January/February 2020

ReNew CANADA

The Infrastructure Magazine

+ Breaking Down the Top100 Projects
+ Building Tomorrow
+ Steeltown Surge

$240 BILLION

Canada's Megaproject Explosion Reaches New Heights

renewcanada.net

understand • innovate • partner • deliver

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

exp • com

10

14

22

34

8

ReNew
CANADA
The Infrastructure Magazine

JANUARY/FEBRUARY 2020

SPECIAL INSERT

Top100 Projects 2020

Our fourteenth annual report on Canada's biggest infrastructure projects is inserted into the centre of this issue.

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

GETTING RID OF LEAD

By Andrew Macklin

The story was disturbing. In early November, a yearlong investigation by over 100 journalists across Canada found that lead levels in drinking water in several cities exceeded the Canadian guidelines for acceptable concentration of 0.005 milligrams per litre (mg/L). Health Canada reduced the Canadian standard from 0.01 mg/L in March 2019.

To put this in perspective, some of the samples of Canadian water in the cities studied resulted in lead levels higher than 0.015 mg/L, more than three times the new standard. That compares to peak levels in Flint, during the infamous water crisis, tested at 0.026-0.031 mg/L.

The dangers of lead have been well documented, so there's no need for a science lesson. As health organizations better understand how minimal levels of lead in the water can impact people, levels of acceptable concentration continue to fall.

But with the lower standard set in place by Health Canada in early 2019, the push to replace lead pipes has become more urgent, and that isn't good news for any asset owners Canada's older cities. Lead was an acceptable material in pipes according to the Plumbing Code of Canada up until 1975.

For homeowners with water coming from lead pipes, the cost of replacement is estimated at $5,000-$10,000, enough to strain any homeowners' budget according to Toronto Star journalist Robert Cribb, who was involved in the investigation and has had to replace his own pipes.

For municipal, commercial, and institutional asset owners, the reality of the cost of lead pipe replacement is significant. Many municipalities are already undergoing this work, on an incremental basis, as part of their annual infrastructure operations and maintenance budget.

However, the press around the issue has raised a very important question: is it time to accelerate the replacement of lead pipes in Canada? And if the time has come, what is the cost, how do we pay for it, and what is a realistic timeline for the pipe replacement? All are important questions, but none of which seem to have a realistic answer at this point.

It is an important issue to be explored. So we are going to explore it. In January, our parent company Actual Media is convening an expert roundtable to discuss the unanswered or unclear questions: why was the standard changed, is the issue being presented fairly to the general public, and what is the reality of getting all of Canada's lead pipe infrastructure replaced. The findings of our discussion will be published in feature-length articles in both ReNew Canada (May/June) and our sister publication Water Canada (March/April).

If you have an opinion to share on the subject, I would encourage you to reach out to me to have your voice heard on the subject of Canada's lead infrastructure. I can be reached via email at any time.

Andrew Macklin is the managing editor of ReNew Canada.

andrew@actualmedia.ca

ReNew CANADA
The Infrastructure Magazine

January/Februray 2020 Volume 18 Number 1

MANAGING EDITOR	Andrew Macklin
GROUP PUBLISHER	Todd Latham
PUBLISHER	Nick Krukowski
ART DIRECTOR AND SENIOR DESIGNER	Donna Endacott
ASSOCIATE EDITOR	Simran Chattha
CONTENT AND MARKETING MANAGER	Todd Westcott
CONTRIBUTORS	Phil Gillies, Andrew Snook
ADVERTISING	Nick Krukowski nick@actualmedia.ca
ADVISORS	Nick Reid, James Sbrolla

actualmedia

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

actualmedia.ca

147 Spadina Avenue, Unit 208, Toronto, ON M5V 2L7

Phone: 416-444-5842

Subscription/customer services: 416-444-5842, ext. 211

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

Undeliverable mail return to:
147 Spadina Avenue, Unit 208
Toronto, ON M5V 2L7

Canadian Publications Mail Product Sales Agreement 40854046

ISSN 1715-6734

Proud members of

ONEIA CNAM Canadian Urban Institute CPWA

renewcanada.net

ABOUT THE COVER

Transit has overtaken energy as the sector with the higher investment in megaproject development. Learn more in the analysis of the 2020 Top100 Projects report on page 10.

ALBERTA'S TRANSPORTATION PRIORITIES

The Government of Alberta has outlined the transportation investments it committed to in the Budget 2019 Capital Plan.

The investment includes $2.9 billion for new road and bridge projects across Alberta, including completing the Calgary Ring Road and expanding the southwest leg of the Edmonton Ring Road.

More than $1.5 billion is allocated to maintaining the condition of Alberta's existing highways and bridges to extend their lifespan and support safe and efficient travel.

Budget 2019 includes:

- $1.9 billion for the Calgary and Edmonton Ring Roads:
  - $1.8 billion for the Calgary Ring Road, including the southwest and west projects and upgrades to five kilometres of the northeast segment
  - $95.4 million for the southwest Anthony Henday Drive expansion
- $104.5 million for the three-phase Highway 19 twinning project between the QEII and Highway 60
- $65 million for the Highway 1A and 22 interchange in Cochrane
- $56 million for continued work on the Peace River Bridge twinning project
- $42 million for the Highway 813 bridge over the Athabasca River
- $209.8 million is identified for improvements to Deerfoot Trail in Calgary, with $110.1 million included in the four-year 2019 Capital Plan and $99.7 million in future years.

Alberta has a vast provincial highway network that includes more than 31,400 kilometres of highways and nearly 4,500 bridges, overpasses and culverts.

NEXT ISSUE: MARCH/APRIL
THE RURAL INFRASTRUCTURE ISSUE

Managing Assets
The challenge of managing municipal assets.

Remote Renewables
Henvey Wind Project powers rural Ontario.

Water Woes
Addressing clean water for Indigenous communities.

THE TRUTH, THE WHOLE TRUTH, AND NOTHING BUT

The Closing Shot article in the November/December 2019 issue of Renew Canada, Truth In Training, unfortunately did not tell the whole truth about construction training and apprenticeship in British Columbia.

The article contends that "learning a skill and mastering a craft happens on the job working side-by-side with colleagues who have the experience" is a superior way to learn a construction trade, leaving the impression that going through a full apprenticeship regimen is not necessary or desirable. The author decries the Province's return to a system of compulsory training standards, preferring the direction B.C. took starting in 2003—a system that reduced training time by dividing training modules into individual competencies. B.C. thought that by breaking long-established training courses up into shorter, easier subsets that they could bring many more young trainees into the workforce more quickly.

But the move to this model has proven to be a failure.

The move to the skill set model diluted the skills of the workforce, pushed B.C. out of alignment with the national Red Seal Program, and led to a decrease in workplace safety.

So, what is the problem with these shorter, watered-down 'skill sets' as opposed to full apprenticeship programs that meet the national standards? First and most obviously—the trainee is going to learn less – he or she will not be prepared with the full range of skills that could be utilized on the jobsite. Yes, you can rush more young people onto the jobsites in less time, but they will not be as knowledgeable or well prepared. They will also not be able to adapt as readily to changing market forces.

Then there is the incompatibility of the skill set system with the national Red Seal Program. Many B.C. workers trained under the skill sets regimen would not meet Red Seal standards. Their ability to work in other provinces is seriously impaired.

The B.C. government is now moving in the right direction. Divergence from national standards is not good for the construction industry. Rushing poorly prepared young workers to the job site is fraught with problems. B.C. is now in the process of reconsidering a fifteen-year process of deskilling which has been, for the most part, a failure.

Of course, there is a place for union and non-union apprenticeship. But regardless of the training provider, we all benefit from a system that ensures the highest standard of training and skill development.

Phil Gillies is the executive director of the Ontario Construction Consortium.

B.C. Looking for Long-term Solution for Taylor Bridge

The Government of B.C. is moving forward with plans to find long-term solution for Taylor Bridge in the province's northeast.

"People expect a safe and reliable highway network and those who live and work in Taylor, Fort St. John, or anywhere in the north Peace demand no less," said Claire Trevena, Minister of Transportation and Infrastructure. "We are actively working on a long-term plan for the Taylor Bridge. We are undertaking engineering work to make sure there's a crossing there that will serve the region for decades to come."

To prepare options for consideration, the ministry will undertake in-field geotechnical, hydrotechnical, and environmental investigations. This work will build on the planning studies that were completed in recent years.

In spring 2020, the ministry will begin consultations with First Nations and host public engagement sessions for input regarding potential options.

The Taylor Bridge was built in 1960 and is 721 metres long, spanning the Peace River on Highway 97 between Dawson Creek and Fort St. John, near the community of Taylor.

Current traffic volume on Highway 97 between Dawson Creek and Fort St. John is approximately 7,500 vehicles per day, 30 per cent of which is commercial vehicle traffic.

Scope Expands for Rimouski Regional Hospital Modernization

The Government of Quebec has announced that the Rimouski Regional Hospital Modernization Project is being enhanced to better meet the needs of the population.

In addition to the expansion and modernization of the operating theater and day surgery area, the medical device reprocessing unit, and the intensive care unit, the project now includes the upgrade of the emergency unit.

"This announcement is a testament to our government's significant efforts to bring our health and social services network into the 21st century by providing our institutions with modern infrastructure that is well-adapted to today's reality and growing needs of the population," said Danielle McCann, Minister of Health and Social Services. "I also want to ensure that such modernization initiatives are carried out optimally, which is why I thought it was crucial to include the emergency component in the project, with a view to acting in a global manner, and proactive to better face the challenges ahead."

All the projected works will better meet the current and future needs of the hospital, in particular by increasing the space needed to provide high-quality health care services while improving the functionality of the premises.

"I am delighted that our government […] is committed to better serving the Bas-Saint-Laurent region. Such a project will contribute to providing the population with the highest quality services possible, in a manner consistent with the changing needs in the region, particularly in terms of accessibility of care, but also safety and the quality of life of users," said Marie-Eve Proulx, Minister responsible for the Bas-Saint-Laurent region.

The government is providing $1.8 million to proceed with the development of the studies needed to complete its analysis of the project. The latter should be filed during the year 2020 to present the real estate solution to be considered, as well as the estimates of the overall cost.

Project management was entrusted to the Société québécoise des infrastructures.

