

Top 100

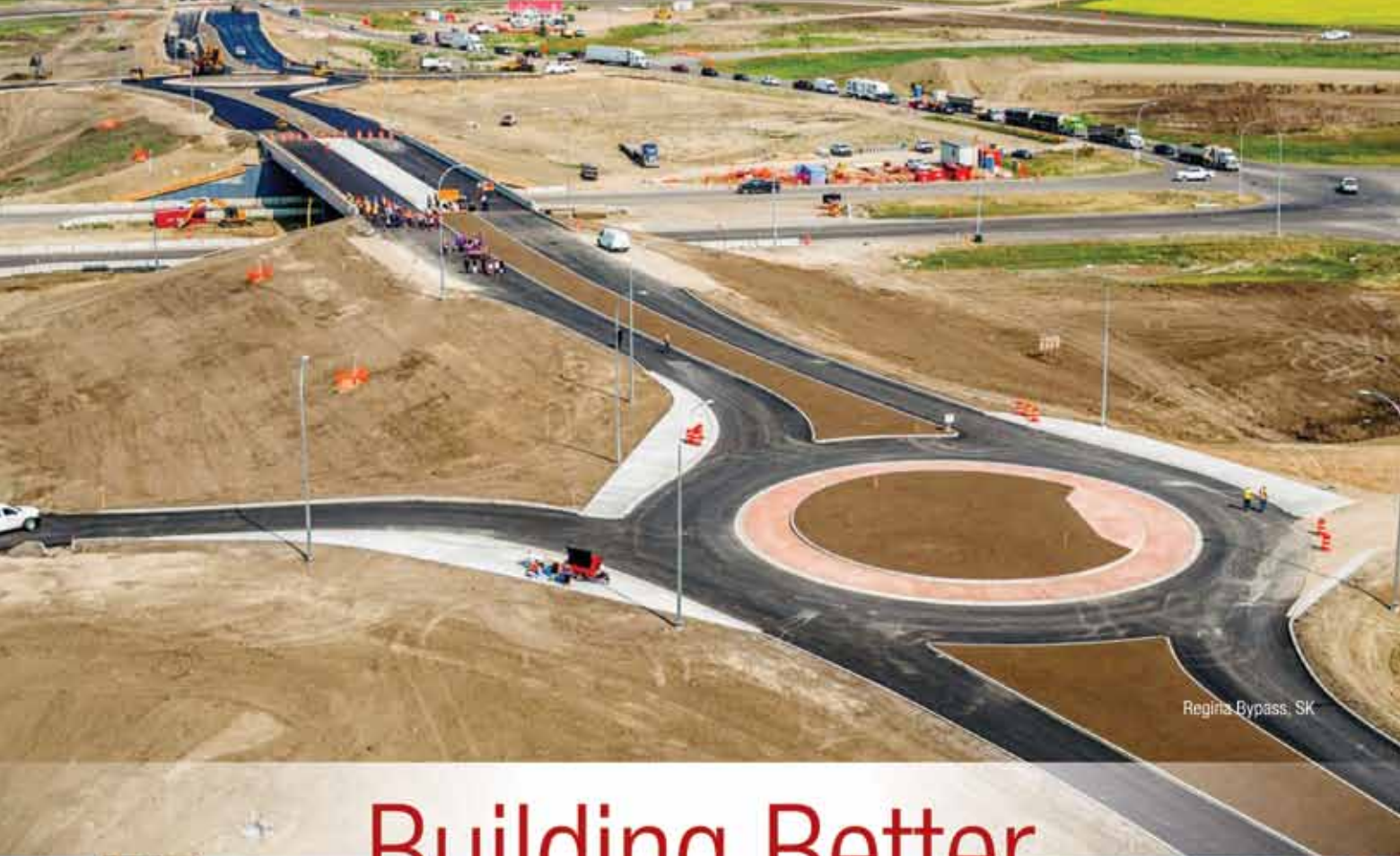
Canada's Biggest Infrastructure Projects

ReNew
CANADA
The Infrastructure Magazine

2018

top100projects.ca





Regina Bypass, SK

Building Better



North Island Hospitals Project, BC



GRAHAM

Your Construction Solutions Partner.
grahambuilds.com

ReNew

C A N A D A
The Infrastructure Magazine

Top100 Projects — 2018
An annual report inserted in
ReNew Canada's
January/February 2018 issue

EDITOR Andrew Macklin
andrew@actualmedia.ca

PUBLISHER Todd Latham
todd@renewcanada.net

**DIRECTOR
OF BUSINESS
DEVELOPMENT** Elena Langlois

**ART DIRECTOR
& DESIGN** Donna Endacott

**ASSOCIATE
EDITOR** Katherine Balpataky

**CONTENT &
MARKETING
MANAGER** Todd Westcott

ADVERTISING Elena Langlois
elena@actualmedia.ca
Todd Latham
todd@actualmedia.ca



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

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

Phone: 416.444.5842

Subscription services: 416-444-5842, ext 117

ReNew Canada subscriptions are
available for \$29.95/year or \$54.95/two years
and include the annual Top100 Projects.

©2018 Actual Media Inc. All rights reserved.
The contents of this publication may not be
reproduced by any means in whole or in part, without
prior written consent from the publisher.

Printed in Canada



Big Projects, Big Investments

It begins the same, and it ends the same, but in between it couldn't be more different.

The 2018 Top100 Projects report starts and finishes as it did in 2017, with two Ontario-based nuclear power projects holding the top spots for a second consecutive year, and #99 and #100 again held by the South End Water Pollution Control Centre and the Etobicoke General Hospital respectively.

But among the remaining 96 projects, change is everywhere. Five of the top ten projects have shifted due to adjusted budgets, each of our key sectors have new developments that have been added to our 2018 report and, in total, 13 new projects have been added.

At the end of the year, it adds up to a \$12.6 billion overall increase and a Top100 now valued at \$199 billion.

The top three sectors in the report have tightened up, as several new building projects found their way into the Top100 thanks, in part, to significant new investments in the health care sector. Energy projects still lead the way with 24 projects, followed by 23 transit projects, and 22 building projects that also made the list. The single biggest sector increase came in our 'other' section, thanks to a couple of new large-scale water projects.

Provincially, Ontario increased its share of projects with its 40 — which is more than double the 18 of its neighbour to the east Quebec. British Columbia and Alberta, at 14 and 11 respectively, are the only other provinces in the double digits among the biggest public infrastructure projects in Canada.

In total, over 300 projects valued at over \$100 million were evaluated for this year's report. Nearly half were not included because there were not far enough along in development, such as the Ontario High Speed Rail project. The other half were valued at lower than our #100 project, the \$330-million Etobicoke General Hospital.

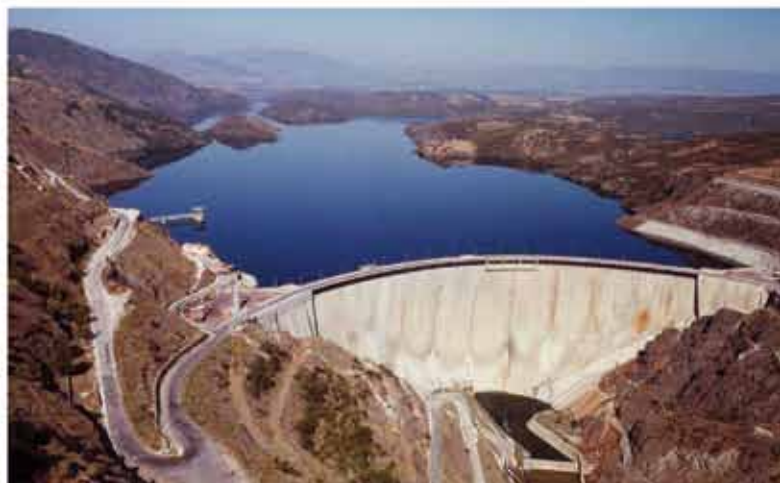
As is always the case with the Top100 Projects report, there is more information available than what is included here. The additional details, as well as year-round updates on the status of all of our Top100 Projects, can be found at top100projects.ca.

This report is a living document, with new details emerging year-round. If you would like to share a new project, have additional information on an existing project or if you have general questions about this report and our ongoing research, contact me at andrew@actualmedia.ca.

Andrew Macklin, Editor, ReNew Canada



To create your own report, visit top100projects.ca/2018filters
and sort by project cost, key players, location, sector, and more.



A trusted partner.

Delivering
tomorrow's top
infrastructure.



We are the proud lead partner on one of Canada's
largest infrastructure projects: Site C Clean Energy Project.

acciona.ca



INNOVATION • DEDICATION • EXCELLENCE

Top100 Project Index

By Rank, Project Title, and Page Reference

Buildings

rank	project title	page #
------	---------------	--------

Education

96	Université de Montréal Science Complex	66
----	--	----

Government

45	Energy Services Acquisition Program's Energy Service Modernization	49
18	Rehabilitation of the Parliament Buildings	38

Health Care

70	CAMH Phase 1C Redevelopment	59
14	Centre hospitalier de l'Université de Montréal (CHUM) and Research Centre	32
79	Corner Brook Acute Care Hospital	61
100	Etobicoke General Hospital	66
74	Grande Prairie Regional Hospital	60
23	Quebec City University Hospital center – Laval University	40
94	Joseph Brant Hospital Redevelopment and Expansion Project	65
42	Mackenzie Vaughan Hospital	48
37	New Cancer Centre in Calgary	46
56	Sainte-Justine University Hospital Centre	54
92	Saskatchewan Hospital North Battleford	65
64	Stanton Territorial Hospital Renewal Project	57

Military

91	Canadian Forces Base Esquimalt A and B Jetty Recapitalization Project	64
----	---	----

59	Canadian Forces Base Trenton Expansion	55
----	--	----

Public Spaces

24	81-141 Bay Street	42
61	Union Station Revitalization Project	56

Social Infrastructure

95	Vancouver Art Gallery	65
----	-----------------------	----

Energy

rank	project title	page #
------	---------------	--------

Hydroelectric

76	Gordon M. Shrum Generating Station Refurbishment	60
51	John Hart Generating Station Replacement Project	52
6	Keeyask Hydroelectric Project	20
69	Marmora Pumped Storage Project	58
3	Muskrat Falls Project	14
66	Rehabilitation of Robert-Bourassa Generating Units	57
29	Renovations to Beauharnois Generating Station	43
7	Romaine Complex	22
65	Ruskin Dam and Powerhouse Upgrade	57
4	Site C Clean Energy Project	16
86	Tazi Twé Hydroelectric Project	63

Natural Gas

72	Chinook Power Station	59
39	Genesee 4 & 5 Generation Stations	47
33	Great Spirit Power Project	45
54	The Milner Energy Centre	53

Nuclear

1	Bruce Power Nuclear Refurbishment	10
2	Darlington Nuclear Refurbishment	12

Transmission

9	Bipole III Transmission Line	25
38	Chamouchouane–Bout-de-l'Île Transmission Line	46
77	East–West Tie Transmission Project	61
35	Fort McMurray West Transmission Project	45
73	Juan de Fuca Power Cable	59
30	Maritime Link Project	44
41	Romaine Complex Transmission Line	47
40	Wataynikaneyap Transmission Project	47

Wind

52	Henvey Inlet Wind Project	52
----	---------------------------	----

Other

rank	project title	page #
------	---------------	--------

Carbon Capture

46	Alberta Carbon Trunk Line	49
----	---------------------------	----

Remediation

57	Giant Mine Remediation Project	54
43	Port Hope Area Initiative	48

Waste Management

53	Deep Geologic Repository	53
----	--------------------------	----

Partnering to Modernize Infrastructure



Canada's AFP/P3 leader

Over
100
AFP
PROJECTS

\$45
Billion
IN CAPITAL
VALUE

Our pipeline of new projects includes 15 social infrastructure projects and 17 civil infrastructure projects.

10 projects on ReNew's Top100

- › Eglinton Crosstown LRT
- › Kitchener Corridor GO RER
- › Barrie Corridor GO RER
- › Hurontario LRT
- › Mackenzie Vaughan Hospital
- › Finch West LRT
- › Highway 407 East Extension – Phase 2
- › Hamilton LRT
- › Joseph Brant Hospital Redevelopment and Expansion Project
- › Etobicoke General Hospital

IO continues to successfully deliver large and complex projects using the Alternative Financing and Procurement (AFP) model.



Contact Us:

contactus@infrastructureontario.ca
www.infrastructureontario.ca



Ontario
Infrastructure Ontario

Top100 Project Index (continued)

By Rank, Project Title, and Page Reference

Water-Wastewater

83	Annacis Island Wastewater Treatment Plant Expansion	62
78	Bonnybrook Wastewater Treatment Plant D Expansion	61
63	Capital Region District Wastewater Treatment Plant	56
89	Hanlan Watermain Project	64
62	North End Sewage Treatment Plant Biological Nutrient Removal Upgrade	56
68	North Shore Wastewater Treatment Plant	58
44	Port Lands Flood Protection and Enabling Infrastructure	49
99	South End Water Pollution Control Centre	66
98	Woodward Wastewater Treatment Plant	66

Transit

rank	project title	page #
------	---------------	--------

BRT

80	Southwest Rapid Transitway (Stage 2) and Pembina Highway Underpass Project	62
34	York VIVA Bus Rapid Transit (vivaNext)	45

LRT

22	Confederation Line	40
27	Edmonton Valley Line – Stage 1	43
5	Eglinton Crosstown LRT	18
47	Finch West LRT	50
11	Green Line LRT	28
55	Hamilton LRT	53
36	Hurontario LRT	46
84	Metrolinx Light Rail Vehicles	63
48	New TTC Light Rail Vehicles	50
17	Ottawa LRT – Stage 2	36
60	Region of Waterloo ION LRT – Stage 1	55

81	Reno-Systèmes Program – Phase IV	62
8	Réseau électrique métropolitain	24

Rail

32	Barrie Corridor GO RER	44
82	Bowmanville Extension Project	62
31	Kitchener Corridor GO RER	44
67	Union Station Infrastructure Renewal Program	58

Subway

90	Cote-Vertu Station Underground Garage	64
20	Montreal Metro Car Replacement	39
16	Scarborough Subway Extension	36
85	Wilson Facility Enhancement and Yard Expansion	63

Transportation

rank	project title	page #
------	---------------	--------

Airport

28	Vancouver International Airport Upgrades	43
----	--	----

Bridge

15	George Massey Tunnel Replacement Project	36
21	Gordie Howe International Bridge	39
12	New Champlain Bridge Corridor Project	28

Highway

93	100-Series Highway Improvements	65
97	Dorval Interchange Road Construction	66
50	East Side Transportation Initiative	51
19	F.G. Gardiner Expressway Strategic Rehabilitation Plan	38
58	Highway 1 Upgrades – Kamloops to Alberta	54

49	Highway 407 East Extension – Phase 2	50
75	Highway 427 Expansion Project	60
26	Regina Bypass Project	42
88	Route 389 Improvement Project	64
10	Southwest Calgary Ring Road	26
71	Trans Labrador Highway Widening and Hard Surfacing	59
13	Turcot Interchange	30

Port

25	Roberts Bank Terminal 2 Project	42
----	---------------------------------	----

Rail

87	Regina Railyard Renewal Project	63
----	---------------------------------	----

Figures

page #

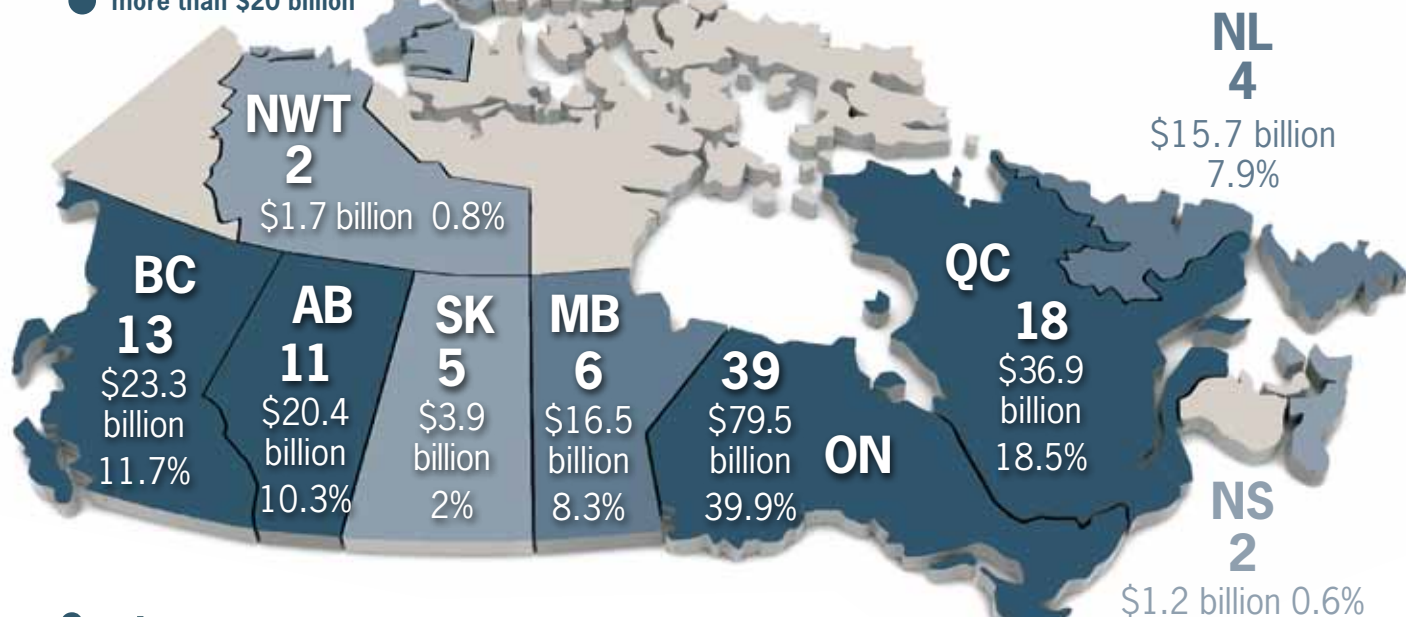
Projects & Sectors by Province	8
Energy Development in Canada	10
Funding Source Breakdown	12
Project Delivery	22
Transit Expansion	24
Expanded Transportation Network	26
Total Investment	34
Projects by Year of Completion	34
A Decade of Top100	51
Building Energy Capacity	52

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 over \$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



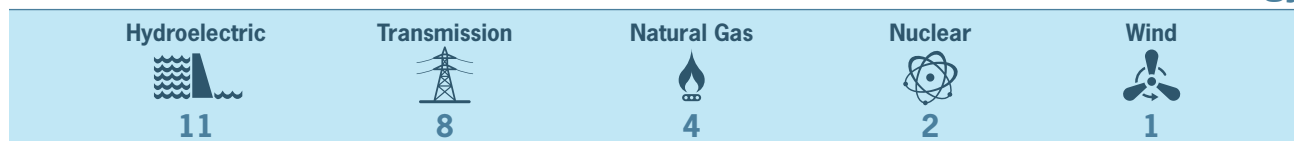
Sectors by Province

	BC	AB	SK	MB	ON	QC	NS	NL	NWT
Energy	4	4	2	2	6	4	1	2	
Buildings	2	2	2		8	5		1	1
Transit		2		1	16	4			
Transportation	4	1	2	1	4	4	1	1	
Other	3	2		2	5				1

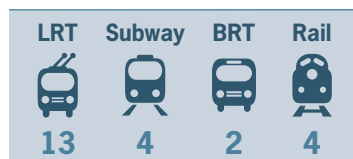
*Two cross-border projects included on list, one that is ON/QC and one NL/NS. Project value halved for each province.

