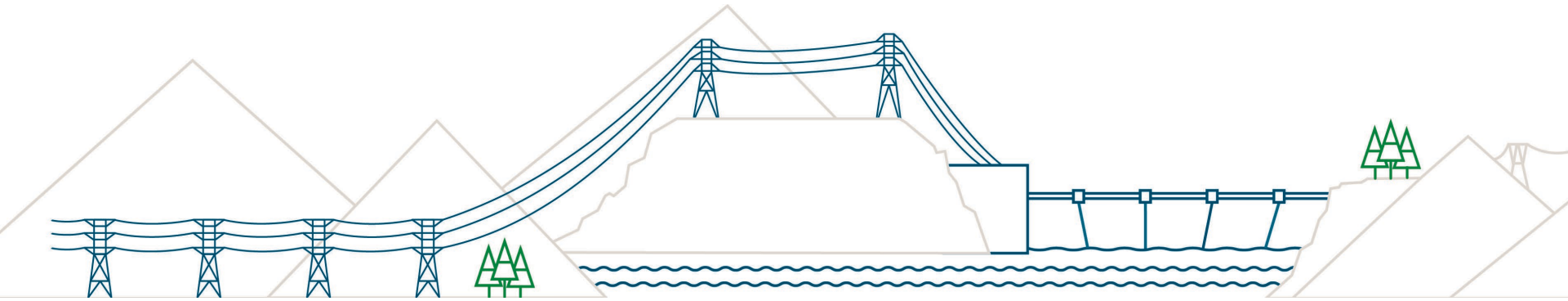
BOMA – Downtown Vancouver Update



October 2020

BC Hydro
Power smart

Introductions

Aaron Ellis
Manager,
Distribution Planning - Lower Mainland

Elin Aasen
Sector Lead
Key Account Manager

Ed Howker
Regional Manager
Distribution Operations

Roy Siebold
Program Manager
PCM Capital Projects Operations

Agenda

1. **Downtown Redevelopment Plan**
    - Substation additions and upgrades in downtown
    - Upgrade of downtown voltages – 12kV to 25kV conversion
    - Upgrades to the dual radial system serving key downtown buildings
2. **H-Frame Removal Program Update** – Chinatown and Gastown
3. **Challenges and opportunities**
4. **Round table discussion**

Downtown Redevelopment Plan

BC Hydro
Power smart

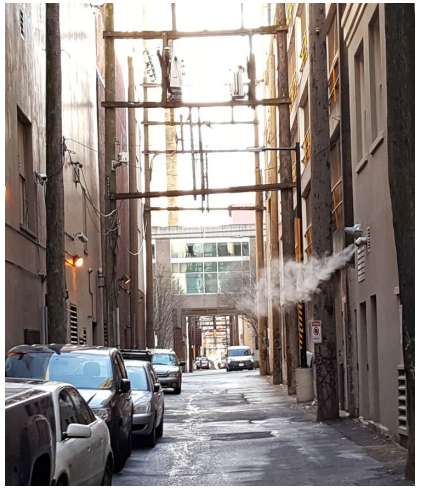
Downtown Vancouver: Then and Now

BC Hydro
Power smart

Downtown Vancouver Redevelopment Plan

Issues:

- **New, Larger, Customer Connections**
  - Building Sizes Increasing
  - Underground Equipment Congestion
- **Aging Equipment**
  - Underground Oil Filled Equipment
  - Substations – Two are over 50 years old
- **Reliability Risk**
  - Existing Dual Radial System lacks flexibility
  - 2008 CSQ Manhole Fire
- **Safety**
  - Overhead Contact – H-Frames
  - Crew Safety in Customer Vaults

