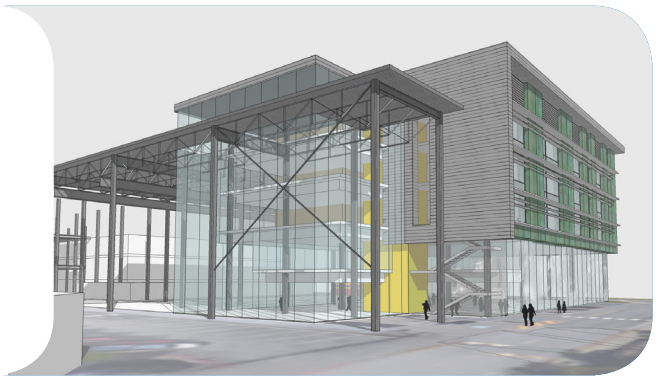
BCIT Renew:
Five-Year Capital Plan
2016 to 2020

BCIT



July 2015

BCIT Five-Year Capital Plan: Overview

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY (BCIT)

Established in 1964, the British Columbia Institute of Technology comprises six schools of study that operate at five campus locations. With 47,320 full and part time students, BCIT is one of the largest post-secondary education institutions in the province.

BCIT is the largest provider of trades education in BC and is the leader in technology education.

MISSION

The Mission of BCIT is to serve the success of learners and employers:

- By providing high quality technical training, and professional education and training, that supports our graduates as practitioners and as citizens; and
- By advancing the state of practice.

MEETING PROVINCIAL OBJECTIVES AND FACILITY RENEWAL

The focus of this Five-Year Capital Plan is the continued renewal of facilities and critical infrastructure at the Burnaby Campus with a focus on trades and technology that responds to the *BC Skills for Jobs Blueprint*.

As the largest provider of trades education BCIT has the demonstrated capability to meet BC's objectives for "the right skills in the right place at the right time". The Five-Year Capital plan will ensure BCIT continues to play a central role in the provision of trades training in the province.

The Five-Year Capital Plan also highlights the urgent need to renew its existing buildings and infrastructure and provide modern, flexible facilities to support the delivery of education and research programs to ensure BCIT graduates are job-ready. It supports institute priorities to address critical deferred maintenance, seismic safety, operational challenges and energy efficiency issues associated with 1960s-70s era buildings.

Meeting Provincial Objectives

BCIT will assist the province in meeting the three key objectives in it's *Skills for Jobs Blueprint*:

1. *A head start to hands on learning*
   BCIT has been a pioneer in programs that are designed to assist high school students in obtaining early educational experience.
2. *A shift in education and training to better match jobs in demand*
   BCIT has over 12,000 full time students and part time enrollments in its School of Construction and the Environment. With support from the province this number can be expanded significantly. Buildings and teaching programs will be flexible to respond to the variations in demand for trades in the market place.
3. *A stronger partnership with Industry and labour to deliver training and apprenticeships*
   BCIT already has strong partnerships with industry and will continue to build on this as liquefied natural gas (LNG) and shipbuilding projects develop. BCIT continuously consults with industry to ensure course relevance, offers apprentice training in over 20 trades, and has customized employee training and co-op programs.

Meeting BCIT Renewal Needs

Apart from the recently completed Gateway Project, the Burnaby Campus has undergone limited capital renewal of buildings over the past two decades. The Burnaby Campus requires an injection of capital investment to enable BCIT to continue to meet its educational mission:

- 75% of Burnaby Campus' academic buildings are more than forty years old;
- The deferred maintenance value of the buildings, based on an average campus wide building **FCI** value of **0.40**, is $355 million (RI Cost);
- 70% of Burnaby Campus buildings are rated within the high seismic risk priority categories;
- Critical parts of the Burnaby Campus' electrical service infrastructure that serves trades education is obsolete, over-capacity and urgently in need of replacement;
- Numerous buildings are functionally inadequate with building layouts, and teaching and social spaces that are inappropriate for modern learning and research;
- Individual building systems and infrastructure are obsolete and inefficient; and
- Many buildings are unattractive and negatively impact Institute image and recruitment.

BCIT Renew: Five-Year Capital Plan is a cost-effective mix of projects that blends new construction with building renewal and infrastructure upgrades and is aligned with the provincial government's key policies and priorities, including the *BC Skills for Jobs Blueprint*.

RENEWAL PRIORITIES

BCIT Renew priorities in this Capital Plan are:

- ***Trades & Technology Centre and NE12 Steel Trades Renewal (Category 1)***
  This is a phased project that involves the construction of an integrated trades and technology centre (67,900 sf, 6,305 m^2), including a dry dock, as well as the renewal and upgrade of a key trades building and works yard. This project creates 21st century learning environments for key trades programs that embrace the use of new technologies, such as simulation, and permits the expansion of in-demand trades that align with the *BC Skills for Jobs Blueprint*.
- ***"Canada Way" BC Hydro Service Replacement (Category 1)***
  This is the replacement of an obsolete and over-capacity hydro receiving station situated adjacent to Canada Way. This receiving station is at risk of complete failure and primarily serves the trades education zone on the campus. Failure of this receiving station would result in cessation of trades education programs at BCIT, in addition to a variety of other programs with classes in buildings in the northern zone of campus.
- ***SW1 Renewal: Energy, Engineering & Health Sciences (Category 2)***
  Phased renewal of Building SW1 will provide modern learning facilities for Energy and Engineering Programs and support the renewal plan for the Health Sciences Centre for Advanced Simulation.

