CULTURAL HERITAGE EVALUATION AND
PRELIMINARY HERITAGE IMPACT ASSESSMENT:
STRUCTURE 170160

MIDDLEBROOK PLACE/WEISENBERG ROAD
Lot 64, GERMAN COMPANY TRACT
GEOGRAPHIC TOWNSHIP OF WOOLWICH
WATERLOO COUNTY
REGIONAL MUNICIPALITY OF WATERLOO, ONTARIO

Prepared for:

GM BluePlan Engineering Limited
650 Woodlawn Road West
Guelph, ON N1K 1B8

ASI File: 17CH-084

November 2017
EXECUTIVE SUMMARY

ASI was contracted by GM BluePlan Engineering Limited to conduct a cultural heritage evaluation and preliminary heritage impact assessment as part of the Woolwich Township 2017 Bridge and Culvert Program. This report is a part of the Part D Structures 180160/170160 Middlebrook Place Class Environmental Assessment and assesses Structure 170160. The study area is located over the Grand River on Middlebrook Place/Weisenberg Road in the Township of Woolwich, Regional Municipality of Waterloo.

Structure 170160 is a single span concrete rigid frame bridge built in 1932. It has an east-west orientation located approximately 290m southeast of Middlebrook Road, near the community of Inverhaugh. The bridge carries a single lane of Middlebrook Place over an unnamed tributary of the Grand River in one span with a total crossing length of 3.6m. The deck has a travel width of 4.9m and an overall structure width of 5.5m. The bridge has a 10 tonnes load limit with an 80km/hr speed limit.

Structure 170160 has been previously identified as retaining cultural heritage value, however does not currently have any status under the Ontario Heritage Act. Based on the results of archival research, an analysis of bridge design and construction in Ontario, a field investigation, and the application of the Ontario Heritage Act Regulation 9/06, Structure 170160 is determined to retain cultural heritage value. In particular, Structure 170160 is an early example of a cast-in-place concrete rigid frame bridge with a box design. It is a single-lane one-span bridge with a simple concrete railing system that gives the bridge a distinctive appearance and affords the bridge a degree of aesthetic appeal along a historic transportation route in a rural setting. Given that Structure 170160 meets one of the criteria contained in Regulation 9/06, this structure is considered to be a cultural heritage resource and is eligible for designation under the Ontario Heritage Act.

Given the identified cultural heritage value of Structure 170160, the following recommendations and mitigation measures should be considered and implemented:

1. Conservation Alternatives 1 - 3 are the preferred conservation options, with Alternative 1, the retention of the bridge with no major modifications undertaken, being the most preferred.

2. Should retention or relocation of the bridge be chosen as the preferred conservation option (one of Conservation Alternatives 1 – 7), the heritage attributes identified in Section 5.1 should be retained and treated sympathetically.

3. Should replacement of the bridge be chosen, (Conservation Alternatives 8 or 9), the following mitigation options should be considered:
a. Replacement/removal of the existing bridge and construction of a new bridge with replication of the appearance of the heritage bridge in the new design, with allowances for the use of modern materials. Where possible, salvage elements of the bridge for incorporation into the new structure or for future conservation work or displays. The heritage attributes identified in Section 5.1 should be considered for replication.

b. Compatible new development, where a new bridge is given a design that is sympathetic to the design qualities of the original bridge and its setting. This option would allow simplification of original design details and the use of new technologies and materials.

4. Should replacement of the bridge be chosen, a full documentation report of the structure is required. A documentation report should be completed even if a new structure is designed to replicate the existing structure sympathetically.

Additionally, the following recommendations and mitigation measures should be considered as part of the proposed Structure 170160 short and/or long term work plan:

5. This report should be filed with the heritage staff at the Region of Waterloo, Woolwich Heritage Committee, and with the Ministry of Tourism, Culture and Sport for review.

6. This bridge should be added to the Woolwich Municipal Heritage Register.

7. Should preservation of the existing bridge prove impossible (i.e. if the safety of the bridge is compromised to the extent that rehabilitation is not possible, or cost of rehabilitation is prohibitive compared to replacement, or replacement is required to meet demand requirements), Woolwich Township may wish to consider retaining the aesthetic design of the bridge, such as a concrete railing system, and fitting this element or design into a new structure.

8. If replacement is the preferred option, it is important to be mindful of the overall bridge setting when considering removal of the structure. Consideration should be given to design options that will minimize impacts to the overall landscape setting and those that will retain the character of the bridge setting.

9. A more detailed Heritage Impact Assessment should be conducted as needed by a qualified heritage professional once the short and/or long term work plan for Structure 170160 has been finalized in order to fully evaluate potential impacts and identify mitigation options, if required, for the bridge.
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1.0 INTRODUCTION

ASI was contracted by GM BluePlan Engineering Limited to conduct a cultural heritage evaluation and preliminary heritage impact assessment as part of the Woolwich Township 2017 Bridge and Culvert Program. This report is a part of the Part D Structures 180160/170160 Middlebrook Place Class Environmental Assessment and assesses Structure 170160. The study area is located over the Grand River on Middlebrook Place/Weisenberg Road in the Township of Woolwich, Regional Municipality of Waterloo.

Structure 170160 is a single-span concrete rigid frame bridge built in 1932. It has an east-west orientation 290m southwest of Middlebrook Road, near the community of Inverhaugh (Figures 1 and 2). The bridge carries a single lane of predominantly vehicular and horse and buggy traffic across a tributary of the Grand River in one span with a total crossing length of 3.6m and deck travel width of 4.9m and an overall structure width of 5.5m. The bridge has not been identified as an Ontario Heritage Bridge and does not currently have any status under the Ontario Heritage Act. Structure 170160 is not listed on the Woolwich Municipal Heritage Register, however, it has been included as a heritage bridge in the Spanning the Generations, Study of Old Bridges in Waterloo Region (PHCS 2004a) inventory within the Waterloo Region. It was also identified as a non-heritage bridge in The Grand River Watershed Heritage Bridge Inventory (Benjamin et al. 2013).

Figure 1: Location of Structure 170160 (in red) within the Middlebrook Place EA Study Area (in blue).
Base Map: ©OpenStreetMap and contributors, Creative Commons-Share Alike License (CC-BY-SA ESRI Street Maps)
As this structure exceeds the 40 year age limit, a Cultural Heritage Evaluation Report (CHER) is required to determine if the bridge retains cultural heritage value, which would warrant further study through the Environmental Assessment (EA) process prior to the detailed design or construction work. The principal aims of this report are to:

- Describe the methodology that was employed and the legislative and policy context that guides heritage evaluations of bridges over 40 years old;
- Provide a historical overview of the design and construction of the bridge within the broader context of the surrounding township and bridge construction generally;
- Describe existing conditions and heritage integrity;
- Evaluate the bridge using Ontario Regulation 9/06, Criteria for Determining Cultural Heritage Value or Interest, of the Ontario Heritage Act and draw conclusions about the heritage attributes of the structure; and,
- If warranted, assess impacts of the undertaking, ascertaining sensitivity to change in the context of identified heritage attributes and recommend appropriate mitigation measures.

2.0 LEGISLATION AND POLICY CONTEXT

Infrastructure projects have the potential to impact cultural heritage resources in a variety of ways. These include loss or displacement of resources through removal or demolition and the disruption of resources by introducing physical, visual, audible or atmospheric elements that are not in keeping with the resources and/or their setting.

A 40-year-old threshold is used as a guiding principle when considering cultural heritage resources in the context of improvements to specified areas (Ministry of Transportation 2006; Ministry of Transportation...
2007; Ontario Realty Corporation 2007). While identification of a resource that is 40 years old or older does not confer outright heritage significance, this threshold provides a means to collect information about resources that may retain heritage value. Similarly, if a resource is slightly younger than 40 years old, this does not preclude the resource from retaining heritage value.

The analysis used throughout the cultural heritage resource assessment process addresses cultural heritage resources under various pieces of legislation and their supporting guidelines:

- **Environmental Assessment Act** (R.S.O. 1990, Chapter E.18)
  - Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments (MCC 1992)
  - Guidelines on the Man-Made Heritage Component of Environmental Assessments (MCR 1980)

- **Ontario Heritage Act** (R.S.O. 1990, Chapter O.18) and a number of guidelines and reference documents prepared by the Ministry of Tourism and Culture (MTC):
  - Ontario Heritage Tool Kit (MCL 2006)
  - Screening for Impacts to Built Heritage and Cultural Heritage Landscapes (November 2010)

The Ontario Heritage Act makes provisions for the protection and conservation of heritage resources in the Province of Ontario. A Cultural Heritage Evaluation Report is intended to identify areas of heritage interest as specified in the Provincial Policy Statement. Built heritage concerns are recognized as a matter of provincial interest in Section 2.6.1 of the Provincial Policy Statement (PPS) which states:

- Significant built heritage resources and cultural heritage landscapes shall be conserved (PPS 2014:29).

