

# Building a Culture of Construction Excellence and Innovation in BC

**2021 Report**



Image credit: ZGF Architects



**BC HOUSING**

**RESEARCH CENTRE**



# BC HOUSING

## RESEARCH CENTRE

BC Housing's Research Centre works in collaboration with housing sector partners to foster excellence in residential construction and find innovative solutions for affordable housing in British Columbia. Sharing leading-edge research, advances in building science, and new technologies encourages best practice. The Research Centre identifies and bridges research gaps to address homelessness, housing affordability, social housing challenges and the needs of distinct populations. Mobilizing knowledge and research expertise helps improve the quality of housing and leads to innovation and adoption of new construction techniques, Building Code changes, and enhanced education and training programs. Learn more about the Research Centre at [www.bchousing.org](http://www.bchousing.org). Sign up to receive the latest news and updates at [www.bchousing.org/subscribe](http://www.bchousing.org/subscribe).

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# Acknowledgments and About This Report

Funded by BC Housing and the BC Construction Association, the 2016 **Construction Innovation Project** is the culmination of eight months of research underpinned by a province-wide consultation process with contractors, consultants, owners and stakeholders involved in all types of project (from home renovations to aluminum smelting facilities). It lays the groundwork for a coherent, constructive and sustained conversation about innovation that includes all stakeholders. It attempts to weave together the common threads emerging in discussions within and between design and construction businesses (large and small), owners, researchers, investors and policy makers. Ultimately, it captures the vision towards which the BC construction industry is striving to achieve sustainable best practice.

The objective was to summarize the current construction innovation landscape in BC and offer a **definition of innovation as it relates to construction** so industry leaders can focus their advocacy efforts for maximum impact and offer best value to their members in these changing times. Indeed, the project's continued success depends not only on buy-in from businesses throughout BC, but also on strong political and financial support from the government and its agencies. It is therefore a **Call to Action** for businesses, investors and stakeholders to seize on the groundswell of interest in the industry and join the efforts underway in other jurisdictions and work together to best exploit the forces of change. It also offers industry leaders and stakeholders a way to prioritize efforts and Identify how education and applied research can be applied to achieve a vision for the industry.

In 2021, the Construction Innovation Project was recognized by Clean50 as a Top Project in Canada. In celebration of this success, this report has been prepared by **Scius Advisory**. It summarizes the key vision and ambitions of the original report. It provides a brief update on progress, recognizes some of the key organizations that have played a leading role – in particular, the **BC Construction Association** and the **Vancouver Regional Construction Association**, but there are numerous others – and highlights a few of the accomplishments that continue to transform BC's construction industry today and into the future.

Canada's Clean50 Top Project Awards are amongst the awards announced annually by Delta Management Group and the Canada's Clean50 organization, to recognize the best sustainability oriented projects completed in Canada over the prior two years. Projects are chosen based on a four "I"s criteria: Impactful, Innovative, Inspiring and can readily be Imitated.

"Delta's criteria in determining Project awards is to carefully consider a combination of actual measurable impact, demonstrated innovation, and the project's ability to inspire others to imitate it – and the Construction Innovation Project is a terrific example."

*Gavin Pitchford, CEO,  
Delta Management Group*



# A Vision of the Future

In a world powered by innovation, action is needed to ensure that BC construction companies are ready to meet the challenges ahead.

It's hard to overstate the importance of construction to BC's economy. As a \$16.5 billion dollar industry it provides over 8% of the province's GDP and employs more than 200,000 workers, making construction one of BC's largest employers. This means innovation is vital for the continued prosperity of the province.

The industry's future includes profound regulatory, technical, demographic, macroeconomic and consumer changes that will impact every aspect of construction. National and international factors such as an aging population, climate change and the emerging role of "big data" are changing the needs and expectations of regulators, clients and end-users and also putting pressure on the industry to integrate new ideas, technologies and specifications into their projects.

BC construction firms will have to adapt and innovate, or risk being left behind. Although BC is strong in green building and wood technologies, we have catching up to do in other areas. Public and corporate investment in innovation in BC lags behind other highly developed countries. The mechanisms for knowledge sharing and collaboration outside of projects do not exist. Fundamentally, the industry has not fostered a culture of innovation that transcends day-to-day problem solving on a construction site. These gaps are concerning because innovation is the ultimate source of long-term economic growth and competitiveness. The ability to create new products, techniques and services, to find novel uses for existing products and to develop new markets provides will ensure success in the twenty-first century.

This "call to action" is meant for general contracting and trade companies and the many stakeholders that are involved with construction in BC. In 2016, the **Construction Innovation Project: A Vision for BC** was published by the BC Construction Association<sup>1</sup> with support from BC Housing. It drew on insights gathered from a three-month consultation process that gathered insights from 450 industry members from across the province and it makes the case that engaging pro-actively with innovation can have a positive impact on business and the ability of businesses of all sizes to succeed. It outlines the key challenges that have to be overcome and highlights the need for a "made-in-BC" construction innovation action plan that can serve as a model for the rest of the country.

<sup>1</sup> Available at <https://www.bccassn.com/media/bcca-report-construction-innovation-2016.pdf>

# The state of innovation in BC's construction industry

**Innovation can be defined as the successful introduction of new technologies or procedures into industry.** The scope of innovation in the construction industry is broad and applies to everything from building products, materials and systems to construction techniques, equipment and business operations.

**The need for more innovation and better innovation deployment systems in the construction sector is well recognized.** Compared to other industries, construction in most regions (including BC) remains largely locally-focused, undiversified, and with relatively small export markets. Despite the fact that it is a major market for the tech sector, there is no construction-specific innovation platform on which to engage with the R&D and start-up community.

**External forces such as changing societal demands and expectations, the increasingly globalized market and business climate, labour market challenges and advances in knowledge and technology are creating new pressures for construction companies to innovate.** Although it may affect individual businesses very differently, there is general agreement that the way construction gets done ten years from now will be very different from today. Innovation will be essential to the industry as a whole to reduce capital construction costs, improve productivity, increase the number of projects completed on time and within budget, and reduce the number of defects and accidents. Investment in innovation can also help companies to differentiate, improve their reputation and compete for the next generation of talent in a tight labour market.

