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Circuit**

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## 4,500-Charging Station Grant Program - **Charging Station Installation Guide**

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## Definitions

### SmartTwo charging station for parking lot

The SmartTwo charging station is available on a pedestal or wall mounted, in single or double set-up. This type of charging station must be connected to an existing electrical distribution panel. Only one electric vehicle at a time can be charged on a SmartTwo charging station (see Photo 1).

### Curbside charging station

An assembly made up of two 240-V charging stations, mounted on a central mast with a recharging cable retraction system and including all equipment required to charge two electric vehicles simultaneously (see Photo 2).

### Primary curbside station

A primary curbside station is required for all new installations. This charging station contains telecommunication equipment. In the case of a new connection on the local distributor's network, the housing also encloses the distribution panel and meter.

### Secondary curbside station

The secondary curbside station must communicate with the primary station. In the case of a new service loop, the power supply of the secondary curbside station is through the distribution panel of the primary charging station.

### Overhead-underground junction (or junction)

An overhead-underground junction is necessary for any new service loop to the overhead system. Connection of the overhead portion to the underground portion of the circuit must be done on the pole closest to the primary curbside station.

### Distributor

The organization responsible for the distribution system of the power company for the territory where the charging stations are installed. For most of Québec, it is Hydro-Québec. However, certain municipalities are served by local companies, e.g., Hydro-Sherbrooke and Hydro-Joliette.



Photo 1: SmartTwo charging station



Photo 2: Curbside charging station

## Connection to an existing electrical installation

The installation must comply with the *Québec Construction Code* – Chapter V, Electricity. Connecting to an existing electrical installation consists of adding new equipment to the current electrical installation of a building (see Figure 1).

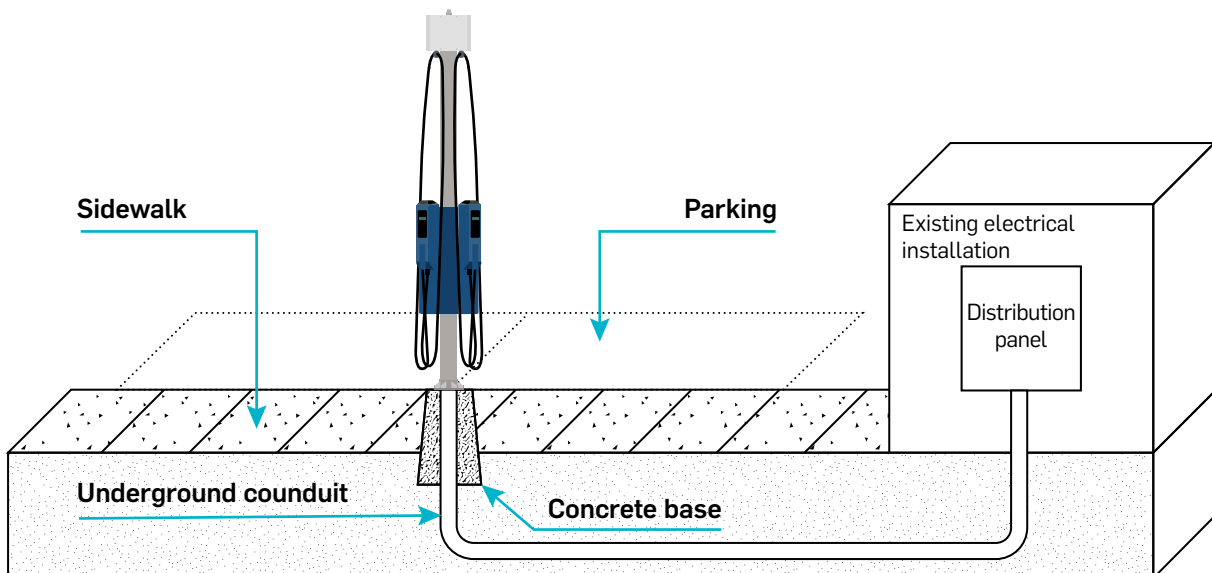
The distance between the existing electrical installation and the location of charging stations must be as short as possible to reduce costs. Preferably, the trench for the underground conduit should be dug in an unpaved or grassy area to reduce the cost of repairing a concrete or asphalt sidewalk. An additional conduit must also be installed from the distribution panel of the electrical installation to the secondary curbside station.

