March/April 2022

ReNew CANADA

The Infrastructure Magazine

+ Alliance Contracting
+ Stormwater Management
+ Low-emissions Concrete

BRIDGING THE GAP

Canada Adopts the Successful IPD Model

renewcanada.net

At EXP, partnership is part of our mission, and we are driven to deliver. EXP is bringing innovation to complex P3 projects around the world.

exp•com

12

16

8

18

28

ReNew CANADA
The Infrastructure Magazine

MARCH/APRIL 2022

BUILDING A WORKFORCE FOR THE FUTURE

By John Tenpenny

In the pages of this publication, we talk a lot about the planning and building of infrastructure projects, but often we don't put enough emphasis on the most critical components of the process—the people, in particular the skilled tradespeople, without whom nothing would ever get built.

But as the number of infrastructure projects continue to grow, as evidenced by our 2022 Top100 Projects report that totalled $273 billion, the gaps in the skilled trades workforce continue to grow.

According to a study by the Conference Board of Canada, just under 10 per cent of people in the skilled trades are eligible to retire by the end of 2026.

In Ontario alone, an estimated 92,500 workers in the construction industry are expected to retire over the next decade—roughly 21 per cent of the workforce, indicates a report by BuildForce Canada. Based on projected new registrations and completion trends, there might be shortages in several trades. It is estimated that by 2025 as many as one in five jobs in the province will be in the skilled trades.

What can be done?

The Residential Construction Council of Ontario (RESCON) says construction employers can help boost numbers in the skilled trades by tapping into government programs and supports, advertising potential opportunities, and focusing on retention.

Richard Lyall, president of RESCON, says everyone from high school guidance counsellors to officials shaping immigration policy and education funding need to give the skilled trades a fairer shake. So, too, do young people looking to enter the workforce, who might not have considered the upsides.

In addition to recruiting new tradespeople and retaining current construction workers, training programs and facilities will need to continue to expand their offerings and spaces.

The good news is that governments and trades organizations have responded.

Recently, Humber College announced it is expanding the Centre for Skilled Trades and Technology to help address the increasing demand for apprenticeship and trades training.

Scheduled to start construction this fall, the three-year, $9.5-million expansion will feature simulated worksites for hands-on learning and alternative methods of course delivery, such as online learning and the use of virtual reality and augmented reality in trades, including plumbing, carpentry, electrical, welding, industrial woodworking and renovation labs.

In response to the growing use of mass timber in construction, the College of Carpenters and Allied Trades (CCAT) Ontario offers a four-week course for workers in its assembly and erection.

Using different full-scale modules or mock-ups as mediums, instructors teach 12 students how to use specialized fastening systems and timber framing tools to put up prefabricated walls, ceilings and other elements that comprise mass timber structures.

Since the course first ran as a pilot in 2019, the training centre has added a fourth teaching module, a complex segment of a structure which distinguishes itself from other modules in part because it is a hybrid, containing steel as well as mass timber.

In order to prevent a slowdown of major infrastructure projects across the country, all of the stakeholders must play a significant role in addressing the skilled trade shortage and demonstrate their commitment to building a strong future skilled workforce.

John Tenpenny is the editor of ReNew Canada.
john@actualmedia.ca

Join the conversation. For daily news and discussion, visit:
@ReNewCanada /ReNewCanada ReNew Canada

ReNew CANADA
The Infrastructure Magazine

March/April 2022 Volume 20 Number 2

EDITOR	John Tenpenny
CONTENT DIRECTOR	Corinne Lynds
ASSOCIATE EDITOR	Jen Smith
CONTRIBUTING EDITOR	Connie Vitello
ART DIRECTOR AND SENIOR DESIGNER	Donna Endacott
ADVERTISING	Nick Krukowski nick@actualmedia.ca
CONTRIBUTORS	Kate Borg, John Longthorne, Jolene McLaughlin, Zoran Postic, Shoshanna Saxe, Matti Siemiatycki, Stacia Van Zetten
DIGITAL MARKETING MANAGER	Shannon Clark
EVENT MANAGER	Natasha Mawji
PRESIDENT	Todd Latham
PUBLISHER	Nick Krukowski
ADVISOR	James Sbrolla

actualmedia

ReNew Canada is published six times a year by Actual Media Inc.

actualmedia.ca

150 Eglinton Ave. E, #806, Toronto, ON M4P 1E8
Phone: 416-444-5842
Subscription/customer services: 416-444-5842 ext. 1

ReNew Canada subscriptions are available for $39.95/year or $64.95/two years and include the annual Top100 Projects report.

Printed in Canada

Undeliverable mail return to:
150 Eglinton Ave. E, #806, Toronto, ON M4P 1E8

Canadian Publications Mail
Product Sales Agreement 40854046
ISSN 1715-6734

renewcanada.net

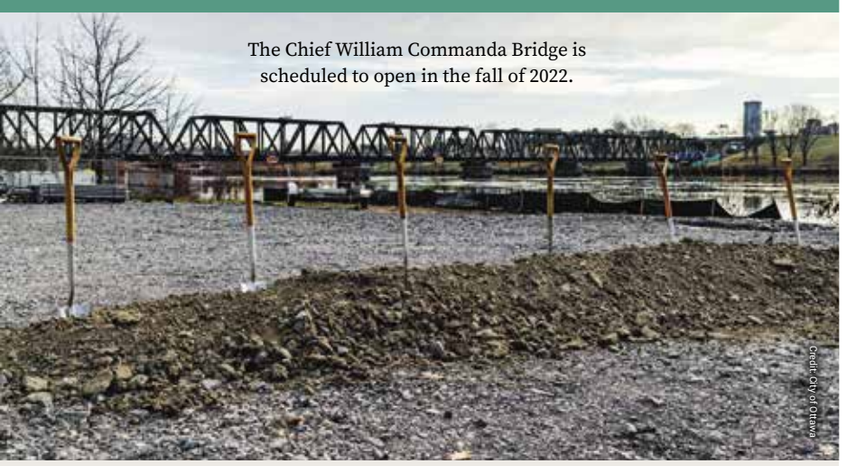
ABOUT THE COVER

The City of Kingston is building a Third Crossing bridge across the Cataraqui River from the foot of Gore Road in the city's east end to the foot of John Counter Boulevard in its north end. The $180 million bridge is the largest infrastructure project the city has ever undertaken and is using an integrated project delivery (IPD) model.

Learn more about IPD on page 12.

Cover Photo: City of Kingston

OTTAWA BREAKS GROUND ON CHIEF WILLIAM COMMANDA BRIDGE



The Chief William Commanda Bridge is scheduled to open in the fall of 2022.

Credit: City of Ottawa

Ottawa Mayor Jim Watson hosted a ground-breaking event to mark the official start of construction on the Chief William Commanda Bridge, to create an interprovincial multi-use pathway between the Ottawa and Gatineau shores of the Kìchì Sìbì Ottawa River. The scope of construction includes structural repairs to the bridge and deck modifications to create the pathway.

Built in 1880 as a railway link, the bridge was last in service in 2001. The City of Ottawa purchased the bridge from Canadian Pacific Railway in 2005 for a future light rail corridor. As a multi-use pathway, it will improve active transportation between Ottawa and Gatineau and serve as a year-round outdoor link for commuting and recreation, including walking, running, rollerblading, cycling, and cross-country skiing.

"Our region has one of the best urban trail systems found anywhere, and this project will incorporate the Chief William Commanda Bridge into that network," said Watson. "When the multi-use pathway opens next fall, it's sure to become a popular active transportation corridor, linking a network of pathways and public transit on both sides of the river, and providing residents with more environmentally-friendly commuting options."

NEXT ISSUE: MAY/JUNE THE INFRASTRUCTURE LANDSCAPE

Resilient Infrastructure	Model Construction	Integrated Transportation
Adapting to climate change.	Improving delivery models.	Building transit faster.

Credit: George Brown College

George Brown College will partner with PCL Construction to build Limberlost Place.

GEORGE BROWN COLLEGE ANNOUNCES LARGEST-EVER DONATION AND ONE-OF-A-KIND EXPANSION OF WATERFRONT CAMPUS

The largest-ever donation to George Brown College will support George Brown College's ongoing Waterfront Campus expansion with an Ontario first—a tall-wood, mass-timber, net-zero carbon emissions, 10-storey institutional building.

The $10-million donation from Canadian philanthropist Jack Cockwell will fund Limberlost Place, a visually stunning new learning facility constructed with mass timber components sourced in Canada.

Inspired by Limberlost Forest and Wildlife Reserve in Huntsville, ON, the building will house the college's School of Computer Technology, School of Architectural Studies, and a new childcare facility. It will also be the new home of the Brookfield Sustainability Institute—a hub for innovative research and programming connected to industry.

The unique wood-based structure features the strength of a traditional steel and concrete building with a fraction of the carbon footprint, harnessing the power of the sun and Lake Ontario. No fossil fuels will be used to heat or cool the building. Limberlost Place will include solar chimney systems, rooftop photovoltaics and deep-water cooling.

"We are grateful to Mr. Cockwell for his incredibly generous donation that will allow us to build this impressive new centre for learning and deepen George Brown College's commitment as a community-builder," said Dr. Gervan Fearon, president of George Brown College. "Limberlost Place highlights the future leadership role George Brown will play in the city's Waterfront development as a sustainable city. This stylish addition to the city skyline will add to the vitality and modernization of Toronto's beautiful waterfront, and will help George Brown students to work, study, learn, and grow."

The landmark structure is designed to adjust to changing academic uses and is scheduled to be completed by summer 2024.

Credit: FMT Hamilton

The tunnel boring machines (TBMs) for Metrolinx's Eglinton Crosstown West Extension and Scarborough Subway Extension projects arrived by ship from Germany.

TBMs FOR GTA SUBWAY PROJECTS ARRIVE AFTER ATLANTIC CROSSING

A trio of tunnel boring machines (TBMs) arrived in the Greater Golden Horseshoe, destined for Metrolinx's Eglinton Crosstown West Extension and Scarborough Subway Extension projects.

Following a two-week journey across the Atlantic, the boring machines, one 12 metres in diameter and the other two both 6.5 metres in diameter, arrived at the Hamilton-Oshawa Port Authority's (HOPA Ports) Ontario ports. All manufactured by Herrenknecht in Germany, the larger Scarborough Subway Extension TBM was delivered to the Port of Oshawa, and the other two for the Eglinton Crosstown West Extension project were delivered to the Port of Hamilton.

At each port, carrier vessels delivered the heavy cargo with the assistance of the expert stevedoring teams who serve HOPA's network of ports.

"As an integrated port network, we look to create better connections for businesses and industrial users moving cargo throughout the Greater Golden Horseshoe, just like Metrolinx does for rail passengers," said Ian Hamilton, president & CEO of HOPA Ports. "We're thrilled to see goods move through the Ports of Hamilton and Oshawa, which will in turn help people move more efficiently."

Projects like the Eglinton Crosstown West Extension and the Scarborough Subway Extension will not only benefit the communities where they are being built, but the region as a whole, said Phil Verster, Metrolinx president and CEO. "We're happy to see these incredible machines arrive through local ports in Hamilton and Oshawa as part of their journeys to their respective launch sites."

Credit: DIALOG + HOK

The agreement between the City of Calgary and CSEC to build a new arena and event centre has been terminated.

CALGARY EVENT CENTRE PROJECT TERMINATED

More than a year after an agreement was signed for the construction of the new Calgary Event Centre and arena, the Calgary Sports and Entertainment Corporation (CSEC) said there is no viable path to complete the project due to rising costs.

According to a Jan. 1 memo from city manager David Duckworth to Calgary city council, the arena deal has now been terminated due to unresolved issues, and there is no opportunity to resurrect the 2019 agreement that was amended by council last summer.

"We have always believed that Calgary needs a new Event Centre" stated John Bean, CSEC president and CEO. "However, under the current circumstances we do not see a path forward that would create a viable partnership with the city, which is essential for a new Event Centre to become a reality."

Calgary Mayor Jyoti Gondek said since her election in October, her office and city officials had been working with CSEC to mitigate additional costs, including two that were identified: $4 million in climate mitigation—including solar cells as part of the development permit process—and $12.1 million for road and sidewalk issues.

Maple Reinders

Over 50 Years of Integrity in Building Excellence

DESIGN • CONSTRUCT • MANAGE • OPERATE • FINANCE • MAINTAIN

Maple Reinders is an award-winning full service solutions provider in the construction industry - built on a foundation of integrity, trust, and a commitment to our clients and their projects.

With more than 2,900 completed projects and over 50 years of design, construction, and project management expertise we have a wealth of experience across every type of project delivery and market.

With significant experience in advanced manufacturing and organic waste management facilities, as well as specializing in innovative wastewater treatment solutions, we are the partner of choice for all manner of civil and environmental projects.

At Maple Reinders, our delivery model revolves around you. As one of Canada's largest private operators of municipal infrastructure through our AIM and MFM subsidiaries, we can offer long term facilities operation services, as well as project financing options. Whether you require an all in design, construct, commission, finance, operate and maintain delivery model or just a few of our many professional services, we would be honoured to be selected for your project.

CRD Residuals Treatment Facility

Calgary Composting Facility

Porter Airlines YTZ Terminal Expansion

Maple.ca

Mississauga (Head Office) • Calgary • Cambridge • Edmonton • Halifax • Kelowna • Vancouver

Credit: Government of Nova Scotia

One goal for Masland was to remove the tolls on the Cobequid Pass for Nova Scotia registered vehicles.

Inset: Nova Scotia's Minister of Public Works, Kim Masland.

THE ROAD TO RESILIENCE

Minister Kim Masland leads the way for public infrastructure improvements in Nova Scotia.

By Connie Vitello

Public Works Minister Kim Masland was first elected to the Nova Scotia House of Assembly as a Member of the Legislative Assembly (MLA) for Queens-Shelburne in 2017 and re-elected in 2021. She is the Government House Leader—the first for a female in the province of Nova Scotia—and is also a member of the Assembly Matters and Internal Affairs Committees, and the Management Commission.