**It is imperative for the industry to continue to innovate in response to these drivers or risk being left behind.** Construction industry leaders say that cost of materials and energy, an aging workforce, the need for workers with higher qualifications and the climate emergency are the four most important drivers of innovation in BC. They are manifesting themselves in trends such as low carbon design, the growing importance of data and the influx of cheap products (and labour) from overseas. BC construction companies must do a lot more with much less.

**There are several areas of strength that the construction industry can leverage as a starting point to build a culture of innovation.** BC's economy has strong prospects for growth with low interest rates and an attractive corporate tax regime. The industry has expertise in wood design, construction and the infrastructure that supports the development of innovative wood products, capabilities in digital technologies and building envelope design, testing and assembly. The combined domain area expertise in green building and wood is unique in the developed world and BC can become a global leader in truly low carbon buildings. The next generation of talent is putting a fresh face to the industry and all levels of government bring concrete commitments to investing in Canada. The BC construction industry's leadership is coming to the fore just at the moment when the world is looking to the built environment to mitigate major environmental and social challenges.

**However, the industry also faces challenges—such as the number of stakeholders, risk aversion, the lack of a culture of learning and short term thinking—that are deeply rooted and will be very difficult to dislodge.** The threats of continued low productivity, lack of attractiveness as a career path to new workers, lack of diversity and an unsatisfactory reputation (whether justified or not) will only become greater as the regulatory environment continues to become more challenging, materials costs go up and the labour shortage becomes increasingly acute.

**BC is well positioned to tackle the challenges that lie ahead, but it will take a concerted effort.** Creating a culture of innovation will not just happen by itself – it requires the commitment, investment and determination of the industry as a whole.

# A Vision for BC's Construction Industry

Embracing innovation can improve project and business performance and position BC construction companies for success. However, a comprehensive industrial action plan is needed to coordinate efforts and catalyze and capture industry innovation. The Construction Innovation Project: A Vision for BC presents the case for such a plan and offers five foundational pillars to serve as a guiding framework:

**Leadership** — A cohesive industry that embraces and celebrates innovation

**Performance** — A responsible industry that continually improves projects' economic, environmental and social performance

**People** — A talented industry that attracts a skilled, technologically-savvy workforce

**Growth and resilience** — An efficient, competitive and profitable industry that drives economic growth

**R&D** — An advanced industry that develops and implements innovative new products, processes and business strategies.

These five pillars lay out an aspirational innovation program of ambitions and recommended activities for the province that reflect best practices and the strengths and weaknesses of the BC construction industry. Their successful implementation will require broad support from government, research organizations and the construction industry as a whole.

## 330 Goldstream social housing project, Victoria, BC



The project at 330 Goldstream Avenue in Victoria is using the Lean Project Delivery method to build 102 affordable rentals for seniors, adults with disabilities, and families. Developed by the Greater Victoria Housing Society and funded by BC Housing, the six-storey wood frame building accommodates a range of unit sizes - 50 studios, 39 one-bedrooms, one two-bedroom, and 12 three-bedrooms. It is due to complete in Spring 2021. The six-storey wood frame structure was selected for its flexibility, efficiency and affordability. BC Housing is providing research support for the project that includes:

- Document the project from beginning to end to better understand and share the benefits of Lean construction and the Last Planner® system as a method to achieve quality performance and reliability.
- Report on the outcomes and opportunities for further research in advancing high performance buildings using modern methods of construction.

# Pillar 1: Leadership – A cohesive industry that embraces and celebrates innovation

## **AMBITION 1.1 Establish an action-oriented innovation council to be the "voice" of innovation in construction in BC.**

- a. Establish an action-oriented innovation council to be the “voice” on innovation in construction in BC.
- b. Develop a formal industrial action plan for innovation.
- c. Keep the conversation alive with a series of “meeting of the minds” dialogues around the province.
- d. Develop strategies so that the many voices of small businesses are heard.

## **AMBITION 1.2 Report on key performance indicators for construction excellence.**

- a. Engage with industry leaders and stakeholders to determine the optimal suite of indicators, reporting framework, and responsibilities for data collection and monitoring.

## **AMBITION 1.3 Recognize and celebrate innovation “champions”.**

- a. Promote awards and recognition programs for innovation.
- b. Showcase leading individuals and organizations.

## **AMBITION 1.4 Shift misperceptions of the industry via public engagement and stakeholder communication.**

- a. Develop and maintain public engagement and stakeholder communication programs.
- b. Review and revamp language and images to steer away from traditional perceptions of construction being physically demanding and without opportunities for career advancement.

## **AMBITION 1.5 Pro-actively engage with government on program and policy development, investment and procurement.**

- a. Pro-actively engage with all the relevant departments and agencies of government at the local and provincial level: fostering partnerships where possible so industry stays ahead of codes changes, etc.
- b. Consider the pros and cons of advocating for a single point of senior leadership within government to help direct desired reforms.

# Pillar 2: Performance – A responsible industry that continually improves projects’ economic, environmental and social performance

## **AMBITION 2.1 Encourage the adoption of innovative design and construction methods that put quality first.**

- a. Advocate for open universal standards to make communication and data transfer seamless and secure across all platforms and devices.
- b. Support the adoption of “Modern Methods of Construction” such as off-site construction and lean construction.
- c. Help businesses of all sizes gain access to and deploy the new tools and technologies they need to be competitive.

## **AMBITION 2.2 Continue to push the boundaries in low-carbon, healthy and green construction.**

- a. Leverage BC leadership in green building and the use of wood when focussing on our competitive advantages.
- b. Promote occupant and operator training to ensure buildings work properly and protect investments in innovation.
- c. Support the adoption of sustainable materials and technologies.

