**APPENDIX A**

OAKVILLE

# REPORT

**COMMUNITY SERVICES COMMITTEE MEETING**

**MEETING DATE: APRIL 25, 2016**

**FROM:** Engineering and Construction Department

**DATE:** March 29, 2016

**SUBJECT:** **Update - Rehabilitation of Lakeshore Road Bridge at Sixteen Mile Creek Funding and Construction Schedule**

**LOCATION:** Bridge at Sixteen Mile Creek
**WARD:** Multiple Wards:



## RECOMMENDATION:

1. That the construction methodology and proposed timing/schedule for the Rehabilitation of Lakeshore Road Bridge at Sixteen Mile Creek Project, as detailed in the report from the Engineering and Construction Department dated March 29, 2016, be approved.

2. That a pilot project involving mechanically compacting solar powered trash receptacles in downtown Oakville at Towne Square and along selected locations along Lakeshore Road East, commencing in the Spring of 2017 at a cost of $60,000, be approved.

3. That staff report back to Council on a plan to address the additional funding required to undertake the bridge project and the trash receptacle pilot project, including the potential for any federal infrastructure funding, prior to awarding the construction contract in October of this year.

## KEY FACTS:

The following are key points for consideration with respect to this report:

- The existing bridge at Lakeshore Road crossing the Sixteen Mile creek is in need of rehabilitation; the concrete deck requires complete replacement and the steel box girders require extensive repairs or replacement
- Staff are recommending that the project proceed with the option that includes replacing the existing steel box girders with new steel I-beams. The project also includes enhancements to the bridge (wider sidewalks, pedestrian barrier walls) and streetscape features of the road approaches.
- Work can be completed in an estimated 9 month time frame, commencing in January 2017; a full closure of the bridge is required during the project – traffic will be detoured via Forsythe, Rebecca and Navy Streets. Navy

Street will be permanently converted to 2-way operation by November of this year; Forsythe Street will be temporarily changed to 2-way operation during the detour.

- Staff are also proposing a pilot project involving mechanically compacting solar powered trash receptacles within Towne Square and at selected locations on Lakeshore Road East in downtown Oakville.
- The total cost for the bridge project and the pilot project is $6.7 million; staff will be following up with Council on a plan to address the additional funding required to undertake this project, including any potential Federal Infrastructure funding, prior to the award of the construction contract in October of this year.

## BACKGROUND:

The existing bridge structure along Lakeshore Road crossing the Sixteen Mile Creek was constructed in 1967; it is a three-span concrete deck slab on steel box girders, supported by two valley piers and abutments at each side of the valley slope.

The structure was rehabilitated in 1986 after approximately 20-years of service; work included concrete deck repairs, stabilization of the valley slope behind the abutment walls and replacement of the expansion joints.

In 2010, after an additional 24-years of service, a condition survey was conducted revealing the deck structure required further rehabilitation, including the replacement of the existing concrete deck and sidewalks.

The bridge rehabilitation work was previously programmed into the capital forecast; however, it was deferred while the town initiated the Downtown Transportation and Streetscape (DTS) Study. The DTS study was initiated in 2013 and Council ultimately approved the recommendations of the study in the spring of 2015, including a streetscape master plan for all roads in the downtown core and a plan to convert existing one-way streets to two-way operation

A major initiative coming out of the DTS study is the Lakeshore Road Reconstruction and Streetscape Project (Navy to Allan streets). Lakeshore Road in the downtown core is nearing the end of its service life and requires a full reconstruction. In 2015, Council approved a plan to reconstruct Lakeshore Road and implement the streetscape features recommended in the DTS study; this road project will take 2 construction seasons to complete and is scheduled to commence in 2019.

At the time of Council's approval to move forward with the Lakeshore Road Reconstruction and Streetscape Project, staff had planned to combine the bridge rehabilitation work with the road work (both starting in 2019).

In the summer of 2015, the consulting firm of Marshall Macklin Monaghan (MMM) was retained to undertake the engineering work for both the road and bridge projects.

Further detailed engineering inspections were undertaken of the bridge in the autumn of 2015 as part of MMM's assignment. These inspections are carried out once the detail engineering design phase is initiated – they are conducted at a much more intrusive level to develop a more comprehensive understanding of the scope of the repair work. These inspections revealed concerns with the existing steel box girders below the concrete deck.

While the exterior of the steel box girders are generally in fair to good condition, the interior of the girders are in poor condition; they have experienced significant corrosion as a result of water leaking from cracks from the deck and also from the expansion joints. Corrosion has resulted anywhere in 15-40% steel section losses This is significant issue and will require attention much sooner than the planned 2019 start; there is a need to move forward with the bridge rehabilitation project starting in 2017. The overall scope of work for this project is larger than previously planned.

The purpose of this report is to update Council on the necessary work program and construction schedule to rehabilitate the Lakeshore Road Bridge at Sixteen Mile Creek and to address the additional funding necessary to undertake this project.

