

ZERO EMISSION VEHICLE INFRASTRUCTURE

Streamlined Permitting Guidebook

Alpine County

Prepared by
**Center for Sustainable Energy
and Rincon Consultants**

As part of the
Central Sierra Zero Emission Vehicle Readiness Plan

AUGUST 2019

Table of Contents

- Definition of Terms 1
- California State Law 2
- Additional State Regulation 3
 - Electric Vehicle Charging Station Accessibility 3
 - Leadership in Energy and Environmental Design Points 3
- Tenant-Provided EVCS 4
 - Residential 4
 - Commercial 4
 - Homeowners Associations (HOAs)..... 5
- Alpine County EVCS Regulations 6
- Environmental Review 7
- Resources..... 8
- Websites and Contact Information 8
- Frequently Asked Questions 8
- Environmental Constraints 10
 - Aesthetics 10
 - Agricultural Resources 10
 - Air Quality/GHG Emissions 10
 - Biological Resources 10
 - Cultural Resources 11
 - Hazards and Hazardous Materials 13
 - Noise 13
 - Water Quality 15
- Plug-In Electric Vehicle Infrastructure Permitting Checklist 16

Using This Guide

Electric vehicle (EVs) usage is being encouraged throughout California and is anticipated to increase in the Alpine County marketplace over the next 10 years. To meet the increasing demand for Electric Vehicle Charging Stations (EVCS), this instructional guide will assist the County's Development staff in providing streamlined and efficient permitting, environmental review, installation, and inspection processes for EV owners seeking to install an EVCS on their property. The guide includes a review of relevant State and Alpine County EVCS regulations, application and permitting processes, environmental review process and environmental constraints guidance in accordance with the California Environmental Quality Act (CEQA), and key contact numbers and websites.

Definition of Terms

EV: Electric vehicle, including plug-in hybrids and pure battery electric vehicles.

EVCS: electric vehicle charging stations. One or more electric vehicle charging spaces served by electric vehicle chargers or other charging equipment allowing charging of EVs.

EV-ready: The necessary electrical capacity has been installed in a garage or parking facility to support electric vehicle charging (typically 20-40 amps of service for a level 2 station).

DC Fast Charging: Direct-current (DC) fast charging equipment, also called Level 3, requires 208/480 Volt (V) AC three-phase input. It is the fastest charging option available. EVs equipped with either a CHAdeMo or SAEcombo DC fast charge receptacle can add 50 to 70 miles range in about 20 minutes.

Level 1: provides charging through a 120 volt (V) AC plug. Based on the battery type and vehicle, AC Level 1 charging requires 15-20 amps of service and adds about 2 to 5 miles of range per hour of charging time. Level 1 is the slowest and least-expensive charging option.

Level 2: provides charging through either a 240 V (typical in residential applications) or 208 V (typical in commercial applications) AC plug. Level 2 charging requires 20 to 100 amps of service (typically 20-40 amps) and adds about 10 to 20 miles of range per hour of charging time.

PEV: Plug-in electric vehicle (includes pure battery electric and plug-in hybrid vehicles, known as PHEVs)

PHEV: A plug-in hybrid electric vehicle that has both an electric motor that is battery powered and a gasoline engine.

ZEV: Zero-emissions vehicle

California State Law

California has several regulations and provisions on the installation of EVCS that promote installation in a feasible manner. To support the ambitious ZEV deployment goal of 5 million ZEVs in California by 2030 set by Governor Edmund G. Brown Jr., the State is prioritizing the development of infrastructure to support these vehicles, in the form of plug-in electric vehicle charging stations. Specifically, Executive Order B-48-18 called for 250,000 ZEV charging stations including 10,000 DC fast charging stations by 2025 to support these vehicles.

Senate Bill 350, the Clean Energy and Pollution Reduction Act (2015). SB 350 called for increases in renewable energy use and widespread electrification of the transportation sector. All investor-owned utilities have submitted transportation electrification (TE) proposals to the California Public Utilities Commission, and as of February 2019 nearly \$1 billion has been approved for these proposals.

Assembly Bill 1236 (2015). AB 1236 amended Government Code Section 65850.7 to require jurisdictions to establish procedures for expedited, streamlined processes for permitting of electric vehicle charging stations. This process includes the establishment of a checklist containing objective requirements for the installation of an electric vehicle charging station and a process for electronic submittal of permit applications.

Sections of the California Building Code – Chapter 11B that regulate EVCS can be found at <http://www.bsc.ca.gov/Codes.aspx> and are summarized below.

Table 1. California Building Code EVCS Regulations

Section	Title	Notes
11B-228.3	Electric Vehicle Charging Stations	Provides scoping for electric vehicle charging stations installed in new and existing facilities.
11B-812	Electric Vehicle Charging Stations	Provides new section with technical provisions for EVCS.
11B-812.1	General	General requirements for the dimensions and marking of EV charging spaces and access aisles.
11B-812.2	Operable parts	Technical requirements for operable parts of the EVCS.
11B-812.3	Floor or ground surfaces	Technical requirements for floor and ground surfaces of the EVCS.
11B-812.4	Vertical clearance	Provisions for vertical clearance requirements at EVCS.
11B-812.5	Accessible routes	Provides requirements for accessible routes to electric vehicle chargers and to a building entrance.
11B-812.6	Vehicle spaces	Provides dimensions for length of van accessible, standard accessible, ambulatory and drive-up EVCS
11B-812.7	Access aisle	Provides requirements for the access aisle adjacent to the electric vehicle charging space.
11B-812.8	Identification signs	Provides general scoping for the technical sections for identification signs for accessible EVCS.
11B-812.9	Surface marking	Provides requirements for the surface markings at EVCS
11B-812.10	Electric vehicle chargers	Technical requirements for electric vehicle chargers, which includes the requirements for operable parts, point-of-sale

		devices and location of the chargers in relation to the EV space.
--	--	-------------------------------------------------------------------