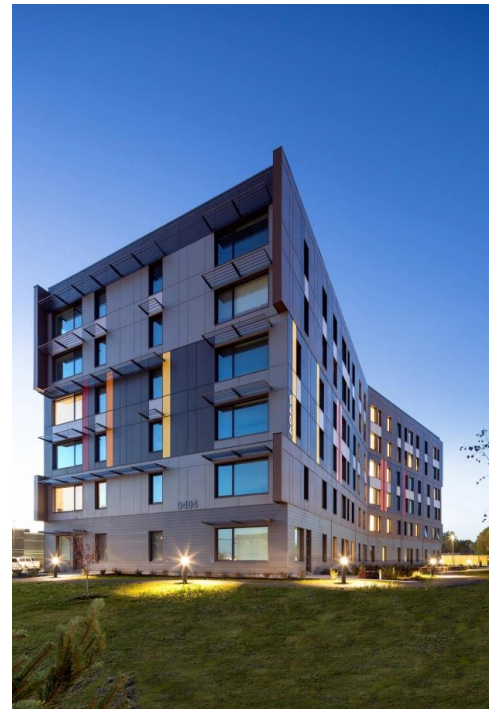
## **AMBITION 2.3 Encourage all businesses to demonstrate corporate responsibility.**

- a. Encourage companies of all sizes to act ethically and transparently at all times to build a positive reputation and win work.

### **BC Housing Passive Residential Building, Fort St. John, BC**

At the time of completion in 2019, the six-storey apartment was Canada’s largest Passive House project and the northernmost multifamily Passive House Building in the world. The building includes 35 two-bedroom and 15 three-bedroom units. Five units are wheelchair accessible. Currently used by BC Hydro as workforce housing, the full 50 units will be turned over to the community for low- and moderate-income families when construction of the Site C dam is complete.

Image credit: Silentsama architectural photography





# Pillar 3: People – A talented industry that attracts a skilled, technologically-savvy workforce

## **AMBITION 3.1 Help businesses of all sizes to acquire the full spectrum of skills necessary to create and implement innovative ideas successfully.**

- a. Foster a culture of learning to develop an engaged and informed workforce.
- b. Develop business leadership capacity so companies of all sizes can manage for innovation.
- c. Consider establishing “Best Practice Clubs” to bring the benefits of best practice to a practical, personal and local level.

## **AMBITION 3.2 Help businesses leverage innovation to drive recruitment and retention.**

- a. Undertake a review of programs aimed at improving the image and perception of the industry by encouraging “beyond code” best practice.
- b. Review recruitment messaging so that it explains the career development opportunities and the diversity of jobs available.

Starting in 2019, a series of technical workshops aimed at developing mass timber and prefabricated timber systems design and construction skills for a range of zero emission building typologies were held in Vancouver and Victoria, co-hosted by ZEBx, Scius Advisory, BCIT and Forestry Innovation Investment.



# Pillar 4: Growth and resilience – An efficient, competitive and profitable industry that drives economic growth

## **AMBITION 4.1 Ensure procurement structures meet client and industry needs and provide an equitable framework within which companies can innovate safely.**

- a. Review current procurement practices and implement the improvements identified.
- b. Advocate for a “quality-first” agenda where life cycle costs and the value of design are recognized.
- c. Develop common language for how “innovation” should be described and interpreted in the bid process.
- d. Create and offer procurement training for owners.
- e. Work with stakeholders to determine how to mitigate adversarial behaviours (such as suicide bidding) and to minimize the underground economy.

## **AMBITION 4.2 Support ongoing evolution of standards and codes as a means to push the innovation into the market.**

- a. Foster a close working relationship with policy makers at the municipal and provincial levels and participate proactively in the development of codes and standards.
- b. Advocate for performance-based building codes as a way to drive innovation into building projects.

## **AMBITION 4.3 Develop strong supply chains so new ideas can be realized cost effectively and in a timely manner.**

- a. Encourage methods that close gaps in the supply chain to ensure the reliable release of work between specialists in design, supply and assembly.
- b. Advocate for centralized, online bidding and tendering.
- c. Promote a design-led, “life-cycle cost” approach so that consultants are rewarded for their expertise.
- d. Connect with financial institutions and insurers to explore innovative financing and risk management mechanisms.

## **AMBITION 4.4 Prioritize innovations that help BC companies to boost competitiveness so they can realise a return on investment in innovation.**

- a. Showcase BC companies’ proficiency in sustainable construction processes and products.
- b. Leverage BC’s various export agencies to promote BC companies’ expertise to new markets.

# Pillar 5: Research and development – An advanced industry that develops and implements innovative new products, processes and business strategies

## **AMBITION 5.1 Support research and development networks and centres.**

- a. Explore the viability of establishing a construction-focussed technology cluster, leveraging the leadership of BC’s wood sector as a role model and possible partner.
- b. Leverage Vancouver’s established venture capital capacity and start-up community to support a construction-focussed incubator.
- c. Create opportunities for industry to feed back ideas from the field into the R&D community.

## **AMBITION 5.2 Showcase demonstration projects.**

- a. Build on BC’s track record of “being first” when it comes to innovative projects.
- b. Connect with industry associations, trade agencies and NGOs who can help to profile local success stories, collect data and build a library of projects.

## **AMBITION 5.3 Advocate for, enable and direct public funding and business investment in innovation.**

- a. On the strength of a sharply defined vision for the industry, advocate strongly for more public spending on construction-related R&D.
- b. Help industry advocates (such as associations) make the business case for investment in R&D to construction companies.

## **AMBITION 5.4 Strengthen the role of large firms in BC as drivers of innovation.**

- a. Develop tools and resources for large firms to use to engage employees and help them “think like innovators”
- b. Help firms to promote their investments in innovation so they can work together effectively and win work
- c. Encourage large firms to share ideas and support collaboration to increase the rate of market transformation

## **AMBITION 5.5 Encourage businesses to collaborate to achieve scale and share knowledge.**

- a. Foster a safe and positive environment in which companies can collaborate to develop new (non project-specific) solutions.
- b. Provide tools and resources for companies to collaborate in order to achieve sufficient scale to compete on large projects.

# Actions and Accomplishments

The **Construction Innovation Project: A Vision for BC** was published in 2016. The findings have served as a blueprint for a series of focused initiatives to address productivity challenges, build capacity and develop a construction technology ecosystem. A selection of these is presented below organized around the five pillars of innovation.

While much has happened in the intervening 5 years, transforming BC's construction industry so that it remains competitive and resilient in the face of future disruptions is a multi-year task that involves many organizations and continues today. This section provides an update on progress thus far – much of which is focussed on benchmarking and understanding the current state of play - and offers some pointers as to where effort might best be deployed next.

