

# The Village of South Barrington



30 SOUTH BARRINGTON ROAD  
SOUTH BARRINGTON, ILLINOIS 60010-9500  
Phone (847) 381-7510 Fax (847) 381-0024  
[www.southbarrington.org](http://www.southbarrington.org)

## SOLAR PANEL PERMITS

### REQUIRED APPLICATION MATERIALS:

- Building Permit Application Form
- Roof Mounting Information Form (attached)
- Three copies of drawings showing location, size of panels, electrical diagram, electrical diagram, specification sheets and installation manual
- Current Plat of Survey
- Application Fee - \$150.00
- Permit Fee Deposit - \$200.00
- Subdivision Approval from the Homeowners Association
- Compliance with Village Zoning Ordinance Title 10, Chapter 2-10 (attached)

### PERFORMANCE DEPOSITS:

The Performance Deposit money is held by the Village Treasurer until the job is complete and a final inspection has been made by the Building Department. **Return of Deposit money is initiated when a WRITTEN request is received by the Building Department.** "Request for Release" forms are available at [www.southbarrington.org](http://www.southbarrington.org), Village Departments, Building Department.

## ROOF MOUNTING INFORMATION FORM

1. Is the roofing type lightweight (Yes = composition, lightweight masonry, metal, etc.)

*If No, submit completed worksheet for roof structure WKS1 (No = heavy masonry, slate, etc.)*

2. Does the roof have a single roof covering?  Yes or  No

*If No, submit completed worksheet for roof structure WKS1*

3. Provide method and type of weatherproofing roof penetrations (e.g. flashing, caulk, etc.)

## MOUNTING SYSTEM INFORMATION

1. Is the mounting structure an engineered product designed to mount PV modules with no more than an 18" gap beneath the module frames?  Yes or  No

*If No, provide details of structural attachment certified by a design professional.*

2. For manufactured mounting systems, fill out information on the mounting system below:

- a. Mounting System manufacturer \_\_\_\_\_ Product Name/Model # \_\_\_\_\_  
b. Total Weight of PV Modules and Rails \_\_\_\_\_ lbs  
c. Total Number of Attachment Points \_\_\_\_\_  
d. Weight per Attachment Point ( $b \div c$ ) \_\_\_\_\_ lbs (if greater than 45 lbs, see WKS1)  
e. Maximum Spacing Between Attachment Points on a Rail \_\_\_\_\_ inches (see product manual for maximum spacing allowed based on maximum design wind speed)  
f. Total Surface Area of PV Modules (square feet) \_\_\_\_\_ ft<sup>2</sup>  
g. Distributed Weight of PV Module on Roof ( $b \div f$ ) \_\_\_\_\_ lbs/ft<sup>2</sup>

*If distributed weight of the PV system is greater than 5 lbs/ft<sup>2</sup>, see WKS1*

## STRUCTURE WORKSHEET – WKS1

1. Roof construction:  Rafters  Trusses  Other: \_\_\_\_\_

2. Describe site-built rafter or site-built truss systems:

- a. Rafter Size: \_\_\_\_\_ x \_\_\_\_\_ inches  
b. Rafter Spacing: \_\_\_\_\_ inches  
c. Maximum unsupported span: \_\_\_\_\_ feet, \_\_\_\_\_ inches  
d. Are the rafters over-spanned? (see the IRC span tables in B.2.)  Yes or  No  
e. If Yes, complete the rest of this section.

3. If the roof system has

- a. over-spanned rafters or trusses,  
b. the array of 5 lbs/ft<sup>2</sup> on any roof construction, or  
c. the attachments with a dead load exceeding 45 lbs per attachment;

It is recommended that you provide one of the following:

- i. A framing plan that shows details for how you will strengthen the rafters using the supplied span tables in B.2.  
ii. Confirmation certified by a design professional that the roof structure will support the array.

# STANDARD SITE PLAN

<b>Contractor Name, Address and Phone:</b>		<b>Site Plan for Small-Scale, Single-Phase PV Systems</b>			
		<b>Site Name:</b>			
		<b>Site Address:</b>			
<b>System AC Size:</b>					
<b>Drawn By:</b>	<b>SIZE:</b>	<b>FORM NO:</b>	<b>DWG NO:</b>	<b>REV:</b>	
<b>Checked By:</b>	<b>SCALE:</b>	<b>NTS</b>	<b>Date:</b>	<b>SHEET:</b>	