## COMMENT/OPTIONS:

Rehabilitation Options:

The entire concrete bridge deck, sidewalks and outer parapet walls will need to be removed and replaced. Due to the extensive existing bridge platform width, there is an opportunity to provide wider sidewalks (2.0 metres) and on road bike lanes. Further, concrete barrier walls will be added between the sidewalk and the travelled portion of the bridge deck providing a physical buffer between pedestrians and traffic. The overall affect will be one that is friendlier to both pedestrians and cyclists while still maintaining sufficient space for vehicles.

The current bridge code requires the replacement concrete deck to be thicker than the original deck (proposed 225 mm deep vs existing 178 mm deep); this along with the wider sidewalks, pedestrian barrier walls and other features will place additional loading onto the girder system.

The current condition of the existing steel box girders needs to be addressed as well as the additional loading created by the additional bridge features. There are two (2) options to address them:

1. Repair/strengthen and recoat the interior of the girders; or,
2. Remove existing steel girders and replace with new steel girders.

Option 1 requires the interior of the girders to be cleaned and coated to extend their life span. Areas of the girders with section losses can be reinforced/strenghtened by welding on additional steel plates However, the actual amount and extent of the losses can only be accurately assessed after the concrete deck is removed and the interior of the girders are fully exposed resulting in potential cost over-runs and delays; there is also some risk that strengthening/reinforcing the girders may not be feasible and the girders would need to be replaced – resulting in the need to order and fabricate replacement girders and setting the project back significantly (beyond one year). Option 1 comes with risk, both in cost and schedule,

Option 2 requires the existing girders be removed completely and replaced with new steel girders. Option 2 is 7% higher in cost than option 1; however, there is an inherent level of certainty in Option 2 as the cost is fixed and the work can be completed in one construction season.

MMM undertook a present value life-cycle cost assessment of the bridge over 75 years to compare the rehabilitation strategies using both girder treatment options. The present value analysis revealed both options were similar (option 2 results in a slightly higher present value cost over option 1); however, a significant benefit of option 2 is that it avoids additional girder repair work that will be necessary later on in the bridge life cycle that would be necessary under option #1 (and the unavoidable construction and traffic impacts associated with that).

Staff and the consultant are recommending to move forward with the full girder replacement option (#2). This option would be the most expeditious way to undertake the bridge project. Further, new steel I-beam girders would address the additional loading expected on the bridge whereas option 1 may require additional reinforcing/strengthening places to address this.

<u>Additional Bridge Features and Streetscape Elements:</u>
In addition to the wider sidewalk, cycle lanes and pedestrian barrier walls that will be incorporated into the bridge, there will also be an opportunity to enhance the structure by providing semi-circular cantilever “lookouts” on both sides of the structure (complete with benches). This will provide a resting place and scenic views of the creek/harbor below.

Streetscape elements included in the design of the Lakeshore Road Reconstruction and Streetscape Project will also be incorporated, where feasible, into the bridge and the road approaches (granite pavers, decorative streetlights, furnishings, etc.).

The streetscape work between Forsythe Street and Navy Street will complement the ultimate streetscape of Lakeshore Road east of Navy Street.

Construction Schedule and Road Closure:
MMM was tasked with developing an aggressive work plan in order to deliver the bridge rehabilitation project in as short a time frame as possible.

One key decision to expedite work is to utilize steel I-beam girder replacements instead of steel box girders. The added weight from the new bridge deck and other features requires the use of more rigid steel girders – I-beams can be installed without compromising the overall bridge clearance to the creek below whereas new steel box girders would need to be deeper, resulting in a loss of vertical clearance over the creek below. As the creek is considered as "navigable water" by Transport Canada, the existing clearance would need to be maintained and therefore the bridge bearing seats in the piers and abutments would have to be raised if steel box girders were used, resulting in additional costs and construction time.

Steel I-beams are also easier to manufacture and will save several weeks in fabrication time over box girders. This will allow girders to be installed in March of 2017. The cost to fabricate steel I-beams are relatively equal in cost to box girders

An option was considered to maintain traffic and pedestrian access across the bridge throughout the project. However, this would require:

- The deck surfaced to be temporarily widened in advance in order to accommodate traffic and constructing staging; this requires extensive additional modifications to the abutments and piers; and
- The project timeline would extend over two (2) full construction seasons.
- Only one lane for traffic can be maintained, requiring a temporary construction signal to alternate traffic movement across the bridge (i.e. one direction at a time).

The option to maintain access is not recommended. The modifications outlined above are significant undertakings in themselves and would add significantly more expense and construction time to the project. Completing the project in 2017 is important as it would avoid having a series of road closure for four (4) consecutive years along Lakeshore Road (the road construction will involve moving road closures in both 2019 and 2020).

The proposed schedule requires a full closure of the bridge to both traffic and pedestrians during the entire construction schedule. Pedestrians and traffic will be detoured via Forsythe, Rebecca and Navy streets. In order to achieve the detour, Navy Street will be permanently converted to two-way operation in November 2016 (i.e. in advance of the start of the bridge project) as per the recommendation of the DTS study. It should be noted that the balance of the two-way road conversions ultimately planned for Thomas, George, Dunn, Church and Randall streets will not occur until 2018. Forsythe Street, which was not part of the two-way conversion plan as recommended in the DTS study, will need to be temporarily converted to two-way operation during the bridge project work in order to achieve the detour.

