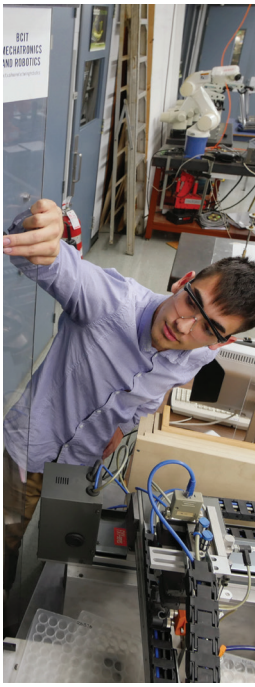
BCIT™ BCITRENEW

Five-Year Capital Plan 2018 to 2022

AUGUST 2017




BCIT

Prioritized List of BCIT Proposed Projects

#	CAMPUS	PROJECT DESCRIPTION	PROJECT CATEGORY	ANTICIPATED CONSTRUCTION START DATE	ANTICIPATED OCCUPANCY DATE	TOTAL PROJECT BUDGET	TOTAL CASHFLOW FORECAST (FISCAL YEARS IN MILLIONS)					
							2018/19	2019/20	2020/21	2021/22	2022/23	Outgoing years
1	Burnaby	Trades & Technology Centre	1	July 2019	Final Occupancy January 2022	$76.5 M	$6.5 M	$20.0 M	$25.0 M	$25.0 M	$0	$0
2	Burnaby	Learning Innovation Centre	1	June 2020	May 2022	$87.5 M	$0	$7.5 M	$35.0 M	$40.0 M	$5.0 M	$0
3	Burnaby	Centre for Ecological Restoration & Climate Adaptation	1	June 2020	January 2022	$55.0 M	5.0 M	$15.0 M	$20.0 M	$15.0 M	$0	$0
4	Burnaby	Student Hub and Intercultural Gathering Place	1	June 2020	December 2021	$77.0 M	$0	$7.0 M	$35.0 M	$35.0 M	$0	$0
5	Burnaby	Centre for Clean Energy Innovation and Distribution	1	June 2021	December 2022	$62.0 M	$0	$0	$5.0 M	$37.0 M	$20.0 M	$0
6	Burnaby	Centre for Automotive Innovation	1	June 2021	December 2022	$60.0 M	$0	$0	$4.0 M	$36.0 M	$20.0 M	$0
7	Burnaby	SW1 Renewal – Energy, Engineering & Health Sciences	2	March 2023	April 2025	$76.5 M	$0 M	$0 M	$0 M	$3.0 M	$5.0	$68.5
						$494.5 M	**$11.5 M**	**$49.5 M**	**$124.0 M**	**$191.0 M**	**$50.0 M**	**$68.5**

NOTE: ALL COSTS INCLUDE TAXES.

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

Category 1: New Priority Projects				
Institution BCIT	**Campus / City** Burnaby	**Project Title** Trades & Technology Centre and NE12 Steel Trades Renewal	**Project Category** 1	**Project Priority** 1 of 7

1. CURRENT SITUATION

NE12, which houses the Iron Worker Foundation, Iron Worker Generalist, Boilermaker, and Metal Fabrication programs, is an aging building with structural and functional deficiencies. Many systems and components are reaching end-of-life with a **VFA FCI value of 0.59**. Coupled with the building containing asbestos, there is a total of **$9 million** in deferred maintenance and seismic mitigation.

Currently, BCIT is experiencing long waitlists for in-demand trade programs. Specifically, BCIT's Enrollment Planning Office has noted that the School of Construction and Environment has **171** students on waitlists for trades foundation programs, while trades foundation and technician programs offered by the School of Energy have **252** students on waitlists. In addition to these waitlists, the respective Schools face challenges with apprenticeship intake capacities. Each year, the number of intakes are filled prior to fulfilling the demand of prospective students, causing them to defer enrollment to another year. The additional space delivered by this project will permit growth in the areas in highest demand by students and industry.

2. PROJECT DESCRIPTION

The BCIT Trades & Technology Centre project is an integrated, multi-phase project that will enhance and expand the Institute's trades and technology teaching space, with specific focus on the in-demand trades and industries identified in the *BC Skills for Jobs Blueprint*. The project is a mix of:

- A new 66,480 sf (6,176 m^2) integrated **Trades & Technology Centre**;
- Four new cost-effective covered workshops;
- A simulated shipyard, including gantry crane;
- A reconfigured works yard;
- Complete upgrade and renewal of the 31,215 sf (2,900 m^2) NE12 **Steel Trades Building**; and
- Demolition of one obsolete building that contains asbestos.

The project is in direct response to growing demand for trades training to address industry-driven labour demand, including the emerging liquefied natural gas industry, and the growing shipbuilding sector. New and enhanced learning environments will showcase advanced technologies and innovations (including simulation) in the design of labs and workshops, and provide flexible space programming that can adapt to changing education and industry requirements.

The new Centre will strengthen trades training, and contribute to a new trades and technology identity on the campus by creating a centralized hub. This hub will support trades and technology collaboration projects including a student commons and trades and technology showcase space that will enhance recruitment opportunities.

This project is proposed to be completed over three stages. The first sees construction of the outdoor workshops, the second includes construction of the new Centre, and the third is renewal of NE12. The total estimated capital cost is $76.5 million.

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

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
- Iron Worker Generalist
- 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 an existing building:

TOTAL PROJECT SIZE: 135,690 SF (12,606 M^2)

- The new Trades & Technology Centre: 66,480 sf (6,176 m^2).
  - Covered workshop: 8,115 sf (754 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: 15,460 sf (1,436 m^2).
- Covered exterior workshop – NE8/NE10: 4,300 sf (400 m^2).
- Demolition of existing building – NE28 (or NE24): 7,013 sf (652 m^2).

TOTAL – New and Renewed Space: 128,690 sf (11,956 m^2).

TOTAL PROJECT SIZE: 135,690 sf (12,606 m^2).

