

# 2023 Canadian Consulting Engineering Awards

## St. David's Road Reconstruction Project Package



### **CIMA Canada Inc. & The Region of Niagara**

Scott Roberts, Partner, Director - Transportation  
400-3027 Harvester Road, Burlington, ON L7N 3G7  
O: 289-288-0287, 6830 | E: [scott.roberts@cima.ca](mailto:scott.roberts@cima.ca)





# St. David's Road Reconstruction

## PROJECT SUMMARY

This project involved the reconstruction of Regional Road 56 (St. David's Road), a Niagara Region arterial road that forms the boundary between the City of St. Catharines and the City of Thorold. The purpose of the project was to upgrade St. David's Road as it serves as a main transportation corridor and was one of the routes for the Canada Summer games hosted by Niagara Region.



Figure 1: St. David's Road Before Reconstruction



Figure 2: St. David's Road After Reconstruction

## INNOVATION

Given the unique arrangement and jurisdictional structure of this "boundary" roadway, which separates the Cities of St. Catharines and Thorold, as well as the presence of active improvement works occurring at the west end of the project area by the MTO and planned improvements at the eastern boundary, the coordination of all parties and maintenance of clear communications was of extreme importance to the success of this project. A proactive progressive decision-making approach was utilized to permit for the consolidation and uniformity of objectives, assurance of consistency in construction works, and elimination of redundancies.

Within the project area, the presence of bedrock as shallow as 1.4 m down from the existing ground surface required balancing criteria to limit roadway re-profiling and utilize existing / pre-excavated trenches for infrastructure wherever possible to mitigate potential construction cost overages, schedule delays, and noise and vibration implications associated with bedrock removal. Due to the limited space within the corridor, a single distribution system watermain was constructed to service both municipalities to replace the existing dual watermain system.

In lieu of having traditional sidewalks on both sides of the road, the decision was made to include for a 3.0m to 4.0m wide asphalt multi-use path (MUP) on the south side of the road. The 4.0m wide MUP is separated from the roadway by a 1.0m wide coloured concrete section of boulevard and the 3.0m wide MUP is separated from the roadway by a 2.5m wide grassed section of boulevard helping improve safety by acting as a buffer space to provide additional separation



**Figure 3: Watermain Installation**



between users of the MUP and motorists. Operational improvements in the form of bus bays, signalization and design parameters upgraded to modern standards were also provided.

As part of this project, the Region of Niagara also requested that 750mm inline butterfly valves be replaced on the Zone 2 transmission main, which had been constructed in the 1970s. The Zone 2 transmission main is the main supply of potable water for a portion of City of St. Catharines, the City of Thorold and a portion of the Town of Niagara-on-the-Lake. Given the existing configuration of valving on the Z2 main, it was not possible to isolate the valves to replace them without impacting supply to residents. Consequently, a plan was developed to replace the valves utilizing line stops that allowed for residents to still receive potable water while the inline valves were replaced.

## COMPLEXITY

Line stops were used to assist in the replacement of the existing inline 750mm watermain butterfly valves. Since the nearly 6km long transmission main serviced residents of St. Catharines, Thorold and Niagara-on-the-Lake, it couldn't simply be shut down fully to replace the existing butterfly valves. In coordination with Regional and City staff, the location of two line stops were determined to allow for the isolation of a just a short portion of the Z2 transmission main and consequently allow for replacement of the inline butterfly valves without putting any residents out of water. Coordination occurred between Regional and City staff to allow for back feeding of areas with potable water with sufficient pressure to ensure residents weren't disrupted by the valve replacement.