Projects by Sector

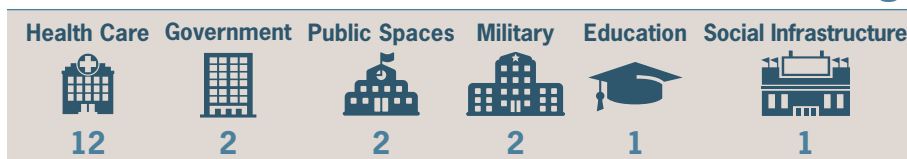
Energy



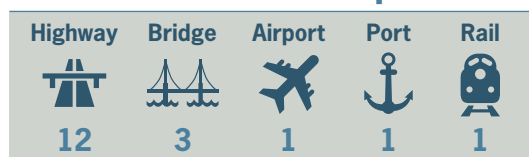
Transit



Buildings



Transportation



Other

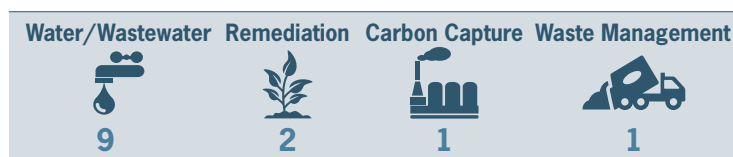




Photo: Stéphanie Brügger

Sainte-Justine University Hospital Centre, Montreal, QC



Tower for power transmission line crossing the Strait of Canso, NS



100 MW solar farm, Kingston, ON



Regina Bypass, SK



Monastère des Augustines, Quebec City, QC

Photo: Monastère des Augustines

With over 1,800 staff across 36 offices from coast to coast, **CIMA+** delivers a full range of engineering services in the Transportation, Energy, Buildings, Municipal Infrastructure and Project Management sectors. For over 25 years, our clients and partners have come to rely on our innovative and results-driven approach in projects completed under traditional and alternative delivery models.

We are proud to see our expertise recognized in 14 of the 2018 top 100 infrastructure projects:

- Eglinton Crosstown LRT
- Romaine Complex
- REM (LRT) Montreal region
- New Champlain Bridge Corridor project
- Turcot new interchange
- CHUM Redevelopment
(Centre hospitalier universitaire de Montréal)
- Gordie Howe International Bridge
- New Quebec City University Hospital Center – Laval University
- Regina Bypass
- Northeast Anthony Henday Drive
- Renovations to Beauharnois Hydroelectric Station
- York Viva Bus Rapid Transit (VivaNext)
- Sainte-Justine University Hospital Centre
- Highway Claude-Béchar (Autoroute 85)

CIMA+
Partners in excellence

AON
BESTEMPLOYER
PLATINUM | CANADA | 2018



Credit: Bruce Power

1

Bruce Power Nuclear Refurbishment



\$13 billion

2017 Rank: 1

Location: Tiverton, Ontario

Owner: Bruce Power

DBFM Team (Office Complex and Training Facility):

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

Engineer: Hatch (preliminary/planning study)

Contractor: AECOM, Aecon, AREVA NP
(Unit 6 steam generator replacement)

Architect: Hatch (on MCS and decontamination building)

Reactor Components Supplier: Bombardier;
Laker Energy Products

Other: WSP (drafting support); Golder Associates

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

Funding: Private

In December of 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 MW 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 will invest approximately \$13 billion of its own funds and agrees to take full risk of cost overruns on refurbishments of the six nuclear units.

Energy Development in Canada

Total investment in Energy: **\$87.2 billion**

\$42.5 billion

10 projects



Hydroelectric

\$25.8 billion

2 projects



Nuclear

\$4.6 billion

4 project



Natural Gas

\$1 billion

1 projects



Wind

Generation

- \$73.9 billion
- 17 projects

Transmission

- \$13.3 billion
- 8 projects



► ENSURING SOLID FOUNDATIONS FOR INFRASTRUCTURE

For over half a century, Golder's global expertise, combined with our depth of local experience and knowledge, has helped our clients manage critical technical, schedule and cost risks for some of the most challenging infrastructure projects.

We are proud to be recognized by ReNew Canada in the Top100 Projects Platinum Elite category, for our work on 33 of the largest infrastructure projects in Canada in 2018.

Workers train on the \$35-million reactor vault mock-up.



Credit: ReNew Canada

2

Darlington Nuclear Refurbishment

\$12.8 billion 

2017 Rank: 2

Location: Clarington, Ontario

Owner: Ontario Power Generation

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

Other: GE Power; ABB; Amec Foster Wheeler; Deloitte LLP; EllisDon (multi-phase construction manager); 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

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

Supplier: DECAST Ltd.; Laker Energy (nuclear components)

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, which 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 of 2016, with the first reactor scheduled to be down for 40 months. The overall project is scheduled for 112 months.

Funding Source Breakdown

Sector	Total Investment	Federal	Provincial	Municipal	Private
Energy	\$86.7 billion	–	\$53.0 billion	–	\$33.7 billion
Transit	\$46.3 billion	\$6.7 billion	\$27.4 billion	\$9.1 billion	\$3.1 billion
Transportation	\$32.7 billion	\$7.0 billion	\$18.7 billion	\$2.8 billion	\$4.2 billion
Buildings	\$23.1 billion	\$5.7 billion	\$13.7 billion	\$1.0 billion	\$2.7 billion
Waste Management	\$1.0 billion	–	\$1.0 billion	–	–
Carbon Capture	\$1.2 billion	\$63 million	\$495 million	–	\$624 million
Remediation	\$2.2 billion	\$2.2 billion	–	–	–
Water/Wastewater	\$5.8 billion	\$739 million	\$1.2 billion	\$3.8 billion	\$41.0 million
2018 Top100	\$199 billion	\$22.4 billion	\$115.5 billion	\$16.7 billion	\$44.4 billion



Clean Air. Made in Ontario.

Power that's 99% free of
smog and carbon emissions.

Learn more at
MadeinOntario.opg.com

ONTARIO **POWER**
GENERATION



Credit: Nalcor Energy

3 Muskrat Falls Project

\$12.7 billion 

2017 Rank: 3

Location: Muskrat Falls, Newfoundland and Labrador

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

Engineer: Nalcor Energy and SNC-Lavalin

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, Pomerleau

Engineer: Nalcor Energy and SNC Lavalin

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

Other: IKC-ONE—Innu Kiewit Constructors, H.J. O'Connell, Neilson, and EBC (rock and overburden excavation); Hatch (engineering services); Golder Associates; Lafarge and Holcim Canada (cement); Ernst & Young (advising gvt.); Aon (risk/insurance advisor to authority); KPMG (advisory services); exp Services (quality control work); CRT Construction (subcontractor for concrete installation)

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

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

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.

According to the revised schedule released in June of 2017, first power from Muskrat Falls is expected in April of 2019, with commissioning complete and the certificate issued by June of 2020.



Source: Nalcor Energy



We embrace your vision as our own.

Your needs are changing rapidly, and your challenges are transforming the way you operate. You need a partner who is proactive, one who can identify the larger, long-term issues affecting you.

We bring our best thinking and teams to solve your toughest challenges. To help you transform the world.

Together we can build positive change. Contact us at hatch.com.

HATCH



Credit: BC Hydro

4 Site C Clean Energy Project

\$9.385 billion 

2017 Rank: 5

Location: Near Fort St. John, British Columbia

Owner: BC Hydro

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 – other); Associated Engineering (owner's team - design)

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) (preferred proponent)

Environmental Services: Golder Associates (EA and permitting, archaeology, agriculture, fisheries and aquatics, socio economics); 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

Other: AL Sims and Sons (road improvements); Aon Risk Solutions (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 Group Inc.; 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)

Legal: Dentons Canada LLP (owner's counsel); Borden Ladner Gervais LLP (legal advisor)

Turbine Supplier: Voith Hydro (turbine and generator)

Funding: Public

• **Provincial BC Hydro:** \$9.385 billion

This proposed hydroelectric earthfill dam on the Peace River includes several components: an earthfill dam 1,050 metres long and 60 metres high, a 1,100-MW 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.

Congratulations to our clients and your Top 100 Infrastructure Projects!

- Site C Clean Energy Project
- George Massey Tunnel Replacement Project
- Roberts Bank Terminal 2 Project
- John Hart Generating Station Replacement Project



Expanding services on a global scale.

Valued by our clients for our expertise and boutique approach, Hemmera has been making a difference across Canada since 1994. As a wholly owned subsidiary of Ausenco, Hemmera's team of highly respected environmental consultants are recognized experts in environmental sciences, social sciences, and engineering.


1.877.669.0424 | hemmera.com

 **Hemmera**
An Ausenco Company



Credit: eip

5 Eglinton Crosstown LRT

\$9.1 billion 

2017 Rank: 4

Location: Toronto, Ontario

Owner: Metrolinx

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

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

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

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)

Architect: IBI Group and SNC-Lavalin (Crosslinx Transit Solutions design team)

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 signaling 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. In August of 2016, tunnelling work was completed on the 10-kilometre underground portion of the project. Projected ridership is 5,400 passengers per

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

Other: 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); Ernst & Young (advising gvt.); exp Services (instrumentation and monitoring); Golder Associates; 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); AECOM/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)

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

Supplier: Bombardier (vehicle); DECAST Ltd. (precast tunnel liner segments); CRH Canada (cement)

Funding: P3

hour in the peak direction by 2031.

In August of 2017, the project reached a major milestone with the laying of the first piece of track, part of a turnout track connecting Mount Dennis station with the storage and maintenance facility. The facility represents the first significant portion of the project to be completed, which will take place in 2018. Overall project construction is estimated to be completed by 2021.

PARSONS



Optimize. Innovate. Deliver.

**Proud to bring smart solutions
to infrastructure across Canada.**

Metrolinx
Eglinton Crosstown LRT
Toronto, ON, Canada

parsons.com

Parsons PLUS envision more



Rendering Courtesy of Metrolinx



Credit: EllisDon

6

Keeyask Hydroelectric Project

\$8.7 billion 

2017 Rank: 7

Location: Lower Nelson River, Manitoba

Owner: Keeyask Hydropower Limited Partnership

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

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

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

Other: Aon Risk Solutions (risk/insurance advisor to authority); Golder Associates (info mgmt. solution services); Hanscomb (owner's cost consultant and special advisor); Boston Consulting Group (capital project analysis); Englobe (quality assurance inspection services); WSP (surveying)

Legal: Fasken Martineau DuMoulin LLP (advised Manitoba Hydro); Borden Ladner Gervais LLP (legal advisor)

Supplier: Voith Hydro

Funding: Public

• **Provincial**
Provincial/First Nations Keeyask Hydropower Limited Partnership (co-owned by Manitoba Hydro and Keeyask Cree Nations): \$8.7 billion

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.

Keeyask 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 Keeyask Cree Nations, including the Tataskweyak Cree Nation, War Lake First Nation, Fox Lake Cree Nation, and York Factory First Nation.

In March of 2017, a revised budget and project schedule were announced, representing a \$2.2 billion cost increase and a 21-month delay in the completion of the project. At the time of the announcement, Manitoba Hydro

president and CEO Kelvin Shepherd stated that "Completing Keeyask will allow us to fulfill export contracts worth approximately \$4.5 billion. This will help offset some of the costs of the project. Despite the increased cost to complete construction, stopping now is not an economically viable option as the significant costs of cancellation—together with lost revenues—more than offset any potential savings."

Construction began in summer 2014. The station's first unit is scheduled to go into service in 2019, with all units commissioned by December 2020.



WE BUILD ON GREAT RELATIONSHIPS

EllisDon is proud to be listed on this year's ReNew Top 100 list, and delivering the following:

- » Edmonton Valley Line - Stage 1
- » TTC York University Subway Station
- » Ottawa Confederation Line LRT
- » Eglinton Crosstown LRT
- » Keeyask Hydroelectric Project
- » York VIVA Bus Rapid Transit - vivaNext

Learn more
at ellisdon.com

 **EllisDon**



Credit: Hydro-Québec

7 Romaine Complex \$6.5 billion

2017 Rank: 6

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-2 (commissioned): Hamel-CRT, EBC-Neilson, Cegerco Inc., Fernand Gilbert, Groupe LAR, Produits Forestiers Innus, Les Excavations Marchand et Fils, Demathieu & Bard-Nordex, Canmec Industriel, Les Constructions BLH, Construction Polaris, Consortium P.O.C, Les Carrières Bob-Son

Romaine-3: Hamel-CRT, EBC-Neilson, Canmec Industriel, Construction Proco, Couillard Construction, Groupe Hexagone, Groupe LAR, COH, HMI Construction, Neilson-EBC, Cegerco, Nordex, Consortium ATA

Other: 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)

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

Funding: Public

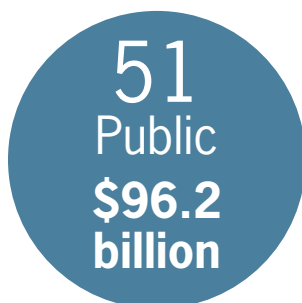
• **Provincial** Hydro-Québec: \$6.5 billion

This 1,550-MW 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. Work is continuing as scheduled, with work on Romaine-4 underway. An average of 975 workers is estimated for the project with a peak workforce of over 2,000 workers from 2012 to 2016. Romaine-2 was commissioned in 2014, followed by Romaine-1 in 2015 and Romaine-3 in 2017, and Romaine-4 is expected to be online in 2020.

2018 Top100 Project Delivery

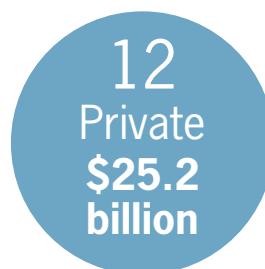
Total Investment: \$199 billion



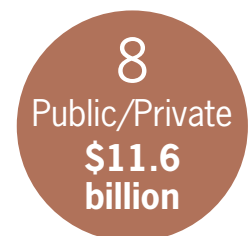
(48% of list value)



(27% of list value)



(13% of list value)



(12% of list value)

Extensive, Collective Capabilities

Over 35 Electric Power Infrastructure services, performed by 14 companies, all encompassed within the Valard Group of Companies.

We work with expert partners to seamlessly produce turnkey solutions for our clients.

Through a single contract and point of contact, we can, collectively, put together a full service team to successfully deliver every aspect of a power project.

The Valard Group has decades of history building strong partnerships and relationships with diverse communities across the country. Our employees are part of the communities in which they work – supporting sustainability, local businesses and causes, as well as showing respect for project-related concerns and acting on them.

www.theValardGroup.com



**The Valard Group
of Companies**

EPC⁺

Engineering

Procurement

Construction





Credit: Caisse de dépôt et placement du Québec

8

Réseau électrique métropolitain

\$6.04 billion 

2017 Rank: 8

Location: Montreal, Quebec

Owner: Caisse de dépôt et placement du Québec

Engineer: CIMA + ; Hatch

Other: HANSCOMB (advisory services for design, engineering, and costing); EXP (feasibility studies); WSP (geotechnical); Aon Risk Solutions

Legal: Norton Rose Fulbright (advising CDPQ Infra)

Financing

In 2017, both the provincial and federal governments pledged \$1.283 billion to the project. CDPQ Infra has committed \$2.67 billion to the project.

Funding: Public-Private

The 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 km), Dubai (80 km) and Vancouver (68 km). For the metropolitan area, the REM also represents the largest public transportation infrastructure since the Montreal 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 kilometers—20 hours a day—7 days a week
- This constitutes Quebec's first "public-public" partnership project

The new network represents an investment of approximately \$6.04 billion. La Caisse will invest \$2.67 billion to the project. The procurement process is expected to be completed this fall.

Transit Expansion

Top100 involves **334.4 km of new transit lines** at a cost of **\$139.4 million per km**.



12
\$34.1 billion
265.6 km



Subway

4
\$6.3 billion
6.2 km



Rail

4
\$4.2 billion
20 km



BRT

2
\$2.0 billion
42.6 km



Credit: Manitoba Hydro

9

Bipole III Transmission Line

\$5.04 billion



2017 Rank: 10

Location: Winnipeg, Manitoba

Owner: Manitoba Hydro

Project/Construction Manager: Tetra Tech
(construction management support)

Engineer: Teshmont Consultants (owner's engineer on converter stations); Stantec (converter station civil design); Sigfasson Northern (Keewatinooow civil site development)

Contractor: Siemens Canada and Mortenson Canada (design, supply, and install the high-voltage direct current equipment and buildings); Voith Hydro and Stuart Olsen Constructors Inc. (mechanical installation at Riel Converter Station)

Other: Aon (risk/insurance advisor to authority); CMC Consultants (initial routing study); Joro Consultants and Wildlife Resources Consulting Services (wildlife impact); KPMG (commercial advisor); WSP (geomatics services); North/South Consultants (environmental); Englobe (QA inspection services); Golder Associates

Legal: Fasken Martineau DuMoulin LLP
(represented Manitoba Hydro)

Supplier: Outland Camps (Keewatinok camp supply); SNC-Lavalin (Keewatinok switchyard supply); Voith Hydro (design and installation of synchronous condensers); Canam Group

Funding: Public

• **Provincial** Manitoba Hydro: \$5.04 billion

In Manitoba, more than 70 per cent of its hydro runs south over Bipole I and II, side-by-side transmission lines in the Interlake region. The close proximity of the two lines makes the province's electricity supply vulnerable in the event of a weather incident or forest fire. The Bipole III line is designed to be an alternate path for electricity distribution, enhancing the reliability of Manitoba Hydro's electrical system. The project includes construction of a 500,000-volt DC transmission line and two converter stations. The transmission line will run along the west side of Manitoba, from the Keewatinok Converter Station down to Riel Converter station, to be located near Winnipeg. The preferred route is about 1,384 kilometres. The line and its increasing costs have sparked considerable debate throughout the province. Bipole III will also provide for additional transmission capability to accommodate new northern generating stations (such as the Keeyask Generating Station) as those plants come on line in future years.

Construction began in 2013 with civil site preparation for the Keewatinok station, construction power, clearing of northern components of transmission lines, and installation of foundations, as well as continued development of the Keewatinok Camp. Construction power was put into service in July 2014, and the contract to design, supply, and install equipment and buildings for the two converter stations was signed in October 2014.

