

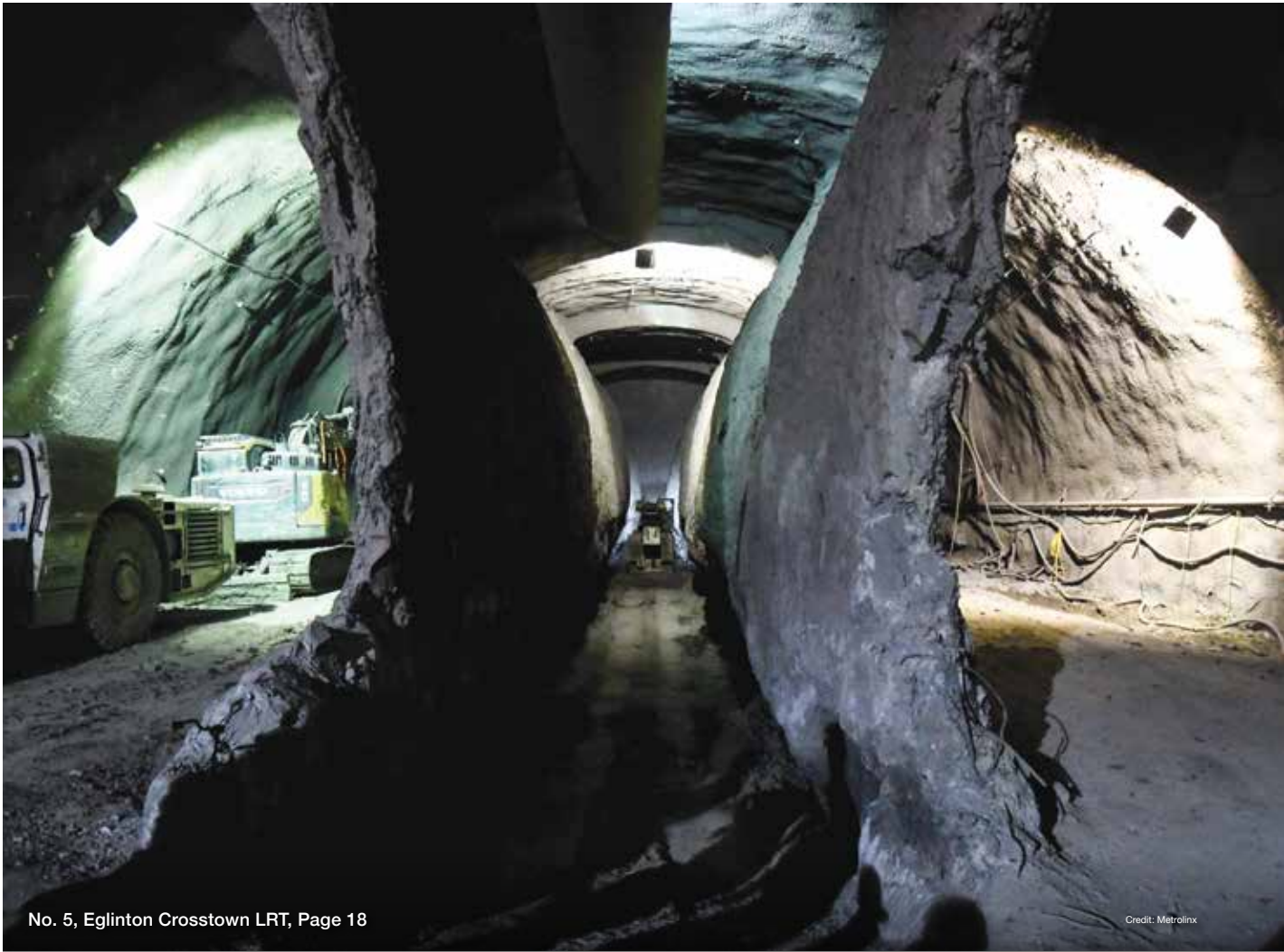
# Top 100

## Canada's Biggest Infrastructure Projects

ReNew  
CANADA  
The Infrastructure Magazine

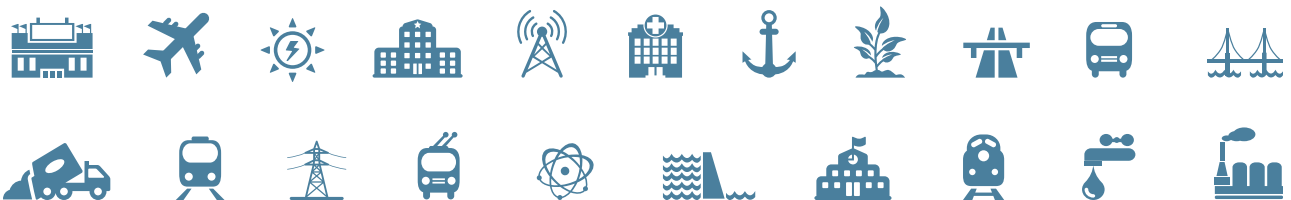
# 2020

top100projects.ca



No. 5, Eglinton Crosstown LRT, Page 18

Credit: Metrolinx





Top100  
Projects  
PLATINUM  
ELITE 2020



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C A N A D A  
The Infrastructure Magazine

**Top100 Projects — 2020**  
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**ReNew Canada's**  
**January/February 2020 issue**

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**One Man Changes the Face of 2020's Top 10**

If not for one individual, this year's Top100 may have looked familiar.

When this year's research process began, there was little change within this year's Top 10, as many of the nation's megaprojects were still in progress. Significant progress has been made on all of the projects we saw grace the Top 10 in our report last year, but completion dates extend beyond the end of the 2019 calendar year.

Enter Matt Clark, Metrolinx's Chief Capital Officer, who took over the position from Peter Zuk. You see, when Zuk was in charge of publicly expressing capital budgets, particularly in the context of the GO Expansion project, he had done so by breaking down the \$13.5 billion spend by corridor. That breakdown led to the full expansion represented by as many as nine projects in the content of the Top100.

Clark does it differently. In the quarterly reports made public following Metrolinx board meetings, the capital projects for the GO Expansion are broken down into three allotments (on corridor, off corridor, and early works). The result? Six less GO Expansion projects in the Top100, but two new projects in our Top 10 including a new number one.

In combination with this new breakdown, and a series of additional new entries to the report, we find ourselves on the cusp of a quarter-trillion dollars accounted for in the pages of this report, rocketing up from last year's \$212.6 billion to just over \$240 billion. And that number could easily increase in the coming years, as completed megaprojects completed are replaced by those lining Ontario's P3 Market Update and grandiose plans for continued megaprojects spending in British Columbia and Quebec.

The temptation to add Ontario's latest megaproject pipeline wasn't enough, as we stuck to our strict criteria of ensuring a publicly-released project cost was available before adding a prospective project to our report. Estimates, and the cost uncertainty that comes with them, do not permit a project to appear on our report.

But in the case of Metrolinx, and the projects associated with the GO Expansion and other regional transit projects, the hard numbers are publicly available for everyone's consumption. As a result, the 2020 Top100 Projects report is, by more than \$25 billion, the richest list of public sector infrastructure projects under development in Canadian history.

**Andrew Macklin, Managing Editor, ReNew Canada**



To create your own report, visit [top100projects.ca](http://top100projects.ca) and sort by **project cost, key players, location, sector**, and more.



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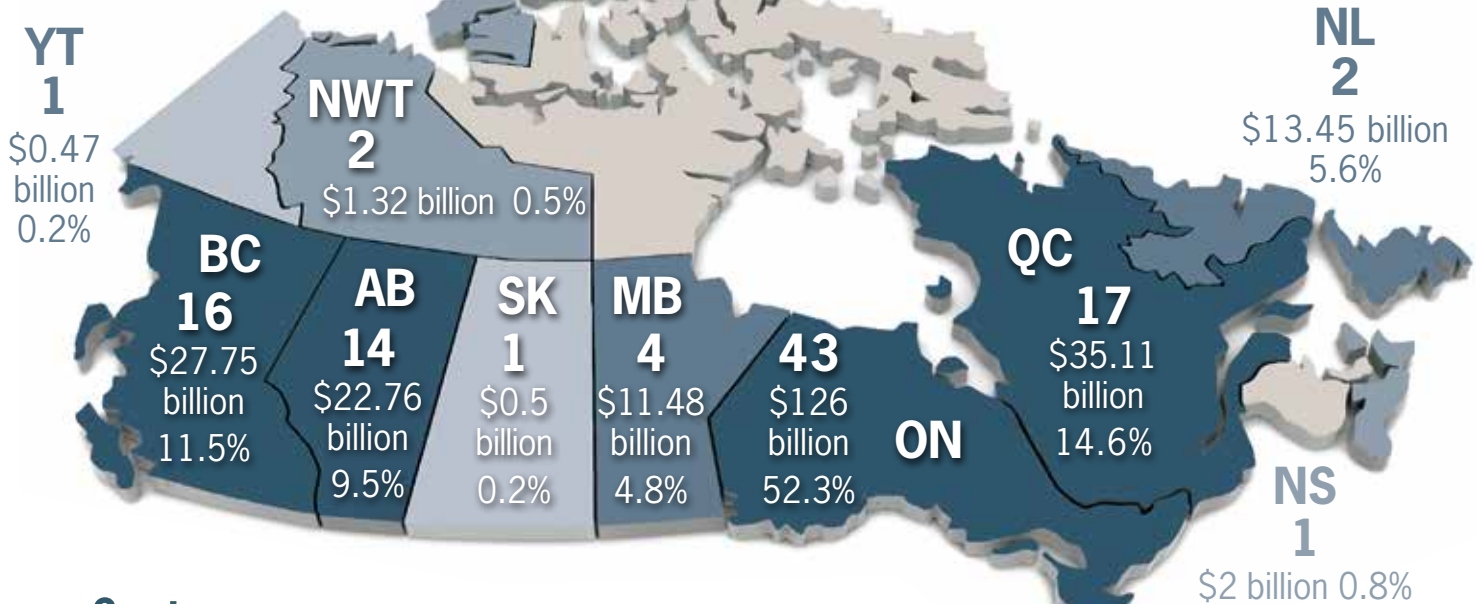
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**Acronym Legend**

- AFP:** Alternative financing and procurement
- DBF:** Design-build-finance
- DBFM:** Design-build-finance-maintain
- DBFOM:** Design-build-finance-operate-maintain
- EPC:** Engineering, procurement, and construction
- EA:** Environmental assessment
- JV:** Joint venture
- LRT:** Light rail transit
- P3:** Public-private partnership
- RFP:** Request for proposals
- RFQ:** Request for qualifications
- SUB:** Subcontractor
- TEUs:** Twenty-foot equivalent unit containers

- no projects more than \$330 million
- less than \$1 billion
- \$1-\$5 billion
- \$5.1-\$20 billion
- more than \$20 billion

## Number of Projects by Province/Territory and Total Value within Top100



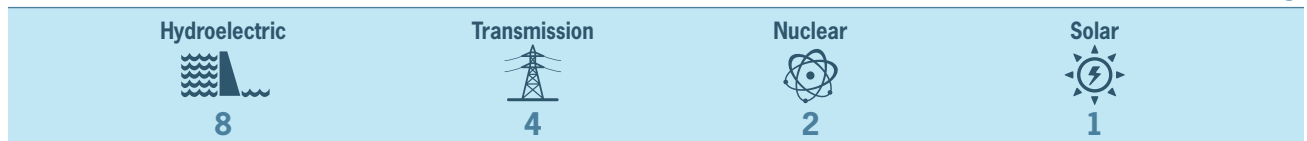
## Sectors by Province

	BC	AB	SK	MB	ON	QC	NS	NL	YT	NWT
Buildings	4	3	1		11	4	1	1		
Energy	2	1		2	4	5		1		
Transit	2	3			18	5				
Transportation	5	4			5	3			1	1
Other	3	3		2	5					1

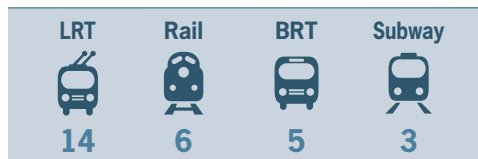
The ESAP Energy Services Modernization has been counted in the 'Buildings' category for both ON and QC.

## Projects by Sector

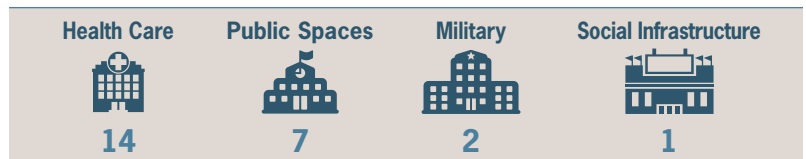
### Energy



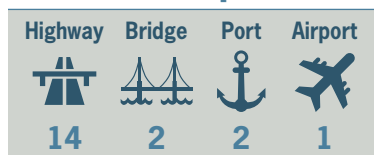
### Transit



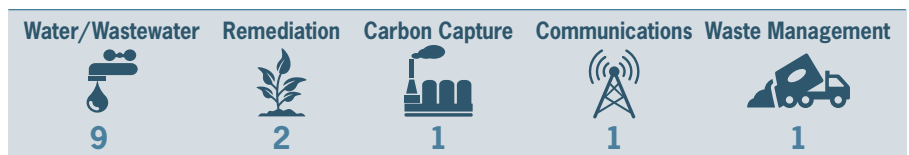
### Buildings



### Transportation



### Other





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**CONSTRUCTION**



Credit: Metrolinx

**1** GO Expansion Projects – On Corridor

**\$15.334 billion** 

**NEW**

**Location:** Greater Toronto and Hamilton Area

**Owner:** Metrolinx

**Project Manager:** Infrastructure Ontario

**Other Key Players:** Parsons (systems work)

**Funding:** P3

The GO Expansion Projects – On Corridor work consists of the core infrastructure and services that will allow Metrolinx’s rail corridor to run two-day, all-day service at a frequency of every 15 minutes, throughout the Greater Toronto and Hamilton Area (GTHA) network.

The scope of the work, as defined by Infrastructure Ontario through the procurement process, includes:

- Operation of train services including train driving.
- Timetable planning, train control, and dispatch for all operators across the GO-owned rail network.
- Design, build, finance, integration, maintenance, rehabilitation, or renewal of the railway corridor (civil infrastructure, tracks, systems, signalling, rolling stock, etc.).
- Refurbishment, maintenance, servicing, and cleaning of all rolling stock and procurement of new rolling stock.
- Construction of new maintenance and train storage and/or layover facilities.
- Reconstruction of Union Station track and platforms.
- Compliance with Metrolinx safety, security, and emergency management policies.

The four pre-qualified consortiums were announced on May 30, 2019. The proposal process is underway, with the successful proponent to be announced in 2020. The project is expected to be completed in late 2025.

**FOUR CONSORTIUMS QUALIFY FOR RFP**

The May 2019 announcement of the pre-qualified teams for the RFP were:

**EnTransit**

- **Applicant Lead:** SNC-Lavalin Capital, Siemens Project Ventures, Keolis
- **Construction Team:** SNC-Lavalin, Siemens
- **Design Team:** SNC-Lavalin, Siemens, Balfour Beatty Rail
- **Operations and Maintenance Team:** Keolis SNCF, SNC-Lavalin, Siemens
- **Financial Advisor:** National Bank

**MTR Kiewit Partners**

- **Applicant Lead:** MTR, Kiewit
- **Construction Team:** MTR, Kiewit
- **Design Team:** MTR, Arup, Mott Macdonald
- **Operations and Maintenance Team:** MTR
- **Financial Advisor:** Scotiabank

**ONcore Transit**

- **Applicant Lead:** ACS
- **Construction Team:** Dragados Canada
- **Design Team:** AECOM, Sener
- **Operations and Maintenance Team:** ACSIC, RATP Dev, Bombardier
- **Financial Advisor:** Astris Finance and Rubicon

**ONxpress Transportation Partners**

- **Applicant Lead:** Aecon Concessions, John Holland, Meridiam Infrastructure, Alstom Transport Canada
- **Construction Team:** Aecon IM, John Holland, Alstom
- **Design Team:** WSP, Hatch, Alstom
- **Operations and Maintenance Team:** Deutsche Bahn, John Holland, Aecon O&M
- **Financial Advisor:** RBC Dominion Securities



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Photos: Bruce Power

**2** **Bruce Power Refurbishment**  
**\$13 billion** 

**2019 Rank:** 1

**Location:** Tiverton, Ontario

**Owner:** Bruce Power

**P3/Project Team:** DBFM Team

**(Office Complex and Training Facility)**

Concert Infrastructure, Bird Construction, Stantec, Concert Realty Services, Stonebridge Financial Corp.

**Engineer:** Hatch (preliminary/planning study); Wood Group (design)

**Contractor:** AECOM, Aecon, AREVA NP (Unit 6 steam generator replacement); Black & McDonald (Unit 6 mechanical and electrical projects)

**Legal:** Osler (lead counsel); Torys (acting for the lender)

**Other Key Players:** WSP (drafting support); Golder; Deloitte; AGAT Labs (analytical testing); Burns & McDonnell (integrated project controls support)

**Supplier:** Laker Energy Products (end fittings, liners, and flow elements); BWXT Canada Inc. (steam generators); Nu-Tech Precision Metals (zirconium alloy pressure tubes); Cameco Fuel Manufacturing (calandria tubes and annulus spacers)

**Funding:** Private

In December 2015, Bruce Power announced its plan to refurbish six of its eight nuclear reactors at its plant near Kincardine, Ont. The project, originally scheduled to commence in 2016, was postponed until 2020 based on the usable life of the reactors. The 15-year refurbishment project will include work on six of the plant's eight CANDU reactors. The eight reactors produce 6,300 megawatts of power annually, approximately 30 per cent of Ontario's current energy usage.

The Bruce Power refurbishment project will make up to 23,000 jobs possible and generate about \$6.3 billion in annual economic benefits in communities throughout the province.

The new agreement between the Ontario government and Bruce Power has achieved \$1.7 billion in savings for electricity customers when compared to the forecast in the 2013 Long-Term Energy Plan (2013 LTEP). This means a reduction in forecast household electricity bills by about \$66 each year over the next decade, according to the Ontario government.

Bruce Power is investing approximately \$13 billion of its own funds to cover the costs associated with the refurbishment, and agrees to take full risk of cost overruns on refurbishments of the six nuclear units.

Throughout 2019, Bruce Power continued to sign contracts with key component suppliers for the refurbishment project. In October, it announced that delivery of the zirconium alloy pressure tubes were set to begin, equipment that will be used for the Unit 6 Major Component Replacement Project.

**Energy Development in Canada**

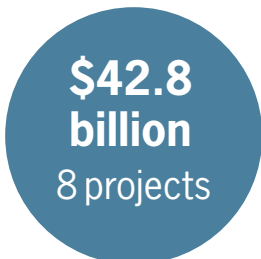
Total investment in Energy: **15 projects at \$73 billion**

**Generation**

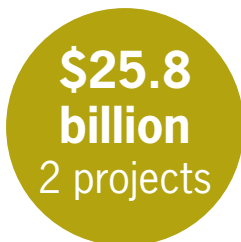
- \$69.1 billion
- 11 projects

**Transmission**

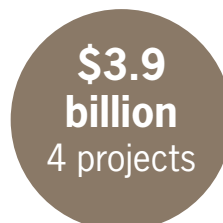
- \$3.9 billion
- 4 projects



 **Hydroelectric**



 **Nuclear**



 **Transmission**



 **Solar**



# Powering the future.

Bruce Power delivers clean, reliable, low-cost nuclear power to families and businesses across Ontario and life-saving medical isotopes across the globe. January 2020 marks the official start of our Major Component Replacement program (MCR) which will refurbish our nuclear fleet and help secure the site's operation until 2064. MCR will generate 22,000 direct and indirect jobs in Ontario and \$4 billion in annual economic benefit to the province with 90% of the spending staying in Ontario.







Credit: OPG

### 3 Darlington Nuclear Refurbishment

**\$12.8 billion** 

**2019 Rank:** 2

**Location:** Clarington, Ontario

**Owner:** Nalcor Energy; Ontario Power Generation

**Project/Construction Manager:** Aecon Group Inc./SNC-Lavalin JV (execution phase of the Retube and Feeder Replacement)

**Engineer:** Wood Group (consulting)

**Contractor:**

- Generation: Andritz Hydro Canada, Astaldi Canada, Barnard-Pennecon JV
- Transmission: GE Energy (formerly Alstom Grid Canada and Alstom Renewable Power Canada), Andritz Hydro Canada, H.J. O’Connell Construction, Valard Construction

**Legal:** Blake, Cassels & Graydon; Torys (acting for the owner)

**Other Key Players:** GE Power; ABB; Amec Foster Wheeler; Deloitte; Kiewit; Black & McDonald; Tetra Tech; BDI Canada; Burns & McDonnell/Modus (Independent Project Oversight); Cameco (calandria tubes and annulus spacers); Alstom Power & Transport Canada Inc. (turbine generator refurbishment); Hatch (engineering services); Armtec; Comtech (Project Control Consultant Services); Golder

**Supplier:** DECAST; Laker Energy (nuclear components); Nu-Tech Precision Metals (calandria tubes)

**Funding:** Public

The commencement of the execution phase marks the joint venture’s (JV) successful delivery of the definition phase (2012-2016) of the project. This included the construction of a full-scale reactor mock-up facility to simulate key elements of the refurbishment work and the testing of specialized tooling and to help prepare a comprehensive estimate and schedule for the project.

A \$35-million reactor vault mock-up and re-tube and feeder replacement (RFR) was completed as part of the preliminary phase of the refurbishment project. Led by SNC Lavalin Nuclear (SLN) and Aecon Nuclear, the mock-up helped to train the team for feeder and fuel channel replacements to be undertaken as part of the overall refurbishment project.

The execution phase of the project will involve the replacement of main reactor components using tools and methods that were developed and tested during the project’s definition phase, carried out by the JV. Each of the four Darlington Candu reactors will be taken out of service sequentially for approximately three years to allow for the replacement of fuel channels, feeder pipes, calandria tubes, and end fittings. The first outage took place in October 2016, with the first reactor scheduled to be down for 40 months. The overall project is scheduled for 112 months.

In October, the installation of all 960 feeder tubes for Unit 2 had been completed. Work on Unit 3 is set to commence in 2020.