Brownie Awards 2019

REPROGRAM REMEDIATE RENEW REINVEST REBUILD REACH OUT REPROGRAM REMEDIATE RENEW REINVEST REBUILD REACH OUT REPROGRAM REMEDIATE RENEW REINVEST REBUILD REACH OUT REPROGRAM REMEDIATE

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

All Photos: Josh Fee


BROWNFIELDER OF THE YEAR


BEST OVERALL PROJECT AWARD


BEST LARGE PROJECT AWARD


BEST SMALL AWARD


REPROGRAM AWARD


REMEDIATE AWARD


REINVEST AWARD


REBUILD AWARD


RENEW AWARD


REACH OUT AWARD

The 2019 Brownie Award winners were recognized at a gala event in Toronto on November 26. Originally begun by the Canadian Urban Institute (CUI) in 2000, the awards are now presented by the Canadian Brownfields Network (CBN) in partnership with ReNew Canada's parent company, Actual Media. Here are our 2019 award winners:

REPROGRAM: Legislation, Policy & Program Initiatives

WINNER: Waterloo Brownfields Financial Incentive Program, Waterloo, ON

REMEDIATE: Sustainable Remediation and Technological Innovation

WINNERS (TIE):

- Anaerobic Bioremediation, La Ronge, SK
- Sanexen Petromont, Varennes, QC

REINVEST: Financing, Risk Management and Partnerships

WINNER: Park City Commons, Winnipeg, MB

REBUILD: Redevelopment at the Local, Site Scale

WINNER: Avenir Centre Sustainable Remediation, Moncton, NB

RENEW: Development at the Community Scale

WINNER: Armour Road, Peterborough, ON

REACH OUT: Communication, Marketing and Public Engagement

WINNER: Waterfront Plan – Town of Ladysmith, Ladysmith, BC

BROWNFIELDER OF THE YEAR

WINNER: Andrew Decontie & Wanda Thusky – Decontie Construction

BEST OVERALL PROJECT

WINNER: Waterfront Toronto – Cherry Street Stormwater Lakefilling and Soil Reuse Program Approval

BEST LARGE PROJECT

WINNER: Emily Carr University of Art and Design, Vancouver, BC

BEST SMALL PROJECT

WINNER: Temporary Modular Housing, Vancouver, BC

THANK YOU TO OUR 2019 SPONSORS

PRESENTED BY

cbn Canadian Brownfields Network

actualmedia

DINNER SPONSOR

Englobe

COCKTAIL SPONSOR

ERIS

AWARD CATEGORY SPONSORS

Bureau Veritas

TheCanningtonGroup

FCM Federation of Canadian Municipalities / Fédération canadienne des municipalités

JACOBS

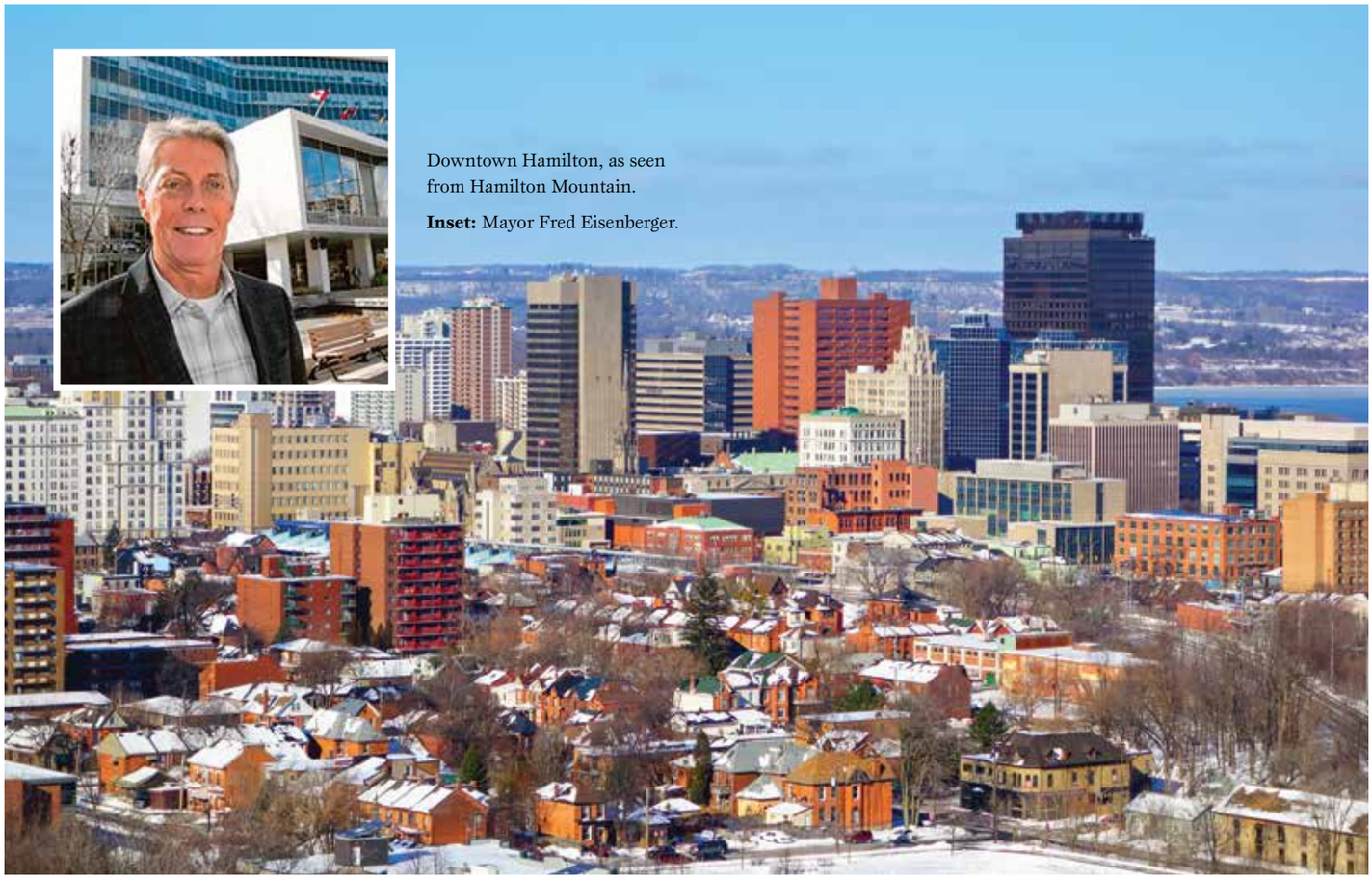
Kilmer Brownfield Equity Fund L.P.

Milestone Environmental Contracting Inc.

OAA Ontario Association of Architects

Willms & Shier Environment Indigenous Energy Law

For further information on the 2019 Brownie Award dinner, winners and finalists, visit **brownieawards.ca**



Inset credit: City of Hamilton

Downtown Hamilton, as seen from Hamilton Mountain.

Inset: Mayor Fred Eisenberger.

STEELTOWN SURGE

Talking infrastructure with Hamilton Mayor Fred Eisenberger.

By Andrew Macklin

The City of Hamilton, also known as Steeltown, is a resilient community. It has never been afraid to embrace change, adapting the community to weather the storms of economic downfall in the industries that call it home.

The past several years has seen the city make several key decisions to help create positive change and build economic prosperity: construction of the Red Hill Expressway, the overhaul of the former Ivor Wynne Stadium, and soon, the introduction of the Hamilton light rail transit (LRT) system.

ReNew Canada sat down with Hamilton Mayor Fred Eisenberger to discuss the significant changes made to the city, and how the roadmap for the community continue to evolve to meet the demands of tomorrow.

Mr. Mayor, the City of Hamilton has used a series of successful municipal programs to bring about positive change in the commercial and public sectors. What has made the difference over the past few years?

Those initiatives and policies have probably been in place for the past 15 or 20 years. And now, in the last five years, they've really taken hold: the downtown incentives (waving of development charges) and the brownfield program that has been in existence for 20 years or more.

We've really seen a lot of uptake in the last five years to the tune of $1 billion plus in terms of new development each and every year. This year (2018), we were already at the $1 billion mark at the end of eight months. A lot of it because of the downtown incentives and a more aggressive economic development department.

Right now we're in that sweet spot where people are actually seeking us out and trying to figure out how they can participate in this new Hamilton economy.

2018 represented the third election in 18 years where the number one issue of the mayoral campaign was based on infrastructure (Red Hill in 2000, new Ivor Wynne in 2010). Now that a year has passed, why was it so important for you to fight for the LRT in 2018?

We tried to minimize the infrastructure aspect of it and focus on the broader picture. But the opponent wanted to make it a single-issue campaign.

LRT has been a lightning rod for as long as we've been at it. My answer to all of that is: it will continue to be until the shovels are in the ground. We don't have the contracts finalized yet (as of November 2019). But the election was hopefully, as I say hopefully because I am not convinced that there isn't another iteration of opposition, that we're past this now. The good majority that I got indicated that we're on board.

Hamilton is also in the unique case where we're one of the only communities that have gotten 100 per cent of the funding for this. So we're luxurious in that sense. I don't think people in Hamilton necessarily appreciate how different that is. The pitch we made to the previous government was: Hamilton has had its challenges. We've had to overcome a downturned economy, and we're now looking to use this as a platform to elevate business opportunities and new development. I see it as a 25 per cent transit piece, and 75 per cent about development.

Hamilton Harbour, once the home of an industrial juggernaut, is being transformed into a hub for both industry and recreation.

We can't talk transit without talking about GO train service. It's been a long time coming for the city. But why is it so important, with the stage that Hamilton is at, to have that direct link to Toronto?

It's obvious from a transportation perspective because getting from Hamilton to Toronto is congestion city and you can spend hours making that trip, as I have and others have. For me, when I was at the Urban Land Institute, it was two hours in and two hours out. It didn't matter I did, transit or otherwise.

That transit has to improve, and I think the Premier understands that, the previous government was very focused on that. This current Liberal government is certainly focused on public transportation as an answer to congestion.

I've made some noise recently about the 2030 plan that came out, and it really said that all-day GO really isn't going to happen until 2030, which I thought was bizarre and ridiculous. We've been told for years now that it's just around the corner.

I'm more convinced now, now that I have met with Phil Verster (Metrolinx CEO) and Metrolinx that they're marching forward on the line capacity issues that are so critically important to make this happen, and that they're focused on getting to Hamilton all-day and then Niagara. And I forsee that we'll get some of these issues sorted out in the next couple of years.

I want to take a moment to focus on the Harbour. The development being done there isn't just about restoring it to its former industrial glory. You've also focused on making it a destination for people. Why is that?

It was, in part, a push by the community at large to say: why can't we get access to our waterfront?

Twenty-five years ago the harbor was in a sorry state. It was polluted; you could have set it on fire in some places. And I think the mission then was to turn it around. […] The remediation efforts over the last 25 years, culminating with Randle Reef, which is really the last big piece, have improved the water quality significantly, creating more than just an industrial space there.

The ability to have the port and the port activities with the industry that's there co-habitate with recreational and residential uses is very doable, and I think we are demonstrating that with the waterfront shores development at Pier 8. I think that is going to be a signature development for the City of Hamilton.

What's next for Hamilton? As we look beyond the current infrastructure developments, including the LRT, what becomes the next area to focus on?

The next opportunity for us is two-fold. Stelco, in terms of employment and repurposing the former industrial lands. I think that Bedrock (the property owner) is marching in the same direction, where they're looking to repurpose those lands into employment opportunities, higher density employment opportunities. Not just a whole sea of warehouses but businesses and companies that are making things that can actually happen on those sites.

And then we have our airport employment growth district. A huge asset that is already starting to develop. We've got applications in for many of the lands that are utilized. The airport is a redevelopment opportunity. Cargo capacity there is huge; it's one of the largest cargo airports in the country. And our passenger loading numbers have gone up significantly.

But the greater benefit is the lands that we have identified around that that are future employment lands that don't necessarily have to be airport related but are opportunities to look at connectivity industries that need to have that mobility built into their business model.

It's exciting times for one of Ontario's economic engines.

Thanks again to Mayor Eisenberger for taking the time to sit down with us.

Andrew Macklin is the managing editor of ReNew Canada.