In the Provincial Policy Statement the term Conserved means:

the identification, protection, management and use of built heritage resources, cultural heritage landscapes and archaeological resources in a manner that ensures their cultural heritage value or interest is retained under the Ontario Heritage Act. This may be achieved by the implementation of recommendations set out in a conservation plan, archaeological assessment and/or heritage impact assessment. Mitigative measures and/or alternative development approaches can be included in these plans and assessments (MMAH 2014:40).

Additionally, Part 4.7 of the PPS states that:

The official plan is the most important vehicle for implementation of this Provincial Policy Statement. Comprehensive, integrated and long-term planning is best achieved through official plans.

Official plans shall identify provincial interests and set out appropriate land use designations and policies. To determine the significance of some natural heritage features and other resources, evaluation may be required.

Official plans should also coordinate cross-boundary matters to complement the actions of other planning authorities and promote mutually beneficial solutions. Official plans
shall provide clear, reasonable and attainable policies to protect provincial interests and
direct development to suitable areas.

In order to protect provincial interests, planning authorities shall keep their official plans
up-to-date with this Provincial Policy Statement. The policies of this Provincial Policy
Statement continue to apply after adoption and approval of an official plan.

The Ministry of Tourism, Culture and Sport (MTCS) published the Standards and Guidelines for the
Conservation of Provincial Heritage Properties (2014). These Standards and Guidelines apply to
properties the Government of Ontario owns or controls that have cultural heritage value or interest. The
Standards and Guidelines, and associated guidance documents, apply to provincially owned or controlled
heritage properties in the areas of identification and evaluation, protection, maintenance, use, and
disposal. However, as Structure 170160 is not provincially owned, the Standards and Guidelines can only
provide general reference in determining the heritage significance of a property. The Ontario Heritage
Toolkit (MCL 2006) provides a guide on how to evaluate heritage properties that are subject to or are
being considered for municipal designation and/or listing under sections 27, 29, or 41 of the Ontario
Heritage Act.

2.1 Regional Policies

Section 3 of the Regional Official Plan (Consolidated 2015) for the Region of Waterloo sets out a number
of policies with regard to cultural heritage resources. Policies that are relevant to this study include:

3.G Cultural Heritage
Cultural heritage resources are the inheritance of natural and cultural assets that give people a
sense of place, community and personal identity. Continuity with the past promotes creativity and
cultural diversity. The region has a rich and diverse heritage, including distinctive cultures,
traditions, festivals, artisans and craftspeople, landmarks, landscapes, properties, structures, burial
sites, cemeteries, natural features and archaeological resources. These resources provide an
important means of defining and confirming a regional identity, enhancing the quality of life of
the community, supporting social development and promoting economic prosperity. The Region
is committed to the conservation of its cultural heritage. This responsibility is shared with the
Federal and Provincial governments, Area Municipalities, other government agencies, the private
sector, property owners and the community.

3.G.1 The Region and Area Municipalities will ensure that cultural heritage resources are
Conserved using the provisions of the Ontario Heritage Act, the Planning Act, the Environmental
Assessment Act, the Cemeteries Act, and the Municipal Act.

3.G.2 The Region will prepare and update a Regional Implementation Guideline for Conserving
Regionally Significant Cultural Heritage Resources. In accordance with the Ontario Heritage Act,
this guideline will outline the criteria and processes the Region will follow to identify and
conserve cultural heritage resources of Regional interest including regional roads that have
cultural heritage value or interest.

3.G.22 The Region supports the national recognition given to the Grand River as a Canadian
Heritage River, including its major tributaries, the Nith River, Speed River, and Conestogo River,
and will continue to promote appropriate initiatives to maintain, enhance, manage and conserve natural, cultural, recreational, scenic and ecological features.

3.G.27 The Region recognizes that many Regional Roads are characterized by natural, cultural heritage and recreational features that contribute to the scenic value of Regional Roads. During any construction or upgrades, the Region will, wherever feasible, endeavour to protect and/or enhance the scenic value of such features along Regional Roads.

It should be noted that the Region of Waterloo’s Official Plan (OP) supports built heritage, but does not specify bridges as a part of non-renewable heritage resources.

In addition to the OP, the Scenic Roads and Special Character Streets, Resource Document (2011) provides recommendations on the conservation of heritage bridges. Significant bridges contribute to the character of a scenic corridor. Within the Region of Waterloo, over 100 bridges have been inventoried and ranked according to their heritage significance. This document recommends that heritage bridges should be conserved. Section 4.3 provides the following specific recommendations on bridges related to this project:

**Heritage Bridge Rehabilitation & Conservation:**

a) Preserve bridges that are designated under the Ontario Heritage Act and listed on Municipal Heritage Registers. These include the West Montrose Bridge in Woolwich, the Freeport Bridge in Kitchener, and the Black Bridge Road Bridge in Cambridge.

b) Conserve other heritage bridges [that are not designated under the Ontario Heritage Act] whenever feasible. Information on historically significant bridges within the Region can be found in Spanning the Generations: A Study of Old Bridges in Waterloo Region (2004).

c) Protection Strategies for the Region’s top 10 historic bridges and collection of steel truss bridges are listed in Phase 2 and 3 of the Bridge Study.

**Maintenance:** Whenever feasible, heritage bridges should be maintained and kept in regular use. Follow industry standards and known best practices to maintain, with an aim to preserve the heritage bridge.

**Alterations/Railing Design:** Consider using open style railings on bridges in high pedestrian areas to allow for views of the waterway. The Region has research available on railing options available from Transportation Engineering staff.

**Recognition:** When possible, provide access for people to visit old bridges, tunnels and overpasses. Refer to Regional Policies and Procedures for Access onto Regional Roads for guidance on appropriate points of access. Cultural heritage staff is available to provide interpretation and to recognize heritage bridges owned by the Region through the Region’s Heritage Bridge Recognition Program, Ontario Heritage Act designations, heritage easements or Provincial plaques. The Region is installing interpretive plaques at the top ten historically significant bridges in the Region. Currently there are plaques at the Hartman Bridge in New Hamburg, the Freeport Bridge and the Bridgeport Bridge in Kitchener, and the Mill Creek Bridge, Main Street Bridge, and Black Bridge Road Bridge in Cambridge.

**Reduction of Load Limit and By-pass Creation and Decommissioned Bridge:**

Ideally, when regular use is no longer feasible, a bridge should be kept in use in its original location with a reduced load limit and/or for pedestrians only, with traffic being re-routed to an alternate route or by-
pass. As this may not be feasible on a Regional corridor, the bridge may need to be relocated or dismantled. Removing the bridge from its original location reduces its heritage value but is preferred over permanent dismantling. Contact cultural heritage staff prior to relocation or demolition, of an historic bridge. It may be recommended that the Region collect and preserve documentation, measured drawings and photographs of the historic bridge; incorporate resources from a demolished historic bridge into a new bridge structure; and/or provide interpretation of the heritage resource on a plaque.

Recommendations for the treatment of heritage bridges can be found in Spanning the Generations: A Study of Old Bridges in Waterloo Region (2004b:69). The study presents Protection Strategies in Section 5.3.2 and is as follows:

- Creating by-passes or using alternate routes. This option preserves the original location of the bridge and its profile within the community.
- Reduction of Load Limit. There can be a reduction of the load limits, or traffic, or traffic can be reduced to pedestrians only. Planning strategies can then be employed to encourage alternate routes of travel.
- Incorporation. Include the bridge into the development scheme. This might involve constructing a new bridge near the existing one.
- Relocation. The bridge may be moved to a safer location. However, removing the bridge from its original location reduces its heritage value.

2.1.1 The Grand River Heritage River Designation

The Grand River is a 280km long river stretching from Wareham Ontario in the north to Lake Erie in the south. The Grand travels through a number of major communities in Southern Ontario, including Kitchener, Waterloo, Cambridge, and Brantford, and has been a central feature in the history of the area. As such, it is recognized as one of Canada’s 42 national heritage rivers.

The Grand River and its major tributaries, the Conestogo, Eramosa, Nith, and Speed rivers, were recognized as a Canadian Heritage Rivers in 1994 for its human and recreational features. Five major themes were listed to describe the human heritage values (GRCA 2014):

- The watershed’s cultural mosaic since the mid-nineteenth century;
- The strong association of native peoples with the watershed for thousands of years;
- The Grand River’s industrial heritage;
- Human adaptation to fluctuating river flows; and
- The many famous people associated with the watershed.

The nomination for the Heritage River designation noted the many unique historical sites associated with themes. The watershed’s cultural significance covers 11,000 years of human history and consists of historical communities, buildings, industries, and over 800 archaeological sites. The area is associated with a number of important groups of people who contributed to pre- and post-Confederation Canada including the Neutral people, the Iroquois Confederacy, British Loyalists, Pennsylvania Mennonites, and Scottish Immigrants. The Grand’s recreational heritage is tied to an extensive hiking and cycling trail network and its 37 conservation areas, which contain opportunities for recreation.
In 2013, the University of Waterloo et al. conducted a study to inventory heritage bridges in the Grand River Watershed. Within this study, 167 heritage bridges and 473 non-heritage bridges were inventoried. Structure 17160 (Lot 64, German Company Tract) was inventoried as a non-heritage bridge.