Prior to becoming an MLA, Masland worked in the banking industry and as the executive assistant to Gerald Keddy, Member of Parliament from 1997-2015. In 2015 she became the Senior Safety Coordinator for Queens County working closely with the RCMP Detachment.

Since her ministerial appointment in 2021, her department has made some major announcements toward achieving more resilient infrastructure. Most recently, the Gravel Road Capital and Rural Impact Mitigation budget was doubled, bringing the total investment to more than $63.5 million. Gravel roads make up about 35 per cent of the provincial road network.

Masland has also demonstrated personal resilience in keeping up with her hectic schedule while battling COVID. In fact, she and her family came down with COVID during the weeks leading up to the *ReNew Canada* interview, but she was determined to proceed and share her insights into the state of public works and how she's tackling her to do list during one of the most challenging times in the history of the province.

> We're undertaking several engineering and feasibility studies to figure out how to plan for more resilient communities and roads.

You were introduced as the new leader of the Department of Public Works, formerly Transportation and Active Transit, on August 31, 2021. How is your previous experience in finance, safety, and public affairs helping you to perform in your relatively new role?

I am absolutely delighted to be in the new role as Minister of Public Works. It has been very challenging to learn so much about a very large department within our government and province. But being involved in government is not new to me. I spent four years in opposition and had various roles during that time, including critic of environment, fisheries and aquaculture, education, justice. I'm thankful for those years where I was able to get my feet underneath of me, to really learn about government and the legislature.

Before that, my experience working with Gerald Keddy was so valuable to me. I went back and forth to Ottawa, and I learned to navigate the many complex systems that exist in government and to help people

Credit: Government of Nova Scotia

The New Waterford site of the Cape Breton Regional Municipality Health Development project. The new community hub will include a health centre, 60 bed long-term care facility, Breton Education Centre (BEC) school, Community Wellness Centre, and recreational facilities.

access services and supports. I've essentially spent my entire adult life involved in public service and I love it. I was brought up believing we all play a role in society and should take care of one another. Stepping up into public service is my way of contributing.

What are some of the key goals that you have for Nova Scotia's public works initiatives?

I'm a rural MLA. I grew up with lots of gravel roads around me and I understand and know the importance of our road system, especially our gravel roads. I wanted to make sure that we had a real focus on rural roads and was very happy when our Premier doubled the funding for those programs—that was my first announcement as minister of public works. It was exciting to come back to Liverpool and deliver that news at our local highway depot.

In terms of other key goals, I want to make sure that we honour the commitments made by previous governments, including our five-year highway improvement plan—which includes management of 23,000 kilometres of roads and 4,100 bridges. It's important for our contractors, road building associations, and truckers to be able to plan ahead. We're also looking at determining what resources are required to reduce our energy consumption and the embodied carbon in our energy portfolio. Moving forward, with building projects and in our major renovations, we will strive for net zero solutions and to maximize climate resilience. My department is responsible for 2,400 structures across our province, so we want to make sure that we're doing our part.

Another goal in my mandate was to remove the tolls on the Cobequid Pass for Nova Scotia registered vehicles and I'm pleased that we were able to do that in December. There will still be a toll for out of province registered vehicles. It was great for me to be able to pay the last in-province toll.

You are checking off the to do list despite it being a tough time to do so. Are there specific steps your team is taking to deduce how to address the ongoing pandemic challenges currently facing public works?

As in most jurisdictions, the pandemic has been the focus for the past two years and we're working to make sure we're providing services and delivering projects that Nova Scotians expect and deserve. We've been quite successful in maintaining our transportation routes and continuing with our pothole management and brush cutting where needed. We will continue to implement the commitments identified in the five-year plan. It has been an unprecedented and very difficult time but we're driving forward with our plans.

Our recent Top100 report highlighted some major projects in Nova Scotia, including the $717.9 million Highway 104 redevelopment project and the $2 billion QEII New Generation healthcare project. What can you tell us about the progress on these projects and how they will help the communities they serve?

These are two very, very exciting projects. Safe highways are absolutely essential for the economic and social well being of all communities. This will provide a high-quality highway for many years to come. The Highway 104 project will see 38 kilometres between Sutherlands River, Pictou County, and Antigonish twinned as well as the construction of new interchanges and bridges. The project includes a new, four-lane divided highway, the twinning of an existing highway, two new interchanges, about 24 new bridges, environmental enhancements and more. This project is very welcome

Nova Scotia Public Works Minister Kim Masland visits a department depot garage and takes the opportunity to get in the driver's seat.

Credit: Government of Nova Scotia

by residents and travellers will appreciate it as well.

The QEII New Generation project is a very complex, multi-year project that will lay the foundation for how we will deliver health services for the future. The redevelopment of the QEII is a multi-phase project involving several healthcare sites in and around the Halifax Regional Municipality (HRM). The project will transform our health care delivery, providing modern services for patients through renovations for the Hants Community Hospital in Windsor and the Dartmouth General Hospital, a new Community Outpatient Centre in Bayers Lake, a new hospice residence in Halifax, movement of the cancer centre, and more. The healthcare community has been very involved in this project. Anytime you can collaborate with people on the front lines who really understand what's needed, it's the best. This project will create such positive change for so many people.

Canadians are increasingly experiencing the impacts of climate change with extreme weather events from coast to coast to coast. How is the government working to make sure coastal communities in Nova Scotia are becoming more resilient?

It's a very good question. We all know how important it is to protect our unique coastline in Nova Scotia, Canada's ocean playground. Our rising seawater levels are putting our communities at risk. The new coastal protection legislation, when finalized, will guide new development and redevelopment, and protect future construction along our more than 13,000 kilometres of coastline. Ecosystems are also at risk. Nova Scotia has partnered with other Atlantic provinces and the federal government to support the CLIMAtlantic program to share critical data, which will help develop strategies to respond to climate change, including risk planning and flood mapping. We want to make sure that our municipalities are prepared. Cape Breton recently suffered a severe storm in which we lost roads. Some bridges were completely washed out. We're undertaking several engineering and feasibility studies to figure out how to plan for more resilient communities and roads.

Speaking of transportation, you recently introduced the Joint Regional Transportation Agency Act - Bill 6, an Act to Establish a Joint Regional Transportation Agency. How will this new legislation improve transportation conditions and accountability in the province?

> Moving forward, with building projects and in our major renovations, we will strive for net zero solutions and to maximize climate resilience.

Yes, I introduced this in the last sitting of the legislature. Any time that we can improve the flow of people and goods in and out of an area it's a good thing. This legislation is specifically looking at the flow of people in and out of the Halifax Regional Municipality. The growth in our city and urban areas has been incredible over the past few years. We need to make sure we're doing the right things in the

right areas. It's a great way to collaborate and it will lead to success. We are collaborating to build a long-term plan and guide future work for roads, ferries, and public transportation.

This winter there was a controversy over the use of public equipment being used to plow private roads. Some attribute this as a legacy of political favours from the past. A freedom of information request last year revealed the province provides some level of service on 348 roads totalling about 95 kilometres. How are you addressing the situation?

We're currently in conversation to sort this matter out. I can tell you that back in the mid-1990s the province took on maintenance of these private, mostly gravel roads. There have been no new private roads added to the list on my watch. It predates my involvement in the department. In the meantime, we want to assure a level of safety for everyone. My understanding is that some of these roads lead to churches, community halls, and grocery stores. We are maintaining the status quo for these 95 kilometres of road, but I am asking my staff to clarify the practice of servicing these roads.

Are there any other up and coming plans for public works that you'd like to share with ReNew Canada readers?

Another incredible project I'd like to highlight is the Cape Breton Regional Municipality redevelopment project. Similar to the HRM project, it's a multi-year, multi-phase endeavor, which will result in a new cancer centre, energy centre and a clinical services building that will house a new emergency department, critical care department, in-patient beds, surgical suites and maternal services area. There will be a community wellness and recreational centre that will be life changing for people in the community.

I'd also like to take a moment to acknowledge the work of the people in public works department. I'm in awe of the ongoing efforts of these incredible public servants that go above and beyond.

Connie Vitello is the contributing editor of ReNew Canada.

Credit: City of Kingston

IPD aims to increase efficiency, while reducing waste and disputes.

By John Tenpenny

The integrated project delivery (IPD) model has been around for close to two decades and, while it began in the United States, it's slowly picking up speed in Canada. In fact, IPD has been called one of the future trends that will impact the construction industry.

According to the Canadian-based, Integrated Project Delivery Alliance (IPDA), there are currently 50 projects either complete or in progress right now, not including ones that are in procurement.

From start to finish, an integrated project differs from a traditional one.

For example, design decisions are moved to the beginning phases of a project—where they can be more effective and less costly. In doing this—and implementing early team engagement—the project has a higher level of completion prior to pre-construction, reducing time and increasing savings.

By optimizing early engagement from all stakeholders—trade partners, architects, owners, and contractors—IPD creates a much deeper level of collaboration. It naturally fosters efficiency, innovation and goal alignment.

During a recent INFRAIntelligence webinar, ReNew Canada, with support from Graham, discussed with a panel of experts what's driving IPD and how infrastructure project finance and procurement is changing in other ways. How have delivery models evolved over the years? What have we learned from past projects and where are the opportunities in the future?

According to Neal Panchuk, pre-construction manager with Graham's Toronto buildings team, the increasing complexity of projects has owners looking for alternative delivery models.

> The business case for IPD from an owner's perspective is that it is supposed to optimize the project constraints of cost, time, quality, and other risks.

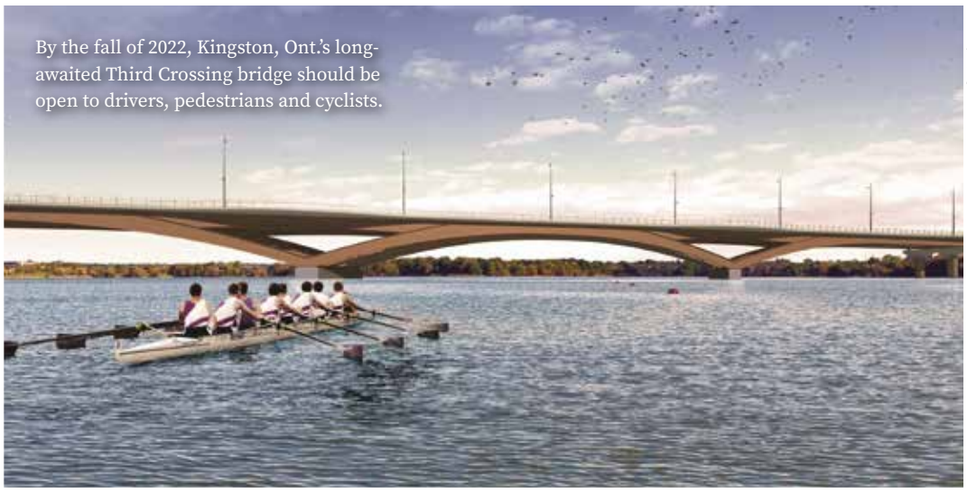
IPD adoption

The business case for IPD from an owner's perspective is that it is supposed to optimize the project constraints of cost, time, quality, and other risks. Proponents of IPD believe that in other traditional project delivery models (e.g., design-bid-build or design-build) the optimization of these constraints comes at the sacrifice of others. From the perspective of other project parties like design professionals, contractors and trades, IPD is aimed at increasing efficiency, reducing waste and minimizing disputes.

"The old way of working, where we're throwing information over the fence from one consultant to another and back to the contractor for pricing, has proved time and again that that's failing. And that's where IPD comes in and allows us to get out of the gate in an aligned manner right from the start."

It's not necessarily just about adoption of the IPD model, says Mark Van Buren, deputy

The City of Kingston, using IPD, is integrated with design and construction teams that are working on the planning, design and construction of the Third Crossing project.



Credit: City of Kingston

By the fall of 2022, Kingston, Ont.'s long-awaited Third Crossing bridge should be open to drivers, pedestrians and cyclists.

Credit: CNL/HDR

Canadian Nuclear Laboratories recently announced that an IPD agreement is now in place for the design and construction of the Chalk River Laboratories' new research complex.

commissioner of major projects, for the City of Kingston, who is currently leading a small team of city staff that are integrated with a design team from Hatch and Systra and a construction team from Kiewit, who are working on the planning, design, and construction of the Third Crossing bridge project.

"I'm not so sure about the adoption at this point, but I'd say the interest is enormous," he explains. "I get inquiries, almost on a weekly basis, about what's going on in Kingston and 'I'd like to learn more about what you guys are doing for IPD.'

"And from an owner's perspective, I think there's a point of getting tired where you constantly are dealing with projects that are missing budget, missing schedule, and you don't have the constant looming threat of legal action between the parties. And [IPD] really set the table for how we can do things differently."

But not every project is right for IPD, says Louise Panneton, president of P1 Consulting.

"Some of the clients we work with, for example large government entities, have the bulk of their project that should be developed through design-bid-build, or design-build."

At its core, a successful IPD project is about selecting the right team—all team members need to be able to communicate and collaborate and be capable of working in new ways that require new skills. The team also needs to align with the initial project objectives and be invested in a successful outcome.

In her experience, Panneton says there are two tests to determine where the IPD model should be used.

1. Do you have the right team?

"As we start looking at projects, will you have the right people at the table to actually carry this project through and have the right attitude?"

2. Do you have the right governance?

"In the approval process, have you figured out how to move your project through the entire approval process and do you have the approval and endorsement from the executive team?"

Bringing everybody to the table up front is a big benefit to IPD, adds Dick Bayer, vice president with Colliers Project Leaders' IPD and Lean services team.

"We get to know an awful lot earlier on things we just used to make assumptions on. So, the more we know earlier, the better we are, and that is right at the top of risk management."

MODEL PROJECTS

We asked recent INFRAIntelligence webinar attendees about their experiences with IPD.

Here's what they had to say:

What do you perceive as the greatest benefit of participating in an IPD project?

- Collaboration/Innovation 75%
- Efficiency/Cost Savings 7%
- Lower Risk 18%

What do you perceive as the greatest challenge of participating in an IPD project?

