

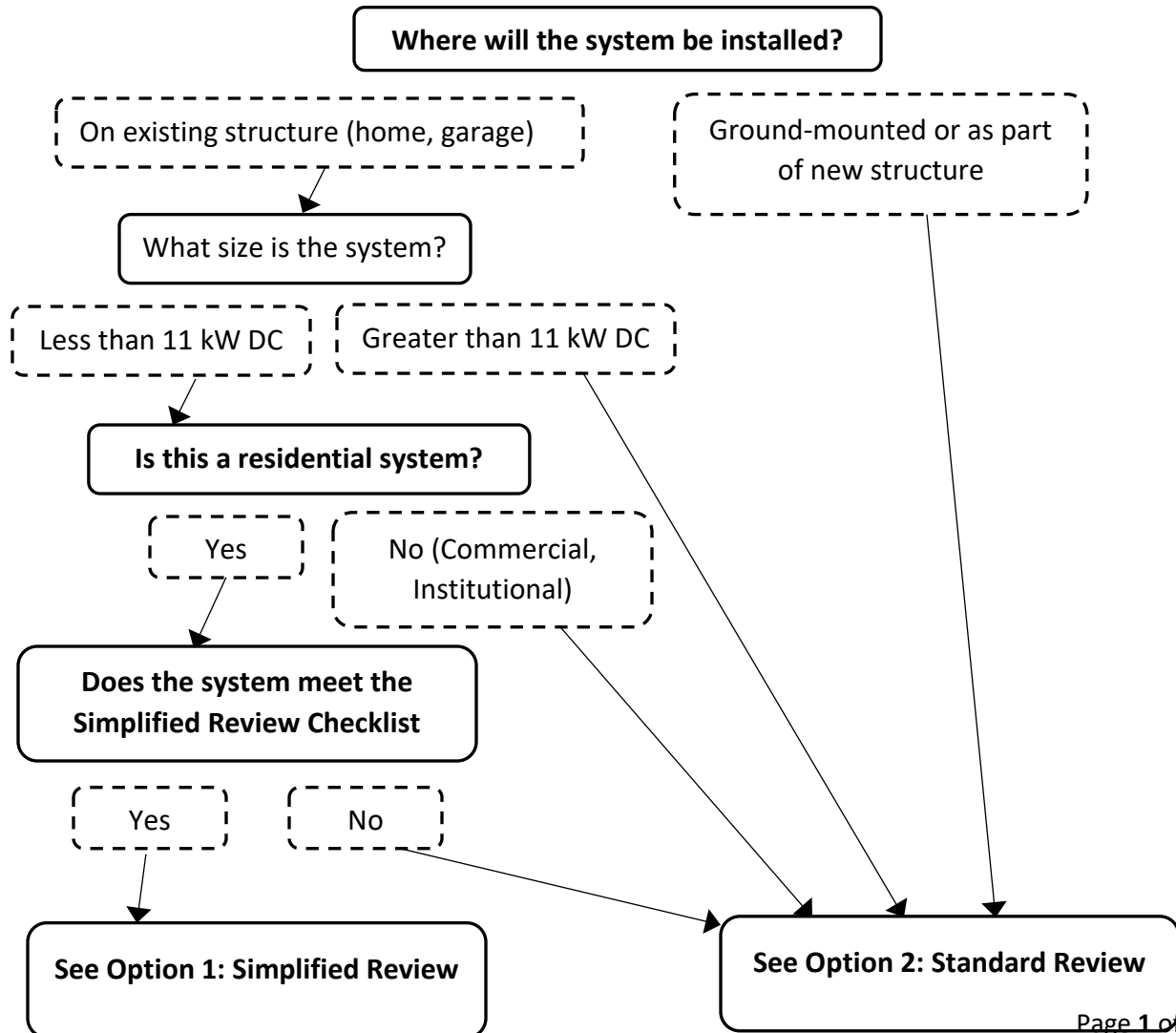
## Solar Photovoltaic (PV) Permit Application Guidelines City of South Bend and St. Joseph County

All solar PV systems require a permit **before** installation may begin. Follow the steps below for either the 1) Simplified Review **OR** 2) Standard Review.