## Funding Source Breakdown

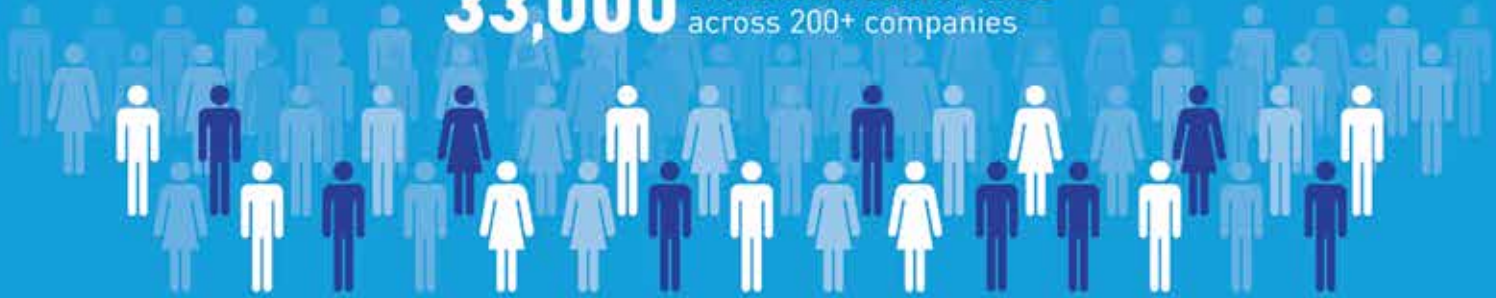
Sector	Total Investment	Federal	Provincial	Municipal	Private
Energy	\$73 billion	\$3.5 billion	\$49.5 billion	–	\$20 billion
Transit	\$88.4 billion	\$10.7 billion	\$64.5 billion	\$10.2 billion	\$3.0 billion
Transportation	\$31 billion	\$8.9 billion	\$16.3 billion	\$2.0 billion	\$3.8 billion
Buildings	\$34.9 billion	\$10.0 billion	\$21.0 billion	\$0.4 billion	\$3.5 billion
Water/Wastewater	\$9.0 billion	\$1.2 billion	\$1.6 billion	\$5.8 billion	\$0.4 billion
Remediation	\$1.3 billion	\$1.3 billion	–	–	–
Carbon Capture	\$1.2 billion	\$0.1 billion	\$0.2 billion	–	\$0.9 billion
Communications	\$0.8 billion	–	\$0.8 billion	–	–
Waste Management	\$1.2 billion	\$0.4 billion	\$0.4 billion	\$0.4 billion	–
<b>2020 Top100</b>	<b>\$240.8 billion</b>	<b>\$36.1 billion</b>	<b>\$154.3 billion</b>	<b>\$18.8 billion</b>	<b>\$31.6 billion</b>



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**76,000** DIRECT and INDIRECT JOBS are created by Canada's nuclear industry

**33,000** of these are DIRECT JOBS across 200+ companies



## PEOPLE UNDER 40

make up 40% of the workforce

## WOMEN

make up 16% of the workforce

## INDIGENOUS PEOPLE

make up 3% of the workforce (40% in uranium mining)

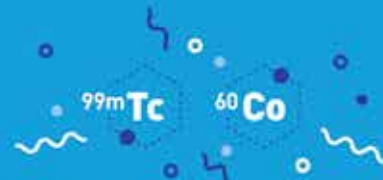
Nuclear jobs are high-quality jobs



**47%**  
TECHNICAL



**42%**  
PROFESSIONAL



**8,500** people work in the production of NUCLEAR ISOTOPES



The GDP impact of the industry is

**\$17B**  
PER YEAR



SMALL MODULAR REACTORS will mean even more Canadian

**JOBS**



Credit: Nalcor Energy

4

## Muskrat Falls Project

**\$12.7 billion** 

**2019 Rank:** 3

**Location:** Muskrat Falls, Newfoundland and Labrador

**Owner:** Nalcor Energy; Emera (Labrador–Island Transmission Link)

**Contractor:**

- Generation: Andritz Hydro Canada; Astaldi Canada; Barnard-Pennecon JV
- Transmission: GE Energy; Andritz Hydro Canada; H.J. O’Connell Construction; Valard Construction; Pomerleau

**Engineer:** Nalcor Energy; SNC Lavalin; Wood Group (consulting)

**Financier:** TD Securities and Goldman Sachs (co-lead arrangers)

**Other Key Players:** IKC-ONE—Innu Kiewit Constructors: H.J. O’Connell, Neilson, and EBC Inc. (rock and overburden excavation); Hatch (engineering services); Golder; Lafarge and Holcim Canada (cement); EY (advising gov’t.); Aon (risk/insurance advisor to authority); KPMG (advisory services); EXP (quality control work); CRT Construction (subcontractor for concrete installation); Morrison Hershfield (code); AGAT Labs (analytical testing); Deloitte

**Legal:** Cassels Brock & Blackwell (Government of Canada); Dentons (advisor to owner); Fasken (finance counsel to Nalcor); Gowling WLG (counsel to Emera); McCarthy Tétrault (TD Securities/Goldman Sachs); Borden Ladner Gervais (legal advisor)

**Supplier:** Lafarge and Holcim Canada (cement); GE (transformers, rotors, and stators); Mammoet; McKeil Marine; Canam Group

**Funding:** Public/Private

Nalcor Energy leads this development, which includes construction of an 824-megawatt hydroelectric generating facility at Muskrat Falls on the lower Churchill River in Labrador and more than 1,600 kilometres of associated transmission lines and infrastructure that will deliver electricity to Newfoundland and Labrador.

The Government of Newfoundland and Labrador sanctioned the Muskrat Falls Project in December 2012, and construction of the project began in January 2013. Construction has started as planned on all major work sites for the project, including Muskrat Falls, Soldiers Pond, Churchill Falls, the Strait of Belle Isle, and the transmission routes.

Once completed, the project will provide sustainable energy production for residential, commercial, and industrial growth throughout Newfoundland and Labrador in the coming decades.

In October, Nalcor Energy announced that all concrete for the Muskrat Falls civil works, 680,000 cubic metres, had been poured. The project is scheduled to reach substantial completion by the end of 2020.



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Credit: Actual Media



Credit: Cossetta



**5 Eglinton Crosstown LRT**  
**\$12.245 billion** 

**2019 Rank:** 5

**Location:** Toronto, Ontario

**Owner:** Metrolinx

**DBFM Team:** Crosslinx Transit Solutions—ACS Infrastructure Canada, Aecon, EllisDon, SNC-Lavalin, and Dragados Canada

**Contractor:** Design-Build JV: Aecon Infrastructure Management, Dragados Canada, EllisDon, and SNC-Lavalin Constructors (Pacific)

**Engineer:** Jacobs and 4 Transit—WSP, Hatch, and Parsons (consulting engineer, technical advisor, construction oversight); AECOM (consulting engineer, preliminary planning/study, design); Wood Group (consulting)

**Architect:** Station Architects; IBI Group; NORR Limited Architect & Engineers; DIALOG; Daoust Lestage

**Financiers/Banks:** National Bank Financial and Scotiabank Global Banking and Markets (underwriters); Alberta Treasury Branches; Caisse Centrale Desjardins; Bank of Nova Scotia; Bank of Tokyo-Mitsubishi UFJ; and Toronto-Dominion Bank (mandate lead arrangers)

This light-rail transit line will run along Toronto’s Eglinton Avenue between Mount Dennis (Weston Road) and Kennedy Station. Part of the Government of Ontario’s light-rail transit plan for the city, this 19-kilometre corridor will include an 11-kilometre underground portion between Keele Street and Laird Drive. When running at street level, the line will carry passengers in dedicated

right-of-way transit lanes separate from regular traffic with priority signalling at intersections. Travelling at an average speed of 28 km/h, it will link to 54 bus routes, three subway stations and various GO Transit lines. The capacity of the LRT vehicles is 15,000 passengers per hour per direction, with the flexibility to easily remove or add cars. Projected ridership is 5,400 passengers

per hour in the peak direction by 2031.

In May, the first light-rail vehicles had been delivered. By the fall, tunnel work both west and east of Laird Station was nearing completion. Track installation at multiple points on the line is in progress or completed.

The overall project construction is on schedule to reach substantial completion in September 2021.

**Management Consultants:** Infrastructure Ontario; Metrolinx; SEG Management Consultants (fairness advisor); EY (transaction advisor); BMO Capital Markets (financial advisor); Aon (insurance advisor)

**Legal:** Blake, Cassels & Graydon (Metrolinx legal advisor); Fasken (advising lenders to consortium); Borden Ladner Gervais (legal advisor); DLA Piper (Canada)

**Other Key Players:** AECOM (consulting engineer, preliminary planning/study, design); Aon (risk/insurance advisor to authority); Arup (preliminary design work); BTY Group (independent certifier); Caterpillar; Entro; Entuitive (structural eng. consultant); EY (advising gov’t.); EXP (instrumentation and monitoring); Golder; Hanscomb (preliminary and concept designers’ cost consultant for 7 stations); Infrastructure Ontario; INTECH (insurance advisor); McCormick Rankin; Munro (concrete); Norton Rose Fulbright; Obayashi Canada; Kenny Construction; Kenaidan Contracting; Technicore (contractors); URS/Parsons JV (systems design); WSP (program manager and engineer, GIS); CRH Canada (cement supply); Dufferin Construction (prep work); McMillen Jacobs Associates (independent verifier); Mott MacDonald (track design review and tunnel construction management); Englobe (geotechnical studies); CIMA+ (traffic mgmt. and road safety audits); Morrison Hershfield (transit operations and maintenance advisory services); GHD (traffic mgmt., site civil support); AGAT Labs; Comtech (consulting services); Deloitte; Geosolv

**Supplier:** Bombardier (vehicle); DECAST Ltd. (precast tunnel liner segments); CRH Canada (cement); Canam Group (steel fabricator)

**Funding:** P3





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Credit: BC Government



Credit: BC Hydro



**6 Site C Clean Energy Project**  
**\$10.7 billion** 

**2019 Rank:** 4

**Location:** Near Fort St. John, British Columbia

**Owner:** BC Hydro

**DB(F)OM Team (Site C accommodation lodge):** ATCO Two Rivers Lodging Group—ATCO Structures & Logistics Ltd. and Bird Design Build Construction Inc.

**Contractor:**

- Peace River Hydro Partners—ACCIONA Infrastructure Canada, Petrowest Corp., and Samsung C&T Canada (main civil works construction)
- AFDE Partnership—Aecon, Dragados, Flatiron, EBC (spillways civil works)
- Allteck Line Contractors Inc. (transmission line, Site C to Peace Canyon generating station)

**Engineer:** Klohn Crippen Berger and SNC-Lavalin (engineering and design—dam and reservoir); Tetra Tech; BGC Engineering; WSP; R.F. Binnie & Associates; Lasalle | NHC (engineering and design); Associated Engineering (owner’s team—design); Wood Group (consulting)

**Environmental Services:** Golder (EA and permitting, archaeology, agriculture, fisheries and aquatics, socioeconomics); Pathfinder Endeavours Ltd.; Keystone Wildlife Research Ltd.; McMillen; RWDI Air Inc.; Knight Piésold; Industrial Forestry Service Ltd. (environmental and regulatory work); Morrison Hershfield (project review for EA authority); Hemmera

**Turbine Supplier:** Voith Hydro (turbine and generator)

**Legal:** Dentons Canada (owner’s counsel); Borden Ladner Gervais (legal advisor); Bennett Jones (acted for successful proponent); Fasken

**Other Key Players:** AL Sims and Sons (road improvements); Aon (insurance broker to authority); BTY Group (cost consultant); Hatch (environmental permitting); KPMG (lead commercial advisor); McElhanney (engineer, materials testing, environment, and survey); McMillen Jacobs Associates (dam/tunnel analyses: design of tunnel support); Morgan Construction and Environmental (north bank); Paul Paquette & Son’s Contracting (south bank); Kasian Architecture Interior Design and Planning Ltd.; WSP; ATCO Two Rivers Lodging Group (worker accommodation lodge); Paul Paquette and Son’s Contracting Ltd. (south bank clearing); Morgan Construction and Environmental Ltd. (north bank site preparation); Englobe (quality assurance (QA) services); Colliers Project Leaders; AGAT Labs; Wood Group

**Suppliers:** ATB Riva Calzoni Hydro Canada Inc. (hydromechanical equipment); Advanced Precast

**Funding:** Public

- **Provincial** BC Hydro: \$10.7 billion

This hydroelectric earthfill dam on the Peace River includes several components: an earthfill dam 1,050 metres long and 60 metres high, a 1,100-megawatt generating station and associated structures, an 83-kilometre-long reservoir, realignment of six sections of Highway 29, and two 77-kilometre transmission lines along an existing transmission line right-of-way, connecting Site C to the existing provincial power grid.

The project’s rigorous environmental assessment was completed in October 2014 and approval granted after numerous consultation meetings, presentations, and events with the public, Aboriginal groups, and local governments. Preliminary engineering work has been done, including the development of plans for construction access roads, clearing plans, construction materials, geotechnical shoreline investigations, and reviews of highway realignment plans.

In 2017, the new NDP-Green coalition government called for an independent review of the Site C project by the B.C. Utilities Commission to determine if it should be continued, delayed, or cancelled outright. As a result of the delays caused by the investigation, BC Hydro President and CEO Chris O’Riley announced that the project cost had risen by \$610 million. The total forecast project cost now sits \$8.945 billion, with the additional project cost set aside as a contingency fund. The increased cost was associated with the inability to meet the timeline of river diversion in 2019. However, it was determined that the project completion deadline of November 2024 was still attainable.

In June, the project reached a significant milestone, with the breakthrough of the first of two diversion tunnels. Work is also underway on the Highway 29 realignment near Cache Creek.





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**7 GO Expansion Projects – Early Works**

**\$10.523 billion** 

**NEW**

**Location:** Greater Toronto and Hamilton Area

**Owner:** Metrolinx

**Engineer:** Wood Group (consulting); Parsons; Hatch; AECOM

**DBF Team (Highway 401 Rail Tunnel):** Toronto Tunnel Partners

**Applicant Lead:** EllisDon Capital Inc. and STRABAG Inc.

**Construction:** EllisDon Civil Ltd. and STRABAG Inc.

**Design:** WSP Canada Inc., Dr. Sauer & Partners, Amec Foster Wheeler

**Financial Advisor:** EllisDon Capital Inc. and STRABAG Inc.

**DBF Team (Davenport Diamond Grade Separation project):** Graham Commuter Rail Solutions

**Applicant Lead:** Graham Capital Partners LP and Gracorp Capital Ltd.; Graham Construction and Engineering LP

**Construction:** Graham Construction and Engineering LP Design: LEA Consulting Ltd. as Design Lead; EXP; International Bridge Technologies; Brown & Storey Architects Inc. Financial Advisor: Graham Capital Partners LP

**Contractor:** EllisDon (Dufferin/Queen bridge); Kenaidan/Cole Engineering (rapid pedestrian tunnels)

**Other Key Players:** 4-Transit JV (technical advisory services): Hatch, Parsons, WSP; CIMA+ (utilities relocation); Golder; Morrison Hershfield (Owner’s Technical Advisors team (Sub-consultant to Gannett Fleming); Comtech (program/project consulting); Jacobs (program mgmt.); A.W. Hooker (cost consultant); Golder (environmental services); INTECH Risk Management, CIMA+; Deloitte (transaction advisor); Aon; Comtech (mgmt. consulting services); Arcadis (environmental services); DECAST; Hemmera

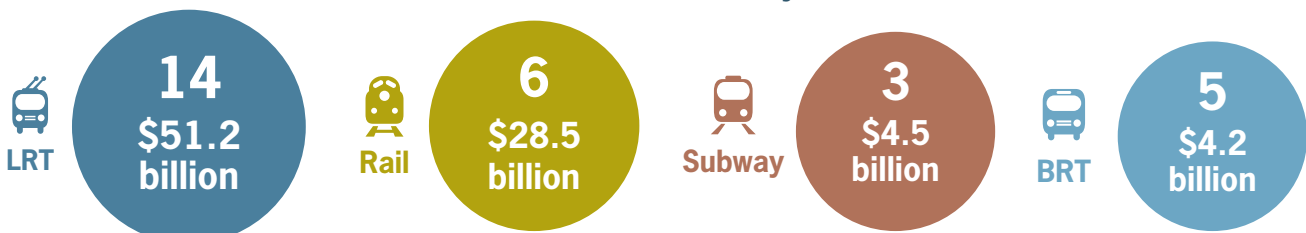
**Funding:** Public

The Early Works portion of the GO Expansion project is one of three blocks of works to be done to accommodate two-way, all-day transit throughout the GTHA corridor. According to the fall 2018 business case, this work represents: “including both on-corridor and off-corridor civil works such as new track, station improvements, grade separations, and utility relocations, that are either enabling infrastructure for future service increases, needed state of good repair improvements or components that can be delivered early, to reduce schedule risk for the program.”

There are over 50 individual projects included in the early works program, including 40 smaller projects delivered as Design-Build or Design-Bid-Build, along with 12 larger projects delivered as Build-Finance and Design-Build-Finance. The latter includes the Davenport Diamond Rail Grade Separation Project, for which the winning bidder of the \$175-million project was selected in July, and the Highway 401 Rail Tunnel, which began construction in March.

**Transit Expansion**

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**8 Keyask Hydroelectric Project**

**\$8.7 billion** 

**2019 Rank:** 6

**Location:** Lower Nelson River, Manitoba

**Owner:** Keyask Hydropower Limited Partnership

**Project/Construction Manager:** Manitoba Hydro (acting as project manager and will operate plant on behalf of KHLP once completed); Tetra Tech (construction management support)

**Engineer:** SNC-Lavalin; Hatch (engineer); KGS Group; AECOM; Wood Group (consulting)

**Contractor:** BBE Hydro Constructors Ltd.—Bechtel, Barnard, and EllisDon

**Environmental Services:** Arcadis Canada Inc.

**Legal:** Fasken (advised Manitoba Hydro); Borden Ladner Gervais (legal advisor)

**Other Key Players:** Aon (risk/insurance advisor to authority); Golder (info mgmt. solution services); Hanscomb (owner’s cost consultant and special advisor); Boston Consulting Group (capital project analysis); Englobe (quality assurance inspection services); WSP (construction surveying); Dillon Consulting (engineering and environmental services)

**Supplier:** Voith Hydro

**Funding:** Public

This 695-megawatt hydroelectric generating station will be a source of renewable energy, producing an average of 4,400 gigawatt-hours of electricity each year. The scope of work includes rock excavation, concrete for the powerhouse and spillway, earthen structures, electrical and mechanical work, and the construction and removal of temporary cofferdams needed to manage the river flow during construction.

Energy produced will be integrated into Manitoba Hydro’s electric system for use in Manitoba and for export. Keyask will be Manitoba’s fourth-largest generating station. The design for the project agreement is based on a partnership model between Manitoba Hydro and the four Keyask Cree Nations, including the Tataskweyak Cree Nation, War Lake First Nation, Fox Lake Cree Nation, and York Factory First Nation.

By the fall of 2019, the project was on target to achieve 97 per cent of all concrete pours, full assembly of Unit 1, and completion of the north, central, and south dams by the end of the year.

All photos: Manitoba Hydro



An aerial photograph of the Keeyask Hydroelectric Generating Station at sunset. The sun is low on the horizon, casting a golden glow over the water and the sky. The station's concrete structure, including a large powerhouse building and a dam with multiple spillways, is visible. The surrounding landscape is a mix of water, rocks, and some vegetation.

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Keeyask Hydroelectric Generating Station, MB

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Credit: Hydro-Québec

**9 Romaine Complex**  
**\$6.5 billion** 

**2019 Rank:** 7

**Location:** Havre-Saint-Pierre, Quebec

**Owner:** Hydro-Québec

**Engineer:**

- Romaine-1: AECOM
- Romaine-2: Groupe RSW and SNC-Lavalin
- Romaine-3: AECOM

**Contractor:**

- Romaine-1: Hamel-CRT, Cegerco, Construction Proco, a consortium of Cegerco and Fernand Gilbert, Groupe Hexagone, Pomerleau, a consortium of J. Euclide Perron and Inter-cité Construction, a consortium of Neilson & EBC Construction, LAR Machinerie and Canmec Industriel.
- Romaine-3: Hamel-CRT, EBC-Neilson, Canmec Industriel, Construction Proco, Couillard Construction, Groupe Hexagone, Groupe LAR, COH, HMI Construction, Neilson-EBC, Cégerco, Nordex, Consortium ATA
- Romaine-4: EBC Inc.; Pomerleau

**Turbine Supplier:**

- Romaine-1: Voith Hydro
- Romaine-3: GE Energy (formerly Alstom)

**Other Key Players:** Tetra Tech (design and construction support); WSP (EA and access roads); CRT Construction (excavation and concreting, road and dam construction); GHD (geotechnical and material technology); CIMA+; Englobe (QA inspection services); EXP (Building plans and specifications and addition/modifications to positions (substations)); Deloitte

**Supplier:** Les Excavations Marchand et Fils (cement)

**Funding:** Public

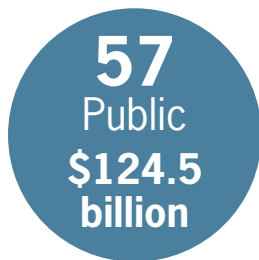
- **Provincial** Hydro-Québec: \$6.5 billion

This 1,550-megawatt hydroelectric complex on the Romaine River involves four generating stations and reservoirs spaced over 150 kilometres along the Romaine River, located on the North Shore of the Gulf of St. Lawrence. Each station will have an associated rockfill dam, two generating units and a spillway. One permanent access road 150 kilometres long will also be built as part of the project linking the generating station to the regional highway.

Hydro-Québec began its work in summer 2009. Romaine-2 was commissioned in 2014, followed by Romaine-1 in 2015, and Romaine-3 in 2017. Work on Romaine-4 is underway, and includes building of all the structures associated with a new power-generation facility: generating station, dam, diversion, spillway, tailrace canal, headrace tunnel, etc. Excavation of the spillway and water intake, along with the temporary diversion structure, were completed in 2018. Romaine-4 is expected to be online in 2020.

**2020 Top100 Project Delivery**

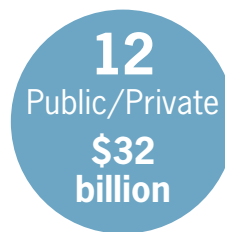
Total Investment: \$240.8 billion



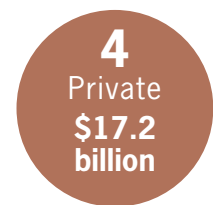
(51.7% of list value)



(27.9% of list value)



(13.3% of list value)



(7.1% of list value)



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Construction site for the Quebec City University Hospital Centre - Laval University, QC



Réseau express métropolitain, QC - Photo: CDPO Infra



Beauharnois Generating Station, QC - Photo: Air Photo Max



Construction site for the Gordie Howe International Bridge, ON







**10** Réseau Express Métropolitain  
\$6.32 billion 

**2019 Rank:** 8

**Location:** Montreal, Quebec

**Owner:** Caisse de dépôt et placement du Québec

**Contractor:**

- Engineering, procurement, and construction contract: Groupe NouvLR—SNC Lavalin Grands Projets Inc.; Dragados Canada Inc.; Groupe Aecon Québec Ltée; Pomerleau Inc.; EBC Inc.
- RSSOM Contract: Groupe des Partenaires pour la Mobilité des Montréalais—Alstom Transport Canada Inc.; SNC-Lavalin O&M Inc.

**Conception:** SNC Lavalin Inc.; Aecom Consultants Inc.

**Architects:** Lemay; Bisson Fortin; Perkins + Will; Provencher Roy

**Engineer:** CIMA+; Hatch

**Legal:** Norton Rose Fulbright (advising CDPQ Infra); Lavery de Billy (advising CDPQ Infra); Borden Ladner Gervais (advised NouvLR); Davies Ward Phillips & Vineberg (advised PMM); Stein Monast (advised the Quebec Government); Fasken (advisor for ARTM)

**Other Key Players:** Hanscomb (advisory services for design, engineering, and costing); EXP (feasibility and diligence studies); WSP (geotechnical); Aon; GHD (geotechnical/testing); INTECH Risk Management; Deloitte (due diligence advisor); Parsons; Englobe; Canam Group

**Funding:** Public-Private

The Réseau express métropolitain (REM) will be a new integrated network linking downtown Montreal, South Shore, West Island, North Shore, and the airport. Once completed, the REM will be the fourth largest automated transportation system in the world after Singapore (82 kilometres), Dubai (80) and Vancouver (68). For the metropolitan area, the REM also represents the largest public transportation infrastructure since the Montréal metro, inaugurated in 1966.

Combined with existing transportation networks (metro, trains, and buses), the REM opens a new era of public transit development in the Greater Montreal area:

- 27 stations—67 kilometres—20 hours a day—7 days a week.
- This constitutes Québec’s first public-public partnership project.

Construction of the line began in April 2018, following the contract award two months earlier.

Significant work is underway throughout the new transit corridor. By the fall, over one-third of the track had been installed on the South Shore, where vehicle testing will take place in the summer or fall of 2020. Tunnel boring equipment had also arrived at the Technoparc construction site.