Since the roadway serves as a main east-west conduit for residents accessing Highway 406 and students attending near-by Brock University, construction was phased in sections to mitigate construction-related impacts to residents. Sections were determined based on side road



Figure 4: West Line Stop



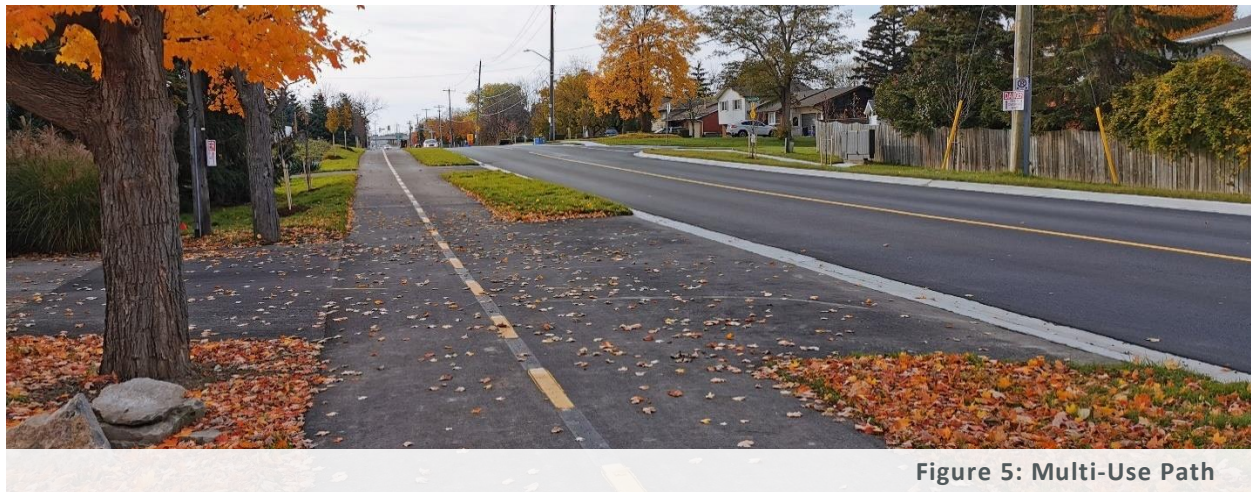
connections to allow for detours around the active construction zone and provide functional alternatives for residents, thus minimizing impacts to their schedule.

## SOCIAL / ECONOMIC BENEFITS

Construction of the majority of works was completed during COVID, which allowed essential workers to remain employed during challenging economic times.

The social benefits provided by the project included the MUP which promotes active transportation as well as street scaping features (street trees) of which more than 100 were planted. Over time, the trees will grow out providing a desirable aesthetic in addition to providing localized shade areas. Inclusion of servicing infrastructure including new watermain and storm sewers (which mitigate flooding potential on private property) provide an enhanced level of service to residents. New street lighting was also included to provide better road visibility at night.

Overall, residents were happy with the changes made and even provided written comments to the Region indicating same.



## ENVIRONMENTAL BENEFITS

Planting of street trees enhanced the landscaping features of the project area, in addition to providing additional greenery along the street.

Instead of replacing all servicing infrastructure as part of the project, in certain cases the decision was made to use a lining to avoid additional excavation and restoration effort. This reduced the overall impact to residents and the existing environment.



Figure 6: Roadside Tree Plantings

## MEETING CLIENT NEEDS

The intent of the project was to upgrade St. David's Road based on the recommendations provided in a Class EA completed in 2018 as well as complying with the Region's Transportation Master Plan, which recommends transit projects that are fully integrated with vehicular, cyclists and pedestrian movements in mind.

To that end, a design was provided and constructed that met the intent of the Class EA recommended solution along with incorporating elements noted in the Transportation Master Plan regarding cohesive transportation corridors that allowed for the movement of people via vehicles/buses, cycling and walking.



Figure 7: Active Transportation Facilities

Including accepted change orders, this project was also completed within the tendered budget of \$8.5 million dollars.