Alberta's Vulcan County, seen here at Frank Lake, will soon be home to the largest solar energy project in Canada history.

Top100
Canada's Biggest Infrastructure Projects

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

Among the key contracts awarded during the past 12 months was the $4.6-billion DBFOM deal signed by Mobilinx for the Hurontario LRT.

Credit: Metrolinx

Among the 20 new projects added to the 2020 Top100 Projects report is the redevelopment of Vancouver's St. Paul's Hospital, the largest health care project in B.C.'s history.

Credit: Providence Health Care

CANADA'S TOP100 PROJECTS

A look inside the 2020 Top100 Projects report.

By Andrew Macklin

It has been a busy year in the development of megaprojects across Canada. The Government of Ontario released its long-awaited project pipeline, the Canada Infrastructure Bank began rolling out investments, and the Government of Saskatchewan completed its most expensive infrastructure project in the province's history.

The infrastructure megaproject landscape continues to grow, as is evident in the significant financial gains again this year. Last year, we broke through the $200 billion barrier, with the value of the list rising $13.6 billion to sit at around $212.6 billion. This year, the report experienced one of its largest gains event, jumping $28.2 billion to top out at just over $240.8 billion.

This year's report continues to use the same criteria that it has in previous years:

1. The project must qualify as public sector infrastructure.
2. The project must have a defined scope of work.
3. The scope of work must have a defined cost.
4. Financial commitments must be in place.
5. The project, in its defined scope, must be progressing in its development.

Projects that have reached substantial completion as of December 31st of the previous calendar year are not included.

As always, we use whatever resources possible to collect the information about the projects and those involved, reaching out to project owners and managers to confirm materials, researching available public information online, and contacting companies involved in bringing the projects to fruition.

With all of that in mind, here is a look at the provinces and territories whose projects make up this year's list, with special attention paid to the new additions to the 2020 report.

British Columbia

Canada's westernmost province continues to deliver a steady stream of key infrastructure assets. Among B.C.'s 16 projects in the 2020 report are at least two projects in at least five different sectors, the only province other than Ontario to have multiple projects in that many categories.

The province's energy, transit, energy, transportation, and water-wastewater projects remain unchanged from the previous year. It is in the buildings sector where we find the province's newest investments, with two new hospital projects added to this year's list. The new $1.9-billion St. Paul's Hospital is moving forward in Vancouver's False Creek, and represents the largest hospital redevelopment in B.C. history. And looking north, plans are now confirmed for the new Mills Memorial Hospital in Terrace at a price tag of $447.5 million.

There are more infrastructure megaprojects in the pipeline, including the Massey Tunnel replacement and a new hospital for Burnaby, and as a result, B.C. continues to consistently place new assets on the Top100 Projects report.

Alberta

The province that ended the year on the wrong note on the infrastructure file following budget cuts at the provincial level, Alberta continues to have a solid stream of projects in the short term, with 14 included in the 2020 Top100 Projects report.

The province boasts new additions to the list in three different sectors: energy, transportation, and transit. On the transit and transportation front, the projects represent the next phase of continuing work. In Edmonton, procurement is progressing on the Valley Line West LRT, coming in at just over $2.6 billion. Three hours down Highway 2, in Calgary, work on the final phase of the Calgary Ring Road, the western portion, is progressing, with two of three associated contracts awarded at press time. The work spec'd so far comes in at $552 million, which will rise once the third contract is awarded.

Being built in Alberta's Vulcan County, the Travers Solar Project represents the first solar energy project to ever qualify for the Top100 Projects report, coming in at $500 million. The Greengate Power-led initiative will provide enough power for more than 111,000 homes and displace an estimated 472,000 tonnes of greenhouse gas emission annually.

Saskatchewan

After completing the largest project in the province's history, the $1.88-billion Regina Bypass, Saskatchewan delivers just a single project to this year's Top100 Projects report, one that was the subject of much internal discussion.

The $500-million Regina Revitalization Initiative is on the list for the second consecutive year, as work continues to rehabilitate and reinvigorate 17.5 acres of former Canada Pacific Railway lands in the heart of the city.

The Chinook natural gas-fired power station came off the list, as the project reached substantial completion by the end of 2019. The next such station in the province, the 350-Megawatt Moose Jaw Power Station, is in early procurement and could be part of our 2021 report.

Manitoba

The biggest infrastructure news from Manitoba comes in at #94 on the 2020 Top100 Projects report, as the Manitoba-Minnesota Transmission Project received regulatory approval to move forward. The $453-million energy project will provide new transmission capacity from just outside of Winnipeg south to the Minnesota border.

The City of Winnipeg continues to progress with its plans for the North End Sewage Treatment Plant Biological Nutrient Removal Upgrade, however it has now been broken up into three separate procurements with a total overall value of $1.789 billion.

Ontario

The release of a robust new P3 project pipeline supports the continued build of infrastructure megaprojects across Canada's largest province. The province represents approximately 50 per cent of the overall report value, supported by massive expansion in the transit sector.

Of the province's 43 projects on this year's report, 18 of those are in the transit sector, and that's actually down from 21 the previous year. However, that is as a result of a change in project representation at Metrolinx. For the Top100 Projects report, we rely on the project breakdown provided by the Chief Capital Officer in quarterly reports filed during board meetings. Under Peter Zuk, GO Expansion had been represented by corridors and secondary projects, with nine projects in total. However, under Matt Clark, the expansion is divided into on-corridor, off-corridor, and early works, resulting in a significant change to the report (check out #1 for example).

Beyond transit, new projects in the transportation sector (Highway 401 Expansion) and buildings sector (Macdonald Block Reconstruction Project) continue the pipeline for key new assets not just related to transit. The province is also responsible for the first communications project to ever grace the Top100 Projects report with the announcement of a $765 million contract for the Ontario Public Safety Radio Network. With the pending introduction of widespread 5G wireless technology, and the push to spread broadband to all corners of the country, communications projects are likely to have a greater foothold in future years of the report.

Quebec

Like its counterparts to the far west, Quebec continues to deliver a steady stream of infrastructure megaprojects in all industry sectors. The province consistently has multiple energy, transit, transportation, and building projects scattered throughout the Top100 Projects report, and 2020 is no exception.

Hydro-Québec continues to improve its energy infrastructure across the province, with the $612.8 million refurbishment of the Rapide-Blanc Generating Station the latest addition to the Top100 Projects report. This is the latest of several refurbishment projects undertaken by the provincial energy authority, and is one of three such projects in Quebec that is part of this year's report.

This year's report also includes the addition of a key transportation corridor project, as work is underway on Phase III of the Route 185 project. This important trade route to the New Brunswick border is being progressively upgraded to become Autoroute 85 (an uninterrupted highway), connecting to Autoroute 20 at Notre-Dame-du-Portage.

We appreciate any and all infrastructure project news and information that will help us deliver our annual report.

Should you have additional information that would help us continue to build a robust report, reach out to Andrew Macklin at andrew@actualmedia.ca

Atlantic Canada

The Atlantic Canada region places just three projects on this year's Top100 Projects list, with all three held over from 2019. The region had four projects last year, however with the addition of new projects at higher values, the 100-series highway improvement project missed our cutoff.

In Newfoundland, work continues on the $12.7-billion Muskrat Falls energy project, which still expects to reach substantial completion in 2020. The project did not rise in overall value in the past 12 months, ending the trend of cost overruns that led to almost annual increases in project value.

The other Newfoundland-based project, the Corner Brook Acute Care Hospital, did see a rise in project value to $750 million, but that is due to the operations and maintenance elements of the contract being added to the overall project value.

In Nova Scotia, work continues to progress with procurement and contract awards for various aspects of the QEII New Generation project. This includes the awarding of the lab relocation project, moving ahead with construction of the expanded dialysis unit in Dartmouth, issuance of the RFP for the Bayers Lake Community Outpatient Centre, and the naming of the two qualifying teams for the Halifax Infirmary project.

Northern Canada

The addition of two new transportation projects raises northern involvement in the Top100 Projects report to three. The $468 million Yukon Resource Gateway Project, funded in part by corporate interests in the territory, will provide important all-season transportation links for communities and resource developments throughout the Yukon. The $411.8-million Tłı̨chǫ All Season Road will provide the community of Whati with a permanent link to the provincial highway network, as well as provide Fortune Minerals Limited with a permanent road to export metal concentrates to its proposed refinery in Saskatchewan.

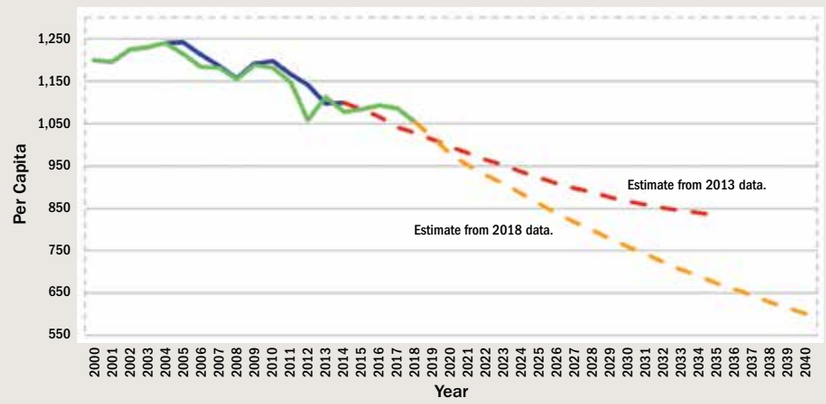
The need for permanent roads and a clean, resilient energy grid are likely to play a significant factor in future editions of the Top100 Projects report as a result of climate change impacts.

In total, the 2020 Top100 Projects report includes 20 new builds that had not previously been included, one of the highest turnover rates we have seen in the history of the list. This is due to a combination of projects reaching substantial completion, and a handful being knocked off the bottom due to a higher dollar value of new additions to our list.

As infrastructure continues to remain a top priority in jurisdictions across the country, we expect that the report value will continue to rise with new and exciting projects that improve the quality of life for all Canadians.

Andrew Macklin is the managing editor of ReNew Canada and has been the author of the annual Top100 Project report since the 2017 edition.

Figure 1: Estimated Demand for Motor Fuel Gasoline in Litres Per Capita in Ontario (2000 to 2040)



CAN ROAD PRICING REPLACE PLUMMETING FUEL TAX REVENUES?

As gas and diesel tax revenues plummet, it's time for the Ontario government to take a hard look at new revenue sources including road pricing, recommends RCCAO's latest report.

In "Ontario's Downward Trend for Fuel Tax Revenue: Will Road Pricing Fill the Gap?" Trent University Professor Emeritus Harry Kitchen finds that the demand for fuel is dropping faster than when he studied the issue five years ago. Technological improvements have resulted in greater fuel efficiency, and the emergence of hybrid and non-fuel vehicles have also impacted revenues. Furthermore, trends such as millennials and retiring baby boomers driving less will result in a dramatic per-capita drop in motor fuel demand from 1,054 litres (2018) to 599 litres (2040).

"To make up for this shortfall, it's time for Ontario to recognize that both dynamic road pricing and innovative parking charges are critical to alleviating congestion in our urbanized regions," Kitchen says. "These funds could help pay for road and transit infrastructure, which we need for commuting and for more efficient goods movement."