**Financing**

There are five funding partners involved with the project:

- CDPQ Infra: \$2.95 billion
- Government of Quebec: \$1.28 billion
- Government of Canada (through the Canada Infrastructure Bank): \$1.28 billion
- Hydro Quebec: \$295 million
- ARTM: \$512 million

Al Photos - Caisse





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## 11 Gordie Howe International Bridge

\$5.7 billion 

**2019 Rank:** 9

**Location:** Windsor, Ontario to Detroit, Michigan

**Owner:** Windsor-Detroit Bridge Authority (WDBA)

**Project/Construction Manager:** Deloitte

**DBFOM Team:** Bridging North America—ACS Infrastructure Canada Inc.; Fluor Canada Ltd.; Aecon Concessions, a division of Aecon Construction Group Inc.; RBC Dominion Securities Inc.; AECOM; Carlos Fernandez Casado S.L./FHECOR Ingenieros Consultores, S.A.; Moriyama and Teshima Architects; Smith-Miller + Hawkinson Architects LLP; Dragados Canada Inc.; Aecon Infrastructure Management Inc.; Turner Construction Company; Aecon O&M, a division of Aecon Construction Group Inc.; DBI Services, LLC; URS Federal Services, Inc., an AECOM company

**Engineer:** Morrison Hershfield (PDC consultant); Davis Langdon (an AECOM company); Parsons (owner's engineer); Wood Group (consulting)

**Environmental Services:** Jacobs (environmental monitoring)

**Legal:** Fasken (transaction advisor); Blake, Cassels & Graydon (legal advisor to the proponent)

**Other Key Players:** EY (advising team); Golder (geotech./foundation engineering); Hanscomb (owner's cost consultant and special advisor); Kasian (PDC team); LeighFisher (lender's technical advisor); INTECH Risk Management (insurance advisor); CIMA+ (transmission relocation design); WSP (environmental services); Aon; Parsons (bridge technical advisor); Tetra Tech; Rider Levett Bucknall; A.W. Hooker (cost consultant); Canam Group

**Supplier:** Entro (signage and wayfinding); DECAST

**Funding:** P3

This crossing is the largest and most ambitious binational border infrastructure project along the Canada–United States border. It includes a new six-lane bridge across the Detroit River, associated border inspection plazas, and connections to the freeway systems in Ontario and Michigan. This project will provide a new alternative crossing for this trade corridor.

The Canada-Michigan Crossing Agreement, signed in June 2012 by Canada and Michigan, provided a framework for the construction, financing, operation, and maintenance of the new publicly owned bridge. The agreement called for the establishment of both a crossing authority, known as the WDBA, to deliver, procure, and fund the project through a P3 and an international authority to oversee the project procurement and the compliance with the agreement.

Both the formation of the WDBA (a Canadian Crown corporation) and the international authority were announced in July 2014. The first phase of construction, including the building of a perimeter access road at the Canadian Port of Entry (POE), utility relocations and advance fill placement, was ongoing in 2016.

In addition to the early site works that are ongoing on both the Windsor and Detroit side, Phase 1 activities for the Michigan Interchange with Interstate 75 also got underway in the fall. The completion for Phase 1 of that part of the project is scheduled for winter 2020.

## 12 Southwest Calgary Ring Road

\$5 billion 

**2019 Rank:** 10

**Location:** Calgary, Alberta

**Owner:** Alberta Transportation

**DB(F)O Team:** Mountain View Partners—Meridiam, Kiewit, Ledcor, Connor Clark and Lunn (project lead); Meridiam (financing lead); Kiewit, Graham, Ledcor (design-construction lead); Alberta Highway Services Ltd. (O&M lead)

**Contractor:** KGL Constructors (Elbow River bridge)

**Engineer:** Jacobs (owner's engineer); COWI North America (concept design of highway interchange structures); ISL Engineering and Land Services (owner's engineer); Tetra Tech (owner's engineer); Wood Group (consulting)

**Legal:** Gowling WLG (counsel to Alberta Transportation); Borden Ladner Gervais (legal advisor); Torys (lenders to MVP); Osler

**Other Key Players:** EY; LeighFisher (lenders technical advisor); WSP (functional planning and preliminary eng. services); Aon (risk advisor/broker for preferred proponent); INTECH Risk Management (insurance advisor); Golder; Englobe (concrete quality control); EXP (geotechnical); ARUP (technical advisory services); Morrison Hershfield (structure design review); Parsons; GHD (dust & air monitoring); McElhanney; Deloitte; Hemmera

**Funding:** Public

- **Federal** Up to \$582.9 million (Building Canada Fund)
- **Provincial** \$4,417,100,000 (Alberta Transportation)

In May 2015, a historic land transfer between Alberta and the Tsuu T'ina Nation was finalized, providing certainty that the construction of the southwest segment of the Calgary Ring Road could go forward. This will extend from Lott Creek Boulevard on Glenmore Trail/Highway 8 south to Macleod Trail (Highway 2A) and is approximately 21 kilometres long. The project will also include approximately 10 kilometres of connector road upgrades.

KGL Constructors spent much of the spring and summer focusing on structures and graveling work, as well as preparing for the upcoming significant detours that will be necessary for the project construction. KGL also increased its 24-hour operations throughout the project landscape in an effort to keep the project on schedule despite weather delays that occurred in June. The road remains on schedule to open in late 2021.



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Photos: City of Calgary

**13** **Green Line LRT**  
**\$4.87 billion** 


**2019 Rank:** 11  
**Location:** Calgary, Alberta  
**Owner:** City of Calgary  
**Engineer:** Hatch; Wood Group (consulting)  
**Consulting Architect:** Sturgess Architecture, IBI Group  
**Legal:** Blake, Cassels & Graydon (advising the City of Calgary); Borden Ladner Gervais  
**Other Key Players:** Colliers Project Leaders; CIMA+; RLB; A.W. Hooker (cost consultant); INTECH Risk Management; Deloitte (pre-procurement assessment); Aon  
**Funding:** Public

The Green Line light-rail transit system will add 28 stations and 46 kilometres of track to Calgary’s existing LRT system. The line will run from 16th Avenue north to 126 Avenue SE, with an underground tunnel for the downtown portion of the system. The initial plans were for the Green Line to be constructed as a bus-only transitway, but were later converted to LRT as funding became available.

While procurement for Stage 1 of the Green Line LRT continues, the City of Calgary is moving forward with enabling works construction, supported by \$250 million in combined provincial and federal funding.

In June 2018, project engineers announced that technical challenges would prevent them from moving forward with plans for a four-kilometre tunnel underneath the Bow River. Then in September 2019, the transportation committee for the City of Calgary informed council that the project budget could expand by up to 10 per cent following a constructability review.

The current project schedule calls for construction to begin in 2020, with a completion date of 2027.

**14** **Parliamentary Precinct Rehabilitation Project**  
**\$4.7 billion** 

**2019 Rank:** 12  
**Location:** Ottawa, Ontario  
**Owner:** Government of Canada  
**Project/Construction Manager:** PCL/EllisDon (West Block); PCL/EllisDon JV (Centre Block)  
**Architect:** Arcop (WSP)/Fournier Gersovitz Moss & Associates (West Block)  
**Other Key Players:** Turner & Townsend (risk management services); Colliers Project Leaders Inc. and Tiree Facility Solutions (project management support services for Centre Block); Atwell-Morin (northern ventilation towers rehabilitation for Centre Block); Golder; Morrison Hershfield (code consulting); Engineering Harmonics; EY (business case advisor); Aon  
**Funding:** Public

The Government of Canada is undertaking an extensive rehabilitation of the Parliament Buildings in Ottawa. The West Block and Centre Block will all undergo intensive interior and exterior upgrades throughout the buildings, and extensive work is also being done on the building grounds and support structures.

The West Block, the first scheduled for completion, has included repairs to the exterior masonry, replacement of electrical, mechanical and life-safety systems, asbestos abatement, window and door replacement, structural reinforcement, and technology upgrades to modern standards.

The original plan was to have parliament move to the West Block in time for the fall session, but the timeline was adjusted to have MPs move in time for the 2018-19 winter session, which began on January 28, 2019. Construction of the Centre Block, however, began in the fall of 2018 as scheduled. The Senate Chamber has been moved to the Government Conference Centre.

To date, the Treasury Board has approved an investment of \$4.7 billion for the delivery of the Long Term Vision and Plan for the Parliamentary Precinct, of which \$3 billion was spent as of March 31, 2018. Included within the approved funding are major projects such as the rehabilitation of the West Block, Visitor Welcome Centre Phase 1, Government Conference Centre, Sir John A. Macdonald Building, the Wellington Building, along with the initial spending authority for the rehabilitation of the Centre Block, the East Block, 100 Wellington, and funding for other projects in the Parliamentary Precinct. The work is expected to take until at least 2027, but could be extended as far as 2033.



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**15** **Ottawa LRT – Stage 2**  
**\$4.657 billion** 

**2019 Rank:** 18

**Location:** Ottawa, Ontario

**Owner:** City of Ottawa

**Engineer:** McMillen Jacobs Associates (owner’s tunnel engineer); Morrison Hershfield (owner’s engineer); Golder (owner’s engineer team); Parsons

**Environment Services:** WSP (environmental lead)

**Legal:** Borden Ladner Gervais (legal advisor); Norton Rose Fulbright (advisor for project owner); Osler; Torys (acted for lender)

**Other Key Players:** EXP (instrumentation and monitoring); Hanscomb (owner’s cost consultant and special advisor); Aon (owner advisor and construction insurance broker); INTECH Risk Management (insurance advisor); AECOM (owner’s representative); GHD (testing, inspection, and geotechnical services); Golder; Enstoa; SNC-Lavalin; WSP (geotechnical); Dragados (vehicles and systems provider); Deloitte; A.W. Hooker (cost consultant); EY (bid advisor); Englobe; EllisDon (O&M)

**Supplier:** DECAST Ltd.; Thales (signaling technology)

**Funding:** P3

Ottawa’s mayor, council, and representatives from the city’s business, tourism, and academic communities officially launched the Ottawa LRT Stage 2 funding request to the federal and provincial governments. Stage 2 will further reduce commute times by adding 19 new stations and 30 kilometres of rail to Ottawa’s O-Train system between 2018 and 2023. It was recently confirmed through EA work it can be constructed within the \$3-billion budget established in the city’s 2013 Transportation Master Plan.

The project will:

- Extend the Confederation Line east from Blair to Orléans, with stations at St. Joseph, Jeanne D’Arc, Orléans Drive, and Place d’Orléans.
- Extend the Confederation Line west to Algonquin College and Bayshore, with stations at Westboro, Dominion, Cleary, New Orchard, Lincoln Fields, Queensview, Pinecrest, Iris, Baseline and Bayshore,
- Extend the O-Train to Riverside South and Bowesville, with a new station at Gladstone, and stations at Walkley, South Keys, Leitrim, and Bowesville.



Credit: City of Ottawa

Early works are underway for the extensions in all three directions, and this work has only intensified since the completion of the Confederation Line. For the east extension, summer 2019 marked the start of lane widening work on Highway 174 eastbound. For the west, realignment work on the Sir John A. MacDonald Parkway was close to completion, which will make way for a cut-and-cover trench/tunnel Dominion Station and the to-be-constructed Cleary Station. For the south extension, site clearing measures got underway in September at the home of the future Rail Maintenance and Storage Facility.

**16** **Hurontario LRT**  
**\$4.6 billion** 

**2019 Rank:** 41

**Location:** Mississauga and Brampton, Ontario

**Owner:** Metrolinx

**Project Manager:** Infrastructure Ontario

**DBFOM Team:** Mobilinx Hurontario General Partnership

**Applicant Lead:** John Laing, Astaldi, Hitachi, Transdev, Amico Concessions, Salini Impregilo

**Construction:** Astaldi, Hitachi, Amico, Bot, Salini Impregilo Design: IBI Group, Hitachi, Morrison Hershfield, Arcadis, Daoust Lestage, EXP

**Operation Maintenance & Rehabilitation Provider:** Transdev, Hitachi, Astaldi, Salini Impregilo

**Financial Advisor:** National Bank, HSBC

**Construction Manager:** SNC-Lavalin (preliminary design/EA phases)

**Contractor:** PCL (maintenance facility)

**Engineer:** SNC-Lavalin (project lead); Steer Davies Gleave (preliminary engineering); AECOM (technical advisory services)

**Legal:** Borden Ladner Gervais (legal advisor); Torys (acted for lender)

**Other Key Players:** DIALOG (urban design); Dufferin Construction; Golder (preliminary geotechnical services); Hanscomb (preliminary design engineer’s cost consultant); Hatch; LEA Group (ITS); Aon (owner advisor and construction insurance broker); AECOM (owner’s representative/technical advisor); EY (financial and transaction advisory); Morrison Hershfield (transit O&M advisors); AGAT Labs; Comtech (program/project consulting); DECAST; RLB; Jacobs (program mgmt.); INTECH Risk Management; Arcadis (environmental services); Deloitte (financial advisor)

**Funding:** Public

The Hurontario light-rail transit (LRT) project will bring 20 kilometres of fast, reliable, rapid transit to the cities of Mississauga and Brampton along the Hurontario corridor. New, modern light-rail vehicles will travel in a dedicated right-of-way and serve 22 stops with connections to GO Transit’s Milton and Lakeshore West rail lines, Mississauga MiWay, Brampton Züm, and the Mississauga Transitway BRT. Funded through a \$1.4-billion commitment from the Province of Ontario, the Hurontario LRT is a signature project of the Moving Ontario Forward plan.

The Hurontario LRT will provide a significant benefit to the communities of Mississauga and Brampton, and be an integral component of the GTHA’s broader transportation network.

Mobilinx was named the preferred proponent for the project in August 2019, with financial close on the \$4.6-billion contract reached in October. Construction will begin in 2020.





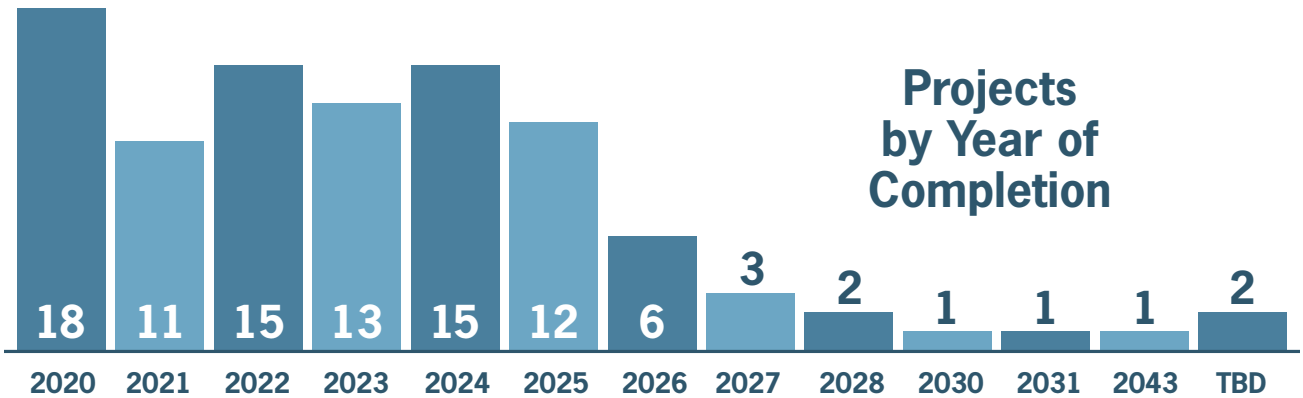
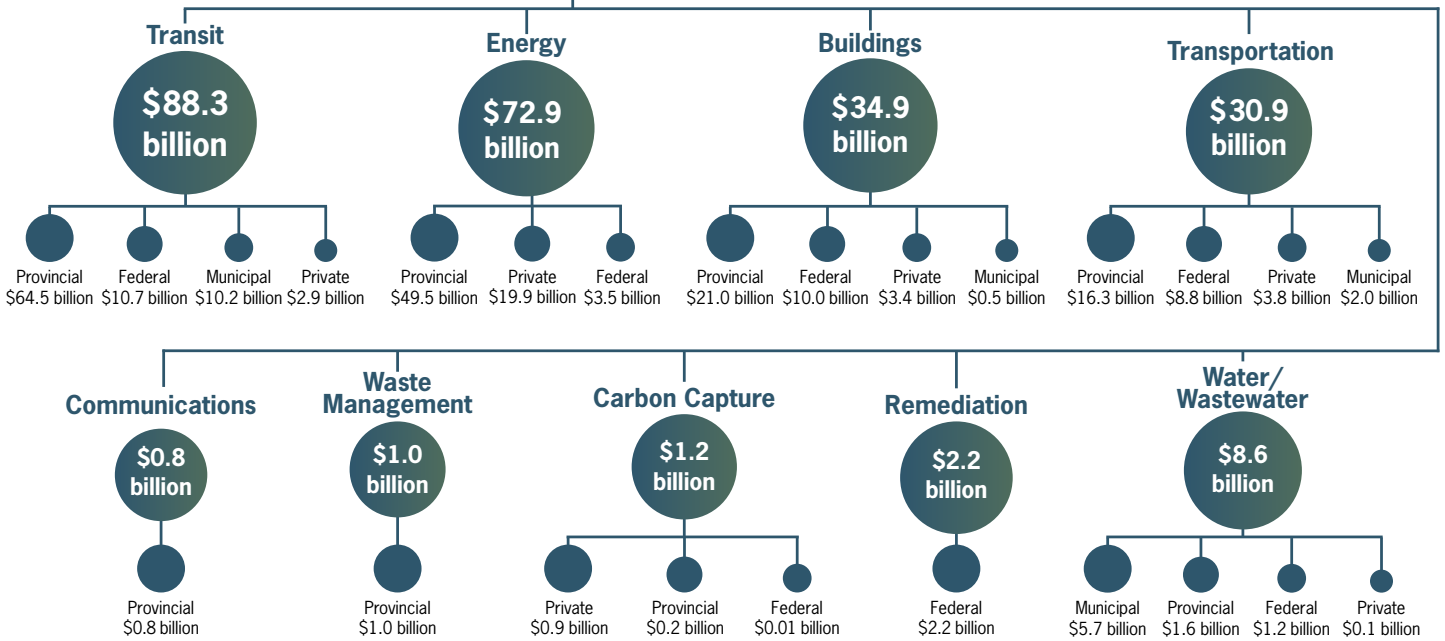
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- Federal: \$36.4 billion
- Private: \$31.1 billion
- Municipal: \$18.4 billion



**Top100 Projects**  
PLATINUM ELITE 2019

20 projects or more

**Top100 Projects**  
PLATINUM 2019

10 to 19 projects

**Top100 Projects**  
GOLD 2019

6 to 9 projects

**Top100 Projects**  
SILVER 2019

3 to 5 projects

**Top100 Projects**  
BRONZE 2019

2 projects

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**17 Blue Line Extension**

**\$3.9 billion** 

**2019 Rank:** 15

**Location:** Montreal, Quebec

**Owner:** Société de transport de Montréal

**Project Manager:** ARTM

**Other Key Players:** EXP (JV for engineering services); Englobe

**Funding:** Public

The Blue Line Extension project will add 5.8 kilometres of track and five new stations to the current 12-station Blue Line, one of four Metro lines that runs through the Greater Montreal Area. The extension will run along Jean-Talon Street, ending at the Galeries D’Anjou shopping mall next to Highway 25.

In 2019, funding support from the federal government was announced, with one-third of the proposed project price (\$1.3 billion) allocated. However, two months earlier, it was reported that the cost of the project could escalate by \$600 million to \$4.5 billion, based on increased expropriation and tax bill costs. But the final cost will not be announced until the final business case is presented by the Société de transport de Montréal (STM) in 2020. Work is expected to start in the winter of 2021.



Credit: HPH Turcot

**18 Turcot Interchange**

**\$3.67 billion** 

**2019 Rank:** 16

**Location:** Montreal, Quebec

**Owner:** Transports Québec

**Project/Construction Manager:** AECOM and BPR-Batiment

**Design-Build Team:** KPH Turcot—Kiewit, Parsons, WSP, and Holcim Canada

**Engineer:** Consortium Génivar/Dessau; Consortium Inspec-Sol inc./EXP; CIMA+; Dessau; Inspec-Sol inc.; Englobe (environmental, geotechnical and materials engineering); WSP (independent engineer); Tetra Tech (part of owner’s engineer team); Hatch (rail engineer)

**Contractors:** Axxys Construction; CMS Entrepreneurs généraux; Construction Demathieu & Bard; Construction DJL; Construction Garnier; DB-AECOM Pont Saint-Jacques S.E.P.; Demix Construction; Demvar; EBC Inc.; Entreprises de construction Panzini; Excavation Loiselle & Frères; Golder Construction; Groupe Hexagone, S.E.C.; Groupe TNT; Hulix Construction; Jacques Arsenault Asphalte; L.A. Hébert Ltée; Lanco Aménagement; Les entreprises Claude Chagnon; Les Grands Travaux Soter; Les services de construction Demo Spec; Les services environnementaux Delsan-A.I.M.; Louisbourg SBC; Pomerleau; Simard-Beaudry Construction; Tesco 3000; SPG Hydro International; TNT2

**Environmental Services:** Consortium Dessau-Soprin/Les Consultants S.M. (environmental impacts study); Dessau-Soprin (environmental study and decontamination); Groupe Qualitas (environmental study); EXP (environmental study); Amphibia-Nature (environmental study on brown grass snake); Sėti Media (environmental study); Tecslut

**Financiers/Banks:** PricewaterhouseCoopers

**Legal:** Dentons Canada (legal counsel, under the authority of the Societé québécoise des infrastructures); Borden Ladner Gervais

**Other Key Players:** WSP (designer, environmental, geotechnical work); Arup (technical advisor, independent certifier); AOR (geotechnical study); Axor experts-conseils (site supervision); Coentreprise Groupe Qualitas/Englobe-Technisol (geotechnical study); ConsultRail (study on railway equipment); Daniel Arbour & associés, S.E.N.C. (study on highways); Ethnoscop (archaeological studies); Génius Conseil (site supervision); Les Conseillers Adec (economic study); Patrimoine Experts S.E.N.C. (archeological excavations); Raymond Chabot Grant Thornton & Cie (assurance and guarantees); Trimax Sécurité (site supervision); Aon (insurance broker); GHD (geotechnical design/materials); Englobe (audits)

**Supplier:** Canam Group (steel superstructure and components)

**Funding:** Public

The Turcot Interchange is a major traffic hub in the Montréal area, connecting Autoroutes 15, 20 and 720, and facilitating access to the Champlain Bridge. It is also a vital link between the Montréal Pierre-Elliott-Trudeau International Airport and downtown. The final plans for the reconstruction of the deteriorating expressway interchange include more space allocated to public transit, cyclists, pedestrians and green space. Several bus-only lanes have been reserved along Highway 20, Notre Dame Street West and St. Patrick Street.

Multiple projects continue on all areas of the new interchange as the build nears its 2020 completion date. However, 2019 did mark the completion of the A-720/A-20 interchange.





