

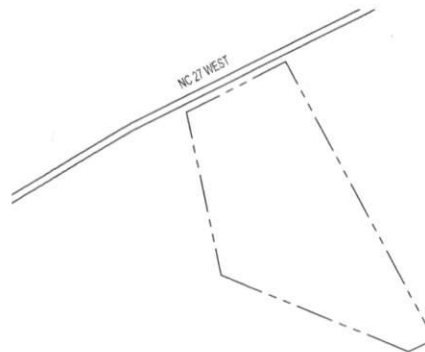
GENERAL NOTES

NEW PV SYSTEM: 7.440 kWp
JOHNSON RESIDENCE

7695 NC 27 WEST,
 LILLINGTON, NC 27546
 ASSESSOR'S #: 130528015703



01 AERIAL PHOTO
 NOT TO SCALE



02 PLAT MAP
 NOT TO SCALE

- 1.1.1 **PROJECT NOTES:**
- 1.1.2 THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (NEC) ARTICLE 690, ALL MANUFACTURER'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION'S (AHJ) 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. PV MODULES: UL1703, IEC61730, AND IEC61215, AND NFPA 70 CLASS C FIRE INVERTERS: UL 1741 CERTIFIED, IEEE 1547, 929, 519 COMBINER BOX(ES): UL 1703 OR UL 1741 ACCESSORY
- 1.1.5 MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VDC, IF UNAVAILABLE, MAX DC VOLTAGE CALCULATED ACCORDING TO NEC 690.7.
- 1.1.6 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]
- 1.1.7 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 AHJ.
- 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 ONSITE 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 - SNAP N RACK ULTRA RAIL COMP KIT
- 1.3.3 PV RACKING SYSTEM INSTALLATION - SNAP N RACK UR-40
- 1.3.4 PV MODULE AND INVERTER INSTALLATION - SILFAB SLA 310W SOLAR EDGE SE7600H-US (240V)
- 1.3.5 PV EQUIPMENT GROUNDING
- 1.3.6 PV SYSTEM WIRING TO A ROOF-MOUNTED SOLADECK 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 FINAL 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: 24 X 310W = 7.440KW
 PTC: 24 X 283.9W = 6.814KW DC
 (24) SILFAB SLA310M
 (1) SOLAR EDGE SE7600H-US (240V)

ATTACHMENT TYPE: SNAP N RACK ULTRA RAIL COMP KIT
 MSP UPGRADE: NO

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-601	LINE DIAGRAM
E-602	DESIGN TABLES
E-603	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: LELAND JOHNSON

PROJECT MANAGER
 NAME: DARREN QUELETTE
 PHONE: 9194592846

CONTRACTOR
 NAME: YES SOLAR SOLUTIONS
 PHONE: 9194592846

AUTHORITIES HAVING JURISDICTION
 BUILDING: HARNETT COUNTY
 ZONING: HARNETT COUNTY
 UTILITY: DUKE ENERGY PROGRESS

DESIGN SPECIFICATIONS
 OCCUPANCY: II
 CONSTRUCTION: SINGLE-FAMILY RESIDENTIAL
 ZONING: RESIDENTIAL
 GROUND SNOW LOAD: 10 PSF
 WIND EXPOSURE: C
 WIND SPEED: 115 MPH

APPLICABLE CODES & STANDARDS
 BUILDING: NCSBC 2018 NCSRC 2018
 ELECTRICAL: NEC 2017
 FIRE: NCFC 2018



CONTRACTOR

YES SOLAR SOLUTIONS

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DATE: 10.21.2019

DESIGN BY: Y.R.

CHECKED BY: M.M.

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(SHEET 1)