Additional State Regulation

Electric Vehicle Charging Station Accessibility

The Division of the State Architect (DSA) developed accessibility standards for electric vehicle charging stations to ensure accessibility to EVCS by individuals with disabilities, and to provide guidance to station developers, building owners, and local building departments. The California Building Standards Commission adopted the accessibility standards for electric vehicle charging stations as part of the 2016 California Building Code (California Code of Regulations, Title 24), which became effective on January 1, 2017. The DSA website with EVCS accessibility guidance is at <http://www.dgs.ca.gov/dsa/Programs/progAccess/evcs.aspx>

CalGreen EV Readiness

The 2016 Green Building Standards Code (CalGreen) effective January 1, 2017 requires all new developments to include pre-wiring for Level 2 (208/240V) charging. Any local government that adopts the state building code by reference will have these pre-wiring requirements in place. Specifically, CalGreen’s mandatory requirements specify new single-family homes and townhomes with attached garages must pre-wire locations where vehicles will be parked, and that multi-family developments with 17 or more units must pre-wire at least three percent of total parking spaces. At non-residential developments, pre-wiring is mandated for a portion of total parking spaces, shown in **Table 2**.

Table 2. CalGreen Required EV Pre-Wired Spaces for Non-Residential Developments

Total Number of Parking Spaces	Number of EV Charging Spaces Required
0 – 9	0
10 – 25	1
26 – 50	2
51 – 75	4
76 – 100	5
101 – 150	7
151 – 200	10
201 and over	6% of total

Source: CalGreen, Chapter 5, Section 5.106.5.3

Leadership in Energy and Environmental Design Points

Leadership in Energy and Environmental Design (LEED) is not a regulation, but can allow developers and building owners to take advantage of regulatory benefits. LEED is one of the most popular green building certification programs used worldwide. Developed by the non-profit U.S.

Green Building Council, it includes a set of rating systems for the design, construction, operation, and maintenance of green buildings, homes, and neighborhoods that aims to help building owners and operators be environmentally responsible and use resources efficiently. LEED certification is an important goal for many buildings. Networked EVCS and EV-ready construction can help earn points toward LEED certification. To earn LEED points, EVCS must be Level 2 or faster, connected to a network, capable of supporting demand response or time of use charging and compatible with universal EV charging connectors.

In addition to earning LEED points from EVCS, buildings can earn points when 10% or more of occupants use alternative transportation such as EVs. Having more EVCS available encourages more people to drive electric, generating more LEED points. LEED certification may also provide building incentives like expedited review, density and height bonuses, tax credits, and grants.

Tenant-Provided EVCS

California state law provides provisions for tenants of residential and commercial rental properties to request permission from their landlords to install electric vehicle charging stations. (EVCS) in the following California Code sections:

- Section 1947.6 for residential tenancies
- Section 1952.7 for commercial tenancies
- Section 4745 and 4745.1 for homeowner's associations (HOAs)

In 2018, SB 1016 amended the law regarding electric charging stations in HOAs, and amended the law regarding electric vehicle stations in rent controlled units.

Residential

For tenants with residential leases signed, renewed, or extended on or after July 1, 2015, state law requires landlords to approve a tenant's written request to install an EVCS at the tenant's parking space if the tenant enters into a written agreement. The written agreement must include requirements regarding the installation, use, maintenance and removal of the charging station. The tenant must also pay for all modifications, and the law requires the tenant to maintain a \$1,000,000 general liability insurance policy. The tenant is required to pay costs for the EVCS and no additional parking spaces are required to be provided by the landlord. These state regulations do not apply under the following conditions:

- When parking is not included as part of the rental contract
- To properties with fewer than 5 parking spaces
- To properties subject to rent control unless a lease is executed, extended or renewed after January 1, 2019
- When 10% or more of the spaces already have electric EVCS

In 2018, SB 1016 amended California Code Sections 4745 and 4645.1 to further secure tenants' rights and responsibilities in installing EVCS in HOAs and rent controlled units. These modifications are described under HOAs below.

Commercial

Landlords are required to approve a tenant's written request to install an EVCS for commercial leases executed on or after January 1, 2015, if certain conditions are met. The tenant is limited to installing EVCS only at parking spaces under their lease. If no parking spaces were allocated, the tenant has the right to convert a number of spaces based on a formula which takes into account the square footage of the rented premises and the total number of parking spaces for the entire property. This law does not apply under the following:

- To a commercial property with less than 50 parking spaces
- To a commercial property which already has 2 electric charging stations for every 100 spaces.

