

# Electric Vehicle Appendix Notes

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## Building Code Requirements – Part 3

### 3.1.21. Electric Vehicle Charging

#### 3.1.21.1. Electric Vehicle Charging Systems

- (1) Except as provided in Sentences (2.1) and (3), where vehicle parking spaces are located in a *building*, other than an apartment *building*, not less than 20% of the parking spaces shall be provided with *electric vehicle supply equipment* installed in accordance with Section 86 of the Electrical Safety Code adopted under Ontario Regulation 164/99 (Electrical Safety Code) made under the *Electricity Act, 1998*.
- (2) The remaining parking spaces located in a *building* described in Sentence (1) shall be designed to permit the future installation of *electric vehicle supply equipment* that conforms to Section 86 of the Electrical Safety Code.
- (2.1) Parking spaces located in a *building* need not comply with Sentence (1) where,
  - (a) before January 1, 2018,
    - i. an agreement was entered into between the owner of the land on which the *building* is to be constructed and a distributor, as defined in subsection 2 (1) of the *Electricity Act, 1998*, that sets out the conditions for the connection of the *building* to a distribution system, as defined in subsection 2 (1) of that Act, or
    - ii. a plan for the land on which the *building* is to be constructed respecting the siting and sizing of lines, transformers or other equipment used for conveying electricity was approved by a distributor, as defined in subsection 2 (1) of the *Electricity Act, 1998*, and
  - (b) an application for a permit to *construct* the *building* was made before January 1, 2020.
- (3) Except as provided in Sentence (6) and (7), where a *house* is served by a garage, carport or driveway, the following shall be installed to permit the future installation of *electric vehicle supply equipment* that conforms to Section 86 of the Electrical Safety Code:
  - (a) a minimum 200 amp panelboard,
  - (b) a conduit that is not less than 27 mm trade size and is equipped with a means to allow cables to be pulled into the conduit, and
  - (c) a square 4-11/16 in. trade size electrical outlet box.
- (4) The electrical outlet box described in Clause (3)(c) shall be installed in the garage or carport or adjacent to the driveway.
- (5) The conduit and electrical outlet box described in Clauses (3)(b) and (c) shall provide an effective barrier against the passage of gas and exhaust fumes.

- (6) A *house* need not comply with Sentence (3) where it,
- (a) is not connected to a distribution system, as defined in subsection 2 (1) of the *Electricity Act, 1998*, or
  - (b) is used or intended to be used as a seasonal recreational building described in Section 9.36.
- (7) A *house* need not comply with Sentence (3) where,
- (a) before January 1, 2018,
    - i. an agreement was entered into between the owner of the land on which the *house* is to be constructed and a distributor, as defined in subsection 2 (1) of the *Electricity Act, 1998*, that sets out the conditions for the connection of the *house* to a distribution system, as defined in subsection 2 (1) of that Act, or
    - ii. a plan for the land on which the *house* is to be constructed respecting the siting and sizing of lines, transformers or other equipment used for conveying electricity was approved by a distributor, as defined in subsection 2 (1) of the *Electricity Act, 1998*, and
  - (b) an application for a permit to *construct* the *house* was made before January 1, 2020.