- Trust isn't automatic 23%
- Higher upfront costs 7%
- Greater time commitment 5%
- Not everyone is familiar with IPD 65%

The 53,000-square-foot Oakville Trafalgar Community Centre was constructed using an integrated project delivery model.

Credit: Graham

Collaborative management of risk, identification of risk, these are important benefits of IPD and, according to Panneton, owners are starting to really rally behind that.

From the perspective of everyone involved in an IPD project—the owner, the consultant, the contractor—they all want certainty, adds Van Buren.

"And in that journey, you look at risk. Every party is trying to minimize their risk. And I think the evolution that we have seen is that we've gone from constantly trying to monetize that risk and then trade it away to flipping that around and saying, 'Well, why don't we actually try to embrace that risk or share that risk?" And I think that's the heart of what IPD tries to do, is to take that shared risk, shared reward approach."

Breaking old habits

The challenges that typically face IPD projects can include higher upfront costs for the owner during the validation and pre-construction phases, difficulty for consultants and trade partners to adapt to this new model and way of thinking, difficulty creating an open and collaborative environment among the various players, and a greater time commitment.

People can be the most important factor, says Panneton.

"This is all about people. If you have the right people around the table, your project will be amazing."

Keeping changes to a minimum is another key to a successful outcome, as IPD is not designed to have a very significant number of changes, adds Panneton. "[IPD] is designed to have a good solid outcome and collaborative work to get there. So, if you don't know what your project is, it's probably not a good candidate for IPD."

Another obstacle can be the inherent transparency of the IPD model—the notion of people being comfortable with the idea that consultants and contractors make profit and understanding what exactly that profit is—says Van Buren.

"In some circles, that makes people feel uncomfortable to be having those discussions with our public, with our residents. These are things that in other models we've always kind of obscured or we don't talk about it.

"But [IPD] is very transparent and very open. And that's a little bit of a shift in the conversation to be having. It is all about people and breaking old habits and being open to different approaches."

As with anything new, it's really a behavior change on everybody's part, adds Panchuk.

"There can be no egos in IPD. You have to drop your ego at the door and say, 'We've developed our conditions of satisfaction and values and that's what's driving us.' It's not the loudest voice in the room."

Using cost as an input to design is one of the biggest challenges with IPD, according to Bayer.

"That's a really difficult thing to do. Getting designers, who are so used to designing and pricing, to have a really robust estimator at their side or an estimation desk in the room, where they can get information about cost is a cultural change that's always a difficult challenge."

According to the Canadian-based, Integrated Project Delivery Alliance (IPDA), there are currently 50 projects either complete or in progress.

Money issues

With the City of Kingston's Third Crossing bridge project, based on the city's review of procurement alternatives and benefits during the business case phase, the innovation of an IPD model stood above other options because it allows for the technical validation, detailed and final design, and construction to be seamlessly wrapped into one project model using a less adversarial contract and delivery approach.

For Van Buren, one of the important ingredients was the extent to which the owner is involved.

"It was one of the points of consideration that we had in discussions with our city council around what was going to be the most suitable procurement model for our project. It was about not diminishing the value that we as the owner could bring to the discussion."

From the other side of the table, it's about trying not to make decisions in the absence of input from the owner simply because it's not your money, says Panchuk, it's the stakeholders' money.

That's when the benefits of getting advisors in early to help educate owners prior to getting an RFP become apparent, "So they can quantify in their brain, 'what am I actually looking for as an end state.' Because we're not mind readers, we can't provide that for you," he says.

"You need to help us determine what value is, and we can collectively move forward."

When it comes to the evolution of IPD and how to improve the model, Van Buren, for one, thinks there is an opportunity to build on the current level of collaboration between project owners and their partners by creating an environment where regulatory bodies can be brought to the table to really capitalize on efficiencies.

"And maybe that's the journey ahead as we think creatively about how we can do that."

John Tenpenny is the editor of ReNew Canada.

AN INDUSTRY LEADER IN IPD CONSTRUCTION

Your Construction Solutions Partner
grahambuilds.com

GRAHAM

Australia's history with Alliance contracting, including in transit development in Melbourne, can provide Canada with the knowledge it needs to properly execute the procurement model in this country.

GETTING THE ALLIANCE RIGHT

Lessons learned from collaborative contracting in Australia.

By Kate Borg

The use of the alliance model for project procurement may be new to owners and developers in Canada, but this form of collaborative contracting already has roots in other countries. Countries like the United Kingdom and Australia have already been using this approach for decades, and the successes they have realized in doing so can now be applied to the Canadian market.

In the Australian market in particular, the alliance contracting model has been in use for over two decades in the transit and transportation sectors. In those sectors, alliance is generally used when there is high-risk, technical complexity, and a capital cost of more than $50M AUD ($45M CDN). Because the alliance model carries a significant up-front investment, it does not suit all project types.

In Australia, there are two types of alliance procurement: pure alliancing and competitive alliancing. In both cases, there is a proposal and evaluation period that involves multiple proponents. Pure alliancing offers a short window with two proponents taking part in a workshop period before the final proponent is named. In competitive alliancing, two proponents participate in the Alliance Development Agreement (ADA) phase, both proponents are evaluated, and a successful proponent is then selected. Competitive alliancing was adopted to ensure that there was still commercial competitive tension within the procurement phase while still assessing the behaviours of the teams. In both cases, the project owner is part of the alliance, taking an active role in the decision-making process for the delivery of the project.

When countries have done their initial adoption of alliance contracting, the starting point is usually pure alliance contracts. This is what is being implemented in Canada today.

Spotting the differences

It's important to understand how alliance contracting differs from traditional design-build projects here in Canada.

The biggest difference between this more traditional form of project procurement and the collaborative alliance contracting is that you are assessed on your behaviours and how you work together as a team. Significant time is spent in pre-construction working together to build a real culture of collaboration among the project partners. This helps build a set of shared expectations between the owner and contractor, building a strong mutually-beneficial partnership among the parties.

There are a few additional key differences between traditional and collaborative contracting models:

- The owner or client is part of the delivery team and a member of the alliance.
- A best-for-project approach to delivery and appointment of people;
- A value-for-money approach to decision-making;
- A series of key result areas that have combined key performance indicators (KPIs) to be met by all of the alliance participants; and
- A "no claim" philosophy to project delivery.

Alliancing also adopts an open book policy to the financial management of the project. There are no secrets related to the costs associated with the project, be it personnel or material related. All project costs are kept in an open forum, where they can be evaluated by all project partners.

Because of the up-front work involved in understanding the behaviours of the partners involved in the project, in place to help manage and mitigate risk, alliance projects

can be seen as an expensive proposition. It can therefore be seen to be not worth adopting for projects that have a low or readily definable risk profile.

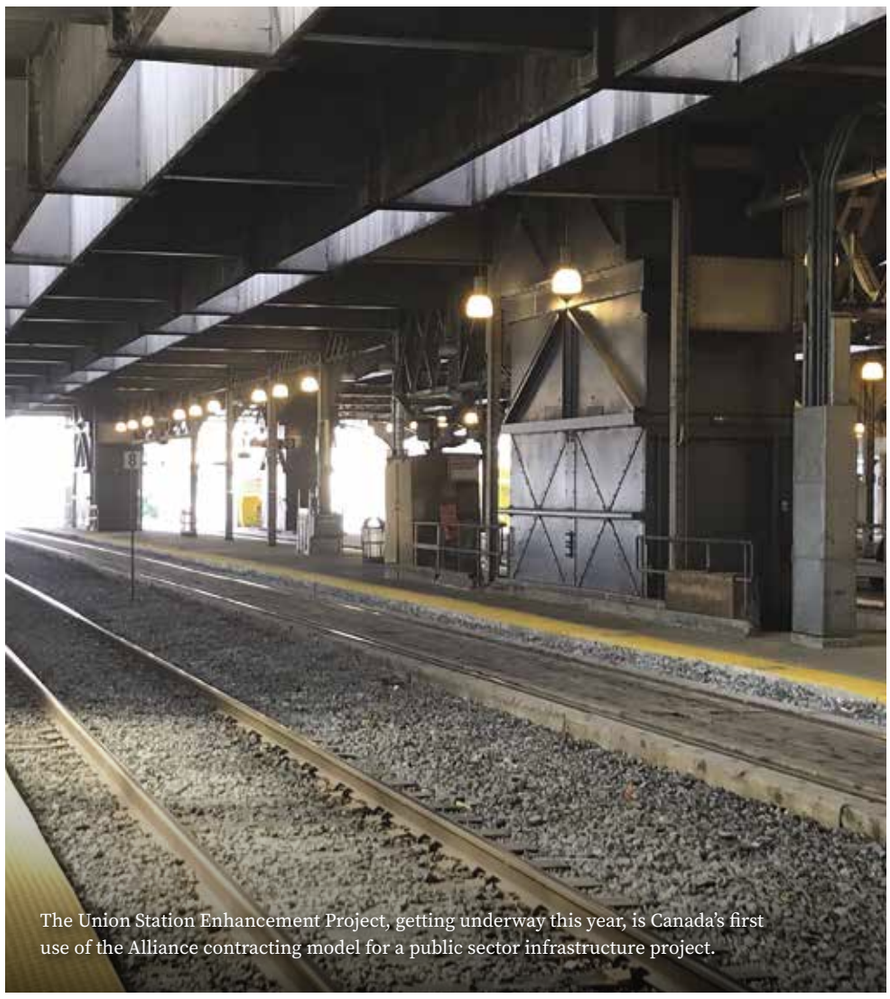
The true cost of litigation resulting from traditional models, compared to the overall cost of the alliance model, has not really been compared properly in Australia. This has led to some skepticism about the value of the model when historically reviewing alliancing. However, it is my general view that the value of seeking claims, and the stress that this places on the private businesses, significantly outweighs the cost of collaboration.

Lessons learned with alliance

There are several reasons why this form of collaborative contracting has the opportunity to create a stronger end result for infrastructure projects in Canada. These observations become clear for all parties when they work together to execute the contract:

1. There are no secrets among the alliance partners, and all risks are discussed between the participants rather than hidden away for commercial advantage.
2. Confrontational discussions relating to commercial, or risk, decisions are non-existent.
3. There is a camaraderie when delivering the project and knowledge is shared rather than restricted between parties.
4. The alliance participant teams enjoy coming to work and working together to solve any problems that emerge throughout the process.
5. The owner or client participant benefits by being part of the project delivery developing a more mature client for future projects.

The focus is placed on the need to execute a strong project for the community it serves, rather than any competitive advantages or corporate restrictions that can create roadblocks during project execution.



Credit: Metrolinx

The Union Station Enhancement Project, getting underway this year, is Canada's first use of the Alliance contracting model for a public sector infrastructure project.

Collaborate to strengthen the local market

Use of the alliance model in Canada could also help prevent some of the contractor pitfalls experienced in the Australian market. It is unfortunate to observe that, the use of aggressive models inciting a race to the bottom and government expectations on who should carry unknown risk, has led to Australian contractors no longer being owned by the Australian people. Local contractors could no longer makes ends meet in that market, forcing them to sell their operations to international companies. Governments need to understand that seeking best value for public funds does not mean at the expense of bankrupting local contractors.

> When countries have done their initial adoption of alliance contracting, the starting point is usually pure alliance contracts. This is what is being implemented in Canada today.

The way that this pitfall can be avoided is through alliance contracting, and other similar collaborative contracting models. Working together focuses efforts on the real end result, creating an asset that provides value for a community or communities over the entire life cycle. When the contract is about nothing more than the immediate dollars invested, the projects that result rarely meet more than the immediate need, which can lead to significant cost concerns when before the asset should have completed its usable life.

I believe collaborative contracting has changed the industry. Even on traditional models, it is business as usual for designers, contractors, and client teams to all sit together to deliver the project. Collaborative contracting has infiltrated the traditional models making project delivery more certain and less adversarial, which results in better project delivery for everyone.

With the Union Station Enhancement Project getting underway this year, Canada's first use of the alliance contracting model for a public sector infrastructure project, it will be important to implement the lessons learned from the Australian experience to create a positive, collaborative experience for all parties involved.

Kate Borg is the alliance design manager for OnTrack Alliance at WSP in Canada.

In 2019, Network Rail established the South Rail Systems Alliance (SRSA), a 10-year £3 billion agreement between Network Rail, Colas and AECOM, for delivery of railway system renewals.

Credit: Network Rail

SOUTH RAIL SYSTEMS ALLIANCE

Complex infrastructure projects being delivered under an alliance contract.

By John Longthorne

Network Rail owns, operates and develops the United Kingdom's highly utilized railway infrastructure which includes over 32,000 km of track and 30,000 bridges, tunnels and viaducts, as well as thousands of signals, level crossings and stations. When system improvements are needed, they are most often performed under challenging conditions in constrained environments with restricted access.

In 2019, Network Rail established the South Rail Systems Alliance (SRSA), a 10-year £3 billion (CDN-$1.76B) agreement between Network Rail, Colas and AECOM, for delivery of railway system renewals across three Network Rail Regions in the south namely, Anglia, Southern and Western & Wales. This extensive enhancement program made up of complex infrastructure projects is being delivered under an alliance contract where all parties are aligned under key performance metrics and a best for project approach that's geared toward generating continuous improvements and successful outcomes.

Building on prior accomplishments

Network Rail, Colas and AECOM had previously delivered all junction renewals under a successful alliance arrangement in a similar geographic region over a six-year period. The scope on this subsequent SRSA alliance now involves incorporating the collaborative and continuous improvement approach established under the previous contract to embrace a wider scope of work on plain line track renewals over a 10-year period.

Collaboration is key

The alliance charter for the SRSA includes a collective sharing of risks and a win/win/win arrangement, meaning there is a common goal, all parties have the best interests of the SRSA at the centre of everything they do, and collaboration underpins all business.

> Success of the alliance has been founded on a tender process that included considering the participants' approach to collaboration and their demonstrated collaborative behaviours.

The alliance form of contract on these projects was based on one that AECOM helped to evolve in Australia in the early 2000s. The commercial framework is constructed with commercial arrangements and contractual terms where all parties are aligned to achieve a common goal with an appropriate sharing of risks, a no blame culture, and an integrated team making unanimous decisions.

