

West End Substation



Welcome

West End Substation



It's our job to keep the lights on

Our electricity system in downtown Vancouver is aging and needs upgrades. We need a new substation in the West End to ensure we continue to keep electricity flowing.

Our plan to continue supplying safe and reliable electricity to downtown Vancouver.

In exploring options for the future of our power system, we've identified a need for up to three new substations within the next 30 years. New substations in the West End and East Vancouver, combined with upgrades to our existing transmission system, would allow us to decommission Dal Grauer and Murrin substations within the next 12 years.

We need to decommission these aging substations as soon as possible as they're nearing end-of-life and it's not practical to rebuild them where they are. Both stations are also susceptible to significant damage from a major earthquake.

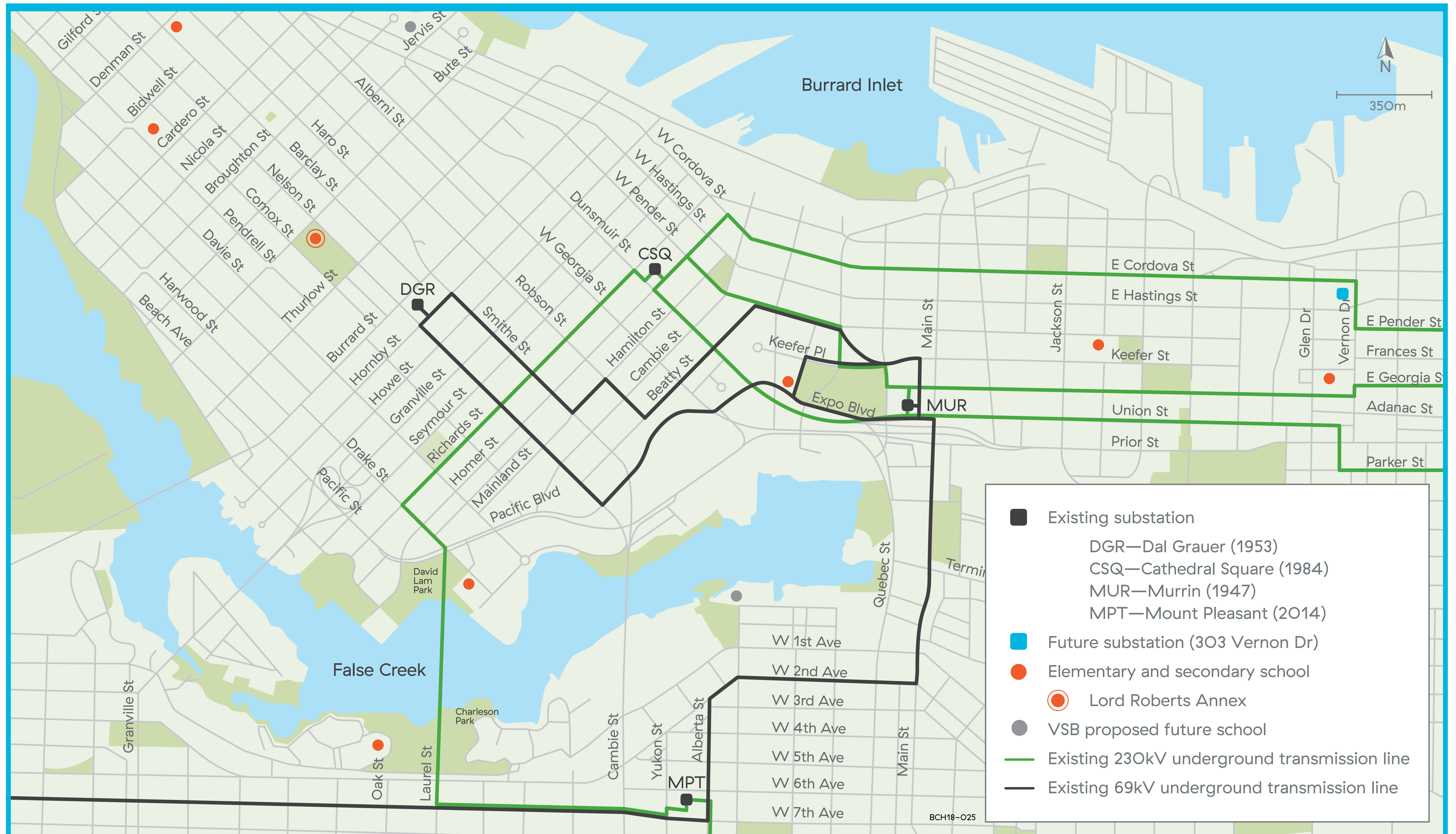
What's a substation?

Substations are a critical link between our electricity system and your light switches and sockets. They reduce the high voltage used in our big power lines to a lower voltage for use in your homes and businesses.

A new West End Substation would receive electricity at a voltage of 230 kilovolts and send it out into your community at a voltage of 12 and 25 kilovolts.



