APPENDIX E

Cultural Heritage Evaluation Report

WELLINGTON COUNTY

CULTURAL HERITAGE EVALUATION REPORT

CONESTOGO RIVER BRIDGE #4 (B109133)

October 04, 2021 FINAL

CULTURAL HERITAGE EVALUATION REPORT

CONESTOGO RIVER BRIDGE #4 (B109133)

WELLINGTON COUNTY

FINAL

PROJECT NO.: 17M-01271-01
DATE: OCTOBER 04, 2021

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October 4, 2021
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EXECUTIVE SUMMARY

WSP Canada Inc. (WSP) was retained by Wellington County to complete the preliminary and detailed design of the Conestogo River Bridge #4 replacement. A Cultural Heritage Evaluation Report (CHER) is required to determine if the bridge has cultural heritage value.

The Conestogo river Bridge #4 (B109133) is a two-lane, single span structure on Wellington Road 109, located approximately 1.7 km east of Highway 6 in the Township of Wellington North in Wellington County. It was built in 1931 and has a span of 13.8 m. The purpose of this report is to establish the potential cultural heritage value or interest of the structure, which is greater than 40 years old.

Based on the results of research, site investigation, and application of Ontario Regulation 9/06 to evaluate the cultural heritage value or interest of the structure, the Conestogo River Bridge #4 does satisfy criteria under Ontario Regulation 9/06. Therefore, the bridge has been found to have cultural heritage value or interest and further heritage reporting is required.

The completion of this study has resulted in the following recommendations:

1 The Conestogo River Bridge #4 was determined to have cultural heritage value or interest. Therefore, a Heritage Impact Assessment is required for this resource to identify appropriate mitigation measures.

PROJECT PERSONNEL

CLIENT

Client Contact	Joe DeKoning, P. Eng. Manager of Construction, Wellington County

WSP

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Cultural Heritage Specialist	Chelsey Tyers, BES, RPP, MCIP Cultural Heritage Specialist
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TABLES

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1 INTRODUCTION

1.1 PROJECT CONTEXT

WSP Canada Inc. (WSP) was retained by Wellington County to complete the preliminary and detailed design of the Conestogo River Bridge #4 replacement. A Cultural Heritage Evaluation Report (CHER) is required to determine if the bridge has cultural heritage value or interest.

The Conestogo river Bridge #4 (B109133) is a two-lane, single span structure on Wellington Road 109, located approximately 1.7 km east of Highway 6 in the Township of Wellington North in Wellington County. It was built in 1931 and has a span of 13.8 m. The structure is oriented in a generally northwesterly to southeasterly direction. For clarity in this report, the structure will be described as oriented west-east.

The purpose of this report is to establish the potential cultural heritage value or interest of the structure, which is greater than 40 years old. The site was evaluated using Ontario Regulation 9/06 (O. Reg. 9/06) to determine if the structure retains cultural heritage value or interest.

2 LEGISLATION AND POLICY CONTEXT

2.1 PROVINCIAL AND MUNICIPAL POLICY CONTEXT

2.1.1 PROVINCIAL POLICY CONTEXT

This Cultural Heritage Evaluation Report (CHER) consider the identified potential built heritage resource in the context of proposed highway intersection improvements under the *Environmental Assessment Act* (1990), as well as the *Planning Act* (1990).

Under the *Environmental Assessment Act* (1990), environment is defined in Subsection 1(c) to include:

- Cultural conditions that influence the life of man or a community, and;
- Any building, structure, machine, or other device or thing made by man.

As part of the Municipal Class EA process, the Municipal Heritage Bridges Cultural, Heritage and Archaeological Resources Assessment Checklist (April, 2014) is required to identify whether a Cultural Heritage Report (CHER) and Heritage Impact Assessment (HIA) are required.

Ontario Regulation 160/02 amendments the Public Transportation and Highway Improvement Act and the specifies that bridges must be inspected every two years under the direction of a professional engineer and in accordance with the *Ontario Structure Inspection Manual.*

The Ministry Heritage, Sport, Tourism and Culture Industries (MHSTCI; formerly the Ministry of Tourism, Culture and Sport) is charged under Section 2 of the *Ontario Heritage Act* with the responsibility to determine policies, priorities and programs for the conservation, protection and preservation of Ontario's built heritage resources and cultural heritage landscapes, and has published two guidelines to assist in assessing built heritage resources and cultural heritage landscapes as part of an environmental assessment:

- Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments (1992), and
- Guidelines on the Man-Made Heritage Component of Environmental Assessments (1981).

Both guidelines have been utilized in this assessment process.

Additionally, the *Planning Act* (1990) and related Provincial Policy Statement (PPS; 2020), provide guidance on the identification and conservation of cultural heritage

resources. In Subsection 2.6 - Cultural Heritage and Archaeological Resources, the PPS states:

2.6.1 Significant built heritage resources and significant cultural heritage landscapes shall be conserved.

The PPS defines built heritage resources as:

a building, structure, monument, installation or any manufactured or constructed part or remnant that contributes to a property's cultural heritage value or interest as identified by a community, including an Indigenous community. Built heritage resources are located on property that may be designated under Parts IV or V of the Ontario Heritage Act, or that may be included on local, provincial, federal and/or international registers.

The PPS defines a cultural heritage landscape is as:

a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Indigenous community. The area may include features such as buildings, structures, spaces, views, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association. Cultural heritage landscapes may be properties that have been determined to have cultural heritage value or interest under the Ontario Heritage Act, or have been included on federal and/or international registers, and/or protected through official plan, zoning by-law, or other land use planning mechanisms.

Examples of cultural heritage landscapes may include, but are not limited to, farmscapes, historic settlements, parks, gardens, battlefields, main streets and neighbourhoods, cemeteries, trailways, and industrial complexes of cultural heritage value or interest.

2.1.2 WELLINGTON COUNTY OFFICIAL PLAN

Wellington County Official Plan was adopted by Wellington County Council on September 24, 1998, approved by the Ministry of Municipal Affairs on April 13, 1999, came into effect on May 6, 1999 and was last updated on August 15, 2019. Policies relevant to this CHER include:

4.1.1 Identifying Cultural Heritage Resources

Cultural heritage resources include, but are not necessarily restricted to the following criteria under Ontario Regulations 9/06 issued under the Ontario Heritage Act.

a) The property has design value or physical value because it,

i. is a rare, unique, representative or early example of a style, type, expression, material or construction method,

ii. displays a high degree of craftsmanship or artistic merit, or

iii. demonstrates a high degree of technical or scientific achievement.

b) The property has historical value or associative value because it,

i. has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community,

ii. yields, or has the potential to yield, information that contributes to an understanding of a community or culture, or

iii. demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.

c) The property has contextual value because it,

i. is important in defining, maintaining or supporting the character of an area,

ii. is physically, functionally, visually or historically linked to its surroundings, or

iii. is a landmark.

4.1.2 **Ontario Heritage Act**

Under the Ontario Heritage Act, a local Council may pass by-laws to:

a) Designate individual properties of cultural heritage value or interest, in accordance with the criteria set out in Ontario Regulation 9/06. Such a by-law shall include a description of the property and a statement of cultural heritage value or interest and description of the heritage attributes;

4.1.5 **Policy Direction**

a) significant built heritage resources and significant cultural heritage landscapes shall be conserved. Conserved means the identification, protection, use and/or management of cultural heritage and archeological resources in such a way that their heritage values, attributes and integrity are retained. This may be addressed through a conservation plan or heritage impact assessment in accordance with Section 4.6.7.

2.2 METHODOLOGY

The recommendations of this CHER are based on an understanding of the physical values of the property, a documentation of its history through research, an analysis of its social and physical context, comparisons with similar properties and mapping.

This CHER is guided by key documents such as the Municipal Engineers Association's (MEA) Municipal Heritage Bridges, Cultural, Heritage and Archaeological Resources Assessment Checklist (2014), the Reference Guide on Physical and Cultural Heritage Resources (Government of Canada, 1996), the Ontario Heritage Toolkit (Ministry of Culture, 2006), and the Guidelines for Preparing the Cultural Heritage Resource Component of Environmental Assessments (Ministry of Culture and Communications, 1992).

A CHER examines a property in its entirety, including its relationship to its surroundings, as well as its individual elements – engineering works, landscape etc. This report will include:

- A summary of the history of the immediate context informed by a review of archival sources and historical maps;
- A summary of the land-use history of the study area;
- Thorough photographic documentation of the bridge and context;
- A written description of the existing conditions and immediate context;
- An assessment of whether the property satisfies criteria under O. Reg. 9/06;
- A comparative analysis, using bridges of a similar age, style, typology, context and history to inform the assessment of CHVI; and
- A draft statement of CHVI if appropriate.

For the purposes of this CHER the following documents were also consulted:

- The Ministry of Transportation Ontario's (MTO) bridge list;
- Wellington County's Bridge Inventory; and,
- Arch, Truss and Beam: The Grand River Watershed Heritage Bridge Inventory.

2.3 CONSULTATION

Wellington County was consulted as a part of this project for information regarding potential cultural heritage resources. Details regarding the scope and timing of this consultation have been provided in Table 1.

Table 1: Consultation Record

CONTACT	CONTACT DETAILS	RESPONSE RECEIVED	RESPONSE
Michelle Innocente Senior Planner, Wellington County michellei@wellington.ca	By email on October 30, 2019; follow up on November 13, 2019.	November 13, 2019	Wellington County does not have a Heritage Register; Michelle suggested contacting the municipality's Clerk.
Karren Wallace 2.3.1.1.1 Director of Legislative Services/Clerk kwallace@wellington-north.com	By email November 13, 2019	November 18, 2019	The bridges have no heritage status.

