

# **EV Charging Infrastructure Requirements in New Buildings**

For discussion at the City of White Rock Environmental Advisory Committee, March 2021

Background material and information used in this document is available via the following;

<https://pluginbc.ca/>

<https://electricautonomy.ca/2021/01/07/ev-readyresidential-buildings/>

<https://electricautonomy.ca/2021/02/11/multifamily-building-ev-retrofit/>

<http://www.metrovancouver.org/services/air-quality/climate-action/transportation-programs/ev-strata-condo/key-info/chargers-installation-costs/Pages/default.aspx>

<https://goelectricbc.gov.bc.ca/>

<http://www.metrovancouver.org/layouts/download.aspx?SourceUrl=http%3a//www.metrovancouver.org/services/air-quality/AirQualityPublications/SiteAssessmentTool-EVstation.xls>

## **EV Charging Terminology**

### **Level 1 Charging**

Level 1 is known colloquially as a “trickle charge.” All EVs come with a cordset that plugs into the car’s J-1772 or Tesla port with the other end plugging into a standard home wall outlet. Vehicles can typically gain 8-10 km of driving range per hour of charging, making this the slowest charging method, *but still adequate for most daily commuters.*

### **Level 2 Charging**

Level 2 chargers are very common and can be found at community centres, parks, shopping malls, hotels, parkades and rest areas. Electric vehicle owners typically install one in their home garage using a 240v connection.

These charging stations use the J1772 plug except for Tesla versions, which of course use the Tesla plug. They provide more power than a regular household outlet and most vehicles will gain 20-40km of range per hour of charging.

Tesla vehicles can use J1772 charging stations by way of a small, inexpensive adapter.

### **Level 3 Charging**

Level 3 charging is better known as Direct Current Fast Charging or simply ‘fast charging’. These charging stations enable most EVs to charge to 80% in under an hour, making road trips easier and quicker.

Public fast charging stations have two plugs: One CCS and one CHAdeMO. Only one plug can be used at a time, but the stations are designed this way so you can use them regardless of which plug type you have.

## **“EV-Ready” (also referred to as “Rough-in” or “Energized Outlet”)**

This refers to the provision of electrical conduit and sufficient load capacity (at the electrical panel) to provide for installation and operation of charging station hardware. For example, an L1 “EV-ready” parking stall still requires the installation of a 110v receptacle before an EV can be plugged in.

## **Retrofit of EV Charging Infrastructure in Existing Buildings**

According to recent data, there is a high cost for the retrofit of existing parking spaces in multi-residential buildings;

“a single EV charger in apartments participating in incentive programs in B.C. has averaged about \$7,000, with many buildings facing significantly higher costs”.

As a component of this cost, a charging station’s hardware (apart from the electrical conduit and load capacity) varies from \$400 to \$4,000 for a level 2 unit, depending on required features and the location for installation.

The above reference to “many buildings facing significantly higher costs”, likely means that the average cost in this data set is primarily derived from an average of easier retrofits, with more complex retrofits not included as they were never undertaken. Metro Vancouver suggests the total cost can be as high as \$20,000 per unit. Clearly, even with a variety of retrofit incentive programs in place, these costs will be a challenge.

However, if electric vehicles are to be an important component in the future (BC gov’t target is all new light-duty vehicle sales by 2040), then aggressive policies and incentives for EV charging stations are vital. It would seem that, at a minimum, municipalities will at some point be compelled to ensure EV charging options are built into all new structures.

## **Current White Rock Policy and Bylaw for EV Charging Requirements in New Buildings**

### **OCP policy 12.5.7;**

Electric Vehicles – Require one electric vehicle charging station for every 10 parking spaces in new multi-unit residential and mixed use buildings. Provide rough-ins for an additional one electric vehicle charging station for every 10 parking spaces, for future use as electric vehicle use increases.

### **Bylaw 2262 (Amending Bylaw 2000)**

#### **4.17 Provision of Electric Vehicle Charging Infrastructure**

4.17.1 For new buildings that include multi-unit residential uses, a minimum of 1 of every 10 off-street parking spaces shall feature an energized outlet capable of providing Level 2 charging or higher to the off-street parking space.

An additional 1 of every 10 off-street parking spaces shall feature roughed-in electric vehicle charging infrastructure, including an electrical outlet box located within 3 metres of the parking space. Where more than 1 of every 10 off-street parking spaces features an energized outlet capable of providing Level 2 charging or higher is provided, the minimum number of off-street parking spaces featuring roughed-in electric vehicle charging infrastructure may be reduced by the number of off-street parking

spaces that feature the energized outlets beyond the minimum requirement. This section does not apply to new buildings with fewer than 10 off-street parking spaces.