Downtown Vancouver Electricity Supply

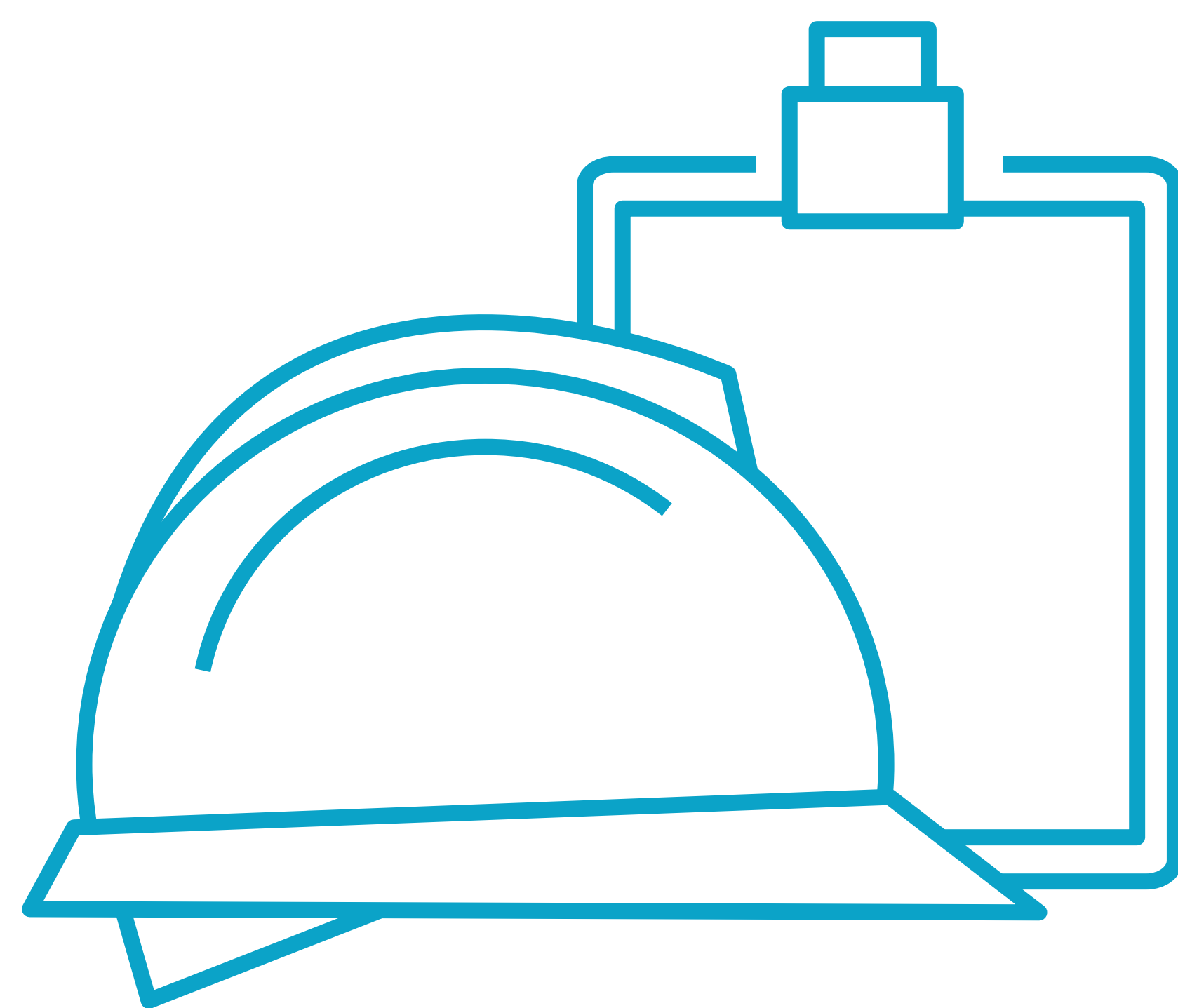


Our traditional approach

Our traditional approach to developing new substations is to determine where they're needed, search for appropriate sites, and then build them above ground.

In the West End, this approach would mean that a new indoor substation would need to be located within three to four blocks of Lord Roberts Annex, taking up almost half a city block like the Mount Pleasant Substation or Dal Grauer Substation.

We think our proposal for the Lord Roberts Annex is a better solution, as it would benefit the Vancouver school community, protect limited housing stock in the West End and result in an out-of-sight underground substation. We recognize that the West End neighbourhood is a unique one, and we think it's the right fit for a different approach.



Why can't BC Hydro build a West End Substation underground if they purchase a property?

To build a substation somewhere else, we'd need to buy the property outright, at a premium price, instead of only securing underground property rights. The additional cost of building underground, on top of the property purchase price, wouldn't be justified for our ratepayers.

Compared to our traditional approach, the business case for the Lord Roberts Annex proposal is cost neutral. By securing underground property rights rather than buying private property, we could justify the increased costs of building underground.