In 2017, work began on the mechanical installation process at the Riel Converter Station. The Bipole III project requires synchronous condensers at the Riel Converter Station in order to support the operation of the high-voltage direct current (HVDC) equipment and conversion of DC power to AC power for the southern Manitoba power grid. The line's anticipated in-service date is 2018.



Credit: Alberta Transportation

10 Southwest Calgary Ring Road

\$5 billion 

2017 Rank: 9

Location: Calgary, Alberta

Owner: Alberta Transportation

P3 Team: Meridiam, Kiewit, Ledcor, Connor Clark and Lunn (project manager); Meridiam (finance); Kiewit, Graham and Ledcor (design and construction); Alberta Highway Services Ltd. (operations and maintenance)

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

Other: EY; LeighFisher (lenders technical advisor); WSP (functional planning and preliminary eng. services); DBGMO Team: Kiewit, Graham (design builder, part of P3 consortium), Ledcor, Parsons and McElhanney; Aon Risk Solutions (risk advisor/broker for preferred proponent); INTECH Risk Management (insurance advisor); Golder Associates; Englobe (concrete quality control); EXP (geotechnical); ARUP (technical advisory services); Morrison Hershfield (structure design review)

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

Funding: P3

- **Federal** National Infrastructure Component of the New Building Canada Fund: up to \$582.9 million (confirmed July 2016)
- **Provincial** Alberta Transportation: around \$4.4 billion

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.

The land transfer is proceeding, and the government is focusing on the delivery of the southwest section of the ring road, which is scheduled to be open to traffic in fall 2022.

Expanded Transportation Network



Transportation projects on the 2018 Top100 Projects list represent **14,197.84 km** in new, expanded, and rehabilitated roads across Canada

Better
PRICING
Stronger
COVERAGE
Industry
EXPERTISE
Global
LEVERAGE



The only broker recognized as Platinum Elite 2018,
involved in 43 of the Top 100 Projects.

We're here to empower results!

construction.aon.ca

11 Green Line LRT

\$4.5 billion 

2017 Rank: 11

Location: Calgary, Alberta

Owner: City of Calgary

Engineer: Hatch

Other: INTECH Risk Management

Consulting Architect: Sturgess Architecture, IBI Group

Funding: Public

- **Federal:** Public Transit Fund: \$1.53 billion
- **Provincial:** \$1.68 billion
- **Municipal:** \$1.56 billion over 30 years

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 was later converted to LRT as funding became available.


In May of 2017, Calgary city council approved the route by a vote of 12-3. In early July, the last portion of the needed funding was secured, with the Government of Alberta committing approximately \$1.53 billion to the project. The province had already contributed \$148 million through its GreenTRIP funding in December of 2016.

The current project schedule calls for construction to begin in 2020, with a completion date of 2026.



Credit: S&L Construction on St. Lawrence Construction

12 New Champlain Bridge Corridor Project

\$4.24 billion 

2017 Rank: 12

Location: Montreal to Brossard, Quebec

Owner: Infrastructure Canada

DBFOM Team: Signature on the Saint-Lawrence Group—SNC-Lavalin, ACS Infrastructure, HOCHTIEF PPP Solutions, Dragados, Flatiron, WSP, T.Y. Lin International, International Bridge Technologies, EBC Inc.

Program Manager: Infrastructure Canada

Engineer: Arup Canada (engineering advisory services); IBI/Roche (owner engineer and electrical); Stantec and Ramboll (project's independent engineer)

Consulting Architect: Dissing + Weitling and Provencher Roy (preliminary designs)

Financiers/Banks: HSBC and National Bank of Canada

Other: PricewaterhouseCoopers; Steer Davies Gleave; Morrison Hershfield (business case); Englobe, Consortium Perron; Hudon; Bélanger and Consultants (advisory services to government); Hanscomb (cost consultant and special advisor); EY (advising team); Aon Risk Solutions (risk/insurance advisor to private partner); INTECH (insurance advisor); GHD (inspection and testing services); Englobe (audits); CIMA +

Legal: Dentons Canada (advising federal gov't.); Borden Ladner Gervais LLP (legal advisor); DLA Piper; Osler

Funding: P3

- **Federal:** \$4.239 billion

On October 5, 2011, the Government of Canada announced the new Champlain Bridge corridor project, one of the largest infrastructure projects in North America. The corridor-wide project not only includes the new Champlain bridge, but a new Îles-Soeurs Bridge and reconstruction and widening of the federal portion of Autoroute 15. The new bridge is designed to have three-corridors, including two three-lane corridors for vehicular traffic and a two-lane transit corridor capable of accommodating a light rail transit system. The new bridge will also include a multi-use path for pedestrians and cyclists.

In August of 2017, the first phase of steel work on the Jacques Carter Bridge was completed, marking a major milestone for the project. This phase of the project involved the replacement of four braces and eight bottom chords, while 150 gusset plates and 17 diagonals were reinforced. Also, approximately 100,000 rivets were also replaced with bolts.

The deadline for substantial completion of the project is set as December 31, 2018.



As a multidisciplinary practice, EXP has the right blend of expertise and experience to meet the world's evolving infrastructure challenges.



let's explore the possibilities.


understand • innovate • partner • deliver

exp • com



Credit: Robb Williamson, AECOM

13 Turcot Interchange

\$3.67 billion 

2017 Rank: 13

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)

Contractors: Axxys Construction; CMS Entrepreneurs généraux; Construction Demathieu & Bard; Construction DJL; Construction Garnier; DB-AECOM Pont St-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); Sési Media (environmental study); Tecsubit

Financiers/Banks: PricewaterhouseCoopers

Other: 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); Génies 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 Risk Solutions (insurance broker); GHD (geotechnical design/materials); Englobe (audits)

Legal: Dentons Canada LLP (legal counsel, under the authority of the Société québécoise des infrastructures)

Supplier: Canam Group
(steel superstructure and components)

Funding: Public

• **Provincial:** \$3.67 billion

The Turcot Interchange is a major traffic hub in the Montreal area, connecting Autoroutes 15, 20, and 720, and facilitating access to the Champlain Bridge. It is also a vital link between the Montreal 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.

Construction of a temporary public transit bypass at Notre Dame and Angrignon Boulevard West has been completed to minimize the impact of the Turcot Interchange reconstruction. The project is expected to be completed by 2020.

Numbers Breakdown

\$590 million
for preparatory work
by the ministry

\$1.54 billion
for a design-build
contract with KPH-Turcot

\$1.54 billion for the costs of different activities, such as real estate acquisitions, utility moves, environmental measures, project management monitoring fees, and a framework for risk management.

PRECAST CONCRETE BUILDS ON...

ACCELERATED BRIDGE CONSTRUCTION (ABC)

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

Hodder Avenue Underpass, Thunder Bay, Ontario | Owner: Ministry of Transportation of Ontario
Engineer: Hatch Mott MacDonald, Mississauga | General Contractor: Teranorth Construction, Sudbury

BRIDGE OUT-OF-A-BOX MODULAR CONSTRUCTION

ADDED BENEFITS OF PRECAST CONCRETE ACCELERATED BRIDGE CONSTRUCTION

- **Effective** use of UHPC & precast concrete engineering
- **Unique** design of pier cap and joints with UHPC use
- **Stay-in-place** pier column form with UHPC use
- **Enhanced** quality, durability and aesthetics

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



E: info@cpci.ca
TF: 877.937.2724

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





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

\$3.63 billion 

2016 Rank: 16

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

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

Contractor: EBC Inc.

Financiers/Banks: **Research Centre:** Axium 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 Shooner Dagenais LeTourneux, Jodoin Lamarre Pratte (sub-consultant), Lemay et Associés, Parkin Architects; Hospital: Cannon Designs, NEUF Architectes

Other: BTY Group (lenders technical advisor); Hatch (independent certifier); Hanscomb (mechanical and electrical cost consultant and special advisor); INTECH (insurance advisor); Société québécoise des infrastructures; SNC-Lavalin and WSP (owner's advisor)

Legal: Research Centre: Blake, Cassels & Graydon; Hospital: Fasken Martineau DuMoulin (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)

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 one, construction of the research centre, was opened in the fall of 2013. Phase two 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 of 2017. Phase three of the project, now underway, includes the construction of a medical office tower and conference facility. Phase three is scheduled for completion in the spring of 2020.

The Future of Three Hospitals

Each of the three hospitals being amalgamated under the CHUM project has been slated for future use:

- The Hôtel-Dieu will still be part of the CHUM for the next four years;
- Notre-Dame Hospital will be transferred to the Center for Integrated Health and Social Services in Center-Sud-de-l'Île-de-Montréal to establish a 250-bed community-type hospital; and
- The Saint-Luc Hospital will be demolished to make room for phase three of the work.

This phase will consist of the construction of an adjacent building to accommodate part of the outpatient clinics, clinico-administrative offices, library, archives, a 500-seat amphitheater, and another parking section.

UNEARTHING A NEW FUTURE IN CANADIAN TRANSIT

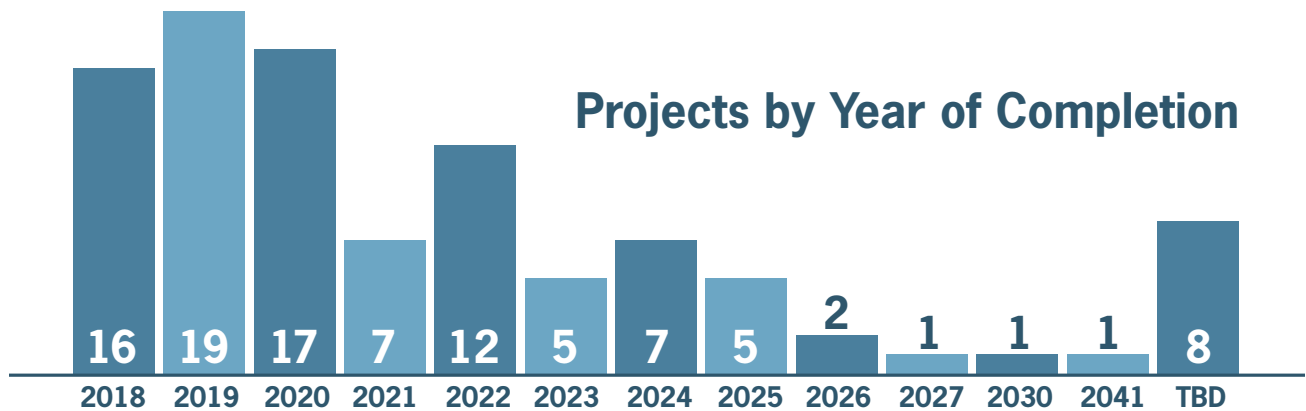
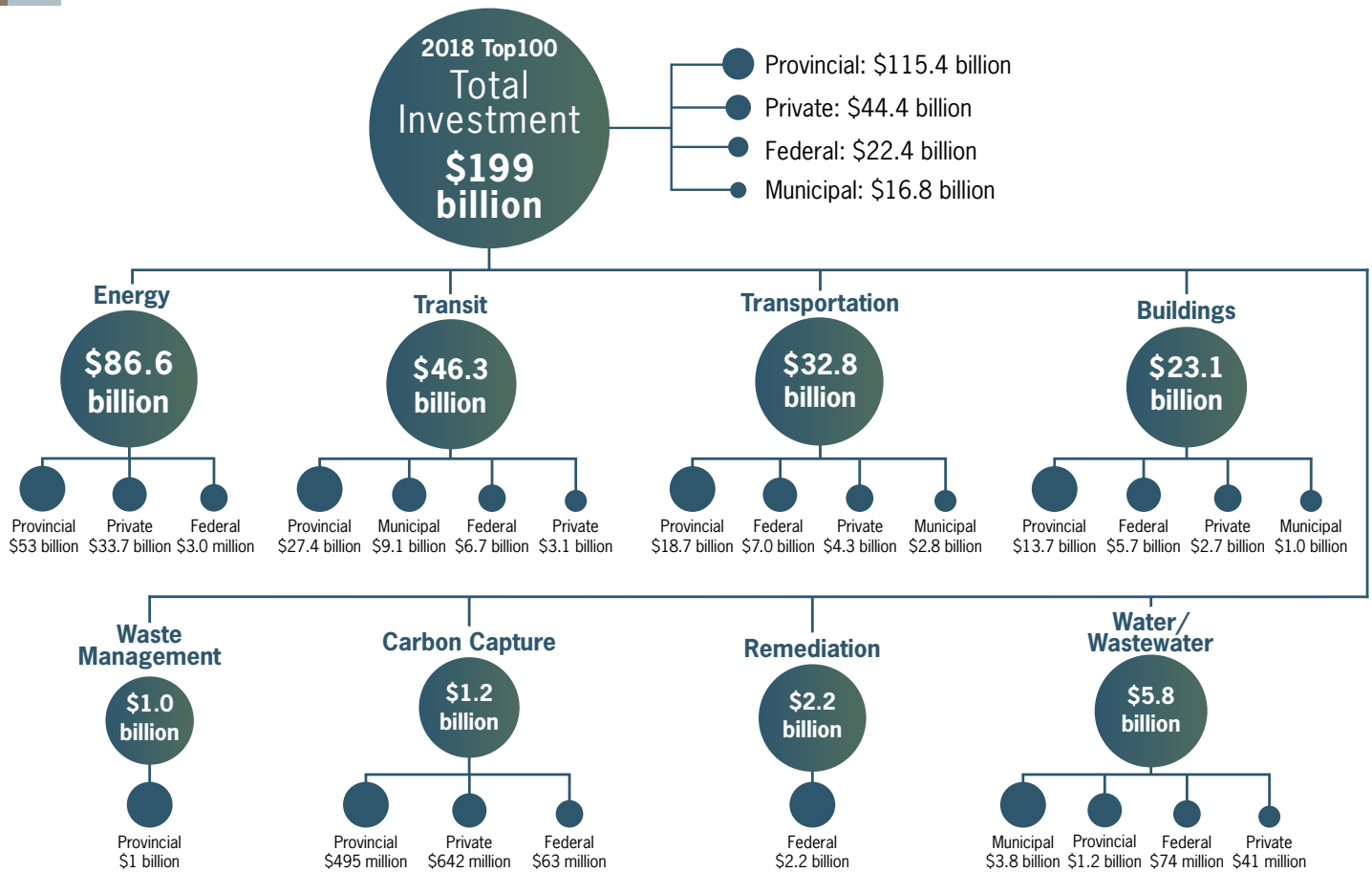
EGLINTON CROSSTOWN
LRT PROJECT, TORONTO, ON



AECOM

in  

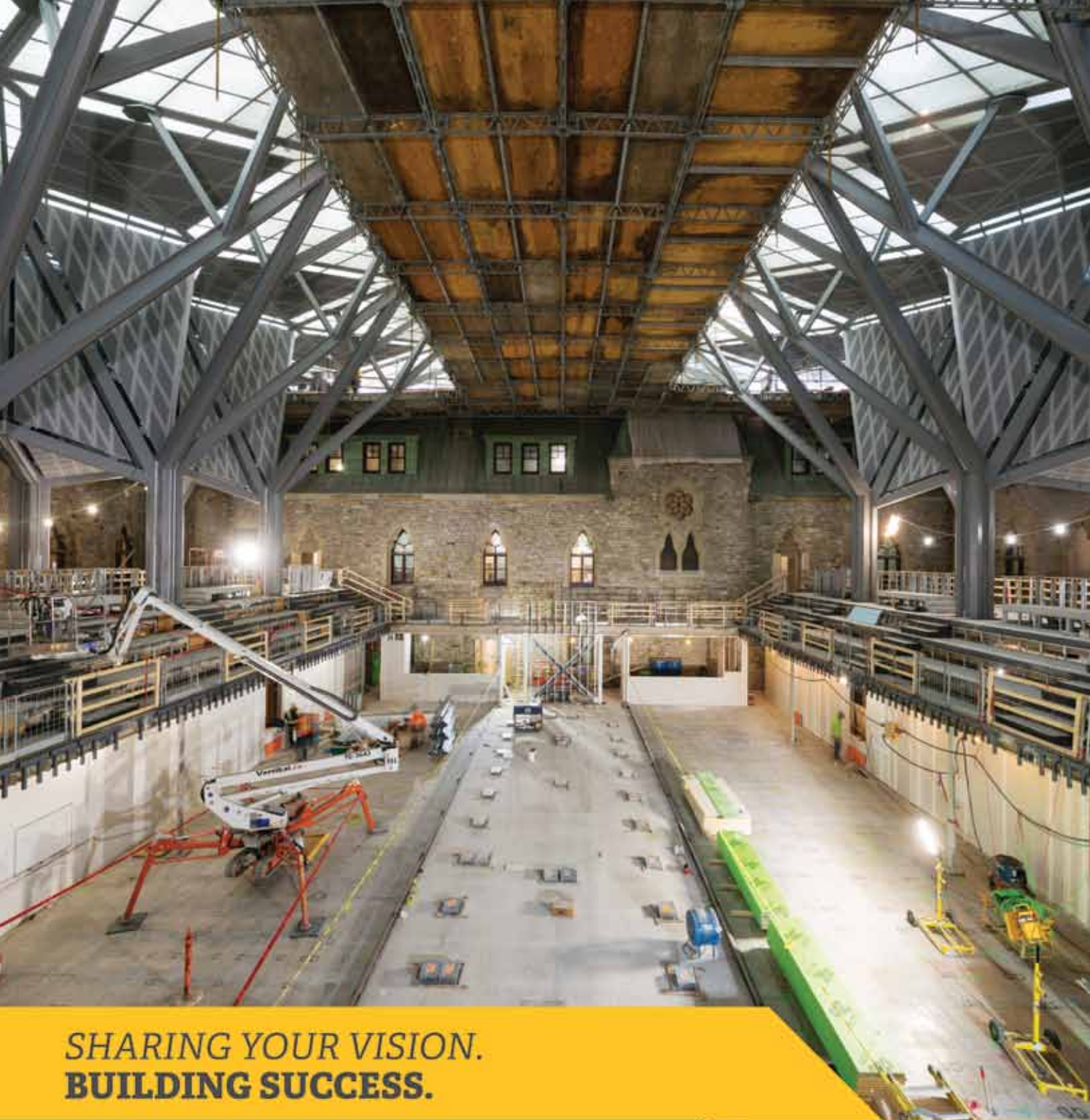
[aecon.com](https://www.aecon.com)



Top100 Badge Program

Badges are sent to key players involved in multiple infrastructure projects on the Top100 list. Companies use these icons to identify themselves as top key players.

Visit top100projects.ca for a company index and list of badge recipients.
Call Elena Langlois at 416-444-5842 ext. 151 to get your badge if you are a key player!



SHARING YOUR VISION. BUILDING SUCCESS.

