TO: CHAIR AND MEMBERS  
BUILT AND NATURAL ENVIRONMENT COMMITTEE  
MEETING ON DECEMBER 13, 2010

FROM: DAVID A. LECKIE, P. ENG.  
DIRECTOR, ROADS AND TRANSPORTATION  
ENVIRONMENTAL SERVICES DEPARTMENT

SUBJECT: TS1349 SARNIA ROAD IMPROVEMENTS  
EXISTING BRIDGE RELOCATION

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RECOMMENDATION

That on the recommendation of the Director, Roads and Transportation, the following actions BE TAKEN with respect to the upcoming Sarnia Road Bridge replacement over the Canadian Pacific Railway:

(a) The Civic Administration BE DIRECTED to remove and not relocate the existing structure during the upcoming bridge replacement contract;

(b) The replacement project SHALL CONSIDER the associated mitigation measures identified in the EA Cultural Heritage Resource Assessment, including “sympathetic” design and possible incorporation of elements of the historic bridge into the new structure, full documentation and erection of a plaque recording the heritage significance of the existing bridge; and,

(c) The wording of the heritage plaque SHALL BE decided upon through consultation with the local community and the London Advisory Committee on Heritage.

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PREVIOUS REPORTS PERTINENT TO THIS MATTER

Environment and Transportation Committee - October 15, 2007 - Sarnia Road CPR Bridge Replacement Review

Environment and Transportation Committee - Jan 11, 2010 - Sarnia Road Environmental Study Report

Environment and Transportation Committee - May 10, 2010 - Appointment of Consulting Engineer

Environment and Transportation Committee - Sept 27, 2010 - Sarnia Road Bridge Replacement Status of CPR Negotiations

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BACKGROUND

Purpose:

This report makes a recommendation on a preferred relocation/disposal option for the existing Sarnia Road bridge for inclusion within the upcoming bridge replacement contract.

Context:

The Environmental Study Report (ESR) for improvements to Sarnia Road, from Hyde Park Road to Wonderland Road North, received approval earlier this year. One of the recommendations of this EA was the removal and replacement of the Sarnia Road bridge over the Canadian Pacific Railway (CPR) line. The construction of this project is scheduled for 2011 and direction is now required for the preparation of the construction contract.

The EA included a heritage study which assessed the significance of the structure. The heritage study also provides a hierarchy of mitigation measures ranging from retention to relocation to removal. As the bridge is currently owned by CPR, any future plans involving the
structure need approval from CPR. Assessment of these options indicate that some have significant cost implications, giving rise to the question of value relative to the project and other City bridge investments.

This report provides a summary of relevant information on the Sarnia Road and other bridges as part of a value assessment.

Discussion:

Significance

A cultural heritage resource assessment was conducted as part of the recent EA. The heritage study concluded that the Sarnia Road Bridge has high heritage value. Specifically, note was made that it was a relatively uncommon type of bridge in the county, that it was somewhat unique in being converted from light railroad to vehicular uses; that it retained excellent visual appeal and was important also for its contextual values. The overall assessment of the bridge would place it as significant on the Ontario Heritage Bridge List. A photo of the structure is shown in Figure 1.

![Figure 1: Sarnia Road Bridge](image)

The heritage consultants report was provided to the London Advisory Committee on Heritage (LACH) for review. No formal comments were received although the committee was reportedly pleased with the quality of the report and subsequently prepared a statement of significance for the bridge in December 2009 as attached in Appendix A.

The bridge is ranked on the City of London’s Heritage Inventory as a Priority 2 heritage resource. Priority 2 structures warrant designation under Part IV of the Ontario Heritage Act on application by the owner. In this case, the owner is CPR. Priority 1 buildings deserve more consideration and Priority 3 buildings do not require such a rigorous response. At the time of ESR approval in January, 2010, the Municipal Council resolved that the bridge “BE TREATED like a heritage structure”. In March 2010, the LACH statement of significance was presented to Council with a recommendation that notice to designate the bridge be given under the Ontario Heritage Act, either in its current or a different location, noting that permission had not yet been sought from the owner. Council resolved that the proposed designation “BE REFERRED to the Civic Administration to review” in conjunction with the current project.