CAPITAL PLAN SUBMISSION

In accordance with Ministry instructions, capital plan submission forms have been completed for each of these projects, and are listed in order of overall priority. In total, the Five-Year Capital Plan includes three projects with a value of $166.75 million, spread over the 2016/17 to 2020/21 timeframe.

Cash flow projections for each project are summarized in the Prioritized List of Proposed Projects.

PROJECT MANAGEMENT FRAMEWORK

The Capital Plan has been developed within BCIT's Project Management Framework which provides a consistent approach to facility analysis, planning and development. All capital investments follow this process that is consistent with the Ministry of Advanced Education's CARG process.

BCIT *Project Management Framework*

Ministry of Advanced Education, Innovation & Technology *CARG Process*

KEY FEATURES

Key features of this plan include:

- *Responds to demands for trades education.* The focus is on construction and building operations trades.
- *Renewal.* The plan provides for renewal of BCIT's large inventory of old buildings.
- *Phased implementation.* Pragmatic project sizes permit the phase in of capital and operating expenditures.
- *Provides for continuance of teaching.* BCIT has demonstrated experience of maintaining operations while renewing buildings.
- *Flexibility.* The new buildings will be designed for changes in demands for different trades over time
- *Timeliness.* Sites for new development have few impediments to early construction starts. Designs will be for simplicity of construction.

Prioritized List of Proposed Projects

#	INSTITUTION	CAMPUS	PROJECT DESCRIPTION	PROJECT CATEGORY	ANTICIPATED CONSTRUCTION DATE	ANTICIPATED OCCUPANCY DATE	TOTAL PROJECT BUDGET	TOTAL CASHFLOW FORECAST (FISCAL YEARS IN MILLIONS)					
								2015 / 16	2016 / 17	2017 / 18	2018 / 19	2019 / 20	Outgoing years
1	BCIT	Burnaby	New Trades & Technology Centre and NE12 Steel Trades Renewal	1	November 2017	Final Occupancy April 2020	$67.5 M	$2.7 M	$7.4 M	$23.0 M	$23.0 M	$11.4 M	$0
2	BCIT	Burnaby	"Canada Way" BC Hydro Service Replacement	1	July 2017	January 2019	$29.75 M	$1.2 M	$1.2 M	$3.3 M	$18.1 M	$5.95 M	$0
3	BCIT	Burnaby	SW1 Renewal: Energy, Engineering & Health Sciences	2	July 2020	July 2022	$69.5 M	$0	$0.7 M	$0.7 M	$5.2 M	$5.9 M	$57.0 M
							$166.75 M	**$3.9 M**	**$9.3 M**	**$27.0 M**	**$46.3 M**	**$23.25 M**	**$57.0 M**

Note: all costs include taxes.

Project 1: Trades & Technology Centre and NE12 Steel Trades Renewal

Category 1: New Priority Projects				
Institution	**Campus / City**	**Project Title**	**Project Category**	**Project Priority**
BCIT	Burnaby	Trades & Technology Centre and NE12 Steel Trades Renewal	1	1 of 3

1.0 CURRENT SITUATION

The Trades & Technology project is targeted at providing teaching spaces critical for construction related trades education that have been identified as priorities in the *BC Skills for Jobs Blueprint*. The project involves two main phases and includes a combination of existing building upgrades, a new building and cost-effective new covered outdoor workshop spaces.

A phased approach enables early, inexpensive outdoor space, which increases capacity quickly. The new building and yard combinations provides teaching space which focuses on marine trades and LNG education. The configuration and facilities include simulation; the integration of trade and technology; distance education broadcasting capabilities; and visitor viewing opportunities to both showcase job training and assist in K-12 recruitment into the trades. In addition, the new facilities provided by this project permit the cost-effective removal of the significant liability presented by three buildings that contain asbestos.

NE12 is an aging building (built in 1972) with many systems and components reaching the end of their life cycle with an VFA **FCI** value of **0.53**. Both the VFA report and the seismic assessment confirm that a renewal and upgrade of life safety, seismic, electrical, mechanical, communications and interior spaces should be completed. NE12 has been categorized as having a medium seismic risk (M). Based on VFA building assessments for the next five years, an estimated $4.6 million of deferred maintenance and $1.8 million for seismic mitigation is required to maintain NE12.

Additional to these structural and seismic issues, there are size and functional inadequacies of some of the teaching spaces in NE12, and the works yard is very congested and functionally challenging. Upgrading and modernizing the workshop, equipment and teaching spaces of NE12 will address these inadequacies.

The new Centre will address a lack of teaching space for marine and LNG related trades and provides opportunities for the integration of Trades and Technology education.

Currently, BCIT is experiencing long waitlists for in-demand trade programs. Specifically, BCIT's School of Construction and Environment has **512** students on waitlists for trades foundation programs, while trades foundation and technician programs offered by the School of Energy have **518** students on waitlists. The additional space delivered by this project will permit growth in the areas of highest demand from students and industry. Without program expansion capabilities, trade employment needs of the province will be impeded.