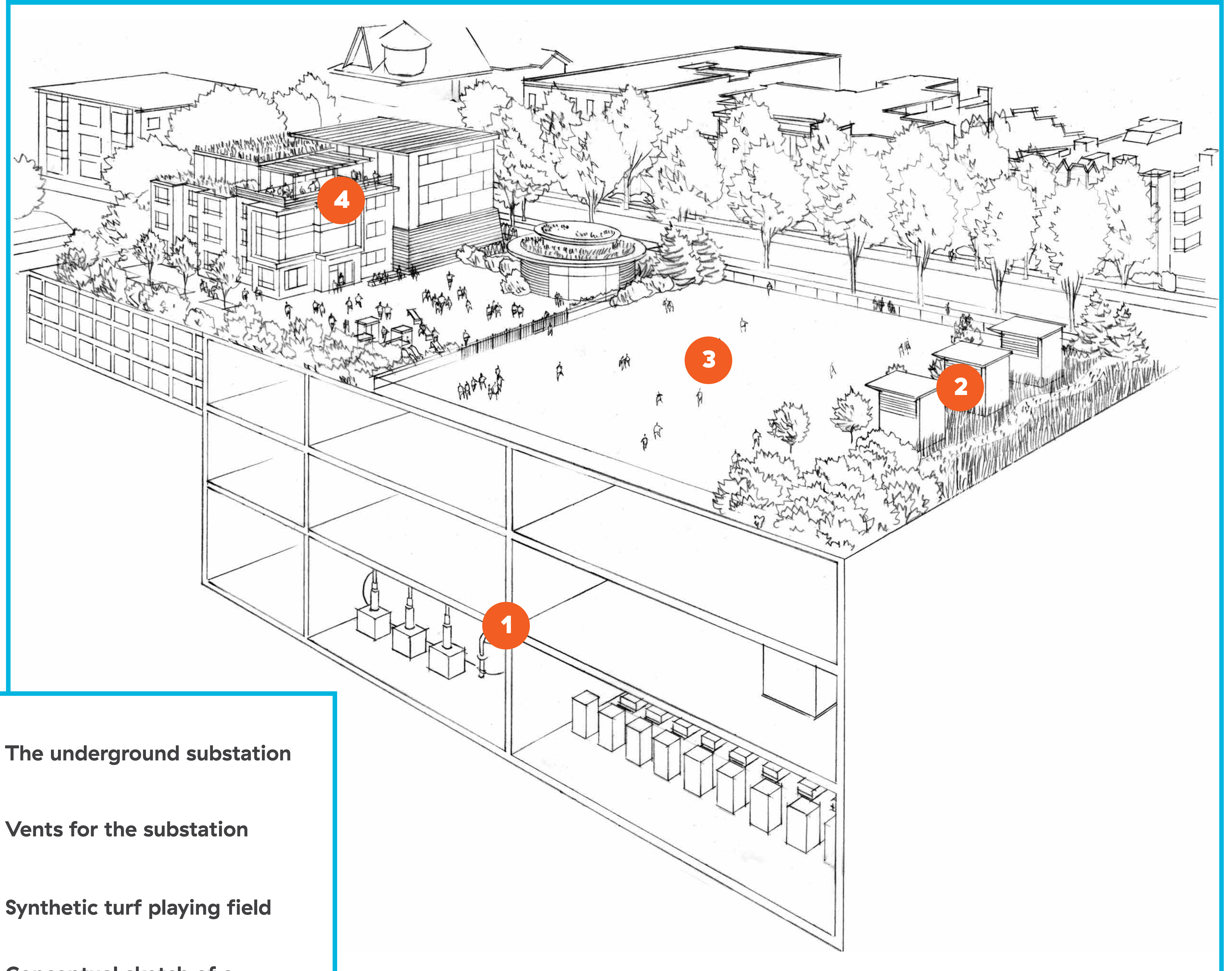
Our proposal

We've approached the Vancouver School Board (VSB) to re-visit our proposal of an underground West End Substation at the Lord Roberts Annex property. Working together with VSB, we're bringing this idea back to local parents and the community to see what you think.

We would offer fair market value compensation in exchange for the underground property rights needed to build our substation. If the proposal is accepted, it will provide VSB with funding to build a new Coal Harbour school sooner, where Lord Roberts Annex students would be relocated before substation construction at the Lord Roberts Annex property begins.

At the Lord Roberts Annex property, it would result in an out-of-sight underground substation, topped with a synthetic turf playing field, and allow for construction of a new elementary school after the substation is complete.

Artist's rendering of what our proposal could look like at the Lord Roberts Annex property



- 1 The underground substation
- 2 Vents for the substation
- 3 Synthetic turf playing field
- 4 Conceptual sketch of a new elementary school, to be built by VSB after the substation is complete.

What's changed?

In early 2017, we consulted the West End community on the idea of building a substation underground at the current location of Lord Roberts Annex, adjacent to Nelson Park. These discussions also included a proposal to build another substation underground at Emery Barnes Park (Yaletown).

Through the process we had good participation from the public. There was support and interest in further exploring the possibilities of this shared land use proposal, with more than half of respondents indicating that they preferred this new approach over our traditional approach.

Since 2017, we've continued to look for suitable properties, however, we still believe in this option and the community benefits it can deliver, and think it's worth exploring one more time. However, there are some changes we've made from our proposal last year.

We're focused on the West End

The need to find a site for the West End Substation remains a top priority. A new West End Substation will ensure we continue to deliver reliable power to the growing downtown core. We'll revisit what is needed in Yaletown once new substations are built in the West End and East Vancouver.



We have a little more time

After our 2017 proposal didn't go forward, we purchased a property in East Vancouver for a future substation. Building an East Vancouver Substation first has become a "Plan B" option for us, that will take some pressure off the system serving downtown Vancouver, giving us more time to secure the right site for a West End Substation.

