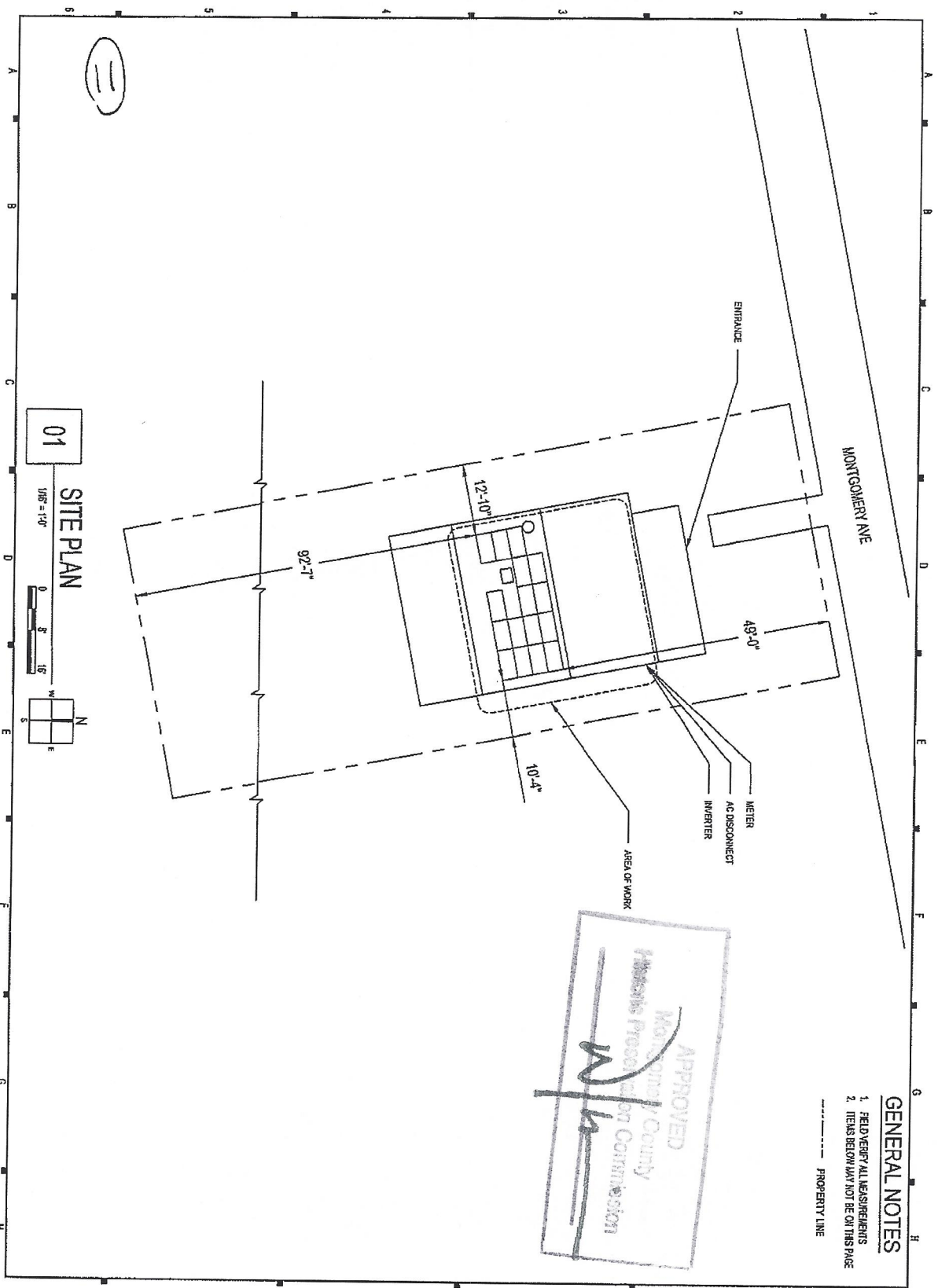
G-001.00

SHEET 7

211	SHEETS:	249	THE GROUNDING ELECTRODE SYSTEM COMPLIES WITH NEC 690.47 AND NEC 250.50 THROUGH 250.706. IF EXISTING SYSTEM IS UNACCESSIBLE OR INADEQUATE, A GROUNDING ELECTRODE SYSTEM PROVIDED ACCORDING TO NEC 250, NEC 690.47 AND AXL.
212	A LEADER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.	253	ACCORDING TO NEC 690.47 (D)(2), UNGROUNDING SYSTEMS INVERTER MAY SIZE DC GEC ACCORDING TO EGC REQUIREMENTS OF NEC 250.122. HOWEVER, DC GEC TO BE UNPULSED OR IRREGULARLY PULSED.
213	THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A ULIMITED INTERLOCKING SYSTEM WITH NO STORAGE BATTERIES.	254	IN UNGROUNDING INVERTERS, GROUND FAULT PROTECTION IS PROVIDED BY "ISOLATION MONITOR INTERRUPTER," AND GROUND FAULT DETECTION PERFORMED BY RESIDUAL-CURRENT DETECTOR.
214	THE SOLAR PV INSTALLATION WILL NOT OBSTRUCT ANY PIPING, MECHANICAL, OR BUILDING HOOR/VENTS.	255	INTERCONNECTOR NOTES: (LOAD-SIDE INTERCONNECTION SHALL BE IN ACCORDANCE WITH NEC 690.64 (B))
215	PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION NEC 110.26.	256	(B) THE SUM OF THE UTILITY (DC) AND INVERTER CONTINUOUS INPUT MAY NOT EXCEED 120% OF BUSBAR RATING (NEC 705.12(D)(2)(3)).
216	ROOF COVERINGS SHALL BE DESIGNED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THIS CODE AND THE APPROVED MANUFACTURER'S INSTRUCTIONS SUCH THAT THE ROOF COVERING SERVES TO PROTECT THE BUILDING OR STRUCTURE.	257	WHEN SUM OF THE PV SOURCES EQUALS >100% OF BUSBAR RATING, PV DEDICATED BACKFEED BREAKERS MUST BE LOCATED OPPOSITE END OF THE BUS FROM THE UTILITY SOURCE (DC) (NEC 705.12(D)(2)(3)).
217		258	AT MULTIPLE INVERTERS OUTPUT COMBINER PANEL, TOTAL RATING OF ALL OVERCURRENT DEVICES SHALL NOT EXCEED CAPACITY OF BUSBAR. HOWEVER, THE COMBINED OVERCURRENT DEVICE MAY BE EXCLUDED ACCORDING TO NEC 705.12(D)(2)(D).
218		259	FEEDER TAP INTERCONNECTION (LOAD SIDE) ACCORDING TO NEC 705.12 (D)(2)(1) SUPPLY SIDE TAP INTERCONNECTION ACCORDING TO NEC 705.12 (A) WITH SERVICE ENTRANCE CONDUCTORS IN ACCORDANCE WITH NEC 230.42
219		260	BACKFEEDING BREAKER FOR UTILITY-INTERACTIVE INVERTER OUTPUT IS EXEMPT FROM ADDITIONAL FASTENING (NEC 705.12 (D)(9)).
220		261	DISCONNECT AND OVERCURRENT PROTECTION NOTES: DISCONNECTING SWITCHES SHALL BE VARIED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING ENERGIZED ARE CONNECTED TO THE TERMINALS MARKED LINE-SIDE (TYPICALLY THE UPPER TERMINALS).
221	EQUIPMENT LOCATIONS	262	DISCONNECTS TO BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BEA VISIBLE-BREAK SWITCH.
222	ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY NEC 110.26.	263	BOTH POSITIVE AND NEGATIVE PV CONDUCTORS ARE UNGROUNDING, THEREFORE BOTH MUST OPEN WHERE A DISCONNECT IS REQUIRED, ACCORDING TO NEC 690.43.
223	THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A ULIMITED INTERLOCKING SYSTEM WITH NO STORAGE BATTERIES.	264	DC DISCONNECT INTEGRATED INTO ROOFTOP DC COMBINER OR INSTALLED WITHIN 6 FT. ACCORDING TO NEC 690.15 (C).
224	ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVING DISCONNECT.	265	OR 5 FT. INSIDE A BUILDING WITHIN 10 SECONDS, CONTROLLED CONDUCTORS 500V AND 540V (NEC 690.12). LOCATION OF LABEL ACCORDING TO AXL.
225	ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEP APPLICABLE CODES.	266	ALL OCPD RATINGS AND TYPES SPECIFIED ACCORDING TO NEC 690.2, 690.4, AND 240.
226	ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.	267	BOTH POSITIVE AND NEGATIVE PV CONDUCTORS ARE UNGROUNDING, THEREFORE BOTH REQUIRE OVERCURRENT PROTECTION, ACCORDING TO NEC 240.21 (SEE EXCEPTION IN NEC 690.9)
227		268	IF REQUIRED BY AXL, SYSTEM WILL INCLUDE ARC-FAULT CIRCUIT PROTECTION ACCORDING TO NEC 690.11 AND UL16998.
228		269	
229		270	
230		271	
231	STRUCTURAL NOTES:	272	WARNING & CONDUIT NOTES:
232	RACKING SYSTEM & PV ARRAY WILL BE INSTALLED ACCORDING TO CODE-COMPLIANT INSTALLATION MANUAL. TOP COLUMNS REQUIRE A DESIGNATED SPACE BETWEEN MODULES, AND RAJS MUST ALSO EXTEND A MINIMUM DISTANCE BEYOND EITHER EDGE OF THE ARRAY/SUBARRAY.	273	ALL CONDUIT AND WIRE WILL BE LISTED AND APPROVED FOR THEIR PURPOSE CONDUIT AND WIRE SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING.
233	ACCORDING TO RAIL MANUFACTURER'S INSTRUCTIONS, JUNCTION BOX WILL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. IF ROOF-PENETRATING TYPE, IT SHALL BE FLASHED & SEALED PER LOCAL REQUIREMENTS.	274	ALL CONDUCTORS SIZED ACCORDING TO NEC 690.4, NEC 690.7, EXPOSED UNGROUNDING PV SOURCE AND OUTPUT CIRCUITS SHALL USE WIRE LISTED AND IDENTIFIED AS PHOTOVOLTAGE (PV) WIRE (690.35 (D)). PV MODULES WIRE LEADS SHALL BE LISTED FOR USE WITH UNGROUNDING SYSTEMS. WIRE MARKING MAY BE FIELD-MARKED WHITE (NEC 200.8 (A)(9)).
234	ROOFTOP PENETRATIONS FOR PV RACKING WILL BE COMPLETED AND SEALED w/ APPROVED CHEMICAL SEALANT PER CODE BY A LICENSED CONTRACTOR.	275	PV WIRE BLACK WIRE MAY BE FIELD-MARKED WHITE (NEC 200.8 (A)(9)).
235	ALL PV RELATED ROOF ATTACHMENTS TO BE SPACED NO GREATER THAN THE SPAN DISTANCE SPECIFIED BY THE RACKING MANUFACTURER.	276	MODULE WIRING SHALL BE LOCATED AND SECURED UNDER THE ARRAY, ACCORDING TO NEC 200.7, UNGROUNDING SYSTEMS DC CONDUCTORS
236	WHEN POSSIBLE, ALL PV RELATED RACKING ATTACHMENTS WILL BE STAGGERED AMONGST THE ROOF FRAMING MEMBERS.	277	
237			
238			
239			
240			
241	GROUNDING NOTES:		
242	GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE AND GROUNDING DEVICES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR SUCH USE.		
243	AS IN CONVENTIONAL PV SYSTEMS, UNGROUNDING PV SYSTEMS REQUIRE AIL EQUIPMENT GROUNDING CONDUCTOR. ALL METAL ELECTRICAL EQUIPMENT AND STRUCTURAL COMPONENTS BOUND TO GROUND, IN ACCORDANCE WITH 250.14 OR 250.15(A), ONLY THE DC CONDUCTORS ARE UNGROUNDING.		
244	PER EQUIPMENT SHALL BE GROUNDING ACCORDING TO NEC 690.43 AND MINIMUM NEC 240.4 & 250.122.		
245	METAL PARTS OF MODULE FRAMES, MODULE RACKING, AND ENCLOSURE CONSISTED GROUNDING ACCORD WITH 250.14 AND 250.15(B)(1).		
246	EACH MODULE WILL BE GROUNDING USING HEAVY GROUNDING CLIPS AS SHOWN IN MANUFACTURER DOCUMENTATION AND APPROVED BY THE AXL. IF WEBS ARE NOT USED, MODULE GROUNDING LOSS MUST BE INSTALLED AT THE SPECIFIED GROUNDING LOCATIONS PER THE MANUFACTURER'S INSTALLATION REQUIREMENTS.		
247	THE GROUNDING CONNECTION TO A MODULE SHALL BE ARRANGED SUCH THAT THE REMOVAL OF A MODULE DOES NOT INTERRUPT A GROUNDING CONDUCTOR TO ANOTHER MODULE.		
248	GROUNDING AND BONDING CONDUCTORS, IF INSULATED SHALL BE COLORED GREEN OR MARKED GREEN IF #1 AWG OR LARGER (NEC 250.119)		