Data from Canada's National Energy Board show that the estimated provincial gas tax revenue per capita peaked in 2005 at $177; by 2040, that revenue tool will drop to $88. Similarly, diesel fuel tax revenues peaked in 2011 at $67 per capita and are projected to drop to $35 by 2040.

Andy Manahan, executive director of RCCAO, said: "The decline of fuel tax revenues will present challenges in light of Ontario's massive infrastructure requirements, but we have an opportunity to bring in more resilient revenue streams. High Occupancy Toll or HOT lanes are a more effective way for users to pay for travelling on our highways. Drivers can either pay a toll by time of day or distance travelled, or opt not to pay the charge by staying in the general-purpose lanes."

Visit rccao.com to view the report and its analysis and conclusions.

RESIDENTIAL AND CIVIL CONSTRUCTION ALLIANCE OF ONTARIO
RCCAO
Constructing Ontario's Future

p: 905-760-7777 e: media@rccao.com

@_RCCAO rccao.com

All photos: Region of Peel

One of the open cut trenches where the new watermain infrastructure was placed in Mississauga.

One of the biggest challenges facing the project was to build new watermains with as little disruptions to major transportation routes like Dixie Road seen here.

IMPROVING THE FLOW

Improving water capacity in one of Canada's largest cities.

By Andrew Snook

The city of Mississauga, Ontario has been a ballooning Toronto suburb for decades. From a population of 172,352 in 1971, it has grown to nearly 750,000 people, making it Canada's sixth-most populated city. With all of that growth comes the need for a wide array of infrastructure. From new schools and hospitals to wider roads and more highways, and, the topic of this article, improved water capacity.

The Region of Peel recently completed the Hanlan Watermain Project, a $450-million project funded by the Region of Peel ($330 million) and York Region ($120 million). The project installed 14.5 kilometres of 2400-mm diameter Hanlan Feedermain and six kilometres of 1500-mm Mississauga City Centre subtransmission watermain, as well as smaller diameter watermains.

"It was needed for future development in the Region of Peel," says Bill Turner, project manager for the Region of Peel, adding that the project was also needed to build in redundancies to the system. "It's basically twinning the existing feedermain."

The project also helps the Region of Peel fulfill its obligations to York Region to supply water under the York-Peel Water Supply Agreement formed in February of 2002.

The project was broken up into three contracts with construction for Contract 1 (Lakeshore and Dixie Roads to Golden Orchard Drive) being performed by McNally Construction Inc.; Contract 2 (Dixie Road from Golden Orchard Drive to Eastgate Parkway) performed by T2DMP; and Contract 3 (Eastgate Parkway and Tomken and Cawthra Roads) constructed by Southland Technicore Mole JV. The engineering companies on the project were Jacobs, WSP, The Municipal Infrastructure Group, and GM Blueplan. Environmental services were performed by AECOM.

A challenging path

The biggest challenge of planning out the project was building a route that would work for all affected parties and limit disruption during the various stages of construction.

> The vast amounts of planning that took place made the overall project move along without any major bumps, on time and on budget.

"Finding a route that was short enough and used municipal roads that wouldn't really affect too much by causing disruption to the public, that was a biggest planning issue," Turner says. "Just trying to find

PRECAST CONCRETE BUILDS ON...

ACCELERATED BRIDGE CONSTRUCTION (ABC)

- **Unlimited** aesthetics
- **Faster** speed of construction
- **Reduced** traffic disruptions
- **Lowest** Total Cost of Ownership (TCO)
- **Plant** manufactured improved quality
- **Less** formwork and associated safety issues

MACLEOD TRAIL AND 162 AVENUE INTERCHANGE IN CALGARY, ALBERTA
OWNER: City of Calgary | ARCHITECT: Perkins+Will | ENGINEER: SL Engineering and Land Services Ltd.

OUT-OF-A-BOX MODULAR BRIDGE CONSTRUCTION

Precast Concrete Accelerated Bridge Construction (ABC) uses innovative planning, design, resources and techniques to accelerate bridge construction without compromising safety.

For your free copy of **Guidelines For Precast Concrete Accelerated Bridge Construction Using Precast/ Prestressed Concrete Elements**, visit www.cpci.ca/publications

CPCI.ca

E: info@cpci.ca
TF: 877.937.2724

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

(CPCQA) CANADIAN PRECAST CONCRETE QUALITY ASSURANCE CERTIFICATION PROGRAM

a route that would work for all the piece stakeholders—the area councillors, the residents themselves, the people on the utilities, the conservation authorities… it was huge challenge."

In the end, the project planners were able to create a suitable route that ran along Lakeshore Road, Dixie Road, Eastgate Parkway and Tomken Road in Mississauga.

"That route was chosen because Dixie Road was actually one of the larger roads, so we could mix the construction between tunnelling and open cut. We just didn't want to do all tunnelling and all open cut, because some areas are very difficult to open cut because we'd be taking up most the travel right of ways," Turner explains. "There were multiple interesting crosses we had to cross: two highways, railroads, a couple of major intersections with heavy volumes of traffic on it, so we had to take them into account."

The biggest challenge outside of the planning of the route was trying to satisfy the public and the area councillors for picking the best route that was suitable for the project.

Turner says he's learned a lot from his experience on the project that he can see himself coming back to when tackling future large infrastructure projects.

"What we recognized during the planning and design was this was this was going to be the largest single individual project the Region has ever carried out. We had to recognize this was going to be quite the impact on the public, and not just the residents, but the businesses, the local utilities, and even the conservation authorities," Turner says. "So right from the beginning we set up working groups. We met regularly with all the key stakeholders to keep everyone informed."

To keep daily updates coming to all of the stakeholders, the Region of Peel adopted a communications strategy specifically for the project.

"It's something we've carried on to other projects in the Region, a similar sort of communications strategy," Turner says.

Considering the size and scope of the project, Turner says the amount of frustrated residents and business owners filing complaints wasn't anywhere near as vast as it could have been.

"There were obviously the odd times when you're starting to disrupt the traffic the first time… but with the communication plan everyone was well aware of it, and so we really didn't see what I expected to be a lot more complaints," he says. "I think because everyone was so well informed, they knew to either avoid the area or they knew what was going on. It wasn't a sort of out-of-the-sky someone dropped a big construction project on my street. Everyone was well aware for some time. I think that made it easier on the public."

The communications strategy wasn't the only part of the project that worked out nicely. The vast amounts of planning that took place made the overall project move along without any major bumps, on time and on budget.

"All the planning we put into it ahead of it seemed to pay off. Everything went relatively smoothly for this size of project," Turner says.

Andrew Snook is a business-to-business writer based in Mississauga, Ont.


Question today
Imagine tomorrow
Create for the future
WSP
Smart
Solutions
Our WSP Smart® Solutions program utilizes smart technologies to enhance infrastructure. As strategic partners, we work with our clients to deliver services for Canadian owners and decision-makers to improve operations, use data previously unavailable, create efficiencies, improve sustainability and encourage economic development.
WSP—big, bold, ambitious thinking that inspires and influences.
wsp
wsp.com
Buildings / Energy, Resources & Industry / Environment / Geomatics / Infrastructure / Transportation

Credit: ReNew Canada

Send us your best infrastructure image, and you may see it featured here. Email managing editor Andrew Macklin at **andrew@actualmedia.ca** for details.

Between Two States

The Memorial Bridge provides the only pedestrian over-water connection between New Hampshire and Maine. — **Staff**

All photos: VINCI Group

REGINA BYPASSED

Work completed on Saskatchewan's largest-ever infrastructure project.

By Andrew Snook

The $1.88-billion Regina Bypass Project officially opened the final phase of the two-phase project to traffic this past October, allowing commuters to breathe a sigh of relief as they drive across the city with significantly less congestion.

The project was a massive undertaking that had been in the works for about 15 years. The original planning of the project took place in 2004 and continued until 2012, with the project officially being announced in 2013 and the contract being signed in July 2015. Over the course of its planning and construction, the Regina Bypass Project created approximately 9,200 jobs.

The province's first public-private partnership project (P3) for transportation infrastructure was awarded by Saskatchewan's Ministry of Highways and Infrastructure to the consortium, Regina Bypass Partners, which is comprised of VINCI Concessions (37.5 per cent), Parsons Enterprises (25 per cent), Graham Construction (12.5 per cent) and investment fund Connor Clark & Lunn (25 per cent).

"The scope of the project is a $1.88-billion project and $1.2 billion of that was the design and construction component of the structure. The remaining $688 million is for the operation, maintenance and rehabilitation for the next 30 years," explains Brent Miller, major projects specialist for the Regina Bypass Project at the Ministry of Highways and Infrastructure. "That operation and maintenance contract started on November 1, 2019. That will carry on until November 1 of 2049."

The 30-year operation and maintenance contract, which will be fulfilled by VINCI Concessions and Eurovia subsidiary Carmacks, includes much of what one would expect, such as crack filling, regular mowing and snowplowing, and the repairing of the infrastructure and repaving of sections whenever necessary. Miller says that when VINCI Concessions and Carmacks hand the infrastructure back to the province at end of 2049, they will hand it back in near new condition.

The need for the bypass

There were three major reasons the Regina Bypass was needed, according to Miller: safety, congestion, and connectivity.

Safety

The safety component was to deal with issues stemming from one of the corridors along the bypass. On the east side of Regina, from Balgonie to Regina on Highway 1, there are several communities—Balgonie, White City and Emerald Park—that have at-grade or level crossing intersections. Miller says there were significant numbers of serious collisions that occurred throughout this corridor.

"One of the key reasons for this project was to eliminate those level or at-grade intersections and replace them with grade-separated interchanges – with bridges and overpasses—so that communities can turn on and off of Highway 1 without having to worry about a rear-end collision or being t-boned. That was reason number one," Miller says.

The project was divided into two phases over the four years of construction. Phase 1 addressed the Highway 1 dangerous corridor, and that was completed on October 31, 2017.

Congestion

The second reason the Regina Bypass was built was to alleviate congestion along Highway 1. When commuters drive along

One of the key interchanges of the project, at Tower Road, east of Regina.

The Regina Bypass features Canada's second diverging diamond interchange.

Highway 1 it goes right into the city, and they're required to drive through eight sets of traffic signals followed by a left-hand turn to continue along the highway.

"It was a lot of congestion, and during rush hour traffic, it took a lot of time for people to get through this stretch of the city. There were a lot of big commercial vehicles on it that created a lot of traffic congestion," Miller explains. "What the bypass does is it re-routes Highway 1 to go south of the city, and then the commercial vehicles can skip all these traffic signals and it saves them a great deal of time."

Connectivity

The bypass has also given commuters in the area improved connectivity to the national highway system.

"Highway 1 is on our national highway system, and also Highway 11 Highway 33 and Highway 6; and what this bypass does is provide better linkage to our national highway system and promotes economic health and development," Miller says.

Challenges

Projects of this magnitude always come with roadblocks and other challenges to overcome. During Phase 1 of its construction, one of the biggest hurdles was getting it open to traffic on schedule.

"It was a tight timeline, we only had two years for the contractor to design and build it," Miller says. "Traffic was currently using Highway 1, so all of this infrastructure had to be built around the existing traffic. There was a lot of traffic accommodation that had to be provided on the Phase 1 work that made it challenging to get drivers from point A to point B."