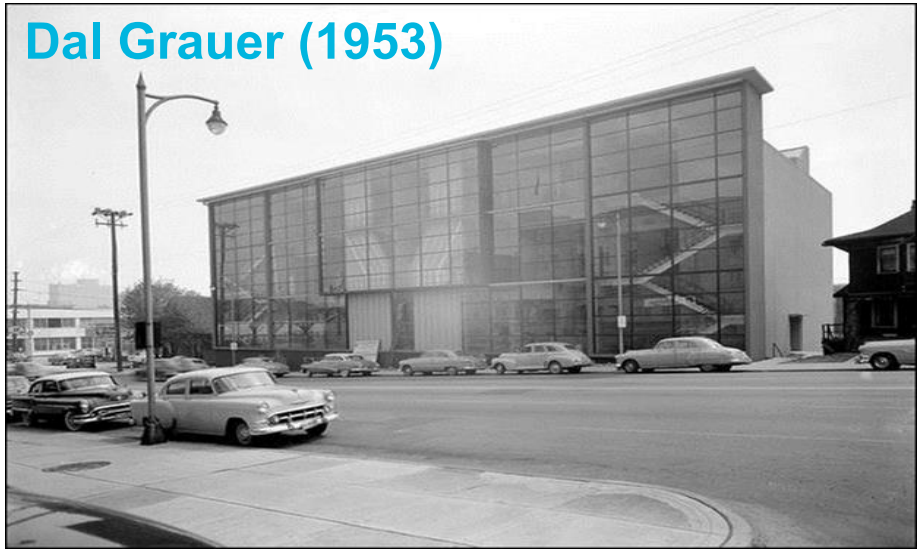


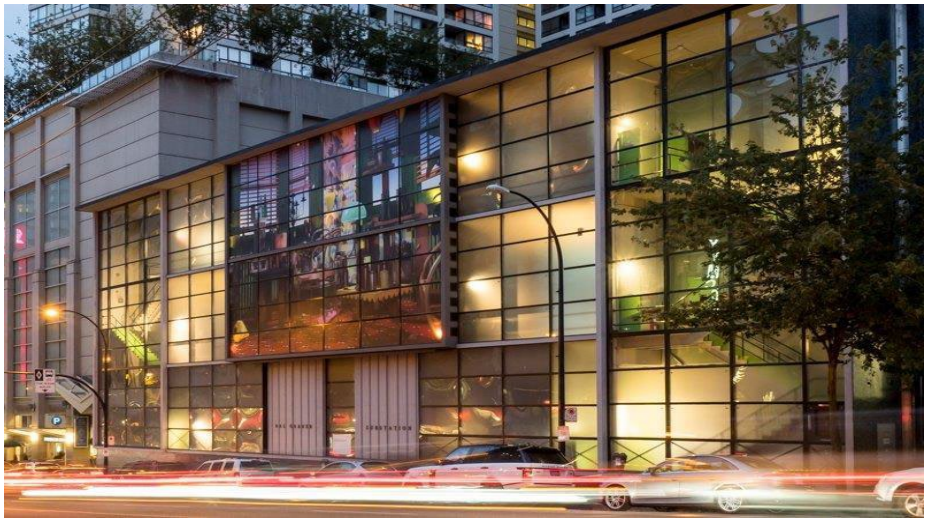
Strategy:

- Eliminate/remove H-frame structures in narrow lanes
- Move from 12 kV towards a 25 kV Distribution System
- Move towards a 25 kV Open Loop U/G Distribution System
- Move towards an Automated Distribution System

