



NORTHUMBERLAND COUNTY LAND USE APPLICATION

Answer all questions. Refer to Appendix A for the checklist to make sure that you have all required information. Please type or print all information in blue or black ink.

1. Owner/Applicant Information:

Owners Name: Mark Malley		Address: 1530 Mundy Point Road, Callao, VA 22435
Telephone (H):	Telephone (W):	Email: malleymark@me.com

Applicants Name: Bernie Stanley (Shockoe Solar)		Address: 13421 River Ridge Lane, Ashland, Virginia 23005
Telephone (H): 804-338-3874	Telephone (W): 804-338-3874	Email: brytni@shockoesolar.com

Plan Preparer/Authorized Agent:		Address:
Telephone (H):	Telephone (W):	Email:

2. Property Information:

Tax Parcel #: 2 - (1) - 61		Parcel Physical Address (If applicable): 1530 Mundy Point Road, Callao, VA 22435		
Current Zoning: <input type="checkbox"/> C-1 <input type="checkbox"/> A-1 <input type="checkbox"/> R-1 <input checked="" type="checkbox"/> R-2 <input type="checkbox"/> R-3 <input type="checkbox"/> R-4 <input type="checkbox"/> B-1 <input type="checkbox"/> M-1		Acreage: 29.44	Magisterial District: NL	Date Property Purchased:
Are there any structures on the property? <input checked="" type="checkbox"/> Yes (If yes, please describe) dwelling, sheds, pool <input type="checkbox"/> No: tennis court, boathouse, etc.			Deed Book Page #:	
Board of Supervisor Representative: James Brann		What is the road name or route number on which your property is located? Mundy Point Road		
Directions to Property: 1530 Mundy Point Rd				

Office Use Only:		Application #: 23 - 011 - 018
DATE RECEIVED: 9/26/23	BOARD ACTION: <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/ conditions <input type="checkbox"/> Denied <input type="checkbox"/> Withdrawn Meeting Date 2-7-23	<div style="text-align: center;"> </div> TYPE OF APPLICATION / FEE: <input type="checkbox"/> Appeal Decision of Zoning Administrator <input checked="" type="checkbox"/> Conditional Use- \$150 <input type="checkbox"/> Conditional Use Boathouse- \$150 <input type="checkbox"/> Exception to the Bay Act- \$300 <input type="checkbox"/> Subdivision Variance- \$300 <input checked="" type="checkbox"/> Zoning Variance- \$300

3. Description of Request:

Type of Request (check one): <input type="checkbox"/> Conditional Use <input type="checkbox"/> Exception to the Bay Act <input type="checkbox"/> Subdivision Variance <input checked="" type="checkbox"/> Zoning Variance
What is the current use? (Use another sheet of paper if more space is needed): 24.30 kW ground mount solar array being built 01/2023. Zoning (#34496), building (#34494) and electrical (#34495) permits have all been issued. This array includes 60 solar panels.
Describe the proposed use/project (Use another sheet of paper if more space is needed): Increase currently approved array from 24.30 kW to 35.64 kw (11.34 kw difference). This would include the addition of 28 solar panels, totaling 88. The sq. footage will remain 1,482.364 sq. ft. As on the plans submitted the total array sq. ft. included the entire array size (noted on plans the portion for future use).
Have you discussed this request with any State and/or Federal agencies that may require a permit? (Health Department, Virginia Department of Transportation, etc.) <input type="checkbox"/> Yes (If yes, please explain) <input checked="" type="checkbox"/> No
Have you previously applied to or obtained a permit from Northumberland County for any portion of this request or relating to this request? <input checked="" type="checkbox"/> Yes (If yes, please explain) Zoning (#34496), building (#34494) and electrical (#34495) permits have all been issued. <input type="checkbox"/> No
Has any portion of this request for which you are seeking a permit been completed or commenced? <input type="checkbox"/> Yes (If yes, please explain) <input checked="" type="checkbox"/> No The portion that has been approved will start 01/2023, but has not started as of this application.

ADJACENT PROPERTY OWNERS

Charles W. or Elizabeth B. Kaufman
8080 Castle Grove Drive
Mechanicsville, VA 23111

Robert W. or Bertha D. Booth
P. O. Box 198
Callao, VA 22435

Norman L. or Linda B. Withers
P.O. Box 81
Callao, VA 22435

Monte B. or Susan F. Lake
P. O. Box A
Callao, VA 22435

Francis G. Landman
1005 Hatches Ave
Callao, VA 22435

Stacy A. Kramer
1473 Mundy Point Road
Callao, VA 22435

Rives Sebrell Hardy &
Elizabeth Broaddus Hardy
1451 Mundy Point RD
Callao, VA 22438

Catherine B. Birley or
Daniel J. Birley, II
45 Yeocomico Lane
Callao, VA 22435

Ashland, VA

23005

5. Signature Page:

This application is submitted true and correct. Applicant agrees that when the permit herein applied for is issued, that all work will be completed as stated and as required by all Northumberland County Ordinances, Virginia State laws, and any other applicable regulations. Failure to comply with any part or terms of this application shall be sufficient cause to revoke any permit issued. This application shows duly authorized representatives of the County to enter upon the premises of the project site at reasonable times for the purpose of inspection.

Signature of Owner(s) Mark J. Morley Date 12/20/22

Printed Name(s) Mark J. Morley

Signature of Applicant(s) Bernie Stanley Date _____

Printed Name(s) Bernie Stanley

Signature of Agent _____ Date _____

Printed Name _____

The applicant and/or a representative shall be present at the hearing or the Board of Zoning Appeals will not hear the variance request.

Please submit this appendix with your application.

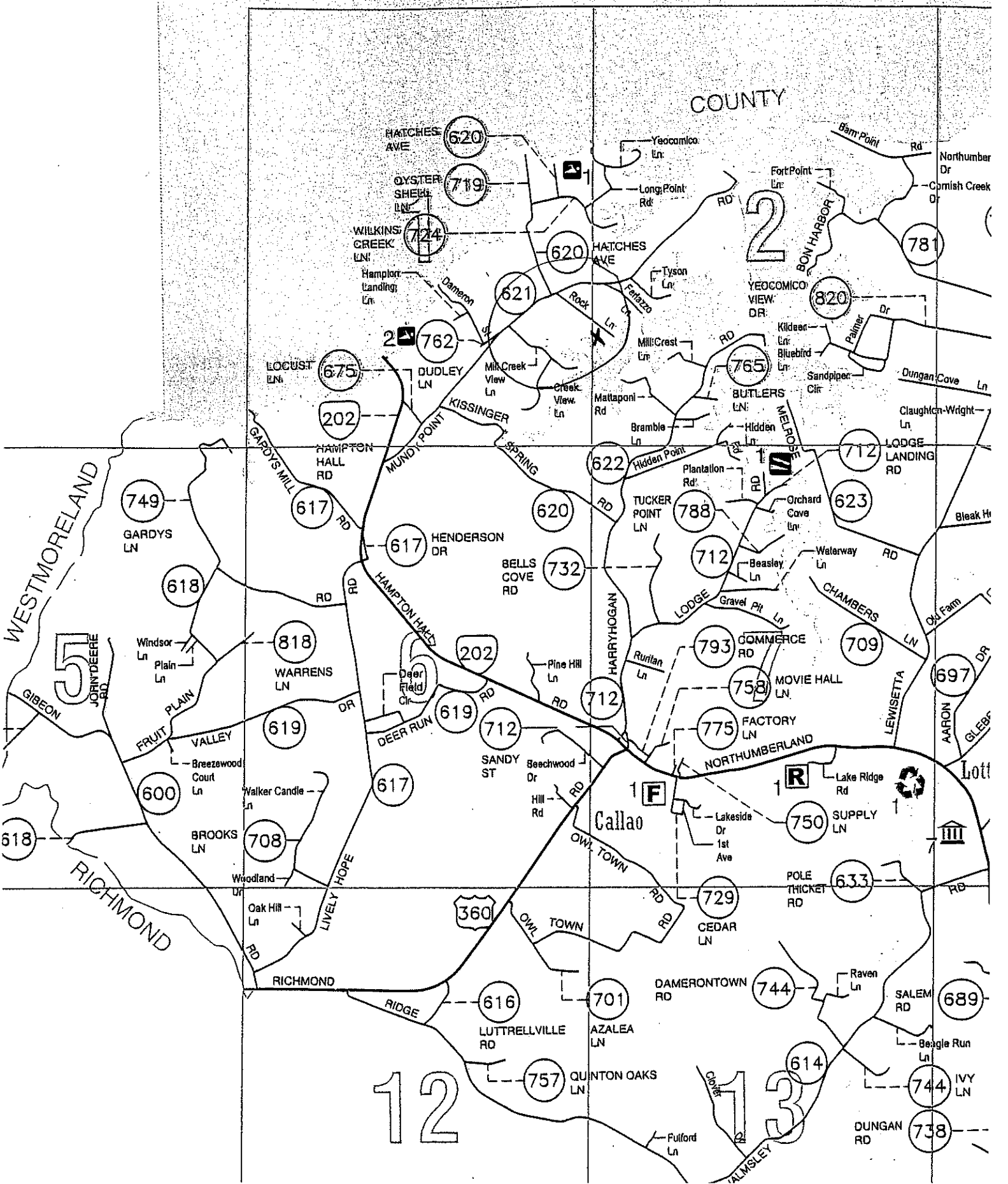
1, Please provide the following setbacks for all proposed structures:

Primary Structure:	
Road/Right-of-way <u>2144' 0"</u>	Rear Yard <u>302' 0"</u>
Left Side Line <u>317' 3"</u>	Right Side Line <u>30' 0"</u>
Height of Structure <u>9' 6"</u>	
Secondary Structure:	
Road/Right-of-way _____	Rear Yard _____
Left Side Line _____	Right Side Line _____
Height of Structure _____	

2. Please answer the following questions:

Will there be any fencing or landscaping? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If yes, describe and show on the site plan.)
Have all attempts been made to meet the current zoning regulations? <input type="checkbox"/> Yes <input type="checkbox"/> No (Please explain.) The sq. footage of the array will remain 1,482.364 sq. ft. (under 1,500 limit).

