MINUTES
FIRST MEETING OF 2007
PUBLIC WORKS COMMITTEE OF THE WHOLE

The Public Works Committee of the Whole met on Wednesday, January 17th, 2007 following the Community Development Committee meeting at the Lanark County Administrative Building, Sunset Blvd., Perth, Ontario.

Members Present:	Chair S. Freeman, Warden A. Lunney, B. Fletcher, B. Horlin, B. Hurrle, J. MacTavish, P. Kavanagh, J. Fenik, W. Laut, K. Kerr, R. Kidd, S. Mousseau, P. Dulmage, E. Sonnenburg, A. Churchill and J. Lowe.
Staff/Others Present:	P. Wagland, Chief Administrative Officer, C. Ritchie, Clerk, S. Allan, Director of Public Works, J. Dickey, Fleet and Facilities Manager (left at 8:57 p.m.) A. Mabo, Committee Secretariat/Administrative Assistant, P. McLaren, IT Support.
Absent:	None.

PUBLIC WORKS

Chair : Councillor Susan Freeman

1. CALL TO ORDER

The meeting was called to order at 7:47 p.m.
A quorum was present.

2. DISCLOSURE OF PECUNIARY INTEREST

None.

3. APPROVAL OF MINUTES

MOTION #PW-2007-01

MOVED BY: Keith Kerr
SECONDED BY: Aubrey Churchill

"THAT, the minutes of the Public Works Committee meeting held on November 1st, 2006 be approved as circulated."

ADOPTED

4. ADDITIONS AND APPROVAL OF AGENDA

i) Under New/Other Business: 2007 OGRA/ROMA Minister Delegation Topics.

MOTION #PW-2007-02

MOVED BY: Paul Dulmage
SECONDED BY: Sharon Mousseau

“**THAT**, the agenda be adopted as amended.”

ADOPTED

5. DELEGATIONS/PRESENTATIONS

i) Public Works Orientation.
Director of Public Works Steve Allan.

Copies of the Presentations can be requested from the Clerk’s Office at 613-267-4200 ext. 119 or amabo@county.lanark.on.ca.

The Public Works Supervisors were in attendance for the Orientation presentation. Janet Tysick, Office Coordinator; Gerry Cole, Perth Operations Supervisor; Tom Guindon, Almonte Operations Supervisor and Walter Warwick, Construction Supervisor.

S. Allan overviewed the mission, organization, roads, bridges, operations, waste management and County – Local Municipal coordination.

The Committee recessed at 8:51 p.m.
The Committee returned to session at 8:57 p.m.

Fleet and Facilities Manager J. Dickey left at 8:57 p.m.

6. COMMUNICATIONS

i) Ministry of Transportation, Chapter 4, Section 4.14, Maintenance of the Provincial Highway System.

ii) Notice of DCR Submission and Study Completion Highway 15 Improvements Smith Falls to Franktown.

iii) Notice McNeely Avenue Environmental Assessment Public Meeting January 18th, 2007.

iv) Perth Arterial Roadway Environmental Assessment Technical Advisory Committee Meeting Report #1.

MOTION #PW-2007-03

MOVED BY: John Fenik
SECONDED BY: Wendy Laut

"THAT, staff be requested to compile a report that establishes the following:

a) the rational for the designation of new County roads;
b) the principles for the establishment of cost sharing agreements for the study, design construction and operation of any newly designed County roads;
c) the level of service and funding support provided to existing and future County roads required to accommodate growth;

AND FURTHERMORE THAT, this report be incorporated into the draft transportation master plan."

ADOPTED

In reviewing the draft transportation master plan this piece was missing. These items will be answered prior to the transportation master plan being undertaken.

In the meantime, Council will lobby the Ministry for the construction and funding of the Perth by-pass at the OGRA/ROMA Conference.

v) Ontario Good Roads Association Board Brief December 1st, 2006.

vi) Ministry of Transportation Highway Access Management Initiative.

vii) Canada-Ontario Municipal Rural Infrastructure Fund (COMRIF) Intake Three Funded Project.

viii) Carmon Crosbie, Resident regarding County Road 511 deterioration.

ix) Town of Carleton Place regarding Appointment to Public Transit System Committee.

A County Transit System study will be done through an RFP. There is a provision in the draft transportation master plan.

Smiths Falls has been given the opportunity to participate in the transportation master plan process but has yet to submit comments.

x) ROMA Request for Nominations for the 2007 – 2010 ROMA Board.

MOTION #PW-2007-04

MOVED BY: Sharon Mousseau
SECONDED BY: Richard Kidd

"THAT, communication items for the January 2007 Public Works Committee meeting, excluding item (iv) be received as information only."

ADOPTED

7. REPORTS

i) Report #PW-01-2007 Public Works Contracts Status Report #1.
Director of Public Works, Steve Allan.

The purpose of this report is to inform the Committee of the status of Public Works Contracts.

MOTION #PW-2007-05

MOVED BY: Richard Kidd
SECONDED BY: Sharon Mousseau

"THAT, Report #PW-01-2007 Public Works Contracts Status Report #1 be received as information only."

ADOPTED

ii) Tender Authorization Reports.
Director of Public Works, Steve Allan.

a) Report #PW-02-2007 County Road #14 (Narrows Locks Road) Proposed Improvements.
b) Report #PW-04-2007 County Road #16 (Wolfe Grove Road) Proposed Improvements.
c) Report #PW-07-2007 Bakers Bridge Rehabilitation.
d) Report #PW-12-2007 Maberly Bridge Rehabilitation.

MOTION #PW-2007-06

MOVED BY: Richard Kidd
SECONDED BY: John Fenik

"THAT, the Director of Public Works be authorized to tender the:
a) County Road 14 Rehabilitation project, as described in Report #PW-02-2007;
b) County Road 16 Rehabilitation project, as described in Report #PW-04-2007;
c) Bakers Bridge Rehabilitation project, as described in Report #PW-07-2007;
d) Maberly Bridge Rehabilitation project, as described in Report #PW-12-2007."

THAT, the tender documents stipulate that the contract awards are subject to County Council 2007 budget approval;

THAT, the Director of Public Works present the results of the tender calls and a recommendation to the Corporate Services Committee during budget deliberations;

AND THAT, the Clerk sends:
a) Report #PW-02-2007 to the Tay Valley Township Clerk, for information;
b) Report #PW-04-2007 to the Town of Mississippi Mills Clerk, for information;
c) Report #PW-07-2007 to the Montague Township Clerk, for information;
d) Report #PW-12-2007 to the Tay Valley Township Clerk, for information."

ADOPTED

iii) Report #PW-03-2007 County Road #15 (Ferguson's Falls Road) Proposed Improvements.
Director of Public Works, Steve Allan.

The purpose of this report is to seek Council approval of the proposed plans to rehabilitate County Road 15 (Ferguson's Falls Road) in 2007. The tender has been written to include paved shoulders in the Hamlet. There are other options that will be discussed during the budget process.

MOTION #PW-2007-07

MOVED BY: Aubrey Churchill
SECONDED BY: Ed Sonnenburg

"THAT, the Director of Public Works be authorized to tender the County Road 15 Rehabilitation project, as described in Report #PW-03-2007;

THAT, the tender document stipulates that the contract award is subject to County Council 2007 budget approval;

THAT, the Public Works Committee provides staff direction regarding the addition of paved shoulders to the County Road 15 project;

THAT, the Director of Public Works presents the results of the County Road 15 Rehabilitation tender call and a recommendation to the Corporate Services Committee during budget deliberations;

THAT, the Director presents a by-law to County Council to reduce the posted speed limit on County Road 15, within the limits of the hamlet of Ferguson's Falls, from 60 kph to 50 kph;

AND THAT, the Clerk sends Report #PW-03-2007 to the Drummond/ North Elmsley Township and the Lanark Highlands Township Clerks, for information."

ADOPTED

iv) Report #PW-05-2007 Deacon Bridge Rehabilitation.
Director of Public Works, Steve Allan.

The purpose of this report is to seek Council approval of the proposed plans to rehabilitate the Deacon Bridge in 2007.

MOTION #PW-2007-08

MOVED BY: Keith Kerr
SECONDED BY: Sharon Mousseau

“THAT, the Director of Public Works be authorized to tender the Deacon Bridge Rehabilitation project, as described in Report #PW-05-2007;

THAT, the tender document stipulates that the contract award is subject to County Council 2007 budget approval;

THAT, the Director of Public Works presents the results of the Deacon Bridge Rehabilitation tender call and a recommendation to the Corporate Services Committee during budget deliberations;

THAT, two-thirds of the Deacon Bridge Rehabilitation project cost (up to $355,140) is funded from the approved Canada-Ontario Municipal Rural Infrastructure Fund (COMRIF) Intake 2 grant;

AND THAT, the Clerk sends Report #PW-05-2007 to the Tay Valley Township Clerk, for information.”

ADOPTED

v) Report #PW-06-2007 Rural Infrastructure Investment Initiative Funding Application.
Director of Public Works, Steve Allan.

The purpose of this report is to recommend that the County of Lanark submit an application for Rural Infrastructure Investment Initiative funding for the Rehabilitation of County Road 15 (Ferguson’s Falls Road).

MOTION #PW-2007-09

MOVED BY: John Fenik
SECONDED BY: Keith Kerr

“THAT, the Director of Public Works submit a Rural Infrastructure Investment Initiative funding application, by February 5th, 2007, for the Rehabilitation of County Road 15 (Ferguson’s Falls Road) with a total estimated project cost of $1.8 million;

THAT, a by-law authorizing the submission of the funding application is presented at the January meeting of County Council;

AND THAT, the Clerk sends Report #PW-06-2007 to Norm Sterling M.P.P, for information."

ADOPTED

vi) Report #PW-08-2007 Town of Mississippi Mills Cost Sharing Request: Ottawa Street Reconstruction.
Director of Public Works, Steve Allan.

The purpose of this Report is to inform Council of a Town of Mississippi Mills request to partially fund road works related to the reconstruction of Ottawa Street between St. James Street and County Road 17 (Appleton Side Road) in Almonte Ward.

MOTION #PW-2007-10

MOVED BY: John Fenik
SECONDED BY: Al Lunney

"THAT, the County contribution to the Town of Mississippi Mills Ottawa Street Reconstruction project be referred to the 2007 budget deliberations;

AND THAT, the Clerk sends Report #PW-08-2007 to the Town of Mississippi Mills Clerk, for information."

ADOPTED

vii) Report #PW-09-2007 Ontario Regulation 555/06 Highway Traffic Act Hours of Service.
Director of Public Works, Steve Allan.

The attachments to the report were distributed as a separate document – *attached, page 12.*

The purpose of this Report is to inform Council of Ontario Regulation 555/06 Highway Traffic Act Hours of Service, which took effect on January 1st, 2007.

MOTION #PW-2007-11

MOVED BY: Al Lunney
SECONDED BY: Brenda Hurrle

"THAT, Report #PW-09-2007 Ontario Regulation 555/06 Highway Traffic Act Hours of Service for information only;

THAT, the staffing implications arising from Ontario Regulation 555/06 be referred to the 2007 budget deliberations;

AND THAT, the Clerk sends Report #PW-09-2007 to all County of Lanark local municipalities, for information."

viii) Report #PW-10-2007 Andrewsville Bridge Rehabilitation/Replacement Options.
Director of Public Works, Steve Allan.

The purpose of this report is to seek Council approval to conduct a Public Information Centre to seek public input regarding the future of the Andrewsville Bridge.

MOTION #PW-2007-12

MOVED BY: Sharon Mousseau
SECONDED BY: John Fenik

"THAT, the Director of Public Works be authorized to schedule a Public Information Centre, in coordination with the United Counties of Leeds and Grenville, to seek public input regarding the future of the Andrewsville Bridge;

THAT, the Director of Public Works presents the results of the Andrewsville Bridge Public Information Centre to the Public Works Committee by June 2007;

AND THAT, the Clerk sends Report #PW-10-2007 to the Montague Township Clerk and the United Counties of Leeds and Grenville Clerk for information."

ADOPTED

ix) Report #PW-11-2007 2006 Traffic Count Program Results.
Director of Public Works, Steve Allan.

The purpose of this report is to inform Council of the results of the 2006 County Roads Traffic Count Program and to recommend the necessary amendments to By-Law 2002-39.

Staff will update the Program Results as County Road #24 was omitted.

MOTION #PW-2007-13

MOVED BY: Aubrey Churchill
SECONDED BY: Brenda Hurrle

"THAT, Report #PW-11-2007 2006 Traffic Count Program Results be received for information only;

AND THAT, a By-Law, to amend By-Law 2002-39 "A By-Law to Establish Highways and to Provide for Road Classifications", be presented at the January meeting of County Council."

ADOPTED

x) Report #PW-13-2007 Appleton Bridge Rehabilitation Options.
Director of Public Works, Steve Allan.

The purpose of this report is to seek approval of the proposed rehabilitation design concept for the Appleton Bridge.

MOTION #PW-2007-14

MOVED BY: John Fenik
SECONDED BY: Al Lunney

“THAT, subject to budget approval, the Director of Public Works be authorized to proceed with the final design for the Appleton Bridge Rehabilitation project, as described in Report #PW-13-2007;

AND THAT, the Clerk sends Report #PW-13-2007 to the Town of Mississippi Mills Clerk, for information.”

ADOPTED

xi) Report #PW-14-2007 Weed Inspector’s 2006 Report and Appointment of the County Weed Inspector for 2007.
Director of Public Works, Steve Allan.

The purpose of this report is to inform the Committee of the activities of the County Weed Inspector.

MOTION #PW-2007-15

MOVED BY: Keith Kerr
SECONDED BY: Richard Kidd

“THAT, the 2006 Annual Weed Report be accepted for information;

THAT, the payment of an honorarium of $500 to Mr. Tom Guindon for his services as County Weed Inspector in 2006 be authorized;

AND THAT, a by-law appointing Mr. Tom Guindon as the County Weed Inspector for 2007 be presented at the January meeting of County Council.”

ADOPTED

xii) Report #PW-15-2007 Extension of Traffic Signals, Flashing Beacon and Streetlight Maintenance Contract.
Director of Public Works, Steve Allan.

The purpose of this report is to recommend the renewal of a contract with Partham Engineering Ltd.

MOTION #PW-2007-16

MOVED BY: Bruce Horlin
SECONDED BY: Bob Fletcher

“THAT, Contract #22-2003 with Partham Engineering Ltd for the provision of routine and emergency maintenance services on traffic signals, overhead flashing beacons and street lights be renewed for a period of three years.”

ADOPTED

8. CONFIDENTIAL REPORTS

None.

9. NEW/OTHER BUSINESS

i) 2007 OGRA/ROMA Minister Delegation Topics.

MTO
- construction and funding of the Perth by-pass.
- our member of parliament will be invited to attend this delegation

OMAFRA
- buy locally theme

- still lack of processing plants in Eastern Ontario
- training program to recruit employees and meat cutters for slaughter houses
- costs of slaughtering/processing, almost doubled

- Sub-Committee update
- 4-H support
- website

Children and Youth Services
– follow up on support for youth centres

Health Promotion
– update on trails

Staff will present the summary at the January 24th Corporate Services Committee meeting.

10. ADJOURNMENT

The meeting adjourned at 9:53 p.m. on motion by Councillors B. Fletcher and E. Sonnenburg.

C Ritchie

Cathie Ritchie,
Clerk

REPORTS

THE COUNTY OF LANARK

PUBLIC WORKS COMMITTEE
January 17th, 2007

Report #PW-10-2007 of the
Director of Public Works

ANDREWSVILLE BRIDGE
REHABILITATION /REPLACEMENT OPTIONS

1. STAFF RECOMMENDATIONS

It is recommended that:

i) The Public Works Committee authorizes the Director of Public Works to schedule a Public Information Centre, in coordination with the United Counties of Leeds and Grenville, to seek public input regarding the future of the Andrewsville Bridge.
ii) The Director of Public Works presents the results of the Andrewsville Bridge Public Information Centre to the Public Works Committee by June 2007.
iii) The Clerk sends Report #PW-10-2007 to the Montague Township Clerk and the United Counties of Leeds and Grenville Clerk for information.

2. PURPOSE

The purpose of this report is to seek Council approval to conduct a Public Information Centre to seek public input regarding the future of the Andrewsville Bridge.

3. BACKGROUND

The Andrewsville Bridge crosses the Rideau River in the hamlet of Andrewsville about 5 km north of the Village of Merrickville and it provides access to the Parks Canada swing bridge (5 tonnes load limit) which crosses the Rideau Canal at the Nicholson's Locks. The Andrewsville Bridge is composed of two separate structures with 5 tonnes load limits: a 38 metre span steel through- truss with timber deck bridge (west approach) and a 10 metre span timber deck on a rolled steel girder bridge (east approach). The width of the travelled lane is 4.4 metres therefore both bridges accommodate single-lane traffic only. Average Annual Daily Traffic (AADT) is about 200. The bridges were constructed in 1915. Since they are designated as boundary bridges, they are jointly maintained by the County of Lanark and the United Counties of Leeds and Grenville.

Under Contract #1-2005, McCormick Rankin Corporation (MRC) were retained to inspect the bridges and to provide rehabilitation recommendations. The MRC Draft Report recommended immediate repairs to the stringers at the west abutment and these repairs were completed in May 2006.

4. DISCUSSION

The MRC Draft Report (extract attached) concluded that the bridge substructure and superstructure were in poor condition and recommended the development of a long-term strategy to address the significant structural deficiencies. MRC also recommended a structural evaluation of the bridge trusses to confirm their condition and to estimate their remaining life. In May 2006 (attached) Parks Canada was asked to comment on the Draft Report and a response was received in November 2006 (attached).

5. ANALYSIS AND OPTIONS

The MRC have identified five alternatives to address the deficiencies noted in their Report:

a. <u>Option 1</u>: Do nothing and close bridge to vehicular traffic when bridge condition necessitates
b. <u>Option 2</u>: Deck replacement and substructure repairs $85,000
c. <u>Option 3:</u> Option 2 plus replace bridge railing system $400,000
d. <u>Option 4:</u> Replace existing structure with a new single-lane bridge, $850,000
e. <u>Option 5:</u> Replace existing structure with a new two-lane bridge, $1,650,000

Parks Canada staff has indicated that there is no need for the Andrewsville Bridge to access their site and that they would not provide financial support for any work on the Bridge. Given the age and the poor condition of the bridge, Option 1 would probably necessitate closure to vehicle traffic within the next three to five years. A more precise estimate of the remaining life of the structure will be available after the proposed structural analysis is completed. Option 2 would provide a short-term solution to the deck problems but it would not address other significant deficiencies and the bridge would eventually be closed to vehicle traffic. Option 3 would address most of the problems but the cost effectiveness is questionable. Options 4 and 5 are feasible but would require a significant financial commitment by both Counties and given the environmental sensitivities, the estimated costs could increase substantially. The Director is uncertain of the United Counties of Leeds and Grenville’s capacity and willingness to commit to Option 4 or 5.

6. FINANCIAL IMPLICATIONS

The proposed 2007 Public Works budget includes $5,000 for the Andrewsville Bridge Public Information Centre and the structural evaluation study costs. The budgeted amount represents the County of Lanark’s 50 per cent share of the total cost.

7. LOCAL MUNICIPAL IMPACT

The bridges at Merrickville and at Burrits Rapids provide alternative crossings of the Rideau Canal. Closing the Andrewsville Bridge would add about 10 kilometres of travel for its current users, in particular the residents of Andrewsville. A Public Information Centre to review the alternatives and consult with the users of the Andrewsville Bridge should be held before the summer.

8. CONCLUSIONS

The Andrewsville Bridge is at the end of its service life and a long-term plan to address its future should be developed in 2007.

9. ATTACHMENTS

i) Appendix “A” - McCormick Rankin Corporation Investigation and Rehabilitation Report September 2005 (Extracts)
ii) Appendix “B” - Director’s letter to Parks Canada dated May 4th 2006
iii) Appendix “C” - Parks Canada letter dated November 7th, 2006

Recommended By:	**Approved for Submission By:**
Steve Allan, P. Eng. **Director of Public Works**	**Peter Wagland** **Chief Administrative Officer**

EXECUTIVE SUMMARY

APPENDIX "A"

The Andrewsville Bridge, located on Main Street in the hamlet of Andrewsville, is a two span, single lane, simply supported structure. The bridge is composed of two separate structures: steel through truss with timber deck, and a timber deck on rolled steel girder structure. The exposed surface of the substructure is currently concrete; however, the concrete is likely a re-facing over the original masonry.

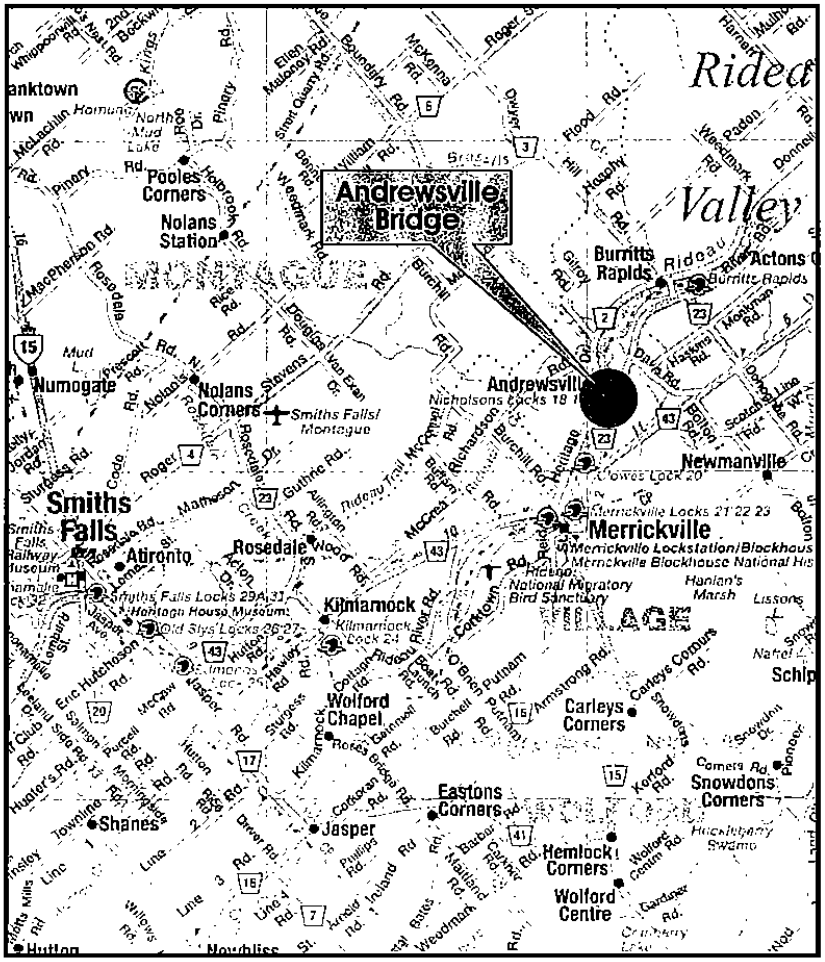
The bridge is in poor condition. The asphalt is in poor condition with several wide transverse cracks, alligator cracks, medium progressive edge cracking and potholes. The timber deck is in fair condition with localized areas requiring replacement. The steel truss is in poor to fair condition with scattered light corrosion throughout. The steel below the deck is in poor to fair condition as the stringers at the west abutment have severe web section loss. The steel roller bearings are in poor condition and severely corroded. The pier and abutments are in poor condition with extensive scaling, delaminations, spalls and widespread alkali-aggregate reaction. The bridge railing and approach guiderail are substandard.

The bridge is 88 years old and is nearing the end of its service life. Five rehabilitation and replacement alternatives were investigated, and it was determined that a single lane structure is adequate to meet future traffic requirements, and that structure replacement (estimated cost of $850,000) is not recommended at this time. It is recommended that the service life of the structure be extended with a major rehabilitation within the next few years. Work under this rehabilitation will include, but not be limited to, the following:

- Abrasive blast clean and recoat the structural steel;
- Remove the existing timber deck and construct a new timber deck;
- Install a crash-tested PL-1 barrier railing on the bridge;
- Remove and repair all deteriorated concrete in the substructure;
- Jack the bridge and replace all bearings with elastomeric bearings;
- Construct a reinforced concrete slab-on-grade on the east approach stone retaining walls;
- Upgrade the approach railing systems to meet current code requirements.

The estimated cost for this rehabilitation is $400,000.00.

KEY PLAN


Andrewsville Bridge
Rideau
Valley
Burritts Rapids
Actons Corners
Andrewsville
Nicholsons Locks 18
Newmanville
Merrickville
Merrickville Locks 21 22 23
Smiths Falls
Atironto
Rosedale
Kilmarnock
Wolford Chapel
Carleys Corners
Eastons Corners
Jasper
Hemlock Corners
Wolford Centre
Snowdons Corners
Shanes
Numogate
Nolans Corners
Nolans Station
Pooles Corners
Smiths Falls/ Montague
Lissons
Schip

Inventory Data:

Structure Name	Andrewsville Bridge		
MTO Region	Eastern	Main Highway	County Rd. 2 On 9
MTO District	Kingston	Owner	County of Lanark
County	Lanark	AADT	-
Township	Montague	Inspection Route Sequence	
Structure Type	Steel Truss, wood deck on steel girders		
Total Deck Area	236.80 (sq.m)	Interchange Structure Number	
Total Deck Length	47.79 (m)	Overall Structure Width	5.343 (m)
No. of Spans	2	Roadway Width	4.460 (m)
Span Lengths	38.545 m, 9.245 m (m)		

Historical Data:

Year Built	1915		
Evaluation Year		Current Load Limit	5.0 tonnes
Latest Biennial Inspection	2004	Last Bridge Master Inspection	
Last Condition Survey		Last Underwater Inspection	

Rehab. History: (Date/description)
1963 – timber deck and curb replaced.

Field Inspection Information:			
Date of Inspection:	June 9, 2005		
Inspector:	Bill Bohne, P.Eng.		
Others in Party:	Nathan Bakker, EIT		
Weather:	Sunny and humid	Temperature:	30°C

Additional Investigations Required:	Priority		
	None	Normal	Urgent
Detailed Deck Condition Survey:		X	
DART Survey:		X	
Detailed Coating Condition Survey:		X	
Underwater Investigation:		X	
Fatigue Investigation:		X	
Seismic Investigation:		X	
Structure Evaluation:		X	

1.0 INTRODUCTION

McCormick Rankin Corporation (MRC) was retained by the County of Lanark to undertake the inspection and detailed design for the rehabilitation of the Andrewsville Bridge (MTO Site No. 015-0013). The first phase of the assignment includes a total station survey of the structure and approach roadways, a delamination survey of all exposed concrete components, the evaluation and analysis of rehabilitation alternatives, and the preparation of a preliminary General Arrangement drawing detailing the rehabilitation work to be completed.

This report summarizes the results of the field investigation, including photographs, recommendations for rehabilitation and studies as required and preliminary cost estimates. Photographs of existing conditions and significant areas of deterioration are included in Appendix A. A preliminary General Arrangement drawing is included in Appendix B. A description and history of the structure, a summary of significant findings, and a discussion of recommended rehabilitations and cost estimates are in Sections 2 through 5 inclusive.

2.0 STRUCTURE DESCRIPTION AND HISTORY

The Andrewsville Bridge spans the Rideau River in the hamlet of Andrewsville, located between Merrickville and Burritts Rapids. Constructed in 1918, it is comprised of two simply supported structures: a 38.5 m steel modified Warren truss and a 9.2 m long steel girder (Photographs 1 and 2). The deck on both spans is 52 mm x 152 mm (2" x 6") transverse timbers laid on their sides. The timber deck has an asphalt topping and a 152 mm x 152 mm timber curb. The substructure consists of two concrete abutments and one concrete pier founded on spread footings on bedrock. In its current configuration, the structures permit one lane of traffic, with oncoming traffic yielding to vehicles on the bridge (Photograph 4). The west approach through the town of Andrewsville is two lanes. The embankment on the east approach is a single lane comprised of two dry stone retaining walls approximately 70 m in length (Photograph 3). The road continues as a two lane roadway to the east of the embankment where is crosses the Rideau Canal at Nicholsons Locks (approximately 500 m from the Andrewsville Bridge).

Information on previous rehabilitations of the Andrewsville Bridge is limited. Records indicate that the timber deck was replaced in 1963 with creosote-treated jack pine timbers. Field observations on the condition of the substructure indicate that the original substructure masonry was likely was re-faced with concrete, but there are no records to substantiate this observation.