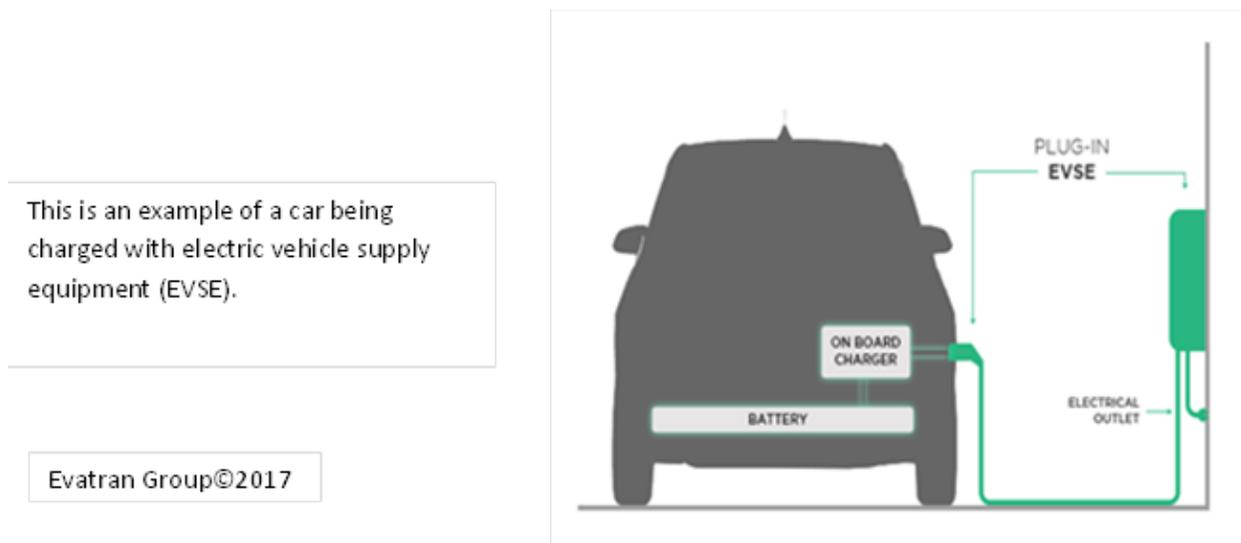
### **A-3.1.21.1.(1). Electric Vehicle Charging Systems**

#### **Sentence 3.1.21.1.(1):**

- Applies to buildings, other than apartment buildings or houses, within the scope of Part 3 of the Building Code with parking spaces in the building
- Electric Vehicle Supply Equipment is to be installed in buildings which have parking spaces integrated into the building.
- Electric Vehicle Supply Equipment is defined in Section 86 of the Ontario Electrical Safety Code, 2015, 26<sup>th</sup> Edition as: “a complete assembly consisting of conductors, connectors, devices, apparatus, and fittings installed specifically for the purpose of power transfer and information exchange between the branch circuit and electric vehicle.”
- The Building Code requirement does not set any requirements for the location or distribution of the relevant parking spaces within a building, nor does it specify the kind of vehicles that would be served by the Electric Vehicle Supply Equipment.
- The building inspector’s role is to inspect to determine if Electric Vehicle Supply Equipment is installed in at least 20 percent of the parking spaces.
- Electric Vehicle Supply Equipment is to be installed in accordance with Section 86 of the Ontario Electrical Safety Code. It is the role of the electrical safety

inspector to verify that installations comply with the Ontario Electrical Safety Code. The primary function of Electric Vehicle Supply Equipment is to transfer power for electrical vehicle charging by means (e.g. ac, dc, conductive, or wireless) appropriate for the specific electrical vehicle to which it is connected.

- The Ontario Electrical Safety Code has requirements regarding electrical panelboards, conduits and Electric Vehicle Supply Equipment for all charging levels. The Ontario Electrical Safety Code does not indicate when a particular charging level is needed.
- See example of Electric Vehicle Supply Equipment in Figure A-3.1.21.1.



**Figure A-3.1.21.1.  
Electric Vehicle Supply Equipment (EVSE)**

**Sentence 3.1.21.1.(2)**

- Applies to buildings, other than apartment buildings or houses, within the scope of Part 3 of the Building Code
- Applies to the remaining parking spaces in a building which are not covered by Sentence 3.1.21.1.(1).
- This requirement relates to building elements that facilitate future electric vehicle charging and does not require that electrical capacity be in place at the time of construction.
- Building elements that can facilitate future electric vehicle charging could include:
  - A suitable amount of space to locate potential future transformers or electrical panelboards

- Space between floors or within one floor for future wiring to run between the building's electric service, space designated for future electrical equipment and individual parking spaces (e.g., chases capped and appropriately labelled).
- The building inspector's role is to inspect to determine if these parking spaces (i.e. the ones that are not covered by Sentence 3.1.21.1.(1)) are designed to permit the future installation of Electric Vehicle Supply Equipment.
- When installed in the future, the Electric Vehicle Supply Equipment would need to be installed in accordance with Section 86 of the Ontario Electrical Safety Code. It is the role of the electrical safety inspector to verify that installations comply with the Ontario Electrical Safety Code.

