City of Westminster

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ELECTRIC VEHICLE (EV) CHARGER INSTALLATION GUIDELINES

The purpose of this guideline is to assist homeowners and contractors in streamlining the permitting and installation process for home EV charging stations.

Be aware that there are different types of Electric Vehicle (EV) Chargers. There are 2 basic types of EV chargers for home use (Level 1 and Level 2). Level 1 chargers are smaller units that plug directly into a standard 120 volt receptacle outlet. These types of charges typically require a longer period of time to recharge the vehicle. As long as the receptacle outlet being used to plug-in the Level 1 charger is existing, there is no requirement to secure a permit from the Building and Safety Division. On the other hand, if you will be installing a new 120 volt receptacle outlet for the charger, you will need to obtain a permit, but you will not need to provide any plans or electrical load calculations as would be required for the more powerful Level 2 type charging systems.

A Level 2 EV charging system requires 240 volt and charges the vehicle much faster than a Level 1 charger. Level 2 charger installations require permits from the City. In order to obtain the permit you will need to provide the City with some basic information to show that your existing electrical service can handle the added load.

What information do I need to provide to the City in order to obtain the permit? In most cases, you or your contractor merely needs to fill-in the blanks on this document, attach the manufacturer's installation instructions and charger specifications and submit it to the Building and Safety Division for an over-the-counter review and permit issuance. If all of the information is provided and the proposal complies with the applicable codes, the review and approval process will only take a few minutes. Once the permit is issued, the installation may begin. When the installation is complete an inspection of the work will be scheduled with the Building Inspector upon request. Inspections are typically performed on the work day following your request for inspection. Keep in mind that someone will need to be present during the inspection so that the Building Inspector can access the location of the EV charger (typically in the garage).

Installing a Level 2 EV charging system often requires changes to building wiring and utility electric services. Before installing charging equipment and associated infrastructure, talk to your EV manufacturer for information about what you need to charge your vehicle.

When installing your EV charger, be sure to use a licensed Electrical contractor whose license is current for electrical work. The contractor should also follow the guidelines of the manufacturer and the requirements of the City of Westminster.

Why is the Electric Utility concerned about your EV charger installation? Though an individual Level 2 EV charger may have a negligible impact on the utility electric system, the combined effect of several chargers in the same area could result in overloads on utility secondary wires and transformers. It is crucial that the City of Westminster is notified of any Level 2 charging station installations to ensure that the utility electrical system components are adequately sized to maintain high levels of service reliability.

LEVEL 2 ELECTRIC VEHICLE CHARGER – SERVICE LOAD CALCULATION

Instructions: Review the list of electrical loads in the table below and check all that exist in the home (don't forget to include the proposed Level 2 EV charger). For each item checked, fill-in the corresponding "Watts used" (refer to the "Typical Usage" column for wattage information). Add up all of the numbers that are written in the "Watts Used" column. Write that number in the "Total Watts Used" box at the bottom of the table and proceed to the next page.

Loads shown are rough estimated; actual loads may vary – for a more precise analysis, use the nameplate ratings for appliances and other loads and consult with a trained electrical professional.

Check all Applicable Loads	Description of Load	Typical Usage	Watts Used	
GENERAL LIGHTING AND RECEPTACLE OUTLET CIRCUITS				
	Multiply the square footage of house x 3	3 watts/sq.ft.		
KITCHEN CIRCUITS				
	Kitchen circuits	3,000 watts		
	Electric oven	2,000 watts		
	Electric stove top	5,000 watts		
	Microwave	1,500 watts		
	Garbage disposal	1,000 watts		
	Automatic dish washer	3,500 watts		
	Garbage compactor	1,000 watts		
	Instantaneous hot water at sink	1,500 watts		
LAUNDRY CIRCUITS				
	Laundry Circuit	1,500 watts		
	Electric Clothes Dryer	4,500 watts		
HEATING AND AIR CONDITIONING CIRCUITS				
	Central heating (gas) and air conditioning	6,000 watts		
	Window mounted AC	1,000 watts		
	Whole-house or attic fan	500 watts		
	Central electric furnace	8,000 watts		
	Evaporative cooler	500 watts		
OTHER ELECTRICAL LOADS				
	Electric water heater (storage type)	4,000 watts		
	Electric tankless water heater	15,000 watts		
	Swimming pool or spa	3,500 watts		
	Other: (describe)			
	Other:			
	Other:			
ELECTRIC VEHICLE CHARGER CIRCUIT				
	Level 2 Electric Charger rating*			
TOTAL WATTS USED (add up all of the watts for the loads you have checked)				

