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**County of Simcoe
County Road 44 Reconstruction
Environmental Study Report
Addendum – Hart Bridge**

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Prepared for:

County of Simcoe

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1.0 Introduction

The County of Simcoe is currently in year 4 of a multi-year project to reconstruct County Road 44 from Longford Mills to Washago. The work began in 2008 following the completion of a Schedule 'C' Class Environmental Assessment and Environmental Study Report (ESR) in 2005.

The planning of municipal infrastructure projects is subject to the Environmental Assessment (EA) Act, R.S.O., 1990, which requires the proponent to meet the requirements of the Act. Typically, municipal projects that are similar in nature and frequently undertaken by a municipality may follow the planning process set out in the Municipal Class Environmental Assessment document dated October 2000 as amended in 2007, providing the projects are limited in scale, have generally predictable range of effects, have relatively minor environmental significance and are responsive to mitigation measures.

At the time of the original Class EA and ESR, there were no plans for the County to undertake improvements at the Hart Bridge which is located 0.6 km south of County Road 169 over the Black River. However, during follow up inspections of the bridge by the County, it was determined that certain components were experiencing significant deterioration. In fact, deterioration of the Hart Bridge steel truss tension chords became so significant that emergency repairs were required in 2010 to keep the bridge in service.

It is anticipated that further deterioration will continue and that further maintenance and repairs will be required on an ongoing basis. Deterioration may develop to a level where a reduction in load carrying capacity will occur. This would not be acceptable on this recently improved roadway experiencing increased traffic volume and truck traffic.

As such, the County has elected to consider improvements to the site to determine the most viable long term solution for the structure.

2.0 Existing Conditions

The Hart Bridge crossing the Black River is located on Simcoe County Road 44 approximately 0.6 km south of County Road 169, east of the Village of Washago in the Township of Ramara, County of Simcoe.

The Hart Bridge is a single span, steel pony truss superstructure on cast-in-place concrete abutments. The bridge was constructed in 1956, has a deck length of 31.4 metres. The driving platform is 7.8 metres between barriers and the overall structure width is 9.0 metres. Barriers on the bridge consist of two rows of steel beam guiderail

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which is attached directly to the truss members. Steel truss structures are considered single load path structures. As such, if the railings were significantly damaged by a collision, it could result in an overall bridge failure.

The County has identified that the existing Hart Bridge is in need of replacement. A previous bridge inspection report indicated that the structure was inadequate and beyond economical rehabilitation. A copy of this report has been provided in **Appendix A**.

In its present condition the structure can be said to be deficient with respect to the following:

- **Geometry**

The existing geometry and the desirable minimum standards are shown in the following table. The minimum standards are based on Simcoe County Standards, the Geometric Design Standards for Ontario Highways, and the Canadian Highway Bridge Design Code.

Geometry	Existing Structure	Minimum Standard	Deficient
Lane Width	3.5	3.7	Yes
Number of Lanes	2	2	No
Shoulder	0.4	2.5	Yes
Railing	None	PL-2 Barrier	Yes

- **Structure Barrier System**

The railing system on the existing structure does not comply with current code requirements for traffic barriers. On the structure, the railings are connected directly to the steel truss supports. In this configuration, collision damage to the rails may result in permanent and critical damage to the truss system.

- **Approach Guide Rail**

Currently, temporary concrete barriers have been provided at the ends of the bridge. These must be replaced with appropriate approach guide rail and end treatment.

- **Physical Condition**

In its current condition, the structure has the following deficiencies:

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- Corrosion of end truss bay tension chords requiring emergency repair.
- Continuing corrosion of remaining steel truss tension chords.
- Corrosion of bottom chord gusset plate connections.
- Nominal corrosion of top chord truss components at end bays.
- Concrete deterioration of abutments, ballast walls and wingwalls.

3.0 Planning Solutions

Given the type of structure and its existing condition, there are essentially four planning solutions available for this site.

- Do Nothing;
- Rehabilitate the Existing Structure;
- Replacement of the Structure; and
- Replacement of the Structure with Sympathetic Modification.

If the Hart Bridge was a stand-alone project, improvements at the site would be considered as a Schedule 'B' project as defined by the Municipal Class Environmental Assessment document. This determination would be made on the basis of the structures age, (over 40 years) and on the nature of the type of bridge (steel pony truss).

The driving rational for the above criteria and schedule selection would be the need to evaluate and assess the potential Cultural Heritage Value of the existing truss structure.

Given that the overall County Road 44 project was subject to a more rigorous Schedule 'C' Environmental Assessment, the primary outstanding issue at the bridge is the consideration or assessment of the Cultural Heritage Aspects value of the bridge. As such, the County has engaged a Heritage Assessment sub-consultant to address this aspect of the project. A copy of their report is included in **Appendix B**.

The following provides a brief description of the each planning solution along with their corresponding advantages and disadvantages.

3.1 Do Nothing

The do nothing option must always be considered but is seldom selected as the most appropriate option. The do nothing option leaves all conditions as they are and allows deterioration to continue unabated. The do nothing option typically defers any action to a future time period. In this case, doing nothing will result in increased monitoring, further repair requirements and eventually a load restriction.

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Advantages

- Minimum capital expenditure.
- Minimum disruption to environment.

Disadvantages

- Deterioration will continue unabated resulting in further need for repairs.
- Increasing monitoring and maintenance needs.
- The structure load capacity will ultimately diminish.
- The lack of a side clearance on the bridge is inconsistent with the approach road geometry, i.e. lane width and shoulders resulting in an apparent narrowing at the bridge.
- The lack of appropriate barriers over the structure leave the bridge as a single load path structure, wherein collision damage to the truss may result in overall bridge failure.

3.2 Rehabilitate the Existing Structure

The rehabilitation of the existing structure can be considered as an option to remedy only some of the noted deficiencies. While some deficiencies could be addressed by completing a nominal work program, for the purposes of this assessment, the rehabilitation option will consider a work program designed to remedy as many of the noted deficiencies as is practically possible.

In general, the work associated with a major rehabilitation program would include:

- Concrete repairs to the concrete abutments and wingwalls.
- Construction of new barriers independent of the steel truss load carrying members.
- Replacement of corroded components, bottom chord tension members, gusset plates and selected other truss members.
- Strengthening of additional members as deemed necessary by a structural evaluation.

The rehabilitated structure would be required to meet as many code required minimum standards as possible.

It should be noted however that this type of structure cannot be widened. To do so, would effectively require the complete reconstruction of the truss.

Advantages

- Can address some of the noted deficiencies.
- Improved public safety (barriers and approach guide rail).

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- Represents the medium range of capital expenditure.
- Preserve heritage features, i.e. the truss.

Disadvantages

- Structure may still have a limited life expectancy due to the condition of remaining components (steel and concrete).
- Travelled way would remain narrow, relative to the approaches, and in fact more narrow in order to provide adequate independent structure barriers.
- Uncertain knowledge of the scope of work and quantities until work is underway (typical of concrete rehabilitation projects).
- Uncertain cost estimate based on variations in work quantities.
- There is no potential to improve hydraulic capacity (if required) as existing hydraulic opening is fixed.
- Reduced service life compared to a new structure.
- Service life expectancy to next rehabilitation is low (10 - 15) years.
- Disruption to traffic during construction including road closure and detour.

3.3 Replacement of the Structure with Vehicular Bridge

The replacement of the structure with a new code compliant bridge would allow the County to bring the site to current standards in all respects including safety, geometry, road grades, drainage and load capacity. A new bridge could be designed to minimize disruption to the local, natural environment during construction.

Advantages

- Improved public safety including structure barriers, approach guide rail and end treatment.
- No load restrictions.
- Improved hydraulic performance can be provided (if required) - reduced risk of blockage and flooding.
- Minimum maintenance.
- Extended service life (75 years +as per code).
- Opportunity to improve or enhance wildlife habitat.

Disadvantages

- Increased capital cost.
- Disruption to traffic during construction including closed road and detour.
- Duration of construction may be longer than rehabilitation option.
- May lose heritage aspects of the site.

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3.4 Replacement of the Structure with Sympathetic Modification

During the original EA process, public comment was received noting the structures aesthetic appeal within the road system. Even though there was no original intent to improve the bridge, the comments were documented by the County. In addition, County staff have expressed a desire to preserve, if possible, the character of the site.

In its assessment of heritage aspects, a sub-consultant outlined eight levels of conservation aimed at preserving the truss heritage in whole or in part. One option included replacing the bridge with a new structure and incorporating elements of the existing structure into the new design.

This option considers a plan that would include the design of a replacement structure as outlined in Option 3.3, along with the preservation of the steel truss components.

As noted previously, this type of bridge cannot be widened. A wider bridge would require new floor beams to carry the wider road platform. The added width would then add increased load on the trusses, and as such the truss components would have to be reconstructed or significantly strengthened. In either case, the modifications would result in the loss of many of the original riveted connections which contribute significantly to the heritage appeal of the bridge.

This option would include the removal and salvage of the steel truss components. These would be cleaned up, coated and reinstalled on the bridge as non-structural elements, essentially adornments to preserve the visual aesthetic of a pony truss steel bridge.

Advantages

- Improved public safety including structure barriers, approach guide rail and end treatment.
- No load restrictions.
- Improved hydraulic performance can be provided (if required) - reduced risk of blockage and flooding.
- Minimum maintenance.
- Extended service life (75 years +as per code).
- Opportunity to improve or enhance wildlife habitat.
- Preservation of heritage value.

Disadvantages

- Increased capital cost.
- Disruption to traffic during construction including closed road and detour.
- Duration of construction may be longer than rehabilitation option.

4.0 Evaluation of Planning Solutions

The evaluation of planning solutions for this site is limited to the consideration of public safety, cost and heritage value.

Within the realm of public safety, concerns include barrier protection, continuity of driving platform, and load capacity. Cost considerations include capital costs, repair and maintenance costs, and the economic impact of a potential load capacity restriction. Heritage concerns include the possibility for the complete loss of a potential heritage feature and the opportunities available to mitigate the loss.

Based on the evaluation of the advantages/disadvantages of the options, the recommended solution for the Hart Bridge site is the replacement of the structure with sympathetic modifications.

5.0 Agency Involvement and Public Participation

5.1 External Agency Involvement

The project planning process for an addendum requires that a notice of the addendum be provided to all interested parties and agencies notified during the original EA process. As such notices have been sent to various federal and provincial government agencies, ministries/authorities, as well as other public agencies. It should be noted that the addendum only allows concerns directly related to the addenda be reopened i.e., only bridge related comments are considered.

The external agencies contacted were as follows:

Federal and Provincial Ministries, Agencies, Groups

- Transport Canada Marine
- Department of Fisheries and Oceans (DFO)
- Ontario Ministry of the Environment
- Ontario Ministry of Culture
- First Nations

Agencies, Municipalities, Utilities

- Township of Ramara
- Bell Canada
- Hydro One Networks Inc.
- CN Rail

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The consultation, authorization and permit process with the above external agencies is an ongoing and iterative process working often, in parallel with the Class EA process.

Beyond the basic Class EA notification requirements the project is also currently under review for approval from Transport Canada and authorization by Department of Fisheries and Oceans.

5.2 Public Participation

Notices of the addenda were published in local papers and mailed to those who expressed interest in the bridge during the EA process.

6.0 Summary and Recommended Solution

On the basis of our review of the options available, R. J. Burnside recommends:

That the County proceed with the publication the required Notice of Addendum identifying the preferred solution as the replacement of the Hart Bridge with sympathetic modifications.

We trust the above is satisfactory for your present needs and look forward to your direction in this regard.

Respectfully submitted by:

R.J. Burnside & Associates Limited

Stephen P. Riley, P.Eng.



Appendix A

Bridge Inspection Report

Biennial Bridge Inspection Report

Hart Bridge

No. 044165

Wednesday, June 30, 2010



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1. Narrative

1.1 Introduction

The inspection summarized in this report was undertaken in compliance with the requirements of the Public Transportation and Highway Improvement Act, Ontario Regulation 104/97. There is no record of a previous detailed visual inspection of this structure. The inspection was carried out on Wednesday, June 30, 2010 by Mugurel Serban under the direction of M. Wallrap P. Eng. At the time of inspection it was partly cloudy with temperatures between 20 and 25 degrees celsius. This report meets or exceeds all requirements for detailed visual surveys as set out in the Ontario Structure Inspection Manual 2000, rev. 2003, 2008.

1.2 General Information

The Hart bridge was built in 1957. The structure has a South-North orientation and is located on Rama Road 0.1 km South of Somerset Dr in the County of Simcoe. This Truss bridge carries 2 lanes of predominantly vehicular traffic across the Severn River - East Branch in 1 continuous span with a crossing length of 33.7m and a maximum clearance of 5.5m. The deck has a travel width of 8m and an overall width of 8.64m.

With an AADT of 3,400 the crossing is lightly used with truck volumes accounting for 10 to 25% of the total traffic. The speed limit at this location is 80 km/hr and there is no load limit posted. There is no record of rehabilitation for this structure. The heritage designation is unknown. The total estimated replacement value is \$4,308,792.

1.3 Observations

Each component is presented along with a discussion of any elements within that component that exhibit notable deterioration and/or a low estimated remaining service life. Thorough documentation of every element in the structure can be found in the detailed forms in section "5.7 - Element Data". At the beginning of each section the asset value contribution for each component is stated. This is simply the percentage of overall structure replacement value that the component represents. As such it gives an indication of the components' economic value in light of any deterioration it may be undergoing.

The Hart bridge is comprised of the following components:

1.3.1 North Approach

The following defects were noted in the elements comprising this component: The approach consists of 43.5 tonnes of asphalt. In total, an estimated 10% exhibits light general deterioration. The estimated remaining service life is 15 years. The entire component will undergo ancillary replacement.

1.3.2 South Approach

The following defects were noted in the elements comprising this component: The approach consists of 43.5 tonnes of asphalt. In total, an estimated 10% exhibits light general deterioration. The estimated remaining service life is 15 years. The entire component will undergo ancillary replacement.

1.3.3 Wearing Surface

The following defects were noted in the elements comprising this component: The wearing surface consists of 48.5 tonnes of asphalt. In total, an estimated 10% exhibits severe general deterioration. The estimated remaining service life is 5 years. The entire component will undergo ancillary replacement.

1.3.4 Deck

The following defects were noted in the elements comprising this component: The deck consists of 2.1 tonnes of cast-in-place concrete. In total, an estimated 4% exhibits severe general deterioration. The estimated remaining service life is 5 years. The entire component will undergo ancillary replacement.

1. Narrative (cont.)

1.3.5 Drainage System

The following defects were noted in the elements comprising this component: The drainage system is 269.6 square metres in area. In total, an estimated 50% exhibits severe general deterioration. The estimated remaining service life is 1 years. The entire component will undergo ancillary replacement.

1.3.6 Sidewalk/Curb/Median

The following defects were noted in the elements comprising this component: The sidewalk/curb/median consists of 10.5 tonnes of cast-in-place concrete. In total, an estimated 18% exhibits severe general deterioration. The estimated remaining service life is 5 years. The entire component will undergo ancillary replacement.

1.3.7 Barrier

The following defects were noted in the elements comprising this component: The barrier consists of 1.7 tonnes of steel. The element is functionally obsolete and replacement is warranted. The estimated remaining service life is 0 years. The east barrier consists of 24 tonnes of precast concrete. The element is structurally inadequate. The estimated remaining service life is 10 years. The entire component will undergo ancillary replacement.

1.3.8 Signage

The following defects were noted in the elements comprising this component: The signage number 4 all together constructed of steel. In total, an estimated 20% exhibits medium general deterioration. The estimated remaining service life is 10 years. The entire component will undergo ancillary replacement.

1.3.9 Truss

The following defects were noted in the elements comprising this component: The truss consist of 45 tonnes of steel. In total, an estimated 6% exhibits severe general deterioration and replacement is warranted. The estimated remaining service life is 0 years.

