

March 16, 2018

Matrix 22380-522

Mr. Jason Stahl, P.Eng.
AMEC FOSTER WHEELER
3450 Harvester Road, Suite 100
Burlington, ON L7N 3W5

**Subject: Assessment of the Mississauga Road Crossing Replacement over the Credit River,
Brampton, ON**

Dear Mr. Stahl:

1 INTRODUCTION

A Schedule 'C' Class Environmental Assessment (EA) is being completed for the widening of Mississauga Road, from Financial Drive to Queen Street West, within the City of Brampton, Ontario. Matrix Solutions Inc. was retained by AMEC Foster Wheeler to provide fluvial geomorphic input into the Class EA, in support of the replacement of crossings within the study area. A geomorphic assessment was completed in October 2017, which took a risk-based approach to provide recommendations for the replacement of the crossing over the Credit River.

The report noted that the existing structure crossing the Credit River is located along a generally straight section of the river, with a slight south-easterly curve. This bridge crossing is constructed with two piers spaced approximately 16 m apart and a total span of approximately 50 m. The slight curve in the reach has caused scour along the length of the right abutment (facing downstream). While there was no flow on either side of the piers, stagnant water was noted. The Credit River ranges from approximately 23 to 27 m wide in the vicinity of the crossing. To compensate for the constriction through the 16 m wide span between the piers, the river over-widens on the downstream side of the bridge.

As a result, the fluvial geomorphic assessment recommended that to reduce the possibility of increased channel widening on the downstream side of the crossing, as well as to limit additional bed scour, the existing piers be removed and the bridge be replaced with one that spans the width of the channel plus a factor of safety for future migration of the river.

It is understood that the proposed crossing design will consist of a wider structure than existing, with a total span of 103 m. Given the proposed crossing design, Credit Valley Conservation (CVC) has requested additional information be supplied regarding potential impacts on the Credit River as a result of the wider span, as well as an indication of whether instream work will "be required to ensure no significant changes after the bridge is reconstructed." This letter builds on the findings of the previous assessment to satisfy this requirement.

2 DISCUSSION

Based on the combined consideration of the 100-year migration rate and field observations of existing conditions, the site was deemed to be low risk from a lateral channel migration perspective. The average bankfull width was measured to be 25 m in the vicinity of the crossing, with an average 100-year migration rate of 12 m upstream. The *Credit Valley Conservation Fluvial Geomorphic Guidelines* (CVC 2015) defines a good crossing as one that spans the watercourse and its banks, does not impact channel velocity, has a natural stream bed, and creates no noticeable changes in the functions of the watercourse.

Under existing conditions, the piers are approximately 16 m apart. This constricts flow between the piers, resulting in the Credit River over-widening on the downstream side to compensate. Additionally, a slight curve in the reach has caused scour along the length of the right abutment. The proposed total span of 103 m is equivalent to four times the average bankfull width and is sufficient to support the long-term form and function of the channel. It is understood that the configuration of the structure consists of a 45 m middle clear span, and two 29 m end clear spans. The middle clear span structure accommodates the channel and its banks, but also a portion of the floodplain. The 100-year migration rate is accommodated within this structure. The middle clear span structure eliminates the constriction under existing conditions, and it is anticipated that this will alleviate the over-widening on the downstream side of the bridge.

In terms of in-water works to ensure no significant impacts to the Credit River, it is not anticipated that they will be required. The proposed span is more than sufficient to accommodate the meander geometry of the Credit River without bank protection and there is a low risk of significant lateral channel migration. To increase the level of erosion protection for the structure offset protection could be implemented, providing a minimum setback between the channel and structure piers should lateral channel migration occur. Offset protection consists of a buried wood or stone treatment, set at a specified distance away from the structure pier. Should lateral channel migration occur, this offset protection would limit the maximum lateral migration possible, thereby protecting the structure pier. It should be noted that the installation of the offset protection is not typically considered in-water works.

3 CLOSURE

We trust that this letter report suits your present requirements. If you have any questions or comments, please call either of the undersigned at 905.877.9531.

Yours truly,

MATRIX SOLUTIONS INC.



Ahmed Siddiqui, M.Sc., CAN-CISEC
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Reviewed by



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AS/ap

4 REFERENCE

Credit Valley Conservation (CVC). 2015. *Credit Valley Conservation Fluvial Geomorphic Guidelines*. Mississauga, Ontario. April 2015.

DISCLAIMER

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