2.1.2 Review of Heritage Registers and Consultation

As a part of the evaluation undertaken for this report, municipal, provincial and federal heritage registers and inventories were reviewed including:

- Region of Waterloo Spanning the Generations: A Study of Old Bridges in Waterloo Region (Phases 1, 2, and 3);
- Woolwich Township Municipal Heritage Register;
- Arch, Truss & Beam, The Grand River Watershed Heritage Bridge Inventory;
- Ontario Heritage Trust Plaque Guide;
- Ontario Heritage Act - Ontario Heritage Trust;
- Conservation Easements - Ontario Heritage Trust;
- Canadian Register of Historic Places; and
- Federal Heritage Designations.

The following stakeholders were contacted with inquiries regarding the heritage status and for information concerning the Structure 170160.

Table 1: Results of Consultation

<table>
<thead>
<tr>
<th>Contact</th>
<th>Organization</th>
<th>Date(s) of Communications</th>
<th>Description of Information Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridget Coady, Principal Planner,</td>
<td>Region of Waterloo</td>
<td>29 September 2017</td>
<td>Response received. Provided viewing of bridge documents.</td>
</tr>
<tr>
<td>Cultural Heritage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patricia Bartel, Librarian</td>
<td>Ministry of Transportation,</td>
<td>29 September 2017</td>
<td>Response received. Patricia forwarded a request to the MTO engineers in the Bridge Office for bridge drawings.</td>
</tr>
<tr>
<td></td>
<td>Division Services Office</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sean Morris, Structural Technician</td>
<td>Ministry of Transportation, Bridge</td>
<td>25 October 2017</td>
<td>Response received. No structural drawings on file for this bridge.</td>
</tr>
<tr>
<td></td>
<td>Office, Bridge Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archive Staff</td>
<td>Archives of Ontario</td>
<td>04 October 2017</td>
<td>Response received. Staff has a Woolwich bridge file but do not have bridge architectural or technical drawings.</td>
</tr>
</tbody>
</table>

2.2 Cultural Heritage Evaluation and Heritage Impact Assessment Report

The purpose of the CHER is to examine a property as whole, its relationship to surrounding landscapes, and its individual elements. Conducting scholarly research and site visits inform such an examination. Background information is gathered from heritage stakeholders where available, local archives, land registry offices, local history collections at public libraries, and the Ministry of Tourism, Culture and Sport when appropriate. Once background data collection is complete, a site visit is carried out to conduct
photographic documentation and site analysis. These components provide a means to soundly establish the resource’s cultural heritage value.

The scope of a Cultural Heritage Evaluation Report (CHER) is guided by the Ministry of Tourism, Culture and Sport’s *Ontario Heritage Toolkit* (2006). Generally, CHERs include the following components:

- A general description of the history of a study area as well as a detailed historical summary of property ownership and building(s) development;
- A description of the cultural heritage landscape and built heritage resources;
- Representative photographs of the exterior and interior of a building or structure, and character-defining architectural details;
- A cultural heritage resource evaluation guided by the *Ontario Heritage Act* criteria;
- A summary of heritage attributes;
- Historical mapping and photographs; and
- A location plan.

Using background information and data collected during the site visit, the property is evaluated using criteria contained within Regulation 9/06 of the *Ontario Heritage Act*.

*Ontario Heritage Act* Regulation 9/06 provides a set of criteria, grouped into the following categories which determine the cultural heritage value or interest of a potential heritage resource in a municipality:

i) Design/Physical Value;
ii) Historical/Associative Value; and
iii) Contextual Value.

Should the potential heritage resource meet one or more of the above mentioned criteria, a Heritage Impact Assessment (HIA) is required and the resource considered for designation under the *Ontario Heritage Act*.

When evaluating the cultural heritage significance of Structure 170160, the *Ontario Heritage Bridge Guidelines for Provincially Owned Bridges* (OHGB) (MTO 2008) and the *Ontario Heritage Bridge Program* (MCC 1991) were consulted as points of reference.

The OHBG provides rationale for the protection and preservation of heritage bridges and is described as follows (MTO 2008:5-6):

Bridges are important parts 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.

Should the potential heritage resource meet one or more of the above mentioned criteria, a Heritage Impact Assessment (HIA) is required and the resource considered for designation under the *Ontario Heritage Act*. 
In order to help guide the EA process, this report also includes a preliminary assessment of impacts ascertaining sensitivity to change in the context of identified heritage attributes and recommends appropriate mitigation measures based on available information.

3.0 HISTORICAL CONTEXT AND CONSTRUCTION

3.1 Introduction

Structure 170160 is a single span concrete rigid frame bridge built in 1932. The bridge has an east-west orientation and is located on Middlebrook Place (Weisenberg Road), 290m southeast of Middlebrook Road. The bridge carries a single lane of predominantly vehicular and horse and buggy traffic across a tributary of the Grand River in one span with a total crossing length of 3.6m. The deck has a travel width of 4.9m, and overall structure width of 5.5m (Ontario Structure Inspection Manual Inspection Form 2015:1). The bridge has not been identified as a heritage bridge on the Ontario Heritage Bridge inventory and does not currently have any status under the Ontario Heritage Act.

Cultural heritage resources are those buildings or structures that have one or more heritage attributes. Heritage attributes are constituted by and linked to historical associations, architectural or engineering qualities and contextual values. Inevitably many, if not all, heritage resources are inherently tied to “place”; geographical space, within which they are uniquely linked to local themes of historical activity and from which many of their heritage attributes are directly distinguished today. In certain cases, however, heritage features may also be viewed within a much broader context. Section 3.2 of this report details a brief historical background to the settlement of the surrounding area. A description is also provided of the construction of the bridge within its historical context (Section 3.3).

3.2 Local History and Settlement

Historically, the environmental assessment study area is located along Woolwich Township Road 60 (Weisenberg Road), in Lot 64, German Company Tract, in the Geographic Township of Woolwich, Waterloo County. This road, currently referred to as Middlebrook Place, is a boundary roadway between the Township of Woolwich and the Township of Centre Wellington (formally Pilkington Township).

3.2.1 Woolwich Township, Waterloo County

Woolwich Township was one of the earliest townships secured for settlement in Waterloo County, but was slow to be settled. It includes the communities of Conestogo, Elmira, St. Jacobs, and Winterbourne. The region of present-day Woolwich Township was formally part of a Crown Grant of land to Joseph Brant and the Iroquois in the late eighteenth century. The land was divided into three blocks, which were later incorporated into the townships of Waterloo, Woolwich, and Dumfries in 1816. The first settler in the township was Captain Thomas Smith of Vermont, who arrived around 1810 and lived in a house on the east side of the Grand River. Smith was followed by George Eby, who settled on Lot 2 in 1813 near the township boundary of Waterloo and Woolwich, and later families such as Cress, Martin, Musselman, Reist, Meyer, Kressler, and Bowman. Most of these early settlers were Mennonites who tended to settle west of the Grand River, while English (many of them Methodists) and Scots-Presbyterians settled to the east of the river. In 1808, lots totalling 26,600 acres were purchased by Mennonites. In 1813 David Musselman built the first mill in the township at the site of Conestogo, which had a population of about
70 people by 1850. Meyer laid out the boundaries of Heidelberg, while Bowman and Snider began the settlement of St. Jacobs around a saw and grist mill circa 1851. Woolwich Township also includes the community of Elmira, which was founded by Edward Bristow in 1825. After 1845 a large influx of German settlers greatly increased the population, and by the 1890s the population exceeded to 1000. (Mika and Mika 1983:673–674; PHCS 2007; Region of Waterloo 2010; Waterloo Region Museum 2017; Woolwich Township n.d).

As a result of early to mid nineteenth century settlement in the township, cleared land led to unpredictable flooding of the Grand River. Therefore, bridges became significant in the development of the township. During this time, almost half the business conducted by Woolwich Township Council focused on the construction and improvement of roads and bridges. Due to flooding, bridges were replaced regularly. Protecting wooden bridges from damage caused by the pounding of horse hooves was a concern, and a by-law was passed stating a horse must cross walking, not running, on bridges over 30 feet long or their rider or driver would be subjected to a fine (Mika and Mika 1983:673–674; PHCS 2007; Region of Waterloo 2010; Waterloo Region Museum 2017; Woolwich Township n.d).

A large Mennonite population still lives in the township, including a small number of Old Order Mennonites. In 1973, a restructuring of the municipal boundaries and organization brought about the dissolution of Waterloo Township, and the creation of the cities of Cambridge, Kitchener, and Waterloo. As well, the western portion of the former Waterloo Township, including Breslau, was transferred into Woolwich Township (Mika and Mika 1983:673–674; PHCS 2007; Region of Waterloo 2010; Waterloo Region Museum 2017; Woolwich Township n.d).

Today, the Regional Municipality of Waterloo consists of the cities of Kitchener, Waterloo, and Cambridge, and the townships of Wellesley, Woolwich Wilmot, and North Dumfries. It is often referred to as the Region of Waterloo or Waterloo Region.