PERMIT PROCESS FOR PV SYSTEMS

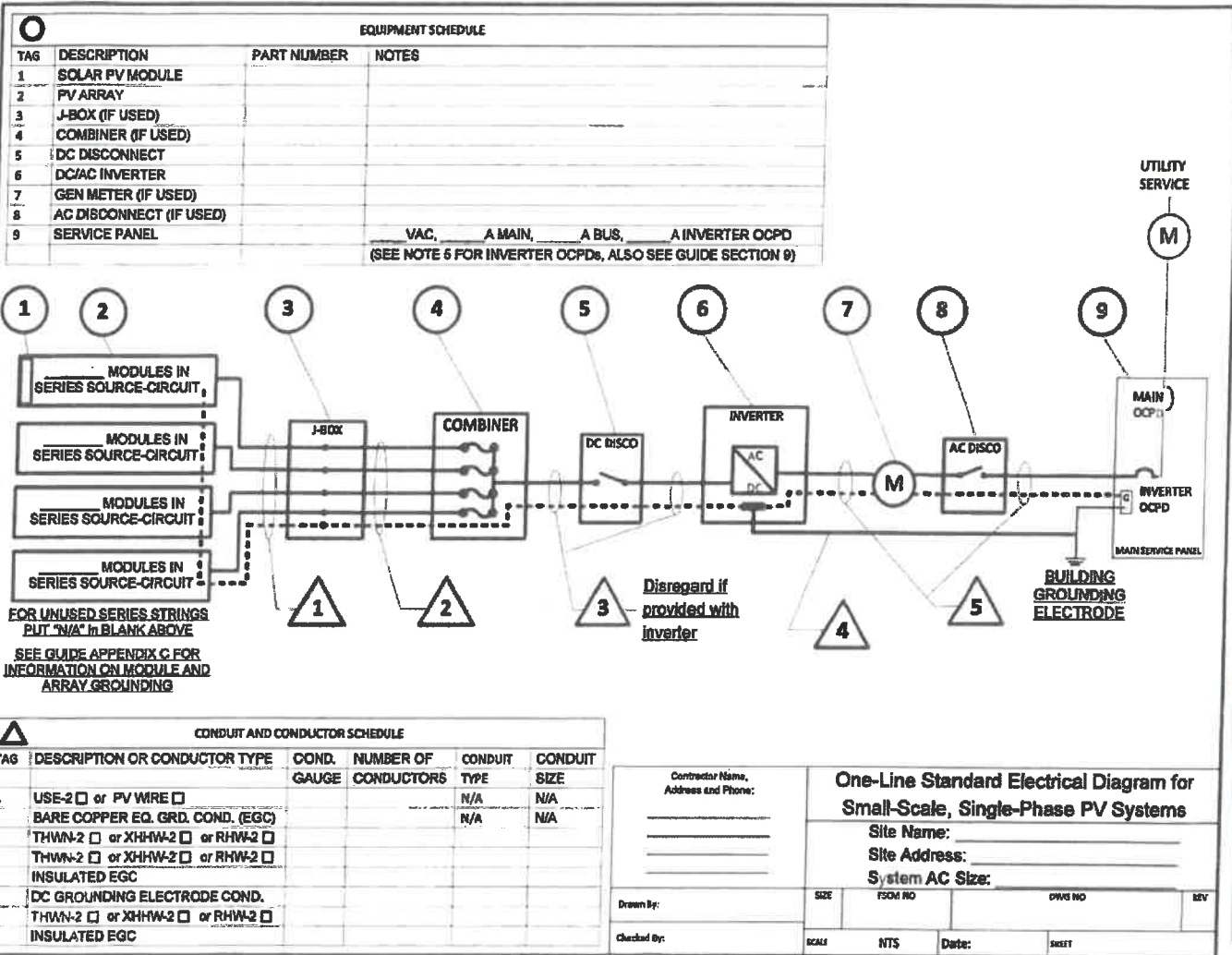
## **ELECTRICAL REVIEW OF PV SYSTEMS (Calculations for Electrical Diagram)**

In order for a PV system to meet the basic review requirements, the following must apply:

1. PV modules, utility-interactive inverters, and combiner boxes are identified for use in PV systems.
2. The PV array is composed of 4 series strings or less per inverter.
3. The total inverter capacity has a continuous ac power output 13,440 Watts or less.
4. The ac interconnection point is on the load side of service disconnecting means (690.64(B)).
5. One of the standard electrical diagrams can be used to accurately represent the PV systems.  
Interactive PDF diagrams are available at [www.solarabcs.org/permitting](http://www.solarabcs.org/permitting).

*Fill out the standard electrical diagram completely. A guide to the electrical diagram is provided to help the applicant understand each blank to fill in. If the electrical system is more complex than the standard electrical diagram can effectively communicate, provide an alternative diagram with appropriate detail.*

## STANDARD STRING SYSTEM ELECTRICAL DIAGRAM



## NOTES FOR STANDARD STRING SYSTEM ELECTRICAL DIAGRAM

### PV MODULE RATINGS @ STC (Guide Section 5)

MODULE MAKE	
MODULE MODEL	
MAX POWER-POINT CURRENT ( $I_{mp}$ )	A
MAX POWER-POINT VOLTAGE ( $V_{mp}$ )	V
OPEN-CIRCUIT VOLTAGE ( $V_{oc}$ )	V
SHORT-CIRCUIT CURRENT ( $I_{sc}$ )	A
MAX SERIES FUSE (DCPD)	A
MAXIMUM POWER ( $P_{max}$ )	W
MAX VOLTAGE (TYP 600V <sub>DC</sub> )	V
VOC TEMP COEFF (mV/°C or %/°C)	
IF COEFF SUPPLIED, GIVE UNITS	

### NOTES FOR ALL DRAWINGS:

OCPD = OVERCURRENT PROTECTION DEVICE

NATIONAL ELECTRICAL CODE® REFERENCES SHOWN AS (NEC XXXXX)

### INVERTER RATINGS (Guide Section 4)

INVERTER MAKE	
INVERTER MODEL	
MAX DC VOLT RATING	V
MAX POWER @ 40°C	W
NOMINAL AC VOLTAGE	V
MAX AC CURRENT	A
MAX OCPD RATING	A

### SIGNS—SEE GUIDE SECTION 7

#### SIGN FOR DC DISCONNECT

PHOTOVOLTAIC POWER SOURCE	
RATED MPP CURRENT	A
RATED MPP VOLTAGE	V
MAX SYSTEM VOLTAGE	V
MAX CIRCUIT CURRENT	A
WARNING: ELECTRICAL SHOCK HAZARD—LINE AND LOAD MAY BE ENERGIZED IN OPEN POSITION	

#### SIGN FOR INVERTER OCPD AND AC DISCONNECT (IF USED)

SOLAR PV SYSTEM	
AC POINT OF CONNECTION	
AC OUTPUT CURRENT	A
NOMINAL AC VOLTAGE	V
THIS PANEL FED BY MULTIPLE SOURCES (UTILITY AND SOLAR)	