## 1. Leadership

### CREATE AN ACTION-ORIENTED INDUSTRY-SPECIFIC INNOVATION COUNCIL

In 2016, the idea of innovation in construction was very new. Industry leaders felt it was important to establish a “Construction Innovation Council” with an outcome-oriented mandate to create a cohesive and resonant voice and drive the agenda forward. Following successful models in other jurisdictions<sup>2</sup>, participation on the Council needs to be carefully sought from representatives within key stakeholder groups (clients, researchers, trainers, consultants, etc.) who are motivated to act and have a proven track record of accomplishments. The Council would be responsible for steering the development of a formal industrial action plan for innovation, fund raising for operations and activities, advocacy and, importantly, government relations. Leveraging the network of over 70 construction associations in Canada, it would also offer a replicable model for other Councils across the country and connect into similar organizations around the world.

To get started, the BC Construction Association established an Innovation Committee that reported to its Board of Directors. Then, in 2019, what began in BC went national. The Canadian Construction Association has since become the voice for innovation in construction in Canada.<sup>3</sup> Working with its affiliated association members across the country (including BCCA and the four regional construction associations in BC), it has established mentorship programs, launched a SR&ED<sup>4</sup> credit proposal service, developed a wide range of resources (such as a CSR How-To Guide, which was developed in BC<sup>5</sup>) and called for funding to support the adoption of innovation and technology, as well as policies that incentivize innovation over lowest-cost bid in project proposals.

<sup>2</sup> The Construction Innovation Project report included a review of Scotland, the UK and Australia.

<sup>3</sup> <https://www.cca-acc.com/advocacy/critical-issues/construction4cdns/innovation/>

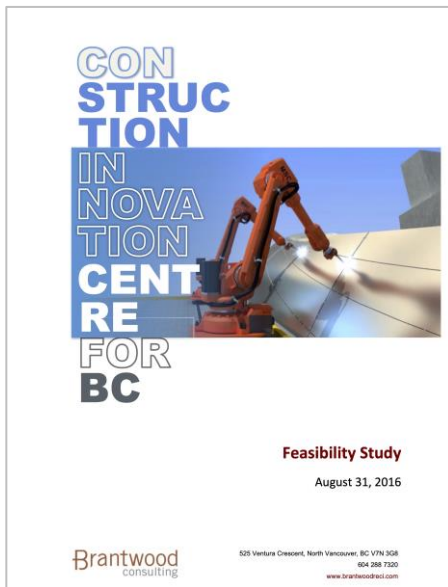
<sup>4</sup> The federal Scientific Research and Experimental Development (SR&ED) Program uses tax incentives to encourage Canadian businesses of all sizes and in all sectors to conduct research and development (R&D) in Canada. These tax incentives come in three forms: an income tax deduction, an investment tax credit (ITC), and, in certain circumstances, a refund. <https://www.canada.ca/en/revenue-agency/services/scientific-research-experimental-development-tax-incentive-program.html>

<sup>5</sup> [https://winnipegconstruction.ca/files/CSR\\_Guide\\_En.pdf](https://winnipegconstruction.ca/files/CSR_Guide_En.pdf)

## DEVELOP AN ACTION PLAN FOR CONSTRUCTION INNOVATION IN BC

To organize and prioritize all the work that needs to get done, the Construction Innovation Project report noted that companies of all sizes would benefit from industry leaders putting together an action plan built on clear goals and describing the prioritized focus areas for research, timelines and how projects and activities are decided upon.

The BC Construction Association embraced innovation in its 2017 – 2020 Strategic Plan<sup>6</sup> and established a Technology pillar with a goal of “fostering construction innovation and entrepreneurship” and a focus on “partnering with BC’s technology sector to support construction-related product development”.



With support from the Construction Foundation of BC and using the Construction Innovation Project findings as a starting point, the Vancouver Regional Construction Association (VRCA) undertook a study in 2016 titled **Construction Innovation Centre for BC** that demonstrated the feasibility of a construction innovation centre sufficient for an industry advocacy organization (individually or in partnership) to gather the support and funds necessary to host and launch the programs and services that industry stakeholders need to foster a culture of innovation. Believing that harnessing innovation is a critical factor for the survival and prosperity of BC’s construction industry, the study found that a construction innovation centre could bring about the transformational change required by industry and society by catalyzing the adoption of innovative construction processes, technologies, materials and business strategies. Such a centre would identify problems that, if solved, will lead to significant market opportunity for both construction businesses and entrepreneurs.

In 2021, the VRCA, supported by Ryder Architecture, embarked on an engagement process<sup>7</sup> to probe further into the issues facing construction companies as they plan for the future – see posters below (courtesy: Vancouver Regional Construction Association).



<sup>6</sup><http://www.bccasn.com/media/BCCA%20Strategic%20Plan%202017-2020.pdf>

<sup>7</sup><https://www.vrca.ca/cic-vancouver/>

## 2. Performance

### DEVELOP AND HOST “MEETING OF THE MINDS” DIALOGUES

A key finding from the **Construction Innovation Project** was the need to provide a platform for information sharing and ideas exchange, thus catalysing “communities of practice” focussed on the pressing matters of the day. The energy efficiency and climate goals set out by the province and the City of Vancouver offered an important catalyst for the VRCA to gather a consortium of industry experts together and establish the Zero Emission Buildings Exchange (ZEBx).<sup>8</sup>

ZEBx was launched in 2018 as a collaborative platform that strengthens the public, private and civic capacities for zero emission buildings in Vancouver and British Columbia. It serves as an industry hub that facilitates knowledge exchange to accelerate market transformation. ZEBx fosters innovation through dialogues, project tours, curated research, training and demonstrations. It works closely with all facets of the industry, including developers, builders, architects and designers spanning single family homes to high rise residential and commercial buildings.

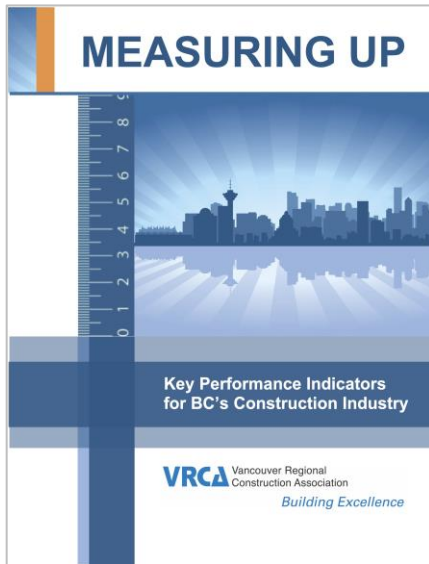
Lately, ZEBx has begun to broaden its mandate and make the link between innovation, competitiveness and the delivery of zero emission buildings with its “Competitive Edge” series of dialogues – see poster below (courtesy, Vancouver Regional Construction Association).