2.0 PROJECT DESCRIPTION

This is a phased project that envisions the construction of a new 66,480 sf (6,176 m^2) building, works yard, and dry dock (including overhead gantry crane) at BCIT's Burnaby campus in the initial phase. Additionally, four outdoor covered teaching spaces will be constructed as a cost-effective strategy to provide all-weather work areas.

This new Centre will accommodate program growth necessary to fulfill employment needs in critical trades areas, including the burgeoning LNG and shipbuilding industries, while providing adaptable and flexible 21st

century learning environments that respond to changes in trades education, particularly with the utilization of simulation technologies. As a compliment to these state-of-the-art trades learning environments, the Centre will also focus on growing technology-based programs that will support the high-tech function of the building, creating a complete integrated and collaborative Trades and Technology Centre.

Following the construction of the new Centre, the next phase involves the complete upgrade and renewal of the 31,215 sf (2,900 m^2) NE12 Steel Trades Building at BCIT's Burnaby campus due to end of life cycle conditions.

This phased project provides the opportunity for subsequent decanting of programs from obsolete buildings and permits the demolition of asbestos-containing buildings NE21, NE22 and NE28.

The scope of work, by major phase, includes:

Phase: New Trades & Technology Centre, Works Yard and Dry Dock

- Construction of a new building with flexible and adaptable simulation labs/workshops with observation galleries and broadcast media capabilities:
  - » Cross-disciplinary Lab – trades and technology collaboration;
  - » Marine Trade Simulation – teaching space;
  - » Power Engineering Lab – Kongsberg system;
  - » Welding Simulation Lab;
  - » Network Simulation Lab;
  - » LTC Gas Simulation – gasfitting software simulation;
  - » Industry Partnership space;
  - » Media Centre Lab;
  - » Maker Space;
  - » Additional supporting classrooms in close proximity to workshops/labs;
  - » Student commons, demonstration and atrium space; and
  - » Ancillary space – First aid facility.
- New works yard complex:
  - » Dry dock and covered works yard complex, including a gantry crane;
  - » Reconfigure existing works yard outside NE12 for increased student safety, improved teaching and efficient materials storage – includes the proposed two-storey steel structure;
  - » Loading and staging areas – lay-by capable of accommodating 30' delivery trucks; and
  - » Fuel storage.
- Other new improvements:
  - » Covered working areas (between NE4 and NE6 and between NE8 and NE10);
  - » Strengthen pedestrian pathways by landscaping around site (including Goard Way and internal student pathways within the northeast portion of campus between buildings); and
  - » Relocation of the existing NE12 substation and tie-in to the new Goard Way Receiving Station.

Phase: NE12 Steel Trades Renewal

- Layout upgrades:

    - » Renewed and modernized instructional workshops, equipment, classrooms, washrooms, and administration area; and
    - » Reconfigured rigging loft (mezzanine).
- Shop upgrades:
    - » Welding booths;
    - » Grinding stations;
    - » Gantry crane over north half of the workshop; and
    - » Gouging facility.
- Structural upgrades:
    - » Seismic upgrades; and
    - » Building envelope upgrades – rainscreened walls with metal cladding, double glazed aluminum windows, and energy efficient overhead doors.
- Mechanical and electrical upgrades:
    - » Conversion of electrical distribution to the more efficient 575/3/60 system, panel boards and lighting;
    - » Rooftop “make up” air units, exhaust fans, and duct work (HVAC);
    - » Lighting replacement;
    - » Fire alarm and sprinkler upgrades and renewals;
    - » Improved energy efficiency;
    - » Plumbing distribution piping; and
    - » Natural gas and compressed air piping.

Supported Programs

The following programs are located within NE12:

- Iron Worker Foundation
- Iron Worker Generalist
- Boilermaker
- Metal Fabrication

Programs to be accommodated in the new Trades and Technology Centre are:

- Steel Trades
- Ironworker
- Boilermaker
- Metal Fabrication
- Marine Fitter
- Millwright and Refrigeration
- Pipefitting – Plumbing, Steam and Gas
- Power Engineering/Instrumentation
- Network Simulation Lab

FTEs

The Steel Trades building (NE12) supports 313 FTEs.

The new Trades & Technology Centre will support approximately 700 FTEs.

Project Size

This project includes a combination of a new building, four covered workshop areas, renewal of an existing facility and the demolition of three existing buildings:

> Total Project Size: 136,220 sf (12,655 m^2).

- The new Trades & Technology Centre: 66,480 sf (6,176 m^2).
  - » Covered workshop: 15,500 sf (1,435 m^2).
- Renewal of existing facility – NE12: 31,215 sf (2,900 m^2).
- Covered exterior workshop – NE12: 3,120 sf (290 m^2).
- Covered exterior workshop – NE4/NE6: 10,765 sf (1,000 m^2).
- Covered exterior workshop – NE8/NE10: 4,300 sf (400 m^2).
- Demolition of existing buildings – NE21, NE22 and NE28: 20,345 sf (1,890 m^2).

3.0 PROJECT OBJECTIVES

High-Level

- Implement the priorities outlined in *BC's Skills for Jobs Blueprint*.
- Increase student intake and reduce waitlists for in-demand trades programs.
- Support programs that are in line with emerging opportunities presented by the LNG, shipbuilding and other high-tech industries that require skilled trades and technology personnel.
- Improve program image and recruitment.
- Strengthen industry partnership opportunities.
- Reduce energy use and operating costs.
- Enable the renewal or replacement of physically obsolete buildings.