	A	B	C	D	E	F	G	H
2.1.1	SITE NOTES:			2.4.9	THE GROUNDING ELECTRODE SYSTEM COMPLIES WITH NEC 690.47 AND NEC 250.50 THROUGH 250.106. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, A	2.7.5	PV WIRE BLACK WIRE MAY BE FIELD-MARKED WHITE [NEC 200.6 (A)(6)].	
2.1.2	A LADDER WILL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.				GROUNDING ELECTRODE SYSTEM PROVIDED ACCORDING TO NEC 250, NEC 690.47 AND AHJ.	2.7.6	MODULE WIRING SHALL BE LOCATED AND SECURED UNDER THE ARRAY.	
2.1.3	THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.			2.4.10	DC PV ARRAYS SHALL BE PROVIDED WITH DC GROUND-FAULT PROTECTION MEETING THE REQUIREMENTS OF 690.41(B)(1) AND (2) TO REDUCE FIRE HAZARDS	2.7.7	ACCORDING TO NEC 200.7, UNGROUNDED SYSTEMS DC CONDUCTORS COLORED OR MARKED AS FOLLOWS:	
2.1.4	THE SOLAR PV INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.						DC POSITIVE- RED, OR OTHER COLOR EXCLUDING WHITE, GREY AND GREEN	
2.1.5	PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION NEC 110.26.			2.5.1	INTERCONNECTION NOTES:		DC NEGATIVE- BLACK, OR OTHER COLOR EXCLUDING WHITE, GREY AND GREEN	
2.1.6	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.			2.5.2	LOAD-SIDE INTERCONNECTION SHALL BE IN ACCORDANCE WITH [NEC 705.12 (B)]	2.7.8	AC CONDUCTORS COLORED OR MARKED AS FOLLOWS:	
				2.5.3	THE SUM OF THE UTILITY OCPD AND INVERTER CONTINUOUS OUTPUT MAY NOT EXCEED 120% OF BUSBAR RATING [NEC 705.12(B)(2)(3)].		PHASE A OR L1- BLACK	
				2.5.4	THE SUM OF 125 PERCENT OF THE POWER SOURCE(S) OUTPUT CIRCUIT CURRENT AND THE RATING OF THE OVERCURRENT DEVICE PROTECTING THE BUSBAR SHALL NOT EXCEED 120 PERCENT OF THE AMPACITY OF THE BUSBAR. PV DEDICATED BACKFEED BREAKERS MUST BE LOCATED OPPOSITE END OF THE BUS FROM THE UTILITY SOURCE OCPD [NEC 705.12(B)(2)(3)].		PHASE B OR L2- RED, OR OTHER CONVENTION IF THREE PHASE	
2.2.1	EQUIPMENT LOCATIONS				AT MULTIPLE ELECTRIC POWER SOURCES OUTPUT COMBINER PANEL, TOTAL RATING OF ALL OVERCURRENT DEVICES SHALL NOT EXCEED AMPACITY OF BUSBAR. HOWEVER, THE COMBINED OVERCURRENT DEVICE MAY BE EXCLUDED ACCORDING TO NEC 705.12 (B)(2)(3)(C).		PHASE C OR L3- BLUE, YELLOW, ORANGE, OR OTHER CONVENTION	
2.2.2	ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY NEC 110.26.				FEEDER TAP INTERCONNECTION (LOAD SIDE) ACCORDING TO NEC 705.12 (B)(2)(1)		NEUTRAL- WHITE OR GREY	
2.2.3	WIRING SYSTEMS INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC 690.31 (A),(C) AND NEC TABLES 310.15 (B)(2)(A) AND 310.15 (B)(3)(C).			2.5.5	SUPPLY SIDE TAP INTERCONNECTION ACCORDING TO NEC 705.12 (A) WITH SERVICE ENTRANCE CONDUCTORS IN ACCORDANCE WITH NEC 230.42		* IN 4-WIRE DELTA CONNECTED SYSTEMS THE PHASE WITH HIGHER VOLTAGE TO BE MARKED ORANGE [NEC 110.15].	
2.2.3	JUNCTION AND PULL BOXES PERMITTED INSTALLED UNDER PV MODULES ACCORDING TO NEC 690.34.			2.5.6	BACKFEEDING BREAKER FOR ELECTRIC POWER SOURCES OUTPUT IS EXEMPT FROM ADDITIONAL FASTENING [NEC 705.12 (B)(5)].			
2.2.4	ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVICING DISCONNECT.			2.5.7				
2.2.5	ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES.			2.5.8				
2.2.6	ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.							
2.3.1	STRUCTURAL NOTES:			2.6.1	DISCONNECTION AND OVER-CURRENT PROTECTION NOTES:			
2.3.2	RACKING SYSTEM & PV ARRAY WILL BE INSTALLED ACCORDING TO CODE-COMPLIANT INSTALLATION MANUAL. TOP CLAMPS REQUIRE A DESIGNATED SPACE BETWEEN MODULES, AND RAILS MUST ALSO EXTEND A MINIMUM DISTANCE BEYOND EITHER EDGE OF THE ARRAY/SUBARRAY, ACCORDING TO RAIL MANUFACTURER'S INSTRUCTIONS.			2.6.2	DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING ENERGIZED ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS).			
2.3.3	JUNCTION BOX WILL BE INSTALLED PER MANUFACTURERS' SPECIFICATIONS. IF ROOF-PENETRATING TYPE, IT SHALL BE FLASHED & SEALED PER LOCAL REQUIREMENTS.			2.6.3	DISCONNECTS TO BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL. BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH.			
2.3.4	ROOFTOP PENETRATIONS FOR PV RACEWAY WILL BE COMPLETED AND SEALED W/ APPROVED CHEMICAL SEALANT PER CODE BY A LICENSED CONTRACTOR.			2.6.4	BOTH POSITIVE AND NEGATIVE PV CONDUCTORS ARE UNGROUNDED. THEREFORE BOTH MUST OPEN WHERE A DISCONNECT IS REQUIRED, ACCORDING TO NEC 690.13.			
2.3.5	ALL PV RELATED ROOF ATTACHMENTS TO BE SPACED NO GREATER THAN THE SPAN DISTANCE SPECIFIED BY THE RACKING MANUFACTURER.			2.6.5	ISOLATING DEVICES OR EQUIPMENT DISCONNECTING MEANS SHALL BE INSTALLED IN CIRCUITS CONNECTED TO EQUIPMENT AT A LOCATION WITHIN THE EQUIPMENT, OR WITHIN SIGHT AND WITHIN 10 FT OF THE EQUIPMENT. AN EQUIPMENT DISCONNECTING MEANS SHALL BE PERMITTED TO BE REMOTE FROM THE EQUIPMENT WHERE THE EQUIPMENT DISCONNECTING MEANS CAN BE REMOTELY OPERATED FROM WITHIN 10 FT OF THE EQUIPMENT, ACCORDING TO NEC 690.15 (A).			
2.3.6	WHEN POSSIBLE, ALL PV RELATED RACKING ATTACHMENTS WILL BE STAGGERED AMONGST THE ROOF FRAMING MEMBERS.			2.6.6	PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION TO REDUCE SHOCK HAZARD FOR EMERGENCY RESPONDERS IN ACCORDANCE WITH 690.12(A) THROUGH (D)			
2.4.1	GROUNDING NOTES:			2.6.7	ALL OCPD RATINGS AND TYPES SPECIFIED ACCORDING TO NEC 690.8, 690.9, AND 240.			
2.4.2	GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVICES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR SUCH USE.			2.6.8	BOTH POSITIVE AND NEGATIVE PV CONDUCTORS ARE UNGROUNDED. THEREFORE BOTH REQUIRE OVER-CURRENT PROTECTION, ACCORDING TO NEC 240.21. (SEE EXCEPTION IN NEC 690.9)			
2.4.3	PV SYSTEMS REQUIRE AN EQUIPMENT GROUNDING CONDUCTOR. ALL METAL ELECTRICAL EQUIPMENT AND STRUCTURAL COMPONENTS BONDED TO GROUND, IN ACCORDANCE WITH 250.134 OR 250.136(A). ONLY THE DC CONDUCTORS ARE UNGROUNDED.			2.6.9	IF REQUIRED BY AHJ, SYSTEM WILL INCLUDE ARC-FAULT CIRCUIT PROTECTION ACCORDING TO NEC 690.11 AND UL1699B.			
2.4.4	PV EQUIPMENT SHALL BE GROUNDED ACCORDING TO NEC 690.43 AND MINIMUM NEC TABLE 250.122.			2.7.1	WIRING & CONDUIT NOTES:			
2.4.5	METAL PARTS OF MODULE FRAMES, MODULE RACKING, AND ENCLOSURE CONSIDERED GROUNDED IN ACCORD WITH 250.134 AND 250.136(A).			2.7.2	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.			
2.4.6	EACH MODULE WILL BE GROUNDED USING WEBB GROUNDING CLIPS AS SHOWN IN MANUFACTURER DOCUMENTATION AND APPROVED BY THE AHJ. IF WEBBS ARE NOT USED, MODULE GROUNDING LUGS MUST BE INSTALLED AT THE SPECIFIED GROUNDING LUG HOLES PER THE MANUFACTURERS' INSTALLATION REQUIREMENTS.			2.7.3	ALL CONDUCTORS SIZED ACCORDING TO NEC 690.8, NEC 690.7.			
2.4.7	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.			2.7.4	EXPOSED PV SOURCE CIRCUITS AND OUTPUT CIRCUITS SHALL USE WIRE LISTED AND IDENTIFIED AS PHOTOVOLTAIC (PV) WIRE [690.31 (C)]. PV MODULES WIRE LEADS SHALL BE LISTED FOR USE ON PV ARRAYS, ACCORDING TO NEC 690.31 (A).			
2.4.8	GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLORED GREEN OR MARKED GREEN IF #4 AWG OR LARGER [NEC 250.119]							



CONTRACTOR

YES SOLAR SOLUTIONS

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 CARY, NC 27513

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 HIC. NO.:
 ELE. NO.:

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NEW PV SYSTEM: 7.440 kWp

JOHNSON RESIDENCE

7695 NC 27 WEST,
 LILLINGTON, NC 27546
 APN: 130528015703

ENGINEER OF RECORD

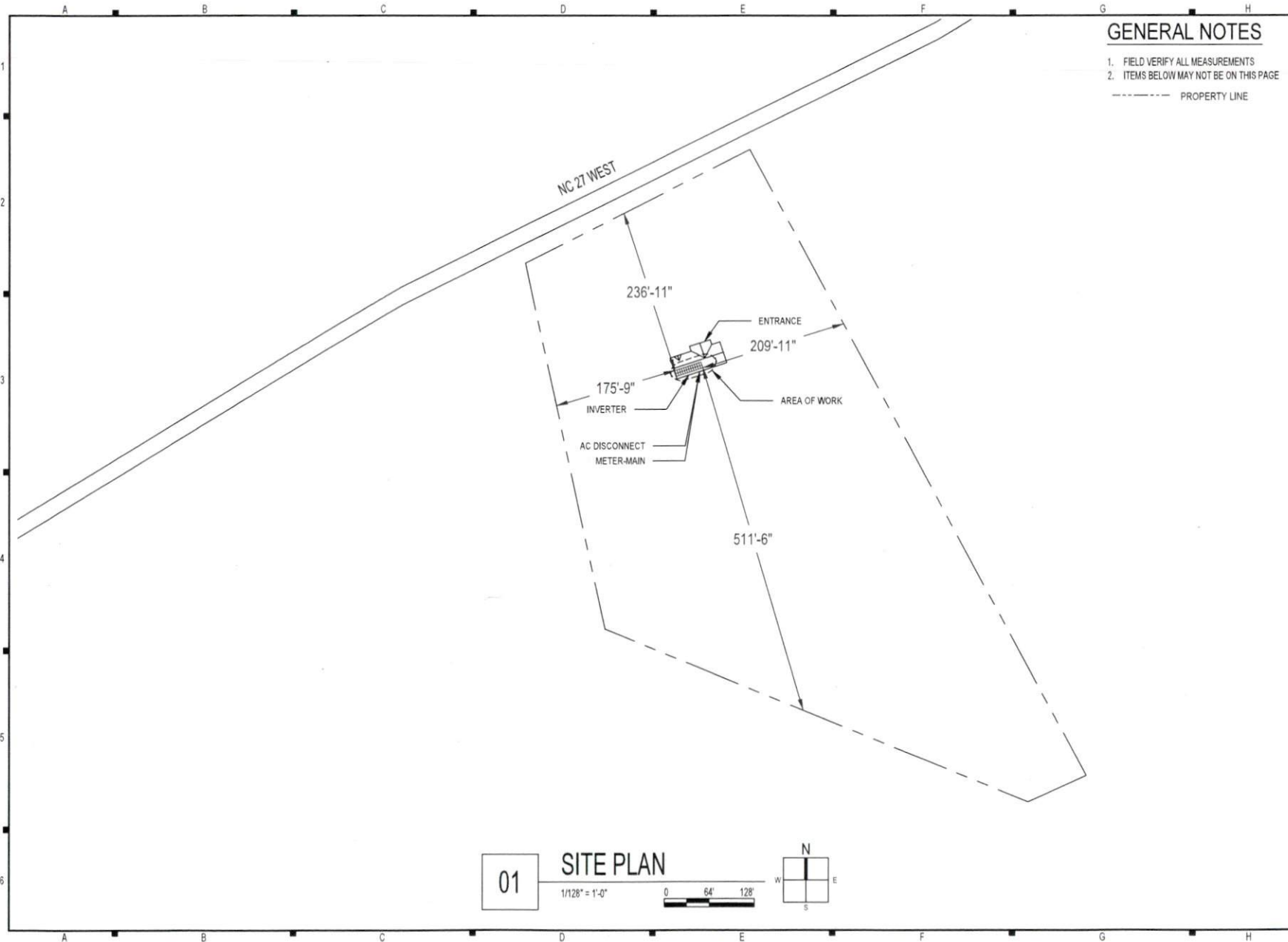
PAPER SIZE: 11" x 17" (ANSI B)

