The Canada Way receiving power substation (east of NEO1) currently services the north half of BCIT (north of Goard Way). This substation is at the end of its useful life and needs to be replaced. Over the next two years, BCIT will replace the receiving power station, associated unit substations and feeders to improve the electrical infrastructure resiliency at BCIT. The new receiving power substation will be housed in the Campus Hydro building (east of SEO1), built under the previous major electrical upgrade project in 2015.

OBJECTIVES

- Replace the aging power receiving substation.
- Replace all aging substation units at campus buildings north of Goard Way.
- Replace three substation units in the south campus.
- Establish a new BC Hydro connection on the north campus, at the corner of Carey Avenue and Canada Way. This will encompass three major electrical services: o High voltage (HV -12.5/25kV) o Low voltage (LV - below 750V) o Telecommunication / control / safety service
- Replace associated water, gas, stormwater, and sanitary pipelines that service the campus.
- Improve landscaping along English Street to align with the standards set by BCIT Campus Plan.

BUDGET AND FUNDING

Project Budget = \$50.7 million

This project is jointly funded by the Federal Government's Strategic Investment Fund (SIF) initiative, the Province (Ministry of Advanced Education, Skills and Training), and BCIT.

INTEGRATED DESIGN TEAM

Based on the lessons learned from the Goard Way Infrastructure Renewal Project completed in 2015, an integrated design team was created for this project. This approach is best suited to complex projects and helps to mitigate risk. With an integrated team, the project owner, construction contractor, and engineering designers meet early in the project timeline to:

- Develop a scope of work, budget, and schedule.
- •Allow for existing infrastructure investigation during design.
- Progress the design based on the actual condition of services and the site conditions as observed by team members
- Develop specifications and drawings which will be distributed to the construction manager to review for constructability.
- Work directly with users (Facilities, Schools, SSEM ETC) to ensure that the campus can continue to operate as usual during construction.
- Maintain high-levels of safety for occupants during multi-phased construction.













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BCIT

CONSTRUCTION (PHASED WORK PACKAGES)

ELECTRICAL INFRASTRUCTURE REPLACEMENT (NORTH CAMPUS)



Project Goals

Improve electrical infrastucture resiliency and increase BC Hydro contingency limits through:

- Upgrading electrical services to 25kV standard from 12.5kV
- Installing new Canada Way (North Campus) switch gear in existing campus hydro station
- Replacing all aging unit substations in North Campus
- Establishing a new BC hydro connection at corner of Carey Avenue and Canada Way





Typical Unit Substation















Existing South Campus Switch Gear

Electrical Manhole and Excavations



WHAT ARE WE TRYING TO ACHIEVE?

Cost Effective

The proposed design will be cost effective and utilize the newly built existing Goard Way infrastructure. It will make use of available space in the Campus Hydro Station building to locate the Canada Way Receiving Substation equipment. It also utilizes recently installed Goard Way duct backbone to feed the north campus unit substations west of Guichon Creek.

Business Continuity

The proposed phasing and design will have minimal impact on campus operations. Part of the campus must remain on the old Canada Way station while the new receiving station is being built. Corresponding downstream substations will be progressively switched over to the new service/receiving station.

Strategic Alignment

Strategic Alignment with the Campus Plan—BCIT has a vision of future campus development that the new infrastructure design should be able to accommodate in terms of future capacity, flexibility, and location.

Reliability

Reliability—providing a new electrical network to the North Campus will allow for load shedding redundancy (between Goard Way and Canada Way main feeds) and support future expansion including a planned School of Health Sciences and Trades & Technology buildings.

Research

In early 2007, BC Hydro and BCIT embarked on a joint research initiative and began the process of designing and constructing Canada's first Smart Power Microgrid at BCIT's Burnaby campus. Through the Smart Microgrid project, BCIT research and industry partners are developing a smart grid test bed on BCIT's Burnaby campus to allow researchers and utilities to experiment and demonstrate their leadingedge technologies and solutions.

The proposed electrical infrastructure upgrade works at BCIT will complement and enhance this research by exposing researchers to the existing electrical infrastructure on site, proposed upgrades, construction methodologies and integration of modern technologies.

Completed Electrical and Communications Manhole Installation







Water main "hot tap" shut off valve

Erosion and sediment control pond















CIVIL INFRASTRUCTURE REPLACEMENT (NORTH CAMPUS)

Site Plan - Civil Utilities & Duct Bank



Project Goals

Improve civil and electrical infrastucture resiliency and support construction activities through:

Site Preparation

- Excavation for utilitity installation
- Erosion and sedimentation control

Civil Utility Replacement

- Water main
- Gas main
- Sanitary sewer
- Storm sewer
- New concrete encased duct bank to support new electrical and communications infrastructure

Site Restoration

- Road replacement
- Sidewalk replacement
- New bike path on Carey Avenue
- Landscape upgrades

3D Modelling of Civil Utilities













CAREY AVENUE AND SMITH STREET

The goal of design for Carey and Smith is to facilitate utility upgrades and make functional use of the space, including an improved streetscape which accommodates pedestrian, cycling, and vehicular traffic to the BCIT Campus. The Landscape and Urban Design work sets the tone of the finished project by providing:

- Functional and aesthetic value to the overall streetscape design;
- A consistent planting throughout the BCIT Campus including English Walk with plantings that are adaptable, tolerant, and native to British Columbia;
- A planting buffer between the street and the sidewalk, promoting safety for pedestrians;
- A safe pull-out area for drop-offs at Carey Avenue;
- Vegetated screening for the utility kiosks along Canada Way, mitigating negative impacts to site appearance; and
- A planting palette that includes a variety of coniferous and deciduous species for visual interest.



Section A



Perspective View at Canada Way and Carey Avenue

Carey Ave and Smith Plan















SUSTAINABILITY



Project Goals

- Economic and operational resiliency through reliable power supply and distribution
- Maintaining education infrastructure for long term benefit of communities
- Environmental protection through the integration of renewable energy sources into the campus microgrid

Envision

Envision is a framework and design tool to help us plan and design better infrastructure projects and gauge performance against best practices for next-generation sustainability. It is also a certification platform that can support efforts to build buy-in and awareness of project achievements through five key categories. Envision was used throughout the design of this project to promote project and overall campus sustainability. BCIT is pursuing Envision certification for this project through the Institute of Sustainable Infrastructure.





Project Features

Environmental

- More efficient lighting and transformer technology
- Planned daylighting of Guichon Creek
- Natural indigenous landscape plantings
- Innovative storm water infrastructure

Social

- Increased campus walkability, greenspace, and activity/event space through the transformation of English Walk
- Future proofing to support campus growth

Financial

- Improved operational efficiencies and reduced unplanned maintenance costs
- Alignment with BCIT Business Plan, BC Jobs Plan, and BC's Skills for Jobs Blueprint

English Walk - Plan













CONSTRUCTION SCHEDULE

Overall: February 2017 - August 2020















PHASING, WORK SEQUENCING & TRAFFIC MANAGEMENT





Building "Cutovers"

- Buildings will have their core utilities cutover to the new systems sequentially
- Closure and other disruptions will be kept to a minimum
- Temporary Generators to maintain certain building operations
- Other building cutovers will be done afterhours
- Will be aligned with existing BCIT Shutdowns





Sample Traffic Management Plan

- BCIT Campus to remain 100% active and operational during construction
- Pedestrian access is maintain to all active buildings
- Deliveries and maintenance access to buildings maintained
- Scopes of work are sequentially constructed to maintain operations
- Noisy and disruptive work done outside classes (where possible)
- Detailed traffic management plans are developed in advance of the work commencing













SAFETY

- Contractor safety management Proactive Approach based on "Lessons Learned"
- JHA's and Exposure Control Plans
- Site Specific Additions to Project Site Orientation
- Coordination with BCIT Safety, Security & Emergency Management
- Traffic Management Plans (vehicle/pedestrian)
- Utility Strike Response Plans
- Life Safety Systems Shut Downs (after hours/weekends)
- Noise Mitigation (after hours work/work around class schedules)
- Hoardings & Signage (public safety and way finding)
- Engineered Plans for Trench and Excavations entry
- Watermain "Hot Tap" Installed at the onset of the project to control the watermain





















ENVIRONMENTAL MANAGEMENT

- Sediment and Erosion Control as per the City of Burnaby design guidelines
- Two Active Erosion and Sediment control systems installed on Campus
- Water detention pond constructed South of NE 06
- Soils testing completed in advance to identify any contaminated soils present.
- Contaminated soils are stockpiled and transported to a designated treatment facility













PARKING LOT UPGRADES/INVESTIGATIVE & ENABLING WORKS



PARKING LOT UPGRADES

- To minimize the Parking disruption as a result of the project, Lot Q was renovated and a New Lot Constructed adjacent to NW01 and NW03
- Work was completed during the summer of 2017 to minimize Campus disruption.
- Greenway Pathway along Student residences was upgraded along with new Pedestrian lighting added.
- Pay Parking Kiosks relocated from English Street







Enabling Works Plan Drawing



INVESTIGATIVE AND ENABLING WORKS

- Key areas of the project were made ready for major Civil works in advance
- Water Main Hot Tap Valves were installed to control the watermain
- Existing utilities were located, daylighted and surveyed to update and confirm existing as-builts
- Work was completed during the summer of 2017 to minimize Campus disruption.
- Existing "backlanes" were excavated and upgraded to provide construction access from multiple routes
- Equipment and Material staging areas were created
- Existing trees were removed in certain areas where future under ground utilities would be installed
- Above grade elements were demolished to make ready the areas for construction
- Addition and relocation of Code Blue Emergency Stations
- Construction of the Erosion and Sediment Control Pond
- Procurement of all long lead electrical manholes
- Installation of the Electrical manholes on Carey Ave.











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LIVING LAB: BCIT Civil Engineering Technology Program

The BCIT Civil Engineering Program is a 4-year full-time program that offers students a Bachelor of Engineering. After 2 years students may exit the program with an accredited Diploma in Civil Engineering Technology.

An essential component of the program is the completion of an Industry Project in second year. This year long project requires students to seek out an industry sponsor, prepare a project proposal and execute their stipulated objectives.

PCL Constructors Westcoast Inc. has sponsored two Civil Engineering students for their industry projects this year. Through this sponsorship, the students will receive guidance and resources to aid them in completing their project.

INDUSTRY PROJECT DETAILS

The students have each been given a portion of the North Campus Infrastructure Project as highlighted in the map.

- 1. Canada Way Receiving Station
- 2. Guichon Creek Redirect Culvert
- 3. Carey Avenue Civil Works

They will each prepare a construction execution plan, cost estimate and schedule for their assigned portions. In addition, the Carey Avenue Civil Works portion will require preparation of a communication plan.

These projects highlight the learning objectives of their second-year Construction Management courses.















Phase 1 English Walk - 'The Yard' Landscape Framework

English Walk is being transformed from a traditional road with surface parking, into a key public realm space for the BCIT campus community. Phase 1 improvements will include special paving, diverse seating elements, new plantings and unique social spaces to help create a vibrant campus hub for socializing, studying and special events. This area will ultimately cluster and showcase "maker" programs to enhance these programs and to promote collaboration across programs.

Phase 1 Elements

- Special paving with graphic pattern
- Seating nooks for socializing and studying
- New pedestrian lighting
- Diverse seating opportunities including small amphitheater
- Major node at English Walk and north/south 'spine'
- Works display area for construction, demonstration projects, exhibits, and planned events
- Services in works area
- Planted rain garden for capturing surface runoff
- Enhanced landscape planting
- Architectural canopy with lighting, integrated seating and information kiosk







Special paving with strong graphic pattern

Diverse seating elements











Works area for construction, demonstrations, displays



Phase 1 English Walk - 'The Yard' **3-D Views**





Key Plan















Thanks for joining us!

CONTACT INFO

For updates, please visit our project page at: www.bcit.ca/facilities/projectservices/projects/northcampusinfrastructure.shtml

If you have specific questions or comments, contact: Gary Holtz BCIT Project Manager, Project Services gholtz1@bcit.ca