**Sentences 3.1.21.1.(3) to (6):**

- Applies to electric vehicle charging in houses served by garages, carports or driveways subject to Part 3 of the Building Code.
- See notes for Sentences 9.34.4.1.(3) to (6) in Appendix Note A-9.34.4.1.

## **Building Code Requirements – Part 9**

### **9.34.4. Electric Vehicle Charging**

#### **9.34.4.1. Electric Vehicle Charging Systems**

- (1)** Except as provided in Sentence (3), where vehicle parking spaces are located in a *building*, other than an apartment building, not less than 20% of the parking spaces shall be provided with *electric vehicle supply equipment* installed in accordance with Section 86 of the Electrical Safety Code adopted under Ontario Regulation 164/99 (Electrical Safety Code) made under the *Electricity Act, 1998*.
- (2)** The remaining parking spaces located in a *building* described in Sentence (1) shall be designed to permit the future installation of *electric vehicle supply equipment* that conforms to Section 86 of the Electrical Safety Code.
- (2.1)** Parking spaces located in a *building* need not comply with Sentence (1) where,

  - (a) before January 1, 2018,

    - i. an agreement was entered into between the owner of the land on which the *building* is to be constructed and a distributor, as defined in subsection 2 (1) of the *Electricity Act, 1998*, that sets out the conditions for the connection of the *building* to a distribution system, as defined in subsection 2 (1) of that Act, or
    - ii. a plan for the land on which the *building* is to be constructed respecting the siting and sizing of lines, transformers or other equipment used for conveying electricity was approved by a distributor, as defined in subsection 2 (1) of the *Electricity Act, 1998*, and
  - (b) an application for a permit to *construct* the *building* was made before January 1, 2020.
- (3)** Except as provided in Sentence (6), where a *house* is served by a garage, carport or driveway, the following shall be installed to permit the future installation of *electric vehicle supply equipment* that conforms to Section 86 of the Electrical Safety Code:

  - (a) a minimum 200 amp panelboard,
  - (b) a conduit that is not less than 27 mm trade size and is equipped with a means to allow cables to be pulled into the conduit, and
  - (c) a square 4-11/16 in. trade size electrical outlet box.
- (4)** The electrical outlet box described in Clause (3)(c) shall be installed in the garage or carport or adjacent to the driveway.
- (5)** The conduit and electrical outlet box described in Clauses (3)(b) and (c) shall provide an effective barrier against the passage of gas and exhaust fumes.

- (6) A *house* need not comply with Sentence (3) where it,
- (a) is not connected to a distribution system, as defined in subsection 2 (1) of the *Electricity Act, 1998*, or
  - (b) is used or intended to be used as a seasonal recreational building described in Section 9.36.
- (7) A *house* need not comply with Sentence (3) where,
- (a) before January 1, 2018,
    - i. an agreement was entered into between the owner of the land on which the *house* is to be constructed and a distributor, as defined in subsection 2 (1) of the *Electricity Act, 1998*, that sets out the conditions for the connection of the *house* to a distribution system, as defined in subsection 2 (1) of that Act, or
    - ii. a plan for the land on which the *house* is to be constructed respecting the siting and sizing of lines, transformers or other equipment used for conveying electricity was approved by a distributor, as defined in subsection 2 (1) of the *Electricity Act, 1998*, and
  - (b) an application for a permit to *construct* the *house* was made before January 1, 2020.

#### **A-9.34.4.1.(1) and (2)**

- Apply to buildings, other than apartment buildings or houses, within the scope of Part 9 of the Building Code with parking spaces in the building
- See Appendix Notes A-3.1.21.1.(1) and A-3.1.21.1.(2).

#### **Sentences 9.34.4.1.(3) to (6):**

##### ***Scope of Application***

- Describes the requirements for a house served by a garage, carport or driveway. The intent of these requirements is to put in place infrastructure to allow for the future installation of Electric Vehicle Supply Equipment as defined in Section 86 of the Ontario Electrical Safety Code, 2015, 26<sup>th</sup> Edition, as: “a complete assembly consisting of conductors, connectors, devices, apparatus, and fittings installed specifically for the purpose of power transfer and information exchange between the branch circuit and electric vehicle.”
- The building inspector’s role is to inspect to determine if a (minimum) 200 amp panelboard has been installed, and that, as a minimum, a conduit and outlet box, as described in the regulation, have been installed (or to approve an alternative solution that would not require a 200 amp panelboard or a conduit).
- Any electrical components installed in the future would need to be installed in accordance with Section 86 and other relevant provisions of the Ontario

Electrical Safety Code. It is the role of the electrical safety inspector to verify that installations comply with the Ontario Electrical Safety Code.

