



# Woodland Fire Department

## Residential Energy Storage Systems (ESS) Guideline CRR-002

Rev. 10/6/2025

### PURPOSE

The purpose of this guideline is to provide clear and concise instructions for the installation, plan submittal, inspection, and maintenance of Residential Energy Storage Systems (ESS) within the City of Woodland. This document is designed to ensure that all ESS installations meet the highest safety standards, comply with local building codes, and support the city's commitment to sustainable energy solutions. By adhering to these guidelines, contractors and designers will contribute to the safe integration of energy storage technologies in residential settings, protecting both property and public safety.

As ESS units present a potential fire risk due to the nature of energy storage, it is imperative that all installations comply with the highest safety standards. This document aims to ensure the safety of both occupants and first responders by outlining the necessary steps for proper ESS implementation.

**Disclaimer: The information provided in this document is general in nature and intended as a guide for ESS installation in R-3 and R-4 occupancies. Each project is unique, and additional requirements may apply as deemed appropriate.**

### SCOPE

This guideline applies to the installation, plan submittal, inspections, and maintenance of Residential Energy Storage Systems (ESS) in Woodland's R-3 and R-4 occupancies. It is intended to assist designers, engineers, contractors, solar installers, homeowners, and other stakeholders involved in the planning, installation, and upkeep of ESS. The guideline outlines the necessary steps to ensure compliance with safety regulations and building codes, mitigating the inherent fire risks associated with ESS units. It provides a comprehensive framework for all phases of ESS implementation, from initial design to ongoing maintenance.

### REFERENCES

The following codes, standards, and guidelines are referenced in this document and should be consulted for additional details and requirements:

- 2022 California Building Code (CBC)
- 2022 California Fire Code (CFC)
- 2022 California Residential Code (CRC)
- 2022 California Electrical Code (CEC)
- 2023 Edition of NFPA 855 - Standard for the Installation of Stationary Energy Storage Systems
- UL 9540 - Standard for Energy Storage Systems and Equipment
- UL 9540A - Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems
- UL 1741 - Standard for Inverters, Converters, Controllers, and Interconnection System Equipment for Use with Distributed Energy Resources
- City of Woodland Municipal Code Section 8.20.040 – Ordinance 1741

These documents provide essential technical criteria and safety requirements that must be adhered to during the design, installation, and maintenance of Residential Energy Storage Systems (ESS).

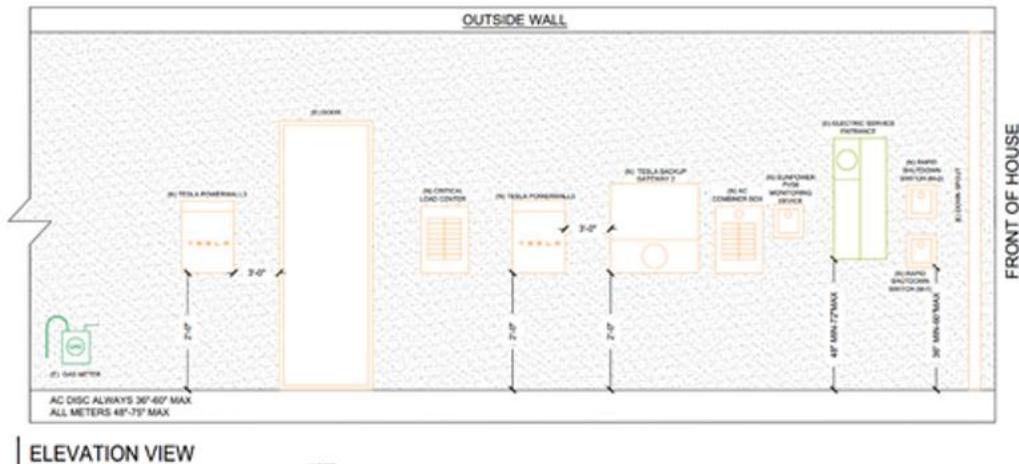
## PLAN SUBMITTAL PROCESS

Residential ESS submittals are required to be submitted to the City of Woodland Building Division in the Community Development Department for review by the Building Division and the Woodland Fire Department. Please reference the City of Woodland Plan Submittal requirements for the required application documents and to ensure that your plan submittal is complete: <https://www.cityofwoodland.gov/300/General-Building-Permit-Information>.