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Photo: CHUM

**19** Centre hospitalier de l'Université de Montréal (CHUM) and Research Centre

**\$3.63 billion** 

**2019 Rank:** 17

**Location:** Montreal, Quebec

**Owner:** Centre hospitalier de l'Université de Montréal

**Project/Construction Manager:** Groupement SLDG, led by SNC-Lavalin

**Research Tower DBFM Team:** Accès Recherche Montréal—Pomerleau and Verreault, a subsidiary of Dessau.

**Hospital DBFM Team:** Collectif Santé Montréal—Laing O'Rourke, Obrascón Huarte Lain, Innisfree, and Dalkia Canada

**Contractor:** EBC Inc.

**Engineer:** AECOM; Consortium Pageau Morel, BPR Bâtiment, LBHA, and SDK NCK (Research Centre); HH Angus, Pasquin St-Jean, and Groupe SMi International (Hospital)

**Financiers/Banks:** Research Centre: Axiom Infrastructure and Meridiam Infrastructure; Hospital: Innisfree (30%), Laing O'Rourke (25%), Obrascón Huarte Lain (25%), Dalkia Canada (20%), and RBC Dominion Securities (underwriter)

**Consulting Engineer:** Tetra Tech (mechanical/electrical engineering)

**Architect: Research Centre:** NFOE et Associés, Menkès Shoener Dagenais LeTourneux, Jodoïn Lamarre Pratte (sub-consultant), Lemay et Associés, Parkin Architects; **Hospital:** Cannon Designs, NEUF Architectes

**Legal:** Research Centre: Blake, Cassels & Graydon; Hospital: Fasken (advised authority), Lavery, de Billy (legal counsel); Blake, Cassels & Graydon (legal advisor); Gowling Lafleur Henderson (repped consortium); McCarthy Tétrault (advised RBC); Stikeman Elliott (repped Dalkia); Raymond Chabot Grant Thornton (financial and process advisor); Dentons Canada (legal advisor); Torys (owner); Borden Ladner Gervais

**Other Key Players:** BTY Group (lenders technical advisor); Hatch (independent certifier); Hanscomb (mechanical and electrical cost consultant and special advisor); INTECH Risk Management (insurance advisor); Société québécoise des infrastructures; SNC-Lavalin, WSP (owner's advisor); Colliers Project Leaders; GHD (geotechnical & materials); EXP (MEP services); Deloitte (financial advisor); Aon; Englobe

**Supplier:** Demix Beton (concrete)

**Funding:** Public/Private

A new hospital and research centre will replace the three facilities which currently make up the Centre hospitalier de l'université de Montréal (CHUM): Hôtel-Dieu in Montréal, Notre-Dame Hospital, and Saint-Luc Hospital. The project received the go-ahead in 2010, which brings all three francophone university hospitals together under one roof.

Phase 1, construction of the research centre, was opened in the fall of 2013. Phase 2 of the project—three 25-storey buildings that will each house therapeutic and hospital diagnostic services, emergency, and clinical follow-ups as well as clinical and logistical support—welcomed its first patients in early October 2017. Phase 3 of the project, now underway, consists of the construction of an adjacent building to accommodate part of the outpatient clinics, clinico-administrative offices, library, archives, a 500-seat amphitheatre, and another parking section. Phase 3 is scheduled for completion in 2021.



# Top100 PROJECTS DINNER: FEBRUARY 18, 2020



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**20** Scarborough Subway Extension

**\$3.56 billion**



**2019 Rank:** 19

**Location:** Scarborough, Ontario

**Owner:** TTC

**Project Manager:**

Scarborough Link Joint Venture—Parsons, Hatch, WSP

**Contractor:** Hatch

(tunnel design); WSP (systems design and management); AECOM (station design)

**Environmental Services:**

AECOM

**Other Key Players:** Aon (risk/insurance advisor to authority); EY (advising gov't.); Golder (owner's consultant); Hanscomb (station designer's cost consultant); Englobe (geotechnical investigation); AGAT Labos; Comtech (property consulting services); Wood Group

**Funding:** P3

The Scarborough Subway Extension is a six-kilometre extension of Toronto's Line 2 subway system, providing a direct link from Kennedy Station to Scarborough Centre. The new line will run along the McCowan Corridor, with the new station located on the west side of McCowan Road between Triton Avenue and Progress Avenue. The project also includes a new bus terminal to link subway riders to local and regional bus routes.

Originally, the Scarborough transit

project had been designed as a seven-stop light-rail transit system, and had received funding from both the federal and provincial government. The funding envelope, including the contribution from the municipality, sat at \$3.56 billion, just over \$200 million more than the current anticipated cost of the one-stop subway.

The Ford government has installed the Scarborough Subway Extension into its estimated \$28.5-billion transit plan for Toronto, which would re-institute a

three-stop subway. Under the new plan, the Request for Qualifications for the project would be released in 2021, with completion by 2030. A final cost of the project has not yet been determined; however, the estimate provided at the time of the announcement (April 2019) was \$5.5 billion. As the scoping had not been finalized by the time this report was released, the project value remains at the number committed to by the municipality, which is the aforementioned \$3.56 billion.

**21** Finch West LRT

**\$3.433 billion**



**2019 Rank:** 21

**Location:** Toronto, Ontario

**Owner:** Metrolinx

**Project/Construction Manager:**

Parsons (project management, engineer, and environmental assessment); Infrastructure Ontario

**DBFM Team:** Mosaic Transit

Partners—ACS Infrastructure Canada Inc.; Aecon Concessions—a division of Aecon Construction Group Inc.; CRH Canada Group Inc.

**Construction:** Aecon Infrastructure and Management Inc.; Dragados Canada Inc.; Dufferin Construction Company—a division of CRH Canada Group Inc.

**Design:** Arup Canada Inc.; Dillon Consulting Limited; DPM Energy Inc.; DTAH; Perkins + Will Canada Inc.; Sener SES Canada Inc.

**Maintenance:** ACS Infrastructure Canada Inc.; Aecon O&M—a division of Aecon Construction Group Inc.

**Financial Advisor:** RBC Dominion Securities Inc.

**Engineer:** Jacobs (owner's engineer and project manager); WSP (engineer/sustainability consultant); Hatch (owner's engineer)

**Consulting Engineer:** WSP (geotechnical consultant)

**Vehicle Supplier:** Bombardier

**Legal:** Norton Rose Fulbright

**Other Key Players:** AECOM (technical advisor); Aon (risk/insurance advisor to authority); EY (advising gov't.); Infrastructure Ontario (managing procurement/construction); LeighFisher (lenders technical advisor); Parsons (overseeing technical advisor); INTECH Risk Management (insurance advisor); Morrison Hershfield (MEP design services); GHD (traffic mgmt.); Golder; Comtech (program/project consulting); Rider Levett Bucknall; Englobe

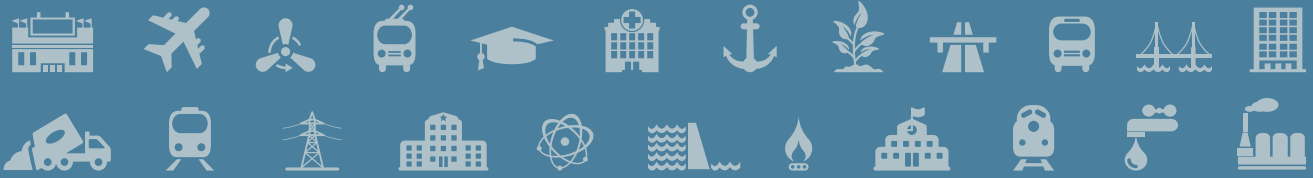
**Supplier:** Dufferin Concrete; DECAST (precast infrastructure)

**Funding:** P3

Located along Finch Avenue West in the city's northwest end, the LRT will be integrated with the city's existing transit system. The project includes 11 kilometres of new semi-dedicated rapid transit between Humber College and the new Finch West subway station on the Toronto-York Spadina subway extension; 18 surface stops and a below-grade interchange station to connect with the new Finch West subway station; and a maintenance and storage facility for the light-rail vehicles.

By the fall of 2019, preparatory activities for the new line were well underway. This includes the relocation of utilities, tree removals, site clearing activities, and the restructuring of sidewalks and roadways.





# A Decade of Infrastructure

Looking back at a decade of Top 5 projects

2020

- 1 GO Expansion Projects – On Corridor
- 2 Bruce Power Refurbishment
- 3 Darlington Nuclear Refurbishment
- 4 Muskrat Falls Project
- 5 Eglinton Crosstown LRT

2019

- 1 Bruce Power Nuclear Refurbishment
- 2 Darlington Nuclear Refurbishment
- 3 Muskrat Falls Project
- 4 Site C Clean Energy Project
- 5 Eglinton Crosstown LRT

2018

- 1 Bruce Power Nuclear Refurbishment
- 2 Darlington Nuclear Refurbishment
- 3 Muskrat Falls Project
- 4 Site C Clean Energy Project
- 5 Eglinton Crosstown LRT

2017

- 1 Bruce Power Nuclear Refurbishment
- 2 Darlington Nuclear Refurbishment
- 3 Muskrat Falls Project
- 4 Site C Clean Energy Project
- 5 Eglinton Crosstown LRT

2016

- 1 Eglinton Crosstown LRT
- 2 Site C Clean Energy Project
- 3 Muskrat Falls Project
- 4 Romaine Complex
- 5 Keeyask Hydroelectric Project

2015

- 1 Site C Clean Energy Project
- 2 Muskrat Falls Project
- 3 Romaine Complex
- 4 Keeyask Hydroelectric Project
- 5 Eglinton Crosstown LRT

2014

- 1 Site C Clean Energy Project
- 2 Romaine Complex
- 3 Keeyask Hydroelectric Project
- 4 New Champlain Bridge Corridor Project
- 5 Eglinton Crosstown LRT

2013

- 1 Site C Clean Energy Project
- 2 Romaine Complex
- 3 Keeyask Hydroelectric Project
- 4 New Champlain Bridge Corridor Project
- 5 Eglinton Crosstown LRT

2012

- 1 Eglinton Crosstown LRT
- 2 Site C Clean Energy Project
- 3 Romaine Complex
- 4 Lower Churchill Hydro project
- 5 Muskrat Falls Project

2011

- 1 Romaine Complex
- 2 Lower Churchill Hydro project
- 3 Eastmain-1-A/Sarcelle/Rupert Project
- 4 Eglinton Crosstown LRT
- 5 Turcot Interchange

## 22 Energy Services Acquisition Program's Energy Service Modernization

**\$2.95 billion** 

**2019 Rank:** 49

**Location:** Ottawa, Ontario and Gatineau, Quebec

**Owner:** Government of Canada

**Legal:** Norton Rose Fulbright (advisor to project owner)

**Other Key Players:** EY (oversight advisors), Aon

**Funding:** Public

- **Federal:** \$2.95 billion

Public Works and Government Services Canada (PWGSC) is responsible for heating and cooling services for 80 and 67 buildings respectively within the National Capital Region (NCR). The Energy Services Acquisition Program was established in 2009 to “explore new business models for the provision of energy services in the NCR.”

The modernization project looks for an energy services solution for PWGSC’s five Central Heating and Cooling Plants (CHCP) and their associated distribution networks within the four National Capital region service areas, three of which are in Ottawa and one in Gatineau. The five CHCPs service 79 total buildings.

In March 2018, Innovate Energy and Rideau Energy Partners were named as the two proponents that will bid on the project. Once their proposals are submitted, Public Services and Procurement Canada will consider elements that extend beyond cost. For instance, the firms will have the opportunity to demonstrate that their technologies can reduce greenhouse gas emissions beyond targets set by Canada. They will also have to provide innovative design features for the Cliff Heating and Cooling Plant, which is located along the Ottawa River and bordered by parliamentary buildings.

Innovate Energy was announced as the successful proponent in June. The contract includes a \$1.1-billion investment for the design and construction of the new system, to be completed by 2025, and an additional \$1.6 billion to cover the cost of operation and maintenance of the system through to 2055.

## 23 Broadway Subway Extension

**\$2.83 billion** 

**2019 Rank:** 20

**Location:** Vancouver, British Columbia

**Owner:** TransLink

**Engineer:** Hatch; Wood Group (consulting)

**Other Key Players:** Golder; McElhanney (assessment and surveying services); Aon; Morrison Hershfield; Entuitive; Hemmera

**Funding:** Public

- **Federal:** \$888.4 million

- **Provincial:** \$1.82 billion

- **Municipal:** City of Vancouver: \$99.8 million (in-kind land contribution), Phase 1 Mayors’ Vision plan: \$17 million



Credit: TransLink

The Broadway Subway Extension will see the addition of six underground stations and 5.7 kilometres of track to the Millennium Line. The extension will run from VCC-Clark Station to Arbutus Street. The line will replace the existing B-line bus service, increasing transit

capacity in the corridor by 250 per cent.

In September 2018, the provincial and federal governments announced more than \$3 billion in funding for both this and the Surrey LRT project.

After announcing three proponents for the project in June, the list had to be

modified due to the withdrawal of SNC-Lavalin from the bidding process. A new shortlist was released in September. That month also saw the station locations revealed for the project. The RFP closes in April, with the preferred proponent to be selected mid-year.

## 24 Valley Line West LRT

**\$2.62 billion** 

**NEW**

**Location:** Edmonton, Alberta

**Owner:** City of Edmonton

**Engineer:** Hatch

**Other Key Players:** EY (financial advisor); Deloitte (financial services advisor); Aon

**Funding:** Public

- **Federal:** \$948.56 million

- **Provincial:** \$1.03876 billion

- **Municipal:** \$637.08 million

The Valley Line West LRT project is the next phase of Edmonton’s light-rail expansion. This project represents a 14-kilometre extension of the existing system from downtown to Lewis Farms.

After announcing the three pre-qualified bidders for the project on May 31, two of the three proponents subsequently withdrew from the process. The City has since conducted a market sounding initiative to understand the reasons for the withdrawal. This is not expected to impact the overall schedule for the project.

Should the successful proponent be named and the construction start on schedule in 2020, the project should be completed in late 2026 or early 2027.



Credit: City of Edmonton



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**25** **New Hospital for Sick Children**  
**\$2.4 billion** 

**2019 Rank:** 22

**Location:** Toronto, Ontario

**Owner:** Hospital for Sick Children

**Contractor:** Patient Support Care Project Team

- Construction manager: PCL Constructors Canada Inc. (Toronto)
- Architect: B + H Architects
- Structural Consultant: Entuitive
- Electrical Consultant: Mulvey & Banani
- Mechanical Consultant: The Mitchell Partnership
- Demolition: Priestly Demolition

**Engineer:**  
 Entuitive (structural);  
 TMP (mechanical);  
 MBII (electrical)

**Architect:**  
 B + H

**Legal:** Borden  
 Ladner Gervais

**Funding:**  
 Public

Dubbed “Project Horizon” by SickKids, the three-phase project to rebuild and rehabilitate The Hospital for Sick Children in Toronto is well underway.

There are three phases to the project, which are expected to take 10 years to complete:

- A new 22-storey Patient Support Centre (ground was broken on this project in October 2019).
- The Peter Gilgan Family Patient Care Tower.
- Renovations to the existing campus.

The Government of Ontario announced it would continue the commitment made by the previous government to build the new Tower, as well as the expansion of the blood and marrow transplant/cellular therapy unit. The renovation of the unit is scheduled for completion in the summer of 2022.



Photos: City of Toronto

**26** **F.G. Gardiner Expressway Strategic Rehabilitation Plan**  
**\$2.3 billion** 

**2019 Rank:** 23

**Location:** Toronto, Ontario

**Owner:** City of Toronto

**Contractor:** Aecon (Section 1)

**Engineer:** Morrison Hershfield (baseline study of substructure components)

**Environmental Services:** Dillon Consulting Limited (environmental assessment); Perkins + Will; Hargreaves Associates

**Legal:** Blake, Cassels & Graydon (City of Toronto); Osler

**Other Key Players:** Ernst & Young, Hanscomb, and HDR (advisory support); Aon (owner advisor and construction insurance broker); WSP (design work)

**Funding:** Public

The City of Toronto is taking a proactive approach to managing the rehabilitation of the Gardiner to keep the roadway in safe and operable condition. City staff have evaluated the procurement options and are recommending an AFP approach to rehabilitate the Gardiner in the most efficient way for Toronto residents and businesses.

The proposed plan addresses the rehabilitation of the expressway, extending from Highway 427 to the eastern limit at Logan Avenue, including the 11-kilometre at-grade section from Highway 427 to Dufferin Street with its 32 bridges and structures, and the seven-kilometre elevated section from Dufferin Street to Logan Avenue with 335 spans. It incorporates the change of scope for the rehabilitation of the Gardiner Expressway east of Jarvis Street based on the future outcome of the environmental assessment.

In June 2018, a \$308.5-million contract for Phase 1 of the project between Cherry Street and Jarvis Street was awarded. Construction began on this section of the project in 2019, and is expected to be completed in early 2021.



**27** 81-141 Bay Street

\$2 billion



**2019 Rank:** 24

**Location:** Toronto, Ontario

**Owner:** Metrolinx and Ivanhoé Cambridge

**Contractor:** EllisDon (general contractor)

**Consulting Architect:** Wilkinson Eyre Architects (design); Adamson Associates Architects (executive architect); DBOX

**Legal:** Torys (representing project owner)

**Other Key Players:** Arup (pedestrian modelling); INTECH Risk Management (advisor to developers); KPMG (advisor to Metrolinx for initial planning stage); Morrison Hershfield (building envelope consultant); WSP (sustainability consultants, geotech./env. work); Cushman & Wakefield

**Funding:** Public/Private

The Bay Street project (CIBC Square) involves the construction of two new commercial buildings, joined by a one-acre elevated park over the rail corridor near Union Station in downtown Toronto.

A key component of the construction is the new Union Station Bus Terminal. Construction got underway on the terminal in June 2017. The terminal will provide stronger connections for users of the rail and bus networks, and provide straightforward access to the Gardiner Expressway. The new terminal also includes over 1,000 bicycle parking spots and integrated green space.

The south tower continued its ascent to the top throughout 2019, and the building's curtainwall glazing is being installed.

Phase 1 of the project—81 Bay St.—is scheduled for completion in 2020. Phase 2, construction of 141 Bay St. and the elevated park, is set to be completed in 2023.

**28** Don River and Central Waterfront & Connected Projects

\$2 billion



**2019 Rank:** 25

**Location:** Toronto, Ontario

**Owner:** City of Toronto

**Contractor:** Graham

**Engineer:** Morrison Hershfield; AECOM; Wood

**Other Key Players:** Golder; Rider Levett Bucknall; The Walsh Group; DECAST

**Funding:** Public

The Don River and Central Waterfront Wet Wester Flow System & connected Projects is a 25-year program aimed at improving water quality in Toronto's Lower Don River, Taylor-Massey Creek, and the Inner Harbour.

In August, Toronto City Council endorsed a plan to reach out to both the provincial and federal governments for funding assistance for the project, funding that would allow for the project to be completed up to eight years ahead of its current schedule.

The Coxwell Bypass Tunnel, as well as the integrated pumping station at the Ashbridges Bay Wastewater Treatment Plant, and new outfall at the plant, are among the first work to be undertaken as part of the overall program. Construction of the tunnel is underway now, and is scheduled for completion in 2023. The station project is anticipated to be completed by 2026, and the new outfall by 2025.

**29** QEII New Generation project

\$2 billion



**2019 Rank:** 26

**Location:** Halifax, Nova Scotia and surrounding communities

**Owner:** Government of Nova Scotia

**Contractor:** PCL Constructors Canada Ltd. (Hants Community Hospital renovation)

**Legal:** Borden Ladner Gervais

**Other Key Players:** Contracting Specialties (2005) Inc.; Coastal Woodworkers Ltd.; Dantra Specialty Products; Duron Atlantic Limited; Twin City Painting (1979) Limited; Northfield Glass Group Ltd.; Apex Industries; Atlantica Mechanical; Bond and Coolen Contracting Ltd.; Life Safety Systems; RKO Steel Ltd.; Southeast Drywall Ltd.; Inflector Environmental Services; Darim Masonry Limited; Flynn Canada Limited; McCarthy's Roofing Limited; Royal Door Limited; Kasian (planning and design compliance team); Deloitte (financial advisor)

**Funding:** Public/P3

The redevelopment of the QEII Health Science Centre is a multi-phase project involving several health care sites throughout Halifax and the surrounding area. The project will transform health care delivery in Nova Scotia, providing modern services for patients throughout the province.

The primarily project elements include:

- The renovation of Hants Community Hospital in Windsor.
- Renovation of Dartmouth General Hospital.
- A new Community Outpatient Centre in Bayers Lake.
- Expansion of the Halifax Infirmary site.
- A new hospice residence in Halifax.
- Movement of the QEII Cancer Centre to the new Infirmary site.

Completion of these projects will result in the closure of Centennial, Dickson, and Victoria buildings on the QEII Victoria site in Halifax.

The project reached several procurement milestones throughout 2019, including awarding the contract for the chemotherapy preparation lab, the RFP for the Bayers Lake Community Outpatient Centre, and the naming of the two proponents for the expansion of the Halifax Infirmary. The preferred proponents for the Bayers Lake and Halifax Infirmary projects will be named in 2020.

### 30 Roberts Bank Terminal 2 Expansion

**\$2 billion** 

**2019 Rank:** 27

**Location:** Delta, British Columbia

**Owner:** Port Metro Vancouver

**Project/Construction Manager:** WorleyParsons (project management); WSP (construction management, quality assurance, reporting to the project manager, construction contract administration, geomatic scanning); Hatch (project manager)

**Engineer:** Parsons

**Environmental Services:** Hemmera (supporting project planning and leading the EA); WSP (air quality assessment); Golder

**Legal:** Blake, Cassels & Graydon (counsel to owner); Borden Ladner Gervais (legal advisor); Norton Rose Fulbright (Proponent team in the Terminal Operator RFP)

**Other Key Players:** Aon; Deloitte

**Funding:** Private

This is a proposed new three-berth container terminal that would provide additional capacity of 2.4 million TEUs per year to meet the port's forecast demand until 2030. The project would be approximately 5.5 kilometres offshore, northwest of the existing Roberts Bank terminal facilities. The new rectangular terminal would have a berth length of 1,300 metres, long enough for the mooring of three ships, and a width of 700 metres to support terminal components, such as a container storage yard and rail intermodal yard. The existing causeway would also be widened to accommodate road and rail improvements, and the tug basin at Deltaport would be expanded.

As part of the environmental assessment (EA) process for the project, the Vancouver Fraser Port Authority submitted an environmental impact statement for the project to the Canadian Environmental Assessment Agency in March 2015. The Environmental Assessment and public consultation for the project are ongoing.

### 31 Quebec City University Hospital Centre – Laval University

**\$1.97 billion** 

**2019 Rank:** 28

**Location:** Quebec City, Quebec

**Owner:** CHU de Québec-Université Laval

**Engineer:** SNC-Lavalin; CIMA+; Stantec

**Other Key Players:** Englobe (geotechnical/environmental investigation, quality control); GHD (vibration monitoring); Golder

**Funding:** Public/Private



Credit: CHU Laval

In April 2017, the Government of Québec formally announced plans to move forward with the replacement of the Hôpital Enfant-Jésus de Québec (Hospital of the Child Jesus) in Québec City. The project will consolidate the research and clinical activities of L'Hôtel-Dieu de Québec on the site of the new hospital.

The first phase of the multi-phase project includes the construction of the Integrated Cancer Centre, along with a new generator building, power plant and parking. As of September, Phase 1 had reached 60 per cent completion. The Integrated Cancer Centre is currently on schedule to welcome its first patient in December 2020.

### 32 Wataynikaneyap Transmission Project

**\$1.9 billion** 

**2019 Rank:** 36

**Location:** Northern Ontario

**Owner:** Wataynikaneyap Power in partnership with FortisOntario and RES Canada

**Contractor:** EPC Contract: Valard

**Engineer:** Hatch (owner's engineer); Wood (consulting)

**Environmental**

**Services:** Golder (Phase 1 EA)

**Legal:** Torys (legal advisor); Fasken

**Other Key Players:** PowerTel, Deutsche Bank (MOU for design, construction, and financial services); PwC (financial feasibility study and socioeconomic impact analysis); Arcadis Canada Inc. (Phase 2 routing study); EY (consultant); INTECH Risk Management; Englobe

**Funding:** Public/Private

Wataynikaneyap Power—composed of 24 Northwestern First Nations communities—partnered with FortisOntario and RES Canada in August 2015 to develop and operate the transmission facilities to connect 16 remote reserves to the power grid and transition them away from diesel generation. The plan calls for a 1,800-kilometre transmission line broken into two phases: a 300-kilometre line to Pickle Lake (\$200 million), and transmission lines to connect the communities north of Pickle Lake and Red Lake (\$1.15 billion).

