REGINA BYPASS PROJECT, SASKATCHEWAN

True Partnership Fosters Innovation, Builds Safer Prairie Highway for All

THE CANADIAN COUNCIL FOR PUBLIC-PRIVATE PARTNERSHIPS
2020 NATIONAL AWARDS CASE STUDY

The Canadian Council for Public-Private Partnerships

Le Conseil Canadien pour les Partenariats Public-Privé

The Canadian Council for Public-Private Partnerships 2020 National Award Case Studies

National Award Case Studies Gold Award for Infrastructure: Regina Bypass Project

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Introduction

For nearly 30 years, The Canadian Council for Public-Private Partnerships and its members from the public and private sectors have played a strong role in refining the P3 model and promoting new approaches to infrastructure development and service delivery.

Governments across Canada are using the public-private partnership (P3) model to build, maintain and operate much-needed infrastructure, from schools and hospitals to bridges and highways. In 2021, there are close to 300 active P3 projects in operation or under construction valued at more than $139.4 billion.

Along the way, the 'made-in-Canada' P3 model has become globally renowned but, as the winners of the 2020 National Awards for Innovation and Excellence in Public-Private Partnerships demonstrate, it has never stopped evolving.

This year, CCPPP is publishing three case studies on these exemplary projects, joining the more than 80 that have been published to date. Designed to inspire others to consider innovative and efficient models for procuring infrastructure, the studies highlight many of the lessons learned about P3s. Each case provides a close look at how a successful P3 has worked, including how the partnership was established, its structure and operation and its resulting benefits.

It is important to learn from these complex projects as we move forward. After all, investment in infrastructure is critical for the future of our communities and country because it creates jobs, drives growth, stimulates productivity, and builds a legacy for us to thrive.

Canadians want — and expect — critical infrastructure to be built quickly and with the best value for taxpayers. Using public-private partnerships is an advantage given their fixed price, on-time private sector delivery commitment, risk allocation and improved life cycle maintenance and operations.

In 1998, CCPPP established the National Awards for Innovation and Excellence in Public-Private Partnerships to honour governments and/or public institutions and their private sector partners who have demonstrated excellence and innovation in P3s. Gold, silver and bronze Awards of Merit are given in the areas of project development, financing, infrastructure, service delivery or other notable attributes to projects from across the country and at all levels of government.

Winning projects are chosen on the basis of the following criteria:

- Innovative features;
- Relevance or significance as a national and/or international model;
- Economic benefit (job creation, enhanced economic value, export potential, etc.);
- Measurable enhancement of quality and excellence of service or project;
- Appropriate allocation of risks, responsibilities and returns between partners; and
- Effective use of financing and/or use of non-traditional sources of revenue.

2020 Award Winners

Waterloo LRT ION Stage 1 — Gold Award for Service Delivery
This 19-kilometre LRT system, which opened in 2019, has already transformed travel in one of Canada's key high-tech startup scenes. The ION corridor in Ontario's Kitchener-Waterloo area passes through two historic downtowns, a university campus and business parks and is fully integrated into the region's bus network, cycling and pedestrian routes. Using the P3 model achieved estimated cost savings of 12 per cent compared with traditional procurement. The awards committee noted that for the first year and a half of service GrandLinq and the OM&R provider Keolis improved system performance and met operating and maintenance targets, despite the challenges of the COVID-19 pandemic. The project is also helping limit urban sprawl and protect farmland by intensifying development in existing urban areas.

Energy Services Acquisition Program (ESAP)/Energy Service Modernization (ESM) Project — Gold Award for Project Development

This ambitious $1.8-billion initiative is modernizing energy centres in five locations — some of which date back almost a century — to provide heating and/or cooling for 80 buildings in the nation's capital, including Parliament. The upgrades will lower operating costs for taxpayers and help reduce the Canadian government's energy consumption and greenhouse gas emissions. This design-build-finance-operate P3 is set to reach substantial completion in 2025, followed by 30 years of operations and maintenance. The awards committee noted the project is complex because it involves the private sector mitigating risks from federal and interprovincial brownfield construction, six years of interim operations during construction, as well as factoring in protections for heritage assets. It also has built in flexibility to potentially expand the modernized district energy system to other public and private buildings in the region.

Regina Bypass — Gold Award for Infrastructure

Opened in 2019 after four years of construction, the Regina Bypass is the largest transportation infrastructure project in Saskatchewan history and its single largest job creator. Improving traffic safety and mobility were the key drivers for the project, the awards committee noted. Previously, residents and visitors to the communities east of Regina had to cross the Trans-Canada Highway on non-signalized at-grade intersections, potentially in inclement weather with poor visibility. Since the bypass was completed, there has been a marked reduction in collisions. The $1.88-billion project involved building 12 interchanges, 60 kilometres of four-lane highway, 55 kilometres of new service roads, twinning on Highway 6, as well as the province's first highway roundabouts.

Corner Brook Acute Care Hospital — Silver Award for Project Development

The project involves the development of a new 164 bed acute care regional hospital to serve the people of western Newfoundland. The project is the largest capital project ever contemplated in Newfoundland and Labrador and faces the challenge of being constructed in a lightly populated area. Using the P3 model for the project is estimated to have resulted in cost savings of $90 million compared with traditional procurement. The awards committee noted the project is using technology to find innovative design, operational and environmental solutions to help in the delivery of care, as well as in reducing long-term operational costs and the site's carbon footprint.

Highway 104 Sutherlands River to Antigonish Twinning Project — Silver Award for Project Development

The twinning of this stretch of Nova Scotian highway, from the boundary with New Brunswick to Antigonish, has been a significant community concern for years to help reduce fatal collisions. It is also the first highway P3 project in the province in more than 20 years and was one of the first P3 projects to reach financial close last spring in the midst of highly volatile financial market conditions caused by the pandemic. Among other things, the awards committee noted that considerable cooperation and flexibility were required by all parties including government, bank lenders and bond underwriters/purchasers to close the project — and with no impact on overall project duration.

Acknowledgements

CCPPP has a team of dedicated Award selection committee volunteers who review the applications, select the winners and provide feedback on the case studies. Using their extensive P3 knowledge and experience, they select the winners from a pool of very qualified applications and then ensure the case studies provide a learning tool for seasoned practitioners, as well as those new to the P3 model. The following panelists comprised the 2020 selection committee:

- Cliff Inskip, Chair of the Awards Selection Committee and President, Polar Star Advisory Services Inc.
- Shariq Alvi, Managing Director, Infrastructure and Project Finance, CIBC
- Rupesh Amin, Founder and CEO, Conquora Capital Partners Inc.
- Peter Hepburn, Managing Director and Head, Infrastructure and Project Finance, National Bank Financial Markets
- Alain Massicotte, Partner, Blake Cassels and Graydon LLP
- Johanne Mullen, Partner, National Capital Projects and Infrastructure Leader, PwC Canada
- Dr. Alan Russell, Professor Emeritus & Chair, Computer Integrated Design & Construction, Department of Civil Engineering, University of British Columbia
- Brad Nicpon, Partner, Real Property & Planning Group, McCarthy Tétrault LLP
- Lindsay Wright, Senior Manager, Global Infrastructure, KPMG

Deborah Reid and Jennifer Robinson authored the 2020 Award Case Studies, which were developed with significant input and review from the project partners and procurement agencies as well as the diligent work of the researchers. CCPPP would like to thank them for their contributions as well as Infrastructure Canada for its research support for the case studies.

Infrastructure Canada

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About CCPPP

Established in 1993, CCPPP is a national not-for-profit non-partisan, member-based organization with broad representation from across the public and private sectors. Our mission is to collaborate with all levels of government, Indigenous communities and the private sector to enable smart, innovative and sustainable approaches to developing and maintaining infrastructure that achieve the best outcomes for Canadians.

Our reports, case studies, guidance and surveys are available on CCPPP's online bookstore at www.pppcouncil.ca/web/bookstore.

Additional resources include: P3 Spectrum (www.p3spectrum.ca), Canada's premier source for up-to-date P3 project info.

Quick Facts – Regina Bypass Project[1]

Project type

Design-Build-Finance-Operate-Maintain (DBFOM)

Asset/Service

34-year performance and availability agreement for a 61 kilometre four-lane highway with:

- 37 km of new highway;
- 24 km of upgraded existing highway;
- 12 interchanges;
- 33 structures (including four water crossings and 21 bridges at interchanges);
- seven rail crossings;
- eight intersections; and
- 55 km of new service roads

Construction period:

- 4 years

Operations and maintenance (O&M) period:

- 30 years

Status

Operational as of October 2019

Partners

Public Sector

- Government of Saskatchewan (represented by Saskatchewan Ministry of Highways)

Private Sector

- Regina Bypass Partners comprised of:
  - VINCI Concessions S.A.S,
  - Graham Capital LP,
  - Parsons Enterprises Inc.,
  - Carmacks Enterprises Ltd.,
  - VINCI Construction Terrassement,
  - Graham Infrastructure LP, and
  - Parsons Canada Ltd.

Other participants

Public Sector

- SaskBuilds[2] – Procurement Advisor
- Associated Engineering (Sask) Ltd. – Owner's Engineer
- Ernst & Young – Financial Advisor
- P1 Consulting – Fairness Advisor
- Aird & Berlis LLP – Legal Advisor

Private Sector

- VINCI Infrastructure Canada – Consortium Lead/Project Co., Equity Provider, Design-Build Lead, Operations, Maintenance & Rehabilitation (OMR)
- Carmacks Enterprises Ltd. – Design-Build Lead, Operations & Maintenance
- Graham Capital Partners LP – Consortium Lead/Project Co., Equity Provider, Design-Build Lead, Rehabilitation
- Broda Group – Major Subcontractor
- National Bank Financial – Financial Advisor
- Torys LLP – Legal Advisor

Project cost, financing and Value for Money (VfM)

*Total project cost (present value dollars at July **29, 2015** with discount rate of **3.1%**)*

- $1.88 billion NPV[3]

Debt and Equity (nominal dollars)

- $648 million: revolving senior construction facility and senior rehabilitation facility
- $629 million: rated long-term amortizing bonds and long-term bullet bonds

[1] Background and facts in this case study rely on the information contained in the award application submitted jointly by the project partners in September 2020 to The Canadian Council for Public-Private Partnerships. Information from the submission has been supplemented and updated with information from the procurement documents, the project agreement, the project report, other sources as noted and personal interviews with project partner representatives.