Office Use Only:
Part of application #: <u>23 CU-018</u>
Date Received: <u>9-20-23</u>



COUNTY

WESTMORELAND

RICHMOND

2

12

13

HATCHES AVE (620)

OYSTER SHELL LN (719)

WILKINS CREEK LN (724)

HATCHES AVE (620)

Hampton Landing Ln

Rock Ln (621)

LOCUST LN (675)

DUDLEY LN (762)

Mill Creek Ln (765)

HAMPTON HALL RD (202)

MUNDY POINT

Hidden Point (622)

GARDYS LN (749)

HENDERSON DR (617)

TUCKER POINT LN (788)

Windsor Ln (618)

BELLS COVE RD (732)

Plantation Rd (712)

FRUIT VALLEY (619)

WARRENS LN (818)

Orchard Cove Ln (623)

BROOKS LN (600)

DEER RUN (619)

LODGE GRAVEL PIT LN (793)

Walker Candle Ln (708)

SANDY ST (617)

COMMERCIAL RD (758)

Woodland Ln (708)

Beechwood Dr (712)

MOVIE HALL LN (775)

Oak Hill Ln (708)

Hill Rd (712)

FACTORY LN (775)

LIVELY HOPE

OW TOWN (712)

LAKESIDE DR (750)

RIDGE

LUTTRELLVILLE RD (616)

SUPPLY LN (750)

QUINTON OAKS LN (757)

AZALEA LN (701)

POLE THicket RD (633)

Fulford Ln

SALEM RD (689)

CEDAR LN (729)

Callao

SALEM RD (689)

DAMERONTOWN RD (744)

DUNGAN RD (738)

IVY LN (744)

Raven Ln (744)

BEAGLE RUN LN (744)

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SALEM RD (689)

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January 24, 2023
Phillip H. Marston
Zoning Administrator
Northumberland County
Heathsville, VA 22473

Dear Mr. Marston,

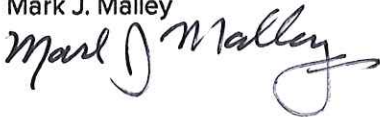
I am writing regarding the solar project at our house at 1530 Mundy Point Road Callao, VA 22435. Thank you for your approval of our initial project. I would like to ask you to consider and approve our upgrade in total capacity of the unit from 25kW to 35.64kW. The reason for the larger system is to actually meet the electrical needs of our property. This is not a commercial project; only a residential one. My wife and I have some experience with solar systems. In our past house in Kansas City, Missouri before we moved here we had a 12kW system which only covered about a fourth of our energy needs. That's why we wanted the size system that we purchased. At the time of purchase, however, we were not aware of potential limits by the county. I ask that you raise the current limit and approve our larger system so that we can meet our electrical needs.

We currently have three electrical meters on our property. Our electrical needs are extensive as we have had a monthly bill of \$1000.00 in the past year and a half in which we have owned the property. Additionally, we are in the process of replacing the current house with a larger house and a guest house so that we will have a place for our family (from all over the US) to stay when they visit. We currently have our storage building which is climate controlled, we charge electric vehicles and we charge a boat. As you can see, our electricity needs are considerable so a larger unit would provide us with the clean power that we need.

My wife, Luellen, and I appreciate your consideration of this matter and ask that you approve our request. If I need to appear before the county commissioners to explain our project I would be glad to do so. Please let me know what else that I need to do to help move the project forward.

Sincerely yours,

Mark J. Malley



February 10,2023

Phillip H. Marston
Northland Umberland County Zoning Commissioner
Heathsville, VA

Dear Mr. Marston,

Thanks for inviting me to the Board of Supervisors' meeting last night and having a chance to present our case. After listening to the debate on commercial solar farms, after talking to one of the county supervisors as well as listening to some fellow citizens talk about solar issues, I think that I understand now what questions and issues the county might have about our system.

I think that the main misunderstanding is how our system has been designed to work. I already have 2 high tech inverters installed (see picture below). One is dedicated to only allowing solar generated power to flow to our house (i.e. It is not connected to the Dominion Power grid). The other inverter would allow any excess flow to go to the grid if we weren't using the power at the time. If you approve our additional panels so that we can reach 36kW, we still would not reach the limit of 25kW as stated in the net metering portion of the Virginia law (56-594) which addresses residential solar energy sending power to the grid. I don't think that Bernie Stanley of Shokoe Solar adequately communicated this to you at the time of getting our original permit. So I can see why you were hesitant to approval our overall generating capacity over 25 kW.



Are there other Virginia residents who currently generate over 25 kW capacity at their homes? Yes, there are several located in different counties. But just like our solar system, these residents split their output to stay within the limits of the current Virginia regulations.

Another issue which I have heard is that solar installations can be unsightly and take away valuable farm land. As you know, we have two rows of ground mounted panels. These are barely visible from Mundy Point Road; they are very inconspicuous. We have planted trees along the edge of the panels between the panels and our neighbors to minimize any impact on them. If you allow us to add the additional panels to reach about 36kW, there will be no additional rows of collectors; they will just be added to the currently installed poles on the second row of collectors. The visual impact will be minimal. (See photos below).



The footprint of our system takes very little of our farmland; the remainder of our farm is still rented to Michael Downing. Additionally, we formally petitioned the FAA and received approval for removal of the private airport status of a large portion of our property. This airstrip is being returned to farmland this spring.

I heard some concern from our fireman/emergency responders about working around solar facilities. The advantage our ground based system has that it is located far from buildings so the risk to any property or people is basically non-existent as opposed to a roof mounted system. Additionally, the disconnects are easy to locate if an emergency situation was ever to arise.

Last year, we used 40.5 kW here at our 1530 Mundy Point Road home in Callao. So even if we are allowed to install about 36 kW, we still would not be producing more than we could use. Our understanding of how net metering works is that if we produce 50 units of electricity in the day but use only 25 units, the 25 units is credited to us during the current billing cycle. So that at night, if we produce no electricity but need 30 units, we would only be billed for 5 units for that day. Any excess energy which we would generate but not use within our 30 day billing cycle would be forfeited to Dominion Power. This is a better deal than our previous location in KC, MO where we received 1 cent per kW/hour for any excess we produced during the day, but paid 13 cents per kW/hour for any we received through the grid. Electricity use is increasing and costs are increasing. We are trying to be proactive to reduce our overall energy costs in our retirement years here in the Northern Neck. I think that you can see that our request based on our power usage is not excessive and is in fact very reasonable.

I'm sorry that the initial miscommunication has caused so much work for you. Perhaps if the initial plan had been communicated properly, you wouldn't have had to spend so much time on considering this project and it would have been easier to approve outright.

Please inform me on how we are to go forward. Since we are staying within the written law, can you approve our project directly? Do we still need to get the County Supervisors or the Planning Commission to approve this with a variance? If you want to share this with Supervisors or whoever else is involved in the final decision, I certainly encourage you to do so. If I need to appear before the Board again in two weeks or meet with any county personnel, I would be glad to do this as well. Thanks for all of your help.

Sincerely yours,

A handwritten signature in black ink that reads "Mark". The signature is written in a cursive, slightly slanted style.

Mark J. Malley

Northumberland County
Office of Building & Zoning
P. O. Box 129
Heathsville, VA 22473
(804)580-7921

Project #: 34494 Permit Date: 10/26/2022
Tax Map #: 2-(1)--61- Expiration Date: 04/26/2023
Structure Type: SOLAR Square Footage:

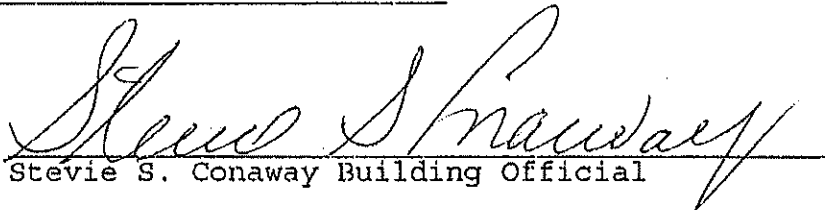
Project Desc: 24.3 KW RESIDENTIAL GROUND MOUNT SOLAR ARRAY
Location: 1530 MUNDY POINT RD

Owner:
MALLEY MARK J AND
1530 MUNDY POINT RD
CALLAO, VA 22435

Contractor:
SHOCKOE SOLAR LLC
13421 RIVER RIDGE LN
ASHLAND, VA 23005
(804)798-9715

Lien Agent:

REMARKS:


Stevie S. Conaway Building Official

BUILDING PERMIT

THIS PERMIT IS ISSUED IN ACCORDANCE WITH REGULATIONS SET FORTH IN THE BUILDING CODE OF NORTHUMBERLAND COUNTY, VIRGINIA. BUILDING MUST BE LOCATED ON PROPERTY IN EXACT POSITION SHOWN ON SITEPLAN SUBMITTED WITH APPLICATION. POST THIS CARD ON A FLAT SURFACE AND TACK AT EACH CORNER. POST THIS CARD SO IT IS VISIBLE FROM THE STREET OR RIGHT-OF-WAY. CARD MUST BE POSTED BEFORE FIRST INSPECTION.

Northumberland County
Office of Building & Zoning
P. O. Box 129
Heathsville, VA 22473
(804)580-7921

Project #: 34496 Permit Date: 10/26/2022
Tax Map #: 2-(1)--61- Expiration Date: 04/26/2023
Structure Type: Zoning Square Footage:

Project Desc: ELECTRIC FOR 24.3 KW RESIDENTIAL GROUND MOUNT SOLAR ARRAY
Location: 1530 MUNDY POINT RD

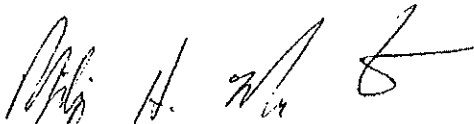
Owner:
MALLEY MARK J AND
1530 MUNDY POINT RD
CALLAO, VA 22435

Contractor:
SHOCKOE SOLAR LLC
13421 RIVER RIDGE LN
ASHLAND, VA 23005
(804)798-9715

VMRC:

REMARKS:

* shall not exceed 1500 sq. ft *


Philip H. Marston Zoning Administrator

ZONING PERMIT

THIS PERMIT IS ISSUED IN ACCORDANCE WITH REGULATIONS SET FORTH IN THE BUILDING CODE OF NORTHUMBERLAND COUNTY, VIRGINIA. BUILDING MUST BE LOCATED ON PROPERTY IN EXACT POSITION SHOWN ON SITEPLAN SUBMITTED WITH APPLICATION. POST THIS CARD ON A FLAT SURFACE AND TACK AT EACH CORNER. POST THIS CARD SO IT IS VISIBLE FROM THE STREET OR RIGHT-OF-WAY. CARD MUST BE POSTED BEFORE FIRST INSPECTION.

Northumberland County
Office of Building & Zoning
P. O. Box 129
Heathsville, VA 22473
(804)580-7921

Project #: 34495
Tax Map #: 2-(1)--61-
Structure Type: Electrical

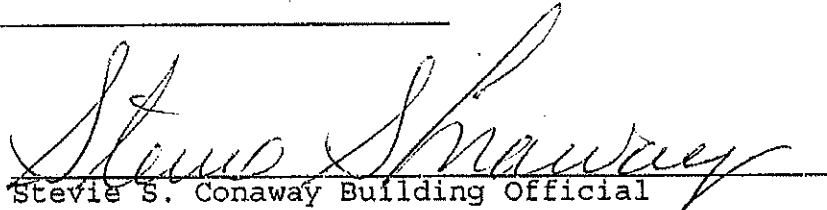
Permit Date: 10/26/2022
Expiration Date: 04/26/2023
Square Footage:

Project Desc: ELECTRIC FOR 24.3 KW RESIDENTIAL GROUND MOUNT SOLAR ARRAY
Location: 1530 MUNDY POINT RD

Owner:
MALLEY MARK J AND
1530 MUNDY POINT RD
CALLAO, VA 22435

Contractor:
SHOCKOE SOLAR LLC
13421 RIVER RIDGE LN
ASHLAND, VA 23005
(804)798-9715

REMARKS:


Stevie S. Conaway Building Official

ELECTRICAL PERMIT

THIS PERMIT IS ISSUED IN ACCORDANCE WITH REGULATIONS SET FORTH IN THE BUILDING CODE OF NORTHUMBERLAND COUNTY, VIRGINIA. BUILDING MUST BE LOCATED ON PROPERTY IN EXACT POSITION SHOWN ON SITEPLAN SUBMITTED WITH APPLICATION. POST THIS CARD ON A FLAT SURFACE AND TACK AT EACH CORNER. POST THIS CARD SO IT IS VISIBLE FROM THE STREET OR RIGHT-OF-WAY. CARD MUST BE POSTED BEFORE FIRST INSPECTION.



CONTRACTOR
 SHOCKOE SOLAR, LLC
 PHONE: 8043144023
 ADDRESS: 1821 RIVER RIDGE LANE
 ASHLAND, VA 23065

LIC. NO.: 2705126885
 HIC. NO.:
 ELE. NO.:
 UNAUTHORIZED USE OF THIS DOCUMENT OR REPRODUCTION THEREOF WITHOUT THE WRITTEN PERMISSION FROM CONTRACTOR IS IN VIOLATION OF U.S. COPYRIGHT LAWS AND WILL BE SUBJECT TO CIVIL DAMAGES AND PROSECUTIONS.

NEW PV SYSTEM: 35.640 kWp

MALLEY RESIDENCE

1530 MUNDY POINT RD,
 CALLAO, VA 22435
 APN: 2 1 61

ENGINEER OF RECORD

PAPER SIZE: 11" X 17" (ANSI B)
COVER PAGE
 DATE: 09.27.2022
 DESIGN BY: I.M.
 CHECKED BY: M.M.
 REVISIONS
T-001.00
 (SHEET 1)

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-001	LINE DIAGRAM
E-002	DESIGN TABLES
E-003	PLACARDS
S-001	ASSEMBLY DETAILS
R-001	RESOURCE DOCUMENT
R-002	RESOURCE DOCUMENT
R-003	RESOURCE DOCUMENT
R-004	RESOURCE DOCUMENT
R-005	RESOURCE DOCUMENT

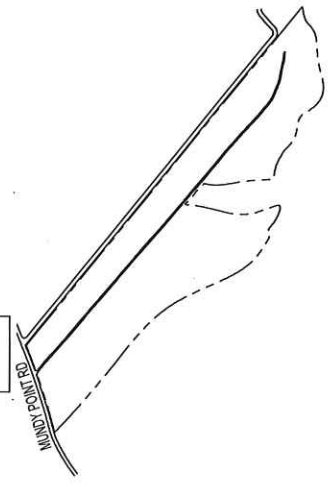
PROJECT INFORMATION

OWNER NAME: MARK MALLEY
PROJECT MANAGER NAME: BERNIE STANLEY PHONE: (804) 314-4023
CONTRACTOR NAME: SHOCKOE SOLAR, LLC PHONE: 8043144023
AUTHORITIES HAVING JURISDICTION
 BUILDING: NORTHUMBERLAND COUNTY
 ZONING: NORTHUMBERLAND COUNTY
 UTILITY: DOMINION ENERGY
DESIGN SPECIFICATIONS
 OCCUPANCY: II
 CONSTRUCTION: SINGLE-FAMILY RESIDENTIAL
 ZONING: RESIDENTIAL
 GROUND SNOW LOAD: 20 PSF
 WIND EXPOSURE: D
 WIND SPEED: 115 MPH
APPLICABLE CODES & STANDARDS
 BUILDING: IRC 2015, IRC 2015
 ELECTRICAL: NEC 2014, IFC 2015
 FIRE: IFC 2015

NEW PV SYSTEM: 35.640 kWp
MALLEY RESIDENCE
 1530 MUNDY POINT RD,
 CALLAO, VA 22435
 ASSESSOR'S #: 2 1 61



01 AERIAL PHOTO
 NOT TO SCALE



02 PLAT MAP
 NOT TO SCALE

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 MANUFACTURER'S LISTING AND INSTALLATION INSTRUCTIONS AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTIONS (A/HJ) 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 690.6C; PV MODULES: UL1703, IEC61730, AND IEC61215, AND NFPA 70 CLASS C FIRE INVERTERS: UL 1741 CERTIFIED, IEEE 1547, 929, 919 COMBINER BOXES); UL 1703 OR UL 1741 ACCESSORY
- 1.1.5 NEC 690.35 REFERS SPECIFICALLY TO "UNGROUND" PV SYSTEMS, ALSO DESIGNATED AS "TRANSFORMERLESS" BY INVERTER MANUFACTURERS AND "NON-ISOLATED" BY UNDERWRITERS LABORATORY.
- 1.1.6 INVERTER(S) USED IN UNGROUND SYSTEM SHALL BE LISTED FOR THIS USE (NEC 690.35 (G)).
- 1.1.7 AS SPECIFIED BY THE AHI, EQUIPMENT USED IN UNGROUND 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 AHI.
- 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 GROUND MOUNT ARRAY PORTION OF THE PHOTOVOLTAIC SYSTEMS DETAILED IN THIS DOCUMENT.
- 1.3.1 **WORK INCLUDES:**
- 1.3.2 PV ATTACHMENTS - IRONRIDGE GROUND MOUNT
- 1.3.3 PV RACKING SYSTEM INSTALLATION - IRONRIDGE XR-1000
- 1.3.4 PV MODULE AND INVERTER INSTALLATION - ZNISHNE ZMFM-SH108 465W / SOL-ARK 15K-LV
- 1.3.5 **SCOPE OF WORK SYSTEM SIZE:**
 STC: 88 X 465W = 35.640KW
 PTC: 88 X 380.3W = 33.494KW
 (88) ZNISHNE ZMFM-SH108 465W
 (2) SOL-ARK 15K-LV
 (2) FORTRESS POWER EVALU1 MAX 18.5 KW/H
- ATTACHMENT TYPE: IRONRIDGE GROUND MOUNT
 MSP UPGRADE: NO



CONTRACTOR

SHOCKOE SOLAR, LLC

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 ADDRESS: 1821 RIVER RIDGE LANE
 ASHLAND, VA 23005

LIC. NO.: 2705126885
 E.E. NO.:

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NEW PV SYSTEM: 35.640 kWp

MALLEY RESIDENCE

1530 MUNDY POINT RD,
 CALLAO, VA 22435
 APN: 2 1 61

ENGINEER OF RECORD

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

NOTES

DATE: 03/27/2022

DESIGN BY: I.M.

CHECKED BY: M.M.

REVISIONS

G-001.00

(SHEET 2)