Many detours had to be planned out, and of course with detours come frustrated drivers with increased commuting times that also need to be managed.

The second major challenge was coordinating all of the utility moves that had to be made.

"There were approximately 400 utility moves that had to be made on the Regina Bypass. Some of them were small and some of them were quite substantive. Getting all of the different utility companies organized and doing their work, and still hold the schedule of the project was a major challenge," Miller recalls.

To help the utility companies keep up with the necessary scheduling, the builders performed some of the earthworks components of the moves.

Prior to the construction of the Regina Bypass, route selection was another major challenge that needed to be overcome.

"Determining the exact positions of where the interchanges were going to be, there were a lot of studies and analysis that had to be done to determine the route going south of the city, and where the connection points of where the new Highway 1 would join up with the old Highway 1," Miller says.

The procurement of the land and the creation of the P3 contract had to be done within a two-year window, which added another challenge to the project.

Clear driving

Miller says opening the Regina Bypass to the public after all the years of planning and construction felt extremely satisfying.

"We've received a lot of positive reviews of the bypass. It's really nice to see some of the streets, the arterial road network, have greatly improved as result of the bypass," Miller says, adding that the reports from the police and the fire department not having to bring out their Jaws of Life on Highway 1 East are very satisfying as well. "Since we opened up Phase 1 there hasn't been one serious collision on that previously used corridor."

Andrew Snook is a business-to-business writer based in Mississauga, Ont.

When planning the smart cities of tomorrow, how data is governed will be key to providing benefits to Canadians.

BUILDING FOR TOMORROW

Creating infrastructure for connected, healthy cities.

By Andrew Macklin

Smart cities. It has been the industry buzz term of the past five years. Rarely can you carry on a conversation about developing infrastructure without stumbling on the subject.

But what does 'smart' really mean? What does it entail? What time of infrastructure has to be built to be smart? Ask 10 different people in the industry, and you are almost guaranteed to receive 10 different answers to those questions.

Understanding smart city development is vital to understanding how best to target infrastructure investments, especially in our urban areas. One false move could cost millions decades from now, and it is unacceptable to just see that as someone else's problem. It is imperative to make informed decisions, understanding the evolving landscape and how out cities will be impact by what's ahead.

In October, ReNew Canada, with the support of WSP, convened a roundtable discussion in order to discuss the aforementioned questions, and to build real understanding about how to develop smart (if that is the word we really want to use) cities for the decades to follow.

What makes a city smart?

Defining the goal of what the 'smart' city is meant to accomplish provided the starting point for the conversation. Oftentimes terminology is thrown around without any real appreciation for whether or not everyone is working off of the same definition, and smart cities is no exception.

There was a general consensus around the room was that smart was about providing overall benefit to the people who work, live, and play in that community. Using technology, innovation, and best practices to improve the quality of life of the citizens is (or perhaps, should be) at the heart of the drive to create a smart city.

And creating 'smart' doesn't have to be game-changing investments in billion dollar infrastructure projects. It can be simple efficiencies that make people's lives better. Antoine Belaieff, Fare Integration Program Sponsor at Metrolinx, provided an excellent example of providing data on how full trains are at certain times of the day. By allowing people to make an informed choice, squeezing onto a packed train or adjusting a schedule to jump on one with more capacity. Perhaps it's the option of jumping onto a toll highway in order to get home to your family faster. It's about choice, and having the information available to make an informed one.

Providing that information to the general public involves the need for connectivity, also referred to as the fourth utility. And like the other utilities, one of the issues surrounding connectivity is the issue of ownership. If municipalities are going to reap the rewards of connectivity, in a municipal context, do they need to own the connectivity assets, or can they be owned by a third-party?

This was the point that struck the first chord in the smart cities discussion. Connectivity providers such as Bell and Rogers are ahead of the game in terms of providing the needed community infrastructure. If the telecommunications companies are able to build, and reap the benefits of, the connectivity infrastructure, it becomes another profit centre for corporate interests. But if municipalities are able to install the infrastructure, or work out a public-private partnership agreement that leads to 100 per cent ownership as part of the financing model, it is the cities that can benefit from the long-term value of connectivity infrastructure.

It seems pretty simple which should be the priority: municipal ownership. But it isn't that

simple. Municipal infrastructure budgets are already stretched incredibly thin, and having to add a massive asset like connectivity infrastructure could be too much to finance in the short term, and pay for operations and maintenance long-term. Even with advancements in asset management, municipalities can only handle so much.

The question was then raised whether or not public ownership was the issue that needed to be considered, or whether public control was the more important issue to be discussed? An effective governance model could eliminate the need for ownership by the public sector, so long as the governance model included provisions around the sharing and analysis of any data collected using the connectivity infrastructure.

The physical footprint of 5G infrastructure, and how many companies will want to install it, are concerns for municipalities as the technology gains mainstream acceptance.

Exchanging data

Before getting to the question of data governance, there were significant issues expressed around the current ability to share data, both within organizations and with other companies and organizations, even when it has the potential to provide a positive impact for the public good.

It was speculated that one of the issues surrounds insecurity around data, which has led some companies and governments to over-protect their information. This can come in the form of lengthy, and sometimes ultimately unnecessary, legal documentation. These legal documents can be dictated by fear of the unknown, how data might be exposed for private exploitation, and in the process, create an inability to share resources when collaboration is possible. This includes things like maps and transportation/transit ridership information, where collaborations among multiple jurisdictions can help to address areas of concern.

When collaboration is able to happen, the obstacle can then be related to formatting. As an example, municipalities don't always use software that is compatible with what's used in another jurisdiction, making it extremely difficult to read, or potentially merge with another like data set.

Then there is the challenge within individual organizations in breaking down silos. Again, the trust factor can come into play. The lack of understanding surrounding the end goal of using data creates a lack of trust.

This is why education is such a vital aspect of the conversation surrounding data. Data has been most emphatically portrayed as something that is stolen, leading to important individual information falling into the hands of someone who can exploit that information for financial gain. There is also a blind spot around the sharing of data, understanding how and when data can be shared, under what forum can it be legitimately collected, and under what format can it be distributed.

Solving this issue would take the creation of a simplified framework for data sharing, one that is easily understood by the legal teams who furiously to protect, the organizations that want to looking at sharing it in the spirit of collaboration, and the public that want to ensure that their personal data is being protected from those who seek to profit from it.

A framework would be a starting point for education all stakeholders about data, making it easier to then focus on how its collection and analysis can benefit the general public. And it doesn't have to be with massive projects; simple, small, effective uses of data collection can provide the 'quick wins' that lead to better services, more effective uses of public funds, and more effective community programming.

A starting point

One example of a quick and easy use of data collection that was cited during the discussion, one that is non-invasive but serves an important purpose, was a project done by the City of Kingston. In an effort to grow tourism within the city, the municipality wanted to find out how many drivers from Quebec were driving along Highway 401 through the north end of Kingston, but not getting off the highway to stop for anything in the city. Targeting that stakeholder could provide an economic opportunity for the community, but they needed evidence that a high enough percentage of drivers with Quebec license plates were passing through without stopping. This is a simple form of data collection, one where license plate numbers were tracked based on the duration of time it took them to travel from one end of the city to the other.

If we go back to the earlier statement about what the word 'smart' should entail in the context of smart cities, providing overall benefit to the people who work, live, and play in that community, then the Kingston project certainly qualifies. It is the collection of data in order to understand the habits of a stakeholder group in order to generate greater economic benefit for the community.

But, taking into account the earlier discussion in the piece, flaws in the initiative, from the standpoint of data collection, could be conceived. Without a governance framework in place, how does a driver trust that this is the only use of the data being collected? Also, if the municipality has not properly communicated the initiative with the public, then questions can be raised about the overall economic benefit of the 'smart' initiative, as well as

ROUNDTABLE CONTRIBUTORS

We would like to thank the following organizations for their participation in our expert roundtable:

- Actual Media
- Alectra Utilities
- Bell Mobility
- Bosch
- Canada Infrastructure Bank
- Commscope
- Enwave
- Lane Consulting
- Metrolinx
- Oracle
- OSPE
- RCCAO
- Region of York
- Watefront Toronto
- WSP

raising questions about whether data is being collected regarding citizens within its own community (how frequently are people leaving town and why could be the real reason for the data collection).

This is why the education component is so important. With so much negative press surrounding data collection, municipalities need to be proactive in communicating with the public about any data collection, how it is being used, and most importantly, how it helps to better their life in the community.

This is already happening. Data collected from sensors and cameras at traffic stops are helping to better program the transportation grid, with tweaks being made based on the number of users travelling in each direction through an intersection. Sensors within fire hydrants and water pipe networks are helping to analyze changes to water pressure, which usually indicate a leak somewhere in the system. More frequent sensors within the system make it easier to geographically pinpoint where the issue is occurring.

Involving the private sector

The private sector, for its part, has shown a clear interest in getting further involved with data collection and analysis in Canadian cities, something that could have significant positive or negative ramifications depending on how it is handled.

From the positive perspective, the private sector has the resources to build the infrastructure needed, at their own expense. Cities would be able to implement the technology portion of the smart city movement, and use procurement models that could lead to the eventual municipal ownership of the network (perhaps using he public-private partnership).

The negatives surround the ownership of the data that comes from the connectivity infrastructure that is installed. As mentioned earlier, companies with the capabilities to install large amounts of infrastructure could potentially analyze and monetize data that is collected. And as the infrastructure falls within or attached to public sector infrastructure, the backlash from collecting personal data for profit could be extensive from the general public.

This is likely to become a bigger issue with the emergence of 5G infrastructure. The advantage of 5G is that it can provide internet speeds up to 100 times faster than 4G. However, the technology does not penetrate buildings very well, and there is a need for an extensive expansion of the number of sensors needed, which may not be easy to hide when mounted on current public infrastructure like lampposts, stoplights, and public/private buildings.

Then there is the question about sharing the infrastructure. The expanded number of sensors is one thing, but what happens if the players in the space want to install their own technology. Now you are multiplying the amount of new sensors in urban centres by two, three, or perhaps more as more companies enter the space.

If the private sector is going to control data collected on public infrastructure, then considerations must be given to the original discussion of the benefits of creating a smart city: improving the quality of life for the people who work, live, and play in the community. The question is: how does private ownership of data, collected and analyzed from public sector infrastructure, ultimately benefit the public? And if it doesn't, does it make sense to install the modern technology just for technology's stake?

It's an important conundrum as

municipalities struggle with the cost of smart cities infrastructure in a time of fiscally-restrained infrastructure asset budgets. Actual Media CEO Todd Latham suggested that cities need time to catch up with data collection, allowing communities to identify issues that data has the potential to solve, rather than have the private sector pressure communities to install technology before they know best how to utilize it.

Solving problems is where the real opportunity may lie when it comes to municipal use of data, and it also could provide the best opportunity for the private sector to work with the public sector. This is already being seen with the use of data in water infrastructure. Real-time data analysis of water is helping to identify elevated levels of contaminants quicker where they appear in drinking water or in lakes/rivers. The result? Less people get sick, shutdown of drinking water resources take less time, and recreation areas can be reopened sooner.

Several members of the discussion suggested that transportation is the next area where big data analysis will have the most impact in urban centres. Real-time traffic control, more efficient transit, and the creation of safer streets for pedestrians. With the emergence of automated vehicles, real-time data will be even more vital to smart mobility within the city core.