[2] On Nov. 9, 2020, the Government of Saskatchewan merged responsibilities of the former Ministry of Central Services and SaskBuilds to create the current Ministry of SaskBuilds and Procurement to oversee a new approach to the management of all infrastructure projects and assets, standardized government procurement and IT infrastructure. Source: http://www.saskbuilds.ca/about-us/ Accessed Feb 1, 2021.

[3] Net present value (NPV) calculated on financial close date of July 29, 2015 with escalation assumption of 2.0% CPI and discount rate of 3.1% (Source: SaskBuilds & Government of Saskatchewan, Regina Bypass Project Public-Private Partnership Value for Money Assessment Report, November 2015).

- Equity:
  - Graham Capital LP – 37.5 per cent
  - VINCI Concessions S.A.S. – 37.5 per cent
  - Parsons Enterprises Inc. – 25 per cent

Payments (nominal dollars)

- Phase 1 substantial completion payment of $103.5 million
- Phase 2 substantial completion payment of $507.4 million
- Interim O&M service payments
- Monthly availability payments

Government Contributions (nominal dollars)

- $200 million toward capital costs – Government of Canada (P3 Canada Fund)
- $1.178 billion – Government of Saskatchewan

*Value for money (present value dollars at July **29, 2015** with discount rate of **3.1%**)*

- $379.9 million (16.8 per cent)

Project highlights and innovative features

- The Regina Bypass is the largest transportation infrastructure project in Saskatchewan and the first transportation infrastructure project undertaken by the province to use the P3 delivery model.
- It is an important contributor to the continued economic growth in the province providing trucking connections to major highway networks and facilitating access to import/export destinations.
- It has improved the City of Regina's traffic mobility by reducing congestion on main routes, and increasing traffic safety around the city.
- The design incorporates two roundabouts, a new concept to Saskatchewan highways, offering the benefit of higher intersection capacity, fewer stops, shorter delays and a general increase in user safety.
- It also incorporates a number of firsts for Canadian P3 projects: the first diverging-diamond interchange; the first use of a utilities cash allowance; and the first use of side-by-side amortizing and bullet bonds.
- Improving safety, a major project goal, has been achieved: since opening, the number of collisions has reduced significantly, with none requiring the use of hydraulic rescue tools.
- The project was the single largest job creator in Saskatchewan's history with more than 100 local companies participating in the construction phase and 80 per cent of salaries allocated to Saskatchewan residents during construction.

Project websites

https://www.reginabypass.ca

https://www.saskatchewan.ca/residents/transportation/regina-bypass-project

http://www.saskbuilds.ca/projects/Regina%20Bypass%20Project.html

Overview

Saskatchewan is in the heart of the Prairies. It is the world's largest potash producer[4], the world's largest lentil exporter and Canada's second largest oil producer. About two-thirds of what it produces it ships around the world, making its economy heavily reliant on an efficient transportation and logistics network.

As early as the 1990s, Saskatchewan's highway system was showing it was insufficient to meet current and future capacity requirements. Growth in the province's population and economic activity in the resources sector were increasing pressure on the provincial transportation system. An extensive needs assessment undertaken by the Ministry of Highways (the Ministry)[5] concluded a highway bypass around the capital city of Regina was the answer. It would reduce congestion, improve safety and decrease travel time for shippers, carriers and the travelling public. It would also contribute to sustainable development by lowering emissions from traffic congestion.

Work began to define the highway bypass project in the early 2000s. Safety concerns were a key driver as there were no controlled interchanges to access the Trans-Canada Highway (Highway 1) east of Regina. Vehicles used at-grade stop-controlled intersections, which were becoming dangerous as traffic volumes increased. There was an average of 100 collisions each year, some resulting in fatalities. The toll of fatalities was keenly felt by families and industrial and commercial developers alike. This problem was exacerbated by the continued and projected deterioration of the existing highway infrastructure.

Supporting efficient economic activity was also important to take advantage of Regina's strategic location at the top and centre of a T-shaped North American transportation network. This network provides truck and rail access to all major Canadian ports, Gulf Coast ports and midwestern U.S. transshipment points, and trucking connections to major networks though highway systems and import/export destinations such as Minneapolis/St. Paul, Chicago and Mexico.

In May 2014, after more than a decade of detailed planning and broad public consultation, the Government of Saskatchewan announced it would build the Regina Bypass using a design-build-finance-operate-maintain (DBFOM) public-private partnership (P3) delivery model.

By using this approach, the project was completed on time and within budget six years sooner than it would have been using a traditional design-bid-build (DBB) delivery model and saved Saskatchewan taxpayers an estimated $379.9 million NPV over the project lifetime. In addition, at construction completion, the project had no claims and a near flawless safety record.

The Regina Bypass Project won gold for infrastructure in the 2020 National Awards for Innovation and Excellence in Public-Private Partnerships, presented by The Canadian Council for Public-Private Partnerships.

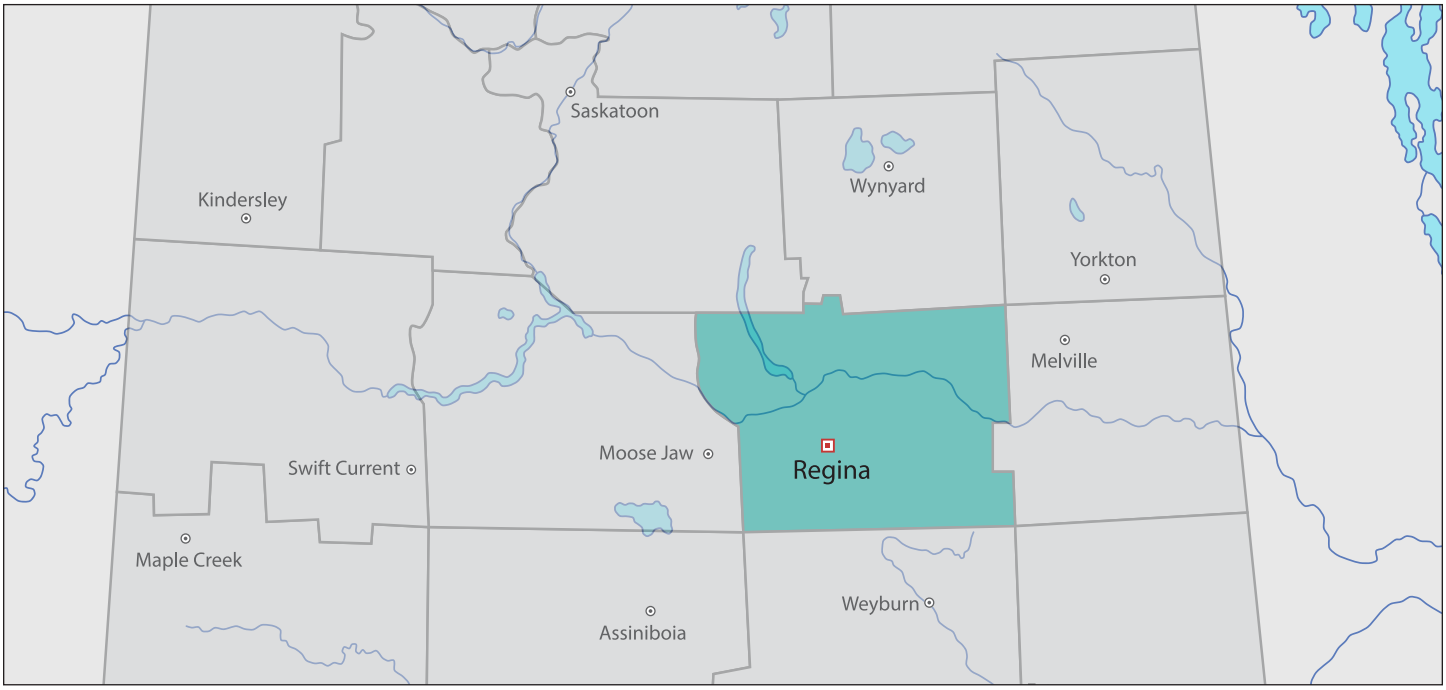
Originally planned as three separate projects, the $1.88-billion DBFOM project involved building 12 interchanges, 61 kilometres of four-lane highway, 55 kilometres of new service roads and twinning on Highway 6. It boasts the province's first highway roundabouts, Canada's second diverging-diamond interchange and a unique cash allowance regime to manage utility relocation risk.

The project opened to traffic in October 2019. One of its distinguishing features was its partnering approach. The "One Project. One Team." motto inspired every team member to take pride of ownership and made participation on the project a career-defining moment for many.

[4] https://www.saskatchewan.ca/business/investment-and-economic-development (Accessed March 8, 2021).

[5] The mission of the Saskatchewan Ministry of Highways is to optimize the role of transportation as it relates to the economic and social development of Saskatchewan.

Figure 1: Regina Bypass location



Description of the Project

Government objectives

The Government of Saskatchewan had several economic, social and procurement objectives for the project:

- Align infrastructure capacity with population growth expectations;
- Facilitate economic growth in the Regina and southern Saskatchewan region;
- Improve safety;
- Promote a livable community;
- Complete the Phase 1 works and Phase 2 works by the specified dates; and
- Achieve value for money.

