Region of Waterloo

SCHEIFELE BRIDGE REPLACEMENT

Northfield Drive (Regional Road 22)
Township of Woolwich

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT STUDY

ENVIRONMENTAL STUDY REPORT

NOVEMBER 2023

Stantec

100-300 Hagey Boulevard
Waterloo ON N2L 0A4

Stantec

November 20, 2023
File: 1650-10600/10

Transportation and Environmental Services
Design and Construction Division
Regional Municipality of Waterloo
150 Frederick Street, 6th Floor.
Kitchener ON N2G 4J3

Attention: Mr. Ken Brisbois, C. Tech. Project Manager

Dear Sir:

Reference:

Scheifele Bridge Replacement Study, Township of Woolwich

ENVIRONMENTAL STUDY REPORT

We are pleased to present the final Environmental Study Report (ESR), for the proposed replacement of the Scheifele Bridge on Northfield Drive in the Township of Woolwich.

The study was completed in accordance with the Provincial guidelines for a Schedule "C" Class Environmental Assessment, and included a full review of natural, social and economic environmental issues and constraints, within the immediate study area. An extensive public and agency consultation process was the cornerstone of many key decisions and preliminary design details associated with the "Recommended Preferred Design Concept".

In conjunction with the evaluation of various bridge cross section alternatives, the planning and design process considered options for improved active transportation facilities for pedestrians, buggies and cyclists who will use the new bridge. In addition, the Project Team placed a high priority on alternative design concepts that would provide for uninterrupted traffic on Northfield Drive during reconstruction of the Scheifele Bridge.

We wish to acknowledge the guidance and support of the Project Team that was created for this important project, whose focus towards addressing the deteriorating condition of the existing structure, and how best to implement needed enhancements consistent with Region of Waterloo policies, practices, and guidelines, was a consistent theme throughout the study process.

Once detailed design and construction is completed, the replacement of the Scheifele Bridge will provide a significant and lasting impact on the efficiency of the local transportation network in north Waterloo and the Township of Woolwich.

Thank you sincerely for the opportunity to have worked on this challenging and interesting project.

STANTEC CONSULTING LTD.

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Design with community in mind

Region of Waterloo

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SCHEIFELE BRIDGE ESR APPENDICES SUMMARY

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1.0 INTRODUCTION

1.1 BACKGROUND AND THE STUDY AREA

The Region of Waterloo Official Plan (ROP), and its complimentary “Moving Forward” 2018 Transportation Master Plan Update (TMP), are forward-looking documents that have been created to ensure that future growth will occur in a sustainable fashion, leading to a high quality of life for Waterloo Region citizens. While the ROP is the Region’s guiding document for directing community growth over a 20-year period, “Moving Forward” is a strategic plan which identifies various policies and projects that will be needed to achieve the Region’s short, and long, term transportation needs over the next 25 years.

Where to invest in region road improvements, traffic controls, public transit services, and cycling and walking facilities, are all part of the TMP document, as are strategies to manage ongoing travel demands and new transportation technologies.

At the time of writing this Environmental Study Report (ESR), the population of the Region was approximately 650,000 (2023), but forecasts suggest that this figure could climb to over 835,000 by 2041 and to 923,000 by 2051. This significant growth will mean that an integrated management approach will be required in the areas of land use planning, environmental protection and preservation, economic development, and infrastructure support and enhancement. Without a balanced strategic plan, the Region will not be properly positioned to protect its natural, cultural, and social assets, and to build on its “credentials” as a diverse and value-oriented community.

To manage the future growth and development of the area, the Region recently completed an update to the Regional Official Plan (ROP), with Region Council enacting a bylaw to replace various sections of the previous ROP at a special meeting held on August 18, 2022. A Notice of Adoption for the proposed ROP amendments was issued in accordance with the provisions of the Planning Act and, at the time of the Scheifele Bridge Class EA Study, the amended ROP was being reviewed by the Ontario Ministry of Municipal Affairs and Housing (MMAH). The amended ROP was also forwarded to local area municipalities, First Nations, and other stakeholders for information.

On April 11, 2023, the Minister of Municipal Affairs and Housing approved the Region of Waterloo’s Official Plan Amendment (ROPA) No. 6 with modifications. The full details of the Ministry’s decision, and modifications, can be viewed on the Environmental Registry of Ontario’s website. Region staff are continuing to work with the Ministry in securing final approval of the updated ROP, including any modifications to the amended ROP deemed necessary by the Ministry. Updates will be provided by the Region as they become available.

In keeping with the principles of the Regional Official Plan, the Region presents annual plans for expansion and retrofit upgrades to its road network, in recognition of the master plan directions

of both the ROP and the Transportation Master Plan. These plans must be responsive to, and in harmony with, other transportation modal opportunities within the Region. As part of its annual network planning, the Region earlier programmed the Scheifele Bridge for a full superstructure (deck) replacement in 2021. The Scheifele Bridge is located on Regional Road 22 (Northfield Drive) over the Conestogo River in the Township of Woolwich, as illustrated in Figure 1.1.

To support the recommendations for a deck replacement contract, the Region of Waterloo's Program Development department retained WSP Canada Group Limited in 2018 to investigate the condition, and rate of deterioration, of the Scheifele Bridge, with a focus on assessing any significant deficiencies that may necessitate interim repairs until the deck can be fully replaced. The findings of an earlier *2010 Structure Investigation and Alternatives Assessment Report* were used as a baseline and comparison to the 2018 inspection results.

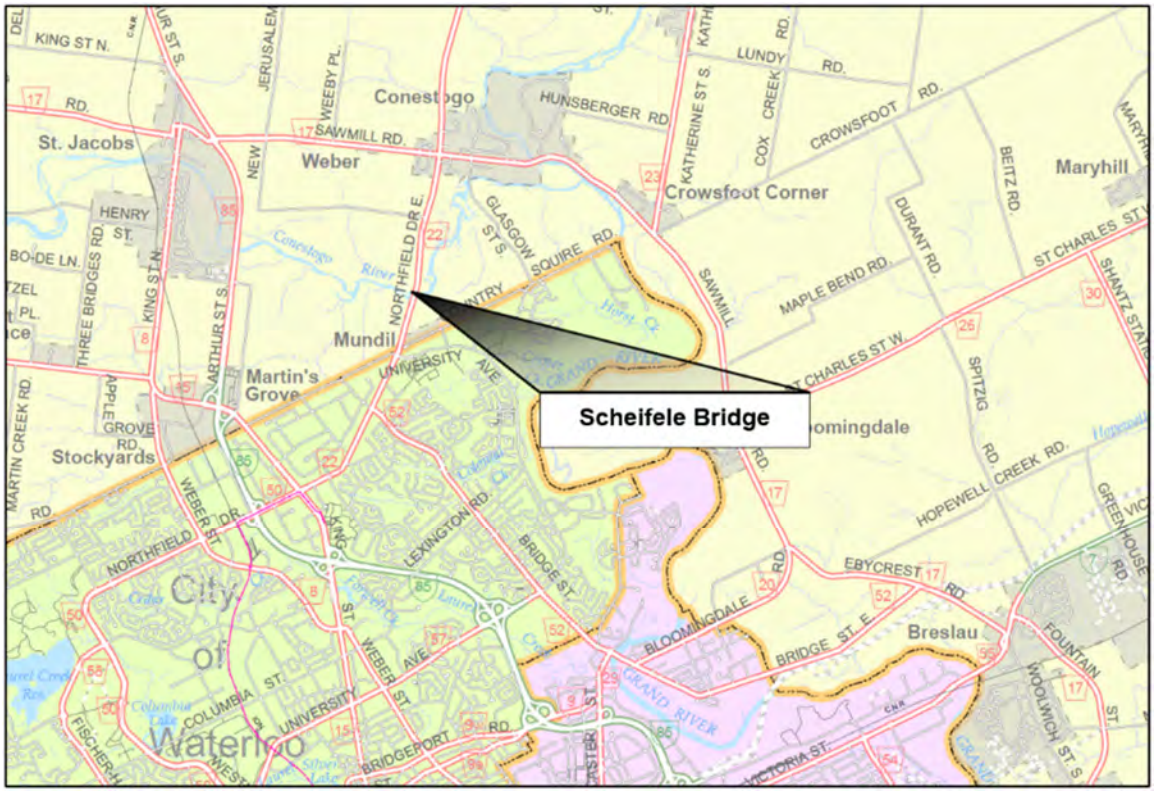
The 2018 WSP report supported the Region's proposal for a superstructure replacement in 2021, with additional recommendations for completion of interim repairs to abutment rocker bearings (south abutment) and spalling of the outside south end span girder. Monitoring of further deck deterioration was also recommended since the condition of the deck surface had reached a threshold where rehabilitation was no longer considered to be cost effective. In summary, the 2018 study proposed specific repairs to the Scheifele Bridge to ensure structural integrity of the bridge until such time as a superstructure replacement contract could be initiated. The subject repairs were subsequently completed under a separate contract awarded by the Region.

In 2019, the Region of Waterloo engaged Stantec Consulting Ltd. to provide professional planning, environmental, and engineering services for the completion of a Schedule "C" Class Environmental Assessment Study, Detailed Design, Tender Documentation, and Contract Administration / On-Site Inspection services for the planned Scheifele Bridge Superstructure Replacement project.

Although the Region had previously included the Scheifele Bridge Superstructure Replacement contract in their 10-Year Transportation Capital Program (TCP) for construction in 2021, unexpected delays arose during the Class EA study process due to the COVID-19 Pandemic, the need for supplementary geotechnical investigations, coordination and completion of an interim substructure repair contract, incorporation of a new approach to on-line Public Consultation Center meetings through the Region's Engage Website, and last minute changes to the recommended preferred bridge design cross section which necessitated a third Public Consultation Center (PCC) meeting in June 2023.

This report summarizes the results of the Schedule "C" Class Environmental Assessment Study.

Figure 1.1: Study Area Key Plan



1.2 NEED AND JUSTIFICATION *AND* PROBLEM STATEMENT

The Project Team assessed the *Need and Justification* for the project and developed a *Problem Statement* for the Class Environmental Assessment Study which, together, define the project deficiencies and the scope of improvements to be evaluated as part of the study.

Current Situation:

- The Scheifele Bridge is a significant part of the Northfield Drive infrastructure, crossing the Conestogo River between the City of Waterloo and the Village of Conestogo, in the Township of Woolwich. Currently, the Scheifele Bridge is a 2-lane structure with a narrow sidewalk on the west side only.

- Northfield Drive functions as a major arterial road corridor within the Region of Waterloo, serving both local and inter-community travel. It is designated as Regional Road #22 in the Regional Official Plan (ROP).

- Between University Avenue (City of Waterloo) and Sawmill Road (Village of Conestogo / Township of Woolwich), Northfield Drive is 2 lanes with a posted speed of 80 km/hr., except on the approaches to University Avenue (60 km/hr.) and the Village of Conestogo (50 km/hr.).

- Land use along Northfield Drive, in the vicinity of the Scheifele Bridge, includes crop farmland, rural residential, and open space.

- Northfield Drive currently (2020 study) carries approximately 10,350 vehicles per day (VPD), with about 3.5% heavy trucks. Vehicular traffic is expected to increase to about 14,000 VPD by 2030. There are modest volumes of buggies and pedestrians crossing the Scheifele Bridge at various times of the year. Higher volumes of cyclists cross the bridge as outlined later in this report.

- There are plans to install a trunk watermain on Northfield Drive and Sawmill Creek Road, in conjunction with municipal water supply upgrades to the Villages of Conestogo and St. Jacobs. These plans are to be confirmed during the detailed design stage for the Scheifele Bridge project.

Need and Justification Statement:

In 2019, the Region of Waterloo completed a Preliminary Information Report (PIR) for the Scheifele Bridge, which examined replacement needs, timing, and preliminary costs based on identified structural and operational deficiencies. Although recent rehabilitation contracts have provided “short-term” solutions to ongoing structural concerns, they did not, as a whole, address more systemic problems with the bridge. The PIR study concluded that the Region must move forward with definitive plans to complete long term improvements to the bridge, including, but not limited to, the following:

- Full replacement of the existing bridge deck superstructure.
- Substructure (abutments and piers) repairs and/or full replacement.
- Provide enhanced pedestrian, buggy and cycling facilities.
- Where possible, maintain surrounding environmental aesthetics as part of any reconstruction project.
- Provide for long term vehicular and active transportation needs in the community.
- Include provisions for a proposed trunk watermain on Northfield Drive.
- Review opportunities to maintain a pathway trail beneath the south span of the bridge.
- Mitigate potential natural and social environmental impacts during construction.

Following completion of the 2019 PIR study, Region of Waterloo Council included the Scheifele Bridge Reconstruction project in the Region’s 10 Year Transportation Capital Plan (TCP) and initiated a Class Environmental Assessment Study to confirm the planning and design details of the project. A budget of $6.8 million was set aside for the project, with an estimated construction start date in 2021 or 2022. The preliminary budget was based on replacement of the bridge deck only, matching its current width of two traffic lanes and a sidewalk on one side. No costing was included for widening the bridge deck or replacement of the substructure piers and abutments.

Due to unforeseen factors as noted in Section 1.1, the schedule for reconstruction of the Scheifele Bridge was adjusted from the 2021-2022 start date approved by Council. The current timeline for construction is tentatively set at 2025 (start date) to 2027 (completion), both of which are subject to final Region Council approval.

Problem Statement:

Based on the above, the Project Team developed the following "Problem Statement" to guide the Scheifele Bridge Class Environmental Assessment, Detailed Design, and Construction stages of the project:

- The Scheifele Bridge, on Regional Road 22 (Northfield Drive) over the Conestogo River, requires reconstruction to address its deteriorating condition, including a full superstructure (deck) replacement and partial, or full, replacement of the substructure piers and abutments.
- In conjunction with the bridge deck replacement, the planning and design process shall consider the addition of active transportation facilities for pedestrians, buggies and cyclists who will use the bridge now and in the future. In addition, provisions shall be made in the design to accommodate a Region of Waterloo trunk watermain.
- The purpose of the Scheifele Bridge Class Environmental Assessment Study is to provide recommendations for improvements which address the deteriorating bridge structure and consider how best to implement optional enhancements, consistent with region policies, practices, and guidelines.
- The subject improvements are proposed so that the Region can continue its ongoing pursuit of implementing all modes of travel within the community, improving municipal streetscapes, and achieving traffic operational improvements all while minimizing potential adverse impacts to the natural and built environments, and adjacent private properties, wherever possible.

2.0 STUDY OBJECTIVES

The main objectives of the Scheifele Bridge Class Environmental Assessment Study, and how they were generally approached, are summarized as follows:

Objective 1:

"*To implement a cooperative and solution-directed approach to liaison with property owners, local municipalities, higher level government departments, utility agencies, the public, and other stakeholders leading to a "consensus-oriented" design solution".*

A key element of any environmental assessment study process is the solicitation and evaluation of dialogue and technical input from various affected property owners, government agencies, the public and other interested stakeholders, leading to the selection of a preferred solution that satisfies most of the expressed concerns and/or issues. By means of Public Consultation Centre (PCC) Meetings, distribution of Project Information Packages, individual consultations, Project Team and Technical Committee meetings, and correspondence, a thorough approach was taken to general liaison over the course of this project. At all times, constructive dialogue was promoted so that the recommended preferred design concepts represent "consensus-oriented" solutions. This approach is the foundation of the Class Environmental Assessment Process and was one of the prime focus areas of the Project Team.

Objective 2:

"*To identify and consolidate all relevant technical, natural, social, and economic environmental issues and constraints within the study area, and address how improvements to the Scheifele Bridge may impact, enhance, or conserve the existing environment while recognizing the vehicular and active transportation needs of the community".*

The Class Environmental Assessment Study was completed in the context of previous planning studies, reports, and environmental research. Where needed, the data from these previous reports was used and updated to reflect the status of existing conditions. Environmental specialists, planners and engineers were included on the Project Team to interpret the existing conditions data and to assist with additional field investigations, research, and analysis of environmental conditions. Ultimately, the team created a summary of environmental related criteria that enabled an integration of alternative roadway, bridge, active transportation, landscape, and other design features into the existing community setting.

Objective 3:

"To develop a range of alternative improvement solutions and concepts, based on acceptable design criteria and operational standards, and to systematically evaluate the alternatives based on established impact guidelines and mitigation opportunities. The process of evaluation must be accountable to legislative planning strategies and policies; natural, social, and economic environmental constraints; property issues; utility and related infrastructure needs; project scheduling; and costs".

Various alternative design concepts were developed for replacing the deteriorating Scheifele Bridge and incorporating the proposed improvements within the Northfield Drive corridor, all while minimizing direct impacts on the social and natural environments. The process of evaluating the alternative concepts recognized numerous issues and constraints associated with operational safety, access management, opportunities to address cyclist and pedestrian needs, property impacts, natural and cultural impacts, opportunities to provide bridge architectural enhancements, geometric improvements, and cost. In the end, a recommended preferred design concept was selected and presented to the public, stakeholders, and Regional Council.

Objective 4:

"To complete a preliminary design of the recommended design concept that provides a sound approach to the mitigation of environmental impacts and structure / corridor enhancement

(natural, social, and economic), provides appropriate solutions for long term vehicular and active transportation needs within the community, and presents budgetary capital cost estimates to construct the project".

Upon selection of a preferred concept from the alternatives that were considered for the project, the Project Team set out to develop preliminary design drawings based on accepted roadway, drainage, and bridge code standards. The preliminary design details will form the basis of the recommended plan that will be carried forward to final design and construction, and, in the end, will have received a reasonable degree of scrutiny to ensure that the design addresses the various technical, environmental, social, economic, and operational issues and constraints raised over the course of the study.

Objective 5:

"To summarize the environmental assessment, and preliminary design of the recommended design concept, in a concise and defendable Schedule "C" Environmental Study Report".

This Environmental Study Report represents the culmination of four phases of a five-phase Class EA Study process. The fifth phase represents the detailed design and construction stages of the project. The Environmental Study Report is a comprehensive document that summarizes the entire Class Environmental Assessment process for a given project and presents the *recommended design concept* along with recommendations for mitigation of any environmental impacts that may be anticipated during construction.

Forming part of this Environmental Study Report is a section that provides the Design Criteria and Preliminary Design details for the project, which provides a foundation for the fifth phase of the Class EA Study Process: Design and Construction.

3.0 STUDY PROCESS

3.1 CLASS ENVIRONMENTAL ASSESSMENT PROCESS

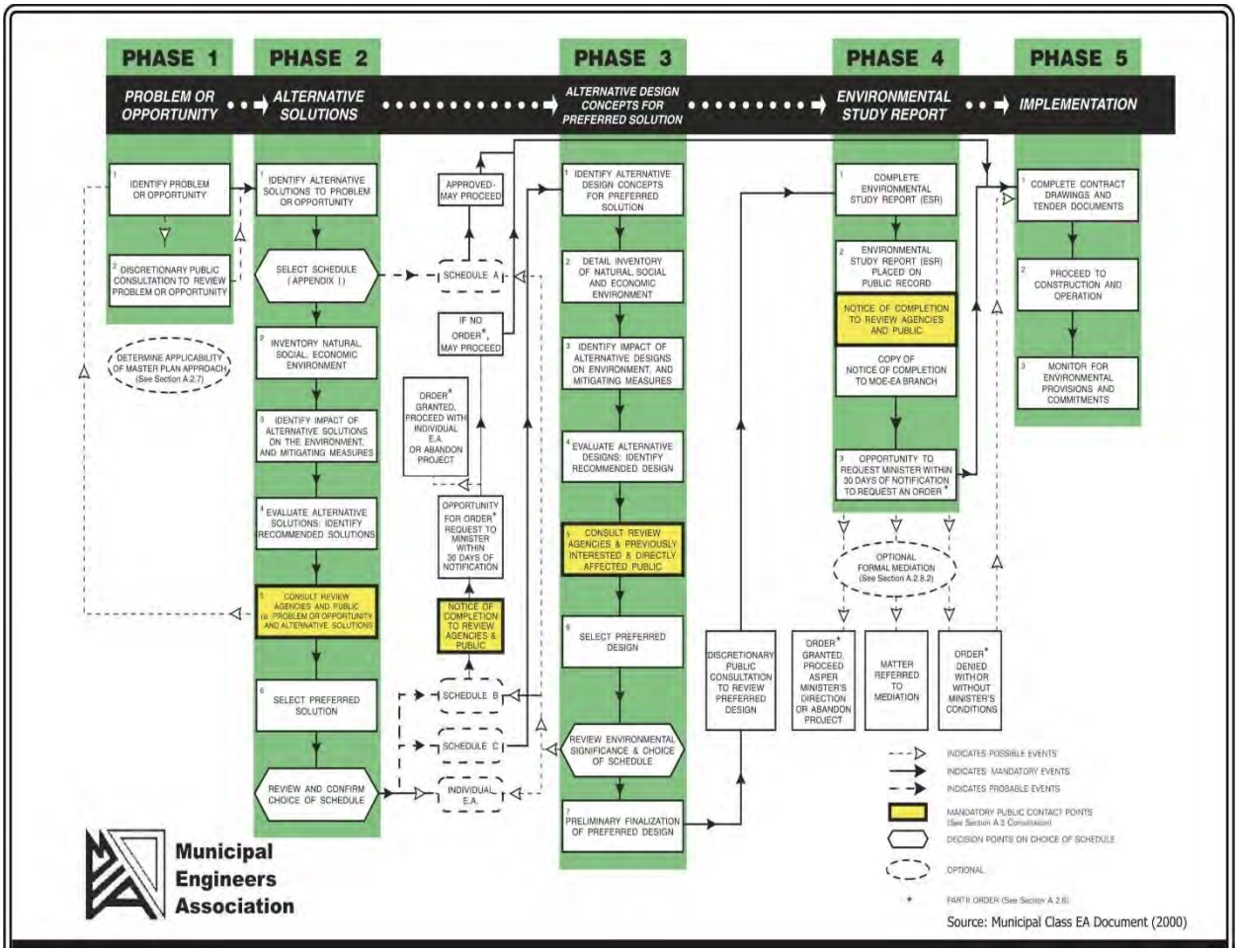
The Municipal Class Environmental Assessment (Class EA) Planning and Design process is an approved five-phase planning procedure under the Ontario Environmental Assessment Act, which applies to all municipal infrastructure projects. Projects undertaken through this planning process are "classified" by municipalities into one of three "Schedule" types ranging from Schedule 'A' to Schedule 'C', in accordance with their degree of anticipated environmental impact.

The five phases of the Class EA planning and design process are summarized as follows:

Phase 1	Identify the problem (deficiency) or opportunity.
Phase 2	Identify alternative solutions to address the problem or opportunity taking into consideration the existing environment and select a preferred solution based on a thorough evaluation process and consultation with public, agencies and other stakeholders.

Phase 3	Examine a range of alternative design concepts for implementing the preferred solution, based on existing constraints, public and agency input, potential environmental impacts, and methods of mitigating any negative environmental issues.
Phase 4	Document, in an Environmental Study Report (ESR), the rationale for the recommended design concept, based on the planning, design and consultation process established through Phases 1 to 3. The ESR must be made available for public and agency review and comment for a specified period.
Phase 5	Complete contract drawings and documents, and proceed to construction of the recommended design concept, once all environmental approvals are in place. Monitoring of construction activities and operations is recommended to ensure adherence to environmental provisions and mitigation measures noted in the ESR.

A copy of the flow chart outlining the Municipal Class EA Planning and Design Process is provided courtesy of the Municipal Engineers Association (MEA).



A Schedule ‘C’ Class Environmental Assessment Study applies to the Scheifele Bridge study, reflecting a project that includes improvements and minor expansions to existing infrastructure facilities that may result in some adverse environmental impacts. The proponent (Region of Waterloo), under this study classification, must proceed through a screening process that includes public consultation and liaison with directly impacted stakeholders, in accordance with the procedures specified under the *Municipal Class Environmental Assessment* Guidelines.

Under a Schedule ‘C’ Class Environmental Assessment study, Phases 1 through 4 are to be completed including the preparation of an “Environmental Study Report (ESR)”. The completion of Phase 5, “Implementation of Detailed Design and Construction”, is optional and subject to funding and local government approvals.

At the outset of the Class EA study, background reports, property ownership data, land use, and other information related to the natural environment were collected and reviewed. Additional data was gathered through field surveys; investigations of natural, social, and economic environmental conditions; geotechnical; and topographical features within the Study Area. In addition, input from government agencies, utilities, and local interest groups was solicited through direct correspondence and liaison.

In addition to convening three (3) on-line Public Consultation Centre (PCC) meetings, presentations were made to Region of Waterloo Planning and Works Committee, Region Council, and the Region’s Active Transportation Advisory Committee (ATAC). Details of the project were also reviewed at Project Team meetings, at specially arranged meetings with local business and residential property owners, and with other interested agency contacts.

In summary, the Schedule ‘C’ Class Environmental Assessment for the Scheifele Bridge Replacement Study has ensured, through adherence to the guiding principles of the Environmental Assessment process, that the following key elements of the project have been completed:

- Consultation with affected agencies, the public, property owners, business owners, and other interest groups.
- Consideration of a reasonable range of design alternatives, including both “alternatives to”, and “alternative methods of,” implementing a preferred solution.
- Identification and consideration of the impacts of the alternatives on all aspects of the environment, social, economic, and otherwise.
- Completion of a thorough evaluation process leading to the selection of a “recommended preferred design concept”.
- Providing an outline of mitigative measures to protect and/or enhance the environment, in response to agency input, public feedback, and study data.
- Documentation of the planning process in a traceable and defendable Environmental Study Report (ESR), which respects the decision-making principles of the Provincial Class EA process.

3.2 PUBLIC COMMENTS ON AN ENVIRONMENTAL STUDY REPORT (ESR)

Class Environmental Assessment studies place an emphasis on the evaluation of various alternatives as well as on a strict protocol for public and agency consultation. The encouragement of stakeholder participation, throughout the process, is strongly recommended so that all project-related issues and concerns may be resolved before a "recommended preferred design concept" is adopted and the Environmental Study Report (ESR) is completed and filed on the public record.

This Scheifele Bridge ESR Report will be available for review on the Region of Waterloo's *EngageWR.ca* website for a 30-day public comment period, between November 20, 2023, and December 20, 2023. Interested persons may provide written comments to the Study Team anytime during this review period, but no later than December 20, 2023, by contacting either one of the following Study Team members:

Mr. Ken Brisbois, C. Tech.
Transportation Project Manager
Regional Municipality of Waterloo
150 Frederick Street, 6th Floor.
Kitchener, ON N2G 4J3
Phone: (519) 575-4606
KBrisbois@regionofwaterloo.ca

Mr. Garry E. Leveck, P. Eng.
Senior Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Phone : (519) 579-4410 or (519) 240-3686
garry.leveck@stantec.com

3.3 SECTION 16 ORDER (ABORIGINAL AND TREATY RIGHTS)

As noted in Section 3.2, all public concerns are to be directed to the project proponent (Region of Waterloo), as represented by the above Project Team members. However, where outstanding concerns may relate to potential adverse impacts on constitutionally protected Aboriginal and treaty rights, then a *Section 16 Order* request on these matters may be addressed in writing, or by email, to the following provincial government contacts, and copied to the Project Team members listed above, **no later than December 20, 2023.**

In addition, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (i.e. an individual / comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g. require further studies), only on the grounds that the requested order may prevent, mitigate, or remedy adverse impacts on

constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered.

All requests should include the full name and contact information of the requester, for Ministry purposes.

Minister
Ministry of the Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
Minister.mecp@ontario.ca

Director
Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto ON M4V 1P5
EABDirector@ontario.ca

A copy of any written *Section 16 Order* request shall also be forwarded to the proponent of the project, in this case the Region of Waterloo:

Regional Municipality of Waterloo
150 Frederick Street, Floor 6
Kitchener, ON N2G 4J3

Attention: Mr. Ken Brisbois,
Project Manager, Transportation Engineering
Design & Construction Division of Transportation & Environmental Services
519-575-4606 (Desk)
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

If there are no Section 16 Orders on the project, or the Minister denies any/all Section 16 Order request(s) with or without conditions, then the proponent (Region of Waterloo) will have complied with the appropriate conditions and sections of the Environmental Assessment Act and will have the right to proceed to final design and construction of the recommended design concept (Phase 5 of the Class EA process).

3.4 WORK PLAN, PROJECT DELIVERABLES AND STUDY SCHEDULE

3.4.1 General

The Planning, Environmental Assessment, and Preliminary Design for the Scheifele Bridge Superstructure Replacement project has been conducted within the framework of the Municipal Engineers Association Class Environmental Assessment document (Amended 2007), as a Schedule “C” project.

More specifically, in this case, the Municipal Class EA process has presented verification of the following:

- Confirmation of the study area.
- Confirmation of the need and justification for replacing the Scheifele Bridge superstructure and substructure bridge components, along with improvements to Northfield Drive that may be impacted by the new bridge design.
- Identification of existing natural, social, and economic environmental conditions.
- Development of alternative design concepts for the replacement of the bridge structure, including any required design changes to Northfield Drive, to accommodate current and projected vehicular traffic, buggy traffic, cyclists, and pedestrians.
- Selection of a “preferred design concept.”
- Refinement of the preferred design concept based on public and agency input, leading to presentation of a “recommended preferred design concept”.
- Consultation with agencies, the public, business and residential property owners, advisory committees, elected officials, and other stakeholders, at strategic points in the study process.

Public and Agency consultation was a key element of the study process and determined, to a large degree, the success of the project. In providing a thorough and transparent public consultation and planning process, and in securing broad base support for the preferred design concept over the course of the study, the Study Team nurtured confidence in the recommendations that were being considered for the proposed bridge replacement and road reconstruction concepts, construction staging and traffic control, and environmental protection measures.

3.4.2 Project Deliverables

The scope of deliverables for a Class Environmental Assessment Study are relatively straight-forward and are documented in the Municipal Engineers Association Class EA guidelines. The project deliverables, associated with the Scheifele Bridge Class Environmental Assessment, were as follows:

- Notice of Study Commencement.
- Relevant background data and study reports.
- Topographic and Legal (Property Identification) Surveys within the Project Limits.

- Base Plan Preparations in AutoCAD.
- Property ownership and stakeholder/agency contact mailing list.
- Photographic summary of study area.
- Transportation Traffic Analysis (vehicular, pedestrian, cyclist, and buggy).
- Geotechnical and Bridge Foundation Investigation Report.
- Environmental Impact Study (Existing Terrestrial, Fisheries, Wildlife Habitat, Species-at-Risk).
- Cultural Heritage Evaluation Report (CHER).
- Stage 1 Archaeological Assessment Report.
- Hydraulic and Geomorphology Fluvial Study Reports.
- Bridge Alternatives Structural Planning Study Report.
- “Need and Justification” and “Problem” Statements.
- Development of Alternative Design Concepts for Northfield Drive and Scheifele Bridge reconstructions, including all plans, graphics, and preliminary engineering details.
- Evaluation Matrix for comparison of Alternative Northfield Drive / Scheifele Bridge Alignment Reconstruction Design Concepts.
- Evaluation Matrix for comparison of Alternative Scheifele Bridge Cross Section Design Concepts.
- Notice of Public Consultation Centre (PCC) Meetings #1, #2 and #3.
- Preparation of PCC Displays, Handout Documents, and Public Comment Sheets for PCC Meetings #1, #2 and #3.
- Content Assistance for Region’s On-Line EngageWR.ca Website: Public Consultation Centre (PCC) Meeting #1 which included “fixed slides”.
- Content Assistance for Region’s On-Line EngageWR.ca Website: Public Consultation Centre (PCC) Meeting #2 which included “fixed slides” and pre-recorded “audio / video presentation”.
- Content Assistance for Region’s On-Line EngageWR.ca Website: Public Consultation Centre (PCC) Meeting #3, which included links to engineering drawings illustrating a revised bridge cross section (sidewalk on east side only) and updated construction staging plans.
- Summary of Public and Agency feedback from the three (3) PCC Meetings.
- Direct Consultations with Public and Agency Stakeholders (as required).
- Agendas and Minutes of Meetings (Project Team; Active Transportation Advisory Committee (ATAC); Project Manager; Property/Business Owners, Region Planning and Works and Council Meeting, etc.).
- Correspondence Documentation.
- Preliminary Property Acquisition Impact Assessment and Documentation.
- Preliminary Design of the “Recommended Preferred Design Concept” and incorporation into the Environmental Study Report (ESR).
- Preparation of Draft and Final versions of the Environmental Study Report (ESR).

- Notice of Study Completion and Filing of the Schedule 'C' ESR on the Public Record.
- Assistance with Section 16 Order Requests (as required).

3.4.3 Work Plan and Schedule

The Region of Waterloo's 10-Year Transportation Capital Program anticipated that the Class Environmental Assessment, Preliminary Design, and Detailed Design phases of the Scheifele Bridge project would be completed in time for a construction start in 2021, depending on funding and other Region capital priorities. This schedule would require that detailed design and tender-ready drawings be completed by fall 2020, at the latest, so that tenders could be called in the winter/spring of 2021.

With the Environmental Assessment Study not starting until January 2019 (Consultant Proposal phase), combined with unexpected delays created by the COVID-19 Pandemic, the addition of supplementary geotechnical investigation work, the tender and completion of an interim bridge repair contract, the implementation of a new approach to on-line Public Consultation Center meetings through the Region's Engage Website, and the addition of a third Public Consultation Centre meeting, it was unrealistic to expect a construction start in 2021. Recognizing the delays to the schedule, the Region adjusted its expectations for construction and, at the time of the ESR preparation, has re-programmed the Scheifele Bridge project for construction from 2025 to 2027 (3-year construction schedule).

With the timing adjustments to the Region's Capital Program related to the Scheifele Bridge, the Project Team was able to comfortably achieve normal Environmental Assessment schedule milestones within a reasonable timeline. Assuming there are no unexpected Section 16 Orders following filing of the Environmental Study Report, Stantec Consulting Ltd. should complete detailed design, contract drawings and specifications, and call tenders by the February 2025.

The following provides a summary of the key milestone activities and dates associated with the Class Environmental Assessment, Detailed Design, Tender Issue / Award, and Construction, at the time of writing the Environmental Study Report. Detailed Design and Construction dates are subject to Region and Agency approvals.

Class Environmental Assessment Study Phase:

- Consultant Award: November 2019.
- Start-Up Project Team Meeting 1: March 5, 2020.
- Notice of Study Commencement: Advertised in Local Newspapers on May 14, 2020
- On-Site Signage: Notice of Study Commencement: May 18, 2020, for a few weeks
- Project Team Meeting 2: August 11, 2020
- Project Team Meeting 3: November 30, 2020
- Project Team Meeting 4: May 11, 2021.
- On-Line Public Consultation Centre (PCC) Meeting #1 (Region Engage Website): May 19, 2021, to June 9, 2021.
- Project Team Meeting 5: July 20, 2021.
- Interim Bridge Repair Contract: September 2021 to December 2021.

- Project Team Meeting 6: November 19, 2021.
- Bridge Alternatives Structural Planning Reviews and Report: January 15, 2022, to February 23, 2022.
- Project Team Status Update (in lieu of formal meeting): April 16, 2022
- On-Line Public Consultation Centre (PCC) Meeting #2 (Region Engage Website): May 18, 2022, to June 8, 2022.
- Final Project Team Meeting 7: July 20, 2022.
- Region Active Transportation Advisory Committee Meeting: September 15, 2022.
- On-Line Public Consultation Centre (PCC) Meeting #3 (Region Engage Website): June 7, 2023, to June 28, 2023. Special PCC Meeting to present revised bridge design concept of a sidewalk on the east side of the structure only.
- Region Engineering Coordination Committee (ECC) Meeting: August 28, 2023.
- Region of Waterloo Planning and Works Committee (PWC) Meeting: September 12, 2023.
- Region of Waterloo Council Meeting: September 27, 2023.
- Environmental Study Report:
  - Draft ESR Document Version 1: August 23, 2022.
  - Draft ESR Document Version 2 (Modified Bridge Section): September 12, 2023.
  - Final ESR Document Version 2: November 9, 2023.
- Notice of Study Completion Date: November 20, 2023
- Advertise ESR on the Public Record (30 Day Period): November 2023.
- Deadline for Public to contact Region with any concerns: December 20, 2023.
- Deadline for ***Section 16 Order Submissions*** (To MECP and Region): December 20, 2023.

Detailed Design and Tender Issue / Award Phase (Dates TBC):

- Detailed Design: February 2024 to February 2025.
- Property Acquisitions: May 2024 to October 2024.
- Permit Approvals: October 2024 to March 2025.
- Tender Advertisement / Award: February 2025 to May 2025.

Construction Phase (Dates TBC):

- Stage 1 Construction: July 1, 2025, to November 30, 2025.
- Stage 2 Construction: December 1, 2025, to February 1, 2026.
- Stage 3 Construction: July 15, 2026, to November 30, 2026.
- Stage 4 Construction: May 1, 2027, to August 31, 2027.

3.5 PROJECT STUDY ORGANIZATION

The success of this project may be attributed, in large part, to the cooperation and feedback received from the Project Team, which guided the decision process over the course of the Class Environmental Assessment study. The proponent of the Scheifele Bridge project was, and is, the Regional Municipality of Waterloo, who directed the study.

The structure of the **Project Team**, which was the primary committee group directing the environmental assessment study, was as follows:

Regional Municipality of Waterloo

- Ken Brisbois, C. Tech., Project Manager: Transportation Engineering, Design & Construction Division of Transportation and Environmental Services.
- Mike Jones, C.E.T., Supervisor, Traffic Engineering.
- Skylar Van Kruistum, P. Eng., Head (Rehabilitation): Design and Construction Division of Transportation and Environmental Services (Staff Support).
- John Stephenson, P. Eng., Senior Project Manager (Structures Advisor / Retired).

Township of Woolwich

- Larry Shantz, Ward 3 Councilor.
- Murray Martin, Ward 3 Councilor.
- Ryan Tucker, P. Eng., Engineering Project Supervisor.
- Jared Puppe, C. E. T., Director of Infrastructure Services (Staff Support).

Stantec Consulting Ltd.

- Garry E. Leveck, P. Eng., Senior Project Manager: Transportation
- Mike Trader, P. Eng., Senior Bridge Engineer.
- Bill White, M.A., Senior Transportation Technologist.
- Adam Felinczak, MA Sc., P. Eng., Structural Engineer.

Within the Stantec organization, specialty services were brought to the project by personnel in the following fields: Roadway and Municipal Design; Structural/Bridge Design; Topographic and Legal Surveys; Electrical Design Coordination; Natural Environmental and Cultural Heritage Studies; Geotechnical and Foundation Investigations; Terrestrial and Aquatic Studies; Stage 1 Archaeological Assessment, and Transportation/Traffic Support.

The Project Team had formal meetings, at various stages during the study, to review project data, alternative design concepts, evaluation criteria, public and agency input, Public Consultation Centre presentation material, technical issues, preliminary design details, and other pertinent study content.

The minutes of all Project Team Meetings are included in **Appendix A.**

3.6 PUBLIC AND AGENCY CONSULTATION

Public and agency consultation is a key feature of the Ontario Municipal Class Environmental Assessment planning and design process. Through an effective public and agency participation program, the proponent can generate meaningful dialogue between project planners and external stakeholders, allowing an exchange of ideas, a broadening of the project information base, and ultimately a consensus-oriented decision-making process. One of the principle aims of external consultation is to achieve resolution of different points of view, thus reducing or avoiding controversy and possible "Section 16 Orders" under the *Ontario Environmental Assessment Act.*

3.6.1 Notice of Study Commencement

The first step in the public and agency consultation process was the publication and circulation of the *Notice of Study Commencement*, a copy of which is provided in **Appendix B.**

Advertising was as follows:

- **The Waterloo Region Record** Newspaper: May 15, 2020, and May 19, 2020
- **The Woolwich Observer** Newspaper: May 13, 2020, and May 21, 2020
- Circulation of the Notice of Study Commencement was also made, by mail or email, to various *agencies, residential and business property owners, and other stakeholders.* A complete list of the initial contacts is provided in **Appendix B**. This contact list was updated over the course of the project based on responses from the circulations, feedback from the three on-line Public Consultation Centre Meetings, and comments received over the course of the study.

In addition to advertisements in the local newspapers, and public circulation by mail or email, the Region of Waterloo erected two portable message signs on Northfield Drive, notifying northbound and southbound drivers that the Scheifele Bridge Class Environmental Assessment study had commenced. The notification signs were left in place for a few weeks after initial setup.

3.6.2 Public Consultation Centre (PCC) Meeting Number 1: Wednesday May 19, 2021, to Wednesday June 9, 2021

Due to the COVID-19 Pandemic, the first of three Public Consultation Centre (PCC) meetings was presented on-line, which was a departure from the typical in-person meeting format where members of the Project Team would meet one-on-one with members of the public, or agencies, to discuss details of the environmental assessment study. Public Consultation Centre Meeting One was set up on a virtual viewing platform within the Region of Waterloo's ***EngageWR.ca*** website. A series of visual displays were uploaded to the website for public viewing over a 3-week period, allowing members of the public to view the study content at times that suited their personal schedules.

The purpose of Public Consultation Centre Meeting One was to introduce the public to the background studies that prompted the Class Environmental Assessment, to confirm the Need and Justification for the project, to provide background study data and reports in fulfillment of the

Environmental Assessment process, and to introduce the initial Northfield Drive and Scheifele Bridge preliminary design concepts that were being considered for further study.

NO DECISIONS ON A PREFERRED DESIGN ALTERNATIVE WERE PRESENTED AT PUBLIC CONSULTATION CENTRE MEETING ONE.

A general overview of the organization and documentation details of the first Public Consultation Centre meeting is provided below. A copy of each of the "Notice of Public Consultation Centre Meeting", the "Display Slides and Links to Engineering Drawings", the "Public *Information Package* Document", and "Completed Comment Sheet and E-mail Responses" are included in **Appendix C**.

Date, Format and Access:

- Date: May 19, 2021, to June 9, 2021
- Format: Region of Waterloo *EngageWR.ca* Website
- Access: Website Access 24/7 to Suit Personal Schedules

Advertisement Process (Notice of Public Consultation Centre Meeting):

- Publications:
    - Waterloo Region Record: May 14, 2021, and May 18, 2021
    - Woolwich Observer: May 13, 2021, and May 20, 2021
    - Waterloo Chronicle: May 13, 2021, and May 20, 2021
- Direct mailings to agencies, community organizations, abutting property owners, and interested stakeholders.
- Portable message signs placed on Northfield Drive at both approaches to the Scheifele Bridge, notifying the travelling public of the on-line Public Consultation Centre meeting dates and access to Region's website.

PCC Display Panels:

- A series of display panels were available for public viewing on the Region of Waterloo EngageWR.ca website. The displays were grouped into the following broad categories:
    - Welcome, Invitation to Participate, and Purpose of the Public Consultation Centre Meeting.
    - Project Objectives and Overview of the Class Environmental Assessment Process.
    - Brief History of the Scheifele Bridge in the community.
    - Current Situation, "Need and Justification Statement", and "Problem Statement".
    - Transportation and Traffic Assessment Data.
    - Overview of Region of Waterloo Transportation Corridor Design Guidelines.

- Existing Natural, Cultural Heritage, and Social Environmental Conditions.
- Stage 1 Archaeological Assessment Study Data.
- Results of Preliminary Geotechnical and Foundation Investigation Studies.
- Existing Bridge Condition Investigation and Structural Analysis Background.
- Details of 2021 Interim Repair Contract and Future Monitoring Program.
- Preliminary Alternative Design Concepts:
    - Bridge Cross Section Design Alternatives 1-4
    - Northfield Drive / Bridge Design Alignment Alternatives 1-4
    - Construction Staging Design Concept
- Traffic Control During Construction:
    - No Long-Term Closure of Northfield Drive or Traffic Detour Option
    - Long-Term Closure of Northfield Drive with Traffic Detour Option
    - Long Term Detour Route Planning, if Applicable
- Architectural Enhancement Opportunities:
    - Architectural Enhancement Guidelines
    - Architectural Enhancement Alternatives
- Preliminary Alternative Alignment Design Concepts Evaluation Matrix
- Next Steps and Further Information:
    - What Are the Next Steps in the Study Process?
    - How to Receive Further Notifications
    - Region and Consultant Contact Information

- A detailed Information Package and Comment Sheet was available to each on-line attendee for their review and use in providing feedback on the project.

Attendance and Responses:

- Website Engagement was tracked by the Region through the EngageWR.ca Summary Report, which was forwarded to team members, along with public comments, on June 22, 2021. The following is a summary:

    - 222 total visits to the EngageWR.ca Website.
    - 183 visitors viewed at least one page.
    - On average, 48 visitors viewed a photo, document, or multiple pages.
    - 5 visitors participated in a survey and 3 registered to ask a question.

- The Project Team agreed that all things considered the number of website visits was encouraging despite the number of return comments and/or questionnaires being somewhat less than anticipated. A total of ten (10) written comments / responses were received after PCC #1, four (4) from government agencies and 6 from residents. The

comments from these submissions are summarized below and are reproduced in **Appendix "C".**

Agency Responses:

- The Ontario Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTC):
  - confirmed that Stantec's Stage 1 Archaeological Assessment study report had been filed on the Ontario Registry of Archaeological Reports, and
  - that the design team should follow up with any new information related to a Marine Archaeological Assessment study after selection of a preferred bridge design solution.

- The Grand River Conservation Authority (GRCA):
  - provided a detailed summary of conditions that will need to be addressed before a future Permit Application can be approved for construction of the new bridge within the regulated boundaries of the Conestogo River. The key elements of the GRCA's conditions included:
    - a requirement that the new design limits, where practical, avoid any impacts on the hydraulic and fluvial dynamics of the Conestogo River and its upstream tributary,
    - where possible, the new bridge should minimize intrusion on any significant natural features or ecological functions in the area,
    - that the new bridge design should avoid, to the extent possible, any natural bends in the river,
    - that the new design should take advantage of existing open areas on the channel banks or valley slopes to minimize impacts on fish habitat, and
    - that any potential hydraulic changes in the Conestogo River, arising from the proposed bridge configuration, shall be modelled using standard engineering design principles.

- Transport Canada: Environmental Assessment Program: Ontario Region: Email Dated May 20, 2021:

  Transport Canada **does not** require receipt of all individual or Class EA related notifications. We are requesting project proponents self-assess if their project:

1. Will interact with a federal property and/or waterway by reviewing the Directory of Federal Real Property, available at at www.tbs-sct.gc.ca/dfrp-rbif/; **and**
2. Will require approval and/or authorization under any Acts administered by Transport Canada* available at http://www.tc.gc.ca/eng/acts-regulations/menu.htm.

Projects that will occur on federal property prior to exercising a power, performing a function or duty in relation to that project, will be subject to a determination of the likelihood of significant adverse environmental effects, per Section 82 of the *Impact Assessment Act, 2019*.
If the above does not apply, the Environmental Assessment program should not be included in any further correspondence and future notifications will not receive a response. If there is a role under the program, correspondence should be forwarded *electronically* to: EnviroOnt@tc.gc.ca with a **brief description of Transport Canada's expected role**.

A summary of the most common Acts that have applied to projects in an Environmental Assessment context include:

- ***Canadian Navigable Waters Act (CNWA)*** – the Act applies primarily to works constructed or placed in, on, over, under, thru, or across navigable waters set out under the Act. The Navigation Protection Program administers the CNWA through the review and authorization of works affecting navigable waters. Information about the Program, CNWA and approval process is available at: http://www.tc.gc.ca/eng/programs-621.html. Enquiries can be directed to NPPONT-PPNONT@tc.gc.ca or by calling (519) 383-1863.

- ***Railway Safety Act (RSA)*** – the Act provides the regulatory framework for railway safety, security, and some of the environmental impacts of railway operations in Canada. The Rail Safety Program develops and enforces regulations, rules, standards, and procedures governing safe railway operations. Additional information about the Program is available at: https://www.tc.gc.ca/eng/railsafety/menu.htm. Enquiries can be directed to RailSafety@tc.gc.ca or by calling (613) 998-2985.

- ***Transportation of Dangerous Goods Act (TDGA)*** – the transportation of dangerous goods by air, marine, rail and road are regulated under the TDGA. Transport Canada, based on risks, develops safety standards and regulations,

provides oversight, and gives expert advice on dangerous goods to promote public safety. Additional information about the transportation of dangerous goods is available at: https://www.tc.gc.ca/eng/tdg/safety-menu.htm. Enquiries can be directed to TDG-TMDOntario@tc.gc.ca or by calling (416) 973-1868.

- ***Aeronautics Act*** – Transport Canada has sole jurisdiction over aeronautics, which includes aerodromes and all related buildings or services used for aviation purposes. Aviation safety in Canada is regulated under this Act and the Canadian Aviation Regulations (CARs). Elevated Structures, such as wind turbines and communication towers, would be examples of projects that must be assessed for lighting and marking requirements in accordance with the CARs. Transport Canada also has an interest in projects that have the potential to cause interference between wildlife and aviation activities. One example would be waste facilities, which may attract birds into commercial and recreational flight paths. The *Land Use In The Vicinity of Aerodromes* publication recommends guidelines for and uses in the vicinity of aerodromes, available at: https://www.tc.gc.ca/eng/civilaviation/publications/tp1247-menu-1418.htm. Enquires can be directed to tc.aviationservicesont-servicesaviationont.tc@tc.gc.ca or by calling 1 (800) 305-2059 / (416) 952-0230.

- The City of Waterloo: Engineering Services Department:
  Letter Dated March 31, 2021 (Note: Comments are consistent with response to Notice of Study Commencement)

  - Since Northfield Drive and the Scheifele Bridge represent critical transportation assets linking the City of Waterloo and Woolwich Township we feel they should be “right sized” for interim and long-term multi-use transportation needs.

  - Present and future transportation needs of this corridor must account for conventional forms of road traffic, agricultural vehicles, buggies, cyclists, and future users of active transportation features (trails, pathways, sidewalks) as linkages become established. We understand that 2019 average annual daily traffic (AADT) stands at approximately 10,300 movements and that figure is projected to grow to approximately 13,000 by 2030.

  - Emphasizing safety in road design is a key element of the Region of Waterloo’s 2018 Transportation Master Plan. Improving road

safety via speed control and other measures are also focus areas of the City of Waterloo's current Transportation Master Plan (TMP) update. As result, design considerations should recognize the present concerns about speeding and traffic safety on Northfield Drive. To that end, separated walkways and multi-use trail should be part of the final design to enhance the protection of pedestrians and cyclists. The opportunity for traffic calming should also be part of the detailed design component of the project.

- Lane width considerations for vehicle passage should address the fact that this portion of the regional road network is essential for EMS and mutual-aid Fire Rescue support between the City and Township.

- The City of Waterloo is encouraged by the Project Team's careful consideration of the impacts of bridge reconstruction and normal traffic flow on Northfield Drive. We are appreciative of your efforts to identify a construction staging approach that would avoid a long-term closure of Northfield Drive and extensive detours that would have a negative impact on the community.

Public Comments:

- A resident of the village of Conestogo, and regular user of Northfield Drive and the Scheifele Bridge, commented:

  - that the Scheifele Bridge is a critical link between Waterloo and Conestogo / Woolwich and should be considered as such in any preferred design solution,
  - that the high posted speed limit on Northfield Drive presents safety issues for buggy, cyclist, and pedestrian users on the current bridge, and
  - that Northfield Drive is used extensively by the Waterloo Cycling Club, making increased safety a high priority.

- Four residents of the Township of Woolwich, who indicated that they are regular users of Northfield Drive and the Scheifele Bridge, presented the following consolidated observations:

  - one resident requested separate lanes, or wider shoulders, for buggy and cyclist traffic crossing the new bridge,
  - another resident requested that Northfield Drive be kept open to traffic during construction of the new bridge, and that the Glasgow Street bridge be kept open to 2-way traffic. (Footnote: The Glasgow Street bridge is under Township of Woolwich jurisdiction and any decisions with respect to that structure are outside the scope of the Scheifele Bridge study),

- a third resident suggested that concrete safety barriers be provided between the roadway and any sidewalks or multi-use trails on both sides of the bridge, and
- a fourth Woolwich resident suggested that a 4-lane bridge, although “nice-to-have”, is perhaps premature based on future traffic volumes; that it is imperative to have wider shoulders for buggy and cycle traffic; and that separate pedestrian walkways are desirable and should be extended along Northfield Drive.

- Finally, one resident of the City of Waterloo, and a frequent user of Northfield Drive and the Scheifele Bridge, requested:

  - that Species at Risk (SAR) should be treated carefully during the design and construction stages,
  - that a full road closure or detour may not be as problematic as other recent construction projects in the Region, and
  - that the trail under the south span of the bridge be maintained during construction.

3.6.3 Public Consultation Centre (PCC) Meeting Number 2: Wednesday May 18, 2022, to Wednesday June 8, 2022

Due to the ongoing COVID-19 Pandemic, the second of the two Public Consultation Centre (PCC) meetings was also presented on-line, but with enhancements over the format used for Public Consultation Centre Meeting Number One. In addition to slides of the latest study information, a “live” audio-video presentation, by members of the Project Team, was embedded into the slide show. Public Consultation Centre Meeting Two was again set up on a viewing platform within the Region of Waterloo’s ***EngageWR.ca*** website, available for members of the public to view the study data over a 3-week period.

The purpose of Public Consultation Centre Meeting Two is summarized as follows:

- Review of the key items contained in on-line Public Consultation Center Meeting 1,
- Review public and agency feedback from Public Consultation Center Meeting 1,
- Provide an update on Northfield Drive vehicle traffic volumes, as well as data on supplemental Active Transportation field counts that captured buggy, pedestrian, and cycle movements over a one-week period in May/June 2021,
- Present the “Recommended Preferred Northfield Drive Alignment Design Concept”,
- Present the “Recommended Preferred Scheifele Bridge Design Concept”, including the proposed bridge deck cross section, structure length and span dimensions, and proposed material types.

- Confirm the proposed staged construction program which will maintain uninterrupted traffic on Northfield Drive for the duration of the bridge replacement, thereby avoiding a potential long-term detour, and finally,

- Provide updates on preliminary project cost estimates, the projected timing for filing the Class Environmental Assessment Study Report (ESR), and the tentative dates for final design and construction.

Although a final decision on the Recommended Preferred Design Concepts for the Scheifele Bridge replacement is subject to Region of Waterloo Council approval, the Project Team endorsed the design concepts as presented in Public Consultation Centre Meeting Two. The design concepts were to be carried forward to the Environmental Study Report unless there were serious, and legitimate, concerns and/or objections expressed after PCC #2.

A general overview of the organization and documentation details of Public Consultation Centre Meeting Two is provided in the following. A copy of each of the "Notice of Public Consultation Centre Meeting", the "Audio-Video and Display Slides", the "Public *Information Package* Document", the "Completed Comment Sheet and E-mail Responses", and a newspaper article in the Woolwich Observer are included in **Appendix C**.

Date, Format and Access:

- Date: May 18, 2022, to June 8, 2022
- Format: Region of Waterloo *EngageWR.ca* Website
- Access: Website Access 24/7 to Suit Personal Schedules

Advertisement Process (Notice of Public Consultation Centre Meeting):

- Publications:
    - Waterloo Region Record: May 13, 2022, and May 17, 2022
    - Woolwich Observer: May 12, 2022, and May 19, 2022
    - Waterloo Chronicle: May 12, 2022, and May 19, 2022
- Direct mailings to agencies, community organizations, abutting property owners, and interested stakeholders.

- Direct Delivery of Information Package (38 copies) to the local Mennonite Community, to accommodate individuals who may not have computer access to the EngageWR.ca website. Personal delivery was made to Mr. James Martin, Deacon of the local Mennonite Congregation.

- Portable message signs placed on Northfield Drive at both approaches to the Scheifele Bridge, notifying the travelling public of the on-line Public Consultation Centre meeting dates and access to the Region's website.

PCC Display Panels:

- A series of display panels, supplemented by a linked audio-video screen presentation, was available for public viewing on the Region of Waterloo EngageWR.ca website. The displays were grouped into the following broad categories:
    - Welcome, Introduction of Audio/Video Participants, and Invitation to Further Participation.
    - Review of Project Objectives and Class Environmental Assessment Study Process.
    - Update on Key Elements of Public Consultation Centre Meeting Number One (PCC #1).
    - Summary of Agency and Public Responses from PCC #1.
    - Update on Northfield Drive Traffic, including Supplementary Active Transportation Traffic counts of Buggy, Pedestrian and Cycle movements.
    - Confirmation of “Recommended Preferred Northfield Drive Alignment Design Concept”.
    - Link to “Bridge Cross Section Alternatives Evaluation Matrix”.
    - Presentation of “Recommended Preferred Scheifele Bridge Design Concept”, including Bridge Cross Section, Structure Span Lengths (3), and Material Specifications.
    - Confirmation of “Recommended Preferred Construction Staging Plan”, which eliminates any Long-Term Closure of Northfield Drive or Lengthy Detours.
    - Update on Preliminary Project Cost Estimates, Schedule for Filing Environmental Study Report (ESR), tentative Construction Program Dates, and other Project Milestone items.
    - Next Steps and Further Information:
        - What Are the Next Steps in the Study Process?
        - How to “Have Your Say”
        - Region and Consultant Contact Information

- Project Information Documents and Comment Sheets were available to each on-line attendee via links on the EngageWR.ca website.

Attendance and Responses:

- Website Engagement was tracked by the Region through the EngageWR.ca Summary Report. The following is a summary:
    - 183 total visits to the EngageWR.ca Website.
    - 152 visitors viewed at least one page.
    - On average, 79 visitors viewed a photo, document, or multiple pages.

- 19 visitors participated in a survey while no participant registered to ask a question.

- Although the total visits to the EngageWR.ca website was slightly down from PCC#1, the number of comments on the study alternatives was much greater. A total of thirty-seven (37) written comments were received from the public, two (2) were received from government agencies, and one (1) was received from a special interest group (Kitchener Easy Riders Cycling Club). In addition, a newspaper article was published in the Woolwich Observer on June 2, 2022. The comments from these submissions are summarized below and are reproduced in **Appendix C**.

  Agency Responses:

  - **The City of Waterloo: Engineering Services Division:**

    - supports the preferred Northfield Drive Alignment #2 (West Side) and are pleased that the staged construction plan will avoid a long-term closure of Northfield Drive, which was one of the City's main concerns expressed in previous comments (Mr. Ormson / Mar 3, 2021, letter).

    - supports the recommended Scheifele Bridge cross-section concept 5, recognizing that it provides appropriate, enhanced facilities for multi-modal use (pedestrians, cyclists, and buggies).

  - **The Grand River Conservation Authority (GRCA):**

    - provided follow up correspondence from PCC#1, with further comments on actions and policy directives that must be followed to secure future design and construction approvals. GRCA comments arising from PCC#2 were as follows:

    - The study area contains the Conestogo River and two unnamed tributaries, as well as their associated floodplains, riverine valleys, and wetlands. We have reviewed the preferred alignment and cross-section alternatives for the bridge replacement and wish to provide the following comments.

      - A new bridge could potentially impact the hydrologic and ecological functions of the resource features noted above. While the proposed replacement is mostly within the area of the existing bridge, the Class EA must speak to how the preferred alternative alignment / cross-section meets GRCA's policies for watercourse crossings (9.1.2) and alterations (9.1.16), as well as public infrastructure in floodplains (8.1.15) and wetlands (8.4.6-8.4.7).

- A floodplain analysis must demonstrate that hydraulic / fluvial impacts of the new bridge are limited, and the flooding hazard is not exacerbated upstream or downstream. This should be confirmed through HEC-RAS modelling and analysis.

- Wetlands will be impacted by the new alignment. As such, an environmental impact study (EIS) will be required as part of the Class EA. We request that wetland boundaries are verified in the field to assist the Region in quantifying and characterizing the impacted wetlands. The EIS should then demonstrate:

    - Avoiding, and where unavoidable, minimizing intrusions on significant natural features or hydrologic / ecological functions; and
    - Where intrusions occur, features / functions are restored and enhanced through a restoration plan.

- During detailed design, we will require plans that show construction staging, erosion and sediment controls, and temporary works (example: isolation / dewatering). Cofferdams must be designed to hold back flows from the 2-year flood event with some freeboard. If a significant portion of the channel will be obstructed resulting in increased flood elevations to design storms, it should be included in the hydraulic analysis and the cofferdam height adjusted accordingly.

- Please note that this bridge is downstream of our Conestogo Dam. Prior to construction, we will request site contacts and construction scheduling to notify personnel of significant outflows and forecasted flooding. We will also request a contingency plan or appropriate notes for work / equipment in or near the water.

- Advisory Comments:

    - We recommend no in-water work from March 15 to June 30. However, this is advisory, and the window must be approved by Fisheries and Oceans Canada (DFO). We are aware that DFO previously requested a more restrictive window for no in-water work from March 15 to July 15 for another bridge project two km downstream (Conestogo Bridge).

    - The lower reach of the “eastern tributary”, the eastern watercourse adjacent to the bridge, is currently enclosed

for 150 meters. The westward shift of the alignment may present an opportunity to “daylight” this watercourse and introduce other enhancements within the current right-of-way after the new bridge is built.

- The Public Consultation Centre materials state that there were no comments from the public related to architectural enhancements. We would offer that the Grand River and its major tributaries have national status as Canadian Heritage Rivers, and the project team may find inspiration by reviewing Arch, Truss & Beam: The Grand River Watershed Heritage Bridge Inventory (University of Waterloo, March 2013).

- Please continue to consult the GRCA on the project. If you have any questions or require additional information, please contact Trevor Heywood at 519-621-2763 ext. 2292 or theywood@grandriver.ca.

- **Kitchener Easy Riders Cycle Club (C/O: Mr. Roger Suffling):**

  - We cycle the Region and elsewhere in Ontario several times a week from early spring to late fall and we promote safe cycling for fun, fitness, and fellowship. Mostly our riding is on roads rather than on trails.
  - Kitchener Easy Riders members use the Scheifele Bridge on a regular basis, and it has been on the route of some of our regular, organized group rides. Thus, we are very pleased to see that the study team has endorsed having paved cycle/buggy lanes and sidewalks across the bridge. We trust that these will be a feature of the completed design.
  - We note that many road bridges in the Region have rather low railings and open sides for snow removal, but this can lead to gusty conditions for cyclists crossing these structures.

- **Woolwich Observer Newspaper Article (Columnist: Bill Atwood):**

  - The Woolwich Observer published an article on June 2, 2022, in their weekly newspaper. The article was based on the columnist’s interviews with Ken Brisbois, Region of Waterloo Project Manager, and a local resident of Conestogo. Highlights of the column included:

    - Confirmation of proposed recommended preferred bridge cross section which includes multi-purpose paved shoulders for buggies and cyclists.

- Confirmation of recent counts of buggy, pedestrian, and cyclist volumes across the Scheifele Bridge, which supported the justification for multi-use paved shoulders.
- Confirmation that a 4-lane bridge is not in the Region's long term Transportation Master Plan, resulting in the preferred 2-lane design concept.
- Confirmation of a proposed staged construction program and a preliminary project budget estimate.
- Reiterated concerns, by a Conestogo resident, that the bridge project does not include an extension of paved bike lanes on Northfield Drive, from University Avenue (Waterloo) to Sawmill Creek Road (Conestogo). Footnote: The scope of the Scheifele Bridge Class EA study does not include a review of bike lane options between Waterloo and Conestogo.

Public Comments:

- As noted, thirty-seven (37) written comments and/or questionnaires were submitted by members of the public following PCC#2. The comments from the public were subdivided into two groups as follows:

  - 24 respondents, from the public, who typically drive cars/trucks and have ready access to the internet, and

  - 13 respondents, from the Mennonite Community, who typically operate horse and buggies and may not have direct access to the internet. They would have received one of the hand-delivered Information Packages that were provided to Mr. James Martin, Deacon of the local Mennonite Congregation.

  - **General Public:**

    The comments of the public were consolidated to illustrate support for the three design concepts (Northfield Drive Alignment Concept #2; Scheifele Bridge Cross Section Design Concept #5; and the Staged Construction program) and to present an overview of the submitted comments:

    Recommended Preferred Northfield Drive Alignment #2:

    - Supports Design: 14 (58%)
    - Does Not Support Design: 6 (25%)
    - Non-Committal: 4 (17%)

Recommended Preferred Bridge Cross Section #5:

- Supports Design: 12 (50%)
- Does Not Support Design: 7 (29%)
- Non-Committal: 5 (21%)

Recommended Construction Staging Plan:

- Supports Design: 19 (79%)
- Does Not Support Design: 1 (4%)
- Non-Committal: 4 (17%)

Significant General Comments:

- Essentially the state of the current bridge and Northfield Drive are entirely unsafe for buggies and cyclists because there is poor visibility, little space, and drivers ignore the current speed requirements with no enforcement.
- The Glasgow Street bridge in Conestogo has just undergone extensive renovations to be intended mostly for pedestrian, buggy, and bicycle users. Cars are to be limited. This is a natural and safer parallel route that would remove these uses from Northfield Drive. Bicyclists would be far safer travelling on this route than exposing themselves to high-speed traffic on the gravel covered roadside of Northfield Drive.
- The wide shoulder/bike lane needs to be continuous along the entire stretch of Northfield (from University Avenue to Sawmill Drive) to make it both useful and safe for cyclists.
- There is not currently safe pedestrian/cycle (normal cyclist, not the cycling club) access from Conestogo to the Health Valley Trail. The trail is advertised as St. Jacobs to Conestogo, and yet it cannot easily be accessed from Conestogo.
- Maintaining traffic during construction is a must.
- Suggest that reconstruction of Scheifele Bridge not be started until the Glasgow Street bridge is reopened, thereby providing residents of Conestogo with an alternate route into Waterloo.
- Please keep as much of the "swamp" on the west side as you can. I fear that encroaching by 10 meters will damage it a lot. I understand the need to avoid moving the new 27kV power line on the east side.

- **Mennonite Community:**

The comments of the Mennonite Community were consolidated to illustrate support for the three design concepts (Northfield Drive Alignment Concept #2; Scheifele Bridge Cross Section Design

Concept #5; and the Staged Construction program) and to present an overview of the many comments:

- Recommended Preferred Northfield Drive Alignment #2:

  - Supports Design: 10 (77%)
  - Does Not Support Design: 0 (0%)
  - Non-Committal: 3 (23%)

- Recommended Preferred Bridge Cross Section #5:

  - Supports Design: 9 (69%)
  - Does Not Support Design: 1 (8%)
  - Non-Committal: 3 (23%)

- Recommended Construction Staging Plan:

  - Supports Design: 10 (77%)
  - Does Not Support Design: 0 (0%)
  - Non-Committal: 3 (23%)

Significant General Comments:

- Thank you to the Project Team for considering Mennonite community needs for wider shoulders on bridge so that buggy travel is out of the traffic lanes while crossing the bridge.
- As a buggy user, I wish to extend a hearty thank you for considering our mode of transportation on this project.
- There are numerous buggy owners who would benefit from having the Peel Street bridge in Winterbourne repaired to a usable condition. We still really miss the closed Peel Street bridge for buggy traffic.
- The closed Peel Street bridge affects us quite a lot as this road would be used by buggies to stay away from other busier roads. Can anything be done to open Peel Street bridge to light traffic?
- Will shoulders be wider north and south of the bridge?

  Footnote: Peel Street Bridge issues are outside the scope of the Scheifele Bridge Class EA Study.

3.6.4 Public Consultation Centre (PCC) Meeting Number 3: Wednesday June 7, 2023, to Wednesday June 28, 2023:

Following the second on-line Public Consultation Centre meeting in May / June 2022, and after considerable evaluation, discussions, and reviews of public and agency feedback, the Project

Team endorsed, and recommended, the following design concept for the Scheifele Bridge replacement over the Conestogo River on Northfield Drive:

Scheifele Bridge Deck Cross Section Design Concept:

- Two 3.35 m lanes, one each for northbound and southbound traffic
- 2.45 m paved shoulders for shared use by buggy traffic and cyclists
- 1.8 m walkway / sidewalk ***on each side of the bridge***
- Decorative pedestrian handrails (design details to be confirmed)
- Concrete protection barriers between the road and each walkway
- Total width of the proposed structure: 16.65 meter

Subsequently, however, the bridge deck cross section design was revisited by the Region of Waterloo, in conjunction with a review of capital forecasts, budget constraints, and facility network usage. Staff deliberations ultimately concluded that a single sidewalk might adequately serve the modest pedestrian needs in the area and should be further considered. Although plans for future active transportation have not been established in this area of Northfield Drive, Region staff concluded that a single, east side sidewalk, would be more cost-effective in providing for the future multi-use trail links between Waterloo and the Village of Conestogo.

Since the Project Team's original recommended preferred bridge design concept (two sidewalks) considered public and agency feedback from the first two Public Consultation Centre meetings, Region staff concluded that a third Public Consultation Centre meeting was warranted to present, and receive comments on, the revised concept of a single sidewalk (east side) on the proposed Scheifele Bridge.

Public Consultation Centre (PCC) meeting #3 was presented on-line through a virtual viewing platform within the Region of Waterloo's ***EngageWR.ca*** website. Compared to the first two PCC meetings, the visual display materials were minimal, focusing primarily on the revised bridge deck section width, minor impacts to the construction staging plan, and estimated construction cost savings attributable to eliminating one sidewalk. Under the revised plan, traffic on Northfield Drive would continue to operate uninterrupted during construction.

A general overview of the organization and documentation details of the third Public Consultation Centre meeting is provided below. A copy of each of the "Notice of Public Consultation Centre Meeting", the "Display Slides and Links to Engineering Drawings", and "Completed Comment Sheets and E-mail Responses" are included in **Appendix C**.

Date, Format and Access:

- Date: June 7, 2023, to June 28, 2023
- Format: Region of Waterloo *EngageWR.ca* Website
- Access: Website Access 24/7 to Suit Personal Schedules

Advertisement Process (Notice of Public Consultation Centre Meeting):

- Publications:
    - Waterloo Region Record: June 13, 2023
    - Woolwich Observer: June 8, 2023, and June 15, 2023
- Direct mailings to agencies, community organizations, abutting property owners, and interested stakeholders, including registrants from PCC #1 and PCC #2.
- Direct delivery of the Notice of PCC Meeting #3 to the local Mennonite Community, c/o Mr. James Martin, Deacon of the local Mennonite Congregation.
- Portable message signs placed on Northfield Drive at both approaches to the Scheifele Bridge, notifying the travelling public of the on-line Public Consultation Centre meeting dates and access to Region's website.

PCC Information Details:

- ***Background on Proposed Design Changes and Cost Estimates:***

    Structure Review Process:

    - The cross section for the proposed Scheifele Bridge was revisited after the second Public Consultation Centre meeting to specifically address the need for sidewalks on both sides of the new bridge structure, and whether a sidewalk on one side would adequately serve current and future pedestrian needs.
    - The review took into consideration active transportation usage, facility network operations, as well as potential project cost savings.
    - The pedestrian volumes on Northfield Drive, across the Scheifele Bridge, are relatively low based on counts conducted between May 31 and June 6, 2021, with the maximum daily count being 19 crossings and a total of 55 crossings for a full week.
    - Significant increases in pedestrian volumes are not anticipated in the future.

    New Sidewalk Location:

    - Although plans for future active transportation along this length of Northfield Drive have not been established, or confirmed, it would make the most sense to construct the new sidewalk on the east side of the new bridge structure, presenting opportunities for future facility links between Conestogo and Waterloo, as well as the Health Community Trail.

Cost Estimates:

- The cost to build, as well as maintain, sidewalks on both sides was considered. The initial savings associated with constructing a single sidewalk, on one side of the new structure only, would be roughly $1.5 million, or 7.5 per cent of the estimated $20.1 million project construction cost.
- Also considered were ongoing operational and maintenance costs to the Region of Waterloo, and the Township of Woolwich, over the new lifespan of the bridge for items like snow removal and future repairs to the structure.

Proposed Design:

- As a result of the above considerations, the proposed bridge design was revised to include just one sidewalk along the east side of the Scheifele Bridge.

- ***Links to Revised Drawings*** and ***Frequently Asked Questions (FAQs)*** were provided to assist PCC attendees better understand the proposed changes to the bridge design and the modest impacts to the Construction Staging Plan, noting that Northfield Drive would remain open to uninterrupted traffic operations over the course of the 2 1/2-year construction period.

- A ***Comment / Survey Form*** was available to each on-line attendee for their use in providing feedback on the proposed bridge design change (single sidewalk).

Attendance and Responses:

- Website Engagement was tracked by the Region through the EngageWR.ca Summary Report, which was issued on July 5, 2023. The following is a summary:

  - 86 total visits to the EngageWR.ca Website.
  - 63 visitors viewed at least one page.
  - 25 visitors downloaded a document, or multiple pages.
  - 11 visitors participated in a survey and 1 registered to ask a question.

- Twelve (12) written comments were received from the public, along with one (1) agency submission (Transport Canada) following PCC #3. The comments from these submissions are summarized below and are reproduced in **Appendix "C".**

  Agency Responses:

  - Transport Canada: Environmental Assessment Program: Ontario Region: Email Dated July 10, 2023. (Note: The following response from Transport Canada is the same as one received following PCC #1).

Transport Canada **does not** require receipt of all individual or Class EA related notifications. We are requesting project proponents self-assess if their project:

1.Will interact with a federal property and/or waterway by reviewing the Directory of Federal Real Property, available at at www.tbs-sct.gc.ca/dfrp-rbif/; **and**

2.Will require approval and/or authorization under any Acts administered by Transport Canada* available at http://www.tc.gc.ca/eng/acts-regulations/menu.htm.

Projects that will occur on federal property prior to exercising a power, performing a function or duty in relation to that project, will be subject to a determination of the likelihood of significant adverse environmental effects, per Section 82 of the *Impact Assessment Act, 2019*.

If the above does not apply, the Environmental Assessment program should not be included in any further correspondence and future notifications will not receive a response. If there is a role under the program, correspondence should be forwarded *electronically* to: EnviroOnt@tc.gc.ca with a **brief description of Transport Canada's expected role**.

A summary of the most common Acts that have applied to projects in an Environmental Assessment context include:

- ***Canadian Navigable Waters Act (CNWA)*** – the Act applies primarily to works constructed or placed in, on, over, under, thru, or across navigable waters set out under the Act. The Navigation Protection Program administers the CNWA through the review and authorization of works affecting navigable waters. Information about the Program, CNWA and approval process is available at: http://www.tc.gc.ca/eng/programs-621.html. Enquiries can be directed to NPPONT-PPNONT@tc.gc.ca or by calling (519) 383-1863.

- ***Railway Safety Act (RSA)*** – the Act provides the regulatory framework for railway safety, security, and some of the environmental impacts of railway operations in Canada. The Rail Safety Program develops and enforces regulations, rules, standards, and procedures governing safe railway operations. Additional information about the Program is available at: https://www.tc.gc.ca/eng/railsafety/menu.htm. Enquiries

can be directed to RailSafety@tc.gc.ca or by calling (613) 998-2985.

- ***Transportation of Dangerous Goods Act (TDGA)*** – the transportation of dangerous goods by air, marine, rail and road are regulated under the TDGA. Transport Canada, based on risks, develops safety standards and regulations, provides oversight, and gives expert advice on dangerous goods to promote public safety. Additional information about the transportation of dangerous goods is available at: https://www.tc.gc.ca/eng/tdg/safety-menu.htm. Enquiries can be directed to TDG-TMDOntario@tc.gc.ca or by calling (416) 973-1868.

- ***Aeronautics Act*** – Transport Canada has sole jurisdiction over aeronautics, which includes aerodromes and all related buildings or services used for aviation purposes. Aviation safety in Canada is regulated under this Act and the Canadian Aviation Regulations (CARs). Elevated Structures, such as wind turbines and communication towers, would be examples of projects that must be assessed for lighting and marking requirements in accordance with the CARs. Transport Canada also has an interest in projects that have the potential to cause interference between wildlife and aviation activities. One example would be waste facilities, which may attract birds into commercial and recreational flight paths. The *Land Use In The Vicinity of Aerodromes* publication recommends guidelines for and uses in the vicinity of aerodromes, available at: https://www.tc.gc.ca/eng/civilaviation/publications/tp1247-menu-1418.htm. Enquires can be directed to tc.aviationservicesont-servicesaviationont.tc@tc.gc.ca or by calling 1 (800) 305-2059 / (416) 952-0230.

Public Comments:

- As noted above, there were twelve (12) written responses from residents identified as residing in either the Township of Woolwich or the Village of Conestogo. Of the 12 public comments, support versus non-support, for elimination of the west side sidewalk from the preferred design concept, is summarized as follows:

  - Supports Design Change: 6 (50%)
  - Does Not Support Design Change: 2 (17%)
  - Non-Committal: 4 (33%)

- **General Public:**

- Five (5) residents of the Township of Woolwich, and regular users of Northfield Drive and the Scheifele Bridge, supports the single sidewalk design concept based on various observations. Comments included:

    - Buggy / bikeway paved shoulder, on the opposite side of the bridge, can be utilized as a pedestrian walkway in the absence of second sidewalk.
    - Supports the single sidewalk alternative because of the modest volume of pedestrian traffic and the absence of sidewalks on Northfield Drive, between Waterloo and Conestogo.
    - Suggests that the Region should save $1.5 million by going to one sidewalk.
    - Based on usage data and associated cost savings, supports the concept of one sidewalk only on the east side of the bridge.
    - Suggests that the Region should investigate providing a better connection to the Health Valley Trail along the Conestogo River, which crosses under the bridge near the south abutment. Walkers and cyclists using the trail must climb a 4-meter steep embankment, and cross over a guiderail, to access Northfield Drive from the trail. A more suitable design should be provided to increase safety and accessibility for cyclists and pedestrians using the trail.
    - There are several marathons, and similar runs and bicycle groups, that use the Scheifele Bridge on a regular basis.

- One (1) resident of the Village of Conestogo, who indicated that they are a regular user of Northfield Drive and the Scheifele Bridge, supports the single sidewalk design concept because of the modest volume of pedestrian traffic crossing the bridge.

- One (1) resident of the Township of Woolwich, and a regular user of Northfield Drive and the Scheifele Bridge, owns one of six properties adjacent to the bridge and does not support the single sidewalk alternative based on various observations. Comments included:

    - Family crosses the bridge multiple times daily, as pedestrians and cyclists, and uses the bridge for truck and heavy farm equipment passage.
    - Firmly believes that there needs to be a sidewalk on both sides of the bridge, for the following reasons:
        - The pedestrian study was carried out during the height of the COVID-19 pandemic. It is not a fair evaluation of the

active transportation needs along the bridge. The pedestrian traffic has visibly and dramatically increased, with the resident's family of nine accounting for the supposed weekly pedestrian crossings alone.
- Resident has young children who use the bridge every day, and frequently at night or in reduced visibility conditions, which occur frequently.
- The Woolwich active transportation plan requires capacity for increased active traffic along this stretch of Northfield Drive, as it connects the Township to the amenities of the City of Waterloo, especially RIM Park and the Health Valley Trail. If we are looking at this bridge lasting 60 years again (and it should be 100 years), two sidewalks almost seem a firm requirement as a preparation for inevitable growth.
- This is a high-speed zone (80Km/hr.) closely connected to a slower zone (60Km/hr.), which creates sudden changes in driving. Combined with the elimination of the road shoulder at the bridge, the sudden change of conditions makes for a dangerous stretch of road to walk, cycle, or even drive, especially heavy equipment which requires extra width.

- Another resident of the Township of Woolwich, and a regular user of Northfield Drive and the Scheifele Bridge, does not support the single sidewalk alternative, stating that the existing situation is very dangerous to bike across the bridge as well as all along Northfield Drive.

- Finally, four (4) residents of the Township of Woolwich, including one (1) resident of the Village of Conestogo, did not specify either support for, or non-support, for the single sidewalk alternative. General comments included:

    - One resident questioned whether there would still be wide shoulders on both sides of the bridge for buggy travel. (Answer: Yes).
    - One resident expressed concern for any long-term construction closure of Northfield Drive.
    - One resident noted that the existing bridge only has a single sidewalk on the west side, inferring that nothing would really change.

- **Mennonite Community:**

- There were no written comments from the Mennonite Community following Public Consultation Centre Meeting #3.

- Mr. James Martin, Deacon of the local Mennonite Congregation, confirmed that there were no pending, or outstanding, comments from the Mennonite Community that needed to be accounted for.

3.6.5 Notice of Study Completion

The final step in the public and agency circulation process was publication and circulation of the *Notice of Study Completion*, dated November 20, 2023.

A copy of the Notice of Study Completion is provided in **Appendix B.**

Advertising was as follows:

- **Waterloo Region Record**: November 21, 2023, and November 24, 2023.
- **The Woolwich Observer:** November 23, 2023, and November 30, 2023.

The *Notice of Study Completion* was circulated, by mail, to an extensive list of Agencies, Residents/Property Owners, and other Stakeholders. Copies were also hand delivered to members of the Mennonite Community through Mr. James Martin, Deacon of the local Mennonite Congregation.

3.7 REGION OF WATERLOO INTERNAL LIAISON

As noted in Section 3.4, the Regional Municipality of Waterloo directed the Scheifele Bridge Class Environmental Assessment Study as the proponent for the project. The following provides a synopsis of the Project Management and Internal Liaison structure for the study.

3.7.1 Project Team

The Project Team was the primary management group, with responsibility for reviewing and endorsing project solutions, concepts, and other details before they were presented to the public and other interested agencies/stakeholders.

The Project Team consisted of Project Managers and Technical Support staff from the Region of Waterloo and Stantec Consulting Ltd., as well as staff representation from the Township of Woolwich. Two Council members were included from the Township of Woolwich, while there was no political representation from the Region of Waterloo.

The makeup of the Project Team is provided in Section 3.4, while Minutes of the seven (7) Project Team meetings are included in **Appendix A**.

3.7.2 Region of Waterloo Planning and Works Committee

The *Region of Waterloo Planning and Works Committee (PWC)* provides policy guidance to Regional Council on matters relating to civil works operated by the Region, and other functions related to the Region's facilities (roads and traffic, transit, water supply, etc.). The committee refers to the Regional Official Policies Plan and the Transportation Master Plan in its review of various planning matters. The Planning and Works Committee is comprised of all members of Regional Council.

A meeting of the Region Planning and Works Committee (see Section 3.3.3) was held on September 12, 2023, to present and approve details of the Scheifele Bridge Class Environmental Assessment Study. The Planning and Works Committee meeting typically constitutes a formal public meeting, within the structure guidelines of the Region for Class Environmental Assessment studies, providing a forum for residents, agencies, and the public to comment on current projects (see Footnote below).

To assist the Planning and Works Committee in its decision process, a comprehensive Staff Report was provided outlining the process for selection, and details of, the "recommended preferred design concepts" for the Scheifele Bridge replacement, the associated Northfield Drive improvements, and the Construction Staging Plan. The Staff Report and details of the Scheifele Bridge project were approved by the PWC Committee at the September 12, 2023, meeting.

Minutes of the Planning and Works Committee meeting were compiled by the Region of Waterloo and are included in **Appendix A.**

A copy of the Staff Report to the Planning and Works Committee is also included in **Appendix A.**

3.7.3 Region of Waterloo Council

On September 27, 2023, Region of Waterloo Council approved the various "Recommended Preferred Design Concepts" that were endorsed by the Region Planning and Works Committee at its September 12, 2023, meeting.

In approving the preliminary design concepts for the Scheifele Bridge Replacement project, Council provided direction for staff to file the Environmental Study Report on the public record, and for staff to proceed with detailed design and construction of the Scheifele Bridge replacement, in accordance with the Region's approved capital expenditure program.

Minutes of the September 27, 2023, Council meeting were compiled by the Region of Waterloo and are included in **Appendix A.**

3.8 TOWNSHIP OF WOOLWICH LIAISON

The entire limits of the Scheifele Bridge Class Environmental Assessment Study are within the Township of Woolwich. It was, therefore, appropriate that staff and Council of the Township of

Woolwich be represented on the Project Team, and that they be consulted with respect to various technical issues and design concepts over the course of the study.

3.8.1 Council Representation

As noted in Section 3.4, the Township of Woolwich appointed two members of Township Council to serve on the Project Team and to represent the interests of the local municipality, as follows:

- Councillor Larry Shantz (Ward 3) *
- Councillor Murray Martin (Ward 3) *

*Councillors Shantz and Martin did not run in the 2022 Municipal Election. Therefore, at the time of finalizing and filing this Environmental Study Report, Mr. Shantz and Mr. Martin no longer represent the Township of Woolwich on Council.

3.8.2 Staff Representation

As noted in Section 3.4, one senior staff member served on the Project Team, while an alternate senior staff member was available on an as-required basis for administrative and technical support.

- Ryan Tucker, P. Eng., Engineering Project Supervisor (Project Team)
- Jared Puppe, C.E.T., Director of Infrastructure Services (Staff Support)

4.0 EXISTING NATURAL ENVIRONMENTAL CONDITIONS

The Class Environmental Assessment process requires that existing natural, social, and economic environments be examined so that any potential negative impacts from the proposed design solution may be evaluated and accounted for through mitigative response measures. An ecological inventory and assessment study (EIS) was completed by Stantec environmental staff in 2020 and is summarized in the following sections. Copies of all technical and environmental reports are included in **Appendix D.**

4.1 GENERAL

The assessment of existing natural environmental conditions was prepared to address policies and guidelines from federal and provincial legislation, as well as local municipal policies relevant to the Scheifele Bridge project. The following policy documents were consulted in the study process:

4.1.1 Federal Legislation:

Fisheries Act:

The Government of Canada is responsible for the management of fisheries resources in Canada through the Fisheries Act, administered primarily by Fisheries and Oceans Canada (DFO). The Fisheries Act addresses national interests in marine and fresh waters and includes prohibitions against harmful alteration, disruption, or destruction (HADD) of fish habitat. When a HADD cannot be avoided or mitigated, a subsection 35(2) authorization, with appropriate offsetting of residual adverse effects, is required. Section 6 of the Act lists the factors that the Minister considers in the approval of an authorization, which are:

- Fisheries management objectives.
- Whether there are measures and standards to avoid, mitigate or offset HADD to fish or fish habitat.
- The public interest.

Species-at-Risk Act:

Federal species at risk are assessed and assigned a status by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The federal Species at Risk Act, 2002 (SARA), protects wildlife species listed as extirpated, endangered, or threatened under Schedule 1 of the Act from harm, harassment, killing or capture, or collection. SARA also prohibits the damage or destruction of the residence of listed species, and the destruction of their critical habitat.

SARA protections extend to migratory birds and some aquatic species at risk (SAR) on non-federal land. The Ministry of the Environment, Conservation and Parks (MECP) may make an order to protect species on non-federal lands if the species is not adequately protected under provincial laws. Permits for prohibited activities may be issued under Section 73 of SARA.

Migratory Birds Convention Act:

The Migratory Birds Convention Act (MBCA) protects migratory birds and their nests. Section 6 of the Migratory Bird Regulations (Consolidated Regulations of Canada (CRC) prohibits the disturbance, destruction, or taking of a nest, egg, or nest shelter of a migratory bird. Disturbance to nests of protected species while clearing vegetation, or during bridge construction, is a contravention of the MBCA.

4.1.2 Provincial Legislation:

Planning Act:

The Provincial Policy Statement (PPS; MMAH 2020) was issued under Section 3 of the Planning Act (PA) and came into effect in 1996, with the most recent revision in March 2020. The PA requires that decisions made by planning authorities are consistent with the policy statements, such as the PPS, which includes policies on development and land use patterns, resources and public health and safety. Municipal official plans are the most important vehicle for implementation of this Provincial Policy Statement (MMAH 2020). Section 2.1 of the PPS deals with natural heritage and requires that natural heritage systems be identified in certain ecoregions. This includes Ecoregion 6E, where the Study Area is located.

Although the PPS provides direction on land use planning and development projects, the policies also provide a useful framework for identifying and evaluating the significance of natural heritage features on other projects, such as the Scheifele Bridge project.

Growth Plan for the Greater Golden Horseshoe:

The Growth Plan for the Greater Golden Horseshoe (GPGGH, 2019) provides direction for development planning including policies regarding a provincial Natural Heritage System (NHS), key hydrologic features (KHFs), key hydrologic areas (KHAs), and key natural heritage features (KNHFs). The 2019 GPGGH area includes the Region of Waterloo in which the Project is situated, however the Project is noted to be outside the settlement area of Waterloo.

The GPGGH states that the mapped NHS for the Growth Plan do not apply until the NHS has been implemented in the Official Plan. Until such time, the policies in the GPGGH plan will apply outside the settlement area in Official Plans approved and in effect as of July 1, 2017. The Region of Waterloo Official Plan was last approved in June 2015 and, as such, the GPGGH policies do not yet apply. The GPGGH polices will be incorporated into the future OP review. Notwithstanding, the policies of GPGGH have been considered; in particular, policies relating to key natural heritage features in the Study Area.

Endangered Species Act:

Provincial species at risk are identified and assessed by the Committee on the Status of Species at Risk in Ontario (COSSARO). The Ontario *Endangered Species Act, 2007* (ESA), protects species on the Species at Risk in Ontario (SARO) list which are threatened, endangered, or extirpated within their habitats, by prohibiting anyone from killing, harming, harassing, or possessing protected

species, as well as prohibiting any damage or destruction to the habitat of the listed species.

Activities that may impact a protected species or its habitat require a permit from the Ministry of Environment, Conservation and Parks (MECP), unless the activities are exempt from the requirements of the regulation. The current Ontario Regulation (O. Reg.) 242/08 identifies activities which are exempt from the permitting requirements of the ESA, but which are subject to controls outside of the permit process. Activities that are not exempt by O. Reg. 242/08 require a complete permit application process.

Grand River Conservation Authority:

The *Conservation Authorities Act, 1990* (CAA), was created to provide for the organization and delivery of programs and services that further the conservation, restoration, development, and management of natural resources in watersheds in Ontario. The CAA is administered by the Ministry of Natural Resources and Forestry (MNRF); however, it grants each of Ontario's 36 Conservation Authorities the authority to make regulations within the areas under their respective jurisdictions.

The Grand River Conservation Authority (GRCA) has the responsibility to regulate activities in wetlands, watercourses, and hazard lands (example: areas in and near rivers, streams, floodplains, wetlands, slopes, and shorelines) through the Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (O. Reg.150/06). The GRCA implements the regulation by issuing permits for works in or near watercourses, valleys, wetlands, or shorelines when required.

Fish and Wildlife Conservation Act:

The *Fish and Wildlife Conservation Act, 1997* (FWCA) provides protection to birds, mammals, reptiles, amphibians, and specially protected invertebrates, as well as protection for habitat features such as mammal dens or beaver dams. Birds, such as raptors, which are not protected by the MBCA, may also receive protection for individuals and their habitat (example: nests) under the FWCA.

4.1.3 Municipal Policy:

Region of Waterloo Official Plan:

The Region of Waterloo Official Plan (ROP; Region of Waterloo, 2015) was approved by the Ontario Municipal Board (OMB) on June 18, 2015. The ROP identifies Landscape Level Systems, Core Environmental Features, Supporting

Environmental Features, and the linkages between them as components of the Greenland Network.

Subject to Official Plan Policy 7.C.12, an Environmental Impact Study (EIS) is required which identifies potential impacts, mitigation measures, and compensation for infrastructure projects such as the Scheifele Bridge project.

Township of Woolwich Official Plan:

The Township of Woolwich Official Plan (WTOP) was approved in July 2012. Chapter 13 of the WTOP provides policies to protect elements of the Natural Habitat Network, which includes:

Environmental Preservation Areas

Environmentally Sensitive Policy Areas

Provincially Significant Wetlands

Significant Valley-lands

Sensitive Groundwater Areas, Recharge Areas, Discharge

Areas and Headwaters and Aquifers

Significant Woodlands

Fish Habitat

Significant Wildlife Habitat

Locally Significant Natural Features

Within a restricted land use area, such as a floodplain, the Grand River Conservation Authority will advise the Township with respect to potential impacts and any proposed mitigative measures.

4.2 NATURAL ENVIRONMENT

4.2.1 Environmental Impact Assessment Study:

A Natural Environmental Conditions field investigation study was completed at the beginning of the Class EA, which focused on confirming the presence of any Species at Risk (SAR) in the study area, and included assessments of:

- Terrestrial and Vegetation features,
- Breeding Bird Surveys,

- Wildlife Habitat Assessment,
- Bat Tree Roost Survey,
- Aquatic Habitat Assessment, and
- Turtle Basking Review.

Although only three actual SAR species were observed near the Scheifele Bridge, including a Butternut Tree (Terrestrial), a single Barn Swallow (Breeding Bird) and a single Eastern Meadowlark (Breeding Bird), the “habitat” for 5 other potential SAR was observed as being present. The actual existence of Species at Risk within these five habitat zones is subject to future field observations.

Approximately 35 Cliff Swallow (non-SAR species) nests were observed under the existing bridge deck, which can only be removed outside of specified breeding periods.

Other observations included:

- The Conestogo River is part of the Grand River Heritage River System “Significant Valley” designation and may be a consideration during the formal agency approval process for the bridge replacement.
- The Conestogo River is a warm water system habitat for certain fish and a potential for SAR habitat (not observed).
- There are no significant woodland features in the area.
- There is no significant habitat for SAR Turtles.
- Some trees are potential habitat for Bat Colony nesting.

The Project Team accounted for the preliminary observations of the natural environmental field investigation study in developing preliminary alternative design concepts. The evaluation matrices that lead to the ultimate selection of recommended preferred designs also considered potential impacts on the natural environment.

4.2.2 Grand River Conservation Authority:

After the initial field work was completed documenting the Natural Environmental features in the study area (Section 4.2.1) and on-line access to Public Consultation Center Meeting #2 was closed, the Region of Waterloo received a letter from the Grand River Conservation Authority (GRCA), dated May 31, 2022, requesting that the Region, and its consultant, address various related environmental issues as part of the Class EA evaluation process. In their comments, the GRCA noted that the Conestogo River is part of a larger water complex that includes two unnamed tributaries and their associated floodplains, riverine valleys, and wetlands. The GRCA went on to note further that:

- A new bridge could potentially impact the hydrologic and ecological functions of resource features in the area. While the proposed bridge replacement is mostly within the area of the existing bridge, the Class EA must speak to how the preferred alternative alignment / bridge cross-section meets GRCA's policies for watercourse crossings (9.1.2) and alterations (9.1.16), as well as public infrastructure in floodplains (8.1.15) and wetlands (8.4.6-8.4.7).

- A floodplain analysis must demonstrate that hydraulic / fluvial impacts of the new bridge are limited, and that the flooding hazard is not exacerbated upstream or downstream. This should be confirmed through HEC-RAS modelling and analysis.

- Wetlands will be impacted by the new bridge design and adjusted road alignment. As such, an environmental impact study (EIS) will be required as part of the Class EA. Wetland boundaries are to be verified in the field to assist the Region in quantifying and characterizing the impacted wetlands.

- The EIS should demonstrate that:

    - Avoiding, and where unavoidable, minimizing intrusions on significant natural features or hydrologic / ecological functions has been achieved, and

    - Where intrusions occur, features / functions are restored and enhanced through a restoration plan.

- During detailed design, plans that show construction staging, erosion and sediment controls, and temporary works (example: isolation / dewatering) should be provided. Cofferdams must be designed to hold back flows from the 2-year flood event with some freeboard. If a significant portion of the channel will be obstructed resulting in increased flood elevations to design storms, it should be included in the hydraulic analysis and the cofferdam height adjusted accordingly.

- The Scheifele Bridge is downstream of the GRCA's Conestogo Dam. Prior to construction, site contacts and construction scheduling shall be provided to the GRCA so that appropriate notification of significant outflows and forecasted flooding events may be provided. A contingency plan, or appropriate notes for work / equipment in or near the water, shall be established prior to commencement of construction.

- The GRCA recommends no in-water work from March 15 to June 30, however this is advisory, and the window must be approved by Fisheries and Oceans Canada (DFO). A more restrictive window for no in-water work, from March 15 to July 15, was provided by DFO for another bridge project two kilometres downstream of the Scheifele Bridge, which may dictate in-water work restrictions.

- The lower reach of the "eastern tributary", the eastern watercourse adjacent to the bridge, is currently enclosed for 150 metres. The westward shift of the alignment may present an opportunity to daylight this watercourse and introduce other enhancements within the current right-of-way after the new bridge is built.

Consistent with the Provincial Legislation noted in Section 4.1.2, related to the Conservation Authorities Act, and the comments presented above by the Grand River Conservation Authority, additional field work was completed in June 2022 to delineate the wetland limits across the study area. Staff from the Region of Waterloo, Stantec Consulting Ltd., and the GRCA worked together to flag the wetland boundaries in the field, which was followed by topographic surveys to accurately map the wetland limits. Data from the wetland boundary delineation survey was used to update the Environmental Impact Study (EIS) report, addressing any impacts and mitigative measures associated with the recommended preferred design concepts.

4.2.3 Updated Environmental Impact Study (EIS) Report:

Following the Project Team's July 20, 2022 (Project Team Meeting #7) endorsement of the recommended preferred design concepts for the Scheifele Bridge replacement and Northfield Drive reconstruction, the Environmental Impact Assessment Study (Section 4.2.1) was updated to include an evaluation of the impacts of the recommended preferred design concepts on the existing natural environmental conditions that were observed and documented. The updated Environmental Impact Study (EIS) also addressed the comments of the Grand River Conservation Authority, as noted in Section 4.2.2, referencing the various policies for watercourse crossings, alterations to waterways, and public infrastructure construction in floodplains and wetlands.

Footnote:

Hydraulic analysis, using HEC-RAS Modelling, and Geomorphological Fluvial studies were completed for the "Recommended Preferred Northfield Drive and Scheifele Bridge Design Concepts" based on GRCA requirements outlined in Section 4.2.2 and general engineering practices. The results of the hydraulic and fluvial studies are briefly summarized in Section 6.4 of this report, while copies of the detailed reports are included in **Appendix D**.

Impacts and Mitigation:

The potential impacts to natural features, which might reasonably be expected to occur because of the recommended preferred design concepts, were considered in the updated EIS study report within the context of both direct and indirect impacts, while appropriate mitigation, restoration and enhancement recommendations were also provided. The following provides a brief overview of the impact assessment process.

- The impact assessment addresses the Project Area, which includes the preferred Northfield Drive alignment and grading limits for the embankments only. Temporary work areas and other refinements will be identified during detailed design, at which time any further impacts will be confirmed, as appropriate.

- Direct loss to vegetation communities will occur along the edge of the existing road, and there will be no new fragmentation effects. However, newly created edges may expose features to increased sunlight penetration, susceptibility to windthrow, desiccation, and possibly road salt, and create new pathways for invasive species. The wetlands (SAS and MASM1-1) may be particularly sensitive to these changes. Standard mitigation strategies are available to prevent inadvertent encroachment into natural areas during construction, protect features including wetlands from sedimentation, and re-vegetation of disturbed areas once work is complete. As per GRCA (2015) policy 8.4.6, remedial measures must also enhance features and functions, including re-vegetation strategies that may include methods to plant and “seal” the newly exposed wetland edges.

- The Recommended Preferred Design Concepts were overlaid on mapping of important habitat features to identify direct impacts, including loss to SAR habitat, and candidate / confirmed SWH habitat. Potential losses are quantified by community type as follows:

    - The candidate Monarch Butterfly habitat does not qualify as significant migratory habitat. However, it provides nectaring plants and other host plants (milkweed) that may be used by adults and larvae, respectively. Given the relatively small size of the habitat, it is not expected to be considered SWH for these functions. Strategies be considered to avoid harm to individuals during construction. To reduce potential harm to Monarch, vegetation clearing in specific areas should be avoided between the peak season for eggs, caterpillar or pupae which is generally May 1 to August 31 (Mission Monarch 2020).

    - Direct loss of wetlands may result in slight decreases in productive amphibian breeding and turtle overwintering habitat. Targeted surveys for amphibian and overwintering turtles would be required to determine if these features qualify as SWH for either function. Given there were summer observations of SOCC turtles (Snapping Turtle and Midland Painted Turtle) in the SAS and MASM1-1 communities, it is likely this part of the wetland is also used for overwintering. Because the direct loss is relatively minor, the features would be anticipated to retain existing functions post-construction, with the implementation of standard mitigation strategies.

      Notwithstanding the above, sediment fencing is recommended between the work areas and natural areas as a standard mitigation measure to prevent sedimentation and encroachment of equipment. This sediment fence will serve the dual purpose of limiting herptiles (amphibians, turtles, and snakes) and other ground-dwelling wildlife access into work areas. If possible, installation of sediment fencing/other exclusionary measures should occur before June 1 or after September 1 (i.e., outside of turtle nesting season) to define and restrict the movement of nesting turtles into the working area.

- In addition to the direct loss of habitat features identified above, the project may impact the following species:

    - Cliff Swallow: An estimated 35 Cliff Swallow nests were observed on the underside of existing Scheifele Bridge during the breeding bird survey. Cliff Swallow nests are protected by the MBCA. Work on the existing bridge has the potential to disturb Cliff Swallow nests and breeding behavior. Detailed mitigation measures to protect active Cliff Swallow nests are provided in the EIS report.

    - Maternity Roosting Bats: Although suitable bat roost trees were not identified in the Study Area, suitability of trees can change over time. Removal of suitable maternity / summer roost trees has the potential to harm bats if present, including bat SAR. To reduce the likelihood of harm to bats, it is recommended that trees > 10 cm diameter at breast height (DBH) are removed outside the bat maternity roost season which is generally between April 1 and September 30.

    - To avoid damaging or disturbing other breeding bird nests and contravening the MBCA, the timing of vegetation clearing should occur outside of the primary nesting period (i.e., the period when the percent of total nesting species is greater than 10% based on ECCC ’s (2014) Nesting Calendars and the period for which due diligence mitigation measures are generally recommended). The primary nesting period identified for the Study Area is generally April 1 – August 15. However, birds may also nest outside this period and nests should be avoided until no longer active.

- Potential impacts to aquatic habitat can include direct habitat loss or indirect impacts to habitat. Direct fish and aquatic habitat loss will occur at the proposed two piers. However, the removal of the existing three piers will result in a gain of habitat at those locations. Specific mitigation measures associated with the bridge construction will be finalized during detailed design as appropriate.

  Areas requiring in-water works are to be isolated, and fish and mussels shall be collected from the work areas and relocated beyond the work area limits prior to any dewatering. Pump intakes for any dewatering or water taking are proposed to be fitted with fish screens to reduce potential for entrainment and impingement of fish. Finally, fish passage and flow diversion should be utilized to maintain flows in the Conestogo River.

  Indirect impacts may result from the potential for sediment transport from exposed soil surfaces, potential entry of construction debris (e.g., concrete slurry, dust, etc.) into the water and spills associated with refueling of equipment. Sediment introductions can affect fish due to increased turbidity of the water

column, which can impair vision and subsequent feeding by fish that are sight-hunters. In-water work and access should adhere to applicable fisheries timing windows to reduce the risk of impacts occurring during sensitive life periods such as spawning and emergence of young fish. For works in the Conestogo River, no in-water work or access should take place from March 15 to July 15.

- Species-specific mitigation recommendations for SAR were either confirmed or considered potentially present in the Project Area, including endangered bats, Silver Shiner, Black Redhorse, and Wavy-rayed Lampmussel.

  Regulated habitat for Silver Shiner includes the Conestogo River channel, areas within the meander belt of the channel and 30 m on either side of the meander belt line. Consultation with DFO will be required to determine if a SARA permit will be required for the works. MECP should also be consulted for Silver Shiner, and submission of an IGF will likely be required to determine if a permit is required.

  Mitigation approaches for aquatic habitat and animals will also provide protection to Black Redhorse as part of the resident fish community. Consultation with DFO will be required to determine if a SARA permit will be required for the works. MECP should also be consulted for Black Redhorse, and submission of an IGF will likely be required to determine if a permit is required.

  Prior to the commencement of in-water construction, a mussel search and relocation program should be initiated. The relocation timing window, based on mussel species and habitat present, restricts handling of mussels to a period when water temperatures are above 16°C, which typically occurs between June 15 and September 30 in any given year. MECP should be consulted on the presence of Wavy-rayed Lampmussel and submission of an IGF will likely be required to determine if a permit is needed. The species is listed federally as Special Concern but is identified on Schedule 1. Consultation with DFO will identify if a SARA permit is required.

Summary and Mitigation Measures:

In summary, the potential indirect impacts from construction phase activities related to the Scheifele Bridge and Northfield Drive construction actions may result in inadvertent encroachment of heavy equipment, siltation and/or spills of deleterious substances, noise, and dust migration into natural features (woodlands, wetlands and the Conestogo River). These impacts may alter species composition by compacting and smothering vegetation and introducing substances that could be harmful to vegetation and wildlife.

These potential indirect effects are common to various types of construction and can be controlled using standard mitigation measures for erosion and sediment control. The primary principles associated with sedimentation and erosion protection measures are to:

- Minimize the duration of soil exposure.
- Retain existing vegetation, where feasible.
- Encourage re-vegetation.
- Divert runoff away from exposed soils.
- Keep runoff velocities low.
- Trap sediment as close to the source as possible.

To address these principles, the following mitigation measures will be implemented during construction:

- Silt fencing will be used along all construction areas adjacent to natural features. No equipment will be permitted to enter natural features beyond the fencing.
- Natural features inadvertently disturbed during construction will be stabilized and re-vegetated, through the placement of seed and mulching or seed and an erosion control blanket, promptly upon completion of construction activities.
- Equipment will be re-fueled >30 m away from natural features avoid potential impacts should an accidental spill occur. Spill control materials, including absorbent barriers and mats, should be kept on site to quickly address any accidental spills immediately.
- In addition to any specified requirements, additional silt fence will be available on site, prior to grading operations, to provide a contingency supply in the event of an emergency. All exposed soil areas will be stabilized and re-vegetated.
- All sediment and erosion controls will be monitored regularly and properly maintained, as required. Controls will be removed only after the construction area has been stabilized.
- Proper muffling of machinery and equipment will be maintained to mitigate noise during construction.

Monitoring Program:

Construction monitoring should be undertaken to track implementation of the planned mitigation measures, including compliance with the final grading, and erosion and sediment control plans. This includes proper functioning of controls throughout all phases of construction, and proper containment of in designated work areas. Remedial action should be undertaken as soon as possible wherever discrepancies are identified.

Monitoring should also occur to identify new occurrences of invasive species. If identified, an action plan should be designed and implemented as soon as reasonably possible to eradicate any invasive species before it becomes established.

Consolidated Natural Environment and EIS Report:

The original Existing Natural Environmental Conditions Report was updated to address any direct and indirect impacts of the Recommended Preferred Design Concepts on the natural environment. With inclusion of the supplementary impact and mitigation assessment studies in the original Natural Environmental Conditions Report, the updated report was renamed the **Environmental Impact Study (EIS) Report**. The final EIS report is included in **Appendix D** of this Scheifele Bridge Class Environmental Assessment Study Report (ESR).

4.3 CULTURAL HERITAGE ENVIRONMENTAL CONDITIONS

4.3.1 Cultural Heritage Environmental Report (CHER) and Heritage Impact Assessment (HIA) Report:

A Cultural Heritage Environmental Report (CHER) was completed in the early stages of the Scheifele Bridge Class Environmental Assessment Study, and highlighted the following conditions:

- The preferred alternative design concept for replacing the existing bridge must recognize, and avoid any disruption to, the any Cultural Heritage Landscape (CHL) features.
- A Cultural Heritage Landscape feature exists west of the existing Scheifele Bridge, comprised of a remnant county road and abutments of two former bridges. The former bridges are circa 1861 and early 1900's
- The existing Scheifele Bridge has no Cultural Heritage Value or Interest (CHVI) per Ontario Regulation O. Reg. 9/06.

After the Project Team presented its Recommended Preferred Design Concepts for the Scheifele Bridge replacement and associated Northfield Drive improvements, the CHER report was updated to include evaluations of any direct or indirect impacts of the design concepts on existing heritage resources that were identified in the CHER report. Impact assessment and proposed mitigative

measures were determined in accordance with Sheet #5 (Government of Ontario 2006A) and included the following impact conditions:

Direct Impacts Include:

- **Destruction** of any, or part of any, significant heritage attributes or features
- **Alteration** that is not sympathetic, or is incompatible, with the historic fabric and appearance.

Indirect impacts to cultural heritage resources do not result in the direct destruction or alteration of the feature or its heritage attributes, but may indirectly affect the cultural heritage value of a property by causing:

- **Shadows** created that alter the appearance of a heritage attribute or change the viability of a natural feature or plantings, such as a garden.
- **Isolation** of a heritage attribute from its surrounding environment, context, or a significant relationship.
- **Direct or indirect obstruction** of significant views or vistas within, from, or of built and natural features.
- **A change in land** use such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces.
- **Land disturbances** such as a change in grade that alters soil, and drainage patterns that adversely affect an archaeological resource.

The evaluation process for the Recommended Preferred Design Concepts determined that “mitigation measures are not required” in any of the above direct of indirect conditions. However, the following recommendations were presented in the HIA for future action:

- *Site identification & communication:* The boundaries of the identified CHL should be clearly marked on project mapping and communicated to all project personnel for avoidance during design, construction, and subsequent operation.
- *Create a physical buffer:* Temporary fencing should be erected at the boundary of the CHL to limit all excavation, installation, and associated vehicle traffic from encroaching on the CHL during construction.
- *Conditions surveys:* A qualified environmental specialist or civil engineer should be engaged to develop a strategy to carry out condition surveys where required. The pre-construction survey completed by a qualified environmental specialist may include screening activities to identify areas where tree roots may have extended into the proposed construction area and whether they will be impacted by construction. The pre-construction survey conducted by a civil engineer should assess whether the modifications to the soil will affect the remnants of the built-up roadway and associated land patterns of

the CHL. Recommendations to limit impacts to the deciduous trees and vegetation within the CHL should be adhered to in the Environmental Impact Study.

The assessment of impacts and mitigative measures, for the recommended preferred design concepts, was considered the next step in the Cultural Heritage Evaluation process leading to a final Heritage Impact Assessment (HIA) study. The results of the two study processes were combined into a single consolidated report titled “Cultural Heritage Environmental Report (CHER) and Heritage Impact Assessment (HIA) Report”.

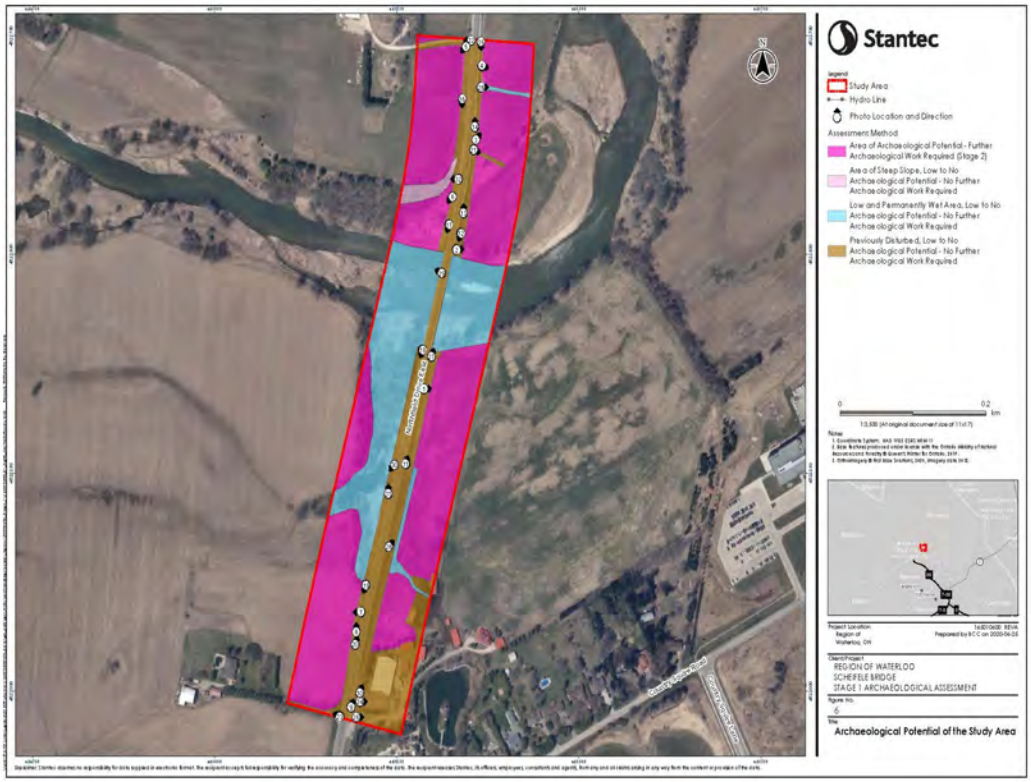
A copy of the complete Cultural Heritage Environmental Report (CHER) / Heritage Impact Assessment (HIA) report is included in **Appendix D** of this Scheifele Bridge Class Environmental Assessment Study Report.