Next steps

If creating safe, smart communities is the ultimate goal, and the collection and analysis of large amounts of data is what helps to reach that goal? The roundtable attendees had several suggestions:

- Use data at a smaller scale to build change;
- Create a repository of positive and negative stories for governments to learn from;
- Convince the internal hierarchy of the benefits of data;
- Make evidence-based decisions and communicate them with the public;
- Educate municipalities on the why, then the how;
- Look for common ground for the public and private sectors to work together for the common good;
- Lay out the legal obligations of data;
- Find a relationship between data and climate change strategy;
- Give municipalities the tools to succeed; and
- Overcome the leadership issues to create a vision.

The development of smart cities means building better communities for those who live and work there. Doing so takes a much better understanding of data than what both our municipalities and our citizens have now, and it is up to those same municipalities to fill the education void. Public ownership of connectivity infrastructure may not be necessary, but public control certainly is. And that control needs to occur thanks to a governance framework that is easy for all stakeholders to understand.

The future of cities depends on the adoption of technology, but ensuring that we know how to use it to benefit everyone.

We would like to thank WSP for their generous support in helping us to bring industry experts together for this important discussion.

Andrew Macklin is the managing editor of ReNew Canada.

The five new gates features glass passenger boarding bridges, the first of their kind at Pearson International Airport.

All photos: ReNew Canada

PEARSON EXPANSION

Meeting evolving customer needs at Canada's busiest airport.

By Andrew Macklin

I remember the trip fondly because I was really excited to see Camden Yards. I was heading to Baltimore in mid-March to attend a tradeshow, and the venue was just down the street from the ballpark, home of Major League Baseball's Baltimore Orioles.

I arrived at Pearson International Airport (they offered direct flights to Baltimore at a convenient mid-morning departure time), parked my car, proceeded through customs, and then went off to find my gate. The journey to the gate was also unfortgettable, but not for the same reasons as the park.

The space was primarily built using pre-fabricated style buildings, and the seating in the area was small (I remember about 40 seats) considering the number of gates it serviced (approximately 4-6 gates with doors leading directly to the tarmac, with outdoor paths leading to the aircraft). It wasn't a horrible experience by any stretch, but it did seem out of place, as every other gate I had flown out of at the airport was stocked with amenities and modern features.

As it turns out, that area of the airport was next on the list.

Let's first provide some much-needed context.

Based on the most up-to-date statistics, Pearson's passenger traffic is growing. Over the first nine months of 2019, the number of passengers travelling through the airport was up just over 700,000 from the same period in 2018, for a total of just over 38.6 million passengers.

The release of the 2017-2037 Growth Plan, entitled Growing Responsibly, outlined the airport's plan for attacking the issues it expects to encounter over the two decades to follow: increases in passenger numbers, connectivity needs, addressing climate change, and the need for regional transportation solutions.

The executive summary of the report provides a more digestable version of the report's extensive content, broken down into the key areas of discussion. Included in this is a subheading labeled Airside System and Passenger Terminals. The opening of the section states the following: "We expect that airside systems and passenger terminals will be able to accommodate the demand we forecast over the course of this Master Plan. Both critical elements of our operations, they largely have sufficient capacity to meet demand over the next two decades—and where this is not the case, they can be expanded or made more productive."

The area I walked through that day in mid-March is now in the midst of a redevelopment known as the Pier G Expansion. The current iteration of the Pier G Expansion is where this 20-year journey of work on passenger terminals begins, providing that aforementioned expanded and more productive space for travellers to regional U.S. destinations.

The first priority was to expand the current staging area (gates) to comfortably accommodate a greater number of passengers waiting for their flight. The new area, part of the overall 20,000-25,000 square metre footprint, features a significant expansion of the seating, with more comfortable seating, restaurants and other typical airport amenities, and lots of windows that allow the sunshine to pour in from the east. On the day I attended the jobsite (I had to stay on the

TOP100 PROJECTS DINNER: FEBRUARY 18, 2020








Top100
Canada's Biggest Infrastructure Projects

Top100 Projects KEY PLAYERS AND OWNERS DINNER

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

On Feb. 18, enjoy a high-powered evening with your colleagues and hundreds of owners, constructors, engineers and key players who are building Canada's biggest infrastructure projects.

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

PREMIER PARTNER

wsp

ELITE PARTNERS

PARSONS · PCL CONSTRUCTION · exp.

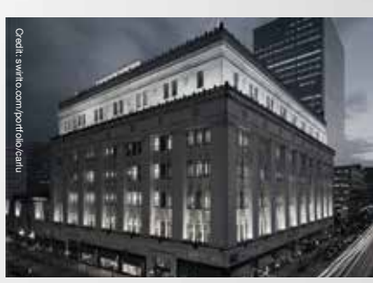
SELECT PARTNERS

CPCI · Comtech · AECOM · JACOBS

CHOICE PARTNERS

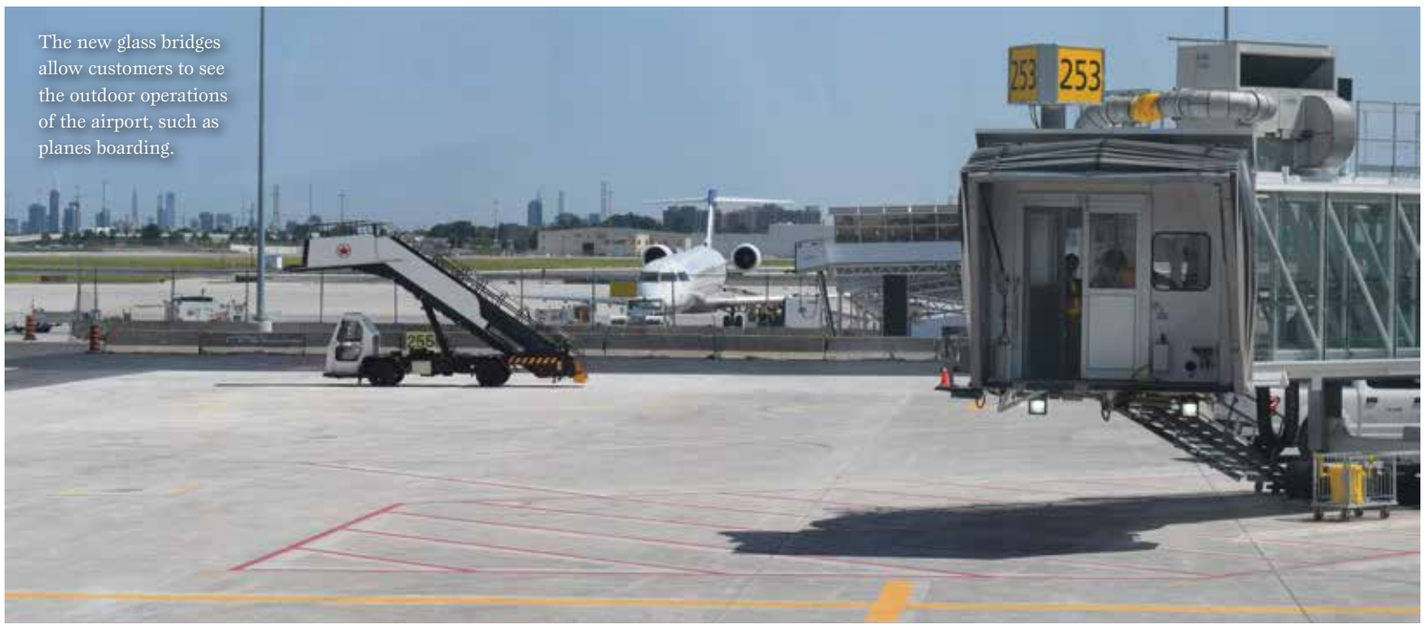
CIMA+ · Englobe · MORRISON HERSHFIELD

Date: Tuesday, Feb. 18
Cocktail Reception: 6:00 p.m.
Dinner: 7:30 p.m.
Venue: The Carlu
444 Yonge Street
7th Floor, Toronto, ON


Credit: swirlto.com/portfolio/carlu

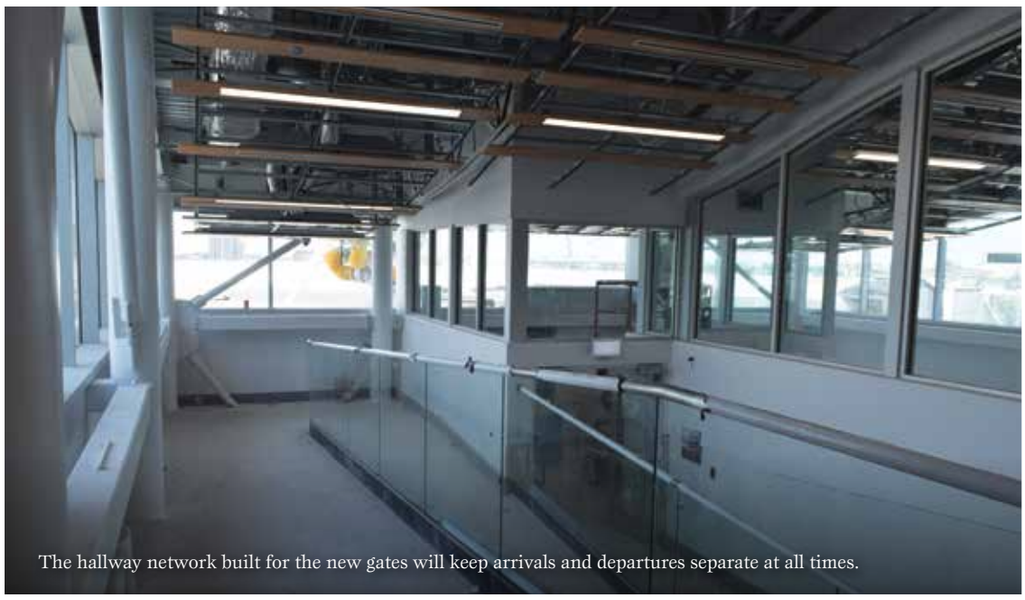
For corporate tables of eight or single tickets, visit **top100projects.ca/celebrate**

Sponsorship opportunities are still available. Contact Nick Krukowski at **416-444-5842 ext. 101** or **nick@actualmedia.ca**



The new glass bridges allow customers to see the outdoor operations of the airport, such as planes boarding.

All photos: ReNew Canada



The hallway network built for the new gates will keep arrivals and departures separate at all times.

A look down the tunnel on the new passenger boarding bridge.

outside for obvious security reasons), you could easily tell how much more comfortable and enjoyable the entire experience was just by seeing the facial expressions of the people sitting, eating, or lining up for their flights.

Speaking of the jobsite, my guide for the tour of the outside of the Pier G project, or Gate 193 Extension as it is also referred to as, was Tony Crepinsek, the associate director of infrastructure development for the Greater Toronto Airports Authority (GTAA). I have been on many jobsites over my career, and few have been more excited to talk about a project than Tony was that day. It didn't take long to understand why.

On the day I arrived on the active construction site, work was being done on the five new gates that are the second phase of the project. And the shiny new toys were featured prominently on the tarmac: five new glass bridges for customers boarding aircraft.

