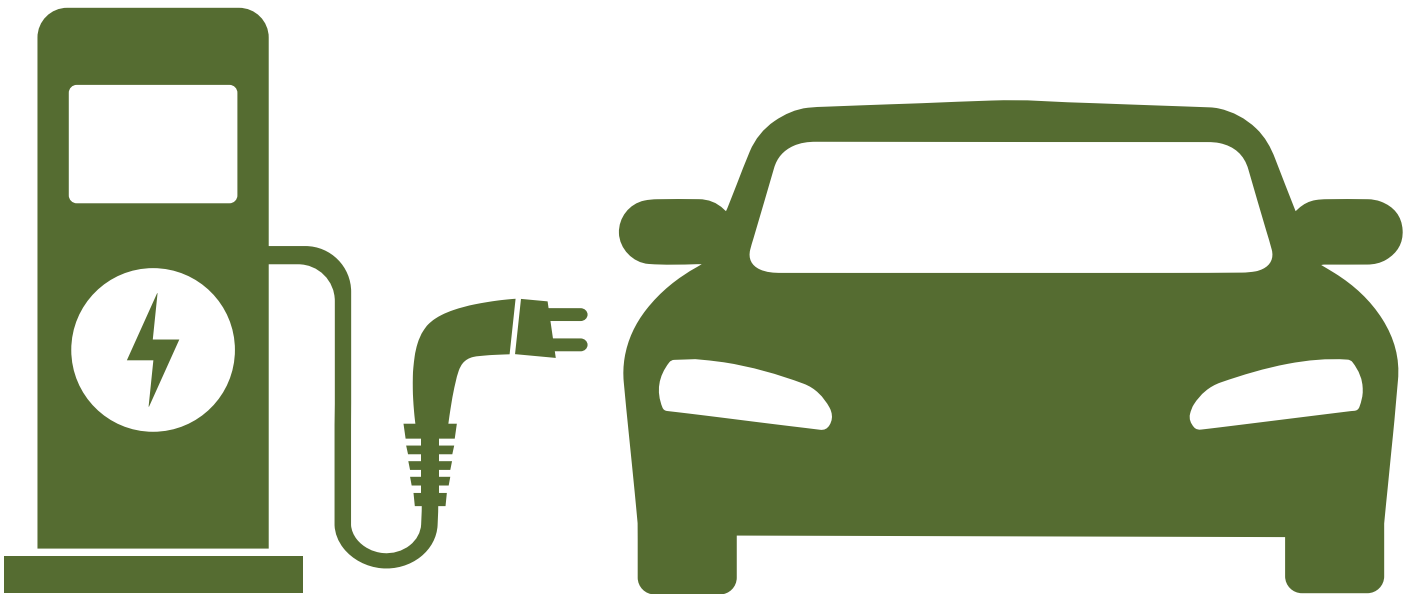


# RESIDENTIAL ELECTRIC VEHICLE CHARGING SYSTEM (EVCS)

APPLICABLE CODES: 2019 CBC, CRC, CEC, CFC, and PAMC

## INTRODUCTION

The purpose of this guideline is to assist permit applicants in the permitting and inspection process for residential EVCS. Our goal is to provide you with the quickest turnaround time possible, consistent review and inspections. The information provided in this document is general in nature and intended as a guide. Each project is unique and additional requirements may be required as deemed appropriate. All plans, forms and documents are to be submitted electronically through our Palo Alto Online Permitting System (OPS). Please see our [\*\*ONLINE PERMITTING SYSTEM \(OPS\) WEBSITE\*\*](#) for instructions on how to submit your application. For project scope that includes PV and/or ESS components refer to their respective guidelines for additional information.



# SUBMITTAL INFORMATION

This information will help prepare you for a successful permit submission.

## APPLICABLE FORMS/DOCUMENTATION

These documents are also on our Online Permitting System (OPS) website.