4.17.2 Energized outlets, provided pursuant to Section 4.17.1 above, shall be labelled for their intended use for electric vehicle charging.

4.17.3 Where an electric vehicle management energy system is implemented, the Director of Engineering may specify a minimum performance standard to ensure a sufficient rate of electric vehicle charging.

## **Comparison of EV Charging Requirements in other Municipalities**

In a joint letter to the City in February 2020, the Victoria Electric Vehicle Association and Plug-in Richmond identified White Rock as one of a number of municipalities in BC with “exceptionally low EV infrastructure requirements”. Many of White Rock’s neighbouring municipalities in Metro Vancouver have more ambitious requirements than those currently specified in the city’s OCP.

### **City of Burnaby**

[Zoning Bylaw 13903, Amendment Bylaw No. 24, 2018](#) includes provisions for electric vehicle charging requirements for new residential developments.

- All parking spaces for dwelling units shall include an energized outlet capable of providing Level 2 charging or higher
- Includes single-family homes and multi-family buildings of all sizes
- Exceptions include visitor and secondary suite parking, and parking for existing units
- Bylaw is in effect starting September 1 2018.

### **City of Coquitlam**

The zoning bylaw has been amended to include EV parking spaces. See Part [714 of the bylaw](#).

- July 30th 2018. See the requirements guide.
- All new constructions must have one energized outlet capable of L2 charging for every dwelling unit (includes single family and MURBs).

### **City of New Westminster**

- Starting April 1, 2019, all new buildings that contain at least one residential unit will be required to install a Level 2 (208 to 240 volt) energized outlet to the residential parking spaces. [See details here](#).
- Please view the City’s updated [Development Permit Area \(DPA\)](#) guidelines to learn more about the recommended EV charging infrastructure for new commercial, institutional and industrial buildings.

### **City of North Vancouver**

The zoning bylaw has been amended to include 100% EV ready parking in multi-unit residential buildings:

- This applies to development or building permit applications accepted for review on or after June 1, 2019.
- All parking spaces in new residential buildings must have a labelled, energized outlet capable of providing Level 2 charging for an electric vehicle.
- This includes all new single family, coach houses, duplexes, triplexes and apartments, as well as parking spaces for shared vehicles.
- Secondary suites are not included.
- EV energy management systems or “load sharing” can be used to meet the requirements

## **District of North Vancouver**

[Implementation of EV Charging Infrastructure with Development](#) policy requiring multi-family, commercial, and industrial builds, document 2380934. Approved in 2014.

- Multi-family in District of North Vancouver:
  - 20% of parking stalls are EV-ready (wired for L1 charging)
  - Conduit in place for 100% of parking stalls to be wired for L1 in the future
- Commercial/Industrial in District of North Vancouver:
  - Approximately 10% of parking stalls are EV-ready (wired for L2 charging)

## **City of Port Coquitlam**

[Zoning Amendment Bylaw 4035](#) requires EV charging in new builds (residential and mixed use):

- In effect Jan 23 2018
- For a residential building other than a building with a common parking area, one parking space per dwelling unit shall be provided with roughed-in electric vehicle charging infrastructure including an electrical outlet box located within 3 metres of the unit’s required parking space.
- For a residential building with a common parking area, a separate single utility electrical meter and disconnect shall be provided in line with the electrical panel(s) intended to provide for charging of electric vehicles located within 3 metres of the unit’s required parking space.
- In a mixed-use building including residential uses and a common parking area, a separate single utility electrical meter and disconnect shall be provided in line with the electrical panel(s) intended to provide for charging of electric vehicles located within 3 metres of the unit’s required parking space.

## **City of Port Moody**

EV ready requirements appear in bylaw 2937 Section 6.11 March 1, 2019.

- See the technical bulletin [here](#).
- All spaces in new residential constructions require an energized outlet capable of L2 charging.
- 20% of spaces in new commercial constructions require an energized outlet capable of L2 charging.

## **City of Richmond**

[Zoning Bylaw 8500](#) requires EV charging in new builds (residential only), revising bylaw 9756.

- October 15, 2017.

- 100% of new residential parking spaces, excluding those provided for visitors use, shall have access to an adjacent energized outlet capable of providing Level 2 charging.

## City of Surrey

The zoning bylaw was amended on February 25, 2019 to require Electric Vehicle (EV) charging infrastructure in ALL new residential and commercial developments.