Glass passenger boarding bridges (PBBs) are fairly prominent in other parts of the world, but are not found in many North American airports. Climate and cost concerns can often override the benefit seen of the technology: another way to enhance the customer experience. The technology is pretty cool. Standardized technology allows for efficient operation of the bridges, which can be moved from gate to gate. Glass walls on both sides allow those boarding the plan to see outdoor airport operations, planes talking off, and views of the surrounding community.

The bridges, made in Spain by Adelte, were tested using real aircrafts in late summer, and have been in operation at the new gates for a few months.

The work on enhancing the passenger experience at the new gates wasn't just about buying new glass bridges. The new passenger movement system built as part of the new gate infrastructure will make it much simpler for arrivals and departures to move through the area, with an intricate hallway network that keeps the two groups separated at all times, reducing the needs for additional customs and security resources.

Additionally, work done on the tarmac area outside of the gates has been expanded, allowing for accommodation of narrow-bodied aircraft, including such frequent

> Over the first nine months of 2019, the number of passengers travelling through the airport was up just over 700,000 from the same period in 2018.

passenger aircraft as the Airbus A32L and the Boeing 737. This provides the airport some additional flexibility, be it in the form of allowing aircraft heading to more in-demand U.S. cities to utilize the gates, or provide the capacity for increased service to the existing roster of U.S. destinations.

No more walking outside in inclement weather conditions to go to and from the aircraft, No more cramming inside a small waiting area. No more long walks to pick up a bite to eat. And in the process, the airport gains enough capacity to process up to two million additional passengers per year.

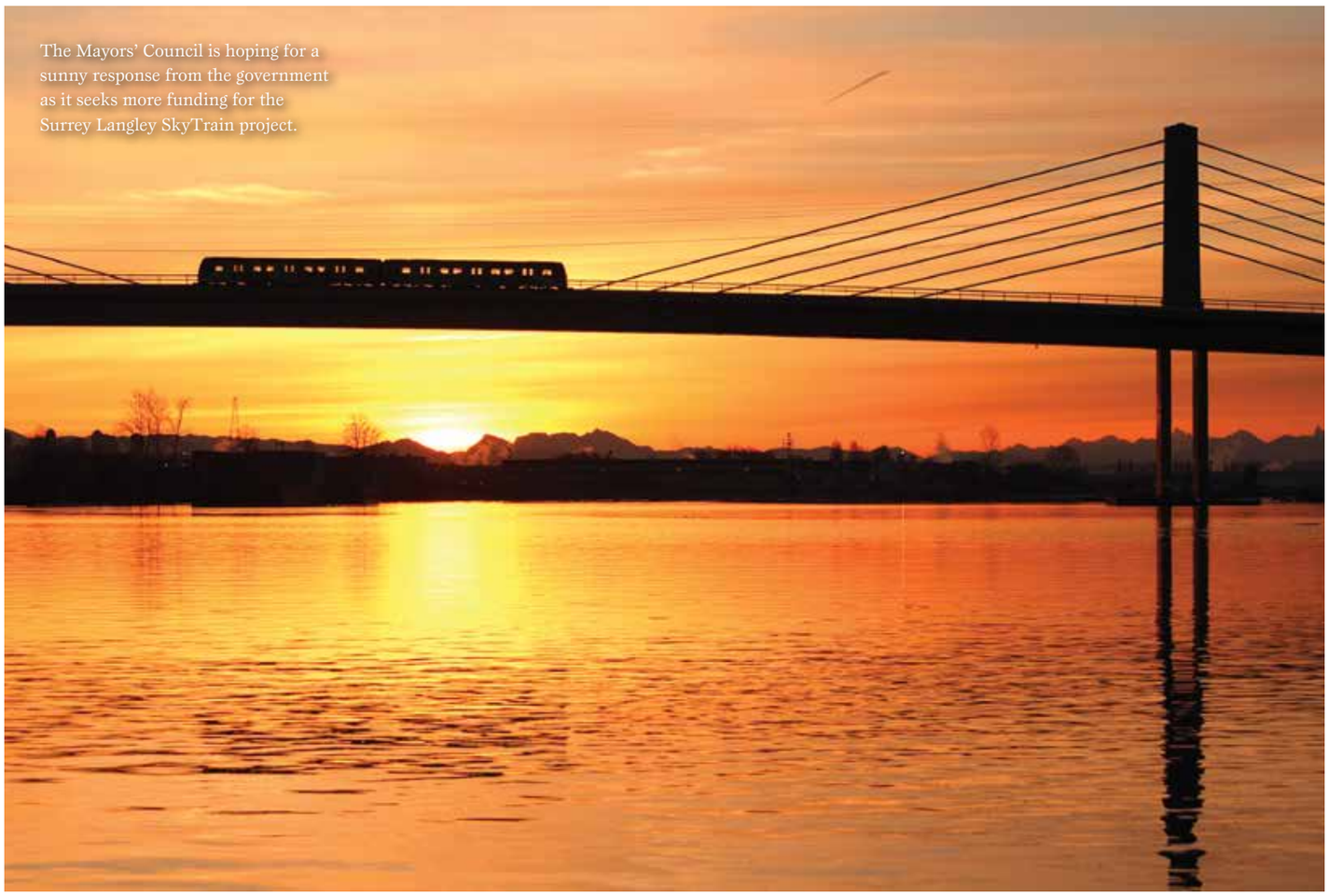
What was once slated as a potential billion-dollar expansion of Pier G has given way to something much more efficient, and in line with the needs of the short and medium term rather than a guess on the needs of the long term. Yes, as the Master Plan had suggested, areas like these can be expanded as demand dictates. And this immediate expansion of the area certainly will allow for that to still happen if the demand emerges. But for now, the passenger experience has been significantly improved without the need for over-the-top visions of grandeur. It clearly wasn't needed here, so why spend millions and millions of extra dollars when it's not necessary, especially with a laundry list of other needs for that critical infrastructure budget.

There is still work to be done. The full expansion will lead to a total of 11 new passenger boarding bridges, as well as a host of additional amenities to enhance the passenger experience. The entire project is scheduled for completion no later than the first quarter of 2023.

Now, no matter which U.S. destination you might need to travel to next, you can expect a significantly improved experience as a result of the expansion work already completed.

Andrew Macklin is the managing editor of ReNew Canada.

Interested in learning more about the GTAA's Master Plan for Pearson International Airport? Visit **torontopearson.com/en/corporate/our-future/master-plan** to download a copy of the report.



The Mayors' Council is hoping for a sunny response from the government as it seeks more funding for the Surrey Langley SkyTrain project.

WHAT COMES NEXT?

Infrastructure stories to watch in 2020.

By Andrew Macklin

Few years will have as much impact on infrastructure development as 2019 did. In the past 12 months we saw Ontario reveal its pipeline, Alberta slash its budget, consistent spending in B.C. and Quebec, the Canada Infrastructure Bank (CIB) start investing and, oh yeah, a little thing called the federal election.

And while it may be impossible to top the overall impact of that list this year, 2020 is not without its important infrastructure stories to track.

Here are 10 that we will be paying particular attention to in the 12 months ahead.

Federal spending priorities

As the Liberal government forms political alliances to push its national agenda forward, we should get a better sense of whether or not it will be spending as usual on infrastructure. If what we heard in the campaign from all parties is any indication, it seems likely that infrastructure will remain an investment priority.

What else could become an area of focused infrastructure spending? Based on economic pressures and previous spending success, perhaps additional funding for trade-related infrastructure, like rail lines, ports, transportation corridors, and airports?

Bridging the Surrey gap

The Surrey Langley SkyTrain project cannot be built to the length of the previous Surrey LRT route for the same amount of money. But that's not what the public was told during the 2018 municipal election. So now the Mayors' Council is looking to the provincial and federal governments for additional funding to make up the shortfall. With either government step in and add to the project funding, already at $2.825 billion?

Support for Alberta municipalities?

What's one way to gain support in a province where you failed to win a single seat in an important federal election? Perhaps you can secure friends by providing the funding needed to make up for an unexpected financial shortfall?

The fiscally-conservative budget released by the Alberta government cut infrastructure funding resources province-wide. The City of Edmonton, among others, has lots of pressing infrastructure priorities its wants/needs to address. A win/win situation here for the federal Liberal minority government?

Fighting the flood

The nation's capital experienced its second significant flood event in three years in 2019. That, along with severe flooding in the Muskoka region, forced the Ontario government to study the situation, hiring a special advisor to provide recommendations on how to prevent future damage. (The report is complete, but was not publicly available at press time).

We have already seen Alberta and Manitoba invest hundreds of millions of dollars on infrastructure solutions to prevent future damage. Could Ontario be next, and after what happened in Atlantic Canada, could New Brunswick be far behind?

Credit: MJMA and Patkau Architects

Will Building Code changes in 2020 open the door to the development of more tall wood structures, like this one proposed by the University of Toronto?

That's our glimpse at 10 industry issues we will be following closely in 2020.

Be sure to watch for daily updates on all of the industry's biggest stories at renewcanada.net.

Breaking the Bank

The Canada Infrastructure Bank is up and running. Project proposals have been submitted. Time has been taken for due diligence to be done. Now the expectation is that a pipeline of projects could soon be released with the dust settled on the federal election.

To date, we have seen everything from $20 million for a municipal water project to more than $1 billion for a $6-billion-plus transit project. We know that investments will focus on projects where steady revenues are involved, and we expect money to be spent, but how and where will be fun to watch.

A solution for Massey?

In October, we learned that the Metro Vancouver board approved a new eight-lane tunnel to replace the existing George Massey Tunnel. There are some environmental concerns cited as part of the approval, including the need to displace 1.5 million tonnes of salt-contaminated soil, and proper consultation with impacted First Nations communities also needs to take place.

Is the controversy now over? Is this the final version of the project that will actually make it through procurement to construction? After years of uncertainty, we could soon be ready to break ground on one of British Columbia's most controversial transportation projects.

Unsolicited proposals

It will be worth watching how Ontario's unsolicited proposal framework develops. When Minister Laurie Scott made the announcement, there were no timelines attached regarding how long the evaluation process would take. Could we see the first project reach procurement in 2020? Hard to say, but it will definitely be worth watching how the process unfolds.

Finding municipal balance

Municipalities across Canada are stretched thin, balancing the need for new assets with the need to rehabilitate existing assets. On top of that, the push continues for a focus on outcomes-based procurement rather than a procurement model that favours to lowest bid above all else.

How do we balance all of the issues facing today's municipalities/ Are there policy, governance, or funding solutions that can help? This will be an important dialogue throughout 2020.

The growth of tall timber

The past year was significant in the growth of the mass timber market in Canada, especially in B.C. and Ontario. Major projects involving mass timber construction were announced in both provinces, with the latter welcoming its first cross-laminated timber manufacturer, and the Toronto Region Conservation Authority unveiled its new headquarters that incorporates the use of engineered wood products.

With Building Code changes coming into effect in 2020 that would allow for expanded use of mass timber construction, is this the final obstacle to overcome for engineered wood products to reach wider adoption throughout Canada?

Powering the north

The Wataynikaneyap Transmission Project has provided a new model for powering remote communities with clean energy. In 2019, we got news of a proposed transmission project of a similar ilk with the news emerging about the proposed 900-kilometre Kivalliq Hydro-Fibre Link.

