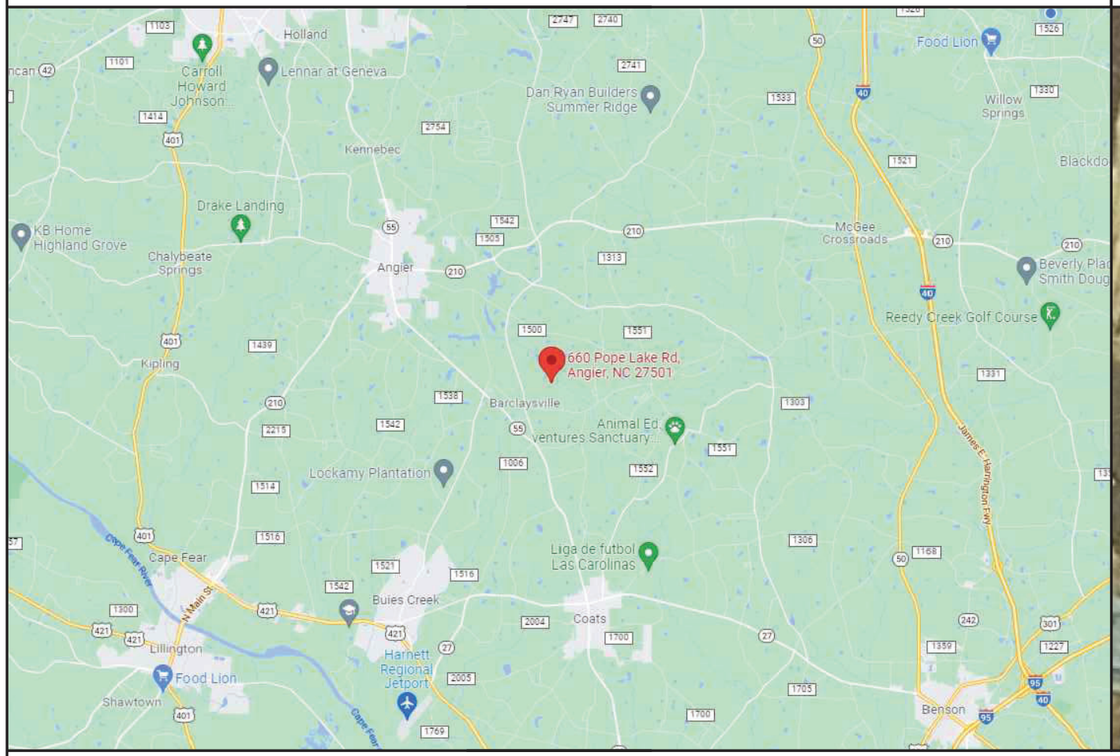
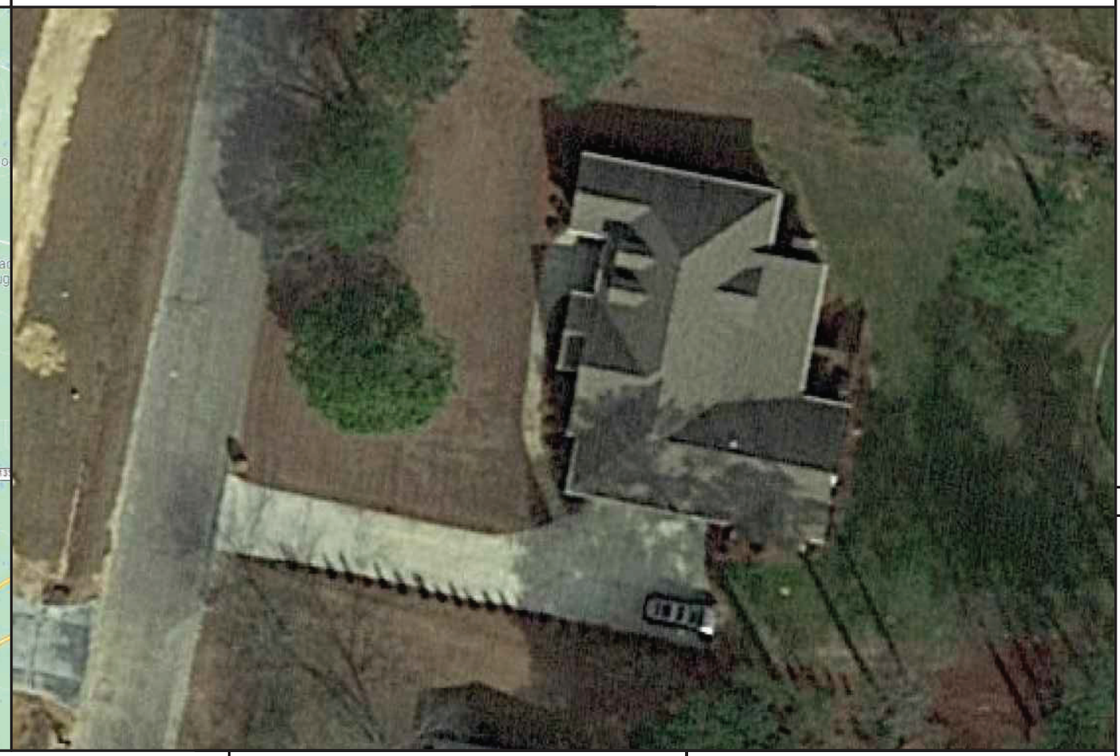
VICINITY MAP



PROPERTY MAP



ENGINEER:

NORTH CAROLINA PROFESSIONAL SEAL 035699 ENGINEER ANDREW W. KING
11/8/21

MODEL ENERGY
300 FAYETTEVILLE ST.
#1430
RALEIGH, NC 27602
919-274-9905
MODELENERGY.COM
P-1194

JOB TITLE:

NEW SOLAR PV SYSTEM
22.04 kW DC INPUT
19.00 kW AC EXPORT

Halbert H Mckinnon Jr
660 POPE LAKE ROAD
ANGIER, NC 27501

CLIENT:

SOUTHERN ENERGY MANAGEMENT
ENERGY EFFICIENCY & SOLAR POWER

ISSUED FOR:	DATE:
CONSTRUCTION	11/04/21

PROJECT INFORMATION

PV1.1

CONSTRUCTION NOTES

1. ALL WORK AND EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST NATIONAL, STATE, AND LOCAL CODES AND ORDINANCES
2. FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS, BEST PRACTICES, AND SPECIFICATIONS
3. WIRES SHALL BE RATED AND LABELED "SUNLIGHT RESISTANT" WHERE EXPOSED TO AMBIENT CONDITIONS
4. THE PHOTOVOLTAIC SYSTEM SHALL NOT EXCEED 600 VOLTS OR 800 AMPS
5. EACH ELECTRICAL APPLIANCE SHALL BE PROVIDED WITH A NAMEPLATE GIVING THE IDENTIFYING NAME AND THE RATING IN VOLTS AND AMPERES, OR VOLTS AND WATTS. IF THE APPLIANCE IS TO BE USED ON A SPECIFIC FREQUENCY OR FREQUENCIES, IT SHALL BE SO MARKED. WHERE MOTOR OVERLOAD PROTECTION EXTERNAL TO THE APPLIANCES IS REQUIRED, THE APPLIANCE SHALL BE SO MARKED
6. WHERE APPLICABLE, GROUNDING ELECTRODE CONDUCTOR TO BE CONTINUOUS. GROUNDING CRIMPS TO BE IRREVERSIBLE
7. IN ONE- AND TWO-FAMILY DWELLINGS, LIVE PARTS IN PHOTOVOLTAIC SOURCE CIRCUITS AND PHOTOVOLTAIC OUTPUT CIRCUITS OVER 150 VOLTS TO GROUND, SHALL ONLY BE ACCESSIBLE TO QUALIFIED PERSONS WHILE ENERGIZED.
8. PHOTOVOLTAIC SYSTEMS SHALL BE PERMANENTLY MARKED AT VARIOUS EQUIPMENT LOCATIONS TO IDENTIFY THAT A PHOTOVOLTAIC SYSTEM IS INSTALLED AND THAT VARIOUS DANGERS ARE PRESENT.
9. EACH PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS SHALL BE PERMANENTLY MARKED TO IDENTIFY IT AS A PHOTOVOLTAIC SYSTEM DISCONNECT
10. WHERE ALL TERMINALS OF A DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION, A WARNING SIGN SHALL BE MOUNTED ON OR ADJACENT TO THE DISCONNECT
11. A PERMANENT LABEL FOR THE DIRECT-CURRENT PHOTOVOLTAIC POWER SOURCE SHALL BE PROVIDED BY THE INSTALLED AT THE DC DISCONNECT MEANS
12. A PERMANENT PLAQUE OR DIRECTORY, DENOTING ALL ELECTRIC POWER SOURCES SERVING THE PREMISES, SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION AND AT LOCATIONS OF ALL POWER PRODUCTION SOURCES.
13. A PERMANENT PLAQUE OR DIRECTORY SHALL BE PROVIDED DENOTING THE LOCATIONS OF THE SERVICE DISCONNECT MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECT MEANS IF THEY ARE NOT LOCATED AT THE SAME LOCATION.
14. ALL MODULE GROUND CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH NEC SECTION 690.4 (C)