West Block Rehabilitation, Ottawa ON

We are more than builders. We are Canada's construction leaders. We look beyond your immediate construction needs to see the bigger picture, provide solutions, and ensure that we exceed your expectations. PCL is proud to build our country's top projects.

Watch us build at PCL.com



CONSTRUCTION



15

George Massey Tunnel Replacement Project

\$3.5 billion 

2017 Rank: 16

Location: Delta to Richmond, British Columbia

Owner: British Columbia Ministry of Transportation and Infrastructure

Engineer: WSP (owner's engineer); Associated Engineering (environmental consulting services and engineering support)

Environmental Services: Hemmera (supporting project planning and leading the EA); WSP (air quality, climate change assessment)

Other: Tetra Tech (pavement design and geotech. services); Golder Associates (deep foundation load testing and geotech. investigation); Parsons (traffic planning); KPMG (commercial advisor); LeighFisher (lenders technical advisor); INTECH Risk Management (insurance advisor); Morrison Hershfield (lender's technical advisor)

Funding: Public

The current George Massey Tunnel carries more than 80,000 vehicles per day and is a key component of the regional and provincial transportation system. The replacement project will replace the tunnel with a new long-span bridge and upgrade the adjacent highway corridor.

With a consensus that area residents want a new bridge on the existing Highway 99 corridor, the next step in the project is to prepare a more detailed project scope and business case. All potential financing options are on the table until the scope of the project is confirmed.

In September of 2017, the Ministry of Transportation and Infrastructure launched an independent review of the project following the election of the NDP-Green coalition government. The current procurement process for the 10-lane bridge has been cancelled pending the project review. The two final bidding teams received up to \$2 million to offset their costs. The proposed bridge, a smaller bridge, and a replacement tunnel are among the options being considered as part of the review.

16

Scarborough Subway Extension

\$3.35 billion 

2017 Rank: 15

Location: Scarborough, Ontario

Owner: TTC

Engineer: SNC-Lavalin

Contractor: Hatch (tunnel design); WSP (systems design and management)

Environmental Services: AECOM (environmental assessment)

Other: Aon Risk Solutions (risk/insurance advisor to authority); EY (advising gov't.); Golder Associates (owner's consultant); Hanscomb (station designer's cost consultant); Englobe (geotechnical investigation)

Funding: Public

The Scarborough Subway Extension is an 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.

Construction of the line is scheduled to begin in 2019, with project completion expected in the second quarter of 2026.

17

Ottawa LRT – Stage 2

\$3.315 billion 

2017 Rank: 17

Location: Ottawa, Ontario

Owner: City of Ottawa

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

Other: EXP Services (instrumentation and monitoring); Hanscomb (owner's cost consultant and special advisor); Aon Risk Solutions (owner advisor and construction insurance broker); INTECH Risk Management (insurance advisor); AECOM (owner's representative); GHD (testing, inspection, and geotechnical services); Golder Associates; Ensto; SNC-Lavalin; WSP (geotechnical); Aon Risk Solutions

Legal: Borden Ladner Gervais LLP (legal advisor); Norton Rose Fulbright (advisor to project owner); Osler; Torsys (acting for lender)

Supplier: DECAST Ltd.

Funding: Public

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; and
- Extend the O-Train to Riverside South and Bowesville, with a new station at Gladstone, and stations at Walkley, South Keys, Leitrim, and Bowesville.

When completed in 2023, Stage 2 would bring LRT to within five kilometres of almost 70 per cent of residents.



Ensuring high material quality
and reliable soil stability while
protecting the environment for your
infrastructure projects nationwide.

Environmental Engineering
Geotechnical Engineering
Pavement Engineering
and Management
Materials Quality Control Testing
Quality Manufacturing
Building Science
Treatment, Management
and Recycling of Materials



Englobe

Soils Materials Environment

englobecorp.com

18 Rehabilitation of the Parliament Building

\$3.0869 billion 

NEW

Location: Ottawa, Ontario

Owner: Government of Canada

Project/Construction Manager: PCL Constructors Inc., EllisDon (West Block)

Other: 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)

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 (2018), 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 Centre Block is set to be emptied of its contents in the summer of 2018, following the completion of the West Block. Construction work on the Centre Block will begin in 2019. Some immediate work has already been necessary for the Centre Block rehabilitation, including mason work on the East Pavillion and repair of stained glass windows.

The work is expected to take until at least 2027, but could be extended as far as 2033.



Credit: City of Toronto

19 F.G. Gardiner Expressway Strategic Rehabilitation Plan

\$2.44 billion 

2017 Rank: 14

Location: Toronto, Ontario

Owner: City of Toronto

Engineer: Morrison Hershfield (baseline study of substructure components)

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

Other: Ernst & Young, Hanscomb, and HDR (advisory support); Aon (owner advisor and construction insurance broker)

Legal: Osler

Funding: P3

• **Federal:** \$820 million (anticipated)

• **Municipal:** \$1.75 billion

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.

Substantial completion of the project work is expected by 2021.

20 Montreal Metro Car Replacement

\$2.191 billion

2017 Rank: 19

Location: Montreal, Quebec

Owner: Société de transport de Montréal (STM)

Engineer: SNC-Lavalin (owner's engineer); Stantec; AECOM (engineering, project management, sustainability)

Vehicle Supplier: Bombardier-Alstom consortium

Other: Hatch; KPMG (procurement advice); Englobe (QA and QC inspection services)

Funding: Public

- **Provincial** Transports Québec: \$1.62 billion
- **Municipal** STM: \$574 million

The scope of the project is to replace half of the STM metro cars with 468 new rubber tired metro cars (52 trains of 9 cars), infrastructure modifications, wayside equipment and operational integration to introduce the new rolling stock.

On February 6, 2016, the first AZUR train was put in revenue service with passengers on the STM's Orange line. After 60 days in service, the train showed an acceptable reliability to start receiving the other trains on a one train per month basis. The delivery will progressively increase in order to meet the 2018 deadline for the delivery of the total 468 cars.

The STM is performing all the maintenance of the new trains in the STM main workshop which was completely modified and equipped with automatic train washing, full train lifting system to replace bogies, overhead cranes, traction power system. The new training programs based on e-learning and train simulators are in full operation to train the conductors on the new trains.

21 Gordie Howe International Bridge

\$2.14 billion

2017 Rank: 20

Location: Windsor, Ontario to Detroit, Michigan

Owner: Windsor-Detroit Bridge Authority (WDBA)

Project/Construction Manager: Deloitte

Engineer: Morrison Hershfield; Parsons (bridge technical advisor); AECOM

Other: EY (advising team); Golder Associates (geotech./ foundation engineering); Hanscomb (owner's cost consultant and special advisor); Kasian (PDC team); LeighFisher (lenders technical advisor); INTECH Risk Management (insurance advisor); CIMA + (transmission relocation design); WSP (environmental services); Aon Risk Solutions

Legal: Fasken Martineau DuMoulin LLP (transaction advisor)

Supplier: Entro (signage and wayfinding)

Funding: P3

This crossing is the largest and most ambitious binational 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, 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 construction of a perimeter access road at the Canadian Port of Entry (POE), utility relocations and advance fill placement, was ongoing in 2016. In late August of 2017, it was announced that the three pre-qualified team submitting proposals in the RFP stage would be given an extra four months to submit their proposals. It is expected that the winning bid will be selected in 2018, and that construction of the bridge will begin later this year.

Three to consider

Legacy Link Partners:

SNC Lavalin Capital Inc.; VINCI Concessions S.A.S; John Laing Investments Ltd.; HDR Corp.; Leonhardt, Andra and Partners (if cable-stayed); Aas-Jakobsen (if suspension); Alfred Benesch & Company; Golder Associates; American Bridge Canada Company; SNC Lavalin Constructor (Pacific) Inc. (SLCP); VINCI Construction Grands Projects; Barton Malow; DRICCA (Joint Venture with Ajax Paving, Dan's Excavating, C.A. Hull Co Inc., Toebe Construction, Amico Infrastructures Inc.); SNC Lavalin Operations & Maintenance Inc.; VINCI Concessions; SNC Lavalin Security Consulting Inc.

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

CanAm Gateway Partners:

Fengate Capital Management Ltd.; BBGI CanHoldco Inc.; EllisDon Capital Inc.; Bechtel Development Company Inc.; Arup-Hatch Mott McDonald Design JV; Bergmann Associates Inc.; NORR Ltd.; Bechtel Canada Co.; EllisDon Civil Ltd.; Traylor Bros. Inc.; EllisDon Facilities Services Inc.; Egis Projects S.A.; Roy Jorgensen Associates Inc.

22 Confederation Line

\$2.13 billion 

2017 Rank: 21

Location: Ottawa, Ontario

Owner: City of Ottawa

DBFM Team: DBFM Team: Rideau Transit Group—ACS Infrastructure Canada, SNC-Lavalin Capital, EllisDon (developer, design-builder, equity provider); OLRT Constructors, a JV of Dragados Canada, SNC-Lavalin Constructors, and EllisDon (design and construction); Rideau Transit Maintenance General Partnership, composed of subsidiaries of ACS Infrastructure Canada, SNC-Lavalin O&M, and EllisDon (maintenance); WSP; IBI Group; Alstom (vehicles and maintenance services); Thales

Engineer: Capital Transit Partners—Morrison Hershfield, McMillen Jacobs Associates, STV Canada Consulting, AECOM (owner's engineer); Parsons (functional design); Halcrow Group (tunnel design for EA report); Golder Associates (owner's geotechnical, hydrogeological, archeological, and environmental consultant); Hatch (design of tunnel lining, portals, and approach cuts; design of underground station structures and entrances; design of tunnel mechanical and electrical systems; analysis of underground ventilation system); WSP

Financiers/Banks: National Bank Financial and Sun Life Assurance (co-lead underwriters and agent); BMO Capital Markets (advisor to IO and City of Ottawa)

Consulting Architect: Adamson Associates Architects, BBB Architects, and IBI Group (design); Perkins + Will (preliminary designs)

Financing

Rideau Transit Group was selected to build and maintain the line and ensure the availability of its service for 30 years. The project team will manage and coordinate all design activities, including tunnel and underground station caverns, station architectural design, urban design, landscape design, geotechnical design, station structural design, and safety.



Credit: EllisDon

Other: Aon (risk/insurance advisor to authority); Parsons (technical advisor); Entro (wayfinding and signage); Hanscomb (owners' engineer's cost consultant); Infrastructure Ontario (procurement advisor); INTECH (insurance advisor); Novus (preliminary studies); EXP (geotechnical & material testing)

Legal: DLA Piper (counsel to Rideau Transit Group Partnership); Borden Ladner Gervais (counsel to City of Ottawa); Torsy (counsel to lenders); Stikeman Elliott (Alstom); Norton Rose Fulbright (advisor for subcontractor)

Supplier: Siemens; DECAST Ltd. (precast girders and structures)

Funding: P3

- **Federal:** \$761.5 million (Building Canada Fund: \$600 million; Gas Tax Fund: \$161.5 million)
- **Provincial:** \$887 million (Government of Ontario: \$600 million; Provincial Gas Tax: \$287 million)
- **Municipal:** \$481.5 million (development charge revenues and transit reserves)

This project is set to meet the City of Ottawa's infrastructure challenge by way of a state-of-the-art LRT system with an initial capacity of 24,000 riders per hour in each direction, including a congestion-solving 2.5-kilometre tunnel that will rapidly move riders across downtown. It will be a fully accessible and convenient system for all users, including cyclists. The 12.5-kilometre rail line will consist of thirteen stations between Tunney's Pasture in the west and Blair Station in the east, with three stations residing in the 2.5-kilometre tunnel downtown. This will make transportation to-and-from the downtown core easier.

This work also includes the widening of Highway 417, as well as the building of a maintenance and storage facility on Belfast Road; selected vehicle assembly, and all cleaning, inspection, heavy maintenance, washing, and storage, will take place at this facility.

Construction will continue into 2018, with the project to be handed over to the City of Ottawa on May 24, 2018.

23 Quebec City University Hospital center – Laval University

\$2 billion 

NEW

Location: Quebec City, Quebec

Owner: Metrolinx and Ivanhoé Cambridge

Engineer: SNC-Lavalin; CIMA + ; Stantec

Other: Englobe (geotechnical/environmental investigation, quality control)

Funding: Public
• **Provincial**

In April of 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. Construction is underway, with Phase 1 of the project is set to be completed by the end of 2020.



Canada's infrastructure is vulnerable to climate change and extreme weather

Engineers Canada's PIEVC Protocol helps infrastructure owners and others assess the nature, severity and likelihood of impacts of climate change on infrastructure.

These assessments are an important step towards building resilient communities.

Learn more at www.pievc.ca



www.pievc.ca

www.engineerscanada.ca/climate-change

24 81–141 Bay Street

\$2 billion



2017 Rank: 22

Location: Toronto, Ontario

Owner: Metrolinx and Ivanhoé Cambridge

Contractor: EllisDon (general contractor)

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

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

Legal: Torys (representing project owner)

Funding: Public/Private

- **Provincial** Metrolinx: around \$100 million
- **Private** Ivanhoé Cambridge: around \$2 billion

The Bay Street project 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 of 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. Phase one of the project—81 Bay Street—is scheduled for completion 2020. Phase two, construction of 141 Bay Street and the elevated park, is set to be completed in 2023.

25 Roberts Bank Terminal 2 Project

\$2 billion



2017 Rank: 23

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 Associates

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

Funding: Private

- **Private** Port Metro Vancouver (self-sufficient corporation established by the Government of Canada): \$2 billion

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 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 conclusions of this document are now being reviewed by an independent review panel. Subject to environmental approval and permits, as well as a final investment decision, construction would likely begin in 2018, with terminal operations beginning in 2024.

26 Regina Bypass Project

\$1.88 billion



2017 Rank: 24

Location: Regina, Saskatchewan

Owner: Saskatchewan Ministry of Highways and Infrastructure

DBFOM Team: DBFOM Team: SaskLink Global Transportation Partners—VINCI, Gracorp Capital, Parsons, Graham, Carmacks, McElhanney, Urban Systems, COWI North America, exp Services, Clifton Associates, and National Bank

Engineer: Associated Engineering (owner's engineer team); exp Services (geotechnical design for structures and pavements); Graham Group (construction lead and concession partner); Morrison Hershfield (ind. structural design certifier); WSP (legal survey for 50% of bypass)

Financiers/Banks: Graham Capital, Parsons Enterprises, Vinci Concessions, and Connor, Clark & Lunn (equity investors)

Other: Aon Risk Solutions (risk/insurance advisor to authority); EY (financial and procurement advisor); Golder Associates; INTECH (insurance advisor); LeighFisher (ind. certifier); Englobe (quality assurance and pavement life-cycle analysis); CIMA + (owner's engineer subcontractor); EXP (geotechnical)

Legal: Aird & Berlis (P3 legal advisor); Fasken Martineau DuMoulin (advising lenders to consortium); Norton Rose Fulbright (OMR service provider on a Proponent team); Osler; Torys (representing City of Regina)

Supplier: Canam Group

Funding: P3

- **Federal** PPP Canada: \$200 million
- **Provincial:** \$1.68 billion

This bypass is the largest infrastructure project in Saskatchewan's history. Based on preliminary numbers, this project will have significant economic benefits for the province by creating 8,200 construction-related jobs in Saskatchewan. The project consists of a free flow highway corridor through the Regina region, which includes approximately 58 kilometres of four-lane highway (including 40 kilometres of new highway) and service roads along with 10 new interchanges, and three new intersections. One of the key aspects of the project is integration and management of both existing and new infrastructure during all stages. Construction began in summer 2015. In the summer of 2017, both the Balgonie and White City overpasses were completed. The entire project is scheduled for completion in 2019.

27 Edmonton Valley Line – Stage 1

\$1.8 billion 

2017 Rank: 25

Location: Edmonton, Alberta

Owner: City of Edmonton

DBFOM Team: TransEd Partners—Fengate Capital Management, Bechtel, Ellis-Don, Bombardier, Transdev, ARUP, and IBI Group

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

Other: Aon Risk Solutions (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)

Legal: Borden Ladner Gervais LLP (legal advisor); McCarthy Tétrault LLP; Norton Rose Fullbright

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 which 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 13.1-kilometre southeast section from Mill Woods to 102 Street (Stage 1) will be the first section to be built, with future extensions eventually taking the line out west to Lewis Farms. The southeast section of the line will be constructed first, due to a required operations and maintenance facility that will be located near Whitemud Drive. Completion is scheduled for 2020. Looking ahead, Stage 2 will continue west to Lewis Farms at an additional \$1.4 billion.

28 Vancouver International Airport Upgrades

\$1.8 billion 

2017 Rank: 26

Location: Vancouver, British Columbia

Owner: Vancouver Airport Authority

Project/Construction Manager: Vancouver Airport Authority

Engineer: Stantec; MMM Group; SNC-Lavalin; WSP (materials engineering, quality management)

Architect: Kasian Architecture Interior Design and Planning Ltd.

Contractor: Graham (general contractor for airside operations support building); Ledcor (A-B connector); PCL (secure corridors); Hatch (civil design, construction support services)

Other: BMO Capital Markets (bonds issue); BTY Group (cost consultant); Entro (wayfinding and signage); EXP Services (quality management); WSP (materials engineering, quality management); Aon Risk Solutions (owner advisor and construction insurance broker); Mott MacDonald (baggage handling master planner); Hanscomb (airport cost consultant)

Legal: McCarthy Tétrault LLP (represented VIAA)

Supplier: Canam Group (joists and steel deck)

Funding: Private

• **Private**

Vancouver Airport Authority: \$1.8 billion (collected through an increased Airport Improvement Fee)

These airport upgrades are part of a 10-year strategy to improve and expand its facilities to accommodate projected increases in travellers and attract new routes and carriers. Included are some 700 metres of additional secure corridors, high-speed baggage systems, upgrades to the original 1968 Domestic Terminal Building, runway safety enhancements, and upgrades to airport roads, bridges, and dykes. In order to help finance the upgrades, a \$5 increase in the Airport Improvement Fee has been added for passengers departing to destinations outside of British Columbia or the Yukon. Construction on the Domestic Terminal's A and B Piers is underway, and completion of the upgrades is estimated for 2022.

29 Renovations to Beauharnois Generating Station

\$1.6 billion 

2017 Rank: 27

Location: Beauharnois, Quebec

Owner: Hydro-Québec

Project/Construction Manager: Hydro-Québec Équipement

Engineer: Dessau; SNC-Lavalin; CIMA +

Contractor: HMI Construction Inc.

Turbine Supplier: GE Energy (formerly Alstom) (design, manufacture, and delivery of runners for multiple units); Voith Hydro

Other: GHD (geotechnical and material testing); Englobe (quality assurance inspection services)

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 2019.