3.0 SUMMARY OF SIGNIFICANT FINDINGS

3.1 General

The truss structure is posted at 5 tonnes, and the posted speed limit across both structures is 10 km/hr. The west approach is tangent to the structures and there is a sharp horizontal curve just past the limits of the stone retaining wall at the east approach (Photograph 5). The width of the travelled lane across the structures is approximately 4400 mm.

3.2 Superstructure

The timber deck is in fair to poor condition. The timbers are connected to the stringers with steel clip angles (Photograph 18). At many of these clip angles, the timbers have separated (Photograph 9), permitting runoff through the timbers. The runoff has removed the protective creosote in these locations, and there is evidence of brown and white rot in the timbers (Photographs 10, 11, 12). The asphalt wearing surface has also failed in these locations (Photographs 7 and 8). The deck has separated from the steel stringers in several locations and the timbers were observed to deflect upwards under traffic loads. There is evidence of numerous previous repairs to the asphalt over the expansion joints (Photograph 6).

The steel truss is in fair condition, with widespread light corrosion and minor section loss throughout. The structural steel in the truss is typically in better condition above deck than below deck. The below deck steel floor system consists of longitudinal stringers and transverse floorbeams, which are suspended below the bottom chord in the truss span (Photograph 13) and tie into the exterior girder in the short span (Photograph 17). The steel floor systems are generally in fair condition, with the exception of the stringers at the West Abutment, which exhibit very severe section loss (Photographs 19 and 20).

Lateral bracing for the steel floor system is provided by square iron bars that are anchored to, and pass through, the floorbeams (Photographs 15 and 16). The bracing is in fair to poor condition.

The truss bearings are fixed steel bearing plates at the pier and nested roller bearings at the West Abutment. The north roller bearing is in poor condition (Photographs 21 and 22), and the south roller bearing is in fair to good condition (Photograph 23). The longitudinal stringers on the truss do not tie into the transverse floorbeams at the bearings, but are individually supported on brick bearing pads (Photograph 24). The short span is fixed at both ends.

3.3 Substructure

The abutments and pier are in poor condition with extensive scaling, delaminations, spalls, deterioration, and alkali-aggregate reaction (Photographs 27, 26, 28, 29). The bearing seats are similarly delaminated, severely scaled and disintegrated at the pier and East Abutment (Photographs 31 and 32). The East Abutment ballast wall exhibits severe deterioration (photograph 30) and undermining of the north bearing plate (Photograph 25). Based on field observations, it appears that the existing substructure, likely masonry, has been encased in concrete (Photograph 32). However, further investigation would be required to confirm visual observations. The top of the footings were exposed and wide cracks, delamination, and spalls were noted throughout.

The severe deterioration of the substructure components is consistent with the deterioration typical when masonry structures are encased in concrete. It is therefore likely that the existing substructure was constructed of masonry shafts with concrete bearing seats and ballast walls (see Photographs 31 and 32).

3.4 Miscellaneous Components

The bridge railing, consisting of 3 x 50 mm diameter hollow tubular steel sections mounted to the truss members exhibits extensive light to medium corrosion and has been damaged in several locations (Photograph 4). The bridge railing is substandard with respect to current code requirements.

The fills in the east approach are retained by an ungrouted masonry retaining wall (photograph 3). The wall is in fair to poor condition. The wall has settled on the south side, which has deformed the guiderail (Photograph 34).

Similar to the bridge railing, the approach railing is substandard and has been damaged in several locations. On the east approach, the railing posts are cast into concrete blocks that sit on an ungrouted masonry wall (Photograph 3).

The curb on the deck consists of 152 mm x 152 mm timbers (Photograph 33), and is in fair to good condition.

4.0 REHABILITATION ALTERNATIVES AND RECOMMENDATIONS

4.1 Short Term Rehabilitation

Three of the stringers supported on the West Abutment exhibit very severe deterioration and it is recommended that they be repaired immediately by removing a 600 mm long section of the deteriorated stringer and replacing it with a section of S200x27. A complete scope of work for, and details of, the repair may be found in Appendix B.

4.2 Long Term Rehabilitation

The selection of any long-term rehabilitation methodology for the Andrewsville Bridge must address the following concerns:

- The existing bridge is in fair to poor condition, is a single lane structure, and is nearly 90 years old;
- The structure is posted for 5 tonnes, but there are no records to indicate when this posting was implemented, nor if any structural evaluation was undertaken to determine this posting;
- The bridge railing system is connected directly to the truss members, and likely could not withstand any significant impact, which could result in significant damage to or complete failure of the truss;
- The existing timber deck is exhibiting severe deterioration and is more than 40 years old;
- The substructure is masonry encased in concrete, and the condition of the masonry cannot be determined without extensive destructive testing;
- The east approach alignment is substandard;
- The approach guiderail is substandard, and the configuration of the approach will not permit upgrading of the approach without significant widening (including reconstruction of the existing stone walls at the east approach).

The Canadian Highway Bridge Design Code (CHBDC) and the MTO Structural Financial Analysis Manual indicate that the assumed service life of a bridge is 75 years. Given the age of the structure and the extent of deterioration, the next major rehabilitation would typically involve replacement of the structure. However, due to the low traffic volume (AADT = 200) and the severe load posting, it is anticipated that the service life of the bridge can be extended by approximately 10 years with the rehabilitation of the primary components. Accordingly, both replacement and rehabilitation alternatives have been considered. A summary of the advantages and disadvantages of each alternative is detailed in Table 1.

Alternative 1 – Do Nothing

Although this is the least expensive alternative (no capital outlay in the near future other than the stringer repairs detailed in Section 4.1), potential liability issues with the bridge and approach railings are not addressed. The continued deterioration of the timber deck will eventually result in punch-trough failures, which could close the bridge until repairs are effected. Accordingly, this alternative is not recommended.

Alternative 2 Replace Timber Deck, Upgrade Bridge Railing, Repair Substructure

In this alternative, the timber deck is replaced in kind and the concrete substructure is repaired. The bridge is jacked and the existing bearings are replaced with elastomeric bearings. The existing railing is removed and replaced with a Performance Level 1 (PL-1) railing system from the MTO publication "Crash Tested Bridge Railings" which is anchored to the new timber deck. A structural evaluation is undertaken to determine the required load posting.

The advantage of this alternative is that the potential for severe damage or total collapse of the structure due to impact damage is addressed, and the service life of the structure is extended with the repairs to the deck and substructure. The primary disadvantage is that the potential liability issues with the substandard approach railing are not addressed.

Alternative 3 Replace Timber Deck, Upgrade Bridge and Approach Railings, Repair Substructure

This alternative is similar to Alternative 2 with the addition of upgrades to the approach guiderail system. The new approach railing system cannot be anchored into the existing masonry wall, so a reinforced concrete slab will be constructed over the entire width of the approach fills, and the railing system will be anchored to the slab. All potential liability concerns are addressed with this alternative. However, it represents a significant outlay of capital for a single lane structure. In addition, the construction of the approach slab will necessitate closure of the bridge for a prolonged period of time.

Alternative 4 New Single Lane Structure

In this alternative, the existing structure is replaced with a single lane slab-on-girder structure (MTO Guidelines for the Design of Bridges on Low Volume Roads permits the construction of new single lane bridges on roads with AADT < 400). The east approach fills are reconstructed to meet current code requirements. This alternative represents a significant outlay of capital for a low volume road. In addition, the widened fills and required wall reconstruction on the east approach may have detrimental environmental impacts on the watercourse.

Alternative 5 New Two Lane Structure

In this alternative, the existing bridge is replaced with a two lane slab-on-girder bridge. This alternative resolves all geometric and structural concerns, but requires significant widening of the east approach.

It is our understanding, through discussions with the Counties of Lanark and Leeds & Grenville, that it is unlikely that the approach roadways will be widened to two lanes in the near future. The bridge over the Rideau Canal to the east of the Andrewsville Bridge is a single lane structure, and no long-term widening of this bridge is planned. Accordingly, this alternative is not recommended.

4.3 Recommended Rehabilitation

It is recommended that the Andrewsville Bridge be rehabilitated in accordance with Alternative 3. This alternative addresses all structural deficiencies and potential liability concerns while extending the service life of the structure and minimizing impacts to the watercourse associated with structure replacement. A detailed breakdown of the work included in the alternative is summarized in Section 5.0 – Cost Estimates, and a preliminary General Arrangement drawing is included in Appendix B. It is our understanding that the County of Lanark is considering implementing Alternative 2 and accepting the liability associated with maintaining the east approach as is.

However, prior to the implementation of any rehabilitation alternative, it is strongly recommended that a structural evaluation be undertaken on the bridge to determine the actual load posting on the structure. The recommended rehabilitation requires a significant outlay of funds (approximately $400,000), and it is prudent to ensure that the existing structure will meet the current and intended use of the bridge for the next decade.

Table 1 – Rehabilitation Alternatives

Alt.	Description	Advantages	Disadvantages	Estimated Cost ($2005)
1	• Maintenance repairs as required.	• Minimal outlay of capital in 2006	• Deficiencies in structure and approaches are not addressed • Actual capacity of structure is not known • Potential risk to the County due to deficiencies is not addressed	-
2	• Remove and replace existing asphalt and timber deck • Install PL-1 crash tested bridge railing system • Repairs to the structural steel as required • Remove rollers and replace with elastomeric bearing pads • Repair deteriorated concrete in piers and abutments	• Least expensive of rehabilitation alternatives • Service life of structure is extended through deck replacement and substructure repairs • Potential for structure collapse due to vehicular impact is mitigated by installation of bridge railing system	• Substandard approach railing and potential liability due to the railing is not addressed • Poor approach alignment not addressed • Actual capacity of structure is not known	$85,000
3	• Same repairs as detailed in Alternative 2 above • Construct concrete slab-on-grade on east approach fills • Construct a crash-tested railing system on approach slab	• Service life of structure is extended through deck replacement and substructure repairs • Potential for structure collapse is avoided by installation of bridge railing system • Approach railings meet current code requirements • Potential for liability associated with bridge collapse and approach railing failure is addressed	• Significant outlay of capital for a structure with limited remaining service life • Poor approach alignment not addressed	$400,000
4	• Replace existing structure with single lane structure • Construct a concrete slab on east approach fills and upgrade guiderail	• Structural and guiderail deficiencies addressed	• Significant outlay of capital for a single lane bridge • Potential environmental impacts due to minor widening	$850,000
5	• Replace existing structure with two lane structure • Widen east approach to permit two lanes of traffic • Upgrade approach guiderail	• All deficiencies addressed	• Two lane bridge not required • Significant outlay of capital • Potential environmental impacts due to significant widening	$1,650,000

5.0 COST ESTIMATES

Cost estimates for the rehabilitation alternatives discussed in Section 4.0 are tabulated below. All costs are in 2005 dollars. For the duration of the rehabilitation, the structure would be closed, which will result in a detour of approximately 10 km.

It is estimated that a structural evaluation of the Andrewsville Bridge would cost approximately $8,000.00.

Table 2 – Upgrading Bridge Railing and Approach Guiderail

Description	Unit	Quantity	Unit Cost	Item Cost
Traffic Control	L.S.	-	-	$5,000
Removal of Existing Timber Deck and Asphalt	L.S.	-	-	$10,000
Timber Replacement	L.S.	-	-	$45,000
Jacking Bridge Deck	L.S.	-	-	$5,000
Bearing Modifications (removal of rollers, installation of pads)	L.S.	-	-	$10,000
Concrete Removals, Partial Depth Type C	m^3	5.5	$3,500.00	$19,250
Concrete Repairs, Formed Surfaces	m^3	4.6	$2,000.00	$9,200
Concrete Refacing	m^3	4.0	$1,000.00	$4,000
Recoating Structural Steel (including environmental protection)	L.S.	-	-	$50,000
Concrete in Approach Slab	m^3	45	$1,000.00	$45,000
Reinforcing Steel	t	3.1	$1,800.00	$5,580
Coated Reinforcing Steel	t	3.1	$2,400.00	$7,440
Bridge Railing System	m	96	$700.00	$67,200
Steel Beam Guiderail	m	140	$85.00	$11,900
Steel Beam Guiderail with Channel	m	40	$115.00	$4,600
			Subtotal	**$304,170**
			Contingency (15%)	**$45,626**
			Total	**$350,000**
			Engineering (15%)	**$50,000**
			Rounded Total	**$400,000**

Report Prepared By:

Report Reviewed By:

Bill Bohne, P.Eng.

Michel Vachon, P.Eng.

- mailed May 5/06

APPENDIX "B"

LANARK
COUNTY

PUBLIC WORKS DEPARTMENT

May 4th, 2006

Parks Canada
Rideau Canal National Historian Site
34A Beckwith Street South
Smiths Falls, ON
K7A 2A8

ATTENTION: MR. DAVE BALLINGER

Dear Mr. Ballinger:

Re: Andrewsville Bridge Rehabilitation Options

The County of Lanark and the United Counties of Leeds and Grenville are jointly responsible for the Andrewsville Bridge which spans the Rideau Canal between Merrickville and Burritts Rapids. The single-lane, two-span structure was built in 1915 and is nearing the end of its service life. Currently, it is load posted to 5 tonnes.

In 2005, McCormick Rankin Corporation (MRC) was retained to inspect the Bridge and to provide rehabilitation options. A copy of the MRC Report is attached. Since alternative crossings of the Rideau Canal are available at Merrickville and Burritts Rapids, the Counties are also exploring the "Do Nothing Option." Under this option, at some point in the near future the Andrewsville Bridge would be closed to vehicle traffic. In the interim, only emergency repairs to the structure would be undertaken until a decision on the future of the Bridge is finalized.

Since the Andrewsville Bridge provides access to the Upper and the Lower Nicholson's Locks, the Counties are interested in Parks Canada's assessment of the situation. In particular the following information is requested, if available:

a. ***Traffic Counts***: Seasonal AADT at the Andrewsville, Burritts Rapids and Merrickville crossings of the Rideau, including percent truck traffic.

b. ***Closure Policy***: The Parks Canada policy and process for closing bridges that cross the Rideau Canal.

c. ***Cost Sharing Policy:*** The Parks Canada policy and application process for sharing the cost with municipalities for the rehabilitation of bridges that cross the Rideau Canal.

The Counties plan to seek public input on the various options open and anticipate conducting a Public Information Centre at some point in the Fall of 2006. Any information and assistance that you could provide by July 2006 will be much appreciated.

Yours truly,

Steve Allan, P. Eng.,
Director of Public Works,
Lanark County Public Works Department

SA:mm

cc Les Sheppard, United Counties of Leeds and Grenville
C.A.O. Montague Township
Bill Bohne, McCormick Rankin Corporation

APPENDIX "C"

Parks Canada Parcs Canada

Rideau Canal National Historic Site
34A Beckwith Street South
Smiths Falls, Ontario K7A 2A8

Telephone: 613-283-5170
Fax: 613-283-0677

November 7, 2006

Mr. Les Shepherd
Director of Public Work and Emergency Services
United Counties of Leeds and Grenville
25 Central Avenue W., Suite 100
Brockville, Ontario K6V 4N6

Dear Mr. Shepherd

I am writing in response to a letter from Mr. Steve Allan and a recent telephone conference call regarding the Andrewsville Bridge.

Parks Canada does not have any statistics on the amount of traffic that goes over our bridge, which is fairly close, and is part of the same road as the Andrewsville Bridge. In addition, there is no funding available from Parks Canada to assist with any remedial work required on the bridge, as we have no need for this bridge to access our site or facilities.

As mentioned, our concerns are related to the fact that it would possibly increase traffic on the Parks Canada Burritts Rapids and Merrickville bridges. Generally, this would not be a serious problem except when we need to close either of these bridges for repair work or refits; such as; painting, and/or redecking. This activity usually occurs about every 10 - 12 years. When this does take place, the bridge can be closed for a period of time, which certainly impacts on residents and others who use either of the bridges. It should be noted that we would not close these two bridges for extended periods at the same time.

We appreciate the opportunity to provide input and are certainly willing to meet to discuss this further if required.

D.J. Ballinger
Director of Operations
Rideau Canal National Historic Site

c.c. Bill Pratt, Chief Engineer
Frank Corrigan Sector Manager

Canada

DO NOT REMOVE

LANARK
COUNTY

Andrewsville Bridge Site No. 015-0013

Structural Evaluation Report

MRC McCORMICK RANKIN
CORPORATION

March 2007

EXECUTIVE SUMMARY

The Andrewsville Bridge, located on Main Street in the hamlet of Andrewsville, is a two span, single lane, simply supported structure. The bridge is composed of two separate structures: a steel through truss with timber deck, and a timber deck on rolled steel girder structure. The exposed surface of the substructure is currently concrete; however, the concrete is likely a refacing over the original masonry.

The bridge is in poor condition. The asphalt is in poor condition with several wide transverse cracks, alligator cracks, medium progressive edge cracking and potholes. The timber deck is in fair condition with localized areas requiring replacement. The steel truss is in poor to fair condition with scattered light corrosion throughout. The steel below the deck is in poor to fair condition, and the stringers at the West Abutment have been strengthened due to severe section loss in the web. The steel roller bearings are in poor condition and are severely corroded. The pier and abutments are in poor condition with extensive scaling, delaminations, spalls and widespread alkali-aggregate reaction. The bridge railing and approach guiderail are substandard.

The results of the structural evaluation indicate that there are ten components on the structure with load postings of 10 tonnes or less. The existing load posting of 5 tonnes is governed by the stringers in the truss floor deck system. The Live Load Capacity Factor (F) for the stringers is 0.23. In accordance with the Canadian Highway Bridge Design Code (CHBDC), consideration should be given to closing a structure with $F < 0.3$.

The bridge is 88 years old and requires major rehabilitation or replacement. It is our understanding that funding is not available now, nor will likely be available in the future for major rehabilitation. On this basis, it is recommended that the County implement one of the following two programs:

- Alternative 2, which involves upgrading of the deck and truss railing system to obtain another 10 to 15 years of useful life, but involves the County assuming the risks for the remaining substandard components;
- Alternative 6, in which the bridge is closed to ~~pedestrian~~ traffic.

vehicular.

27 Apr 07

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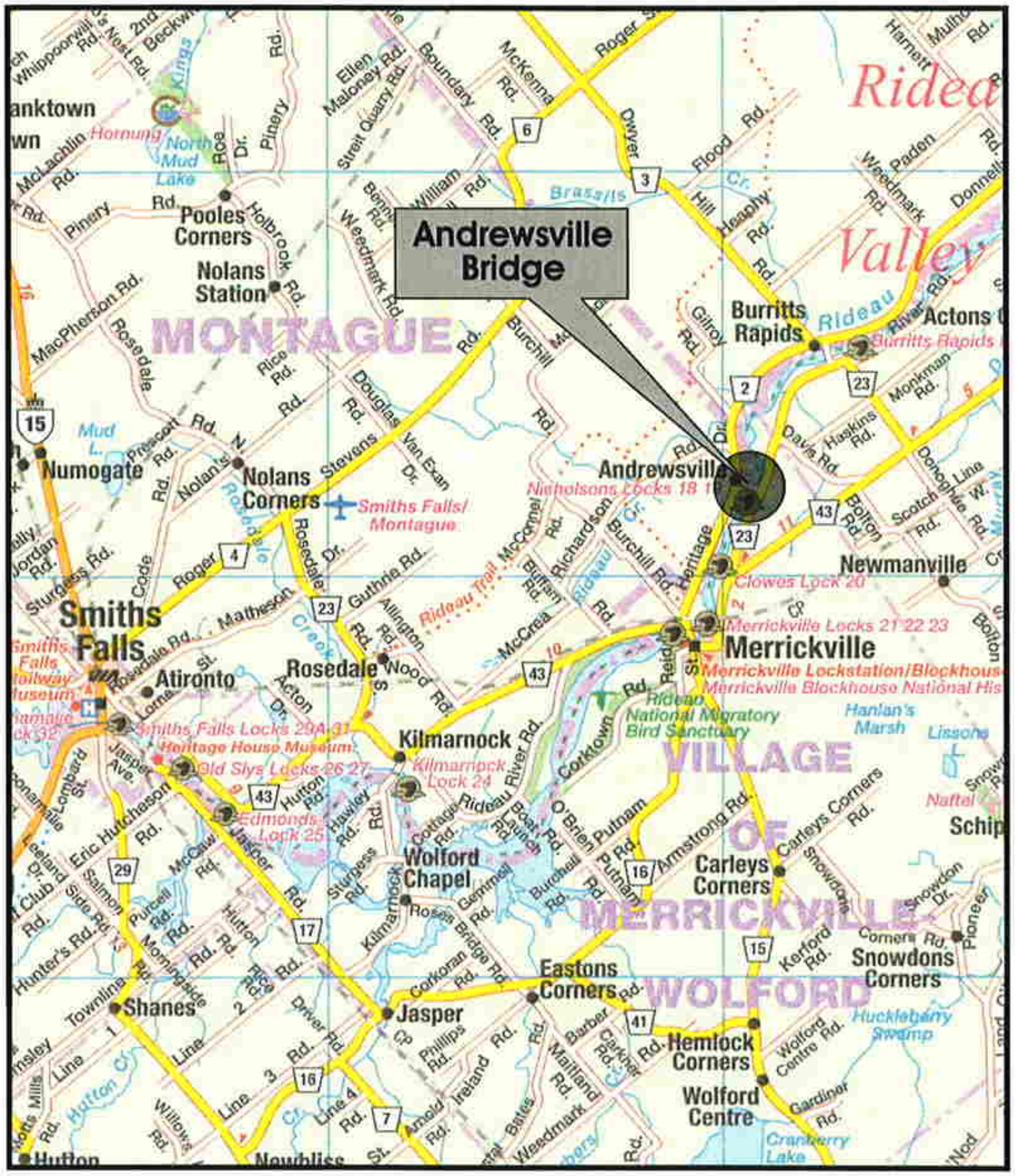
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1.0 INTRODUCTION

McCormick Rankin Corporation (MRC) was retained by the County of Lanark to undertake a structural evaluation of the Andrewsville Bridge (MTO Site No. 015-0013). The structural evaluation follows the site inspection and the development and evaluation of rehabilitation alternatives for the structure done by MRC in June and July of 2005 (see Investigation and Recommended Rehabilitation Report, dated October 2005). One of the recommendations of the 2005 report was to undertake a structural evaluation to determine if the existing posted loading (5 tonnes) is accurate, and to ensure the structure meets the current requirements of the Canadian Highway Bridge Design Code CAN/CSA-06 (CHBDC). This report summarizes the results of the structural evaluation.

To provide a more complete overview of the investigations and evaluations done to date, this report also summarizes the results of the field investigation the alternatives evaluated, and the recommended rehabilitation. An additional rehabilitation alternative has been added as a result of the structural evaluation. A description and history of the structure, a summary of significant findings of the field investigation, a discussion of recommended rehabilitation, and the results of the structural evaluation are detailed in Sections 2 through 5 inclusive.

Photograph 1: North elevation of Andrewsville Bridges, showing truss and slab on girder spans.

2.0 STRUCTURE DESCRIPTION AND HISTORY

The Andrewsville Bridge spans the Rideau River in the hamlet of Andrewsville, located between Merrickville and Burritts Rapids. Constructed in 1918, it is comprised of two simply supported structures: a 38.5 m steel modified Warren truss and a 9.2 m long steel girder (Photograph 1, previous page). The deck on both spans is 52 mm x 152 mm (2" x 6") transverse timbers laid on their sides. The timber deck has an asphalt topping and a 152 mm x 152 mm timber curb. The substructure consists of two concrete abutments and one concrete pier founded on spread footings on bedrock. In its current configuration, the structures permit one lane of traffic (Photograph 2), with oncoming traffic yielding to vehicles on the bridge. Two lanes of traffic are provided on the west approach through the hamlet of Andrewsville. The embankment on the east approach is a single lane comprised of two dry stone retaining walls approximately 70 m in length (Photograph 3). The road continues as a two lane roadway to the east of the embankment where is crosses the Rideau Canal at Nicholsons Locks, approximately 500 m from the Andrewsville Bridge.

Photograph 2: View across truss, looking east.

Photograph 3: View of single lane east approach on dry stone retaining walls, looking east.

Information on previous rehabilitations of the Andrewsville Bridge is limited. Records indicate that the timber deck was replaced in 1963 with creosote-treated jack pine timbers. Field observations on the condition of the substructure indicate that the original substructure was likely masonry that was later refaced with concrete, but there are no records to substantiate this observation.

3.0 SUMMARY OF SIGNIFICANT FINDINGS

The following section provides a brief description of the condition of the structure observed during the June 2005 inspection. For further details, refer to the October 2006 Investigation and Recommended Rehabilitation Report.

The truss structure is posted at 5 tonnes and the posted speed limit across both structures is 10 km/hr. The west approach is tangent to the structures, and there is a sharp horizontal curve just past the limits of the stone retaining wall at the east approach. The width of the travelled lane across the structures is approximately 4400 mm.

The timber deck is in fair to poor condition. The timbers have separated in numerous locations, permitting runoff through the timbers and removing the protective creosote (Photographs 4 and 5). Timber rot was also observed in a few areas where the creosote was missing. The deck has separated from the steel stringers in several locations and the timbers were observed to deflect upwards under traffic loads. The asphalt wearing surface has also failed in these locations. There is evidence of numerous previous repairs to the asphalt over the expansion joints.

Photograph 4: Deterioration of the asphalt and separation of the deck timbers.

Photograph 5: Deterioration of the timber deck due to loss of creosote protection. Note the widespread light corrosion of the below-deck steel floor system.

The steel truss is in fair condition, with widespread light corrosion and minor section loss throughout (Photograph 6). The structural steel in the truss is typically in better condition above deck than below deck. The steel floor systems are generally in fair condition, with the exception of the stringers at the West Abutment. During the June 2005 inspection, it was noted that the stringers at the West Abutment exhibited very severe section loss and perforations. The October 2005 report recommended that these stringers be retrofit, which had been done by the time of the February 2007 inspection (Photograph 7).

The truss bearings are typically in poor condition.

Photograph 6: Typical condition of below-deck structural steel in truss.

Photograph 7: Detail of repaired stringer at the West Abutment.

The abutments and pier are in poor condition with extensive scaling, delaminations, spalls, deterioration, and alkali-aggregate reaction. The bearing seats are similarly delaminated, severely scaled and disintegrated at the pier and East Abutment. The East Abutment ballast wall exhibits severe deterioration and undermining of the north bearing plate. The top of the footings were exposed and wide cracks, delamination, and spalls were noted throughout. The severe deterioration of the substructure components is consistent with the deterioration typical when masonry structures are encased in concrete. It is therefore likely that the existing substructure was constructed of masonry shafts with concrete bearing seats and ballast walls.

The bridge railing exhibits extensive light to medium corrosion and has been damaged in several locations. The bridge railing is substandard with respect to current code requirements.

The fills in the east approach are retained by an ungrouted masonry retaining wall. The wall is in fair to poor condition. The wall has settled on the south side, which has deformed the guiderail. Similar to the bridge railing, the approach railing is substandard and has been damaged in several locations. On the east approach, the railing posts are cast into concrete blocks that sit on an ungrouted masonry wall.

4.0 STRUCTURAL EVALUATION

A structural evaluation of the truss and the beam span of the Andrewsville Bridge was undertaken in accordance with Section 14 of the Canadian Highway Bridge Design Code S6-00 (CHBDC). The evaluation considered dead and live loads.

The truss structure was analysed using a two-dimensional model generated with SAP 2000 commercial software assuming fully pinned behaviour at the truss joints. The truss floor system was analysed using the simplified method in accordance with Section 5 of the CHBDC. The configuration of the slab-on-girder span did not meet the requirements to use the simplified method of analysis as specified in the CHBDC. Consequently, a three-dimensional grillage model was created to complete the analysis.

The applicable load factors of the evaluation were based on the target reliability index specific to the structural behaviour of each element as outlined under Section 14 of the CHBDC for the Inspection Level 2. The resistance modification factor U was applied in accordance with Section 14 of the CHBDC.

No contract drawings were available for this bridge. Consequently, section properties were calculated from measurements obtained from the field inspection in June 2005, and confirmed in March 2007. The section properties were based on the original condition of each element.

The material properties were selected in accordance with Section 14 of the CHBDC considering the reported age of the bridge. Yield and ultimate strengths of all structural steel were assumed to be 210 MPa and 420 MPa, respectively. The deck timbers were assumed to be S-P-F No. 1 Grade.

