



# York Region 2<sup>nd</sup> Concession Bridge Project

**Canadian Consulting Engineering Awards 2018**  
*Category: Transportation*

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## PROJECT SUMMARY

The 2nd Concession project included road widening to four through lanes plus turning lanes, dedicated cycling facilities, multiple bridges and retaining walls, connections to existing trail systems, a gravity sewer, multiple forcemain sewers, a trunk watermain and the creation and restoration of wetlands. Design also included on-street bike lanes / cycle track, elevated boardwalk for Nokiidaa Trail over the Rogers Reservoir wetland feature and a railway bridge designed to accommodate future expansion of Metrolinx rail service.



## INNOVATION

The 2nd Concession connects the Town's three growing communities: Queensville, Holland Landing and Sharon. Growth, were the main reasons behind the 2nd Concession Widening and Servicing Infrastructure project which aims to improve mobility for all corridor users to support a growing community.

This was the largest project ever tendered to date by York Region's Transportation Services Department. The 640 Working Day contract was tendered ahead of schedule in 2013 and working days began in May 2014. All milestones were met with no working-day extensions granted. The project was completed within budget. The construction schedule was controlled with Primavera P6 Project Management scheduling software. There were zero Lost Time Injuries. The Ministry of the Environment and Climate Change (MOECC) provided clearance to proceed without any conditions imposed. The project concluded with nearly 1000 community residents attending the official ribbon-cutting ceremony. The project's success ensured adjacent land development could proceed on schedule.

Schedule adherence, worker safety, community engagement, environmental protection and the provision of active transportation infrastructure were key project priorities. With a \$56 million CAD transportation component, the team capitalized on opportunities that arose from the project's unique and challenging features:

The Metrolinx GO Barrie rail corridor (Metrolinx) crossed 2nd Concession atgrade. The 2nd Concession was narrow with an undulating profile and steep grades of up to 12 percent. There were multiple conflict points between vehicles, cyclists, pedestrians and trains.

The 2nd Concession bridge runs directly through the Rogers Reservoir Conservation Area where it crosses the Holland River at the old canal and lock system which was built at the turn of the century. The corridor also crosses the Nokiidaa Trail, a multi-use path within Rogers Reservoir that is part of the 121 kilometre "Lake to Lake Cycling Route and Walking Trail" connecting Lake Ontario to Lake Simcoe. Environmental constraints in this area include impacts to plants and wildlife and timing restrictions on in-water, near-water and tree clearing activities.

The project includes three new bridges, retained soil system and concrete cast-in-place retaining walls, concrete culvert headwalls and bridge removal. Architectural treatments of parapet walls, pilasters and lighting were included in the bridge design in an effort to humanize the scale of the bridge to better suit pedestrians and cyclists.

The bridge over the Metrolinx corridor is a precast concrete girder structure with a 19.2 metre span. Provisions have been made for future electrification and double tracking.

The bridge over the Holland River is a steel bathtub girder structure with a 57.5 metre span. Both bridges include linear servicing infrastructure attached to the underside of the bridges.

The Nokiidaa Trail Pedestrian Bridge is located adjacent to the Holland River Bridge and is a four span pre-stressed concrete beam structure with an overall length of 36.6 metres. The pedestrian bridge was aesthetically enhanced with a timber-clad two span arch superstructure. Bridge removal included the existing roadway bridge over the Holland River which was built over top of the original bridge that sat upon the Rogers Reservoir weir.



## COMPLEXITY

The project avoided impacting the canal and locks at Rogers Reservoir. Their history dates back to the early 1900's when construction began on the Holland River Diversion, a proposed extension of the Trent Canal System from Lake Simcoe to the Town of Aurora. A lack of water supply for the proposed lock system required the project engineers to construct reservoirs, including Rogers Reservoir, to retain the water from the spring freshets. The construction of the canal was cancelled after six years of work, leaving a series of unused locks and swing bridges along the Holland River between the Town of Newmarket and the community of Holland Landing. The design not only protected the existing lock system, but incorporated the locks into the project by creating viewing galleries.

The Nokiidaa Trail Pedestrian Bridge was constructed to enhance the existing lock system by utilizing the existing piers to provide support to the new structure. Care had to be taken when constructing the pier caps to avoid any unnecessary modifications but through careful design considerations and successful execution by the Contractor, the bridge looks natural in the environment and enhances the area, all the while persevering the natural beauty of the existing locks.

## SOCIAL / ECONOMIC BENEFITS

Of the utmost importance to the design was the safety and security of all users. Our Landscape Architects are trained in Crime Prevention through Environmental Design (CPTED) and incorporated these principles to the design of the trail, and all other associated elements. The facilities were designed to allow users of all abilities and all forms of non-motorized transportation, including cyclists, wheelchair users, and hikers, safe access and use. Sidewalk pavement design meets AODA (Accessibility for Ontarians with Disabilities Act) guidelines.

Improving mobility for vehicles, by increasing road capacity · For pedestrians, by providing sidewalks and platforms for future sidewalks and a recreation trail · For cyclists, by providing dedicated and illuminated cycling facilities separated from vehicles and pedestrians by curbs · For trail users, by providing connections that eliminate the need to cross the road · For users with disabilities, by adhering to regulatory requirements · For transit users, by providing transit infrastructure

The project has been designed in a context sensitive manner by lifting the road out of the valley with a bridge over the Holland River. The project eliminates a rail conflict with a bridge over a busy commuter rail line and minimizes the construction footprint on a popular natural and historical site with retaining walls. The project's design hides retaining walls with terraced planting beds and provides a boardwalk through a wetland and connections to an adjacent popular walking trail.



## ENVIRONMENTAL BENEFITS

To enhance the environmental integrity of the site, WSP developed an iconic crossing, where the 2nd Concession touches the Holland River and the Rogers Reservoir, which knit seamlessly with the natural environment. Landscape design solutions include curvilinear retaining walls with steeped planting beds, boardwalk trails, and enhancement plantings to enhance the site's collective identity.

The 2nd Concession Project was reviewed for sustainability using the Envision Rating System (Envision) for Sustainable Infrastructure. Envision reports on 60 sustainability criteria (credits), each with multiple sustainability metrics, organized into five categories. Points are awarded based upon the level of achievement within each credit. The review was conducted by an Envision Sustainability Professional.

The 2<sup>nd</sup> Concession Project scored well within Envision because project planning, design and construction were driven by York Region's Sustainability Principles, namely providing quality communities, an enhanced environment, infrastructure for a growing community and engaged communities. Anticipated Envision scores demonstrate a project that performs beyond the industry norm across a range of sustainability indicators.

While the score has not been verified by a third party, the project is expected to have achieved a "Silver" or "Gold" score, which are the second and third of four possible award levels.

## MEETING CLIENT'S NEEDS

To exceed the basic infrastructure requirements to address capacity and environmental mitigation. Construction of a four lane roadway with left turn lanes at signalized intersections to meet the needs of the proposed development growth in the Queensville, Holland Landing and Sharron communities. York Region expressed on numerous occasions that the Railway / Holland River crossing section of the project was to be a landmark feature that showcased and maintained the historic and natural environment features of this area and incorporate within the design.

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