CANADIAN CONSULTING ENGINEERING AWARDS 2021

REGINA BYPASS – OWNER'S ENGINEER SERVICES

LOCATION: REGINA, SASKATCHEWAN
CLIENT/OWNER: GOVERNMENT OF SASKATCHEWAN, MINISTRY OF HIGHWAYS AND INFRASTRUCTURE
LEAD CONSULTANTS: ASSOCIATED ENGINEERING WITH CIMA+

OTHER MEMBERS OF THE OWNER'S ENGINEER TEAM: GOLDER ASSOCIATES, WSP (OPUS INTERNATIONAL), LINDSEY QUALITY SOLUTIONS INC., ASSOCIATED ENVIRONMENTAL, COLDSTREAM TECHNICAL LTD., AMERICOST INFRASTRUCTURE ESTIMATORS INC., DAVID KRIGER CONSULTANTS INC., HJ LINNEN AND ASSOCIATES, HEMSON CONSULTING LTD., NCE VALUE ENGINEERS INC., ANDREW JOHNSON ASSOCIATES, PVP ENGINEERING LTD., INTERNATIONAL ROAD DYNAMICS (IRD)

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THE REGINA BYPASS ESTABLISHES A SAFE CORRIDOR, SUPPORTING THE REGION'S GROWTH AND TRANSPORTATION NEEDS AND PROVIDING LONG-TERM BENEFITS FOR MOVING PEOPLE AND GOODS. THE BYPASS WAS THE LARGEST TRANSPORTATION PROJECT IN SASKATCHEWAN'S HISTORY AND THE MINISTRY OF HIGHWAYS AND INFRASTRUCTURE'S FIRST PUBLIC-PRIVATE PARTNERSHIP. EMPLOYING A ONE TEAM APPROACH, THE OWNER'S ENGINEER TEAM OF ASSOCIATED ENGINEERING AND CIMA+ SUPPORTED THE GOVERNMENT TO DELIVER DESIGN AND CONSTRUCTION OF THE $1.88 BILLION PROJECT ON TIME AND UNDER BUDGET.

Members of the Project Team

REGINA BYPASS - OWNER'S ENGINEER SERVICES

EXECUTIVE SUMMARY

The $1.88 billion Regina Bypass includes over 60 kilometres of 4-lane highway, 12 interchanges, 33 new structures and 54 kilometres of service roads. The project is essential to public safety, transportation needs, and economic development of the City of Regina and the surrounding region. The Saskatchewan Ministry of Highways and Infrastructure (Ministry) retained Associated Engineering with key partner CIMA+ and subconsultants as its Owner's Engineer for its first Public-Private Partnership (P3).

The Owner's Engineer consisted of a diverse, multi-discipline team with more than 200 individuals from firms in Saskatchewan and across North America. With such a large team, strong project management, coordination and communication were critical to project success. At the outset, a project collaboration website was established to ensure secure data storage and facilitate communication and integration among the team members. Team members from varying organizations and physical locations were able to access project information and work together securely and efficiently, supporting our One Team approach.

The team developed a reference concept design and strong Business Case to secure maximum financial support from PPP Canada for the project. We conducted a Best Practices Review examining design-build-finance-operate-maintain (DBFOM) models, and developed a new, Saskatchewan DBFOM model including technical specifications and contract documents. A testament to the quality and fairness of the procurement documents, the project attracted multiple competitive proponent submissions.

At the core of the team's philosophy was an integrated partnering approach which enabled constructive, collaborative relationships between all parties, including the P3 Project Co. This led to successful delivery of the largest transportation project in Saskatchewan's history, on time, under budget, with no major claims. The Regina Bypass has increased public safety, reduced congestion, and improved the quality of life in the region.

COMPLEXITY

Trans Canada Highway (Highway 1) east of Regina, Saskatchewan had the province's worst accident record and fatalities. Highway 1 routed truck traffic through Regina, increasing congestion.

The Saskatchewan Ministry of Highways and Infrastructure (Ministry) conceived the Regina Bypass to improve safety, reduce congestion, and support regional growth. The Regina Bypass includes approximately 60 kilometres of 4-lane highway, 12 interchanges, 33 structures, and 54 kilometres of service roads.

