City of FRESNO

DEVELOPMENT AND RESOURCE MANAGEMENT DEPARTMENT
BUILDING AND SAFETY SERVICES
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RESIDENTIAL PHOTOVOLTAIC SUBMITTAL REQUIREMENTS

Chapter 1 Section 105.1 of the California Building Code requires any person engaged in the construction, alteration, expansion, repair, demolition or change of occupancy of a building/structure or its components (electrical, plumbing, mechanical systems) shall obtain appropriate permits. The following is provided in an effort to expedite the process of obtaining permits for the installation of Solar Photovoltaic Systems.

SUBMITTAL REQUIREMENTS

Plans are required for permits to install Photovoltaic Systems in compliance with the California Electrical Code as well as the California Building Code when structural review is required.

Provide 2-sets of plans which include the following documents:

1. Site Plan: Provide the site address, property owner's name and address, all property lines and setbacks dimensioned, and location of all existing and proposed structures. Site plans shall be drawn to a suitable scale and sufficient clarity. *(aerial or overhead photos are not acceptable)* For PV systems installed on the existing building's roof structure, the site plan may also serve as a roof plan if the footprint of the building, roof layout, roofing material, and the location of the arrays and all equipment are clearly shown. For ground mounted PV systems, show property lines and setback dimensions to the supporting structure. *(See attached Sample Site Plan)*

2. Electrical Plan: Provide an electrical one-line diagram showing the number of photovoltaic panels, number of strings, with voltage and kilowatt output, all disconnects, all combiners, all inverters with input and output ratings, the size of the main electrical panel bussing in amperes, the size of the main service disconnect, the size of the PV circuit breaker in amperes, size and type of all raceways and the size and type of all conductors.
   Provide manufacturer's "cut" sheets for all modules and inverters that clearly specify all electrical information.
   - DC Roof Top Disconnects: There shall be a separate emergency DC disconnect on the roof to disconnect solar panels from DC wiring running through and on the building to the inverter. This disconnect must be permanently labeled in reflective, fade-resistant material that states: "Emergency DC Disconnect." This provides a safety mechanism for firefighting ensuring power has been disabled as close to the source as possible. Disconnects, provided in a NEMA 3R box, shall be installed as close to the array as possible to eliminate any substantial length of energized wiring that cannot be shut down. (FMC section 10-50605.11.1)
     - *Exception: Conductors in rigid or electrical metallic tubing (EMT)*

   - All micro-inverter systems will require a rooftop AC disconnect.

   - Electrical Load Calculations for the dwelling electrical panel is required when de-rating the main service breaker.

3. Structural Plans (if applicable see below):
   - Ground Mounted Structures: Complete plans shall be required for all structures for ground mounted arrays, trellises, and patio covers. Provide the attachment of the panels to the roof for all roof mounted modules. If using pre-manufactured racking systems, provide the manufacturer's installation specifications.

   - Existing Roof Structures: If the existing roofing material is tile or there is more than one layer of composition shingles, alterations may be required to the existing roof structure to support the additional loads imposed from the module system. Structural plans shall be provided that are of sufficient detail and scope to demonstrate the required load path to ground. (Roof framing plan, cross-sections, structural calculations and details as necessary). Structural design may require a licensed Architect or Engineer to prepare plans and calculations and properly certify in conformance with section 5537(b) of the California Business and Professions Code.

PERMIT REQUIREMENTS

1. A Solar Photovoltaic Permit shall be required for the installation of all PV systems. Permit fees are calculated per the revised fee schedule adopted January 3, 2012 as follows:
   - First 10 solar panels: $114.47
   - Each additional 10 panels over 10: $ 87.22
   - Standard Electrical fee: $ 81.76
   - Residential Solar Plan Check fee: $ 80.35
     (may be subject to additional fees for complex structural review)

2. An additional Electrical Permit may be required for additional electrical modifications to the existing electrical system. (example: service panel change/upgrade, etc.) Fees shall be calculated as itemized in the revised fee schedule for "stand-alone" electrical permits.

3. An additional Building Permit may be required if structural modifications to the existing roof structure are required to provide adequate support for the solar panels. (to be determined during plan check)

4. A separate Building Permit is required for installations on new structures such as trellises, patio covers, carports, ground mounted structures, etc. to support the PV System.

INSPECTIONS

Required inspections may include:

- Electrical Underground
- Electrical Rough
- Electrical Final
- Structural-Foundation
- Structural-Rough Framing
- Structural-Final

WARNING LABELS

As required by Article 690 of the California Electrical Code, signage or labels shall be posted at all equipment locations which state the following information:

"WARNING"

ELECTRIC SHOCK HAZARD. THE DIRECT CURRENT CIRCUIT CONDUCTORS OF THIS PHOTOVOLTAIC POWER SYSTEM ARE UNGROUNDED BUT MAY BE ENERGERIZED WITH RESPECT TO GROUND DUE TO LEAKAGE PATHS AND/OR GROUND FAULTS.

"WARNING:"

ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION.

