Construction Permit Application

Solar Voltaic Systems

CITY OF Vancouver WASHINGTON

www.cityofvancouver.us/departments/fire-department

International Fire Code as adopted by VMC 16.04 (Washington State Fire Code)

Permitting Requirements

A solar voltaic system, often referred to as a solar photovoltaic (PV) system, is a technology that converts sunlight directly into electricity. It utilizes solar panels made up of photovoltaic cells to generate electrical power in a clean and renewable way.

A **construction permit** is required to install or modify solar photovoltaic power systems as regulated by WSFC Section 1205**.** When a battery energy storage system (BESS) is provided, a separate permit is required. An FRI type permit is required for fire code compliance review in addition to any MPE, CMI or RES type of permit. Where maintenance being performed is not considered a modification in accordance with the WSFC, a permit is not required.

Project Information

Site Address		Business Name	
Other			

Applicant Information

Company Name			Address		
Contact Name					
Office Phone		Cellular		Email	

Contractor

Company Name			Address		
Contact Name					
Office Phone		Cellular		Email	

Building

Fire Sprinklers	☐Yes ☒No	Fire Alarm	☐Yes ☒No	Emergency Power	☐Yes ☒No
Location	☐Rooftop ☒Other	Occupancy Class	_____ ☑N/A	Energy Storage?	☐Yes ☒No
Installation by:	☐Contractor ☒Owner		If roof mounted:	☐Panels ☒Aesthetic	
Related Permits:	RES_____	CMI_____	DEF_____	MPE_____	

Description of Work

Electronic Plan Standards

File Naming Standards:
Electronic plans and documents shall be named as specified in the City of Vancouver ePLANS system:
https://www.cityofvancouver.us/business/permits-licenses-and-inspections/eplans/

Acceptable File Types:
Plans, calculations, specifications and supporting documents shall be uploaded as a PDF file.

Plan Sheet Standards:
All plans shall be drawn to scale, as identified in the checklist, and each sheet shall state the scale and show a measurable scale on the page for measurement calibrations. One page per upload in plans.

Document Orientation:
All plans must be uploaded in "Landscape" format in the horizontal position with a north indicator. All other documents can be in "Portrait" format. Multiple pages allowed per upload in documents.

Stamped:
Where documentation contains a code analysis or engineering calculations, such documents shall be stamped by the design professional.

Minimum Submittal Checklist for Upload to ePLANS

- ☐ Completed Construction Permit Application – Solar Voltaic Systems (this document) Check all Permit Conditions checkboxes that are applicable to your project.
- ☐ Completed Hazardous Materials Management Plan (HMMP) documents and supplemental documents (See Document Details below)
- ☐ Site plans and floor plans (see *Plan Details* below)

Document Details

HMMP Guide: https://www.cityofvancouver.us/wp-content/uploads/2023/10/Hazardous-Materials-Management-Plan.pdf
See Vancouver Fire Department HMMP Guide for direction on completing required HMMP and/or supplemental forms

An HMMP must contain the following minimum elements:

- ☐ Facility Information Form: Business Activities Declaration page
- ☐ Facility Information Form: Business Owner/Operator Identification page
- ☐ Hazardous Materials Inventory Statement (HMIS)
- ☐ HMIS Hazard Class Summary Report
- ☐ Emergency Response/Contingency Plan
- ☐ Employee Training Plan
- ☐ Recordkeeping
- ☐ Facility Site Plan & Storage Map
- ☐ Facility Information Forms
- ☐ ESS and Lithium-Ion Battery Storage Notification form

In addition to the HMMP documents listed above, provide the following documents:

- ☐ PV system type, such as on-grid (dual pathway with the power grid) or off-grid (standalone)
- ☐ System size in kW
- ☐ Installer qualifications
- ☐ Equipment listing sheets and installation directions
- ☐ Narrative explaining the scope and plans for the project.

Plan Details

The following is a list of information required on all plan submittals for review of a solar voltaic systems permit. The plan shall be drawn to 1/8" = 1'-0" minimum scale. The applicant is required to submit all applicable information so an accurate and timely review may be completed.

General:

- ☐ Plan with a north arrow, a measurable scale for calibration purposes, fire hydrants, emergency access lanes and doors, Fire Department Connection, points of assembly/accountability for evacuees, electrical room, sprinkler riser, fire alarm control panel, Knox Box, and provided roof access
- ☐ Location and layout diagram of the roof or area in which the PV is to be installed, direct current conductors, circuits, and wiring systems.
- ☐ Access pathways and setbacks at ridge for firefighter access and percentage of PV roof coverage if applicable.
- ☐ Illustration and locations of required signage for PV systems(s) in use.
- ☐ Signage with a simple diagram of a building with a roof for the applicable PV system *(seen right).* Sections in red shall signify sections of the PV system that are not shut down when the rapid shutdown switch is turned off.
- ☐ High-voltage areas of solar voltaic system that could be hazardous to emergency responders.
- ☐ Clear perimeter around the roof dimensions and interior pathways dimensions.
- ☐ Identify all smoke ventilation (where applicable) with their required pathway dimensions clearly labeled.
- ☐ Plan view diagram of the roof showing each different photovoltaic system (if using multiple) and a dotted line around areas that remain energized after the rapid shutdown switch is operated.
- ☐ For ground-mounted PV, 10 feet around and under the panels to be clear of vegetation.