Applicant must appear in person to receive the permit at 125 S. Lafayette Blvd. Suite 100, South Bend, IN 46601. Application materials may be submitted in advance as a PDF file to [building@southbendin.gov](mailto:building@southbendin.gov). Permit fees must be paid before the permit is issued. For permit and inspection questions, call the Building Department at 574-235-9554.

Typical permit turnaround time is less than 3 days for small rooftop solar PV.

- 1. Check the zoning code, determine if you are in a Special Design Review Area, Local Historic District/Historic Landmark, contact your electric utility, and contact your Homeowner Association (if relevant) before preparing materials for the Building Department**
- 2. Next use the diagram below to determine if the system qualifies for Simplified Review:**



## **Option 1: Simplified Review (Small Residential Rooftop Systems)**

*Applicants may qualify for a simplified review for small, residential rooftop photovoltaic (PV) systems that are **less than 11 kW DC** and **meet criteria in the Simplified Review Checklist**.*

*The simplified review allows the majority of simple **rooftop** solar PV systems to be permitted and inspected without requiring additional structural and design calculations.*

### **Review:**

#### **1. Simplified Review Checklist [See Appendix A]**

Review Appendix A in this document to identify whether the solar project likely falls under the simplified review. This document does not need to be submitted. Find the online Solar PV Permit Application Guidelines at <https://southbendin.gov/department/community-investment/building/building-permits/>

### **Required Information for Permit:**

#### **2. Permit Application:**

Under simplified review, only an electrical permit is required for systems interconnected to the utility grid.

Access online: <https://southbendin.gov/department/community-investment/building/building-permits/>

#### **3. Basic Site Map with Roof Layout:**

This drawing does not need to be to scale. Setbacks from property lines do not need to be indicated for roof-mounted systems. Mark the location of the panels on the roof, inverters, utility meter, and the AC disconnect switch. Roof setbacks should be marked.

#### **4. Specification Sheets:**

Digital or paper copies of specification sheets **must** be submitted **at the time of application** for all major PV system components including PV modules, dc-to-dc converters, inverters, and mounting systems. Digital files may be submitted by email to [building@southbendin.gov](mailto:building@southbendin.gov)

## **Option 2: Standard Review**

Standard review applies to: all **non-residential** systems, all **ground-mounted** systems, all residential rooftop systems that do not qualify for Simplified Review. Commercial and institutional systems require standard review.

### **Required Information for Permit:**

#### **1. Permit Application:**

All systems require an electrical permit if interconnected to the utility grid.

Ground-mounted systems may require an accessory structure permit.

Access online: <https://southbendin.gov/department/community-investment/building/building-permits/>

#### **2. Site Plan:** The site plan should represent the relative location of components on the parcel, including panels, inverters, utility meters, disconnect switches and existing structures.

- a. **Roof-mounted:** Mark location of the panels on the roof, labeling fire access setbacks from roof ridges and valleys. Setbacks from property lines do not need to be measured.
- b. **Ground-mounted:** Measure and mark setbacks from property lines to the solar system.

#### **3. Structural Worksheet [See Appendix B]:**

Supply the requested information for roof or ground-mounted systems and provide any additional information if necessary. This is not required if documentation is provided by a certified engineer or design professional.

#### **4. Electrical Diagram:**

Provide an electrical diagram showing PV array configuration, wiring system, overcurrent protection, inverter, disconnects, and AC connection to building. Note that a simple one-line diagram will satisfy this requirement.