### NOTES FOR ARRAY CIRCUIT WIRING (Guide Section 8 and 8 and Appendix D):

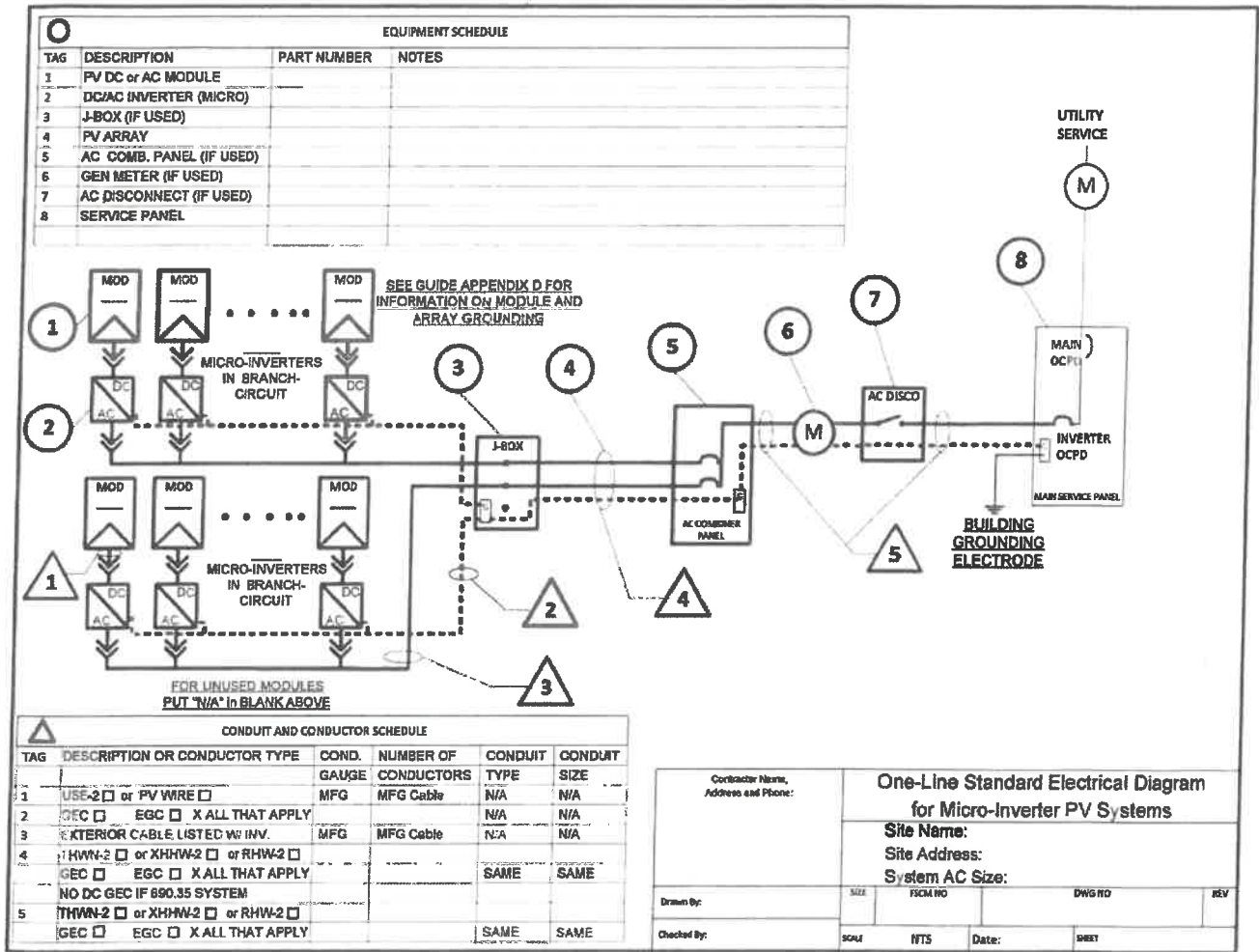
- 1.) LOWEST EXPECT AMBIENT TEMPERATURE BASED ON ASHRAE MINIMUM MEAN EXTREME DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. LOWEST EXPECTED AMBIENT TEMP \_\_\_\_\_°C
- 2.) HIGHEST CONTINUOUS AMBIENT TEMPERATURE BASED ON ASHRAE HIGHEST MONTH 2% DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. HIGHEST CONTINUOUS TEMPERATURE \_\_\_\_\_°C
- 2.) 2005 ASHRAE FUNDAMENTALS 2% DESIGN TEMPERATURES DO NOT EXCEED 47°C IN THE UNITED STATES (PALM SPRINGS, CA IS 44.1°C). FOR LESS THAN 9 CURRENT-CARRYING CONDUCTORS IN ROOF-MOUNTED SUNLIT CONDUIT AT LEAST 0.5" ABOVE ROOF AND USING THE OUTDOOR DESIGN TEMPERATURE OF 47°C OR LESS (ALL OF UNITED STATES).
  - a) 12 AWG, 90°C CONDUCTORS ARE GENERALLY ACCEPTABLE FOR MODULES WITH  $I_{sc}$  OF 7.68 AMPS OR LESS WHEN PROTECTED BY A 12-AMP OR SMALLER FUSE.
  - b) 10 AWG, 90°C CONDUCTORS ARE GENERALLY ACCEPTABLE FOR MODULES WITH  $I_{sc}$  OF 9.6 AMPS OR LESS WHEN PROTECTED BY A 15-AMP OR SMALLER FUSE.