3 HISTORICAL CONTEXT

3.1 LOCAL CONTEXT AND SETTLEMENT HISTORY

3.1.1 PHYSIOGRAPHIC CONTEXT

The study area is located within a projection of the Stratford Till Plain physiographic region that otherwise encompasses the City of Stratford and stretches towards London in the south and Listowel to the north (Chapman and Putnam 1984: 133). One or two moraines modify the northern region of the Stratford Till Plain, whereas the southern portion of the region contains multiple ground and terminal moraines, resembling the Mount Elgin Ridges (Chapman and Putnam 1984: 133). Drainage is greatest within the Thames watershed, as it is the lowest point within the region. The soil is comprised of fairly uniform silty clay with few stone deposits, a product of the Huron ice lobe. Areas between moraines often contain sand and gravel (Chapman and Putnam 1984: 133). The soil allows the region to be one of the most productive in the Province for agriculture given a high supply of lime, good natural fertility, and easy opportunities for cultivation once proper drainage has been supplied (Chapman and Putnam, 1984: 134).

3.1.2 INDIGENOUS CONTEXT

Paleoindian period populations were the first to occupy what is now southern Ontario, moving into the region following the retreat of the Laurentide Ice Sheet approximately 11,000 years before present (BP). The first Paleoindian period populations to occupy southern Ontario are referred to by archaeologists as Early Paleoindians (Ellis and Deller, 1990).

Early Paleoindian period groups are identified by their distinctive projectile point morphologies, exhibiting long grooves, or ‘flutes’, that likely functioned as a hafting mechanism (method of attaching the point to a wooden stick). These Early Paleoindian group projectile morphologies include Gainey (ca. 10,900 BP), Barnes (ca. 10,700), and Crowfield (ca. 10,500) (Ellis and Deller, 1990). By approximately 10,400 BP, Paleoindian projectile points transitioned to various unfluted varieties such as Holcombe (ca. 10,300 BP), Hi Lo (ca. 10,100 BP), and Unstemmed and Stemmed Lanceolate (ca. 10,400 to 9,500 BP). These morphologies were utilized by Late Paleoindian period groups (Ellis and Deller, 1990). Both Early and Late Paleoindian period populations were highly mobile, participating in the hunting of large game animals. Paleoindian period sites often functioned as small campsites where stone tool production and maintenance occurred (Ellis and Deller, 1990).

Climatic warming, approximately 8,000 BP, was accompanied by the arrival of the deciduous forest in southern Ontario. With this shift in flora came new faunal resources,

resulting in a change in cultural adaptations in the region. This change is reflected in new tool-kits and associated subsistence strategies referred to archaeologically as the Archaic period. The Archaic period in southern Ontario is divided into three phases: the Early Archaic (ca. 10,000 to 8,000 BP), the Middle Archaic (ca. 8,000 to 4,500 BP), and the Late Archaic (ca. 4,500 to 2,800 BP) (Ellis et al. 1990).

The Archaic period is differentiated from earlier Paleoindian populations by a number of traits such as: 1) an increase in tool stone variation and reliance on local tool stone sources, 2) the emergence of notched and stemmed projectile point morphologies, 3) a reduction in extensively flaked tools, 4) the use of native copper, 5) the use of bone tools for hooks, gorges, and harpoons, 6) an increase in extensive trade networks, and 7) the production of ground stone tools. Also noted is an increase in the recovery of large woodworking tools such as chisels, adzes (a tool similar to an axe with an arched blade, used for cutting or shaping large pieces of wood), and axes (Ellis et al., 1990).

The Archaic period is also marked by population growth. Archaeological evidence suggests that by the end of the Middle Archaic period (ca. 4,500 BP) populations were steadily increasing in size (Ellis et al., 1990). Over the course of the Archaic period, populations began to rely on more localized hunting and gathering territories. By the end of the Archaic period, populations were utilizing more encampments that are seasonal. From spring to fall, the archaeological record shows populations were shifting their settlement patterns on a regular, seasonal basis. From spring to fall, settlements would exploit lakeshore/riverine locations where a broad-based subsistence strategy could be employed, while the late fall and winter months would be spent at interior site where deer hunting was likely a primary focus with some wild edibles likely being collected (Ellis et al. 1990:114). This steady increase in population size and adoption of a more localized seasonal subsistence strategy eventually evolved into what is termed the Woodland period.

The beginning of the Woodland period is identified by archaeologists by the emergence of ceramic technology for the manufacture of pottery. Similar to the Archaic period, the Woodland period is separated into three primary timeframes: the Early Woodland (approximately 2,800 to 2,000 BP), the Middle Woodland (approximately 2,000 to 1,200 BP), and the Late Woodland (approximately 1,200 to 350 BP) (Spence et al., 1990; Fox, 1990).

The Early Woodland period is represented in southern Ontario by two different cultural complexes: the Meadowood Complex (ca. 2,900 to 2,500 BP), and the Middlesex Complex (ca. 2,500 to 2,000 BP). During this period, the life ways of Early Woodland populations differed little from that of the Late Archaic with hunting and gathering representing the primary subsistence strategies. The pottery of this period is characterized by its relatively crude construction and lack of decorations. These early ceramics exhibit cord impressions, likely resulting from the techniques used during manufacture (Spence et al., 1990).

The Middle Woodland period is differentiated from the Early Woodland period by changes in lithic tool morphologies (e.g. projectile points, expedient tools) and the increased elaboration of ceramic vessels (Spence et al., 1990). In southern Ontario, the Middle Woodland is observed in three different cultural complexes: the Point Peninsula Complex to the north and northeast of Lake Ontario, the Couture Complex near Lake St. Claire, and the Saugeen Complex throughout the remainder of southern Ontario. These groups can be identified by their use of either dentate or pseudo scalloped ceramic decorations. It is by the end of the Middle Woodland period that archaeological evidence begins to suggest the rudimentary use of maize (corn) horticulture (Warrick, 2000). The Point Peninsula tradition is characterized by Vinette II ceramics, small camp sites and seasonal village sites, and a clear influence from both northern Ontario and Hopewell cultures (Warrick, 2000).

The adoption and expansion of maize horticulture during the Late Woodland period allowed for an increase in population size, density, and complexity among Late Woodland populations. As a result, a shift in subsistence and settlement patterns occurred, with the adoption of a more sedentary village life and reliance on maize horticulture, with beans, squash, and tobacco also being grown. Nearing the end of the Late Woodland period (approximately 600 BP) villages reached their maximum size.

During this period, increased warfare resulted in the development of larger villages with extensive palisades. In the Eramosa River area, the shift from Point Peninsula tradition during the Middle Woodland period to the Late Woodland period Iroquoian lifeways is indicated by settlement in larger, more permanent village sites. Later in the Late Woodland period, the pre-contact Neutral tradition is defined by large villages (up to 5 hectares in size) with large populations and extensive farming of crops. Additional site types, including hamlets, cabins, camps and cemeteries are represented in the Late Woodland period as well (Munson and Jamieson, 2013).

Early contact with European settlers at the end of the Late Woodland period resulted in extensive change to the traditional lifestyles of most populations inhabiting southern Ontario. Trade with the Europeans lead to dependency on European goods and incited conflict between the Indigenous communities in southern Ontario (Warrick, 2000).

3.1.3 EUROCANADIAN CONTEXT

The study area is located within in the Township of Wellington North in Wellington County.

3.1.3.1 WELLINGTON COUNTY

In 1783, General Halidmand directed Sir John Johnson to purchase land on the north side of Lake Ontario from the Mississaugas. Land was purchased from the Mississaugas in May 1784. In October 1784, General Halidmand granted land six miles deep from each side of the Grand River extending from the mouth of the river at Lake

Erie to the head of the river to the Haudenosaunee (Six Nations of the Grand River, hereafter Six Nations). Due to a mistake in Augustus Jones' survey line from the Head of Lake (Burlington) to the Conestoga River at the present site of Arthur (that was mistaken for the Thames River), the land east of this line was not conveyed to the Six Nations as was intended in the original agreement. In the late eighteenth century, the Six Nations sold blocks of land including a portion of Wellington County to land purveyors. Parts of the Crown's purchases of December 7, 1792 (Between the Lakes Purchase) from the Mississaugas and July 10, 1827 (Huron Tract Purchase) from the Chippewas also make up Wellington County (Hutchinson, 1998; Kelsay, 1984).

The district of Wellington was created out of the Gore District in 1838. The District of Wellington was absorbed into the United Counties of Wellington, Waterloo and Grey in 1852. The following year, Wellington County separated from Waterloo County and by 1854 Wellington was a separate, independent county holding its county seat in the town of Guelph. This included the Towns and Townships of Amaranth, Arthur, Eramosa, Erin, Guelph, Garafraxa, Maryborough, Nichol, Peel, Pilkington and Puslinch. In 1857, Luther and Arthur Townships joined the county (Belden 1878).

Within Wellington County, the study area straddles the boundary between the Township of Wellington North and the Township of Centre Wellington and historically straddles the boundary between the Township of Luther and the Township of Garafraxa.

3.1.3.2 TOWNSHIP OF WELLINGTON NORTH

The Township of Wellington North was formed through the amalgamation of the Township of Arthur, Village of Arthur, the Township of West Luther and the Town of Mount Forest, effective January 1, 1999.

Named after the Arthur Wellesley the Duke of Wellington (1769-1852) and Prime Minister of Britain (1828-1830), the Township of Arthur was surveyed by John McDonald in 1841-42 and the Village of Arthur was laid out in 1846 by D.B. Papineau (Township of Wellington North, n.d.; Rayburn, 1997: 15). Most settlers were from Ireland, but some were also from Scotland and England. A post office was established in the Village of Arthur in 1848 and by 1871 there were 15 hotels between the Village of Arthur and the Town of Mount Forest.