4.3.2 Stage 1 Archaeological Assessment:

A Stage 1 Archaeological Assessment was completed in accordance with the Standards and Guidelines established by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI), with the following conclusions and recommendations presented:

- Within the 4 quadrants surrounding the Scheifele Bridge, approximately 54% of the assessed area retains potential for the identification and documentation of archaeological resources.
- The remainder of the study lands (46%) retains a low to no potential for the identification or recovery of archaeological resources because of previous disturbances, steep slopes, and/or low and permanently wet areas. Consequently, a Stage 2 Archaeological Assessment will not be required in these zones.
- In accordance with Ministry guidelines, a Stage 2 Archaeological Assessment will be required for any portion of the project’s anticipated construction which may impact the area of potential exposure.
- Subject to clarification from MHSTCI, a Marine Archaeological Assessment study may be required, depending on the preferred design concept for the Scheifele Bridge reconstruction project.

The Stage 1 Archaeological Assessment Report is included in **Appendix D** while the approximate limits of Archaeological Potential are illustrated on the following reference map.



The PINK areas represent zones of archaeological potential and are subject to a Stage 2 Archaeological Assessment Study.

The BLUE areas represent zones with no known archaeological potential and are not subject to further study.

4.4 GEOTECHNICAL AND FOUNDATION INVESTIGATIONS

Stantec Consulting Ltd. completed a preliminary geotechnical and foundation investigation study in 2020, with a focus on subsurface conditions associated with the replacement of the Scheifele Bridge over the Conestogo River.

4.4.1 Geotechnical Field Operations:

- A total of seven (7) boreholes were advanced on site to between 9.8 meters and 20.4 meters “Below Ground Surface” (BGS). Of the seven boreholes, three (3) were driven into the Conestogo Riverbed from the bridge deck, while the remaining 4 boreholes were located on the banks of the river, in the four quadrants of the bridge (NE, NW, SE and SW)

- In addition to the 2020 borehole work, supplementary borehole data was secured from a previous geotechnical report by Peto MacCallum Ltd., related to the study of alternative alignments for a Regional Trunk Watermain on Northfield Drive, between the City of Waterloo and the Village of Conestogo. Four boreholes were advanced in 2019 for this study, also located near the four corners of the bridge.

- The geotechnical subsurface and groundwater conditions observed in the eleven (11) boreholes, combined with various laboratory materials testing, was used to develop geotechnical / foundation parameters for consideration and use in the design and reconstruction of the Scheifele Bridge and any associated road embankment construction.

Drill Rig Setup on Existing Scheifele Bridge

4.4.2 Existing Conditions and Preliminary Foundation Recommendations:

- A variation of soil types was encountered in the eleven boreholes from 2019 and 2020, including native sandy silt tills, silty sands, sand and gravel, clayey silt till, and granular fill material. The native soils have a relatively high silt content and are, therefore, not free draining and may be susceptible to frost heave.

- The existing substrate granular fill and loose materials are not considered suitable for supporting the proposed bridge foundations. Footings must be constructed within the stiffer native inorganic soils.

- Shallow spread footings may provide suitable foundation conditions but will offer relatively low bearing resistance, which may not meet bridge design codes and standards. In addition, shallow spread footings will need to be dewatered during construction, be constructed at frost-free elevations, and extend beyond the limits of potential river scour. An approximate founding elevation of 313.00 meters is considered appropriate for shallow footing design, if selected for the bridge foundations.

- Deep foundations, such as machine-driven steel “H-piles”, founded in the underlying dense soils, will provide higher bearing resistance than shallow spread footings and is, therefore, the recommended foundation design option. Subject to further structural load capacity

analysis of the recommended bridge concept, the design engineer will confirm whether deep pile foundation construction is the preferred foundation alternative for the Scheifele Bridge.

- Further geotechnical / foundation investigations will be required as part of the detailed design phase of the project, once the precise location of new abutments and piers, and the limits of the Northfield Drive reconstruction, are confirmed. Supplementary geotechnical investigations will not only provide design parameters for the final bridge substructure components but will also confirm detailed design requirements for road embankment construction, retaining wall construction, road pavement design, groundwater controls during construction, and guidelines for any open-cut trench construction.

A copy of the 2020 “Preliminary Geotechnical Investigation Report: Scheifele Bridge Reconstruction” report is included in **Appendix D** of this Environmental Study Report.

4.5 SOCIAL ENVIRONMENT

Two official plans govern the context of current and future planning within the rural area surrounding the Scheifele Bridge Study Area. They include the Regional Official Plan and the Township of Woolwich Official Plan, which are outlined below.

4.5.1 Regional Official Plan and Regional Growth Management Strategy:

The *Regional Official Plan (ROP)* is the guiding document for directing growth and change in the Region of Waterloo and is complemented by the Regional Growth Management Strategy in recognition of local innovative approaches to population increases and its associated pressures on sustainability and quality of life. An amendment to the ROP was recently endorsed by Region Council (see Section 1.1) and formally submitted to the Ministry of Municipal Affairs and Housing (MMAH) for review and acceptance.

On April 11, 2023, the Minister of Municipal Affairs and Housing approved the Region of Waterloo’s Official Plan Amendment (ROPA) No. 6 with modifications. The full details of the Ministry’s decision, and modifications, can be viewed on the Environmental Registry of Ontario’s website. Region staff is continuing to work with the Ministry in securing final approval of the updated ROP, including any modifications to the amended ROP deemed necessary by the Ministry. Updates will be provided by the Region as they become available.

It is noted that no specific details of the Region of Waterloo’s Official Plan Amendment (ROPA), or modifications outlined in the MAMH’s approval decision, appear to have a direct impact on the conclusions and/or recommendations of the Scheifele Bridge Class EA Study, within the context of the Region’s overall transportation network operations and future growth.

In addition to focus areas on environmental protection, re-urbanization, green field development and lifestyle initiatives, the *Regional Growth Management Strategy* also identifies initiatives that integrate effective land use with transportation choice options.

Successfully planning and managing infrastructure, including major projects like the Scheifele Bridge Replacement, are essential elements in achieving the visions laid out in the Regional Official Plan and the Regional Growth Management Strategy. One of these visions is to optimize the use of current infrastructure, such as existing roadway corridors, by increasing capacity without the need to implement other alternatives such as building new roadways. In doing so, localized improvements may be seen as reshaping urban form and providing more accessible communities, while maximizing the use of available capital funding.

The recommendations of the Scheifele Bridge Class Environmental Assessment Study attempt to respond to the following transportation related objectives embedded in the *Regional Official Plan* and the *Regional Growth Management Strategy*:

- Regional Roads provide safe, direct, accessible, and *multi-modal* transportation links for moving people and goods throughout Waterloo Region and to adjacent municipalities. Regional Roads will be planned and constructed in accordance with the provisions of the Regional Transportation Corridor Design Implementation Guideline.

- The design, construction and operation of Regional Roads, and *development applications* or *site plans* that affect Regional Roads, will be in accordance with the provisions of the Regional Transportation Corridor Design Implementation Guideline, the Regional Transportation Impact Study Implementation Guideline, the Regional Road Access By-law Implementation Guideline, the Regional Cycling Master Plan, the Regional Pedestrian Master Plan, and applicable Area Municipal Design Guidelines.

- Regional cycling routes have been identified within the Regional Cycling Master Plan and will be developed in association with ongoing Regional and Area Municipal Road improvements and other activities.

- Wherever feasible, sidewalks will be provided on both sides of streets where transit service currently exists or is planned, and on a minimum of one side of all other through-streets or streets that interconnect with the walking network.

- The Region, in collaboration with Area Municipalities, will prepare and update a Regional Pedestrian Master Plan that identifies the *pedestrian* network component of the Region's transportation system, which will be developed in association with Regional and area municipal road improvement projects and other activities.

4.5.2 Township of Woolwich Official Plan:

The Township of Woolwich has worked with the Region of Waterloo in ensuring that the principles of the Woolwich Official Plan, particularly in the areas of Transportation policies, have been recognized in the planning and design of the Scheifele Bridge replacement and the associated Northfield Drive improvements.

The Township of Woolwich recognizes, along with the Region, that a transportation system is one of the most important elements in shaping the form and character of the region and outlying communities. Various policy directives in the Woolwich Official Plan, which have helped to guide the Project Team in moving towards a recommended preferred design concept for the Scheifele Bridge project, have included:

- In cooperation with the Regional Municipality of Waterloo, the Township of Woolwich is committed to provide and maintain a road network that will accommodate current and anticipated traffic volumes.

- Primary Arterial Roads are roads under the jurisdiction of the Regional Municipality of Waterloo. Generally, their function is to distribute higher volumes of traffic between other arterial roads and major collector roads. The primary purpose of such roads is to carry through traffic within and between municipalities. Access to abutting lands is regulated.

- Improvements to road corridors should not be finalized until they are confirmed through the completion of an Environment Assessment Study.

- In recognition of the environmental and energy benefits associated with increasing the proportion of trips on foot and by bicycle, corridor facilities and amenities should be supported and pursued, where practical and safe, to promote these modes of travel.

- Within the areas of its jurisdiction, the Township will exercise control to ensure that traffic movements are not jeopardized by land service functions along region roads.

- Within the areas of its jurisdiction, the Township will request consideration of the needs of horse drawn vehicles, cyclists and pedestrians in the design and construction of roads and bridges, where appropriate.

4.6 TRANSPORTATION AND TRAFFIC ASSESSMENT

4.6.1 Vehicle and Active Transportation Volumes:

The Region of Waterloo routinely monitors traffic volumes on arterial roads, focusing primarily on vehicular movements. In certain circumstances, counts of pedestrian and cyclist activity are included.

For the Scheifele Bridge Class EA study, the Region provided Transportation and Traffic Analysis data for Northfield Drive, in the vicinity of the existing bridge. Unfortunately, reliable traffic information was limited to vehicular traffic, including cars and trucks, while data on buggy, cyclist and pedestrian traffic crossing the Scheifele Bridge was considered out of date and unreliable.

To ensure a proper evaluation of the various alternatives for the Scheifele Bridge, leading to the selection of a defendable recommended preferred design concept, the Region arranged for supplemental 24-hour camera counts of buggy, cycle, and pedestrian movements at the existing Scheifele Bridge. The camera counts took place over a 7-day period from Monday May 31 to Sunday June 6, 2021. A copy of the study results is provided in **Appendix D.**

The consolidation of the Transportation and Traffic Data is summarized as follows:

Vehicle Traffic Volumes:

- Northfield Drive is classified as a “Rural Connector” in the Region of Waterloo’s Context Sensitive Corridor Design Guidelines.
- The 2020 Average Annual Daily Traffic (AADT) volume was approximately 10,350 vehicles per day (VPD). The approximate percentage of heavy trucks was 3.5% or about 360 VPD.
- Traffic Growth is projected by the Region to be modest within the timeline of traffic forecasting. The projected 2030 AADT is estimated at 15,400 vehicles per day (VPD) based on a 3% annual growth rate.
- AM and PM peak hour volumes are between 9.0 % and 12.0% of AADT volumes, which is typical for urban / rural roads. The resultant AM and PM Peak Hour volumes are within the following approximate ranges:

2020	AM	950 vehicles
	PM	1,230 vehicles
2030 (projected)	AM	1,385 vehicles
	PM	1,850 vehicles

- According to Student Transportation Services of Waterloo Region, Northfield Drive is a school bus route and would be impacted by any moderate, or long term, road closures during normal school terms.

Buggy and Active Transportation Volumes:

- **Mennonite Buggy Volumes (May / June 2021 Camera Count):**

Maximum Daily Count:	7 crossings
Seven Day Total Count:	26 crossings

- **Cyclist Volumes (May / June 2021 Camera Count):**

  Maximum Daily Count: 80 crossings
  Seven Day Total Count: 361 crossings

- **Pedestrian Crossing Volumes (May / June 2021 Camera Count):**

  Maximum Daily Count: 19 crossings
  Seven Day Total Count: 55 crossings

- **Footnotes:**

- Although the number of buggy and pedestrian crossings were in the range of what the Project Team expected, the number of cyclist crossings exceeded anticipated volumes.

- Because of the rural nature of Northfield Drive, it is believed that most cyclists are experienced riders as opposed to “weekend riders with children”.
- The current narrow bridge deck poses a danger for buggies and cyclists as they cross the 107 m (350 ft.) long structure in shared automobile / truck lanes.
- Based on the recent camera count data, the Project Team agreed that the new bridge should include space for safe buggy travel, cycling lanes, and pedestrian walkways on both sides of the structure

4.6.2 Region of Waterloo Transit Operations:

Transit service in the Region of Waterloo is provided by “Grand River Transit”.

There are no transit routes that currently use Northfield Drive between the City of Waterloo and the Village of Conestogo. The nearest transit bus servicing the area is “Route 202 I-Xpress / University” route, which connects the Conestoga Station (Conestoga Mall) with the Boardwalk Station via University Avenue and Erb Street.

At the time of the Scheifele Bridge study, there were no known changes anticipated to the Grand River Transit bus transit routes, between the City of Waterloo and the Village of Conestogo.

4.6.3 Context Sensitive Regional Transportation Corridor Design Guidelines

Regional Road 22 (Northfield Drive) is a ***“Rural Connector”*** within the context of the Region of Waterloo Transportation Corridor Design Guidelines.

Rural Connectors are typically travelled at higher speeds, warranting features that will enhance the operational safety of cyclists and pedestrians with separate cycle lanes, multi-use trails, and wider roadway lanes. The presence of buggies in the Region of Waterloo adds another dimension to the design of a safe transportation corridor.

In addition to operational design, *Rural Connectors* may also be identified as having “scenic landscapes”, characterized by natural, cultural heritage, and recreational features that contribute to the overall view by the user. Contributing elements such as woodlots, wetlands, farmland, and other natural features are to be protected, preserved, and / or enhanced in the design and construction of Rural Connectors.

The Context Sensitive Regional Transportation Corridor Design Guidelines were approved in June 2010 and were an important source of information on the role and function of Northfield Drive within the area of the Scheifele Bridge.

Selected elements of the corridor design, which are associated with the ***Rural Connector*** designation and applicable to the Scheifele Bridge study, were considered by the Project Team during the design process:

Pedestrian Provisions:

Criteria: Given the anticipated low volumes of pedestrians on *Rural Connectors*, pedestrian infrastructure is recommended to occur where it is determined to be appropriate.

- Pedestrian movements on Northfield Drive, at the Scheifele Bridge, were confirmed to be relatively low and therefore not a major factor in the bridge cross section design. However, the safety of pedestrians crossing the structure, both short term and long term, was the primary reason for including walkways on both sides of the proposed bridge.

Cycling Provisions:

Criteria: Cycling facilities are to be provided in keeping with the Active Transportation Master Plan.

- Although Northfield Drive is not identified as a corridor warranted for future On-Road Cycling lanes or off-road multi-use trails, the high volume of cyclists currently using Northfield Drive convinced the Project Team that bike lanes should be provided in the

bridge design. In addition, the potential for future bike lanes, or multi-use trails, on Northfield Drive, between the City of Waterloo and the Village of Conestogo, should be investigated at the detailed design stage.

- Cycling lanes are proposed to be shared with the 2.45 m buggy lanes planned for both sides of the new bridge.

Scenic Views:

Criteria: Rural setting with views of farmland, buildings, and natural heritage features.

- Open Pedestrian Railings are proposed on the Scheifele Bridge to facilitate unrestricted views of the Conestogo River and other natural and heritage features in the area.

Right-of-Way Width:

Criteria: Subject to confirmation through the context sensitive design process, an ideal right of way width for a Rural Connector should be a minimum of 30 meters.

- The ROW width, within the study area, exceeds the minimum recommended criteria of 30 m. Widening of the corridor on the west side, to accommodate the new bridge alignment, will increase the ROW width within the limits of the Northfield Drive reconstruction.

Auto Travel Speeds:

Criteria: Posted Speed is typically 60 to 80 km/h.

- The posted speed limit on Northfield Drive is retained at 80 km/h.

4.7 EXISTING SCHEIFELE BRIDGE

4.7.1 Bridge History and Design Details:

The Scheifele Bridge is currently a four-span, continuous, cast-in-place reinforced concrete T-beam structure with span lengths of 22.86 m – 30.48 m – 30.48 m – 22.86 m, for a total length of 106.7 meters. The bridge has no skew, the total width is 11.58 meters, and the roadway width is 9.14 meters. The wearing surface is asphalt.

There is a 1.83 m wide concrete sidewalk along the west edge of the bridge and a 0.61 m wide concrete curb along the east edge. There is a steel “post and panel” railing system on each side of the bridge, which has been “reinforced” with the addition of steel beam guiderails.

An 1861 Map of the Woolwich Township / Waterloo County area illustrates various landowners related to the study area, including the ***Shifely*** family (alternatively spelled Scheifele). The mapping also shows a river crossing / bridge west of the existing structure.

Property owners listed on the south side of the river included Matthew and Frederick Scheifele, while Christian Scheifele was listed on the northwest side of the river. They were brothers and sons of Andrew and Maria Scheifele, who were a pioneer family arriving in Berlin (City of Kitchener) in 1815.

Subsequent mapping, dated 1881, shows a bridge crossing the Conestogo River at the same location that the original bridge was shown on the 1861 mapping. The bridges were rudimentary at the time.

The current bridge was constructed in 1958 by E. & E. Seegmiller Construction, a company based in Kitchener, Ontario. The new (current) bridge was located immediately east (downstream) of the original structures and was named after the Scheifele family, who were the original landowners in the vicinity of the bridge.

4.7.2 Bridge Maintenance and Repair History:

The Scheifele Bridge has been subject to various repair contracts in recent years:

In 1982, a contract was carried out which included major repairs to the beams, deck soffit and abutment ballast walls; a concrete overlay on the existing deck; repairs to the concrete curb and sidewalk; replacement of expansion joints at the abutments; and placement of new deck waterproofing and an asphalt wearing surface.

In 2011, the bridge underwent minor rehabilitation which included concrete repairs to the abutments, piers, and retaining walls; replacement of expansion joints at the abutments; and partial depth removal and replacement of the surface asphalt. The rehabilitation also included replacement of the steel beam guide rails at the approaches to the bridge as well as the installation of steel beam guide rails along both sides of the bridge.

In 2019, a contract was issued to add blocking support to the east exterior beam at the abutment of the south span. The blocking was installed to address excessive rotation of the steel rocker bearings supporting this beam. Additionally, plywood was installed to the sides and soffit of the west exterior beam over the pedestrian trail in the south end span.

In conjunction with the current Class Environmental Assessment study, Stantec Consulting Ltd. completed a site inspection, in September 2020, to document any significant new deficiencies in the bridge, and to closely examine the condition of the substructure. The field inspection was followed by a structural analysis of the superstructure components (supporting beams) to determine if there were any inherent load capacity concerns with the bridge.

The 2020 field inspection determined that lingering deficiencies were present in the south span girders and the south abutment bearings. The structural analysis confirmed that, notwithstanding the noted deficiencies, the load carrying capacity of the bridge was not compromised.

As a result of the 2020 field inspection and structural analysis, emergency repairs were completed in late 2021 to add blocking supports to the south span girder bearings that were not attended to in 2019, along with repairs to delaminated sections of the south span girders.

4.7.3 Interim Monitoring Program:

To address any unexpected structural issues going forward, the Region engaged Stantec Consulting Ltd. to complete an annual monitoring / inspection program of the bridge until final approvals are in place for detailed design and a contract is awarded for replacement of the Scheifele Bridge. The frequency and timeline for further inspections, and possible interim repairs, is subject to confirmation by the Region of Waterloo in consultation with Stantec.

5.0 ALTERNATIVE PLANNING SOLUTIONS

Phase 2 of the Class Environmental Assessment process (see Section 3.1) focuses on the identification and evaluation of “Alternative Planning Solutions” that may address the natural, social, and economic issues presented in the “Problem Definition” and “Need and Justification” statements for the project. Before the proponent can move forward with any design concepts, a review of broader scope solutions is typically completed, which puts the environmental assessment study “on the right course” within the planning context of the project.

For the Scheifele Bridge project, the review of Alternative Planning Solutions was considered redundant to the overall study process since the Region of Waterloo’s *2019 Preliminary Information Report (PIR)* clearly documented the need and justification for replacement of the bridge superstructure. Conditions of need, identified in the PIR, are summarized as follows:

- Deterioration of the girders in the South Span (and other locations), and abutment bearings, are basically beyond further rehabilitation.
- Barriers and handrails no longer meet Ontario Highway Bridge Design Code (OHBDC) specifications.
- Section losses, at the connection points of the railings to the soffits, are beyond further cost-effective repair.
- A 2010 *Structure Investigation and Alternative Assessment Report* confirmed that full replacement of the superstructure was required.
- A subsequent detailed delamination inspection, completed in the spring of 2018, also confirmed the need for a full replacement of the bridge superstructure.
- Scour protection measures at the piers, as well as a possible raise of the structure height, should be investigated in conjunction with an Environmental Assessment study.
- The Township of Woolwich requested that the existing narrow paved shoulders be widened to facilitate cycling, horse & buggy, and pedestrian traffic.

- Based on the Region's *Active Transportation Master Plan* (ATMP), 1.5m wide cycling facilities are required in the form of paved shoulders.
- Region Transportation Planning recommended that provisions be made in the reconstructed bridge for a 1.5m wide walkway on at least one side of the bridge.
- Rather than providing 3.0m wide paved shoulders, Region Transportation Planning recommended constructing a 3.0m wide multi-use trail for pedestrians and cyclists.

Based on the decision to accept the recommendations contained within the Region's 2019 Scheifele Bridge Preliminary Information Report (PIR), the Project Team moved directly towards developing **Alternative Design Concepts** for replacement of the Scheifele Bridge superstructure.

Footnote:

Early in the study process, the Project Team learned that the abutments and piers, of the existing bridge, are heavily salt-laden and experiencing ongoing structural deterioration. Although rehabilitation of the abutments and piers would be possible in conjunction with replacement of the bridge superstructure, the Project Team felt that "building a totally new bridge deck over rehabilitated abutments and piers" would be "throwing good money after bad" and would, in the end, significantly reduce the overall future lifespan of the structure. The Project Team concluded that such an approach was impractical and quickly recognized the need to replace both the superstructure and substructure components of the bridge at the same time.

6.0 ALTERNATIVE DESIGN CONCEPTS

The development of Alternative Design Concepts for the Scheifele Bridge study was grouped into two categories based on the interaction between various bridge design options, the function of Northfield Drive, and the impacts of construction on traffic control and staging. The two categories of Alternative Design Concepts included the following:

- Alternative Northfield Drive Alignment Design Concepts
- Alternative Scheifele Bridge Cross Section Design Concepts

6.1 OBJECTIVES OF ALTERNATIVE DESIGN CONCEPTS

6.1.1 Alternative Northfield Drive Alignment Design Objectives:

The development of alternative Northfield Drive alignment design concepts focused on the following primary objectives:

- The Region of Waterloo Traffic Division reported that Northfield Drive is not expected to be widened, beyond 2 lanes, prior to 2050. Therefore, all planning for Northfield Drive was based on retaining a two-lane cross section within the limits of the bridge study.

- Retain the current posted speed limit of 80 km/h within the study limits, which reflects a Design Speed of 100 km/h under current Transportation Association of Canada (TAC) Design Standards.

    - ***Footnote:*** *See Section 7.2.1, with comments on a proposal to reduce the posted speed from 80 km/h to 60 km/h, within the limits of the Scheifele Bridge. The proposal, which was ultimately rejected by the Region's Traffic Division, would have allowed for the removal of concrete roadside barriers between the travelled roadway and the pedestrian walkways.*

- Where possible, make improvements to the Northfield Drive horizontal and vertical design geometrics.

- Where possible, eliminate any long-term Northfield Drive construction detours by means of either a full offset design alignment or a staged construction design.

- Where possible, minimize impacts on the wetland area south of the bridge and on the west side of Northfield Drive.

- Where possible, reduce property acquisition requirements.

- Where possible, eliminate the need to relocate the high voltage hydro line on the east side of Northfield Drive, owned by Waterloo North Hydro (recently changed to ***Enova Power Corp*** through an amalgamation of WNH and Kitchener-Wilmot Hydro).

- Where possible, reduce the extent of reconstruction of Northfield Drive, with a suitable connection to the recently reconstructed intersection at University Avenue.

- Maintain access to existing properties within the study limits.

- Maintain a trail route beneath the south bridge span, which connects to the Health Valley Trail and is also used by horse-back riders from Conestogo River Horseback Adventures.

6.1.2 Alternative Scheifele Bridge Cross Section Design Objectives:

The development of alternative Scheifele Bridge Cross Section Design Concepts focused on the following primary objectives:

- Provide a combination of 2-lane and 4-lane bridge concepts for initial evaluation under the Class EA process. Since bridges are currently designed with a lifespan of approximately 75 years, and the timeline for widening of Northfield Drive from 2 lanes

to 4 lanes is unknown, it was deemed prudent to include at least one 4-lane alternative bridge design concept in the study planning.

- For initial study purposes, provide 3.75 m traffic lanes for both 2-lane and 4-lane design options. This approach presents “worst case” evaluation scenarios relative to environmental impacts, geometric design, and construction costs.
- Provide wider paved shoulders of variable widths for increased safety of buggy and cycle users.
- Provide either 1.8 m walkways or 3.0 m Multi-Use Trails (MUT) on one, or both, side(s) of the proposed bridge.
- Provide solid concrete safety barriers between the travelled lanes / paved shoulders and the pedestrian walkways or Multi-Use Trails.

6.2 DESCRIPTION OF ALTERNATIVE DESIGN CONCEPTS

6.2.1 Preliminary Alternative Northfield Drive Alignment Design Concepts:

Four (4) Preliminary Northfield Drive Alignment Design Concept alternatives were developed to accommodate the replacement of the Scheifele Bridge and to achieve, where possible, the objectives outlined in Section 6.1.1. In order that a “worst case” scenario would be evaluated with respect to impacts on the natural and social environments, as well as estimated construction costs, the widest bridge design concept (See Section 6.2.2: Alternative Bridge Design Concept 4) was included in all four of the preliminary Northfield Drive alternative alignment concepts.

Footnote:

In addition to the evaluation of various road and bridge design concepts, the Class Environmental Assessment process requires that a ***“Do Nothing”*** Alternative be considered as a baseline model when comparing all other alternatives. In this case, the “Do Nothing” Alternative would reflect deferral of any reconstruction of the Scheifele Bridge, for an indefinite time, and ongoing maintenance of the existing structure. This alternative was deemed to be unacceptable and not supportive of the study objectives and conclusions of the Region of Waterloo Preliminary Information Report (PIR). For further information on the “Do Nothing” Alternative, see Sections 6.3.1 and 6.3.2 which provide information within the “Alternatives Evaluation Matrix” process.

The four (4) Preliminary Alternative Northfield Drive Alignment Design Concepts, which were developed for review and evaluation, are presented in the following:

ALTERNATIVE NORTHFIELD DRIVE ALIGNMENT CONCEPT 1: FULL OFFSET CONSTRUCTION: WEST SIDE:

- This alternative proposes a new bridge constructed to the west of the existing Scheifele Bridge structure, with an approximate 22.0 m centerline-to-centerline separation between the new and old bridges.
- Expanded road embankments would need to be constructed on the north and south approaches to the new bridge, west of the existing roadway.
- The new bridge and realigned Northfield Drive could be constructed without the need for any long-term closure of Northfield Drive, or traffic detours.
- Other features of this alternative include:

    - Significant encroachment on the west side environmental wetland area and unnamed tributary of the Conestogo River, south and west of the existing bridge.
    - To reduce construction impacts on the wetland area and unnamed tributary, a lengthy retaining wall is proposed in the south-west quadrant of the study area.
    - Proposed design provides “fair to very good” roadway design geometrics.
    - Approximate property acquisition (northwest quadrant): 5,030 m2.
    - There is a potential for significant archaeological and other natural environmental impacts.
    - Proposed design may result in a protracted agency permit approval process due to environmental impacts.

    A copy of Alternative Northfield Drive Alignment Design Concept 1 is included in **Appendix E, Figure 1.**

ALTERNATIVE NORTHFIELD DRIVE ALIGNMENT CONCEPT 2: STAGED CONSTRUCTION: WEST SIDE:

- This alternative proposes a new bridge constructed slightly offset to the west of the existing Scheifele Bridge structure, with an approximate 8.7 m centerline-to-centerline separation between the new and old bridges.
- Expanded road embankments would need to be constructed on the north and south approaches to the new bridge, west of the existing roadway. The embankment construction would be less than in Alternative Design Concept 1.
- The new bridge and roadway could be constructed under a “Staged Work Program” without the need for any long-term closure of Northfield Drive, or traffic detours.
- Other features of this alternative include:

    - Significantly reduced encroachment on the west side environmental wetland area and unnamed tributary of the Conestogo River, compared to Alternative Design Concept 1.
    - Reduced retaining wall construction in the south-west quadrant of the study area, compared to Alternative Concept 1

- Proposed design provides “very good to excellent” roadway design geometrics.
- Approximate property acquisition (northwest quadrant): 2,250 m2
- Potential archaeological and other natural environmental impacts are reduced compared to Alternative Design Concept 1
- Agency permit approvals are still required but may be less onerous than with Alternative Design Concept 1.

A copy of Alternative Northfield Drive Alignment Design Concept 2 is included in **Appendix E, Figure 2.**

For further information on the Preliminary Construction Staging Program that was developed for consideration and evaluation, refer to Section 6.2.4**.**

ALTERNATIVE NORTHFIELD DRIVE ALIGNMENT CONCEPT 3: STAGED CONSTRUCTION: EAST SIDE:

- This alternative proposes a new bridge constructed slightly offset to the east of the existing Scheifele Bridge structure, with an approximate 8.7 m centerline-to-centerline separation between the new and old bridges (mirror image of Alternative Design Concept 2).
- Expanded road embankments would need to be constructed on the north and south approaches to the new bridge, east of the existing roadway.
- The new bridge and roadway would be constructed under a “Staged Work Program” without the need for any long-term closure of Northfield Drive, or detours.
- Other features of this alternative include:

    - Encroachment on the west side environmental wetland area and unnamed tributary of the Conestogo River is eliminated.
    - Construction of the major retaining wall in the south-west quadrant of the study area is eliminated.
    - Proposed design provides “fair to good” roadway design geometrics.
    - Property acquisition requirements are significantly more than Alternative Design Concepts 1 and 2. Approximate property acquisition Requirements:
        - Northeast quadrant: 5,730 m2
        - Southeast quadrant: 6,480 m2
    - Potential archaeological and other natural environmental impacts mirror those of Alternative Design Concept 2 but are less than Alternative Design Concept 1.
    - Agency permit approvals are considered equal to Alternative Design Concept 2 but less onerous than with Alternative Design Concept 1.
    - Proposed design requires relocation of a high voltage overhead hydro line owned by Enova Power Corp (formerly Waterloo North Hydro).

A copy of Alternative Northfield Drive Alignment Design Concept 3 is included in

Appendix E, Figure 3.

For further information on the Preliminary Construction Staging Program that was developed for consideration and evaluation, refer to Section 6.2.4**.**

ALTERNATIVE NORTHFIELD DRIVE ALIGNMENT CONCEPT 4: CONSTRUCTION OF SCHEIFELE BRIDGE ON EXISTING ALIGNMENT:

- This alternative proposes a new bridge constructed at the current location of the Scheifele Bridge, and on the existing Northfield Drive alignment.
- Depending on the width of the new bridge, the existing road embankments would need to be widened slightly on both sides of Northfield Drive, along both the north and south approaches to the bridge.
- There are two options for building a new bridge at the existing location and within the current Northfield Drive alignment, both of which significantly impact traffic operations on Northfield Drive and require a long-term detour, compared to Alternative Design Concepts 1, 2 and 3:

Option 1: Standard Bridge Construction and Full Closure of Northfield Drive:

Standard bridge construction would require a long-term (estimated 24-30 months) closure of Northfield Drive to facilitate removal of the existing bridge, complete construction of a new bridge structure, and reconstruction of the road approaches within the current Northfield Drive alignment.

A lengthy detour route would be required for traffic that typically uses Northfield Drive, between the City of Waterloo and the Village of Conestogo, during full closure of the roadway during construction of the new bridge and roadway approaches. Further discussion of road closure and detour options are presented in Section 6.2.3**.**

Option 2: Advanced Bridge Construction (ABC) and Lengthy Closure of Northfield Drive:

Replacement of the Scheifele Bridge is possible by means of an “Advanced Bridge Construction (ABC)” method of construction, whereby the deck of the new bridge would be constructed beside the existing bridge and “slid” into place on rehabilitated and/or widened abutments and piers.

Further study would be required to assess the viability of an ABC construction option and the inherent potential impacts on the surrounding natural and social environments, including the Conestogo River. Regardless, this approach would still require a lengthy closure of Northfield Drive (estimated 18-24 months) to reconstruct the abutments and piers, to “slide” the new bridge deck onto the rebuilt abutments and piers, and to reconstruct the Northfield Drive approaches.

Further discussion of road closure and detour options are presented in Section 6.2.3**.**

- Other features of this alternative include:

  - Encroachment on the west side environmental wetland and unnamed tributary of the Conestogo River is minimized and dependent on the width of the new bridge and Northfield Drive embankments.
  - Construction of the major retaining wall in the south-west quadrant of the study area is eliminated.
  - Proposed design provides “excellent” roadway design geometrics (existing roadway).
  - Property acquisition requirements are minimal and subject to the width of the new bridge and road embankment widenings.
  - Potential archaeological and other natural environmental impacts are minimal.
  - Agency permit approvals are considered equal to Alternative Design Concepts 2 and 3, but less onerous than with Alternative Concept 1.

A copy of Alternative Northfield Drive Alignment Design Concept 4 is included in **Appendix E, Figure 4.**

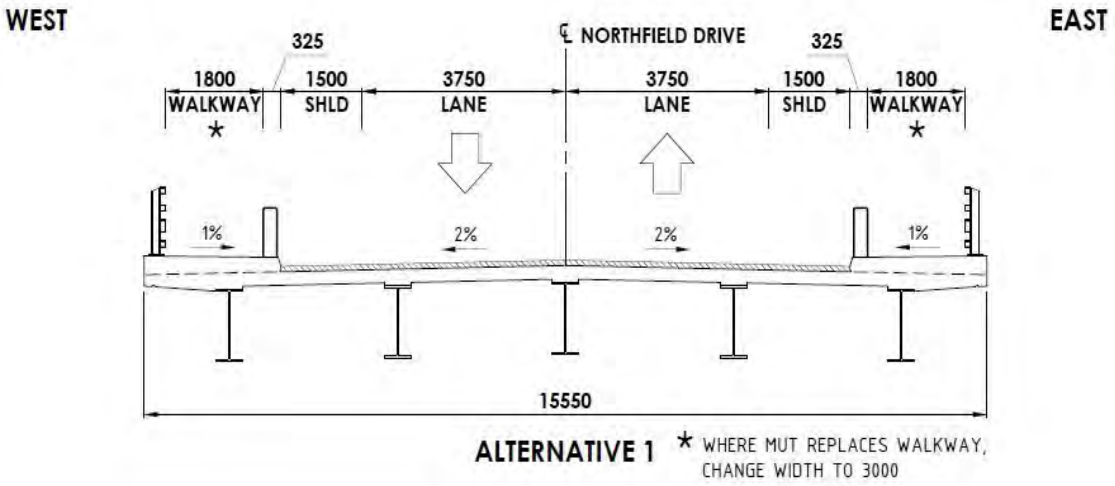
6.2.2 Preliminary Alternative Scheifele Bridge Cross Section Design Concepts:

Four (4) Preliminary Bridge Cross Section Design Concepts were developed to accommodate the replacement of the Scheifele Bridge and to achieve, where possible, the objectives outlined in Section 6.1.2. As noted, Bridge Design Concept 4 was included in the four Alternative Northfield Drive Alignment Design Concepts (Section 6.2.1) to represent a “worst case” scenario for evaluation of the alternatives, including estimated construction costs.

The four (4) Preliminary Scheifele Bridge Cross Section Design Concepts, which were developed for review and evaluation, are presented in the following:

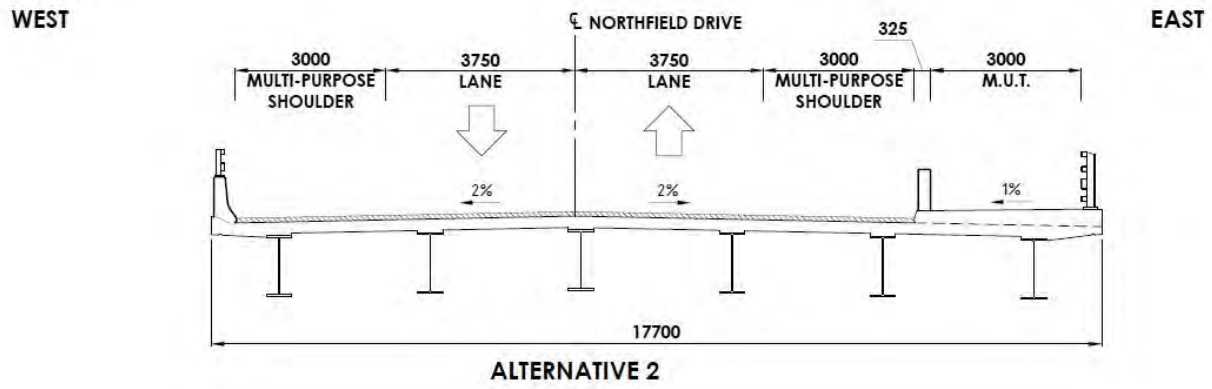
ALTERNATIVE BRIDGE DESIGN CONCEPT 1:

- Matches existing bridge condition by retaining 2 travel lanes. Widening of the structure would be required to expand to a future 4-lane bridge.
- Paved Shoulders (1.50 m wide) and “Protected” Walkways (or Multi-Use Trails) are provided on both sides to improve cyclist and pedestrian safety.
- Buggy travel will be slightly safer than the current condition because of the added 1.50 m wide paved shoulders but remains less than optimum.
- The total width of this Bridge Design Concept is 15.55 meters, with Walkways on both sides.



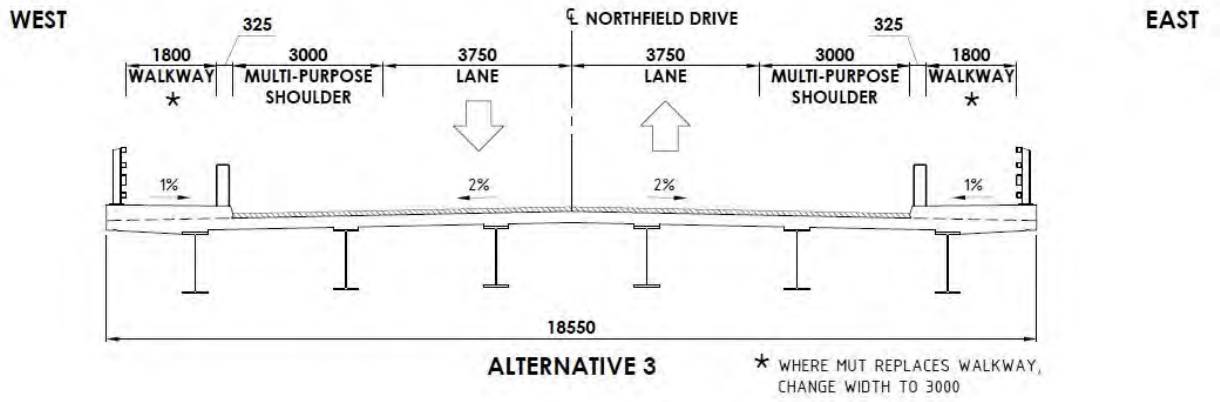
ALTERNATIVE BRIDGE DESIGN CONCEPT 2:

- Matches existing bridge condition by retaining 2 travel lanes. Widening of the structure would be required to expand to a future 4-lane bridge.
- Paved Shoulders (3.0 m wide) are provided on both sides, while a “Protected” Multi-Use Trail is provided on one side to improve cyclist and pedestrian safety.
- The safety of buggy travel is significantly improved with the addition of 3.0 m wide “multi-use” paved shoulders on both sides, which would also serve the needs of on-road cyclists.
- The total width of this Bridge Design Concept is 17.70 meters, based on a Multi-Use Trail on one side.



ALTERNATIVE BRIDGE DESIGN CONCEPT 3:

- Matches existing bridge condition by retaining 2 travel lanes. Widening of the structure would be required to expand to a future 4-lane bridge.
- Paved Shoulders (3.0 m wide) and “Protected” Walkways (or Multi-Use Trails) are provided on both sides to improve cyclist and pedestrian safety.
- The safety of buggy travel is significantly improved with the addition of 3.0 m wide “multi-use” paved shoulders on both sides, which would also serve the needs of on-road cyclists.
- The total width of this Bridge Design Concept is 18.55 meters, based on Walkways on both sides.



ALTERNATIVE BRIDGE DESIGN CONCEPT 4:

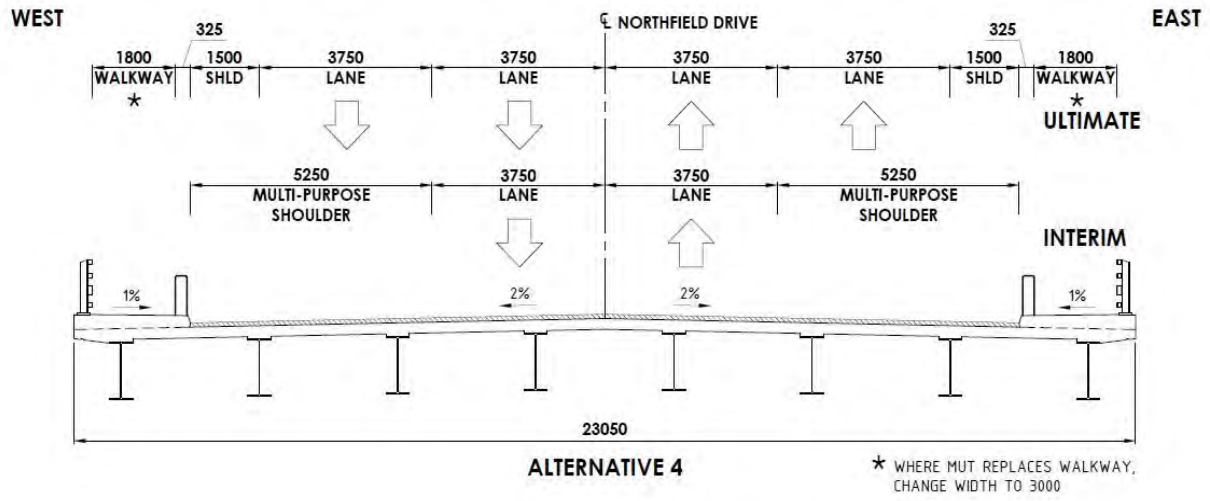
Interim Condition:

- Matches existing bridge condition by retaining 2 travel lanes.
- Wider Paved Shoulders (5.25 meter) provide enhanced safety for cyclist and buggy travel while also providing sufficient width to add two lanes of traffic (4-lane roadway) and 1.5 m paved shoulders in the future.
- “Protected” Walkways (or Multi-Use Trails) are provided on both sides to improve cyclist and/or pedestrian safety.

Ultimate Condition:

- Without any structural widening of the bridge, the wide shoulders can be converted to traffic lanes, thereby providing a 4-lane bridge to accommodate potential future traffic growth in the area.

- With a 4-lane bridge, 1.50 m shoulders would remain for the improved safety of buggy and cyclist travel.
- The total width of this Bridge Design Concept is 23.05 meters under both the Initial and Ultimate conditions, based on Walkways on both sides.



6.2.3 Northfield Drive Closure and Long-Term Traffic Detour Planning:

As noted in Section 6.2.1 (Alternative Northfield Drive Alignment Concept 4), reconstruction of the Scheifele Bridge, at its current location and on the existing Northfield Drive alignment, would require a long-term closure of Northfield Drive and significant disruptions to traffic operations in the community.

Although it was a goal of the Project Team, from the outset of the study, to favour design alternatives that provide for “No Closure of Northfield Drive” over “A Temporary or Full Closure of Northfield Drive with Accompanying Detours”, the Class EA study process dictates that all options are considered in the development and evaluation of alternative design concepts, regardless of any perceived negative impacts of such options.

To this end, *Alternative Northfield Drive Alignment Concept 4: Construction of the Scheifele Bridge on Existing Alignment (Section 6.2.1)* was developed despite the perceived negative impacts on traffic operations due to a long-term closure of Northfield Drive during construction, and the resultant detour that would be needed to divert traffic from the bridge construction site.

In the On-Line presentation for Public Consultation Center #1, details of a possible detour route were provided to the public for review and comment. The proposed detour route, as determined by the Region of Waterloo, is presented in the following description and location map:

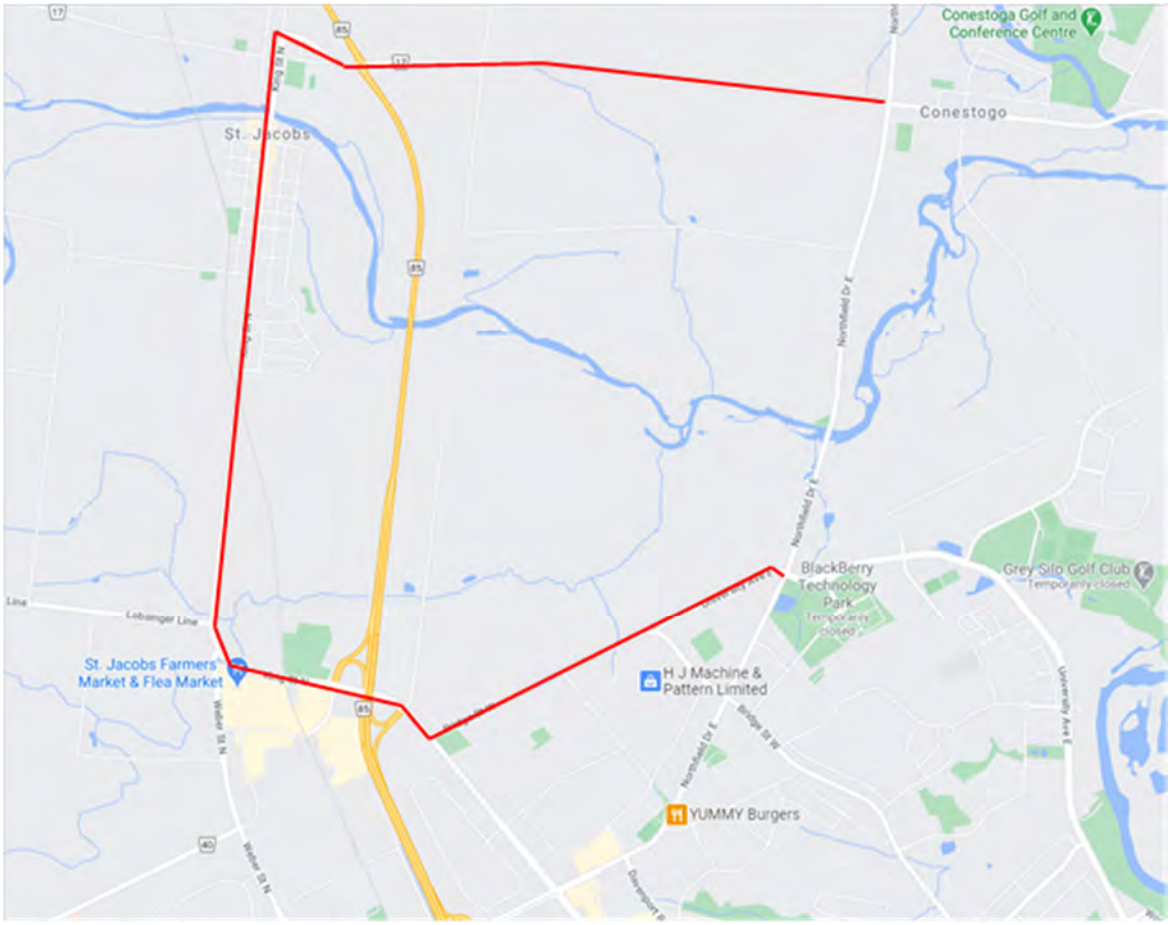
Vehicle and Truck Detour Route:

- West on Sawmill Road to Highway 85 (St. Jacob's Roundabout)
- South on Highway 85 to Northfield Drive Interchange
- East on Northfield Drive to University Avenue (or points in between)

Buggies and Other Slower Moving Vehicles:

The route shown in **RED** on the map below would be signed for buggies and other slower moving vehicles, and consist of:

- West on Sawmill Road to King Street North in St. Jacobs
- South on King Street North to Bridge Street West
- East on Bridge Street West to University Avenue (or points in between)



6.2.4 Construction Staging Program: Alternative Northfield Drive Alignment Concepts 2 and 3:

As noted in Section 6.2.1, reconstruction of the Scheifele Bridge, on either the west side or east side of the existing structure (Alternative Northfield Drive Alignment Concepts 1, 2 and 3), may be accomplished under a Staged Construction program, thereby avoiding any long-term detours.

Details of a preliminary construction staging concept were presented to the public in the Public Consultation Center Meeting #1 slides and are summarized below, along with a schematic of the 4-stage construction program based on “Alternative Northfield Drive Alignment Concept 2: Staged Construction: West Side”.

Construction Stage 1:

- Construct a “half section” of the new bridge structure to the west of the existing Scheifele Bridge.
- Maintain uninterrupted traffic on Northfield Drive and the existing bridge during construction of the first stage of the new bridge.

Construction Stage 2:

- After completion of the “half section” of the new bridge and expanding the road embankments on the west side of Northfield Drive, switch traffic to the newly constructed half bridge and widened / realigned Northfield Drive.

Construction Stage 3:

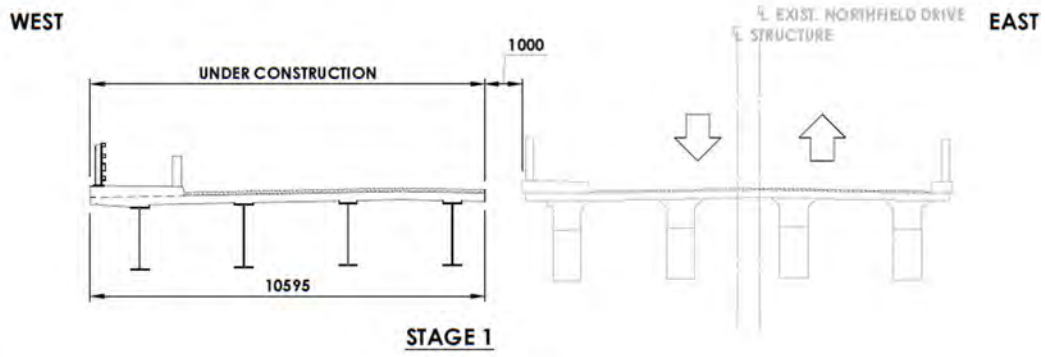
- Demolish the existing Scheifele Bridge and construct the balance of the new structure (east side), all while maintaining traffic on the “half section” of the new bridge.

Construction Stage 4:

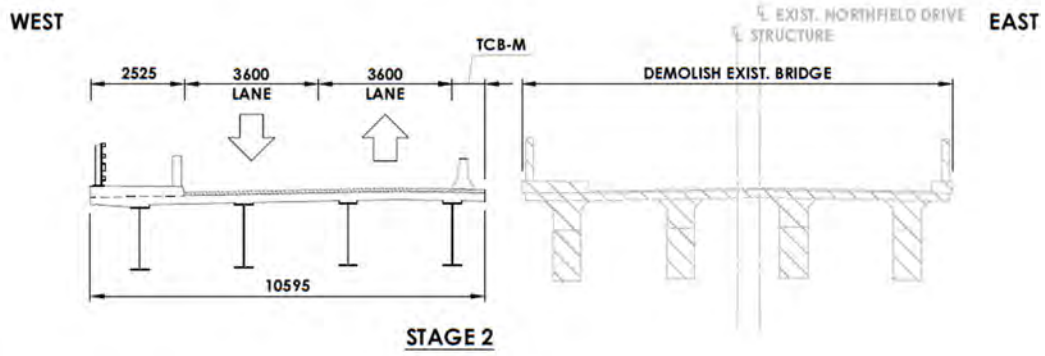
- Upon completion of the balance (east side) of the new bridge, complete the northbound and southbound roadway approaches on Northfield Drive and any remaining features of the new bridge.
- Open the new Scheifele Bridge and reconstructed section of Northfield Drive to full traffic operations, including vehicular, buggy, cyclist, and pedestrian traffic.

The details shown on the schematic construction staging plan are representative of the new structure being built to the west side of the existing Scheifele Bridge structure, consistent with “Alternative Northfield Drive Alignment Concept 2: Staged Construction: West Side” (see Section 6.2.1).

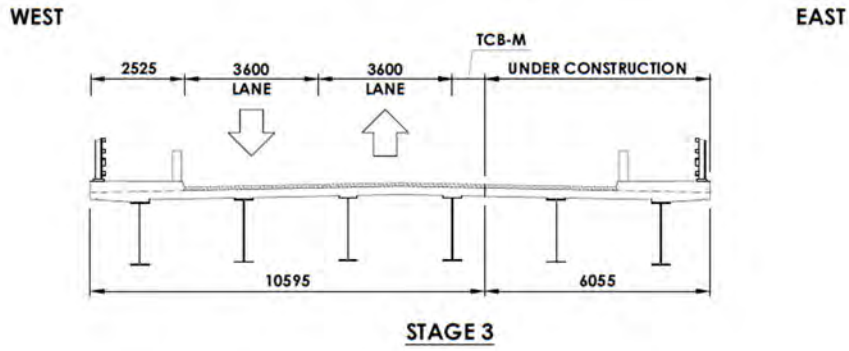
A mirror image of the construction staging plan would apply to “Alternative Northfield Drive Alignment Concept 3: Staged Construction: East Side” (see Section 6.2.1).



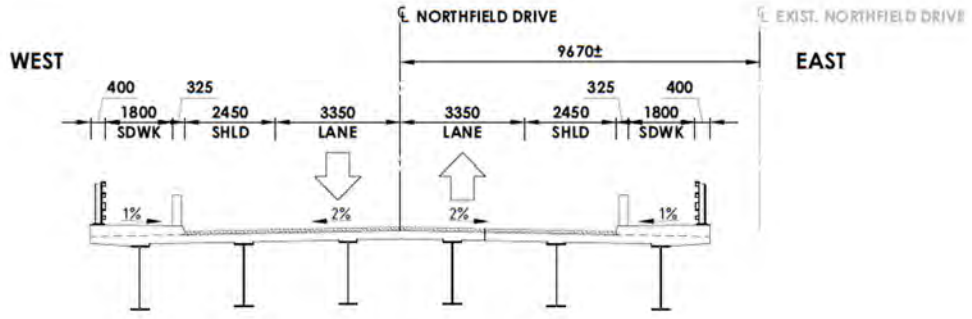
STAGE 1



STAGE 2



STAGE 3



STAGE 4

6.3 ALTERNATIVE DESIGN CONCEPTS EVALUATION MATRICES

The process of evaluating alternative design concepts, that are developed over the course of an environmental assessment study, is not a straight-forward process and often includes an evaluation of factors on a subjective basis.

Likewise, for complex projects it is generally impossible to evaluate the various alternatives, and determine “a winner”, strictly on a quantitative basis as decisions in these matters are not always a matter of pure numbers, such as cost. In many cases, a preferred design tends to evolve over time, based on feedback from agencies, local property owners, and the public, as well as through discussions at the Project Team level.

In essence, there are many intangibles that must be considered, on a subjective versus quantitative basis, to arrive at the best overall solution to a problem and determine a “recommended preferred design concept”. Such was the case for the Scheifele Bridge Replacement Class Environmental Assessment Study.

For this project, the Project Team knew, from the outset, that the Scheifele Bridge superstructure design should accommodate various modes of local travel (vehicles, buggies, cyclists, and pedestrians), which was one of the main priorities in the decision process. Added to this objective was the need to examine, and include where possible, design provisions that would avoid any long-term closure and detour of Northfield Drive traffic during construction. Full replacement of the existing bridge substructure (abutments and piers) was also on the list of design requirements.

As discussed in Sections 6.2.1 and 6.2.2, four alternative design concepts were developed for the Scheifele Bridge study, in each of the following two categories:

- Preliminary Northfield Drive Alternative Alignment Design Concepts
- Preliminary Alternative Scheifele Bridge Cross Section Design Concepts

To assist the Project Team in moving towards final recommended preferred designs for the Northfield Drive Alignment and the Scheifele Bridge Design Cross Section, “Alternative Design Concept Evaluation Matrices” were developed which compared the design concepts in the following areas:

6.3.1 Preliminary Northfield Drive Alternative Alignment Design Concepts Evaluation Matrix:

Vehicular and Active Transportation:

- Traffic Capacity, Operations and Access to Abutting Properties
- Four Lane Bridge Capacity
- Traffic Control During Construction
- Provisions for Mennonite Buggy Movements

Natural Environment:

- Aquatic Species and Habitat
- Wildlife and Wildlife Habitat
- Terrestrial Vegetation and Wetlands
- Species at Risk (SAR) and Other Habitat
- Archaeological

Cultural and Social Environments:

- Cultural Heritage
- Property Acquisitions and Landscape Opportunities

Technical Design Details:

- Winter Operations
- Municipal Services and Utilities
- Estimated Construction Cost

6.3.2 Preliminary Alternative Scheifele Bridge Cross Section Concepts Evaluation Matrix:

Vehicular and Active Transportation:

- Two Lane Vehicular Traffic Capacity and Operations
- Four Lane Vehicular Traffic Capacity
- Provisions for Dedicated Cycle Lanes
- Provisions for Pedestrian Walkways and/or Multi-Use Trail Facilities on bridge structure
- Provisions for Safe Mennonite Buggy Travel crossing bridge
- Subjective “Safety Rating” for Bridge Cross Section design, accounting for all Modes of Traffic Operations

Constructability, Operations and Technical Design Issues:

- Traffic control during construction and viability for a staged construction program
- Deck-Level bridge maintenance operations, lane restrictions and traffic disruptions
- Winter maintenance
- Provision for Accommodating Existing or Future Utilities

- Provision for Region Trunk Watermain Construction
- Subjective Rating of "Constructability, Operations and Technical Design Issues"
- Comparative Bridge Construction Cost Estimates
- Overall Ranking of Alternative Bridge Design Concepts Including Project Costs

Copies of the "Alternative Design Concepts Evaluation Matrices", for the "**Northfield Drive Alignment Design Concepts"** and the **"Scheifele Bridge Cross Section Design Concepts",** were presented at the two Public Consultation Centre meetings. Copies are provided in **Appendix F.**

Footnote:

It is noted that the "Scheifele Bridge Cross Section Design Concepts Evaluation Matrix" was not edited for presentation at Public Consultation Centre Meeting #3, following the Region's decision to eliminate the west side sidewalk from the preferred bridge design concept. Notwithstanding reduced estimated construction and winter maintenance costs associated with Alternative 5 Modified (single sidewalk) versus Alternative 5 (double sidewalk), other subjective evaluation factors were considered equal to the double sidewalk alternative.

6.3.3 Natural Environment Impacts Evaluation Matrix:

To supplement the Northfield Drive Alternative Alignment Design Concepts Evaluation Matrix presented in Section 6.3.1, a separate *Natural Environment Impacts Evaluation Matrix* was created by Stantec's Aquatic, Wildlife, and Terrestrial specialists to ensure that the conclusions presented in the Northfield Drive Design Concepts Evaluation Matrix fully embodied the extent of any impacts on the natural environment.

The "Natural Environment Impacts Evaluation Matrix", which is presented in **Appendix F,** examined the impacts of the three **offset** Northfield Drive and Bridge Design Concepts (see footnote below) on the Natural Environment, and compared the design concepts in the following areas:

Natural Environment Impacts Evaluation Matrix:

- Impacts on Aquatic Species and Habitat
- Impacts on Wildlife and Wildlife Habitat
- Impacts on Vegetation and Wetlands
- Impacts on Species at Risk (SAR) and SAR Habitat

Footnote: The "Natural Environment Impacts Evaluation Matrix" did not examine Alternative Northfield Drive Alignment Concept 4, which provides for replacement of the Scheifele Bridge at the current location, because of the modest environmental impacts associated with this design concept.

6.4 HYDRAULIC AND GEOMORPHOLOGICAL FLUVIAL ASSESSMENTS:

The Grand River Conservation Authority (GRCA), in their letter dated May 31, 2022, expressed preliminary concerns about how the recommended preferred design concepts may impact the Conestogo River and its associated floodplains, riverine valleys, and wetlands. The GRCA presented a summary of action items that the Region of Waterloo should consider, in terms of further studies and environmental responses, leading up to final design, approval submissions, and construction. One of the comments focused on the need for a floodplain analysis to demonstrate that hydraulic and fluvial impacts of the new bridge are limited, and that any flooding hazards are not exacerbated upstream and downstream of the structure.

Assessments of the hydraulic and geomorphological fluvial parameters, arising from the "Recommended Preferred Northfield Drive and Scheifele Bridge Design Concepts", were completed in accordance with GRCA policies and acceptable engineering practice. The following provides an overview of the study results and associated preliminary design details:

Hydraulic Analysis:

- The Grand River Conservation Authority (GRCA) provided Stantec with the latest HEC-RAS models for the Conestoga River through the study area. The current HEC-RAS model for the Scheifele bridge was prepared as part of a Dam Break analysis of the Conestogo Dam (MTE, 2015), but contained unsteady flows produced through the dam break scenario and did not have the correct design and regional flow rates. The GRCA also provided an older, non-georeferenced HEC-RAS model that contained appropriate design and regional flows but appeared to represent a simplified design of Scheifele Bridge containing only one pier. As the dam break model provided a more accurate depiction of the Scheifele bridge and was properly geo-referenced, this model was used to create the existing conditions model for this analysis.

- Using the project and geometry files from the Dam Break model, steady state flows and boundary conditions were taken from the older HEC-RAS model (containing the proper design and regional flows) to create an updated existing model. Recent topographic survey along Northfield Drive was imported into the model.

Existing Bridge Conditions:

  - Comparing the exiting bridge conditions to MTO design standards, the design flow (2% probability of occurrence in any year, or a 50-year return period) water level is 318.41 m upstream of the bridge. The spill elevation of the road, based on available data, is approximately 321.60 m. The clearance of the bridge was determined to be 1.70 from the water surface elevation to the soffit (bottom of the bridge). Freeboard modeled under existing conditions is 3.19 m, meeting MTO design criteria of 1 m. In addition, the check flow (130% of the 100-year return period) has a water level of 318.82 m upstream of the bridge which does not overtop the roadway at its low point of 321.60 m, also meeting MTO design criteria.

- The regulatory flow has a water level of 319.43 m upstream of the bridge and does not overtop the road, which meets MTO criteria. Therefore, there is no relief flow, which also meets MTO criteria.

Proposed Bridge Conditions:

- The existing conditions HEC-RAS model was updated to reflect the proposed widening of Northfield Drive and replacement of Scheifele Bridge. In addition, the road profile was updated to match that of the proposed road. A single pier was removed in the proposed model and the remaining pier widths were increased from 0.6 m to 0.8 m. The opening was widened to 117.0 m and shifted westwards approximately 9.7 m and bridge grade was adjusted to 0.6%. Pedestrian railings were updated to match the proposed design; however, the style of railing is assumed to remain the same as under existing conditions.
- The proposed conditions model showed a slight increase in water levels (approximately 0.05 m in the design storm) of the cross section immediately upstream of Scheifele Bridge when compared to the Updated Existing Conditions Model. However, these cross sections cannot be directly compared as they are in different locations due to the shifted nature of the new bridge. The remaining cross sections further upstream, and in the same location as the existing model, show lowered water surface elevations which is to be expected for a bridge with a wider opening and less piers.
- The design flow (2% probability of occurrence in any year or a 50-year return period) water level is 318.46 m upstream of the bridge. The spill elevation of the road, based on available data, is approximately 321.29 m. The clearance of the bridge was determined to be 1.61 from the water surface elevation to the soffit (bottom of the bridge). Freeboard modeled under proposed conditions is 2.83 m, which is greater than the MTO design criteria of 1 m. The check flow has a water level of 318.89 m upstream of the bridge which does not overtop the roadway at its low point of 321.29 m, therefore meeting MTO design criteria.
- The regulatory flow has a water level of 319.51 m upstream of the bridge and does not overtop the road, which meets MTO criteria. Therefore, there is no velocity and depth for the relief flow, which also meets MTO criteria.
- Additionally, the Regional Water surface elevations are lower upstream but outside of the immediate vicinity of the bridge; therefore, reducing upstream flood risk.

Hydraulic Analysis Conclusions and Recommendations:

- The hydraulic analysis of Scheifele Bridge along Northfield Drive East indicates that the proposed bridge meets all hydraulic design requirements and will not cause any increase in flood risk upstream or downstream of the bridge.

- Although water surface elevations immediately upstream of the bridge increase from existing to proposed, these values cannot be compared as the bridge was moved upstream and therefore up gradient.
- The remaining cross sections, at comparable locations just outside of the immediate bridge limits, showed lower water surface elevations between proposed and existing models due to the increased hydraulic capacity of the bridge.

Geomorphological Fluvial Assessment:

- **Field Assessment:**

To identify the existing site conditions within the immediate vicinity of the existing bridge crossing, a field assessment of the river channel along the right and left banks (looking downstream), both upstream and downstream of the existing bridge, was completed. The conditions are briefly described below within each of four quadrants abutting the existing bridge.

- Southwest Quadrant

  The unnamed tributary drainage feature in the southwest quadrant is comprised of soft cohesive material and vegetated heavily with aquatic plants. The existing south bridge abutment is located approximately 10-15 m from the right bank of the river.

  At the time of assessment, no flow was going through the south bridge span (right bank area), with the major flow path of the river being located adjacent to the left bank (north span).

  A lateral bar is attached to the right bank of the river, indicating a relatively low energy environment along the southern margin of the river. The lateral bar extends from the outlet of the unnamed tributary drainage feature and blocks moderate flows from being conveyed between the existing bridge abutment and the southernmost pier. Within the southwest quadrant, the right bank of the creek appears to be stable and well vegetated with moderate slopes.

- Northwest Quadrant

  The main flow path of the Conestogo River is adjacent to the left bank and within the north span of the existing bridge crossing. The left bank exhibits evidence of erosion (steep gradient with low-density vegetation and exposed soils) extending approximately 60 m upstream of the existing north bridge abutment.

  Visual observations indicated that the bank material consists of firm sandy loam. Vegetation on banks and riparian areas are mostly grasses with some milkweeds and small shrubs directly adjacent to the bridge.

  Upstream of the eroding bank, the riverbank becomes shallower with a few deciduous trees helping to stabilize the bank.

- Southeast Quadrant

  Immediately downstream of the bridge there is a large depositional feature that is overgrown with cattails, along with stable shallow banks that are well vegetated with shrubs and woody plant materials.

  Approximately 90 m downstream of the existing bridge, bank erosion was observed along the outside bend of the river. The erosion along this bend does not present any current risks to the existing Scheifele Bridge or the proposed replacement structure.

- Northeast Quadrant

  The left bank, immediately downstream of the bridge, is approximately 2 m high with some soil loss noted behind the abutment. Approximately 15 m downstream of the bridge, the bank height decreases, with the bank slopes being shallower and offering good floodplain access. Some horse trails were noted along the shallower sections of the bank.

  A point bar, located approximately 120 m downstream of the north bridge abutment, is vegetated with small shrubs and contains loose gravel and cobbles.

- **Design Considerations:**

  - Bank Stabilization

    Continued erosion of the left bank has the potential to result in future interaction between the river and the north abutment, which will be exacerbated with the proposed shift in the location of the north abutment. Subsequently, bank stabilization is recommended along the left bank, extending for a total length of approximately 120 m upstream and downstream of the new bridge abutment.

    The bank stabilization should tie into stable portions of the existing riverbank at the upstream and downstream limits. To minimize the in-water footprint of the stabilization work, it is recommended that the bank treatments extend from the existing river's edge to the elevation of the existing top of bank.

    To provide improved riparian habitat in areas outside of the proposed bridge footprint, it is recommended that bank stabilization be completed with vegetated stone bank protection. Vegetated stone bank protection is a system that consists of the placement of stone and plantings to protect against channel degradation and widening. The incorporation of plantings within the treatment increases the

effectiveness of the stone placement by forming a living root mat within the treatment.

Over time, the use of plantings will set in place a broad range of habitat enhancement opportunities, be aesthetically pleasing, and provide a natural streambank appearance. Ecologically, this approach provides shade over the area, providing cover for improved aquatic and terrestrial habitat.

Within the bridge footprint, vegetation is unlikely to establish because of limited sunlight. Subsequently, rock bank protection is recommended in this area, the limits of which are subject to refinement during detailed design.

The right bank was observed to be stable and well-vegetated with moderate slopes at the proposed crossing location. Additionally, erosion of this bank was not observed during the historic air photo record. Assuming that no significant channel modifications are required to support the implementation of the new bridge, stabilization of the right bank is not recommended upstream and downstream of the new south bridge abutment.

- Riverbed Stabilization

  Since the existing bridge piers are proposed to be removed as part of the Scheifele Bridge replacement, the riverbed may require stabilization within the footprint of the existing piers after their removal. The scope of riverbed stabilization should be confirmed during detailed design and should consider substrate stability and regulatory requirements and approvals.

Copies of both the “Scheifele Bridge Hydraulic Analysis Report” and the “Scheifele Bridge Fluvial Geomorphological Assessment Report” are included in **Appendix D** of this Class Environmental Assessment Study report**.**

6.5 PRELIMINARY PROJECT COST ESTIMATES

Over the course of the study, cost estimates were developed for the various alternative design concepts which enabled the Project Team to compare the options based on financial impacts and the ability of the Region of Waterloo to fund the project. The cost estimates continued to be updated between the initial “Alternatives Evaluation” stage and the final “Recommended Preferred Design Concept” stage.

Preliminary Project Cost Estimates were presented in the initial **Alternative Northfield Drive Alignment Design Concepts Evaluation Matrix,** which examined four (4) alternative alignment designs for Northfield Drive, as outlined in Section 6.2.1. For uniformity in calculating estimated construction costs for the four alternative alignment design concepts, the widest bridge design concept (future 4 lane bridge with walkways on both sides and a total width of 23.05 m) was included in the initial costing program. The initial preliminary cost estimates (excluding

engineering fees and HST) were presented to the public at the first Public Consultation Centre Meeting, between May 19, 2021, and June 9, 2021, and are reproduced in **Table 1** below:

TABLE 1 **PRELIMINARY PROJECT COST ESTIMATES (OPINION OF PROBABLE COST):** **BASED ON ALTERNATIVE BRIDGE DESIGN CONCEPT 4 (SEE SECTION 6.2.2)**			
ALTERNATIVE DESIGN CONCEPTS	**BASE CONSTRUCTION COST: CONSTINGENCY ALLOWANCE (12%)**	**PROPERTY ACQUISITIONS**	**TOTAL (2021 DOLLARS)**
ALTERNATIVE 1: FULL OFFSET CONSTRUCTION WEST SIDE	$20,400,000	$30,000	$20,430,000
ALTERNATIVE 2: STAGED CONSTRUCTION WEST SIDE	$21,400,000	$30,000	$21,430,000
ALTERNATIVE 3: STAGED CONSTRUCTION EAST SIDE	$19,600,000	$40,000	$19,640,000
ALTERNATIVE 4: BRIDGE AND ROAD CONSTRUCTION: EXISTING ALIGNMENT & FULL ROAD CLOSURE	$17,200,000	$60,000	$17,260,000

7.0 RECOMMENDED PREFERRED DESIGN CONCEPTS

7.1 PROCESS LEADING TO THE SELECTION OF RECOMMENDED PREFERRED DESIGN CONCEPTS:

The process leading to the selection of *Recommended Preferred Design Concepts,* for the reconstruction of the Scheifele Bridge and the approaches on Northfield Drive, was evolutionary, technically driven, and responsive to public and agency input where practical. The Project Team was consistently focused on providing design solutions that addressed both current and future community needs, while mitigating, wherever possible, all forms of potential natural and social environmental impacts.

The Design Concept Evaluation Matrices, as outlined in Section 6.3, provided a foundation for the initial selection of preferred bridge and road design concepts. However, subsequent public and agency feedback and support, following Public Consultation Center Meeting #2, provided confirmation that the decisions and recommendations of the Project Team were sound. In the end, it was a relatively straight forward exercise for the Project Team to unanimously, and formally, endorse the recommended preferred design concepts that were widely supported by the public, as outlined in Sections 3.5.2 and 3.5.3.

7.2 DESCRIPTION OF THE RECOMMENDED PREFERRED DESIGN CONCEPTS:

The “Recommended Preferred Design Concepts”, for the replacement of the Scheifele Bridge and associated improvements to the Northfield Drive approaches, were refinements of the following preliminary design options:

7.2.1 Scheifele Bridge Deck Cross Section Design Concept:

At its July 20, 2022, meeting, the Project Team endorsed ***Recommended Preferred Scheifele Bridge Design Cross Section 5*** which is a modification of Alternative Bridge Design Concept 3, as presented in Section 6.2.2. Modifications to the initial design concept included the following:

- **Vehicle Lane Width:**

  Vehicle lanes were originally proposed to be 3.75 m wide. However, the Region of Waterloo noted that vehicle lane widths are typically 3.35 m on rural bridges where paved shoulders are included.

  Although the Region’s Context Sensitive Corridor Design Guidelines propose vehicle lane widths of 3.65 m for “Rural Connector” roadways, the Project Team followed the direction of the Region and reduced the vehicle lane widths on the Scheifele Bridge to 3.35 m. This lane width is considered a safe design within the context of current standards.

- **Paved Shoulder Width:**

  Paved shoulder widths on the four preliminary bridge cross section design concepts varied between 1.5 m and 3.0 m (Note: Although Alternative Design Concept #4 had a 5.25 m wide shoulder in the Interim 2-lane condition, the shoulder width was shown to be 1.5 m wide in the Ultimate 4-lane condition). In the interests of operational safety of buggy and cycle users, the width of the paved shoulders was ultimately proposed to be 2.45 m. This width will allow buggies to cross the bridge without encroaching into the primary vehicle lanes and provide a safe space for on-road cyclists.

- **Walkway / Sidewalk versus Multi-Use Trail:**

  In 3 of the 4 preliminary bridge cross section design concepts, 1.8 m wide pedestrian walkways / sidewalks were proposed on both sides of the new bridge, with an option to substitute the walkways / sidewalks with 3.0 m wide Multi-Use Trails. Alternative Cross Section Design Concept 2 proposed a single Multi-Use Trail on one side of the structure.

  Considering the additional costs to provide 3.0 m wide Multi-Use Trails versus 1.8 m wide walkways / sidewalks (extra 280 m2 of added deck area) and recognizing that most of the cyclists on Northfield Drive will use the wider paved shoulders on the bridge, the Project Team concluded that 1.8 m wide walkways / sidewalks are sufficient in serving the long-term interests of pedestrians and other users of the Scheifele Bridge.

- **Protective Barrier versus No Protective Barrier:**

  All the preliminary bridge cross section design concepts included concrete protective barriers between the roadway / paved shoulders and the pedestrian walkways, or MUTs, on each side of the structure.

  While evaluating the preliminary bridge cross section alternatives, the Project Team learned of recent (2019) changes to design criteria in the Canadian Highway Bridge Design Code (CHBDC) that allows concrete protective barriers to be eliminated on bridge structures where the posted speed limit is 70 km/h or lower. Since the current posted speed limit is 80 km/h on Northfield Drive at the Scheifele Bridge, concrete protective barriers are warranted under CHBDC code requirements.

  Although the current posted speed limit is 80 km/h at the Scheifele Bridge, the posted speed on Northfield Drive reduces to 60 km/h approaching the urban limits of Waterloo near the University Avenue intersection. The transition from 80 km/h to 60 km/h occurs about 500 m (0.5 km) south of the Scheifele Bridge.

Because the 60 km/h posted speed limit is relatively close to the Scheifele Bridge, the Project Team investigated the potential of extending the 60 km/h posted speed limit further north on Northfield Drive, and across the Scheifele Bridge, so that concrete protective barriers might be eliminated on the future bridge.

The suggested advantages of eliminating the concrete barriers would be:

- Capital Construction Cost Saving of about $935,000.
- Improves winter maintenance by eliminating separate roadway and walkway snow plowing operations.
- Eliminates long-term maintenance of concrete barriers and crash attenuators and other associated costs (over and above Capital Cost Savings noted above)
- Improves aesthetics with “cleaner bridge lines” and provides driver views of Conestogo River.
- Eliminates potential plugged barrier drainage ports at walkway level.

On November 19, 2021, the Project Team presented a proposal to the Region of Waterloo’s Program Review Committee, requesting consideration of the following:

- That the Region reduce the posted speed limit across the Scheifele Bridge to 60 km/h, by relocating the current transition signage, from 60 km/h to 80 km/h, to a point north of the existing bridge.
- In compliance with the Canadian Highway Bridge Design Code (CHBDC), endorse the elimination of concrete barrier walls on the new bridge deck.

At its January 22, 2022, meeting, the Region’s Program Review Committee did not support the recommendations of the Project Team, concluding that the 80 km/h posted speed limit on Northfield Drive, and across the Scheifele Bridge, would be retained. As a result of the Program Review Committee’s decision, protective concrete barriers were retained as part of the proposed Scheifele Bridge deck cross section design.

- **Architectural Design Considerations:**

The Scheifele Bridge is an important structure in the Region of Waterloo. Although the current structure is not listed on the Ontario Heritage Bridge List, nor on the *Candidate Bridge List* within the *Heritage Bridges: Identification and Assessment Guide, 1945-1965 (Ministry of Culture and Ministry of Transportation),* it was deemed appropriate that alternative architectural enhancements be considered for the structure, in recognition of previous bridge crossings at this location and their connection to the “Scheifele” name.

In conjunction with Public Consultation Center Meeting #1, various design options were presented that could be considered to enhance the architectural character of the reconstructed Scheifele Bridge. The following architectural enhancement parameters were presented as a guide in the decision process:

- Where possible, the outside pedestrian handrail should provide pedestrians, cyclists, and motorists with a view of the Conestogo River and the river valley beyond.

- A combination of concrete and steel/aluminum/stainless may be considered for the various railing applications.

- A pedestrian viewing platform, jutting out from the walkway / multi-use trail, may be considered on both the sides of the bridge, at mid-span.

- The proposed barrier wall, between the road and the walkway, may include an architectural treatment on the walkway side but should be a smooth surface, void of any architectural treatment, on the road-side due to salt and debris splashing against this side of the wall.

- In addition to any code requirements, capital construction and long-term maintenance costs should be considered in the final design of the barrier walls and pedestrian railings.

Public Consultation Center Meeting #1 resulted in little public feedback on possible architectural enhancements in the design of the Scheifele Bridge. However, further review by the Project Team resulted in the following conclusions:

- Pedestrian Viewing Platforms, at the mid-span on the structure, cannot be justified due to capital cost, long-term maintenance, and perceived minimal use issues.

- The inclusion of architectural enhancements on the walkway side of the barrier walls will be confirmed at the detailed design stage, subject to cost and other architectural design considerations.

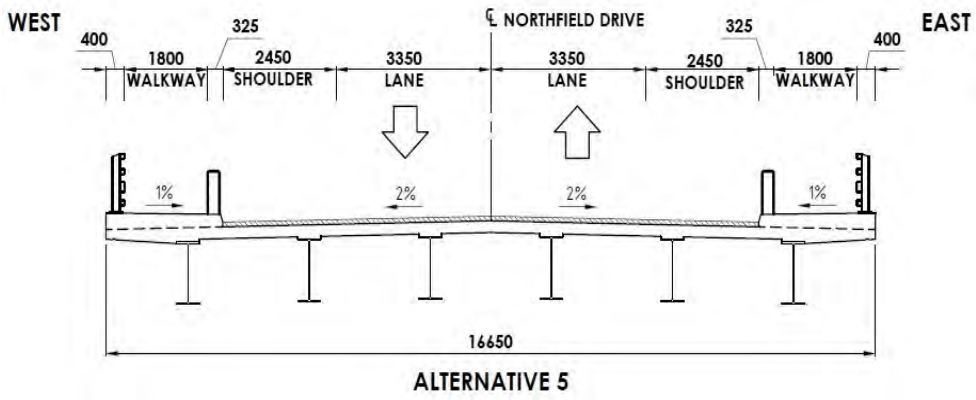
- Details of the pedestrian handrails will be confirmed at the detailed design stage, subject to cost and other architectural design considerations.

  Footnote: As noted Section 7.2.4, the recommended preferred bridge concept includes a 3-span, haunched, steel girder design, in keeping with the heritage character of the existing

bridge. This design concept is considered part of the overall architectural enhancement features of the structure.

Project Team "Recommended Preferred Scheifele Bridge Design Concept":

Based on consideration of the above design factors, the "Recommended Preferred Cross Section Design Concept", for the Scheifele Bridge replacement, was proposed by the Project Team to be **Alternative Concept 5** as presented below:



Features of Recommended Preferred Cross Section Design Concept 5 include:

- Two 3.35 m lanes, one each for northbound and southbound traffic
- 2.45 m paved shoulders for shared use by buggy traffic and cyclists
- 1.8 m walkway on each side of the bridge
- Decorative pedestrian handrails (design details to be confirmed)
- Concrete protection barriers between the road and each walkway
- Total width of the proposed structure is 16.65 meters.

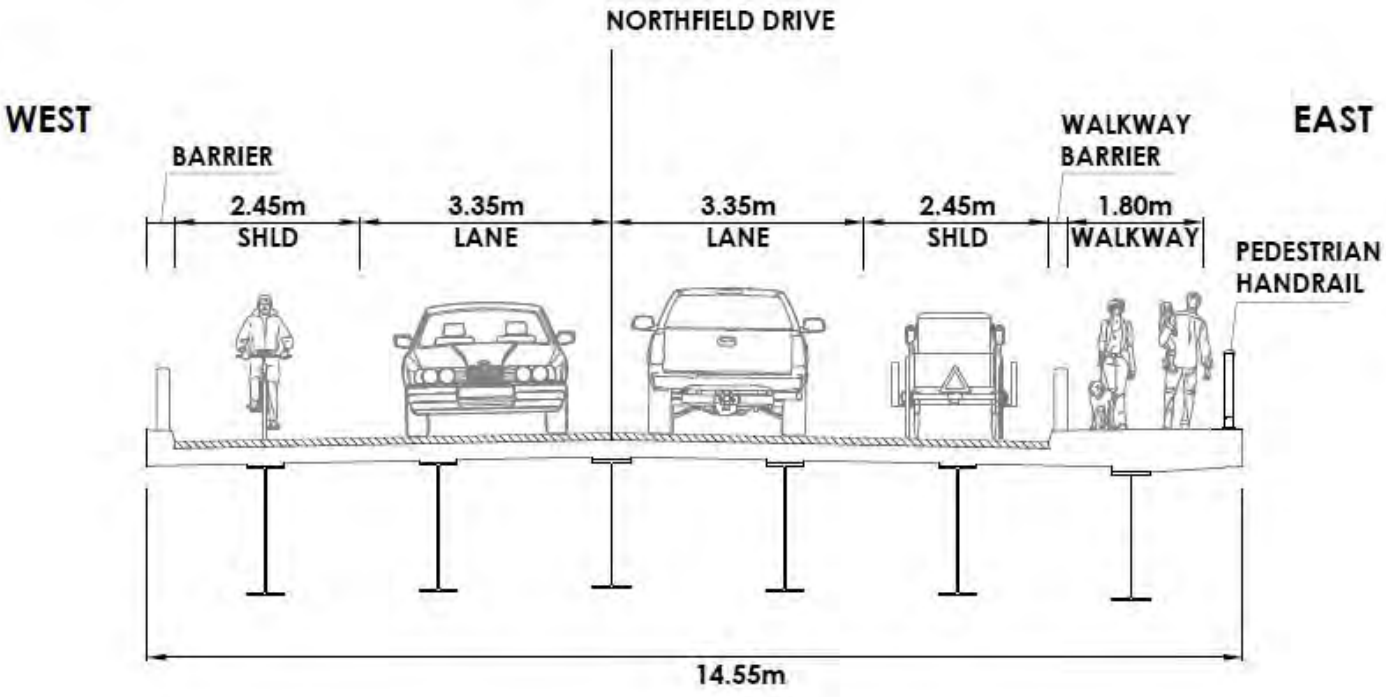
Modified "Recommended Preferred Scheifele Bridge Design Concept":

Following endorsement of "Recommended Preferred Scheifele Bridge Design Concept 5" by the Project Team, the bridge deck cross section design was revisited by the Region of Waterloo, in conjunction with a review of capital forecasts, budget constraints, and facility network usage.

Staff deliberations ultimately concluded that a single sidewalk may adequately serve the modest pedestrian needs in the area and should be further considered. Although future active transportation plans have not been established in this area of Northfield Drive, Region staff concluded that a single, east side, sidewalk would be more cost-effective in providing for the future multi-use trail links between the City of Waterloo and the Village of Conestogo.

Since the Project Team's original recommended preferred bridge design concept (two sidewalks) considered public and agency feedback from the first two Public Consultation Centre meetings, Region staff concluded that a third Public Consultation Centre (PCC) meeting was warranted to present, and receive comments on, the revised concept of a single sidewalk (east side) on the proposed Scheifele Bridge. Details of PCC #3 are presented in Section 3.5.4.

The results of additional public consultation confirmed that a bridge cross section with a single, east-side, sidewalk was generally accepted by the public, and should therefore be considered as the revised **Recommended Preferred Scheifele Bridge Design Concept 5 Modified,** as presented below.



Further details of the modified bridge design cross section are presented in Section 7.2.5.

7.2.2 Northfield Drive Alignment Design Concept:

After careful review and assessment of the four alternative road and bridge design concepts outlined in Section 6.2.1, the Project Team selected **"Alternative Northfield Drive Alignment Design Concept 2: West Side Staged Construction"** as the recommended preferred new alignment for Northfield Drive and the reconstructed Scheifele Bridge. Because of the elimination of the west side sidewalk from the bridge design cross section, the Northfield Drive Alignment Concept 2: West Side Staged Construction was revised. Details of recommended preferred Design Concept 2 **Modified** are presented below:

- This alternative proposes a new bridge (modified single sidewalk design) constructed to the west of the existing Scheifele Bridge, with an approximate 12.4 m centerline to centerline separation between the new and existing structures.
- The existing road embankments, on the west side of Northfield Drive, will be widened on the north and south approaches to permit the proposed shift in the road and bridge alignments.
- Since the Region of Waterloo owns most of the land on the west side of Northfield Drive and south of the bridge, property acquisition is minimized with this design concept. A modest property acquisition is required in the northwest quadrant of the project limits.
- Although this design concept impacts the Conestogo River wetlands on the west side of Northfield Drive, encroachment of the proposed road embankment on the wetlands will be lessened by construction of a retaining wall in the southwest quadrant, extending about 175 meters south of the new bridge.
- The west side alignment avoids impacts to the Conestogo River Horseback Adventures property and the Enova Power Corp (Waterloo North Hydro) overhead lines on the east side of the corridor, significantly reducing social and cost implications.

A copy of the **"Recommended Preferred Northfield Drive Alignment Design Concept 2: West Side Staged Construction Modified"** is presented in **Appendix G.**

In addition to the Northfield Drive alignment drawing referenced above, a copy of the **"Preliminary Recommended Preferred Northfield Drive Profile Concept"** is presented in **Appendix G**.

7.2.3 Scheifele Bridge Construction Staging Plan:

A high priority of the Project Team was to thoroughly investigate, and give preference to, any alternative bridge and road construction alternative that would avoid a long-term closure of Northfield Drive during construction. As noted in Section 6.2.3, a lengthy detour, west on Sawmill Road from Conestogo to Highway 85 and then south to Northfield Drive in Waterloo, would represent a 10 km detour route which would be a significant inconvenience and added expense to the travelling public.

Three of the four Alternative Northfield Drive Alignment Design Concepts were created to eliminate a long-term traffic detour during replacement of the Scheifele Bridge. *Alternative Northfield Drive Alignment Concept 4: Construction of Scheifele Bridge on Existing Alignment*, was the only design concept of the 4 alternatives that would require a full closure of Northfield Drive during construction.

As noted in Section 6.2.4, a preliminary construction staging plan was developed in conjunction with Alternative Northfield Drive Alignment Concepts 1, 2 and 3, which allowed retention of uninterrupted traffic on Northfield Drive during replacement of the Scheifele Bridge. The preliminary construction staging plan was presented to the public at both Public Consultation Center meetings and received positive feedback.

With the acceptance of “Recommended Preferred Northfield Drive Alignment Design Concept 2: West Side Staged Construction”, the original construction staging concept was endorsed by the Project Team and included in the overall strategic plan for replacement of the Scheifele Bridge.

Following supplemental Public Consultation Centre Meeting #3, at which time the proposed bridge cross section was revised to eliminate the west side sidewalk, the original construction staging plan was adjusted to accommodate the new bridge design concept.

The final recommended “Scheifele Bridge Construction Staging Plan / Modified” is based on the revised *Scheifele Bridge Design Cross Section 5 Modified* and consists of 4 phases, as described in the following:

Construction Stage 1 (see “Footnote” below):

- Construct a “half section” of the new bridge structure to the west of the existing Scheifele Bridge.
- Maintain uninterrupted traffic on Northfield Drive and the existing bridge during construction of the first stage of the new bridge.

Construction Stage 2 (see “Footnote” below):

- After completion of the “half section” of the new bridge and expanding the road embankment approaches on the west side of Northfield Drive, switch traffic to the newly constructed “half bridge” and realigned portion of Northfield Drive.

Construction Stage 3 (see "Footnote" below):

- Demolish the existing Scheifele Bridge and construct the balance of the new structure (east side), while maintaining traffic on the "half section" of the new bridge and realigned / widened Northfield Drive.

Construction Stage 4:

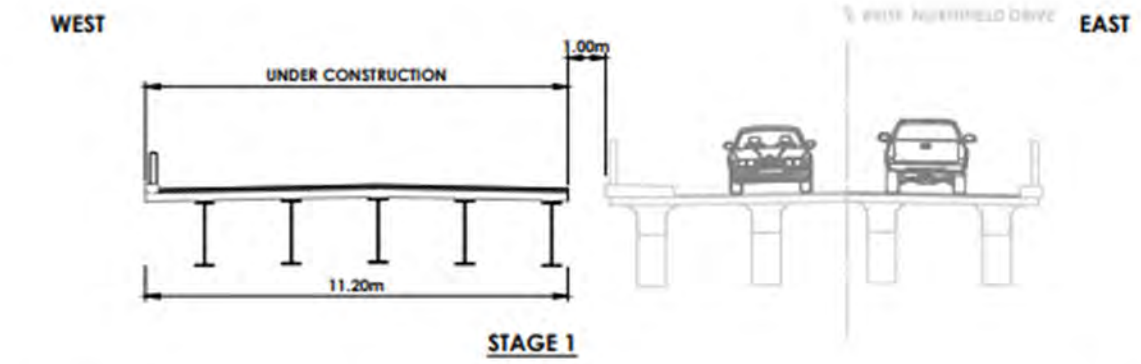
- Upon completion of the east side of the new bridge, complete the northbound and southbound roadway approaches on Northfield Drive and any remaining features of the new bridge.
- Open the new Scheifele Bridge and reconstructed section of Northfield Drive to full traffic operations, including vehicular, buggy, cyclist, and pedestrian traffic.

A schematic of the final **Scheifele Bridge Construction Staging Plan Modified**, incorporating "*Recommended Preferred Scheifele Bridge Deck Cross Section Design Concept 5 Modified"* and "*Recommended Preferred Northfield Drive Alignment Design Concept 2 Modified"*, is shown below.

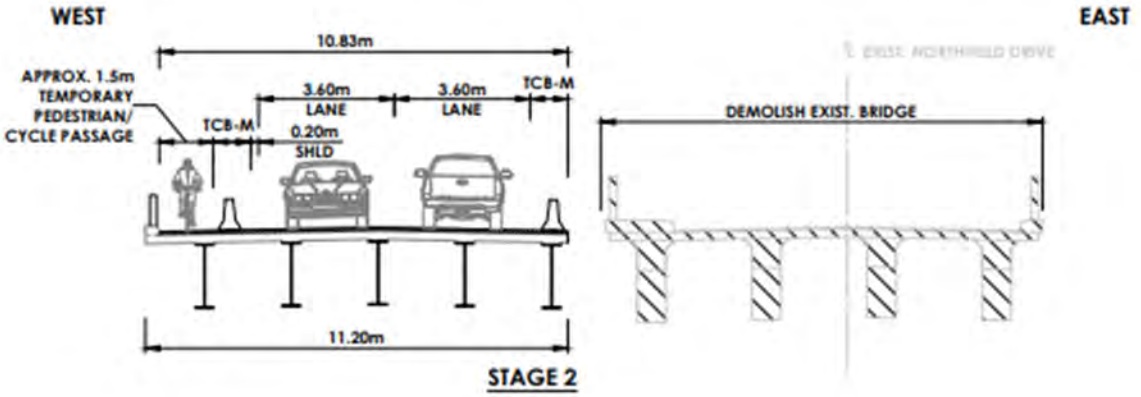
Footnote:

During construction of the new Scheifele Bridge, it is proposed that the posted speed on Northfield Drive be temporarily reduced to a maximum of 40 km/hour within the immediate construction limits and signed accordingly, subject to review by the Region of Waterloo Traffic Division.

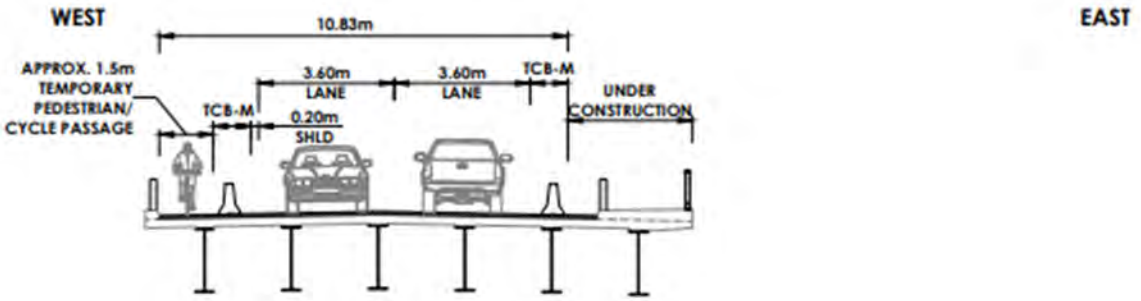
It is also recommended that electronically illuminated PVMS and Speed Indicator signs be installed throughout the duration of construction, to advise motorists of the temporarily reduced speed limit and their "actual operating speed" while approaching the construction zones on the northbound and southbound approaches.



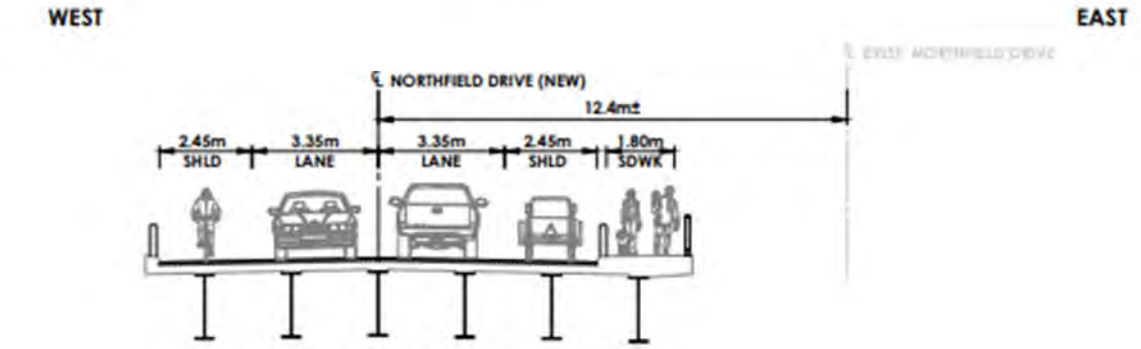
STAGE 1



STAGE 2



STAGE 3



STAGE 4

7.2.4 Scheifele Bridge Structural Planning Study: Recommended Superstructure Design Concept

General

In February 2022, Stantec completed a *Bridge Alternatives Structural Planning Study* to present, evaluate, and recommend a preferred plan for the replacement of the Scheifele Bridge, including a review of various bridge span alternatives, girder material options, construction access and procedural constraints, and preliminary updated construction cost estimates.

The Structural Planning Study team assumed that the parameters of Recommended Preferred Northfield Drive Alignment Concept 2, Recommended Preferred Scheifele Bridge Cross Section 5, and the Recommended Preferred Construction Staging Plan would be approved and, therefore, the basis of all structural planning recommendations. It was also assumed that any preliminary hydrological river modelling, geotechnical foundation conditions, and natural environmental impacts would be further evaluated during the detailed design phase and include the details presented in the Structural Planning Study.

Design Codes and Standards

The design of the Scheifele Bridge will be carried out in accordance with the Canadian Highway Bridge Design Code (CHBDC), 2019 Edition. Specific design details will be in accordance with the MTO Structural Manual and the Integral Abutment Manual.

Foundation Conditions

A preliminary geotechnical foundation report was prepared in 2020 by Stantec. The existing subsurface conditions found in the 2020 investigations, supplemented with background information near the study area, was reviewed to provide preliminary foundation design recommendations for the new bridge abutments and piers.

The geotechnical foundation report proposed that both shallow and deep foundation designs would be feasible options for the Scheifele Bridge. After further structural review, it was decided that deep foundations, such as driven steel piles founded in the underlying dense to very dense soils, will provide higher bearing resistances and are, therefore, the preferred alternative for the bridge foundations.

The new abutments are proposed to be setback from the existing abutments to provide adequate clearance for driving new piles and to avoid conflict with the existing abutment shallow footings during the staged construction program. The use of integral abutments on a single row of steel H-piles is considered appropriate for the recommended bridge configuration and length.

Based on the proposed alignment of Northfield Drive and the configuration of the Conestogo River, the new bridge piers are proposed to be longitudinally offset from the existing bridge piers, for the same reason that the abutments are setback. The construction of piers will require the dewatering of soils prior to excavation, and the dewatering activities will need to be maintained during construction where the foundation extends below the stabilized groundwater table. In

addition to dewatering activities, construction of a cofferdam, or river flow diversion, will be required for the construction of the piers.

Prior to detailed design, additional geotechnical / foundation investigations will be needed to confirm pile founding depths and possible sub-artesian conditions within the lower sand deposits.

Hydrology and Navigation

The Conestogo River flows from west to east under the Scheifele Bridge. The main channel is situated within the north span of the existing bridge, but the watercourse widens out near the structure, resulting in shallower water levels spilling into the other three spans.

The normal water level is approximately 315.6 m, while the high-water level for the 50-year storm, which is the applicable design event for a rural arterial, is 317.38 m. Since Clause 1.9.8.2 of the CHBDC requires a 1.0 m clearance between the underside of a structure and the high-water level, the underside of the Scheifele Bridge must be no lower than 318.40 m.

At the time of the Structural Planning Study, it was assumed that the above noted high-water level (317.38) would be verified as part of the final Conestogo River Hydraulic Modelling Study for the recommended preferred Scheifele Bridge design concept (Refer to Section 6.3.4 for further information).

The Conestogo River is not considered a Navigable Water under the Canadian Navigable Waters Act (CNWA). However, there appears to be documented evidence of canoe and kayak use of the waterway. Following MTO's Navigable Water Guidelines flow chart, the Conestogo River should be considered as navigable for the purposes of the CNWA process. Therefore, a navigation clearance window for canoes and kayaks, equal to 1.5 m tall by 3.0 m wide, shall be maintained during construction.

Structural Design Planning Alternatives

The Region of Waterloo was initially considering a 'superstructure replacement' approach for the Scheifele Bridge improvements. However, after considering traffic staging needs during construction and the lack of any opportunity to salvage and/or reuse parts of the existing abutments and piers which are in poor condition (significant deterioration and high chloride content levels), none of the structural design planning alternatives considered salvaging any components of the existing bridge. This approach was acknowledged by the Project Team and presented to the public at Public Consultation Center Meetings 1 and 2.

The development of structural design planning alternatives began, therefore, with identifying a range of potential bridge replacement options to accommodate the site constraints, which consists of crossing a relatively wide Conestogo River. Since the bridge is over a watercourse, various environmental constraints limit opportunities of using a cast-in-place concrete, post-tensioned type deck structure which requires falsework in the watercourse. In addition, the high costs associated with less traditional bridge types, such as precast segmental decks, arches, and trusses eliminated further consideration of these alternatives.

In the end, the recommended preferred structure type was a concrete-deck-on-girder type bridge, with the following three bridge span options being considered for evaluation:

- 4-span Bridge Structure
- 3-span Bridge Structure
- 2-span Bridge Structure

These three options were considered to provide a reasonable range of alternatives that can, in turn, offer variety in the elevation profile of the bridge. The girder materials that were considered for the superstructure of the above span options included:

- Precast Concrete NU Girders
- Straight Steel Plate “I” Girders
- “Haunched” Steel Plate Girders

Footnote: A steel box girder design was considered as an alternative to a straight I-Beam steel plate girder design but was deemed unsuitable for the Scheifele Bridge due to cost and construction staging / scheduling.

The existing Scheifele Bridge consists of haunched concrete T-beam girders, so the design team gave preference to the “complimentary” haunched steel plate girder option for the new structure, which happens to be an economically viable option despite being slightly more expensive than straight steel and concrete girders.

The concrete deck is proposed to be a 225 mm thick reinforced concrete slab for all girder span alternatives and all girder material options. The deck could be constructed using a cast-in-place concrete approach or using partial depth precast concrete deck panels with a cast-in-place concrete topping. The benefit of partial depth precast deck panels is that they are also used as the formwork for the cast-in-place concrete topping, which eliminates the need for other formwork requirements.

All bridge replacement options were considered to include an integral abutment design which provides increased durability and reduced future maintenance. For the purposes of the structural planning study, it was also assumed that the new abutments would be shifted by approximately 5 m beyond the existing abutments, resulting in a proposed new bridge length of 117.0 m. Shifting the south abutment 5 meters further south will enhance the usability of the current pedestrian and horseback riding trail (Conestogo River Horseback Adventures) under the south span.

The existing piers are founded on shallow footings. Vibration related issues, during installation of new foundation piles near the existing piers, was considered in positioning the proposed piers as far away as possible from the existing piers. In addition, the shallower river depth towards the south provides advantages in terms of access, cofferdam dewatering, and overall construction.

The recommended preferred alignment for the new bridge (west side with a staged construction program) requires the construction of a long retaining within the southwest quadrant of the proposed bridge, which reduces impacts on the wetland area while supporting the new roadway embankment.

Short-List of Bridge Span Options, the Evaluation Process, and the Selection of a Recommended Preferred Bridge Design Concept

The combination of span arrangements and girder material options presented several alternatives for consideration in the selection of a recommended preferred design concept for the bridge superstructure. To simplify the process, a preliminary review of the alternatives was completed, leading to a short-listing of the most feasible and desirable alternatives.

The 4-span bridge option was removed from further consideration because of its anticipated greater impacts on the environment, specifically related to in-water construction. For example, the main flow channel of the Conestogo River is situated within the north span of the existing bridge; the proposed 4-span alternative would retain the relatively narrow primary flow channel whereas the 2-span and 3-span options would improve the “open channel” situation.

The positioning of the piers was another important factor in the short listing of bridge span options, with a goal of avoiding potential conflicts between the installation of piles for the new piers and the existing piers, while traffic is maintained on the existing structure. Both the 2-span and 3-span design concepts provide advantages over the 4-span concept in this regard.

After further review, the short-list process resulted in the following bridge design concepts being considered as candidates for the Scheifele Bridge replacement:

- Short List Bridge Alternative 1: 3-Span NU Girder Bridge
- Short List Bridge Alternative 2: 3-Span Steel Plate Girder Bridge
- Short List Bridge Alternative 3: 2-Span Symmetrical Steel Plate Girder Bridge

Preliminary sketches depicting the short-listed alternatives are provided in the **Scheifele Bridge Structural Planning Study Report, Appendix D.**

All alternatives meet the CHBDC Code requirement of providing minimum vertical clearance from the high-water level and can be constructed using the proposed staging (maintaining uninterrupted traffic on Northfield Drive during construction).

An objective evaluation process was developed to determine a recommended preferred concept from the bridge span and material design alternatives. The evaluation process did not consider any impacts associated with the recommended preferred west side Northfield Drive Alignment Design Concept 2 or the recommended preferred Scheifele Bridge Deck Cross Section Design Concept 5, since the Northfield Drive realignment and Scheifele Bridge deck designs were consistent with all structural planning alternatives.

The factors used in the evaluation of bridge planning alternatives included environmental and watercourse impacts, constructability and site accessibility, long term durability and maintenance issues, aesthetics of the span configuration, and preliminary construction cost. Comparative bridge construction cost estimates considered the new structure only and did not include costs related to removal of the existing bridge, retaining wall construction, or the reconstruction of Northfield Drive.

Based on a detailed evaluation of the three short-listed alternatives, **Design Concept 2: Symmetrical 3-Span Haunched Steel Girder Bridge** was selected as the recommended preferred structure replacement option for the Scheifele Bridge. With this design, haunched steel girders were recommended over straight steel "I" beam girders because they would capture the architectural character of the existing haunched-girder structure, at a modest cost premium of about $700,000.

Details of the "Symmetrical 3-Span Haunched Steel Plate Girder Bridge" can be found in the Bridge Alternatives Structural Planning Study Report, **Appendix D**, while a copy of the recommended preferred design concept drawing is presented in **Appendix G.**

The cost of the Symmetrical 3-Span Haunched Steel Girder Bridge was estimated at $10,040,000. This cost compares to the 3-Span Concrete NU Girder bridge at $9,360,000, the 3-Span Steel Plate "I" Girder bridge at $9,940,000, and the 2-Span Steel Plate "I" Girder bridge at $10,700,000.

7.2.5 Summary of "Project Team" Recommended Preferred Design Concepts

After considerable evaluation, discussions, and reviews of public and agency feedback, the Project Team endorsed, and recommended, the following design concepts for the replacement of the Scheifele Bridge over the Conestogo River on Northfield Drive:

Scheifele Bridge Deck Cross Section Design Concept 5:

- Two 3.35 m lanes, one each for northbound and southbound traffic
- 2.45 m paved shoulders for shared use by buggy traffic and cyclists
- 1.8 m walkway / sidewalk on each side of the bridge
- Decorative pedestrian handrails (design details to be confirmed)
- Concrete protection barriers between the road and each walkway
- Total width of the proposed structure is 16.65 meters.

Northfield Drive Design Concept 2: West Side Staged Construction:

- This alternative proposes a new bridge constructed to the west of the existing Scheifele Bridge, with an approximate 9.7 m centerline to centerline separation between the new and existing structures.

- The existing road embankments, on the west side of Northfield Drive, will be widened on the north and south approaches to permit the proposed shift in the road and bridge alignments.

Scheifele Bridge Staged Construction Plan:

- A staged construction plan is proposed in conjunction with the Recommended Preferred Northfield Drive Alignment Design Concept 2: West Side Staged Construction.
- The construction staging plan will consist of 4 phases which will provide for uninterrupted traffic operations on Northfield Drive and the Scheifele Bridge during construction.

Scheifele Bridge Structural Plan:

- A symmetrical 3-Span Haunched Steel Plate Girder Bridge is the recommended preferred structural replacement option for the Scheifele Bridge.
- The proposed bridge spans are 35.5 m – 46.0 m – 35.5 m, for a total bridge length of 117 meters.

7.2.6 Summary of "Modified" Recommended Preferred Design Concepts

As noted in Section 7.2.1, the originally proposed "Recommended Preferred Bridge Deck Cross Section Design", as endorsed by the Project Team, was revisited by the Region of Waterloo in conjunction with a review of capital forecasts, budget constraints, and facility network usage.

It was ultimately concluded that a single sidewalk would adequately serve the modest pedestrian needs in the vicinity of the Scheifele Bridge and be more cost-effective in providing for the future multi-use trail links between the City of Waterloo and the Village of Conestogo. After further public consultation (PCC #3) and majority acceptance, it was concluded that a revised version of the bridge deck cross section, with a single east-side sidewalk, be presented as "**Recommended Preferred Scheifele Bridge Design Concept 5 Modified"**.

To accommodate both vehicular and pedestrian traffic during the first stages of the Construction Staging Plan, the elimination of the west-side sidewalk from the recommended bridge design concept slightly altered the alignment of the new bridge structure, which also changed the offset of the centerline of the new bridge from the existing structure (12.4 meters versus 9.7 meters). The revised Construction Staging Plan is shown in Section 7.2.3.

Based on the above design changes, the revised details of the "Modified" Recommended Preferred Design Concepts, compared to the originally approved "Project Team" design concepts noted in Section 7.2.5, are as follows:

Scheifele Bridge Deck Cross Section Design Concept 5 Modified:

- Two 3.35 m lanes, one each for northbound and southbound traffic
- 2.45 m paved shoulders for shared use by buggy traffic and cyclists
- 1.8 m walkway / sidewalk on east side of the bridge only
- Decorative pedestrian handrail on east side only (design details to be confirmed)
- Concrete protection barrier between the road and east side walkway / sidewalk
- Concrete protection barrier on west side of structure
- Total width of the proposed structure is 14.55 meters.

Northfield Drive Design Concept 2: West Side Staged Construction Modified:

- This alternative proposes a new bridge constructed to the west of the existing Scheifele Bridge, with an approximate 12.4 m centerline to centerline separation between the new and existing structures.

- The existing road embankments, on the west side of Northfield Drive, will be widened on the north and south approaches to permit the proposed shift in the road and bridge alignments.

Scheifele Bridge Staged Construction Plan Modified:

- A staged construction plan is proposed in conjunction with the Recommended Preferred Northfield Drive Alignment Design Concept 2: West Side Staged Construction.
- The construction staging plan will consist of 4 phases which will provide for uninterrupted traffic operations on Northfield Drive and the Scheifele Bridge during construction.

Scheifele Bridge Structural Plan (No Changes):

- A symmetrical 3-Span Haunched Steel Plate Girder Bridge is the recommended preferred structural replacement option for the Scheifele Bridge.
- The proposed bridge spans are 35.5 m – 46.0 m – 35.5 m, for a total bridge length of 117 meters.

Since the Project Team was essentially disbanded in December 2022, it was impossible to receive endorsement of the proposed design modifications through the original Project Team. Since the Township of Woolwich played an integral role in the Class Environmental Assessment study through both political and staff level involvement, it was deemed essential by the Region that the

recommended bridge and construction staging design modifications be reviewed with Township staff. To this end, a meeting was held on August 3, 3023 with Mr. Ryan Tucker, P. Eng., Engineering Project Supervisor, at which time the full scope of proposed design modifications, and public feedback from PCC #3, were presented and reviewed. In a follow up letter, dated August 9, 2023, the Township of Woolwich agreed with the Region of Waterloo's proposal to eliminate the west-side sidewalk from the originally preferred Project Team design concept. A copy of the August 9, 2023, letter from Mr. Tucker is presented in **Appendix C**.

8.0 SUMMARY OF IDENTIFIED CONCERNS AND MITIGATING MEASURES

8.1 INTERNAL PROJECT TEAM

The Project Team, consisting of staff from the Region of Waterloo, the Township of Woolwich, and Stantec Consulting Ltd., plus Councilors Larry Shantz and Murray Martin from the Township of Woolwich, supported the conclusions of this Environmental Study Report and recommended acceptance of the following preferred design concepts as the basis for final design and construction of the Scheifele Bridge replacement and associated Northfield Drive realignment within the project limits:

- Scheifele Bridge Deck Cross Section Design Concept 5
- Northfield Drive Alignment Design Concept 2: West Side Construction
- Scheifele Bridge Staged Construction Plan
- Scheifele Bridge Symmetrical 3-Span, Haunched, Steel Girder Structure

The Project Team endorsed the following features of the Scheifele Bridge project:

- The existing Scheifele Bridge will be completely removed and replaced with a new symmetrical 3-Span cast-in-place concrete deck structure supported on haunched steel girders, new abutments, and new piers (2).
- The proposed structure will include 2-3.35 m traffic lanes, 2.45 m paved shoulders for buggy and cycle use, 1.8 m pedestrian walkways / sidewalks on both sides, concrete safety barriers between the roadway and walkways, and decorative outside pedestrian railings.
- The total length of the proposed bridge is 117 m, with span lengths of 35.5 m / 46.0 m / 35.5 m, an increase of about 10 m over the length of the existing 4-span structure.
- In conjunction with the replacement of the Scheifele Bridge, Northfield Drive will be realigned and reconstructed over an approximate length of 650 meters. The offset of Northfield Drive, west of the existing alignment, will vary within the reconstruction limits, while the total length of reconstruction may be subject to adjustment at the south end to align with the reconstruction of the Northfield

Drive / University Avenue intersection, which is scheduled for completion in late 2022.