<sup>8</sup> [www.zebx.org](http://www.zebx.org)

## MEASURE SUCCESS

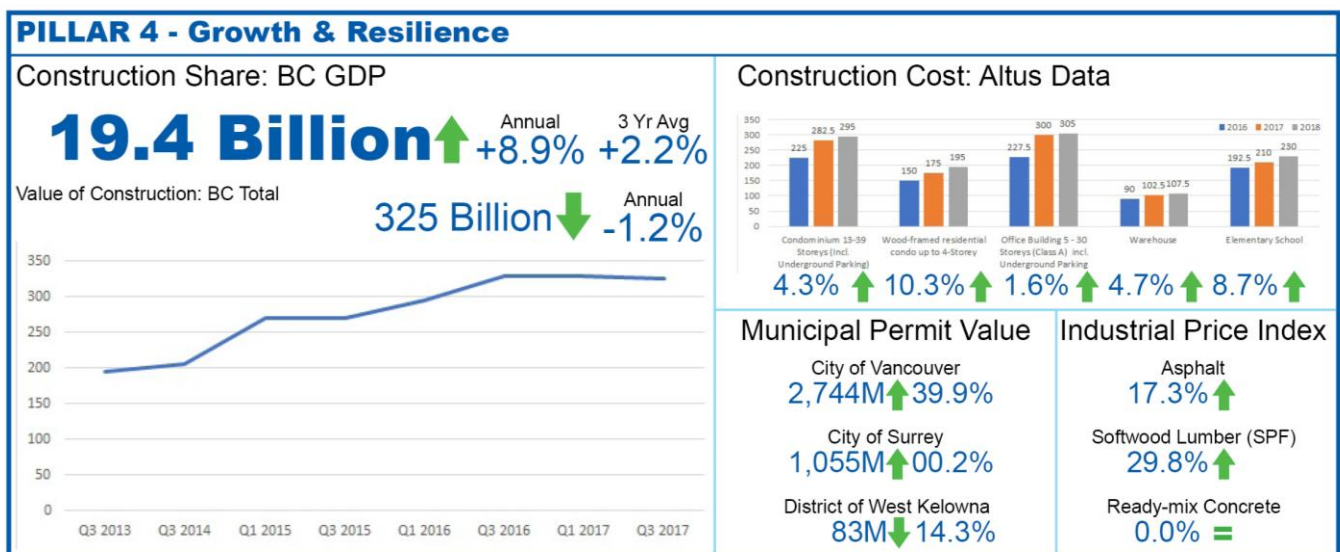
Construction KPIs paint a picture of the health of the industry as a whole. They also provide a set of tools that can be used by companies across the sector to evaluate their performance and raise their game against their peers, bringing lasting benefits to the whole industry. When asked, as part of the research for the Construction Innovation Project, “Do you think it would be useful if the performance of BC’s construction industry as a whole was tracked and reported every year?” 73% of industry respondents agreed. The report recommended that more work should be done to evaluate industry’s interest in establishing industry-level performance targets and Key Performance Indicators to make sure that investments in innovation are actually improving productivity and performance and delivering business to construction companies.



Hard numbers and facts are often what precipitate and drive change. Without relevant and timely data, it is difficult to gauge how companies are faring in the face of regulatory, technical, demographic, macroeconomic and consumer change. This makes it difficult for businesses and governments to know if and/or to what extent support in the form of policies, R&D investment or education may be needed. The lack of public and private investment in transformative solutions for Canada’s construction industry to date is, in large part, due to a lack of understanding of where and how best to deploy investment dollars.

In 2018, the VRCA, with support from the Construction Foundation of BC, published “Measuring Up: Key Performance Indicators for BC’s Construction Industry”, which identifies thirty KPIs have been identified that, together, would offer a robust snapshot of the health of BC’s construction industry.<sup>9</sup>Of these, data is available for twenty KPIs today without requiring any involvement of construction firms directly.

The Measuring Up study contemplates a dynamic dashboard that tracks metrics for all five of the performance pillars set out in the Construction Innovation Project. A mock-up of the KPI dashboard for Pillar 4 - Growth and Resilience is presented below.



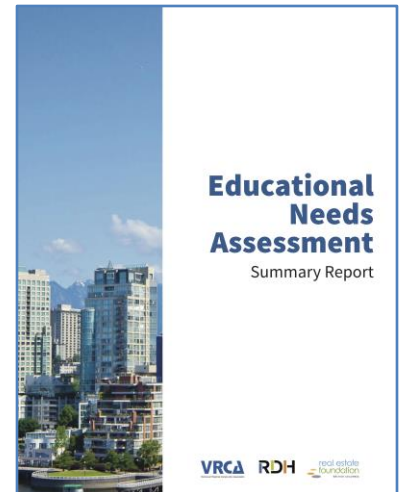
<sup>9</sup><https://www.constructionfoundation.ca/wp-content/uploads/2019/05/Construction-Industry-KPI-report-FINAL.pdf>

# 3. People

## EDUCATION NEEDS ASSESSMENT

In 2019, the VRCA published an Education Needs Assessment<sup>10</sup> prepared by RDH Building Science Inc. and supported by the Real Estate Foundation of BC. The two key goals were to consider how the VRCA could expand its education offerings to continue to serve emerging needs in the industry and to share lessons and insights with other industry stakeholders. Specifically, the main objectives were to:

- provide a snapshot of the state of construction industry education in BC,
- identify and summarize industry trends and drivers that are expected to inform future educational needs and potential training gaps and opportunities, and
- review the VRCA’s current education offerings and provide information to guide new programming.



The report is publicly available and provides direction to industry leaders across the province as they review their education offerings and prepare for the future.