Homeowners Associations (HOAs)

Under state law, homeowners must pay for both EVCS installation and electricity usage, but HOAs may not prohibit or restrict the installation or use of EVCSs in a designated parking unit. Starting January 1, 2019, homeowners have the right to install EVCS in their "units"—either a residential or garage element—rather than in an exclusive parking space. Homeowners are also required to have an insurance liability coverage policy, but the coverage value has been eliminated from the \$1,000,000 required coverage prior to 2019. Applications for dedicated EVCS time-of-use (TOU) meter installation must also be processed similarly to EVCS applications, easing the application process and electricity cost and tracking for homeowners. As a final advantage to homeowners, given a lawsuit, only homeowners are eligible to recover attorney fees even if the HOA wins.

Alpine County EVCS Regulations

The Alpine County Building Department is responsible for permitting the installation of EVCS for residential, commercial, and industrial uses throughout the County. EVCS permitting information for Alpine County is presented below. The Planning Department is responsible for processing new residential, commercial, industrial and public projects that include EVCS as part of the project. For instance, as part of the Greenhouse Gas Reduction measures for the Bear Valley Village development project, the following reduction measures related to EVCS were approved:

- Transportation 9 – Provide preferential parking locations for alternatively-powered vehicles, including hybrids, electric, and CNG vehicles at commercial venues in order to incentivize the use of GHG-efficient vehicles by patrons.
- Transportation 12 - Install conduit for the future installation of charging stations for electric cars and hybrid plug-in electric vehicles at an adequate number of residential parking spaces in the event that electric vehicles become readily available and widely used.

As a result of these measures and increased usage of EVs in California, there are currently a number of EVCS locations in and around Bear Valley.

Alpine County uses the 2016 California Building Code for reviewing all development projects, including installation of EVCS. The County does not currently have any specific EVCS regulations beyond this code. The 2016 CBC can be accessed online at the California Building Standards Commission website: <http://www.bsc.ca.gov/codes.aspx>

Environmental Review

The California Environmental Quality Act (CEQA) generally requires state and local government agencies to inform decision makers and the public about the potential environmental impacts of proposed projects, and to reduce those environmental impacts to the extent feasible. If a project subject to CEQA will not cause any adverse environmental impacts, a public agency may adopt a brief document known as a Negative Declaration. If the project may cause adverse environmental impacts, the public agency must prepare a more detailed study called an Environmental Impact Report (EIR). An EIR contains in-depth studies of potential impacts, measures to reduce or avoid those impacts, and an analysis of alternatives to the project. A key feature of the CEQA process is the opportunity for the public to review and provide input on both Negative Declarations and EIRs.

The CEQA Guidelines do not directly address the installation of EVCS. Most installations into existing residential or commercial structures will only require an over-the-counter or ministerial building permit that would not be subject to CEQA review as described above. Examples of ministerial EVCS projects are:

Installation of a new EVCS in an existing structure such as a single family or multi-family residential garage or commercial/industrial garage or covered parking area.

Installation of EVCS in front of existing outdoor parking spaces in a single-family residence driveway, multi-family residential parking area, commercial/industrial parking lot, or public building or park outdoor parking area.

EVCS that are part of a new residential, commercial, industrial, or public development project (i.e. new park, sports facility, public works yard, etc.) may require CEQA review. A discretionary project is defined in the CEQA Guidelines as follows:

15357. DISCRETIONARY PROJECT

“Discretionary project” means a project which requires the exercise of judgment or deliberation when the public agency or body decides to approve or disapprove a particular activity, as distinguished from situations where the public agency or body merely has to determine whether there has been conformity with applicable statutes, ordinances, or regulations, or other fixed standards. The key question is whether the public agency can use its subjective judgment to decide whether and how to carry out or approve a project.

As the CEQA lead agency, staff for Alpine County would determine the level of CEQA review (Negative Declaration or EIR) based on the potential environmental impacts of the project.

Resources

Websites and Contact Information

- California Building Officials (CALBO):
 - Example EVCS streamlined permitting ordinances:
<https://www.calbo.org/sites/main/files/file-attachments/ab1236toolkitsmalljurisdiction.pdf>
- California Division of State Architect (DSA):
 - EV Charging Station Accessibility:
www.dgs.ca.gov/dsa/Programs/progAccess/evcs.aspx
 - Phone number: (916) 322-2490
- California – Governor’s Office of Planning and Research
 - Zero Emission Vehicles: <http://www.opr.ca.gov/planning/transportation/zev.html>
 - Zero Emissions Vehicles in California: Community Readiness Guidebook:
opr.ca.gov/docs/ZEV_Guidebook.pdf
 - Phone number: (916) 322-2318
- Alpine County
 - Building Department: <http://alpinecountyca.gov/index.aspx?NID=157>
 - Phone number: (530) 694-2140
 - Planning Department: <http://alpinecountyca.gov/index.aspx?NID=161>
 - Phone number: (530) 694-2140

Frequently Asked Questions

What will residential building permit applicants need to operate a plug-in electric vehicle?

They will need a way to charge the vehicle at their home or at another charging facility. Although some vehicles will be provided with a Level 1 charging system that can be used from a standard household outlet, some will need a building permit for installation of a Level 2 charging station for home use.

What are their options for charging an EV?

All EVs come equipped with a standard 120-volt cord that can be plugged into any standard electrical socket. This is referred to as a Level 1 charger.