As load restrictions are being applied to this bridge and it is required to carry single unit vehicles, a Level 3 evaluation was performed. The applicable live load model was the CL3-625-ONT truck or lane loading. Structural responses were considered at Ultimate Limit States for bending moment, shear force, and axial force. The Live Load Capacity Factor (F) for each structural element has been summarized in Table 1. Corresponding load postings for components are also included in Table 1.

The results of the structural evaluation determined that the existing load posting of 5 tonnes must remain (based on the capacity of the stringers in the below deck truss floor system). It can be seen from Table 1 that there are 10 components with load postings of 10 tonnes or less. In accordance with Clause 14.17.2 of the CHBDC, for $F < 0.3$ at Evaluation Level 3, consideration should be given to closing the bridge.

Structural evaluations at Serviceability and Fatigue Limit States (SLS and FLS, respectively) were not undertaken. There was no evidence of serviceability related defects during the June 2005 inspection, and the traffic volumes across the bridge are low.

Table 1 – Live Load Capacity Factors (F < 1.0)

Span	Element	Response	F	Posting (t)
Truss Span	Wood Deck	Moment	0.65	15
		Shear	0.82	20
	Stringers	Moment	0.23	5
		Shear	0.53	12
	Floorbeams	Moment	0.34	7
		Shear	0.85	21
	Bottom Chord	Axial Tension	0.87	21
	Top Chord	Axial Compression	0.60	14
	End Post	Axial Compression	1.14	
	Hanger	Axial Tension	1.75	
	Post	Axial Compression	0.45	10
	Diagonal	Axial Compression	0.55	13
	Counter	Axial Compression	zero force	N/A
Girder Span	Wood Deck	Moment	1.10	
		Shear	0.95	23
	Stringers	Moment	0.36	8
		Shear	0.47	11
	Floorbeam	Moment	0.42	9
		Shear	1.30	
	Girder	Moment	0.30	6
		Shear	3.73	

5.0 REHABILITATION AND REPLACEMENT ALTERNATIVES

Table 1 below provides a summary of the rehabilitation and repair alternatives developed and evaluated as part of the October 2005 Investigation and Recommended Rehabilitation Report. Since that time, consideration has been given to closing the bridge to vehicular traffic. Accordingly, Alternative 6 – Close Bridge to Vehicular Traffic has been added to the previous alternatives.

Table 1 – Rehabilitation and Replacement Alternatives

Alternative	Description	Advantages	Disadvantages	Estimated Cost ($2007)
Do Nothing	• Maintenance repairs as required.	• Minimal outlay of capital in 2007.	• Deficiencies in structure and approaches are not addressed; • Structure load posting remains at current level; • Potential risk to County due to existing structural deficiencies that have not been addressed.	-
Replace Timber Deck, Upgrade Bridge Railing, Repair Substructure	• Remove and replace existing asphalt and timber deck (to correct deflections and areas of rot); • Install PL1 crash-tested bridge railing system (to protect truss members from vehicular impact); • Repair/replace/retrofit structural steel as required; • Jack bridge, remove deteriorated rollers bearings at North Abutment and replace with elastomeric bearing pads; • Repair deteriorated concrete in piers and abutments; • Undertake a structural evaluation to determine actual load posting requirements.	• Least expensive of rehabilitation alternatives; • Service life of structure (assumed to be 75 years per CHBDC) is extended through deck replacement and substructure repairs; • Potential for structure failure due to impact loads to truss members is mitigated by installation of bridge railing system anchored to the deck (not the truss, as is currently the case).	• Substandard approach railing on east approach (and potential liability to County) is not addressed; • Poor approach alignment on east approach is not addressed; • Structure load posting remains at current level; • Potential risk to County due to existing structural deficiencies that have not been addressed.	$95,000
Replace Timber Deck, Upgrade Bridge and Approach Railings, Repair Substructure	• Same work as detailed in Alternative 2 above; • Construct new concrete slab-on-grade on east approach fills; • Install a PL1 crash-tested railing system on east approach (anchored to the new concrete slab).	• Service life of structure is extended through deck replacement and substructure repairs; • Potential for structure failure due to impact loads to truss members is mitigated by installation of bridge railing system anchored to the deck, not the truss; • Approach railings brought up to meet current code requirements; • Potential for liability to County associated with bridge collapse and approach railing failure is addressed.	• Significant outlay of capital for a structure with limited remaining service life; • Poor approach alignment on east approach not addressed.	$430,000
New Single Lane Structure	• Replace existing truss and slab-on-girder structures with single lane slab-on-girder structures; • Construct a reinforced concrete slab-on-grade and install new guiderail on east approach (per Alternative 3 above).	• Structural and guiderail deficiencies addressed.	• Significant outlay of capital for a single lane bridge; • Potential environmental impacts due to minor widening of east approach.	$910,000
New Two Lane Structure	• Replace existing truss and slab-on-girder structures with two lane slab-on-girder structures; • Widen east approach o permit two lanes of traffic; • Upgrade approach guiderail.	• All deficiencies addressed.	• Two lane bridge may not be required to meet current and future traffic volumes; • Significant outlay of capital; • Potential environmental impacts due to significant widening of east approach.	$1,800,000
Close Bridge to Vehicular Traffic	• Roadway is blocked such that only pedestrian and bicycle traffic is permitted on bridges.	• Minimal outlay of capital over the remaining life of the bridge; • Existing load posting is adequate for loading conditions; • Potential liability associated with upgrading structure for vehicular traffic is addressed.	• Crossing across the Rideau River is lost; • Potential delays for emergency and service vehicles due to the detour.	$30,000 (Note 1)

Notes

1. Assumed costs associated with bridge closure, including additional public notification, bridge closure signage, etc.

6.0 RECOMMENDED REHABILITATION

The selection of any long-term rehabilitation methodology for the Andrewsville Bridge must address the following concerns:

- The existing bridge is in fair to poor condition, is a single lane structure, is posted at 5 t, and is nearly 90 years old;
- The bridge railing system is connected directly to the truss members, and likely could not withstand any significant impact, which could result in significant damage or complete failure of the truss;
- The existing timber deck is exhibiting severe deterioration and is more than 40 years old;
- The substructure is masonry encased in concrete, and the condition of the masonry cannot be determined without extensive destructive testing. However, experience has shown that concrete-encased masonry typically exhibits extensive deterioration;
- The east approach alignment is substandard;
- The approach guiderail is substandard, and the configuration of the approach will not permit upgrading of the approach without significant widening (including reconstruction of the existing stone walls at the east approach).

The Canadian Highway Bridge Design Code (CHBDC) and the MTO Structural Financial Analysis Manual indicate that the assumed service life of a bridge is 75 years. Given the age of the structure and the extent of deterioration, the next rehabilitation would typically involve major rehabilitation or replacement of the structure. Accordingly, the October 2005 report recommended Alternative 3, which included deck replacement, structural steel recoating, and railing upgrades on the structures and approaches.

However, it is our understanding that funding is not available for the rehabilitation, and neither the County of Lanark nor the County of Leeds & Grenville (who would be jointly funding the rehabilitation) will have funding available for major rehabilitation in the near future. If the County of Lanark intends to extend the service life of the bridge for another decade, it is recommended that the County implement Alternative 2. This alternative will maintain the bridge at its current level of service, and will address some of the risks associated with the current bridge. Alternatively, if funding is not available to maintain the bridge at its current level of service, consideration should be given to closing the bridge to vehicular traffic.

Report Prepared By:

LICENSED PROFESSIONAL ENGINEER
W. R. BOHNE
Apr 10/07
PROVINCE OF ONTARIO

Bill Bohne, P.Eng.

Report Reviewed By:

REGISTERED PROFESSIONAL ENGINEER
M Vachon
M. VACHON
Apr 10/07
PROVINCE OF ONTARIO

Michel Vachon, P.Eng.

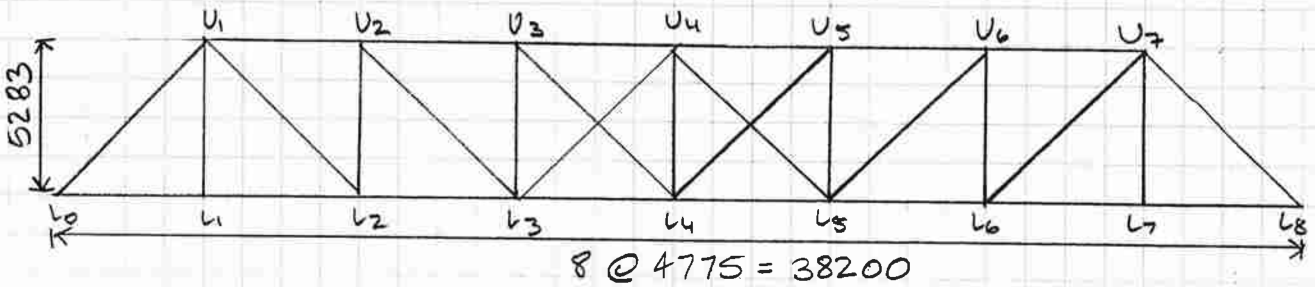
APPENDIX A

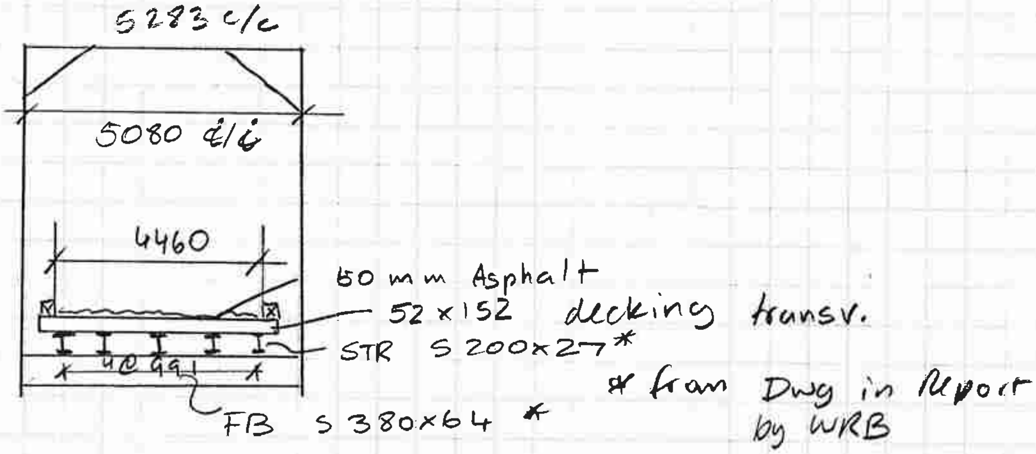
STRUCTURAL EVALUATION

Andrewsville Bridge Evaluation

Truss Span - Evaluation

Code S6-00





Dead Load Categories (14.7.2)

D1 = Steel
D2 = deck
D3 = asphalt

Evaluation Level 1 (Normal Traffic) (14.8.1.1.)

LL = CL-625 ONT

1 lane $R_L = 1.0$

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Load Factors and Target Reliability Index β (14.11)

System Behaviour:

Truss Members, Floorbeams S1

Stringers S2

Deck S3

Element Behaviour

Truss Compression or Net Section Tension E1

Stringers, Floorbeams, Deck
Truss tension at gross section E3

Inspection Level INSP2 (inspected by MRC in 2005)

Load Factors:

Element	β	α_{D1}	α_{D2}	α_{D3}	α_L
Deck	2.75	1.06	1.12	1.30	1.42
Stringer	3.00	1.07	1.14	1.35	1.49
Floorbeam	3.25	1.08	1.16	1.40	1.56
Truss (Comp + Net sec. T)	3.75	1.10	1.20	1.50	1.70
Truss (gross sec. T)	3.25	1.08	1.16	1.40	1.56

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Resistance Factors (14.13.1)

$\phi s = 0.95$ ($\phi_{comp} = 0.9$) $\phi r = 0.67$

$\phi w = 0.90$

Material Properties (14.6.3)

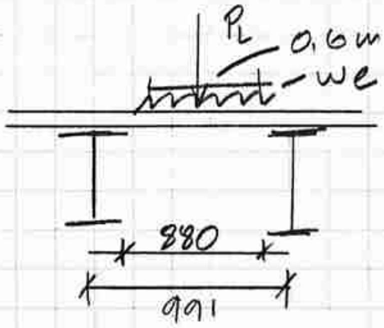
year built 1915

$F_y = 210$ MPa $F_u = 420$ MPa

rivets $F_u = 320$ MPa

wood: assume S-P-F No 1 grade

Evaluation of Deck



wheel load shall be distributed ove width of a plank or 0.25 m, whichever is greater (5.7.1.7.6 and 5.7.1.8.2)
=> use 5 planks

DLA (1axle) = 0.7 (0.4) = 0.28

Evaluation level 1 + 2 $P_L = 87.5$ KN $w = 145.8$ kN/m

$M_f = (1.42)(1.28)(145.8)(0.087) = 23.1$ KNm

$V_f = (1.42)(1.28)(145.8)(0.395) = 104.7$ KN

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Evaluation level 3 $P_L = 70$ KN

$M_f = 18.5$ KNm

$V_f = 83.8$ KN

Resistances (see p 5)

$M_r = 2.7 \times 5 = 13.5$ KNm

$V_r = 13.7 \times 5 = 68.5$ KN

LLCF - Moment

Eval. 1 + 2 $F = \frac{13.5 - 0}{23.1} = 0.58$

Eval 3 $F = \frac{13 \cdot 5 - 0}{18.5} = 0.73$

LLCF - Shear

Eval 1 + 2 $F = \frac{68.5 - 0}{104.7} = 0.65$

Eval 3 $F = \frac{68.5 - 0}{83.8} = 0.82$

Posting

Eval level	F	P	PW
1	0.58	0.057	35 t
2	0.58	0.041	25t
3	0.65	0.026	15 t

Wood Resistance

Type	1	(Joists and Planks = 1, Beams and Stringers = 2, Post Timber = 3)
Species	3	(D.Fir-L = 1, Hem-Fir = 2, SPF = 3, Northern = 4)
Grade	1	(SS = 0, No. 1 = 1, No. 2 = 2)
System	2	Long. Nail-lam = 1, Trans. Nail-lam = 2, Long. Stress-lam = 3, Transv. Stress-lam = 4, Stringers = 5)
Width b	52	mm
Depth d	152	mm
Length L	880	mm
L_u =	0	mm (unsupported length of compression flange)
Spacing	52	mm

Flexural Resistance $M_r = \Phi k_d k_{ls} k_m k_{sb} f_{bu} S$

Φ = 0.9

f_{bu} = 8.4 MPa

k_d = 1.00 (Dead and Live Load combination. For all others see 9.5.3)

K_{ls} = 1.00

k_m = 1.51

k_{sb} = 1.2

S = 200235 mm^3

M_r = 2.7 kNm

Shear Resistance $V_r = \Phi k_d k_m k_{sv} f_{vu} A/1.5$

Φ = 0.9

f_{vu} = 0.8 MPa

k_d = 1.00 (Dead and Live Load combination. For all others see 9.5.3)

k_m = 1.47

K_{sv} = 2.45

A = 7904 mm^2

V_r = 13.7 kN

Andrewsville Br
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5/

Evaluation of Truss Stringers

stringers are simply supported between floorbeams. update stringers are continuous at L2, L4 and L6

Dead Load:

		kN/m	α_D =
Asphalt	= 4.780 (0.050) (23.5) /5	= 1.12	1.35
Deck	= 4.780 (0.152) (6.0) /5	= 0.87	1.14
selfwt	= 0.27 kN/m	= 0.27	1.07

$W_{D,f} = 1.35(1.12) + 1.14(0.87) + 1.07(0.27) = 2.79$ kN/m

$M_{D,f} = 2.78(4.775)^2/8 = 7.9$ kNm

$V_{D,f} = 2.78(4.775)/2 = 6.6$ kN

Live Load:

- Moment Amplification Factor Fm (5.7.1.2)

$We = \frac{4460}{1} = 4460$

$\mu = \frac{4.46 - 3.3}{0.6} = 1.93 \longrightarrow \mu = 1.0$

S = 0.991 m N = 5

Type C - Girder Bridges with wood planks

F = 2.4 Cf = 0

$$Fm = \frac{SN}{F(1 + \frac{\mu C_f}{100})} = \frac{0.991(5)}{2.4} = 2.06$$

- Shear Amplification Factor Fv (5.7.1.4)

$$F = 2.40 \left(\frac{S}{2}\right)^{0.25}$$

$$= 2.40 \left(\frac{0.991}{2}\right)^{0.25} = 2.01$$

$$Fv = \frac{SN}{F} = \frac{(0.991)(5)}{2.01} = 2.465$$

- Live Load Force effects (SAP 2000) L = 4.775m

Eval level	M_L	V_L	DLA
1	254	245	0.3
2	254	245	0.3
3	254	245	0.3

$$M_{Lf} = \frac{\alpha_L (DLA) n M_L R_L F_m}{N} = \frac{1.49(1.3)(254)(2.06)}{5} = 202.7 \text{ KNm}$$

$$V_{L,f} = \frac{\alpha_L (DLA) n V_L R_L F_v}{N} = \frac{(1.49)(1.3)(245)(2.465)}{5} = 234.0 \text{KN}$$

Resistance of Stringers

- Moment

S200 × 27

Class web $\frac{h}{w} = \frac{181}{6.9} = 26.2 \leq \frac{1100}{\sqrt{210}} = 75.9$ Class 1

Flange $\frac{b_o}{t} = \frac{51}{10.8} = 4.7 \leq \frac{145}{\sqrt{210}} = 10.0$ Class 1

=> class 1 section

Stringers are laterally supported (brackets every 624 mm ±)

$$M_r = \phi_s Z_x F_y = (0.95)(272\times10^3)(210)$$

$$= 54.3 \text{ KNm}$$

- Shear

$k_v = 5.34$

$$\frac{h}{w} \Big/ \sqrt{\frac{k_v}{F_y}} = 26.2 \Big/ \sqrt{\frac{5.34}{210}} = 164 \leq 502$$

$F_s = F_{cr} = 0.577 \ F_y = 121$ MPa

$A_w = dw = 203(6.9) = 1401 \text{ mm}^2$

$V_r = \phi_s A_w F_s = (0.95)(1401)(121) = 161.0$ kN

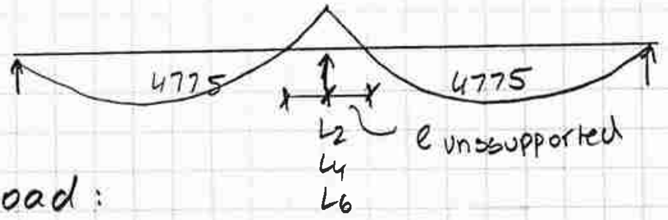
LLCF (all evaluation levels)

Moment $\Rightarrow$ $F = \dfrac{1.0(54.3) - 7.9}{202.7} = 0.23$
$U = 1.0$

Shear $\Rightarrow$ $F = \dfrac{0.87(161) - 6.6}{234} = 0.57$
$U = 0.87$

since $F < 0.3$ at Eval. level consideration shall be give to close this bridge

a $F = 0.23$ corresponds to a posting of 5 tonnes (single posting) (Cl. 14.17.2) continuous stringers at L2, L4, L8



Dead Load:

W_{fD} = 2.8 KN/m see p 6.

$M_{fD}^{+} = 0.07(2.8)(4.775)^2 = 4.5$ < before

$M_{fD}^{-} = -0.125(2.8)(4.775)^2 = 7.9$ KNm, same as before, but with $l_u = 1.18$ m

$V_{fD} = 1.25(2.8)(4.775)/2 = 8.4$ KN > before

Live Load:

$F_m = 2.06$ and $F_v = 2.465$ as before

$M_L^{+} = 208$ < before $V_L = 258$ (from SAP 2000)

$M_L^{-} = -136$

$M_{L,f}^{-} = (1.49)(1.3)(136)(2.06)/5 = 108.5$ KNm

$V_{L,f} = (1.49)(1.3)(258)(2.465)/5 = 246.4$ KN

look at l_u: S200×27 confirmed.

$$M_u = \frac{1.0\pi}{1180}\sqrt{(200000)(1.59\times10^6)(77000)(140\times10^3) + \left(\frac{200000\pi}{1180}\right)^2(1.59\times10^6)(14.7\times10^9)}$$

$= 267$ KNM $> 0.67 M_p = 0.67(57.2)$

$$M_r = 1.15(0.95)(57.2)\left[1 - \frac{0.28(57.2)}{267}\right] = 58.7 \not> 54.3$$

$M_r = 54.3$ KNm

LLCF

Moment⁻ $u = 1.0$ ⇒ $F = \frac{(1.07)(54.3) - 7.9}{108.5} = 0.42$

positive Moment in non continuous stringer governs with F = 0.23

Shear $u = 0.87$ ⇒ $F = \frac{0.87(161) - 8.4}{246.4} = 0.53$ (governs)

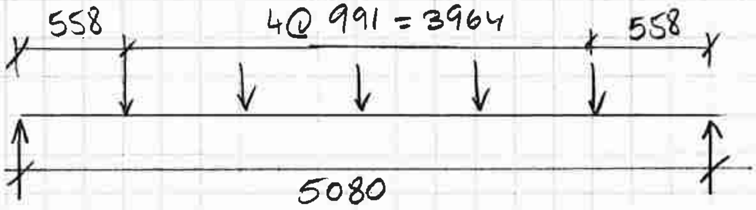
Evaluation of Truss Floorbeams

S 380×64

Dead Load from stringers

Asphalt	:	1.12 (4.775) =	5.4 kN
Deck	:	0.87 ( ) =	4.2 kN
Stringer		0.27 ( ) =	1.3 kN

Floorbeam self-wt: 0.627 kN/m



sap 2000 for unit load

$$M_{fD} = \left[1.40(5.4) + 1.16(4.2) + 1.08(1.3)\right](3.38) + 1.08(0.627)(5.08)^2/8$$

$= 49.0$ kNm

sap 2000 for unit load

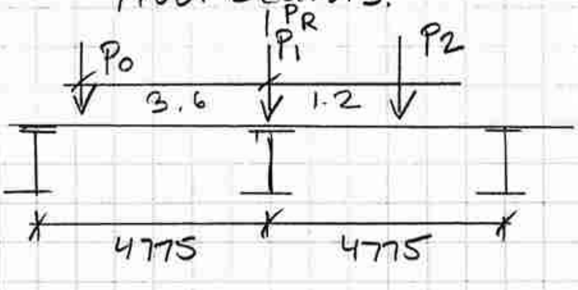
$$V_{fD} = \left[\qquad - '' \qquad - \right](2.50) + 1.08(0.627)(5.08)/2$$

$= 36.3$ kN

end floorbeam

$M_{fD} = 25.6$ kNm $\qquad V_{fD} = 19.0$ kN

Live Load: no longitudinal continuity across floorbeams.



all eval. levels
DLA = 0.3

$P_R = P_1 + 0.75 P_2 + 0.25 P_0$

$= 70 + 0.75(70) + 0.25(25)$

$= 129$ kN

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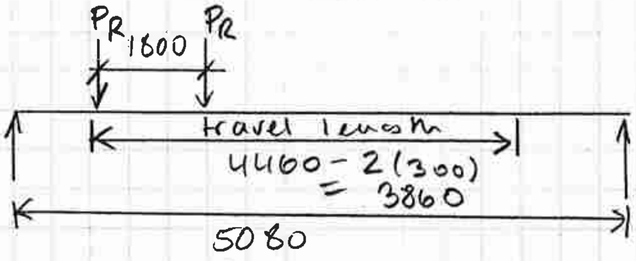


from SAP 2000

$M_{Max} = 1.71\, P_R$

$V_{max} = 1.43\, P_R$

$$\overset{\alpha}{} \quad \overset{DLA}{} \quad \overset{P_R}{} \quad \overset{f}{}$$

$$M_{L,f} = (1.56)\,(1.30)\,(129)\,(1.71) = 447\,kNm$$

$$V_{L,f} = (1.56)\,(1.30)\,(129)\,(1.43) = 374\,kN$$

since endfloorbeams are also S380x64, interior floorbeams will be more critical.

Floorbeam Resistance S380x64

- Moment:

class web $\frac{h}{w} = \frac{349}{10.4} = 33.6 \leq \frac{1100}{\sqrt{210}} = 75.9$ Class 1

class flange $\frac{b_0}{t} = \frac{70}{15.8} = 4.4 \leq \frac{145}{\sqrt{210}} = 10.0$ Class 1

Class 1 section

top flange of floorbeams connected to stringers and thus laterally supported

$$M_r = \Phi Z_x F_y = (0.95)\,(1140 \times 10^3)\,(210) = 227.4\,kNm$$

- Shear:

$K_v = 5.34$

$$\frac{h}{w} \Big/ \sqrt{\frac{K_v}{F_y}} = 33.6 \Big/ \sqrt{\frac{5.34}{210}} = 211 \leq 502$$

$F_s = F_{cr} = 0.577\ F_y = 121$ MPa

$A_w = dw = 381\ (10.4) = 3962$ mm^2

$V_r = \phi_s A_w F_s = (0.95)(3962)(121) = 455$ kN

LLCF:

- Moment $u=1.0$ $F = \frac{1.0(227.4) - 49}{447} = 0.40$

- Shear $u=0.87$ $F = \frac{(0.87)(455) - 36}{374} = 0.96$

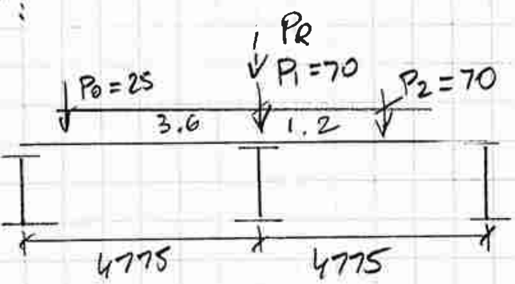
Eval level	F	P	Posting
1	0.40	0.038	23
2	0.40	0.027	17
3	0.40	0.015	9

Floorbeams at L_2, L_4 and $L6$ (stringers are continuous across FB)

$M_{FD} = [(1.40)(5.4) + 1.16(4.2) + 1.08(1.3)](1.25)(3.38) + 1.08(0.627)(5.08)^2/8$
$= 60.6$ KN

$V_{FD} = [$ — " — $](1.25)(2.50) +$ — " — $(5.08)/2$
$= 45.0$ KN

Live Load:



$P_R = 142$ KN

$M_{L,F} = (1.56)(1.30)(142)(1.71) = 492$ KNm
$V_{L,F} = (1.56)(1.30)(142)(1.43) = 412$ KN

LL CF:

- Moment $F = \frac{1.0(227.4) - 60.6}{492} = 0.34$ (governs)

- Shear $F = \frac{(0.87)(455) - 45}{412} = 0.85$ (governs)

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Evaluation of Truss

Dead Loads

joints L_1 to L_7: (floorbeam reaction)

Asphalt: $\frac{1}{2}(4.46)(4.775)(23.5)(0.05) = 12.5$ KN

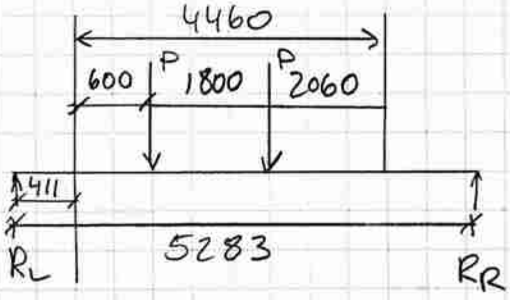
Deck : $\frac{1}{2}(4.46)(4.775)(6.0)(0.152) = 9.7$ KN

Steel : $(4.775)(0.27)(2.5) + (0.627)(5.08)(\frac{1}{2}) = 4.8$ KN

joints U_1 to U_7: $(0.115)(4.775)(\frac{1}{2})$ $+ (0.075)(7.121) = 0.8$ KN bracing

Steel truss self-wt generated by SAP2000 × 1.10 (misc. steel)

