



Staff Report to Council - for Information

Title: Durham Street Bridge - Third-Party Review Final Recommendations

From: Adam Stanley, Director of Transportation and Environmental Services

Date: March 7, 2024

Report Purpose:

This Durham Street Bridge third-party review final recommendations report is for information.

Report Summary:

Triton Engineering Services (Triton) has completed their third-party review of the ongoing Municipal Class Schedule 'C' Environmental Assessment (MCEA) with the help from sub-consultants Burgess Engineering Inc. (Burgess) and HAL Group Inc. (HAL). The Report concludes that BM Ross has adequately addressed the Problem Statement, by following the MCEA process set out during the initial project commencement phase, and due to the nature of the project and implications to public safety, BM Ross has selected a suitable Alternative for replacement of the bridge and local detour options.

Triton also highlights that the additional bridge condition investigations completed by the HAL Group Inc. have affected the MCEA process and provide evidence that bridge rehabilitation is a viable alternative. They recommend that the County procure the services of an Investigate-Design-Build Contractor to complete "Immediate Bridge Repairs" by May 1, 2024 to maintain safe passage over the Bridge while the MCEA process is ongoing, at an estimated capital cost of \$3.2M-\$3.5M. They further recommend that the alternative of bridge rehabilitation be re-introduced into the MCEA process for evaluation, at an additional estimated capital cost of \$1.8M-\$2.1M. The total estimated capital cost for rehabilitation, including "Immediate Bridge Repairs" is \$5.0M-\$5.6M and is anticipated to take 12-16 months.

Background:

At the July 6th, 2023 Transportation Committee Meeting, the Committee gave staff the direction to engage Triton Engineering Services in a third-party review with a scope focused on the following items:

- 1) A review of the proposed detour alternatives for the Durham Street Bridge Replacement, as identified in the ongoing Schedule 'C' EA, including reviewing the implications of a temporary bridge and potential locations not currently identified.*

- 2) *A review of implications (by means of comparison) of a wooden permanent bridge Vs. a concrete construction permanent bridge, both in length of construction (time) and cost. Environmental factors such as Hydrology, etc. should be considered as well.*
- 3) *A review of BM Ross's proposed life extending measures (reinforcement) for the existing Durham Street Bridge to ensure public safety is maintained and a professional opinion on whether there could be another life extending measure considered.*

As Council heard at the February 1st, 2024 Council meeting, in order to adequately assess the current condition of the Durham Street Bridge, Triton utilized the services of Burgess Engineering Inc. (Burgess) and HAL Group Inc. (HAL) as sub-consultants to undertake a comprehensive Bridge Condition Survey (BCS), authorized by County Staff.

Both Burgess and Triton provided summary letters to Bruce County staff outlining the findings of the BCS. It was determined that:

- The existing bridge is generally structurally sound and rehabilitation should be investigated.
- Rehabilitation could be a feasible and economical solution to extending the overall life of the bridge.
- There is some concrete deterioration at the half joints along with observed heavy impact loading.
- A recommendation was made to correct the half joints by either temporary repair or rehabilitation.
- A recommendation was made to apply a 3-level load limit to the bridge (15, 25 & 30 tonnes) and provide an alternate truck route (Municipal Maintenance and Emergency EMS/Fire Vehicles to be exempt).
- A recommendation was made that a qualified professional complete a visual inspection of the half-joints on a quarterly basis.

Upon direction from County Council, Staff worked with the Municipality of Brockton, The Municipality of South Bruce, The Municipality of West Grey, Grey County and the MTO to implement two (2) alternate truck routes (ATR's) which have been in place since a 3-level load limit was instated on the Bridge effective February 16th, 2024.

On February 21st, 2024 representatives from BM Ross & Associates Ltd. (BM Ross) completed the Q1 2024 inspection of the half-joints as per Triton and Burgess' recommendation. It was noted that the condition of the half-joints do not appear to have worsened since the last inspection, which was completed in October of 2023 by Burgess. BM Ross noted in their letter, dated February 23rd, 2023, that they are of the opinion that the 3-level load limit should remain in place and that repairs to the half-joints should be made in Spring of 2024. Their inspection letter is attached for reference. The next quarterly inspection is expected to be completed by the end of Q2 in June of 2024.

Triton has completed their final report for the third-party review of the Class Environmental Assessment of the Durham Street Bridge. It is attached to this information report for Council's review. A summary of the findings are provided below.

Item #1 - Review of the Existing Detour Options and Potential Alternative Locations

As part of their assessment of the work completed to date, Triton has offered an updated 2024 order of magnitude cost for replacement of the Bridge in the same location and associated detour route contained within the Schedule 'C' Class EA (MCEA).

<i>Updated Costs For Existing Options in MCEA</i>		
From May 11, 2023	Item	Capital Cost (2024)
<i>Preferred Alternative</i>	<i>Bridge Replacement in same location Detour via Local Detour Route (8.2km)</i>	<i>\$ 15,750,000.00*</i>
<i>Identified Alternative</i>	<i>Bridge Replacement in same location Detour via Temporary Vehicle Bridge Adjacent to Orange Street</i>	<i>\$ 20,500,000.00*</i>
<i>Identified Alternative</i>	<i>Bridge Replacement in same location Detour via Temporary Pedestrian Bridge Adjacent to Orange Street</i>	<i>\$ 16,300,000.00*</i>
<i>*Denotes costs excluding the immediate bridge repairs required (estimated at \$3.2M-\$3.5M)</i>		

They note that “the above costs include all tangible costs (labour and material), engineering and contingency allowance” but does not include the costs that the County would need to spend to immediately repair the bridge which is discussed later in this report.

As for an analysis on the length of time required to complete the three (3) options listed above they believe it would take 24 to 36 months for construction. All three (3) options are expected to “extend the Bridge’s service life to at least seventy-five (75) years, provided regular preventative maintenance activities are implemented and sustained.”

Triton looked at two (2) other alternatives not previously identified in the MCEA.

Alternative 1 - Replace Existing Bridge & Offset New Bridge Downstream - Maintain Traffic on Existing Bridge

This alternative involves constructing the proposed 13.2-metre-wide bridge immediately downstream (north) of existing bridge, while the existing bridge would remain in place, to maintain vehicle and pedestrian connectivity during construction. This alternative would not require a local detour. It would require the relocation of several utilities, such as Gas and Hydro, the acquisition of properties on the north side of the existing bridge, a significant road realignment and several other costly considerations listed in the report. It is expected that the property acquisition would take 12-24 months to complete, ahead of the 18-24 month construction period (30-48 months total).

<i>Estimated Cost of Alternative 1</i>	
Item	Capital Cost (2024)
<i>Immediate Bridge Repairs</i>	\$ 3,200,000.00 - \$3,500,000.00
<i>Replacement (3 span concrete structure)</i>	\$ 13,500,000.00
<i>Road Realignment</i>	\$ 750,000.00 - \$1,000,000.00
<i>Property Acquisition (estimated)</i>	\$ 500,000.00 - \$2,000,000.00
Total	\$ 17,950,000.00 - \$20,000,000.00

After carefully examining Alternative 1, Triton indicated that “although this Alternative is potentially viable, due to the need to implement the Immediate Bridge Repairs as well as the unknowns involved with the outcome of property acquisition, it is not recommended that this Alternative be brought forward for evaluation under the MCEA process.”

Alternative 2 - Rehabilitate Existing Bridge (Various Levels) - Maintain Single Lane Traffic

This alternative is consistent with the findings of the BCS completed by HAL and summary letter completed by Burgess in January of 2024.

Triton indicates “The advantage of structure rehabilitation is that local traffic can be maintained during construction, excluding heavy truck traffic exceeding the prescribed 3-level load limit weight restriction. As rehabilitation activities can be completed independent of a complete bridge closure, the need for a local detour can be eliminated and/or minimized. During rehabilitation of the Bridge, access by light duty and essential/emergency vehicles would be maintained and controlled by temporary signalization on either end of the bridge, reduced to single lane traffic.”

They estimate that the total construction period could be condensed to 12-16 months if the work were to commence by May 1st, 2024. The report indicates that the expected life extension for the structure would be 20-40 years, noting that “achieving a service life up to forty (40) years requires that all proposed rehabilitation items be implemented”. Regular maintenance would also be critical to extending the service life.

<i>Estimated Cost of Alternative 2</i>	
Item	Capital Cost (2024)
<i>Immediate Bridge Repair - 7 Months (2024)</i>	\$ 3,200,000.00 - \$3,500,000.00
<i>Remaining Bridge Rehabilitation - 7 to 9 months (2024-2025)</i>	\$ 1,800,000.00 - \$2,100,000.00
Total	\$ 5,000,000.00 - \$5,600,000.00

After carefully examining Alternative 2, Triton indicated that “As the bridge repairs are required to complete any work involving the use of the existing Bridge to route traffic during construction, it is recommended that the associated works required to complete the rehabilitation of the remaining Bridge elements be further evaluated within the MCEA process.”

Item #2 - Alternative Structure Replacement Material

The third-party review evaluated the comparison criteria between a wooden permanent bridge and a concrete permanent bridge. The Durham Street Bridge is located on a heavily used road corridor (approximately 12,000 vehicles per day) which also sees large volumes of heavy truck traffic daily. The Report found that a concrete bridge offers the most structural durability, ability to handle heavy load capacities and provides overall lower maintenance costs. Through this exercise it was determined that the use of a wooden bridge, to replace the Durham Street Bridge, was not recommended and should not be included within the MCEA process.

Item #3 - Proposed Temporary Life Extending Repair Measures

Triton and Burgess evaluated the proposed temporary life extending repair measures that BM Ross had proposed in June of 2022. It was recommended to provide further redundancy in the support system as follows:

- Extend I-Beams further beyond the half joint (calculations required).
- Grout space between I-Beam and existing arched girder to provide bearing surface area.
- Incorporate an additional set of threaded bars to provide support on left and right side of the half joint.

The report provides some diagrams showing the details. The life extending measures are consistent with the findings of the BCS completed by HAL and the initial investigation completed by BM Ross in 2019. The report states “the need for repair of the half-joints has been reinforced and confirmed. This repair is recommended to occur in 2024 and ahead of the MCEA completion.” The estimated cost for these immediate repairs are \$3.2M to \$3.5M.

Recommendations & Conclusions

The third-party review provides the following conclusions:

- That BM Ross has adequately addressed the Problem Statement by following the MCEA process set out during the initial project commencement phase.
- Due to the nature of the project and implications to public safety BM Ross has selected a suitable Alternative for replacement of the bridge and local detour options.
- The additional bridge condition investigations completed by the HAL Group Inc. have affected the MCEA process and provide evidence that bridge rehabilitation is a viable alternative.

The third-party review provides the following recommendations:

- That bridge rehabilitation be re-introduced into the MCEA process as a viable alternative for evaluation, in addition to the original bridge replacement option.
- That the County procure the services of an Investigate-Design-Build Contractor to complete repairs of the bridge's half-joint and accompanied bridge elements (Immediate Bridge Repairs) in 2024 in order to maintain safe passage over the Bridge, while the MCEA process is ongoing.

Representatives from Triton & Burgess Engineering are here today to provide a summary presentation of the third-party review.

Financial/Staffing/Legal/IT Considerations:

There are no immediate financial considerations. Staff will bring forward a Report for Direction at a future Council meeting to address the financial considerations outlined in Triton's final recommendations.

There are no staffing, legal or IT Considerations at this time.

Interdepartmental Consultation:

The Office of the CAO and Corporate Services were consulted on this report.

Link to Strategic Goals and Objectives:

Community and Partnerships - Enhance and grow partnerships

Link to Departmental Plan Goals and Objectives, if any:

Goal No. 5 from the Transportation & Environmental Services Departmental 2024 Business Plan - Re-enforcement of the Durham Street Bridge.

Report Author:

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Approved for Submission:

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