In 1854, George McPhillips surveyed the land for the Township of Luther (Township of Wellington North, n.d). The Township was covered with timber and swamps which made settlement progress very slow. By 1867, Luther had three post offices, eight or ten schools, and a saw mill (Irwin & Burnham, 1867: xxiv). In the early 1870s during a dry summer, fires spread throughout the Township, drying off the land and leveling most of the timber. The construction of the Toronto, Grey Bruce Railway in 1871 also accelerated development in township. In 1881, the Ontario Legislature passed a bill to divide Luther Township into separate townships, West and East Luther. In 1883 East Luther was transferred to Dufferin County. In 1995, the Township of East Luther and the

former Village of Grand Valley amalgamated to become the Township of East Luther Grand Valley.

The Town of Mount Forest was situated on the South Saugeen River, but the surveyor John McDonald mistakenly assumed that the future site of Mount Forest was located on the Maitland River (Rayburn, 1997: 232). As such, early names for the Mount Forest site included Maitland Hills and Maitland Woods. In 1853, the post office as renamed Mount Forest. In 1864, the community was incorporated as a village with a population of about 1000 people and in 1879 it was incorporated as a town (Welch & Payne, 2015).

3.1.3.3 TOWNSHIP OF CENTRE WELLINGTON

The Township of Centre Wellington was formed by the amalgamation of the Town of Fergus, Village of Elora and the Townships of Nichol, Pilkington, West Garafraxa and a portion of Eramosa, effective January 1, 1999.

Fergus was laid out in 1834 by Scottish settlers, James Webster and Adam Fergusson. The area was originally called Little Falls, but was renamed Fergus after Fergusson when the post office opened in 1836 (Welch & Payne, 2015b). The first industry was a grist mill established in 1835 and population growth led to the area's incorporation as a village in 1858. An economic boost came in 1870 with the construction of the Wellington, Grey and Bruce Railway and again in 1880 with the construction of the Credit Valley Railway. It was not until 1952 that the Fergus became a town.

The Village of Elora was founded in 1832 by retired British captain William Gilkison who named the area after his brother John's ship *Ellora* which in turn was named after the seventh and eighth century cave temples and sculptures at Ellora, India. Elora became a Village in 1858. The limestone gorge was quarried until the 1870s and is responsible for the stone architectural landscape in Elora.

The Township of Nichol was named in 1822 after Robert Nicole (c.1780-1824), a merchant, military officer and member of the House of Assembly of Upper Canada (Rayburn, 1997: 242). By 1877 the population of the township was 2737.

The area that became the Township of Pilkington was acquired by Royal Engineer, Robert Pilkington in 1799. Pilkington returned to England in 1802 but kept an interest in the land, arranging for some immigrants from Northamptonshire and Warwickshire to settle in the area (Rayburn, 1997: 272). However, Pilkington was reluctant to sell any of his land and it was not until his death in 1834 that settlement of the area began in earnest (Thorning, 1992). Many early settlers lacked the capital to make improvements and investments necessary for settlement and were forced to abandon their farms (Thorning, 1992).

The Township of Garrafraxa was surveyed and named in 1821. In 1869, the township, which was then spelt with only one "r", was split into East and West at the 9th concession. In 1874, East Garafraxa became part of Dufferin which became a county in

1881. West Garafraxa remained part of Wellington County. Early settlers were predominantly Irish protestants in the 1830s followed by British immigrants in the early twentieth century.

3.1.4 ROADWAY TRANSPORTATION HISTORY IN ONTARIO

The earliest transportation routes in Ontario consisted of the many waterways and paths utilized by Canada's Indigenous populations. These same routes were utilized by early European explorers during the fur trade as they were the most effective way to traverse the tree covered land (MTO, 2016). It wasn't until the growth of Euro-Canadian settlement that the need for cleared paths suitable for wagon travel led to the development of roadways.

The earliest roadways consisted of little more than dirt pathways cleared of stumps and boulders to a width that would allow for the passage of wagons and coaches. These roads were often built to varying levels of quality by settlers and quickly became pitted and washed out.

The introduction of corduroy roads, consisting of horizontal logs laid along the roadway and covered/chinked with dirt, provided an improvement upon basic dirt roads. They allowed for the construction of roadways over marshy, wet terrain that basic dirt roads could not pass through easily. However, these roads also experienced short periods of use before decaying and becoming impassable (MTO, 2016).

In the late 1700's there were no formal road workers responsible for the construction and maintenance of roadways. Instead, the construction of roads was the responsibility of township citizens and settlers who were required to contribute time in road work every year as statutory labour and overseen by the local 'Pathmaster'.

Techniques for roadway construction improved throughout the 1800's, with the invention of the plank road (sawed planks of wood laid horizontally perpendicular to the road alignment) in the 1830's. Similar to the previous corduroy roads, plank roads were prone to decomposition and deterioration (MTO, 2016). The macadam road (using various gravel sizes) provided better drainage, compaction, slope control, and longevity, but the initial construction cost posed an issue for many roadworks. The costly repair and maintenance of these early roads meant that in the latter half of the nineteenth century many of Ontario's roadways were in disrepair.

The arrival of the automobile in Ontario during the late 1800's – early 1900's, and the advocacy work of the bicycle lobby, resulted in a push for new and improved roadways. The use of cars and bicycles on roadways resulted in the development of improved gravel and macadamized dirt roadways, and the patent of modern tarmac technology in 1901 allowed for improved road conditions and longevity (MTO, 2016). By 1916,

roadways had become important enough to warrant the founding of the Department of Public Highways (what would eventually become the MTO).

The first half of the 20th century saw a number of developments on Ontario's roadways, despite the restrictions imposed by the great depression and two world wars. The 1920's saw the formalization of road systems, the passing of the provincial Highway Traffic Act, and the removal of municipal and regional road tolls. By the 1940's preliminary construction on numerous sections of 400 series highways were completed. Over the following decades numerous highway expansions were completed and older dirt roads upgraded to improved tarmac.

3.1.4.1 WELLINGTON ROAD 109

Wellington Road 109 was originally a provincial highway known as Highway 9. In the early 1930's, Highway 9 was extended through the study area from its eastern terminus in Arthur to Orangeville to Wellington and Dufferin Counties. The road was a gravel surface when the Department of Highways of Ontario (DHO) acquired the road and paving work began in 1931 finishing in 1934 between Arthur and Orangeville (Bevers, 2019).

In the late 1990's the provincial government downloaded many portions of Ontario highways to the municipalities. Wellington County became responsible for portions of highways 9, 23, 24 and 25 which are now named Wellington Road 109, 123, 124 and 125 respectively.

3.1.5 BRIDGE CONSTRUCTION HISTORY IN ONTARIO

The history of bridge construction in Ontario coincided roughly with the spread of Euro-Canadian settlers and surveyors and the expansion of Ontario's road systems (Bradford 2015, MTO 2016). These earliest bridges were rudimentary in construction, utilizing the abundance of large trees available to span waterways and covering the bridge top with a corduroy log cover and dirt flooring. With the decline of suitable large lumber came the introduction of wooden truss bridges.

Wooden truss bridges benefitted from the construction knowledge of early settlers, utilizing King and Queen trusses common in barn construction. The wooden truss bridge enjoyed a long lived popularity in southern Ontario, being commonly used until the 1890's.

Stone arch bridge construction began during the same period as the wooden truss bridges, being used throughout the 1850's to 1880's. However, stone bridges were never as common, due largely to the expensive and time consuming nature of quarrying, transporting, and crafting the raw material (Bradford 2015, MTO 2016). As such, stone bridges are more common for larger important bridge crossings and wealthier economic centres.

With the arrival of the railway came the use of iron in bridge construction. Introduced in the 1850's, early iron bridges were constructed using cast iron and were brittle. Later development of wrought iron bridges improved on the tensile strength of the material, thus improving its longevity (Bradford 2015, MTO 2016). However, iron's use in bridge construction was limited to the 1870's and 1880's, as the introduction of steel replaced it as the standard bridge material in the 1870s.

Numerous bridge technologies were used in the construction of wooden, iron, and steel bridges in the 1800's. These included the truss (1820's), suspension (1848), and cantilever (1883).

With the reintroduction of concrete as a building material in the twentieth century came a more efficient and effective way to build bridges. Concrete's maleability meant that the construction of slab and arch bridges could be produced relatively quickly and easily to span the many smaller waterways of Ontario. This resulted in the decline of steel in bridge construction, with concrete soon becoming the dominant material. The introduction of steel reinforcing concrete further improved its versatility, allowing for its use in larger building projects (Bradford 2015, MTO 2016). The result is the increased use of concrete in major roadworks throughout the 1940's and 1950's.

The most recent innovation to the use of concrete is the development of pre-stressed concrete, which provides better resistance to cracking and failure and can be either cast in place or pre-formed off site. This versatility has resulted in pre-stressed concrete's domonance in modern bridge construction.

3.1.5.1 RIGID FRAME BRIDGES

Rigid frame bridges are bridges where the superstructure and substructure are rigidly connected to act as a unit. Older rigid frame bridges tend to be small to medium spans with an arch shape to them. The use of rigid frame bridges began in Germany in the early twentieth century and proliferated in Ontario during the first half of that century (Lin & Yoda, 2017).

In 1920, an innovation in concrete bridge construction was developed by Arthur Hayden, the concrete rigid frame (Parsons, 2005). The first use in North America was in Westchester County, New York, in the development of a comprehensive parkway system. Between 1922 and 1930, 74 rigid frame structures were built on the Westchester County parkway system (Parsons, 2005).

This bridge type was introduced in Ontario in the 1930s and continued to be the dominant form of highway bridges into the 1950s until the introduction of pre-stressed concrete beam and post-tension cast-in-place structures in the 1960s (Benjamin et al., 2013).