- The realignment and reconstruction of Northfield Drive is to accommodate a staged construction program of the new bridge, which is designed to maintain uninterrupted traffic throughout the construction period. No long-term detours will be required for Northfield Drive traffic.
- In accordance with DFO and GRCA guidelines, no in-water construction will be permitted within the Conestogo River between March 15 and July 15. A detailed construction schedule will be prepared during detailed design to ensure contractor adherence to this environmental restriction.
- During final design, staff of the Region of Waterloo, Township of Woolwich, City of Waterloo, and Stantec will investigate alternatives to enhance the safety of pedestrians and cyclists who may use Northfield Drive in the vicinity of the new bridge construction. Options may include Multi-Use Trails and/or wider paved shoulders. Although Northfield Drive is not identified as a cycle route in the Region's Master Cycling Plan, field counts have shown a significant number of cyclists use this busy rural corridor.
- The owners of Conestogo Horseback Adventures utilize an existing pathway, under the south span of the Scheifele Bridge, to access a riding trail on the west side of Northfield Drive. During construction, this pathway will be closed to pedestrians and horseback riders. A decision on how to maintain uninterrupted horse trail access, during reconstruction of the Scheifele Bridge, was not fully resolved during the environmental study phase of the project. Details of any temporary trail access, and safe crossing of Northfield Drive, will be reviewed and confirmed at the final design stage.
- To enhance the visual character of the new Scheifele Bridge, "decorative" pedestrian handrails are recommended. Although the final details of the pedestrian handrails have not been confirmed, the Project Team favours an open railing system that will provide views of the river valley from the walkway level. Decorative concrete or stone-faced end and intermediate posts may be considered to further enhance the architectural aesthetics of the pedestrian railing system.
- Planning is underway by the Region and the Township of Woolwich to install a new 300 mm trunk watermain from Waterloo to Conestogo. Options that examined how the watermain might cross the Conestogo River were investigated as part of a separate study but not concluded. During final design of the Scheifele Bridge and Northfield Drive reconstruction, provisions must be made to accommodate the new watermain in the bridge and road contract.
- Subject to further clarification from the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI), a Marine Archaeological Assessment study may be required, which the Region will authorize if required. A Stage 2 Archaeological Assessment may also be required in small areas in the northwest and southwest limits of the construction zone.
- Supplementary geotechnical / foundation investigations must be completed as part of the detailed design phase of the Scheifele Bridge once the precise

locations of new abutments and piers are confirmed. The additional geotechnical study shall also provide design specifications related to the widening and reconstruction of Northfield Drive.

- Preliminary Hydraulic and Geomorphological Fluvial investigations have been completed in conjunction with the Class Environmental Assessment study. Updates to the hydraulic and fluvial work may be required during final design to accommodate agency approval submissions for the recommended bridge and road designs.

8.2 INTERNAL ENDORSEMENT OF MODIFIED DESIGN CONCEPTS

As noted in Section 7.2.1 and Section 7.2.6, the originally proposed "Recommended Preferred Bridge Deck Cross Section Design", as endorsed by the Project Team, was revisited by the Region of Waterloo in conjunction with a review of capital forecasts, budget constraints, and facility network usage. It was ultimately concluded that a single east-side sidewalk would adequately serve the pedestrian needs in the vicinity of the Scheifele Bridge and be more cost-effective in providing for the future multi-use trail links between the City of Waterloo and the Village of Conestogo.

Following a supplementary third Public Consultation Center Meeting, the Region of Waterloo and Township of Woolwich supported the proposed modifications to the bridge design concept and recommended acceptance of the following preferred design concepts as the basis for final design and construction of the Scheifele Bridge replacement and associated Northfield Drive realignment within the project limits:

- Scheifele Bridge Deck Cross Section Design Concept 5 **Modified**
- Northfield Drive Alignment Design Concept 2: West Side Construction **Modified**
- Scheifele Bridge Staged Construction Plan **Modified**
- Scheifele Bridge Symmetrical 3-Span, Haunched, Steel Girder Structure

The Region of Waterloo also endorsed the following **modified** features of the Scheifele Bridge project, where changed from those outlined in Section 8.1:

- The proposed structure will include 2-3.35 m traffic lanes, 2.45 m paved shoulders for buggy and cycle use, 1.8 m pedestrian walkway / sidewalk on the **east side** only, concrete safety barrier between the roadway and the **east side** walkway / sidewalk, concrete safety barrier on the **west side** of the bridge, and an outside pedestrian railing on the **east side** only.
- To enhance the visual character of the new Scheifele Bridge, the east side pedestrian handrail shall have a "decorative / aesthetic" character to its design. Although the final details of the pedestrian handrail have not been confirmed, the Project Team favoured an open railing system that will provide views of the river valley from the walkway level. Decorative concrete or stone-faced end and intermediate posts may be considered to further enhance the architectural aesthetics of the pedestrian railing system.

8.3 EXTERNAL AGENCIES

The concerns and questions raised by external agencies, who responded at various stages of the study process, are presented in the following table, along with the response of the Project Team.

Issues and Concerns	Mitigation/Response
Grand River Conservation Area (GRCA)	
• A new bridge could potentially impact the hydraulic and ecological functions of the Conestogo River, its associated floodplain and the unnamed tributary on the west side. As per GRCA's policies for watercourse crossings (9.1.2) and public infrastructure in floodplains (8.1.15), the bridge should be designed to: - Limit hydraulic or fluvial impacts, and not impact upstream or downstream floodplain levels. - Avoid, and where unavoidable, minimize intrusions on significant natural features or hydrologic or ecological functions. Where intrusions occur, features / functions are restored and / or enhanced. - Avoid any bends in the river to the extent practical. - Take advantage of existing impacted or open areas on the channel bank or valley slope, wherever possible. - Not inhibit fish passage, and, - Minimize maintenance requirements. • The potential hydraulic impacts of the bridge replacement should be verified through HEC-RAS modelling and analysis. Please reach out to the GRCA to obtain a copy of the approved HEC-RAS model for this reach of the river. The analysis will be required as part of detailed design, but we recommend doing preliminary modelling to ensure that the selected alternative can meet GRCA policy requirements. • GRCA's wetland policies depend on a wetland's characteristics. Wetlands will be	• Hydraulic and Geomorphological Fluvial modelling and assessments will be completed for the recommended preferred bridge design to confirm impacts on the river floodplains and ecological functions. Any adverse impacts will be mitigated during the detailed design phase in accordance with GRCA policies. • Existing wetland limits were field flagged and surveyed in June 2022, with GIS Mapping provided to GRCA. The project Environmental Impact Study (EIS) was updated to outline measures to deal with any impacts of the proposed design on the wetland areas and other natural environmental features. • Engineering and construction staging plans, temporary works, and erosion / sediment control plans will be provided during the detailed design phase. • After contract award, details related to the construction schedule, in-water work, and contact personnel will be provided to GRCA. Conservation Authority staff will be invited to attend Construction Site Meetings where appropriate.

Issues and Concerns	Mitigation/Response
impacted by the new alignment. As such, an environmental impact study (EIS) will be required as part of the Class EA. We request that wetland boundaries are verified in the field to assist the Region in quantifying and characterizing the impacted wetlands. The EIS should demonstrate: -Avoiding, and where unavoidable, minimizing intrusions on significant natural features or hydrologic / ecological functions; and, -Where intrusions occur, features / functions are restored and enhanced through a restoration plan. Please refer to GRCA policies 8.4.4-8.4.7 for more info. • During detailed design, we will require plans that show construction staging, erosion and sediment controls, and temporary works. Cofferdams must be designed to hold back flows from the 2-year flood event with some freeboard. If a significant portion of the channel will be obstructed, resulting in increased flood elevations to design storms, it should be included in the hydraulic analysis and the cofferdam height adjusted accordingly. • Please note that this bridge is downstream of our Conestogo Dam. Prior to construction, we will request site contacts and construction scheduling to notify personnel of significant outflows and forecasted flooding. We will also request a contingency plan or appropriate notes for work / equipment in or near the water.	
Canadian Wildlife Service / Environment and Climate Change Canada	
• Under the Migratory Birds Convention Act (MBCA), migratory birds, eggs and nests are protected.	• Field investigations have been completed to identify existing bird species, which have been summarized in an Environmental Study report.

Issues and Concerns	Mitigation/Response
• Environment and Climate Change Canada (ECCC) recommends that non-intrusive survey methods, such as point counts, be used to determine whether migratory birds are breeding in the planned project limits. • If signs of nesting or breeding are detected, ECCC recommends: - halt all disruptive activities, - avoid disturbing surrounding vegetation, - protect the nest with a buffer zone, - avoid the immediate area until the young have left the vicinity of the nest - avoid, adapt, reschedule, or relocate planned activities.	• Prior to and during construction, bird specialists from Stantec will be on-site, as required, to confirm the presence of any migratory birds, eggs or nests that require protection.
Bell Canada	
• Bell has a concrete encased duct structure along Northfield Dr that crosses this bridge, and as it is encased, Bell Canada assumes that it would be attached to or in the bridge and will need to be relocated/replaced when the bridge is rebuilt.	• Provisions will be made during design and construction to relocate the existing Bell Canada duct structure. Liaison will occur during design to confirm the final details.
Enbridge Gas	
• Enbridge Gas Inc. does not have any existing infrastructure in this area. Please remove from distribution list for any future communications.	• No further action required, although Enbridge Gas will be contacted during detailed design to ensure that no changes have occurred in their planning for future services in the area.
Ministry of Environment, Conservation and Parks (MECP)	
• It is the expectation of MECP that, as part of the study process, the following will be considered in the identification of impacts and necessary mitigation: • Climate change adaptation and mitigation	• As requested by MECP, the Region formally contacted Six Nations of the Grand River Territory, Haudenosaunee Confederacy Chiefs Council, and Mississauga's of the Credit First Nation as part of the Class EA Notice of Project Commencement, Notices of PCC #1 and PCC #2, and the Public Filing of the ESR document.

Issues and Concerns	Mitigation/Response
• Identification of, and mitigation for any Species at Risk that are identified. • Identification of required permits and approvals to enable the implementation of each alternative. • The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before authorizing this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of this duty to project proponents while retaining oversight of the consultation process. • The MECP is delegating the procedural aspects of rights-based consultation to the Region through the MECP letter.	
Mississauga's of the Credit First Nations (MCFN)	
• MCFN / DOCA requested that a Field Liaison Representative (FLR) be on site during all Geotechnical and Stage 1 Archaeological field investigations.	• The Region signed an agreement for FLR attendance on site for geotechnical and archaeological field work and reimbursed MCFN in accordance with Federal Treasury Board Rates.
Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI)	
• While some cultural heritage resources may have already been formally identified, others may be identified through screening and evaluation. Indigenous communities may have knowledge that can contribute to the identification of cultural heritage resources, and we suggest that any engagement with	• A Cultural Heritage Evaluation Report (CHER) was completed in November 2020, in accordance with MHSTCI requirements, as well as the Region of Waterloo's Draft Implementation Guideline for Cultural Heritage Landscape Conservation (2018). The CHER report was updated in September 2022 to include an

Issues and Concerns	Mitigation/Response
Indigenous communities includes a discussion about known or potential cultural heritage resources that are of value to these communities. • Under the Class EA process, the proponent is required to determine a project's potential impact on cultural heritage resources. The Municipal Engineers Association provides screening criteria for work on bridges that falls under the Municipal Class EA with a checklist and background material available online. Please use the checklist and background material to determine what technical cultural heritage studies may be required. • Environmental Assessment Reporting: All technical cultural heritage studies and their recommendations are to be addressed and incorporated into EA projects. If the screening has identified no known or potential cultural heritage resources, or no impacts to these resources, please include the completed checklists and supporting documentation in the EA report or file. • If In-Water construction is required for the replacement of the Scheifele Bridge, MHSTCI requests that a Marine Archaeological Study be completed during he detailed design phase. • MHSTCI requests that, if the riverbank area below the existing bridge may be disturbed during construction, then this area shall be considered as part of the study, thereby clarifying the archaeological potential within this zone.	evaluation of impacts and mitigative measures associated with the recommended preferred design concepts. The updated CHER report was renamed the CHER / HIA report in recognition of completion of the Heritage Impact Assessment component of the study. • As part of the Class EA process, Municipal Heritage Bridges Cultural, Heritage and Archaeological Resources Assessment Checklists were completed and included in the study documentation. • The 2021 Scheifele Bridge Archaeological Study acknowledged that a Marine Archaeological Study is to be completed during the detailed design phase. • The 2021 Scheifele Bridge Archaeological Study included the riverbank areas in the overall assessment. Conclusions and recommendations are provided in the 2021 report included with the ESR. • The 2021 Scheifele Bridge Archaeological Study report was formally reviewed and entered by MHSTCI into the Ontario Public Registry of Archaeological Reports in March 2021. • The requirements for a Stage 2 Archaeological Assessment Study will be reviewed during detailed design, and a subsequent Stage 2 study commissioned if required.
Rogers Communication Canada Inc.	
• Rogers has no plant or property on this stretch of Northfield, including across the bridge, and will not need any in the future.	• No further action required, although Rogers will be contacted during detailed design to ensure

Issues and Concerns	Mitigation/Response
	that no changes have occurred in their planning for future services in the area.
Transport Canada: Environmental Assessment Program, Ontario Region	
• Transport Canada **does not** require receipt of all individual or Class EA related notifications. We are requesting project proponents self-assess if their project: • *Will interact with a federal property and/or waterway by reviewing the Directory of Federal Real Property, or* • *Will require approval and/or authorization under any Acts administered by Transport Canada.* • The Canadian Navigable Waters Act (CNWA) is the only TC Act relevant to the Scheifele Bridge project.	• No further action required, as the Conestogo River is not considered a Navigable Water under the provisions of the Transport Canada Act.
Enova Power Corp. (Formerly Waterloo North Hydro / WNH)	
• An existing pole line on the east side of Northfield Drive was rebuilt in 2013 and is in good condition. There are no plans to replace the pole line in the future. • WNH would like to know if there will be any possible changes to grading, changes of the structure width, or changes in the elevation of the structure that may affect the safety aspects of the existing pole line. • During the bridge construction, WNH shall be contacted should any poles require support or temporary removal. if any pole holding or supporting guarantee are needed such requests for hydro support shall be made to WNH. • WNH provided a preliminary estimate to relocate the existing hydro pole line, in the amount of $86,000 including engineering fees (2020 dollars).	• The existing overhead Enova Power Pole line was considered in the evaluation of alternative Northfield Drive alignment design concepts. • With the selection of Alternative Alignment Concept 2 as the recommended preferred design, the existing Enova pole line will not be directly impacted by the realignment of Northfield Drive and the replacement of the Scheifele Bridge. • Ongoing liaison with Enova Power Corp. will take place during detailed design and construction to deal with any minor pole line impacts.

Issues and Concerns	Mitigation/Response
City of Waterloo	

• Since Northfield Drive and the Scheifele Bridge represent critical transportation assets linking the City of Waterloo and Woolwich Township we feel they should be "right sized" for interim and long-term multi-use transportation needs.
 	
• Present and future transportation needs of this corridor must account for conventional forms of road traffic, agricultural vehicles, buggies, cyclists, and future users of active transportation features.
 	
• Design considerations should recognize the present concerns about speeding and traffic safety on Northfield Drive. To that end, separated walkways and multi-use trails should be part of the final design to enhance the protection of pedestrians and cyclists. The opportunity for traffic calming should also be part of the detailed design component of the project.
 	
• Lane width considerations for vehicle passage should address the fact that this portion of the regional road network is essential for EMS and mutual-aid Fire Rescue support between the City and Township.
 	
  • We are appreciative of the Project Team's efforts to identify a construction staging approach that will avoid a long-term closure of Northfield Drive and extensive detours that would have a negative impact on the community.
 	
  Post PPC #2 Comments:
 	
  • The City of Waterloo supports the preferred Alignment #2 (West Side) and are pleased that the staged construction plan will avoid a long-term closure of
	• The initial concerns of the City of Waterloo were satisfied with the selection of recommended preferred Scheifele Bridge design concept #5 and recommended preferred Northfield Drive alignment concept #2 (West Side).
	
	• Further liaison will occur with the City of Waterloo during detailed design to coordinate any additional design features such as extending a Multi-Use Trail, or separate bike lanes, beyond the City of Waterloo boundary into the Township of Woolwich.

Issues and Concerns	Mitigation/Response
Northfield Drive, which was one of our initial concerns. • The City of Waterloo supports the recommended bridge cross-section concept 5, recognizing that it provides appropriate, enhanced facilities for multi-modal use (pedestrians, cyclists, and buggies).	

8.4 PUBLIC COMMENTS

The major concerns of the public, as expressed at Public Consultation Centre Meetings 1, 2 and 3, were highlighted in Sections 3.5.2, 3.5.3 and 3.5.4 respectively. The Project Team, along with Region and Township staff, are confident that "*Recommended Preferred Northfield Drive Alignment Design Concept 2 Modified, Recommended Preferred Scheifele Bridge Cross Section Design Concept 5 Modified, and the Modified Recommended Construction Staging Program", together,* address the bulk of issues and concerns raised by the PCC attendees.

Going forward through the final design and construction phases, the Region of Waterloo will be open to addressing any additional concerns that may be raised by members of the public, where practical and appropriate.

Copies of the public comment sheets, from Public Consultation Centre Meetings 1, 2 and 3 are included in **Appendix C,** along with consolidated summaries of the public submissions.

9.0 PRELIMINARY DESIGN: RECOMMENDED PREFERRED DESIGN CONCEPTS FOR SCHEIFELE BRIDGE AND NORTHFIELD DRIVE

The Class Environmental Assessment for this project has followed a process that was developed by the Municipal Engineers Association and outlined in the document titled "Municipal Class Environmental Assessment, October 2000, amended in 2007, and Approved by Order-in-Council No. 1923/2000".

Over the course of the study, the Project Team developed various Alternative Design Concepts to address the "Need and Justification" and "Problem Statement" for the project. The alternatives were evaluated based on input from many sources, including agencies, local government departments, and the public, leading to the development of the "Recommended Preferred Design Concepts".

The following chapter presents the preliminary design and construction details associated with the Recommended Preferred Design Concepts for the proposed Scheifele Bridge, the realignment of Northfield Drive, and a Staged Construction program.

The Scheifele Bridge shall be designed in accordance with the following general provisions of the Canadian Highway Bridge Design Code:

- In the interpretation and application of this Code, the primary concern shall be the safety of the public, including that of construction and maintenance workers.
- Unless otherwise approved, the design life of the new structure shall be 75 years.
- Bridges, culverts, and their associated works shall be designed to comply with all environmental requirements established for the site. Wherever possible, features of archaeological, historical, and cultural importance shall be preserved.
- In the design and rehabilitation of structures, consideration shall be given to the appearance of the finished structure and to its compatibility with its surroundings. Wherever possible, the appearance of a structure shall be such that it will be generally perceived as an enhancement to its surroundings.
- Structures shall be simple and graceful in form, shall intrude minimally on desirable scenery, and shall exhibit an integrity in which the function of their components are explicit in their form and size, realistically reflecting strength.

Northfield Drive shall be designed within the following general parameters of civil engineering practice for rural connector roads:

- Geometric Design Criteria
- Preliminary pavement design
- Preliminary typical cross-sections
- Drainage and other infrastructure servicing
- Utility relocations and upgrades,
- Illumination Design Criteria,
- Active Transportation Planning,
- Corridor landscaping and restoration,
- Property Impact Planning, and
- Capital Construction Costs

9.1 DESIGN CRITERIA

9.1.1 Scheifele Bridge:

As noted, the Scheifele Bridge will be designed in accordance with the Canadian Highway Bridge Design Code (CHBDC). The following summarizes selected aspects of the Code Design Criteria applicable to the structural design and detailing:

- **Deck Drainage:**

  Bridge deck drainage of the roadway shall be achieved by providing a minimum 2% transverse crossfall and by providing a minimum longitudinal grade of 0.5%, except where, for limited lengths, vertical curves or superelevation transitions preclude this.

  Except where unavoidable, bridges shall be located away from the low point of a sag curve in the vertical alignment of the road profile.

  The spacing and capacity of bridge deck drains established by hydraulic design and testing shall be sufficient to ensure that for a ten-year design storm the runoff flowing in the swale or gutter will not encroach more than 1.50 m into the traffic / shoulder lane**.**

- **Soffit Elevation and High-Water Level:**

  Unless otherwise specified, the high-water levels used for design purposes shall be the water levels corresponding to the design flood discharge without ice jams. If the crossing is subject to abnormal flood conditions, the worst conditions likely to occur, together with the design flood, shall be assumed.

  The clearance, between the soffit of the structure and the high-water level as noted above, shall be sufficient to prevent damage to the structure by the action of flowing water, ice flows, or debris, and unless otherwise approved shall not be less than 1.0 m for freeways, arterial roads, and collector roads and not less than 300 mm for other roads. The clearance for a structure with an arched soffit shall be based on site-specific considerations.

  Unless otherwise approved, the clearance between the lowest point of the soffit and normal water level shall be at least 1.0 m

- **Scour and Dynamic Loading:**

  Local conditions and past records of floods shall be consulted in designing foundation elements when scour is expected to occur. Changes in foundation conditions, resulting from the design flood, shall be considered at serviceability and ultimate limit states.

  For ice loads in freshwater rivers and lakes, ice forces on bridge substructure elements shall be determined by considering the prevailing site conditions and expected form of ice action.

- **Foundation Design and Construction:**

  All footings, foundation components, and retaining structure components, including deep foundation units, ground anchors and ties, pile footings, and all components of crib and bin walls and MSE systems, shall be considered structural components and shall comply with the applicable requirements of the CHBDC for all material types.

  Consultation between the structural Engineer and the geotechnical Engineer shall take place during planning, design, and construction. The geotechnical Engineer shall review the geotechnical aspects of the Bridge Design Plans before construction.

  During construction, deep and shallow foundations shall be inspected by the geotechnical Engineer to confirm that the site conditions are consistent with the design assumptions and to ensure that the geotechnical aspects of the work are carried out as intended. The results of the inspection and of observations at the site shall be documented.

- **Structural Steel:**

  Structural steel shall conform to CSA G40.21 or ASTM A709/A709M, except as provided elsewhere in the Code.

  Weathering steel members shall be of Type A atmospheric corrosion-resistant steel as specified in CSA G40.21 or a steel grade designated with suffix W in accordance with ASTM A709/A709M.

  Fracture-critical members and primary tension members shall be of Type AT, Type WT, or Type QT steel as specified in CSA G40.21 or a steel grade designated with suffix F or T in accordance with ASTM A709/A709M.

  Structural steel, including diaphragms and bracing but excluding surfaces in contact with concrete and the contact surfaces of bolted joints, shall be coated with an Approved coating system for a minimum distance of 3000 mm from the ends of girders at expansion joints.

  Surfaces of girders that are subject to water runoff from the deck shall either be coated with an Approved coating system, or the cross-sections shall be increased to account for the estimated loss of section over the design life of the structure.

9.1.2 Northfield Drive:

- **Design Criteria:**

The Scheifele Bridge replacement project, including alignment modifications to a section of Northfield Drive, represents a major investment in the Region of Waterloo's transportation infrastructure. Within the study area, Northfield Drive (Regional Road 22) exhibits the characteristics of a rural arterial roadway and is classified as a "*Rural*

Connector" within the Region of Waterloo's Context Sensitive Transportation Corridor Design Guidelines. The description of this classification, within these guidelines, is as follows:

> *"Rural Connectors are typically travelled at higher speeds, warranting features that will enhance the operational safety of cyclists and pedestrians with separate cycle lanes, multi-use trails, and wider roadway lanes. The presence of buggies in the Region of Waterloo adds another dimension to the typical design of a safe transportation corridor".*

In accordance with Transportation Association of Canada (TAC) guidelines, design classification for a roadway is based on anticipated traffic volumes, desirable operating speed, service function, preferred traffic flow characteristics, compatibility with the existing roadway system, and integration with the surrounding community development. Based on these considerations, the design classification for this section of Northfield Drive was determined as **"*Rural Arterial Undivided* (RAU)",** with a design speed of 100 km/hour (posted speed of 80 km/hour).

The Design Criteria associated with this section of Northfield Drive is summarized in Table 9.1.

TABLE 9.1 NORTHFIELD DRIVE DESIGN CRITERIA	
DESIGN CLASSIFICATION	Rural Arterial Undivided (RAU): Design Speed: 100 km/hour (UAU 100) Posted Speed: 80 km/hour
CROSS-SECTION	• Right-of-Way: Variable
	• Roadway: 2 lanes (3.35 m) undivided.
	• Paved Shoulders: Proposed: 1.50 m (cycling lane) • Gravel Shoulders: Proposed: 1.80 m (buggies) plus rounding
	• Footnote: East Side Multi-Use Trail TBC
Maximum Horizontal Gradient	3.0%
Minimum Horizontal Gradient	Rural Cross Section: Level Grades acceptable provided pavement surface is adequately crowned and properly drains. Preferred minimum gradient of 0.5%.
Minimum Stopping Site Distance	185 meters (CREST); 185 meters (SAG)
Equivalent Minimum "K" Factors	CREST Vertical Curve: K = 52 SAG Vertical Curve: K = 18-25 (comfort control)

Superelevation: Minimum Radius of Horizontal Curvature	R= 490 meters (RC) R= 190 meters (4% Superelevation)
Super-Elevation	2% Reverse Crown (RC) Nominal 4% Optional (Suitable Design Conditions)

Design Criteria Notes:

1. The extension of recent (2022) upgrades to the Northfield Drive / University Avenue intersection should be accounted for in the detailed design of the Northfield Drive improvements.
2. Super-elevation design criteria, for proposed horizontal curves, are to be confirmed during detailed design.
3. Drainage provisions are to be confirmed during detailed design and shall be compatible with rural drainage conditions.
4. Provisions to accommodate a proposed Region of Waterloo 300 mm trunk watermain, from the City of Waterloo to the village of Conestogo, are to be confirmed during detailed design.
5. Provisions for possible illumination upgrades should be investigated during detailed design, as an extension of lighting improvements completed as part of the 2022 Northfield Drive / University Avenue intersection reconstruction.
6. Provisions for a multi-use trail on Northfield Drive, from University Avenue to the Scheifele Bridge, should be evaluated during detailed design, in consultation with the City of Waterloo and the Township of Woolwich.

- **Preliminary Pavement Design:**

The geotechnical investigation and report that was completed for the environmental assessment study focused on preliminary design details for the Scheifele Bridge foundations and did not provide pavement design recommendations for the embankment widening and realignment of Northfield Drive. A supplementary geotechnical and foundation investigation study will be required in conjunction with the detailed design phase, which will provide appropriate pavement design criteria for Northfield Drive and additional design criteria for the Scheifele Bridge foundations.

For initial costing purposes, preliminary pavement design criteria are presented in Table 9.2 based on previous engineering standards on rural arterial roadways in the Region of Waterloo. The recommended pavement structure may be subject to minor adjustments during detailed design.

TABLE 9.2: PRELIMINARY PAVEMENT DESIGNS	
STREET	**PAVEMENT DESIGN STANDARD**
Northfield Drive	Asphaltic Concrete: HL3 Superpave 12.5 Surface Mix: 50mm Superpave 19 Upper Binder Mix: 2 X 50mm (100 mm)
	Granular "A" Base Course: 500mm

- **Drainage:**

Since Northfield Drive has a rural cross section within the project limits, drainage of the roadway platform will be via existing and proposed roadside ditches. Typically, the storm ditch system will be designed to accommodate a 5-year storm event, with overland routes discharging major 100-year storm events where applicable. The need for subdrains, to capture granular road-base drainage, should be examined during detailed design in consultation with the geotechnical engineer.

In a letter from the Grand River Conservation Authority, dated May 31, 2022, the GRCA requested that the design team investigate opportunities to expose 150 meters of an enclosed watercourse (lower reaches of the "eastern tributary") on the east side of Northfield Drive, which currently drains lands of the Conestogo Horseback Adventures property and beyond. The GRCA is looking to improve water quality within the watercourse and to introduce other enhancements.

In consultation with the GRCA, it is anticipated that the design team will examine the issues, constraints, opportunities, and costs associated with improvements to the eastern tributary and decide on a course of action during the Scheifele Bridge and Northfield Drive detailed design phase.

Since the drainage enhancements proposed by GRCA are over-and-above, and outside, the scope of the Scheifele Bridge project, it is anticipated that the GRCA will fund any improvements and associated engineering fees related to the "eastern tributary" improvements.

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- **Utility Relocations and Upgrades:**

Utility responses to the Notice of Study Commencement (Sections 3.5.2) confirmed that there are two utility agencies with existing service plant within the proposed Northfield Drive reconstruction limits, as follows:

Enova Power Corp. (previously Waterloo North Hydro) has an existing double-circuit overhead pole line on the east side of Northfield Drive, within the limits of the proposed reconstruction. Since the existing pole line is on the east side of the corridor and the realignment of Northfield Drive is proposed on the west side, it is anticipated that the existing pole line will not be impacted by reconstruction.

Bell Canada has an existing concrete encased duct structure on the west side of Northfield Drive, which is also attached to the underside of the existing Scheifele

Bridge as it crosses the Conestogo River. The existing Bell duct structure will need to be relocated, within the realigned Northfield Drive, to keep it outside the limits of the pavement area. In addition, details of how the Bell duct structure will cross the Conestogo River, after demolition of the existing bridge, must be examined and confirmed during detailed design. Since the Region's policy is to avoid placing utilities on new bridge structures, Bell Canada will need to investigate alternative options for crossing the river, either by underground / trenchless tunnelling or by aerial pole stringing.

There are no existing Enbridge Gas or Rogers Cable TV facilities within the proposed construction limits that require relocation.

- **Corridor Landscaping and Restoration:**

A significant amount of natural vegetation will be removed to accommodate the realignment of Northfield Drive and construction of the new Scheifele Bridge. The removal of trees and other vegetation, regardless of their quality, will dramatically change the visual character of the area.

In conjunction with the detailed design, the Region should engage the services of a Landscape Architect to present alternative concepts for new landscape treatments and restorations that will enhance any disturbed limits. An allowance is provided in the base construction cost estimate for this work.

- **Illumination:**

Although lighting is generally an important feature of road design in urban areas, the rural nature of Northfield Drive, within the proposed construction limits, minimizes the functional and aesthetic needs for corridor illumination. However, with the recent reconstruction of the Northfield Drive / University Avenue intersection, there may be a need to add street lighting to the design criteria for the Scheifele Bridge project, as an extension of any lighting upgrades near University Avenue. Properly designed, new lighting on the Northfield Drive approach to University Avenue may enhance the safety for drivers leaving the un-lit rural section of Northfield Drive and entering the urban section at the University Avenue intersection.

In conjunction with the detailed design, it is proposed that Stantec's electrical team examine alternatives for enhanced illumination, including a cost-benefit analysis of potential improvements.

- **Property Impact Planning:**

The "Recommended Preferred Northfield Drive: West Side Staged Construction Plan: Modified" presents significant benefits in terms of reduced property impacts and acquisition needs compared to other alternatives (except Alternative #4). Since the Region of Waterloo currently owns a large tract of land, on the west side of Northfield Drive and south of the Conestogo River, land acquisition needs have been minimized with the recommended preferred Alternative Design Concept 2.

During detailed design, Property Impact Plans will be prepared to illustrate and confirm the extent of impacts on, and acquisition needs for, any private properties directly affected by the proposed west side realignment of Northfield Drive.

Based on the preliminary plan for Recommended Preferred Design Concept 2: Modified, the only property currently impacted is 698 Northfield Drive, Schnarr Family Farms Inc. The approximate acquisition area is currently estimated to be 2,230 m2 (0.223 Ha), which will be verified by legal surveys based on final design plans.

9.2 UPDATED PRELIMINARY PROJECT COST ESTIMATES

9.2.1 Scheifele Bridge and Northfield Drive:

Preliminary Construction Cost Estimates were prepared for the Scheifele Bridge and Northfield Drive realignment concepts and included in the Design Alternatives Evaluation Matrices. These cost estimates were developed in the very early stages of the Class EA study process and were used for comparing the various design concepts, as noted in Section 6.5.

Over the course of evaluating the various alternatives and the ultimate selection of recommended preferred design concepts for the Scheifele Bridge replacement and Northfield Drive realignment, the preliminary cost estimates were refined to reflect modifications to the designs and updated preliminary item quantities. For example, it was learned in April 2022 that bridge construction costs had increased by as much as 30% in the one-year period between January 2021 and January 2022 (MTO research data). In addition, cost adjustments were applied to reflect changes to the bridge deck cross section, bridge span and substructure design parameters, utility cost provisions, property impacts, and other pertinent design and construction details.

Based on preliminary design concepts and known inflationary increases within the construction industry (at the time of ESR writing), the updated cost estimates for the “Modified Recommended Preferred Scheifele Bridge and Northfield Drive Design Concepts” are as follows:

***Note**: The following construction cost estimates are based on the best available cost data available at the time of preparation. The presented estimates are subject to market fluctuations in the construction industry, which can quicky change. As a result, the following estimates are “an opinion of probable construction costs only”, and therefore subject to change at any time.*

Scheifele Bridge Replacement:	
Removal and Disposal of Existing Bridge:	$830,000
117 m, 3-Span, Haunched Steel Plate Girder Bridge:	$8,980,000
Retaining Wall Construction:	$1,990,000
Staged Construction Program:	$1,850,000
Subtotal Scheifele Bridge:	**$13,650,000**

Northfield Drive Reconstruction:	
Removals, Site Preparation and General:	$690,000
Earth Grading / Embankment Construction:	$925,000
Roadwork Construction:	$2,078,000
Utility Relocations (Bell Canada):	$140,000
Property Acquisition Allowance:	$25,000
Subtotal Northfield Drive:	**$3,858,000**
Engineering Fees and Contingencies:	
Contingency Allowance:	$1,752,000
Engineering: Class EA, Design and Construction Services (TBC):	
Class EA and Detailed Design:	$990,000
Contract Administration:	$420,000
On-Site Inspection Services:	$1,570,000
As-Recorded Drawings:	$30,000
Subtotal Engineering Fees and Contingencies:	**$4,762,000**
Total Preliminary Project Cost Estimate:	**$22,270,000**

It is noted that the above Preliminary Project Cost estimates **do not include** the following items:

- Construction costs or engineering fees associated with the design and installation of the proposed 300 mm trunk watermain, and/or underwater casing pipe, that is proposed to connect Waterloo to Conestogo.
- Engineering fees associated with assisting Bell Canada, as required, with the design of a crossing system of the Conestogo River to accommodate the existing Bell duct structure and cables. An allowance of $140,000 has been carried for utility relocations, a portion of which may be attributable to relocation of the existing Bell duct and cables from the existing bridge structure.
- An allowance of $55,000 has been carried for landscape restorations, but do not include professional landscape design fees. A fee for landscape architectural design services will be confirmed at the detailed design stage for approval by the Region of Waterloo.
- Additional Geotechnical and Structural Foundation field investigations and reporting services will be required at the detailed design phase. A fee for these engineering services will be confirmed at the detailed design stage for approval by the Region of Waterloo.
- The scope of fluvial geomorphological design and construction within the Conestogo River will be confirmed at the detailed design phase. A fee for fluvial design services will be confirmed at the detailed design stage for approval by the Region of Waterloo, and an updated construction cost estimate will be provided for any in-water fluvial work.

- The GRCA has requested that the Region of Waterloo include improvements to an underground drainage tributary within the south-east quadrant of the project limits (Conestogo Horseback Adventures property) as part of the overall Scheifele Bridge reconstruction. Subject to negotiations between the Region and GRCA, an engineering design fee will be provided for any extra work related to drainage improvements in the area. It is assumed that the GRCA will fund any construction improvements once the scope of work is confirmed.
- The scope of any temporary access controls during construction, for horseback trail riders from Conestogo Horseback Adventures, was not confirmed at the time of preparation and filing of this Environmental Study Report (ESR). Although an allowance of $70,000 was included for potential temporary construction provisions (example: Temporary Traffic Signals and/or 24-7 Flagging Controls, etc.), no allowance has been included for engineering fees. Based on final negotiations between Conestogo Horseback Adventures and the Region of Waterloo, a fee for engineering design and coordination services will be provided for approval by the Region of Waterloo.
- Extensive environmental field studies were completed as part of the Class Environmental Assessment study. Should further field work be required to address specific environmental issues, a work plan and fee budget will be provided for Region approval, prior to any action being taken in the field.
- The costs for a Stage 2 Archaeological Assessment Study and report.
- The costs for a Marine Archaeological Assessment Study within the Conestogo River.

9.2.2 Annual Breakdown of Project Cost Estimate:

The replacement of the Scheifele Bridge is tentatively scheduled to start in Spring/Summer 2025 and extend to summer 2027. To assist the Region of Waterloo in their annual capital budget forecasting, the above Preliminary Construction Cost Estimate was separated by construction year. It is noted that Engineering Fees for the construction years include Contract Administration and On-Site Inspection services only, under the assumption that the Class EA and Detailed Design Fees ($990,000) will be budgeted and paid in the years up to, and including, 2024.

In considering the following breakdown of estimated annual project costs, it is important to note that the 2025-2027 construction timeline is tentative and may be subject to change based various unknowns being clarified, such as:

- Region of Waterloo Council budget approvals,
- The scope of work and timeline for supplementary pre-design geotechnical / foundation investigations,
- The scope of work and timeline for supplementary pre-design environmental and fluvial analysis,
- The scope of work and timeline for a Stage 2 Archaeological Assessment study and report,
- The scope of work and timeline for a Marine Archaeological Assessment Study,
- The timeline for Grand River Conservation Authority liaison and approvals related to proposed in-water Conestogo River work and improvements to the underground tributary on the east side of Northfield Drive,
- The timing and extent of negotiations with Conestogo Horseback Adventures related to safe access controls for horseback riders during construction,

- The timing and scope of work required to facilitate a crossing design for the future 300 mm trunk watermain on Northfield Drive,
- The timing and extent of reviews to confirm the scope of any architectural enhancements deemed appropriate for the bridge structure,
- The timing and scope of utility liaison and relocation designs,
- The timing and successful completion of the property acquisition process.
- The timing of various outside agency approvals, and
- The timing and scope of work to monitor any project changes that may directly affect the interests of the Mississauga's of the New Credit First Nations (MNCFN), including contacts with the Band's Department of Consultation and Accommodation (DOCA).

2025:	Scheifele Bridge:	$3,300,000
	Retaining Walls:	$1,300,000
	Construction Staging:	$650,000
	Northfield Drive:	$2,300,000
	Utility Relocations:	$60,000
	Property Acquisitions (2024):	$25,000
	Subtotal 2025 Construction:	**$7,635,000**
	Contingencies:	$780,000
	Engineering CA / On-Site:	$640,000
	Subtotal 2025 Budget Forecast:	**$9,055,000**
2026:	Removal of Existing Bridge:	$830,000
	Scheifele Bridge:	$4,000,000
	Retaining Walls:	$690,000
	Construction Staging:	$900,000
	Northfield Drive:	$750,000
	Utility Relocations:	$80,000
	Subtotal 2026 Construction:	**$7,250,000**
	Contingencies:	$750,000
	Engineering CA / On-Site:	$900,000
	Subtotal 2026 Budget Forecast:	**$8,900,000**

2027:	Scheifele Bridge:	$1,680,000
	Construction Staging:	$300,000
	Northfield Drive:	$643,000
	Subtotal 2027 Construction:	**$2,623,000**
	Contingencies:	$222,000
	Engineering CA / On-Site:	$480,000
	Subtotal 2027 Budget Forecast:	**$3,325,000**
	Total 2025 / 2027 Budget:	**$21,280,000**

9.2.3 Detailed Cost Estimate Summary:

The updated preliminary construction cost estimate for the “Recommended Preferred Scheifele Bridge Design Concept Modified” was calculated based on a bench-mark cost per square meter of deck area ($5,250 / m2), reflecting recent inflationary bridge construction costs and other factors. This budget estimate, per square meter of deck area, will be updated during the final design stage and prior to tender call, based on more accurate bridge design details.

The updated preliminary construction cost estimate for the “Recommended Preferred Northfield Drive Design Concept Modified” was based on a “bottom-up estimate”, applying recent (2023) road construction unit prices to preliminary item quantities. The Northfield Drive reconstruction budget estimate will be further updated during the final design stage, and prior to tender call, based on more accurate road design details and unit prices.

For future reference, a detailed breakdown of the bridge and road construction cost estimates are provided in Table 9.3.

TABLE 9.3: SCHEIFELE BRIDGE AND NORTHFIELD DRVE RECONSTRUCTION:
Northfield Drive Design Concept 2 Modified and Scheifele Bridge Design Concept 5 Modified

DETAILED PRELIMINARY CONSTRUCTION COST ESTIMATE

Item	Quantity Estimates	Cost Estimate (2022 Dollars)
1.0 NORTHFIELD DRIVE RECONSTRUCTION		
1.1 General Requirements		
Mobilization / Demobilization	L.S.	$45,000
Bonds and Insurance	L.S.	$95,000
Contract Administrator Field Office	L.S.	$60,000
Contract Layout	LS	$84,000
PVMS Signage	L.S.	$30,000
Conestogo River Horseback Access	L.S.	$70,000
Miscellaneous	L.S.	$96,000
General Requirements Subtotal		**$480,000**
1.2 Removals and Site Preparations		
Erosion and Sediment Control	L.S.	$60,000
Strip Topsoil and Disposal	L.S.	$14,000
Full Depth Asphalt Removal	L.S.	$36,000
Tree Removals (Clearing and Grubbing)	L.S.	$70,000
Miscellaneous	L.S.	$30,000
Removals and Site Preparations Subtotal		**$210,000**
1.3 ROADWORKS:		
Supply, Place and Grade Imported Fill	27,000 m3	$670,000
Excavate / Dispose of Existing Embankment	L.S.	$255,000
Qualified Person (QP-C) Earth Operations	L.S.	$10,000
Soil Sampling and Testing	L.S.	$8,000
Sub-Excavation of Unsuitable Materials	L.S.	$12,000
Backfill Sub-excavated areas with Granular B	L.S.	$25,000
Asphalt: Surface 12.5 FC1 (PGAC 64-28)	1,900 t	$360,000
Asphalt: Base 19.0 (PGAC 58-28)	1,650 t	$206,000
Granular “A”	4,800 t	$110,000
Granular “B”	15,800 t	$284,000

TABLE 9.3: SCHEIFELE BRIDGE AND NORTHFIELD DRVE RECONSTRUCTION:
Northfield Drive Design Concept 2 Modified and Scheifele Bridge Design Concept 5 Modified

DETAILED PRELIMINARY CONSTRUCTION COST ESTIMATE

Item	Quantity Estimates	Cost Estimate (2022 Dollars)
Tack Coat Application	7,500 m2	$8,000
Concrete Curb on Approaches	800 m	$40,000
Multi-Use Trail on Approaches	1,700 m2	$128,000
Type 1-A Granular Sealing	1,500 m2	$20,000
Asphalt Drainage Outlets	6 each	$12,000
Steel Beam Guiderail System	480 m	$110,000
Connect SBGR to Bridge	4 each	$8,000
Barrier Energy Attenuators	4 each	$40,000
Grade Slopes Prior to Topsoil Placement	L.S.	$18,000
Screened Topsoil (150 mm)	12,000 m2	$84,000
Seed and Mulch	12,000 m2	$72,000
Staked Sod	1,000 m2	$12,000
Sod (Not Staked)	1,500 m2	$10,000
Pavement Markings (Temporary)	L.S.	$5,000
Pavement Markings (Permanent)	L.S.	$4,000
Pavement Marking Removals	L.S.	$1,000
Driveway Restorations	L.S.	$6,000
Landscaping Allowance	L.S.	$55,000
Miscellaneous Allowance	LS	$430,000
Roadworks Subtotal		**$3,003,000**
Utility Relocations and Property Acquisition:		$165,000
NORTHFIELD DRIVE RECONSTRUCTION		**$3,858,000**
2.0 SCHEIFELE BRIDGE:		
Removal of Existing Bridge	L.S.	$830,000
117 m 3-Span Steel Plate Girder Bridge	1710 m2 @ $5250 / m2	$8,980,000
Staged Construction Allowance	L.S.	$1,850,000
Retaining Wall Construction	L.S.	$1,990,000
SCHEIFELE BRIDGE REPLACEMENT		**$13,650,000**

TABLE 9.3: SCHEIFELE BRIDGE AND NORTHFIELD DRVE RECONSTRUCTION: Northfield Drive Design Concept 2 Modified and Scheifele Bridge Design Concept 5 Modified

DETAILED PRELIMINARY CONSTRUCTION COST ESTIMATE

Item	Quantity Estimates	Cost Estimate (2022 Dollars)
3.0 SCHEIFELE BRIDGE AND NORTHFIELD DRIVE CONSTRUCTION		
Northfield Drive Reconstruction	Total Estimate	$3,693,000
Scheifele Bridge Replacement	Total Estimate	$13,650,000
Subtotal Northfield Drive and Scheifele Bridge	Total Estimate	$17,343,000
Utility Relocations Allowance	L.S.	$140,000
Property Acquisitions Allowance	L.S.	$25,000
Subtotal Construction, Utility Relocations and Property Acquisition	**L.S.**	**17,508,000**
Contingency Allowance	LS	$1,752,000
Contract Administration and On-Site Inspection Services Fees (Excludes Class EA and Design Fees)	LS	$2,020,000
TOTAL CONSTRUCTION COST ESTIMATE (Excludes HST)		**$21,280,000**

10.0 STUDY SUMMARY AND RECOMMENDATIONS

The Scheifele Bridge Replacement Class Environmental Assessment Study was commissioned by the Region of Waterloo to complete planning and preliminary design for the replacement of the bridge superstructure (deck), plus partial, or full, replacement of the substructure piers and abutments. The need and justification for the undertaking was confirmed in a 2019 Region of Waterloo Preliminary Information Report (PIR).

In conjunction with the bridge deck replacement study, the planning and design process considered the addition of active transportation facilities for pedestrians, cyclists and buggies who will use the Scheifele Bridge, both now and in the future.

The purpose of the Scheifele Bridge Class Environmental Assessment Study was to examine alternatives for the partial or full bridge replacement, and to provide recommendations for improvements after comprehensive public and agency consultations consistent with Region policies, practices, and guidelines. Conclusions and recommendations recognized the Region of Waterloo's continued pursuit of accommodating all modes of travel within the community, achieving traffic operational improvements, and enhancing municipal streetscapes, all while minimizing potential adverse impacts on the natural and built environments.

The Scheifele Bridge Study was completed in accordance with the guidelines for a Schedule "C" Class Environmental Assessment, as outlined in the document titled "Municipal Class Environmental Assessment, Municipal Engineers Association, October 2000, as amended in 2007" and approved by Order-In-Council No. 1923/2000. Through this structured process, "Recommended Preferred Design Concepts" have been presented for the proposed complete replacement of the Scheifele Bridge as well as realignment improvements to Northfield Drive on the north and south approaches to the new structure. A staged construction plan is proposed for replacement of the bridge which will allow retention of uninterrupted traffic on Northfield Drive throughout the estimated 2 1/2-year construction period.

Incorporated within this Environmental Study Report (ESR) are various background reports, project files and data, correspondence, Minutes of Project Team meetings, details of Public Consultation Center Meetings (3), public and agency feedback, and functional details of the proposed bridge and road reconstruction plans.

The following summarizes the final recommendations of this Environmental Assessment:

1. It is recommended that the Region of Waterloo accept "Recommended Preferred Scheifele Bridge Design Concept 5 Modified" and "Recommended Preferred Northfield Drive Alignment Design Concept 2 Modified" as the preferred designs for the replacement of the Scheifele Bridge, as illustrated in the preliminary plans included within this report. These design concepts propose that the Scheifele Bridge be fully reconstructed to the west of the existing bridge, requiring reconstruction of the northbound and southbound bridge approaches on Northfield Drive.

2. It is recommended that the Region of Waterloo plan the project in accordance with the final Scheifele Bridge Construction Staging Plan Modified, which will maintain uninterrupted traffic

on Northfield Drive throughout the estimated 2 1/2-year construction period. No long-term detours will be required.

3. It is recommended that the Region of Waterloo respect, wherever possible in the completion of the project, the planning and design parameters within the Regional Context Sensitive Transportation Corridor Design Guidelines.

4. It is recommended that the Region of Waterloo continue dialogue with the Township of Woolwich throughout the detailed design and construction phases of the project. The Township of Woolwich played an important role in the Class EA study phase and has an ongoing vested interest in the final details of the project, thru to completion.

5. It is recommended that the Region of Waterloo proceed with detailed design of the project in 2024, in general conformance with the preliminary design plans included within this report.

6. It is recommended that the Region of Waterloo initiate a property acquisition process that is required to facilitate construction. One property taking is required in the northwest quadrant of the project limits, the details of which will be confirmed by legal surveys.

7. It is recommended that the Region of Waterloo work towards a project construction start date of spring/summer 2025, which will provide for a 2027 completion date. The start date of construction is subject to completion of the property acquisition process, availability of project funding, a suitable tender submission, and final approvals from interested agencies and Region of Waterloo Council (Also refer to Section 9.2.2, Annual Breakdown of Annual Construction Costs).

8. It is recommended that the Region of Waterloo, along with its consultant, work with the owner of Conestogo Horseback Adventures to finalize a trail access plan that will permit horseback riders to cross Northfield Drive during construction. For safety reasons, rider access along the existing trail beneath the south span of the current bridge will not be possible during construction. At the time of writing this ESR, a conclusive solution had not been confirmed with respect to an alternate trail access plan.

9. It is recommended that further engineering and environmental studies be initiated by the Region of Waterloo in conjunction with the detailed design phase, including a Stage 2 Archaeological Assessment Study, a supplemental Geotechnical and Foundation Investigation Study, a Marine Archaeological Assessment Study, and protection of the existing Cultural Heritage Landscape (CHL) feature (circa 1861 remnant bridge abutments and roadway) in the southwest quadrant of the study area. Applications for final agency approvals should be submitted as soon as possible in the design process.

10. It is recommended that the Region, and its consultant, include riverbank and streambed stabilization measures in the detailed design and construction contract, expanding upon the preliminary details outlined in the Fluvial Geomorphological Study Report.

11. It is recommended that engineering and construction staging plans, temporary works, and erosion / sediment control plans be prepared during the detailed design stage to ensure contractual conformance with the environmental protection guidelines of GRCA and MECP.

12. It is recommended that the Region of Waterloo, and its consultant, work with the Grand River Conservation Authority to investigate and confirm details for “exposing and improving” an existing covered drainage system in the eastern tributary draining the Conestogo Horseback Adventure lands and beyond. Any decisions and costs, associated with implementing a preferred drainage improvement program, will be subject to GRCA acceptance and funding.

13. It is recommended that, prior to construction, the Region of Waterloo, and its consultant, mark the boundaries of the Cultural Heritage Landscape (CHL) candidate located west of the recommended preferred Northfield Drive and Scheifele Bridge design concept, comprising remnant roadway and bridge abutments of two former bridge crossings. Temporary fencing should be erected along the boundary of the CHL to limit all earth excavation, grading and related construction from encroaching on the CHL.

14. It is recommended that a landscaping plan be developed for the project, at the detailed design stage, that will examine alternatives for the restoration of lands along the west side of Northfield Drive, which will be significantly impacted by the proposed construction. A proper landscape restoration plan may enhance the disturbed areas adjacent to the wetlands and banks of the Conestogo River.

15. It is recommended that further studies be completed for the design of the bridge pedestrian handrails, and the walkway side of the concrete protection barrier walls, which may add to the architectural character of the new bridge. Enhancement opportunities for the pedestrian handrails may include “open decorative railings for river viewing”, “decorative concrete intermediate and end posts to interrupt the long stretches of handrail”, and a “plaque acknowledging the history of the Scheifele Bridge” named after the early settlers who farmed the lands near the current river crossing.

16. It is recommended that the Region of Waterloo, along with its consultant, work with the Region’s Water group and the Township of Woolwich to finalize the details of a proposed trunk watermain that is scheduled to be installed along Northfield Drive, from the City of Waterloo to the Village of Conestogo. Provisions for crossing the Conestogo River, at the Scheifele Bridge, should be considered in the final design phase of the Scheifele Bridge. Estimated costs for the proposed 300 mm diameter watermain have not been included in this study.

17. It is recommended that the Region engage the services of a qualified company to complete testing of any existing soils that may require removal from the site, to determine potential contaminant levels from previous land uses, dumping, or spills, and to prepare a Soil Characterization Study in accordance with the Environmental Protection Act and Ontario’s “On-Site and Excess Soil Management Policy, O. Reg. 406/19”. During construction, it is recommended that the Region engage the services of a Qualified Person (QP-PL) to monitor soil management activities of the general contractor.

18. It is recommended that the Region include provisions in the Contract Tender documents requiring that the general contractor engage the services of a Qualified Person (QP-C) to undertake various soil sampling and soil management duties during construction, in accordance with the provisions of the Soil Characterization report and Ontario’s “On-Site and Excess Soil Management Policy, O. Reg. 406/19”.

19. It is recommended that the Region of Waterloo, and its consultant, work with Bell Canada in facilitating the relocation of an existing Bell Canada duct and cable structure that is currently supported on the existing bridge.

20. It is recommended that the Region of Waterloo, and its consultant, further liaise with the City of Waterloo, during detailed design, to coordinate any additional design features such as extending a Multi-Use Trail, or separate bike lanes, beyond the City of Waterloo boundary into the Township of Woolwich.

21. It is recommended that appropriate state-of-the-art erosion control measures be installed during construction to protect adjacent lands and the Conestogo River from silt runoff during rainfall events.

22. It is recommended that the Region of Waterloo continue to monitor any changes to the project that may directly affect the interests of the Mississauga's of the New Credit First Nations (MNCFN), and to contact the Band's Department of Consultation and Accommodation (DOCA) in the event of possible changes.

Filing of this Environmental Study Report ("Notice of Study Completion" Date) occurred on November 20, 2023, in accordance with the guidelines of the Municipal Class Environmental Assessment (Class EA) Planning and Design process.

Stantec Consulting Ltd.

Garry E. Leveck, P. Eng.
Senior Consultant: Transportation
Senior Project Manager

Region of Waterloo

SCHEIFELE BRIDGE REPLACEMENT

Northfield Drive (Regional Road 22)
Township of Woolwich

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT STUDY

APPENDICES

NOVEMBER 2023

Stantec

Region of Waterloo

SCHEIFELE BRIDGE REPLACEMENT

Northfield Drive (Regional Road 22)
Township of Woolwich

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT STUDY

APPENDIX A: Minutes of Meetings and Reports

Stantec

Planning and Works Committee Minutes

September 12, 2023, 9:30 a.m.
Council Chambers

Members Present: K. Redman, D. Craig, R. Deutschmann, J. Erb, S. Foxton, M. Harris, C. Huinink, C. James, J. Liggett, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, P. Wolf

Should you require an alternative format or a copy of the official minutes please contact the Regional Clerk at Tel.: 519-575-4400, TTY: 519-575-4605, or regionalclerk@regionofwaterloo.ca

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1. Call to Order

Chair C. James called the meeting to order at 9:32 a.m.

2. Land Acknowledgement

Chair C. James provided a land acknowledgement.

3. Declarations of Pecuniary Interest under the "Municipal Conflict of Interest Act"

None declared.

4. Presentations

There were no presentations.

5. Delegations

5.1 Jane Richard, Kitchener

Jane Richard appeared before the Committee to express the importance of public consultation, and how petitions are not just a tool, but a testament to the collective voice.

A copy of their speaking notes are attached to the minutes.

6. Consent Agenda

Item 6.3.1 was removed from the Consent Agenda.

Moved by S. Foxton
Seconded by N. Salonen

That the Consent Agenda items be received for information and approved.

In Favor (16): K. Redman, D. Craig, R. Deutschmann, J. Erb, S. Foxton, M. Harris, C. Huinink, C. James, J. Liggett, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, and P. Wolf

Carried (16 to 0)

6.1 Strategic Focus - Sustainable Transportation

6.1.1 EES-DCS-23-008, Project Approval for Scheifele Bridge Replacement, Northfield Drive at Conestogo River, Township of Woolwich

Moved by S. Foxton
Seconded by N. Salonen

That the Regional Municipality of Waterloo:

a. Approve the recommended project design concept for Scheifele Bridge Replacement, Northfield Drive at Conestogo River, Township of Woolwich, as described in Report EES-DCS-23-008, dated September 12, 2023.

b. Direct staff to file the Notice of Completion for this Class Environmental Assessment Study and place the Environmental Study Report on the public record for a period of 30 days.

Carried

6.2 Strategic Focus - Environmental and Climate Action

6.2.1 EES-WAS-23-008, Designation of Owners Representative for the Region's Drinking Water Systems

Moved by S. Foxton
Seconded by N. Salonen

That the Regional Municipality of Waterloo authorize the appointment of the Director of Water and Wastewater Services to act as the owner representative for the drinking water systems

owned and operated by the Regional Municipality of Waterloo as outlined in report EES-WAS-23-008, dated September 12, 2023.

Carried

6.3 Strategic Focus – Healthy, Safe and Inclusive Communities

6. Consent Agenda

6.3 Strategic Focus – Healthy, Safe and Inclusive Communities

6.3.1 PDL-LEG-23-045, Amendment to Traffic and Parking By-law – Administrative Monetary Penalties

Graham Walsh, Regional Solicitor, provided an overview of the report, explaining that this would take parking infractions out of the Provincial Offences Court system, and move them to a more streamlined system, where a screening officer works with the person who has been given the ticket to either maintain the fine, reduce or remove it altogether. G. Walsh explained that the benefits of this approach are lower court costs, and that generally revenue increases as well. G. Walsh also confirmed that this has been done at the request of the cities of Cambridge, Kitchener, and Waterloo.

Responding to questions from the Committee, G. Walsh confirmed that there is always an audit to assess whether the system is running effectively.

The Committee asked staff to report back with more information regarding the fine review process, including what the system currently is, and who are the parties involved.

Moved by M. Harris
Seconded by C. Huinink

That the Regional Municipality of Waterloo amend the Traffic and Parking By-law as set out in Schedule A to allow the use of administrative penalties for parking on Regional roads, pursuant to report PDL-LEG-23-045, dated September 12, 2023.

In Favor (16): K. Redman, D. Craig, R. Deutschmann, J. Erb, S. Foxton, M. Harris, C. Huinink, C. James, J. Liggett, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, and P. Wolf

Carried (16 to 0)

7. Regular Agenda

7.1 Strategic Focus – Responsive and Engaging Public Service

7.1.1 EES-SAM-23-001, Asset Management and Capital Budget Alignment (Staff Presentation)

Jennifer Rose, Commissioner, Engineering and Environmental Services and Craig Dyer, Commissioner, Corporate Services/Chief Financial Officer provided a presentation on asset management and capital budget alignment, including an overview of the steps of bringing a capital plan together and funding gaps. C. Dyer explained that the goal is to not use long term borrowing to fund asset renewal works, and to preserve debt capacity by ensuring there is sufficient contributions to capital reserves in the long run. C. Dyer noted that the current strategy is working, as debt levels have remained the same over the past few years.

A copy of the presentation is attached to the minutes.

This report was received for information.

Responding to questions from the Committee, C. Dyer noted that the intention behind reserve funds are to make sure that they are sustainable in terms of their ability to fund the capital program, as capital investments are not the same year over year. C. Dyer noted that the goal is to have enough funds, so the Region does not need to issue debt.

In response to a question from the Committee, C. Dyer shared that with a few exceptions, there is no specific requirements in the Municipal Act that direct a level of reserve or reserve fund balance, and that municipalities are allowed to establish this target as deemed appropriate. J. Rose confirmed that the water reserve is mandated through the Safe Drinking Water Act.

8. Information/Correspondence

8.1 Council/Committee Tracking List

Received for information.

8.2 J. Richard Petition

Received for information.

9. Other Business

Responding to a question from the Committee, Mathieu Goetzke, Commissioner, Transportation Services stated that a new record of ridership was achieved on Thursday, September 7th, 2023, with approximately 134,000 riders on GRT and 20,000 on the LRT. M. Goetzke confirmed that staff are aware of the delays that occurred and that the root causes still need to be unpacked, which will help inform the work staff is doing for next year's budget, and that there may be a need for some operational changes.

Responding to a question from the Committee, C. Dyer explained that the provincial gas tax revenue is to a large extent, based on ridership, and to the extent that ridership is increasing in the Region at a faster rate than in other jurisdictions, that should result in additional provincial gas tax funding for the Region.

Responding to questions from the Committee, M. Goetzke noted that the Region’s LRT has the highest performance in Ontario in terms of reliability, and that to support the increase in ridership, the first step would be to increase the frequency of vehicles before adding length to the cars, which would require purchases.

The Committee asked staff to share the positive GRT and LRT news to Council on a regular basis, in addition to the challenges, so that Council can get a feeling on how the system is working and moving across the Region.

10. Next Meeting - October 10, 2023

11. Adjourn

J. Liggett left the meeting at 10:28 am.

Moved by C. Huinink
Seconded by N. Salonen

That the meeting adjourn at 10:29 a.m.

In Favor (15): K. Redman, D. Craig, R. Deutschmann, J. Erb, S. Foxton, M. Harris, C. Huinink, C. James, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, and P. Wolf

Carried (15 to 0)

Committee Clerk

Committee Chair

Asset Management and Capital Budget Alignment

Planning and Works Committee

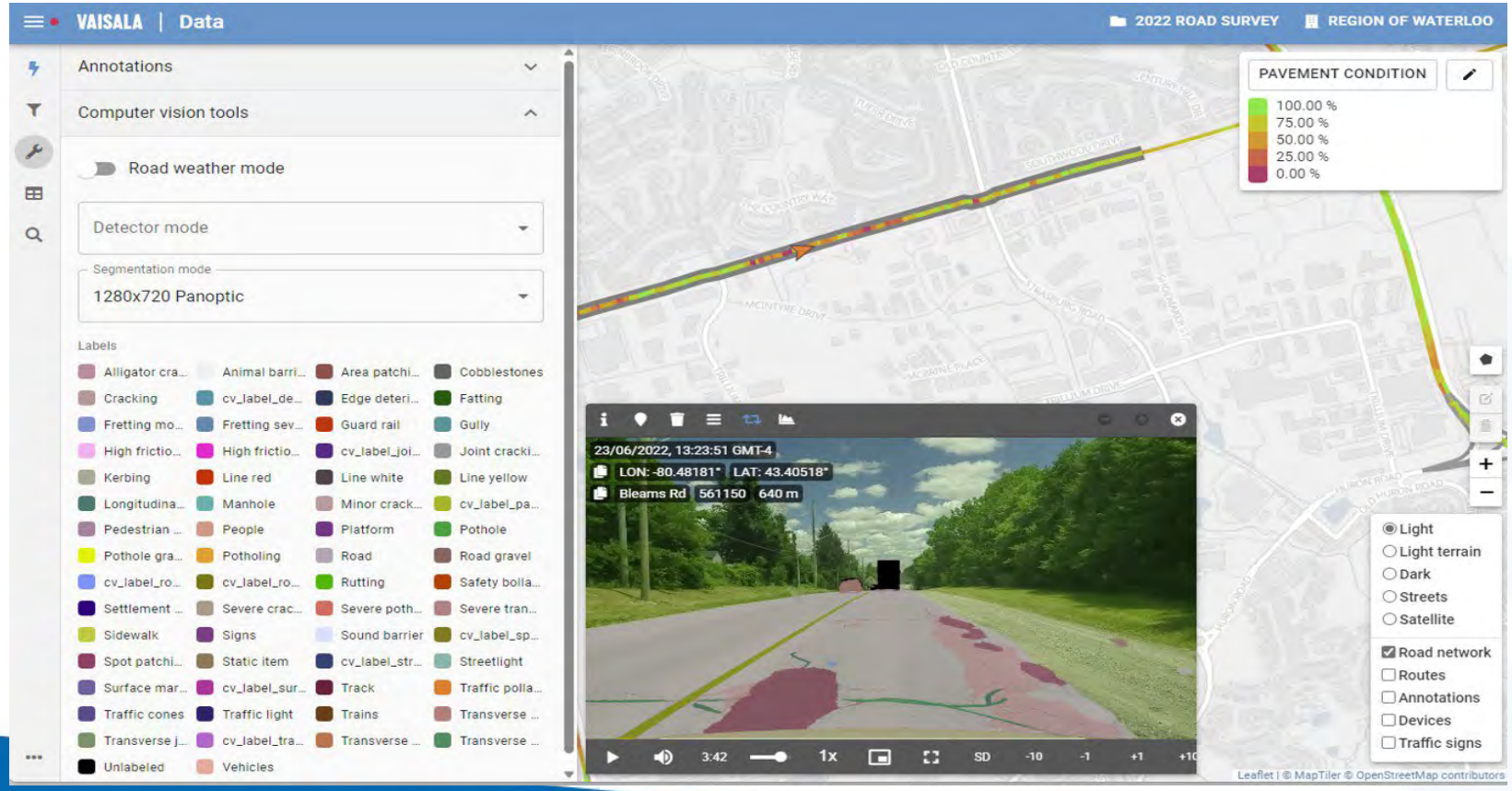
September 12, 2023

Region of Waterloo

Corporate Asset Management and Capital Planning

Strategic Investments	Strategic investments in infrastructure assets using a variety of data points to develop a comprehensive capital plan
Levels of service	Fiscally responsibly infrastructure investment strategy to ensure delivery of services according to legislative and council approved levels of service
Infrastructure interventions	Strategic use of interventions, including preventative maintenance, repair, rehabilitation or replacement
Growth	Integrated with growth infrastructure
Reserves	Intentional investments in reserves for future anticipated needs

Condition of Assets – Roads example



Strategic Investments in Existing Infrastructure

Levels of Service

- Legislated – delivery of potable water
- Council approved – condition of road before replacement
- Future growth needs

Prioritization

- Capital Budget is prioritized base on condition and levels of service
- Current practice – prioritize within each program area
- Future practice – organization wide approach to prioritization

Investment

- AM Plan will strategically prioritize where the Region invests tax dollars

Funding gaps

The asset management plan gap

- gap between needed expenditure per the asset management plan and the planned expenditure in the capital program

- Based on the 2019 asset management plan and inflating values to 2023 dollars, this gap is currently estimated at $61M

Funding gaps

The renewal funding gap

- the difference between required and targeted levels of investment (reserve contributions) in order to make the capital program sustainable and avoid issuing debt for renewal works

- based on the 2023 operating budget and 2023-2032 capital program requirements, this funding gap is currently estimated at $41M

Asset Renewal Funding Strategy

Implemented in 2015

Increase "pay-as-you-go" funding for asset renewal – increase contributions to capital reserves, offset in part by debt servicing cost savings as old renewal debt is retired

Goal is to not issue new debt for asset renewal purposes

Instead: Focus debt issuance on service expansion, growth and transformative capital investments

Region of Waterloo

Engineering and Environmental Services

Design and Construction

To:	Planning and Works Committee
Meeting Date:	September 12, 2023
Report Title:	Project Approval for Scheifele Bridge Replacement, Northfield Drive at Conestogo River, Township of Woolwich

1. Recommendation

That the Regional Municipality of Waterloo:

a) Approve the recommended project design concept for Scheifele Bridge Replacement, Northfield Drive at Conestogo River, Township of Woolwich, as described in Report EES-DCS-23-008, dated September 12, 2023.

b) Direct staff to file the Notice of Completion for this Class Environmental Assessment Study and place the Environmental Study Report on the public record for a period of 30 days.

2. Purpose / Issue:

Seek Council approval for the design concept and to file a notice of completion. The design concept includes providing paved shoulders for buggies and cyclists on both sides of the bridge and a sidewalk with a concrete barrier separating pedestrians from traffic on the east side of the bridge.

3. Strategic Plan:

This project supports Strategic Focus Area 2—Sustainable Transportation.
It will offer residents more choice in active transportation and improve road safety for this crossing of the Conestogo River.

4. Report Highlights:

≠ The new bridge will be wider to accommodate all modes of travel including motorists, cyclists, pedestrians and buggies, and will have a lifespan of approximately 75 years.

≠ The new bridge will be constructed slightly to the west of the existing Scheifele Bridge to maintain two-way traffic during construction.

- ≠ The new bridge includes the following:
    - o two vehicle lanes;
    - o paved shoulders for buggies and cyclists on both sides of the bridge; and
    - o a sidewalk with a concrete barrier separating pedestrians from traffic on the east side of the bridge.
- ≠ The funding for the detailed design and construction are included in the 2023 ten-year capital plan.
- ≠ This project will help with climate mitigation with the installation of cycling facilities and a pedestrian facility on the bridge to allow for active transportation.

More information is provided in the appendices.

5. Background:

Scheifele Bridge, on Regional Road 22 (Northfield Drive) over the Conestogo River, must be replaced to address its deteriorating condition.

Currently, Scheifele Bridge is a two-lane structure with a narrow sidewalk on one side as well as narrow shoulders lacking adequate space to separate cyclists and buggies crossing the Conestoga River from vehicles.

There are modest volumes of buggies and pedestrians and a significant number of cyclists crossing Scheifele Bridge.

There are plans to install a trunk watermain on Northfield Drive and Sawmill Creek Road, to upgrade municipal water supply to the Villages of Conestogo and St. Jacobs. These plans will be considered in the design for the new Scheifele Bridge.

6. Communication and Engagement with Area Municipalities and the Public

Area Municipalities: Township of Woolwich staff were part of the project team that developed the recommended alternatives.

Public:

Public consultation included three occasions where project information was posted to the Region's EngageWR website and residents were asked to provide feedback online.

Letters were delivered to applicable agencies and property owners within the Village of Conestogo and adjacent areas at various stages of the Environmental Study to provide project information and engagement opportunities. Engagement information was also included on signs at the bridge and ads in local newspapers.

In-person meetings or phone conversations were coordinated with area residents and the Mennonite community.

Project comments and feedback included 52 recorded contributions from over 1700 visits to the EngageWR website.

Feedback from the public included both support for and concerns regarding the proposed bridge replacement. The main themes raised by the public and Mennonite Community included:

- ≠ maintaining travel access between Waterloo and Conestogo during construction;
- ≠ providing safe travel for pedestrians, cyclists and buggies;
- ≠ controlling speeds across the bridge;
- ≠ protecting wetland areas to the west of the bridge;
- ≠ providing safe travel for pedestrians, cyclists and buggies north and south of the bridge on Northfield Drive outside of the limits of the bridge replacement project.

7. Financial Implications:

The Region's approved 2023-2032 Transportation Capital Program includes a total budget of $23,451,600 ($487,700 in 2023 and $22,963,900 in 2024-2027) for the Scheifele Bridge Replacement (Project #05954) to be funded from levy supported debentures (47%, $11,006,500), Transportation Capital Reserve (40%, $9,352,400), Canada Community Building Reserve Fund (13%, $3,092,700).

8. Conclusion / Next Steps:

Subject to Regional Council approval of the recommended design concept, staff will file a Notice of Study Completion on the public record for a 30-day review period. After the review period, staff will meet with affected landowners for minor property acquisition(s), start detailed design, and coordinate required utility relocations, with construction planned from 2025 to 2027.

9. Attachments:

Attachment A - Key Plan

Attachment B – Recommended Alternative Alignment #2

Attachment C – Recommended Bridge Cross Section #5 (Modified)

Attachment D – Proposed Staging Design (Maintaining 2-Way Travel)

Attachment E – Responses to Public Consultation Comments

Prepared By: Ken Brisbois, Project Manager, Design and Construction

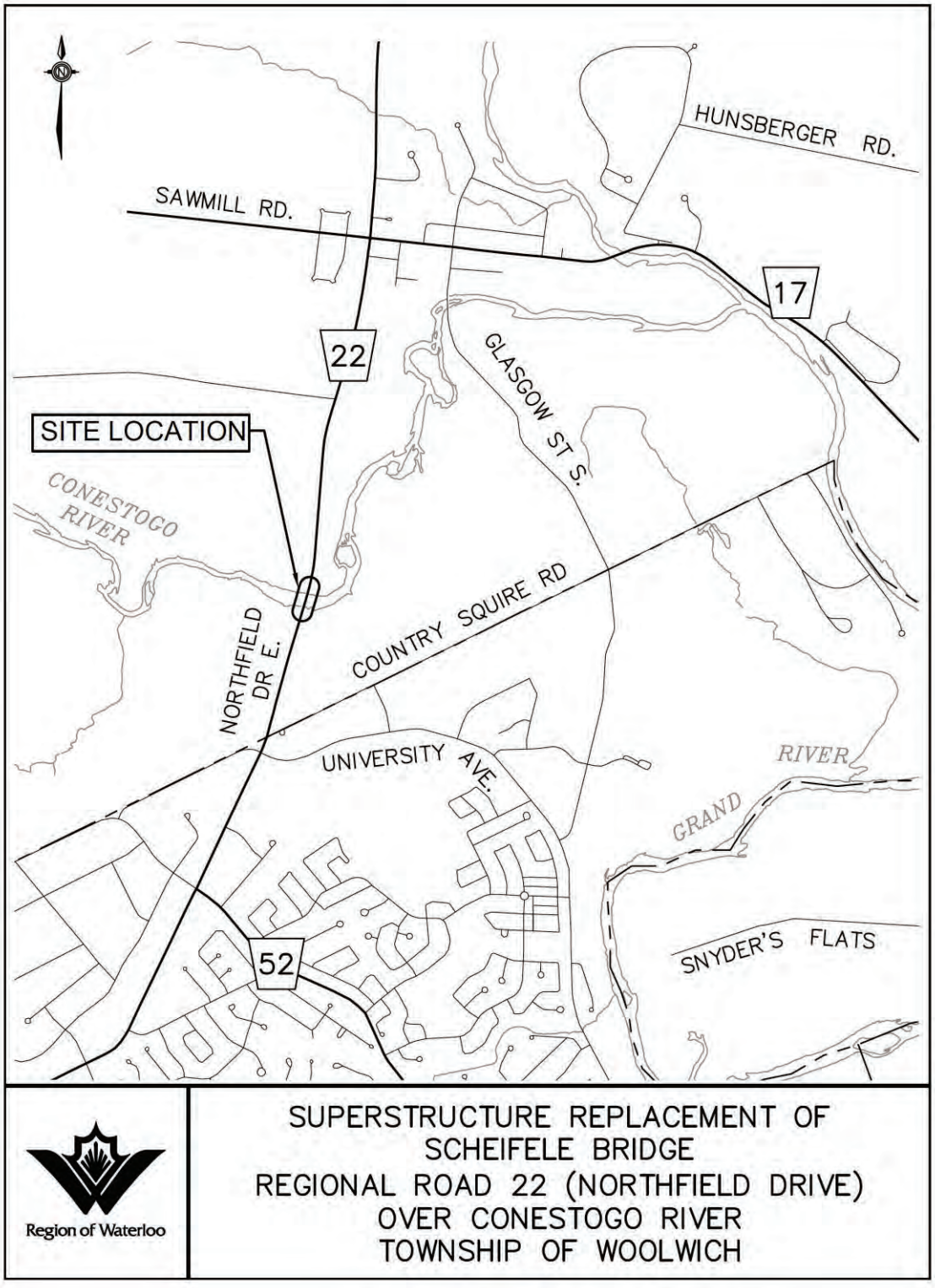
Skylar Van Kruistum, Head, Design and Construction

Reviewed By: Phil Bauer, Director, Design and Construction

Approved By: Jennifer Rose, Commissioner, Engineering and Environmental Services

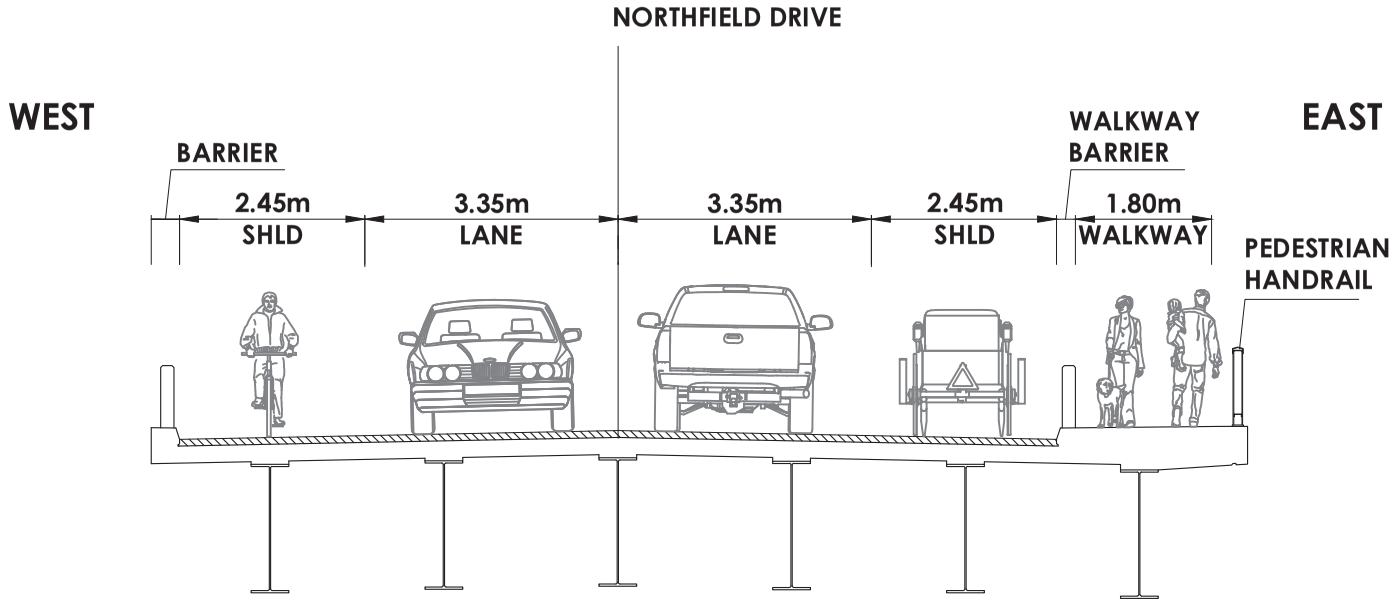
Mathieu Goetzke, Commissioner, Transportation Services

Attachment A - Key Plan



Attachment B – Recommended Alternative Alignment 2

Stantec



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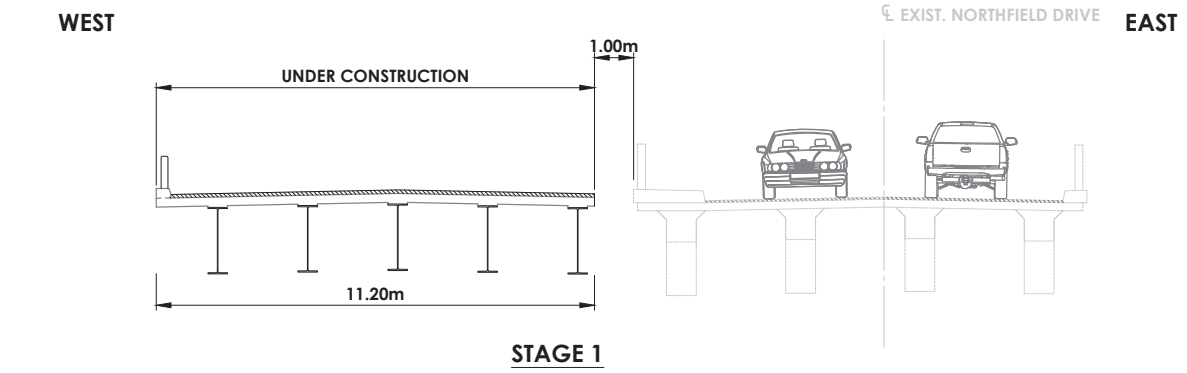
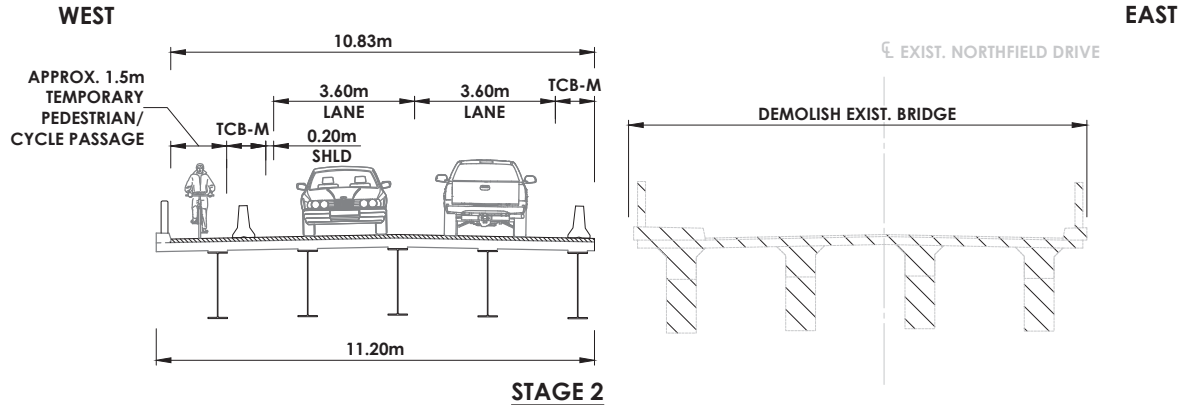
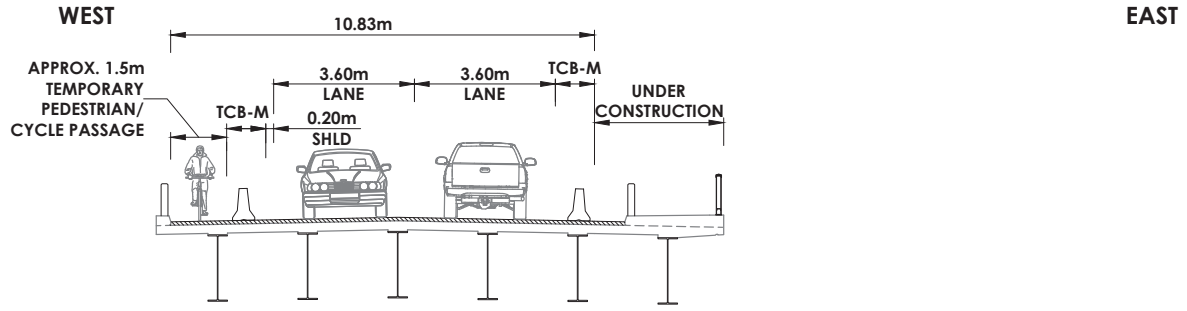
Region of Waterloo Stantec



STAGE 1



STAGE 2



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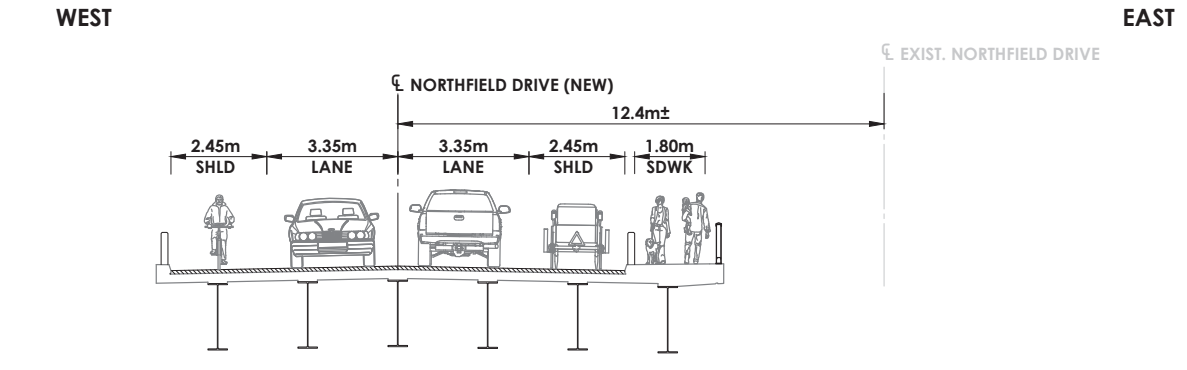

STAGE 4

Scale: 1 : 125

Attachment E – Responses to Public Consultation Comments

As part of the preliminary design process for this project, staff sought public input on the bridge replacement. Letters were delivered to all agencies and property owners within the Village of Conestogo and adjacent areas at various stages of the Environmental Study to provide project information and engagement opportunities. EngageWR information was also included on signs that were installed at the bridge location, and in newspapers ads in local papers.

Project information was available on the Region's EngageWR website, including contacts for appropriate Region of Waterloo staff and the opportunity to subscribe for project updates. The EngageWR website provided people the opportunity to participate in a public survey regarding the project.

Survey Summary

The EngageWR website recorded 52 survey responses from the three Public Consultation Centres and approximately 1700+ visits to the site.

From the Engage survey polled at PCC#2, approximately 80% of the participants that answered were in favour of the recommended bridge alignment, approximately 72% of the responses support the recommended cross section of the bridge which included sidewalks on both sides of the bridge and finally an overwhelming 97% support staging the construction to maintain two-way travel during construction. After staff reviewed pedestrian usage and project cost saving potential, an option was developed which eliminated one of the previously recommended sidewalks. Participants were polled at PCC#3 whether they would be in support of installing sidewalk on only the east side of the bridge to which 75% were in favour.

Main Concerns Raised by the Public and Adjacent Property Owners

Feedback from the public included concerns as well as support for the with the project teams recommended alternative. Responses to the main themes raised by the public and adjacent property owners are below:

a) Request to maintain travel along Northfield Drive and over the bridge during construction.

The project team recognized the fact that Northfield Drive is a critical link between Waterloo and Conestogo and therefore developed an alternative which would allow two way travel across the Conestogo River by staging approximately half of the new bridge construction to the west of the existing bridge. Traffic would continue to use the existing bridge structure until Stage 1 of the new bridge is built at which time traffic would be moved over to the newly built portion and the existing bridge demolished in order to construct the second half of the new bridge under Stage 2. A final stage would see a short term closure to align the approaches and the newly built structure.

b) Concern for the width of the new bridge structure and its ability to accommodate all modes of travel.

Respondents expressed concern regarding the lack of safety for cyclists, pedestrians and buggies on the existing bridge as the width is inadequate for these modes of transportation. The project team developed a recommended cross section which accommodates a balance for all modes of travel across the bridge and includes 3.35m driving lanes, 2.45m shoulders as well as a 1.8m sidewalk on the east side separated by a roadside concrete barrier.

c) Concerns surrounding speed and safety along Northfield Drive and across the bridge structure.

The new bridge will allow for some geometric design corrections to improve the safety and overall ride of both of the bridge approaches as well as the bridge. The preferred alternative will provide narrower driving lanes to slow drivers down in addition to wider shoulders providing much more room for buggies, cyclists, and pedestrians to navigate across the bridge.

d) Concern of the wetland area affected by the proposed new bridge.

Residents raised concerns regarding impacts to the natural areas surrounding the bridge due to any proposed widening.

The project team looked at various alignment options and it was determined that a staged construction to the west of the existing bridge structure would be the best alternative as it provides the ability to maintain traffic during construction while still minimizing the impacts to natural habitat surrounding the bridge.

Also, there was mention of providing a better connection to the Health Valley Trail along the Conestogo River, which crosses under the bridge near the south abutment

During detailed design a review of the trail under the bridge structure at the south abutment can be conducted regarding possible enhancements for those travelling along and/or accessing the Health Valley Trail.

e) Concerns regarding the cross section along Northfield Drive on either side of the bridge structure.

Cyclists and Residents raised concerns over the existing cross section along Northfield Drive on either side of the bridge over Conestogo River. This section of road is beyond the scope of this project, but the feedback will be considered when planning any future projects along these areas of Northfield Drive.

Regional Council Minutes

September 27, 2023, 6:00 p.m.
Council Chambers

Members Present: K. Redman, D. Craig, R. Deutschmann, J. Erb, S. Foxton, C. Huinink, C. James, J. Liggett, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, P. Wolf

Members Absent: M. Harris

Should you require an alternative format or a copy of the official minutes please contact the Regional Clerk at Tel.: 519-575-4400, TTY: 519-575-4605, or regionalclerk@regionofwaterloo.ca

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Council will consider a motion to go into Closed Session at the start of the meeting. The Open Session will resume following Closed at approximately 7:00 p.m.

1. Call to Order

Regional Chair K. Redman called the meeting to order at 6:00 p.m.

2. Land Acknowledgement

Regional Chair K. Redman provided a land acknowledgement.

3. Motion to go into Closed Session

Moved by S. Foxton
Seconded by J. Erb

That a closed meeting of Council be held on Wednesday, September 27, 2023 at 6:05 p.m. in accordance with Section 239 of the “Municipal Act, 2001”, for the purposes of considering the following subject matters:

1. Receiving advice that is subject to solicitor-client privilege related to a potential litigation;
2. Discussions about identifiable individuals related to advisory committee appointment; and

3. Receiving advice that is subject to solicitor-client privilege.

In Favor (13): K. Redman, D. Craig, R. Deutschmann, J. Erb, S. Foxton, C. Huinink, J. Liggett, D. McCabe, J. Nowak, N. Salonen, S. Shantz, K. Williams, and P. Wolf

Carried (13 to 0)

4. Motion to Reconvene into Open Session

Regional Chair K. Redman recognized that September 30th is the National Day for Truth and Reconciliation and acknowledged the work that has been done to date by the Reconciliation Action Plan team.

C. James joined the meeting during the closed session.

B. Vrbanovic joined the meeting at 7:12 pm.

Moved by J. Nowak
Seconded by J. Erb

That Council reconvene into Open Session.

In Favor (15): K. Redman, D. Craig, R. Deutschmann, J. Erb, S. Foxton, C. Huinink, C. James, J. Liggett, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, and P. Wolf

Carried (15 to 0)

5. Declarations of Pecuniary Interest under the "Municipal Conflict of Interest Act"

None declared.

6. Presentations

Graham Walsh, Regional Solicitor, provided a presentation outlining the purpose and intention of the proposed amendment to the code of use by-law. A copy of the presentation is appended to the original minutes. He stressed that the amendment is designed to address harassment and not intended to prevent legitimate protest or political discourse. He further outlined the fundamental freedoms and limits on those freedoms that are contained in the Charter of Rights and Freedoms.

7. Petitions

None.

8. Delegations

8.1 Helen Fishburn, CEO, Canadian Mental Health Association Waterloo Wellington

H. Fishburn provided a presentation outlining the results of a survey looking at the mental health of the community. A copy of the presentation is appended to the original minutes. She highlighted that 90% of respondents want all levels of government to respond to mental health challenges with solutions and that additional work is needed, especially in rural communities. She encouraged municipal partners to integrate mental health into all aspects of decision making.

8.2 Ashley Schuitema, Member of the Waterloo Region Community Legal Services

A. Schuitema appeared before Council regarding the recent closure of the encampment at 150 Main Street. She encouraged the Region to designate a space in Cambridge where people can set up tents and stated that people who left 150 Main Street have said that it was not voluntary and that suitable options were not offered. She shared stories of individuals that formerly resided at 150 Main Street and then went to Soper Park.

In response to a question from Council, A. Schuitema stated that it is easy to point the finger at other levels of government for funding but an easy solution for the Region is to designate a place to tent.

8.3 Julia Malott, Kitchener

J. Malott spoke regarding the proposed amendment to the code of use by-law. She stated that limiting freedom of speech should not be taken lightly and expressed concerns with by-law enforcement making this decision. She noted that she has experienced hateful speech and that the current by-law allows for someone to be removed from Regional property for hateful speech.

8.4 Alan Honner, Litigation Director, The Democracy Fund

A. Honner stated that provisions of the Criminal Code mean that the by-law is not required. He provided his legal opinion that the amending by-law limits free expression by more than is required to achieve the goal and that the by-law and would fail a constitutional challenge.

8.5 Marium Ali, Million March 4 Children KW, Hands Off Our Kids, Waterloo Council For Religious Freedom Waterloo; and Wasai Rahimi, President, Afghan Council and organizer of Parent Protest on September 20

M. Ali and W. Rahimi appeared to express their concerns with the proposed amendment. A copy of M. Ali's written remarks are attached to the original minutes. M. Ali stated that she doesn't think that the amendment will improve safety and is concerned it could be used to intimidate citizens from sharing their opinions to influence legislation. W. Rahim expressed his concerns with the by-law, noting that the by-law would take away freedom of speech from parents.

8.6 Janice Jim, Waterloo

J. Jim appeared before Council to highlight recent incidents of anti-Asian and anti-2SLGBTQ hate. She stressed that it causes harm to individuals and thanked the Region for putting forward the amendment to the code of use by-law. A copy of her written remarks are attached to the original minutes.

8.7 Laura Pin, Hamilton

L. Pin expressed her concerns with limited housing options and the recent eviction of an encampment at Soper Park in Cambridge. She stressed that people do not have options for legal shelter, and that this is a matter of life and death for people. She shared a story of an individual that was forced to leave Soper Park previously and when a community worker checked on them later, they had passed away. She encouraged the Region to cease evictions on Regional land, reopen space at 150 Main Street, and identify suitable lands for tenting in Cambridge. A copy of her written remarks are attached to the original minutes.

8.8 Marjorie Knight, Cambridge

M. Knight shared her lived experience living with homelessness. She highlighted that it is constantly stressful and challenging to find shelter, and that being a woman experiencing violence is the quickest way to homelessness.

8.10 Adam Cooper, Cambridge

A. Cooper appeared before Council to express his concerns with the wording of the amendment by-law noting that one could have legal issues just because someone feels uncomfortable. He stressed that the by-law

will hinder speech and thought. He encouraged Councillors to not vote for it in its current form.

8.9 David Alton, Lived Expertise Facilitator, Social Development Centre of Waterloo Region

D. Alton noted that they have received hateful messages from many individuals and that they support the addition of adding socio-economic status or housing status to the amending by-law. They shared stories of harassment and hateful messages that have been directed at homeless individuals and stated that the amendment to the by-law will be an education tool that hate and harassment toward homeless communities will not be tolerated.

8.11 Fauzia Mazhar, Executive Director, Coalition of Muslim Women of KW

F. Mazhar stated that she has experienced harassment and hate since she came to Canada and reminded Council that the Coalition of Muslim Women of KW recommended the amendment to the code of use by-law in the wake of the attack on the Afzaal family in London. She encouraged the Region to pass the by-law and be a leading municipality, to ensure that people like her can be free from harassment in public spaces.

8.12 Craig Sloss, Waterloo

C. Sloss shared his recent experience as a part of a queer youth rally noting the slurs that were used. He stressed that legitimate protest can be done without harassment and noted his support for homeless individuals being added to the list of protected individuals in the code of use by-law. A copy of his written remarks are attached to the original minutes.

8.13 John Bannister, Treasurer of PSAC Local 902

J. Bannister appeared in support of the proposed by-law amendment noting that it is necessary and will ensure a place for all. He encouraged Council to defend people that have historically not been protected.

8.14 Elaine Scharlach, Kitchener

E. Scharlach stated that she rejects the by-law amendment noting that free speech is under attack. She expressed her concern that free speech is being labeled as hateful, and questioned who will be the arbitrator of hurt feelings.

8.15 Brooklin Wallis, Kitchener

B. Wallis shared her experiences with street harassment noting that the amendment will empower marginalized groups to feel safe in public spaces. She noted that Edmonton and Calgary have implemented similar by-laws and that protests have still occurred. A copy of her written remarks are attached to the original minutes.

8.16 Brian Finlayson, Kitchener

B. Finlayson encouraged Council to not pass the amendment to the code of use by-law noting that it will infringe on the rights for public protest. He stated that it will enable public indoctrination and erode parental rights to determine what is best for their children.

8.17 Brian Kitchen, Cambridge

B. Kitchen stated that he has recently been evicted from Soper Park in Cambridge. He explained that he has been removed from places without other options of where to stay. He encouraged the Region to use vacant industrial or retail as places for people to reside.

Council recessed at 8:56 and reconvened at 9:13 p.m.

Regional Chair K. Redman noted that the procedure by-law states that recording devices are not permitted if they are disruptive. She directed the gallery to turn off all recording devices.

8.18 David Broderick, Kitchener

D. Broderick stated that the by-law amendment does not curtail peoples' ability to hold a demonstration. He stressed that there are differences in speech, and that hate speech is not legitimate discourse.

D. Craig left the meeting at 9:05 pm.

8.19 Michael Wassilyn Sr, Guelph

M. Wassilyn Sr. expressed his concerns with the by-law amendment noting that it will increase hate speech and did not have sufficient consultation with the public. He encouraged Council to vote against the by-law.

8.20 Heather Majaury, Kitchener

H. Majaury appeared in support of including socio-economic status and homelessness in the by-law amendment. She noted that she has experienced systemic hatred for homeless individuals in the community.

8.21 Reverend Roslyn Vincent-Haven

R. Vincent-Haven appeared in support of the by-law amendment noting that she heard hate speech at a recent protest. She stated that it was scary and couldn't imagine the impact on marginalized individuals.

8.22 Julian Ichim

J. Ichim stated that the by-law amendment will not do anything, and that people who are poor and homeless are constantly persecuted. He noted that municipalities will be violating the by-law whenever they evict homeless individuals.

8.23 Peter Sommerfeld, Kitchener

P. Summerfeld expressed his concerns with the subjective nature of the use of the word "feeling" in the by-law amendment and who will be the arbitrator of feelings. He stated that harassment should be demonstrable and the by-law will have a chilling affect on free speech.

9. Minutes of Previous Meetings

Moved by P. Wolf
Seconded by S. Shantz

That the following minutes be approved.

In Favor (14): K. Redman, R. Deutschmann, J. Erb, S. Foxton, C. Huinink, C. James, J. Liggett, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, and P. Wolf

Carried (14 to 0)

9.1 Closed Council - August 30, 2023

9.2 Council - August 30, 2023

9.3 Nominating Panel - September 7, 2023

9.4 Closed Nominating Panel - September 7, 2023

9.5 Planning and Works Statutory Public Meeting - Regional Official Plan Amendment - September 12, 2023

9.6 Planning and Works Committee - September 12, 2023

9.7 Administration and Finance Committee - September 12, 2023

9.8 Closed Committee - September 12, 2023

9.9 Community and Health Services Committee - September 12, 2023

9.10 Strategic Plan and Budget Workshop - September 19, 2023

10. Communications

10.1 Council Information Package - September 20, 2023 (Distributed to Councillors Electronically)

Received for information.

10.2 Perry and Charlene Carruthers

Received for information.

10.3 Angela Wray

Received for information.

10.4 Tanner Siglaet

Received for information.

10.5 Kim Moore

Received for information.

10.6 Educating Minds, Parents of Waterloo Region (EMPOWR)

Received for information.

11. Motion to Go Into Committee of the Whole to Consider Reports

Moved by D. McCabe
Seconded by C. Huinink

That Council go into Committee of the Whole to consider reports.

In Favor (14): K. Redman, R. Deutschmann, J. Erb, S. Foxton, C. Huinink, C. James, J. Liggett, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, and P. Wolf

Carried (14 to 0)

12. Reports

12.1 Committee Reports

12.1.1 Planning and Works Summary - September 12, 2023

Moved by S. Shantz
Seconded by P. Wolf

That the following recommendations from the Planning and Works Committee be approved:

1. That the Regional Municipality of Waterloo:

a) Approve the recommended project design concept for Scheifele Bridge Replacement, Northfield Drive at Conestogo River, Township of Woolwich, as described in Report EES-DCS-23-008, dated September 12, 2023;

b) Direct staff to file the Notice of Completion for this Class Environmental Assessment Study and place the Environmental Study Report on the public record for a period of 30 days.

2. That the Regional Municipality of Waterloo authorize the appointment of the Director of Water and Wastewater Services to act as the owner representative for the drinking water systems owned and operated by the Regional Municipality of Waterloo as outlined in report EES-WAS-23-008, dated September 12, 2023.

3. That the Regional Municipality of Waterloo amend the Traffic and Parking By-law as set out in Schedule A to allow the use of administrative penalties for parking on Regional roads, pursuant to report PDL-LEG-23-045, dated September 12, 2023.

In Favor (14): K. Redman, R. Deutschmann, J. Erb, S. Foxton, C. Huinink, C. James, J. Liggett, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, and P. Wolf

Carried (14 to 0)

12.1.2 Administration and Finance Summary - September 12, 2023

Moved by J. Erb
Seconded by N. Salonen

That the following recommendations from the Administration and Finance Committee be approved:

1. That the Regional Municipality of Waterloo approve the following to support the Council- approved expansion of the Automated Speed Enforcement Program to all school zones within the Region, subject to 2024 budget approval as outlined in report PDL-CAS-012, dated September 12, 2023:

    a. Approve the establishment of a Region of Waterloo processing centre for automated speed enforcement infractions;

    b. Direct staff to submit the proposed staffing and budget requirements as part of the 2024 Plan and Budget for the associated start-up costs, and the permanent full-time positions necessary for operating the automated speed enforcement processing centre as outlined in the report; and

    c. That the Commissioner of Transportation Services, on behalf of the Region, enter into an Amending Agreement amending the current Agreement between Redflex Traffic Systems (Canada) Limited and the Region dated July 16, 2019, to allow for the supply of necessary equipment for the Region to establish the Region of Waterloo Processing Centre, to the satisfaction of the Regional Solicitor.

In Favor (14): K. Redman, R. Deutschmann, J. Erb, S. Foxton, C. Huinink, C. James, J. Liggett, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, and P. Wolf

Carried (14 to 0)

12.1.3 Closed Committee Summary - September 12, 2023

Moved by C. Huinink
Seconded by D. McCabe

1. That the Regional Municipality of Waterloo:

    a. Authorize and direct the Regional Solicitor on behalf of the Regional Municipality of Waterloo to enter into an Agreement of Purchase and Sale with Angela Celestine Campbell and Robert Douglas Campbell (the “owner”), and execute all documentation with respect to the

purchase of property municipally known as 16 Reinhardt Street, Kitchener, and being legally described as Lot 30, Plan 131; Part of Lots 27-29, Plan 131, as in 1098396; Kitchener; in the City of Kitchener, Regional Municipality of Waterloo; being all of PIN 22326-0185 (LT) (the "Property"), for the sum of $801,000, with all terms and conditions subject to the satisfaction of the Regional Solicitor; and

b. Authorize and direct the Regional Solicitor to execute such documents, to the satisfaction of the Commissioner of Community Services and the Regional Solicitor, and to carry out the Agreement of Purchase and Sale.

In Favor (14): K. Redman, R. Deutschmann, J. Erb, S. Foxton, C. Huinink, C. James, J. Liggett, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, and P. Wolf

Carried (14 to 0)

12.1.4 Community and Health Services Summary - September 12, 2023

Regional Chair K. Redman noted that item three on the Community and Health Services Summary will be taken separately.

Responding to questions, G. Walsh stated that staff did not seek an external legal opinion on the proposed amendment, but he stressed that the Region has a very experienced legal team and staff are confident that any Charter issues are addressed. He further noted that the by-law does not apply to Regional roads but would apply to Regional facilities and transit.

In response to a question from Council, G. Walsh stated that if the by-law amendment is passed, by-law enforcement staff will be trained on the changes to the by-law including the Charter rights that are involved. Council requested that if the by-law amendment is approved, that staff provide a report on how the training of by-law officers will occur and what enforcement of the by-law will look like.

Council debated the proposed by-law amendment and the implications of various provisions and the impact on the community. Various amendments to the Committee recommendation were adopted by unanimous consent.

Moved by C. James
Seconded by S. Foxton

That the following recommendations from the Community and Health Services Committee be approved:

1. That the Regional Municipality of Waterloo take the following actions with regard to Year 5 (2023/24) and 6 (2024/25) of the Canada-Ontario Community Housing Initiative (COCHI) and the Ontario Priorities Housing Initiative (OPHI), as outlined in report CSD-HOU-23-025 dated September 12, 2023:

    a. Approve the recommended Year 5 and 6 Investment Plan for submission to the Ministry of Municipal Affairs and Housing;

    b. Authorize the Commissioner, Community Services Department to execute such agreements and documentation in a form satisfactory to the Regional Solicitor, as may be required to process the advance of funding for these programs;

    c. Authorize either the Assistant Director or Director, Housing Services, to execute and deliver all other documentation required by the Ministry of Municipal Affairs and Housing and the Region of Waterloo to allocate funding from COCHI and OPHI;

    d. Approve 2 new full time equivalent (FTE) positions as detailed in Report CSD-HOU-23-025 dated September 12, 2023 to be fully funded from COCHI and OPHI funding; and

    e. Request the provincial government allocate additional Canada-Ontario Housing Benefit funding dedicated towards households experiencing homelessness in Waterloo region.

2. That the Regional Municipality of Waterloo approve the Paramedic Services 2024 pre-budget request for service enhancements effective January 1, 2024 as set out in report PHP-PSV-23-006 dated September 12, 2023.

4. WHEREAS intimate partner violence, often referred to as domestic violence, means any use of physical or sexual force, actual or threatened in an intimate relationship, including emotional and/or psychological abuse or harassing behaviour. Persons of any gender or sex can be victims of intimate partner violence; AND

WHEREAS on the morning of September 22, 2015, Carol Culleton, Anastasia Kuzyk and Nathalie Warmerdam were murdered by a former intimate partner; AND

WHEREAS on June 28, 2022, the jury in a Coroner's Inquest held on these deaths (hereinafter referred to as the CKW Inquest), delivered 86 recommendations; AND

WHEREAS every six days in Canada a woman is killed by her intimate partner; AND

WHEREAS in Ontario in 2022, 52 women, or one every week, were victims of femicide; AND

WHEREAS in Ontario in 2023, year-to-date, 30 women in 30 weeks were the victim of femicide; AND

WHEREAS the prevalence of intimate partner violence in Waterloo Region has continued to increase steadily over the last decade with the Waterloo Regional Police Service:
• Attending more than 66,000 calls for service, or an average of 6,600 per year and over 17 per day
• Laying more than 35,000 charges, or an average of over 3500 per year
• Investigating the homicide, attempt homicide and manslaughter of 24 people by an intimate partner; AND

WHEREAS, on any given night in Canada, 6000 women and children sleep in shelters because it is not safe for them at home; AND

WHEREAS racialized women and Indigenous women experience disproportionately high rates of intimate partner violence, AND

WHEREAS Indigenous women are approximately 3.5 times more likely to experience some form of intimate partner violence than non-Indigenous women, and the homicide rate

for Indigenous women and girls is approximately 6 times higher than for non-Indigenous women and girls, and Indigenous women are 12 times more likely to be murdered or missing than any other women in Canada and 16 times more likely than white women; AND

WHEREAS violence against women costs the justice system, health care systems, social services agencies and municipalities billions of dollars per year, and municipalities are on the front lines in addressing gender-based violence; AND

WHEREAS Lanark County, the City of Ottawa, the Region of Durham, Burlington City Council, the Region of Peel, the City of Toronto and numerous other municipal councils, have passed motions declaring intimate partner violence an epidemic and acknowledging the 86 recommendations made by the CKW jury; AND

WHEREAS Indigenous women and girls are 12 times more likely to be missing or murdered when compared to other women in Canada, and that number is 16 times when compared only with White women; AND

WHEREAS the homicide rate for Indigenous community members was seven times higher than their non-Indigenous counterparts.

NOW THEREFORE, BE IT RESOLVED:

THAT Waterloo Regional Council:

Recognizes the issues of violence against women and girls in Waterloo Region as serious to the health and wellness of our residents and their families, AND
Is committed to engaging with community partners to educate and support our residents about the seriousness and long-term danger of violence in our community; AND

THAT Waterloo Regional Council declares that intimate partner violence and violence against women is an epidemic, in accordance with Recommendation #1 of the CKW Inquest; AND

THAT the Province of Ontario be requested to declare that intimate partner violence and violence against women is an epidemic, in accordance with Recommendation #1 of the CKW Inquest; AND

THAT Waterloo Regional Council agrees to integrate intimate partner violence into the Region's Community Safety and Wellbeing Plan, in accordance with Recommendation #10 of the CKW Inquest, and set out gender-based violence/intimate partner violence as a separate priority within the plan, AND

THAT Waterloo Regional Council declares that Intimate Partner Violence and Violence Against Indigenous women, girls and 2SLGBTQQIA is an epidemic, AND

THAT the Province of Ontario be requested to declare, that Intimate Partner Violence and Violence against Indigenous women, girls and 2SLGBTQQIA is an epidemic, AND

BE IT FURTHER RESOLVED THAT this resolution will be circulated to The Honourable Doug Ford, Premier of Ontario, The Honourable Charmaine A. Williams, Associate Minister of Women's Social and Economic Opportunity, The Honourable Parm Gill, Minister of Red Tape Reduction, Members of Parliament and Members of Provincial Parliament representing Waterloo Region, all the cities and townships in the Regional Municipality of Waterloo, the Waterloo Region Police Services Board, the Federation of Canadian Municipalities, the Association of Municipalities of Ontario and the Ontario Big City Mayors.

In Favor (14): K. Redman, R. Deutschmann, J. Erb, S. Foxton, C. Huinink, C. James, J. Liggett, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, and P. Wolf

Carried (14 to 0)

Moved by D. McCabe
Seconded by C. Huinink

3. That The Regional Municipality of Waterloo amend the Code of Use Bylaw (#13-050) in accordance with Appendix A to prohibit harassing / discriminatory behaviour on Regional premises, pursuant to Report CAO-EDI-23-003, dated September 12, 2023;

And that the Regional Municipality of Waterloo amend the proposed by-law to include socio-economic and housing status.

And that Section 1 of Schedule “B” of the By-law be amended by adding subsections (1.1) and (1.2) as follows:

“(1.1) “communicating” and “communication” includes but is not limited to words spoken, written, or recorded electronically or electro-magnetically or otherwise as well as gestures, signs or other visible representations;”

“(1.2) “harassed” includes, but is not limited to:

(a) experiencing objectionable or unwelcome conduct, comment, bullying, or actions that could reasonably cause offence or humiliation, including conduct, comment, bullying, or actions because of race, religious beliefs, colour, disability, age, ancestry, place of origin, marital status, source of income, family status, gender, gender identity, gender expression, sexual orientation;”

And that subsection 2(2) of Schedule “B” of the By-law be amended to add the following subsection (h.1):

“(h.1) communicating with any person in a way that, reasonably in the circumstances, constitutes harassment, subject to the provision that nothing in this subsection shall prevent or limit a lawful protest;”

And that the Regional Municipality of Waterloo recognizes that the Canadian Charter of Rights and Freedoms is paramount.

In Favor (14): K. Redman, R. Deutschmann, J. Erb, S. Foxton, C. Huinink, C. James, J. Liggett, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, and P. Wolf

Carried (14 to 0)

Amendment:
Moved by J. Liggett
Seconded by B. Vrbanovic

That the language "unwelcome" and "objectionable" be removed from the amendment.

In Favor (2): J. Liggett, and B. Vrbanovic

Opposed (12): K. Redman, R. Deutschmann, J. Erb, S. Foxton, C. Huinink, C. James, D. McCabe, J. Nowak, N. Salonen, S. Shantz, K. Williams, and P. Wolf

Defeated (2 to 12)

Amendment:
Moved by B. Vrbanovic
Seconded by R. Deutschmann

That the motion be amended to add:

And that the Regional Solicitor seek a peer-review of the final bylaw from a solicitor specializing in human rights and/or charter law before bringing it back to Council for implementation.

In Favor (5): S. Foxton, J. Liggett, N. Salonen, S. Shantz, and B. Vrbanovic

Opposed (9): K. Redman, R. Deutschmann, J. Erb, C. Huinink, C. James, D. McCabe, J. Nowak, K. Williams, and P. Wolf

Defeated (5 to 9)

12.1.5 Closed Council Summary - September 27, 2023

Moved by S. Foxton
Seconded by N. Salonen

1. That the Regional Municipality of Waterloo approve a Settlement Agreement pursuant to Section 24 of the Expropriations Act with 707 Ottawa Street South Ltd. and Kitchener Ford Ltd. to settle all claims on a full and final

basis in relation to the partial expropriation from the lands municipally known as 707 Ottawa Street South, in the City of Kitchener, whereby the Region pays compensation in the amount of $743,785 plus reasonable costs, as determined by the Regional Solicitor, in accordance with the Expropriations Act; andThat Regional Council increase the 2023 approved budget for Ottawa Street, Homer Watson Boulevard to Alpine Road (Project 07294) by $215,000 to be funded from the Roads Regional Development Charges Reserve Fund.

2. That the Regional Municipality of Waterloo appoint the following memberships and associated length of terms as per the Nominating Panel recommendations:

   Active Transportation Advisory Committee (ATAC):

1. Anne Crowe for a term length of 2 years;
2. Anne Quin for a term length of 2 years;
3. Ashley Cullen for a term length of 2 years;
4. Dan Plante for a term length of 4 years;
5. Jeff Miller for a term length of 4 years;
6. Margaret Santos for a term length of 2 years;
7. Matthew Cowan for a term length of 2 years;
8. Michael C. Jeans for a term length of 2 years;
9. Robert E. Publicover for a term length of 4 years;
10. Tim Osland for a term length of 2 years;
11. Tom Slomke for a term length of 4 years; and
12. Councillors N. Salonen and P. Wolf for the remainder of the term of Council.

   Ecological and Environmental Advisory Committee (EEAC):

1. Charles Priddle for a term length of 4 years;
2. Cory Brown for a term length of 4 years;
3. Deanna Zenger for a term length of 4 years;

4. H.T. Lam for a term length of 4 years;
5. Jeremy Bannon for a term length of 4 years;
6. Julia Shonfield for a term length of 4 years;
7. Karen Ballard for a term length of 4 years;
8. Ken Hough for a term length of 4 years;
9. Krista Elena for a term length of 4 years;
10. Maria M.F. Mesquita for a term length of 4 years;
11. Ryan Archer for a term length of 4 years; and
12. Sandra Mooibroek for a term length of 4 years.

