



# ENVIRONMENTAL SCREENING REPORT

McCORMACQUODALE BRIDGE  
Project No. 2008-66CP

Our File: 10 7475 (302)



**October 13, 2010**

Prepared by:

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A member of  **MMM GROUP**



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## EXECUTIVE SUMMARY

The City of Kawartha Lakes has retained McCormick Rankin Corporation (MRC) to complete an Environmental Assessment for the McCorquodale Bridge in accordance with the Municipal Class EA process. The bridge is located on Simcoe Street between 2<sup>nd</sup> Concession Road and 1<sup>st</sup> Concession Road approximately 1 km north of the intersection of Woodville Road and Simcoe Street. Communities within close proximity to the bridge include Lorneville and Woodville.

The bridge crosses a water course identified by the Lake Simcoe Region Conservation Authority (LSRCA) as a tributary of the Beaver River. This watercourse flows from the east to the west perpendicular to the road way. It drains to the bridge from a wooded area. Draining away from the bridge, it meanders through farmers fields.

Land use in the vicinity of the McCorquodale Bridge can be described as rural agricultural lands.

Due to the state of deterioration in some of the bridge components, the “single lane” width of the travelled way over the bridge deck and the posting of a 9 tonne load limit, the City of Kawartha Lakes have decided to initiate this study as a first step in the rehabilitation the McCorquodale Bridge. This study report is being carried out concurrently with studies for the Grass Creek Bridge and the Mitchell’s Bridge.

This report presents improvement alternatives being considered and evaluated, agency comments received to-date, natural environment studies completed, geotechnical investigations completed, recommended preferred alternative based on current information and results of a public information centre.

For the McCorquodale Bridge Rehabilitation, it has been determined that the project is deemed to fall within the requirements of Schedule ‘B’. Under Schedule ‘B’, projects are “Approved Subject to Screening”.

Two structure rehabilitation alternatives were considered. They were:

- construct a new superstructure maintaining the existing single lane configuration,
- and
- replace the bridge in it entirety including substructure (abutment and footings) thereby providing a two lane configuration appropriate for the posted speed and volumes associated with the road.

An evaluation of the alternatives was completed, with the Preferred Alternative being to replace the bridge in it entirety; replace the existing single lane bridge with a new two lane bridge. This is a reasonable solution considering the traffic volumes on the road and the safety improvements realized with a two lane bridge.

No known opposition to the project has been made by agencies or the public at this time with verbal feedback being one of general support for the preferred alternative. The next step in the EA process is to publish a notice of study completion. Following 30 days from the date of publication the City of Kawartha Lakes may go to construction of the preferred alternative.

The estimated construction budget for the proposed replacement is \$980,000 which includes contingency and construction supervision.

Interested persons should provide written comment to the City of Kawartha Lakes on the project within 30 calendar days from the date of the Notice of Study Commencement. Those seek further information should contact persons listed below.

Mr. Darrell Darling, CET  
Senior Engineering Technician  
**CITY OF KAWARTHA LAKES**  
12 Peel Street, P.O. Box 9000  
Lindsay, ON K9V 3L8  
Tel: (705) 324-9411 ext. 1153  
Email: ddarling@city.kawarthalakes.on.ca

Mr. Andrew Superville, P.Eng.  
**MCCORMICK RANKIN CORPORATION**  
920 Princess Street, Suite 101  
Kingston, ON K7L 1H1  
Phone: (613) 546-2227  
Email: asuperville@mrc.ca

If concerns arise regarding this project, which cannot be resolved in discussion with the Municipality, a person or party may request that the Minister of the Environment make an order for the project to comply with Part II of the Environmental Assessment Act (referred to as a Part II Order), which addresses individual environment assessments. Requests must be received by the Minister at the address below within 30 calendar days of this Notice.