The Government of Saskatchewan decided to deliver this complex project as a Public-Private Partnership (P3). As the project was the largest ever delivered by the province and the Ministry's first P3 transportation project, the Ministry retained Associated Engineering with CIMA+ as Owner's Engineer.

Partnering with the Ministry and SaskBuilds, we adopted a "One Team" approach for project delivery. We worked collaboratively, side-by-side with the Ministry's technical standards team, to understand needs and refine the concept.

At the outset, we built an online collaboration site to support communication and share information. Within three months of award, we developed a reference concept design and cost estimates for the Business Case. The design moved traffic away from the city, while allowing local connections.

To improve safety, existing intersections along the highway were replaced with grade-separated interchanges. Demonstrating the strength of the Business Case, the Ministry secured maximum financial support from PPP Canada for the project.

During Planning, we conducted a Best Practices Review examining design-build-finance-operate-maintain (DBFOM) models. We developed a new, Saskatchewan DBFOM model including technical specifications and contract documents. We refined cost estimates, developed risk and quality management strategies, supported land acquisition, conducted safety planning, and assisted stakeholder consultation.

We supported communications to encourage bidders. A testament to this process and the quality and fairness of the procurement documents, the project attracted multiple bidders, assuring competitive bids, and bringing value to the government. We supported the Ministry in short-listing three proponents to provide detailed bids, and assisted in selecting the Project Co to undertake detailed design, construction, operation, maintenance, and rehabilitation.

During construction, we audited quality, environmental, and health and safety systems, and conducted technical compliance audits of the design and construction, non-conformance tracking and reporting, and contract administration. We embraced Project Co in our One Team, developing mutual trust which helped to minimize claims.

The Regina Bypass opened in 2019, on time, under budget, with no major claims. The Bypass has increased safety, reduced congestion, and improved the quality of life in the region.

Opening Day

MEETING CLIENTS NEEDS

The Ministry's goals were to develop a route around Regina to improve safety, reduce congestion in the city, allow access to local businesses, and accommodate regional growth.

The Owner's Engineer team collaborated with Ernst & Young and SaskBuilds to develop a Business Case that supported project delivery under a P3 delivery model. This model saved approximately $380 million compared to traditional design-bid-build delivery, minimized risk to the Ministry, and allowed the project to be built quicker than a traditional approach.

We established a One Team approach between the Owner's Engineer team, the Ministry, and SaskBuilds, and developed an online project collaboration site to support communication and information exchange. We collaborated to identify and address issues, and undertook risk workshops, identifying risks, and allocating them to the party best positioned to manage and own the risk, ensuring value to the government.

A key concern was the number of teams that would bid the works. We supported early communications regarding the project, and SaskBuilds reviewed the Canadian market so that we promoted the project at the right time, thus attracting multiple bidders.

Our concept design reduced commercial traffic in the city while allowing connectivity to local businesses. We provided appropriate access points to the highway and service roads which allowed free flow traffic while enabling the rural communities and businesses to remain connected and position communities to grow.

Design and construction of the Regina Bypass was completed under budget and on time, with no major claims, meeting the Ministry's project goals.

Open House Event

ENVIRONMENTAL BENEFITS

The Regina Bypass was built within the historic Regina Lake basin, which posed the greatest environmental issue for the project. The route bisected many overland flows; therefore, it was essential to maintain the overland flows so as not to change any surrounding ecological features or impact farming activities.

Easily maintainable and reliable drainage strategies were established so during rainfall, the original overland flows were maintained without compromising operation of the new highway or putting at risk any existing local establishments or land features.

The alignment was built on an embankment for much of its length, requiring a significant amount of fill material. Fill sources were established along the Bypass route to minimize the need for long haul routes and associated environmental impact.

The existing pavement of Highway 1 needed reconstruction. We worked with the Ministry to amend their Pavement Manual to enable the contractor to recycle as much of the existing pavement as possible, reducing the need for new materials, and making the project more environmentally sustainable.