3.2.2 Pilkington Township, Wellington County

Pilkington Township was originally part of the Haldimand Tract in 1784, and was later purchased from the Six Nations by William Wallace of Niagara. Wallace then sold the block in 1799 to Robert Pilkington, Major-General in the Corps of Royal Engineers of Canada, and it became known as the Pilkington Block. Settlement began around 1819 with the Lepard, Wolcott, Davis, Reeve, Greenhalgh, and Matthews families, and a saw mill, grist mill, and lime kiln were built. Settlement after 1830 was slow, as land was twice as expensive as in the neighbouring Nichol Township. The Pilkington estate advertised free 100-acre parcels to new settlers to encourage growth, however General Pilkington died in 1835 and his executors did not honour the offer of free land. The estate was surveyed in 1845, and was considered part of the Township of Woolwich until 1852 when it became the Township of Pilkington (Mika and Mika 1983:217–218). In 1999 Pilkington Township was amalgamated into the Township of Centre Wellington, along with the towns of Elora and Fergus and the Townships of Nichol and West Garafraxa (County of Wellington 2016).

3.2.3 Inverhaugh, Pilkington Township

Inverhaugh is considered a post settlement situated in the vicinity of Lot 5S Concession III in Pilkington Township, Wellington County. The settlement is located on the Grand River, four miles from the
settlement of Elora. In 1906, the community contained a Methodist church and blacksmith shop with a population of 26 (from Lovell’s 1906 Canada Gazetteer).

3.3 History of the Study Area, Structure 170160, and Previous Bridge Crossing

3.3.1 Review of Nineteenth and Twentieth Century Mapping

The 1861 Tremaine map indicates that Middlebrook Place was not surveyed at that time (Figure 3). In 1861, the existing bridge falls into a lot owned by Benjamin Snider. The map illustrates the existing bridge crosses a tributary of the Grand River. On the 1877 historical atlas map of Woolwich Township, the location of the bridge is within Lot 64, German Company Tract, however there is no bridge or land owner illustrated (Figure 4). The 1906 historical atlas map of Wellington County shows that Middlebrook Place is open and is carried over the Grand River (Figure 5). By 1935, the topographic map shows two bridges extant along Middlebrook Place, one of which is a wooden bridge crossing the Grand River (Middlebrook Bridge/Structure 180160) (Figure 7). The other bridge illustrated represents Structure 170160. The type of bridge is not illustrated. The 1966 aerial photograph indicates that little development occurred between 1935 and the early 1960s and the vicinity of the bridge is wooded with agricultural fields and farmsteads surrounding the area (Figure 8).

Figure 3: Location of Structure 170160 overlaid on the 1861 map of the Township of Woolwich
Source: Tremaine’s Map of Waterloo County, 1861
Figure 4: Structure 170160 overlaid on the 1877 Township of Woolwich and 1881 Township of Pilkington

Source: H. Parsell & Co. and Walker & Miles, 1881-1877

Figure 5: Location of Structure 170160 overlaid on the 1906 historical atlas map of Pilkington Township

Source: Historical Atlas Publishing, 1906
Figure 6: Structure 170160 overlaid on 1930 aerial photography
Source: Digital Historical Air Photos of Woolwich Township (Accessed online at http://www.lib.uwaterloo.ca/locations/umd/project/IME21.html)

Figure 7: Structure 170160 overlaid on 1935 NTS mapping
Source: Department of National Defence, 1935
3.3.2 Previous Bridge Crossings

Structure 170160 is located on a boundary roadway between the Township of Woolwich and the Township of Centre Wellington. This bridge was built to carry Middlebrook Place/Weissenberg Road over an unnamed tributary of the Grand River. Historical mapping suggests that the road was opened between 1877 and 1906, so it is likely that an earlier bridge was located at this location. However, a review of historical mapping and archival records could not confirm what type of bridge, if any, was extant on the site.

3.4 Structure 170160 Construction

3.4.1 Early Bridge Building in Ontario

Bridges were a necessity from the earliest days of road construction and were important to economic and social life, especially as mills were situated along the rivers. Crossing rivers by bridge was easier than fording. Settlements sprang up where the mills were serviced by bridges. Construction of the railway in the 1850s made it necessary to have reliable bridges able to withstand the weight of locomotives. In addition, good road bridges were required so farmers could transport their produce to local railway stations (PHCS 2004b). Most road bridge designs that evolved were based on principles derived from railroad construction. In Ontario, the timber bridge dominated the landscape in rural areas from 1780-1880, and persisted into the early twentieth century (Cuming 1983:38). Most nineteenth-century bridges in southern Ontario were built of timber. Short spans were beam structures, and longer spans employed
simple trusses, such as King and Queen Post trusses. Stone and wrought iron materials were also employed, but due to higher costs and a lack of skilled craftsmen such structures were generally restricted to market towns. By the 1890s, steel and concrete were becoming the materials of choice when constructing bridges given that both were less expensive and more durable than their wood and wrought iron predecessors (Ministry of Culture and Ministry of Transportation [n.d.]:7-8). Steel truss structures were very common by 1900, as were steel girder bridges. After WWI the increase in personal vehicles meant that stronger bridges were necessary. The Pratt truss and the Warren truss dominated the early twentieth century, and were typically used for spans up to 400 feet (Comp and Jackson 1977). The use of concrete in bridge construction was introduced at the beginning of the twentieth century, and by the 1930s, it was challenging steel as the primary bridge construction material in Ontario (Ministry of Culture and Ministry of Transportation [n.d.]:8). The rigid frame bridge style was introduced in 1931 and gained favour for use as a highway overpass (Ministry of Culture and Ministry of Transportation [n.d.]:8). Some of the stronger concrete bridges constructed in the 1930s formed part of the “Depression Era” Public Works Program that created work for the unemployed (PHCS 2004b). Post war period the trend was toward pre-casting concrete components off-site rather than pouring the concrete in place (Ministry of Culture and Ministry of Transportation [n.d.]:9). Today, concrete is the primary bridge building material on Ontario roads (Ministry of Culture and Ministry of Transportation [n.d.]:8).

3.4.2 **Construction of Structure 170160**

Structure 170160 is a single span concrete rigid frame bridge carrying one lane of Middlebrook Place over an unnamed tributary of the Grand River. According to the Ontario Structure Inspection Manual-Inspection Form for Structure 170160 in 2015, the subject bridge was built in 1932. This date was also reflected in the Municipal Bridge Appraisal Sheets in 1993. The appraisal sheet states that the bridge in 1993 carried two lanes of traffic and is 3.1m long, with a concrete deck measuring 5.5m wide. No further information could be gleaned about the construction of the structure.

4.0 **EXISTING CONDITIONS AND INTEGRITY**

A field review was undertaken by Tara Jenkins on 02 October 2017 to conduct photographic documentation of the bridge crossing from the existing right-of-way and to collect data relevant for completing a heritage evaluation of the structure. Results of the field review and bridge inspection reports received from the client were then utilized to describe the existing conditions of the bridge crossing. This section provides a general description of the bridge and associated cultural heritage features. For ease of description the bridge is considered to have an east-west orientation. Photographic documentation of the structure is provided in Appendix A.

This single span cast-in-place reinforced concrete rigid frame bridge, built in 1932, resembles a box culvert. However, a culvert is a span that has more than 300mm of fill above it, or is less than 3m in length. In previous documentation, Structure 170160 has also been referred to as an open footing concrete box bridge (PHCS 2004a). The abutments and deck are cast-in-place as one unit.

Middlebrook Place, including the bridge crossing, is wooded on all sides. Outside the wooded corridor, are open agricultural fields. Structure 170160 is roughly 35m west of Structure 180160, a steel truss bridge along Middlebrook Place that crosses the Grand River. When approaching the bridge there are hazard markers indicating a narrow bridge on all sides, though there is no signage to indicate a single lane. The existing bridge features a gravel wearing surface atop a concrete deck and abutments. The
bridge deck is bounded by a concrete railing system. The original simple concrete railing system is largely extant, though in a state of disrepair, and the southeast end section has been replaced by steel rail. The concrete posts and continuous railings sit upon a concrete curb. The soffit is a thick slab of cast-in-place concrete. The abutments are cast-in-place and form the legs of the rigid frame that are cast-in-place with the below ground bridge footings. Structure 170160 is almost invisible in the landscape apart from its railings.

Structure 170160 (Lot 64, German Company Tract Bridge) has been identified by the Region of Waterloo as a heritage bridge on the *Spanning the Generations: Study of Old Bridges in Waterloo Region* (PHCS 2004a), an inventory and heritage assessment of bridges within the Waterloo Region. It is not listed on the Municipal Register or designated under Part IV of the *Ontario Heritage Act*, nor is it identified as a heritage bridge on the *Ontario Heritage Bridge List*. The bridge was also identified as a non-heritage bridge on the Grand River Watershed Heritage Bridge Inventory (Benjamin et al. 2013).

According to the available reference documents, no refurbishments have been undertaken on the subject bridge, however the southeast end side has been replaced by steel rail.