3. PROJECT OBJECTIVES

As described in the Opportunity Assessment Report submitted to the Ministry of Advanced Education (AVED) in April 2016, the Trades & Technology Centre project will provide teaching spaces that are critical for construction-related trades' education in priority areas identified in the *BC Skills for Jobs Blueprint*.

As outlined in the Project Description, this renewal and expansion project will quickly increase high demand trades training capacities, including the growing shipbuilding sector and the emerging LNG industry. The Centre will also provide:

- Facilities that include simulation technologies;
- Integration of trade with technology programs;
- Distance education online "narrowcasting" capabilities that allow the Institute to pursue pre-training, and other innovative delivery methods, designed to foster stronger outcomes for First Nations students, and other remote learners; and
- Visitor viewing opportunities to showcase job training, and assist in K-12 trades' recruitment.

4. OPTIONS CONSIDERED

Three options are identified in this assessment:

- **Status Quo Option**.
- **Non-Capital Option** – Off-site Lease Option.
- **Capital Option**: Preferred – New Trades & Technology Centre, Works Yard & NE12 Steel Trades Renewal.

The **Status Quo Option** is deemed not viable because of its shortfalls in meeting BCIT's training objectives, and the Province's growing labour market projections for in-demand trade professions.

The **Non-Capital Option – Off-site Lease Option** is also deemed not viable, because of the functional deficiencies it presents within the larger trades and technology complex on campus. Students need to be in proximity to adjacent spaces, and be able to easily access various shops, structures, and classrooms within the larger trades training complex. In addition, this option would not address the backlog of deferred maintenance associated with Building NE12.

5. 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.

This new Trades Complex will provide a provincial showcase for trades and technology education.

Cost Effectiveness

- Renewed mechanical and electrical systems and exterior window upgrades in NE12 will reduce energy consumption. A business case evaluation was undertaken by a Quantity Surveyor and determined that the renewal cost of NE12 is 41% of the current replacement value.
- 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.

Strategic Alignment

The Project is aligned with BC government priorities and strategies:

- *BC's Skills for Jobs Blueprint*.
- Supports Ministry of Jobs Tourism and Skills Training Goal #1 by providing facilities that support a highly-skilled labour force that is ready to meet the challenges of expanding industries.
- 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 Ministry of Advanced Education Goal #2 by supporting a high-quality education that provides BC with a global competitive advantage.
- 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).
- *#BCTECH Strategy* by supporting tech-related education and training with new and expanded modern teaching spaces.

- Consistent with Aboriginal Post-Secondary Education and Training Policy Framework and Action Plan.
- Trades, transport and equipment operators and related is one of the top four occupation groups identified as having the strongest growth in demand (*BC Labour Market Outlook 2016-25*).

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 & Emission Reductions

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

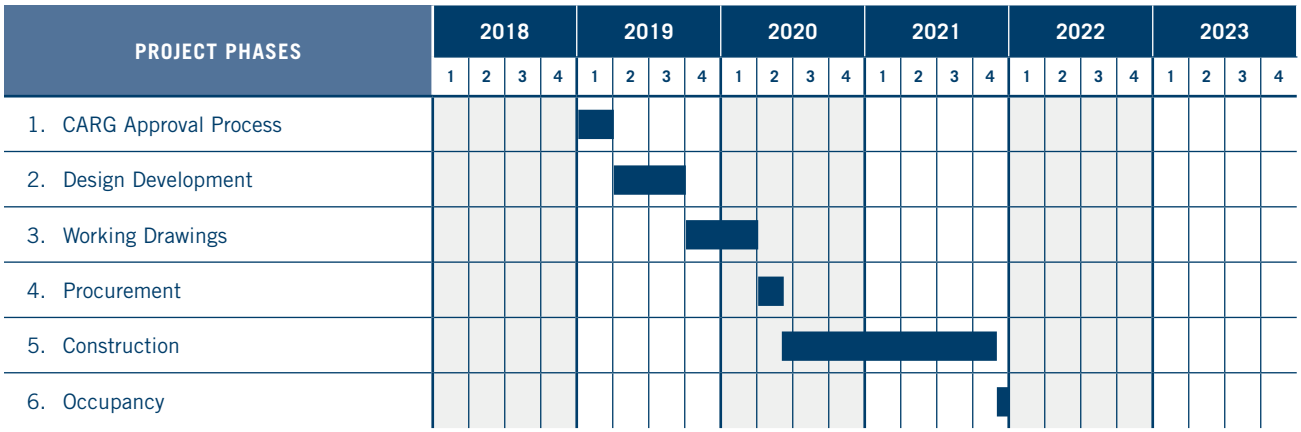
6. PROJECT COST/FUNDING

$76.5 MILLION - TOTAL ESTIMATED PROJECT COST, INCLUDING ESCALATION, EQUIPMENT AND TAXES.

7. KEY RISKS

As outlined in Table 4.3 of the Opportunity Assessment Report submitted to AVED in April 2016, a risk register has been developed for this project. BCIT has a well-defined project management framework that will identify appropriate risk mitigation strategies during the project design process. .

8. PROJECT SCHEDULE



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

Project 2: Learning Innovation Centre

Category 1: New Priority Projects				
Institution BCIT	**Campus / City** Burnaby	**Project Title** Learning Innovation Centre	**Project Category** 1	**Project Priority** 2 of 7

1. CURRENT SITUATION

BCIT's campus is aging and lacks sufficient modern and flexible learning and administration spaces. In particular, SE12 contains a number of outdated, inflexible and functionally in adequate spaces. The building is functionally inadequate and is rated at the highest end of the seismic risk scale – **H1**, indicating potential structural failure during a major seismic event. SE12 was found to be extremely expensive to renew to modern building and seismic standards. Including seismic upgrading and deferred maintenance, the cost of renewal was estimated at 80% of a new building.

Based on VFA building assessments for the next ten years, an estimated $40 million of deferred maintenance is required to maintain SE12.