When installing a wall-mounted SmartTwo charging station, the underground conduit may not be necessary. The master electrician responsible for the work must determine the method to be used to connect the wall-mounted charging station to the existing distribution panel.

The existing electrical installation, which cannot be a public lighting power installation, must have its own meter. This meter will be used for the charging stations; therefore adding a new meter is unnecessary.

It is essential that a master electrician analyze this type of connection beforehand. The master electrician will be able to determine whether an existing distribution panel can be modified to allow charging stations to be added, or if it will necessary to add a panel to the existing electrical installation.

**Figure 1: Connection to an existing electrical installation**





## New connection (curbside stations only)

Installation must comply with the *Québec Construction Code* — Chapter V, Electricity, and with the Hydro-Québec Standard E.21-10, *Low-Voltage Electrical Service*, commonly called the “Blue Book.”

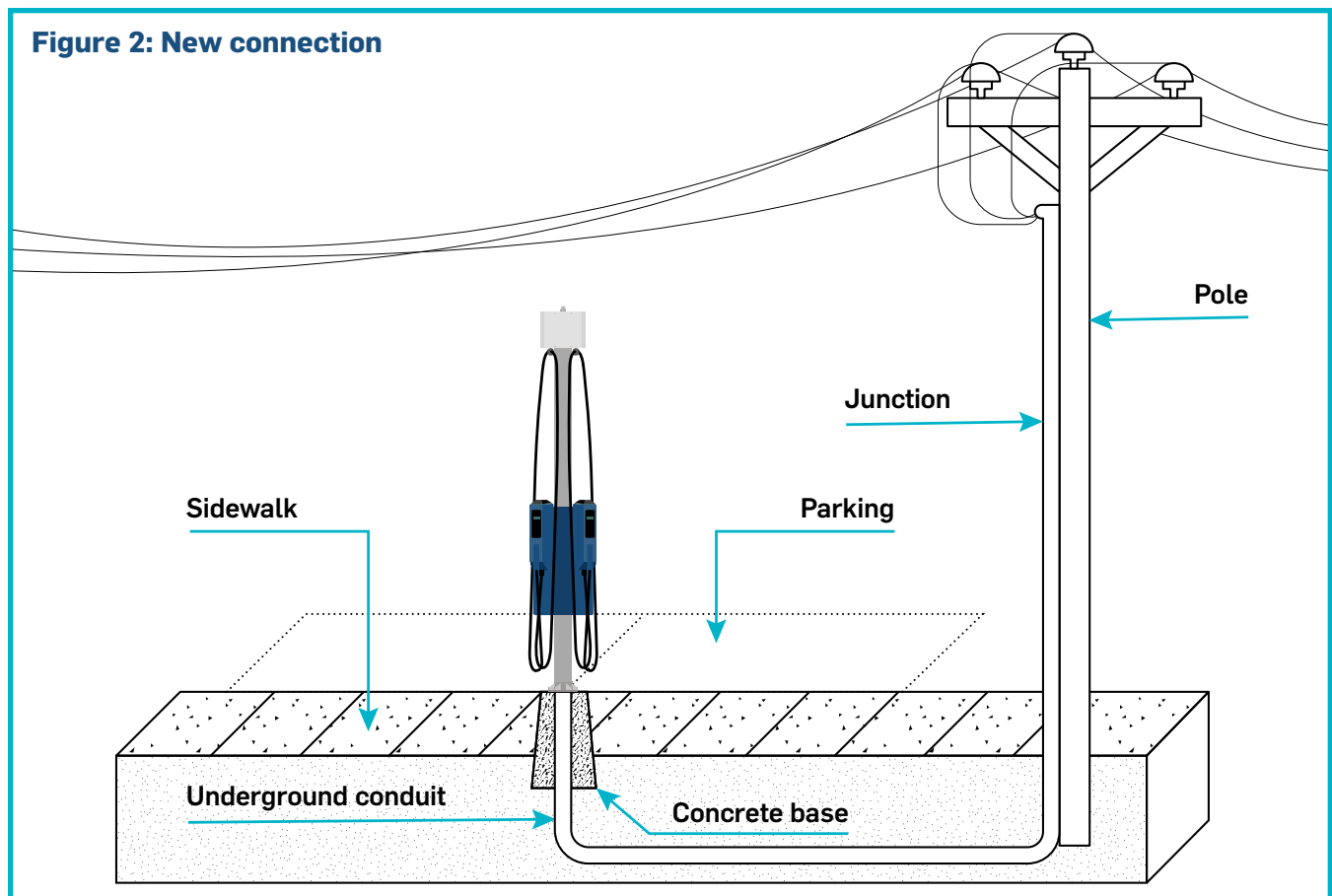
For a new connection, a new service loop must be added to the network of the distributor (see Figure 2). Charging stations have their own meter and own electricity bill. This single meter is integrated into the primary curbside station and can provide measurement for two secondary curbside stations, for a total of six charging ports.