Phasing

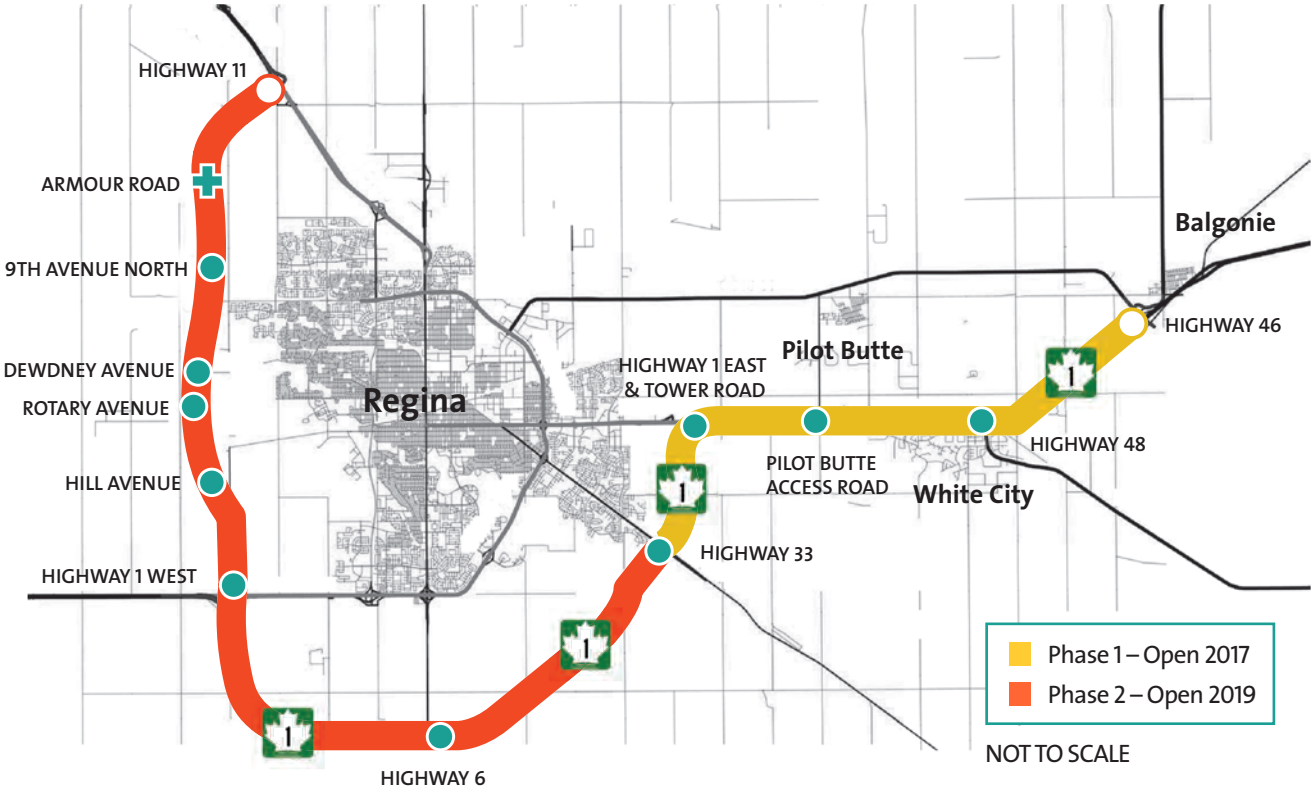
Construction took place in two phases: the first, from Balgonie to Highway 33, and the second, from Highway 33 to Highway 11. The existing stretch of Highway 1 to be upgraded (from Balgonie to the Highway 1 East and Tower Road interchange) had to remain available for travellers during construction so it made sense to have Regina Bypass Partners operate and maintain this stretch during construction. An interim O&M payment regime was developed for this section during the construction period.

To move traffic safely during construction, a new south service road near Pilot Butte was completed early in Phase 1 to provide an alternate route for travellers coming into the city from the east. Other safety measures were put in place to manage a large and busy work zone during the Highway 1 rehabilitation:

- Simplified signs, including variable message signs, to provide real-time information such as road conditions and construction zone information;
- Signs with impactful messages reminding drivers to slow down in the construction zone;
- High definition and reflective pavement markings to lead drivers through medians, turning lanes and acceleration lanes; and
- Increased enforcement.

Phase 1 was completed in fall 2017 and Phase 2 in fall 2019.

Figure 2: Project components and phases



Design

Regina Bypass Partners, the successful proponent, developed several unique infrastructure design features that benefitted the project and provided improvements to traffic flow, route continuity, safety and constructability phasing.

Roundabouts (Phase 1)

The Ministry's initial design had one roundabout in the entire project located at the north end of the bridge at the Highway 46 interchange at Balgonie. However, Regina Bypass Partners proposed a modification that would add a second roundabout at the south end of the same bridge. The new design modified ramps to meet at a roundabout instead of a stop-controlled intersection. This improved traffic flow at an intersection with high volumes of left turns at peak hours.

This change allowed the existing at-grade interchange to remain open during construction of the bridge, reducing traffic management issues. The addition of the second roundabout on the south side improved the overall safety of the interchange.

First highway roundabouts in Saskatchewan

Lane realignment and structural enhancements (Phase 2)

Variations were made to the Ministry's initial design of the Highway 1 West interchange to enhance traffic flow and improve structural elements. Northbound lanes were realigned and the lengths of two bridges were reduced so they only had to cross one carriageway instead of two.

Structural enhancements were also made by adding post-tensioned pier caps for Bridge 17 at the same interchange. Bridge 17 was to span Highway 1, but also needed to travel under the access ramps of Bridges 18, 19 and 20. Post tensioning of the pier caps enabled lower embankment approaches and reduced the overall height of the bridge because it allowed for the girders to pass directly through the pier caps within the bridge clearance envelope.

These design concepts:

- Improved route continuity from Highway 1 East to Highway 1 West;
- Improved safety as through-traffic flows do not need to change lanes to stay on the primary route;
- Enhanced constructability and phasing because of the need to span only one active carriageway; and
- Improved traffic safety during construction because of limited construction on or around live traffic lanes.

Drainage system

Regina is in the heart of the Prairies where the topography is flat. While the horizontal alignment of the bypass was relatively fixed due to space constraints, there was room to provide value engineering to the vertical alignment to benefit drainage. Regina Bypass Partners spent a significant amount of time through the procurement stage calculating the optimum elevation of the bypass to ensure drainage flowed naturally to the nearby creeks without disturbing the existing natural drainage paths. This optimum height was just over one metre.

The natural "downhill" drainage approach was then aided with the installation of equalizer culverts and ditches. The equalizer culverts were installed a minimum of every 800 metres to ensure runoff from the bypass and neighbouring properties did not overload one side of the bypass or the other. The large three-metre-wide ditches then acted to manage major weather events, taking advantage of evaporation.

Integral monolithic bridge structures and hybrid piles

Most of the bridges in the project were designed as integral bridges with monolithic superstructure/substructure connections at piers and abutments to reduce construction complexity, facilitate a shorter construction schedule and simplify maintenance.

These modern frame structures shortened the effective bridge length and avoided maintenance-intensive bridge components such as bearings and expansion joints. A characteristic feature of the integral bridge concept employed by Regina Bypass Partners was the closed abutment that used mechanically stabilized earth (MSE) walls rather than traditional head slopes.

The foundations of the integral bridges used hybrid piles at the abutments. The hybrid pile consisted of a concrete drilled shaft below ground level and a steel H-pile, which was embedded into the concrete drilled shaft. The hybrid pile concept combined the advantages of concrete drilled shafts and steel H-piles.

Compared to a solution that only uses driven steel piles, the concrete drilled shafts significantly improved geotechnical pile resistance and fewer piles were required. This ensured the full steel-pile capacity was used without compromising the pile's integrity.

Construction

Earthworks & 24/7 construction operations

The earthworks were a major scope of work with 14 million cubic metres of earth to be moved, mainly from "borrow" or sand and gravel pits. This was also one of the highest risk scopes of work because of the ground conditions (flat topography and swelling Regina clay) and the weather (spring and summer thunderstorms that cause water ponding and extremely cold winters that generally preclude earthwork).

To meet these challenges, Regina Bypass Partners included an experienced local earthworks subcontractor on its team. This local knowledge enabled earthworks to be conducted 24/7 through the harsh winters to support excavating and placing material before it froze using specialized techniques:

- Till was mined from deep borrow pits and the face was kept live to prevent it from freezing, often working in temperatures below -30 C.
- The initial embankment was constructed in the low-lying swampy areas of the project while the ground was frozen allowing the haul trucks to traverse the terrain without sinking into the soft ground.
- Boxes in the haul trucks were heated by diverting vehicle exhaust through portions of the dump boxes.
- Short hauls were used rather than longer hauls.
- Material was sourced and placed rapidly with the help of local knowledge and experience: for example the local

Deep borrow pit

24/7 construction

Concrete costs

Concrete was a key cost driver of the project with approximately 20,000 m3 needed. When bid costs for high-performance concrete mixes varied significantly from those for other grades of concrete, Regina Bypass Partners worked with two local concrete suppliers to identify the causes. The local suppliers advised that the higher costs were driven by extremely onerous temperature requirements that caused bidders to add costs for ice in the concrete batching, and more significantly, to include a 50 per cent waste factor for concrete that did not meet the high-performance specification.

Working closely with the local concrete suppliers and the Ministry's team, Regina Bypass Partners was able to significantly mitigate the additional costs, which in turn enabled the suppliers to change the mix design, eliminating most of the forecast waste and reducing the cost, but not the quality, of high-performance concrete by hundreds of dollars per cubic metre.

Schedule

Active dialogue between the proponents and the Ministry during the procurement stage was fundamental in enabling the development of a robust construction schedule. The Ministry viewed the schedule as a shared responsibility, and it did its part to ensure its activities and/or decisions did not cause disruptions.

Project delivery began within weeks of financial close. This was aided by keeping the same leadership and team members in place from the bid stage to construction stage, so procurement knowledge was transferred effectively.