Live Load



$R_L = 0.81P + \overset{0.47}{\cancel{0.37}}P = \overset{1.28P}{\cancel{1.18}}P$

64 % of CL-625 ONT truck load to one side of truss

$\frac{1.28}{1.18} \times 0.5 = 0.54$

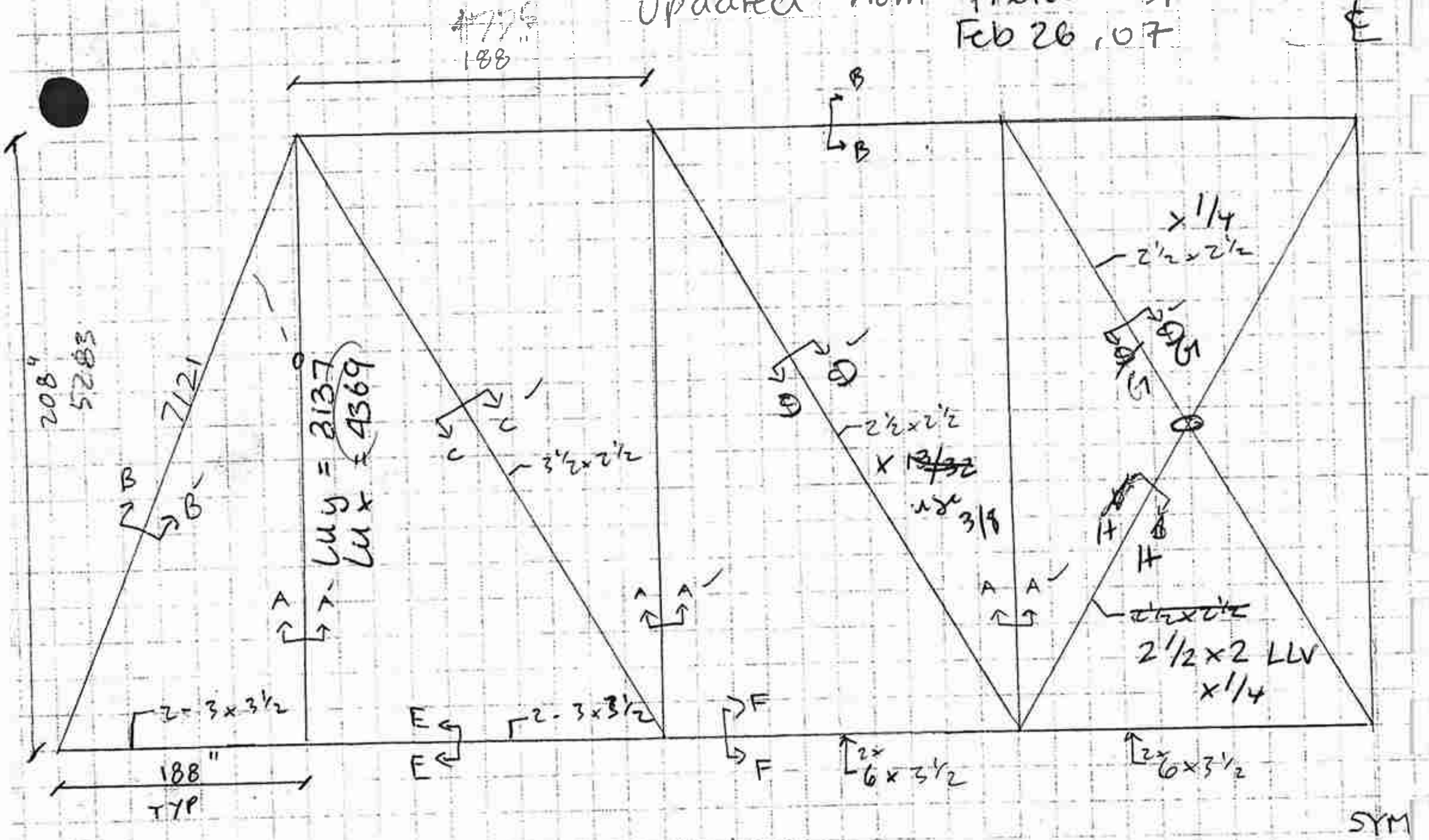
factor applied to spread sheet to modify LL

- apply LL to bottom chord
- assume fully pinned truss
- DLA = 0.25 Eval. L. 1+2 except hangers DLA = 0.3
  = 0.3 Eval. L. 3

ANDREWSVILLE BRIDGE Section Properties

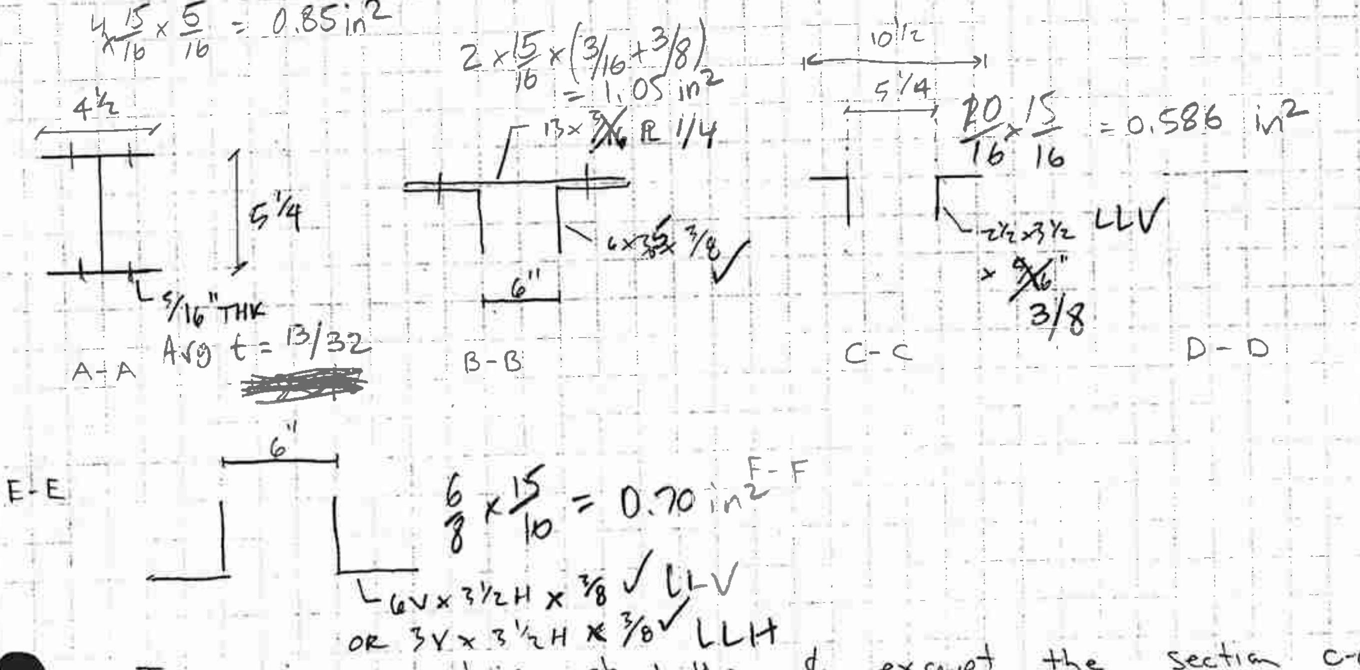
Updated from field inspection

Feb 26, 07



33.130 m

8.83 c/c Lug.



Note: Truss is symmetric about the ℄ except the section C-C &
that cross are now reversed in the next bay.

Andrewsville Br SAS Feb 07 WO 6075 p13 ~~23~~

Compressive Strength

					Lu,x	Lu,y	(Lu/r)x	(Lu/r)y	λ	Cw	J	y0	Ae	r0^2	H	Fex	Fey	Fez	Fe	λe	fo	fe	Cr
Jt1 Jt2	Elem	ID	Type	Sec	m	m																	
L0 L1	9	91	bc	EE	4.298	4.298	189	40	1.95	2.31E+07	44900.0	8.9	1482.0	12103.7	1.0	55.4	1229.9	192.9	192.6	1.0	0.2	0.6	131.7
L1 L2	10	101	bc	EE	4.298	4.298	189	40	1.95	2.31E+07	44900.0	8.9	1482.0	12103.7	1.0	55.4	1229.9	192.9	192.6	1.0	0.2	0.6	131.7
L2 L3	11	111	bc	FF	4.298	4.298	87	43	0.90	9.11E+07	66800.0	39.1	2207.5	13834.5	0.9	259.1	1056.1	168.7	165.4	1.1	0.7	0.5	437.2
L3 L4	12	121	bc	FF	4.298	4.298	87	43	0.90	9.11E+07	66800.0	39.1	2207.5	13834.5	0.9	259.1	1056.1	168.7	165.4	1.1	0.7	0.5	437.2
L0 U1	1	11	ep	BB	4.201	5.903	87	60	0.90	6.59E+08	285000.0	20.0	6510.0	12338.7	1.0	259.3	545.0	273.7	265.5	0.9	0.7	0.7	809.0
U1 U2	2	21	tc	BB	4.298	4.298	89	44	0.92	6.59E+08	285000.0	20.0	6510.0	12338.7	1.0	247.8	1028.2	274.1	270.9	0.9	0.6	0.7	793.2
U2 U3	3	31	tc	BB	4.298	4.298	89	44	0.92	6.59E+08	285000.0	20.0	6510.0	12338.7	1.0	247.8	1028.2	274.1	270.9	0.9	0.6	0.7	793.2
U3 U4	4	41	tc	BB	4.298	4.298	89	44	0.92	6.59E+08	285000.0	20.0	6510.0	12338.7	1.0	247.8	1028.2	274.1	270.9	0.9	0.6	0.7	793.2
U1 L1	17	171	h	AA	3.137	4.369	56	151	1.56												0.3	1.0	195.9
U2 L2	18	181	v	AA	3.137	4.369	56	151	1.56												0.3	1.0	195.9
U3 L3	19	191	v	AA	3.137	4.369	56	151	1.56												0.3	1.0	195.9
U4 L4	20	201	v	AA	3.137	4.369	56	151	1.56												0.3	1.0	195.9
U1 L2	24	241	d	CC	6.207	6.207	222	73	2.29	1.15E+07	24100.0	16.8	1357.5	8362.4	1.0	40.1	373.9	163.5	159.5	1.1	0.2	0.5	90.8
U2 L3	25	251	d	DD	6.207	6.207	324	70	3.35	5.87E+06	19900.0	0.0	1116.5	8135.3	1.0	18.8	398.1	168.7	168.7	1.1	0.1	0.5	36.6
U3 L4	26	261	d	GG	3.194	3.194	163	37	1.69	5.87E+06	19901.0	0.0	766.0	7974.5	1.0	73.9	1469.1	251.0	251.0	0.9	0.3	0.6	86.4
L3 U4	30	301	ct	HH	3.194	3.194	212	36	2.19	5.87E+06	19902.0	0.0	685.5	8136.9	1.0	43.7	1530.7	274.9	274.9	0.9	0.2	0.7	49.5

L:\W.O. # Directories\6075-05 Lanark County 5 Bridge Rehabilitations\Andrewsville Bridge\[6075-301 sks Andrewsville Truss Evaluation.xls]Comp

SKS 2/27/2007
Jm Feb 07

Evaluation Level **1**

Load Factors	D1	D2	D3	LL
Tension - Gross Section	1.08	1.16	1.40	1.56
Otherwise	1.10	1.20	1.50	1.70

DLA	
Hangers	0.30
Other	0.25

Element Forces						**Unfactored Axial Loads**									**Factored Live Loads**				**Factored Dead Loads**	
						Dead Load			Live - Lane		Live - Truck		Live	Live	Tension - Gross Sec		Otherwise		Tension Gross Sec.	Otherwise
Jt1	Jt2	Elem	ID	Type	Sec	Steel	Deck	Asphalt	L1MX	L1MIN	T1MX	T1MIN	Max	Min	Max	Min	Max	Min		
L0	L1	9	91	bc	EE	41.0	30.7	39.5	266.0	0.0	247.9	0.0	309.9	0.0	483.4	0.0	526.8	0.0	135.2	141.2
L1	L2	10	101	bc	EE	41.0	30.7	39.5	266.0	0.0	247.9	0.0	309.9	0.0	483.4	0.0	526.8	0.0	135.2	141.2
L2	L3	11	111	bc	FF	70.8	52.6	67.8	457.8	0.0	427.2	0.0	534.0	0.0	833.0	0.0	907.8	0.0	232.4	242.7
L3	L4	12	121	bc	FF	89.0	65.8	84.7	563.1	0.0	522.6	0.0	653.2	0.0	1019.0	0.0	1110.5	0.0	291.0	303.9
L0	U1	1	11	ep	BB	-61.1	-45.8	-59.0	0.0	-396.7	0.0	-369.7	0.0	-462.1	0.0	-720.9	0.0	-785.6	-201.6	-210.6
U1	U2	2	21	tc	BB	-70.8	-52.6	-67.8	0.0	-457.8	0.0	-427.2	0.0	-534.0	0.0	-833.0	0.0	-907.8	-232.4	-242.7
U2	U3	3	31	tc	BB	-89.3	-65.8	-84.7	0.0	-563.1	0.0	-522.6	0.0	-653.2	0.0	-1019.0	0.0	-1110.5	-291.3	-304.2
U3	U4	4	41	tc	BB	-96.0	-70.1	-90.4	0.0	-580.7	0.0	-532.5	0.0	-665.6	0.0	-1038.3	0.0	-1131.5	-311.6	-325.3
U1	L1	17	171	h	AA	6.7	9.7	12.5	153.0	0.0	164.6	0.0	213.9	0.0	333.7	0.0	363.7	0.0	36.0	37.7
U2	L2	18	181	v	AA	-25.2	-14.6	-18.8	43.8	-178.5	47.1	-175.4	58.9	-219.2	91.9	-342.0	100.1	-372.6	-70.4	-73.4
U3	L3	19	191	v	AA	-12.2	-4.9	-6.3	80.6	-127.9	83.5	-129.4	104.4	-161.7	162.8	-252.3	177.5	-274.9	-27.6	-28.6
U4	L4	20	201	v	AA	-5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-5.9	-6.0
U1	L2	24	241	d	CC	44.5	32.7	42.1	316.0	-23.2	302.3	-26.4	377.9	-33.0	589.5	-51.5	642.4	-56.1	145.0	151.4
U2	L3	25	251	d	DD	27.6	19.6	25.3	240.6	-59.0	236.4	-63.5	295.5	-79.4	460.9	-123.8	502.3	-134.9	87.9	91.8
U3	L4	26	261	d	GG	10.0	6.5	8.4	172.4	-108.6	174.4	-112.6	218.0	-140.7	340.0	-219.5	370.5	-239.2	30.2	31.5
L3	U4	30	301	ct	HH	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5

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Jm Feb 07

Live Load Capacity Factor

Evaluation Level 1

Fy 210 MPa U = 1.01
Fu 420 MPa

Jt1	Jt2	Elem	ID	Type	Sec	Tr (gross) kN	Tr (net) kN	Lu m	Cr kN	F tension	F compr.
L0	L1	9	91	bc	EE	591.3	852.1	4.775	131.7	0.96	T
L1	L2	10	101	bc	EE	591.3	852.1	4.775	131.7	0.96	T
L2	L3	11	111	bc	FF	880.8	1344.2	4.775	437.2	0.79	T
L3	L4	12	121	bc	FF	880.8	1344.2	4.775	437.2	0.59	T
L0	U1	1	11	ep	BB	1298.7	1978.1	7.121	809.0	C	0.77
U1	U2	2	21	tc	BB	1298.7	1978.1	4.775	793.2	C	0.62
U2	U3	3	31	tc	BB	1298.7	1978.1	4.775	793.2	C	0.45
U3	U4	4	41	tc	BB	1298.7	1978.1	4.775	793.2	C	0.42
U1	L1	17	171	h	AA	612.7	855.5	5.283	195.9	1.75	T
U2	L2	18	181	v	AA	612.7	855.5	5.283	195.9	7.50	0.33
U3	L3	19	191	v	AA	612.7	855.5	5.283	195.9	3.97	0.62
U4	L4	20	201	v	AA	612.7	855.5	5.283	195.9	~~#DIV/0!~~	~~#DIV/0!~~
U1	L2	24	241	d	CC	541.6	792.6	7.121	90.8	0.68	4.33
U2	L3	25	251	d	DD	445.5	629.1	7.121	36.6	0.79	0.95
U3	L4	26	261	d	GG	305.6	391.3	7.121	86.4	0.82	0.50
L3	U4	30	301	ct	HH	273.5	336.7	7.121	49.5	~~#DIV/0!~~	~~#DIV/0!~~

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Evaluation Level 2

Load Factors	D1	D2	D3	LL
Tension - Gross Section	1.08	1.16	1.40	1.56
Otherwise	1.10	1.20	1.50	1.70

DLA	
Hangers	0.30
Other	0.25

Element Forces						**Unfactored Axial Loads**									**Factored Live Loads**				**Factored Dead Loads**	
						Dead Load			Live - Lane		Live - Truck		Live	Live	Tension - Gross Sec		Otherwise		Tension Gross Sec.	Otherwise
Jt1	Jt2	Elem	ID	Type	Sec	Steel	Deck	Asphalt	L2MX	L2MIN	T2MX	T2MIN	Max	Min	Max	Min	Max	Min		
L0	L1	9	91	bc	EE	41.0	30.7	39.5	240.8	0.0	216.4	0.0	270.6	0.0	422.1	0.0	460.0	0.0	135.2	141.2
L1	L2	10	101	bc	EE	41.0	30.7	39.5	240.8	0.0	216.4	0.0	270.6	0.0	422.1	0.0	460.0	0.0	135.2	141.2
L2	L3	11	111	bc	FF	70.8	52.6	67.8	416.3	0.0	375.4	0.0	469.3	0.0	732.0	0.0	797.7	0.0	232.4	242.7
L3	L4	12	121	bc	FF	89.0	65.8	84.7	516.6	0.0	464.5	0.0	580.6	0.0	905.7	0.0	987.0	0.0	291.0	303.9
L0	U1	1	11	ep	BB	-61.1	-45.8	-59.0	0.0	-359.2	0.0	-322.8	0.0	-403.5	0.0	-629.5	0.0	-685.9	-201.6	-210.6
U1	U2	2	21	tc	BB	-70.8	-52.6	-67.8	0.0	-416.3	0.0	-375.4	0.0	-469.3	0.0	-732.0	0.0	-797.7	-232.4	-242.7
U2	U3	3	31	tc	BB	-89.3	-65.8	-84.7	0.0	-516.6	0.0	-464.5	0.0	-580.6	0.0	-905.7	0.0	-987.0	-291.3	-304.2
U3	U4	4	41	tc	BB	-96.0	-70.1	-90.4	0.0	-546.3	0.0	-489.6	0.0	-612.0	0.0	-954.7	0.0	-1040.4	-311.6	-325.3
U1	L1	17	171	h	AA	6.7	9.7	12.5	153.0	0.0	164.6	0.0	213.9	0.0	333.7	0.0	363.7	0.0	36.0	37.7
U2	L2	18	181	v	AA	-25.2	-14.6	-18.8	43.8	-165.1	47.1	-158.7	58.9	-198.3	91.9	-309.4	100.1	-337.2	-70.4	-73.4
U3	L3	19	191	v	AA	-12.2	-4.9	-6.3	80.6	-120.4	83.5	-119.9	104.4	-149.9	162.8	-233.8	177.5	-254.8	-27.6	-28.6
U4	L4	20	201	v	AA	-5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-5.9	-6.0
U1	L2	24	241	d	CC	44.5	32.7	42.1	288.8	-23.2	268.3	-26.4	335.4	-33.0	523.3	-51.5	570.2	-56.1	145.0	151.4
U2	L3	25	251	d	DD	27.6	19.6	25.3	222.6	-59.0	213.9	-63.5	267.3	-79.4	417.1	-123.8	454.5	-134.9	87.9	91.8
U3	L4	26	261	d	GG	10.0	6.5	8.4	162.3	-108.6	161.6	-112.6	202.0	-140.7	315.2	-219.5	343.5	-239.2	30.2	31.5
L3	U4	30	301	ct	HH	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5

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SKS 2/27/2007

Feb 07

Live Load Capacity Factor

Evaluation Level 2

Fy 210 MPa U = 1.01

Fu 420 MPa

Jt1	Jt2	Elem	ID	Type	Sec	Tr (gross) kN	Tr (net) kN	Lu m	Cr kN	F tension	F compr.
L0	L1	9	91	bc	EE	591.3	852.1	4.775	131.7	1.09	T
L1	L2	10	101	bc	EE	591.3	852.1	4.775	131.7	1.09	T
L2	L3	11	111	bc	FF	880.8	1344.2	4.775	437.2	0.90	T
L3	L4	12	121	bc	FF	880.8	1344.2	4.775	437.2	0.66	T
L0	U1	1	11	ep	BB	1298.7	1978.1	7.121	809.0	C	0.88
U1	U2	2	21	tc	BB	1298.7	1978.1	4.775	793.2	C	0.70
U2	U3	3	31	tc	BB	1298.7	1978.1	4.775	793.2	C	0.50
U3	U4	4	41	tc	BB	1298.7	1978.1	4.775	793.2	C	0.46
U1	L1	17	171	h	AA	612.7	855.5	5.283	195.9	1.75	T
U2	L2	18	181	v	AA	612.7	855.5	5.283	195.9	7.50	0.37
U3	L3	19	191	v	AA	612.7	855.5	5.283	195.9	3.97	0.66
U4	L4	20	201	v	AA	612.7	855.5	5.283	195.9	~~#DIV/0!~~	~~#DIV/0!~~
U1	L2	24	241	d	CC	541.6	792.6	7.121	90.8	0.77	4.33
U2	L3	25	251	d	DD	445.5	629.1	7.121	36.6	0.87	0.95
U3	L4	26	261	d	GG	305.6	391.3	7.121	86.4	0.88	0.50
L3	U4	30	301	ct	HH	273.5	336.7	7.121	49.5	~~#DIV/0!~~	~~#DIV/0!~~

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Jm Feb 07.

Evaluation Level **3**

Load Factors	D1	D2	D3	LL
Tension - Gross Section	1.08	1.16	1.40	1.56
Otherwise	1.10	1.20	1.50	1.70

DLA	
Hangers	0.30
Other	0.30

Element Forces						**Unfactored Axial Loads**									**Factored Live Loads**				**Factored Dead Loads**	
						Dead Load			Live - Lane		Live - Truck		Live	Live	Tension - Gross Sec		Otherwise		Tension Gross Sec.	Otherwise
Jt1	Jt2	Elem	ID	Type	Sec	Steel	Deck	Asphalt	L3MX	L3MIN	T3MX	T3MIN	Max	Min	Max	Min	Max	Min		
L0	L1	9	91	bc	EE	41.0	30.7	39.5	196.4	0.0	160.9	0.0	209.1	0.0	326.2	0.0	355.5	0.0	135.2	141.2
L1	L2	10	101	bc	EE	41.0	30.7	39.5	196.4	0.0	160.9	0.0	209.1	0.0	326.2	0.0	355.5	0.0	135.2	141.2
L2	L3	11	111	bc	FF	70.8	52.6	67.8	335.2	0.0	274.0	0.0	356.2	0.0	555.6	0.0	605.5	0.0	232.4	242.7
L3	L4	12	121	bc	FF	89.0	65.8	84.7	416.5	0.0	339.4	0.0	441.2	0.0	688.3	0.0	750.1	0.0	291.0	303.9
L0	U1	1	11	ep	BB	-61.1	-45.8	-59.0	0.0	-292.8	0.0	-239.9	0.0	-311.9	0.0	-486.5	0.0	-530.2	-201.6	-210.6
U1	U2	2	21	tc	BB	-70.8	-52.6	-67.8	0.0	-335.2	0.0	-274.0	0.0	-356.2	0.0	-555.6	0.0	-605.5	-232.4	-242.7
U2	U3	3	31	tc	BB	-89.3	-65.8	-84.7	0.0	-416.5	0.0	-339.4	0.0	-441.2	0.0	-688.3	0.0	-750.1	-291.3	-304.2
U3	U4	4	41	tc	BB	-96.0	-70.1	-90.4	0.0	-443.3	0.0	-360.7	0.0	-468.9	0.0	-731.5	0.0	-797.2	-311.6	-325.3
U1	L1	17	171	h	AA	6.7	9.7	12.5	153.0	0.0	164.6	0.0	213.9	0.0	333.7	0.0	363.7	0.0	36.0	37.7
U2	L2	18	181	v	AA	-25.2	-14.6	-18.8	42.9	-138.3	46.0	-125.2	59.7	-162.7	93.2	-253.8	101.6	-276.6	-70.4	-73.4
U3	L3	19	191	v	AA	-12.2	-4.9	-6.3	71.6	-103.5	72.4	-98.8	94.1	-128.4	146.8	-200.3	159.9	-218.3	-27.6	-28.6
U4	L4	20	201	v	AA	-5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-5.9	-6.0
U1	L2	24	241	d	CC	44.5	32.7	42.1	237.6	-23.2	204.3	-26.4	265.6	-34.3	414.3	-53.5	451.5	-58.3	145.0	151.4
U2	L3	25	251	d	DD	27.6	19.6	25.3	186.5	-57.8	168.7	-62.0	219.3	-80.5	342.2	-125.6	372.9	-136.9	87.9	91.8
U3	L4	26	261	d	GG	10.0	6.5	8.4	139.5	-96.6	133.1	-97.5	173.1	-126.8	270.0	-197.8	294.2	-215.6	30.2	31.5
L3	U4	30	301	ct	HH	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5

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Live Load Capacity Factor

Evaluation Level **3**

Fy 210 MPa U = 1.01
Fu 420 MPa

					Tr (gross)	Tr (net)	Lu	Cr	F	F
Jt1 Jt2	Elem	ID	Type	Sec	kN	kN	m	kN	tension	compr.
L0 L1	9	91	bc	EE	591.3	852.1	4.775	131.7	1.42	T
L1 L2	10	101	bc	EE	591.3	852.1	4.775	131.7	1.42	T
L2 L3	11	111	bc	FF	880.8	1344.2	4.775	437.2	1.18	T
L3 L4	12	121	bc	FF	880.8	1344.2	4.775	437.2	0.87	T
L0 U1	1	11	ep	BB	1298.7	1978.1	7.121	809.0	C	1.14
U1 U2	2	21	tc	BB	1298.7	1978.1	4.775	793.2	C	0.92
U2 U3	3	31	tc	BB	1298.7	1978.1	4.775	793.2	C	0.66
U3 U4	4	41	tc	BB	1298.7	1978.1	4.775	793.2	C	0.60
U1 L1	17	171	h	AA	612.7	855.5	5.283	195.9	1.75	T
U2 L2	18	181	v	AA	612.7	855.5	5.283	195.9	7.39	0.45
U3 L3	19	191	v	AA	612.7	855.5	5.283	195.9	4.40	0.78
U4 L4	20	201	v	AA	612.7	855.5	5.283	195.9	#DIV/0!	#DIV/0! *
U1 L2	24	241	d	CC	541.6	792.6	7.121	90.8	0.97	4.17
U2 L3	25	251	d	DD	445.5	629.1	7.121	36.6	1.06	0.94
U3 L4	26	261	d	GG	305.6	391.3	7.121	86.4	1.03	0.55
L3 U4	30	301	ct	HH	273.5	336.7	7.121	49.5	#DIV/0!	#DIV/0! *

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counters are made
zero force members.