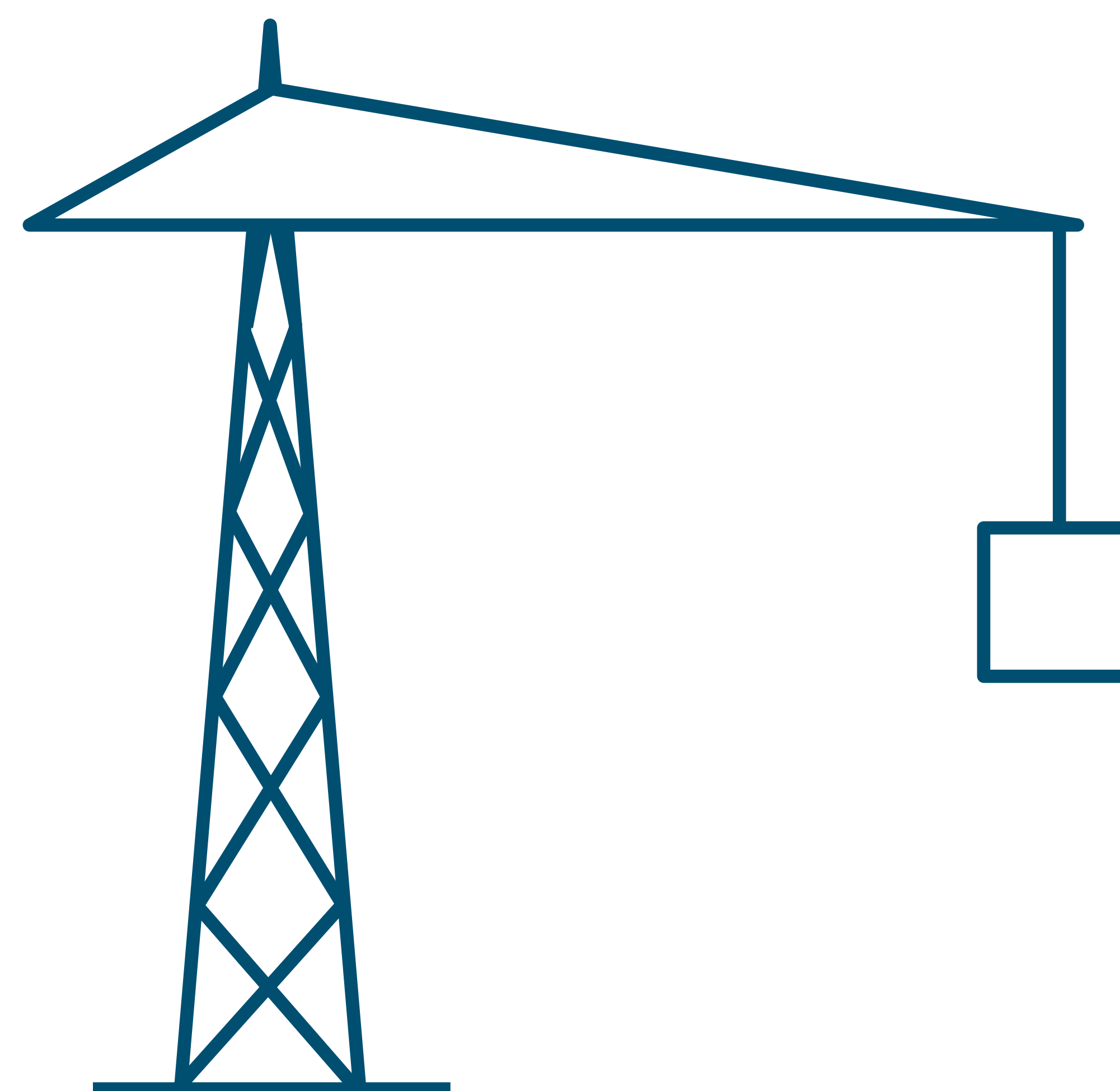
Construction impacts

We know that the construction of a substation in the West End would have temporary impacts on those who live, work, play and learn in the community, just like any other construction project.

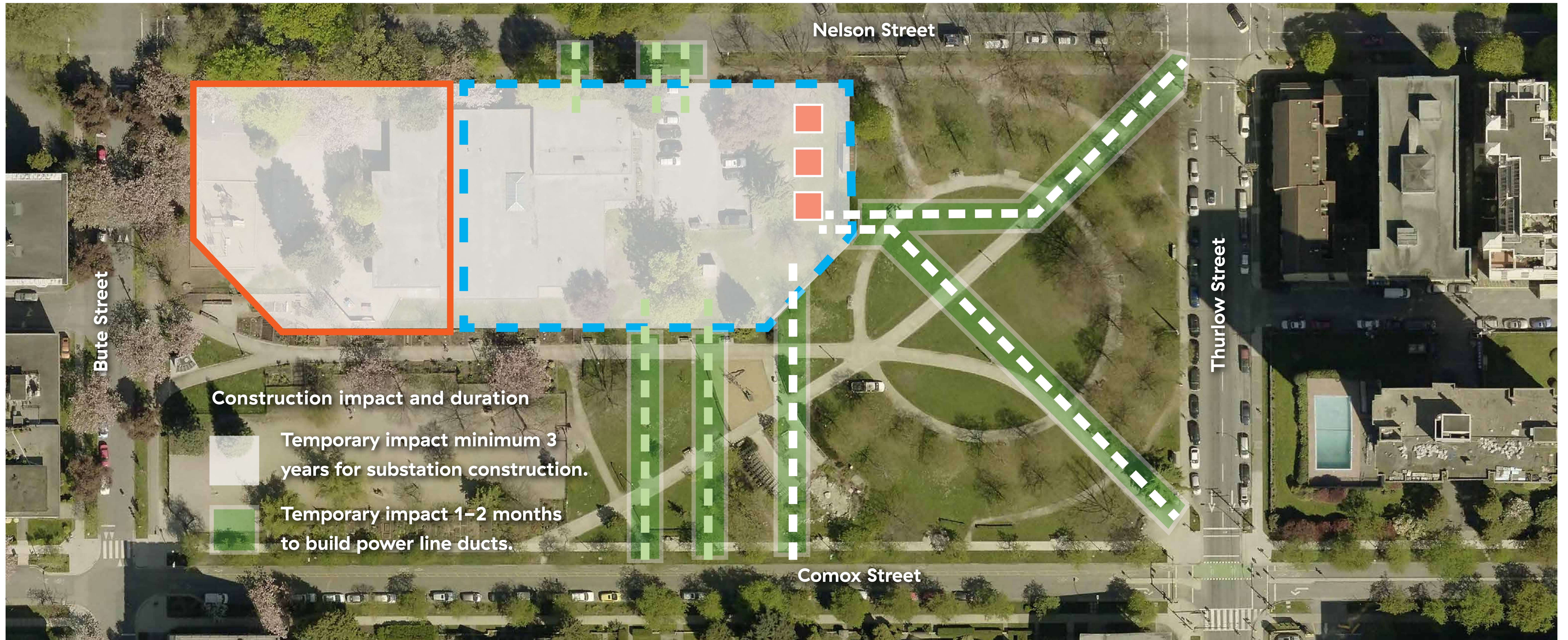
We commit to mitigating noise impacts as much as practical, using measures such as adjusting construction hours and activities to minimize disruptions, implementing noise barriers, and linking noise mitigation to construction permits and contractor remuneration. A Community Construction Liaison Committee would be created well in advance of construction to ensure two-way communication with the community.