Structure 170160 is currently co-owned by Woolwich Township and the Township of Centre Wellington. The bridge is maintained by Woolwich Township. According to an inspection undertaken in 2015, the bridge has a east-west orientation and is located on Middlebrook Place/Weisenberg Road 290m southeast of Middlebrook Road in the Geographic Township of Woolwich. The bridge carries one lane of motor and horse and buggy traffic across an unnamed tributary of the Grand River with a total crossing length of 3.6m. The deck has a travel width of 5.5m. The Ontario Structure Inspection Manual (OSIM) Inspection Form indicates the posted speed limit is 80km/hr and a current load limit of 10 tonnes (Ontario Structure Inspection Manual- Inspection Form 2015:1). The OSIM Inspection Form completed by GM BluePlan found the following deficiencies in 2015 (Appendix B):

- Cast-in-place concrete abutment walls- rust stains from exposed rebar on soffit; honeycombing on NE corner; light erosion; scour at W footing with light honeycombing and light scaling throughout
- Cast-in-place concrete abutment wingwalls each end repair concrete on abutments narrow Cast-in-place abutment wingwalls all quadrants- stained cracks with efflorescence; light honeycombing and light spalls
- Signs are all damaged
- Cast-in-place concrete posts- top of second post on N side has spalled off; base of one post severely disintegrated; cracking on other posts with light spalls; south riling missing two posts; severe outward rotation
- Cast-in-place concrete railing system- wide full depth cracks in several rails; severe spalling at ends with exposed corroded rebar
- Cast-in-place concrete thick slab soffit- exterior- severe delamination and spalling with exposed corroded rebar and wide cracking with alkali aggregate reaction
- Cast-in-place concrete thick slab soffit- interior- severe spalls and delaminations with exposed corroded rebar; honeycombing and wide cracking with a medium alkali aggregate reaction
- Cast-in-place concrete foundation- medium erosion at toe of footing; west footing exposed
- Cast-in-place concrete curb- severe spalling and light honeycombing on south curb; wide crack and severe spalling on SE curb
4.1 Comparative Geographic and Historic Context of Bridges in the Region of Waterloo and in Ontario

According the *Grand River Watershed Heritage Bridge Inventory* (Benjamin et al. 2013), the rigid frame style can be seen dating back to the early 1920s in the Grand River watershed, and continued to be the dominant type of concrete bridge in Ontario until the 1950s when pre-stressed precast concrete beams were introduced. A number of concrete rigid frame bridges were built throughout the watershed in the 1930s. Ten percent of the 167 heritage bridges identified in the *Grand River Watershed Heritage Bridge Inventory* were rigid frame. However, the subject bridge was not considered a heritage bridge in the Grand River watershed bridge study.

According to the *Spanning the Generations, Study of Old Bridges in Waterloo Region* (PHCS 2004a) inventory of bridges, there are two “open footing, concrete box” heritage bridges in the Region (PHCS 2004a). Structure 170160, most commonly referred to Lot 64, German Company Tract Bridge, is identified as one of them. The other open footing concrete box bridge is Lots 114/115 German Company Tract Bridge, built in 1930, also in the Township of Woolwich. This bridge, although longer than Structure 170160, does not have a railing system.

The inventory (PHCS 2004a) also reports an additional seven rigid frame heritage bridges. These bridges are documented as the earliest example of a rigid frame type bridge in the Region of Waterloo. Only one rigid frame has a construction date earlier than Structure 170160 – Klein’s Bridge, built in 1920 as a cast-in-place concrete bridge. In addition, in Woolwich Township there are two rigid frame varieties – the arch and the box. Similar to Structure 170160, there is only one box type rigid frame bridge on the inventory referred to as Lot 19, German Company Tract Bridge, built later in 1945.

In summary, the Region of Waterloo heritage bridge inventory has a total of three box type rigid frame bridges (including the open footing concrete box). Structure 170160 represents an early example of a rigid frame in Woolwich Township and is one of nine concrete rigid type heritage bridges in the Waterloo Region.

Structure 170160 is roughly 35m west of Structure 180160, a steel Pratt camelback through truss bridge, along Middlebrook Place which crosses the Grand River. Although Structure 180160 has a concrete railing system on its east approach, the railing design is different from Structure 170160. At the time of this report, no direct correlation between the two structures could be made.

5.0 HERITAGE EVALUATION OF STRUCTURE 170160

Table 2 contains the evaluation of Structure 170160 against criteria as set out in Ontario Regulation 9/06. Within the Municipal EA process, Ontario Regulation 9/06 is the prevailing evaluation tool when determining if a heritage resource, in this case a bridge, has cultural heritage value.
### Table 2: Evaluation of Structure 170160 (Lot 64, German Company Tract) using Ontario Regulation 9/06

1. The property has design value or physical value because it:

<table>
<thead>
<tr>
<th>Ontario Heritage Act Criteria</th>
<th>Yes/No</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. is a rare, unique, representative or early example of a style, type, expression, material or construction method;</td>
<td>Yes</td>
<td>Structure 170160, built in 1932, is a cast-in-place reinforced concrete rigid frame bridge. It is representative of rigid frame bridges built in this era throughout the Grand River watershed. It is an early example of a cast-in-place concrete rigid frame with a box design in the Region of Waterloo. It is a single-lane one-span bridge with a simple concrete railing system which gives the bridge a distinctive appearance and affords the bridge a degree of aesthetic appeal along a historic transportation route in a rural setting.</td>
</tr>
<tr>
<td>ii. displays a high degree of craftsmanship or artistic merit, or;</td>
<td>No</td>
<td>Structure 170160 does not display a high degree of craftsmanship or artistic merit.</td>
</tr>
<tr>
<td>iii. demonstrates a high degree of technical or scientific achievement.</td>
<td>No</td>
<td>Structure 170160 does not demonstrate a high degree of technical achievement or scientific achievement.</td>
</tr>
</tbody>
</table>

2. The property has historical value or associative value because it:

<table>
<thead>
<tr>
<th>Ontario Heritage Act Criteria</th>
<th>Yes/No</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community;</td>
<td>No</td>
<td>This bridge is not considered to have direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community.</td>
</tr>
<tr>
<td>ii. yields, or has the potential to yield, information that contributes to an understanding of a community or culture, or;</td>
<td>No</td>
<td>This bridge is not considered to have the potential to yield information that contributes to an understanding of a community or culture.</td>
</tr>
<tr>
<td>iii. demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.</td>
<td>No</td>
<td>This bridge is not known to represent the work or ideas of a particular architect or building significant to the community.</td>
</tr>
</tbody>
</table>

3. The property has contextual value because it:

<table>
<thead>
<tr>
<th>Ontario Heritage Act Criteria</th>
<th>Yes/No</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. is important in defining, maintaining or supporting the character of an area;</td>
<td>No</td>
<td>Structure 170160 is almost invisible in the landscape apart from its railings. Therefore, it is not significantly important in defining, maintaining, or supporting the character of the area.</td>
</tr>
</tbody>
</table>
Table 2: Evaluation of Structure 170160 (Lot 64, German Company Tract) using Ontario Regulation 9/06

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Evaluation</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>ii. is physically, functionally, visually or historically linked to its</td>
<td>No</td>
<td>At this time of this report, Structure 170160 could not be historically linked with its surrounding context, specifically Structure 180160 (the Middlebrook Bridge steel through truss bridge) located roughly 35m east of Structure 170160 along Middlebrook Place. Therefore, Structure 170160 it is not considered physically, functionally, visually or historically linked to its surroundings.</td>
</tr>
<tr>
<td>iii. is a landmark.</td>
<td>No</td>
<td>Due to the small scale of Structure 170160, the bridge does not serve as a landmark feature.</td>
</tr>
</tbody>
</table>

The above evaluation confirms that Structure 170160 meets one of the criteria set out in Regulation 9/06 of the *Ontario Heritage Act*. It is determined that Structure 170160 is an early example of a cast-in-place concrete rigid frame bridge with a box design. It is a single lane one span bridge with a simple concrete railing system that gives the bridge a distinctive appearance and affords the bridge a degree of aesthetic appeal along a historic transportation route in a rural setting.

Given that Structure 170160 meets at least one of the criteria contained in Regulation 9/06, this structure is considered to be a cultural heritage resource and is eligible for designation under the *Ontario Heritage Act*.

### 5.1 Draft Statement of Cultural Heritage Value

**Name:** Structure 170160  
**Alternate Name:** Lot 64, German Company Tract Bridge

Structure 170160 is located on Middlebrook Place/Weisenberg Road (formally Woolwich Township Road 60), 290m southeast of Middlebrook Road, in the Regional Municipality of Waterloo, near the community of Inverhaugh. Constructed in 1932, Structure 170160 is a single-lane single-span cast-in-place concrete rigid frame bridge.

This bridge is situated along a boundary roadway between the Township of Woolwich and the Township of Centre Wellington. The bridge crosses a tributary of the Grand River, a Canadian Heritage River.

Structure 170160 is one of the earliest rigid frames found in Woolwich Township. Built in 1932 of reinforced concrete, it is one of nine concrete rigid frame type heritage bridges in the Region of Waterloo. However, Structure 170160 is one of only three rigid frame bridges with a box design in the Region. This rigid frame bridge was built in a design type typical of its era and is an early example of a common bridge design built between the 1920s and the 1950s. The abutments and deck are one unit cast-in-place, a design that were used on small bridges. It is a single-lane one-span bridge with a simple concrete railing system which gives the bridge a distinctive appearance and affords the bridge a degree of aesthetic appeal along the historic transportation route in a rural setting. As an early example of this bridge type, contributes to the understanding of bridge development in the Waterloo Region.