## PLAN SUBMITTAL INFORMATION

Plan reviews for the Woodland Fire Department will be conducted internally by the Community Risk Reduction Division. The following items should be included and/or addressed in your submitted plan set for ESS:

- Plan set needs to include the stamp (full name of the design professional and CSLB number). The fire code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional (CFC 104.8.2).
- Note on plan set if the residence has a fire sprinkler system installed or not.
- A detailed site plan showing the location of the ESS unit(s) and all related electrical equipment. Equipment shall be labeled as “existing” or “proposed”. The distance between the ESS unit(s) and doors or windows which lead directly into the dwelling unit shall be noted on the plans for all ESS proposed for installation on an exterior wall.
- A detailed floor plan showing the location of the ESS unit(s), related electrical equipment, vehicle impact protection, designated working clearances from electrical equipment and distances between ESS unit(s) and all doors or windows leading directly into the dwelling unit.
- A detailed elevation for each wall on which an ESS unit(s) or related electrical equipment is proposed for installation. The clear height of the vehicle garage opening shall be noted. The distance from the ceiling/top of wall and floor/ground to the ESS unit(s) and the distance between each ESS unit(s) shall be noted on the elevation. Indicate the clearances on the Elevation view to include the mounting clearances in line with minimum mounting clearances. The noted distances should include all 4 sides of the ESS. NFPA 15.3.1 states: Individual ESS units shall be separated from each other by a minimum of 3 ft (914 mm) unless smaller separation distances are documented to be adequate based on fire and explosion testing complying with 15.13. (CFC 1207.11.2.1)
  - **(NEW)** Clearly label the emergency disconnect location to include distances from battery. The location of the disconnect shall be shown on all plan submittals, including one-line diagrams and site plans, and shall be verified during field inspection.
    1. ESS disconnects to be installed at a safe distance from the battery itself, typically 10 to 15 feet away.
    2. The disconnect shall be mounted at a height of 5 feet on center above finished grade, measured to the center of the operating handle.
    3. The disconnect shall be in a clear and unobstructed path of travel from the front of the residence and shall not require people to pass by or through the ESS installation location to access it.Exception: This requirement does not apply to ESS units that incorporate an integral, clearly labeled, and readily accessible manual shutdown switch that isolates the battery from the electrical system—provided the switch is located on the exterior of the unit, meets the accessibility and labeling requirements of this section, and is approved by the Fire Code Official.
  - Additionally, if smaller separation distance is in accordance with the manufacturer’s instructions and listing, provide documentation of fire and explosion testing in accordance with UL 9540A or equivalent test standards.



- ESS unit(s) and related electrical equipment shall be labeled as “existing” or “proposed”. Show the location of all related disconnects for the ESS and/or solar photovoltaic equipment.
  1. If the ESS unit(s) is installed on an exterior wall on which the gas meter is located, note the distance in feet between the ESS unit(s) and the gas meter
- Specification sheets for all ESS equipment and related equipment, including solar photovoltaic equipment, if applicable.
- Labels listed shall be in color or note in text the color of each label listed.
- Manufactures required open space in front of battery must be listed on plan set (*i.e., Tesla Powerwall 2 requires at least 6 feet of open space in front of the battery, as well as 2 feet of clearance on each side*).

**INTERIOR INSTALLATION** (i.e., Garage, Detached building, etc.)

In addition to the above specifications, include/address the following in the submitted plan set:

- Provide details on hourly fire-resistant-rated assemblies provided or relied upon in relation to the ESS.
- **(NEW)** Energy storage systems (ESS) installed in unfinished and unconditioned spaces in Group R-3 and R-4 occupancies shall comply with the requirements of the 2022 California Fire Code Section 1207.11.6, as well as the additional provisions outlined below:
  1. Rooms and areas within dwelling units, sleeping units, basements, permitted enclosed spaces, and attached garages in which ESS are installed shall be protected by smoke alarms in accordance with Section 907.2.11 of the California Fire Code.
  2. A listed heat alarm, interconnected to the smoke alarms, shall be installed in any location within dwelling units, sleeping units, or attached garages where smoke alarms cannot be installed based on their listing.
  3. Heat alarms shall meet all of the following criteria:
    - a. Be listed by Underwriters Laboratories (UL).
    - b. Be approved by the California Office of the State Fire Marshal.
    - c. Be rated and permitted for the type of installation. In unconditioned and unfinished spaces, the **ambient temperature rating** for the heat alarm shall be listed by the manufacturer as 135°F or higher.
    - d. The location of all required smoke alarms and heat alarms shall be shown on plan submittals and verified during field inspection.
  4. For conditions other than specific fire safety functions noted in Section 907.3, in areas where ambient conditions prohibit the installation of smoke detectors, an automatic sprinkler system installed in such areas in accordance with Section 903.3.1.1 or 903.3.1.2 and that is connected to the fire alarm system shall be approved as automatic heat detection (CFC 907.4.3.1).
- Home fire sprinkler system must be tied into a flow switch allowing interconnection of the smoke alarms inside the residence. For conditions other than specific fire safety functions noted in Section 907.3, in

areas where ambient conditions prohibit the installation of smoke detectors, an automatic sprinkler system installed in such areas in accordance with Section 903.3.1.1 or 903.3.1.2 and that is connected to the fire alarm system shall be approved as automatic heat detection (CFC 907.4.3.1).