NW1 is an older, inefficient administration building that is also at the highest end of the seismic risk scale – **H1**. It also has a very high renewal cost relative to its size, with a 10-year maintenance backlog equal to 54% of its replacement cost.

2. PROJECT DESCRIPTION

The new Learning Innovation Centre (LIC) would provide an integrated learning environment, creating a collaboration and resource hub for teachers and students throughout the Institute, facilitating student success through innovative learning. In addition, this project would give students and teachers the opportunity to incorporate and experiment with new technologies and enhanced audio visual equipment in the learning spaces. The new building would also facilitate the demolition of two aged and outdated buildings (SE12 and NW1) and alleviate significant seismic risk as both of these buildings are rated as having high risk to fail during a seismic event.

Supported Programs

The new building will accommodate:

- School of Computing and Academic Studies
- School of Business
- Learning and Teaching Centre
- Information Technology
- General purpose classrooms

New Building Components

Division	Room Area Net sf (Net m^2)
School of Computing and Academic Studies / School of Business	5,382 sf (500 m^2)
Learning and Teaching Centre / Student Services / AV	10,764 sf (1,000 m^2)
Learning Commons / Project Rooms	12,917 sf (1,200 m^2)
Generally Timetabled Labs and Classrooms	17,222 sf (1,600 m^2)
Information Technology Services	10,764 sf (1,000 m^2)
Sub-total	57,049 sf (5,300 m^2)
TOTAL (Gross up factor of 1.5)	**86,111 sf (8,000 m^2)**

Demolish Existing Buildings

SE12 is a 102,870 sf (9,557 m^2) concrete building that was constructed in 1976. The building is on a sloped site with the east and south walls of the first floor being set below grade.

Existing NW1 is a 14,250 sf (1,324 m^2) concrete building with a single story of administrative space over a basement. It was constructed in 1962.

FTEs

There are no additional FTEs associated with this proposal.

Project Size

This project will comprise approximately 86,000 sf (8,000 m^2).

3. PROJECT OBJECTIVES

- Replacement of an existing structurally and functionally obsolete building.
- Construction of a modern building to serve the Learning and Teaching Centre, the School of Computing and Academic Studies, the School of Business and IT services.
- Modernize computer data server and communication facilities.
- Maintain BCIT's leadership role in computer science education.
- Reduce building operating costs.
- Enable redevelopment of the SE12 site to improve campus circulation routes.
- The existing SE12 building is functionally, structurally and physically obsolete, with estimated renewal costs of 80% of total replacement value.
- The VFA Facility Condition Index (FCI) rating for SE12 is 0.47, and indicates 10-year deferred maintenance costs of $40 million. The FCI rating of NW1 is 0.54.
- Structural analysis of the buildings performed by Bush, Bohlman & Partners, revealed significant structural deficiencies. Both buildings are rated **H1 – High Seismic Risk**.

4. OPTIONS CONSIDERED

- **Status Quo**: does not address functional and structural issues.
- **Renovation of Existing Building**: not cost effective as renewal cost of this building is 80% of total replacement value and the buildings unusual structural design is not economical to renovate.
- **New Centre**: Preferred.

5. PROJECT OUTCOMES

Strategic Alignment

The Project is aligned with BC government priorities and strategies:

- *BC's Skills for Jobs Blueprint*.
- Supports Ministry of Jobs Tourism and Skills Training Goal #1 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 training and produce job ready graduates that align with labour market demand.
- Supports Ministry of Advanced Education Goal #2 by supporting a high-quality education that provides BC with a global competitive advantage.
- Information systems analysts and consultants are one of the top ten occupations and Computer systems design and related services are one of the top five industries forecast to expand the fastest in the Mainland/Southwest economic region (*BC Labour Market Outlook 2016-25*).
- Project aligned with BCIT's Strategic Plan and Campus Plan.

Quality Education

The project will provide a modern educational environment. The expanded Learning and Teaching Centre will support teaching excellence and pedagogical innovation across the Institute.

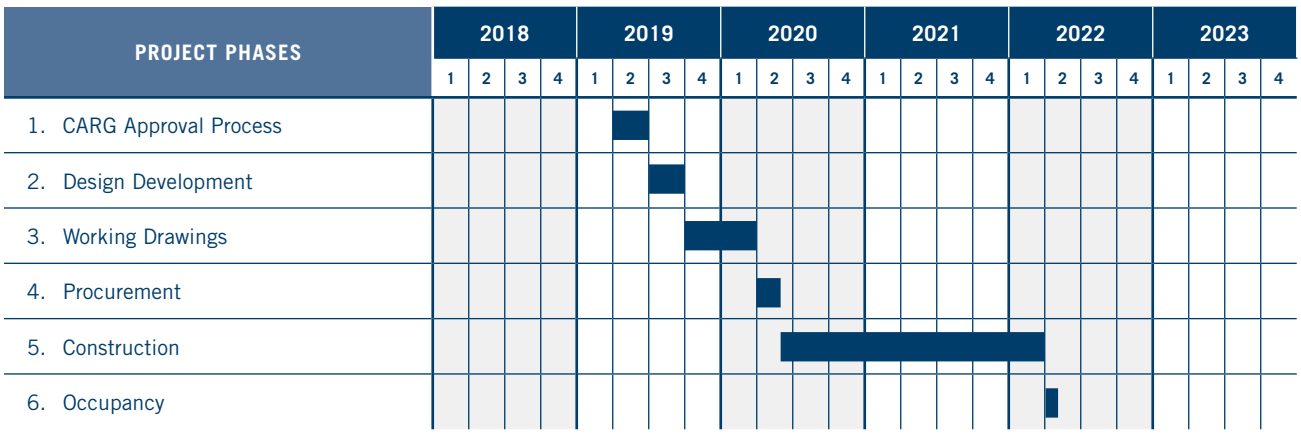
6. PROJECT COST/FUNDING

$87.5 MILLION - TOTAL ESTIMATED PROJECT COST, INCLUDING EQUIPMENT AND TAXES.