All secondary curbside stations must be connected to the primary charging station by a conduit. Preferably, the trench for this underground conduit should be dug in an unpaved or grassy area to reduce the cost of repairing a concrete or asphalt sidewalk. The distance between the pole

and the location of charging stations must be as short as possible to reduce costs.

The distribution pole targeted must be able to receive a new junction, which a representative of the distributor will be able to confirm. The addition of a new pole belonging to the customer may prove necessary to reduce the length of the trench or to allow the installation of a junction if the distributor’s pole cannot accommodate a new one.

In areas without an underground system, this type of connection is possible. This way, the integration of new curbside charging stations is more discreet. However, related costs could be considerably higher and involve longer lead times. A representative of the distributor will have to perform an on-site analysis to confirm whether this is possible and, if so, determine the extra lead time to be expected.



# Installation work

## Civil engineering

### Pole (new connection only)

If no distributor's pole near the future charging stations can receive a new junction, a new pole for the overhead service loop will have to be installed, in accordance with the standards. The distributor's representative will be able to confirm whether this is necessary in their connection feasibility assessment.

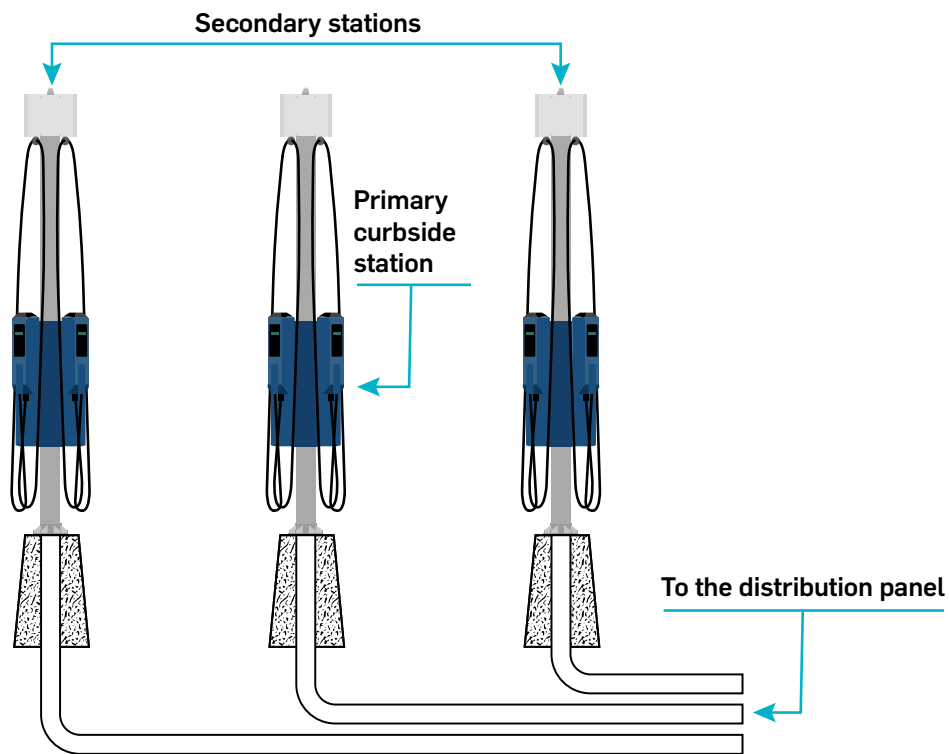
### Trench

A trench approximately one-metre deep will have to be dug at the supply point and at the location planned for the primary curbside station. Conduits containing the charging station power supply cables will be buried there.

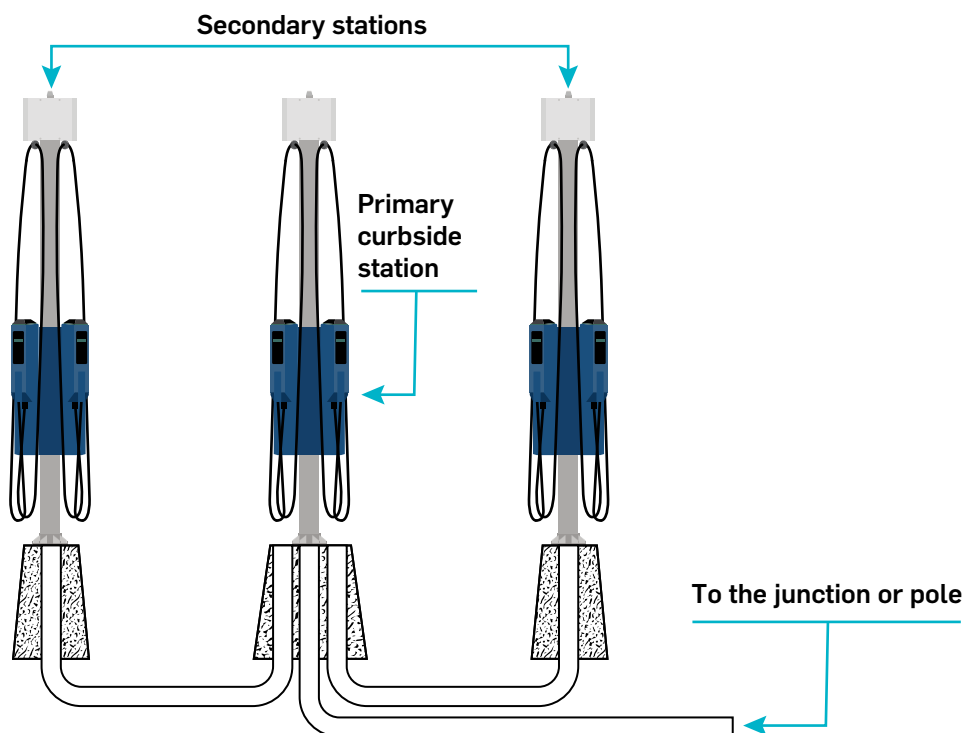
In the case of connection to an existing installation, the trench will also have to allow connection of the primary curbside station and each secondary station to the distribution panel. (see Figure 3, page 6).

In the case of a new connection, a trench will also have to be dug to allow connection of the secondary curbside stations to the primary station (see Figure 4, page 6).