Familiarizing new employees and subcontractors with the "One Project. One Team." approach, as elaborated upon further on in the Communications section, contributed to high productivity early on. It was also important in developing the strong culture for health and safety, environment and quality control.

As construction progressed, maintaining adherence to the schedule was critical. One master project schedule existed on the project and it was visible to all team members at all times so everyone knew their task and area of accountability. Other standard planning tools were used, including daily plans and weekly task schedules, all aligned with the master schedule.

Additional strategies used to keep the schedule on track included:

- Constructability reviews – Through the technical work group meetings the construction project managers for each scope provided their constructability comments as the design progressed. This eliminated re-work and streamlined the detailed design process.
- Regular utility meetings – The project scope for the utility companies was outside of their normal business activities. By engaging early and frequently the team was able to assist the utility companies in planning for the needed diversions. This included some companies setting up dedicated teams and augmenting their own internal governance to fast-track approvals.
- Specialized crews – Specialty crews were assembled for specific activities. For example, there were specialized bridge crews, paving crews and earthworks crews that moved from site to site allowing for continual improvement and ensuring high productivity as the project progressed.

Environmental management

The project alignment transected 55 wetlands and four major

waterways, including creeks and associated tributaries. There were nine regulatory agencies involved at the federal, provincial and local levels of government and the project was subject to 10 federal and eight provincial statutes.

A number of activities were undertaken to mitigate the project's environmental impacts. For example, many migratory bird nests were identified and avoided to allow the birds to raise their young successfully. Most notably, a great horned owl nest was identified, and setbacks were respected that enabled the two owlets to successfully leave the nest.

A large portion of the project was built directly over the Regina Aquifer. Design of the bridge foundations had to consider the location and depth of the aquifer. Procedures were developed to prevent any impact during construction. Water-well levels within 100 metres of the project limits were monitored for any construction impact.

The successful resolution of environmental challenges was, in part, due to the Integrated Management System (IMS), which used a cloud-based asset management tracking system to identify and track environmental non-conformances so they could be promptly addressed.

Innovative Features

Customized procurement process

The Ministry took a novel approach to its public-private partnership model by considering it an adaptable document with flexibility to ensure the model fit the project, not the other way around.

Using Infrastructure Ontario's procurement model as a base, the Ministry added two features, practiced by Infrastructure BC[6] and Alberta. These were commercially confidential meetings (CCMs) and a much earlier due date for technical submissions than financial submissions.

CCMs are known for driving innovation. Proponents are encouraged to raise issues and innovations as they are being developed. Several features built into the project resulted from CCM discussions, including the second roundabout at the Highway 46 interchange near Balgonie and the utility cash allowance.

The Ministry and SaskBuilds also understood the best value would be gained if proponents were encouraged to value engineer the reference concept within the confines of project constraints and goals. Equally important, is that proponents would only include value engineering and alterations if they had a degree of certainty their innovations would be acceptable.

In this regard, technical plans submitted before financial plans allowed for both parties to benefit. The Ministry and its advisors were able to confirm compliance of any value engineering and innovation proposals with technical project requirements. Proponents then had the time to adjust their financial submissions for any cost implications resulting from their technical plan review.

Utilities cash allowance

Another example of how the P3 model was adjusted to best fit the project scope centred on the utility scope. While less than 10 per cent of the project scope by value, there were more than 400 utility conflicts, a source of considerable risk. These included federally regulated pipelines, provincially regulated electrical transmission lines and critical fibre optics. Some of the pipeline relocations required National Energy Board (NEB) approval, which can take a significant amount of time.

The allocation of utility risk was significant given the limited availability of information during the procurement stage and the restricted access to utility owners. During the procurement phase, the Ministry and SaskBuilds coordinated a general meeting for all proponents with utility stakeholders, however this was not confidential, so proponents were unable to discuss proprietary design and construction ideas.

The draft project agreement initially placed the burden of coordinating utility relocations on the private sector partner. Through the CCM process, it became evident this risk could grossly impact value for money and was better managed as a shared risk.

The Ministry and SaskBuilds, with the input of proponents, crafted a cash allowance regime to share the risk and promote collaboration between the successful proponent and the Ministry. The Ministry and SaskBuilds also extended the project schedule by three months to allow more time to complete the critical utility crossings/relocations. These two alterations significantly improved value for money on the project. This was also the first time a cash allowance was used to manage utility risk on a public-private partnership in Canada.

[6] Formerly Partnerships BC.

At the start of the design and construction phase, an initial cash allowance was set aside to cover the costs of managing utility conflicts. If the actual costs exceeded the cash allowance, the Ministry and Regina Bypass Partners would share the excess costs equally. However, if at the end of the design and construction phase the full amount set aside for the cash allowance was unused, then the Ministry was entitled to receive a financial credit for the unused amount.[7]

The benefit of these modifications was demonstrated in three ways. First, the project was delivered on time with no extensions or variations. Second, Regina Bypass Partners was successful in working directly with utility companies to complete 99 per cent of the work on time. When a roadblock was encountered with one utility in particular, the matter was escalated to the Deputy Minister of Highways who spoke directly to the CEO of the company in question. The issue was resolved, and work was back on schedule.

This type of problem escalation was exceptional, but it made the difference when all else failed as both the team and the Ministry were fully aligned in their goals for the project to get the project done on time at the fixed cost.

And third, there were excess funds in the utilities cash allowance at the end of the construction period and they went back to the Ministry of Highways, and ultimately to the Saskatchewan taxpayer.

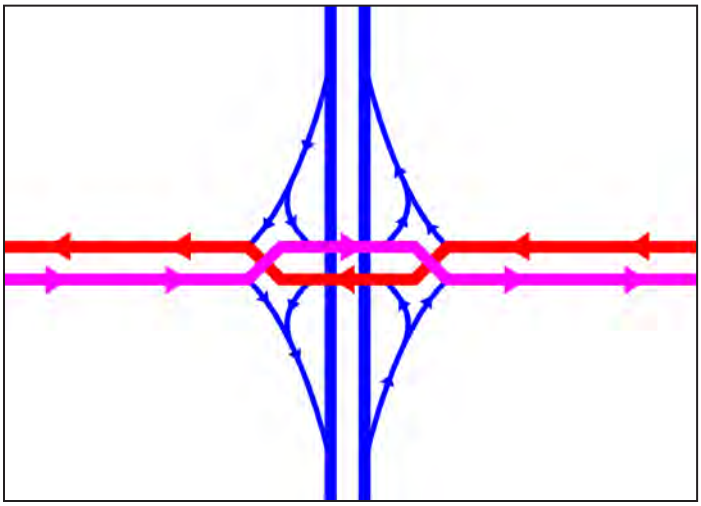
Diverging-diamond interchange

The Ministry included a diverging-diamond interchange at the Pilot Butte Access Road interchange as part of the Highway 1 upgrades. This is a first in a Canadian P3 project, and only the second diverging-diamond interchange to be opened in the country after Calgary's in 2017.[8]

In operation, a diverging-diamond interchange improves traffic flow and driver safety by reducing conflict points (opportunities for vehicles to collide). Traffic is shifted from the right side of the road to the left side between the interchange ramps. This means left-turning traffic does not cross paths with oncoming traffic, so the chance for collision is reduced. Once left-turn intersections are cleared, traffic is brought back to the right side of the road.

This interchange supported commuters travelling from Emerald Park/White City to Regina and was one of the most challenging elements to construct due to the restricted right-of-way and the location of the new overpass on top of the existing at-grade intersection and approach roads. The construction methodology required the temporary closure of the existing intersection, with traffic rerouted during construction. This minimized traffic delays and enhanced the safety of the construction zone as there was no turning traffic in the vicinity and no need to address at-grade sightline issues or other construction obstructions.

Figure 3: Traffic flow in a diverging-diamond interchange



Pavement and rehabilitation techniques

After analyzing design options for the pavement structure, Regina Bypass Partners determined it was preferable to build a long-life structure for both the new and upgraded portions of the project. To do this, two innovative techniques were used.

First, a proprietary high-specification pavement mix was developed by adding a polymer giving the pavement greater flexibility and movement to avoid cracking. This was important given the clay subgrade and climate conditions in the area. It also contributed to lower maintenance costs as the number of overlays needed in the long term will be fewer than with a typical pavement mix.

[7] SaskBuilds & Government of Saskatchewan, Regina Bypass Project Public-Private Partnership Value for Money Assessment Report, November 2015, p. 16.

[8] Canada's first diverging-diamond interchange was opened in August 2017 in the City of Calgary (Global News, August 13, 2017, https://globalnews.ca/video/3667179/canadas-first-diverging-diamond-interchange-now-open-to-traffic)

Diverging-diamond interchange at Pilot Butte Access Road interchange

Second, in contrast with typical practice, Regina Bypass Partners decided to use a full-depth-rehabilitation construction technique on the section of Highway 1 to be upgraded. The existing pavement was completely removed and replaced with the project's proprietary pavement making it consistent with the high specifications of the rest of the bypass and reducing maintenance interventions over the project term.

Cut/fill balance – highway embankments

In typical highway construction, excavated material from grading operations is reused to construct embankments to form a smooth roadway. These embankments are elevated above the surrounding terrain for drainage purposes and are usually built with side slopes of 3:1 or 4:1. However, the bypass route included a large percentage of excavated Regina clay. This type of material swells under wet conditions, has a typical California Bearing Ratio (CBR) of 2.5 (extremely weak) and requires a 5:1 or 6:1 slope if used for highway embankments. Steeper embankment slopes composed of this clay risk slope failure.

Given the presence of the Regina clay, Regina Bypass Partners took a more creative approach by designing a till-capped embankment. Typical road construction uses the weakest and lowest cost material (earth) at the bottom of an embankment and the strongest highest cost material (asphalt concrete) at the top. The design used for the bypass used the weaker material (Regina clay) in the core of the embankment in taller fill sections and the better-quality material (till) from the borrow pits to encapsulate or surround the core. More like icing on all sides of a cake, not just the top.

