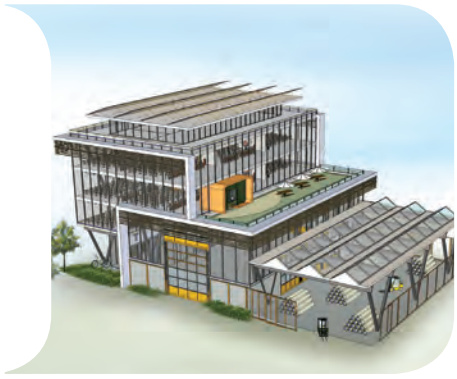


BCIT Renew:
Five-Year Capital Plan 2015 to 2019

BCIT

June 2014

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 46,000 full and part time students, BCIT is one of the largest post-secondary education institutions in the province.

BCIT is the largest provider of trade's education in BC and is the leader in technology education.

VISION

BCIT: Integral to the economic, social and environmental prosperity of British Columbia.

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 at the Burnaby Campus with a focus on trades and technology that responds to BC's 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 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 its Skills for Jobs Blueprint.

1. *A head start to hands on learning in our schools*
   BCIT has been a pioneer in programs that are designed to assist high school students in obtaining early educational experience (see "Pathways to and through a career in trades" initiatives at BCIT).
2. *A shift in education and training to better match jobs in demand*
   BCIT has over 12,000 full time students and part time enrolments 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 existing partnerships with industry and will continue to build on this as LNG 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:

- Two-thirds of Burnaby Campus academic buildings (29 of 43) are more than forty years old;
- The deferred maintenance value of the buildings is very large, with a total value of $607 Million (VFA study- Burnaby Campus);
- Two-thirds of Burnaby Campus buildings (29 of 43) are rated within the high seismic risk priority categories;
- Numerous buildings are functionally inadequate with building layouts, and teaching and social spaces that are inappropriate for modern learning and research;
- Building systems and infrastructure are obsolete and inefficient;
- Many buildings are unattractive and negatively impact Institute image and recruitment; and
- Energy efficiency and carbon reduction projects are featured in the Capital Plan as a means of achieving sustainability objectives and reducing operating expenses.

BCIT Renew: Five-Year Capital Plan is a cost effective mix of projects that blends new construction with building renewal and upgrades and is aligned with the provincial government's key policies and priorities.

RENEWAL PRIORITIES

BCIT Renew priorities in this Capital Plan are:

- ***Trades & Technology Complex (Category 1)***
  The provision of a new building plus renewal of Steel Trades Building NE12 will enable an expansion of the Trades & Technology complex at BCIT. This project will support programming identified in BC's Skills for Jobs Blueprint, with particular alignment with the expanding liquefied natural gas (LNG) and shipbuilding sectors.
- ***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 and SW3 building renewal.

CAPITAL PLAN SUBMISSION

In accordance with Ministry instructions, capital plan submission forms have been completed for these projects, and are listed in order of overall priority. In total, the Five-Year Capital Plan includes two projects with a value of $106.6 Million, spread over the 2015/16 to 2019/20 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 that 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 trade's education.* The focus is on construction and building operations trades.
- *Renewal.* The plan provides for renewal of BCIT' 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 to demands for different trades overtime
- *Timeliness.* Sites for new development have few impediments to early construction starts. Designs will be for construction simplicity

#	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	Trades & Technology Complex	1. New Priority	July 2016	October 2017 April 2019	$40.0 M	$9.0 M	$11.0 M	$8.5 M	$11.0 M	$0.5 M	$0
2	BCIT	Burnaby	SW1 Renewal: Energy, Engineering & Health Sciences	2. Whole Asset Renewal	July 2019	March 2020	$66.6 M	$0	$0	$3.0 M	$4.0 M	$14.6 M	$45.0 M
							106.6 M	**9.0 M**	**11.0 M**	**11.5 M**	**15.0 M**	**15.1 M**	**45.0 M**

Note: all costs include taxes.

Project 1: Trades & Technology Complex

Category 1: New Priority				
Institution	**Campus / City**	**Project Title**	**Project Category**	**Project Priority**
BCIT	Burnaby	Trades & Technology Complex	1	1 of 1

1.0 CURRENT SITUATION

Trades and Technology programs are currently located in a variety of old and functionally inadequate buildings that are operating at or above capacity. Based on VFA building assessments for the next ten years, an estimated $62.8 Million of deferred maintenance and $15.7 Million in seismic mitigation is required to maintain these five buildings.