The SRSA is based on a target cost model with a pain/gain mechanism. Target costs are jointly developed and agreed upon between participants with a commitment to an open book approach and external audits. There is a commitment to resolve any disputes within the alliance and without legal recourse in the

RCCAO MEMBERS READY TO KEEP CONSTRUCTING ONTARIO'S FUTURE

Investments in Ontario' infrastructure pay dividends for everyone:

- Ontario's fastest growing region needs new infrastructure to keep the province on the move, which is why the Bradford Bypass and Highway 413 transportation corridor must be built.
- Municipalities must have the necessary capital funds to proceed with maintaining critical infrastructure in a state-of-good-repair for Ontarians.

Policy reforms to enable industry and grow Ontario:

- Improve the delivery timeframes of underground utility locates as the current system results in significant project delays and additional on-site costs.
- Continue to address Ontario's labour shortages including through reforming the immigration system by making it easier to attract immigrants with construction experience.

RCCAO MEMBERS

Greater Toronto Sewer and Watermain Contractors Association

GTSWCA has been representing sewer and watermain construction contractors in the Greater Toronto Area for more than 60 years, and currently serves over 200 member companies. GTSWCA is committed to the maintenance and expansion of this core infrastructure to ensure a plentiful supply of clean water and the preservation of our lakes and rivers.

Heavy Construction Association of Toronto

HCAT is an organization of contractors in the heavy civil engineering construction sector involved in bridge construction and rehabilitation, tunnels, marine construction, structure foundations and other infrastructure in the GTA.

Joint Residential Construction Association

Representing the unionized residential builders in high-rise and low-rise construction, this Vaughan-based organization is dedicated to labour relations.

LiUNA, Local 183

This is the largest construction local union in North America. It is comprised of more than 58,000 construction workers in the Greater Golden Horseshoe who work on projects for residential construction, sewer and watermain, roads, bridges, pipelines, railroads and utilities.

Ontario Formwork Association

Woodbridge-based OFA represents more than 50 employer companies and 4,500 employees in provincial collective bargaining as they complete the formwork to build condominiums, subway tunnels, treatment plants and other forms of concrete infrastructure.

Toronto and Area Road Builders Association

TARBA has more than 25 contractor members that perform the majority of new road construction and maintenance for the City of Toronto, as well as municipalities in Halton and Peel Regions as well as Simcoe County. Members also perform work for the TTC, Metrolinx, the Ministry of Transportation, other provincial agencies and private developers.

VISIT RCCAO.COM TO FIND OUT MORE

RESIDENTIAL AND CIVIL CONSTRUCTION ALLIANCE OF ONTARIO

Constructing Ontario's Future

e: media@rccao.com

@_RCCAO RCCAO

rccao.com

The SRSA has an integrated project team where the best person is selected for each position, irrespective of parent company.

Credit: Network Rail

event of disagreements. A 'no blame culture' established under the alliance has been fundamental to its success.

Project team and delivery

The SRSA has an integrated project team where the best person is selected for each position, irrespective of parent company. Wherever possible, project teams are co-located in offices and depots at strategic locations around the regions.

There are efficiency targets which translate into the SRSA becoming more competent each year. These are built into contract rates, along with a pain/gain mechanism to incentivize SRSA participants and drive efficient working. Efficiency workshops led by our transformation lead are regularly held to explore and implement efficiency initiatives, and monthly continuous improvement workshops are held for each discipline. All design, assurance and construction staff are in attendance, leading to more effective communication and project delivery.

Safety excellence is also paramount and is a performance indicator in the SRSA contract. Led by the alliance director, the safety culture is cultivated from the top where regular safety conversations and weekly safety calls occur with the alliance team. Alliance boot camps, safety briefings and the alliance safety app—designed for project members to easily track close calls—are just some of the initiatives and tools that the SRSA uses to drive continuous safety improvement.

Alliance successes

Success of the alliance has been founded on a tender process that included considering the participants' approach to collaboration and their demonstrated collaborative behaviours. It was therefore essential that the selection process favour companies and individuals who could operate effectively in the alliance environment. This meant that the evaluation process needed to include tools that allowed behaviour to be assessed at an individual and company level.

The overall aim of the process was for the Network Rail team to observe and experience what it would be like to work with the people they ultimately select for the alliance.

The program team has been able to realize a broad range of benefits from the alliance approach. Late handback of renewals works has been virtually eradicated, removing unplanned disruption penalty payments to train operators. As track quality has significantly increased through progressive assurance techniques, the Alliance is handing sites back to rail traffic at up to 125-mph full line speed, benefitting the passengers with shorter planned disruption.

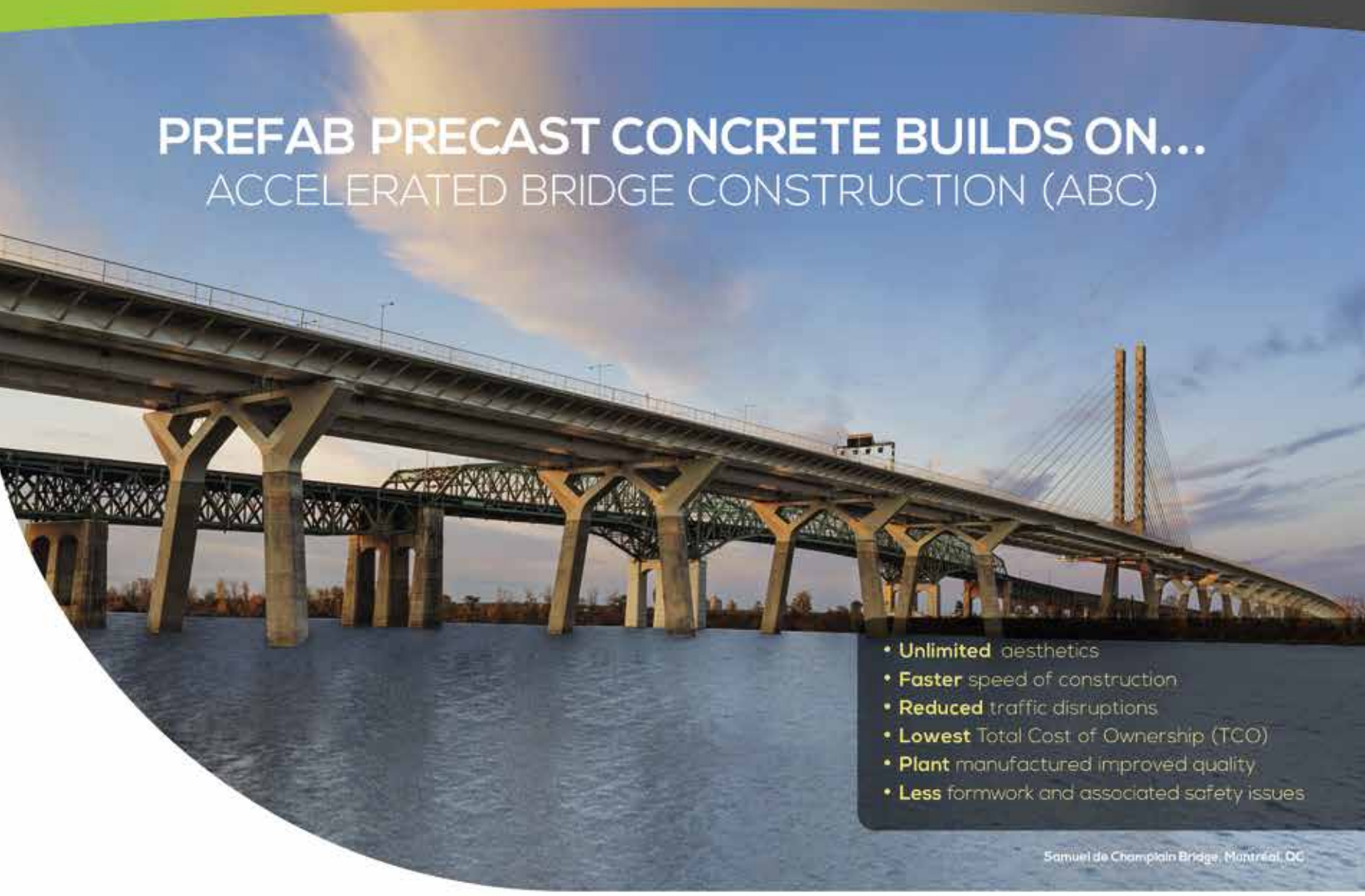
SRSA has been recognized within the rail industry for exceptional performance and won the Engineer of the Year Award and Rail Civils / Infrastructure Team Award at the 2019 UK Rail Staff Awards.

This contract is also being successfully used to instruct a number of additional enhancement works including High Speed 2 preparatory works at London Euston Station and the new station site at Old Oak Common; plus major track remodelling schemes and early development programs of work that ultimately feed into the core contract works.

> The alliance form of contract on these projects was based on one that AECOM helped to evolve in Australia in the early 2000s.

John Longthorne is the director of major projects for the U.K. and Ireland with AECOM.

PREFAB PRECAST CONCRETE BUILDS ON...
ACCELERATED BRIDGE CONSTRUCTION (ABC)



Owner: Infrastructure Canada | **Architect:** Arup Canada - Collaboration with Dissing+Weitling and Provencher Roy | **Engineer:** Stantec and Ramboll
Photo: BPDL Alma, QC

PREFABRICATED AND MODULAR BRIDGE CONSTRUCTION

Prefab Precast Concrete Accelerated Bridge Construction (ABC) uses innovative planning, design, resources, technologies and precast concrete prefabrication techniques to accelerate bridge construction without compromising Quality, Durability and Safety.

A Québec-based Precast Concrete Company supplied 315 pier leg segments; 44 pylon segments; 9,636 deck slabs; 32 box girders; 142 girders; 6,170 square metres (66,415 square feet) of architectural panels; 495 panels for the electrical rooms; and other precast concrete elements including retaining walls, pipes and more.

For more information on this project: **http://www.cpci.ca/en/about_us/project_month/january_2020/**

BRIDGE PUBLICATIONS

CPCI and PCI offer free resources on the design and construction of bridges, including the PCI Bridge Design Manual: Transportation Resources Catalog PCINE Directory Transportation Products.
https://www.pci.org/PCI_Docs/Design_Resources/Transportation_Resources/2021%20Transportation_Catalog.pdf

CANADIAN PRECAST/PRESTRESSED CONCRETE INSTITUTE
INSTITUT CANADIEN DU BÉTON PRÉFABRIQUÉ ET PRÉCONTRAINT

E: info@cpci.ca
TF: 877.937.2724

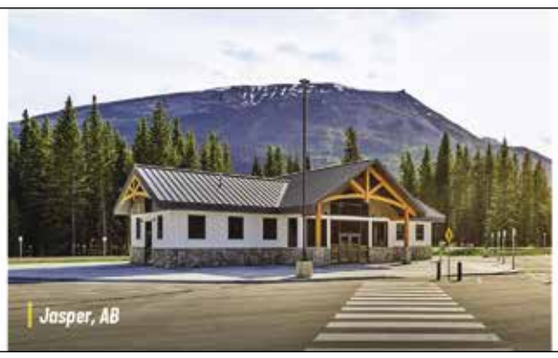
For more information on the Canadian Precast Concrete Quality Assurance (CPCQA) Certification Program, please visit: www.precastcertification.ca

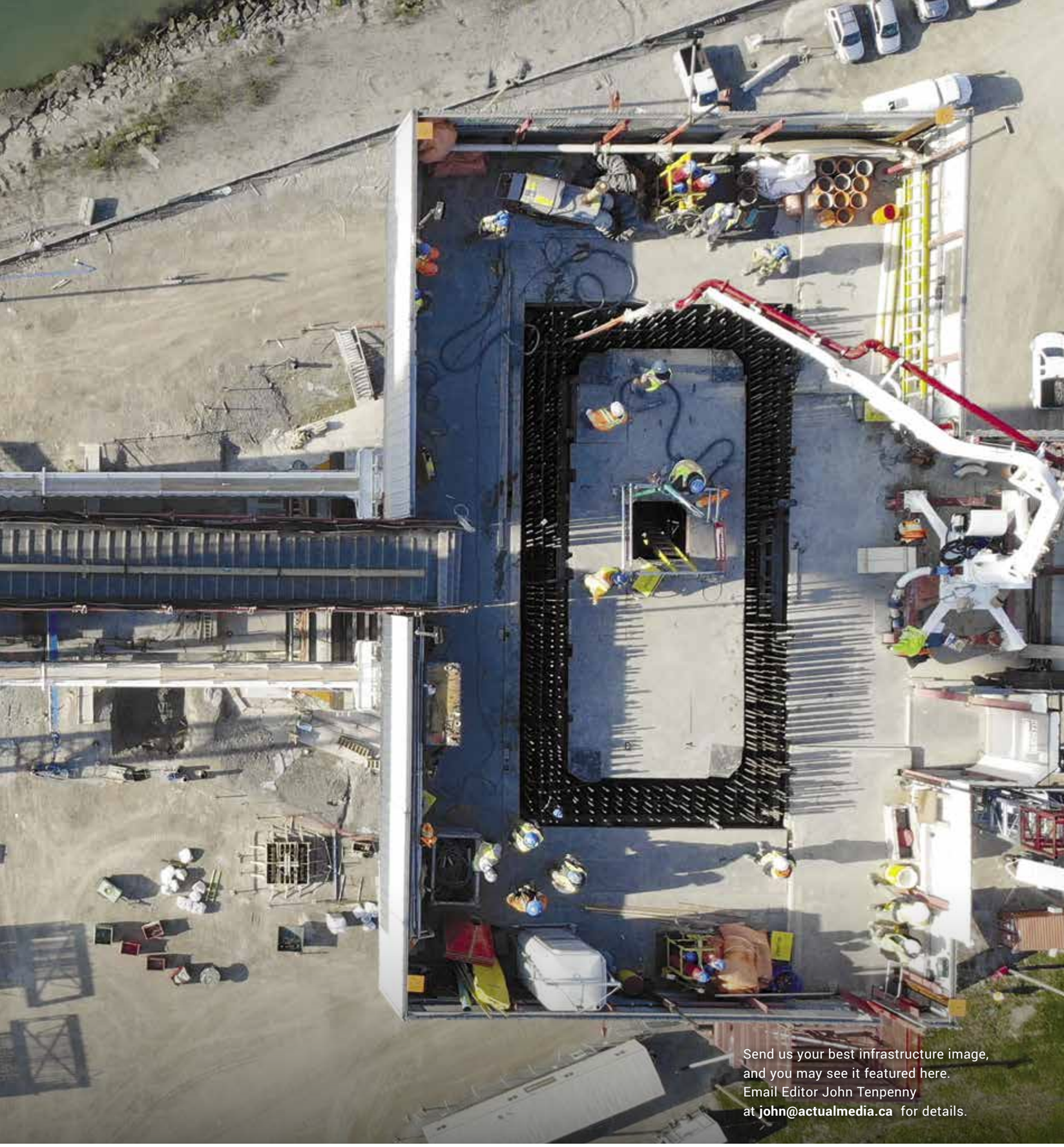
(CPCQA) CANADIAN PRECAST CONCRETE QUALITY ASSURANCE CERTIFICATION PROGRAM

Bridges Make Great Neighbours

An overhead view of construction workers building the Canadian tower legs for the Gordie Howe International Bridge. The tower legs are currently over 100 metres (328 feet) tall. Once completed, the towers in Canada and the U.S. will be 220 metres (722 feet) tall. **— Staff**

Credit: Windsor-Detroit Bridge Authority Credit: Aecon





Send us your best infrastructure image, and you may see it featured here. Email Editor John Tenpenny at **john@actualmedia.ca** for details.

