To: Warden and Members of Council  
From: Peter Nielsen, Manager, Engineering and Design  
Date: April 3, 2019  

Subject: INF 2019 009 James A. Gifford Causeway Widening Cost Savings Opportunities  

Recommendation:

Be it resolved that County Council receives the James A Gifford Causeway Widening Cost Savings Opportunities report; and

That County Council endorse proceeding with the Causeway Improvement Plan as being the lowest cost solution and as previously approved by Council in the 10 year capital forecast.

Overview

At the February 20, 2019 meeting of County Council, staff were directed to bring forward a report with recommendations on how costs could be reduced to complete the widening, embankment stabilization and roadway rehabilitation of the James A. Gifford Causeway (Causeway).

As with all major infrastructure renewal projects, a review of project risks, including costs, is an integral part of the planning, design and construction phases. This report presents a discussion of associated risks related to public safety, infrastructure life cycle, procurement, and project costs.

Background

In July 2013, the County completed and filed the Environmental Study Report (ESR) for the Widening and Rehabilitation of the James A. Gifford Causeway.

The overall objective was to allow for the planning of needed improvements to the Causeway and included:

- rehabilitation of the wearing surface of the existing 2-lane roadway;
- replacement of the deficient roadside safety devices (guiderails);
- stabilization of the shoreline and embankments;
- future traffic demand of vehicles utilizing the Causeway.

The sequencing and timing of these improvements was analyzed through the municipal class environmental assessment process. The following priorities were outlined in the ESR and were approved by Council:

Priority 1: The cost to implement operational improvement Alternative 3, which consists of 3.5 m lane with 3.0 m paved shoulder one side, and 4.5 m shared lane with 2.0 m sidewalk across one side (i.e. entire length) is approximately $3.2 million (current dollars). This cost also includes the rock surcharge for the future 4-laning.

Priority 2: Construction of the single lane roundabout intersection improvements at the west end of the Causeway (Bridgenorth) will cost approximately $1.8 million.

Priority 3A: A signalized intersection at the east end of the Causeway (Ennismore) will cost approximately $0.4 million (current dollars), including sidewalk and lighting. The future long term plan for a roundabout at this location will cost approximately $1.2 million (current dollars).

Priority 3B: The total capital and life cycle cost to widen the Causeway to 4 lanes is approximately $3.4 million (current dollars) which includes property acquisition. The pedestrian facilities (i.e. sidewalk, lookout) will be implemented during the short-term improvements, and therefore are excluded from this cost.

At the regular Council meeting on June 26, 2013, Council endorsed the following resolution:

6-2013 Moved by: Councillor Pearcy
Seconded by: Councillor Moher

Be it resolved that County Council:

1. Endorses the preferred alternative recommendation as presented by Bytown Engineering on behalf of the Project Steering Committee, namely:
   a. Bridgenorth Intersection – Single Lane Roundabout plus through lane on Ward Street.
   b. Ennismore Intersection – Channelization (Long Range plan) – protection for roundabout
   c. Causeway Operational Improvements: Alternative 3 – 3.5 m lane with 3.0 m paved shoulder one side, and
4.5 m shared land with 2.0 m sidewalk across one side (i.e. entire length)

d. Causeway Long Term Improvements: Alternative 3S – 4 lane urban widening to the south, paved shoulder.

2. Directs the Environmental Study Report be advertised for the mandatory 30 day review period.

3. That prior to the commencement of any construction, a detailed budget request will be made to County Council.

Carried

Following the resolution of County Council, these improvements were included as part of the 2014 10-year capital forecast. The overall objective, widening the Causeway to four (4) lanes “Causeway Operational Improvements: Alternative 3S”, is shown in Figure 2.

Figure 1 Aerial plan – Causeway Improvement Priorities
Since receiving the endorsement of the EA by Council, the 10-year capital forecast is annually reviewed and updated with cost and risks data as more details on the proposed Causeway improvements have become available.

To prepare for the future Causeway improvements, repairs were completed in 2014/2015 to the three (3) cross-culverts by installing culvert liners in order to maintain the structural integrity of the pipes.

During 2017, detailed design and tender document preparation proceeded for the Causeway widening project and the first application was submitted to the Department of Fisheries and Oceans for authorization to proceed with the rock (surcharge) widening component of the EA priorities.

On May 4, 2018, a wind storm passed through the County of Peterborough with wind gusts reported to be in excess of 100 km/hr resulting in high waves on Chemong Lake, power outages and other damage throughout the region.

The prevailing southwest winds caused extensive shoreline damage to the embankments of the Gifford Causeway. Immediate repairs were required to stabilize the Causeway embankment, and this heightened the need to complete the planned future improvements.

