Vancouver Coastal Health
Electric Vehicle Charging Stations
Operations Manual

Date: October 2023

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1. Introduction

Vancouver Coastal Health (VCH) is committed to delivering exceptional care to 1.2 million people, including the First Nations, Métis and Inuit in our region, within the traditional territories of the Heiltsuk, Kitasoo-Xai'xais, Lil'wat, Musqueam, N'Quatqua, Nuxalk, Samahquam, shíshálh, Skatin, Squamish, Tla'amin, Tsleil-Waututh, Wuikinuxv, and Xa'xtsa. VCH is British Columbia's hub of health-care innovation, research and academic excellence, providing specialized care to patients throughout the province.

Vancouver Coastal Health's (VCH) commitment to providing sustainable transportation options that prioritize the restoration and regeneration of the health of individuals, communities, and the environment. Through various initiatives, VCH aims to reduce its carbon footprint, increase energy efficiency, and decrease reliance on fossil fuels.

One of the important strategies implemented by VCH is the installation of Electric Vehicle Charging Stations across our facilities. This infrastructure is designed to encourage the transition from gasoline vehicles to electric vehicles (EVs) and promote sustainable transportation practices. By providing convenient and accessible charging options, VCH hopes to facilitate the adoption of EVs among our staff, patients, and visitors.

The shift from gasoline-powered vehicles to EVs offers numerous benefits for both public health and environmental sustainability. By reducing carbon emissions, VCH can improve air quality and mitigate the detrimental effects of pollution on the health of our communities. Additionally, decreasing reliance on fossil fuels helps combat climate change and conserve natural resources.

VCH is actively engaged in promoting alternative modes of transportation such as cycling, walking, carpooling, and public transit. By encouraging active transportation and supporting infrastructure improvements, VCH aims to create a healthier and more sustainable environment for our employees, patients, and surrounding communities.
By prioritizing the well-being of both people and the planet, VCH is taking concrete steps toward a healthier future.

2. Purpose

The purpose of creating an Electric Vehicle Charging Station (EVCS) operations manual is to provide a comprehensive guide for the effective and efficient operation of the charging station infrastructure. It serves as a reference document for individuals responsible for managing the EV charging operations. This document is primarily used by Transportation Services, Facilities Maintenance & Operations (FMO), Energy & Environmental Sustainability (EES), Project and Planning teams.

The manual serves as a valuable training resource for new staff members or operators responsible for the charging station. It provides a structured guide for their onboarding process, ensuring they have a thorough understanding of the equipment, procedures, and safety protocols.

EVCS operations manual aims to streamline operations, enhance safety, ensure compliance with regulations, support users effectively, and promote efficient and reliable charging services. It serves as a vital tool for the successful management and maintenance of electric vehicle charging stations with the following benefits:

- Standardized Operations: The manual establishes consistent operating procedures and guidelines for the charging station, ensuring that all staff members and other users follow the same protocols. This helps maintain a high level of service quality and minimizes errors or inconsistencies in station operations.

- Safety and Compliance: The manual outlines safety protocols to ensure that the charging station is operated in a safe and compliant manner. It includes guidelines on electrical safety, emergency procedures, proper handling of charging equipment, and compliance with relevant regulations and standards.

- Equipment Maintenance: To ensure the reliability of VCH Electric Vehicle (EV) charging equipment, a five-year service agreement is in place for all existing chargers and the same practice will be applied to all future chargers. As outlined in the agreement, the vendor conducts semi-annual inspections and maintenance, which play a vital role in ensuring the safety and reliability of all EV chargers.

- User Support: The manual will include guidance on user support, such as instructions for EV owners on how to use the charging station, troubleshooting tips, and contact information for technical assistance. This helps users navigate the charging process smoothly and addresses common questions or concerns they may have.

3. Roles & Responsibilities

The roles and responsibilities clarifies the specific tasks and accountabilities of each team involved in the implementation and management of the EV charging infrastructure. This ensures clear communication, accountability, and efficient coordination among the teams to achieve the desired outcomes.

a. Energy and Environmental Sustainability Team (EES):
    - Work with Government entities to seek and secure funding for sustainable transportation options.
    - Engage in collaborations with relevant partners to support the implementation of sustainable transportation initiatives.
    - Coordinate with the Planning and Projects teams to initiate the procurement process for securing a vendor to install EV chargers.
    - Provide guidance and expertise on energy and environmental sustainability aspects throughout the implementation of the charging infrastructure.
b. Planning and Projects Teams:
    - Collaborate with the EES team to identify the need for EV chargers and develop plans for their installation.