Kissing Bridge Trailway Advisory Board:

1. Nick Wetzel for a term length of 4 years.

Public Art Advisory Committee (PAAC):

1. Angela Grasse for a term length of 4 years;
2. Heather Franklin for a term length of 4 years;
3. Lee Angold for a term length of 4 years;
4. Melika Hashemi for a term length of 4 years;
5. Michelle Purchase for a term length of 4 years;
6. Rob Gorbet for a term length of 4 years;
7. Sharl Smith for a term length of 4 years;
8. Suzanne Luke for a term length of 4 years; and
9. Councillors R. Deutschmann and C. Huinink for the remainder of the term of Council.

In Favor (14): K. Redman, R. Deutschmann, J. Erb, S. Foxton, C. Huinink, C. James, J. Liggett, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, and P. Wolf

Carried (14 to 0)

12.2 Board of Health

12.2.1 Dr. Julie Emili, Associate Medical Officer of Health

Dr. J. Emili provided an update on the status of respiratory illnesses in the community. She highlighted that the Region has had its first influenza case of the season and there has been an increase Covid-19 identified in wastewater. She noted that vaccinations will be available in the coming weeks to the most vulnerable initially and that the general public will have access to the vaccinations toward the end of October.

13. Other Matters Under Committee Of The Whole

13.1 PDL-CPL-23-027, Official Plan Amendment Application Fee Waiver Request, 110 Royal Oak Drive, Cambridge

Rod Regier, Commissioner, Planning, Development & Legislative Services, noted that the request for the fee waiver request has been withdrawn.

Received for information.

14. Motion for Committee of the Whole to Rise and Council Resume

J. Liggett left the meeting at 10:44 pm.

Moved by J. Nowak
Seconded by C. James

That Committee of the Whole rise and Council resume.

In Favor (13): K. Redman, R. Deutschmann, J. Erb, S. Foxton, C. Huinink, C. James, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, and P. Wolf

Carried (13 to 0)

15. Motion To Adopt Proceedings of Committee of the Whole

Moved by S. Foxton
Seconded by N. Salonen

That Council adopt the proceedings of Committee of the Whole.

In Favor (13): K. Redman, R. Deutschmann, J. Erb, S. Foxton, C. Huinink, C. James, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, and P. Wolf

Carried (13 to 0)

16. Motions

17. Notice of Motion

18. Unfinished Business

19. Other Business

C. James requested that staff provide an update on the transition of planning authority to the area municipalities and the impact on the Region and Regional staff. R. Regier confirmed that staff can bring a report back.

20. Questions

21. Enactment of By-laws – First, Second & Third Readings

Moved by D. McCabe
Seconded by K. Williams

That the following by-laws be approved.

In Favor (13): K. Redman, R. Deutschmann, J. Erb, S. Foxton, C. Huinink, C. James, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, and P. Wolf

Carried (13 to 0)

21.1 By-law 23-040

Moved by D. McCabe
Seconded by K. Williams

That a By-law to Amend By-law 16-023, as amended, being a By-law to Regulate Traffic and Parking on Highways Under the Jurisdiction of the Regional Municipality of Waterloo (Establish a System of Administrative Penalties) be read a first, second and third time, finally passed and numbered 23-040, be signed by the Regional Chair and Regional Clerk and sealed with the Regional Seal.

Carried

21.2 By-law 23-041

Moved by D. McCabe
Seconded by K. Williams

That a By-law to amend By-law 13-050, A By-Law Respecting the Conduct of Persons Entering Upon Buildings, Grounds and Public Transportation Vehicles Owned or Occupied by The Regional Municipality of Waterloo, as amended be read a first, second and third time, finally passed and numbered 23-041, be signed by the Regional Chair and Regional Clerk and sealed with the Regional Seal.

Carried

21.3 By-law 23-042

Moved by D. McCabe
Seconded by K. Williams

That a By-law to Confirm the Proceedings of the Council of the Regional Municipality of Waterloo at this Meeting Held on September 27, 2023 be read a first, second and third time, finally passed and numbered 23-042, be signed by the Regional Chair and Regional Clerk and sealed with the Regional Seal.

Carried

22. Adjourn

Moved by P. Wolf
Seconded by D. McCabe

That the meeting adjourn at 10:51 p.m.

In Favor (13): K. Redman, R. Deutschmann, J. Erb, S. Foxton, C. Huinink, C. James, D. McCabe, J. Nowak, N. Salonen, S. Shantz, B. Vrbanovic, K. Williams, and P. Wolf

Carried (13 to 0)

Regional Clerk

Regional Chair

Meeting Notes

The Regional Municipality of Waterloo
SCHEIFELE BRIDGE SUPERSTRUCTURE REPLACEMENT:
Regional Road 22 (Northfield Drive) over the Conestogo River, Township of Woolwich
Class Environmental Assessment and Detailed Design

PROJECT TEAM MEETING NUMBER ONE / 1650-10600/49

Date/Time:	Thursday March 5, 2020 / 10:20 AM		
Place:	Stantec Waterloo Office: Breslau Boardroom		
Next Meeting:	To Be Confirmed		
Attendees:	Ken Brisbois	RMOW	KBrisbois@regionofwaterloo.ca
	John Stephenson	RMOW	JStephenson@regionofwaterloo.ca
	Jared Puppe	Township of Woolwich	JPuppe@woolwich.ca
	Ryan Tucker	Township of Woolwich	RTucker@woolwich.ca
	Michael McGann	Stantec Asst Manager	Michael.McGann@stantec.com
	Mike Trader	Stantec Structures	Mike.Trader@stantec.ca
	Brian Keep	Stantec Geomatics	Brian.Keep@stantec.com
	Jeff Dietz	Stantec Geotechnical	Jeff.Dietz@stantec.com
	Garry Leveck	Stantec Manager	Garry.Leveck@stantec.com
Regrets:	None		
Distribution:	All Present/Brian Campbell; Jayson Innes; Parker Dickson; Mellissa Cameron; Meghan Rivard; Eric Reinink; Sean Geddes; Bill White		
Attachments:	None for this Meeting		

Meeting Topic:	Action By
1.0 Safety Moment - Garry presented the daily Safety Reminder: Always back your car into the parking space. Driving out from a parking space is much easier, and safer, than backing out prior to leaving the parking lot. Numerous accidents happen in parking lots with vehicles backing out of parking spaces.	
2.0 Project Team Introductions - Garry introduced the Project Team members present at this Start Up Meeting. - Garry noted that Michael McGann will provide support as Assistant Project Manager throughout the Class EA Study. - Garry also noted that there are several other senior Stantec staff members who are not present but will represent various specialty study disciplines throughout the Class EA and Design. They include: Mellissa Cameron: Terrestrial Inventory Parker Dickson: Archaeological Assessment Sean Geddes: Fish Habitat and SAR Meaghan Rivard: Cultural Heritage Jayson Innes: Hydraulics, Drainage and Fluvial Eric Reinink: Electrical / WNH Liaison	

	Derek Lough: Landscape Architecture Bill White: Technical and CADD support The above support staff will be engaged on the project when it is appropriate to begin their field investigations and / or preliminary work. - Garry inquired about the need to have other Region and/or Township staff or political involvement in the Class EA Study. After discussion, it was concluded that: - Ken advised that there will likely be political involvement on the Project Team, from both the Region and Township levels. - Ken and Jared will review potential Councillor representation and confirm possible attendees as soon as possible.	Ken Brisbois Jared Puppe
3.0	**Project Background and Summary Problem Statement**	
	- **Project in Region 10 Year Transportation Capital Program:** Garry reviewed the current Region's commitment to the replacement of the Scheifele Bridge Superstructure, as it relates to the Region's 10 Year Transportation Capital Program. The Scheifele Bridge, on Regional Road 22 (Northfield Drive), is a significant structure over the Conestogo River. It represents a major connection between the City of Waterloo and the Village of Conestogo and beyond. The Region's 10 Year Transportation Capital Program (TCP) currently includes funds of $6.8 million, in the 2019-2022 timeline, to complete this project. Ken suggested that the next Transportation Capital Program update will result in an increase in the funding level and extend the timeline to 2023 or 2024, based on the latest schedule for the Class EA, Detailed Design and Construction. - **Primary Design Objectives / Issues:** The Region's commitment to the replacement of the Scheifele Bridge Superstructure, as it relates to design geometrics, aesthetics and environmental preservation, includes the following improvements: Enhance Pedestrian, Buggy and Cycling Facilities, Attempt to Maintain Existing Bridge Sub-Structure and Surrounding Recognize Area Aesthetics, where possible, Minimize Environmental / Conestogo River Impacts, Traffic Management During Construction. - **Class Environmental Assessment:** The parameters guiding the Class Environmental Assessment Study include the following basics:	

Schedule "C" Class EA Study

Examine 3 Bridge Configurations to Accommodate Design Needs:

In terms of alternative bridge designs, Garry reviewed the four preliminary concepts presented in Stantec's EOI submission:

- Two Traffic Lanes Plus Buggy/Bike Lanes and Sidewalk:
    - Slight widening of 2 traffic lanes
    - Add buggy lanes on each side, which would serve as Bike Lanes
    - Include standard sidewalks and parapet walls
    - Total Width: 18.1 m +/-

- Two Traffic Lanes Plus Paved Shoulders and Sidewalk:
    - Slight widening of 2 traffic lanes
    - Add 1.5 m paved shoulders on each side, which would serve as on-road Bike lanes and a "partial safe zone" for Buggies
    - Include standard sidewalks and parapet walls
    - Total Width: 15.1 m +/-

- Two Traffic Lanes Plus Paved Shoulders and Multi Use Trails:
    - Slight widening of 2 traffic lanes
    - Add 1.5 m paved shoulders on each side, which would serve as on-road Bike lanes and a "partial safe zone" for Buggies
    - Include 3 m Multi Use Trails and parapet walls
    - Total Width: 17.5 m +/-

- Four Traffic Lanes Plus Paved Shoulders and Multi Use Trails:
    - Widen bridge to 4 lanes to accommodate future growth in Waterloo and the Township
    - Add 1.5 m paved shoulders on each side, which would serve as on-road Bike lanes.
    - It is assumed that the inside two lanes would serve immediate traffic needs, while the outside two lanes, and paved shoulders, could be reserved for buggies and bike lanes.
    - In the long term, when growth necessitated 4 lanes of traffic, the bridge cross section would be suitable for such needs. Buggies could still utilize the curb lanes, and bicycles would continue using the 1.5 m paved shoulders.
    - Either standard sidewalks or MUTs could be included.
    - Total Width: 21.2 m +/- with sidewalks and 23.6 m +/- with MUTs on each side of the bridge.

- After a brief discussion, the following comments were presented:	
- The above widths do not provide for a barrier between the pavement and the sidewalk / MUT, which may be required. Such barriers create other issues including drainage, snow clearing, and approach side crash attenuation. Further review will be required during the Class EA.	Stantec/ Region
- With any option, John noted that the abutments will most likely require full removal due to heavy concentrations of salt in the concrete. The piers may also be in jeopardy. Further review required.	Stantec/ Region
- John noted that the Scheifele Bridge has inherent structural issues and may need to be monitored between now and the replacement date. It was agreed that Ken will discuss how this will be handled and advise Garry on a possible supplementary assignment, separate from the current Class EA and Design.	Ken Brisbois
- John also suggested that the Project Team may want to investigate a “buggy activation” system that will stop traffic when a buggy approaches the bridge, for added safety. This idea will be reviewed at a future date.	Project Team
- Jared noted that the Region is in the process of initiating a Class EA study to examine a new water feed to the Conestoga area from Waterloo. Garry will contact Kevin Dolishny to confirm the status of the study and the timing of a possible water main installation. It was agreed that hanging the watermain on the reconstructed bridge is not desirable.	Garry Leveck
Examine 3 Options for Construction Staging / Traffic Control:	
In terms of construction staging and traffic control during construction, the Region has requested that three alternatives be considered:	
- Full Bridge and Road Closure / Detours	
- New Bridge on New Alignment	
- Accelerated Bridge Construction (ABC)	
It was noted that a detour of any significant length of time will be problematic for the community, as there is no easy detour route available. Although the Woolwich Street bridge is in the process of being rehabilitated, it is being designed as a “one way”	

route into Waterloo from Conestoga. Regardless, this route would not be suitable for a detour of Northfield Drive traffic, which exceeds 13,500 VPD. It was also noted that if any significant closures/detours are required, advance notification should clearly be provided to the public as well as Regional and Township Council members. It was generally agreed that, without pre-judging the Class EA process, a new bridge on a new alignment would satisfy traffic control issues, allowing for a short-term cutover of a new road to existing Northfield Drive, at either end of the construction limits. This option will be explored in detail, under both the "new Bridge" and the "ABC" models.	Project Team
To facilitate further study, Garry requested that the Region provide current traffic data on Northfield Drive, and the surrounding routes, which will be used to assess the above alternatives. The traffic data must also be presented at the Public Information Center meetings. Ken will investigate and report back to Garry.	Ken Brisbois
Agency and Stakeholder Liaison and Background Material: In conjunction with the Class EA Study, design concepts and related study presentations will utilize the following: - Preliminary Information Report (PIR) - Region "Context Sensitive Guidelines" - Cycling Master Plan - Traffic Data on Northfield Drive (by Region) Agency and Stakeholder liaison will also be vital to the successful conclusion of the Class EA. The liaison will start with issuance of the "Notice of Study Commencement" as well as an "invitation" to agencies to provide preliminary comment on the pending study and design. Garry will prepare a Draft "Notice of Study Commencement" and "Letter to Agencies" for review by Ken. After final editing, the "Notice of Study Commencement" will be placed in the local newspapers and circulated locally, while the "Letter to Agencies" will be mailed to a select list of agencies, utilities, etc. Garry will prepare a draft list of agencies, utilities, etc.	Garry Leveck Ken Brisbois

4.0 Key Design Issues and Constraints:	
- Garry initiated a discussion of the various key design issues and constraints, which will be the foundation for a successful Class EA study. To avoid heading down different study paths, it will be important that the Project Team focuses on alternative design concepts that are achievable and meet the objectives of the project. The following key design items were briefly discussed: - Bridge Deck Widening and Reconstruction Issues: Condition Assessment of Abutments and Piers Foundation Assessment Practicality of Sub-Structure Widening Super-Structure Design (Slab on Girder / Integral Abutments) Construction Staging and Scheduling of Work Heavy Construction Access to Riverbed Cost Assessments and Impacts on Budget - Potential Bridge Architectural Enhancements - Property Impacts and Acquisition Requirements for Options - Utility Relocations and Costs - Conestogo River Hydraulic and Bathometric Analysis - Environmental: DFO and GRCA Approvals Terrestrial and Species-at-Risk impacts Archaeological Assessment	
5.0 Initiation of Geomatics and Geotechnical Work - Garry lead a discussion on the best way to approach the study area topographic surveys and the geotechnical / foundation investigation field work, which represent important first steps in the creation of a base inventory of plans and study background.	
Geomatics Scope of Work and Approach: - Garry presented a preliminary plan showing the approximate topographic survey limits identified in the project Terms of Reference. Also presented was the limit of field surveys that should be completed to ensure that the area captured will serve all future study needs. - After review and discussion, it was agreed that Stantec should extend the limits of the survey to encompass the full extent of future study needs. Brian Keep will	Brian Keep

	review with Garry and Brian Campbell to see what impact this extra work will have on the current geomatics budget. Any budget increase will be taken from the Class EA Contingency Allowance.	Garry Leveck
	- In terms of schedule, Brian Keep advised of a preference to do the field work once the snow has disappeared and the river flows have subsided. Brian will keep Garry posted with schedule updates.	Brian Keep
	- In addition to the capture of property information in the study area, Brian's crew will tie in all boreholes within the open fields and complete the Bathometric River Survey (tied to geodetic benchmarks). Garry asked Brian to coordinate the Bathometric survey with Jayson Innes.	Brian Keep
	Geotechnical and Foundation Scope of Work and Approach:	
	- Jeff Dietz outlined the proposed location of boreholes as presented in the Proposal Submission. The locations included one at each abutment (roadside), two on the bridge deck cored through the center of the bridge, and one on each side of the riverbank in line with a possible new bridge alignment, for a total of 6 boreholes.	
	- Jeff noted access issues for the proposed boreholes on the riverbanks. It was agreed that Ken Brisbois will arrange to contact the owners of Horseback Adventures to see if Stantec can utilize the existing trail to the bridge (southwest borehole). Access for the northwest borehole will be possible from Northfield Drive, although the owner of the adjacent farm should be notified.	Ken Brisbois Jeff Dietz
	- For the two boreholes on the deck, it was agreed that three (3) boreholes should be advanced though the deck drains on the west side of the deck, close to the three piers. Jeff is to coordinate with Mike Trader on which deck drains are to be used for the best borehole locations.	Jeff Dietz Mike Trader
	- The schedule for the borehole work will be dependent on property access issues being resolved and after snow melt.	
6.0	**Project Schedule Review:**	
	Based on the updated Terms of Reference presented by the Region, the current "tentative" schedule for the project was summarized as follows: • Official Start Date: March 5, 2020 • PIC Number 1: November 12, 2020 • PIC Number 2: May 19, 2021 • ESR Filing: October 22, 2021 • Detailed Design: November 15, 2021 to February 16, 2023	

	• Construction: May 2023 to November 2024 Garry noted that the Class EA Study schedule is realistic based on the extent of work and public/agency involvement required. However, Garry suggested that the Detailed Design phase, which allows 15 months, may potentially be completed quicker, depending on the preferred design concept. For example, a “New Bridge” design concept could potentially be completed quicker than an “ABC” design concept. Updates to the Project Schedule will be provided over the course of the Class EA and Design phases.	
7.0	**Other Business** There was no new business presented by the attendees. The meeting adjourned at 12:10 PM, which was followed by a light lunch and miscellaneous discussions.	
8.0	**Next Meeting** No date was established for the next Project Team Meeting. Ken and Garry will collaborate on a preferred date and advise all attendees.	Ken Brisbois Garry Leveck

Garry E. Leveck, P. Eng.
Senior Consultant
Senior Project Manager

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Meeting Notes

The Regional Municipality of Waterloo
SCHEIFELE BRIDGE SUPERSTRUCTURE REPLACEMENT
Regional Road 22 (Northfield Drive) over the Conestogo River, Township of Woolwich
Class Environmental Assessment and Detailed Design
PROJECT TEAM MEETING NUMBER 2

Date/Time:	Tuesday August 11, 2020 / 9:30 AM	
Place:	Due to Covid-19, the meeting was held virtually thru TEAMS	
Next Meeting:	To Be Confirmed	
Attendees:	Ken Brisbois	RMOW
	Ryan Tucker	Township of Woolwich
	Michael McGann	Stantec Asst Manager
	Mike Trader	Stantec Structures
	Bill White	Stantec CADD Tech
	Garry Leveck	Stantec Manager
Regrets:	John Stephenson; Jared Puppe;	
Distribution:	All Present/Brian Campbell; Jayson Innes; Parker Dickson; Mellissa Cameron; Meghan Rivard; Eric Reinink; Sean Geddes; Brian Keep, Jeff Dietz; Cheryl Bauman	
Attachments:	Bridge Cross Section Concepts; Three Alternative Design Concepts (Maintain Traffic); Architectural Concepts report;	

Meeting Topic:		Action By
1.0	**SAFETY MOMENT:** **Wear a mask when in public indoor spaces and maintain 2 m safe social distancing wherever possible.**	
2.0	**Minutes of Project Team Meeting #1: March 5, 2020:** **Review and Action Items Arising:** - Garry reviewed the Minutes of the first Project Team meeting. Some of the meeting topics may be covered further in these minutes. - **Council Representation on Project Team:** Due to Covid-19, no decisions have been made at the Region or Township level with respect to possible Council involvement on the Project Team. Ken advised that he anticipates attendance by one Council member plus one additional staff member (Traffic or Transportation). Ken will further investigate this matter and advise as soon as practical. Ryan advised that no decision has been made at the Township level and will confirm if, and when, a decision is made.	Ken Ryan

Meeting Topic:	Action By
- **Design Issues: Barrier Walls; Condition of Existing Abutments; Monitoring of the Existing Bridge (Agenda Item; Buggy Activation System; Conestogo Watermain Class EA Study:** Further to meeting #1, Garry provided updates on the following design items / issues, some of which are covered in other Meeting Agenda items: - All preliminary bridge cross sections have included barrier walls between the road and sidewalk / MUT (see Agenda Item 4.0) - Further direction is requested from the Region on supplementary inspections to confirm the condition of abutments and piers relative to salt content and deterioration. Reference was made to an email issued March 11, 2020. Ken suggested that Stantec examine the existing bridge and provide a recommendation on a future / ongoing structural inspection program. Mike Trader to investigate and report. Fees for supplementary inspections will be from the project contingency allowance. - Existing Structural Reports have been received by Mike Trader. - Buggy Activation System: No further action has occurred to date. Further discussion may be required if this idea is to be pursued as part of study design, particularly for minimal cross section designs. Garry suggested that a "buggy activation system" may be questionable at this location because of the volumes of buggies could decrease in the future, as the local Mennonite population continues to move northward. - GM Blue-Plan Watermain Crossing Study: The GM Blue-Plan study was received from the Region and has been reviewed in detail (see Agenda Item 3.0) - **Traffic Data for Northfield Drive:** - In a March 11, 2020 email to Ken, Garry outlined the basic Traffic Data requirements that are required for the project. Ken advised that he is waiting for a response from the Region Traffic Department, where staffing levels have been low. Ken will follow up again, and report back to Garry. - **Notice of Study Commencement and Agency Circulation:** - A Notice f Study Commencement was prepared by Stantec and vetted by Ken. It was subsequently advertised in Waterloo Region	Mike Ken

Meeting Topic:	Action By
Record, Waterloo Chronicle and Woolwich Observer in May 2020. (A copy of Notice was issued to Team members) - In addition to the formal Notice, a Region Website has been set up for ongoing public review and comment - The Notice of Study Commencement was issued to an extensive list of Agencies on May 14, 2020: The Agency List was prepared by Garry and Ken. Responses to date Include: - **Bell Canada:** Apparently has a multi cable duct structure attached to the outside of the west bridge deck. Further investigation is required to confirm the configuration of Bell cables (fiber optics, etc.) - **Enbridge Gas:** No existing plant. Asked to be removed from future mailing list. - **Mississauga of the Credit First Nation (MCFN):** Requested involvement of an FLR (Field Liaison Representative) during all field investigation work, under a special agreement with payment conditions. An agreement is currently under review by the Region, with certain pending field work on hold until this matter is resolved. Note: Various field activities have already been completed without FLR involvement. Ken will advise as soon as an agreement is reached with MCFN. *Footnote: Following the Team meeting, an agreement was reached with MCFN in principle. Final details and execution were pending at the time of circulation of these minutes.* - **GRCA:** As the study has the potential to impact the Conestogo River and 2 unnamed tributaries, GRCA wishes to stay involved with the Class EA Study. Trevor Heywood is the GRCA contact. - **Ministry of Environment, Conservation and Parks (MECP):** Heavy emphasis on proponent's responsibilities associated with Aboriginal Community Liaison; A new Part II Order Process is in effect for Class EA Studies which must be followed (to be outlined in future Public Mailings); Draft ESR to be provided to MECP, attention Barbara Slattery. - **Ministry of Heritage, Sport, Tourism and Cultural Industries (MHSTCI):** Recommendations provided for the normal heritage and cultural studies as part of the Class EA process, all of which have been identified and are currently underway by Stantec. - **Rogers Cable Networks:** No existing plant or future needs in the study area. - **Transport Canada:** Recommends an owner Self-Assessment of Project Impacts in lieu of future contact with TC. Transport Canada confirmed that the Conestogo River is NOT a Navigable Water under the Canadian Navigable Waters Act.	Garry Ken

Meeting Topic:	Action By
- **Because of Covid-19, it was agreed that Ken and Garry will work together in sending reminder letters to agencies who have not responded, extending the deadline for final comments. Garry will provide an updated list to Ken, who will issue the letters on Region letterhead.**	Garry Ken
3.0 Work Task Study Data Updates: **Topographic and Property Surveys:** - Topographic and Property Surveys were completed, and Base Plans prepared. - River Cross Section and Bathometric Surveys are pending MCFN Agreement for FLR Site Monitoring, plus Completion of Geotechnical Foundation Investigations. After further discussion, it was agreed that the balance of the field survey work may proceed without the need for an FLR Agreement with MCFN. Garry will contact Brian Keep and Jayson Innes to coordinate the river sections as soon as possible. - Further to agreement at Project Team meeting #1, an addendum fee is pending for the surveys / geomatics Task. The survey limits were expanded beyond the original study terms of reference, which will result in additional costs, yet to be confirmed. So far, the survey work is on budget but the remaining work to be completed for the river sections and bathometric surveys will push the final costs over the original budget. An update on final costs will be presented to the Region once the survey work is completed. **Geotechnical / Foundation Investigations:** - Road Approach and Off-Structure Boreholes were completed - River Boreholes (3) from the bridge deck have been delayed pending the agreement with MCFN for FLR Site Monitoring. Work will proceed as soon as possible. - An Addendum for Additional Borehole, Drilling and Traffic Control Costs ($16,000) was approved by the Region of Waterloo. **Water Resources / Hydraulic River Modelling:** - The river hydraulic analysis work is pending final River Section and Bathometric Surveys, plus any preliminary Bridge Alternative Design concepts. Based on the above comments, the surveys will proceed as soon as possible. Jayson Innes will proceed when surveys are completed.	Garry Brian Garry Jayson

Meeting Topic:	Action By
- *Footnote: Following the Team meeting, Garry confirmed the river cross section / bathometric survey details with Brian and Jayson, with the field work scheduled for the week of August 24, 2020.* - Conestogo River Hydraulic Modeling base was received from the GRCA / Trevor Heywood is GRCA Contact. **Stage 1 Archaeological Study:** - A Draft Stage 1 Report was submitted to Region for review and comment, and subsequently formally submitted to MHSTCI. - Study findings show that 53.6 % of the focus area retains a potential for the identification and documentation of archaeological resources, while the balance area (46.4 %) retains low, to no, archaeological potential. - A Stage 2 Archaeological Study is required for areas where future construction will impact the study zone where future archaeological study resources have a potential for identification and documentation. - Garry noted that, regardless of what construction option is selected, it is expected that there will be impacts on the sensitive archaeological zone, thereby necessitating a Stage 2 Archaeological Assessment in the impacted areas. The Stage 2 study will not occur until a later date, when plowing can occur in the fields. Garry will coordinate with Parker Dickson. **Fish and Mussel Habitat Study:** - Field Work has been completed and a Draft Report in Progress **Natural Habitat Studies:** - Spring Botanical, Vegetation Community Classification, and Bat Habitat Inventories have been completed. A final report is pending Fall fieldwork and will be presented later this year. - Fall Botanical Studies are scheduled for September. **DFO Investigation:** - As noted, the Conestoga River is not Classified as a Navigable Water by DFO. **Traffic Study Data:** - As noted, traffic study data is pending receipt of Information from Region of Waterloo **Watermain Class EA Study: Waterloo to St. Jacobs, Elmira and Conestogo:**	Garry

Meeting Topic:	Action By
- GM Blue Plan Study was received from Region and reviewed in detail by Garry. The study focuses on determining a preferred location for a future 300 mm watermain crossing of the Conestogo River at the Scheifele Bridge. - The recommended preferred option, out of 5, is to hang the 300 WM on the new Northfield Drive bridge. Other options included either open-cut or directional drilling installations under the Conestogo River, on both the west and east sides of the existing or new bridge. - Hanging the proposed watermain on the new bridge represents the preferred design because it is the most cost-effective solution and will result in the least amount of environmental impact, compared to the 4 alternative river level crossings options. - If a subsurface river crossing is preferred over hanging the watermain on the bridge, then Horizontal Directional Drilling (HDD) would be preferred over an Open-Cut installation procedure. - The outstanding question is whether the Region, and the Township, can wait until 2023 / 2024 to install the watermain in conjunction with the bridge replacement construction. - An alternative to hanging the watermain on the bridge, and/or a subsurface river crossing, may be a stand-alone bridge support structure, parallel to the new bridge. This has been successfully completed in other municipalities. - The GM Blue Plan report includes a geotechnical report by Peto MacCallum, which provides supplementary subsurface information that may be helpful to the bridge design team. Mike Trader and Jeff Dietz both have copies of the report. - Further discussions will be required to determine an approach to dealing with the future 300 mm watermain at the Scheifele Bridge crossing. **History of "Scheifele Bridge" Name:** - Garry reviewed the background of "Scheifele" bridge name: - An 1861 Map of the Woolwich Township / Waterloo County area illustrates various landowners and structures related to the study area, including the ***Shifely*** family (alternatively spelled Scheifele). - Listed on the south side of the river are Matthew and Frederick Scheifele, with Christian Scheifele listed on the northwest side of the river. They were brothers and sons of Andrew and Maria Scheifele, who were a pioneer family arriving in Berlin (City of Kitchener) in 1815. - Mapping, dated 1881, shows a bridge crossing the Conestogo River at the same location that the original bridge was shown on the 1861 mapping. The bridges were rudimentary at the time.	All

Meeting Topic:	Action By
- The current bridge was constructed in 1958 by E. & E. Seegmiller Construction. The new (current) bridge was located immediately east (downstream) of the original structures and was named after the Scheifele family, who were the original landowners in the vicinity of the bridge.	
4.0 Bridge Design: Preliminary Cross Sections and Alignment Alternatives: - Garry presented preliminary design cross sections for the new Scheifele Bridge, as well as a concept for a Staged reconstruction program that would enable traffic to be maintained on Northfield Drive throughout the duration of the bridge replacement. Copies of the section details are attached to these minutes. After review and discussion, no significant comments or requested changes were presented. That said, further review and feedback was requested prior to the initial public circulation / PCC meeting. - Garry also presented three (3) alternative design concepts for the reconstruction of the Scheifele bridge, based on the widest design alternative (Alternative 4) and maintaining uninterrupted traffic on Northfield Drive throughout construction. Garry compared the three design concepts as follows: **Alternative Concept 1: Full Offset Construction: West Side:** - Offset from Existing Bridge: 5 meters - Encroachment on Watercourse: 10-17 meters (worst case) - Road Alignment Design Rating: North Approach: Good South Approach: Fair - Retaining Walls: NW Corner: 19 meters SW Corner: 235 meters (4.5 m high +/-) - Property Acquisition: North Side: 5,030 m2 - General: Will require significant embankment fill in watercourse and extensive agency approvals for potential loss of habitat. May also have extensive archaeological impacts. **Alternative Concept 2: Staged Construction: West Side:** - Stage 1 Offset from Existing Bridge: 1 meter - Encroachment on Watercourse: 3-4 meters - Road Alignment Design Rating: North Approach: Excellent	All

Meeting Topic:	Action By
South Approach: Very Good - Retaining Walls: NW Corner: 19 meters SW Corner: 168 meters - Property Acquisition: North Side: 2,250 m2 - General: Impacts on watercourse and embankments, at the south west quadrant, are significantly less than Alternative 1. Permit approvals will still be required for work in sensitive areas. **Alternative Concept 3: Staged Construction; East Side:** - Stage 1 Offset from Existing Bridge: 1 meter - Encroachment on Watercourse: No encroachment but offset by more property impacts on the east side. - Road Alignment Design Rating: North Approach: Fair to Good South Approach: Good - Retaining Walls: NE Corner: 18 meters SE Corner: 18 meters - Property Acquisition: North Side: 5,730 m2 South Side: 6,480 m2 - Additional Impact: This concept requires relocation of the WNH Overhead pole line on the east side, which would not be required with alternatives 1 and 2 above. - General: Impacts on west side watercourse are eliminated but are offset by increased property impacts on the east side. Also, major impact on WNH Overhead Power line with this option. Permit approvals will be restricted to river crossing impacts. **Summary:** - Although no preference was expressed for either of the above alternatives, there was general concern for Alternative 1 because of the significant impacts on the watercourse on the west side of Northfield Drive. - The above concepts, and any future concepts, will be included with a future Corridor and Bridge Replacement Evaluation Matrix Table that will be created as part of the EA assessment process. - Preliminary costs will be developed for the alternatives. - Feedback from others was requested.	All
5.0 Future Structural Design Action Items:	

Meeting Topic:	Action By
- **Bridge Deck Widening and Reconstruction:** After a brief discussion, it was agreed that Mike Trader will complete a site inspection with the goal of confirming the need, and a possible schedule, for an inspection / monitoring program of the existing structure. This review is requested by the region to eliminate any concerns for a possible unexpected failure of any component of the existing bridge. At the same time, Stantec will visually assess the condition of the existing abutments and piers as part of the study process. Upon completion of the above, and submission of a possible program of inspections / extra work to the Region, Mike's group will use the data to address other design issues related to the study, including: - Practicality of Sub-Structure Widening - Super-Structure Design (Slab on Girder / Integral Abutments) - Construction Staging and Scheduling of Work for a Widening Program - Accelerated Bridge Construction (ABC) Feasibility - Heavy Construction Access to Riverbed - Cost Assessments - **Bridge Architectural Enhancement Options:** Garry presented a preliminary report outlining possible architectural enhancement options for the bridge deck railings and barriers, which may be appropriate for the Scheifele Bridge. Garry noted that the area has historical references, and, for a small cost premium, some beautiful and long-lasting enhancements are possible on the bridge that could complement the history of the area. The draft report is attached for reference, and future discussions will be required to assess the scope of potential architectural enhancements. Although the attached report focuses on pedestrian and barrier walls, other enhancements are possible such as: - Decorative Light Poles and Fixtures - Historical Plaques	Mike

Meeting Topic:	Action By
- Garry requested any feedback from team members after they have had a chance to read and digest the report contents.	All
6.0 Project Schedule Update: Due to Covid-19, Garry presented an updated Project Schedule. Although the Project Start and Completion Dates have not changed, the dates for the PPC meetings have been adjusted to account for lost time during the Covid-19 shutdown. The original Proposal, or Previous Schedule Dates, are shown in Brackets: • Official Start Date: February 5, 2020 (April 6, 2020) • PIC Number 1: April 8, 2021 (November 12, 2020) • PIC Number 2: September 9, 2021 (May 19, 2021) • ESR Filing: November 30, 2021 (October 22, 2021) • Detailed Design: January 5, 2022 to February 16, 2023 (November 15, 2021 to February 16, 2023) • Construction: May 2023 to November 2024 (No Change)	
7.0 PUBLIC INFORMATION CENTER MEETING (PIC) FORMAT: - Due to Covid-19, we are anticipating the first PIC, in April 2021, could be a virtual meeting, with all of the typical display boards presented on-line and on the Region's website. Ken suggested that Stantec could provide a short on-line presentation of the project. - Further discussions will be required as we move towards the April 2021 date. If the Covid-19 situation improves, we may even see the possibility of an in-person PIC.	All

Meeting Topic:	Action By
8.0 Other Business: - No new business was presented by attendees.	
9.0 Next Meeting: - Date to be confirmed by Garry and Ken, based on future progress.	

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Meeting Notes

The Regional Municipality of Waterloo
SCHEIFELE BRIDGE SUPERSTRUCTURE REPLACEMENT
Regional Road 22 (Northfield Drive) over the Conestogo River, Township of Woolwich
Class Environmental Assessment and Detailed Design
PROJECT TEAM MEETING #3

Date/Time:	Monday November 30, 2020 / 10:30 AM	
Place:	Due to Covid-19, the meeting was held virtually thru TEAMS	
Next Meeting:	To Be Confirmed	
Attendees:	Ken Brisbois	RMOW
	Mike Jones	RMOW
	Ryan Tucker	Township of Woolwich
	Larry Shantz	Woolwich Councillor
	Mike Trader	Stantec Structures
	Adam Felinczak	Stantec Structures
	Bill White	Stantec CADD Tech
	Garry Leveck	Stantec Manager
Staff Liaison:	John Stephenson (RMOW) and Jared Puppe (Woolwich)	
Distribution:	All Present/Brian Campbell; Jayson Innes; Parker Dickson; Mellissa Cameron; Meghan Rivard; Eric Reinink; Sean Geddes; Brian Keep, Jeff Dietz; Cheryl Bauman	
Attachments:	Region of Waterloo: Transportation Capital Projects: Project Team Mandate	
	Structural Inspection and Capacity Analysis Slides	
	Preliminary Evaluation Matrix Comparing Environmental Impacts of 3 Concepts	

Meeting Topic:	**Action By**
1.0 SAFETY MOMENT, INTRODUCTIONS AND PROJECT TEAM MANDATE - Wear a mask when in public indoor spaces and maintain 2 m safe social distancing wherever possible. - Garry welcomed Councillor Larry Shantz, Mike Jones and Adam Felinczak to the Project Team, who did not attend the previous Technical Team Meetings. - Ken Brisbois read excerpts from the Region of Waterloo Transportation Capital Projects Team Meeting Mandate, which is provided as guidance to all Project Teams involved with major Region Transportation projects. A copy of the Mandate is attached with these minutes. - Footnote: Garry advised that Michael McGann recently left Stantec for another job opportunity. Michael had the title of Assistant Project Manager on the Scheifele Bridge project and was being mentored by Garry under the EA process. Garry assured the	

Meeting Topic:	Action By
team that Michael's departure will not impact the project schedule. Garry will continue as Project Manager.	
2.0 Minutes of Technical Team Meeting #2: August 11, 2020: Review and Action Items Arising: - Garry reviewed the Minutes of the second Technical Team meeting, held on August 11, 2020. Some of the meeting topics are covered further in these minutes, as noted. - **Existing Conestogo River Bridge Structure Inspection:** Stantec completed a detailed visual inspection of the existing structure with the intent of confirming the scope of potential repairs, a capacity analysis, and a possible bridge monitoring program. The inspection of the existing bridge was included in the original Class EA work scope and was completed in September 2020. A summary of the study findings is provided in Section 5.0 of these Minutes. Following the August meeting, the Region asked Stantec to comment on the potential to delay bridge reconstruction from 3 to 5 years (2025), due to Region budget issues that may impact the ability to tender the project for a 2023 reconstruction start. Stantec confirmed that a bridge capacity analysis would be required before an answer could be provided. Subsequently, the Region approved extra fees for two supplemental investigations, including a "Structural Capacity Analysis Study" and a "Strategy Report on Bridge Repairs, Construction Deferral and Monitoring Program". Summaries of the September visual bridge condition inspection and the Structural Capacity Analysis Study are provided in Section 5.0 of these Minutes, while the recommendations of the Strategy Report are pending. - **Traffic Data for Northfield Drive:** Ken and Garry have been reviewing available Traffic Data on Northfield Drive. A summary of the current data and future actions is covered in Section 3.0 of these Minutes. - **Notice of Study Commencement and Agency Circulation:**	

Meeting Topic:	Action By
The comments of eight agencies, who responded to the initial Notice of Study Commencement mailing, were reviewed at Technical Team Meeting 2. Because of Covid-19, it was felt that there should have been more agency responses to this important project. It was agreed in August that Ken and Garry would work together in issuing reminder letters to agencies who had not responded, extending the deadline for comments. Garry provided an updated list of outstanding agencies to Ken, which was followed by a second mailing to selected agencies. A summary of the additional mailings and responses is provided in Section 4.0 of these Minutes. - **Topographic and Bathometric Surveys:** All topographic, property ownership, and bathometric field surveys have been completed. Current base plans reflect the extent of all surveys. No further action is required at this time. - **Geotechnical and Foundation Inspection Report:** As of the August meeting, Stantec was waiting to secure approval to proceed with completing three remaining boreholes on the project. Delays occurred as the Region negotiated an agreement with the Mississauga of the Credit First Nations (MCFN) to provide a Field Liaison Representative (FLR) during drilling operations. An agreement was ultimately reached, and geotechnical field work was completed in September 2020. The preliminary results are presented in Section 3.0 of these Minutes. - **Water Resources and Hydraulic River Modelling:** Stantec has secured a Hydraulic Base Model for the Conestogo River from the GRCA, which will be used to develop suitable modelling of river flows at the bridge once the preferred design concept is confirmed. No further action is required at this time. - **Stage 1 Archaeological Assessment Study:** A Stage 1 Archaeological Assessment report was completed on June 30, 2020 and submitted to the Region of Waterloo for initial review and approval. Comments were received from the Region.	

Meeting Topic:	Action By
A Final Report was subsequently submitted to the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) and accepted for review on August 14, 2020. It is currently "in the queue" for Ministry review. If no response is received from MHSTCI by mid-December, a *Request for an Expedited Review* will be submitted to the Ministry, with the pending PCC as justification for the expedited review. The expedited review period is approximately 30 business days. Garry advised that a Stage 2 Archaeological Study will be required prior to construction, based on current study results and the impacts of the preliminary alignment options on existing archaeological features. The scope of the Stage 2 study will be confirmed at the detailed design stage. Garry also advised that a Marine Archaeological Assessment may also be required prior to construction, depending on MHSTCI comments. This is a new program (last year or so) and is subject to further review between the Ministry, the Region and Stantec. - **Preliminary Bridge Section Alternatives, Alternative Alignment Concepts and Architectural Enhancement Report:** A discussion of the various bridge design alternatives, alignment concepts and architectural enhancements occurred at the August 11, 2020 Technical Team meeting. Further discussion is presented in Section 6.0 of these Minutes.	
3.0 Work Task Study Data Updates: - **Geotechnical / Foundation Investigations:** The results of the geotechnical / foundation investigations at the bridge are briefly summarized as follows: - A total of 7 boreholes were advanced to between 9.8 and 20.4 meters below ground surface, with three of the boreholes advanced from the bridge deck. The Stantec field work has been supplemented by previous investigations (4 boreholes) by Peto MacCallum in conjunction with the Conestogo River Watermain Crossing Study at the Scheifele Bridge.	

Meeting Topic:	Action By
- A variation of soil types was encountered across the 7 boreholes while bedrock was not encountered in any of the boreholes at full depth. - The native soils have a high silt content and are, therefore, not free draining and are susceptible to frost heaving. - Although shallow spread footings may be considered for the pier and abutment foundations, it is generally felt that driven pile foundations will be preferred. The final foundation configuration is subject to further structural design reviews and confirmation by Mike Trader. Regardless of the approach to foundation design, dewatering of excavations will be required. - **Traffic Study Data:** - Available traffic data was reviewed by Stantec and the Region, concluding the following: - 2020 AADT: 10,350 VPD with AM Peak of 943 Vehicles and PM Peak of 1,223 Vehicles. Heavy Trucks: 3.5 %. Cyclist, Buggy and Pedestrian data is low and not reliable. - 2030 AADT: 14,000 VPD with AM Peak of 1,275 Vehicles and PM Peak of 1,650 Vehicles. Heavy Truck Estimate: 4.0%. Projecting Cyclist, Buggy and Pedestrian movements is difficult at best. - Since the vehicle traffic volumes are not critical to the Class EA study, other than outlining impacts of a long-term closure and detour, additional counts are not warranted. However, camera counts of cyclist, buggy and pedestrian movements will be arranged by the Region in the spring, covering a one-week period in early May 2021. In the event of inclement weather, the Region will extend the count timeline. - A brief discussion took place regarding the current and future state of Mennonite buggy travel in the area. Current volumes appear to be low and it is possible that buggy traffic may be even less in the future, as Old Order Mennonites are moving out of the Region in favour of less expensive farmland in central and northern Ontario. It was noted, for example, that there is only one farm on Glasgow Street served by the existing steel truss bridge, which will be permanently reduced to “one lane” out of Conestogo in 2021. The steel truss bridge could be considered as a detour route for buggy traffic during a potential construction	Mike Jones

Meeting Topic:	Action By
shutdown of the Scheifele Bridge. Larry suggested that the Scheifele Bridge / Northfield Drive may not be a busy route for Mennonite traffic to/from the St. Jacob's Market.	
- Horseback Adventures Farm confirmed that there are horseback movements under the bridge throughout the year (weather permitting) which must be accounted for in both the bridge design and during construction. Riders currently access trails west of Northfield Drive, towards St. Jacobs, by passing under the bridge at the south abutment. Larry suggested that we might consider either a temporary or permanent culvert under Northfield Drive to allow horse passage. Such a horse passage could be installed to move the trail away from the construction zone (temporary condition) or it could be considered a permanent crossing under the roadway. Footnote: In a follow up email from Garry to Larry, it was confirmed that further discussions would be required with the owners of Horseback Adventures on issues such as "the ability of riders to dismount and walk horses through the culvert, the potential of horses being "spooked" in a long dark tunnel, the potential impacts of construction noise on the horses, and other issues".	Ken, Garry, Larry
- **Cultural Heritage Evaluation Report (CHER):**	
- A draft CHER Report was received on November 12, 2020. A copy of the CHER report will be forwarded to Ken so that he can submit to Region HPAC for their review and comment.	Garry, Ken
- A Cultural Heritage Landscape (CHL) candidate exists west of bridge, comprised of a remnant county road and abutments of two former bridges (1861 to early 1900s). These features are to be protected from the impacts of the new bridge / road embankment construction. The current (3) alternative alignment concepts appear to have no impacts on the CHL features of the remnant abutments / piers and road embankments.	
- The Scheifele Bridge has no Cultural Heritage Value or Interest (CHVI) per Ontario Regulation O. Reg. 9/06.	
- **Natural Environmental Existing Conditions (NEEC) Report:**	
- A draft NEEC Report was received on November 12, 2020. A copy of the NEEC report will be forwarded to Ken so that he can forward to Region EEAC for their review and comment.	Garry, Ken

Meeting Topic:	Action By
- A summary of the study results are as follows: - Botanical / Terrestrial / Vegetation conditions - Bat Tree Roost Survey - Turtle Basking Review - Breeding Bird Survey - Wildlife Habitat Assessment - Aquatic Habitat Assessment - All work was completed with an interest in confirming the presence of any Species at Risk (SAR) Habitat. - Field work resulted in the observation of various "potential" SAR Habitat conditions, although only three actual SAR were confirmed, including a Butternut Tree, a single Barn Swallow and a single Eastern Meadowlark. - Approximately 35 Cliff Swallow nests were observed under the bridge deck, which must be accounted for in the bridge removal schedule. These nests are not SAR habitat. - The Conestogo River valley is part of the Grand River Heritage River "significant valley" system designation and will come into play during the approval process. This should not be a major hurdle in the approval process. - Other study findings include: - No significant wetland features - No significant woodland features - No significant habitat for SAR turtles - Some trees are potential habitat for bat colony nesting - The Conestogo River is a warmwater system habitat for certain fish and a potential SAR habitat - Stantec's environmental team prepared a preliminary comparative Impact Assessment of the Three Preliminary Design Alignment / Bridge Concepts, which was presented as part of the Natural Environmental Conditions Report. Based on "High, Medium and Low" Impact Evaluations, the findings suggest that Alternative 2 (West Side Staged Construction) and Alternative 3 (East Side Staged Construction) are deemed to have somewhat equivalent degrees of environmental impact, while Alternative 1 (Full Offset Construction) has the greatest degree of environmental impact. A copy of the Environmental Impact Evaluation Matrix is included with the Meeting Minutes but should be considered "preliminary and subject to modification". **4.0 Notice of Study Commencement:**	

Meeting Topic:	Action By
- A Second Notice of Study Commencement was forwarded to: - Waterloo Region Public and Separate School Boards - Student Transportation Services of Waterloo Region (*) - Conestogo Public School - Waterloo North Hydro (*) - RMOW Active Transportation Advisory Committee (ATAC) - RMOW Ecological and Environmental Advisory Committee (EEAC) - RMOW Heritage Planning Advisory Committee (HPAC) - Department of Fisheries and Oceans Canada (DFO) - City of Waterloo Planning and Engineering Departments - City of Waterloo Ward 4 Councillor (Dianne Freeman) - Waterloo Region Police Services - Waterloo Region Public Health and Emergency Services / Paramedic Services - Conestogo River Horseback Adventures (*) - Additional responses were received from agencies with an (*), with the following general comments: - Student Transportation Services: Can deal with reduced 1 lane of traffic during construction; Any full closure would be best in July and August since bus trips would be significantly impacted. - Waterloo North Hydro: Existing Pole line was built in 2013 and there are no plans to replace or upgrade the OH line. Footnote: As part of the EA Evaluation process, Garry has reached out to WNH for an estimate of cost to relocate the pole line (15 affected poles) should the preferred alternative design (east side alignment) impact the poles. - - Conestogo River Horseback Adventures: Needs to maintain trail crossing under the south abutment. Trails are used 4 seasons, weather permitting. Maintaining some form of trail access will be required during construction. - Since no further notices will be issued until the first PCC meeting, Garry expressed concern for the lack of responses from key groups, including ATAC; EEAC; DFO; HPAC; City of Waterloo; Emergency Services and School Board Officials. Garry noted that ATAC will be contacted in the future; EEAC will be circulated with the Environmental Study Report; HPAC will be circulated with the CHER Report; and Garry will contact City of Waterloo representatives.	Garry

Meeting Topic:	Action By
5.0 Existing Bridge Inspection, Capacity Analysis and Strategy Report: - **Structural Inspection of Existing Scheifele Bridge:** - Mike Trader reported that the field inspection of the existing bridge condition was completed on September 3, 2020. In addition to Stantec staff, John Stephenson was present from the Region. - With reference to slides (attached to Minutes), Mike and Adam presented the results of the field inspection, with the following highlights: - 4 span concrete arch girder bridge. Some girders show signs of vertical and diagonal cracking. - Crack gauges were installed previously but reporting indicates no appreciable crack widening or propagation. - Because of deterioration and tilting of some bearings at the south abutment, supports were installed to stabilize the loading on the bearings. - Repairs have been made to the underside of various girders where spalling has occurred, including some FRP wrap under a U of W study. The spalling of concrete on the underside of the girders is not of structural concern. - Overall, the bridge appears to be in reasonable condition which will be reflected in the forthcoming Strategy Report on Repairs, Construction Deferral and Monitoring Program. - **Structural Capacity Analysis Study:** - Mike and Adam also presented the results of Bridge Capacity Analysis. Based on an ULS analysis of the interior girder, the Positive and Negative Bending Moments are within an acceptable range of Maximum and Minimum Allowable Limits. In addition, Shear values are within acceptable Maximum and Minimum allowable limits. - The results of the Structural Field Inspection and the Structural Capacity Analysis will be summarized in a stand-alone report and included in the Environmental Study (ESR). - **Strategy Report on Bridge Repairs, Construction Deferral and Monitoring Program:** - Further to the Bridge Field Inspection and the Structural Capacity Analysis Study, a Bridge Repair and Monitoring Program will be	Mike, Adam

Meeting Topic:	Action By
presented by Stantec. The Region is hoping to defer reconstruction by up to 5 years (2025), so a Bridge Repair and Monitoring Strategy is required to guide the Region over the next 4-5 years. - Stantec presented a Work Plan and Fee Estimate to prepare a Strategy Report, which has been approved. - The Strategy Report has been pending completion of the Structural Capacity Analysis. Since this study has now been finalized, the Strategy Report will be prepared and submitted to the Region by late-December. - Fees for any future Monitoring Programs (Annual or Bi-Annual), and /or Repair Designs have not been confirmed and will be extra to the project.	Mike, Adam
6.0 Bridge Design: Preliminary Cross Sections, Alignment Alternatives and Architectural Options: - At Technical Team Meeting 2, feedback was requested on the Preliminary Bridge Cross Sections, the Preliminary Alternative Alignment Concepts, and the Architectural Enhancement Report. Since no formal comments have been received, Garry briefly reviewed the alternatives again. - Garry commented on the Preliminary Environmental Evaluation Matrix, which compared the three alternative alignment concepts. Garry did not review the Matrix in detail but suggested that team members could peruse the summary table. As mentioned, the environmental assessment suggests that Alternatives 2 and 3 are, for the most part, equivalent in their impacts on the natural environment. Alternative 1 (Full Offset Construction) has the most impact on natural environmental features in the study area. - Features of the Three Alternative Alignment Concepts are as follows (repeat of the Minutes from Technical Team Meeting 2): **Alternative Concept 1: Full Offset Construction: West Side:** - Offset from Existing Bridge: 5 meters - Encroachment on Watercourse: 10-17 meters (worst case) - Road Alignment Design Rating: North Approach: Good South Approach: Fair - Retaining Walls: NW Corner: 19 meters SW Corner: 235 meters (4.5 m high +/-)	

Meeting Topic:	Action By
- Property Acquisition: North Side: 5,030 m2 - General: Will require significant embankment fill in watercourse and extensive agency approvals for potential loss of habitat. May also have extensive archaeological impacts. **Alternative Concept 2: Staged Construction: West Side:** - Stage 1 Offset from Existing Bridge: 1 meter - Encroachment on Watercourse: 3-4 meters - Road Alignment Design Rating: North Approach: Excellent South Approach: Very Good - Retaining Walls: NW Corner: 19 meters SW Corner: 168 meters - Property Acquisition: North Side: 2,250 m2 - General: Impacts on watercourse and embankments, at the south west quadrant, are significantly less than Alternative 1. Permit approvals will still be required for work in sensitive areas. **Alternative Concept 3: Staged Construction; East Side:** - Stage 1 Offset from Existing Bridge: 1 meter - Encroachment on Watercourse: No encroachment but offset by more property impacts on the east side. - Road Alignment Design Rating: North Approach: Fair to Good South Approach: Good - Retaining Walls: NE Corner: 18 meters SE Corner: 18 meters - Property Acquisition: North Side: 5,730 m2 South Side: 6,480 m2 - Additional Impact: This concept requires relocation of the WNH Overhead pole line on the east side, which would not be required with alternatives 1 and 2 above. - General: Impacts on west side watercourse are eliminated but are offset by increased property impacts on the east side. Also, major impact on WNH Overhead Power line with this option. Permit approvals will be restricted to river crossing impacts. - In addition to the above three alternative design concepts, it was agreed that a fourth alternative should be prepared, showing reconstruction of the bridge on the existing alignment. This option may require a full road closure during construction or may be possible under an ABC construction method. These considerations will be highlighted in the Alternatives Evaluation Matrix.	Garry, Bill

Meeting Topic:	Action By
- Garry requested any additional feedback on the Preliminary Bridge Cross Sections, the Preliminary Construction Staging Cross Sections, the Preliminary Alternative Alignment Concepts, and the Architectural Enhancement Report, so that any modifications may be included in the Evaluation Matrix and the PCC Displays.	All
7.0 Future Planning and Design Activities: - Garry outlined the following planning and design activities going forward: - Structural Design Team will continue developing Concepts for Bridge Alternative Cross Sections, Layout Design Alternatives (Span Lengths, Girder Material), Full and Partial Structure Replacement Options, Construction Methodologies, and Preliminary Cost Estimates based on the Inspection, Analysis and Foundation Study / Investigation Results. Alternatives will include: - Full Offset Bridge / No Staged Construction - Partial Offset Bridge / Staged Construction - Widen and Reconstruct Existing Bridge / Full Road Closure - Accelerated Bridge Construction (ABC) / Temporary Closure - Garry will begin to create an "Alternative Design Concepts Evaluation Matrix" comparing impacts on the natural and social environments, construction / post-construction traffic operations, property acquisitions, cost, and other factors - Garry will continue to refine the Alternative Alignment Concepts and Develop any new Design Alternatives. - Garry will start preparing for PCC #1, including the creation of draft Display Boards, finalizing an Outreach Process, and reviewing On-Line Meeting Arrangements. Garry will coordinate with Ken and rely on his experience with Regional Virtual PCC meetings.	Mike, Adam Garry Garry Garry, Ken
8.0 Project Schedule Update: - An updated Project Schedule was presented at Technical Team Meeting 2, which has not changed. Although the Project Start and Completion Dates have not changed, the dates for the PCC	

Meeting Topic:	Action By
meetings have been adjusted to account for lost time during the Covid-19 shutdown. Also, a Footnote has been added related ti the potential deferral of construction to 2025. The original Proposal, or Previous Schedule Dates, are shown in Brackets: • Official Start Date: February 5, 2020 (April 6, 2020) • PCC Number 1: April 8, 2021 (November 12, 2020) • PCC Number 2: September 9, 2021 (May 19, 2021) • ESR Filing: November 30, 2021 (October 22, 2021) • Detailed Design: January 5, 2022 to February 16, 2023 (November 15, 2021 to February 16, 2023) • Construction: May 2023 to November 2024 (No Change) **NOTE:** Due to Region Budget Issues, Construction may be deferred until 2025, depending on decisions regarding the Bridge Capacity Analysis and the Repairs / Monitoring Program. Delays in the Construction Schedule may, in turn, alter the detailed design and tender schedule.	
9.0 PUBLIC CONSULTATION CENTER MEETING (PCC) FORMAT: - Due to Covid-19, we are anticipating the first PCC, in April 2021, will be a virtual meeting, with typical display boards presented on-line and on the Region's website. - Further discussions will be required as we move towards the April 2021 date. If the Covid-19 situation improves, we may even see the possibility of an in-person PCC.	
10.0 OTHER BUSINESS: - There was no new business tabled by Team Members beyond what was already covered in the above meeting notes.	
11.0 NEXT MEETING:	Garry, Ken

Meeting Topic:	Action By
- Tentative Date: March 2021. Date to be confirmed by Garry and Ken, based on future progress. This meeting may be a "Dry Run" of PCC #1.	

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Meeting Notes

The Regional Municipality of Waterloo
SCHEIFELE BRIDGE SUPERSTRUCTURE REPLACEMENT
Regional Road 22 (Northfield Drive) over the Conestogo River, Township of Woolwich
Class Environmental Assessment and Detailed Design
Project Team Meeting #4

Date/Time:	Tuesday May 11, 2021 / 9:30 AM	
Place:	Due to Covid-19, the meeting was held virtually thru TEAMS	
Next Meeting:	To Be Confirmed	
Attendees:	Ken Brisbois	RMOW
	Mike Jones	RMOW
	Ryan Tucker	Township of Woolwich
	Larry Shantz	Woolwich Councillor
	Murray Martin	Woolwich Councillor (Guest)
	Mike Trader	Stantec Structures
	Bill White	Stantec CADD Tech
	Garry Leveck	Stantec Manager
Staff Liaison:	John Stephenson (RMOW) and Jared Puppe (Woolwich)	
Distribution:	All Present; Brian Keep; Jayson Innes; Parker Dickson; Debbie Giesbrecht; Meghan Rivard; Eric Reinink; Sean Geddes; Jeff Dietz; Adam Felinczak	
Attachments:	N/A	

Meeting Topic:	Action By
1.0 SAFETY MOMENT AND INTRODUCTION: - Wear a mask when in public indoor spaces and maintain 2 m safe social distancing wherever possible. Stay Safe. - Garry welcomed Township of Woolwich Ward 3 Councillor Murray Martin to the meeting, a guest invitee of Larry Shantz. In addition to Murray's lengthy tenure as a Woolwich Councillor, his residence in Conestogo provides an added perspective to the study. It was proposed that Murray become a permanent member of the Project Team, which will be confirmed by Ken.	Ken
2.0 Minutes of Project Team Meeting #1: November 30, 2020: **Review Business and Action Items Arising:** - Garry reviewed the Minutes of the first Project Team meeting, held on November 30, 2020.	

Meeting Topic:	Action By
- **Active Transportation Travel Camera Counts:** - On-site traffic count cameras were scheduled to be installed for a week starting May 14, 2021. However, the Region has delayed the installations until after the current Ontario Stay-at-Home order. Ken will advise the team once the cameras are installed. - The purpose of the cameras is to capture current volumes of pedestrian, cycle, and buggy traffic on Northfield Drive at the Scheifele Bridge. Updates will be provided once the count data is received. - **Mennonite Buggy Detour on Glasgow Street:** - The Township confirmed that, after rehabilitation of the Glasgow Street outside of Conestogo, the bridge will be available to southbound traffic and buggy traffic in both directions. Notwithstanding the limited traffic capacity, the Township would prefer that Glasgow Street not be considered as a temporary traffic detour route (other than buggy traffic), should Northfield Drive be closed for bridge construction. - Ryan indicated that the rehabilitation contract is scheduled to begin in June. - **Conestogo Horseback Adventures:** - Following guidance at the November 30, 2020 Project Team meeting, Garry contacted the owner of Horseback Adventures to discuss the status of the current EA Study, and to review options for uninterrupted horse trail use during construction. Items arising from the discussion included the following: - A temporary under-road tunnel under Northfield Drive would not be suitable for horse movements, as horses would be "spooked" by a confined space of any significant length. A more practical option, suggested by the owner, would be a temporary "activated traffic signal" opposite the property entrance between the bridge and University Avenue. - The Region's Legal department has been made aware of owner's proposal for a temporary signalized crossing and is currently reviewing what obligations, if any, they have in providing a safe crossing during construction. Since a justifiable warrant for a	Ken

Meeting Topic:	Action By
temporary signalized "horse / rider" crossing is not likely, the Region would be hard pressed to approve a temporary installation. Other alternatives for crossing Northfield Drive were presented as follows: 1. Having the trail riders cross at the signalized University Avenue intersection. Although feasible during fair weather, this concept may present some issues during the winter months, with snow piled on the shoulders. It is worth considering. 2. Having a Special Provision in the contract requiring the contractor to provide a flag-person, about 8 times a day (4 trail excursions "out and back"), to provide for the safe crossing of trail riders near the owner's driveway. This option might work during the work weekdays but would be problematic on weekends. Further discussion will be needed to come up with a workable and financially favourable alternative. - The owner was also apprised of concerns over further deterioration of the bridge soffit in the south span, and the potential for falling debris that may be of danger to horses and riders. Proposed temporary signage, as well as provisions for a restricted crossing zone under the existing bridge, were discussed with the owner, who agreed with the need to protect their staff, guests, and horses. Ken indicated that Engineered Concrete is currently looking into soffit repairs, while Region Legal is assessing the wording for any signage that may be provided at the crossing. Mike reminded Ken of the recommendations for blocking at the south abutment bearings, which Ken agreed to discuss further with John Stephenson. - **Cultural Heritage Evaluation Report:** - Final Report was submitted to the Region on January 8, 2021. The results of the study report will be summarized in the PCC #1 documents for public review and comment. - **Natural Environmental Existing Conditions Report:**	Ken

Meeting Topic:	Action By
- Final Report was submitted to the Region on February 23, 2021. The results of the study report will be summarized in the PCC #1 documents for public review and comment. - **Agency Contacts: City of Waterloo:** - Following guidance at the November 30, 2020 Project Team meeting, Garry contacted the City of Waterloo, who was "noticeably absent" in responding to two requests for comments on the Notification of Study Commencement. Following a conference call with City staff, a formal response was received on March 3, 2021. A copy of the City letter was forwarded to Project Team members. City comments are summarized as follows: - The bridge replacement should be "right-sized" to accommodate future traffic needs of all types (Active Transportation needs). - Safety is a primary focus of current Transportation Master Plans, so the final design should provide safe separation of vehicular and pedestrian / cycle / buggy traffic for safety of users. - Multi-Use Trails should be a high priority in this area to accommodate future active transportation needs. - Northfield Drive is an essential EMS route and will continue to be more important in the future with growth. - City encourages any design concept that avoids any lengthy construction detour on Northfield Drive because of the significant social impacts on the community. - **Structural Inspection and Strategy Report on Bridge Repairs, Construction Deferral, and a Monitoring Program:** - Stantec submitted the final report on December 24, 2020. The report provided various recommendations on temporary repairs to the existing bridge as well as a Monitoring Program over the next 4 years (TBC) until construction proceeds. - Ken advised that he is reviewing the report with John Stephenson and that Engineered Concrete is currently providing a price for	

Meeting Topic:	Action By
the soffit repairs. Ken anticipates moving forward with the concrete repairs as soon as a Purchase Order can be issued. - With respect to the provision of design plans for the interim bearing blocking / repairs, Ken agreed that Mike should proceed to prepare the necessary plan(s), Special Provision(s) and Payment Items. - **Alternative Alignment Design Concepts: Alternative #4:** - Following the November 30, 2020 Project Team, Alternative Alignment Design Concept #4 was prepared and will be presented at PCC#1. It provides for construction of a new bridge on the existing alignment by removing the existing structure and replacing with the new bridge. This represents the only alternative that would require a full and lengthy closure of Northfield Drive, with significant social impacts. It is expected that this concept will not be received well by the public since there are other viable alternatives that will not require full closure of Northfield Drive. - **Alternative Design Concepts Evaluation Matrix:** - A preliminary Alternative Design Concepts Evaluation Matrix was prepared comparing the 4 alternatives on a subjective basis, including preliminary construction cost estimates. The Matrix will be presented to the public at PCC#1. - Garry indicated that the preliminary construction cost estimates range from $21 million to $26 million, with Alternative 4 being the cheapest and Alternative 2 being the most expensive. Alternatives 1 and 3 are very close to the estimate for Alternative #2. - All costs are in 2021 dollars and include ballpark costs for property acquisitions, utility relocations, engineering, and contingencies. - The cost estimates do not include any funds for the proposed 300 mm watermain that is proposed to be constructed on Northfield Drive between Waterloo, Conestogo and St. Jacobs.	Mike Trader

Meeting Topic:	Action By
3.0 Public Consultation Center Meeting #1: - **Go-Live Date and Format:** - Public Consultation Center Meeting #1 was originally scheduled to go live on April 8, 2021 (approximate date). However, due to complications in the setup and checking of the Engage website, combined with internal Communications reviews at the Region, the date for initiation of the on-line site is now Wednesday May 19, 2021. All public and agencies will have three weeks (ending Wednesday June 9, 2021) to view the displays and to provide comments. - **Region of Waterloo "Engage" Website:** - Ken reviewed the arrangements for the PCC #1 website access by taking everyone through a "dry run" of the Engage site, and how the public / agencies will be able to provide comments and / or questions. After receipt of any questions, Ken and Garry will respond and incorporate all details into the EA Files. Copies of all public comments will be forwarded to Project Team members for review. - Ken agreed to forward a copy of the Engage website access to Team members for their review and comment. - Garry complimented Ken on his efforts in consolidating the many display boards prepared by Stantec and making them look so user friendly and engaging on the website. Great job. - **Advance Notification of Public Consultation Center Meeting #1 will be by four (4) methods:** - Emails to previously engaged public and agency representatives who responded to the Notice of Study Commencement. - Mailing of about 1100 letters to the community, which will be mailed after Council gives the green light to PCC #1. - Newspaper Publications: Advertisements will be published in The Record (May 14 and 18), the Woolwich Observer (May 13 and 20) and the Waterloo Chronicle (May 13 and 20).	Ken

Meeting Topic:	Action By
- On-Site Signage will be installed to advise public of the Engage website access date of May 19, 2021. Garry confirmed that the signage has already been provided, replacing the Notice of Study Commencement signage.	
- **Public Consultation Center Display Material:** - Stantec and the Region created a comprehensive group of displays for review by the public and agencies, summarizes the numerous details of the study to date. No recommendations are being provided on a preferred design concept at PCC #1. **The text board displays on the Engage site include:** - Welcome and Key Map - Purpose and Invitation to Attendees - Objectives of the Scheifele Bridge Class EA Study - "What is a Class Environmental Assessment" Study - History of the Scheifele Bridge - "Need and Justification" and "Problem Statement" - Transportation and Traffic Assessment - Natural, Cultural and Social Environments - Geotechnical and Bridge Foundation Conditions - Existing Bridge Condition Investigation, Structural Analysis, Interim Repairs and Monitoring Program - Alternative Design Concepts: - Bridge Cross Section Design Options (4) - Alternative Road and Bridge Alignment Concepts (4) - Construction Staging Concept: Alternative Alignment Concepts 2 and 3 Only - Traffic Control During Construction: - No Long-Term Northfield Drive Closure or Detour - Long-Term Closure of Northfield Drive and Detour - Architectural Enhancement Opportunities: - Enhancement Guidelines - Three Alternative Architectural Enhancement Concepts - Preliminary Alternative Design Concepts Evaluation Matrix - Next Steps and Further Information - **Other PCC #1 documents include:**	

Meeting Topic:	Action By
- Notification of Public Consultation Center Meeting #1 - Information Package (Previously a Handout Document) - Comment Sheet (Previously a Handout Document) - Questionnaire Sheet (Previously a Handout Document)	
4.0 Project Schedule Update: - An updated Project Schedule was presented at Project Team Meeting 2, which has changed since the previous team meeting. A Footnote has been added related to the potential deferral of construction to 2025. The original Proposal, or Previous Schedule Dates, are shown in Brackets: • Official Start Date: February 5, 2020 (April 6, 2020) • PCC Number 1: May 19, 2021 (November 12, 2020 / April 8, 2021) • PCC Number 2: October 2021 (May 19, 2021) • ESR Filing: April 2022 (October 2021 / November 2021) • Detailed Design and Property Acquisitions: August 2022 to February 2023 (November 2021 to February 2023) • Construction: April 2023 to November 2024 (May 2023 to November 2024). **NOTE:** Due to Region Budget Issues, Construction may be deferred until 2025, depending on decisions regarding the Bridge Capacity Analysis and the Repairs / Monitoring Program. Delays in the Construction Schedule may, in turn, alter the detailed design and tender schedule.	
5.0 OTHER BUSINESS:	

Meeting Topic:	Action By
- Larry questioned whether members of the public are obligated to provide their name on the PCC Comment form. With no method of tracking "bogus" or "duplicate" comment forms, there is a risk of having skewed feedback. Ken advised that the Region's policy is to allow the PCC attendee full discretion in the disclosure of any personal information. Generally, and historically, there doesn't appear to be issues with skewed comment results from PCC meetings. - There was no other business tabled by Team Members beyond what was already covered in the above meeting notes.	
6.0 NEXT MEETING: - Date to be confirmed.	Garry, Ken

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Meeting Notes

The Regional Municipality of Waterloo
SCHEIFELE BRIDGE SUPERSTRUCTURE REPLACEMENT
Regional Road 22 (Northfield Drive) over the Conestogo River, Township of Woolwich
Class Environmental Assessment and Detailed Design
Project Team Meeting #5

Date/Time:	Tuesday July 20, 2021 / 1:30 PM	
Place:	Due to Covid-19, the meeting was held virtually thru TEAMS	
Next Meeting:	To Be Confirmed	
Attendees:	Ken Brisbois	RMOW
	Mike Jones	RMOW
	Ryan Tucker	Township of Woolwich
	Larry Shantz	Woolwich Councillor
	Murray Martin	Woolwich Councillor
	Mike Trader	Stantec Structures (Part of Meeting)
	Adam Felinczak	Stantec Structures
	Bill White	Stantec CADD Tech
	Garry Leveck	Stantec Manager
Staff Liaison:	John Stephenson (RMOW) and Jared Puppe (Woolwich)	
Distribution:	All Present; John Stephenson; Jared Puppe; Brian Keep; Jayson Innes; Parker Dickson Debbie Giesbrecht; Meghan Rivard; Eric Reinink; Sean Geddes; Jeff Dietz;	
Attachments:	N/A	

Meeting Topic:	Action By
1.0 SAFETY MOMENT AND INTRODUCTION: - Wear a mask when in public indoor spaces and maintain 2 m safe social distancing wherever possible. Stay Safe.	
2.0 Minutes of Project Team Meeting #2: May 11, 2021: **Review Business and Action Items Arising:** - Garry led discussions regarding Action Items arising from the Minutes of Project Team Meeting #2, held on May 11, 2021. - **Active Transportation Travel Camera Counts:** - Garry advised that the Region completed camera counts of active transportation (buggy, cyclist, and pedestrian) crossings of the Scheifele Bridge. The camera monitoring was 24 hours per day, between Monday May 31 and Sunday June 6, 2021. A copy of the Excel spreadsheet populating the daily count data was	Ken

Meeting Topic:	Action By
forwarded to Project Team members on July 13, 2021, and is briefly summarized as follows: Summary of Results: **Horse / Buggy Traffic:** - Maximum Daily Count: 7 crossings (Monday May 31) - Seven Day Total Count: 26 crossings **Cyclists:** - Maximum Daily Count: 80 crossings (Sunday June 6) - Seven Day Total Count: 361 crossings **Pedestrians:** - Maximum Daily Count: 19 crossings (Saturday June 5) - Seven Day Total Count: 55 crossings - Although the number of buggy and pedestrian crossings were in the range of expected results, it was agreed that the number of cyclist crossings was significantly more than anticipated. - Because of the rural location on Northfield Drive, it is believed that most of cyclists are experienced riders, as opposed to "Dad and Mom out for an evening or weekend ride with their kids". The narrow bridge deck poses a danger to riders as they cross the 110 m long structure with fast moving traffic close by. - Murray Martin suggested that the volume of buggy traffic may get smaller in the future as a lot of the younger generation Mennonites switch to motorized vehicles. - Based on the recent camera count data, it was agreed that the new bridge should include designated cycling lanes and pedestrian sidewalks on both sides. - **Conestogo Glasgow Street Bridge Rehabilitation:** - Ryan indicated that the rehabilitation contract for the Glasgow Street bridge will start July 26, with traffic detour routes set up in the area. - Construction is anticipated to last 4 months (November 2021). After completion, the bridge will be available to southbound traffic and buggy traffic in both directions. With the limited traffic capacity on the rehabilitated structure, the Township recommends that Glasgow Street not be considered as a temporary Northfield Drive traffic detour route (other than buggy traffic), should Northfield Drive be closed for bridge construction.	

Meeting Topic:	Action By
- **Conestogo Horseback Adventures: Tour Ride Crossings of Northfield Drive and Other Details:** - Following discussions at Project Team Meeting #2, Ken had an internal meeting with senior Region staff to review options for horse trail rider groups to cross Northfield Drive during reconstruction of the Scheifele Bridge. A copy of an email, dated June 7, 2021, was circulated earlier to the Project Team, and is summarized below: - *The Region will accommodate trail crossings of Northfield Drive during construction likely by including an item within the contract which will put the onus on the contractor to provide flagging based on the riding schedule.* - *Further conversations are to be scheduled with the owners of Horseback Adventures Farm regarding the ability to have riders walk their horses across Northfield vs. riding, as a precautionary measure. The Region acknowledges that this may be difficult given the low experience level of some riders.* - *Further conversations are to be scheduled with Horseback Adventures Farm regarding the likelihood that, at times, crossings may not be possible due to conditions and / or site safety, and that preparations should be in place for an alternate route to take riders.* - *Fencing or other physical barriers will not be installed which would prevent post construction access for various users (walking, fishing, horseback riding etc.). It was noted that GRCA would not likely approve any fencing in the floodplain.* - *The Region noted, and agreed, that some minor interim repairs would soon be completed (quotations currently being received) to remove some loose concrete and install support blocking at the south abutment.* - *The Region noted that a program is already in place by Stantec to continue monitoring the structure after completion of scheduled repairs and until capital construction takes place.* - *Hazard signage was discussed and deemed not required, as repairs are being made. However, the possibility of overhead netting will be discussed with Stantec.* - Project Team comments, arising from the Region staff meeting and the above summary, include:	

Meeting Topic:	Action By
- Liability issues would require that the contractor strictly enforce "No Trespassing" within the limits of construction, making the need for an alternate Northfield Drive crossing available to Horseback Adventures. - Contractor flagging, for horse trail ride crossings, could work from Monday to Friday when the contractor is on site. However, other arrangements would be needed on weekends when the contractor is not on site. It may be possible that the contractor hires a private company to provide crossing flagging on weekends, or that University Avenue may be used for crossings in off hours. Winter months may create issues. - Horse crossings of Northfield Drive, without any form of control, may present liability issues to the Region. The owners of Horseback Adventures will argue that the Region has an obligation to provide a safe and reasonable alternative crossing location during construction, when the existing under-bridge crossing is unavailable. - The Region confirms that a temporary, push-button-activated, signalized crossing (as suggested by the owner to be installed near the Horseback Adventure driveway) is not something that staff can support. - After a lengthy discussion, it was agreed that a meeting will be arranged with the owners of Horseback Adventure Farm, to be attended by Ken, Ryan, and Garry. Garry will contact Tatyanna Van Lenthe of Conestogo River Horseback Adventures. - **Structural Inspection and Strategy Report on Bridge Repairs, Construction Deferral, and a Monitoring Program:** - Based on the comments from the June 7 Region staff meeting, temporary warning signage will not be installed on either side of the south abutment, advising horseback riders and walkers of the potential for spalling concrete from the overhead bridge soffit. - Mike Trader had internet issues, so Adam updated the team on the design of the south abutment blocking, which is required because of serious deterioration of the abutment bearing seats. Adam noted that delays in the design process arose because more time was taken in confirming the loading on each girder at the south abutment. - In the end, it was decided to require steel support blocking at the west girder seat (similar to the blocking at the east girder), while wooden blocking will suffice on the interior girders.	Garry

Meeting Topic:	Action By
- Final drawings were submitted to Ken for review last week and Ken confirmed that they can be issued to the contractors who expressed interest in bidding on the work. The abutment blocking is to be added to the soffit spalling repairs that were discussed earlier. - Adam will contact Mike and together create a drawing / specification for the soffit repairs. A full package is to be forwarded to Garry, who will issue the contract drawings to the contractors with a timeline for bid submissions. - Adam to contact Mike for input on the need for netting below the girders to protect against possible spalling concrete after soffit repairs, as suggested by Region staff in the June 7, 2021 email.	Adam/Mike Garry Adam/Mike
3.0 Public Consultation Center Meeting #1: "Engage Website" Activity and Summary: - The On-Line Public and Agency Access "Engage Website" was live from May 19, 2021 through Wednesday June 9, 2021 (three weeks). Advanced notices were issued by means of Email / Mail, Newspaper Advertising, and On-Site Signage. - Website Engagement was tracked by the Region through the ENGAGEWR Summary Report, which was forwarded to team members, along with public comments, on June 22, 2021. The following is a summary: - 222 total visits to the Engage Website - 183 visitors viewed at least one page - On average, 48 visitors viewed a video, photo, document, or multiple pages - 5 visitors participated in a survey and 3 registered to ask a question - It was agreed that all things considered the number of site visits was encouraging although the number of return comments and/or questionnaires was somewhat discouraging. That said, the number of responses should not be correlated to the fact that the PCC was an on-line platform, because in many past cases of in-person PCC meetings the number of written comments may have been equally disappointing. - It was suggested that vocal concerns tend to arise more often, and with more intensity, when a preferred concept is presented that is not acceptable to the community. At this stage, with several options open for consideration, complaints tend to be	

Meeting Topic:	Action By
suppressed until a realization sets in that a design may directly impact residents, such as a long-term closure of Northfield Drive (Alternative Alignment Design Concept 4). - All in all, the number of site "hits" could easily be considered a "Win" situation. **Strategy for Second Public Consultation Center (PCC) Meeting:** - As noted in the June 22, 2021 email transmittal to the Project Team, direction was requested on the preferred format for the second PCC meeting. Depending on the COVID-19 situation later this year, three alternatives were discussed for PCC #2, as follows: - Alternative 1: On-Line Engage Website meeting - Alternative 2: In-Person Drop-In Center Meeting - Alternative 3: No PCC #2 Meeting - The primary objective of the Second PCC, in a Schedule "C" Class EA Study, is to present the preferred design concept for final public scrutiny and comment, leading to a formal preliminary design and submission to Council for endorsement. It is the last opportunity for the public to voice any concerns, notwithstanding the potential for a Part II Order request. - Advantages of Having a Second PCC Meeting: - Follows Schedule "C" Class EA Process. - Eliminates Potential Class EA Process Challenges. - An In-Person Meeting would provide an opportunity to meet members of the public. - Disadvantages of Having a Second PCC Meeting: - Potential for a similar poor engagement result as the first PCC Meeting, if in an "on-line" format. - On-Line Presentation is time consuming and a not cost effective. - Potential for Class EA Process non-adherence challenges. - Considerations for Not Having a Second PCC Meeting: - Focus Resources on Reviewing and Presenting a more thorough review of bridge alternatives and road design details for preferred concept.	

Meeting Topic:	Action By
- Simplifies presentation of Preferred Design Concept to the public, avoiding confusion that may have been created with the large (mandatory) number of displays in PCC#1. - Cost effective and efficient approach. - Consideration may be given to one-on-one meetings with directly affected property owners near the bridge.	
- **Project Team Guidance and Recommendation:**	
- Following considerable discussion of the alternatives for a Second PCC Meeting, the Project Team determined that a second **On-Line Engage Website PCC #2** should be held with the following guidelines:	
- The presentation material is to be significantly minimized for easier public review and comment, with the primary focus being on the recommended preferred Road Alignment and Bridge Cross Section design concepts. **Footnote:** Garry advised that the extensive data provided in the PCC #1 documentation is dictated by the Environmental Assessment Act for Class projects. A large part of the PCC #1 documentation is not required to be presented in the PCC #2 displays.	
- Prior to PCC #2, Region, Township and Stantec staff will meet with immediately impacted property owners, adjacent to the bridge, to discuss the preferred design concepts, any property impacts, and other details such as construction staging, etc. Garry and Ken will make meeting arrangements, which will be attended by Ken, Ryan, and Garry.	Ken/Garry
- It was noted that many local Mennonite households lack access to computers and cannot view the Engage website. It was agreed that special mailings will be distributed to local Mennonite households, presenting details of PCC #2. Ryan will provide a suitable mailing list for the Region to use. Ken will follow up with mailings at a future date.	Ryan Ken
4.0 Recommended Preferred Road Alignment and Bridge Concepts:	

Meeting Topic:	Action By
- **4.1 Alternative Road / Bridge Alignment Concepts:** - There were 4 Alternative Road / Bridge Alignment Concepts developed and presented to the public at PCC#1. There was no public response to the alternatives, in terms of a preferred design. Garry reviewed the options, which was followed by a brief discussion and the following conclusions: - **Alternative Road / Bridge Alignment Concept:** **Alternative Road/Bridge Alignment Concept 1: Full Offset Design:** - Because of maximum impacts on the natural area to the west of Northfield Drive, this alternative is not recommended. - **Alternative Road/Bridge Alignment Concept 2: West Side Staged Construction Design:** - This alternative reduces impacts on the natural area to the west of Northfield Drive, has minimal property impacts, eliminates any long-term closure of Northfield Drive under a staged construction scenario, and is a better option than Alternative #3 (staged construction on the east side). - This design concept Is generally recommended by the Project Team as the current preferred alternative. - **Alternative Road/Bridge Alignment Concept 3: East Side Staged Construction Design:** - Although this alternative eliminates all impacts on the natural area to the west of Northfield Drive, it has increased property impacts (especially on Conestogo Horseback Adventures) and requires relocation of a major overhead hydro transmission line. Like Alternative #2, it eliminates any long-term closure of Northfield Drive under a staged construction scenario. - Despite its slightly lower estimated cost (8% less), Alternative #3 is not recommended. - **Alternative Road/Bridge Alignment Concept 4: Construction on Existing Northfield Drive Alignment Design:** - Although this alternative reduces impacts on the natural area to the west of Northfield Drive and has minimal property impacts, its design requires a long-term full closure of Northfield Drive. The	

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Region's proposed detour route, along Sawmill Road (17) and Highway 85, is about 8 km and would represent a public cost of over $3.0 million in extra fuel costs for an 18-month construction / detour period. - This design concept is not recommended by the Project Team. - **4.2 Alternative Bridge Cross Section Design Concepts:** - There were 4 Alternative Bridge Cross Section Concepts developed and presented to the public at PCC#1. There was no public response to the alternatives, in terms of a preferred design. Copies of the 4 alternative bridge sections are attached to the minutes for reference. - Garry indicated that Stantec's structural group will begin evaluating various bridge span options, girder configuration material (steel versus concrete) options, and other structure design details that will go into the preliminary / final evaluation process. To assist the bridge team, it would be helpful for the Project Team to provide guidance on a preliminary preferred alternative. - To date, all planning and costing of the Alternative Road Alignment design concepts were based on the widest bridge layout concept (Option #4). This bridge section option was created on the assumption that, at some point in the future lifespan of the new bridge (75 years), Northfield Drive may possibly be widened to 4 lanes of traffic. Bridge Option #4 would allow such widening of the Northfield Drive without any need to widen the structure. All other bridge cross section options (#1 thru #3) would require widening of the structure to accommodate the future widening of Northfield Drive to 4 lanes. - A major consideration in the assessment of a preferred bridge design alternative is cost. To assist the Project Team, the following supplementary bridge cost data was provided for consideration: - Base Bridge Construction Costs: - Alternative Bridge Concept #1: $7,000,000 - Alternative Bridge Concept #2: $8,300,000 - Alternative Bridge Concept #3: $9,000,000 - Alternative Bridge Concept #4: $11,900,000 - Based on the above cost estimates, which include an allowance for design engineering and contingencies, it is shown, for example, that Alternative #3 is approximately $2.9 M cheaper	

Meeting Topic:	Action By
than the widest design concept Alternative #4 that was used in the preliminary Alternative Road/Bridge Alignment Designs. - In addition to the above costs, questions were raised about whether the Region has any projected forecast date for widening Northfield Drive to 4 lanes. It was agreed that Mike Jones would discuss this issue with senior Region Traffic staff and confirm any available study data in this regard. - **4.3 Project Team Action and Guidance Plan:** - The Project Team generally supports the selection of Alternative Road Alignment Concept # 2 (West Side Staged Construction) and agrees that Stantec may proceed with further preliminary planning / design of this concept. - Since there are various outstanding factors affecting the selection of a preferred Bridge Design Cross Section, the Project Team did not provide a decision on a preferred bridge design section. A separate meeting may be convened by Ken / Garry to further consider a preferred bridge width once additional traffic information is available. - Architectural enhancements will also be considered at a future meeting. - **Future Consultant Action Plan:** - Garry noted the following general outline of upcoming actions by Stantec: - Refine Preferred Road Design Alignment Concept, including Property Impacts, Retaining Walls, etc. - Bridge Team to examine / refine alternative bridge spans, deck sections, materials, staging plans, construction access and procedures, cost estimates, etc., once a preferred cross section is selected. - Preparations for PCC # 2 - Meetings with Property Owners **5.0 Project Schedule Update (Proposal or Previous Dates in Brackets):** • Official Start Date: February 5, 2020 (April 6, 2020)	Mike Jones Ken / Garry Stantec

Meeting Topic:	Action By
• PIC Number 1: May 19-June 9, 2021 (November 12, 2020 / April 8, 2021) • PIC Number 2 (Tentative): October 14, 2021 (May 19, 2021) • ESR Filing: April / June 2022 (October 22, 2021 / November 30, 2021) • Detailed Design and Property Acquisition: August 2022 to September 2023 (November 15, 2021 to February 16, 2023 / January 5, 2022 to February 16, 2023) • Construction: April 2024 to November 2025 (May 2023 to November 2024) **NOTE:** Due to Region Budget Issues, Construction may be deferred. Delays in the Construction Schedule may, in turn, alter the detailed design and tender schedule.	
6.0 OTHER BUSINESS: - There was no other business tabled by Team Members beyond what was already covered in the above meeting notes.	
7.0 NEXT MEETING: - Date to be confirmed.	Garry, Ken

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Meeting Notes

The Regional Municipality of Waterloo
SCHEIFELE BRIDGE SUPERSTRUCTURE REPLACEMENT
Regional Road 22 (Northfield Drive) over the Conestogo River, Township of Woolwich
Class Environmental Assessment and Detailed Design
Project Team Meeting #6

Date/Time:	Friday November 19, 2021 / 9:30 AM	
Place:	Due to Covid-19, the meeting was held virtually thru TEAMS	
Next Meeting:	To Be Confirmed	
Attendees:	Ken Brisbois	RMOW
	Mike Jones	RMOW
	Ryan Tucker	Township of Woolwich
	Larry Shantz	Woolwich Councillor
	Mike Trader	Stantec Structures
	Bill White	Stantec CADD Tech
	Garry Leveck	Stantec Manager
Regrets:	Murray Martin	Woolwich Councillor
	Adam Felinczak	Stantec Structures
Staff Liaison:	John Stephenson (RMOW) and Jared Puppe (Woolwich)	
Distribution:	All Present; Murray Martin; Adam Felinczak; John Stephenson; Jared Puppe; Brian Keep; Jayson Innes; Parker Dickson; Debbie Giesbrecht; Meghan Rivard; Eric Reinink; Sean Geddes; Jeff Dietz;	
Attachments:	Bridge Cross Section Alternatives Evaluation Matrix	
	Bridge Cross Section Alternatives 1-4 (Original Concepts)	
	Bridge Cross Section Alternatives 5A and 5B (New)	

Meeting Topic:	Action By
1.0 SAFETY MOMENT AND INTRODUCTION: - When parking your car in a parking lot, always back into the space. It is proven that driving forward out of a parking space is much safer and reduces both vehicle and pedestrian incidents.	
2.0 Minutes of Project Team Meeting #3: July 20, 2021: Review and Business Arising: Garry provided an overview of key issues and decisions from Project Team meeting three, held on July 20, 2021: **2.1 Active Transportation Travel Camera Counts:** Update on Field Camera Program:	

The Region completed a one-week camera survey of buggy, cyclist, and pedestrian movements across the existing Scheifele Bridge. The survey was completed in late May / early June, with the resultant numbers shown below:

Horse / Buggy Traffic:
- Seven Day Total Count: 26 crossings

Cyclists:
- Maximum Daily Count: 80 crossings
- Seven Day Total Count: 361 crossings

Pedestrians:
- Maximum Daily Count: 19 crossings
- Seven Day Total Count: 55 crossings

Based on the above active transportation counts, and the need for improved public safety, the Project Team committed, on July 20, 2021, **that the "new bridge structure should have cycling lanes and sidewalks on both sides".**

2.2 Glasgow Street Bridge Rehabilitation:

- Ryan provided an update on the Glasgow Street Bridge rehabilitation contract in Conestoga, advising that construction is behind schedule and that reopening will not occur before spring 2022. Although the steel repairs can continue over the next couple of months, final deck re-surfacing must wait until warm temperatures in the spring.

This update is for information only and has not direct bearing on the Scheifele Bridge study.

2.3 Conestogo Horseback Adventures: Alternatives for Horseback Rider crossings of Northfield Drive during bridge construction:

Garry advised that a meeting was held on September 21, 2021 with Tatyana Van Lenthe, owner of Horseback Adventures. The meeting was held in conjunction with a pre-construction site meeting with Sierra Bridge, who was awarded a contract for the interim south abutment and soffit repairs. Nothing of significance was discussed with respect to the Class EA study, the future bridge replacement design, or horse / rider access across Northfield Drive during the future bridge replacement.

	A future meeting will be arranged with Tatyana to review, in more detail, any decisions by the Project Team related to horse / rider access across Northfield Drive. Ken and Garry will set up a future meeting, to be attended by Ryan as Woolwich representative. Timing to be confirmed, but potentially after PPC #2.	Ken / Garry
	2.4 Bridge Repair Contract Update: Contract was Awarded to Sierra Bridge of Woodstock: Construction prices ranged from $27,314 to $53,934 to $94,904 for three invited contractors, all of which included a Contingency Allowance of $3,600. Stantec Construction estimate: $25,000 to $30,000. On behalf of Adam, who has been handling field inspection visits, Garry advised that the repairs are virtually complete. Two shim blocks are to be installed at the interior girders during the week of November 22, 2021, which will complete the contract work. Adam will complete one final inspection, with final payment to be made to Sierra. Ken directed that Stantec forward a final invoice from Sierra, which will be paid directly. No PPC is required for the project. Garry will follow up with Adam and Sierra.	Garry
	2.5 Property Owner Meetings and Mailings: As a reminder, meetings will be convened with directly impacted property owners prior to PCC #2, which will provide an opportunity to better explain the Class EA process and current study recommendations (Road Alignment #2, Bridge Cross Section 5, Construction Staging, Northfield Drive Traffic, etc.). The meeting will be attended by Ken, Ryan, and Garry. Garry will arrange after details of PCC#2 are settled.	Garry
	PCC #2 Information Packages are to be mailed to the local Mennonite community, who may not have computer access. Ryan provided the name and phone contact for the local church Deacon. Garry will contact at the appropriate time.	Garry
	2.6 Region Transportation Master Plan (TMP): Based on consultation with Region Transportation Planning, Ken confirmed that the current Transportation Master Plan (TMP) shows that it is unlikely that Northfield Drive will be widened to 4 lanes before 2050, which is important information in the conceptual planning of the bridge cross section. In the development of preliminary bridge section alternatives, allowances had been	

made for an ultimate 4 -lane structure, which can now be abandoned. If Northfield Drive is widened outside of a 30-year horizon period, a 2-lane structure can be widened at that time.

2.7 Recommended Preferred Design Alignment:

As a reminder, Garry noted that the Project Team approved, in principle, Alternative Road / Bridge Alignment Concept #2 as the Recommended Preferred Design for the study. Features of Alternative #2 include:

West Side Staged Construction
No Long-term detours required for Northfield Drive traffic
Bridge Cross Section subject to confirmation (see Agenda Item 3.0)

2.8 Recommended Preferred Bridge Cross Section Design:

At Project Team meeting #3, the Project Team deferred any decision with respect to a recommended preferred bridge cross section design, from the 4 concepts presented at PCC #1 (attached to minutes).

Based on the TMP data noted in Item 2.6 above, it was concluded that a 2-lane bridge will be carried forward as the recommended bridge cross section. Further discussion, with respect to refining the overall bridge cross section, is covered under Agenda Item 3.0.

Potential Architectural Enhancements were discussed during Project Team Meeting #3, with no decisions presented. Garry noted that the selection of architectural enhancements, such as a decorative pedestrian railing and a mid-span viewing platform are still "on the table" for discussion and approval. Garry also noted that there was "no feedback from the public on various architectural enhancement opportunities following PCC #1".

After discussion, it was agreed that:

The pedestrian handrails are still open to architectural enhancements, subject to confirmation of a final bridge design cross section.
Mid-span viewing platforms are not recommended because pedestrians / cyclists can stop to look at the river without interfering with other users. Viewing platforms could only be justified if the sidewalks were heavily used.

3.0 Bridge Cross Section Evaluation and Planning:

As noted above, the Region Transportation Master Plan (TMP) confirms that Northfield Drive will not be widened to 4 lanes within the immediate future, and not before 2050.

Using the above information, Garry created a comprehensive Alternative Bridge Cross Section Evaluation Matrix that examines the subjective pros and cons of each alternative bridge section, leading to an overall rating of the original four (4) bridge sections that were presented to the public at PCC #1.

In addition to the TMP data, current Region of Waterloo design standards specify 3.35 m lanes on rural roads and bridges (reference Region of Waterloo Rural Road Resurfacing Standards and Practices), which is different than the 3.75 m lanes that was provided for the original 4 cross sections.

Based on the above, Ken and Garry went on to develop *Alternative Bridge Cross Section Concept #5* and include it in the comprehensive Evaluation Matrix. Features of Alternative Bridge Section #5 are as follows:

1. Vehicle Lanes: 2 @ 3.35 m
2. Paved Shoulders / Buggy Lane / Cycle Lane: 2 @ 2.45 m
3. Roadside Barriers: 2 @ 0.325 m
4. Walkway / Sidewalks: 2 @ 1.80 m
5. Pedestrian Railings: 2 @ 0.40 m

6. **Total Deck Width: 16.65 m**

Alternative Bridge Concept #5 reflects the narrower travel lanes, paved shoulders for safe buggy and cycle traffic, and maintains a barrier between the road and walkway.

Prior to the Project Team meeting and after review of the Evaluation Matrix, Ken and Garry discussed the merit of eliminating the concrete barriers between the road and sidewalks / walkways. *Alternative Bridge Cross Section #5B* was developed, which is identical to Alternative #5 but without the roadside barriers. After development of Alternative Section #5B, Alternative #5 was subsequently referenced as Alternative Section #5A.

	According to the 2019 Canadian Bridge Design Code, all new bridges with a posted speed greater than 70 km/h must have a barrier between the travelled roadway and the sidewalk. Although municipal Councils may overrule the Bridge Code, it was concluded that Region Council would not likely have an appetite for taking such action. Therefore, if Alternative #5B was to be considered, the speed limit on Northfield Drive would have to be reduced to a minimum of 70 km/h across the bridge. To this end, Ken and Garry suggested that the Project Team consider a recommendation to "extend the 60 km/h speed zone approximately 750 m northerly, from its current transition from 60 km/h to 80 km/h, to the north side of the bridge". The speed on Northfield Drive would increase from 60 km/h to 80 km/h approximately 200 m north of the new structure. Mike Jones noted that Region Transportation Planning recently considered a request from Horseback Adventures to extend the 60 km/h zone further to the north, which was denied. The Region did install centerline speed markers to slow traffic, which has had only marginal success in calming traffic. Although Mike Jones expressed doubt about receiving approval to have the speed limit reduced across the new bridge, to enable elimination of the deck barriers, it was agreed by the Project Team that the current parameters associated with a possible speed zone change are significantly different than what may have been previously considered by Transportation Planning. **The Project Team directed the following actions:** 1. Garry will forward a summary to Ken outlining the benefits of Alternative Bridge Cross Section #5B (no deck barriers), as summarized to the Project Team as follows: Estimated Capital Construction Cost Savings of $935,000 Reduced Long Term Maintenance: No Concrete Barrier Repairs. No Approach Guiderail and Attenuator Repairs. No Plugged Barrier Drainage Ports. Improved Winter Maintenance: Eliminates separate snow clearing operations for road and sidewalk. Visual Aesthetics: "No Barrier" retains driver view of Conestogo River. Safety Considerations with "No Barrier": 2.45 m Paved Shoulders (Buggy / Cyclist Lane) provide buffer between vehicular traffic and pedestrians.	Garry

Eliminates Crash Hazard with barriers and attenuators.	
2. Mike Jones to take the Project Team request to Steve van De Keere, as soon as possible, and involve Ken in any discussions as required.	Mike Jones
4.0 PCC #2: Strategy for Second Public Consultation Center Meeting: As confirmed at Project Team meeting #3, a second Public Consultation Center Meeting will be arranged on-line. The presentation material will be significantly less than for PCC #1, which will allow for easier public review and comment. The primary focus will be on the recommended preferred Road Alignment and Bridge Cross Section design concepts. The objectives of the Second PCC, in a Schedule C Class EA Study, is to present the "recommended preferred design concept" for final public scrutiny and comment, leading to a formal preliminary design and submission to Council for endorsement. It is the last opportunity for the public to voice any concerns, notwithstanding the potential for a Part II Order (Bump Up) request. To this end, the presentation material will be concentrated on "Recommended Preferred Road Alignment Concept #2, Recommended Preferred Bridge Cross Section #5A or 5B (TBC), Selected Bridge Structural Design features, and Construction Staging / Northfield Drive Traffic control during construction". Prior to finalizing the presentation materials for PCC#2, Mike Trader's Structural Team will examine, and confirm, preferred bridge materials, span lengths, deck girder spacings, and other preliminary bridge design details. Although it would be preferable to have confirmation on the preferred Alternative Bridge Cross Section 5A versus 5B, it was decided that the structural team can get started immediately on this study work.	Mike Trader
5.0 Project Schedule Update (Proposal or Previous Dates in Brackets): - Garry provided a brief update on the Class EA, Design and Construction schedules based on the current state of the preliminary EA work. Because of delays in the Class EA process, it appears that the earliest construction start date would be spring 2024. - Preliminary updated schedule dates are:	

• Official Start Date: February 5, 2020 (April 6, 2020) • PPC Number 1: Completed May 19-June 9, 2021 (November 12, 2020 / April 8, 2021) • PPC Number 2: Tentative January / February 2022 (May 19, 2021) • ESR Filing: Late Summer 2022 (October 22, 2021 / November 30, 2021) • Council Adoption of ESR: Fall 2022 (December 2021/ January 2022) • Detailed Design and Property Acquisition: September 2022 to November 2023, (November 15, 2021, to February 16, 2023 / January 5, 2022, to February 16, 2023) • Tender and Contract Award: January to March 2024 (January to March 2023) • Construction: April 2024 to November 2025 (May 2023 to November 2024) **NOTES:** 1. Due to Region Budget Issues, Construction may be deferred. Delays in the Construction Schedule may, in turn, alter the detailed design and tender schedule. 2. Ken advised that Property Impact Plans (PIP) should be prepared as soon as the preliminary design of the recommended preferred concepts are completed, because the property acquisition process can take up to 2 years.	Garry / Ken
6.0 OTHER BUSINESS: - There was no other business tabled by Team Members beyond what was already covered in the above meeting notes.	

7.0 NEXT MEETING: - Date to be confirmed.	Garry, Ken

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Meeting Notes

The Regional Municipality of Waterloo
SCHEIFELE BRIDGE SUPERSTRUCTURE REPLACEMENT
Regional Road 22 (Northfield Drive) over the Conestogo River, Township of Woolwich
Class Environmental Assessment and Detailed Design
Project Team Meeting #7

Date/Time:	Wednesday July 20, 2022: 1:30 PM	
Place:	Due to ongoing Covid-19 issues, the meeting was held virtually thru TEAMS	
Next Meeting:	To Be Confirmed	
Attendees:	Ken Brisbois	RMOW
	Mike Jones	RMOW
	Ryan Tucker	Township of Woolwich
	Larry Shantz	Woolwich Councillor
	Murray Martin	Woolwich Councillor (Guest)
	Mike Trader	Stantec Structures
	Adam Felinczak	Stantec Structures
	Bill White	Stantec CADD Tech
	Garry Leveck	Stantec Project Manager
Staff Liaison:	Jared Puppe (Woolwich)	
Distribution:	All Present, Jared Puppe	
Attachments:	All relevant Design Concepts and Background Documentation for the project was forwarded to Project Team members on July 4, 2022, with the Meeting Agenda.	

Meeting Topic:	Action By
1.0 SAFETY MOMENT AND PURPOSE OF MEETING: - Play safe while around lakes and rivers during the summer season. - **Meeting Objectives:** - Review Minutes of November 19, 2021, Meeting - Discuss PCC Meeting #2 and Agency / Public Comments - Project Team Approval / Endorsement of Recommended Preferred Design Concepts - Review Updated Cost Estimates - Review Latest Project Schedule	
2.0 Minutes of Project Team Meeting #6: November 19, 2021: Review and Action Items Arising: **2.1 Glasgow Street Bridge Rehabilitation:**	

Meeting Topic:	Action By
- Ryan advised that the Glasgow Street Bridge is scheduled to be opened on July 28, 2022. One-way vehicular traffic will be permitted heading from Conestogo to Waterloo. **2.2 Conestogo Horseback Adventures:** - It was agreed that a second meeting would be arranged with Tatyana, owner of Conestogo River Horseback Adventures, to discuss the recommended Northfield Drive and Scheifele Bridge design concepts, and to further review options for horseback movements during the bridge construction. The last meeting with Tatyana was in September 2021. - Decisions still need to be made on how trail ride movements can be handled during construction, with options such as a Contract Item in the Construction Contract, a separate button activated crossing signal, or restricted use to the east side trails for the duration of construction. - Ken will further review this outstanding issue with senior Region staff before convening an owner meeting later this year. - Garry and Ryan will attend the next meeting with Tatyana. - It was agreed that there is no need for meetings with other property owners, as was suggested earlier. **2.3 Interim Soffit and Abutment Bridge Repair Contract Update:** - Contract was completed in December 2021 by Sierra Bridge of Woodstock, at a final contract value of $26,796.82 including HST. Other 2 bids ranged from $54 K to $95 K. - A Final Inspection Report was completed by Adam in early December 2021 and filed by Stantec. - No further action required, other than possible annual monitoring of structure until the reconstruction contract is awarded in 2024. **2.4 Bridge Cross Section: Barrier or No-Barrier:** - Region Transportation Program Review Committee considered the Project Team's proposal to delete roadside barriers in favour of a reduced posted speed limit (60 km/h) on Northfield Drive. Benefits of the team proposal included: - Estimated Capital Construction Cost Savings of $935,000 - Reduced Long Term Maintenance	**Ken**

Meeting Topic:	Action By
- No long-term Concrete Barrier Repairs. - No Approach Guiderail and Attenuator Repairs. - No Plugged Barrier Drainage Ports. - Improved Winter Maintenance: Eliminates separate snow clearing operations for road and sidewalk. - Improved Visual Aesthetics: "No Barrier" may retain driver view of Conestogo River. - Region's Program Review Committee (January 22, 2022, meeting) declined consideration of a speed reduction on Northfield Drive and turned down the Project Team's motion to eliminate roadside barriers. Barriers between the road and sidewalk were deemed necessary because of the PRC decision. - Although Region Council can overrule PRC and the OHBDC, and eliminate the barriers while retaining the posted speed of 80 km/h, it is not likely that Council would take this step. - The Region has installed centerline speed markers to slow traffic, which has had only marginal success in calming traffic, according to Region Traffic.	
3.0 Public Consultation Center Meeting #2: - PCC #2 was live on the Region's EngageWR.ca website from May 18 to June 9, 2022. - Format included slides and a video presentation by Region and Stantec staff (Region: Ken Brisbois and Stantec: Adam Felinczak). Adam was sitting in for Garry Leveck who had come down with COVID at the scheduled time for the videotaping. - Garry acknowledged Adam's assistance for filling in on short notice, and for doing an excellent job. - Stantec's Hamilton Marketing Team provided video-taping coordination, and final editing for the PCC presentation, at no charge to the Region. - **Advertising PCC Meeting:** PCC # 2 was advertised in the following publications: o Waterloo Region Record: May 13, 2022, and May 17, 2022 o Woolwich Observer: May 12, 2022, and May 19, 2022	

Meeting Topic:	Action By
o Waterloo Chronicle: May 12, 2022, and May 19, 2022 Direct mailings were made by the Region to agencies, community organizations, abutting property owners, and interested stakeholders. Direct Delivery of the Information Package (40 copies) was made to the local Mennonite Community, to accommodate individuals who may not have computer access to the EngageWR.ca website. Delivery was made to Mr. James Martin, Deacon of the local Mennonite Congregation. Portable signage was placed on Northfield Drive at both approaches to the Scheifele Bridge, notifying the travelling public of the on-line Public Consultation Centre meeting dates. - **On-Line Statistics:** - On-Line Meeting Statistics: o 183 total visits to the EngageWR.ca Website o Responses to PCC Meeting: Agencies: 2 written responses Interest Groups: 1 written response Newspaper: Woolwich Observer Article General Public: 24 written responses Mennonite Community: 13 written responses - **Review of Agency and Public Comments from PCC#2:** - Two attachments were provided with the meeting agenda, summarizing the comments received from agencies and the public. - The first attachment was a **detailed** compilation of the written comments from each respondent, while the second attachment was a synopsis of recurring comment themes as well as a breakdown of “support versus non-support” for the various recommended preferred alternative design concepts (Alignment Concept #2; Bridge Cross Section #5; and Construction Staging Program). - Public Comments were separated between the “general public” and those from the “Mennonite Community” because of the significant difference in their respective modes of transportation (vehicle versus buggy).	

Meeting Topic:	Action By
- The detailed compilation of agency and public comments was not reviewed at the meeting but was left to each Project Team member to review on their own time. However, Garry reviewed the synopsis summary and offered the following comments: - **General Public Comments (24 Total):** - Recommended Preferred Alignment #2: - Supports Design: 14 (58%) - Does Not Support Design: 6 (25%) - Non-Committal: 4 (17%) - Recommended Preferred Bridge Cross Section #5: - Supports Design: 12 (50%) - Does Not Support Design: 7 (29%) - Non-Committal: 5 (21%) - Recommended Construction Staging Plan: - Supports Design: 19 (79%) - Does Not Support Design: 1 (4%) - Non-Committal: 4 (17%) - **Mennonite Community Comments (13 Total):** - Recommended Preferred Alignment #2: - Supports Design: 10 (77%) - Does Not Support Design: 0 (0%) - Non-Committal: 3 (23%) - Recommended Preferred Bridge Cross Section #5: - Supports Design: 9 (69%) - Does Not Support Design: 1 (8%) - Non-Committal: 3 (23%) - Recommended Construction Staging Plan: - Supports Design: 10 (77%) - Does Not Support Design: 0 (0%) - Non-Committal: 3 (23%)	

Meeting Topic:	Action By
- In general, it was concluded that a majority of the public, who responded to the PCC#2 presentation details, support "Recommended Preferred Alignment #2", "Recommended Preferred Bridge Cross Section #5", and the "Recommended Construction Staging Plan. - The public support for the Project Team's recommended preferred design concepts was felt to be an acknowledgement of the thought process that went into the study to date, and the consideration that was given to the various users of Northfield Drive and the Scheifele Bridge, including the Mennonite community and Cyclists.	
4.0 Project Team Approval / Endorsement of Design Concepts: - At PCC #2, the Recommended Preferred Design Concepts for the Scheifele Bridge Replacement Study were officially presented to the public. - The Environmental Study Report (ESR) will carry forward the design concepts to Region Planning and Works Committee and Council for final approval, prior to filing the ESR on the Public Record. - Notwithstanding the potential for a Section 16 (Part II) Order, clearance of the ESR Study document will ultimately lead to final design and construction. - Prior to finalizing the ESR and meeting with Region Planning and Works / Council later this year, it is critical that the Project Team **formally** approve / endorse the various "Recommended Preferred Design Concepts". - The following design concepts were reviewed and discussed, followed by subsequent approval / endorsement as noted: o **Northfield Drive Alignment Alternative #2:** Unanimously approved by the Project Team. o **Scheifele Bridge Design Cross Section #5 (16.65 m):** Unanimously approved by the Project Team.	

Meeting Topic:	Action By

- **Scheifele Bridge Three (3) Span, Haunched, Steel Girder Planning Concept:**
- Steel haunched girder design reflects heritage character of the existing bridge, although there is a 5% +/- overall project cost premium above straight steel or concrete girders.
- Steel girders provide "visual break lines" between steel girders and the concrete deck, which is not available with concrete girders (all concrete view).
- Three span design allows for offset of new piers from existing piers so that pile construction minimizes vibration impacts on existing substructure.
- Three span design, and longer structure length, provides increased width of primary flow channel of Conestogo River under the north span.
- Three span / two pier design minimizes in-water construction timelines compared to a 4 span / three pier design.

After discussion of the above structure planning details, the design concept was **unanimously approved** by the Project Team, with the understanding that some minor details may be changed during detailed design.

- **Construction Staging Plan (4 Stages):**

Unanimously approved by the Project Team.

- Garry thanked the Project Team members for their support of the recommended preferred design concepts.

- **Construction Cost Estimates:**

- In conjunction with the Project Team's approval of the recommended design concepts, updated preliminary construction cost estimates were also reviewed for the project.

- Stantec regularly tracks MTO costing data with respect to bridge construction in Ontario. As a result of supply chain issues and recent construction market trends, MTO reported that bridge construction costs increased by about 30% over a 12 month period, between April 2021 and April 2022.

Meeting Topic:	Action By
- As a result of the above MTO benchmark cost data, Stantec has updated the preliminary construction cost estimates from previous values. - The latest / revised 2022 construction cost estimate for the project, including road construction, bridge construction, property acquisition, and a 10% contingency allowance, is **$20.1 Million**. Not included in this updated estimate are utilities (example: new 300 watermain), design and construction engineering fees, and HST. - Based on a 3-year construction program, from spring 2024 to summer 2026, the annual costs are estimated as follows: - 2024 Cost Estimate: $8.3 M - 2025 Cost Estimate: $8.5 M - 2026 Cost Estimate: $3.3 M	
5.0 Project Schedule Update: • Official Start Date: February 5, 2020 • PPC Number 1: May 19 to June 9, 2021 • PPC Number 2: May 18 to June 9, 2022 • Draft ESR Report: September 1, 2022 • Region Staff Review of Draft ESR and Comments to Stantec: September 6 to September 21, 2022 • Finalize ESR Report and Printing / Circulation: September 22 to October 14, 2022 (Dates TBC) • Region Staff Report to Planning and Works Committee and Council: October 14 to November 1, 2022 (Dates TBC) • Joint Region Planning and Works Committee and Council: November 8, 2022 (Date TBC)	

Meeting Topic:	Action By
• Filing of ESR Report (30 Day Public Review Period): November 17, 2022 (Date TBC) • End of Formal ESR Public Review Period: December 27, 2022. (Date TBC) • Detailed Design, Property Acquisition, Tender Call, and Tender Award: January 16, 2023, to April 19, 2024 (Dates TBC) • Construction: May 2024 to July 2026 (Tentative) **Note:** Earliest Date for In-Water Construction is July 15)	
6.0 OTHER BUSINESS: - **GRCA Wetland Flagging and Surveys:** - Comments from GRCA after PCC#2 was a request to complete wetland mapping in the southwest quadrant of the study area. - Field Work was completed in late June by Stantec's Ecologist along with GRCA staff, Ken, and Garry. Flagging was followed by Total Station surveys and CADD mapping. - The EIS Report must be updated and is scheduled for August / September (delayed due to summer vacation schedules) - Addendum work: Since this is extra work to the original contract, an addendum will be submitted to Ken for approval once all final costs are known. - Further coordination, and liaison, is required with GRCA (Trevor Heywood). - **Next Project Team Meeting:** - Final Class EA Project Team Meeting will be convened after filing of the ESR report and completion of the 30-day review period. - The next meeting will be in January / February 2023, subject to the any changes in the schedule outlined in Section 5.0. - Region to consider need for, and makeup of, Final Design and Construction Project Team. Further discussion on this matter is required.	