Minister of the Environment  
135 St. Clair Avenue  
10th Floor, Toronto, Ontario. M4V 1P5

Judy Currins, CMO,  
City Clerk  
**CITY OF KAWARTHA LAKES**  
P. O. Box 9000,  
26 Francis Street,  
Lindsay, Ontario. K9V 5R8  
(705) 324-9411 Ext. 1295

A copy of the request must also be sent to the above noted City representatives. If there is no “request” received by 30 days from publication date, the project will proceed to detail design and construction as presented in the planning documentation.

## 1. INTRODUCTION

The City of Kawartha Lakes has retained McCormick Rankin Corporation (MRC) to complete an Environmental Assessment for the McCorquodale Bridge in accordance with the Municipal Class EA process. The bridge is located on Simcoe Street between 2<sup>nd</sup> Concession Road and 1<sup>st</sup> Concession Road approximately 1 km north of the intersection of Woodville Road and Simcoe Street. Communities within close proximity to the bridge include Lorneville and Woodville.

The bridge crosses a water course identified by the Lake Simcoe Region Conservation Authority (LSRCA) as a tributary of the Beaver River. This watercourse flows from the east to the west perpendicular to the road way. It drains to the bridge from a wooded area. Draining away from the bridge, it meanders through farmers fields. The location of the bridge is shown in Figure 1.



FIGURE 1: Location of Bridge Site

Land use in the vicinity of the McCorquodale Bridge can be described as rural agricultural lands.

According to the 2008 Municipal Bridge Appraisal, the bridge was constructed in 1934. The bridge's configuration consists of a reinforced concrete deck on steel girders. The clear span is 8.5 m with an out-to-out width of approximately 6.3 m. The travelled way over the bridge is 6.15 m wide which is the measured opening between the barriers. Cautionary signage is provided indicating the bridge is narrow. The bridge is load posted with a 9 tonne limit. See Appendix B, MBAS Part M.

Due to the state of deterioration in some of the bridge components, the width of the travelled way over the bridge deck and the posting of a 9 tonne limit, the City of Kawartha Lakes have decided

to initiate this study as a first step in the rehabilitation or replacement of the McCorquodale Bridge. This study report is being carried out concurrently with studies for the Grass Creek Bridge and the Mitchell's Bridge.

This report presents improvement alternatives being considered and evaluated, agency comments received to-date, natural environment studies completed, geotechnical investigations completed recommended preferred alternative based on current information and results of a Public Information Centre (PIC). It should be noted that the intent of the project is to replace the bridge due to both structural and geometric deficiencies.



FIGURE 2: Channel added at beam ends for additional support.



FIGURE 3: Inferior barrier wall.

## 2. REQUIREMENTS UNDER THE MUNICIPAL ENVIRONMENTAL ASSESSMENT PLANNING AND DESIGN PROCESS

The process of planning and designing for major rehabilitation or replacement of any bridge structure in the Province of Ontario is subject to the requirements of the Ontario Environmental Assessment Act. In the case of municipal bridges, there is an approved assessment process, known as the *Municipal Class Environmental Assessment*, which was undertaken by the Municipal Engineers Association and which applies to many municipal infrastructure projects, such as roads, bridges, water and wastewater projects.

As shown in Figure 4, the first phase in the process of applying the Class EA is to “*Identify Problem or Opportunity*”. The “*problem*” at the McCorquodale Bridge is that

- The general deterioration of some of the structural components may lead to the bridge becoming unsafe for use by the travelling public if repairs are not carried out.
- The width of the travelled way over the deck is sub-standard.
- The bridge is posted at 9 tonnes.