We have an excellent history of mitigating construction impacts across a variety of projects, as demonstrated most recently with our Mount Pleasant Substation Project. This project included high voltage cables being buried in the city streets along the Fairview Slopes, the downtown core and the west side, as well as through David Lam Park.


Excavation of Mount Pleasant Substation— Alberta St at W 6th Ave



Construction impacts



Construction impact and duration

 Temporary impact minimum 3 years for substation construction.

 Temporary impact 1-2 months to build power line ducts.

Proposed locations:

 Future site for urban elementary school

 Underground substation

 Above ground vents

 230 kV underground transmission lines

 25 kV underground distribution lines

Underground power line routes through Nelson Park are only proposed. If our proposal moves forward, underground power line routing will be reviewed and potentially modified in consultation with the Vancouver Park Board.

Operational impacts

Our experience with both above ground and underground substations tell us that an underground substation would have less operational impact on the community when public safety, visual and noise considerations are factored in. It would also leave space above ground for public use.

We commit to design and build the substation ventilation infrastructure using state-of-the-art technologies to minimize the operational noise to well below the City nighttime noise by-law level.

We'll also look at different ideas for integrating the air vents and entrance structure for the substation into the surrounding landscape.



Electric and magnetic fields

What is EMF?

EMF stands for electric and magnetic fields. EMF are invisible fields produced anywhere that electricity flows, such as transmission lines, household appliances like coffee makers, vacuum cleaners and lights. EMF is present around the wiring in your walls and can be found indoors and outdoors in the environment. As magnetic fields aren't easily shielded like electric fields, our materials mainly focus on magnetic fields.

What are the guidelines for magnetic field exposure?

Health Canada and the World Health Organization endorse the guidelines created by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The guideline for residential exposure is 2,000 milligauss (mG), whereas the guideline for occupational exposure, for people like power line technicians, is 10,000 mG. There is a large safety factor applied to the occupational guideline limit; the residential guideline limit has a further additional safety factor.

Do people accumulate exposure to magnetic fields?

If someone were to use an electric blanket throughout the night, blow dry their hair in the morning, use their coffee maker and then walk under a power line, would they accumulate exposure throughout the day? The answer is no, there is no evidence for cumulative exposure or effects. There is no difference between walking under a powerline or sitting near a powerline for the afternoon—neither increase health risk at the levels we're talking about.

Because EMF dissipates very quickly with distance from the source, the EMF inside a future school would be similar to levels inside the existing Lord Roberts Annex currently. The source of any EMF within the future school would be the lights, computers and other electrical equipment found in any other school.

