

Electric Vehicle Infrastructure Requirement

Engagement Summary: September 2019

1.0 Introduction

The District of Saanich is proposing a set of electric vehicle (EV) infrastructure requirements for new construction, intended to “future proof” our building stock, decarbonize our transportation system, and ensure that residents of Saanich have easy and affordable access to EV charging.

The proposed “EV-ready” requirement responds to the following Council direction:

- Council Endorsement, on October 2, 2017, of the Terms of Reference for the Updated Climate Plan: 100% Renewable Saanich, and targets to achieve an 80% reduction in corporate and community greenhouse (GHG) emissions by 2050 (below 2007 levels), and for Saanich to become a 100% Renewable Energy Community by 2050; and
- Council Motion, passed January 11, 2018, for staff to “develop an approach to requiring electric vehicle charging infrastructure within new development”; and
- Council Motion, passed March 25, 2019, outlining that “The District of Saanich declare a climate emergency and work towards achieving carbon neutrality in the municipality by 2030”.
- Council Motion, passed August 19, 2019, “That Council:
 1. Adopt new climate targets of:
 - a) Achieving 50% reduction of community-wide greenhouse gas (GHG) emissions below 2007 levels by 2030; and
 - b) Reaching net zero emissions before 2050 as a complement to the target of becoming a 100% Renewable Energy Community.
 2. Direct staff to amend the Terms of Reference for the updated Climate Plan: 100% Renewable and Resilient Saanich, and replace the target of 80% reduction in greenhouse gas emissions below 2007 levels by 2050 with the new climate targets.”

In addition, the proposed “EV-Ready” requirement will ensure that Saanich buildings are equipped for the legislated Zero Emission Vehicle (ZEV) Mandate in BC, whereby automakers are required to meet an escalating annual percentage of new light-duty ZEV sales and leases. Under this requirement, 10% of light-duty vehicle sales must be ZEV by 2025, 30% by 2030, and 100% by 2040, meaning that internal combustion engine sales will not be permitted for light duty cars and trucks in BC from 2040 on.

Ensuring EV charging in new construction is an important demand-side policy that local governments can play to ensure current and future needs for EV charging are met.

A two phased approach to engagement has been undertaken:

Phase 1: The intent of Phase 1 was to explore options and best practices for EV infrastructure in new development, and seek feedback from industry and the public on the current and expected demand, familiarity with technology and installations, importance and need for local government policy, and level of support for a requirement. This phase of engagement involved surveys and workshops in partnership with the CRD and other local governments as part of the Capital Region Electric Vehicle and Electric Bike Infrastructure Planning Project, as well as broad feedback collected from the District as part of the extensive Climate Plan update engagement process.

Phase 2: The intent of Phase 2 was to seek feedback from industry and stakeholders on a proposed requirement for EV-Ready new development, which was informed by background research on the EV market and technologies, a review of best practices from other BC municipalities, and feedback from Phase 1 engagement. Through a workshop and survey, information on the technical requirements was disseminated, and input was solicited on the proposed approach including requirements and timelines for implementation to inform a final recommendation to Council.

2.0 Summary of Phase 1 Engagement

In 2018, three projects involved public or stakeholder engagement that informed the development of the proposed EV requirement:

1. The Capital Region EV and E-Bike Infrastructure Planning Project;
2. Phase 1 Engagement for the updated Saanich Climate Plan: 100% Renewable and Resilient Saanich; and
3. Plugging the Gaps Event: A Conversation about EV charging for people who live in condos and apartment buildings

The Capital Region EV and E-Bike Infrastructure Planning Project

The Capital Region Local Government EV and E-Bike Infrastructure Planning Project was led by the CRD's Climate Action Program and guided closely by an Advisory Group of local governments, including the District of Saanich, the City of Victoria, the District of Central Saanich, the Township of Esquimalt, and the District of Sooke. The purpose of the project was to:

- Understand opportunities for local governments to accelerate uptake of EVs and E-bikes;
- Collect feedback from the development community and general public to better understand the barriers and opportunities for EV and E-bike charging;
- Draw on resources and lessons learned from other communities;
- Identify priority locations for new EV charging stations in the Capital Region; and
- Create an infrastructure planning guide outlining options for local governments on how to advance EV and E-bike charging infrastructure in the region.

As part of this work, a public survey and a development industry survey were disseminated, and a development industry workshop was convened in collaboration with the Urban Development Institute (UDI). The engagement methods and participation rates are summarized in Table 1.