The provision of a new building plus the whole renewal of Steel Trades Building NE12 will enable an expansion of the Trades & Technology complex at BCIT. This project will support programming identified in BC's Skills for Jobs Blueprint, with particular alignment with the expanding liquefied natural gas (LNG) and shipbuilding sectors.

In addition, this project represents a key building block in a long range facility plan for the Burnaby Campus valued at over $800 Million of replacement and renewal projects required over the next 20 years.

The project will provide a collaborative educational facility that supports expansion of both the construction trades programs and building operations programs such as Plumbing & Pipefitting, Welding, Steel Trades, Boilermakers, Power Engineering, Industrial Instrumentation, Refrigeration, Millwrights and Machinists.

BUILDING	VFA RATING	VFA COST	SEISMIC	
NE1 – JW Inglis (37 years old)	VFA FCI = 0.32	$31.3 M	H1	$7.3 M
NE2 – Joinery (57 years old)	VFA FCI = 0.62	$5.9 M	H3	$2.0 M
NE4 – Carpentry (55 years old)	VFA FCI = 0.28	$6.3 M	H3	$2.0 M
NE6 – Plumbing and Pipefitting (53 years old)	VFA FCI = 0.60	$6.5 M	H2	$1.6 M
NE8 – Welding (33 years old)	VFA FCI = 0.37	$5.5 M	H2	$1.0 M
NE12 – Steel Trades (42 years old)	VFA FCI = 0.43	$7.3 M	M	$1.8 M
		$62.8 M		$15.7 M

2.0 PROJECT DESCRIPTION

This project includes the development of a new 60,000 sf (5,574 m^2) building plus comprehensive renewal of the 31,590 sf (2,935 m^2) Steel Trades Building (NE12) to create an integrated 91,590 sf Trades & Technology complex.

BCIT recently completed a project identification / opportunity assessment report for the renewal of Building NE12. The conceptual design for building renewal includes renewed instructional workshops, classrooms, service yard and administrative areas. A Quantity Surveyor prepared a full cost estimate and verified that building renewal is the most cost effective and low risk renewal approach for this asset. Comprehensive renewal would cost approximately $9.3 Million, approximately 60% of new building replacement cost.

The Trades & Technology Complex would be developed in two sequential phases: Phase 1 would include the construction of the new 60,000 sf facility. Phase 2 would include the comprehensive renewal of Building NE12.

The new space provided in Phase 1 would provide temporary swing space needed to expedite Phase 2 work. Similarly, this project would also enable the relocation of some existing labs currently located in Building SW1 and facilitate the future renewal of this building (identified as the Priority #2 project in this capital plan).

The project would significantly increase the teaching space for skilled trades while incorporating new simulation technologies to provide 21st Century learning experiences such as power plant and chiller system instrumentation labs. This project will expand upon existing facilities and enable an increase in job-ready graduates required to support the BC's Skills for Jobs Blueprint.

As of June 2014, there are over 700 students on waitlists for programs operating in existing buildings at the Burnaby Campus.

BUILDING	FOUNDATION PROGRAM	STUDENT WAITLIST (JUNE 2014)
NE01	Sheet Metal	4
NE01	Drafting Technician	12
NE02	Joinery	8
NE04	Carpentry	20
NE06	Piping	106
NE08	Welder	135
NE08	Welding Level C	101
NE12	Boilermaker	10
NE12	Ironworker	5
NE12	Metal Fabricator	16
SE01	Electrical	296
		713

This innovative building will be based on a flexible design module so that the facility is adaptable to evolving skilled trades programming needs. The overriding design intent is to create a collaborative education facility that integrates construction trades with building operations trades in one facility and serve as a catalyst for greater industry partnership. BCIT believes that this facility will create unique opportunities to solicit industry cost sharing and technology demonstration labs.

The location of the new building will be situated on an unimpeded and flat parking lot on the eastern side of campus, adjacent to existing trades buildings. This building site has few impediments to immediate construction and would result in minimal disruption to on-going program delivery in adjacent buildings.

Supported Programs

- Joinery
- Carpentry
- Plumbing
- Steamfitting
- Gasfitting
- Sprinklerfitting
- Welding
- Iron Worker Foundation
- Iron Worker Generalist
- Power Engineering
- Boiler Maker
- Metal Fabrication
- Industrial Instrumentation
- Refrigeration
- Millwrights
- Machinists

FTEs

These skilled trades buildings support 2,500 FTEs.

Project Size

This project includes the development of a new 60,000 sf (5,574 m^2) building plus comprehensive renewal of the 31,590 sf (2,935 m^2) Steel Trades Building (NE12) to create an integrated 91,590 sf Trades & Technology complex.