## DEVELOPING BC’S CONSTRUCTION WORKFORCE OF TOMORROW

The drivers of change impacting (or about to impact) construction companies vary depending on the type and size of business they are, and the sort of projects they take on. Some of these changes will hit some businesses faster and harder than others. For some, these changes may come as a blessing, for others – a curse. The Construction Innovation Project highlighted the need to develop strategies to improve and communicate workforce capabilities, opportunities and accomplishments.

In 2020 – right in the middle of the pandemic — the VRCA undertook an exploratory project supported by BC Hydro to help plan for future skills development over the next decade. The key take-aways and areas of future work identified from this project included:

### A. The Transition to the Workforce of the Future Will Take Time

Much more needs to be done to equip the building industry with the skills it needs to deliver high performance projects efficiently, profitably and safely. What BC’s construction workforce will look like in the future will depend on a range of inter-related factors many of which are outside the industry’s direct control. It is important to view this transition as a journey and to regularly engage industry members and stakeholders, update information in a timely fashion and adjust programming accordingly. **The NEXT STEP will be for the VRCA to become an active participant on the Energy Step Code Council and to get involved in emerging initiatives such as BC Hydro’s Roadmap to Electrification or the Alteration (Retrofit) Code.**

### B. Education Resources Need to be Easily Accessible and Novel Promotional Approaches Are Necessary

This document is intended to support the development, promotion and implementation of training and resources that will be needed by industry to prepare for the future – specifically building zero energy, low carbon buildings successfully and profitably. This will involve working closely with many organizations, education institutions and government.

**THE NEXT STEP will be to create a centralized Training Hub with Case Studies for those working in Part 3 building sector to be zero energy, low carbon construction ready.**

<sup>10</sup> <https://my.vrca.ca/Education/VRCASummaryReportRDHFinal20181220.pdf>



### C. Continuous Industry Input Is Essential

The Workforce of Tomorrow project sets the tone for a strategic involvement in the future of construction at the industry level. Industry leaders such as the VRCA can expect to facilitate greater collaboration and information transparency among their members to address systemic issues and highlight new opportunities for businesses of all sizes. **THE NEXT STEP is to benchmark and track industry KPIs so that improvement can be measured over time.**

### INNOVATION BOOTCAMPS



Recognizing that the vast majority of design and construction firms in BC are small (less than 10 employees), the Construction Innovation Project highlighted the need to develop an education and training strategy oriented around innovation to engage SMEs. There was the potential for companies to work together and even leverage their limited investment dollars to solve common problems. But first, it was important to clearly convey the value proposition for investing in innovation.

In 2017, BC Housing funded the development and delivery of a four innovation bootcamps in partnership with each of the four regional construction associations (in Vancouver, Victoria, Kelowna and Prince George). These involved visits to a prefab plant, watching the installation of a modular Passive House residential project and first-hand experience with drones, and more.



**Top:** tour of Metric Modular prefab plant.

**Middle:** lifting modular units into place at the Yale social housing project, Chilliwack

**Bottom:** demonstration of drone technology for construction  
Image credit: courtesy The Sky Guys

# 4. Growth and Resilience

## LAUNCH AN INNOVATION PROCUREMENT INITIATIVE

As it stands, the procurement process needs to be fixed. There has to be a shift from a culture of “lowest bid” to focus increasingly on quality and “whole-life” value. The first step is a procurement process review to identify options for improving existing approaches to procurement (particularly by public sector building owners), potentially based on effective procurement models from other jurisdictions

Although a procurement review will uncover a range of actions that need to be taken (not least of which will undoubtedly be training for owners and purchasers), something industry leaders could develop right away is a “best practices” document for public procurement agencies with clear guidelines, that include a definition of innovation and how it should be described and interpreted in the bidding process.



In 2017, BCCA published “Procuring innovation: a review of models, processes and practices” to help public and private owners become “innovation friendly” in their construction procurement – to enable them to access the potential environmental, economic and social benefits that innovative construction solutions can bring. An innovative construction project can be quite different from a conventional one, requiring longer upfront design time, a greater degree of involvement by regulatory bodies, collaborative involvement of the entire design team from an early stage (e.g., via an integrated design and/or integrated project delivery process) and the involvement of technical specialists. Funded by Forestry Innovation Investment and using mass timber as a case study, the guide illustrates how can the procurement process be best deployed to accommodate project specific R&D, allow for new technologies and processes and encourage project team creativity.

### 1190 Burrard St, Vancouver

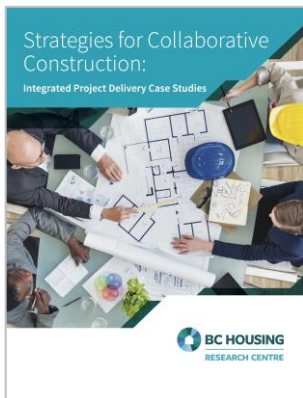


BC Housing is working with the Vancouver Affordable Housing Agency (VAHA) to develop a 17-storey, mixed-use wood tower with the new home of QMUNITY and 154 units of social housing with 31% targeted for families. The building will also be home to Qmunity-BC Queer, Trans, and Two-Spirit Resource / Community Centre.

Using mass timber offers the potential to build the project quickly, quietly and sustainably as it leverages the benefits of prefabrication and the low carbon advantages of sustainably sourced, local forest products.

Image credit: ZGF Architects

## STRATEGIES FOR COLLABORATIVE CONSTRUCTION



Case studies have proven important tools for sharing information about emerging technologies and best practices. Collaboration has been shown to empower project teams and facilitate successful adoption of unfamiliar technologies and approaches. Both the Construction Innovation Project and the Procuring Innovation Guide point to the need for improved collaboration across the project team. The Integrated Project Delivery (IPD) is a project delivery method which aligns the project team goals and provides effective collaboration mechanism among them to achieve overall project goals efficiently.

IPD is an innovative building project procurement strategy which requires early involvement of key participants, who share risks and rewards through multi-party contracts between a minimum of the owner, the architect and the contractor, to achieve improved project outcomes.

In IPD, the stakeholders' success depends on the project's success. To this end, Scius Advisory in partnership with the UBC BIM Topics Lab<sup>11</sup> researched the adoptability of IPD to housing projects in BC. Four case studies were completed that looked at the success and lessons learnt from IPD and "IPD-like" projects.

The UBC BIM Topics Lab has developed substantial expertise in several important areas of construction innovation, including: Building Information Modelling, Design for Manufacturing and Assembly, Integrated Project Delivery and more.