7. KEY RISKS

- Mechanical failure and seismic risk impacts on program continuity.
- Technology limitations on education programmatics.
- Reliability of Institute data and communication services.

8. PROJECT SCHEDULE



Schedule for the Learning Innovation Centre (Proposed)

Project 3: Centre for Ecological Restoration and Climate Adaptation

Category 1: New Priority Projects				
Institution BCIT	**Campus / City** Burnaby	**Project Title** Centre for Ecological Restoration and Climate Adaptation	**Project Category** 1	**Project Priority** 3 of 7

1. CURRENT SITUATION

Ecological restoration is a new a rapidly developing industry, one which BCIT has become the lead institution in Canada in providing education. In 2009, BCIT initiated the first of only two B.Sc. programs in Canada for Ecological Restoration and in 2015 BCIT developed Canada's only M.Sc. program in Ecological Restoration as a joint M.Sc. with Simon Fraser University.

The Ecological Restoration program has collaborative projects with industry, all three levels of government and non-government organizations, positioning the institution to capitalize on the increasing market demand and government initiatives related to Ecological Restoration. CERCA could become a preeminent research centre with global influence.

2. PROJECT DESCRIPTION

This new building will establish the Institute's Centre for Ecological Restoration and Climate Adaptation (CERCA), a new research and teaching centre that will solidify BCIT's role as the leader in Ecological Restoration. The Centre will allow for expansion of department's M.Sc and B.Sc. programs, and will provide opportunities to support Indigenous learners in the field of Environmental Stewardship. The project will also permit the demolition of building SE4, an obsolete building with significant deferred maintenance liabilities and seismic risk.

Supported Programs

The new building will accommodate:

- Ecological Restoration Masters
- Ecological Restoration Degree
- Forests and Natural Areas Management
- Fish Wildlife and Recreation
- Rivers Institute

Portions of Programs Relocated from SE4 Include:

- Mining
- Geomatics
- Biotechnology

FTEs

The new Centre will support approximately 70 additional FTEs.

Project Size

This project will comprise approximately 60,000 sf (5,600 m^2).

3. PROJECT OBJECTIVES

- Enhance the Institution's contribution and influence by expanding the current Ecological Restoration program.
- Create opportunities to link existing BCIT programs and collaborate on research initiatives with faculty across campuses including existing programs related to marine, mining, forestry and fish, wildlife and recreation.
- Capitalize on substantial opportunities to collaborate with Federal research facilities in North Vancouver (Environment Canada), West Vancouver Aquatic Laboratory (DFO), the Vancouver Aquarium and the Hakai Institute.

4. OPTIONS CONSIDERED

- **Status Quo**: does not address program expansion opportunities.
- **New Centre**: Preferred.

5. PROJECT OUTCOMES

Strategic Alignment

The Project is aligned with BC government priorities and strategies:

- Supports Ministry of Jobs Tourism and Skills Training Goal #1 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 training and produce job ready graduates that align with labour market demand.
- Supports Ministry of Advanced Education Goal #2 by supporting a high-quality education that provides BC with a global competitive advantage.
- Consistent with Aboriginal Post-Secondary Education and Training Policy Framework and Action Plan.
- Consistent with BC's sustainability objectives (*BC Climate Action Plan*).

Quality Education

This new centre will serve as collaborative hub and research centre in the emerging ecological restoration industry. In particular, linking existing BCIT programs and providing the opportunity for faculty and students to collaborate on research initiatives related to marine, mining, forestry and fish, wildlife and recreation.

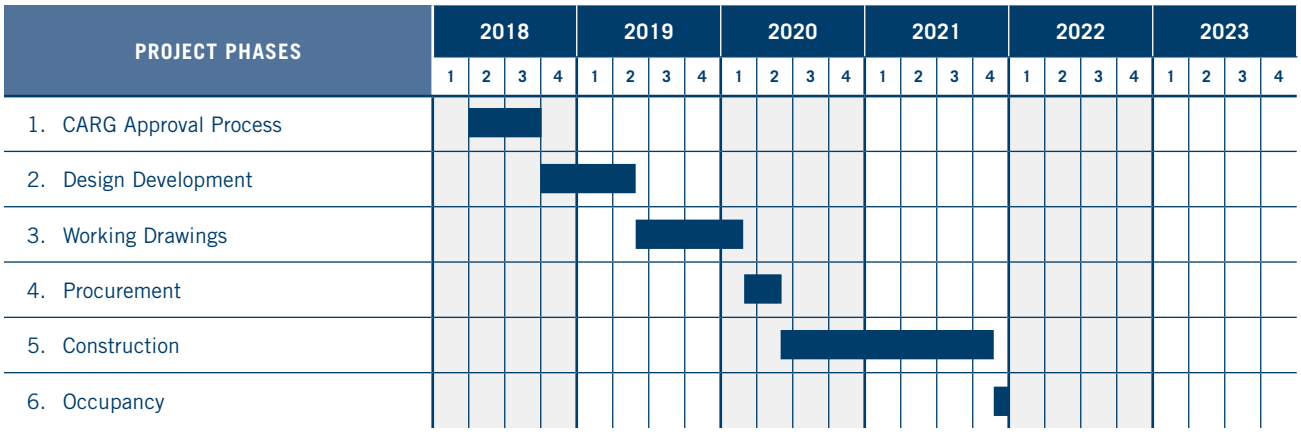
6. PROJECT COST/FUNDING

$55.0 MILLION - TOTAL ESTIMATED PROJECT COST, INCLUDING EQUIPMENT AND TAXES.

7. KEY RISKS

- Impact on recruitment of students, faculty and staff – loss of market share to other ecological restoration and climate adaptation research institutions.
- Limit the Province's ability to successfully implement its priorities and initiatives identified in the "Strategic Alignment" section.