1.3.10 Floor Beams

The following defects were noted in the elements comprising this component: The floor beams consist of 27 tonnes of steel. In total, an estimated 12% exhibits severe general deterioration. The estimated remaining service life is 1 years. The entire component will undergo ancillary replacement.

1.3.11 Stringers

The following defects were noted in the elements comprising this component: The stringers consist of 20 tonnes of steel. In total, an estimated 8% exhibits severe general deterioration. The estimated remaining service life is 5 years. The entire component will undergo ancillary replacement.

1.3.12 Bracing

The following defects were noted in the elements comprising this component: The bracing consists of 1.7 tonnes of steel. In total, an estimated 12% exhibits severe general deterioration. The estimated remaining service life is 5 years. The entire component will undergo ancillary replacement.

1.3.13 North Abutment

The following defects were noted in the elements comprising this component: The abutment consists of 115 tonnes of cast-in-place concrete. In total, an estimated 20% exhibits severe general deterioration. The estimated remaining service life is 2 years. The entire component will undergo ancillary replacement.

1. Narrative (cont.)

1.3.14 South Abutment

The following defects were noted in the elements comprising this component: The abutment consists of 115 tonnes of cast-in-place concrete. In total, an estimated 12% exhibits severe general deterioration. The estimated remaining service life is 1 years. The entire component will undergo ancillary replacement.

1.3.15 North Embankment

The following defects were noted in the elements comprising this component: The embankment consists of 60 square metres of gravel. In total, an estimated 50% exhibits severe general deterioration. The estimated remaining service life is 5 years. The entire component will undergo ancillary replacement.

1.3.16 South Embankment

The following defects were noted in the elements comprising this component: The embankment consists of 60 square metres of gravel. In total, an estimated 50% exhibits severe general deterioration. The estimated remaining service life is 1 years. The entire component will undergo ancillary replacement.

1.3.17 Foundation

No significant defects were noted.

1.3.18 Coating

The following defects were noted in the elements comprising this component: The coating consists of 1040 square metres of c other. In total, an estimated 50% exhibits severe general deterioration and replacement is warranted. The estimated remaining service life is 0 years.

1.3.19 Watercourse

No significant defects were noted.

1.4 Conclusions and Further Investigation

Overall the structure is in very poor condition with an aggregate condition index of 0. The major concerns at this site are the severe deterioration of the east bottom chord at both ends including connections and affecting the load carrying capacity, partial poor condition of floor beams, stringers, bracing, abutments, south embankment and coating.

1. Narrative (cont.)

1.4.1 Rehabilitative

The structure has rehabilitative needs of \$4,903,919:

South Approach Ancillary Replacement	\$7,919
North Approach Ancillary Replacement	\$7,919
Wearing Surface Ancillary Replacement	\$24,721
Deck Ancillary Replacement	\$3,584
Drainage System Ancillary Replacement	\$3,927
Sidewalk/Curb/Median Ancillary Replacement	\$11,468
Barrier Replacement	\$11,028
Barrier - East Ancillary Replacement	\$34,951
Signage Ancillary Replacement	\$2,350
Truss Replacement	\$656,829
Floor Beams Ancillary Replacement	\$309,648
Stringers Ancillary Replacement	\$203,569
Bracing Ancillary Replacement	\$17,303
North Abutment Ancillary Replacement	\$282,616
South Abutment Ancillary Replacement	\$282,616
South Embankment Ancillary Replacement	\$4,847

1. Narrative (cont.)

North Embankment
Ancillary Replacement

\$4,847

Foundation
Reinstallation

\$360,654

Coating
Replacement

\$2,673,125

1.4.2 Maintenance

No maintenance operations are currently recommended or required

1.4.3 Further Investigation

The next biennial inspection should be scheduled no later than June, 2012. In addition, a structural evaluation and a monitoring program for deformations, settlements & movements should be carried out immediately. At some point during the next year a concrete substructure condition survey is also recommended.

2. Component Summary

	Rehabilitation Needs						
	Replacement	ERSL	None\ > 10 yrs	6 - 10 years	1 - 5years	< 1 year	Urgent
North Approach	\$7,675	15	\$7,919				
South Approach	\$7,675	15	\$7,919				
Wearing Surface	\$23,957	5			\$24,721		
Deck	\$3,474	5			\$3,584		
Drainage System	\$3,804	1				\$3,927	
Sidewalk/Curb/Median	\$11,114	5			\$11,468		
Barrier	\$42,270	0					\$45,979
Signage	\$1,411	10		\$2,350			
Truss	\$500,147	0					\$656,829
Floor Beams	\$300,089	1				\$309,648	
Stringers	\$222,288	5			\$203,569		
Bracing	\$18,895	5			\$17,303		
North Abutment	\$273,890	2			\$282,616		
South Abutment	\$273,890	1				\$282,616	
North Embankment	\$5,292	5			\$4,847		
South Embankment	\$5,292	1				\$4,847	
Foundation	\$274,004	10		\$360,654			
Coating	\$2,293,446	0					\$2,673,125
Watercourse	\$40,181	10					
Total Replacement Cost:	\$4,308,794	0	\$15,838	\$363,004	\$548,108	\$601,038	\$3,375,933
Total Rehabilitative Cost:							\$4,903,921

3. Element Summary

	Focus	ERSL	Rehabilitation Needs				Urgent
			None\> 10 yrs	6 - 10 years	1 - 5years	< 1 year	
South Approach	All	15	\$7,919				
Slab	All	15					
Wearing Surface	All	15					
North Approach	All	15	\$7,919				
Slab	All	15					
Wearing Surface	All	15					
Wearing Surface	All	5			\$24,721		
Top Surface	All	5					
Deck	All	5			\$3,584		
Top Surface	All	5					
Exterior Soffit Ends	All	10					
Interior Soffit	All	10					
Exterior Soffit	All	5					
Soffit Ends	All	10					
Drainage System	All	1				\$3,927	
Gratings	All	5					
Drains	All	1					
Sidewalk/Curb/Median	All	5			\$11,468		
Curb	All	5					
Barrier	All	0					\$11,028
Railing System	All	5					
Barrier - East	All	10		\$34,951			
Signage	All	10		\$2,350			
Truss	All	0					\$656,829
Top Chords	All	10					

3. Element Summary (cont.)

	Focus	ERSL	Rehabilitation Needs				Urgent
			None\> 10 yrs	6 - 10 years	1 - 5years	< 1 year	
Bottom Chords	All	0					
Verticals	All	10					
Diagonals	All	10					
Connections	All	0					
Floor Beams	All	1				\$309,648	
Intermediate Floor Beams	All	1					
Floor Beam Ends	All	1					
Stringers	All	5			\$203,569		
Intermediate	All	5					
Bracing	All	5			\$17,303		
Intermediate Bracing	All	5					
North Abutment	All	2			\$282,616		
Abutment Wall	All	5					
Bearings	All	5					
Ballast Wall	All	10					
Bearing Seats	All	2					
East Wing Wall	All	5					
West Wing Wall	All	10					
South Abutment	All	1				\$282,616	
Abutment Wall	All	5					
Bearings	All	5					
Ballast Wall	All	10					
Bearing Seats	All	1					
East Wing Wall	All	10					
South Embankment	All	1				\$4,847	

3. Element Summary (cont.)

	Focus	ERSL	Rehabilitation Needs				Urgent
			None\> 10 yrs	6 - 10 years	1 - 5years	< 1 year	
North Embankment	All	5			\$4,847		
Slope Protection	All	5					
Foundation	All	10		\$360,654			
Coating	All	0					\$2,673,125
Watercourse	All	10					
Bottom	All	15					
Upstream Section	All	20					
Downstream Section	All	20					
			0	\$15,838	\$397,955	\$548,108	\$601,038
			Total Rehabilitative Cost:				\$4,903,921

4. OSIM Reporting

4.1 Inventory Data

Structure Name	<input type="text" value="Hart"/>	Site Number	<input type="text" value="044165"/>
Main Hwy/Road #	<input type="text" value="44"/> On <input checked="" type="checkbox"/> Under <input type="checkbox"/>	Crossing Type:	Navigable Water <input checked="" type="checkbox"/> Non-Navig. Water <input type="checkbox"/>
Hwy/Road Name	<input type="text" value="Rama Road"/>	Rail	<input type="checkbox"/> Road <input type="checkbox"/> Ped. <input type="checkbox"/> Other <input type="checkbox"/>
Structure Location	<input type="text" value="0.1 km South of Somerset Dr"/>		
Latitude	<input type="text" value="4955767"/>	Longitude	<input type="text" value="17632175"/>
Owner(s)	<input type="text" value="Simcoe County"/>	Heritage Designation:	Not Cons. <input type="checkbox"/> Cons./Not App. <input type="checkbox"/> List/Not Desig. <input type="checkbox"/> Desig./Not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	<input type="text" value="Central"/>	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input checked="" type="checkbox"/> Local <input type="checkbox"/>
MTO District	<input type="text" value="Unknown"/>	Posted Speed	<input type="text" value="80"/> No. of Lanes <input type="text" value="2"/>
Old County	<input type="text" value="Unknown"/>	AADT	<input type="text" value="3400"/> No. of Trucks <input type="text" value="25"/>
Geographic Twp.	<input type="text" value="County of Simcoe"/>	Inspection Route Sequence	<input type="text" value="Unknown"/>
Structure Type	<input type="text" value="Truss"/>	Interchange Number	<input type="text" value="Unknown"/>
Total Deck Length	<input type="text" value="33.7"/> (m)	Interchange Structure Number	<input type="text" value="Unknown"/>
Overall Str. Width	<input type="text" value="8.64"/> (m)	Minimum Vertical Clearance	<input type="text" value="1.9"/> (m)
Total Deck Area	<input type="text" value="291.17"/> (sq.m)	Special Routes:	Transit <input checked="" type="checkbox"/> Truck <input checked="" type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Roadway Width	<input type="text" value="8"/> (m)	Detour Length Around Bridge	<input type="text" value="13"/> (km)
Skew Angle	<input type="text" value="45"/> (Degrees)	Direction of Structure	<input type="text" value="South-North"/>
No. of Spans	<input type="text" value="1"/>	Fill on Structure	<input type="text" value="0"/> (m)
Span Lengths	<input type="text" value="33.1"/> (m)		

4.2 Historical Data

Year Built	<input type="text" value="1957"/>	Year of Last Major Rehab.	<input type="text"/>
Last OSIM Inspection	<input type="text" value="Unknown"/>	Last Evaluation	<input type="text" value="Unknown"/>
Last Enhanced OSIM Inspection	<input type="text" value="Unknown"/>	Current Load Limit	<input type="text" value="None"/> (tonnes)
Enhanced Access Equipment	<input type="text"/>		
Last Underwater Inspection	<input type="text" value="Unknown"/>	Load Limit By-Law #	<input type="text" value="Not Applicable/Unknown"/>
Last Condition Survey	<input type="text" value="Unknown"/>	By-Law Expiry Date	<input type="text" value="Not Applicable/Unknown"/>
Rehabilitation History	<input type="text" value="None"/>		

4. OSIM Reporting (Cont.)

4.3 Scheduled Improvements

Regional Priority Number

Programmed Work Year

Nature of Program Work

--

4.4 Appraisal Indices

		Comments
Fatigue	<input type="text"/>	<input type="text"/>
Seismic	<input type="text"/>	<input type="text"/>
Scour	<input type="text"/>	<input type="text"/>
Flood	<input type="text"/>	<input type="text"/>
Geometrics	<input type="text"/>	<input type="text"/>
Barrier	<input type="text"/>	<input type="text"/>
Curb	<input type="text"/>	<input type="text"/>
Load Capacity	<input type="text"/>	<input type="text"/>

4. OSIM Reporting (Cont.)

4.5 Field Inspection Information

Date of Inspection	Wednesday, June 30, 2010	Type of Inspection	<input checked="" type="checkbox"/> OSIM	<input type="checkbox"/> Enhanced OSIM
Inspector	Mugurel Serban			
Others in Party	None			
All Equipment Used	Tablet, Camera, GPS			
Weather	Partly Cloudy			
Temperature	20 to 25	C		

4.6 Additional Investigations Required

	None	Normal	Urgent	Est. Cost
Detailed Deck Condition Survey	X			
Non-Destructive Delamination Survey of Asphalt Covered Deck	X			
Concrete Substructure Condition Survey		X		
Detailed Coating Condition Survey	X			
Detailed Timber Investigation	X			
Post-Tensioned Strand Investigation	X			
Underwater Investigation	X			
Fatigue Investigation	X			
Seismic Investigation	X			
Structure Evaluation			X	
Monitoring of Deformations, Settlements and Movements			X	
Other* None	X			
Next Detailed Visual Inspection	June, 2012			Total Est. Cost

The major concerns at this site are the severe deterioration of the east bottom chord at both ends including connections and affecting the load carrying capacity, partial poor condition of floor beams, stringers, bracing, abutments, south embankment and coating.

Suspected Performance Deficiencies

- | | | |
|---|--|------------------------------|
| 01 Load carrying capacity | 06 Bearing not uniformly loaded/unstable | 12 Slippery surfaces |
| 02 Excessive deformations (deflections & rotations) | 07 Jammed expansion joint | 13 Flooding/channel blockage |
| 03 Continuing settlement | 08 Pedestrian/vehicular hazard | 14 Undermining of foundation |
| 04 Continuing movements | 09 Rough riding surface | 15 Unstable embankments |
| 05 Seized bearings | 10 Surface ponding | 16 Other |
| | 11 Deck drainage | |

Maintenance Needs

- | | | |
|--------------------------------------|---------------------------------|-------------------------------|
| 00 None | 06 Bridge Bearing Maintenance | 12 Bridge Surface Repair |
| 01 Lift and Swing Bridge Maintenance | 07 Repair to Structural Steel | 13 Erosion Control at Bridges |
| 02 Bridge Cleaning | 08 Repair of Bridge Concrete | 14 Concrete Sealing |
| 03 Bridge Handrail Maintenance | 09 Repair of Bridge Timber | 15 Rout and Seal |
| 04 Painting Steel Bridge Structures | 10 Bailey bridges - Maintenance | 16 Bridge Deck Drainage |
| 05 Bridge Deck Joint Repair | 11 Animal/Pest Control | 17 Other |

* eg. monitoring crack widths, trip hazards, issues impacting pedestrian or vehicular control

4. OSIM Reporting (Cont.)

4.7 Element Data

4.7.1 Overall Structure - Structure

Element Group:	Overall Structure				Length:	N/A	
Element Name:	Structure				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Any				Count:	N/A	
Element Type:	Bridge				Total Quantity:	1	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	See Individual Elements					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	count	0	0.48	0.4	0.12	01	17
Comments:	The recommendation is replacement of the entire structure how ever if instructed so by a structural engineer partial replacement or repairing may be taken into account. The structures is under heavy traffic and taking into account the partial poor condition of the structure w hich affects the load carrying capacity an evaluation is required to determine the extent of strength reduction. The width of the watercourse is wider than the length of						
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input checked="" type="checkbox"/>		
Recommended Work :	Defer to Element Level						



West Elevation.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.2 South Approach - Approach

Element Group:	South Approach				Length:	N/A	
Element Name:	Approach				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Asphalt				Count:	N/A	
Element Type:	Primary Element				Total Quantity:	43.5	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	tonnes	0	43.5	0	0	00	00
Comments: None							
Urgency : None <input checked="" type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : Ancillary Replacement Estimated Cost: \$7,919							



South Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.3 South Approach - Slab

Element Group:	South Approach				Length:	6	
Element Name:	Slab				Width:	8	
Location:	Single Element				Height:	0.3	
Material:	Cast-In-Place Concrete				Count:	1	
Element Type:	Any				Total Quantity:	48	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	48	0	0	00	00
Comments: None							
Urgency : None <input checked="" type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



South Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.4 South Approach - Wearing Surface