A different bridge was constructed at this location when the rail line was built in 1889. The existing bridge was installed at the current location in 1909, after being relocated from St. James, Manitoba. The bridge is a single span, pin-connected through Pratt truss structure. It appears to be a rail bridge that was widened when relocated to London for use as a road structure. Records indicate that many of the bridge’s original elements were re-used, while numerous modifications were made to widen the structure. A number of modifications have also occurred subsequently as a result of truck collision repairs.
The EA cultural assessment identifies at least 31 steel truss bridges in Ontario. Three other through Pratt truss bridges exist in the County of Middlesex. These include the King Street Bridge in London (1897) which is a pin-connected Pratt truss like the structure on Sarnia Road.

**Policy**

The Provincial Policy Statements and Planning Act make provision for the conservation of heritage resources. Section 2.6.1 of the Provincial Policy Statement (2005) states: Significant built heritage resources and significant cultural heritage resources shall be conserved. Accordingly, City of London's Official Plan provides policy context for conserving cultural heritage resources. Section 13.1 states:

i) Protect in accordance with Provincial policy those heritage resources which contribute to the identity and character of the City; (Clause i) amended by OPA 438 Dec 17/09
ii) Encourage the protection, enhancement, restoration, maintenance, and utilization of buildings, structures, areas, or sites within London which are considered to be of cultural heritage value or interest to the community; (Clause ii) amended by Ministry Mod. #30 Dec. 17/09

**Strategies**

The EA identified a range of mitigation measures if, for engineering or other considerations, the replacement of the Sarnia Road Bridge was necessary. These strategies ranged from retention and retention adapted for a new use, through relocation to another site and finally, to removal and replacement with a new structure. The following is a summary of options for the Sarnia Road bridge, as guided by the EA cultural heritage resource assessment and the mitigation measures contained therein.

**Retention**

The Sarnia Road EA evaluated numerous options to address the road operating deficiency presented by the current bridge. This included an option to retain the historic bridge at its current location. However, the analysis determined that this option would add $3.8 Million in cost to the project, and incur significant property impacts. Therefore, this alternative was not recommended. The new bridge planned to be constructed next year requires removal of the existing bridge from its current location.

**Relocation - Nearby over CPR Line**

The mitigation measures recommended for potential relocation strategies include a feasibility assessment by an engineer, selection of a new site that has ties to the CPR line and erection of a plaque or interpretive signage.

Relocation near the current location along the CPR line was previously dismissed because CPR was planning for a second rail line along the corridor – the bridge is not long enough to span a double track corridor. Recently, CPR has indicated a one-track crossing would be sufficient. This makes an on-site relocation option feasible and lead to some preliminary engineering to evaluate this option.

Relocating the bridge to the east of the new structure as shown in Figure 2 is possible. It would involve lifting the bridge off its abutments and placing it in a temporary lay-down area for recoating. The bridge would then be placed on newly constructed abutments followed by minor repairs and installation of a new deck and railing. It would serve as an alternate pedestrian crossing of the CPR tracks. It would require some additional sidewalk and landscaping to create a path for pedestrians to gain access. However, the bike lanes and sidewalks would also be constructed continuously across the new structure since pedestrians may choose this route as a shorter alternative to the relocated bridge.
The estimated cost of this option is $1,280,000. Although the relocation distance for this option is relatively short, the total estimated cost is high due to the requirements for a "new" railway crossing. The foundations would be substantial.

Additionally, this option carries significant risks. Placing the bridge at a new location across the tracks would require a new legal agreement with CPR. Approval of the relocation design would be required and the project would be subject to requirements imposed by the railway. Because this alternative was not previously viable due to the two-track crossing requirement, no detailed discussions or engineering reviews have been carried out with CPR.

Ongoing maintenance and rehabilitation obligations would include snow removal, periodic minor structure and deck repairs, and recoating every 25 years. These costs would be sporadic over the life of the structure. However, for comparison purposes, maintenance and rehabilitation have been translated into equivalent annual cost and this is estimated to be in the range of $10,000 per year. Ongoing maintenance would also be subject to CPR scrutiny and would be at risk of increase.