ABBREVIATIONS

A	AMPERE
AC	ALTERNATING CURRENT
DC	DIRECT CURRENT
EGC	EQUIPMENT GROUNDING CONDUCTOR
EMT	ELECTRICAL METAL TUBING
GALV	GALVANIZED
GEC	GROUNDING ELECTRODE CONDUCTOR
GND	GROUND
I	CURRENT
IMP	CURRENT AT MAXIMUM POWER
ISC	SHORT-CIRCUIT CURRENT
KVA	KILOVOLT AMPERE
KW	KILOWATT
MAX	MAXIMUM
MIN	MINIMUM
MCB	MAIN CIRCUIT BREAKER
MLO	MAIN LUG ONLY
NOM	NOMINAL
NTS	NOT TO SCALE
PNOM	NOMINAL POWER
PV	PHOTOVOLTAIC
PVC	POLYVINYL CHLORIDE
SN	SOLAR NOON
STC	STANDARD TEST CONDITIONS
TYP	TYPICAL
V	VOLT
VMP	VOLTAGE AT MAXIMUM POWER
VOC	OPEN-CIRCUIT VOLTAGE
W	WATT

CODE REFERENCES

2017 NATIONAL ELECTRIC CODE
2018 NORTH CAROLINA BUILDING CODE
2018 NORTH CAROLINA RESIDENTIAL CODE
2018 NORTH CAROLINA FIRE CODE

SHEET INDEX

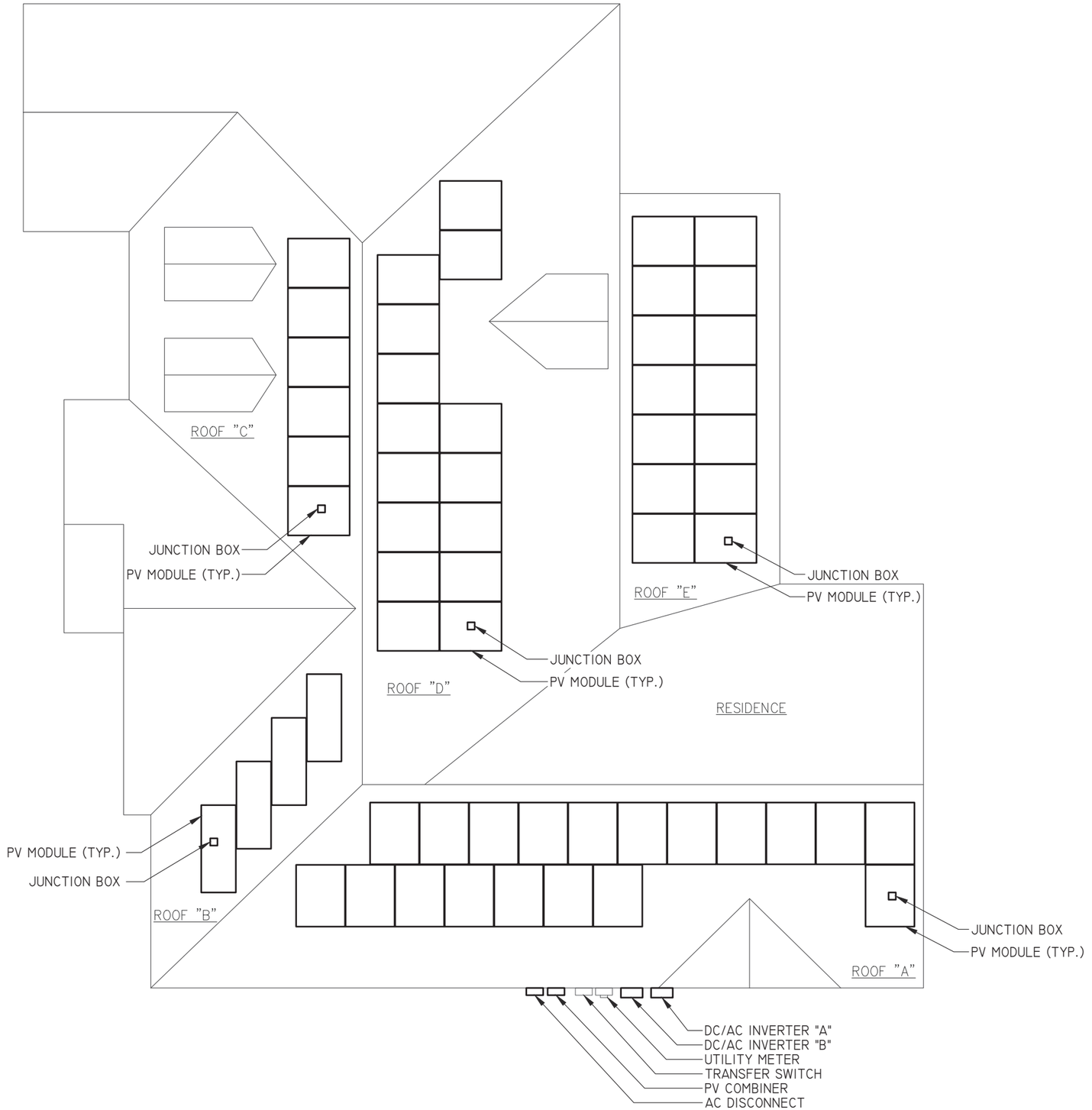
PV1.1 - *PROJECT INFORMATION*
PV2.1 - *SITE INFORMATION*
PV3.1 - PV3.5 - *STRUCTURAL INFORMATION*
PV4.1 - PV4.2 - *ELECTRICAL INFORMATION*
PV5.1 - *EQUIPMENT LABELS*

SITE CONDITIONS

ASCE 7-10 WIND SPEED - 116 MPH
EXPOSURE CATEGORY - B
RISK CATEGORY - II

LEGEND

- DISCONNECT SWITCH
- FUSE
- CIRCUIT BREAKER
- GND — EQUIP. GROUND



N

1 SITE PLAN

SCALE: 1/8" = 1'-0"

ENGINEER:

NORTH CAROLINA PROFESSIONAL SEAL 035699 ENGINEER ANDREW W. KING
11/8/21

MODEL ENERGY
300 FAYETTEVILLE ST.
#1430
RALEIGH, NC 27602
919-274-9905
MODELENERGY.COM
P-1194

JOB TITLE:

NEW SOLAR PV SYSTEM
22.04 kW DC INPUT
19.00 kW AC EXPORT

Halbert H Mckinnon Jr
660 POPE LAKE ROAD
ANGIER, NC 27501

CLIENT:

SOUTHERN ENERGY MANAGEMENT
ENERGY EFFICIENCY & SOLAR POWER

ISSUED FOR:	DATE:
CONSTRUCTION	11/04/21

SITE INFORMATION

PV2.1

ROOF LOADING	
GROUND SNOW LOAD:	15 LBS./SQFT.
LIVE LOAD:	20 LBS./SQFT.
DEAD LOAD:	
ROOFING	3.9 LBS./SQFT.
PV ARRAY	2.4 LBS./SQFT.
TOTAL	6.3 LBS./SQFT.
WIND LOAD:	
UPLIFT ZONE 1	-24.6 LBS./SQFT.
UPLIFT ZONE 2	-29.0 LBS./SQFT.
UPLIFT ZONE 3	-29.0 LBS./SQFT.
DOWNWARD	23.0 LBS./SQFT.
FASTENER LOAD:	
UPLIFT ZONE 1	-396 LBS.
UPLIFT ZONE 2	-350 LBS.
UPLIFT ZONE 3	-117 LBS.
DOWNWARD	370 LBS.

MOUNTING RAILS	
MAKE	SNAPNRACK
MODEL	RES. MOUNTING SYSTEM
MATERIAL	ALUMINUM
WEIGHT	0.42 LBS./FT.
SPACING	36 IN.

ROOF MOUNT & FASTENER	
ROOF MOUNT:	
MAKE	SNAPNRACK
MODEL	SPEEDSEAL FOOT
MATERIAL	ALUMINUM
FASTENER	
MAKE	GENERIC
MODEL	LAG BOLT
MATERIAL	304 SS
SIZE	5/16"-18 X 4"
GENERAL	
WEIGHT	1 LBS
FASTENERS PER MOUNT	1 PER MOUNT
MAX. PULL-OUT FORCE	800 LBS.
SAFETY FACTOR	2
DESIGN PULL-OUT FORCE	400 BS.