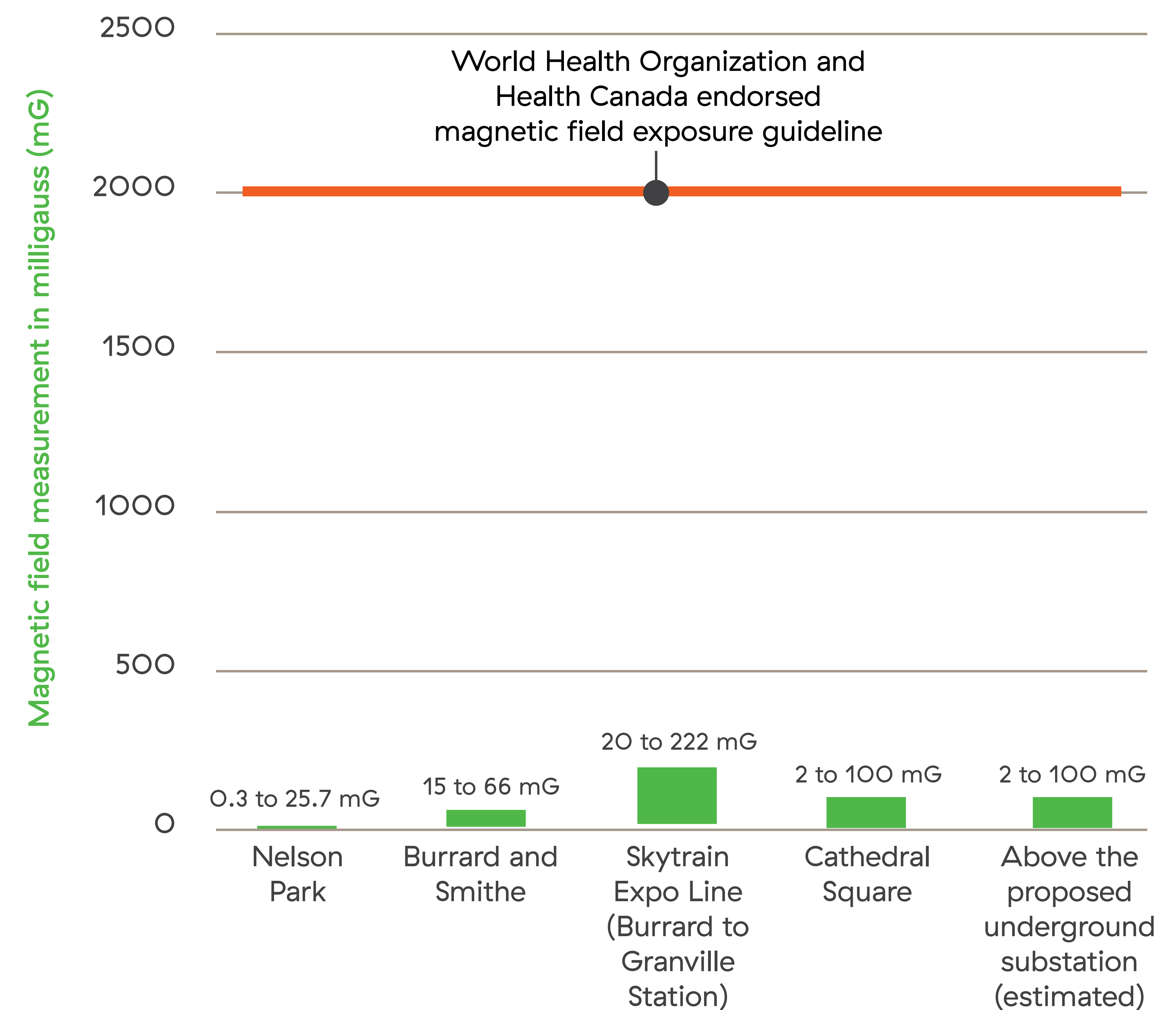
Electric and magnetic fields

Our commitment on EMF at the Lord Roberts Annex property and Nelson Park, if our proposal is accepted:

- Bury transmission cables deeper underground and implement magnetic field shielding (minimum 75% reduction in magnetic field from the estimate in the figure shown to the right) within the boundaries of Nelson Park and VSB property.
- Commission an independent study of current EMF levels at the existing Lord Roberts Annex property and Nelson Park, and report this publically.
- Confirm the EMF levels expected at and around the proposed substation, based on final design, and report this publically.
- Commission an independent study to verify EMF levels once the substation is in-service and continue to monitor EMF levels and report publically on an on-going basis.

Magnetic field levels around Vancouver:

We anticipate the levels of magnetic fields above the proposed substation will be similar to those above our underground substation at Cathedral Square.



Substation safety

Our highest priority at BC Hydro is public safety and the safety of our employees. We safely operate more than 300 substations throughout the province; 37 of those substations can be found within Metro Vancouver with about 50% of them located within 100–200 metres of busy public spaces including parks, shopping malls and schools. This includes our underground substation in downtown Vancouver beneath Cathedral Square Park, which we've been operating safely for more than 30 years.

Any new substation in downtown Vancouver would use the most modern technology available, virtually eliminating the risk of fire or explosion, and be built to rigorous safety and environmental standards.

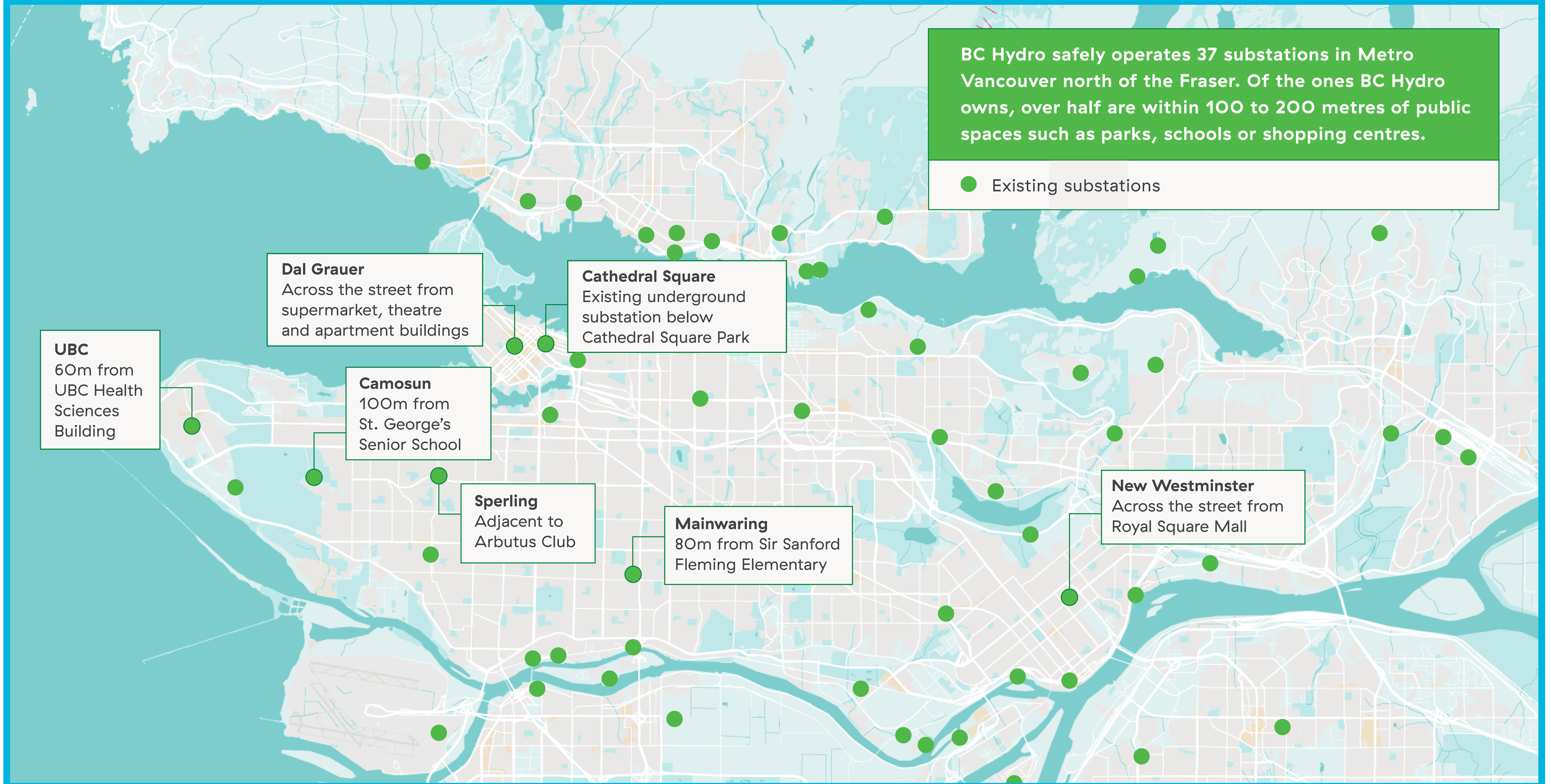
There are also firm soils (bedrock) under the Lord Roberts Annex property which is ideal for withstanding a significant earthquake. An underground substation will also perform better than an above ground station in an earthquake.