BC Hydro
Power smart

Downtown Substations





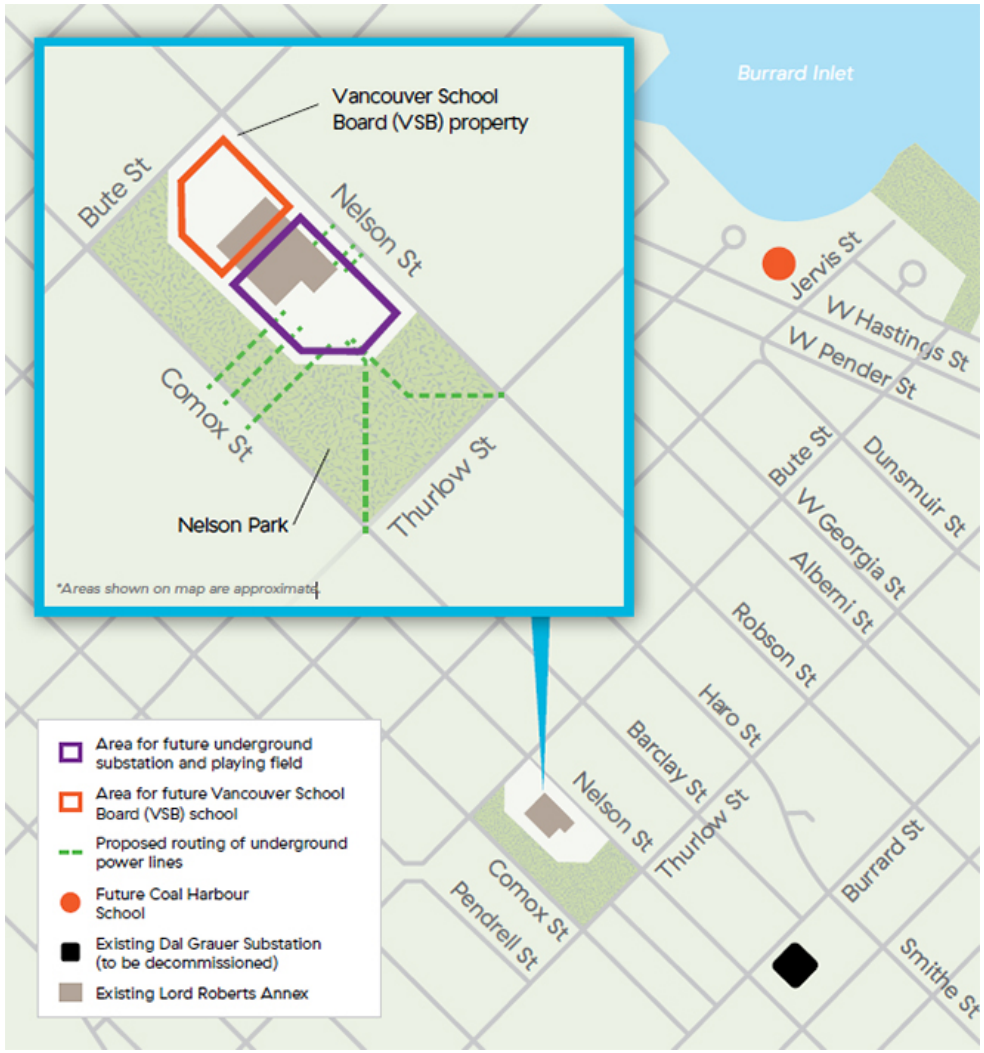
Downtown Substations

Cathedral Square (1984) – First Underground Substation

BC Hydro
Power smart

West End Substation

Planning for future growth.



- NEW Underground Substation
- Replaces the Dal Grauer Substation built in 1954
- 10 year timeframe
- **25 kV** Distribution Voltage

BC Hydro
Power smart

Why 25kV in Downtown Vancouver?

Serve Twice the Load with the Same Equipment as Today

Benefits:

- **Reduced footprint** - Less congestion in the underground street corridors
- **Increased utilization** of electrical equipment (lowers costs to serve)
- **Enables Larger Customer Loads** (for bigger buildings, EV Charging, electrification)

