

HALIFAX

P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Item No. 15.1.2
Halifax Regional Council
April 5, 2022

TO: Mayor Savage and Members of Halifax Regional Council

SUBMITTED BY: Original Signed by 

Jacques Dubé, Chief Administrative Officer

DATE: February 1, 2022

SUBJECT: **Increase to Contract, RFP-18-306 Consulting Services – BR041- Lucasville Bridge Rehabilitation Design**

ORIGIN

This report originates from a need to increase the cost for RFP No. 18-306 Consulting Services – BR041- Lucasville Bridge rehabilitation design and estimate beyond 20% and \$20,000 of its original award.

LEGISLATIVE AUTHORITY

The Municipality may spend money for municipal purposes in accordance with section 79A of the HRM Charter. The recommended contract award complies with all of the pre-requisites for awarding contracts as set out in section 26 of Administrative Order 2020-004-ADM, the *Procurement Administrative Order*.

The recommendation complies with all the pre-requisites for Contract Amendment as set out in section 32 of the Administrative Order 2020-004-ADM, the *Procurement Administrative Order*.

Section 32, Section 7 of the *Procurement Administrative Order* provides that Halifax Regional Council can approve cumulative contract amendments for any amount.

RECOMMENDATION

It is recommended that Halifax Regional Council approve an increase to contract with Harbourside Engineering Consultants (Purchase Order No. 2070790796) for additional work from the original scope in the amount of \$21,702 (net HST included) with funding from Project Account CR200003– Bridges, as outlined in the Financial Implications section of this report.

BACKGROUND

The Lucasville Bridge is a concrete girder structure which carries Lucasville Road (North-South) over the Sackville River. It is a single span concrete girder structure, approximately 21.5 meters in length with overall bridge width of 13.4 meters. On April 2018 Harbourside Engineering Consultants was awarded RFP 18-306 for the detailed design for repairs to the Lucasville Bridge (BR041).

Conceptual designs for a multiuse path (MUP) are being developed for Lucasville Road. As part of this project, options for crossing the Sackville River were identified. The economical option would be to use the existing vehicle bridge for this crossing. However, it is not clear if the current bridge has sufficient capacity for this change in use.

DISCUSSION

The proposed work on the Lucasville Bridge is a significant investment. The original scope of work did not consider the addition of active transportation (AT) infrastructure as part of repair work, and no significant changes to the railing system were anticipated. AT infrastructure was to be addressed in future with a separate structure. However, based on the level of investment required, it is an opportune time to verify if the AT MUP can be added to the existing structure, by changing the cross section of the existing bridge. This would mean replacing the railings. An evaluation is therefore required to verify that the bridge has sufficient capacity to accommodate the addition of a MUP without needing significant strengthening, and also to confirm that it can accommodate new loadings for the expected extended life span of the bridge. This will inform the long-term decision on the life span of the bridge.

Harbourside Engineering Consultants has provided an estimate of \$11,894 (net HST included) to complete these load evaluations. As part of this work, they will outline their findings in a memo and provide a cost estimate to add the MUP.

If, through the load evaluation, Harbourside Engineering Consultants determines a MUP on Lucasville Bridge is feasible, there will be some additional design work. This work overlaps significantly with the design work currently in progress by Harbourside Engineering Consultants. Therefore, they have provided a cost of \$9,808 (net HST included) to complete this additional design work. The additional design work would be provisional and only be carried out by the consultant if the load evaluation indicates the addition of the MUP to the Lucasville Bridge is feasible and determined to be the best solution overall for the corridor.

As a result of the above additional scope, the cumulative increase of consultant design fees for RFP 18-306 is \$60,496 (net HST included). A summary of the changes are as follows:

Contract Award (net HST included)	\$ 27,126
Change Order #1 (net HST included) ¹	\$ 38,794
Current Request for Increase (net HST included)	\$ 21,702
Cumulative Increase to Date (net HST included)	\$ 60,496
New Contract Value (net HST included)	\$ 87,622

Note 1. Approved by Regional Council September 24, 2019

This request for an increase of \$21,702 (Net HST included) represents a cumulative increase of 223% to the original contract of \$27,126.

FINANCIAL IMPLICATIONS

Funding in the amount of \$20,810.00 plus net HST of \$891.92 for a net total of \$21,701.92, is available from Project Account No. CR200003 – Bridges. The budget availability has been confirmed by Finance.

Budget Summary:	<u>Project Account No. CR200003 – Bridges</u>	
	Cumulative Uncommitted Budget	\$ 2,714,599
	Less increase to RFP – 18-306:	\$ 21,702
	Balance	\$ 2,692,897

The balance of funds will be used for the remaining 2021/2022 Bridge projects approved by Council.

RISK CONSIDERATION

There are no significant risks associated with the recommendations in this Report. The additional time to complete the load evaluation may impact the project design and delivery schedule but performing the evaluation would reduce the risks of extending the service life of the bridge. The risks considered rate low.

To reach this conclusion, consideration was given to financial, legal and compliance, and service delivery risks.

ENVIRONMENTAL IMPLICATIONS

Design will consider minimizing environmental impact to fish and fish habitat near the project limits which would be further minimized by avoiding construction of a second bridge on Lucasville road for the MUP.

ALTERNATIVES

The Halifax Regional Council could choose not to increase the budget for this contract. This is not recommended by staff as the additional work is required to complete Lucasville Bridge rehabilitation and may result in significant savings if an additional bridge isn't needed for the future MUP.

ATTACHMENTS

A1: Harbourside Engineering change requests

A copy of this report can be obtained online at halifax.ca or by contacting the Office of the Municipal Clerk at 902.490.4210.

Report Prepared by: Kristin Thomas, P. Eng., Bridge Design Engineer, Project Planning and Design.
902.943.0883

Report Approved by: Original Signed
David Hubley, Director, Project Planning & Design 902.490.4845

Report Approved by: Original Signed
Brad Anguish, Executive Director, TPW 902.490.4855

Procurement Review: Original Signed
Jane Pryor, Director, Procurement, 902.292.3128

Report Approved by: Original Signed
Denise Schofield, DCAO, Citizen Services, 902.490.4078



November 16, 2021

File No: 181127

SUBJECT: LOAD EVALUATION OF EXISTING STRUCTURE TO ACCOMMODATE
MULTI-USE PATH ON LUCASVILLE BRIDGE (BR041)

The following proposal is based on Harbourside Engineering's understanding of the required additional scope of work outlined in your e-mail dated November 8, 2021. Harbourside Engineering understands that HRM would like to consider a "future use" case for the Lucasville Bridge and incorporate a multi-use path (MUP) on Lucasville Road which was not considered in Harbourside's original scope of work for the rehabilitation of the structure.

The addition of a MUP will require modification to the existing bridge cross section including: a new curb and barrier on the North side of the deck, narrowing of the lanes and shoulders, a new combination bicycle barrier on the South side, and the widening of the South sidewalk to accommodate the MUP.

HRM has requested that Harbourside Engineering complete a Load Evaluation of the bridge to determine if it is feasible to reconfigure the structure to the requested cross section (provided in the November email). In addition to the Load Evaluation, HRM requested that Harbourside Engineering provide a construction cost estimate for the bridge deck modifications and for Harbourside to update the preliminary cost estimate provided to HRM on October 25, 2021 to incorporate the changes necessitated by the addition of the MUP.

We have completed a cursory review of the proposed changes to flag any obvious concerns. At this stage two items stand out as potential issues to the feasibility of this option.

1. The design drawings for the bridge indicate it was designed to a MS-200 design truck. This is a three-axle truck with axle loads of 40 kN, 160 kN and 160 kN with spacing of 4.25 m followed by a second spacing which is variable from 4.25 m to 9.25 m. This is substantially smaller than the current CL-625 design loading. At this stage we are unsure if load evaluation with the larger design truck will result in acceptable results even without reconfiguration. Working to our benefit is that prestressed girders are typically not governed by ULS composite action but rather SLS (limiting cracking). This SLS limit represents a durability concern and even if exceeded as a result of the larger live loading, HRM could choose to ignore this given the limited additional life span required (obviously this is not the case for the ULS checks). Additionally, Section 14 – Evaluation could allow us to consider smaller load factors compared to Section 3 - Loads (see further discussion below) further helping to

offset the increased design loading. We want to flag that it is possible (unknown) that the bridge would not meet the load evaluation requirements based on current design code requirements.

2. The existing girders are tangent to the deck and in very close proximity to the north edge of the deck. The typical combined barrier for NSW uses a 450 mm concrete curb and an open steel barrier. This barrier is anchored through the deck to a steel plate mounted below the deck. This option will not be available due to the presence of the exterior girder at the edge of the deck. A custom anchorage design will be required. Based on past experience with these connections, achieving a TL-4 rated barrier could be problematic. Note that this concern is lessened somewhat in our current design which maintains the existing barrier. Its curb width is substantially higher increasing the moment arm of the anchorage reinforcement and subsequently decreasing the tensile requirements.

We wish to raise the discussion early regarding the use of Section 14 – Evaluation of CSA-S6. This section allows for use of lower load factors in evaluating existing structures (compared to Section 3). Typically, in load evaluations we would use this section to determine appropriate reliability index and subsequent load factors. However, in our opinion, there is some ambiguity when this methodology is projected further into situations where changes to the dead loading of the structure are made (i.e. widening the sidewalk). The methodology does rely on more precise consideration of the element considered, the behaviour of the structural system of the element and the degree of inspection which, is how it allows for lower factors than a “new” bridge. This doesn’t change as a result of modifications to the structure. However, the commentary specifically states, “Section 14 is not to be used for design”, which implies that this may not be suitable for design of changes to the structure. It is likely that with the larger dead and live loads to be considered the use of lower Section 14 load factors will be required. Harbourside wants to be transparent with this regard and ensure that HRM can accept this design methodology.

We note that Harbourside are in the middle of completing rehabilitation design of various components of the bridge. The proposed alterations will influence design work completed to date including the following:

- Load takeoffs for bearings and jacking
- Barrier repairs/replacements (in-kind)
- Repairs to sidewalk
- Configuration of sidewalk/barrier work for implementation of approach slabs

Pivoting to this modified cross section will have an influence on this work completed to date. Therefore, we propose fees to address these partial design items that are included in the attached fee proposal.

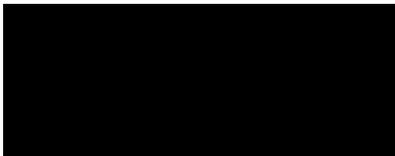
The proposed scope of work included in this additional fee proposal is as follows:

1. Complete load evaluation of deck, girders and bearings to support new MUP (including CL-625 loading) using the provisions of CSA S6-19.

2. Complete a Class D construction cost estimate for the proposed new barriers and sidewalk widening and merging this with our previous construction cost estimate (assumes no work to strengthen the structure).
3. Proceed through detailed design of previous proposed rehabilitation (modified for new cross section) to tender ready drawings and special provisions.

Harbourside Engineering proposes to complete these tasks, the results of which will be summarized in a memorandum, for a fee of \$20,810.00 + HST (note that this is in addition to the remaining \$30,443.86 +HST detailed design fee for a total of \$51,253.86 + HST. A detailed breakdown of these figures is shown in Appendix A). Should you have any questions or concerns, feel free to contact the undersigned at your convenience.

Sincerely,



Grant Kelly, P.Eng.
Structural Engineer
Harbourside Engineering Consultants
Office: (902) 405-4696

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Appendix A - Fee Proposal

Lucasville Bridge Rehabilitation - Load Rating & Reconfiguration				
	Senior Structural Engineer	Intermediate Structural Engineer	Drafting Technician	Sub Total Fees
	■	■	■	
Load Evaluation				\$11,405.00
- Complete load calculations for girders under current dead load configuration including CL-625	3.0	6.0		■
- Complete load calculations for girders under modified (new sidewalk) dead load configuration including CL-625	3.0	6.0		■
- Complete girder resistance calculations based on original design drawing details	6.0	18.0		■
- Preliminary design new barrier anchorage	4.0	12.0	6.0	■
- Modify Class D cost estimate	2.0	6.0	1.0	■
- Summary memo	3.0	10.0		■
- Review meeting (virtual)	2.0	2.0		■
Detailed Design				\$9,405.00
- Modified bearing load/rotation analysis	4.0	13.0	2.0	■
- Detailed design new barrier system	4.0	13.0	15.0	■
- Modify existing work for sidewalk/approach slabs/wingwalls	4.0	13.0	25.0	■
TOTAL	35.0	99.0	49.0	\$20,810.00
Cost Summary:				
Total Additional Proposed Fee Excluding Sales Tax: \$20,810.00				
Original Design Budget (Modified and Includes Sub-Consultants): ■				
Design Budget Billed to Date: ■				
Remaining Design Budget: ■				
Remaining Design Budget + Additional Proposed Design Fee: ■				

Notes:

1. Fees exclude HST.