Why can't a new substation be built somewhere else?

We understand that those who live, work, play and learn in the West End would prefer a new substation be located somewhere else, for a variety of reasons. A new West End Substation needs to be built in close proximity to the electricity demand and the customers it serves, to ensure that the power system can operate efficiently and reliably. The alternative to building an underground substation at the Lord Roberts Annex property is an above ground substation, ideally within three to four blocks of the Annex.

Substation safety

Map of our substations around Metro Vancouver



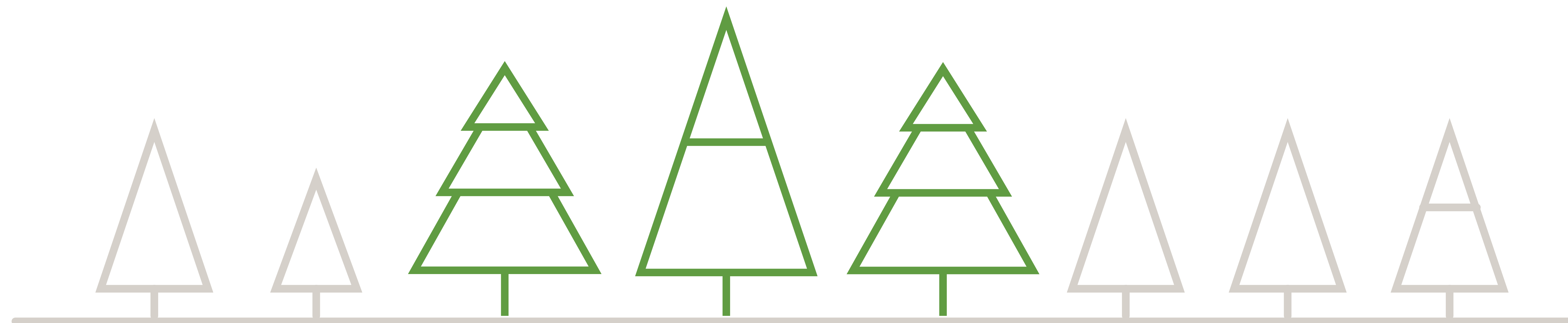
Green space and tree canopy

In any construction project, loss of green space, as well as removal of trees, is a concern.

We commit to minimizing the impact of an underground substation, as well as the resulting underground transmission and distribution cables, on green space and trees.

We're committed to minimizing the space taken by our permanent infrastructure through innovative and integrated design. The net result of this proposal could be a three-quarter synthetic turf playing field above the underground West End Substation. This playing field would offer a substantial increase of play area for school students and could be available for public use and events.