Staff are recommending to undertake the proposed work plan over a nine (9) month schedule, commencing in January of 2017. Demolition of the deck and girders would be completed prior to the end of February, with erection of the new girders planned for March. The balance of the works (deck, surface works and streetscape of the bridge approaches) would commence in the early spring and be completed by the end of the summer. The new bridge and roadway is anticipated to open prior to the end of September 2017.

In order to meet the January 2017 construction start date, the project contract will need to be tendered in September 2016 and a contract awarded by late October 2016 – this will provide enough lead time to execute the contracts and for the selected contractor to place the order for the fabrication of the steel girders.

Public Engagement:
Public consultation for streetscape materials and furnishings are currently underway as part of the Lakeshore Road Reconstruction and Streetscape Project; a public meeting was held on March 1, 2016 where material and furnishing options were presented. Final selection recommendations will be presented at a public meeting later this spring. These selections will be incorporated into the bridge project.

The Downtown Oakville BIA has been advised of the proposed construction methodology and construction timing/schedule, including the requirement to close the bridge and the proposed detour during the work.

MMM is currently moving forward with the structural engineering design for the bridge; a public meeting will be scheduled to present the final bridge design prior to tendering the project.

Staff have also noted an opportunity to engage Heritage Oakville to discuss a commemorative heritage feature/element within the proposed bridge “lookouts”.

Solar Powered Compacting Trash Receptacle Pilot Project:
In addition to the bridge rehabilitation/streetscape project, staff are proposing to undertake a pilot project involving the use of solar powered mechanically compacting trash receptacles in selected locations within the downtown core. Staff wish to explore the benefits of these units in advance of undertaking the Lakeshore Road Reconstruction and Streetscape Project. These units will be specifically reviewed for mechanical reliability and frequency of trash pickup intervals.

Three (3) units will be located in Towne Square and two (2) units will be placed at high trash frequency locations along Lakeshore Road between Navy and Allan streets. The Parks and Open Space Department will service the units throughout the pilot project period.

The Downtown Oakville BIA has been advised of the proposed pilot project and they are supportive of this initiative.

Funding Requirements:
The overall revised project estimate, as detailed in this report is as follows:

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|---|---|---|
| • Bridge rehabilitation project | | $ 5,400,000 |
| • Streetscape enhancements (Navy to Forsythe) | | $ 940,000 |
| • Quality Assurance/Contract Admin | | $ 300,000 |
| • Trash receptacle pilot project | | $ 60,000 |
| | Total | $ 6,700,000 |

Currently, $3,636,000 in funding has been included in the capital forecast in 2019 for the Lakeshore Road Bridge at Sixteen Mile Creek Rehabilitation Project (53361501). In order to implement the project as described in this report, staff will be reporting back to Council on a plan to fund the project, including the potential for any Federal Infrastructure funding prior to awarding the contract in October of this year.

## CONSIDERATIONS:

### (A) PUBLIC

The public is currently being engaged with regards to streetscape materials and furnishings selections; these selections will be incorporated into the bridge project (Forsythe Street to Navy Street).

The Downtown BIA has been advised of the proposed construction work plan, schedule and the implementation of the conversion of Navy Street to two way operation in advance of the bridge project. They have also been advised of the trash receptacle pilot project.

The final engineering plans for the bridge project will be presented at a public meeting prior to the tendering of the project.

## (B) FINANCIAL

The overall project estimate, as detailed in this report, is $6.7 million. $3,636,000 in funding is currently included in the capital forecast in 2019 for the Lakeshore Road Bridge at Sixteen Mile Creek Rehabilitation Project (53361501). In order to implement the project as described in this report, the funding identified in 2019 for the bridge needs to be advanced in time to award a construction contract in October of this year. Further, additional funding in the amount of $3,064,000 is required to undertake this project.

Staff will be following up with Council on a plan to address the funding required, including the potential for any federal infrastructure funding prior to proceeding with the project. The funding will need to be resolved prior to the awarding the contract in October of this year.

## (C) IMPACT ON OTHER DEPARTMENTS & USERS

Staff at both the Roads and Works Operations and Park and Open Space have been consulted with regards to the bridge project. Staff at Parks and Open Space will service the solar powered compacting trash receptacles during the pilot project period.

## (D) CORPORATE AND/OR DEPARTMENT STRATEGIC GOALS

This report addresses the corporate strategic goal to:

- enhance our natural environment
- enhance our economic environment
- continuously improve our programs and services
- provide outstanding service to our residents and businesses

## (E) COMMUNITY SUSTAINABILITY

The Lakeshore Road Bridge at Sixteen Mile Creek provides an important link to the Downtown Oakville and Kerr Village commercial districts. With its proximity to the commercial districts, cultural performance facilities, harbour and heritage district, the timely rehabilitation of the structure impacts all four pillars of sustainability.

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