Under Phase 2 in Figure 4, the term “Alternative Solutions” refers to the “global” alternatives possible at a site. For the McCorquodale Bridge, there are three alternative solutions:

- *Do Nothing*
- *Close McCorquodale Bridge*
- *Rehabilitate the McCorquodale Bridge*

NOTE: This flow chart is to be read in conjunction with Part A of the Municipal Class EA

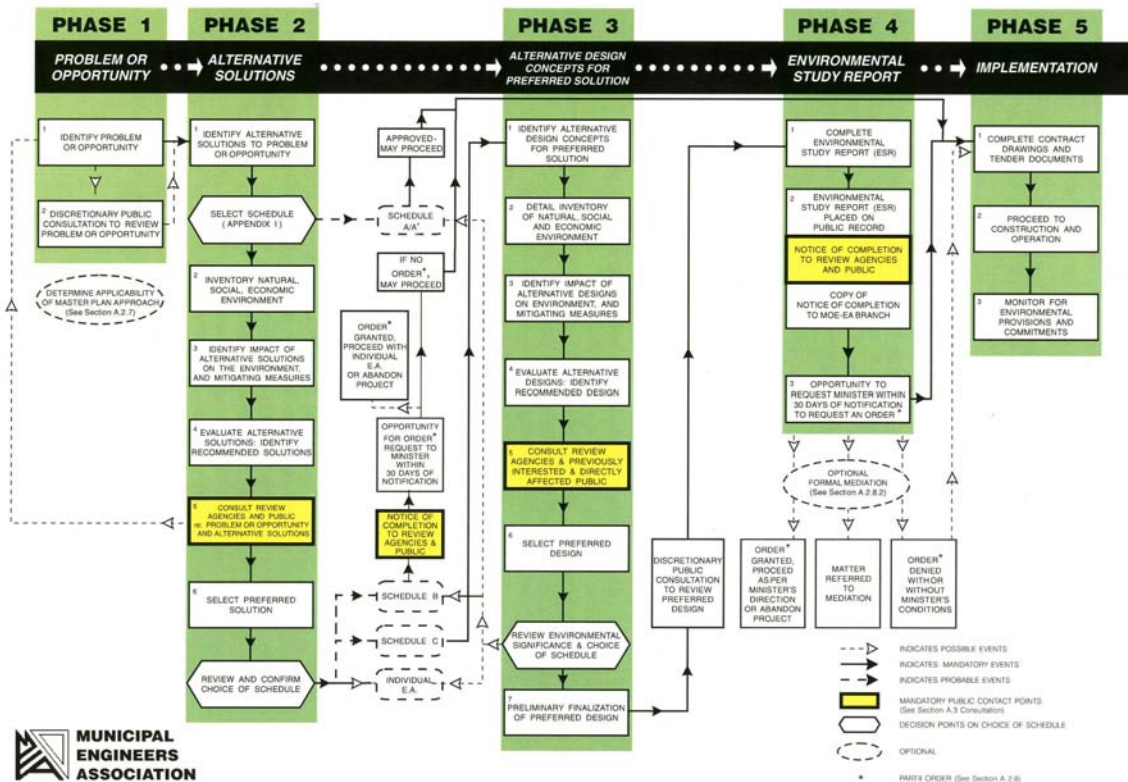


FIGURE 4: Class EA

For the “Do Nothing” alternative, deterioration will continue to the point where the bridge will not be considered safe and the road will have to be closed to traffic. This leads to the second alternative of “Close McCorquodale Bridge”. The City of Kawartha Lakes considers it unacceptable to close the road at the bridge site since this would adversely affect local residents and traffic patterns. It is currently being used by the school bus services. This leaves the alternative of “Repair or Replace the McCorquodale Bridge”.

The Municipal Class EA document allows for the categorization of individual projects under one of four possible schedules (i.e. Schedule A, A+, B or C) by means of generic project descriptions, and then outlines the specific requirements to be completed under each schedule.