- LAG BOLT EMBEDDED WITH 2.5" OF THREAD IN WOOD RAFTER OR TRUSSES MEMBER

ARRAY SUMMARY	
# MODULES	19
# ROOF MOUNTS	43
RAIL LENGTH	130 FT.
ARRAY AREA	388 SQFT.
ARRAY WEIGHT	915 LBS.
AZIMUTH @ SN	100°
TILT ANGLE	45°

PV MODULES	
MAKE	Q CELL
MODEL	Q.PEAK DUO BLK-ML-G9 380
WIDTH	40.6"
LENGTH	72.4"
THICKNESS	1.26"
WEIGHT	43.0 LBS

ROOF SUMMARY	
STRUCTURE:	
TYPE	RAFTERS
MATERIAL	SOUTHERN PINE #2
SIZE	2" X 8"
SPACING	16" O.C.
EFF. SPAN	14'-0"
PITCH	12 / 12
DENSITY	30 LBS./CU.FT.
DECKING:	
TYPE	OSB
MATERIAL	WOOD COMPOSITE
THICKNESS	7/16"
WEIGHT	1.6 LBS./SQFT.
ROOFING:	
TYPE	ARCH SHINGLE
MATERIAL	ASPHALT
WEIGHT	2.3 LBS./SQFT.

STATEMENT OF STRUCTURAL COMPLIANCE

THE EXISTING ROOF STRUCTURE HAS BEEN DESIGNED TO SUPPORT THE ADDITIONAL LOADS OF THE PROPOSED PV SYSTEM. IN ADDITION, THE RACKING AND FASTENING SYSTEM SHALL BE CAPABLE OF SECURING THE SYSTEM TO THE STRUCTURE UNDER DESIGN CONDITIONS WHEN INSTALLED PROPERLY AND IN ACCORDANCE WITH THE RACKING AND FASTENING ARRANGEMENT DETAILED WITHIN THESE DRAWINGS.

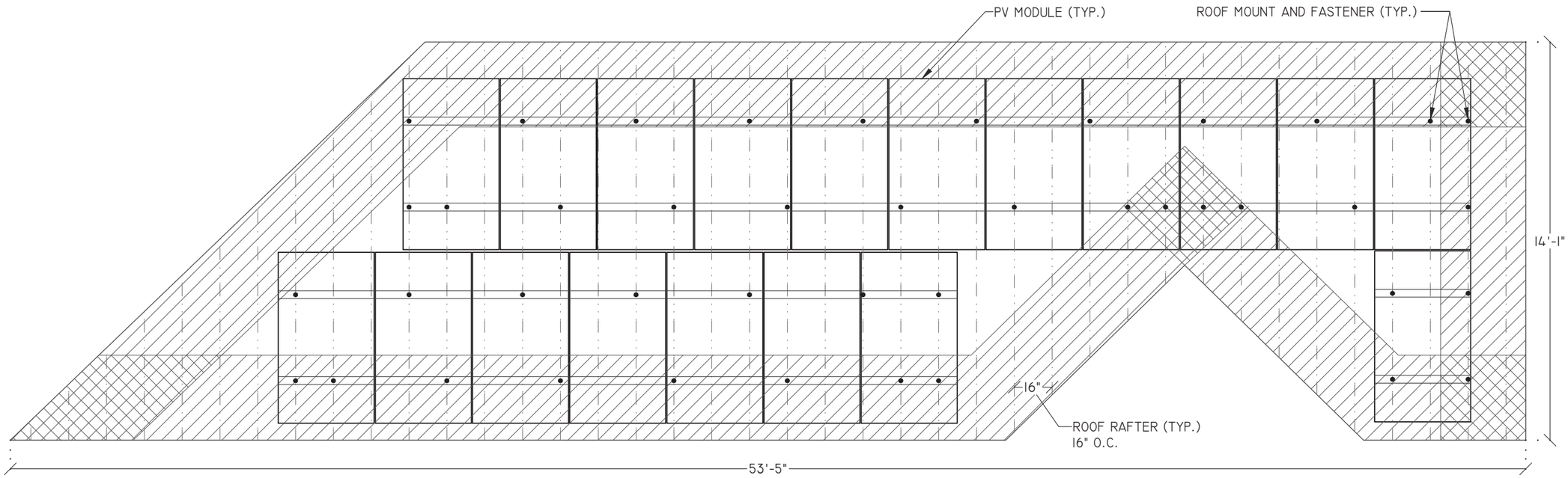
SIGNED:

NAME: ANDREW W. KING, PE

TITLE: PROFESSIONAL ENGINEER

ROOF ZONES:

ALL ZONES	MAX. RAIL OVERHANG = 12"
☐ ZONE 1	MAX. FASTENER SPAN ZONE 1 = 64"
▨ ZONE 2	MAX. FASTENER SPAN ZONE 2 = 48"
⊠ ZONE 3	MAX. FASTENER SPAN ZONE 3 = 16"



1 MODULE, RACKING, AND FASTENER LAYOUT - ROOF PLANAR VIEW

SCALE: 1/4" = 1'-0"

ENGINEER:

NORTH CAROLINA PROFESSIONAL SEAL 035699 ENGINEER ANDREW W. KING
11/8/21

MODEL ENERGY
300 FAYETTEVILLE ST.
#1430
RALEIGH, NC 27602
919-274-9905
MODELENERGY.COM
P-1194

JOB TITLE:

NEW SOLAR PV SYSTEM
22.04 kW DC INPUT
19.00 kW AC EXPORT

Halbert H Mckinnon Jr
660 POPE LAKE ROAD
ANGIER, NC 27501

CLIENT:

SOUTHERN ENERGY MANAGEMENT
ENERGY EFFICIENCY & SOLAR POWER

ISSUED FOR:	DATE:
CONSTRUCTION	11/04/21

STRUCTURAL INFORMATION

PV3.1

ROOF LOADING	
GROUND SNOW LOAD:	15 LBS./SQFT.
LIVE LOAD:	20 LBS./SQFT.
DEAD LOAD:	
ROOFING	3.9 LBS./SQFT.
PV ARRAY	2.7 LBS./SQFT.
TOTAL	6.6 LBS./SQFT.
WIND LOAD:	
UPLIFT ZONE 1	-24.6 LBS./SQFT.
UPLIFT ZONE 2	-29.0 LBS./SQFT.
UPLIFT ZONE 3	-29.0 LBS./SQFT.
DOWNWARD	23.0 LBS./SQFT.
FASTENER LOAD:	
UPLIFT ZONE 1	-222 LBS.
UPLIFT ZONE 2	-196 LBS.
UPLIFT ZONE 3	-65 LBS.
DOWNWARD	208 LBS.

MOUNTING RAILS	
MAKE	SNAPNRACK
MODEL	RES. MOUNTING SYSTEM
MATERIAL	ALUMINUM
WEIGHT	0.42 LBS./FT.
SPACING	20 IN.

ROOF MOUNT & FASTENER	
ROOF MOUNT:	
MAKE	SNAPNRACK
MODEL	SPEEDSEAL FOOT
MATERIAL	ALUMINUM
FASTENER	
MAKE	GENERIC
MODEL	LAG BOLT
MATERIAL	304 SS
SIZE	5/16"-18 X 4"
GENERAL	
WEIGHT	1 LBS
FASTENERS PER MOUNT	1 PER MOUNT
MAX. PULL-OUT FORCE	800 LBS.
SAFETY FACTOR	2
DESIGN PULL-OUT FORCE	400 BS.

- LAG BOLT EMBEDDED WITH 2.5" OF THREAD IN WOOD RAFTER OR TRUSSES MEMBER

ARRAY SUMMARY	
# MODULES	4
# ROOF MOUNTS	24
RAIL LENGTH	49 FT.
ARRAY AREA	82 SQFT.
ARRAY WEIGHT	217 LBS.
AZIMUTH @ SN	100°
TILT ANGLE	45°

PV MODULES	
MAKE	Q CELL
MODEL	Q.PEAK DUO BLK-ML-G9 380
WIDTH	40.6"
LENGTH	72.4"
THICKNESS	1.26"
WEIGHT	43.0 LBS

ROOF SUMMARY	
STRUCTURE:	
TYPE	RAFTERS
MATERIAL	SOUTHERN PINE #2
SIZE	2" X 8"
SPACING	16" O.C.
EFF. SPAN	14'-0"
PITCH	12 / 12
DENSITY	30 LBS./CU.FT.
DECKING:	
TYPE	OSB
MATERIAL	WOOD COMPOSITE
THICKNESS	7/16"
WEIGHT	1.6 LBS./SQFT.
ROOFING:	
TYPE	ARCH SHINGLE
MATERIAL	ASPHALT
WEIGHT	2.3 LBS./SQFT.

STATEMENT OF STRUCTURAL COMPLIANCE

THE EXISTING ROOF STRUCTURE HAS BEEN DESIGNED TO SUPPORT THE ADDITIONAL LOADS OF THE PROPOSED PV SYSTEM. IN ADDITION, THE RACKING AND FASTENING SYSTEM SHALL BE CAPABLE OF SECURING THE SYSTEM TO THE STRUCTURE UNDER DESIGN CONDITIONS WHEN INSTALLED PROPERLY AND IN ACCORDANCE WITH THE RACKING AND FASTENING ARRANGEMENT DETAILED WITHIN THESE DRAWINGS.