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Chart

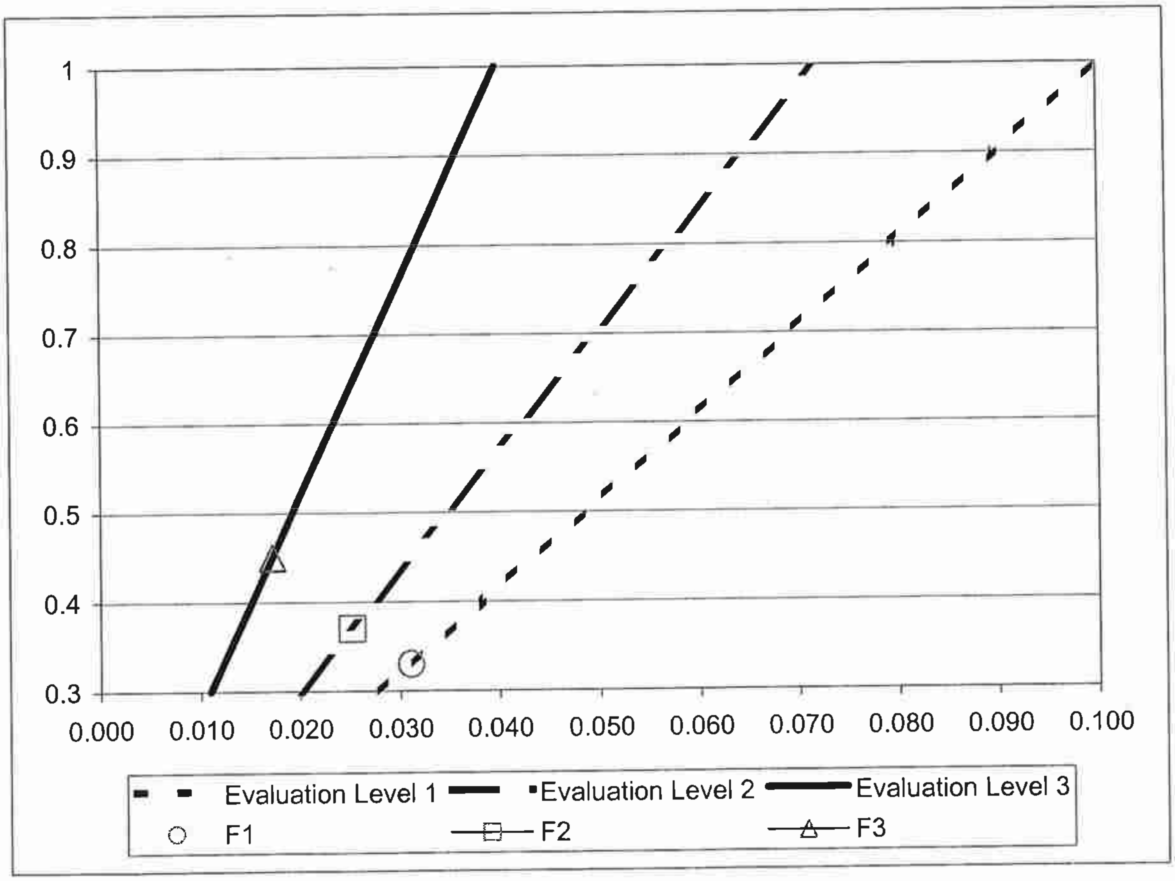
F	P1	P2	P3
0.3	0.028	0.020	0.011
0.4	0.038	0.027	0.015
0.5	0.049	0.035	0.019
0.6	0.059	0.042	0.023
0.7	0.069	0.050	0.028
0.8	0.079	0.057	0.032
0.9	0.090	0.065	0.036
1	0.100	0.072	0.040

L	p1	p2	m	b
1	0.028	0.1	0.102857	-0.00286
2	0.02	0.072	0.074286	-0.00229
3	0.011	0.04	0.041429	-0.00143

Posting loads for gross vehicle weights

W **=** 625 KN

Evaluation Level	LLCF F	P	Posting (t)
1	0.33	0.031	**19**
2	0.37	0.025	**15**
3	0.45	0.017	**10**



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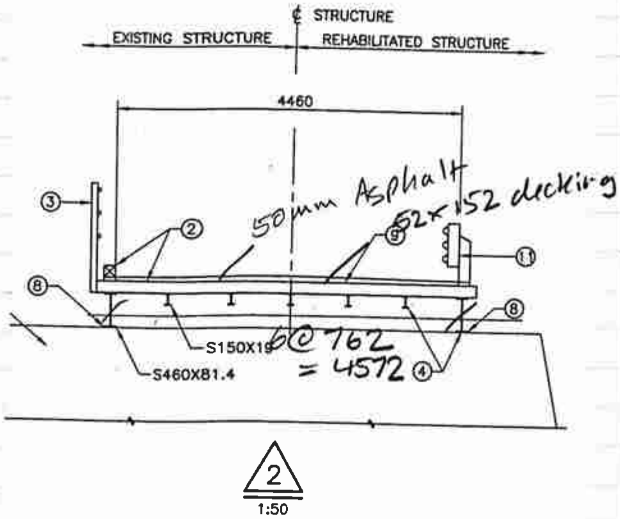
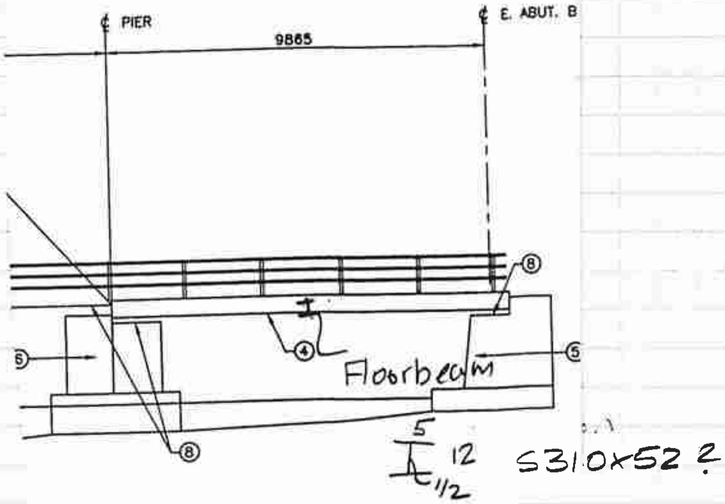
Beam Span - Evaluation Code S6-00





Dead load categories (14.7.2)

D_1 = steel
D_2 = deck
D_3 = asphalt

Evaluation level 1 (Normal Traffic) (14.8.1.1)

CL-625-ONT, 1 lane, $R_L = 1.0$

Load Factors and Target Reliability Index (14.11/14.12)

System Behaviour:

Deck	S3
Stringers	S2
Floorbeam / Girder	S1

McCORMICK RANKIN CORPORATION

PROJECT Andrewsville Br W.O. No. 6075
DESIGNED SUS DATE Feb 07
CHECKED DATE Feb 07 PAGE 22 OF

Element Behaviour:

all E3

Inspection level INP 2

Load factors:

Element	β	α_{D1}	α_{D2}	α_{D3}	α_L
Deck	2.75	1.06	1.12	1.30	1.42
Stringer	3.00	1.07	1.14	1.35	1.49
Floorbeam	3.25	1.08	1.16	1.40	1.56
Girder	3.25	1.08	1.16	1.40	1.56

Resistance Factors (14.13.1)

$\phi_s = 0.95$ $\phi_w = 0.9$

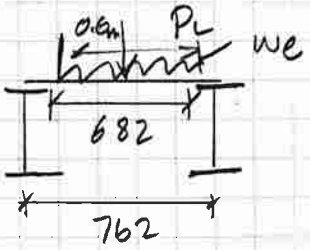
Material Properties (14.6.3)

year built 1915

$F_y = 210 MPa$ $F_u = 420 MPa$

wood - assume SPF No1 grade

Evaluation of Deck



wheel load shall be distributed over width of a plank, or 0.25m whichever is greater (5.7.1.7.6 and 5.7.1.8.2)
⇒ use 5 planks

DLA (1 axle) = 0.7 (0.4) = 0.28

Evaluation level 1+2 P_L = 87.5 kN we = 145.8 kN/m

M_F = 1.42 (1.28) (145.8) $(0.682)^2/8$ = 15.4 kNm

V_F = 1.42 (1.28) (145.8) (0.682) / 2 = 90.4 kN

Evaluation level 3 P_L = 70 kN we = 116.7 kN/m

M_F = 12.3 kNm

V_F = 72.3 kN

Resistances - see p 5

M_r = 2.7 × 5 = 13.5 kNm

V_r = 13.7 × 5 = 68.5 kN

LLCF:

	Moment	Shear
Eval 1+2	$F = \frac{13.5 - 0}{15.4} = 0.88$	F = 68.5/90.4 = 0.76
Eval 3	F = 13.5/12.3 = 1.10	F = 68.5/72.3 = 0.95

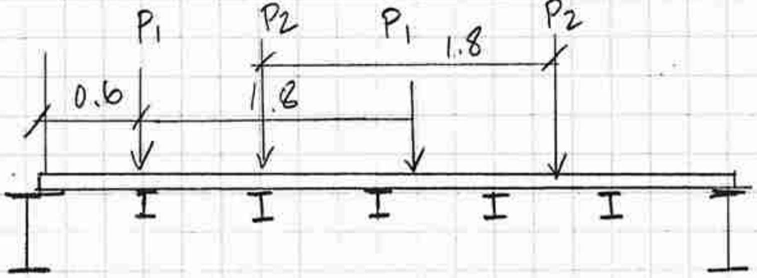
Posting (14.17.2)

Eval level	F	P	PW
1	0.76	0.075	47 t
2	0.76	0.054	33 t
3	0.95	0.038	23 t

Evaluation of Stringers

- assume stringers are simply supported at floorbeam (conservative, and judging from pictures, most probable) stringers are continuous across FB (see grillage model)

2 positions of truck to be investigated



- simplified method of analysis (cl. 5.7.1.1) requires girders of equal (or ± 10%) flexural rigidity. In this case, interior girders are less rigid and will deflect more. If truck is in position P2, the ext. girders will see very little load due to the low stiffness of the deck. Consequently, it is reasonable and conservative to assume truck load is resisted by the five stringers and to apply simplified method. The dead load is resisted by all seven elements.

Dead Load:

Asphalt = 4.780 (0.050) (23.5)/7 = 0.8 KN/m $\alpha_D = 1.35$
Deck = 4.780 (0.152) (6.0)/7 = 0.6 KN/m $\alpha_D = 1.14$
self wt = 0.183 kN/m $\alpha_D = 1.07$

$w_{D,f} = 1.35(0.8) + 1.14(0.6) + 1.07(0.18) = 2.0$ KN/m

$M_{D,f} = 2.0(4.93)^2/8 = 6.1$ KNm

$V_{D,f} = 2.0(4.93)/2 = 4.9$ KN

- Live Load

$S = 0.762 \quad N = 5$

Type C - Girder Bridges with wood planks

$F = 2.4 \quad C_f = 0$

$$F_m = \frac{SN}{F(1+\frac{\mu C_f}{100})} = \frac{0.762(5)}{2.4} = 1.59$$

$$F = 2.40 \left(\frac{S}{2}\right)^{0.25}$$

$$= 2.40 \left(\frac{0.762}{2}\right)^{0.25} = 1.89$$

$$F_V = \frac{SN}{F} = \frac{(0.762)(5)}{1.89} = 2.02$$

- Live Load Force effects (SAP 2000) $L = 4.93$

Eval level	M_L	V_L	DLA
1	264	247	0.3
2	264	247	0.3
3	264	247	0.3

$$M_{ULf} = \frac{\alpha_L (DLA) \cdot n M_L R_L F_m}{N} = \frac{1.49(1.3)(264)(1.59)}{5} = 163 \text{ kNm}$$

$$V_{ULf} = \frac{\alpha_L (DLA)\, n V_L R_L F_V}{N} = \frac{1.49(1.3)(247)(2.02)}{5} = 193 \text{ kN}$$

Resistance of Stringers

S150 × 19

class web $h/w = 134/5.9 = 22.7 \leq \frac{1100}{\sqrt{210}} = 75.9$ Class 1

class flange $b_0/t = 42.5/9.1 = 4.7 \leq \frac{145}{\sqrt{210}} = 10.0$ Class 1 stringers are laterally supported (brackets every 624 mm I)

$M_r = \Phi_s Z_x F_y = (0.95)(139 \times 10^3)(210) = 27.7$ KNm

- Shear

$K_v = 5.34$

$\frac{h}{w} / \sqrt{\frac{K_v}{F_y}} = 22.7 / \sqrt{\frac{5.34}{210}} = 142.4 \leq 502$

$F_s = F_{cr} = 0.577\, F_y = 121$ MPa

$A_w = dw = (152)(5.9) = 897$ mm^2

$V_r = \Phi_s A_w F_s = (0.95)(897)(121) = 103$ kN

LLCF (all evaluation levels)

Moment
$U = 1.0$ $F = \frac{(27.7) - 6.1}{163} = 0.13$

Shear
$U = 0.87$ $F = \frac{0.87(103) - 4.9}{193} = 0.44$

Results show that the stringers have a capacity of less than 5 t, (see p 8). Revise live load force effects using detailed grillage Model (SAP 2000). Based on previous results, only need to look at Evaluation level 3 (single posting).

$M_L = 30.8$ KNm
$V_L = 92.5$ KN
} from SAP 2000 grillage Model

$M_{Lif} = 1.49(1.3)(30.8) = 60.0$ KNm

$V_{Lif} = 1.49(1.3)(92.5) = 179.2$ KN

Stringers - revised: continuous across FB

$M_L^+ = 30.2$ kNm unchanged

$M_L^- = 9.24$ kNm

$M_{L,f}^- = 1.49(1.3)(9.24) = 18.0$ kNm

$M_{D,f} = 2.2(0.126)(4.93)^2 = 6.7$ kNm

lu in M^- = 300 mm ± by inspection M^- will not be critical.

$V_{L,f}$ = 86.6 kNm not critical

Revised LLCF for stringer

			PW	P
Moment $u=1.0$	$= \dfrac{27.7 - 6.1}{60}$	$= 0.36$	0.013	8t
Shear $u=0.87$	$= \dfrac{0.87(103) - 4.9}{179}$	$= 0.47$		

Required posting (14.17.2) = 8 t

Evaluation of Floorbeam

- Dead Load: Reaction from stringers + self wt

$P_{Asplt} = (0.8)(4.93) = 3.94$ kN $\qquad \alpha_D = 1.40$

$P_{DECK} = (0.6)(4.93) = 3.00$ kN $\qquad \alpha_D = 1.16$

$P_{stringer} = (0.183)(4.93) = 0.90$ kN $\qquad \alpha_D = 1.08$

$W_{selfwt} = 0.512$ kN/m $\qquad \alpha_D = 1.08$

$$M_{f,D} = \left[(1.4)(3.94) + 1.16(3.00) + 1.08(0.90)\right](4.5)(0.762) + (1.08)(0.512)(4.572)^2/8 = 35.6 \text{ kNm}$$

$$V_{f,D} = \left[(1.4)(3.94) + 1.16(3.00) + 1.08(0.9)\right](2.5) + (1.08)(0.512)(4.572)/2 = 26.2 \text{ kN}$$

- Live Load (from grillage model SAP 2000)

$M_{L,f} = (1.56)(1.30)(131.5) = 267$ kNm

$V_{L,f} = (1.56)(1.30)(115.9) = 235$ kN

- Floorbeam Resistance S310×52 ?

class web $h/w = 277/10.9 = 25.4 \le \frac{1100}{\sqrt{210}} = 75.9$ Class 1

class flange $b_o/t = 645/13.8 = 4.7 \le \frac{145}{\sqrt{210}} = 10.0$ Class 1

floorbeam laterally supported at Stringer connection

$$M_r = \phi_s Z_x F_y = (0.95)(736\times10^3)(210) = 147 \text{ KNM}$$

Shear:

$K_v = 5.34$

$$h/w \Big/ \sqrt{\frac{K_v}{F_y}} = 25.4 \Big/ \sqrt{\frac{5.34}{210}} = 159 \le 502$$

$$F_s = F_{cr} = 0.577 F_y = 121 \text{ MPa}$$

$$A_w = dw = (305)(10.9) = 3325 \text{ mm}^2$$

$$V_r = \phi_s A_w F_s = (0.95)(3325)(121) = 382 \text{ kN}$$

LLCF (all evaluation levels) and posting (14.17.2)

		PW	P
Moment $u = 1.0$	$F = \frac{147 - 35.6}{267} = 0.42$	0.016	9 t
Shear $u = 0.87$	$F = \frac{0.87(382) - 26.2}{235} = 1.30$	—	—

revise Floorbeam : stringers continuous

$M_{f,D} = [(1.4)(3.94) + 1.16(3.00) + 1.08(0.90)](1.25)(4.5)(0.762)$
$+ 1.08(0.512)(4.572)^2/8 = 44.2\ \text{KNm}$

$V_{FD} : [\quad - " \quad](1.25)(2.5)$
$+ \quad - " - \quad /2 = 32.4\ \text{KN}$

$M_{f,L} = (1.56)(1.30)(119.6) = 242.5\ \text{KNm}$

$V_{f,L} = (1.56)(1.30)(102.2) = 207.3\ \text{KN}$

LLCF

M: $F = \frac{147 - 44.2}{242.5} = 0.42$ as before

V: $F = \frac{0.87(382) - 32.4}{207.3} = 1.44$

Evaluation of Girder

- Dead Load

  - Reaction from Floorbeam

$V_f = 26.2$ (factored, same load factors)

- Deck $w_D = 0.3$ kN/m $\alpha_D = 1.16$
- Asph $w_a = 0.4$ kN/m 1.40
- Selfwt $w_s = 0.8$ kN/m 1.08

$$w_f = 1.16(0.3) + 1.40(0.4) + 1.08(0.8) = 1.8 \text{ kN/m}$$

$$M_{LD} = \frac{26.2(9.865)}{4} + \frac{1.8(9.865)^2}{8} = 86.5 \text{ kNm}$$

$$V_{fD} = 26.2/2 + 1.8(9.865)/2 = 22.0 \text{ kN}$$

- Live Load (from SAP 2000 grillage Model)

$$M_{Lf} = (1.56)(1.30)(390.5) = 792 \text{ kNm}$$

$$V_{Lf} = (1.56)(1.30)(106.0) = 215 \text{ kN}$$

Resistance of girder

class web $h/w = 422/11.7 = 36.1 \leq \frac{1100}{\sqrt{210}} = 75.9$ Class 1

class flange $b_0/t = 76/17.6 = 4.3 \leq \frac{145}{\sqrt{210}} = 10.0$ Class 1

$L_u = 4600^*$ mm $\omega_2 = 1.0$ * 4930 - 144 ± (bracket at support) ✓

$$M_u = \frac{\omega_2 \pi}{L}\left(\sqrt{E_s I_y G_s J + \left(\frac{\pi E_s}{L}\right)^2 I_y C_w}\right)$$

$$= \frac{\pi}{4600}\sqrt{(20000 f 8.77\times10^6)(77000)(986\times10^3) + \left(\frac{200000\pi}{4600}\right)^2(8.77\times10^6)(423\times10^9)}$$

$M_u = 307$ kNm $\cancel{>}$ $0.67\, M_p = 0.67(1720 \times 10^3)(210) = 242$ kNm

$$M_r = 1.15\, \phi_s\, M_p \left[1 - \frac{0.28\, M_P}{M_u}\right] \leq \phi_s\, M_P$$

$$= 1.15(0.95)(361)\left[1 - \frac{0.28(361)}{307}\right] \leq 0.95(361)$$

$$= 265 \text{ kNm} \leq 343$$

Shear $K_v = 5.34$

$$h/w \Big/ \sqrt{\frac{K_v}{F_y}} = 36.1 \Big/ \sqrt{\frac{5.34}{210}} = 226 < 502$$

$$F_s = F_{cr} = 0.577\, F_y = 121 \text{ MPa}$$

$$A_w = 457(11.7) = 5347$$

$$V_r = \phi_s A_w F_s = (0.95)(5347)(\overset{121}{\cancel{210}}) = \overset{615}{\cancel{1067}} \text{ kN}$$

LLCF and posting (14.17.2) (all Eval. Levels)

		PW	P
Moment $U=1.0$	$F = \dfrac{265 - 86.5}{792} = 0.23$	0.008	5t
Shear $U=0.87$	$F = \dfrac{(0.87)\overset{615}{\cancel{(1067)}} - 22}{215} = \overset{2.4}{\cancel{4.2}}$	–	–

LANARK COUNTY
PUBLIC WORKS
JUL 12 2007
FILE
Action Info
PWCOW August Copy
BF.

July 9, 2007

Ministry of Culture Ontario
400 University Avenue, 4th Floor
Toronto, Ontario M7A 2R9

Attention: Ms. Karla Barboza, Conservation Advisor

RE: ANDREWSVILLE BRIDGE (MTO SITE No. 015-0073)
CULTURAL AND HERITAGE EVALUATION
OUR FILE: W.O. 6075-3013

Dear Ms. Barboza:

McCormick Rankin Corporation (MRC) has been retained by the County of Lanark to recommend a rehabilitation strategy for the above-noted bridge. As part of this assignment, we have undertaken an assessment of the cultural and heritage value of the Andrewsville Bridge in accordance with Municipal Class EA requirements. The results of our evaluation, including photographs of key features of the bridge, are summarized below. A completed Heritage Bridge Program Criteria Form and any relevant correspondence has been appended to this document.

Location and Description of Property

The Andrewsville Bridge (MTO Site No. 015-0013) spans the Rideau River. It is located off County Road 2, approximately 4 km east of Merrickville, on Main Street in the hamlet of Andrewsville, Township of Montague, County of Lanark. The bridge was constructed by Dominion Steel Limited. The exact date of construction is unknown, but previous inspection records indicate that it was built in 1915 or 1918.

The bridge consists of two distinct spans: a 38 m long Pratt through truss with timber deck; and a 10 m long timber deck on steel stringers and girders (Photograph 1). There are no existing drawings for the bridge; however, the presence of exposed bedrock at the base of the footings indicates that the centre pier and abutments were likely founded on spread footings on bedrock. The original substructure was likely stone masonry that was subsequently encased on concrete at an unknown date (Photographs 2, 3, 4). The timber deck was replaced in kind in 1963. The overall width of the deck will permit a single lane of traffic.

The east approach to the structure is comprised of a dry stone retaining wall, likely backfilled with rubble (Photograph 5).

.../2

McCORMICK
RANKIN
CORPORATION

Global Transportation Engineering
1145 Hunt Club Road, Suite 300, Ottawa, Ontario, Canada K1V 0Y3
Tel: (613) 736-7200 Fax: (613) 736-8710 E-mail: mrc-ott@mrc.ca www.mrc.ca

MRC 50 YEARS

Historical Records

The only historic record of the structure pertains to the 1963 deck replacement. All other information was gathered from field observations and measurements during MRC inspections in June 2005 and 2007.

Cultural Heritage Value

The Andrewsville Bridge was rated using the "Ontario Heritage Bridge Guideline" produced by the Ontario Ministry of Citizenship, Culture, and Recreation, and the "Heritage Bridges: Identification and Assessment Guide, Ontario, 1945 to 1965" was referenced for comparison of the evaluation. A copy of the completed Heritage Bridge Program Criteria Form has been completed and is appended to this correspondence and can be summarized as follows:

- Design and Designer are not remarkable. The bridge is a combination of two structures: a standard Pratt truss and a slab-on-girder steel bridge. The Heritage Bridges – Identification and Assessment Guide states that these types of bridges are fairly common in Ontario;
- The bridge itself is of a typical material and design, and is not a prototype structure. The bridge is constructed of steel, timber and concrete. These construction materials were used, and still are used, because they are readily available. The steel members of the truss and the girders are standard rolled steel sections available from numerous steel producers. The original substructure may be stone masonry substructure, but it has been encased in concrete and has therefore lost much of its historical significance. The dry stone retaining wall on the east approach is original, but is not part of the bridge *per se*. Walls are Random Interrupted Coursed and were not executed with a high degree of craftmanship;
- The visual of the appeal of the bridge has no distinguishing features and has no particular aesthetic appeal beyond the aesthetic appeal of truss bridges in general. The stone retaining wall on the east approach has some appeal because of the use of natural materials;
- While all bridges provide a crossing of a barrier and thus to a certain extent are landmarks, this bridge is not distinguished specifically as a landmark or gateway structure;
- The bridge has some local cultural value, as it is a popular spot for recreational fishermen and walkers; however, this value is based on the access it provides and not the form or historic value of the structure;

- The surrounding landscape has significant cultural importance (see attached correspondence from Rideau Canal Historic Site), and the Rideau Canal has recently been declared a UNESCO World Heritage Site. The link specifically to this structure is less clear as it could be argued that although the bridge has been present for a long period, it is not original to the Canal.

Archaeological Value

An archaeological survey of the area was not undertaken, as the proposed rehabilitation of the bridge will not impact areas of archaeological significance. All in-situ grounds will remain undisturbed.

Level of Intervention

The evaluation would indicate that the historical value of the bridge itself is minimal, and that any historical value is associated with the nearby Rideau Canal. Nonetheless, all interventions will treat the structure as if it has heritage value and will minimize the effect on the heritage value until final determination has been made by the Ministry of Culture.

Interventions have been divided into short term and long term interventions. The short-term intervention will likely include replacement of the timber deck in kind and installation of a bridge railing system. This intervention represents the minimum required to maintain the current level of service, to provide some level of safety to the public, and to protect the structural integrity of the bridge. The replacement railings will be selected to meet current acceptable highway standards while attempting to retain the aesthetics of the bridge. Choices are limited the acceptable standards.

The bridge is currently posted at 5 tonnes, which is acceptable for local car and light truck traffic. However, continued deterioration of the bridge components will likely require significant strengthening or modifications in the future to maintain the current level of service. Accordingly, the selection of a long-term intervention for major structural rehabilitation will be dependent on the heritage status of the bridge. The selection of a long-term major rehabilitation alternative will therefore not be decided until a review of the heritage status of the Andrewsville Bridge has been completed.

We trust that the above and the enclosed correspondence will address the concerns of the Ministry of Culture. The evaluation and correspondence has been reviewed by Mr. Andy Huctwith P.Eng of our Kingston office, who is a member of the Canadian Association of Professional Heritage Consultants (CAPHC). Mr. Huctwith is in agreement with the assessment.

If you have any questions, or require further information, please do not hesitate to contact us.

Yours very truly,

McCORMICK RANKIN CORPORATION

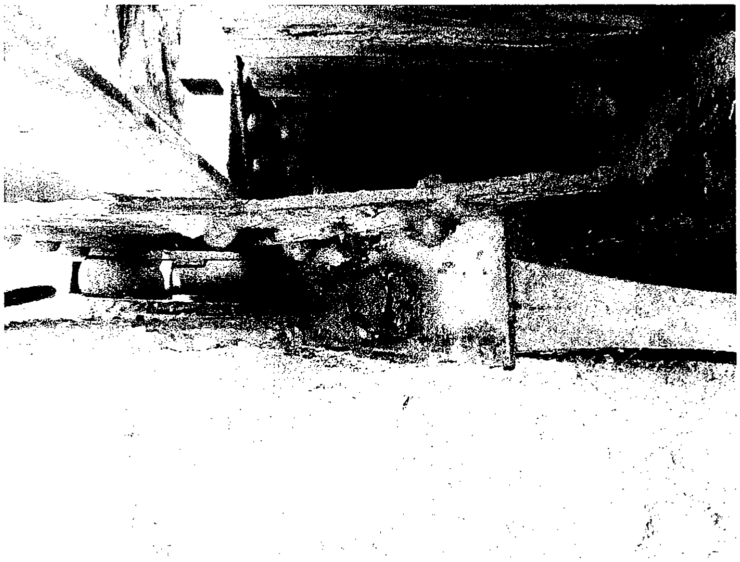
Bill Bohne, P.Eng.

Encl.

cc S. Allan, County of Lanark

L:\W.O. # Directories\6075-05 Lanark County 5 Bridge Rehabilitations\Andrewsville Bridge\Heritage\6075-301 wrb covering letter.doc

Photograph 1: South elevation of Andrewsville Bridge as viewed from the southeast quadrant.



Photograph 2: West Abutment bearing seat. Bottom bearing plate and cross-bracing are embedded in concrete, which is likely indicative that abutment and bearing seat have been refaced.

Photograph 3: East Abutment showing concrete refacing on original abutment.

Photograph 4: West Abutment ballast wall. Concrete has deteriorated, exposing stone fill behind.

Photograph 5: Dry stone retaining wall on east approach.