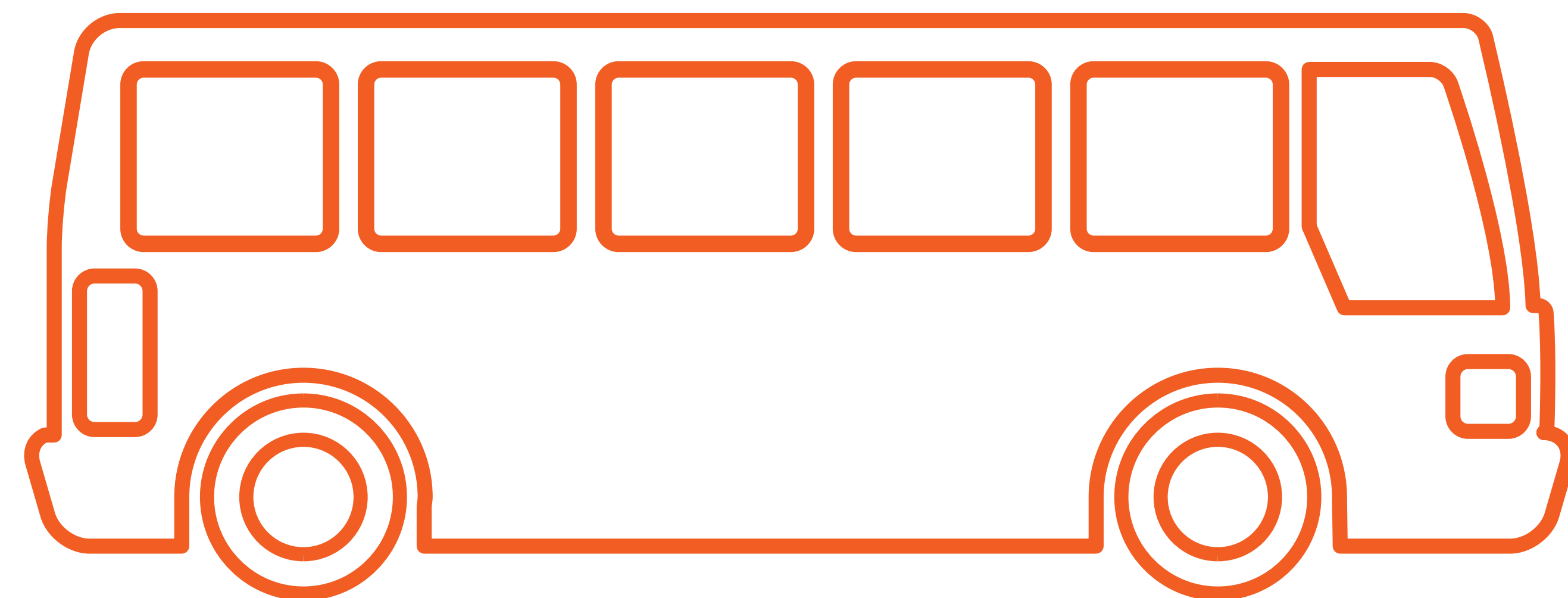
If this proposal moves forward, we'd work with the Vancouver Park Board to confirm routing of underground power lines through Nelson Park and to minimize permanent effects on parkland.



Relocating students and the memorial playground

We commit that construction will not begin for a new West End Substation until the Lord Roberts Annex students are relocated to the new Coal Harbour School.

We commit to removing the playground equipment, storing it and then working with VSB to reinstall it at our expense. We'll continue to work with the Lord Roberts Annex Parent Advisory Committee to confirm this commitment and explore other options if preferred.

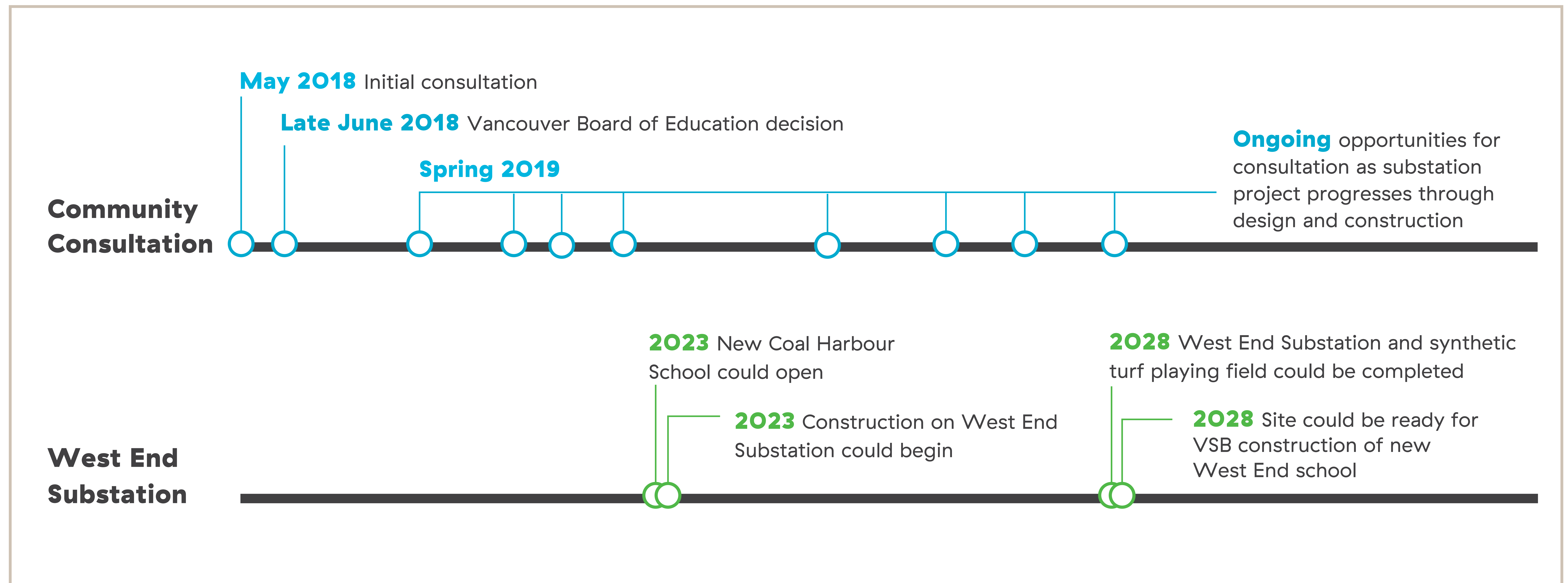


Playground at Lord Roberts Annex



What's next?

This tentative timeline shows how our proposal could move forward if approved by the Vancouver Board of Education.



If our proposal goes forward public consultation will be ongoing, including City and Park Board-led consultation to further explore impacts of underground power lines through Nelson Park.

Thank you

You can provide your feedback and learn more by:

- Reading the discussion guide and completing the feedback form (pages 18 & 19).
- Completing an online feedback form at bchydro.com/westendsub
- Emailing us: westendsub@bchydro.com
- Visiting our website: bchydro.com/westendsub

