



Construction Permit Submittal Requirements for Photovoltaic Electrical Systems (Solar)

The following information is provided to assist permit applicants in preparing the plans and submittals for photovoltaic (solar) electric generating systems. Missing or incomplete information may cause delays in issuing your permit. If you are uncertain about these requirements, please contact Matt Varvel at 805-781-1536 or e-mail mvarvel@co.slo.ca.us for assistance.

All electrical installations shall comply with the adopted edition of the California Electrical Code (NEC with California amendments). In addition to the general requirements contained in Chapters 1 through 4, special requirements may also apply. See Article 690 for solar (photovoltaic) systems, Article 445 for generators and Article 480 for storage batteries and Article 705 for interconnected electrical power production sources. Other articles may also apply depending on the system configuration.

Application Package must include:

- Construction Permit Application Form.
- Title/Cover Sheet
- Vicinity Map (directions to property)
- Site Plan and separate Roof Plan
- Attachment Details (Roof Mount Sys)
- Warning Labels and Locations
- Supporting Documentation: Manufacture's Specifications, Charts and/or Manuals
- Structural Plans & Calcs (if applicable for GMS)

Required plans for the PV system application:

1. Electronic Submittal

- One upload of the plans listed below:
- One copy of supporting documentation
- A complete Construction Permit Application

2. Paper Submittal (Minimum size 11 x 17)

- Two copies of the plans listed below:
- Two copies of supporting documentation
- A complete Construction Permit Application

PLAN CONTENT DETAILS

The following is a list of project information expected on your plans, as applicable.

COVER SHEET:

- Project location, Street Address & APN
- Provide a clear and concise scope of work, a detailed description of the system and of its components.
- State if the system is a stand-alone (off-grid), hybrid or an interactive (grid-tied) system.
- Provide list of Applicable Governing Codes (newest cycle: 2022) include County of SLO Ordinances Title 19, 22 & 23.
- Identify the owner and contact information (name, address, phone number, and email).
- Identify the project designer/contractor and contact information (name, address, phone number, and email), Include License No.
- Sheet Index: Clearly lists all the pages included in the plans set, each sheet to be dated and signed.

SITE PLAN: Minimum Scale 1/8" = 1'-0"

- Property location and boundaries of all existing buildings or other existing structures above 120 sf. Provide permit numbers & use/occupancy.
- Provide fronting streets, scale, north arrow.
- Driveway & access to Site and/or PV System.
- Location of any existing setbacks easements
- Proposed location of solar panel arrays, inverters, and if used, generators, battery banks, and battery charge controllers.
- Clearance from existing structures, property lines, fences/retaining walls.
- Clearly indicate all site utilities to support the PV system. Location and size of the existing service equipment. All existing equipment and wiring shown on the plan as (E). All other equipment and wiring will be considered to be new.

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ROOF PLAN: Minimum Scale 1/8" = 1'-0"

- Include the following information: North arrow, identify roof slope, materials of roof covering, roof dimensions, any skylights, roof ventilation openings, or other plumbing and mechanical equipment on the roofs, with clearances req.
- Show location of all equipment; proposed and existing. This includes: solar modules, inverters (or micro-inv.) and if used, generators, battery banks, and/or EV charging station equipment.
- Identify on plans whether the photovoltaic supporting equipment is proposed to be installed inside or outside of buildings.
- Roof access, pathways and setback requirements shall be provided on plans.
- Access and minimum spacing shall be required to provide emergency access to the roof, to provide pathways to specific areas of the roof, provide for smoke ventilation opportunity areas, and to provide emergency egress from the roof.
- Access and Pathways shall be over areas capable of supporting fire fighters. Access and Pathways shall be located in areas with minimal obstructions such as vent pipes, conduit, or mechanical equipment.
- Provide no fewer than two pathways, on separate roof planes from lowest roof edge to ridge and not less than 36 inches (914 mm) wide. One pathway shall be provided on the street or driveway side of the roof.

ATTACHMENT DETAILS: Minimum Scale 1/4" = 1'-0"

- Show the method of attachment to the roof, flashing details, state minimum embedment.
- Provide a detail showing a section of the roof composition, mounting type and racking system, structural attachment.

SUPPORTING DOCUMENTATION:

- The manufacturers' product data or specification sheets for the modules, inverters, array racking system, and any other major components. Be sure to identify the make and model of the equipment you intend to use.