## PLAN REVIEW INFORMATION

1. Energy Ratings: Individual ESS units shall have a maximum rating of 20 kWh. The aggregate rating structure shall not exceed:

- 40 kWh within utility closets and storage or utility spaces.
- 80 kWh in attached or detached garages and detached accessory structures.
- 80 kWh on exterior walls.
- 80 kWh outdoors on the ground.

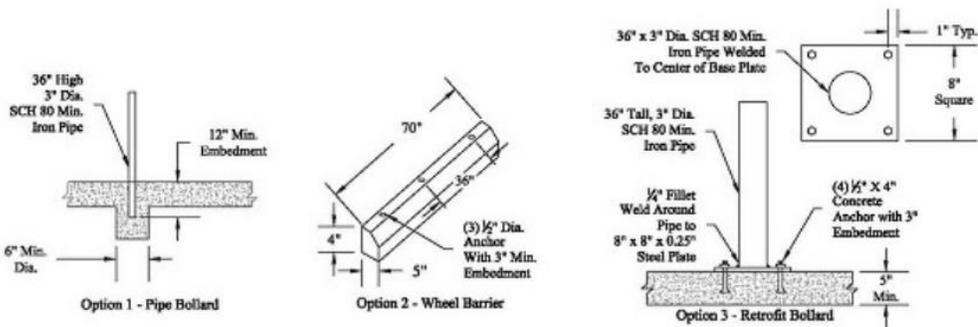
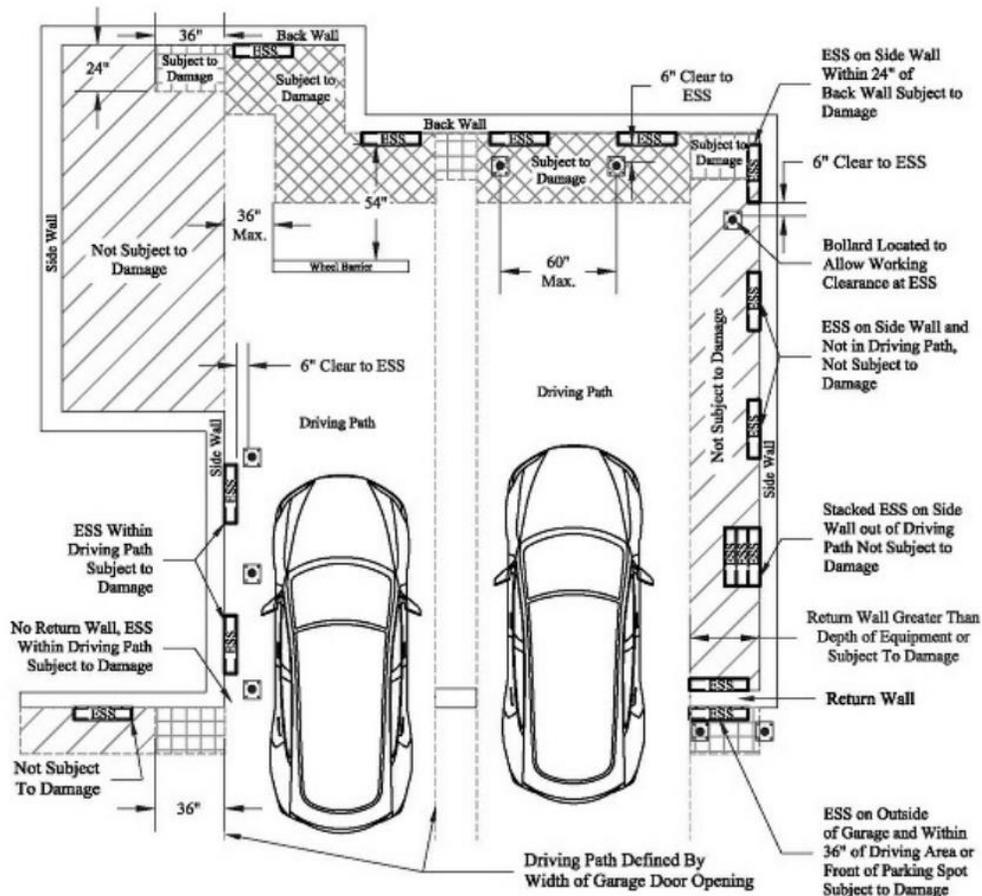
ESS installations exceeding the permitted individual or aggregate ratings shall be installed in accordance with Sections 1207.1 through 1207.9 of the California Fire Code. (CFC 1207.11.4)

2. NOTE: Installation of individual ESS units using separation distances less than 3 feet, or unit “stacking,” under Section 1207.1.5, must be in accordance with UL9540A testing. A copy of the large-scale fire testing report and installation guidelines must be provided to Woodland Fire Department for review and approval on a case-by-case basis. Confirmation of the UL 9540A test must be listed in the testing laboratory’s online database.