### 1<sup>st</sup> and Clark, Vancouver, BC



The state-of-the-art development at 1st and Clark in Vancouver is a response to the need for long-term affordable housing and will include community-centred additions programs and social enterprise/jobs programs. It is aiming to be the first Integrated Project Delivery (IPD) project in British Columbia. This multipurpose building will include 10 floors with a two-level underground parkade consisting of wood frame and concrete structure.

There will be 51 in-patient beds and an additional 20 units to support the need for

those completing detoxification. The upper six floors will be utilized by BC Housing to provide affordable housing for those at the "low end of market" income. There will be between 60-100 beds of affordable units depending on zoning. The first four floors will be occupied by Vancouver Coastal Health providing those in need with community health services such as withdrawal management and detox services.

Image credit: HDR Architecture Associates

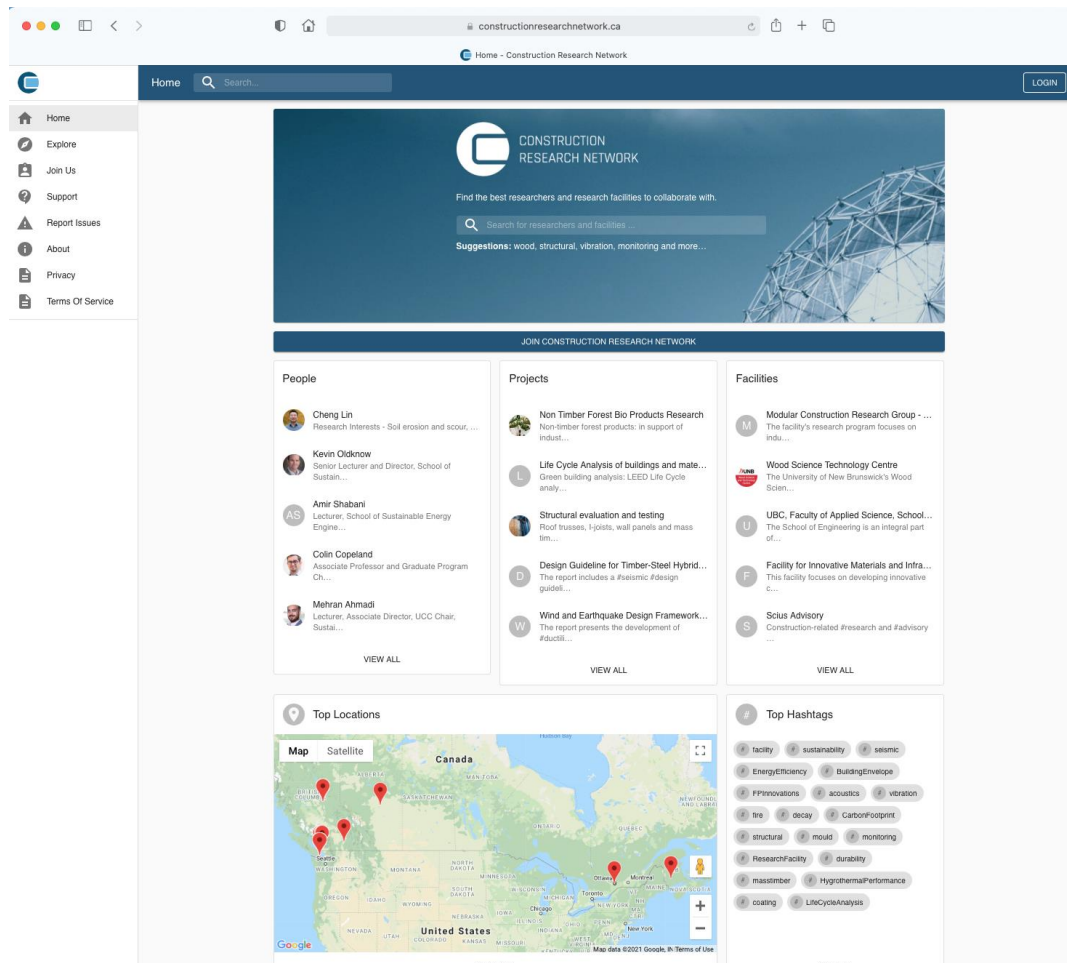
<sup>11</sup> <https://bimtopics.civil.ubc.ca/>

# 5. Research and Development

## CONSTRUCTION RESEARCH NETWORK

The **Construction Innovation Project** highlighted how the lack of centralized resources were a barrier to innovation adoption. In many cases, there was no “front door” for construction companies to find important connections, information and advice. Launched in March 2021, the Construction Research Network ([www.constructionresearchnetwork.ca](http://www.constructionresearchnetwork.ca)) brings together a “social network” of R&D assets (e.g., academic institutions, labs, training centres, demonstration / monitoring facilities, prototyping and testing centres, and manufacturing companies). It provides a single point of contact between British Columbia's Real Estate, Architectural, Engineering and Construction (RAEC) sector and the research and development community focussed on construction so that industry can easily find the resources and R&D partners they need to solve their next challenge.