Their second option, a Level 2 charger, is also referred to as electric vehicle supply equipment (EVCS). EVCS is a 240-volt charging unit which connects the EV to the electrical power source in their home. The installation of a Level 2 charging unit may require modifications to the electrical system and an application for a building permit.

Who can install the charging station?

A homeowner or business owner can install a charging station if they know how to perform electrical work to city code and get the required permits. However, it is recommended that the EV owner contact a licensed electrical contractor to evaluate whether their home or business’s wiring, electrical outlets and other hardware can support the charging requirements of their EV. An EV car dealer also may have access to a third-party or contractor network that may be able to conduct a home or business assessment to determine the safest and least expensive way to install an EVCS.

How long does it take to install a charger?

A typical installation usually takes less than one day; however, the issuance of their building permit could take one day or a week or more depending on the completeness of the submittal to the building department. Please see the submittal checklist in this guide to ensure a complete application.

Factors that may affect the installation process include necessary upgrades to wiring, electrical outlets and other hardware that supports EV charging; inspection and permitting processes; or unforeseen weather delays.

Will their current electric meter need to be replaced?

There is typically no need to replace your existing electric meter.

What is the climate impact of the electricity that will power the electric automobiles?

Both all-electric vehicles and plug-in hybrids have the ability to reduce greenhouse gas emissions. One of the major greenhouse gases that contributes to climate impacts is carbon dioxide (CO₂) which results from combustion of fuels. When emissions from electric power generation are considered, an all-electric vehicle typically reduces CO₂ emissions by over 30% compared to a conventional gasoline vehicle.

Environmental Constraints

Aesthetics

EVCS are most likely to be installed in currently developed sites or as a component of new development projects. However, they may be installed individually at strategic suburban or rural locations. Given the prevalence of forest and wilderness land, viewpoints and roadside resources throughout Alpine County, it may be important to consider the aesthetic of EVCS to ensure it harmonizes with surroundings. Particularly DC fast chargers are often designed with a modern, sleek appearance. Level 2 chargers also have a modern appearance, though design is more varied given the array of models. While EVCS tend to be smaller and less obtrusive than the gas stations they partially offset, developers may need to consider coloration, height, viewpoint obstruction, reflectivity, and aesthetic compatibility with nearby structures. Developers should consult design regulations for county zoning, including historic districts, County building and design regulations, United States Forest Services (USFS), Bureau of Land Management (BLM), and California Department of Parks and Recreation guidelines as applicable to the location. This may dictate the EVCS designs available to install at a location, or require appearance modifications such as coverings to reduce prominence, reflectivity or obstruction of views.

Agricultural Resources

Alpine County has historically produced a variety crops including hay, grain, apples and peaches, as well as livestock including cattle, sheep, poultry, and horses. While no prime farmland or farmland of statewide importance exists, the County General Plan emphasizes protection of agricultural and livestock land due to its economic and aesthetic importance. The El Dorado and Alpine Counties Department of Weights and Measures also promotes agricultural and environmental preservation to protect and maintain crops and livestock. Ensuring that EVCS is located in compatible County zones and land use designations should prevent compromise of local agricultural resources and lands.

Air Quality/GHG Emissions

EVCS is unlikely to cause adverse air quality effects or increase in greenhouse gas (GHG) emissions. The installation of single EVCS will have minimal impact in developed areas, while installation as one component of a larger development project may require a project-based air quality and GHG emissions analysis. Operation of EVCS will have no on-site emissions, and as power is sourced through the electricity provider and composed of some renewable energy (meeting the California Renewable Portfolio Standards), or through on-site renewable energy, EVCS will offset vehicle tailpipe emissions and reduce overall emissions. Developers should be sure installation plans meet City, County and Great Basin Unified Air Pollution Control District (APCD) requirements and perform air quality and GHG analyses as necessary. APCD rules can be found at <https://www.arb.ca.gov/drdb/gbu/cur.htm>