Heritage attributes associated with Structure 170160 include but are not limited to:

- single-lane construction;
- reinforced concrete rigid frame box construction;
- concrete railing system; and
• location on an unnamed tributary of the Grand River.

6.0 ALTERNATIVES TO BE CONSIDERED FOR HERITAGE BRIDGES AS PART OF THE ENVIRONMENTAL ASSESSMENT PROCESS

Following the evaluation of Structure 170160 it is determined that it retains cultural heritage value. The following eight conservation options/alternatives are arranged according to the level or degree of intervention from minimum to maximum. The conservation options have been adapted from the Ontario Heritage Bridge Program (MCC 1991) which is regarded as current best practice for conserving heritage bridges in Ontario and ensures that heritage concerns, and appropriate mitigation options are considered.

1. Retention of existing bridge with no major modifications undertaken;
2. Retention of existing bridge and restoration of missing or deteriorated elements where physical or documentary evidence (e.g., photographs or drawings) can be used for their design;
3. Retention of existing bridge with sympathetic modification;
4. Retention of existing bridge with sympathetically designed new structure in proximity;
5. Retention of existing bridge no longer in use for vehicle purposes but adapted for pedestrian walkways, cycle paths, scenic viewing etc.;
6. Retention of bridge as a heritage monument for viewing purposes only;
7. Relocation of bridge to appropriate new site for continued use or adaptive re-use;
8. Replacement/removal of existing bridge with salvage elements/members of heritage bridge for incorporation into new structure or for future conservation work or displays;
9. Replacement/removal of existing bridge with full recording and documentation of the heritage bridge.

Given that the bridge was found to retain cultural heritage value under Regulation 9/06, all nine of these conservation options should be considered as part of the Structure 170160 Cultural Heritage Evaluation and Heritage Impact Assessment Report.

7.0 ENVIRONMENTAL ASSESSMENT OPTIONS

Based on the age of the structure and deficiencies observed in 2015, the Class EA process for this bridge is required to address the closure of the structure and identify a short and/or long term plan for the structure. The assessment is a part of the Woolwich Township 2017 Bridge and Culvert Program. This report is a part of the Part D Structure 180160/170160 Middlebrook Place Class Environmental Assessment.

7.1 Evaluation of Impacts

To assess the potential impacts of the proposed alternatives, the cultural heritage resource and identified heritage attributes were considered against a range of possible impacts (Table 3) as outlined in the Ministry of Tourism and Culture document entitled Screening for Impacts to Built Heritage and Cultural Heritage Landscapes (November 2010), which include:

• Destruction of any, or part of any, significant heritage attribute or feature (III.1).
- Alteration which means a change in any manner and includes restoration, renovation, repair or disturbance (III.2).
- Shadows created that alter the appearance of a heritage attribute or change the visibility of a natural feature of plantings, such as a garden (III.3).
- Isolation of a heritage attribute from its surrounding environment, context, or a significant relationship (III.4).
- Direct or indirect obstruction of significant views or vistas from, within, or to a built and natural feature (III.5).
- 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 (III.6).
- Soil disturbance such as a change in grade, or an alteration of the drainage pattern, or excavation, etc. (III.7)
### Nine Bridge Improvement Alternatives

<table>
<thead>
<tr>
<th>Alternative Description</th>
<th>Destruction, removal or relocation</th>
<th>Alteration</th>
<th>Shadows</th>
<th>Isolation</th>
<th>Direct or indirect obstruction of significant views</th>
<th>A change in land use</th>
<th>Soil disturbance</th>
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<tbody>
<tr>
<td>1) Retention of existing bridge with no major modifications undertaken</td>
<td>No impact.</td>
<td>No impact.</td>
<td>No impact.</td>
<td>No impact.</td>
<td>No impact.</td>
<td>No impact.</td>
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<tr>
<td>2) Retention of existing bridge and restoration of missing or deteriorated elements</td>
<td>No impact.</td>
<td>No impact.</td>
<td>No impact.</td>
<td>No impact.</td>
<td>No impact.</td>
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<td>where physical or documentary evidence (e.g. photographs or drawings) can be used for</td>
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<td>their design.</td>
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<td>4) Retention of existing bridge with sympathetically designed new structure in</td>
<td>No impact.</td>
<td>Yes –</td>
<td>No impact.</td>
<td>No impact.</td>
<td>Yes – use of bridge would change, as current</td>
<td>Yes – impacts are</td>
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<td>proximity</td>
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<td>impacts are</td>
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<td>5) Retention of existing bridge no longer in use for vehicle purposes but adapted for</td>
<td>No impact.</td>
<td>Yes –</td>
<td>No impact.</td>
<td>No impact.</td>
<td>Yes – use of bridge for pedestrian walkways,</td>
<td>Yes – use of bridge</td>
<td>No impact.</td>
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<td>pedestrian walkways, cycle paths, scenic viewing etc</td>
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<td>cycle paths, scenic viewing, et cetera, would</td>
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<td>structure.</td>
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<tr>
<td>6) Retention of bridge as heritage monument for viewing purposes only</td>
<td>No impact.</td>
<td>Yes –</td>
<td>No impact.</td>
<td>No impact.</td>
<td>Yes – use of bridge for viewing purposes only</td>
<td>Yes – use of bridge</td>
<td>No impact.</td>
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<td>structure.</td>
<td>structure.</td>
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<tr>
<td>7) Relocation of bridge to appropriate new site for continued use or adaptive re-use</td>
<td>Yes – impacts to the heritage</td>
<td>Yes –</td>
<td>No impact.</td>
<td>No impact.</td>
<td>Yes – the adaptive re-use of the bridge for</td>
<td>Yes – impacts are</td>
<td>No impact.</td>
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<td></td>
<td>resource are expected</td>
<td>alterations</td>
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<td>purposes other than vehicular and horse and</td>
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<td>through relocation.</td>
<td>to the</td>
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<td>buggy purposes would result in a</td>
<td>process of removing</td>
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<td>change from the</td>
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<td>original use of the</td>
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<td>if the bridge</td>
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<td></td>
<td></td>
<td>remains in vehicular</td>
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<td>use, no impact is</td>
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<td></td>
<td></td>
<td>expected.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8) Replacement/removal of existing bridge with salvage elements/members of heritage</td>
<td>Yes - impacts to the cultural</td>
<td>Yes –</td>
<td>No impact.</td>
<td>No impact.</td>
<td>Yes – the adaptive re-use of the bridge for</td>
<td>Yes – impacts are</td>
<td>No impact.</td>
</tr>
<tr>
<td>bridge for incorporation into new structure or for future conservation work or</td>
<td>heritage values of Structure</td>
<td>alterations</td>
<td></td>
<td></td>
<td>purposes other than vehicular and horse and</td>
<td>expected through</td>
<td></td>
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<tr>
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<td>to the</td>
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<td>removal of the</td>
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<td></td>
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<td></td>
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<td>the original use of the structure. If the bridge</td>
<td>existing bridge and</td>
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<td></td>
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<td>expected</td>
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<td>remains in vehicular use, no impact is</td>
<td>the introduction of</td>
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<td></td>
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<td>expected.</td>
<td></td>
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<tr>
<td>9) Replacement/removal of existing bridge with full recording and documentation of the</td>
<td>Yes - impacts to the cultural</td>
<td>Yes –</td>
<td>No impact.</td>
<td>No impact.</td>
<td></td>
<td>Yes – impacts are</td>
<td>No impact.</td>
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<td>alterations</td>
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<td>expected through removal of the existing bridge</td>
<td>expected through</td>
<td></td>
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<td>to the</td>
<td></td>
<td></td>
<td>and the introduction of a new structure.</td>
<td>removal of the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>through complete removal of the</td>
<td>resource are</td>
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<td></td>
<td>bridge.</td>
<td>existing bridge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>bridge.</td>
<td>expected</td>
<td></td>
<td></td>
<td>and the introduction of a new structure.</td>
<td>and the introduction</td>
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<tr>
<td></td>
<td></td>
<td>of a new structure.</td>
<td></td>
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</table>
8.0 CONCLUSIONS

As a result of this study, Structure 170160 retains heritage value when evaluated using Regulation 9/06 of the Ontario Heritage Act. It is determined that Structure 170160 is 85 years old and is an early example of a cast-in-place concrete rigid frame bridge. It is a single lane one span bridge with a simple concrete railing system that gives the bridge a distinctive appearance and affords the bridge a degree of aesthetic appeal.

9.0 RECOMMENDATIONS

At the time of this report, there is no specified proposed undertaking - rehabilitation, replacement, adaptive re-use - for Structure 170160. However, following the evaluation of potential impacts on the heritage resource (see Table 3), it is recommended that the Structure 170160 be refurbished and retained in place, if feasible. The best strategy is continual maintenance, rehabilitation, and conservation.

Given the identified cultural heritage value of Structure 170160, the following recommendations and mitigation measures should be considered and implemented:

1. Conservation Alternatives 1 -3 are the preferred conservation options, with Alternative 1, the retention of the bridge with no major modifications undertaken, being the most preferred.