# **Project Images**





**Pre-construction**





**Excavating for Drainage Improvements**





**Trench Excavation**





**Storm Sewer Installation**





Maintenance Hole Installation





Rock Removal





**Backfill of Sewer**





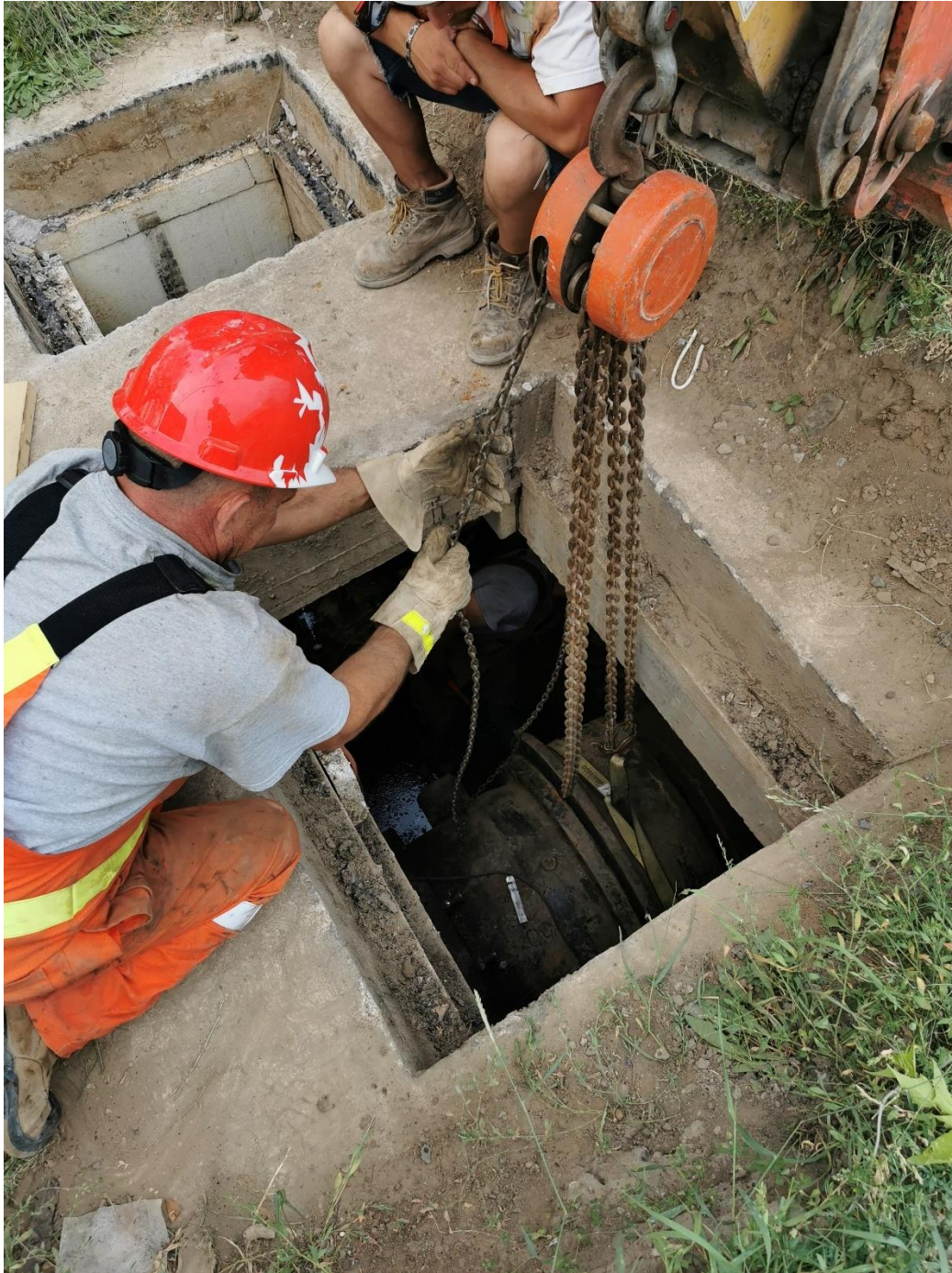
**Watermain Installation**





Linestop Saddle





**Removal of Existing Inline Valves**





**Complete Installation of Dual Stage Pressure Reducing Valves**





**Initial Grading of Road Subgrade**





Swabbing of Watermain





**Tupper/St.David's Intersection – Post Construction**



**St.David's Road – Post Construction**





**St.David's Road – Post Construction**





St.David's Road – Multi Use Path and Street Trees





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