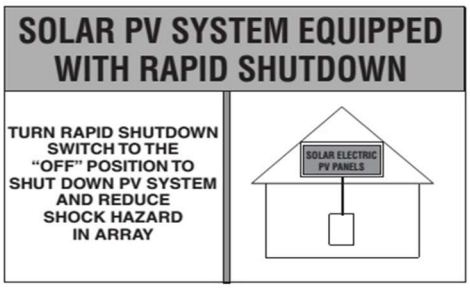

FIGURE 1205.4.1(1)

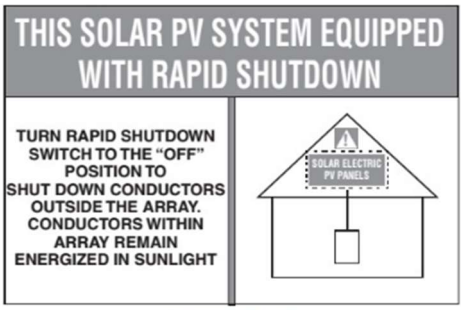

FIGURE 1205.4.1(2)

- ☐ Support arrangement associated with the installation, including any snow and wind loads and required seismic restraint.
- ☐ Drawings showing the rapid shutdown label no more than 3 feet from the service disconnecting means to which the PV system is connected and the locations of all rapid shutdown switches if not at the same location.

Permit Conditions

The following is a list of WSFC Chapter 12 requirements related to solar voltaic operations. Use this form to confirm that all applicable requirements are met. Non-applicable requirements can be left blank.

Access and Pathways:

☐ Roof access, pathways and spacing requirements shall be provided in accordance with the following sections. Pathways shall be over areas capable of supporting fire fighters accessing the roof. Pathways shall be located in areas with minimal obstructions, such as vent pipes, conduit, or mechanical equipment (WSFC 1205.2).

Exceptions:

1. Detached, uninhabitable Group U structures including, but not limited to, detached garages serving Group R-3 buildings, parking shade structures, carports, solar trellises and similar structures.
2. Roof access, pathways and spacing requirements need not be provided where the fire code official has determined that rooftop operations will not be employed.
3. Building-integrated photovoltaic (BIPV) systems where the BIPV systems are approved, integrated into the finished roof surface and are listed in accordance with a national test standard developed to address Section 690.12(B)(2) of NFPA 70. The removal or cutting away of portions of the BIPV system during fire-fighting operations shall not expose a fire fighter to electrical shock hazards.

☐ Residential Systems: Solar photovoltaic systems for Group R-3 residential and buildings built under the International Residential Code shall comply with the following sections (WSFC 1205.2.1).

Exceptions:

1. Residential dwellings with an approved automatic fire sprinkler system installed.
2. Residential dwellings with approved mechanical or passive ventilation systems.
3. Where the fire code official determines that the slope of the roof is too steep for emergency access.
4. Where the fire code official determines that vertical ventilation tactics will not be utilized.
5. These requirements shall not apply to roofs where the total combined area of the solar array does not exceed 33 percent as measured in plan view of the total roof area of the structure, where the solar array will measure 1,000 square feet or less in area, and where a minimum 18 inches unobstructed pathway shall be maintained along each side of any horizontal ridge.

☐ Pathways to Ridge: Not fewer than two 36-inch-wide pathways on separate roof planes, from lowest roof edge to ridge, shall be provided on all buildings. Not fewer than one pathway shall be provided on the street or driveway side of the roof. For each roof plane with a photovoltaic array, not fewer than one 36-inch-wide pathway from lowest roof edge to ridge shall be provided on the same roof plane as the photovoltaic array, on an adjacent roof plane or straddling the same and adjacent roof planes (WSFC 1205.2.1.1).

☐ Setbacks to Ridge: For photovoltaic arrays occupying 33 percent or less of the plan view total roof area, a setback of not less than 18 inches wide is required on both sides of a horizontal ridge. For photovoltaic arrays occupying more than 33 percent of the plan view total roof area, a setback of not less than 36 inches wide is required on both sides of a horizontal ridge (WSFC 1205.2.1.2).

☐ Alternative Setbacks: Where an automatic sprinkler system is installed within the dwelling in accordance with WSFC 903.3.1.3, setbacks at the ridge shall conform to one of the following (WSFC 1205.2.1.3):

1. For photovoltaic arrays occupying 66 percent or less of the plan view total roof area, a setback of not less than 18 inches wide is required on both sides of a horizontal ridge.
2. For photovoltaic arrays occupying more than 66 percent of the plan view total roof area, a setback of not less than 36 inches wide is required on both sides of a horizontal ridge.

☐ Emergency Escape and Rescue Openings: Panels and modules installed on Group R-3 buildings shall not be placed on the portion of a roof that is below an emergency escape and rescue opening. A pathway of not less than 36 inches wide shall be provided to the emergency escape and rescue opening (WSFC 1205.2.2).