### NOTES FOR INVERTER CIRCUITS (Guide Section 8 and 9):

- 1) IF UTILITY REQUIRES A VISIBLE-BREAK SWITCH, DOES THIS SWITCH MEET THE REQUIREMENT? YES  NO  N/A
- 2) IF GENERATION METER REQUIRED, DOES THIS METER SOCKET MEET THE REQUIREMENT? YES  NO  N/A
- 3) SIZE PHOTOVOLTAIC POWER SOURCE (DC) CONDUCTORS BASED ON MAX CURRENT ON NEC 880.53 SIGN OR OCPD RATING AT DISCONNECT
- 4) SIZE INVERTER OUTPUT CIRCUIT (AC) CONDUCTORS ACCORDING TO INVERTER OCPD AMPERE RATING. (See Guide Section 9)
- 5) TOTAL OF \_\_\_\_\_ INVERTER OCPD(s), ONE FOR EACH INVERTER. DOES TOTAL SUPPLY BREAKERS COMPLY WITH 120% BUSBAR EXCEPTION IN 680.84(B)(2)(a)? YES  NO

Contractor Name, Address and Phone:		<b>Notes for One-Line Standard Electrical Diagram for Single-Phase PV Systems</b>	
Site Name:			
Site Address:			
System AC Size:			
Drawn By:	SIZE	7.5LM-5-3	DATE: N/A
Checked By:	SCALE	NTS	Date: 6-16-21

## MICRO-INVERTER ELECTRICAL DIAGRAM



## NOTES FOR MICRO-INVERTER ELECTRICAL DIAGRAM

### PV MODULE RATINGS @ STC (Guide Section 5)

MODULE MAKE	
MODULE MODEL	
MAX POWER-POINT CURRENT ( $I_{mp}$ )	
MAX POWER-POINT VOLTAGE ( $V_{mp}$ )	
OPEN-CIRCUIT VOLTAGE ( $V_{oc}$ )	
SHORT-CIRCUIT CURRENT ( $I_{sc}$ )	
MAX SERIES FUSE (OCPD)	
MAXIMUM POWER ( $P_{max}$ )	
MAX VOLTAGE (TYP 600V <sub>DC</sub> )	
VOC TEMP COEFF (mV/°C <input type="checkbox"/> or %/°C <input type="checkbox"/> )	
IF COEFF SUPPLIED, CIRCLE UNITS	

### NOTES FOR ALL DRAWINGS:

OCPD = OVERCURRENT PROTECTION DEVICE

NATIONAL ELECTRICAL CODE® REFERENCES SHOWN AS (NEC XXXX.XX)

### INVERTER RATINGS (Guide Section 4)

INVERTER MAKE	
INVERTER MODEL	
MAX DC VOLT RATING	
MAX POWER @ 40°C	
NOMINAL AC VOLTAGE	
MAX AC CURRENT	
MAX OCPD RATING	

### SIGNS-SEE GUIDE SECTION 7

#### SIGN FOR DC DISCONNECT

No sign necessary since 690.51 marking on PV module covers needed information

#### SIGN FOR INVERTER OCPD AND AC DISCONNECT (IF USED)

SOLAR PV SYSTEM  
AC POINT OF CONNECTION

AC OUTPUT CURRENT

NOMINAL AC VOLTAGE

THIS PANEL FED BY MULTIPLE SOURCES (UTILITY AND SOLAR)

### NOTES FOR ARRAY CIRCUIT WIRING (Guide Section 6 and 8 and Appendix B):

- 1) LOWEST EXPECT AMBIENT TEMPERATURE BASED ON ASHRAE MINIMUM MEAN EXTREME DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. LOWEST EXPECTED AMBIENT TEMP \_\_\_\_ °C
- 2) HIGHEST CONTINUOUS AMBIENT TEMPERATURE BASED ON ASHRAE HIGHEST MONTH 2% DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. HIGHEST CONTINUOUS TEMPERATURE \_\_\_\_ °C
- 2) 2009 ASHRAE FUNDAMENTALS 2% DESIGN TEMPERATURES DO NOT EXCEED 47°C IN THE UNITED STATES (PALM SPRINGS, CA IS 44.1°C). FOR LESS THAN 9 CURRENT-CARRYING CONDUCTORS IN ROOF-MOUNTED SUNLIT CONDUIT AT LEAST 0.5" ABOVE ROOF AND USING THE OUTDOOR DESIGN TEMPERATURE OF 47°C OR LESS (ALL OF UNITED STATES),
  - a) 12 AWG, 90°C CONDUCTORS ARE GENERALLY ACCEPTABLE FOR MODULES WITH  $I_{sc}$  OF 7.68 AMPS OR LESS WHEN PROTECTED BY A 12-AMP OR SMALLER FUSE.
  - b) 10 AWG, 90°C CONDUCTORS ARE GENERALLY ACCEPTABLE FOR MODULES WITH  $I_{sc}$  OF 9.6 AMPS OR LESS WHEN PROTECTED BY A 15-AMP OR SMALLER FUSE.

### NOTES FOR INVERTER CIRCUITS (Guide Section 6 and 9):

- 1) IF UTILITY REQUIRES A VISIBLE-BREAK SWITCH, DOES THIS SWITCH MEET THE REQUIREMENT? YES  NO  N/A
- 2) IF GENERATION METER REQUIRED, DOES THIS METER SOCKET MEET THE REQUIREMENT? YES  NO  N/A
- 3) SIZE PHOTOVOLTAIC POWER SOURCE (DC) CONDUCTORS BASED ON MAX CURRENT ON NEC 690.63 SIGN OR OCPD RATING AT DISCONNECT
- 4) SIZE INVERTER OUTPUT CIRCUIT (AC) CONDUCTORS ACCORDING TO INVERTER OCPD AMPERE RATING. (See Guide Section 8)
- 5) TOTAL OF \_\_\_\_\_ INVERTER OUTPUT CIRCUIT OCPD(s), ONE FOR EACH MICRO-INVERTER CIRCUIT. DOES TOTAL SUPPLY BREAKERS COMPLY WITH 120% BUSBAR EXCEPTION IN 690.64(B)(2)(4)? YES  NO

Contractor Name,  
Address and Phone:

### Notes for One-Line Standard Electrical Diagram for Single-Phase PV Systems

Site Name:

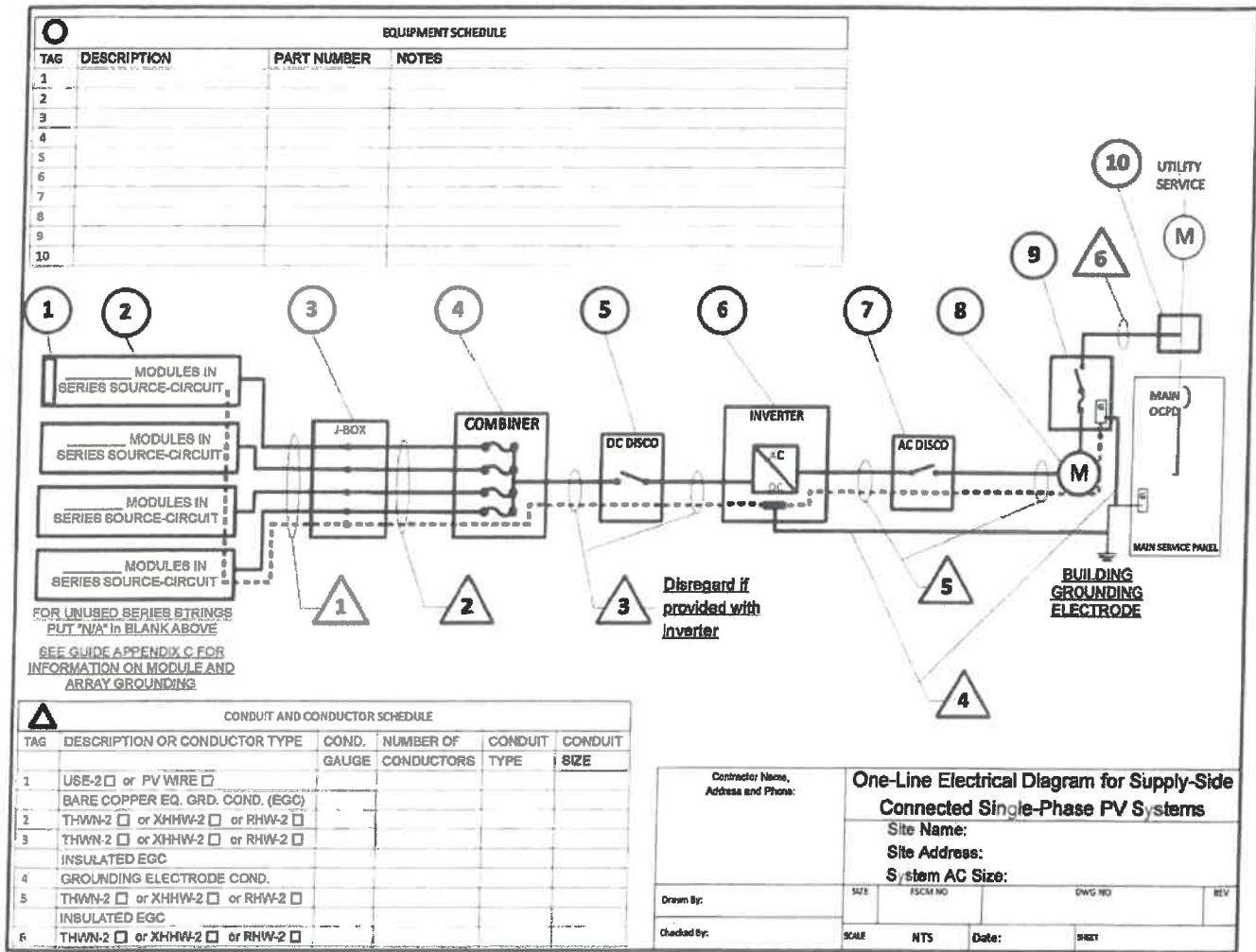
Site Address:

System AC Size:

Drawn By:	SCALE	NTS	Date:	SHEET
Checked By:				



## SUPPLY-SIDE CONNECTION ELECTRICAL DIAGRAM



PERMIT PROCESS FOR PV SYSTEMS

## NOTES FOR SUPPLY-SIDE CONNECTION ELECTRICAL DIAGRAM

### PV MODULE RATINGS @ STC (Guide Section 5)

MODULE MAKE	
MODULE MODEL	
MAX POWER-POINT CURRENT ( $I_{mp}$ )	A
MAX POWER-POINT VOLTAGE ( $V_{mp}$ )	V
OPEN-CIRCUIT VOLTAGE ( $V_{oc}$ )	V
SHORT-CIRCUIT CURRENT ( $I_{sc}$ )	A
MAX SERIES FUSE (OCPD)	A
MAXIMUM POWER ( $P_{max}$ )	W
MAX VOLTAGE (TYP 600V <sub>DC</sub> )	V
VOC TEMP COEFF (mV/°C or %/°C)	
IF COEFF SUPPLIED, CIRCLE UNITS	

### NOTES FOR ALL DRAWINGS:

OCPD = OVERCURRENT PROTECTION DEVICE  
 NATIONAL ELECTRICAL CODE® REFERENCES SHOWN AS (NEC XXXXX)

### INVERTER RATINGS (Guide Section 4)

INVERTER MAKE	
INVERTER MODEL	
MAX DC VOLT RATING	V
MAX POWER @ 40°C	W
NOMINAL AC VOLTAGE	V
MAX AC CURRENT	A
MAX OCPD RATING	A

### SIGNS—SEE GUIDE SECTION 7

#### SIGN FOR DC DISCONNECT

PHOTOVOLTAIC POWER SOURCE	
RATED MPP CURRENT	A
RATED MPP VOLTAGE	V
MAX SYSTEM VOLTAGE	V
MAX CIRCUIT CURRENT	A
WARNING: ELECTRICAL SHOCK HAZARD—LINE AND LOAD MAY BE ENERGIZED IN OPEN POSITION	