- Initiate the procurement process to select a qualified vendor for the installation of the chargers.
- Coordinate with the EES team to ensure alignment with energy and environmental sustainability goals.

c. Transportation Services Team:
    - Responsible for managing the operations of the installed EV chargers.
    - Monitor and ensure compliance with the service level agreement for regular maintenance of the chargers.
    - Facilitate the establishment of a minimum five-year service level agreement with the selected vendor.
    - Coordinate with the selected vendor or maintenance team to address any issues or malfunctions promptly.
    - Maintain records of charger usage, energy consumption, and any user feedback or concerns.
    - Provide user support and guidance on charging processes, including troubleshooting assistance when needed.
    - Regularly review and update signage as needed to reflect any changes in regulations or organizational policies.
    - Collaborate with the EES team and Planning and Projects teams to assess the effectiveness of the charging infrastructure and propose improvements if necessary.

d. Legal Team:
    - Collaborate with Transportation Services Team to ensure compliance with VCH legal and regulatory requirements related to signage for EV charging stations.
    - Review and approve the design and content of signage and disclaimers to ensure it meets legal standards and conveys accurate information.
    - Provide guidance on any legal considerations, such as disclaimers, liability, or intellectual property rights.

e. Communications Team:
    - Collaborate with the Energy and Environmental Sustainability Team, Planning and Projects Teams, and Transportation Services Team to develop a comprehensive communication strategy for the EV charging infrastructure.
    - Work with Transportation Services to finalize informative signage that provides clear instructions and guidelines for users of the charging stations.
    - Coordinate with relevant partners to ensure consistent branding and messaging across all methods (signage and VCH websites).
    - Develop staff notifications and internal communication materials to inform employees about the installation of EV chargers, their locations, and any operational guidelines or updates.

4. Business Process

Pre-Operations is covered in the Regional EV Framework, refer to the document for further guidance.

a. Vendor Selection –The Redevelopment team, Project & Planning team, EES team or Transportation Services will work with Procurement to select a vendor for product delivery and

installation. Vendor and Project requirements will be identified at the beginning of the project along with project scope, timeline and budget constraints.

b. Electrical Component – The Project & Planning team and Site Facility Management Office (FMO) are responsible for collaborating with the chosen vendor to establish the power supply and distribution parameters in alignment with the EV charger specifications. Additionally, the vendor will ensure the implementation of effective Cable Management strategies while reviewing load management approaches. For comprehensive guidance, the "Vancouver Coastal Health Electrical Performance Specification For DC Fast Chargers and Level 2 EV Chargers" should be consulted, see appendix for details.
c. Signage - Transportation Services will collaborate with VCH Communications and Branding for the creation of sign drafts that effectively convey essential information. Additionally, the joint efforts of the Project & Planning team and Transportation Services with the vendor will guarantee the installation of clear and impactful signage. See appendix for sign drafts.

5. Operations

a. Standardized Operations – EV charging manual establishes a framework for standardized operations with a primary preference given to carefully selected vendors. Ensure operational consistency and compatibility by endorsing a standardized selection of EV charging units whenever feasible. Explore a potential leasing model i.e. the selected vendor assumes the responsibility for providing, maintaining, and managing all EV chargers. It is important to note that our current evaluation indicates that the leasing model might not be optimal due to the availability of government funding specifically designated for the purchase and installation of EV chargers.
b. Safety and Compliance – Project & Planning team and Transportation Services will work closely with the vendor to ensure necessary EV Charging Station manuals are created and that installations adhere to manufacturer guidelines. The cable management protocols are implemented to prevent any potential trip and fall hazards, thereby ensuring the well-being of users and maintaining a secure charging environment.
c. Equipment Maintenance – Upon installation, a comprehensive five-year service agreement with the vendor ensures the consistent maintenance of the EV chargers. The vendor takes charge of delivering a well-defined maintenance schedule during this period, guaranteeing smooth EV operation. After the initial five years, responsibility for repairing malfunctioning EV chargers transitions to Transportation Services. The online network access to the VCH EV chargers will identify repairs and will be addressed. To facilitate user assistance, clear signage with Transportation Services' or the vendor contact number will be displayed, offering users a direct means to report non-operational EV chargers for timely resolution.
d. User Support – The displayed signage will provide comprehensive instructions on utilizing the EV chargers effectively. There could be one or two options for using the charger based on the location: utilizing a QR code or an RFID card. To ensure a smooth experience, Transportation Services' or the vendor contact information will be readily available on the signs, enabling users to seek additional support or address any inquiries they may have while using the charging stations.