In this way, the cut/fill balance or the amount of material that needed to be moved was improved and the clay, that would otherwise have been wasted, was reused. In addition, the risk associated with swelling Regina clay impacting the pavement structure or causing slope failure was minimized because it was confined by the till, granular and asphalt concrete layers that prevent it from swelling under wet conditions.

Safety

Safety was, and continues to be, a primary focus on the project. Innovative measures to keep the public and workers safe were incorporated in many ways through site security, infrastructure design elements, and other tools and practices:

- **Safety coins**: Safety coins were issued to all team members to commemorate significant health and safety milestones. For instance, coins were issued when the project achieved two million hours of zero lost-time injuries. Employees were encouraged to keep them with them to provide a constant reminder of the importance of safety. Collecting them also promoted health and safety conversations among team members. This was so successful the Ministry adopted it as part of its own safety program.

- "Finish Strong" campaign: In a large construction project, the majority of accidents occur as deadlines for construction milestones near. To counteract this, Regina Bypass Partners introduced a pause in work in advance of completing each milestone to reassess and remind workers of the hazards related to their work. One such pause included displaying a banner with a safety message stretched across one of the bridges.
- Adopting innovative safety procedures on the spot: In January 2019, while roadbeds were frozen, the project was in the middle of a massive aggregate haul to position gravel for summer construction. There were several minor safety incidents in a two- to three-day period, which all had the potential to be more serious. Regina Bypass Partners called a stop to the operation, idling more than 150 trucks, to investigate the root cause of the incidents and revise safety procedures. The outcome was to adopt a side-dump rather than end-dump method for gravel hauling because it was safer. With the new procedures in place, the gravel haul continued without incident.
- Monthly mass safety meeting: One morning each month work was stopped for approximately 30 minutes and everyone on the project met to discuss safety. Meetings were held outside at construction zones at 6:30 a.m. As the number of workers increased, the number of meetings increased to one for each of the three work areas, held on consecutive days. The leadership from both partners attended every meeting. At the peak of construction, there were 200 to 300 workers at each meeting, standing outside with their coffees discussing project safety.
- Yearly full day stand down: The project was shut down for one full day each year to bring the delivery team together to discuss safety. The meeting was held at a conference centre in Regina and everyone on the project attended, including site workers and subcontractors. All workers were paid by Regina Bypass Partners for the day. The agenda was tailored to be engaging, interactive and impactful with guest speakers, supplier expos showing personal protective safety equipment, and activities such as participation in filming to support safety standards.

Procurement Process

Selecting the P3 model

SaskBuilds managed the procurement process on behalf of the Ministry and was responsible for determining the best value procurement model for the project based on the government's objectives. Infrastructure Ontario's model was used as the base, then best practices and lessons learned from the experience of other provinces were incorporated to form a P3 procurement model unique to Saskatchewan.

Monthly mass meeting of project team

After assessing qualitative criteria such as timelines, long-term safety, quality of maintenance and availability, cost certainty, schedule certainty and risk allocation the design-build-finance-operate-maintain (DBFOM) delivery model was determined to be most closely aligned with the goals and objectives of the project. A value-for-money (VfM) assessment was undertaken by independent financial advisor Ernst & Young to see whether the DBFOM approach would provide value for money when compared to the traditional design-bid-build (DBB) route. The results showed the DBFOM model provided greater VfM savings than the DBB model and on this basis the DBFOM option was used to procure the project.[9]

Selecting a partner

SaskBuilds conducted a two-stage procurement process. The first stage, request for qualifications (RFQ), was intended to identify qualified proponents eligible to participate in the second stage, request for proposals (RFP).

RFQ respondents were evaluated on their financial capacity and technical experience in delivering projects of similar scope and size. Five teams submitted compliant responses. An RFQ evaluation committee, including representatives from SaskBuilds, the Ministry and external expert advisors, selected three teams to participate in the RFP stage. Table 1 lists the three qualified teams.

Table 1: Shortlisted proponent teams

Proponent Team	Design	Construction	Financing (Equity/Debt)	Maintenance
Queen City Infrastructure	AECOM Tetra Tech MMM Group	Aecon Flatiron Dragados	ACS Aecon InfraRed Hochtief CIBC	Volker Stevin Highways
Regina Bypass Partners (previously SaskLink Global Transportation Partners)	Parsons McElhanney Urban Systems Buckland and Taylor EXP Clifton Associates	Graham Infrastructure VINCI Infrastructure Canada Parsons Canada Carmacks Enterprises	Graham Capital VINCI Concessions Parsons Enterprises Connor Clark & Lunn National Bank	VINCI Concessions Carmacks
Wascana Development Partners	Stantec AMEC Westridge Construction Kelly Panteluk Construction	SNC-Lavalin Kiewit	SNC-Lavalin Kiewit Scotiabank	SNC-Lavalin

[9] SaskBuilds & Government of Saskatchewan, Regina Bypass Project Public-Private Partnership Value for Money Assessment Report, November 2015.

During the RFP period, SaskBuilds and the Ministry hosted commercially confidential meetings (CCMs) with each proponent team to provide early feedback, minimizing the possibility of unacceptable technical proposals and optimizing proponents' efforts.

Proponents submitted their technical proposals in advance of the financial submission. An RFP evaluation committee, including representatives from SaskBuilds, the Ministry and external expert advisors, evaluated proposals after ensuring they were fully compliant, and ranked them based on net present cost (NPC). The proposal with the lowest NPC was selected as the preferred proponent. Table 2 shows the overall timeline for the project.

Table 2: Project timeline

April 2013 – May 2014
Assessment of procurement options by SaskBuilds and Ministry

May 13, 2014
RFQ issued

June 24, 2014
RFQ Closed

August 18, 2014
Qualified teams announced

August 22, 2014
RFP issued

January 30, 2015
Initial technical proposals submitted

April 17, 2015
Final technical proposals submitted

May 1, 2015
Financial proposal submitted

May 29, 2015
Preferred proponent announced

June 2015
Early works agreement executed & construction started

July 29, 2015
Commercial & financial close achieved

October 2017
Phase 1 substantial completion achieved

October 29, 2019
Substantial completion achieved for entire project

October 29, 2049
End of operations and maintenance (O&M) period

Fairness of the process

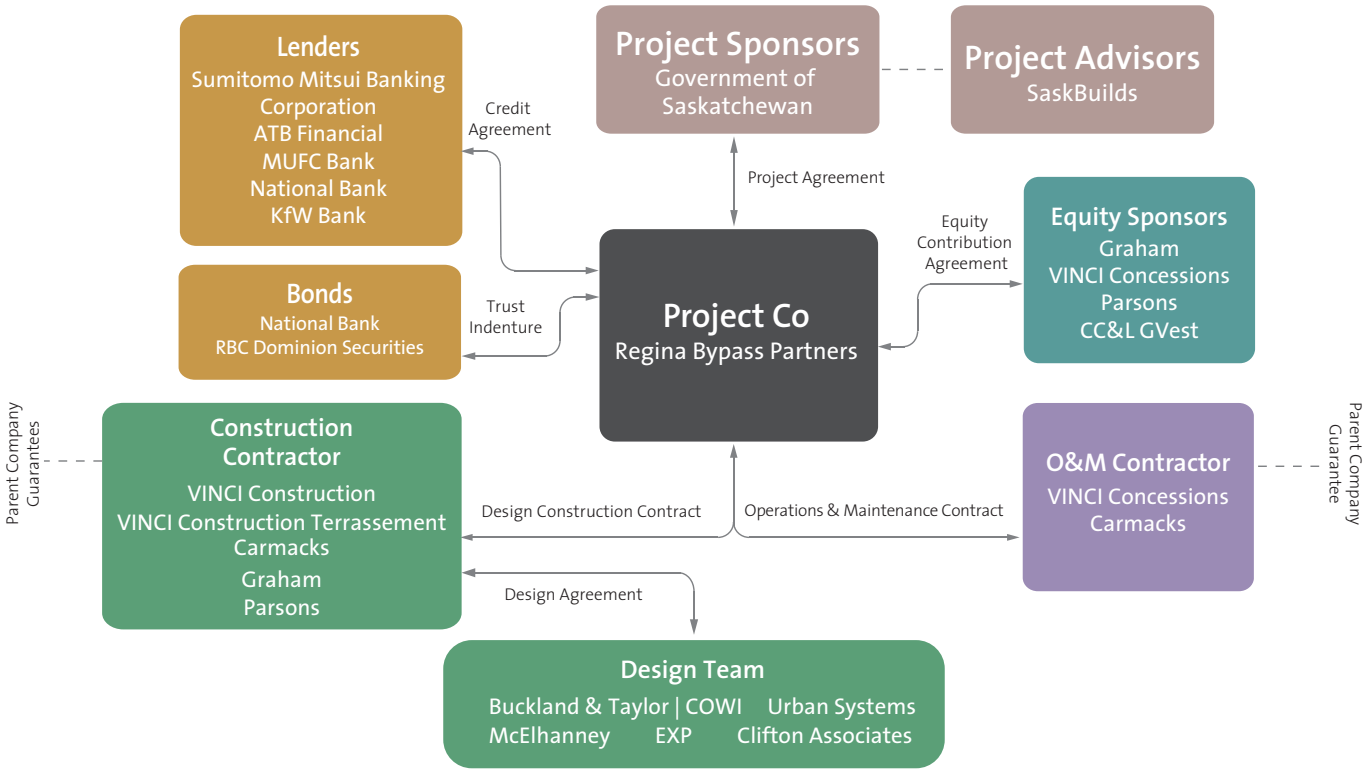
SaskBuilds engaged an external fairness advisor, P1 Consulting Inc., to monitor the qualification and proposals stage of the procurement process and ensure fairness, equity, objectivity, transparency and adequate documentation of the evaluation process. The fairness advisor was provided access to all documentation and participated in all meetings. Two reports were published by the fairness advisor, one for each stage of the procurement process, certifying the principles of fairness, openness, consistency and transparency were upheld. [10]

[10] P1 Consulting, Fairness Advisor Report on the Regina Bypass Project RFQ, July 14, 2014. http://saskbuilds.ca/projects/ReginaBypass/SaskBuild_RBFairness_Letter%20(14%2009%2023)%20FINAL.pdf; and P1 Consulting, Fairness Advisor Report on the Regina Bypass Project RFP, May 13, 2015.)