Relocation – Abandoned Rail Spur Line

Since the completion of the EA relocation alternatives have been investigated with groups such as City Parks, Recreation (golf courses) and Fanshawe Pioneer Village with limited success. A not-for-profit alternative, the Graham Family Eco Park northeast of London, was identified but project costs would be similar, and with no cost sharing anticipated, sites within the public realm were preferred. The bridge is not long enough to span the Thames River and its linear span does not make it a good configuration for many other creek crossings due to the associated need for large approach fills to achieve the required clearance. The only suitable location identified is the Hyde Park Rotary Club Trail multi-use path on the abandoned rail spur line north of Gainsborough Road, west of Hyde Park Road as shown on Figure 3.
This option involves lifting the bridge off its abutments, disassembly at a nearby lay-down area, recoating and transport to its new location. The bridge would be re-erected with minor truss repairs and placement of a new deck and railing on new abutments and approaches.

The cost of this alternative is $950,000 and includes disassembly of the bridge, recoating and re-erection on site with replacement of selected members and a new pedestrian suitable deck and handrails. The cost of recoating is included in all relocation options.

A Stanton Drain stormwater management facility is proposed for construction in 2011. It is envisioned that the historic structure could be used where the facility outlets under the multi-use pathway. The feasibility of this option would need to be confirmed during the upcoming design of the SWM pond.

It is uncertain at this time whether this option would result in any cost savings to the construction of the stormwater facility. It is possible that the bridge would slightly reduce the outlet structure requirements but the savings are not anticipated to be significant. The 25 m long span of the current bridge would be significantly longer than necessary at what is and will continue to be a relatively minor watercourse and may appear out of proportion.

In the unlikely event that incorporation into the stormwater facility is not feasible, the structure could be placed along the pathway nearby as an aesthetic, non-functioning feature. The cost reduction realized by this alternative would be $160,000 due to the reduced foundation and structural requirements. The appeal of this option is low given that it would be strictly commemorative and not provide a bridge function.

Ongoing maintenance and rehabilitation obligations include periodic minor structure and deck repairs and recoating every 25 years. The frequencies are less for the non-water
crossing location. Translated into equivalent annual cost, this is estimated to be in the range of $10,000 per year, or $7,500 for the non-watercrossing location.

This option would have the advantage of maintaining an association with rail history as suggested in the EA cultural heritage assessment although interpretive signage would be needed to raise awareness of this connection.

Removal

This option comprises lifting the bridge truss off its abutments and placing on a lay-down area for recording and disassembly, with subsequent archiving, storage, recycling or disposal.

This is the most economical and risk averse alternative. Heritage conservation would be conducted following the mitigation measures outlined in the EA heritage assessment including incorporation of sympathetic design into the replacement structure, full documentation of the structure prior to removal and erection of a plaque. Perhaps elements of the bridge could be incorporated into a new structure. The location and wording of the heritage plaque/signage would be decided upon through consultation with the local community and LACH.

The bridge would become the property of the contractor. A possible outcome of this option is a private sector initiative to relocate the bridge. The successful contractor will have the opportunity to salvage, and potentially transfer ownership of the bridge if it has value.

Summary of Costs

For comparison purposes, the costs of the above described alternatives are summarized as follows:

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<tr>
<th>Alternative</th>
<th>Initial Cost</th>
<th>Ongoing Costs (Equivalent Annual Value*)</th>
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<tr>
<td>Relocate On-Site</td>
<td>$1,280,000</td>
<td>$10,000</td>
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<td>Relocate to Hyde Park Trail over watercourse</td>
<td>$950,000</td>
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The budget account for this growth project, TS1349, previously assumed a $1,000,000 contingency for relocation of the historic bridge in the event that the initiative is approved by the Municipal Council. Staff is not aware of any external funding opportunities to support heritage conservation.

Cost Sharing

Cost sharing discussions are underway with CPR. Cost sharing of road-rail grade separations in Canada is guided by the Canadian Transportation Agency (CTA) document "Guidelines on Apportionment of Costs of Grade Separations". This document indicates that the scope of cost-shared work is limited to the reconstruction of the grade separation and would normally include the costs associated with the removal and disposal alternative. To date, CPR has indicated that a transfer of ownership of the bridge to the City is possible but has not agreed to a contribution towards a relocation option. Any cost-sharing contribution beyond the basic disposal option is currently speculative and unlikely to be significant.
Other Historic Bridges in London

It is noteworthy that London is currently undertaking initiatives elsewhere in the city to preserve historic bridges that are deemed to have cultural value. These are bridges that exist at their original location and have historic connections to their surroundings as part of the cultural landscape.

