Photovoltaic PV Solar Install Permit Submittal Checklist

Applications for **Photovoltaic Solar Install** projects such as residential and commercial photovoltaic solar installs are reviewed by the Building and Inspection Services Division for compliance with applicable ordinances and design criteria and are required to be approved prior to issuance of a building permit. The following list of documents or information is required at the time of submission of application for permit:

- Completed City of Wheat Ridge **Permit Application** containing the following:
  - Property owner name, address and contact information
  - Contractor and subcontractor information (***A contractor currently licensed with the City of Wheat Ridge, possessing a minimum Class A license, is required at the time of permit issuance unless all work is performed by the property owner and that owner resides at the property currently and for a minimum of year from the date of completion of the project)***
  - Detailed description of work to be performed including kw and number of panels
  - Contract value of all work to be performed
  - Printed name and signature of individual submitting application

****APPLICATIONS THAT ARE INCOMPLETE OR LACKING SUBMITTAL DOCUMENTS WILL NOT BE ACCEPTED BY THE BUILDING DIVISION****

- **For Commercial Installs, provide printed copy of the electronic submittal confirmation from the Fire District for Permitting/Plan Review.** This will be the confirmation email you receive or a copy of the confirmation page from the online portal.

- **Solar Photovoltaic Systems Policy – Submittal Requirements**
  - Two complete sets of minimum size 11”x17” construction drawings
  - A professional engineer’s seal and signature is required for all PV installations that will not be located on a single-family dwelling or duplex.
  - A professional engineer’s seal and signature is not required for single-family dwelling or duplex PV installations, unless the proposed PV system equals or exceeds a maximum solar output of 10 kilowatts or includes provisions for a generator or battery backup.

- The **Design Package submitted must include two complete sets of the items** listed below with the permit application:
  - Manufacturer’s cut sheets and listing information for PV equipment, inverters, and other special equipment, including the system manufacturer, model name and number.
  - One-Line Diagram: Indicate all conductor sizes and insulation types, conduit sizes, fuse and circuit breaker ratings, inverter ratings, ground fault protection device (GFPD), AC and DC disconnect ratings. Specify the PV module’s nameplate short circuit current (Isc) and open circuit voltage (Voc). If disconnects, breakers, fuses,

GFPD, etc. are part of a larger piece of equipment, show them as such by indicating how they are connected to the other devices and indicating their ratings. The inverter must be shown as either connected to a dedicated branch circuit with back-fed overcurrent protection (NEC 705.12(B)(1)) or connected to the supply side of the service disconnecting means (NEC 705.12(A)). The AC and DC grounding electrode conductors must be shown on the one-line diagram (NEC 690.41).

- Details showing how the panels will be mounted. Calculations performed by a Colorado registered professional engineer must be submitted to substantiate that the structure can support the design loads specified in Chapter 16 of the International Building Code (IBC). Details and calculations for the panel connections to the roof must be included.
- Calculations: Submit conductor ampacity calculations based upon 156% multiplied by the short circuit current (Isc) (NEC 690.8), or where the PV system rating is greater than 100 kilowatts, submit a documented and stamped PV system design using an industry standard method and provided by a licensed professional electrical engineer to indicate the maximum current value. The current value obtained by using the method indicated in NEC 690.8 cannot be less than 70% of the value calculated using NEC 690.8(A)(1)(1). Also include the temperature derating correction factor per NEC Table 690.31(A). For all roof-mounted flexible wiring, use a worst- case ambient temperature of 61-70°C (141-158°F) per NEC Table 609.31(A).
- Listed PV breakers or fuses are required in PV source and output circuits per NEC 690.9(C). The PV breakers and fuses must be accessible but are not be required to be readily accessible.
- Provide calculations showing that the sum of 125% of the inverter(s) output circuit current and the rating of the overcurrent device protecting the AC load center is less than or equal to 120% of the load center bus rating, where the utility and inverter sources are located at opposite ends of the load center busbar (NEC 705.12(B)(2)(3)(b)).
- Provide calculations showing that the maximum PV system voltage is less than the maximum rated DC inverter input voltage and less than the voltage rating of all connected equipment (NEC 690.7).
- The maximum PV system voltage is equal to the open circuit voltage multiplied by the number of modules in the series, multiplied by the NEC lowest expected ambient temperature derating correction factor from Table 690.7(A) for the -21°C to -25°C (-5°F to –13°F) range.
- Provide calculations indicating that the equipment grounding conductor is sized correctly (NEC 690.43 and 690.45).
- Provide drawing with location of all new and existing electric service equipment.
- Provide detailed NEC required signage description and location.

- Provide compliance for rapid shutdown of the PV systems circuits installed on or in buildings (NEC 690.12).

- ***Other Points to Incorporate into the Design:***
  - Switches, fuses, and breakers on the DC side of the system must be listed and labeled for the DC voltage rating per NEC 690.9(B). Do not use "AC only" rated devices on the DC side of the system.
  - If tied to the grid, the inverter must be listed as utility-interactive (NEC 705.6).
  - The PV system disconnecting means shall be installed at a readily accessible location (NEC 690.13(A)).
  - No more than six PV system disconnecting means or six circuit breakers mounted in a single enclosure, switchboard, or in a group of separate enclosures are allowed per NEC 690.13(D).
  - PV DC source or output circuits of a utility-interactive listed inverter can run inside a building or structure only when contained in metal raceways, type MC metal-clad cable that complies with NEC 250.118(10), or metal enclosures from the point of penetration of the surface of the building to the first readily accessible disconnecting means (NEC 690.31(G)).
  - Structural Integrity: All projects, both residential and commercial, must have a documented and stamped letter from a licensed structural engineer in the State of Colorado, indicating that the existing structure has been reviewed and can adequately support all PV systems and meet all current applicable code requirements. If additional structural enhancements are required, detailed structural drawings and/or structural enhancements outlined in a report must be signed and sealed by a structural engineer and submitted with the permit.
  - For single-family and duplex projects, the structural upgrades will be noted on the solar panel permit and an inspection of this work will be required and should be called in as a framing inspection.
  - If structural enhancements are required for a commercial project, signed and sealed drawings must be logged in for a structural review. A separate permit will be issued for this work.