3.1.6 CONESTOGO RIVER

The Conestogo River is a river in Waterloo Region and Wellington County in Southwestern Ontario, Canada. The Conestogo River watershed drains approximately 820 km2 of the western part of the Grand River. It is in the Lake Erie Basin and joins the Grand River as a right tributary at the community of Conestogo, ON.

The watershed is largely composed of Tavistock Till, and 72% of the land area it classified as Clayey Till. The most significant hydrological feature within the Conestogo River Watershed is Conestogo Lake and Dam, which was built in 1958 for flood control and low flow augmentation.

Fish species in the Conestogo River river include brown trout, pike, smallmouth bass, perch, walleye and carp. The area is also a part of the Rich Tract, an area of relatively high quality habitat is the within the The Stratford Till Plain, located between Fergus and Arthur along Highway 6. It has sub-boreal plant communities and bird species uncommonly observed in the Watershed.

The beauty and cultural richness of the Grand River watershed is reflected in the names of the rivers main tributaries: the Nith, the Conestogo, the Speed and the Eramosa Rivers. It is the Grand River that inspired aboriginal poet Pauline Johnson to write her frequently anthologised The Song My Paddle Sings.

Named after the Conestogo River in Pennsylvania by Mennonite settlers in the nineteenth century (Mercer, 2018), it is in the Lake Erie Basin and joins the Grand River as a right tributary. The river traverses through Waterloo Region and Wellington County.

The river was the natural power source that fueled the mills of St. Jacobs and Conestogo, drawings its first settlers. By the mid-1800s Conestogo and St. Jacobs were busy pioneer villages, with hotels, blacksmith shops, distilleries, foundries, flour and grain mills that crowded along the river's edge. It was the Contesogo river that first brought electricity to St. Jacobs, when the mill owner sold his surplus power to the rest of the village.

In the first half of the 20th century, many people considered the Grand River watershed to be an "open sewer". Improvements in sewage treatment, controls on discharge of industrial pollutants into water courses and changes on the landscape have led to a significant improvement in overall quality of the Grand River and its tributaries over the past 50 years. The result has been better water quality and a revival of the Grand system as a focal point of outdoor recreation and tourism.

In 1994, the Grand River and its major tributaries, the Nith, Conestogo, Speed and Eramosa rivers, were designated as Canadian Heritage Rivers for their cultural heritage and recreational values. The Grand River was the first non-wilderness river to be designated, as well as the first river to include the tributaries in the designation. The

nomination was accepted because of the abundant nationally significant human heritage and recreational features associated with the river.

3.2 CONTESTOGO RIVER BRIDGE #4 HISTORY

This section of Wellington Road 109 first opened in the 1930s as Provincial Highway 9, but it followed an already established local route which was identified in early Township maps in the 1850's and 1860's (Figure 2). The 1861 Map of Wellington County, 1877 Historical Atlas of Wellington County and the 1906 Historical Atlas of Wellington County also depict the road and surrounding large lots, but do not identify bridge crossings on the maps (Figure 3-5). The current Conestogo River Bridge #4 was constructed in 1931 (MSIF, 2017). In the 1954 aerial photograph of the area it is difficult to detect the existence of a bridge at this location, but the aerial photograph does depict the agricultural use of the surrounding area (Figure 6).

The Conestogo River Bridge #4 is a two lane, single span, rigid frame, reinforced cast-in-place concrete structure with a span of 13.8 m and overall deck length of 16 m. It was rehabilitated in 1989 with repairs to the substructure, railings and curbs; patching, waterproofing and paving of the bridge deck and soffit repairs (MSIF, 2017).

4 EXISTING CONDITIONS

4.1 DESCRIPTION OF STRUCTURE

The Conestogo River Bridge #4 is a two-lane, single span rigid frame structure constructed in 1931 and located along Wellington Road 109, 1.7 km east of Highway 6 (Figure 1). The Conestogo River Bridge #4 is a reinforced cast-in-place bridge with concrete abutments, asphalt paving surface and cast-in-place concrete railing. The bridge is oriented west to east and spans 13.8 m, while the roadway width is 9.5 m, the overall width is 13.8 m and the total deck length is 16 m. Embankments on either end of the bridge consist of soil and overgrown, low lying vegetation. Approaches to the bridge on both sides are straight and flat, and both sides of the road are lined with steel barriers (Images 1-10).

As the Conestogo River Bridge #4 is a rigid frame concrete bridge, the superstructure and substructure were cast as one single unit. The substructure consists of reinforced concrete abutments. The abutments were cast-in-place separately and are separated from the superstructure by a construction joint. The superstructure has a segmental arch with a deck depth ranging from 0.93 m (3’1”) to 0.38 m (1’3”). The bridge deck consists of paved asphalt and both sides of the bridge have a reinforced concrete railing system. A sidewalk is only located on the north side of the bridge’s deck.

Repairs to the bridge were undertaken in 1989 which included repairs to the superstructure, railings and curbs; patching, waterproofing and paving the deck; and soffit repairs. In 2017 the bridge was inspected and deemed to require replacement.

Wellington County provided original bridge plans for the Conestogo River Bridge #4 (Appendix A).

Image 1: Looking west to west approach to the bridge

Image 2: Looking east to east approach to the bridge

Image 3: Looking east towards the bridge deck

Image 4: Looking north towards south side of the bridge

Image 5: Looking southeast towards north side of the bridge

Image 6: View of the south side of the west wingwall

Image 7: View of hand rail, note construction joint between abutment and deck/superstructure

Image 8: View of sidewalk on north side of the bridge deck

Image 9: View of west abutment

Image 10: View of west abutment and bridge soffit, note the formwork outlines in the concrete used to cast the concrete

4.1.1 DESIGN AND CONSTRUCTION

Structure Name	Conestogo River Bridge #4	**Road Name**	Wellington Road 109
District	Central Region	**Road Type**	Highway
Municipality	Township of Wellington North	**Owner**	Wellington County
Bridge or Culvert	Bridge	**Overall Structure Width (m)**	11.5
Structure Type	Rigid Frame	**Roadway Width (m)**	9.5
Span (m)	13.8	**Total Deck Length (m)**	16
Height (M)	Unknown	**Total Deck Area (s.m)**	185
Direction of Structure	West/East	**Heritage Recognition**	None
Year Built/Rehabilitated	Built 1931		
Current Load Limit	Unknown	**Designer/Construction Firm**	Department of Highways Ontario

Waterway	Conestogo River

A site visit to the structure was completed to record existing conditions. An inspection of the bridge and the landscape context was conducted on November 6, 2019. The weather allowed for good visibility of the landscape and structural features. Access to the bridge was gained via Wellington Road 109.

4.2 DESCRIPTION OF STUDY AREA AND LANDSCAPE CONTEXT

The Conestogo River Bridge #4 is located in the Township of Wellington North, in Wellington County. The study area consists of the current bridge, approaches to the bridge and the embankments supporting the bridge (Images 11-14). Wellington Road 109 consists of a two lane-divided road with gravel shoulders that was formerly provincial Highway 9. The approaches to the Conestogo River Bridge #4 are straight and flat, and include steel guardrails on both sides of the road on either end of the bridge.

The area surrounding the bridge includes cultivated agricultural fields lined with interspersed deciduous and coniferous trees parallel to the road. A steel and metal bridge structure is located north of the bridge on private property crossing the Conestogo River.

The Conestogo River flows underneath the bridge and the riverbank on the west side, south of the bridge is supported by gabions. Narrow, shallow and winding, the Conestogo River crosses Wellington Road 109 multiple times within the general area.

Image 11: Looking northeast towards agricultural fields

Image 12: Looking north towards a small bridge in the agricultural field

Image 13: Looking south towards the Conestogo River surrounded by agricultural fields

Image 14: Looking east towards the bridge and the Conestogo River

4.3 COMPARATIVE ANALYSIS

A comparative analysis was undertaken to establish a baseline understanding of similar bridges in the general vicinity of the subject bridge, and to determine if the materials, bridge type, or size is uncommon within the region. Given that the Conestogo River Bridge #4 was originally constructed and owned by the Department of Highways, Ontario (DHO, now MTO), comparative examples were drawn from the MTO bridge inventory for Central Region (See Appendix B for a list of comparative examples) as well as from Wellington County's Bridge Inventory (See Appendix B for a list of comparable examples).

4.3.1 CENTRAL MTO BRIDGE LIST

Of the structures reviewed, 54 reinforced cast-in-place concrete rigid frame bridges are identified on the Central Region bridge inventory, built between 1937 and 2003. Lengths vary between 7.8 m to 40.4 m and the number of spans vary from one to two.

The oldest MTO owned reinforced cast-in-place rigid frame bridges in Central Region are the Sturgeon River Bridge and the Dillon's Creek Bridge which were both constructed in 1937. As such, the Conestogo River Bridge #4, is older than the oldest MTO owned cast-in-place concrete rigid frame bridges.

The longest total span of a rigid frame bridge in the Central Region is 40.4 m and belongs to the Underpass at King Side Road and Highway 400. Of the 54 comparable examples, 41 have longer spans than the Conestogo River Bridge #4. Accordingly, the Conestogo River Bridge #4 is not the longest spanning bridge of this type.

Of the 54 comparable examples, 51 have one span and three have two spans. As such, the Conestogo River Bridge #4 has a typical number of spans for rigid frame bridges currently owned by the MTO in Central Region.

4.3.2 WELLINGTON COUNTY BRIDGE LIST

Wellington County's Bridge List identifies 45 rigid frame bridges in Wellington County, built between 1930 and 2017. Lengths vary between 3.5 m and 25 m and the number of spans are not listed.

The oldest Wellington County-owned rigid frame bridge is the Bramwell Bridge which was constructed in 1930. The Conestogo River Bridge #4 is one of two rigid frame bridges constructed in 1931, with the Conestogo River Bridge #6 also constructed in that year.