6. Request for Proposal (RFP)

In order to maintain efficient operation and maintenance of the Electric Vehicle Chargers, we currently have a five-year service agreement in place for existing chargers and will extend this practice to cover all upcoming future chargers. The operation and maintenance of our EV charging network are currently facilitated by two vendors, Electrum Charging Solutions and FLO. To streamline and optimize our operations, Transportation Services is actively planning to initiate a Request for Proposal (RFP) process in the fiscal year 2025-26. Through this RFP, we aim to select a common vendor who will be responsible for managing the maintenance and overall operations of all current and future VCH EV chargers, ensuring a more cohesive and efficient charging experience for our users.

7. Enforcement of Charging Time Restriction

As part of our current Electric Vehicle (EV) charging station signage, there is a one-hour parking limit at all Level-3 chargers and a four-hour limit at Level-2 chargers. Richmond Hospital currently has no hour limit as per signage. However, it's important to note that these limits are challenging to enforce due to limitations within our existing Parking Management contract. To address this issue and promote vehicle turnover, Transportation Services is actively working on implementing a rate structure for the usage of our EV charging stations, refer to section 9.a. This approach will be helpful but, may not entirely ensure compliance, as it's still possible for users to remove the charging cord and occupy the parking space for the entire working shift. Transportation Services will continue to explore alternative solutions such as text message or email to the user to address the time restriction challenges.

8. Network Connection

VCH Electric Vehicle (EV) charging network currently utilizes a SIM card-based solution provided by an external vendor. The project and planning team is working with the IMIT to integrate all EV chargers into the VCH Health Authority network. The operational manual will be updated once this initiative progresses.

9. Emergency Process

- Theft or vandalism - VCH will not be liable for any loss, harm, injury or death for using the EV Chargers at VCH locations. To promptly address any incidents, contact information for either Transportation Services or the vendor will be visibly displayed for users to report instances of theft or vandalism. Additionally, site security can also be contacted for immediate assistance in notifying and addressing these matters.
- Emergency contacts –
    - Transportation Services:
        - Nav Nijjar, Lead Transportation Services, Contact: navdeep.nijjar@vch.ca or at 778-237-2363
        - Commuter Services, Contact: Commuting@vch.ca or at 604-785-3409
    - Site Security:
        - VGH, LGH and RH

Security non-Emergency / Routine: Dial 4777 or 604-677-3734
Security Emergency / Urgent: Dial 5800 or 604-677-3672

- UBCH
  Security non-Emergency / Routine: Dial 74777 or 604-677-3734
  Security Emergency / Urgent: Dial 27225 or 604-677-3672

10. Revenue and Expenses

a. Revenue Streams:
   i. Time Usage: EV Charging station users pay for the time used to charge their vehicles at Level 3 chargers. Additionally, upon SET's approval, a Level 2 payment structure will be implemented, augmenting revenue potential. VCH is currently is planning to implement the following EV charging rate structure:

Charging Station	**Payment Rate**	**Parking Rates**
Level-3 Charger (60KW)	$0.15 per minute	N/A
Level-3 Charger (120KW)	$0.30 per minute	N/A
Level-2 Charger	$1 per hour	Regular parking rates apply
Monthly Subscription rate applicable to both Level-2 and Level-3 chargers	TBD (Between $30-$60 per month, an evaluation will be completed before finalizing the subscription rate)	Regular parking rates apply for level-2 chargers and parking rates are not applicable for level-3 chargers

   ii. Carbon Credits: VCH will capitalize on carbon credits by applying them for the electrical consumption linked to EV chargers. The Government of BC offers these credits to organizations funding electrical usage for EV charging services, which can be sold to generate operational revenue. Stay tuned for further information from the Ministry regarding this opportunity.

b. Expenses: The manual acknowledges the necessity of an operating budget upon charger installation to facilitate the maintenance and management of EV chargers. The Carbon Neutral Capital Program (CNCP) may present funding opportunities to sustain EV chargers, and EES will coordinate this funding. This budget allocation is essential to ensure seamless operations and upkeep of the charging infrastructure.