ANDREWSVILLE BRIDGE
HERITAGE BRIDGE EVALUATION CRITERIA

CRITERION	DESCRIPTOR	SCORING		COMMENTS
A. Documentation	**Maximum Score (A):**	**20**	**11**	
1. Builder or Designer	Maximum Score:	6	4	
	a) Unknown: Builder or designer is totally unknown. May be revised as more information comes to light.	0		
Or	b) Known; undetermined contribution Companies, engineers, builders about which there is little present information may be elevated to Category c) or d) as more information comes to light.	2		
Or	c) Known; prolific builder or designer Companies, engineers, builders responsible for large numbers of bridges utilising standard forms or elements.	4	4	Bridge Designed by Dominion Bridge, Montreal.
Or	d) Known; unusual designer Innovative companies, engineers, builders having major impacts on the development of bridge design.	6		
2. Age	Maximum Score:	14	7	
	Pre -1880 This criterion recognizes the value placed by society on the age of artifacts. Older structures are often seen to have value simply because they still remain in our environment.	14		
	1880-1900	12		
	1901-1910	10		
	1911-1920	8	7	Records indicate bridge constructed in 1915 or 1918. One point deducted due to estimated age.
	1921-1930	6		
	1931-1940	4		
	1941-1950	2		
B. Technology	**Maximum Score (B):**	**40**	**16**	
3. Materials	Maximum Score:	4	2	
	Wrought Iron or Stone Wrought iron and stone are afforded high priority because these materials are no longer in use.	4	2	Dry stone retaining walls on east approach are not part of the bridge per se. Walls are Random Interrupted Coursed and were not executed with a high degree of craftsmanship, and have

CRITERION	DESCRIPTOR	SCORING		COMMENTS
				been modified by the addition of steel posts and railings. Original substructure is may be stone masonry, but it has been encased on concrete.
Or	Other Category "Other" means only materials not normally used in bridge or that have not gained favour as well as unusual combinations of materials used in bridges.	4		
4. Design/Style	Maximum Score:	16	8	
	Unique: The only one of its kind. It may be eccentric, odd, an exaggerated version by virtue of its design (includes especially large examples), materials or construction.	16	0	
Or	Rare Survivor of a Typical Design or Style: Bridge structures that were very common at their time of construction may now be quite rare and grow increasingly rare as the majority of similar structures are demolished, changed, or fall into disrepair.	16	8	Pratt truss and slab-on-steel girder bridges are two of the more common types of structures. Many truss bridges on highways similar to this structure have been replaced; however, there are still numerous examples of this type of bridge remaining.
Or	Unusual: Included here are bridges of which only a small number may have been built and perhaps a smaller number now remain.	16	0	
5. Prototype	Maximum Score:	10	0	
	Prototype A bridge may possess a technological or design innovation or adaptation, which marks it as a first of a type.	10		
Or	Early Example A bridge may possess a technological or design innovation or adaptation, which marks it as an early example or an important improvement	10		
6. Structural Preservation	Maximum Score:	10	6	
	No Significant Modifications: This example has escaped significant modification and is of importance in illustrating the original form.	10	6	Original timber deck replaced in kind in 1963, now covered in asphalt. Stone masonry substructure has been encased in concrete. Original stone approach walls mostly intact, but modified to accommodate railing system.

ANDREWSVILLE BRIDGE
HERITAGE BRIDGE EVALUATION CRITERIA

CRITERION	DESCRIPTOR	SCORING		COMMENTS
Or	Sympathetic Modifications: This example has undergone modifications aimed at preserving the original form while improving the effectiveness of the structure.	5		
C. Bridge Aesthetics and Environment	**Maximum Score (C):**	**30**	**17**	
7. Visual Appeal	Maximum Score:	12	5	
	Design Merits: An attractive structure due to elegant visual elements and interplay with surrounding scenic landscape. Removal of the structure would be detrimental to the ambience of the setting.	10	5	
And/or	Ornamentation/Decoration: Decoration or ornamentation, whether discreet or ostentatious, adds visual interest to the structure. It may appear in sculptured forms, balustrade, light standards, piers, cross members, portals, etc.	2		
8. Integrity	Maximum Score:	4	3	
	At Original Location Original locations are often benchmarks in the past development of a particular environment and they often contribute a strong sense of place.	4	3	
9. Landmark	Maximum Score:	6	4	
	Physical Prominence: A bridge may be a prominent feature in the landscape, from either the road or some other vantage point. Landmarks may be used by people as guides for moving through an area, or more simply adding interest in the environment.	6		
Or	Public Perception: Bridges may be perceived as landmarks in the community and have a symbolic importance rather than purely visual or aesthetic value.	6	4	Bridge has significant importance to local community.
10. Gateway	Maximum Score (10):	4	2	
	Entrance/Exit Occurrence: In some instances, particularly urban areas, certain bridges may assume the function of a gateway, albeit quasi, emphasizing to drivers and pedestrians that they are entering or leaving a specific area.	4	2	

ANDREWSVILLE BRIDGE
HERITAGE BRIDGE EVALUATION CRITERIA

CRITERION	DESCRIPTOR	SCORING		COMMENTS
11. Character	Maximum Score (11):	4	3	
	Character Contribution: A bridge, together with other buildings or structures may contribute to a particular mood or ambiance or an area. This is more readily identifiable in certain places than others.	4	3	
D. Historical	Maximum Score:	**10**	7	
12. Historical Association	Maximum Score:	10	7	
	Associated with person/group: Associated with the life or activities of a person or group that made a significant contribution to the community, province or nation.	10	0	
Or	Associated with event: Associated with a significant event that contributed to the future activities of a community, province or nation.	10	0	
Or	Associated with theme: Associated with an illustrative of significant patterns of cultural, social, political, economic or industrial history.	10	7	See correspondence from Rideau Canal National Historic Site. Parks Canada has indicated that there is some association with the Canal system; however the correspondence is unclear as to whether or not this bridge is identified as a character defining element of the Canal.
Or	Associated with former bridges: Associated with former bridges that have served the same site or locale.	10	0	
	Maximum Total:	**100**	**51**	

MINUTES
FOURTEENTH MEETING OF 2007
PUBLIC WORKS COMMITTEE OF THE WHOLE

The Public Works Committee of the Whole met in regular session on Wednesday, October 3rd, 2007 immediately following the Community Development Committee meeting at Lanark Lodge, Christie Lake Road, Perth, Ontario.

Members Present:	Chair S. Freeman, Councillors B. Fletcher, B. Horlin, B. Hurrle, J. MacTavish, P. Kavanagh, J. Fenik, W. Laut, K. Kerr, R. Kidd, S. Mousseau (left at 6:12 pm), E. Sonnenburg, A. Churchill and G. McConnell.
Staff/Others Present:	P. Wagland, Chief Administrative Officer, C. Ritchie, Clerk, S. Allan, Director of Public Works, A. Mabo, Council and Clerk Services Assistant, M. MacDonald, Council and Clerk Services Assistant, P. MacLaren, IT Support.
Absent:	Warden A. Lunney and Councillor P. Dulmage

PUBLIC WORKS

Chair: Councillor Susan Freeman

1. CALL TO ORDER

The meeting was called to order at 6:06 p.m.
A quorum was present.

2. DISCLOSURE OF PECUNIARY INTEREST

None at this time.

3. APPROVAL OF MINUTES

MOTION #PW-2007-154

MOVED BY: Brenda Hurrle
SECONDED BY: Bob Fletcher

“**THAT**, the minutes of the Public Works Committee meeting held on September 5th, 2007 be approved as circulated.”

ADOPTED

4. ADDITIONS AND APPROVAL OF AGENDA

MOTION #PW-2007- 155

MOVED BY: Keith Kerr
SECONDED BY: Gord McConnell

"**THAT**, the agenda be adopted as amended."

ADOPTED

5. DELEGATIONS & PRESENTATIONS

i) Posted Speed Reduction Almonte (County Road 16A)
Resident, Catherine Blake.

Councillor S. Mousseau left at 6:12 pm.

C. Blake gave a Power Point Presentation – *attached page 8.* She noted that there are not enough posted speed signs along the road. The current speed limit is 50 km per hour and C. Blake requested that it be reduced to 40 km per hour.

Enforcement is conducted by the Ontario Provincial Police (OPP). The issue was discussed at the last Town of Mississippi Mills Police Services Board (PSB) meeting. The OPP will be setting up speed traps as well as installing a radar billboard that displays the speed of vehicles. The results of the speed traps will be brought forward in a Staff report at the November Public Works Committee meeting.

The Public Works Committee requested a motion from the Town of Mississippi Mills regarding the posted speed on Queen Street (County Road 16A) on how the Town would like to proceed.

Staff will provide a report at the next meeting also incorporating information received from the Town of Mississippi Mills.

ii) Andrewsville Bridge Future Recommendations – *attached page 23.*
McCormic Rankin Corporation, Bill Bohne.

Andrewsville Bridge is jointly owned by the County of Lanark and United Counties of Leeds & Grenville. A joint decision would be required by both Counties for any decisions with regard to the Bridge. United Counties of Leeds & Grenville Warden J. Douglas Struthers and Director of Public, Leslie Shepherd and residents of Andrewsville were present at the meeting.

Ministry of Culture notified the County that the Andrewsville Bridge may be designated a Heritage Bridge. Prior to any major rehabilitation project, the County must notify the Ministry of Culture and an evaluation of the bridge will be done. This process costs approximately $10,000 to $15,000 and can take up to 6 months. The bridge is presently safe with a load restriction of 5 tonnes. The cost of the minor repairs recommended by the Consultant are estimated at $80,000 and painting the structure would cost an additional $135,000. The repairs would extend the life of the bridge for approximately 5 to 10 years.

Staff is continuing to assess and evaluate public comments regarding several issues. Further Consultation with Parks Canada regarding their comments is also required.

The Committee thanked the Director of Public Works for his diligent work and the process of gathering information keeping the public and the United Counties of Leeds & Grenville involved.

6. COMMUNICATIONS

i) Ministry of the Environment: Municipal Engineers Association Municipal Class Environmental Assessment Notice of Approval of Amendments.

ii) Town of Perth: Electronic Waste Depot Day.

The Committee thanked the Town of Perth for organizing the Waste Depot Day.

iii) Rural Ontario Municipal Association (ROMA): Ontario Election 2007 Promoting a Rural Agenda.

iv) Ontario Good Roads Association (OGRA): Ontario's Party Leaders Discuss Municipal Issues.

v) Ontario Good Roads Association Board: Board Brief.

MOTION #PW-2007- 157

MOVED BY: Brenda Hurrle
SECONDED BY: Wendy Laut

"**THAT**, communication items for the October 2007 Public Works Committee meeting be received as information only."

ADOPTED

7. REPORTS

i) Report #PW-78-2007 Andrewsville Bridge Assessment.
Director of Public Works, Steve Allan.

The purpose of this Report is to recommend the repair of the Andrewsville Bridge in 2008, subject to budget approval.

MOTION #PW-2007- 156

MOVED BY: Peter Kavanagh
SECONDED BY: Richard Kidd

"THAT, County Council authorizes McCormick Rankin Corporation to proceed with pre-engineering for repairs to the Andrewsville Bridge, with a view to tendering the work in January 2008 (Option 2);

THAT, the Andrewsville Bridge Repair project is referred to the 2008 budget deliberations;

THAT, the County of Lanark and United Counties of Leeds and Grenville staffs jointly develop a long-term strategy for the Andrewsville Bridge for presentation during the 2008 budget deliberations;

THAT, all costs associated with the Andrewsville Bridge project are shared equally between the County of Lanark and the United Counties of Leeds and Grenville;

AND THAT, the Clerk sends Report #PW-78-2007 to the United Counties of Leeds and Grenville and the Montague Township Clerk and Parks Canada, for information."

ADOPTED

Warden J. D, Struthers and L. Shepherd will bring forward Lanark County's resolution and their recommendations to the United Counties of Leeds & Grenville Council.

ii) Report #PW-77-2007 Claim for Damages (Hosler): County Road #29 at Lot 6 Concession IX Geographic Township of Pakenham*.*
Director of Public Works, Steve Allan.

The purpose of this Report is to inform Council of the receipt of a claim for damages from Mr. Robert Hosler alleging erosion of a creek on his property abutting County Road 29, due to the diversion of storm water from an existing concrete box culvert (cattle pass).

MOTION #PW-2007- 158

MOVED BY: Keith Kerr
SECONDED BY: Bob Fletcher

"THAT, Report #PW-77-2007 Claim for Damages (Hosler): County Road 29 at Lot 6 Concession IX Geographic Township of Pakenham" be accepted, for information only;

AND THAT, the Clerk sends Report #PW-77-2007 to the Town of Mississippi Mills Clerk, for information."

ADOPTED

iii) Report #PW-75-2007 Public Works Contracts Status Report #9.
Director of Public Works, Steve Allan.

The purpose of this report is to inform the Committee of the status of Public Works Contracts.

MOTION #PW-2007- 159

MOVED BY: Bruce Horlin
SECONDED BY: Wendy Laut

“**THAT**, Report #PW-75-2007 Public Works Contracts Status Report #9 be received for information.”

ADOPTED

iv) Report #PW-74-2007 Road Tour 17 October 2007: Itinerary.
Director of Public Works, Steve Allan.

The purpose of this Report is to confirm the itinerary for the Road Tour to be held on October 17th, 2007.

MOTION #PW-2007- 160

MOVED BY: Aubrey Churchill
SECONDED BY: John Fenik

“**THAT**, the October 17th, 2007 Public Works Committee Road Tour Itinerary be accepted, as amended.”

ADOPTED

v) Report #PW-76-2007 DiCola Petroleum Remediation Plan: County Road 10 and Rogers Road.
Director of Public Works, Steve Allan.

The purpose of this Report is to inform Council of the receipt of a site remediation work plan from 901659 Ontario Inc (DiCola Petroleum) for the removal of hydrocarbon contamination at the intersection of County Road 10 and Rogers Road, in the Town of Perth.

MOTION #PW-2007- 161

MOVED BY: Wendy Laut
SECONDED BY: Peter Kavanagh

“**THAT**, Report #PW-76-2007 “DiCola Petroleum Remediation Plan: County Road 10 and Rogers Road, Town of Perth” be accepted, for information only;

AND THAT, the Clerk sends Report #PW-76-2007 to the Town of Perth Clerk, for information.”

ADOPTED

vi) Report #PW-XX-2007 First Draft Ten Year Road and Bridge Plan – ***deferred** to a future meeting.*

8. CONFIDENTIAL REPORTS

None.

9. NEW/OTHER BUSINESS

None.

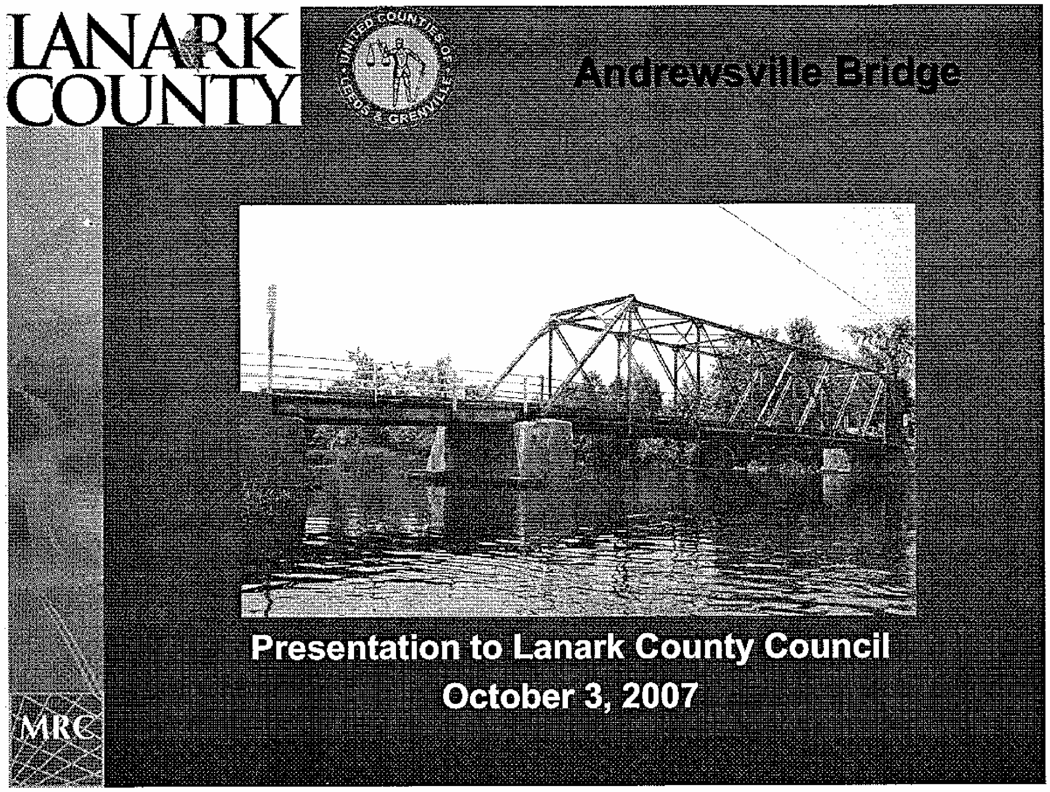
10. ADJOURNMENT

The Committee adjourned at 7:27 p.m. on motion by Councillors E. Sonnenburg and B. Horlin.

CRitchie

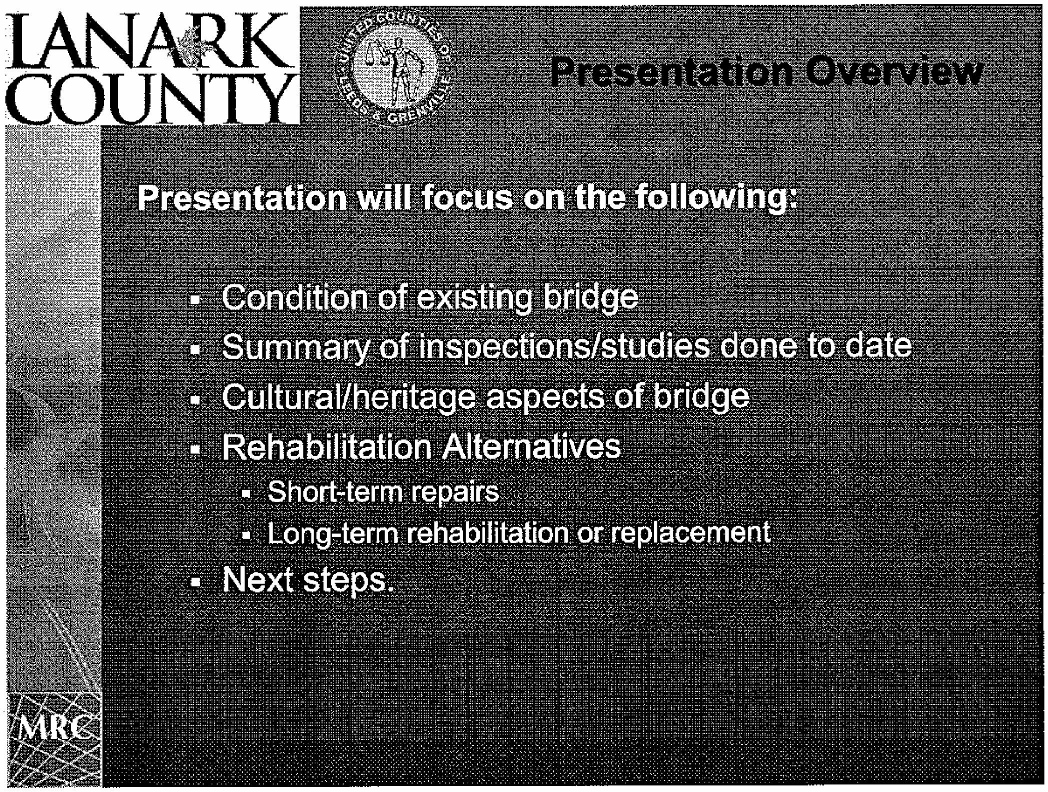
Cathie Ritchie,
Clerk

DELEGATIONS/ PRESENTATIONS



Andrewsville Bridge

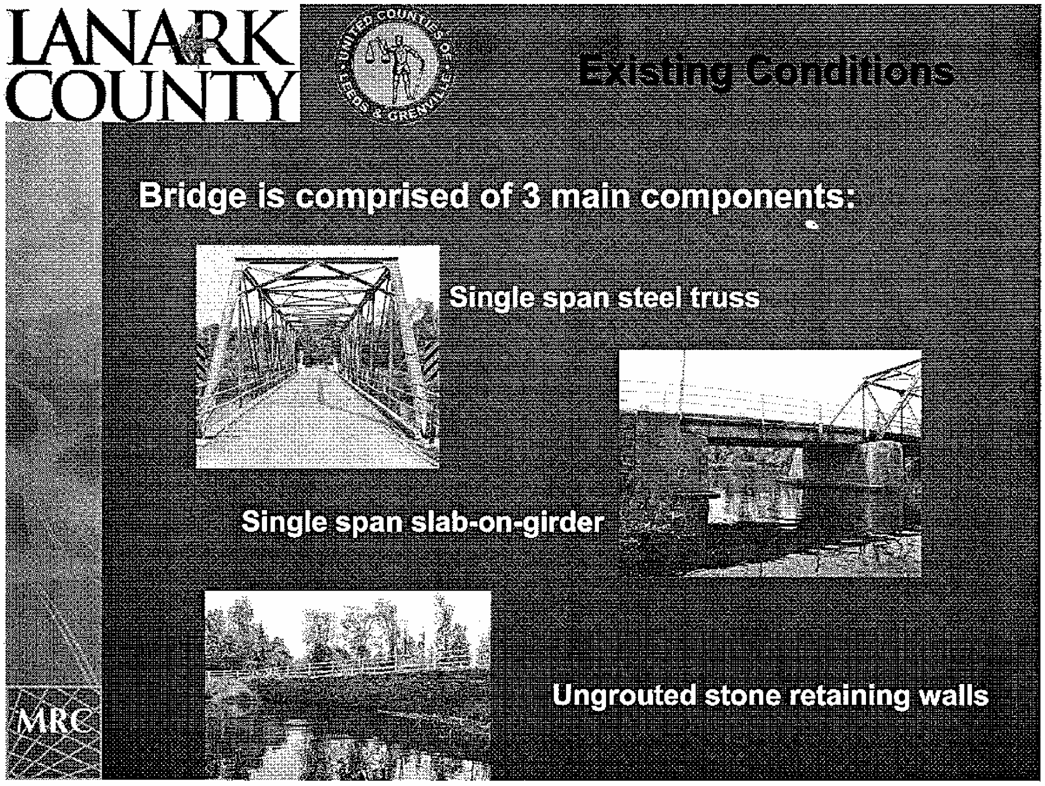
Presentation to Lanark County Council
October 3, 2007



Presentation Overview

Presentation will focus on the following:

- Condition of existing bridge
- Summary of inspections/studies done to date
- Cultural/heritage aspects of bridge
- Rehabilitation Alternatives
  - Short-term repairs
  - Long-term rehabilitation or replacement
- Next steps.



LANARK COUNTY

Existing Conditions

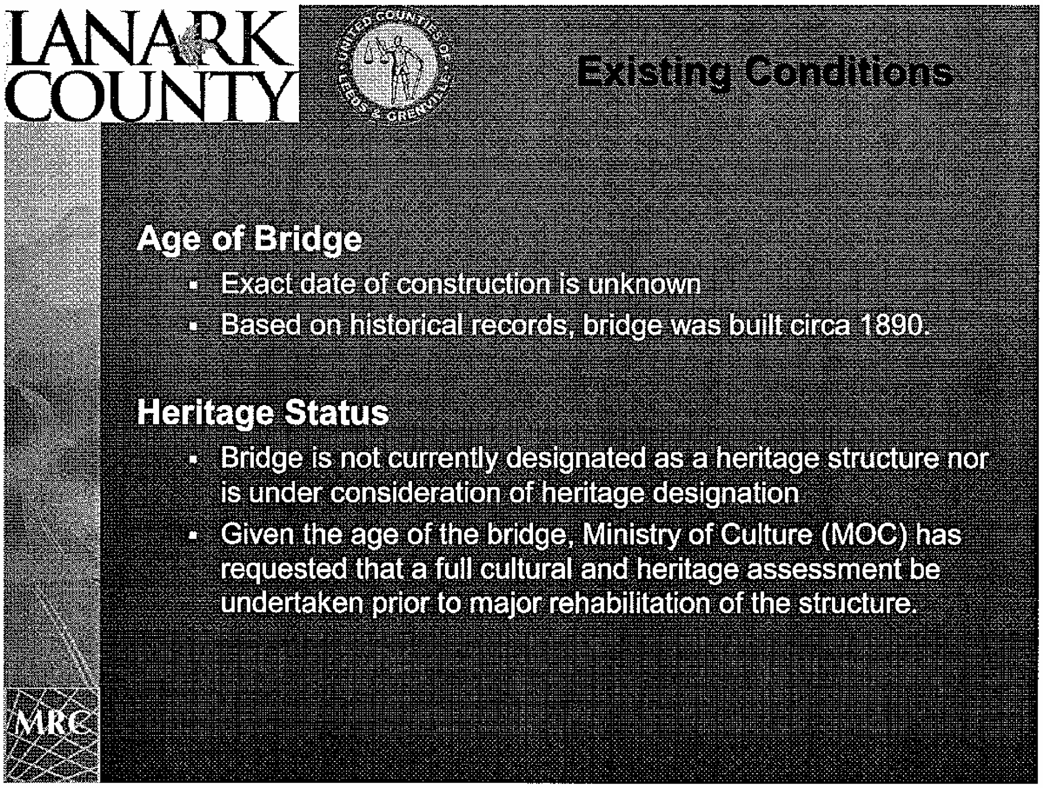
Bridge is comprised of 3 main components:

Single span steel truss

Single span slab-on-girder

Ungrouted stone retaining walls

MRC



LANARK COUNTY

Existing Conditions

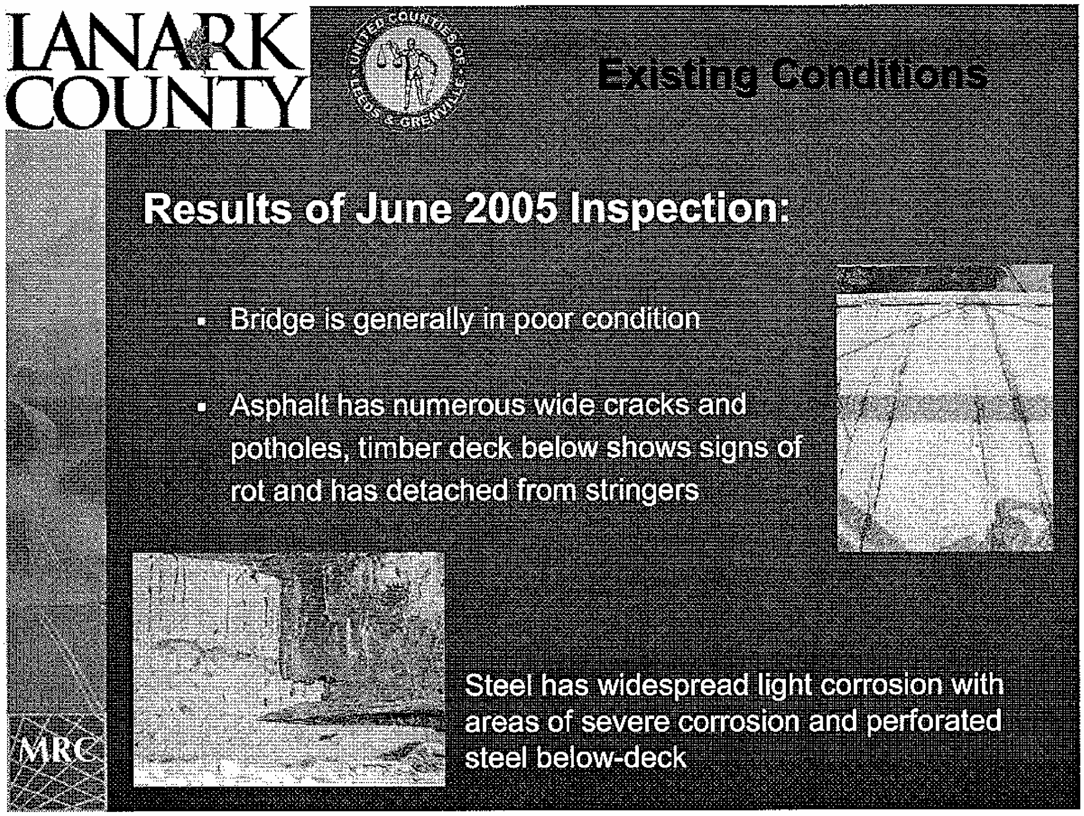
Age of Bridge

- Exact date of construction is unknown
- Based on historical records, bridge was built circa 1890.

Heritage Status

- Bridge is not currently designated as a heritage structure nor is under consideration of heritage designation
- Given the age of the bridge, Ministry of Culture (MOC) has requested that a full cultural and heritage assessment be undertaken prior to major rehabilitation of the structure.