ADDITIONAL SUPPORTING DOCUMENTATION:

Roof mounted arrays:

- Arrays weighing more than three pounds per square foot: Provide a detailed design for the solar collector support racks. Include engineering documentation for seismic and wind loading. Show the method of attachment to the roof, flashing details and provide engineering documentation that the existing roof structure is capable of supporting the additional loads.

Ground mounted arrays:

- Engineering is required for arrays exceeding six feet above adjacent grade.
- Show wiring method is in compliance, throughout entire system

WARNING LABELS:

- Identify locations and provide details depicting all required warning labels.
- Marking is required on all interior and exterior DC conduit, enclosures, raceways, cable assemblies, junction boxes, combiner boxes, and disconnects.
- The materials used for marking shall be reflective, weather resistant and suitable for the environment and comply with UL 969.
- Marking shall have all letters capitalized with a minimum height of 3/8 inch white on red background. The marking shall contain the following words in all capitals: "WARNING: PHOTOVOLTAIC POWER SOURCE". The marking shall be placed adjacent to the main service disconnect in a location clearly visible from the location where the disconnect is operated. Marking shall be placed on all interior and exterior DC conduit, raceways, enclosures and cable assemblies every 10 feet, within one foot of all turns or bends and within one foot above and below all penetrations of roof/ceiling assemblies and all walls and /or barriers.
- Provide the location of all warning signs required. Lettering must be permanent and not less than one quarter inch high. Stand-alone systems shall also be labeled in compliance.

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SINGLE LINE DIAGRAM:

- State if the system is a stand-alone (off-grid) or an interactive (grid tie) system. Please note that stand alone PV systems must be properly sized. Provide load calculations to justify the system size, include with the submittals.
- Conductor sizes and types (consideration shall be given to conductor temperature ratings, ampacity, environment, and sunlight exposure). All conductors and cables shall be listed by a nationally recognized testing agency (NRTL) and installed in accordance with their listing.
- The maximum and minimum open circuit voltage (Voc) for each DC source circuit (series string of modules) and output circuit. Use the following formulas to calculate voltage. $V_{max}=V_{oc}+((T_{low}-T_{ref})\times aV_{oc})$, $V_{min}=V_{mp}+((T_{hi}+T_{rise}-T_{ref})\times bV_{mp})$
 T_{low} is the ASHRAE Extreme Annual Mean Minimum Density Dry Bulb Temperature. This is the ASHRAE 2% Annual Dry Density Bulb Temperature. See <http://solarprofessional.com/articles/design-installation/array-voltage-considerations>
- The short circuit current (Isc) for each series string of modules and for each output circuit (combined parallel source circuits).
- Note compliance for the identification of grounded conductor, positive or negative.
- Show all AC and DC disconnects – sizes, types, and locations.
- Indicate all conduit sizes and types and the number and sizes of conductors in each.
- Fuses and/or circuit breakers, show rating in amperes (fuses and/or circuit breakers used for direct current circuits must be listed for direct current).
- Inverters, show AC output voltage and amperage, connected to single or three phase system.
- Transfer switches – show size, type, number of poles, rating and location.
- Batteries/ESS: show number, voltage, amp-hours, series and/or parallel connected.
 -Show location of ESS equipment on the Site plan
 -If installed inside of garage provide a Floor Plan showing impact protection (when required) and heat detection alarm that is interconnected with smoke detecting system installed in the home. – include specification sheets.
- Generators: Show size in volt-amps or watts and voltage output.
- Show EV charging station connection and location if part of scope of work or if equipment is existing.
- See the *updated* “Construction Permit Submittal Requirements for Electric Vehicle (EV) Stations Form BLD-2039” for additional information.
- Ground fault protection (indicate if included in the inverter or separate).
- Arch fault Protection of DC circuits: indicate if included in the inverter or separate.
- The grounding system including the conductor sizes, connection points and grounding electrodes (ground rods).
- Existing wiring and equipment that is not code compliant must be corrected.
- Note compliance for inverter AC output connection point. Load side back feed overcurrent devices when combined with line overcurrent devices shall not exceed 120% of the panel board buss or conductor rating. In no case shall a system’s design permit a Buss or conductor rating to be exceeded.

Note: All electrical equipment and conductor shall be listed by a nationally recognized testing laboratory (NRTL) such as U.L., ETL, CSA. A complete listing of nationally recognized testing laboratories can be found on the OSHA web site.)