30 Maritime Link Project

\$1.577 billion



2017 Rank: 28

Location: Granite Canal to Bottom Brook to Cape Ray, Newfoundland and Labrador to Cape Breton, Nova Scotia

Owner: Emera Newfoundland & Labrador (NSP Maritime Link)

Engineer: ENL's project management team: Hatch (engineering services); Stantec; Amec Foster Wheeler; Altus Group; Servant, Dunbrack, McKenzie & MacDonald; SNC-Lavalin (3 substations/2 transition stations)

Contractor: Abengoa S.A.; Marine Contractors Inc. – Qalipu Partnership, Jone|Jim Concrete Construction, H.J. O'Connell, Zutphen Contractors

Environmental Services: Dillon Consulting Ltd. (environmental assessment)

Other: ABB; exp Services (geotechnical work); Maclean Forestry (clearing in N.S.); Major's Logging (clearing in N.L.); Nexans (subsea cable); Carillion; EUS Rokstad (HVdc transmission line construction); PowerTel (grounding line and HVAC transmission line construction)

Legal: McCarthy Tétrault (underwriter for Maritime Link Financing Trust); Osler Hoskin & Harcourt; Cox & Palmer

Funding: Private



Credit: ENL, Maritime Link

This project involves the design, engineering, construction, operations, and maintenance of a new 500-MW transmission system between Granite Canal, Newfoundland and Labrador and Woodbine, Nova Scotia. The link will also include two 170-kilometre subsea cables across the Cabot Strait, close to 50 kilometres of overland transmission in Nova Scotia, and nearly 300 km of overland transmission on the island of Newfoundland.

In 2016, the Maritime Link Project reached a number of significant milestones, including the completion of right-of-way clearing, site preparation and its horizontal directional drilling program in both Cape Breton and on the island of Newfoundland. Significant progress has also been made on the grounding lines in each province, with the Nova Scotia portion substantially complete and the ground site at Indian Head, NL substantially complete.

Financing

Funding is private with support of a Federal Loan Guarantee from the Government of Canada. In its update to the Nova Scotia Utility and Review Board (UARB) on December 13, 2013, NSP Maritime Link reported its net cost estimate as \$1.56 billion, which is within the range approved by the UARB.

31 Kitchener Corridor GO RER

\$1.534 billion



NEW

Location: Toronto, Ontario to Kitchener, Ontario

Owner: Metrolinx

DBF Team: Highway 401 Rail Tunnel— STRABAG Inc. (applicant lead); EllisDon Civil Ltd., STRABAG Inc. (construction); WSP, Dr. Sauer & Partners, Amec Foster Wheeler (design); EllisDon Capital Inc., STRABAG Inc. (financial advisor)

Other: 4-Transit JV—WSP, Parsons, Hatch (technical advisory services); INTECH Risk Management

Legal: Norton Rose Fulbright (advisor to IO)

Funding: Public

Improvements to the Kitchener GO rail network is one of 10 projects that comprise the \$13.5-billion Regional Express Rail redevelopment. The overall project aims at upgrading and improving the rail lines, stations, and technology, as well as the electrification of core segments.

The Kitchener improvements include the Highway 401/409 rail tunnel project, which involves the construction of a second tunnel to accommodate two tracks, future signalling, communications infrastructure, and replacing footings of retaining walls that support the ramp from eastbound Highway 409 to eastbound Highway 401. The new tunnel is also being built to support future high speed rail, as was proposed by the Government of Ontario in 2017.

32 Barrie Corridor GO RER

\$1.506 billion



2017 Rank: 31

Location: Toronto, Ontario to Barrie, Ontario

Owner: Metrolinx

Contractor: EllisDon (Dufferin St. at Queen St. bridge); Cole Engineering and Kenaidan (rapid pedestrian tunnels)

Other: Mammoet (crane for precast tunnel placement); DECAST Ltd.; 4-Transit JV—WSP, Parsons, Hatch (technical advisory services); Aon Risk Solutions; INTECH Risk Management

Funding: Public

The \$13.5 billion Regional Express Rail (RER) program includes significant improvements to the Barrie GO corridor. The current corridor runs consists of 11 stations running from the Allandale Waterfront GO station on the shores of Lake Simcoe and Barrie through to Union Station in downtown Toronto. Preliminary construction work has begun in preparation for the expansion of service through the Barrie corridor, as well as the electrification of service on the line. The first construction contract, released by Metrolinx in August of 2016, was the expansion of the Dufferin/Queen bridge in order to accommodate the additional capacity. Full construction and expansion of the Barrie corridor is scheduled for completion in 2025.

33 Great Spirit Power Project

\$1.5 billion 

2017 Rank: 29

Location: Lake Wabamun, Alberta

Owner: Focus Energy Group and Paul First Nation

Project/Construction Manager: Focus Energy Group

Other: Paul First Nation (host and equity owner); New West Opportunities (First Nations advisors); CF Power (interconnection engineers); WSP (quality management)

Funding: Private

Financing

Focus Energy Group and partners will provide equity and debt financing.

This proposed 930-MW power project is to be a combined cycle natural-gas fired power plant. The facility will be located on Paul First Nation Industrial Park, and ownership will be shared with that Nation. The Paul First Nation has agreed to develop the project along with Focus Equities Inc. which will replace nearby aging coal plants as well as provide economic development opportunities for the community. Construction of the facility is to be completed in early 2018.

34 York VIVA Bus Rapid Transit (vivaNext)

\$1.5 billion 

2017 Rank: 30

Location: York Region, Ontario

Owner: York Region Rapid Transit Corp. and Metrolinx

Project Manager: Kiewit EllisDon, a 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)

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

Program Manager: MMM Group

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

Environmental Services: WSP (environmental consultant, EA)

Other: Aon (risk/insurance advisor to authority); BTY Group (ind. certifier); Entro; Golder Associates (ground engineering services); Hanscomb; Revay and Associates; Morrison Hershfield (prime design consultants); Infrastructure Ontario (procurement advisor); 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)

Legal: McCarthy Tétrault; WeirFoulds (acting for York Region); Borden Ladner Gervais LLP (legal advisor); Osler; Torgys (acting for lender)

Vehicle Supplier: NovaBus

Supplier: Canam Group (steel joists); Van Hool; DECAST Ltd.

Funding: Public

- **Federal:** \$85 million
- **Provincial** Capital allotment to Metrolinx, the regional transportation authority: \$1.23 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. The Davis Drive segment was officially opened in October 2016. Flexibility is being built into the design for potential future expansion through Markham Centre. Substantial completion is expected in 2020.

35 Fort McMurray West Transmission Project

\$1.43 billion 

2017 Rank: 32

Location: Edmonton to Fort McMurray, Alberta

Owner: Alberta PowerLine

DBFOM Team: Alberta PowerLine—Quanta Services (subsidiary Valard Construction to provide EPC services) and ATCO Electric (route planning, operations, and maintenance)

Other: Aon Risk Solutions (risk/insurance advisor to authority); INTECH Risk Management (insurance advisor)

Legal: Bennett Jones (acted for successful proponent); Norton Rose Fulbright; Torgys (proponent lenders)

Funding: Private

- **Private:** \$1.43 billion

This project will consist of approximately 500 kilometres of transmission line and associated facilities in order to support increasing growth in northeastern Alberta. It will include a 500-kilovolt (kV) AC single-circuit transmission line, approximately 100 kilometres in length, running from a new substation in the Thickwood Hills area to the existing Livock 939S substation, and a 500 kV AC single-circuit transmission line, approximately 400 kilometres in length, running from Livock 939S substation to the approved Sunnybrook 510S substation. The proposed route, substations, and design of the transmission line are subject to approval by the Alberta Utilities Commission (AUC). Approval for the project was granted by the AUC in February of 2017. The project is set to be in service in 2019.

36 Hurontario LRT

\$1.4 billion 

2017 Rank: 33

Location: Mississauga and Brampton, Ontario

Owner: Metrolinx

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

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

Other: DIALOG (urban design); Dufferin Construction; Golder Associates (preliminary geotechnical services); Hanscomb (preliminary design engineer's cost consultant); Hatch; LEA Group (ITS); Aon (owner advisor and construction insurance broker); EY (financial and transaction advisory); INTECH Risk Management

Legal: Borden Ladner Gervais LLP (legal advisor); Torys (acting for lender)

Funding: Public


Credit: Public consultation via mississauga.brampton.ca



Credit: Infrastructure Ontario

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 be significant benefit to the communities of Mississauga and Brampton, and be an integral component of the GTHA's broader transportation network. The Request for Proposals was released to three selected proponents in August of 2017. The winning bidder is to be selected, and construction is scheduled to begin, in 2018. The anticipated completion of the project is 2022.

37 New Cancer Centre in Calgary

\$1.4 billion 

2017 Rank: 57

Location: Calgary, Alberta

Owner: Alberta Health Services

Architect: Morrison Hershfield

Contractor: PCL Constructors Inc.

Consulting Architect: HKS and Marshall Tittlemore Architects (subconsultants)

Other: Arup (technical advisor and prime consultant); Ernst & Young (advising gov't); KPMG (commercial advisor); Morrison + Hershfield (commissioning study)

Legal: Norton Rose Fulbright (for the authority)

Funding: Public



Credit: Alberta Infrastructure

This new comprehensive cancer centre is to be built at the Foothills Medical Centre in Calgary. The 80,000-plus-square-metre complex will include 160 inpatient beds, an outpatient facility, cancer diagnostic and treatment

technologies, and dedicated space for research. The centre will provide much-needed access to cutting-edge treatment and care for residents of Calgary and southern Alberta. The RFP was released in October 2016, and the

successful proponent was announced in June of 2017. Groundbreaking on the new centre took place in late 2017. Project construction is expected to run until 2022, with the facility opening to patients in 2023.

38 Chamouchouane-Bout-de-l'Île Transmission Line

\$1.4 billion 

2017 Rank: 34

Location: Saguenay to Montreal, Quebec

Owner: Hydro-Québec

Contractor: Pomerleau (Chamouchouane-Bout-de-l'Île Section 6 Power Line - Caisson Piles for the 315 kV and 735 kV Towers)

Environmental Services: WSP (environmental impact study)

Other: Englobe (geotechnical investigation)

Supplier: Canam Group

Funding: Public

This project includes building a new 735-kV, 406-kilometre transmission line to increase its capacity to bring power from the north to the south. In the Lac-Saint-Jean region, four transmission lines bring power to the Chamouchouane and Saguenay substations from the north (from Baie-James on one side, and Côte-Nord on the other), while only three run southwards. This creates a funnel effect and limits the system's capacity to bring power to the south, where the major load centres are located. To reduce pressure on the system and mitigate this funnel effect, reinforcement between the Chamouchouane substation and the Montreal metropolitan loop is necessary. Construction began in 2015, with a completion date expected around September 2018.

39 Genesee 4 & 5 Generation Stations

\$1.4 billion 

2017 Rank: 35

Location: West of Edmonton, Alberta

Owner: Enmax and Capital Power Corp.

Project/Construction Manager: Capital Power

Turbine Supplier: Mitsubishi Hitachi Power Systems

Funding: Private

• **Private:** \$1.4 billion

This proposed combined cycle natural gas-fired generation facility is a joint venture project between Capital Power and ENMAX. The facility will be located on a brownfield site within the boundaries of Capital Power's existing Genesee Generating Station. The project will utilize the latest high-efficiency turbine technology and will have a generation capacity of approximately 1,060 MW consisting of two 530-MW units. The facility consists of two one-on-one, single shaft power islands, each incorporating a 501 J-class natural gas turbine, steam turbine, generator, and heat recovery steam generator.

All major regulatory approvals have been granted from the Alberta Utilities Commission and Alberta Environment and Sustainable Resource Development (now Alberta Environment and Parks). Full notice to proceed decision deferred. Continuation and timing of the project will be considered once more Alberta market structure certainty exists and new generation is required to balance supply and demand. The project's design configuration allows for construction to occur in two phases with staged completions. The commercial agreements include flexibility on the timing of the in-service date for the project to be timed to correspond to the need for new power generation in the Alberta market. Towards the end of the decade in 2020, nearly 1,000 megawatts of coal generation is scheduled to retire.

40 Wataynikaneyap Transmission Project

\$1.35 billion 

2017 Rank: 36

Location: Northern, Ontario

Owner: Wataynikaneyap Power in partnership with FortisOntario and RES Canada

Environmental Services: Golder Associates (Phase 1 EA)

Other: AECOM (lead), PowerTel, and Deutsche Bank (MOU for design, construction, and financial services); PricewaterhouseCoopers (financial feasibility study and socioeconomic impact analysis); Torys (regulatory overview); Arcadis Canada Inc. (Phase 2 routing study); EY (consultant)

Funding: Public/Private

Financing

Wataynikaneyap has invested approximately \$16 million to date on pre-development activities. Government funding is still required to make the project a reality.

Wataynikaneyap Power—composed of 22 Northwestern First Nation 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). Construction is planned to start in early 2018. Potential remote electrification is anticipated in 2022, with build-out to 2024.

41 Romaine Complex Transmission Line

\$1.3 billion 

2017 Rank: 37

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)

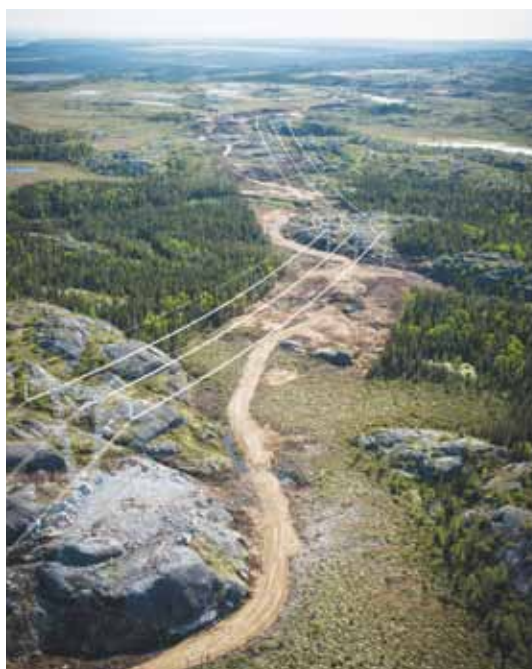
Other: WSP (environmental impact assessment); Thirau; GLR; GHD (geotechnical services); Englobe (field surveillance)

Funding: Public

• **Provincial Hydro-Québec:** \$1.3 billion

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 kV 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.



Credit: Hydro-Québec

42 Mackenzie Vaughan Hospital

\$1.3 billion 
2017 Rank: 38

Location: Vaughan, Ontario

Owner: Mackenzie Health

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)

Other: Hanscomb (hospital's cost consultant); A.W. Hooker Associates (independent certification); GHD (condition assessment remediation); Aon Risk Solutions
Legal: Torys (represented Johnson Controls)
Supplier: DECAST Ltd.
Funding: Public/AFP



Credit: Infrastructure Ontario

Mackenzie Vaughn 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. Construction of the new hospital began in October of 2016. The hospital is expected to open to patients sometime in 2020.

43 Port Hope Area Initiative

\$1.28 billion 

2017 Rank: 39

Location: Port Hope and Clarington, Ontario

Owner: Atomic Energy Canada Limited, Natural Resources Canada

Project/Construction Manager: Canadian Nuclear Laboratories

Engineer: AECOM; MMM-GHD Joint Venture

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

Environmental Services: Golder Associates (contamination investigation/remediation; Phase I ESA; geotechnical); Amec Foster Wheeler (waste transport)

Financiers/Banks:

Natural Resources Canada

Other: Hanscomb (owner's preliminary design stage cost consultant and special advisor); Tetra Tech; SNC-Lavalin

Legal: Osler; Torys (acting for lender)

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, 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 aboveground 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. Construction of a \$25.5 million waste water treatment plant at the new site was completed in 2014, and construction of the first storage cell in the aboveground mound began in summer 2016. The Port Hope Project Property Radiological Survey, currently in progress, involves the radiological testing of approximately 4,800 public and private properties—small-scale sites—for the presence of historic low-level radioactive waste. It is expected that 90% of properties will not require remediation. Cleanup of the remaining properties and the major sites is expected to begin when the long-term waste management facility is ready to receive waste in 2018.

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 aboveground mound at a long-term waste management facility being constructed approximately 700 metres north of the lake. Ongoing maintenance and monitoring will continue for hundreds of years after the facility is capped and closed. Construction of a \$28.8 million waste water treatment plant has been completed. Construction of the first storage cell of the aboveground mound and a temporary underpass below Lakeshore Road to connect existing and new sites began in spring 2016. Waste excavated at the existing facility began being safely transported by truck beginning in the fall of 2016. In December of 2017, cleanup of historic low-level radioactive waste began at the legacy Welcome Waste Management Facility. Substantial completion of the entire Port Hope Area Initiative is expected by 2023.

44 Port Lands Flood Protection and Enabling Infrastructure

\$1.25 billion 

NEW

Location: Toronto, Ontario

Owner: City of Toronto

Project Manager:
Waterfront Toronto

Funding: Public

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



Credit: Toronto Port Lands Commission

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. Early construction activities began in late 2017, and excavation of the river valley is set to begin in early 2019.

45 Energy Services Acquisition Program's Energy Service Modernization

\$1.2 billion 

NEW

Location: Ottawa, Ontario and Gatineau, Quebec

Owner: Government of Canada

Legal: Norton Rose Fulbright (advisor to project owner)

Funding: Public

- **Federal:** \$1.2 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 CHCP's service 79 total buildings. The Request for Qualifications (RFQ) submission deadline was November 1st, 2017. Three proponents will be selected from the RFQ to submit proposals in the RFP stage.

46 Alberta Carbon Trunk Line

\$1.2 billion 

2017 Rank: 40

Location: Fort Saskatchewan to Clive, Alberta

Owner: Enhance Energy Inc.

Project/Construction Manager:
SAW Engineering (EPC management)

Engineer: Caber Engineering; SAW Engineering; BETA Tech Engineering

Other: WSP (geomatics services); North West Redwater Partnership's Sturgeon Refinery; Agrium Inc.; LeighFisher (lenders technical advisor); Land Solutions LP; BOSS Environmental; Worley; Scott Land

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:** \$495 million
- **Private:** \$641.8 million

Financing

Enhance Energy noted that this project would not have proceeded without government assistance and that the line provides infrastructure for multiple oilsands business.

This 240-kilometre pipeline will collect CO₂ 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 CO₂ 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. It will lay the groundwork for a cost-effective, industry-wide solution to the management of CO₂ emissions from Alberta's upgrading, refining, power generation, and petrochemical operations. Enhance Energy received regulatory approval to build the pipeline and acquired 100 per cent of its right of way. Procurement is underway, with 70 per cent of all goods and services being accessed in Alberta. There is no confirmed completion date for this project.

