July/August 2022

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The Infrastructure Magazine

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The Infrastructure Magazine

JULY/AUGUST 2022

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USE IT OR LOSE IT

By John Tenpenny

Canadian provinces have been issued an ultimatum by their federal counterparts: move forward on infrastructure investments or lose the funds previously promised to complete those projects.

The Investing in Canada Infrastructure Program is providing $33.5 billion over 11 years for public infrastructure across Canada. Under this program, provinces and territories prioritize and submit projects to Infrastructure Canada for review. To date, the program has approved more than $20 billion for more than 4,500 projects in communities across the country, including public transit projects, such as the Montreal Blue Line, Calgary Green Line, and Vancouver Millennium Line extensions, and the expansion plans for the Greater Toronto Area.

However, in the 2022 federal budget, the government warned that "as a measure of fiscal prudence, any uncommitted funds after (March 31, 2023) will be reallocated to other priorities."

While many of the funded projects have reported construction delays due to the pandemic, and despite significant progress, the feds say there is also a need for provinces to commit their remaining funding more quickly to projects that will deliver the infrastructure that communities need.

There is a large range among provinces on how much of their federal funding they have allocated. Manitoba has plans in place for all but one per cent ($13.6 million) of the money and in Alberta it's two per cent ($60.3 million), while Newfoundland and New Brunswick have not defined plans for 59 per cent ($326.3 million) and 58 per cent ($392.4 million) of the money, respectively.

In dollar figures, Quebec has the most money still to commit with $3.3 billion not yet allocated, British Columbia has $1.3 billion, and Ontario has just over $1 billion.

The deals with the provinces over infrastructure money commits provincial governments to pay anywhere from a third to half of the cost of projects funded with the federal dollars. The new deadline only requires them to decide where the dollars are going, giving them until 2033 to build the projects.

The original Investing in Canada Infrastructure Program broke down the federal funding into different streams such as public transit, culture and recreation, green and rural projects.

Still, some areas are being given short shrift.

A new report from the Canada West Foundation (CWF) suggests Canada's trade infrastructure system has fallen behind.

The report contains seven recommendations for how Canada can replace funding for shovel-ready projects with more worthy investment in the equipment, facilities, and infrastructure necessary to grow our trade economy.

"Canada's infrastructure must be a genuine investment that is based on clear priorities and measurable economic returns," states the report. "As we plan new critical infrastructure to move our people and goods, we need to build for the future and not simply address today's needs. Above all, we require approval processes that are transparent and fair, but that also allow projects to be undertaken much more quickly and efficiently."

Funding doesn't seem to be the problem; making decisions—at all levels of government—does. Prioritizing needs and which projects will have the biggest impact over the long term must continue if Canada is to get the infrastructure it deserves.

John Tenpenny is the editor of ReNew Canada.
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ABOUT THE COVER

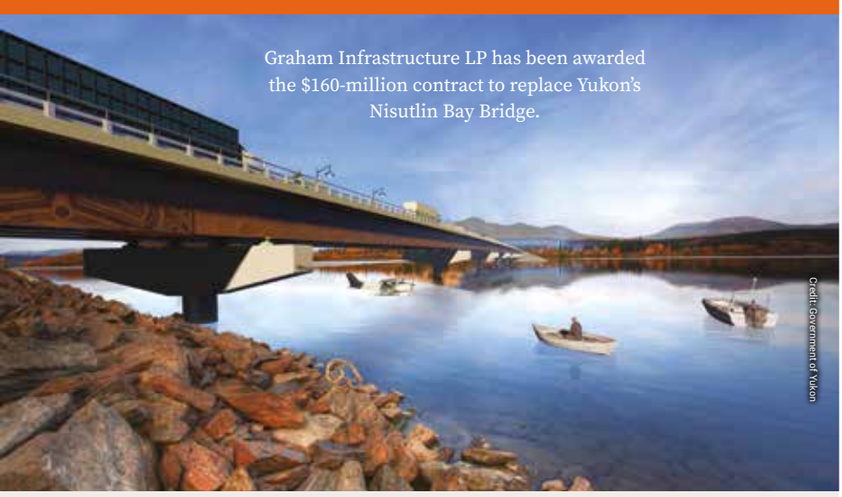
Public transit is the backbone of livable cities. Better transit means less congestion, faster commutes, more convenience, higher productivity, and lower emissions. Simply put public transit builds better lives.

Read about public transit infrastructure on page 14.

A senior geoscientist at the NWMO examines core samples pulled from rock in South Bruce, Ont., as part of investigations to support safe storage of used nuclear fuel in proposed deep geological repository.

Credit: NWMO

CONTRACT AWARDED TO REPLACE YUKON'S NISUTLIN BAY BRIDGE



Graham Infrastructure LP has been awarded the $160-million contract to replace Yukon's Nisutlin Bay Bridge.

Credit: Government of Yukon

The Yukon government's Nisutlin Bay Bridge replacement project has been awarded to Graham Infrastructure LP for $160 million.

The new Nisutlin Bay Bridge—to be completed in 2026—will be the largest capital project in Yukon history.

"The Nisutlin Bay Bridge is an important landmark for Teslin, a key gateway to the Yukon and a critical transportation link along the Alaska Highway that keeps our communities connected," said Minister of Highways and Public Works, Nils Clarke. "This project is an excellent example of the benefits provided by the Yukon First Nations Procurement Policy and will create jobs for Teslin Tlinglit community members and Yukoners."

In 2019, the Government of Yukon and the Teslin Tlingit Council signed a project charter for the bridge replacement.

The Nisutlin Bay Bridge is a critical link along the Alaska Highway and an important landmark for Teslin. Originally designed in 1953, the bridge is nearing the end of its lifespan and needs to be replaced.

NEXT ISSUE: SEPTEMBER/OCTOBER COLLABORATION

Trade Corridors	First Nations	Green Infrastructure
Increasing Canada's port capacity.	Indigenous partnerships.	Looking to nature for support.

CANADA CLOSE TO SELECTING SITE FOR PROJECT TO STORE USED NUCLEAR FUEL

After more than 10 years studying the geology in two potential siting areas, the Nuclear Waste Management Organization (NWMO) has completed a deep borehole drilling program that marks a key milestone in site investigations to confirm a safe location for a deep geological repository to safely contain and isolate Canada's used nuclear fuel.

Some of Canada's top geoscientists are leading the studies, in which approximately eight kilometres of core samples were pulled from the bedrock at two Ontario sites under consideration for the project—one in the Wabigoon-Ignace area and the other in the Saugeen Ojibway Nation-South Bruce area.

"Deep geological repositories are internationally recognized as the safest way to manage used nuclear fuel over the very long term," said Lise Morton, NWMO's VP of site selection. "Completion of this drilling program is a significant step forward in our geoscience work. In addition to informing the safety case for the project, the resulting data will also provide important insights to the communities that are considering hosting the project in their area."

Canada's plan calls for centralized containment and isolation of Canada's used nuclear fuel in suitable rock formation in an area with informed and willing hosts. The community-driven siting process launched in 2010, and by 2012, 22 communities had expressed interest in learning about the project and exploring their potential to host it. The NWMO is on track to finalize site selection in 2023.

"We need to be sure that used nuclear fuel can be safely contained in the rock to ensure water, people and the environment are safe," said Sarah Hirschorn, NWMO's director of geoscience.

Credit: Greater Toronto Airports Authority

Toronto Pearson Airport's runway rehabilitation project began in early April and will extend through fall 2022.

TORONTO PEARSON MARKS START OF RUNWAY REHABILITATION

The Greater Toronto Airports Authority (GTAA) held a ground-breaking ceremony to mark one of the largest runway rehabilitation projects in the airport's history.

Runway 06L/24R, Pearson's second-busiest runway, will be temporarily closed until late fall for a complete rehabilitation. Dufferin Construction has been selected as lead contractor for the project.

First built in the 1960s, the three-kilometre runway requires a complete rehabilitation due to the wearing down of its concrete sub-structure because of weather conditions, use and time. This project will extend the life of the runway by 30 years and enhance the safety of the runway. The project will include the use of recycled materials and upgrades to 1,800 LED lights, which will help enhance safety and reduce its carbon footprint. Other environmentally friendly construction practices include using crushed concrete from the runway pavement removal for the sub-base and base materials and recycled milling asphalt materials on approach roads in the vicinity of the runway.

"This rehabilitation is about building essential infrastructure that is required for the economy of the region, the province and the nation," said Deborah Flint, GTAA's president and CEO. "A strong Pearson will support Canada's recovery by enabling foreign direct investment, trade, tourism, and critical goods movement."

"As Canada works towards recovery from the pandemic, investments in our airport infrastructure continue to be crucial to maintain safety, security and connectivity for travellers, workers and communities," added Minister of Transport, Omar Alghabra.

Credit: City of Toronto

Construction of Toronto's first net zero energy and emissions community recreation facility is anticipated to be completed by the end of 2024.

TORONTO'S FIRST NET ZERO COMMUNITY CENTRE

The City of Toronto broke ground for the new North East Scarborough Community Recreation & Child Care Centre, which will be the city's first net zero energy and emissions community recreation facility. The building will also house the city's second net zero childcare centre.

The building's leading-edge design employs innovative strategies to eliminate the use of fossil fuels, reduce overall energy consumption and incorporate on-site renewable energy systems. It will be 100 per cent electricity powered through a mix of solar photovoltaic panels on its roof and façade, as well as a parking lot canopy. Air handling units will improve heat recovery efficiency by 85 per cent.

"This centre will help us meet Toronto's goal of becoming a net zero city while providing more childcare opportunities for families in Scarborough," said Mayor John Tory. "We are proud to deliver a state-of-the-art community centre and gathering place that specifically meets the needs of the very diverse neighbourhoods that surround it."

The Centre is also aiming to become the first building of its kind in Ontario to achieve the Canadian Green Building Council's Zero Carbon Building Certification.

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Credit: Windsor-Detroit Bridge Authority

STICK HANDLING

Bryce Phillips leads the building team the Gordie Howe International Bridge.

By Connie Vitello

By all accounts the Gordie Howe International Bridge project is a once-in-a-generation infrastructure project with a price tag to match: $5.7 billion. When constructed, this bridge will have the longest main span of any cable-stayed bridge in North America and the ports of entry among the largest along the Canada-U.S. border.

Not only will the project deliver much-needed transportation improvements for international travellers, but it will also provide jobs and opportunities for growth to the Windsor-Detroit region.

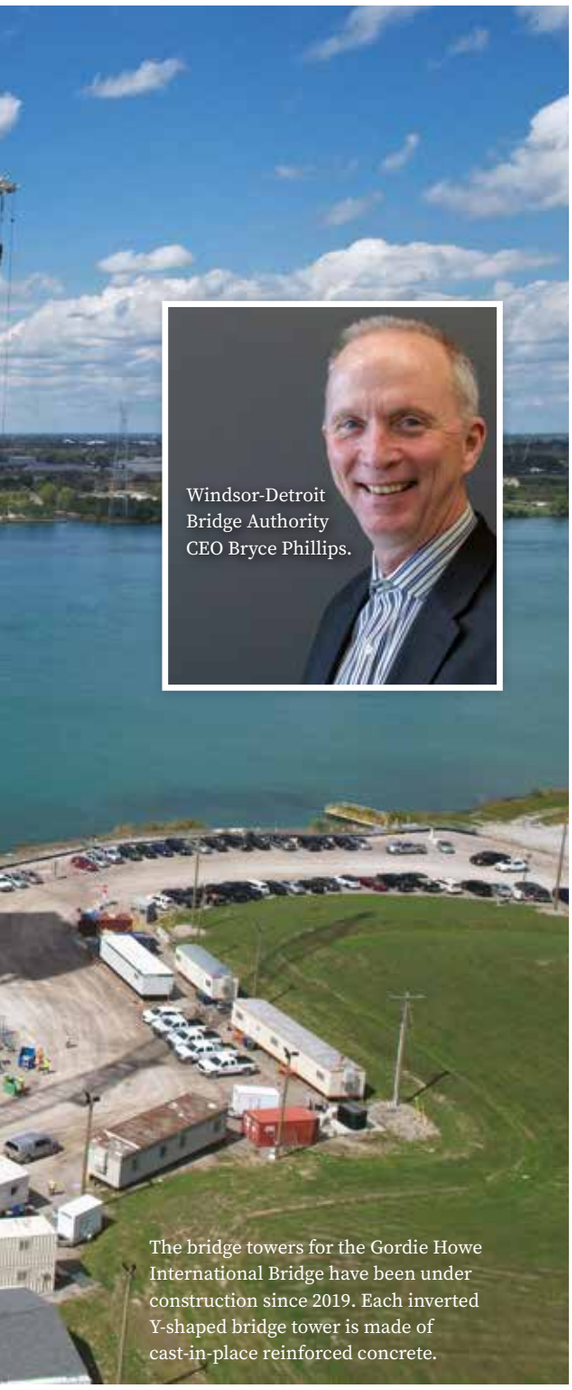
Thanks to a public-private partnership (P3) that incorporates a long-term performance-based approach to procuring public infrastructure, the private sector partners are assuming a major share of the risks in terms of financing and construction. Inherently, the P3 model ensures effective performance, from design and planning to long-term maintenance.