#### **5. Specification Sheets:**

Digital or paper copies of specification sheets **must** be submitted **at the time of application** for all major PV system components including PV modules, dc-to-dc converters, inverters, and mounting systems. Digital files may be submitted by email to [building@southbendin.gov](mailto:building@southbendin.gov)

## APPENDIX A: Simplified Review Checklist

### Step 1: Structural PV Array Mounting Requirements

#### Both Member-Attached and Sheathing-Attached Provisions

##### **A. General Site and Array Requirements (all square boxes must be checked; where slanted check box sub-options occur, one sub-option must be checked):**

- 1. Wind Exposure and Design Wind Speed (as defined by ASCE 7-10, select one below):
  - a. Member-Attached System: Exposure B or C and design wind speed does not exceed 150 mph.
  - b. Sheathing-Attached System (select one below):
    - i. Exposure C (open terrain/fields) and design wind speed does not exceed 120 mph, or
    - ii. Exposure B (urban, suburban and wooded areas more than 500 yards from open terrain) and design wind speed does not exceed 140 mph.
- 2. The structure is not in Wind Exposure D (within 200 yards of a body water wider than a mile).
- 3. The structure is not on a hill with a grade steeper than 5%, where topographic effects can significantly increase wind loads.
- 4. Ground snow loads do not exceed 30 psf.
- 5. Distributed weight of PV array is less than 4 lbs/ft<sup>2</sup> (less than 5 lbs/ft<sup>2</sup> for thermal systems).

##### **B. Roof Information (all must apply):**

- 1. The array is mounted on a permitted one- or two-family roof structure or similar structure.  
*If roof not permitted, show compliance with International Residential Code (IRC) span tables.*
- 2. The roof is framed with wood rafters or trusses at no greater than 48" on center. Roof framing members run upslope/downslope (not horizontal purlins).
- 3. The roof structure appears to be structurally sound, without signs of alterations or significant structural deterioration or sagging.
- 4. Sheathing: At least 7/16" or thicker plywood, or 7/16" or thicker oriented strand board (OSB).
- 5. If a composition shingle roof, the roof has a single roof overlay (no multiple shingle layers).  
*If not, show compliance with IRC span tables.*
- 6. Roof height: Mean roof height is not greater than 40 feet.

##### **C. Array Mounting Equipment Information (all must be defined):**

- 1. Mounting Equipment Manufacturer \_\_\_\_\_
- 2. Product Name and Model# \_\_\_\_\_
- 3. UL2703 fire rating for the PV modules used in the project. Fire rating Class \_\_\_\_ (A, B, or C).
- 4. Specify anchor-to-roof sealing (e.g. flashing, or sealant compatible with roofing):

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***If any structural item cannot be checked off, the building official may require the installer to provide structural calculations and/or details, stamped and signed by a design professional, addressing the unchecked item.***

## Step 2: Member-Attached Additional Provisions

(Skip to Step 3 if Sheathing-Attached)

### **D. Member-Attached Array Requirements (all square boxes must be checked; where slanted check box sub-options occur, one sub-option must be checked):**

- 1. Array is set back from all roof edges and ridge by at least twice the gap under the modules (or more, where fire access pathways are required).
- 2. Array does not cantilever over the perimeter anchors more than 19".
- 3. Gap under modules (roof surface to underside of module) is no greater than 10".
- 4. Gaps between modules are (select one below):
  - a. at least 0.25" on both short and long sides of modules, or
  - b. 0" on short side, and at least 0.50" on long sides.
- 5. Mounting rail orientation or rail-less module long edges (select one below):
  - a. run perpendicular to rafters or trusses, and attached to them, or
  - b. run parallel to rafters and are spaced no more than 4'-0" apart, Ground Snow Load is no greater than 10 psf, and Design Wind Speed does not exceed 120 mph.
- 6. The anchor/mount/stand-off spacing perpendicular to rafters or trusses (select one below):
  - a. does not exceed 4'-0", and anchors in adjacent rows are staggered where rafters or trusses are at 24" or less on center (see Figure), or
  - b. does not exceed 4'-0", anchor layout is orthogonal, roof slope is 6:12 or less, Ground Snow Load is no greater than 10 psf, and Design Wind Speed does not exceed 120 mph, or
  - c. does not exceed 6'-0", anchor layout is orthogonal, roof slope is 6:12 or less, Ground Snow Load is zero, and Design Wind Speed does not exceed 120 mph.
- 7. Upslope/downslope anchor spacing follows manufacturer's instructions.
- 8. Anchor fastener is (select one below):
  - a. 5/16" diameter lag screw with 2.5" embedment into structural member, or
  - b. fastener other than (a.) embedded in structural members in accordance with manufacturer's structural attachment details. Manufacturer's anchor layout requirements must not exceed the anchor spacing requirements shown in Items 5 and 6 above.