- The requirements in Sentence 9.34.4.1.(3) do not apply to:
  - Houses not served by a garage, carport or driveway;
  - Houses where parking spaces are not adjacent to the house, and the installation of future Electrical Vehicle Supply Equipment would not be enabled by electrical infrastructure in the house (e.g., row houses served by a separate parking garage or a surface parking lot)
  - A multiple unit building of Group C major occupancy where residential units do not fall under the definition of house in the Building Code.
- Sentence 9.34.4.1.(3) requires only one electrical outlet box per house for the purpose of permitting the future installation of Electric Vehicle Supply Equipment.

### ***Alternative Solutions***

- The following considerations may apply to the development of an alternative solution to Sentence 9.34.4.1.(3) under Clause 1.2.1.1.(1)(b) of Division A:
  - For an alternative solution to be approved by a chief building official, the solution must achieve the level of performance required by the “acceptable solutions” set out in Division B of the Building Code with respect to the relevant “objectives” and “functional statements”.
  - As set out in SA-1, the requirements in Sentence (3) are tied to the following objective and functional statement:
    - Objective: to limit the probability that, as a result of the design or construction of a building, the natural environment will be exposed to an unacceptable risk of degradation due to emissions of greenhouse gases into the air
    - Functional statement: to limit excessive emissions of greenhouse gases into the air
  - The level of performance of the house for the purpose of evaluating a potential alternative solution is intended to be the ability for a house to enable future electric vehicle charging to an equal or greater extent than the acceptable solution in Sentence 9.34.4.1.(3).
  - Based on the required amperage of the panelboard and the size of the conduit required by Sentence 9.34.4.1.(3), the intent of the requirements is to enable the future installation of “Level 2” Electric Vehicle Supply Equipment.
  - “Level 1” charging uses 120 volts, supplied through a common household electrical outlet.
  - “Level 2” charging uses 240 volts and can be expected to require 40 amps at the panelboard.

- Depending on other anticipated electrical load demand, available Electric Vehicle Supply Equipment and electric vehicle charging options available to occupants, it is possible that certain houses might reasonably be expected to achieve this performance through a combination of measures other than those set out in Clauses 9.34.4.1.(3)(a) to (c).
  - A 200 amp panelboard, for example, may not be required in a particular house to support “Level 2” charging and other reasonably anticipated load demand (e.g. a smaller house without significant loading demands and/or where load sharing technology would limit peak loading).
  - The availability of electric panelboards with amperages greater than the standard 100 amp level, but less than 200 amps, increases the feasibility of such alternative solutions.
- Building officials assessing applications for alternative solutions may wish to consider the following types of documents to demonstrate that a 240 volt/40 amp energized receptacle could be installed while meeting the house’s anticipated electrical demand:
  - Electrical demand or loading calculations provided by a qualified person that conform to Section 8 of the Ontario Electrical Safety Code, or
  - An electrical design or plan that has been signed by a qualified person and which includes information about electrical demand or loading.
- “Qualified person”, in this context may include a professional engineer or an architect.
- In certain cases, a building permit applicant may propose that an energized receptacle capable of delivering a “Level 2” charge to an electric vehicle be installed at the time of construction (for example, a 240 volt-energized receptacle, supplied with a minimum of 40A, that meets the demand calculations of the Ontario Electrical Safety Code) rather than providing for the installation of infrastructure to enable future charging. This may be seen as meeting Sentence 9.34.4.1.(3) regardless of the amperage of the panelboard, or the presence of a conduit. This would require electrical design demand or loading calculations that demonstrate that the house’s electrical system is capable of supporting a Level 2 charging station and other expected electrical loads.
- Installing an energized receptacle or electric vehicle supply equipment capable of delivering a “Level 1” charge would not be seen as achieving the level of performance required by Sentence 9.34.4.1.(3).