#### SIGN FOR INVERTER OCPD AND AC DISCONNECT (IF USED)

SOLAR PV SYSTEM AC POINT OF CONNECTION	
AC OUTPUT CURRENT	A
NOMINAL AC VOLTAGE	V
THIS PANEL FED BY MULTIPLE SOURCES (UTILITY AND SOLAR)	

### NOTES FOR ARRAY CIRCUIT WIRING (Guide Section 6 and 8 and Appendix D):

- 1.) LOWEST EXPECT AMBIENT TEMPERATURE BASED ON ASHRAE MINIMUM MEAN EXTREME DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. LOWEST EXPECTED AMBIENT TEMP \_\_\_\_\_°C
- 2.) HIGHEST CONTINUOUS AMBIENT TEMPERATURE BASED ON ASHRAE HIGHEST MONTH 2% DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. HIGHEST CONTINUOUS TEMPERATURE \_\_\_\_\_°C
- 2.) 2005 ASHRAE FUNDAMENTALS 2% DESIGN TEMPERATURES DO NOT EXCEED 47°C IN THE UNITED STATES (PALM SPRINGS, CA IS 44.1°C). FOR LESS THAN 9 CURRENT-CARRYING CONDUCTORS IN ROOF-MOUNTED SUNLIT CONDUIT AT LEAST 0.5" ABOVE ROOF AND USING THE OUTDOOR DESIGN TEMPERATURE OF 47°C OR LESS (ALL OF UNITED STATES).
  - a) 12 AWG, 90°C CONDUCTORS ARE GENERALLY ACCEPTABLE FOR MODULES WITH  $I_{sc}$  OF 7.68 AMPS OR LESS WHEN PROTECTED BY A 12-AMP OR SMALLER FUSE.
  - b) 10 AWG, 90°C CONDUCTORS ARE GENERALLY ACCEPTABLE FOR MODULES WITH  $I_{sc}$  OF 8.6 AMPS OR LESS WHEN PROTECTED BY A 16-AMP OR SMALLER FUSE.

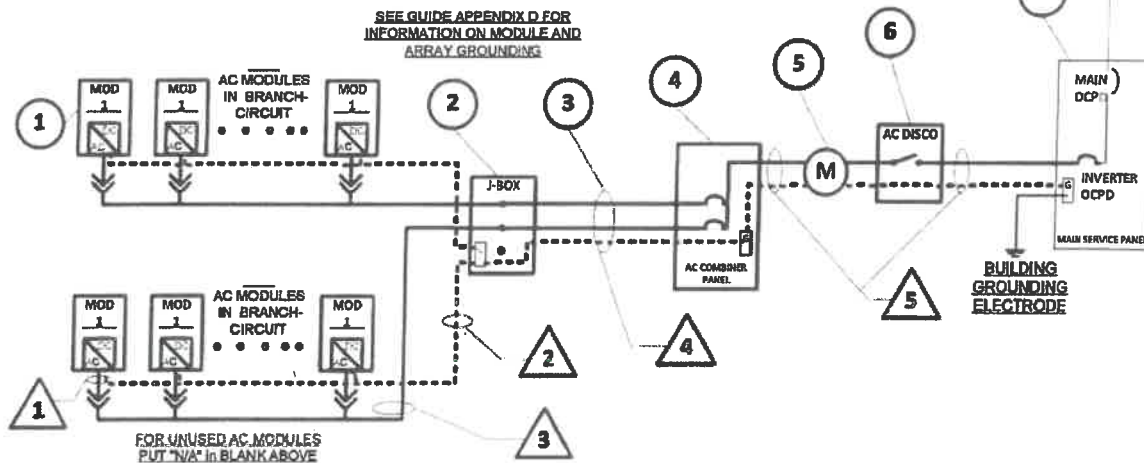
### NOTES FOR INVERTER CIRCUITS (Guide Section 8 and 9):

- 1) IF UTILITY REQUIRES A VISIBLE-BREAK SWITCH, DOES THIS SWITCH MEET THE REQUIREMENT? YES  NO  N/A
- 2) IF GENERATION METER REQUIRED, DOES THIS METER SOCKET MEET THE REQUIREMENT? YES  NO  N/A
- 3) SIZE PHOTOVOLTAIC POWER SOURCE (DC) CONDUCTORS BASED ON MAX CURRENT ON NEC 690.53 SIGN OR OCPD RATING AT DISCONNECT
- 4) SIZE INVERTER OUTPUT CIRCUIT (AC) CONDUCTORS ACCORDING TO INVERTER OCPD AMPERE RATING. (See Guide Section 9)
- 5) TOTAL OF \_\_\_\_\_ INVERTER OCPD(s), ONE FOR EACH INVERTER, DOES TOTAL SUPPLY BREAKERS COMPLY WITH 120% BUSBAR EXCEPTION IN 690.64(B)(2)(e)? YES  NO

Contractor Name: Address and Phone: _____ _____ _____		<b>Notes for One-Line Standard Electrical Diagram for Single-Phase PV Systems</b>	
Site Name: _____ Site Address: _____ System AC Size: _____			
Drawn By:	SCALE	FORM NO:	DATE/REV
Checked By:	SCALE	NTS	Date: _____ SHEET