Table 1: Engagement Methods from Capital Region EV and E-Bike Infrastructure Planning Project

Engagement Summary	# Participants	Details
Public Survey	592 completed + 110 partially completed	28% of survey respondents were Saanich residents
Development Industry Survey	41 completed + 22 partially completed	53% have building projects in Saanich; 60% construct multi-family
Development Industry Workshop	60	Hosted in collaboration with UDI.

Public Engagement Findings

The public survey was focused on perceived barriers and opportunities around EV and E-bike ownership as well as identifying how to best facilitate EV charging opportunities in the Capital Region. Key findings in relation to an EV-ready requirement for new development included:

- 27% of people living in multi-family buildings cited access to home charging as the largest barrier to EV ownership
- 92% of respondents cited access to home charging as important or very important
- 92% felt it was important or very important for new developments to be “future proofed” to be EV-Ready

Industry Engagement Findings

The intent of the industry survey and workshop was to understand existing developer uptake in EV charging infrastructure in new buildings, collect feedback on the barriers facing developers to make their buildings EV-ready, and to gather feedback and level of support for municipal policies and actions that could be adopted to advance EV charging infrastructure in new development. The workshop was also designed to provide information on market trends and emerging technologies that can make EV-ready development more cost-effective to install. Key findings included:

- Many developers have experience with installing EV stations or related infrastructure, with 60% having installed an EV charging station in a recent development, and 63% having installed conduit and wiring for either Level 1 or Level 2 charging in a recent development
- The most common barrier to installing EV charging stations in new development was cost, cited by 44% of respondents, followed by a lack of demand, cited by 30% of respondents
- Although lack of demand was one of the top barriers cited by developers, 50% indicated that they expected a moderate to high demand in the next 5+ years, and 76% expected a moderate to high demand in the next 10+ years
- 68% of survey respondents supported (27%) or strongly supported (41%) EV-ready regulations in the Capital Region. Of the 19% that opposed such regulation, the most common concerns were:
 - increased costs to developers, leading to increased housing costs;
 - a belief that the market should decide, based on consumer demand; and

- general opposition to governments regulating this area.
- When asked how local governments can support EV charging infrastructure in new developments, the following actions were prioritized:
 - Development incentives (e.g. density bonuses, parking relaxations): 74%
 - Financing incentives (e.g. tax incentives): 69%
 - Expedited permitting: 54%
 - Clear, consistent regulations: 46%
 - Education on emerging technology: 44%

A summary of discussion points from the industry workshop was included in the Background Report to the Capital Region EV and E-Bike Infrastructure Planning Guide as follows:

- Issues around metering, equitable distribution of costs, and challenges with stratas assigning cost were raised as key issues. Consideration also needs to be given to differentiating rates for short- and long-term parking (i.e., customer vs employee).
- Concern was expressed over investment in charging infrastructure that may be obsolete (or “old technology”) in future, and committing to a specific charging technology or supplier that may not exist in future.
- Further testing and confidence with load management system was identified as being important in easing uncertainty over building electrical requirements.
- A level of urgency with charge station installation was expressed as the region is in a period of growth and delaying installing charging infrastructure will result in more buildings requiring retrofit at a later date (and at higher cost).
- It was suggested that financial or development process incentives would encourage inclusion of charging infrastructure in new development. Some participants cautioned that added regulation results in additional development cost and time.
- Certain participants indicated that EV chargers are a marketable feature that they use to attract buyers / leases and suggested that others should do the same.
- The group indicated support for this initiative and the guidance / certainty it will provide on concerns such as development cost implications, technology options, and infrastructure suppliers.
- Widespread use of electric vehicles will not address issues of single-occupant vehicle use and suburban “sprawl”-type land development.
- The group reiterated the value of the session and the timeliness of this information being presented as land developers consider installing EV chargers and municipalities look to enact bylaws to require them.
- A desire was expressed for the UDI to establish a working group to guide work on this from the development industry.
- A desire was also expressed for a reference guide for the detailed installation of charging stations to streamline electrical design work.

Phase 1 Engagement for the Updated Saanich Climate Plan: 100% Renewable and Resilient Saanich

The purpose of the first phase of engagement for the Saanich Climate Plan was to receive input on key themes, issues, opportunities and potential actions related to climate change. Phase 1 engaged thousands of individuals representing a broad cross-section of the community from May through December, 2018. The engagement strategies and participation rates are summarized in Table 2, below.

Table 2: Engagement Methods from Phase 1 of the Saanich Climate Plan Update

Engagement strategy	Participation/ Response Rate
Engagements at community events	28
People actively engaged in Phase 1 climate discussions at these events	Over 1700
Comments/sticky notes on engagement boards at events	639
Surveys completed	945
Stakeholder Workshops	98
Claremont School Workshops	52
Public open houses and workshops	190
Letters/email correspondence received from stakeholders and the public	13

While the purpose of the Climate Plan engagement was not to solicit feedback on electric vehicles specifically, support for uptake of electric vehicles was unsurprisingly a commonly heard piece of feedback. Specifically:

- Electric vehicle adoption was one of the top three climate action priorities for 41% of survey respondents (n=945), and represented the third most popular strategy overall
- When asked which approaches or tools Saanich should prioritize to reach our climate targets, the use of municipal regulations, policies and standards was the most popular choice alongside providing rebates and incentives, both of which were favoured by 55% of survey respondents
- Promoting, incentivizing and adopting EVs, as well as improving EV charging access were among the most common responses on the open ended “Ideas Board” that asked participants for ways we can address climate change.
- When survey respondents were asked what might help them choose an EV for their next vehicle purchase, more public charging was the second most common response (41%), while charging equipment at home was the fourth most common response (35%).

Plugging the Gaps Event: A Conversation about EV Charging for People who live in Condos and Apartment Buildings

In September, 2018, Saanich partnered with Drive Electric Victoria during their annual Ride and Drive event, as well as the CRD and the City of Victoria to host a workshop for residents of condos and apartment buildings who are interested in purchasing an EV. The intent was to facilitate conversation aimed at removing barriers and helping increase charging access in the places where EV owners or would-be owners live and work.

Intended outcomes of the dialogue were to:

- increase participant understanding of EV and charging technology and available resources to undertake retrofits in their buildings
- inform the CRD, Saanich, and Victoria EV Strategies by gaining a better understanding of current barriers, as well as emerging ideas that can contribute to EV charging solutions in existing buildings
- help participants build relationships with others that are undertaking similar processes in their buildings

There were 24 participants at the event, which began with presentations from Saanich and PlugIn BC on the EV charger installation process, potential challenges and solutions, and available grants and resources. Participants were then able to choose a discussion group to join based on their specific interests and challenges. The discussion groups were supported by subject matter experts from PlugIn BC, the Vancouver Island Strata Owners Association, Technical Safety BC, and the EV Club. The discussion enabled participants to delve deeply into the challenges they were facing, and explore possible solutions based on the expert knowledge and their peer's experiences.

With regards to EV infrastructure policy for buildings, key findings included:

- Electrical engineers and electricians are quickly getting up to speed on EV charging, and in the future there may be a certification program developed to support training and accreditation
- Many retrofits are installing one-off chargers with dedicated circuits, often in visitor stalls. This has the following implications:
 - The use of visitor stalls for EV charging by residents may contravene the parking requirements of the building, as per the zoning bylaw
 - Installing dedicated circuits may cause early adopters to use up the building's spare electrical capacity, with costly electrical upgrades required to support later installations. To ensure equitable and affordable access, retrofits should be designed for load management that would enable residents in all units to have access.
- The retrofit process is lengthy, costly, and challenging to get through strata board approval, with limitations on where the required studies and upgrades can be funded from. A ¾ vote is required to amend bylaws, approve funding for the project, and enact a "change of use" of common property.
- In addition, multi-family buildings need to grapple with issues such as who should pay for and own the charger, how to track and recover electricity costs in shared parking areas, how to choose station models if the units are networked and must be the same, and other liability and legal questions.

- Many participants were daunted by the process or were not finding the level of support needed by non-EV users in the building to move the initiative forward
- At the time of the workshop, there had been no rental apartment buildings that had accessed and installed EV charging stations through the Province of BC’s Charging Solutions and Incentives program, administered by PlugIn BC, highlighting the added barriers and access issues for renters.
- The average cost of installation for existing multi-unit buildings through the Provincial rebate program was \$6,800

The dialogue confirmed that many of the challenges outlined in the Capital Region EV and E-bike Infrastructure Planning Guide are being experienced by Saanich residents, including the considerably higher cost barriers (as compared to new construction), as well as the social and legal barriers such as the rules governing common property, the high level of support required for strata approval, and the “split” incentive associated with rental buildings, whereby owners accrue no direct benefit from the investment, and so are reluctant to install or allow charging infrastructure for renters.

3.0 Summary of Phase 2 Engagement

The engagement results from Phase 1 informed the development of a proposed EV-Ready requirement that balanced the following three criteria:

- Minimized upfront cost for developers;
- Simple for the strata or property owner to administer; and
- Climate action and “future-proofed” buildings and transportation system

Phase 2 engagement activities included an industry workshop and stakeholder survey that was intended to provide background information on how developers can affordably install EV-ready infrastructure, present the proposed requirement, including technical information and estimated cost, and seek feedback on the level of support and opportunities for improvement.

Table 3: EV-Ready Phase 2 Engagement Methods

Engagement strategy	Participation/ Response Rate
Industry Workshop, hosted in partnership with UDI	43
Stakeholder Survey	81

Industry Workshop

A breakfast workshop for the developer community was offered on April 30, 2019 in partnership with the Urban Development Institute (UDI). The invitation was distributed through UDI’s listserve, and also shared with the Vancouver Island Construction Association, the Canadian Home Builders’ Association, and the Victoria Residential Builders Association through UDI. There were 43 attendees, primarily developers, social housing providers, architects, designers, and local government staff. The workshop was structured with opening presentations from the District of Saanich and AES Engineering, who has experience in both the design of building electrical systems for EV infrastructure as well as supporting local government to develop performance standards and policy.

The information shared with the audience included background information on EVs and infrastructure including the use of EV energy management systems and electrical design, policy context, best practices from other BC municipalities, a summary of the phase 1 engagement findings, and the proposed EV-ready requirement. Participants then had the opportunity to ask questions and provide feedback in small breakout groups, guided by the following four questions:

- What is your current experience with EV infrastructure and your perception of EV demand in the marketplace?
- What is your feedback on the proposed residential development requirement?
- What is your feedback on the proposed institutional, commercial and industrial requirement?
- What is your feedback on the proposed start date of the requirement?

The proposed EV-ready requirements presented to workshop participants is provided in appendix A. A summary of the feedback from the workshop is provided in Table 4.

Table 4: Summary of Phase 2 Industry Workshop Feedback

Discussion Question	Feedback/Comments
1. Current experience with EV infrastructure and perception of EV demand	<ul style="list-style-type: none"> • Considerable experience with installing EV chargers and/or roughing in wiring in recent developments • Relatively little familiarity or experience with EV Energy Management Systems, but see lots of benefits • EV infrastructure seen as a selling feature, an asset for the next buyer • Regulation needed, as even those that are putting in EV infrastructure now are not installing enough • Participants expected a large increase in demand in 5-10 years • Non-market housing has no demand because cars are too expensive; however may increase as more market housing is integrated with non-market construction in the future • Access to home charging a major barrier for people considering buying EVs in condos; retrofits are very challenging, very divisive for stratas • Having more charging infrastructure would help to encourage the market

Table 4: Summary of Phase 2 Industry Workshop Feedback

Discussion Question	Feedback/Comments
2. Proposed requirement for residential development	<ul style="list-style-type: none"> • General agreement with 100% energized outlets, using energy management systems to reduce costs • Some participants felt that affordable housing should be exempt or get variances from the 100% requirement, and that the capital costs would be too high and increase rents • Some participants felt it would exacerbate inequities if affordable housing did not provide charging – because costs will be much higher to retrofit in the future • Many participants felt that incentives should be provided for social housing • Some groups felt that secondary suites should not be exempted • Concerns about cost - some uncertainty about what is included in the costing study and if it is accurate • Reducing overall parking requirements would help new developments achieve the EV requirement • May be challenges for stratas and how they manage the infrastructure • Would like to see consistency across the CRD
3. Proposed requirement for institutional, commercial and industrial (ICI) development	<ul style="list-style-type: none"> • General agreement and support for the ICI requirements and having different standards per building type • Many participants felt 5% was a low requirement and should be higher, or paired with incentives to achieve higher levels • Not a lot in commercial tenant demand, but retail outlets would see benefit for their customers and could be higher • Weekend/ vacation destinations should have adequate charging (winery, hotels, B&Bs, etc.) • Universities, event centres and hospitals could be higher • Could be a balance of Level 1 and Level 2 chargers • Zoning bylaw doesn't specify employee parking, but should still encourage these to do in • Some questions about the rationale/ nuances for each zoning category – need more info on where the numbers come from • Need to more clearly state that the actual stations (as opposed to just the energized outlets) is required

Table 4: Summary of Phase 2 Industry Workshop Feedback

Discussion Question	Feedback/Comments
<p>4.</p> <p>A) Proposed start date for the requirement and</p> <p>B) Other implementation considerations</p>	<ul style="list-style-type: none"> • Overall support for start date for single family/ townhouse • Some felt that the start date was workable for multi-family • Some felt that the start date for multi-family and rental should be phased in more slowly to support training, education, and more familiarity with the technology • Some felt the requirement for multi-family should be triggered by the development permit (not building permit) since that is when BC Hydro and an engineer needs to be engaged • Some felt that aligning the timing with Step Code (Jan 1, 2020) was helpful, so all changes could be considered at once <ul style="list-style-type: none"> • Concern that BC Hydro may not have the ability to supply all the energy needs • Concern that BC Hydro will not consider the EV Energy Management Systems when calculating loads • Concern about a lack of knowledge from electrical industry (inspectors, engineers, contractors) • Saanich/CRD should help with industry-wide education • Develop better marketing materials – e.g. the monthly costs for the consumer of EVs vs. gas • Consider reducing parking requirements or relaxations in certain areas • Consider incentives, particularly for social housing

Stakeholder Survey

An online survey was made available to the development industry, as well as shared with a broader set of stakeholders including local EV clubs, environmental non-profits, the Vancouver Island Strata Owners Association, and residents and organizations that had self-identified as interested in EV policy through our online e-newsletter.

The survey had 81 responses, 17 of which identified as being within the development industry. For those that worked within the development industry, there was an even spread between those constructing multi-unit residential, small scale residential, commercial, industrial and/or institutional (ICI), and mixed use developments.

The survey questions followed the same format as the industry workshop. The survey was meant to complement the in-person engagement for those who were not able to attend, as well as broaden the type of stakeholders engaged. Background information and the proposed requirement (see appendix A) were presented through the survey, and respondents were prompted to share their level of agreement and provide comments on the residential and ICI requirements.

A summary of survey feedback is provided in Table 5.

Table 5: Summary of Phase 2 Stakeholder Survey Feedback

Survey Question	Agree or Strongly Agree	Disagree or Strongly Disagree	Feedback/Comments (in order of frequency)
Do you agree with the overall residential EV requirement as proposed? (n=66)	88%	8%	<ul style="list-style-type: none"> • Must act now to future proof / meet local or Provincial targets/ act on climate change • Access to charging a major barrier that this can help overcome/ need more access to at-home charging • Other comments/ suggestions (described below) • Costs are reasonable/ less than having to retrofit later • Suggestions for improvement on the proposed approach (described below) • Installing charging at time of construction is easier/ cheaper and should be done to avoid having to retrofit buildings later • Ensure the costs can be allocated to users <p>Suggestions for improvement:</p> <ul style="list-style-type: none"> • Saanich should consider requiring the EV station • Visitor parking should be required as well • Requirement should be per residential unit, instead of per stall • Secondary and basement suites need access too • Requirement should only apply to multi-unit buildings (not single-family) <p>Other comments/ suggestions:</p> <ul style="list-style-type: none"> • Would also like to see support for retrofits • More at-home charging will make public chargers more available, as they are getting very congested • Need to consider impact of autonomous vehicles • Need on-street charging options too • EVs are not really green and will undermine public transit • The performance standard is insufficient (6 stations per 40A circuit) • Costs are not proven and add to the lack of affordability

Table 5: Summary of Phase 2 Stakeholder Survey Feedback

Survey Question	Agree or Strongly Agree	Disagree or Strongly Disagree	Feedback/Comments (in order of frequency)
Do you agree with the amount of lead-in time for the residential requirement? (n=65)	85%	11%	<ul style="list-style-type: none"> • Lead in time should be sufficient • Lead in time should be less, must act as soon as possible • Lead in time is insufficient <p>Note: for those that identified the specific building types they are involved in developing, only 8 respondents answered this question, with 5 in support of the proposed lead-in time, and 3 in disagreement.</p> <p>Suggestions for improvement:</p> <ul style="list-style-type: none"> • Phase in requirement, by first requiring 50% of stall be energized and requiring 100% in 5 years • Needs more lead in time so designs don't need to be adjusted for buildings already in process • One year lead in time would be sufficient • Ensure harmonization with 2018 Electrical Code for EVSE load management

Table 5: Summary of Phase 2 Stakeholder Survey Feedback

Survey Question	Agree or Strongly Agree	Disagree or Strongly Disagree	Feedback/Comments (in order of frequency)
Do you agree with the overall ICI EV requirement as proposed? (n=61)	79%	13%	<ul style="list-style-type: none"> • The proposed requirement is reasonable for the building uses; most charging will occur at home • Suggestions for improvement (described below) • Requirements should be set higher • Cost of charging needs to be covered by owner • Needs more data <p>Suggestions for improvement:</p> <ul style="list-style-type: none"> • 5% requirement should extend to libraries, galleries, rec centres and other places with high parking requirements • Need to get more input from employers and employees • May be a greater need for workplace charging • Consider reducing parking requirements in areas with good walk scores and/or transit service • Start with this, but increase the EV requirements over time <p>Additional Comments</p> <ul style="list-style-type: none"> • Investing in EV charging infrastructure will further increase car dependency and undermine public transit • Concern about electrical capacity of buildings • Consider requirements for e-bike charging • EV owners should mostly charge at home at their own cost
Do you agree with the amount of lead-in time for the ICI requirement? (n=61)	84%	13%	<ul style="list-style-type: none"> • Responses were similar to comments on the lead-in time for residential, with most respondents in support or highlighting urgency in introducing requirement • However, development industry is more divided on whether the amount of lead-in time is sufficient

Additional
Comments

- General support of the proposed approach, appreciation for taking action
- Additional policy or program ideas to support EVs (described below)
- Suggestions/comments on proposed EV-Ready requirement (described below)

Additional Policy or Program Ideas for EVs:

- Increase use of solar panels to reduce energy demand; amend bylaws to make solar a requirement
- Consider a “Right to Charge” bylaw/amendments to strata act to protect owners/tenants
 - ability to access charging at home
- Increase the number of public stations at existing locations (e.g. Saanich facilities) as priority over installing stations at new locations
- Require open data on charger use to facilitate understanding of plug-in vehicle use
- Develop mechanisms to recover the cost of installation and electricity use by users (e.g. at public stations)
- Support more public charging in neighbourhoods
- Install more DC Fast Charger stations
- Support E-bikes
- Use EVs as energy storage to reduce peak demand
- Offer rebates for EV purchases

Additional Suggestions/ Comments on Proposed Requirement

- Require 100% of all parking spaces be energized to meet future demand
- Ensure Level 2 chargers are necessary in all cases; may be instances where Level 1 is sufficient
- Apply the requirement to major renovations as well
- The residential requirements are the most important, whereas ICI installations will be driven more directly by demand
- Ensure coordination with other municipalities in the CRD
- Ensure there is sufficient electrical capacity in the proposed performance standard
- Consider reducing overall parking requirements to support implementation by developers
- Exempt affordable housing or provide funds to cover the cost of installation

Appendix A: Proposed EV requirements presented in phase 2 engagement

Proposed Residential Requirement:

Intent: Enable all new residential development to be equipped with electrical infrastructure that facilitates easy and cost-effective access to electric vehicle charging at home.

Single-Family, Duplex and Townhouse Development	Multi-Unit Development
Require 1 on-site parking space per unit to be energized (Level 2). The addition of a secondary suite or garden suite to an existing development will not trigger this requirement.	Require all off-street parking spaces in multi-unit residential developments to be energized (Level 2), excluding visitor parking. <ul style="list-style-type: none"> A minimum performance standard (see Table 1) must be achieved where an EV Energy Management System (EVEMS) is employed.

Note: "Energized" means all the electrical infrastructure required for the charging of an EV, up to and including the outlet or connection box is provided. This includes panel capacity, circuit breaker, conduit, wiring and outlet, but does NOT include the charging station.

Residential Performance Standard:

- The performance requirements (Table 1) indicate the maximum number of EVSE (chargers) that may be connected to the same circuit for various circuit ratings where an EVEMS is employed.
- For designs where an EVEMS is intended, the electrical infrastructure shall include all communications equipment, control systems installation, licensing, and permitting required to operate.
- Where the feeder ampacity exceeds the rating of the equipment (e.g. 40A EVSE connected to a 100A feeder), a local circuit breaker is required to provide overcurrent protection.

Table 1: Performance Requirements

Minimum Circuit Breaker Rating (AMPS)	Maximum Number of EVSE (Chargers) Per Circuit
20	2
30	4
40	6
50	8
60	10
70	12
80	14
90	16
100	23
125	23
150	24

Proposed Institutional, Commercial and Industrial Requirements:

Intent: Increase available public and workplace charging for EV owners on the go or without access to charging at home (availability of both public and workplace chargers have been statistically linked to uptake in EV ownership¹; 15-25% of charging events occur at work when EV owners commute in their vehicle to work²).

Considerations for minimum requirements:

- Estimated proportion of stalls for employees parking on site
 - Locations where very few employees are expected to be on site, a requirement may be lower
 - Locations where a high proportion of parking stalls are likely to be used by employees, load management may be enabled
- Expected dwell-time for public users
 - Locations where public users are likely to spend very little time (<20 min), the requirement may be lower or none
 - Dedicated circuits (not load managed) are preferred for public users to provide certainty and maximize the amount of charge they will receive during a given time period
- Estimated proportion of visitors that would be out of return range
 - Locations where many users are likely to be visiting from further distances (e.g. >75km) and may be relying on a charge for their return trip, a requirement may be higher
 - Locations where most users are likely to be locally based, a requirement may be less

Column A in each of the tables refers to the class code.

Column B in each of the tables refers to the land uses that include a minimum parking space requirement.

Column C in each of tables refers to the minimum number of parking spaces required for the land use(s) indicated in Column B

Column D in each of the tables refers to the minimum number of parking spaces, either expressed as a percentage of the total or as a whole number for which energized outlets shall be provided.

Column E in each of the tables refers to the minimum number of energized outlets that shall also be provided with EVSE units at the time of development. It may be expressed as a % or a whole number. Where the number of EVSE exceeds the % requirement for a specific development, the % shall apply to the EVSE requirement instead.

Column F in each of the tables refers to the minimum charging Level to be provided at each of the energized parking spaces in Column D (L2 = Level 2; L2M = Level 2 with load management enabled. Where load management is allowed, the residential performance standard shall apply).

Where a percentage of spaces is specified and the calculated amount of energized parking spaces or EVSE units results in a fraction, the number required shall be rounded up to the next whole number.

¹ 2018 International Council on Clean Transportation

² Hardman *et al.*, A Review of Consumer Preferences of and Interactions with Electric Vehicle Charging Infrastructure. Transportation Research Part D 62 (2018) 508-523.



Institutional

A	B	C	D	E	F
Use of Building		Req'd Parking Spaces	Minimum energized	Min EVSE	Minimum charging level
2.0	Institutional Public and Semi-Public and Health				
2.1	Personal Care Homes, Extended Care Homes or Group Care Facilities with lodging	1 space per 3 beds	5%	2	L2
2.2	Medical, Dental and Real Estate office	1 space per 20 m ² (215.0 ft ²) of gross floor area	5%	2	L2
2.3	Hospital or similar use	1 space per 50 m ² (538.2 ft ²) of gross floor area	5%	6	L2
2.4	Funeral Homes	1 space per 5.6 m ² (60.0 ft ²) of gross floor area used for Assembly	1	1	L2
2.5	Churches(areas of worship, halls, meeting rooms)	1 space per 8.0 m ² (86.1 ft ²) of gross floor area used for Assembly	1	1	L2
2.6	Sunday School	1 space per classroom	0%		
2.7	Schools				
	(a) Kindergarten and Elementary	1 space per employee plus 2	5%	6	L2M
	(b) Junior Secondary/Middle	1 space per employee plus 2	5%	6	L2M
	(c) Senior Secondary	1 space per employee and 1 space per 10 students	5%	6	L2M
	(d) Colleges	1 space per 30 m ² (322 ft ²) of gross floor area	5%	12	L2M
	(e) Universities	1 space per 50 m ² (538 ft ²) of gross floor area	5%	12	L2M
2.8	Public Utilities	1 space per employee	5%	6	L2M

Cultural and Recreational

A	B	C	D	E	F
Use of Building		Req'd Parking Spaces	Minimum energized	Min EVSE	Minimum charging level
3.0	Cultural and Recreational				
3.1	Community Centres, Activity Centres	1 space per 20 m ² (215 ft ²) of gross floor area used for Assembly	2	2	L2
3.2	Libraries, Galleries, Museums	1 space per 10 m ² (107 ft ²) of gross floor area used for Assembly	2	2	L2
3.3	Theatres, Auditoriums, Dancehalls, Clubs, Halls or Lodges	1 space per 10 m ² (107 ft ²) of gross floor area used for Assembly	2	2	L2
3.4	Stadiums, Arenas, Exhibition Halls, Pools or similar places with spectator facilities	1 space per 4 seats plus 1 space per 10 m ² (107 ft ²) of ice area plus 1 space per player capacity of other sports	2	2	L2
3.5	Gymnasiums, Health Clubs, Spas	1 space per 10 m ² (107 ft ²) of fitness or gymnasium surface area	2	2	L2
3.6	Bowling Alleys, Curling Rinks	4 spaces per alley or sheet of ice plus 1 space per employee	2	2	L2
3.7	Racquet and ball courts	2 spaces per court	0%		
3.8	Ranges for golfing driving, archery or small arms firing	1 space per range tee or target corridor	2	2	L2
3.9	Golf Courses	8 spaces per golf hole provided	2	2	L2
3.10	Marinas, Sailing Schools and Associations	1 space per 2 mooring berths or storage spaces provided	2	2	L2

Commercial

A	B	C	D	E	F
Use of Building		Req'd Parking Spaces	Minimum energized	Min EVSE	Minimum charging level
4.0	Commercial				
4.1	General Office	For buildings not exceeding 1000 m ² (10764 ft ²) of gross floor area: 1 space per 25 m ² (269 ft ²). For buildings exceeding 1000 m ² (10764 ft ²): 1 space per 25 m ² (269 ft ²) for the first 1000 m ² (10764 ft ²), and 1 space per 30 m ² (323 ft ²) for any additional area.	2 5%	2 2	L2M L2M
4.2	Retail sales of goods and services	1 space per 14 m ² (150 ft ²) of gross floor area	2	2	L2
4.3	Freestanding Local Convenience Stores	5 spaces plus 1 employee parking space	0%		
4.4	Retail Food Stores greater than 275 m ² (2960 ft ²) of gross floor area	1 space per 14 m ² (150 ft ²) of gross floor area	2	2	L2
4.5	Restaurants, Drive-in and Fast Food Restaurants	1 space per 10 m ² (107 ft ²) of gross floor area	0%		
4.6	Premises or portions thereof, licenced pursuant to Provincial Legislation for the regular sale of liquor except for neighbourhood public houses	1 space per 5.5 m ² (59 ft ²) of gross floor area open to the public	0%		
4.7	Neighbourhood Public Houses	1 space per 3 seats	0%		
4.8	Service stations and facilities for the repair or servicing of motor vehicles	1 space per 2 employees (minimum of 2 spaces) plus 1 space for each service bay	1	1	L2
4.9	Financial Institutions	1 space per 16 m ² (172 ft ²) of gross floor area	2	2	L2
4.10	Shopping centres less than 1000 m ² (10764 ft ²) of gross leasable area	Shall be the sum of the various classes of uses calculated separately	0%		

4.11	Shopping centres greater than 1000 m ² (10764 ft ²) and less than 23225 m ² (250000 ft ²) of gross leasable floor area	1 space per 19 m ² (204 ft ²) of gross leasable floor area	5%	2	L2
4.12	Shopping centres greater than 23225 m ² (250000 ft ²) of gross leasable area	1 space per 17 m ² (183 ft ²) of gross leasable floor area	5%	12	L2
4.13	Cabaret or Dinner Theatres	1 space per 10 m ² (107 ft ²) of gross floor area open to the public	0%		
4.14	Studios for broadcasting and production for television, radio or recording purposes	1 space per 30 m ² (322 ft ²) of gross floor area	2	2	L2
4.15	Auction Rooms	1 space per 10 m ² (107 ft ²) of auction floor area	0%		
4.16	Home Furnishing Stores	1 space per 80 m ² (861 ft ²) of gross floor area	0%		
4.17	Rental and repair of household items, tools, appliances and small equipment	1 space per 100 m ² (1076 ft ²) of gross floor area	0%		

Industrial

A	B	C	D	E	F
Use of Building		Req'd Parking Spaces	Minimum energized	Min EVSE	Minimum charging level
5.0	Industrial				
5.1	(a) Warehouse and Storage Area (b) Retail Sales Areas incidental to a Permitted Use (c) Home Furnishing Store	1 space per 175 m ² (1883 ft ²) of gross floor area 1 space per 14 m ² (150 ft ²) of gross floor area Notwithstanding clause 5.1(a) or (b), 1 space per 80 m ² (861 ft ²) of gross floor area	5%	2	L2M
5.2	Industrial	1 space per 95 m ² (1022 ft ²) of gross floor area	5%	2	L2M
5.3	Research Establishments, Laboratories	1 space per 30 m ² (322 ft ²) of gross floor area	5%	2	L2M



5.4	Beverage Container Depots in Industrial Zones	1 space per 40 m ² (431 ft ²) of gross floor area or 6 spaces, whichever is greater	5%	2	L2M
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Implementation:

- The requirement will apply to the number of stalls required in the zoning bylaw (pre-variance, if requested)
- The location of EV infrastructure would be provided through drawings submitted at the building permit stage. Applications that are in-stream at the time the requirement takes effect would be exempt.
- The requirement is proposed to take effect for building permits received on or after Jan 1, 2020

DRAFT