47 Finch West LRT

\$1.2 billion 

2017 Rank: 41

Location: Toronto, Ontario

Owner: Metrolinx

Project/Construction Manager:

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

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

Consulting Engineer: WSP (geotechnical consultant)

Other: AECOM (technical advisor); Aon Risk Solutions (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)

Legal: Norton Rose Fulbright; Torgys (acting for lender)

Vehicle Supplier: Bombardier

Supplier: Dufferin Concrete

Funding: Public

• **Provincial** Ministry of Transportation capital allotment to Metrolinx: \$1.2 billion

This new LRT, located along Finch Avenue West in the city's northwest end, 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. In September of 2017, Metrolinx announced that the project completion date had been pushed until 2022. A firm construction schedule is set to be released shortly after the awarding of the contract for the project in the spring of 2018.

48 New TTC Light-Rail Vehicles

\$1.187 billion 

2017 Rank: 42

Location: Toronto, Ontario

Owner: TTC

Engineer: Parsons

Other: KPMG (advisor for TTC Capital Program Delivery Review); WSP (consulting on the manufacture and procurement, commissioning, hazard and safety control phases of new vehicle projects)

Vehicle Supplier: Bombardier

Funding: Public

• **Provincial:** \$416 million

• **Municipal** TTC: \$771 million

The provincial government has allocated up to \$416 million, or 1/3 funding of eligible costs related to the purchase of 204 light-rail vehicles, to replace the current streetcar fleet. The program is active and is slated to run from 2009 to 2019, when the last LRV is delivered.

49 Highway 407 East Extension – Phase 2

\$1.158 billion 

2017 Rank: 43

Location: Oshawa to Clarington, Ontario

Owner: Ontario Ministry of Transportation

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

Engineer: exp Services (geotechnical design for structures and pavements); Parsons

Other: Aon Risk Solutions (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 Associates (materials testing and inspection); Englobe; A.W. Hooker Associates (independent certification); GHD (quality assurance services); Canam Group; DECAST Ltd.; WSP (archaeology)



Credit: Ontario Ministry of Transportation

Legal: Osler; Torgys (acting for lender)

Funding: P3

• **Provincial:** \$1.158 billion

Financing

The aggregate AFP delivery costs are \$1.158 billion, with base capital costs of \$1.052 billion.

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. This phase will be built in two stages: Harmony Road to EDL by early 2018, and EDL to Highway 35/115 including the EDL by 2020.

50 East Side Transportation Initiative

\$1.125 billion 

2017 Rank: 44

Location: Eastern Manitoba

Owner: Province of Manitoba

Engineer: SNC-Lavalin; AECOM;
Dillon Consulting; Associated
Engineering (design engineer)

Environmental Services:
Tetra Tech

Consulting Architect: Dillon
Consulting (compliance architect);
KGS Group (compliance architect)

Funding: Public

• **Provincial:** \$1.125 billion



Credit: East Side Road Authority

Financing

The full budget is \$3 billion (the value assigned to the project in 2014's Top100), but the East Side Road Authority said only \$1.125 billion has been committed to by the provincial government so far. Discussions are underway with the federal government regarding federal involvement in the project. If the feds come to the table and match provincial government contributions, the project's 30-year timeline could be significantly reduced.

This all-season road on the east side of Lake Winnipeg is a multi-year, multi-billion-dollar project. In 2000, the communities on the east side of Lake Winnipeg delivered a report with recommendations on where government should focus their long-range planning activities, including increased economic development opportunities and improvements to the transportation network. Construction has been guided through the East Side Transportation Initiative, launched following the East Side Large Area Transportation Network Study undertaken by SNC-Lavalin/AECOM. It is a strategic initiative to provide improved, safe, and

more reliable transportation service to remote and isolated communities on the east side of Lake Winnipeg. The final report of the Large Area Transportation Network Study was completed in June 2011 and recommended an all-season road network for the region that is estimated at 1,028 kilometres in length costing \$3 billion.

The first step in the project is building the 156-kilometre road that runs from PR304 to Berens River—a massive undertaking consisting of 23 individual road segments and nine bridges. To date, 50 kilometres of all-season road up to Berens River First Nation has been constructed, including

four permanent bridges. In addition to that, 92 kilometres of additional right-of-way clearing has been done toward Berens River First Nation, and 233 kilometres of exploratory clearing has been completed and three bridges have been installed, which dramatically extend the winter road network in the Island Lake area of Manitoba's north.

Since July 2009, over 300 First Nation residents living on the east side of Lake Winnipeg have received valuable job training, allowing them to gain the skills necessary to obtain good jobs and help build the all-season road. Further to that, the all-season road has created over 1,000 jobs in Manitoba.

A Decade of Top100

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



51 John Hart Generating Station Replacement Project

\$1.093 billion 

2017 Rank: 45

Location: Campbell River, British Columbia

Owner: BC Hydro

DBFM Team: InPower BC General Partnership—SNC-Lavalin; Aecon

Environmental Services: Hatfield; SNC-Lavalin

Financiers/Banks: SNC-Lavalin Capital Inc.; Scotiabank Global Banking and Markets (underwriter); National Bank Financial (co-lead underwriter)

Other: BTY Group (cost consultant); Ernst & Young (advising gov't); Frontier-Kemper; GE Energy (formerly Alstom); Golder Associates; Mott MacDonald (lenders' technical advisor); INTECH (insurance advisor); KPMG (commercial advice and due diligence); McElhanney; Hemmera; Golder Associates (owner's engineer team); Altus Group; ZINC Strategies

Legal: Borden Ladner Gervais (counsel to BC Hydro); Blake, Cassels & Graydon (SNC-Lavalin Capital Inc.); McMillan (underwriters and construction lender)

Funding: P3



Credit: BC Hydro

This generating station project includes the replacement of three 1.8-kilometre penstocks with a 2.1-kilometre tunnel through bedrock (completed in Sept. 2016); construction of a replacement generation station upstream of the existing station; replacement of the water intake at the John Hart Spillway Dam; and the construction of a new water bypass facility within the new generating station. The current station has been providing energy to the B.C. grid for more than 67 years, and this project aims to improve safety features to protect it against seismic activity, continue to provide reliable hydroelectric power, and protect downstream fish habitat from water flow disruptions.

First Nations have signed project impact benefit agreements with BC Hydro. In February 2014, BC Hydro announced that InPower BC was awarded the contract to design and build the project, the cost of which remains well within the range initially submitted to the British Columbia Utilities Commission. Construction began in summer 2014 and is expected to be completed by late 2018.

52 Henvey Inlet Wind Project

\$1 billion 

2017 Rank: 46

Location: Between Sudbury and Parry Sound, Ontario

Owner: Pattern Development and Nigig Power (wholly owned by Henvey Inlet First Nation)

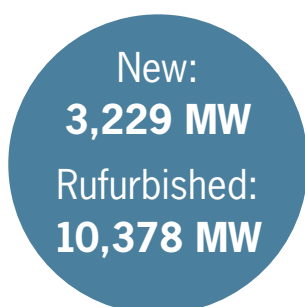
Environmental Services: AECOM (environmental assessment reports)

Other: Englobe (geotechnical investigation, quality control)

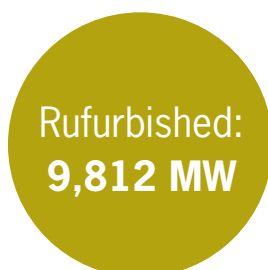
Legal: Torys (project owner legal advisor); Osler

Funding: Private

The 300-MW Henvey Inlet wind project in northern Ontario is in the final planning stages. The feed-in tariff scheme is a 50-50 joint venture between Pattern Development and Nigig Power, which is wholly owned by Henvey Inlet First Nation. It will be constructed on reserve lands in Parry Sound County, near Georgian Bay. The project does not require provincial permits as the First Nation has legal authority to grant a lease and environmental approval. Upon completion in 2018, it will be the largest First Nation wind project in Ontario.



 **Hydroelectric**



 **Nuclear**



 **Natural Gas**



 **Wind**

Building Energy Capacity

Work on new and refurbished energy projects in Canada represents **26,579 MW** of power

53 Deep Geological Repository

\$1 billion



2017 Rank: 47

Location: Kincardine, Ontario

Owner: Ontario Power Generation

Project Manager: Nuclear Waste Management Organization

Other: AECOM (environmental consulting); Geofirma Engineering (geoscientific characterization); G.L. Tiley & Associates; Golder Associates (env. impact statement); Tetra Tech; WorleyParsons; WSP (technical support)

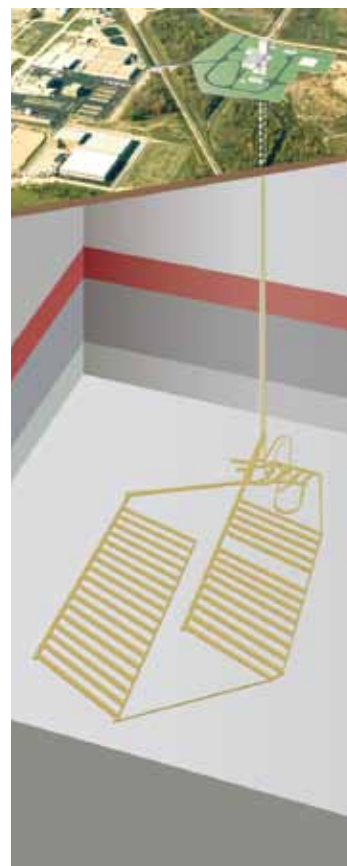
Funding: Public

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 February of 2016, Minister of Environment and Climate Change Catherine McKenna requested that Ontario Power Generation (OPG) provide additional information on three aspects of the environmental assessment: alternate locations for the project, cumulative environmental effects of the project, and an updated list of mitigation commitments for each identified adverse effect under the Canadian Environmental Assessment Act, 2012 (CEAA 2012). In January of 2017, OPG provided the additional information requested by Minister McKenna.



Credit: Ontario Power Generation

54 The Milner Energy Centre

\$1 billion



2017 Rank: 48

Location: Grande Cache, Alberta

Owner: Maxim Power Corp.

Contractor: Covanta Energy Corporation

Funding: Private

The goals of this initiative are to increase baseload electrical generating capacity in Alberta in an era when conventional coal-fired generation is being phased out and provide long-term economic benefits to the local and regional area. In June 2014, the Alberta Utilities Commission (AUC) approved MAXIM's application to construct and operate a 520-MW natural gas-fired expansion (M2) at the site of the existing 150-MW Milner generating facility (M1). The expansion will be located adjacent to M1 and will take advantage of the existing infrastructure at the site, allowing MAXIM to leverage benefits including electrical connection, fuel delivery, water licenses, and a skilled operations team. Natural gas will be supplied via an expansion of the existing natural gas pipeline that currently supplies M1. In February 2015, the AUC approved MAXIM's application for an 86-MW expansion (M3) to M1; the expansion will be composed of two natural gas-fired turbines located next to M1. Exhaust energy from these turbines will be converted to steam and utilized to generate electricity in the existing M1 steam turbine, displacing coal-sourced steam. These two initiatives will increase the capacity at the Milner site from 150 MW to 756 MW. Construction timing for both projects is pending clarity on new Alberta provincial climate change initiatives and regulations. It is also anticipated that M3 would be completed in advance of M2.

55 Hamilton LRT

\$1 billion



2017 Rank: 49

Location: Hamilton, Ontario

Owner: Metrolinx

Engineer: Morrison Hershfield (design engineer)

Other: AECOM (technical advisory services); Morrison + Hershfield (feasibility study); SNC-Lavalin (preliminary design); Aon Risk Solutions; INTECH Risk Management

Legal: Torgys (acted for lender)

Funding: Public

The original plan for the Hamilton LRT project will include approximately 11 kilometers 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 km option, versus the original 11 km option, extending the line eastward from Queenston Circle to Eastgate Square. In May of 2017, Hamilton submitted an updated plan following the change in the scope of the project, and received approval to proceed as amended.

56 Sainte-Justine University Hospital Centre

\$939.6 million



2017 Rank: 52

Location: Montreal, Quebec

Owner: Sainte-Justine University Hospital Centre

Project/Construction Manager: TDC

Consortium—Tecsult, AECOM, CIMA + ; WSP (project manager)

Engineer: Expansion: SNC-Lavalin (design engineer)

Modernization: Pellemon/Bouthillette, Parizeau et Associés (electrical, mechanical); SKD/NCK Consortium—Saïa, Deslauriers, Kadanoff, Leconte, Brisebois, Blais and Nicolet Chartrand Knoll (civil, structural)

Contractor: Expansion: SNC-Lavalin (EPC contractor)

Financiers/Banks: National Bank (lead arranger for financing); CIBC World Markets (mandated lead arranger for SNC-Lavalin)

Consulting Architect: Expansion: Provencher Roy, Menkès Shooner Dagenais Letourneux Modernization: Brière, Demontigny, Gilbert et Associés, Hébert Fortin Martin Consortium, Jodoin Lamarre Pratte (compliance architects), Lemay et Associés, Métivier, Provencher Roy

Other: Mott MacDonald (lender's technical advisor); WSP (phase II + geotech); GHD (geotechnical, environmental and material testing)

Legal: McCarthy Tétrault LLP (advising lenders to a proponent); Fasken Martineau DuMoulin LLP (advised authority); Norton Rose Fulbright LLP (represented selected proponent)

Supplier: Demix Beton (concrete); Canam Group (supplier); Honeywell (supplier)

Funding:

Public/Private

• **Provincial:**

\$869.6 million

• **Private**

Sainte-Justine

Hospital Foundation: \$70 million

Sainte-Justine University Health Centre is a teaching hospital affiliated with the Université de Montreal. It specializes in obstetrics and other care for mothers and children. The objective of the hospital's upgrades are to provide a hospitalization and work environment that is modern and adapted to patients' needs while also considering impacts on the environment and surrounding community. This project, which is targeting LEED Silver certification, consists of two components: an expansion involving the construction of new buildings, as well as a modernization program for existing structures.

57 Giant Mine Remediation Project

\$903.5 million



2017 Rank: 53

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

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 Dehcho 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. Under a multi-year services agreement with AANDC, Public Works and Government Services Canada (PWGSC)

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

Other: Parsons (project planning/permitting, decontamination, hazardous waste abatement, deconstruction, construction management); Golder Associates Ltd. (multi-disciplinary consulting services, general and civil design); Hatch (design); SRK Consulting and Arcadis Canada Inc. (lead technical advisors)

Funding: Public

• **Federal:** \$903.5 million

is contributing project management, engineering, procurement, and environmental services in the implementation of assessment and remediation of such contaminated sites. 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. General discussions with stakeholders to prioritize the measures have already begun. Project completion is expected in 2025.

58 Highway 1 Upgrades -- Kamloops to Alberta

\$872.7 million



2017 Rank: 70

Location: Kamloops, BC to Alberta border

Owner: Government of B.C.

Contractor: Emil Anderson Construction Inc. (Pritchard to Hoffman's Bluff)

Other: Golder Associates (geotech, environmental services); Englobe (pavement engineering services, QA, QV); WSP (construction supervision)

Funding: Public – Provincial/Federal

The Government of B.C. has embarked on a 10-year, \$650-million 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 km under the jurisdiction of the B.C. Ministry of Transportation and Infrastructure, as well as 101 km under the jurisdiction of Parks Canada. In total, the province has broken down the project into 18 sections to be twinned across the 10-year project. Eleven of the sections have already been completed, with seven others currently under development. In February of 2017, the federal government announced that it would provide \$215 million to the Kicking Horse Canyon project that is part of the province's upgrade of the highway.

59 Canadian Forces Base Trenton Expansion

\$860 million



2017 Rank: 55

Location: Trenton, Ontario

Owner: Department of National Defence

Design Engineer: Amec Foster Wheeler; SNC-Lavalin; Jain & Associates; J.L. Richards & Associates; Peak; Stantec

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

Environmental Services: Englobe

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.

Other: Engineering Harmonics (AV consultant); Hanscomb (owner and design architect/engineer's cost consultant)

Supplier: Allen Mechanical; Alliance Forming; Amstel Manufacturing; AZ3; Black & McDonald; Canam Group (steel joists); CBM; Coco Paving; Coreslab Structures; Cremers Brothers Electric; Deep Foundation Contractors; Diamond Electric Contractors; Domson Engineering & Inspection; Dufferin Concrete; Eastern Ontario Terazzo and Tile Co.; Flynn Canada; Gilbert Steel Ltd.; JVH Masonry; Lafarge; LRL Associates Engineers; Presland Iron & Steel; Quinte Mobile Concrete; Select Door 7 Frame; Tri-con Concrete Finishing; Unistrut Canada; Vipond Fire Protection

Funding: Public

• **Federal:** \$860 million

Established in 1929, CFB Trenton has traditionally been an air base, home to the 8 Wing unit, and it is one of Canada's primary launching sites for military missions abroad. The base 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 project involves acquiring an additional 401 hectares of land—a move that has been controversial as it involves expropriating neighbouring farms, some more than 200 years old. The 10-year expansion program has already begun construction, with several components already complete. In 2016, Hangar 2 obtained LEED(R) Gold certification. The project continues and is expected to be finalized by 2022. At CFB Trenton, 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 Region of Waterloo ION LRT – Stage 1

\$818 million



2017 Rank: 59

Location: Waterloo, Kitchener, and Cambridge, Ontario

Owner: Region of Waterloo

Engineer: WSP (owner's engineer: includes technical advisor, program manager and owner's engineer role, phase one ESA)

Contractor: DBFMO Team: GrandLinq, including Plenary, Meridiam, Aecon, Kiewit and Keolis

Environmental Services: Golder Associates (environmental consulting engineers); Hatfield Consultants; Hatch (EA)

Financiers/Banks: CIBC World Markets (underwriter and bookrunner to GrandLinq)

Consulting Architect: PBK Architects (station stop design)

Other: AECOM (project assessment process team); Aon (owner advisor and construction insurance broker); BTY Group (lenders' technical advisor); Golder Associates (construction); Infrastructure Ontario (procurement advisor); Hanscomb (EA engineer's cost consultant); INTECH (insurance advisor); LeighFisher (lenders' technical advisor); Englobe (geotechnical services, pavement design & quality assurance); Aon Risk Solutions

Legal: Blake, Cassels & Graydon (counsel to successful proponent); Fasken Martineau DuMoulin (advised lenders); Gowling WLG (counsel to GrandLinq); Norton Rose Fulbright (acted for Waterloo); Osler

Vehicle Supplier: Bombardier

Supplier: Siemens

Funding: P3

• **Federal** Building Canada Fund: \$265 million

• **Provincial:** \$300 million

• **Municipal:** \$253 million

Transit options for the Region of Waterloo were debated at length before light-rail technology was selected instead of bus rapid transit. LRT offers the best long-term value for expanding the local public transit system. The region chose to use Bombardier as the supplier for the LRT vehicles based on an existing agreement Metrolinx had already approved. This agreement will allow the region to capitalize on a larger volume purchase, potentially reducing the individual cost of the vehicles, as well as the cost of spare parts and maintenance contracts. This rapid transit service will shape the future of the community's transportation system by bringing LRT in two stages. Stage 1 was expected to open in 2017, but was delayed to 2018 by issues regarding vehicle delivery and functionality. Stage 1 of the line includes a 19-kilometre LRT route from Conestoga Mall Transit Terminal to Fairview Park Mall Transit Terminal, with stops in downtown Kitchener, Grand River Hospital, UpTown Waterloo, both universities, and Waterloo Park. It also features a 17-kilometre route of adapted bus rapid transit (aBRT) from Fairview Park Mall to the Ainslie Street Terminal in Cambridge, with four stops along Hespeler Road. Stage 2 will see the BRT line converted to LRT, creating a seamless 37-kilometre service of 23 stops between Cambridge and Waterloo. Phase one was originally to open in late 2017, issues with the light rail vehicles to be used on the project has caused completion to be moved to spring or summer of 2018.