2. Should retention or relocation of the bridge be chosen as the preferred conservation option (one of Conservation Alternatives 1 – 7), the heritage attributes identified in Section 5.1 should be retained and treated sympathetically.

3. Should replacement of the bridge be chosen, (Conservation Alternatives 8 or 9), the following mitigation options should be considered:
   a. Replacement/removal of the existing bridge and construction of a new bridge with replication of the appearance of the heritage bridge in the new design, with allowances for the use of modern materials. Where possible, salvage elements of the bridge for incorporation into the new structure or for future conservation work or displays. The heritage attributes identified in Section 5.1 should be considered for replication.
   b. Compatible new development, where a new bridge is given a design that is sympathetic to the design qualities of the original bridge and its setting. This option would allow simplification of original design details and the use of new technologies and materials.

4. Should replacement of the bridge be chosen, a full documentation report of the structure is required. A documentation report should be completed even if a new structure is designed to replicate the existing structure sympathetically.

Additionally, the following recommendations and mitigation measures should be considered as part of the proposed Structure 170160 short and/or long term work plan:

5. This report should be filed with the heritage staff at the Region of Waterloo, Woolwich Heritage Committee, and with the Ministry of Tourism, Culture and Sport for review.
6. This bridge should be added to the Woolwich Municipal Heritage Register.

7. Should preservation of the existing bridge prove impossible (i.e. if the safety of the bridge is compromised to the extent that rehabilitation is not possible, or cost of rehabilitation is prohibitive compared to replacement, or replacement is required to meet demand requirements), Woolwich Township may wish to consider retaining the aesthetic design of the bridge, such as a concrete railing system, and fitting this element or design into a new structure.

8. If replacement is the preferred option, it is important to be mindful of the overall bridge setting when considering removal of the structure. Consideration should be given to design options that will minimize impacts to the overall landscape setting and those that will retain the character of the bridge setting.

9. A more detailed Heritage Impact Assessment should be conducted as needed by a qualified heritage professional once the short and/or long term work plan for Structure 170160 has been finalized in order to fully evaluate potential impacts and identify mitigation options, if required, for the bridge.
10.0 REFERENCES

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Woolwich Township
### APPENDIX A: Photographic Plates

<table>
<thead>
<tr>
<th>Plate</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Plate 1" /></td>
<td>Plate 1: View of Structure 170160 from Middlebrook Place, looking east.</td>
</tr>
<tr>
<td><img src="image2.png" alt="Plate 2" /></td>
<td>Plate 2: View of Structure 170160, looking east.</td>
</tr>
</tbody>
</table>
Plate 3: View of Structure 170160, looking west along Middlebrook Place.

Plate 4: Distant view of bridge along Middlebrook Place, looking west.
<table>
<thead>
<tr>
<th>Plate</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>View of concrete posts and railing, looking south.</td>
</tr>
<tr>
<td>6</td>
<td>View of permanent stream from the bridge, looking north.</td>
</tr>
</tbody>
</table>
Plate 7: Detail of railing system.

Plate 8: View of steel guard rail on the southeast end.
Plate 9: Oblique view of the south elevation, looking west. Note the steep slope.

Plate 10: Oblique view of the north elevation, looking east.
Plate 11: Oblique view of the south elevation.
Photograph courtesy of GMBluePlan.

Plate 12: South elevation of Structure 170160
Photograph courtesy of GMBluePlan.
APPENDIX B: OSIM Inspection Form, 2015
SUMMARY ACTION REPORT

Bridge 170160
Structure: 170160

Middlebrook Place / Weisenberg Road
290m southeast of Middlebrook Road

Bridge Condition Index (BCI): 56
Current Load Limit (t): 10
Inspection Date: 8/12/2015
Next Inspection: 8/12/2017

Overall Comments
Structure is in overall fair condition with major rehabilitation work required.

<table>
<thead>
<tr>
<th>Recommended Work</th>
<th>Recommended Timing</th>
<th>Total Recommended &amp; Associated Work Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Rehab</td>
<td>1-5yr</td>
<td>$260,000</td>
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</table>

Additional Investigations
None

Maintenance Needs
None
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<th><strong>Inventory Data:</strong></th>
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</tr>
</thead>
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<tr>
<td><strong>Structure Name</strong></td>
<td>Bridge 170160</td>
</tr>
<tr>
<td><strong>Main Hwy/Road #</strong></td>
<td>On ✓</td>
</tr>
<tr>
<td><strong>Hwy/Road Name</strong></td>
<td>Middlebrook Place / Weisenberg Road</td>
</tr>
<tr>
<td><strong>Structure Location</strong></td>
<td>290m southeast of Middlebrook Road</td>
</tr>
<tr>
<td><strong>Latitude (decimal degrees)</strong></td>
<td>Longitude (decimal degrees)</td>
</tr>
<tr>
<td><strong>Owner(s)</strong></td>
<td>Twp of Woolwich / Twp of Centre Wellington</td>
</tr>
<tr>
<td><strong>Region</strong></td>
<td>Southwestern</td>
</tr>
<tr>
<td><strong>District</strong></td>
<td>London/Stratford</td>
</tr>
<tr>
<td><strong>Old County</strong></td>
<td>Waterloo</td>
</tr>
<tr>
<td><strong>Geographic Twp</strong></td>
<td>Woolwich</td>
</tr>
<tr>
<td><strong>Structure Type</strong></td>
<td>Rigid Frame, Vertical Legs</td>
</tr>
<tr>
<td><strong>Total Deck Length</strong></td>
<td>3.6 (m)</td>
</tr>
<tr>
<td><strong>Overall Str Width</strong></td>
<td>5.5 (m)</td>
</tr>
<tr>
<td><strong>Total Deck Area</strong></td>
<td>19.8 (sq m)</td>
</tr>
<tr>
<td><strong>Roadway Width</strong></td>
<td>4.9</td>
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<tr>
<td><strong>Skew Angle</strong></td>
<td>0 (deg)</td>
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<td><strong>No. of Spans</strong></td>
<td>1</td>
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<td><strong>Span Lengths</strong></td>
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<td><strong>Year Built</strong></td>
<td>1932</td>
</tr>
<tr>
<td><strong>Year of Last Rehab</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Last OSIM Inspection</strong></td>
<td>10/18/2013</td>
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<tr>
<td><strong>Last Evaluation</strong></td>
<td></td>
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<tr>
<td><strong>Last Enhanced OSIM Inspection</strong></td>
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</tr>
<tr>
<td><strong>Current Load Limit</strong></td>
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<tr>
<td><strong>Enhanced Access Equipment (ladder, boat, lift, etc)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Load Limit By Law</strong></td>
<td></td>
</tr>
<tr>
<td><strong>By Law expiry Date</strong></td>
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</tr>
<tr>
<td><strong>Last Condition Survey</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Last underwater Inspection</strong></td>
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| **Rehabilitation History:** |  |
Additional Investigations Required:

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<th>Investigation</th>
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<th>Urgent</th>
<th>Estimated Cost</th>
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<tr>
<td>Detailed Deck Condition Survey</td>
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<tr>
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<tr>
<td>Concrete Substructure Condition Survey</td>
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<td>Detailed Coating Condition Survey</td>
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<td>Detailed Timber Investigation</td>
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<td>Post-Tensioned Strand Investigation</td>
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</tr>
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<td>Monitoring Deformations, Settlements, Movements</td>
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<td>Monitoring Crack Widths</td>
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Total Cost: $0

Investigation Notes:

Overall Structure Notes:

Overall Comments: Structure is in overall fair condition with major rehabilitation work required.

Recommended Work: Major Rehab

Next Inspection: 08/12/2017

Recommended Work Time: 1-5yr
### Element Data:

<table>
<thead>
<tr>
<th>Element Group</th>
<th>Element Name</th>
<th>Length</th>
<th>Width</th>
<th>Height</th>
<th>Count</th>
<th>Total Quantity</th>
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<td>Abutments</td>
<td>Abutment Walls</td>
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**Environment:**
- Benign
- Limited Inspection

**Protection System:** None

**Condition Data:**
- Units: sq.m.
  - Exc.: 0.0
  - Good: 25.9
  - Fair: 0.6
  - Poor: 0.6

**Performance Deficiencies:**
- sq.m. 0.0 25.9 0.6 0.6

**Comments:**
- Rust stains from exposed rebar on soffit; Honeycombing on northeast corner; Light erosion; Scour at west footing with light honeycombing and light scaling throughout
- Narrow stained cracks with efflorescence; Light honeycombing and light spalls

**Recommended Work:**
- Rehab

**Recommended Timing:**
- 1-5 Years

**Work Details:**
- Repair poor concrete on abutments
- Repair poor concrete on wingwalls

**Maint. Desc.:**
### Element Group: Accessories

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<th>Element Name: Signs</th>
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</tr>
</thead>
<tbody>
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<td>Location: All quadrants, hazard markers</td>
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</tr>
<tr>
<td>Material:</td>
<td>Height: 0.00</td>
</tr>
<tr>
<td>Element Type: -</td>
<td>Count: 4.0</td>
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<tr>
<td>Environment: Moderate</td>
<td>Total Quantity: 4.0</td>
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**Protection System:**