Meeting Topic:	Action By

Garry E. Leveck, P. Eng.
Senior Consultant: Transportation
Senior Project Manager
Stantec
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Cell: (519) 240-3686
Fax: (519) 579-6733
garry.leveck@stantec.com

Active Transportation Advisory Committee

Minutes

September 20, 2022, 5:00 p.m.
Meeting to be held electronically
150 Frederick Street, Kitchener, Ontario

Members Present: K. Kiefer, A. Cullen, A. Crowe, K. Alexander, J. Gibbins, T. Osland, A. Quin, M. Shipley, C. Speers

Members Absent: M. Cowan, M. Jeans, R. Mattix, M. Santos

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1. Call to Order

Chair A. Cullen called the meeting to order at 5:02 p.m.

M. Shipley joined the meeting at 5:03 pm.

2. Declarations of Pecuniary Interest under the "Municipal Conflict of Interest Act"

None declared.

3. Review of Agenda

K. Marshall, Principal Planner (Transit), Transportation Services, requested that an item related to the King Street (University-Central) Bike Lane Transit Integration be added to the agenda.

4. Approval of Minutes of Meeting - June 21, 2022

Moved by A. Crowe
Seconded by A.Quin

That the minutes of the Active Transportation Advisory Committee from June 21, 2022 be approved.

Carried

5. Delegations

6. Business Arising from the Minutes

6.1 ATAC Terms of Reference Update - K. Marshall (10 min.)

K. Marshall confirmed that Regional Council approved the ATAC Terms of Reference on August 24, 2022. He acknowledged and thanked ATAC Vice-Chair T. Osland, and member R. Mattix and C. Speers for participating in the preliminary review of the proposed updates, as well the entire ATAC membership for their thoughtful input in June.

7. New Business

7.1 Scheifele Bridge Replacement : Northfield Drive over the Conestogo River - K. Brisbois (20 min.)

Ken Brisbois, Project Manager (Design & Construction), Engineering and Environmental Services, provided a presentation on the Scheifele Bridge Replacement, which is attached to the original minutes. He outlined the various alternatives for the project. There were multiple public consultations held from in 2021 and 2022. He summarized the community comments such as the concern for a wider shoulder on the road for horse and buggy usage. He also noted the bridge crossing volumes for horse and buggies, cyclists, pedestrian, and vehicles. He provided a list of next steps which include finalizing the Environmental Study Report, seeking Council approval, and starting the procurement process.

In response to the Committee, K. Brisbois will speak with his supervisor regarding how Staff will approach Council approval and budget considerations given the municipal election in October.

7.2 Separated Cycling Network Expansion Project - A. Martinez (30 min.)

Alberto Martinez, Engineer (Transportation Planning) for Transportation and Environmental Services, provided a presentation on the separated cycling network improvements and expansions in the Cities of Waterloo and Kitchener, which is attached to the original minutes. He explained that the separated cycling facility pilot project has included five sections of road and has been active fore 18 months. Based on the results of the pilot project, Regional Council decided to convert the temporary facilities that were part of the regional network to permanent facilities and expand the network in some locations. He noted that the existing regional policy directed this pilot project based on the 2018 Transportation Master Plan and the Transform Waterloo Region - Climate Action Strategy. He outlined the project milestones with the preliminary design planned for Winter

2022/2023 and provided an overview of the key cycling network connections. He explained the evaluation process, the separated facility types and the proposed design alternatives. He concluded by stating that design alternative options 1 and 2 scored the highest and are recommended by Staff to continue.

The Committee expressed concern about the visibility on the south side. Staff will be looking at the curve and the downslope with the consultant, so that the signals are visible at a safe distance.

The Committee expressed concern about the absence of Cambridge in these types of projects and Staff noted that this is a continuation of a pilot project from 2019 and will look for opportunities in the future.

8. Information/Correspondence

8.1 Group Ride Debrief - T. Osland, A. Crowe (10 min.)

A. Crowe declared the public group ride a success but expressed concern about two trail exchanges. T. Osland reiterated A. Crowe's comments and noted that future rides should be diversify the trails to ride on to ensure that all area municipalities are included.

8.2 Micromobility Update - K. Marshall (10 min.)

K. Marshall provided an update on the micromobility. Staff are reviewing proposals this month, and will return to ATAC in October with more details and next steps.

8.3 King Street (University-Central) Bike Lane Transit Integration

K. Marshall provided an update on the King Street (University-Central) Bike Lane Transit Integration and presented an image, which is attached to the original minutes.

In response to the Committee's concern about misuse of the bike lane, K. Marshall explained next steps that will prevent this misuse, such as signage and dedicated bike lanes.

9. Next Meeting - October 18, 2022

9.1 Call for Agenda Items - All ATAC (10 min.)

T. Osland expressed interest in discussing ATAC's involvement with the micromobility procurement process, specifically, in providing Committee

input with respect to the received proposals. He also noted that Staff and the Committee should consider options related to permitting transit payments via a mobile app.

9.2 Agenda Items for Upcoming Meetings

10. Adjourn

Moved by K. Kiefer
Seconded by T. Osland

That the meeting adjourn at 6:19 p.m.

Carried

Committee Clerk

Committee Chair

Scheifele Bridge Replacement
Northfield Drive Over The Conestogo River

https://www.engagewr.ca/scheifele-bridge-superstructure-replacement

The structure of the **Project Team** included Region of Waterloo Design & Construction as well as Transportation Engineering reps, Township Staff and Councillors as well as Stantec Consulting.

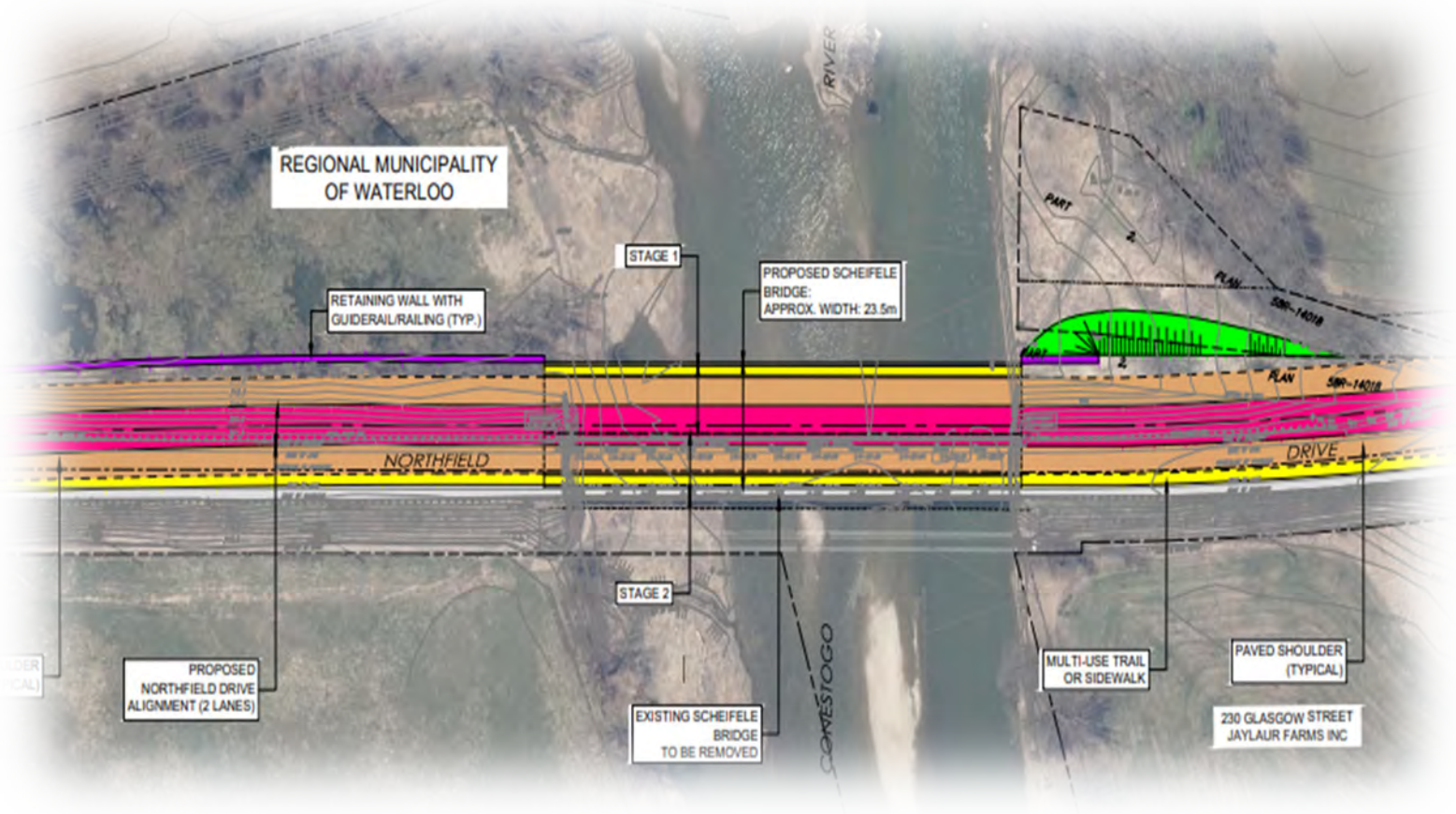
Alignment Alternatives (PCC #1)

Alternative Alignment #1
- Full Offset Construction West Side

Alternative Alignment #2
- Staged Construction West Side

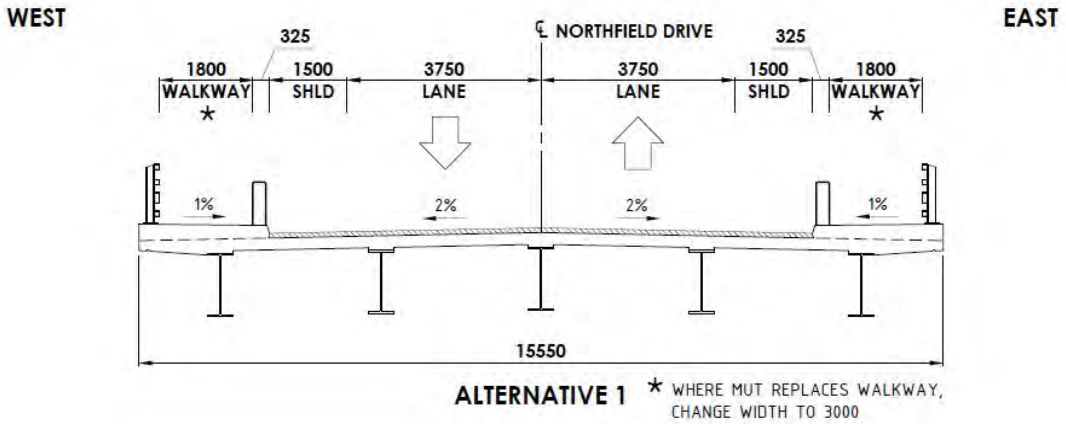
Alternative Alignment #3
- Staged Construction East Side

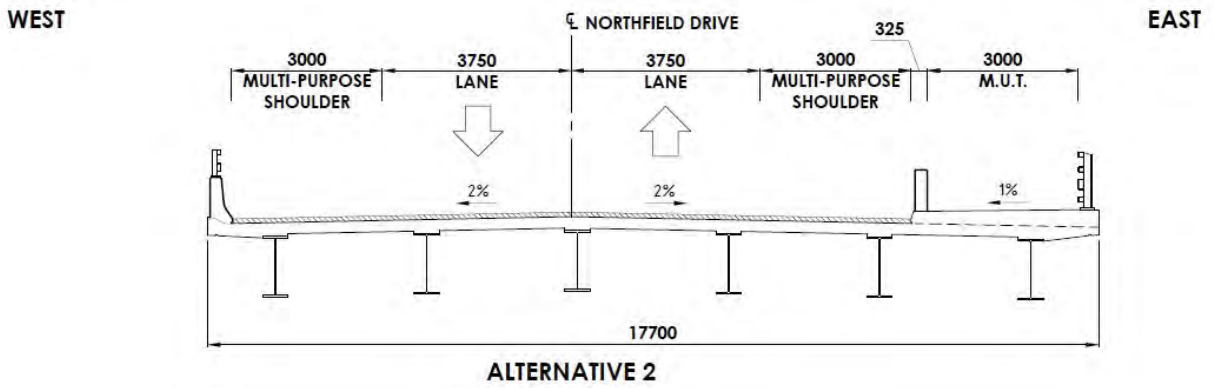
Alternative Alignment #4
- Construction on Existing Alignment

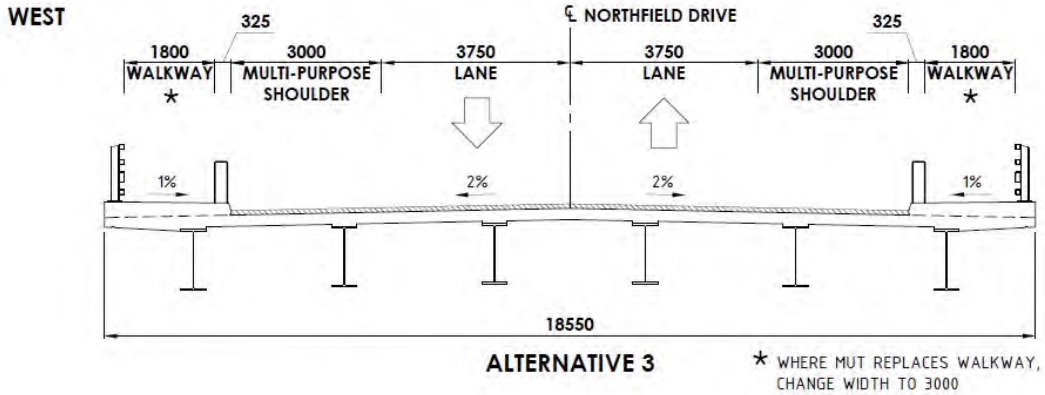


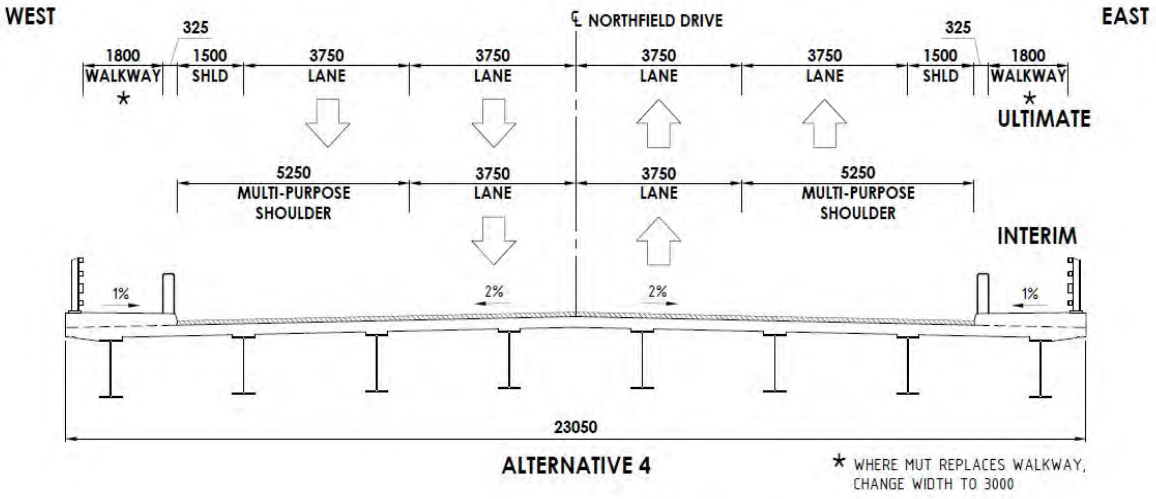
Alternative Alignment #2 (PREFERRED)

Cross Section Alternatives (PCC #1)









Virtual Public Consultation #1 (May 19 – June 9, 2021)

- The following is a summary from Engage:
  - 222 total, 83 visitors viewed at least one page, on average, 48 visitors viewed a photo, document, or multiple pages and 5 visitors participated in a survey to determine mode of travel, frequency as well as general comment.

- A resident of the village of Conestogo, and regular user of Northfield Drive and the Scheifele Bridge, commented:
  - that the Scheifele Bridge is a critical link between Waterloo and Conestogo / Woolwich and should be considered as such in any preferred design solution,
  - that the high posted speed limit on Northfield Drive presents safety issues for buggy, cyclist, and pedestrian users on the current bridge; and
  - that Northfield Drive is used extensively by the Waterloo Cycling Club, making increased safety a high priority

- Four residents of the Township of Woolwich, who indicated that they are regular users of Northfield Drive and the Scheifele Bridge, presented the following consolidated observations:
  - one resident requested separate lanes, or wider shoulders, for buggy and cyclist traffic,
  - another resident requested that Northfield Drive be kept open to traffic during construction of the new bridge, and that the Glasgow Street bridge be kept open to 2-way traffic. (Footnote: The Glasgow Street bridge is under Township of Woolwich jurisdiction and any decisions with respect to that structure are outside the scope of the Scheifele Bridge study),
  - a third resident suggested that concrete safety barriers be provided between the roadway and any sidewalks or multi-use trails on both sides of the bridge, and
  - a fourth Woolwich resident suggested that a 4-lane bridge, although “nice-to-have”, is perhaps premature based on future traffic volumes; that it is imperative to have wider shoulders for buggy and cycle traffic; and that separate pedestrian walkways are desirable and should be extended along Northfield Drive.

- Finally, one resident of the City of Waterloo, and an expressed frequent user of Northfield Drive and the Scheifele Bridge, requested:
  - that Species at Risk (SAR) should be treated carefully during the design and construction stages
  - that a full road closure or detour may not be as problematic as other recent construction projects in the Region, and
  - that the trail under the south span of the bridge be maintained during construction

Mennonite Buggy Volumes (2021):

Maximum Daily Count: 7 crossings

Seven Day Total Count: 26 crossings

Cyclist Volumes (2021):

Maximum Daily Count: 80 crossings

Seven Day Total Count: 361 crossings

Pedestrian Crossing Volumes (2021):

Maximum Daily Count: 19 crossings

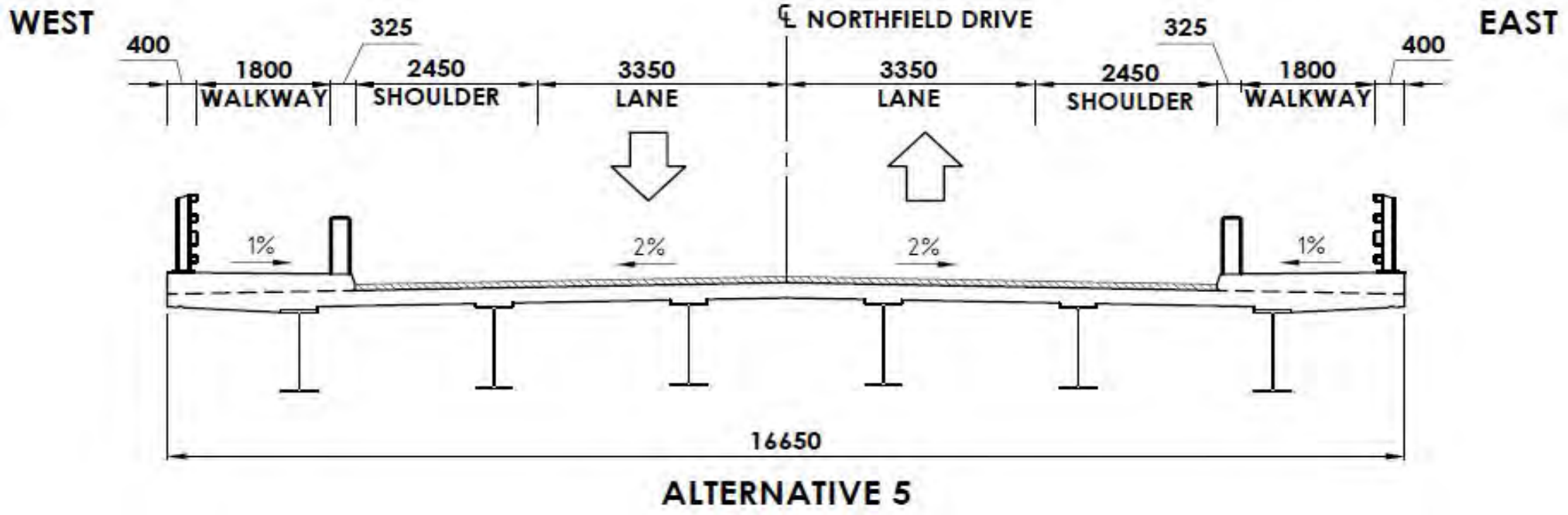
Seven Day Total Count: 55 crossings

Vehicle Volumes (2020):

The 2020 Average Annual Daily Traffic (AADT) volume is approximately 10,350 vehicles per day (VPD). The approximate percentage of heavy trucks is 3.5% or about 360 VPD.

Traffic Growth is anticipated to be modest within the timeline of traffic forecasting. The projected 2030 AADT is estimated at 15,400 vehicles per day (VPD) based on a 3% annual growth rate.

Preferred Cross Section (PCC #2)



Features of Recommended **PREFERRED** Bridge Cross Section Design Concept 5 include:

- Two 3.35 m lanes, one each for northbound and southbound traffic
- 2.45 m paved shoulders for shared use by buggy traffic and cyclists
- 1.8 m walkway / sidewalk on each side of the bridge
- Decorative pedestrian handrails (design details to be confirmed)
- Concrete protection barriers between the road and each walkway
- Total width of the proposed structure is 16.65 meters

Virtual Public Consultation #2 (May 18 – June 8, 2022)

The following is a summary from Engage:

- 183 total visits,152 visitors viewed at least one page, on average 79 visitors viewed a photo, document, or multiple pages and 19 visitors participated in a survey

- **Kitchener Easy Riders Cycle Club (C/O: Mr. Roger Suffling):**

- We cycle the Region and elsewhere in Ontario several times a week from early spring to late fall and we promote safe cycling for fun, fitness, and fellowship. Mostly our riding is on roads rather than on trails. Kitchener Easy Riders members use the Scheifele Bridge on a regular basis, and it has been on the route of some of our regular, organized group rides. Thus, we are very pleased to see that the study team has endorsed having paved cycle/buggy lanes and sidewalks across the bridge. We trust that these will be a feature of the completed design. We note that many road bridges in the Region have rather low railing and open sides for snow removal, but this can lead to gusty conditions for cyclists crossing these structures.

General Public

- Recommended Preferred Alignment #2:
  - Supports Design: 14 (58%)
  - Does Not Support Design: 6 (25%)
  - Non-Committal: 4 (17%)

- Recommended Preferred Bridge Cross Section #5:
  - Supports Design: 12 (50%)
  - Does Not Support Design: 7 (29%)
  - Non-Committal: 5 (21%)

- Recommended Construction Staging Plan:
  - Supports Design: 19 (79%)
  - Does Not Support Design: 1 (4%)
  - Non-Committal: 4 (17%)

Significant Comments:

- Essentially the current state of the bridge and Northfield Drive are entirely unsafe for buggies and cyclist because there is poor visibility, little space and drivers ignore the current speed requirements and there is no enforcement.
- The Glasgow Street bridge in Conestogo has just undergone extensive renovations to be intended mostly for pedestrian, buggy, and bicycle users. Cars are to be limited. This is a natural and safer parallel route that would remove these uses from Northfield Drive. Bicyclists would be far safer travelling on this route than exposing themselves to high-speed traffic on the gravel covered roadside of Northfield Drive.
- The wide shoulder/bike lane needs to be continuous along the entire stretch of Northfield (from University Dr to Sawmill Drive) to make it both useful and safe for cyclists.
- There is not currently safe pedestrian/cycle (normal cyclist, not the cycling club) access from Conestogo to the Health Valley Trail. The trail is advertised as St. Jacobs to Conestogo, and yet it cannot easily be accessed from Conestogo.
- Maintaining traffic during construction is a must.
- Suggest that reconstruction of Scheifele Bridge not be started until the Glasgow Street bridge is reopened, thereby providing residents of Conestogo with an alternate route into Waterloo.
- Please keep as much of the "swamp" on the west side as you can. I fear that encroaching by 10 meters will damage it a lot. I understand the need to avoid moving the new 27kV power line on the east side.

Mennonite Community:

- Recommended Preferred Alignment #2:
    - Supports Design: 10 (77%)
    - Does Not Support Design: 0 (0%)
    - Non-Committal: 3 (23%)

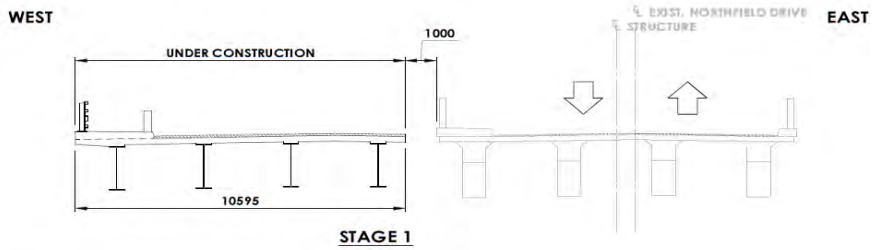
- Recommended Preferred Bridge Cross Section #5:
    - Supports Design: 9 (69%)
    - Does Not Support Design: 1 (8%)
    - Non-Committal: 3 (23%)

- Recommended Construction Staging Plan:
    - Supports Design: 10 (77%)
    - Does Not Support Design: 0 (0%)
    - Non-Committal: 3 (23%)

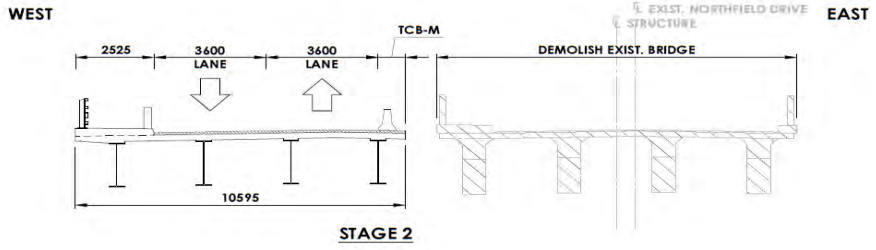
Significant Comments:

- Thank you to Project Team for considering Mennonite community needs for wider shoulders on bridge so that buggy travel is out of the traffic lanes while crossing the bridge.
- As a buggy user, I wish to extend a hearty thank you for considering our mode of transportation on this project.
- There are numerous buggy owners who would benefit from having the Peel Street bridge in Winterbourne repaired to a usable condition. We still really miss the closed Peel Street bridge for buggy traffic.
- The closed Peel Street bridge affects us quite a lot as this road would be used by buggies to stay away from other busier roads. Can anything be done to open Peel Street bridge to light traffic?
- Will shoulders be wider north and south of the bridge?

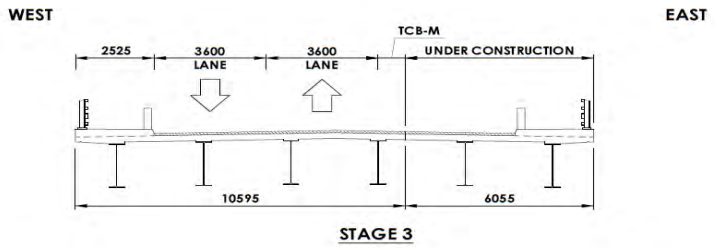
Staging



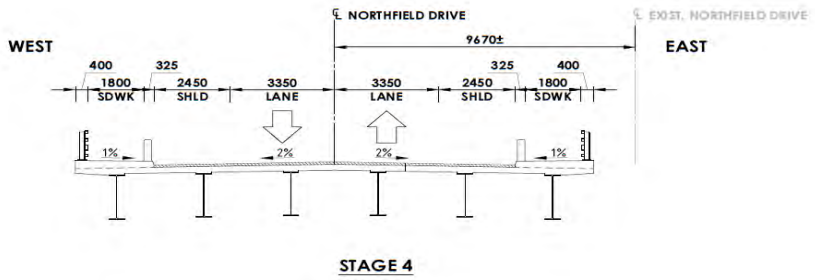
STAGE 1



STAGE 2



STAGE 3



STAGE 4

- Construct a “half section” of the new bridge structure to the west of the existing Scheifele Bridge.
- Maintain uninterrupted traffic on Northfield Drive and the existing bridge during construction of the first stage of the new bridge.

- After completion of the “half section” of the new bridge and expanding the road embankments on the west side of Northfield Drive, switch traffic to the newly constructed half bridge and widened Northfield Drive.
- Demolish the existing Scheifele Bridge and construct the balance of the new structure (east side), all while maintaining traffic on the “half section” of the new bridge.

- Upon completion of the east side of the new bridge, complete the northbound and southbound roadway approaches on Northfield Drive and any remaining features of the new bridge.

- Open the new Scheifele Bridge and reconstructed section of Northfield Drive to full traffic operations, including vehicular, buggy, cyclist, and pedestrian traffic.

Next Steps….

- Stantec is currently finalizing the Environmental Study Report
- Council Approval Report scheduled for November 2022 / TCP Approval $23M
- Detailed Design Winter 2022/23 – Spring 2024
- Tender/Award Spring 2024
- Stage 1 Construction Late Spring / Early Summer 2024
- Stage 2 Construction 2025
- Stage 3 Final Road Tie-in Spring – Summer 2026

Questions….

THE TOWNSHIP OF
WOOLWICH

BOX 158, 24 CHURCH ST. W.
ELMIRA, ONTARIO N3B 2Z6
TEL. 519-669-1647 / 1-877-969-0094
INFRASTRUCTURE SERVICES FAX 519-669-4669

August 9, 2023

Ken Brisbois
Regional Municipality of Waterloo
150 Frederick Street
Kitchener, ON N2G 4J3
kbrisbois@regionofwaterloo.ca

Dear Mr. Brisbois,

The Township of Woolwich has reviewed the proposed cross-section changes to the Scheifele Bridge reconstruction project, as presented at the meeting between the Region and the Township that took place on August 3rd, 2023. The proposed cross-section change would remove the west sidewalk as part of the reconstruction of the Scheifele Bridge, in an effort to reduce the overall construction costs for the project.

The Township understands that the Region undertook an additional online public consultation center (PCC#3) from June 7th to June 28th, 2023, to present the proposed change to the public. The Township also understands that of the 12 responses received no major concerns were raised from the public, although 2 responses were not in favor of the removal of the sidewalk. The Township has no objections to the proposed change to remove the sidewalk on the west side of the structure. Please keep the Township informed of the anticipated approval of the project at Regional Council on September 27, 2023.

Sincerely,

Ryan Tucker, P.Eng.
Engineering Project Supervisor
Township of Woolwich
24 Church Street West
Elmira, ON N3B 1M5

Region of Waterloo

SCHEIFELE BRIDGE REPLACEMENT

Northfield Drive (Regional Road 22)
Township of Woolwich

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT STUDY

APPENDIX B: Public and Agency Contacts and Responses

Stantec

NOTICE OF STUDY COMMENCEMENT

SCHEDULE "C" CLASS ENVIRONMENTAL ASSESSMENT

SCHEIFELE BRIDGE REPLACEMENT: REGIONAL ROAD 22 (NORTHFIELD DRIVE) OVER THE CONESTOGO RIVER TOWNSHIP OF WOOWICH

The Regional Municipality of Waterloo has initiated a Class Environmental Assessment (Class EA) Study for the superstructure replacement of the Scheifele Bridge, on Regional Road 22 (Northfield Drive) in the Township of Woolwich. The study is being carried out in accordance with the provincial guidelines for a Schedule "C" Municipal Class Environmental Assessment.

The study will investigate practical and cost-effective alternatives for widening and reconstruction of the current bridge, to accommodate future traffic volumes and enhanced pedestrian, buggy and cycling facilities. The study will focus heavily on options for traffic management during reconstruction of the bridge, in recognition of the significant negative impacts that an extended closure of Northfield Drive would have on the community. The aesthetics of the bridge and surrounding area will also play an important role in the study evaluations.

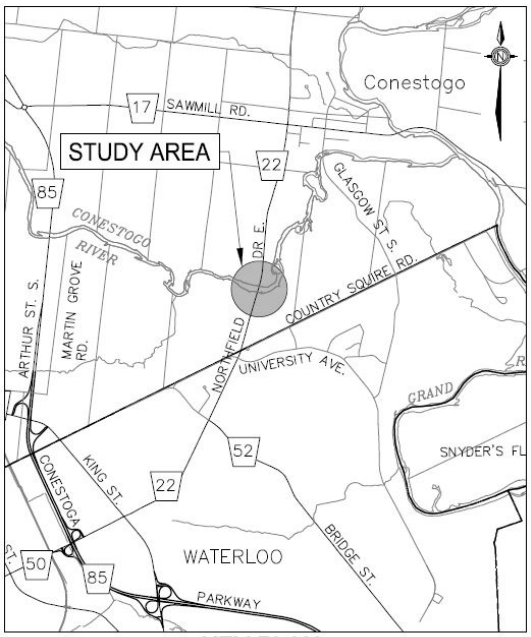
Following completion of the Class Environmental Assessment Study, and approval of any findings and recommendations by Region of Waterloo Council, the project will move to detailed design and construction. The Region will soon be updating its 10-year Transportation Capital Program, which is expected to allot funds for reconstruction of the Scheifele Bridge in 2023/2024.

This "Notice of Study Commencement" is the first of several opportunities for public input to the Scheifele Bridge Replacement study and design. Future Public Consultation Centre (PCC) meetings will be held, over the course of the Class Environmental Assessment study, to present design and traffic management alternatives for viewing by, and input from, local property owners, businesses, and the general public. Future notices will provide information on the dates, times and locations of the PCC meetings.

If you have any initial comments or concerns regarding this study, or would like to ensure that you are on the mailing list for future notices, please contact either of the following:

Mr. Ken Brisbois, C.Tech.
Transportation Project Manager
Regional Municipality of Waterloo
150 Frederick Street, 6 th Floor
Kitchener, ON N2G 4J3
Phone: (519) 575-4606
Email: KBrisbois@regionofwaterloo.ca

Mr. Garry E. Leveck, P. Eng.
Senior Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Phone : (519) 579-4410 or (519) 240-3686
Email: garry.leveck@stantec.com



KEY PLAN

This Notice Dated April 6, 2020

All comments and information received from individuals, stakeholder groups and agencies regarding this project are being collected under the authority of the *Municipal Act* to assist the Region of Waterloo in making a decision. Under the *Municipal Act*, personal information such as name, address, telephone number, and property location that may be included in a submission becomes part of the public record. Questions regarding the collection of this information should be referred to Ken Brisbois at the Region of Waterloo.

Administration Centre: 400 Clyde Road, P.O. Box 729 Cambridge, ON N1R 5W6

Phone: 519-621-2761 Toll free: 1-866-900-4722 Fax: 519-621-4844 www.grandriver.ca

May 15, 2020

Ken Brisbois
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener ON N2G 4J3
kbrisbois@regionofwaterloo.ca

Re: Municipal Class Environmental Assessment – Schiefele Bridge
Northfield Drive East and Conestogo River, Conestogo
Township of Woolwich

Dear Mr. Brisbois,

The Grand River Conservation Authority (GRCA) has received the Notice of Commencement for the above-noted Class Environmental Assessment (Class EA).

The study area contains the Conestogo River, two unnamed tributaries, and their associated floodplains, riverine valleys, and wetlands. As the Class EA may propose measures that have the potential to impact these regulated features, the GRCA wishes to stay involved as the EA process moves forward.

Please include the GRCA on the project mailing list. If you have any questions or require additional information, please contact me at 519-621-2763 ext. 2292 or theywood@grandriver.ca.

Sincerely,

Trevor Heywood
Resource Planner
Grand River Conservation Authority

Attachment

c.c. Garry Leveck, Stantec

Ministry of Heritage, Sport, Tourism and Culture Industries

Programs and Services Branch
401 Bay Street, Suite 1700
Toronto, ON M7A 0A7
Tel: 416.314.7643

Ministère des Industries du Patrimoine, du Sport, du Tourisme et de la Culture

Direction des programmes et des services
401, rue Bay, Bureau 1700
Toronto, ON M7A 0A7
Tél: 416.314.7643

Ontario

June 9, 2020 EMAIL ONLY

Ken Brisbois
Project Manager
The Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
kbrisbois@regionofwaterloo.ca

MHSTCI File : 0012401
Proponent : The Region of Waterloo
Subject : Notice of Study Commencement
Project : Scheifele Bridge Superstructure Replacement
Location : Scheifele Bridge, Regional Road 22, Township of Woolwich, Region of Waterloo

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Dear Ken Brisbois:

Thank you for providing the Ministry of Heritage, Sport, Tourism and Cultural Industries (MHSTCI) with the Notice of Study Commencement for the above-referenced project. MHSTCI's interest in this environmental assessment (EA) project relates to its mandate of conserving Ontario's cultural heritage.

Project Summary
The Region of Waterloo has initiated a Class Environmental Assessment Study (Class EA) and preliminary design for the superstructure replacement of the Scheifele Bridge on Regional Road 22 (Northfield Drive) in the Township of Woolwich. The study will be conducted in accordance with Schedule "C" requirements as outlined in the Municipal Engineers Association "Municipal Class Environmental Assessment," (October 2000, as amended to 2015).

Identifying Cultural Heritage Resources
While some cultural heritage resources may have already been formally identified, others may be identified through screening and evaluation. Indigenous communities may have knowledge that can contribute to the identification of cultural heritage resources, and we suggest that any engagement with Indigenous communities includes a discussion about known or potential cultural heritage resources that are of value to these communities. Municipal Heritage Committees, historical societies and other local heritage organizations may also have knowledge that contributes to the identification of cultural heritage resources.

Municipal Heritage Bridges: Cultural, Heritage & Archaeological Resources Assessment Checklist

Under the EA process, the proponent is required to determine a project's potential impact on cultural heritage resources. The Municipal Engineers Association provides screening criteria for work on bridges that falls under the Municipal Class EA with a *checklist* and *background material* available online, developed in coordination with MHSTCI.

Part A – Municipal Class EA Activity Selection

Please use the *checklist* and *background material* to determine what technical cultural heritage studies may be required.

Part B - Cultural Heritage Assessment

If Part B of the checklist determines that the bridge or study area warrants the preparation of a Cultural Heritage Evaluation Report (CHER), and the undertaking of a Heritage Impact Assessment (HIA), our ministry's *Info Sheet #5: Heritage Impact Assessments and Conservation Plans* outlines the scope of HIAs. CHERs and HIAs are to be prepared by qualified consultants. Please send HIAs to MHSTCI for review and make copies available to local organizations or individuals who have expressed an interest in cultural heritage.

Part C – Heritage Assessment

If Part C of the checklist determines that the CHER has identified heritage features on the project and recommends that a Heritage Impact Assessment (HIA) be undertaken, our Ministry's *Info Sheet #5: Heritage Impact Assessments and Conservation Plans* outlines the scope of HIAs. CHERs and HIAs are to be prepared by qualified consultants. Please send HIAs to MHSTCI for review and make copies available to local organizations or individuals who have expressed an interest in cultural heritage.

Part D – Archaeological Resources Assessment

If Part D of the checklist establishes that an archaeological assessment is required, it is to be conducted by an archaeologist licenced under the *Ontario Heritage Act* (*OHA*), who is responsible for submitting the report directly to MHSTCI for review. MHSTCI archaeological sites data are available at *archaeology@ontario.ca*.

After completing the checklist, please update MHSTCI whether any technical cultural heritage studies will be completed for the project. Please provide all technical heritage studies to MHSTCI before issuing a Notice of Completion or commencing any of work on site.

Environmental Assessment Reporting

All technical cultural heritage studies and their recommendations are to be addressed and incorporated into EA projects. If the screening has identified no known or potential cultural heritage resources, or no impacts to these resources, please include the completed checklists and supporting documentation in the EA report or file.

Thank you for consulting MHSTCI on this project. Please continue to do so through the EA process, and contact me for any questions or clarification.

Sincerely,

Joseph Harvey
On behalf of

Katherine Kirzati
Heritage Planner
Heritage Planning Unit
Katherine.Kirzati@Ontario.ca

Copied to: Garry Leveck, Senior Project Manager, Stantec Consulting Ltd.

It is the sole responsibility of proponents to ensure that any information and documentation submitted as part of their EA report or file is accurate. MHSTCI makes no representation or warranty as to the completeness, accuracy or quality of the any checklists, reports or supporting documentation submitted as part of the EA process, and in no way shall MHSTCI be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

Please notify MHSTCI if archaeological resources are impacted by EA project work. All activities impacting archaeological resources must cease immediately, and a licensed archaeologist is required to carry out an archaeological assessment in accordance with the Ontario Heritage Act and the Standards and Guidelines for Consultant Archaeologists.

If human remains are encountered, all activities must cease immediately and the local police as well as the Registrar, Burials of the Ministry of Government and Consumer Services (416-326-8800) must be contacted. In situations where human remains are associated with archaeological resources, MHSTCI should also be notified to ensure that the site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

A PROPONENT'S INTRODUCTION TO THE DELEGATION OF PROCEDURAL ASPECTS OF CONSULTATION WITH ABORIGINAL COMMUNITIES

DEFINITIONS

The following definitions are specific to this document and may not apply in other contexts:

Aboriginal communities – the First Nation or Métis communities identified by the Crown for the purpose of consultation.

Consultation – the Crown's legal obligation to consult when the Crown has knowledge of an established or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. This is the type of consultation required pursuant to s. 35 of the *Constitution Act, 1982*. Note that this definition does not include consultation with Aboriginal communities for other reasons, such as regulatory requirements.

Crown – the Ontario Crown, acting through a particular ministry or ministries.

Procedural aspects of consultation – those portions of consultation related to the process of consultation, such as notifying an Aboriginal community about a project, providing information about the potential impacts of a project, responding to concerns raised by an Aboriginal community and proposing changes to the project to avoid negative impacts.

Proponent – the person or entity that wants to undertake a project and requires an Ontario Crown decision or approval for the project.

I. PURPOSE

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that may adversely impact that right. In outlining a framework for the duty to consult, the Supreme Court of Canada has stated that the Crown may delegate procedural aspects of consultation to third parties. This document provides general information about the Ontario Crown's approach to delegation of the procedural aspects of consultation to proponents.

This document is not intended to instruct a proponent about an individual project, and it does not constitute legal advice.

II. WHY IS IT NECESSARY TO CONSULT WITH ABORIGINAL COMMUNITIES?

The objective of the modern law of Aboriginal and treaty rights is the *reconciliation* of Aboriginal peoples and non-Aboriginal peoples and their respective rights, claims and interests. Consultation is an important component of the reconciliation process.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. For example, the Crown's duty to consult is triggered when it considers issuing a permit, authorization or approval for a project which has the potential to adversely impact an Aboriginal right, such as the right to hunt, fish, or trap in a particular area.

The scope of consultation required in particular circumstances ranges across a spectrum depending on both the nature of the asserted or established right and the seriousness of the potential adverse impacts on that right.

Depending on the particular circumstances, the Crown may also need to take steps to accommodate the potentially impacted Aboriginal or treaty right. For example, the Crown may be required to avoid or minimize the potential adverse impacts of the project.

III. THE CROWN'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

The Crown has the responsibility for ensuring that the duty to consult, and accommodate where appropriate, is met. However, the Crown may delegate the procedural aspects of consultation to a proponent.

There are different ways in which the Crown may delegate the procedural aspects of consultation to a proponent, including through a letter, a memorandum of understanding, legislation, regulation, policy and codes of practice.

If the Crown decides to delegate procedural aspects of consultation, the Crown will generally:

- Ensure that the delegation of procedural aspects of consultation and the responsibilities of the proponent are clearly communicated to the proponent;
- Identify which Aboriginal communities must be consulted;
- Provide contact information for the Aboriginal communities;
- Revise, as necessary, the list of Aboriginal communities to be consulted as new information becomes available and is assessed by the Crown;
- Assess the scope of consultation owed to the Aboriginal communities;

- Maintain appropriate oversight of the actions taken by the proponent in fulfilling the procedural aspects of consultation;
- Assess the adequacy of consultation that is undertaken and any accommodation that may be required;
- Provide a contact within any responsible ministry in case issues arise that require direction from the Crown; and
- Participate in the consultation process as necessary and as determined by the Crown.

IV. THE PROPONENT'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

Where aspects of the consultation process have been delegated to a proponent, the Crown, in meeting its duty to consult, will rely on the proponent's consultation activities and documentation of those activities. The consultation process informs the Crown's decision of whether or not to approve a proposed project or activity.

A proponent's role and responsibilities will vary depending on a variety of factors including the extent of consultation required in the circumstance and the procedural aspects of consultation the Crown has delegated to it. Proponents are often in a better position than the Crown to discuss a project and its potential impacts with Aboriginal communities and to determine ways to avoid or minimize the adverse impacts of a project.

A proponent can raise issues or questions with the Crown at any time during the consultation process. If issues or concerns arise during the consultation that cannot be addressed by the proponent, the proponent should contact the Crown.

a) What might a proponent be required to do in carrying out the procedural aspects of consultation?

Where the Crown delegates procedural aspects of consultation, it is often the proponent's responsibility to provide notice of the proposed project to the identified Aboriginal communities. The notice should indicate that the Crown has delegated the procedural aspects of consultation to the proponent and should include the following information:

- a description of the proposed project or activity;
- mapping;
- proposed timelines;
- details regarding anticipated environmental and other impacts;
- details regarding opportunities to comment; and
- any changes to the proposed project that have been made for seasonal conditions or other factors, where relevant.

Proponents should provide enough information and time to allow Aboriginal communities to provide meaningful feedback regarding the potential impacts of the project. Depending on the nature of consultation required for a project, a proponent also may be required to:

- provide the Crown with copies of any consultation plans prepared and an opportunity to review and comment;
- ensure that any necessary follow-up discussions with Aboriginal communities take place in a timely manner, including to confirm receipt of information, share and update information and to address questions or concerns that may arise;
- as appropriate, discuss with Aboriginal communities potential mitigation measures and/or changes to the project in response to concerns raised by Aboriginal communities;
- use language that is accessible and not overly technical, and translate material into Aboriginal languages where requested or appropriate;
- bear the reasonable costs associated with the consultation process such as, but not limited to, meeting hall rental, meal costs, document translation(s), or to address technical & capacity issues;
- provide the Crown with all the details about potential impacts on established or asserted Aboriginal or treaty rights, how these concerns have been considered and addressed by the proponent and the Aboriginal communities and any steps taken to mitigate the potential impacts;
- provide the Crown with complete and accurate documentation from these meetings and communications; and
- notify the Crown immediately if an Aboriginal community not identified by the Crown approaches the proponent seeking consultation opportunities.

b) What documentation and reporting does the Crown need from the proponent?

Proponents should keep records of all communications with the Aboriginal communities involved in the consultation process and any information provided to these Aboriginal communities.

As the Crown is required to assess the adequacy of consultation, it needs documentation to satisfy itself that the proponent has fulfilled the procedural aspects of consultation delegated to it. The documentation required would typically include:

- the date of meetings, the agendas, any materials distributed, those in attendance and copies of any minutes prepared;
- the description of the proposed project that was shared at the meeting;
- any and all concerns or other feedback provided by the communities;
- any information that was shared by a community in relation to its asserted or established Aboriginal or treaty rights and any potential adverse impacts of the proposed activity, approval or disposition on such rights;

- any proposed project changes or mitigation measures that were discussed, and feedback from Aboriginal communities about the proposed changes and measures;
- any commitments made by the proponent in response to any concerns raised, and feedback from Aboriginal communities on those commitments;
- copies of correspondence to or from Aboriginal communities, and any materials distributed electronically or by mail;
- information regarding any financial assistance provided by the proponent to enable participation by Aboriginal communities in the consultation;
- periodic consultation progress reports or copies of meeting notes if requested by the Crown;
- a summary of how the delegated aspects of consultation were carried out and the results; and
- a summary of issues raised by the Aboriginal communities, how the issues were addressed and any outstanding issues.

In certain circumstances, the Crown may share and discuss the proponent's consultation record with an Aboriginal community to ensure that it is an accurate reflection of the consultation process.

c) Will the Crown require a proponent to provide information about its commercial arrangements with Aboriginal communities?

The Crown may require a proponent to share information about aspects of commercial arrangements between the proponent and Aboriginal communities where the arrangements:

- include elements that are directed at mitigating or otherwise addressing impacts of the project;
- include securing an Aboriginal community's support for the project; or
- may potentially affect the obligations of the Crown to the Aboriginal communities.

The proponent should make every reasonable effort to exempt the Crown from confidentiality provisions in commercial arrangements with Aboriginal communities to the extent necessary to allow this information to be shared with the Crown.

The Crown cannot guarantee that information shared with the Crown will remain confidential. Confidential commercial information should not be provided to the Crown as part of the consultation record if it is not relevant to the duty to consult or otherwise required to be submitted to the Crown as part of the regulatory process.

V. WHAT ARE THE ROLES AND RESPONSIBILITIES OF ABORIGINAL COMMUNITIES' IN THE CONSULTATION PROCESS?

Like the Crown, Aboriginal communities are expected to engage in consultation in good faith. This includes:

- responding to the consultation notice;
- engaging in the proposed consultation process;
- providing relevant information;
- clearly articulating the potential impacts of the proposed project on Aboriginal or treaty rights; and
- discussing ways to mitigate any adverse impacts.

Some Aboriginal communities have developed tools, such as consultation protocols, policies or processes that provide guidance on how they would prefer to be consulted. Although not legally binding, proponents are encouraged to respect these community processes where it is reasonable to do so. Please note that there is no obligation for a proponent to pay a fee to an Aboriginal community in order to enter into a consultation process.

To ensure that the Crown is aware of existing community consultation protocols, proponents should contact the relevant Crown ministry when presented with a consultation protocol by an Aboriginal community or anyone purporting to be a representative of an Aboriginal community.

VI. WHAT IF MORE THAN ONE PROVINCIAL CROWN MINISTRY IS INVOLVED IN APPROVING A PROPONENT'S PROJECT?

Depending on the project and the required permits or approvals, one or more ministries may delegate procedural aspects of the Crown's duty to consult to the proponent. The proponent may contact individual ministries for guidance related to the delegation of procedural aspects of consultation for ministry-specific permits/approvals required for the project in question. Proponents are encouraged to seek input from all involved Crown ministries sooner rather than later.

NOTICE OF STUDY COMPLETION: October 20, 2023

SCHEDULE "C" CLASS ENVIRONMENTAL ASSESSMENT

SCHEIFELE BRIDGE REPLACEMENT: REGIONAL ROAD 22 (NORTHFIELD DRIVE) OVER THE CONESTOGO RIVER: TOWNSHIP OF WOOWICH

The Regional Municipality of Waterloo has completed a Class Environmental Assessment (Class EA) Study for the full replacement of the Scheifele Bridge, on Regional Road 22 (Northfield Drive) in the Township of Woolwich. The study was carried out in accordance with the provincial guidelines for a Schedule "C" Municipal Class Environmental Assessment.

The study investigated alternatives for widening and reconstruction of the current bridge to accommodate future traffic and enhanced pedestrian, buggy and cycling facilities. The study also focused heavily on options that would provide for uninterrupted traffic on Northfield Drive during reconstruction of the bridge, recognizing the significant negative impacts that an extended closure of Northfield Drive would have on the community. Aesthetics of the new bridge and avoidance of negative environmental impacts also played important roles in the evaluation process.

Three (3) virtual Public Consultation Centre (PCC) meetings were held to present overviews of the various technical and environmental studies that were completed in support of the study, as well as details of the recommended preferred design concepts that were eventually presented to the Region Planning and Works Committee and Region Council, on September 12, 2023, and September 27, 2023, respectively. The three PCC meetings were accessible to the public on the Region of Waterloo's *EngageWR.ca* website.

After extensive background review, evaluations of various bridge and roadway alternatives, and feedback from the public and government agencies, the Project Team presented three "Recommended Preferred Design Concepts", which were subsequently endorsed by Region Planning and Works Committee and Council. The recommended preferred design concepts are briefly described as follows:

- **Full Replacement of the Scheifele Bridge**, including:

    - A 3-Span, Haunched Steel Plate-Girder Structure, with a total length of 117 meters,
    - 2 X 3.35 m wide traffic lanes,
    - 2 X 2.45 m wide paved shared-use shoulders for buggies and cyclists,
    - 1.8 m wide pedestrian sidewalk on the east side of structure only, protected from vehicular traffic by a concrete barrier wall,
    - A concrete protection barrier wall on the west side of structure

    - An aesthetically decorative pedestrian handrail on the east side of the structure, adjacent to the sidewalk.
    - Total Bridge Deck Width: 14.55 m

- **Reconstruction of Northfield Drive** over a length of about 650 m, which includes an approximate maximum roadway shift of 12.4 m to accommodate a staged construction of the Scheifele Bridge.

- Implementation of a **Staged Construction Program**, which provides for replacement of the Scheifele Bridge in four stages while retaining uninterrupted traffic on Northfield Drive throughout the estimated 2 1/2-year construction period.

Complete details of the environmental study process, and the Recommended Preferred Design Concepts for the Scheifele Bridge replacement, the Northfield Drive reconstruction and the Construction Staging Program, are included in a comprehensive Environmental Study Report (ESR) that is available for review on the Region of Waterloo's ***EngageWR.ca*** **website**.

Section 16 Order:

A Class Environmental Assessment study not only proposes, and evaluates, various design alternatives to address project concerns, but it also places an emphasis on public and agency consultation throughout the study process. The encouragement of stakeholder participation has been encouraged throughout this study, so that all project-related issues and concerns could be resolved before any "recommended preferred design concepts" were presented, and the Environmental Study Report (ESR) completed and filed on the public record.

Notwithstanding the above, the Class EA process allows that, if during the period of public review of the Environmental Study Report, certain issues cannot be resolved through discussions with the proponent (Region of Waterloo), a ***"Section 16 Order"*** request (previously referred to as a PART II Order) may be submitted by any member of the public, or agency, to the Ontario Minister of the Environment, Conservation, and Parks (MECP) and the Director of Environmental Assessment Branch, outlining any objections.

For this Schedule "C" Class Environmental Assessment project, a written Section 16 request must be submitted to the Minister and the Director within a **maximum 30 calendar day review period** after publication of this Notice of Study Completion and filing of the ESR on the public record. Requests made, or received, after 30 calendar days will not be considered. The deadline for submissions is December 8, 2023.

Section 16 Order requests may be submitted by mail, email, facsimile, or hand delivered to:

Minister
Ministry of the Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
Minister.mecp@ontario.ca

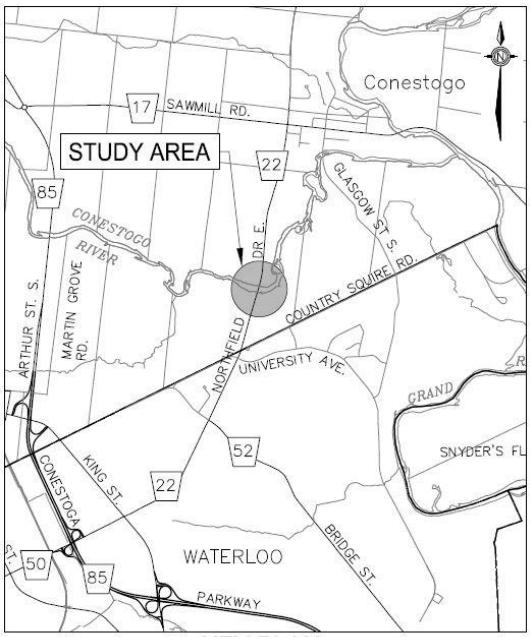
Director
Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto ON M4V 1P5
EABDirector@ontario.ca

A copy of any written Section 16 Order request shall also be forwarded to the proponent of the project, in this case the Region of Waterloo. The final date for receipt of Section 16 Orders is Friday December 8, 2023.

Regional Municipality of Waterloo
150 Frederick Street, Floor 6
Kitchener, ON N2G 4J3
Attention: Mr. Ken Brisbois,
Project Manager, Transportation Engineering
Design & Construction Division of Transportation & Environmental Services
519-575-4606
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

Mr. Ken Brisbois, C. Tech.
Transportation Project Manager
Regional Municipality of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Phone: (519) 575-4606
KBrisbois@regionofwaterloo.ca

Mr. Garry E. Leveck, P. Eng.
Senior Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard



KEY PLAN

Waterloo, ON N2L 0A4
Phone : (519) 579-4410 or (519) 240-3686
garry.leveck@stantec.com

This Notice Dated October 20, 2023

All comments and information received from individuals, stakeholder groups and agencies regarding this project are being collected under the authority of the *Municipal Act* to assist the Region of Waterloo in making any decision. Under the *Municipal Act*, personal information such as name, address, telephone number, and property location that may be included in a submission becomes part of the public record. Questions regarding the collection of this information should be referred to Ken Brisbois at the Region of Waterloo.

Region of Waterloo

TRANSPORTATION AND
ENVIRONMENTAL SERVICES
Design and Construction

150 Frederick Street
Kitchener Ontario N2G 4J3 Canada
Telephone: 519-575-4400
TTY: 519-575-4608
Fax: 519-575-4430
www.regionofwaterloo.ca

Refer To:	**File No:**	**Date:**
Ken Brisbois, C. Tech., 519-575-4606	5954	October 20, 2023

AGENCIES AND STAKEHOLDERS

Dear Sir/Madam:

Re: Scheifele Bridge Replacement: Regional Road 22 (Northfield Drive): Schedule "C" Class Environmental Assessment Study: Township of Woolwich:

Notice of Study Completion

The Regional Municipality of Waterloo has completed a Class Environmental Assessment (Class EA) Study for the replacement of the Scheifele Bridge, on Regional Road 22 (Northfield Drive) in the Township of Woolwich. The study was carried out in accordance with the provincial guidelines for a Schedule "C" Municipal Class Environmental Assessment.

The study investigated alternatives for widening and reconstruction of the current bridge to accommodate future traffic and enhanced pedestrian, buggy and cycling facilities. The study also focused heavily on options that would provide for uninterrupted traffic on Northfield Drive during reconstruction of the bridge, recognizing the significant negative impacts that an extended closure of Northfield Drive would have on the community. Aesthetics of the new bridge and avoidance of negative environmental impacts also played important roles in the evaluation process.

Three (3) virtual Public Consultation Center (PCC) meetings were held to present highlights of the various technical and environmental studies that were completed in support of the study, as well as details of alternative and recommended preferred design concepts that were evaluated. The final study recommendations were eventually presented to meetings of the Region Planning and Works Committee and Region Council. The three PCC meetings were available to the public on the Region of Waterloo's *EngageWR.ca* website.

After extensive background review, evaluations of various bridge and roadway alternatives, and feedback from the public and government agencies, the Project Team

presented three “Recommended Preferred Design Concepts”, which were subsequently endorsed by the Region Planning and Works Committee and Council. The concepts are briefly described as follows:

- **Full Replacement of the Scheifele Bridge**, including:

    - 3-Span Haunched Steel Plate Girder Structure with a total length of 117 meters,
    - 2 X 3.35 m wide traffic lanes,
    - 2 X 2.45 m wide paved shared-use shoulders for buggies and cyclists,
    - A 1.8 m wide pedestrian sidewalk on the east side only, protected from traffic by a concrete barrier wall,
    - A protective barrier wall on the west side of the structure,
    - An aesthetic decorative pedestrian handrail adjacent to the east side sidewalk,
    - Total Bridge Width: 14.55 m

- **Reconstruction of Northfield Drive** over a length of about 650 m, which includes a roadway shift of approximately 12.4 m to accommodate a staged construction of the Scheifele Bridge.

- Implementation of a **Staged Construction Program**, which provides for replacement of the Scheifele Bridge in four stages while maintaining uninterrupted traffic on Northfield Drive during construction.

Complete details of the environmental study process, and the Recommended Preferred Design Concepts for the Scheifele Bridge replacement, the Reconstruction of Northfield Drive, and the Construction Staging Program, are included in a comprehensive Environmental Study Report (ESR) that is available for review on the Region of Waterloo’s ***EngageWR.ca*** **website**.

We invite you to provide any final comments on the Scheifele Bridge Class Environmental Assessment Study. Any additional comments that you provide may still be accounted for by the Project Team during detailed design and construction phases.

If you have no further interest in the Scheifele Bridge project, we would still appreciate a response noting your position. If we do not hear from you by December 8, 2023, we will assume that you have no further interest in the project as it moves forward to design and construction.

If you have any questions that you wish to have answered in person, please feel free to contact either of the following two members of the Project Team:

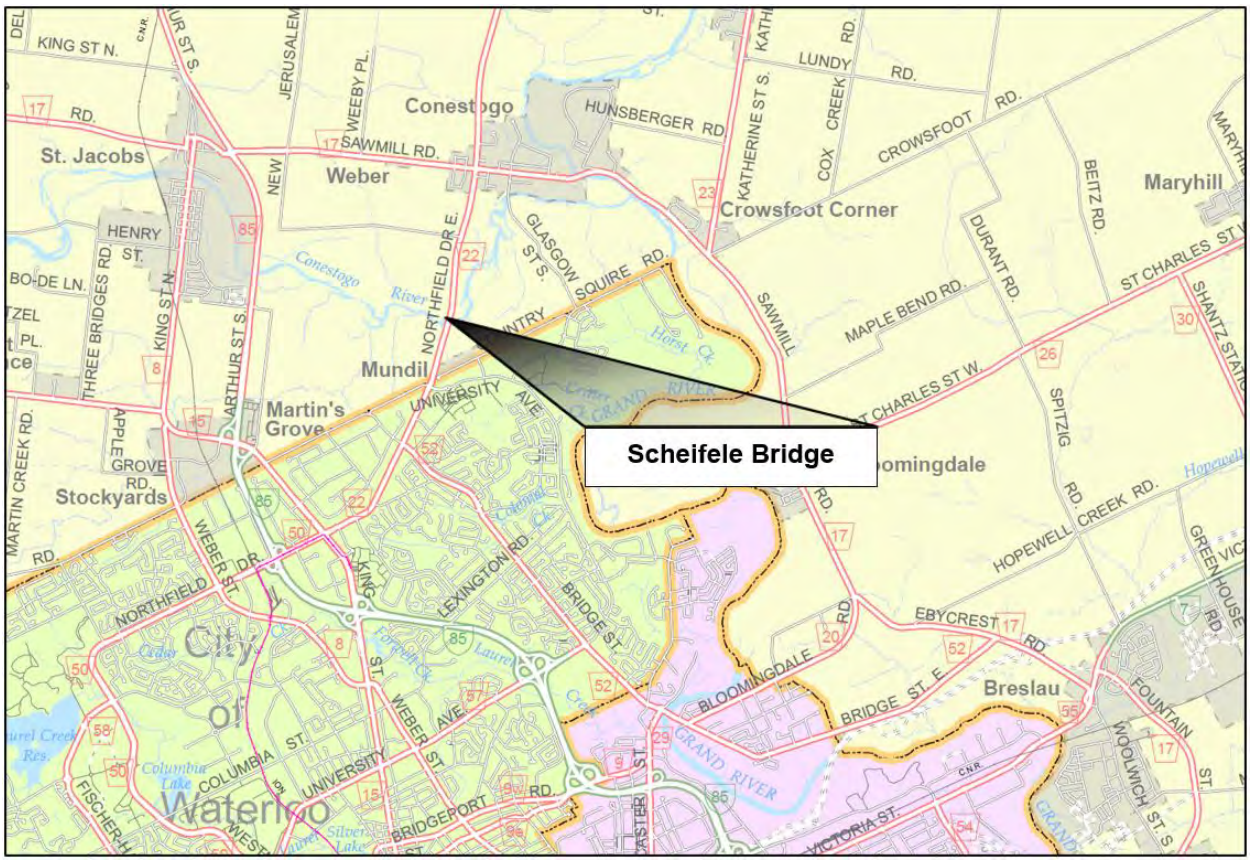
Mr. Ken Brisbois, C. Tech.
Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: (519) 575-4606
Fax: (519) 575-4430
KBrisbois@regionofwaterloo.ca

Mr. Garry Leveck, P. Eng.
Senior Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 240-3686
Fax: (519) 579-6733
Garry.Leveck@stantec.com

Yours truly,

Ken Brisbois, C. Tech.
Project Manager, Design and Construction

Key Plan:



From:	Ken Brisbois
To:	Leveck, Garry
Cc:	McGann, Michael
Subject:	FW: FW: RE: Scheifele Bridge Superstructure Replacement Class Environmental Assessment Study - Notice of Commencement
Date:	Thursday, October 8, 2020 9:56:06 AM

From: Benoit Bourgault <benoit_bourgault@stswr.ca>
Sent: October 8, 2020 9:51 AM
To: Ken Brisbois <KBrisbois@regionofwaterloo.ca>
Subject: Re: FW: RE: Scheifele Bridge Superstructure Replacement Class Environmental Assessment Study - Notice of Commencement

Good morning

thank you for reaching out

As long as traffic is maintained in at least 1 direction during construction we can cope with the project

If the road needs to be completely closed July and August would be greatly appreciated by the students as their ride to and from school will be greatly affected

Thanks
Should you have any further questions, please do not hesitate to contact me.

Regards.

Benoit Bourgault
General Manager
Student Transportation Services of Waterloo Region
Phone 519 744 7575 Ext 222

This email communication is CONFIDENTIAL. If you are not the intended recipient, you may not use, copy, disclose to anyone this message or any information contained in the message and I ask that you please notify me by return email and delete this communication immediately. Thank You.

On Wed, Oct 7, 2020 at 7:48 PM Ken Brisbois <KBrisbois@regionofwaterloo.ca> wrote:

> Hello,
>
> This is just a follow up to the Notice of Study Commencement circulated in May 2020 (attached).
>
> In light of these unpreceded times, the Project Team has decided to reach out to all agencies/interest groups that normally would provide comment but to date have not, which may be a direct result of disruption due to the COVID-19 pandemic or for

other reasons.

If possible, please advise the Project Team of your interest in this study with the following information, by **Friday November 13, 2020**:

- The representative from your community/organization who will participate as part of the study;
- Initial comments/concerns and feedback related to the study area that should be considered as the project advances; and
- If you would like to be removed from the project contact list because your community/organization has no concerns please reply so we can update our distribution list.

Please contact me directly if you have any questions regarding this email or cannot provide information by the date above.

If we do not hear from you by the noted deadline date, we will assume that your agency has no interest in the project.

Regards,

Ken

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services
Regional Municipality of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3
519-575-4606 (Desk)
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

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From: Ken Brisbois
Sent: May 14, 2020 7:53 PM
Subject: RE: Scheifele Bridge Superstructure Replacement Class Environmental Assessment Study - Notice of Commencement

Hello,

Please find the Notice of Commencement for Scheifele Bridge Superstructure Replacement over the Conestogo River in the Township of Woolwich.

Please contact me if you have any questions.

Regards,

Ken

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services

Regional Municipality of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3
519-575-4606 (Desk)
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

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--

From:	Ken Brisbois
To:	Leveck, Garry
Cc:	McGann, Michael
Subject:	FW: Scheifele Bridge Superstructure Replacement Class Environmental Assessment Study - Notice of Commencement
Date:	Tuesday, May 26, 2020 3:19:56 PM
Attachments:	image001.jpg

FYI

From: Michael OToole <Michael.OToole@rci.rogers.com>
Sent: May 15, 2020 8:17 AM
To: Ken Brisbois <KBrisbois@regionofwaterloo.ca>
Subject: RE: Scheifele Bridge Superstructure Replacement Class Environmental Assessment Study - Notice of Commencement

Hi Ken,

Just to update you from a Rogers' standpoint within this projects scope of work.
Rogers doesn't have any plant or property on this stretch of Northfield, including across the bridge, and will not need any in the future.
Hope this is helpful.

Cheers,
Mike O'Toole
System Planner – SWO Outside Plant Engineering
Wireline Access Networks
Rogers Communications Canada Inc.
85 Grand Crest Pl.
Kitchener, ON N2C 2E6

michael.otoole@rci.rogers.com
m 519-498-3642

From: Ken Brisbois [mailto:KBrisbois@regionofwaterloo.ca]
Sent: Thursday, May 14, 2020 7:53 PM
Subject: RE: Scheifele Bridge Superstructure Replacement Class Environmental Assessment Study - Notice of Commencement

Hello,

Please find the Notice of Commencement for Scheifele Bridge Superstructure Replacement over the Conestogo River in the Township of Woolwich.

Please contact me if you have any questions.

Regards,

Ken

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services

Regional Municipality of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3
519-575-4606 (Desk)
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

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---

From:	Ken Brisbois
To:	Leveck, Garry
Cc:	McGann, Michael
Subject:	FW: Scheifele Bridge Superstructure Replacement Class Environmental Assessment Study - Notice of Commencement
Date:	Tuesday, May 26, 2020 3:22:22 PM
Attachments:	Scheifele Bridge Superstructure Replacement - Notice of Commencement (May 14, 2020).PDF

Hi Garry,

I thought you were cc'd – see below.

Thanks,

Ken

From: EnviroOnt <EnviroOnt@tc.gc.ca>
Sent: May 15, 2020 10:36 AM
To: Ken Brisbois <KBrisbois@regionofwaterloo.ca>
Subject: Scheifele Bridge Superstructure Replacement Class Environmental Assessment Study - Notice of Commencement

Hello,

Thank you for your email. This is a request that you please **remove** Transport Canada contact Tamara Rudge (tamara.rudge@tc.gc.ca) from all future correspondence on this project as well as your master mailing list. All EA related correspondence for Transport Canada Ontario Region can be sent to EnviroOnt@tc.gc.ca.

Please note Transport Canada **does not** require receipt of all individual or Class EA related notifications. We are requesting project proponents to self-assess if their project:

1. Will interact with a federal property and/or waterway by reviewing the Directory of Federal Real Property, available at at www.tbs-sct.gc.ca/dfrp-rbif/; **and**
2. Will require approval and/or authorization under any Acts administered by Transport Canada* available at http://www.tc.gc.ca/eng/acts-regulations/menu.htm.

Projects that will occur on federal property prior to exercising a power, performing a function or duty in relation to that project, will be subject to a determination of the likelihood of significant adverse environmental effects, per Section 82 of the *Impact Assessment Act, 2019*.

If the aforementioned does not apply, the Environmental Assessment program should not be included in any further correspondence and future notifications will not receive a response. If there is a role under the program, correspondence should be forwarded *electronically* to: EnviroOnt@tc.gc.ca with a **brief description of Transport Canada's expected role**.

*Below is a summary of the most common Acts that have applied to projects in an Environmental

Assessment context:

- ***Canadian Navigable Waters Act (CNWA)*** – the Act applies primarily to works constructed or placed in, on, over, under, through, or across navigable waters set out under the Act. The Navigation Protection Program administers the CNWA through the review and authorization of works affecting navigable waters. Information about the Program, CNWA and approval process is available at: http://www.tc.gc.ca/eng/programs-621.html. Enquiries can be directed to NPPONT-PPNONT@tc.gc.ca or by calling (519) 383-1863.

- ***Railway Safety Act (RSA)*** – the Act provides the regulatory framework for railway safety, security, and some of the environmental impacts of railway operations in Canada. The Rail Safety Program develops and enforces regulations, rules, standards and procedures governing safe railway operations. Additional information about the Program is available at: https://www.tc.gc.ca/eng/railsafety/menu.htm. Enquiries can be directed to RailSafety@tc.gc.ca or by calling (613) 998-2985.

- ***Transportation of Dangerous Goods Act (TDGA)*** – the transportation of dangerous goods by air, marine, rail and road is regulated under the TDGA. Transport Canada, based on risks, develops safety standards and regulations, provides oversight and gives expert advice on dangerous goods to promote public safety. Additional information about the transportation of dangerous goods is available at: https://www.tc.gc.ca/eng/tdg/safety-menu.htm. Enquiries can be directed to TDG-TMDOntario@tc.gc.ca or by calling (416) 973-1868.

- ***Aeronautics Act*** – Transport Canada has sole jurisdiction over aeronautics, which includes aerodromes and all related buildings or services used for aviation purposes. Aviation safety in Canada is regulated under this Act and the Canadian Aviation Regulations (CARs). Elevated Structures, such as wind turbines and communication towers, would be examples of projects that must be assessed for lighting and marking requirements in accordance with the CARs. Transport Canada also has an interest in projects that have the potential to cause interference between wildlife and aviation activities. One example would be waste facilities, which may attract birds into commercial and recreational flight paths. The *Land Use In The Vicinity of Aerodromes* publication recommends guidelines for and uses in the vicinity of aerodromes, available at: https://www.tc.gc.ca/eng/civilaviation/publications/tp1247-menu-1418.htm. Enquires can be directed to at tc.aviationservicesont-servicesaviationont.tc@tc.gc.ca or by calling 1 (800) 305-2059 / (416) 952-0230.

Please advise if additional information is needed.

Thank you,

Environmental Assessment Program, Ontario Region
Transport Canada / Government of Canada / 4900 Yonge St., Toronto, ON M2N 6A5
EnviroOnt@tc.gc.ca / Facsimile : (416) 952-0514 / TTY: 1-888-675-6863

Programme d'évaluation environnementale, Région de l'Ontario

Transports Canada / Gouvernement du Canada / 4900, rue Yonge, Toronto, ON, M2N 6A5
EnviroOnt@tc.gc.ca / télécopieur: (416) 952-0514

From: Ken Brisbois [mailto:KBrisbois@regionofwaterloo.ca]
Sent: Thursday, May 14, 2020 7:53 PM
Subject: RE: Scheifele Bridge Superstructure Replacement Class Environmental Assessment Study - Notice of Commencement

Hello,

Please find the Notice of Commencement for Scheifele Bridge Superstructure Replacement over the Conestogo River in the Township of Woolwich.

Please contact me if you have any questions.

Regards,

Ken

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services

Regional Municipality of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3
519-575-4606 (Desk)
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

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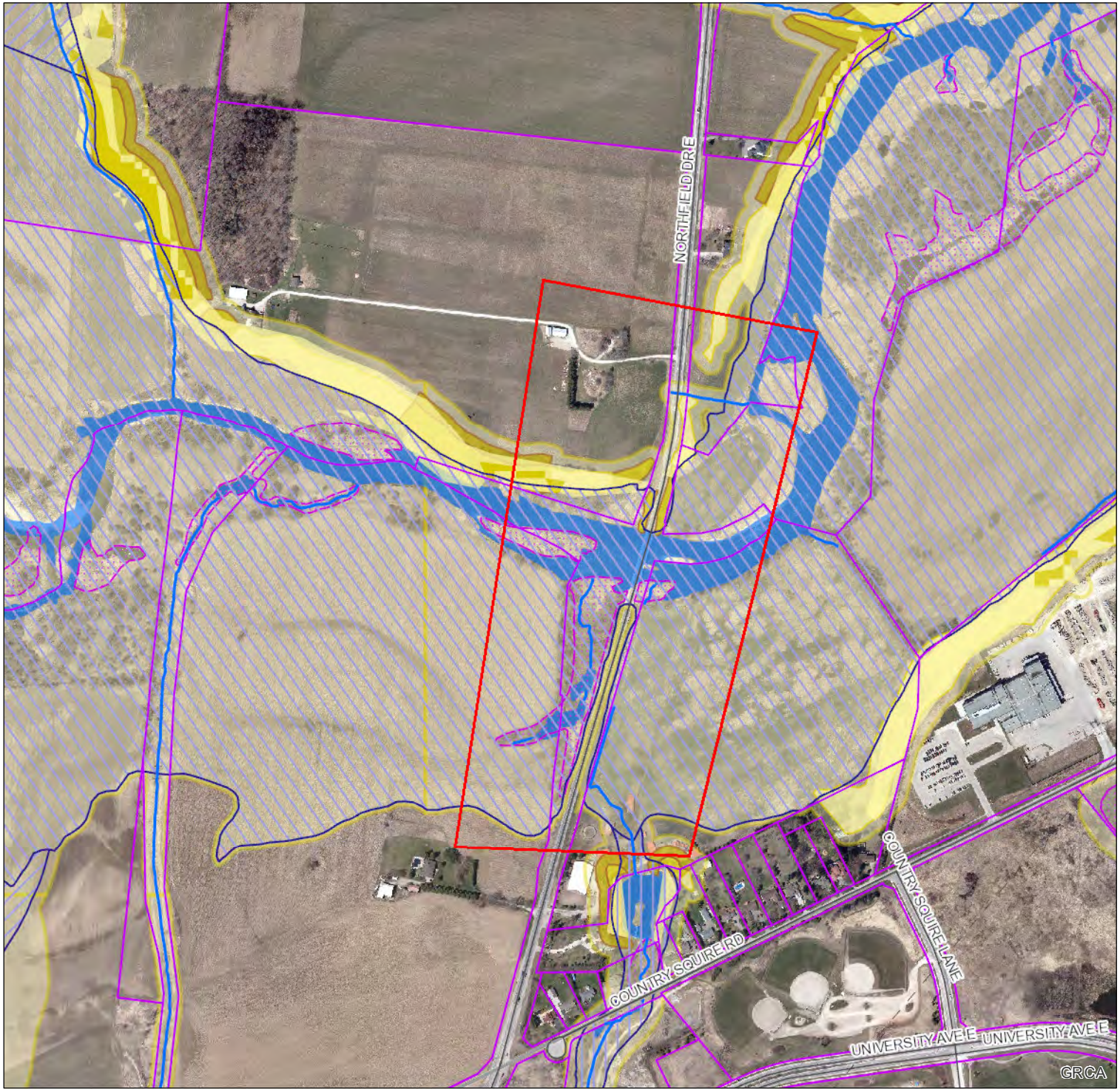

Grand River Conservation Authority

Date: May 15, 2020
Author: TH

Scheifele Bridge, Woolwich

Legend

- Regulation Limit (GRCA)
- Regulated Watercourse (GRCA)
- Regulated Waterbody (GRCA)
- Wetland (GRCA)
- Floodplain (GRCA)
  - Engineered
  - Estimated
  - Approximate
  - Special Policy Area
- Slope Valley (GRCA)
  - Steep
  - Oversteep
  - Steep
- Slope Erosion (GRCA)
  - Oversteep
  - Toe
- Lake Erie Flood (GRCA)
- Lake Erie Shoreline Reach (GRCA)
- Lake Erie Dynamic Beach (GRCA)
- Lake Erie Erosion (GRCA)
- Parcel - Assessment (MPAC/MNRF)

This legend is static and may not fully reflect the layers shown on the map. The text of Ontario Regulation 150/06 supercedes the mapping as represented by these layers.

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Disclaimer: This map is for illustrative purposes only. Information contained herein is not a substitute for professional review or a site survey and is subject to change without notice. The Grand River Conservation Authority takes no responsibility for, nor guarantees, the accuracy of the information contained on this map. Any interpretations or conclusions drawn from this map are the sole responsibility of the user.
The source for each data layer is shown in parentheses in the map legend. For a complete listing of sources and citations go to: https://maps.grandriver.ca/Sources-and-Citations.pdf

0 45 90 180 270 Metres

N

NAD 1983 UTM Zone 17N

Scale: 7,773

Map Centre (UTM NAD83 z17): 539,129.58 4,819,234.28

This map is not to be used for navigation | 2018 Ortho (RMOW)

Canadian Wildlife Service
Environment and Climate Change Canada
4905 Dufferin St.
Toronto, ON, M3H 5T4

18 November 2020

Ken Brisbois
Project Manager- Design & Construction
Scheifele Bridge Superstructure Replacement
Region of Waterloo
150 Frederick St.
Kitchener, ON, N2G 4J3
Tel: 519-575-4400
E-mail: kbrisbois@regionofwaterloo.ca

Dear Mr. Brisbois,

It has been brought to our attention that the Scheifele Bridge Superstructure Replacement project will be underway in the near future. Bridge structures are popular nesting sites for many species of migratory birds and we wanted to reach out to provide initial guidance and offer our contact information in case you had any questions regarding your legal responsibilities under the *Migratory Birds Convention Act* (MBCA), and the Migratory Birds Regulations (MBR).

As you may know, under the MBCA, migratory birds, eggs and nests are protected. For a list of the species protected, please refer to the Birds Protected in Canada webpage. It is important to note that some species of birds protected under the MBCA have also been listed in Schedule 1 of the *Species at Risk Act* (SARA). These species receive protection from both the MBCA and SARA. One key responsibility under the MBCA, which is stipulated in the associated Migratory Birds Regulations (MBR) relates to the protection of migratory birds and their nests:

6 Subject to subsection 5(9), no person shall

- (a) disturb, destroy or take a nest, egg, nest shelter, eider duck shelter or duck box of a migratory bird, or
- (b) have in his possession a live migratory bird, or a carcass, skin, nest or egg of a migratory bird

except under authority of a permit therefor.

To minimize the possibility of contravening the law, proponents must understand the potential effect(s) of their activities on migratory birds, nests, and eggs and implement appropriate avoidance and mitigation measures. Although disturbance or destruction of migratory bird nests and eggs is prohibited under the Act and Regulations (except under authority of a permit), it is important to note that the removal of trees, shrubs, stumps or roots, or grading or mowing of areas used by ground nesting birds in itself is not necessarily prohibited by the MBCA and MBR, providing the activity does not disturb or destroy migratory bird nests or eggs.

To this end, Environment and Climate Change Canada (ECCC) recommends that non-intrusive survey methods, such as point counts, be used to determine whether migratory birds are breeding in the area where the activity is planned. If signs of nesting or breeding are detected, ECCC recommends:

- halt all disruptive activities,
- avoid disturbing surrounding vegetation,
- protect the nest with a buffer zone,
- avoid the immediate area until the young have left the vicinity of the nest
- avoid, adapt, reschedule or relocate planned activities

Additional information on avoiding harm to migratory birds is available on our website. Specifically, the following pages may provide information of use to you:

- Published general nesting periods support planning activities;
- The nesting calendar query tool; and,
- Technical information for how to determine the presence of a nest.

This advice does not provide an authorization for harming or killing migratory birds or for the disturbance, destruction or taking of nests or eggs under the MBR. It does not provide a guarantee that implementing the recommended measures will avoid contravening the MBR or other federal, provincial or municipal regulations, laws and bylaws because each situation must be assessed individually. The guidance provided is not intended to be relied on as official advice concerning the legal consequences of any specific activity. It is not a substitute for the MBCA, the MBR, or any other legislation.

If, after reviewing the information on our website, you have additional questions please contact us via e-mail (ec.faune.ontario-wildlife.ontario.ec@canada.ca) or telephone (613-990-8355).

Yours sincerely,

Lesley Dunn,
Regional Director
Canadian Wildlife Service, Ontario Region

Cc:

Elyse Howat, Permit and Regulations Biologist, Canadian Wildlife Service-Ontario Region
Ewen Eberhardt, Manager, Regulatory Affairs, Canadian Wildlife Service-Ontario Region

Murphy, Heather

From: Kevin Schimus <Kevin.Schimus@enbridge.com>
Sent: Wednesday, June 3, 2020 8:24 AM
To: Ken Brisbois; Leveck, Garry
Subject: Notice of Study Commencement - Scheifele Bridge (Northfield Dr RR22)

Good morning,

Thank you for notification re: Scheifele Bridge Replacement (Northfield Dr RR22). Enbridge Gas Inc. does not have any existing infrastructure in this area.

Please remove from distribution list for any future communications.

Regards,

Kevin Schimus
Advisor, Construction and Project Management
Construction and Growth

ENBRIDGE GAS INC. OPERATING AS UNION GAS
TEL: 519-885-7400 x5067506 | CELL: 519-635-9488 | kschimus@uniongas.com
603 Kumpf Drive, Waterloo, Ontario, N2V 1K3

uniongas.com | enbridgegas.com
Safety. Integrity. Respect.

Region of Waterloo

ENGINEERING AND
ENVIRONMENTAL SERVICES
Design and Construction
150 Frederick Street
Kitchener Ontario N2G 4J3 Canada
Telephone: 519-575-4400
TTY: 519-575-4608
Fax: 519-575-4430
regionofwaterloo.ca

Refer To:	**File No:**	**Date:**
Ken Brisbois 519-575-4606	5954	November 20, 2023

Property owners, Tenants, and Interested Parties.

Dear Sir/Madam:

Re: Scheifele Bridge Replacement
Regional Road 22 (Northfield Drive), Township of Woolwich
Notice of Study Completion – Municipal Class Environmental Assessment

---

The Regional Municipality of Waterloo has completed a Municipal Class Environmental Assessment (EA) study to address the deteriorated condition of Schefiele Bridge. The study investigated alternatives for widening and reconstructing the current bridge to accommodate future traffic and enhance pedestrian, buggy and cycling facilities. The study also focused heavily on options that would provide for uninterrupted traffic on Northfield Drive during the reconstruction of the bridge, recognizing the significant negative impacts that an extended closure of Northfield Drive would have on the community. The aesthetics of the new bridge and avoiding negative environmental impacts also played important roles in the evaluation process.

We will publish the Notice of Completion in The Record on Tuesday, November 21, 2023 and Friday, November 24, 2023 as well as the Woolwich Observer on Thursday, November 23, 2023 and Thursday, November 30, 2023 for public information.

An Environmental Study Report has been prepared for this project and is available for review for 30 days, from November 20–December 20, 2023, at https://www.engagewr.ca/scheifele-bridge-superstructure-replacement. The report is also available for review in person during regular business at 150 Frederick Street, Kitchener.

Please contact me at 519-575-4606 if you have any questions.

Yours truly,

Ken Brisbois, C. Tech
Project Manager
Regional Municipality of Waterloo
Engineering and Environmental Services
150 Frederick Street, 6th Floor
Kitchener, Ontario N2G 4J3

Attachment

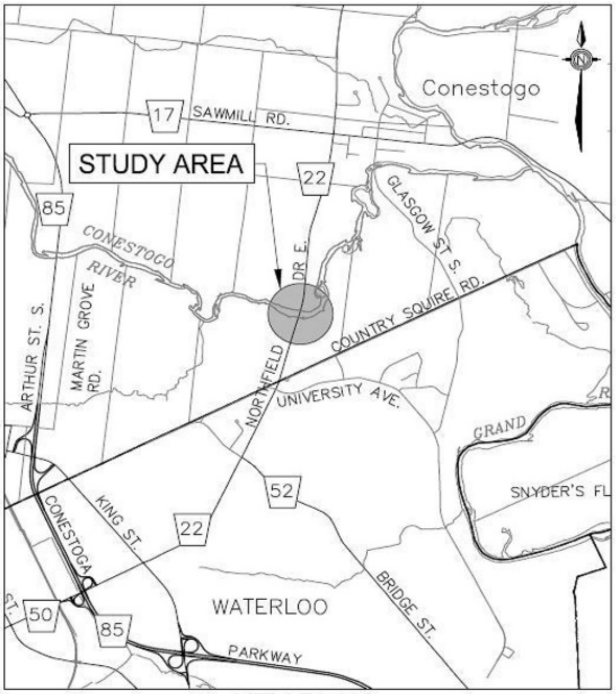
cc: Skylar Van Kruistum, Head, Transportation Rehabilitation

NOTICE OF COMPLETION
Municipal Class Environmental Assessment
Scheifele Bridge Replacement
Regional Road 22 (Northfield Drive)Township of Woolwich

The Region of Waterloo has undertaken a planning study for Scheifele Bridge in accordance with the Ontario Environmental Assessment Act following the approved process for Schedule 'C' projects under the Municipal Class Environmental Assessment. This project addresses the deteriorated condition of Scheifele Bridge while accommodating the current and future needs of the bridge and roadway. The study investigated alternatives for widening and reconstructing the current bridge to accommodate future traffic and enhance pedestrian, buggy and cycling facilities. The study also focused heavily on options that would provide for uninterrupted traffic on Northfield Drive during the reconstruction of the bridge, recognizing the significant negative impacts that an extended closure of Northfield Drive would have on the community. The aesthetics of the new bridge and avoiding negative environmental impacts also played important roles in the evaluation process.

The recommended design alternative is to replace the existing bridge with a new bridge with the following features:

- Three-span haunched steel plate girder structure with a total length of 117 meters and width of 14.55 metres
- Two 3.35 metre-wide traffic lanes
- Two 2.45 metre-wide paved shared-use shoulders for buggies and cyclists
- A 1.8 m wide pedestrian sidewalk on the east side only, protected from traffic by a concrete barrier wall
- A decorative pedestrian handrail alongside the sidewalk
- A protective barrier wall on the west side of the structure
- Reconstruction of Northfield Drive at each end of the bridge
- Four stages during the bridge replacement so traffic is maintained on Northfield Drive during construction



KEY PLAN

A summary of the environmental study process and the Recommended Preferred Design Concepts for the Scheifele Bridge replacement, the Northfield Drive reconstruction, and the Construction Staging Program, are included in a comprehensive Environmental Study Report (ESR).

The ESR Report will be available for review on the Region of Waterloo's EngageWR.ca website at https://www.engagewr.ca/scheifele-bridge-superstructure-replacement for a 30-day public comment period, between November 20, 2023, and December 20, 2023.

The Environmental Study Report is also available for review in person during regular business hours at the following location:

The Regional Municipality of Waterloo Clerk's Office 150 Frederick Street, 2nd Floor Kitchener, Ontario

Interested persons may provide written comments to the Study Team anytime during this review period, but no later than December 20, 2023, by contacting either one of the following Study Team members:

Mr. Ken Brisbois, C. Tech Transportation Project Manager Regional Municipality of Waterloo 150 Frederick Street, 6th Floor. Kitchener, ON N2G 4J3 Phone: (519) 575-4606 KBrisbois@regionofwaterloo.ca	Mr. Garry E. Leveck, P. Eng. Senior Project Manager Stantec Consulting Ltd. 100-300 Hagey Boulevard Waterloo, ON N2L 0A4 Phone : (519) 579-4410 or (519) 240-3686 garry.leveck@stantec.com

SECTION 16 ORDER: ABORIGINAL AND TREATY RIGHTS:

As noted, public concerns are to be directed to the project proponent (Region of Waterloo), as represented by the above Project Team members. However, where outstanding concerns may relate to potential adverse impacts to constitutionally protected Aboriginal and treaty rights, then Section 16 Order requests on these matters shall be addressed in writing, or by email, to the following provincial government contacts, and copied to the Project Team members listed above, no later than **December 20, 2023**.

In addition, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (i.e. an individual / comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g. require further studies), only on the grounds that the requested order may prevent, mitigate, or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered.

All requests should include the full name and contact information of the requester, for Ministry purposes.

Minister	**Director**
Ministry of the Environment, Conservation and Parks 777 Bay Street, 5th Floor Toronto ON M7A 2J3 Minister.mecp@ontario.ca	Environmental Assessment Branch Ministry of the Environment, Conservation and Parks 135 St. Clair Avenue West, 1st Floor Toronto ON M4V 1P5 EABDirector@ontario.ca

This Notice Dated November 20, 2023

All comments and information provided become part of the consultation process and are being collected to assist the Region of Waterloo in making a decision. All submissions will become part of the public record files for this matter. Personal information collected is under the authority of the Municipal Act, 2001 and in compliance with the Municipal Freedom of Information and Protection of Privacy Act, R.S.O. 1990. Questions about the collection of personal information should be directed to Ken Brisbois, Project Manager at kbrisbois@regionofwaterloo.ca or 519 575-4606

Murphy, Heather

From: Rocket Wei <rwei@wnhydro.com>
Sent: Thursday, October 8, 2020 10:53 AM
To: Ken Brisbois
Cc: Leveck, Garry
Subject: RE: RE: Scheifele Bridge Superstructure Replacement ClassEnvironmental Assessment Study - Notice of Commencement - [EXTERNAL]

Hi Ken

The pole line alongside Northfield Dr E was rebuilt in 2013, and they are in good conditions and we have no plan to replace or repair in a foreseeable future.
We would like to know if there will be any possible changes of grading, changes of the structure width or changes on the elevation of the structure that may affect the safety aspects of the existing pole line. Also during the construction if any pole holding or supporting guarantee are needed such requests for hydro support shall be made to WNH.

If you need our design drawing please let me know I can provide to you.

Thanks kindly!

Northfield Dr E

526 Country Squire Road, Waterloo, ON N2J 4G8
O: 519-888-5591 | M: 519-505-3906
rwei@wnhydro.com | wnhydro.com

From: Ken Brisbois <KBrisbois@regionofwaterloo.ca>
Sent: Thursday, October 8, 2020 9:01 AM
To: Rocket Wei <rwei@wnhydro.com>
Cc: Garry Leveck <garry.leveck@stantec.com>
Subject: RE: RE: Scheifele Bridge Superstructure Replacement ClassEnvironmental Assessment Study - Notice of Commencement - [EXTERNAL]

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Hi Rocket – email is just fine to provide the info at this stage.

Thanks!

Ken

From: Rocket Wei <rwei@wnhydro.com>
Sent: October 8, 2020 8:57 AM
To: Ken Brisbois <KBrisbois@regionofwaterloo.ca>
Subject: RE: RE: Scheifele Bridge Superstructure Replacement ClassEnvironmental Assessment Study - Notice of Commencement - [EXTERNAL]

Good morning Ken

Is there a standard response form provided by the Region we should use? Or just respond by email is good enough?

Thanks!

Rocket Wei, P.Eng., MASc | ***Engineering Supervisor***

Waterloo North Hydro Inc.
526 Country Squire Road, Waterloo, ON N2J 4G8
O: 519-888-5591 | M: 519-505-3906
rwei@wnhydro.com | wnhydro.com

From: Ken Brisbois <KBrisbois@regionofwaterloo.ca>
Sent: Wednesday, October 7, 2020 7:48 PM
Cc: Garry Leveck <garry.leveck@stantec.com>; Ken Brisbois <KBrisbois@regionofwaterloo.ca>
Subject: FW: RE: Scheifele Bridge Superstructure Replacement ClassEnvironmental Assessment Study - Notice of Commencement - [EXTERNAL]

*** This is an EXTERNAL email. DO NOT open attachments, enable editing or macros, or click on links from unknown senders or in unexpected email ***

Hello,

This is just a follow up to the Notice of Study Commencement circulated in May 2020 (attached).

In light of these unpreceded times, the Project Team has decided to reach out to all agencies/interest groups that normally would provide comment but to date have not, which may be a direct result of disruption due to the COVID-19 pandemic or for other reasons.

If possible, please advise the Project Team of your interest in this study with the following information, by **Friday November 13, 2020**:

- The representative from your community/organization who will participate as part of the study;
- Initial comments/concerns and feedback related to the study area that should be considered as the project advances; and
- If you would like to be removed from the project contact list because your community/organization has no concerns please reply so we can update our distribution list.

Please contact me directly if you have any questions regarding this email or cannot provide information by the date above.

If we do not hear from you by the noted deadline date, we will assume that your agency has no interest in the project.

Regards,

Ken

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services
Regional Municipality of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3
519-575-4606 (Desk)
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

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From: Ken Brisbois
Sent: May 14, 2020 7:53 PM
Subject: RE: Scheifele Bridge Superstructure Replacement Class Environmental Assessment Study - Notice of Commencement

Hello,

Please find the Notice of Commencement for Scheifele Bridge Superstructure Replacement over the Conestogo River in the Township of Woolwich.

Please contact me if you have any questions.

Regards,

Ken

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services

Regional Municipality of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3
519-575-4606 (Desk)
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

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This EXTERNAL email has been processed by Glasswall. Forward email WITH ATTACHMENTS to isbackups@WNHydro.com to request release if files were quarantined or were sanitised and have data missing.

From:	CR Horseback Adventures
To:	Ken Brisbois
Cc:	Leveck, Garry; McGann, Michael
Subject:	RE: Re: FW: RE: Scheifele Bridge Superstructure Replacement Class Environmental Assessment Study - Notice of Commencement
Date:	Tuesday, October 27, 2020 8:25:44 PM
Attachments:	1.jpg Bridge map with trail lines.jpg Bridge map.jpg

Please see attached photo for a view of our trail paths.

As you can see we use the river and the trails beside the bridge is an integral part of our trail business. We do trails all year long weather permitting. In the colder months when we cannot go through the river we are limited to 1hr trails on the South Western side of the river. The rest of the year we can offer 2hr and 4hr trails from all sides of the river. The months of November and April are generally icy so we are not able to safely take people out. Our spring riding season starts when the the ice jam from the river under the bridge melts. 2020 didn't have any ice chunks that inhibited us from access to the trails. Which was amazing considering the impact that 2020 has had. Generally our trails are going out at 10, 12, 3, 6 o'clock weather permitting.

My biggest concern is how the final bridge will allow us access to the trails. It is understandable that the river flow may change. We can wade though at a certain depth in the warmer months. In the colder months, a larger dry bankside on the south east and west side of the road is necessary to continue on the off season.

I'm not as concerned when under construction. I would assume that since you are not planning on closing Northfield completely there will be a traffic management plan. I believe we can be included in the green light red light pass schedule. My horses can wait to pass over the road and follow the edge of the field to reach the trails. As long as the traffic can wait a moment for us to pass.

PLEASE tell me that fiber optic internet will be laid down in the new road!

Thank you,
Tatyanna
c519.741.6503
w519-888-6503
Conestogo River Horseback Adventures

---- On Fri, 16 Oct 2020 13:23:15 -0400 **Ken Brisbois <KBrisbois@regionofwaterloo.ca>** wrote ----

> Hi Tatyanna,
>
> Thanks for responding.
>
> So you are aware, construction is not planned for a few years and we are currently just in the Environmental Assessment Phase but want to obtain as much feedback as possible early one

especially from those who use this route for commuting and/or live directly adjacent the bridge.

Would you be able to provide route(s) of the horseback riding and your typical operational hours and any other information you think may be beneficial of course.

Thanks,

Ken

From: CR Horseback Adventures <info@horsebackadventures.ca>
Sent: October 11, 2020 12:49 PM
To: Ken Brisbois <KBrisbois@regionofwaterloo.ca>
Subject: Re: FW: RE: Scheifele Bridge Superstructure Replacement Class Environmental Assessment Study - Notice of Commencement

Very interested in following up with this project. Thank you for including us.

Tatyanna
Cell
519.741.6503

Thank you,
From the horses and staff
519-888-6503
Conestogo River Horseback Adventures

---- On Wed, 07 Oct 2020 19:48:02 -0400**KBrisbois@regionofwaterloo.ca** wrote ----

Hello,

This is just a follow up to the Notice of Study Commencement circulated in May 2020 (attached).

In light of these unpreceded times, the Project Team has decided to reach out to all agencies/interest groups that normally would provide comment but to date have not, which may be a direct result of disruption due to the COVID-19 pandemic or for other reasons.

If possible, please advise the Project Team of your interest in this study with the following information, by **Friday November 13, 2020**:

- The representative from your community/organization who will participate as part of the study;
- Initial comments/concerns and feedback related to the study area that should be considered as the project advances; and
- If you would like to be removed from the project contact list because your community/organization has no concerns please reply so we can update our distribution list.

Please contact me directly if you have any questions regarding this email or cannot provide information by the date above.

If we do not hear from you by the noted deadline date, we will assume that your agency has no interest in the project.

Regards,

Ken

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services
Regional Municipality of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3
519-575-4606 (Desk)
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

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From: Ken Brisbois
Sent: May 14, 2020 7:53 PM

Subject: RE: Scheifele Bridge Superstructure Replacement Class Environmental Assessment Study - Notice of Commencement

Hello,

Please find the Notice of Commencement for Scheifele Bridge Superstructure Replacement over the Conestogo River in the Township of Woolwich.

Please contact me if you have any questions.

Regards,

Ken

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services
Regional Municipality of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3
519-575-4606 (Desk)
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Conestogo River
Google

Conestogo River
Google

From:	Leveck, Garry
To:	Ken Brisbois
Cc:	White, Bill; Trader, Mike; Felinczak, Adam; Ryan Tucker; Larry Shantz; Mike Jones; info@horsebackadventures.ca
Subject:	SCHEIFELE BRIDGE CLASS EA STUDY: CONVERSATION WITH TATYANA VAN LENTHE / CONESTOGO RIVER HORSEBACK ADVENTURES
Date:	Monday, February 1, 2021 5:39:00 PM
Attachments:	RE ReFW RE Scheifele Bridge Superstructure Replacement Class Environmental Assessment Study - Notice of Commencement.msg

---

Hi Ken:

Today, I contacted Tatyanna Van Lenthe, co-owner, with her husband Terry, of Conestogo River Horseback Adventures.

Tatyanna's contact coordinates are as follows:

- Email: info@horsebackadventures.ca
- Business: 519-888-6503
- Cell: 519-741-6503

Conestogo River Horseback Adventures is an important business operation abutting the Scheifele Bridge reconstruction. Because of their unique situation, it was agreed that I would contact the owners, in advance of the first Public Consultation Center, to ensure that they feel engaged in the study process and to facilitate up-front discussions related to the current horse riding trails and how they might be impacted by any new bridge construction alternatives. For reference, I have attached a copy of an October 27, 2020 email, sent by Tatyanna in response to the Notice of Study Commencement. Her email provides details on the existing horseback riding trails.

The following provides a synopsis of my conversation with Tatyanna on Monday February 1, 2021:

1. **Class Environmental Assessment Process, PCC #1, and Alternative Design Concepts:**

   - I provided a brief overview of the Class EA Study process, indicating that the Region, Township and Stantec are in the early stages of the project. I confirmed that the first PCC meeting is tentatively scheduled for early April 2021 and that she would receive a formal invitation to the virtual public meeting.
   - I reviewed the 4 alternative bridge alignment concepts, including the two on the west side of the existing structure (full offset and staged construction options), the staged construction option on the east side, and the option of constructing the new bridge on the same alignment as the existing bridge. I indicated that the alternative alignments could include various bridge cross section concepts that are also being considered.
   - From a traffic control perspective, I advised that Alternatives 1-3 could be constructed without any long-term closure of Northfield Drive. Contrary to her earlier understanding, I indicated that Northfield Drive could be kept open to 2 lanes of uninterrupted traffic under these three concepts, with no temporary traffic signals. Posted speed limits would be reduced through the construction zone.
   - I advised that Alternative 4 would require a full, long-term closure of Northfield Drive, with detours, to enable the new bridge to be constructed in the same location as the existing structure. In terms of potential interruption to horse crossings of Northfield Drive, this alternative would permit crossings at any designated location with no

concern for traffic on Northfield Drive, except for construction vehicles.

2. **Horseback Riding Trails and Crossing Northfield Drive During Construction:**

    - The attached email clearly illustrates the need to maintain an uninterrupted horseback access / crossing of Northfield Drive, both during construction and as part of the final design of the new bridge.
    - To accommodate horseback crossings during construction, we discussed the thought of a “temporary tunnel” crossing under Northfield Drive, away from the construction zone. I indicated that this idea had been presented by the Project Team for initial discussion, not knowing the possible constraints associated with horse responses within a confined space. Based on my conversation with Tatyanna, it was agreed that there would be too many issues to overcome with this concept, including “horse and rider training, safety of horses and riders, length and lighting of the tunnel, and the inability of riders to dismount prior to entering the tunnel”. We mutually agreed that this concept would not be desirable.
    - After a brief discussion, I agreed to investigate the potential for a “rider-activated push button” temporary traffic signal installation on Northfield Drive, opposite the northerly driveway to Horseback Adventures. It would be a suitable location for the horses and riders to safely cross Northfield Drive throughout the duration of construction (assuming Northfield Drive is keep open). Tatyanna suggested that the push buttons be slightly higher than normal to allow riders to bend over and reach the button activator from horseback level. I agreed that this concept would be significantly less expensive than a temporary tunnel crossing under Northfield Drive.
    - A temporary signal crossing opposite their driveway would keep all horse activity well away from any construction operations and would suit the trail needs of Horseback Adventures. It was agreed that further discussion would be appropriate.

3. **Structural Bridge Inspection and Temporary Protection of Horses and Riders:**

    - I indicated that recent inspections of the Scheifele Bridge show a potential for falling concrete in the south bridge span, due to ongoing deterioration. Since the majority of horseback crossings, from east to west, occur in the south span, Stantec is proposing interim repairs and “Caution Signs” to alert riders of the need to cross under the bridge within a restricted 5-6 meter zone **adjacent to the south abutment**. This temporary measure would stay in place until the bridge was replaced, currently under consideration for a 2023-2025 construction schedule.
    - Tatyanna acknowledged that the safety of their horses and riders is of paramount importance and that the measures proposed by the Region / Stantec would be acceptable. She agreed that “education” of her staff would be appropriate to ensure a clear understanding of the need and context of the “Caution Signage”.

I trust the above is helpful to you, and the Project Team members.

I have copied Tatyanna and confirm that this summary will become a part of the formal ESR

record. I suggest that a follow-up Zoom call is not required with Tayanna unless she specifically requests one. We will maintain ongoing dialogue with Conestogo River Horseback Adventures.

Regards.

GARRY

Garry E. Leveck, P. Eng.
Senior Consultant
Senior Project Manager

Direct: 519 585-7316
Mobile: 519 240-3686
Fax: 519 579-6733
Garry.Leveck@stantec.com

Stantec
100-300 Hagey Boulevard
Waterloo ON N2L 0A4

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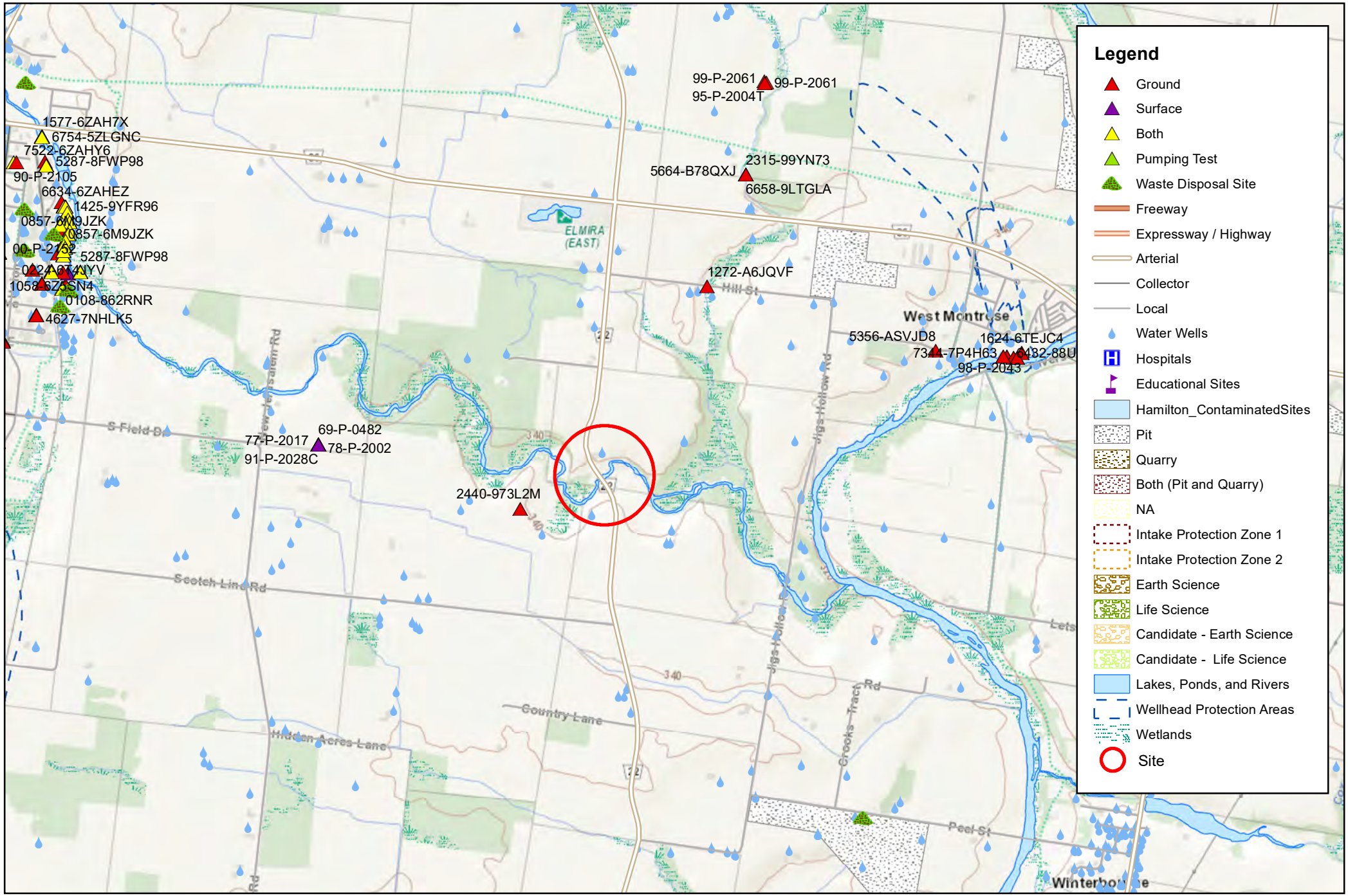
Ontario

Scheifele Bridge Superstructure Replacement, Township of Woolwich, Ontario

Ministry of the Environment Conservation and Parks



Legend

- Ground
- Surface
- Both
- Pumping Test
- Waste Disposal Site
- Freeway
- Expressway / Highway
- Arterial
- Collector
- Local
- Water Wells
- Hospitals
- Educational Sites
- Hamilton_ContaminatedSites
- Pit
- Quarry
- Both (Pit and Quarry)
- NA
- Intake Protection Zone 1
- Intake Protection Zone 2
- Earth Science
- Life Science
- Candidate - Earth Science
- Candidate - Life Science
- Lakes, Ponds, and Rivers
- Wellhead Protection Areas
- Wetlands
- Site

Projection:
Universal Transverse Mercator
Zone 17
False Easting: 500000m
False Northing: 0m
Central Meridian: -81
Scale Factor: 0.9996
Latitude of Origin: 0
1983 North American Datum

0 0.15 0.3 0.6 0.9 1.2 1.5
Kilometers

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Region of Waterloo

TRANSPORTATION AND
ENVIRONMENTAL SERVICES
Design and Construction

150 Frederick Street
Kitchener Ontario N2G 4J3 Canada
Telephone: 519-575-4400
TTY: 519-575-4608
Fax: 519-575-4430
www.regionofwaterloo.ca

Refer To:	**File No:**	**Date:**
Ken Brisbois, C. Tech., 519-575-4606	5954	April 13, 2020

AGENCIES AND STAKEHOLDERS

Dear Sir/Madam:

Re: Scheifele Bridge Replacement: Regional Road 22 (Northfield Drive): Schedule "C" Class Environmental Assessment Study: Township of Woolwich

The Regional Municipality of Waterloo has initiated a Class Environmental Assessment (Class EA) Study for the superstructure replacement of the Scheifele Bridge, on Regional Road 22 (Northfield Drive) in the Township of Woolwich. The study is being carried out in accordance with the provincial guidelines for a Schedule "C" Municipal Class Environmental Assessment.

The study will investigate practical and cost-effective alternatives for widening and reconstruction of the current bridge, to accommodate future traffic volumes and enhanced pedestrian, buggy and cycling facilities. The study will focus heavily on options for traffic management during reconstruction of the bridge, in recognition of the significant negative impacts that an extended closure of Northfield Drive would have on the community. Bridge and surrounding area aesthetics will also play an important role in the study evaluations.

Following completion of the Class Environmental Assessment Study, and approval of any findings and recommendations by Region of Waterloo Council, the project will move to detailed design and construction. The Region will soon be updating its 10-year Transportation Capital Program, which is expected to allot funds for reconstruction of the Scheifele Bridge in 2023/2024.

A "Notice of Study Commencement" was advertised in the local newspapers on XXX, 2020 to notify the general public of the pending study and to invite initial comments. Future Public Consultation Centre (PCC) meetings will be convened to present the ongoing study concepts and recommendations; the public and all agencies will be invited to attend the PCC meetings.

We invite you to provide any initial comments on the Scheifele Bridge Class Environmental Assessment Study. Any comments that you provide will be accounted for by the Project Team, along with any future feedback from the public and agencies.

If your agency has no current, or future, interest in the Scheifele Bridge project, we would still appreciate a response noting your position. If, on the other hand, we do not hear from you by June 12, 2020, we will assume that your agency has no interest in the project.