## AC MODULE ELECTRICAL DIAGRAM

EQUIPMENT SCHEDULE			
TAG	DESCRIPTION	PART NUMBER	NOTES
1			
2			
3			
4			
5			
6			
7			



CONDUIT AND CONDUCTOR SCHEDULE					
TAG	DESCRIPTION OR CONDUCTOR TYPE	COND. GAUGE	NUMBER OF CONDUCTORS	CONDUIT	
				TYPE	SIZE
1	USE-2 <input type="checkbox"/> or PV WIRE <input type="checkbox"/>		MFG Cable	N/A	N/A
2	GEC <input type="checkbox"/> EGC <input type="checkbox"/> X ALL THAT APPLY			N/A	N/A
3	EXTERIOR CABLE LISTED W/ INV.	MFG	MFG Cable	N/A	N/A
4	THWN-2 <input type="checkbox"/> or XHHW-2 <input type="checkbox"/> or RHW-2 <input type="checkbox"/> GEC <input type="checkbox"/> EGC <input type="checkbox"/> X ALL THAT APPLY NO DC GEC IF 690.36 SYSTEM				
5	THWN-2 <input type="checkbox"/> or XHHW-2 <input type="checkbox"/> or RHW-2 <input type="checkbox"/> GEC <input type="checkbox"/> EGC <input type="checkbox"/> X ALL THAT APPLY				

Contractor Name: Address and Phone:	<b>One-Line Standard Electrical Diagram for AC Module PV Systems</b>			
	Site Name: Site Address: System AC Size:			
Drawn By:	SIZE	FORM NO.	DWG NO.	REV.
Checked By:	SCALE	NTS	Date:	SHEET

## NOTES FOR AC MODULE ELECTRICAL DIAGRAM

**NOTES FOR ALL DRAWINGS:**

OCPD = OVERCURRENT PROTECTION DEVICE  
 NATIONAL ELECTRICAL CODE® REFERENCES SHOWN AS (NEC XXX.XX)

**AC MODULE RATINGS (Guide Appendix C)**

AC MODULE MAKE	
AC MODULE MODEL	
NOMINAL OPERATING AC VOLTAGE	
NOMINAL OPERATING AC FREQUENCY	
MAXIMUM AC POWER	
MAXIMUM AC CURRENT	
MAXIMUM OCPD RATING	

**SIGNS—SEE GUIDE SECTION 7**

**SIGN FOR DC DISCONNECT**

N/A since no dc wiring

**SIGN FOR INVERTER OCPD AND AC DISCONNECT (IF USED)**

**SOLAR PV SYSTEM  
AC POINT OF CONNECTION**

AC OUTPUT CURRENT

NOMINAL AC VOLTAGE

**THIS PANEL FED BY MULTIPLE  
SOURCES (UTILITY AND SOLAR)**

**NOTES FOR ARRAY CIRCUIT WIRING (Guide Section 6 and 8 and Appendix E):**

- 1.) LOWEST EXPECT AMBIENT TEMPERATURE BASED ON ASHRAE MINIMUM MEAN EXTREME DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. LOWEST EXPECTED AMBIENT TEMP \_\_\_\_°C
- 2.) HIGHEST CONTINUOUS AMBIENT TEMPERATURE BASED ON ASHRAE HIGHEST MONTH 2% DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. HIGHEST CONTINUOUS TEMPERATURE \_\_\_\_°C
- 2.) 2009 ASHRAE FUNDAMENTALS 2% DESIGN TEMPERATURES DO NOT EXCEED 47°C IN THE UNITED STATES (PALM SPRINGS, CA IS 44.1°C). FOR 6 OR LESS CURRENT-CARRYING CONDUCTORS IN ROOF-MOUNTED SUNLIT CONDUIT AT LEAST 0.5" ABOVE ROOF AND USING THE OUTDOOR DESIGN TEMPERATURE OF 47°C OR LESS (ALL OF UNITED STATES).
  - a) 12 AWG, 90°C CONDUCTORS ARE GENERALLY ACCEPTABLE FOR AC MODULES INVERTER OUTPUT CIRCUITS WITH 12 AMPS OR LESS WHEN PROTECTED BY A 15-AMP OR SMALLER OCPD.
  - b) 10 AWG, 90°C CONDUCTORS ARE GENERALLY ACCEPTABLE FOR AC MODULES INVERTER OUTPUT CIRCUITS WITH 16 AMPS OR LESS WHEN PROTECTED BY A 20-AMP OR SMALLER OCPD.

**NOTES FOR INVERTER CIRCUITS (Guide Section 8 and 9):**

- 1) IF UTILITY REQUIRES A VISIBLE-BREAK SWITCH, DOES THIS SWITCH MEET THE REQUIREMENT? YES  NO  N/A
- 2) IF GENERATION METER REQUIRED, DOES THIS METER SOCKET MEET THE REQUIREMENT? YES  NO  N/A
- 3) SIZE PHOTOVOLTAIC POWER SOURCE (DC) CONDUCTORS BASED ON MAX CURRENT ON NEC 690.53 SIGN OR OCPD RATING AT DISCONNECT (N/A)
- 4) SIZE INVERTER OUTPUT CIRCUIT (AC) CONDUCTORS ACCORDING TO INVERTER OCPD AMPERE RATING. (See Guide Section 9)
- 5) TOTAL OF \_\_\_\_\_ INVERTER OUTPUT CIRCUIT OCPD(s), ONE FOR EACH AC MODULE CIRCUIT. DOES TOTAL SUPPLY BREAKERS COMPLY WITH 120% BUSBAR EXCEPTION IN 690.64(B)(2)(a)? YES  NO

Contractor Name, Address and Phone:		<b>Notes for One-Line Standard Electrical Diagram for Single-Phase PV Systems</b>			
Site Name:					
Site Address:					
System AC Size:		SIZE	FSCM NO	DWG NO	REV
Drawn By:	SCALE	NTS	Date:	SHEET	