In January, two new First Nations communities joined the project with a minority ownership stake: Mishkeegogamang First Nation and Ojibway Nation of Saugeen's utility partner, Algonquin Power & Utilities Corp. (Algonquin).

Four proponents were selected to participate in the RFP process in September 2018. The date of selection of the successful proponent has not been released.

Potential remote electrification is anticipated in 2022, with build-out to 2024.



### 33 St. Paul's Hospital Redevelopment

**\$1.9 billion** 

**NEW**

**Location:** Vancouver, British Columbia

**Owner:** Fraser Health Authority

**Other Key Players:** IBI Group (early design works); KPMG (clinical planning services); Entuitive

**Funding:** Public/Private

- **Provincial:** \$1.8 billion
- **Private:** Providence Hospital Foundation (minimum \$100 million)

In February 2019, the Government of British Columbia approved the business plan for a new St. Paul's Hospital in downtown Vancouver. The new hospital will continue to serve as an acute-care hospital and integrated health campus. The new facility will be expanded to a capacity of 548 beds, which represents 115 net new beds, and "will be the home of several leading provincial programs and referral centres, including for heart and lung care, renal, eating disorders, and specialty surgeries and transplants," according to a government release. It will also be a teaching hospital for both University of British Columbia medical students and British Columbia Institute of Technology nursing students. The project will be done in two phases, with Phase 1 consisting of the new core hospital while Phase 2 is expected to include a clinical support and research centre.



Credit: Fraser Health Authority

### 34 Valley Line LRT – Stage 1

**\$1.8 billion** 

**2019 Rank:** 30

**Location:** Edmonton, Alberta

**Owner:** City of Edmonton

**DBFOM Team:** TransEd Partners—Fengate Capital Management, Bechtel, EllisDon, Bombardier, Transdev, ARUP, IBI Group

**Engineer:** ConnectED Transit Partnership—AECOM, Hatch, Mott MacDonald, DIALOG, ISL Engineering and Land Services Ltd., GEC Architecture; Associated Engineering (engineering & environmental services); Wood (consulting)

**Legal:** Borden Ladner Gervais (legal advisor); McCarthy Tétrault; Norton Rose Fulbright

**Other Key Players:** Aon (risk/insurance advisor to owner); BTY Group (cost consultant); EY (advising team); KPMG (financial and process advisor); LeighFisher (equity O&M advisor); Morrison Hershfield (transit O&M consultant); INTECH Risk Management (insurance advisor); Englobe (quality control); Tetra Tech (geotechnical and environmental services); AGAT Laboratories; GHD; McElhanney (surveying services)

**Supplier:** Canam Group

**Funding:** P3

- **Federal Building Canada Fund:** \$150 million; PPP Canada: \$250 million
- **Provincial GreenTRIP:** \$310 million; Building Canada Fund matching: \$150 million; interest-free loan: \$140 million
- **Municipal:** \$800 million

The Valley Line is the largest single infrastructure project in the history of Edmonton. It consists of a 27-kilometre low-floor urban line running from Mill Woods to Lewis Farms that crosses downtown. It will be separate from the city's existing high-floor LRT system. This line will feature modern, low-floor, light-rail vehicles running segregated along existing streets and integrating with Edmonton's surrounding neighbourhoods.

The first stage of the project is the 13.1-kilometre southeast section from Mill Woods to 102 Street. Construction is progressing on all areas of the project, with target service commencement scheduled for December 15, 2020.

### 35 North End Sewage Treatment Plant Biological Nutrient Removal Upgrade

**\$1.789 billion** 

**2019 Rank:** 43

**Location:** Winnipeg, Manitoba

**Owner:** City of Winnipeg

**Engineer:** AECOM (owner's advocate/consultant); KGS Group Ltd.

**Legal:** Blake, Cassels & Graydon

**Other Key Players:** Hanscomb (independent/engineer's design stage cost consultant); Veolia (professional services); P1 Consulting Ltd.

**Funding:** Public

- **Provincial:** \$195 million
- **Municipal:** \$1.594 billion

The Province of Manitoba has issued the City of Winnipeg an Environment Act Licence requiring the treatment of nutrients (such as nitrogen and phosphorus) among other requirements at this treatment facility. The implementation of a nutrient-removal process will require a major plant expansion and, given the age of the infrastructure and the complexity of phasing the construction, several new facilities will be constructed. The addition of wet weather treatment processes associated with combined sewer overflow control must be considered in the

overall nutrient-removal process design and operational effluent disinfection for wet weather.

In February 2019, Winnipeg City Council approved a request to break the overall project into three separate capital projects:

- **North End Sewage Treatment Plant Upgrades: Power Supply & Headworks Facilities,** \$408 million.
- **North End Sewage Treatment Plant Upgrades: Biosolids Facilities,** \$553 million.
- **North End Sewage Treatment Plant Upgrades: Nutrient Removal Facilities,** \$828 million.

**36** York VIVA Bus Rapid Transit (vivaNext)

**\$1.755 billion** 

**2019 Rank:** 39

**Location:** York Region, Ontario

**Owner:** York Region Rapid Transit Corp. and Metrolinx

**Project Manager:**

- Kiewit EllisDon partnership (rapidways along Highway 7 between Bayview and Warden avenues in Markham)
- York RapidLINK Constructors—Aecon, Dufferin Construction, AECOM, Hatch, Morrison Hershfield, and Leigh Fisher Canada (rapidways along Yonge Street in Richmond Hill and Newmarket)

**Program Manager:** MMM Group (now WSP)

**DBF Team:** EDCO—EllisDon Capital Inc. and Coco Paving Inc., IBI Group, LEA Consulting Ltd., Peto MacCallum Ltd. (design, build, and finance rapidways along the Highway 7 transit corridor in the City of Vaughan and Town of Richmond Hill)

**Engineer:** AECOM; Parsons; KED; McCormick Rankin Corp.; MMM Group (engineer and program manager); Ecoplans Ltd.; IBI Group (design engineer); Wood (design)

**Environmental Services:** WSP (environmental consultant, EA)

**Vehicle Supplier:** NovaBus

**Legal:** McCarthy Tétrault; WeirFoulds (acting for York Region); Borden Ladner Gervais (legal advisor); Osler; Torys (acted for lender)

**Other Key Players:** Aon (risk/insurance advisor to authority); BTY Group (ind. certifier); Entro; Golder (ground engineering services); Hanscomb; Revay and Associates; Morrison Hershfield (prime design consultants); KPMG (advisory services); LeighFisher (ind. quality certifier); Hanscomb (owners' engineer's cost consultant); INTECH (insurance advisor); CIMA+ (road safety audits); GHD (sanitary design); EY (financial advisory services); ARUP (technical advisory services); Comtech (program mgmt. consulting); Rider Levett Bucknall; Jacobs (technical advisor/construction oversight)

**Funding:** Public

- **Federal:** \$85 million
- **Provincial:** Capital allotment to Metrolinx, the regional transportation authority: \$1.585 billion
- **Municipal:** \$85 million

Once completed, vivaNext Rapidways will be more than 35 kilometres of dedicated bus lanes in the centre of the road that will allow rapid transit buses to provide more reliable and frequent service to York residents. This new bus rapid transit service will be available on two significant corridors; east-west along Highway 7 and north-south along Yonge Street with another small east-west route along Davis Drive in Newmarket. In late September, it was announced that the 2.6-kilometre section from Richmond Hill Centre Terminal near Yonge Street and the Viva station on Bathurst Street was complete and would open three months ahead of schedule. The project remains on schedule for completion in 2020.

**37** Vancouver International Airport Upgrades

**\$1.7 billion** 

**2019 Rank:** 31

**Location:** Vancouver, British Columbia

**Owner:** Vancouver Airport Authority

**Project/Construction Manager:** Vancouver Airport Authority

**Engineer:** Stantec; SNC-Lavalin; WSP (materials engineering, quality management); Wood (consulting); Hatch (consulting)

**Architect:** Kasian Architecture Interior Design and Planning Ltd.

**Contractor:** Graham (general contractor for airside operations support building); Leducor (A-B connector); PCL Constructors Canada Ltd. (secure corridors); Hatch (civil design, construction support services)

**Legal:** McCarthy Tétrault LLP (represented VIAA); Borden Ladner Gervais

**Other Key Players:** BMO Capital Markets (bonds issue); BTY Group (cost consultant); Entro (wayfinding and signage); exp Services (quality management); WSP (materials engineering, quality management); Aon (owner advisor and construction insurance broker); Mott MacDonald (baggage handling master planner); Hanscomb (airport cost consultant); Colliers Project Leaders; McElhanney (survey and monitoring services); Hemmera

**Supplier:** Canam Group (joists and steel deck)

**Funding:** Private

- Vancouver Airport Authority: \$1.8 billion (collected through an increased airport improvement fee)



Credit: VIAA

The multi-year expansion at Vancouver International Airport (YVR) involves a number of capital construction projects to enhance the airport experience and improve YVR's competitive position as a world-class connecting hub. Current projects include a Central Utilities Building that will house one of Canada's largest GeoExchange energy systems; a new parkade and ground transportation facility; expanded international terminal building with four new bridged aircraft gates and four new bus operation gates and new remote aircraft stands. Two new international hold rooms with capacity for 600 passengers have just opened and a new transborder hold room is starting construction in October—both will support YVR's remote stand operations. To make room for the new remote aircraft stands, YVR will reclaim a portion of its existing jetSet parking concept and convert the remaining space into a valet operation. Construction on YVR's runway safety enhancements will also continue until 2022.



**38** **Surrey Langley SkyTrain Project**

**\$1.65 billion** 

**2019 Rank:** 32  
**Location:** Surrey, British Columbia  
**Owner:** TransLink  
**Engineer:** Hatch (lead engineer)  
**Contractor:** WestPro (Pomerleau) (Bear Creek Bridge replacement)

**Consulting Services:** McElhanney Consulting Services and Stewart Group Strategic Consulting

**Legal:** Borden Ladner Gervais

**Other Key Players:** Deloitte; Golder; Hemmera

**Funding:** Public

The Surrey Langley SkyTrain project is the current iteration of the former Surrey-Newton-Guildwood LRT system. The change from the original 11-stop, 10.5-kilometre LRT to SkyTrain has reduced the current scope of the project to a four-stop system running along the Fraser Highway from City Centre to Fleetwood. In July, the Mayors' Council voted to move ahead with a business case for the project, and will look to the provincial and federal governments to provide additional funds that would allow the SkyTrain to be extended to Langley.

**39** **Crowchild Trail Project**

**\$1.6 billion** 

**2019 Rank:** 33  
**Location:** Calgary, Alberta  
**Owner:** City of Calgary

**Contractor:** Graham (Phase 1)

**Engineer:** Wood (consulting)

**Funding:** Public

In May 2017, the City of Calgary approved the plan for changes and upgrades to Crowchild Trail, as outlined in its Crowchild Trail Study. The renewal and expansion of Crowchild Trail, located west of the city's downtown core, is necessary to improve the life of the current infrastructure, as well as to accommodate future growth. Phase 1 focuses on work around and over the Bow River, including adding a lane of traffic in each direction on the existing bridge, as well as upgrades to the off-ramps already in place.

**40** **Mackenzie Vaughan Hospital**

**\$1.6 billion** 

**2019 Rank:** 34  
**Location:** Vaughan, Ontario  
**Owner:** Mackenzie Health  
**Project Manager:** Infrastructure Ontario  
**DFBM Team:** Plenary Group (Canada) Ltd. (developer); Stantec (design); PCL Constructors Canada Inc. (design builder); Johnson Controls Canada LP (facilities management); Plenary Group (Canada) Ltd. (financial advisor); WSP (construction services for DB team)

**Legal:** Torys (represented Johnson Controls); Borden Ladner Gervais; Fasken

**Other Key Players:** Hanscomb (hospital's cost consultant); A.W. Hooker Associates (independent certification); GHD (condition assessment remediation); Aon; Colliers Project Leaders; Deloitte; EY (financial advisor)

**Supplier:** DECAST

**Funding:** Public/Private



Credit: Infrastructure Ontario

Mackenzie Vaughan Hospital represents the first new hospital built in York Region in the last 30 years. The new hospital will include a state-of-the-art emergency department, advanced diagnostic imaging services, modern surgical services and operating rooms, specialized ambulatory clinics and intensive care beds, and new technology to connect systems with medical devices for optimum information exchange. Work on both the interior and exterior of the hospital continues, and construction continues to progress on time for a late 2020 opening.

**41** **Renovations to Beauharnois Generating Station**

**\$1.6 billion** 

**2019 Rank:** 35  
**Location:** Beauharnois, Quebec  
**Owner:** Hydro-Québec  
**Project/Construction Manager:** Hydro-Québec Équipement  
**Contractor:** HMI Construction Inc.  
**Engineer:** Stantec, SNC-Lavalin, CIMA+  
**Turbine Supplier:** GE Energy (formerly Alstom) (design, manufacture, and delivery of runners for multiple units); Voith Hydro

**Other Key Players:** GHD (geotechnical and material testing); Englobe (quality assurance inspection services); Aecom

**Funding:** Public  
**• Provincial** Hydro-Québec: \$1.6 billion

Since 1994, this hydroelectric station has been undergoing gradual renovations and replacement of its generation units. The plant was powered by the Beauharnois Canal, which had been newly dredged and expanded to one kilometre in width for that purpose. At the time of its construction, it was considered to be the largest hydroelectric station in Canada. Today, at 1,900 megawatts, it is still one of the largest run-of-river plants in the world. The current project also includes restoration of the station's historic art deco architecture, which led it to be designated as a National Historic Site. Renovations continue, and work is expected to be completed in 2021.

**42** **Macdonald Block Reconstruction Project**

**\$1.536 billion** 

**NEW**

**Location:** Toronto, Ontario

**Owner:** Ontario Ministry of Government and Consumer Services

**DBFM Team:**

- Fengate PCL Progress Partners (FP3) Developers: Fengate Asset Management and PCL Investments Canada Inc.
- Design-BUILDER: PCL Constructors Canada Inc.

- Design Architect: WZMH Architects
- Facilities Management: Johnson Controls Canada
- Financial Advisor: National Bank Financial.

**Other Key Players:** Aon; Hanscomb; Morrison Hershfield; Entuitive  
**Funding:** Public

The Macdonald Block Complex is the hub for administrative services for the Government of Ontario. The complex consists of five buildings, including four office towers, with a total of approximately 1.7 million square feet. From Infrastructure Ontario: “Each building in the complex will be taken back to its original building core, remediated, and rebuilt using modern technologies, systems, and materials while preserving the integrity of its many heritage features. The newly reconstructed complex will meet current building, health, safety, and accessibility standards and will accommodate significantly more employees through more efficient use of this government-owned office space.” The winning bidder was selected in August, and construction commenced shortly thereafter. Substantial completion is expected in the spring of 2024.

**43** **Calgary Cancer Centre**

**\$1.4 billion** 

**2019 Rank:** 42

**Location:** Calgary, Alberta

**Owner:** Alberta Health Services

**Design-Build Team:** PCL; Stantec; DIALOG

**Consulting Architect:** HKS and Marshall Tittlemore Architects (subconsultants); DIALOG; Stantec

**Legal:** Norton Rose Fulbright (for the authority)

**Other Key Players:** Arup (technical advisor and prime consultant); EY (advising gov't.); KPMG (commercial advisor); Morrison Hershfield (commissioning study); Colliers Project Leaders; Aon; Canam Group

**Funding:** Public



Credit: Aquil Media

This new comprehensive cancer centre is currently under construction at the Foothills Medical Centre site in Calgary. The 95,000-plus-square-metre complex will include 160 inpatient beds, outpatient facilities with over 100 exam rooms, systemic treatment and radiation treatment technologies, clinical trial units and research laboratories, a knowledge exchange centre and 1,650 stalls of underground parking. The centre will provide much-needed access to cutting-edge treatment and care for residents of Calgary and southern Alberta. Despite inclement weather hitting the Calgary in early fall, 13 levels of the concrete structure have been built (eight above ground and five below ground). Interior construction works up to Level 6 are underway, and exterior work, including glass installation, has begun. The facility is on schedule to open in 2023.

**44** **Pattullo Bridge Replacement Project**

**\$1.377 billion** 

**2019 Rank:** 44

**Location:** New Westminster, British Columbia

**Owner:** Government of B.C.

**Engineer:** Parsons (owner's engineer); Hatch; Wood (consulting)

**Legal:** Borden Ladner Gervais

**Other Key Players:** Golder; Morrison Hershfield (engineering services); Deloitte (commercial advisor); Hemmera

**Funding:** Public

In February 2018, the Government of British Columbia announced its plans to replace the Pattullo Bridge. Built in 1937, the bridge is one of the oldest in the Metro Vancouver Area, and was built for a 50-year lifespan. The new bridge will be four lanes, built to modern safety standards, featuring a centre safety median barrier and wider lanes to accommodate both passenger and commercial vehicles. The bridge will also have walking and cycling lanes, separated from traffic, on both sides of the bridge. In May, the project was granted an environmental assessment certificate. Three pre-qualified teams had been announced in February, but the list had to be re-released in September after one of the companies involved in the RFP process dropped out.



## 45 Romaine Complex Transmission Line

**\$1.3 billion** 

**2019 Rank:** 45

**Location:**

Minganie Region, Quebec

**Owner:** Hydro-Québec

**Engineer:** AECOM

(engineer, detailed design for transmission towers and foundations)

**Contractor:** Lockwell, Fabrinet, Prometek (steel); General Cable (cables); TCI-Arnaud and GLR JV (assembly)

**Other Key Players:** WSP (environmental impact assessment); Thirau; GLR; GHD (geotechnical services); Englobe (field surveillance); EXP

**Funding:** Public



Credit: Hydro-Québec

This project involves the construction of transmission lines needed to connect the 1,550-MW Romaine Complex to the rest of the grid in Quebec. The project includes building more than 500 kilometres of transmission lines, designed for both 315 kilovolt and 735 kV but operated at 315 kV, constructing new switchyards at the generating stations, and modifying and adding equipment in existing facilities. The transmission line is a separate venture from the Romaine Complex project. Construction has been underway since summer 2011, and is expected to be completed by 2020.

## 46 Port Hope Area Initiative

**\$1.28 billion** 

**2019 Rank:** 46

**Location:** Port Hope and Clarington, Ontario

**Owner:** Atomic Energy Canada Limited, Natural Resources Canada

**Project/Construction Manager:**

Canadian Nuclear Laboratories

**Contractor:** Wood-CB&I Joint Venture; ECC/Quantum Murray Limited Partnership; Wood; Maple Reinders; Kenaidan Contracting Ltd.; Northwind Portage; Milestone Environmental; WSP; Graham

**Engineer:** AECOM; MMM-GHD Joint Venture; Wood (consulting)

**Environmental Services:** Golder (contamination investigation/remediation; Phase 1 ESA; geotechnical); Arcadis Canada; Dillon Consulting

**Financiers/Banks:** Natural Resources Canada

**Legal:** Osler; Torys (acted for the lender)

**Other Key Players:** Hanscomb (owner's preliminary design stage cost consultant and special advisor); Arcadis (excavation and waste removal); Tetra Tech; SNC-Lavalin; Colliers Project Leaders; CIMA+; Aon

**Funding:** Public

• **Federal** Atomic Energy of Canada Limited: \$1.28 billion

The Port Hope Area Initiative (PHAI) is a federal environmental clean-up program. Its mandate is the remediation and local, long-term, safe management of approximately 1.7 million cubic metres of historic low-level radioactive waste in the municipalities of Port Hope and Clarington in southern Ontario. The historic waste resulted from the radium and uranium refining operations of the former Crown corporation, Eldorado Nuclear Limited, and its private sector predecessors, which operated from the 1930s to 1988.

The PHAI has two projects: the Port Hope Project and the Port Granby Project. The Historic Waste programs Management Office, led by Canadian Nuclear Laboratories (CNL), is implementing these projects on behalf

of Atomic Energy of Canada Limited, a federal Crown corporation.

The Port Hope Project involves: the construction of an engineered above-ground mound and supporting infrastructure for the safe, long-term management of approximately 1.2 million cubic metres of historic low-level radioactive waste; cleanup of the waste from various major sites and small-scale sites in Port Hope; and transportation of the waste to a new long-term waste management facility currently under construction. After the facility is capped and closed, anticipated to be in 2023, ongoing maintenance and monitoring will continue for hundreds of years.

The Port Granby Project involves the relocation of approximately 450,000

cubic metres of historic low-level radioactive waste, located at an existing site on the shoreline of Lake Ontario in southeast Clarington, to a new, engineered above-ground mound at a long-term waste management facility being constructed approximately 700 metres north of the lake.

In August, CNL announced the completion of the cleanup and environmental restoration of three temporary storage sites as part of the Port Hope Area Initiative (PHAI). Contaminated soil from these locations—Pine Street North Extension, near the Municipal Sewage Treatment Plant and Centre Pier—has now been safely transferred to CNL's Long-Term Waste Management Facility (LTWMF).

## 47 Port Lands Flood Protection and Enabling Infrastructure

\$1.25 billion



2019 Rank: 47

**Location:** Toronto, Ontario

**Owner:** City of Toronto

**Project Manager:**

Waterfront Toronto; City of Toronto

**Construction Manager:** EllisDon

**Contractor:** EllisDon (Cherry Street Lakefilling Project)

**Engineer:** Wood (consulting)

**Architect:** Michael Van Valkenburgh Associates Inc. (Port Lands Estuary Plan)

**Environmental Services:** Arcadis Canada

**Other Key Players:** MVVA (design of parks, flood protection, river valley); WSP and DTAH (roads and municipal infrastructure); Entuitive with Grimshaw and SBP (bridges); Jacobs (environmental); Toronto Region Conservation Authority; Golder; INTECH Risk Management; Dillon Consulting (planning services); GHD (geotechnical and environmental services); A.W. Hooker (cost consultant); Englobe

**Funding:** Public  
The **Federal, Provincial, and Municipal** governments are each contributing an equal share of \$416.6 million to this project.

The Port Lands Flood Protection and Enabling Infrastructure project is the redevelopment of one of the largest portions of under-developed land in a major urban core in North America. Located along the shore of Lake Ontario southeast of Toronto's downtown core, the project will include substantial soil remediation, a new mouth for the Don River, and critical infrastructure for flood resilience to unlock the 325-hectare site for residential and commercial development. In January 2018, work began on the Cherry Street Stormwater and Lakefilling project. The project will stabilize the shoreline under flood conditions, enhancing aquatic habitat, and allow for the realignment of Cherry Street. Work on this section of the project is expected to be completed by March 2020.

## 48 Alberta Carbon Trunk Line

\$1.233 billion



2019 Rank: 48

**Location:** Fort Saskatchewan to Clive, Alberta

**Owner:** Enhance Energy Inc.; Wolf Carbon Solutions

**Project/Construction Manager:**

SAW Engineering (EPC management)

**Engineer:** Caber Engineering; SAW Engineering; BETA Tech Engineering

**Other Key Players:** WSP (geomatics services); North West Redwater Partnership's Sturgeon Refinery; Agrium Inc.; LeighFisher (lenders technical advisor); Land Solutions LP; BOSS Environmental; Worley; Scott Land; INTECH Risk Management; McElhanney (components installation)

**Supplier:** Siemens; MAN Diesel and Turbo; Comco Pipe and Supply; KTI Ltd; Exchanger Industries Ltd.; Startech Refrigeration; Spectrum Process Systems

**Funding:** Public/Private

- **Federal:** \$63.2 million
- **Provincial CCS Fund:** \$223 million
- **Private:** \$641.8 million (Enhance Energy), \$305 million (Wolf Carbon Solutions)

This 240-kilometre pipeline will collect CO<sub>2</sub> from industrial emitters in and around Alberta's Industrial Heartland and transport it to aging reservoirs throughout central and southern Alberta for secure storage in enhanced oil recovery projects. At full capacity, the line will provide access to reservoirs capable of producing an additional one billion barrels of high-quality light crude oil. These reservoirs will safely and securely store 14.6 million tonnes of CO<sub>2</sub> per year as the oil is produced. It will be the largest carbon capture and storage project in the world, storing six times more carbon dioxide than the Weyburn project in Saskatchewan. In August 2018, Enhance Energy announced a partnership with Wolf Carbon Solutions Inc. Under this agreement, Wolf will construct, own and operate the CO<sub>2</sub> capture and pipeline transportation assets. Enhance will continue to be the owner and operator of the CO<sub>2</sub> utilization and sequestration portion of the ACTL project through its EOR operations.