If you have any questions that you wish to have answered in person, please feel free to contact either of the following two members of the Project Team:

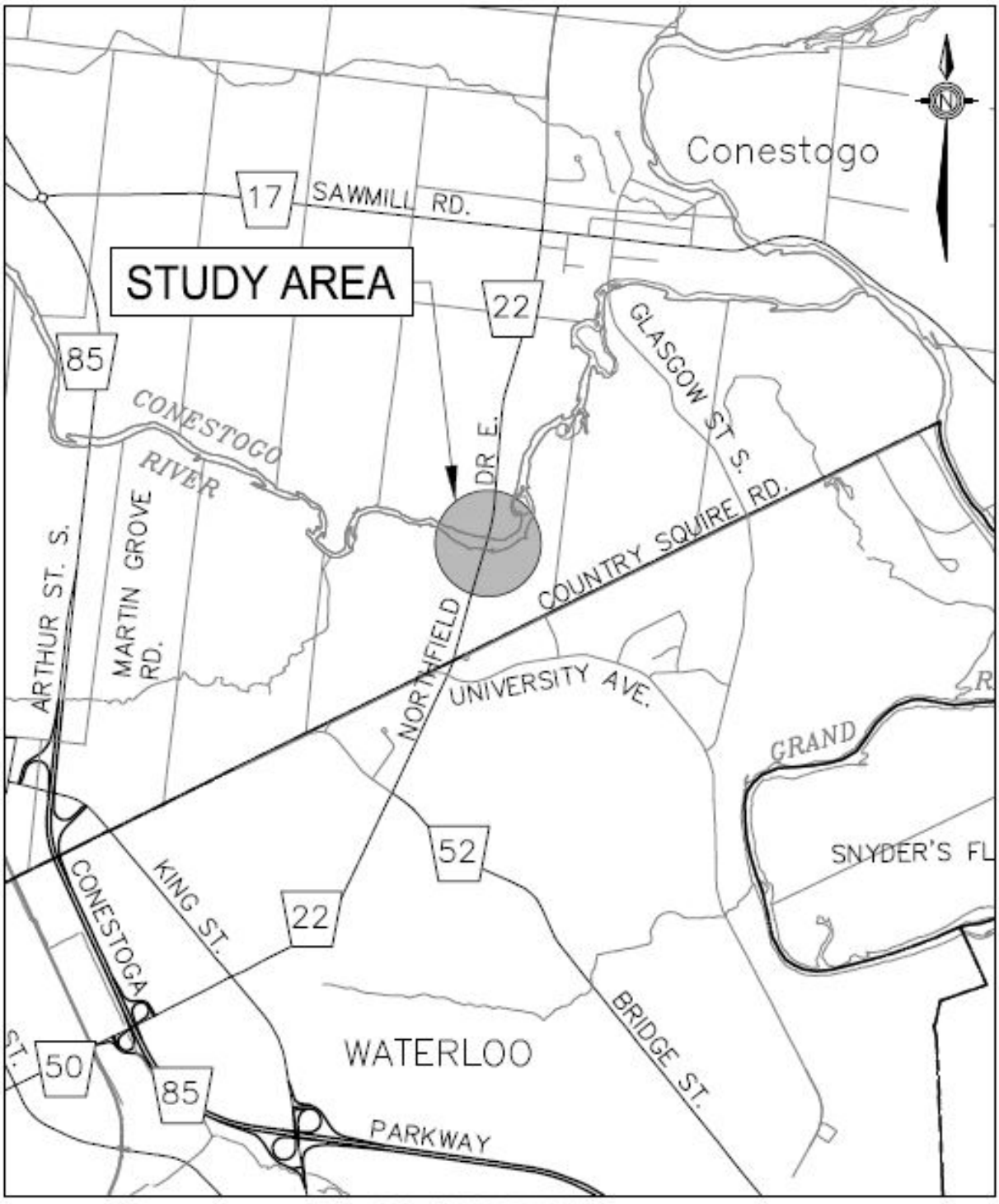
Mr. Ken Brisbois, C. Tech.
Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: (519) 575-4606
Fax: (519) 575-4430
Email: KBrisbois@regionofwaterloo.ca

Mr. Garry Leveck, P. Eng.
Senior Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 240-3686
Fax: (519) 579-6733
Email: Garry.Leveck@stantec.com

Yours truly,

Ken Brisbois, C. Tech.
Project Manager, Design and Construction

Attachments: Key Plan



KEY PLAN

Docs 2438741

Notice of Study Commencement

Scheifele Bridge Superstructure Replacement
Class Environmental Assessment and Preliminary Design
Township of Woolwich

The Study:

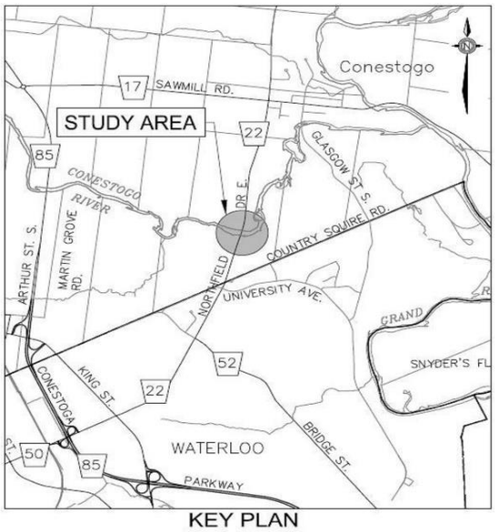
The Region of Waterloo has initiated a Class Environmental Assessment Study (Class EA) and preliminary design for the superstructure replacement of the Scheifele Bridge on Regional Road 22 (Northfield Drive) in the Township of Woolwich. The study will investigate practical and cost-effective alternatives for widening and reconstruction of the current bridge, to accommodate future traffic volumes and enhanced pedestrian, buggy and cycling facilities. The study will focus heavily on options for traffic management during reconstruction of the bridge, in recognition of the significant negative impacts that an extended closure of Northfield Drive would have on the community. The aesthetics of the bridge and surrounding area will also play an important role in the study evaluations.

The Process:

The study will be conducted in accordance with Schedule “C” requirements as outlined in the Municipal Engineers Association *"Municipal Class Environmental Assessment,"* (October 2000, as amended to 2015). This is an approved process under the Ontario *Environmental Assessment Act*. The Class EA process includes public/external agency consultation, an evaluation of alternative solutions and alternative design concepts, an assessment of potential impacts associated with the proposed improvements, and development of measures to mitigate identified impacts.

Comments:

Consultation with interested parties, including the public, businesses, and technical or regulatory agencies will form an integral part of this Class EA study to identify and address interests within the study area. A minimum of two public consultation centres will be held during the study to provide opportunities to meet with the project team, learn about the study, and to share feedback. Upon completion of the study, an Environmental Study Report will be prepared and made available for public review and comment.



KEY PLAN

We want to hear from you. If you have any questions or concerns within the study area, want to know more about the study, or would like to join the project mailing list, please contact the project team:

Ken Brisbois, C.Tech
Project Manager Transportation
Design & Construction
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON., N2G 4J3
Phone: (519) 575-4606
Email: kbrisbois@regionofwaterloo.ca

Garry Leveck, P.Eng
Senior Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON., N2L 0A4
Phone : (519) 579-4410
Alternate: (519) 240-3686
Email: garry.leveck@stantec.com

Study information will be posted on the Region of Waterloo’s website: www.regionofwaterloo.ca/en/living-here/resources/Documents/Future-Construction/DC_05954_InfoSheet.pdf.

Check for an upcoming project info webpage at www.engagewr.ca/regionofwaterloo where there will be the ability to receive email notifications of project information updates.

All comments and information provided become part of the consultation process and are being collected to assist the Region of Waterloo in making a decision when considering design alternatives for the superstructure replacement of the Scheifele Bridge. All submissions will become part of the public record files for this matter. Personal information collected is under the authority of the Municipal Act, 2001 and in compliance with the Municipal Freedom of Information and Protection of Privacy Act, R.S.O. 1990. Questions about the collection of personal information should be directed to Ken Brisbois, Project Manager at kbrisbois@regionofwaterloo.ca or 519-575-4606.

Date of Notice: May 14, 2020

Ministry of the Environment, Conservation and Parks

Environmental Assessment Branch

1st Floor
135 St. Clair Avenue W
Toronto ON M4V 1P5
Tel.: 416 314-8001
Fax.: 416 314-8452

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction des évaluations environnementales

Rez-de-chaussée
135, avenue St. Clair Ouest
Toronto ON M4V 1P5
Tél. : 416 314-8001
Téléc. : 416 314-8452

905-521-7864

May 20, 2020

Mr. K. Brisbois
Region of Waterloo

Mr. Garry Leveck
Stantec

Dear Messrs. Brisbois and Leveck:

Re: Scheifele Bridge
Township of Woolwich
MEA – Schedule "C" Project
Response to Notice of Commencement

This letter is in response to the Notice of Commencement for the above noted project. The Ministry of the Environment, Conservation and Parks (MECP) acknowledges that the Region of Waterloo has indicated that its study is following the Schedule "C" process as outlined in the MEA Class EA in order to determine how to improve the Scheifele Bridge located in Woolwich Township. It is understood that the EA is being undertaken in order to determine how best to improve this bridge in order to meet future traffic demands, accommodate buggy traffic and enable active transportation.

It is our expectation that as part of the study process, the following will be considered in the identification of impacts and necessary mitigation:

- Climate change adaptation and mitigation
- Identification of, and mitigation for any Species at Risk that are identified
- Identification of required permits and approvals to enable the implementation of each alternative

We have mapped the site against our available data. This map is enclosed with this letter. You will note the presence of a number of wells and wetland features that we expect will be taken into account as part of the study.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before authorizing this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of this duty to project proponents while retaining oversight of the consultation process.

Your proposed project may have the potential to affect Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. Where the Crown's duty to consult is triggered in relation to your proposed project**, the MECP is delegating the procedural aspects of rights-based consultation to you through this letter.** The Crown intends to rely on the delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit.

Based on information you have provided to date and the Crown`s preliminary assessment you are required to consult with the following communities who have been identified as potentially affected by your proposed project:

Six Nations of the Grand River Territory **1695 Chiefswood Road** **P.O. Box 5000** **Ohsweken, ON N0A 1M0**	Chief Mark Hill Tel: (519)445-220 **markhill@sixnations.ca** and/or Fran Henry franhenry@sixnations.ca Lonny Bomberry, Lands and Resources Director at lonnybomberry@sixnations.ca
Haudenosaunee Confederacy Chiefs Council **2634 6th Line Road** **R.R. #2** **Ohsweken, ON N0A 1M0**	Hohahes Leroy Hill, Secretary jocko@sixnations.ca
Mississaugas of the Credit First Nation	Fawn Sault Consultation Manager

2789 Mississauga Road
RR #6
Hagersville, ON N0A 1H0

Email: Fawn.Sault@newcreditfirstnation.com

Steps that you may need to take in relation to Aboriginal consultation for your proposed project are outlined in the "Code of Practice for Consultation in Ontario's Environmental Assessment Process" which can be found at the following link: https://www.ontario.ca/document/consultation-ontarios-environmental-assessment-process Additional information related to Ontario's Environmental Assessment Act is available online at: www.ontario.ca/environmentalassessments

You must contact the Director of Environmental Approvals and Permissions Branch under the following circumstances subsequent to initial discussions with the communities identified by MECP:

- Aboriginal or treaty rights impacts are identified to you by the communities
- You have reason to believe that your proposed project may adversely affect an Aboriginal or treaty right
- Consultation has reached an impasse
- A Part II Order request or elevation request is expected

The Director of the Environmental Assessment and Permissions Branch can be notified by email with the subject line "Potential Duty to Consult" to the address provided below:

Email:	enviropermissions@ontario.ca Subject: Potential Duty to Consult
Fax:	416-314-8452
Address:	Environmental Approvals and Permissions Branch 135 St. Clair Avenue West, 1st Floor Toronto, ON, M4V 1P5

The MECP will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role you will be asked to play in them.

As of July 1st 2018, a standardized form is to be used by anyone who believes that the environmental assessment process was incomplete, incorrect in that it failed to follow the required process. The required form can be found on the Forms Repository website (http://www.forms.ssb.gov.on.ca/) by searching "Part II Order" or "012-2206E (the form ID number). Once completed, the form is then to be sent to both the Minister and Director of the Environmental Assessment and Permissions Branch. Their addresses are:

Minister
Ministry of the Environment, Conservation and Parks
777 Bay Street, 5th floor
Toronto, ON M7A 2J3
Minister.mecp@ontario.ca

Director, Environmental Assessment and Permissions Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Ave. West, 1st Floor
Toronto, ON M4V 1P5
MOECCpermissions@ontario.ca

Please ensure that the new process for making a Part II Order request is included in all notices and on a project website if one will be created. Also, at this time, all Schedule "C" EA documents are being reviewed by MECP. Accordingly, please provide me with a draft ESR and allow for a minimum of 30 days for review.

This concludes our comments. Please continue to provide all Notices using the new email address: eanotification.wcregion@ontario.ca Should you have any questions or require any clarification, please contact me directly at Barbara.slattery@ontario.ca

With best regards,

EA/Planning Coordinator

Region of Waterloo

SCHEIFELE BRIDGE REPLACEMENT

Northfield Drive (Regional Road 22)
Township of Woolwich

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT STUDY

APPENDIX C: Public Consultation Center Meetings 1, 2 and 3

Stantec

Grand River Conservation Authority

Administration Centre: 400 Clyde Road, P.O. Box 729 Cambridge, ON N1R 5W6

Phone: 519-621-2761 Toll free: 1-866-900-4722 Fax: 519-621-4844 www.grandriver.ca

June 7, 2021

Ken Brisbois
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener ON N2G 4J3
kbrisbois@regionofwaterloo.ca

Re: Municipal Class Environmental Assessment – Schiefele Bridge
Northfield Drive East and Conestogo River, Conestogo
Township of Woolwich

Dear Mr. Brisbois,

The Grand River Conservation Authority (GRCA) has received the notice and materials from Public Consultation Centre #1 for the above-noted Class Environmental Assessment (Class EA).

The study area contains the Conestogo River, an unnamed tributary, and their associated floodplains, riverine valleys, and wetlands. We now understand that a full replacement of the structure is being considered, which has the potential to significantly impact these regulated features. As such, we wish to provide the following comments as the Region evaluates both alignment and cross-sectional alternatives for the replacement:

1. A new bridge could potentially impact the hydraulic and ecological functions of the Conestogo River, its associated floodplain and the unnamed tributary. As per GRCA's policies for watercourse crossings (9.1.2) and public infrastructure in floodplains (8.1.15), the bridge should be designed to:
    a. Limit hydraulic or fluvial impacts, and not impact upstream or downstream floodplain elevations;
    b. Avoid, and where unavoidable, minimize intrusions on significant natural features or hydrologic or ecological functions. Where intrusions occur, features / functions are restored and enhanced;
    c. Avoid any bends in the river to the extent practical,
    d. Take advantage of existing impacted or open areas on the channel bank or valley slope, wherever possible;
    e. Not inhibit fish passage; and,

f. Minimize maintenance requirements.

We note that while impacts to aquatic species and habitat are captured, impacts to the river, tributary and floodplain are not included in the evaluation criteria. We would ask that this is considered going forward, as it will be a key consideration in reviewing the GRCA permit application for the preferred alternative.

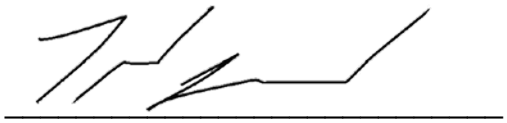
2. The potential hydraulic impacts of the bridge replacement should be verified through HEC-RAS modelling and analysis. Please reach out to the GRCA to obtain a copy of the approved HEC-RAS model for this reach of the river. The analysis will be required as part of detailed design, but we recommend doing preliminary modelling to ensure that the selected alternative can meet GRCA policy requirements.

3. GRCA's wetland policies depend on a wetland's characteristics. We would ask the Region to provide any preliminary characteristics of the wetland present in the study area (e.g. size, origin, features) so that we can confirm what policy requirements apply. Please refer to GRCA policies 8.4.4-8.4.7 for more info.

4. Based on the above, we agree that Design Alternative 1 would have the highest impact on wetlands. We also believe it would have the highest impact on the unnamed Conestogo River tributary originating from the East / Labrador Drive area. Impacts from Design Alternatives 2 and 4 would range from medium to low depending on the detailed design and final alignment of the approaches.

Please continue to consult the GRCA on the project. We would appreciate any opportunity to review and comment on the preliminary preferred alternative. If you have any questions or require additional information, please contact me at 519-621-2763 ext. 2292 or theywood@grandriver.ca.

Sincerely,



Trevor Heywood
Resource Planner
Grand River Conservation Authority

c.c. Garry Leveck, Stantec

From:	Engage
To:	Ken Brisbois
Subject:	Dlarke completed Public Consultation Centre #1 - Survey Questions
Date:	Wednesday, May 19, 2021 4:25:12 PM

Dlarke just submitted the survey Public Consultation Centre #1 - Survey Questions with the responses below.

Where do you live?

Township of Woolwich

How often do you cross the Scheifele Bridge on Northfied Drive?

More then once a week

What mode of travel do you primarily use when crossing the Scheifele Bridge at Conestogo River?

Passenger Vehicle (car, truck, motorcycle)

What is your primary reason for travel across Scheifele Bridge at Conestogo River?

Work

Please include any comments you would like to add or questions you may have. If you do not have any comments or questions please just write "None".

Add a separate lane for bikes and buggys in each direction

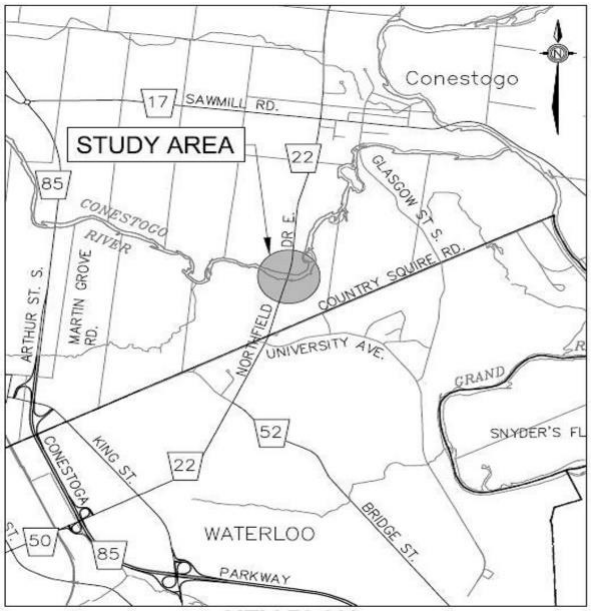
Public Consultation Centre #1
Scheifele Bridge Replacement Study
Regional Road 22 (Northfield Drive) at Conestogo River
Township of Woolwich

You are invited to provide your input into the planning of the Scheifele Bridge Replacement Study Schedule C Class Environmental Assessment (Class EA) in the Township of Woolwich.

Background

The Region of Waterloo is undertaking a Schedule C Municipal Class Environmental Assessment (Class EA) for the Scheifele Bridge Replacement on Regional Road 22 (Northfield Drive at Conestogo River, in the Township of Woolwich.

The structure replacement will address deteriorating infrastructure needs as well as provide opportunity an opportunity to provide enhanced pedestrian, cycling and buggy facilities.



KEY PLAN

The Process

The project is being conducted in accordance with the requirements of a Municipal Class Environmental Assessment (MCEA), which is an approved process under the Ontario Environmental Assessment Act (amended through 2019). The proposed improvements are considered a Schedule “C” undertaking in accordance with the MCEA document.

Community Involvement

The Region of Waterloo encourages members of the public, stakeholder groups, and agencies to actively participate in this study. Due to ongoing COVID-19 restrictions on public gatherings, no physical Public Consultation Centre (PCC) will be held for this project at this present time however an EngageWR website has been created to host a virtual PCC and provide a forum to:

- Learn about the background studies that have led the Region of Waterloo to conclude that reconstruction of the Scheifele Bridge is warranted;
- Review study data on current environmental, social, and cultural features that may be impacted by any improvements to the Scheifele Bridge;

- Learn about recent structural investigations and load capacity analyses that have been completed for the Scheifele Bridge, which provide background data in support of replacing various bridge components or the entire structure;
- View preliminary alternative bridge cross section and road alignment design concepts that have been developed for the project;
- Comment on the preliminary alternative design concepts, each of which offer varying operational features, property impacts, environmental impacts, capital costs, and impacts on Northfield Drive traffic operations during construction; and
- Engage in "virtual dialogue" with Project Team representatives and ask any questions that you may have about the project or study process.

We ask that the online questionnaire including any comments be submitted prior to June 9, 2021 to be considered by the Project Team in conjunction with all other relevant information in determining the proposed design for the Scheifele Bridge.

Please provide comments at:

https://www.engagewr.ca/scheifele-bridge-superstructure-replacement**:**

May 19, 2021 until June 9, 2021 at 4:30 p.m.

If you wish to be added to the project mailing list, or would like further information on the project, please visit www.regionofwaterloo.ca or contact:

Ken Brisbois, C. Tech.
Region Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: (519) 575-4400 Ext. 4606
Fax: (519) 575-4430
Email: kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

Accessibility

If you require assistance to review this information online, access information in alternate formats or submit comments by means other then those provided please do not hesitate to contact Ken Brisbois prior to the June 9, 2021 deadline to submit comments.

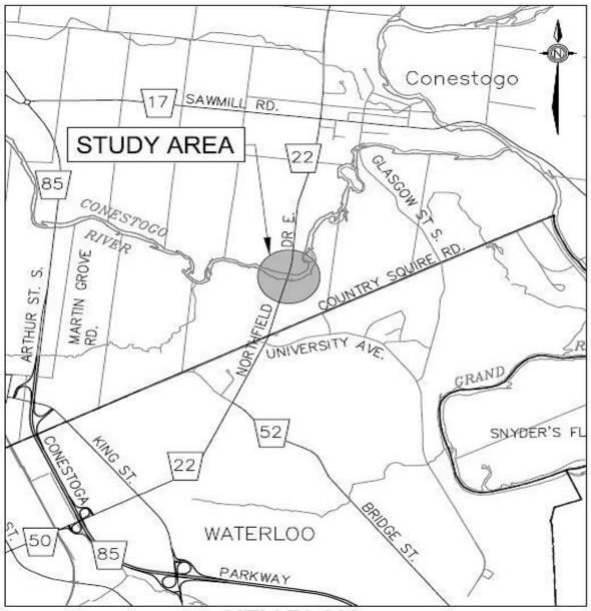
Public Consultation Centre #1
Scheifele Bridge Replacement Study
Regional Road 22 (Northfield Drive) at Conestogo River
Township of Woolwich

You are invited to provide your input into the planning of the Scheifele Bridge Replacement Study Schedule C Class Environmental Assessment (Class EA) in the Township of Woolwich.

Background

The Region of Waterloo is undertaking a Schedule C Municipal Class Environmental Assessment (Class EA) for the Scheifele Bridge Replacement on Regional Road 22 (Northfield Drive at Conestogo River, in the Township of Woolwich.

The structure replacement will address deteriorating infrastructure needs as well as provide opportunity an opportunity to provide enhanced pedestrian, cycling and buggy facilities.



KEY PLAN

The Process

The project is being conducted in accordance with the requirements of a Municipal Class Environmental Assessment (MCEA), which is an approved process under the Ontario Environmental Assessment Act (amended through 2019). The proposed improvements are considered a Schedule “C” undertaking in accordance with the MCEA document.

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- Learn about the background studies that have led the Region of Waterloo to conclude that reconstruction of the Scheifele Bridge is warranted;
- Review study data on current environmental, social, and cultural features that may be impacted by any improvements to the Scheifele Bridge;

- Learn about recent structural investigations and load capacity analyses that have been completed for the Scheifele Bridge, which provide background data in support of replacing various bridge components or the entire structure;
- View preliminary alternative bridge cross section and road alignment design concepts that have been developed for the project;
- Comment on the preliminary alternative design concepts, each of which offer varying operational features, property impacts, environmental impacts, capital costs, and impacts on Northfield Drive traffic operations during construction; and
- Engage in "virtual dialogue" with Project Team representatives and ask any questions that you may have about the project or study process.

We ask that the online questionnaire including any comments be submitted prior to June 9, 2021 to be considered by the Project Team in conjunction with all other relevant information in determining the proposed design for the Scheifele Bridge.

Please provide comments at:

https://www.engagewr.ca/scheifele-bridge-superstructure-replacement**:**

May 19, 2021 until June 9, 2021 at 4:30 p.m.

If you wish to be added to the project mailing list, or would like further information on the project, please visit www.regionofwaterloo.ca or contact:

Ken Brisbois, C. Tech.
Region Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: (519) 575-4400 Ext. 4606
Fax: (519) 575-4430
Email: kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

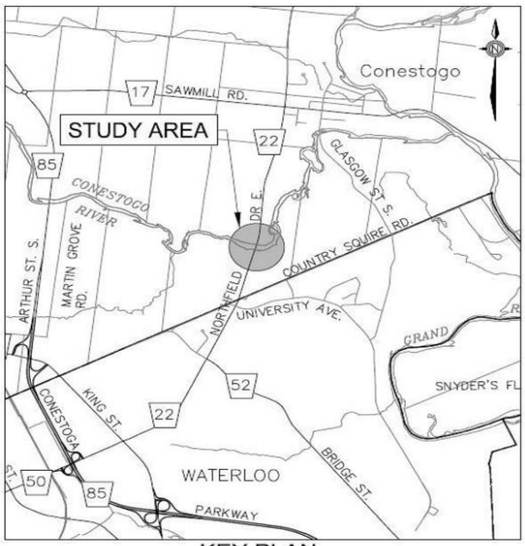
Accessibility

If you require assistance to review this information online, access information in alternate formats or submit comments by means other then those provided please do not hesitate to contact Ken Brisbois prior to the June 9, 2021 deadline to submit comments.

Public Consultation Centre #1
Scheifele Bridge Superstructure Replacement
Class Environmental Assessment and Preliminary Design
Township of Woolwich

You are invited to provide your input into the planning of the Scheifele Bridge Replacement in the Township of Woolwich by taking part in Public Consultation Centre #1.

The Region of Waterloo is undertaking a Schedule C Municipal Class Environmental Assessment (Class EA) for the Scheifele Bridge Replacement on Regional Road 22 (Northfield Drive at Conestogo River, in the Township of Woolwich. The structure replacement will address deteriorating infrastructure needs as well as provide opportunity an opportunity to provide enhanced pedestrian, cycling and buggy facilities.



KEY PLAN

The project is being conducted in accordance with the requirements of a Municipal Class Environmental Assessment (MCEA), which is an approved process under the Ontario Environmental Assessment Act (amended through 2019). The proposed improvements are considered a Schedule “C” undertaking in accordance with the MCEA document.

Due to ongoing COVID-19 restrictions on public gatherings, no physical Public Consultation Centre (PCC) will be held for this project at this present time. This virtual PCC is a forum to review, study and learn about the past reports and studies related to Scheifele Bridge, review and provide comment on preliminary alternative bridge cross section and road alignment design concepts and Engage in “virtual dialogue” with Project Team representatives and ask any questions that you may have about the project or study process.

All interested parties are invited to complete the online questionnaire and add any comments at the Region’s EngageWR project site by June 9, 2021.

Please provide comments at:

https://www.engagewr.ca/scheifele-bridge-superstructure-replacement**:**

May 19, 2021 until June 9, 2021 at 4:30 p.m.

If you would like further information on the project, please visit www.regionofwaterloo.ca or contact:

Ken Brisbois, C. Tech.
Region Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: (519) 575-4400 Ext. 4606
Fax: (519) 575-4430
Email: kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

All comments and information provided become part of the consultation process and are being collected to assist the Region of Waterloo in making a decision when considering design alternatives for the superstructure replacement of the Scheifele Bridge. All submissions will become part of the public record files for this matter. Personal information collected is under the authority of the Municipal Act, 2001 and in compliance with the Municipal Freedom of Information and Protection of Privacy Act, R.S.O. 1990. Questions about the collection of personal information should be directed to Ken Brisbois.

From:	Barboza, Karla (MHSTCI)
To:	Ken Brisbois; Leveck, Garry
Cc:	Harvey, Joseph (MHSTCI)
Subject:	FW: Region of Waterloo_ MEA Class EA _ Scheifele Bridge Replacement - Public Consultation Centre #1 [MHSTCI File 0012401]
Date:	Thursday, May 20, 2021 11:45:31 AM
Attachments:	DOCS_ADMIN-#3646985-v2-Letter_Notice_Regarding_Scheifele_Bridge_Virtual_Public_Consultation.pdf

Hi Ken and Garry,

Thanks for sending the Public Consultation Centre notice for the Scheifele Bridge Replacement to the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI).

Please note that there has been some changes in our unit (see full MHSTCI contact below). You may also want to contact the Ministry of the Environment, Conservation and Parks for an updated Government Review Team List at 416-314-8001 or 1-800-461-6290. For this project, please continue to send any notices and/or information to:

- Karla Barboza, Team Lead - Heritage (Acting) | Heritage Planning Unit (Heritage, Sport, Tourism and Culture Industries) | 416-314-7120 | karla.barboza@ontario.ca
- Joseph Harvey, Heritage Planner | Heritage Planning Unit (Heritage, Sport, Tourism and Culture Industries) | 613-242-3743 | joseph.harvey@ontario.ca

The Information Package indicates that a Stage 1 archaeological assessment was completed for this project. We can confirm that a Stage 1 AA (PIF P256-0611-2020) has been accepted into the Ontario Public Register of Archaeological Reports. We recommend that any further assessments be completed as early as possible during detailed design. The Information package also indicates that a marine archaeological assessment may be required depending on the preferred design concept and subject to clarification from MHSTCI. Once the preferred design concept, let us know if we can assist with any questions you might have on making that determination.

The Information Package indicates that a Cultural Heritage Evaluation Report (CHER) was completed as part of the environmental assessment. Could you please send us an electronic copy for our review?

Let us know if you have any other questions in the meantime.

Thanks again,
Karla

Karla Barboza MCIP, RPP, CAHP | (A) Team Lead, Heritage
Ministry of Heritage, Sport, Tourism and Culture Industries
Heritage, Tourism and Culture Division | Programs and Services Branch | Heritage Planning Unit
T. 416.314.7120 | Email: karla.barboza@ontario.ca

Ministry of Heritage, Sport, Tourism and Culture Industries			
Heritage, Tourism and Culture Division			
Name, Position, Agency	**Document**	**Phone, Fax and Email**	**Types of EA Projects to be**

and Address	Form		Circulated
Karla Barboza, Team Lead(A), Heritage Heritage Planning Unit Programs and Services Branch Ministry of Heritage, Sport, Tourism and Culture Industries 401 Bay Street, Suite 1700 Toronto ON M7A 0A7	1 electronic/ email copy each (preferred)	T: 416-314 7120 karla.barboza@ontario.ca	Receives the initial circulations for all individual and site-specific Class EAs for all regions of the province. The Team Lead will assign to a Heritage Planner for review. EA matters of province-wide significance (including Parent Class EAs and Environmental Assessment policies and guidelines).
Heritage Planners: Site-specific individual and Class EA projects – Heritage Planners review site-specific EAs impacts on cultural heritage resources.			
Laura Hatcher, Heritage Planner Heritage Planning Unit Programs and Services Branch Ministry of Heritage, Sport, Tourism and Culture Industries 401 Bay Street, Suite 1700 Toronto ON M7A 0A7	1 electronic/ email copy each (preferred)	T: 437-239-3404 laura.e.hatcher@ontario.ca	Contact Karla Barboza as initial step prior to circulating documents. All individual and site-specific Class EAs in Central Ontario, which covers upper- and single-tier municipalities of: Hamilton, Halton, Niagara, Peel, Dufferin; Durham, York, Toronto, Simcoe, Muskoka, Kawartha Lakes, Haliburton, Peterborough and Northumberland.
Dan Minkin, Heritage Planner Heritage Planning Unit Programs and Services Branch Ministry of Heritage, Sport, Tourism and Culture Industries 401 Bay Street, Suite 1700 Toronto ON M7A 0A7	1 electronic/ email copy each (preferred)	T: 416-786-7553 dan.minkin@ontario.ca	Contact Karla Barboza as initial step prior to circulating documents. All individual and site-specific Class EAs in Central Ontario, which covers upper- and single-tier municipalities of: Hamilton, Halton, Niagara, Peel, Dufferin; Durham, York, Toronto, Simcoe, Muskoka, Kawartha Lakes, Haliburton, Peterborough and Northumberland.
Joseph Harvey, Heritage Planner(A) Heritage Program Unit Programs and Services Branch Ministry of Heritage, Sport, Tourism	1 electronic/ email copy each	T. 613-242-3743 joseph.harvey@ontario.ca	Contact Karla Barboza as initial step prior to circulating documents.

and Culture Industries 401 Bay Street, Suite 1700 Toronto ON M7A 0A7	(preferred)		

From: Ken Brisbois <KBrisbois@regionofwaterloo.ca>
Sent: Wednesday, May 19, 2021 5:02:36 PM
Cc: Garry Leveck <garry.leveck@stantec.com>
Subject: Region of Waterloo_ MEA Class EA _ Scheifele Bridge Replacement - Public Consultation Centre #1

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.
Hello,

Please find the attached Notice of Public Consultation Centre #1 for Scheifele Bridge Replacement over the Conestogo River in the Township of Woolwich.

https://www.engagewr.ca/scheifele-bridge-superstructure-replacement

Thanks,

Ken

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services
Regional Municipality of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3
~~519-575-4606 (Desk)~~
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

This email correspondence (including any attachments) may contain information which is confidential and/or exempt from disclosure under applicable law and is intended only for the use of the designated recipient(s) listed above. Any unauthorized use or disclosure is strictly prohibited. If you are not the intended recipient, or have otherwise received this message by mistake, please notify the sender by replying via email and destroy all copies of this original correspondence (including any attachments). Thank you for your cooperation.

From:	Engage
To:	Ken Brisbois
Subject:	Impacted completed Public Consultation Centre #1 - Survey Questions
Date:	Wednesday, May 19, 2021 4:21:15 PM

Impacted just submitted the survey Public Consultation Centre #1 - Survey Questions with the responses below.

Where do you live?

Township of Woolwich

How often do you cross the Scheifele Bridge on Northfied Drive?

Daily

What mode of travel do you primarily use when crossing the Scheifele Bridge at Conestogo River?

Passenger Vehicle (car, truck, motorcycle)

What is your primary reason for travel across Scheifele Bridge at Conestogo River?

Other (please specify) - Shopping and visiting family in Waterloo

---

Please include any comments you would like to add or questions you may have. If you do not have any comments or questions please just write "None".

Hopefully you will keep the bridge open while you do the work and you will also ensure that the Glasgow Street bridge is also open in both directions when the work is done

---

From:	Engage
To:	Ken Brisbois
Subject:	ns completed Public Consultation Centre #1 - Survey Questions
Date:	Tuesday, June 8, 2021 9:39:11 AM

ns just submitted the survey Public Consultation Centre #1 - Survey Questions with the responses below.

Where do you live?

Township of Woolwich

How often do you cross the Scheifele Bridge on Northfied Drive?

Daily

What mode of travel do you primarily use when crossing the Scheifele Bridge at Conestogo River?

Passenger Vehicle (car, truck, motorcycle)

What is your primary reason for travel across Scheifele Bridge at Conestogo River?

Other (please specify) - Access to amenities in Waterloo

Please include any comments you would like to add or questions you may have. If you do not have any comments or questions please just write "None".

None

From:	Engage
To:	Ken Brisbois
Subject:	Rayzor completed Public Consultation Centre #1 - Survey Questions
Date:	Wednesday, May 26, 2021 7:49:36 PM

Rayzor just submitted the survey Public Consultation Centre #1 - Survey Questions with the responses below.

Where do you live?

Township of Woolwich

How often do you cross the Scheifele Bridge on Northfied Drive?

More then once a week

What mode of travel do you primarily use when crossing the Scheifele Bridge at Conestogo River?

Passenger Vehicle (car, truck, motorcycle)

What is your primary reason for travel across Scheifele Bridge at Conestogo River?

Other (please specify) - Groceries, Gas, Hardware store etc.

Please include any comments you would like to add or questions you may have. If you do not have any comments or questions please just write "None".

In concept # 1 (The offset bridge proposal) I suggest a concrete barrier being placed on the road bed between the live lane of traffic and the M.U.T lanes on either side of the road deck. This will offer protecting to pedestrians, buggies and cyclists using the bridge in either winter or summer travel. We all know that drivers almost never pay attention to conditions, pedestrians and more so buggies. I have seen this first hand on this stretch of roadway and at least the barriers will provide them a fighting chance when a driver isn't paying attention and loses control. Adding the barriers will also allow service vehicles to access those areas in winter for snow removal and provide them protection in adverse conditions without affecting traffic flow.

[redacted]

[redacted]

From:	ONT Environment / Environnement ONT
To:	Ken Brisbois
Cc:	Leveck, Garry
Subject:	RE: Region of Waterloo_ MEA Class EA _ Scheifele Bridge Replacement - Public Consultation Centre #1
Date:	Thursday, May 20, 2021 9:48:21 AM
Attachments:	DOCS_ADMIN-#3646985-v2-Letter_Notice_Regarding_Scheifele_Bridge_Virtual_....pdf

Greetings,

Thank you for your correspondence.

Please note Transport Canada **does not** require receipt of all individual or Class EA related notifications. We are requesting project proponents self-assess if their project:

1. Will interact with a federal property and/or waterway by reviewing the Directory of Federal Real Property, available at at www.tbs-sct.gc.ca/dfrp-rbif/; **and**
2. Will require approval and/or authorization under any Acts administered by Transport Canada* available at http://www.tc.gc.ca/eng/acts-regulations/menu.htm.

Projects that will occur on federal property prior to exercising a power, performing a function or duty in relation to that project, will be subject to a determination of the likelihood of significant adverse environmental effects, per Section 82 of the *Impact Assessment Act, 2019*.

If the aforementioned does not apply, the Environmental Assessment program should not be included in any further correspondence and future notifications will not receive a response. If there is a role under the program, correspondence should be forwarded *electronically* to: EnviroOnt@tc.gc.ca with a **brief description of Transport Canada's expected role**.

*Below is a summary of the most common Acts that have applied to projects in an Environmental Assessment context:

- ***Canadian Navigable Waters Act (CNWA)*** – the Act applies primarily to works constructed or placed in, on, over, under, through, or across navigable waters set out under the Act. The Navigation Protection Program administers the CNWA through the review and authorization of works affecting navigable waters. Information about the Program, CNWA and approval process is available at: http://www.tc.gc.ca/eng/programs-621.html. Enquiries can be directed to NPPONT-PPNONT@tc.gc.ca or by calling (519) 383-1863.

- ***Railway Safety Act (RSA)*** – the Act provides the regulatory framework for railway safety, security, and some of the environmental impacts of railway operations in Canada. The Rail Safety Program develops and enforces regulations, rules, standards and procedures governing safe railway operations. Additional information about the Program is available at: https://www.tc.gc.ca/eng/railsafety/menu.htm. Enquiries can be directed to RailSafety@tc.gc.ca or by calling (613) 998-2985.

- ***Transportation of Dangerous Goods Act (TDGA)*** – the transportation of dangerous goods by air, marine, rail and road is regulated under the TDGA. Transport Canada, based on risks, develops safety standards and regulations, provides oversight and gives expert advice on dangerous goods to promote public safety. Additional information about the transportation of dangerous goods is available at: https://www.tc.gc.ca/eng/tdg/safety-menu.htm. Enquiries can be directed to TDG-TMDOntario@tc.gc.ca or by calling (416) 973-1868.

- ***Aeronautics Act*** – Transport Canada has sole jurisdiction over aeronautics, which includes aerodromes and all related buildings or services used for aviation purposes. Aviation safety in Canada is regulated under this Act and the Canadian Aviation Regulations (CARs). Elevated Structures, such as wind turbines and communication towers, would be examples of projects that must be assessed for lighting and marking requirements in accordance with the CARs. Transport Canada also has an interest in projects that have the potential to cause interference between wildlife and aviation activities. One example would be waste facilities, which may attract birds into commercial and recreational flight paths. The *Land Use In The Vicinity of Aerodromes* publication recommends guidelines for and uses in the vicinity of aerodromes, available at: https://www.tc.gc.ca/eng/civilaviation/publications/tp1247-menu-1418.htm. Enquires can be directed to tc.aviationservicesont-servicesaviationont.tc@tc.gc.ca or by calling 1 (800) 305-2059 / (416) 952-0230.

Please advise if additional information is needed.

Thank you,

Environmental Assessment Program, Ontario Region
Transport Canada / Government of Canada / 4900 Yonge St., Toronto, ON M2N 6A5
EnviroOnt@tc.gc.ca / Facsimile : (416) 952-0514 / TTY: 1-888-675-6863

Programme d'évaluation environnementale, Région de l'Ontario
Transports Canada / Gouvernement du Canada / 4900, rue Yonge, Toronto, ON, M2N 6A5
EnviroOnt@tc.gc.ca / télécopieur: (416) 952-0514

From: Ken Brisbois [mailto:KBrisbois@regionofwaterloo.ca]
Sent: Wednesday, May 19, 2021 5:03 PM
Cc: Garry Leveck <garry.leveck@stantec.com>
Subject: Region of Waterloo_ MEA Class EA _ Scheifele Bridge Replacement - Public Consultation Centre #1

Hello,

Please find the attached Notice of Public Consultation Centre #1 for Scheifele Bridge Replacement over the Conestogo River in the Township of Woolwich.

https://www.engagewr.ca/scheifele-bridge-superstructure-replacement

Thanks,

Ken

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services
Regional Municipality of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3
~~519-575-4606 (Desk)~~
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

This email correspondence (including any attachments) may contain information which is confidential and/or exempt from disclosure under applicable law and is intended only for the use of the designated recipient(s) listed above. Any unauthorized use or disclosure is strictly prohibited. If you are not the intended recipient, or have otherwise received this message by mistake, please notify the sender by replying via email and destroy all copies of this original correspondence (including any attachments). Thank you for your cooperation.

SCHEIFELE BRIDGE CLASS EA STUDY

PUBLIC INFORMATION CENTRE MEETING 1 COMMENTS

AGENCY AND SPECIAL INTEREST GROUP COMMENTS:

1. **Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTC): Programs and Services Branch, Heritage Planning Unit: Email Dated May 20, 2021**

Thanks for sending the Public Consultation Centre notice for the Scheifele Bridge Replacement to the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI).

Please note that there has been some changes in our unit (see full MHSTCI contact below). You may also want to contact the Ministry of the Environment, Conservation and Parks for an updated Government Review Team List at 416-314-8001 or 1-800-461-6290. For this project, please continue to send any notices and/or information to:

- Karla Barboza, Team Lead - Heritage (Acting) | Heritage Planning Unit (Heritage, Sport, Tourism and Culture Industries) 416-314-7120 | karla.barboza@ontario.ca

- Joseph Harvey, Heritage Planner | Heritage Planning Unit (Heritage, Sport, Tourism and Culture Industries) 613-242-3743 | joseph.harvey@ontario.ca

The Information Package indicates that a Stage 1 archaeological assessment was completed for this project. We can confirm that a Stage 1 AA (PIF P256-0611-2020) has been accepted into the Ontario Public Register of Archaeological Reports. We recommend that any further assessments be completed as early as possible during detailed design. The Information package also indicates that a marine archaeological assessment may be required depending on the preferred design concept and subject to clarification from MHSTCI. Once the preferred design concept, let us know if we can assist with any questions you might have on making that determination.

The Information Package indicates that a Cultural Heritage Evaluation Report (CHER) was completed as part of the environmental assessment. Could you please send us an electronic copy for our review.

2. **Grand River Conservation Authority: C/O Trevor Heywood, Resource Planner: Letter Dated June 7, 2021.**

    - The Grand River Conservation Authority (GRCA) has received the notice and materials from Public Consultation Centre #1 for the Scheifele Bridge Class Environmental Assessment (Class EA).
    - The study area contains the Conestogo River and two unnamed tributaries, as well as their associated floodplains, riverine valleys, and wetlands. We now understand that a full replacement of the structure is being considered which has the potential to impact these regulated features. As such, we wish to provide the following comments as the Region evaluates both alignment and cross section alternatives for the replacement.

        - A new bridge could potentially impact the hydrologic and ecological functions of the resource of the Conestogo River. As per GRCA's policies for watercourse

crossings (9.1.2) and public infrastructure in floodplains (8.1.15), the bridge should be designed to:

a. Limit hydraulic or fluvial impacts, and not impact upstream or downstream floodplain elevations.
b. Avoid, and where unavoidable, minimize intrusions on significant natural features or hydrologic or ecological functions. Where intrusions occur, features / functions are restored and enhanced.
c. Avoid any bends in the river to the extent practical.
d. Take advantage of existing impacted or open areas on the channel bank or valley slope, wherever possible.
e. Not inhibit fish passage; and
f. Minimize maintenance requirements.

We note that while impacts to aquatic species and habitat are captured, impacts to the river, tributary and floodplain are not included in the evaluation criteria. We would ask that this is considered going forward, as it will be a key consideration in reviewing the GRCA permit application for the preferred alternative.

- The potential hydraulic impacts of the bridge replacement should be verified through HEC-RAS modelling and analysis. Please reach out to the GRCA to obtain a copy of the approved HEC-RAS model for this reach of the river. The analysis will be required as part of detailed design, but we recommend doing preliminary modelling to ensure that the selected alternative can meet GRCA policy requirements.

- GRCA's wetland policies depend on a wetland's characteristics. We would ask the Region to provide any preliminary characteristics of the wetland present in the study area (example: size, origin, features) so that we can confirm what policy requirements apply. Please refer to GRCA policies 8.4.4-8.4.7 for more information.

- Based on the above, we agree that Design Alternative 1 would have the highest impact on wetlands. We also believe it would have the highest impact on the unnamed Conestogo River tributary originating from the East / Labrador Drive area. Impacts from Design Alternatives 2 and 4 would range from medium to low depending on the detailed design and final alignment of the approaches.

Please continue to consult the GRCA on the project. If you have any questions or require additional information, please contact Trevor Heywood at 519-621-2763 ext. 2292 or theywood@grandriver.ca.

3. Transport Canada: Environmental Assessment Program: Ontario Region
Email Dated May 20, 2021

Please note Transport Canada **does not** require receipt of all individual or Class EA related notifications. We are requesting project proponents self-assess if their project:

1. Will interact with a federal property and/or waterway by reviewing the Directory of Federal Real Property, available at at www.tbs-sct.gc.ca/dfrp-rbif/; **and**
2. Will require approval and/or authorization under any Acts administered by Transport Canada* available at http://www.tc.gc.ca/eng/acts-regulations/menu.htm.

Projects that will occur on federal property prior to exercising a power, performing a function or duty in relation to that project, will be subject to a determination of the likelihood of significant adverse environmental effects, per Section 82 of the *Impact Assessment Act, 2019*.

If the above does not apply, the Environmental Assessment program should not be included in any further correspondence and future notifications will not receive a response. If there is a role under the program, correspondence should be forwarded *electronically* to: EnviroOnt@tc.gc.ca with a **brief description of Transport Canada's expected role**.

Below is a summary of the most common Acts that have applied to projects in an Environmental Assessment context:

- ***Canadian Navigable Waters Act (CNWA)*** – the Act applies primarily to works constructed or placed in, on, over, under, thru, or across navigable waters set out under the Act. The Navigation Protection Program administers the CNWA through the review and authorization of works affecting navigable waters. Information about the Program, CNWA and approval process is available at: http://www.tc.gc.ca/eng/programs-621.html. Enquiries can be directed to NPPONT-PPNONT@tc.gc.ca or by calling (519) 383-1863.

- ***Railway Safety Act (RSA)*** – the Act provides the regulatory framework for railway safety, security, and some of the environmental impacts of railway operations in Canada. The Rail Safety Program develops and enforces regulations, rules, standards and procedures governing safe railway operations. Additional information about the Program is available at: https://www.tc.gc.ca/eng/railsafety/menu.htm. Enquiries can be directed to RailSafety@tc.gc.ca or by calling (613) 998-2985.

- ***Transportation of Dangerous Goods Act (TDGA)*** – the transportation of dangerous goods by air, marine, rail and road is regulated under the TDGA. Transport Canada, based on risks, develops safety standards and regulations, provides oversight and gives expert advice on dangerous goods to promote public safety. Additional information about the transportation of dangerous goods is available at: https://www.tc.gc.ca/eng/tdg/safety-menu.htm. Enquiries can be directed to TDG-TMDOntario@tc.gc.ca or by calling (416) 973-1868.

- ***Aeronautics Act*** – Transport Canada has sole jurisdiction over aeronautics, which includes aerodromes and all related buildings or services used for aviation purposes. Aviation safety in Canada is regulated under this Act and the Canadian Aviation Regulations (CARs). Elevated Structures, such as wind turbines and communication towers, would be examples of projects that must be assessed for lighting and marking requirements in accordance with the CARs. Transport Canada also has an interest in projects that have the potential to cause interference between wildlife and aviation activities. One example would be waste facilities, which may attract birds into commercial and recreational flight paths. The *Land Use In The Vicinity of Aerodromes* publication recommends guidelines for and uses in the vicinity of aerodromes, available at: https://www.tc.gc.ca/eng/civilaviation/publications/tp1247-menu-1418.htm. Enquires can be directed to tc.aviationservicesont-servicesaviationont.tc@tc.gc.ca or by calling 1 (800) 305-2059 / (416) 952-0230.

4. **City of Waterloo: Engineering Services Department:**
   Letter Dated March 31, 2021
   Note: Comments are consistent with response to Notice of Study Commencement.

   City staff have reviewed the preliminary design concepts for the replacement of the Scheifele Bridge superstructure. Further to our meeting on January 27, 2021, we offer the following initial comments:

   - Since Northfield Drive and the Scheifele Bridge represent critical transportation assets linking the City of Waterloo and Woolwich Township we feel they should be "right sized" for interim and long-term multi-use transportation needs.

   - Present and future transportation needs of this corridor must account for conventional forms of road traffic, agricultural vehicles, buggies, cyclists, and future users of active transportation features (i.e. trails, pathways, sidewalks) as linkages become established. We understand that 2019 average annual daily traffic (AADT) stands at approximately 10,300 movements and that figure is projected to grow to approximately 13,000 by 2030.

   - Emphasizing safety in road design is a key element of the Region of Waterloo's 2018 Transportation Master Plan. Improving road safety via speed control and other measures are also focus areas of the City of Waterloo's current Transportation Master Plan (TMP) update. As result, design considerations should recognize the present concerns about speeding and traffic safety on Northfield Drive. To that end, separated walkways and multi-use trail should be part of the final design to enhance the protection of pedestrians and cyclists. The opportunity for traffic calming should also be part of the detailed design component of the project.

   - Lane width considerations for vehicle passage should address the fact that this portion of the regional road network is essential for EMS and mutual-aid Fire Rescue support between the City and Township.

   - We are encouraged by the Project Team's careful consideration about the impacts of bridge reconstruction and normal traffic flow on Northfield Drive. We are appreciative of your efforts to identify a construction staging approach that would avoid a long-term closure of Northfield Drive and extensive detours that would have a negative impact on the community.

PUBLIC COMMENTS (Not in any specific order):

1. Chris Metaxis: Conestogo:

   - This is a critical link from Waterloo to Conestogo/Woolwich. We use this daily both for personal transportation and active transportation.
   - A few key considerations:
     - Daily observation of both heavy bicycle and horse/buggy use - currently narrow platform combined with high operating speeds creates potential safety issues

    - Glasgow Street S including historic bridge into south Conestogo is an alternate active transportation and vehicle bypass however, it is currently under study for by the Township and potential closure/removal and or strict limitations. Therefore the closure may cause additional active transportation use of Northfield in the future. Coordination with Woolwich study required.
    - There is a lack of connectivity of active use trails and MUT between Woolwich (St Jacobs, Conestogo, etc) and Waterloo (Grey Silo trails, University Ave MUT, etc.). In addition, high use by Waterloo cycling club, etc.

2. D. Larke: Township of Woolwich:

    - Add a separate lane for bikes and buggies in each direction

3. Anonymous: Township of Woolwich:

    - Hopefully, you will keep the bridge open while you do the work, and you will also ensure that the Glasgow Street bridge is also open in both directions when the work is done

4. Email Name “Rayzor” (Anonymous): Township of Woolwich:

    - In concept # 1 (The offset bridge proposal) I suggest a concrete barrier being placed on the roadbed between the live lane of traffic and the M.U.T lanes on either side of the road deck. This will offer protection to pedestrians, buggies and cyclists using the bridge in either winter or summer travel.
    - We all know that drivers almost never pay attention to conditions, pedestrians and more so buggies. I have seen this first-hand on this stretch of roadway and at least the barriers will provide them a fighting chance when a driver isn't paying attention and loses control. Adding the barriers will also allow service vehicles to access those areas in winter for snow removal and provide them protection in adverse conditions without affecting traffic flow.

5. Adrian S: Township of Woolwich:

    - I also cross the bridge while running and biking (at least once per week).
    - Many bicyclists use this bridge and the occasional person walking.
    - As you know there are horse and buggies on this road as well.
    - While it would be nice to have two lanes for cars in each direction to prepare it for the future, it might be too early for it.
    - It is imperative to have a wide shoulder with partition for horse and buggies (or bicycle).
    - If you add a lane for walking it would be even better, but this would require this lane to be extended along the entire road.

6. Laura Imeson: City of Waterloo:

    - I hope that all SAR will be treated with the utmost care.
    - As a family that uses the bridge frequently, I anticipate traffic disruption when this project is underway. However, I think this will be less trouble than other recent construction projects, such as at the Northfield bridge over the expressway, which increased the traffic near our home. (I think Benjamin Road is still busier after drivers got used to the detours).
    - The expressway gives a very reasonable alternative for most traffic when the bridge is closed.

- My family has also used the trail under the bridge. Unless I missed it, I did not see anything in the presentation about the impact on the trail during construction. It would be a shame if the trail were closed for 18 months.

END OF COMMENTS

Comment Sheet
Regional Municipality of Waterloo
Scheifele Bridge Replacement – Northfield Drive at Conestogo River
Township of Woolwich

Public Consultation Centre #1

Please complete and mail, fax or email your comments by June 11, 2021 to:

Ken Brisbois, C. Tech. Region Project Manager Region of Waterloo 150 Frederick Street, 6th Floor Kitchener, ON N2G 4J3 Telephone: (519) 575-4400 Ext. 4606 Fax: (519) 575-4430 Email: kbrisbois@regionofwaterloo.ca	Garry E. Leveck, P.Eng. Consultant Project Manager Stantec Consulting Ltd. 100-300 Hagey Boulevard Waterloo, ON N2L 0A4 Telephone: (519) 585-7316 Fax: (519) 579-6733 Email: garry.leveck@stantec.com

Questions marked with an (*) are required

1.) Where do you live?*

☑ Township of Woolwich
☐ City of Waterloo
☐ City of Kitchener
☐ City of Cambridge
☐ Other (Specify) _____

2.) How often do you cross the Scheifele Bridge on Northfied Drive?*

☑ Daily
☐ Once a Week
☐ More Than Once a Week
☐ Monthly
☐ Seldom

3.) What mode of travel do you primarily use when crossing the Scheifele Bridge at Conestogo River?*

- ☑ Passenger Vehicle
- ☐ Public Transit
- ☐ Bicycle
- ☐ Walk
- ☐ Seldom

4.) What is your primary reason for travel across Scheifele Bridge at Conestogo River?*

- ☑ Work
- ☐ School
- ☐ Recreation
- ☐ Other (Specify) _____

Comments regarding this project (Additional Sheet at Back):

I also cross the bridge while running and biking (at least once per week).

Many bicyclists use this bridge and also the ocassional person walking.

As you know there are horse and buggies on this road as well.

While it would be nice to have two lanes for cars in each direction to prepare it for the future, it might be too early for it.

It is imperative to have a wide shoulder with partition for horse and buggies (or bicycle).

If you add a lane for walking it would be even better, but this would require this lane to be extended along the entire road (

Thank you!

Name: Adrian S.

Address: Postal Code:

Phone: [redacted] Email:

Collection Notice:

All comments and information received from individuals, stakeholder groups, and agencies regarding these projects and meetings are being collected to assist the Region of Waterloo in making a decision. Under the “Municipal Act”, personal information (such as name, address, telephone number and property location) which may be included in a submission becomes part of the public record. Questions regarding the collection should be forwarded to the staff member noted above.

Comment Sheet
Regional Municipality of Waterloo
Scheifele Bridge Replacement – Northfield Drive at Conestogo River
Township of Woolwich

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- ☐ City of Kitchener
- ☐ Other (Specify) _____
- ☑ City of Waterloo
- ☐ City of Cambridge

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- ☐ Walk
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4.) What is your primary reason for travel across Scheifele Bridge at Conestogo River?*

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- ☐ School
- ☐ Recreation
- ☐ Other (Specify) _____

Comments regarding this project (Additional Sheet at Back):

I hope that all SAR will be treated with the utmost care. As a family that uses the bridge frequently, I anticipate traffic disruption when ths project is underway. However, I think this will be less trouble than other recent construction projects, such as at the Northfield bridge over the expressway, which increased the traffic near our home. (I think Benjamin road is still busier after drivers got used to the detours).

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My family has also used the trail under the bridge. Unless I missed, it I did not see anything in the presentaion about the impact on the trail during construction. It would be a shame if the trail was closed down for 18 months.

Name: Laurel Imeson

Addres [redacted]

Phone:

Collection Notice:

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Additional Comments:

COMMENT SHEET

Regional Municipality of Waterloo
Scheifele Bridge Class Environmental Assessment
Regional Road 22 (Northfield Drive), Township of Woolwich
PUBLIC CONSULTATION CENTRE MEETING #1

Please provide your comments electronically in the space below so that your opinions can be considered for this project. Please email your comments by Friday May 28, 2021 to either of the following:

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services
Regional Municipality of Waterloo

150 Frederick Street
Kitchener ON N2G 4J3
519-575-4606 (Desk)
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Senior Consultant
Senior Project Manager
Stantec Consulting Ltd.

100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Direct: 519 585-7316
Mobile: 519 240-3686
Fax: 519 579-6733
garry.leveck@stantec.com

Comments regarding this project:

All comments and information received from individuals, stakeholder groups, and agencies regarding this project is being collected to assist the Region of Waterloo in making decisions.

Under the "Municipal Act", personal information (such as name, address, telephone number and property location), which may be included in a submission, becomes part of the public record. If Any questions regarding the collection process should be forwarded to Mr. Ken Brisbois at the email address noted above. Due to current COVID restrictions, any mailed inquiries may not be received and/or acknowledged due to Region staff working remotely.

Region of Waterloo

Information Package

Scheifele Bridge Replacement Study
Regional Road 22 (Northfield Drive)
Township of Woolwich

Public Consultation Centre No. 1
Dates: April 19, 2021 to May 7, 2021
Online Review and Comments: www.engagewr.ca

What? The Region of Waterloo is undertaking a Municipal Class Environmental Assessment (EA) for the proposed replacement of the Scheifele Bridge.

Where? The Scheifele Bridge crosses the Conestogo River on Regional Road 22 (Northfield Drive) between University Avenue in the City of Waterloo and Sawmill Creek Road in the Village of Conestogo.

Why? To address deteriorating structural deficiencies in the existing bridge, as noted in a July 2019 Preliminary Information Study Report by the Region of Waterloo.

When? The Region of Waterloo's 10-Year Transportation Capital Plan includes funding for reconstruction in 2023. However, due to recent budget programming adjustments, the Region is currently considering a possible deferred construction start date to 2025.

Who? Region of Waterloo Project Manager
Ken Brisbois
Phone: Office: (519) 575-4606 Cell: (519) 240-2995
Email: kbrisbois@regionofwaterloo.ca

KEY PLAN

1. WHY IS THE REGION CONSIDERING THIS PROJECT?

In July 2019, the Region of Waterloo completed a Preliminary Investigation Report (PIR) which summarized the results of various investigative studies of the Scheifele Bridge. The 2019 study included reviews by the engineering and transportation planning departments at the Region, as well as input from utility companies, the Township of Woolwich, and various local stakeholders.

The 2019 study acknowledged numerous deficiencies in the 65-year-old structure, including concerns with the bridge deck and abutments that were identified in earlier structural appraisals dating back to 2005 and 2010. Although a full deck replacement was the focus of the 2019 PIR, replacement of the abutments and piers was not ruled out in conjunction of any major bridge replacement contract.

In addition to the structural deficiencies of the bridge superstructure and substructure components, the 2019 report also cited concerns for the bridge width and cross section, which poses safety issues for pedestrian, cyclist, and buggy traffic. To address these issues, the Region's Active Transportation Master Plan (ATMP) recommends a combination of wider paved shoulders, sidewalks, and/or multi-use trails on a reconstructed bridge deck.

With an identified need to replace the Scheifele Bridge, Region Council authorized staff to complete a Municipal Class Environmental Assessment study that would examine various design concepts for replacement of the Scheifele Bridge. Following completion and approval of a final Environmental Study Report, the Region would move forward with final design and construction of the preferred design, subject to budget and agency approvals.

2. WHO IS DIRECTING THE PROJECT?

The planning and design for this project is being directed by Project Team consisting of staff from the Region of Waterloo and the Township of Woolwich, including Councillor Larry Shantz from the Township of Woolwich. The Waterloo office of Stantec Consulting Ltd has been retained by the Region of Waterloo to provide planning and engineering design services on the project. Project Managers from the Region of Waterloo and Stantec include Ken Brisbois and Garry Leveck, respectively.

3. HOW IS THE PROJECT BEING PLANNED?

This project is being planned in accordance with the requirements of the Provincially guided *Municipal Class Environmental Assessment (Class EA)* process. The Municipal Class EA process is a planning and decision-making tool approved under the Environmental Assessment Act of Ontario and used by municipalities to plan and implement public infrastructure projects. The Class EA process accounts for any impacts to the natural and social environments by implementing mitigative measures during the design and construction of any new infrastructure facilities. Economic factors are considered in the selection of a preferred design solution.

The Scheifele Bridge study is being completed as a **Schedule 'C'** Class Environmental Assessment project, which typically applies to larger and more complex projects where the potential for significant environmental impacts may be evident.

Consultation is a key component of any Class EA study, involving input from the public; federal, provincial, and local agencies; utility corporations; and other interested stakeholder groups. Multiple opportunities for public and agency input are available throughout the Schedule "C" Class EA study process, and the input from these groups can often have a significant bearing on decisions made over the course of the Class EA study process.

This project is currently in Phase 3 of the Class EA Study process. This initial Public Consultation Centre is being held so that attendees can become familiar with recent background technical studies, view alternative design concepts that have been developed for replacement of the Scheifele Bridge, and to provide comments to the Project Team.

Please refer to **Appendix A** for more information about the Class Environmental Assessment process.

4. WHAT IS THE PURPOSE OF THIS PUBLIC CONSULTATION CENTRE MEETING?

This Public Consultation Centre meeting provides an opportunity for individuals and interested groups to:

- Learn about the background studies that have led the Region of Waterloo to conclude that reconstruction of the Scheifele Bridge is warranted.
- Review study data on current environmental, social, and cultural features that may be impacted by any improvements to the Scheifele Bridge.
- Learn about recent structural investigations and load capacity analyses that have been completed for the Scheifele Bridge, which provide background data in support of replacing various bridge components or the entire structure.
- View preliminary alternative **bridge cross section** and **road alignment** design concepts that have been developed for the project.
- Comment on the preliminary alternative design concepts, each of which offer varying operational features, property impacts, environmental adversity, capital costs, and impacts on Northfield Drive traffic operations during construction.
- Engage in "virtual dialogue" with Project Team representatives and ask any questions that you may have about the project or study process.

5. ARE ACTIVE TRANSPORTATION UPGRADES, OR WIDENING OF THE SCHEIFELE BRIDGE, BEING CONSIDERED AS PART OF THE STUDY?

Potential active transportation upgrades are being considered for a portion of Northfield Drive, as well as widening the Scheifele Bridge to accommodate short term, and long term, active transportation needs, all in accordance with current Region of Waterloo and City of Waterloo Master Transportation Plans.

The 2018 Region of Waterloo Active Transportation Master Plan (ATMP) recommends a combination of wider paved shoulders, sidewalks, and/or multi-use trails on a reconstructed Scheifele Bridge deck, which may be carried through to the structure approaches.

The City of Waterloo has also provided initial comments on the current study, suggesting that:

- The Northfield Drive corridor represents a critical transportation connector linking the City of Waterloo and Woolwich Township and should be "right sized" to accommodate interim and long-term transportation needs of all users.
- The replacement of the Scheifele Bridge should not only account for conventional forms of road traffic, but should also be designed to accommodate agricultural vehicles, buggies, and the active transportation needs of cyclists and pedestrians.

- As active transportation linkages become established on Northfield Drive, the new bridge should have “built-in” infrastructure to accommodate trails, pathways, and sidewalks.

- Improving road safety should be a priority by providing wider travel lanes for buggies and separated walkways and/or multi-use trails for pedestrians.

The Region of Waterloo “Context Sensitive Transportation Corridor Design Guidelines” (CDG) is a planning policy document that guides the design of Regional roads. The CDG identifies design parameters for desirable features within the road allowance such as vehicle lanes, cycling facilities, sidewalks, and boulevards.

Regional Road 22 (Northfield Drive) is a ***“Rural Connector”*** within the context of the Region of Waterloo Transportation Corridor Design Guidelines. *Rural Connectors* are typically travelled at higher speeds, warranting features that will enhance the operational safety of cyclists and pedestrians with separate cycle lanes, multi-use trails, and wider roadway lanes. The presence of buggies in the Region of Waterloo adds another dimension to the typical design of a safe transportation corridor.

In addition to operational design, *Rural Connectors* may also be identified as having “scenic landscapes”, characterized by natural, cultural heritage, and recreational features that contribute to the overall view by the user. Contributing elements such as woodlots, wetlands, farmland, and other natural features, are to be protected, preserved and / or enhanced in the design and construction of Rural Connectors.

6. WHAT POTENTIAL DESIGN CONCEPTS HAVE BEEN CONSIDERED SO FAR, AND WHICH OF THEM WILL BE FURTHER CONSIDERED AFTER THIS PCC MEETING?

First, it is important to recognize that, although the Project Team has developed several design concepts for the replacement of the Scheifele Bridge and the approach alignments on Northfield Drive, **no decisions have been made to date**. After receiving public feedback on the details presented at PCC #1, the Project Team will revisit the alternative design concepts and amend them, where deemed appropriate, prior to making any decisions on a recommended preferred design.

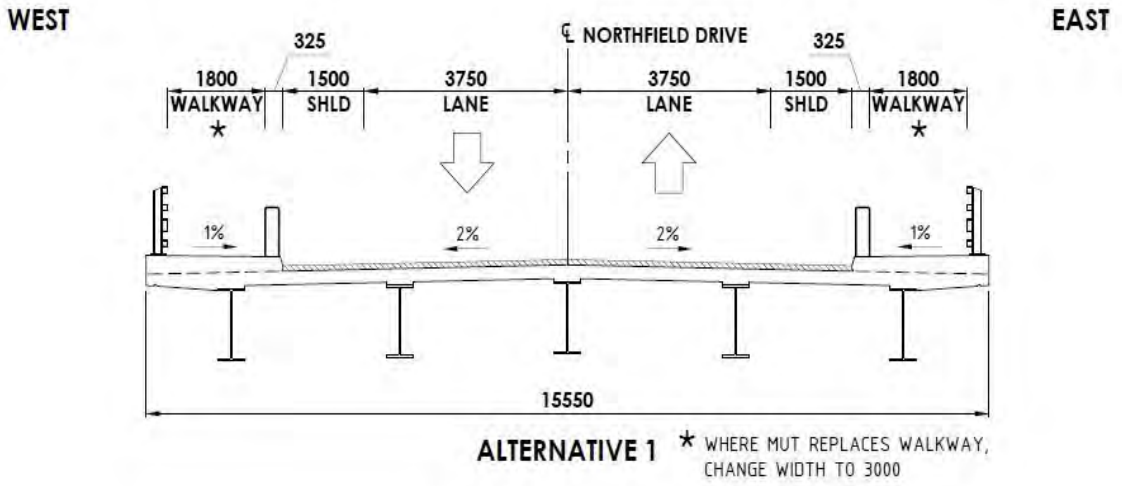
To date, the Project Team has developed 4 Alternative Bridge Design Cross Sections for the replacement of the Scheifele Bridge, as well as 4 Alternative Northfield Drive Alignment Concepts that would accompany any bridge construction design. It is possible that either of the Northfield Drive Alignment Concepts may be “married” to either one of the four bridge design cross sections to create a matrix of various design alternatives. At this stage of the planning process, the four alternative Northfield Drive alignment concepts have incorporated the **widest** bridge design cross section (Alternative #4), which, in turn, produces a “worst case” scenario in terms of site impacts, property acquisition needs, and construction costs.

If a narrower bridge design is ultimately selected, the overall project costs would be correspondingly reduced.

ALTERNATIVE BRIDGE DESIGN CROSS SECTION CONCEPTS:

ALTERNATIVE BRIDGE DESIGN CONCEPT 1:

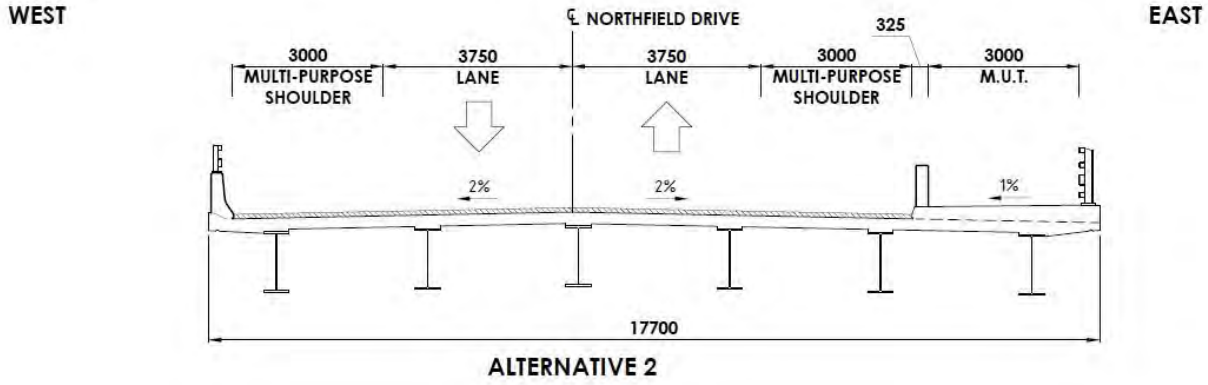
- Matches existing bridge condition by retaining 2 travel lanes. Widening of the structure would be required to expand to a future 4-lane bridge.
- Paved Shoulders (1.50 m wide) and “Protected” Walkways (or Multi-Use Trails) are provided on both sides to improve cyclist and pedestrian safety.
- Buggy travel will be slightly safer than the current condition because of the added 1.50 m wide paved shoulders but remains less than optimum.
- The total width of this Bridge Design Concept is 15.55 meters, based on Walkways on both sides.



ALTERNATIVE BRIDGE DESIGN CONCEPT 2:

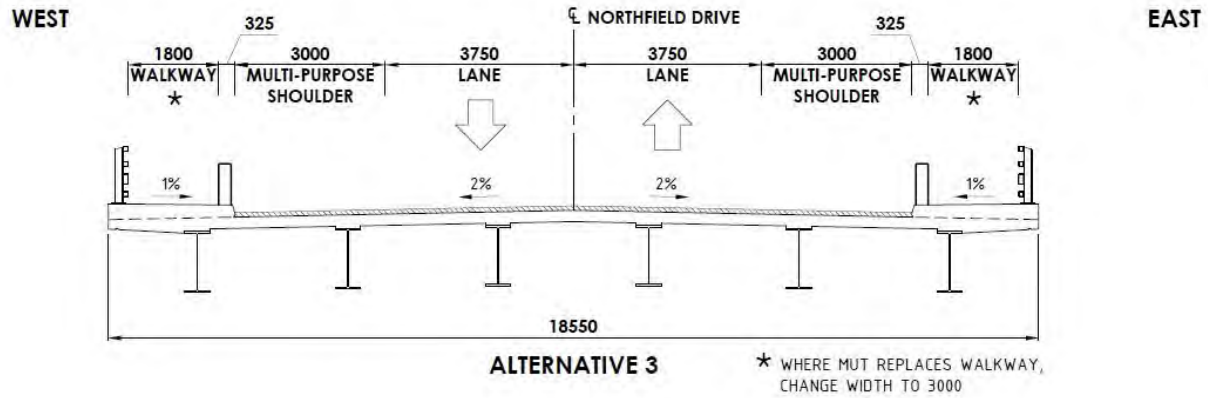
- Matches existing bridge condition by retaining 2 travel lanes. Widening of the structure would be required to expand to a future 4-lane bridge.
- Paved Shoulders (3.0 m wide) are provided on both sides, while a “Protected” Multi-Use Trail is provided on one side to improve cyclist and pedestrian safety.
- The safety of buggy travel is significantly improved with the addition of 3.00 m wide paved shoulders on both sides.

- The total width of this Bridge Design Concept is 17.70 meters, based on a Multi-Use Trail on one side.



ALTERNATIVE BRIDGE DESIGN CONCEPT 3:

- Matches existing bridge condition by retaining 2 travel lanes. Widening of the structure would be required to expand to a future 4-lane bridge.
- Paved Shoulders (3.0 m wide) and “Protected” Walkways (or Multi-Use Trails) are provided on both sides to improve cyclist and pedestrian safety.
- The safety of buggy travel is significantly improved with the addition of 3.00 m wide paved shoulders on both sides.
- The total width of this Bridge Design Concept is 18.55 meters, based on Walkways on both sides.



ALTERNATIVE BRIDGE DESIGN CONCEPT 4:

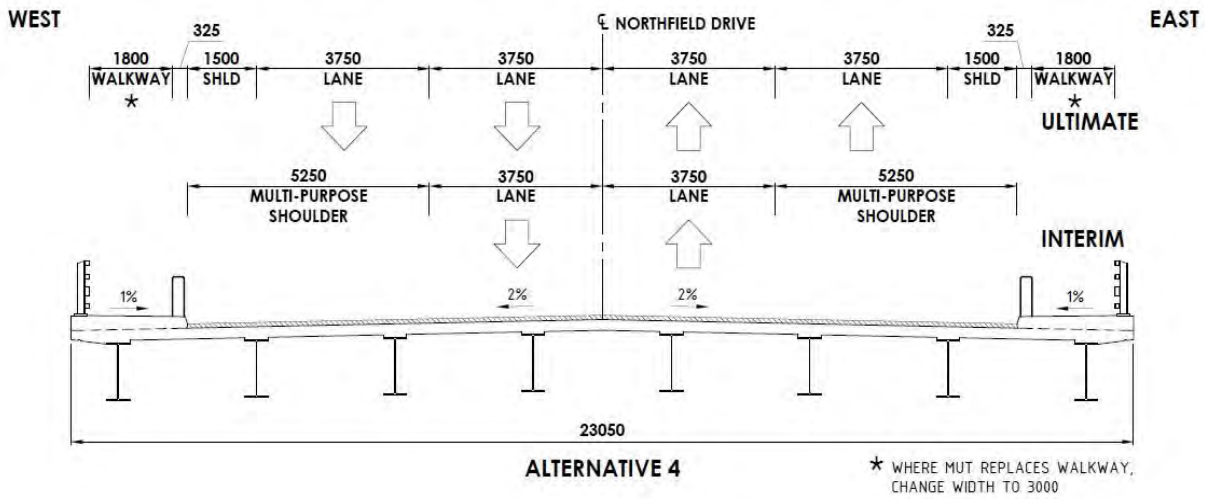
Interim Condition:

- Matches existing bridge condition by retaining 2 travel lanes.
- Wider Paved Shoulders (5.25 meter) provide enhanced safety for cyclist and buggy travel while also providing sufficient width to add two lanes of traffic (4-lane roadway) in the future.
- “Protected” Walkways (or Multi-Use Trails) are provided on both sides to improve cyclist and/or pedestrian safety.

Ultimate Condition:

- Without any structural widening of the bridge, the wide shoulders can be converted to traffic lanes, thereby providing a 4-lane bridge, and accommodating potential future traffic growth in the area.
- With a 4-lane bridge, 1.50 m shoulders remain for the improved safety of buggy and cyclist travel.

- The total width of this Bridge Design Concept is 23.05 meters under both the Initial and Ultimate conditions, based on Walkways on both sides.



ALTERNATIVE NORTHFIELD DRIVE ALIGNMENT CONCEPTS:

Note:

The Alternative Northfield Drive Alignment Concepts are not shown in this document but are available as a “Link” in the PCC Displays.

ALTERNATIVE CONCEPT 1: FULL OFFSET CONSTRUCTION: WEST SIDE:

- This alternative proposes a new bridge constructed offset to the west from the existing structure, with a 22.0 m centerline to centerline separation between the two bridges. New road embankments would need to be constructed on the north and south approaches.
- The new bridge and roadway could be constructed without the need for any long-term closure of Northfield Drive.
- Other features of this alternative include:
    - Major encroachment on the west side environmental area and watercourse
    - Significant retaining wall construction on west side to minimize watercourse impacts.
    - Provides “fair to very good” new road alignment.
    - Approximate property acquisition (north west side): 5,030 m2
    - Potentially significant archaeological and natural environmental impacts
    - May require protracted agency permit approvals.

ALTERNATIVE CONCEPT 2: STAGED CONSTRUCTION: WEST SIDE:

- This alternative proposes a new bridge constructed slightly offset to the west from the existing structure, with an 8.7 m centerline to centerline separation between the two bridges. The existing road embankments on the west side would need to be widened on the north and south approaches.
- The new bridge and roadway would be constructed under a “Staged Work Plan” without the need for any long-term closure of Northfield Drive. An illustration of the preliminary Construction Staging Plan is provided below.
- Other features of this alternative include:
    - Significantly reduced encroachment on the west side environmental area and watercourse, compared to Alternative Concept 1
    - Reduced retaining wall construction on west side compared to Alternative Concept 1
    - Provides “very good to excellent” new road alignment.
    - Approximate property acquisition (north west side): 2,250 m2
    - Potential archaeological and natural environmental impacts are reduced compared to Alternative Concept 1

- Agency permit approvals are still required but may be less onerous than with Alternative Concept.

ALTERNATIVE CONCEPT 3: STAGED CONSTRUCTION: EAST SIDE:

- This alternative proposes a new bridge constructed slightly offset to the east from the existing structure, with an 8.7 m centerline to centerline separation between the two bridges (mirror image of Alternative Concept 2). The existing road embankments on the east side would need to be widened on the north and south approaches.
- The new bridge and roadway would be constructed under a "Staged Work Plan" without the need for any long-term closure of Northfield Drive. An illustration of the preliminary Construction Staging Plan is provided below.
- Other features of this alternative include:
    - Encroachment on the west side environmental area and watercourse is eliminated.
    - Major retaining wall construction on west side is eliminated.
    - Provides "fair to good" new road alignment.
    - Property acquisition requirements are significantly more than Alternative Concepts 1 and 2. Approximate property acquisition:
        - North side: 5,730 m2
        - South Side: 6,480 m2
    - Potential archaeological and natural environmental impacts mirror those of Alternative Concept 2 but are less than Alternative Concept 1.
    - Agency permit approvals are considered equal to Alternative Concept 2 but may be less onerous than with Alternative Concept 1.
    - Requires the relocation of a major overhead hydro pole owned by Waterloo North Hydro.

ALTERNATIVE CONCEPT 4: CONSTRUCTION ON EXISTING ALIGNMENT:

- This alternative proposes a new bridge constructed at its current location, including either full replacement of the superstructure and substructure or replacement of the existing superstructure on a widened / rehabilitated substructure. Depending on the width of the new bridge, the existing road embankments would need to be slightly widened on both sides of Northfield Drive, on the north and south approaches to the bridge.

There are two options for building a new bridge at the existing location:

1. A long-term (estimated 18 months) full closure of Northfield Drive to remove and replace the structure and reconstruct the road approaches.

2. Replacement of the bridge by means of an “Advanced Bridge Construction (ABC)” procedure, whereby the deck of the new bridge would be constructed beside the existing bridge and “slid” into place on rehabilitated / widened abutments and piers. This approach would still require a lengthy full closure of Northfield Drive, although somewhat less than the above 18-month full closure option.

Other features of this alternative include:

- Encroachment on the west side environmental area and watercourse is minimal and dependent on the preferred width of the new bridge.
- Major retaining wall construction on west side is eliminated.
- Provides “excellent” new road alignment (existing roadway)
- Property acquisition requirements are minimized and subject to the width of the new bridge and road embankment widening.
- Potential archaeological and natural environmental impacts are minimized.
- Agency permit approvals, although still required, may be reduced.

7. HOW HAVE THE NATURAL AND CULTURAL ENVIRONMENTS BEEN CONSIDERED FOR THIS STUDY?

In conjunction with this study of bridge replacement options for the Scheifele Bridge, and in accordance with the requirements of the Provincial Class Environmental Assessment Act, specialty investigations have been completed of the existing natural, cultural, and social environments. Detailed reports will be included with the final Environmental Study Report (ESR) at the completion of the project.

A synopsis of the study reports is presented in the following:

NATURAL ENVIRONMENTAL CONDITIONS:

- The Natural Environmental Conditions field investigations were focused on confirming the presence of any Species at Risk (SAR) in the area, and included assessments of:
    - Terrestrial and Vegetation features
    - Breeding Bird Surveys
    - Wildlife Habitat Assessment
    - Bat Tree Roost Survey
    - Aquatic Habitat Assessment
    - Turtle Basking Review

- Although only three actual SAR species were observed near the Scheifele Bridge, including a Butternut Tree (Terrestrial), a single Barn Swallow (Breeding Bird) and a single Eastern Meadowlark (Breeding Bird), the “habitat” for 5 other potential SAR was

observed as being present. The actual existence of Species at Risk is subject to future field observation in these five habitat zones.

- Approximately 35 Cliff Swallow (non-SAR species) nests were observed under the bridge deck, which can only be removed outside of specified breeding periods.

- Other observations included:

    - The Conestogo River is part of the Grand River Heritage River System "Significant Valley" designation and may be a consideration during the formal agency approval process for the bridge replacement.
    - The Conestogo River is a warm water system habitat for certain fish and a potential for SAR habitat (not observed).
    - There are no significant wetlands or woodland features in the area.
    - There is no significant habitat for SAR Turtles.
    - Some trees are potential habitat for Bat Colony nesting.

- The Natural Environmental Conditions Report will be included in the final Scheifele Bridge Class Environmental Assessment Study Report (ESR)

CULTURAL HERITAGE ENVIRONMENTAL CONDITIONS:

- A **Cultural Heritage Environmental Report (CHER)** was completed as part of the Class Environmental Assessment, and highlighted the following conditions:

    - A Cultural Heritage Landscape (CHL) feature exists west of the existing Scheifele Bridge, comprised of a remnant county road and abutments of two former bridges. The former bridges are circa 1861 and early 1900's.

    - The preferred alternative design concept for replacing the existing bridge must recognize, and avoid any disruption to, the above CHL features.

    - The existing Scheifele Bridge has no Cultural Heritage Value or Interest (CHVI) per Ontario Regulation O. Reg. 9/06.

    - The Cultural Heritage Environmental Report will be included in the final Scheifele Bridge Class Environmental Assessment Study Report (ESR).

- A **Stage 1 Archaeological Assessment** was completed in accordance with the Standards and Guidelines established by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI), with the following conclusions and recommendations presented:

    - Within the 4 quadrants surrounding the Scheifele Bridge, approximately 54% of the assessed area retains potential for the identification and documentation of archaeological resources.

- In accordance with Ministry guidelines, a Stage 2 Archaeological Assessment will be required for any portion of the project's anticipated construction which may impact the area of potential exposure.

- The remainder of the study lands (46%) retains a low to no potential for the identification or recovery of archaeological resources because of previous disturbances, steep slopes, and/or low and permanently wet areas. Consequently, a Stage 2 Archaeological Assessment will not be required in these zones.

- Subject to clarification from MHSTCI, a Marine Archaeological Assessment study may be required, depending on the preferred design concept for the Scheifele Bridge reconstruction project.

- The Archaeological Assessment Report, and any subsequent study reports, will be included in the final Scheifele Bridge Class Environmental Assessment Study Report (ESR).

8. IS ANY PROPERTY REQUIRED FOR THE WIDENING OF THE SCHEIFELE BRIDGE OR THE REALIGNMENT OF NORTHFIELD DRIVE?

One of the goals of any planning and design process is to minimize impacts on adjacent properties and the need to acquire private property.

Based on the current preliminary alternative design concepts for the bridge replacement and realignment of Northfield Drive, the requirements for future property acquisitions vary between each alternative. The least amount of property impact is estimated at 2,250 m2 for Alternative Alignment concept #2, while the maximum amount of property impact is estimated at 5,030 m2 for Alternative concept #1. These property acquisition areas are very preliminary estimates and subject to change based on the preparation of detailed Property Impact Plans (PIP) at the time of detailed design of the preferred concept.

9. WHAT IS THE PRELIMINARY ESTIMATED COST FOR THE PROJECT?

The cost of this project will depend largely on the final approved bridge cross section for the Scheifele Bridge as well the selection of the reconstruction alignment concept from the four alternatives under consideration. As noted, the widest bridge option (bridge option 4) has been used in the preliminary alignment design concepts, which, in turn, provides a "worst case" assessment of preliminary construction costs.

A narrower bridge, combined with one of the alternative road alignment concepts, will result in a lower cost estimate compared to other alternatives. For example, if the preferred bridge design concept was selected as Alternative Concept 2 (2 traffic lanes, plus 3-meter paved

shoulders and a multi-use trail on the east side only), then the cost estimate could be reduced by about $4.8 million).

At this stage, preliminary estimates for the widest bridge concept range from $20.9 million for Alternative Alignment Concept 4 (build new bridge on current alignment) to $25.9 million for Alternative Alignment Concept 2 (staged construction on west side). All cost estimates include allowances for property acquisitions, utility relocations and multi-use trail construction from the City of Waterloo boundary (near University Avenue) to a point north of the bridge.

Not included in these cost estimates are any social impact costs such as added fuel costs associated with a long-term detour of Northfield Drive. As shown in the PCC displays, the "Consumer Detour Fuel Cost" could be upwards of $7 million, depending on various factors.

10. HOW WILL I RECEIVE FURTHER NOTIFICATIONS REGARDING THE PROJECT?

Property owners and tenants abutting the project site, members of the public requesting further information through the Region's project website (www.regionofwaterloo.ca), or those who register for this Public Consultation Centre will receive all upcoming public correspondence and will be notified of all future meetings.

Alternatively, you may register on the Region's engage site to receive an email that new information has been posted at www.engagewr.ca.

11. HOW CAN I PROVIDE COMMENTS ON THE DETAILS PRESENTED IN PCC #1?

To assist the Project Team in addressing any comments or concerns, please fill out the attached Comment Sheet and Questionnaire and email them to the Project Team members listed below. Alternatively, you may provide your comments on the Region's Engage site at www.engagewr.ca.

Thank you for your involvement and should you have any questions or concerns please contact one of the following:

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of
Transportation & Environmental Services
Regional Municipality of Waterloo

Garry E. Leveck, P.Eng.
Senior Consultant,
Senior Project Manager
Stantec Consulting Ltd.

150 Frederick Street
Kitchener ON N2G 4J3
519-575-4606 (Desk)
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Direct: 519 585-7316
Mobile: 519 240-3686
Fax: 519 579-6733
garry.leveck@stantec.com

12. HOW CAN I VIEW PROJECT INFORMATION FOLLOWING THIS PCC MEETING?

The PCC display materials, and other relative project information, notifications of upcoming meetings, and contact information are available by visiting the Region's website at www.regionofwaterloo.ca or the Engage Waterloo Region site at www.engagewr.ca.

Appendix A

Municipal Class Environmental Assessment Process
Ontario Environmental Assessment Act

The purpose of the Ontario Environmental Assessment Act (EA Act) is to provide for "the betterment of the people of the whole or any part of Ontario by providing for the protection, conservation and wise management of the environment of Ontario". The term "environment" is applied broadly and includes the natural, social, cultural, built and economic components.

The key principles of successful environmental assessment planning include:

- Consultation with stakeholders and affected members of the public;
- Consideration of a reasonable range of practical alternatives;
- Assessment of the environmental impacts associated with each alternative;
- Systematic evaluation of alternatives; and,
- Clear documentation.

Municipal Class Environmental Assessment

The Municipal Class Environmental Assessment (Class EA) is a planning process approved under the Environmental Assessment Act that is used by municipalities to plan infrastructure enhancement projects while satisfying the requirements of the Environmental Assessment Act. Under the Class EA process, projects are planned in one of three ways depending on their scope, complexity, and potential for adverse environmental impacts.

Schedule "A"

- Includes routine maintenance, operation and emergency activities.
- The Municipality can proceed with this work without further approval or public consultation.

Schedule "B"

- Includes projects with potential for some adverse environmental effects.
- These projects are subject to a screening process that includes consultation with directly affected public and agencies.

Schedule "C"

- Includes larger, more complex projects with the potential for significant environmental effects.
- These projects are subject to all phases of the Class Environmental Assessment and require a minimum of three (3) points of public contact.

Public Involvement

Members of the public that have a stake in the project are encouraged to provide comment throughout the Class Environmental Assessment process. For Schedule "C" projects there are a minimum of three (3) opportunities for contact. These opportunities typically include

two Public Consultation Centres and the Notice of Completion which includes a mandatory 30-day public review period to review the project documentation.

Change in Project Status – Appeal Provision

It is recommended that all stakeholders (including the proponent, public and review agencies) work together to determine the preferred means of addressing a problem or opportunity. If you have any concerns, you should discuss them with the proponent and try to resolve them. In the event that there are major issues which cannot be resolved, you may request the Minister of Environment by order to require a proponent to comply with Part II of the Environmental Assessment Act before proceeding with a proposed undertaking which has been subject to Class Environmental Assessment requirements. This is called a "Part II Order". The Minister will make on of the following decisions:

1. Deny the request (with or without conditions);
2. Refer the matter to mediation; or
3. Require the proponent to comply with Part II of the Environmental Assessment Act, ordering a full Environmental Assessment.

All stakeholders are urged to try to resolve issues since it is preferable for them to be resolved by the municipality in which a project is located, rather than at the provincial level.

To request a Part II Order, a person must send a written request to:

Minister
Ministry of the Environment, Conservation and Parks
777 Bay Street, 5th floor
Toronto, ON. M7A 2J3
Minister.mecp@ontario.ca

Director, Environmental Assessment and Permissions Branch

Ministry of the Environment, Conservation and Parks

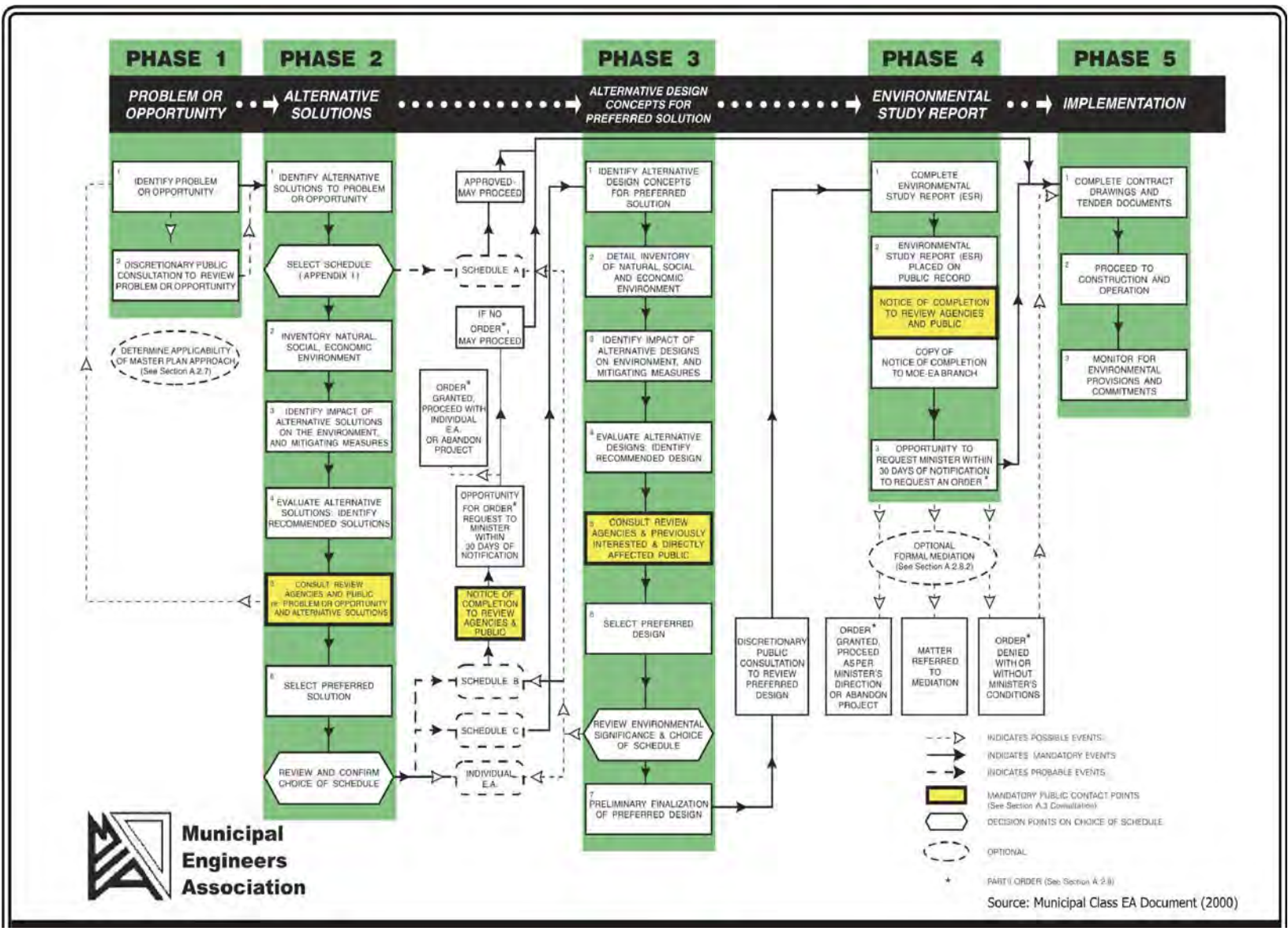
135 St. Clair Ave. West, 1st Floor

Toronto, ON. M4V 1P5

MOECCpermissions@ontario.ca

The request must address the following with respect to the identified concerns:

- Environmental Impacts and specific concerns;
- Adequacy of the planning and public consultation process;
- Involvement of the person in the planning process; and,
- Details of discussions held between the person and the proponent.


PHASE 1
PROBLEM OR OPPORTUNITY
PHASE 2
ALTERNATIVE SOLUTIONS
PHASE 3
ALTERNATIVE DESIGN CONCEPTS FOR PREFERRED SOLUTION
PHASE 4
ENVIRONMENTAL STUDY REPORT
PHASE 5
IMPLEMENTATION
1 IDENTIFY PROBLEM OR OPPORTUNITY
2 DISCRETIONARY PUBLIC CONSULTATION TO REVIEW PROBLEM OR OPPORTUNITY
DETERMINE APPLICABILITY OF MASTER PLAN APPROACH (See Section A.2.7)
1 IDENTIFY ALTERNATIVE SOLUTIONS TO PROBLEM OR OPPORTUNITY
SELECT SCHEDULE (APPENDIX 1)
2 INVENTORY NATURAL, SOCIAL, ECONOMIC ENVIRONMENT
3 IDENTIFY IMPACT OF ALTERNATIVE SOLUTIONS ON THE ENVIRONMENT, AND MITIGATING MEASURES
4 EVALUATE ALTERNATIVE SOLUTIONS: IDENTIFY RECOMMENDED SOLUTIONS
5 CONSULT REVIEW AGENCIES AND PUBLIC re: PROBLEM OR OPPORTUNITY AND ALTERNATIVE SOLUTIONS
6 SELECT PREFERRED SOLUTION
REVIEW AND CONFIRM CHOICE OF SCHEDULE
APPROVED - MAY PROCEED
SCHEDULE A
IF NO ORDER*, MAY PROCEED
ORDER* GRANTED, PROCEED WITH INDIVIDUAL E.A. OR ABANDON PROJECT
OPPORTUNITY FOR ORDER* REQUEST TO MINISTER WITHIN 30 DAYS OF NOTIFICATION
NOTICE OF COMPLETION TO REVIEW AGENCIES & PUBLIC
SCHEDULE B
SCHEDULE C
INDIVIDUAL E.A.
1 IDENTIFY ALTERNATIVE DESIGN CONCEPTS FOR PREFERRED SOLUTION
2 DETAIL INVENTORY OF NATURAL, SOCIAL AND ECONOMIC ENVIRONMENT
3 IDENTIFY IMPACT OF ALTERNATIVE DESIGNS ON ENVIRONMENT, AND MITIGATING MEASURES
4 EVALUATE ALTERNATIVE DESIGNS: IDENTIFY RECOMMENDED DESIGN
5 CONSULT REVIEW AGENCIES & PREVIOUSLY INTERESTED & DIRECTLY AFFECTED PUBLIC
6 SELECT PREFERRED DESIGN
REVIEW ENVIRONMENTAL SIGNIFICANCE & CHOICE OF SCHEDULE
7 PRELIMINARY FINALIZATION OF PREFERRED DESIGN
DISCRETIONARY PUBLIC CONSULTATION TO REVIEW PREFERRED DESIGN
1 COMPLETE ENVIRONMENTAL STUDY REPORT (ESR)
2 ENVIRONMENTAL STUDY REPORT (ESR) PLACED ON PUBLIC RECORD
NOTICE OF COMPLETION TO REVIEW AGENCIES AND PUBLIC
COPY OF NOTICE OF COMPLETION TO MOE EA BRANCH
3 OPPORTUNITY TO REQUEST MINISTER WITHIN 30 DAYS OF NOTIFICATION TO REQUEST AN ORDER*
OPTIONAL FORMAL MEDIATION (See Section A.2.8.2)
ORDER* GRANTED, PROCEED AS PER MINISTER'S DIRECTION OR ABANDON PROJECT
MATTER REFERRED TO MEDIATION
ORDER* DENIED WITH OR WITHOUT MINISTER'S CONDITIONS
1 COMPLETE CONTRACT DRAWINGS AND TENDER DOCUMENTS
2 PROCEED TO CONSTRUCTION AND OPERATION
3 MONITOR FOR ENVIRONMENTAL PROVISIONS AND COMMITMENTS
INDICATES POSSIBLE EVENTS
INDICATES MANDATORY EVENTS
INDICATES PROBABLE EVENTS
MANDATORY PUBLIC CONTACT POINTS (See Section A.3 Consultation)
DECISION POINTS ON CHOICE OF SCHEDULE
OPTIONAL
* PART II ORDER (See Section A.2.8)
Municipal Engineers Association
Source: Municipal Class EA Document (2000)

Region of Waterloo

CLASS ENVIRONMENTAL ASSESSMENT STUDY
SCHEIFELE BRIDGE: TOWNSHIP OF WOOLWICH

Public Consultation Centre #1

QUESTIONNAIRE / COMMENT SHEET

1. Where do you live?

☐ City of Cambridge ☐ City of Kitchener ☐ City of Waterloo

☐ Region of Waterloo ☐ Other

2. How often do you cross the Scheifele Bridge on Northfield Drive (pre-COVID 19)?

☐ Daily ☐ Weekly ☐ Monthly ☐ Rarely

3. What is the travel mode you often use on this section of Northfield Drive?

☐ Bus ☐ Walk ☐ Bike ☐ Drive ☐ Other

4. What is the general purpose of your travel on this section of Northfield Drive?

☐ Work ☐ School ☐ Recreational ☐ Other_

5. Recognizing that new bridges are designed and constructed for a life span of 75 years or more, which of the 4 alternative bridge cross sections (range from basic 2 lane structure to future 4 lane structure) do you prefer?

   Cross Section # _____

6. Three of the 4 alternative alignment design concepts provide for replacement of the Scheifele Bridge without full closure of Northfield Drive, while Alternative Alignment Concept 4 (replace bridge on the current alignment) would require an extended closure of Northfield Drive. Preliminary cost estimates show that reconstructing the bridge on the current alignment (full detour) is significantly cheaper than maintaining uninterrupted traffic on Northfield Drive (no detour).

   Based on your travel patterns and use of Northfield Drive, how important is it to you that the Region consider paying a potential capital cost premium to maintain traffic on Northfield Drive (no detour) during replacement of the Scheifele Bridge? Please rank your response on a scale of 1-10, with 1 being "not very important" and 10 being "very important".

   Keep Northfield Drive Open During Construction: Rank_____

7. As noted in the PCC displays, the Region is considering adding architectural enhancements to the pedestrian handrails of the bridge, which may also include the addition of “pedestrian viewing platforms” at the center span of the structure. Recognizing that there is a relatively small cost premium to include these aesthetic improvements, please let us know how you feel about these features.

   Agree to Include _____

   Do not include _____

   If you agree that the Region should include these enhancements, please comment on what type of feature you prefer from the examples exhibited in the PCC displays:

   Preferred Architectural Enhancement:

   - Textured Stone Pedestrian Railing: _____
   - Unobstructed View Tube Type Railing: _____
   - Wainscot Solid Railing: _____

8. What challenges or considerations, if any, do you see with the Alternative Design Concepts that are being carried forward?

_____
_____
_____
_____
_____

9. What new information do you feel that the Project Team should consider when reviewing the Alternative Design Concepts for the Scheifele Bridge Replacement?

_____
_____
_____
_____

For more information, please visit our website at engagewr.ca/woolwich-scheifele-bridge.

Please return this questionnaire to one of the project team members listed below by **Friday May 28, 2021.**

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services
Regional Municipality of Waterloo

150 Frederick Street
Kitchener ON N2G 4J3
519-575-4606 (Desk)
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Senior Consultant, Senior Project Manager
Stantec Consulting Ltd.

100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Direct: 519 585-7316
Mobile: 519 240-3686
Fax: 519 579-6733
garry.leveck@stantec.com

Your Name: _____

Your Address: _____

Your Email: _____

Your Telephone: _____

Note: *Personal information, as defined by the Municipal Freedom of Information and Protection of Privacy Act (MFIPPA), is collected under the authority of the Municipal Act, 2001, and in accordance with the provisions of MFIPPA. Personal information on this form will be used for the purpose of completing the SCHEIFELE BRIDGE CLASS ENVIRONMENTAL ASSESSMENT STUDY. The information will be used to identify public and stakeholder concerns and interests and will be documented in the Study as part of the formal Class Environmental Assessment study process. Except for personal information, all comments will become a part of the public record. If you have questions about this collection; use, and disclosure of this information, contact Ken Brisbois at 519-575-4606 or 519-240-2995, or kbrisbois@regionofwaterloo.ca.*

SCHEIFELE BRIDGE IMPROVEMENTS
CLASS ENVIRONMENTAL ASSESSMENT
Regional Road 22 (Northfield Drive)
Township of Woolwich

PUBLIC CONSULTATION CENTRE

WELCOME to the FIRST Public Consultation Centre (PCC) meeting for the Scheifele Bridge Class Environmental Assessment study. The location of the Scheifele Bridge is shown on Figure 1.

FIGURE 1: SCHEIFELE BRIDGE

This project is being completed in accordance with the Ontario Ministry of Environment, Conservation and Parks guidelines for a "Schedule "C" Municipal Class Environmental Assessment: Reconstruction", where the "Reconstructed Facility" will be for the same purpose, use or capacity under the Environmental Assessment Act.

The Environmental Assessment is being directed by a Project Team consisting of staff from the Region of Waterloo and the Township of Woolwich, including Township of Woolwich Councillor Larry Shantz. Stantec Consulting Ltd. is providing planning, engineering design, and construction administration services on the project.

This Virtual Public Consultation Centre Meeting is a forum for you to:

- Learn about the background studies that have led the Region of Waterloo to conclude that reconstruction of the Scheifele Bridge is warranted.
- Review study data on current environmental, social, and cultural features that may be impacted by any improvements to the Scheifele Bridge.
- Learn about recent structural investigations and load capacity analyses that have been completed for the Scheifele Bridge, which provide background data in support of replacing various bridge components or the entire structure.
- View preliminary alternative **bridge cross section** and **road alignment** design concepts that have been developed for the project.
- Comment on the preliminary alternative design concepts, each of which offer varying aesthetic features, property impacts, environmental adversity, capital costs, and impacts on Northfield Drive traffic operations during construction.
- Engage in “virtual dialogue” with Project Team representatives and ask any questions that you may have about the project or study process.

All attendees at this meeting are invited to:

- Digitally register on the Meeting Attendance Registration Form.
- Pick up a digital “Information Package” which includes a digital “Comment Sheet” and “Questionnaire Form”.
- Review the digital Project Displays, at your leisure.
- Ask questions, if required, via email to the staff listed herein.
- Complete a digital “Comment Sheet” and “Questionnaire” with any suggestions, support, concerns or other thoughts about the Scheifele Bridge project.
- Complete the digital “On-Line Survey”.

OBJECTIVES OF THE STUDY

Objective 1:

"*To implement a cooperative and solution-directed approach to liaison with property owners, local municipalities, higher level government departments, utility agencies, the public, and other stakeholders, leading to a "consensus-oriented" design solution".*

Objective 2:

"*To identify and consolidate all relevant technical, natural, social, and economic environmental issues and constraints within the study area, and address how improvements to the Scheifele Bridge may impact, enhance, or conserve the existing environment while recognizing the vehicular and active transportation needs of the community".*

Objective 3:

"To develop a range of alternative improvement solutions and concepts, based on acceptable design criteria and operational standards, and to systematically evaluate the alternatives based on established impact guidelines and mitigation opportunities. The process of evaluation must be accountable to legislative planning strategies and policies; natural, social, and economic environmental constraints; property issues; utility and related infrastructure needs; project scheduling; and costs".

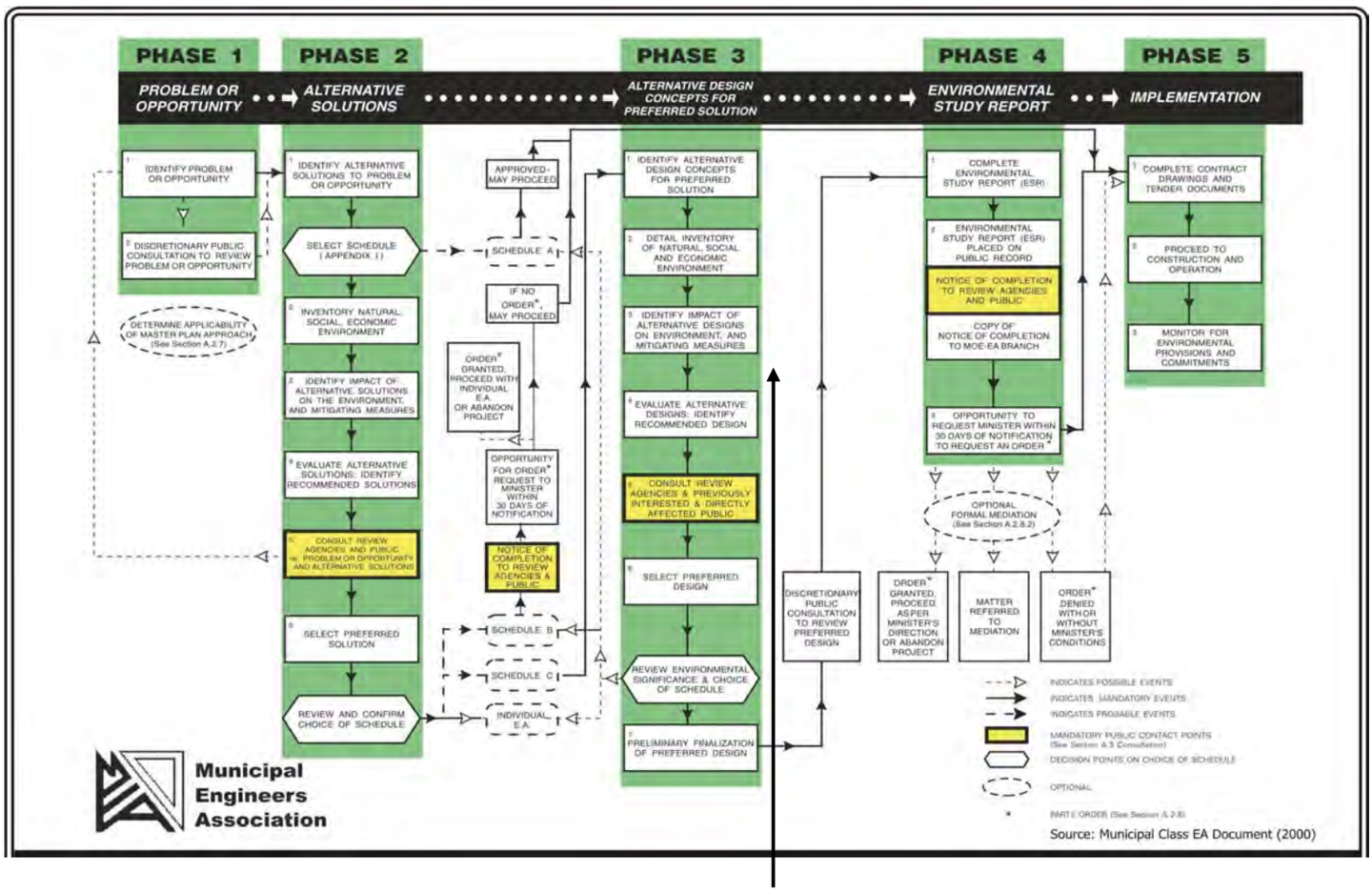
Objective 4:

"To complete a preliminary design of the recommended design concept that provides a sound approach to the mitigation of environmental impacts and structure / corridor enhancement (natural, social, and economic), provides appropriate solutions for long term vehicular and active transportation needs within the community, and presents budgetary capital cost estimates to construct the project".

Objective 5:

"To summarize the environmental assessment process, and preliminary details of the preferred design concept, in a concise and defendable Schedule "C" Class Environmental Study Report (ESR)".

CLASS ENVIRONMENTAL ASSESSMENT STUDY PROCESS



WE ARE HERE

What is a Class Environmental Assessment?

The purpose of the Ontario Environmental Assessment Act (R.S.O. 1990) is to provide:

"for t*he betterment of the people of the whole or any part of Ontario, by providing for the protection, conservation and wise management of the environment".*

The word "Environment" is applied in a broad sense and includes the natural, social, cultural, economic, and built environments.

Under the provincial Environmental Assessment Act, a "Class Environmental Assessment" planning and approval process is available for a group of undertakings that are similar in nature and provides an alternative to completing an exhaustive Individual Environmental Assessment.

The foundation of the Class EA study process is built on the following key parameters:

- A Public Consultation program is included.
- There is consideration of a rational range of alternatives to address the problem.
- Identification of potential environmental impacts from the alternatives is presented.
- A systematic evaluation of alternatives is completed, leading to a preferred solution and design concept.
- Documentation of the decision-making process is provided in the form of an Environmental Study Report (ESR).

An Environmental Study Report (ESR) will be completed at the conclusion of this project.

If an individual or interest group is not satisfied with the conclusions, recommendations or processing of the Class EA Study, and efforts to resolve any concerns with the proponent are unsuccessful, there is an Appeal Process available. Members of the public, interest groups and review agencies may request the Minister of the Environment, Conservation and Parks, or designated delegate, to review the project and rule on whether a more detailed environmental assessment is required, as per Part II of the EA Act (Part II Order).

A standardized form is to be used by anyone who files an appeal of the final Class EA Study Report (ESR). The required form can be found on the Ministry's Forms Repository website (http://www.forms.ssb.gov.on.ca/) by searching "Part II Order" or "012-2206E (the form ID number). Once completed, the form is to be sent to both the Minister and Director of the Environmental Assessment and Permissions Branch. Their addresses are:

Minister
Ministry of the Environment, Conservation and Parks
777 Bay Street, 5th floor
Toronto, ON. M7A 2J3
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If there are no significant unresolved objections or formal Part II Orders, following the 30-day review period after formal filing of the ESR, the project will be considered "approved" and may proceed to detailed design and construction.

"HISTORY OF THE SCHEIFELE BRIDGE"

An 1861 Map of the Woolwich Township / Waterloo County area illustrates various landowners related to the study area, including the ***Shifely*** family (alternatively spelled Scheifele). The mapping also shows a river crossing / bridge west of the existing bridge structure.

Property owners listed on the south side of the river included Matthew and Frederick Scheifele, while Christian Scheifele was listed on the northwest side of the river. They were brothers and sons of Andrew and Maria Scheifele, who were a pioneer family arriving in Berlin (City of Kitchener) in 1815.

Subsequent mapping, dated 1881, shows a bridge crossing the Conestogo River at the same location that the original bridge was shown on the 1861 mapping. The bridges were rudimentary at the time.

The current bridge was constructed in 1958 by E. & E. Seegmiller Construction. The new (current) bridge was located immediately east (downstream) of the original structures and was named after the Scheifele family, who were the original landowners in the vicinity of the bridge.

"NEED AND JUSTIFICATION" AND "PROBLEM STATEMENT"

The Project Team assessed the *Need and Justification* for the project and developed a *Problem Statement* for the Class Environmental Assessment Study, which, together, define the project deficiencies and the scope of improvements to be evaluated as part of the study:

CURRENT SITUATION:

- Northfield Drive functions as a major arterial road corridor throughout the Region of Waterloo, serving both local and inter-community travel. It is designated as a Regional Road in the Regional Official Plan (ROP).

- The Scheifele Bridge is a significant part of the Northfield Drive infrastructure, crossing the Conestogo River between the City of Waterloo and the Village of Conestogo, in the Township of Woolwich. Currently, the Scheifele Bridge is a 2-lane structure with a narrow sidewalk on one side.

- Land use along Northfield Drive, in the vicinity of the Scheifele Bridge, includes crop farmland, rural residential, and open space.

- Northfield Drive currently (2020 study) carries approximately 10,350 vehicles per day (VPD), with about 3.5% heavy trucks. Vehicular traffic is expected to increase to about 14,000 VPD by 2030. There are modest volumes of cyclists, buggies and pedestrians crossing the Scheifele Bridge at various times of the year.