11. Data Collection

Transportation Services will work closely with the vendor to monitor the usage of EV charging stations, compile data about energy consumption, and oversee billing and payment systems. This approach will identify opportunities for EV Charging Station enhancements. Additionally, this data-driven strategy aids in understanding EV usage patterns, thereby informing decisions on the necessity for the potential expansion of EV chargers to meet the increasing demand effectively.

Appendix

Type of EV Chargers and Inventory:

	Level 1 Charging (4)	**Level 2 Charging (37)**	**Level 3 Charging (1)**
Electric specifications	120 Volt	208-240 volt	480 volt
Time to fully charge a vehicle	17-25 hours	4-5 hours	30-45 minutes
Range per hour	7-9 km	About 30 km	Most vehicles will get 80% charge in 30 minutes
Locations	LGH – Hope Centre (4)	LGH (3) RH (37) VGH (4)	RH (3 dual port)

Disclaimers:

Legal disclaimer – EV charging users to accept the Legal disclaimer online before the charging session begins:

BY USING THIS ELECTRIC VEHICLE CHARGING STATION (**"STATION"**) OWNED BY VANCOUVER COASTAL HEALTH AUTHORITY (**"VCH"**), I AGREE AS FOLLOWS:

- **VCH'S INSTRUCTIONS.** I WILL USE THIS STATION STRICTLY IN ACCORDANCE WITH VCH'S INSTRUCTIONS.
- **ASSUMPTION OF RISK.** I VOLUNTARILY ACCEPT ANY AND ALL RISKS ASSOCIATED WITH MY USE OF THIS STATION. I UNDERSTAND THAT SUCH RISKS MAY INCLUDE, WITHOUT LIMITATION, PROPERTY DAMAGE (E.G. TO MY ELECTRIC VEHICLE), PERSONAL INJURY, OR DEATH. I AM SOLELY RESPONSIBLE FOR INFORMING MYSELF OF SUCH RISKS.
- **RELEASE.** I RELEASE, WAIVE, AND FOREVER DISCHARGE ANY AND ALL CLAIMS THAT I HAVE OR MAY HAVE IN THE FUTURE AGAINST VCH AND ITS DIRECTORS, OFFICERS, EMPLOYEES, CONTRACTORS, AGENTS, AND REPRESENTATIVES (COLLECTIVELY, **"VCH PERSONNEL"**) IN CONNECTION WITH MY USE OF THIS STATION. I WILL NOT BRING SUCH CLAIMS AGAINST THE VCH PERSONNEL.
- **INDEMNITY.** I WILL INDEMNIFY AND HOLD HARMLESS THE VCH PERSONNEL FROM AND AGAINST ANY AND ALL LOSSES AND DAMAGES SUFFERED OR INCURRED BY THE VCH PERSONNEL RESULTING FROM MY USE OF THIS STATION OTHER THAN IN ACCORDANCE WITH VCH'S INSTRUCTIONS.

Privacy Disclaimer – EV Charging user to accept privacy disclaimer online before the charging session begins:

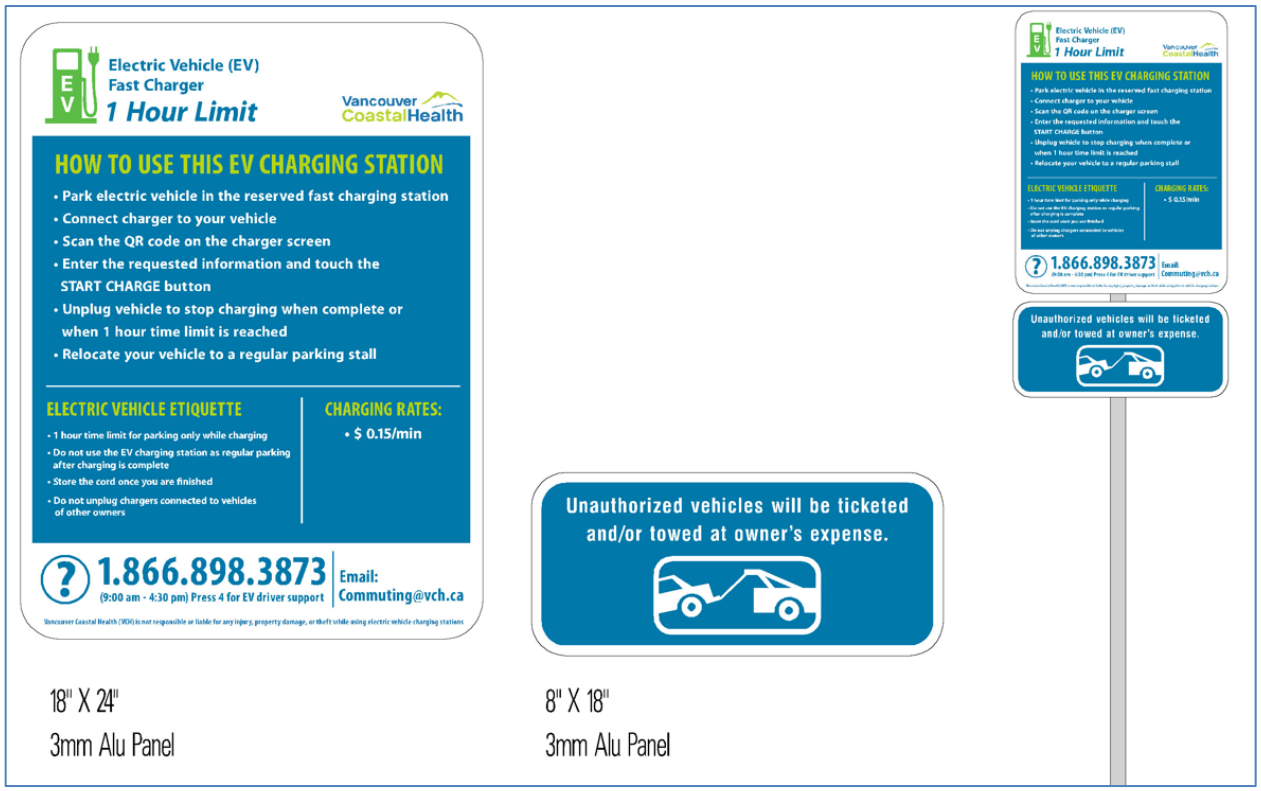
Collection Notice

Electrum Charging Solutions, on behalf of Vancouver Coastal Health (VCH), collects certain personal information from its users for the purpose of administering the charging service and the subsequent payment. This information is collected under section 26(c) of the Freedom of Information and Protection of Privacy Act (FOIPPA) and will only be only be used for the specific purposes outlined.

If you have any questions about the collection or use of your personal information, please contact VCH Privacy at vchinformationprivacy@vch.ca or at 604-875-5568.

Signage:

Level 3 Signage:



HOW TO USE THIS ELECTRIC VEHICLE CHARGING STATION

- Park electric vehicle in the reserved electric vehicle charging station stall
- Connect charger to your vehicle
- Scan the QR code on the charger screen
- Enter the requested information and touch the START CHARGE button
- Unplug vehicle to stop charging when completed and/or when charging time limit of 1 hour is reached
- Relocate your vehicle to a regular parking stall

ELECTRIC VEHICLE ETIQUETTE

- 1 hour time limit for parking only while charging
- Do not use the EV charging station as regular parking after charging is complete
- Store the cord once you are finished
- Do not unplug chargers connected to vehicles of other owners

CHARGING RATES:

- $0.15/min

Level 2 Signage:

Without Usage Fee:
Parking Fees: Charging station users will be responsible for paying the regular parking fees associated with the designated parking area where the EV charging stations are located. These fees will be determined and enforced by Integrated Protection Services or their representative overseeing the parking facilities.

Usage Fees: No additional fees will apply for the time spent using the EV charging stations. Users will be able to charge their electric vehicles free of charge during their parking session.

HOW TO USE THIS ELECTRIC VEHICLE CHARGING STATION

- Park electric vehicle in the reserved electric vehicle charging station stall
- Connect charger to your vehicle
- Scan the QR code on the charger screen
- Enter the requested information and touch the START CHARGE button
- Unplug vehicle to stop charging when completed and/or when charging time limit of 4-hour limit is reached
- Relocate your vehicle to a regular parking stall

ELECTRIC VEHICLE ETIQUETTE

- 4-hour time limit for parking only while charging
- Do not use the EV charging station as regular parking after charging is complete
- Store the cord once you are finished
- Do not unplug chargers connected to vehicles of other owners

CHARGING RATES:

- $0/min
- Pay regular public or staff parking fees

With Usage Fee:
Parking Fees: Charging station users will be responsible for paying the regular parking fees associated with the designated parking area where the EV charging stations are located. These fees will be determined and enforced by Integrated Protection Services or their representative overseeing the parking facilities.