Project Specific

> Phase: Trades & Technology Centre

- Modernization to meet new technology requirements – create 21st century flexible teaching environment for trades and technology programs, especially those associated with the LNG and shipbuilding industries.
- Develop integrated and collaborative Trades-Technology programming space.
- Enable broadcast media capabilities to stream or playback demonstrations, lectures and simulations to distance education students and industry partners in the field.
- Provide cost-effective covered workshop spaces and dry dock.
- Create a formal demonstration space and student commons to showcase BCIT trades and technology.
- Provide a safer works yard that is a more efficient use of space and is more functional, including improved delivery truck access.

> Phase: NE12 Steel Trades Renewal

- Renew a key facility situated in the core trades precinct.

- Create more efficient and functional space design.
- Provide modern, flexible learning and research facilities that respond to changing future teaching and workplace requirements.
- Upgrade critical deferred maintenance conditions identified by VFA.
- Seismic safety structural upgrades.

Needs Assessment

- NE12 is classified as **M – Medium Seismic Risk**.
- NE12 has a **FCI** of **0.53**.
- Mitigate congestion and safety issues in works yard.
- Demolish asbestos containing buildings NE21, NE22 and NE28.

4.0 OPTIONS CONSIDERED

> NE 12 Steel Trades Renewal

- **Status Quo**: does not address functional, structural and building system problems. Does not provide for program expansion and a reduction in student waitlists for in-demand trades and trades supporting LNG and shipbuilding.
- **Building Replacement**: more costly than renewal.
- **Renovation of Existing Building**: preferred.

> Trades & Technology Centre

- **Status Quo**: does not provide for program expansion and a reduction in student waitlists for in-demand trades and trades supporting LNG and shipbuilding. Does not address issues with the works yard or address physical and functional inadequacies of other buildings that will be vacated by the construction of the Centre.
- **New building**: preferred

5.0 PROJECT OUTCOMES

Infrastructure Improvements

This will significantly improve the FCI and address code compliance issues in NE12. Indoor air quality will be significantly improved with new HVAC equipment and controls.

The new Centre will provide 21st century flexible teaching spaces built to modern design and materials standards, correcting infrastructure deficiencies. Once completed, the facility will enable trade and technology program integration and consolidation by creating necessary swing space and program expansion opportunities for in-demand trades and technology programs.

Improvements to the works yard will also create a safer teaching and learning environment, while the covered workshops do likewise by shielding students, teachers and equipment from some of the natural elements. Within the yard, the new dry dock area provides for marine fitting program simulation.

Cost Effectiveness

- Renewed mechanical and electrical systems and exterior window upgrades in NE12 will reduce energy consumption.

- Provide flexible spaces to adapt to changes in labour market demands and subsequent program delivery options.
- More cost-efficient building and teaching technologies.
- Cost-effective project delivery schedule will create swing space in the new Centre that will expedite the renewal of NE12.

Innovation

The new Trades and Technology Centre will showcase new technologies and innovations, such as simulation, into the design of labs and workshops, and provide flexible space programming. This will enable student-centered learning that is adaptable over time to changes in teaching and labour market trends.

The inclusion of observation galleries and a demonstration/atrium space allows BCIT to showcase trades and technology education to students and visitors alike. The use of new technology will also enable media broadcasting capabilities to wider audiences, strengthening distance education and industry partnership opportunities. The media centre lab will also provide for these capabilities in a "green room" type environment to allow for varying workplace simulations.

Other innovations of this project include:

- Best practice design elements from the recently completed NE8 Welding Shop upgrade will be integrated into the renewal of NE12.
- Potential heat recovery from the exhaust and plumbing systems will be explored and utilized if feasible.
- Micro-grid technology will enable demand side control of the electrical usage.

Strategic Alignment

The Project is aligned with BC government priorities and strategies:

- *BC Skills for Jobs Blueprint*.
- Supports Ministry of Jobs Tourism and Skills Training Goal #4 by providing facilities that support a highly skilled and competitive labour force.
- Supports Ministry of Advanced Education Goal #1 by providing flexible facilities that support high quality education skills and trades training and produce job ready graduates that align with labour market demand.
- Supports BCIT Institute Strategic Initiative 4 – Stewardship and Resource Development to ensure that physical facilities and campus infrastructure needs are met through an integrated plan that accounts for teaching space, research facilities, equipment, information and education technologies.
- Consistent with BC's sustainability objectives (*BC Climate Action Plan*).

Quality Education

The existing systems of NE12 have antiquated ventilation and lighting and do not meet modern teaching environment standards. Renewal of these systems will greatly enhance the learning environment and enable an increased student intake.

The incorporation of simulation into trades and technology training provides improved learning environments for students to practice and learn in a diverse range of situations and experiences. These replicated situations may not be as readily available in real-life training experiences as they are limited by

lab, workshop and work yard limitations. The simulators can replicate more real life scenarios in a safe and controlled environment, preparing and accommodating students until they are comfortable attempting in real life. Simulation also provides more cost-effective training, as expensive materials are not being utilized as frequently as with traditional hands-on training. Together, these education and infrastructure improvements greatly enhance the trades education experience.