**Figure 3: Trench for connection to an existing installation**



**Figure 4: Trenches for a new connection**



# Installation work

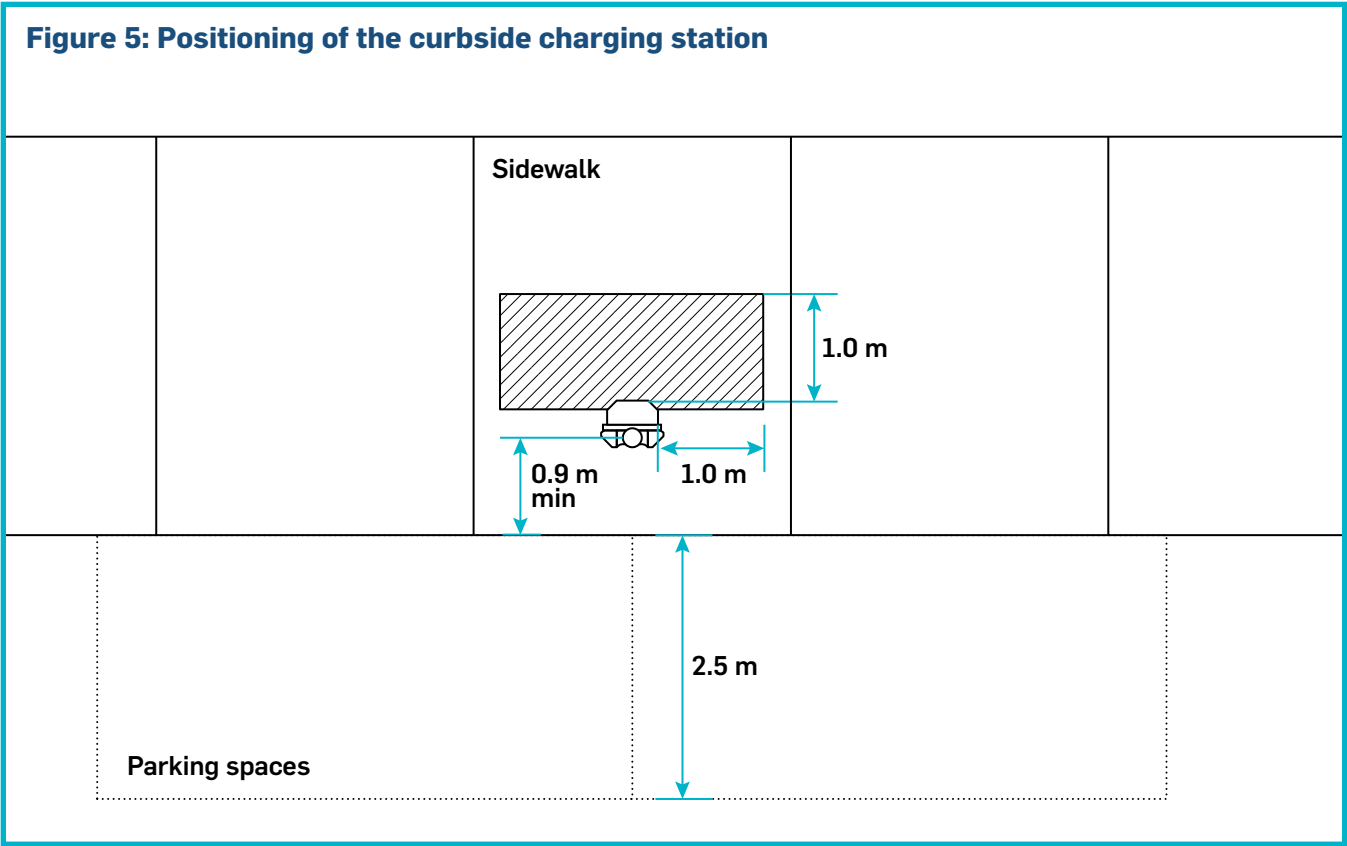
## Civil engineering (continued)

### Base for curbside station

A concrete base must be installed to support the curbside charging station. This base must contain the service conduit. It could either be poured on site or precast. It is advisable to proceed using drawing DNI-4A-105 in the Ville de Montréal’s standardized technical document *Travaux de structure et massif de conduits* (<https://ville.montreal.qc.ca/executiontravaux/etapes/famille-4-travaux-de-structure-et-de-massif-de-conduits>) (in French only).