Usage Fees: Additional fees will apply for the time spent using the EV charging stations. Users will be able to charge their electric vehicles by paying a usage fee along with the parking fees.

HOW TO USE THIS ELECTRIC VEHICLE CHARGING STATION

- Park electric vehicle in the reserved electric vehicle charging station stall
- Connect charger to your vehicle
- Scan the QR code on the charger screen
- Enter the requested information and touch the START CHARGE button
- Unplug vehicle to stop charging when completed and/or when charging time limit of 4-hour limit is reached
- Relocate your vehicle to a regular parking stall

ELECTRIC VEHICLE ETIQUETTE

- 4-hour time limit for parking only while charging
- Do not use the EV charging station as regular parking after charging is complete
- Store the cord once you are finished
- Do not unplug chargers connected to vehicles of other owners

CHARGING RATES:

- $1/min
- Pay regular public or staff parking fees

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www.omengineering.
caPermit to Practice No.
1001261

Section- Electrical Performance Specification

Vancouver Coastal Health Electrical Performance Specification For DC Fast Chargers and Level 2 EV Chargers

November 10, 2022
Internal Project Number 22- 041

Submitted by:
O'M Engineering
401 533 Smithe Street Vancouver, BC V6B 6H1
&
528 Carnoustie Drive Kelowna, BC, V1P 1T1

Prepared for:
Ashok Mishra
Vancouver Coastal Health
520 West 6th Avenue

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Performance Specification Executive Summary

O'M Engineering has analyzed and reviewed at various DC Fast Charging (DCFC) and Level 2 EV Charging systems available in the market and has completed a performance specifications in accordance with the requirements set out by Vancouver Coastal Health. A suitable questionnaire had been drawn up to gain an understand of the VCH's requirements for the DCFC. The survey results gathered from the client givea roadmap of what Vancouver Coastal Health is in the market for and helped formulate the performance specifications.

DC fast charging is governed by the North American SAEJ 1772 Combo standard and the Japanese JEVS G105-1993 standard. DCFC stations generally support both standards. All carmakers adhere to one of these standards except for the company Tesla, which has developed a higher performance charging station but can offers a CHAdeMO adapter as an option. Level 2 chargers utilize the J1772 charger or other proprietary charging connectors (ie Tesla).

Typically, customers in business areas are subject to different energy rates for energy associated with EV charging. As the EV chargers will increase the maximum power demand and because rates are subject to change by the power distributor the ideal strategy is to supply the charging stations from a dedicated connection (separate meter and billing) to avoid optimization charges associated with maximum power demand while complying with BC Hydro's Conditions of Electricity Service. Another way to avoid optimization charges when supplying a group of charging stations is to select a model that has a built in energy management system for controlling power demand and charger output.

Below are the questionnaire results for the DCFC and the results of which have been considered in the formulation of these specifications:

Item	Question	Answer
1	KW rating is required for the DCFC?	50-200 kW
2	Is power sharing amongst DCFC acceptable?	Yes
3	Number of charging heads per DCFC?	2
4	Type of charging head(s)?	CCS2 and CHAdeMO
5	Cable length for each charging head?	10-20 ft
6	Preferred communications protocol for chargers?	Wi-Fi and Cellular
7	DCFC activation preference?	Mobile App/ RFID/ Credit Card
8	Open charge point protocol (OCPP) compliant chargers required?	Yes
9	Do DCFCs need billing and credit card processing capabilities?	Yes
10	Remote monitoring for troubleshooting, charger faults and customer support required?	Yes

1.0. DC Fast Charger Electrical Specifications

The Performance Specifications for the DC Fast chargers which the Vancouver Coastal Health require will be highlighted in the sections below. The sections which will be discussed below are as follows:

- Power Specific - AC Input and DC Output
- User Interface and Control
- Communications
- Mechanical specifics

1.1. AC Input and DC Output

The Power Specification will include both the AC Input power and the DC Output power specifications needed for the client. The client would like multiple DC Fast Chargers on the Vancouver Coast Health's premises with the following electrical characteristics:

AC Voltage:	480V AC
Phase	3 + neutral (4 wire + bond)
Input Frequency:	60 Hz
Input voltage Tolerance:	+10% to -15% of nominal
Power Input:	50kW – 200kW
Power factor:	96% or better
Efficiency (at max output power):	92% or better
Harmonics	<5% iTHD (comply with IEEE 519)
DC output voltage:	50V to 500V
DC voltage accuracy:	+/- 2%
Energy Management:	Yes, built into unit

DCFC may be separate units for each output rating or, preferably, a scalable system with standard sized power modules. The unit shall have electrical isolation between input and output internal wiring and circuitry.