8. PROJECT SCHEDULE



Schedule for the Centre of Excellence for Ecological Restoration and Climate Adaptation (Proposed)

Project 4: Student Hub and Intercultural Gathering Place

Category 1: New Priority Projects				
Institution BCIT	**Campus / City** Burnaby	**Project Title** Student Hub and Intercultural Gathering Place	**Project Category** 1	**Project Priority** 4 of 7

1. CURRENT SITUATION

This project seeks to leverage the Institution's partnership with the BCIT Student Association (BCITSA) to deliver an integrated project that will take a holistic approach to education and wellness. The BCITSA recently passed a referendum to fund a $38.5 million Student Centre to provide students with services and space that are currently inadequate on campus. Whereas the Institution requires a new centre for dialogue and Indigenous initiatives to provide a forum for pan-institutional cultural exchange and indigenous learning initiatives and as part of BCIT's strategy to fulfill it's Provincial mandate.

2. PROJECT DESCRIPTION

This project is proposed in partnership with BCIT Student Association (BCITSA) to leverage their approved capital investment in order to deliver a larger, integrated facility that will take a holistic approach to education and wellness. The Student Hub will foster engagement and collaboration through 24/7 accessibility, project spaces, diverse food options, conference services, part-time studies, as well as space for large community events. It will also house a gathering place to accommodate intercultural initiatives, with a particular focus on supporting indigenous and international students.

Project Size

This project will comprise approximately 75,000 sf (7,000 m^2).

3. PROJECT OBJECTIVES

- Provide a centre that extends the concept of a "Gathering Place" to a place of collaborative and responsive change maker for both Indigenous and non-Indigenous initiatives.
- Provide a resource centre and central hub for students to collaborate and socialize in an informal setting.
- Create a centre for dialogue and a think tank to discuss, design, and implement initiatives in education, training and community needs.
- Provide a space for programs and services, community forums and local events.
- Create innovative learning opportunities that support and enhance existing pathways in education and relationships amongst Indigenous and non-Indigenous people.
- Support and increase community collaboration that is more effective, unique and entrepreneurial using the latest technology and thought.
- Support Indigenous initiatives in education, training, research and advocacy.

4. OPTIONS CONSIDERED

- **Status Quo**: does not provide appropriate space for a 'gathering place' that fosters cultural exchange.
- **New Centre**: Preferred.

5. PROJECT OUTCOMES

Strategic Alignment

The Project is aligned with BC government priorities and strategies:

- Consistent with Aboriginal Post-Secondary Education and Training Policy Framework and Action Plan.
- Consistent with BC's sustainability objectives (*BC Climate Action Plan*).

Quality Education

This new facility will serve as a hub within BCIT to coordinate and support student initiatives on campus and help drive student success and engagement.

The facility will provide a holistic centre for reciprocal engagement with the Indigenous community, stakeholders and others to advance education, skills and training. It will be innovative and provide relevant focus to support Indigenous learners to meet their challenges and to maximize their opportunities.

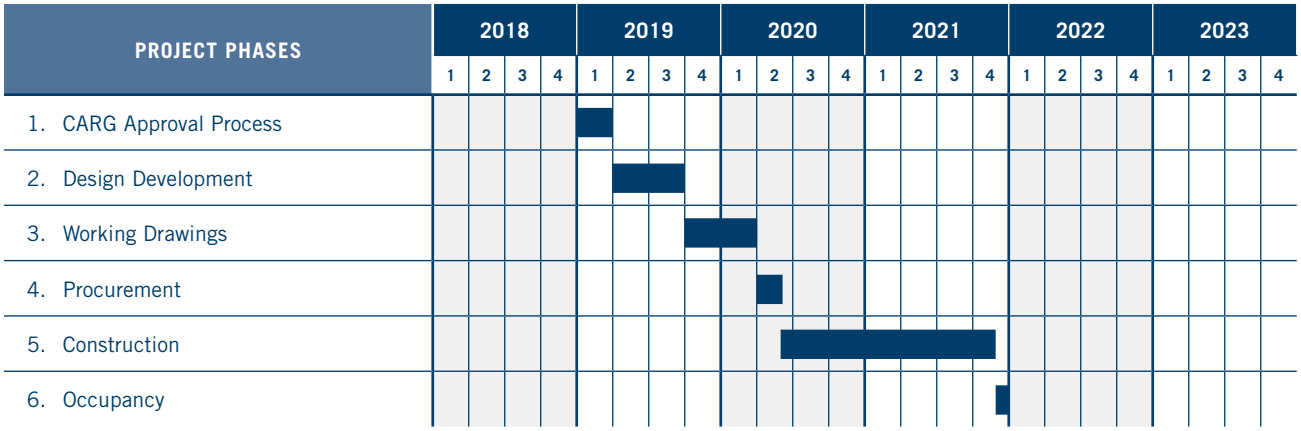
6. PROJECT COST/FUNDING

$77.0 MILLION - TOTAL ESTIMATED PROJECT COST, INCLUDING EQUIPMENT AND TAXES.

7. KEY RISKS

- Limit BCIT's ability to attract and retain international students.
- Limit the Province's ability to successfully implement its priorities and initiatives identified for Indigenous students, including the wider population.
- The effectiveness of existing BCIT Indigenous initiatives and efforts would be lessened.
- Limit the ability of BCIT to engage with the community and host academic, industry or inter-cultural gatherings.

8. PROJECT SCHEDULE



Schedule for the Student Hub and Intercultural Gathering Place (Proposed)

Project 5: Centre for Clean Energy Innovation and Distribution

Category 1: New Priority Projects				
Institution BCIT	**Campus / City** Burnaby	**Project Title** Centre for Clean Energy Innovation and Distribution	**Project Category** 1	**Project Priority** 5 of 7

1. CURRENT SITUATION

The generation, storage and distribution of energy is a research priority for BCIT. BCIT is a provincial and national leader in the field of energy management, and boasts various programs, installations and research programs that are unique in the country. This includes the BCIT-led Smart Grid, the Centre for Energy Education and Research, or its related Power Engineering program.