The base must be installed according to the following two constraints (see Figure 5):

- ▶ One-meter behind and on each side the charging station must be free of obstructions at all times.
- ▶ The centre of the mast body of the charging station must be at least 0.9 m from the edge of the sidewalk.





# Installation work

## Civil engineering (continued)

### Base for SmartTwo charging station

#### Pedestal

For the installation of a SmartTwo charging stations on a pedestal in a parking lot, a prefabricated anchor is offered by the supplier, AddÉnergie. This anchor requires a prefabricated or poured concrete base with a hole to pass the power supply cable through. The positioning, sizing and specification of the concrete base must be done according to the supplier's instructions available at [addenergie.com/download/7695/](https://addenergie.com/download/7695/)

#### Wall mount

The installation of a wall-mounted SmartTwo charging station requires a clear height of at least 2160 mm. Clearance of at least 740 mm is required under the station and the nozzle must be at a height of between 915 mm and 1015 mm from the ground.

The supplier's instructions for installing a wall-mounted SmartTwo station are available at [addenergie.com/download/7674/](https://addenergie.com/download/7674/)

#### Signage

A sign reading "Réservé pour véhicule électrique en recharge" (reserved for electric vehicle charging) should be installed near charging stations.

# Installation work

## Electricity

### New connection (curbside installation only)

Charging station manufacturer's installation guide (Guide d'installation du fabricant des bornes)

The master electrician responsible for the work must submit a written connection request and statement of work to their distributor. In the case of Hydro-Québec, this is done by means of a form *Request for service* (<https://www.hydro-quebec.com/business/customer-space/request-work/request-connection.html>).

To complete the connection request, the master electrician must know the street address of the location of the curbside charging stations as well as the available power of the charging stations installed, i.e., 15 kW per curbside station.

On the connection request form, the electrician must:

- ▶ at item 9, check off the box “Autre” and enter “Borne de recharge – Projet 4500”
- ▶ at item 26, enter “Borne de recharge – Projet 4500” as well as the number (CEA-XXXXX) of each station covered by the connection request.

The statement of work is submitted after installation of charging stations to indicate that the distributor's teams can proceed with connection.

### Connection to the overhead system

For new connections to the distributor's overhead system, a junction must be installed on the pole closest to the projected location of the primary charging station.

### Connection to the underground system

Connections to the underground system must be planned jointly with the distributor's person responsible for that system.

### Supply of conduits and cables

The master electrician must supply conduits of sufficient diameter as well as cables of adequate gauge for the entire distance between the point of connection to the system and the projected location of the primary charging station. They must also supply the conduits and cables needed for secondary curbside stations.

### Connection to an existing installation (SmartTwo and curbside charging stations)

#### Installation study

For each SmartTwo charging station, the master electrician must confirm whether it is possible to add two 40 A circuits (without neutral) to an existing 240 V distribution panel.

For each curbside charging station, the master electrician must confirm whether it is possible to add four 40 A circuits (without neutral) to an existing 240 V distribution panel. If no panel can receive the new equipment, a new panel could be installed. The addition of a panel may also reduce the distance between the distribution panel and the new charging stations.

### Supply of conduits and cables

The master electrician must provide conduits of sufficient diameter and cables of adequate gauge, then install them along the entire length separating each charging station on the distribution panel of the existing electrical installation.

# Installation work

## Electricity (continued)

### Installation of a charging station

A lifting device will be needed to place the charging station onto the previously installed concrete base.