☐ BIPV Systems: Where building-integrated photovoltaic (BIPV) systems are installed in a manner that creates areas with electrical hazards to be hidden from view, markings shall be provided to identify the hazardous areas to avoid. The markings shall be reflective and be visible from grade (WSFC 1205.2.3).

Exception: BIPV systems listed in accordance with Section 690.12(B)(2) of NFPA 70, where the removal or cutting away of portions of the BIPV system during fire-fighting operations have been determined to not expose a fire fighter to electrical shock hazards.

Other Than Group R-3 Occupancies:

☐ Access to systems for buildings, other than those containing Group R-3 occupancies, shall be provided in accordance with the following (WSFC 1205.3).

Exception: Where it is determined by the fire code official that the roof configuration is similar to that of a Group R-3 occupancy, the residential access and ventilation requirements in WSFC 1205.2 are a suitable alternative.

- ☐ Perimeter Pathways: There shall be a minimum 6-foot-wide clear perimeter around the edges of the roof (WSFC 1205.3.1).

  Exception: Where either axis of the building is 250 feet or less, the clear perimeter around the edges of the roof shall be permitted to be reduced to a minimum width of 4 feet.
- ☐ Interior Pathways: Interior pathways shall be provided between array sections to meet the following requirements (WSFC 1205.3.2):
  1. Pathways shall be provided at intervals not greater than 150 feet throughout the length and width of the roof.
  2. A pathway not less than 4 feet wide in a straight line to roof standpipes or ventilation hatches.
  3. A pathway not less than 4 feet wide around roof access hatches, with no fewer than one such pathway to a parapet or roof edge.
- ☐ Smoke Ventilation: The solar installation shall be designed to meet the following requirements (WSFC 1205.3.3):
  1. Where non-gravity operated smoke and heat vents occur, a pathway not less than 4 feet wide shall be provided bordering all sides.
  2. Where gravity-operated dropout smoke and heat vents occur, a pathway not less than 4 feet wide on not fewer than one side.
  3. Smoke ventilation options between array sections shall be one of the following:
     a. A pathway not less than 8 feet wide.
     b. A pathway not less than 4 feet wide bordering 4-foot by 8-foot venting cutouts every 20 feet on alternating sides of the pathway.

Buildings With Rapid Shutdown:

☐ Buildings with rapid shutdown solar photovoltaic systems shall have permanent labels (WSFC 1205.4).

- ☐ Rapid Shutdown Type: The type of solar photovoltaic system rapid shutdown shall be labeled with one of the following (WSFC 1205.4.1):
  1. For solar photovoltaic systems that shut down the array and the conductors leaving the array, a label shall be provided. The label shall be in accordance with Figure 1205.4.1(1) *(See plan details)* and state the following: SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN. TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY.
  2. For photovoltaic systems that only shut down conductors leaving the array, a label shall be provided. The label shall be in accordance with Figure 1205.4.1(2) *(See plan details)* and state the following: THIS SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN. TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN CONDUCTORS OUTSIDE THE ARRAY. CONDUCTORS WITHIN ARRAY REMAIN ENERGIZED IN SUNLIGHT.
- ☐ More Than One Shutdown Type: Solar photovoltaic systems that contain rapid shutdown in accordance with both Items 1 and 2 of WSFC 1205.4.1 or solar photovoltaic systems where only portions of the systems on the building contain rapid shutdown, shall provide a detailed plan. *See plan details above* (WSFC 1205.4.2).
- ☐ Switch: A rapid shutdown switch shall have a label located not greater than 3 feet from the switch that states the following: RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM (WSFC 1205.4.3).

Ground-Mounted Photovoltaic Panel System:

- ☐ Ground-mounted photovoltaic panel systems shall be installed in accordance with this section. Setback requirements shall not apply to ground-mounted, free-standing photovoltaic arrays (WSFC 1205.5).
  - ☐ Vegetation Control: A clear, brush-free area of 10 feet shall be required around the perimeter of the ground-mounted photovoltaic arrays. A maintained vegetative surface or a noncombustible base, approved by the fire code official, shall be installed, and maintained under the photovoltaic arrays and associated electrical equipment installations (WSFC 1205.5.1).

Size of Solar Photovoltaic Array:

- ☐ Each photovoltaic array shall be limited to 150 feet by 150 feet. Multiple arrays shall be separated by a 3-foot wide clear access pathway (WSFC 1205.6.1).
- ☐ Panels/modules shall be located up to the roof ridge where an alternative ventilation method approved by the fire code official has determined vertical ventilation techniques will not be employed (WSFC 1205.6.2).

NOTE: *This is not intended to be an all-inclusive list. The WSFC requirements listed are intended to ensure that we have adequate information to begin a review of the application. Additional information may be required.*

I understand that all applicable codes apply and that other regulatory codes may also apply. Errors and/or omissions on the plans and corrections from field inspections are the responsibility of the owner/contractor. All work is subject to compliance with City of Vancouver ordinances and laws of the State of Washington.

APPLICANT NAME:_____APPLICATION DATE: _____

APPLICANT SIGNATURE: _____