- There are plans to install a trunk watermain on Northfield Drive and Sawmill Creek Road, to upgrade municipal water supply to the Villages of Conestogo and St. Jacobs.

NEED AND JUSTIFICATION STATEMENT:

- In 2019, the Region of Waterloo completed a Preliminary Information Report (PIR) for the Scheifele Bridge, which examined replacement needs, timing, and preliminary costs, based on identified structural and operational deficiencies. Although recent rehabilitation contracts have provided “stop-gap” solutions to ongoing concerns, they did not, over time, address more systemic structural problems with the bridge. The PIR study concluded that the Region must move forward with definitive plans to complete long term improvements to the bridge, including, but not limited to, the following:

    - Full replacement of the existing bridge deck superstructure.
    - Substructure (abutments and piers) repairs and/or replacement.
    - Provide enhanced pedestrian, buggy and cycling facilities.
    - Maintain surrounding environmental aesthetics as part of any reconstruction.
    - Provide for long term vehicular and active transportation needs in the community.
    - Include provisions for a proposed trunk watermain on Northfield Drive.
    - Provide allowances for pathways beneath the bridge.
    - Mitigate potential natural and social environmental impacts during construction.

- Following completion of the 2019 PIR study, Region of Waterloo Council included the Scheifele Bridge Reconstruction project in the Region’s 10 Year Transportation Capital Plan (TCP) and initiated a Class Environmental Assessment Study to confirm the planning and design details of the project. A budget of $6.8 million was set aside for the project, with an estimated construction date of 2023.

- Due to Covid-19 and current structural analysis and monitoring programs, the schedule for reconstruction of the Scheifele Bridge has been adjusted from the 2023 timeline originally approved by Council.

PROBLEM STATEMENT:

Based on the above, the Project Team developed the following "Problem Statement" to guide completion of the Scheifele Bridge Class Environmental Assessment, Detailed Design, and Construction project:

> **PROBLEM STATEMENT**
>
> The Scheifele Bridge, on Regional Road 22 (Northfield Drive) over the Conestogo River, requires reconstruction to address its deteriorating condition, including a full superstructure (deck) replacement and partial, or full, replacement of the substructure piers and abutments.
>
> In conjunction with the bridge deck replacement, the planning and design process shall consider the addition of active transportation facilities for pedestrians, buggies and cyclists who will use the bridge now and into the future. In addition, provisions shall be made in the design to accommodate a Region of Waterloo trunk watermain.
>
> The purpose of the Scheifele Bridge Class Environmental Assessment Study is to provide recommendations for improvements which address the deteriorating bridge structure and consider how best to implement optional enhancements consistent with Regional policies, practices, and guidelines.
>
> The subject improvements are proposed so that the Region can continue its ongoing pursuit of implementing all modes of travel within the community, improving municipal streetscapes, and achieving traffic operational improvements, all while minimizing potential adverse impacts to the natural and built environments, and adjacent private property, wherever possible.

TRANSPORTATION AND TRAFFIC ASSESSMENT

The Region of Waterloo routinely monitors traffic volumes on arterial roads, focusing primarily on vehicular movements. In certain circumstances, counts of pedestrian and cyclist activity are included.

Current and projected traffic volumes on Northfield Drive, in the vicinity of the Scheifele Bridge, are presented below. Pedestrian, buggy, and cyclist traffic data is limited and will be updated in May or June 2021 by means of on-site camera monitoring.

EXISTING CONDITIONS

TRAFFIC DATA:

- The 2020 Average Annual Daily Traffic (AADT) volume is approximately 10,350 vehicles per day (VPD). The approximate percentage of heavy trucks is 3.5% or about 360 VPD.
- Northfield Drive is classified as a "Rural Connector" in the Region of Waterloo's Corridor Design Guidelines.
- Traffic Growth is anticipated to be modest within the timeline of traffic forecasting. The projected 2030 ADDT is estimated at 14,000 vehicles per day (VPD) based on a 3% annual growth rate.
- AM and PM peak hour volumes are between 9.0 % and 12.0% of AADT volumes, which is typical for urban / rural roads. The resultant AM and PM Peak Hour volumes are within the following approximate ranges:

2020	AM	950	vehicles

	PM	1,230 vehicles
2030	AM	1,275 vehicles
	PM	1,650 vehicles

- According to Student Transportation Services of Waterloo Region, Northfield Drive is a school bus route and would be impacted by any moderate, or long term, road closures during normal school terms.

PEDESTRIAN, BUGGY AND CYCLE FACILITIES:

Being a rural corridor there are no designated walkways or cycling facilities on Northfield Drive. Pedestrians are required to walk on the shoulders of the road while cyclists have the option of riding on the paved shoulders or on the slightly wider gravel shoulders. At the Scheifele Bridge, southbound pedestrians may use the existing sidewalk while northbound pedestrians are forced to walk on the paved shoulder due to the lack of a sidewalk on the east side of the bridge. Cyclists typically use the paved shoulders to navigate the bridge in both directions.

- Mennonite buggies currently travel on the gravel shoulders of Northfield Drive and are forced to cross the bridge in the northbound and southbound travel lanes on the bridge.

- As mentioned, data on pedestrian, buggy and cyclist activity at the Scheifele Bridge is limited and will be updated in 2021. Typical 2020 fair weather travel data is as follows:

  - Pedestrians: 5-6 bridge crossings per day
  - Cyclists: 6-8 bridge crossings per day
  - Buggies: 3-5 bridge crossings per day

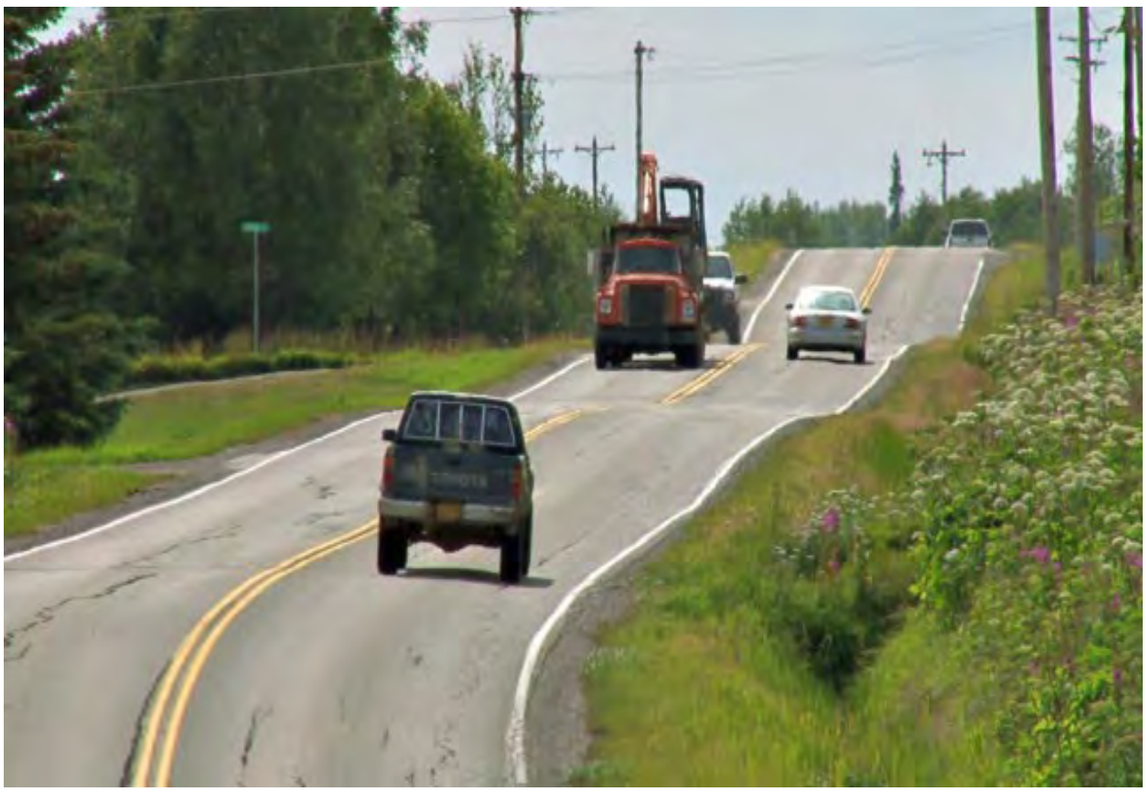
- Once updated data on pedestrian, buggy and cyclist counts is received, the information will be presented at the second PCC Meeting and used by the Project Team to make important decisions on the design of the bridge to accommodate these active transportation movements.

WHY IS TRAFFIC DATA IMPORTANT TO THIS BRIDGE STUDY?

- Traffic data of all types (vehicular, pedestrian, cyclist, and buggy) will be used by the Project Team to assess the following bridge design and construction parameters:
  - Number and width of vehicular traffic lanes.
  - The need for separate pedestrian walkways and cycling lanes, versus the use of combined facilities (example: Multi Use Trails).
  - How to integrate separate buggy lanes into the bridge design for the optimum safety of the Mennonite community.
  - Assessment of the impacts on community traffic movements caused by a potential long-term closure of Northfield Drive during reconstruction of the Scheifele Bridge.

REGION OF WATERLOO TRANSPORTATION CORRIDOR DESIGN GUIDELINES:

- Regional Road 22 (Northfield Drive) is a ***"Rural Connector"*** within the context of the Region of Waterloo Transportation Corridor Design Guidelines.
- Rural Connectors are typically travelled at higher speeds, warranting features that will enhance the operational safety of cyclists and pedestrians with separate cycle lanes, multi-use trails, and wider roadway lanes. The presence of buggies in the Region of Waterloo adds another dimension to the typical design of a safe transportation corridor.
- In addition to operational design, Rural Connectors may also be identified as having "scenic landscapes", characterized by natural, cultural heritage, and recreational features that contribute to the overall view by the user. Contributing elements such as woodlots, wetlands, farmland, and other natural features, are to be protected, preserved and / or enhanced in the design and construction of Rural Connectors.



NATURAL, CULTURAL AND SOCIAL ENVIRONMENTS

In conjunction with this study of bridge replacement options for the Scheifele Bridge, and in accordance with the requirements of the Provincial Class Environmental Assessment Act, specialty investigations have been completed of the existing natural, cultural, and social environments. Detailed reports will be included with the final Environmental Study Report (ESR) at the completion of the project.

A synopsis of the study reports is presented in the following:

NATURAL ENVIRONMENTAL CONDITIONS:

- The Natural Environmental Conditions field investigations were focused on confirming the presence of any Species at Risk (SAR) in the area, and included assessments of:
    - Terrestrial and Vegetation features
    - Breeding Bird Surveys

    - Wildlife Habitat Assessment
    - Bat Tree Roost Survey
    - Aquatic Habitat Assessment
    - Turtle Basking Review

- Although only three actual SAR species were observed near the Scheifele Bridge, including a Butternut Tree (Terrestrial), a single Barn Swallow (Breeding Bird) and a single Eastern Meadowlark (Breeding Bird), the “habitat” for 5 other potential SAR was observed as being present. The actual existence of Species at Risk is subject to future field observation in these five habitat zones.

- Approximately 35 Cliff Swallow (non-SAR species) nests were observed under the bridge deck, which can only be removed outside of specified breeding periods.

- Other observations included:

    - The Conestogo River is part of the Grand River Heritage River System “Significant Valley” designation and may be a consideration during the formal agency approval process for the bridge replacement.
    - The Conestogo River is a warm water system habitat for certain fish and a potential for SAR habitat (not observed).
    - There are no significant wetlands or woodland features in the area.
    - There is no significant habitat for SAR Turtles.
    - Some trees are potential habitat for Bat Colony nesting.

- The Natural Environmental Conditions Report will be included in the final Scheifele Bridge Class Environmental Assessment Study Report (ESR)

CULTURAL HERITAGE ENVIRONMENTAL CONDITIONS:

- A **Cultural Heritage Environmental Report (CHER)** was completed as part of the Class Environmental Assessment, and highlighted the following conditions:

    - A Cultural Heritage Landscape (CHL) feature exists west of the existing Scheifele Bridge, comprised of a remnant county road and abutments of two former bridges. The former bridges are circa 1861 and early 1900’s.

    - The preferred alternative design concept for replacing the existing bridge must recognize, and avoid any disruption to, the above CHL features.

    - The existing Scheifele Bridge has no Cultural Heritage Value or Interest (CHVI) per Ontario Regulation O. Reg. 9/06.

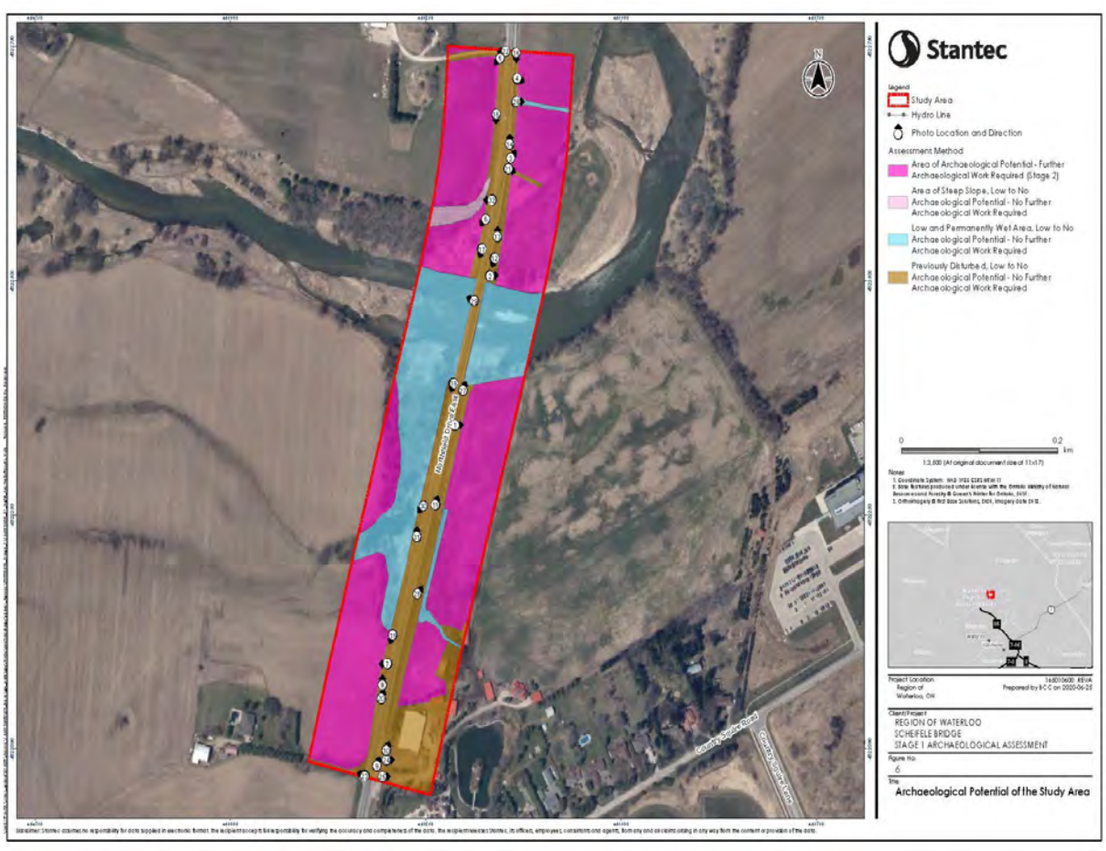
    - The Cultural Heritage Environmental Report will be included in the final Scheifele Bridge Class Environmental Assessment Study Report (ESR).

- A **Stage 1 Archaeological Assessment** was completed in accordance with the Standards and Guidelines established by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI), with the following conclusions and recommendations presented:

    - Within the 4 quadrants surrounding the Scheifele Bridge, approximately 54% of the assessed area retains potential for the identification and documentation of archaeological resources.

- In accordance with Ministry guidelines, a Stage 2 Archaeological Assessment will be required for any portion of the project's anticipated construction which may impact the area of potential exposure.
- The remainder of the study lands (46%) retains a low to no potential for the identification or recovery of archaeological resources because of previous disturbances, steep slopes, and/or low and permanently wet areas. Consequently, a Stage 2 Archaeological Assessment will not be required in these zones.
- Subject to clarification from MHSTCI, a Marine Archaeological Assessment study may be required, depending on the preferred design concept for the Scheifele Bridge reconstruction project.
- The Archaeological Assessment Report, and any subsequent study reports, will be included in the final Scheifele Bridge Class Environmental Assessment Study Report (ESR).

THE LIMITS OF ARCHAEOLOGICAL POTENTIAL, IN THE STUDY AREA, ARE ILLUSTRATED ON THE FOLLOWING MAP



NOTE:

1. **The PINK areas represent zones of archaeological potential and are subject to a future Stage 2 Assessment.**

2. **The BLUE areas represent zones with no known archaeological potential and are not subject to future study.**

GEOTECHNICAL AND FOUNDATION INVESTIGATION STUDY REPORT

FIELD INVESTIGATION AND APPROACH:

- A total of seven (7) boreholes were advanced on site to between 9.8 meters and 20.4 meters “Below Ground Surface” (BGS). Of the seven boreholes, three (3) were driven into the Conestogo Riverbed from the bridge deck, while the remaining 4 boreholes were located on the banks of the river, in the four quadrants of the bridge (NE, NW, SE and SW)

- In addition to the 2020 borehole work by Stantec Consulting Ltd., supplementary borehole data was secured from a previous geotechnical report by Peto MacCallum Ltd., related to a study of alternative alignments for Regional Trunk Watermain on Northfield Drive at the Scheifele Bridge. Four boreholes were advanced in 2019 for this study, also located near the four corners of the bridge.

- The geotechnical subsurface and groundwater conditions observed in the eleven (11) boreholes, combined with various laboratory materials testing, was used to develop geotechnical / foundation parameters for consideration and use in the design and reconstruction of the Scheifele Bridge and any associated road embankment construction.

EXISTING CONDITIONS AND FOUNDATION RECOMMENDATIONS:

- A variation of soil types was encountered in the eleven boreholes from 2019 and 2020, including native sandy silt tills, silty sands, sand and gravel, clayey silt till, and granular fill material. The native soils have a relatively high silt content and are, therefore, not free draining and may be susceptible to frost heave.

- The existing substrate granular fill and loose materials are not considered suitable for supporting the proposed bridge. Footings must be constructed in the stiffer native inorganic soils.

- Shallow spread footings may provide suitable foundation conditions but will offer relatively low bearing resistance, which may not be suitable to the bridge design. In addition, shallow footings will need to be dewatered during construction and constructed at a frost-free depth and beyond the limits of potential river scour. An approximate founding elevation of 313.00 meters was provided for shallow footing design.

- Deep foundations, such as machine-driven steel “H-piles” founded in the underlying dense soils, will provide higher bearing resistance than shallow spread footings. Subject to the structural load capacity requirements of the bridge, the design engineer may determine that deep foundation construction is the preferred alternative for the Scheifele Bridge.

- Future geotechnical / foundation investigations will be completed as part of the detailed design phase of the Scheifele Bridge once the precise locations of new abutments and piers are confirmed. The current Preliminary Geotechnical Investigation Report will be included with the final Environmental Study Report.

EXISTING BRIDGE CONDITION INVESTIGATION, STRUCTURAL ANALYSIS, INTERIM REPAIRS AND MONITORING PROGRAM

EXISTING BRIDGE DETAILS

The Scheifele Bridge is a four-span continuous cast-in-place reinforced concrete T-beam structure, with span lengths of 22.86 m – 30.48 m – 30.48 m – 22.86 m, for a total length of 106.7 m. The bridge has no skew, the overall the width is 11.58 m, and the roadway width is 9.14 m. The wearing surface is asphalt. There is a 1.83 m wide concrete sidewalk along the west edge of the bridge and a 0.61 m wide concrete curb along the east edge. There is a steel post and panel railing system on each side of the bridge, which has been “reinforced” with the addition of steel beam guiderails.

MAINTENANCE AND REPAIR HISTORY

The Scheifele Bridge has been subject to various repair contracts in recent years:

In 1982, a major contract was carried out which included repairs to the beams, deck soffit and abutment ballast walls; a concrete overlay on the existing deck; repairs to the concrete curb and sidewalk; replacement of expansion joints at the abutments; and placement of new deck waterproofing and asphalt wearing surface.

In 2011, the bridge underwent minor rehabilitations which included concrete repairs to the abutments, piers, and retaining walls; replacement of expansion joints at the abutments; and partial depth removal and replacement of the surface asphalt. The rehabilitation also included replacement of the steel beam guide rails at the approaches to the bridge as well as the installation of steel beam guide rails along both sides of the bridge.

In 2019, a contract was issued to add blocking support to the east exterior beam, in the form of a steel post bolted to the south abutment wall. The blocking was installed to address excessive rotation of the steel rocker bearing supporting this beam. Additionally, plywood was installed to the sides and soffit of the west exterior beam over the pedestrian trail in the south end span.

CONDITION OF EXISTING STRUCTURE

A bridge condition, and delamination investigation, was completed by others in 2018. Engineers from Stantec Consulting Ltd. completed a site inspection in September 2020 to confirm the findings from the 2018 surveys, to document any significant new deficiencies in the bridge, and to closely examine the condition of the substructure. The field inspection was followed by a structural analysis of the superstructure components (supporting beams) to determine if there are any inherent load capacity concerns with the bridge.

The field inspection determined that current deficiencies are primarily present in the south span, the south abutment, and the south pier of the bridge. The structural analysis confirmed that, notwithstanding the noted deficiencies, the load carrying capacity of the bridge is not compromised.

REGION 10-YEAR TRANSPORTATION CAPITAL PROGRAM AND DEFERRAL OF THE SCHEIFELE BRIDGE CONSTRUCTION TIMELINE

The Region's 10-Year Transportation Capital Plan includes funding for reconstruction of the Scheifele Bridge in 2023.

Based on the results of the Structural Site Inspection and Capacity Analysis of the bridge, Stantec presented a Strategy Report commenting on the impacts of deferring construction, recommendations on potential interim repairs that may be required, and an outline of a monitoring program that should be undertaken to evaluate any unforeseen deterioration of the bridge over the next 3 years.

After careful assessment of the condition and structural capacity of the bridge, Stantec provided the following initial recommendations as part of a strategy to maintain the Scheifele Bridge in a safe operating condition until 2026.

1. **Repairs in South Span:**

   Scale deck and beam soffits over pedestrian trail, and zinc spray exposed reinforcing.

2. **Supplemental Support at South Abutment:**

   Install structural blocking under south abutment diaphragms.

3. **Safe Passage Under South Bridge Span:**

   Install "Caution" signs on each side of the south abutment advising users of the Health Trail to pass under the south span no further than 5-6 meters from the face of the abutment.

4. **Monitoring Inspection Program:**

   Complete regular inspections of the structure, including the potential use of a Bridge-Master vehicle for detailed close-up inspections of the structure underside, as required.

ALTERNATIVE DESIGN CONCEPTS

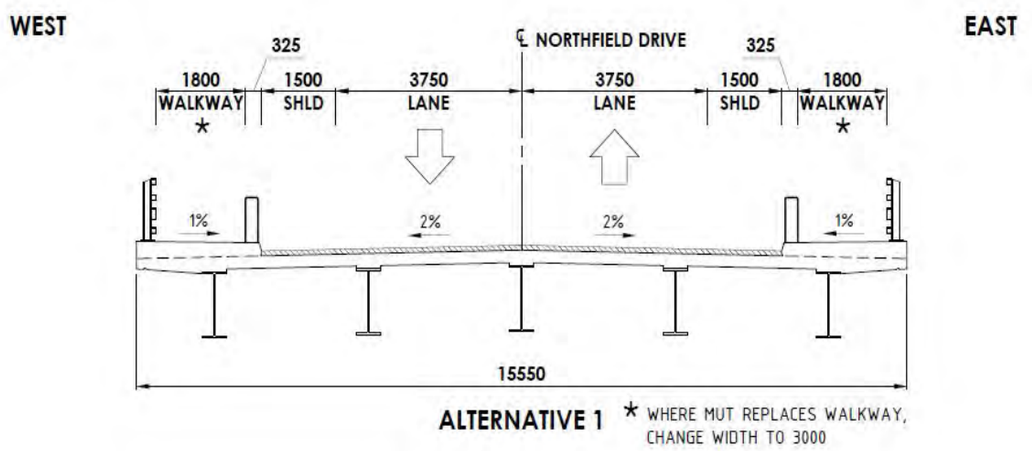
The Project Team has developed four (4) Alternative Design Cross Sections for replacement of the Scheifele Bridge, as well as four (4) Alternative Road and Bridge Alignment Concepts for the reconstruction of Northfield Drive as part of any bridge replacement proposal. In addition to the evaluation of various road and bridge design concepts, the Class Environmental Assessment process requires that a ***"Do Nothing"*** Alternative be considered as a baseline model when comparing all other alternatives. In this case, the "Do Nothing" Alternative would include deferral of any reconstruction of the Scheifele Bridge in favour of retention and ongoing maintenance of the structure.

ALTERNATIVE BRIDGE CROSS SECTION DESIGN CONCEPTS:

The four (4) Alternative Bridge Cross Section Design Concepts are illustrated and described below. Common elements of each design include 3.75 m traffic lanes, 1.80 m walkways and/or 3.00 m Multi-Use Trails.

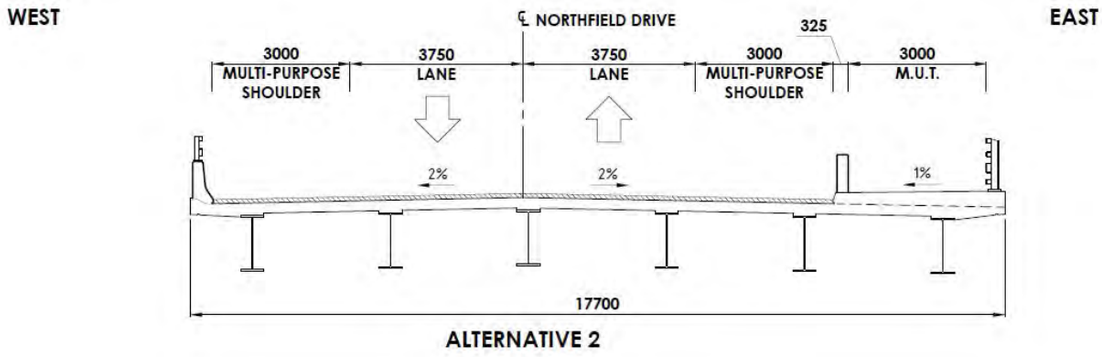
ALTERNATIVE DESIGN CONCEPT 1:

- Matches existing bridge condition by retaining 2 travel lanes. Widening of the structure would be required to expand to a future 4-lane bridge.
- Paved Shoulders (1.50 m wide) and "Protected" Walkways (or Multi-Use Trails) are provided on both sides to improve cyclist and pedestrian safety.
- Buggy travel will be slightly safer than the current condition because of the added 1.50 m wide paved shoulders but remains less than optimum.
- The total width of this Bridge Design Concept is 15.55 meters, based on Walkways on both sides.



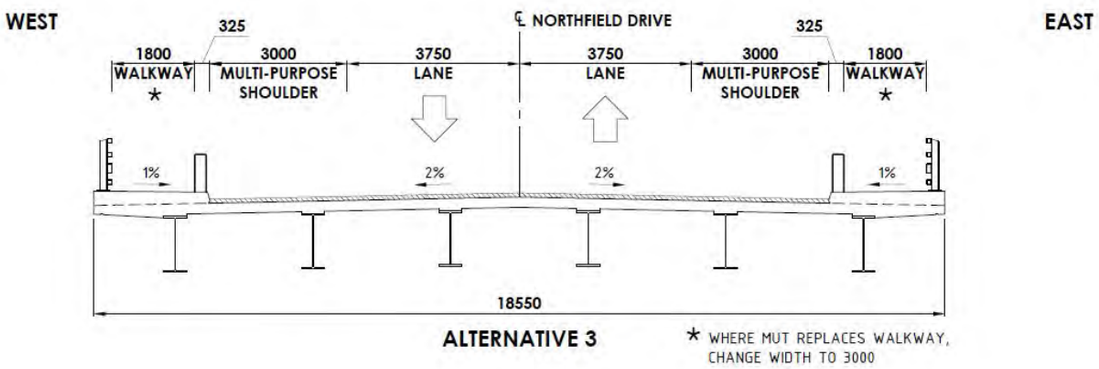
ALTERNATIVE DESIGN CONCEPT 2:

- Matches existing bridge condition by retaining 2 travel lanes. Widening of the structure would be required to expand to a future 4-lane bridge.
- Paved Shoulders (3.0 m wide) are provided on both sides, while a "Protected" Multi-Use Trail is provided on one side to improve cyclist and pedestrian safety.
- The safety of buggy travel is significantly improved with the addition of 3.00 m wide paved shoulders on both sides.
- The total width of this Bridge Design Concept is 17.70 meters, based on a Multi-Use Trail on one side.



ALTERNATIVE DESIGN CONCEPT 3:

- Matches existing bridge condition by retaining 2 travel lanes. Widening of the structure would be required to expand to a future 4-lane bridge.
- Paved Shoulders (3.0 m wide) and “Protected” Walkways (or Multi-Use Trails) are provided on both sides to improve cyclist and pedestrian safety.
- The safety of buggy travel is significantly improved with the addition of 3.00 m wide paved shoulders on both sides.
- The total width of this Bridge Design Concept is 18.55 meters, based on Walkways on both sides.



ALTERNATIVE DESIGN CONCEPT 4:

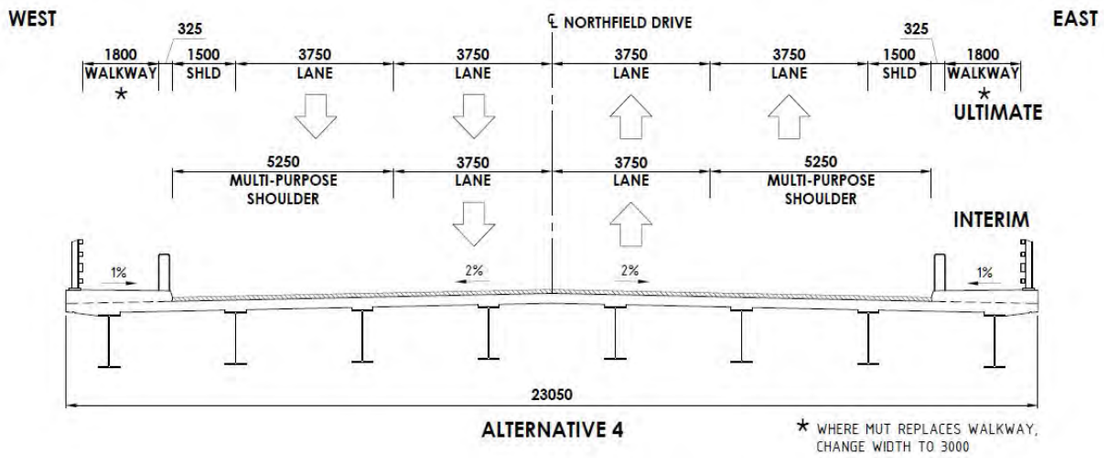
Interim Condition:

- Matches existing bridge condition by retaining 2 travel lanes.
- Wider Paved Shoulders (5.25 meter) provide enhanced safety for cyclist and buggy travel while also providing sufficient width to add two lanes of traffic (4-lane roadway) in the future.
- “Protected” Walkways (or Multi-Use Trails) are provided on both sides to improve cyclist and/or pedestrian safety.

Ultimate Condition:

- Without any structural widening of the bridge, the wide shoulders can be converted to traffic lanes, thereby providing a 4-lane bridge, and accommodating potential future traffic growth in the area.
- With a 4-lane bridge, 1.50 m shoulders remain for the improved safety of buggy and cyclist travel.

- The total width of this Bridge Design Concept is 23.05 meters under both the Initial and Ultimate conditions, based on Walkways on both sides.



Footnote:

Bridges are currently designed with a projected lifespan of approximately 75 years. It is difficult to predict whether Northfield Drive will need to be widened to 4 lanes within this timeline. Although it is typically more cost effective to provide for future needs in the initial design and construction of a project, a present-day cost analysis is always helpful in confirming the timing of major capital infrastructure investments.

ALTERNATIVE ROAD AND BRIDGE ALIGNMENT CONCEPTS:

Four (4) Alternative Road and Bridge Alignment Concepts have been developed for the project. Each concept is based on the premise that Alternative Bridge Design Concept 4 (23.05 m wide structure) would be constructed. This bridge design was used to provide a “worst case” scenario in the evaluation of environmental impacts and construction costs. The selection of either of the other three Bridge Design Concepts would result in reduced impacts and offer savings in capital costs, which would be further assessed in the future.

A brief description of the four Alternative Road and Bridge Alignment Concepts is as follows:

ALTERNATIVE CONCEPT 1: FULL OFFSET CONSTRUCTION: WEST SIDE:

- This alternative proposes a new bridge constructed offset to the west from the existing structure, with a 22.0 m centerline to centerline separation between the two bridges. New road embankments would need to be constructed on the north and south approaches.
- The new bridge and roadway could be constructed without the need for any long-term closure of Northfield Drive.
- Other features of this alternative include:
    - Major encroachment on the west side environmental area and watercourse
    - Significant retaining wall construction on west side to minimize watercourse impacts.
    - Provides “fair to very good” new road alignment.
    - Approximate property acquisition (north west side): 5,030 m2
    - Potentially significant archaeological and natural environmental impacts
    - May require protracted agency permit approvals.

CLICK HERE TO VIEW ALTERNATIVE ALIGNMENT CONCEPT 1

ALTERNATIVE CONCEPT 2: STAGED CONSTRUCTION: WEST SIDE:

- This alternative proposes a new bridge constructed slightly offset to the west from the existing structure, with an 8.7 m centerline to centerline separation between the two bridges. The existing road embankments on the west side would need to be widened on the north and south approaches.
- The new bridge and roadway would be constructed under a “Staged Work Plan” without the need for any long-term closure of Northfield Drive. An illustration of the preliminary Construction Staging Plan is provided below.
- Other features of this alternative include:
    - Significantly reduced encroachment on the west side environmental area and watercourse, compared to Alternative Concept 1
    - Reduced retaining wall construction on west side compared to Alternative Concept 1
    - Provides “very good to excellent” new road alignment.
    - Approximate property acquisition (north west side): 2,250 m2
    - Potential archaeological and natural environmental impacts are reduced compared to Alternative Concept 1
    - Agency permit approvals are still required but may be less onerous than with Alternative Concept.

CLICK HERE TO VIEW ALTERNATIVE ALIGNMENT CONCEPT 2

ALTERNATIVE CONCEPT 3: STAGED CONSTRUCTION: EAST SIDE:

- This alternative proposes a new bridge constructed slightly offset to the east from the existing structure, with an 8.7 m centerline to centerline separation between the two bridges (mirror image of Alternative Concept 2). The existing road embankments on the east side would need to be widened on the north and south approaches.
- The new bridge and roadway would be constructed under a “Staged Work Plan” without the need for any long-term closure of Northfield Drive. An illustration of the preliminary Construction Staging Plan is provided below.
- Other features of this alternative include:
    - Encroachment on the west side environmental area and watercourse is eliminated.
    - Major retaining wall construction on west side is eliminated.
    - Provides “fair to good” new road alignment.
    - Property acquisition requirements are significantly more than Alternative Concepts 1 and 2. Approximate property acquisition:
        - North side: 5,730 m2
        - South Side: 6,480 m2
    - Potential archaeological and natural environmental impacts mirror those of Alternative Concept 2 but are less than Alternative Concept 1.
    - Agency permit approvals are considered equal to Alternative Concept 2 but may be less onerous than with Alternative Concept 1.
    - Requires the relocation of a major overhead hydro pole owned by Waterloo North Hydro.

CLICK HERE TO VIEW ALTERNATIVE ALIGNMENT CONCEPT 3

ALTERNATIVE CONCEPT 4: CONSTRUCTION ON EXISTING ALIGNMENT:

- This alternative proposes a new bridge constructed at its current location, including either full replacement of the superstructure and substructure or replacement of the existing superstructure on a widened / rehabilitated substructure. Depending on the width of the new bridge, the existing road embankments would need to be slightly widened on both sides of Northfield Drive, on the north and south approaches to the bridge.

There are two options for building a new bridge at the existing location:

1. A long-term (estimated 18 months) full closure of Northfield Drive to remove and replace the structure and reconstruct the road approaches.

2. Replacement of the bridge by means of an "Advanced Bridge Construction (ABC)" procedure, whereby the deck of the new bridge would be constructed beside the existing bridge and "slid" into place on rehabilitated / widened abutments and piers. This approach would still require a lengthy closure of Northfield Drive, although somewhat less than the above 18-month full closure option.

Other features of this alternative include:

- Encroachment on the west side environmental area and watercourse is minimal and dependent on the width of the new bridge.
- Major retaining wall construction on west side is eliminated.
- Provides "excellent" new road alignment (existing roadway)
- Property acquisition requirements are minimal and subject to the width of the new bridge and road embankment widening.
- Potential archaeological and natural environmental impacts are minimal.
- Agency permit approvals, although still required, are minimal.

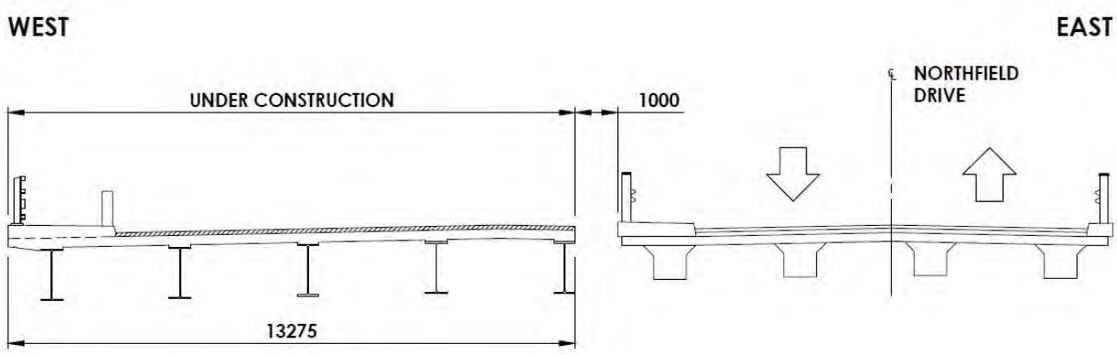
CLICK HERE TO VIEW ALTERNATIVE ALIGNMENT CONCEPT 4

CONSTRUCTION STAGING PROGRAM:

APPLICABLE TO ABOVE ALTERNATIVE ALIGNMENT CONCEPTS 2 AND 3

CONSTRUCTION STAGE 1:

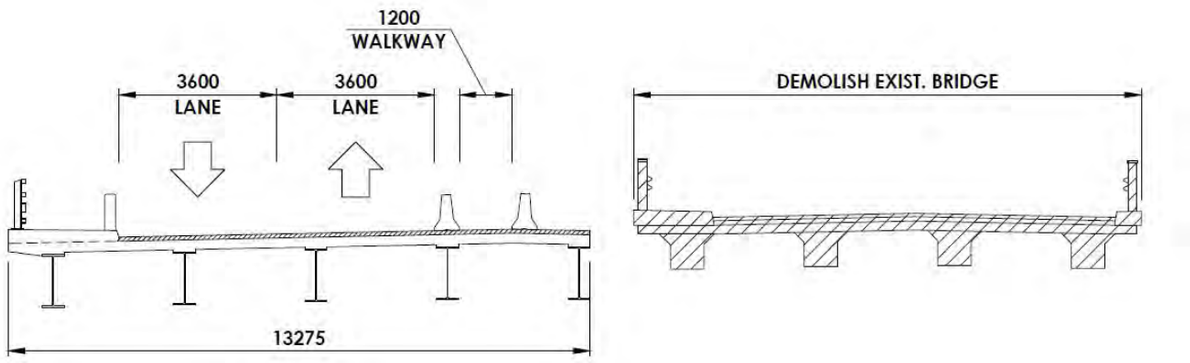
- **Construct a "half section" of the new bridge structure to the west (or the east) of the existing Scheifele Bridge.**
- **Maintain uninterrupted traffic on Northfield Drive during construction of first stage of new bridge.**



CONSTRUCTION STAGE 2A and STAGE 2B:

STAGE 2A:

- After switching Northfield Drive traffic to the newly constructed "half section" of the ultimate bridge, demolish the existing Scheifele Bridge.

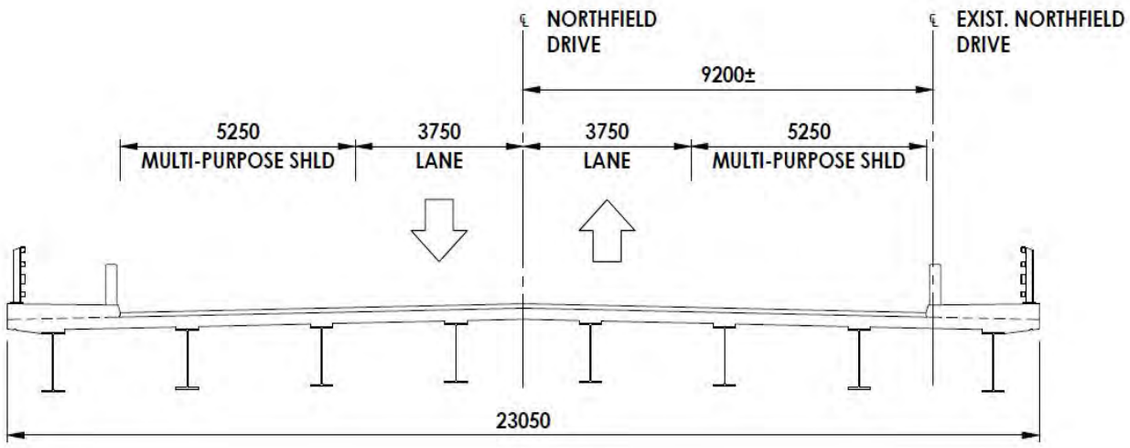


STAGE 2B:

- After demolition of the existing Scheifele Bridge, construct the balance of the new structure all while maintaining two lanes of traffic on the new "half section" of the new bridge.

CONSTRUCTION STAGE 3: FINAL STRUCTURE:

- After completion of the Stage 2B bridge construction, and the realignment of the Northfield Drive structure approaches, shift traffic onto the fully completed bridge structure.
- In addition to vehicle traffic lanes, the new bridge provides safe travel spaces for pedestrians, cyclists and buggy traffic.



TRAFFIC CONTROL DURING CONSTRUCTION

NO LONG-TERM CLOSURE OF NORTHFIELD DRIVE OR TRAFFIC DETOUR:

- It is possible to replace the Scheifele Bridge and realign Northfield Drive with no long-term road closure or traffic detours. The following Alternative Alignment Design Concepts would permit retention of full traffic movements on Northfield Drive without the need for extended long-term detours:

  Alternative Concept 1: Full Offset Construction: West Side

  Alternative Concept 2: Staged Construction: West Side

  Alternative Concept 3: Staged Construction: East Side

- Provisions for pedestrian and cyclist movements, through an active construction site, will be assessed during the detailed design stage to confirm safe accessibility and passage routes.

LONG-TERM CLOSURE OF NORTHFIELD DRIVE WITH TRAFFIC DETOUR:

- A full closure of Northfield Drive, along with implementation of a traffic detour route, would be required if the Scheifele Bridge were to be reconstructed at its current location (Alternative Concept 4). The duration of any road closure and traffic detour would depend on a selection between two construction options, as follows:

  3. A long-term full closure of Northfield Drive would be required to remove and replace the structure without any novel approaches to reconstruction. The estimated closure / detour period would be about 18 months under this option.

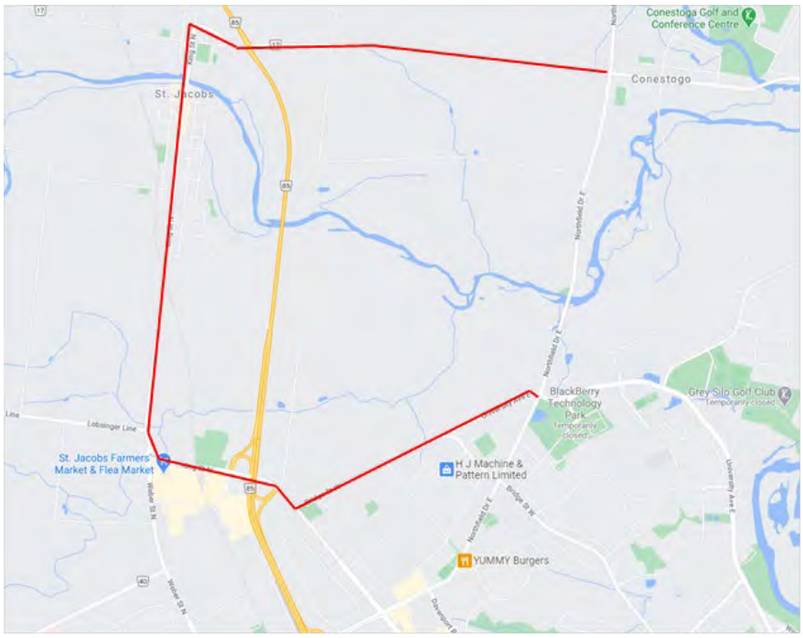
  4. A shorter-term full closure of Northfield Drive would be required if the design team opted for an “Advanced Bridge Construction (ABC)” procedure. The deck of the new bridge would be constructed beside the existing bridge and “slid” into place on rehabilitated / widened abutments and piers. This approach would still require a lengthy closure of Northfield Drive and traffic detour, although the timeline for the closure would be somewhat less than the above full closure option.

  5. Provisions for pedestrian and cyclist movements, through the construction site under a full closure of Northfield Drive, will be assessed during the detailed design stage to confirm the viability of accessibility.

LONG-TERM TRAFFIC DETOUR ROUTES:

- The Project Team acknowledges that any long-term closures of Northfield Drive, resulting in major traffic detours, would have significant negative impacts on the local and surrounding communities. However, it is mandatory that all potential alternatives, both positive and negative, be explored as part of the Class Environmental Assessment process.

- With a full or partial closure of Northfield Drive to reconstruct the Scheifele Bridge, the following detour route may be implemented by the Region of Waterloo, which represents an 11 km detour through St. Jacobs. The route shown in **RED** would be signed for buggies and other slower moving vehicles, although regular vehicle traffic would logically use Highway 85, between the St. Jacobs' roundabout and Northfield Drive.



- The estimated cost to the public for an 18-month detour would be approximately $6,900,000 based on the following preliminary parameters:

• Annual Weekday Daily Traffic Detour Volume:	11,000 VPD
• Annual Weekend Daily Traffic Detour Volume:	8,000 VPD
• Average Detour Travel Distance:	10 kilometers
Less Conestogo to Waterloo Route:	2 kilometers
Net Length of Detour	8 kilometers
Total Additional Detour Travel km for 18 months:	44.3 million km.
• Average Vehicle Efficiency: Liters / 100 km:	12.0 L/100
• Average Fuel Cost: $ / Liter:	$1.30 / liter
• TOTAL Consumer Detour Fuel Cost:	$6.9 Million

NOTE: The above "Consumer Detour Fuel Cost" does not account for other added costs that may be incurred, such as vehicle wear and tear or added fuel costs arising from traffic delays during congested peak hour periods. The above is presented simply as an indicator of the approximate added consumer vehicle fuel costs associated with a lengthy detour.

ARCHITECTURAL ENHANCEMENT OPPORTUNITIES

PREAMBLE:

- The Scheifele Bridge is an important structure in the Region of Waterloo. Although the current structure is not listed on the Ontario Heritage Bridge List, nor on the *Candidate Bridge List* within the *Heritage Bridges: Identification and Assessment Guide, 1945-1965 (Ministry of Culture and Ministry of Transportation),* it was deemed appropriate that alternative architectural enhancements be considered for the structure, in recognition of previous bridge crossings at this location and their connection to the “Scheifele” name.

- Since the existing bridge does not offer any significant architectural features that may be replicated in a reconstruction scenario, it is proposed that a “clean slate” be adopted with respect to selecting any potential architectural enhancements. Further, since the underside of the reconstructed bridge will not provide visual opportunities for the public, it is suggested that any architectural enhancements be limited to the design of the barrier walls (between the travelled road and the multi-use trail/sidewalk) and the outside pedestrian railings.

ARCHITECTURAL ENHANCEMENT GUIDELINES:

- The following Architectural Enhancement parameters will guide the decision process:

    - The outside pedestrian handrail should provide pedestrians, cyclists, and motorists with a view of the Conestogo River.

    - A pedestrian viewing platform, jutting out from the multi-use trail/walkway, could be provided on both the sides of the bridge, at mid-span.

    - The proposed barrier wall, between the road and the walkway/MUT, may include architectural enhancements on the walkway side but should be void of any architectural treatments on the road-side due to salt and debris splashing against this side of the barrier wall.

    - A combination of concrete and steel/aluminum/stainless may be considered for the various railing applications.

    - Cost should be considered in the final design of the barrier walls and pedestrian railings.

ARCHITECTURAL ENHANCEMENT ALTERNATIVES:

The Project Team has considered various alternative Architectural Enhancement concepts for use on the Scheifele Bridge. Based on aesthetic and structural design factors, as well as experience with architectural enhancements on past projects, three concepts are presented for public review and comment:

1. TEXTURED STONE PEDESTRIAN RAILING WITH MATCHING BARRIER WALL:

This alternative introduces a decorative “stone textured” finish on the lower portions of the pedestrian railing (both sides) and on the multi-use trail/walkway sides of the barrier wall. The roadside of the barrier wall would be plain concrete.

Other features of this design would include:

- Two or three horizontal aluminum railings on top of the textured concrete pedestrian railing and barrier wall.
- Stone textured Pilasters at each of the 4 corners of the bridge. A Heritage Plaque could be mounted on one of the pilasters with a history of the Scheifele Bridge name.
- Pedestrian viewing platforms could be provided at mid-span on both sides of the bridge.

- The premium for the architectural enhancements, over standard pedestrian railings and barriers, would be approximately **$375,000**.

2. OPEN RAILING WITH UNOBSTRUCTED VIEW OF THE CONESTOGO RIVER:

This alternative introduces pedestrian railings that offer an unobstructed view of the Conestogo River, for walkers and cyclist using the multi-use trails / walkways. A barrier wall would still be provided between the road and multi-use trails / walkways, with a decorative treatment on the pedestrian side.

Similar projects include the Fairway Road Bridge in Kitchener and the Temagami River Bridge in Timmins, as depicted in the photos below.

Other features of this design would include:

- Stone textured Pilasters could be provided at each of the 4 corners of the bridge connecting to the pedestrian handrails. A Heritage Plaque could be mounted on one of the pilasters with a history of the Scheifele Bridge name.
- Pedestrian viewing platforms could be provided at mid-span on both sides of the bridge.

- The premium for the architectural enhancements, over standard pedestrian rail and barrier designs, would be approximately **$600,000**.

3. WAINSCOT PATTERNED SOLID CONCRETE RAILING:

This alternative provides an opportunity to introduce a solid concrete “wainscot” design on the pedestrian railings and on the pedestrian sides of the roadside barrier walls. An example of this railing design can be found on the St. Jacobs Bridge over the Conestogo River. The roadside of the barrier walls would be plain concrete. Aluminum horizontal railings could be mounted on top of the pedestrian railing (double or triple rail) and the barrier/parapet wall (single rail). Pedestrian viewing platforms could be provided on the east and west sides of the bridge.

Other features of this design would include:

- Optional horizontal aluminum railings on top of the pedestrian railings and barrier walls.
- Optional “Wainscot” patterned Pilasters at each of the 4 corners of the bridge. A Heritage Plaque could be mounted on one of the pilasters with a history of the Scheifele Bridge name.

- Pedestrian viewing platforms on both sides of the bridge, at mid-span.

- The premium for the architectural enhancements, over standard pedestrian railing and barrier designs, would be approximately **$400,000**.

PRELIMINARY EVALUATION MATRIX

The Project Team has developed a Preliminary Concepts Evaluation Matrix, assessing the merits of each of the Alternative Alignment Design Concepts. The attached evaluation table will be updated over the course of the Scheifele Bridge study, accounting for public and agency input and ongoing study data assessments.

CLICK HERE TO VIEW PRELIMINARY ALTERNATIVE DESIGN CONCEPTS EVALUATION MATRIX

NEXT STEPS AND FURTHER INFORMATION

What Are the Next Steps in This Study?

After collecting and reviewing comments received from the public, agencies, and other stakeholders, the Scheifele Bridge Project Team will proceed with the following:

- Confirm that our approach to the “Problem Statement” and “Need and Justification” is sound and adjust where required.
- Develop any new road and bridge design concepts that may be appropriate for the study.
- Re-evaluate the Alternative Design concepts and select a Recommended Preferred Design Concept for presentation at Public Consultation Center (PCC) Meeting # 2.
- After the second PCC meeting, and endorsement of the final “Recommended Preferred Design Concept” by the Project Team, an Environmental Study Report (ESR) will be prepared and circulated for final public and agency review (30-day review period per Ontario Class EA guidelines).
- If there are no significant unresolved objections (Part II Orders) following the formal 30-day review period, the Environmental Study Report (ESR) will be presented to Region of Waterloo Council for formal approval and further direction on a schedule for detailed design and construction.

How Will You Receive Further Notification Regarding This Project?

Adjacent property owners, members of the public registering for this Public Consultation Centre, and those requesting to be kept advised of ongoing study progress, will receive all relevant study information, and will be notified of future meetings. Advertisements will also be placed in local newspapers advising of any additional meetings and access to the final Environmental Study Report, once it is filed.

PROJECT TEAM CONTACT INFORMATION

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of
Transportation & Environmental Services
Regional Municipality of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3
519-575-4606 (Desk)
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Senior Consultant, Senior Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Direct: 519 585-7316
Mobile: 519 240-3686
Fax: 519 579-6733
garry.leveck@stantec.com

NOTIFICATION

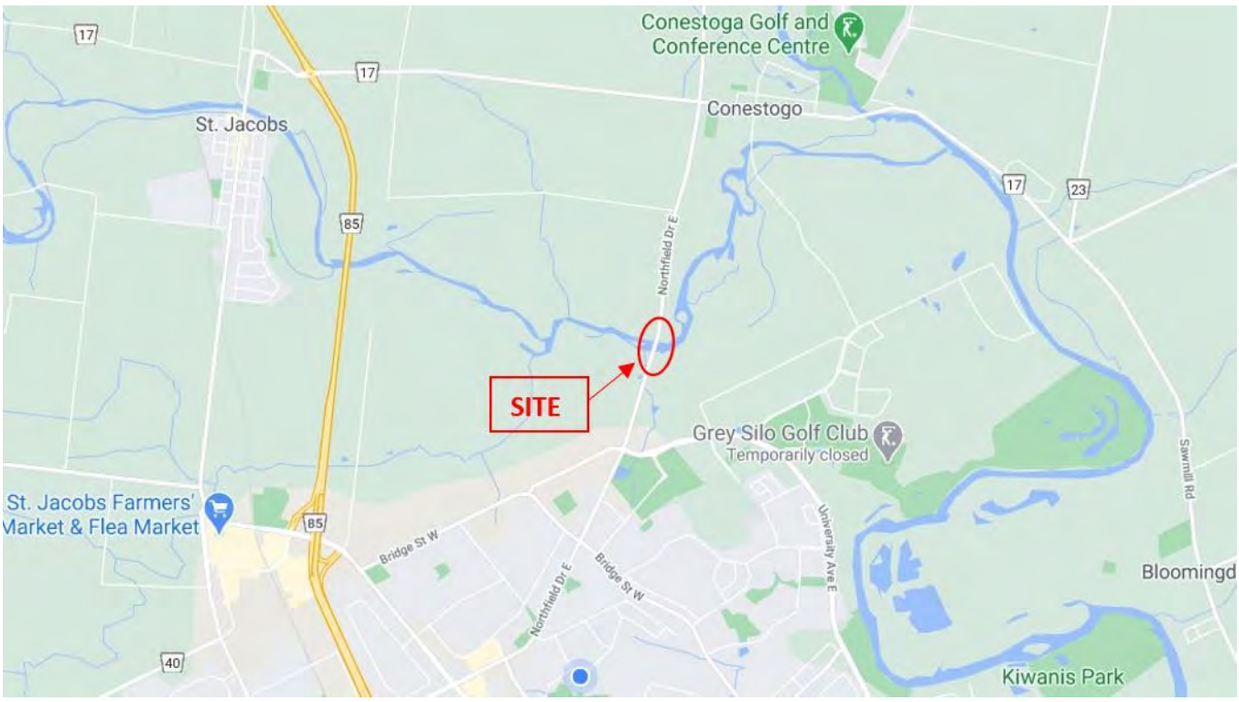
PUBLIC CONSULTATION CENTRE #1

Scheifele Bridge Replacement Study
Schedule “C” Class Environmental Assessment

Regional Road 22: Northfield Drive
Township of Woolwich

The Region of Waterloo invites you to participate in an online **Public Consultation Centre (PCC)** meeting for the proposed replacement of the Scheifele Bridge, which crosses over the Conestogo River on Northfield Drive (Regional Road 22) between the City of Waterloo and the Village of Conestogo. Details of the Public Consultation Centre meeting are provided below.

SITE MAP



BACKGROUND:

The Region of Waterloo is undertaking a Class Environmental Assessment Study, evaluating potential improvements to, or full replacement of, the Scheifele Bridge over the Conestogo River, located in the Township of Woolwich on Northfield Drive (Regional Road 22), between the City of Waterloo and the Village of Conestogo.

This project is being completed in accordance with the Ontario Ministry of Environment, Conservation and Parks guidelines for a “Schedule “C” Municipal Class Environmental Assessment: Reconstruction”, where the “Reconstructed Facility” will be for the same purpose, use or capacity under the Environmental Assessment Act.

The Environmental Assessment is being directed by a Project Team consisting of staff from the Region of Waterloo and the Township of Woolwich, including Township of Woolwich Councillor Larry Shantz. Stantec Consulting Ltd. is providing planning, engineering design, and construction administration services on the project.

THE PUBLIC CONSULTATION PROCESS:

This is the first of two Public Consultation Centre Meetings, where the Project Team will be presenting the need and justification for improvements to the Scheifele Bridge as well as alternative design concepts to address any short, and long term, structural deficiencies.

Public Consultation Centre meeting #1 is a "virtual on-line" session providing the public, agencies and other community stakeholders an opportunity to:

- Learn about various background studies that have been completed on the project, including environmental, social, and cultural features that may be impacted by any improvements to the Scheifele Bridge.
- Learn about recent structural investigations that have been completed to provide background data in support of replacing various bridge components of the Scheifele Bridge.
- View preliminary alternative **bridge cross section** and **road alignment** design concepts that have been developed for the project.
- Comment on the preliminary alternative design concepts, each of which offer varying aesthetic features, property impacts, environmental adversity, capital costs, and impacts on Northfield Drive traffic operations during construction.
- Engage in "virtual dialogue" with Project Team representatives and ask any questions that you may have about the project or study process.

A second Public Consultation Centre meeting will be convened later in the study, at which time a "recommended preferred design concept" will be presented for public consideration. Following the second PCC, a final Environmental Study Report (ESR) will be prepared for government approval.

If an individual or interest group is not satisfied with the conclusions, recommendations, or processing of the Class EA Study, they may request the Minister of the Environment, Conservation and Parks, or designated delegate, to review the project and rule on whether a more detailed environmental assessment is required, as per Part II of the EA Act (Part II Order).

COMMUNITY INVOLVEMENT

The Region of Waterloo encourages members of the public, stakeholder groups, and agencies to actively participate in this study by means of public consultation opportunities or contacting staff directly with comments or questions. If you wish to be added to the project mailing list, or would like further information on the project and any future public meetings, please visit our website at www.regionofwaterloo.ca or contact:

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services
Regional Municipality of Waterloo

150 Frederick Street
Kitchener ON N2G 4J3
519-575-4606 (Desk)
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Senior Consultant,
Senior Project Manager
Stantec Consulting Ltd.

100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Direct: 519 585-7316
Mobile: 519 240-3686
Fax: 519 579-6733
garry.leveck@stantec.com

All interested parties are invited to complete the online questionnaire and add any comments on the Region's project site at www.engagewr.ca. Interested parties may complete the survey and submit their comments on the project site between the dates below:

Open for Public Review at www.engagewr.ca :

Wednesday May 19, 2021, to Wednesday June 9, 2021

Closing Date for Comments: Friday July 2, 2021, at 4:30 p.m.

Plans and other project information will be available for your review and staff will be available to answer your questions. Your comments and input on this project are requested to assist the Project Team in finalizing the preferred design concept for the project. Plans will be available for viewing online at:

https://www.regionofwaterloo.ca/en/living-here/resources/Documents/Future-Construction/DC_07116_InfoSheet.pdf

If you are unable to review the Consultation Centre content within the review and comment period, but would like to provide comment, please direct your comments to either of the Project Managers listed above.

ACCESSIBILITY

If you require assistance to participate in this online PCC, or to access information in an alternative format, please contact Ken Brisbois by June 2, 2021.

All comments and information received from individuals, stakeholder groups and agencies regarding this project are being collected to assist the Region of Waterloo. Under the Municipal Act, personal information such as name, address, telephone number, and property location that may be included in a submission becomes part of the public record. Questions regarding the collection of this information should be referred to Ken Brisbois.

2@ 4' x 8'

Public Consultation Centre #1
Scheifele Bridge Replacement
May 19, 2021 - June 9, 2021
www.engagewr.ca/regionofwaterloo
Region of Waterloo
For more information:
www.regionofwaterloo.ca
519-575-4400

Administration Centre: 400 Clyde Road, P.O. Box 729 Cambridge, ON N1R 5W6
Phone: 519-621-2761 Toll free: 1-866-900-4722 Fax: 519-621-4844 www.grandriver.ca

May 31, 2021

Ken Brisbois
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener ON N2G 4J3
kbrisbois@regionofwaterloo.ca

Re: Municipal Class Environmental Assessment – Schiefele Bridge
Northfield Drive East and Conestogo River, Conestogo
Township of Woolwich

Dear Mr. Brisbois,

The Grand River Conservation Authority (GRCA) has received the notice and materials from Public Consultation Centre #2 for the above-noted Class Environmental Assessment (Class EA).

The study area contains the Conestogo River and two unnamed tributaries, as well as their associated floodplains, riverine valleys, and wetlands. We have reviewed the preferred alignment and cross-section alternatives for the bridge replacement, and wish to provide the following comments.

1. A new bridge could potentially impact the hydrologic and ecological functions of the resource features noted above. While the proposed replacement is mostly within the area of the existing bridge, the Class EA must speak to how the preferred alternative alignment / cross-section meets GRCA's policies for watercourse crossings (9.1.2) and alterations (9.1.16), as well as public infrastructure in floodplains (8.1.15) and wetlands (8.4.6-8.4.7).

2. A floodplain analysis must demonstrate that hydraulic / fluvial impacts of the new bridge are limited, and the flooding hazard is not exacerbated upstream or downstream. This should be confirmed through HEC-RAS modelling and analysis.

Member of Conservation Ontario, representing Ontario's 36 Conservation Authorities | The Grand – A Canadian Heritage River

3. Wetlands will be impacted by the new alignment. As such, an environmental impact study (EIS) will be required as part of the Class EA. We request that wetland boundaries are verified in the field to assist the Region in quantifying and characterizing the impacted wetlands. The EIS should then demonstrate:
    a. Avoiding, and where unavoidable, minimizing intrusions on significant natural features or hydrologic / ecological functions; and,
    b. Where intrusions occur, features / functions are restored and enhanced through a restoration plan.

4. During detailed design, we will require plans that show construction staging, erosion and sediment controls, and temporary works (e.g. isolation / dewatering). Cofferdams must be designed to hold back flows from the 2 year flood event with some freeboard. If a significant portion of the channel will be obstructed resulting in increased flood elevations to design storms, it should be included in the hydraulic analysis and the cofferdam height adjusted accordingly.

5. Please note that this bridge is downstream of our Conestogo Dam. Prior to construction, we will request site contacts and construction scheduling to notify personnel of significant outflows and forecasted flooding. We will also request a contingency plan or appropriate notes for work / equipment in or near the water.

Advisory Comments

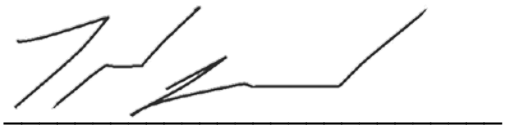
A. We recommend no in-water work from March 15 to June 30, however this is advisory, and the window must be approved by Fisheries and Oceans Canada (DFO). We are aware that DFO previously requested a more restrictive window for no in-water work from March 15 to July 15 for another bridge project two kilometres downstream (Conestogo Bridge).

B. The lower reach of the “eastern tributary”, the eastern watercourse adjacent to the bridge, is currently enclosed for 150 metres. The westward shift of the alignment may present an opportunity to daylight this watercourse and introduce other enhancements within the current right-of-way after the new bridge is built.

C. The Public Consultation Centre materials state that there were no comments from the public related to architectural enhancements. We would offer that the Grand River and its major tributaries have national status as Canadian Heritage Rivers, and the project team may find inspiration by reviewing *Arch, Truss & Beam: The Grand River Watershed Heritage Bridge Inventory* (University of Waterloo, March 2013).

Please continue to consult the GRCA on the project. If you have any questions or require additional information, please contact me at 519-621-2763 ext. 2292 or theywood@grandriver.ca.

Sincerely,



Trevor Heywood
Resource Planner
Grand River Conservation Authority

c.c. Garry Leveck, Stantec

From:	Engage
To:	Ken Brisbois
Subject:	BHunt completed Public Consultation Centre #2 - Survey Questions
Date:	Friday, May 27, 2022 11:08:59 AM

BHunt just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

City of Waterloo

How often do you cross the Scheifele Bridge on Northfield Drive

Weekly

What is the general purpose of your travel on this section of Northfield Drive?

Recreational

What is the travel mode you often use on this section of Northfield

Car

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

Yes

Staged bridge construction with no long term closure of Northfield Drive during construction.

Yes

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

Yes

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

answered yes

What new information do you feel that the Project Team should consider when

proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

Maintaining traffic during construction is a must. Not sure where traffic would be routed if a detour were necessary.

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

Time and weather conditions impacting construction.

Name:

BettyAnn Hunt

[redacted]

[redacted]

From:	Engage
To:	Ken Brisbois
Subject:	Bridge completed Public Consultation Centre #2 - Survey Questions
Date:	Thursday, May 26, 2022 8:34:30 AM

Bridge just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

Region of Waterloo

How often do you cross the Scheifele Bridge on Northfield Drive

Daily

What is the general purpose of your travel on this section of Northfield Drive?

Other (please specify) - Its our route from Conestogo to Waterloo

---

What is the travel mode you often use on this section of Northfield

Car

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

Yes

Staged bridge construction with no long term closure of Northfield Drive during construction.

Yes

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

Yes

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

?

What new information do you feel that the Project Team should consider when

proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

Northfield Rd from University to Sawmill Rd. is hazardous for cyclists. It is well used by cyclists. That section needs to have a cyclists lane in both directions.

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

Future growth with more pedestrians and cyclists.

Name:

Nigel King

[redacted]

[redacted]

[redacted]

[redacted]

From:	Engage
To:	Ken Brisbois
Subject:	Bruce B completed Public Consultation Centre #2 - Survey Questions
Date:	Saturday, May 21, 2022 7:15:18 PM

Bruce B just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

Other (please specify) - Conestogo

How often do you cross the Scheifele Bridge on Northfield Drive

Daily

What is the general purpose of your travel on this section of Northfield Drive?

Other (please specify) - Access to North Waterloo

What is the travel mode you often use on this section of Northfield

Car

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

Yes

Staged bridge construction with no long term closure of Northfield Drive during construction.

Yes

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

Yes

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

didn't answer No

What new information do you feel that the Project Team should consider when

proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

The length of time the road is closed. In Conestogo, construction affected the main street for two years, Saw mill drive to the round about for two years and the steel/wooden bridge has been down for 10 ish months and still no opening. Some focus, and/or incentive, on over all project timing would be helpful.

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

See above

Name:

Bruce Burkhardt

[redacted]

[redacted]

[redacted]

[redacted]

From:	Engage
To:	Ken Brisbois
Subject:	CarlaHWilson completed Public Consultation Centre #2 - Survey Questions
Date:	Wednesday, May 25, 2022 12:31:26 PM

CarlaHWilson just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

City of Waterloo

How often do you cross the Scheifele Bridge on Northfield Drive

Daily

What is the general purpose of your travel on this section of Northfield Drive?

Recreational

What is the travel mode you often use on this section of Northfield

Bicycle

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

Yes

Staged bridge construction with no long term closure of Northfield Drive during construction.

Yes

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

Yes

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

I didn’t answer no!

What new information do you feel that the Project Team should consider when

proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

Please include bike lanes before and after the bridge too. Should be automatic and mandatory with all road improvements.

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

Make it people friendly, not just car.

Name:

Carla Wilson

[redacted]

[redacted]

[redacted]

[redacted]

From:	Engage
To:	Ken Brisbois
Subject:	Chris M completed Public Consultation Centre #2 - Survey Questions
Date:	Wednesday, May 25, 2022 2:41:03 PM

Chris M just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

Region of Waterloo

How often do you cross the Scheifele Bridge on Northfield Drive

Daily

What is the general purpose of your travel on this section of Northfield Drive?

Recreational

What is the travel mode you often use on this section of Northfield

Bicycle

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

Yes

Staged bridge construction with no long term closure of Northfield Drive during construction.

Yes

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

Yes

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

n/a

What new information do you feel that the Project Team should consider when

proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

The preferred alternative is a positive choice to accommodate active transportation (biking and hiking) however connectivity & safety issues remains beyond the study limits, specifically the final tie in to Northfield at university and also northward to Conestogo

---

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

Consideration for connectivity to the Heath Valley Trail, connectivity to University MUT/bike lanes would assist with closing the loop on connectivity.

Name:

Chris Metaxas

[redacted]

[redacted]

[redacted]

[redacted]

Region of Waterloo

Public Notice

Public Consultation Centre #2

Scheifele Bridge Replacement - Township of Woolwich

We want your feedback

Join the Public Consultation Centre (PCC) #2 by sharing your comments with us as we plan to replace the Scheifele Bridge that crosses over the Conestogo River in the Township of Woolwich.

This virtual public consultation is open from **May 18 to June 8, 2022** at EngageWR.ca/scheifele-bridge-superstructure-replacement

What to expect

At this virtual PCC, the project team will post a presentation that includes a preferred alternative design that meets the improvement needs of Scheifele Bridge. We will share the findings of the Environmental Assessment (EA) in terms of the improvement needs, what other solutions were considered, how we evaluated all alternative solutions to reach a preferred alternative, and ask you to comment on the preferred alternative.

Public consultation

Visit our Scheifele Bridge project page at EngageWR.ca/scheifele-bridge-superstructure-replacement and complete the online survey by June 8 and include any other comments you would like to share with the project team. Project documents, including frequently asked questions, are also available. If you have any additional questions about the project, please email **garry.leveck@stantec.com** or **kbrisbois@regionofwaterloo.ca.**

Project background

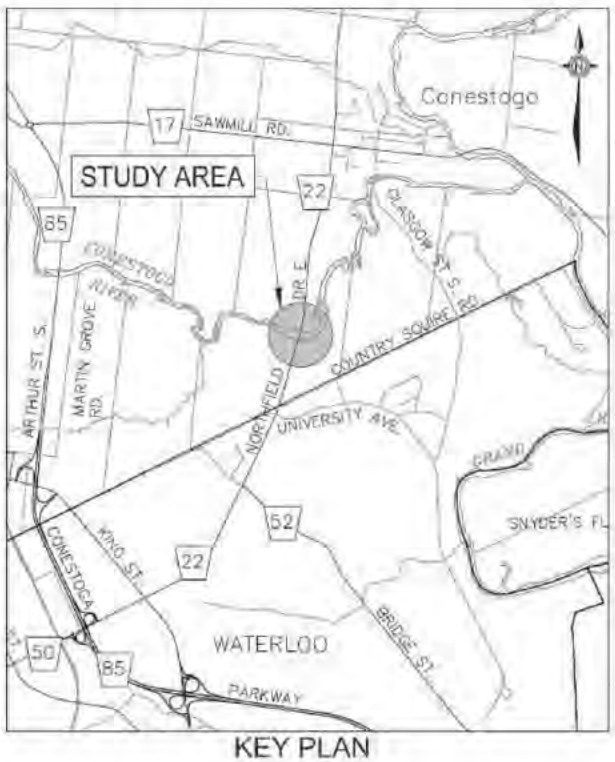
The Region of Waterloo has conducted a Schedule C Municipal Class Environmental Assessment (Class EA) for the Scheifele Bridge Replacement on Regional Road 22 (Northfield Drive at Conestogo River), in the Township of Woolwich. The structure replacement will address deteriorating infrastructure needs as well as provide an opportunity to enhance pedestrian, cycling, and buggy facilities.

All interested parties are invited to complete the online survey and add any comments at the Region's EngageWR project page by June 8, 2022, or by email to either of the contacts listed.

If you would like further information on the project please contact:

Ken Brisbois, C. Tech.
Region Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: 519-575-4606
Fax: 519-575-4430
kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: 519-585-7316
Fax: 519-579-6733
garry.leveck@stantec.com



KEY PLAN

All comments and information received from individuals, stakeholder groups, and agencies regarding this project are collected to assist the Region of Waterloo in making a decision. Under the "Municipal Act", personal information such as name, address, telephone number and property location that may be included in a submission becomes part of the public record.

Graeme Frisque/Metroland

Total residential sales in April in the Kitchener-Waterloo area included 361 detached homes (down 25.4 per cent from April 2021) and 107 condominium units (down 2.7 per cent).

AVERAGE HOME PRICE DIPS FOR SECOND STRAIGHT MONTH

The average sale price in April for all residential properties in the Kitchener-Waterloo area was $907,205 — a 5.5 per cent decrease compared to March 2022.

"Last month introduced a small measure of relief to the market," said Megan Bell, president of Kitchener Waterloo Association of Realtors in its monthly market update.

"While the number of sales remains strong, and sale prices continue to turn out robust annual gains, we're seeing fewer multiple offers and more conditions on offers making their way back into the market."

Total residential sales in April included 361 detached homes (down 25.4 per cent from April 2021) and 107 condominium units (down 2.7 per cent). The average price of a detached home was $1,060,992 — a decrease of 6.4 per cent compared to March 2022, but still an 18 per cent increase from April 2021. The average sale price for an apartment-style condominium was $600,219 — up 6 per cent compared to March 2022 and an increase of 35.3 per cent from April 2021.

"The trajectory the market was on was simply not sustainable, however, I want to emphasize it would be premature to draw any conclusions on just a single month's activity," Bell said in the update.

"The housing market in Waterloo Region is still very much a sellers' market, but sellers may need to adjust their expectations. We noticed this shift after the Bank of Canada's recent rate increase reinforcing that it has been cheap money empowering too many buyers to chase after too few listings driving the market rather than anything else."

There were 1,277 new listings added to the MLS System in K-W and area last month, an increase of 16.2 per cent compared to April of last year and a 40.2 per cent increase compared to the previous ten-year average for April.

From:	Engage
To:	Ken Brisbois
Subject:	danbrotherston completed Public Consultation Centre #2 - Survey Questions
Date:	Saturday, May 28, 2022 2:33:51 PM

danbrotherston just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

City of Kitchener

How often do you cross the Scheifele Bridge on Northfield Drive

Never

What is the general purpose of your travel on this section of Northfield Drive?

Recreational

What is the travel mode you often use on this section of Northfield

Other (please specify) - I would never go there, because I cycle, and the road is dangerous and fatal to cyclists.

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

No

Staged bridge construction with no long term closure of Northfield Drive during construction.

No

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

No

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

Your cycling infrastructure is inadequate. It's a busy high speed road, according to the MTO book 18 monograph it needs separated cycle infra. You know this, so why are you proposing inadequate infrastructure. This is a legal liability, you aren't meeting the standards set out, next

time someone is injured or killed they can sue you.

What new information do you feel that the Project Team should consider when proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

I dunno...the standard monograph for cycling infrastructure in the MTO book 18, and your own traffic counts for the road. It explicitly states "Alternate roadway or MUT" for roads with speeds >=80km/h (Northfield) and traffic counts >=10k which according to the 2015 traffic counts on your website, Northfield exceeds.

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

It's dangerous, and will lead to more deaths.

Name:

Daniel Brotherston

[redacted]

[redacted]

From:	Engage
To:	Ken Brisbois
Subject:	DavidT completed Public Consultation Centre #2 - Survey Questions
Date:	Wednesday, May 25, 2022 5:01:44 PM

DavidT just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

City of Waterloo

How often do you cross the Scheifele Bridge on Northfield Drive

Monthly

What is the general purpose of your travel on this section of Northfield Drive?

Recreational

What is the travel mode you often use on this section of Northfield

Bicycle

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

Yes

Staged bridge construction with no long term closure of Northfield Drive during construction.

Yes

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

No

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

A large segment of the cycling population will never use an unprotected lane on a busy and high-speed road like Northfield. Bridges are expensive and long-term infrastructure so it is important to get the design right. TransformWR, adopted by the Region and the township calls for a major shift to active transportation -- we cannot reach these goals if major infrastructure

does not meet the needs of the majority. Therefore, the design should convert one sidewalk to a multi-use pathway, connected on both sides to continuous paths from Sawmill to University. I imagine that the east side will be best but have not looked into that in detail.

What new information do you feel that the Project Team should consider when proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

TransformWR, our climate plan, has as the very first action, "Action 1.1.1 : Plan a network of major active transportation corridors … for people of all ages and abilities (AAA)". AAA facilities appeal to 2/3s of the cycling population characterized as "interested but concerned". If this bridge is not AAA then it failed to serve that population and fails to move the needle on climate action.

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

Given low pedestrian volumes, a MUP on one side of the bridge will serve both pedestrians and cyclists.

Name:

David Trueman

[redacted]

[redacted]

[redacted]

[redacted]

From:	Engage
To:	Ken Brisbois
Subject:	djbmcmur completed Public Consultation Centre #2 - Survey Questions
Date:	Sunday, May 29, 2022 8:15:04 AM

djbmcmur just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

City of Waterloo

How often do you cross the Scheifele Bridge on Northfield Drive

Monthly

What is the general purpose of your travel on this section of Northfield Drive?

Recreational

What is the travel mode you often use on this section of Northfield

Bicycle

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

No

Staged bridge construction with no long term closure of Northfield Drive during construction.

Yes

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

No

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

Provide protected bike lanes

What new information do you feel that the Project Team should consider when

proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

Build your infrastructure with the future in mind. More pedestrian and bicycle traffic is inevitable.

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

You must place a higher priority on pedestrians and cyclists that will inevitably come with development of this land. Be bold. Have foresight.

Name:

Josephine McMurray

[redacted]

[redacted]

[redacted]

[redacted]

From:	Engage
To:	Ken Brisbois
Subject:	Dm0534 completed Public Consultation Centre #2 - Survey Questions
Date:	Wednesday, May 25, 2022 4:39:56 PM

Dm0534 just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

City of Waterloo

How often do you cross the Scheifele Bridge on Northfield Drive

Monthly

What is the general purpose of your travel on this section of Northfield Drive?

Recreational

What is the travel mode you often use on this section of Northfield

Car

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

Yes

Staged bridge construction with no long term closure of Northfield Drive during construction.

Yes

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

Yes

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

N/a

What new information do you feel that the Project Team should consider when

proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

bike lane needs to be continuous and along the entire stretch for cyclists. Wide shoulders on the bridge don't help when there are no wide bike lanes before and after.

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

See above

Name:

David Martin

[redacted]

[redacted]

[redacted]

[redacted]

QUESTIONNAIRE / COMMENT SHEET

RECEIVED
JUN 14 2022
DESIGN & CONST. DIVISION

Scheifele Bridge Replacement
Regional Municipality of Waterloo
Township of Woolwich

Public Consultation Centre #2, May 18 – June 8, 2022

1. Where do you live?

- ☐ City of Cambridge
- ☐ City of Kitchener
- ☐ City of Waterloo
- ☑ Region of Waterloo
- ☐ Other

2. How often do you cross the Scheifele Bridge on Northfield Drive?

- ☐ Daily
- ☑ Weekly
- ☐ Monthly
- ☐ Rarely
- ☐ Never

3. What is the travel mode you often use on this section of Northfield Drive

- ☐ Car
- ☐ Walk
- ☐ Bicycle
- ☐ Public Transit
- ☑ Other

4. What is the general purpose of your travel on this section of Northfield Drive?

☑ Work ☐ School ☐ Recreational

☑ Other ☐

5. **Do you support the recommendations of the Project Team with respect to the following design concepts?**

   a. **Scheifele Bridge/Northfield Drive Alternative Alignment #2 (West Side)**

   ☑ Yes ☐ No

   b. **Staged Bridge Construction with No Long-Term Closure of Northfield Drive during Construction:**

   ☑ Yes ☐ No

   c. **Recommended Bridge Cross Section Concept 5 which included two traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers**

   ☑ Yes ☐ No

6. **If you answered NO to any of the above recommendations, please elaborate on your reasons:**

_____

_____

_____

_____

_____

7. **What challenges or considerations, if any, do you see with the Recommended Preferred Design Alignment #2 and Cross Section #5 that are being carried forward by the project team?**

8. **Is there anything else that we haven't discussed that you feel the project team should consider as we proceed to final design?**

For more information or to complete this questionnaire online, please visit engagewr.ca/woolwich-scheifele-bridge

Please return this questionnaire to one of the project team members listed below by **Friday, June 10, 2022**

Ken Brisbois, C. Tech.
Region Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: (519) 575-4400 Ext. 4606
Fax: (519) 575-4430
Email: kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

Your Name: ALLEN SAUER

Your Address: [redacted]

Your Email:

Your Telephone:

Note: *Personal information, as defined by the Municipal Freedom of Information and Protection of Privacy Act (MFIPPA), is collected under the authority of the Municipal Act, 2001, and in accordance with the provisions of MFIPPA. Personal information on this form will be used for the purpose of completing the SCHEIFELE BRIDGE CLASS ENVIRONMENTAL ASSESSMENT STUDY. The information will*

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DESIGN & CONST. DIVISION

Scheifele Bridge Replacement
Regional Municipality of Waterloo
Township of Woolwich

Public Consultation Centre #2, May 18 – June 8, 2022

1. Where do you live?

- ☐ City of Cambridge
- ☐ City of Kitchener
- ☐ City of Waterloo
- ☑ Region of Waterloo
- ☐ Other

2. How often do you cross the Scheifele Bridge on Northfield Drive?

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☑ Rarely
- ☐ Never

3. What is the travel mode you often use on this section of Northfield Drive

- ☐ Car
- ☐ Walk
- ☐ Bicycle
- ☑ Public Transit
- ☐ Other

4. What is the general purpose of your travel on this section of Northfield Drive?

shopping in Waterloo

8. Is there anything else that we haven't discussed that you feel the project team should consider as we proceed to final design?

We wish to thank you for your consideration for the horse and buggy Mennonites.

For more information or to complete this questionnaire online, please visit engagewr.ca/woolwich-scheifele-bridge

Please return this questionnaire to one of the project team members listed below by **Friday, June 10, 2022**

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Email: kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

Your Name: Edgar Martin

Your Address: [redacted]

Your Email:

Your Telephone:

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☐ Work ☐ School ☐ Recreational

☐ Other ☐

5. Do you support the recommendations of the Project Team with respect to the following design concepts?

a. Scheifele Bridge/Northfield Drive Alternative Alignment #2 (West Side)

☑ Yes ☐ No

b. Staged Bridge Construction with No Long-Term Closure of Northfield Drive during Construction:

☑ Yes ☐ No

c. Recommended Bridge Cross Section Concept 5 which included two traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers

☑ Yes ☐ No

6. If you answered NO to any of the above recommendations, please elaborate on your reasons:

_____

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7. What challenges or considerations, if any, do you see with the Recommended Preferred Design Alignment #2 and Cross Section #5 that are being carried forward by the project team?

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JUN 14 2022
DESIGN & CONST. DIVISION

Scheifele Bridge Replacement
Regional Municipality of Waterloo
Township of Woolwich

Public Consultation Centre #2, May 18 – June 8, 2022

1. **Where do you live?**

- [ ] City of Cambridge
- [ ] City of Kitchener
- [ ] City of Waterloo
- [x] Region of Waterloo
- [ ] Other

2. **How often do you cross the Scheifele Bridge on Northfield Drive?**

- [ ] Daily
- [ ] Weekly
- [x] Monthly
- [ ] Rarely
- [ ] Never

3. **What is the travel mode you often use on this section of Northfield Drive**

- [ ] Car
- [ ] Walk
- [ ] Bicycle
- [ ] Public Transit
- [x] Other Horse + Buggy

4. **What is the general purpose of your travel on this section of Northfield Drive?**

to access the North section of Waterloo.

☐ Work ☐ School ☐ Recreational

☒ Other ☐

5. Do you support the recommendations of the Project Team with respect to the following design concepts?

a. Scheifele Bridge/Northfield Drive Alternative Alignment #2 (West Side)

☐ Yes ☐ No

b. Staged Bridge Construction with No Long-Term Closure of Northfield Drive during Construction:

☐ Yes ☐ No

c. Recommended Bridge Cross Section Concept 5 which included two traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers

☐ Yes ☐ No

6. If you answered NO to any of the above recommendations, please elaborate on your reasons:

_____

_____

_____

_____

_____

7. What challenges or considerations, if any, do you see with the Recommended Preferred Design Alignment #2 and Cross Section #5 that are being carried forward by the project team?

8. **Is there anything else that we haven't discussed that you feel the project team should consider as we proceed to final design?**

I would like to just give you a big thank-you for considering the horse & buggy traffic. Thank-you.

For more information or to complete this questionnaire online, please visit engagewr.ca/woolwich-scheifele-bridge

Please return this questionnaire to one of the project team members listed below by **Friday, June 10, 2022**

Ken Brisbois, C. Tech.
Region Project Manager
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Kitchener, ON N2G 4J3
Telephone: (519) 575-4400 Ext. 4606
Fax: (519) 575-4430
Email: kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

Your Name: Isaac Martin

Your Address: [redacted]

Your Email: [redacted]

Your Telephone: [redacted]

Note: *Personal information, as defined by the Municipal Freedom of Information and Protection of Privacy Act (MFIPPA), is collected under the authority of the Municipal Act, 2001, and in accordance with the provisions of MFIPPA. Personal information on this form will be used for the purpose of completing the SCHEIFELE BRIDGE CLASS ENVIRONMENTAL ASSESSMENT STUDY. The information will*

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JUN 09 2022
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Regional Municipality of Waterloo
Township of Woolwich
Public Consultation Centre #2, May 18 – June 8, 2022

1. Where do you live?

- ☐ City of Cambridge
- ☐ City of Kitchener
- ☐ City of Waterloo
- ☑ Region of Waterloo
- ☐ Other

2. How often do you cross the Scheifele Bridge on Northfield Drive?

- ☐ Daily
- ☐ Weekly
- ☑ Monthly
- ☐ Rarely
- ☐ Never

3. What is the travel mode you often use on this section of Northfield Drive

- ☐ Car
- ☐ Walk
- ☐ Bicycle
- ☐ Public Transit
- ☑ Other Horse

4. What is the general purpose of your travel on this section of Northfield Drive?

Horse & Buggy

☐ Work ☐ School ☐ Recreational

☐ Other ☑ Shopping

5. **Do you support the recommendations of the Project Team with respect to the following design concepts?**

   a. **Scheifele Bridge/Northfield Drive Alternative Alignment #2 (West Side)**

   ☑ Yes ☐ No

   b. **Staged Bridge Construction with No Long-Term Closure of Northfield Drive during Construction:**

   ☑ Yes ☐ No

   c. **Recommended Bridge Cross Section Concept 5 which included two traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers**

   ☑ Yes ☐ No

6. **If you answered NO to any of the above recommendations, please elaborate on your reasons:**

_____

_____

_____

_____

_____

7. **What challenges or considerations, if any, do you see with the Recommended Preferred Design Alignment #2 and Cross Section #5 that are being carried forward by the project team?**

8. Is there anything else that we haven't discussed that you feel the project team should consider as we proceed to final design?

For more information or to complete this questionnaire online, please visit engagewr.ca/woolwich-scheifele-bridge

Please return this questionnaire to one of the project team members listed below by **Friday, June 10, 2022**

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Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

Your Name: Erwin M Martin

Your Address: [redacted]

Your Email:

Your Telephone:

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- ☐ City of Cambridge
- ☐ City of Kitchener
- ☐ City of Waterloo
- ☑ Region of Waterloo
- ☐ Other

2. How often do you cross the Scheifele Bridge on Northfield Drive?

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☑ Rarely
- ☐ Never

3. What is the travel mode you often use on this section of Northfield Drive

- ☐ Car
- ☐ Walk
- ☐ Bicycle
- ☐ Public Transit
- ☑ Other Buggy

4. What is the general purpose of your travel on this section of Northfield Drive?

ST Jacobs Market
OLEX
Shopping

☐ Work ☐ School ☐ Recreational

☐ Other ☐

5. **Do you support the recommendations of the Project Team with respect to the following design concepts?**

   a. **Scheifele Bridge/Northfield Drive Alternative Alignment #2 (West Side)**

   ☐ Yes ☐ No

   b. **Staged Bridge Construction with No Long-Term Closure of Northfield Drive during Construction:**

   ☐ Yes ☐ No

   c. **Recommended Bridge Cross Section Concept 5 which included two traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers**

   ☐ Yes ☐ No

6. **If you answered NO to any of the above recommendations, please elaborate on your reasons:**

_____

_____

_____

_____

_____

7. **What challenges or considerations, if any, do you see with the Recommended Preferred Design Alignment #2 and Cross Section #5 that are being carried forward by the project team?**

I would like to leave the bridge design in your hands to do as seemth best but would like to take this opperfunity to Sincerly thank you for the consideration of buggy traffic we do appreciate shoulders on the bridge so

8. Is there anything else that we haven't discussed that you feel the project team should consider as we proceed to final design?

we can stay out of the traffic Lane. And thankyou again for giving us a chance for input and making our roadways a safe as possible George & Mart

For more information or to complete this questionnaire online, please visit engagewr.ca/woolwich-scheifele-bridge

Please return this questionnaire to one of the project team members listed below by **Friday, June 10, 2022**

Ken Brisbois, C. Tech.
Region Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
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Email: kbrisbois@regionofwaterloo.ca

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Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

Your Name: George S. Martin

Your Address: [redacted]

Your Email:

Your Telephone:

Note: *Personal information, as defined by the Municipal Freedom of Information and Protection of Privacy Act (MFIPPA), is collected under the authority of the Municipal Act, 2001, and in accordance with the provisions of MFIPPA. Personal information on this form will be used for the purpose of completing the SCHEIFELE BRIDGE CLASS ENVIRONMENTAL ASSESSMENT STUDY. The information will*

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DESIGN & CONST. DIVISION

Scheifele Bridge Replacement
Regional Municipality of Waterloo
Township of Woolwich
Public Consultation Centre #2, May 18 – June 8, 2022

1. Where do you live?

- ☐ City of Cambridge
- ☐ City of Kitchener
- ☐ City of Waterloo
- ☑ Region of Waterloo
- ☐ Other

2. How often do you cross the Scheifele Bridge on Northfield Drive?

- ☐ Daily
- ☐ Weekly
- ☑ Monthly
- ☐ Rarely
- ☐ Never

3. What is the travel mode you often use on this section of Northfield Drive

- ☑ Car
- ☐ Walk
- ☐ Bicycle
- ☐ Public Transit
- ☑ Other

4. What is the general purpose of your travel on this section of Northfield Drive?

☐ Work ☐ School ☐ Recreational

☑ Other ☐

5. Do you support the recommendations of the Project Team with respect to the following design concepts?

a. Scheifele Bridge/Northfield Drive Alternative Alignment #2 (West Side)

☑ Yes ☐ No

b. Staged Bridge Construction with No Long-Term Closure of Northfield Drive during Construction:

☑ Yes ☐ No

c. Recommended Bridge Cross Section Concept 5 which included two traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers

☐ Yes ☑ No

6. If you answered NO to any of the above recommendations, please elaborate on your reasons:

The few times we use the bridge with the buggy does not justify to spend on extra road barriers

7. What challenges or considerations, if any, do you see with the Recommended Preferred Design Alignment #2 and Cross Section #5 that are being carried forward by the project team?

8. **Is there anything else that we haven't discussed that you feel the project team should consider as we proceed to final design?**

For more information or to complete this questionnaire online, please visit engagewr.ca/woolwich-scheifele-bridge

Please return this questionnaire to one of the project team members listed below by **Friday, June 10, 2022**

Ken Brisbois, C. Tech.
Region Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: (519) 575-4400 Ext. 4606
Fax: (519) 575-4430
Email: kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

Your Name: Ion Martin

Your Address: [redacted]

Your Email: [redacted]

Your Telephone: [redacted]

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QUESTIONNAIRE / COMMENT SHEET

RECEIVED
JUN 09 2022
DESIGN & CONST. DIVISION

Scheifele Bridge Replacement
Regional Municipality of Waterloo
Township of Woolwich
Public Consultation Centre #2, May 18 – June 8, 2022

1. Where do you live?

- ☐ City of Cambridge
- ☐ City of Kitchener
- ☐ City of Waterloo
- ☑ Region of Waterloo
- ☐ Other

2. How often do you cross the Scheifele Bridge on Northfield Drive?

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☑ Rarely
- ☐ Never

3. What is the travel mode you often use on this section of Northfield Drive

- ☐ Car
- ☐ Walk
- ☐ Bicycle
- ☐ Public Transit
- ☑ Other

4. What is the general purpose of your travel on this section of Northfield Drive?

☐ Work ☐ School ☐ Recreational

☑ Other ☐

5. **Do you support the recommendations of the Project Team with respect to the following design concepts?**

   a. **Scheifele Bridge/Northfield Drive Alternative Alignment #2 (West Side)**

   ☑ Yes ☐ No

   b. **Staged Bridge Construction with No Long-Term Closure of Northfield Drive during Construction:**

   ☑ Yes ☐ No

   c. **Recommended Bridge Cross Section Concept 5 which included two traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers**

   ☑ Yes ☐ No

6. **If you answered NO to any of the above recommendations, please elaborate on your reasons:**

7. **What challenges or considerations, if any, do you see with the Recommended Preferred Design Alignment #2 and Cross Section #5 that are being carried forward by the project team?**

8. **Is there anything else that we haven't discussed that you feel the project team should consider as we proceed to final design?**

For more information or to complete this questionnaire online, please visit engagewr.ca/woolwich-scheifele-bridge

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Garry E. Leveck, P.Eng.
Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

Your Name: Eli B. Martin

Your Address: [redacted]

Your Email:

Your Telephone:

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Scheifele Bridge Replacement
Regional Municipality of Waterloo
Township of Woolwich
Public Consultation Centre #2, May 18 – June 8, 2022

1. Where do you live?

- ☐ City of Cambridge
- ☐ City of Kitchener
- ☐ City of Waterloo
- ☑ Region of Waterloo
- ☐ Other

2. How often do you cross the Scheifele Bridge on Northfield Drive?

- ☐ Daily
- ☐ Weekly
- ☑ Monthly
- ☐ Rarely
- ☐ Never

3. What is the travel mode you often use on this section of Northfield Drive

- ☐ Car
- ☐ Walk
- ☑ Bicycle
- ☐ Public Transit
- ☐ Other Buggy

4. What is the general purpose of your travel on this section of Northfield Drive?

☐ Work ☐ School ☐ Recreational

☑ Other ☐

5. **Do you support the recommendations of the Project Team with respect to the following design concepts?**

   a. **Scheifele Bridge/Northfield Drive Alternative Alignment #2 (West Side)**

   ☑ Yes ☐ No

   b. **Staged Bridge Construction with No Long-Term Closure of Northfield Drive during Construction:**

   ☑ Yes ☐ No

   c. **Recommended Bridge Cross Section Concept 5 which included two traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers**

   ☑ Yes ☐ No

6. **If you answered NO to any of the above recommendations, please elaborate on your reasons:**

7. **What challenges or considerations, if any, do you see with the Recommended Preferred Design Alignment #2 and Cross Section #5 that are being carried forward by the project team?**

sounds like a good plan!

8. **Is there anything else that we haven't discussed that you feel the project team should consider as we proceed to final design?**

I see no value in leaving the original bridge abutments, they could be removed!
Can't please everybody, right?!
Thanks for all your detailed work, and may a new bridge be erected safely!

For more information or to complete this questionnaire online, please visit engagewr.ca/woolwich-scheifele-bridge

Please return this questionnaire to one of the project team members listed below by **Friday, June 10, 2022**

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Region Project Manager
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Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

Your Name: John Weber
Your Address: [redacted]
Your Email:
Your Telephone:

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JUN 01 2022
DESIGN & CONST. DIVISION

Scheifele Bridge Replacement
Regional Municipality of Waterloo
Township of Woolwich
Public Consultation Centre #2, May 18 – June 8, 2022

1. Where do you live?

- ☐ City of Cambridge
- ☐ City of Kitchener
- ☐ City of Waterloo
- ☒ Region of Waterloo
- ☐ Other

2. How often do you cross the Scheifele Bridge on Northfield Drive?

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☒ Rarely
- ☐ Never

3. What is the travel mode you often use on this section of Northfield Drive

- ☒ Car
- ☐ Walk
- ☐ Bicycle
- ☐ Public Transit
- ☒ Other Buggy

4. What is the general purpose of your travel on this section of Northfield Drive?

☐ Work ☐ School ☐ Recreational

☒ Other ☒ doctor appointments

5. Do you support the recommendations of the Project Team with respect to the following design concepts?

a. Scheifele Bridge/Northfield Drive Alternative Alignment #2 (West Side)

☒ Yes ☐ No

b. Staged Bridge Construction with No Long-Term Closure of Northfield Drive during Construction:

☒ Yes ☐ No

c. Recommended Bridge Cross Section Concept 5 which included two traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers

☒ Yes ☐ No

6. If you answered NO to any of the above recommendations, please elaborate on your reasons:

7. What challenges or considerations, if any, do you see with the Recommended Preferred Design Alignment #2 and Cross Section #5 that are being carried forward by the project team?

8. **Is there anything else that we haven't discussed that you feel the project team should consider as we proceed to final design?**

As a horse and buggy user I wish to extend a hearty thank-you for considering our mode of transportation concerning this project. However- there are numerous buggy users that would benefit more by having the Peel street bridge at Winterbourne repaired to a useable condition. Again thanks for your efforts! Eli K Martin

For more information or to complete this questionnaire online, please visit engagewr.ca/woolwich-scheifele-bridge

Please return this questionnaire to one of the project team members listed below by **Friday, June 10, 2022**

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Region Project Manager
Region of Waterloo
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Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

Your Name: ELI K MARTIN

Your Address: [redacted]

Your Email:

Your Telephone:

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QUESTIONNAIRE / COMMENT SHEET

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DESIGN & CONST. DIVISION

Scheifele Bridge Replacement
Regional Municipality of Waterloo
Township of Woolwich

Public Consultation Centre #2, May 18 – June 8, 2022

1. Where do you live?

- ☐ City of Cambridge
- ☐ City of Kitchener
- ☐ City of Waterloo
- ☑ Region of Waterloo
- ☐ Other

2. How often do you cross the Scheifele Bridge on Northfield Drive?

- ☐ Daily
- ☐ Weekly
- ☑ Monthly
- ☐ Rarely
- ☐ Never

3. What is the travel mode you often use on this section of Northfield Drive

- ☐ Car
- ☐ Walk
- ☐ Bicycle
- ☐ Public Transit
- ☑ Other Hores & Buggy

4. What is the general purpose of your travel on this section of Northfield Drive?

Get to Waterloo

☐ Work ☐ School ☐ Recreational

☑ Other ☐

5. **Do you support the recommendations of the Project Team with respect to the following design concepts?**

   a. **Scheifele Bridge/Northfield Drive Alternative Alignment #2 (West Side)**

   ☑ Yes ☐ No

   b. **Staged Bridge Construction with No Long-Term Closure of Northfield Drive during Construction:**

   ☑ Yes ☐ No

   c. **Recommended Bridge Cross Section Concept 5 which included two traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers**

   ☑ Yes ☐ No

6. **If you answered NO to any of the above recommendations, please elaborate on your reasons:**

7. **What challenges or considerations, if any, do you see with the Recommended Preferred Design Alignment #2 and Cross Section #5 that are being carried forward by the project team?**

8. **Is there anything else that we haven't discussed that you feel the project team should consider as we proceed to final design?**

Thank you for Considering horse & Buggys!!

For more information or to complete this questionnaire online, please visit engagewr.ca/woolwich-scheifele-bridge

Please return this questionnaire to one of the project team members listed below by **Friday, June 10, 2022**

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Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

Your Name: MERVIN MARTIN

Your Address: [redacted]

Your Email: [redacted]

Your Telephone: [redacted]

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QUESTIONNAIRE / COMMENT SHEET

Scheifele Bridge Replacement
Regional Municipality of Waterloo
Township of Woolwich
Public Consultation Centre #2, May 18 – June 8, 2022

1. Where do you live?

- ☐ City of Cambridge
- ☐ City of Kitchener
- ☐ City of Waterloo
- ☑ Region of Waterloo
- ☐ Other

2. How often do you cross the Scheifele Bridge on Northfield Drive?

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☑ Rarely
- ☐ Never

3. What is the travel mode you often use on this section of Northfield Drive

- ☐ Car
- ☐ Walk
- ☐ Bicycle
- ☐ Public Transit
- ☐ Other Buggy

4. What is the general purpose of your travel on this section of Northfield Drive?

☐ Work ☐ School ☐ Recreational

☑ Other ☐

5. **Do you support the recommendations of the Project Team with respect to the following design concepts?**

   a. **Scheifele Bridge/Northfield Drive Alternative Alignment #2 (West Side)**

   ☑ Yes ☐ No

   b. **Staged Bridge Construction with No Long-Term Closure of Northfield Drive during Construction:**

   ☑ Yes ☐ No

   c. **Recommended Bridge Cross Section Concept 5 which included two traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers**

   ☑ Yes ☐ No

6. **If you answered NO to any of the above recommendations, please elaborate on your reasons:**

7. **What challenges or considerations, if any, do you see with the Recommended Preferred Design Alignment #2 and Cross Section #5 that are being carried forward by the project team?**

8. **Is there anything else that we haven't discussed that you feel the project team should consider as we proceed to final design?** NO

Comment We Want to give a heartfelt Thank you for consideration to make shoulders for the buggy traffic on the New bridge Thank you again.

James M Martin

P.S We still really miss the Closed Peel Street bridge for buggy traffic.

For more information or to complete this questionnaire online, please visit engagewr.ca/woolwich-scheifele-bridge

Please return this questionnaire to one of the project team members listed below by **Friday, June 10, 2022**

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Region of Waterloo
150 Frederick Street, 6th Floor
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100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

Your Name: James M Martin

Your Address: [redacted]

Your Email:

Your Telephone:

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QUESTIONNAIRE / COMMENT SHEET

RECEIVED
JUN 01 2022
DESIGN & CONST. DIVISION

Scheifele Bridge Replacement
Regional Municipality of Waterloo
Township of Woolwich

Public Consultation Centre #2, May 18 – June 8, 2022

1. Where do you live?

- [ ] City of Cambridge
- [ ] City of Kitchener
- [ ] City of Waterloo
- [x] Region of Waterloo
- [ ] Other

2. How often do you cross the Scheifele Bridge on Northfield Drive?

- [ ] Daily
- [ ] Weekly
- [x] Monthly or more
- [ ] Rarely
- [ ] Never

3. What is the travel mode you often use on this section of Northfield Drive

- [ ] Car
- [ ] Walk
- [ ] Bicycle
- [ ] Public Transit
- [x] Other mostly buggy

4. What is the general purpose of your travel on this section of Northfield Drive?

☐ Work ☐ School ☐ Recreational

☑ Other ☐

5. **Do you support the recommendations of the Project Team with respect to the following design concepts?**

   a. **Scheifele Bridge/Northfield Drive Alternative Alignment #2 (West Side)**

   ☑ Yes ☐ No

   b. **Staged Bridge Construction with No Long-Term Closure of Northfield Drive during Construction:**

   ☑ Yes ☐ No

   c. **Recommended Bridge Cross Section Concept 5 which included two traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers**

   ☑ Yes ☐ No

6. **If you answered NO to any of the above recommendations, please elaborate on your reasons:**

7. **What challenges or considerations, if any, do you see with the Recommended Preferred Design Alignment #2 and Cross Section #5 that are being carried forward by the project team?**

8. **Is there anything else that we haven't discussed that you feel the project team should consider as we proceed to final design?**

Thanks for considering buggy lanes
will shoulder be wider North and South
of bridge ?

For more information or to complete this questionnaire online, please visit
engagewr.ca/woolwich-scheifele-bridge

Please return this questionnaire to one of the project team members listed below by
Friday, June 10, 2022

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100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

Your Name: Harvey Sauder

Your Address: [redacted]

Your Email:

Your Telephone:

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May 27-2022

To whom it may concern

I read one of your package's of papers about your plans to do work on the bridge on Northfield Drive south of Conestoga. I am from the horse & buggy people and live north of Winterbourne.

We want to Thank you for your concern to include us in your plan for our safety on the road to make lanes wide enough to not force us onto the busy road.

At this time the bridge on Peel St at Winterbourne is closed, which is a road that affects us quite a lot, it is a road that would be used by buggies, as it is not a big road and would keep buggy's off the main roads, could something be done to make that bridge for light traffic? Thanks again

Henry M Bumbacher

[redacted]

RECEIVED
JUN 09 2022
CONST. DIVISION

From:	Engage
To:	Ken Brisbois
Subject:	Erin S completed Public Consultation Centre #2 - Survey Questions
Date:	Wednesday, May 25, 2022 5:46:42 PM

Erin S just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

Region of Waterloo

How often do you cross the Scheifele Bridge on Northfield Drive

Weekly

What is the general purpose of your travel on this section of Northfield Drive?

Other (please specify) - Shopping, errands, groceries, library

---

What is the travel mode you often use on this section of Northfield

Car

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

Yes

Staged bridge construction with no long term closure of Northfield Drive during construction.

Yes

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

Yes

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

n/a

What new information do you feel that the Project Team should consider when

proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

I would like to be able to bike from Conestogo to Waterloo along Northfield but it is currently unsafe. There should be a continuous paved shoulder ideally meeting the requirements for a AAA trail ("all ages and abilities") and have a barrier for the bike lane. Also, I would like to be able to hike or bike along the Health Valley Trail from Conestogo to St. Jacobs , so it would be great if this extension was taken into account when rebuilding the bridge and the underside.

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

n/a

Name:

Erin Schmidt

[redacted]

[redacted]

[redacted]

[redacted]

From:	Engage
To:	Ken Brisbois
Subject:	Gena completed Public Consultation Centre #2 - Survey Questions
Date:	Wednesday, May 25, 2022 9:34:28 AM

Gena just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

Region of Waterloo

How often do you cross the Scheifele Bridge on Northfield Drive

Daily

What is the general purpose of your travel on this section of Northfield Drive?

Work

What is the travel mode you often use on this section of Northfield

Other (please specify) - I would prefer to bike, but this is very unsafe under the current conditions (very narrow bike lane and high speed traffic). I drive when I am unable to bike via the Glasgow bridge.

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

Yes

Staged bridge construction with no long term closure of Northfield Drive during construction.

Yes

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

Yes

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

n/a

What new information do you feel that the Project Team should consider when proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

The wide shoulder/bike lane needs to be continuous along the entire stretch of Northfield (from University Dr to Sawmill Drive) to make it both useful and safe for cyclists. Ideally it would meet the requirements for a AAA trail ("all ages and abilities") and a raised multi-use trail or a bike lane with a barrier would be best. The design team is taking into account the trail under the bridge on the south side - it would be wonderful if this trail can even be improved as part of the construction to make it useful for possible future extension of the Health Valley Trail from St Jacobs to Conestogo.

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

Controlling (deterring) northbound traffic on Glasgow may require additional enforcement, and efforts to discourage cars detouring by this route will be needed.

Name:

Gena Braun

[redacted]

[redacted]

[redacted]

[redacted]

Resident looks for bike lanes as region plans rebuild of Scheifele Bridge

Bill Atwood
Observer Staff

AS THE SECOND ROUND OF public consultation on the Scheifele Bridge draws to a close, one Conestogo resident and avid cyclist is hoping to see the project expand past the current proposal.

Due to ongoing repairs at the Glasgow Street bridge, Gena Braun chose an alternate bike route to get to work taking Northfield Drive down to University Avenue. Due to a lack of a paved shoulders along Northfield Drive, she felt unsafe doing so.

"I've only done it once and I will never do it again, just because it felt terrifying. With Glasgow unavailable, there's really no way to safely bike to Waterloo from Conestogo," Braun said.

The path is fine for horse-drawn buggies, but not for bikes, she added.

"I think the only way to make it feel safe to bike there is to have a really wide paved shoulder or in a perfect world to have a protected bike lane [from University Avenue to Sawmill Road], but I'm not sure how they would manage that with the buggies also using that route," she explained.

The Region of Waterloo is looking to reconstruct the bridge over the Conestogo River, but bike paths are outside the scope of the project, says project manager Ken Brisbois.

"This project in particular is for the bridge. We're looking at the accommodation over the structure. Moving forward beyond this project to the roadworks, we're only tying in the bridge and then on either side... there are other projects that would connect on either side that once those are in the program," Brisbois said.

The project team presented four different potential designs during the first round of public consultation, which occurred last year. Based on that feedback the team

→ BRIDGE 6

Current plans for reconstructing the bridge see it remain a two-lane crossing. Bill Atwood

BRIDGE: Neither bike lanes nor widening is part of plan

→ FROM 3

is now recommending a two-lane bridge that would have multi-purpose paved shoulders on each side of the vehicle lanes. There would also be a multi-use trail on one side of the bridge with concrete barriers between the lanes and the trails.

The proposal would see construction done on half the bridge while the other side would remain open to traffic. The second half would then be completed later on. Preliminary cost estimates to replace the super structure of the 1960 span is $6.6 million.

At the start of the Scheifele Bridge study, data indicated there was an average of 10,350 vehicles that used the bridge daily, with 360 of those being heavy trucks. During the final week of May 2021 the project team tallied the total number of other crossing over the bridge, recording 26 buggies, 55 pedestrians and 361 cyclists.

While the project team also looked at putting in four lanes given the expected growth in Waterloo Region, the studies show that's not warranted at this point, Brisbois said.

"We weren't recommending that option based on the expectation. Not to say that the region's not growing, but that the section of Northfield isn't in our capital program. There isn't a plan for widening anytime from now till 2050," he explained.

According to Brisbois if the feedback indicates support for the proposed design it will then be recommended to council.

While Braun said she appreciates that there are bike lanes on the bridge, she would still like to see it connect to a long bike route along the side of Northfield Drive.

"It kind of becomes a little like a safe bike island, but getting there is way too treacherous. It doesn't make sense to spend that money unless the paving continues," she said.

Resident looks for bike lanes as region plans rebuild of Scheifele Bridge

Bill Atwood
Observer Staff

AS THE SECOND ROUND OF public consultation on the Scheifele Bridge draws to a close, one Conestogo resident and avid cyclist is hoping to see the project expand past the current proposal.

Due to ongoing repairs at the Glasgow Street bridge, Gena Braun chose an alternate bike route to get to work taking Northfield Drive down to University Avenue. Due to a lack of a paved shoulders along Northfield Drive, she felt unsafe doing so.

"I've only done it once and I will never do it again, just because it felt terrifying. With Glasgow unavailable, there's really no way to safely bike to Waterloo from Conestogo," Braun said.

The path is fine for horse-drawn buggies, but not for bikes, she added.

"I think the only way to make it feel safe to bike there is to have a really wide paved shoulder or in a perfect world to have a protected bike lane [from University Avenue to Sawmill Road], but I'm not sure how they would manage that with the buggies also using that route," she explained.

The Region of Waterloo is looking to reconstruct the bridge over the Conestogo River, but bike paths are outside the scope of the project, says project manager Ken Brisbois.

"This project in particular is for the bridge. We're looking at the accommodation over the structure. Moving forward beyond this project to the roadworks, we're only tying in the bridge and then on either side... there are other projects that would connect on either side that once those are in the program," Brisbois said.

The project team presented four different potential designs during the first round of public consultation, which occurred last year. Based on that feedback the team

→ BRIDGE 6

Current plans for reconstructing the bridge see it remain a two-lane crossing. Bill Atwood

BRIDGE: Neither bike lanes nor widening is part of plan

→ FROM 3

is now recommending a two-lane bridge that would have multi-purpose paved shoulders on each side of the vehicle lanes. There would also be a multi-use trail on one side of the bridge with concrete barriers between the lanes and the trails.