## 49 West Park Healthcare Centre

\$1.2 billion



2019 Rank: 50

**Location:** Toronto, Ontario

**Owner:** West Park Healthcare Centre

**Project Manager:** Infrastructure Ontario

**DBFM Team:** EllisDon Infrastructure Healthcare—CannonDesign, Montgomery Sisam Architects (design); EllisDon (constructor); EllisDon Facilities Services Inc. (facilities management provider); EllisDon Capital Inc. (financial advisor); Modern Niagara Toronto Inc., Ozz Electric (mechanical and electrical subcontractor)

**Other Key Players:** EXP (PDC services); Deloitte; A.W. Hooker (independent certifier); EY (financial advisor); Aon

**Funding:** P3

The West Park Healthcare Centre is a new 730,000-sq.-ft. hospital that will replace the existing facility.

The new hospital will feature:

- 314 beds, with 80 per cent of beds in single-patient rooms.
- Three-piece private washroom for each patient, even in double-occupancy rooms.
- Significant increase in outpatient care space to accommodate current and new services such as geriatric clinics and day hospital, and satellite hemodialysis.

- Demolition of three existing hospital buildings—Main, Ruddy and Gage—as well as the existing maintenance buildings.
- New campus entrance with new public and private roads within the campus.
- Increased green space, landscaping for outdoor therapy, therapeutic gardens, walking paths and courtyards, plus terraces on every floor.

The excavation phase will begin in early 2020. The project is to be completed in early 2023.



**50 Highway 407 East Extension – Phase 2**

**\$1.158 billion** 

**2019 Rank:** 52

**Location:** Oshawa to Clarington, Ontario

**Owner:** Ontario Ministry of Transportation

**Project Manager:** Infrastructure Ontario

**DBFM Team:** Blackbird Infrastructure Group—Holcim (Canada) and Cintra Infraestructuras (developer); Dufferin Construction and Ferroviaal Agroman Canada (constructors); Urban Systems, AIA Engineers, and Louis Berger Group (designers); Holcim and Cintra Infraestructuras (maintenance)

**Engineer:** EXP (geotechnical design for structures and pavements); Parsons; Wood

**Legal:** Cassels Brock & Blackwell (legal counsel to the Authority); Osler (legal counsel to the SPV); McMillan (legal counsel to the finance parties); Torys (acted for lender)

**Other Key Players:** Aon (risk/insurance advisor to authority); Jacobs (technical advisors for procurement and implementation); EY (advising gov't.); Infrastructure Ontario (procurement manager and project development); LeighFisher (lenders technical advisor); INTECH Risk Management (insurance advisor); Golder (materials testing and inspection); Englobe; A.W. Hooker Associates (independent certification); GHD (quality assurance services); WSP (archaeology); AGAT Labs (analytical testing); Rider Levett Bucknall

**Suppliers:** Canam Group; DECAST Ltd.

**Funding:** P3



Credit: 407 ETR

Phase 2 will extend Highway 407 East approximately 22 kilometres from Harmony Road to Highway 35/115 in Clarington. The work also includes the addition of the 10-kilometre East Durham Link (EDL or Highway 418), which connects Highway 407 with Highway 401. There are eight interchanges as well, three of which are freeway-to-freeway. Phase 2A of the project, running from Harmony Road to EDL, was completed in January 2018. Phase 2B of the project, from the EDL to Highway 35/115 and including the EDL, is well underway. Paving, as well as work on bridges and other structures, continues to advance toward completion in line with the 2020 scheduled completion.

**51 Deep Geologic Repository**

**\$1 billion** 

**2019 Rank:** 55

**Location:** Kincardine, Ontario

**Owner:** Ontario Power Generation

**Project/Construction Manager:** Nuclear Waste Management Organization

**Engineer:** Hatch, Wood (consulting)

**Legal:** Torys (owner)

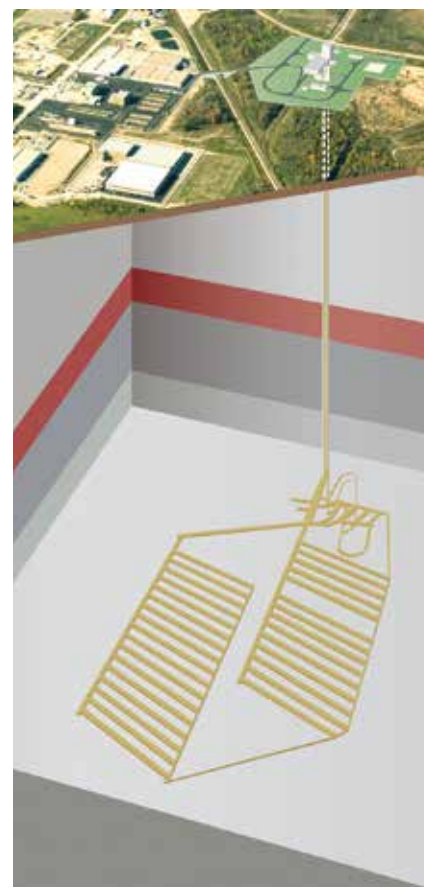
**Other Key Players:** AECOM (env. consulting); Geofirma Engineering (geoscientific characterization); G.L. Tiley & Associates; Golder (env. impact statement); Tetra Tech; WorleyParsons; WSP (technical review/support); Morrison Hershfield (fire protection analysis); AGAT Labs

**Funding:** Public

OPG is building this 680-metre-deep underground storage facility to house 200,000 cubic metres of low and intermediate level radioactive waste. Low-level waste consists of material that may be contaminated through the normal course of operations at a nuclear facility such as paper towels, mops, and used tools. While low-level waste does not require specialized shielding for workers, the intermediate waste will require special handling and can consist of items such as irradiated core components, ion exchange resins, and various filters. Used fuel, considered high-level waste, is not to be stored in the Deep Geologic Repository (DGR).

The repository will safely isolate and contain the waste underground ensuring protection of the water and the environment for many thousands of years. It will be buried 680 metres—deeper than the CN Tower is tall—in stable rock formations that are more than 450 million years old. In May 2015, an independent Federal Joint Review Panel recommended to the Federal Minister of the Environment that OPG be granted a licence to construct the DGR.

In August 2017, OPG was asked for further information about the project from Minister of Environment and Climate Change Catherine McKenna, including an update on impacts to the Saugeen Ojibway Nation. Negotiations with both parties to allow the project to move forward are still ongoing.



Credit: Ontario Power Generation

**52** **Hamilton LRT**  
**\$1 billion** 

**2019 Rank:** 56  
**Location:** Hamilton, Ontario  
**Owner:** Metrolinx  
**Project Manager:** Infrastructure Ontario  
**Engineer:** Morrison Hershfield (design engineer); Hatch; Wood (consulting)  
**Legal:** Torys (acted for lender); Blake, Cassels & Graydon (advising Infrastructure Ontario and Metrolinx)  
**Other Key Players:** AECOM (technical advisory services); Morrison Hershfield (feasibility study); SNC-Lavalin (preliminary design); Aon; AGAT Labs; Comtech (program/project consulting); Rider Levett Bucknall; Jacobs (program mgmt.); INTECH Risk Management; EY (bid advisor); Englobe; Hemmera  
**Funding:** Public



Photos - City of Hamilton

The original plan for the Hamilton LRT project will include approximately 11 kilometres of new light-rail that will connect McMaster University through downtown Hamilton to Queenston Circle. The project also includes a high-order pedestrian connection to the Hamilton GO Centre Station, and a maintenance and storage facility. In April, Hamilton City Council voted in favour of the LRT line, but decided to investigate the 14-kilometre option, versus the original 11-kilometre option, extending the line eastward from Queenston Circle to Eastgate Square. The current \$1-billion budget is expected to rise, as Metrolinx cites in its September 2019 Capital Projects Group Quarterly Report that: “the project’s announced capital budget is \$1,000M in nominal 2014 dollars plus escalation. Revised baseline in year of expenditure dollars to be reported upon contract award.” In April 2018, three teams were announced as the successful proponents to participate in the RFP. According to Infrastructure Ontario’s P3 Market Update, released in September 2019, financial close is expected in October 2020.

**53** **Yellowhead Trail Freeway Conversion Project**  
**\$1 billion** 

**2019 Rank:** 57  
**Location:** Edmonton, Alberta  
**Owner:** City of Edmonton  
**Engineer:** Parsons (owner’s engineer); Wood (consulting)  
**Funding:** Public  

- **Federal:** \$241.6 million
- **Provincial:** \$241.6 million
- **Municipal:** \$516.8 million

The Yellowhead Trail Freeway Conversion Project will transition 15 kilometres of the current west-east roadway in Edmonton’s north end to a free-flowing six-lane freeway, with a targeted speed of 80 km/h. The upgrade will eliminate eight intersections, build two new interchanges, modify three existing intersections and build new collector roads. Construction on some of the connecting roadways began in 2019; however, the larger portions of the project will not begin until 2020. The entire project is projected to be completed sometime in 2026.

**54** **Toronto Courthouse Project**  
**\$956.4 million** 

**2019 Rank:** 58  
**Location:** Toronto, Ontario  
**Owner:** Ministry of the Attorney General  
**Project Manager:** Infrastructure Ontario  
**DBFM Team:** EllisDon Infrastructure—EllisDon Capital Inc. (developer); EllisDon Design Build Inc. (constructor); Renzo Piano Building Workshop, NORR Architects & Engineers Limited (design); EllisDon Facilities Services Inc. and SNC-Lavalin O&M (facilities mgmt.); EllisDon Capital Inc. (financial advisor); Morrison Hershfield (sustainability services)  
**Engineer:** Wood (consulting)  
**Architect:** Kleinfeldt Mychajlowycz Architects Inc.; Montgomery Sisam Architects Inc.  
**Legal:** Blake, Cassels & Graydon (advisor to the proponent); McCarthy Tétrault (advisor for MAG, IO); Norton Rose Fulbright (advisor for SNC-Lavalin), Farris, Vaughan, Willis & Murphy (advisor for the lenders and hedge providers)

**Other Key Players:** Morrison Hershfield (sustainability services for the lead contractor); A.W. Hooker (prime cost consultant for IO); Engineering Harmonics; Aon  
**Funding:** P3

The new Toronto Courthouse will amalgamate several Toronto courts located throughout the city. The new Toronto courthouse will include:

- Barrier-free access, to allow visitors and occupants to travel throughout the building with ease, regardless of ability.
- Video conferencing to allow witnesses to appear from remote locations and in-custody individuals to appear from detention facilities.
- Closed-circuit television to enable children and other vulnerable witnesses to appear before the court from a private room.
- Courtroom video/audio systems to allow counsel to display video evidence recorded in various formats and for the simultaneous viewing of evidence.
- A single point of entry with magnetometers, baggage scanners, continuous video surveillance and separate corridors to ensure the security of judges, members of the public and the accused.

Construction began shortly after the project reached financial close in February 2018. Substantial completion is expected in 2022.



**55** **Route 185 Phase III**  
**\$942.9 million**   
**NEW**


**Location:** Saint-Atonin, Quebec to the New Brunswick border  
**Owner:** Transport-Québec  
**Other Key Players:** WSP, Tetratex, AECOM (construction supervision)  
**Funding:** Public  
 • **Federal:** \$389.7 million  
 • **Provincial:** \$553.2 million

This nearly 40-kilometre conversion to two-lane divided highway is the final step in the conversion of Route 185 to Autoroute 85, also known as Autoroute Claude-Bécharde. The final portion runs from Saint-Antonin to Saint-Louis-du-Ha!-Ha!, connecting Autoroute 20 at Notre-Dame-du-Portage to the New Brunswick border. Work got underway on four of seven sections of the project in the summer of 2019. Sections will be completed starting in 2021.

**56** **TTC Bus Fleet Renewal**  
**\$934 million**   
**NEW**

**Location:** Toronto, Ontario  
**Owner:** Toronto Transit Commission  
**Suppliers:** New Flyer Industries Inc; Proterra Inc; BYD Canada Co. Ltd.  
**Other Key Players:** Entuitive  
**Funding:** Public  
 • **Federal:** \$442 million  
 • **Municipal:** \$492 million

The City of Toronto is upgrading its bus fleet, thanks in part to federal funding to help make the project a reality. In total, the City will purchase 1,043 new buses to help green its fleet, as well as refurbish 695 additional vehicles. As part of the acquisition, the City is testing electric buses from three companies, New Flyer Industries Ltd., Proterra Inc. and BYD Canada Co. Ltd., to see which ones its drivers prefer. The City was set to take delivery of 60 total buses by the end of the first quarter of 2020.

**57** **Giant Mine Remediation Project**  
**\$903.5 million**   
**2019 Rank:** 59

**Location:** Yellowknife, Northwest Territories  
**Owner:** The Government of the Northwest Territories and Aboriginal Affairs and Northern Development Canada, with support from Public Works and Government Services Canada  
**Project/Construction Manager:** Aboriginal Affairs and Northern Development Canada and the Government of the Northwest Territories; AECOM (construction management)  
**Engineer:** AECOM (environmental studies, preliminary and detail design, construction management); Parsons; Wood (consulting)



Credit: GNWT


**Environmental Services:** Dillon Consulting  
**Other Key Players:** Parsons (project planning/permitting, decontamination, hazardous waste abatement, deconstruction, construction management); Golder (multi-disciplinary consulting services, general and civil design); Hatch (design); KPMG (commercial advisor); SRK Consulting, Arcadis Canada Inc. (lead technical advisors); Colliers Project Leaders; McElhanney (surveying services); Englobe  
**Funding:** Public  
 • **Federal:** \$903.5 million

Between 1948 and 2004, the Giant Mine was a major economic driver for Yellowknife and the Northwest Territories. Mining operations at the site, which grew over the years to encompass more than 870 hectares, including a number of ponds and small lakes, were halted in July 2004. Since 2005, Aboriginal Affairs and Northern Development Canada (AANDC) and the Government of Northwest Territories (GNWT) have co-managed the site, with the Deton'Cho Nuna Joint Venture providing on-site care and maintenance. However, when the mine closed, 237,000

tonnes of arsenic trioxide were left behind in underground chambers. The remediation project proposes to leave behind a site suitable for future community use as the community sees fit. In August 2014, the decision was made to move forward in implementing the measures outlined in the environmental assessment. The project's goal is to ultimately protect public health and safety and the environment through long-term containment and management of the site's waste, water treatment, and surface cleanup at the site.

In February 2018, the main construction manager for the project was selected. Term 1 of the work will centre around responsibility for site care and maintenance and emerging risks on site, as well as supporting planning efforts for the full remediation in Term 2. This work will start immediately and will be undertaken until March 31, 2020. In Term 2, set to begin in 2020, the construction manager will oversee the implementation of the overall remediation plan and associated activities. Potential remote electrification is anticipated in 2022, with build-out to 2024.



**58 Highway 1 Upgrades – Kamloops to Alberta**  
**\$872.7 million** 

**2019 Rank:** 60  
**Location:** Kamloops, British Columbia to the Alberta border  
**Owner:** B.C. Ministry of Transportation and Infrastructure  
**Contractor:** Emil Anderson Construction Inc. (Pritchard to Hoffman’s Bluff)

**Engineer:** Wood (consulting)  
**Other Key Players:** Golder (geotech, environmental services); Englobe (pavement engineering services, QA, QV); WSP (construction supervision services); McElhanney (design and planning services)  
**Funding:** Public

The Government of B.C. has embarked on a 10-year project to expand the Trans-Canada Highway (Highway 1) between the city of Kamloops and the Alberta border. The focus of the expansion is to four-lane the entire section of roadway, which includes 339 kilometres under the jurisdiction of the B.C. Ministry of Transportation and Infrastructure, as well as 101 kilometres under the jurisdiction of Parks Canada. There are three sections of the work that are scheduled for completed over the next three to five years: Hoffman’s Bluff to Jade Mountain to be completed by 2022; Salmon Arm West to be completed by 2023; and Kicking Horse Canyon Phase 4 to be completed by 2024. The RFQ for the Kicking Horse Canyon Project was released in September, carrying an additional \$35-million in funding for the implementation of a Community Benefits Agreement.

**59 Canadian Forces Base Trenton Expansion**  
**\$860 million** 

**2019 Rank:** 61  
**Location:** Trenton, Ontario  
**Owner:** Department of National Defence  
**Contractor:** Bird Construction; SNC-Lavalin; Bondfield Construction; Buddy Haegele Enterprises; Budget Environmental Disposal; Dufferin Construction; Graham (general contractor for maintenance hangar); Fitzgibbon Construction; Gordon Barr Limited; Jasper Construction Corporation; Kiley Paving; M.J. Dixon Construction; Miller Group; Mirtren Construction; Strong Brothers Heating & Air Conditioning; Varcon Construction  
**Design Engineer:** Wood; SNC-Lavalin; Jain & Associates; J.L. Richards & Associates; Peak; Stantec

**Consulting Architect:** Architecture 49 (previously Smith Carter Architects); Colbourne & Kembel Architects Inc.; Jacobs Carter Burgess; Kasian Architecture Interior Design and Planning Ltd.; Robertson Martin Architects Inc.  
**Environmental Services:** Englobe  
**Other Key Players:** Engineering Harmonics (AV consultant); Hanscomb (owner and design architect/engineer’s cost consultant); DECAST  
**Funding:** Public  
 • **Federal:** \$860 million

CFB Trenton is now undergoing a major expansion that will add the Land Advanced Warfare Centre (a multi-functional training and administrative campus), as well as new hangars and runways to accommodate additional aircraft, and a new fire hall. It will also see the relocation of the elite Joint Task Force 2 to the base, and the addition of a hazardous material transfer facility, among other construction and reconstruction components. Substantial upgrades to the natural gas service and an expansion of the electrical service are underway. The 10-year expansion program has already begun construction, with several components already complete. In 2016, Hangar 2 obtained LEED Gold certification. The project continues and is to be finalized by 2022. Substantial upgrades to the natural gas service, expansion of the electrical service, and construction of the Land Advanced Warfare Centre, hazardous materials transfer facility and fire hall is all complete. Work on new hangars and runways is ongoing.

**60 Union Station Revitalization Project**  
**\$823.7 million** 

**2019 Rank:** 62  
**Location:** Toronto, Ontario  
**Owner:** City of Toronto  
**Project/Construction Manager:** Carillion (Stage 1) and Bondfield Construction (Stage 2/3)  
**Program Manager:** WSP (Stage 2/3)  
**Engineer:** EXP (train shed roof design and construction admin); NORR Limited Architects & Engineers (structural, mechanical and electrical); Wood (consulting)  
**Contractor:** Clifford Restoration (building envelope restoration)

**Architect:** NORR Limited Architects & Engineers (prime design consultant); DIALOG (executive architect of retail features)  
**Management Consultants:** EY  
**Legal:** WeirFoulds (acting for architects); Osler  
**Other Key Players:** Arup (4D modelling, pedestrian flow, construction coordination analyses); A.W. Hooker Associates (cost management); Entro (wayfinding and signage); Engineering Harmonics (AV consultant); FGMDA (heritage consultant); Golder (construction mat. engineering/testing); Hanscomb (study and design teams’ cost consultant); WSP (geotechnical consultant); Aecon (train shed platform); Aon (risk advisor/broker for preferred proponent); Morrison Hershfield (conceptual study); Comtech (multidisciplinary consulting services)  
**Supplier:** Canam Group (steel deck); Dufferin Concrete  
**Funding:** Public

The revitalization project includes restoration of many of the station’s heritage elements, creation of 160,000 square feet of retail space with the focus of bringing the best of Toronto’s independent retailers and restaurants to the station, and expansion of the GO concourses to accommodate the expected doubling of passengers by 2030. In April 2015, the new spacious 62,000-square-foot York Concourse opened to provide almost twice the space of the existing Bay Concourse to help get customers to where they are going faster and easier. In August 2015, the Bay Concourse was closed to undergo renovation. Substantial completion has been delayed, and is now expected to occur in 2020.



## 61 CFB Esquimalt A/B Jetty Recapitalization Project

\$781 million



2019 Rank: 63

Location: Constance Cove, British Columbia

Owner: Department of National Defence

Construction Manager: WestPro (Pomerleau) (demolition of the existing B jetty)

Contractor: Scansa Construction (utility corridor)

Engineer: SNC-Lavalin (multiple services)

Other Key Players: Wood (design authority for A jetty); Stantec (design authority for B jetty); BTY Group (cost consultant); Hanscomb (design engineer's cost consultant for Jetty A); McElhanney (survey/geomatics services); Milestone Environmental; Golder; Aon; Hemmera

Funding: Public

• Federal Department of National Defence: \$781 million

The aim of the jetty project is to demolish the existing A and B jetties at CFB Esquimalt's dockyard and construct a new steel-and-concrete-pile A and B jetty facility in the same location. Due to the degraded functional and technical condition of the existing 70-plus-year-old structures, the recapitalization of these facilities has long been an infrastructure priority for the Royal Canadian Navy and the

Department of National Defence.

This project will provide sufficient operational berthing space for four Halifax-class frigate, two Arctic/offshore patrol ships, one Queenston-class joint support ship, and one Victoria-class submarine. Significant portions of the dockyard's service-support infrastructure will be recapitalized: both existing jetty cranes will be replaced, and all utility infrastructure on the site will

be renewed. The project will also include rebuilding roads and sidewalks as well as the expansion and improvement of the jetty-apron area.

Phase 1 of the A/B Jetty project was completed in 2014. A contract for works involving the replacement of the main substation was awarded in early 2018, and final elements of that work were continuing into 2019. The project is expected to be completed by 2024.

## 62 East-West Tie Transmission Project

\$777.1 million



2019 Rank: 74

Location: Municipality of Shuniah (near Thunder Bay) to Wawa, Ontario

Owner: NextBridge Infrastructure, a partnership with NextEra Energy Canada, Enbridge Inc., and Borealis Infrastructure

Construction Manager: Quanta Services Inc.

Contractor: Valard

Engineer: Burns & McDonnell

Environmental Services: Dillon Consulting Limited (environmental assessment)

Legal: Gowling WLG (counsel to NextBridge); Osler; Torys (acting for the owner)

Other Key Players: Ontario Energy Board and the IESO; Golder (environmental and social impact assessment, environmental inspection services for geotech drilling program); Hatch (constructability reviews and access planning); Englobe

Supplier:

Canam Group

Funding: Private

• Provincial: \$600 million

The East-West Tie Transmission Project is planned to consist of a new, approximately 447-kilometre, double-circuit, 230-kilovolt transmission line, primarily paralleling an existing transmission line corridor. The new East-West Tie will connect the Wawa Transformer Station to the Lakehead Transformer Station in the Municipality of Shuniah, near Thunder Bay, with a connection approximately mid-way at the Marathon Transformer Station. The need for the project was established by the Independent Electricity System Operator to: (i) increase capacity to meet expected electricity demand growth in northwestern Ontario; (ii) provide two-way power flow across the tie, allowing more efficient use of generation resources; and (iii) create improved electricity system reliability, flexibility and operation. Additionally, in March 2016, Ontario declared that the construction of the East-West Tie Transmission line is needed as a priority project. In October 2017, the Ontario Energy Board issued the Letter of Direction and Notice of Proceeding for the project. In early 2018, Hydro One filed for a Leave to Construct, presenting its own vision (Lake Superior Link) for the project. Acting on concerns that the project cost had risen to \$777 million, Hydro One announced that it could build the project for \$100 million less, by using an existing corridor through Pukaskwa National Park. In January, it was announced that NextBridge would continue to lead the project. Construction of the project began in October.