King Street Bridge

The King Street pedestrian bridge, which is also a pin-connected through Pratt truss structure like the Sarnia Road bridge as illustrated in Figure 4. The structure is nearing the end of a $1.4 M rehabilitation to improve its condition and extend its life expectancy.

Recognition of its past service at this location was part of the rehabilitation design, which includes:
- Concrete repairs to the barriers, piers, and abutments;
- New longitudinal steel stringers and connections;
- Structural steel coating (forest green);
- Reinstatement of a full width timber deck – combining the present two divided sections into one with a single paint line down the middle similar to the parks pathway system; and,
- Replacement of the railing system on the bridge and approaches with one that that mimics the original style while recognizing current spacing requirements.

In the design of this work, consideration was given to respecting the historical aspects of this structure by protecting the existing inscription (from 1897) on the west pier, remounting the existing commemorative plaques, and reinstating some of the original design features (full width decking and railing system). Incorporating these features was intended to bring this structure back to it's vintage appearance, while meeting the structural design requirements of the current day.

Meadowlily Bridge

The Municipal Council resolved in July 2009 that the Meadowlily Bridge be recognized as an important cultural heritage resource that should be protected and exist in perpetuity as a footbridge. Consequently, a technical study of the Meadowlily pedestrian bridge is underway, in conjunction with the Meadowlily Area Planning Study, to determine a rehabilitation strategy to preserve this bridge at its current location. The budget forecast includes $3.85 M for structural repairs and a major bridge rehabilitation in 2012. The bridge is shown in Figure 5.
Approximately $600,000 has been spent since 2004 on structural repairs to conserve the abutments and to replace the deck on this historic bridge.

A risk assessment is currently underway to determine the best approach to continue to protect and conserve Blackfriars Bridge, which is designated as a heritage structure.

Synthesis of Other Historic Bridges in London

The above bridges have existed at their respective locations for many, many years, providing an ongoing transportation function. These provide the City with important transportation linkages worthy of ongoing investment. The type of ongoing maintenance and rehabilitation is unique to their design and age compared to more modern bridges, and is considered to be justified because of their usefulness. This is considered high value because of their double duty as a functional asset and landmark. For example, a recent $1.4 million investment in the King Street bridge using provincial funding was considered by both partners to be worthy. Functioning structures attract investment by others.

Basis for Recommendation:

Based on consideration of heritage, costs and risks as described above, there are two options available for consideration:

1. Removal – Heritage conservation would be conducted following the mitigation measures outlined in the heritage assessment as possible, including full documentation of the
structure prior to removal, erection of a plaque(s) and consideration of sympathetic design in the replacement structure. The location and wording of the heritage plaque would be decided upon through consultation with the local community and LACH.

2. Relocation: Relocation of the bridge to the Hyde Park Rotary Trail provides a higher degree of heritage conservation if the associated cost is considered to be of good value. The location on the Hyde Park Rotary Path provides a functional and commemorative use with a connection to railway history given that the path is on an abandoned rail spur line. Although relocation to the nearby on-site location across the CPR line provides more contextual perspective, it is not recommended as it would be a redundant, less functional crossing with higher costs.

The bridge does have a long history in London and has been identified as a link to the area’s rural past. Although referred to affectionately by some, the bridge does not appear to have strong links to the surrounding neighbourhood such as that exhibited by the King Street and Blackfriars bridges. Additionally, it can be debated whether the structure’s previous relocation to London and associated modifications enhance its uniqueness, or diminishes its design related heritage value as a Pratt truss bridge.

Unfortunately, the bridge can no longer serve an effective function at its current site and the best relocation option identified has contextual links to the railway, but limited function and exposure. Furthermore CPR, the owner of the bridge, does not promote its conservation.