To manage a project of this magnitude requires the kind of leadership qualities exhibited by the bridge's namesake, Canadian hockey great Gordie Howe, who led the Detroit Red Wings to four Stanley Cup victories.

Bryce Phillips joined Windsor-Detroit Bridge Authority (WDBA), the Crown corporation that managed the procurement process and is responsible for the delivery of the project, as CEO, following an appointment by the federal government in 2018. A native of Windsor, Phillips brings more than 35 years of experience as an executive in the infrastructure and energy sectors.

ReNew Canada recently engaged Phillips to discuss the winning strategy that's going into getting this massive project successfully completed on time and on budget.

How did your previous work experience prepare you to take on this complex



Windsor-Detroit Bridge Authority CEO Bryce Phillips.

The bridge towers for the Gordie Howe International Bridge have been under construction since 2019. Each inverted Y-shaped bridge tower is made of cast-in-place reinforced concrete.

Each bridge tower for the Gordie Howe International Bridge will require 10,000 cubic metres of concrete and 4,500 metric tons of steel rebar.

Credit: Windsor-Detroit Bridge Authority

infrastructure project? Share some of the lessons learned that provided you with the wisdom and industry know-how to guide your project team.

As a Mechanical Engineer, graduating from the University of Windsor, I have had the privilege to hold positions throughout my career where I have led subject matter experts through challenging and complex projects. I have derived my leadership style from these experiences, which have also well positioned me to manage WDBA's relationship with our private-sector partner, Bridging North America, as well as that of our other project partners.

Over my career, I have seen firsthand that people really are your greatest asset. Your project's success depends to the people on your team. I have learned so much by asking the people on my team for their thoughts and ideas, by empowering them to be part of the decision-making process, and by encouraging innovation.

Also, I recognize that there will be disagreements along the way, but it is critical to never lose sight of the fact that you are all working toward achieving a common goal. There are always solutions.

The official start of construction was October 5, 2018. What have been the major milestones achieved so far, and what are some of the key construction milestones to come in 2022?

There was a significant amount of preparatory work that was undertaken both in Canada and the U.S. that allowed Bridging North America (BNA) to take over the sites and get to work after Financial Close was achieved on September 28, 2018. Since the start of construction, BNA has undertaken detailed design and construction simultaneously on the four project components.

In 2019, there was completion of the perimeter access road around the Canadian Port of Entry (POE), wind tunnel testing, placement of fill and installation of wick drains to accelerate soil consolidation at the ports of entry and demolition of three road bridges to be reconstructed for the Michigan Interchange.

2020 included the selection of design for pedestrian bridges as part of Michigan Interchange activities, completion of property acquisition in the U.S. (led by the State of Michigan), completion of tower footings, installation of art pieces on the tower cranes completed by local indigenous and Southwest Detroit artists.

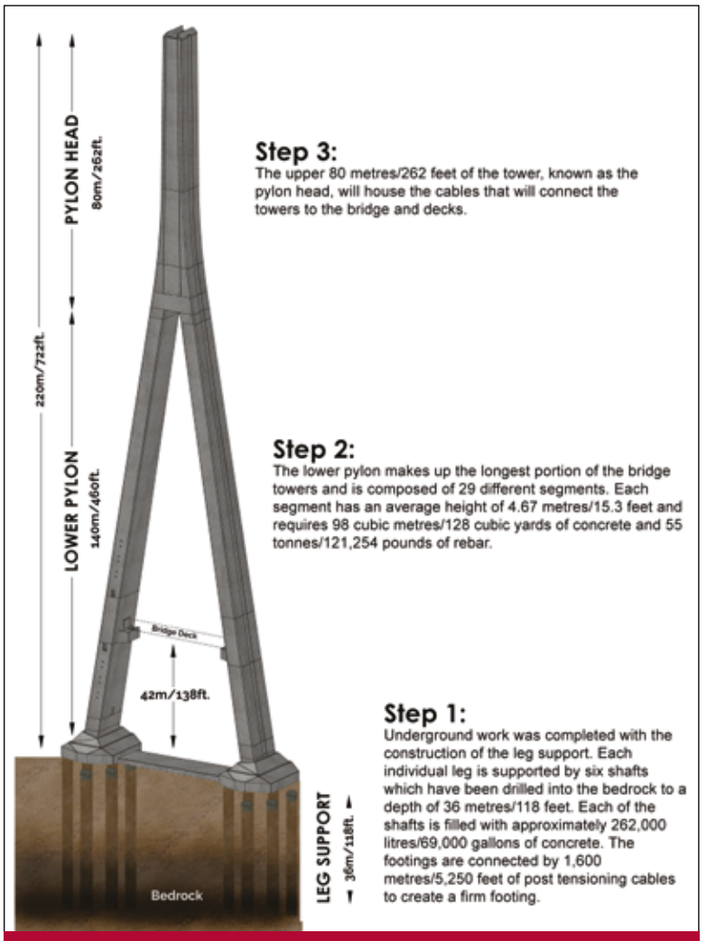
In 2021 work began on the lower pylons of the bridge towers, and the project achieved the prestigious Envision platinum award for sustainable infrastructure. Construction of many buildings at the Canadian POE began, BNA completed 1,000 days of construction and three million hours of work without a lost-time injury.

Over 2022, crews will continue to advance phase two activities on the Michigan Interchange, complete the upper pylon of the tower legs and begin work on the side and back spans of the bridge and advance construction on the buildings at each of the ports of entry.

A major international project such as this, with multiple stakeholders and a variety of legal variances, would be challenging to navigate at the best of times. How did the pandemic impact construction timelines and factors such as stakeholder engagement?

The COVID-19 pandemic presented significant challenges to our long-standing approach to engagement and communications. When the COVID-19 crisis hit North America, the communications world we knew and practiced in was suddenly no more. On March 20, 2020, the Canada-U.S. land border was closed to non-essential travel. As WDBA is based in Ontario, this meant we were unable to meet with local Michigan residents in person. The

Credit: Windsor-Detroit Bridge Authority



Now that the bridge tower legs, also known as the lower pylon, have reached their full height of 140 metres/460 feet, Bridging North America has begun work on the final portion of the tower – the pylon head, which will take shape as this final 80 metres is completed over the remainder of 2022.

closure of non-essential businesses in Ontario and Michigan meant we had to close our head office and two community offices, and pivot to working from home. In this unprecedented environment, we had to completely rethink our approach to stakeholder engagement and communications. We changed to a virtual environment and identified new ways to keep communities engaged with the project.

We developed plans to shift from in-person quarterly community meetings to a virtual environment and promoted alternative ways to contact WDBA, considering the closure of our community offices. Going online enabled us to deliver on our engagement commitments, and even allowed us to be exposed to a wider audience.

It also forced businesses to adjust in the way they operate to ensure that government directives were followed. Measures were put in place to ensure the health and safety of our workers, contractors, and the public. With these measures in place, construction on the project has been able to continue throughout the pandemic. As with any design-build project, adjustments to schedule may occur as design progresses. We are still understanding the possible impact that the pandemic may have on the project schedule. Windsor-Detroit Bridge Authority and Bridging North America have been taking steps to help mitigate significant disruption to project schedule.

An independent value analysis demonstrated that the P3 model for this project results in a savings of approximately $562.8 million. That is 10.7 per cent as compared to delivery of the project using traditional procurement methods. Tell us about the financial management process.

The contract with Bridging North America is not just fixed price. It is also outcome-based. This means that WDBA has set the requirements and outcomes for the project and has agreed that Bridging North America will be paid the contract amount for delivering those requirements. As a fixed cost contract, BNA assumes risk related to material cost increases or other cost fluctuations. Our contract with BNA is for 36 years and covers the six-year design and construction phase and a 30-year operations, maintenance, and rehabilitation phase.

Recently, the Government of Canada appointed Tim Murphy as Chair of WDBA's Board of Directors. I'm pleased to have Canada's leading expert in public-private partnerships working with us on the Gordie Howe International Bridge ensuring sound governance approaches are maintained ensuring ongoing value for money for Canadian taxpayers.

You mentioned that the project has four different main aspects: the cable-stayed bridge, the Canadian POE, the U.S. POE, and the Michigan Interchange. What are your favourite features about each of these aspects?

WDBA recognizes the permanent influence the Gordie Howe International Bridge will have on Windsor's and Detroit's skylines and its role as a new gateway symbol for Canada and the United States. Due to this, we are building elegance through aesthetics. Aesthetics, and its role in supporting functionality, have been considered for all aspects of the project.

For the bridge, I love that we were able to take the feedback of the community and integrate a multi-use path. Thus, contributing to active and healthy lifestyles for our host communities.

For the ports of entry, we are integrating technology to make our plazas state-of-the art. This will contribute to the efficient and timely movement of travellers through the facilities and toward their destinations and will provide our customers with a positive experience when making the Gordie Howe International Bridge their crossing of choice.

BNA has engaged more than 145 local businesses in Windsor-Essex and Detroit and more than 3,900 workers, about half of which are local. What is your team doing to make sure that the Community Benefits Plan that will be successful in carrying out initiatives that integrate positive outcomes for the local workforce and communities?

The development of the Community Benefits Plan was very community-driven, reflecting three years of engagement with Sandwich/Windsor and Delray/Detroit residents, businesses, workforce and educational institutions, elected officials, and other stakeholders. The initiatives in the plan are based on and align with the priorities that we heard.

We know that we can't fully understand each community, so we carefully selected initiative delivery partners that have proven track records and are well-known in the respective communities. We spent a lot of time meeting with workforce and training agencies and organizations to better understand the two local workforce environments. These partnerships along with BNA's relationships with subcontractors and unions are helping to ensure that residents have opportunities on the project and local businesses and vendors can participate in project procurements. Our current track record for local hiring and procurement indicates this approach is achieving success.

Connie Vitello is the contributing editor of ReNew Canada.

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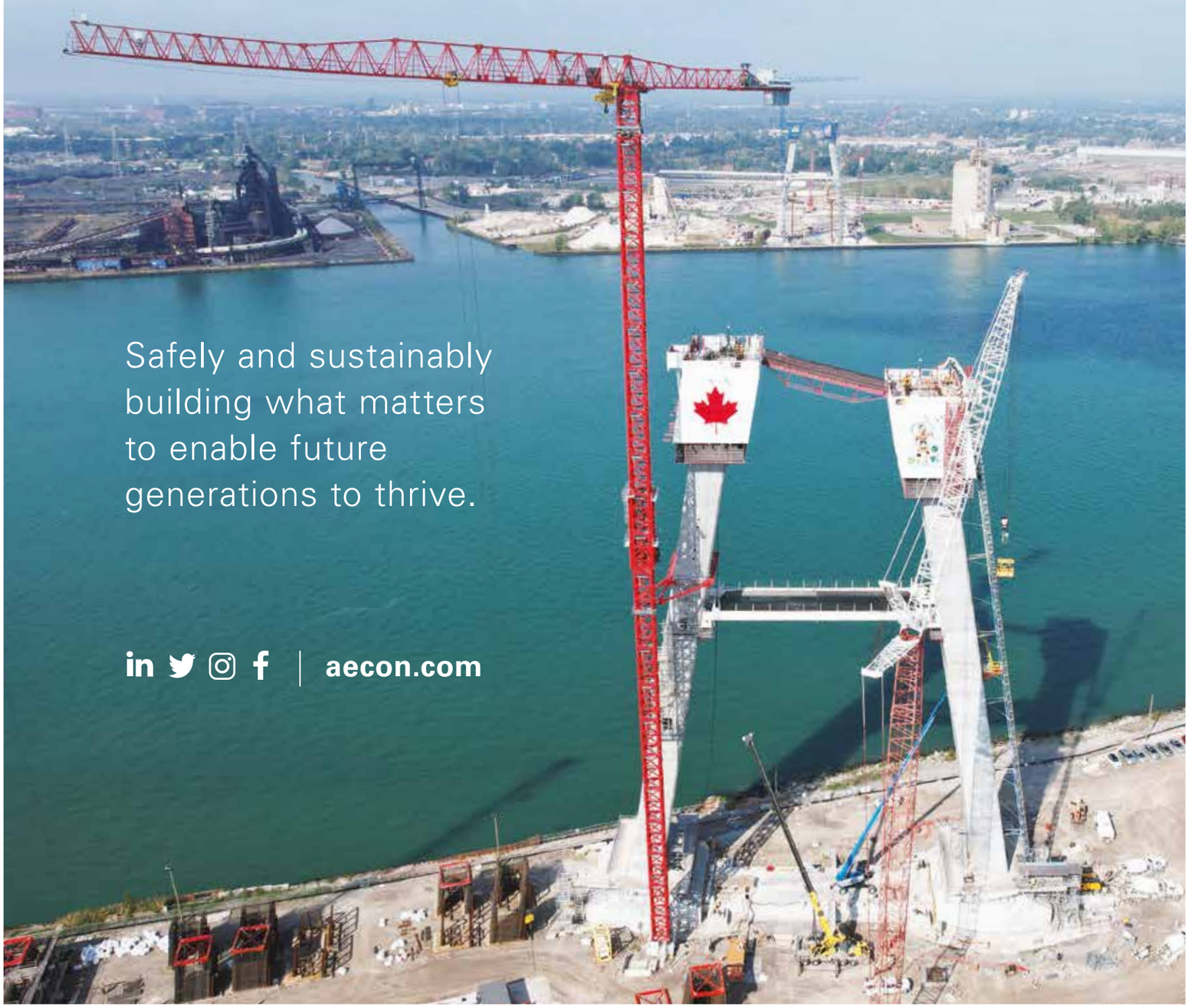