- [BUILDING PERMIT APPLICATION](#)
- [RESIDENTIAL ELECTRIC LOAD CALCULATOR](#)
- [CPAU EVCS INFORMATION FORM](#)

**Informational Note:** Please complete and submit the CPAU EVSE Information form if EVSE is rated greater than 50 AMP, or if it requires an overcurrent protection device (circuit breaker) greater than 60 AMP.



## GENERAL REQUIREMENTS

- Plan shall be printable at 11"x 17" minimum and a maximum of 30"x 42"
- Text shall be a minimum size 10 Font, 0.12" or 1/8"
- Specify the following information on the Cover Sheet:
  - Applicable Codes
  - Capacity of Charger (AMPS)
  - Identify Charging Level: Level 1 (120-Volt), Level 2 (208 to 240-Volt) or Level 3 (400 to 900-Volt)
- Provide Project Professional Design Documents (CBC 107 and CRC R106):
  - Site Plan
    - Identify location of proposed Electric Vehicle Supply Equipment (EVSE), which are components of the complete EVCS.
  - Floor Plans, if equipment is installed indoors (including garage).
    - Identify location of proposed equipment, including panelboards and standalone disconnects.
    - Add vehicular protection in garage (if applicable).
    - Elevation Plans, if structure or equipment is in flood plain or equipment.
      - Lowest part of equipment must be installed 1 foot above Base Flood Elevation (BFE).
  - Three-line Electrical Diagram
  - Manufacturer's Equipment Specification Sheets and Installation Instructions

**All equipment shall be listed by a Nationally Recognized Testing Laboratory (NRTL) either individually or as a complete, self-contained system according to a recognized standard. (CEC 110.3 & 625.5)**

# PLAN REVIEW INFORMATION

This information will help provide an understanding of what our city's plan review staff will generally look for.

## BUILDING

- Means of Access and Clearances to EVCS (CEC 110.26)**
  - Working Clearances at Equipment (CEC 110.26)
    - Vegetation including trees, which impact working clearances, shall be removed or relocated.
- Manufacturer's Equipment Specification Sheets and Installation Instructions:**
  - EVCS shall be listed and labeled (CEC 110.3 and 625.5)
- Three-line Electrical Diagram**
  - Wiring Method/Materials/Sizes (CEC 110.8 and 300)
  - Overcurrent Protection (CEC 625.41)
- Equipment subject to physical damage shall be protected by approved means. (CEC 110.27(B))**

*See Illustration 1 for Clarification/Guidance – Similar to ESS*

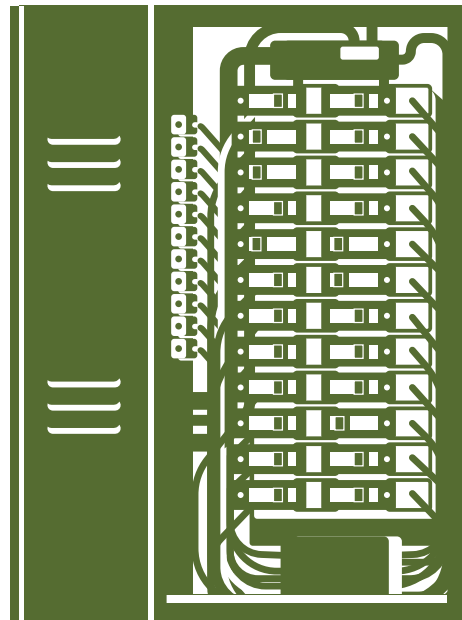
- Overcurrent Protection (CEC 625.41) and Disconnecting Means (CEC 625.43 and 110.25)**

## CPAU ELECTRICAL ENGINEERING

- All electrical equipment clearance requirements to gas meter are to be as specified in Utilities Standard Detail SR-CN-0-1009 of the Electric Service Requirements and Gas Standard Detail GD-02A of Water, Gas, Wastewater Utility Standards.**

Conduit without couplings is allowed to pass through the "Restricted Area" at a height of more than 6 feet.

*See Illustration 3 for Clarification/Guidance*



# INSPECTION INFORMATION

This information will help provide an understanding of what our city's inspection staff will generally look for.