In consideration of the heritage, risks and substantial cost of conserving the bridge, it is recommended that Option 1, removal of the bridge, along with documentation and commemorative measures, be implemented in conjunction with the bridge replacement contract in 2011. It should be noted that a possible outcome of this option is a private sector initiative to reuse the bridge. The successful contractor will have the opportunity to salvage, and potentially transfer ownership of all or parts of the bridge if value exists.

Acknowledgements:

This report was prepared with assistance from Doug MacRae, P.Eng, of the Transportation Planning and Design Division. The report considers input from Don Menard, City Heritage Planner and Andrew Macpherson, Manager Parks Planning and Design.

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<td>DAVID A. LECKIE, P.ENG.</td>
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<td>DIRECTOR, ROADS &amp; TRANSPORTATION</td>
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Attachment: Appendix A - LACH Statement of Significance

c. **P. McNally, P.Eng.**
   D. Menard, Heritage Planner
   A. Macpherson, Manager Parks Planning and Design
   B. Krichker, Manager Stormwater Unit
   LACH
   J. Matthews, P.Eng., Dillon Consulting
Appendix A  LACH Statement of Significance, December 2009

Statement of Significance for the Sarnia Road Bridge over the C.P.R.

Description of Property

Sarnia Road is the road between Concession 2 and Concession 3 in the former Township of London. The bridge carries Sarnia Road over the Canadian Pacific Railway, located in the south half of Lot 22 of Concession 3 in London Township, now in the City of London.

Statement of Cultural Heritage Interest

Samia Road was opened in the early 19th century to service the lands in the second and third concessions of the Township. The Ontario Quebec Railway Company, part of the Canadian Pacific Railway, constructed a rail line through the area in 1889. Because of the deep cut of the railway in this location, a bridge was necessary to allow the road to cross the railway line. The current bridge on this site was not the first structure to be used but there is no information on the original structure except that it was 296 feet long and crossed the railway in the straight line of the roadway, rather than squaring across the cut with a span length of 90 feet as it does today. Documents indicate that land from the southwest quarter of Lot 22 in Concession 3 was sold to the Township of London in 1904 to allow for re-alignment of the roadway to cross the railway at right angles with a shorter structure than the original.

Structural drawings from the C.P.R. indicate that a bridge from St. James (Manitoba), in Central Division was altered to fit at Mile 2.9 in the Windsor Section, the railway location for this crossing, being 2.9 miles west of the Richmond Street crossing. The bridge was originally constructed probably about 1890 in the Manitoba location. The drawings for its re-configuration to the new location are dated November 1904 but documents indicate that it was March 1909 when the Board of Railway Commissioner authorized the C.P.R. to use the bridge at Mile 2.9. The relocated structure was re-constructed on the Sarnia Road site by the Canadian Bridge Company of Walkerville, Ontario.

The bridge maintains a historical connection with the CPR at this site and an association with the Canadian Bridge Company, one of Canada’s leading constructors. It also serves as a connection with a time period when roads and bridges were first incorporated into the physical landscape of the area.

Although the Pratt truss was quite common in bridges of the time, there is only one other similar design in the City of London, that being the former King Street Bridge over the Thames River. In the move from Manitoba, the bridge deck was widened to carry a two-lane roadway rather than the original rail tracks and timber decking was added. The added components to modify the configuration are still in use on the bridge, although the deck planking has been replaced a number of times. More recently, modern traffic demands require that the bridge is now used as a single lane. The concrete abutments date to the 1909 construction at Samia Road but they appear to have been repaired and altered several times.

Description of Heritage Attributes

- The Samia Road Bridge is a single span, steel, pin-connected, through Pratt truss
- The pin-connected feature is quite uncommon in local bridge construction
- The bridge’s bottom chord, eye-bar and pin configuration is typical of late 19th century construction
- Members were added to the basic Pratt design, diagonally crossing in the central panel of each truss
- An unusual feature is a rod connecting the three central panels on each truss, running from the top of the end post to the mid-point of the two central verticals and ending at the top of the other end post
- Indications are that many of the steel components of the bridge are original to its first use in Manitoba
- Several of the modified portions of the bridge are still evident today in the portal framing and v-lacing of the upper chords
- The height of the trusses was designed to allow railway clearances which are much higher than roadway clearances