The longest rigid frame bridge owned by Wellington County is the Elora Street Bridge at 25 m long. Of the 45 rigid frame bridges in Wellington County, six are longer than the Conestogo River Bridge #4. Therefore, the Conestogo river Bridge #4 is not the longest rigid frame bridge owned by Wellington County.

5 HERITAGE ASSESSMENT

The Conestogo River Bridge #4 is owned by Wellington County. Therefore, O. Reg. 9/06 was used to assess the cultural heritage value or interest of the bridge. A bridge that satisfies at least one criteria under O. Reg. 9/06 is considered to be of cultural heritage value or interest and eligible for designation under Part IV of the *Ontario Heritage Act*.

Table 2: O. Reg. 9/06 Assessment – Conestogo River Bridge #4

CATEGORY	CRITERIA	Y/N	COMMENTS
Design/ Physical Value	Is a rare, unique, representative or early example of a style, type, expression, material or construction method	Y	The Conestogo River Bridge #4 is an early and representative example of a rigid frame cast-in-place concrete bridge as it was built in 1931. It is one of two built along Wellington Road 109 in 1931 and both are early examples of this bridge style in the area. The bridge maintains its rigid frame construction as well as its reinforced cast concrete hand rails and has not been substantially altered.
	Displays a high degree of craftsmanship or artistic merit	Y	The design of the Conestogo River Bridge #4 was in accordance with the DHO's General Specification for Concrete Highway Bridges. However, the bridge design demonstrates an attention to aesthetics, visible in the slight arch of the soffit and the design of the hand railings. Therefore, this criterion is satisfied.
	Demonstrates a high degree of technical or scientific achievement	N	The Conestogo River Bridge #4 is designed and built in accordance with the DHO's General Specifications for Concrete Highway Bridges and as such does not display a high degree of technical or scientific achievement. Therefore, this criterion is not satisfied.

Historical/ Associative Value	Has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community	N	While the bridge is associated with the MTO's predecessor the DHO, the DHO was responsible for construction of all bridges on provincial highways in the 1930s. The association for the Conestogo River Bridge #4 is not considered more significant than other bridges originally owned by the DHO/MTO. Therefore, this criterion is not satisfied.
	Yields, or has the potential to yield, information that contributes to an understanding of a community or culture,	N	The bridge does not have the potential to yield information about the understanding of a community or culture. Therefore, this criterion is not satisfied.
	Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community	N	The bridge reflects the DHO's General Specifications for concrete highway bridges which is not attributed to a designer or engineer. Therefore, this criterion is not satisfied.
Contextual Value	Is important in defining, maintaining or supporting the character of an area	Y	The surrounding area consists of agricultural landscapes, interrupted by the meandering Conestogo River. The aesthetic quality of the bridge design supports the character of the area. Therefore, this criterion is satisfied.

	Is physically, functionally, visually or historically linked to its surroundings	Y	While the Conestogo River Bridge #4 provides a functional purpose in allowing traffic to cross over the Conestogo River, this is not considered a significant link beyond that of any other river crossing bridge. The bridge is also not considered to have a visual link with its surroundings. However, it is considered to have a historical link with its surroundings given this road was originally Highway 9, acquired by the DHO in 1930, paved between 1931 and 1934 and included the coordination of the construction of at least three concrete rigid frame bridges along this road (Conestogo River Bridge #4, Conestogo River Bridge #6 and Conestogo River Bridge #10).
	Is a landmark	N	The Conestogo River Bridge #4 is not considered well known, memorable or a discernible marker in the community. As such, it is not considered a landmark.

6 CONCLUSIONS

Based on the results of research, site investigation, and application of the criteria in O. Reg. 9/06, the Conestogo River Bridge #4 does have cultural heritage value or interest. Accordingly, the following Statement of Cultural Heritage Value or Interest and list of Attributes has been prepared.

6.1 STATEMENT OF CULTURAL HEITAGE VALUE OR INTEREST

6.1.1 DESCRIPTION OF RESOURCE

The Conestogo River Bridge #4 was constructed in 1931 to carry Highway 9 (now Wellington Road 109) traffic over the Conestogo River in the Township of Wellington-North, Wellington County. The rigid frame cast-in-place concrete bridge is single span and allows for two lanes of traffic to travel across it.

6.1.2 CULTURAL HERITAGE VALUE OR INTEREST

Built in 1931, the Conestogo River Bridge #6 is one of three rigid frame cast-in-place concrete bridges along Wellington Road 109 built between 1931 and 1934. The Conestogo River Bridge #4 is an early and representative example of a rigid-frame cast-in-place concrete bridge in Wellington County. The bridge has had minimal repairs since it's construction and continues to display the original rigid frame design which consists of the reinforced cast-in-place superstructure and substructure, the reinforced and cast-in-place wingwalls and the concrete hand rails.

The bridge was built by the Department of Highways, Ontario (DHO) according to their General Specifications for Concrete Highway Bridges. These specifications emphasized the importance of the aesthetic quality of bridges, particularly the hand rails and arched design. The subject bridge exhibits a simple but aesthetically pleasing design that also supports the character of the surrounding rural area.

The Conestogo River Bridge #4 also demonstrates a contextual relationship with the other two rigid frame cast-in-place bridges (Conestogo River Bridge #6 and Conestogo River Bridge #10) built by the DHO along Wellington Road 109 shortly after the DHO acquired the road and designated it Provincial Highway 9.

6.1.3 DESCRIPTION OF HERITAGE ATTRIBUTES

The heritage attributes that reflect the cultural heritage value or interest of the Conestogo River Bridge #4 include:

- One-span length;
- Reinforced, cast-in-place wingwalls;
- Reinforced, cast-in-place abutments;
- Slight arch design; and
- DHO railing system.

7 RECOMMENDATIONS

The Conestogo River Bridge #4 is a two-lane, single span structure located approximately 1.7 km east of Highway 6 in the Township of Wellington North in Wellington County. It was built in 1931 and has a span of 13.8 m.

Based on the results of research, site investigation, and application of the criteria in O. Reg. 9/06 it was determined that the Conestogo River Bridge #4 has cultural heritage value or interest. As such, a Heritage Impact Assessment should be completed during detailed design..

The completion of this study has resulted in the following recommendations:

1. The Conestogo River Bridge #4 was determined to have cultural heritage value or interest. Therefore, a Heritage Impact Assessment is required for this resource to identify appropriate mitigation measures.

8 HISTORICAL MAPPING

wsp

LEGEND

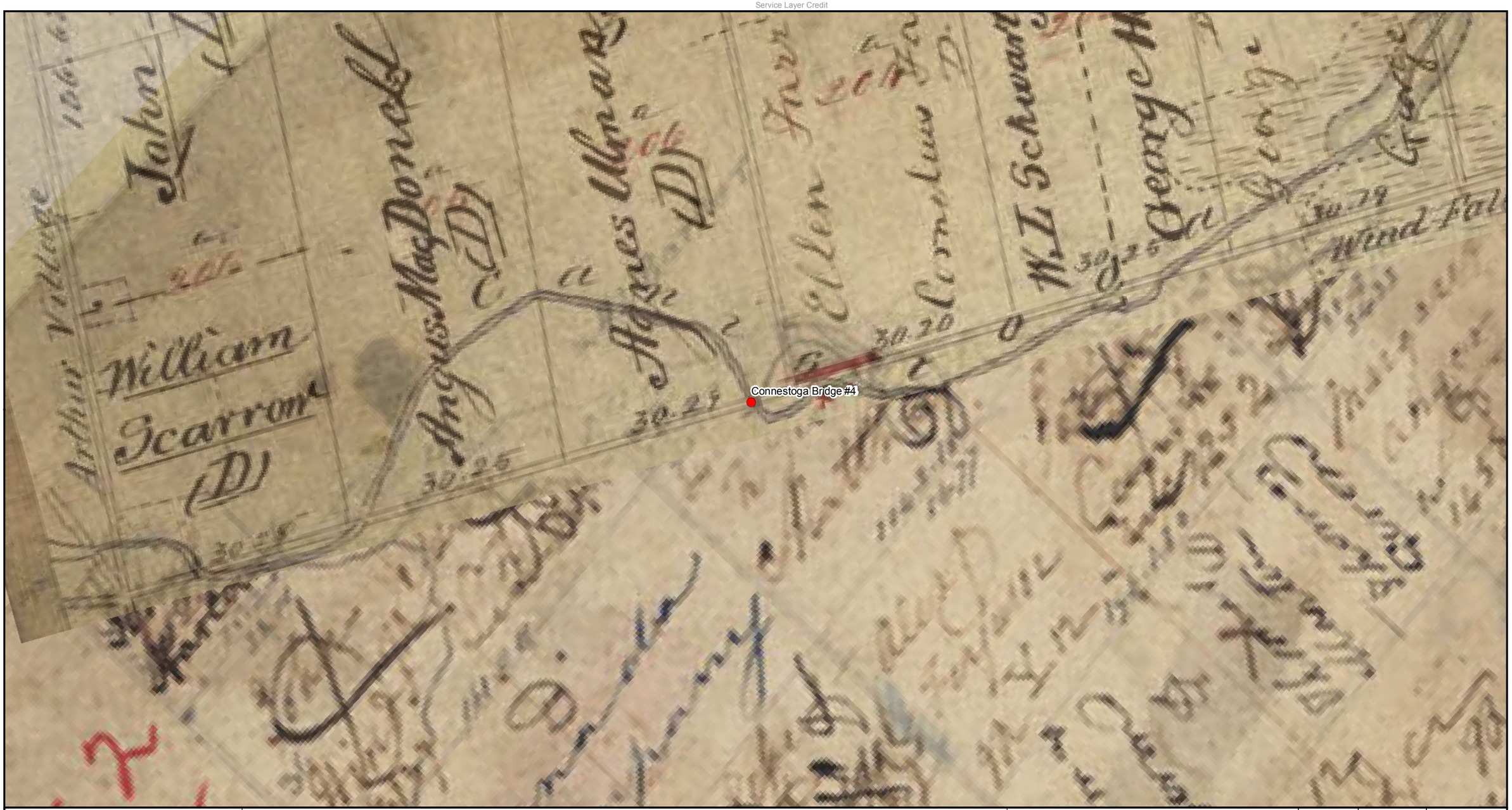
- Connestoga Bridge 4

TITLE: FIGURE 1: PROJECT LOCATION	SCALE: 1:15,000	PROJECT NO: 17M-01271-01	DATE: NOVEMBER 2019
	DRAWN BY: AST	CLIENT: WELLINGTON COUNTY	
PROJECT: CONNESTOGA BRIDGE #4 CHER	CREDITS: LAND INFORMATION ONTARIO		