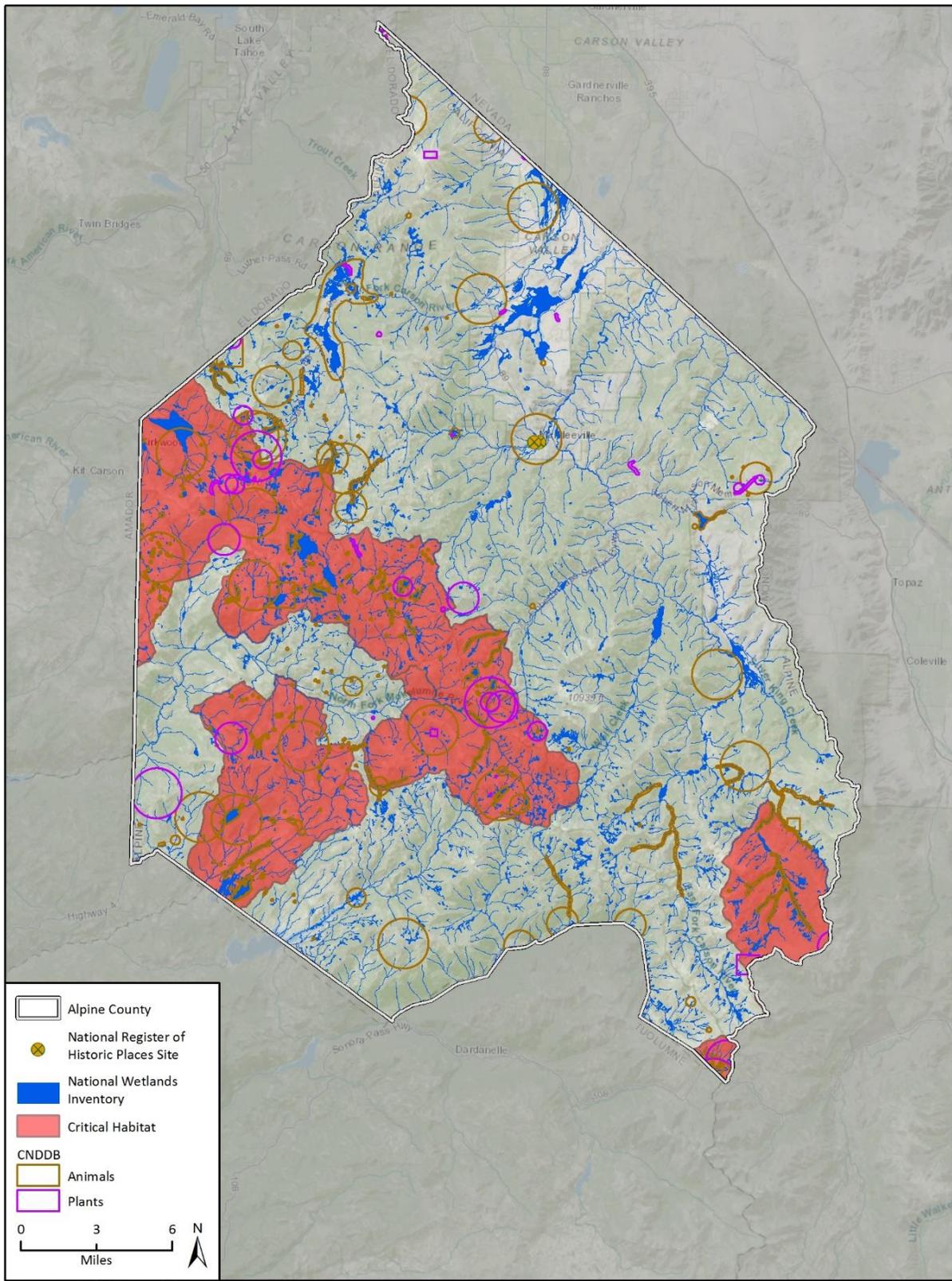
Biological Resources

Alpine County's biological resources are well known statewide and nationally. The county is crossed by state park, national forest and national wilderness land, in addition to county park land. It contains iconic alpine lakes, peaks and meadows, but also several rare species. Figure 1 shows critical habitat of two amphibians, as well as areas containing unique and sensitive plant and

animal species listed on the California Natural Diversity Database (CNDDDB). National Wetlands Inventory areas are designated by the U.S. Fish and Wildlife Service, existing along rivers, lakes and streams throughout the County. Seasonal wetlands, or vernal pools, also exist. Sensitive and critical habitat for plants, amphibians, and other species are commonly found in wetlands and vernal pools. In addition, two federally threatened species of trout inhabit waterways. Critical summer and winter deer habitat also exist throughout the County, as noted in the County General Plan. While EVCS is likely to be placed in developed areas non-adjacent to these sensitive habitats, any new development will need to consider regulations and protections applicable to local biological resources. Agencies to consult for local development regulations include the U.S. Bureau of Land Management (BLM), California Department of Fish and Wildlife (CDFW), California Native Plant Society (CNPS), U.S. Forest Service (USFS), California Department of Parks and Recreation, and California Department of Fish and Wildlife.

Cultural Resources

Reflecting the history of the Central Sierra region and California, two National Register of Historic Places are located in Alpine County. These include a schoolhouse and a courthouse in Markleeville, as shown in Figure 1, and compose part of the Alpine County Historical Complex along with an old log jail and a silver ore stamp mill. EVCS will require adherence to the Markleeville Historic District Combined Zone code regulations if located in the vicinity, and may require adherence to aesthetic standards. See City Code Section 18.56 for details.



Imagery provided by Microsoft Bing and its licensors © 2019.
 Additional Data provided by California Natural Diversity Database, January, 2019. U.S. Fish and Wildlife Service, September, 2017.
 National Wetlands Inventory, U.S. Department of the Interior, Fish and Wildlife Service 2018. National Register of Historic Places, National Park Service 2019.

Figure 1 Biological and Cultural Resources in Alpine County

Hazards and Hazardous Materials

Alpine County is at some risk of natural hazards which should be considered when siting and planning EVCS. Notably, portions of the northern and central county are at very high to high fire hazard, as shown in Figure 2. Fire has the potential to damage both charging stations and wiring, including pre-wiring. Bounding infrastructure with several feet of pavement or placing in a parking lot will mitigate risk of damage from flammable materials nearby.