61 Union Station Revitalization Project

\$800.7 million



2017 Rank: 60

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 Services (train shed roof design and construction admin); NORR Limited Architects & Engineers (structural, mechanical and electrical)

Contractor: Clifford Restoration (building envelope restoration); EllisDon (general contractor)

Architect: NORR Limited Architects & Engineers (prime design consultant); DIALOG (executive architect of retail features)

Management Consultants: EY

Other: 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 Associates (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)

Legal: WeirFoulds (acting for architects)

Supplier: Canam Group (steel deck); Dufferin Concrete

Funding: Public

- **Federal:** \$164.5 million
- **Provincial:** \$172 million
- **Municipal:** \$464.2 million (estimated)

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 is expected by the end of 2018.

62 North End Sewage Treatment Plant Biological Nutrient Removal Upgrade

\$794.6 million



2017 Rank: 79

Location: Winnipeg, Manitoba

Owner: City of Winnipeg

Project/Construction Manager: KGS Group (owner's advocate/consultant)

Engineer: AECOM (owner's advocate/consultant)

Other: Hanscomb (owner's/engineer's design stage cost consultant)

Legal: Blake, Cassels & Graydon LLP

Funding: Public

- **Provincial:** \$195 million
- **Municipal:** \$374.4 million

The Province of Manitoba has issued the City of Winnipeg an Environment Act License requiring the treatment of nutrients (such as nitrogen and phosphorus) among other requirements at the 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. A staff report released in the fall of 2017 suggested that the total cost for the project could rise to north of \$1 billion. However, at press time, the City of Winnipeg budget for the project had not exceeded the stated value of \$794.6 million. The upgrade is to be completed by 2023.

63 Capital Region District Wastewater Treatment Plant

\$765 million



NEW

Location: Victoria, British Columbia

Owner: Capital Region District

DBF Team: AECOM Canada; Graham; SUEZ; CEI; Gracorp; Michelss Canada

DBFOM Team (residuals treatment facility): Bird Construction; Maple Reinders; Synargo Capital

Management Consultants: EY

Contractor: Parsons (Residual Solids Conveyance Line)

Other: KPMG (commercial advisor); Operis (financial advisor for RTF proponent); Aon Risk Solutions; Associated Engineering; INTECH Risk Management

Legal: Norton Rose Fulbright (advisor to CRD)

Funding: P3

The Capital Region District Wastewater Treatment Project is the integration of three projects aimed at building a modern, efficient wastewater treatment system for Victoria and its surrounding communities. The first is the McLoughlin Point Wastewater Treatment Plant, which will provide tertiary treatment to the core area's wastewater and includes a pipeline from Ogden Point to McLoughlin Point and a new marine outfall for treated water into the Juan de Fuca Strait. The second is Residuals Treatment Facility at the Hartland Landfill, which will turn residual solids into "Class A" biosolids. The third is a conveyance system, which will carry wastewater from across the core area to the treatment plant, and residual solids to the Residuals Treatment Facility. Construction of the redesigned McLoughlin Point Wastewater Treatment Plant got underway in April, with an overall cost of \$385 million. All of the project components are scheduled for completion by the end of 2020.

64 Stanton Territorial Hospital Renewal Project

\$751 million 

2017 Rank: 61

Location: Yellowknife, Northwest Territories

Owner: Government of the Northwest Territories

DBFM Team: Boreal Health Partnership—Carillion, HOCHTIEF PPP Solutions North America, and Bird Capital (developers); Bird Construction, Clark Builders, and Kasian Architects (design-builder); Crossey Engineering Ltd. and Weiler Smith Bowers Consulting Structural Engineering (engineers); Carillion (service provider); Morrison Hershfield

Financiers: BMO (financial advisor to Boreal Health Partnership); CIBC World Markets (underwriter)

Management Consultants: Operis (financial model audit)

Other: Aon Risk Solutions (risk/insurance advisor to private partner); EY (advising gov't.); INTECH (insurance advisor); Mott MacDonald (facilities management advisor)

Legal: Blake, Cassels & Graydon (counsel to successful proponent); Borden Ladner Gervais LLP (legal advisor); Torsys (representing project owner)

Supplier: Canam Group

Funding: P3

The new Stanton Territorial Hospital will be over 26,000 square metres and will offer outpatient and inpatient services including emergency, medical imaging, dialysis, obstetrics, pediatric, cardio and mental health departments, as well as day procedure and surgery suites. The new facility will have 100 inpatient beds. The existing Stanton Territorial Hospital was constructed in 1988 and is approximately 13,300 square metres in area with 80 inpatient beds (including Extended Care). The project is expected to be completed by 2018.

65 Ruskin Dam and Powerhouse Upgrade

\$748 million 

2017 Rank: 62

Location: Mission, British Columbia

Owner: BC Hydro

Engineer: BC Hydro; MWH Americas Inc.; Golder Associates (right abutment); Bogdonov Pao Associates

Contractor: Golder Construction (right abutment – Phase 2); Flatiron-Dragados JV (upper dam and spillway gates, balance of plant)

Architect: RATIO Architecture Interior Design + Planning Inc.

Other: Hemmera (First Nation consultation and negotiation services); McElhanney (survey/geomatics services); Pomerleau

Turbine Supplier: Voith Hydro

Supplier: HMI Construction (spillway gates), COH (powerhouse crane), Fortune Electric (generator step-up transformers), ABB (exciters), L&S Electric of Canada (governors)

Funding: Public

• **Provincial** BC Hydro: \$748 million



Credit: BC Hydro

The Ruskin Dam generation station has supplied power to the BC Hydro grid for almost 80 years and requires upgrades to ensure operational reliability and improve safety in the event of an earthquake.

There are four major components to this project:

- The right bank of the dam is being reinforced with a specially designed cutoff wall, which will control and manage water seepage.
- Seven concrete piers and spillway gates will be removed and replaced with five new ones, and the one-lane road on top of the dam will be replaced with a two-lane road.
- The powerhouse facility will be seismically upgraded and the powerhouse turbines, generators, and ancillary equipment will be upgraded or replaced (including upgrades to penstocks and intake tunnels that move water from the reservoir to the powerhouse).
- The switchyard, currently located on the roof of the powerhouse, will be rebuilt and relocated to the left bank behind the road.

The upgrades to the right bank are complete, and the replacement of the piers and spillway gates is underway. Approved by the British Columbia Utilities Commission in April 2012, construction began that year and the facility is expected to be in service in early 2018.

66 Rehabilitation of Robert-Bourassa Generating Units

\$732 million 

NEW

Location: Baie-James, Quebec

Owner: Hydro-Quebec

Contractor: GE; TRANSAR

Funding: Public

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 sixteen units. One unit will be rehabilitated each year. 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 us to optimize our facilities and adequately secure Québec's energy future. Robert-Bourassa generating station is one of the crown jewels in Hydro-Québec's generating fleet. With an installed capacity of 5,616 MW, it is the most powerful generating facility in Québec. Its longevity is essential to ensuring the long-term supply of reliable power in Québec.



67 Union Station Infrastructure Renewal Program

\$700 million



2017 Rank: 63

Location: Toronto, Ontario

Owner: Metrolinx

Project/Construction Manager: A JV with Hatch (lead), Parsons, and IBI Group

Engineer: Morrison Hershfield (design engineer)

Other: Entro (signage and wayfinding consultant); Morrison Hershfield (track/signals eng. for conceptual work); WSP (geotechnical consultant, design services); Aon Risk Solutions (risk advisor/broker for member of preferred proponent); Hatch (signals specialist); WSP (materials inspection and testing); Golder Associates

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 signaling system with new state-of-the-art signals, communications, power supply, CCTV, and SCADA systems. This 10-20 year improvement program aims to relieve overcrowding and allow for future growth. A new storage yard for 10 commuter trains was constructed, and an existing train storage yard refurbished. A new platform with associated underground passenger circulation facilities has also been completed inside the station. The program is expected to wrap up in 2019.

68 North Shore Wastewater Treatment Plant

\$700 million



2017 Rank: 64

Location: North Vancouver, British Columbia

Owner: Metro Vancouver

P3 Team: ADAPT Consortium (Acciona Infrastructure; DIALOG; Amec Foster Wheeler; TetraTech)

Engineer: AECOM (owner's engineer)

Consulting Architect: Miller Hull

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

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

Funding: P3

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. An earlier estimate of \$400 million for a new secondary treatment plant for the North Shore was developed several years ago, before the project had been defined and indivative design phases completed. Since then, the project cost has increased to accomodate current design considerations, the costs associated with a new site and the decommissioning of the existing primary treatment plant. Metro Vancouver will use a design-build-finance (extended warranty and holdback) delivery model and other conveyance upgrades using the conventional design-bid-build delivery model. 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 Marmora Pumped Storage Project

\$700 million



2017 Rank: 65

Location: Marmora, Ontario

Owner: Northland Power

Other: SNC-Lavalin

Legal: Borden Ladner Gervais LLP (legal advisor)

Funding: Private

This 400 MW pumped storage project will make use of an abandoned water-filled open-pit mine to store energy like a battery. Located on private land in Marmora, Ontario, the project will use low rate, off-peak energy to pump water into a raised reservoir, which will be constructed above the existing mine. During peak hours, when energy prices are higher, the water will be released into the mine through a hydroelectric turbine to generate electricity. In this way, excess electricity from non-controllable sources like solar and wind generators can effectively be stored for any desired period of time. Although pumped storage technology is new to Canada, it has been in use in Europe, the United States, and Japan since at least the 1960s. The project is endorsed by the County, Township, and many local residents. The development phase of the project continues as Ontario's energy supply remains an important area of infrastructure development. Northland Power continues to work with the Independent Electricity System Operator to secure an energy services contract. They hope to complete the project by 2021.

70 CAMH Phase 1C Redevelopment**\$685 million****NEW****Location:** Toronto, Ontario**Owner:** Government of Ontario**P3 Team:** Plenary Health - Plenary Group and PCL (developer); PCL (design-build); Stantec (architect); Plenary group (financial advisor); ENGIE Services (facilities manager)**Other:** INTECH (insurance advisor); Hascomb (owner's cost consultant); ARUP (risk assessment); Aon Risk Solutions**Funding:** Public

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
- site improvements, including parks and green space improvements

Construction began in the fall of 2017. The project is scheduled for completion in 2020.

71 Trans Labrador Highway Widening and Hard Surfacing**\$683 million****2017 Rank:** 66**Location:** L'Anse-au-Clair to Labrador City, Newfoundland and Labrador**Owner:** Government of Newfoundland and Labrador**Contractor:** Pavex; Mike Kelly and Sons; Humber Valley Paving

Other: Hatch (pre-design, design, construction supervision and layout, administration, QA/QC); exp (materials testing)

Funding: Public

The Trans Labrador Highway has been one of the most significant infrastructure projects in the province's history. The road spans close to 12,000 kilometres and over 500 kilometres has been paved. The paving and widening of this major piece of transportation infrastructure, the first continuous connection across Labrador, will connect residents with jobs, products, and economic opportunities. In Budget 2017, the provincial government pledged \$55.7 million to the ongoing construction of the project. This was funding presenting to cover the cost of work on the project during the 2017 calendar year.

72 Chinook Power Station**\$680 million****2017 Rank:** 67**Location:** Swift Current, Saskatchewan**Owner:** Government of Saskatchewan**Project Manager:** SaskPower**Contractor:** Burns and McDonnell (EPC services)**Other:** WSP (surveying)

Supplier: Siemens (one SGT6-5000F gas turbine, a SST-900 steam turbine, a SGen6-1000A generator, and one SGen6-100A generator)

Funding: Private

The Chinook Power Station is SaskPower's newest project for providing a stronger energy supply for the people of Saskatchewan. The 350 MW natural gas-fired power facility will be located on the outskirts of Swift Current in the province's southwest. The EPC contract was awarded in September of 2016. The project is expected to be completed by 2019.

73 Juan de Fuca Power Cable**\$665 million****2017 Rank:** 69**Location:** Victoria, British Columbia to Port Angeles, Washington**Owner:** Sea Breeze Power**Project/Construction Manager:** Sea Breeze Power and Boundless Energy JV

Financiers/Banks: Energy Investors Fund

Other: Aon (risk/insurance advisor to authority)

Funding: Private

This 550-MW electricity transmission line will be the first international power connection across the Strait of Juan de Fuca. The 50-kilometre line will link Vancouver Island with the Olympia Peninsula region in Washington State, 30 kilometres of which will be underwater. The bi-directional cable will increase speed and efficiency of transmission between Canada and the United States, an issue for certain types of fluctuating renewable energy, such as wind and solar. The cable will use state-of-the-art transmission technology and will improve reliability of the electricity supply with minimal environmental impact. All technical studies are complete and permits in place.

74 Grande Prairie Regional Hospital

\$647.5 million



2017 Rank: 71

Location: Grande Prairie, Alberta

Owner: Alberta Health Services

Project/Construction Manager: Graham (construction manager)

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

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

Supplier: Canam Group

Other: Aon (risk advisor/broker for preferred proponent); Armtec

Funding: Public

• **Provincial** Alberta Health Services: \$647.5 million

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. Work continues on the superstructure, which is about 60 per cent complete. The facility is expected to open in 2019.

75 Highway 427 Expansion Project

\$616 million



NEW

Location: Toronto, Ontario to Vaughan, Ontario

Owner: Government of Ontario

DBFM Team: LINK 427—Developer: ACS Infrastructure Canada Inc. and Brennan Infrastructures Inc. (a member of the Miller Group of Companies)

Construction: Dragados Canada Inc., Brennan Infrastructures Inc. and Bot Infrastructure Ltd.

Design: MMM Group Ltd. and Thurber Engineering Ltd.

Maintenance: ACS Infrastructure Canada Inc. and Brennan Infrastructures Inc.

Other: Golder Associates (preliminary foundation and pavement engineering services); INTECH (insurance advisor); Aon Risk Solutions

Legal: Torys (acted for lender)

Funding: P3
• **Provincial:** \$616 million

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 lanes highway sections, three interchanges, and median HOT lanes. Completion of the project is expected in 2021.

76 Gordon M. Shrum Generating Station Refurbishment

\$600 million



2017 Rank: 74

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

• **Provincial**
BC Hydro: \$600 million




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.

Two significant projects underway now are the Rip-rap upgrade and control system upgrade. Rip-rap is the large rock that protects the upstream face of the W.A.C. Bennett Dam from erosion by wind, waves and ice. The project is scheduled to run until 2020, the contractor is Peter Kiewit Infrastructure Inc. The control system on all 10 units at the dam's G.M.

Shrum Generating Station will be replaced and upgraded including the plant's central control room, adding over 900 alarm points. The governor controllers for units 6 to 10, that control the flow of water through the units, are also being replaced. There are several other components to this project which ultimately is scheduled for completion in fall 2022.

77 East-West Tie Transmission Project

\$600 million 

2017 Rank: 75

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

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

Contractor: Quanta Services Inc.

Environmental Services: Dillon Consulting Limited (environmental assessment)

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

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


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-kV transmission line, primarily paralleling an existing transmission line corridor. The new East-West Tie will which connects 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 of 2017, the Ontario Energy Board issued the Letter of Direction and Notice of Proceeding for the project. The targetted in-service date in 2020.

78 Bonnybrook Wastewater Treatment Plant D Expansion

\$600 million 

2017 Rank: 76

Location: Calgary, Alberta

Owner: City of Calgary

Project/Construction

Manager: Graham; Stantec

Consulting Architect: Stantec


Engineer: AECOM

Other: Hanscomb (owner's design stage cost consultant); Aon Risk Solutions (owner advisor and construction insurance broker); Jacobs; AECOM

Funding: Public

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 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.

79 Corner Brook Acute Care Hospital

\$588 million 

2017 Rank: 77

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, PCL Construction, and Marco Construction

Engineer: WSP (structural engineers, sustainability consultants)

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

Other: Hanscomb (functional programmer's cost consultant); WSP (helicopter planning); INTECH Risk Management

Funding: Public

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. The provincial government, in its 2017 budget, announced a commitment of \$13.2 million to the project to "allow for the engagement of professional service contracts, such as procurement, legal, and technical advisors, and engineering and architectural services for the Corner Brook Acute Care Hospital." Site preparation activities are underway, and this project has entered the design phase.

Financing

The exact project cost is not yet available, but the Government of Newfoundland and Labrador's 2014 budget includes \$588 million for its construction. In May 2015, Health Minister Steve Kent defended the money spent to date on the new Corner Brook hospital. Total costs may vary down the line, as was quoted on a local morning show saying "there's much more to come given the project is going to cost about \$800 million overall."



80 Southwest Rapid Transitway (Stage 2) and Pembina Highway Underpass Project

\$587.3 million 

2017 Rank: 87

Location: Winnipeg, Manitoba

Owner: City of Winnipeg

P3 Team: Plenary Roads Winnipeg (Plenary Group); PCL Construction (construction); Alberta Highway Services Ltd. (a division of Colas Canada Inc.)

Engineer: Dillon Consulting (owner's advocate); Landmark Planning & Design (public consultation); McGowan Russell Group (active transportation, station design, station areas, landscaping)

Other: Deloitte (financial); Hanscomb (engineer's cost consultant); LeighFisher (lenders technical advisor); Plenary Group (lead developer and equity provider, OM&R provider); Aon Risk Solutions (risk advisor/broker for preferred proponent); Hatch (design)

Legal: Blake, Cassels & Graydon LLP (counsel to owners)

Funding: P3

This project—previously listed as the Winnipeg Capital Integration Project—will be the City of Winnipeg's largest infrastructure project to date. It involves significant components in the southwest quadrant of the city, including completion of Stage 2 of the Southwest Transitway, the addition of active transportation infrastructure, and the renewal and expansion of the Pembina Underpass. Stage 2 will extend the transitway from the Pembina Highway and Jubilee Avenue south to the University of Manitoba. Completion of the project will represent a significant step forward in building the transportation network outlined in the city's transportation master plan and will help promote the increased densification of Winnipeg by facilitating the future development of several large-scale, infill, transit-oriented developments. Construction has started; with completion expected in late 2019. Operator training and facility commissioning will be carried out, with full operation expected to commence in April 2020.