\*IN 4-WIRE DELTA CONNECTED SYSTEMS THE PHASE WITH HIGHER VOLTAGE TO BE MARKED ORANGE (NEC 110.15)

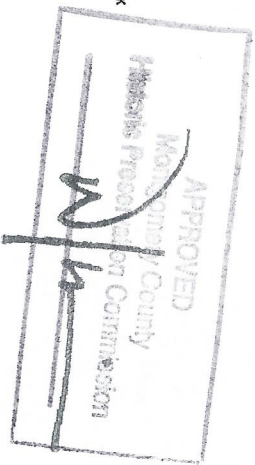
COLORED OR MARKED AS FOLLOWS:  
DC POSITIVE: RED, OR OTHER COLOR EXCLUDING WHITE, GREY AND GREEN  
DC NEGATIVE: BLACK, OR OTHER COLOR EXCLUDING WHITE, GREY AND GREEN  
AC CONDUCTORS COLORED OR MARKED AS FOLLOWS:  
PHASE A OR L1: BLACK  
PHASE B OR L2: RED, OR OTHER CONVENTION IF THREE PHASE  
PHASE C OR L3: BLUE, YELLOW, ORANGE, OR OTHER CONVENTION  
NEUTRAL: WHITE OR GREY



**GENERAL NOTES**

1. FIELD VERIFY ALL MEASUREMENTS
2. ITEMS BELOW MAY NOT BE ON THIS PAGE

----- PROPERTY LINE



**ENERBIO GRID SERVICES**

**CONTRACTOR**

ENERBIO GRID SERVICES

PHONE: 202.932.8463  
 ADDRESS: 401 NEW YORK AVE. #E  
 WASHINGTON, DC DISTRICT OF COLUMBIA, 20002

LIC. NO.: MEIC 12919  
 EC. NO.:  
 ELEC. NO.:

UNAUTHORIZED USE OF THIS SEAL OR SIGNATURE FOR ANY PURPOSES IS PROHIBITED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPLICABLE JURISDICTIONS.

**DIGGS RESIDENCE**

11 MONTGOMERY AVE  
 TAKOMA PARK, MD 20912  
 APN: 1301075820

**ENGINEER OF RECORD**

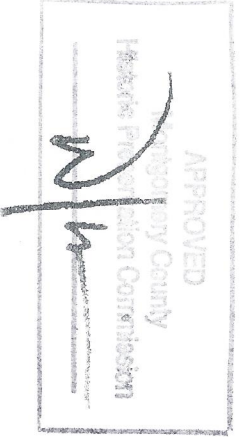
**NEW PV SYSTEM: 4,800 kWp**

PAPER SIZE: 11" x 17" (P&S) 9

**SITE PLAN**

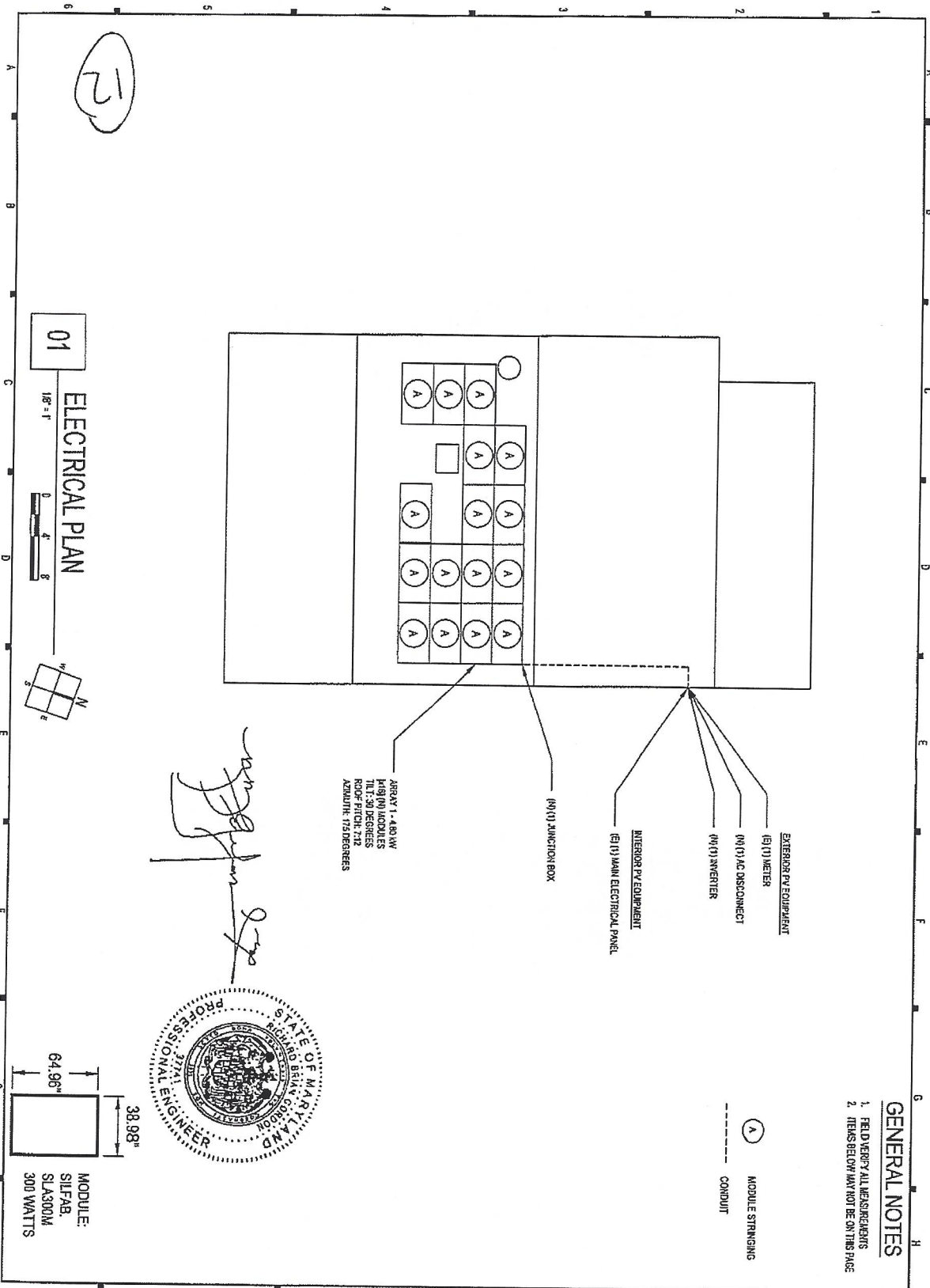
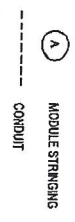
DATE: 11.2017  
 DESIGN BY: E.M.  
 CHECKED BY: A.M.  
 REVISIONS

**A-101.00**  
 (SHEET)



**GENERAL NOTES**

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**01 ELECTRICAL PLAN**  
1/8" = 1'



38.98"  
64.96"  
MODULE:  
SILFAB,  
SLA300M  
300 WATTS



*Richard B. Gordon*  
*Richard B. Gordon*

**CONTRACTOR:**  
ENERBÜ GRID SERVICES  
PHONE: 202/12413  
ADDRESS: 401 NEW YORK AVENUE  
WASHINGTON DC DISTRICT OF  
COLUMBIA 20002  
LIC. NO.: MHC 127519  
E.C. NO.:  
E.E. NO.:  
UNAUTHORIZED USE OF THIS  
DRAWING SET WITHOUT WRITTEN  
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VIOLATION OF U.S. COPYRIGHT LAW  
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LAWES AND PROSECUTIONS.