Presently, BCIT is restricted in its ability to integrate students within multi-disciplinary research initiatives. Applied research initiatives are most successful when they are available to students and form the core of educational programs. This requires localization in a secure and maintained facility that is easily accessible, open after hours and equipped with the appropriate breakout and learning spaces.

2. PROJECT DESCRIPTION

BCIT proposes the creation of a provincial nexus for education and innovation in energy management with a correlated set of facilities at its Burnaby Campus. At the heart of these facilities will be a Centre for Clean Energy Innovation and Distribution, which will hold various modules such as:

- Flexible and reconfigurable space for industry and other partners.
- Research labs for clean energy innovation and distribution.
- A lecture theatre for conferences, presentations and discourse on energy-related matters.
- Expansive space for clean energy prototyping and demonstration labs, test beds and comparative analysis to educate and showcase accomplishments in clean energy and LNG research.
- Prototyping labs for the design, manufacture and proof of concept of new ideas, including those in fields adjacent to energy generation and grid maintenance.
- Maker spaces for student, teacher, researcher, engineer and industry interaction.

The new Centre will play an intricate roll in the energy node at the Burnaby Campus. As part of the nexus, it will be the central nucleus acting as a cross-disciplinary hub for the other research facilities and programs on campus such as the Centre for Energy Education and Research (CEER), and its related Power Engineering program, the Intelligent Microgrid Network (“Smart Grid”), the OASIS energy project (Open Access to Sustainable Intermittent Sources), and other future initiatives and applications made possible by the new Centre.

Supported Programs

Creating a cross-disciplinary learning and research environment, the Centre supports the following programs:

- Power Engineering
- Industrial Instrumentation
- Chemical / Environmental Technology
- Mechanical Engineering
- Electrical Engineering

Project Size

This staged project will eventually comprise approximately 65,000 sf (6,000 m^2).

3. PROJECT OBJECTIVES

Project Specific

- Create a multi-disciplinary incubation and technology transfer hub for energy research, education and discourse – integrate disciplines such as energy, mobility, infrastructure and computing.
- Through expanded research capabilities, ensure BCIT's leadership position in the adoption of electric vehicle charging stations.
- Support the Province's mandate for greener transportation.
- Build partnerships to support and enhance critical infrastructure resiliency

Future Initiatives (made possible by the new Centre)

- Empower remote, off-grid, and indigenous communities with training in the operation and maintenance of custom Smart Grid installations, both in situ and at the new Centre.
- Create a test site for autonomous vehicles, in collaboration with industry partners.
- Provide design, prototyping, manufacturing and testing of airframes and payloads of Unmanned Aerial Vehicles (UAV, Drones) for Smart Grid inspection.
- Provide a platform for the simulation of cyber security and train students in protection of our national infrastructure.
- Create an LNG research, test and training facility that will stimulate innovation in breakthrough technologies for LNG production, distribution and consumption

4. OPTIONS CONSIDERED

- **Status Quo**: Does not provide for collaboration and multidisciplinary environments critical for the success of applied research initiatives that require the embedding of industry, faculty and students.
- **New Centre**: Preferred.

5. PROJECT OUTCOMES

Infrastructure Improvements

The new Centre will be a state-of-the-art core School of Energy facility that permits BCIT to build on its provincial leadership role in energy research and education by providing flexible and reconfigurable space for industry partners, linking research and training directly to application and market.

The Centre will generate opportunities that will attract industry, researchers, national and international partners. This will be a landmark investment into a physical facility serving as a nexus for Energy Innovation and Distribution, bringing together researchers, industry, students and instructors in a central location.

Innovation

The new Centre will provide a core facility for the advancement of applied research and innovation technologies related to energy generation, storage, and distribution. Acting as an incubator and technology transfer hub, the Centre is part of a larger nexus of energy on campus, creating a system that provides for a very dynamic and flexible research and training backplane that is responsive to changes in industry.

The Centre will act as the nucleus, connecting BCIT's other energy distribution related facilities and programs, such as the Centre for Energy Education and Research (CEER), and its related Power Engineering program, the Intelligent Microgrid Network ("Smart Grid"), and the OASIS energy project.

Strategic Alignment

The Project is aligned with BC government priorities and strategies:

- *BC's Skills for Jobs Blueprint*.
- Supports Natural Resources Canada's National Strategy for Critical Infrastructure by providing research and education space for energy generation from different energy sources, including intelligent and cyber secure supply systems.
- *#BCTECH Strategy* by supporting tech-related education and training with new and expanded modern teaching spaces.
- Supports Ministry of Jobs Tourism and Skills Training Goal #1 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 Ministry of Advanced Education Goal #2 by supporting a high-quality education that provides BC with a global competitive advantage.
- 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 Aboriginal Post-Secondary Education and Training Policy Framework and Action Plan.
- Consistent with BC's sustainability objectives (*BC Climate Action Plan*).

Quality Education

The creation of a centralized hub on campus, bridging many adjacent fields and facilities, creates an indispensable resource and training opportunity that would build on its reputation as being a key institution for knowledge and research of energy generation and distribution. The facility will attract educators, presenters and partners from around the globe and provide the opportunity for exchange and discourse on energy-related and other matters of engineering and polytechnic nature, linking research and training directly to application and market.