One month after the Regina Bypass opened, the province reported an average of 1,230 trucks were using the Bypass daily, taking them away from Regina streets. It is estimated the free-flow highway will reduce greenhouse gas emissions by 1.5% and will reduce fuel consumption by nearly 300 million litres over 30 years.

The Regina Bypass also reduces transportation noise within the city and improves air quality through large reductions of a variety of compounds that contribute to air pollution from vehicle idling.

Project team meeting

INNOVATION

With up to 200 personnel from different organizations across North America working on the project at the same time, easy secure access to project information was essential. We established an online collaboration site which ensured secure data storage, facilitated communication, provided easy access to information, helped integrate team members, and fostered a One Team culture with Ministry staff.

The tool helped manage over 7,700 reviews, 800 fabrication and construction audits, and 100 quality, environmental and health and safety management audits. The tool's resiliency was tested during the COVID-19 pandemic, which forced team members to work remotely. The tool ensured the Owner's Engineer's work proceeded seamlessly, meeting contractual timelines for reviews and Project Co audits.

We leveraged technology to electronically post procurement documents for secure pickup by proponents, and, during construction, implemented an online tracking system to manage non-conformance reports. This system tracked Project Co's non-conforming supplies and materials, preventing unintended use and helping ensure corrective actions.

Our collaborative, One Team approach fostered mutual trust with Project Co, which facilitated development of innovative, cost-saving solutions. The project includes Canada's first diverging diamond interchange in a rural area, which reduces queuing and results in safer, free-flowing left turns. Through our collaborative approach, we helped ensure this interchange at Pilot Butte opened early, one year ahead of schedule, resulting in safer traffic flow.

The Regina Bypass features Saskatchewan's first Intelligent Transportation System, encompassing a control centre, weigh-in-motion facilities, weather station, and automated traffic information signs, enhancing safety throughout the province's transportation network.

SOCIAL AND ECONOMIC BENEFITS

Between 2006 and 2011, eight deaths and 600 collisions occurred on Highway 1 between Regina and Balgonie to the east - 24% higher than other sections of Highway 1 in Saskatchewan. Highway 1 within Regina was fully congested, with models indicating worsening congestion. The Regina Bypass has improved safety, reduced congestion, improved access to destinations, including the Global Transportation Hub and the Regina Airport, and resulted in faster emergency response.

Approximately 9,200 jobs were created by the project, including apprenticeships for youths, benefitting the local, indigenous and national economies. While keeping to the province's philosophy to attract world-class contractors, our approach gave local businesses the opportunity to bid on smaller contracts. Relationships established with First Nation communities along the Bypass, enabled them to develop their lands, participate in the project, improve skills, and establish a basis for future growth.

Our clear scope and strong concept design resulted in an accurate, pre-bid cost estimate that was within 0.5% of the bid value. With effective project management, design and construction of the $1.88 billion Regina Bypass was completed under budget and on time, with no major claims!

The economic benefits of the Regina Bypass were projected at $2.67 billion (2016 dollars) over a 30-year period, including savings from decreased driver delay, fuel consumption, and greenhouse gas mitigation costs. The safety increase was estimated at $52 million (2012 dollars).

The Regina Bypass establishes a free-flow corridor and access to trade routes, providing long-term benefits for moving people and goods in Saskatchewan and beyond.

CONCLUSION

The Regina Bypass, the largest transportation project in Saskatchewan's history and the Saskatchewan Ministry of Highways and Infrastructure's first Public-Private Partnership, is essential to the public safety, transportation needs and economic development of Regina and the surrounding region.

As the Owner's Engineer, Prime Consultant Associated Engineering with key partner CIMA+ provided project management and technical expertise and developed collaboration tools and processes that supported the planning, design and construction of this $1.88 billion project. At the core of the Owner's Engineering team's philosophy was an integrated partnering approach enabling strong, constructive, collaborative relationships between all parties. Our One Team approach contributed to the design and construction of this project on time, under budget with no major claims.

Opened in 2019, the Regina Bypass provides a free flow corridor that has increased public safety, reduced congestion in the city, and improved the quality of life in the region.

Official opening ceremony