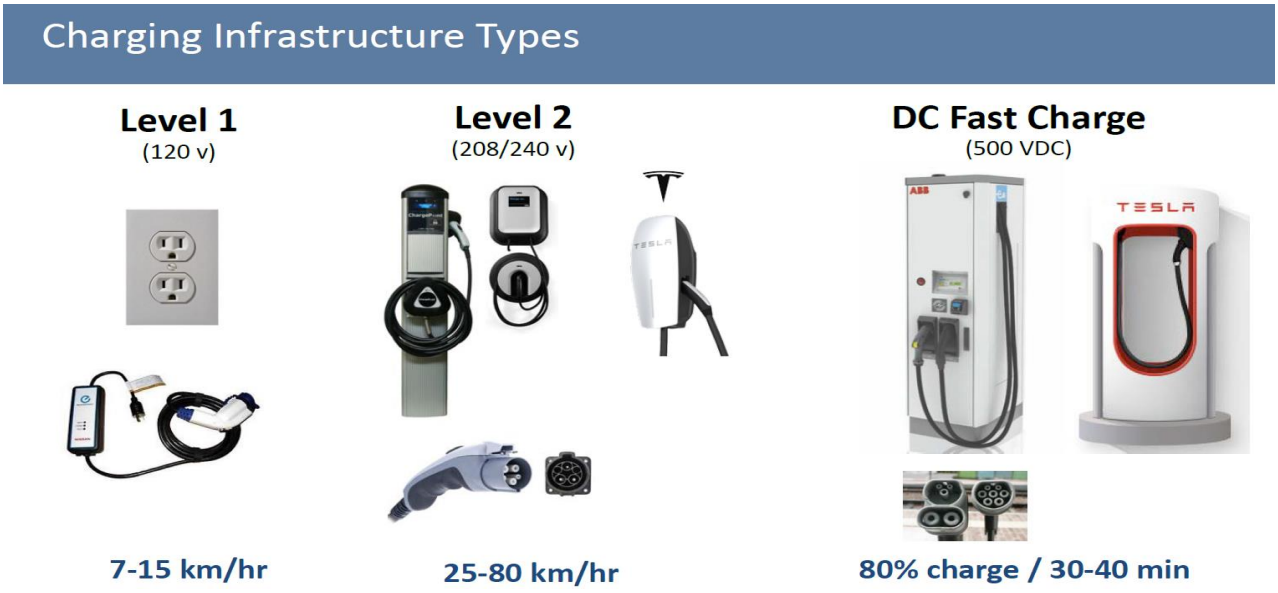
EV Infrastructure Types

Definitions:

- **"Electric Vehicle (EV)"** means a vehicle that operates, either partially or exclusively, on electrical energy from an off-board source that is stored on-board for motive purposes, but does not include vehicles that cannot be licensed by the Insurance Corporation of British Columbia.
- **"Energized Electric Vehicle Outlet"** means a connected point in an electrical wiring installation at which current is taken and a source of voltage is connected to supply utilization equipment for the specific purpose of charging an electric vehicle.
- **"Electric Vehicle Charger"** means a complete assembly consisting of conductors, connectors, devices, apparatus, and fittings installed specifically for the purpose of power transfer and information exchange between a branch circuit and an EV.
- **"Electric Vehicle Energy Management System"** means a system consisting of monitors, communications equipment, controllers, timers, and other applicable devices used to control electric vehicle supply equipment loads through the process of connecting, disconnecting, increasing, or reducing electric power to the loads.
- **"Level 2 Charging"** means an EV charging level as defined by Society of Automotive Engineers (SAE) International's J1772 standard (208/240 volts).



Because EV charging takes longer than refilling at a gas station, at-home charging is the most convenient, reliable, and preferred location with EV owners tending to charge at home over 80% of the time. L2 charging, with a similar output as a clothes dryer, provides a higher level of performance which more quickly charges a vehicle, supporting a better consumer experience and is consistent with recent policy across BC and North America. This bylaw amendment recommends 100% adoption of EV readiness in the residential sector for these reasons.

The installation of EV charging equipment requires the following electrical infrastructure:

- **Sufficient capacity** at the building's electrical panel for EV charging;
- **Electrical raceway** and conduit from the electrical panel to each parking stall;
- **Energized outlet** at each parking stall;
- **EV Energy Management Systems (EVEMS)** are optional control technologies that enable the power drawn to be shared or prioritized between chargers, thereby reducing peak power demand, making efficient use of electrical capacity, and greatly reducing electrical infrastructure costs. EVEMSs are recognized in the 2018 edition of the Canadian Electrical Code and are currently in the process of being adopted into the BC Electrical Code; Technical Safety BC has developed a variance process to permit installation of EVEMSs in the interim. The 'Smart' chargers used with EVEMSs can facilitate billing, which is a common concern for strata's in shared parking areas.
- **EV charger** (also know as EV Supply Equipment or EVSE) with cable to reach the vehicle.

The most cost-effective time to install EV charging infrastructure is during construction. The recent emergence of EVEMSs has significantly reduced the cost of installation in new multi-family residential and commercial development by reducing the amount of electrical capacity and infrastructure. The City of Victoria will require the abovementioned electrical infrastructure up to and including an energized outlet for each parking space in residential developments and will allow EVEMSs to provide a flexible and cost-effective approach for achieving this requirement.

A minimum performance standard (see Table 1) should be achieved where an EVEMS is installed. The performance standard requirements indicate that the maximum number of L2s that can be connected to the same circuit for various circuit ratings. New developments must achieve at least 12kWh per vehicle over an eight our period when all vehicles are charging simultaneously (i.e. allocate at least 8A per vehicle on a 208V or 240V circuit, if all vehicles are sharing power equally). Greater allowable levels of sharing are appropriate beyond 80A, given the greater diversity of electrical loads possible at these higher amperages. Additionally, no more than 1 vehicle should be able to charge on a 20A circuit and no more than 2 on a 30A circuit. A Technical Bulletin will be drafted to outline these standards for the development community.

Table 1: Performance Requirements

Minimum Circuit Breaker Rating (AMPS)	Maximum Number of L2 Chargers Per Circuit
20	1
30	2
40	4
50	5
60	6
70	7
80	8
90	10
100	11
125	14
150	17