The unit shall have built in energy management systems to share power between the two charging connectors on each unit, or with other stand-alone DCFC. The DCFC shall be capable of providing simultaneously charging for two electric vehicles and be able to dynamically manage the power distribution.

1.2. User Interface and Control

The User Interface and Control involves the inclusion of the display and function buttons.

Screen size:	7-inch, or equivalent
Touch Screen:	Yes, preferred
Emergency Stop Button:	Yes

The DCFC should have at least a 7-inch display which is easily accessible and clear for all customers. There shall also be function buttons such as operational buttons and an emergency stop which should be clearly labelled.

1.3. Communications

Communications involves the External and Internal connections in the DC fast chargers. The external connection needed are stipulated below while the Internal connection must have a CAN bus as standard.

External Ethernet Communications Protocols:	hardwired ethernet and Wi-Fi,
External cellular Communications Protocols:	3G, 4G or LTE
Other Communications Protocols:	BACnet IP
OCPP compliant:	Yes. Version 1.6 and upgradable to 2.0 and beyond.
Card reader:	Yes, built in utilizing NFC/RFID technology.
In Vehicle Authentication:	Yes
Payment processing:	Shall support Visa, MasterCard, paypal (via app) and option of integrated magnetic strip and chip based payment options
Payment Regulatory Standard:	PCI Compliancy
Charger Activation	Via touchscreen, Android/IOS devices or proximity cards (HID)
Push Notifications	Must have the ability to send push notifications to mobile phones

The DCFC shall be capable of networked or standalone operations.

Software shall be capable of user authentication, metering, billing, running diagnosis and remote management. Software and firmware updates shall be done "over the air" and not impede use of charger while updating.

Customers shall be able to access DCFC via mobile app or RFID System and shall be able to provide user with real time updates and notifications.

1.4. Mechanical Specifics:

The Mechanical Specifications are also important as they can include the general construction of the DCFC, charging connectors, cable length, cabinet dimensions and even the cooling method of the fast chargers. The two most common EV chargers include the CHAdeMO and the CCS1.

DCFC Casing:	NEMA Type 3R
Casing Material	Aluminum
Vandal Resistant:	Yes
Operating Temperature:	-30°C – 50°C
Humidity Tolerance:	Up to 95% (non-condensing)
Impact Rating	IK-10
Charging connections per DCFC:	2
Charging Connectors:	CCS1 and CHAdeMO (one of each)
Cable length:	6.1m (20') minimum
Cable management	Yes retracting type
Noise Level	53db or less
Fixing type	Pedestal style

It is preferred the DCFC also have a customizable partner panel for branding and company logo.

2.0. Level 2 Charger Electrical Specifications

The Performance Specifications for Level 2 chargers which the Vancouver Coastal Health require will be highlighted in the sections below. The sections which will be discussed below are as follows:

- Power Specific - AC Input
- User Interface and Control
- Communications
- Mechanical specifics

2.1. AC Input

The Power Specification will include the AC Input power specifications needed for the client. The client would like multiple Level 2 Chargers on the Vancouver Coast Health's premises with the following electrical characteristics:

AC Voltage:	208V AC
Phase	1 (2 wire + bond)
Input Frequency:	60 Hz
Input voltage Tolerance:	+5% to -5% of nominal
Power Input:	up to 7.2kW
Energy Management:	Yes, built into unit (minimum 4:1 load sharing)

The unit shall have built in energy management systems to share power between the charging connectors on each unit, or with other stand-alone level 2 chargers. The chargers shall be capable of dynamically manage the power distribution.

2.2. User Interface and Control

The User Interface and Control involves the inclusion of the display and function buttons.

Touch Screen:	LCD display preferred, but not required
Display:	LCD display preferred, but not required

The chargers shall have status LED indicator lights as a minimum if no LCD display is provided. Readouts shall be easily accessible and clear for all customers.

2.3. Communications

Communications involves the External and Internal connections for the chargers. The external connection needed for the specific chargers must have an Ethernet, Wi-Fi and cellular connection as standard.