Energy and Emission Reductions

- Energy efficient HVAC, lighting, welding systems and insulated building envelop will increase energy efficiency and reduce GHG emisions.

A 30% reduction in energy and subsequent green house gas emissions is targeted for the renewal of NE12. The building will be designed to meet (or exceed) LEED Gold design standards.

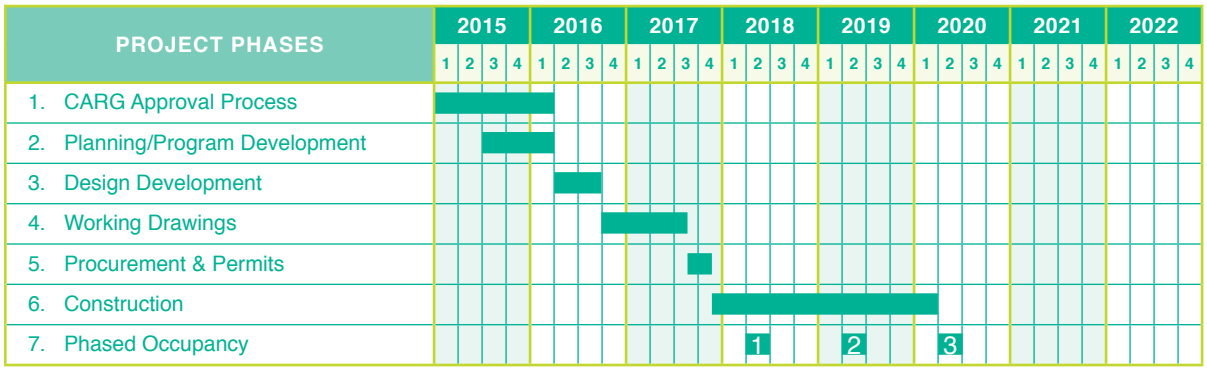
6.0 PROJECT COST / FUNDING

$67.5 Million - Total estimated project cost, including equipment and taxes.

7.0 KEY RISKS

- Maintaining operations while renewals are underway.
- Failure to upgrade will impact student education linked to the *BC Skills for Jobs Blueprint* and LNG and shipbuilding industry labour demand.

8.0 PROJECT SCHEDULE



Schedule for Trades & Technology Centre and NE12 Steel Trades Renewal (Proposed).

[1] Works Yard, Dry Dock, and Covered Workshops.

[2] Trades & Technology Centre.

[3] NE12 Steel Trades Renewal.

Trades & Technology Centre and NE12 Renewal Project Site and Phase Components

Trades & Technology Centre

Project 2 - “Canada Way” BC Hydro Service Replacement

Category : New Priority Projects				
Institution	**Campus / City**	**Project Title**	**Project Category**	**Project Priority**
BCIT	Burnaby	“Canada Way” BC Hydro Service Replacement	1	2 of 3

1.0 CURRENT SITUATION

Electrical power at the BCIT Campus is provided mainly through two on-campus high voltage (HV) receiving stations – “Goard Way” (South) and “Canada Way” (North), connected to the 12.5K HV BC Hydro service. The “Canada Way” receiving station supplies power to eleven substations and serves the entire campus area north of Goard Way, which provides power to the entire trades education programs.

A recently completed condition assessment by Stantec shows that approximately 50% of the electrical service infrastructure, which includes the north campus receiving station and its 11 substations, is past expected serviceable life and is in need of immediate replacement.

2.0 PROJECT DESCRIPTION

The BCIT Burnaby Campus North Receiving Station Replacement project involves the replacement and relocation of the northern “Canada Way” high voltage power receiving station. The replacement of all electrical equipment associated with the major receiving station is to address end of life issues as well as provide interconnection back to the “Goard Way” receiving station. This creates a more reliable and robust electrical distribution system for the north campus that has been stressed by being over capacity on several occasions.

This project addresses extreme risk to continuing operations in the northern portion of the campus. The full scope of work for the project includes:

- Replacement and relocation of the “Canada Way” high voltage receiving station.
- A new building approximately 2,150 sf (200 m^2) to house the receiving station located beside the “Goard Way” receiving station to minimize interconnection cable runs. This new building will provide physical protection to the receiving station and built in redundancy.
- Associated duct bank work to connect receiving station to substations.
- A utility spine will be created along Smith Street to backfeed the substations from the new receiving station via new underground high voltage electrical duct systems. All electrical cabling will be 25 kV rated.
- Civil works will include Smith Street and Carey Street road works, and new watermain and storm sewer along the Smith Street.
- New stand-by generator set.
- Create a single north campus grounding grid.
- All above ground features impacted by the duct bank installation will be reinstated to equivalent condition or better. This will include removal and replacement of landscaping, concrete sidewalk, concrete curb, asphalt, and miscellaneous architectural features. LED Street Lighting will be provided according to IESNA Standards

Supported Programs

- School of Energy
- School of Construction and the Environment
- School of Computing and Academic Studies

* Essentially, all programs located in the north campus are supported by the “Canada Way” receiving station.

FTEs

No additional student FTEs are associated with this proposal.

Project Size

The area of impact associated with this project is the entire north campus. It involves construction of a 2,150 sf (200 m^2) building to house the receiving station, multiple cable and duct runs, watermain and storm sewer replacement, road works, miscellaneous architectural repairs and landscaping.