0 400 800 m N

Document Path: C:\Users\Andrew.S.Turner\Projects\17M-01271-01 Wellington Bridges and Culverts\MapDocuments\Bridge#4\Project Location.mxd

Service Layer Credit



wsp

LEGEND

- Connestoga Bridge 4

TITLE: FIGURE 2: HISTORIC MAPPING (1857/1860)

SCALE:	PROJECT NO:	DATE:
1:10,000	17M-01271-01	NOVEMBER 2019
DRAWN BY: AST	CLIENT: WELLINGTON COUNTY	

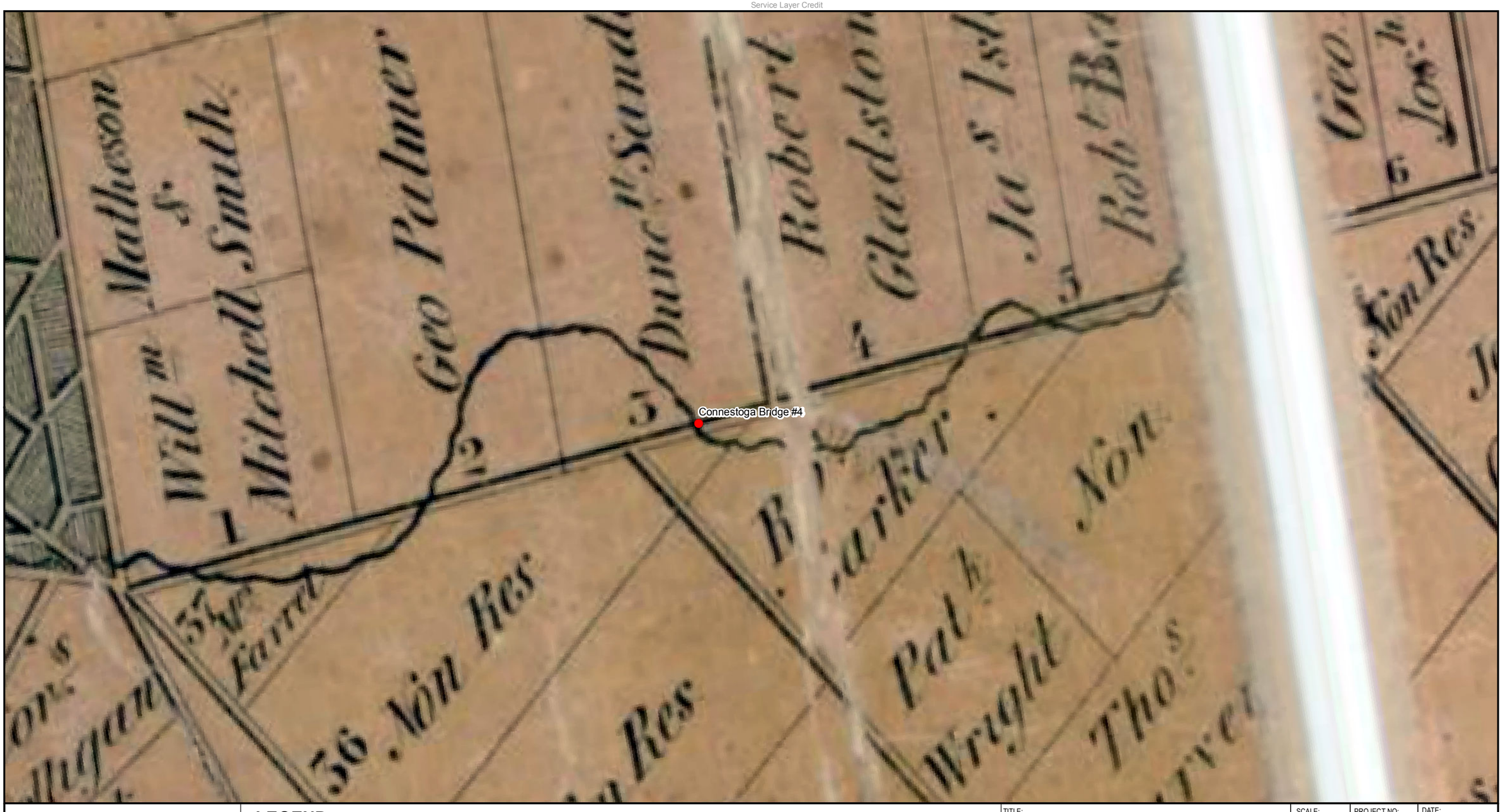
PROJECT: CONNESTOGA BRIDGE #4 CHER

0 295 590 m N

CREDITS: WEST GARAFRAXA TOWNSHIP MAP #13 (1857) AND WEST AND EAST LUTHER TOWNSHIP (1860)

Document Path: C:\Users\Andrew.S.Turner\Projects\17M-01271-01 Wellington Bridges and Culverts\MapDocuments\Bridge#4\Map 2 1857 and 1860 Historic Mapping.mxd

Service Layer Credit



wsp

LEGEND

- Connestoga Bridge 4

TITLE: FIGURE 3: HISTORIC MAPPING (1861)

SCALE: 1:10,000

PROJECT NO: 17M-01271-01

DATE: NOVEMBER 2019

DRAWN BY: AST

CLIENT: WELLINGTON COUNTY

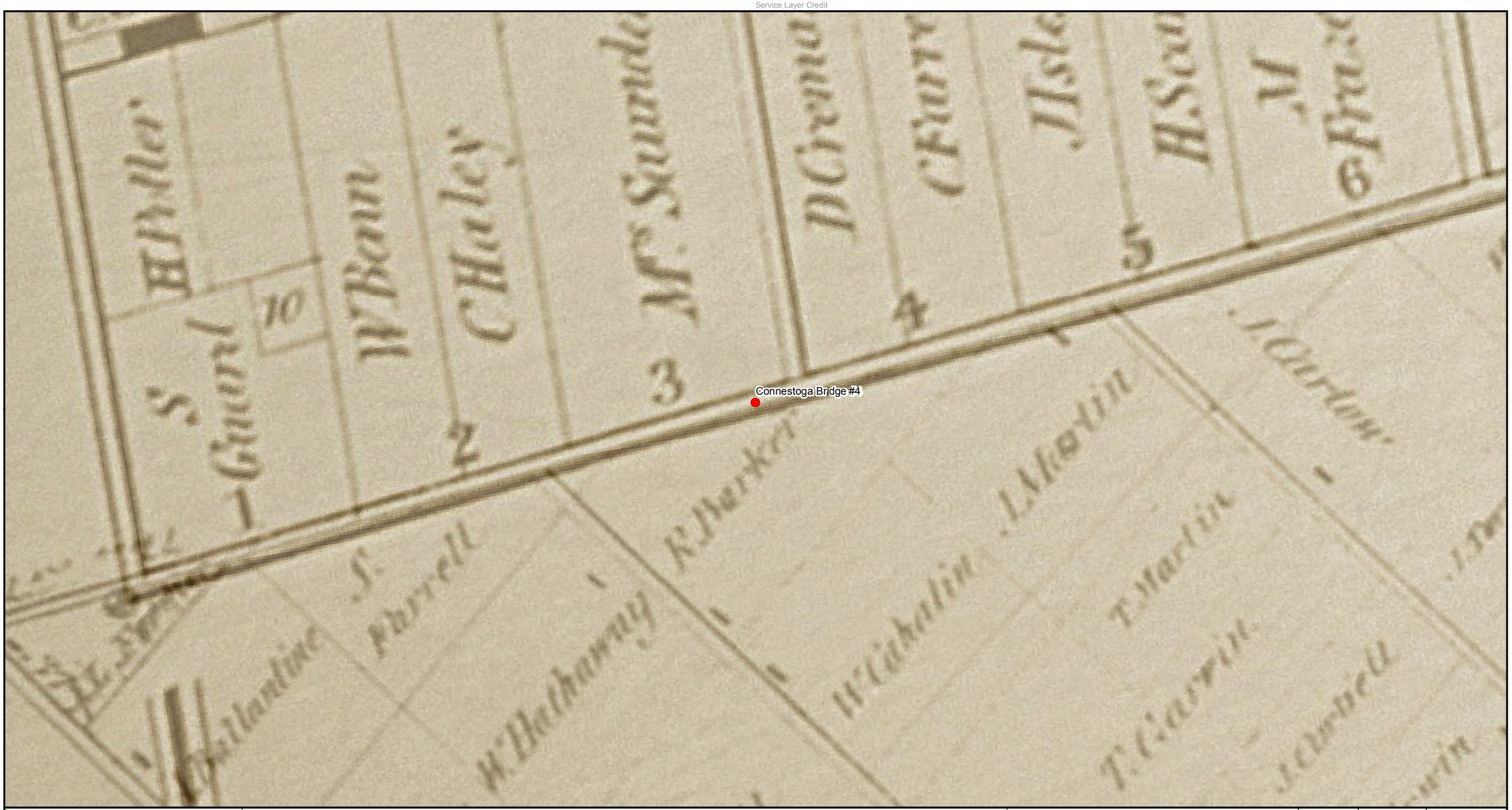
PROJECT: CONNESTOGA BRIDGE #4 CHER

CREDITS: MAP OF THE COUNTY OF WELLINGTON (LESLIE AND WHEELOCK, 1861)