Recognizing the need to prevent a catastrophic road failure while at the same time plan for future growth, the Causeway widening and stabilization project is the first major step in achieving the stated long term goal of County Council to construct a 4-lane road cross-section on the Causeway.

**Figure 2 Causeway – Recommended Long Range Improvement**
In July 2018, Tender No. T-13-2018 – James A. Gifford Causeway Widening Preload (Tender) was issued for public bidding with construction to commence in October 2018, with several bids being received. After a value engineering review and renegotiation with the lowest bidder, on November 7, 2018, the tender was awarded to Drain Bros. through a MOU that reflected the adjustments to the tender items.

A delay to the original start date of October 2018 occurred due to the requirement for additional consultation with Federal Department of Fisheries and Oceans (DFO). With amendments to the Fisheries Act, the Federal Department of Fisheries and Oceans considers potential adverse effects to First Nations aboriginal and treaty rights holders. Additional consultation has occurred regarding fish habitat monitoring protocols and, these protocols are being implemented during spring of 2019. With authorization being received from DFO in the near future, the Causeway widening and stabilization is expected to start in October 2019 and proceed over the next two years.

**Approved Sequencing of the Causeway Improvement Plan**

The scope of possible costs savings opportunities considers projects that are included in the Causeway Improvement Plan within the approved 10-Year capital forecast and the County’s Transportation Master Plan and Official Plan (up to 2039).

The current and approved sequence of construction activities to be completed on the Causeway in order to achieve Council’s long term goal is shown in Table 1.

### Table #1 Approved Project Sequencing

<table>
<thead>
<tr>
<th>Short Term Improvement</th>
<th>Long Term Improvement</th>
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<tbody>
<tr>
<td>Short Term Improvement</td>
<td>Long Term Improvement</td>
</tr>
<tr>
<td>1 Widening &amp; Stabilization</td>
<td>5 Roundabout</td>
</tr>
<tr>
<td>2 Maintenance repairs</td>
<td>6 Roundabout</td>
</tr>
<tr>
<td>3 Road enhancements</td>
<td>7 4-Lane construction</td>
</tr>
<tr>
<td>4 Chemong Bridge</td>
<td>8 Chemong Bridge</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Short Term Improvement</th>
<th>Rock fill &amp; stabilize shoreline</th>
<th>2019-2020</th>
<th>$5.8 M</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Maintenance repairs</td>
<td>Pavement Rehab. Exist. 2-lanes</td>
<td>2021</td>
<td>$2.7 M</td>
</tr>
<tr>
<td>3 Road enhancements</td>
<td>sidewalk, st. lights, storm sewer</td>
<td>2021</td>
<td>$1.0 M</td>
</tr>
<tr>
<td>4 Chemong Bridge</td>
<td>rehabilitation</td>
<td>2022</td>
<td>$0.8 M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5 Roundabout</th>
<th>Bridgenorth</th>
<th>2029</th>
<th>$1.1 M</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Roundabout</td>
<td>Ennismore</td>
<td>2029</td>
<td>$1.1 M</td>
</tr>
<tr>
<td>7 4-Lane construction</td>
<td>2 new lanes; rehab ex. 2-lanes</td>
<td>2039</td>
<td>$7.0 M</td>
</tr>
<tr>
<td>8 Chemong Bridge</td>
<td>Twin</td>
<td>2039</td>
<td>$15 M</td>
</tr>
</tbody>
</table>

$10.3 M

$24.2 M
The long term cost projection of the completion of the identified improvement will result in the following funding requirements over a 20 year planning horizon:

<table>
<thead>
<tr>
<th></th>
<th>5 years</th>
<th>10 years</th>
<th>20 years</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$10.3 M</td>
<td>$2.2 M</td>
<td>$22.0 M</td>
<td>$34.5 M</td>
</tr>
</tbody>
</table>

The purpose of the widening and stabilization activity is to place rock fill onto the compressible bed of Chemong Lake.

The rock will be permitted to settle and consolidate for the next 20-25 years so that the fill will be stable and the expansion from 2-lane to 4-lanes can be completed at that time.

Additionally, placing the rock fill prior to completing the maintenance repairs on the existing 2-lane roadway will eliminate the anticipated and significant damage to the asphalt wearing surface by heavy construction.

During the completion of the maintenance repairs, road enhancements will proceed in conjunction with the Township of Selwyn (sidewalk, street lights).

The projected lifespan of the road maintenance repairs to the existing 2-lane roadway is 20-25 years and coincides with the need to expand the Causeway from 2-lanes to 4-lanes due to anticipated traffic demand.