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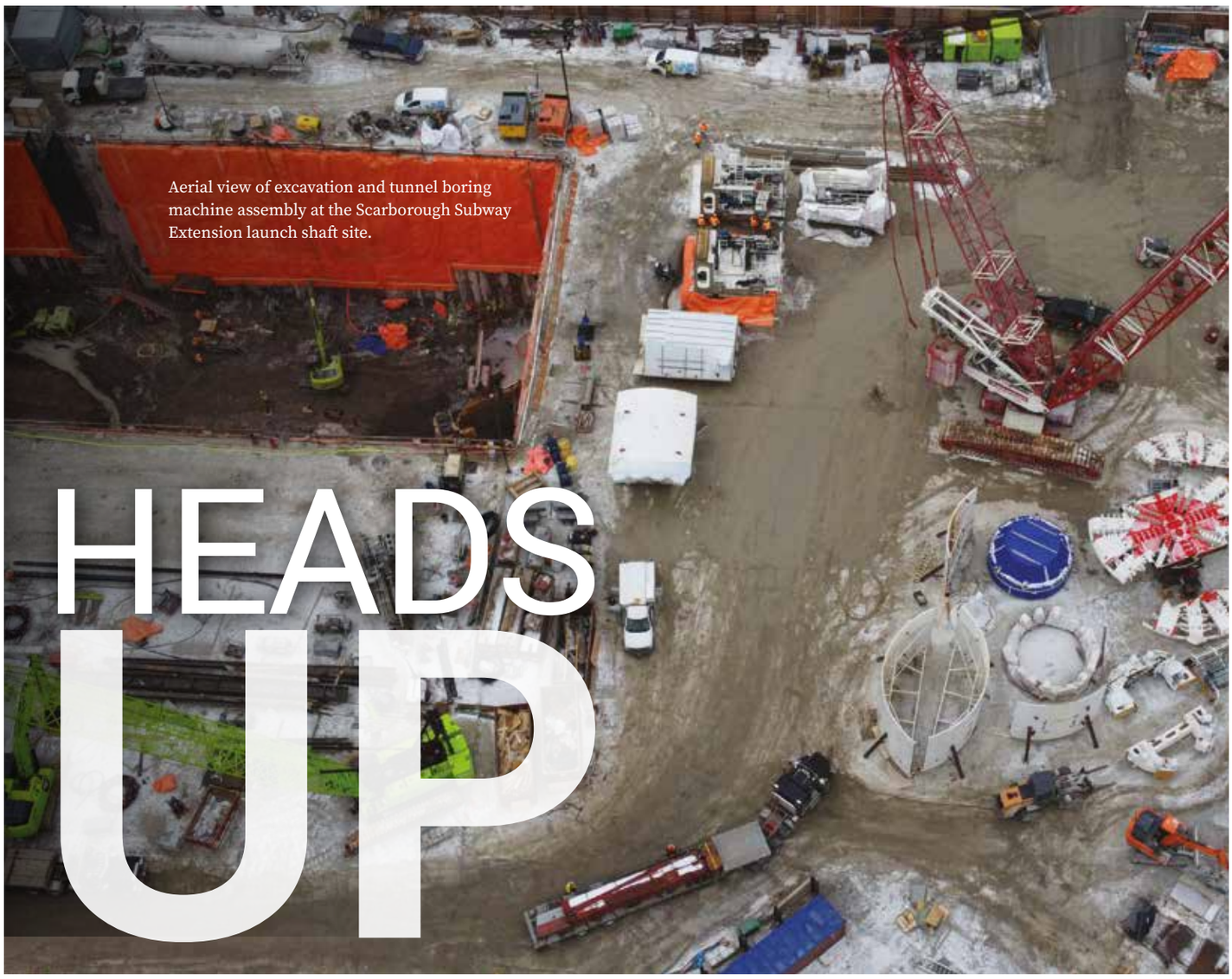
Credit: Metrolinx



Aerial view of excavation and tunnel boring machine assembly at the Scarborough Subway Extension launch shaft site.

HEADS UP

Progress continues on Scarborough Subway Extension with the construction of headwalls.

By Joshua Patel

Scarborough's three-stop subway extension continues to take shape with crews starting work on the project's headwalls.

Headwalls are underground support structures made up of a series of concrete columns, called piles, that create a watertight wall around the area of future subway stations and emergency exit buildings. These piles will be drilled into the ground using large drill rigs, which are usually over 33 metres high.

Responsible for designing and constructing the tunnel for the Scarborough Subway Extension, is a consortium led by Strabag. Part of the advanced tunnel contract, this includes designing and building the launch and extraction shafts and supplying the tunnel boring machine.

Metrolinx and Infrastructure Ontario issued a Request for Proposals (RFPs) in February for the Stations, Rail and Systems (SRS) package for the project. Three teams—Dragados, KSX Integrated Design-Builders, and Scarborough Transit Connect—were shortlisted and invited to bid on the package, which is being delivered using a Progressive Design-Build delivery model.

The 7.8-kilometre subway extension is part of the Province of Ontario's $28.5 billion subway expansion program, which also includes the Ontario Line, the Yonge North Subway Extension, and the Eglinton Crosstown West Extension.

Crews will build headwalls at 12 sites along the project route. All of them must be built before the project's tunnel boring machine—Diggy Scardust—arrives at each location. Construction for the first headwall began just south of the launch shaft site at Sheppard Avenue East and McCowan Road.

Similar to the ones installed at the launch shaft site last summer to prepare for excavation, piles will be drilled into the ground using large drill rigs.

Approximately 19 piles will be required for each headwall.

"As the tunnel boring machine travels underground from the launch shaft site, it will bore through these headwalls, leaving behind the frames for stations and emergency exit buildings we'll build later," said Andrej Butala, headwall manager for the project.

At each future station and emergency exit building site, crews will be installing a pair of headwalls to mark where the buildings will start and end. After the tunnel boring machine bores through these headwalls and tunnelling is completed, the successful stations, rail and systems (SRS) contractor will use the headwalls as frames to complete building the future stations and emergency exit buildings.

The headwalls need to go deeper than the future tunnels to ensure water and soil don't disrupt the area during tunnelling or construction.

Butala said each pile will be drilled roughly 40 metres underground and a single drill rig will be used at most sites to complete this work.

It will take crews roughly four to six months to build each headwall, and work will also involve utility relocations.

Metrolinx broke ground on the subway project last June with construction of a foundational wall around the launch shaft, which meant a massive hole—about 28 metres wide, 80 metres long and 30 metres deep—was dug before excavation could begin.

To keep such a massive excavation open and safe for the duration of construction and tunnelling, some special excavation supports need to be drilled into the ground with the drill rigs. Strabag installed these supports, commonly referred to in the construction industry as a shoring system. The type of shoring system being used for the Scarborough Subway Extension launch shaft is called a secant pile shoring system.

A secant pile shoring system uses a series of concrete columns with steel reinforcements, called piles, to create a strong, water-tight barrier that holds soil and water in place and out of the excavated area.

Crews have started work building headwalls at twelve sites along the Scarborough Subway Extension route.

Credit: Strabag/Metrolinx

The installation of this secant pile shoring system marked the beginning of the excavation process at the launch shaft site and the official start of construction.

Although the launch shaft only needed to be excavated about 30 metres deep, the piles went much deeper than the base of the launch shaft. This is a critical requirement to extend support below the base of the launch shaft so that water doesn't get into the shaft.

After the secant piles were drilled and the shoring system fully installed, crews excavated the area in anticipation of the arrival of the tunnel boring machine, which is currently being assembled on site.

Joshua Patel is a senior advisor, for subway programs at Metrolinx.

Credit: Metrolinx

MOVING FORWARD

The full fleet of 76 light rail transit vehicles to be used on the Eglinton Crosstown line assembled at the Eglinton Maintenance and Storage Facility.

Driving the next wave of public transit expansion.

By John Tenpenny

Public transit is the backbone of livable cities. Better transit means less congestion, faster commutes, more convenience, higher productivity, and lower emissions. Simply put public transit builds better lives.

Currently, the transportation sector accounts for 25 per cent of Canada's greenhouse gas emissions and shifting vehicles away from fossil fuel engines, towards zero emission alternatives, presents an opportunity for significant greenhouse gas emission reductions.

And while many municipalities are pursuing fleet electrification, the transition can be challenging due to the complexities of converting entire transit systems to a new technology, which involves significant upfront costs and related ancillary infrastructure.

Building modern transit also takes decades of continuous planning, design, and delivery.

During a recent INFRAIntelligence webinar, *ReNew Canada* brought together a panel of experts to discuss how governments—at all levels—can continue to plan, build, and finance projects that the public wants.

ReNew Canada: Some have called for a permanent federal funding mechanism for public transit. Is that the best path forward?

David Hubner VP, Transportation and Utilities, Infrastructure BC: I think the predictability of funding is key because all the transit, whether it's interregional, regional, or local within a municipality, it's very impactful in the respective communities.

And increasingly, projects are becoming more complex. And so, in order to deal with them effectively, everything has to start really early, and it needs to fit together, and all of that work takes time, and it takes money. And I think the federal funding is the catalyst for the provincial and municipal funding working together.

> "Public transit also needs to be part of the Canadian psyche the same way healthcare and education are."

Scott Gillner, senior policy advisor, Brampton Transit: It's difficult for public transit operators to make any money, so I think capital funding is crucial. In Brampton's case, we're covering about 50 per cent of our costs through fare revenues. We also need assistance with operating funding, that again is sustainable, predictable, long-term, and easily accessible.

Funding programs like the Public Transit Infrastructure Fund or the Investing in Canada Infrastructure Program are done through a formula-based model, but there are funds allocated to municipal transit projects that aren't part of those programs. And those funds are crucial to municipalities, so in those cases, equitable funding across the board either based on ridership or growth or population would be welcomed in terms of the federal provincial funding that we've been receiving.

Josipa Petrunic president & CEO, Canadian Urban Transit Research and Innovation

Diggy Scardust, the 2,050-tonne tunnel boring machine for the three-stop Scarborough Subway Extension sits waiting to be lowered into its launch shaft.

Credit: Metrolinx

Consortium (CUTRIC): The $2.75 billion right now from the federal Zero Emission Transit Fund is a drop in the bucket. Agencies that are doing complicated engineering infrastructure work need to know that when 2026, 2027, 2028 come around there's still going to be ongoing funding for this electrification decarbonization because that's what it's going to take.

The complexity of the technology ahead requires sustainable funding.

Public transit also needs to be part of the Canadian psyche the same way healthcare and education are because what we wouldn't want to see is a federal government in the future undo the permanent funding that has been announced.

Last year, the government of Canada created the $2.75 billion, Zero Emission Transit Fund. How can public transit projects help Canada reach its climate goals?

Kaya Sabag manager, Project Planning, Metrolinx: Sustainability is really one of the main pillars that supports all our analyses and how we plan our systems for the future.

So, for example, in our business cases, we consider the changes in vehicle kilometers traveled, how many people we're planning to get out of and onto buses. But even beyond that if we think about our transit-oriented community focused development, our GO rail stations are now delivered with a focus on transit-oriented development around those station areas.

The big picture perspective on sustainability considers economic development, sustainable communities and helping people to get around more efficiently.

Josipa Petrunic: CUTRIC spend a lot of time helping Infrastructure Canada devise the actual number. We pitched $4 billion, but it tells you about the costs at play.

For example, at the TTC—the biggest transit system in Canada— but still just one agency, it would cost $2 billion alone to electrify their buses. That's just to buy electric buses. Not the chargers, not the energy storage devices, not the software not facility modification.

It's a good start, but a drop in the bucket to get to 2030 because really only TTC could absorb all of that and still not be fully electrified.

How can governments and other industry stakeholders work together to ensure the right projects are built on time and on budget?

Kaya Sabag: When we think about planning these big projects in a way that works well, we need to think about integration and how the different systems fit together.

It starts with designing for easy transfers between systems and services. So, if you get off your bus make sure it's easy to get into the subway station.

While different levels of government all focus on our own projects, collaboration is critical to ensure seamless transit across regions.

IN TRANSIT

We asked recent INFRAIntelligence webinar attendees about public transit infrastructure expansion. Here's what they had to say:

Which level of government should bear the largest share of transit funding?

Provincial	87%
Municipal	13%

What type of transit should governments focus on?

Rail and Light Rail	56%
Subway	11%
Bus	33%

Credit: B.C. Ministry of Transportation and Infrastructure

Scheduled to open in 2025, the Broadway Subway Project is a 5.7-km extension of Vancouver's Millennium Line, from VCC-Clark Station to Broadway and Arbutus.