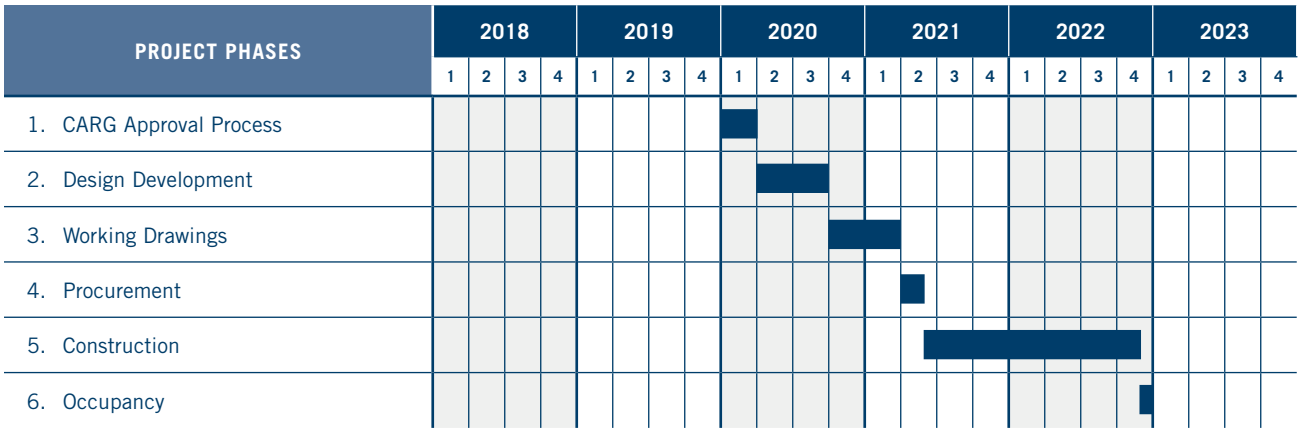
6. PROJECT COST/FUNDING

$62.0 MILLION - TOTAL ESTIMATED PROJECT COST, INCLUDING EQUIPMENT AND TAXES.

7. KEY RISKS

- Impact on recruitment of faculty and staff – loss of market share to other energy generation, storage and distribution research institutions.
- Negative impacts on industry due to reduced ability/sites to conduct research and test innovations.
- Limit the Province's ability to successfully implement its priorities and initiatives identified in the "Strategic Alignment" section.

8. PROJECT SCHEDULE



Schedule for the Centre for Clean Energy Innovation and Distribution (Proposed)

Project 6: Centre for Automotive Innovation

Category 1: New Priority Projects				
Institution BCIT	**Campus / City** Burnaby	**Project Title** Centre for Automotive Innovation	**Project Category** 1	**Project Priority** 6 of 7

1. CURRENT SITUATION

BCIT has identified an emerging need to train automotive technicians with the appropriate skills to work within the rapidly growing intelligent vehicle and intermodal transportation sectors.

As a flagship for polytechnic education, BCIT is the only institution in Canada that can provide comprehensive programming in intelligent intermodal transportation, such as:

- Specialized campuses for aerospace, marine and commercial transportation are complemented by operation management and engineering divisions.
- Clean energy vehicle technology and cyber security are strong elements of the Institute's research portfolio.
- Car manufacturers use BCIT's Automotive division for authorized Original Equipment Manufacturer (OEM) and brand-specific training.
- Industry provides state-of-the-art vehicles for modern training and has committed to even more engagement.

2. PROJECT DESCRIPTION

This new building would provide a multi-disciplinary training centre to showcase modern vehicle technology and attract industry partners requiring augmented training dedicated to next-generation transportation solutions, including autonomous driving, alternative energy propulsion and vehicles that interact with the infrastructure around them. With the growing need to reduce GHG emissions and the potential to support Smart City infrastructure, Industry partners have expressed interest in supporting this project.

Project Size

This project will comprise approximately 65,000 sf (6,000 m^2).

3. PROJECT OBJECTIVES

Project Specific

- Create a hub for Pacific Northwest auto manufacture's training.
- Convey emerging technologies through new educational tools, materials and methodologies, such as maker spaces where industry, students and faculty interact in a multi-disciplinary innovation lab.
- Strengthen and maintain existing partnerships with car manufacturers, OEMs, and authorized vendors, as well as create new ones.
- Replace the current functionally obsolete and deteriorating transportation facilities at the Burnaby Campus.

Future Initiatives (made possible by the new Centre)

- Create a research, test and training facility that will stimulate innovation in LNG vehicle power technologies.
- Create a test site for autonomous vehicles, in collaboration industry partners.

- Provide design, prototyping, manufacturing and testing of airframes and payloads of Unmanned Aerial Vehicles (UAV, Drones) for Smart Grid.
- Provide a platform for the simulation of cyber security and train students in protection of our national infrastructure.

4. OPTIONS CONSIDERED

- **Status Quo**: Does not provide for collaboration and multidisciplinary environments critical for the success of applied research initiatives that require the embedding of industry, faculty and students. And this option does not address the backlog of deferred maintenance associated with existing buildings.
- **New Centre**: Preferred.

5. PROJECT OUTCOMES

Strategic Alignment

The Project is aligned with BC government priorities and strategies:

- *BC's Skills for Jobs Blueprint.*
- *#BCTECH Strategy* by supporting tech-related education and training with new and expanded modern teaching spaces.
- Supports Ministry of Jobs Tourism and Skills Training Goal #1 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 Ministry of Advanced Education Goal #2 by supporting a high-quality education that provides BC with a global competitive advantage.
- 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 Aboriginal Post-Secondary Education and Training Policy Framework and Action Plan.
- Consistent with BC's sustainability objectives (*BC Climate Action Plan*).
- Trades, transport and equipment operators and related is one of the top four occupation groups identified as having the strongest growth in demand (*BC Labour Market Outlook 2016-25*).

Quality Education

The new Centre would employ innovative teaching methodologies that would strengthen BCIT's leadership role in intermodal transportation related education. This will support the emerging need to train automotive technicians with the appropriate skills to work within the rapidly growing intelligent vehicle and intermodal transportation sectors.