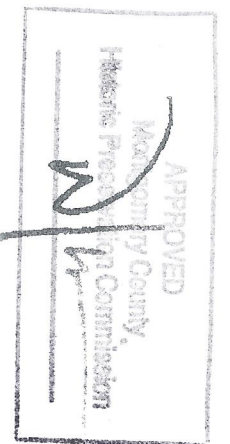
**NEW PV SYSTEM: 4,800 kWhp**

**DIGGS RESIDENCE**  
11 MONTGOMERY AVE  
TAKOMA PARK, MD 20912  
APN: 1301075820

**ENGINEER OF RECORD**  
Richard B. Gordon, P.E.  
Maryland P.E. License No. 37741  
P.E. Lic. Expiration Date 7.9.2019

PAPER SIZE: 11" x 17" (JAN 09)  
**ELECTRICAL PLAN**  
DATE: 11.1.2017  
DESIGN BY: EN.  
CHECKED BY: N.M.  
REVISIONS

**A-102.00**  
SHEET 9



**GENERAL NOTES**

1. FIELD VERIFY ALL REQUIREMENTS
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--- ROOF TRUSS

**CONTRACTOR**

ENERGU GRID SERVICES



PHONE: 202816863  
 ADDRESS: 401 NEW YORK AVE NE  
 WASHINGTON DC DISTRICT OF  
 COLUMBIA 20002

LIC. NO.: MEIC 72519  
 REC. NO.

STATE OF MARYLAND  
 BOARD OF PROFESSIONAL ENGINEERS  
 REGISTERED PROFESSIONAL ENGINEER  
 NUMBER 37241  
 EXPIRES 12/31/2017  
 CHARLES ANDERSON, INC.

NEW PV SYSTEM: 4,800 kWhp

**DIGGS**

**RESIDENCE**  
 11 MONTGOMERY AVE  
 TAKOMA PARK, MD 20912  
 APN: 1301075820

**ENGINEER OF RECORD**

Richard B. Gordon, P.E.  
 Maryland P.E. License No. 37741  
 P.E. Lic. Expiration Date 7/31/2019

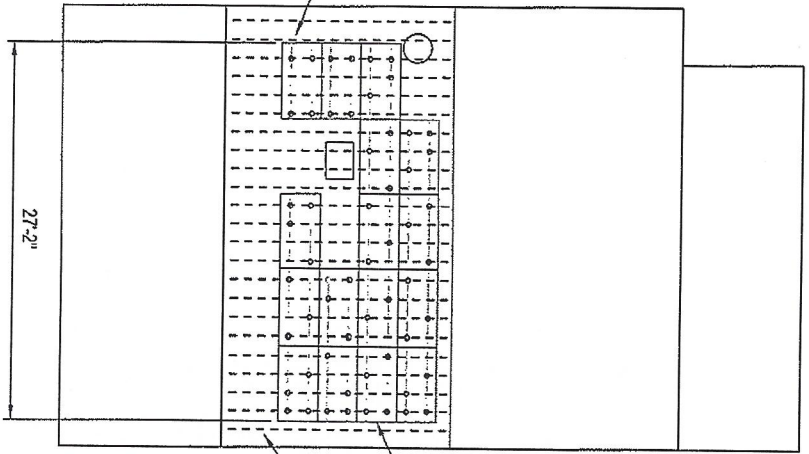


*[Handwritten Signature]*

ROOF MATERIAL IS 1 LAYER ASPHALT SHINGLE

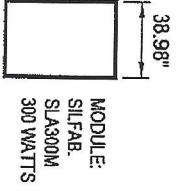
FUSH MOUNT SOLAR MODULES  
 ATTACHED TO ROOF SURFACE (SEE  
 SHEET S-301 FOR MOUNTING DETAILS)

FUSH MOUNT SOLAR MODULES  
 ATTACHED TO ROOF SURFACE (SEE  
 SHEET S-301 FOR MOUNTING DETAILS)



**SOLAR ATTACHMENT PLAN**

01



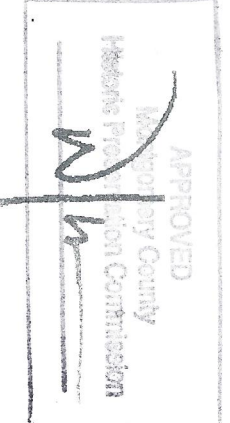
MODULE:  
 SILFAB  
 SLA300M  
 300 WATTS

**SOLAR ATTACHMENT PLAN**

DATE: 11.1.2017  
 DESIGN BY: EKL  
 CHECKED BY: MAM  
 REVISIONS

A-103.00

(SEE P. 9)



**A** MODULE STRINGING

PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN AND COMPLIANT WITH NEC 690.12.

SILFAB SLA300M

SOLAR EDGE P320 POWER OPTIMIZER

JUNCTION BOX

SOLAR EDGE SE7600A-US (240V)

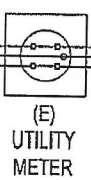
AC DISCONNECT

EQUIPMENT ABOVE LINE IS (N) NEW

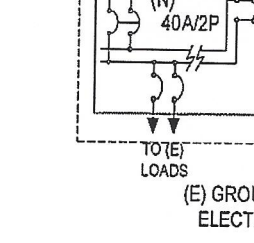
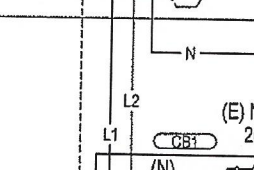
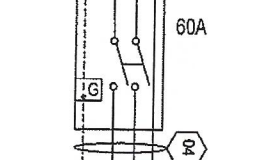
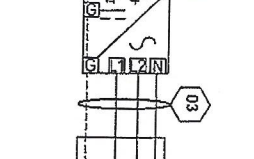
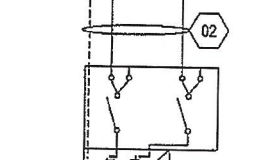
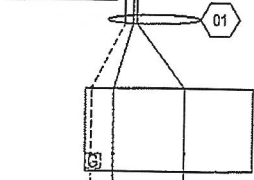
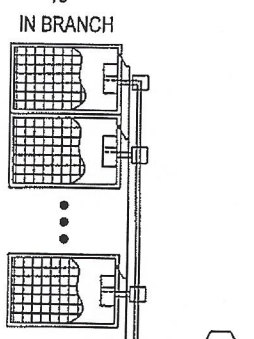
EQUIPMENT BELOW LINE IS (E) EXISTING UNLESS OTHERWISE NOTED.

TO UTILITY GRID (OH)

**MAIN SERVICE PANEL**  
240/120 V 1Ø, 3W  
MAIN BUSS: 200A  
MAX BREAKER SIZE:  
(200 A x 1.2) - 200 A = 40 A



(E) UTILITY METER



REFER TO THE NEC ELECTRICAL CALCULATION FOR CONDUCTORS ON SHEET E-602.00 FOR WIRE INFORMATION



**CONTRACTOR**

ENERBIO GRID SERVICES

PHONE: 202818483  
ADDRESS: 401 NEW YORK AVE NE  
COLUMBIA, MD 21042

LIC. NO.: MHC 12395  
HC. NO.:  
E.E. NO.:

UNAUTHORIZED USE OF THIS DOCUMENT IS PROHIBITED. THE LOCATION OF ALL COMPONENTS AND WIRING SHALL BE SUBJECT TO THE DIMENSIONS AND REVISIONS.

**DIGGS**

**RESIDENCE**

11 MONTGOMERY AVE  
TAKOMA PARK, MD 20912  
APN: 1301078820

**ENGINEER OF RECORD**

Richard B. Gordon, P.E.  
Maryland P.E. License No. 37241  
P.E. Lic. Expiration Date 7/9/2019

DATE: 11.1.2017  
DESIGN BY: E.N.  
CHECKED BY: A.M.  
REVISIONS

E-601.00  
sheet 6



**CONDUCTOR AND CONDUIT SCHEDULE W/ ELECTRICAL CALCULATIONS**

ID	TYPICAL	CONDUCTOR	CONDUIT	CURRENT CARRYING CAPACITIES IN CONDUIT	COND	EGG	TEMP	COND. FACTOR	CONDUIT FILL FACTOR	COHT. CURRENT	MAX CURRENT (125%)	BASE AMP.	DERATED AMP.	TEMP. RATING	AMP @ TERMINAL
1	10 AWG PV WIRE, COPPER	FREE AIR	2	NA	NA	6 AWG BARE COPPER	0.71 (67.2°C)	1	1	15A	16.75A	55A	39.65A	75°C	55A
2	10 AWG THWN-2, COPPER	0.75 DIA EMT	2	NA	NA	8 AWG THWN-2, COPPER	0.71 (67.2°C)	1	1	15A	16.75A	40A	28.4A	75°C	55A
3	8 AWG THWN-2, COPPER	0.75 DIA EMT	2	NA	NA	8 AWG THWN-2, COPPER	0.91 (83.2°C)	1	1	32A	40A	55A	50.65A	75°C	50A
4	8 AWG THWN-2, COPPER	0.57 DIA EMT	2	40A	40A	8 AWG THWN-2, COPPER	0.91 (83.2°C)	1	1	32A	40A	55A	50.65A	75°C	50A

**SYSTEM SUMMARY**

POWERBOX MAX OUTPUT CURRENT	15A
OPTIMIZERS IN SERIES	16
NOMINAL STRING VOLTAGE	350V
ARRAY OPERATING CURRENT	13.71A
ARRAY STC POWER	4.80kW
ARRAY PTD POWER	4.32kW
MAX AC CURRENT	32A
MAX AC POWER	8.35kW
DERATED (CEC) AC POWER	4.21kW

**DESIGN TEMPERATURES**

ASHRAE EXTREME LOW: -15°C (5°F)  
 ASHRAE 2% HIGH: 33.7°C (92.7°F)  
 SOURCE: WASHINGTON NATIONAL (88.47° - 77.07°)

**MODULES**

REF. QTY.	MAKE AND MODEL	MAX I <sub>SC</sub>	IS <sub>C</sub>	IMP	VOC	WMP	TEMP. COEFF. (P-VOC)	FUSE RATING
P1-16	16	16	3.09V	27.84V	31.0A	52.8A	40.53V	32.9V

**POWER OPTIMIZERS**

REF. QTY.	MAKE AND MODEL	RATED INPUT POWER	MAX OUTPUT CURRENT	MAX INPUT ISC	MAX DC VOLTAGE	WEIGHTED EFFICIENCY
P01-16	16	SOLAR EDGE P320	320W	11.9A	48V	98.8%

**INVERTERS**

REF. QTY.	MAKE AND MODEL	AC VOLTAGE	GROUND RATING	DCPD RATED POWER	MAX OUTPUT CURRENT	MAX INPUT CURRENT	MAX INPUT VOLTAGE	DCD WEIGHTED EFFICIENCY
I1	1	SOLAR EDGE SERVOPLUS 2000	200V	FLOATING	40A	7500W	32A	23A