## PRIOR TO INSPECTION

- Approved plans, permit, and installation instructions shall be available on site at time of inspection.
- Major changes, including revisions, to the installation shall be submitted to the city for review and approval prior to inspection.
- De-energize relevant electrical panels prior to removing the dead-front. Notify tenant/owner/occupant prior to de-energizing. All equipment shall be open and ready for inspection.
- The installer shall check the existing electrical panel for unsafe conditions. If existing panel is found to be unsafe, it may be necessary to make repairs or replace equipment. This work may require change in scope of the permit and a revision.
- Torque specifications are to be determined and provided for any electrical termination, such as circuit breakers, equipment grounds, neutrals, and feeders. (CEC 110.3 (B) and 110.14 (D))
- We recommend that the electrical contractor be on site with the following tools: (CEC 100.3(B) and CEC 110.14(D))
  - Torque wrenches with in-lbs. or ft-lbs., as appropriate
  - Torque screwdriver (with a range of up to 50 in-lb.)
  - Slip-joint pliers to secure lugs in place when applying the proper torque
- Contractor to torque all connections per the manufacturer's listings prior to inspection. The inspector will witness a spot check. If all terminations are found to be torqued properly, nothing further will be required. If loose connections are found, all connections will be required to be torqued in the presence of the inspector. (CEC 110.3 (B) and 110.14 (D))

## INSPECTION

- Required Inspections (to be scheduled at the same time)**
    - 720 – EVCS / FINAL
    - 280 – TRAVEL TIME WEST OF 280 (Use in addition to required inspections for projects west of 280)
  - Working Space About Electrical Equipment (CEC 110.26)**
    - Minimum 36 inches in depth, 30 inches in width, and 6 feet-6 inches in height.
    - Vegetation, including trees, which impact working clearances, shall be relocated.
  - Equipment subject to physical damage shall be protected by approved methods. (CEC 110.27)**
- See Illustration 1 for Clarification/Guidance*
- Disconnecting means shall be provided for the EVSE in excess of 60 AMPS or more than 150 Volts to ground. (CEC 625.43)**
  - Circuit breakers shall be listed or classified as compatible with the panel they are installed in. (CEC 110.3 (B))**
  - All circuits shall be legibly identified for its specific purpose or use. (CEC 110.22(A) and CEC 408.4(A))**
  - Grounding will be verified in accordance with CEC 250.52(5) and CEC 250.53(A)(3).**
  - Equipment grounding shall be as required by the manufacturer. (CEC 110.3(B))**
  - Wiring Methods (CEC 690 Part IV)**
    - Flexible, fine-stranded cables (CEC 690.31(H) and 110.14)
    - Access to all junction boxes (CEC 690.34)
  - Conductor Size (CEC 310)**
  - Derating of more than three current-carrying conductors in conduit exceeding 24 inches in length. (CEC 310.15(B)(3))**
  - Conduit Fill (CEC Chapter 9)**

- ❑ **Charger coupling height shall be located a minimum of 18 inches (indoor) above floor level or 24 inches (outdoor), unless otherwise specified by the manufacturer. (CEC 625.50)**

***Informational Note:*** *When installation instructions do not specify how the EVSE will be supported in a particular manner, it is acceptable to use the minimum requirements shown in Illustration 2. (Note: The EVSE is mounted on a metal post.) If a wooden post is used, it shall be installed so it is protected from the weather: treated wood, concrete base sloped to shed water, post cap.*

- ❑ **Listed Smoke Alarms within the structure per CRC R314.**

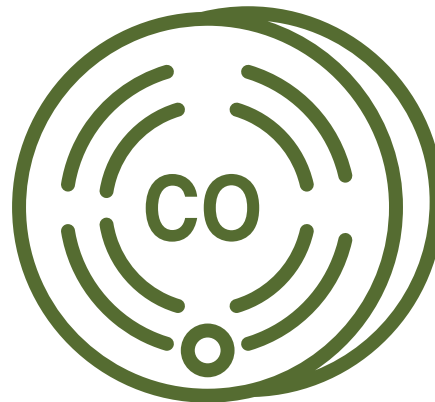
- PAMC 16.06.200 - R314.1 Smoke detection and notification.
- Listed single- and multiple-station smoke alarms complying with UL 217 shall be installed in accordance with the California Fire Code Sections 907.2.11.1 through 907.2.11.5 and manufacturer's installation and use instructions.