## A Decade of Top100

The total value of the Top100 projects list has grown over the years (in billions of dollars)



**63** Capital Region District Wastewater Treatment Project

**\$775 million** 

**2019 Rank:** 64

**Location:** Victoria, British Columbia

**Owner:** Capital Region District

**DBF Team:** Harbour Resource Partners (McLoughlin Point Wastewater Treatment Plant)—AECOM Canada; Graham; SUEZ; CEI; Gracorp; Michelss Canada

**DBFOM Team:** Hartland Resource Management Group (Residuals Treatment Facility)— Bird Construction; Maple Reinders; Synargo Capital

**Contractor:** Kenaidan Contracting Ltd. (Clover Point Pump Station)

**Management Consultants:** EY

**Legal:** Norton Rose Fulbright (advisor to CRD); Bennett Jones (counsel); Borden Ladner Gervais

**Other Key Players:** KPMG (commercial advisor); Operis (financial advisor for RTF team); Aon; Associated Engineering; Kerr Wood Leidal; Stantec; Parsons (Residual Solids Pipeline Phase – Designer); GHD (odour control & HVAC); Deloitte; INTECH Risk Management

**Funding:** P3



Credit: CRD

The Capital Regional District’s Wastewater Treatment Project will provide tertiary treatment for wastewater from the core area municipalities of Victoria, Esquimalt, Saanich, Oak Bay, View Royal, Langford and Colwood, and the Esquimalt and Songhees Nations. The project consists of three main components: the McLoughlin Point Wastewater Treatment Plant, which will provide tertiary treatment to the core area’s wastewater; the Residuals Treatment Facility which will turn the residual solids into Class A biosolids; and the conveyance system which is the pumps and pipes that will carry wastewater from across the core area to the treatment plant and residual solids to the Residuals Treatment Facility. In May, the CRD board approved a project budget increase of \$10 million, after a staff report concluded that the project could not be built for the original budget. In 2018, the Residuals Treatment Facility began construction, along with the major parts of the conveyance system. The remaining aspects of the conveyance system began construction in 2019. All of the project components are scheduled for completion by the end of 2020.

**64** Ontario Public Safety Radio Network 

**\$765 million**

**NEW**

**Location:** Province of Ontario

**Owner:** Government of Ontario

**Project/Construction Manager:** Bell Mobility

**Other Key Players:** CIMA+; Entuitive

**Funding:** Public

In October, the Government of Ontario announced that it had awarded a contract to Bell Mobility to replace the province’s aging Public Safety Radio Network. The agreement includes the reconstruction of core infrastructure, replacement of outdated equipment, and maintenance of the new radio network will help keep communities safe. Transition to the new network will begin to take place in 2021. Full transition to the new network is to be completed in 2023.

**65** Corner Brook Acute Care Hospital 

**\$750 million**

**2019 Rank:** 78

**Location:** Corner Brook, Newfoundland and Labrador

**Owner:** Government of Newfoundland and Labrador (to be turned over upon completion to the Western Health Regional Health Authority)

**Project/Construction Manager:** Corner Brook Care Team—B + H Architects, Montgomery Sisam Architects, Constructors, Marco Construction

**DBFM Team:** Corner Brook Health Partnership— Plenary Group Ltd.; PCL Constructors Canada Inc.; Marco Services Ltd; Johnson Controls Canada.

**Contractor:** Marine Contractors of Pasadena (site excavation and grading); Brook Construction (underground concrete water reservoir)

**Engineer:** WSP (structural engineers, sustainability consultants)

**Legal:** Torys (owner); Borden Ladner Gervais; Fasken

**Other Key Players:** WSP (heliport planning); Hanscomb (functional programmer’s cost consultant); INTECH Risk Management; EY (financial advisor); AGAT Labs; Aon

**Funding:** P3



Credit: Government of Newfoundland and Labrador

This new hospital will continue to offer the high level of services currently available at Western Memorial Regional Hospital including emergency care, obstetrics, palliative care, rehabilitation, inpatient mental health services and diagnostic services, in addition to new services such as radiation treatment and a dedicated space for a PET scanner. In June 2019, Corner Brook Health Partnership was named as the successful proponent for the project. Substantial completion is expected in 2023.



## 66 Rehabilitation of Robert-Bourassa Generating Units

\$732 million 

**2019 Rank:** 66

**Location:**

Baie-James, Quebec

**Owner:** Hydro-Quebec

**Contractor:** GE; TRANSAR

**Other Key**

**Players:**

EXP (plans and specs for mechanical systems);

McElhanney; Englobe

**Funding:**

Public

Robert-Bourassa generating station is one of the crown jewels in Hydro-Québec's generating fleet. With an installed capacity of 5,616 megawatts, it is the most powerful generating facility in Québec. Its longevity is essential to ensuring the long-term supply of reliable power in the province. This project includes the rehabilitation of eight of the sixteen generating units of the Robert-Bourassa generating station, as well as the speed governors, static excitation systems and cooling systems in all 16 units. The DEW generating units (made by Dominion Engineering Works) will be the ones rehabilitated, as they show the most signs of wear. This work will allow Hydro-Quebec to optimize its facilities and adequately secure Québec's energy future. Project completion is targeted for 2022.

## 67 Union Station Infrastructure Renewal Program

\$700 million 

**2019 Rank:** 67

**Location:** Toronto, Ontario

**Owner:** Metrolinx

**Project/Construction**

**Manager:** Joint Venture—

Hatch (lead), Parsons, IBI Group

**Engineer:** Morrison Hershfield (design engineer)

**Legal:** Torys (owner)

**Other Key Players:**

Entro (signage and wayfinding consultant);

Morrison Hershfield (track/signals eng. for conceptual work); WSP (geotechnical consultant, design services); Aon

(risk advisor/broker for member of preferred proponent); Hatch

(signals specialist); Golder; Rider Levett

Bucknall; Deloitte;

Comtech (consulting services)

**Funding:** Public

The Union Station rail corridor is the 6.4-kilometre hub of Toronto's transit network and consists of a complex arrangement of approach tracks, passenger platforms, and four interlockings at Cherry, Scott, John, and Bathurst streets. The corridor supports GO Transit commuter trains, Canadian Pacific, Canadian National, VIA, and ON Rail operations. It has 14 station tracks with platform access and more than 180 signals, 250 switch machines, 40 kilometres of circuited track, and all associated infrastructure, dating back to the late 1920s. This will be replaced with state-of-the-art computer-based interlockings and LED signalling technology. The scope of work has included track additions and upgrading, replacement of all special trackwork in the multi-track rail corridor extending four miles east and west of the station, and replacement of the 90-year old signalling system with new state-of-the-art signals, communications, power supply, CCTV, and SCADA systems. The program will wrap up in 2020.

## 68 North Shore Wastewater Treatment Plant

\$700 million 

**2019 Rank:** 68

**Location:** North Vancouver, British Columbia

**Owner:** Metro Vancouver

**DB(F) Team:** ADAPT Consortium—Acciona Infrastructure; DIALOG; Wood; TetraTech

**Engineer:** AECOM (owner's engineer); Wood (consulting)

**Consulting Architect:** Miller Hull; HDR/CEI

**Legal:** Norton Rose Fulbright (counsel for Metro Vancouver); Osler (DBF Counsel); Torys (acted for lender)

**Other Key Players:** Space2Place (public consultation, research and analysis, concept development); BTY Group (cost consultant); Golder (geotechnical evaluations); Maple Reinders (compatibility advisor); KPMG (business case financial advisor); Pomerleau; Aon; WSP (procurement); INTECH Risk Management; Deloitte (financial and procurement advisor)

**Funding:** P3



Credit: Acciona

This greenfield secondary treatment plant will replace an existing primary treatment plant. New federal and provincial regulations require the upgrade of all primary treatment plants. The existing primary plant removes only 40 to 60 per cent of suspended organic matter in the wastewater which, after primary treatment, is discharged directly into Burrard Inlet—a matter of concern for some environmentalists—and is located on land leased from the Squamish Nation. The new secondary plant will be able to remove over 90 per cent of organic matter and will be located two kilometres east of the existing plant. Increased plant capacity will allow up to 320 million litres per day to be treated under storm conditions. Construction officially began in late August 2018. The new plant is scheduled to be operational by the end of 2020, and the existing primary plant will be de-constructed once the new plant is in service.

**69 CAMH Phase 1C Redevelopment**

**\$685 million** 

**2019 Rank:** 69

**Location:** Toronto, Ontario

**Owner:** Government of Ontario

**Project Manager:** Infrastructure Ontario

**DBFM Team:** Plenary Health—Plenary Group and PCL (developer); PCL (design-build); Stantec (architect); Plenary group (financial advisor); ENGIE Services (facilities manager)

**Engineer:** Wood (consulting)

**Legal:** Fasken

**Other Key Players:** INTECH Risk Management (insurance advisor); Hascomb (owner’s cost consultant); ARUP (risk assessment); Aon; Colliers Project Leaders; Engineering Harmonics; AGAT Labs (analytical testing)

**Funding:** P3

The redevelopment project will see the construction of two modern buildings along Queen Street West in Toronto featuring inpatient and outpatient services for those most in need: people who are acutely ill and those experiencing the most complex forms of mental illness. The project will result in the construction of approximately 655,000 square feet of new build space, which will include: 235 in-patient beds; ambulatory programs; relocation of the emergency department to the Queen Street site; research and educational facilities; information and resource facilities; and site improvements, including parks and green space improvements. The concrete foundation of the two buildings has been completed. The project is on track to reach substantial completion in 2020.



Credit: CAMH



Credit: Plenary Group

**70 GO Bus Infrastructure**

**\$648 million** 

**NEW**

**Location:** Greater Toronto-Hamilton Area, Ontario

**Owner:** Metrolinx

**Engineer:** Hatch

**Funding:** Public

Metrolinx continues to invest in GO Bus Infrastructure throughout its GTHA network, including significant upgrades to several of its stations. The upgrades are complementary to the work being done to expand rail service throughout the same corridor. The work includes Park and Ride and major bus stop projects, maintenance facilities, parking areas, carpool lots, and system wide programs. Construction of several of these projects is underway, however limited information on those companies involved was available at press time.

**71 Grande Prairie Regional Hospital**

**\$647.5 million** 

**2019 Rank:** 72

**Location:** Grande Prairie, Alberta

**Owner:** Alberta Health Services

**Project/Construction Manager:** Clark Builders

**Engineer:** Stantec; WSP (engineer, mechanical, and electrical design)

**Consulting Architect:** DIALOG (prime consultants); Stantec, HOK (design); Stantec (landscape architecture); ISL Engineering and Land Services Ltd.

**Legal:** Borden Ladner Gervais

**Other Key Players:** Aon (risk advisor/broker for preferred proponent); Colliers Project Leaders; Tetra Tech (materials testing); Graham (construction management services); Morrison Hershfield (LEED consulting)

**Supplier:** Canam Group  
**Funding:** Public

This new 64,000-square-metre hospital is expected to provide 200 beds, a cancer care centre, and a nursing and medical careers training facility from the Grande Prairie Regional College. It will function as a regional referral centre, providing health services to northwestern Alberta residents. The existing Queen Elizabeth II Hospital will continue as a health care facility to be used to provide ambulatory, community and other health services. Alberta Health Services will operate on the two sites. Following the fallout with the initial construction manager in mid-2018, the government hired Clark Builders in November 2018 to take over the project. Despite efforts to get the project back to its original construction schedule, with substantial completion in 2019, Minister of Infrastructure Prasad Panda noted in the fall of 2019 that the project would not be completed until 2020.



**72 Highway 401 Expansion Project**

**\$639.8 million** 

**NEW**

**Location:** Milton to Mississauga, Ontario  
**Owner:** Ontario Ministry of Transportation  
**Project Manager:** Infrastructure Ontario  
**DBF Team:**

- West Corridor Contractors
- Developer: Aecon infrastructure Management Inc. (Aecon), Parsons Inc. (Parsons), and Amico Design Build Inc. (Amico)
- Constructors: Aecon, Amico, Parsons Inc.
- Designers: Parsons (Lead Designer), Hatch, EXP
- Financial: National Bank Financial

**Legal:** Fasken

**Other Key Players:** Operis (financial services); Morrison Hershfield (structural design review); A.W. Hooker (independent certifier); AECOM; Aon; DECAST; EllisDon

**Funding:** P3



The Highway 401 expansion project consists of an approximately 18-kilometre long stretch within the western part of the Greater Toronto Area, from the Credit River in Mississauga to Regional Road 25 in Milton. This portion of highway feeds into the northwest corner of Toronto, passing by Pearson International Airport before stretching across the top of the city heading east. The expansion project will create: 12 lane core-collector system from the Credit River to Winston Churchill Boulevard; 10 lanes from Winston Churchill Boulevard to Highway 407 ETR/ Highway 401 interchange; 12 lane core-collector system from Highway 407 ETR/ Highway 401 interchange to east of the James Snow Parkway; 10 lanes from the James Snow Parkway to west of Regional Road 25; Median HOV lanes; and support facilities and features drainage, lighting, signage, ATMS, carpool lots, etc. The winning bidder was selected on April 26, 2019 and construction began shortly thereafter.

**73 Highway 427 Expansion Project**

**\$616 million** 

**2019 Rank:** 73

**Location:** Toronto to Vaughan, Ontario  
**Owner:** Government of Ontario  
**Project Manager:** Infrastructure Ontario  
**DBFM Team:** LINK 427—ACS Infrastructure Canada Inc., Brennan Infrastructures Inc. (Miller Group) (developer); Dragados Canada Inc., Brennan Infrastructures Inc. and Bot Infrastructure Ltd. (construction); MMM Group Ltd. and Thurber Engineering Ltd. (design); ACS Infrastructure Canada Inc. and Brennan Infrastructures Inc. (maintenance)  
**Engineer:** AECOM

**Legal:** Torys (acted for the lender)

**Other Key Players:** Golder (preliminary foundation and pavement engineering services); INTECH Risk Management (insurance advisor); Aon; Canam Group

**Supplier:**

DECAST (precast infrastructure)

**Funding:** P3

The expansion of Highway 427 is a 10.4-kilometre addition to one of Toronto's 400-series highways, which currently runs from the Queen Elizabeth Way north to Highway 7 in the city's west end. There are two sections to the project. The first is the widening of the highway from Finch Avenue to Highway 7 (four kilometres), expanding the highway from four and six lanes to eight lanes. This will include the addition of high-occupancy toll (HOT) lanes. The second section is the 6.4-kilometre extension of the highway from Highway 7 to Rutherford Road. This includes the creation of six- and eight-lane highway sections and three interchanges. In 2018, work was done to clear the land north of the current highway, and bridge and culvert installation has begun at multiple points throughout the 10.4-kilometre extension. In 2019, following steady progress, the first section of paving has begun. Completion of the project is expected in 2021.

**74 Rapide-Blanc Generating Station Refurbishment Project**

**\$612.9 million** 

**NEW**

**Location:** Northern Quebec  
**Owner:** Hydro-Québec

**Contractor:** Voith (installation of new turbines, generators, and digital governors, as well as the refurbishment of embedded turbine components)

**Other Key Players:** Englobe  
**Funding:** Public

The Rapide-Blanc generation station is located on the Saint-Maurice River, 66 kilometres north of La Tuque, Québec. The station's initial construction began in 1930 and was completed in 1934. All of the six units will be replaced. Four of the existing turbines were installed in 1934, which means that by the time the project is complete, those units will have been in service for 90 years. The contract for the new units calls for a complete replacement of removable turbine and generator parts, the refurbishment of all embedded components and installation of digitally controlled governor units. The new units will also be more efficient and allow production of approximately 10 per cent more energy with the same amount of water. The components will be designed to last at least 70 years. The site work and assembly will begin in 2021 and, after commissioning, the contract is expected to be completed by the end of 2025.

**75 GO Expansion Project – Off Corridor**

**\$605 million** 

**NEW**

**Location:** Greater Toronto-Hamilton Area, Ontario

**Owner:** Metrolinx  
**Project Manager:** Infrastructure Ontario

**Other Key Players:** Parsons (systems work)

**Funding:** Public

The Off Corridor projects for the GO Expansion are the smallest of the three sections of the project. The work includes “[...] customer and safety-related improvements to existing stations and the introduction of new stations that are delivered in partnership with local municipalities and property developers.” (Metrolinx Business Case, Fall 2018) DB and DBF procurement models will be used for the projects in the off-corridor portfolio.

**76 Gordon M. Shrum Generating Station Refurbishment**

**\$600 million** 

**2019 Rank:** 75

**Location:** Peace River, British Columbia

**Owner:** BC Hydro

**Contractor:** Peter Kiewit Infrastructure

**Turbine Supplier:** Voith Hydro

**Supplier:** Andritz Hydro (rotor poles), Siemens (replacement transformers)

**Funding:** Public

This generating station, located at the W.A.C. Bennett Dam, provides 24 per cent of BC Hydro’s hydroelectric power. Currently, there are several capital projects underway at this generating station and the W.A.C. Bennett Dam to replace the station’s 50-year-old equipment. The largest in terms of budget is the replacement of five turbines, and this project was completed in fall 2015. In 2018, work began to install new exciter transformers on units one through five. Work is also continuing on the rip-rap and spillway upgrades.



Credit: BC Hydro

**77 Bonnybrook Wastewater Treatment Plant D Expansion**

**\$600 million** 

**2019 Rank:** 76

**Location:** Calgary, Alberta

**Owner:** City of Calgary

**Project/Construction Manager:** Graham

**Contractor:** KLS Earthworks & Environmental (Bonnybrook emergency outfall channel)

**Engineer:** Stantec (local); Jacobs; AECOM; Wood (consulting)

**Legal:** Blake, Cassels & Graydon (advised the City of Calgary)

**Other Key Players:** Hanscomb (owner’s design stage cost consultant); Aon (owner advisor and construction insurance broker); WPC Water Solutions; AGAT Labs; McElhanney (mgmt. services)

**Funding:** Public



Credit: City of Hamilton

One of Calgary’s three wastewater treatment plants, Bonnybrook is undergoing an expansion with the plant estimated to be able to service an additional equivalent population of 325,000 people. When construction is completed in 2022, the facility will service a population of 1.366 million people. The Plant D expansion is the largest project of the overall upgrade and includes new primary and secondary clarifiers, new bioreactors with biological nutrient removal system, new treated effluent filtration facility, new Thermal Hydrolysis Process facility, and a new flood berm. The City is also upgrading the existing ultraviolet disinfection system, digesters, and primary sludge thickening systems. Three significant construction projects got underway in 2019: the primary treatment expansion, new biogas storage facility, and the cogeneration facility expansion. Work was also done on the emergency outfall channel.



**78** Réno-Systèmes – Phase IV

**\$582.5 million** 

**2019 Rank:** 80  
**Location:** Montreal, Quebec  
**Owner:** STM  
**Engineer:** SNC-Lavalin  
**Other:** Englobe (quality management services)  
**Funding:** Public

In the fall of 2014, the board of directors of Société de transport de Montréal (STM) announced that it would invest \$582.5 million into replacement of metro stationary equipment in Phase 4 of its Réno-Systèmes program. The program, still in the design phase according to the 2016-2026 Quebec Infrastructure Plan, calls for the systematic replacement of end-of-life assets in the following categories: energy, accessibility, ventilation, motorized installations, telecommunications, and operating process controls, track equipment, and train control. STM’s current budget calls for a \$64.6-million investment in 2017, with over \$100 million to be spent on the project each year from 2018 to 2020.



Credit: STM

**79** Library and Archives Canada Preservation Centre

**\$580 million** 

**NEW**

**Location:** Gatineau, Quebec  
**Owner:** Government of Canada  
**Project Manager:** Infrastructure Ontario  
**DBFOM Team:** Plenary Partners Gatineau—B + H Architects; Group (Canada) Ltd.; PCL Constructors Eastern Inc.; PCL Investments Inc.; ENGIE Services Inc.

**Other Key Players:** Morrison Hershfield (BE/CLS work); EY (P3 advisor); Deloitte (financial advisor); Aon  
**Funding:** P3

The new preservation centre will be the first net-zero carbon facility dedicated to archival preservation in the Americas, and the first federal building constructed to the requirements of Canada’s Greening Government Strategy. The building is being constructed across from the current facility, located in Gatineau, Quebec. The main features of a net-zero carbon building are: Minimal carbon emissions from energy consumption, achieved through building design and efficiency measures; energy needs met through carbon-free fuel sources; and minimal embodied carbon in building materials. The DBFOM contract, awarded in June 2019, includes 30 years of operation and maintenance.

**80** West Calgary Ring Road

**\$552 million** 

**NEW**

**Location:** Calgary, Alberta  
**Owner:** Alberta Transportation  
**Contractor:** EllisDon (north section); Aecon, Flatiron (Bow River Bridge Twinning)  
**Engineer:** Hatch; Wood (consulting)  
**Other Key Players:** Deloitte (financial advisor); Burns & McDonnell (electric utility relocations); Parsons; Englobe

**Funding:** Public  
**• Provincial:** \$552 million

The 11-kilometre project is divided into three segments: the south one that connects with the Southwest Calgary Ring Road, the north one that meets the Trans-Canada Highway, and a new bridge across the Bow River. Construction of the north segment, running between Old Banff Coach Road and the Trans-Canada Highway, was awarded to EllisDon. The project was tendered at a cost of \$463 million. The West Bow River Bridge twinning project will be built by Flatiron and Aecon and has been tendered at a cost of \$89 million. The Request for Qualifications for the south segment of the West Calgary Ring Road, between Highway 8 and Old Banff Coach Road, has been issued. A contractor is expected to be in place for the 2020 construction season. The West Calgary Ring Road will be open during fall 2022, one year following the expected completion of the Southwest Calgary Ring Road project. When complete, the entire Calgary Ring Road will provide travellers with 101 kilometres of free-flow travel.



**81 Bowmanville Extension Project**

**\$550 million** 

**2019 Rank:** 82  
**Location:** Bowmanville, Ontario  
**Owner:** Metrolinx

**Other Key Players:** Wood, Stantec (technical advisory services); Deloitte, Golder  
**Funding:** Public

Announced in June 2016, the Bowmanville Extension project will see the Lakeshore East train line extended nearly 20 kilometres from Oshawa to Bowmanville. The project includes the creation of four new stations: two in Oshawa, one in Courtice and one in Bowmanville. When service begins, four rush-hour trains will leave from Bowmanville in the morning, and return in the afternoon. When service opens in 2024, the line will provide four morning trips along the line to Union Station in downtown Toronto, and four afternoon trips making all station stops to the new Bowmanville station.

**82 Annacis Island Wastewater Treatment Plant Expansion**

**\$550 million** 

**2019 Rank:** 83  
**Location:** Delta, British Columbia  
**Owner:** Metro Vancouver

**Construction Manager:** Graham/Aecon Joint Venture (Stage 5 expansion); Hatch (outfall project)  
**Contractor:** North American Construction; Kenaidan Contracting (computer control system and laboratory building); Bessac/Pomerleau JV (outfall pipeline)  
**Engineer:** Brown and Caldwell, Stantec, EIC Solutions, Klohn Crippen Berger (Stage 5 Expansion); CDM Smith, Golder (outfall); Wood, Black & Veatch (Cogeneration Backup Power)

**Legal:** Norton Rose Fulbright (for Metro Vancouver)

**Other Key Players:** EXP (vibration monitoring); JJM Construction and Geopac Inc. (prepare the ground and relocate utilities); Golder (outfall design team); WSP (materials engineering and testing); Hatch (tunnel design review and outfall construction management); Colliers Project Leaders; Jacobs (construction mgmt. services); McElhanney (surveying services); Aon

When this Stage 5 project by Metro Vancouver is complete, the Annacis Island facility will serve 1.5 million people in 14 Metro Vancouver municipalities. Today, it serves 1.25 million people. The previous expansion, Stage 4, was done in the late 1990s. The plant serves much of the Tri-Cities, Burnaby, Maple Ridge, Delta, Surrey, Pitt Meadows, Langley, and White Rock. The \$184-million contract for the outfall pipeline was awarded in September. The outfall pipe will be excavated using a tunnel boring machine. Construction is scheduled for completion in 2022.