MRC

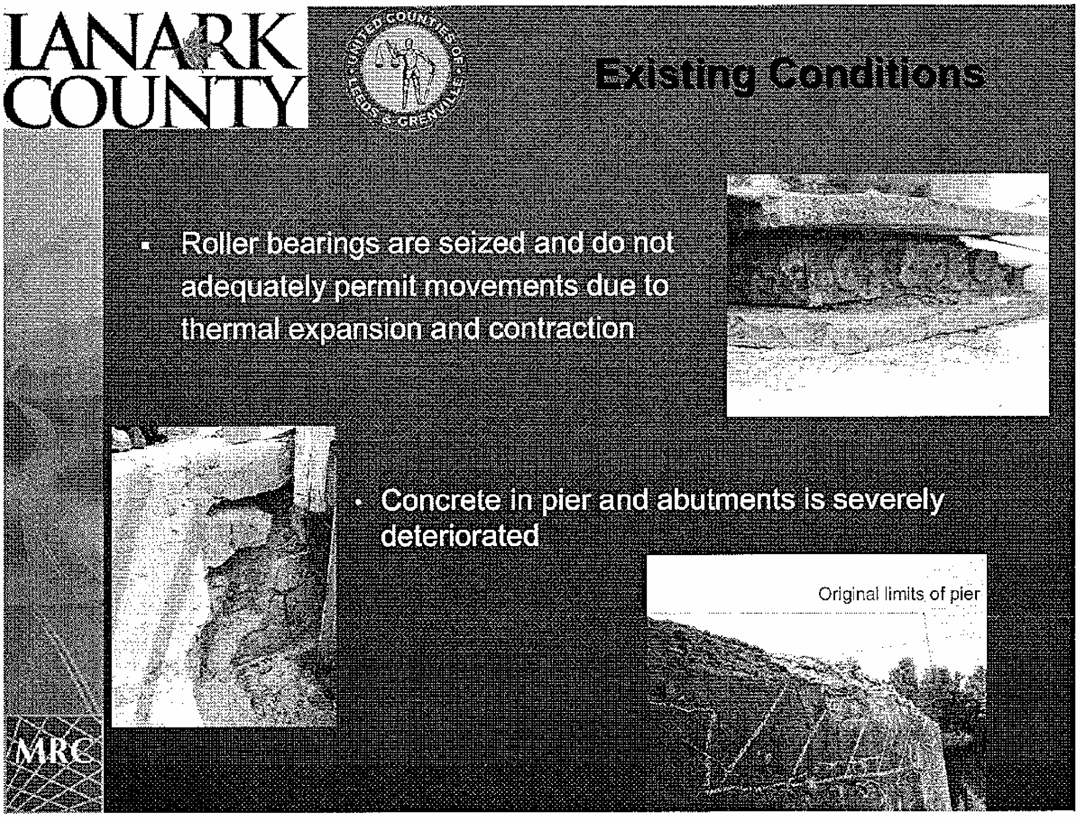


Existing Conditions

Results of June 2005 Inspection:

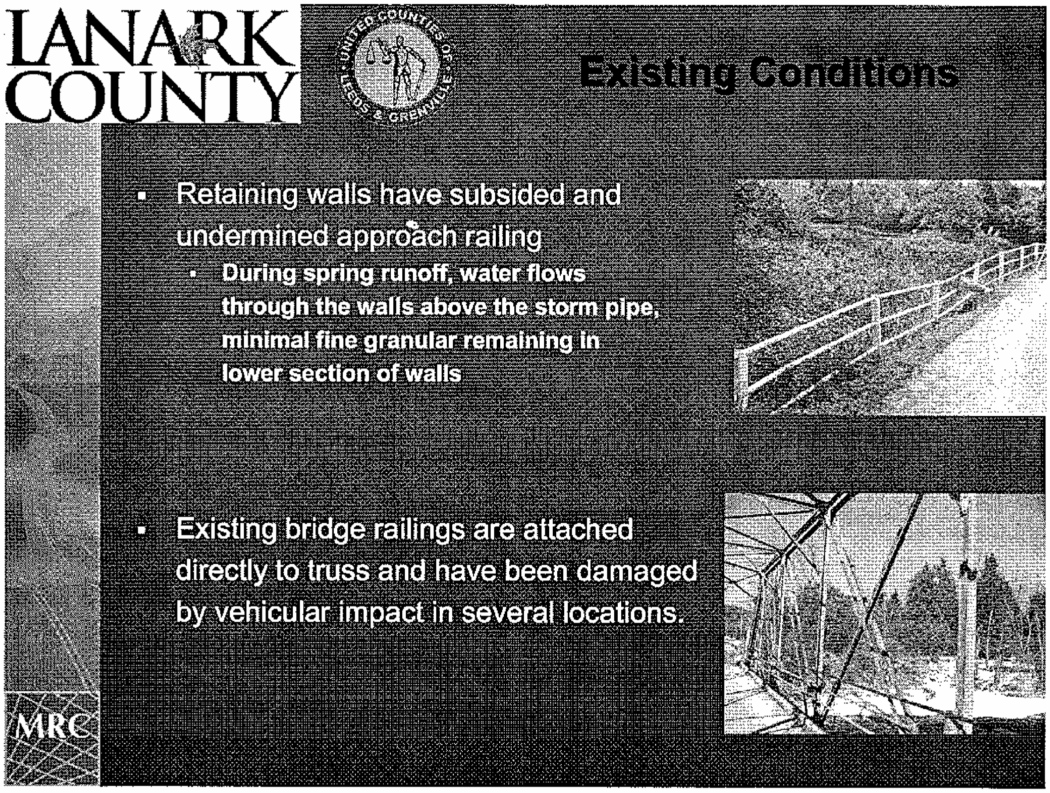
- Bridge is generally in poor condition
- Asphalt has numerous wide cracks and potholes, timber deck below shows signs of rot and has detached from stringers

Steel has widespread light corrosion with areas of severe corrosion and perforated steel below-deck



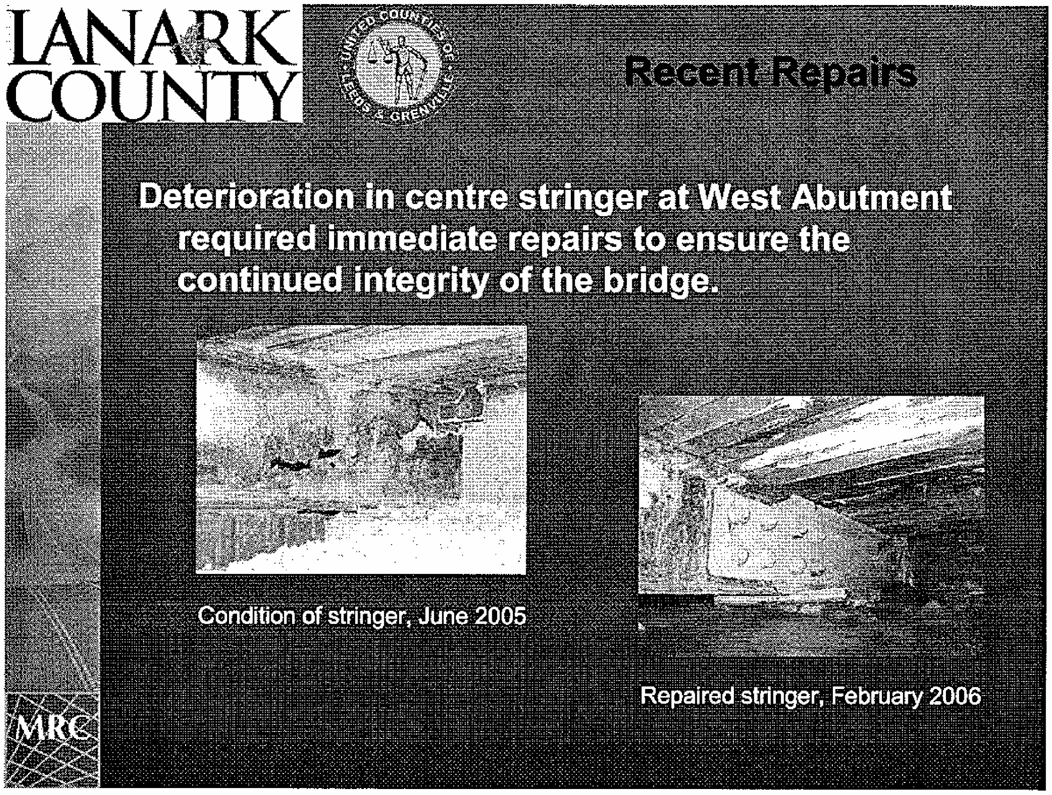
Existing Conditions

- Roller bearings are seized and do not adequately permit movements due to thermal expansion and contraction
- Concrete in pier and abutments is severely deteriorated



Existing Conditions

- Retaining walls have subsided and undermined approach railing
  - **During spring runoff, water flows through the walls above the storm pipe, minimal fine granular remaining in lower section of walls**
- Existing bridge railings are attached directly to truss and have been damaged by vehicular impact in several locations.

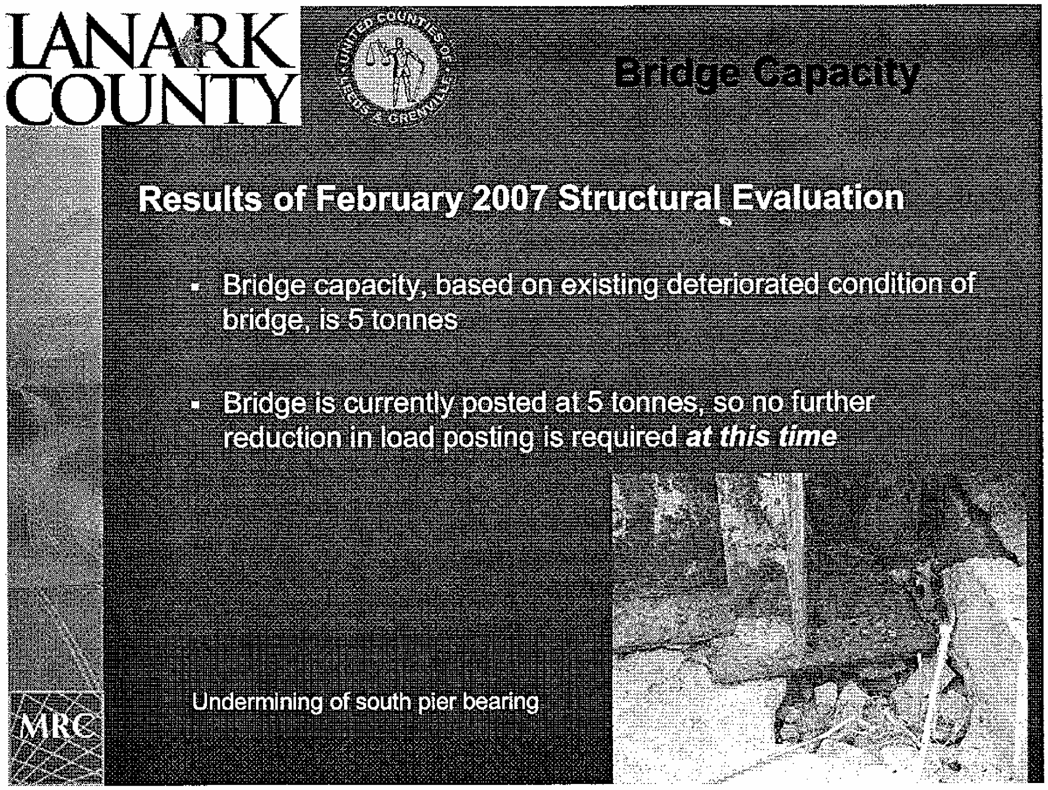


Recent Repairs

Deterioration in centre stringer at West Abutment required immediate repairs to ensure the continued integrity of the bridge.

Condition of stringer, June 2005

Repaired stringer, February 2006



LANARK COUNTY

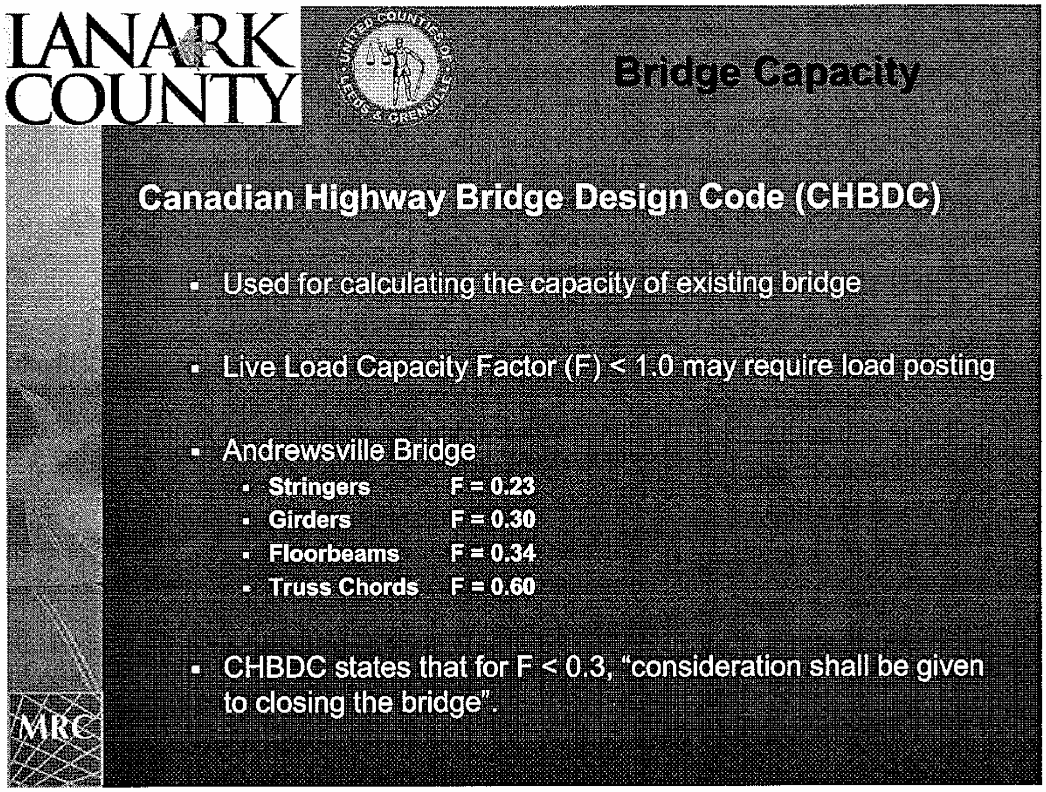
Bridge Capacity

Results of February 2007 Structural Evaluation

- Bridge capacity, based on existing deteriorated condition of bridge, is 5 tonnes
- Bridge is currently posted at 5 tonnes, so no further reduction in load posting is required ***at this time***

Undermining of south pier bearing

MRC



LANARK COUNTY

Bridge Capacity

Canadian Highway Bridge Design Code (CHBDC)

- Used for calculating the capacity of existing bridge
- Live Load Capacity Factor (F) < 1.0 may require load posting
- Andrewsville Bridge
    - **Stringers F = 0.23**
    - **Girders F = 0.30**
    - **Floorbeams F = 0.34**
    - **Truss Chords F = 0.60**
- CHBDC states that for F < 0.3, "consideration shall be given to closing the bridge".

MRC

LANARK COUNTY

Summary to Date

- Bridge is in poor condition and repair is required
- Current industry standards suggest Owner consider closing the bridge
- Bridge is load posted, but there is currently no method of restricting overloaded vehicles from using the bridge
- Public Information Centre was held to obtain feedback from general public

MRC

LANARK COUNTY

Public Information Centre
May 2007

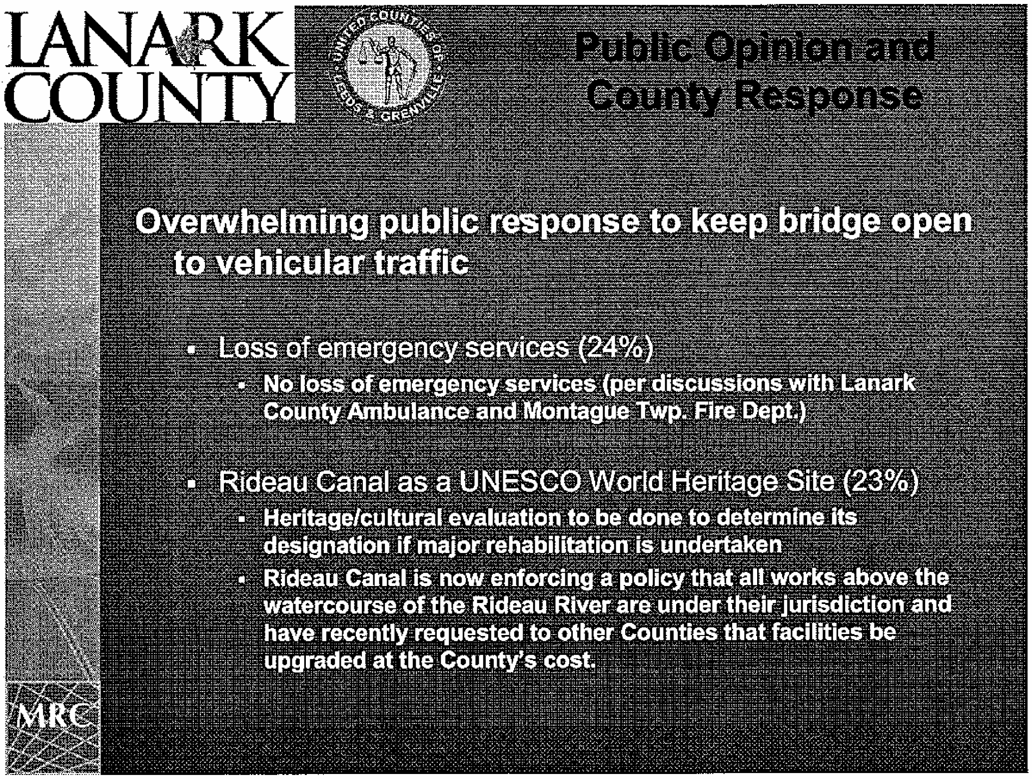
Six rehabilitation alternatives were presented

- Do Nothing
- Repair timber deck, upgrade bridge railing, repair concrete substructure
- Repair timber deck, upgrade bridge railing, repair concrete substructure, upgrade approach railings
- New single lane bridge
- New two lane bridge
- Close bridge to vehicular traffic.

Two alternatives were subsequently rejected

- Do Nothing: structural defects and potential for public risk not addressed
- New two lane bridge: not warranted given cost/benefit analysis, and does not fit with character of Andrewsville.

MRC



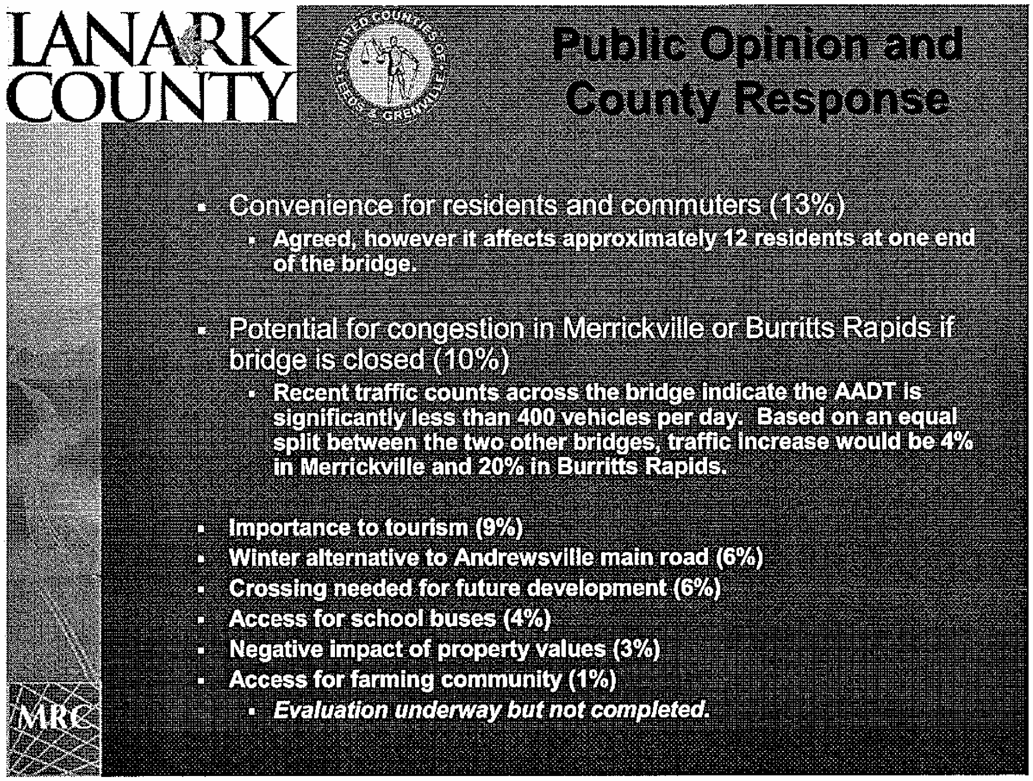
LANARK COUNTY

Public Opinion and County Response

Overwhelming public response to keep bridge open to vehicular traffic

- Loss of emergency services (24%)
  - **No loss of emergency services (per discussions with Lanark County Ambulance and Montague Twp. Fire Dept.)**
- Rideau Canal as a UNESCO World Heritage Site (23%)
  - **Heritage/cultural evaluation to be done to determine its designation if major rehabilitation is undertaken**
  - **Rideau Canal is now enforcing a policy that all works above the watercourse of the Rideau River are under their jurisdiction and have recently requested to other Counties that facilities be upgraded at the County's cost.**

MRC



LANARK COUNTY

Public Opinion and County Response

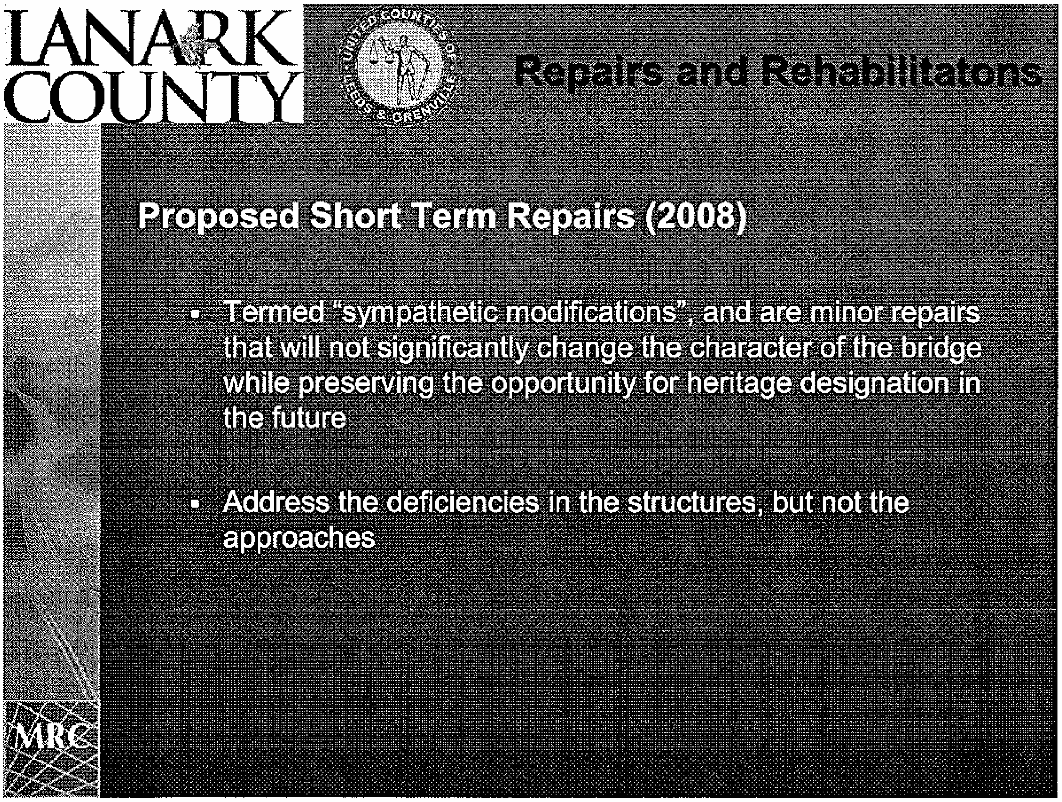
- Convenience for residents and commuters (13%)
  - **Agreed, however it affects approximately 12 residents at one end of the bridge.**
- Potential for congestion in Merrickville or Burritts Rapids if bridge is closed (10%)
  - **Recent traffic counts across the bridge indicate the AADT is significantly less than 400 vehicles per day. Based on an equal split between the two other bridges, traffic increase would be 4% in Merrickville and 20% in Burritts Rapids.**
- **Importance to tourism (9%)**
- **Winter alternative to Andrewsville main road (6%)**
- **Crossing needed for future development (6%)**
- **Access for school buses (4%)**
- **Negative impact of property values (3%)**
- **Access for farming community (1%)**
  - ***Evaluation underway but not completed.***

MRC

Repairs and Rehabilitations

Issues

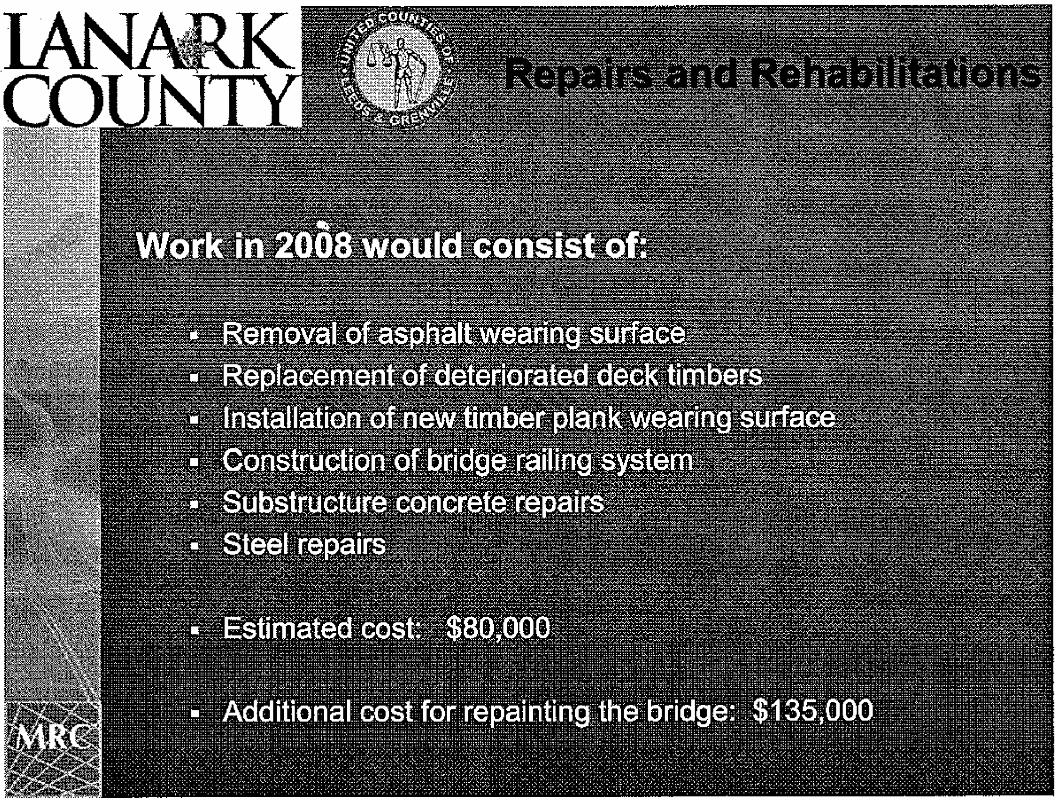
- Short term repairs are required within the next year to ensure public safety and maintain the bridge at its current level of service until rehabilitation/replacement
- Short term repairs represent a substantial outlay of capital on a 100 year old asset to postpone rehabilitation or replacement by 5 to 10 years maximum
- If the bridge is granted heritage designation
  - Replacement will not be permitted
  - Rehabilitation to strengthen the bridge to keep it open to vehicles may not meet heritage requirements, and closure to traffic may be required



Repairs and Rehabilitatons

Proposed Short Term Repairs (2008)

- Termed "sympathetic modifications", and are minor repairs that will not significantly change the character of the bridge while preserving the opportunity for heritage designation in the future
- Address the deficiencies in the structures, but not the approaches