**DISCONNECTS**

REF. QTY.	MAKE AND MODEL	RATED CURRENT	MAX RATED VOLTAGE
D1	1	SERVOPLUS 2000 60 CELLS MONOCRYSTALLINE SILICON	240VAC

**OCPDS**

REF. QTY.	MAKE AND MODEL	RATED CURRENT	MAX VOLTAGE
C81	1	TRANSITIONARY PASS THROUGH BOX WITH 4 TERMINAL BLOCKS	40A

**BILL OF MATERIALS**

MODULE	CATEGORY	MAKE	MODEL NUMBER	REF. QTY.	UNIT	QTY/UNIT	DESCRIPTION
INVERTER	SILFAH	SERVOPLUS (2000)	P01-16	16	PIECES	1	SOLAR EDGE SERVOPLUS 2000 INVERTER
MODULE OPTIMIZER	SOLAR EDGE	P320	P01-16	16	PIECES	1	SOLAR EDGE P320 OPTIMIZER (REQUIRED PART OF INVERTER'S DISTRIBUTED DC ARCHITECTURE)
DISCONNECT	SQUARE D	D1222B	D1	1	PIECE	1	SQUARE D D1222B, 2 POLE, 60A, 240VAC OR EQUIVALENT
WIRING	GEN-BA	GEN-BA-ANG-PV-WIRE-CU	W01	90	FEET	1	10 AWG PV WIRE, COPPER (POSITIVE AND NEGATIVE)
WIRING	GEN-BA	GEN-BA-ANG-PV-WIRE-CU	W01	45	FEET	1	10 AWG BARE COPPER (GROUND)
WIRING	GEN-BA	GEN-BA-ANG-THWN-2-CU-10	W02	20	FEET	1	10 AWG THWN-2 COPPER, RED (POSITIVE)
WIRING	GEN-BA	GEN-BA-ANG-THWN-2-CU-10	W02	20	FEET	1	10 AWG THWN-2 COPPER, BLACK (NEGATIVE)
WIRING	GEN-BA	GEN-BA-ANG-THWN-2-CU-10	W03	20	FEET	1	8 AWG THWN-2 COPPER, RED (LINE 1)
WIRING	GEN-BA	GEN-BA-ANG-THWN-2-CU-10	W03	20	FEET	1	8 AWG THWN-2 COPPER, BLACK (LINE 2)
WIRING	GEN-BA	GEN-BA-ANG-THWN-2-CU-10	W04	40	FEET	1	8 AWG THWN-2 COPPER, WHITE (NEUTRAL)
WIRING	GEN-BA	GEN-BA-ANG-THWN-2-CU-10	W04	20	FEET	1	8 AWG THWN-2 COPPER, GREEN (GROUND)
WIRING	GEN-BA	GEN-BA-ANG-THWN-2-CU-10	W05	20	FEET	1	8 AWG THWN-2 COPPER, WHITE (NEUTRAL)
WIRING	GEN-BA	GEN-BA-ANG-THWN-2-CU-10	W05	20	FEET	1	8 AWG THWN-2 COPPER, GREEN (GROUND)
CONDUIT	GEN-BA	GEN-BA-ANG-THWN-2-CU-10	W06	20	FEET	1	0.75 DIA CONDUIT
CONDUIT	GEN-BA	GEN-BA-ANG-THWN-2-CU-10	W07	20	FEET	1	0.57 DIA CONDUIT
TRANSITION BOX	GEN-BA	GEN-BA-ANG-THWN-2-CU-10	C81	1	PIECE	1	TRANSITIONARY PASS THROUGH BOX WITH 4 TERMINAL BLOCKS

15

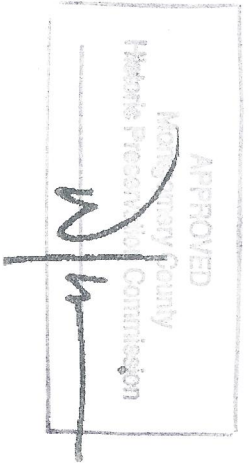
**CONTRACTOR**  
 ENERBIO GRID SERVICES  
 PHONE: 2026281815  
 ADDRESS: 4011 NEW YORK AVE  
 COLUMBIA, MD 21042  
 LIC. NO.: ELEC 17219

**ENGINEER OF RECORD**  
 Richard B. Gordon, P.E.  
 Maryland P.E. License No. 37741  
 P.E. Lic. Expiration Date 7/9/2018

**DIGGS RESIDENCE**  
 11 MONTGOMERY AVE  
 TAKOMA PARK, MD 20912  
 APN: 1301075820

**DESIGN TABLES**  
 DATE: 11.1.2017  
 DESIGN BY: E.N.  
 CHECKED BY: M.A.  
 REVISIONS:  
 E-602.00  
 (sheet 7)





**PLACARD 3**  
AT EACH JUNCTION COILMANS, DISCONNECT AND DEVICE WHERE ENERGIZED UNINSULATED CONDUCTORS MAY BE EXPOSED DURING SERVICE (NEC 690.35(f))

**LABEL 2**  
AT EACH DISCONNECTING MEANS FOR PHOTOVOLTAIC EQUIPMENT (NEC 690.17)

**LABEL 3**  
AT EACH DC DISCONNECTING MEANS (NEC 690.53)

**LABEL 4**  
AT POINT OF INTERCONNECTION MARKED AT DISCONNECTING MEANS (NEC 690.54)

**OPERATING CURRENT: 12.11 A DC**  
**OPENING VOLTAGE: 37.1 V DC**  
**MAX SHORT CURRENT: 500 V DC**

**OPERATING CURRENT: 23 A DC**  
**OPENING VOLTAGE: 249 V AC**

**CAUTION!**  
PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKED

**INTERACTIVE PHOTOVOLTAIC SYSTEM CONNECTED**  
PHOTOVOLTAIC SYSTEM/DISCONNECT LOCATED EAST SIDE OF THE HOUSE

**PHOTOVOLTAIC SYSTEM DC DISCONNECT**

**PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN**

**PHOTOVOLTAIC AC DISCONNECT**

**WARNING: PHOTOVOLTAIC POWER SOURCE**

**LABEL 1**  
AT POINT OF INTERCONNECTION LABEL, SUCH AS LABEL 5 OR LABEL 6 MUST IDENTIFY PHOTOVOLTAIC SYSTEM (NEC 705.12(D)(4))

**LABEL 5**  
AT POINT OF INTERCONNECTION LABEL, SUCH AS LABEL 5 OR LABEL 6 MUST IDENTIFY PHOTOVOLTAIC SYSTEM (NEC 705.12(D)(4))

**LABEL 7**  
AT UTILITY METER (NEC 690.56(f))

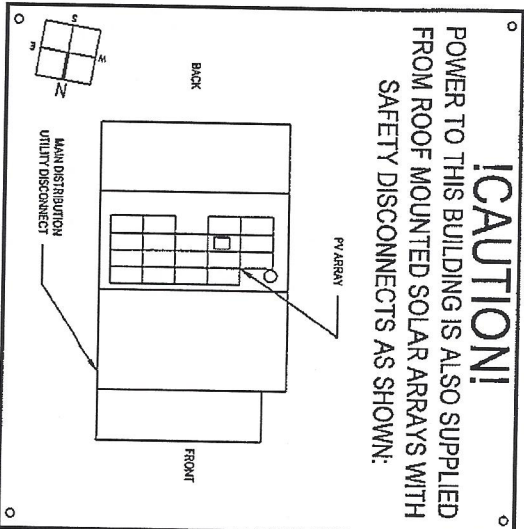
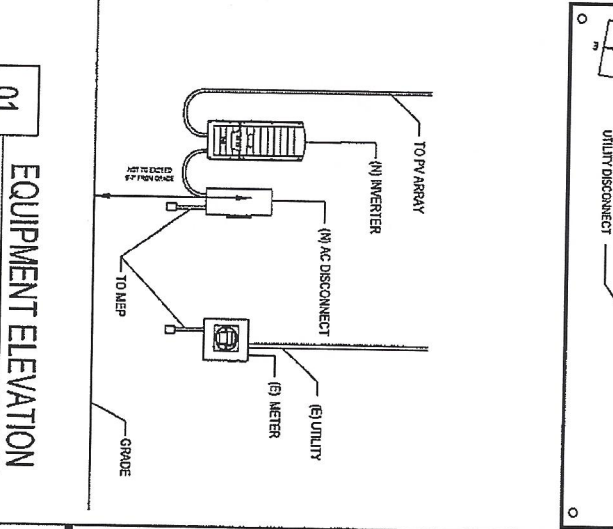
**LABEL 8**  
AT EACH DC DISCONNECTING MEANS (NEC 690.13(f))

**LABEL 9**  
AT RAPID SHUTDOWN SWITCH (NEC 690.56(f))  
LETTERS AT LEAST 3/8 INCH, WHITE ON RED BACKGROUND, REFLECTIVE (NEC 690.11.1.1)

**LABEL 11**  
AT EACH AC DISCONNECTING MEANS (NEC 690.13(f))

**LABEL 12**  
AT POINT OF INTERCONNECTION OVERCURRENT DEVICE (NEC 705.12(D)(7))

**LABEL 13**  
AT EXPOSED RACEWAYS, CABLE TRAYS, AND OTHER WIRING METHODS, SPACED AT MAXIMUM 10 FT SECTION OR WHERE SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILING, OR FLOORS. (NEC 690.31(g))  
LETTERS AT LEAST 3/8 INCH, WHITE ON RED BACKGROUND, REFLECTIVE (NEC 690.11.1.1)



**EQUIPMENT ELEVATION**  
01  
NOT TO SCALE

**CONTRACTOR**  
ENERBIO GRID SERVICES

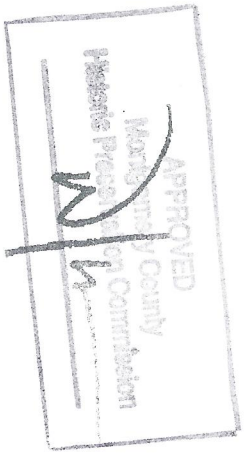
PHONE: 202.726.83  
ADDRESS: 401 NEW YORK AVE NE  
WASHINGTON DC DISTRICT OF  
COLUMBIA 20002  
LIC. NO.: 6416-17519  
E.E. NO.:  
UNAUTHORIZED USE OF THIS DRAWING SET WITHOUT WRITING PERMISSION FROM CONTRACTOR IS IN VIOLATION OF PROFESSIONAL ETHICS AND WILL BE SUBJECT TO LAW. CHANGES AND PROSECUTIONS.

**RESIDENCE**  
11 MONTGOMERY AVE  
TAKOMA PARK, MD 20912  
APN: 1301075820

**ENGINEER OF RECORD**  
Richard B. Gordon, P.E.  
Maryland P.E. License No. 37741  
P.E. Lic. Expiration Date 7.9.2019

POWER SIZE: 1/4" = 1" (AS SHOWN)  
PLACARDS

DATE: 11/12/17  
DESIGN BY: E.H.  
CHECKED BY: M.L.K.  
REVISIONS  
E-603.00  
SHEET 4

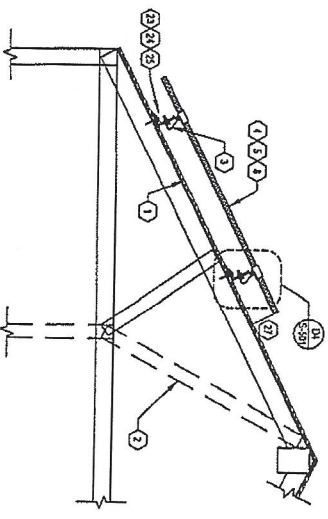


**GENERAL NOTES**

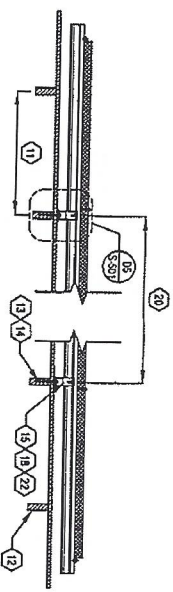
- FIELD VERIFY ALL MEASUREMENTS

**SHEET KEYNOTES**

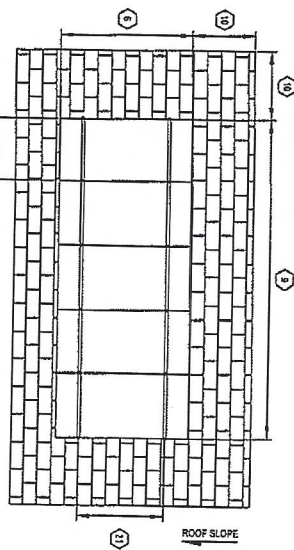
- ROOF MATERIAL: ASPHALT SHINGLE
- ROOF STRUCTURE: TRUSS
- ATTACHMENT TYPE: IRONROCKE FLASHFOOT
- MODULE MANUFACTURER: SILFA
- MODULE WEIGHT: 54 POUNDS
- MODULE LENGTH: 54.50"
- MODULE WIDTH: 15.50"
- MODULE WEIGHT: 21.90 LBS.
- SEE SHEET A-101 FOR DIMENSIONS!
- MIN. FREE OFFSET: NO FIRE CODE ENFORCED
- TRUSS SPACING: 16 IN. O.C.
- TRUSS SIZE: 2X8 NOMINAL
- LAG BOLT DIAMETER: 5/8 IN.
- LAG BOLT EMBEDMENT: 3 1/2 IN.
- TOTAL # OF ATTACHMENTS: 57
- TOTAL AREA: 281.35 SQ. FT.
- TOTAL WEIGHT: 819.43 LBS.
- WEIGHT PER ATTACHMENT: 14.27 LBS.
- DISTRIBUTED LOAD: 2.88 PSF.
- MAX. HORIZONTAL STANDOFF: 48 IN.
- MAX. VERTICAL STANDOFF: 33 IN.
- UNDERLAP: 26 IN., PORTLAND: 33 IN.
- WIND UPLIFT S/P RESISTANCE: YES
- RAIL S/P ATTACHMENT (FOR EDGM): IRONROCKE
- RAIL WEIGHT: 0.68 LBS/FT.
- MAX. TRUSS SPAN: 15 FT.
- MODULE CLEARANCE: 3 IN. MIN., 6 IN. MAX.



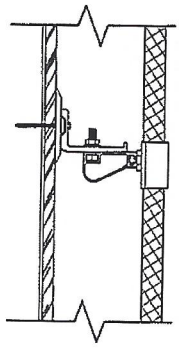
**D1**  
RACKING DETAIL (TRANSVERSE)  
NOT TO SCALE



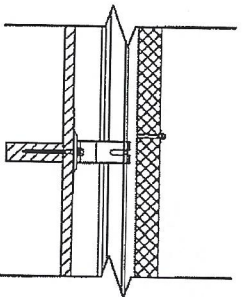
**D2**  
RACKING DETAIL (LONGITUDINAL)  
NOT TO SCALE



**D3**  
RACKING DETAIL (TOP)  
NOT TO SCALE



**D4**  
DETAIL (TRANSVERSE)  
NOT TO SCALE



**D5**  
DETAIL (LONGITUDINAL)  
NOT TO SCALE



*Richard B. Gordon*

**ENERBIO GRID SERVICES**  
**CONTRACTOR**  
 ENERBIO GRID SERVICES  
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 COLUMBIA, MD 21046  
 LIC. NO.: MHC 127519  
 H.C. NO.:  
 E.E. NO.:

**RESIDENCE**  
 11 MONTGOMERY AVE  
 TAKOMA PARK, MD 20912  
 APN: 1301075820  
**ENGINEER OF RECORD**  
 NEW PV SYSTEM: 4,800 KWP  
**DIGGS**

Richard B. Gordon, P.E.  
 Maryland P.E. License No. 37741  
 P.E. Lic. Expiration Date 7.9.2019

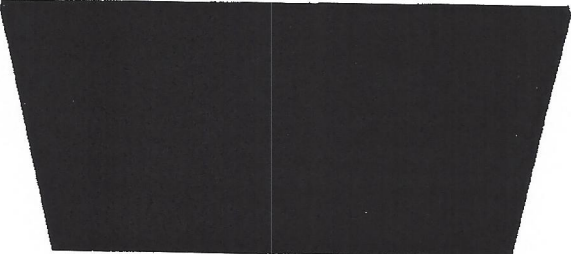
DATE: 11.1.2017  
 DESIGN BY: ENL  
 CHECKED BY: MLJ  
 REVISIONS



Technical Datasheet



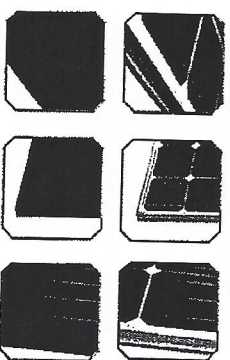
SILFAB  
SLA-M 280/285/290/295/300



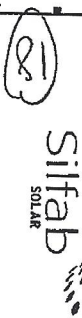
The Silfab SLA-M 60-cell monocrystalline module series is the result of the experience of the Silfab technical team, specialized in the entire photovoltaic value chain, with modules produced and operating for over 33 years.

The SLA-M modules are ideal for ground-mount, roof-top and solar tracking installations where maximum power density is preferred.

- Maximum Efficiency: 60 of the highest efficiency, best quality monocrystalline cells result in a maximum power rating of up to 300 Wp.
- Positive Tolerance (-0/+5W) module sorting achieves the maximum electrical performance of the PV system.
- Industry Experts: Silfab's technical team has specialized experience in the entire photovoltaic value chain, with modules produced and operating for over 33 years.
- Highest Automation: Strict quality controls during each step at one of the world's most automated module production facilities.
- Increased Quality: Top quality materials and 100% EL testing guarantee a trustworthy 25-year performance warranty.
- Reduced Weight: Engineered to accommodate low load bearing structures while maintaining highly durable mechanical characteristics including a maximum loading of 5400 Pa.



Available in Black



A B C D E F G H

PARAMETER	SLA-M 280	SLA-M 285	SLA-M 290	SLA-M 295	SLA-M 300
Module Power (Peak)	280	285	290	295	300
Maximum Power Voltage (Open Circuit)	31.7	32.0	32.2	32.4	32.6
Maximum Power Current (Short Circuit)	8.83	8.91	8.97	9.04	9.11
Open Circuit Voltage (Voc)	36.0	36.2	36.4	36.6	36.8
Short Circuit Current (Isc)	9.07	9.15	9.22	9.29	9.36
Module Efficiency (NREL)	17.1	17.2	17.3	17.4	17.5
Power Tolerance	±0.5%				
Temperature Coefficient (Pmax)	-0.45%				
Temperature Coefficient (Voc)	-2.10%				
Temperature Coefficient (Isc)	0.03%				
Operating Temperature	-40/+45°C				
Weight	15 kg				
Dimensions (L x W x H)	1650 x 990 x 38 mm				
Cell Size	156 mm x 156 mm				
Cell Pitch	2 mm				
Cell Area	243 cm²				
Number of Cells	60				
Number of Joints	59				
Number of Joints per Meter	35.75				
Number of Joints per Kilowatt	127				
Number of Joints per Kilowatt per Meter	4.25				
Number of Joints per Kilowatt per Meter per Kilowatt	0.14				
Number of Joints per Kilowatt per Meter per Kilowatt per Meter	0.0045				

**GENERAL INFORMATION**

Product: SLA-M 280/285/290/295/300

Material: Monocrystalline Silicon

Color: Black

Weight: 15 kg

Dimensions: 1650 x 990 x 38 mm

Cell Size: 156 mm x 156 mm

Cell Pitch: 2 mm

Cell Area: 243 cm²

Number of Cells: 60

Number of Joints: 59

Number of Joints per Meter: 35.75

Number of Joints per Kilowatt: 127

Number of Joints per Kilowatt per Meter: 4.25

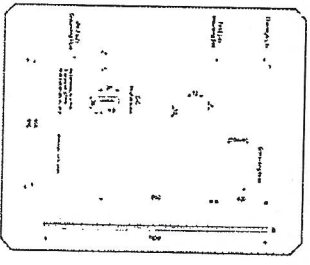
Number of Joints per Kilowatt per Meter per Kilowatt: 0.14

Number of Joints per Kilowatt per Meter per Kilowatt per Meter: 0.0045

Warranty: 25 years

Performance: 25-year performance warranty

Installation: See installation manual



**Silfab SOLAR**

3 Silfab Solar Inc.  
10000 Highway 101, Mississauga, Ontario Canada L4T 1S5  
Tel: +1 (905) 276-8829  
Fax: +1 (905) 276-8830  
www.silfab.com

**ENERGI BIO GRID SERVICES**

CONTRACTOR

PHONE: 2026 193618  
ADDRESS: 401 NEW YORK AVE NE  
WASHINGTON, DC DISTRICT OF  
COLUMBIA 20002

U.C. NO.: A/MC 12519  
E.L.E. NO.:

RESIDENCE  
11 MONTGOMERY AVE  
TAKOMA PARK, MD 20912  
APN: 1301073820

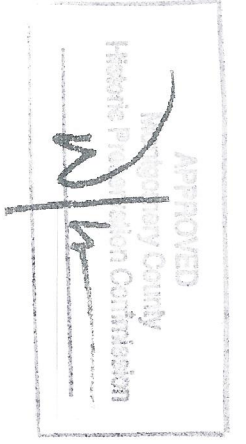
ENGINEER OF RECORD  
**DIGGS**

NEW PV SYSTEM: 4.800 kWp

DATE: 11/13/17  
DESIGN BY: EML  
CHECKED BY: MAL

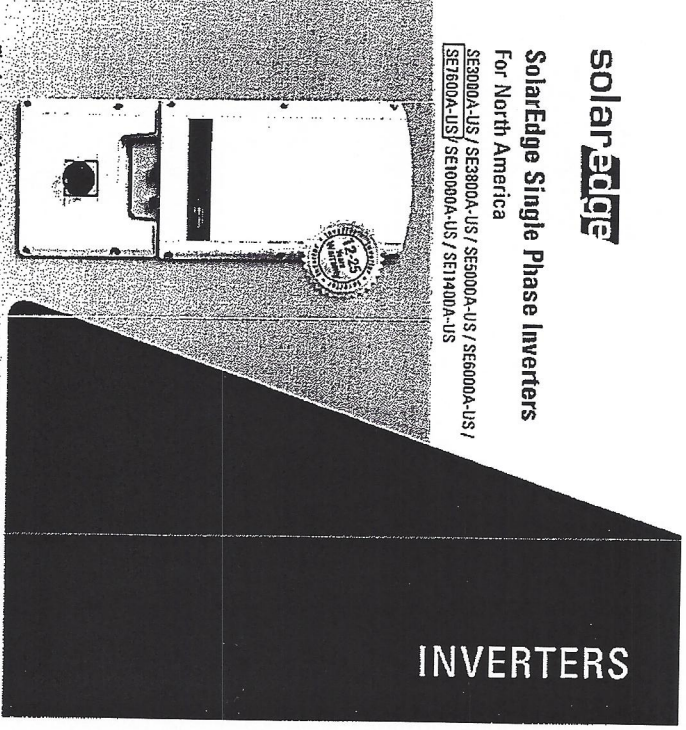
REVISIONS

R-001.00  
SHEET 19



# solaredge

**SolarEdge Single Phase Inverters**  
 For North America  
 SE3000A-US / SE3800A-US / SE5000A-US / SE6000A-US /  
 SE7600A-US / SE10900A-US / SE11400A-US



- The best choice for SolarEdge enabled systems**
- Integrated arc fault protection for NEC 2011 690.31 compliance.
  - Rapid Shutdown for NEC 2014 690.32
  - Superior efficiency (98%)
  - Small, lightweight and easy to install on provided bracket
  - Built-in middle-level monitoring
  - Internet connection through Ethernet or Wireless
  - Outdoor and indoor installation
  - Field voltage inverter, DC/AC conversion only
  - Pre-assembled Safety Switch for faster installation
  - Optional - revenue grade data, AHIS C1220

www.solaredge.us

# solaredge

**Single Phase Inverters for North America**  
 SE3000A-US / SE3800A-US / SE5000A-US / SE6000A-US /  
 SE7600A-US / SE10900A-US / SE11400A-US

Model	SE3000A-US	SE3800A-US	SE5000A-US	SE6000A-US	SE7600A-US	SE10900A-US	SE11400A-US
Max AC Power Output	3000	3800	5000	6000	7600	10900	11400
AC Output Voltage (Line-to-Line)	120V	120V	120V	120V	120V	120V	120V
AC Output Voltage (Line-to-Neutral)	240V	240V	240V	240V	240V	240V	240V
Max. AC Output Current	15A	15A	21A @ 240V	25A	31A @ 240V	45A @ 240V	47.5A @ 240V
Max. Continuous Output Current	15A	15A	21A @ 240V	25A	31A @ 240V	45A @ 240V	47.5A @ 240V
Max. Output Energy (kWh)	15.1	15.1	25.2	30.2	39.8	54.6	57.0
Max. Output Energy (kWh) (with 10% safety margin)	13.6	13.6	22.7	27.2	35.8	49.1	51.3
Max. Output Energy (kWh) (with 20% safety margin)	12.1	12.1	20.2	24.2	31.8	43.0	45.3
Max. Output Energy (kWh) (with 30% safety margin)	10.6	10.6	17.7	21.2	28.3	37.9	39.6
Max. Output Energy (kWh) (with 40% safety margin)	9.1	9.1	15.2	18.2	24.3	32.6	34.0
Max. Output Energy (kWh) (with 50% safety margin)	7.6	7.6	12.7	15.2	20.3	27.5	28.8
Max. Output Energy (kWh) (with 60% safety margin)	6.1	6.1	10.2	12.2	16.3	21.9	22.9
Max. Output Energy (kWh) (with 70% safety margin)	4.6	4.6	7.7	9.2	12.3	16.9	17.6
Max. Output Energy (kWh) (with 80% safety margin)	3.1	3.1	5.2	6.2	8.3	11.4	11.9
Max. Output Energy (kWh) (with 90% safety margin)	1.6	1.6	2.7	3.2	4.3	5.9	6.2
Max. Output Energy (kWh) (with 95% safety margin)	0.6	0.6	1.2	1.2	1.3	1.8	1.9
Max. Output Energy (kWh) (with 99% safety margin)	0.1	0.1	0.2	0.2	0.2	0.3	0.3
Max. Output Energy (kWh) (with 99.9% safety margin)	0.01	0.01	0.02	0.02	0.02	0.03	0.03
Max. Output Energy (kWh) (with 99.99% safety margin)	0.001	0.001	0.002	0.002	0.002	0.003	0.003
Max. Output Energy (kWh) (with 99.999% safety margin)	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003
Max. Output Energy (kWh) (with 99.9999% safety margin)	0.00001	0.00001	0.00002	0.00002	0.00002	0.00003	0.00003
Max. Output Energy (kWh) (with 99.99999% safety margin)	0.000001	0.000001	0.000002	0.000002	0.000002	0.000003	0.000003
Max. Output Energy (kWh) (with 99.999999% safety margin)	0.0000001	0.0000001	0.0000002	0.0000002	0.0000002	0.0000003	0.0000003
Max. Output Energy (kWh) (with 99.9999999% safety margin)	0.00000001	0.00000001	0.00000002	0.00000002	0.00000002	0.00000003	0.00000003
Max. Output Energy (kWh) (with 99.99999999% safety margin)	0.000000001	0.000000001	0.000000002	0.000000002	0.000000002	0.000000003	0.000000003
Max. Output Energy (kWh) (with 99.999999999% safety margin)	0.0000000001	0.0000000001	0.0000000002	0.0000000002	0.0000000002	0.0000000003	0.0000000003
Max. Output Energy (kWh) (with 99.9999999999% safety margin)	0.00000000001	0.00000000001	0.00000000002	0.00000000002	0.00000000002	0.00000000003	0.00000000003
Max. Output Energy (kWh) (with 99.99999999999% safety margin)	0.000000000001	0.000000000001	0.000000000002	0.000000000002	0.000000000002	0.000000000003	0.000000000003
Max. Output Energy (kWh) (with 99.999999999999% safety margin)	0.0000000000001	0.0000000000001	0.0000000000002	0.0000000000002	0.0000000000002	0.0000000000003	0.0000000000003
Max. Output Energy (kWh) (with 99.9999999999999% safety margin)	0.00000000000001	0.00000000000001	0.00000000000002	0.00000000000002	0.00000000000002	0.00000000000003	0.00000000000003
Max. Output Energy (kWh) (with 99.99999999999999% safety margin)	0.000000000000001	0.000000000000001	0.000000000000002	0.000000000000002	0.000000000000002	0.000000000000003	0.000000000000003
Max. Output Energy (kWh) (with 99.999999999999999% safety margin)	0.0000000000000001	0.0000000000000001	0.0000000000000002	0.0000000000000002	0.0000000000000002	0.0000000000000003	0.0000000000000003



DATE: 11/2017  
 DESIGN BY: ELL  
 CHECKED BY: MLL  
 REVISIONS  
 PWS SIZE: 11" x 17" (incl. B)

**RESIDENCE**  
 11 MONTGOMERY AVE  
 TAKOMA PARK, MD 20912  
 APN: 1301075820

**DIGGS**  
 ENGINEER OF RECORD

CONTRACTOR  
 ENERGI GRID SERVICES  
 PHONE: 202612813  
 ADDRESS: 401 NEW YORK AVE NE  
 WASHINGTON, DC DISTRICT OF  
 COLUMBIA 20002  
 LIC. NO.: MHC 127519  
 E.E. NO.:

NEW PV SYSTEM: 4,800 kWh  
 DRAWING NO. OF THIS PROJECT: 17-0001  
 DRAWING SET WITHOUT WHICH THIS CONTRACT IS VOID AND WILL BE SUBJECT TO THE TERMS AND CONDITIONS OF THE DRAWINGS AND SPECIFICATIONS.

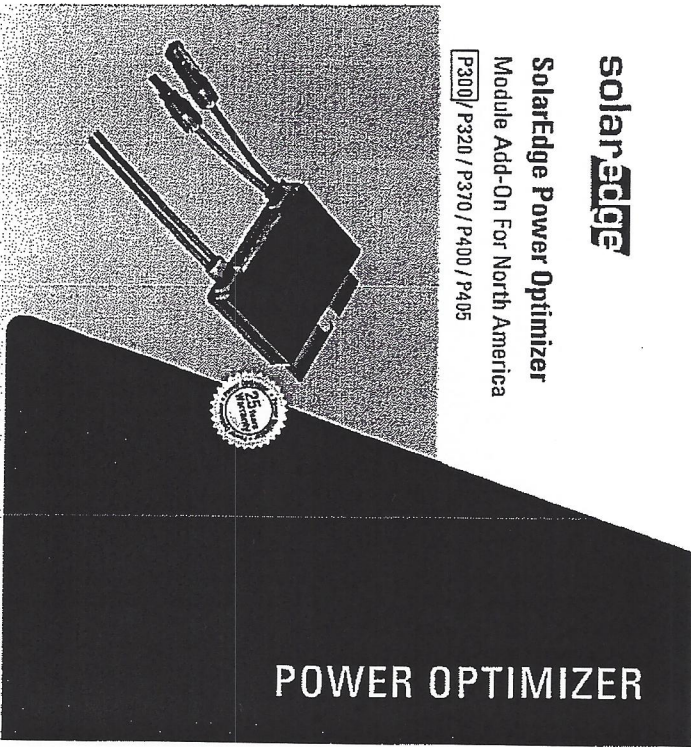
RESOURCE DOCUMENT  
 R-002.00  
 SHEET 11



# solarEdge

SolarEdge Power Optimizer  
Module Add-On For North America

P300/ P320 / P370 / P400 / P405



## POWER OPTIMIZER

### PV power Optimization at the module-level

- Up to 35% more energy
- Superior efficiency (99.9%)
- Mitigate all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Module-level voltage shutdown for installer and firefighter safety

US PATENT D5,654,106; US PATENT D5,654,107; US PATENT D5,654,108; US PATENT D5,654,109; US PATENT D5,654,110; US PATENT D5,654,111; US PATENT D5,654,112; US PATENT D5,654,113; US PATENT D5,654,114; US PATENT D5,654,115; US PATENT D5,654,116; US PATENT D5,654,117; US PATENT D5,654,118; US PATENT D5,654,119; US PATENT D5,654,120; US PATENT D5,654,121; US PATENT D5,654,122; US PATENT D5,654,123; US PATENT D5,654,124; US PATENT D5,654,125; US PATENT D5,654,126; US PATENT D5,654,127; US PATENT D5,654,128; US PATENT D5,654,129; US PATENT D5,654,130; US PATENT D5,654,131; US PATENT D5,654,132; US PATENT D5,654,133; US PATENT D5,654,134; US PATENT D5,654,135; US PATENT D5,654,136; US PATENT D5,654,137; US PATENT D5,654,138; US PATENT D5,654,139; US PATENT D5,654,140; US PATENT D5,654,141; US PATENT D5,654,142; US PATENT D5,654,143; US PATENT D5,654,144; US PATENT D5,654,145; US PATENT D5,654,146; US PATENT D5,654,147; US PATENT D5,654,148; US PATENT D5,654,149; US PATENT D5,654,150; US PATENT D5,654,151; US PATENT D5,654,152; US PATENT D5,654,153; US PATENT D5,654,154; US PATENT D5,654,155; US PATENT D5,654,156; US PATENT D5,654,157; US PATENT D5,654,158; US PATENT D5,654,159; US PATENT D5,654,160; US PATENT D5,654,161; US PATENT D5,654,162; US PATENT D5,654,163; US PATENT D5,654,164; US PATENT D5,654,165; US PATENT D5,654,166; US PATENT D5,654,167; US PATENT D5,654,168; US PATENT D5,654,169; US PATENT D5,654,170; US PATENT D5,654,171; US PATENT D5,654,172; US PATENT D5,654,173; US PATENT D5,654,174; US PATENT D5,654,175; US PATENT D5,654,176; US PATENT D5,654,177; US PATENT D5,654,178; US PATENT D5,654,179; US PATENT D5,654,180; US PATENT D5,654,181; US PATENT D5,654,182; US PATENT D5,654,183; US PATENT D5,654,184; US PATENT D5,654,185; US PATENT D5,654,186; US PATENT D5,654,187; US PATENT D5,654,188; US PATENT D5,654,189; US PATENT D5,654,190; US PATENT D5,654,191; US PATENT D5,654,192; US PATENT D5,654,193; US PATENT D5,654,194; US PATENT D5,654,195; US PATENT D5,654,196; US PATENT D5,654,197; US PATENT D5,654,198; US PATENT D5,654,199; US PATENT D5,654,200.

USA PATENT D5,654,106

# solarEdge

SolarEdge Power Optimizer  
Module Add-On for North America

P300/ P320/ P370 / P400 / P405

UNIT	P300 (per diode module)	P320 (16 diode module)	P370 (per diode module)	P400 (16 diode module)	P405 (per diode module)
Max. Output Power (W)	300	320	370	400	405
Max. Output Current (A)	6.0	6.4	6.0	6.0	6.1
Max. Output Voltage (V)	50	50	61.7	61.7	67.5
Max. Input Current (A)	10	10	10	10	10
Max. Input Voltage (V)	17.5	17.5	17.5	17.5	17.5
Efficiency (%)	99.9	99.9	99.9	99.9	99.9
Operating Temperature (°C)	-40 to +125	-40 to +125	-40 to +125	-40 to +125	-40 to +125
Humidity (RH)	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100
Weight (kg)	0.08	0.08	0.08	0.08	0.08
Dimensions (mm)	100 x 100 x 10	100 x 100 x 10	100 x 100 x 10	100 x 100 x 10	100 x 100 x 10

MAXIMUM INPUT CURRENT TO OPERATING SOLAR MODULES  
MAXIMUM OUTPUT CURRENT TO OPERATING SOLAR MODULES  
MAXIMUM INPUT VOLTAGE TO OPERATING SOLAR MODULES

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MAXIMUM INPUT VOLTAGE TO OPERATING SOLAR MODULES

### CONTRACTOR

ENERBUIO GRID SERVICES



PHONE: 202.823.0163  
ADDRESS: 401 NEW YORK AVE NE  
WASHINGTON DC DISTRICT OF  
COLUMBIA, 20002

LIC. NO.: RMD 127919  
LIC. NO.:  
E.E. NO.:

UNEMPLOYED OR HAS  
UNEMPLOYMENT BENEFITS  
FEDERATION OF ELECTRICAL CONTRACTORS IN  
VIRGINIA OR US CONTRACTORS  
MAY NOT REGISTER TO WORK  
AS AN ELEC. CONTRACTOR.

NEW PV SYSTEM: 4,800 kWh

### DIGGS

### RESIDENCE

11 MONTGOMERY AVE  
TAKOMA PARK, MD 20912  
APN: 1310175820

### ENGINEER OF RECORD

PARALLEL 11-17 (2016)

RESOURCE DOCUMENT

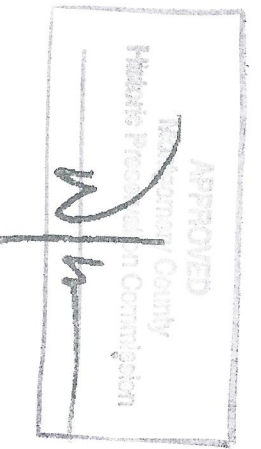
DATE: 11.2017

DESIGN BY: E.K.

CHECKED BY: M.M.

REVISIONS:

R-003.00  
GAMESA



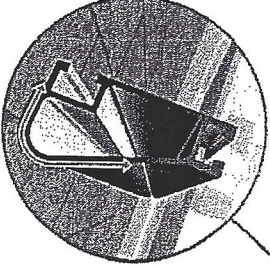
**IRONRIDGE**

**XR Rail Family**

Solar Is Not Always Sunny

Over their lifetimes, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

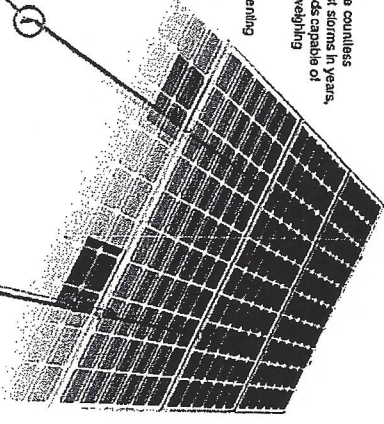
XR Rails are the structural backbone preventing these disasters. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their capacity spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.



**Force-Stabilizing Curves**  
 Force-stabilizing curves prevent solar panels from being lifted by wind. The curved shape of XR Rails is specially designed to increase strength in both tension and compression. The unique weather and a longer system lifetime.

**Compatible with Flat & Pitched Roofs**  
 XR Rails are compatible with flat and pitched roofs. XR Rails are compatible with other pitched roof applications.

**Corrosion-Resistant Materials**  
 All XR Rails are made of marine-grade aluminum alloy. Non-potential with an anodized finish. XR Rails provide a more attractive appearance.



**XR Rail Family**

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.



**XR10**  
 XR10 is a light, low-profile mounting rail designed for use with 100-watt solar panels. It features a 3-foot span, while retaining light and economical.

- 6' spanning capability
- Moderate load capacity
- Clear anodized finish
- Internal splices available



**XR100**  
 XR100 is the ultimate residential mounting rail. It's built to handle a range of wind and snow conditions. XR100 manufacturing spans up to 8 feet.

- 8' spanning capability
- Heavy load capacity
- Clear anodized finish
- Internal splices available



**XR1000**  
 XR1000 is a heavy-weight mounting rail designed for use with 300-watt solar panels. XR1000 manufacturing spans up to 12 feet.

- 12' spanning capability
- Extreme load capacity
- Clear anodized finish
- Internal splices available

**Rail Selection**

The following table was prepared in compliance with applicable engineering codes and standards. Values are based on the following criteria: ASCE 7-10, Roof Zone 1, Exposure B, Roof Slope of 7 to 27 degrees and Mean Building Height of 30 ft. Visit [ironridge.com](http://ironridge.com) for detailed span tables and connections.

Roof (ASCE 7-10)	Wind (ASCE 7-10)	Rail Span				
		4'	6'	8'	10'	12'
None	100					
	140	XR10				
	180		XR100			
10-20	100					
	140					
	180					
30	100					
	140					
	180					
40	100					
	140					
	180					
50-70	100					
	140					
	180					
80-100	100					
	140					
	180					



**CONTRACTOR**

ENERBIO GRID SERVICES

PHONE: 202.763.8103  
 ADDRESS: 401 NEW YORK AVE NE  
 WASHINGTON, DC DISTRICT OF  
 COLUMBIA, 20002

L.C. NO.: IHC 22719

H.C. NO.:  
 E.L.E. NO.:

UNAPPROVED USE OF THIS DOCUMENT FOR ANY OTHER PROJECT OR FOR ANY OTHER JURISDICTION IS STRICTLY PROHIBITED. ANY SUCH USE WILL BE SUBJECT TO CIVIL DAMAGES AND PENALTIES.

NEW PV SYSTEM: 4,800 KWP

**DIGGS**

**RESIDENCE**

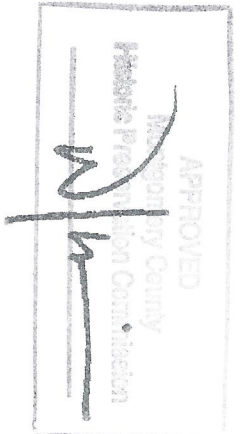
11 MONTGOMERY AVE  
 TAKOMA PARK, MD 20912  
 APN: 1301075820

**ENGINEER OF RECORD**

DATE: 11.13.17  
 DESIGN BY: EN  
 CHECKED BY: ALL  
 REVISIONS:  
 RESOURCE DOCUMENT  
 PWS 2016 11-17 (M&S) BY

**R-004.00**

SHEET 13



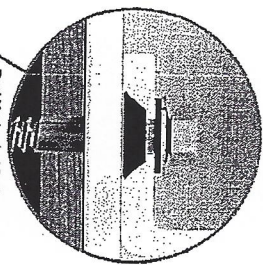
# IRONRIDGE

## Rapid & Secure Solar Attachments

Ironridge FlashFoot™ is an all-in-one solar mounting product for composition shingle roofs that eliminates the need for separate stands, flashings, and L-feet.

FlashFoot incorporates a number of structural and waterproofing features to securely attach Ironridge Rails to roof structures, while also protecting against water intrusion and washer damage.

# FlashFoot™



**Dual Mechanical Seal**  
At the core of the FlashFoot is a pre-installed rubber bonding foam & dual mechanical seal, with its outer compressed spring layer providing a secondary seal. The bonding foam wrapping secured the state of the lig line.

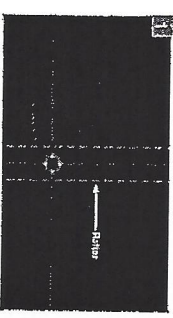


**Lead Datasheet Plate**  
A lead datasheet plate is included with each FlashFoot installation to document the FlashFoot's structural design and prevent any abatement of the leading during installation.

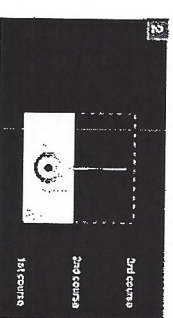
**Water Shedding Design**  
An elevated leading position minimizes the FlashFoot's water shedding ability.

## Installation Overview

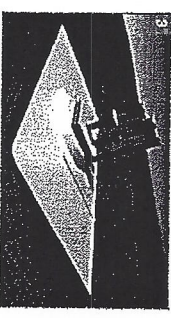
Tools: Framing tape measure, chalk line, stud finder, roofing bar, caulking gun with an approved sealant, drill with 1/4" bit and 1/2" socket.



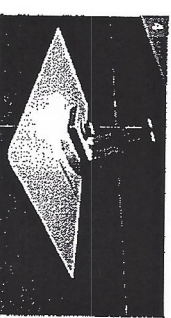
1. Locate rafters and snip vertical and horizontal lines to mark locations of flashings. Drill 1/4" pilot holes, then install with an approved sealant.



2. Slide flashing, between 1st and 2nd course, so the lip is at least 3/4" above the edge of the 3rd course and the bottom is above the edge of the 1st course.



3. Line up pilot hole with flashing hole and feed lag bolt through bonded washer, L-Foot, and flashing. Tighten lag bolt until fully seated.

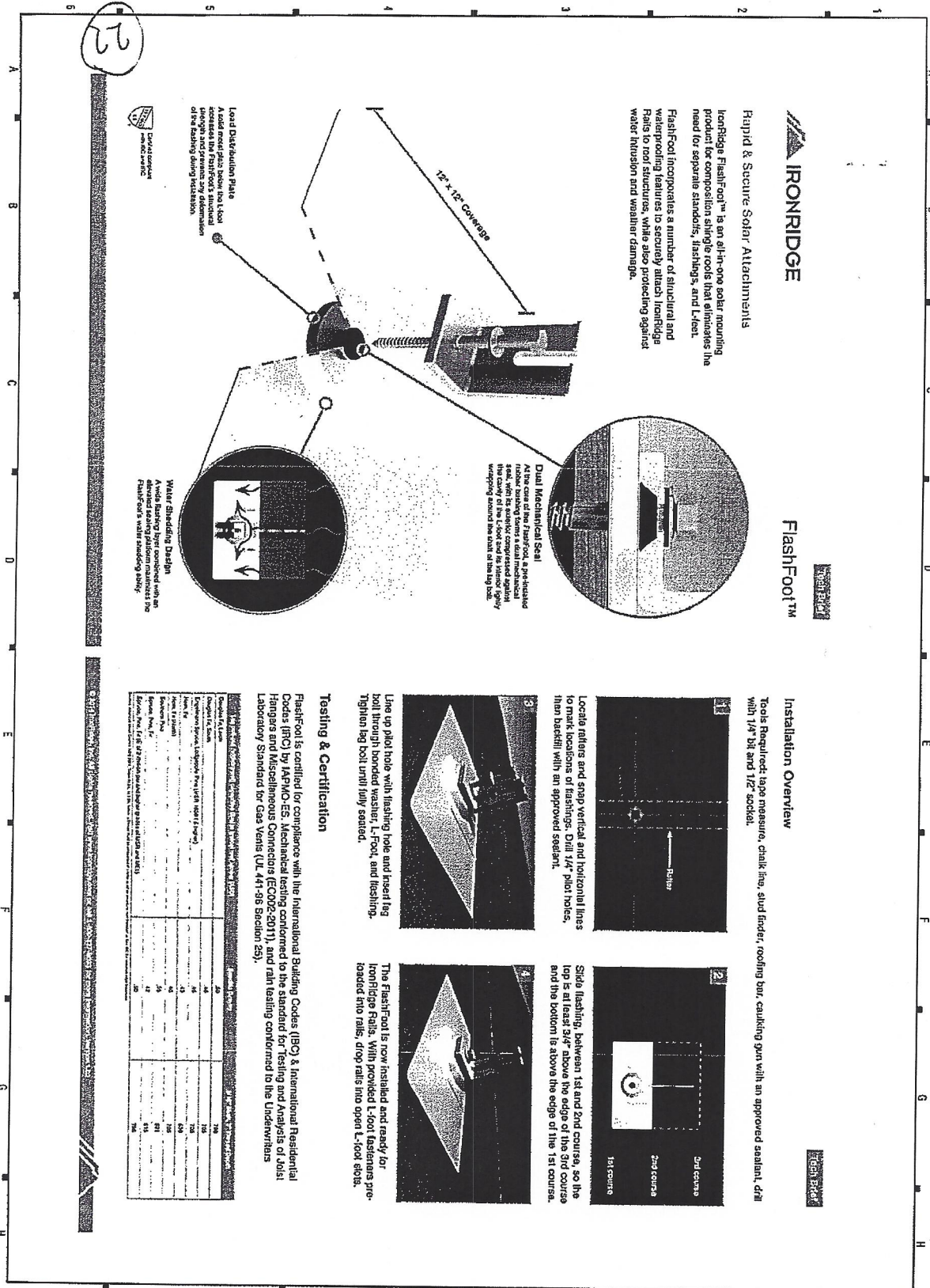


4. The FlashFoot is now installed and ready for IronRidge Rails. With provided L-Foot fasteners pre-installed into rails, drop rails into open L-Foot slots.

## Testing & Certification

FlashFoot is certified for compliance with the International Building Codes (IBC) & International Residential Codes (IRC) by IAPMO-ES. Mechanical components are certified to the standard for Testing and Analysis of Joints (TAPAC) by IAPMO-ES. Components are also certified to the standard for Testing and Analysis of Joints (TAPAC) by IAPMO-ES. Components are also certified to the standard for Testing and Analysis of Joints (TAPAC) by IAPMO-ES.

Test Name	Standard	Pass/Fail
Wind Uplift	ICC-ES ESR-1111	Pass
Static Load	ICC-ES ESR-1111	Pass
Dynamic Load	ICC-ES ESR-1111	Pass
Seismic	ICC-ES ESR-1111	Pass
Water Penetration	ICC-ES ESR-1111	Pass
Impact	ICC-ES ESR-1111	Pass
Fire Resistance	ICC-ES ESR-1111	Pass
Corrosion	ICC-ES ESR-1111	Pass
Temperature Fluctuation	ICC-ES ESR-1111	Pass
UV Radiation	ICC-ES ESR-1111	Pass
Acid Rain	ICC-ES ESR-1111	Pass
Alkaline Rain	ICC-ES ESR-1111	Pass
Soil Salinity	ICC-ES ESR-1111	Pass
Freeze/Thaw	ICC-ES ESR-1111	Pass
Deicing Chemicals	ICC-ES ESR-1111	Pass
Microbial Growth	ICC-ES ESR-1111	Pass
Radon Gas	ICC-ES ESR-1111	Pass
Lead	ICC-ES ESR-1111	Pass
Asbestos	ICC-ES ESR-1111	Pass
Flammability	ICC-ES ESR-1111	Pass
Smoke Density	ICC-ES ESR-1111	Pass
Acoustic Performance	ICC-ES ESR-1111	Pass
Electromagnetic Interference	ICC-ES ESR-1111	Pass
Electromagnetic Compatibility	ICC-ES ESR-1111	Pass
Energy Efficiency	ICC-ES ESR-1111	Pass
Green Building	ICC-ES ESR-1111	Pass
Health and Safety	ICC-ES ESR-1111	Pass
Accessibility	ICC-ES ESR-1111	Pass
Historic Preservation	ICC-ES ESR-1111	Pass
Archaeology	ICC-ES ESR-1111	Pass
Historic Landmarks	ICC-ES ESR-1111	Pass
Historic Districts	ICC-ES ESR-1111	Pass
Historic Sites	ICC-ES ESR-1111	Pass
Historic Structures	ICC-ES ESR-1111	Pass
Historic Landscapes	ICC-ES ESR-1111	Pass
Historic Gardens	ICC-ES ESR-1111	Pass
Historic Parks	ICC-ES ESR-1111	Pass
Historic Monuments	ICC-ES ESR-1111	Pass
Historic Landmarks	ICC-ES ESR-1111	Pass
Historic Districts	ICC-ES ESR-1111	Pass
Historic Sites	ICC-ES ESR-1111	Pass
Historic Structures	ICC-ES ESR-1111	Pass
Historic Landscapes	ICC-ES ESR-1111	Pass
Historic Gardens	ICC-ES ESR-1111	Pass
Historic Parks	ICC-ES ESR-1111	Pass
Historic Monuments	ICC-ES ESR-1111	Pass



## CONTRACTOR

ENERBIU GRID SERVICES  
 PHONE: 2026125463  
 ADDRESS: 401 NEW YORK AVE NE  
 WASHINGTON DC DISTRICT OF  
 COLUMBIA 20002  
 LIC. NO.: MARC 12319  
 ELEC. NO.:

## ENGINEER OF RECORD

NEW PV SYSTEM: 4,800 WHP  
**DIGGS**  
 11 MONTGOMERY AVE  
 TAKOMA PARK, MD 20912  
 APN: 1301075829

## RESOURCE DOCUMENT

DATE: 11.2017  
 DESIGN BY: E.M.  
 CHECKED BY: M.M.  
 REVISIONS:  
**R-005.00**  
 (PAGE 14)