Element Group:	South Approach				Length:	6	
Element Name:	Wearing Surface				Width:	8	
Location:	Single Element				Height:	0.08	
Material:	Asphalt				Count:	1	
Element Type:	Any				Total Quantity:	48	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	48	0	0	00	00
Comments: Approach wearing surface will undergo ancillary replacement.							
Urgency : None <input checked="" type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



Overall View.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.5 North Approach - Approach

Element Group:	North Approach				Length:	N/A	
Element Name:	Approach				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Asphalt				Count:	N/A	
Element Type:	Primary Element				Total Quantity:	43.5	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	tonnes	0	43.5	0	0	00	00
Comments: None							
Urgency :	None <input checked="" type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work : Ancillary Replacement Estimated Cost: \$7,919							



Overall View.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.6 North Approach - Slab

Element Group:	North Approach				Length:	6	
Element Name:	Slab				Width:	8	
Location:	Single Element				Height:	0.3	
Material:	Cast-In-Place Concrete				Count:	1	
Element Type:	Any				Total Quantity:	48	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	48	0	0	00	00
Comments: None							
Urgency : None <input checked="" type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



Overall View.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.7 North Approach - Wearing Surface

Element Group:	North Approach			Length:	6		
Element Name:	Wearing Surface			Width:	8		
Location:	Single Element			Height:	0.08		
Material:	Asphalt			Count:	1		
Element Type:	Any			Total Quantity:	48		
Environment:	Severe			Limited Inspection	<input type="checkbox"/>		
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	48	0	0	00	00
Comments: Approach wearing surface will undergo ancillary replacement.							
Urgency : None <input checked="" type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



Overall View.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.8 Wearing Surface - Wearing Surface

Element Group:	Wearing Surface				Length:	N/A	
Element Name:	Wearing Surface				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Asphalt				Count:	N/A	
Element Type:	Primary Element				Total Quantity:	48.5	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	tonnes	0	29.1	14.55	4.85	09	12
Comments:	The wearing surface is in partial poor condition showing potholing areas which are partially patched and alligator cracking.						
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input checked="" type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work :	Ancillary Replacement				Estimated Cost: \$24,721		



Overall View.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.9 Wearing Surface - Top Surface

Element Group:	Wearing Surface				Length:	33.7	
Element Name:	Top Surface				Width:	8	
Location:	Single Element				Height:	0.08	
Material:	Asphalt				Count:	1	
Element Type:	Any				Total Quantity:	269.6	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	161.76	80.88	26.96	09	12
Comments:	The wearing surface is in partial poor condition showing potholing areas which are partially patched and alligator cracking.						
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input checked="" type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work :	See Primary Element						



Top Surface. Showing deterioration.



Top Surface. Showing deterioration.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.10 Deck - Deck

Element Group:	Deck	Length:	N/A				
Element Name:	Deck	Width:	N/A				
Location:	Single Element	Height:	N/A				
Material:	Cast-In-Place Concrete	Count:	N/A				
Element Type:	Primary Element	Total Quantity:	2.1				
Environment:	Severe	Limited Inspection	<input checked="" type="checkbox"/>				
Protection System:	None	Performance Deficiencies	Maintenance Needs				
Condition Data:	Units	Exc.	Good	Fair	Poor		
	tonnes	0	1.26	0.74	0.1	16	17
Comments:	The inspection of the deck was limited due to water level however the deck progressively deteriorates as a result of moisture penetration.						
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input checked="" type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work :	Ancillary Replacement		Estimated Cost: \$3,584				



West Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.11 Deck - Top Surface

Element Group:	Deck				Length:	33.7	
Element Name:	Top Surface				Width:	8.64	
Location:	Single Element				Height:	0.3	
Material:	Cast-In-Place Concrete				Count:	1	
Element Type:	Any				Total Quantity:	291.2	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	177.63	69.89	43.68	16	17
Comments:	Taking into account the moisture penetration observed on the underside and partial poor condition of the wearing surface the presumption is that the top of the deck shows a certain level of contamination.						
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input checked="" type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work :	See Primary Element						



West Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.12 Deck - Exterior Soffit Ends

Element Group:	Deck				Length:	0.3	
Element Name:	Exterior Soffit Ends				Width:	0.3	
Location:	Exterior				Height:	N/A	
Material:	Cast-In-Place Concrete				Count:	5	
Element Type:	Any				Total Quantity:	0.4	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	0	0.4	0	16	17
Comments:	The inspection of the deck was limited due to water level however the deck progressively deteriorates as a result of moisture penetration. There are also isolated areas showing medium to severe spalling.						
Urgency :	None <input type="checkbox"/>		6-10 years <input checked="" type="checkbox"/>		1-5 years <input type="checkbox"/>		< 1 year <input type="checkbox"/>
Recommended Work :	See Primary Element						



Underside Surface. Showing deterioration.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.13 Deck - Interior Soffit

Element Group:	Deck	Length:	29.7				
Element Name:	Interior Soffit	Width:	7.62				
Location:	Single Element	Height:	N/A				
Material:	Cast-In-Place Concrete	Count:	1				
Element Type:	Any	Total Quantity:	226.3				
Environment:	Severe	Limited Inspection	<input checked="" type="checkbox"/>				
Protection System:	None	Performance Deficiencies	Maintenance Needs				
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	147.1	79.2	0	16	17
Comments: The inspection of the deck was limited due to water level however the deck progressively deteriorates as a result of moisture penetration. There are also isolated areas showing medium to severe spalling.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



Underside Surface. Showing moisture penetration.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.14 Deck - Exterior Soffit

Element Group:	Deck				Length:	33.7	
Element Name:	Exterior Soffit				Width:	0.45	
Location:	Single Element				Height:	N/A	
Material:	Cast-In-Place Concrete				Count:	2	
Element Type:	Any				Total Quantity:	30.3	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair			
	m2	0	18.79	9.09	2.42	16	17
Comments: The exterior of the deck is in partial poor condition showing very severe spalling.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



West Side. Showing very severe spalling.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.15 Deck - Soffit Ends

Element Group:	Deck				Length:	2	
Element Name:	Soffit Ends				Width:	7.62	
Location:	Single Element				Height:	N/A	
Material:	Cast-In-Place Concrete				Count:	2	
Element Type:	Any				Total Quantity:	30.5	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	15.25	15.25	0	00	17
Comments:	The inspection of the deck was limited due to water level however the deck progressively deteriorates as a result of moisture penetration. There are also isolated areas showing medium to severe spalling.						
Urgency :	None <input type="checkbox"/>	6-10 years <input checked="" type="checkbox"/>	1-5 years <input type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work :	See Primary Element						



Underside Surface. Showing moisture penetration.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.16 Drainage System - Drainage System

Element Group:	Drainage System			Length:	N/A		
Element Name:	Drainage System			Width:	N/A		
Location:	Single Element			Height:	N/A		
Material:	Any			Count:	12		
Element Type:	Primary Element			Total Quantity:	12		
Environment:	Severe			Limited Inspection	<input checked="" type="checkbox"/>		
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	all	0	0	6	6	16	17
Comments: The steel pipes are in poor condition showing severe corrosion. The opening is partially obstructed by the curb.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input checked="" type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : Ancillary Replacement Estimated Cost: \$3,927							



Underside Surface. Showing severe deterioration.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.17 Drainage System - Gratings

Element Group:	Drainage System				Length:	N/A	
Element Name:	Gratings				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Any				Count:	N/A	
Element Type:	Any				Total Quantity:	12	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	count	0	8.4	3.6	0	16	17
Comments: The opening is partially obstructed by the curb.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



Top Surface.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.18 Drainage System - Drains

Element Group:	Drainage System				Length:	N/A	
Element Name:	Drains				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Steel				Count:	N/A	
Element Type:	Straight				Total Quantity:	12	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	count	0	0	0	12	16	17
Comments: The steel pipes are in poor condition showing severe corrosion.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input checked="" type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



Underside View. Showing severe deterioration.

4. OSIM Reporting (Cont.)

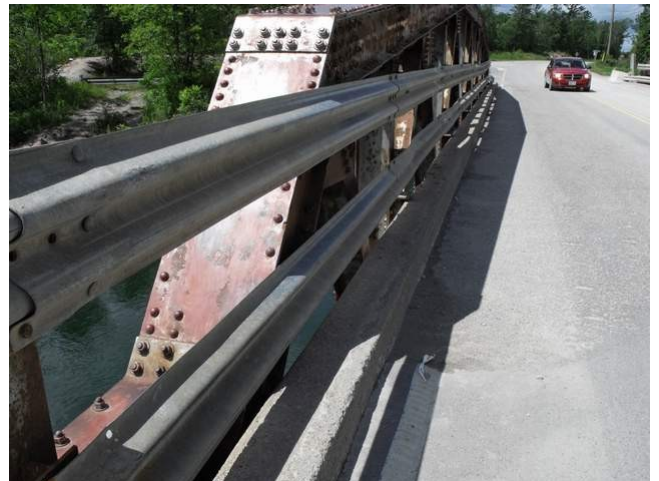
4.7 Element Data (cont.)

4.7.19 Sidewalk/Curb/Median - Sidewalk/Curb/Median

Element Group:	Sidewalk/Curb/Median			Length:	N/A		
Element Name:	Sidewalk/Curb/Median			Width:	N/A		
Location:	Single Element			Height:	N/A		
Material:	Cast-In-Place Concrete			Count:	N/A		
Element Type:	Primary Element			Total Quantity:	10.5		
Environment:	Severe			Limited Inspection	<input type="checkbox"/>		
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	tonnes	0	6.82	1.78	1.89	16	17
Comments: Curbs are in partial poor condition.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : Ancillary Replacement Estimated Cost: \$11,468							



East Side.



West Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.20 Sidewalk/Curb/Median - Curb

Element Group:	Sidewalk/Curb/Median			Length:	33.7		
Element Name:	Curb			Width:	0.32		
Location:	Single Element			Height:	0.2		
Material:	Cast-In-Place Concrete			Count:	2		
Element Type:	Any			Total Quantity:	48.6		
Environment:	Severe			Limited Inspection	<input type="checkbox"/>		
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	31.1	8.75	8.75	16	17
Comments: Curbs are in partial poor condition.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



. Showing severe deterioration.



West Side. Showing severe spalling.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.21 Barrier - Barrier

Element Group:	Barrier				Length:	N/A	
Element Name:	Barrier				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Steel				Count:	N/A	
Element Type:	Primary Element				Total Quantity:	1.7	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	tonnes	0	0	0.85	0.85	16	17
Comments: The barrier is not CHBDC compliant and is also loose and showing collision damage.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input checked="" type="checkbox"/>							
Recommended Work : Replacement Estimated Cost: \$11,028							



East Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.22 Barrier - Railing System

Element Group:	Barrier				Length:	35	
Element Name:	Railing System				Width:	N/A	
Location:	Single Element				Height:	1.5	
Material:	Steel				Count:	4	
Element Type:	Any				Total Quantity:	140	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m	0	112	28	0	16	17
Comments: The barrier is not CHBDC compliant and is also loose and showing collision damage.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



West Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.23 Barrier - EastBarrier

Element Group:	Barrier				Length:	N/A	
Element Name:	EastBarrier				Width:	N/A	
Location:	East				Height:	N/A	
Material:	Precast Concrete				Count:	N/A	
Element Type:	Primary Element				Total Quantity:	24	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	tonnes	0	24	0	0	16	17
Comments: The jersey walls at the end of the bridge are temporary solutions and they will eventually need to be replaced.							
Urgency : None <input type="checkbox"/> 6-10 years <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : Ancillary Replacement Estimated Cost: \$34,951							



Northwest Side.



Southwest Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.24 Signage - Signage

Element Group:	Signage				Length:	N/A	
Element Name:	Signage				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Steel				Count:	4	
Element Type:	Primary Element				Total Quantity:	4	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	all	0	3.2	0.8	0	16	17
Comments: None							
Urgency :	None <input type="checkbox"/>	6-10 years <input checked="" type="checkbox"/>	1-5 years <input type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work : Ancillary Replacement Estimated Cost: \$2,350							



Overall View.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.25 Truss - Truss

Element Group:	Truss				Length:	N/A	
Element Name:	Truss				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Steel				Count:	N/A	
Element Type:	Primary Element				Total Quantity:	45	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	tonnes	0	28.8	13.5	2.7	01	17
Comments:	The inspection of the bottom side was limited due to water level and watercraft inspection is recommended in order to properly evaluate the condition of the truss. The east bottom chord shows severe to very severe corrosion affecting the ends and end connections and sudden collapsing may occur as a result						
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input checked="" type="checkbox"/>		
Recommended Work :	Replacement				Estimated Cost: \$656,829		



East Side.



West Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.26 Truss - Top Chords

Element Group:	Truss				Length:	38	
Element Name:	Top Chords				Width:	0.51	
Location:	Single Element				Height:	0.4	
Material:	Steel				Count:	2	
Element Type:	Any				Total Quantity:	260	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	189.8	65	5.2	00	17
Comments: The top chords show light to medium corrosion and some isolated severe on the underside around connections.							
Urgency : None <input type="checkbox"/> 6-10 years <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



East Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.27 Truss - Bottom Chords

Element Group:	Truss				Length:	33.7	
Element Name:	Bottom Chords				Width:	0.35	
Location:	Single Element				Height:	0.35	
Material:	Steel				Count:	2	
Element Type:	Any				Total Quantity:	67.4	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	N/A	0	41.79	20.22	5.39	01	17
Comments: The inspection was limited to the ends of the bottom chords however the east cord shows very severe corrosion at both end and sudden collapsing may occur. An evaluation is required to determine the extent of strength reduction.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input checked="" type="checkbox"/>							
Recommended Work : See Primary Element							



East Side. Showing severe corrosion.



Northeast Side. Showing very severe corrosion.



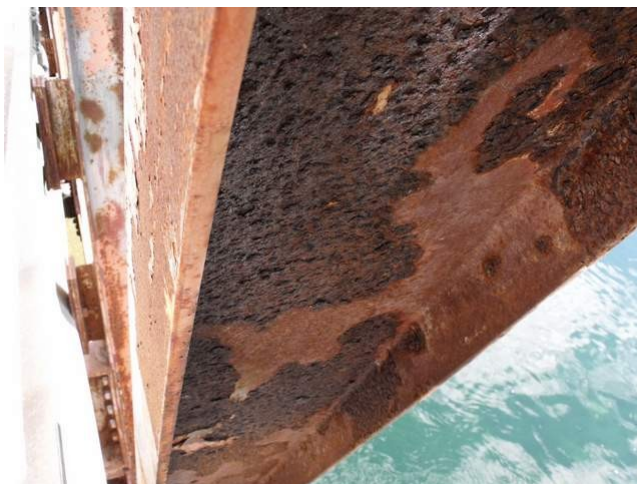
Southwest End. Showing very severe corrosion.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.28 Truss - Verticals

Element Group:	Truss				Length:	0.21	
Element Name:	Verticals				Width:	0.32	
Location:	Single Element				Height:	2.2	
Material:	Steel				Count:	12	
Element Type:	Any				Total Quantity:	39	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	23.01	13.65	2.34	00	17
Comments: There are areas showing medium and severe corrosion. The inspection of the bottom part was limited due to water level and position of the barrier.							
Urgency : None <input type="checkbox"/> 6-10 years <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



West Side. Showing isolated severe corrosion.



West Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.29 Truss - Diagonals

Element Group:	Truss				Length:	0.18	
Element Name:	Diagonals				Width:	0.31	
Location:	Single Element				Height:	3.6	
Material:	Steel				Count:	24	
Element Type:	Any				Total Quantity:	112.5	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	60.75	45	6.75	00	17
Comments: There are areas showing medium and severe corrosion. The inspection of the bottom part was limited due to water level and position of the barrier.							
Urgency : None <input type="checkbox"/> 6-10 years <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



West Side. Showing isolated severe corrosion.



West Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.30 Truss - Connections

Element Group:	Truss				Length:	N/A	
Element Name:	Connections				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	High Strength Steel				Count:	42	
Element Type:	Bolted				Total Quantity:	42	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	each	0	27.3	10.5	4.2	16	17
Comments: The connections of the bottom east cord at the ends show very severe corrosion and sudden failure may occur. An evaluation is required to determine the extent of strength reduction.							
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input checked="" type="checkbox"/>		
Recommended Work :	See Primary Element						



East End. Showing very severe corrosion.



East Side.



West Side. Showing severe corrosion.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.31 Floor Beams - Floor Beams

Element Group:	Floor Beams			Length:	8.64		
Element Name:	Floor Beams			Width:	0.3		
Location:	Single Element			Height:	0.85		
Material:	Steel			Count:	9		
Element Type:	Primary Element			Total Quantity:	246.5		
Environment:	Severe			Limited Inspection	<input checked="" type="checkbox"/>		
Protection System:	Corrosion Inhibitor					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	155.29	61.62	29.58	01	17
Comments:	The inspection of the floor beams was limited to the end ones due to water level however the ends and bottom flange of all floor beams are in poor condition showing severe corrosion. Watercraft inspection is recommended in order to have a proper evaluation.						
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input type="checkbox"/>	< 1 year <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work :	Ancillary Replacement			Estimated Cost: \$309,648			



Underside Surface. Showing very severe corrosion.



Underside View.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.32 Floor Beams - Intermediate Floor Beams

Element Group:	Floor Beams				Length:	8.64	
Element Name:	Intermediate Floor Beams				Width:	0.3	
Location:	Single Element				Height:	0.85	
Material:	Steel				Count:	7	
Element Type:	Any				Total Quantity:	175.5	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	129.87	26.32	19.3	01	17
Comments:	The inspection of the floor beams was limited to the end ones due to water level however the ends and bottom flange of all floor beams are in poor condition showing severe corrosion.						
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input type="checkbox"/>	< 1 year <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work :	See Primary Element						



Underside Surface. Showing severe corrosion.



West End. Showing severe corrosion.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.33 Floor Beams - Floor Beam Ends

Element Group:	Floor Beams				Length:	12.2	
Element Name:	Floor Beam Ends				Width:	0.3	
Location:	Single Element				Height:	0.85	
Material:	Steel				Count:	2	
Element Type:	Any				Total Quantity:	71	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	31.95	24.85	14.2	01	17
Comments: The end floor beams show s severe to very severe corrosion.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input checked="" type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



Northeast End. Showing very severe corrosion.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.34 Stringers - Stringers

Element Group:	Stringers				Length:	33.7	
Element Name:	Stringers				Width:	0.14	
Location:	Single Element				Height:	0.38	
Material:	Steel				Count:	7	
Element Type:	Primary Element				Total Quantity:	7	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	each	0	5.74	0.7	0.56	16	17
Comments:	The inspection was limited due to water level however stringers show some severe corrosion on the top flange and around connections. The 2 exterior ones show severe corrosion. Watercraft inspection is recommended in order to have a proper evaluation.						
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input checked="" type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work :	Ancillary Replacement				Estimated Cost: \$203,569		



Underside Surface. Showing condition.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.35 Stringers - Intermediate

Element Group:	Stringers				Length:	33.7	
Element Name:	Intermediate				Width:	0.14	
Location:	Single Element				Height:	0.38	
Material:	Steel				Count:	7	
Element Type:	Any				Total Quantity:	7	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	each	0	5.74	0.7	0.56	16	17
Comments:	The inspection was limited due to water level however stringers show some severe corrosion on the top flange and around connections. The 2 exterior ones show severe corrosion.						
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input checked="" type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work :	See Primary Element						



Underside Surface. Showing severe corrosion.



Underside Surface. Showing severe corrosion.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.36 Bracing - Bracing

Element Group:	Bracing				Length:	10.3	
Element Name:	Bracing				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Steel				Count:	12	
Element Type:	Primary Element				Total Quantity:	12	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	each	0	7.2	3.36	1.44	01	17
Comments:	The inspection was limited due to the water level however bracing shows severe corrosion at the ends and around connections. Watercraft inspection is recommended in order to have a proper evaluation.						
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input checked="" type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work :	Ancillary Replacement				Estimated Cost: \$17,303		



Underside Surface. Showing severe corrosion.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.37 Bracing - Intermediate Bracing

Element Group:	Bracing				Length:	10.3	
Element Name:	Intermediate Bracing				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Steel				Count:	12	
Element Type:	Any				Total Quantity:	12	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	each	0	7.2	3.36	1.44	01	17
Comments: The inspection was limited due to the water level however bracing shows severe corrosion at the ends and around connections. Watercraft inspection is recommended in order to have a proper evaluation.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



Underside Surface. Showing severe corrosion.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.38 North Abutment - Abutment

Element Group:	North Abutment				Length:	N/A	
Element Name:	Abutment				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Cast-In-Place Concrete				Count:	N/A	
Element Type:	Primary Element				Total Quantity:	115	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	tonnes	0	51.75	40.25	23	16	17
Comments:	The abutment is in partial poor condition. The width of the watercourse is wider than the length of the span and water flow encroaches against the abutments as a result. When replacing the structure a longer span should be considered.						
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input checked="" type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work :	Ancillary Replacement				Estimated Cost: \$282,616		



North Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.39 North Abutment - Abutment Wall

Element Group:	North Abutment			Length:	N/A		
Element Name:	Abutment Wall			Width:	12.2		
Location:	Single Element			Height:	1.6		
Material:	Cast-In-Place Concrete			Count:	1		
Element Type:	Any			Total Quantity:	19.1		
Environment:	Severe			Limited Inspection	<input type="checkbox"/>		
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	13.18	2.86	3.06	16	08
Comments:	The abutment wall is in partial poor condition showing severe disintegration.						
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input checked="" type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work :	See Primary Element						



Northeast Side. Showing severe deterioration.



Northwest Side. Showing severe deterioration.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.40 North Abutment - Bearings

Element Group:	North Abutment				Length:	N/A	
Element Name:	Bearings				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Any				Count:	2	
Element Type:	Plate				Total Quantity:	2	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	each	0	1.2	0.4	0.4	05	17
Comments: There is some medium to severe corrosion affecting bearings.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



North Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.41 North Abutment - Ballast Wall

Element Group:	North Abutment				Length:	N/A	
Element Name:	Ballast Wall				Width:	12.2	
Location:	Single Element				Height:	1.4	
Material:	Cast-In-Place Concrete				Count:	1	
Element Type:	Any				Total Quantity:	17.1	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	12.82	4.28	0	16	08
Comments: The inspection was limited.							
Urgency : None <input type="checkbox"/> 6-10 years <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



North Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.42 North Abutment - Bearing Seats

Element Group:	North Abutment				Length:	N/A	
Element Name:	Bearing Seats				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Cast-In-Place Concrete				Count:	N/A	
Element Type:	Ledge				Total Quantity:	2	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	count	0	1.02	0.48	0.5	16	08
Comments: Bearing seats are in poor condition and will eventually show loss of bearing section.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



Northeast Side. Showing severe deterioration.



Northwest Side. Showing severe deterioration.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.43 North Abutment - East Wing Wall

Element Group:	North Abutment			Length:	2.75		
Element Name:	East Wing Wall			Width:	N/A		
Location:	East			Height:	1.75		
Material:	Cast-In-Place Concrete			Count:	1		
Element Type:	Any			Total Quantity:	4.8		
Environment:	Severe			Limited Inspection	<input type="checkbox"/>		
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	2.54	1.1	1.15	16	08
Comments: The wing wall is in partial poor condition.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



Northeast Side. Showing severe deterioration.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.44 North Abutment - West Wing Wall

Element Group:	North Abutment				Length:	2.75	
Element Name:	West Wing Wall				Width:	N/A	
Location:	West				Height:	1.75	
Material:	Cast-In-Place Concrete				Count:	1	
Element Type:	Any				Total Quantity:	4.8	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	4.8	0	0	16	08
Comments: None							
Urgency : None <input type="checkbox"/> 6-10 years <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



Northwest .

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.45 South Abutment - Abutment

Element Group:	South Abutment			Length:	N/A		
Element Name:	Abutment			Width:	N/A		
Location:	Single Element			Height:	N/A		
Material:	Cast-In-Place Concrete			Count:	N/A		
Element Type:	Primary Element			Total Quantity:	115		
Environment:	Severe			Limited Inspection	<input type="checkbox"/>		
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	tonnes	0	77.05	24.15	13.8	16	17
Comments:	The abutment is in partial poor condition. The width of the watercourse is wider than the length of the span and water flow encroaches against the abutments as a result. When replacing the structure a longer span should be considered.						
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input type="checkbox"/>	< 1 year <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work :	Ancillary Replacement			Estimated Cost: \$282,616			



Overall View.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.46 South Abutment - Abutment Wall

Element Group:	South Abutment			Length:	N/A		
Element Name:	Abutment Wall			Width:	12.2		
Location:	Single Element			Height:	1.6		
Material:	Cast-In-Place Concrete			Count:	1		
Element Type:	Any			Total Quantity:	19.1		
Environment:	Severe			Limited Inspection	<input type="checkbox"/>		
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	14.71	2.86	1.53	16	08
Comments:	The abutment wall is in partial poor condition showing severe disintegration.						
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input checked="" type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work :	See Primary Element						



South Side. Showing condition.



Southwest Side. Showing severe deterioration.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.47 South Abutment - Bearings

Element Group:	South Abutment				Length:	N/A	
Element Name:	Bearings				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Any				Count:	2	
Element Type:	Plate				Total Quantity:	2	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	each	0	1.2	0.4	0.4	05	17
Comments: There is some medium to severe corrosion affecting bearings.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.48 South Abutment - Ballast Wall

Element Group:	South Abutment				Length:	N/A	
Element Name:	Ballast Wall				Width:	12.2	
Location:	Single Element				Height:	1.4	
Material:	Cast-In-Place Concrete				Count:	1	
Element Type:	Any				Total Quantity:	17.1	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	12.82	4.28	0	16	08
Comments: The inspection was limited.							
Urgency : None <input type="checkbox"/> 6-10 years <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



Southwest Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.49 South Abutment - Bearing Seats

Element Group:	South Abutment			Length:	N/A		
Element Name:	Bearing Seats			Width:	N/A		
Location:	Single Element			Height:	N/A		
Material:	Cast-In-Place Concrete			Count:	N/A		
Element Type:	Ledge			Total Quantity:	2		
Environment:	Severe			Limited Inspection	<input checked="" type="checkbox"/>		
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	count	0	0.6	0.7	0.7	01	08
Comments: Southw est bearing seat is in poor condition show ing loss of section.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input checked="" type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



Southwest Approach. Showing poor condition.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.50 South Abutment - East Wing Wall

Element Group:	South Abutment				Length:	2.75	
Element Name:	East Wing Wall				Width:	N/A	
Location:	East				Height:	1.75	
Material:	Cast-In-Place Concrete				Count:	1	
Element Type:	Any				Total Quantity:	4.8	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	4.8	0	0	00	00
Comments: None							
Urgency :	None <input type="checkbox"/>	6-10 years <input checked="" type="checkbox"/>	1-5 years <input type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work : See Primary Element							



Southeast Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.51 South Embankment - Embankment

Element Group:	South Embankment				Length:	N/A	
Element Name:	Embankment				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Gravel				Count:	1	
Element Type:	Primary Element				Total Quantity:	1	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	all	0	0	0.5	0.5	16	17
Comments: Embankment is in poor condition and may further affect the road system.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input checked="" type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : Ancillary Replacement Estimated Cost: \$4,847							



Southeast Side. Showing poor condition.



Southwest Side. Showing poor condition.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.52 North Embankment - Embankment

Element Group:	North Embankment				Length:	N/A	
Element Name:	Embankment				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Gravel				Count:	1	
Element Type:	Primary Element				Total Quantity:	1	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	all	0	0	0.5	0.5	16	17
Comments: Slope protection is in partial poor condition.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : Ancillary Replacement Estimated Cost: \$4,847							



Northwest Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.53 North Embankment - Slope Protection

Element Group:	North Embankment			Length:	N/A		
Element Name:	Slope Protection			Width:	N/A		
Location:	Single Element			Height:	N/A		
Material:	Paving Stones			Count:	2		
Element Type:	Any			Total Quantity:	2		
Environment:	Severe			Limited Inspection	<input type="checkbox"/>		
Protection System:	None					Performance Deficiencies	Maintenance Needs
Condition Data:	Units	Exc.	Good	Fair	Poor		
	all	0	0	1	1	16	13
Comments: Slope protection is in partial poor condition.							
Urgency : None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : See Primary Element							



Northeast Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.54 Foundation - Foundation

Element Group:	Foundation				Length:	N/A	
Element Name:	Foundation				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Steel Piles				Count:	2	
Element Type:	Primary Element				Total Quantity:	2	
Environment:	Severe				Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	each	0	2	0	0	00	00
Comments: None							
Urgency :	None <input type="checkbox"/>	6-10 years <input checked="" type="checkbox"/>	1-5 years <input type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input type="checkbox"/>		
Recommended Work : Reinstallation Estimated Cost: \$360,654							



West Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.55 Coating - Coating

Element Group:	Coating	Length:	N/A				
Element Name:	Coating	Width:	N/A				
Location:	Single Element	Height:	N/A				
Material:	C Other	Count:	N/A				
Element Type:	Primary Element	Total Quantity:	1040				
Environment:	Severe	Limited Inspection	<input checked="" type="checkbox"/>				
Protection System:	None	Performance Deficiencies	Maintenance Needs				
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	260	260	520	16	04
Comments: Coating is in poor condition.							
Urgency :	None <input type="checkbox"/>	6-10 years <input type="checkbox"/>	1-5 years <input type="checkbox"/>	< 1 year <input type="checkbox"/>	Urgent <input checked="" type="checkbox"/>		
Recommended Work :		Replacement Estimated Cost: \$2,673,125					



Underside View.



West Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.56 Watercourse - Watercourse

Element Group:	Watercourse				Length:	N/A	
Element Name:	Watercourse				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Any				Count:	1	
Element Type:	Straight				Total Quantity:	1	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	all	0	0.75	0.25	0	16	17
Comments: The width of the watercourse is wider than the length of the span and water flow encroaches against the abutments as a result. When replacing the structure a longer span should be considered.							
Urgency : None <input type="checkbox"/> 6-10 years <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : Defer to Element Level							



West Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.57 Watercourse - Bottom

Element Group:	Watercourse				Length:	N/A	
Element Name:	Bottom				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Soil				Count:	N/A	
Element Type:	Natural				Total Quantity:	292	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	292	0	0	00	00
Comments: None							
Urgency : None <input checked="" type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : None							



Overall View.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.58 Watercourse - Upstream Section

Element Group:	Watercourse				Length:	N/A	
Element Name:	Upstream Section				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Soil				Count:	N/A	
Element Type:	Uncontrolled				Total Quantity:	146	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	146	0	0	00	00
Comments: None							
Urgency : None <input checked="" type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : None							



East Side.

4. OSIM Reporting (Cont.)

4.7 Element Data (cont.)

4.7.59 Watercourse - Downstream Section

Element Group:	Watercourse				Length:	N/A	
Element Name:	Downstream Section				Width:	N/A	
Location:	Single Element				Height:	N/A	
Material:	Soil				Count:	N/A	
Element Type:	Uncontrolled				Total Quantity:	146	
Environment:	Severe				Limited Inspection	<input type="checkbox"/>	
Protection System:	None				Performance Deficiencies	Maintenance Needs	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m2	0	146	0	0	00	00
Comments: None							
Urgency : None <input checked="" type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> < 1 year <input type="checkbox"/> Urgent <input type="checkbox"/>							
Recommended Work : None							



West Side.

5. Glossary

Abutment

A substructure unit which supports the end of the structure and retains the approach fill.

Asset

A collection of Components that are most economically and/or practically replaced, rehabilitated or maintained together under a single contract or initiative. The timing of such an initiative is weighed against the timing of treating other Assets.