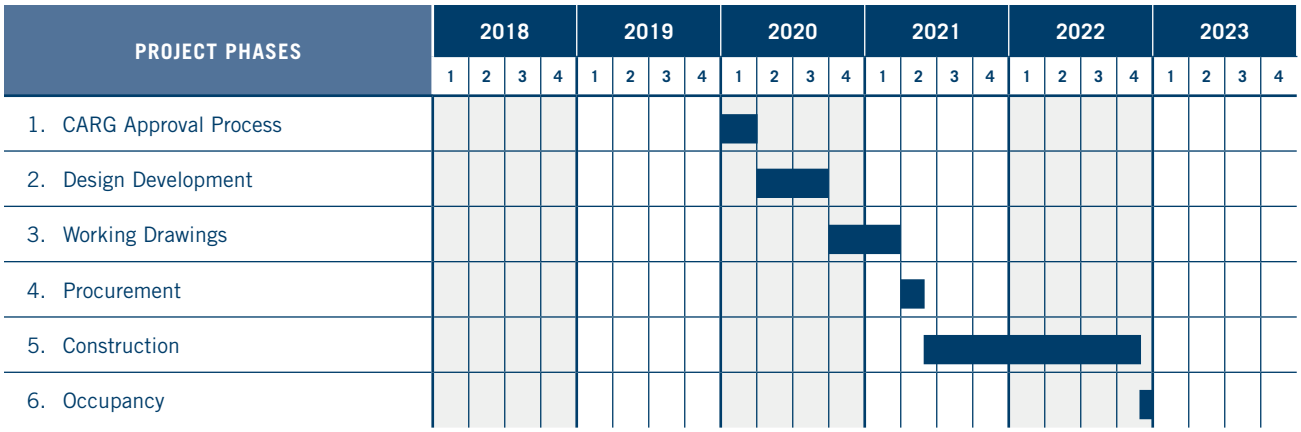
6. PROJECT COST/FUNDING

$60.0 MILLION - TOTAL ESTIMATED PROJECT COST, INCLUDING EQUIPMENT AND TAXES.

7. KEY RISKS

- Impact on recruitment of faculty and staff – loss of market share to other intermodal transportation research institutions.
- The weakening of industry and vendor partnerships if status quo is maintained at the Burnaby Campus.
- Limit the Province's ability to successfully implement its priorities and initiatives identified in the "Strategic Alignment" section.

8. PROJECT SCHEDULE



Schedule for the Centre for Automotive Innovation (Proposed)

Project 7: SW1 Renewal: Energy, Engineering & Health Sciences

Category 2: Whole Asset Replacement & Renewal				
Institution BCIT	**Campus / City** Burnaby	**Project Title** SW1 Renewal: Energy, Engineering & Health Sciences	**Project Category** 2	**Project Priority** 7 of 7

1. 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 reflects newly captured space 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 VFA building assessments for the next ten years, an estimated $58.7 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. 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. 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

The renewed building will accommodate:

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

Other supported services are:

- Student Services
- Administration

FTEs

There are no additional FTEs associated with this proposal.

Project Size

This project will comprise approximately 206,500 sf (19,200 m^2).

3. PROJECT OBJECTIVES

- Renew and replace existing architectural, structural, mechanical, electrical and acoustical elements of the building that are inadequate or have reached the end of their useful life.
- Provides modern teaching environment for Schools of Energy, Construction and the
- 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.
- Permit consolidation of programs.
- Improve space utilization through more efficient and flexible functional design.
- Support BCIT Burnaby Campus Development planning objectives.

4. OPTIONS CONSIDERED

- **Status Quo**: inadequate for the long-term and seismically unsafe.
- **Renovation of Existing Building**: Preferred.

5. PROJECT OUTCOMES

Strategic Alignment

The Project is aligned with BC government priorities and strategies:

- *BC's Skills for Jobs Blueprint*.
- Supports Ministry of Jobs Tourism and Skills Training Goal #1 by providing facilities that support a highly-skilled labour force that is ready to meet the challenges of expanding industries.
- 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 Ministry of Advanced Education Goal #2 by supporting a high-quality education that provides BC with a global competitive advantage.
- 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).
- *#BCTECH Strategy* by supporting tech-related education and training with new and expanded modern teaching spaces.

Quality Education

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

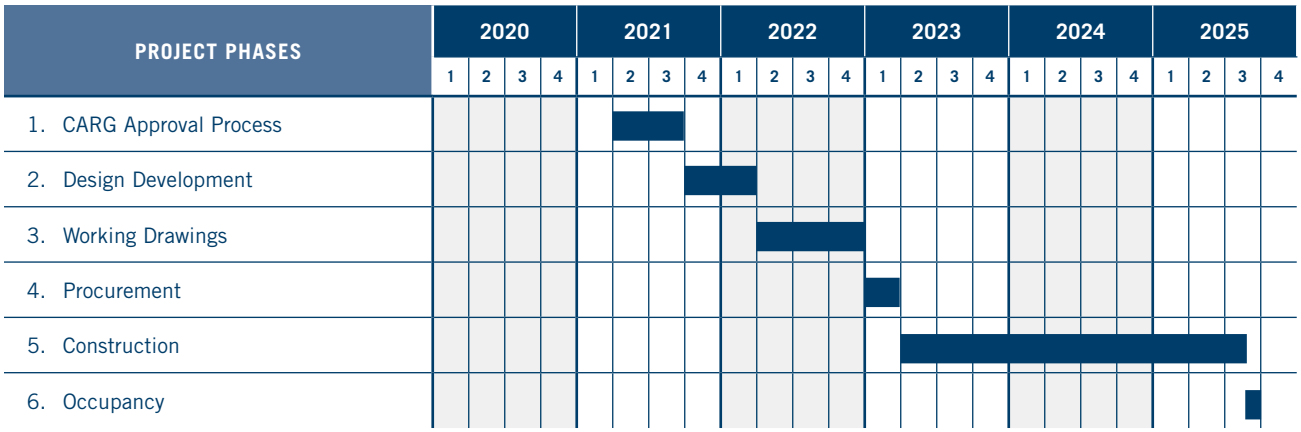
6. PROJECT COST/FUNDING

$76.5 MILLION - TOTAL ESTIMATED PROJECT COST, INCLUDING EQUIPMENT AND TAXES.

7. 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. PROJECT SCHEDULE



Schedule for SW1 Renewal: Energy, Engineering & Health Sciences (Proposed)

SW1 Context Map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