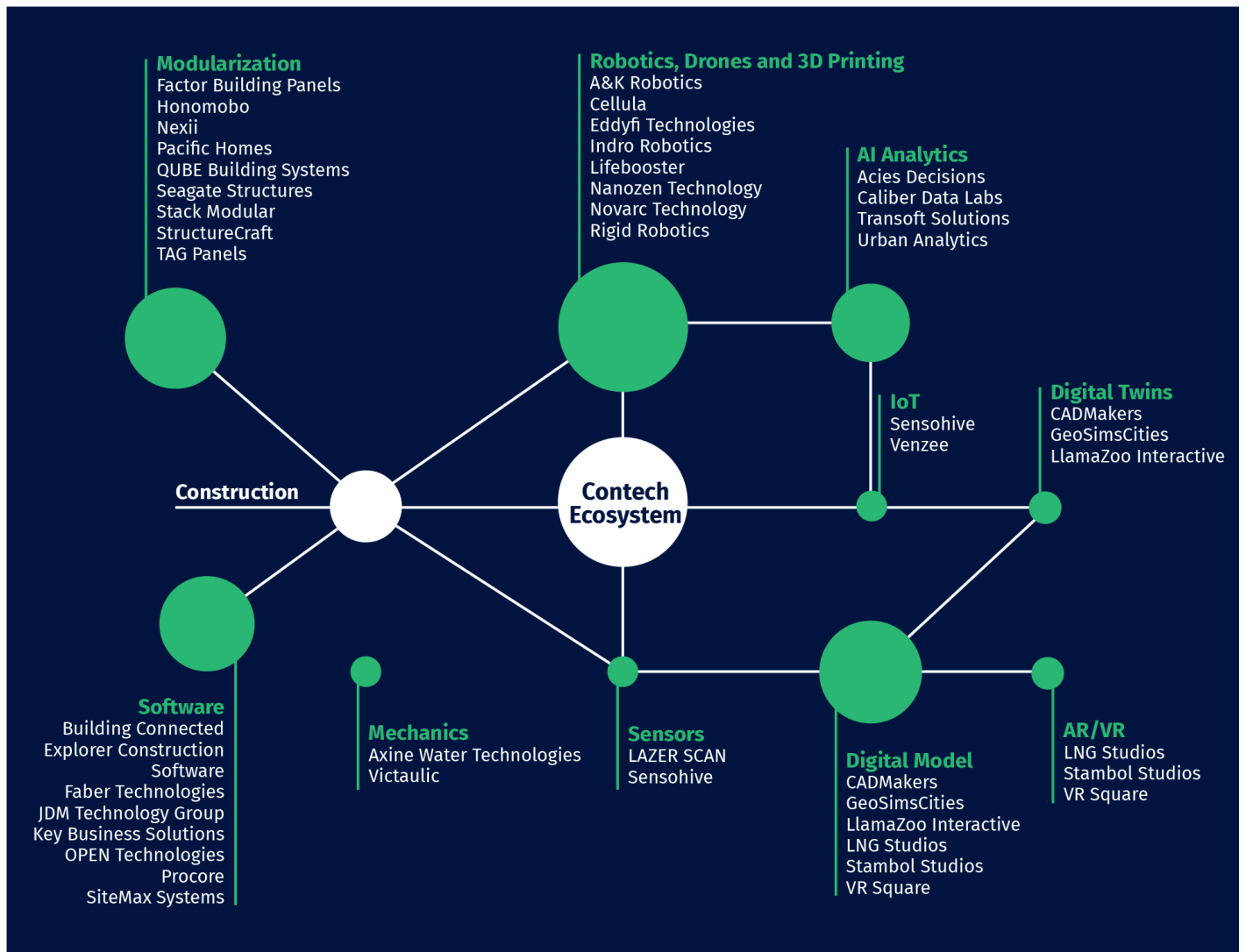
it not only offers a practical tool that architecture, engineering and construction firms can use to easily browse R&D assets but it also enables researchers to better understand the capabilities, expertise and activities that are happening in research centres across the province. Further, the project process will start an important conversation about what is going on in BC’s labs, what innovation means to AEC firms and how they are innovating. The Construction Research Network was founded by the VRCA and funded by Forestry Innovation Investment and the Real Estate Foundation of British Columbia. The project Lead was Scius Advisory and software development by rmd Studio.



## CONTECH ECOSYSTEM MAP

Leveraging technology is crucial to construction companies improving efficiency, reducing waste and delivering better customer service. It is therefore important to help BC’s construction industry become familiar with what is going on in the emerging construction technology or “contech” sector. Contech is defined by McKinsey and others as the “application of innovative technologies in construction that can be used to improve the way that structures are planned, designed and built, as well as the manufacturing and transportation of its components.”<sup>12</sup>

The Vancouver Economic Commission, in partnership with the VRCA, Scius Advisory and BCIT, published a white paper<sup>13</sup> that defined and evaluated Vancouver’s fledgling contech sector which comprises 66 companies generating about \$426m in annual revenues (2018). And yet its growth is intimately linked to the success of the latter and represents a massive opportunity in new expansion for the former. This is all motivating the industry to accelerate its shift from analog to digital processes to improve efficiency and reduce waste.



<sup>12</sup> <https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/the-new-age-of-engineering-and-construction-technology>

<sup>13</sup> <https://www.vancouvereconomic.com/blog/news/the-426-million-sector-youve-never-heard-of-meet-vancouver-contech-ecosystem/>

# There is Still More to Do

The **Construction Innovation Project** report presented an agenda for strengthening the BC construction industry by enabling innovation. It was recognized at the time that implementing this agenda would take significant resources and requires an industry-wide commitment to collaborating and investing in new products, processes and business models.

While a good deal has been accomplished so far, there are many activities that still need to be taken on to build a vibrant innovation ecosystem. The possibilities are extensive and exciting. However, they all start with the willingness to change and the acceptance that it is in the best interest of the broader industry for business of all sizes to get on board. To effect meaningful change will require a long-term commitment and investment; results are not going to happen overnight.

Two key outstanding actions that warrant attention include:

**Metrics need to be tracked and reported annually.** The VRCA **Measuring Up** study recommends that the following steps are recommended to the VRCA as it moves forward with establishing an industry-level KPI program:

1. Publish an annual report of the twenty KPIs for which data already exists and seek grant funding to build an online “dashboard”.
2. Work with industry leaders across the country to resolve data gaps and establish consistent definitions and data collection standards.
3. Ensure the data is handled properly by working with a neutral third party data management company.
4. Minimize administrative intensity by coalescing a leadership group of progressive industry associations around a pilot project.
5. Be patient. Program growth will be slow and conditional upon regular communication with businesses.
6. Celebrate leadership.

**Develop an integrated province-wide innovation network and centre.** The construction industry suffers from a lack of a centralized hub for resources for education courses, R&D funding sources, case study projects and business support programs. The **Construction Innovation Project** pointed to the success of innovation “points-of-service” in other jurisdictions (such as the Construction Scotland Innovation Centre<sup>14</sup>) as potential models that could be replicated in BC.

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BC is well-positioned to tackle the challenges that lie ahead; but a concrete action plan is needed to coordinate efforts and catalyze innovation in a way that is meaningful for all construction businesses. To develop and implement this plan requires an industry-wide commitment and investment but will yield significant benefits for BC’s construction companies and the province as a whole.

<sup>14</sup><https://www.cs-ic.org>