Risk Management – Approved Sequencing of the Causeway Improvement Plan

From a risk management perspective, infrastructure life cycle and regulatory approval risks are the most significant to address. The Causeway is a regional transportation corridor that services a traffic demand of greater than 10,000 vehicles per day. This is a key transportation linkage in the County and proper operation is vital for emergency...
management, economic development and movement of goods and services throughout the region.

The tender awarded to Drain Bros. addresses the placement of rock fill to construct a widened road base and to stabilize the shoreline of the Causeway adjacent to the water’s edge.

The existing pavement has reached the end of its lifecycle and requires rehabilitation in order to address the deteriorated pavement condition, asphalt cracking and variable settlement along the road surface.

As documented in the EA, the existing steel beam guiderail is demonstrating rotational movement that has occurred over time as the road base continued to settle.

Once the rehabilitation of the pavement structure has been completed, the steel beam guiderail may be removed and replace in its current configuration.

The condition of the pavement structure across the Causeway continues to be inspected and monitored by the County. Based on visual observations of the pavement condition, the roadway remains in a safe and passable condition. Additionally, the County conducts regular and routine patrols of all County infrastructure and is able to respond immediately when repairs or maintenance of existing infrastructure may be required.

Prior to proceeding with construction, the authorization of the DFO must be secured and this is anticipated to be received in the near future. Should the DFO authorization not be received in a timely manner, it may be necessary for Council to consider re-sequencing of project activities. At this time, staff do not see major obstacles to receiving the DFO authorization prior to the start of construction, not due to start for another six (6) months.

Minimizing Costs - Approved Sequencing of the Causeway Improvement Plan

The planning of large construction projects involves the review of costs throughout the design process for the purpose of optimizing costs, resources, schedule and the quality of the project. This project is no different. In fact, significant effort has been expended to look at ways to reduce costs, mitigate risk and optimize project delivery, throughout the planning, design and tendering phases of the Causeway widening and stabilization project.

1) Alternative Material Procurement

In 2017, the County received the offer from Covia Canada Limited (formerly Unimin Canada Limited) to supply, at no cost to the County, 185,000 tonnes of rock fill for the County’s project.

A working committee comprised of County, consultant (Civil and Geotechnical) and Covia representatives was established to develop a framework under which parties could
discuss how the supply of 185,000 tonnes of rock fill could be accomplished in the most efficient and effective manner.

In order to fully understand the scope and net cost of this opportunity, it was determined that two (2) bidding options would be included in the tender document, being contractor supply and Covia Canada Limited supply of the rock fill.

The Tender included both bidding options for public bidding with results received on August 28, 2018, as follows:

<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Drain Bros. Excavating Limited</td>
<td>$6,745,115.00</td>
<td>$13,997,481.50</td>
</tr>
<tr>
<td>Coco Paving Inc.</td>
<td>$11,108,064.49</td>
<td>$17,848,526.47</td>
</tr>
<tr>
<td>Royel Paving, A division of CRH Canada Group Inc.</td>
<td>$11,385,149.00</td>
<td>$27,431,770.00</td>
</tr>
<tr>
<td>Atlantis Marine Construction Canada Inc.</td>
<td>$12,402,480.00</td>
<td>$24,057,480.00</td>
</tr>
<tr>
<td>Dynex Construction Inc.</td>
<td>$14,987,714.00</td>
<td>No bid</td>
</tr>
<tr>
<td>SLR Contracting Group Inc.</td>
<td>$15,445,000.00</td>
<td>$19,524,250.00</td>
</tr>
</tbody>
</table>

The bid results demonstrated to Council that the County would be in a more favourable financial position by proceeding with the option of the lowest bidder supplying the rock fill for the project. However, the low bid received exceeded the amount of funding available for the project.

2) Optimize Design (Value Engineering)

In an effort to achieve cost savings, staff met with the design engineer (BT Engineering) and Drain Bros. Excavating Limited (Drain Bros.) being the low bidder, in September 2018 to review all contract items and the scope of work in order to determine if there were potential areas of cost reduction.

The group completed a value engineering exercise which involved a systematic review of all components of the contract, including rock and material specifications, construction procedures and other components that comprised the construction of the widened roadbed.

As the result, a net savings of $1.54M ($6,745,115.00 vs. $5,200,518.00) was achieved.

On November 7, 2018, a Memorandum of Understanding (MOU) was executed between...
the County and Drain Bros. in support of adjustments to the original scope of work and tender.