PHOTOVOLTAIC

AC – DISCONNECT

PHOTOVOLTAIC

"DC – DISCONNECT

CAUTION:

SOLAR CIRCUIT

"WARNING"

BIPOLAR PHOTOVOLTAIC ARRAY

DISCONNECTION OF NEUTRAL OR GROUNDED CONDUCTORS MAY RESULT IN OVERVOLTAGE ON ARRAY OR INVERTER.

CAUTION:

SOLAR ELECTRIC SYSTEM

"WARNING"

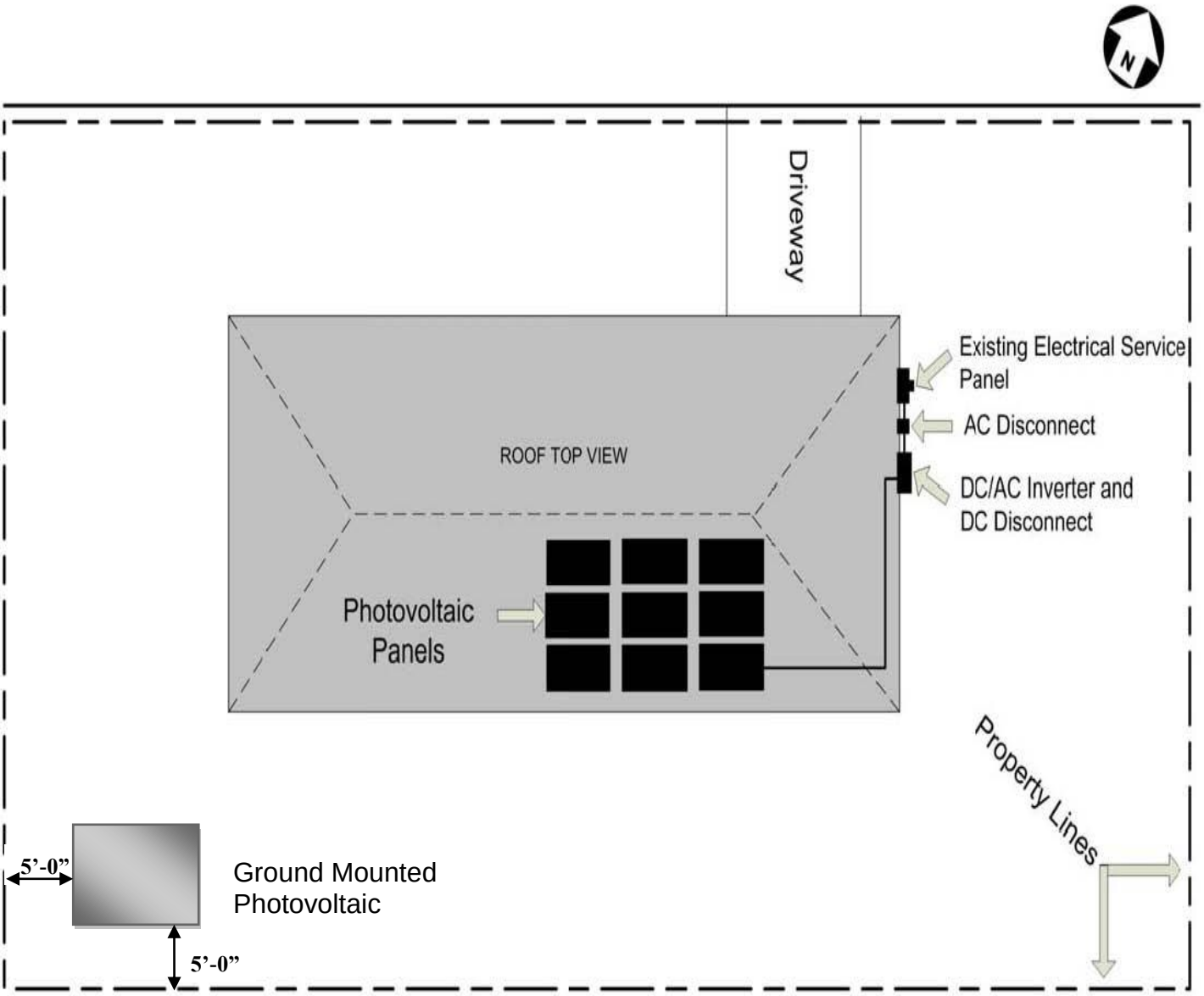
DUAL POWER SUPPLY

AC
PHOTOVOLTAIC DISCONNECT

Open-circuit Voltage	XXXX Vdc
Operating Voltage	XXXX Vdc
Maximum System Voltage	XXXX Vdc
Operating Current	XXXX Amps
Short Circuit Current	XXXX Amps
Maximum Power	XXXX Watts

DC
PHOTOVOLTAIC DISCONNECT

Open-circuit Voltage	XXXX Vdc
Operating Voltage	XXXX Vdc
Maximum System Voltage	XXXX Vdc
Operating Current	XXXX Amps
Short Circuit Current	XXXX Amps
Maximum Power	XXXX Watts



SAMPLE SITE PLAN (additional plans are also required)