David Hubner: One thing to think about is the standardization of technology where you've got the federal government putting in money so that jurisdictions aren't having to reinvent the wheel and that means there is potentially some interoperability and understanding of the full life cycle of the technology.

And being on time and being on budget is about—although it may sound glib—having the right schedule and having the right budget at the outset.

With projects getting increasingly more complex in terms of the physical construction, it means looking at starting work early as owners to facilitate a contractor coming in and doing a project and focusing on what they need to do. And part of that speaks to the timing and the amount of funding so it can facilitate robust planning, setting the stage, doing some early work and then the actual construction contract and just being realistic about what the risks are and what the timelines can be.

> "The big picture perspective on sustainability considers economic development, sustainable communities and helping people to get around more efficiently."

Josipa Petrunic: At CUTRIC we have expertise looking at technology integration projects that are infrastructure, plus operations, and ongoing maintenance.

What we have now that we didn't have 20 or 10 years ago are powerful data analytics and we can see that there's a whole new transparent world where municipalities and transit agencies and the clients of the infrastructure providers and the vendors can now track performance and hold companies to account in a way that was not possible before.

So, if you are winning a contract to build a charging system, overhead rafters, facility updates and bus deployments, we can now track every iota of performance of that facility, that bus, that charger.

I believe in the stick over the carrot, the stick has a certain amount of value to the taxpayer because these projects are complicated. It's hard to predict all the budget overruns and cost overruns and complexities before you dig a hole and find out what's underneath the streets of say Toronto.

But on the other side, there's a lot of tracking those cities and the customers can do now. And is there space now for these multibillion dollar projects to have penalty measures that come into effect years after the infrastructure is built because the performance is not what was promised when the contract was awarded?

Because we're seeing that it is possible in the bus and charger domain at a micro level, is it possible for a larger aggregate facility, turnkey solution, mega-billion-dollar arrangement? I suspect so.

Scott Gillner: In order to plan these complex projects and execute them you really have to look at the total life cycle of the project, from early days concepts through the funding requests and trying to align the stars between all the various funding and financing opportunities that exist.

It is a hugely complex model, and at the end of the day, a level of good faith needs to be continued between the various levels of government to see these projects come to fruition, because if we waited for all agreements to be signed and all the Ts crossed, and Is dotted, we'd never get anything built.

And a good example of that here in Brampton is the Hurontario LRT that's being built. We're proceeding without a formal implementation agreement. All parties are at the table. We're designing and we are constructing. And that's all in the absence of this implementation agreement.

So that sign of good faith is there. We want to get this thing built as soon as possible for the greater good, and we know all the legal stuff will eventually come together but we're taking that leap and moving that project forward specifically.

John Tenpenny is the editor of ReNew Canada.

SHAPING THE FUTURE

AI, the new partner for safer, smarter, and more productive construction sites

The day-to-day application of AI from Pomerleau's perspective

Nowadays, artificial intelligence (AI) is in almost every aspect of our daily lives. AI is changing our lives as well as our work, by replacing the human workforce in some industries that rely on repetitive jobs. However, in the construction industry, there is still a long way to go before some jobs become fully automated. Pomerleau's vision for innovation is to help focus its workforce on value-added tasks and leverage innovation to enhance productivity, safety and create more value for clients and communities. AI is a part of this vision because it helps achieve this in several ways, with unlimited potential for future applications.

Smarter tools and work plans

Architects and engineers are using various applications that benefit from AI algorithms in the back end, daily. BIM is now used by Pomerleau on design-build projects to prevent design errors and match architectural plans with structural designs. The collaborative tool brings great value to construction projects for designers and clients.

Surveyors and quality inspectors can rely on AI to accomplish most of their repetitive and time-consuming tasks. Pomerleau developed a solution to collect data, based on project progress by using AI algorithms that are integrated with Spot, the autonomous robot from Boston Dynamics (see picture above). The solution enables construction stakeholders to address limitations of manual reality capture, which is labour intensive, costly, and prone to error. Computer vision algorithms are employed to detect and recognize the locations for data collection, while Spot navigates the job site. These locations are marked using QR codes. When Spot detects a QR code attached to building elements or construction materials, it stops, changes its status to stabilization mode, and starts collecting data in the form of 360-degree images, RGB-D images, and 3D point clouds. Data captured can be compared with 3D designs to monitor project progress. Spot and other innovative technologies used by Pomerleau are beneficial additions to the team because they give employees the ability to focus on value-added tasks.

Searchable and non-searchable PDFs are some of the most common formats for storing data including invoices, reports, and contracts. Various departments at Pomerleau generate different scripts and PDFs with different layouts/patterns and move them to a specific database. To reduce the time taken to complete this process, Pomerleau developed an automated and user-friendly solution, which allows end users to mine and pull specific information from PDF files through a web application.

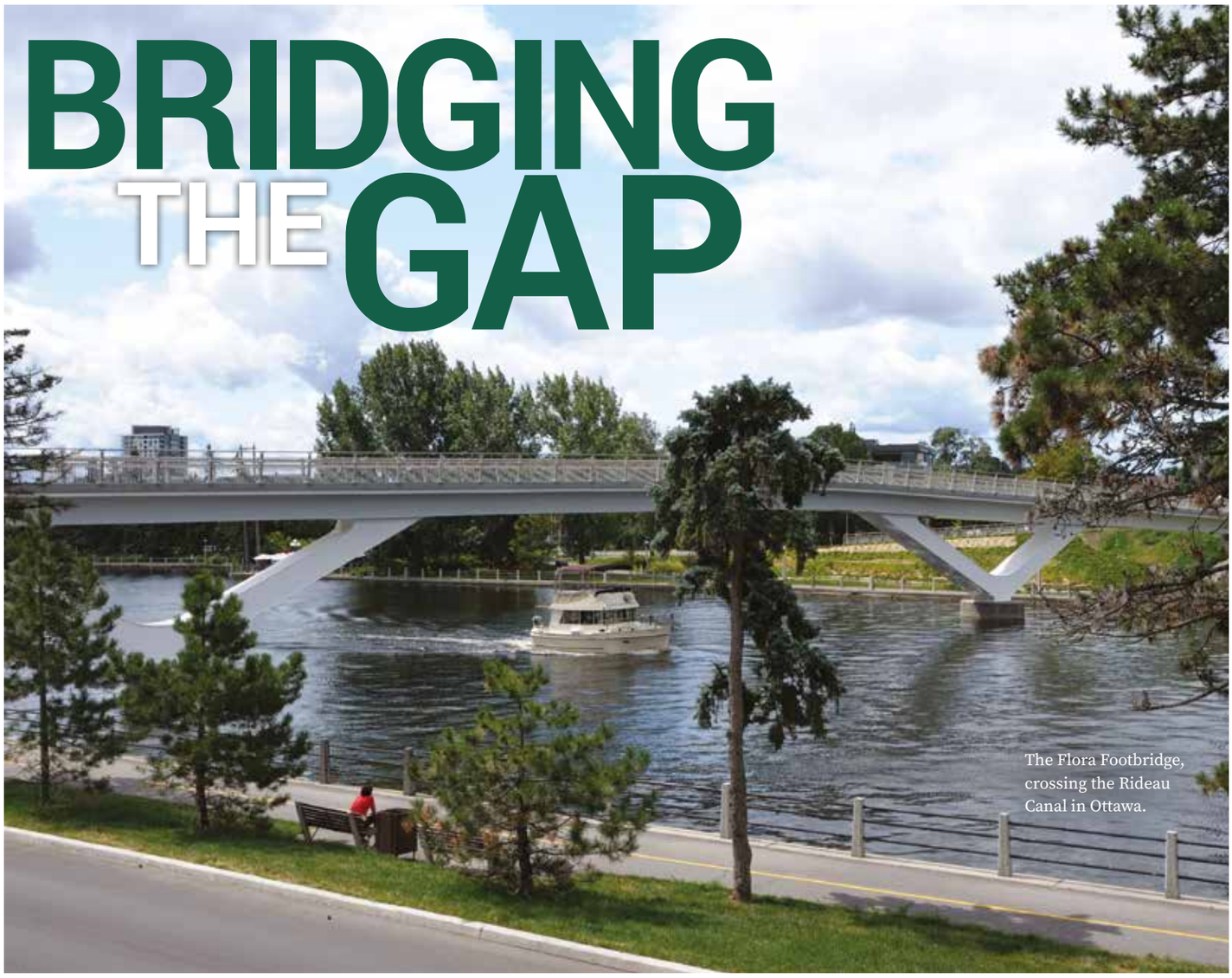
Safer worksites

Since a wide variety of man-made and natural emergencies can happen and lead to immediate evacuation on job sites, it is important to know the logistics of the worksite. To know how many people are on the job site at each point of time, Pomerleau developed a solution in which camera and computer vision techniques are used to count people entering and exiting the site in real-time. It also calculates and illustrates the total number of people inside the job site to inform new workers on whether they can enter or not (this is in consideration of limitations applied due to COVID-19). Partnering AI with safety measures ensures that everyone is accounted for.

Looking Forward

The construction industry has always taken a slow pace when adapting to new technologies. In recent years, however, more companies are seeing the benefits of AI solutions in the management of their projects. Although skill transformation by AI is inevitable in some workplaces, Pomerleau has found ways to use AI to ensure employees can prioritize value-added tasks. AI has become a positive addition to a fast-paced work environment that requires timely solutions. Construction workers and managers can collaboratively use AI to operate and supervise their projects, while still maintaining autonomy and creativity.

BRIDGING THE GAP



Credit: WSP

The Flora Footbridge, crossing the Rideau Canal in Ottawa.

The shifting landscape of bridge design and construction in Canada.

By Jianping Jiang and Keith Holmes

The way we design and build bridges in Canada continues to evolve. The introduction of new technologies and techniques, incorporating active transportation, and the need for greater environmental adaptation, are among the new variables that we now consider. It has forced us to change the way we deliver these vital infrastructure projects for communities across the country.

These factors are helping us build structures that are more efficient in carrying loads, resilient to climate change, and provide greater overall functionalities for all users of our communities. From remote highway river crossings to busy inter-city transit passages, the new generation of bridges are providing greater value than ever before.

Evolving bridge landscape

Many of the bridges you see built in Canada, at first glance, don't look much different than what has been built in the past. We still see the same primary structural forms, usually girder bridges with the occasional arch or truss or cable-stayed crossing.

However, we are also seeing a shift in designs to suit new priorities. For example, river crossings are trending to longer spans often with no piers in the river channel. This approach can mitigate the environmental impact of a pier foundation in a sensitive water course and reduce the risk of damage associated with extreme flooding events.

Project owners haven't lost the desire to build bridges that have an aesthetic appeal, but the cost premium that this commands can make it more difficult to justify. Where we are seeing less conventional forms are often with projects of smaller scale, such as pedestrian bridges, where aesthetic design can be achieved without breaking the bank.

With renewed focus on the whole life cycle cost of our structures, we are seeing design solutions that reduce future maintenance. The best example is the reduction in deck joints, a perennial maintenance headache that owners would gladly avoid. Continuous bridge decks and integral/semi-integral abutments are now commonplace in all jurisdictions including those in more northern climates. This means designing to accommodate larger thermal movements and bridge owners accepting some pavement maintenance at the approaches (which is still better than deck joint maintenance).

But in the last 10 years (since the 2014 Canadian Highway Bridge Design Code), the biggest change for bridge engineers is in seismic design. The old "force-based" design approach (i.e., make it strong) has been replaced with a ductility approach (i.e., make it "stretch") with a focus on post-earthquake performance (what is the damage, and can the bridge still be in service to carry traffic?)

One such example is the increased use of seismic isolator bearings to reduce inertial demands on bridge structures. Outwardly, a bridge may not look all that different, but

This pedestrian bridge, part of the Calgary West LRT, is an example of where elements can be added to make the bridge aesthetically appealing without incurring significant cost.

Credit: WSP

how the bridge is designed and detailed has changed profoundly to accommodate seismic performance.

There are a few other changes worth mentioning as part of the evolution of our bridge designs:

- the increasing use of prefabricated bridge components to manage the costs, quality, and risks of site work;
- the implementation of a Service Life Design approach, typically for large projects, where the engineers are required to explicitly consider durability limit states to ensure the design will meet the prescribed service life; and
- the reuse of existing bridge foundations for replacement bridges to minimize environmental impacts and reduce construction costs.

Each of these changes has led the bridge design and construction communities to adapt their way of delivering solutions for project owners across the country.

Designing for all users

Accommodating active transportation is one of the biggest recent trends and includes integration of pedestrians, cyclists, and various new personal mobility options. While the loading is less, design for all users' safety and accessibility is now more important than ever. This means:

- improved accessibility that considers a path's grade and width for integration of all users;
- improved safety that considers the travelled surface, railings, lighting, and signage;
- improved convenience where alignments prioritize active transportation users; and
- improved comfort including consideration for people-induced vibration of bridges.

These changes not only apply to the finished product but are now also an important consideration during construction. Owners and engineers now engage in dialog with active transportation communities, finding construction solutions that can accommodate the community at each stage of the project.