81 Réno-Systèmes Program – Phase IV

\$582.5 million 

2017 Rank: 78

Location: Montreal, Quebec

Owner: STM

Engineer: SNC-Lavalin

Other: Englobe (quality management services)

Funding: Private

In the fall of 2014, the board of directors of Société de transport de Montréal (STM) announced that it would invest \$582.5 million in the replacement of metro stationary equipment in phase 4 of its Réno-Systèmes program. The program, still in the design phase according to the 2017-2027 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 called for a \$64.6 million investment in 2017, with over \$100 million to be spent on the project each year from 2018 to 2020.

82 Bowmanville Extension Project

\$550 million 

NEW

Location: Oshawa, Ontario to Bowmanville, Ontario

Owner: Metrolinx

Other: Amec Foster Wheeler and Stantec (technical advisory services)

Funding: Public

Announced in June of 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 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.

83 Annacis Island Wastewater Treatment Plant Expansion

\$550 million 

2017 Rank: 80

Location: Delta, British Columbia

Owner: Metro Vancouver

Construction Manager: Graham/Aecon Joint Venture

Engineer: Brown and Caldwell with Stantec, EIC Solutions, and Klohn Crippen Berger; Hatch (tunnel design)

Contractor: North American Construction; Kenaidan Contracting (computer control system and laboratory building); Hatch (construction management of the outfall)

Other: exp Services (vibration monitoring); JJM Construction and Geopac Inc. (prepare the ground and relocate utilities); Golder Associates (outfall design team); WSP (materials testing & engineering)

Legal: Norton Rose Fulbright (for Metro Vancouver)

Funding: Public
• **Municipal:** \$550 million

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 Annacis expansion is to be built in two phases, with the first phase to be finished in 2018 and the second stage in 2022. This project is Stage 4 of an eight-stage facility plan to be completed by 2036.

84 Metrolinx Light Rail Vehicles**\$528 million** **NEW****Location:** Toronto, Ontario**Owner:** Metrolinx**Engineer:** SNC-Lavalin**Vehicle Supplier:**

Alstom

Funding: Public• **Provincial:**
\$528 million

Metrolinx announced the purchase of 61 Citadis Spirit light rail vehicles from Alstom in May of 2017. The purchase provides Metrolinx with the flexibility to use the vehicles as needed across its current light rail transit projects, with 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** **2017 Rank:** 82**Location:** Toronto, Ontario**Owner:** TTC**Project/Construction Manager:** Bondfield Construction (construction management)**Engineer:** AECOM; Hatch; TTC**Contractor:** Dufferin Construction, a division of CRH Canada (contract for prep work)**Environmental Services:** WSP**Other:** KPMG (advisor for TTC Capital Program Delivery Review); Hanscomb (owner's cost consultant)

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

Funding: Public
• **Municipal** TTC:
\$506.4 million
(2015 Capital Budget)

TTC's Wilson Yard is undergoing a significant expansion of the rail yard 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. Site services and track bed preparation for Stage 1, the storage tracks, is almost complete, and installation of the tracks has begun. Preparation for Stage 2, the run-around tracks, has been awarded, and all other systems contracts have been tendered. Systems installation will follow each stage of track installation completion. The entire project is expected to be completed by 2019.

86 Tazi Twé Hydroelectric Project**\$500 million** **2017 Rank:** 83**Location:** Elizabeth Falls, Saskatchewan**Owner:** Black Lake First Nation in partnership with SaskPower**Project/Construction Manager:** SaskPower**Engineer:** KGS Group (engineering, design, and technical assessment)**Contractor:** Peter Kiewit Infrastructure (general contractor)**Environmental Services:**Golder Associates
(environmental impact assessment)**Funding:** Public• **Provincial** SaskPower:
\$500 million

The proponent has proposed the construction and operation of a 50 MW water-diversion-type electrical generating station at Elizabeth Falls. The proposed project would be located adjacent to the Fond du Lac River on the Black Lake Denesuline First Nation reserve land Chicken 224 between Black Lake and Middle Lake in northern Saskatchewan, approximately seven kilometres northeast of the community of Black Lake. It would involve the construction and operation of a water intake, a power tunnel, a powerhouse, a tail race, a submerged weir, a construction camp, a bridge, and access roads. In an EA decision statement in July 2015, the federal minister of the environment said the project was not likely to cause significant adverse environmental effects. The EA report states project construction would take approximately three years, from 2016 to 2019.

87 Regina Railyard Renewal Project**\$500 million** **2017 Rank:** 85**Location:** Regina, Saskatchewan**Owner:** City of Regina**Engineer:** WSP; Ground Engineering Consultants

Other: Urban Strategies; Urbanics Consultants; P3A Architecture; WSP (assessment, analysis, ESA)

Funding: Public/Private• **Municipal:** \$47 million• **Private:** \$450 million to \$500 million

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. The project is not expected to be completed until 2025.

88 Route 389 Improvement Program

\$468 million 

NEW

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

Owner: Government of Quebec

Engineer: SNC-Lavalin

Other: BPR / AXOR Experts-Conseils Consortium (planning and specifications north of Manic-5); Roche-TDA Consortium, in conjunction with Inspec-Sol (now GHD) (environmental assessment)

Funding: Public

This 570-kilometre long highway joins the city of Baie-Comwau in Quebec with the Newfoundland-Labrador border. The improvement program is aimed at creating a safer and more comfortable route for its users. A federal environmental assessment was conducted in early 2016 for the stretch of highway between Fire Lake and Fermont kilometre 478 to 564) in Quebec.

89 Hanlan Watermain Project

\$450 million 

2017 Rank: 89

Location: Mississauga, Ontario

Owner: Region of Peel

Contractor: McNally Construction Inc. (Contract 1, Lakeshore and Dixie Roads to Golden Orchard Drive); T2DMP (Contract 2, Dixie Road from Golden Orchard Drive to Eastgate Parkway); Southland Technicore Mole JV (Contract 3, Eastgate Parkway and Tomken and Cawthra Roads)

Engineer: Jacobs (detailed design consultant: South Assignment—Contracts 1 & 2); WSP (detailed design consultants: North Assignment—Contract 3); The Municipal Infrastructure Group; GM Blueplan Environmental Services; AECOM (environmental assessment)

Other: AECOM (preliminary design report); Arup (geotechnical engineering, tunnel design, pipeline and structural design support, engineering and construction phase services); EXP Services (instrumentation and monitoring); Revay and Associates (project management support services); WSP (consultant and geotechnical); Aon (risk advisor/broker for preferred proponent on their phases of the project); Golder Associates

Legal: Borden Ladner Gervais LLP (legal advisor)

Supplier: Hanson Pipe and Precast (concrete pressure pipe); DECAST Ltd. (concrete pressure pipe, precast chambers); CRH Canada, Dufferin Concrete, and Dufferin Aggregates (materials supply)

Funding: Public

• **Municipal**
Peel Region:
\$330 million;
York Region:
\$120 million

The Hanlan feedermain will run approximately 14.5 kilometres from the Lakeview Water Treatment Plant on Lake Ontario to the Hanlan Reservoir and Pumping Station at Tomken Road and Britannia Road East. Part of the same project, the 1,500-millimetre-wide Mississauga City Centre Subtransmission Main will run approximately six kilometres from the Hanlan pumping station to the intersection of Cawthra and Burnhamthorpe roads. As part of the York-Peel Water Agreement, Peel Region will provide water to York Region via the feedermain. In exchange, York Region will be funding 35.6 per cent of the feedermain costs. Both the feedermain and the subtransmission main are undergoing installation. Work on the Burnhamthorpe Water Project, part of the overall Hanlan Watermain Project, is underway. The entire project is scheduled for completion in 2019.

90 Côte-Vertu Station Underground Garage

\$440 million 

2017 Rank: 95

Location: Montreal, Quebec

Owner: STM

Contractor: Dragados

Project/Construction Manager: SNC-Lavalin

Engineer: Hatch (engineer consortium);

SNC-Lavalin (engineer consortium);

Stantec (engineer consortium)

Other: Englobe (Geotechnical and environmental field surveillance); WSP (geotechnical)

Funding: P3

• **Provincial:**
\$350.2 million

The new Cote-Vertu underground garage will double the capacity of the train storage available at the end of the Orange line in Montreal, 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.

91 Canadian Forces Base Esquimalt A and B Jetty Recapitalization Project

\$430.6 million 

2017 Rank: 90

Location: Constance Cove, British Columbia

Owner: Department of National Defence
Contractor: Scansa Construction (utility corridor)

Engineer: SNC-Lavalin (multiple services)

Other: Amec Foster Wheeler (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)

Funding:

Public

• **Federal**
Department of National Defence:
\$430.6 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. Phase 1 of the A/B Jetty project was completed in 2014. The design work is complete for Phases 2 and 3. Phase 2A, the B Jetty site preparation contract will take between two to three years to complete. The project is expected to be completed by 2024.

92 Saskatchewan Hospital North Battleford

\$407 million 

2017 Rank: 92

Location: North Battleford, Saskatchewan

Owner: Province of Saskatchewan and Prairie North Regional Health Authority

DBFM Team: Access Prairies Partnership—Graham; Carillion; Gracorp Capital Advisors LP; Carillion Private Finance Ltd.; Kasian Architecture Interior Design and Planning Ltd.; WSP; and Entuitive (structural engineer)

Engineer: Morrison Hershfield (civil engineering, sustainability consultant, energy modeling)

Financiers/Banks: National Bank Financial (consortium's financial advisor)

Management Consultants: Operis (financial model audit at bid submission and commercial close stages); EY

Other: Aon (risk/insurance advisor to authority); Ernst & Young (advising govt.); INTECH Risk Management (insurance advisor); Hatch (lenders' technical advisor)

Legal: Blake, Cassels & Graydon (counsel to successful proponent); Dentons Canada (legal advisor); Norton Rose Fulbright (for the Authority)

Supplier: Canam Group

Funding: P3

The new 284-bed Saskatchewan Hospital North Battleford will have 188 beds, replacing the existing 156-bed facility, and a 96-room secure unit for male and female offenders living with mental health issues. This is an innovative approach for delivering mental health care and supports two separate groups of people with significant psychiatric rehabilitation needs. Construction began in September 2015 and will be complete by spring 2018.

93 100-Series Highway Improvements

\$390 million 

NEW

Location: Nova Scotia

Owner: Government of Nova Scotia

Consulting Engineer: CBCL Limited Consulting Engineers (highway corridor study)

Other: MQO Research (consultation report)

Funding: Public

• **Provincial:** \$390 million

The Government of Nova Scotia had studied the cost of twinning the 100-series highway network, a total of just over 300 kilometres of highway. An initial report suggested that the cost would be close to \$2 billion, a number that forced the province to explore alternatives funding mechanisms for the project. Following a resounding rejection by the public of a recommendation to toll sections of the highway to pay for the cost of the project, the province instead decided to move forward with four smaller projects:

- Highway 101, Three Mile Plains to Falmouth, including the Windsor Causeway, 9.5 kilometres
- Highway 103, Tantallon to Hubbards, 22 kilometres
- Highway 104, Sutherlands River to Antigonish, including Barneys River, 38 kilometres
- construction of the four-lane, divided Burnside Connector (Highway 107) between Burnside to Bedford, 8.7 kilometres

The work is expected to be completed by the end of 2023.

94 Joseph Brant Hospital Redevelopment and Expansion Project

\$353.6 million 

2017 Rank: 93

Location: Burlington, Ontario

Owner: Joseph Brant Hospital

DBF Team: Integrated Team Solutions—EllisDon (developer, design-builder); Fengate Capital Management (financial advisor); and Parkin/Adamson Architects (architects JV)

Other: Aon (risk/insurance advisor to authority); Entuitive (building envelope consulting); Ernst & Young (advising govt.); EXP Services; Infrastructure Ontario (managing procurement and construction); INTECH (insurance advisor); Marshall & Murray (owner's design stage cost consultant); A.W. Hooker Associates (independent certification); WSP (geotechnical)

Legal: McCarthy Tétrault (lead counsel to IO and the hospital); Osler

Supplier: Entro (signage and wayfinding); Canam Group

Funding: P3

- **Provincial:** up to \$371.3 million
- **Municipal City** of Burlington: \$60 million
- **Private** Joseph Brant Hospital Foundation: \$60 million

This project involves the construction of a new seven-storey tower at Joseph Brant Hospital and a significant renovation in other areas of the hospital to give patients faster access to the right care. Through this expansion, patients will benefit from space for 172 additional beds in the new tower; additional beds in the intensive care unit; a modern emergency department; expanded diagnostic imaging services, which will provide capacity for an additional 23,745 exams per year; nine modern operating rooms and a post-anaesthetic care unit; an expanded cancer clinic; expanded ambulatory care programs; an expanded and modernized laboratory; and a renovated special care nursery. Construction of the new patient tower is scheduled for completion in the fall of 2017, with renovations to the existing hospital to be completed in the fall of 2018.

95 Vancouver Art Gallery

\$350 million 

2017 Rank: 96

Location: Vancouver, British Columbia

Owner: City of Vancouver

Architects: Herzog & de Meuron (design architect); Perkins + Will (executive architect)

Other: WSP (surveying)

Supplier: Canam Group

Funding:

- **Provincial:** \$50 million
- **Municipal:** \$300 million

The new Vancouver Art Gallery will be a purpose-built art museum that will significantly expand the public programming and education opportunities offered in the region. The new gallery will be built on two-thirds of the city's Larwill Park site, footsteps from the gallery's current home and nestled within Vancouver's vibrant culture and recreation scene. An official groundbreaking for the new gallery was expected for sometime in 2017, but as of press time, an official date had not yet been scheduled.

96 Université de Montréal Science Complex

\$348.3 million

2017 Rank: 97

Location: Montreal, Quebec

Owner: Université de Montréal

Contractor: EBC Inc.

Engineer: Bouthillette Parizeau Inc. (engineer consortium); PMA Engineering (engineer consortium); SNC-Lavalin (engineer consortium); SDK (civil and structural engineers)

Architects: MSDL; Lemay; NFOE

Environmental Services: WSP (environmental/acoustic)

Other: Englobe (QC and roofing inspection services)

Supplier: Canam Group

Funding:

• **Provincial:** \$145 million

• **Université de Montréal:** \$203.3 million

Located on the site of the former Outremont railway yard, the new science complex at the Université de Montréal will provide a home for 2,200 students in the fields of biological sciences, physics, chemistry, geography, and materials engineering. Financial contributions from the provincial and federal governments helped to cover costs associated with the decontamination of the site, which also includes five hectares for green space. The project is expected to be completed by 2019.

97 Dorval Interchange Road Construction

\$344.2 million

2017 Rank: 98

Location: Dorval, Quebec

Owner: Transports Québec

Other: WSP (detailed design); Golder Associates; SNC-Lavalin (engineering services); Englobe (quality control services); GHD

Funding:

• **Provincial:** \$344.2 million

The City of Dorval has announced that construction on two interchanges as part of the re-engineering of the Dorval Interchange has begun. The two overpasses will create direct links from Highway 20 to the Montreal-Pierre Elliott Trudeau International airport. The overpass should be finished by 2017 and the north side of the interchange should be completed by 2019.

98 Woodward Wastewater Treatment Plant

\$340 million

NEW

Location: Hamilton, Ontario

Owner: City of Toronto

Contractor: Maple/Ball JV, a joint venture between Maple Reinders and Ball Construction (Raw Sewage Pumping Station)

Funding:

• **Federal:** \$100 million

• **Provincial:** \$100 million

• **Municipal:** \$140 million

The Woodward Wastewater Treatment Plant project is one of several measures being implemented to address concerns over the quality of the water in Hamilton Harbour. This multi-stage project will have a direct impact on the health of the local environment, specifically the water quality in the harbour.

The over project includes:

- New Raw Sewage Pumping Station;
 - New energy centre/electrical upgrades;
 - The addition of a tertiary level of treatment;
 - New chlorine contact tank;
 - Upgrades to the Red Hill Creek outfall; and
 - Upgrades to the collection system.
- The entire project is scheduled for completion by the end of 2022.

99 South End Water Pollution Control Centre

\$335.6 million

2017 Rank: 99

Location: Winnipeg, Manitoba

Owner: City of Winnipeg

Engineer: Jacobs

Other: PCL Constructors Ltd. (site preparation works); Graham (clarifier and grit removal concrete)

Funding:

• **Federal:** \$53 million

• **Provincial:** \$234.81 million

• **Municipal:** \$45.79 million

The Government of Manitoba has issued the City of Winnipeg an Environment Act License requiring the treatment of nutrients (nitrogen (N) and Phosphorus (P)) among other requirements at the SEWPCC. The Implementation of Biological Nutrient Removal (BNR) will require a major plant upgrade and expansion. Also, the population within the SEWPCC service area is growing and will necessitate an effluent capacity upgrade. The project will address the BNR effluent quality limits and increased capacity requirements. In October of 2017, NAC Constructors was awarded a \$180-million contract to build, upgrade, modify, and reconfigure several elements of the project. The entire project is scheduled for completion in September of 2021.

100 Etobicoke General Hospital

\$330 million

2017 Rank: 100

Location: Etobicoke, Ontario

Owner: William Osler Health System

DBFM Team: Axiom Infrastructure Canada and DIF Infra 4 Canada Ltd. (developer); Walsh Canada (constructor); HDR Architecture Associates Inc. (architect); Brookfield Securities LP (financial advisor); Cofely Services Inc. (facility manager)

Financier: Brookfield Financial Securities LP

Architect: HDR Architecture Associates Inc.

Other: WSP (topographic survey and legal survey); Hanscomb (hospital's cost consultant); A.W. Hooker Associates (independent certification); GHD (environmental, geotech, and soils assessment services); EY (financial advisory services); INTECH (insurance advisor); EXP (testing & inspection); Aon Risk Solutions

Legal: Borden Ladner Gervais (owner's legal advisor); Osler
Supplier: PMX (owner's scheduling consultant); Canam Group

Funding:

• **Provincial:** \$330 million

Phase 1 of the Etobicoke General Hospital Patient Tower project will involve the construction of a new four-storey tower that will add approximately 250,000 square feet to the facility. The new tower will include a state-of-the-art emergency department, expanded ICU/CCU space, an ambulatory services unit, and a maternal newborn unit. The project is expected to be completed by 2018.



Imagine it. **Delivered.**

AECOM is honoured to have its projects represented in ReNew Canada's "2018 Top 100:

Canada's Biggest Infrastructure Projects." Our goal is to continue helping Canada's infrastructure industry into the future through innovative and award-winning expertise. It starts with an idea—that can be shaped to benefit the community. And we can deliver it to fruition.

We extend congratulations to all the companies and our clients on being recognized this year.



Question today *Imagine tomorrow* Create for the future

We must all hold ourselves accountable for tomorrow. For us, that means engineering innovative solutions to the challenges the future will bring. Can we design a place where our communities can thrive?

We think we can.

wsp.com