Will the Kivalliq project secure funding to move forward? With a model for success in place in northern Ontario, could we see more projects like this emerge?

Andrew Macklin is the managing editor of ReNew Canada.

APPOINTED

Catherine McKenna

The federal government named its new cabinet, including a new Minister of Infrastructure and Communities.

Former Minister of Environment and Climate Change **Catherine McKenna** takes over the portfolio from **Francois-Philippe Champagne**, who was named the new Minister of Foreign Affairs.

Other ministers of note include **Marc Garneau**, who was renamed the Minister of Transport, **Jonathan Wilkinson**, who takes over as the new Minister of Environment and Climate Change, and **Anita Anand**, who was named the Minister of Public Services and Procurement.

Katrina Nokleby

Joe Dragon

Katrina Nokleby was named the new Minister of Infrastructure for the Government of Northwest Territories.

Nokleby, the Member of the Legislative Assembly representing the Yellowknife-based riding of Great Slave, will work alongside Dr. **Joe Dragon**, named the new Deputy Minister of Infrastructure for NWT.

Nokleby is a consulting engineer in the environmental, earthworks, and ice engineering fields. She is a former president (2015-2017) of the Association of Consulting Engineering Companies in the Northwest Territories, and was a councilor for the NT and NU Association of Professional Engineers and Geoscientists. She holds a Bachelor of Applied Science as a geological engineer.

Dr. Dragon, a member of the Smith's Landing First Nation, previously held the title of Deputy Minister of Environment and Natural Resources, which he was appointed to in December 2016. He has previously spent more than two decades in public service with the territorial and federal governments.

In addition to the infrastructure portfolio, Nokleby also takes on the role of Minister of Industry, Tourism, and Investment, as well as Minister responsible for the Workers' Safety and Compensation Commission.

Satvinder Flore

Satvinder Flore has joined WSP, becoming the company's business line executive for the energy, resources & industry (ERI) business in Canada.

Flore has an extensive background in the international oil and gas, energy, and industrial sectors. Over his 18-year career, he has held senior-level executive roles in North America and Europe with a focus on business development, strategy, operational planning and mergers & acquisitions. Most recently, Satvinder was Canadian regional strategy and development lead for oil, gas and petrochemicals for a major multi-national professional services firm.

Olivia MacAngus

Olivia MacAngus has joined Colliers Project Leaders as its chief development officer.

MacAngus brings broad and deep sector knowledge in infrastructure, procurement, and major capital projects. She will continue to grow Colliers Project Leaders' infrastructure service offerings, including project management and infrastructure, and real estate advisory services.

MacAngus previous served as the managing director of capital projects & infrastructure at PwC. Before that, she held senior roles at Plenary Group and PPP Canada.

Pam Mood

Yarmouth Mayor **Pam Mood** has been named as the new president of the board of directors of the Nova Scotia Federation of Municipalities (NSFM).

Mood, a municipal politician since 2012, had previously served as the vice president on the board. Mood takes over the position from Halifax councillor **Waye Mason**.

Mood's grandfather, **Fred Emin**, had served as president of NSFM's predecessor, the Union of Nova Scotia Municipalities, in 1971-72.

Lucy Casacia

Lucy Casacia has been brought on by WSP as the company's vice-president of smart cities.

Casacia is well-known in the field of intelligent and connected infrastructure. For eight years she held senior roles with Siemens Canada, most recently leading business development for their Smart Cities practice, delivering intelligent infrastructure solutions to major public and private clients in Canada.

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

Photos: ReNew Canada


National inuit Leader Natan Obed.


CCC CEO Perrin Beatty (far left) moderates the discussion with four of Canada's provincial infrastructure ministers.


Ontario Premier Doug Ford opens day two of the CCPPP annual conference.

P3 2019 TORONTO, ONT.

Over 1,000 infrastructure industry professionals gathered in Toronto for the 27th annual CCPPP conference on public-private partnerships.

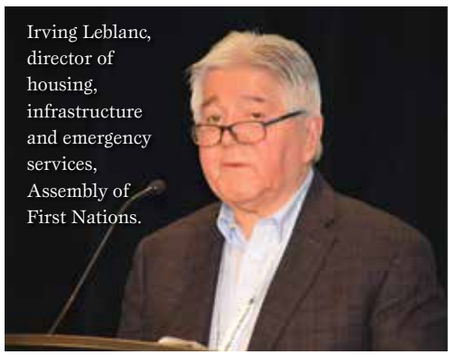
The annual showcase of the biggest issues facing the P3 infrastructure space featured a strong roster of keynote presentations, including talks delivered by Zurich North America CEO **Kathleen Savio**, Telus chief customer officer **Tony Geheran**, and Hyperloop Transportation Technologies Inc.'s co-founder and chairman **Dirk Ahlborn**.

The conference's opening keynote address was given by **Natan Obed**, president of Inuin Taripiriit Kanatami and Canada's national Inuit leader. Obed focused his presentation on addressing both the significant infrastructure deficit faced by the Inuit Nunangat (the Inuit homeland which consists on portions of all three Canadian territories as well as northern portions of Quebec and Labrador), as well as the litany of opportunities for infrastructure development in the decade ahead. This includes the need for more deep water ports in Inuit communities, many of which can be found along parts of the Northwest Passage, the need for further development of renewable energy, and the opportunity for an Inuit-based post-secondary institution. All of these can be developed in partnership with the Inuit Development Corporation, formed last year as a national body to help attract investment.

The conference also featured a discussion amongst four of the country's infrastructure ministers: **Prasad Panda** of Alberta, **Gordon Wyant** of Saskatchewan, **Laurie Scott** of Ontario, and **Lloyd Hines** of Nova Scotia. Moderated by Canadian Chamber of Commerce president and CEO **Perrin Beatty**, the conversation focused on new opportunities for development through the P3 lens. In Alberta, the new United Conservative Party government has stated that it is publicly that it is open to P3 projects, something that previous NDP government was reluctant to support. Saskatchewan just finished its largest P3 project in the province's history, and is actively looking at where the model might next be used to help get infrastructure built. Ontario recently released its P3 projet pipeline, which contains over $65 billion in projects to be procured over the next decade. And in Nova Scotia, the province is in the midst of one of its largest P3 procurements ever as part of the QEII New Generation project.

P3 projects continue to be a vital method of contract delivery for infrastructure projects in Canada. For more information on the work being done by the CCPPP to support these efforts, visit *pppcouncil.ca*.

Photos: ReNew Canada


Irving Leblanc, director of housing, infrastructure and emergency services, Assembly of First Nations.


Melissa Herda, a Level 2 water operator from the Fisher River Cree Nation in Manitoba, speaks during the First Nations Women and First Nations Youth panel.


Manitoba Regional Chief Kevin Hart, AFN housing and infrastructure portfolio holder.

AFN WATER SYMPOSIUM TORONTO, ONT.

On the day that the new federal cabinet was announced, Indigenous leaders from across Canada gathered to discuss one of the government's key promises and what would happen next once that promise was fulfilled.

The previous mandate of the Prime Minister Justin Trudeau-led government stated that all of the country's boil water advisories would be removed by March 31, 2021. In its first term in office, the government managed to remove more than 80 of these advisories, but many more remain, many of which are within the province of Ontario.

Infrastructure investments continue to be made in order to purchase the necessary equipment to help clean up the water. But the initial investment isn't the only concern for these communities. It's the costs that follow: operations and maintenance, getting parts to the communities when something fails, and having qualified personnel in place to run the equipment. While the latter is a problem faced by many communities across Canada, the first two can be unique to the more remote First Nations communities. The lack of broadband access prevents these communities from utilizing the online resources that can help to troubleshoot system issues as they occur, and the changing weather conditions are making the transportation networks to many communities unstable, as ice roads have become less reliable and flying in parts can be a tricky proposition.

The discussions held at the water symposium will help to provide part of the foundation for an AFN water strategy moving forward, one that helps address the ongoing needs of provide clean water to communities once the threat of boil water advisories is no longer the primary concern.

We're going to stare at the burning match of climate change for a while before we light the flame of global economic transformation. Let's not wait until we burn our fingers before we do.

IT'S GOING TO GET WORSE

By Todd Latham

Unless you have figured out deep space or time travel, there is no escaping climate change. Every living thing on this planet is, and will continue to be, affected by the global crisis. Yes, it's an environmental emergency that demands worldwide attention and advocacy. Yes, it's the existential threat of our lifetime that must be tackled by policy and human behaviour change. And yes, it will cost you in real financial terms. But what can you do about it?

You can pay the true cost of your footprint via carbon tax, cap-and-trade, or fee-for-service or you can reject all pricing mechanisms and demand voluntary measures. Either way, you are going to pay for climate change, eventually. The financial hit will come from product and service price hikes and increased insurance rates. According to the Insurance Bureau of Canada, property and casualty insurable losses rose by an average of $405 million/year between 1983 and 2008 and then jumped to $1.8 billion per year from 2009 to 2017. The impact will also be felt through reduced GDP. A recent report from the International Monetary Fund said climate change was set to reduce world real GDP per capita by 7.22 per cent by 2100—some countries will fare worse than others. And your retirement savings will be impacted by losses from climate risk-impacted companies in your investment portfolio.

Mark Carney, Governor of the Bank of England, says the financial sector has the ability to "move capital from where it is today to where it needs to be tomorrow." The Caisse de dépôt et placement du Québec, the Ontario Teachers' Pension Plan, and the OPSEU Pension Trust have all committed to carbon-neutral portfolios. Climate change was highlighted as a vulnerability by Governor Poloz in the Bank of Canada 2019 Financial System Review: "limited understanding and mispricing of climate-related risks could potentially increase the costs of transitioning to a low-carbon economy." Some 101 financial institutions from 38 countries have adopted the Equator Principles—a risk management framework to guide investment decisions related to environmental and social risk in projects. Measuring and valuing climate risk is rapidly redefining our economy. We're at the beginning of the greatest economic transition in the earth's history, and it's coming just in time.

Addressing climate change is not a choice to make; it is a matter of survival. Our primal human nature is to wait until the crisis is literally at our front door before we act. Nobody knows exactly what is going to happen in the decade of decision ahead of us, but like anything worth having, we're going to have to pay for it. Let's not wait until there is a daily news cycle of people dying around the world from extreme weather impacts and the lack of food, water, and habitat causing the migration of millions of climate refugees before we do. The resulting conflicts and political chaos would just add to the sad and scary headlines.

It might be that the climate crisis will get a lot worse before it gets better but I have faith in the human species to figure it out and adapt. Nobody wants the alternative.

Todd Latham is the founder of ReNew Canada and welcomes your comments, rants or raves at *todd@actualmedia.ca*.

PARSONS

Knowledge. Expertise. Resources.

Safely Delivering End-to-End Mine Closure and Reclamation Solutions.

Giant Mine Roaster Complex Deconstruction
Yellowknife, Northwest Territories, Canada

parsons.com

Question today
Imagine tomorrow
Create for the future

WSP is proud to partner with our clients to deliver innovative and sustainable engineering solutions.

As a future-focused organization, we design and deliver projects that shape societies and connect communities, creating places where our friends, families and neighbours can thrive.

WSP—big, bold, ambitious thinking that inspires and influences.

---

wsp

wsp.com