NOTES

DATE: 10.21.2019
 DESIGN BY: Y.R.
 CHECKED BY: M.M.

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G-001.00
 (SHEET 2)



GENERAL NOTES

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



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SITE PLAN

DATE: 10.21.2019

DESIGN BY: Y.R.

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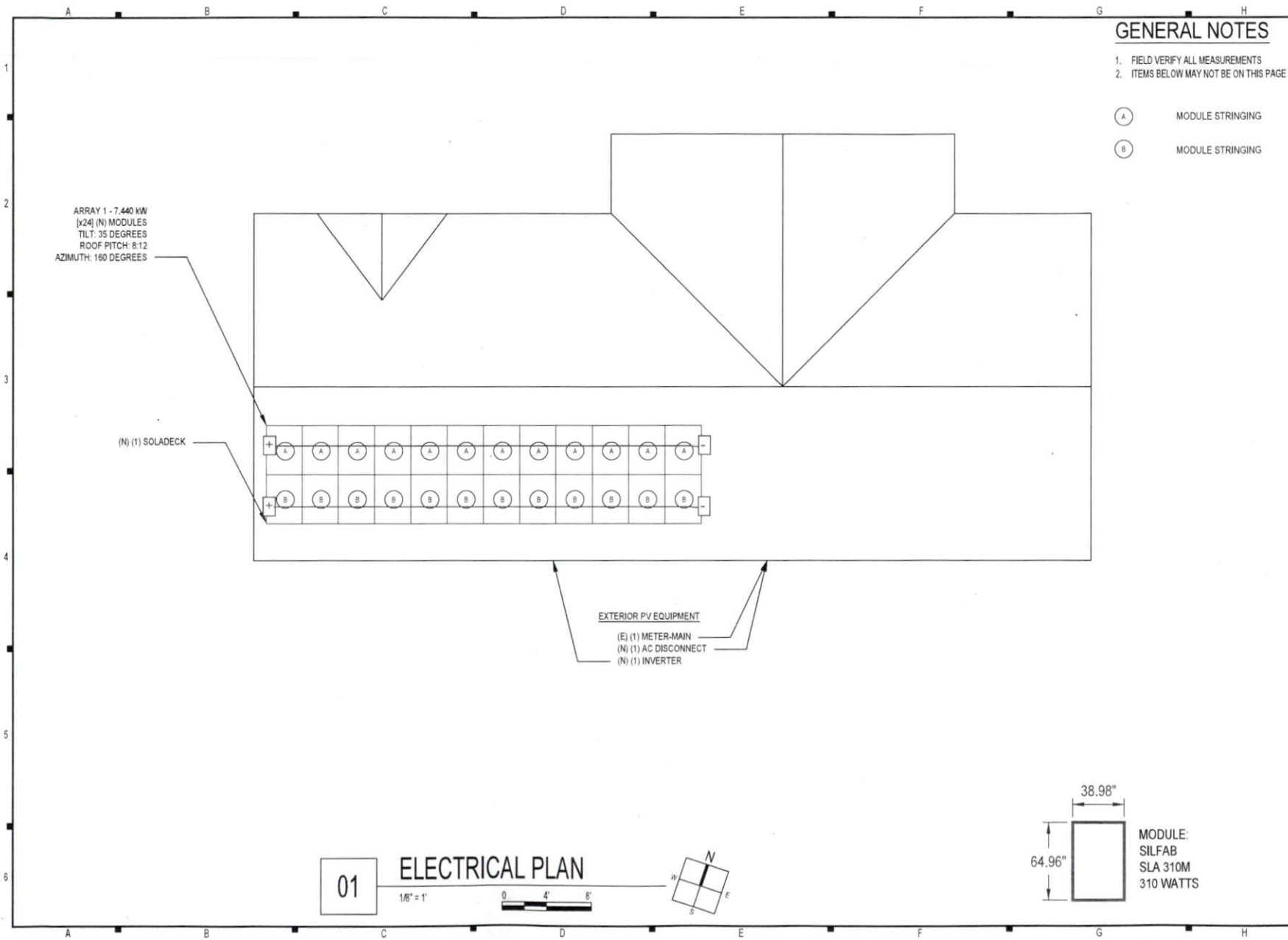
(SHEET 3)

01 SITE PLAN

1/128" = 1'-0"

0 64' 128'





GENERAL NOTES

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- (A) MODULE STRINGING
- (B) MODULE STRINGING



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ELECTRICAL PLAN

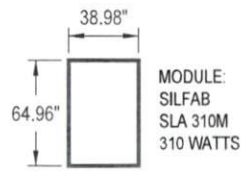
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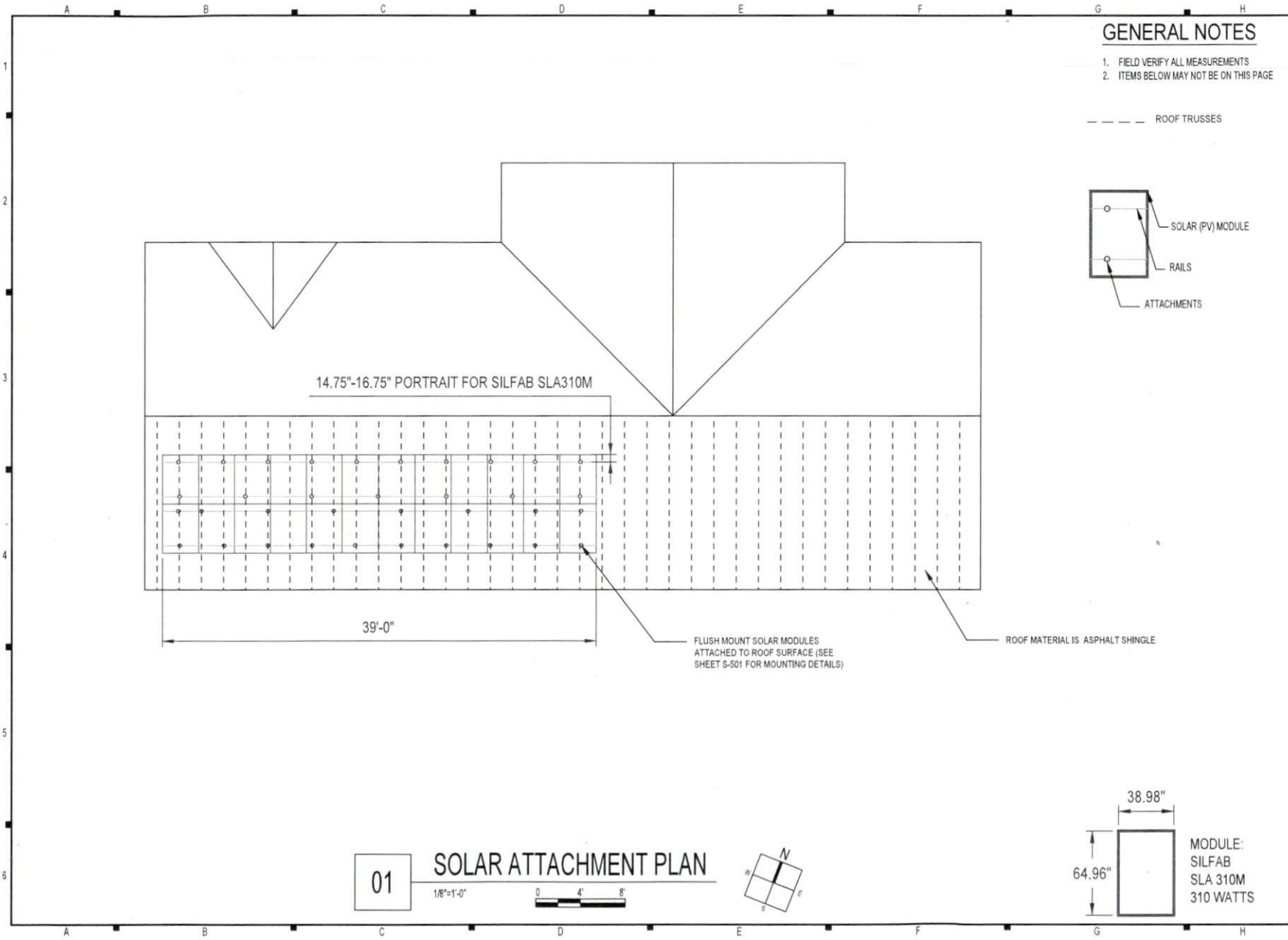
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01 ELECTRICAL PLAN
 1/8" = 1'