External Ethernet Communications Protocols:	hardwired ethernet and Wi-Fi,
External cellular Communications Protocols:	3G, 4G or LTE
Other Communications Protocols:	BACnet IP (for data gathering)
OCPP compliant:	Yes. Version 1.6 and upgradable to 2.0 and beyond.
Card reader:	Yes, built in utilizing NFC/RFID technology.
In Vehicle Authentication:	Yes
Payment processing:	Shall support Visa, MasterCard, paypal (via app) and option of integrated magnetic strip and chip based payment options
Payment Regulatory Standard:	PCI Compliancy
Charger Activation	Via charger, Android/IOS devices or proximity cards (HID)
Push Notifications	Must have the ability to send push notifications to mobile phones

The charger shall be capable of networked or standalone operations.

Software shall be capable of user authentication, metering, billing, running diagnosis and remote management. Software and firmware updates shall be done "over the air" and not impede use of charger while updating.

Customers shall be able to access charger via mobile app or RFID System and shall be able to provide user with real time updates and notifications.

2.4. Mechanical Specifics:

The Mechanical Specifications are also important as they can include the general construction of the charger, charging connectors, cable length, etc.

Casing:	NEMA Type 3R
Casing Material:	Aluminum
Vandal Resistant:	Yes
Operating Temperature:	-30°C – 50°C
Humidity Tolerance:	Up to 95% (non-condensing)
Impact Rating	IK-10
Charging connections per charger:	single or double
Charging Connectors:	SAE J1772
Cable length:	6.1m (20') minimum
Cable management	Yes retracting type
Noise Level	53db or less
Fixing type	Pedestal or wall mounted

It is preferred the charger also have a customizable partner panel for branding and company logo.

3.0. Warranty Requirements

Proponent shall provide a 5 year extended manufacturer warranty and services maintenance plan from day of substantial completion of project, issued by Project Consultant for both Level 2 and DCFC. Include extended warranty and service maintenance cost for total number of EV charger per site. **This cost is to be considered as part of base price per site.** Provide unit price per charger for extended warranty and service maintenance plan for future reference.

Proponent shall clearly note any exclusions if applicable with regards to warranty/maintenance.

Vendor/Contractor shall respond within 24 hours of problem reported and make all efforts to fix the issue within 72 hours after problem is reported.

For the service maintenance plan, include two maintenance site visits per year (spring and autumn) for each site. Each maintenance site visit shall consist of review and analysis of installed EV chargers and associated EV charging infrastructure. Test sheet shall be submitted to VCH designate upon completion of each site maintenance visit. Test sheet to include diagnostic test of applicable EV charger and EV infrastructure."

4.0. Regulations:

The chargers shall comply with the following certifications and/or regulations:

CSA 22.2 No 281.12 Standard for Safety for Personnel Protection Systems for Electric Vehicle(EV) Supply Circuits: General Requirements

CSA 22.2 No 107.1-16 Power Conversation Equipment

cUL 2202 Standard for Electric Vehicle (EV) Charging

System Equipment FCC Part 15 Radio

Frequency Devices

EN 61851 Electric Vehicle Conductive Charging System Part 1: General Requirements

UL 2231-1 Personal Protection Systems for Electric Vehicle (EV) Supply Circuits; Part 1: General Requirements

UL 2231-2 Personal Protective Systems for Electric Vehicle (EV) Supply Circuits: Particular Requirements for Protection Devices for Use In Charging Systems.

UL 2594 Standard for Electric Vehicle Supply Equipment

5.0. Proponent Qualifications

The successful proponent shall supply and install the Level 2 and DCFCs. The proponent shall provide information relating to or demonstrate the following in their proposal:

1. Provide overview of company qualifications, experience and relevant projects where DCFC were locally supplied and installed.

2. Provide resume and qualifications of key personnel along with time with firm.

3. Provide details of the ability and capacity to provide local support for servicing, repairs, etc
    - Service centre or technicians shall be located in the Greater Metro Vancouver Area
    - Indicate typical dispatch and repair times.
    - Typical fee structure for servicing plan.

4. Have the ability to program in house or via external forces a customized dashboard to display energy consumption, GHG saving, etc. Dashboard

may be displayed locally or via the internet on desktop or mobile devices

5. Provide general pricing for Level 2 and DCFC of various sizes. Proponents will not be held tothese prices and VCH will solicit quotes on individual project basis.