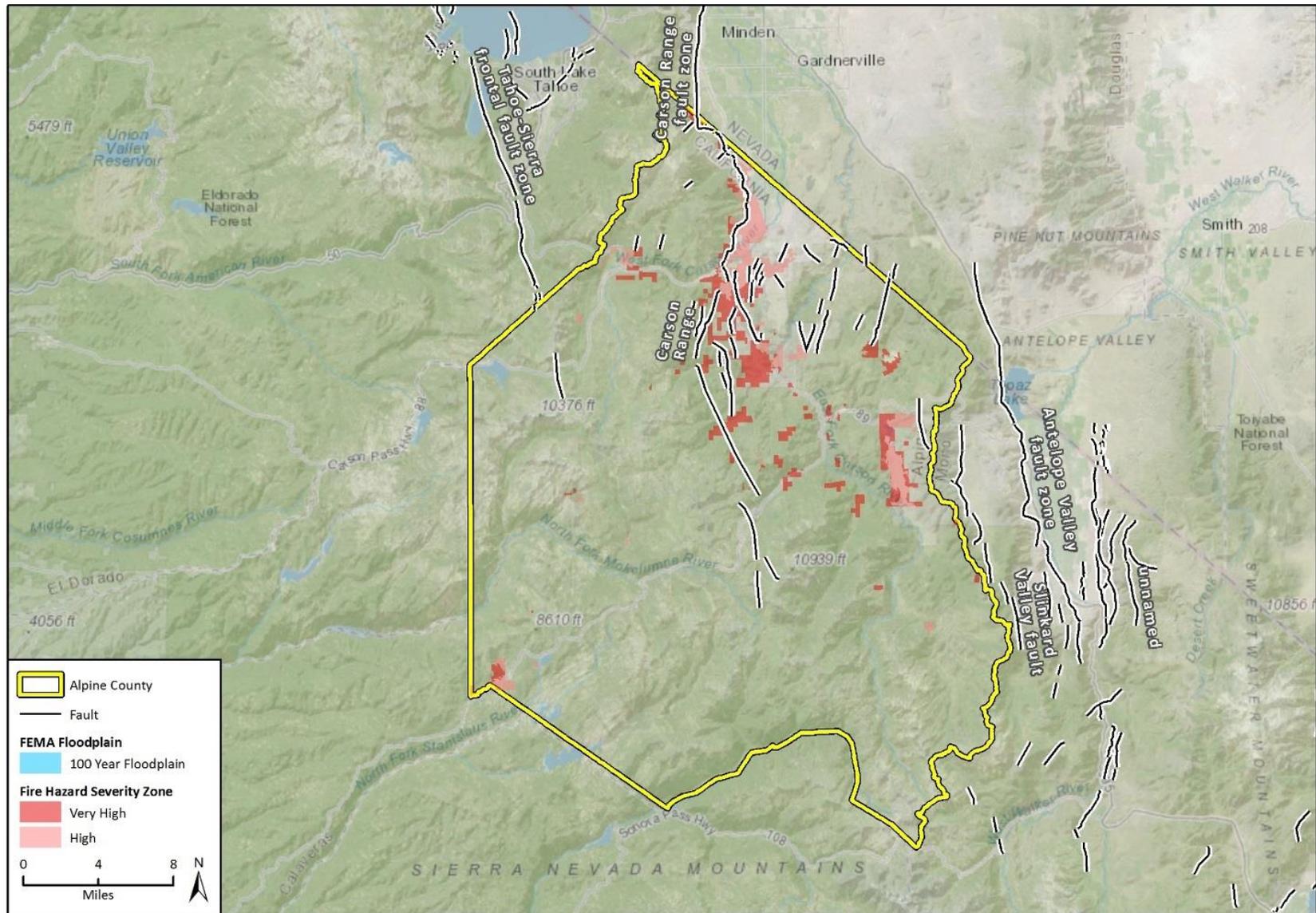
Alpine County has modest risk of flooding. It has experienced flash and winter flooding in the past century, but all were within expected 50-year flood levels. Flood risk to EVCS is also minimized as it is placed in graded areas. Nonetheless, planners should be cognizant of topography to be sure EVCS is not placed in floodplains of adjacent water bodies, and be aware of risk from upstream dam failure associated with earthquakes.

A third natural hazard to consider is earthquakes. Northern Alpine County is scattered with north-south fault lines, and some faults extend into central Alpine County. In addition, numerous faults lie to the immediate east, north and northwest of the County, shown in Figure 2. EVCS should be located adjacent to buildings constructed to earthquake standards to protect from incidental damage. In addition, while stand-alone structures, EVCS should be constructed to present low risk themselves; solar panels and other equipment expected to be installed conjointly with or above chargers should be evaluated for safety.

There are no listed hazardous waste facilities in Alpine County, per the State Department of Toxic Substances Control. One federally designated Superfund site exists at Leviathan Mine (per the U.S. EPA National Priorities List), 24 miles southeast of Lake Tahoe on an eastern slope of the Sierra Nevada. The mine is in a rural area surrounding by Toiyabe National Forest. While cleanup is ongoing, hazardous material dispersal poses little risk in developed areas and along roadways which have potential for EVCS siting. Risks for siting EVCS associated with hazardous waste is minimal.

Noise

Level 2 EVCS operates silently when charging and Level 3 DCFC produce minimal noise due to cooling fans. Electric vehicles run far more quietly and reduce overall sound impacts compared to combustion engines. As EVCS is usually located in developed areas, unless located next to highly noise sensitive locations, noise impact should be minimal and exempt from noise analysis requirements. Nonetheless, when EVCS is installed in currently undeveloped areas, noise levels will increase. In addition, noise analysis may be required if EVCS is installed as a component of a larger development project. Developers should consult County noise requirements as applicable to verify analysis needs.