Overall Structure of the Agreement

Figure 4 shows the relationships and division of responsibilities for the project.

Figure 4: Partnership structure



Financial Arrangements

Total project costs are $1.88-billion NPV. Financing was accomplished with a combination of government contributions and private-sector financing. The need to meet the project's two-phase completion timeline and the upgrades to Highway 1 required innovation in the financing solution.

The financing structure pulled together the most cost-efficient forms of financing available within project finance in 2015. Short-term credit facility terms were competitive and comfortably beat the short-term bond solution. The long-term financing solution employed a hybrid bond structure to reduce the loan life and interest cost of the long-term financing. It was the first project in Canada to pair an amortizing bond with a bullet bond.

Capital costs

Capital costs were funded by the Government of Canada, contributing $200 million during the construction period, and Saskatchewan, contributing $1.178 billion, with the remainder provided by Regina Bypass Partners through private financing comprised of equity plus:

- $648 million of short-term bank debt for a revolving senior construction facility and a senior rehabilitation facility; and
- $629 million in rated long-term bonds with two tranches: an amortizing tranche and a bullet bond tranche.

The equity commitment is in the following proportions:

- Graham Capital LP – 37.5 per cent (split 12.5 per cent Graham/25 per cent Connor Clark & Lunn);
- VINCI Concessions S.A.S. – 37.5 per cent; and
- Parsons Enterprises Inc. – 25 per cent.

Payments

Substantial completion payments

The payment mechanism for the project included two fixed lump-sum payments. The first, $103.5 million, was made when Phase 1 substantial completion was achieved and the second, $507.4 million, was made when full substantial completion was reached.

Operations and maintenance payments

During construction, the Ministry made monthly interim O&M services payments to Regina Bypass Partners for the operation and maintenance of:

- existing infrastructure to be upgraded; and
- Phase 1 components completed and operational in October 2017.

Through the operating period, the Ministry makes monthly performance-based availability payments, which are subject to deductions for service, quality and/or availability failure events. These payments include a capital component and are indexed by the Canadian the consumer price index (CPI).

Responsibilities and Risk Allocation

Using a P3 procurement model provided the Ministry with a greater opportunity to ensure risks were allocated to the partner best equipped to manage them. This reduced the costs attributed to risk and improved VfM of the project. Risks transferred to Regina Bypass Partners added value through private sector design and innovation.

The project agreement includes detailed risk allocation provisions over the construction period and the 30-year operating term. A summary is presented in Table 3.

Benefits

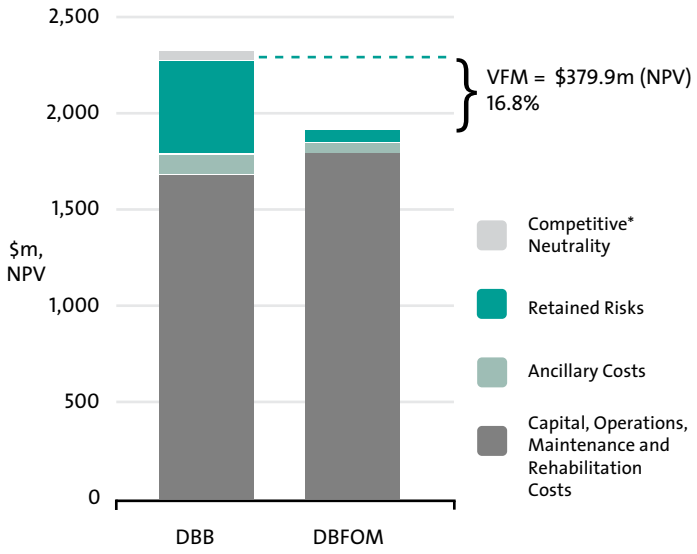
Cost savings/value for money[11]

The value-for-money assessment was updated following financial close with the results from Regina Bypass Partner's bid submission. The updated analysis showed that by using the P3 approach, the net present value (NPV) of the total project cost was $1.88 billion compared to $2.26 billion for a traditional DBB. This represents an estimated $379.9 million or 16.8 per cent in savings over the contract term.

Figure 5 shows the comparison between the two models. Cost savings were achieved through a number of measures including:

- Construction and design innovations;
- Life cycle optimization;
- Risks shifted from the public to the private sector; and
- A fixed-price project agreement.

Figure 5: Value for money (VfM)



* Competitive neutrality includes adjustments to the DBB model to account for differences in tax treatment and insurance costs between the public and private sectors.

Community socio-economic benefits

One of the most noticeable community benefits of the project is the improvement in community safety. Since the bypass was opened in 2019, there has been a marked reduction in traffic collisions, with no collision requiring the use of hydraulic rescue tools by emergency service providers.[12] In the past, this was a common occurrence.

The Regina Bypass has contributed to economic growth by facilitating smooth and uninterrupted access to the Canadian and U.S. national highway systems enabling the efficient movement of goods.

[11] SaskBuilds & Government of Saskatchewan, Regina Bypass Project Public-Private Partnership Value for Money Assessment Report, November 2015.

[12] As of case study research date: April 16, 2021.

Table 3: Allocation of key risks

Risk	Ministry	Regina Bypass Partners	Shared
Permits & Approvals			
Project approvals	■		
Construction permits		■	
Site Condition/ Environmental			
Geotechnical		■	
Contamination caused by Regina Bypass Partners		■	
Utility relocation			■
Environmental condition of site			■
Design and Construction			
Ministry initiated scope changes/ delay	■		
Design & construction cost overruns		■	
Weather (excl. supervening events)		■	
Construction delays		■	
Traffic and safety management		■	
Design errors and omissions		■	
Resource/labour availability		■	
Deficiencies and latent defects		■	
Interim O&M services		■	
Force majeure			■
Change in law			■
Operational			
Ministry initiated scope changes	■		
O&M cost overruns		■	
Service delivery		■	
Force majeure			■
Change in law			■
Life cycle			
Life cycle cost overruns		■	
Meeting hand back requirements		■	
Latent defects in existing infrastructure			■

During construction, more than 100 local Saskatchewan companies participated in providing goods and services to the project, and 80 per cent of project salaries were allocated to Saskatchewan residents. All O&M salaries go to Saskatchewan residents.

Communications

Between the partners

Project motto – "One Project. One Team."

Early on in the design and development phase, an initiative took hold that developed into the project's defining approach and became the project team motto.

Shortly after commercial and financial close, Regina Bypass Partners and the Ministry worked through several partnering sessions to establish clear expectations and shared project goals. At the first partnering session, the team developed a set of team core values, based on the core values of each party. These were posted in all common areas and regularly referred to as detailed design and construction progressed. Eventually they were dubbed "One Project. One Team." and became the cornerstone around which the partners came together to deliver the project.

The motto was a significant factor in the project's success because it put the interests of the project first and foremost in the minds of all team members, rather than the interests of each organization or firm. It also supported a foundation of trust that helped the team work through issues as they arose and deliver the project on time and on budget with no claims.

To support the initiative, decision makers worked together in one office complex in close proximity to maximize communication and information sharing. As relationships were built and trust was developed, the team was closely aligned, overall group decision making was more efficient, and a higher volume of knowledge integration and communication was achieved.

Individuals from all parties were given the authority to make binding decisions appropriate to their roles. The Ministry's executive management received biweekly briefings on project progress, so they were aware of any current and pending issues further facilitating timely resolution of issues.

Together, these measures resulted in an unparalleled level of productivity and avoided disputes by giving all parties easy access to decision makers. This made in-person meetings possible at short notice, so the project approach could be adapted on a real-time basis to avoid conflict, address risks and optimize results.

For example, understanding the Ministry's goals helped Regina Bypass Partners come up with a solution to eliminate all at-grade crossings on Highway 1 earlier than planned. The Ministry allowed Regina Bypass Partners to modify the traffic management plan for Highway 1 East and revised the schedule to accommodate this modification so the new interchange would be opened by October 31, 2018, one year ahead of schedule. Further collaboration, to address concerns raised by the local business community, resulted in the interchange being opened even earlier in February 2018.

As the project progressed, subcontractors and others who were involved wanted to be part of "One Project. One Team." Jackets and shirts with a customized logo were made and distributed, leaving corporate brands behind. Team members developed a sense of pride and even became protective of the job — essentially becoming project ambassadors. For some, working on the Regina Bypass Project and being part of the "One Project. One Team." initiative was a defining moment in their careers.

Technical work group meetings

At the beginning of the project planning stage and throughout the procurement process, Regina Bypass Partners held regular multidisciplinary meetings among consortium team members. At the core of these meetings was the technical work group (TWG) meeting. The primary purpose was to bring together the technical experts and management team to generate, consider, evaluate and decide on value engineering and construction options and alternative technical solutions for the bid submission. Each team member, regardless of their employer or position, was treated as if they were a trusted member of the bid consortium.

After Regina Bypass Partners was named the preferred proponent and as the project progressed into detailed design, the Ministry, Owner's Engineer, and relevant stakeholders were fully integrated into the technical work group meetings. TWG meetings were held on a weekly basis. The integration of all parties achieved a strong sense of collaboration and was a key driver in the project's success.