3. The following information shall be noted on the plan set (as applicable):

- Installation shall comply with NFPA 855, 2023 Edition
- System shall be UL 9540 Listed.
- Inverters shall be listed and labeled in accordance with UL 1741 or provided as part of the UL 9549 listing.
- ESS Listed and labeled solely for utility or commercial use shall not be used.
- Battery units should not be installed in direct sunlight.
- Access and working space shall be provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment in accordance with the California Electrical Code and the manufacturer's instructions.
- Signs and labels shall meet the requirements of the NEC 2022 article 110.21(b), unless specific instructions are required by section 690, or if requested by the local AHJ.
  - The residential image directory placard shall include the location of Energy Storage Systems (ESS) installed on or in the residence.
  - Labels shall be permanently affixed to the equipment or wiring method and shall not be hand written.
  - Labels shall be of sufficient durability to withstand the environment where they are installed.
  - Labeling must be present on DC conduit, raceways, enclosures, cable assemblies, and junction boxes. Every 10 feet, at every turn, above/below penetrations, and all DC combiner and junction boxes.
  - Warning Labels Located Outside and/or Exposed to Sunlight Shall be Engraved or Etched Plastic Placards with Red Background and White Lettering
- Manual: An operations and maintenance manual shall be provided to both the ESS owner or their authorized agent and system operator before the system is put into operation.
- A copy of the operations and maintenance manual shall be placed in an approved location to be accessible to AHJs and emergency responders.
- Installing contractor shall verify the system is installed according to approved plans and the manufacturer's instructions and operating properly.
- Installing contractor shall provide training on the proper operation and maintenance of the system.

- Installing contractor shall provide a label on the system containing contact information for qualified maintenance and service providers.
  - ESS shall be separated from each other and doors/windows by minimum 3 feet.
  - For interior installations, the garage walls/ceiling shall be protected with minimum 5/8" Type X gypsum board. The door leading into the living space shall be solid wood core and self-closing.
  - Systems connected to the utility grid shall use inverters Listed for utility interaction.
  - ESS installed in locations subject to vehicle damage shall be provided with approved barriers. If the ESS is not subject to vehicle damage, then the plans must clearly document that the ESS are not subject to physical damage such as in a vehicular pathway, and as required per 2022 CRC 328.8.
  - Residence shall be provided with interconnected smoke alarms.
  - Panels and modules shall not be located below an emergency escape and rescue opening. A minimum 36-inch-wide pathway shall be provided for all such openings.
  - ESS that emit toxic gases shall not be used in R-3 occupancies.
  - ESS that generate hydrogen or other flammable gases shall be provided with mechanical ventilation in accordance with CFC 1207.6.1.
  - Heat alarms, if installed, shall be UL/CSFM Listed and interconnected with interior smoke alarms.
  - No portion or component of the system shall be hidden from view by permanent placement of parts of the system or construction without notification, inspection, and approval by the Woodland Fire Department.
  - Do not install battery in direct sunlight
  - Do not install the Battery where it may be exposed to direct water spray from sources such as downspouts, sprinklers, or faucets.
  - Do not install the Battery, if it has been dropped, crushed, or has signs of physical damage.
  - Do not install the Battery near heating equipment, ignition sources, or open flames.
  - Do not place any combustible items in the vicinity of the Battery.
4. ESS shall not be installed in sleeping rooms, closets, spaces opening directly into sleeping rooms or in habitable spaces of dwelling units. (CFC 1207.11.3)
5. Protection From Impact: See CFC Figure 1207.11.7.1 below for required locations of vehicle impact protection. The floor plan must clearly show the necessary information to determine if vehicle impact protection is required. If vehicle impact protection is required, the type and location of vehicle impact protection devices must be noted on the plans.
- Exception: Where the clear height of the vehicle garage opening is 7 feet 6 inches (2286 mm) or less, ESS installed not less than 36 inches (914 mm) above finished floor are not subject to vehicle impact protection requirements. (CFC 1207.11.7.1)



CFC Figure 1207.11.7.1

## INSPECTIONS

A final Fire inspection is required prior to final inspection by the Building Division. A minimum of 48 hours is required for the inspection request. Fire final inspections must be requested online at: <https://www.cityofwoodland.gov/FormCenter/Woodland-Fire-Department-12/Request-for-Construction-Inspection-176>.