- February 25, 2019. See the technical bulletin [here](#).
- 100% of residential parking spaces in new residential developments must each have an installed energized electrical outlet capable of providing Level 2 charging for an electric vehicle. This requirement applies to both single-family and multiple unit residential dwellings.
- 50% of visitor parking spaces in multiple unit residential developments must each have an installed energized electrical outlet capable of providing Level 2 charging for an electric vehicle.
- 20% of parking spaces in new commercial developments must each have an installed energized electrical outlet capable of providing Level 2 charging for an electric vehicle.

## City of Vancouver

[Building Code Bylaw 10908](#) requiring EV charging in new builds (commercial and residential), revised bylaw Electric Vehicle Charging s 10.2.3.

- This [bylaw was updated](#) on March 14, 2018 to increase the percentage of EV-ready stalls in multi-unit residential buildings from 20% to 100%
- For new buildings current bylaw requires:
  - 1 EV-ready stall in single-family homes with garages
  - 10% of stalls be EV-ready in commercial buildings
  - 100% of stalls be EV-ready in multi-unit residential buildings

## What should White Rock require for EV Charging Infrastructure in New Buildings?

Objectively speaking, the most efficient and cost-effective delivery of the basic infrastructure for charging stations (electrical conduit and load capacity) is during initial construction.

“Making parking EV-ready typically adds 1-to-2 per cent to the overall cost of constructing new onsite parking...”

However, it does not follow that full installation of charging units is always most efficient at initial construction. The actual charging hardware/unit which connects to this electrical infrastructure comes in a variety of configurations. For example, units can be for charging a single vehicle or 2 vehicles, or include the technology for power sharing among up to 4 charging units. Although the charge per vehicle is not as rapid when the electrical load is shared (though a vehicle will be charged overnight), the upfront costs per parking stall can be 50-60% lower than single user units. Some units provide the user with free power, while others are configured for user-pay, with different costs depending on how the use is tracked and costs recovered.

In some cases, new apartment or strata owners may not own an EV, and will not immediately require a charging unit. On the other hand, some builders may find that providing a fully outfitted charging unit,

user-pay or otherwise, shared power or single user, is an enticement to buyers. With the variety of charging units and configurations available, and with more innovations likely to come in the future, the builder, the strata, and/or the individual owner are in a better position than the municipality to determine which is best for their needs.

Some municipalities have focused on requiring that 100% of parking stalls in new construction, including at least 1 stall in new single-family homes, be equipped with Level 2 charging stations. In the alternative, some municipalities have opted for a focus on “EV ready” requirements, with the installation of charging units for later determination.

A disadvantage of the first approach is that it may be overly prescriptive and thereby limit the options available to owners regarding power sharing versus single user units, user-pay units versus usage covered via strata fees, etc. At the same time, this approach will be more certain to provide a ready capacity for EV owners, and a ready incentive for others to purchase EVs.

In the alternative, a focus on EV readiness can provide for a more open-ended set of options for installation and hardware configuration, and reduce the conflict over upfront cost issues where, for example, every parking stall requires an EV option. At the same time, if a builder is so inclined, they can decide to go beyond EV readiness, and install complete charging stations.

### **Draft resolution to amend OCP Policy 12.5.7**

The EAC recommends that OCP Policy 12.5.7 be amended as follows;

Electric Vehicles- Require the following electric vehicle charging components in new residential, multi-unit residential, and commercial buildings. A minimum of;

- 1 Level 2 EV-ready parking stall in single-family homes with garages
- 20% of parking stalls to be Level 2 EV-ready in commercial buildings
- 100% of resident parking stalls to be Level 2 EV-ready in multi-unit residential buildings
- 50% of visitor parking stalls to be Level 2 EV-ready in multi-unit residential buildings

### **A Final Comment (something to consider in terms of vehicles and cities)**

Whether electric or otherwise, vehicle production and use contribute to a variety of environmental problems; beginning with the materials and processes for their construction, through to the roadways and infrastructure to fuel, repair and accommodate their usage, and finally the disposal of vehicle parts, including batteries. An interesting feature of the debate around electric vehicles is that it assumes cities should continue to support vehicle ownership in the future. For example, all the EV infrastructure requirements reviewed here are focused on piggy backing on minimum parking requirements for construction of residential and commercial buildings. However, in some jurisdictions (Edmonton, Toronto, Vancouver) efforts are shifting to a focus on reducing or removing minimum parking requirements, and thereby opening a pathway to fewer vehicles in those cities.