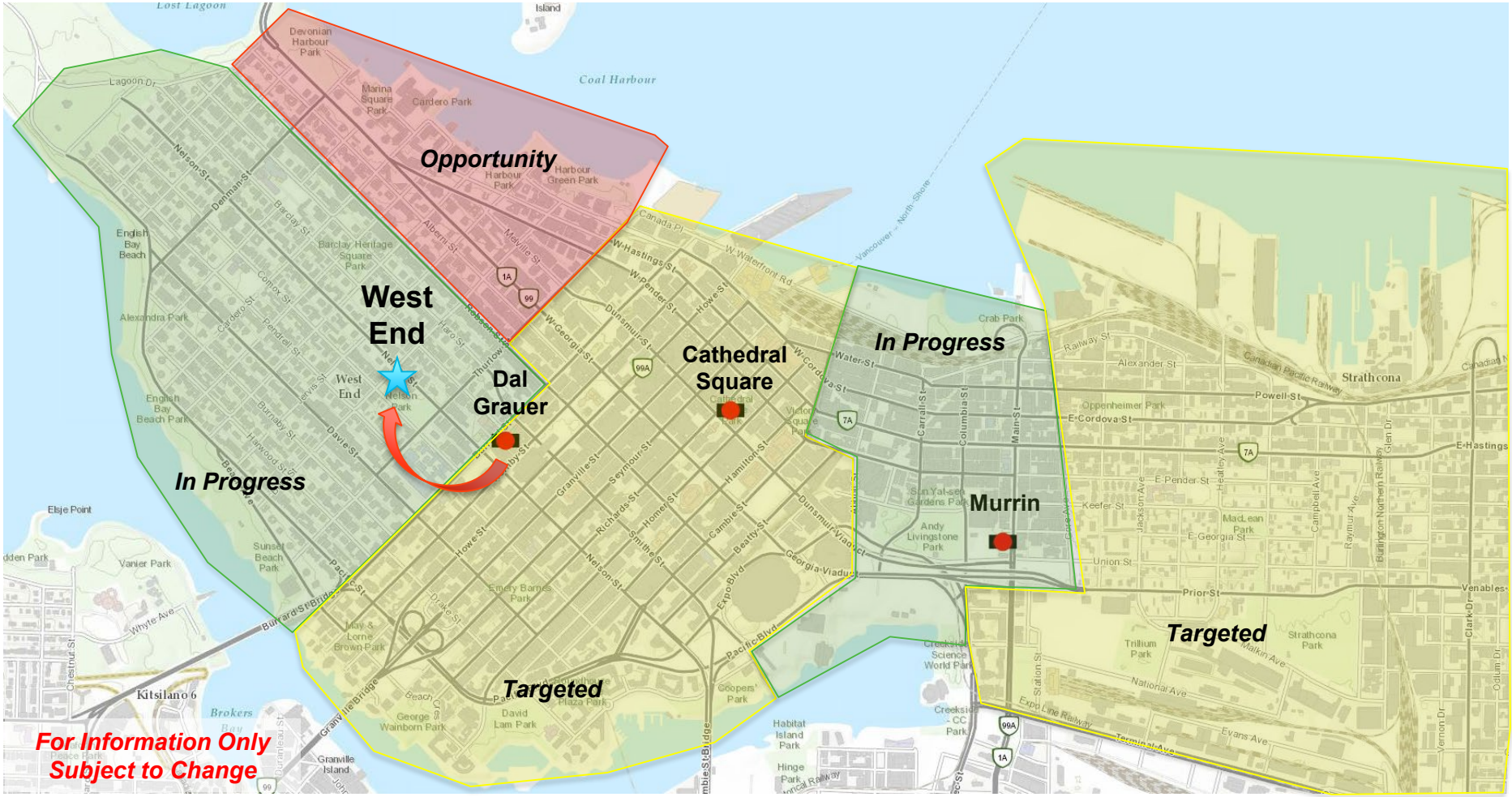
Opportunities:

- **Replace end of life equipment** with 25 kV equipment
  - BC Hydro equipment at end of life
  - Customer end of life electrical vaults
- All buildings designed after 2010 are ready for 25 kV
- New Substation construction

Customer Impacts:

- Customer Vault Conversions
- Outages to switch voltages

Map of Voltage Conversion



BC Hydro
Power smart

Customer Vault Conversion

- Primary side equipment will need to be upgraded to 25kV (switchgear)
- Transformers will be required to be dual voltage to operate at current 12kV until 25kV system is in place
- Sometimes modifications to the electrical room may be required to accommodate new clearance requirements and equipment for higher voltage.
- Some customers with small electrical load may have the option to convert to a secondary voltage (600 V).
- *Secondary equipment not impacted (lights, receptacles, building distribution etc.)*