CONCRETE JUNGLE

Credit: EXACT Technology

The Eglinton Crosstown LRT project required over 500,000 m3 of concrete—the equivalent of about 200 Olympic-sized swimming pools.

Crosslinx makes a big impact with a smaller carbon footprint.

By Stacia Van Zetten and Jolene McLaughlin

The Eglinton Crosstown LRT (ECLRT) is part of Metrolinx's regional transportation plan, The Big Move, and is one of the first large-scale transit projects for the Toronto area. The ECLRT will provide fast, dependable, and comfortable transit along Eglinton Avenue, helping to reduce congestion, while offering reliable transit to Toronto residents and integrating transit services.

Since 2014, the joint venture (JV) known as Crosslinx Transit Solutions Constructors (CTSC) comprised of EllisDon Corporation, Aecon Group Inc., ACS - Dragados and SNC Lavalin Group Inc., has been responsible for the project design and construction. Upon completion, the ECLRT will connect east and west Toronto via 25 stations along a dedicated route.

The completed project will contribute to significant greenhouse gas (GHG) emissions reductions by taking cars off the road and reducing the need for diesel buses. In addition, the project provided an opportunity for further GHG emissions reductions during the construction process.

The project required over 500,000 m^3 of concrete—the equivalent of about 200 Olympic-sized swimming pools—across the 25 stations and stops, tracks, signals, communications system, as well as a maintenance and storage facility. According to independent policy institute Chatam House, each year more than four billion tonnes of cement are produced, accounting for around eight per cent of global CO_2 emissions. Therefore, reducing the emissions from the project's concrete provides a significant reduction potential in GHG emissions.

CTSC invested in valuable research to identify optimization opportunities in the concrete mixes to maximize long-term durability of the massive placements while reducing carbon emissions. The use of high-volume supplementary cementing materials (HVSCM) combined with state-of-the-art concrete sensor technology (Exact Technology), delivered a high-quality product with low carbon results.

Increasing the amount of allowable SCM

The ECLRT project's concrete specifications included stringent requirements for maximum temperature and maximum temperature differentials to minimize thermal cracking of structural elements. CTSC enlisted EllisDon's Construction Sciences team to review the specifications and provide a thermal control plan for the project. A key mandate of the plan was to increase the amount of allowable supplementary cementitious material (SCM), which would reduce the heat released during the hydration process by reducing the portland cement content. The JV team invested in comprehensive testing to evaluate the SCM—in this case slag—at replacement levels ranging from 10 to 80 per cent in order to understand the durability and performance impacts when

Credit: EXACT Technology

The use of high-volume supplementary cementing materials (HVSCM) combined with state-of-the-art concrete sensor technology, delivered a high-quality product with low carbon results.

Credit: EXACT Technology

After thorough investigation and verification of the performance of the HVSCM mixes, the project team agreed to increase the SCM use in the concrete.

Credit: EXACT Technology

Multiple mass concrete pours were done at Eglinton LRT Station.

decreasing the cement content. Results from the study, in combination with data from Europe and other jurisdictions showed that SCM at a 70 per cent replacement value was optimal, increasing the durability while reducing temperature rise (also known as the heat of hydration) that could compromise the durability of the placed concrete.

have some percentage of SCM to aid in heat reduction during the curing process. Until recently, this was often limited to less than 50 per cent SCM; it is typical specifications for projects, similar to ECLRT, to still carry this limit. However, because of the sheer volume of the mass elements for ECLRT, the SCM increase was critical to managing the internal heat gained during curing. Collaboration among CTSC, concrete suppliers, and Metrolinx was required to enable the use of an increased volume of SCM at what is considered high volumes.

> CTSC invested in valuable research to identify optimization opportunities in the concrete mixes to maximize long-term durability of the massive placements while reducing carbon emissions.

The significant amount of mass concrete employed on the ECLRT required careful consideration to manage the heat generated during the curing process. Codes and standards specify mass concrete elements as anything at least a meter thick or elements subject to significant thermal stress such as the finished walls and slab at many of the stations. All mass concrete mixes generally

The main project sponsor and overall owner of the project is Metrolinx, however, Infrastructure Ontario (IO) and the Toronto Transit Commission (TTC) are significant stakeholders in the project. As major public agencies, these organizations must consider the public safety and future maintenance of the project assets in their evaluation of any proposed innovations. An increase the allowable SCM percentage in the design is only possible where it will not compromise the integrity of the project requirements as stipulated in the specifications. To support this, CTSC invested in further research, evaluating the impacts of various SCMs at a wide range of volumes to verify the impacts of changing the mix designs. Ultimately, by working with the concrete suppliers, subcontractors and the various stakeholders, CTSC confirmed 70 per cent replacement using slag cement was the optimal level to ensure the project would achieve its durability and performance requirements. After thorough investigation and verification of the performance of the HVSCM mixes, all stakeholders agreed to increase the SCM use in most of the mass concrete elements.

Monitoring and match curing

Throughout the process, CTSC has utilized Exact Technology to monitor the mass concrete placements, ensuring that the placements remain within the specified limits

By using 70 per cent supplementary cementing materials (SCM), Crosslinx Transit Solutions Constructors (CTSC) was able to avoid nearly 130,000 tonnes of CO2e as compared to using a mix with no SCMs.

for maximum temperature and maximum temperature differential. Project teams were able to access critical data through Exact's online portal on a 24/7 basis to make educated decisions for thermal control (e.g., adding or removing thermal blankets, or providing supplementary heat to the placed concrete as it cures) resulting in the most efficient element turnover.

Exact's temperature sensors also monitor in situ strength and communicate with remote curing boxes to match the conditions to the heat of hydration of the mass concrete placements. As a result, project teams can observe and monitor the higher concrete temperatures at early ages and rely confidently on highly representative strengths to advance their most critical activities, such as removing formwork or loading the elements. This offers contractors more control over the curing/strengthening timelines resulting in optimal material use while achieving performance requirements without the added costs from having to apply additional heat during curing.

Environmental benefits of HVSCM

SCMs are commonly used in concrete mixes for everything from foundation walls to bridge decks. Percentages greater than 40 per cent are considered high volume use. Employing HVSCM not only results in more durable concrete that is less susceptible to temperature-driven compromise during hydration; it is also significantly better for the environment. Using SCMs to replace a large portion of cement in concrete mixes, significantly reduces concrete GHG emission intensity. Both fly ash and slag are common SCMs used in concrete mixes. Fly ash is a by-product of coal burning plants and slag derives from steel production, a by-product of removing impurities from molten steel.

As with all materials, the emissions intensity of any one concrete mix depends on the GHG emissions intensity of the individual components that comprise the final product. Emissions estimates presented in this article for the mixes used at ECLRT as compared to lower SCM replacement mixes are based on current best practices and industry average emissions rates for concrete components as published in the Canadian Ready Mix Concrete Association's (CRMCA) Industry Average Environmental Product Declaration.

> As Canada looks to meet aggressive emissions reductions targets, finding ways to reduce emissions in the concrete we use to build our cities and support systems is critical.

By using 70 per cent SCM, CTSC was able to avoid nearly 130,000 tonnes of CO2e as compared to using a mix with no SCMs. While all mass concrete mixes have some percentage of SCM to aid in temperature control,

the impact of increasing the volume of SCM is still significant. For context the emissions reductions realized here is roughly the same magnitude as taking more than 28,000 passenger vehicles off the road for a year.

Looking ahead

The use of concrete has been integral to the construction of buildings and infrastructure for a very long time. There have been advances in concrete mix methodology but there has been fundamentally little development in the constitution of the material overall. Due to the use of concrete in roads, bridges and major developments, material failure would create significant risks to human safety, as well as operational budgets and greatly disrupt day to day life for many. It is common for there to be resistance to making changes to mix designs, with unknown impacts to the longevity of the structures being created to avoid risk of early failure. Some of the more common concerns with the use of HVSCMs include durability tied to salt exposure for concrete on roads and bridges or slower strength gain which would impact overall project schedules and structure use. All these concerns arise because of lack of experience with minor changes to concrete mixes. However, the performance benefits, including emissions reductions, of HVSCM mixes are proven and, as a result, are being used around the world for various types of infrastructure. In the end, the benefits of HVSCM are significant and any associated risks can be mitigated, including the use of various in-situ monitoring tools and technologies.

Environmental savings

As Canada looks to meet aggressive emissions reductions targets, finding ways to reduce emissions in the concrete we use to build our cities and support systems is critical. The industry as a whole is investing in process improvements, including new technologies, to drive toward zero emission material. In the meantime, utilizing high volume SCMs and accurate monitoring tools can help realize meaningful incremental reductions. Procurement authorities at all levels of government should focus on performance-based specifications that outline durability, structural criteria, stability, and Global Warming Potential limits, while encouraging innovation throughout the industry. This will encourage market adoption of tools that will ensure adherence to performance requirements while reducing GHG emissions.

Over the coming decade, the U.S. and Canadian governments are poised to commit nearly three-quarters of a trillion dollars to stimulus spending on large infrastructure projects, comparable to the scope and magnitude of ECLRT. If these projects employ HVSCM, the resulting environmental benefits will be staggering—estimated carbon savings roughly the same amount as taking about 1.7 million passenger vehicles off the road for an entire year. HVSCM adoption across major infrastructure projects globally will deliver more robust infrastructure to the world at a fraction of the environmental cost while also improving performance characteristics.

Stacia Van Zetten is CSO, EXACT Technology.

Jolene McLaughlin is director, Corporate Sustainability, EllisDon

Credit: City of Vaughan

MOVING SMARTER, NOT FASTER

City of Vaughan implements a first-of-its-kind Mobility Management Strategy.

By Zoran Postic

As home to a bustling downtown core, thousands of businesses and more than 341,600 residents, Vaughan is one of Ontario's fastest growing municipalities—and it continues to expand. In fact, by 2031, the city's population is projected to increase by 36 per cent, while jobs are expected to grow by 18 per cent in the same period. To support Vaughan's rapidly increasing population, the City is working smarter to meet the existing and evolving transportation needs of current and future residents. The City's Public Works portfolio launched the new MoveSmart Mobility Management Strategy in March 2021, a first-of-its-kind initiative in the province that aligns the City's vision and forward-thinking initiatives to ensure an efficient, reliable, safe and sustainable transportation system over the next five years, and beyond.

Developed with input from the community, including the Accessibility Advisory Committee (PDF) and the Seniors Association of Vaughan Initiatives, MoveSmart is a plan to continue delivering efficient traffic services in response to the increase in travel demand. The strategy objectives include the following:

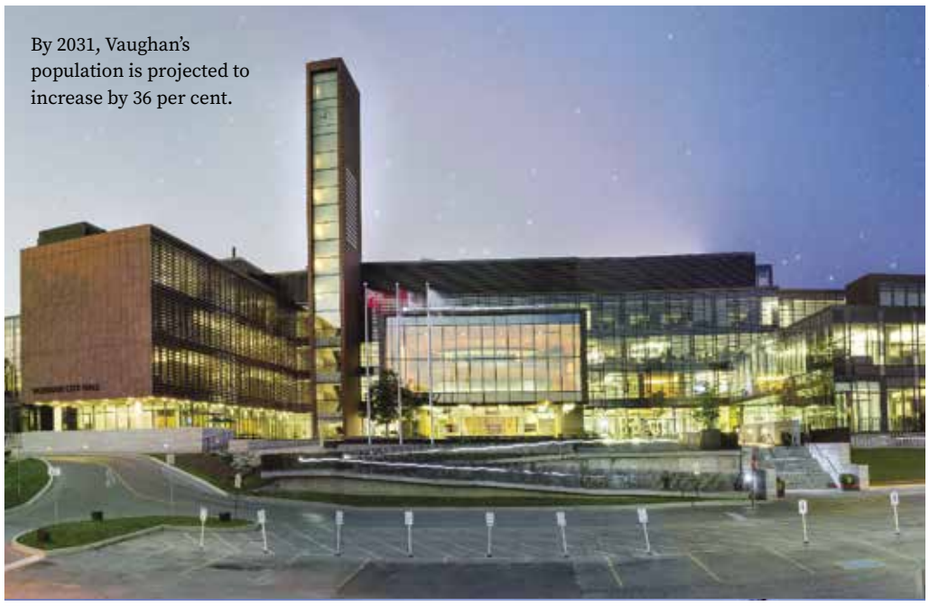
- Provide a framework for collaboration with the community and other stakeholders;
- Define a set of goals for transportation encompassing community values and identify a plan to address the City's mobility needs in an effective, responsible and sustainable manner; and
- Identify opportunities for a more balanced approach to transportation, including the most vulnerable road users.

MoveSmart consists of four programs, which include 29 initiatives in total. The programs are as follows:

1. **Road Safety Program:** to increase road safety and raise public awareness.
2. **Mobility Management Program:** to improve efficiency through innovation and technology.
3. **Traffic Data Management Program:** to assure accuracy and availability of traffic data.
4. **Sustainable Mobility Program:** to support active and sustainable transportation.

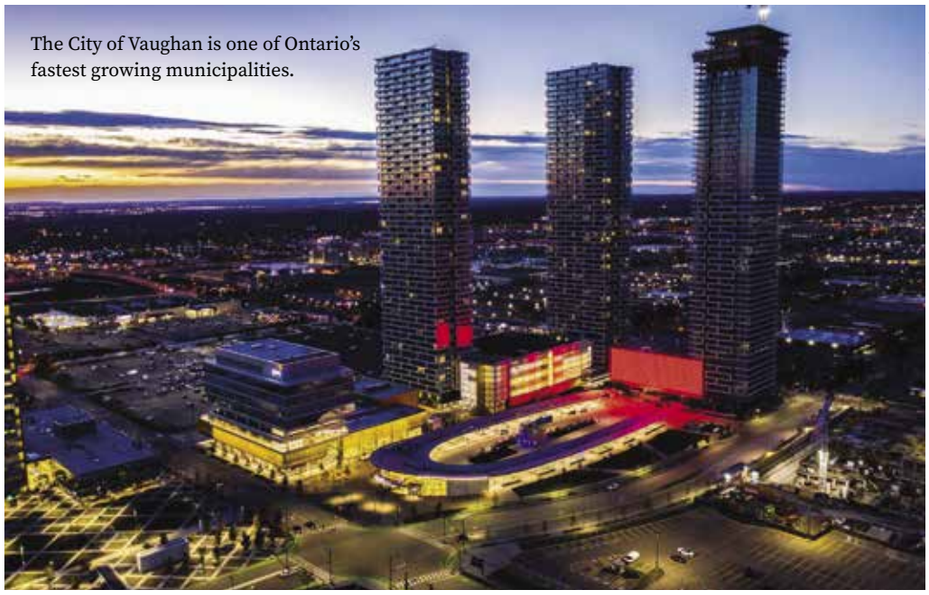
Each of these four programs helps guide City staff to continue to focus efforts on ensuring an efficient and reliable transportation system that ultimately gets

The City of Vaughan launched the new MoveSmart Mobility Management Strategy in March 2021, a first-of-its-kind initiative in Ontario.



By 2031, Vaughan's population is projected to increase by 36 per cent.

Credit: City of Vaughan



The City of Vaughan is one of Ontario's fastest growing municipalities.

Credit: City of Vaughan

citizens and visitors where they need to go.

MoveSmart reinforces the City's commitment to Transportation and Mobility—a strategic priority in the City's 2018-2022 Term of Council Service Excellence Strategic Plan. It focuses on improving the municipal road network, enhancing road safety and supporting more cycling and pedestrian infrastructure to create a fully connected and integrated community. The strategy will be reviewed and updated every five years, and its progress will be reported annually to Council.

Speed limit policy

In Vaughan, ensuring the safety and well-being of all citizens and visitors remains a top priority. As part of that commitment, the City is taking action to reduce speeding in the community. Based on a Council directive in 2015, City staff conducted a review of Vaughan's street network to develop a speed limit policy to address community safety, account for the increase in the number of pedestrians and cyclists, and ensure speed limits are consistent with future growth. The relationship between speed and injury severity is critical for vulnerable road users. Evidence suggests that lowering speed limits, especially in residential areas, can be effective in reducing the risk of severe injury or even death.

The City's Public Works portfolio launched the new MoveSmart Mobility Management Strategy in March 2021, a first-of-its-kind initiative in the province.

This is where the City's new Speed Limit Policy comes in. As part of the larger MoveSmart Mobility Management Strategy, the policy sets and adjusts appropriate speed limits throughout the City's street network to continue to ensure a safe community for all road users and address growing urbanization as more cars are anticipated to be on the roads. The policy is exclusive to municipal roads and focuses on four areas within Vaughan's road network: rural roadways, built-up/urban areas (including school zones), public laneways and select neighbourhoods.

To align with the first week of school and help ensure families can safely walk, cycle or drive to and from school, the City launched the Speed Limit Policy in September 2021 in all school zones across Vaughan. Speed limits in school zone areas decreased from

Credit: City of Vaughan

To reduce incidences of speeding, Vaughan partnered with residents who share the same traffic concerns to launch the interactive #SlowDownVaughan campaign.

50 kilometres per hour to 40 kilometres per hour, and new signage was installed. The City also decreased speed limits on all public laneways in December to 30 kilometres per hour from 50 kilometres per hour.

The next step in the City's Speed Limit Policy will be changing speed limits in select neighbourhood areas throughout Vaughan from 50 kilometres per hour to 40 kilometres per hour by fall 2022. York Regional Police (YRP) will be responsible for enforcing speed limit compliance, and City staff will continue to work closely with YRP to develop public education and enforcement strategies—both of which are essential components to achieve compliance.

Alongside the Speed Limit Policy, road safety and school zone safety continue to be a joint priority for the City's Transportation and Fleet Management Services, By-law and Compliance, Licensing and Permit Services and Vaughan Fire and Rescue Service departments. Together with York Regional Police, York Region, York Region District School Board and York Catholic District School Board, the City remains committed to implementing new and innovative initiatives to ensure the safety of all members of the community.

#SlowDownVaughan campaign

To reduce incidences of speeding, the City has partnered with residents who share the same traffic concerns. The name of the new, interactive campaign says it all: #SlowDownVaughan.

Vaughan residents can post a #SlowDownVaughan sign on their lawn, in their windows or on their social media profiles to encourage the public to slow down.

Vaughan residents can post a #SlowDownVaughan sign on their lawn, in their windows or on their social media profiles to encourage the public to slow down while driving on City roads. Lawn signs are available to pick up at Vaughan Public Libraries and community centres, excluding Garnet A. Williams Community Centre as it undergoes renovations. Citizens can also download print-at-home window signs or social media graphics. The signs are produced by the City and are free to Vaughan residents.

Citizens are also encouraged to use the power of social media and show their support for safe driving by sharing pictures of their signs online and using the hashtag #SlowDownVaughan.

This program is just one of many underway related to road safety and aligned with the directions, programs and plans outlined in the City's MoveSmart Mobility Management Strategy and Speed Limit Policy.

Vaughan is a dynamic city that's ever-growing and changing. It's clear the MoveSmart Mobility Management Strategy, Speed Limit Policy and #SlowDownVaughan campaign are just the beginning of a long road of work to ensure the safety of the community and those who travel throughout Vaughan. It's a Council-approved vision that City staff continue to drive forward to achieve an exceptional citizen experience and continued innovation.

Zoran Postic is the deputy city manager of Public Works at the City of Vaughan, which consists of the Transportation and Fleet Management Services, Parks, Forestry and Horticulture Operations, and Environmental Services departments.

THE GREEN MUNICIPAL FUND:

SUPPORTING CANADIAN COMMUNITIES ON THE PATH TO NET ZERO

Canadian municipalities impact more than 50 per cent of all greenhouse gas (GHG) emissions, as approximately 60 per cent of public infrastructure is under their purview. As a result, they have a vital role to play in mitigating the impacts of climate change, building green resilience and charting a shared course to net zero by 2050. Today, as they address the economic repercussions posed by COVID-19, there is a real opportunity to advance innovative municipal solutions to environmental challenges while delivering tangible local economic and social benefits. The Green Municipal Fund (GMF) is supporting Canadian municipalities in this journey.

What is the Green Municipal Fund?

Across Canada, GMF is helping local governments transition to sustainable practices, and they're helping them get there faster. This $1.65 billion program is delivered by the Federation of Canadian Municipalities (FCM) and funded by the Government of Canada.

With its unique mix of project funding, resources and training, the Green Municipal Fund is giving municipalities the tools they need to build resiliency and accelerate the transition to a low-carbon future.

How?

By supporting the adoption of proven, replicable low- and zero-emission approaches and providing training and resources across five key municipal sectors, including:

- **Energy:** Adopting technologies and practices to improve energy efficiency and produce cleaner energy
- **Transportation:** Investing in greener modes of transportation
- **Waste:** Implementing innovative waste-management solutions and reducing, recovering and recycling solid waste
- **Water:** Improving community water systems and increasing their efficiency
- **Land use:** Revitalizing contaminated land and returning it to productive use

GMF funding covers projects at all stages — from plans and studies, to pilot projects and capital projects. For municipalities beginning their journey to net zero emissions, this might involve early-stage planning support. For those further down the road, funding might assist in developing actionable strategies, conducting assessments to determine the best approach, evaluating a small-scale version of the project or embarking on a full-scale implementation.

Funding eligibility

Green Municipal Fund support is primarily available to local governments across Canada as well as the project partners of municipalities — including private sector entities, non-profit and Indigenous community partners. Funding can cover between 50 and 80 per cent of eligible project costs. It can also be applied toward grants for planning, studies and pilot projects, while a combination of grants and loans can propel projects at the capital stage forward. To learn more, visit the Green Municipal Fund website or contact a GMF advisor to help determine project eligibility and answer questions about the GMF application process.

A deep history

With more than 2,000 members nationwide, and decades of experience at the forefront of municipal climate action in Canada, the Federation of Canadian Municipalities is the sector's trusted partner in creating sustainable, prosperous communities.

Since 2000, Green Municipal Fund investments across Canada have resulted in innovative, proven sustainability practices that have directly improved the quality of life for Canadians in communities of all sizes and all regions, from big cities to municipalities with a few thousand residents. Since its inception, GMF has:

- Approved more than 1,730 sustainability projects
- Approved $1.1 billion in project funding
- Supported projects that offset 2.75 million tonnes in greenhouse gases
- Helped create more than 12,900 person-years of national employment

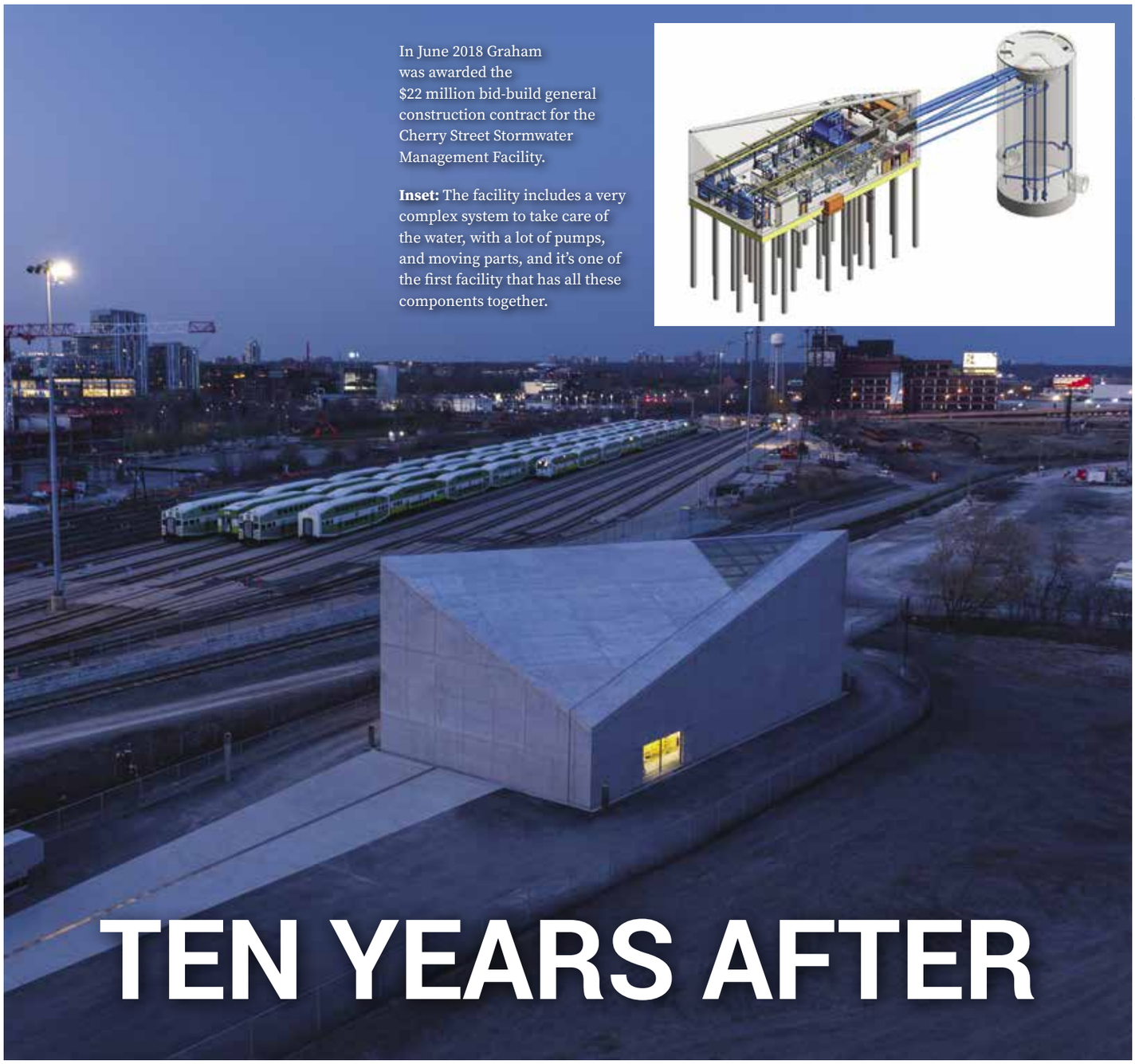
Learn more about how the Green Municipal Fund can support your next sustainability project.

fcm.ca/en/programs/green-municipal-fund

A program of/
Un programme de la

FCM FEDERATION OF CANADIAN MUNICIPALITIES FÉDÉRATION CANADIENNE DES MUNICIPALITÉS

Chris Boivin
Managing Director
Green Municipal Fund
Federation of Canadian Municipalities



In June 2018 Graham was awarded the $22 million bid-build general construction contract for the Cherry Street Stormwater Management Facility.

Inset: The facility includes a very complex system to take care of the water, with a lot of pumps, and moving parts, and it's one of the first facility that has all these components together.

Main Photo: Ozimek Photography; Inset Photo: R.V. Anderson Associates Ltd.

TEN YEARS AFTER

Innovative stormwater facility project overcomes numerous challenges.

An award-winning design marks an auspicious start to any project. But when the architecture is daring and the structure must house an innovative stormwater system in a never-before-executed configuration, complete with a seven-year delay between design and construction, then clearly there will be some challenges. These challenges were handled, construction and engineering ones were overcome, and Waterfront Toronto, in November 2021, began final testing of its new Cherry Street Stormwater Management Facility. Each of these indicate that the project is achieving success—but also offers lessons to be learned.

"The Cherry Street Stormwater Management Facility is a small piece of the City of Toronto's large program to ensure that stormwater discharged into Lake Ontario is treated," explains Ilidio Coito, project director, Infrastructure & Public Realm with Waterfront Toronto, a tri-government organization that is stewarding Toronto's waterfront revitalization. "Any trunk pipe, anything that goes into the lake, needs to be converted to where it gets treated to about 98 per cent." Treating such runoff water is part of an even larger environmental program in which all stormwater discharges from Toronto's buildings—including roofs—are treated before even going into the stormwater system (or preferably being put to other uses such as irrigation).

> The overall footprint is very small, and to get all that technology in a small area is very impressive.

The Cherry Street Stormwater Management Facility was conceived to handle stormwater from Toronto's West Don Lands, East Bayfront and Quayside—everything south of Lakeshore. "This was the first facility of

Brownie Awards 2022

Tuesday, November 14
7 p.m. - 10 p.m. EST
Delta Toronto Hotel
75 Lower Simcoe St.,
Toronto, ON

Recognizing Excellence in the Remediation and Redevelopment of Brownfield Sites Across Canada

CONGRATULATIONS TO THE 2021 AWARD WINNERS

BROWNFIELDER OF THE YEAR

Monisha Nandi of Kilmer Brownfield Management

BEST OVERALL PROJECT AWARD

Don Mouth Naturalization and Port Lands Flood Protection Project, Treatment Technology Evaluation Program, Toronto, Ontario

BEST LARGE PROJECT AWARD

Environmental Remediation of the Turcot Site, Montreal, Quebec

BEST SMALL AWARD

Richards Complete Streets, Vancouver, British Columbia

REPROGRAM AWARD

2020 Community Improvement Plan, St. Catharines, Ontario

REFOCUS AWARD

150 Harrison Street Modular Housing Initiative, Toronto, Ontario

REINVEST AWARD

Randle Reef Contaminated Sediment Remediation Project, Hamilton, Ontario

REBUILD AWARD

Tower Automotive Building Adaptive Re-Use/Museum of Contemporary Art (MOCA), Toronto, Ontario

RENEW AWARD

Historical North Vancouver Shipyards, North Vancouver, British Columbia

REACH OUT AWARD

Arbutus Greenway Design Vision and Implementation Strategy, Vancouver, British Columbia

REMEDIATE AWARD

Marwell Tar Pit Remediation, Whitehorse, Yukon

2022 BROWNIE AWARD CATEGORIES

BROWNFIELDER OF THE YEAR
Recognizing an Outstanding Individual in the Industry

REFOCUS
Alternative Benefits to Brownfield Remediation

REPROGRAM
Legislation, Policy and Program Initiatives

REINVEST
Financing, Risk Management and Partnerships

REBUILD
Redevelopment at the Local, Site Scale

RENEW
Development at the Community Scale

REACH OUT
Communications, Marketing and Public Engagement

REMEDIATE
Sustainable Remediation and Technological Innovation

NOMINATE SOMEONE TODAY FOR 2022!

THANK YOU TO OUR 2021 SPONSORS!

ORGANIZERS
cbn
actualmedia

DINNER
wsp

COCKTAIL
ERIS

AWARD CATEGORIES
TheCanningtonGroup
eco canada
Green Municipal Fund / Fonds municipal vert
FCM Canada
GFL
Golder
Kilmer Brownfield
Milestone
SANEXEN
Stantec
TERRAPEX
Willms & Shier

SUPPORTING

MEDIA
Environment Journal.ca

To sponsor an award category, contact **Jackie Pagaduan**, Business Development Manager, at **416-444-5842 ext. 0112** or **jackie@actualmedia.ca**

BrownieAwards.ca

its kind, and since then others have been built, and there are more to be built on the Port Lands," explains Coito. The facility also sends approximately 25 per cent of its water to the Shelbourne Common UV Treatment Facility for additional treatment and use in the fountains and water features in the park, before it is directed into Lake Ontario.

Small footprint

The project's complexities were significant but were initially overshadowed by the remarkable exterior design, which was approved in 2011. The facility would pump untreated water from the existing 20-metre diameter, 26-metre deep West Don Land Stormshaft (which also serves a temporary surge storage function), via new underground piping, to the new, 650-square-metre building. This is an extremely small space to handle the expected stormwater volume of up to 1,450 litres per second when compared to other stormwater management facilities. Accordingly, engineering consultant R.V. Anderson Associates Ltd. incorporated some of the latest technology into the treatment process to maximize the limited space in the building.

Typically, a conventional gravity screen separator removes sediment, debris and oil from the water. Then, the second step, clarification, usually needs a lot of space, often including open-air ponds. Instead, the Cherry Street Stormwater Management Facility adopted "ballasted sand flocculation." This is an innovative process that adds sand and hydro-cyclones to stimulate and speed up the settling of suspended solids so the clarified water can quickly flow onward, reducing the space required for clarification. Third, the water is subjected to standard UV light disinfection, before being pumped back as clean water to the stormshaft and out to Lake Ontario. Lastly, recovered solids are periodically removed from the stormwater management facility and sent to a wastewater treatment facility.

"The overall footprint is very small, and to get all that technology in a small area is very impressive," says Raymond Deasy, Graham's project manager for the facility's construction. "Typically, the large flow volume involved requires a larger building, and achieving that footprint was challenging." Coito adds, "The designers felt the scale of the facility as planned was enough for the equipment. But it's a very complex system to take care of the water: the process is complex, there are a lot of pumps, a lot of moving parts, and it's the first facility that has all these components together."

> The city wanted a landmark, and the Cherry Street Stormwater Management Facility was expected to display panache and sophistication.

Award-winning design

Being situated in a showcase development zone of a world-class city, the packaging of these utilitarian tasks needed to demonstrate design excellence. The city wanted a landmark, and the Cherry Street Stormwater Management Facility was expected to display panache and sophistication, reflecting Toronto's contemporary design and urban living values. The structure became angular rather than cubic and the exterior was embellished with etchings acting as rain channels running down roof and walls. Glazed openings in the façade would reveal the system's inner workings by day and become softly glowing features by night.

The design proved sensational, winning no fewer than three significant awards for its architects, gh3* of Toronto. In 2011, the Cherry Street Stormwater Management Facility became one of eight recipients in the Canadian Architect Awards of Excellence. In 2021, Azure Magazine ranked it No. 3 out of 10 great designs around the world, calling the facility "a strikingly simple choreography of elements." And in July 2021, it received a Special Jury Award of Excellence for Inspiring Infrastructure in the Toronto Urban Design Awards, which stated, "This sublime and sculptural form creates a strong presence at a prominent trailhead well-used by cyclists and celebrates a commitment to high performance in water quality."

There were some design changes along the way. "Initially the plan was to have three different shafts for the stormwater conveyance, but that would take up a lot of room along Bayside, so then the process led to combining everything into one facility with the water being pumped, and that required a redesign," says Coito. In addition, he adds, "The original building design was supposed to be a concrete shell with cladding, but the costs went up, so then we went to exposed concrete."

Challenging build

In June 2018 Graham was awarded the $22 million bid-build general construction contract, responsible for managing all the concrete, mechanical, electrical and undergrounds up to commissioning. A separate project management consultant oversaw Graham and the other consultants for the project. Graham began work almost immediately. "In brief," explains Deasy, "Our tasks were to build the facility, build the undergrounds that take the untreated stormwater from the shaft to the facility, and back again taking the treated water for discharge, upgrading an existing sewage pumping station within the area, and housing the upgraded control systems within the new stormwater facility."

While that sounds straightforward, Deasy says that "the building itself was unbelievably challenging to build." Built entirely of cast-in-place concrete and lacking large entrances, not only construction equipment but building systems like HVAC had to be prepositioned within the footprint before the walls went up, which required additional scaffolding and bracing to work around. During construction, as the designers realized that normal construction processes would result in concrete seams and bore joints being offset irregularly, they requested for aesthetic reasons that all the seams and bore joints be aligned and equally spaced.

"That created another challenge because we had to customize a lot of panels on the roof," recalls Deasy. "Those modifications took a lot of time, and to do that while shoring over the equipment was a massive challenge." Pouring self-levelling concrete

on double-sided forms became a further one. The planned skylight was also moved from its original location. "The building is very much design-driven, function being fit to the form, rather than form following function," says Deasy. "We accommodated all of it as best we could." Due to these challenges, the original completion was extended twice to March 2021, when substantial completion was achieved.

Unfortunately, the facility did not operate as engineered upon substantial completion. The mechanical system's three pumps and pipes moved far too much water for the compact treatment system to handle. And while the treatment system functioned when run manually by an onsite operator, it was intended to be fully automated. Work on both issues continued over the summer and into the autumn. "There was definitely frustration at not having it run properly," says Coito. As of early November 2021, the pumping volume and control issues had been resolved and the facility has undergone a full running test with all consultants and contractors present.

From Coito's standpoint, the more than 10-year-long process offers two lessons that might save time and smooth the work on similar future projects. "For this kind of project, a design-build contract that aligns those two major providers would probably have been better," he says. More broadly, on any project involving significant innovation, all parties should recognize that added risk is intrinsic, and that things "going wrong" should not come as a surprise. "The planning component should have incorporated a more extended commissioning period to account for the fact that a project of this nature will require extended testing and fine-tuning," says Coito.

> For this kind of project, a design-build contract that aligns those two major providers would probably have been better.

"My impression of Graham is highly satisfying," says Coito. "Their on-site team was very good. They were always transparent and open to the discussions. They were very cordial, very professional, always controlled. Our executives appreciated that. We were able to reach agreement on a number of things. A lot of things were very positive." From Graham's standpoint, says Deasy, "The Cherry Street Stormwater Management Facility has been a success for Graham. We constructed an architectural showpiece for a new client, and it was one of our first projects in downtown Toronto. We developed relationships with a lot of new trades and expanded our water and wastewater portfolio in Ontario."

This case study was submitted by Graham Construction & Engineering Inc. of Calgary, Alberta.

NEW DATE! Top100 PROJECTS DINNER: MAY 17, 2022

Top100
Canada's Biggest Infrastructure Projects

Top100 Projects KEY PLAYERS AND OWNERS DINNER

All leaders in Canadian infrastructure are invited to attend the gala dinner and networking event that celebrates the Top100 Projects each year.

On May 17, enjoy a high-powered evening with your colleagues and hundreds of owners, constructors, engineers and key players who are building Canada's biggest infrastructure projects.

Special guests and speakers will be announced soon at **top100projects.ca**

THANK YOU TO OUR 2022 SPONSORS

PREMIER PARTNER

wsp

ELITE PARTNERS

exp. · Maple Reinders · PCL CONSTRUCTION

SELECT PARTNERS

AECOM · CIMA+ · Comtech · HKA

CHOICE PARTNERS

EllisDon · Morrison Hershfield

Top100 Canada's Biggest Infrastructure Projects SPONSOR

Sponsorship opportunities are still available for the 2022 event. Contact Nick Krukowski at 416-444-5842 ext. 0101 or nick@actualmedia.ca

Date: Tuesday, May 17, 2022
Cocktail Reception: 6:00 p.m.
Dinner: 7:30 p.m.
Venue: The Carlu
444 Yonge Street
7th Floor, Toronto, ON

For corporate tables of eight or single tickets, visit **top100projects2022.eventbrite.ca**

Credit: JCCBI

Top100 Canada's Biggest Infrastructure Projects

For additional details on this year's Top100 report, visit top100projects.ca

Champlain Bridge Deconstruction Project

2022 Top100 Projects Rank: 99
Value: $400 million

The Jacques Cartier and Champlain Bridges Incorporated (JCCBI) and Nouvel Horizon Saint-Laurent G.P. (NHSL) started a major step in the deconstruction of the original Champlain Bridge with the dismantling of the bridge's steel structure. This operation began with the removal of the main steel span over the St. Lawrence River.

"Nearly two years of design, coordination and detailed planning have gone into [the] lowering of the main span, which is a unique operation in Canada," said Fabrice Guedon, project director at NHSL. "Although this type of work is carried out occasionally around the world, it has never been done on this scale in Canada, especially in winter conditions and under the operational constraints of this project. I want to congratulate our teams for their innovative work, which has been directly and indirectly supported by our local and international suppliers and stakeholders."

Before lowering the main span, work to reinforce the steel structure was done to maintain the integrity of the anchor spans and the long span during the descent. The teams also had to install special-purpose bearings before taking down the span.

The barge assembly holding the large span will slowly be moved to the South Shore and secured on the Brossard side, where the span will be dismantled in the spring.

In the coming months, teams will take apart the cantilever sections that were attached to the main span and dismantle the anchor spans using cranes on the jetties and dike. These sections will be deconstructed chord by chord and then either recycled or reused.

Credit: Waterfront Toronto

Port Lands Flood Protection and Enabling Infrastructure

2022 Top100 Projects Rank: 56
Value: $1.25 billion

Waterfront Toronto marked the arrival of a colourful new bridge that will become a landmark on Toronto's skyline, connecting the future Villiers Island to surrounding revitalized Port Lands.

The 57-metre-long bridge will span the future mouth of the Don River, where Cherry Street currently meets the Polson Slip. This is the third bridge to be delivered as part of the Port Lands Flood Protection project, with the final Cherry Street North vehicular bridge scheduled to arrive in Spring 2022.

"This bridge will connect Toronto with its bright and promising future, advancing our goal of making our waterfront one of the world's very best," said Stephen Diamond, chair of Waterfront Toronto. "The future Villiers Island will be one of the most exciting new places to live and work in Canada, with new parks and access to Lake Ontario."

The Port Lands Flood Protection project is jointly funded by the Government of Canada, the Province of Ontario and the City of Toronto and will provide flood protection for areas east of the Don River and Port Lands, with the south side of Villiers Island to be bounded by a new naturalized river valley featuring extensive open green space and new public amenities.

"This specific bridge will provide much-needed walking and cycling paths for those who live in and around the area or those who are looking to visit the new Villiers Island once it is complete," said Mayor John Tory. "I want to thank the Federal and Provincial governments for working with us on the Port Lands Flood Protection project."

Credit: Aecon Group

Bruce Power Refurbishment

2022 Top100 Projects Rank: 3
Value: $13 billion

Aecon Group and SNC-Lavalin Group announced that Shoreline Power Group, a joint venture between Aecon (55%), SNC-Lavalin (30%) and United Engineers & Constructors (15%), has been awarded an approximately $400 million contract by Bruce Power to execute the Unit 3 Fuel Channel and Feeder Replacement (FCFR) at the Bruce Nuclear Generating Station in Tiverton, Ontario.

"We are proud of the progress that has been made by Shoreline Power Group to successfully execute FCFR work on Unit 6, and the award of Unit 3 further strengthens our long-term partnership with Bruce Power to continue advancing the MCR program," said Jean-Louis Servranckx, president and CEO, Aecon Group Inc. "We look forward to working with Bruce Power and our partners to deliver this important project safely and with unwavering execution performance. As part of the Steam Generator Replacement Team (SGRT), Aecon is also currently contracted to replace steam generators at Units 3, 4 and 6.

In 2018, the JV was awarded the first FCFR contract for the refurbishment of Unit 6. Both projects support Bruce Power's Life Extension Program that will allow its CANDU units to continue to operate safely through to 2064.

"This new refurbishment work on Unit 3 is a continued vote of confidence by Bruce Power in our abilities as the OEM and steward of CANDU nuclear technology," said Sandy Taylor, president, Nuclear, SNC-Lavalin. "We will continue to leverage our deep technical knowledge base, decades of CANDU experience and innovation to confidently fulfill the refurbishment needs for this reactor as we have been doing now for several years on Unit 6."

APPOINTED

Jean-François Bolduc

Logistec Corporation announced that **Jean-François Bolduc** has been named president of Logistec Environmental Services Inc. and Sanexen Environmental Services Inc.

Bolduc brings an impressive track record as a global engineering, consulting and senior construction executive with 30 years of experience delivering environmental solutions and services to corporate and industrial clients in North America, Europe, the Middle East and Africa.

"As we have entered this next phase in our journey, this appointment is highly strategic for Logistec Environmental and Sanexen," said Madeleine Paquin, president and CEO of Logistec. "I am extremely confident that Jean-François's extensive leadership experiences coupled with his outstanding interpersonal and communications skills, will set the right foundation to accelerate growth for Logistec across North America."

"I am excited about the opportunity to join this amazing team of experts at a time when environmental solutions and climate-smart technologies are needed more than ever before," said Bolduc. "Our organization is well-poised to lead the industry in delivering the most innovative solutions, but our mission does not stop here."

Dario Di Carlo

David Sinclair

The HIDI Group Inc., announced the appointment of **Dario Di Carlo** as CEO and **David Sinclair** as president.

Jamie Hidi, president since 2003, will continue to provide guidance and oversight to the firm in his new role as executive advisor.

"As a firm that is 100 per cent employee-owned, our management team is committed to this next chapter and the ongoing success of The HIDI Group," said Sinclair. "We believe this commitment will allow us to continue to serve our clients across the many sectors we service. The diversity of our work truly engages our staff and allows us to apply best practices from multiple sectors to better serve all of our clients."

Sardar Nabi

RVA announced the appointment of **Sardar Nabi** as a manager of the transportation structures team and lead of the bridge practice. Nabi will be focusing on enhancing RVA's structural capabilities while spearheading our bridges practice to create new ways of generating long-term value and realizing sustainable growth for our clients and communities. With vast experience in bridges, transportation structures, and structural rehabilitation, he is a key addition to RVA's award-winning transportation practice, having led several large-scale projects in major cities across Canada throughout his career.

RVA's transportation team is committed to providing best-in-class infrastructure services to communities across Canada as they undergo accelerated growth in ever-changing landscapes. Nabi's expertise will be integral in expanding RVA's operational capabilities to help clients meet the challenges of today's infrastructure projects, beginning with Greater Toronto and Hamilton Area, Ottawa, and Moncton.

Jason Leong

Comtech Group Inc. announced the appointment of **Jason Leong** as its CFO.

Leong, a Chartered Professional Accountant, brings over 20 years of experience focusing on financial and operational performance optimization, business system software deployments, mergers and acquisitions, and analytics. He joins Comtech from Bird Construction where he served as vice president, Corporate Finance, following his positions at WSP Canada, MMM Group Limited, Celestica International Inc., and IMAX Corporation.

"Comtech is at a pivotal stage in the execution of its strategic plan," said Leong. "I am excited to join an organization that is dedicated and committed to realizing its strategic vision and continuing to provide value-add services to its employees, clients, and community."

"Comtech is fortunate to have a business leader and executive of Jason's calibre on the team," said **Hugo Blasutta**, Comtech's president and CEO. "I have had the pleasure of working with Jason in the past and look forward to the positive changes and approaches to continuous improvement he will bring to Comtech."

Quentin Chiotti

Canadian environmental consulting and engineering design firm Matrix Solutions has welcomed **Quentin Chiotti**, Ph.D. as practice lead for Climate Risk and Resilience.

Dr. Chiotti has extensive consulting and research experience as an evidence-based practitioner and thought leader—working in the area of climate adaptation since 1993 for government and non-government agencies. He joins Matrix Solutions from Metrolinx, Canada's largest transit agency, where he served as senior advisor for Sustainability and subject matter expert for climate risk and resiliency. He also held roles in climate change and air quality management with Environment Canada, the Ontario Ministry of Natural Resources, and Pollution Probe, one of Canada's oldest environmental non-governmental organizations.

"Climate risk adaptation has become an essential consideration for our public and private sector clients—with both positioning themselves to understand climate risks and build resilience into their operations," said Matrix Solutions president and CEO **Matthew Sutton**. "Quentin's leadership and reputation combined with Matrix's solid foundation in water resources engineering and the environmental sciences, position us to be industry leaders."

"Assessing climate change risks and designing resilience into critical infrastructure requires a collaborative approach and the multi-disciplinary integration of environmental and climate sciences and engineering," Chiotti said. "I'm very excited to be working with well-respected technical leaders at Matrix to develop and implement solutions that reduce climate risks."

Brian Connolly

EllisDon announced the appointment of **Brian Connolly** to the role of vice president Civil, Western Canada.

Connolly has over 20 years of combined civil,

Send your news and events to **john@actualmedia.ca**

infrastructure and buildings experience split between Ireland, England and Canada, working on some of Europe's largest infrastructure projects, including the €112M M6 Motorway Dublin to Kilbeggan, the €210M M50 South Eastern Motorway, and the €300M Ringsend Wastewater Treatment Plant. Brian has also worked across multiple contract platforms including public-private-partnership (P3), design-build, bid-build and construction management contracts.

For the past three and half years, Brian has been focused as construction manager on one of EllisDon's largest light rail transit (LRT) projects, Edmonton's Valley Line LRT.

"Brian's efforts on the Edmonton Valley Line LRT have proven to be invaluable and we believe his natural leadership is in full alignment with the EllisDon core values," said **David McFarlane**, senior vice president, Western Canada.

"I am honoured to be given the opportunity to step up into this role and to be trusted with leading the EllisDon Western Civil team on our next step in becoming the industry leader in the Alberta and British Columbia markets," said Connolly.

LEADING THE WAY IN MASS TIMBER TORONTO, ON

Ontario is on its way to becoming a world leader in mass timber construction, according to the comments made during an information session hosted by the Carpenters' District Council Ontario at its headquarters in Woodbridge.

The event was attended by leading experts in the field, including **Mark Gaglione** from Ellis Don, **Leith Moore** of R-Hauz, **Brock O'Donnell** of Rothoblaas, and **David Moses** of Moses Engineering.

"The advent of mass timber couldn't be happening at a better time for the world's lungs, green targets, and Ontario's economy," said **Mike Yorke**, president of the Carpenters' District Council.

He added that mass timber construction means huge opportunities for Ontario's northern and Indigenous communities when it comes to resource development, cultivation, and sustainability. It also means more carbon capture as well as the benefits of the beauty of wood.

"In mass timber construction, the new technique of Cross-laminated timber (CLT) gives wood similar strength properties to steel—and makes wood just as fire retardant. Ontario's oldest building resource—wood—is now our newest," added Yorke.

Moore, R-Hauz Solutions Inc.'s co-founder and principal discussed the company's six-storey mass timber residential rental building, built on Toronto's Queen Street East. The largely prefabricated CLT structure was assembled in less than six weeks and consisted of a 20-foot-wide six-plex and a 40-foot 12-plex.

It's a viable new model for midrise housing, said Moore, and described the project as "a repeatable product" that speeds design, development and construction.

Gaglione, manager of the Construction Sciences Division at EllisDon says the goal is to "remove friction from the process" so more mass timber construction projects are built moving forward.

Credit: Metrolinx

DON'T BLAME RED TAPE

While it is tempting to blame slow infrastructure delivery on red tape, what is really standing in the way of providing transit projects more quickly is a hesitancy to set definitive priorities.

By Shoshanna Saxe and Matti Siemiatycki

There has long been talk of the urgent need to speed up the construction of major transit projects in Toronto. This comes amidst a widely held view that getting anything built in the city is unacceptably slow. This is reinforced by the recent announcement of another construction delay on the Eglinton Crosstown LRT and "priority" projects like the Waterfront LRT East still far from even starting construction.

In 2020 the province passed the *Building Transit Faster Act* to accelerate the environmental assessment process, expedite land expropriations by limiting opportunities for property owners to contest a forced purchase, and compel companies to move faster on relocating utilities that are in the way of transit projects. An effort to streamline construction and limit "red tape."

To be certain, big transportation projects famously face delays during planning and construction, and if better coordination with utilities can be realized this could be particularly promising for limiting construction delay. But this is far from the main driver of slow transportation infrastructure. In recent research between the University of Toronto and University College London we look at what really happens between the time a large transportation project is first announced and when it opens? Where is time being spent or lost?

Our research on every major public transit project built in Greater Toronto over the past 20 years shows that the period of time it takes to design and procure complex transit projects in Toronto is respectable by global standards, even though delays during the construction phase are all too common.

Evidence from our research shows that "red tape" and lengthy planning processes are not what is primarily slowing down the opening of new transit projects in our region. Our biggest challenge and source of delay is a commitment problem about setting priorities, approving funding, and sticking to the plans that are set. This dwarfs the much more discussed time spent in environmental assessment or coordinating utility relocations. Focusing on environmental assessment or even the construction process itself misses the part of infrastructure delivery that is actually the slowest. Too often in our efforts to speed up construction we are looking at the wrong part of the process. To date, governments have focused on the years after funding is promised and technical engineering in progress. This misses the years and often decades it takes to even get to the starting line.

We talk seemingly interminably about which ideas have merit, which should get priority, and wait for the window where politics align and funding for infrastructure is available. The period of discussion before detailed planning even starts has too often lasted anywhere from a decade to upwards of 60 years, during which time projects are repeatedly reassessed and altered at the whim of the politicians in power. And our research only looked at project that did eventually get built, many others remain in this early pre-funding, pre-design inception stage.

This is not a call for speed for speeds sake. After decades of dithering there is an undeniable urge in Toronto to 'just get on with it'; to pick transit projects quickly and get shovels in the ground. But the need for speed cannot trump effective project selection, community consultation, and the use of evidence to inform decisions. To truly speed up transportation projects we need a clear process for setting priorities using evidence to select which projects deliver the greatest benefit, and a regional transportation plan that has the legitimacy to withstand changes in government, neither of which survive without public legitimacy.

It is tempting to blame slow infrastructure delivery on red tape. But what is really standing in the way of providing transit projects more quickly is a hesitancy to set definitive priorities, continually changing our minds and unwillingness to pay for the projects on the books.

Dr. Shoshanna Saxe is an assistant professor in the University of Toronto's Department of Civil and Mineral Engineering.

Matti Siemiatycki is an associate professor in the University of Toronto's Department of Geography & Planning, and Canada Research Chair in Infrastructure Planning and Finance.

A TOUGH ACT TO FOLLOW.

WORK READY

Brandt Truck Rigging & Trailers is the exclusive dealer for Work Ready™ Brandt heavy haul trailers, utility trailers, and your #1 source for specialized transportation equipment for the oil & gas, mining, pipeline, construction/infrastructure, and environmental industries. Designed for extreme durability and made with premium-quality components, our equipment is built to pull through the toughest conditions and come back for more. And, with rental purchase options, rentals, and exclusive in-house financing, Brandt delivers the flexible solutions you need to keep your operation rolling every single day. **That's Powerful Value. Delivered.**

Brandt Truck Rigging & Trailers
1806 2 Street, Nisku, AB, Canada T9E 0W8
brandt.ca/trucks | 1-877-955-2770

Brandt


What if we
could re-imagine
todays cities,
for tomorrow?
Whether it's helping our clients and stakeholders understand new technologies,
standards or providing the technical know-how to design and build,
we deliver robust transportation networks, high-performance buildings,
resilient infrastructure, and new energy pathways for all Canadians.
wsp
wsp.com
Energy, Resources & Industry / Environment / Property & Buildings / Transportion & Infrastructure