- **<u>Solar Photovoltaic Systems Policy – Inspections</u>**
  - A qualified person must be present at the time of a PV electrical inspection. A qualified person is as follows:
  - For Residential structures with an electrical service of 200 amps or less, the qualified person can be either a
    - Licensed master electrician,
    - Licensed journeyman electrician,
    - Residential wireman, or

        - NABCEP-certified (North American Board of Certified Energy Practitioners) solar installer capable of testing the rapid shut down system.
    - For Residential structures with an electrical service over 200 amps and International Building Code (IBC) structures, the qualified person can be either a
        - Licensed master electrician or
        - Licensed journeyman electrician.
    - When structural enhancements are required, framing inspection must be requested for both residential and commercial projects.
    - A ladder must be provided by the customer for PV electrical inspections where any component of the system is mounted on the roof.
    - The rapid shut down system must be tested at the final electrical inspection with the inspector present.
    - If the rapid shut down system is located on the AC side of the system, then this test must be conducted by a licensed electrician.
    - If the rapid shut down system is located on the DC side of the system, then a NABCEP certificate holder can conduct this test, in addition to any licensed electrician. The solar installer must provide proof of their NABCEP certificate, which may be done by providing the inspector a photo of the certificate, a copy of the certificate, or by showing the inspector their name on the NABCEP website with a driver's license to verify.

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FOR OFFICE USE ONLY
Date:
Plan/Permit #
Plan Review Fee:

Building & Inspection Services
7500 W. 29th Ave., Wheat Ridge, CO 80033
Office: 303-235-2855 * Fax: 303-237-8929
Inspection Line: 303-234-5933
Email: permits@ci.wheatridge.co.us

Building Permit Application

***** Complete all applicable highlighted areas on both sides of this form. Incomplete applications may not be processed. *****

Property Address: _____

Property Owner *(please print)*: _____ **Phone**: _____

Property Owner Email: _____

Tenant Name (Commercial Projects Only) _____

Property Owner Mailing Address: *(if different than property address)*

Address: _____

City, State, Zip: _____

Architect/Engineer: _____

Architect/Engineer E-mail: _____ **Phone:** _____

Contractor Name: _____

City of Wheat Ridge License #: _____ **Phone:** _____

Contractor E-mail Address: _____

For Plan Review Questions & Comments (please print):

CONTACT NAME *(please print)*: _____ **Phone:** _____

CONTACT EMAIL*(please print)*: _____

Sub Contractors (Must provide Wheat Ridge License No & Signed Subcontractor Authorization form):

Electrical:	Plumbing:	Mechanical:
W.R. City License #	W.R. City License #	W.R. City License #

Other City Licensed Sub:
City License #

Other City Licensed Sub:
City License #

Complete all highlighted fields, if applicable.

☐ **COMMERCIAL** ☐ **RESIDENTIAL**

Provide description of work: For **ALL** projects, provide a **detailed** description of work to be performed, including current use of areas, proposed uses, square footage, existing condition and proposed new condition, appliance size and efficiency, type and amount of materials to be used, etc.

Sq. Ft./LF _____ **BTUs** _____ **Gallons** _____

Amps _____ **Squares** _____ **For Solar:** _____ **KW** _____ **# of Panels** _____ **Requires Structural**

For Commercial Projects Only: **Occupancy Type:** _____ **Construction Type:** _____
Occupancy Load: _____ **Square Footage:** _____

Project Value: (Contract value or the cost of **all** materials and labor included in the **entire** project)

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OWNER/CONTRACTOR SIGNATURE OF UNDERSTANDING AND AGREEMENT

I hereby certify that the setback distances proposed by this permit application are accurate and do not violate applicable ordinances, rules or regulations of the City of Wheat Ridge or covenants, easements or restrictions of record; that all measurements shown and allegations made are accurate; that I have read and agree to abide by all conditions printed on this application and that I assume full responsibility for compliance with applicable City of Wheat Ridge codes and ordinances for work under any permit issued based on this application; that I am the legal owner or have been authorized by the legal owner of the property to perform the described work and am also authorized by the legal owner of any entity included on this application to list that entity on this application. I, the applicant for this building permit application, warrant the truthfulness of the information provided on the application.

CIRCLE ONE: ***(OWNER) (CONTRACTOR) or (AUTHORIZED REPRESENTATIVE) of (OWNER) (CONTRACTOR)***

Signature (first and last name): _____ **DATE:** _____

Printed Name: _____

DEPARTMENT USE ONLY

ZONING COMMMENTS:

OCCUPANCY CLASSIFICATION: _____

CONSTRUCTION TYPE: _____

Reviewer:_____

BUILDING DEPARTMENT COMMENTS:

Reviewer:_____

PUBLIC WORKS COMMENTS:

Reviewer: _____

Building Division Valuation: _____