- Smoke alarms and smoke detectors shall be in compliance with this code or subject to the provisions of the Health and Safety Code, they shall also be listed and approved for rapid response to smoldering synthetic materials. All smoke alarms or detectors shall be of the photoelectric type or shall have equivalent detection capabilities in compliance with UL 217.

- Exception: A combination photoelectric/ionization smoke alarm or detector may be used if located no closer than 20 feet to a kitchen, bathroom, fireplace or woodburning stove.

- ❑ **Listed Carbon Monoxide Alarms if the residence has fuel-fired appliances and/or an attached garage with an adjoining opening. (R315.2)**



# ILLUSTRATIONS/TABLE

## Illustration 1: Vehicular Protection Example

Compliments of Cobalt Power Systems Inc.

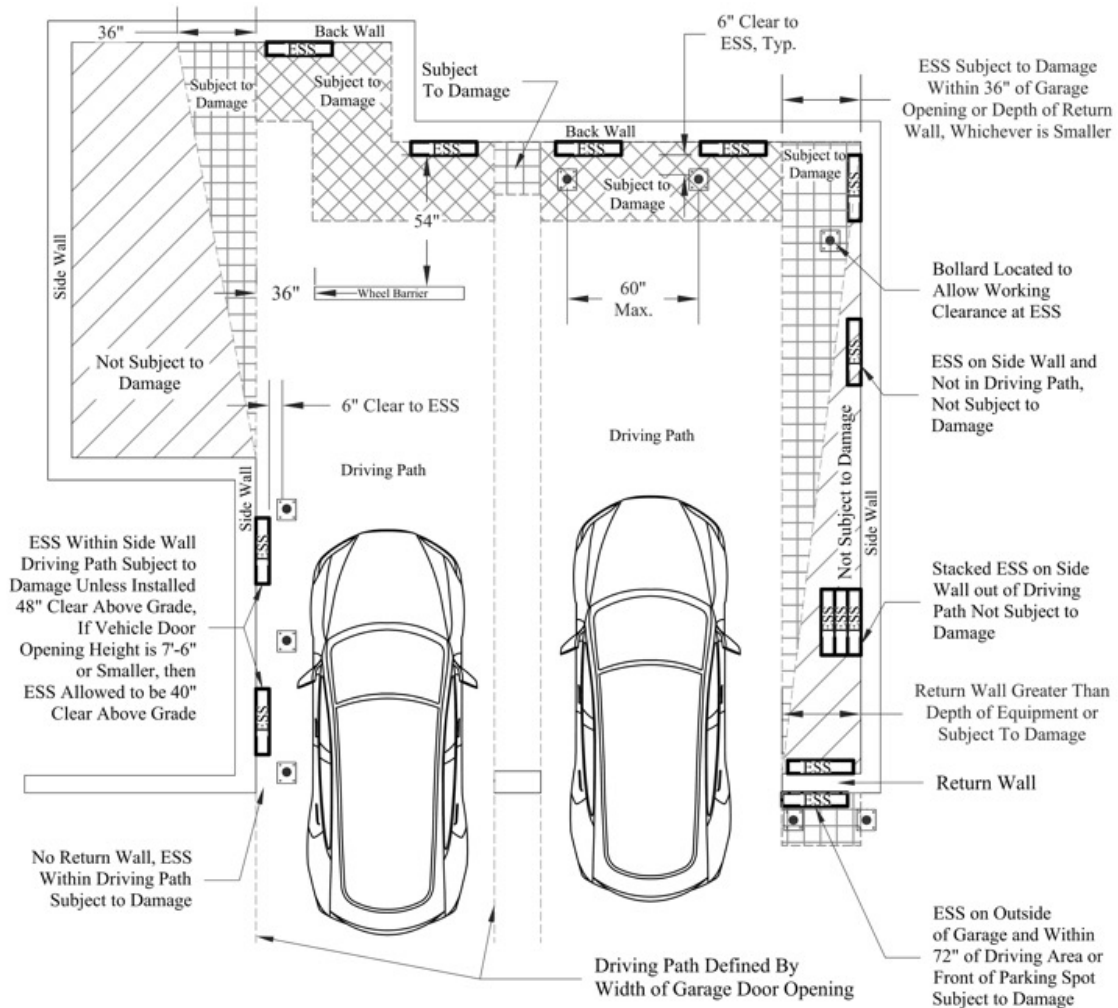
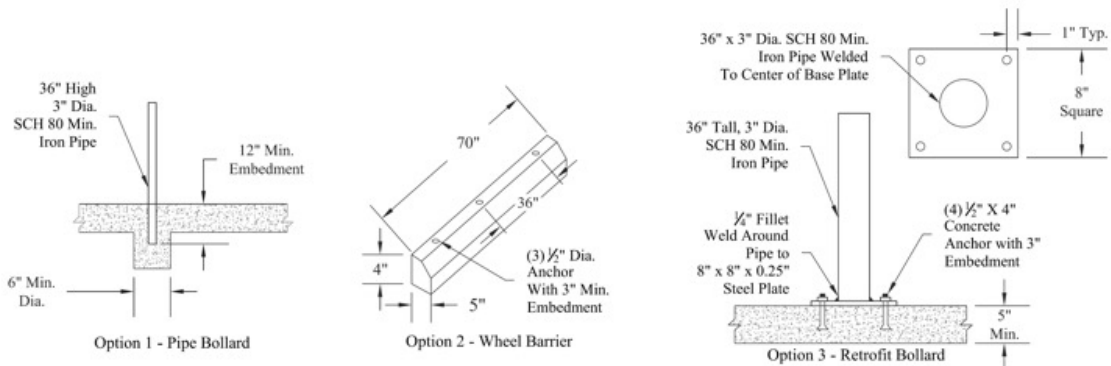
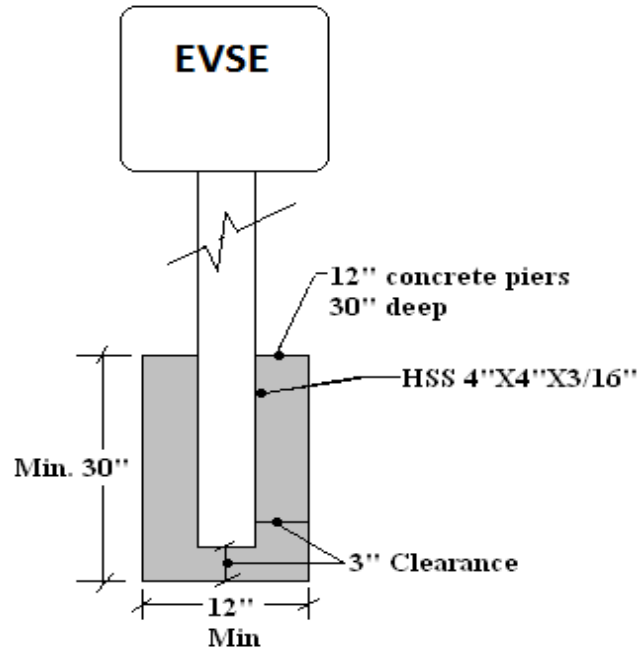


Image Courtesy of: Cobalt Power Systems



# ILLUSTRATIONS/TABLE

*Illustration 2 – Post Mounted EVSE Example*



# ILLUSTRATIONS/TABLE

## **Illustration 3: Utilities Standard Detail SR-CN-0-1009**

Extracted from Utilities Department Electric Service Requirements

Additional reference: Gas Standard Detail GD-02A of Water, Gas, Wastewater Utility Standards