**83 Lake Manitoba and Lake St. Martin Outlet Channels**

**\$540 million** 

**2019 Rank:** 84  
**Location:** Interlake, Manitoba  
**Owner:** Government of Manitoba

**Contractor:** 513 Construction Ltd./Glen Hartman Construction Ltd. (all-weather road construction); Interlake Regional Tribal Council/Sigfusson Northern Ltd. (all-weather road construction)  
**Engineer:** Hatch; KGS Group  
**Environmental Services:** North/South Consultants Inc.; M. Forster Enterprises; Stantec; E. Hicks & Associates Ltd.; Szwaluk Environmental Consulting Ltd.; Magellanicum Ecological Services

**Funding:** Public  
 • **Federal:** \$247.5 million  
 • **Provincial:** \$292.5 million

In 2011, southern Manitoba experienced widespread flooding and Lake Manitoba experienced excessively high inflows through the Waterhen River, Whitemud River, and the Portage Diversion. This flood protection project is intended to improve lake level regulation and consequently reduce the likelihood of flooding along Lakes Manitoba and St. Martin. The \$540-million flood protection project consists of two 23-kilometre long outlet channels with associated control structures and bridge crossings as well as an 80-kilometre all-weather access road and a 24kV transmission line to the Lake St. Martin outlet channel control structure. The Lake Manitoba outlet channel will connect Watchorn Bay on Lake Manitoba to Birch Bay on Lake St. Martin and the Lake St. Martin outlet channel will drain Lake St. Martin from a point in the southeast to Willow Point in Lake Winnipeg. Two sections of the all-weather access road are currently under construction, with an anticipated completion in 2019. Outlet Channel construction is scheduled to commence in 2020. Manitoba recognizes its duty to consult with Indigenous peoples in a meaningful way. The engagement and consultation process is currently underway, with 31 Indigenous communities identified as having the potential to be affected by the project.

**84 Metrolinx Light-Rail Vehicles**

**\$528 million** 

**2019 Rank:** 85  
**Location:** Toronto, Ontario  
**Owner:** Metrolinx  
**Engineer:** SNC-Lavalin; Wood

**Vehicle Supplier:** Alstom  
**Other Key Players:** Comtech (project mgmt. consultant services); Jacobs (vehicle engineering consultants)  
**Funding:** Public  
 • **Provincial:** \$528 million

Metrolinx announced the purchase of 61 Citadis Spirit light-rail vehicles from Alstom in May 2017. The purchase provides Metrolinx with the flexibility to use the vehicles as needed across its current light-rail transit projects: 17 of the vehicles will be purpose-built for the Finch West LRT project, with the remaining 44 available for additional projects underway, including the Eglinton LRT and Hurontario LRT. The vehicles are expected to be available in time for use on any of the aforementioned projects in 2021.



**85 Wilson Facility Enhancement and Yard Expansion**

**\$506.4 million**



**2019 Rank:** 86

**Location:** Toronto, Ontario

**Owner:** TTC

**Project/Construction Manager:**

- Bondfield Construction (construction management)
- Contractor: Dufferin Construction, a division of CRH Canada (contract for prep work)

**Engineer:** AECOM, Hatch, TTC

**Legal:** Osler

**Other Key Players:** KPMG (advisor for TTC Capital Program Delivery Review); Hanscomb (owner's cost consultant); Comtech (consulting services)

**Supplier:** Ansaldo; Canam Group; DECAST (precast chambers); Dufferin Concrete; Nedco; Nortrak; Powell; Tomlinson; Thales; Twinco

**Funding:** Public

- **Municipal** TTC: \$506.4 million (2015 Capital Budget)



Credit: TTC

TTC's Wilson Yard is undergoing a significant expansion of the railyard and supporting maintenance facilities, which is required to accommodate the needs for Toronto Rocket train storage and as a result of the introduction of the Spadina Subway Extension and increasing service demands on Line 1 (Yonge University Spadina). This expansion will add eight new storage tracks to the facility with room to store 16 trains, as well as an expanded car house for servicing Toronto Rocket trains, new run-around connections, and a connection to Downsview station. The entire project is expected to be completed in 2020.

**86 BMO Convention and Trade Centre Expansion Project**

**\$503.7 million**



**NEW**

**Location:** Calgary, Alberta

**Owner:** City of Calgary

**Project Managers:** PCL Construction (construction manager); Calgary Municipal Land Corporation (development manager); M3 Development (project management)

**Architect:** Stantec, S2 Architecture, Populous (planning and design)

**Funding:**

Public/Private  
All three levels of government will contribute approximately \$166.6 million to the project, while Calgary Stampede and Exhibition Ltd. is contributing \$3.9 million

The 50,000 square feet BMO Convention and Trade Centre is Calgary's largest convention centre. The expansion project will create a tier-1 venue, the second largest facility of its kind in Canada. The project will more than double the size of the BMO Centre to almost one million square feet, transforming it into Canada's second-largest facility, and create new spaces for conferences, meetings, exhibitions, and consumer shows. The project is scheduled for completion by the summer of 2024.

**87 Regina Revitalization Initiative**

**\$500 million**



**2019 Rank:** 87

**Location:** Regina, Saskatchewan

**Owner:** City of Regina

**Engineer:** WSP; Ground Engineering Consultants

**Other Key Players:** UrbanStrategies; Urbanics Consultants; P3A Architecture; WSP (assessment, analysis, ESA); Deloitte (real estate advisor)

This is the second phase of the Regina Revitalization Initiative, including the redevelopment of approximately 17.5 acres of vacant downtown land formerly used as a Canadian Pacific intermodal yard. With new offices, shops and restaurants, there will be new opportunities for work and play, and a variety of housing options will provide distinctive urban living. With a new walkway connecting this lively district to downtown, it will strengthen Regina's culture and nightlife. Urban planning and design, as well as engineering consulting work, is currently taking place as part of a public engagement process. Work has been pushed back, based on other community priorities, and it could now be up to five years before anything concrete happens with the lands. The new step for the project is the renewal of Dewdney Avenue, which is slated to begin in 2020 and last until 2025.

**Funding:** Public/Private

- **Municipal:** \$47 million
- **Private:** \$450 million to \$500 million

**88 Travers Solar Project**

**\$500 million**



**NEW**

**Location:** Vulcan County, Alberta

**Owner:** Greengate Power

**Contractor:** Greengate Power

**Other Key Players:** Entuitive

**Funding:** Private

The Travers Solar Project is the largest solar energy project in Alberta history. Located on approximately 4,700 acres of land eight kilometres southwest of the village of Lomond in Vulcan County, the project will include the installation of around 2.5 million solar photovoltaic modules and 166 inverter/transformer stations. At 400 megawatts, the project will generate enough power to supply more than 111,000 homes, offsetting more than 472,000 tonnes of greenhouse gas emissions annually.

## 89 Michael Garron Hospital Project

**\$498.2 million** 

**2019 Rank:** 88

**Location:** Toronto, Ontario

**Owner:** Toronto East Health Network

**Project Manager:** Infrastructure Ontario

**DBF Team:** EllisDon Infrastructure Healthcare—EllisDon Design Build Inc. (design-builder); B + H Architects, Diamond Schmitt Architects (design); Mulvey & Banani International Inc., Crossey Engineering Ltd., Stephenson Engineering Ltd., WalterFedy (engineer); EllisDon Capital Inc. (financial advisor)

**Engineer:** Wood (consulting)

**Legal:** Blake, Cassels & Graydon (advisor to the proponent); Borden Ladner Gervais

**Other Key Players:** EXP (Planning Design & Compliance services); A.W. Hooker (prime cost consultant and independent certifier for IO); Aon  
**Funding:** P3



The Michael Garron Hospital – Phase 1 New Patient Care Tower Project involves the construction of a new eight-storey patient care tower and three-storey connection, as well as demolition of some existing space and renovations to the existing hospital. The project will add up to approximately 550,000 square feet, as well as renovate an additional approximately 100,000 square feet of select areas. Early works are underway at the project site.

## 90 London Bus Rapid Transit System

**\$498 million** 

**2019 Rank:** 89

**Location:** London, Ontario

**Owner:** City of London

**Other Key Players:**

IBI Group/WSP JV

**Funding:** Public

The London BRT system is a proposed 23.7-kilometre system that will run throughout the city's busiest corridors. The current iteration's north-south route runs from the downtown to the city's north end past Western University, and to the south end near Highway 401. The west-east corridor will run west from the downtown past Wonderland Road, and east to the campus of Fanshawe College. The project has received \$170 million of provincial funding, and the City of London has budgeted \$130 million for the project. While there is under \$200 million in funding commitments still outstanding, the federal government contribution for transit funding for the next decade exceeds the amount needed to pay for the balance of the project. If the project is kept to its current timeline, construction is phased and estimated to begin on the east corridor in 2020 and on the north corridor in 2022, with the opening of these corridors in 2023 and 2026 respectively. Construction would then begin on the south corridor in 2023 and on the west corridor in 2025, and open by 2026 and 2028.

## 91 Yukon Resource Gateway Project

**\$468 million** 

**NEW**

**Location:** Yukon Territory

**Owner:** Government of Yukon

**Engineer:** Wood (consulting)

**Other Key Players:** Associated Engineering (preliminary design)  
**Funding:** Public/Private  
• **Federal:** \$247 million  
• **Territorial Government:** \$112 million  
• **Private:** \$108 million (local industry)

The Yukon Resource Gateway Project will provide the bypass at Carmacks and approximately 650 kilometres of needed upgrades of existing road infrastructure in the Dawson and Nahanni ranges—two key areas of high mineral potential and active mining in Yukon. That includes replacing road surfaces, bridges and culverts in the two regions. In April, the Yukon government reached an agreement with the Little Salmon/Carmacks First Nation for the Carmacks Bypass project, one of the roadways included in the overall project. Project agreements must be in place with the First Nations communities as a stipulation for funding from the federal government.

## 92 Route 389 Improvement Program

**\$468 million** 

**2019 Rank:** 90

**Location:** Baie-Comeau, Quebec to the Newfoundland-Labrador border

**Owner:** Government of Quebec

**Contractor:** Dexter Quebec (km 240-254)

**Engineer:** SNC-Lavalin

**Other Key Players:** BPR/AXOR Experts-Conseils Consortium (planning and specifications north of Manic-5); Roche-TDA Consortium, in conjunction with Inspec-Sol (now GHD) (environmental assessment); WSP (route design work); Englobe

**Funding:** Public

This 570-kilometre long highway joins the city of Baie-Comeau in Quebec with the Newfoundland and Labrador border. The improvement program is key in the development of Plan Nord, as it will improve access to lands north of the 49th parallel. The program is divided into five individual projects: Project A: from Fire Lake to Fermont; Project B: Baie-Comeau to Manic-2; Project C: winding sector north of Manic-Five; Project D: Manic-2 north of Manic-3; Project E: Manic-3 North to Manic-5. In April, the start of construction on Project C was announced. Project C represents a stretch of roadway between kilometre markers 240 and 254 about 28 kilometres north of the Daniel-Johnson Dam (Manic-5). This portion represents an approximate investment of \$27 million and will take two years to complete.



**93** **Centerm Expansion Project**  
**\$454 million** 

**2019 Rank:** 91  
**Location:** Vancouver, British Columbia  
**Owner:** Vancouver Fraser Port Authority  
**Design-Build contractor:** Centennial Expansion Partners—Dragados Canada Inc.; Jacob Bros. Construction Inc.; Fraser River Pile & Dredge Inc.  
**Engineer:** AECOM; Hatch

**Other Key Players:** PBX Engineering; Klohn Crippen Berger; WSP; Proactive Infrastructure Consulting; Deloitte; Aon; Hemmera

**Funding:** Public  
**• Federal:** \$454 million

The Port of Vancouver’s Centerm Expansion Project involves a series of improvements to the Centerm container terminal to meet near-term demands for container shipment in the port. The two-thirds increase in capacity would expand by 600,000 twenty-foot equivalent unit containers (TEUs), from 900,000 TEUs to 1.5 million TEUs. The project also includes the South Shore Access project, a wide range of road improvements that will benefit the entire south shore port area, including a new Centennial Road Overpass and an extension to Waterfront Road. Construction began in April, with completion expected in early 2022.

**94** **Manitoba-Minnesota Transmission Project**  
**\$453 million** 

**NEW**  
**Location:** Winnipeg area, Manitoba to the Minnesota border  
**Owner:** Manitoba Hydro


**Contractor:** Muskego Joint Venture (Section 1 of MMTP from Dorsey Converter Station, north-west of Winnipeg to Anola); Valard Construction (Section 2 Anola to the U.S. border.)  
**Engineer:** Wood (consulting)  
**Funding:** Public

The Manitoba-Minnesota Transmission project involves the construction of a 500-kilovolt transmission line from the Winnipeg area to the border with the United States in the province’s southeast. As part of the new construction, upgrades are being made to three of Manitoba Hydro’s converter stations: Dorsey, Glenboro and Riel. It is estimated that the clean energy exported to Minnesota will displace 1.5 megatonnes of emissions per year. Construction is already underway on the Minnesota side, and construction was able to start on the Manitoba side following the awarding of the environmental assessment certificate in April 2019.

**95** **Mills Memorial Hospital Replacement Project**  
**\$447.5 million** 

**NEW**  
**Location:** Terrace, British Columbia  
**Owner:** North West Regional Hospital District  
**Project Manager:** Northern Health  
**Funding:** Public

The business plan for a new Mills Memorial Hospital in Terrace, B.C., was approved by the provincial government in April 2019. The 78-bed hospital is expected to be more than twice the size of the current facility, going from 11,610 square metres (124,969 square feet), to approximately 26,400 square metres (284,000 square feet). It will feature private rooms, an expanded emergency department including two trauma bays, six stretcher bays, pediatric care space, and four operating rooms, as well as the latest diagnostic imaging equipment. The new hospital will be built at the north end of the current hospital grounds. It is expected that construction will begin in 2020 and run until 2024.

**96** **Côte-Vertu Station Underground Garage**  
**\$440 million** 

**2019 Rank:** 93  
**Location:** Montreal, Quebec  
**Owner:** STM  
**Project/Construction Manager:** SNC-Lavalin  
**Contractor:** Dragados  
**Engineer:** Hatch, SNC-Lavalin, Stantec (engineer consortium)  
**Legal:** Borden Ladner Gervais  
**Other Key Players:** Englobe (geotechnical and environmental field surveillance); WSP (geotechnical); Aon  
**Funding:** P3  
**• Provincial:** \$440 million

The new Côte-Vertu underground garage will double the capacity of the train storage available at the end of the Orange line in Montréal, enabling for 20 trains to be stored at the site. A fan of tracks at the entrance of the garage will consist of three tunnels, with two tracks holding eight trains. A connecting track from the garage to the station will provide for space for an extra four trains to be parked if necessary. A maintenance pit will also be built as part of the garage project. The additional space for parking trains will allow for a 20 per cent increase in train frequency during peak periods. The project is expected to be completed by 2020.



Credit: STM



**97** **Springbank Off-stream Reservoir**

**\$432 million** 

**2019 Rank:** 94  
**Location:** Calgary, Alberta  
**Owner:** Government of Alberta  
**Engineer:** Stantec  
**Environmental Services:** Stantec  
**Legal:** McLennan Ross (Counsel for the Government of Alberta)  
**Funding:** Public

The Springbank Off-stream Reservoir represents the Government of Alberta’s solution to mitigate severe flooding along the Elbow River, similar to what took place in June 2013. Current plans call for a dry reservoir with a capacity of 70.2 million cubic metres, with an outlet structure to safely release the water back to the river when safe to do so. The reservoir will be located approximately 15 kilometres west of the City of Calgary. The Government of Alberta, under Premier Jason Kenney, hired lawyer Martin Ignesiak in May to explore ways to expedite the project. However, in July, the Tsuut’ina Nation Council voted to formally oppose the project, citing environmental impact concerns including the potential for groundwater pollution. This opposition is likely to delay the project’s original anticipated completion date. Construction will require three years, with the reservoir being functionally operational at a reduced level after two years.

**98** **Royal Inland Hospital Patient Care Tower**

**\$417.2 million** 

**NEW**  
**Location:** Kamloops, British Columbia  
**Owner:** Interior Health  
**DB(F)M Team:** EllisDon Infrastructure—Respondent team lead: EllisDon Capital Inc. Equity providers: EllisDon Capital Inc. Design-Builder: EllisDon Infrastructure Architect: Parkin Architects Ltd./Kasian Architects Service Provider: EllisDon Facility Services Inc.  
**Legal:** Fasken

**Funding:** Public/Private  
**Provincial:** \$225.2 million (Inland Health and Government of B.C.), Thompson Regional Hospital District (\$172 million)  
**Private:** Royal Inland Hospital Foundation (\$20 million)

The Royal Inland Hospital, located in Kamloops, B.C., is a 254-bed tertiary acute-care hospital. It is one of two Interior Health tertiary referral hospitals. The Patient Care Tower project will take place in two phases. Phase 1 will be the design and construction of the Patient Care Tower, which will feature single-patient rooms and will bring Royal Inland Hospital up to current standards of care, improving working conditions, as well as infection control and prevention measures. Phase 2 will include significant renovation and expansion to the emergency department, pediatrics, post-anesthetic recovery and the morgue. New parking stalls will be added to the site. Construction of the patient tower got underway in the fall of 2018. The patient care tower is scheduled to open in early 2022, with Phase 2 renovations to be completed in the fall of 2024.

**99** **Tłı̨chq All-Season Road**

**\$411.8 million** 

**NEW**  
**Location:** Whati to Bechocko, Northwest Territories  
**Owner:** Government of Northwest Territories  
**DBFOM Team:** North Star Infrastructure—Kiewit Canada Development Corp., the Tłı̨chq Government (as 20 per cent equity provider); and together with Design-Build partners Peter Kiewit Sons ULC, Hatch Corporation, and Thurber Engineering Ltd.

**Engineer:** Wood (consulting)  
**Legal:** Borden Ladner Gervais  
**Other Key Players:** Golder; EY (financial advisor); Aon  
**Funding:** P3

The new 97-kilometre, permanent all-season road will connect the community of Whati to the territorial highway system. The roadway will be a two-lane gravel road, and will include four bridges and one large arched culvert. In addition to the community benefit that the permanent roadway will create for the people of Whati, the roadway will also provide Fortune Minerals Limited with a means to transport metal concentrates from its NICO Mine to the company’s refinery in Saskatchewan. The contract for construction of the new roadway was awarded in February 2019. Construction began in August. The Tłı̨chq Government owns a 20-per-cent stake in the roadway.

**100** **SRB PIE-IX BRT Project**

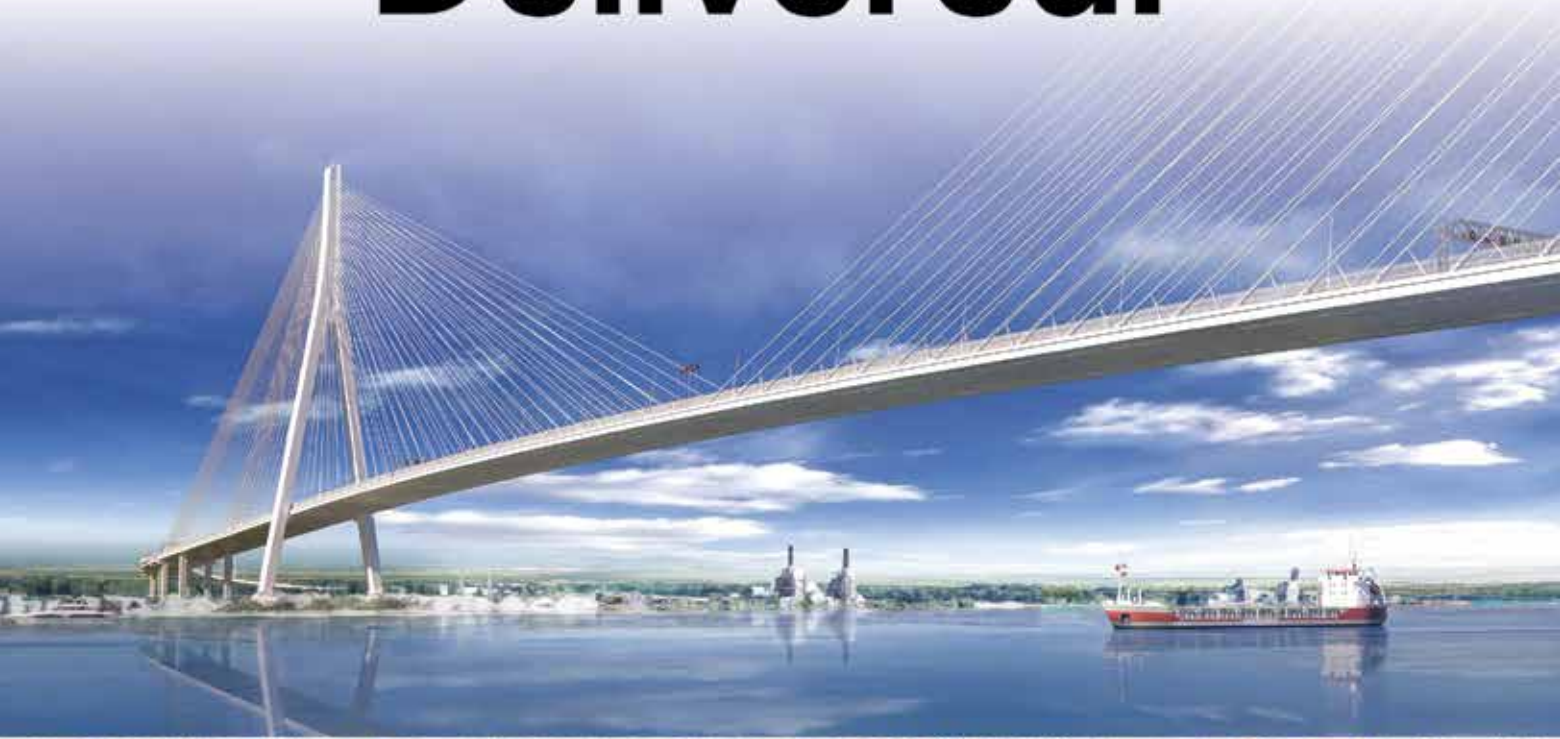
**\$393.8 million** 

**NEW**  
**Location:** Montreal, Quebec  
**Owner:** Metropolitan Regional Transit Authority (ARTM)  
**Engineer:** SNC-Lavalin (consulting)  
**Legal:** Borden Ladner Gervais  
**Other Key Players:** WSP (pre-feasibility study)  
**Funding:** Public

An increase of 30,000 trips by public transport per day. A bus frequency similar to that of the subway. An improvement in the comfort of public transit users thanks to bus shelters allowing to accommodate 100 people simultaneously and simplifying the ascent and descent. Better interconnectivity with the public transport network. Competitiveness and economic attractiveness of the axis Pie-IX, two of the most important axes of the island of Montréal for public transport and the largest public transportation corridor east of the Orange Line subway from Montréal. The potential development of several projects focused on public transit, both in Laval and Montréal. The project got underway in fall 2018, and is expected to reach substantial completion in 2022.



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