*** Use name plate rating in watts or calculate as: (Ampere of circuit x 240 volts = Watts)**
INSTRUCTIONS: Apply the **Total Watts Used** number from the previous page to t the Table below to identify if the Existing Electrical Service Panel is large enough to handle the added electrical load from the proposed Level 2 EV charger. If your electrical service is NOT large enough, then you will need to install a new upgraded electrical service panel.

Table based on NEC 220.83 (A)

Check the appropriate line	Total Watts Used	Minimum Required size of existing 240 volt electrical service panel (main service breaker)	Identify the size of your existing main service breaker (amps)**
	0 - 24,000	60 amps	
	24,001 - 48,000	100 amps	
	48,001 - 63,000	125 amps	
	63,001 - 78,000	150 amps	
	78,001 - 108,000	200 amps	
	108,001 - 123,000	225 amps	

**Please note that the size of your existing service MUST be equal to or larger than the minimum required size identified in the Table above or a new upgraded electrical service panel will need to be installed (separate permit required for new service).

CAUTION: This table is **NOT** to be used to determine the size of a **NEW UPGRADED** Electrical Service Panel if your existing panel is too small or overloaded according to the Table above. In order to determine the size of a NEW or UPGRADED Service Panel, there is a completely different load calculation methodology that applies. Sizing of a NEW or UPGRADED Electrical Service Panel should only be done by a qualified Electrical Contractor or Electrical Engineer.

STATEMENT OF COMPLIANCE

By my signature, I attest that the information provided is true and accurate.

Job address: _____

Signature: _____ **Date:** _____

In addition to this document, you will also need to provide a copy of the manufacturer's installation literature and specifications for the Level 2 Charger you are installing.

Please note that this is a voluntary compliance alternative and you may wish to hire a qualified individual or company to perform a thorough evaluation of your electrical service capacity in lieu of this alternative methodology. Use of this electrical load calculation estimate methodology and forms is at the user's risk and carries no implied guarantee of accuracy. Users of this

methodology and these forms are advised to seek professional assistance in determining the electrical capacity of a service panel.

OTHER HELPFUL INFORMATION FOR EV CHARGER INSTALLATIONS

The Table below illustrates the type and size of wire and conduit to be used for various Electric Vehicle Charger circuits.

Size of EV Charger Circuit Breaker	Required minimum size of conductors (THHN wire)	CONDUIT TYPE SIZE***		
		Electrical Metallic Tubing (EMT)	Rigid Nonmetallic Conduit – Schedule 40 (RNC)	Flexible Metal Conduit (FMC)
20 amp	#12	½"	½"	½"
30 amp	#12	½"	½"	½"
40 amp	#10	½"	½"	½"
50 amp	#8	¾"	¾"	¾"
60 amp	#6	¾"	¾"	¾"
70 amp	#6	¾"	¾"	¾"

*****Based on 4 wires in the conduit**
(2-current carrying conductors, 1-grounded conductor, 1- equipment ground).

As an alternate, Nonmetallic Sheathed Cable (aka: Romex cable or NMC) may be used if it is protected from physical damage by placing the cable inside a wall cavity or attic space which is separated from the occupied space by drywall or plywood.

The Table below illustrates the required supports for various types of electrical conduit or cable.

Conduit Support	Electrical Metallic Tubing (EMT)	Rigid Nonmetallic Conduit – Schedule 40 (RNC)	Flexible Metal Conduit (FMC)	Nonmetallic Sheathed Cable (NMC)
Conduit Support Intervals	10'	3'	4-1/2'	4-1/2'
Maximum distance from box to conduit support	3'	3'	1'	1'

In addition to the above noted requirements, the California Electrical Code contains many other provisions that may be applicable to the installation of a new electric circuit. Installers are cautioned to be aware of all applicable requirements before beginning the installation. For additional information or guidance, consult with the Building and Safety Division staff or a qualified and experienced Electrical Contractor.