### Installation of the communication gateway (SmartTwo charging station only)

An external communication gateway must be installed within 48.7 m (160 ft) of the SmartTwo charging station. This communication gateway is powered by a 120 V power outlet. You can find the supplier installation instructions for the communication gateway at [addenergie.com/download/7691/](https://addenergie.com/download/7691/)

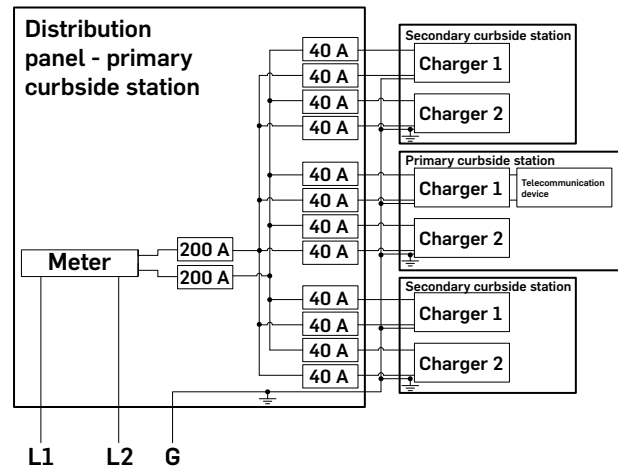
### Connection of the charging stations

The master electrician must then connect the equipment according to the instructions of the charging station manufacturer (see Figure 6 for a new connection or Figure 7 for a connection of an existing installation). Measurements will have to be taken several times to ensure that the electricity service of charging stations is adequate to charge electric vehicles.

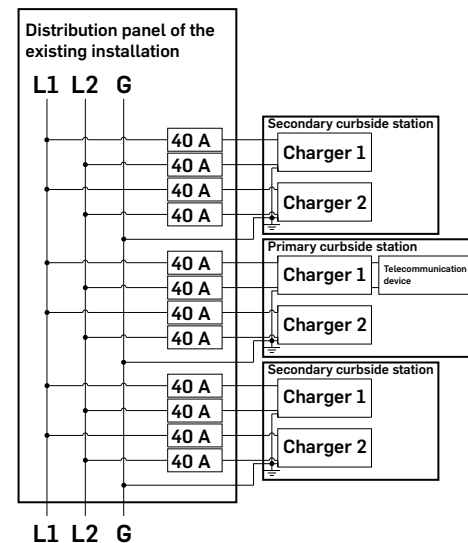
## Commissioning

Once the system is powered, the contractor must call the manufacturer of the charging station so they can commission it. The manufacturer will register the new equipment in its charging station management system and confirm the operation of the equipment and quality of the telecommunications link.

**Figure 6: Cabling diagram – new connection**



**Figure 7: Cabling diagram – connection of an existing installation**



## Additional reference materials

### ***Electric Vehicle Charging Stations – Technical Installation Guide***

Chapters 5 and 6 of this guide apply directly to the installation of charging stations, but earlier chapters are particularly relevant for novices.

<https://www.hydroquebec.com/data/electrification-transport/pdf/technical-guide.pdf>

### **Hydro-Québec Blue Book Low-Voltage Electrical Service – Standard E.21-10**

This document describes in detail the standards to be followed for new connections.

<https://www.hydroquebec.com/documents-data/official-publications/standard-blue-book.html>

### **Curbside charging station manufacturer's installation guide (Guide d'installation du fabricant des bornes)**

Various information required to handle, connect and commission the equipment is found in this document.

<https://addenergie.com/download/7638/>

### **SmartTwo charging station manufacturer's installation guide**

All the information required to handle, connect and commission the SmartTwo charging station is found in this document.

<https://addenergie.com/download/7674/>

### **Communication gateway manufacturer's installation guide**

All the information on communication gateway installation is found in this document.

<https://addenergie.com/download/7691/>

### **Request a connection page on the Hydro-Québec website**

This page describes the process to request a connection from Hydro-Québec.

<https://www.hydroquebec.com/business/customer-space/request-work/request-connection.html>

## Steps for completion

The table below indicates the various technical steps to be followed and estimates of lead times to expect for critical steps. Nonetheless, additional lead time should be allowed for administrative approvals. It must therefore be added in the final calculation.