3.0 PROJECT OBJECTIVES

- Maintain business continuity for the entire north campus – BCIT is the primary provider of education for the construction trades in BC.
- Upgrade critical deferred maintenance conditions related to electrical equipment that has reached end of life.
- Create a more modern electrical distribution system.
- Improve fire protection.
- Create electrical distribution redundancy.
- Align future campus developments with the campus strategic vision and above-ground master planning by providing a service corridor, or utility spine, for the north campus.

Needs Assessment

- Most of BCIT’s electrical equipment (approximately 50%) has passed its expected serviceable life and is in need of immediate replacement.
- Approximately 36% of the equipment that is not beyond its lifecycle is in need of replacement within the next 10 years.
- BC Hydro has notified BCIT on several occasions that the incoming service has been over capacity on several occasions. Due to the age of the electrical equipment, this poses an extreme risk to business operations.

4.0 OPTIONS CONSIDERED

Given the risk that electrical failure poses to the institution’s operations, immediate replacement of the electrical distribution system is required. Potential location options, including retention it in it’s existing location, were considered and it was determined that placing the new “Canada Way” receiving station beside the new “Goard Way” receiving station was optimal. This location will minimize interconnection runs and will open up the north-most side of the campus to future developments while keeping the new station central to its subordinate substations.

5.0 PROJECT OUTCOMES

Infrastructure Improvements

- Modernization of the electrical distribution system.
- Mitigates risk of electrical service interruption to buildings within the northern half of the campus representing 36% of campus instructional and administrative space, including the majority of BCIT's trades training spaces.
- Increased load capacity.
- Improved fire protection.
- Provides additional capacity for future expansion of construction trades.
- Provides back up for south campus electrical service.

Cost Effectiveness

- The renewal of the electrical distribution system for the north campus provides a grid system for delivering services throughout the north campus. This reduces cost of future development as the proposed utility spine is more accessible and strategically located.
- Avoid the risk of system failure and reduce costs associated with unplanned disruption to operations. Due to the age of the equipment, any failure would be for a significant amount of time because the equipment would likely not be repairable and would require long lead item replacement equipment.
- Locating the new "Canada Way" receiving station adjacent to the new "Goard Way" receiving station allows for short interconnection runs. The location also provides a large footprint for the stations and duct bank to allow for future 25 kV electrical service proposed by BC Hydro for the Burnaby area.

Strategic Alignment

The Project is aligned with BC government priorities and strategies:

- Aligns directly with the *BC Skills for Jobs Blueprint* with a focus on supporting education for the construction trades. Supports BCIT's role as the primary provider of trades education in the province by ensuring continuity in instruction.
- Supports BCIT Institute Strategic Initiative 4 – Stewardship and Resource Development to ensure that physical facilities and campus infrastructure needs are met through an integrated plan that accounts for teaching space, research facilities, equipment, information and education technologies.

6.0 PROJECT COST / FUNDING

$29.75 MILLION – Total estimated project cost.

7.0 KEY RISKS

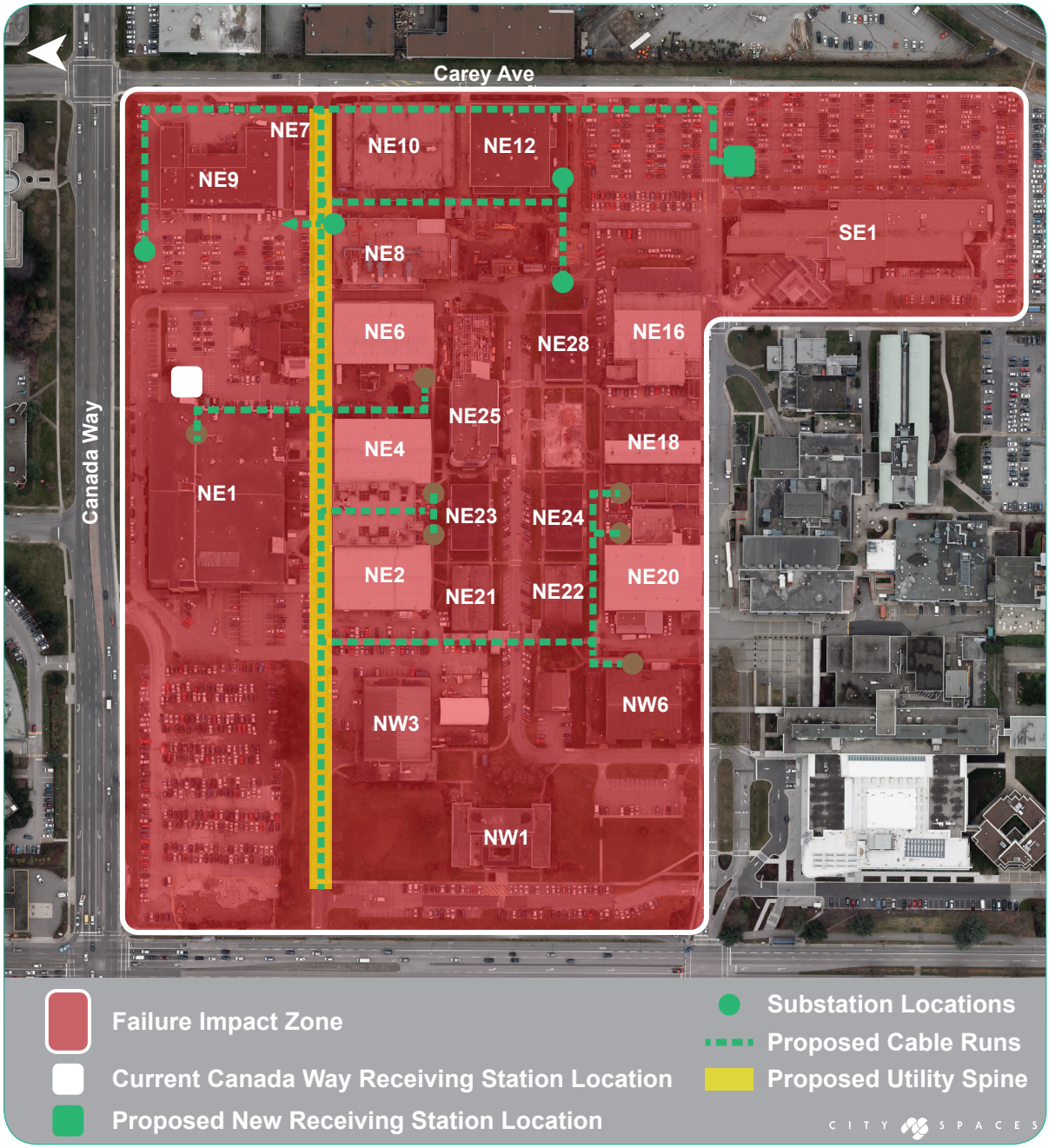
- There is the risk of unforeseen circumstances associated with excavation and replacement of infrastructure in the complex layout of buildings and services. BCIT has developed a risk register with mitigating strategies.