*If any structural item cannot be checked off, the building official may require the installer to provide structural calculations and/or details, stamped and signed by a design professional, addressing the unchecked item.*

## Step 3. Sheathing-Attached Additional Provisions

(Skip to Step 4 if Member-Attached)

### **E. Sheathing-Attached Array Requirements (all square boxes must be checked; where slanted check box sub-options occur, at least one sub-option must be checked):**

- 1. Array is set back from all roof edges and ridge by at least twice the gap under the modules (or more, where fire access pathways are required).
- 2. Array does not cantilever over the perimeter anchors more than 19".
- 3. Gap under modules (roof surface to underside of module) is no greater than 5".
- 4. Gap between modules is at least 0.75" on both short and long sides of modules.
- 5. Roof framing and sheathing nailing options (select a, b, or c below):
  - a. Manufactured Wood Trusses, or

- b. Initially Dry Wood Rafters (lumber grade stamps are visible and state “S-DRY” (Surfaced Dry) or “KD” (Kiln-Dried), or
  - c. Initially Wet Wood Rafters meeting one of the field-verified sheathing nail options listed below. Note: If lumber stamps are not visible, or if lumber stamps state “S-GRN” (Surfaced Green), the lumber shall be assumed to have been initially “wet” (MC > 19%) at time of sheathing installation. (select I, ii, or iii below):
    - i. Deformed shank nails, 6d or greater, or
    - ii. 8d smooth shank common or box nails, or
    - iii. 6d smooth shank common or box nails, nailed into dense lumber, either Douglas Fir (stamp: DF or DF-L) or Southern Pine (stamp: SPIB).  
 (**NOTE:** sheathing attached not allowed with Lower density lumber such as Spruce-Pine-Fir (stamp: S-P-F) and Hem-Fir (stamp: HF) and 6d smooth shank nails.)
- 6. Anchor location restrictions—all anchors must comply with at least one of the options below. Anchors verified to be in “Bands of Strength” are attached in the middle 16” wide strip centered between the long edges of sheathing panels (at least 16” from sheathing long edge). Check all boxes that apply to anchors in the array:
  - a. Anchor is not in bands of strength (i) tributary region is more than 3 feet from any roof edge (wind Zone 1), (ii) tributary area is 9 square feet or less (up to half the area of a 60 cell PV module), and (iii) If initially wet lumber as defined by item 5c: Exposure B only, 120 mph max wind speed.
  - b. Anchor is in bands of strength (i) tributary region is more than 3 feet from any roof edge (wind Zone 1), and (ii) tributary area is 18 square feet or less (up to the full area of a 60 cell PV module).
  - c. Anchor is in bands of strength (i) tributary region is less than 3 feet from a roof edge (wind Zone 2), and (ii) tributary area is 9 square feet or less (up to half the area of a 60 cell PV module).
  - d. Anchor is in bands of strength (i) tributary region is within 3 feet of a roof corner (wind Zone 3), and (ii) tributary area is 4.5 square feet or less (up to ¼ of a 60 cell PV module).