0 300 600 m N

Document Path: C:\Users\Andrew.S.Turner\Projects\17M-01271-01 Wellington Bridges and Culverts\MapDocuments\Bridge#4\Map 3 1861 Leslie and Wheelock.mxd

Service Layer Credit



LEGEND

- Connestoga Bridge 4

TITLE: FIGURE 4: HISTORIC MAPPING (1877)	SCALE: 1:10,000	PROJECT NO: 17M-01271-01	DATE: NOVEMBER 2019
	DRAWN BY: AST	CLIENT: WELLINGTON COUNTY	
PROJECT: CONNESTOGA BRIDGE #4 CHER	CREDITS: MAP OF THE COUNTY OF WELLINGTON (LESLIE AND WHEELOCK, 1861)		

0 300 600 m N

Document Path: C:\Users\Andrew.S.Turner\Projects\17M-01271-01 Wellington Bridges and Culverts\MapDocuments\Bridge#4\Map 4 1877 Walker and Miles .mxd

Service Layer Credit

wsp

LEGEND

- Connestoga Bridge 4

TITLE: FIGURE 3: HISTORIC MAPPING (1861)

SCALE:	PROJECT NO:	DATE:
1:10,000	17M-01271-01	NOVEMBER 2019
DRAWN BY: AST	CLIENT: WELLINGTON COUNTY	

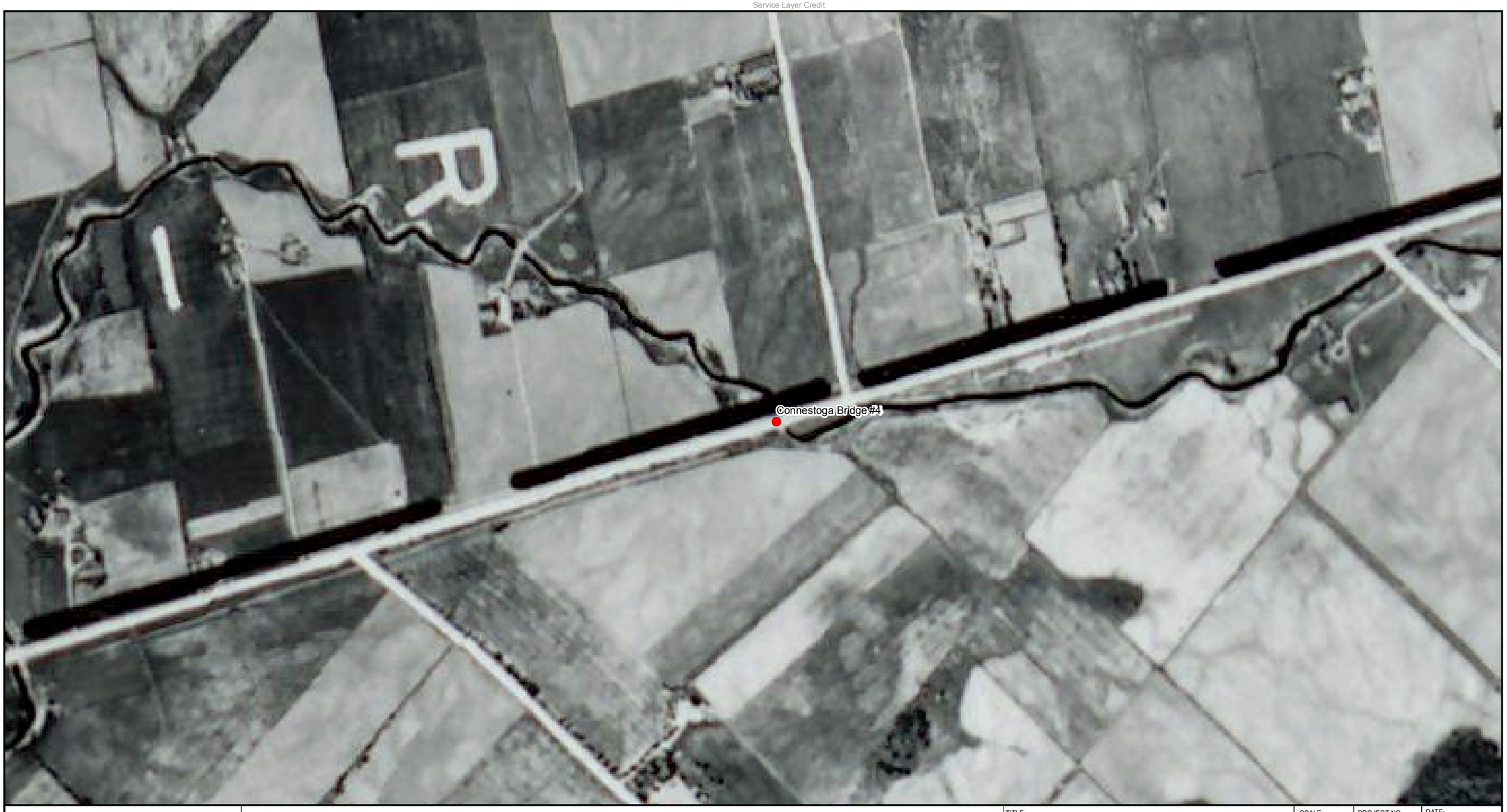
PROJECT: CONNESTOGA BRIDGE #4 CHER

0 300 600 m N

CREDITS: HISTORICAL ATLAS OF THE COUNTY OF WELLINGTON, ONTARIO (F. LLOYD, 1906)

Document Path: C:\Users\Andrew.S.Turner\Projects\17M-01271-01 Wellington Bridges and Culverts\MapDocuments\Bridge#4\Map 5 1906 County of Wellington.mxd

Service Layer Credit



wsp

LEGEND

- Connestoga Bridge 4

TITLE: FIGURE 6: 1954 AERIAL IMAGERY

SCALE: 1:5,000

PROJECT NO: 17M-01271-01

DATE: NOVEMBER 2019

DRAWN BY: AST

CLIENT: WELLINGTON COUNTY

PROJECT: CONNESTOGA BRIDGE #4 CHER

CREDITS: AERIAL IMAGE (1954)

0 150 300 m N

Document Path: C:\Users\Andrew.S.Turner\Projects\17M-01271-01 Wellington Bridges and Culverts\MapDocuments\Bridge#4\Map 6 1954 Aerial.mxd

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APPENDIX A – BRIDGE INVENTORIES

Table 3: Central MTO Bridge List Comparative Examples

STRUCTURE ID	STRUCTURE NAME	TYPE	MATERIAL	HIGHWAY	YEAR OF CONSTRUCTION	NUM SPANS	SPAN LENGTH TOTAL
10 - 20/1	HIGHWAY 401 CROSSING AT CPR. OVERPASS	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1958	1	15.2
10 - 20/2	HIGHWAY 401 CROSSING AT CPR. OVERPASS	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1958	1	15.2
10 - 57/1	CNR OVEHEAD WIDENING AT HIGHWAY 401	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1965	1	15
10 - 57/2	CNR OVEHEAD WIDENING AT HIGHWAY 401	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	427	1969	1	15.2
18 - 105/	LAKE STREET UNDERPASS	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1996	2	40.2
18 - 166/	CNR SUBWAY MERRITON	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	2003	0	
21 - 158/1	Highway 401/Courtice Road Overpass, EBL	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1965	1	12
21 - 158/2	Highway 401/Courtice Road Overpass, WBL	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	1	1937	1	7.8
21 - 161/1	BOWMANVILLE CR.BR. WIDENING	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1985	1	10.5
21 - 161/2	BOWMANVILLE CR.BR. WIDENING	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1950	1	11.3
21 - 187/1	Highway 35/CPR Overhead, NBL	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1958	1	33.5
21 - 187/2	Highway 35/CPR Overhead, SBL	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1940	2	34
21 - 188/	WILMOT CRK. BR.	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	427	1968	1	22.6
21 - 191/1	Highway 401/Wilmot Creek, EBL	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1959	1	17

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21 - 191/2	Highway 401/Wilmot Creek Bridge, WBL	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1965	1	17.1
21 - 193/	MILL STREET UNDERPASS	Reinforced Cast-In-Place Concrete	Reinforced Cast-In-Place Concrete	35	1954	1	19.5
21 - 195/1	CLARKE TWP. BR #12 CPR. O/H	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1965	1	17.1
21 - 195/2	CLARKE TWP. BR #12 CPR. O/H	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1955	1	17.3
21 - 197/1	NEWTONVILLE ROAD OVERPASS	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1958	1	18.2
21 - 197/2	NEWTONVILLE ROAD OVERPASS	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1951	1	18.3
21 - 432/1	Reg. Rd. 4 Overpass	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1952	1	18.3
21 - 432/2	Reg. Rd. 4 Overpass	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1952	1	18.3
22 - 41/	Vrooman Creek Bridge	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	1	2003	1	20
22 - 150/1	Hwy 401 Lynde Creek Bridge at Whitby, EBL	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1955	1	17.3
22 - 150/2	Hwy 401 Lynde Creek Bridge at Whitby, WBL	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1958	1	18.2
22 - 183/1	FAREWELL CK - HWY 401	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1950	1	15
22 - 183/2	FAREWELL CK - HWY 401	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1950	1	15
22 - 367/	Hwy 401 TIS Ramp Bridge	Rigid Frame, Vertical Legs	Reinforced Cast-In-	401	1959	1	17