## Chapter 2 GENERAL ZONING PROVISIONS

### 2-10: ALTERNATIVE ENERGY SYSTEMS:

#### A. Scope Of Regulations:

1. Regulations: It shall be unlawful to install any form of alternate energy source other than one permitted by the terms of this ordinance in the zoning district wherein such premises, building or structure is located.
2. Building Permit Required: A building permit issuance shall be required prior to the installation of any alternate energy source equipment installation.
3. Location And Manner Of Installation: All alternate energy source equipment shall be installed in a location and manner so as not to be objectionable to the property occupants, adjoining property and owners. Objectionable criteria shall include:
  - a. Appearance: Shall be integrated in architecture of building.
  - b. Sound: Audible projection not to exceed fifty (50) dB at lot line.
  - c. Odor: No noxious odor detectable at lot line.
  - d. Discharge: No toxic discharge and all other waste products to be diluted in accordance with IEPA and OSHA rules and regulations.
  - e. Particulate Emission: Not to exceed that similar to flue gases emanating from combustion of natural gas.
  - f. Vibration: No measurable vibration at lot line.
  - g. Documentation: Compliance with above criteria shall be provided by acceptable scientific and engineering data and/or reports and shall be subject to verification testing by village of South Barrington and/or its authorized agent.
4. Inoperable Or Damaged Equipment: When any alternate energy source equipment has become inoperable or damaged for a period of one hundred eighty (180) days, or otherwise violates the requirements of this ordinance, it shall be deemed by the village to be abandoned. The owner of said alternate energy source equipment shall remove the alternate energy source equipment within thirty (30) days following the mailing of written notice that removal is required. If the abandoned facility is not removed within the time period required the village may remove all structures at the owner's expense. In the case of said removal the village has the right to file a lien for reimbursement, for any and all expenses incurred by the village, without limitation,

including attorney fees and accrued interest. Upon removal the site shall be restored to a prealternate energy condition.

5. Violation And Penalty: Any violation of any provision of this section shall constitute a municipal civil infraction subject to the remedies specified in [title 1, chapter 4](#), "General Penalty", of the South Barrington village code.

#### B. Solar Energy Collection Panels And Solar Water Heating Systems (Solar Panels):

1. Solar systems shall be permitted on any roof in any zoning district as permitted accessory uses. No freestanding solar panels shall be allowed in any zoning district.
2. Solar systems shall be flush with the roof and not extend beyond the roofline, integrated with the structure's architecture. Solar panels shall not be located on a roof face that faces the front yard of a lot unless it is properly integrated with the structure's architecture.
3. Solar surfaces shall be permitted to cover any amount of a roof without the above area and location limitation, provided that they are incorporated into and made to appear as part of the roof, continuous in area without gaps, and do not cause glare to reflect onto neighboring properties.
4. All frame and visible structural parts of a solar panel shall coordinate with the roof color.
5. No solar systems shall be artificially lighted.
6. A building permit shall be required prior to erecting any solar collector system. Mounting for such solar systems shall be in conformance with all electrical codes and building codes to ensure wind and weight loading requirements are met. Plans shall be prepared and stamped by a licensed architect, professional engineer or structural engineer (SE), and inspected by the building officer or his designee.
7. An emergency direct current (DC) disconnect switch shall be provided in a location accessible outside near the electric meter to shut off such system in the event of an emergency.
8. Solar systems shall be used primarily to generate energy for the property where it is located. This provision is not intended to restrict connection to or providing excess electricity to the utility provider.

#### C. Ground Source Heat Pump Systems (Geothermal System):

1. Definitions: The following definitions shall apply to this section:

**CLOSED HORIZONTAL LOOP GEOTHERMAL SYSTEM:** A geothermal system that consists of the following basic elements: underground loops of piping; heat transfer fluid; a heat pump, and an air distribution system. An opening is made in the earth. A series of pipes are installed into the opening and connected to a heat exchange system in the building. The pipes form a

"closed loop" and are filled with a heat transfer fluid. The fluid is circulated through the piping from the opening into the heat exchanger and back. The system functions in the same manner as the open loop system except there is no pumping of groundwater. A horizontal closed loop geothermal system shall be no more than twenty feet (20') deep.

**CLOSED VERTICAL LOOP GEOTHERMAL SYSTEM:** A geothermal system in which a borehole extends beneath the surface. Pipes are installed with U-bends at the bottom of the borehole. The pipes are connected to the heat exchanger and heat transfer fluid is circulated through the pipes.

**GEOTHERMAL SYSTEM:** A system for heating and/or cooling buildings using the earth's thermal properties in conjunction with electricity.

**HEAT TRANSFER FLUID:** Any nontoxic liquid, such as food grade antifreeze, used especially for the purpose of transferring thermal energy from the heat source to another location.

**OPEN LOOP GEOTHERMAL SYSTEM:** A geothermal system in which groundwater is pumped from a well into a heat exchanger located in a surface building. The water drawn from the earth is then pumped back into the aquifer through a different well or in some cases the same well (commonly referred to as "re injection"). Alternatively, the groundwater could be discharged to a surface water body (also known as "pump and dump"). In the heating mode, cooler water is returned to the earth, while in the cooling mode, warmer water is returned to the surface water body.

2. Open Loop Systems: Open loop systems are prohibited.
  3. Vertical Closed Loop Systems: Vertical closed loop systems are limited to a depth no deeper than twenty feet (20') below grade.
  4. System Testing: Pipes for geothermal systems permitted under this section shall be tested hydrostatically at one and one-half ( $1\frac{1}{2}$ ) times the maximum system design pressure, but not less than one hundred (100) psi (689 kPa), for a duration of not less than fifteen (15) minutes. All geothermal systems must be pressure checked by a licensed geothermal system contractor every five (5) years from the date of its initial successful test. Results shall be filed with the building officer. If the test results show the system fails to meet these requirements, system shutdown and repairs shall be made at the direction of the building officer.
  5. Drilling: Any and all drilling associated with the installation of a ground source heat pump system shall be performed by a certified geothermal drill operator.
- D. Special Uses: Subject to the conditions and requirements of this section and of section 11-5 of this ordinance other future alternative energy systems may be considered. (Ord. 2012-973, 9-13-2012)