Asset Value Contribution

The portion of the total replacement value attributable to a particular component.

Auxiliary Components

Any component which does not share in the load carrying capacity of the structure.

Benign

Not exposed. e.g. girders, pier caps (unless joints are leaking)

Bridge

A structure which provides a roadway or walkway for the passage of vehicles across an obstruction, gap or facility and which is greater than 3 m in span.

Chord

The upper and lower main longitudinal component in trusses or arches extending the full length of the structure.

Coating

The generic term for paint, lacquer, enamel, sealers, galvanizing, metallizing, etc.

Component

A major feature of an Asset that performs a particular function. Often in multiple occurrences.

Condition Index

See Net Asset Salvage Value (NASV).

Critical Quantity

The single quantity that defines the Element for costing purposes.

Culvert

Any bridge that is embedded in fill and is used to convey water, pedestrians or animals through it.

Deck Condition Survey

A detailed inspection of a concrete deck in accordance with The Structure Rehabilitation Manual.

Defect

An identifiable, unwanted condition that was not part of the original intent of design.

5. Glossary (cont.)

Detailed Visual Inspection

An element by element visual assessment of material defects, performance deficiencies and maintenance needs of a structure.

Deterioration

A defect that has occurred over a period of time.

Diagonals

Component which spans between the top and bottom chord of a truss or arch in a diagonal direction.

Distress

A defect produced by loading.

Element

A feature of a Component distinguished in terms of condition, material, base of measurement or unit cost of repair.

Engineer

A member or licensee of the Professional Engineers of Ontario.

Environment

An element's exposure to chloride contamination and freeze-thaw cycling

Estimated Remaining Service Life

The Remaining Service Life (RSL) is an estimate, in years, over which an element may remain in service without repair or replacement. It is assumed that the conditions to which the element has been exposed will not change significantly and is based solely on visual observation.

Estimated Remaining Service Life (ERSL)

This is an estimate, in years, as to how long an element can be expected to continue to perform satisfactorily without the predominant deficiency being addressed. In the case of a Primary Element, it is the time remaining before the element must be addressed at a Primary Element Level if nothing is done. It is based on judgment and experience and is tempered by the need to control liability of our clients. In cases where no physical testing results are available, ERSLS will tend to be more conservative. The ESSL assigned to a component represents the minimum ESSL assigned to any element comprising that component.

Evaluation

The determination of the load carrying capacity of structures in accordance with the requirements of the Ontario Highway Bridge Design Code or the Canadian Highway Bridge Design Code, when implemented.

Floor Beam

Transverse beams that span between trusses, arches or girders and transmit loads from the deck and stringers to the trusses, arches or girders.

5. Glossary (cont.)

Focus

At the element level, focus refers to the portion of the element in question. In most cases the focus is simply stated as "All" or, in other words, the entire element is being reported on under one designation. As elements deteriorate over time it is often desirable to differentiate between areas that are deteriorating more rapidly or differently. In other cases, elements are comprised of different materials and would be repaired differently as a result. These too should be separated and referred to by their focus. The focus of a primary element is always set to "All".

Highway

A common and public thoroughfare including street, avenue, parkway, driveway, square, place, bridge, designed and intended for, or used by, the general public for passage of vehicles, pedestrians or animals.

Lateral Bracing

Bracing which lies in the plane of the top or bottom chords or flanges and provides lateral stability and resistance to wind loads.

Maintenance

Any action which is aimed at preventing the development of defects or preventing deterioration of a structure or its components.

Masonry

Structure made up of natural stones separated by mortar joints, usually in uniform courses. Masonry in existing structures is usually in retaining walls, abutments, piers or arches.

Masonry Ashlar

Stone worked to a square shape or cut square with uniform coursing height and vertical joints staggered. The stone has a minimum course height of 200 mm set in joints with an average thickness of 10 mm or less.

Masonry Rubble

Stone masonry constructed with rough field stones or only roughly squared stones set in mortar joints with average thickness greater than 20 mm. Also any squared stone masonry in which the joints are greater than 20 mm, but less than 30 mm in thickness.

Masonry Squared Stone

Stone in natural bed thicknesses or roughly squared stones with course height less than 200 mm and joints greater than 10mm but not over 20mm.

Moderate

Exposed but element protected e.g. asphalt covered and waterproofed deck

5. Glossary (cont.)

Net Asset Salvage Value (NASV)

The current NASV of an asset is equal to its original dollar value minus the estimated cost of rehabilitating the asset back to its original condition. NASV changes continually with time, diminishing in step with the continued deterioration of the asset. It is important to recognize that whether a component such as a bridge deck is replaced or fully repaired it will still be reset to its full Asset Value Contribution. Recognition of the difference in longevity of the two strategies will be revealed by the subsequent behaviour of the post-rehabilitation performance curve. Expressed as a percentage it forms the rationale for the overall Condition Index of the asset.

Owner

An agency having jurisdiction and control over the bridge.

Performance Curve

A plot of Condition Index over time. The vertical scale represents Condition Index from 0 to 100, the horizontal scale represents time in years. The plot will reflect the Condition Index of the Asset since original construction to the present and from the present to the end of the analysis period. The impact of rehabilitative work (already carried out since construction as well as that planned for the future) will be reflected in the curve as will the anticipated subsequent performance of that Rehabilitation.

Person

An individual, board, commission, partnership or corporation, including a municipal corporation, and employees, agents, successors and assigns of any of them.

Plans

All drawings, descriptions and specifications, being parts of the contract, and all drawings and descriptions produced by the constructor for the erection of a bridge or structure, and all revisions thereto.

Portal Bracing

Overhead bracing at the ends of a through truss or arch and provides lateral stability and shear transfer between trusses.

Primary Components

The main load carrying components of the structure.

Primary Element

The elemental equivalent of the component it comprises. For example, an Abutment consists of the elements, Wngwalls, Abutment Wall, Ballast Wall, Bearings. It also has an element called "Abutment". This element is needed so that costing (which is carried out at the element level) can account for replacement of the entire component. This element is referred to as the Primary Element.

Rehabilitation

Any modification, alteration, retrofitting or improvement to a structure sub-system or to the structure which is aimed at correcting existing defects or deficiencies. May involve repair of existing elements or complete replacement.

5. Glossary (cont.)

Repair

Any modification, alteration, retrofitting or improvement to a component of the structure which is aimed at correcting existing defects or deficiencies.

Replacement Cost

Replacement Cost is the expenditure required to build, on a new site, or replace at an existing site, a bridge that meets all present and projected requirements of the site, community and current codes.

Replacement Value

Traditionally, Replacement Value refers to the cost in today's dollars for the identical replacement of an existing bridge. In other words, it is the value of the existing installation.

Retaining Wall

Any structure that holds back fill and is not connected to a bridge.

Secondary Components

Any component which helps to distribute loads to primary components, or carries wind loads, or stabilizes primary components.

Severe

Exposed and element not protected e.g. Exposed concrete deck, Barrier Wall

Sign Support

A metal, concrete or timber structure, including supporting brackets, service walks and mechanical devices where present, which support a luminaire, sign or traffic signal and which span or extend over a highway.

Span

The horizontal distance between adjacent supports of the superstructure of a bridge, or the longest horizontal dimension of the cross-section of a culvert or tunnel taken perpendicular to the walls.

Stringers

Stringers span between floor beams and provide the support for the deck above.

Structure

Bridge, culvert, tunnel, retaining wall or sign support.

Suspected Performance Deficiency

A Suspected Performance Deficiency should be recorded during an inspection, if an element's ability to perform its intended function is in question, and one or more performance defects exist.

Sway Bracing

Vertical bracing spanning between through trusses or arches, or outside of half-through trusses or arches and providing lateral stability and shear transfer between the trusses or arches.

5. Glossary (cont.)

Tunnel

Any bridge that is constructed through existing ground, and is used to convey highway or railway traffic through it.

Utility

Refers to a local utility such as hydro, gas, telephone etc. not part of the structure itself but rather utilizing it to provide passage. Typically carried between girders or hanging from the underside of the deck. Of significance only because the integrity of its connection to the structure impacts public safety.

Verticals

Components which span between the top and bottom chords of a truss or arch in the vertical direction.

Whisker Graphs

Simple frequency distribution charts that are intended, at a glance, to convey a comparative reference. They are shown on the Structure Summary to give the reader an immediate sense of how the bridge compares to the rest of the network based on various criteria.

Appendix B
Heritage Impact Assessment Report



**Report on the 2009 Cultural Heritage Evaluation of Hart Bridge Replacement
over the Black River, Township of Ramara, County of Simcoe**

Submitted to

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&

The Ontario Ministry of Culture

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Corporate Project # 29380-P

August 2009

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Project Personnel

Heritage Consultant	Michael Henry
Report Preparation	Teresa Wagner Michael Henry
Draughting	Phil Rice
Photography	Teresa Wagner

Executive Summary

This report describes the results of the 2009 Cultural Heritage Evaluation and Heritage Impact Study of Hart Bridge located on Rama Road approximately 0.6 km south of County Road 169 and 1.3 km east of Highway 11 over the Black River, Township of Ramara, County of Simcoe conducted by AMICK Consultants, Limited. This investigation was undertaken as part of an Environmental Assessment process with respect to proposed improvements along the road allowance of Rama Road, Township of Ramara, County of Simcoe. All work was conducted in conformity with the Ontario Heritage Act (RSO 2005). In addition, the Ontario Heritage Bridge Guidelines for Provincially Owned Bridges (MTO 2008), the Ontario Heritage Bridge Program (MCL 1991), and Ontario Regulation 9/06, "*Criteria for Determining Cultural Heritage Value or Interest*", under the Ontario Heritage Act (RSO 2005) were employed as guides to the conduct and findings of this research.

Hart Bridge is over 40 years old and the Ontario Ministry of Tourism and Culture (MTC) considers that Hart Bridge may have cultural heritage value given its style of construction. Therefore, a heritage impact assessment report, prepared by a qualified heritage consultant, is required for this project. This report has been prepared to address this requirement. The proponent is advised that they should file this report with the MCL for the purpose of review by MCL Heritage Planning Staff. AMICK Consultants Limited was engaged by the proponent to undertake this study on June 11, 2009.

As a result of this study, it has been determined that the existing Hart Bridge crossing the Black River at Rama Road is likely not a provincially significant heritage feature based on the evaluation criteria of both the OHBP and the OHBG and in consideration of O. Reg. 9/06 under the Ontario Heritage Act (RSO 2005). However, although this structure is not considered to be significant according to the criteria set forth in the OHBP or the OHGB, it is nonetheless a heritage feature which is a non-renewable and irreplaceable historic structure. It is understood that the proponent intends to salvage the truss elements of the existing bridge to incorporate into the new crossing as non-load carrying elements. This would preserve the heritage appearance

of the crossing and a significant portion of the visible elements of the original structure. It is also understood that the original construction plaque will remain affixed to the original structure components and that a second plaque be affixed to the superstructure, which details the date and the improvements made to this crossing.

1.0 INTRODUCTION

This report describes the results of the 2009 Cultural Heritage Evaluation and Heritage Impact Study of Hart Bridge located on Rama Road approximately 0.6 km south of County Road 169 and 1.3 km east of Highway 11 over the Black River, Township of Ramara, County of Simcoe conducted by AMICK Consultants, Limited. This investigation was undertaken as part of an Environmental Assessment process with respect to proposed improvements along the road allowance of Rama Road, Township of Ramara, County of Simcoe. All work was conducted in conformity with the Ontario Heritage Act (RSO 2005). In addition, the Ontario Heritage Bridge Guidelines for Provincially Owned Bridges (MTO 2008), the Ontario Heritage Bridge Program (MCL 1991), and Ontario Regulation 9/06, "*Criteria for Determining Cultural Heritage Value or Interest*", under the Ontario Heritage Act (RSO 2005) were employed as guides to the conduct and findings of this research.

Simcoe County Road 44 has been under multi-phase construction since 2008.

This construction program was the result of a previous Class environmental assessment for the road from Langford Mills to Highway 169. The environmental assessment was completed in 2005. At the time of the original environmental assessment, there were no plans to do any work at the Hart Bridge.

However, since that time, the condition of the bridge has deteriorated significantly and, as a result, required emergency repairs in 2010 in order to remain open.

The county has therefore determined that improvements at the site must be considered. The options considered included rehabilitating the existing bridge or replacing the existing bridge while incorporating elements of the existing structure into the new design.

At present, the preferred option is to retain the original trusses and incorporate them into the new design.

AMICK Consultants Limited was engaged by the proponent to undertake this study on June 11, 2009. All records, documentation, field notes, and photographs related to the conduct and findings of these investigations are held at the Lakelands District corporate offices of AMICK Consultants Limited until such time that they can be transferred to an agency or institution approved by the Ministry of Culture on behalf of the government and citizens of Ontario.

2.0 LOCATION AND DESCRIPTION

This report describes the results of the 2009 Cultural Heritage Evaluation and Heritage Impact Study of Hart Bridge located on Rama Road approximately 0.6 km south of County Road 169 and 1.3 km east of Highway 11 over the Black River, Township of Ramara, County of Simcoe.

The existing bridge is a single span riveted steel pony truss structure which carries Rama Road over the Black River. The existing structure is not listed on the Ontario Heritage Bridge List nor has it been designated under the Ontario Heritage Act.

The structure has been identified as being deficient with respect to overall geometry, physical condition, and roadside safety. Hart Bridge is a two-lane, riveted steel pony truss structure on conventional closed abutments. The structure was constructed between 1955 and 1957 and has an overall length of 31.4 m. The travel width is 7.8 m between barriers and the overall structure width is 9.0 m. The steel structural trusses that carry the live and dead loads on the structure also form the side walls of the bridge. This configuration classifies the structure as a single load path meaning that if the trusses were significantly damaged, it could result in total bridge failure. Single load path structures are not encouraged in Ontario for this reason. The structure platform width does not meet the recommended criteria for lane width and side clearance as dictated by Table D7-1 of the Geometric Design Guidelines for Ontario Highways.

Ongoing deterioration of the existing structure is expected to require continued and increasing levels of maintenance.

3.0 Cultural Heritage Evaluation

Hart Bridge meets the Ministry of Tourism and Culture (MTC) Heritage Landscape Checklist (see Appendix 2) criteria to mandate a heritage impact assessment (i.e. over 40 years old). In accordance with O. Reg. 9/06 under the Ontario Heritage Act (RSO 2005), MTC considers that the Hart Bridge may have cultural heritage value given its characteristics. Therefore, a heritage impact assessment report prepared by a qualified heritage consultant **is required** for this project. This report has been prepared to address this requirement. The proponent is advised that they should file this report with the MTC for the purpose of review by MTC Heritage Planning Staff.

In evaluating Hart Bridge, the Ontario Heritage Bridge Guidelines for Provincially Owned Bridges (OHGB) published by the Ontario Ministry of Transportation (MTO 2008) and the Ontario Heritage Bridge Program published by the Ontario Ministry of Culture and Communications (MCC 1991), now the Ministry of Tourism and Culture (MTC) have both been used. Section 3.3 of this report considers Hart Bridge under the evaluation criteria set forth in the OHGB (MTO 2008) and Section 3.4 considers Hart Bridge under the evaluation criteria set forth in the OHBP (MCC 1991). The evaluation criteria differ markedly between these two documents. Both documents were prepared in a collaborative project undertaken by

MTO and MCL staff. While the more recent document states that it supersedes the earlier OHBP (MTO 2008: 5), it is also designed for provincially owned bridges. It is our understanding that a separate OHBG is under development for municipally owned bridges. In the interim, we have been advised by MTC that bridges not owned by the province are to be evaluated in accordance with the OHBP (MCC 1991). This results in inconsistent evaluation criteria that should be measuring heritage features in accordance with the inherent merits of any structure under consideration, not according to ownership. We have evaluated Hart Bridge under both regimes, which in this particular case have produced consistent results.