The presence of the Ministry and its Owner's Engineer at the weekly meetings ensured they heard first-hand the rationale for certain design plans and were asked for their input. It also provided a venue where the Ministry and Owner's Engineer could raise technical requests with Regina Bypass Partners. This facilitated a speedy design-review process when the Ministry received the design packages.

Informal meetings

The team reinforced its open communication approach during the construction phase with informal meetings such as weekly one-hour "off the record" discussions among the project leaders from the Ministry, the Owner's Engineer, Regina Bypass Partners and the design-build joint venture. Concerns, issues and ideas were raised at these discussions in an open manner. This ensured there were "no surprises" during the formal multidisciplinary team meetings. The result was that no issues were escalated to the dispute resolution procedure and instead conflicts were remedied through collaborative problem solving.

With the public

Before project implementation

During project development, the Ministry undertook a comprehensive public consultation process to receive input on the route and interchange locations for the proposed bypass. Frequent public and stakeholder meetings were held with residents and officials from the City of Regina and surrounding municipalities.

Initial plans were changed based on public comments received through these consultations. For example, the original concept for the Hill Avenue Interchange included a right-in/right-out intersection. It was decided to change this to a grade separated diamond interchange to limit unnecessary interaction of local and highway traffic, thereby keeping the safety of local traffic at the forefront of design and supporting the future development plans of the City of Regina and Regional Municipality of Sherwood.

During project implementation

Under the terms of the project agreement, the Ministry leads all communications with the support of Regina Bypass Partners. One of the first communication challenges was related to the proposed roundabout at the south end of the Highway 46 interchange near Balgonie. In their bid, Regina Bypass Partners proposed this roundabout instead of a stop-controlled intersection. The Ministry agreed to this modification on the condition local residents and stakeholders also agreed. Following commercial and financial close, community and stakeholder consultation events were held in the Balgonie area by the Ministry and Regina Bypass Partners where the public could see the designs for the proposed roundabout and ask questions directly to subject matter experts on the Regina Bypass Partners team. The result was public and stakeholder acceptance for the additional roundabout. Had there been no public acceptance, Regina Bypass Partners would have had to build the stop-controlled intersection as per the Ministry's reference design.

Other tools used to communicate with the public during the design and construction phase:

- Regular open houses were held in all communities involved in the project. Two major design changes were made to the project because of community consultation, and modifications were made to the construction traffic route to avoid local roads.
- A multi-stakeholder advisory group was established including community leaders, first responders (fire, ambulance, etc.), town councillors/mayors and rural municipality representatives. Monthly meetings were held to announce and discuss upcoming construction activities. Feedback was received regarding possible community

and stakeholder impacts and mitigation strategies were discussed. An added benefit of these meetings was that community leaders became project champions in their respective community or group.

- Representatives working on the construction site from the Ministry and Regina Bypass Partners attended monthly town council meetings for each municipality along the route.
- Quarterly meetings were held with local Indigenous groups affected by the project. Chiefs and their councils participated, were given updates on the project and could voice questions and concerns (see following section on Frist Nations and Métis involvement).
- Mail drops were used to let specific communities know of upcoming project activities such as lane closures and slower traffic. The mail drops included contact information for their community information phone line and the project's 24-hour contact centre.
- Public education was undertaken through media campaigns and high school visits to educate drivers, student drivers and driving instructors on how to efficiently zipper merge to reduce traffic delays and how to safely and correctly use the roundabouts and the diverging-diamond interchange.
- Frequent tours and technical briefings were held for elected officials and the media. The news stories and reports on these activities also provided the public with a window to construction progress.

First Nations and Métis involvement

The project agreement required Regina Bypass Partners to develop and implement a First Nations and Métis engagement plan describing how it would procure services from, and involve, First Nations and Métis individuals, businesses and organizations. The plan also explored ways to make apprenticeship programs available and provide employment training to First Nations and Métis individuals.

As part of the engagement plan, Regina Bypass Partners held a job fair with on-the-spot interviews. More than a thousand applicants attended from 38 First Nations and Métis organizations and communities in the area. Regina Bypass Partners and their key subcontractors and employment agencies were on hand to discuss opportunities and qualifications with each applicant. The job fair helped fill close to 300 jobs, including flaggers, office workers, heavy machine operators and engineers.

On-the-spot interviews at First Nations and Métis job fair

Services and materials procured from First Nations and Métis communities included sand and gravel from borrow pits on First Nations and Métis land close to the bypass route and vehicle fuel from Indigenous-owned gas stations enabling them to become high-volume fuel providers for the duration of the construction phase of the project.

One-on-one meetings with First Nations and Métis chiefs or council members were held quarterly to provide construction updates and to discuss potential employment and partnering opportunities. For example, some of land around the project footprint owned by First Nations was being developed for commercial use. Regina Bypass Partners assisted these projects by providing earth-moving services and sharing materials and construction resources.

Regina Bypass Partners also participated in a special blessing ceremony for land that was purchased for the project from a local First Nation community. Before beginning earthworks for the project, the ceremony asked the creator for its blessing to disturb the land. This helped forge a positive working relationship that continues today.

Dispute resolution

All P3 projects include a dispute resolution process embedded in the project agreement. Both partners in the Regina Bypass project believe that the commitment of their team members championed through the project motto "One Project. One Team." helped them solve issues without having to use the formal dispute resolution

process. As of the case study research date (April 2021), the formal dispute resolution process had not been used.

In future, should there be a conflict that cannot be resolved amicably by party representatives, Schedule 22 of the project agreement includes a stepped dispute resolution process. The process escalates the dispute to senior officers, and if there is still no resolution it is further escalated to expert determination, and finally to arbitration or litigation.[13]

Performance Monitoring

Integrated management system (IMS) and non-conformance reporting (NCR)

The project agreement required Regina Bypass Partners to develop and implement a comprehensive integrated management system (IMS) to manage the quality of the design and construction and OM&R works, protection of the environment, and worker and public health and safety.[14] The IMS system also included a non-conformance reporting (NCR) tracking system with incentives to avoid the application of non-performance pay adjustments.

If Regina Bypass Partners identified and corrected a non-conformance, no points would be allocated towards a non-performance payment adjustment. However, if a non-conformance was identified by the Ministry and the Owner's Engineer, then points would be accumulated towards a non-performance payment adjustment. The way points were accumulated gave Regina Bypass Partners an incentive to have robust audit and monitoring tools.

These audit and monitoring tools included weekly reports to the project management team summarizing the project performance indicators, the resources mobilized, safety aspects, nonconformities, and customer variation requests. Detailed performance and monitoring data was also shared monthly with the Ministry to define areas for continuous improvement.

IMS staff took an active hands-on approach to risk management by actively monitoring the project through a regular inspection, testing and audit program.

[13] Schedule 22, Project Agreement, Execution Version, Regina Bypass Project, July 29, 2015.

[14] Schedule 14, Project Agreement, Execution Version, Regina Bypass Project, July 29, 2015.

Project committee and general oversight

During the construction period, the independent certifier and lender's technical advisor certified work was completed according to the terms of the project agreement to approve payment.

Through the construction stage and now in the operating period, joint committees were established to monitor progress and performance and provide oversight and direction on matters related to project activities. The project committee meets monthly throughout the lifetime of the project agreement and includes representatives from the Ministry, Regina Bypass Partners and SaskBuilds.

Key performance measures

Key performance measures (KPMs) with specified thresholds are set out in detail in the project agreement to ensure Regina Bypass Partners is continually meeting its contractual requirements. Regina Bypass Partners must report to the Ministry monthly on its achievement of KPMs, which are grouped under the following key delivery areas:

- Operational communications;
- Safety;
- Asset service;
- Winter service;
- Corridor management;
- Emergency response; and
- Project relationships.[15]

Each delivery area has a specific weighting and within each delivery area there are between two and five KPMs. For example, the delivery area of operational communications has a weighting of 15 per cent and includes the following KPMs:

1. Highway condition reports;
2. Report adverse or extreme road surface conditions;
3. Recording of lane closure events;
4. Customer satisfaction rating; and
5. Respond to correspondence.[16]

[15] Schedule 15-3, OM&R and Handback, Section 401, Project Agreement, Execution Version, Regina Bypass Project, July 29, 2015.

[16] Ibid. Table 401-1.

Lessons Learned

Collaboration

The project delivery team focused on partnership and collaboration. The Ministry and Regina Bypass Partners worked, and continue to work, together to meet all project requirements and resolve challenges if necessary. This commitment to partnership was exemplified through the motto: "One Project. One Team."

This open and transparent partnering approach, a fundamental principle of the P3 delivery model, is a major contributor to the project's success. The ability of the project team to operate as a focused group with a common goal was driven by both the Ministry and Regina Bypass Partners. Both partners agree this was an essential ingredient to the team navigating and overcoming issues such as the numerous utility conflicts.

Co-location of team employees, including the key leadership of Regina Bypass Partners, the Ministry and its Owner's Engineer, was also essential to the project's success. This improved productivity, fostered relationships and avoided disputes by making in-person meetings easy to arrange and ensuring a common understanding of project challenges.

Flexibility

The flexibility and open-mindedness of the Ministry and SaskBuilds to listen to proponents and ensure the project documentation aligned with the technical risk specific to the project, was an important lesson learned. This approach to the implementation of a public-private partnership model ensured project goals, such as cost and schedule, were achieved.

Implementing the utilities cash allowance and extending the schedule are examples of where the Ministry and proponents worked together during the procurement process to understand the challenges facing each party and the risks associated with those challenges. The Ministry took a novel approach to its P3 model by considering it an adaptable document with flexibility to ensure the model fit the project, not the other way around.

Importance of background information

Throughout the procurement process, SaskBuilds learned the importance of sufficient and reliable background information to achieve effective risk understanding and allocation. Limited utility information was known for this project and there was limited access to the utility owners. The solution was the innovative cash allowance regime.

Because of this, SaskBuilds and the Ministry recognized the importance of either completing utility relocations in advance with complete and accurate mapping or, where this was not possible, using a cash allowance concept based on the experience in this project. In this way, the best value can be obtained from transferring utility risk in part, or in whole, to the private sector.