3) Alternative Project Activity Sequencing

An alternative sequencing of project activities was considered, as part of the request to evaluate potential cost savings to the approved Causeway Improvement Plan. Consideration was given to deferring the widening and stabilization to beyond the 20 year horizon while completing maintenance repairs in the near term (refer to Table 2).

### Table #2 Alternative Project Sequencing

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</tr>
<tr>
<td>1 Inflation on Rock Fill Estimated deferral cost to 2039 2039 $4.0 M</td>
<td></td>
</tr>
<tr>
<td>7 4-Lane construction 2 new lanes; rehab ex. 2-lanes 2039 $7.0 M</td>
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<tr>
<td>$3.5 M</td>
<td>$2.2 M</td>
<td>$32.8 M</td>
<td>$38.5 M</td>
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</table>

The alternative sequencing would require the deferral of the widening and stabilization activity to the 20-year planning horizon when the need for additional traffic capacity has been projected. However, it is projected that this would result in a net cost increase to the
Causeway Improvement Plan by $4.0M (assuming 2.5% inflation rate compounded per annum due to construction cost increases).

Other changes to the Causeway Improvement Plan include:

a) Advancing maintenance repairs of the existing 2-lane roadway including shoreline stabilization and the Chemong Bridge rehabilitation within 5 years.

b) These maintenance repairs would include shoreline restoration, removal and replacement of the existing steel beam guiderail and pulverizing and paving the existing 2-lane road in its current configuration.

c) Deferring road enhancement features for 20 years, such as streetlighting and sidewalks, and would affect Selwyn Township’s plans as well.

From a risk management perspective the most significant risks relate to procurement and contract administration associated with the alternative sequencing of activities.

The rehabilitation of the existing 2-lane road surface and replacement of the steel beam guiderail are activities are defined as maintenance activities under the MCEA process as Schedule ‘A’ activities are preapproved and may proceed without any requirement for consultation or documentation.

As mentioned, on November 7, 2018, the tender was awarded to Drain Bros. through a MOU that reflected the adjustments to the tender items. This was a result of the value engineering exercise entered into with Drain Bros. resulting in a net savings of $1.54M. If County Council were to proceed with the alternative sequencing, it would be necessary to renegotiate major items in the contract.

There has been considerable good faith demonstrated between the County and Drain Bros. through the endorsement of the MOU that resulted in considerable savings to the contract.

Expenses have already been incurred by the County while proceeding with the contract with some items remaining to be invoiced by Drain Bros.

Existing costs that have already been incurred include bonding, insurance, processed rock currently stockpiled by the County and silt barrier pre-purchased by the contractor.

Renegotiating the current contract with Drain Bros. represents a significant change in scope to the original provisions of Tender No. T-13-2018 that would require agreement between parties and the issuance of a change order to the contract. Preliminary general discussions between County staff and Drain Bros. representatives have taken place but a comprehensive agreement will need to be negotiated due to the significant scope change.

Should it be determined that the scope change is too significant then this may require revoking the existing contract. There is a risk of litigation by the contractor against the County over this matter.
Anticipated Impacts on Local and/or First Nations Communities

Following the EA process as a Schedule ‘C’ undertaking, consultation was conducted with the greater Peterborough County community and First Nation communities in the form of Public Information Centres, public meetings with County of Peterborough and Township of Selwyn Councils, meetings with regulatory agencies including the Department of Fisheries and Oceans (DFO), Transport Canada (TC), Ministry of Natural Resources and Forestry (MNRF), Otonabee Region Conservation Authority (ORCA), community groups and interested individual residents and property owners.

Consultation has been continuing with the Department of Fisheries and Oceans to assist in achieving the mandate being the Duty to Consult with First Nations on potential impacts to Aboriginal and treaty rights. With amendments to the Fisheries Act, the Federal Department of Fisheries and Oceans must consider potential adverse effects to First Nations Aboriginal and treaty Rights through their Duty to Consult on the Causeway Widening project.

Considerable effort has been focused on developing responses and required actions including enhancing the fish monitoring protocol that will measure and monitoring walleye populations along the Causeway that is expected to commence in late March/early April that will involve County, DFO and Curve Lake First Nation representatives.

Link to County of Peterborough Strategic Plan Priorities

Improved Essential Infrastructure

In consultation with:

1. CAO Troy Speck
2. Grant Murphy, Director, Infrastructure Services Department

Communication Completed/required:

Construction activities will be able to commence upon receipt of the authorization from the Federal Department of Fisheries and Oceans and Transport Canada.

Attachments

1. Presentation

Respectfully Submitted,
Peter Nielsen, C.E.T.
Manager of Engineering and Design

For more information, please contact:

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