Subsequent to filing of the original version of this report, we were advised by MTC that we should evaluate the Hart Bridge in accordance with O. Reg 9/06. While O. Reg. 9/06 under the Heritage Act (RSO 2005) does define in broad terms what constitutes potentially significant heritage attributes, it does not provide any direction on the conduct of assessment of heritage resources in general, or of bridges in particular. Without using either the OHGB or OHBP, there is no meaningful set of objective criteria that can be applied

Overview of Ontario Bridge Construction History

The history of settlement in Ontario is inextricably tied to the history or the development of overland transportation. As David Cuming notes in his *Discovering Heritage Bridges on Ontario Roads* (n.d.: 31), "Ontario with its myriad of rivers, creeks, streams and lakes has resulted in a substantial number of minor barriers to communication". As a result, bridges have always formed a significant component of overland transportation and communication routes. The first major roads in Ontario followed settlement by the United Empire Loyalists after the American War of Independence. These early roads were built for strategic military purposes but soon attracted settlement along these routes. Subsequent road construction, whether built by government agencies or private concerns also served to attract settlement and initial settlement promoted construction of further roadways as settlement moved inland from the Great lakes and the initial transportation corridors (Cuming n.d.: 32).

Bridges were a necessity from the earliest days of road construction. The earliest bridges consisted of nothing more than two parallel logs stretching from one bank to the other with logs overlying these at a right angle. These bridges could be easily and quickly replaced as they rotted or should they be swept away by flood waters or ice flows (Cuming n.d.: 32). Bridges needed to cover larger spans were constructed by early settlers based on principles employed in the construction of early houses and barns. Truss systems used in the framing of structures were employed. Two such standard bridge types emerged fairly early on: The King Truss Bridge and the Queen Truss Bridge. The King Truss was built by setting a vertical beam supported by two inclined beams midway along a horizontal beam. The King Truss Bridge could span a gap of up to sixty (60) feet. The Queen truss system was employed for wider spans. This bridge was constructed with two vertical beams supported by one inclined beam

for each and joined by a horizontal top beam. The Queen Truss Bridge could span a gap of up to one hundred and twenty (120) feet (Cuming n.d.: 35).

In the years between 1841 and 1849, the Department of Public Works spent \$1,300,564 on roads in Canada West, including the construction of forty-three major bridges at a total cost of \$206, 928. A full third of these bridges were timber-built Queen Truss bridges. During this same period numerous bridge designs were patented in the United States under fierce competition to increase the length and strength of bridges. As a result, bridge construction in North America began a period of transition from wood to metal structures (Cuming n.d.: 36).

Many road bridge designs that evolved were based on principles derived from railroad construction. Other designs that had a major impact on bridge engineering evolved independently. The Whipple Truss was first built in 1841. This new design consisted of a totally metal bowstring arch bridge. The arch of the bridge and the vertical supporting members were manufactured of cast iron while the diagonal bracing used wrought iron. The typical bridge built in the middle of the 19th century in the United States was entirely made of wrought iron (Cuming n.d.: 37). In Ontario the timber bridge dominated the landscape in rural areas from 1780-1880 and persisted into the early twentieth century. Wrought iron bridges were built in areas with higher population densities such as the thriving market towns of Brantford, Peterborough, London and Paris. These communities all had wrought iron bridges that were constructed during the 1870s (Cuming n.d.: 38).

Metal bridges were sold in separate components produced in factories and shipped to the location of construction and assembled on site. Bridge components were ordered through catalogues. To simplify construction, the first metal bridges were assembled using “pin connections”, which were essentially threaded bolts that obviated the need for specialists or specialized equipment such as rivets required. Construction of such bridges could be completed with unskilled local labour in two to three weeks. These bridges were ideally suited to bridge construction in small communities or rural contexts (Cuming n.d.: 38).

Beginning in the 1880s designers began to replace wrought iron elements in bridges with steel. This marked the beginning of a transition from wrought iron to steel bridges (Cuming n.d.: 41). Several factors contributed to the rapid development and proliferation of steel bridges at the beginning of the twentieth century. Portable pneumatic tools allowed for the use of rivets on even rural sites of bridge construction and pin connections rapidly disappeared. Rivets allowed for longer and sturdier construction. New production methods made steel as cheap as wrought iron. The concurrent developments in heavier vehicle and agricultural machinery required bridges capable of taking heavier loads which made construction of timber bridges impractical even in rural areas. “Through truss” style construction was employed over larger spans or in locations where traffic loads were heavy. Steel bridges were erected in quantity throughout Ontario following 1900 (Cuming n.d.: 42). The improvement in highway and bridge construction was particularly notable following the end of the First World

War with massive increases in automobile traffic and the development of heavy construction machinery. (Cuming n.d.: 51-53).

Experimentation with reinforced concrete bridge construction began in the 1880s in France followed by the United States. The first concrete arch bridge was constructed in Ontario in 1905 and was comprised of mass concrete. The first steel reinforced bridge was constructed in 1906. The appeal of reinforced concrete as a construction technology stemmed from its great strength, length of use and low maintenance requirements compared to steel or iron which required regular painting and rust removal (Cuming n.d.: 44). The strength of a reinforced tied concrete arch above the deck was early recognized as a design suitable for almost any location, particularly in crossings with low banks where arched construction below the deck was unsuitable (Cuming n.d.: 47). By 1914 it was clear that concrete would dominate the construction of bridges for the foreseeable future (Cuming n.d.: 49). Concrete bridge construction of two types, the tied arch and the concrete beam, boomed in the 1920s (Cuming n.d.: 51).

Beginning in the 1930s a new innovation in bridge design challenged more traditional arched designs. The rigid frame reinforced concrete bridge employed a shallow arch below the deck and could be easily widened to accommodate demands of growing traffic pressures. This was a major advantage over earlier bridge designs such as the tied arch for which such an alteration was impossible (Cuming n.d.: 52).

Hart Bridge appears to date to the middle of the twentieth century. This bridge rests on poured reinforced concrete abutments. The fact that the bridge is riveted likewise points to this period. The rural context suggests that the erection of this steel bridge was likely in response to the need for a relatively inexpensive structure to span a relatively wide channel and to carry increasingly heavier loads due to the rise in popularity of automobile transportation and mechanical farm implements. Hart Bridge also has a plaque mounted at the centre of the superstructure on the east side which indicates that this bridge was erected between 1955 and 1957 by the County of Ontario.

3.2 Heritage Legislative Requirements

Within the Province of Ontario there are a number of legislative requirements which necessitate the consideration of potential heritage features during the planning process.

1. The provincial interest in cultural heritage and the conservation of heritage resources is articulated in the Ontario Heritage Act (RSO 2005). This legislation provides the legislative framework for the conservation of Ontario's heritage. The Ontario Heritage Act is administered by the Ontario Ministry of Culture.
2. Heritage resource conservation is also identified as a provincial interest within the Provincial Policy Statement (2007)

3. Heritage resource conservation is also identified as a provincial interest within the Planning Act (RSO 1990a)
4. Heritage resource conservation is also identified as a provincial interest within the Environmental Assessment Act (RSO 1990b). This legislation considers cultural and built components to be integral elements of the environment. The impact of proposed undertakings to cultural heritage resources must be addressed as part of the standard environmental assessment process in the Province of Ontario.
5. The Public Transportation and Highway Improvement Act (RSO 1990c) and Ontario Regulation 104/97 addresses the design, construction and maintenance of bridges.

In partnership with other provinces, territories and the federal government, Ontario is also a participant in the Historic Places Initiative which is a national program to encourage heritage conservation across Canada.

3.3 Ontario Heritage Bridge Guidelines Evaluation Criteria

In evaluating Hart Bridge, the Ontario Heritage Bridge Guidelines for Provincially Owned Bridges (OHGB) published by the Ontario Ministry of Transportation (MTO 2008) and the Ontario Heritage Bridge Program published by the Ontario Ministry of Culture and Communications (MCC 1991) have both been used. The purpose of the OHBG is articulated on Page 5 of the document as follows:

1. *Establishing a process for their identification, evaluation and listing at an early stage of the planning process,*
2. *Identifying conservation options to be considered when planning for any rehabilitation, widening or replacement that may be required,*
3. *Identifying the methods and principles for defining heritage values and assessing project alternatives in the Environmental Assessment Process, and*
4. *Ensuring the management of heritage bridges conforms to the provisions of the Ontario Heritage Act (OHA), the Environmental Assessment Act and its regulations, as well as Ontario Regulation 104/97.*

Within the Introduction to the MTO OHBG the rationale for the protection and preservation of heritage bridges is described as follows:

“Bridges are an important part of our engineering and architectural heritage. Perhaps more than any other type of structure built by man, they exhibit major historical change and innovation in the development and use of materials, in design, and in construction methods. They can be viewed as important elements and make a positive contribution to their surroundings. In some cases, they are rare survivors of an important bridge type or are revered because of their age, historical associations or other publicly perceived values.” (MTO 2008: 5-6)

In addition to the above, we would add that apart from a visible monument to the past, bridges have an important additional distinction. As part of historic overland transportation routes, bridges represent substantial evidence that is clearly historic in its character. Many roadways, although following historic routes, do not preserve evidence of this fact in and of themselves. The surrounding landscapes provide the visual cues to this heritage in the form of old tree rows, fence lines, heritage farm complexes, and old houses. Bridges stand in a distinct class from most heritage landscape features as elements that invite the public to participate in that history. Driving, cycling or walking across a heritage bridge evokes the past by sharing the same structure enabling the passage over physical obstacles that was employed by our predecessors. Bridges with evidently old superstructure above the deck are particularly evocative of the past to users travelling over a bridge. It is known that people often choose indirect routes of travel to enjoy the experience of travelling over old bridges, particularly in areas where there are clusters of surviving bridges seen to be of a historic character or quality. With this consideration in mind, the preservation of heritage bridges function as an attraction which serves to divert traffic and reduce loads on more commonly travelled routes by providing travellers with route selection criteria appealing to diverse interests.

The complete Ministry of Transportation (MTO) OHBG Evaluation Criteria chart is included within this report as Appendix 1. The MTO OHBG Evaluation Criteria are designed to evaluate the structure with particular reference to provincial significance as it is designed to be employed in consideration of provincially owned bridges. Bridges which score an aggregate of 60 points or more are eligible to be included within the Ontario Heritage Bridge List. However, it must be borne in mind that although any given bridge may not score high enough to be considered for eligibility on the Ontario Heritage Bridge List, the bridge may yet be of great significance within a particular region or to a local community. With this caveat in mind, Table 1 below presents the criteria and scoring of Hart Bridge under the MTO OHBG.

Table 1 MTO OHBG Evaluation Criteria and Scoring Hart Bridge

Criteria	Details	Score	Comments
Design/Physical Value			
Functional Design	Common	0 /20	Steel truss bridges were once common features of rural Ontario but, highly susceptible to corrosion. There are some within the immediately surrounding Townships, and many more within Simcoe County.
Visual Appeal	Good	12/20	<i>The bridge is well proportioned and has retained its original elements</i>
Materials	Very Good	8/10	The riveted construction method employed on this bridge is relatively rare within a rural context.
Contextual Value			
Landmark	Fair	3/15	<i>This bridge is situated along a major local transportation route, the bridge is a familiar form in the area, and is associated with two other possible heritage bridges in the area</i>
Character	Good	6/10	This rural bridge form was once typical of Ontario's agricultural community
Historic/Associative Value			
Designer/Construction Firm	Good	9/15	<i>The Ontario Department of Highways is a well known builder of a large number of steel truss bridges throughout Ontario</i>
Associative	Good	6/10	The bridge is emblematic of a rural community roadway in the mid-20 th century. It also marks the growing affluence of the area following initial settlement and the advent of automobile travel.

TOTAL SCORE 44/100

Discussion

The scoring is divided into three sections: Design/Physical Value; Contextual Value; and Historic/Associative Value. To achieve a minimum score of 60, a bridge under evaluation will have to score points within all three categories. A bridge with a score over 60 points is considered to be a significant cultural heritage resource and worthy of inclusion within the Ontario Heritage Bridge List. In order to appreciate the scoring system and the results obtained for Hart Bridge, readers should refer to Appendix 1.

The score of Hart Bridge according to the MTO OHBG Criteria as of the date of compiling this report is 44 points which is 16 points below the minimum score for recommendation to be added to the Ontario Heritage Bridge List. Accordingly, this bridge is not considered to merit inclusion within the Ontario Heritage Bridge List **based on evaluation criteria employed for provincially owned bridges**. Currently, the Ministry of Tourism and Culture (MTC) is developing Ontario Heritage Bridge Guidelines for Municipally owned bridges. The criteria and scoring developed to evaluate bridges on a provincial scale does not mean that a specific bridge is not a significant local feature.

3.4 Ontario Heritage Bridge Program Evaluation Criteria

Prior to the development of the above evaluation method designed specifically for provincially owned bridges, the Ontario Ministry of Culture and Communications (now the Ministry of Culture-MCL) published the Ontario Heritage Bridge Program (OHBP) in 1991. Presently, the Ministry of Culture is working to develop guidelines tailored to municipally owned bridges. The Ministry of Culture recommends that the OHBP criteria be used in the interim to evaluate municipal structures. This has resulted in an inconsistent evaluation and review process determined by ownership and not by the heritage attributes of any structure under consideration.

In evaluating Hart Bridge, the Ontario Heritage Bridge Program (OHBP) published by the Ontario Ministry of Culture (MCL 1991) has been used as a supplementary evaluation to augment and balance the evaluation conducted using the OHBG. The principles of the OHBP are articulated on Page 2 of the document as follows:

“One of the objectives of the Heritage Bridge Program is to make carefully considered and consistent decisions in allocating scarce funds for the conservation of heritage road bridges. The Ministry of Transportation and the Ministry of Culture and Communications have sought to avoid an ad hoc approach to conservation funding by identifying heritage road bridges in a systematic and comprehensive fashion, in advance of proposed undertakings which may affect a road bridge.” (MCL 1991: 2)

On page 3 of the OHBP the evaluation of potential heritage bridges is discussed:

“Evaluation of any physical object, policy or plan is an objective exercise that determines quality. It is an accepted idea in most areas of sound planning and decision making. The examination of road bridges from a heritage perspective is no different than in principle from evaluating not only other heritage structures but also other physical objects.

“A prerequisite for determining quality, and subsequent comparison with other like objects being evaluated, is establishing standards of measurement-criteria.” (MCL 1991: 2)

The evaluation criteria and scoring rationale of the OHBP are reproduced as Appendix 2 of this report. Although the basis of determining scores under various criteria are established, the OHBP provides no direction as to what the requisite aggregate score might be to determine if any bridge under review is deemed to have heritage significance and/or interest.

Table 2 MCL OHBP Evaluation Criteria and Scoring Hart Bridge

Criteria	Score	Comments
A. Documentation		
1. <i>Builder</i>	4/6	<i>The Ontario Department of Highways is a well known builder of a large number of steel truss bridges throughout Ontario</i>
2. <i>Age</i>	0/14	The bridge was first built in 1955
B. Technology		
3. <i>Material</i>	0/4	Steel
4. <i>Design/Style</i>	0/16	Steel truss construction was once the most common built form. Although many have been replaced there are many examples still in use.
5. <i>Prototype</i>	0/10	This bridge is a typical steel truss bridge built near the end of its period of dominance.
6. <i>Structural Integrity</i>	10/10	This bridge consists entirely of as-built original components and material apart from the deck surface pavement.
C. Bridge Aesthetics & Environment		
7. <i>Visual Appeal</i>	10/12	The steel through truss design has widespread appeal as a clean, graceful and elegant design without ostentatious ornamentation.
8. <i>Integrity</i>	4/4	This bridge is situated in its original location
9. <i>Landmark</i>	0/6	Public consultation resulted in one person suggesting preservation. This suggests there is not much public concern for the bridge or community identity with it.
10. <i>Gateway</i>	4/4	This bridge does not demarcate the limits of a geographic space but it is situated on a major local route of travel
11. <i>Character Contribution</i>	4/4	A bridge of clear historical antiquity and in close proximity to two other possible heritage bridges serves to enhance the rural heritage of the locality.
D. Historical		
12. <i>Historical Association</i>	10/10	This bridge is associated with influential builders and with a traditional river crossing point.