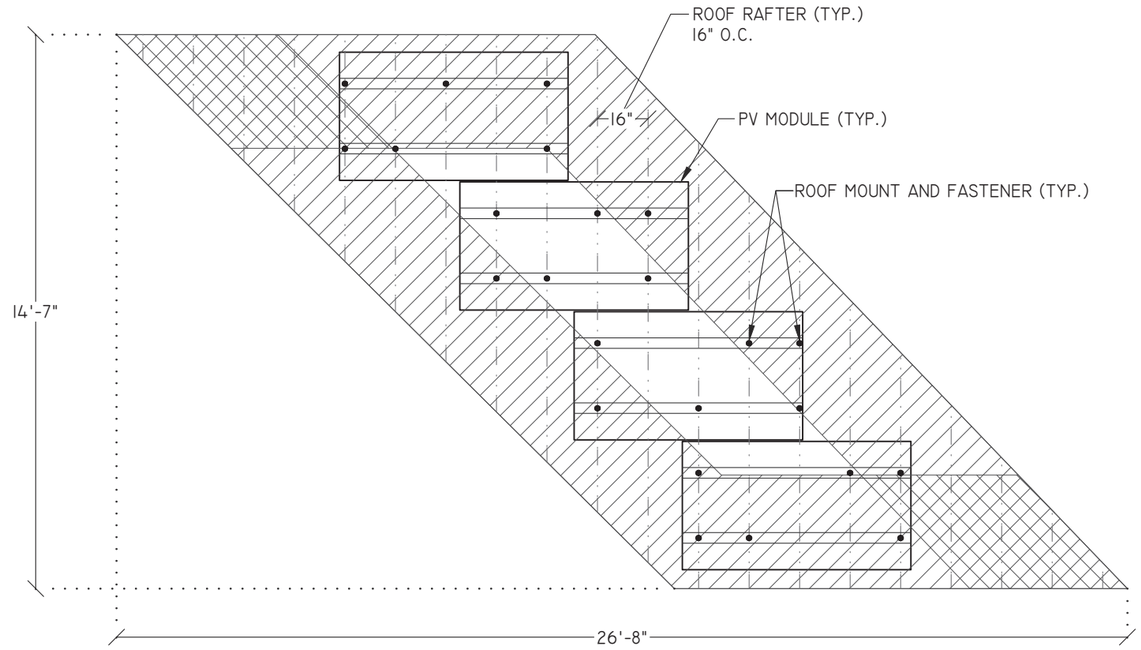
SIGNED:

NAME: ANDREW W. KING, PE

TITLE: PROFESSIONAL ENGINEER

ROOF ZONES:

ALL ZONES	MAX. RAIL OVERHANG = 12"
☐ ZONE 1	MAX. FASTENER SPAN ZONE 1 = 64"
▨ ZONE 2	MAX. FASTENER SPAN ZONE 2 = 48"
⊠ ZONE 3	MAX. FASTENER SPAN ZONE 3 = 16"



1 MODULE, RACKING, AND FASTENER LAYOUT - ROOF PLANAR VIEW

SCALE: 1/4" = 1'-0"

ENGINEER:

NORTH CAROLINA PROFESSIONAL SEAL 035699 ENGINEER ANDREW W. KING

11/8/21

MODEL ENERGY
300 FAYETTEVILLE ST.
#1430
RALEIGH, NC 27602
919-274-9905
MODELENERGY.COM
P-1194

JOB TITLE:

NEW SOLAR PV SYSTEM
22.04 kW DC INPUT
19.00 kW AC EXPORT

Halbert H Mckinnon Jr
660 POPE LAKE ROAD
ANGIER, NC 27501

CLIENT:

SOUTHERN ENERGY MANAGEMENT
ENERGY EFFICIENCY & SOLAR POWER

ISSUED FOR:	DATE:
CONSTRUCTION	11/04/21

STRUCTURAL INFORMATION

PV3.2

ROOF LOADING	
GROUND SNOW LOAD:	15 LBS./SQFT.
LIVE LOAD:	20 LBS./SQFT.
DEAD LOAD:	
ROOFING	3.9 LBS./SQFT.
PV ARRAY	2.4 LBS./SQFT.
TOTAL	6.3 LBS./SQFT.
WIND LOAD:	
UPLIFT ZONE 1	-24.6 LBS./SQFT.
UPLIFT ZONE 2	-29.0 LBS./SQFT.
UPLIFT ZONE 3	-29.0 LBS./SQFT.
DOWNWARD	23.0 LBS./SQFT.
FASTENER LOAD:	
UPLIFT ZONE 1	-297 LBS.
UPLIFT ZONE 2	-350 LBS.
UPLIFT ZONE 3	-175 LBS.
DOWNWARD	278 LBS.

MOUNTING RAILS	
MAKE	SNAPNRACK
MODEL	RES. MOUNTING SYSTEM
MATERIAL	ALUMINUM
WEIGHT	0.42 LBS./FT.
SPACING	36 IN.

ROOF MOUNT & FASTENER	
ROOF MOUNT:	
MAKE	SNAPNRACK
MODEL	SPEEDSEAL FOOT
MATERIAL	ALUMINUM
FASTENER	
MAKE	GENERIC
MODEL	LAG BOLT
MATERIAL	304 SS
SIZE	5/16"-18 X 4"
GENERAL	
WEIGHT	1 LBS
FASTENERS PER MOUNT	1 PER MOUNT
MAX. PULL-OUT FORCE	800 LBS.
SAFETY FACTOR	2
DESIGN PULL-OUT FORCE	400 BS.

- LAG BOLT EMBEDDED WITH 2.5" OF THREAD IN WOOD RAFTER OR TRUSSES MEMBER

ARRAY SUMMARY	
# MODULES	6
# ROOF MOUNTS	13
RAIL LENGTH	41 FT.
ARRAY AREA	122 SQFT.
ARRAY WEIGHT	289 LBS.
AZIMUTH @ SN	100°
TILT ANGLE	45°

PV MODULES	
MAKE	Q CELL
MODEL	Q.PEAK DUO BLK-ML-G9 380
WIDTH	40.6"
LENGTH	72.4"
THICKNESS	1.26"
WEIGHT	43.0 LBS

ROOF SUMMARY	
STRUCTURE:	
TYPE	RAFTERS
MATERIAL	SOUTHERN PINE #2
SIZE	2" X 8"
SPACING	16" O.C.
EFF. SPAN	14'-0"
PITCH	12 / 12
DENSITY	30 LBS./CU.FT.
DECKING:	
TYPE	OSB
MATERIAL	WOOD COMPOSITE
THICKNESS	7/16"
WEIGHT	1.6 LBS./SQFT.
ROOFING:	
TYPE	ARCH SHINGLE
MATERIAL	ASPHALT
WEIGHT	2.3 LBS./SQFT.

STATEMENT OF STRUCTURAL COMPLIANCE

THE EXISTING ROOF STRUCTURE HAS BEEN DESIGNED TO SUPPORT THE ADDITIONAL LOADS OF THE PROPOSED PV SYSTEM. IN ADDITION, THE RACKING AND FASTENING SYSTEM SHALL BE CAPABLE OF SECURING THE SYSTEM TO THE STRUCTURE UNDER DESIGN CONDITIONS WHEN INSTALLED PROPERLY AND IN ACCORDANCE WITH THE RACKING AND FASTENING ARRANGEMENT DETAILED WITHIN THESE DRAWINGS.

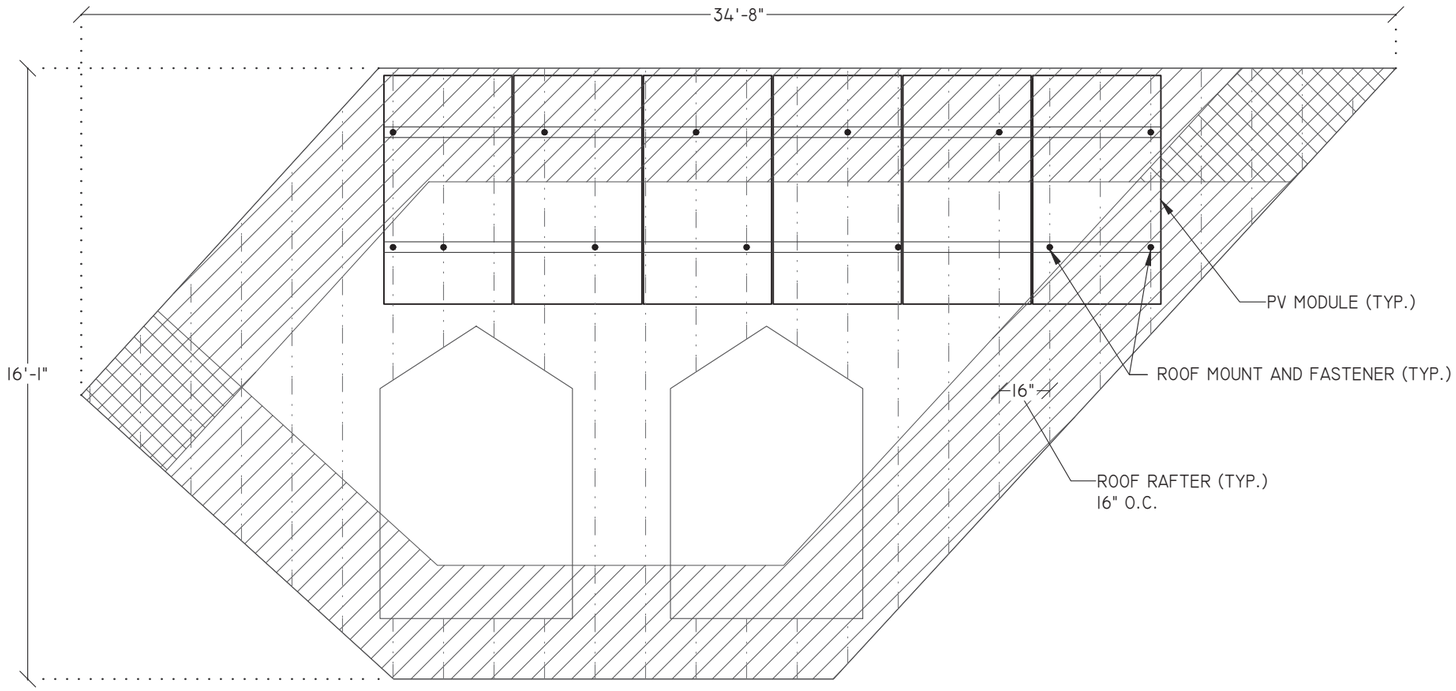
SIGNED:

NAME: ANDREW W. KING, PE

TITLE: PROFESSIONAL ENGINEER

ROOF ZONES:

ALL ZONES	MAX. RAIL OVERHANG = 12"
☐ ZONE 1	MAX. FASTENER SPAN ZONE 1 = 64"
▨ ZONE 2	MAX. FASTENER SPAN ZONE 2 = 48"
⊠ ZONE 3	MAX. FASTENER SPAN ZONE 3 = 16"



1 MODULE, RACKING, AND FASTENER LAYOUT - ROOF PLANAR VIEW

SCALE: 1/4" = 1'-0"

ENGINEER:

NORTH CAROLINA PROFESSIONAL SEAL 035699 ENGINEER ANDREW W. KING 11/3/21

MODEL ENERGY
300 FAYETTEVILLE ST.
#1430
RALEIGH, NC 27602
919-274-9905
MODELENERGY.COM
P-1194

JOB TITLE:

NEW SOLAR PV SYSTEM
22.04 kW DC INPUT
19.00 kW AC EXPORT

Halbert H Mckinnon Jr
660 POPE LAKE ROAD
ANGIER, NC 27501

CLIENT:

SOUTHERN ENERGY MANAGEMENT
ENERGY EFFICIENCY & SOLAR POWER

ISSUED FOR:	DATE:
CONSTRUCTION	11/04/21

STRUCTURAL INFORMATION

PV3.3

ROOF LOADING	
GROUND SNOW LOAD:	15 LBS./SQFT.
LIVE LOAD:	20 LBS./SQFT.
DEAD LOAD:	
ROOFING	3.9 LBS./SQFT.
PV ARRAY	2.4 LBS./SQFT.
TOTAL	6.3 LBS./SQFT.
WIND LOAD:	
UPLIFT ZONE 1	-24.6 LBS./SQFT.
UPLIFT ZONE 2	-29.0 LBS./SQFT.
UPLIFT ZONE 3	-29.0 LBS./SQFT.
DOWNWARD	23.0 LBS./SQFT.
FASTENER LOAD:	
UPLIFT ZONE 1	-396 LBS.
UPLIFT ZONE 2	-350 LBS.
UPLIFT ZONE 3	-117 LBS.
DOWNWARD	370 LBS.

MOUNTING RAILS	
MAKE	SNAPNRACK
MODEL	RES. MOUNTING SYSTEM
MATERIAL	ALUMINUM
WEIGHT	0.42 LBS./FT.
SPACING	36 IN.

ROOF MOUNT & FASTENER	
ROOF MOUNT:	
MAKE	SNAPNRACK
MODEL	SPEEDSEAL FOOT
MATERIAL	ALUMINUM
FASTENER	
MAKE	GENERIC
MODEL	LAG BOLT
MATERIAL	304 SS
SIZE	5/16"-18 X 4"
GENERAL	
WEIGHT	1 LBS
FASTENERS PER MOUNT	1 PER MOUNT
MAX. PULL-OUT FORCE	800 LBS.
SAFETY FACTOR	2
DESIGN PULL-OUT FORCE	400 BS.

- LAG BOLT EMBEDDED WITH 2.5" OF THREAD IN WOOD RAFTER OR TRUSSES MEMBER

ARRAY SUMMARY	
# MODULES	15
# ROOF MOUNTS	34
RAIL LENGTH	103 FT.
ARRAY AREA	306 SQFT.
ARRAY WEIGHT	723 LBS.
AZIMUTH @ SN	100°
TILT ANGLE	45°

PV MODULES	
MAKE	Q CELL
MODEL	Q.PEAK DUO BLK-ML-G9 380
WIDTH	40.6"
LENGTH	72.4"
THICKNESS	1.26"
WEIGHT	43.0 LBS

ROOF SUMMARY	
STRUCTURE:	
TYPE	RAFTERS
MATERIAL	SOUTHERN PINE #2
SIZE	2" X 8"
SPACING	16" O.C.
EFF. SPAN	14'-0"
PITCH	12 / 12
DENSITY	30 LBS./CU.FT.
DECKING:	
TYPE	OSB
MATERIAL	WOOD COMPOSITE
THICKNESS	7/16"
WEIGHT	1.6 LBS./SQFT.
ROOFING:	
TYPE	ARCH SHINGLE
MATERIAL	ASPHALT
WEIGHT	2.3 LBS./SQFT.

STATEMENT OF STRUCTURAL COMPLIANCE

THE EXISTING ROOF STRUCTURE HAS BEEN DESIGNED TO SUPPORT THE ADDITIONAL LOADS OF THE PROPOSED PV SYSTEM. IN ADDITION, THE RACKING AND FASTENING SYSTEM SHALL BE CAPABLE OF SECURING THE SYSTEM TO THE STRUCTURE UNDER DESIGN CONDITIONS WHEN INSTALLED PROPERLY AND IN ACCORDANCE WITH THE RACKING AND FASTENING ARRANGEMENT DETAILED WITHIN THESE DRAWINGS.

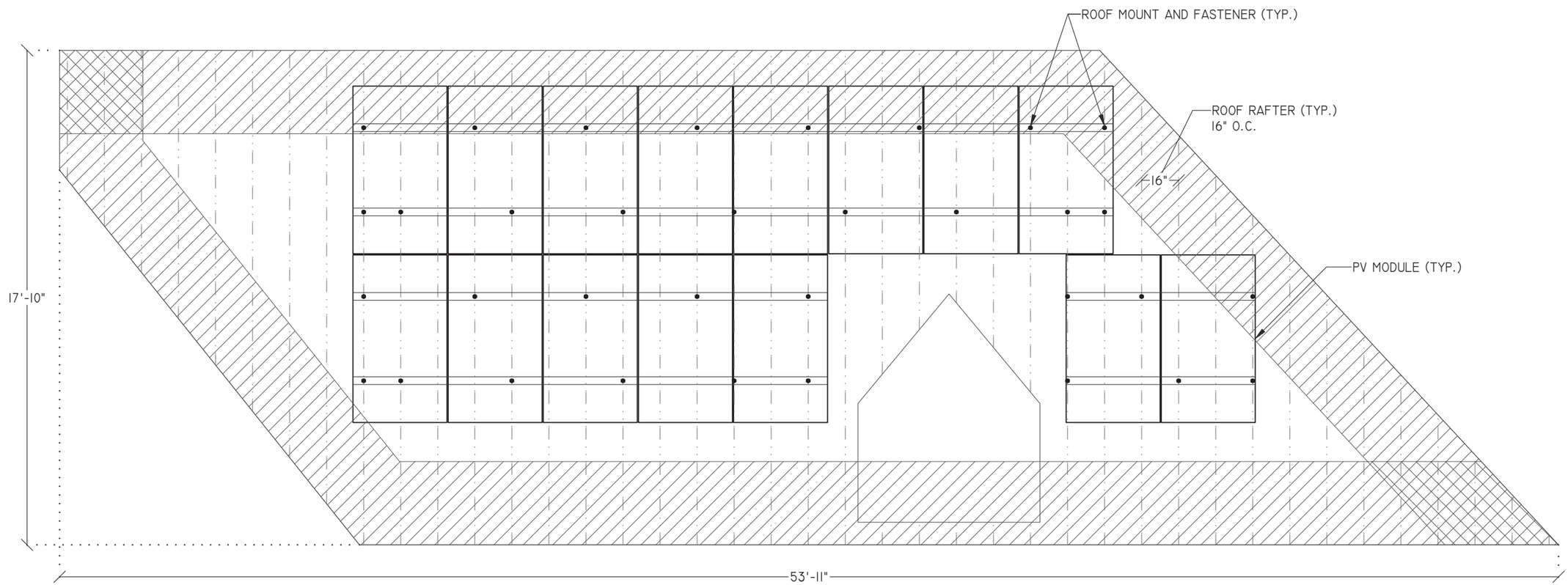
SIGNED:

NAME: ANDREW W. KING, PE

TITLE: PROFESSIONAL ENGINEER

ROOF ZONES:

ALL ZONES	MAX. RAIL OVERHANG = 12"
☐ ZONE 1	MAX. FASTENER SPAN ZONE 1 = 64"
▨ ZONE 2	MAX. FASTENER SPAN ZONE 2 = 48"
⊠ ZONE 3	MAX. FASTENER SPAN ZONE 3 = 16"



1 MODULE, RACKING, AND FASTENER LAYOUT - ROOF PLANAR VIEW

SCALE: 1/4" = 1'-0"

ENGINEER:

NORTH CAROLINA PROFESSIONAL SEAL 035699 ENGINEER ANDREW W. KING

11/8/21

MODEL ENERGY
300 FAYETTEVILLE ST.
#1430
RALEIGH, NC 27602
919-274-9905
MODELENERGY.COM
P-1194

JOB TITLE:

NEW SOLAR PV SYSTEM
22.04 kW DC INPUT
19.00 kW AC EXPORT

Halbert H Mckinnon Jr
660 POPE LAKE ROAD
ANGIER, NC 27501

CLIENT:

SOUTHERN ENERGY MANAGEMENT
ENERGY EFFICIENCY & SOLAR POWER

ISSUED FOR:	DATE:
CONSTRUCTION	11/04/21

STRUCTURAL INFORMATION

PV3.4

ROOF LOADING	
GROUND SNOW LOAD:	15 LBS./SQFT.
LIVE LOAD:	20 LBS./SQFT.
DEAD LOAD:	
ROOFING	3.9 LBS./SQFT.
PV ARRAY	2.4 LBS./SQFT.
TOTAL	6.3 LBS./SQFT.
WIND LOAD:	
UPLIFT ZONE 1	-24.6 LBS./SQFT.
UPLIFT ZONE 2	-29.0 LBS./SQFT.
UPLIFT ZONE 3	-29.0 LBS./SQFT.
DOWNWARD	23.0 LBS./SQFT.
FASTENER LOAD:	
UPLIFT ZONE 1	-396 LBS.
UPLIFT ZONE 2	-350 LBS.
UPLIFT ZONE 3	-117 LBS.
DOWNWARD	370 LBS.

MOUNTING RAILS	
MAKE	SNAPNRACK
MODEL	RES. MOUNTING SYSTEM
MATERIAL	ALUMINUM
WEIGHT	0.42 LBS./FT.
SPACING	36 IN.

ROOF MOUNT & FASTENER	
ROOF MOUNT:	
MAKE	SNAPNRACK
MODEL	SPEEDSEAL FOOT
MATERIAL	ALUMINUM
FASTENER	
MAKE	GENERIC
MODEL	LAG BOLT
MATERIAL	304 SS
SIZE	5/16"-18 X 4"
GENERAL	
WEIGHT	1 LBS
FASTENERS PER MOUNT	1 PER MOUNT
MAX. PULL-OUT FORCE	800 LBS.
SAFETY FACTOR	2
DESIGN PULL-OUT FORCE	400 BS.

- LAG BOLT EMBEDDED WITH 2.5" OF THREAD IN WOOD RAFTER OR TRUSSES MEMBER

ARRAY SUMMARY	
# MODULES	14
# ROOF MOUNTS	31
RAIL LENGTH	96 FT.
ARRAY AREA	286 SQFT.
ARRAY WEIGHT	674 LBS.
AZIMUTH @ SN	100°
TILT ANGLE	45°

PV MODULES	
MAKE	Q CELL
MODEL	Q.PEAK DUO BLK-ML-G9 380
WIDTH	40.6"
LENGTH	72.4"
THICKNESS	1.26"
WEIGHT	43.0 LBS

ROOF SUMMARY	
STRUCTURE:	
TYPE	RAFTERS
MATERIAL	SOUTHERN PINE #2
SIZE	2" X 8"
SPACING	16" O.C.
EFF. SPAN	14'-0"
PITCH	12 / 12
DENSITY	30 LBS./CU.FT.
DECKING:	
TYPE	OSB
MATERIAL	WOOD COMPOSITE
THICKNESS	7/16"
WEIGHT	1.6 LBS./SQFT.
ROOFING:	
TYPE	ARCH SHINGLE
MATERIAL	ASPHALT
WEIGHT	2.3 LBS./SQFT.

STATEMENT OF STRUCTURAL COMPLIANCE

THE EXISTING ROOF STRUCTURE HAS BEEN DESIGNED TO SUPPORT THE ADDITIONAL LOADS OF THE PROPOSED PV SYSTEM. IN ADDITION, THE RACKING AND FASTENING SYSTEM SHALL BE CAPABLE OF SECURING THE SYSTEM TO THE STRUCTURE UNDER DESIGN CONDITIONS WHEN INSTALLED PROPERLY AND IN ACCORDANCE WITH THE RACKING AND FASTENING ARRANGEMENT DETAILED WITHIN THESE DRAWINGS.

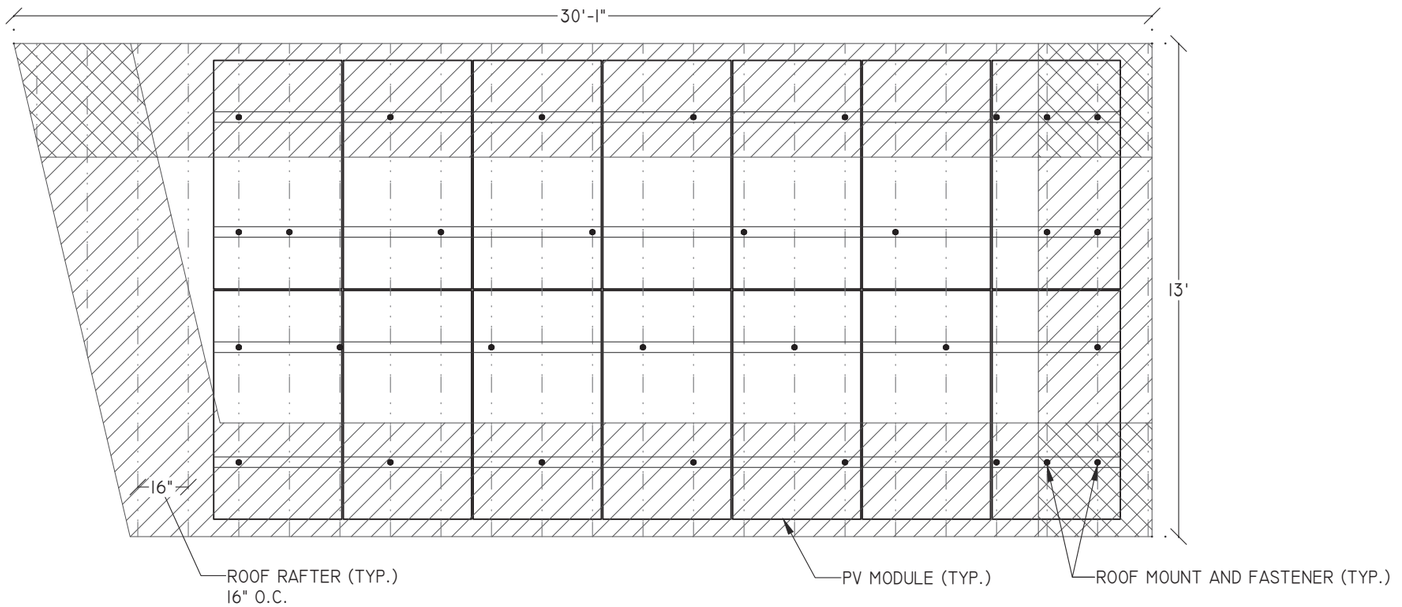
SIGNED: _____

NAME: ANDREW W. KING, PE

TITLE: PROFESSIONAL ENGINEER

ROOF ZONES:

ALL ZONES	MAX. RAIL OVERHANG = 12"
☐ ZONE 1	MAX. FASTENER SPAN ZONE 1 = 64"
▨ ZONE 2	MAX. FASTENER SPAN ZONE 2 = 48"
⊠ ZONE 3	MAX. FASTENER SPAN ZONE 3 = 16"



1 MODULE, RACKING, AND FASTENER LAYOUT - ROOF PLANAR VIEW

SCALE: 1/4" = 1'-0"

ENGINEER:

NORTH CAROLINA PROFESSIONAL SEAL 035699 ENGINEER ANDREW W. KING

11/8/21

MODEL ENERGY
300 FAYETTEVILLE ST.
#1430
RALEIGH, NC 27602
919-274-9905
MODELENERGY.COM
P-1194

JOB TITLE:

NEW SOLAR PV SYSTEM
22.04 kW DC INPUT
19.00 kW AC EXPORT

Halbert H Mckinnon Jr
660 POPE LAKE ROAD
ANGIER, NC 27501

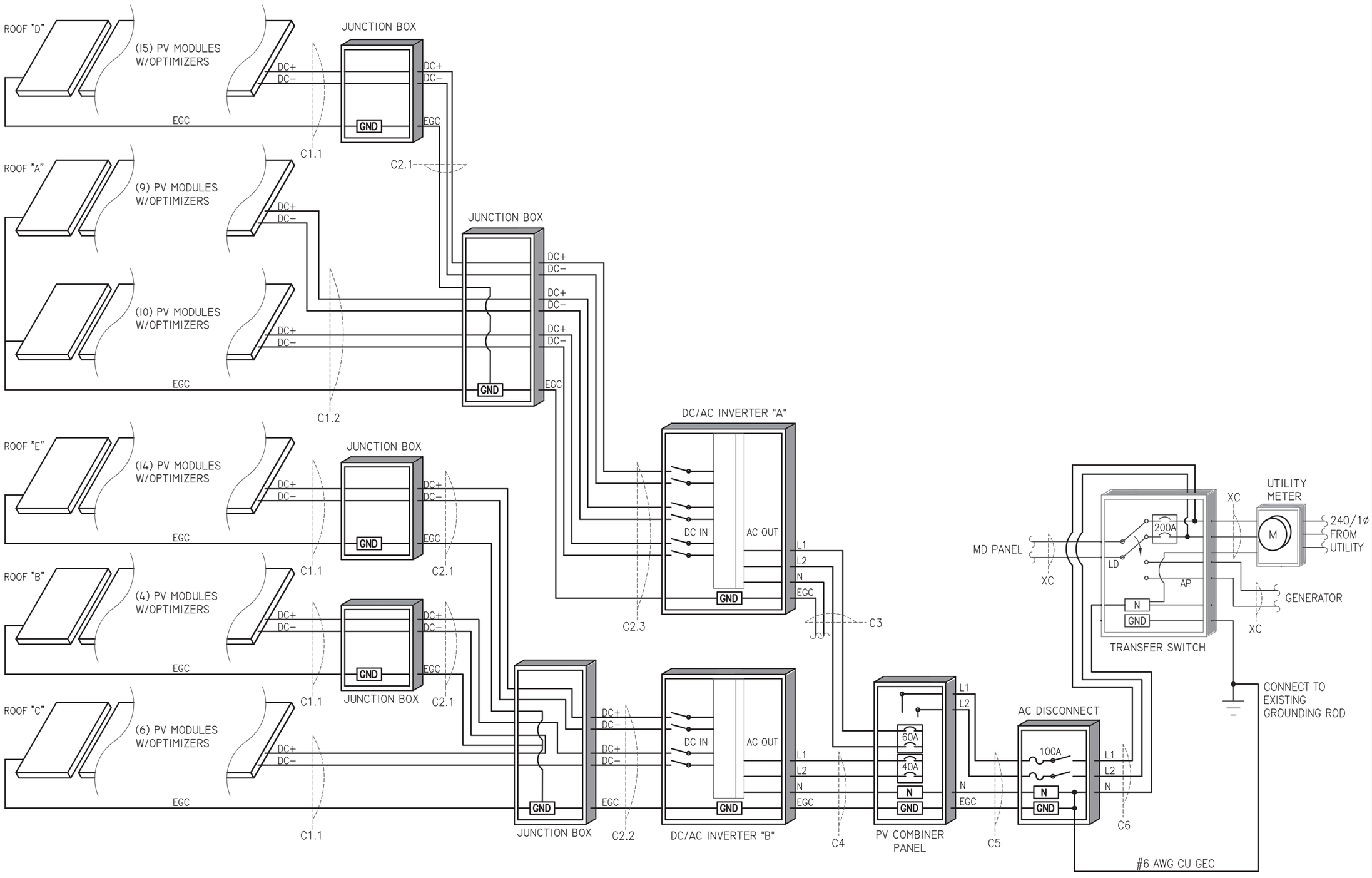
CLIENT:

SOUTHERN ENERGY MANAGEMENT
ENERGY EFFICIENCY & SOLAR POWER

ISSUED FOR:	DATE:
CONSTRUCTION	11/04/21

STRUCTURAL INFORMATION

PV3.5



1 | PV SYSTEM ELECTRICAL WIRING SCHEMATIC

SCALE : NTS

ENGINEER:

NORTH CAROLINA PROFESSIONAL SEAL 035699 ENGINEER ANDREW W. KING 11/3/21

MODEL ENERGY
300 FAYETTEVILLE ST.
#1430
RALEIGH, NC 27602
919-274-9905
MODELENERGY.COM
P-1194

JOB TITLE:

NEW SOLAR PV SYSTEM
22.04 kW DC INPUT
19.00 kW AC EXPORT

Halbert H Mckinnon Jr
660 POPE LAKE ROAD
ANGIER, NC 27501

CLIENT:

SOUTHERN ENERGY MANAGEMENT
ENERGY EFFICIENCY & SOLAR POWER

ISSUED FOR:	DATE:
CONSTRUCTION	11/04/21

ELECTRICAL INFORMATION

PV4.1

PV MODULES	
MAKE	Q CELL
MODEL	Q.PEAK DUO BLK-ML-G9 380
TECHNOLOGY	MONO-CRYST.
NOM. POWER (Pnom)	380 WATTS
NOM. VOLT. (Vmp)	37.85 VOLTS
O.C. VOLT. (Voc)	45.04 VOLTS
MAX. SYS. VOLT.	1000 V (UL)
TEMP. COEF. (Vtc)	-0.27 %/°C
NOM. CURR. (Imp)	10.04 Amps
S.C. CURR. (Isc)	10.50 Amps
MAX. SERIES FUSE	20 Amps

MODULE OPTIMIZER	
MAKE	SOLAREDGE
MODEL	P401
DC INPUT:	
RATED POWER	400 WATTS
VOLT. RANGE	8 - 60
MAX. SCC	11.75 AMPS
MAX. DC INPUT CURRENT	11.75 AMPS
DC OUTPUT:	
MAX. CURRENT	15 AMPS
MAX. VOLT.	60 VOLTS
MAX. SYSTEM VOLT.	1000 VOLTS
MIN. STRING	8 OPTIMIZERS
MAX. STRING	25 OPTIMIZERS
MAX. POWER	
INVERTERS: SE3000H-SE6000H	5700 WATTS
INVERTERS: SE7600H-SE11400H	6000 WATTS

JUNCTION BOX	
MAKE	SOLADECK
MODEL	0783-3R
PRO. RATING	NEMA 3R
VOLT. RATING	600 VOLTS
AMP RATING	120 AMPS
UL LISTING	UL 50

DC/AC INVERTER "A"	
MAKE	SOLAREDGE
MODEL	SE11400H-US
TECHNOLOGY	TRANS-LESS
DC INPUT:	
MAX. POWER	17650 WATTS
MAX. VOLT	480 VOLTS
NOM. VOLT.	400 VOLTS
MAX. CURRENT	30.5 AMPS
MAX. SCC	45 AMPS
STRINGS INPUTS	3 STRINGS
AC OUTPUT:	
RATED POWER	11400 WATTS
MAX. POWER	11400 WATTS
NOM. VOLT.	240 VOLTS
MAX. CURR.	47.5 AMPS
GFP (Y/N)	YES
RPP (Y/N)	YES
GFCI (Y/N)	YES
AFCI (Y/N)	YES
DC DISC. (Y/N)	YES
RAPID SHUTDOWN	AUTOMATIC
FUSE RATING	15 AMPS
PROTECT. RATING	NEMA 4X

DC/AC INVERTER "B"	
MAKE	SOLAREDGE
MODEL	SE7600H-US
TECHNOLOGY	TRANS-LESS
DC INPUT:	
MAX. POWER	11800 WATTS
MAX. VOLT	480 VOLTS
NOM. VOLT.	400 VOLTS
MAX. CURRENT	20 AMPS
MAX. SCC	45 AMPS
STRINGS INPUTS	2 STRINGS
AC OUTPUT:	
RATED POWER	7600 WATTS
MAX. POWER	7600 WATTS
NOM. VOLT.	240 VOLTS
MAX. CURR.	32 AMPS
GFP (Y/N)	YES
RPP (Y/N)	YES
GFCI (Y/N)	YES
AFCI (Y/N)	YES
DC DISC. (Y/N)	YES
RAPID SHUTDOWN	AUTOMATIC
FUSE RATING	15 AMPS
PROTECT. RATING	NEMA 4X