**Condition Data:**

<table>
<thead>
<tr>
<th>Units:</th>
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<th>Fair</th>
<th>Poor</th>
<th>Performance Deficiencies:</th>
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<tbody>
<tr>
<td>Each</td>
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<td>0.0</td>
<td>0.0</td>
<td>4.0</td>
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**Comments:** All are damaged

**Recommended Work:** Rehab

**Recommended Timing:** 1-5 Years

**Work Details:** Replace damaged signs

### Element Group: Approaches

<table>
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<th>Element Name: Wearing Surface</th>
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<tbody>
<tr>
<td>Location: Each end</td>
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<tr>
<td>Material: Gravel</td>
<td>Height: 0.00</td>
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<tr>
<td>Element Type: -</td>
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<tr>
<td>Environment: Severe</td>
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**Protection System:**

**Condition Data:**

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<th>Fair</th>
<th>Poor</th>
<th>Performance Deficiencies:</th>
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<td>sq.m.</td>
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<td>60.0</td>
<td>0.0</td>
<td>0.0</td>
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</tbody>
</table>

**Comments:**

**Recommended Work:**

**Recommended Timing:**

**Work Details:**

---

Page 246
### Barriers - Posts

- **Location**: Both Sides
- **Material**: Cast-in-Place Concrete
- **Element Type**: Concrete
- **Count**: 14.0
- **Environment**: Severe
- **Protection System**: None
- **Condition Data**
  - Units: sq.m.
  - Exc. 0.0
  - Good 0.0
  - Fair 2.4
  - Poor 11.0
  - Performance Deficiencies: 1
- **Comments**: Top of second post on north side has spalled off; base of one post severely disintegrated; cracking on other posts with light spalls; south railing missing 2 posts, severe outward rotation.
- **Recommended Work**: Rehab
- **Recommended Timing**: 1-5 Years
- **Work Details**: Replace railing system

---

### Barriers - Railing Systems

- **Location**: Both Sides
- **Material**: Cast-in-Place Concrete
- **Element Type**: Concrete Post and Continuous Railing
- **Count**: 12.0
- **Environment**: Severe
- **Protection System**: None
- **Condition Data**
  - Units: m
  - Exc. 0.0
  - Good 0.0
  - Fair 19.8
  - Poor 8
  - Performance Deficiencies: 8
- **Comments**: Wide, full depth cracks in several rails; southwest end replaced with steel rail; severe spalling at ends with exposed corroded rebar.
- **Recommended Work**: Maint.
- **Recommended Timing**: Maint.
- **Work Details**: Replace railing system
### Element Group: Decks

#### Element Name: Deck Top
- **Length:** 3.10
- **Width:** 3.50
- **Location:** Top of structure
- **Material:** Cast-in-Place Concrete
- **Element Type:** Cast-in-place Concrete on Supports
- **Environment:** Severe
- **Protection System:** None
- **Condition Data:**
  - Units: sq.m.
  - Exc.: 0.0
  - Good: 0.0
  - Fair: 10.9
  - Poor: 0.0
- **Comments:** Not visible below wearing surface; Assumed in fair condition based on soffit.

**Recommended Work:** Replace

**Recommended Timing:** 1-5 Years

**Work Details:** Replace deck, waterproof and pave

---

#### Element Name: Soffit - Thick Slab
- **Length:** 3.10
- **Width:** 1.60
- **Location:** Exterior
- **Material:** Cast-in-Place Concrete
- **Element Type:** -
- **Environment:** Moderate
- **Protection System:** None
- **Condition Data:**
  - Units: sq.m.
  - Exc.: 0.0
  - Good: 3.9
  - Fair: 2.0
  - Poor: 4.0
- **Comments:** Severe delamination and spalling with exposed corroded rebar and wide cracking with alkali aggregate reaction.

**Recommended Work:**

**Recommended Timing:**

**Work Details:**
### Soffit - Thick Slab

- **Element Group:** Decks
- **Location:** Interior
- **Material:** Cast-in-Place Concrete
- **Environment:** Benign
- **Protection System:** None

<table>
<thead>
<tr>
<th>Condition Data</th>
<th>Units</th>
<th>Exc.</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>sq.m.</td>
<td>0.0</td>
<td>4.9</td>
<td>2.0</td>
<td>4.0</td>
<td></td>
</tr>
</tbody>
</table>

**Performance Deficiencies:**
- Severe spalls and delaminations with exposed corroded rebar; Honeycombing and wide cracking with a medium alkali aggregate reaction.

**Recommended Work:**
**Recommended Timing:**
**Work Details:**

### Wearing Surface

- **Element Group:** Decks
- **Location:** Height
- **Material:** Gravel
- **Environment:** Severe

<table>
<thead>
<tr>
<th>Condition Data</th>
<th>Units</th>
<th>Exc.</th>
<th>Good</th>
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**Recommended Work:**
**Recommended Timing:**
**Work Details:**

---

**Site Number:** 170160
**Structure ID:** 170160
<table>
<thead>
<tr>
<th>Element Group:</th>
<th>Embankments &amp; Streams</th>
<th>Length:</th>
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<td>Limited Inspection</td>
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<td>Condition Data:</td>
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Comments: 

Recommended Work: 
Recommended Timing: 
Work Details: 

<table>
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<tr>
<td>Environment:</td>
<td>Benign</td>
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<tr>
<td>Condition Data:</td>
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</tbody>
</table>

Comments: 

Recommended Work: 
Recommended Timing: 
Work Details: 

Page 250
### Foundations

**Element Name:** Foundation (below ground level)  
**Material:** Cast-in-Place Concrete  
**Element Type:** Spread  
**Environment:** Benign

<table>
<thead>
<tr>
<th>Condition Data</th>
<th>Units</th>
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</table>

**Comments:** Medium erosion at toe of footings; West footing exposed

**Recommended Work:** Rehab  
**Recommended Timing:** 1-5 Years  
**Work Details:** Install rock protection at abutments

### Sidewalks/Curbs

**Element Name:** Curbs  
**Material:** Cast-in-Place Concrete  
**Element Type:** -  
**Environment:** Severe

<table>
<thead>
<tr>
<th>Condition Data</th>
<th>Units</th>
<th>Exc.</th>
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**Comments:** Severe spalling and light honeycombing on south curb; Wide crack and severe spalling on southeast curb.

**Recommended Work:** Replace  
**Recommended Timing:** 1-5 Years  
**Work Details:** Remove and replace curbs with deck.
### Repair / Rehabilitation Required

<table>
<thead>
<tr>
<th>Element Group</th>
<th>Element</th>
<th>Repair / Rehabilitation</th>
<th>Priority</th>
<th>Const Cost</th>
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<tbody>
<tr>
<td>Abutments</td>
<td>Abutment Walls</td>
<td>Repair poor concrete on abutments</td>
<td>1-5 Years</td>
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<td>Abutments</td>
<td>Wingwalls</td>
<td>Repair poor concrete on wingwalls</td>
<td>1-5 Years</td>
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<tr>
<td>Accessories</td>
<td>Signs</td>
<td>Replace damaged signs</td>
<td>1-5 Years</td>
<td>$1,000</td>
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<tr>
<td>Barriers</td>
<td>Posts</td>
<td>Replace railing system</td>
<td>1-5 Years</td>
<td>$50,000</td>
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<tr>
<td>Decks</td>
<td>Deck Top</td>
<td>Replace deck, waterproof and pave</td>
<td>1-5 Years</td>
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<tr>
<td>Foundations</td>
<td>Foundation</td>
<td>Install rock protection at abutments</td>
<td>1-5 Years</td>
<td>$10,000</td>
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<td>Sidewalks/Curbs</td>
<td>Curbs</td>
<td>Remove and replace curbs with deck.</td>
<td>1-5 Years</td>
<td>$10,000</td>
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</table>

**Total Repair/Rehabilitation Cost** $146,000

### Associated Work

<table>
<thead>
<tr>
<th>Comments</th>
<th>Estimated Cost</th>
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<tr>
<td>Approaches</td>
<td>Install SBGR on approaches</td>
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<td>Detours</td>
<td>$0</td>
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<td>Traffic Control</td>
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<td>Utilities</td>
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<td>Right-of-Way</td>
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<td>Environmental Study</td>
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<td>Other</td>
<td>Mobilization, dewatering, etc.</td>
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**Total Associated Work Cost** $114,000

**Total Repair / Rehabilitation Cost** $146,000

**Total Cost** $260,000

### Justification
Structure Name: Bridge 170160

Inspection Photos

North elevation

Plan view, looking west
Southwest barrier

South barrier
<table>
<thead>
<tr>
<th>Site Number</th>
<th>170160</th>
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</thead>
<tbody>
<tr>
<td>Structure Name</td>
<td>Bridge 170160</td>
</tr>
<tr>
<td>Structure ID</td>
<td>170160</td>
</tr>
</tbody>
</table>

**Soffit, looking west**

**West abutment**
**East abutment**

**East soffit, looking south**