To support engineers in designing bridges for active transportation, CSA (Canadian Standard Association) is currently developing a new national guideline, the *Pedestrian, Cycling and Multi-use Bridge Design Guideline,* to be published in 2023. We are fortunate to have a number of our team members actively involved in developing this important new national document.

With municipalities across Canada developing active transportation plans, and government funding being provided to support their implementation, the need to consider and integrate all users into bridge design will only increase in the years ahead.

Technology and innovation

The introduction of new technologies is impacting both the design and construction phases of bridges, creating new insights into the long-term performance and durability of the structure.

In the design phase, the adoption of 3D BIM for large design-build and P3 projects has improved communication, collaboration, optimization, and simulation. Using BIM, team members can work with an integrated model to better resolve the inevitable interdisciplinary challenges. And project stakeholders can access a visualization of the project, providing input on design and construction, and identifying potential stressors.

During the construction phase, the installation of remote sensors is helping contractors detect and monitor movements and vibrations. And once construction is complete, owners are using similar technology to continuously monitor the health of the structure over its service life. There is also a range of new construction materials being introduced that focus on creating a durable and resilient final product. These include high strength and high-performance variations of steel and concrete products, as well as stainless steel and GFRP (glass fiber reinforced polymer) rebar providing long-term durability and service life benefits.

Credit: Infrastructure Canada

The Samuel De Champlain Bridge in Montreal, opened in 2019, has an extended bridge design life of up to 125 years before replacement.

Environmental factors

At every stage of bridge design and construction, environmental impacts are being given greater consideration than ever before. Even though legislation is inconsistent in provincial and territorial jurisdictions across Canada, there are enhanced standards in place, and even more are expected.

As an example, right now the BC Ministry of Transportation and Infrastructure and Engineers and Geoscientists BC (EGBC) have mandated that all highway infrastructure including bridges use a climate change-resilient design approach as documented in EGBC's new guidelines, *Developing Climate Change-Resilient Design for Highway Infrastructure in BC*. The upcoming 2025 edition of the Canadian Highway Bridge Design Code will further address the impact of climate changes on bridges with new and specific requirements.

Bridge designs, regardless of jurisdiction, are considering the evolving environmental conditions due to climate change. On major projects, such as the new Champlain Bridge in Montreal, we are seeing an extended bridge design life of up to 125 years before replacement. And on all projects, we are seeing creative solutions to "tread lightly" on our ecosystems. As example, girder launches, and demolition "de-launches" are increasingly commonplace and planned well in advance to minimize the impacts on in-water and riparian habitats.

What comes next?

As the focus on delivering bridge structures with longer lifespans and minimal environmental impacts continues, there are two key features that we expect will continue to emerge in bridge development in Canada.

First, we are seeing an increase in the use of Accelerated Bridge Construction. On busy routes that are particularly impacted by prolonged traffic disruption, some project owners are turning to innovative construction solutions. In Ontario, we have seen several projects use a Self-Propelled Modular Transporter to literally pick up and move a bridge superstructure into place in a matter of hours. While the capital investment can be higher, the trade-offs from a community congestion and interference perspective can make it a worthwhile consideration.

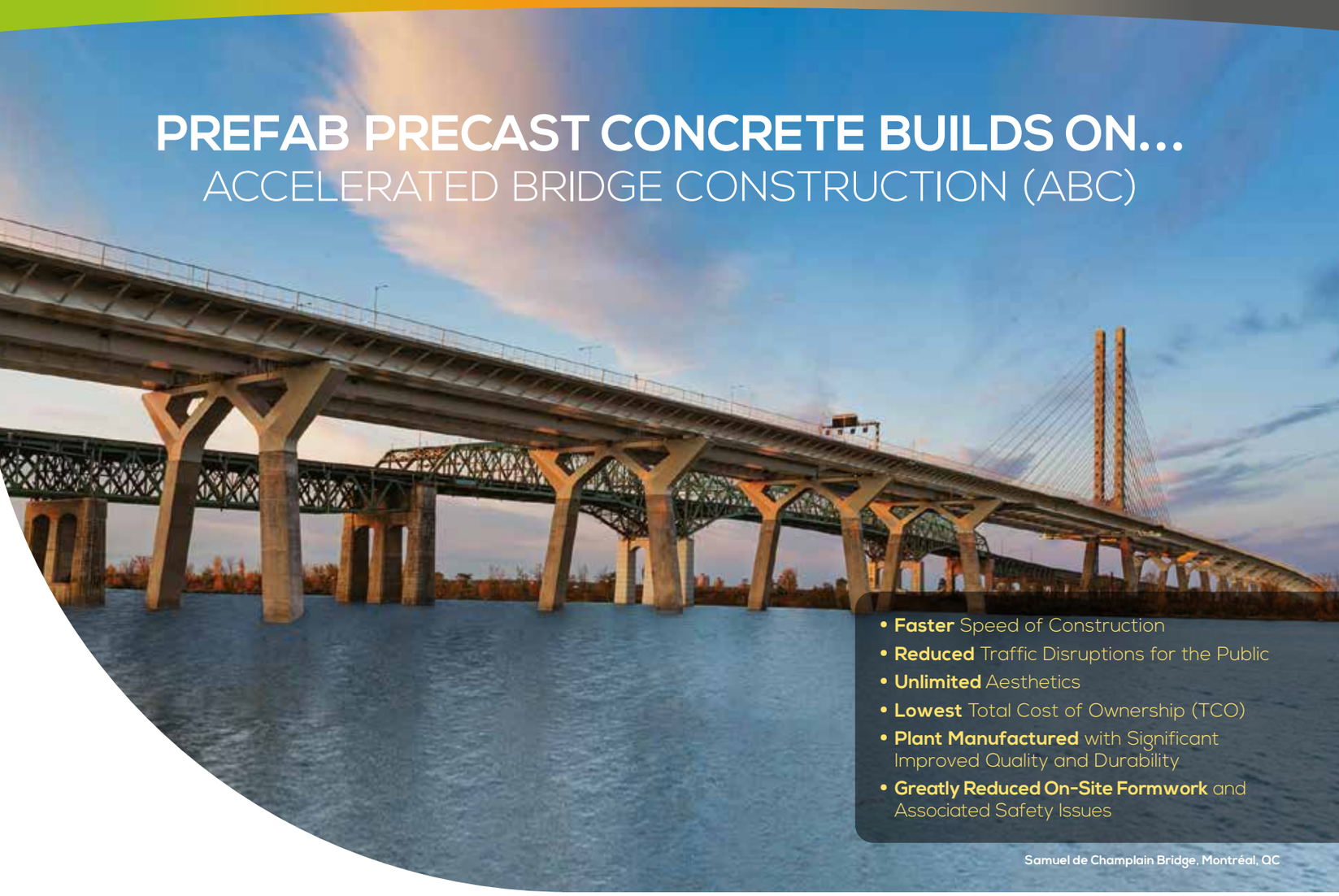
Second, there is the introduction of collaborative procurement models such as Alliance Contracting and Integrated Project Delivery. While both are still in their infancy in Canada, especially in relation to bridge projects, they offer an opportunity for greater collaboration among all project partners, and the opportunity for a result that provides the best value to the public.

There continues to be a lot of change in the design and construction of bridges in Canada, as new technologies create more efficient solutions, structures are built to withstand the impacts of climate change, and all team members work in closer collaboration. However, we believe that these changes, and our ability to implement them, will lead to the delivery of better bridges for those who use them.

Jianping Jiang is the national practice leader, Bridges and Civil Structures, at WSP in Canada.

Keith Holmes is the director of Bridges for BC/Yukon at WSP in Canada.

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



- **Faster** Speed of Construction
- **Reduced** Traffic Disruptions for the Public
- **Unlimited** Aesthetics
- **Lowest** Total Cost of Ownership (TCO)
- **Plant Manufactured** with Significant Improved Quality and Durability
- **Greatly Reduced On-Site Formwork** and Associated Safety Issues

Samuel de Champlain Bridge, Montréal, QC

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 Geometry Manual: **https://www.pci.org/bookstore** and other CPCI Bridge Publications: **https://www.cpci.ca/en/resources/technical_publications/**

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(CPCQA) CANADIAN PRECAST CONCRETE QUALITY ASSURANCE CERTIFICATION PROGRAM

Tunnel Visions

Metrolinx marked a major milestone as tunnelling started on the Eglinton Crosstown West Extension, the 9.2-kilometre extension of the Eglinton Crosstown LRT from Mount Dennis Station to Renforth Drive. A pair of tunnel boring machines have started digging from the launch site near Renforth Drive and Eglinton Avenue West and will move 10 to 15 metres a day as they travel east to Scarlett Road.

Credit: Matt Llewellyn photo/Metrolinx

Credit: City of Toronto

Ottawa, ON

Calgary, AB

Nisku, AB

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

CRITICAL RESPONSIBILITY

Credit: Bruce Power

New report challenges municipalities to prioritize cyber resiliency.

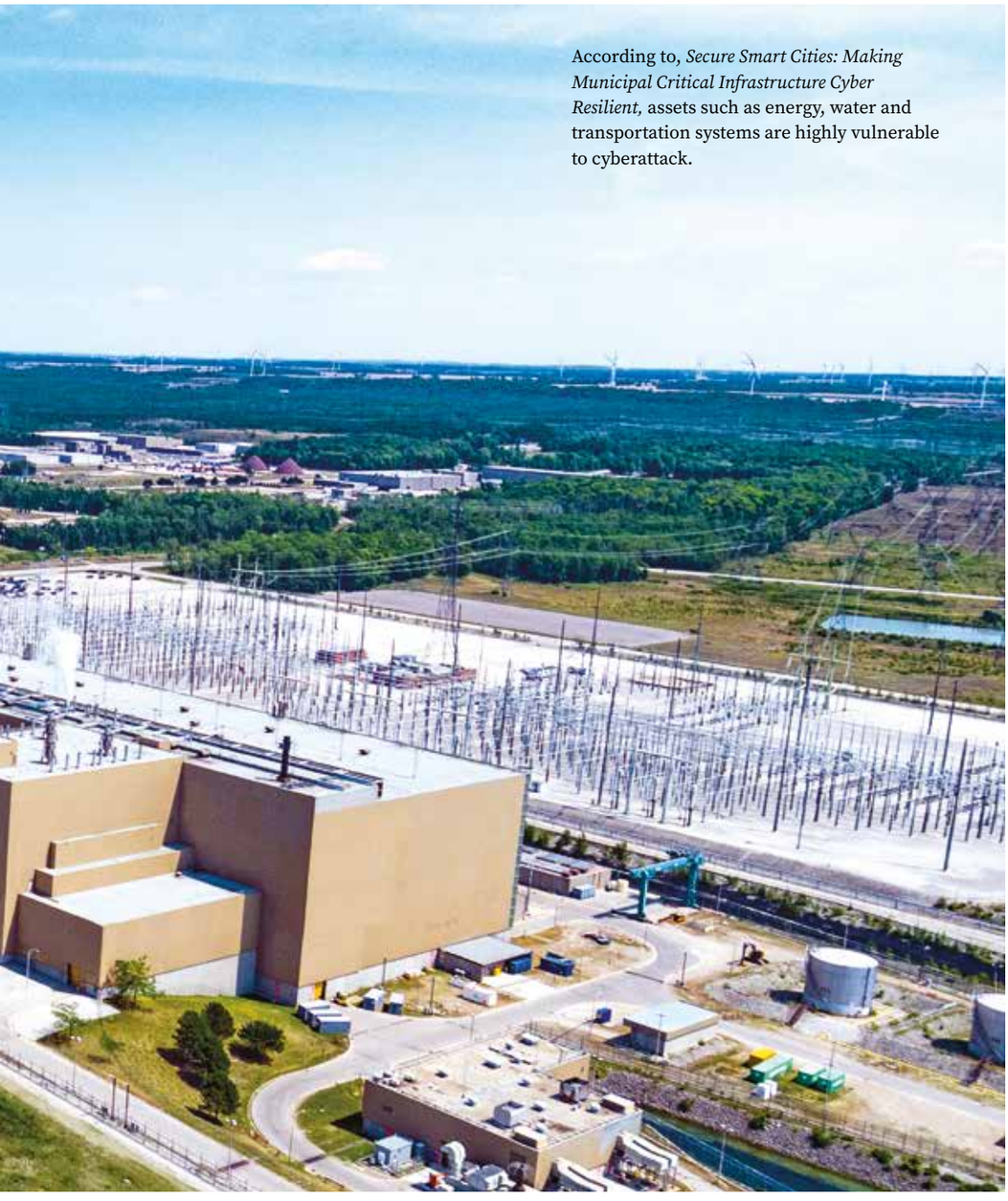
By Glenn Miller

While the shocking events in Ukraine have raised the public profile of cyberattacks on critical infrastructure, Toronto Metropolitan University's (TMU)—formerly Ryerson University—Cybersecure Policy Exchange project was diving deep into this complex issue long before Russia's tanks rolled over the border.

With financial support from the Canadian Infrastructure Bank, Rogers and RBC, the report, entitled *Secure Smart Cities: Making Municipal Critical Infrastructure Cyber Resilient,* identifies a series of challenges the authors say must be met by the nation's municipalities and other owners/operators of critical infrastructure. Assets such as energy, water and transportation systems are highly vulnerable to cyberattack.

The report's authors, Stephanie Tran, Sharan Khela and Andre Côté, highlight four main points that need to be urgently addressed.

1. The "scale, frequency and sophistication of ransomware and supply chain attacks" are on the increase. Although not always well publicized, disruptions to critical operations are a growing cause for concern. While headlines focus on major disruptions such as last year's shutdown of the Colonial pipeline in the U.S., many less dramatic, but equally disruptive attacks are having a negative cumulative impact, often in smaller, under-resourced communities across Canada. The events in Ukraine underscore how state-sponsored cyberattacks can be used to cripple critical infrastructure.
2. While the extent of under investment in critical infrastructure has been known for some time—the *2019 Canadian Infrastructure Report Card* pulled no punches in this regard—TMU's report suggests that a perfect storm is developing on this file. The Report Card acknowledged that infrastructure assets are physically deteriorating, but because most systems are now connected in some manner to the Internet, aging infrastructure assets are "more susceptible to cyberattacks," suggests the TMU report. The problem for municipalities is that the cost to replace infrastructure assets is already unaffordable in many cases. Ensuring that replacement assets are also designed to be cyber-secure is out of scope for many organizations.



According to, *Secure Smart Cities: Making Municipal Critical Infrastructure Cyber Resilient,* assets such as energy, water and transportation systems are highly vulnerable to cyberattack.

3. The report also underscores a disturbing reality—finding the talent with expertise in cybersecurity to devise and implement strategic solutions is what one industry observer calls "mission impossible." Even if municipalities and other owners were to put cybersecurity at the top of their spending priorities today, it would take years to fill the gap in human resources capacity. As the report makes clear, there simply aren't enough knowledgeable people around to address the problem.
4. Even though municipalities have decades of experience in developing emergency preparedness plans, traditional emergency management structures "lack clarity" in how cyber emergencies should be prepared for and responded to. Attacks on vulnerable critical infrastructure such as railways, electrical grids or even hospitals cause havoc within municipal boundaries, but municipalities do not control or manage those assets. The TMU report argues establishing collaborative relationships and a framework for cooperation within updated emergency preparedness plans must be in place before an event.

Progress is being made

Despite the dire warnings, the report also documents progress in some areas:

- Headway being made within the energy sector, resulting from expansion of NERC standards (North American Electric Reliability Corporation) to add cyber resilience criteria for the electricity grid;
- More municipalities are taking steps to prioritize cyber security;
- The insurance industry is making it easier for municipalities to qualify for insurance against attacks on critical infrastructure; and
- The federal government has launched two assessment tools for municipalities.

In this regard, initiatives from Public Safety Canada now offers two voluntary assessment tools aimed at supporting enhanced resilience against the threat of cyberattacks. The Canadian Cyber Security Tool (CCST) focuses on helping organizations "determine their operational resilience and cybersecurity maturity." As the assessment takes only about an hour to complete, the resulting high-level report is seen as a starting point that allows "municipalities to benchmark themselves against their peers."

The Regional Resilience Assessment Program (RRAP), on the other hand, is more comprehensive, and follows through on a commitment first articulated back in 2014 when the government updated its National Strategy for Critical Infrastructure and accompanying Action Plan. Although there is no cost, the tool takes four days to complete, and requires that municipalities first be accepted by Public Safety Canada before they can undertake the assessment.

Nevertheless, although the *Secure Smart Cities* report makes a strong case for collaboration across sectors, it makes only passing reference to the federal government's National Infrastructure Assessment: Building the Canada We Want in 2050—a comprehensive engagement process dedicated to assessing national infrastructure that is currently underway. The initiative has already drawn criticism for its lack of attention to cyber issues. The resulting report, published in July 2021—*Building Pathways to 2050: Moving Forward on the National Infrastructure Assessment*—covers a lot of ground, but the term critical infrastructure is not addressed. More puzzling, given the increasing public profile of cyberattacks, is that the report makes no mention of cybersecurity or the need to improve resilience in the face of cyberattacks on infrastructure.

This shortcoming was noted in a submission to Infrastructure and Communities Canada by Quantum-Safe Canada, a not-for-profit organization based at the University of Waterloo whose mission is to ensure home-grown quantum innovation and talent is leveraged to Canada's competitive advantage. But as recounted in a *Globe and Mail* opinion piece in 2019, "those same powerful quantum properties have a dark side: they will also enable much of today's "unbreakable" encryption to be hacked in mere minutes." Noting that the National Infrastructure Assessment focuses on the key role of infrastructure in "promoting economic growth, tackling climate change and improving social inclusion," Quantum-Safe Canada observed that "none of these objectives are achievable if the country's critical infrastructure is inoperable."

To be fair, there are other government agencies and municipalities at work on this complex file, including:

- A recent report from Canadian Security Intelligence Service (CSIS)—*Smart Cities and National Security*—published in February 2022, provides another example of the federal perspective on cybersecurity. The report defines smart cities as "environments where digital technologies are used to enhance the quality and efficiency of municipal services." Although CSIS is primarily concerned with the need to safeguard and prevent the manipulation of data, the implications for municipal and other local entities responsible for critical infrastructure are clear. CSIS states "In the hands of a hostile threat actor…data can be exploited to enable activities that compromise the safety and security of Canadians and …critical infrastructure." (https://www.canada.ca/en/security-intelligence-service/corporate/publications/smart-cities-national-security/smart-cities-national-security.html)
- Back in 2018, Public Safety Canada, Shared Services Canada, and the Communications Security Establishment established the Canadian Centre for Cyber Security to provide stakeholders in all sectors with access to a single "high-functioning, responsive organization." In addition to issuing advisories, technical briefings and formal threat assessments, the Centre manages the National Computer Security Incident Response Team (CSIRT), which is on call 24/7 across the country. Working with victims, the Centre works to "take down" several thousand infected websites and connected systems annually. (https://www.canada.ca/en/security-intelligence-service.html)
- In western Canada, the Alberta Urban Municipalities Association (AUMA) continues to offer specialized cost-effective access to their members through Strategm, a private company retained by the association. Strategm also authored a whitepaper, entitled *Best Cyber Security Practices for Municipalities.* (https://www.abmunis.ca/sites/default/files/BusinessServices/Insurance/Risk/stratejm_white_paper_-_best_practices_for_municipalities_oct_2020.pdf)
- The City of Toronto recently updated its digital infrastructure strategy. Published in March 2022, the new report places a high priority on cybersecurity. (https://www.toronto.ca/wp-content/uploads/2022/03/9728-DISFAcc2.pdf)

> "Because most systems are now connected in some manner to the Internet, aging infrastructure assets are more susceptible to cyberattacks."

Conclusion

The Cybersecure Policy Exchange chose municipalities as the subject of its first major report because it was clear that "municipalities are not only under-resourced but are spread thin having to deal with such broad mandates." The authors said that when they examined "the risk factor with respect to the impact of cyber vulnerability," focusing on the needs of municipalities made the most sense and had the most catching up to do.

Glenn Miller, FCIP, RPP is a senior associate with the Canadian Urban Institute and co-founder of Strategic Regional Research Alliance.

FURTHER READING

Secure Smart Cities: Making Municipal Critical Infrastructure Cyber Resilient concludes with a reference to five resources the authors suggest can be helpful to municipal managers and policy makers.

1. Association of Municipalities Ontario. (2020). *A Municipal Cyber Security Toolkit: Best Practices to Guide and Improve Cyber Security Readiness* (p. 23). Association of Municipalities Ontario. (https://www.amo.on.ca/sites/default/files/assets/DOCUMENTS/Reports/2020/AMunicipalCyberSecurityToolkit20200930.pdf)
2. Miller, G. (2021, June 22). *Prepare For the Worst, Hope For the Best. ReNew Canada.* (https://www.renewcanada.net/feature/prepare-for-the-worst-hope-for-the-best)
3. Internet Society & Next Century Cities. (2019, November 1). *Security Factsheet: Why Should Municipalities Make Network and Data Security a Priority?* Internet Society. (https://www.internetsociety.org/resources/doc/2019/why-should-municipalities-make-network-and-data-security-a-priority/)
4. Canadian Centre for Cyber Security. (2018). *State-Sponsored Espionage and Threats to Critical Infrastructure.* Canadian Centre for Cyber Security. (https://www.cyber.gc.ca/en/guidance/state-sponsored-espionage-and-threats-critical-infrastructure)
5. Barrett, M. (2018). *Framework for Improving Critical Infrastructure Cybersecurity Version 1.1,* NIST Cybersecurity Framework. NIST. (https://doi.org/10.6028/NIST.CSWP.04162018)

A new report identifies a series of challenges that must be met by the nation's municipalities and other owners/operators of critical infrastructure.

Credit:City of Mississauga

WASTE NOT, WANT NOT

The City of Mississauga underwent a major waste diversion project at the Hazel McCallion Central Library that resulted in substantial environmental, community and economic benefits.

Library renovation project sets new standard for construction waste diversion.

By John Tenpenny

Construction, renovation, and demolition waste continue to be the largest contributors of waste in municipal and regional landfills. Even though materials like wood, bricks, drywall, metal, cardboard, carpeting as well as furnishings can be reused or recycled.

Recently, municipalities like the City of Mississauga have begun to prioritize programs and strategies that divert waste from landfills.

They are also looking for more ways to effectively reuse, recycle, and manage used products and materials. Not only does reusing and recycling divert material from landfills, but it also helps reduce carbon dioxide emissions. Manufacturing new building supplies and furnishings contributes to the generation of carbon dioxide—one of the greenhouse gases that contribute to global warming—so when materials are reused, or recycled emissions are avoided.

According to Diane Gibson, Mississauga's environmental sustainability supervisor, the city, in collaboration with the Region of Peel, has diverted more than 75 per cent of its demolition construction waste from landfills.

"We now look at waste from a circular economy approach where everything waste-related has a resource and a value, instead of always looking to recycling," said Gibson.

The most recent example of this new approach can be seen at the $42.8 million Hazel McCallion Central Library renovation project.

The waste diversion implemented during this project resulted in substantial environmental, community, and economic benefits. Using the Disposal of Surplus City Assets Policy as a guide, staff from across City divisions (e.g., library, environment, space planning, procurement and IT) developed and implemented a plan to reduce the number of City-owned items that would be sent to landfill prior to construction. City staff were able to reuse, recycle, and donate a number of items to reduce environmental impacts.

"With this project it was great to have so many collaborators and we all aligned with the goal of zero waste—to look at how we could best divert the city assets," said Gibson. "Our lofty goal was zero waste."

The large-scale renovation of the Hazel McCallion Central Library is the first to take place since its opening in 1991. The library is scheduled to reopen in 2023.

All five floors of public and staff space, including the Glass Pavilion, Breezeway and the Noel Ryan Auditorium are under renovation. After all interior demolition was completed, construction of the fourth-floor sky lounge has commenced, and mechanical and electrical rough-ins are ongoing.

During the renovation period, approximately 28,000 square feet of public space will be added within the existing building, along with plans for an additional 6,000 square feet of secondary space on the fourth floor overlooking Celebration Square.

What stood out for Gibson about the Central Library project was the sheer volume of the materials that were involved.

Credit:City of Mississauga

All five floors of public and staff space at the Central Library, including the Glass Pavilion, Breezeway, the Noel Ryan Auditorium, and the Skylounge (pictured), are under renovation.

Credit:City of Mississauga

Since the demolition began at the Central Library, including the South Atrium, most of the wood, concrete and scrap metal have been sent for recycling with an estimated 650,000 kg diverted from landfill.

"It was made more complicated by the fact that there was a mixture of office space and public space material—two different waste streams, meaning there would be two different groups that would be interested in them," she said.

Leveraging its membership in local not-for-profit Partners in Project Green's material exchange program, Gibson said the project was able to donate items like chairs, bookshelves, display cases, book carts, filing cabinets, lockers, desks and office chairs to Habitat for Humanity, Salvation Army and other not-for-profit organizations.

It's estimated that more than 120,000 kg of City-owned items were diverted from landfill, including:

- 40,635 kg of paper sent for recycling;
- 35,256 kg reused internally;
- 7,460 kg of scrap metal sent for recycling; and
- 3,084 kg of donated books.

What was done differently for the Central Library project was that every item was tracked. "It's easy to track recycling by weight, but generally with reuse, you track differently, looking at it from the number of items or monetary value," explained Gibson.

"We decided to weigh the reuse material, using scales on-site, which helped us better explain the success of the project. And it was great to be able to have that number."

Mississauga now has a fully-developed documented best practice model for future removal of City-owned items before renovation and construction projects begin.

The project also saved the City an estimated $75,000 in third-party expenses. Additionally, by internally reusing and donating assets, this project saved an estimated $4,000 in disposal fees to landfill, which Gibson said resulted in 40 kgs of CO_2 emissions avoided from landfill and additional emissions that would have otherwise been created to manufacture new material.

According to Dianne Zimmerman, the City of Mississauga's environment manager, the Central Library project is following the City's Corporate Green Building Standards, which include the need to reduce the amount of construction and demolition waste that is sent to landfills or incinerated by promoting good waste management practices.

"Within those standards we do have some important components, including a 75 per cent diversion rate for construction materials and we also look at requirements for low-impact materials, such as minimum requirements for cement replacement in concrete, 50 per cent post consumer recycled content in the rebar. There is also a component around embedded carbon."

Since the demolition began in April 2021, most of the wood, concrete and scrap metal have been sent for recycling with an estimated 650,000 kg diverted from landfill so far with more to be diverted as the renovations continue. Along with diverted materials, the construction project will also include environmentally sustainable initiatives in the newly renovated building such as bird-friendly glass and lighting control measures to reduce light pollution.

Zimmerman said Mississauga is committed to advancing waste diversion initiatives and exploring the circular economy further to ensure all products, materials and resources are reused or recycled during construction projects.

John Tenpenny is the editor of ReNew Canada.

Credit: Regional Municipality of Durham

RECYCLED ROADS

More than four tonnes of polyethylene terephthalate (PET) fibres—made from recycled plastic—will be incorporated in the new asphalt for Durham's Regional Road 18.

Durham Region pilots road reconstruction using recycled materials.

By John Tenpenny

The principles of "rethink, reduce and reuse," have been around a long time, but new takes on the old adage are still happening, especially in the infrastructure sector.

As part of its long-term waste management plan, Ontario's Durham Region is applying an innovative approach to its waste streams to manage them as resources in a circular economy that involves incorporating the use of recycled materials—plastics and glass—in road reconstruction.

Split into two phases, this project reconstructed the north half of this road segment (Phase 1) using conventional techniques, while the southern half (Phase 2) will pilot the use of recycled material.

Portions of Durham Regional Road 18 in Clarington, between Concession Road 5 and the bridge south of Kendal the roadway will be reconstructed as part of Phase 2 of a pilot project incorporating the use of recycled materials.

"We are proud to be exploring the use of recycled materials in our road reconstruction projects," said Susan Siopis, Durham Region's Commissioner of Works. "This pilot will help define the potential for sustainable practices and determine the durability of roads that incorporate recycled materials."

According to Ramesh Jagannathan, director of transportation & field services, with the Regional Municipality of Durham Works Department, this 3.6-kilometre stretch of Regional Road 18 requires reconstruction and strengthening but has remained a low priority for near term work as the road carries low daily traffic volumes.

The one-time Federal Gas Tax funding in 2019 earmarked by Regional Council for transformative capital projects provided a unique opportunity for upgrading this road as an innovation initiative using Regional Waste materials.

"Regional Road 18 is the perfect testing ground for this innovative option of road reconstruction," said Jagannathan. "Splitting

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Based on the outcome of the pilot, Durham Region will develop standards for use of recycled waste materials, including construction inspection and testing guidelines.

the road segment in two phases will help clearly assess and evaluate the difference in performance between using conventional methods and recycled materials. We look forward to advancing this pilot project and contributing to a circular economy."

Phase 1, which was completed in the fall of 2021, used conventional reconstruction methods and materials. The second phase will focus on the southerly section of the road and will include recycled waste materials for a beneficial new use. Recycled glass will be incorporated into the granular base and recycled plastics will be incorporated in the new asphalt.

An estimated six tonnes of mixed plastic and 400 tonnes of recycled glass from Durham Region's Material Recovery Facility (MRF) are to be used for the proposed second phase of this project. Additionally, 4.5 tonnes of polyethylene terephthalate (PET) fibres—made from recycled plastic would also be used in this second phase.

Upon completion of Phase 2, the longer-term monitoring will begin to objectively compare the time-series variation in the performance of the Phase 1 segment using conventional road rehabilitation techniques, with the Phase 2 segment incorporating recycled waste materials.

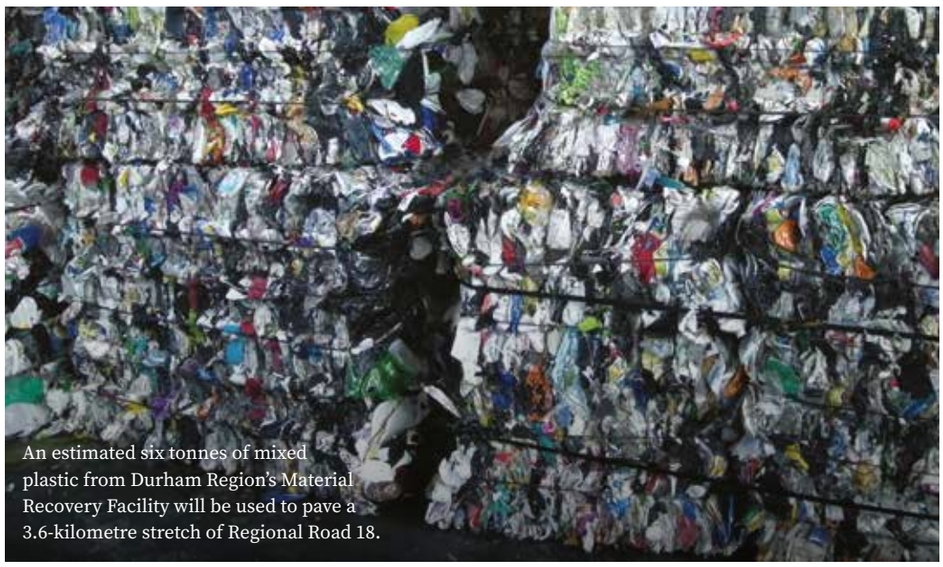
"Both segments will be subject to similar traffic volumes, weather conditions, and other factors that typically influence the durability of a pavement structure," said Jagannathan. "Based on the outcome of the pilot, the project would seek to develop standards for use of recycled waste materials, including construction inspection and testing guidelines, for potential application to other Regional roads and beyond."

"Plastics and glass were chosen for this project given the learnings from previous experiments in Ontario that showed promising results," explained Jagannathan. "These experiments emphasized that with diligent onsite and offsite quality controls their additions can result in increased structural strength and pavement stiffness without causing premature surface cracking in winter. The project evaluation will inform whether this will give us a more sustainable pavement compared to conventional practice."

The mixed plastics, sourced from the Region's Material Recovery Facility (MRF), and PET fibre plastics sourced from an external manufacturer, will be hauled to the asphalt plant to become part of the asphalt mix that will be used for reconstruction. Recycled glass will be sourced from the Region's MRF, washed, and crushed offsite, pulverized, and blended with the existing road base onsite, to become part of the new road base.

"Glass is recycled at a cost to the Region because of significant transportation costs and its limited markets. Reusing it locally and using it to offset virgin materials makes economic and environmental sense" said Jagannathan. "Also, while the Region currently gets revenue from the sale of plastics collected in its Blue Box program, their potential use in road construction to generate long-term life cycle benefits could far outweigh the short-term value of just selling the material."

Upon successful completion of this project, in the future, Jagannathan said, the Region will have the potential to incorporate an estimated 300 tonnes of mixed plastic, 240 tonnes of PET plastic and all recycled glass processed at Durham's MRF through the Region's annual road program.



An estimated six tonnes of mixed plastic from Durham Region's Material Recovery Facility will be used to pave a 3.6-kilometre stretch of Regional Road 18.

"This would ensure a local beneficial use for these materials and decrease the amount of virgin material that is mined and trucked for road construction, such as aggregate materials. Extrapolating this possibility to other potential road applications such as the construction and reconstruction of local municipal roads, parking lots, and cycling facilities, potential benefits are significant.

"The use of plastics also has the potential to significantly increase the strength, durability, and the overall lifecycle of the pavement structure in our road network, thus reducing its associated long-term repair, maintenance costs and waste."

John Tenpenny is the editor of ReNew Canada.

Credit: Philip Hall/Metrolinx

Top100 Canada's Biggest Infrastructure Projects

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

GO Expansion —On-Corridor Works

2022 Top100 Projects Rank: 2
Value: $15.705 billion

Metrolinx and Infrastructure Ontario have executed an agreement with ONxpress Transportation Partners to enter the Development Phase of the On-Corridor Works project—the largest project in Metrolinx's GO Rail Expansion program.

ONxpress is comprised of: **(Applicant Lead)** Aecon Concessions, a division of Aecon Construction Group Inc., ALSTOM Holdings SA, FCC Construccion S.A., Deutsche Bahn International Operations GmbH; **(Systems and Integration Team)** ALSTOM Transport Canada Inc.; **(Construction, Design and Engineering Team)** Aecon Infrastructure Management Inc., ALSTOM Transport Canada Inc., FCC Construccion S.A., WSP Canada Inc., Hatch Corporation; **(Fixed Infrastructure Maintenance Team)** Deutsche Bahn International Operations GmbH, Aecon O&M, a division of Aecon Construction Group Inc.; **(Operator Team)** Deutsche Bahn International Operations GmbH, Aecon O&M, a division of Aecon Construction Group Inc.

The GO Expansion On-Corridor Works package is a single, fully-integrated contract to run more and better service for the regional GO rail system. ONxpress is responsible for designing, building, operating and maintaining all GO Rail infrastructure and trains for 25 years. This includes all works that facilitate train service, such as track, civil infrastructure, signalling, electrification infrastructure and electric vehicles, as well as the operations and maintenance of the GO rail network.

As On-Corridor Works is a complex regional project with multiple external interfaces, stakeholders, utility and operational elements, it is being delivered as a Progressive DBOM (design-build-operate-maintain) model.

"Over the last two years, Infrastructure Ontario and Metrolinx have adapted our contracting approach for these important On-Corridor works," said Michael Lindsay, president and CEO of Infrastructure Ontario. "The result is the awarding of a contract that will allow us to work collaboratively with our partners to implement an expanded and modernized GO transit system that meets our future transportation needs."

Credit: Twitter (@ToddSmithPC)

East-West Tie Transmission Project

2022 Top100 Projects Rank: 68
Value: $777.1 million

The East-West Tie Transmission Line Project is now in service, providing reliable, long-term electricity to Ontario's Northwest. The 450-kilometre, 230-kilovolt transmission line runs from Wawa to Thunder Bay, Ontario.

Built by NextBridge, a partnership of NextEra Energy Canada, Enbridge and OMER Infrastructure, the East-West Tie line addresses long-standing constraints that restricted the flow of electricity between Northwestern Ontario and the south. The project featured strong participation from a number of local Indigenous communities.

A partnership with Bamkushwada, a group comprised of the most proximate Indigenous communities, saw the creation of Supercom Industries, a 100 per cent Indigenous-owned partnership responsible for project hiring and procurement. More than 200 Indigenous workers received training and Indigenous monitors were deployed to ensure Aboriginal and Treaty rights were respected during project construction.

"Despite numerous external challenges during construction, including a global pandemic and historic forest fire activity in the region, the NextBridge joint venture partners have fulfilled a commitment to the people of Ontario and the East-West Tie to deliver electricity that will power growth in the Northwest," said project director Jennifer Tidmarsh.

"Now that it's come into service, the East West Tie Line will support a new era of economic growth and opportunity for the region," said Fort William First Nation Chief Peter Collins. "I applaud the Government of Ontario and the project partners for their bold action in bringing this project to fruition with a focus on Indigenous inclusion and participation."

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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

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BrownieAwards.ca

Top100
Canada's Biggest Infrastructure Projects

KEY PLAYERS AND OWNERS DINNER

CELEBRATING THE BIGGEST INFRASTRUCTURE PROJECTS IN CANADA

On May 17, senior executives from throughout the Canadian public sector infrastructure landscape came together at The Carlu in downtown Toronto to celebrate more than $273 billion in infrastructure megaproject development.

The Canadian Council for Public-Private Partnerships President and CEO **Lisa Mitchell** provided keynote remarks at the annual event, telling the audience about the evolution of the P3 delivery model over the past 20 years.

This year's keynote panel discussion focused on the delivery of healthcare infrastructure through the climate lens, including the environmental and climate considerations that need to be applied to new asset development. The panel featured **David Stolte,** vice president, Strategy and Program Support Services, with Mackenzie Health and **Danny Giacomel,** vice president, with EllisDon Capital's Infrastructure Group.

Work is now underway to develop the 2023 edition of the Top100 Projects report. Project and stakeholder submissions are being accepted now. If you would like to supply us with information for consideration for the report, please email *ReNew Canada* Editor **John Tenpenny at john@actualmedia.ca.**

TOP100PROJECTS.CA

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EllisDon Capital's Danny Giacomel.


Mackenzie Health's David Stolte.


CCPPP president & CEO Lisa Mitchell delivered the keynote address.


ReNew Canada's editor John Tenpenny moderated the panel discussing healthcare infrastructure.

WSP in Canada president & CEO Marie-Claude Dumas.


The team from Comtech Group at the 2022 event.

Actual Media's content director Corinne Lynds served as MC for the 2022 event.


Toronto City Councillor Jennifer McKelvie in conversation with Deloitte's Alyna Kassam.


Maple Reinders' Dan Hayhoe shares a laugh with his colleague Dan McKinnon.


Infrastructure Ontario's Michael Fedchyshyn with Deloitte's Nicole Wang.

A full house of 300 guests at the 2022 Top100 Key Players and Owners Dinner.


Metrolinx executive VP, GO Expansion Stephanie Davies stands between WSP's Jennifer Verellen and WSP in Canada president & CEO Marie-Claude Dumas.

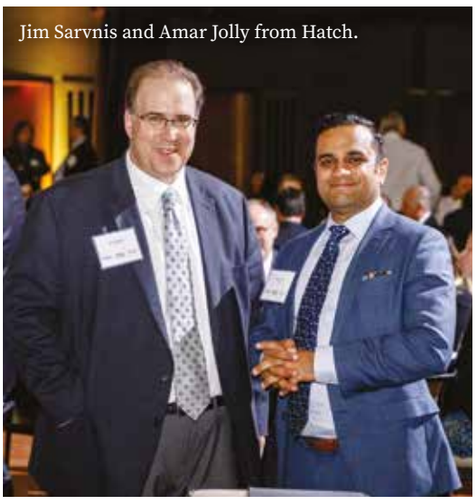

The team from CIMA+: Cian Murphy, Matt McBride, Troy Briggs, Vanessa Chau, Tom Montgomery, Brian Sudic, Vincent Ermatinger, and Peter Keohne.


Simon Finlayson, Ahsan Mirza, Julie Han and Brent Thomas of McMillan LLP.

EY's Jordan Potter-Davey alongside colleague Damian Joy in conversation.


The team from A.W. Hooker Associates Ltd.: Wegnar Barwari, Glenn Hultzer, Ann Lawson, Tanju Celen, Allie Bell, Stew Kyle, Greg Babiak and Alan Hand.

The team from EXP: Magdy Samaan, Christina Cruz, Lloyd Gonsalves, Aziz Sene, Rebecca Huang, Stan Gonsalves, and Mark Dvorak.



Jim Sarvnis and Amar Jolly from Hatch.

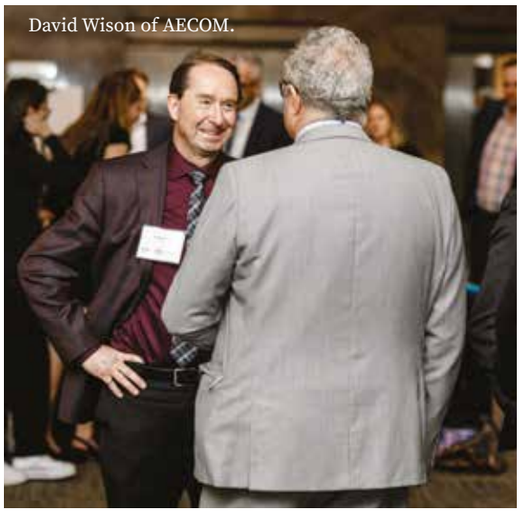
Morrison Herschfield's Loui Pappas.

David Morley of Pomerleau catches up with old friends.

Edward Poon of HKA Global.

Natalie Closs of Graham Construction with Grant Glady of Parsons.

Srdjan Brasic of Morrison Herschfield with Cristian Huma of Wood.



David Wison of AECOM.

APPOINTED


Carolyn Brown


Jessica Child

DPI Construction Management announced the promotions of **Carolyn Brown** as the company's new director of operations and **Jessica Child** as its director of corporate services.

"Carolyn and Jessica are doing incredible work for DPI, and making life easy for our clients and partners," said **Rick Perin,** DPI's co-founder. "Carolyn ensures we continue to communicate with clarity and purpose across every level of the company. Project successes with our client partners reflect her leadership. Likewise, Jessica is a force within commercial construction in the GTA. She approaches any scale mandate with zeal and a commitment to success that is second to none."

As DPI's director of operations, Brown will lead operations, projects, and people to support the growth of the business in all markets.

"It's an important opportunity for me to be a mentor and an inspiration for future generations looking to advance in the construction industry," said Brown.

As DPI's director of corporate services, Child will share her unique perspective on ground-breaking ways project success can be realized including the merits of harnessing diverse cultural and experiential differences amongst project stakeholders.

"I look forward to bringing this experience forward in my new leadership role, supporting our clients during their project journey," said Child.


Olivia MacAngus

Colliers announced that **Olivia MacAngus,** chief development officer, will succeed Colliers Project Leaders founder and president **Franklin Holtforster,** who has retired. "Olivia is a collaborative, strategic leader and I am thrilled to congratulate her on this well-deserved appointment," said **Brian Rosen,** president and CEO of Colliers Canada. "She exemplifies our values and brings a growth mindset and enterprising vision to Colliers. On behalf of our clients and team, I would like to thank Franklin for his intentional leadership and exemplary contribution to Colliers."

Prior to joining Colliers Project Leaders in 2019, MacAngus was managing director of Capital Projects and Infrastructure at PricewaterhouseCoopers, and VP at Plenary Group.

"I am proud to be appointed to this role and I would like to thank Franklin for his confidence in me," said MacAngus. "I am honoured to have the support of our leadership team and be entrusted with this legacy. In this new role, I will build on our strong foundation and culture, collaborate with our incredibly talented team, and continue to support our clients and communities with leading solutions as they evolve the built environment."


Sean Meadows

Arup announced that **Fiona Cousins** has been appointed chair of the Americas Region and **Nigel Nicholls** has been named COO of the Americas Region.

Four regional leaders will also drive Arup's local operations to ensure the highest quality client service, including **Sean Meadows** (Canada).

Meadows has over 20 years of experience in the consulting industry, supporting public sector clients to deliver diverse and challenging infrastructure projects that have expanded sustainable transit options and equitable transit access. Arup's Canada offices are in Toronto and Montréal.


Eric Van Acker


Paul Chamberland

CIMA+ announced the appointment of **Eric Van Acker** as senior vice president, Finance, and **Paul Chamberland** as vice president, Information Technologies.

"It is with great pleasure that we welcome these two new leaders at CIMA+. Their experience in their respective field will help CIMA+ achieve its growth objectives," said COO, Denis Thivierge.

A graduate of Concordia University, Van Acker has nearly 18 years of experience in the finance industry. He worked at Bombardier for almost 13 years, as well as at KPMG.

Chamberland has worked in the IT sector for nearly 25 years, including more than 15 years in management or senior management positions as well as in international operations. Over the past few years, he has gained valuable experience as a project manager and head of infrastructure and IT operations at the SAQ and SQDC.


Hannah Schell

The Canadian Council of Independent Laboratories (CCIL) announced that **Hannah Schell,** P. Eng., has been named this year's recipient of its prestigious Leadership Award.

Recently retired, after a long and distinguished career with the Ontario Ministry of Transportation (MTO), Schell is being honoured for her many contributions to the development of engineering standards for concrete in highway infrastructure construction and rehabilitation, including concrete testing standards, and for her leadership in encouraging the full partnership of industry stakeholders such as CCIL in this important work.

For most of her time at MTO, Schell was head of its Concrete Section in the Materials and Engineering Research Office (MERO), where she directed a group of expert engineers and technicians responsible for developing ministry-specific technical standards and specifications for public infrastructure in Ontario, troubleshooting concrete performance and testing issues, and incorporating new products and technologies in MTO construction and quality assurance operations.

"For more than 40 years, Ms. Schell has been a driving force in fostering consultation and collaboration between government and the private sector," said **Trevor Gluck,** P. Eng., president of CCIL.

"It was always a pleasure and an education to work with individuals from CCIL whose knowledge and expertise is so strong," commented Schell. "I can think of so many situations when I sought input from CCIL and in return received honest and constructive feedback, ensuring the best path forward could be chosen."

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

FNMPC TOWARD NET ZERO BY 2050 CONFERENCE VANCOUVER, BC

Jonathan Wilkinson, Minister of Natural Resources addresses attendees at the First Nations Major Projects Coalition's Toward Net Zero by 2050 Conference, in Vancouver.

Credit: First Nations Major Projects Coalition/Flickr/Vimeo

Over 1,000 delegates from Indigenous nations, industry and government gathered in Vancouver for a first-of-its-kind Indigenous net zero policy conference, hosted by the Canadian-based First Nations Major Projects Coalition (FNMPC) and the U.S.-based First Peoples Worldwide.

The purpose of the conference was to hold discussions between Indigenous clean energy leaders from the U.S. and Canada with industry, investors, and government officials in the context of a North American transition to net zero. Questions focused on how the public policy and investment decisions needed to achieve net zero by 2050 will impact Indigenous interests and rights and where Indigenous voices need to be included in those discussions.

"The transition to net zero represents a $6 trillion opportunity. This includes a 14-fold increase in critical mineral production—all this coming from Indigenous lands," said Chief Sharleen Gale, chair of FNMPC. "At the conference we had discussions about how we can align the policy and investment decisions on net zero with the principles of free, prior, and informed consent and how we are to meaningfully include Indigenous people as partners and equity owners in net zero projects."

According to Kate Finn, executive director, First Peoples Worldwide, most proposed solutions for achieving net zero by 2050—be it clean power stations, carbon capture and storage facilities, or new mines for transition minerals—rely on using Indigenous lands and resources. "This conference provided the opportunity for Indigenous and industry leadership to begin critical conversations about how to achieve net zero solutions in ways that are aligned with international human rights standards such as FPIC and fully account for the impacts of development in Indigenous communities."

For more information, visit www.fnmpcindustryevent.com.

MOVING FROM SHOVEL READY TO SHOVEL WORTHY

Shovel ready is the wrong way to make large investments and an even worse way to manage serious long-term challenges like mitigating impacts of climate change.

Credit: Government of Ontario

By Carlo Dade

If Canada's prospects for COVID recovery and economic growth crash in the forest of world business opinion, does it make a sound? Apparently not in Canada.

Canada depends on trade for more than two-thirds of its GDP and little over a decade ago Canadian users placed the country in the top 10 of global infrastructure rankings. In 2019, as trade has grown in importance, confidence levels in the country's transportation infrastructure systems are ranked 32nd in the world.

The U.S. has also experienced a drop—of two points—from 11th to 13th, something hard to miss given the public alarm raised by President Biden, signalling that any drop is unacceptable.

Yet in Canada, our decade long decline has not raised the same level of alarm. To be sure, there have been moves to address the transportation infrastructure file such as the Pan-Canadian Competitive Trade Corridor Initiative, a National Supply Chain Task force and a National Infrastructure Assessment.

But governments are easily overwhelmed and sidetracked. Until elected leaders, federal and provincial, follow the Americans and forcefully commit to solving it, the problem will only get worse. This gives the appearance, correct or not, of a lack of commitment especially when contrasted to the reaction south of the border. Bold action is needed, and it is needed now.

What's Canada lacks, and is critical to the improvement of its rankings, is a long-range, evergreen national plan.

Trade contributes three times more to Canada's GDP than it does to the U.S. This money pays for COVID recovery, social services, a green future and all the things Canadians and the government say are priorities.

But reality is that there is the infrastructure Canadians want like parks and hockey rinks, the infrastructure Canadians need like hospitals and green transit and then there is the infrastructure that pays for wants, needs and government priorities. For Canada, that is trade infrastructure.

Canada's drop in global rankings is an indicator of what has been long simmering. What is surprising is that the decline has been accompanied by capital spending by successive governments and massive private sector investment.

Yet these efforts by government and the private sector have not been enough for those rating Canada's infrastructure.

The reason is identified in a recent analysis by the European Auditors comparing how the EU, U.K., Australia, and Canada manage large transport infrastructure projects. The study found Canada to be the only jurisdiction lacking coherent, institutionalized long-term coordination and planning.

The shorthand for this lack-of-planning approach is shovel ready—a term Canadians are familiar with thanks to the many government spending announcements since 2008.

Using shovel ready as a default to guide spending—even for emergency stimulus—is starting with an admission of failure. It signals that the country is incapable of, or indifferent to funding based on long-range, intelligence-based plans. It signals to domestic users and international customers that the country has not optimized infrastructure improvements to facilitate delivering goods and services. Shovel ready relegates to a secondary consideration whether investments are of top priority, will produce maximum return on investment, are of long-term value and can increase supply chain competitiveness. All these criteria define a shovel worthy approach.

Shovel ready is the wrong way to make large investments and an even worse way to manage serious long-term challenges like mitigating impacts of climate change and harms to traditionally marginalized communities. These are challenges best handled as components of a shovel worthy approach.

The first step is to follow what our competitors have done—produce ongoing, coordinated long-term national plans. As our competitors have found, fixing trade infrastructure also requires bringing in the private sector as a partner, not a consultee. Not only are they often owners, operators and users of transportation infrastructure, the private sector has unique, often proprietary knowledge that is critical for shovel worthy decision making.

The federal government's National Infrastructure Assessment is a quiet yet potentially promising start to catching up with competitors and reversing the country's decade long decline by laying the basis for ongoing national trade infrastructure plans. This needs to succeed. For that to happen, improving the country's trade infrastructure and committing to permanent national plans need to be an articulated priority by government and opposition—federal and provincial.

Carlo Dade is the director, Trade and Investment Centre at the Calgary-based Canada West Foundation.

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