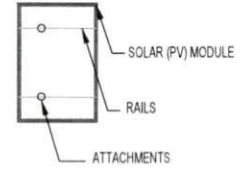




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--- ROOF TRUSSES



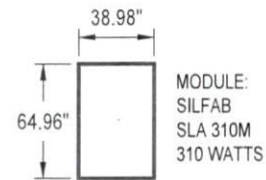
14.75"-16.75" PORTRAIT FOR SILFAB SLA310M

39'-0"

FLUSH MOUNT SOLAR MODULES
ATTACHED TO ROOF SURFACE (SEE
SHEET S-501 FOR MOUNTING DETAILS)

ROOF MATERIAL IS ASPHALT SHINGLE

01 **SOLAR ATTACHMENT PLAN**
1/8"=1'-0"



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SOLAR ATTACHMENT PLAN

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DESIGN BY: Y.R.

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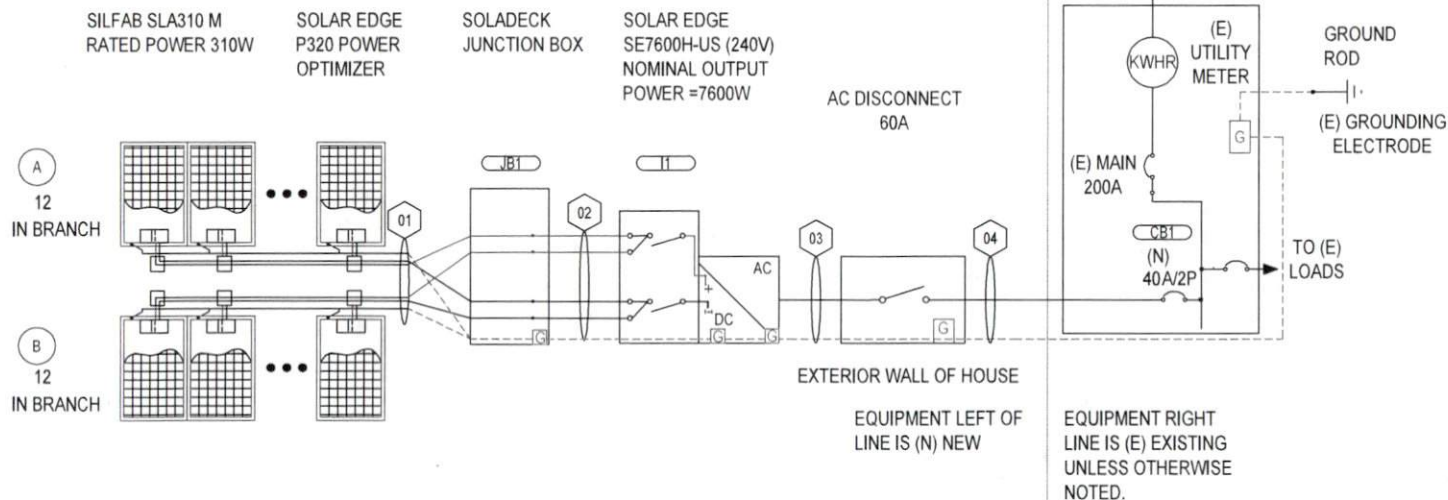
(SHEET 5)

CONDUCTOR AND CONDUIT SCHEDULE W/ELECTRICAL CALCULATIONS

ID	TYPICAL	CONDUCTOR	CONDUIT	CURRENT-CARRYING CONDUCTORS IN CONDUIT	OCPD	EGC	TEMP. CORR. FACTOR	CONDUIT FILL FACTOR	CONT. CURRENT	MAX. CURRENT (125%)	BASE AMP.	DERATED AMP.	TERM. TEMP. RATING	AMP. @ TERMINAL
D1	2	10 AWG PV WIRE, COPPER	FREE AIR	2	N/A	6 AWG BARE, COPPER	0.71 (59.1°C)	1	15A	18.75A	55A	39.05A	75°C	50A
D2	1	10 AWG THWN-2, COPPER	0.5" DIA EMT	4	N/A	10 AWG THWN-2, COPPER	0.71 (59.1°C)	0.8	15A	18.75A	40A	22.72A	75°C	35A
D3	1	8 AWG THWN-2, COPPER	0.75" DIA EMT	2	40A	10 AWG THWN-2, COPPER	0.91 (37.1°C)	1	32A	40A	55A	50.05A	75°C	50A
D4	1	8 AWG THWN-2, COPPER	0.75" DIA EMT	2	N/A	10 AWG THWN-2, COPPER	0.91 (37.1°C)	1	32A	40A	55A	50.05A	75°C	50A

- (A) MODULE STRINGING
- (B) MODULE STRINGING

PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN AND COMPLIANT WITH NEC 690.12



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

TO UTILITY GRID (UG)

GROUND ROD
 (E) GROUNDING ELECTRODE

TO (E) LOADS

EXTERIOR WALL OF HOUSE
 EQUIPMENT LEFT OF
 LINE IS (N) NEW

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

PROJECT DETAILS

PROJECT OWNER: LELAND JOHNSON
 PROJECT NAME: JOHNSON RESIDENCE
 PROJECT ADDRESS: 7695 NC 27 WEST, LILLINGTON, NC 27546
 METERING ARRANGEMENT: NET METERING/BILLING



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LINE DIAGRAM

DATE: 10.21.2019
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CONTRACTOR

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DESIGN TABLES

DATE: 10.21.2019

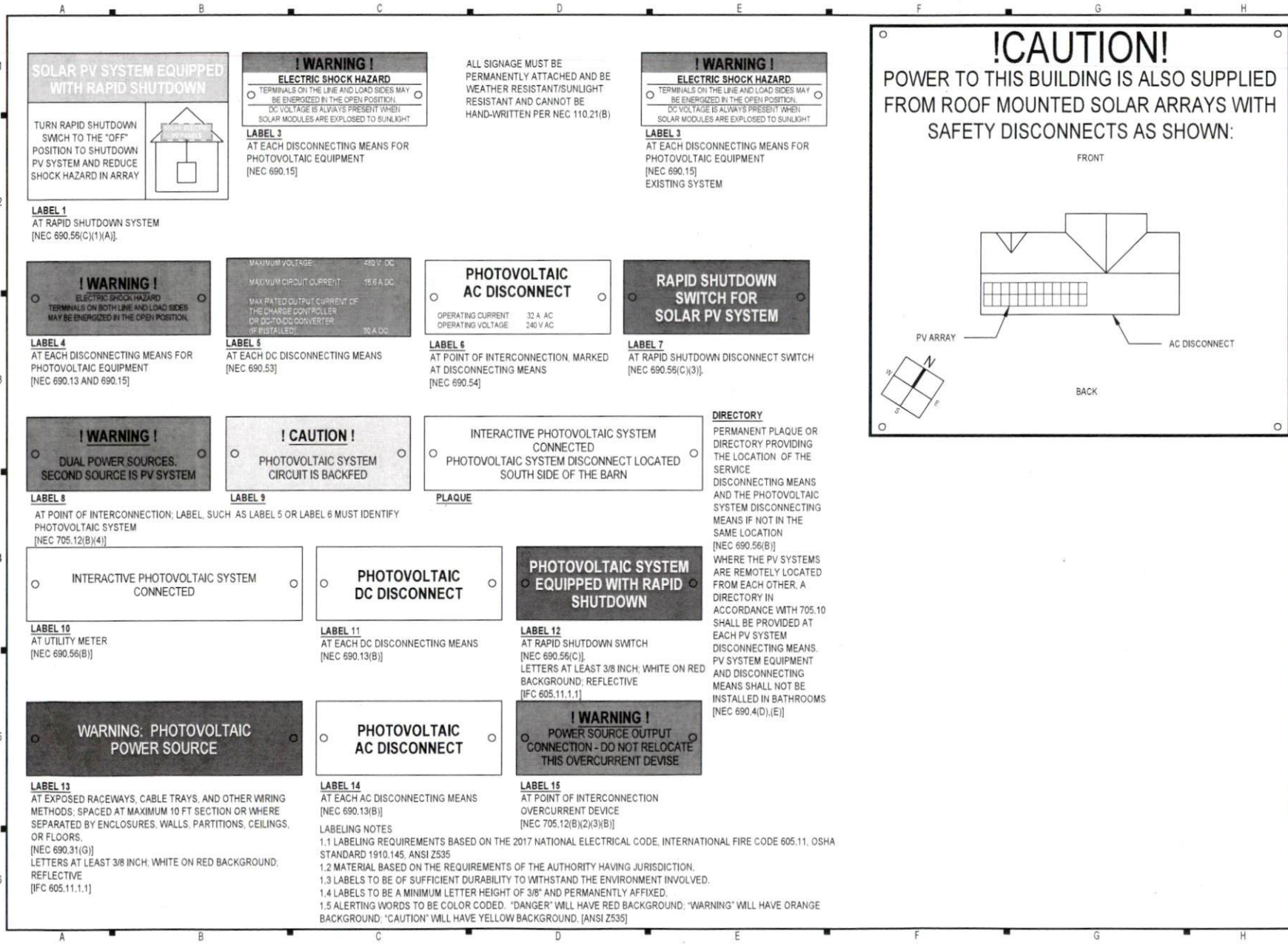
DESIGN BY: Y.R.

CHECKED BY: M.M.

REVISIONS

E-602.00
 (SHEET 7)

SYSTEM SUMMARY			MODULES										
	STRING #1	STRING #2	REF.	QTY.	MAKE AND MODEL	P _{MAX}	PTC	ISC	IMP	VOC	VMP	TEMP. COEFF. OF VOC	FUSE RATING
POWERBOX MAX OUTPUT CURRENT	15A	15A	PM1-24	24	SILFAB SLA310M	310W	283.9W	9.93A	9.38A	40.25V	33.05V	-0.121V/°C (-0.3%/°C)	15A
OPTIMIZERS IN SERIES	12	12											
NOMINAL STRING VOLTAGE	400V	400V											
ARRAY OPERATING CURRENT	9.3A	9.3A											
ARRAY STC POWER	7,440W												
ARRAY PTC POWER	6,814W												
MAX AC CURRENT	32A												
MAX AC POWER	7,600W												
DERATED (CEC) AC POWER	6,665W												
DESIGN TEMPERATURES			POWER OPTIMIZERS										
			REF.	QTY.	MODEL	RATED INPUT POWER	MAX OUTPUT CURRENT	MAX INPUT ISC	MAX DC VOLTAGE	WEIGHTED EFFICIENCY			
ASHRAE EXTREME LOW	-11.1°C (12.0°F), SOURCE: HARTNETT COUNTY (35.38°; -78.73°)		PO1-24	24	SOLAR EDGE P320	320W	15A	11A	48V	98.8%			
ASHRAE 2% HIGH	37.1°C (98.8°F), SOURCE: HARTNETT COUNTY (35.38°; -78.73°)												
			INVERTERS										
			REF.	QTY.	MAKE AND MODEL	AC VOLTAGE	GROUND	OCPD RATING	RATED POWER	MAX OUTPUT CURRENT	MAX INPUT CURRENT	MAX INPUT VOLTAGE	CEC WEIGHTED EFFICIENCY
			I1	1	SOLAR EDGE SE7600H-US (240V)	240V	FLOATING	40A	7600W	32A	20A	480V	99.0%
			DISCONNECTS					OCPDS					
			REF.	QTY.	MAKE AND MODEL	RATED CURRENT	MAX RATED VOLTAGE	REF.	QTY.	RATED CURRENT	MAX VOLTAGE		
			SW1	1	EATON DG222URB OR EQUIV.	60A	240VAC	CB1	1	40A	240VAC		



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ADDRESS: 202 NORTH DIXON AVENUE
CARY, NC 27513
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NEW PV SYSTEM: 7.440 kWp

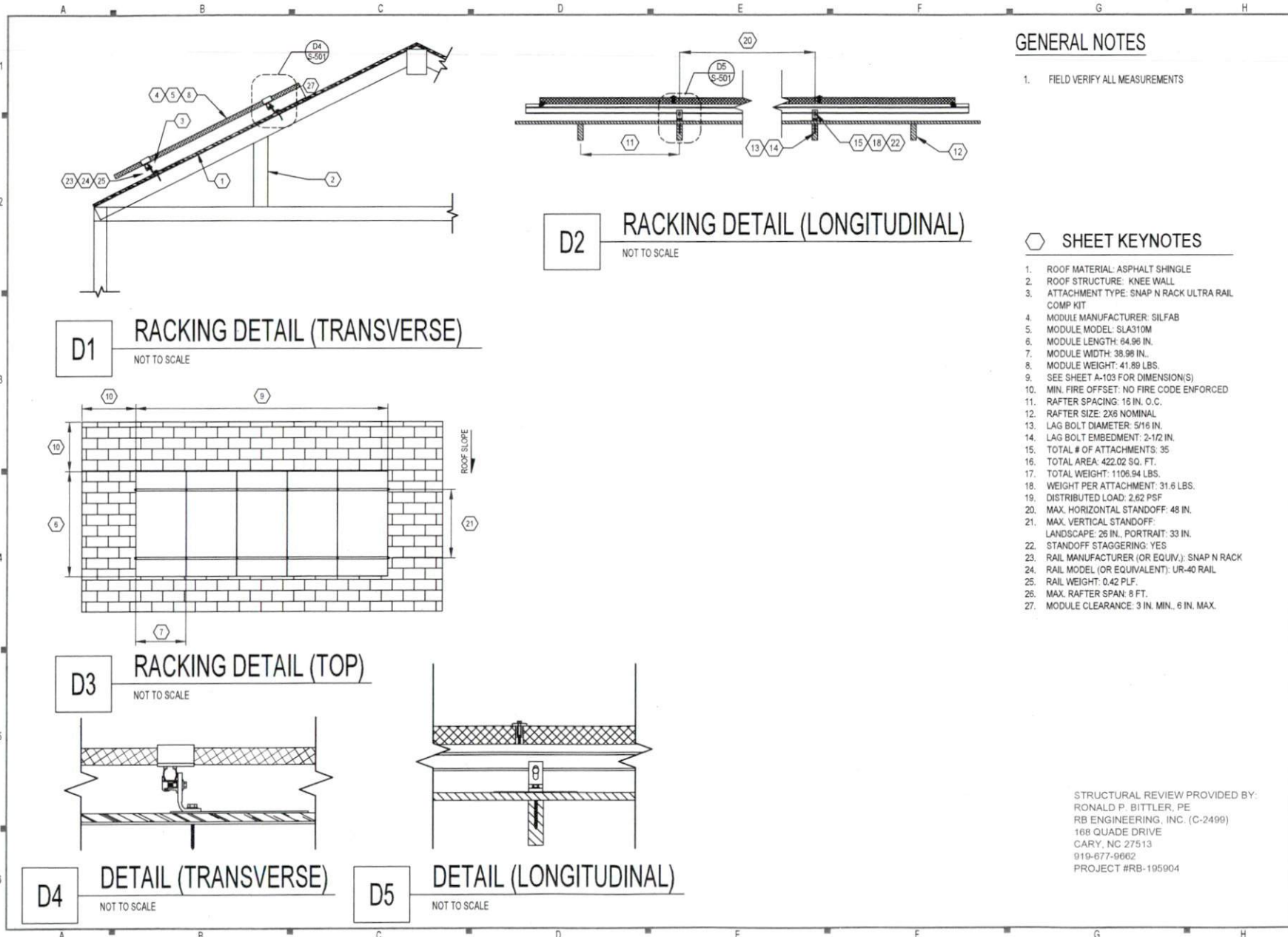
JOHNSON RESIDENCE
7695 NC 27 WEST,
LILLINGTON, NC 27546
APN: 130528015703

ENGINEER OF RECORD

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

DATE: 10.21.2019
DESIGN BY: Y.R.
CHECKED BY: M.M.
REVISIONS

E-603.00
(SHEET 8)



GENERAL NOTES

1. FIELD VERIFY ALL MEASUREMENTS

SHEET KEYNOTES

1. ROOF MATERIAL: ASPHALT SHINGLE
2. ROOF STRUCTURE: KNEE WALL
3. ATTACHMENT TYPE: SNAP N RACK ULTRA RAIL COMP KIT
4. MODULE MANUFACTURER: SILFAB
5. MODULE MODEL: SLA310M
6. MODULE LENGTH: 64.96 IN.
7. MODULE WIDTH: 38.96 IN.
8. MODULE WEIGHT: 41.89 LBS.
9. SEE SHEET A-103 FOR DIMENSION(S)
10. MIN. FIRE OFFSET: NO FIRE CODE ENFORCED
11. RAFTER SPACING: 16 IN. O.C.
12. RAFTER SIZE: 2X6 NOMINAL
13. LAG BOLT DIAMETER: 5/16 IN.
14. LAG BOLT EMBEDMENT: 2-1/2 IN.
15. TOTAL # OF ATTACHMENTS: 35
16. TOTAL AREA: 422.02 SQ. FT.
17. TOTAL WEIGHT: 1106.94 LBS.
18. WEIGHT PER ATTACHMENT: 31.6 LBS.
19. DISTRIBUTED LOAD: 2.62 PSF
20. MAX. HORIZONTAL STANDOFF: 48 IN.
21. MAX. VERTICAL STANDOFF: LANDSCAPE: 26 IN., PORTRAIT: 33 IN. STANDOFF STAGGERING: YES
22. RAIL MANUFACTURER (OR EQUIV.): SNAP N RACK
23. RAIL MODEL (OR EQUIVALENT): UR-40 RAIL
24. RAIL WEIGHT: 0.42 PLF
25. MAX. RAFTER SPAN: 8 FT.
26. MODULE CLEARANCE: 3 IN. MIN., 6 IN. MAX.



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

ASSEMBLY DETAILS

DATE: 10.21.2019

DESIGN BY: Y.R.

CHECKED BY: M.M.

REVISIONS

S-501.00

(SHEET 9)

STRUCTURAL REVIEW PROVIDED BY:
 RONALD P. BITTLER, PE
 RB ENGINEERING, INC. (C-2499)
 168 QUADE DRIVE
 CARY, NC 27513
 919-677-9662
 PROJECT #RB-190504



SLA-M 310 Wp

60 Cell Monocrystalline PV Module



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

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.

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.



CHUBB
The 2018 product is not yet approved for sale in the US.

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 entrusted 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 is 100% North American which means our customer service is direct, efficient and local. Your solar panels can be delivered anywhere in the Continental USA within days.

AESTHETICALLY PLEASING

All black sleek design doesn't compromise on quality.

PID RESISTANT

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

Electrical Specifications		SILFAB SLA Monocrystalline	
Test Conditions		STC	NOCT
Module Power (Pmax)	Wp	310	234
Maximum power voltage (Vpmax)	V	33.05	29.7
Maximum power current (Ipmax)	A	9.38	7.88
Open circuit voltage (Voc)	V	40.25	37.2
Short circuit current (Isc)	A	9.93	8.14
Module efficiency	%	19.0	17.9
Maximum system voltage (VDC)	V	1000	
Series fuse rating	A	20	
Power Tolerance	Wp	-0/+5	
Measurement conditions: STC 1000 W/m ² • AM 1.5 • Temperature 25 °C • NOCT 80 W/m ² • AM 1.5 • Measurement uncertainty ± 3% • Sun simulator calibration reference modules from Fraunhofer Institute. Electrical characteristics may vary by ±5% and power by -0/+5W.			
Temperature Ratings		SILFAB SLA Monocrystalline	
Temperature Coefficient Isc	%/K	0.03	
Temperature Coefficient Voc	%/K	-0.30	
Temperature Coefficient Pmax	%/K	-0.38	
NOCT (± 2°C)	°C	45	
Operating temperature	°C	-40/+85	
Mechanical Properties and Components		SILFAB SLA Monocrystalline	
Module weight (± 1 kg)	kg	19	
Dimensions (H x L x D; ± 1mm)	mm	1650 x 990 x 38	
Maximum surface load (wind/snow)*	N/m ²	2400 Pa upward / 5400 Pa downward	
Hail impact resistance		Ø 25 mm at 83 km/h	
Cells		60 - Si monocrystalline - 4 or 5 busbar - 156.75 x 156.75 mm	
Glass		3.2 mm high transmittance, tempered, antireflective coating	
Backsheet		Multilayer polyester-based	
Frame		Anodized Al (Black)	
Bypass diodes		3 diodes-45W/12A, IP67/IP68	
Cables and connectors (See installation manual)		1200 mm Ø 5.7 mm (4 mm ²), MC4 compatible	
Warranties		SILFAB SLA Monocrystalline	
Module product workmanship warranty		25 years	
Linear power performance guarantee		30 years	
Certifications		SILFAB SLA Monocrystalline	
Product		ULC ORD C1703, UL 1703, IEC 61215, IEC 61730-1 and IEC 61730-2 Certified, PSEEC and CEC listed, IEC 62716 Ammonia Corrosion, IEC 61701:2011 Salt Mist Corrosion Certified	
Factory		UL Fire Rating: Type 2 (Type 1 on request)	
		ISO9001:2015	

*Please refer to the Safety and Installation Manual for mounting specifications.

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

Third-party generated pan files from Fraunhofer-Institute for Solar Energy Systems ISE are available for download at: www.silfabsolar.com/downloads

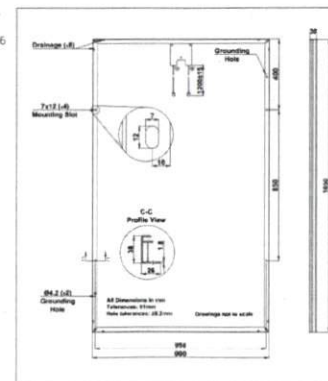


Modules Per Pallet: 26
Pallets Per Truck: 36
Modules Per Truck: 936



Silfab Solar Inc.
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Mississauga ON L5T 2Y3 Canada
Tel +1 905-255-2501 | Fax +1 905-696-0267
info@silfabsolar.com | www.silfabsolar.com

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800 Cornwall Ave
Bellingham WA 98225 USA
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CONTRACTOR

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APN: 130528015703

ENGINEER OF RECORD

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RESOURCE DOCUMENT

DATE: 10.21.2019
DESIGN BY: Y.R.
CHECKED BY: M.M.
REVISIONS

R-001.00
(SHEET 10)

Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US

12-25 YEAR WARRANTY



Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking efficiency
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown per NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Extremely small
- Built-in module-level monitoring
- Outdoor and indoor installation
- Optional: Revenue grade data, ANSI C12.20 Class 0.5 (0.5% accuracy)

solaredge.com

solaredge

INVERTERS

/ Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US

	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US
OUTPUT							
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V
AC Output Voltage Min-Nom-Max (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓
AC Output Voltage Min-Nom-Max (183 - 208 - 229)	-	✓	-	✓	-	-	✓
AC Frequency (Nominal)	50 / 60 ± 0.5%						
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5
CFM Threshold	1						
Utility Monitoring, Standby Protection, Country Configurable Thresholds	Yes						
INPUT							
Maximum DC Power @240V	4650	5900	7750	9300	11900	15500	17050
Maximum DC Power @208V	-	5100	-	7750	-	-	15500
Transformer-less, Ungrounded	Yes						
Maximum Input Voltage	480						
Nominal DC Input Voltage	400						
Maximum Input Current @240V ¹	8.5	10.5	11.5	16.5	20	27	30.5
Maximum Input Current @208V ¹	-	9	-	18.5	-	-	27
Max. Input Short Circuit Current	45						
Reverse Polarity Protection	Yes						
Ground-Fault Isolation Detection	600mA Sensitivity						
Maximum Inverter Efficiency	99.2						
CEC Weighted Efficiency	99						
Nighttime Power Consumption	< 2.5						
ADDITIONAL FEATURES							
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)						
Revenue Grade Data, ANSI C12.20	Optional ²						
Rapid Shutdown - NEC 701.4 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect						
STANDARD COMPLIANCE							
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AECI according to T.L. M-07						
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (H)						
Emissions	FCC Part 15 Class B						
INSTALLATION SPECIFICATIONS							
AC Output Conduit Size / AWG Range	3/4" minimum / 14-6 AWG			3/4" minimum / 14-4 AWG			
DC Input Conduit Size / # of Strings / AWG Range	3/4" minimum / 1-2 strings / 14-6 AWG			3/4" minimum / 1-3 strings / 14-6 AWG			
Dimensions with Safety Switch (in/WxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174			21.3 x 14.6 x 7.3 / 540 x 370 x 185			
Weight with Safety Switch	22 / 10		25.1 / 11.4		26.2 / 11.9		38.8 / 17.6
Noise	< 25			< 50			
Cooling	Natural Convection						
Operating Temperature Range	-40 to +140 / -45 to +60 ³ (-40 ³ / -40 ³ optional ⁴)						
Protection Rating	NEMA 4X (inverter with Safety Switch)						

¹ For other regional settings please contact Solaredge support.
² A higher current output may be used, the energy will limit the input current to the rated value.
³ Revenue grade inverter Part SE3800H-US/SE5000H-US/SE6000H-US/SE7600H-US/SE10000H-US/SE11400H-US.
⁴ For power derating information, refer to <https://www.solaredge.com/resources/derating-temperature-derating-mppt>
⁵ 40 degree FWH, SE3800H-US/SE5000H-US.

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RoHS



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NEW PV SYSTEM: 7.440 kWp

JOHNSON RESIDENCE
 7695 NC 27 WEST,
 LILLINGTON, NC 27546
 APN: 130528015703

ENGINEER OF RECORD

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

RESOURCE DOCUMENT

DATE: 10.21.2019
 DESIGN BY: Y.R.
 CHECKED BY: M.M.

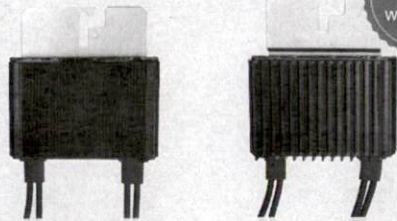
REVISIONS

R-002.00
 (SHEET 11)

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P405 / P505



25 YEAR WARRANTY

POWER OPTIMIZER

PV power optimization at the module-level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates 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
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

solaredge.com



/ Power Optimizer For North America

P320 / P340 / P370 / P400 / P405 / P505

Optimizer model (typical module compatibility)	P320 (for 60-cell modules)	P340 (for high-power 60-cell modules)	P370 (for higher-power 60 and 72-cell modules)	P400 (for 72 & 96-cell modules)	P405 (for thin film modules)	P505 (for higher current modules)	
INPUT							
Rated Input DC Power ¹⁾	320	340	370	400	405	505	W
Absolute Maximum input Voltage (Voc, at lowest temperature)	48		63	80	125 ²⁾	83 ³⁾	Vdc
MPPT Operating Range	8 - 48		8 - 60	8 - 80	12.5 - 105	12.5 - 83	Vdc
Maximum Short Circuit Current (IsC)		11		10.1		14	Adc
Maximum DC Input Current		13.75		12.63		17.5	Adc
Maximum Efficiency			99.5				%
Weighted Efficiency			98.8			98.6	%
Oversoltage Category				II			
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER)							
Maximum Output Current				5			Adc
Maximum Output Voltage		60			80		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR SOLAREEDGE INVERTER OFF)							
Safety Output Voltage per Power Optimizer			1 ± 0.1				Vdc
STANDARD COMPLIANCE							
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3						
Safety	IEC62709-1 (class I safety), UL1741						
RoHS	Yes						
INSTALLATION SPECIFICATIONS							
Maximum Allowed System Voltage	1000						
Compatible inverters	All SolarEdge Single Phase and Three Phase inverters						
Dimensions (W x L x H)	176 x 153 x 27.5 / 5.1 x 6 x 1.1		129 x 153 x 33.5 / 5.1 x 6 x 1.3	129 x 159 x 49.5 / 5.1 x 6.3 x 1.9	129 x 162 x 59 / 5.1 x 6.4 x 2.3		mm / in
Weight (including cables)	530 / 1.4		750 / 1.7	845 / 1.9	1064 / 2.4		gr / lb
Input Connector	MC4 ⁴⁾						
Output Wire Type / Connector	Double insulated, MC4						
Output Wire Length	0.95 / 3.0			1.2 / 3.9			m / ft
Input Wire Length			0.16 / 0.52				m / ft
Operating Temperature Range	-40 - 85 / -40 - 185						
Protection Rating	IP68 / NEMA6P						
Relative Humidity	0 - 100						

¹⁾ Rated STC power of the module. Module of up to +10% power tolerance allowed.
²⁾ NEC 2017 requires max input voltage to not exceed 80V.
³⁾ For other connector types please contact SolarEdge.

PV System Design Using a SolarEdge Inverter ¹⁾	Single Phase HD-Wave	Single phase	Three Phase 208V	Three Phase 480V
Minimum String Length (Power Optimizers)	P320, P340, P370, P400 / P405 / P505	8	10	8
Maximum String Length (Power Optimizers)	P320, P340, P370, P400 / P405 / P505	6	8	16
Maximum Power per String	5700 (E6000 with SE7600-US - SE11400-US)	25	25	50 ²⁾
Maximum Power per String		5250	6000 ³⁾	12750 ⁴⁾
Parallel Strings of Different Lengths or Orientations	Yes			

¹⁾ For detailed string sizing information refer to: http://www.solaredge.com/resources/string_sizing.pdf
²⁾ It is not allowed to mix P405/P505 with P320/P340/P370/P400 in one string.
³⁾ A string with more than 30 optimizers does not meet NEC rapid shutdown requirements, safety voltage will be above the 30V requirement.
⁴⁾ For SE14400/SE4120US, it is allowed to install up to 6,000W per string when 3 strings are connected to the inverter (3 strings per unit for SE4120US and when the maximum power difference between the strings is up to 1,000W).
⁵⁾ For SE100/SE133/SE150/SE160/US/SE100K/US, it is allowed to install up to 15,000W per string when 3 strings are connected to the inverter (3 strings per unit for SE100/SE133/SE150/US and when the maximum power difference between the strings is up to 2,000W).

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ENGINEER OF RECORD

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RESOURCE DOCUMENT

DATE: 10.21.2019

DESIGN BY: Y.R.

CHECKED BY: M.M.

REVISIONS

R-003.00
 (SHEET 12)

DESCRIPTION:
SNAPRACK, UR-40 RAIL

DRAWN BY:
 mwatkins

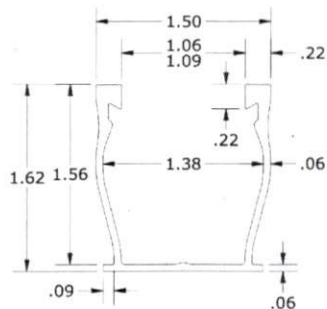
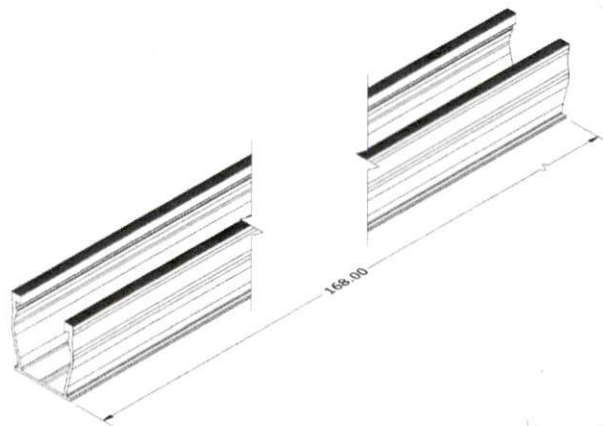


PART NUMBER(S):
 232-02449, 232-02450, 232-02451

REVISION:
A

390 MARKET STREET, 29TH FLOOR • SAN FRANCISCO, CA 94103, USA
 PHONE: (415) 540-6900 • FAX: (415) 580-0302

THIS INFORMATION IS THE PROPERTY OF SNAPNRACK, INC. AND IS UNLAWFUL TO REPRODUCE OR TRANSMIT IN ANY MANNER WITHOUT THE WRITTEN CONSENT OF SNAPNRACK, INC.



UR-40 RAIL PROPERTIES	
SKU	FINISH
232-02449	MILL
232-02450	CLEAR
232-02451	BLACK

ALL DIMENSIONS IN INCHES

MATERIALS:	6000 SERIES ALUMINUM	OPTIONS:
DESIGN LOAD (LBS):	N/A	CLEAR / BLACK ANODIZED
ULTIMATE LOAD (LBS):	N/A	MILL FINISH
TORQUE SPECIFICATION:	N/A LB-FT	BUNDLES OF 144
CERTIFICATION:	UL 2703, FILE E359313	
WEIGHT (LBS):	5.85	



CONTRACTOR

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(SHEET 13)

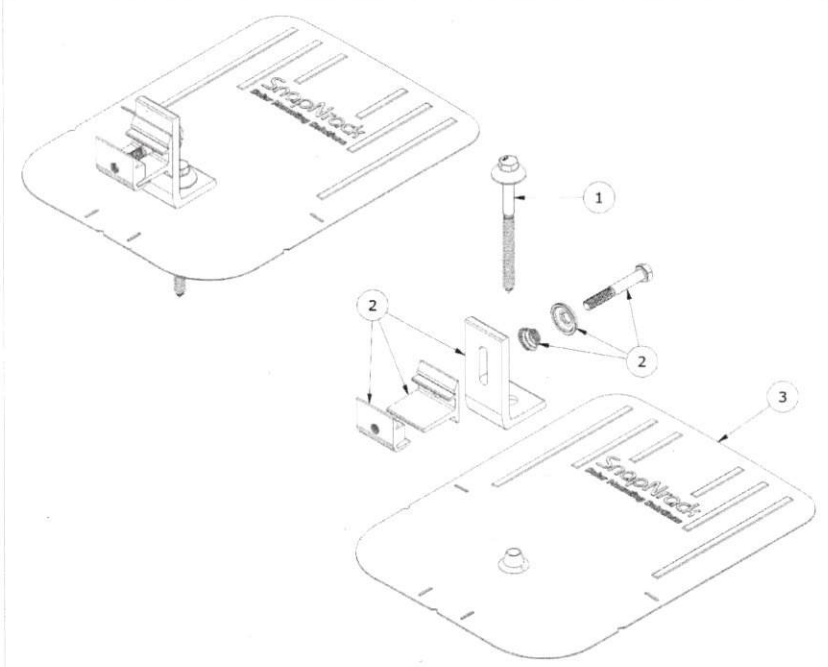
DESCRIPTION:
SNAPNRACK, ULTRA RAIL COMP KIT

DRAWN BY:
mwatkins
REVISION:
B



PART NUMBER(S):
SEE BELOW

395 MARKET STREET, 20TH FLOOR • SAN FRANCISCO, CA 94103 USA
PHONE: (415) 583-8920 • FAX: (415) 583-8922



PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	242-92266	SNAPNRACK, UMBRELLA LAG, TYPE 3, 4IN, SS
2	1	242-01219, 242-01220	SNAPNRACK, ULTRA FOOT FOR U FLASHING, SILVER / BLACK
3	1	232-01375, 232-01376	SNAPNRACK, COMP FLASHING, 9IN X 12IN, SILVER / BLACK ALUM

MATERIALS:	6000 SERIES ALUMINUM, STAINLESS STEEL, RUBBER
DESIGN LOAD (LBS):	405 UP, 788 DOWN, 236 SIDE
ULTIMATE LOAD (LBS):	2006 UP, 4000 DOWN, 1070 SIDE
TORQUE SPECIFICATION:	12 LB-FT
CERTIFICATION:	UL 2703, FILE E359313
WEIGHT (LBS):	0.80

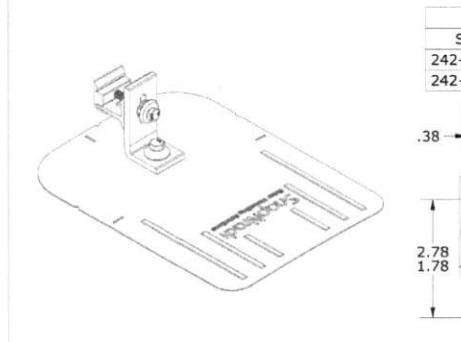
DESCRIPTION:
SNAPNRACK, ULTRA RAIL COMP KIT

DRAWN BY:
mwatkins
REVISION:
B



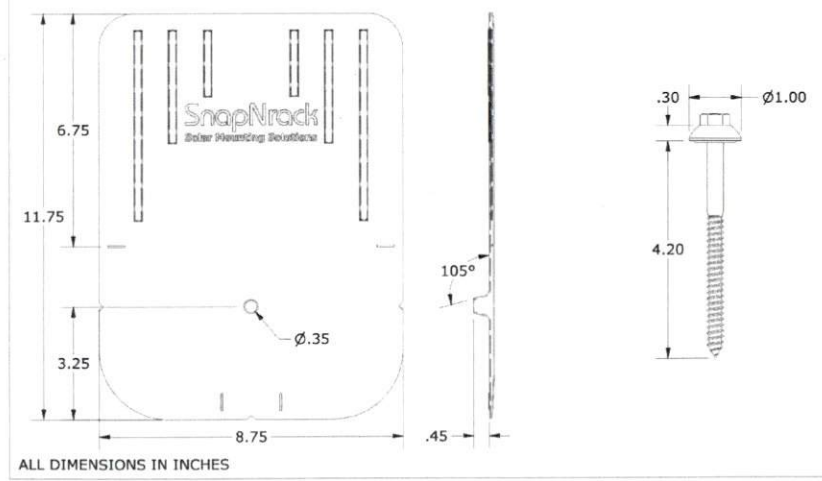
PART NUMBER(S):
SEE BELOW

395 MARKET STREET, 20TH FLOOR • SAN FRANCISCO, CA 94103 USA
PHONE: (415) 583-8920 • FAX: (415) 583-8922



UMBRELLA L FOOT PROPERTIES	
SKU	DESCRIPTION
242-01219	ULTRA RAIL UMBRELLA L FOOT, SILVER
242-01220	ULTRA RAIL UMBRELLA L FOOT, BLACK

COMP FLASHING PROPERTIES	
SKU	DESCRIPTION
232-01375	COMP FLASHING, 9" X 12", BLACK ALUM
232-01376	COMP FLASHING, 9" X 12", SILVER ALUM



ALL DIMENSIONS IN INCHES



CONTRACTOR

YES SOLAR SOLUTIONS
PHONE: 9194592846
ADDRESS: 202 NORTH DIXON AVENUE
CARY, NC 27513

LIC. NO.: 67356
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: 7.440 kWp

JOHNSON RESIDENCE
7695 NC 27 WEST,
LILLINGTON, NC 27546
APN: 130528015703

ENGINEER OF RECORD

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

RESOURCE DOCUMENT

DATE: 10.21.2019
DESIGN BY: Y.R.
CHECKED BY: M.M.
REVISIONS

R-005.00
(SHEET 14)