LANARK COUNTY

Repairs and Rehabilitations

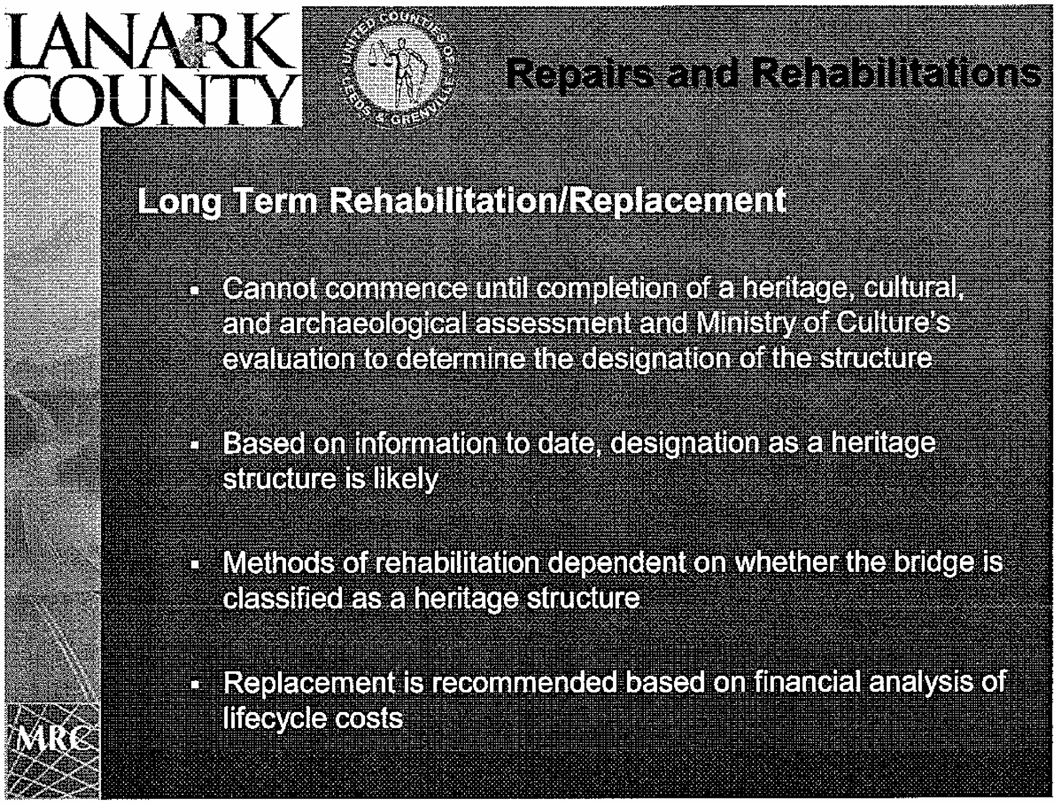
Work in 2008 would consist of:

- Removal of asphalt wearing surface
- Replacement of deteriorated deck timbers
- Installation of new timber plank wearing surface
- Construction of bridge railing system
- Substructure concrete repairs
- Steel repairs

- Estimated cost: $80,000

- Additional cost for repainting the bridge: $135,000

MRC



LANARK COUNTY

Repairs and Rehabilitations

Long Term Rehabilitation/Replacement

- Cannot commence until completion of a heritage, cultural, and archaeological assessment and Ministry of Culture's evaluation to determine the designation of the structure

- Based on information to date, designation as a heritage structure is likely

- Methods of rehabilitation dependent on whether the bridge is classified as a heritage structure

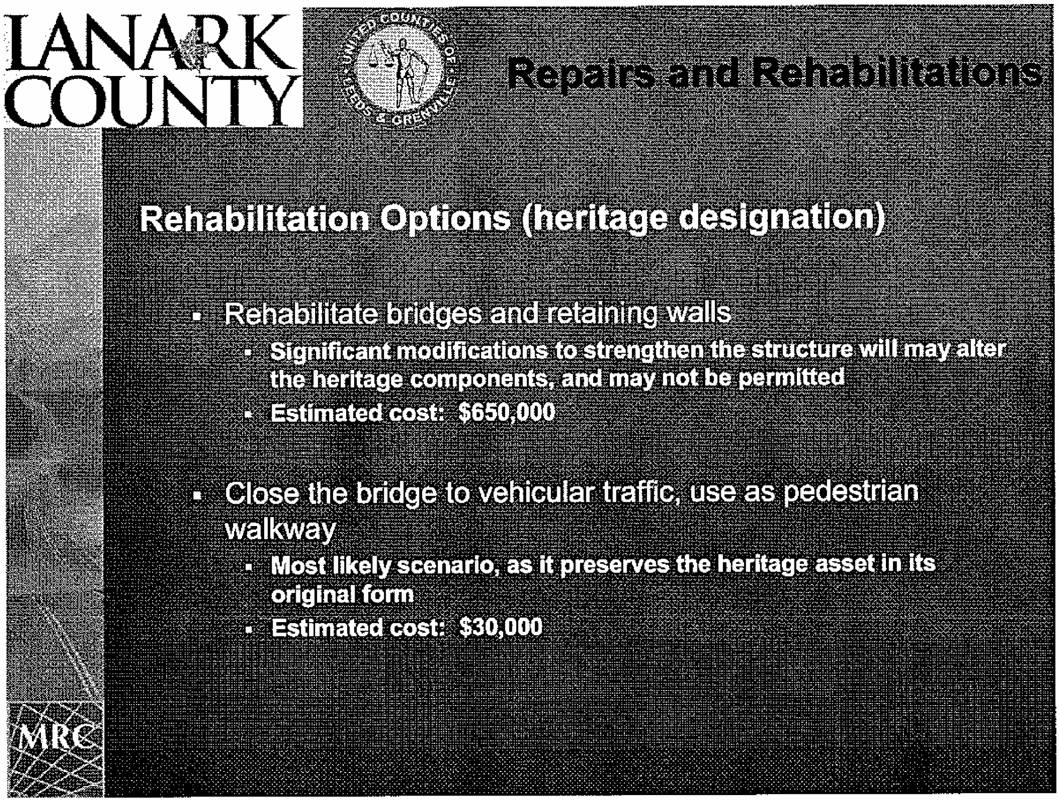
- Replacement is recommended based on financial analysis of lifecycle costs

MRC

Repairs and Rehabilitation

Rehabilitation Options (no heritage designation)

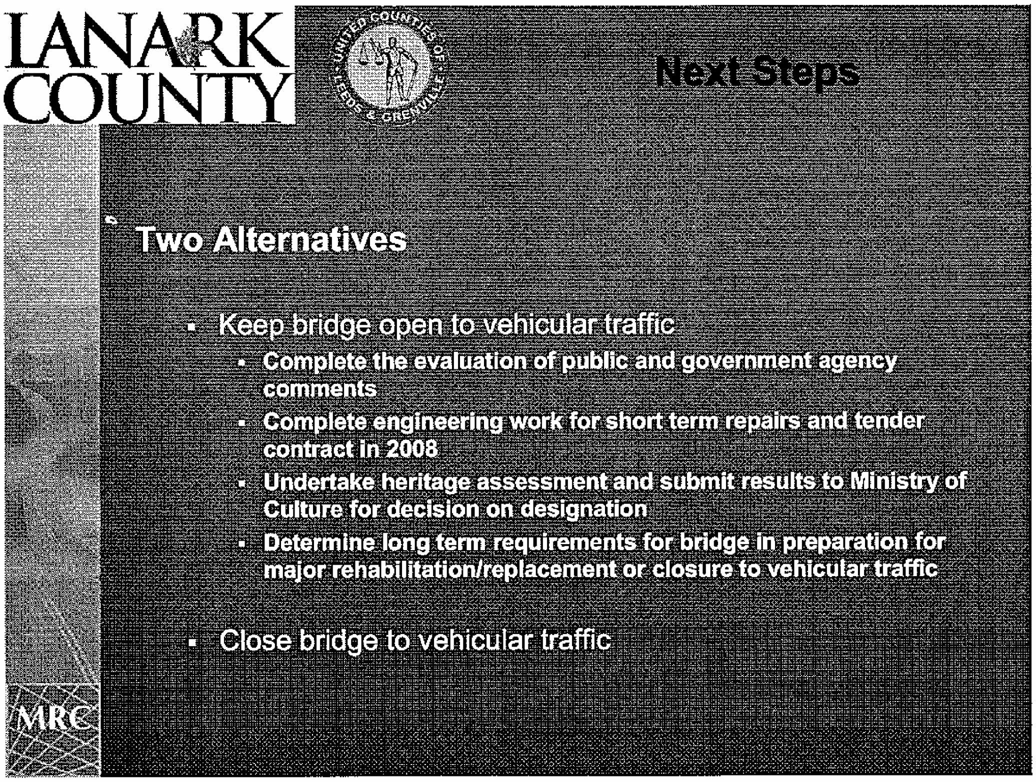
- Rehabilitate existing bridges and stone retaining walls for vehicular traffic
  - **Rehabilitated structure will retain appearance of existing bridges**
  - **Estimated Cost: $650,000**
- Replace bridges and retaining walls with a new two span single lane bridge
  - **Slab-on-girder bridge will be visually less intrusive on area**
  - **Estimated Cost: $1,500,000**
- Close bridge to vehicular traffic
  - **Estimated Cost: $30,000**



Repairs and Rehabilitations

Rehabilitation Options (heritage designation)

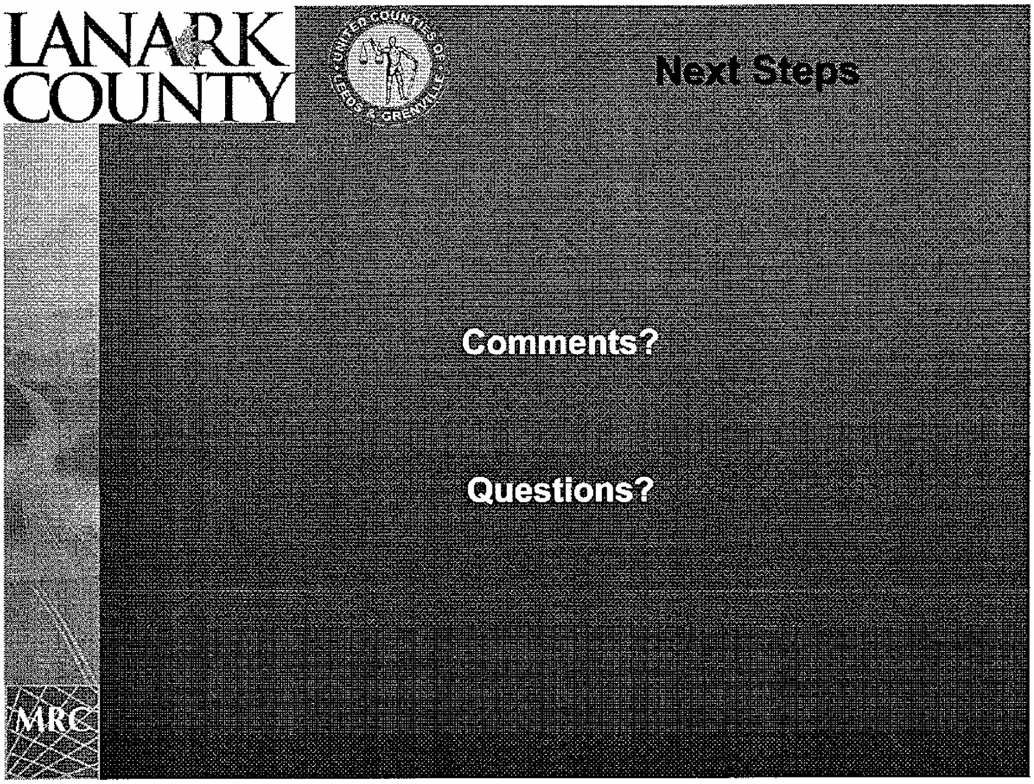
- Rehabilitate bridges and retaining walls
  - **Significant modifications to strengthen the structure will may alter the heritage components, and may not be permitted**
  - **Estimated cost: $650,000**
- Close the bridge to vehicular traffic, use as pedestrian walkway
  - **Most likely scenario, as it preserves the heritage asset in its original form**
  - **Estimated cost: $30,000**



Next Steps

Two Alternatives

- Keep bridge open to vehicular traffic
  - Complete the evaluation of public and government agency comments
  - Complete engineering work for short term repairs and tender contract in 2008
  - Undertake heritage assessment and submit results to Ministry of Culture for decision on designation
  - Determine long term requirements for bridge in preparation for major rehabilitation/replacement or closure to vehicular traffic
- Close bridge to vehicular traffic



Next Steps

Comments?

Questions?

THE COUNTY OF LANARK

PUBLIC WORKS COMMITTEE
October 3rd, 2007

Report #PW-78-2007 of the
Director of Public Works

ANDREWSVILLE BRIDGE REPAIRS

1. STAFF RECOMMENDATIONS

It is recommended that:

i) County Council authorizes McCormick Rankin Corporation to proceed with pre-engineering for repairs to the Andrewsville Bridge, with a view to tendering the work in January 2008 (Option 2).
ii) The Andrewsville Bridge Repair project is referred to the 2008 budget deliberations.
iii) The County of Lanark and United Counties of Leeds and Grenville staffs jointly develop a long-term strategy for the Andrewsville Bridge for presentation during the 2008 budget deliberations
iv) All costs associated with the Andrewsville Bridge project are shared equally between the County of Lanark and the United Counties of Leeds and Grenville.
v) The Clerk sends Report #PW-78-2007 to the United Counties of Leeds and Grenville and the Montague Township Clerk and Parks Canada, for information.

2. PURPOSE

The purpose of this Report is to recommend the repair of the Andrewsville Bridge in 2008, subject to budget approval. Bill Bohne P.Eng, of McCormick Rankin Corporation will also provide a presentation to the Committee on October 3rd, 2007 to provide more detail on this project.

3. BACKGROUND

In 2005 the McCormick Rankin Corporation (MRC) was retained to undertake an analysis of rehabilitation options for the Andrewsville Bridge. The MRC findings (Report #PW-10-2007) concluded that the bridge substructure and superstructure were in poor condition and recommended the development of a long-term strategy to address these significant structural deficiencies. The Report identified six (6) potential repair/replacement strategies including the closure of the Bridge to vehicular traffic.

In May 2007 (Report #PW-39-2007) the Director presented an MRC Structural Evaluation Report which confirmed the need for the current 5 tonnes load limit on the bridge due to the poor condition of the stringers in the truss floor deck system. The MRC Report also noted that in accordance with the Canadian Highway Bridge Design

Code without repair or rehabilitation, consideration should be given to closing the structure in a few years, due to the diminished capacity of the stringers. The complete Report was posted on the County website.

In August 2007 (Report #PW-66-2007) the Director presented the results of a Public Information Centre that was held in Merrickville on May 17th, 2007 regarding the future of the Andrewsville Bridge. The results of the PIC indicated that the users of the Andrewsville Bridge are overwhelmingly in favour of repairing the structure and do not support the closure of the bridge to vehicular traffic. Since the PIC the Director has also received correspondence from the Merrickville-Wolford Heritage Committee (Appendix “A”) and the Rideau Canal National Historic Site (Appendix “B”). Both organizations support the repair and the preservation of the bridge. On August 24th, 2007, by e-mail, the Ministry of Culture (MOC) advised that “sympathetic modifications” (minor repairs to ensure public safety) to the structure would be permitted if they did not alter the character of the structure. The MOC has also indicated that major modifications or the replacement or relocation of the structure cannot proceed until a heritage impact assessment is completed by a qualified heritage consultant, and approved by the MOC. The estimated cost of a heritage impact assessment is $10,000 to $20,000.

4. DISCUSSION

A summary of the written comments that were received at the PIC was presented at the August Public Works Committee Meeting (Report #PW-66-2007). Since then the Director has endeavoured to consult with the appropriate agencies to discuss the ten (10) areas of concern that were identified by the public. A summary of the results of this consultation, to date, is at Appendix “C.”

5. ANALYSIS AND OPTIONS

Four options are open:

a. Option 1. Do nothing
b. Option 2. Effect minor repairs consistent with the MOL “sympathetic modifications” definition.
c. Option 3. Effect major repairs
d. Option 4. Replace the structure.

Option 1 is not recommended as it does not support good risk management practices. If minor repairs to the structure are not completed during the next two years, consideration must be given to closing the bridge to vehicular traffic. Option 2 is feasible; however it is unlikely that it would add more than five years to the life of the structure. Option 3 is not recommended as a large investment to repair a one-hundred year old, one-lane bridge is not practical. In the short-term Option 4 is not practical as at least two years of pre-engineering would be needed before the project could begin.

Effecting minor repairs to the bridge in 2008 (Option 2) would “buy” some time for the structure. However, extending the life of the bridge for a short time will place the burden of a decision on the long-term strategy for the Andrewsville Bridge on future

County Councils. The Director recommends that MRC be authorized to complete the pre-engineering for Option 2 (minor repairs) with a view to tendering the project in January 2008 to provide a firm price for consideration during the budget deliberations. Staff should also develop a long-term strategy for the Andrewsville Bridge for consideration during the budget deliberations. This process would provide the Councils the flexibility to consider moving forward with Option 2 or reconsidering Option 1 or Option 4.

6. FINANCIAL IMPLICATIONS

To be presented by Bill Bohne, McCormick Rankin Corporation.

7. LOCAL MUNICIPAL IMPACT

Public interest in the project is very high, particularly in the Andrewsville, Merrickville, and Burrits Rapids areas. Notification of this Report has been sent to about fifty (50) persons on the project mailing list. Attendance by the public at the October 3rd, 2007 meeting is likely. The Director is committed to keeping all informed of the progress of the project.

8. CONCLUSIONS

Minor repairs to the Andrewsville Bridge in 2008 will provide a short-term solution to the existing deficiencies, but it will also shift the burden of a long-term decision on the future of the structure to future Councils from Lanark County and the United Counties of Leeds and Grenville.

9. ATTACHMENTS

i) Appendix “A” – Letter from the Chair, Merrickville-Wolford Heritage Committee received September 5th, 2007
ii) Appendix “B” – Letter from the Field Unit Superintendent, Rideau Canal National Historic Site of Canada, dated August 27th, 2007
iii) Appendix “C”- Areas of Concern Evaluation

Recommended By:	**Approved for Submission By:**
Steve Allan, P. Eng. **Director of Public Works**	**Peter Wagland** **Chief Administrative Officer**

July 23rd, 2007
To: Merrickville-Wolford Council
From: The Merrickville-Wolford Heritage Committee

Re: A Letter of Support for Andrewsville Bridge Preservation

The Merrickville Heritage Committee has several concerns regarding the future of the Andrewsville Bridge which, under the mandate given to heritage committees by the province, we would like to bring to the council's attention. It is our recommendation that this council provide a letter of support to the various decision makers and area groups in order to demonstrate our support for the preservation and/or restoration of the Andrewsville bridge. Merrickville is the next possible canal and river crossing to the east of Andrewsville and there are several points that we would like to draw to your attention:

1) We are advised that a study done in 2006 indicates that 200 cars a day cross the Andrewsville bridge. The impact of the increased traffic in Merrickville that would result from the closure of the Andrewsville bridge will be felt in several ways:
    a) The traffic is already backed up down the St. Lawrence street when the bridge is open, making it impossible to drive up the street even if one is not going to cross the bridge.
    b) The designation of the Rideau Canal as a World Heritage Site will no doubt draw yet more tourists to the area and increase the traffic congestion in Merrickville even more if the option of crossing the river at Andrewsville is not available.
    c) This same designation is a potential boon to shop owners. If it is more difficult to reach shops because additional traffic uses the Merrickville bridge, the Andrewsville bridge closure will negatively impact the shops which are the attraction of Merrickville for many tourists.
    d) Merrickville is a tourist attraction not just for its shops but also for its architectural history. Additional traffic clogging the main street when the bridge is open impedes tourists' views of the picturesque village.

2) The Andrewsville bridge is part of an important tourist route used by visitors to Merrickville and will become increasingly important as the World Heritage designation of the canal attracts more visitors.

3) Local traffic can use the bridge in Andrewsville if the bridge in Merrickville is open for boaters and closed to vehicles.

4) The Andrewsville Bridge is available for emergency vehicles transporting people to the nearest hospital in Kemptville. Should it be closed, the

residents along Heritage Drive east of Merrickville, as well as Merrickville residents north of the canal could be affected.

5) The Andrewsville Bridge provides a location east of Merrickville where emergency vehicles can get to and across the water. Its value became obvious during the drowning accident in March and could be crucial in the event of a fire.

6) The Merrickville Heritage Committee encourages the preservation and maintenance of historically significant architecture. The bridge facilitates access to the historically important village of Andrewsville.

If the reported cost of $95,000 for repairs to the bridge that will last for 15 years is shared by all the counties affected, each county will pay much less than the estimated $30,000 it would cost to close the bridge, yet would reap much greater benefits.

The Merrickville Heritage Committee considers it important to emphasize why the closure of this bridge will be a significant loss to both tourists and Merrickville residents, as well as to the larger communities nearby. We hope that you will take our concerns into consideration and that you will decide to support the efforts to repair and not to close the Andrewsville bridge.

Anne Barr, Chair, for Claire Smith
Merrickville-Wolford Heritage Committee

APPENDIX "B"

Parks Canada Parcs Canada

Rideau Canal National Historic Site
34A Beckwith Street South
Smiths Falls, Ontario K7A 2A8

Phone: (613) 283-5170
Fax: (613) 283-0677

LANARK COUNTY
PUBLIC WORKS
AUG 29 2007
FILE Andrewsville-Pic
Action [illegible] Info
PWCOW Copy
BF
Sent to Les Sheppard, done 31Aug07

August 27, 2007

Mr. Bill Bohne
McCormick Rankin Corporation
1145 Hunt Club Road, Suite 300
Ottawa, Ontario K1V 0Y3

Subject: Andrewsville Bridge Cultural and Heritage Evaluation, Parks Canada comments

Dear Mr. Bohne:

I am writing to provide you with Parks Canada's review of the Cultural and Heritage Evaluation of the Andrewsville Bridge. Upon review of the completed Heritage Bridge Program Criteria Form, we feel it does not adequately reflect the heritage value of the bridge, particularly with respect to its connection with the surrounding community and the Rideau Canal National Historic Site of Canada.

The *Rideau Canal National Historic Site of Canada Management Plan* identifies Parks Canada's interests in the conservation of the heritage values of the Rideau Canal Corridor. Parks Canada strives to work in co-operation with others to protect the cultural heritage resources within the Rideau Canal corridor. Specifically, one of the key principles in that plan is that:

"The historic values, natural features, scenic beauty and diversity of cultural landscapes of the Canal corridor constitute its unique heritage character and should be preserved by government, commercial interests and private residents."

The Andrewsville Bridge and the views from it are critical to the protection of the heritage setting of the Upper Nicholsons Lockstation and the community of Andrewsville, an integral component of the heritage character of the Rideau Canal. Its continued use as a crossing of the canal contributes to a wide range of unique heritage experiences available to visitors to the Canal Corridor.

We have reviewed the scoring of the Andrewsville Bridge undertaken by your firm and have the following suggestions to better reflect its heritage value.

2. Age

Our reports indicate that the bridge was built around 1900. Parks Canada scoring: 12

4. Design/Style: Rare Survivor of a Typical Design or Style:

The current score of 8/16 appears low for a bridge of this style and does not evaluate it in the context of the Rideau Canal. The Andrewsville Bridge is the only high through truss bridge on the Rideau Canal, is one of only two steel fixed bridges owned by a municipality, is the only

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surviving municipal road bridge of that era on the canal and quite likely among a handful of such bridges left in Ontario. Parks Canada score: 10/16

6. **Structural Preservation: No Significant Modifications:**
The score of 6 is seems low for a structure which retains its original stone approach walls mostly intact and a timber deck which was *replaced in kind* in 1963, which follows good conservation practices. Parks Canada score: 7/10

7. **Visual Appeal: Design Merits:**
This score could be increased from the current 5/10 for the very reasons outlined for this descriptor: This is an attractive structure due in part to the interplay with the surrounding environment. More importantly, the removal of the Andrewsville Bridge would be "detrimental to the ambience of the setting." Indeed, as it is an integral component of the picturesque character of the area, the combination of natural, cultural and scenic values makes this one of the most attractive locations along the canal. Parks Canada score 8/10

8. **Integrity: At Original Location:**
This score could be increased from 3/4 as this bridge significantly contributes to a strong sense of place for both the community and the lockstation. It has been part of the Upper Nicholsons Lockstation landscape since 1900 and is part of a road network which dates back to the 1870s when the first bridge was built. Parks Canada score 4/4

9. **Landmark: Physical Prominence:**
Landmark: Public Perception:

The 0/6 rating for physical prominence, and 4/6 for public perception appears low and may not adequately reflect the landmark value of the bridge and its significance to the local community. The Andrewsville Bridge continues to be a prominent feature in this rural landscape, connecting the north side of the canal and the community of Andrewsville with the Upper Nicholsons Lockstation and the River Road on the south side of the Canal. For many local residents it symbolizes the old Rideau as they knew it before the bridge upgrading program of the last 30 years resulted in the loss of many of these types of bridges. This is one of only a few locations on the canal where residents and visitors are able to cross the river and canal on a bridge that was designed 100 years ago in a setting that has retained much of its rural charm. As a symbol of the Rideau as a living museum it is thus an important feature both in its physical form but also in its function as a vehicular bridge. Parks Canada score 6/6 and 5/6

10. **Gateway: Entrance / Exit Occurrence:**

The bridge functions as a gateway to the Rideau River and Upper Nicholsons Lockstation reinforcing the notion that they are entering a heritage area. The score of 2/4 appears to minimize this value. Parks Canada score: 3/4

12. **Historical Association: Associated with theme:**
Historical Association: Associated with former bridges:

The Andrewsville Bridge is associated with the integration of the Rideau Canal, with the local community and the development of the communities along the canal. In conjunction with the lock, swing bridge and channel, the bridge constitutes a character defining element of the site.

The bridge is directly associated with the canal and its operation by virtue of the fact that the presence of the bridge required a swing bridge at the lockstation. If this bridge never existed, nor would the features of this lockstation.

Continued use of this bridge for vehicular traffic is a tradition that dates back to 1864 when the first bridge was constructed. Vehicular traffic requires the swing bridge across the lock to be opened and closed. The sights and sounds of this operation and the traffic across the lock speak to the fact that the Rideau is a functioning historic system integrated into the life of the communities along the canal. Parks Canada scoring 6/10 and 7/10

Based on Parks Canada's heritage evaluation, using the Heritage Bridge Program Criteria Form, the Andrewsville Bridge should have a score of 77. In our opinion, this score is a more realistic reflection of its heritage value.

Parks Canada also has concerns regarding the Archaeological Value section of the Cultural and Heritage Evaluation Report. It states that "an archaeological survey of the area was not undertaken, as the proposed rehabilitation of the bridge will not impact areas of archaeological significance." This is inconsistent with the archaeological process as areas of archaeological significance can only be determined when an archaeological survey of the area is undertaken.

We trust that you will find our comments useful and that the evaluation will be modified to reflect these observations.

Yours sincerely,

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APPENDIX “C”

SUMMARY OF WRITTEN COMMENTS FROM ANDREWSVILL EVALUATION TO DATE

Area of Concern	Number of Written Comments from the Public/Agencies	Results of Director’s Consultation with Agencies
Loss of emergency services if bridge closed	18	Lanark County Ambulance and the CAO Montague Township (re: Fire Service) have advised that there would be **no** loss of emergency services.
Convenience for Andrewsville residents and commuters	10	True for the dozen residences that are located at the foot of the bridge in Montague Township.
World Heritage status of Rideau Canal and sites	18	Agreed that this is a factor to consider.
Potential congestion in Merrickville and Burritt’s Rapids if bridge is closed	8	Based on recent counts daily traffic crossing bridge (AADT) is less than 400. Current AADT at Merrickville is 4,700 and Burritt’s Rapids is 1,100. Assuming Andrewsville Bridge traffic would split equally between Merrickville and Burritt’s Rapids, increase in AADT would be 4 % in Merrickville and 20 % in Burrit’s Rapids.
Importance of tourism	7	No data available
Bridge is needed in winter as an alternative to Andrewsville Main Road	5	Could be resolved by Montague Township by providing higher level of service on Andrewsville Main Road
Andrewsville crossing is needed for future development	5	No data available.
Farmers need the bridge for access	1	Not evaluated yet.
Bridge is needed for school bus access	3	Not evaluated yet
Negative impact of bridge closure on property values	2	No data available.