**If any structural item cannot be checked off, the building official may require the installer to provide structural calculations and/or details, stamped and signed by a design professional, addressing the unchecked item.**

## Step 2: Electrical PV System Requirements Checklist

- 1. Major electrical components including PV modules, dc-to-dc converters, and inverters, are identified for use in PV systems.
- 2. Array mounting system UL2703 certified for bonding and grounding. Alternatively, the array mounting system may incorporate UL2703 grounding devices to bond separate exposed metal parts together or to the equipment grounding conductor.
- 3. The PV array consists of no more than 2 series strings per inverter input and no more than 4 series strings in total per inverter.
- 4. Field Installed PV array wiring meets the following requirements:
  - a. All exposed PV source circuit wiring is 10 AWG PV Wire.
  - b. All PV source circuit wiring in raceway is 10 AWG THWN-2, XHHW-2, or RHW-2.
  - c. Any field-installed PV output circuit wiring is 6 AWG THWN-2, XHHW-2, or RHW-2.
  - d. PV system circuits on buildings meet requirements for controlled conductors in 690.12.
- 5. The total inverter capacity has a continuous ac power output 11,000 Watts or less and meets the requirements of 705.12(D) where installed on the load side of the service disconnecting means (complies with Table 705.12(D) in **Technical Appendix**). (choose one below)
  - Load-side connection complying with Table 705.12(D)
  - Supply-side connection complying with 705.12(A)
- 6. Equipment is rated for the maximum dc voltage applied to the equipment (put N/A in all blanks that do not apply to the specific installation):
  - a. ASHRAE Extreme Annual Mean Minimum Design Dry Bulb Temperature (one source is [www.solarabcs.org/permitting](http://www.solarabcs.org/permitting)) = -22°C ; Table 690.7 (NEC) value 1.20
  - b. Max (temp adjusted) module Voc:  
Rated Voc \_\_\_\_\_ V x Table 690.7 value 1.20 = \_\_\_\_\_ V
  - c. Dc-to-dc converter(s) or microinverter rated maximum input voltage: \_\_\_\_\_ V  
(must be greater than Max module Voc in (B.))
  - d. Maximum number of dc-to-dc converters allowed in series (up to 600Vdc): \_\_\_\_\_
  - e. Maximum voltage of dc-to-dc converter circuit with maximum number in (C.): \_\_\_\_\_ V
  - f. Inverter(s) rated maximum input voltage: \_\_\_\_\_ V (must be greater than i to iv below)
    - i) Inverter 1 input 1: Max module Voc (B.) \_\_\_\_\_ V x # in series \_\_\_\_\_ = \_\_\_\_\_ V
    - ii) Inverter 1 input 2: Max module Voc (B.) \_\_\_\_\_ V x # in series \_\_\_\_\_ = \_\_\_\_\_ V
    - iii) Inverter 2 input 1: Max module Voc (B.) \_\_\_\_\_ V x # in series \_\_\_\_\_ = \_\_\_\_\_ V
    - iv) Inverter 2 input 2: Max module Voc (B.) \_\_\_\_\_ V x # in series \_\_\_\_\_ = \_\_\_\_\_ V
- 7. One of the standard electrical diagrams (E1.1a, E1.1b, E1.1c, E1.1d, or E1.1e) can be used to accurately represent the PV system.

*Fill out the standard electrical diagram completely. If the electrical system is more complex than the standard electrical diagram can effectively communicate, the project does not meet the requirements for a simplified permit application and additional information may be necessary for the jurisdiction to process the permit application.*

## APPENDIX B: Structural Worksheet

This section is for evaluating roof structural members that are site built. This includes rafter systems and site built trusses. Manufactured truss and roof joist systems, when installed with proper spacing, meet the roof structure requirements covered in item 2 below.

**Note:** This worksheet is not required if plans are certified by a design professional.

### ***If the array is roof mounted:***

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

2. **Describe site-built rafter or site-built truss system.**

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)  Yes  No

e. **If Yes**, complete section 3 below.

3. **If the roof system has:**

a. over-spanned rafters or trusses,

b. the array over 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 below.

ii. Confirmation certified by a design professional that the roof structure will support the array.

### ***If array is ground mounted:***

1. Show array supports, framing members, and foundation posts and footings.

2. Provide information on mounting structure(s) construction. If the mounting structure is unfamiliar to the local jurisdiction and is more than six (6) feet above grade, it may require engineering calculations certified by a design professional.

3. Show detail on module attachment method to mounting structure.