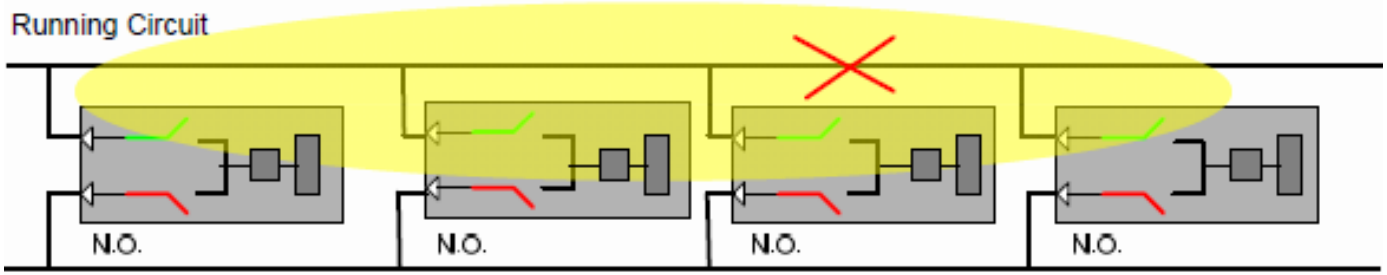
BC Hydro
Power smart

System Configuration Changes

Dual Radial System to Open Loop conversion.

Dual Radial Challenges:

- **Long Outage Restoration Time**
- **High Volume of Manual Switching / Availability of Stand-by**
- **Safety and Access Issues**
  - BC Hydro personnel operates customer owned and maintained switches
  - Safety a major issue for poorly maintained or aging equipment
  - Arc Flash