For the McCorquodale Bridge Rehabilitation, it has been determined that Project Description #24, in Appendix 1 of the Class EA, applies, i.e.:

*Reconstruction of a water crossing where the reconstructed facility will be for the same purpose, use, capacity and at the same location. (Capacity refers to either hydraulic or road capacity). This includes ferry docks.*

In accordance with this description, the project would fall under Schedule 'A'. However, since the bridge is more than forty (40) years old, and one of the alternatives is making it a two lane bridge (where there is a change in configuration). Project Description #30 also applies, i.e.:

*Construction, reconstruction or alteration of a structure or the grading adjacent to it when the structure is over 40 years old, where the proposed work will alter the basic structural system, overall configuration or appearance of the structure.*

In this case, Project Description #30 governs and therefore the project is deemed to fall within the requirements of Schedule 'B'. Under Schedule 'B', projects are "Approved Subject to Screening".

If it during the EA process it is determined that the preferred alternative is keeping the narrowed lane configuration in place, the project will return to a Schedule A type project and therefore be considered pre-approved.

### 3. CONTACT WITH REVIEW AGENCIES AND THE PUBLIC

As a minimum for water crossings and/or transportation-related projects under Schedule 'B', it is suggested in the Class EA document that the proponent contact the following Agencies:

- The local Conservation Authority
- The Ministry of Natural Resources (MNR)
- The Ministry of the Environment (MOE)
- Transport Canada, Navigable Waters Protection Act (NWPA)
- The Ministry of Transportation (MTO)
- Affected Utilities

It is also required that the proponent make contact with the general public and affected property owners, as well as special interest groups, as appropriate.

The so-called "First Mandatory Point of Contact" with the Public and the Agencies is a *Notice of Study Commencement*. For this project, the notice was publicized by means of The Kawartha Lakes Municipal Bulletin advertisement published on March 5, 2009. Letters were sent to the various interested review agencies and utilities June 16, 2009.

Appendix 'A' contains a list of Agency contacts, copies of letters to Agencies, copies of the newspaper advertisement and all correspondence received in reply to this first contact.

On August 11, 2010, a Public Information Centre (PIC) was held for this project at the Woodville Town Hall at 100A King Street in the Town of Woodville. It was hosted by Darrell Darling, Engineering Technician and Juan Rojas, Manager of Engineering Services, of the City of Kawartha Lakes and Andrew Superville of MRC. Two attendees attended the PIC. No comments

were provided and the general feedback was one of support for the preferred alternative. The advertisement for the PIC, Public Consultation Sign-In Sheet, PIC display boards and, sample comment sheet are provide in Appendix 'H'.

## 4. OSIM INSPECTION

A condition inspection of the bridge was carried out in March of 2009 in accordance with the procedures set out in the Ontario Structure Inspection Manual (OSIM). The findings of the current inspection were similar to findings reported after the 1995 and 2001 inventory inspections.

A summary of the main findings are as follows:

- Hole at end of deck allowing leakage on to the steel girders.
- Concrete deck soffit shows signs of honey combing, delaminations, spalls and narrow transverse cracks and extensive water staining. Exposed corroded reinforcing steel bars were noted at spall locations.
- Structural steel girders are in poor condition with corrosion throughout. One girder was found to be crushed in the southeast quadrant. Protective coatings are in poor condition.
- East barrier wall is non standard.

## 5. EXISTING CONDITIONS

### 5.1 Road Geometry

The bridge is situated along the section of Simcoe Street between Regional Road 15 and Woodville Road. This section of Simcoe Street is different than that south of Woodville Road and can be considered a two lane rural collector type road.

The existing traveled portion of the bridge approaches are currently paved with an average travelled way of approximately 7 m wide with gravel shoulders between 1.5 m and 2.0 m wide. No dividing line exists. The AADT for 2001 was 815 vehicles. 2011 AADT projections put the traffic volumes at 897. This volume will be taken as the current AADT value for the purposes of this report. There is no posted speed limit on Simcoe Street for this section which results in an operating speed of 80 km/h which implies a design speed of 100 km/h.

Table D2-4 of the MTO manual *Geometric Design Standards For Ontario Highways* indicates that for AADT values of between 400 to 1000 with a design speed of 100 km/h, the roadway lane width should be 3.5 m, shoulder widths of 2.0 m and a strip for guiderail of 1.0 m each side . This makes a total required top road width of 13 m. A typical cross section of the road's width is shown on Drawings, contained in Appendix 'F'.

