

MT MCINTYRE BRIDGE INSPECTION / EVALUATION & REHABILITATION

Location: City of Whitehorse, Yukon Territory

Client: City of Whitehorse

Project Completion: March 2020



PROJECT DESCRIPTION

The City of Whitehorse has been maintaining a 24 m Bailey bridge for the local Cross Country Ski Club tenants at the Nordic Centre in Whitehorse, YT. The bridge is a link to 105 kilometers of year round cross country skiing, snowshoeing, mountain biking, running and walking trails.

The original bridge provided only 4 m of clearance to traffic passing underneath and resulted in multiple vehicle impacts. In 2017, the bridge was struck by a truck, and MH was engaged to provide an inspection / assessment, interim usage recommendations and, ultimately, a rehabilitation design in early 2019.

However, prior to the rehabilitation, the bridge was struck again in July 2019 resulting in further damage including a fully compromised sway bracing system, 500 mm of lateral bridge deflection at mid-span, lateral bridge displacement from the supports and transom, raker and weld fractures. MH recommended immediate closure to the public and performed / coordinated a detailed damage inspection and magnetic particle weld testing. The inspection / testing findings did not justify keeping the bridge open to the public and, instead, the bridge was closed and a new primary support system was designed and constructed.

The design repair consisted of repairing the bridge by hanging the existing transoms from the bottom flange of the new steel plate girders. The new girder design was 4 m longer than the original bridge and skewed in order to accommodate the existing slope embankment conditions and to create a stable load path from the substructure to the deficient retaining walls below. The design repair resulted in an additional 0.5 m of roadway clearance below to mitigate the risk of future vehicle impacts, an additional 0.4 m of bridge deck width, a lighter superstructure and reduced maintenance requirements.

SCOPE OF SERVICES

MH performed the role of Prime Consultant and delivered or coordinated the delivery of the following services: Field Investigations (Site Visit, Survey, Geotechnical Testing); Detailed Bridge Inspection; Load Evaluation; Detailed Design with IFT / IFC Drawings, Construction Cost Estimate and Tender Package Specifications; Construction Oversight.



CHALLENGES AND INNOVATION

Fast-Tracked Design & Construction: The bridge repair required completion during extreme cold winter months in order to be ready for the March 2020 Arctic Winter Games. As such, the design was carried out to accommodate cold Yukon winter construction, fast-tracked and completed over an impressive 6 weeks while construction was implemented over 2.5 of the coldest winter months and completed just before the scheduled 2020 Games

Innovative Design Detailing: In order to hang the transoms from the bottom flange of the new girders and also prevent lateral buckling of the compression/top flange of the new girders, MH came up with the innovative idea of designing the connection between the transoms and girders as moment connection to resist the buckling force.

BIO OF NOMINEE (ENGINEERING LEADS AND FIRM)



Scott Lopston, P.Eng., Engineer of Record

Scott has specialized in bridge & structural engineering for the past 24 years, primarily throughout British Columbia & Alberta with several projects across Canada. He is involved in all aspects of bridges, culverts, retaining walls & transportation infrastructure projects, including Conceptual & Detailed Design, Inspection, Load Ratings, Rehabilitation & Construction Services. His responsibilities also typically include Project Management, Contract Preparation & Administration, Cost Estimates & Specification Preparation. He has significant experience with both structural condition inspections & full-time bridge construction inspection.

He is familiar with concrete, steel & timber design & has performed post-graduate research related to high performance concrete. Scott is the Department Manager for MH bridge personnel in BC, Alberta & the Yukon.



Ryan O'Donovan, P.Eng., Project Manager

Ryan is a Bridge/Structural Engineer and Project Manager based out of Morrison Hershfield's Whitehorse office. He combines practical, hands-on construction background with structural design and project management training and experience to liaise effectively with clients, contractors, team members and stakeholders. Combining 15 years of construction experience with a background in structural design and project management has facilitated his ability to deliver projects throughout Yukon, British Columbia and Alberta. Some of the construction, management and engineering services he has provided throughout his career include:

concrete foundation/slab forming, placement & finishing; conventional wood framing; traditional heavy timber framing & log construction; residential finishing, plumbing & electrical; construction supervision & inspection; contract administration & project management; conceptual & detailed design; adaptive use assessments & design; and structural condition assessments & rehabilitation design. He is involved in all aspects of MH structural design and construction implementation projects.