Continuity of management personnel

Regina Bypass Partners, the Ministry and its Owner's Engineer transitioned several management staff, including leadership positions from each partner, and nearly all technical leads from the procurement stage through to project delivery. This was a significant factor in project success as it ensured relationships forged and knowledge gained through the procurement stage were retained. Momentum and continuity of knowledge can be lost in projects where one team bids and another builds,

Local contractor involvement

Great importance was placed on the involvement of local subcontractors, subconsultants and labour. Local knowledge of supply chains, weather patterns and soil structure were critical to the success of the project.

Community involvement

Regina Bypass Partners believes strongly in directly engaging in community investment programs and initiatives that help build the communities in which it works and lives. To this end, the team fostered a culture of caring and teamwork through its involvement with a project for Habitat for Humanity, picking up garbage around Regina on Earth Day, and participating in many children's events such as building the Holy Rosary Community School play structure.

Project team members working on community play structure

Applicability to other projects

The Ministry is now using best practices learned from the P3 delivery model on some of its traditionally procured projects and Graham Infrastructure LP is trying to recreate the "One Project. One Team." philosophy on all of its projects. For example, in the Ministry's case, for projects greater than $50 million a fairness advisor is used, and for projects over $100 million a value-for-money report is prepared.

As a result of the lessons learned on this project, the Ministry is also incorporating extensive public and stakeholder consultation, early utility involvement and multi-party technical working groups, among other key aspects, into the functional planning process for the upcoming Saskatoon Freeway project.

From Graham's perspective, it has learned the benefits of using an IMS and non-conformance reporting system that provides incentives for self-monitoring by allocating points towards a payment adjustment threshold only where non-conformances are reported by the project sponsor. Graham plans to support and encourage the use of such a reporting system in future P3 projects.

Both partners note the value of a cash allowance regime in supporting a partnership approach around risks that cannot be fully mitigated or managed by the private sector. This was a game changer for the utility relocation risks in this project and can be replicated in future P3 projects to mitigate similar risks.

Concluding Comments

During the early stages of the Regina Bypass Project, the Saskatchewan Ministry of Highways looked at delivering it as three separate projects with traditional DBB procurement processes. However, a business case completed with the assistance of SaskBuilds showed combining the three projects into one using a P3 DBFOM delivery model would meet the Ministry's goals of improving safety and contribute to economic development while also providing significant VfM savings for taxpayers. In addition, the entire bypass would be completed six years sooner.

Using a P3 delivery model brought this project the experience and innovation of the private sector partner, Regina Bypass Partners. Innovations in design, construction methodology, finance and life cycle contributed to the project's success.

The Regina Bypass Project was completed on time and within budget, with no claims and a near flawless safety record. The new bypass boasts Saskatchewan's first highway roundabouts and a number of firsts for P3 projects in Canada: the first diverging-diamond interchange; the first use of a utilities cash allowance to manage and share utility relocation risk; and the first use of side-by-side amortizing and bullet bonds in a financing structure.

The Ministry set the example early, and Regina Bypass Partners picked up the torch for true partnering. The "One Project. One Team." philosophy guided every aspect of the partnership and directly contributed to no delays in the project schedule, and no disputes being addressed through arbitration.

The Ministry and SaskBuilds ensured their customized DBFOM procurement model, the project documentation and implementation fit the specifics of the project, not the reverse. Taking its part in partnership one step further, the Ministry considered on-time delivery a shared obligation and did its part to avoid impacts in this regard. This showed in the Ministry's willingness to make changes to the project phasing, schedule and utility regime and its assistance in addressing potential delays with regulators and utility companies when required.

The innovative approach to sharing utility risk was a game changer. This regime was highly successful in providing incentives to both partners to resolve issues and limit schedule disruptions. Excess funds went back to the Saskatchewan taxpayer — meaning the project was not only completed within budget, but under budget.

And the schedule at the start of construction was the same as at the end — this is noteworthy for a project of this size and complexity.

The project is delivering measurable enhancements to the travelling public with reduced travel times, increased safety and stakeholder satisfaction. With an eye always on the key project goals, the Ministry and Regina Bypass Partners worked, and continue to work, together to understand each other's challenges and support resolution by approaching issues as "we" not "us or them." The Regina Bypass Project is a testament to a true public-private partnership.

Highway 1 looking north

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Appendix: CCPPP's National Award Case Studies 1998 - 2020

Defence
Communications Security Establishment Canada Long-Term Accommodation Project (**2011**)

Education
Quad at York University, Ontario (**2018**)
Saskatchewan Joint Use School Projects (**2015**)
Alberta School Alternative Procurement – Phase **1** (ASAP I), Alberta (**2010**)
O'Connell Drive Elementary School, Nova Scotia (**1998**)

Energy
Energy Services Acquisition Program (ESAP)/Energy Service Modernization (ESM) Project, Ottawa-Gatineau (**2020**)
Fort McMurray West **500**-kV Transmission Project, Alberta (**2018**)
John Hart Generating Station Replacement Project, B.C. (**2014**)
Britannia Landfill Gas to Electricity Project, Ontario (**2005**)
Vancouver Landfill Gas Cogeneration Project, B.C. (**2003**)
Bruce Nuclear Power Facility, Ontario (**2000**)
Waterloo Landfill Gas Power Project, Ontario (**2000**)

Government Services
Archives of Ontario – Offsite Archival Storage (**2006**)
Cook Chill Food Production Centre, Ontario (**2005**)
DriveTest: Ontario Driver Examination Services (**2004**)
Transforming the Delivery of Ontario's Social Assistance System (**2003**)
Emergency Service Mobile Communications in Ontario (**2000**)
Electronic Child Health Network, Toronto, Ontario (**1999**)
Teranet, Ontario (**1998**)

Health
New Oakville Trafalgar Memorial Hospital, Ontario (**2016**)
Humber River Hospital, Ontario (**2015**)
BC Cancer Agency Centre for the North and Fort St. John Hospital & Residential Care Project, B.C. (**2012**)
Centre Hospitalier de l'Université de Montréal Project (**2012**)
Glen Campus – McGill University Health Centre, Quebec (**2010**)
Women's College Hospital Redevelopment Project, Ontario (**2010**)
Royal Jubilee Hospital Patient Care Centre, B.C. (**2009**)
VIHA Residential Care and Assisted Living Capacity Initiative, B.C. (**2007**)
Abbotsford Regional Hospital and Cancer Centre, B.C. (**2008**, **2005**)
Facility Management for the Royal Ottawa Health Care Group, Ontario (**2000**)
Devonshire Care Centre, Alberta (**2000**)
Shaikh Khalifa Medical Centre, United Arab Emirates (**2000**)

IT Infrastructure
Connecting Small Schools in Newfoundland (**2003**)

Justice & Corrections
Forensic Services and Coroner's Complex, Ontario (**2016**)
Okanagan Correctional Centre, British Columbia (**2015**)
Elgin County Courthouse, Ontario (**2014**)
Ontario Provincial Police Modernization Project (**2013**)
Surrey Pretrial Services Centre Expansion, B.C. (**2011**)
Durham Consolidated Courthouse, Ontario (**2007**)
Central North Correctional Centre, Ontario (**2002**)
Five Corners Project, B.C. (**2002**)

Real Estate
Aurora College Family Student Housing, Northwest Territories (**1999**)
Legislative Chamber, Offices and Housing, Nunavut (**1999**)

Recreation & Culture
L'Adresse symphonique, Quebec (**2011**)
SHOAL Centre: Seniors Recreation Centre, B.C. (**2004**)
John Labatt Centre, London, Ontario (**2002**)
Skyreach Place, B.C. (**2000**)

Social Housing
Single Room Occupancy Renewal Initiative Project, B.C. (**2013**)

Transportation
Gordie Howe International Bridge Project (**2019**)
Tłı̨chǫ All-Season Road Project (**2019**)
North Commuter Parkway & Traffic Bridge Replacement, Sask. (**2018**)
Iqaluit International Airport, Nunavut (**2017**)
Southwest Calgary Ring Road, Alberta (**2016**)
Disraeli Freeway and Bridges Project, Winnipeg, Manitoba (**2012**)
Canada Line, B.C. (**2009**)
Confederation Bridge, PEI (**2009**)
Highway **407** ETR, Ontario (**2008** & **1999**)
Autoroute **30**, Montreal, Quebec (**2008**)
Northwest Anthony Henday Drive, Alberta (**2008**)
William R. Bennett Bridge, B.C. (**2008**)
Autoroute **25**, Montreal, Quebec (**2007**)
Kicking Horse Canyon Project –Phase **2**, B.C. (**2007**)
Golden Ears Bridge, B.C. (**2006**)
Anthony Henday Drive Southeast Leg Ring Road, Alberta (**2005**)
Sea-to-Sky Highway Improvement Project, B.C. (**2005**)
Sierra Yoyo Desan Resource Road , B.C. (**2004**)
Fredericton-Moncton Highway Project, New Brunswick (**2003**)
Belledune Port Authority, New Brunswick (**2000**)
Retendering Alberta's Highway Maintenance Contracts (**2000**)
Cobequid Pass Toll Highway, Nova Scotia (**1998**)

Water, Wastewater & Biosolids
Calgary Composting Facility, Alberta (**2017**)
City of Saint John Safe Clean Drinking Water Project, New Brunswick (**2017**)
Regina Wastewater Treatment Plant Upgrade Project, Saskatchewan (**2014**)
Biosolids Management Facility, Sudbury, Ontario (**2013**)
Britannia Mine Water Treatment Plant, B.C. (**2006**)
Goderich Water and Sewer Services, Ontario (**2000**)
Port Hardy Treatment Project, B.C. (**2000**)

These case studies can be obtained through CCPPP's online bookstore at: www.pppcouncil.ca/web/bookstore

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