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			Place Concrete				
24 - 124/1	Hwy.401 O'Pass at Derry Rd. W, EBL	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1950	1	15
24 - 124/2	Hwy.401 O'Pass at Derry Rd. W. WBL	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1950	1	15
24 - 190/	DILLON'S CREEK BRIDGE	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1965	1	12
30 - 22/	Sturgeon River Bridge	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	1	1965	1	21.4
30 - 135/1	WILLOW CREEK (NORTH BRIDGE)	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	427	1968	1	22.6
30 - 135/2	WILLOW CREEK (NORTH BRIDGE)	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	427	1968	1	22.6
30 - 137/1	HIGHWAY #93 OVERPASS	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	35	1985	1	24.9
34 - 27/	CNR OVERHEAD BRIDGE #3	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	35	1985	1	24.9
34 - 102/	MILL RACE BR-WAINFLEET #2	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	427	1968	1	22.6
37 - 93/	U'PASS AT KING SIDE RD & 400	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1996	2	40.4
37 - 95/1	Vaughan TWP O/P NB	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	1	1965	1	21.4
37 - 186/2	C.N.R.O/H W.OF ISLINGTON 401 WB COLLECTORS	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1965	1	12
37 - 186/6	C.N.R.O/H W.OF ISLINGTON 401 EW OFF-RAMP FOR 409	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1976	1	12.2

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37 - 195/1	CNR O/H ON HWY 401 AND WIDENING	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1950	1	11.3
37 - 195/2	CNR O/H ON HWY 401 AND WIDENING	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1950	1	11.3
37 - 200/3	BATHURST ST O/P	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1951	1	18.3
37 - 215/3	CNR O'HEAD EB & WB CORE	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1961	1	10.4
37 - 234/1	N.QUEEN ST O/P (HWY 427 NBL collectors)	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1954	1	13
37 - 234/2	N.QUEEN ST O/P (HWY 427 SBL collectors)	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1981	1	14
37 - 234/3	N.QUEEN ST O/P (QEW WN AND EN) Hwy 427 SBL core)	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1981	1	14
37 - 341/3	HWY #1001 OPASS/RAMP W-N EB CORE	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1958	1	15.2
37 - 341/4	HWY #1001 OPASS/RAMP W-N WB CORE	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1958	1	15.2
37 - 342/	YONGE ST BR #10	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1965	1	12
37 - 801/	BR. 1 HWY 427 SB OVER HWY 27 SB	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1976	1	12.2
37 - 802/	BR. 2 HWY 427 NB OVER HWY 27 SB	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	427	1970	1	15.2
37 -1480/	Hwy 404/401 N-W HOV Ramp Tunnel	Rigid Frame, Vertical Legs	Reinforced Cast-In-Place Concrete	401	1950	1	19.9

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Table 4: Wellington County Bridge List Comparative Examples

STRUCTURE ID	STRUCTURE NAME	STRUCTURE TYPE	ROAD NAME	YEAR BUILT	LENGTH
B002095	Lots 30 & 31 Conc XVI and XVII Minto	Rigid Frame	Wellington Road 2	1975	7
B005014	Ranton's Bridge	Rigid Frame	Wellington Road 5	1971	9.5
B005015	Bramwell Bridge	Rigid Frame	Wellington Road 5	1930	6.8
B006008	O'Dwyers Bridge	Rigid Frame	Wellington Road 6	1972	10.4
B007045	Moores Bridge	Rigid Frame	Wellington Road 7	2009	6.7
B007046	Burnett's Bridge	Rigid Frame	Wellington Road 7	2009	7.9
B008018	Lawless Bridge	Rigid Frame	Wellington Road 8	1960	8.3
B010024	Wyandot Bridge	Rigid Frame	Wellington Road 10	1955	8.2
B010091	LOT 9/10 CONC 1 MARYBOROUGH	Rigid Frame	Wellington Road 10	1972	12.1
B011027	McNabb Bridge	Rigid Frame	Wellington Road 11	1948	10.1
B012035	Lots 9/10 CONC 9 PEEl	Rigid Frame	Wellington Road 12	2011	6.8
B012036	Thorpe Bridge	Rigid Frame	Wellington Road 12	1965	16.5
B012094	McGrath Bridge	Rigid Frame	Wellington Road 12	1961	15.9
B012100	Lots 9/10 Conc 13 Peel	Rigid Frame	Wellington Road 12	1960	6.3
B012119	Lots 9/10 Conc XIV Peel	Rigid Frame	Wellington Road 12	2011	4.6
B016103	Lot 26, Conc IV/V West Garafraxa	Rigid Frame	Wellington Road 16	1950	3.7
B016104	Lot 22, Conc IV/V West Garafraxa	Rigid Frame	Wellington Road 16	1993	5.6
B017040	Creekbank Bridge	Rigid Frame	Wellington Road 17	1972	13.8
B017115	Lot 2 Conc VI Nichol	Rigid Frame	Wellington Road 17	1965	4.9
B018090	Carroll Creek Bridge	Rigid Frame	Wellington Road 18	1969	18.9
B022107	LOT 9 CONC VIII/IX NICHOL	Rigid Frame	Wellington Road 22	1950	4.1
B024121	LOT 24 CONC XIV/XV ERIN	Rigid Frame	Wellington Road 24	1975	6.9
B025108	LOT 17 CONC XI ERIN TOWNSHIP	Rigid Frame	Wellington Road 25	2007	9.2
B027106	LOT 12 CONC IV/V ERAMOSA	Rigid Frame	Wellington Road 27	2015	6
B029083	LOT 32 CONC I/II ERAMOSA	Rigid Frame	Wellington Road 29	1960	16.5
B030124	Marden Bridge	Rigid Frame	Wellington Road 30	2017	6.299
B035087	Paddock Bridge	Rigid Frame	Wellington Road 35	1963	10.4
B036122	LOT 31 CONC X/XI PUSLINCH	Rigid Frame	Concession 11	1946	5.3
B038113	LOT 1 CONC X GUELPH TOWNSHIP	Rigid Frame	Wellington Road 38 (Victoria Road)	1950	4.4

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STRUCTURE ID	STRUCTURE NAME	STRUCTURE TYPE	ROAD NAME	YEAR BUILT	LENGTH
B041084	Watson Road Bridge	Rigid Frame	Wellington Road 41 (Watson Road)	1960	20.7
B042080	LOT 1 CONC IX ERIN	Rigid Frame	Wellington Road 42	1987	10
B042110	LOT 1 CONC XI ERIN	Rigid Frame	Wellington Road 42	1949	5.3
B042111	LOT 1 CONC VIII ERIN TOWNSHIP	Rigid Frame	Wellington Road 42	1950	3.5
B044112	LOT 4 CONC III/IV ERAMOSA	Rigid Frame	Wellington Road 44	1960	5
B049097	Everton Bridge	Rigid Frame	Wellington Road 49 (Everton Bridge)	1990	11
B052109	Erin Bridge	Rigid Frame	Wellington Road 52	1940	5.6
B086126	Smith Creek Bridge	Rigid Frame	Wellington Road 86	1969	12.5
B087137	Maitland River Overflow Bridge	Rigid Frame	Wellington Road 87	1956	14
B109127	Elora Street Bridge	Rigid Frame	Wellington Road 109	1998	25
B109128	Maitland River Bridge	Rigid Frame	Wellington Road 109	1969	8.5
B109132	Conestogo Rover Bridge #6	Rigid Frame	Wellington Road 109	1931	18.5
B109133	Conestogo River Bridge #4	Rigid Frame	Wellington Road 109	1931	16
B109134	Conestogo River bridge #10	Rigid Frame	Wellington Road 109	1934	13.5
B124136	WEST CREDIT RIVER BRIDGE	Rigid Frame	Wellington Road 124	1958	12
C110910	Lot 1 Conc VI Peel	Rigid Frame	Wellington Road 11	1955	4.3

APPENDIX B – BRIDGE PLANS

½ ELEVATION BB

½ ELEVATION AA

½ SECTION AT SPRINGING

½ SECTION AT ARCH CROWN

Scale ⅜"=1'-0

END ELEVATION

Scale ⅜"=1'-0

DETAILS OF HANDRAIL

Scale ½"=1'-0

½ SECTION THRO' SIDEWALK & HANDRAIL

½ SECTION THRO' ROADWAY on ℄

Scale ¼"=1'-0

EXTRADOS

INTRADOS

℄ of Highway

Length of Deck 150'37

NOTE: Depth of Footings subject to revision by the Engineer. Structure to be built in accordance with D.H.O. General Specifications for Concrete Highway Bridges 1920, with revisions & additions as per Form No. 1930

Concrete Mix For Arch Section 1-2-3½
For Wings 1-2½-4

If depth of Footings varies by more than 2' from that shown on Plan, or if, after excavation is made it is found necessary to use Piles where none is shown on plan, the Bridge Engineer must be notified before any concrete is poured. Where Construction joints are necessary in the floor system, they are to be made vertical, & parallel to the main reinforcement.

320 B109133

Drawn by O.T.C.
Checked by T.M.

SITE 133

CONTRACT No 30-44

PROPOSED BRIDGE

ARTHUR No 4

THE KINGS HIGHWAY No 9

TWP LUTHER WEST CON I LOT 3

TWP GARAFRAXA WEST CON II LOT 35

CO. WELLINGTON

APPROVED

Bridge Engineer — Chief Engineer

Deputy Minister

DEPARTMENT OF PUBLIC HIGHWAYS ONTARIO

Toronto July / 1931

Scales ⅛", ⅜", ½" = 1'-0

DRAWING No D[illegible]

35-133