8.0 PROJECT SCHEDULE

PROJECT PHASES	2015				2016				2017				2018				2019				2020				2021				2022			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. CARG Approval Process																																
2. Planning/Program Development																																
3. Design Development																																
4. Working Drawings																																
5. Procurement & Permits																																
6. Construction																																

Schedule for "Canada Way" BC Hydro Service Replacement (Proposed).

BC Hydro Service Failure Impact Zone: Existing Service and Proposed System Layout



Project 3 - SW1 Renewal: Energy, Engineering & Health Sciences

Category 2: Whole Asset Replacement & Renewal Projects				
Institution	**Campus / City**	**Project Title**	**Project Category**	**Project Priority**
BCIT	Burnaby	SW1 Renewal: Energy, Engineering & Health Sciences	2	3 of 3

1.0 CURRENT SITUATION

SW1 was constructed in 1964. This four-storey building has 271,000 sf (25,200 m^2) total gross area, which includes the new space provided through the Gateway Project.

The east wing of SW1 has been categorized as high seismic risk (H1) by Bush Bohlman & Partners, indicating potential structural failure during a major seismic event. Based on 2014 VFA building assessments for the next five years, an estimated $46.8 million of deferred maintenance is required to maintain SW1. Further to these structural and seismic issues, there are functional inadequacies with some of the teaching spaces in SW1 that do not support 21st century learning pedagogies.

2.0 PROJECT DESCRIPTION

The proposed renewal of Building SW1 represents one component of a comprehensive and integrated facility renewal plan for BCIT's Schools of Energy, Computing and Academic Studies and Health Sciences. A BCIT Health Sciences Renewal Project Concept Plan Report, dated February 2013, was provided to the Ministry, and describes the need for this phased renewal.

Renovation of the balance of the SW1 Main Wing will address deferred maintenance, as will the structural seismic upgrade of the East Wing. In 2014, SW1 was rated by VFA at **0.48 FCI**. This renewal project will complete outstanding functional renovation to classrooms, project rooms, labs, and research facilities not previously included in the scope of the SW1 Gateway Project, estimated at 206,500 sf (19,200 m^2). The scope of renewal includes building system replacement, seismic upgrade, and deferred maintenance.

Supported Programs

- School of Energy
- School of Computing and Academic Studies
- School of Health Sciences

FTEs

No additional student FTEs are associated with this proposal.

Project Size

The area of the building to be renewed is approximately 206,500 sf (19,200 m^2).

Structural seismic deficiencies exist within 26,230 sf (2,440 m^2) of the single-storey portion of the East Wing, whereas base building renewal work is required on the full 206,500 sf (19,200 m^2).

3.0 PROJECT OBJECTIVES

- Implement the priorities outlined in the *BC Skills for Jobs Blueprint*.
- Supports programs that are in line with emerging opportunities presented by the LNG and other high-tech industries that require skilled trades (School of Energy).

- Health care is expected to remain a high-demand employment sector.
- Leverage previous capital investment in the SW1 – Gateway project.
- Seismic safety structural upgrades.
- Upgrade critical deferred maintenance conditions identified by VFA.
- Provide modern, flexible learning and research facilities.
- Create more efficient and functional space design.
- Consolidate programs.
- Renew a key facility situated in the core academic precinct.
- Reduce energy use and operating costs.

Needs Assessment

- The building has a **FCI** of **0.48**.
- Seismic structural analysis conducted by Bush, Bohlman & Partners classified the building as **H1 – High Seismic Risk**.
- 55% of current space was rated "unsatisfactory" or "completely unsatisfactory" by educators.
- SoHS facilities are located in seven different buildings distributed across the Burnaby Campus. This proposal enables consolidation of SoHS programs into three adjacent buildings.