CONDUCTOR SCHEDULE

TAG	CURRENT CARRYING CONDUCTORS				GROUNDING CONDUCTORS				CONDUIT/RACEWAY				NOTES
	QTY.	SIZE	MATERIAL	INSULATION	QTY.	SIZE	MATERIAL	INSULATION	QTY.	SIZE	MATERIAL	LOCATION	
C1.1	2	10 AWG	COPPER	PV WIRE	1	6 AWG	COPPER	BARE	-	-	-	FREE AIR	1
C1.2	4	10 AWG	COPPER	PV WIRE	1	6 AWG	COPPER	BARE	-	-	-	FREE AIR	1
C2.1	2	10 AWG	COPPER	THWN-2	1	10 AWG	COPPER	THWN-2	1	1/2"	FMC/EMT/MC	EXT/INT	2,4
C2.2	4	10 AWG	COPPER	THWN-2	1	10 AWG	COPPER	THWN-2	1	1/2"	FMC/EMT/MC	EXT/INT	2,4
C2.3	6	10 AWG	COPPER	THWN-2	1	10 AWG	COPPER	THWN-2	1	1/2"	FMC/EMT/MC	EXT/INT	2,4
C3	3	6 AWG	COPPER	THWN	1	10 AWG	COPPER	THWN	1	3/4"	NOTE 5	EXTERIOR	2,4,5
C4	3	8 AWG	COPPER	THWN	1	10 AWG	COPPER	THWN	1	3/4"	NOTE 5	EXTERIOR	2,4,5
C5	3	3 AWG	COPPER	THWN	1	8 AWG	COPPER	THWN	1	1"	NOTE 5	EXTERIOR	2,4,5
C6	3	3 AWG	COPPER	THWN	-	-	-	-	1	1"	NOTE 5	EXTERIOR	2,4,5,6
XC	-	-	-	-	-	-	-	-	-	-	-	-	3

NOTES:

1. MANUFACTURER PROVIDED, UL LISTED WIRING HARNESS FOR USE ON EXPOSED ROOFS
2. CONDUIT SIZE SHOWN IS CODE MINIMUM. LARGER SIZES ARE ALLOWED.
3. EXISTING CONDUCTORS, FIELD VERIFY
4. EQUIPMENT TERMINAL RATING SHALL BE A MINIMUM OF 75°C AT BOTH END OF CONDUCTOR
5. PVC, EMT, ROMEX, LFNMC & FMC ARE ACCEPTABLE WHEN USED IN ACCORDANCE WITH ARTICLES 330, 334, 348, 350, 352, 356, & 358 OF THE 2017 NEC
6. SERVICE CONDUCTORS SHALL NOT BE LONGER THAN 5' AND SHALL TERMINATE AT THE FIRST POINT OF DISCONNECT.

AC DISCONNECT	
MAKE	GENERIC
MODEL	N/A
ENCL. RATING	NEMA 3R
VOLT. RATING	240 VOLTS
AMP RATING	100 AMPS
UL LIST. (Y/N)	YES
FUSED (Y/N)	YES
FUSE RATING	100 AMPS

NOTES:

- LOAD-BREAK RATED
- VISIBLE OPEN
- LOCKABLE IN OPEN POSITION
- INSTALL ADJACENT TO METER
- DISCONNECT TO BE READILY ACCESSIBLE TO UTILITY COMPANY PERSONNEL AT ALL TIMES
- SERVICE RATED
- PROVIDE NEUTRAL/GROUND BONDING JUMPER

PV COMBINER PANEL	
MAKE	N/A
MODEL	N/A
ENCL. RATING	NEMA 3R
VOLT. RATING	240 VOLTS
BUS RATING	125 AMPS
UL LIST. (Y/N)	YES
MAIN BREAKER (Y/N)	NO
BREAKER RATING	N/A

NOTES:

- BACK-FEED SOLAR OUTPUT VIA (1) 60 BREAKER FOR INVERTER "A" & (1) 40 AMP BREAKER FOR INVERTER "B" AT THE OPPOSITE END OF THE BUS BAR FROM THE INCOMING FEEDERS
- PROVIDE WITH PERMANENT LABEL THAT READS, "PV COMBINER PANEL. DO NOT ADD ADDITIONAL LOADS."

TRANSFER SWITCH (EXISTING)	
MAKE	N/A
MODEL	N/A
ENCL. RATING	NEMA 3R
VOLT. RATING	240 VOLTS
BUS RATING	200 AMPS
UL LIST. (Y/N)	YES
MAIN BREAKER (Y/N)	YES
BREAKER RATING	200 AMPS

NOTES:

- BACK-FEED PV COMBINER OUTPUT VIA SUPPLY SIDE TAP IN TRANSFER SWITCH

1 PV SYSTEM ELECTRICAL SCHEDULES

SCALE : NTS

ENGINEER:

NORTH CAROLINA PROFESSIONAL SEAL 035699 ENGINEER ANDREW W. KING
11/8/21

MODEL ENERGY
300 Fayetteville St.
#1430
Raleigh, NC 27602
919-274-9905
ModelEnergy.com
P-1194

JOB TITLE:

NEW SOLAR PV SYSTEM
22.04 kW DC INPUT
19.00 kW AC EXPORT

Halbert H Mckinnon Jr
660 POPE LAKE ROAD
ANGIER, NC 27501

CLIENT:

SOUTHERN ENERGY MANAGEMENT
ENERGY EFFICIENCY & SOLAR POWER

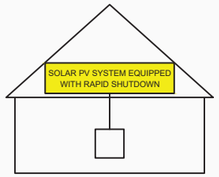
ISSUED FOR:	DATE:
CONSTRUCTION	11/04/21

ELECTRICAL INFORMATION

PV4.2

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY



NEC 690.56 (C)(1)(a)
PLACE WITHIN 3FT OF SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATIONS OF RAPID SHUTDOWN SWITCHES

WARNING: PHOTOVOLTAIC POWER SOURCE

NEC 690.31 (G)(3)&(4)
PLACE ON ALL JUNCTION BOXES, EXPOSED RACEWAYS, AND OTHER WIRING METHODS EVERY 10' AND ON EVERY SECTION SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

NEC 690.56 (C)(3)
PLACE ON RAPID SHUTDOWN SWITCH OR EQUIPMENT WITH INTEGRATED RAPID SHUTDOWN *REFLECTIVE*

PV SYSTEM DISCONNECT

NEC 690.13 (B)
PLACE ON PV SYSTEM DISCONNECTING MEANS.

WARNING
DUAL POWER SUPPLY
SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

NEC 705.12 (B)(3)
PLACE ON ALL EQUIPMENT THAT IS SUPPLIED BY BOTH POWER SOURCES

WARNING
POWER SOURCE OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

NEC 705.12 (B)(2)(3)(b)
PLACE ADJACENT TO BACK-FED BREAKER

WARNING
FED BY MULTIPLE POWER SOURCES
TOTAL RATING OF ALL OVERCURRENT DEVICES EXCLUDING UTILITY OVERCURRENT DEVICE SHALL NOT EXCEED AMPACITY OF BUSBAR

NEC 705.12 (B)(2)(3)(c)
PLACE ADJACENT TO BACK-FED BREAKER

EQUIPMENT LABEL NOTES

1. LABELS SHOWN ARE 1/2 THEIR ACTUAL REQUIRED SIZE.
2. LABEL MATERIAL SHALL BE SUITABLE FOR THE EQUIPMENT ENVIRONMENT.
3. CONDUIT SHALL BE MARKED WITH REQUIRED LABEL EVERY 10 FEET.

WARNING
ELECTRIC SHOCK HAZARD
TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

NEC 690.13 (B)
PLACE ON PV SYSTEM DISCONNECTING MEANS.

DIRECT CURRENT
PHOTOVOLTAIC POWER SOURCE

MAXIMUM VOLTAGE	600	VDC
MAX CIR. CURRENT	45.0	AMPS

NEC 690.53
PLACE ON INVERTER "A"
DC DISCONNECTING MEANS

DIRECT CURRENT
PHOTOVOLTAIC POWER SOURCE

MAXIMUM VOLTAGE	600	VDC
MAX CIR. CURRENT	30.0	AMPS

NEC 690.53
PLACE ON INVERTER "B"
DC DISCONNECTING MEANS

PHOTOVOLTAIC POWER SOURCE

OPERATING AC VOLT.	240 VAC
MAXIMUM OPERATING AC OUTPUT CURRENT	79.5 AMPS

NEC 690.54
PLACE ON INTERCONNECTION DISCONNECTING MEANS

ENGINEER:

NORTH CAROLINA PROFESSIONAL SEAL 035699 ENGINEER ANDREW W. KING
11/8/21

MODEL ENERGY
300 FAYETTEVILLE ST.
#1430
RALEIGH, NC 27602
919-274-9905
MODELENERGY.COM
P-1194

JOB TITLE:

NEW SOLAR PV SYSTEM
22.04 kW DC INPUT
19.00 kW AC EXPORT
Halbert H Mckinnon Jr
660 POPE LAKE ROAD
ANGIER, NC 27501

CLIENT:

SOUTHERN ENERGY MANAGEMENT
ENERGY EFFICIENCY & SOLAR POWER

ISSUED FOR:	DATE:
CONSTRUCTION	11/04/21

EQUIPMENT LABELS

PV5.1