3.0 PROJECT OBJECTIVES

- Implement the priorities outlined in BC's Skills for Jobs Blueprint.
- Increase the student intake for supported programs, and reduce current waitlists.
- Meet emerging skills and labour market demands in the LNG and Shipbuilding industries.
- Provide modern, adaptive and flexible learning facilities.
- Create a collaborative education facility that integrates construction trades with building operations trades.
- Serve as a catalyst for industry partnerships and technology demonstration labs.
- Provide modern and functional learning spaces that are receptive to new technologies, simulation learning and 21st Century teaching methodologies.
- Reduce energy use and operating costs.
- Improve program image and recruitment.
- Implement the BCIT Campus Development Plan.

4.0 OPTIONS CONSIDERED

- Status Quo: Does not address required expansion outlined in the BC Skills for Jobs Blueprint to meet LNG and Shipbuilding labour market needs.
- Renovation of existing buildings: Does not meet required program expansion.
- Develop a new building and renew a building for program expansion: preferred.

5.0 PROJECT OUTCOMES

Infrastructure Improvements

- This will significantly expand the skilled trades programs to meet the market demands driven by the LNG and Shipbuilding industries.

Cost Effectiveness

- 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 temporary swing space that will expedite the renewal of Building NE12 and also facilitate renewal of specialized labs in Building SW1.

Innovation

- Modern teaching spaces and technology that improves the learning environment.
- Consolidation of compatible programs improves functional design and the integration of spaces.
- Create a collaborative education facility that integrates construction trades with building operations trades.
- Provide a catalyst for industry partnerships and technology demonstration labs
- Sustainable and energy efficient buildings designed to be adaptive to evolving programming requirement.
- Micro-grid technology will enable demand-side control of electrical usage.

Strategic Alignment

The Project supports BC government priorities and strategies:

- BC Skills for Jobs Blueprint.
- Ministry of Jobs Tourism and Skills Training, especially Goal #4 - BC has a highly skilled and competitive work force.
- Ministry of Natural Gas Development, especially 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.
- Ministry of Advanced Education mandate to support students to achieve their education, employment and training goals.
- Consistent with BC's sustainability objectives (BC Climate Action Plan).
- 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.

BCIT has signed an MOU with Northern Lights College (Ft. St. John Campus) to share curricular materials and expertise to facilitate the delivery of Industrial Instrumentation courses at BCIT and NLC. Under the agreement, BCIT and NLC share curricular materials (at cost) and agree to coordinate student intakes to the mutual benefit of students at each institution. While NLC delivers Levels 1 & 2 of the Red Seal apprenticeship, BCIT delivers all four levels as well as the Foundations program. The shared program has been in place for about 6 months and will extend indefinitely into the future.

Quality Education

The current space provided by the six buildings are challenged to fully respond to the emerging demand and opportunities presented by the LNG industry. The new building will provide a modern and collaborative learning environment for skilled trade workers.

Increased opportunities for aboriginal and women, key groups underrepresented in trades sectors. BCIT has a number of initiatives aimed at increasing the enrollment of aboriginal students through its Aboriginal Services Departments. The "Trades Discovery for Women" is designated to facilitate the inclusion of women in trades programs.

Energy and Emission Reductions

The new building would be constructed to a minimum LEED Gold standard.
The renewal of NE12 would include high-efficiency building system renewal.

6.0 PROJECT COST / FUNDING

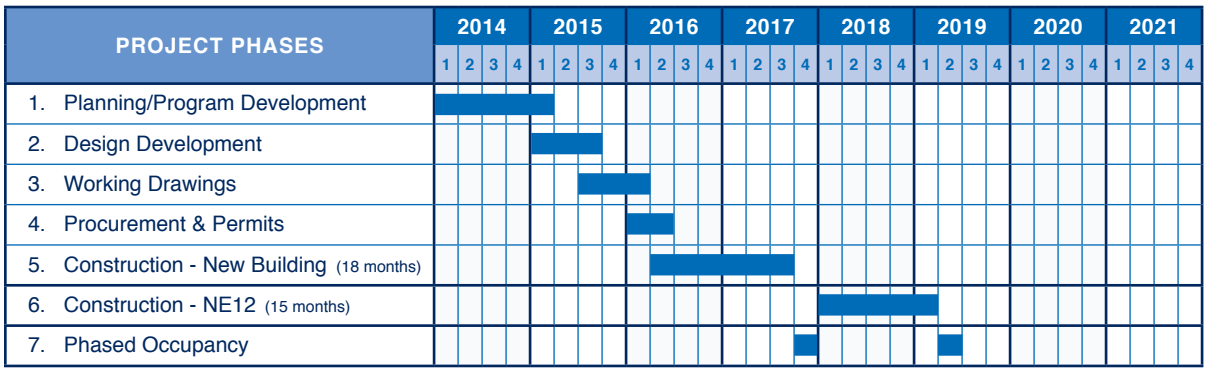
$40.0 Million - Total estimated project cost, including equipment and taxes.

The 60,000 sf new building is estimated at $30.7 Million.
The renewal of 31,500 sf Building NE12 is estimated at $9.3 Million.

7.0 KEY RISKS

- Projects do not proceed - opportunity to expand and support the BC Skills for Jobs Blueprint and Industry partnerships is missed.

8.0 PROJECT SCHEDULE



Schedule for Trades & Technology Complex (Proposed).

Trades & Technology Complex

New Building

Renewed NE12

Project 2 - 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	1 of 2

1.0 CURRENT SITUATION

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

The east wing of SW1 has been categorized as having a 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 ten years, an estimated $72.0 Million of deferred maintenance is required to maintain SW1. Further to these structural and seismic issues, there are functional inadequacies of some of the teaching spaces in SW1.

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, Construction and the Environment, 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 0.43 (average) 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 Construction and the Environment
- School of Computing and Academic Studies
- Biomedical Engineering
- Occupational Health and Safety
- Clinical Genetics Technology
- Prosthetics Orthotics
- Environmental Health Technology
- Radiation Therapy
- Medical Laboratory
- Medical Radiography

Other Supported Schools and Services

- Food Process Resource Centre
- Student Services
- Administration

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 BC's Skills for Jobs Blueprint.
- Supports programs that are in line with emerging opportunities presented by the liquefied natural gas (LNG) and other high-tech industries that require skilled trades (School of Energy and the School of Construction and the Environment).
- Health care is expected to remain a high-demand employment sector.
- Leverage previous capital investment in the Gateway SW1 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 VFA Facility Condition Index of 0.43 (average) FCI.
- 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 - SW03 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

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

Cost Effectiveness

The complete renewal of SW1 mitigates 10-year deferred maintenance costs of $72.0 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 to 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

- Modern teaching spaces and technology that improves 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 in glazing especially at the ground floor level.

Strategic Alignment

The Project is aligned with BC government priorities and strategies:

- BC's Skills for Jobs Blueprint.
- Ministry of Health's 2010/2011-2012/2013 Service Plan, particularly "Goal 4: Improved innovation, productivity, and efficiency in the delivery of health services".
- Ministry of Jobs Tourism and Skills Training, especially Goal #4 - BC Has a highly skilled and completive work force.
- Ministry of Natural Gas Development, especially 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.
- Ministry of Advanced Education, all three Goals, but specially 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 $135,740 or a 30% reduction of current levels.

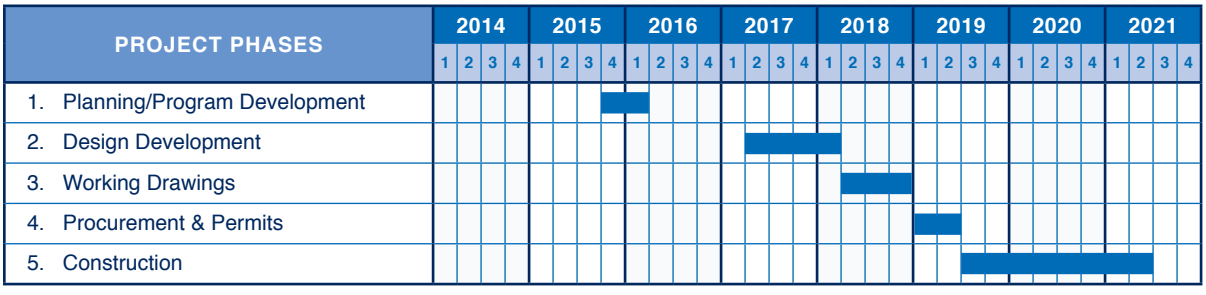
6.0 PROJECT COST / FUNDING

$66.6 MILLION – Total estimated project cost; 65% of the whole asset replacement cost.

7.0 KEY RISKS

- 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 SW01 (Proposed).

Note: This project schedule is linked to two previous phases of the project outlined in the Concept Plan Report (Feb 2013).

SW01 Context Map

BCIT Renew:
Five-Year Capital Plan
2015 to 2019

BRITISH COLUMBIA
INSTITUTE OF TECHNOLOGY