4.0 OPTIONS CONSIDERED

As this project is integrated with the HSCAS and the Health Sciences Facility Renewal - SW3 projects, the options considered are the same: Preferred, Status Quo, Complete Replacement of the SoHS, and Renewal of Existing Buildings Only with Provision of Off-Campus Swing Space. For details and the full evaluation please see the submitted Concept Plan Report, dated February 2013.

5.0 PROJECT OUTCOMES

Infrastructure Improvements

- Completes the modernization of SW1 – Gateway Project.
- Provides modern teaching environment for Schools of Energy, Computer and Academic Studies, and Health Sciences.
- Improves health education program delivery and maintain BCIT's provincial leadership role.
- Provides necessary support space for the Health Sciences Centre for Advanced Simulation.
- Provides seismically safe accommodation.
- Upgrades entire building to modern standards and services (VFA report).
- Permits consolidation of programs.
- Improves space utilization through more efficient and flexible functional design.
- Supports BCIT Burnaby Campus Development planning objectives.

Cost Effectiveness

The complete renewal of SW1 mitigates VFA deferred maintenance costs of $46.8 million and $4.0 million in seismic deficiencies. A quantity surveyor has estimated the renewal cost to be 65% of the whole asset

replacement cost.

A complete functional renovation of SW1 classrooms, project rooms, labs and research facilities would provide modern learning environments and informal learning spaces. Space reconfiguration will enable flexibility for changing education requirements. The replacement of building systems provides for the adoption of energy saving electrical, mechanical and plumbing systems, while replacing exterior envelope systems increases the provision of natural light and improves energy efficiency.

Innovation

- Renewed modern teaching spaces with 21st century technology, improving the learning environment.
- Consolidation of compatible programs improves functional design and the integration of spaces.
- Supports the development of LNG by providing modern facilities for Energy, Engineering and Construction programs.
- More efficient and flexible functional design.
- More attractive, walkable campus though significant introduction of glazing, especially at the ground floor level.

Strategic Alignment

The Project is aligned with BC government priorities and strategies:

- *BC Skills for Jobs Blueprint*.
- Ministry of Jobs Tourism and Skills Training and Minister Responsible for Labour 2014/15 – 2016/17 Service Plan Goal 4: BC Has a highly skilled and competitive work force.
- Ministry of Natural Gas Development and Minister Responsible for Housing 2014/15 – 2016/17 Service Plan Goal 1: A globally competitive Liquefied Natural Gas export industry in B.C. that supports a prosperous economy and benefits all British Columbians. Objective 1.1: B.C. is a competitive jurisdiction for LNG investment. Goal 6: Healthy buildings, strong communities.
- Ministry of Advanced Education, all three Goals, but especially Students are supported to achieve their education, employment and training goals.
- The Project is also aligned with BCIT's Strategic Vision and Campus Development Plan.
- Consistent with BC's sustainability objectives (*BC Climate Action Plan*).

Quality Education

The facility renewal will improve program delivery and maintain BCIT's provincial leadership role by providing 21st century learning environments.

Energy and Emission Reduction

The project will be renewed to a LEED Gold standard. Annual energy savings are expected to be a 30% reduction of current levels.

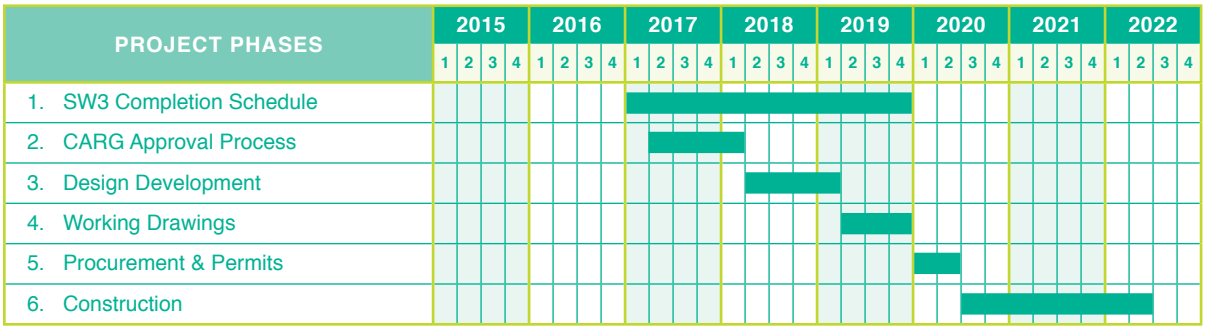
6.0 PROJECT COST / FUNDING

$69.5 MILLION – Total estimated project cost; 65% of the whole asset replacement cost.

7.0 KEY RISKS

- Timing of project is directly tied to SW3 completion timeline.
- Inadequate swing space available to allow for programs to be decanted from the building during renewal – disruption to program delivery.
- Hazardous materials mitigation.
- Disruptions to program continuity in the event of a seismic event/deferred maintenance.

8.0 PROJECT SCHEDULE



Schedule for Renewal of SW1 (Proposed).

SW01 Context Map

BCIT Renew:
Five-Year Capital Plan
2016 to 2020

BRITISH COLUMBIA
INSTITUTE OF TECHNOLOGY