Stage	Details
<b>1 - Site selection</b>	<ul style="list-style-type: none"> <li>▶ To be completed by the municipal official, with the master electrician, considering the proximity of the power grid</li> </ul>
<b>2 - Request confirmation of the connection point by the distributor*</b>	<ul style="list-style-type: none"> <li>▶ Maximum lead time of three weeks for a new connection to the overhead system</li> <li>▶ For a connection to the underground system, this lead time could be eight weeks</li> </ul>
<b>3 - Charging station procurement</b>	Timeline for delivery: <ul style="list-style-type: none"> <li>▶ SmartTwo charging station: 8 to 16 weeks</li> <li>▶ Curbside charging station: 16 weeks or more</li> </ul>
<b>4 - Preparation of civil and electrical engineering plans</b>	<ul style="list-style-type: none"> <li>▶ To be done by the contractor</li> </ul>
<b>5 - Design of connection by the distributor*</b>	<ul style="list-style-type: none"> <li>▶ Allow lead time of between two and 10 weeks for an overhead system connection</li> <li>▶ For an underground system connection, allow lead time of between four and 20 weeks (from receipt of the request for electricity service)</li> </ul>
<b>6 - Preparation of drawings and specifications</b>	<ul style="list-style-type: none"> <li>▶ To be completed by the master electrician</li> </ul>
<b>7 - Civil engineering work</b>	<ul style="list-style-type: none"> <li>▶ Installation of the concrete base and excavation of trenches</li> </ul>
<b>8 - Installation of charging stations</b>	<ul style="list-style-type: none"> <li>▶ To be completed by the master electrician</li> </ul>
<b>9 - Connection by the distributor*</b>	<ul style="list-style-type: none"> <li>▶ Allow lead time of between two and 10 weeks for an overhead system connection</li> <li>▶ For an underground system connection, allow lead time of between four and 40 weeks (after receipt of the statement of work)</li> </ul>
<b>10 - Commissioning and final survey</b>	<ul style="list-style-type: none"> <li>▶ To be done by the master electrician or an employee of the municipality, ideally with an electric vehicle</li> </ul>

\*Applies only to new connections

## Comparison of types of connections

	New connection (curbside installation)	Connection to an existing installation (off street installation of SmartTwo or curbside charging station)
<b>Lead time</b>	Intervention by several teams of the distributor will be necessary. Lead times must be allowed for between each step (cf. previous table).	All work can be done by contractors who will be able to coordinate among themselves to achieve rapid execution.
<b>Electricity and telecommunication charges</b>	Each primary curbside station must be equipped with a meter and associated with its own electricity and telecommunication bill.	Consumption from charging stations could affect the bill associated with the existing meter. A master electrician will be able to evaluate the impact on the bill. Each primary charging station will have its own electricity bill.
<b>Choice of site</b>	A new connection will make it possible to add charging stations to all locations served by the distributor's system. The distributor can nonetheless require additional fees.	Access to an existing distribution panel. Make sure that this panel will be able to supply four single SmartTwo charging stations or two curbside charging stations.
<b>Installation costs</b>	The cost will vary, depending on the distance between the last pole of the distributor and the primary curbside station as well as the extent of restoration work on the route of the trench. Additional costs should be expected for an underground system connection.	Costs will vary depending on the distance and complexity of access to the existing panel.
<b>Complexity of the project</b>	The distributor's teams, in communication with the master electrician, will be able to provide assistance during the connection process. Coordination between the teams of the distributor and the master electrician will reduce lead times.	The complexity depends on the characteristics of the existing installation. If an outdoor panel is found near the location desired, the entire process could be very easy. The work evaluation and analysis of charges must be done by the master electrician. Such a project does not require distributor intervention.



**For more information,**

please email us at [programme4500bornes@hydroquebec.com](mailto:programme4500bornes@hydroquebec.com) or consult our FAQ.

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