TOTAL SCORE 46/100

Discussion

The scoring is divided into four sections: “Documentation”, “Technology”, “Bridge Aesthetics & Environment”, and “Historical”. The OHBP does not specify a general score that a bridge under consideration must achieve. When the Heritage Bridge List was initially compiled agreement on the score that a bridge was to achieve was reached following evaluation. This would seem to suggest that although objective criteria were created for the evaluation of bridges, the interpretation of scores was not generally applied, but was considered on a case-by-case or ad hoc basis. For the purposes of the present study, we assume that as the potential score has remained the same, with some modifications in the criteria and relative weighting of those criteria, bridges that score an aggregate of 60 points or more using the OHBP would be considered to merit inclusion on the Heritage Bridge List.

The score of Hart Bridge according to the MCL OHBP Criteria as of the date of compiling this report is 42 which is 18 points below the minimum score for recommendation to be added to the Ontario Heritage Bridge List. Accordingly, this bridge is not considered to merit inclusion within the Ontario Heritage Bridge List.

4.0 HERITAGE IMPACT ASSESSMENT

The evaluation of Hart Bridge employing two separate evaluation criteria currently in wide usage across Ontario has resulted in consistent results. The MTO OHBG has resulted in an evaluation score (44/100) that indicates this bridge **is not** a significant heritage feature. The MCL OHBP has also resulted in an evaluation score (42/100) that indicates this bridge **is not** a significant heritage feature. Although the bridge is not considered to be provincially significant, the age of the bridge (i.e. over 40 years of age) does indicate that this bridge requires a Heritage Impact Assessment.

The conservation options specified that must be addressed in the Heritage Impact Assessment are derived from the OHBP (see MCL 1991: 4). The OHBP specifies eight (8) conservation options to be considered and addressed. The options are listed in the OHBP in descending order of preference with options (g) and (h) being the least preferable. The following consideration of the conservation options is presented in the same order as in the OHBP.

(a) Retention of Existing Bridge with no Major Modifications Undertaken

This option does not eliminate the single load path configuration of the structure. In addition, this option does not provide for the minimum required side clearance requirements of Table D7-1 of the Geometric Design Standards for Ontario Highways. Bridges serve a critical engineering function which is inextricably linked to public safety. Bridges must be able to handle traffic volumes and load stresses safely. As noted above, the existing bridge is deteriorating and structural integrity is

compromised. Even after rehabilitation, the existing bridge is unlikely to meet the increased loads imposed by new codes. The single load path configuration of the structure and the narrow shoulders on approach represent safety hazards inherent on the current built form. The rehabilitated structure would be required to meet as many of the bridge code requirements and minimum standards as possible, however a rehabilitated structure would still have critical identified defects, most notably, continued operation as a single load path structure. If barriers were erected to protect the single load path elements (trusses) there will be a further reduction in the cross section platform width. A load limit may also be necessary for the rehabilitated bridge based on the condition of remaining components and the strength and capacity of components and abutments relative to new higher loads. Even at original design specifications, without consideration to the effects of age and deterioration, vehicle loads prescribed in the Canadian Highway Bridge Design Code are substantially higher than the load for which the bridge was designed. While rehabilitation of the existing structure addresses the need for a restored bridge crossing, this alternative still has a limited life expectancy and will not provide a long-term solution to the problem. A rehabilitation program cannot address all of the identified defects and it is not considered to be a viable alternative.

This structure has previously required emergency repairs in order to remain open. The end bay tension chords of the truss had corroded through, resulting in a loss of section and reduced capacity. At the bottom end of the trusses at the joints with the transverse floor beams, there is corrosion which has resulted in scaling of the steel. The corrosion at the structural joints on either side of the bridge below the deck is most likely the result of salt applications to the road surface during winter months. Unfortunately, the location of heavy corrosion is at the site of critical joints that tie the deck of the bridge to the load bearing truss structure.

Hart Bridge is defective in a number of ways, which include the following:

Load Capacity

The structure is not currently posted with a load limit but has required emergency repairs to remain open. Continued repairs are expected as deterioration continues. Reductions in capacity are expected in the near future as a result of the continuing deterioration of structural components. The structure is a single load path structure which does not conform to the Canadian Highway Bridge Design Code (CHBDC) in Ontario.

Geometry

The existing geometry and desirable minimum standards are shown in the following table. The minimum standards are based on the Geometric Design Standards for Ontario Highways.

Geometry	Existing Structure	Minimum Standard	Deficient
<i>Lane Width</i>	3.9	3.7	No
<i>Number of Lanes</i>	2	2	No
<i>Minimum Platform</i>	7.8	12.4	Yes
<i>Side Clearance</i>	0.2	2.5	Yes
<i>Railing</i>	None	Performance Level 1 Barrier	Yes

Structure Barrier System

The railing system on the existing structure does not comply with current CHBDC requirements for traffic barriers. On the structure, the railings are connected to and form part of the structure support system classifying the bridge as having a single load path. Where single load path structures exist, the supports should be shielded from direct impact, which is not the case at this site.

Physical Condition

The structure has the following deficiencies:

- Single load path structure, which does not conform to CHBDC in Ontario;
- Severe oxidization at the truss/transverse floor beam connections;
- Degradation of abutments through cracking and spalling from age and weathering;

The structure has an existing traffic volume (AADT) of approximately 3700 vehicles per day and it is expected that this will increase over the next ten years. There is no remaining capacity for this structure to meet future traffic projections even in a rehabilitated condition. Hart Bridge represents an important link in the local road infrastructure. Rama Road/County Road 44 is an arterial route on the east side of Lake Couchiching and the only north-south through road between County Road 169 between County Road 169 to the north and Highway 12 to the south, a distance of approximately 16.5 kms. Any restrictions on its use in the form of further load restriction or a closed structure would be seen as detrimental.

(b) Retention of the Existing Bridge with Sympathetic Modification

Given the inherent characteristics of the built form (i.e., steel pony truss), most of the above noted deficiencies cannot be rectified with sympathetic modifications. In addition, a major drawback to attempted modification is that almost any alteration proposed to the structure to improve its functionality would impair structural integrity.

This type of bridge cannot be widened which is a major factor in the shift to reinforced concrete rigid frame design bridges soon after the introduction of the concrete bridge construction. Subsequent designs allow for widening of a bridge as traffic volumes increase. This form of bridge cannot be modified in this way since the load is carried in the truss superstructure which would also require replacement to carry the additional load.

(c) Retention of Existing Bridge with Sympathetically Designed Structure in Proximity

This option suggests that this bridge be twinned either with another single lane structure which would accomplish the same object as widening the existing bridge or to build another bridge to take the modern loads and traffic volumes entirely. This option effectively combines the costs of bridge rehabilitation and bridge replacement. Although the principle of heritage conservation suggests that the cost of preservation should not be the determining factor in selection of a preferred alternative, this option is cost prohibitive. In addition, this alternative would necessitate a significant expansion to the existing road allowance or the development of a second road allowance resulting in additional impacts to the Black River through the development of another crossing.

(d) Retention of the Existing Bridge no Longer in use for Vehicular Purposes but Adapted for Pedestrian Walkways, Cycle Paths, Scenic Viewing, etc.

This option would still require rehabilitation of the bridge but has the advantage of mitigating any highway traffic safety concerns inherent in the design of the existing structure. However, we are still confronted with the environmental concerns of option (c) with only a marginal reduction in cost, if any at all. This option may have more appeal were there a strong local need or demand for an adapted bridge structure in this location. In addition, Rama Road represents the only existing road corridor on the east side of Lake Couchiching running north-south between County Roads 169 and Highway 12 for a distance of roughly 16.5 kilometres. There are no available alternate traffic routes.

e) Relocation of Bridge to Appropriate New Site for Continued Use (see c) or Adaptive Re-use (see d)

The inherent limitations in the structural design of the bridge discussed under options (a) & (b) suggest that movement of the bridge and re-use for vehicular traffic is untenable. Given the design characteristics of the bridge and the manner of construction, it can be dismantled and rebuilt. If a pedestrian crossing, multiple use trail, or light vehicle crossing could make use of this bridge, this would be the preferred alternative.

(f) Retention of the Bridge as a Heritage Monument for Viewing Purposes Only

This option has the same practical results as Option (c) in that an entirely new crossing and approach would have to be constructed on a new alignment with significant impact on existing local residential development. See also (d). As the Town has committed to retaining another heritage structure representative of the “pony truss” bridge type in the Town of Bolton, retention of Sneath Road Bridge 4 for viewing purposes would be redundant.

(f) Retention of the Bridge as a Heritage Monument for Viewing Purposes Only

This option has the same practical results as Option (c) in that an entirely new crossing and approach would have to be constructed. See also (d).

(g) Salvage of Elements/Members of Bridge for Incorporation into the New Structure of For Future Conservation Work or Displays

Given the design characteristics of the bridge and the manner of construction, it can be dismantled and rebuilt. Consideration should be given to salvaging the superstructure of the existing bridge. This would preserve the appearance and a significant portion of the visible elements of the original structure. It is further suggested that a second plaque be affixed to the superstructure which details the date and the improvements made to this crossing, including reference to the original bridge elements incorporated into the new structure. It should also be noted that if the trusses were reused in another application where they were required to carry loads would require strengthening which would result in the loss of many of the heritage riveted connectors. However, if the truss components were to be incorporated as non-structural members, the riveted connections could possibly be retained. Option (g) represents the preferred alternative. This approach retains the external appearance of the current bridge while facilitating projected loads and planned future uses of this crossing.

(h) Full Recording and Documentation of Structure if it is to be Demolished

The inherent design characteristics of this style of bridge and its environmental context severely restrict viable alternatives. There is a requirement for a bridge at this location that can accommodate existing and future traffic loads in a manner that meets current safety standards for vehicular traffic. This bridge cannot be modified to achieve these requirements.

Option (h) is not the preferred option. Option (g) is the preferred option with Option (e) as a viable alternative to (g). Option (h) should only be undertaken if both Options (g) and Option (e) cannot be undertaken.

5.0 CONCLUSIONS & RECOMMENDATIONS

Hart Bridge is over 40 years old and, in accordance with the Ontario Ministry of Tourism and Culture (MTC) policy (see Appendix 3), may have cultural heritage value given its characteristics. Therefore, a heritage impact assessment report prepared by a qualified heritage consultant is required for this project. This report has been prepared to address this requirement. The proponent is advised that they should file this report with the MCL for the purpose of review by MCL Heritage Planning Staff.

The score of Hart Bridge according to the MTO OHBG Criteria as of the date of compiling this report is 44 which is 16 points below the minimum score for recommendation to be added to the Ontario Heritage Bridge List. Accordingly, this bridge is not considered to merit inclusion within the Ontario Heritage Bridge List. The score of Hart Bridge according to the MCL OHBP Criteria as of the date of compiling this report is 42 which is 18 points below the minimum score for recommendation to be added to the Ontario Heritage Bridge List. Accordingly, this bridge is **not** considered to merit inclusion within the Ontario Heritage Bridge List. Currently, the Ministry of Tourism and Culture (MTC) is developing Ontario Heritage Bridge Guidelines for Municipally owned bridges. The criteria and scoring developed to evaluate bridges on a provincial scale does not mean that a specific bridge is not a significant local feature.

Given the design characteristics of the bridge and the manner of construction, it can be dismantled and rebuilt. It is recommended that this bridge be dismantled and re-used. It is possible that the major design characteristics of the existing structure can be incorporated into a new structure at this location. This would preserve the most significant heritage elements at the same location while addressing longterm concerns for engineering and safety requirements at this crossing. If a suitable use and/or location is not currently available, it is recommended that the bridge be dismantled and the components retained for future use as a community enhancement feature. Option (g) is the preferred alternative and represents the minimum level of intervention to render this crossing safe and efficient.

It is recommended that the superstructure of the existing bridge be salvaged and fitted onto the replacement bridge as non-load bearing components. It is further suggested that a second plaque be affixed to the superstructure which details the date and the improvements made to this crossing, including reference to the original bridge elements incorporated into the new structure. Option (e) represents an acceptable alternative should Option (g) prove untenable. Documentation and recording of the structure prior to demolition [Option (h)] should only be undertaken if both Options (g) and Option (e) cannot be undertaken.

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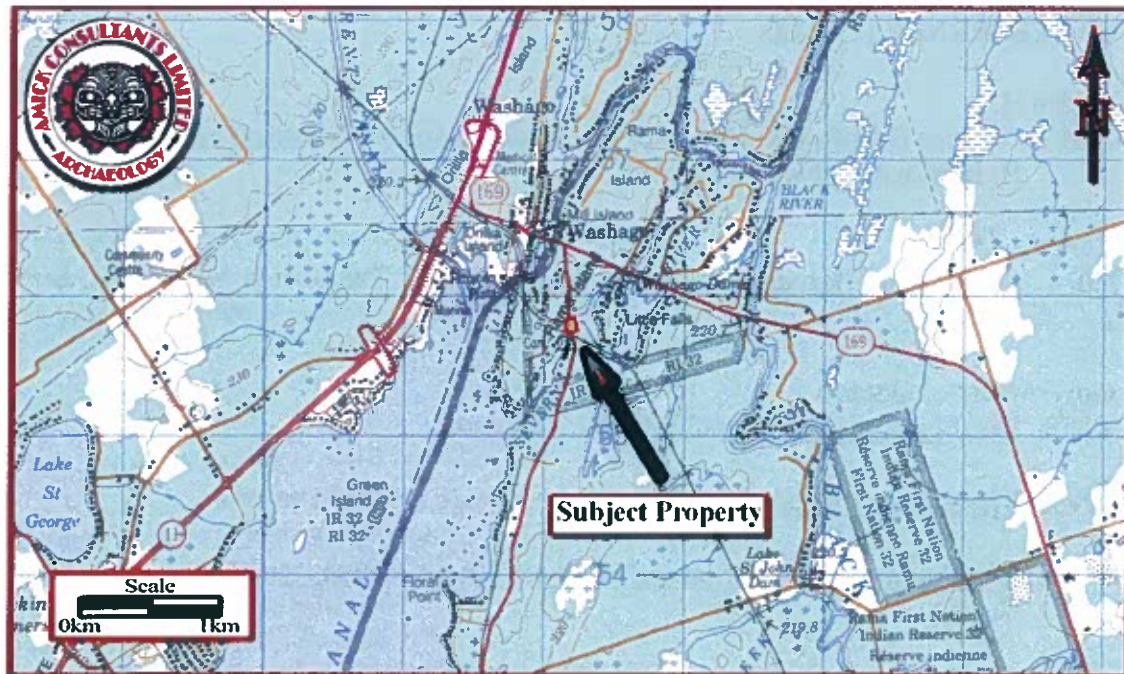


Figure 1 Location of the Subject Property

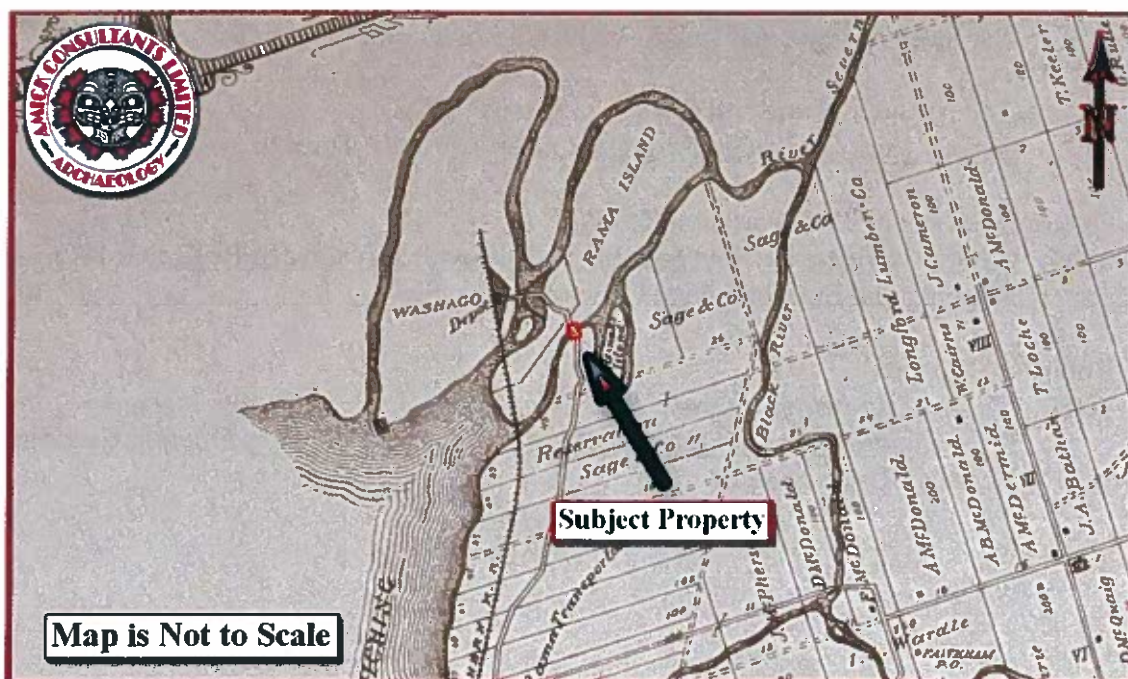


Figure 2 Segment of Historic Atlas Map (1881)

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Ramara, County of Simcoe***

Appendix 1
MTO OHBG EVALUATION CRITERIA

The following scoring system was developed to provide a clear and easily understood system for evaluating bridges for potential inclusion on the Heritage Bridge List. The scoring, derived from Ontario Regulation 9/06, is divided into three main areas: Design / Physical Value, Contextual Value and Historic / Associative Value. Within these three divisions are further criteria that are individually scored. For the purposes of these Guidelines, a bridge with a score of 60 or greater is considered provincially important.