Road widths are an important factor in the rehabilitation of the bridge because typically bridge decks should be sufficiently wide to accommodate the required road widths.

## 5.2 Bridge Geometry

As indicated earlier, the existing out-to-out bridge width is approximately 6.3 m. The traveled way across the bridge is 6.15 m wide. The recommended bridge deck width to accommodate two lanes should have the following dimensions.

- 2 x 3.5 m Traffic Lanes ..... 7.0 m
  - 2 x 2.5 m Side Clearance ..... 5.0 m
  - 2 x 0.5 m for Barrier each side ..... 1.0 m
- Total (Bridge Width) ..... 13 m**

This configuration is shown on the bridge cross section shown on the Drawing for Alternative 2 - Appendix F.

## 5.3 Hydraulic Considerations and Navigable Waters Protection Act (NWP)

The tributary of the Beaver River runs east to the west. At the bridge it runs perpendicular with road. The depth of water at the crossing at the time of the inspection was approximately 1 m. The design alternatives will be of such a configuration that the hydraulic capacity of the opening will increase slightly. The soffit elevation will not change.

With any water crossing, consideration must be made for the navigability of the water course being crossed. The authority responsible for such matters is Transport Canada (TC). Correspondence has been made with TC and an indication that the water course is not navigable has been received. Refer to Appendix A Section (e).

## 5.4 Geotechnical

Geo-Logic Inc. was retained to carry out a geotechnical investigation and provide recommendations for foundation bearing and pavement structure recommendations. The report by Geo-Logic, dated May 12, 2009 is included in Appendix 'D'.

Some of the major findings of the investigation are as follows:

- Groundwater levels will correspond approximately with open water levels present at the bridge structure.
- Excavated native inorganic soils may be reused to construct the common non-structural fill areas or wasted off site.
- Backfill to abutments and any other areas requiring engineered fill should be accomplished using well graded granular B type 1 material, complying with OPSS 1010.
- Footings should be constructed on compact to dense native tills or engineered fill as prescribed in the geotechnical report.
- Pavement structure shall consist of 40 mm of HL3, 50 mm of HL8, 150 mm of Granular A and 450 mm of Granular B Type 1.

## 6. ENVIRONMENTAL CONSIDERATIONS

A natural environment study was completed and report was prepared. A copy of the report is contained in Appendix C. The report indicates that the tributary of the Beaver River can be considered a fish habitat and that any works in the vicinity of the bridge will be restricted to after July 1. Regardless of the alternative carried forward measures will be in place for the protection of the natural environment as described in the report. Consultation with Lake Simcoe Region Conservation Authority (LSRCA) is ongoing and a permit will be required in order to complete the work.

All construction regardless of the alternative selected will conform to guidelines and requirements issued by the LSRCA and MOE, which will be incorporated into the Contract Documents. Demolition of the existing structure will need to be executed with care, with special measures in place to ensure debris does not fall into the water. Other mitigative measures that will be included in the contract specifications include the following:

- Silt nets will be installed as indicated by authorities, or as required to prevent silt deposition into the watercourse.
- Fuelling of construction equipment will be restricted so as to prevent flow of spilled fuel into the creek.
- An MOE “spill kit” will be available on site at all times.
- Other measures as required by the Authorities.

## 7. TRAFFIC DETOURS

As noted previously, Simcoe Street is classified as a low volume rural collector road. At this time, it is expected that the road can be closed for the duration of the rehabilitation project. Therefore, it will be assumed that Simcoe Street will be closed to all but local traffic between 1<sup>st</sup> Concession Road and 2<sup>nd</sup> Concession Road.

A closure will have a limited impact to the traffic on Simcoe Street. The impact would occur during the construction phase of the project expected during the summer months when school bus services are not operating. A closure would increase traffic on some near by roads used for detour routes. A partial closure of the bridge is not possible due to the narrow width.

Prior to a closure a notice will be circulated to the public describing the detour route and the anticipated duration of the closure. A local detour route will utilize 2<sup>nd</sup> Concession Road, 1<sup>st</sup> Concession Road, Lorneville Road, Farms Road, and Woodville Road. It is anticipated that the project will proceed with a full road closure lasting approximately 2 ½ months through the summer.

## 8. UTILITIES

The following utilities are known to exist adjacent to, or through, the bridge site:

- Cable Television Cogeco Cable Canada Inc.
- Telephone - Bell
- Electrical - Hydro

The above list includes those utilities for which responses to the *Notice of Commencement* letters were received, as well as those which were observed at the site. The accuracy of the utility infrastructure shown on the bridge Preliminary General Arrangement Drawing is not guaranteed.

Bell Canada currently has a service that hangs from the bridge. They have asked that provisions in the form of conduit for their service be incorporated into the design.

## 9. STRUCTURE ALTERNATIVES AND COSTS

As described in the above sections, various elements of the existing McCorquodale Bridge are in fair or poor condition and require rehabilitation. The two structure rehabilitation alternatives being considered at this time are:

- New Superstructure - Replace only the superstructure and retain the existing abutments
- New Bridge - Replace the bridge in its entirety including substructure (abutment and footings).

### 9.1 Alternative 1: New Superstructure

The existing superstructure can be replaced with a new reinforced concrete deck over either precast or steel beams. This design can be prepared such that there is no increase to the bearing load on the existing supporting sub soils. New barriers could be constructed with the 6.0 m width maintained but there would be no clearance width provided keeping the bridge as a one lane bridge.

The construction of such a configuration can be achieved without work being completed in the water. The construction contract for this alternative would require that no in water work will be permitted without appropriate protective measures taken.

It is not expected that Alternative 1 would have any direct or measureable impact to the natural environment because work will be completed in the dry above the watercourse. Rehabilitation would be limited to replacing the superstructure of the bridge. This work would see a new concrete deck, barrier walls, guiderails and some concrete facing repairs to the remaining wing walls and abutments.

The rehabilitation would see the bridge superstructure removed possibly with the use of saw cuts made at strategic locations such that longitudinal pieces are lifted out and removed. Once the top of the existing abutment has been prepared, new beams could be set in place with the use of a crane. This would avoid any requirements for shoring installed in the water.

A construction cost estimate for superstructure replacement, with allowances for miscellaneous sub structure repairs, is included in Appendix E. An estimated budget amount is \$ 540,000.

## 9.2 Alternative 2: New Bridge

Alternative 2 would see a new bridge constructed. The configuration of this alternative would be a wider two lane bridge cross section such that it accommodates the current road design guidelines.

The existing bridge, including the substructure (footings and wing walls), would be completely removed with the use of excavation type equipment.

A new widened bridge would be constructed such that the new abutments would be constructed parallel to the watercourse along the line of the face of the existing abutments. A general arrangement drawing of the configuration is included in Appendix F.

For Alternatives 2 there will be some impact to the adjacent terrain within the road right of way due to a wider bridge and subsequent wider approaches and abutments. This alternative will require the removal and reconstruction of the entire substructure. Removal of the old substructure and construction of the new will likely require the use of a cofferdam or steel sheet piling for dewatering of the areas adjacent to the existing abutments. Details with respect to work adjacent to the watercourse and the mitigation measures required will be part of the detail design, will be described as part of the permit application process with the LSRCA and will be consistent with the recommendations made in the NEIA Report.

A construction cost is included in Appendix 'E'. The estimated budget amount is \$980,000.

## 9.3 Comparison of Alternatives

The two alternatives are compared with respect to various criteria as shown in Table 1. Each alternative is assigned a score between 1 and 5 for each criterion. The higher the score, the more desirable and less adverse.

**TABLE 1 – Comparison of Alternatives**

Criterion	Alternative 1 – New Superstructure Construct New Deck Superstructure & Repair of Existing Substructure		Alternative 2 – New Bridge Replace Entire Bridge (Superstructure and Substructure)	
	Bridge Cross-Section Geometry	The bridge will remain a single lane bridge due to the small width. No opportunity for road widening without replacing the bridge. Does not accommodate for current nor future traffic volumes.	1	Can carry the design road cross-section in accordance with current design standards. Does accommodate current and future traffic volumes.
Safety	a) No improvements to safety; two travel directions are not simultaneously accommodated. b) No improvements to safety, Driver expectation atypical.	1	a) Improvements to safety, vehicles can cross simultaneously with appropriate distance between vehicles and clearances. b) Improvements to safety, Driver expectation accommodated.	4
Hydraulic Capacity	No change in hydraulic capacity because existing soffit elevation and span will be maintained.	1	No change in hydraulic capacity because existing soffit elevation and span will be maintained.	1
Impacts to Public During Construction	It is expected that the bridge will be closed during construction activities because of the limited traffic volumes and the many alternative detour routes available.	1	It is expected that the bridge will be closed during construction activities because of the limited traffic volumes and the many alternative detour routes available.	1
Natural Environment Impact	No in water work	5	In water work required but no change to stream bottom, mitigation measures in place and work completed outside of fish spawning time frames.	3
Cost (Update)	Estimated construction cost is \$400,000. (\$ 540,000)	4	Estimated construction cost is \$700,000. (\$ 980,000)	1
Un-weighted Total		13		15

From the above matrix it appears that the **Preferred Alternative** is **Alternative 2**; replace the existing bridge with a new two lane bridge. This is a reasonable solution considering the traffic volumes on the road and the safety improvements realized with a two lane bridge. Replacing the bridge keeps this project as a Schedule B type project under the Municipal Class EA process.

It should be noted that the evaluation of the two alternatives was completed in early 2010 and that the estimation of the construction costs for each alternative were based on values from 2009 and early 2010 projected for a 2011 construction season. Following the 2010 construction season, an updated cost estimate was prepared for both alternatives. The estimate for the preferred alternative is now at \$980,000. A cost estimate of the single lane alternatives would see a similar order of increase. The construction costs in Table 1 show an order of magnitude cost difference which results in the same general scoring.

## 10. PROJECT SCHEDULE

As noted above in the Introduction, this EA screening study for the McCorquodale Bridge is being carried out concurrently with similar studies for the Mitchell's Bridge and the Grass Creek Bridge. It is the general plan that the work associated with the three bridges be carried out in the 2011 construction season.

## 11. SUMMARY

The existing McCorquodale Bridge, over a tributary of the Beaver Creek, is in a state of advanced deterioration to the point where public safety may become a concern. The bridge is already posted for a minimum load limit of 9 tonnes. To address this problem, the City of Kawartha Lakes has initiated a class environmental assessment as a first step in the design process for the rehabilitation or replacement of the bridge.

In accordance with the terms of the Municipal Class Environmental Assessment, the required work on the bridge has been deemed to fall under "Schedule B" of the class EA, and is therefore approved subject to screening. This screening report will comprise the Project File which will be accessible by the public for 30 days following publication of the Notice of Completion.

Due to the single lane configuration of the existing bridge on an 80 km/h road, the safety aspects are reduced because there is an increased chance that vehicles approaching from opposite directions may have a collision through the narrowed portion. Additionally the configuration does not support the current nor future traffic volumes of the road. While the initial capital cost for the project is estimated to be \$980,000 the two lane alternative is recommended considering also that any environmental impacts can be effectively mitigated.

The estimated construction cost for the proposed replacement is estimated to be \$980,000 including engineering fees and contingency.

Prepared by,



Andrew Superville, P. Eng.  
Structural Engineer

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