Standby Circuit

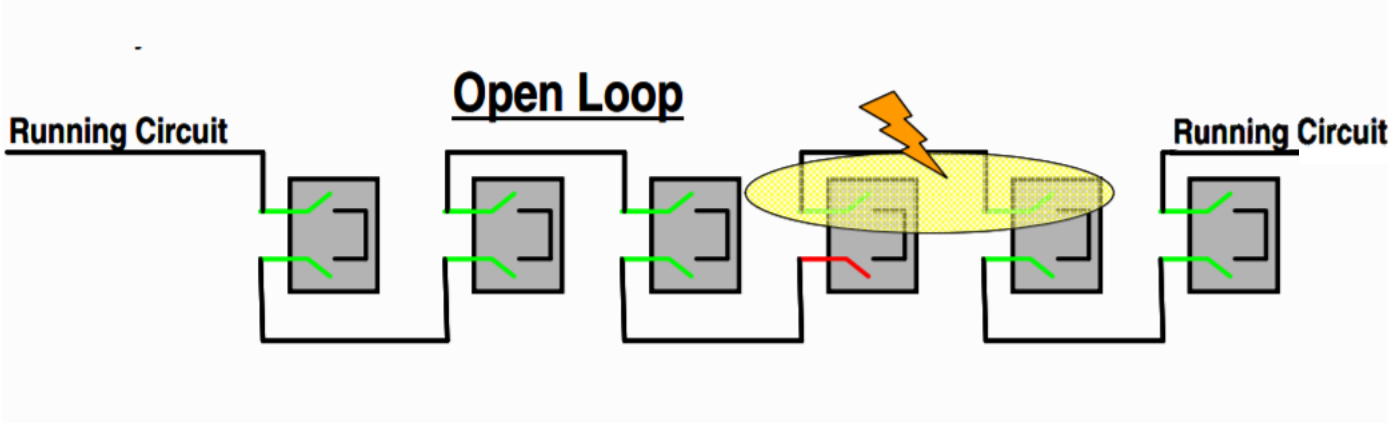
4-6 Hours

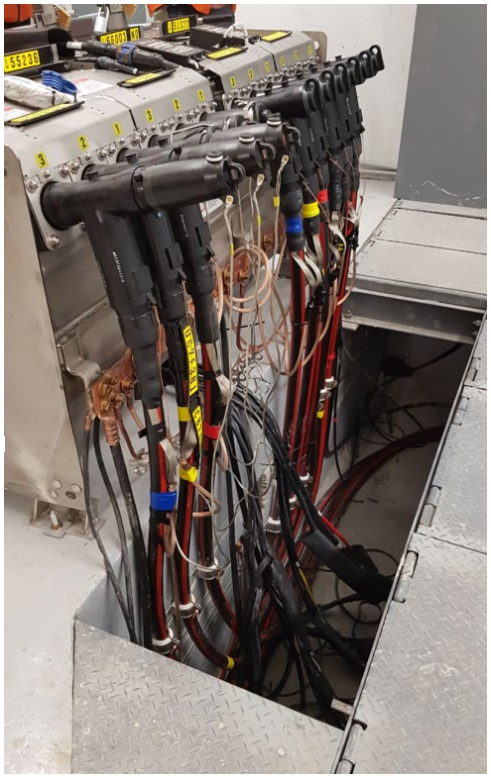
BC Hydro
Power smart

Open Loop

Open Loop Benefits

- **Fast Restoration Times**
  - Automatic detection and isolation of faults
  - Automated switching to restore power
- **Safety**
  - BC Hydro operating BC Hydro owned equipment
  - BC hydro equipment design for Arc Flash safety
- **Access -** BC Hydro control of switchgear location
  - Dedicated BC Hydro switchgear room in buildings (*in dense areas*)
  - Dedicated BC Hydro vault in the street (*where street space is available*)



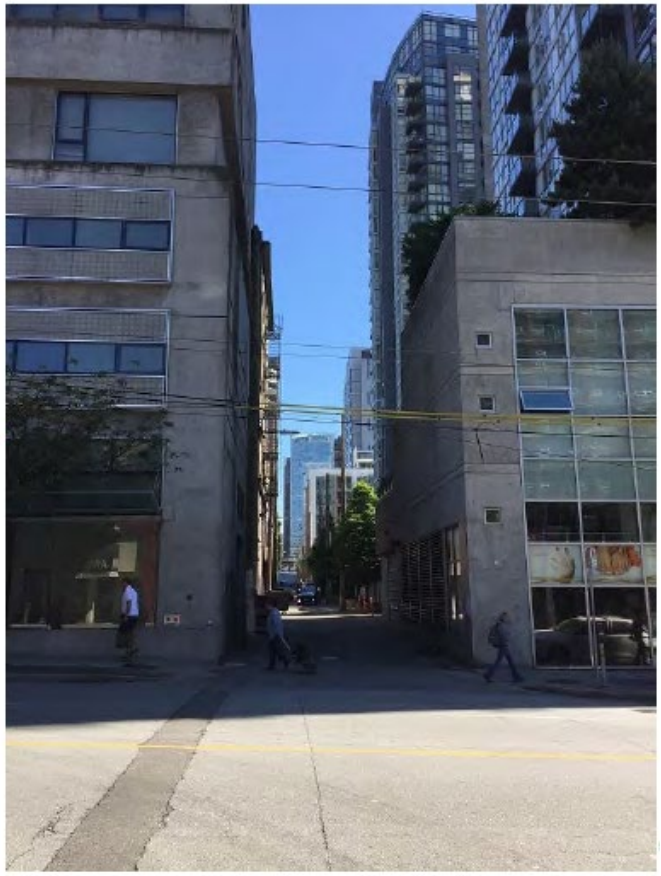


H-Frame Removal Program Update

BC Hydro
Power smart

H-Frame Program – Chinatown

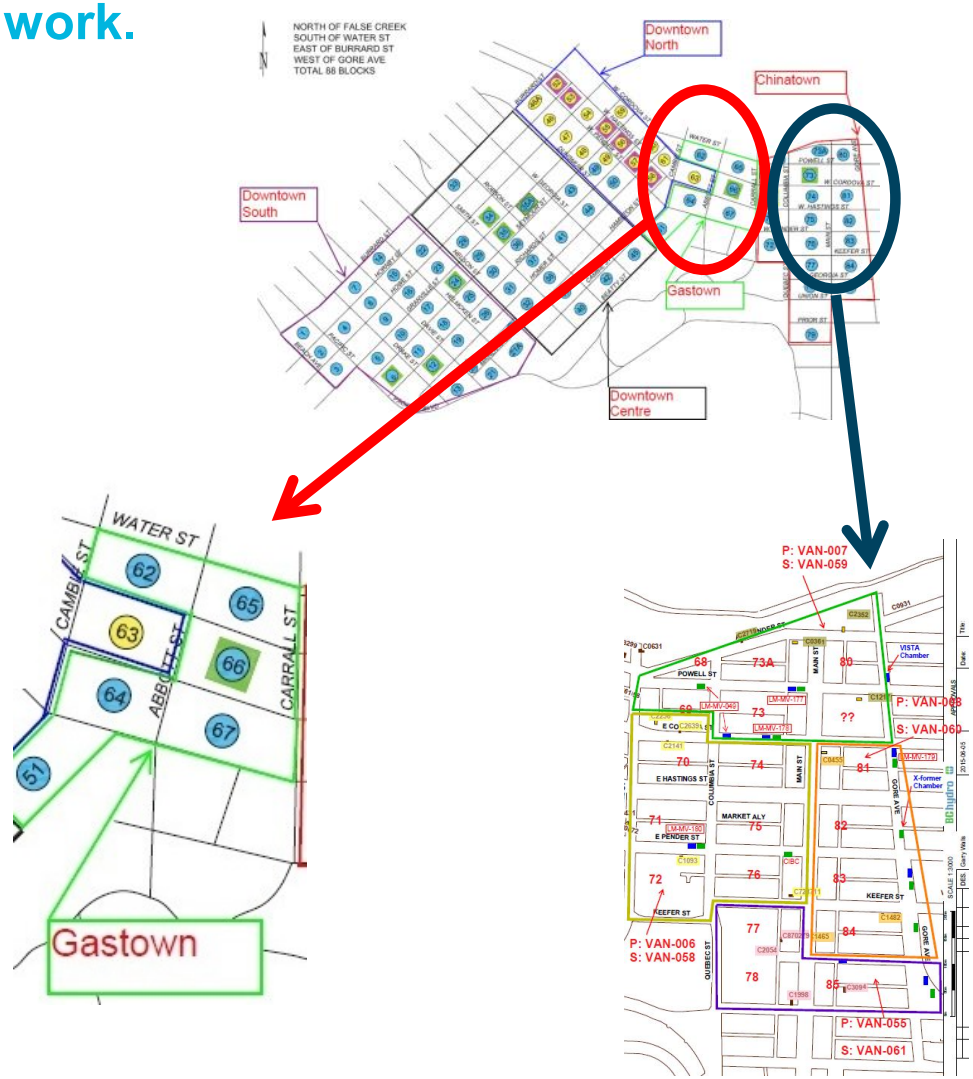
Start and End Goal



BC Hydro
Power smart

H-Frame Program – Chinatown & Gastown

Where is the work.

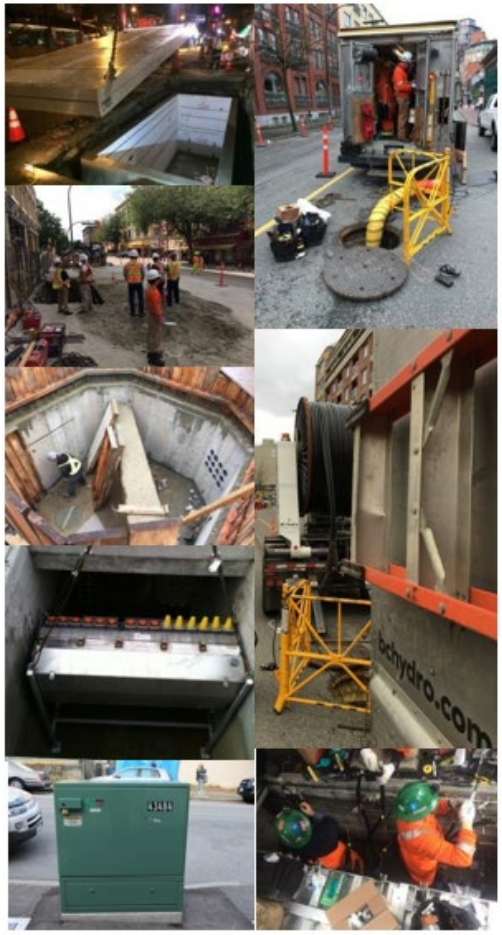


BC Hydro
Power smart

H-Frame Program – Chinatown & Gastown

What has to be built.

In street/sidewalk



In lanes

BUILDING ELECTRICAL SERVICE UPGRADE AGREEMENT
FOR
H-FRAMES REMOVAL PROJECT

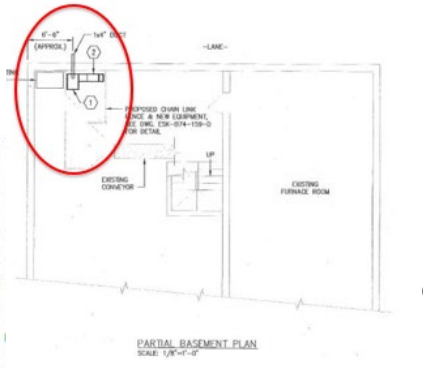
THIS AGREEMENT is made as of the 10th day of October, 2017.

Between:

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY, a Crown Corporation of the Province of British Columbia having an office at 333 Dunsmuir St., Vancouver, British Columbia, V6B 5R3.
("BC Hydro")

BC HOUSING MANAGEMENT COMMISSION having an office at #1701 – 4555 Kingsway, Burnaby, British Columbia, V5H 4V
("Owner")

currently receives electric service from BC Hydro at the premises located at 52-60 & 82 Street (the "Building") pursuant to a 100A, 120/240V, 1-Phase, 3W and 200A, ases 3W, 60A, 120/240V, 1-Phase, 3W (Temporary Trailer), 30A, 120/240V, 1-Phase, boards #877146781) and under BC Hydro Electrical Tariff Rate Schedule 1300; rming upgrade work on its electrical distribution works in the vicinity of the Building may impact the Building service connection (the "Project").



Challenges and Opportunities

BC Hydro
Power smart

Challenges and Opportunities

- Challenges
  - Building owner care and understanding for BCH crews
  - Dual Radial vault database – keeping contacts updated for maintenance
  - New construction or redevelopments
- Opportunities
  - Manhole clean-up, street congestion
  - Street level kiosks
  - Benefits for voltage conversion and open loop

How can BOMA help

- Existing Buildings - work together to minimize impact to building occupants
  - Inform BC Hydro of impending renovations to existing buildings
  - Inform BC Hydro of scheduled maintenance of electrical equipment
  - Inform BC Hydro of planned equipment replacement and choose equipment with consultation with BC Hydro

- New Buildings - design to accommodate new electrical equipment requirements
  - Customer electrical equipment space
  - BC Hydro equipment space
  - Locate equipment for ease of accessibility

- Provide BC Hydro with your ideas!

BC Hydro has been working on

- Voltage Conversion website
    - Includes a webform to ask questions or get in touch with our Key Account Managers for voltage conversion
- Discussions with the City of Vancouver ongoing
- Discussions with the External Design Community ongoing

Roundtable Discussion

BC Hydro
Power smart

BC Hydro

Power smart