Criteria	Details	Score	Comments
Design / Physical Value (Total marks 50)			The Score for Design/Physical Value is comprised of three elements: Functional Design, Visual Appeal and Materials.
Functional Design (Maximum score 20)	Excellent	20	Displays a high degree of technical merit or scientific achievement <u>and</u> ; <ul style="list-style-type: none"> Is one of a kind or prototype (first or earliest example of its kind), <u>or</u> Is exemplary for its kind (i.e. the longest, highest, etc. of its kind). Examples: Rainy Lake Causeway, reinforced concrete bridge at Massey
	Very Good	16	Displays a high degree of technical merit or scientific achievement <u>and</u> ; <ul style="list-style-type: none"> Includes types in which fewer than five survive within a Region.
	Fair	12	This category includes types of which fewer than five survive within a Region, regardless of degree of technical merit or scientific achievement, even if many were originally constructed.

Criteria	Details	Score	Comments
	Common	0	Of little value from a technical or scientific perspective. Many were built, many remain.
Visual Appeal (Maximum score 20)	Excellent	20	High degree of craftsmanship or stylistic merit for most of the elements of the bridge; the design elements are well balanced and overall the structure is well proportioned; modifications are sympathetic.
	Good	12	Well-proportioned bridge that has a general massing that is appropriate to the landscape in which it is situated.
	Fair	4	Structure has only one or two noteworthy elements or is severely altered from its original form.
	None	0	No noteworthy features
Materials (Maximum score 10)	Excellent	10	Provincially rare or unusual materials. Stone, wrought iron are examples of provincially rare materials.
	Very Good	8	Regionally rare or unusual materials. Wood and riveted steel are examples of regionally rare materials.
	Good	5	Unusual Combinations: this is reserved for materials that are used in combination(s) that are considered unusual or remarkable.
	Common	0	Common materials or combinations

Criteria	Details	Score	Comments
Contextual Value (Total marks 25)			
Landmark (Maximum score 15)	Excellent	15	Physically prominent: The bridge is highly significant physically and a primary symbol in the area. This includes 'gateway' structures. <ul style="list-style-type: none"> It is a critical element in understanding a family of bridges within a corridor
	Good	9	Locally significant: The bridge is perceived in the community as having symbolic value rather than purely visual or aesthetic value. <ul style="list-style-type: none"> It is an important element in understanding a family of bridges within a corridor.
	Fair	3	A familiar structure in the context of the area. <ul style="list-style-type: none"> It is a contributory element in understanding a family of bridges within a corridor.
	Common	0	No prominence in area
Character Contribution (Maximum score 10)			
	Excellent	10	The bridge is the critical element in defining the character of the area and is of great importance in establishing or protecting this character.
	Good	6	Maintains or contributes to the overall character of the area and is of municipal importance in establishing or protecting this character.

Criteria	Details	Score	Comments
	Common	0	Character contribution is minimal.
Historic / Associative Value (Maximum score 25)			
Designer/Construction Firm (Maximum 15 points)	Excellent	15	Known influential designer-builder: structure demonstrates or reflects the innovative work or ideas of companies, engineers and/or builders having major impacts on the development of a community. For this item, community is broadly defined to include professional groups who have been demonstrably affected by the work in question.
	Good	9	Known prolific builder-designer: companies, engineers, and/or builders directly responsible for a large number of structures whose activities led to design or construction refinements and the establishment of standard forms.
	Fair	3	Known undetermined contribution: companies, engineers, and/or builders about who have made a limited/minor contribution to a community.
	Unknown	0	Those responsible for the design/construction are not known
Association with a Historical theme, person or event (Maximum score 10 points)	Excellent	10	Direct Association with a theme or event that is highly significant in understanding the cultural history of the nation, province or municipality.
	Good	6	Close association with a theme or event within an area
	Common	0	Limited or no association with historic themes or events.

Appendix 2

MCL OHBP EVALUATION CRITERIA

ONTARIO HERITAGE BRIDGE PROGRAM

Evaluation Criteria

MINISTRY OF TRANSPORTATION AND MINISTRY OF CULTURE AND COMMUNICATIONS
ONTARIO HERITAGE BRIDGE PROGRAM
HERITAGE BRIDGE EVALUATION CRITERIA

SUMMARY

General Category	Criterion	Maximum Score
Documentation..... (page 15)	Builder.....	6
	Age.....	14
Technology..... (page 16)	Materials.....	4
	Design/Style.....	16
	Prototype.....	10
	Structural Integrity.....	10
Bridge Aesthetics and Environment..... (page 17)	Visual Appeal.....	12
	Integrity.....	4
	Landmark.....	6
	Gateway.....	4
Historical..... (page 19)	Character contribution.....	4
	Historical Association.....	10
Total Score.....		100

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ONTARIO HERITAGE BRIDGE PROGRAM

MINISTRY OF TRANSPORTATION AND MINISTRY OF CULTURE AND COMMUNICATIONS

Criterion		
General Category	Points	Comments
A. DOCUMENTATION		
1. Builder		
a) Unknown	0	
b) Known; undetermined contribution	2	Companies, engineers, builders about which there is little present information may be elevated to categories c) and d) as knowledge increases.
c) Known; prolific builder-designer	4	Companies, engineers, builders responsible for large numbers of bridges utilizing standard forms, elements, e.g. Ontario Department of Highways, Wrought Iron Bridge Co.; Dominion Bridge Building Co.
d) Known; unusual designer	6	Innovative companies, engineers, builders having major impacts on the development of bridge design, e.g. W.A. McLean; Barber and Young; Ontario Department of Highways.
Maximum Score	6	
2. Age		
pre 1880	14	This criterion recognizes the value placed by society on the age of artifacts. Old structures, irrespective of whether they are ill- or well-designed, are often seen to have value simply because they still remain in our environment. Given the physical legacy of 120 years of bridge building, radical changes in pace and form of physical development prove a threat to many bridges built as late as the 1950s.
1880-1900	12	
1901-1910	10	
1911-1920	8	
1921-1930	6	
1931-1940	4	
1941-1950	2	
Maximum Score	14	Points may be awarded when date can be accurately determined from date plates, newspaper accounts, plans, etc. When date can only be estimated from design/materials it may be necessary to deduct one point.

ONTARIO HERITAGE BRIDGE PROGRAM

Criterion		
General Category	Points	Comments
B. TECHNOLOGY		
3. Materials		
a) Wrought Iron or	4	Wrought iron and stone are afforded high priority because these materials are no longer in use. Category "Other" means only materials not normally used in bridges or that have not gained favour, as well as unusual combinations of materials used in superstructure, piers or abutments.
b) Stone or	4	
c) Other (not normally in use)	4	
Maximum Score	4	
4. Design/Style		
a) Unique or	16	The only one of its kind. It may be eccentric, odd, an exaggerated version by virtue of its size, sophistication, use of a particular truss type, e.g. Sioux Narrows, Burlington Skyway.
b) Typical; but rare as survivor or	16	In any given period many bridges will be built which are typical of their age, being neither unique nor unusual. The ravages of time, climate and changing transportation requirements may have seen a number of such bridges disappear. The survivors may now be rare.
c) Unusual	16	Included here are bridges of which only a small number may have been built and perhaps a smaller number now remain, e.g. suspension spans, stone arches.
Maximum Score	16	
5. Prototype		
a) Prototype or	10	A bridge may possess a technological or stylistic innovation or adaption, which marks it as a first of a type, an early example or an important improvement, e.g. reinforced concrete bridge at Massey; concrete bowstring arch, Etobicoke.
b) Early example	10	
Maximum Score	10	

MINISTRY OF TRANSPORTATION AND MINISTRY OF CULTURE AND COMMUNICATIONS

Criterion		
General Category	Points	Comments
6. Structural Integrity		
a) No significant modifications	10	Bridges are often modified to remedy a variety of deficiencies, i.e. structural, transportation, hydrological. Those that have escaped unchanged are more often than not a rarity and thus of importance in illustrating their original form. Many bridges may have been modified over the years to the extent that they are no longer recognizable.
b) Sympathetic modifications	5	A few, however, may still be able to illustrate their original form because of sympathetic modifications, e.g. QEW widening/Bronte Creek; unobtrusive strengthening in Blackfriars Bridge; or other renovation and repair work.
Maximum Score	10	
C. BRIDGE AESTHETICS AND ENVIRONMENT		
7. Visual Appeal		
a) Design merits	10	This criterion addresses the intrinsic worth of a structure beyond its technological and functional characteristics. It may be an attractive structure because it is well designed and admirably fitted to a particular site, e.g. Sioux Narrows, Massey, Bronte Creek/QEW. Such a structure will always enhance its environment rather than detract. The removal of such a structure would be detrimental to the ambience of the setting.
b) Ornamentation/Decoration	2	Decoration or ornamentation, whether discreet or ostentatious, adds visual interest to the structure. It may appear in sculptured forms, balustrading, light standards, piers, cross members, portals, etc.
Maximum Score	12	

ONTARIO HERITAGE BRIDGE PROGRAM

Criterion

General Category	Points	Comments
8. Integrity		
a) At original location	4	Original locations are often benchmarks in the past development of a particular environment, and they often contribute to a strong sense of place.
Maximum Score	4	

9. Landmark

a) Physical prominence or	6	A bridge may be a visually prominent feature in the landscape, either from the road or some other vantage point. Landmarks may be used by people as guides for moving through an area, or more simply for adding interest in the environment, e.g. Welland Canal lift bridges, Skyway, etc.
b) Public perception	6	Bridges may be perceived as landmarks in the community and have a symbolic importance rather than a purely visual or aesthetic value.
Maximum Score	6	

10. Gateway

a) Entrance/exit occurrence	4	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 into or leaving a specific area. The gateway function may be recognized either as a funnelling phenomena as at Caledonia, or as a prominent superstructure on the road, e.g. Fort Colborne, Hamilton.
Maximum Score	4	

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MINISTRY OF TRANSPORTATION AND MINISTRY OF CULTURE AND COMMUNICATIONS

Criterion		
General Category	Points	Comments
11. Character contribution	4	A bridge, together with other buildings or structures, may contribute in a particular character or atmosphere of an area. This is more readily identifiable in certain places than others, e.g. stone bridges, St. Marys.
Maximum Score	4	
D. HISTORICAL		
12. Historical Association		
a) Associated with person/group or	10	Associated with the life or activities of a person or group that has made a significant contribution to the community, province or nation, e.g. entrepreneurs, politicians, etc.
b) Associated with event or	10	Associated with a significant event that contributed to the future activities of a community, province or nation, e.g. road building programs, public work projects.
c) Associated with theme or	10	Associated with and illustrative of significant patterns of cultural, social, political, economic or industrial history, e.g. Depression era, urban growth.
d) Associated with former bridges	10	Associated with former bridges that have served the same site or locale, i.e. a traditional river crossing.
Maximum Score	10	

Appendix 3

Ministry of Culture Heritage Landscape Checklist

Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This check list will help identify potential cultural heritage resources, determine how important they are and indicate whether a cultural heritage impact assessment is needed.

Step 1 – Screening Potential Resources		
YES	NO	Built heritage resources Does the property contain any built structures, such as: <ul style="list-style-type: none"> ▪ Residential structures (e.g. house, apartment building, trap line shelter) ▪ Agricultural (e.g. barns, outbuildings, silos, windmills) ▪ Industrial (e.g. factories, complexes) ▪ Engineering works (e.g. bridges, roads, water/sewer systems)
	✗	
	✗	
	✗	
✗		
YES	NO	Cultural heritage landscapes Does the property contain landscapes such as: <ul style="list-style-type: none"> ▪ Burial sites and/or cemeteries ▪ Parks ▪ Quarries or mining operations ▪ Canals ▪ Other human-made alterations to the natural landscape
	✗	
	✗	
	✗	
✗		

Step 2 – Screening for Potential Significance		
YES	NO	A property's heritage significance may be identified through the following:
	<input checked="" type="checkbox"/>	1. Is it designated or adjacent to a property designated under the Ontario Heritage Act?
	<input checked="" type="checkbox"/>	2. Is it listed on the municipal heritage register or provincial register (e.g. Ontario Heritage Bridge List)?
	<input checked="" type="checkbox"/>	3. Is it within or adjacent to a Heritage Conservation District?
	<input checked="" type="checkbox"/>	4. Does it have an Ontario Heritage Trust easement or is it adjacent to such a property?
	<input checked="" type="checkbox"/>	5. Is there a provincial or federal plaque?
	<input checked="" type="checkbox"/>	6. Is it a National Historic Site?
	<input checked="" type="checkbox"/>	7. Does documentation exist to suggest built heritage or cultural heritage landscape potential? (eg. research studies, heritage impact assessment reports, etc.)
	<input checked="" type="checkbox"/>	8. Was the municipality contacted regarding potential cultural heritage value? Were any concerns expressed?
<input checked="" type="checkbox"/>		9. What are the dates of construction? Are the buildings and/or structures over 40 years old? Is it within a Canadian Heritage River watershed?
<input checked="" type="checkbox"/>		10. Is a renowned architect or builder associated with the property?

Note: If you answer "yes" to any of the questions in Step 2, a heritage impact assessment is required.

Step 3 – Screening for Potential Impacts		
YES	NO	
✖		Destruction of any, or part of any, significant heritage attribute or feature.
✖		Alteration that is not sympathetic, or is incompatible, with the historic fabric or appearance.
	✖	Shadows created that alter the appearance of a heritage attribute or change the visibility of a natural feature or plantings, such as a garden.
	✖	Isolation of a heritage attribute from its surrounding environment, context or a significant relationship.
	✖	Direct or indirect obstruction of significant views or vistas from, within, or to a built and natural feature.
	✖	A change in land use such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces.
✖		Land disturbances such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource.