City of Malibu

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Photovoltaic Systems Guide:
Plan Check and Inspection Requirements

This guide outlines the plan check submittal requirements and the inspections process for the installation of all residential and commercial photovoltaic (PV) systems within the City of Malibu. The intent of these guidelines is to provide a standardized outline of requirements to obtain code compliance and to facilitate the installation of PV systems in a safe compliant manner with a minimum of effort and cost. All PV system proposals should include adequate component documentation, structural attachment, and code compliant wiring methods. When installations fail to meet minimum requirements, a system may be a hazard to public health and safety, and negatively impact properties.

All PV system installations require an approval from the Planning Department. The review will verify conformance to setbacks, height, and conformance with other local ordinances and the Local Coastal Implementation Plan. Generally, a standard roof or ground mount installation will be approved "over the counter." Complex or large installations may require a detailed plan check that necessitates a review submittal to Planning. Contact Planning staff at Mplanning@malibucity.org or 310-456-2489 ext. 485 with questions regarding the process.

Any project with Solar and Battery Storage will require Los Angeles County Fire Department approval. If a project only involves an Energy Storage System (ESS), obtain County Fire Department approval, then Building Safety approval prior to requesting a permit. If a project involves PV system installation and ESS, obtain County Fire Department approval before submitting to Planning and Building Safety. Email all plan submittals to FIRE-FPCalabasas@fire.lacounty.gov with the following information in the subject line: Address, City, Description including company name, roof mounted solar back-up battery or ground mounted solar back-up battery. The County will review all ESS and backup ESS as some installations have been found to be noncompliant with Los Angeles County Fire Code Section 1206. It should be noted that the County Code is more restrictive than the State Code in this section. Contact the Calabasas/Malibu Field Office at 818-880-0341.

Roof mounted or ground mounted PV systems require the issuance of an electrical permit for the electrical installation and equipment, and a building permit for the structural attachment of the array. City of Malibu is located within Exposure C with a design wind speed of 110mph. Stamped and signed Wind Uplift structural calculations are required for all (roof or ground) installations; include the total weight of the arrays, existing roofing material, and array mounting hardware detail sheets. The calculations must demonstrate the roof elements will support the array and withstand the wind uplift forces for Exposure C zone for both the roof structure and the roof mounting hardware.

All photovoltaic systems must show compliance with the most recent County adoption of California Building Code Residential Code R324, including section R324.7 Access and Pathways. Review of this section will be conducted by the City. Contact Building Safety staff at Mbuilding@malibucity.org or 310-456-2489 ext. 390 with questions. Fees are available online at www.malibucity.org/fees.

Photovoltaic System Plan Check Requirements

The following information is required for PV system plan check. If all items are not included at the time of submittal, plans will be returned to the Applicant. For questions regarding any of the requirements listed below, email Mbuilding@malibucity.org or call 310-456-2489 ext. 390.

Planning:

- ☐ Must provide Los Angeles County Fire Department approval for Energy Storage Systems (ESS/BESS) prior to City Planning Department or Building Safety submittals: Email plan submittals to FIRE-FPCalabasas@fire.lacounty.gov with the following information in the subject line: Address, City, Description including company name, roof mounted or ground mounted.
- ☐ Must provide City Planning Department approval prior to building plan check submittal: 2 sets of plans or 1 PDF (electronic preferred)
- ☐ Submit all PV system manufacturers' information and specifications: 2 sets of packets or 1 PDF (electronic preferred)

Site Plan:

- ☐ Full dimension site plan identifying property lines, lot size, streets, and all structures located on the property with dimensions to property lines
- ☐ Roof plan with Array Panel layout showing compliance with Residential Code R324.7 Access and Pathways for roof mounted systems
- ☐ Plot plan with location of ground mounted array for ground mounted system
- ☐ Location of service meter and all photovoltaic system components (must provide City Geology approval)

Plans Required:

- ☐ Site plan (see above)
- ☐ Single line diagram with the following:
  - ☐ Array configuration and wiring identification
  - ☐ Main panel amp and busbar rating
  - ☐ Combiner/Junction box identified
  - ☐ Conduit from array to PV power source disconnect identified
  - ☐ Equipment grounding
  - ☐ Disconnect identify. Note: If batteries installed, identify all disconnect for emergency personnel.
  - ☐ Inverter specified
  - ☐ Conduit from disconnect to inverter identified
  - ☐ Conduit from disconnect to panel identified
  - ☐ System grounding
  - ☐ Point of connection attachment method identified (standing seam, tilt kit, flat roof, ground mount)
  - ☐ EE stamp on all roof or ground mount systems
  - ☐ All manufacturers' information and specifications for products to be used with system
  - ☐ All products to comply with high fire requirements, including panels, racking system, batteries, or roofing products
  - ☐ If generator previously permitted for the site, an electrical engineered single line is required

Notes on Plans Required:

- ☐ "All work shall comply with 2020 Los Angeles County Residential Building Code; 2020 Los Angeles County Electrical Code, California Residential Code, California Electrical"
- ☐ "All work shall be performed by a California Licensed Solar Contractor (C-46) or a California Licensed Electrical Contractor (C-10)"

- ☐ "Local utility provider shall be notified prior to use and activation of any solar photovoltaic system installation"
- ☐ Hold down kits required for secondary power source

Inverter Information:

- ☐ Inverter manufacturers information and specifications
- ☐ Inverter Model Number:_____
- ☐ Inverter Listed for utility interactive
- ☐ Maximum continuous output at 40°C:_____
- ☐ Input voltage range of inverter:_____
- ☐ Rapid shutdown compliant

PV Module Information:

- ☐ PV Module manufacturers information and specifications
- ☐ PV Module listed
- ☐ Open-circuit voltage (Voc) from listing label:_____
- ☐ Maximum permissible system voltage from listing label:_____
- ☐ Short-circuit current (Isc) from listing label:_____
- ☐ Maximum series fuse rating from listing label:_____
- ☐ Maximum power at Standard Test Conditions (Pmax on label):_____
- ☐ Voltage at Pmax on listing label:_____
- ☐ Current at Pmax on listing label:_____

Array Information:

- ☐ Number of modules in series:_____
- ☐ Number of parallel source circuits:_____
- ☐ Total number of modules:_____
- ☐ Operating Voltage (number of modules in series X module current a Pmax)_____
- ☐ Maximum system voltage(690.7):_____
- ☐ Short-circuit current (690.8):_____

Wiring and Overcurrent Protection:

- ☐ Wiring type is 90° wet rated
- ☐ Conductor ampacities are sufficient
- ☐ Maximum PV source circuit current:_____
- ☐ Minimum PV source circuit current:_____
- ☐ Minimum PV output circuit ampacity:_____
- ☐ Minimum PV inverter output circuit ampacity:_____
- ☐ Source circuit overcurrent protection is sufficient
- ☐ Overcurrent protection on Inverter Output Circuit is sufficient (amps):_____
- ☐ Point of connection meets provisions of NEC 690.64/705.12
- ☐ Point of connection busbar rating:_____

Roof Information (roof mount systems only):

- ☐ PV Array conductors are run through structure:_____
- ☐ Weight of array per square foot:_____
- ☐ Age of building:_____
- ☐ Building is over 30 years old roof engineering required
  - ☐ Size of rafters:_____
  - ☐ Span of rafters:_____
  - ☐ Spacing of rafters:_____
- ☐ Roof material type:_____

- ☐ PV panel mounting attachment: Provide listing and torque specifications depending on attachment product
- ☐ PV panel wind uplift calculations and details: Include EE stamps for attachment product
- ☐ Method of sealing roof penetrations:_____

Required PV Signage:

- ☐ **DC Combiner/Junction Box:**

  "Warning. Electrical shock hazard. The direct current circuit conductors of this photovoltaic power system are ungrounded but may be energized with respect to ground due to leakage paths and/or ground faults."

  "CAUTION: SOLAR CURCUIT" marking on all interior and exterior DC conduits, raceways, enclosures, and cable assemblies.

- ☐ **DC Disconnect:**

  "Warning. Electrical shock hazard. The direct current circuit conductors of this photovoltaic power system are ungrounded but may be energized with respect to ground due to leakage paths and/or ground faults."

  "PV System-DC Disconnect"

  "Open-Circuit Voltage _____Vdc"
  "Operating Voltage _____Vdc"
  "Maximum System Voltage _____Vdc"
  "Operating Current _____Amps"
  "Short Circuit Current _____Amps"
  "Maximum Power _____Watts"

- ☐ **Inverter:**

  "Warning. Electrical shock hazard. Do not touch terminals. Terminals on both the line and load sides may be energized in the open position."

- ☐ **AC Disconnect:**

  "Open Circuit Voltage _____Vdc"
  "Operating Voltage _____Vdc"
  "Maximum System Voltage _____Vdc"
  "Operating Current _____Amps"
  "Short Circuit Current _____Amps"
  "Maximum Power _____Watts"

- ☐ **Meter:**

  "Warning – Dual Power Supply"
  "Caution: Solar Electric System"

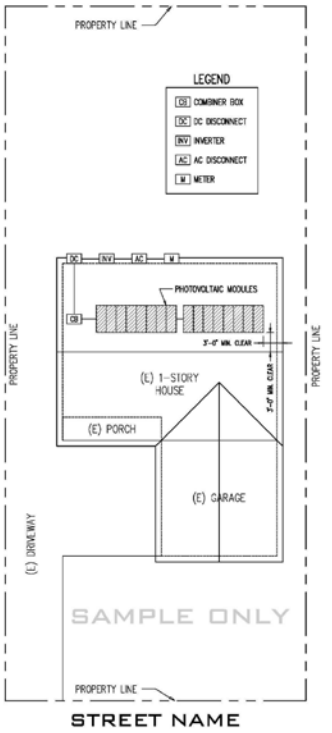
Battery Backup Systems:

- ☐ **Battery backup disconnects must be clearly identified for emergency personnel**
- ☐ **Backup load calculations**
- ☐ **All secondary power sources must include hold down kits**
- ☐ **If installed in basement, garage, or greater than 6 feet from main service panel, must install ESS (emergency shut down plunder switch)**

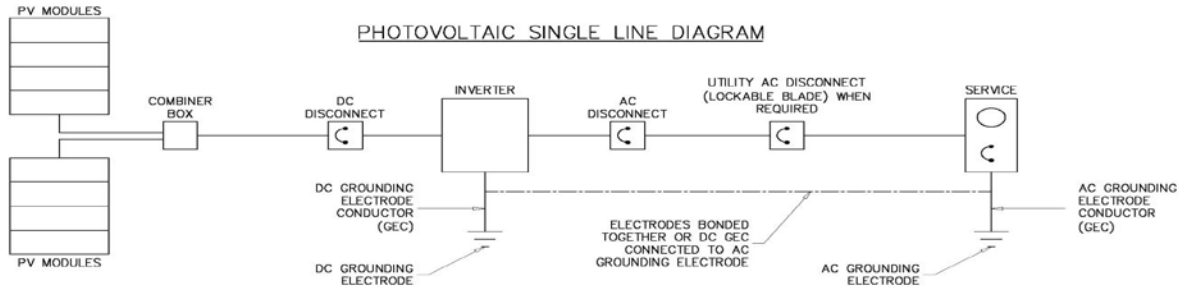
Ground Mount Structure:

- ☐ Must provide City Geology approval
- ☐ Array support engineering (provide calculations and EE stamp for uplift and seismic
- ☐ Details for span distance, pipe size with attachments, footing details including depth size and width (provide EE stamp and concrete specifications)
- ☐ Overall length, width, and height of array (all PV wires and output circuits shall be guarded when greater than 30 Volts)

Sample Site Plan:



SAMPLE SINGLE LINE DIAGRAM:



– ALL WIRING IN A SOLAR PHOTOVOLTAIC SYSTEM SHALL BE IDENTIFIED
– FOR INFORMATIONAL PURPOSES ONLY.

Photovoltaic System Inspection Guidelines

The City Inspector shall verify all elements of PV installation are completed satisfactorily. The following information is required prior to final approval of the installation and authorization to activate the system.

Building Safety Inspection Types Required

Planning Inspection may also be required for some projects. Contact Planning staff at 310-456-2489 ext. 485 or Mplanning@malibucity.org with questions.

- ☐ Ground Mount System
  - Footing inspection
  - Underground electrical (raceway and conduits)
  - Final inspection of the complete system including full rapid shutdown test, modules, panel (brand and size), wire terminations, grounding, etc.
- ☐ Roof Mount System
  - Rough electrical for concealed wiring
  - Array bonding and grounding
  - Final inspection of the complete system including full rapid shutdown test, modules, panel (brand and size), wire terminations, grounding, etc.
- ☐ Roofing
  - A separate roofing permit and inspection will be required if system installation affects any new or existing roof

Inspection Checklist

General:

- ☐ Approved plans and permit card onsite
- ☐ Installation of equipment shall be per approved plans
- ☐ Work shall be ready for the requested inspection
- ☐ Cal-OSHA compliant ladder shall be onsite and secured in place for the inspection
- ☐ All required working clearances for electrical equipment must be provided and maintained
- ☐ All required labels must be properly fixed in place

Service Equipment:

- ☐ Service equipment and its verifiable busbar rating shall be adequate and properly sized for the designed PV source
- ☐ Service grounding and bonding connections shall be located and verified
- ☐ All grounding requirements shall be verified on the PV installations involving detached structures
- ☐ Install a placard for all customer self-generating electrical equipment as required by the California electrical code
- ☐ New circuit breakers shall be of the same manufacturer as the existing service equipment or listed to be used with the existing electrical equipment. When existing circuits are relocated to accommodate the PV breaker, if breakers are relocated, a new panel schedule will be required

PV Array Installed on Roofs:

- ☐ All roof mount PV arrays and racking systems require inspection of the wiring, attachments, and grounding
- ☐ The racking system and the modules must be installed in compliance with the manufacturer installation instructions

- The installed racking system and modules shall be the same as those identified on the approved plans
- The racking system must be positively attached to the structure and the weather protection of the roof membrane shall be maintained
- Roof mount arrays may not compromise or obstruct roof vents, plumbing vents, or chimneys
- Class A fire rating shall be provided
- Separate inspection is required on standing seam roofs to verify S5 clamps and torque specifications prior to installation of panels

Combiner Boxes, Junction Boxes, and Wiring Methods:

- Source wiring conductors shall be an approved type and properly sized
- Combiner boxes, disconnects, and fusing used in DC source wiring shall be DC rated
- Intermediate enclosures, boxes, and conduit body covers must be accessible for servicing and properly grounded

PV Inverters and DC Disconnects:

- The placard or label with the actual power source operating voltages and currents shall be affixed to or located adjacent to either the inverter or the DC disconnect
- The installed inverters shall be the same as those identified on the approved plans
- A properly sized system grounding electrode conductor shall be installed to the appropriate grounding terminal
- Metallic raceways and enclosures, enclosing system grounding electrode conductors, shall be bonded at each end of the raceways and at each enclosure

AC Overcurrent Protection and Required Utility Disconnects:

- When a lockable AC disconnect is required by the utility, it shall be located at the service equipment unless the utility approves a remote location
- When the utility disconnect is required, it shall be identified on the placard at “PV System Disconnect for Utility Operation”
- All back-fed circuit breakers and disconnects must be properly labeled

Backup Batteries:

- Location must be clearly identified on approved plans
- All emergency disconnects must be clearly identified
- Secondary power sources must have hold down kits

It shall be the duty of the Permit Applicant to cause the work to remain accessible and exposed for inspection purposes, neither the Building Official nor the jurisdiction shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

Construction Hours: Monday - Friday, 7:00 AM to 7:00 PM and Saturday, 8:00 AM to 5:00 PM.
No construction is allowed on Sundays or holidays. Malibu Municipal Code Section 4.2.04(G)