	A	B	C	D	E	F	G	H
2.1.1	<p>SITE NOTES:</p> <p>THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.</p> <p>THE SOLAR PV INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING OR MECHANICAL. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION NEC 110.26.</p>							
2.1.2	<p>2.5.1 THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.</p>							
2.1.3	<p>2.5.2 THE SOLAR PV INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING OR MECHANICAL. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION NEC 110.26.</p>							
2.1.4	<p>2.5.3 THE SOLAR PV INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING OR MECHANICAL. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION NEC 110.26.</p>							
2.2.1	<p>2.5.4 THE SOLAR PV INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING OR MECHANICAL. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION NEC 110.26.</p>							
2.2.2	<p>EQUIPMENT LOCATIONS</p> <p>ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY NEC 110.26.</p>							
2.2.3	<p>2.5.5 WIRING SYSTEMS INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC 690.31 (A)(1) AND NEC TABLES 310.15 (D)(2)(A) AND 310.15 (D)(2)(C).</p>							
2.2.4	<p>2.5.6 JUNCTION AND PULL BOXES PERMITTED INSTALLED UNDER PV MODULES ACCORDING TO NEC 690.34.</p>							
2.2.5	<p>2.5.7 ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVING DISCONNECT.</p>							
2.2.6	<p>2.5.8 ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES.</p>							
2.2.7	<p>2.6.1 ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.</p>							
2.3.1	<p>2.6.2 SOLAR ARRAY LOCATION SHALL BE ADJUSTED ACCORDINGLY TO MEET LOCAL SETBACK REQUIREMENTS.</p>							
2.3.2	<p>STRUCTURAL NOTES:</p> <p>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.</p>							
2.3.3	<p>2.6.3 JUNCTION BOX WILL BE INSTALLED PER MANUFACTURERS' SPECIFICATIONS. IT SHALL BE SEALED PER LOCAL REQUIREMENTS.</p>							
2.3.4	<p>2.6.4 ALL PV RELATED ATTACHMENTS TO BE SPACED NO GREATER THAN THE SPAN DISTANCE SPECIFIED BY THE RACKING MANUFACTURER.</p>							
2.4.1	<p>GROUNDING NOTES:</p> <p>GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVICES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR SUCH USE. AS IN CONVENTIONAL PV SYSTEMS, UNGROUNDED 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.</p>							
2.4.2	<p>2.6.5 PV EQUIPMENT SHALL BE GROUNDED ACCORDING TO NEC 690.43 AND MINIMUM NEC TABLE 250.132.</p>							
2.4.3	<p>2.6.6 METAL PARTS OF MODULE FRAMES, MODULE RACKING, AND ENCLOSURE CONSIDERED GROUNDED IN ACCORD WITH 250.134 AND 250.136(A).</p>							
2.4.4	<p>2.6.7 EACH MODULE WILL BE GROUNDED USING WEBER GROUNDING CLIPS AS SHOWN IN MANUFACTURER DOCUMENTATION AND APPROVED BY THE AHJ. IF WEBS ARE NOT USED, MODULE GROUNDING LUGS MUST BE INSTALLED AT THE SPECIFIED GROUNDING LUG HOLES PER THE MANUFACTURERS' INSTALLATION REQUIREMENTS.</p>							
2.4.5	<p>2.6.8 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.</p>							
2.4.6	<p>2.6.9 GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLORED GREEN OR MARKED GREEN IF #4 AWG OR LARGER (NEC 250.119).</p>							
2.4.7	<p>2.7.1 THROUGH 250.106, IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, A GROUNDING ELECTRODE SYSTEM PROVIDED ACCORDING TO NEC 250, NEC 690.47 AND AHJ.</p>							
2.4.8	<p>2.7.2 ACCORDING TO NEC 690.47 (C)(3), UNGROUNDED SYSTEMS INVERTER MAY SIZE DC GEC ACCORDING TO EGC REQUIREMENTS OF NEC 250.122. HOWEVER, DC GEC TO BE UNSPLICED OR IRREVERSIBLY SPLICED.</p>							
2.4.9	<p>2.7.3 "ISOLATION MONITOR INTERRUPTER," GROUND FAULT PROTECTION IS PROVIDED BY "RESIDUAL-CURRENT DETECTOR."</p>							
2.4.10	<p>2.7.4</p>							
2.4.11	<p>2.7.5</p>							

TO BE MARKED ORANGE [NEC 110.15], ELECTRICAL WIRES IN TRENCH SHALL BE AT LEAST 18IN. BELOW GRADE (RESIDENTIAL).

INTERCONNECTION NOTES:

LOAD-SIDE INTERCONNECTION SHALL BE IN ACCORDANCE WITH [NEC 2.7.9 690.64 (B)]

THE SUM OF THE UTILITY OCPD AND INVERTER CONTINUOUS OUTPUT MAY NOT EXCEED 120% OF BUSBAR RATING [NEC 705.12(D)(2)(3)].

PV DEDICATED BACKFEED BREAKERS MUST BE LOCATED OPPOSITE END OF THE BUS FROM THE UTILITY SOURCE OCPD [NEC 705.12(D)(2)(3)].

AT MULTIPLE INVERTERS 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 (D)(2)(3)(C).

FEDER 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

BACKFEEDING BREAKER FOR UTILITY-INTERACTIVE INVERTER OUTPUT IS EXEMPT FROM ADDITIONAL FASTENING [NEC 705.12 (D)(5)].

DISCONNECT AND OVER-CURRENT PROTECTION NOTES:

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). DISCONNECTS TO BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH.

BOTH POSITIVE AND NEGATIVE PV CONDUCTORS ARE UNGROUNDED. THEREFORE BOTH MUST OPEN WHERE A DISCONNECT IS REQUIRED, ACCORDING TO NEC 690.13.

DC DISCONNECT INTEGRATED INTO DC COMBINER OR INSTALLED WITHIN 6 FT. ACCORDING TO NEC 690.15 (C).

RAPID SHUTDOWN OF ENERGIZED CONDUCTORS BEYOND 10 FT OF PV ARRAY OR 5 FT INSIDE A BUILDING WITHIN 10 SECONDS. CONTROLLED CONDUCTORS #30V AND #240V(A) [NEC 690.12]. LOCATION OF LABEL ACCORDING TO AHJ.

ALL OCPD RATINGS AND TYPES SPECIFIED ACCORDING TO NEC 690.3, 690.9, AND 240.

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)

IF REQUIRED BY AHJ, SYSTEM WILL INCLUDE ARC-FAULT CIRCUIT PROTECTION ACCORDING TO NEC 690.11 AND UL 1699B.

WIRING & CONDUIT NOTES:

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.

ALL CONDUCTORS SIZED ACCORDING TO NEC 690.8, NEC 690.7.

EXPOSED UNGROUNDED PV SOURCE AND OUTPUT CIRCUITS SHALL USE WIRE LISTED AND IDENTIFIED AS PHOTOVOLTAIC (PV) WIRE [690.35 (D)]. PV MODULES WIRE LEADS SHALL BE LISTED FOR USE WITH UNGROUNDED SYSTEMS, ACCORDING TO NEC 690.35 (D)(3).

PV WIRE BLACK WIRE MAY BE FIELD-MARKED WHITE [NEC 200.6 (A)(6)].

MODULE WIRING SHALL BE LOCATED AND SECURED UNDER THE ARRAY. ACCORDING TO NEC 200.7, UNGROUNDED SYSTEMS DC CONDUCTORS COLORED OR MARKED AS FOLLOWS:

DC POSITIVE- RED, OR OTHER COLOR EXCLUDING WHITE, GRAY AND GREEN

DC NEGATIVE- BLACK, OR OTHER COLOR EXCLUDING WHITE, GRAY 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 GRAY

* IN 4-WIRE DELTA CONNECTED SYSTEMS THE PHASE WITH HIGHER VOLTAGE



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E.E. NO.:

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DAMAGES AND PROSECUTIONS.

NEW PV SYSTEM: 35,640 kWp

**MALLEY
RESIDENCE**

1530 MUNDY POINT RD,
CALLAO, VA 22435
APN: 2 1 6 1

ENGINEER OF RECORD

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

SITE PLAN

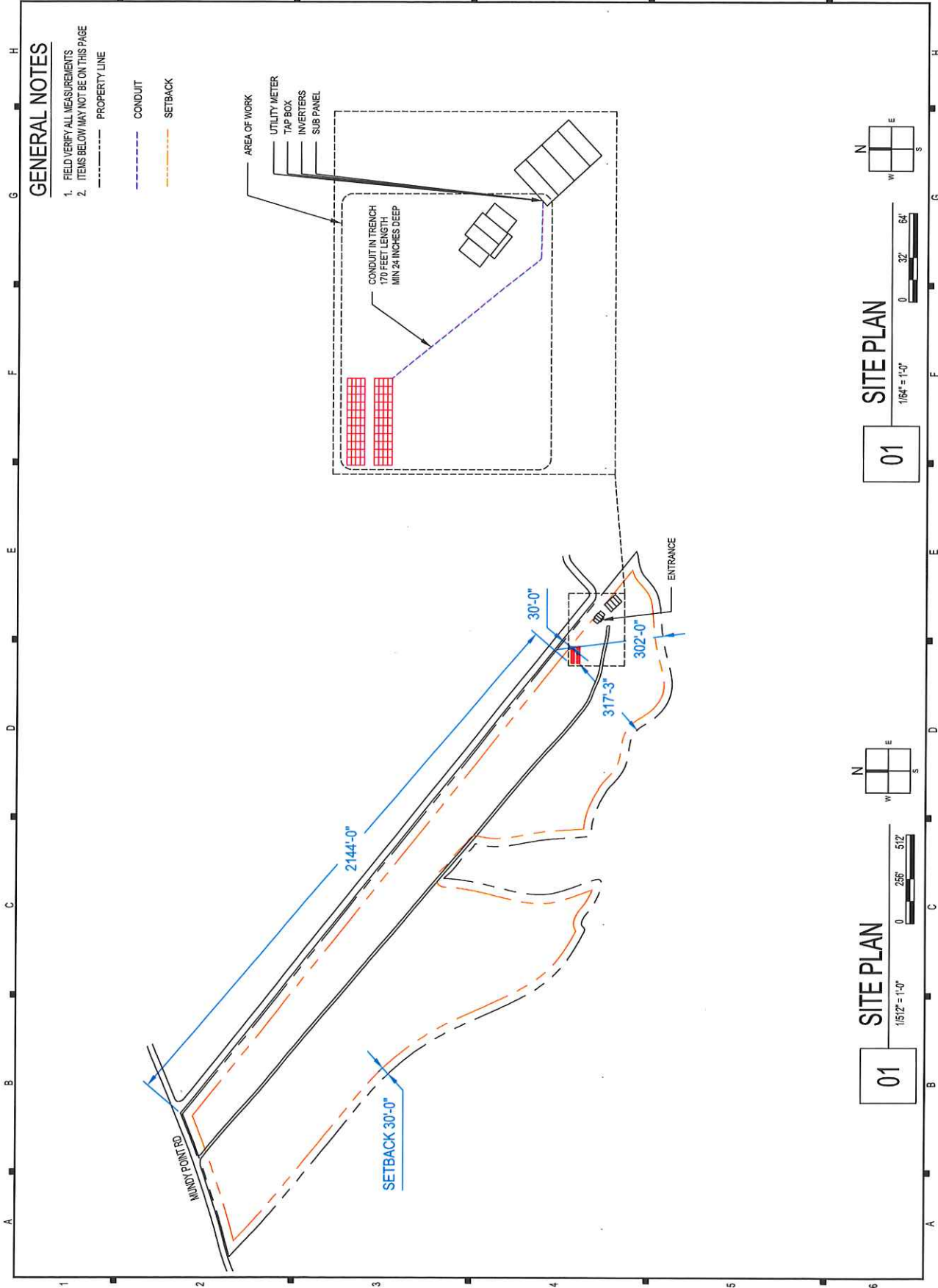
DATE: 09.27.2022

DESIGN BY: J.M.

CHECKED BY: M.J.M.

REVISIONS

A-101.00
(SHEET 3)





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NEW PV SYSTEM: 35.640 kWp

**MALLEY
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APN: 2 1 61

ENGINEER OF RECORD

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

ELECTRICAL PLAN

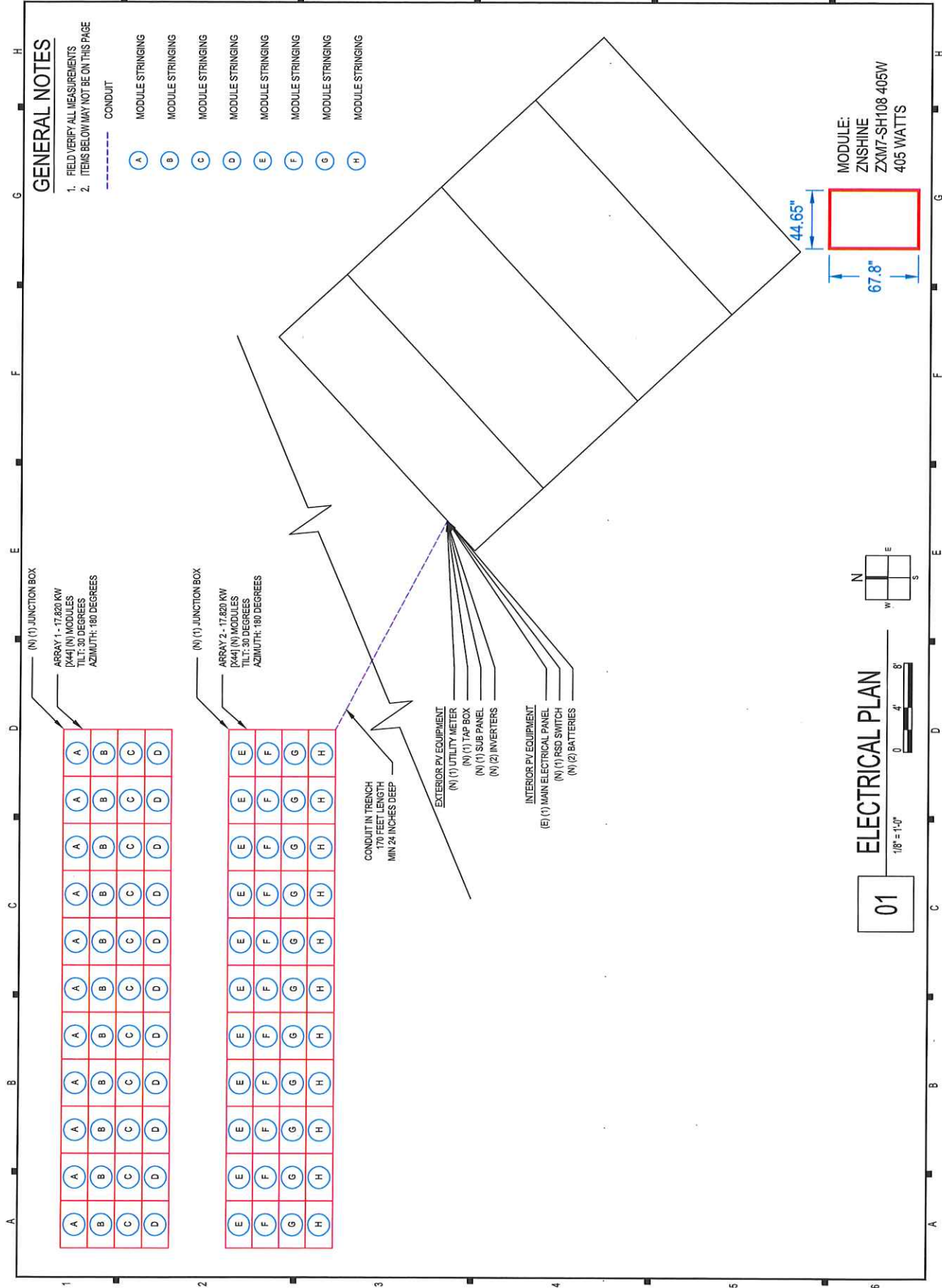
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CHECKED BY: M.J.M.

REVISIONS

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(SHEET 4)

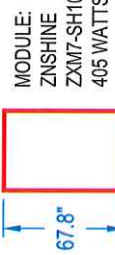


GENERAL NOTES

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

CONDUIT

- (A) MODULE STRINGING
- (B) MODULE STRINGING
- (C) MODULE STRINGING
- (D) MODULE STRINGING
- (E) MODULE STRINGING
- (F) MODULE STRINGING
- (G) MODULE STRINGING
- (H) MODULE STRINGING



01

ELECTRICAL PLAN



CONTRACTOR

SHOCKOE SOLAR, LLC

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NEW PV SYSTEM: 35,640 kWp

**MALLEY
RESIDENCE**

1530 MUNDY POINT RD,
CALLAO, VA 22435
APN: 2 1 61

ENGINEER OF RECORD

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

SOLAR ATTACHMENT PLAN

DATE: 09.27.2022

DESIGN BY: I.M.

CHECKED BY: M.M.

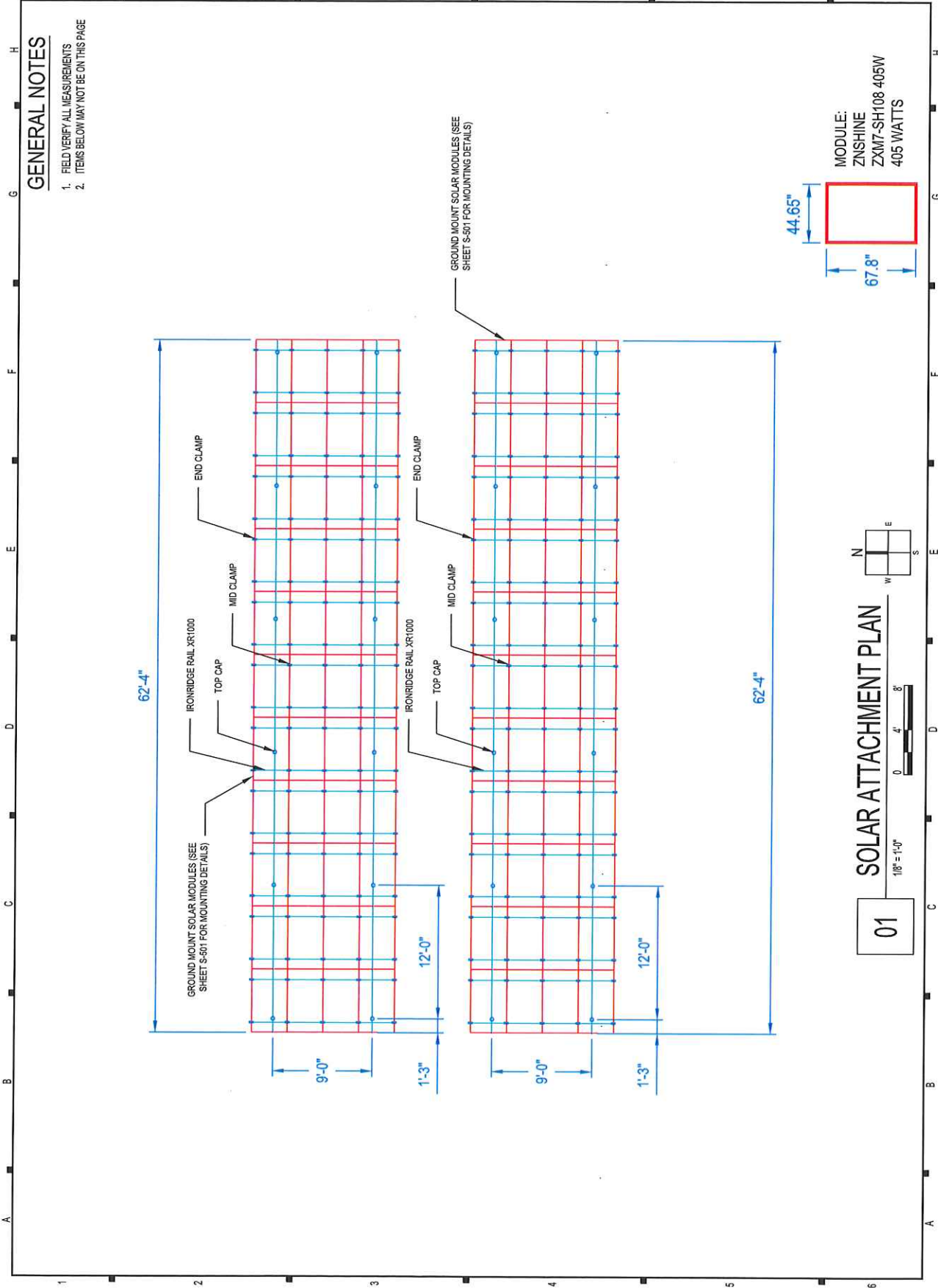
REVISIONS

A-103.00

(SHEET 5)

GENERAL NOTES

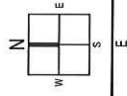
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2. ITEMS BELOW MAY NOT BE ON THIS PAGE



SOLAR ATTACHMENT PLAN

1/8" = 1'-0"

01





CONTRACTOR

SHOCKOE SOLAR, LLC

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NEW PV SYSTEM: 35,640 kWp

**MALLEY
RESIDENCE**

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CALLAO, VA 22435
APN: 2 1 61

ENGINEER OF RECORD

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

LINE DIAGRAM

DATE: 09.27.2022

DESIGN BY: J.M.

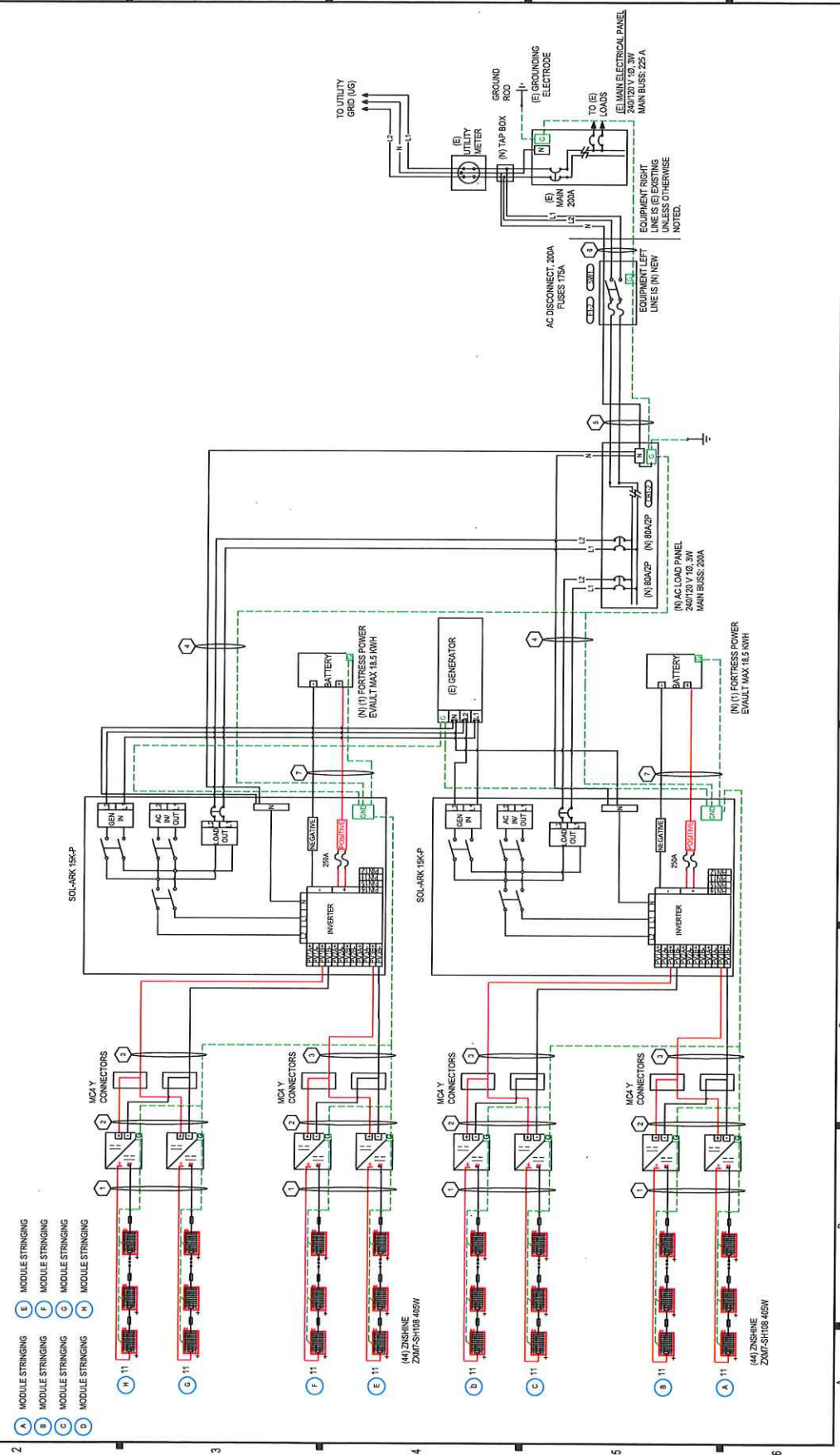
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REVISIONS

E-601.00
(SHEET 6)

CONDUCTOR AND CONDUIT SCHEDULE W/ELECTRICAL CALCULATIONS

ID	TYPIC AL	CONDUCTOR	CONDUIT	CURRENT-CARRYING CONDUCTORS IN CONDUIT	OCPD	EGC	TEMP. CORR. FACTOR	CONDUIT FILL FACTOR	MAX. CURRENT (125%)	BASE AMP.	DERATED AMP.	TERM. TEMP. RATING	AMP. @ TERMINAL	VOLTAGE DROP
1	8	10 AWG PV WIRE, COPPER	FREE AIR	2	N/A	8 AWG BARE, COPPER	0.71 (58 °C)	1	17.21A	55A	30.05A	75°C	50A	
2	2	8 AWG THWN-2, COPPER	1" DIA. EMT	8	N/A	8 AWG THWN-2, COPPER	0.71 (58 °C)	0.7	17.21A	55A	27.34A	75°C	50A	
3	4	8 AWG THWN-2, COPPER	1" DIA. PVC-40	2	N/A	8 AWG THWN-2, COPPER	0.71 (58 °C)	1	17.21A	55A	30.05A	75°C	50A	1.14%
4	2	4 AWG THWN-2, COPPER	1" DIA. EMT	2	80A	4 AWG THWN-2, COPPER	0.96 (84 °C)	1	62.5A	55A	91.2A	75°C	85A	
5	1	2/0 AWG THWN-2, COPPER	2" DIA. EMT	2	175A	2/0 AWG THWN-2, COPPER	0.96 (84 °C)	1	125A	195A	187.2A	75°C	175A	
6	1	2/0 AWG THWN-2, COPPER	2" DIA. EMT	2	N/A	2/0 AWG THWN-2, COPPER	0.96 (84 °C)	1	125A	195A	187.2A	75°C	175A	
7	2	3/0 AWG THWN-2, COPPER	2" DIA. EMT	2	N/A	3/0 AWG THWN-2, COPPER	0.96 (84 °C)	1	125A	255A	216A	75°C	200A	





CONTRACTOR

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NEW PV SYSTEM: 35,640 kWp

**MALLEY
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1530 MUNDY POINT RD,
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ENGINEER OF RECORD

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

PLACARDS

DATE: 06.27.2022

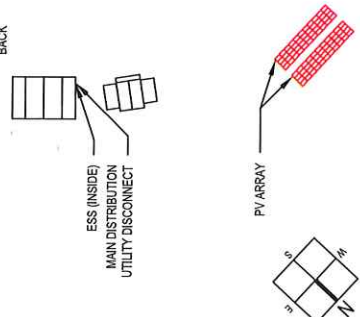
DESIGN BY: J.M.

CHECKED BY: M.M.

REVISIONS

E-603.00
(SHEET 8)

!CAUTION!
POWER TO THIS BUILDING IS ALSO SUPPLIED
FROM GROUND MOUNTED SOLAR ARRAYS
WITH SAFETY DISCONNECTS AS SHOWN:



INTERACTIVE PHOTOVOLTAIC SYSTEM CONNECTED PHOTOVOLTAIC SYSTEM DISCONNECT LOCATED NE SIDE OF THE HOUSE

DIRECTORY
PERMANENT PLAQUE OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS IF NOT IN THE SAME LOCATION (5 3/4" X 1 1/8").
[NEC 690.56(B)]
WHERE THE INVERTERS ARE REMOTELY LOCATED FROM EACH OTHER, A DIRECTORY IN ACCORDANCE WITH 705.10 SHALL BE INSTALLED AT EACH DC PV SYSTEM DISCONNECTING MEANS, AT EACH AC DISCONNECTING MEANS, AND AT THE MAIN SERVICE DISCONNECTING MEANS SHOWING THE LOCATION OF ALL AC AND DC PV SYSTEM DISCONNECTING MEANS IN THE BUILDING.
[NEC 690.4(H)]

WARNING: PHOTOVOLTAIC POWER SOURCE

LABEL 10
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 (5 3/4" X 1 1/8").
[NEC 690.31(G)]
LETTERS AT LEAST 3/8 INCH, WHITE ON RED BACKGROUND, REFLECTIVE
[IFC 605.11.1.1]

PHOTOVOLTAIC SYSTEM DC DISCONNECT	
RATED MPP CURRENT	26.026 AMPS
RATED MPP VOLTAGE @ MPPT POWER POINT	532.3 VOLTS
MAX SYSTEM VOLTAGE	657.3 VDC
MAX CIRCUIT CURRENT	27.531 AMPS

LABEL 12
AT EACH DC DISCONNECTING MEANS (3" X 4").
[NEC 690.53]

CAUTION
SOLAR ELECTRIC SYSTEM CONNECTED

LABEL 13
AT UTILITY METER (5 3/4" X 1 1/8")
[NEC 690.56(B)]

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

LABEL 5
AT RAPID SHUTDOWN SWITCH (5 1/4" X 2")
[NEC 690.56(C)]

PHOTOVOLTAIC SOLAR DC DISCONNECT

LABEL 6
AT EACH DC DISCONNECTING MEANS (1" X 4")
[NEC 690.13(B)]

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

LABEL 7
AT POINT OF INTERCONNECTION (2 3/4" X 1 5/8").
[NEC 705.12(D)(3)]

WARNING
SOLAR ELECTRIC CIRCUIT BREAKER IS BACKFIED

LABEL 8
AT POINT OF INTERCONNECTION (2" X 1").
[NEC 705.12(D)(3)]

WARNING
ELECTRICAL SHOCK HAZARD
DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL 9
AT POINT OF INTERCONNECTION OVERCURRENT DEVICE (2" X 4").
[NEC 705.12(D)(2)]

WARNING
ELECTRICAL SHOCK HAZARD
THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED

PLACARD 1
AT EACH JUNCTION, COMBINER, DISCONNECT AND DEVICE WHERE ENERGIZED UNGROUNDED CONDUCTORS MAY BE EXPOSED DURING SERVICE (3" X 4").
[NEC 690.35(F)]

WARNING
ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL 2
AT EACH DISCONNECTING MEANS FOR PHOTOVOLTAIC EQUIPMENT (3" X 4").
[NEC 690.17]

PHOTOVOLTAIC SYSTEM AC DISCONNECT	
RATED AC OUTPUT CURRENT	123 A
NOMINAL OPERATING AC VOLTAGE	240 V

LABEL 3
AT POINT OF INTERCONNECTION, MARKED AT DISCONNECTING MEANS (2" X 4").
[NEC 690.54]

PHOTOVOLTAIC SOLAR AC DISCONNECT

LABEL 4
AT EACH AC DISCONNECTING MEANS (1" X 4").
[NEC 690.13(B)]

- LABELING NOTES**
- 1.1 LABELING REQUIREMENTS BASED ON THE 2014 NATIONAL ELECTRICAL CODE, INTERNATIONAL FIRE CODE 605.11, OSHA STANDARD 1910.145, ANSI Z535
 - 1.2 MATERIAL BASED ON THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
 - 1.3 LABELS TO BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED.
 - 1.4 LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8" AND PERMANENTLY AFFIXED.
 - 1.5 ALERTING WORDS TO BE COLOR CODED. "DANGER" WILL HAVE RED BACKGROUND; "WARNING" WILL HAVE ORANGE BACKGROUND; "CAUTION" WILL HAVE YELLOW BACKGROUND. [ANSI Z535]



CONTRACTOR

SHOCKOE SOLAR, LLC

PHONE: 804/3144023

ADDRESS: 1921 RIVER RIDGE LANE
ASHLAND, VA 23005

LIC. NO.: 2705128885

ELE. NO.:

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AND WILL BE SUBJECT TO CIVIL
DAMAGES AND PROSECUTIONS.

NEW PV SYSTEM: 35,640 kWp

**MALLEY
RESIDENCE**

1530 MUNDY POINT RD,
CALLAO, VA 22435
APN: 2 1 61

ENGINEER OF RECORD

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

ASSEMBLY DETAILS

DATE: 06.27.2022

DESIGN BY: J.M.

CHECKED BY: M.M.

REVISIONS

S-501.00

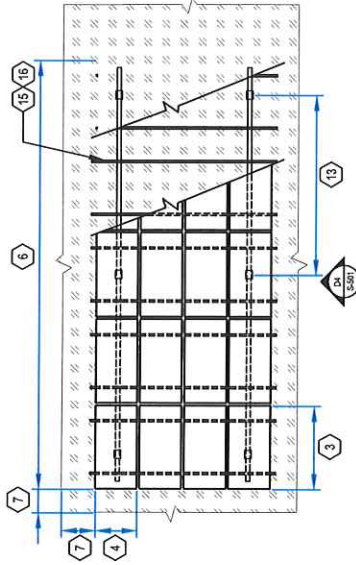
(SHEET 9)

GENERAL NOTES

1. FIELD VERIFY ALL MEASUREMENTS

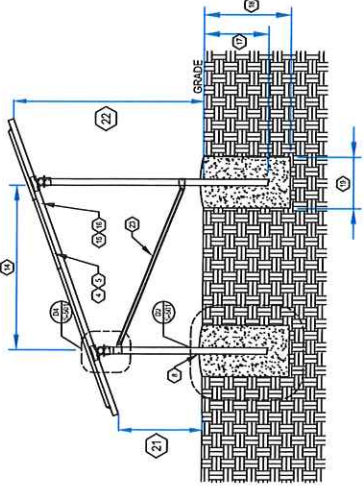
SHEET KEYNOTES

1. MODULE MANUFACTURER: ZASHINE
2. MODULE MODEL: ZM7-SH108 465W
3. MODULE LENGTH: 67.8"
4. MODULE WIDTH: 44.65"
5. MODULE WEIGHT: 45.16 LBS.
6. SEE SHEET A-103 FOR DIMENSIONS)
7. MIN. SETBACK REQUIREMENT: 30 FT.
8. FOUNDATION ANCHOR TYPE: DRILL AND POUR
9. TOTAL # OF FOUNDATION/CONCRETE PERK: 12
10. TOTAL AREA: 925 SQ. FT.
11. TOTAL WEIGHT: 1960.39 LBS.
12. WEIGHT PER FOUNDATION/ANCHOR: 165.7 LBS.
13. EAST/WEST SPACING: 12 FT. 0 IN.
14. NORTH/SOUTH SPACING: 9 FT. 0 IN.
15. RACKING MANUFACTURER (OR EQUIV.): IRONRIDGE
16. RACKING MODEL (OR EQUIVALENT): IRONRIDGE GROUND MOUNT
17. POLE EMBEDMENT DEPTH: 4 FT. 0 IN.
18. MIN. FOOTING DEPTH: 7 FT.
19. PIPE DIAMETER: 12 IN.
20. PIPE DIAMETER: 2 IN.
21. FRONT CLEARANCE: 1 FT. 0 IN.
22. REAR CLEARANCE: 9 FT. 6 IN.
23. DIAGONAL BRACING: NO
24. WIND EXPOSURE: D
25. WIND SPEED: 115 MPH
26. ARRAY TILT: 30 DEGREES



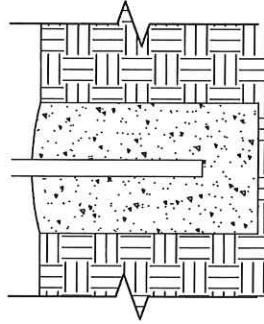
RACKING DETAIL (TRANSVERSE)

D3 NOT TO SCALE



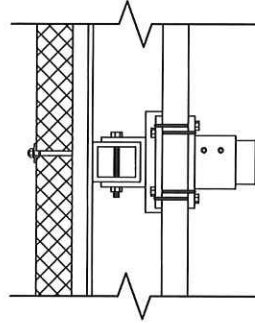
RACKING DETAIL (TRANSVERSE)

D1 NOT TO SCALE



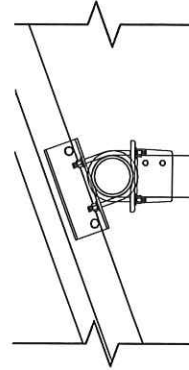
DETAIL (TRANSVERSE)

NOT TO SCALE



DETAIL (LONGITUDINAL)

NOT TO SCALE



DETAIL (TRANSVERSE)

NOT TO SCALE



CONTRACTOR

SHOCKOE SOLAR, LLC

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NEW PV SYSTEM: 35,640 kWp

**MALLEY
 RESIDENCE**

1530 MUNDY POINT RD,
 CALLAO, VA 22435
 APN: 2 1 61

ENGINEER OF RECORD

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

RESOURCE DOCUMENT

DATE: 09.27.2022

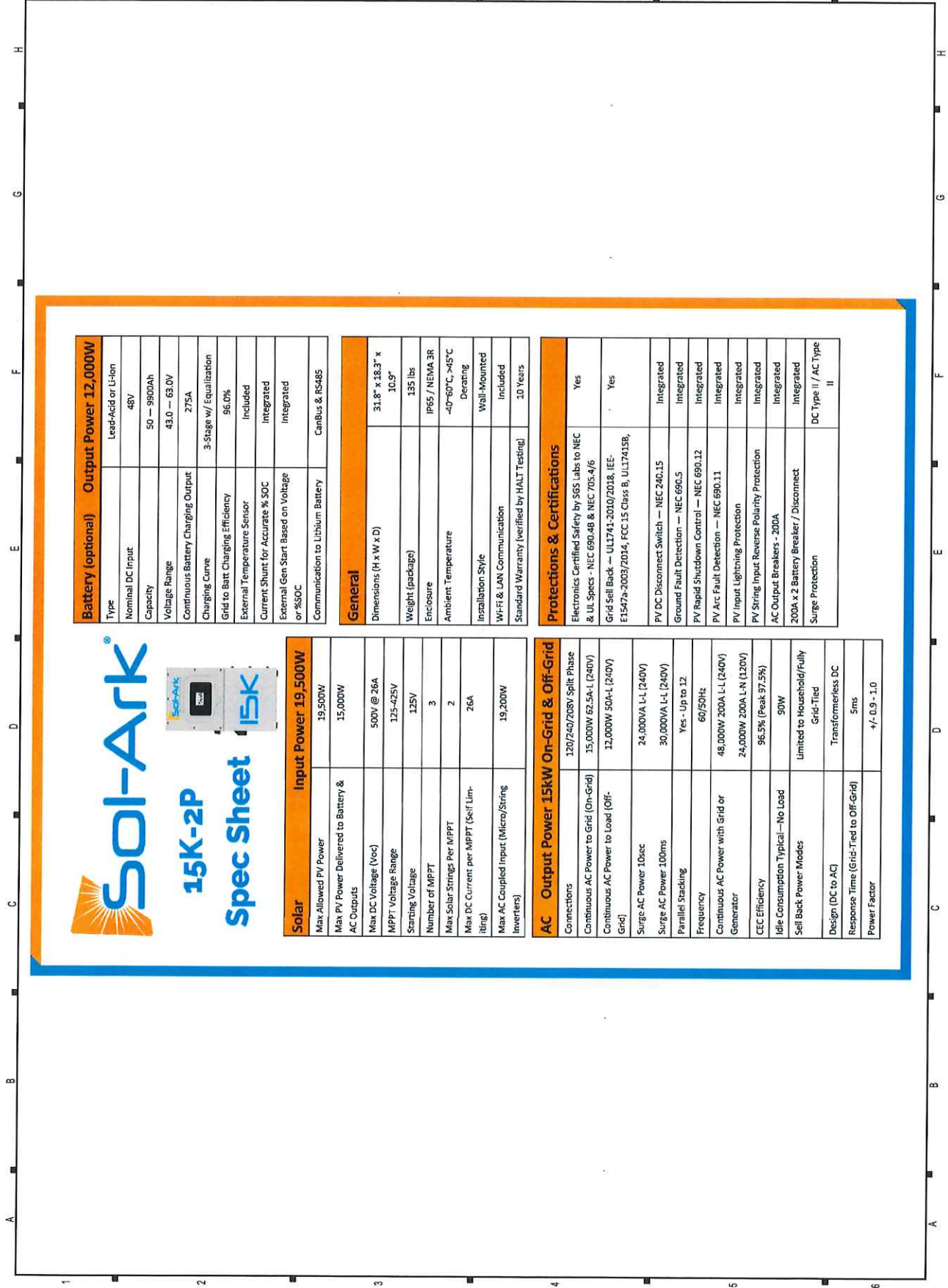
DESIGN BY: I.M.

CHECKED BY: M.M.

REVISIONS

R-002.00

(SHEET 1)



Battery (optional) Output Power 12,000W	
Type	Lead-Acid or Li-Ion
Nominal DC Input	48V
Capacity	50 - 9900Ah
Voltage Range	43.0 - 63.0V
Continuous Battery Charging Output	275A
Charging Curve	3-Stage w/ Equalization
Grid to Batt. Charging Efficiency	96.0%
External Temperature Sensor	Included
Current Shunt for Accurate % SOC	Integrated
External Gen Start Based on Voltage or %SOC	Integrated
Communication to Lithium Battery	CanBus & RS485

General	
Dimensions (H x W x D)	31.8" x 18.3" x 10.9"
Weight (packages)	135 lbs
Enclosure	IP65 / NEMA 3R
Ambient Temperature	-40~60°C, >45°C Derating
Installation Style	Wall-Mounted
Wi-Fi & LAN Communication	Included
Standard Warranty (verified by HALT Testing)	10 Years

Protections & Certifications	
Electronics Certified Safety by SGS Labs to NEC & UL Specs - NEC 690.48 & NEC 705.4/6	Yes
Grid Sell Back - UL1741-3010/2018, IEE-E1547a-2003/2014, FCC 15 Class B, UL1741SB,	Yes
PV DC Disconnect-Switch - NEC 240.15	Integrated
Ground Fault Detection - NEC 690.5	Integrated
PV Rapid Shutdown Control - NEC 690.12	Integrated
PV Arc Fault Detection - NEC 690.11	Integrated
PV Input Lightning Protection	Integrated
PV String Input Reverse Polarity Protection	Integrated
AC Output Breakers - 200A	Integrated
200A x 2 Battery Breaker / Disconnect	Integrated
Surge Protection	DC Type II / AC Type II



Solar Input Power 19,500W	
Max Allowed PV Power	19,500W
Max PV Power Delivered to Battery & AC Outputs	15,000W
Max DC Voltage (Voc)	500V @ 26A
MPPT Voltage Range	125-425V
Starting Voltage	125V
Number of MPPT	3
Max Solar Strings Per MPPT	2
Max DC Current per MPPT (Self Limiting)	26A
Max AC Coupled Input (Micro/String Inverters)	19,200W

AC Output Power 15kW On-Grid & Off-Grid	
Connectors	120/240/208V Split Phase
Continuous AC Power to Grid (On-Grid)	15,000W 62.5A-L (240V)
Continuous AC Power to Load (Off-Grid)	12,000W 50A-L (240V)
Surge AC Power 10sec	24,000VA L-L (240V)
Surge AC Power 100ms	30,000VA L-L (240V)
Parallel Stacking	Yes - Up to 12
Frequency	60/50Hz
Continuous AC Power with Grid or Generator	48,000W 200A L-L (240V) 24,000W 200A L-N (120V)
CEC Efficiency	96.5% (Peak 97.5%)
Idle Consumption Typical - No Load	90W
Sell Back Power Modes	Limited to Household/fully Grid-Tied
Design (DC to AC)	Transformerless DC
Response Time (Grid-Tied to Off-Grid)	5ms
Power Factor	+/- 0.9 - 1.0



CONTRACTOR
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NEW PV SYSTEM: 35,640 kWp

MALLEY RESIDENCE
 1530 MUNDY POINT RD,
 CALLAO, VA 22435
 APN: 2 1 61

ENGINEER OF RECORD

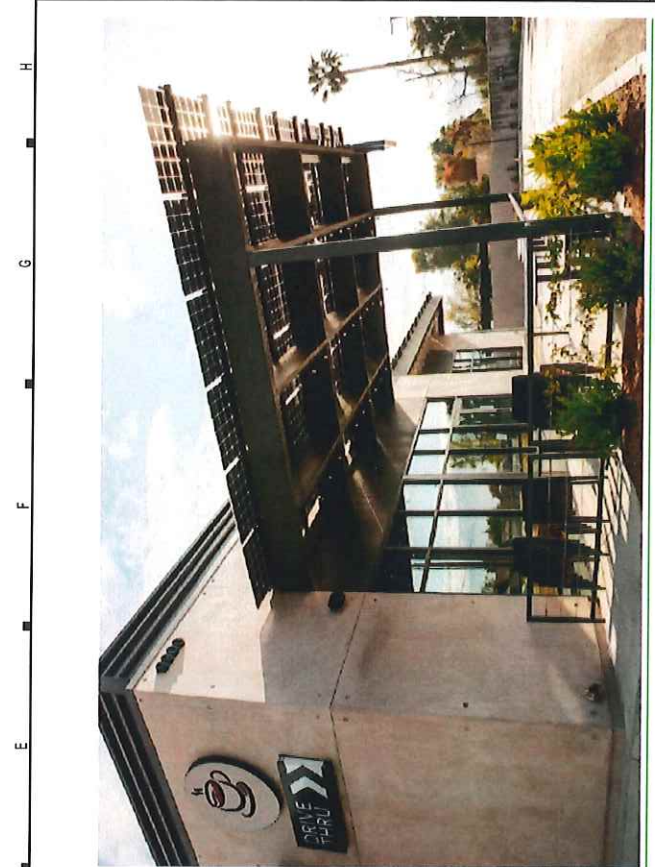
PAPER SIZE: 11" X 17" (ANSI B)

RESOURCE DOCUMENT
 DATE: 09.27.2022

DESIGN BY: I.M.

CHECKED BY: M.M.
 REVISIONS

R-003.00
 (SHEET 12)



FORTRESS Power eVault
 eVault 18.5 Lithium Battery Storage



Latest Technology
 We use the safest, environmentally friendly Lithium Iron Phosphate technology

Maximize Investment
 Maximize Your Solar Investment with Battery Storage

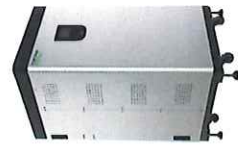
Grid Independence
 Achieve Grid Independence during Power Outages

Save Money
 Reduce Your Electric Bill

Did you know that your solar system **STOPS WORKING** when the grid goes down?



With **Fortress Power**, you can use your solar power all day and night - even during grid outages!



- Provide power during grid outages
- Lower your electrical bill by avoiding having to buy electricity at peak times
- Enjoy a 26% investment tax credit when incorporating with solar
- Increase your independence from the utility grid

FORTRESS POWER MISSION

Our mission is to provide compact, user-friendly and affordable lithium energy storage solutions using the latest technology for all homes and businesses. Fortress Power's smart and innovative energy storage units can be easily integrated with new and existing PV systems. They work by storing clean energy for when you need it most - it's that simple



"Fortress Energy Storage keeps my family safe & provides us with reliable outage protection!"
 -Deon (homeowner)

www.FortressPower.com • Sales@FortressPower.com • 877-497-4937 • 505 Keystone Road, Southampton PA, 18966, USA

Keep Your Family & Business Safe and Connected with Fortress Power

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NEW PV SYSTEM: 35,640 kWp

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 APN: 2 1 61

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)
RESOURCE DOCUMENT
 DATE: 08/27/2022
 DESIGN BY: I.M.
 CHECKED BY: M.M.
 REVISIONS

R-004.00
 (SHEET 13)

A B C D E F G H

HOW FORTRESS POWER COMPARES TO ALTERNATIVE POWER BACK-UP SOLUTIONS

	Fortress Power Solution	Other Lithium Ion Solution	Lead Acid	Generator
Applications	Backup power, time of use, self-use, & off-grid	Backup power, time of use, self-use, & off-grid	Backup power	Backup power
Depth of Discharge	100%	100%	50%	N/A
Potential Harm	Safest Technology	Potential fires and thermal runaway	Risk of harmful gases	Environmental pollution
Life Cycles	Up to 6,000	Up to 3,000	500-1,000	N/A
Warranty	10 years*	10 years	2 years	2 years
Fuel Cost	\$0	\$0	\$0	\$50-100/day
Maintenance	No	No	Yes	Yes

*US territory & Canada

TECHNICAL SPECIFICATIONS EVAULT 18.5 KW/h

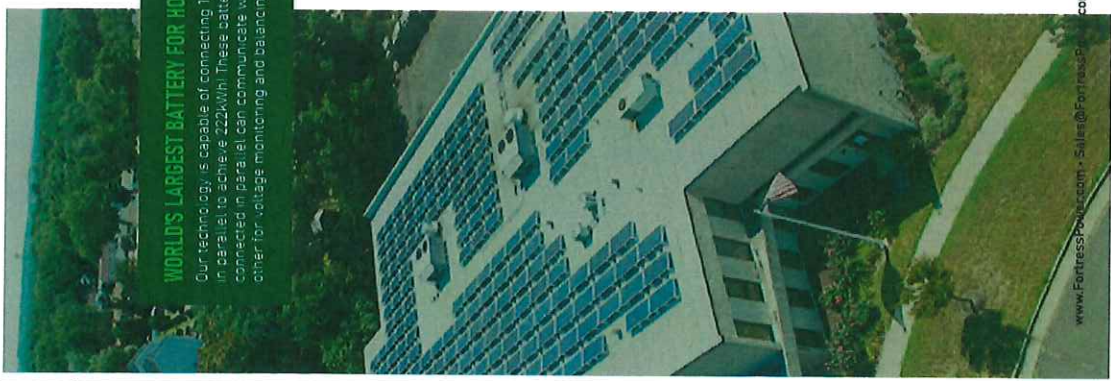
Total Energy (kWh)	18.5
Capacity (Ah)	360
Nominal Voltage (V)	51.2 (48)
Voltage Range (V)	44-56
Recommended Charge Current (A)	100
Max. Charge Current (Continuous) (A)	170
Max. Discharge Current (Continuous) (A)	180
Max. Pulse Current (for 10 sec) (A)	200
Charge Temperature (F)	32 to 113
Discharge Temperature (F)	32 to 113
Recommended Storage Temperature (F)	50 to 95
Dimension (WxDxH, inch)	19.2 x 21.3 x 38.8
Weight (lbs)	476
Enclosure Protection Rating	IP21
Mounting Options	Floor-standing
Certificates	UL 1442
Warranty	*5/10 years
Scalability	Maximum 12 in Parallel (222 kWh)
Communication	CAN/RS485
High Current Circuit Breaker	250A
Efficiency	> 98%

*5 year warranty applies to installs outside of the US & Canada.



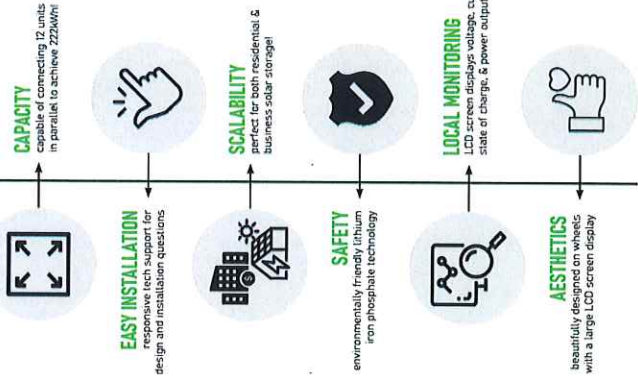
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Join us to bring the latest energy storage solutions to homes and businesses across the world.



WORLD'S LARGEST BATTERY FOR HOMES!
 Our technology is capable of connecting 12 units in parallel to achieve 222kWh! These batteries connected in parallel can communicate with each other for voltage monitoring and balancing.

Fortress eVault 18.5 kWh Lithium Battery



Fortress Power is a manufacturer of high-performance solar, lithium battery storage products that are designed, engineered and inventoried along with live technical support in the United States!

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