Imagery provided by Microsoft Bing and its licensors © 2019.
 Additional data provided by FEMA 2018, CAL FIRE 2007.

Fig 2 Natural Hazard Risks in Alpine County

Figure 2 Hazards in Alpine County

Water Quality

As Sierra snowpack is a source of water for major metropolitan areas throughout California, water quality is a prime concern for the Central Sierra region. Alpine County's water is managed by the State Water Resources Control Board (SWRCB)'s Central Valley and Lahontan Regional Water Quality Control Boards (RWQCB 5 and 6 on the County's west and east, respectively). These RWQCBs oversee water quality, water regulations and supply. EVCS is unlikely to impact surface or groundwater quality directly; however, developers should be aware of local land ownership and potential installation impacts, including to resources not immediately apparent, such as nearby vernal pools. If EVCS installation is part of a larger development project located near a water body, developers should also consult the U.S. Clean Water Act to be sure the project complies with all regulations. Learn more about RWQCBs 5 and 6 rules at www.waterboards.ca.gov/centralvalley/ and www.waterboards.ca.gov/lahontan/. Learn more about the Clean Water Act at <https://www.epa.gov/laws-regulations/summary-clean-water-act>.

Plug-In Electric Vehicle Infrastructure Permitting Checklist

The following table is from an EVCS permitting guidance document prepared by the Governor’s Office of Planning and Research (OPR). It contains information on the conditions requiring an EVCS permit, application requirements, inspection requirements, and applicable codes and guidance regarding EVCS installation.

	Residential	Non-Residential
Phase 1 Pre-Work Contractor	<ul style="list-style-type: none"> ✓ Understands intended use of the EVCS (i.e. personal) 	<ul style="list-style-type: none"> ✓ Obtain an address for the location ✓ Determine the ownership of the site and/or authorization to install equipment at site ✓ Understands intended use of the EVCS (i.e., fleet, employee, customer, visitor, etc.) ✓ Determine number of vehicles charging and connectors per charging station ✓ Determine source of power and authorization to use source
	<ul style="list-style-type: none"> ✓ Determine type of vehicle(s) to be charged at EVCS ✓ Evaluate mounting type options (i.e., bollard, pole-mount, wall-mount, ceiling-mount) ✓ Clarify communication requirements (i.e., Ethernet, cellular, Wi-Fi, none or other) ✓ Determine the NEMA Enclosure type ✓ Determine the physical dimensions of the space(s) ✓ Inspect the type of circuit breaker panel board intended for the installation 	
Phase 2 Pre-Work Customer	<ul style="list-style-type: none"> ✓ Identify incentives or rate structures through the utility ✓ Determine size of electrical service at the site ✓ Identify and contact applicable local permit office(s) to identify specific requirements, including local fire, environmental, construction, building, concealment and engineering requirements ✓ Identify incentives available through local, state or federal programs ✓ Contact insurance company to acquire additional insurance or separate coverage as needed ✓ Hire the contractor and verify credentials with all subcontractors; ensure electrical contractor’s license for electrical work is current 	
Phase 3 On-Site Evaluation	<ul style="list-style-type: none"> ✓ Verify EVCS meets UL requirements and is listed by UL or another nationally recognized testing laboratory ✓ Verify EVCS has an appropriate NEMA rated enclosure (NEC 110.28) based on environment and customer needs, such as weatherization or greater levels of resistance to water and corrosive agents ✓ Determine the level or charger meets customer’s PEV requirements (most vehicles require the maximum of a 240V/32A (40A breaker) 	

	Residential	Non-Residential
	<ul style="list-style-type: none"> ✓ Based on proposed EVCS location, determine if cord length will reach a vehicle's charging inlet without excessive slack and does not need to be more than 25' in length (NEC 625.17) ✓ Cord management methodologies have been considered to reduce the risk of tripping hazards and accidental damage to the connector ✓ Mounting type selection based on requirements to meet site guidelines ✓ Determine whether EVCS communication options are beneficial to customer and/or local utility 	
Phase 4 On-Site Survey	<ul style="list-style-type: none"> ✓ Ensure overhead doors and vehicle parking spot do not conflict with EVCS location ✓ Place EVCS in a location convenient to charging port on vehicle and typical orientation of the vehicle in garage (i.e., backed in or head-first) ✓ Ensure functionality of lighting in the garage to meet NEC code 210-70 	<ul style="list-style-type: none"> ✓ Space(s) should be visible to drivers and pedestrians ✓ Determine proximity to building entrance (could be considered an incentive for PEV use) ✓ Select spaces proximate to existing transformer or panel with sufficient electrical capacity ✓ EVCS installation should maintain a minimum parking space length to comply with local zoning requirements ✓ If available, use wider spaces to reduce the risk of cord damage and minimize the intersection of cords with walking paths ✓ Ensure sufficient lighting at proposed space(s) to reduce the risk of tripping and damage to charging station from vehicle impact or vandalism; light levels above two foot candles are recommended ✓ Address accessibility requirements (refer to the Plug-In Electric Vehicle Infrastructure and Equipment Accessibility section of the Guidebook for more information) ✓ Determine availability of space for informative signing ✓ EVCS with multiple cords should be placed to avoid crossing other parking spaces ✓ All available charging station mounting options should be considered and optimized for the space ✓ Determine if hazardous materials were located at the site <p>PARKING DECKS</p> <ul style="list-style-type: none"> ✓ Place EVCS towards the interior of a parking deck to avoid weather-related impacts on equipment <p>PARKING LOTS</p>

	Residential	Non-Residential
		<ul style="list-style-type: none"> ✓ Avoid existing infrastructure and landscaping to mitigate costs, potential hazards and other negative impacts <p>ON-STREET</p> <ul style="list-style-type: none"> ✓ Install on streets with high foot and vehicle traffic to mitigate vandalism ✓ Avoid existing infrastructure to mitigate costs, potential hazards and other negative impacts ✓ Address accessibility requirements (refer to the Plug-In Electric Vehicle Infrastructure and Equipment Accessibility section of the Guidebook for more information) ✓ For pull-in spaces, EVCS should be placed in front of the space and either centered on the space if placed between two spaces (if two connectors are available); EVCS with more than two connectors should not be used in on-street applications ✓ For parallel parking locations, the charging station should be installed at the front third of the parked vehicle and based on the direction of traffic flow; EVCS with a single connector is recommended to reduce potential trip hazards
	<ul style="list-style-type: none"> ✓ Mount the connector at a height between 36" and 48" from the ground (NEC 625.29) unless otherwise indicated by the manufacturer ✓ Install wall or pole-mount stations and enclosures at a height between 36" and 48" ✓ Ensure sufficient space exists around electrical equipment for safe operation and maintenance (NEC 110.26); recommended space is 30" wide, 3' deep and 6'6" high ✓ Minimize tripping hazards and utilize cord management technologies when possible ✓ Equipment operating above 50 volts must be protected against physical damage (NEC 110.27); ensure the vehicle is out of the line of vehicle travel and use wheel stops or other protective measures ✓ EVCS must be located such that ADA routes maintain a pathway of 36" at all times 	
Phase 4 Contractor Installation Preparation	<ul style="list-style-type: none"> ✓ Price quote submitted to customer and approved including utility upgrades ✓ Order equipment ✓ Provide stamped engineering calculations as needed ✓ Provide site plan modification with diagrams as necessary ✓ Complete all necessary service upgrades and/or new service assessments ✓ Complete permit applications as required by local permitting department ✓ Ensure permit is approved and collected 	

	Residential	Non-Residential
	<ul style="list-style-type: none"> ✓ Schedule all necessary contract work (i.e., boring, concrete and/or paving restoration) and utility work (i.e., utility marking, service upgrade, new service and/or meter pull) ✓ Ensure utility marking of existing power lines, gas lines or other infrastructure is completed and utilize “call before you dig” services 	
Phase 5 Installation	<ul style="list-style-type: none"> ✓ Residential garages may permit the use of nonmetallic-sheathed cable in lieu of conduit 	<ul style="list-style-type: none"> ✓ Run conduit from power source to station location ✓ For EVCS greater than 60 amperes, a separate disconnect is required (NEC 625.23) and should be installed concurrently with conduit and visible from the EVCS
	<ul style="list-style-type: none"> ✓ Post permit at site in visible location ✓ Remove material to run conduit and/or wiring (i.e., drywall, insulation, pavers, concrete, pavement, earth, etc. ✓ Contractors are encouraged to examine requirement for installation sites and types of wiring in Chapter 3 of the NEC ✓ Pull wiring; charging stations require a neutral line and a ground line and equipment is considered to be a continuous load ✓ Conductors should be sized to support 125% of the rated equipment load (NEC 625.21) ✓ Preparing mounting surface and install per equipment manufacturer instructions ✓ Floor-mount: typically requires a concrete foundation with J-bolts on station base; place with space to allow conductors to enter through the base ✓ Wall/pole/ceiling-mount: install brackets for mounting of the equipment ✓ Install bollard(s) and/or wheel stop(s) as needed ✓ Install informative signage to identify the EVCS and potential trip hazards ✓ Install additional electrical panels or subpanels as needed ✓ Install service upgrades, new service and/or new meter as needed; utility may also pull a meter to allow for charging station wires to be connected to a panel ✓ Make electrical connection ✓ Perform finish work to repair existing infrastructure, surfaces and landscaping 	
Phase 6 Inspection	<ul style="list-style-type: none"> ✓ An initial electrical inspection by applicable building, fire, environmental and electrical authorities should occur after conduit has been run and prior to connecting equipment and running wires; if necessary, contractor should correct any issues and schedule a second rough inspection ✓ If required, the inspector will perform a final inspection to ensure compliance with NEC and other codes adopted within the jurisdiction by inspecting wiring, connections, mounting and finish work ✓ Contractor should verify EVCS functionality 	

	Residential	Non-Residential
Additional Resources	<ul style="list-style-type: none"> ✓ National Codes and Standards ✓ American National Standards Institute (ANSI) ✓ National Fire Protection Association (NFPA) ✓ Underwriters Laboratories, Inc. (UL) ✓ International Association of Electrical Inspectors (IAEI) ✓ International Code Council (ICC) ✓ NECA-NEIS Standards ✓ NECA and NFPA Webinars ✓ Electrical Vehicle Infrastructure Training Program (EVITP) Installer Training Course/Certification 	