The proposal would see construction done on half the bridge while the other side would remain open to traffic. The second half would then be completed later on. Preliminary cost estimates to replace the super structure of the 1960 span is $6.6 million.

At the start of the Scheifele Bridge study, data indicated there was an average of 10,350 vehicles that used the bridge daily, with 360 of those being heavy trucks. During the final week of May 2021 the project team tallied the total number of other crossing over the bridge, recording 26 buggies, 55 pedestrians and 361 cyclists.

While the project team also looked at putting in four lanes given the expected growth in Waterloo Region, the studies show that's not warranted at this point, Brisbois said.

"We weren't recommending that option based on the expectation. Not to say that the region's not growing, but that the section of Northfield isn't in our capital program. There isn't a plan for widening anytime from now till 2050," he explained.

According to Brisbois if the feedback indicates support for the proposed design it will then be recommended to council.

While Braun said she appreciates that there are bike lanes on the bridge, she would still like to see it connect to a long bike route along the side of Northfield Drive.

"It kind of becomes a little like a safe bike island, but getting there is way too treacherous. It doesn't make sense to spend that money unless the paving continues," she said.

From:	Engage
To:	Ken Brisbois
Subject:	JillianS completed Public Consultation Centre #2 - Survey Questions
Date:	Wednesday, May 25, 2022 8:39:18 PM

JillianS just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

City of Waterloo

How often do you cross the Scheifele Bridge on Northfield Drive

Monthly

What is the general purpose of your travel on this section of Northfield Drive?

Recreational

What is the travel mode you often use on this section of Northfield

Bicycle

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

No

Staged bridge construction with no long term closure of Northfield Drive during construction.

Yes

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

No

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

I do not believe the preferred design concept aligns with the Region's transportation master plan for Northfield. I would prefer to see a multi-use trail incorporated in the preferred concept. Exhibit 5.6 of the Region's Transportation Master Plan indicates that the long-term strategy is for this section of Northfield is to implement separated bike lanes by 2041. A multi-

use trail already exists along the eastern side of Northfield between Davenport and Bridge Street. Although this is outside of the study area, the potential opportunities to provide future connections to existing infrastructure is not apparent in the evaluation.

What new information do you feel that the Project Team should consider when proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

The PIC materials and evaluation framework both note that experienced cyclists can use the paved shoulder and inexperienced cyclists can choose to use the protected sidewalks. However, this does not consider that adults riding bikes on sidewalks is prohibited by municipal by-laws throughout the Region and that many adults will believe that biking on the sidewalk is prohibited in this case. I do not consider sidewalks protected by a barrier to be bike friendly infrastructure.

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

In my view the prohibition of adults riding on sidewalks under municipal by-laws is a challenge to the real-world functioning of the preferred design concept. Regardless of if this specific by-law exists in Woolwich, many people incorrectly believe that adults riding bikes on sidewalks is prohibited province-wide. Therefore, by not providing dedicated cycling infrastructure this bridge will continue to be a barrier to inexperienced cyclists and adults riding bikes with children.

Name:

Jillian Schmitter

[redacted]

[redacted]

From:	Engage
To:	Ken Brisbois
Subject:	josh completed Public Consultation Centre #2 - Survey Questions
Date:	Friday, May 27, 2022 8:01:59 PM

josh just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

City of Kitchener

How often do you cross the Scheifele Bridge on Northfield Drive

Monthly

What is the general purpose of your travel on this section of Northfield Drive?

Recreational

What is the travel mode you often use on this section of Northfield

Bicycle

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

No

Staged bridge construction with no long term closure of Northfield Drive during construction.

Yes

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

No

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

There's no protection for people riding bicycle.

What new information do you feel that the Project Team should consider when

proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

None.

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

The current bridge was built 62 years ago. If the new bridge is going to be around for decades, it seems irresponsible to not future-proof it with protected cycling infrastructure.

Name:

Josh Orita

[redacted]

[redacted]

[redacted]

[redacted]

From:	Engage
To:	Ken Brisbois
Subject:	Julie Metaxas completed Public Consultation Centre #2 - Survey Questions
Date:	Wednesday, May 25, 2022 1:57:01 PM

Julie Metaxas just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

Other (please specify) - Conestogo

How often do you cross the Scheifele Bridge on Northfield Drive

Daily

What is the general purpose of your travel on this section of Northfield Drive?

Work

What is the travel mode you often use on this section of Northfield

Car

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

No

Staged bridge construction with no long term closure of Northfield Drive during construction.

Yes

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

Yes

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

Widening of the bridge will be great, but not overly useful if the widening and paved shoulders are not extended beyond the scope of the bridge. One downfall to living in Conestogo is we're not well-connected by means of bike and sidewalk/recreational trails. It would be great to be able to connect to the Health Valley Trail, for example, from Conestogo.

What new information do you feel that the Project Team should consider when proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

Better bike-ability connecting Woolwich (Conestogo) to Waterloo.

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

Widening of the bridge itself isn't overly useful if it's not extended beyond either side of the bridge.

Name:

Julie Metaxas

[redacted]

[redacted]

[redacted]

[redacted]

From:	Engage
To:	Ken Brisbois
Subject:	khofbauer completed Public Consultation Centre #2 - Survey Questions
Date:	Wednesday, May 25, 2022 12:21:40 PM

khofbauer just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

Region of Waterloo

How often do you cross the Scheifele Bridge on Northfield Drive

Weekly

What is the general purpose of your travel on this section of Northfield Drive?

Other (please specify) - everyday errands and access to the City from Conestogo.

What is the travel mode you often use on this section of Northfield

Car

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

Yes

Staged bridge construction with no long term closure of Northfield Drive during construction.

Yes

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

Yes

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

n/a

What new information do you feel that the Project Team should consider when

proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

please consider expanding the project to include a paved bike lane/multi-use trail connecting to Sawmill Road. There is not currently safe pedestrian/cycle (normal cyclist, not the cycling club) access from Conestogo to the Healt Valley Trail. The trail is advertised as St. Jacobs to Conestogo, and yet it cannot easily be accessed from Conestogo.

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

There is a history of vehicle accidents (head-on and otherwise) between the Scheifele Bridge and Conestogo. I feel that this is in part due to people speeding up leaving Waterloo, and tehn slamming on the brakes as they approach a traffic backup south of Sawmill Road. Widening this bridge will encourage drivers to speed up more as they leave Waterloo. Consideration should be given to a 60 km/hr speed limit between the bridge and Conestogo.

Name:

Karen Hofbauer

[redacted]

[redacted]

[redacted]

[redacted]

From:	Engage
To:	Ken Brisbois
Subject:	mattfr completed Public Consultation Centre #2 - Survey Questions
Date:	Tuesday, May 31, 2022 12:07:45 PM

mattfr just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

City of Waterloo

How often do you cross the Scheifele Bridge on Northfield Drive

Rarely

What is the general purpose of your travel on this section of Northfield Drive?

Other (please specify) - Shopping

What is the travel mode you often use on this section of Northfield

Public Transit

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

Yes

Staged bridge construction with no long term closure of Northfield Drive during construction.

Yes

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

No

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

The recommended alternative with multi use trails should be used instead. There is enough space for the trails and there is not enough pedestrian/cyclist volume to justify separating both, so the trail should be used. The trail also meets the region’s goals of becoming climate neutral and supporting active transportation much better than the currently selected cross section.

What new information do you feel that the Project Team should consider when proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

The project team should consider the safety of all road users, the goal of the region to be climate neutral, and the goal to improve active transportation. The project team should also take into account the city of Waterloo's new transportation master plan and how that will effect the mode share of transportation types on this bridge.

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

The large shoulders are somewhat nonsensical, especially on a road that is deemed important enough to have sidewalks. If the bridge need only be wide enough for pedestrians and cars, then make it only that wide and save taxpayer money. If the bridge needs to accommodate other transportation types as well, then they should be properly accommodated through a multi use trail. The current plan seems to spend extra money with little benefit and without much explanation.

Name:

Matthew Froggatt

[redacted]

[redacted]

From:	Engage
To:	Ken Brisbois
Subject:	mikewoolwich completed Public Consultation Centre #2 - Survey Questions
Date:	Saturday, May 21, 2022 10:42:34 PM

mikewoolwich just submitted the survey Public Consultation Centre #2 - Survey Questions with the responses below.

Where do you live?

Region of Waterloo

How often do you cross the Scheifele Bridge on Northfield Drive

Daily

What is the general purpose of your travel on this section of Northfield Drive?

Work

What is the travel mode you often use on this section of Northfield

Car

Scheifele Bridge / Northfield Drive Alternative Alignment #2 (West Side)

No

Staged bridge construction with no long term closure of Northfield Drive during construction.

Yes

Recommend Bridge Section Concept 5 which included 2 traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers.

No

If you answered No to any of the the above 3 questions please elaborate on your reason(s).

The Glasgow Street bridge in Conestogo has just undergone extensive renovations to be intended mostly for pedestrian, buggy and bicycle users. Cars are to be limited. This is a natural and safer parallel route that would remove these type of users from Northfield Drive. Bicyclists in particular would be far safer travelling on this route than exposing themselves to

high speed traffic on the gravel covered roadside of Northfield Drive.

What new information do you feel that the Project Team should consider when proceeding to the Final Design Stage for the Scheifele Bridge Replacement?

Buggys and pedestrians should be banned from access to the bridge. Buggys and bicyclists can be diverted through RIM Park to the Glasgow Street bridge. Bicyclists can continue to use the existing Northfield Drive configuration at their peril.

What challenges or considerations if any do you see with the Recommended Preferred Design Concepts that are being carried forward by the Project Team?

Lane widening for nominal users of the road with increase costs exponentially. With inflation increasing construction costs will be hard to control and now is not the time for hefty property tax increases to support unnecessary extravagances like this proposal.

Name:

Mike McKerlie

[redacted]

[redacted]

From: Ken Brisbois
To: [redacted]
Cc: Leveck, Garry
Subject: RE: Schefule bridge project

Hi Rodney,

I see you submitted a comment sheet prior to information being updated/posted for Public Consultation Centre #2 (PCC#2) on the PCC#1 form.

The Engage website is now active with PCC#2 information and is available for you to review and provide comments either online or by downloading a PCC#2 questionnaire/comment sheet and emailing to either Garry or myself.

Sorry for the confusion and feel free to give me a call if you like.

Thanks,

Ken

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services

Regional Municipality of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

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-----Original Message-----
From: [redacted]
Sent: May 17, 2022 7:01 PM
To: Ken Brisbois <KBrisbois@regionofwaterloo.ca>
Subject: Schefule bridge project

Here's my suggestion!

From: Ken Brisbois
To: [redacted]
Cc: Leveck, Garry
Subject: RE: Scheifele Bridge Comments

Hi Paul,

I see you submitted a comment sheet prior to information being updated/posted for Public Consultation Centre #2 (PCC#2) on the PCC#1 form.

The Engage website is now active with PCC#2 information and is available for you to review and provide comments either online or by downloading a PCC#2 questionnaire/comment sheet and emailing to either Garry or myself.

Sorry for the confusion and feel free to give me a call if you like.

Thanks,

Ken

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services

Regional Municipality of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

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From: [redacted]
Sent: May 11, 2022 5:00 PM
To: Ken Brisbois <KBrisbois@regionofwaterloo.ca>
Cc: garry.leveck@stantec.com
Subject: Scheifele Bridge Comments

[redacted]

Tolerance will reach such a level that,

From: Ken Brisbois
To: "Ashley Reid"; Leveck, Garry
Subject: RE: Scheifele Bridge Replacement - Northfield Drive Over The Conestogo River

---

Hi Ashley,

I see you submitted a comment sheet prior to information being updated/posted for Public Consultation Centre #2 (PCC#2) on the PCC#1 form.

The Engage website is now active with PCC#2 information and is available for you to review and provide comments either online or by downloading a PCC#2 questionnaire/comment sheet and emailing to either Garry or myself.

Sorry for the confusion and feel free to give me a call if you like.

Thanks,

Ken

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services

Regional Municipality of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

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From: Ashley Reid [redacted]
Sent: May 13, 2022 12:03 AM
To: Ken Brisbois <KBrisbois@regionofwaterloo.ca>; garry.leveck@stantec.com
Subject: Scheifele Bridge Replacement - Northfield Drive Over The Conestogo River

Hello,

I live in Conestogo and received a letter regarding the

Scheifele Bridge Replacement - Northfield Drive

Over The Conestogo River

I have completed your survey and provided my feedback.

Essentially the current state of the bridge and Northfield road are entirely unsafe for buggies and cyclist because there is poor visibility, little space and drivers ignore the current speed requirements and there is no enforcement. I am concerned someone is going to die the way Orvie Bowman did last year in Elmira.

The 4 alternatives you presented are all pretty blah. You need to have a separated lane for the buggies and cyclists. The usage will dramatically increase if people feel safer so the counts that you have provided are reflective of the current unsafe condition. Alternative 4 is the only reasonable option but the paved shoulder should be separated similar to the Queen Street separation or heck give the cyclists and buggies there own lane entirely - the way they are in Bogata Columbia.

I know change takes time but do it once and do it right!

Cheers,
Ashley

SCHEIFELE BRIDGE CLASS EA STUDY

PUBLIC INFORMATION CENTRE MEETING 2 COMMENTS

AGENCY AND SPECIAL INTEREST GROUP COMMENTS:

1. **City of Waterloo: C/O Dan Ditaranto, P. Eng.**
   Manager, Design and Construction, Engineering Services:
   Email Dated June 9, 2022.

   The City of Waterloo's Engineering and Transportation Services divisions have reviewed the EngageWR.ca material for PIC #2 for the Scheifele Bridge project and offer the following comments:

   - We support the preferred Alignment #2 (West Side) and are pleased that the staged construction plan will avoid a long-term closure of Northfield Drive, which was one of our main concerns expressed in our previous comments (Mr. Ormson / Mar 3, 2021, letter)).
   - We support the recommended cross-section concept 5, recognizing that it provides appropriate, enhanced facilities for multi-modal use (pedestrians, cyclists, and buggies).

2. **Grand River Conservation Authority: C/O Trevor Heywood, Resource Planner:**
   Letter Dated May 31, 2022.

   - The Grand River Conservation Authority (GRCA) has received the notice and materials from Public Consultation Centre #2 for the Scheifele Bridge Class Environmental Assessment (Class EA).
   - The study area contains the Conestogo River and two unnamed tributaries, as well as their associated floodplains, riverine valleys, and wetlands. We have reviewed the preferred alignment and cross-section alternatives for the bridge replacement and wish to provide the following comments.

     - A new bridge could potentially impact the hydrologic and ecological functions of the resource features noted above. While the proposed replacement is mostly within the area of the existing bridge, the Class EA must speak to how the preferred alternative alignment / cross-section meets GRCA's policies for watercourse crossings (9.1.2) and alterations (9.1.16), as well as public infrastructure in floodplains (8.1.15) and wetlands (8.4.6-8.4.7).

     - A floodplain analysis must demonstrate that hydraulic / fluvial impacts of the new bridge are limited, and the flooding hazard is not exacerbated upstream or downstream. This should be confirmed through HEC-RAS modelling and analysis.

     - Wetlands will be impacted by the new alignment. As such, an environmental impact study (EIS) will be required as part of the Class EA. We request that wetland boundaries are verified in the field to assist the Region in quantifying and characterizing the impacted wetlands. The EIS should then demonstrate:
       - Avoiding, and where unavoidable, minimizing intrusions on significant natural features or hydrologic / ecological functions; and
       - Where intrusions occur, features / functions are restored and enhanced through a restoration plan.

- During detailed design, we will require plans that show construction staging, erosion and sediment controls, and temporary works (example: isolation / dewatering). Cofferdams must be designed to hold back flows from the 2-year flood event with some freeboard. If a significant portion of the channel will be obstructed resulting in increased flood elevations to design storms, it should be included in the hydraulic analysis and the cofferdam height adjusted accordingly.

- Please note that this bridge is downstream of our Conestogo Dam. Prior to construction, we will request site contacts and construction scheduling to notify personnel of significant outflows and forecasted flooding. We will also request a contingency plan or appropriate notes for work / equipment in or near the water.

- Advisory Comments:

    - We recommend no in-water work from March 15 to June 30. However, this is advisory, and the window must be approved by Fisheries and Oceans Canada (DFO). We are aware that DFO previously requested a more restrictive window for no in-water work from March 15 to July 15 for another bridge project two km downstream (Conestogo Bridge).
    - The lower reach of the "eastern tributary", the eastern watercourse adjacent to the bridge, is currently enclosed for 150 metres. The westward shift of the alignment may present an opportunity to daylight this watercourse and introduce other enhancements within the current right-of-way after the new bridge is built.
    - The Public Consultation Centre materials state that there were no comments from the public related to architectural enhancements. We would offer that the Grand River and its major tributaries have national status as Canadian Heritage Rivers, and the project team may find inspiration by reviewing Arch, Truss & Beam: The Grand River Watershed Heritage Bridge Inventory (University of Waterloo, March 2013).

Please continue to consult the GRCA on the project. If you have any questions or require additional information, please contact Trevor Heywood at 519-621-2763 ext. 2292 or theywood@grandriver.ca.

3. **Woolwich Observer: Columnist: Bill Atwood:**
   Newspaper Article: June 2, 2022.

The Woolwich Observer published an article on June 2, 2022, in their weekly newspaper. The article was based on the columnist's interviews with Ken Brisbois, Region of Waterloo Project Manager, and a local resident of Conestogo. Highlights of the column included:

- Confirmation of proposed recommended preferred bridge cross section which includes multi-purpose paved shoulders for buggies and cyclists.
- Confirmation of recent counts of buggy, pedestrian, and cyclist volumes across the Scheifele Bridge, which supported the justification for multi-use paved shoulders.
- Confirmation that a 4-lane bridge is not in the Region's long term Transportation Master Plan, resulting in the preferred 2-lane design concept.
- Confirmation of proposed staged construction program and preliminary project budget estimate.
- Reiterated concerns, by a Conestogo resident, that the bridge project does not include an extension of paved bike lanes on Northfield Drive, from University Avenue (Waterloo) to Sawmill Creek Road (Conestogo). Footnote: The scope of the Scheifele Bridge Class EA study does not include a review of bike lane options between Waterloo and Conestogo.

4. **Kitchener Easy Riders Cycle Club: C/O Roger Suffling:**

   - Kitchener Easy Riders Cycle Club is an adult 50+ cycling club. This organization has a capped membership of 240 drawn from throughout the Region, with a large waiting list of potential members. The club is more than 25 years old.
   - We cycle the Region and elsewhere in Ontario several times a week from early spring to late fall and we promote safe cycling for fun, fitness, and fellowship. Mostly our riding is on roads rather than on trails. Many members also cycle individually for utilitarian purposes, for recreation, and as part of an environmental ethic.
   - Kitchener Easy Riders members use the Scheifele Bridge on a regular basis, and it has been on the route some of our regular, organized group rides. Thus, we are very pleased to see that the study team has endorsed having paved cycle/buggy lanes and sidewalks across the bridge. We trust that these will be a feature of the completed design.
   - We note that many road bridges in the Region have rather low railing and open sides for snow removal, but this can lead to gusty conditions for cyclists crossing these structures. Can anything be done to avoid this happening at the rebuilt Scheifele Bridge?

PUBLIC COMMENTS (Not in any specific order):

1. Ashley Reid: [redacted]
   Note: Late Submission on PCC#1 Comment Form, prior to PCC#2 Live Website.

   - Essentially the current state of the bridge and Northfield Drive are entirely unsafe for buggies and cyclist because there is poor visibility, little space and drivers ignore the current speed requirements and there is no enforcement. I am concerned someone is going to die the way Orvie Bowman did last year in Elmira.
   - The 4 alternatives you presented are all pretty blah. You need to have a separated lane for the buggies and cyclists. The usage will dramatically increase if people feel safer so the counts that you have provided are reflective of the current unsafe condition. Alternative 4 is the only reasonable option but the paved shoulder should be separated similar to the Queen Street separation or heck give the cyclists and buggies their own lane entirely - the way they are in Bogata Columbia.
   - I know change takes time but do it once and do it right!

2. Bruce Burkhardt: [redacted]

   - Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
   - Concerns for the length of time the road might be closed. In Conestogo, construction affected the main street for two years, Sawmill Road to the St. Jacobs roundabout for two years, and the Glasgow Street steel/wooden bridge has been down for 10 plus months and still no opening date.

3. Paul Bolger: [redacted]
   Note: Late Submission on PCC#1 Comment Form, prior to PCC#2 Live Website.

   - The teardown of the Scheifele Bridge will be painful for commuters, emergency services, and pretty much anyone coming in and out of the north end of Waterloo.
   - Single lane on 86 from King Street North to Elmira is 20 years past its capacity.

- Glasgow Street bridge in Conestogo is still unusable and embarrassing for the Region. Should have been functional months ago.

4. Rodney Brown: [redacted]
   Note: Late Submission on PCC#1 Comment Form, prior to PCC#2 Live Website

   - Suggest that reconstruction of Scheifele Bridge not be started until the Glasgow Street bridge is reopened, thereby providing residents of Conestogo with an alternate route into Waterloo.

5. Mike McKerlie: [redacted]

   - Does not support either Alignment Concept 2 or Bridge Cross Section 5 but does support a Staged Construction Program.
   - The Glasgow Street bridge in Conestogo has just undergone extensive renovations to be intended mostly for pedestrian, buggy, and bicycle users. Cars are to be limited. This is a natural and safer parallel route that would remove these uses from Northfield Drive. Bicyclists would be far safer travelling on this route than exposing themselves to high-speed traffic on the gravel covered roadside of Northfield Drive.
   - Buggies and pedestrians should be banned from access to the Scheifele bridge. Buggies and bicyclists can be diverted through RIM Park to the Glasgow Street bridge. Bicyclists can continue to use the existing Northfield Drive configuration at their peril.

6. Gena Braun: [redacted]

   - Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
   - I would prefer to bike, but this is very unsafe under the current conditions (very narrow bike lane and high-speed traffic). I drive when I am unable to bike via the Glasgow bridge.
   - The wide shoulder/bike lane needs to be continuous along the entire stretch of Northfield (from University Dr to Sawmill Drive) to make it both useful and safe for cyclists. Ideally it would meet the requirements for a AAA trail ("all ages and abilities") and a raised multi-use trail or a bike lane with a barrier would be best.
   - The design team is considering the trail under the bridge on the south side - it would be wonderful if this trail can even be improved as part of the construction to make it useful for possible future extension of the Health Valley Trail from St Jacobs to Conestogo.

7. Karen Hofbauer: [redacted]

   - Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
   - Consider expanding the project to include a paved bike lane/multi-use trail connecting to Sawmill Road. There is not currently safe pedestrian/cycle (normal cyclist, not the cycling club) access from Conestogo to the Health Valley Trail. The trail is advertised as St. Jacobs to Conestogo, and yet it cannot easily be accessed from Conestogo.
   - There is a history of vehicle accidents (head-on and otherwise) between the Scheifele Bridge and Conestogo. I feel that this is in part due to people speeding up leaving Waterloo, and then slamming on the brakes as they approach a traffic backup south of Sawmill Road. Widening this bridge will encourage drivers to speed up more as they leave Waterloo. Consideration should be given to a 60 km/h speed limit between the bridge and Conestogo.
   -

8. Carla Wilson: [redacted]

    - Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
    - Please include bike lanes before and after the bridge too. Should be automatic and mandatory with all road improvements. Make it people friendly, not just car.

9. Julie Metaxas: [redacted]

    - Supports Bridge Cross Section Concept 5 and Staged Construction but did not support Alignment Concept 2.
    - Widening of the bridge is useful but the project falls short if bike lanes are not extended between Waterloo and Conestogo.
    - A connection to the Health Valley Trail would be beneficial to the Conestogo Community.

10. Chris Metaxas: [redacted]

    - Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
    - The preferred alternative is a positive choice to accommodate active transportation (biking and hiking) however connectivity & safety issues remains beyond the study limits.
    - Consideration should be given to a connection with the Health Valley Trail.

11. David Martin: [redacted]

    - Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
    - Bike lanes need to be continuous between Conestogo and Waterloo.

12. David Trueman: [redacted]

    - Supports Alignment Concept 2 and Staged Construction Program but does not support Bridge Cross Section Concept 5.
    - A large segment of the cycling population will never use an unprotected lane on a busy and high-speed road like Northfield. Bridges are expensive and long-term infrastructure, so it is important to get the design right.
    - TransformWR, adopted by the Region and the Township calls for a major shift to active transportation -- we cannot reach these goals if major infrastructure does not meet the needs of the majority. Therefore, the design should convert one sidewalk to a multi-use pathway, connected on both sides to continuous paths from Sawmill to University. I imagine that the east side will be best but have not looked at this detail.
    - TransformWR, our climate plan, has, as the very first action, "Action 1.1.1: Plan a network of major active transportation corridors … for people of all ages and abilities (AAA)". AAA facilities appeal to 2/3s of the cycling population characterized as "interested but concerned". If this bridge is not AAA, then it failed to serve that population and fails to move the needle on climate action.

13. Erin Schmidt: [redacted]

    - Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.

- I would like to be able to bike from Conestogo to Waterloo, along Northfield Drive, but it is currently unsafe. There should be a continuous paved shoulder ideally meeting the requirements for a AAA trail ("all ages and abilities") and have a barrier for the bike lane.
- Also, I would like to be able to hike or bike along the Health Valley Trail from Conestogo to St. Jacobs, so it would be great if this extension were to be accounted for in the rebuilding the bridge and the underside.

14. Jillian Schmitter: [redacted]

- Supports a Staged Construction Program but does not support Alignment Concept 2 or Bridge Cross Section Concept 5.
- I do not believe the preferred design concept aligns with the Region's transportation master plan for Northfield. I would prefer to see a multi-use trail incorporated in the preferred concept.
- Exhibit 5.6 of the Region's Transportation Master Plan indicates that the long-term strategy is for this section of Northfield to implement separated bike lanes by 2041. A multi-use trail already exists along the eastern side of Northfield between Davenport and Bridge Street. Although this is outside of the study area, the potential opportunities to provide future connections to existing infrastructure is not apparent in the evaluation.
- The PIC materials and evaluation framework both note that experienced cyclists can use the paved shoulder and inexperienced cyclists can choose to use the protected sidewalks. However, this does not consider that adults riding bikes on sidewalks is prohibited by municipal by-laws throughout the Region and that many adults will believe that biking on the sidewalk is prohibited in this case. I do not consider sidewalks protected by a barrier to be bike friendly infrastructure.
- In my view the prohibition of adults riding on sidewalks under municipal by-laws is a challenge to the real-world functioning of the preferred design concept. Regardless of if this specific by-law exists in Woolwich, many people incorrectly believe that adults riding bikes on sidewalks is prohibited province wide. Therefore, by not providing dedicated cycling infrastructure this bridge will continue to be a barrier to inexperienced cyclists and adults riding bikes with children.

15. Colleen Heihrichs: [redacted]

- Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
- The wide shoulder/bike lane needs to be continuous and PAVED along the entire stretch of Northfield (from University Dr to Sawmill Drive) to make it both useful and safe for cyclists. Ideally it would meet the requirements for a AAA trail ("all ages and abilities") and a raised multi-use trail or a bike lane with a barrier would be best.
- The design team has accounted for the trail under the bridge on the south side - it would be wonderful if this trail can even be improved as part of the construction to make it useful for possible future extension of the Health Valley Trail from St Jacobs to Conestogo.

16. Nigel King: [redacted]

- Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
- Northfield Drive from University to Sawmill Rd. is hazardous for cyclists. It is well used by cyclists. That section needs to have a cycle lane in both directions.

17. Betty Ann Hunt: [redacted]

    - Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
    - Maintaining traffic during construction is a must. Not sure where traffic would be routed if a detour were necessary.

18. David Paleczny: [redacted]

    - Supports Alignment Concept 2 and Staged Construction Program.
    - One request. The Woolwich Township people have been uncooperative and difficult in the past when Northfield closure was required. Please I beg you --- convince them to open Glasgow Street north and south when Northfield temporary closure is required.

19. Josh Orita [redacted]

    - Supports a Staged Construction Program but does not support Alignment Concept 2 or Bridge Cross Section Concept 5.
    - There is no protection for people riding bicycles.
    - The current bridge was built 62 years ago. If the new bridge is going to be around for decades, it seems irresponsible to not future proof it with protected cycling infrastructure.

20. Dan Brotherston: [redacted]

    - Does not support either of Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
    - Your cycling infrastructure is inadequate. It is a busy high-speed road, and according to the MTO book 18 monograph it needs separated cycle infra. You know this, so why are you proposing inadequate infrastructure. This is a legal liability, and you are not meeting the standards set out. Next time someone is injured or killed they can sue you.
    - The standard monograph for cycling infrastructure in the MTO book 18 explicitly states "Alternate roadway or MUT" for roads with speeds >=80km/h (Northfield) and traffic counts >=10k which according to the 2015 traffic counts on your website, Northfield exceeds.
    - It is dangerous and will lead to more deaths.

21. Josephine McMurray: [redacted]

    - Supports a Staged Construction Program but does not support Alignment Concept 2 or Bridge Cross Section Concept 5.
    - Provide protected bike lanes Build your infrastructure with the future in mind. More pedestrian and bicycle traffic are inevitable.
    - You must place a higher priority on pedestrians and cyclists that will inevitably come with development of this land. Be bold. Have foresight.

22. Matthew Froggatt: [redacted]

    - Supports Alignment Concept 2 and Staged Construction Program but does not support Bridge Cross Section Concept 5.
    - The recommended alternative with multi use trails should be used instead. There is enough space for the trails and there is not enough pedestrian/cyclist volume to justify separating both, so the trail should be used. The trail also meets the region’s goals of becoming climate

neutral and supporting active transportation much better than the currently selected cross section.
- The project team should consider the safety of all road users, the goal of the region to be climate neutral, and the goal to improve active transportation. The project team should also account for the City of Waterloo's new transportation master plan and how that will affect the mode share of transportation types on this bridge.
- The large shoulders are somewhat nonsensical, especially on a road that is deemed important enough to have sidewalks. If the bridge need only be wide enough for pedestrians and cars, then make it only that wide and save taxpayer money. If the bridge needs to accommodate other transportation types as well, then they should be properly accommodated through a multi-use trail. The current plan seems to spend extra money with little benefit and without much explanation.

23. Len Bradfield [redacted]

- No comment on either of the Staged Construction Program, Alignment Concept 2, or Bridge Cross Section Concept 5.
- I cycle daily all winter, at least when conditions are not fully Antarctic (about a week). The plow comes by after a snowstorm and I can then use the road into Waterloo (with much care) until the Bridge. I find there is a huge crush of snow on the raised sidewalk and carefully proceed, usually after crossing to the other (east) side, which the plow has been able to clear.
- A raised barrier "protecting" cyclists on each side will provide a very dangerous situation. The west raised sidewalk currently remains unusable all winter. It has been that way since I moved to Conestogo 37 years ago. The thought of both sides being unusable is just wrong.
- It is not reasonable to expect a separate smaller plow to handle the "sidewalks" expeditiously. There is a delay of a day or more in Waterloo where there are separate paths.
- The rest of Northfield Dr has no such barriers and since the extra 20 or so inches was added to the pavement several years ago seems to be safe enough.
- A preference: please keep as much of the "swamp" on the west side as you can. I fear that encroaching by 10 meters will damage it a lot. I understand the need to avoid moving the new 27kV power line.

24. Marsha Ferguson: [redacted]

- Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
- I would ride my bike to work if it were safer to do so down Northfield Dr to University Ave from Conestogo.
- Will large farm equipment operators be able to safely drive across with barriers in place?

COMMENTS FROM MENNONITE COMMUNITY (Not in any specific order):

25. Allen Sauder: [redacted]

- Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
- Crosses bridge weekly by buggy.

26. Edgar Martin: [redacted]

    - Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
    - Rarely crosses bridge (by transit).
    - Thank you to Project Team for consideration of Mennonite community needs for safe buggy travel across bridge.

27. Isaac Martin: [redacted]

    - No indication of support for recommended design concepts.
    - Crosses bridge monthly by buggy.
    - Thank you to Project Team for considering Mennonite community needs for safe buggy travel across bridge.

28. Irvin Martin: [redacted]

    - Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
    - Crosses bridge monthly by buggy.

29. George Martin, [redacted]

    - No indication of support for recommended design concepts.
    - Rarely crosses the bridge by buggy.
    - Thank you to Project Team for considering Mennonite community needs for wider shoulders on bridge so that buggy travel is out of the traffic lanes while crossing the bridge.

30. Ion Martin: [redacted]

    - Supports Alignment Concept 2 and Staged Construction Program but **does not support** Bridge Cross Section Concept 5.
    - Crosses the bridge by car or buggy once a month.
    - The few times that we cross the bridge by buggy does not justify expenditure on extra road barriers.

31. Eli Martin: [redacted]

    - Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
    - Crosses the bridge by buggy on rare occasions.

32. John Weber, [redacted]

    - Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
    - Crosses the bridge monthly by buggy and/or bicycle.
    - I see no value in leaving the old bridge abutments.
    - Sounds like a good plan.
    - Thanks for all the detailed work and may a new bridge be erected safely.

33. Eli K. Martin, [redacted]

- Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
- Crosses the bridge by buggy on rare occasions.
- As a buggy user, I wish to extend a hearty thank you for considering our mode of transportation on this project.
- There are numerous buggy owners who would benefit from having the Peel Street bridge in Winterbourne repaired to a usable condition.

34. Mervin Martin: [redacted]

- Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
- Crosses the bridge monthly by buggy.
- Thank you for considering Horse and Buggies!!

35. James M. Martin: [redacted]

- Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
- Crosses the bridge monthly by buggy.
- We want to give a heartfelt thank you for the consideration of shoulders on the bridge for buggy traffic.
- PS: We still really miss the closed Peel Street bridge for buggy traffic.

36. Harvey Sauder, [redacted]

- Supports Alignment Concept 2, Bridge Cross Section Concept 5, and Staged Construction Program.
- Crosses the bridge monthly by buggy.
- Thank you for considering buggy lanes.
- Will shoulders be wider north and south of the bridge?

37. Henry Brubacher [redacted]
Note: Handwritten comments as opposed to Questionnaire response.

- No indication of support for recommended design concepts.
- No indication of frequency of travel across existing bridge.
- Thank you for your concern to include us in your plan for our safety on the road to make lanes wide enough to not force us onto the busy road.
- The closed Peel Street bridge affects us quite a lot as this road would be used by buggies to stay away from other busier roads.
- Can anything be done to open Peel Street bridge to light traffic?

SCHEIFELE BRIDGE CLASS EA STUDY

PUBLIC INFORMATION CENTRE MEETING 2 COMMENTS

SYNOPSIS OF PUBLIC SUBMISSIONS

GENERAL PUBLIC (24 Comments):

1. **Recommended Preferred Alignment #2:**

   - **Supports Design: 14**
   - **Does Not Support Design: 6**
   - **Non-Committal: 4**

2. **Recommended Preferred Bridge Cross Section #5:**

   - **Supports Design: 12**
   - **Does Not Support Design: 7**
   - **Non-Committal: 5**

3. **Recommended Construction Staging Plan:**

   - **Supports Design: 19**
   - **Does Not Support Design: 1**
   - **Non-Committal: 4**

4. **Significant General Comments:**

   - Essentially the current state of the bridge and Northfield Drive are entirely unsafe for buggies and cyclist because there is poor visibility, little space and drivers ignore the current speed requirements and there is no enforcement.
   - The Glasgow Street bridge in Conestogo has just undergone extensive renovations to be intended mostly for pedestrian, buggy, and bicycle users. Cars are to be limited. This is a natural and safer parallel route that would remove these uses from Northfield Drive. Bicyclists would be far safer travelling on this route than exposing themselves to high-speed traffic on the gravel covered roadside of Northfield Drive.
   - The wide shoulder/bike lane needs to be continuous along the entire stretch of Northfield (from University Dr to Sawmill Drive) to make it both useful and safe for cyclists.
   - There is not currently safe pedestrian/cycle (normal cyclist, not the cycling club) access from Conestogo to the Health Valley Trail. The trail is advertised as St. Jacobs to Conestogo, and yet it cannot easily be accessed from Conestogo.
   - Maintaining traffic during construction is a must.
   - Suggest that reconstruction of Scheifele Bridge not be started until the Glasgow Street bridge is reopened, thereby providing residents of Conestogo with an alternate route into Waterloo.

- A preference: please keep as much of the "swamp" on the west side as you can. I fear that encroaching by 10 meters will damage it a lot. I understand the need to avoid moving the new 27kV power line.

MENNONITE COMMUNITY (13 Comments):

5. **Recommended Preferred Alignment #2:**

   - **Supports Design: 10**
   - **Does Not Support Design: 0**
   - **Non-Committal: 3**

6. **Recommended Preferred Bridge Cross Section #5:**

   - **Supports Design: 9**
   - **Does Not Support Design: 1**
   - **Non-Committal: 3**

7. **Recommended Construction Staging Plan:**

   - **Supports Design: 10**
   - **Does Not Support Design: 0**
   - **Non-Committal: 3**

8. **Significant General Comments:**

   - Thank you to Project Team for considering Mennonite community needs for wider shoulders on bridge so that buggy travel is out of the traffic lanes while crossing the bridge.
   - As a buggy user, I wish to extend a hearty thank you for considering our mode of transportation on this project.
   - There are numerous buggy owners who would benefit from having the Peel Street bridge in Winterbourne repaired to a usable condition. We still really miss the closed Peel Street bridge for buggy traffic.
   - The closed Peel Street bridge affects us quite a lot as this road would be used by buggies to stay away from other busier roads. Can anything be done to open Peel Street bridge to light traffic?
   - Will shoulders be wider north and south of the bridge?

Region of Waterloo

Public Consultation Centre #2

Scheifele Bridge Replacement Study

Regional Road 22 (Northfield Drive) over Conestogo River

Township of Woolwich

Class EA - Schedule C

May 18th, 2022 – June 8, 2022

Stantec

Region of Waterloo

Video Will Go Here

Welcome and Thank You For Participating

Info at www.engagewr.ca/scheifele-bridge-replacement

Please submit any other questions or comments to either:

Ken Brisbois, C. Tech.
Project Manager
Region of Waterloo
Email: kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Project Manager
Stantec Consulting Ltd.
Email: garry.leveck@stantec.com

Please submit all comments by June 8, 2022

Stantec

Region of Waterloo

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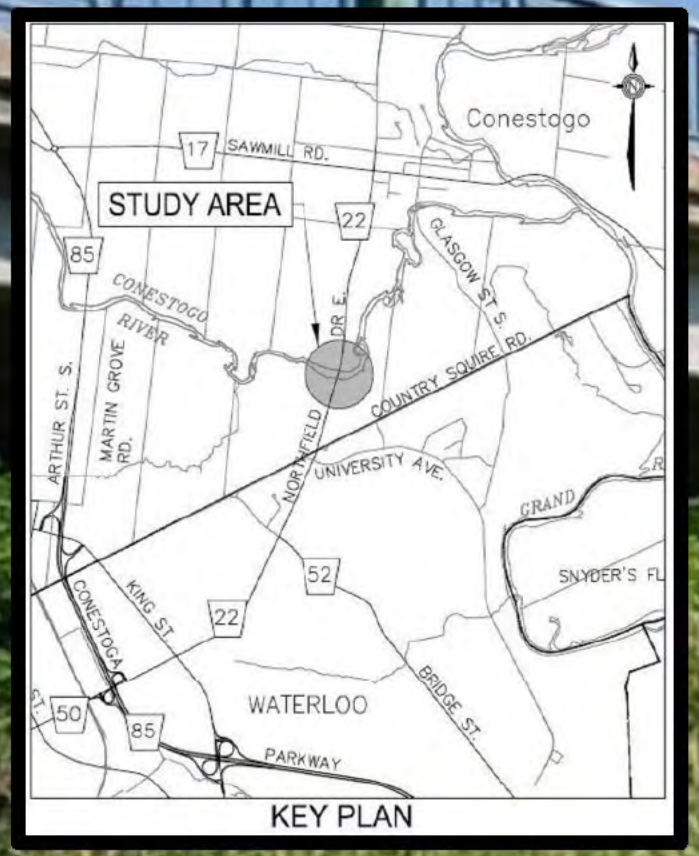

May 18, 2022

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Region of Waterloo

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Study Team

Region of Waterloo

Mike Jones
Supervisor
Traffic Engineering

Ken Brisbois
Project Manager
Design and Construction

Skylar Van Kruistum
Head (Rehabilitation)
Design and Construction

WOOLWICH TOWNSHIP

Larry Shantz
Councillor – Ward 3

Murray Martin
Councillor – Ward 3

Ryan Tucker
Project Supervisor
Engineering

Jared Puppe
Director
Infrastructure Services

Stantec

Mike Trader
Structural Engineer

Adam Felinczak
Structural Engineer

Garry Leveck
Senior Project Manager

Bill White
Senior Transportation
Technologist

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May 18, 2022

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May 18, 2022

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Public Consultation Centre #1

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Environmental Assessment

Background Information

Existing Conditions vs. Needs

Studies

Alternatives

Questionnaire

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May 18, 2022

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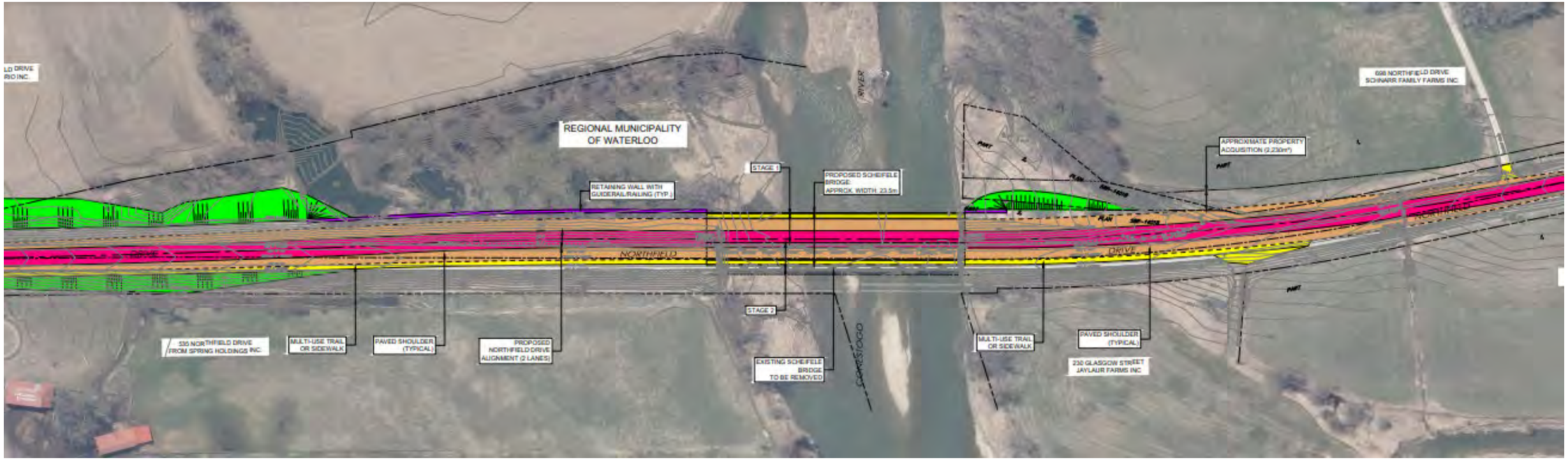
Alternative Alignment Concept 2

Alternative Concept 2: Staged Construction (West Side)



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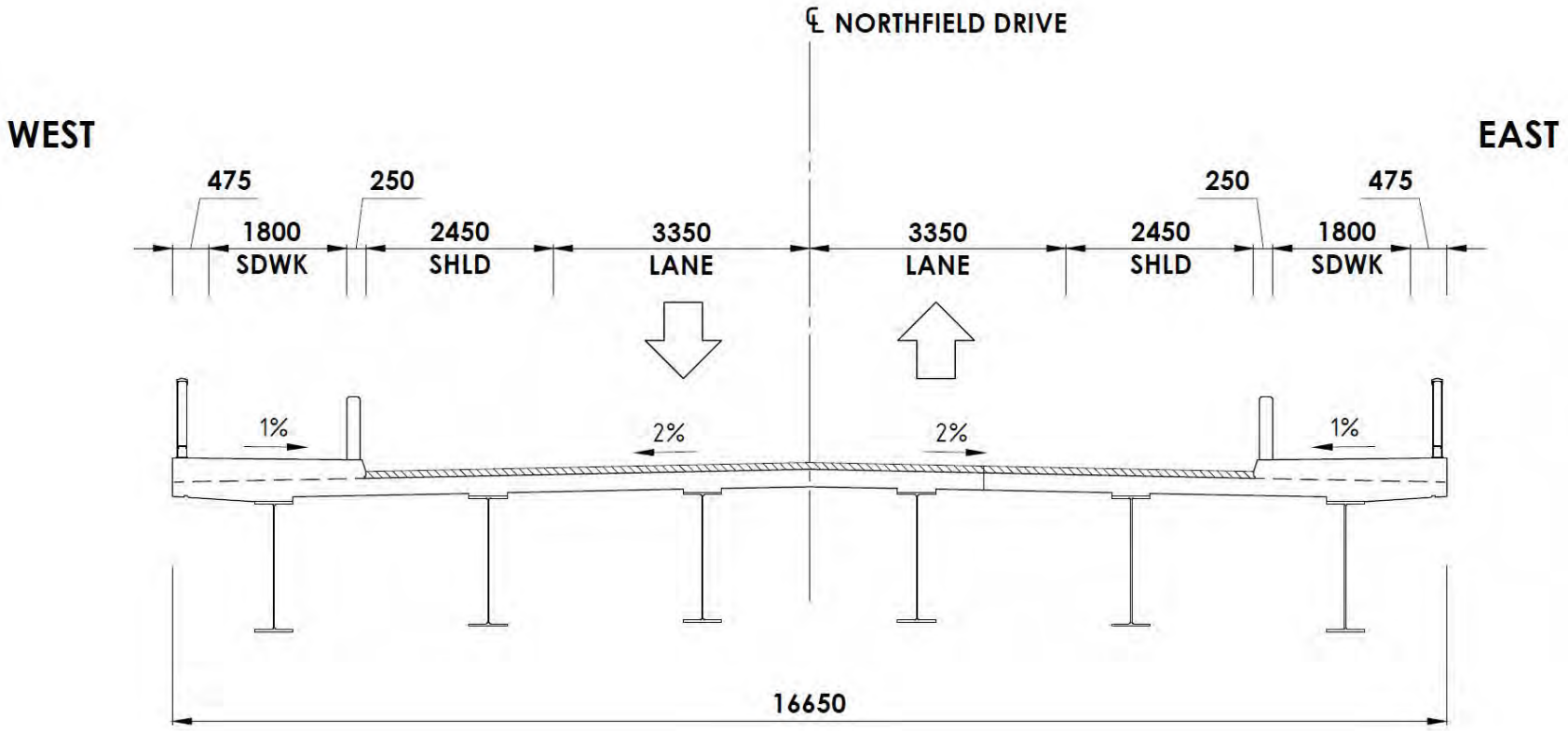
Alternative Cross Section 5



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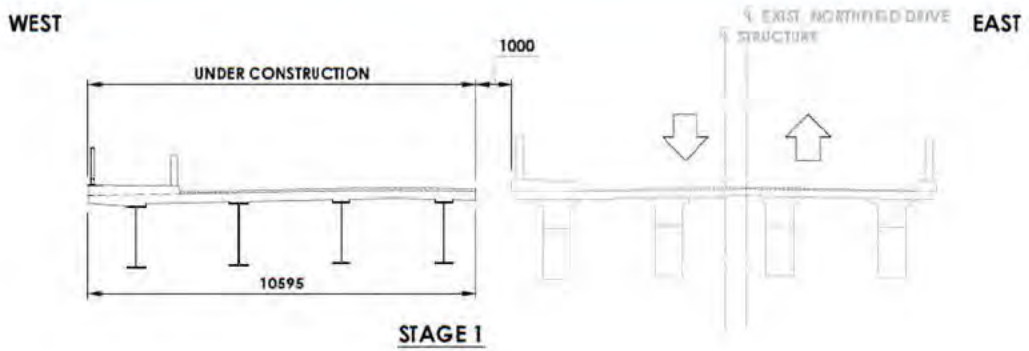
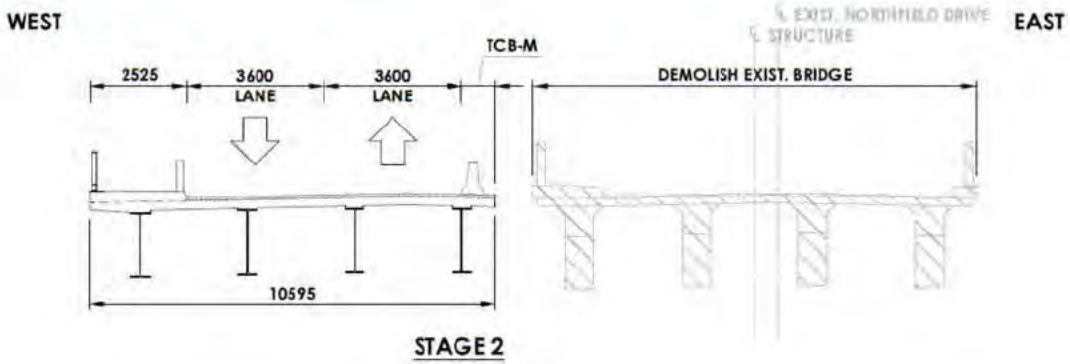
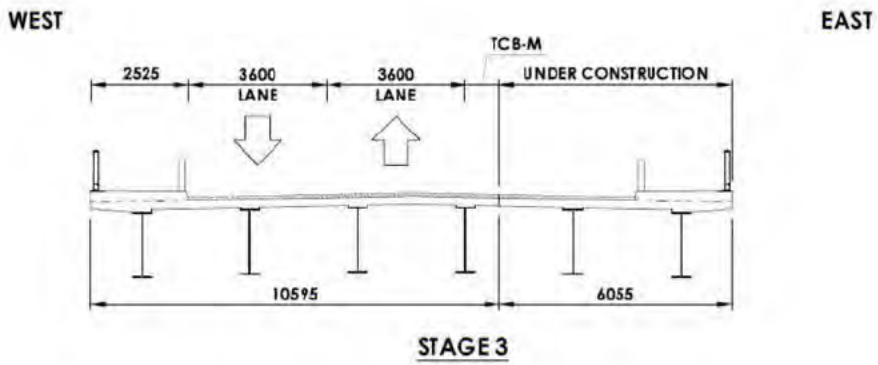
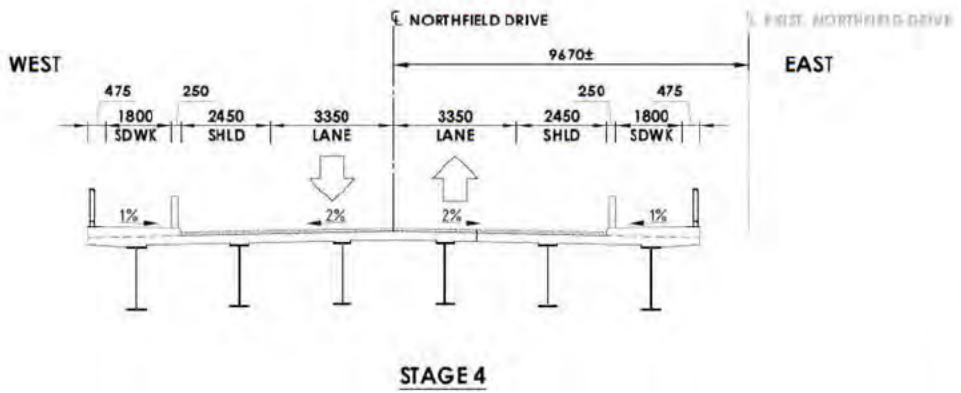
Construction Staging / Traffic Control

Construction Staging Program: Alternative Alignment Concept 2 and Cross Section 5









May 18, 2022

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Schedule – Next Steps

May 18, 2022

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Have Your Say…

Video Will Go Here

Once you have taken time to review all the presentation materials, we ask that you please provide feedback either through the online survey link provided or by filling out the Questionnaire/Comment Sheet at the link below and returning it by mail or e-mail to the address below.

The Online Survey Questionnaire/Comment Form can be found here.

Alternatively the Public Consultation Centre #1 Questionnaire/Comment form can be download (Not required if online survey is completed).

Please submit your downloaded form or any other questions or comments to either:

Ken Brisbois, C. Tech.
Region Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: (519) 575-4400 Ext. 4606
Fax: (519) 575-4430
Email: kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

Please submit all comments by June 9, 2022

May 18, 2022

Stantec

16 Fernwood Place
Kitchener
Ontario N2M 2Z2

Mr. Ken Brisbois
Region Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3

Re: Scheifele Bridge Replacement
Public Consultation Centre #2, May 18 – June 8, 2022

June 3, 2022

Dear Mr. Brisbois,

Kitchener Easy Riders Cycle Club is pleased to have an opportunity to comment on the proposed Scheifele Bridge replacement.

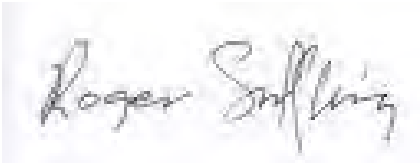
Kitchener Easy Riders Cycle Club is an adult 50+ cycling club. This organisation has a capped membership of 240 drawn from throughout the Region, with a large waiting list of potential members. The club is more than 25 years old. We cycle the Region and elsewhere in Ontario several times a week from early spring to late fall and we promote safe cycling for fun, fitness and fellowship. Mostly our riding is on roads rather than on trails. Many members also cycle individually for utilitarian purposes, for recreation, and as part of an environmental ethic.

Kitchener Easy Riders members use the Scheifele bridge on a regular basis, and it has been on the route some of our regular, organised group rides. Thus, we are very pleased to see that the study team has endorsed having paved cycle/buggy lanes and sidewalks across the bridge. We trust that these will be a feature of the completed design.

We note that many road bridges in the Region have rather low railing and open sides for snow removal, but this can lead to gusty conditions for cyclists crossing these structures. Can anything be done to avoid this happening at the rebuilt Scheifele bridge?

Thanks again for the opportunity to comment.

Sincerely,



Roger Suffling

On behalf of the Kitchener Easy Riders Bike Advocacy Committee.

CC:

Garry E. Leveck, P.Eng.
Consultant Project Manager
Stantec Consulting Ltd.

Graham Vincent, President of Kitchener Easy Riders

Patrick and Audrey Gleeson

Information Package

Scheifele Bridge Replacement Study

Regional Road 22 (Northfield Drive) at Conestogo River
Township of Woolwich

Public Consultation Centre #2

May 18 – June 8, 2022

Held virtually online at www.engagewr.ca

What: The Region of Waterloo is undertaking a Municipal Class Environmental Assessment (EA) for the proposed replacement of the Scheifele Bridge.

Where: The Scheifele Bridge crosses the Conestogo River on Regional Road 22 (Northfield Drive) between University Avenue in the City of Waterloo and Sawmill Road in the Village of Conestogo.

Why: To address deteriorating structural deficiencies in the existing bridge, as noted in a July 2019 Preliminary Information Study Report by the Region of Waterloo.

When: The Region of Waterloo's 10-Year Transportation Capital Plan currently includes funding for reconstruction in 2023.

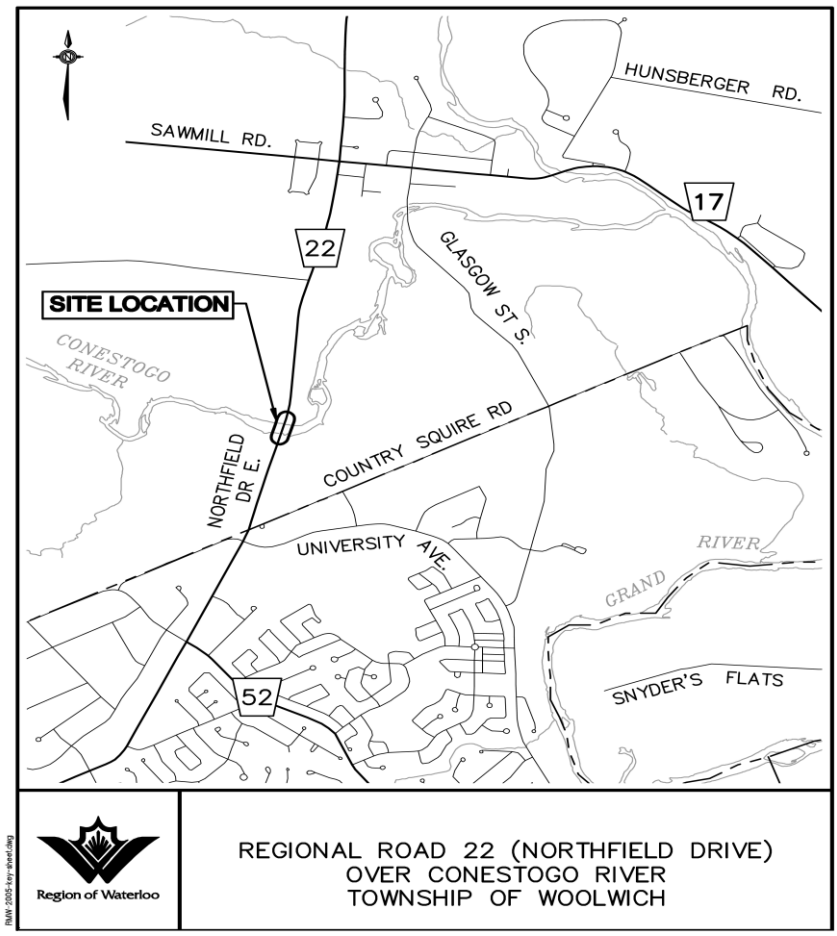
Who: Region of Waterloo Project Manager
Ken Brisbois
Phone: 519-575-4606
kbrisbois@regionofwaterloo.ca

What is the purpose of this second Public Consultation Centre (PCC)?

At this PCC, the project team will present a preferred alternative to meet the improvement needs of Scheifele Bridge. We will share the findings of the Environmental Assessment (EA) in terms of the improvement needs, what other solutions were considered, how we evaluated all alternative solutions to reach a preferred alternative, and ask the public for their comments on the preferred alternative.

Region and project consultant staff are available to answer any questions the public may have.

To complement this Class EA process, the Region of Waterloo will use its EngageWR online survey platform to help reach as many of the public as possible to get input on this project. Your comments will be considered by the project team in conjunction with all other relevant information in recommending a preferred alternative to Council.



What is a Class Environmental Assessment?

The Municipal Class EA is a planning and decision-making process approved under the Environmental Assessment Act that is used by municipalities to plan public infrastructure projects so that potential environmental impacts are considered before a project is approved to move forward. It requires consultation with the public, involved stakeholders and agencies to consider alternatives and impacts on the project environment.

This project is being planned in accordance with the requirements of the Municipal Class Environmental Assessment (Class EA) Schedule "C" which applies to larger, more complex projects with the potential for significant environmental impacts (natural, social, cultural and economic) and requires multiple opportunities for public input.

For additional details regarding the Municipal Class EA process, please refer to **Appendix "B"**.

Who is directing this project?

The planning and design for this project is being directed by a project team consisting of staff from the Region of Waterloo and the Township of Woolwich, including Councillors Larry Shantz and Murray Martin from the Township of Woolwich. The Waterloo office of Stantec Consulting Ltd has been retained by the Region of Waterloo to provide planning and preliminary design services for this project.

Why is the Region considering this project?

In July 2019, the Region of Waterloo completed a Preliminary Investigation Report (PIR) that summarized the results of various investigative studies of the Scheifele Bridge. The 2019 study included reviews by the Engineering and Transportation Planning Divisions at the Region, as well as input from utility companies, the Township of Woolwich, and various local stakeholders.

The 2019 study acknowledged numerous deficiencies in the 65-year-old structure, including concerns with the bridge deck and abutments that were identified in earlier structural appraisals dating back to 2005 and 2010. Although a full deck replacement was the focus of the 2019 PIR, replacement of the abutments and piers was not ruled out in conjunction with any major bridge replacement contract.

The bridge replacement is also an opportunity to provide enhanced pedestrian, cycling and buggy facilities. The Region's Transportation Master Plan recommends a combination of wider paved shoulders, sidewalks, and/or multi-use trails on a reconstructed bridge deck.

With an identified need to replace the Scheifele Bridge, the Region is completing a Municipal Class Environmental Assessment study to examine various design concepts. Following completion and approval of a final Environmental Study Report, the Region would move forward with final design and construction of the preferred design, subject to budget as well as council and agency approvals.

What work has been completed to date?

The project was initiated in 2019 with the first Public Consultation Centre (PCC#1) held online between May 19 and June 9, 2021, to provide information on the purpose of the Class EA study and need for replacement of Scheifele Bridge.

There were 222 visits to the Region of Waterloo's Engage website with a total of 8 written comments (two from government agencies and 6 from residents) summarized below:

1. The Ontario Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTC) confirmed that Stantec's Stage 1 Archaeological Assessment study report has been filed on the Ontario Registry of Archaeological Reports, and that the design team should follow up with any new information related to a Marine Archaeological Assessment study after selection of a preferred bridge design solution.

2. The local Grand River Conservation Authority (GRCA) provided a detailed summary of conditions that will need to be addressed before a future Permit Application can be approved for construction of the new bridge within the regulated boundaries of the Conestogo River. The key elements of the GRCA's conditions included:

    - A requirement that the new design limits, where practical, any impacts on the hydraulic and fluvial dynamics of the Conestogo River and its upstream tributary;
    - Where possible, the new bridge should minimize intrusion on any significant natural features or ecological functions in the area;
    - That the new bridge design should avoid, to the extent possible, any natural bends in the river;
    - That the new design should take advantage of existing open areas on the channel banks or valley slopes to minimize impacts on fish habitat;
    - That any potential hydraulic changes in the Conestogo River, arising from the proposed bridge configuration, shall be modelled using standard engineering design principles, and finally; and

3. A resident of the village of Conestogo and regular user of Northfield Drive and the Scheifele Bridge commented that the Scheifele Bridge is a critical link between Waterloo and Conestogo / Woolwich and should be considered as such in any preferred design solution and that the high posted speed limit on Northfield Drive presents safety issues for buggy, cyclist, and pedestrian users on the current bridge, and that Northfield Drive is used extensively by the Waterloo Cycling Club, making increased safety a high priority.

Four residents of the Township of Woolwich, who indicated that they are regular users of Northfield Drive and the Scheifele Bridge, presented the following consolidated observations:

4. One resident requested separate lanes, or wider shoulders, for buggy and cyclist traffic;

5. One resident requested that Northfield Drive be kept open to traffic during construction of the new bridge, and that the Glasgow Street bridge be kept open to 2-way traffic;

6. One resident suggested that concrete safety barriers be provided between the roadway and any sidewalks or multi-use trails on both sides of the bridge;

7. One resident suggested that a 4-lane bridge, although "nice-to-have", is perhaps premature based on future traffic volumes; that it is imperative to have wider shoulders for buggy and cycle traffic; and that separate pedestrian walkways are desirable and should be extended along Northfield Drive; and

8. Finally, one resident of the City of Waterloo, and an expressed frequent user of Northfield Drive and the Scheifele Bridge, requested that Species at Risk (SAR) should be treated carefully during the design and construction stages; commented that a full road closure or detour may not be as problematic as other recent construction projects in the Region; and requested that the trail under the south span of the bridge be maintained during construction.

Four Preliminary Design Alignment Concepts were developed for the replacement of the Scheifele Bridge and reconstruction of Northfield Drive near the bridge. The four alignment options were created with several objectives in mind, including:

- Where possible – minimize impacts to the natural environment.
- Where possible – avoid or minimize impacts to existing private property.
- Where possible – minimize conflicts with existing major utilities.
- Where possible – create solutions that provide for uninterrupted traffic on Northfield Drive over the course of an anticipated two-year bridge reconstruction period.

The four Northfield Drive alignment concepts, along with a comparative evaluation matrix, were presented in the Public Consultation Center # 1, but no decisions or recommendations were presented at that time.

The four alignment concepts were:

- Alternative Concept 1: Construction beside existing bridge - West Side
- Alternative Concept 2: Staged construction – West Side
- Alternative Concept 3: Staged construction – East Side
- Alternative Concept 4: Construction on existing alignment

Although no member of the public expressed a preference for one alternative over the other, the project team has since considered all the background study data and completed its final assessment of the four bridge/road alignment concepts.

In conjunction with the evaluation of the four alignment alternatives, four preliminary bridge cross-section design concepts were also developed for the replacement of the Scheifele Bridge and presented at Public Consultation Center #1.

The four alternative bridge cross-sections varied in total widths from 14.5 m to 23.0 m,

with three of the options retaining two traffic lanes and one providing for a future four lane pavement section. Paved shoulders, for the increased safety of buggy and cycle users, were included in all four of the bridge alternatives, while provisions for sidewalks or multi-use trails, on either one or both sides of the bridge were optional for all bridge cross section designs.

Comments received at PCC#1 supported the need for traffic, pedestrian/cyclist and buggy improvements in conjunction with the Scheifele Bridge replacement and have been incorporated into the needs and opportunities of the project for the development of the preferred design.

The Region of Waterloo routinely monitors traffic volumes on arterial roads, focusing primarily on vehicular movements. In certain circumstances, counts of pedestrian and cyclist activity are completed to supplement available data.

Since the planning process for a new Scheifele Bridge design is integrally connected to all forms of traffic movements, including vehicular, buggy, cyclist and pedestrian volumes, the Region supplemented current vehicle traffic data with one-week camera counts of buggy, cycle, and pedestrian movements across the Scheifele Bridge. The field counts were carried out between Monday May 31 and Sunday June 6, 2021, and are summarized as follows:

	Max Daily Count:	**Seven Day Total:**
Pedestrian	19 Crossings	55 crossings
Cyclist	80 Crossings	361 crossings
Buggy	7 Crossings	26 Crossings

In accordance with the Class EA, environmental studies were completed for the study area in order to identify areas of concern related to potential for impacts with the Scheifele Bridge replacement. Environmental studies completed include: legal surveys, structural/bridge design, geotechnical investigations, heritage and archaeological field studies, terrestrial, fisheries and natural environmental assessments, river hydraulics and morphology modelling, and traffic and transportation. No significant environmental constraints or potential for impact were identified from these studies.

How have the improvement alternatives been evaluated?

The improvement alternatives have been assessed against a set of evaluation criteria by the project team to determine which alternative is “Preferred” and is considered to best address the needs and opportunities for the replacement of Scheifele Bridge. The evaluation criteria included the following:

1. Technical

How well does the alternative manage traffic performance and network connectivity, pedestrian, cyclist and buggy related needs?

2. Natural Environment

What impact does the alternative have on the natural environment features such as trees and wetlands, wildlife, aquatic habitat, air quality and surface drainage?

3. Socio-Cultural Environment

What impact does the alternative have on adjacent communities and properties (access, property acquisition), landscapes, archaeological or heritage resources?

4. Costs

How do the alternatives compare for anticipated capital, operating and property acquisition costs?

Following PCC #1, the project team reviewed public input, as well as the various identified constraints, in order to finalize the evaluation of the alternatives.

Has the project team identified a preferred alternative?

In consideration of the various alignment, as well as cross section alternatives related to the Scheifele Bridge Replacement, the project team has identified the following as the preferred alternative:

Alternative Alignment Concept 2—Staged Construction (West Side)

- This alternative proposes that the new bridge be constructed about 9.5 meters west of the existing structure, which will require widening of the Northfield Drive embankments on the northbound and southbound approaches to the structure as well as construction of new piers within the watercourse.

- This alternative allows for the replacement of the Scheifele Bridge under a staged construction program, allowing Northfield Drive to remain open to uninterrupted traffic over the anticipated two-year construction program. No long-term detours will be needed, which was one of the primary objectives of the study team.

- This alternative avoids major property acquisitions and operational impacts on Conestogo Horseback Adventures, located on the east side of Northfield Drive. A large part of the lands on the west side of Northfield Drive are currently owned by the Region of Waterloo.
- This alternative eliminates the need to relocate the overhead hydro line on the east side of Northfield Drive, owned by Waterloo North Hydro.

- This alignment avoids any impacts on the heritage values of the original bridge abutments and roadway, which are located further west of the proposed alignment and visible to those who drive this route on a regular basis.

The Alternative Northfield Drive Alignment Concept 2 is not shown in this document due

to size/scale however is available on the EngageWR website at:

https://www.engagewr.ca/scheifele-bridge-superstructure-replacement

Proposed construction phases

If approved, the constuction will done in stages as follows:
(refer to **Appendix A** for a map)

Construction Stage 1:

- Construct portion of piers and half of the new bridge structure to the west of the existing Scheifele Bridge.
- Maintain uninterrupted traffic on Northfield Drive and the existing bridge.

Construction Stage 2:

- Construct road embankments on the west side of Northfield Drive to switch all traffic to the newly constructed bridge.

Construction Stage 3:

- Demolish the existing Scheifele Bridge and construct the remaining portion of peirs completing the other half of the new structure.

Construction Stage 4:

- Upon completion of the east side of the new bridge, reconstruct the northbound
- and southbound roadway approaches on Northfield Drive.
- Open the new Scheifele Bridge and reconstructed section of Northfield Drive to full traffic operations, including vehicular, buggy, cyclist, and pedestrian.

Cross Section Alternative 5

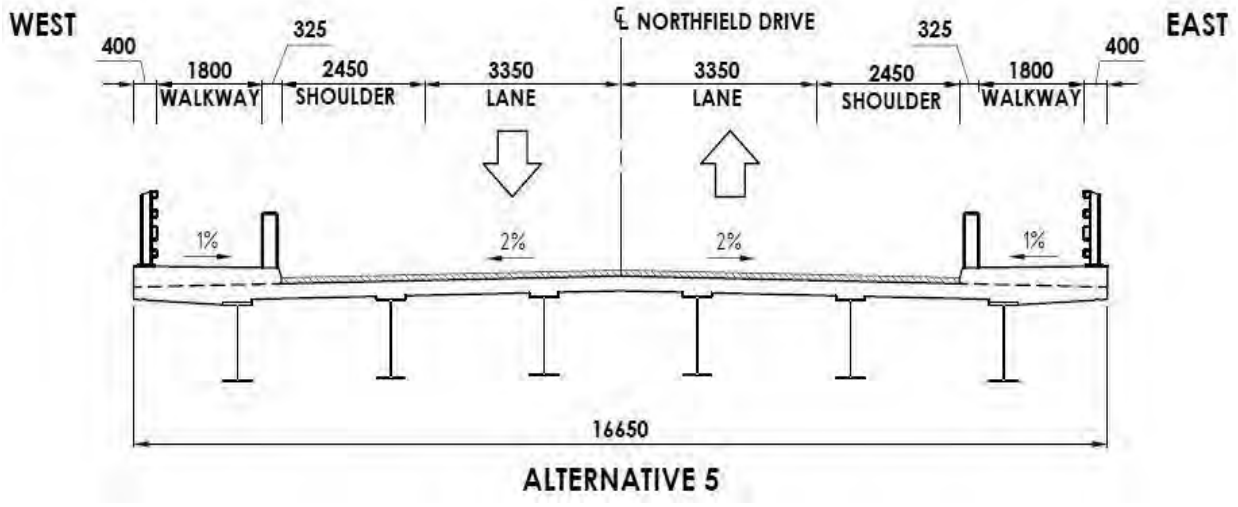
Using the collected supplementary traffic data an Alternative Bridge Cross Section, Concepts Evaluation Matrix was developed to assess the four preliminary bridge design cross sections presented at PCC#1 with the objective of confirming a recommended preferred bridge cross section design concept. Based on the detail presented in the Evaluation Matrix and following review by the project team, a modified Bridge Design Cross Section was developed, shown as Design Alternative #5. A complete evaluation of this recommended preferred design concept, as well as the original four alternatives, is presented in the Alternative Bridge Cross Section Concepts Evaluation Matrix.

Details of the Cross Section for Design Alternative #5 are as follows:

- Total width of 16.65 meters
- two-lane structure with 3.35 m wide traffic lanes
- 2.45 m wide paved shoulders on both sides for shared buggy and cycle use
- 250 mm wide concrete protection barriers between the roadway and raised

walkways on both sides of the bridge
- 475 mm reserved space for pedestrian railings on both sides

The Alternative Bridge Cross Section Concepts Evaluation Matrix can be found on the EngageWR website https://www.engagewr.ca/14428/widgets/120585/documents/78454



Subject to additional comments received from this second Public Consultation Centre, and additional agency comments, **Alternative Alignment Concept 2 and Cross Section Alternative 5** are considered "Preferred" compared to all the other alternatives based on overall impacts on the traffic, natural environment, socio-cultural environment and costs.

Evaluation summary

The following summarized the evaluation that positions **Alignment Alternative 2 and Cross Section 5** as the current preferred alternative.

Technical

The recommended Alignment Alternative 2 results in reduced retaining wall construction on west side compared to Alternative 1 and provides a "very good to excellent" new road alignment along with minimal need for property acquisition (north west side): 2,250 m2. This Alternative also allows for a staged approach to construction allowing the existing bridge to remain open to traffic and avoid long term detours to undertake the majority of the work and impacting travel between Waterloo and Conestogo and beyond.

The recommended Cross Section 5 proposes a new two-lane bridge with 3.35m travel lanes with 2.45m multi-purpose paved shoulders on each side. Concrete barriers are proposed to separate the travelled roadway from proposed 1.8m walkways / sidewalks on each side of the structure. Pedestrian railings are proposed on the outside of the walkways / sidewalks. Inexperienced cyclists would be able to use the 1.8 m walkways /sidewalks proposed for both sides of the bridge. The addition of paved shoulders, on both sides of the deck, increases the bridge width and adds to the winter snow plowing

requirements. An additional 2.46 m and 1.1 m of additional deck width must be cleared.

The addition of a barrier wall, between the road and the walkways, will require separate passes of walkway plows to clear snow on this pedestrian facility. The wider deck width provides more space for temporary snow storage until second snowplow passes can occur.

Natural Environment

The recommended Alignment Alternative 2 has a low impact rating towards aquatic species and habitat however will result in silt and sediment loading due to in-water construction, access road construction, and removal of habitat for road and bridge alignment. It will also require mussel relocations for in-water work including new pier construction and possible fish removals prior to dewatering operations. Alternative Alignment 2 is considered to have medium impacts to wildlife and wildlife habitat with a minor loss of candidate breeding habitat in areas of construction, temporary disturbances to wildlife and wildlife habitat during construction from vegetation removal, noise, dust, and sedimentation loading. As well there is a medium impact on terrestrial vegetation and wetlands due to offset construction and embankment grading.

There is potential for minor loss of candidate breeding habitat in areas of construction as well as temporary disturbances to wildlife and wildlife habitat during construction from vegetation removal, noise, dust, and sedimentation load. Limited or no impacts expected to candidate bat roost habitat, reptile (snake), turtle nesting areas, or other bird species. Loss of roadside meadow (lower quality vegetation) due to embankment grading Limited permanent wetland loss due to proposed retaining wall but impacts unavoidable during construction.

Alternative Alignment 2 has a medium impact to species at risk and other habitat with potential for sensory disturbance to Eastern Meadowlark and Bobolink birds as well as bats as well as potential increases in silt and sediment impacting Silver Shiner, Black Redhorse as well as Wavy-rayed Lamp Mussels.

Socio-Cultural Environment

A Cultural Heritage Resource Assessment for Built Heritage Resources and Cultural Heritage Landscapes was completed for the study area. The proposed preferred Alternative Alignment 2 crosses a small portion of the zone of archaeological potential on the west edge of Northfield Drive. Based on this a Stage 2 Assessment will be required along with a potential marine review. The preferred Alignment Alternative 2 avoids impacting remnant county road and bridge abutments (Circa 1861 and early 1900's) located on the west side of the site and requires the least property acquisition of any alternatives not on the existing alignment. Socio-Cultural Environment impacts of Alignment Alternative 2 are considered low in comparison to the alternatives not on the existing alignment.

Costs

Alternative Cross Section 5 is the third least expensive alternative of the 5 Alternatives, only higher then both a "Do Nothing" alternative and "Alternative Cross Section 1 which

includes narrower shoulders and walkways/sidewalks.

The cost of Alternative Cross Section 5 when built on Alternative Alignment 2 is estimated:

Base Construction (Includes Both Bridge & Road)	$20.1M
Engineering	$ 2.4M
Total	**$22.5M**

The costs for the preferred cross section and preferred alignment exceed the original budget for this project because the previous budget assumed replacement of the bridge deck only. During the course of this study, it was determined that a full replacement of the bridge structure is warranted at this time, which will address the condition of the bridge abutments while also providing an opportunity to stage the bridge replacement in order to prevent a full closure during construction. The total costs for the project will be included as part of the Region's 2023 budget update.

What happens when property is required for the approved alternative?

While it is the intent of the design process to mitigate the need to obtain property for the Scheifele Bridge Replacement, the Preferred Alternative being considered will require a minor widening of the road allowance to accommodate the staged offset construction, the realignment of Northfield Drive approaches to the new bridge location, as well as limited temporary work on adjacent property to match grades and restore landscaping during the construction period. In areas where property is required, the property owner will be contacted directly by the Region of Waterloo's Land Purchasing Officer during the future detail design process. Compensation will be provided at fair market rates based on recent similar area sales. Please refer to **Appendix "C"** for further information on the property acquisition process.

What are the next steps in the project?

The project team will consider the comments received from Public Consultation Centre #2, along with other input received from the public and approval agencies, as well as technical data, to finalize a recommended alternative for the Scheifele Bridge Replacement.

Subject to comments received, we propose to present the Recommended Alternative to the Region of Waterloo's Planning and Works Committee for approval in fall 2022. If the Recommended Alternative design is approved, the study process and findings will be documented in an Environmental Study Report (ESR) which will then be available for public review and comment for 30 days. Public notice will be made and notification sent to interested parties. This is a requirement of the Municipal Class Environmental Assessment Act (Part II Order requests). Any Part II Order requests unresolved after the 30 day review period will be sent to the Ministry of Environment for further consideration and ruling.

Further consultation and preliminary design for utility needs and/or relocations are currently underway and will be incorporated into the assessment of alternatives being considered.

Pending project approval by Regional Council, detailed design and property acquisition would be scheduled throughout 2022/23 and construction planned for 2024 through 2026.

How will I receive further notification regarding this project?

All property owners within the study area and members of the public registering at this Public Consultation Centre, or the first Public Consultation Centre, will receive any forthcoming additional information and be notified of any future meetings including Regional Council or Committee meetings. Advertisements will also be placed in local newspapers advising the public of the meetings and availability of the final Environmental Study Report for the Scheifele Bridge Replacement Class EA study.

How can I provide my comments at this stage?

We encourage you, stakeholder groups, and agencies to actively participate in this study by filling out the EngageWR survey and/or contacting staff directly with comments or questions. If you wish to be added to the project mailing list, or would like further information on the project and any future project meetings, please visit our website at https://www.engagewr.ca/scheifele-bridge-superstructure-replacement or contact one of the following:

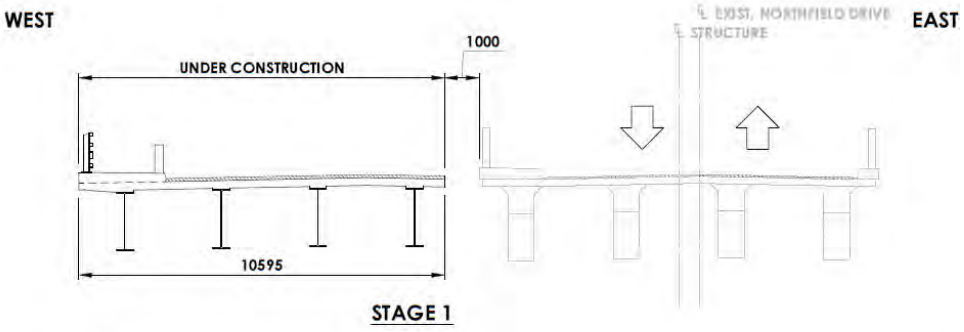
Ken Brisbois, C. Tech.
Region Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: (519) 575-4400 Ext. 4606
Fax: (519) 575-4430
Email: kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

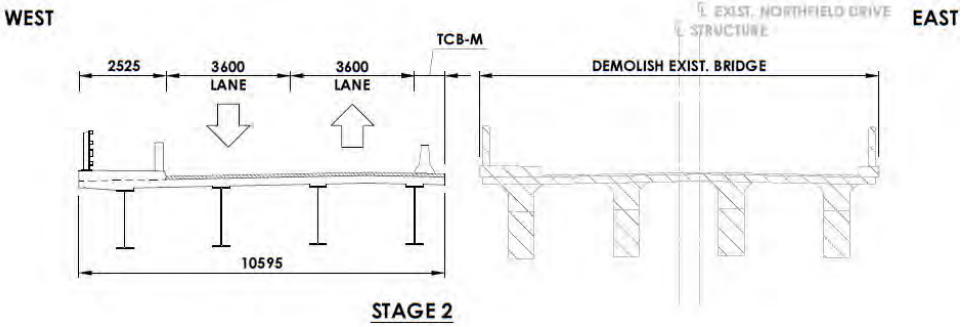
How can I view project information following the PCC?

All of the PCC display materials, and other relevant project information, notifications of upcoming meetings and contact information, is available for viewing at the Region of Waterloo municipal office as identified above. Alternatively, you may visit the Region's website at https://www.engagewr.ca/scheifele-bridge-superstructure-replacement

Appendix A – Proposed Staging for Preferred Alternative



STAGE 1



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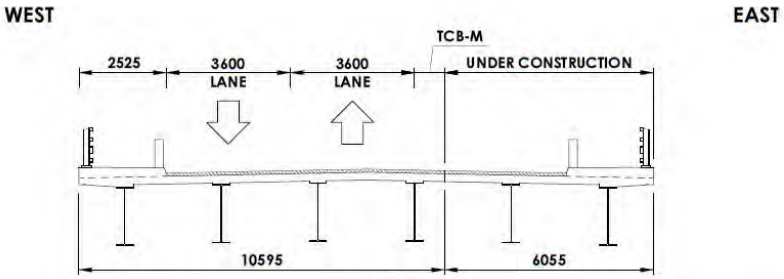
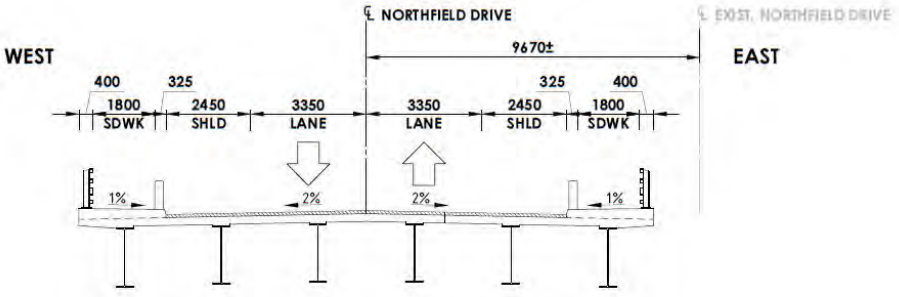


STAGE 3



STAGE 4

Appendix B– Municipal Class Environmental Assessment Process

Ontario Environmental Assessment Act

The purpose of the Ontario Environmental Assessment Act (EA Act) is to provide for "the betterment of the people of the whole or any part of Ontario by providing for the protection, conservation and wise management of the environment of Ontario". The term "environment" is applied broadly and includes the natural, social, cultural, built and economic components.

The key principles of successful environmental assessment planning include:

- Consultation with stakeholders and affected members of the public
- Consideration of a reasonable range of practical alternatives
- Assessment of the environmental impacts associated with each alternative
- Systematic evaluation of alternatives
- Clear documentation

Municipal Class Environmental Assessment
The Municipal Class Environmental Assessment (Class EA) is a planning process approved under the Environmental Assessment Act that is used by municipalities to plan infrastructure enhancement projects while satisfying the requirements of the Environmental Assessment Act. Under the Class EA process, projects are planned in one of three ways depending on their scope, complexity, and potential for adverse environmental impacts.

Schedule "A"

- Includes routine maintenance, operation and emergency activities.
- The Municipality can proceed with this work without further approval or public consultation.

Schedule "B"

- Includes projects with potential for some adverse environmental effects.
- These projects are subject to a screening process that includes consultation with directly affected public and agencies.

Schedule "C"

- Includes larger, more complex projects with the potential for significant environmental effects.
- These projects are subject to all phases of the Class Environmental Assessment and require a minimum of three (3) points of public contact.

Public Involvement
Members of the public that have a stake in the project are encouraged to provide comment throughout the Class Environmental Assessment process. For Schedule "C" projects there are a minimum of three (3) opportunities for contact.

These opportunities typically include two Public Consultation Centres and the Notice of

Completion which includes a mandatory 30-day public review period to review the project documentation.

Change in Project Status – Appeal Provision

It is recommended that all stakeholders (including the proponent, public and review agencies) work together to determine the preferred means of addressing a problem or opportunity. If you have any concerns, you should discuss them with the proponent and try to resolve them. In the event that there are major issues which cannot be resolved, you may request the Minister of Environment by order to require a proponent to comply with Part II of the Environmental Assessment Act before proceeding with a proposed undertaking which has been subject to Class Environmental Assessment requirements.

This is called a "Part II Order". The Minister will make one of the following decisions:

1. Deny the request (with or without conditions)
2. Refer the matter to mediation
3. Require the proponent to comply with Part II of the Environmental Assessment Act, ordering a full Environmental Assessment

All stakeholders are urged to try to resolve issues since it is preferable for them to be resolved by the municipality in which a project is located, rather than at the provincial level.

Learn more at:

https://www.ontario.ca/page/class-environmental-assessments-section-16-order

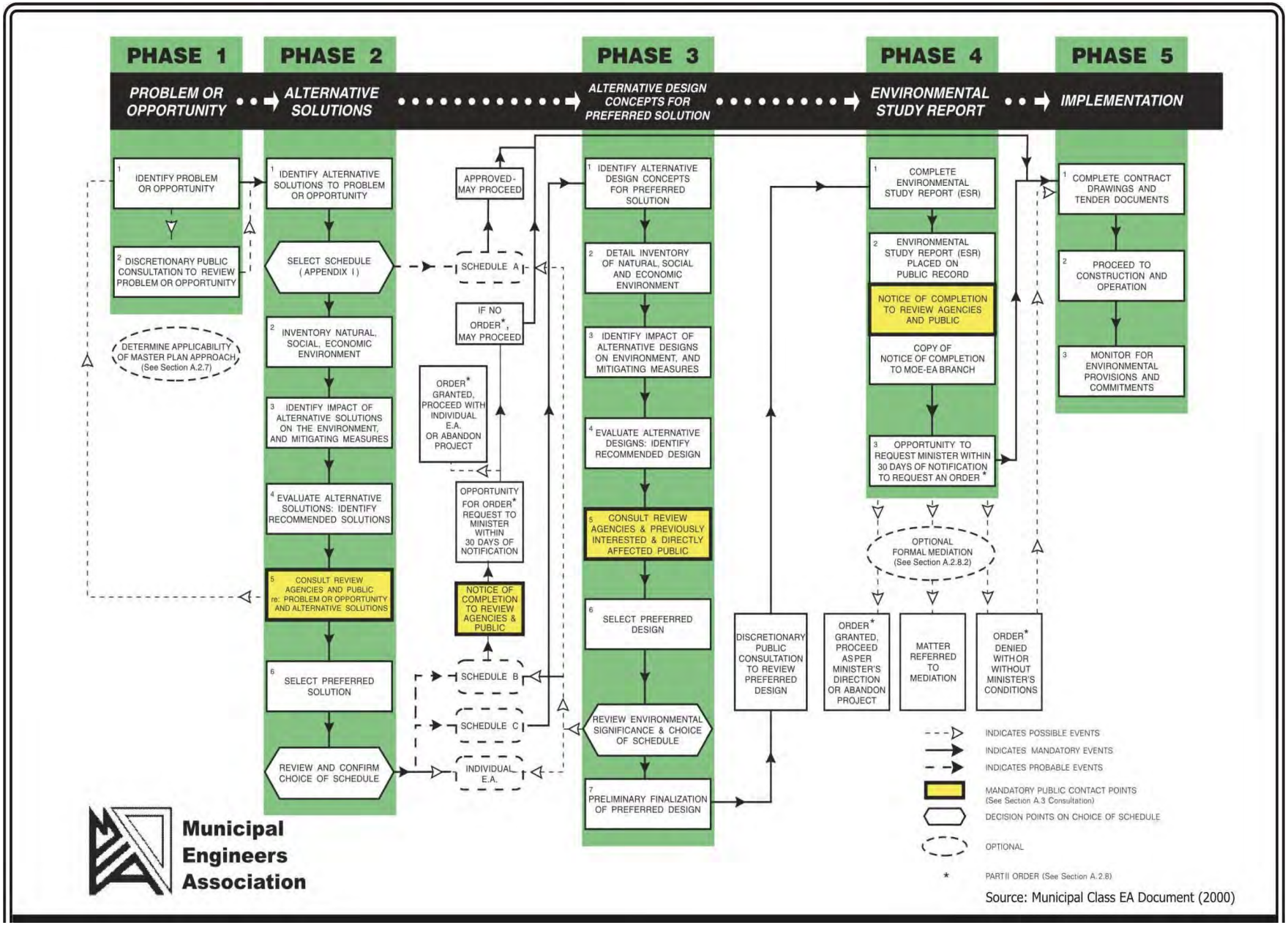
Send your completed Part II Order Request Form to the Minister of Environment, Conservation and Parks or delegate. You should also send a copy of the form to the Director of Environmental Assessment Branch and the proponent:

Minister
Ministry of the Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
Minister.mecp@ontario.ca

Director, Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto ON M4V 1P5
enviropermissions@ontario.ca

You should also send a copy of your written request to the proponent.
The request must address the following with respect to the identified concerns:

- Environmental Impacts and specific concerns
- Adequacy of the planning and public consultation process
- Involvement of the person in the planning process
- Details of discussions held between the person and the proponent


PHASE 1
PROBLEM OR OPPORTUNITY
PHASE 2
ALTERNATIVE SOLUTIONS
PHASE 3
ALTERNATIVE DESIGN CONCEPTS FOR PREFERRED SOLUTION
PHASE 4
ENVIRONMENTAL STUDY REPORT
PHASE 5
IMPLEMENTATION
1 IDENTIFY PROBLEM OR OPPORTUNITY
2 DISCRETIONARY PUBLIC CONSULTATION TO REVIEW PROBLEM OR OPPORTUNITY
DETERMINE APPLICABILITY OF MASTER PLAN APPROACH (See Section A.2.7)
1 IDENTIFY ALTERNATIVE SOLUTIONS TO PROBLEM OR OPPORTUNITY
SELECT SCHEDULE (APPENDIX I)
2 INVENTORY NATURAL, SOCIAL, ECONOMIC ENVIRONMENT
3 IDENTIFY IMPACT OF ALTERNATIVE SOLUTIONS ON THE ENVIRONMENT, AND MITIGATING MEASURES
4 EVALUATE ALTERNATIVE SOLUTIONS: IDENTIFY RECOMMENDED SOLUTIONS
5 CONSULT REVIEW AGENCIES AND PUBLIC re: PROBLEM OR OPPORTUNITY AND ALTERNATIVE SOLUTIONS
6 SELECT PREFERRED SOLUTION
REVIEW AND CONFIRM CHOICE OF SCHEDULE
APPROVED - MAY PROCEED
SCHEDULE A
IF NO ORDER*, MAY PROCEED
ORDER* GRANTED, PROCEED WITH INDIVIDUAL E.A. OR ABANDON PROJECT
OPPORTUNITY FOR ORDER* REQUEST TO MINISTER WITHIN 30 DAYS OF NOTIFICATION
NOTICE OF COMPLETION TO REVIEW AGENCIES & PUBLIC
SCHEDULE B
SCHEDULE C
INDIVIDUAL E.A.
1 IDENTIFY ALTERNATIVE DESIGN CONCEPTS FOR PREFERRED SOLUTION
2 DETAIL INVENTORY OF NATURAL, SOCIAL AND ECONOMIC ENVIRONMENT
3 IDENTIFY IMPACT OF ALTERNATIVE DESIGNS ON ENVIRONMENT, AND MITIGATING MEASURES
4 EVALUATE ALTERNATIVE DESIGNS: IDENTIFY RECOMMENDED DESIGN
5 CONSULT REVIEW AGENCIES & PREVIOUSLY INTERESTED & DIRECTLY AFFECTED PUBLIC
6 SELECT PREFERRED DESIGN
REVIEW ENVIRONMENTAL SIGNIFICANCE & CHOICE OF SCHEDULE
7 PRELIMINARY FINALIZATION OF PREFERRED DESIGN
DISCRETIONARY PUBLIC CONSULTATION TO REVIEW PREFERRED DESIGN
1 COMPLETE ENVIRONMENTAL STUDY REPORT (ESR)
2 ENVIRONMENTAL STUDY REPORT (ESR) PLACED ON PUBLIC RECORD
NOTICE OF COMPLETION TO REVIEW AGENCIES AND PUBLIC
COPY OF NOTICE OF COMPLETION TO MOE-EA BRANCH
3 OPPORTUNITY TO REQUEST MINISTER WITHIN 30 DAYS OF NOTIFICATION TO REQUEST AN ORDER*
OPTIONAL FORMAL MEDIATION (See Section A.2.8.2)
ORDER* GRANTED, PROCEED AS PER MINISTER'S DIRECTION OR ABANDON PROJECT
MATTER REFERRED TO MEDIATION
ORDER* DENIED WITH OR WITHOUT MINISTER'S CONDITIONS
1 COMPLETE CONTRACT DRAWINGS AND TENDER DOCUMENTS
2 PROCEED TO CONSTRUCTION AND OPERATION
3 MONITOR FOR ENVIRONMENTAL PROVISIONS AND COMMITMENTS
INDICATES POSSIBLE EVENTS
INDICATES MANDATORY EVENTS
INDICATES PROBABLE EVENTS
MANDATORY PUBLIC CONTACT POINTS (See Section A.3 Consultation)
DECISION POINTS ON CHOICE OF SCHEDULE
OPTIONAL
* PART II ORDER (See Section A.2.8)
Municipal Engineers Association
Source: Municipal Class EA Document (2000)

Appendix C

Property acquisition process information sheet
The following information is provided as a general overview of the property acquisition process and is not legal advice. Further, the steps, timing and processes can vary depending on the individual circumstances of each case.

Once the Recommended Design Concept has been approved, the property acquisition process and the efforts of Regional Real Estate staff will focus on acquiring the required lands to implement the approved design. Regional staff cannot make fundamental amendments or changes to the approved design concept.

Property Impact Plans
After the project has been approved and as it approaches final design, the project planners will generate drawings and sketches indicating what lands and interests need to be acquired from each affected property to undertake the project. These drawing are referred to as Property Impact Plans (PIP).

Initial owner contact by Regional Real Estate staff
Once the PIPs are available, Regional Real Estate staff will contact the affected property owners by telephone and mail to introduce themselves and set-up initial meetings to discuss the project and proposed acquisitions.

Initial meetings
The initial meeting is attended by the project engineer and the assigned real estate staff person to brief the owner on the project, what part of their lands are to be acquired or will be affected, what work will be undertaken, when, with what equipment, etc. and to answer any questions. The primary purpose of the meeting is to listen to the owner and identify issues, concerns, effects of the proposed acquisition on remaining lands and businesses that can be feasibly mitigated and/or compensated, and how the remaining property may be restored. These discussions may require additional meetings. The goal of staff is to work with the owner to reach mutually agreeable solutions.

Goal – fair and equitable settlement for all parties
The goal is always to reach a fair and equitable agreement for both the property owner and the Region. Such an agreement will provide compensation for the fair market value of the lands and address the project impacts (such as repairing or replacing landscaping, fencing, paving) so that the property owner will receive the value of the lands acquired and the restoration of their remaining property to the condition it was prior to the project.

The initial meetings will form the basis of an initial offer of settlement or agreement of purchase and sale for the required lands or interests.

Steps toward offer of settlement or agreement of purchase and sale

The general steps towards such an offer are as follows;

- The Region will obtain an independent appraisal of the fair market value of the lands and interests to be acquired, and an appraisal of any effect on the value of the rest of the property resulting from the acquisition of the required lands and interests.
- Compensation will be estimated and/or works to minimize other effects will be defined and agreed to by the property owner and the Region.
- Reasonable costs of the owner will be included in any compensation settlement.
- An offer with a purchase price and any other compensation or works in lieu of compensation will be submitted to the property owner for consideration.
- An Agreement will be finalized with any additional discussion, valuations, etc. as may be required.

Depending on the amount of compensation, most agreements will require the approval of Council. The approval is undertaken in Closed Session which is not open to the public to ensure a level of confidentiality.

Expropriation

Due to the time constraints of these projects, it is the practice of the Region to commence the expropriation process in parallel with the negotiation process to insure that lands and interests are acquired in time for commencement of the project. Typically, over 90 per cent of all required lands and interests are acquired through the negotiation process. Even after lands and interests have been acquired through expropriation an agreement on compensation can be reached through negotiation, this is usually referred to as a 'settlement agreement'.

Put simply, an expropriation is the transfer of lands or an easement to a governmental authority for reasonable compensation, including payment of fair market value for the transferred lands, without the consent of the property owner being required. In the case of expropriations by municipalities such as the Region of Waterloo, the process set out in the Ontario *Expropriations Act* must be followed to ensure that the rights of the property owners provided under that *Act* are protected.

QUESTIONNAIRE / COMMENT SHEET

Scheifele Bridge Replacement
Regional Municipality of Waterloo
Township of Woolwich

Public Consultation Centre #2, May 18 – June 8, 2022

1. Where do you live?

- ☐ City of Cambridge
- ☐ City of Kitchener
- ☐ City of Waterloo
- ☐ Region of Waterloo
- ☐ Other

2. How often do you cross the Scheifele Bridge on Northfield Drive?

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☐ Rarely
- ☐ Never

3. What is the travel mode you often use on this section of Northfield Drive

- ☐ Car
- ☐ Walk
- ☐ Bicycle
- ☐ Public Transit
- ☐ Other

4. What is the general purpose of your travel on this section of Northfield Drive?

☐ Work ☐ School ☐ Recreational

☐ Other ☐

5. Do you support the recommendations of the Project Team with respect to the following design concepts?

a. Scheifele Bridge/Northfield Drive Alternative Alignment #2 (West Side)

☐ Yes ☐ No

b. Staged Bridge Construction with No Long-Term Closure of Northfield Drive during Construction:

☐ Yes ☐ No

c. Recommended Bridge Cross Section Concept 5 which included two traffic lanes, buggy/cycle shoulders and sidewalks on both sides protected by roadside barriers

☐ Yes ☐ No

6. If you answered NO to any of the above recommendations, please elaborate on your reasons:

_____

_____

_____

_____

_____

7. What challenges or considerations, if any, do you see with the Recommended Preferred Design Alignment #2 and Cross Section #5 that are being carried forward by the project team?

8. Is there anything else that we haven't discussed that you feel the project team should consider as we proceed to final design?

For more information or to complete this questionnaire online, please visit engagewr.ca/woolwich-scheifele-bridge

Please return this questionnaire to one of the project team members listed below by **Friday, June 10, 2022**

Ken Brisbois, C. Tech.
Region Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: (519) 575-4400 Ext. 4606
Fax: (519) 575-4430
Email: kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: (519) 585-7316
Fax: (519) 579-6733
Email: garry.leveck@stantec.com

Your Name: _____

Your Address: _____

Your Email: _____

Your Telephone: _____

Note: *Personal information, as defined by the Municipal Freedom of Information and Protection of Privacy Act (MFIPPA), is collected under the authority of the Municipal Act, 2001, and in accordance with the provisions of MFIPPA. Personal information on this form will be used for the purpose of completing the SCHEIFELE BRIDGE CLASS ENVIRONMENTAL ASSESSMENT STUDY. The information will*

be used to identify public and stakeholder concerns and interests and will be documented in the Study as part of the formal Class Environmental Assessment study process. Except for personal information, all comments will become a part of the public record. If you have questions about this collection; use, and disclosure of this information, contact Ken Brisbois at 519-575-4606 or 519-240-2995, or kbrisbois@regionofwaterloo.ca.

From: paleczny@execulink.com
To: garry.levack@stantec.com; Ken Brisbois
Subject: Schiefele Bridge replacement
Date: Friday, May 27, 2022 11:39:46 AM

Thanks for detailed study.

I agree with your Alt Align Concept 2 West Side, and when possible keeping the current bridge open during construction period.

One request ----- the Woolwich Township people have been uncooperative and difficult in the past when Northfield closure was required. Please I beg you --- convince them to open Glasgow Street north and south when Northfield temporary closure is required.

David Paleczny

96 Glasgow St N.

Conestogo

From:	Trevor Heywood
To:	Ken Brisbois
Cc:	Leveck, Garry
Subject:	Schiefele Bridge
Date:	Tuesday, May 31, 2022 1:35:29 PM
Attachments:	2022-05-31 Schiefele Bridge PCC 2 response.pdf

Hey Ken,

Please see our attached comments in response to PCC 2.

Thanks,

Trevor Heywood
Resource Planner
Grand River Conservation Authority

theywood@grandriver.ca
www.grandriver.ca | Connect with us on social media

Public Consultation Centre #3 - Provide Your Feedback

Share on Facebook Share on Twitter Share on LinkedinEmail this link

04 Jul 2023

CLOSED: This discussion has concluded.

Online Public Consultation Centre #3 - June 7 - June 28, 2023

Complete the Survey!

Previous findings
The cross section for Scheifele Bridge was revisited since the last public consultation to specifically review the need for sidewalks on both sides of the new bridge structure over Conestogo River, and whether one side would adequately serve the area pedestrian needs.

This review took into consideration usage, facility networks as well as the opportunity for overall project cost savings.

The pedestrian use on Northfield Drive across the Scheifele Bridge is limited when looking at the counts conducted in 2021, and as presented at the last public consultation. Pedestrian counts were carried out between May 31 and June 6, 2021, and the maximum daily count was 19 crossings with a total number of 55 crossings for the full week.

New sidewalk location
Although future plans for active transportation along the length of Northfield Drive have not been established at this time, it would make the most sense to construct the new sidewalk on the east side of the new bridge structure to allow opportunity for future linking of facilities between Conestogo and University Ave E.

Costs
Finally, the cost to build, as well as maintain sidewalks on both sides was considered. The initial savings by constructing a sidewalk on only one side of the new structure would be roughly $1.5 million or 7.5 per cent of the estimated $20.1 million project construction costs. Also considered are the ongoing operational and maintenance costs to the Region of Waterloo as well as the Township of Woolwich over the new lifespan of the bridge for items like snow removal and future repairs that would be required.

Proposed design
As a result of the options mentioned, the proposed design has been revised to include just one sidewalk along the east side of the Scheifele Bridge.

Documents
Links to the revised drawings are can be found under the PCC#3 folder to the right.

Links to all other documents from prior Public Consultation Centres can be found at the links provided on the right-hand side of this project page.

Feedback

Please complete the survey and share any comments with us about this prosed design. You can also find the survey under the Survey Tab

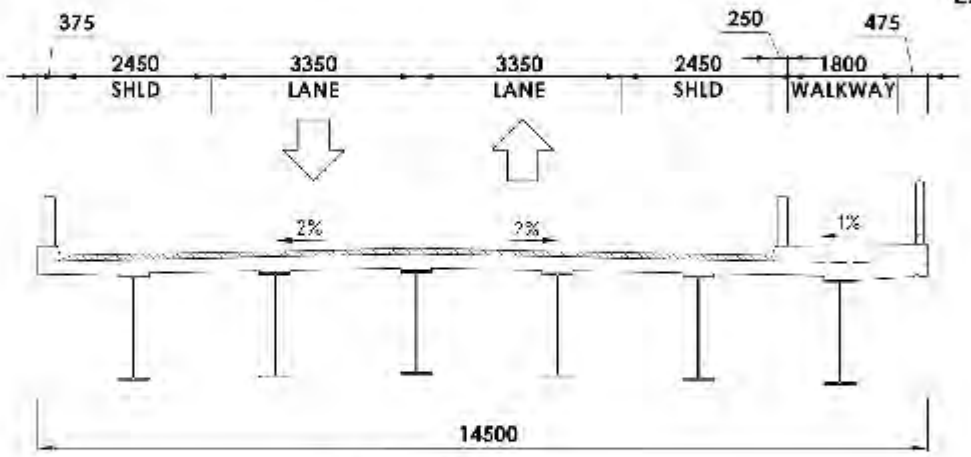
Please reach out if you have any questions or need to access the survey in a different format.

Links to the revised drawings and Frequently Asked Questions (FAQs) can be found on the right:

Please reach out if you have any questions regarding this comment collection or the project in general to either:

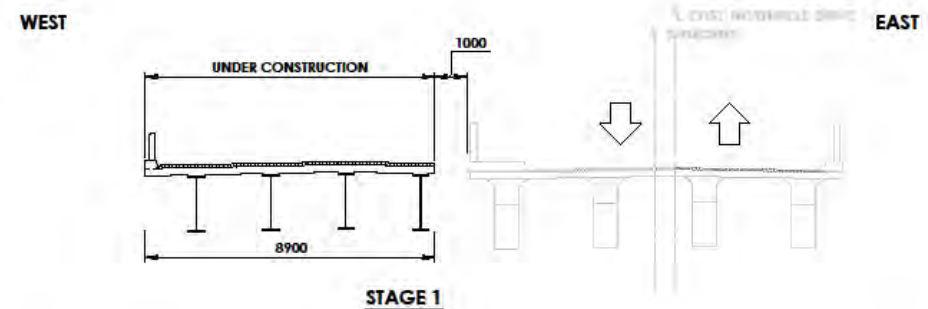
Ken Brisbois, C. Tech.	Garry E. Leveck, P.Eng.
Region Project Manager	Consultant Project Manager
Region of Waterloo	Stantec Consulting Ltd.
150 Frederick Street, 6th Floor	100-300 Hagey Boulevard
Kitchener, ON N2G 4J3	Waterloo, ON N2L 0A4
Telephone: (519) 575-4400 Ext. 4606	Telephone: (519) 585-7316
Fax: (519) 575-4430	Fax: (519) 579-6733
Email: kbrisbois@regionofwaterloo.ca	Email: garry.leveck@stantec.com

WEST

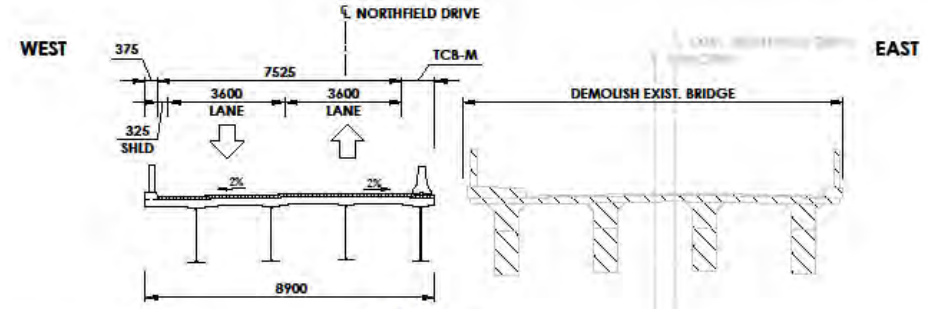


EAST

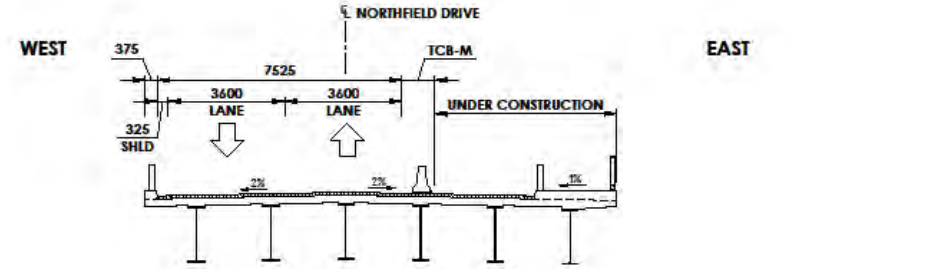
ALTERNATIVE 5
(MODIFIED)



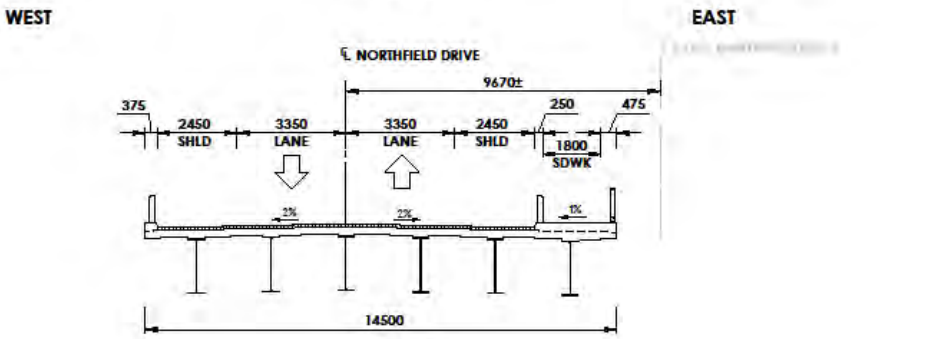
STAGE 1



STAGE 2



STAGE 3



STAGE 4

Region of Waterloo

Stantec

CONSTRUCTION STAGING (MODIFIED)

SCHEIFELE BRIDGE
(SITE No. 2201)

Scale: 1 : 125

FAQs

Where are we with this project?

What are the recommended improvements so far?

Will the bridge be closed during construction?

What are the next steps?

Where are we with this project?

Since the last public consultation, and before making a final recommendation, the project team reviewed the need for sidewalks on both sides of the new bridge, and whether a sidewalk on one side would adequately serve the needs of those using the sidewalk.

After looking at usage, active transportation needs, and costs to build and maintain, the project team is recommending one sidewalk on the east side of the bridge and is sharing this information with the public through the EngageWR project page.

top of the page

What are the recommended improvements so far?

The recommended improvements to date include Alternative Alignment #2 which is a staged construction to the west side of the existing structure.

top of the page

Will the bridge be closed during construction?

No – The proposed Alternative Alignment #2 allows for the existing bridge to be replaced in a staged manner by realigning the bridge and roadway approaches to the west side of the existing structure which will allow two-way travel to be maintained during the work.

top of the page

What are the next steps?

Pending project approval by Regional Council this summer, we'll move to detailed design and property acquisition, and plan for construction to start in spring of 2025.

top of the page

Scheifele Bridge Replacement - Public Consultation Centre #3, June 7, 2023 – June 28, 2023

The Region would like to hear from you regarding installation of sidewalk on only one side of Scheifele Bridge when reconstructed as shown in Cross Section Alternative #5 (Revised).

1.) Where do you live?

☐ Township of Woolwich
☐ City of Waterloo
☐ City of Kitchener
☐ City of Cambridge
☐ Other (Specify) _____

2.) How often do you cross the Scheifele Bridge on Northfied Drive?

☐ Daily
☐ Once a Week
☐ More Than Once a Week
☐ Monthly
☐ Seldom

3.) What mode of travel do you primarily use when crossing the Scheifele Bridge at Conestogo River?

☐ Passenger Vehicle
☐ Public Transit
☐ Bicycle
☐ Walk
☐ Seldom

4.) What is your primary reason for travel across Scheifele Bridge at Conestogo River?*

☐ Work
☐ School

☐ Recreation ☐ Other (Specify) _____

Comments regarding the option to install sidewalk only on the east side of the bridge:

_____
_____
_____
_____
_____
_____
_____
_____

Collection Notice:

All comments and information received from individuals, stakeholder groups, and agencies regarding these projects and meetings are being collected to assist the Region of Waterloo in making a decision. Under the “Municipal Act”, personal information (such as name, address, telephone number and property location) which may be included in a submission becomes part of the public record. Questions regarding the collection should be forwarded to the staff member noted above.

SCHEIFELE BRIDGE CLASS EA STUDY

PUBLIC INFORMATION CENTRE MEETING 3 COMMENTS

AGENCY, PUBLIC AND SPECIAL INTEREST GROUP COMMENTS:

1. **Transport Canada / Government of Canada :**
   Environmental Assessment Program, Ontario :
   July 10, 2023 Email.

   Please note Transport Canada **does not** require receipt of all individual or Class EA related notifications. We are requesting project proponents self-assess if their project:

   1. Will interact with a federal property and/or waterway by reviewing the Directory of Federal Real Property, available at at www.tbs-sct.gc.ca/dfrp-rbif/; **and**
   2. Will require approval and/or authorization under any Acts administered by Transport Canada* available at http://www.tc.gc.ca/eng/acts-regulations/menu.htm.

   Projects that will occur on federal property, prior to exercising a power, performing a function or duty in relation to that project, will be subject to a determination of the likelihood of significant adverse environmental effects, per Section 82 of the *Impact Assessment Act, 2019*.

   If the above does not apply, the Environmental Assessment program should not be included in any further correspondence and future notifications will not receive a response. If there is a role under the program, correspondence should be forwarded *electronically* to: EnviroOnt@tc.gc.ca with a **brief description of Transport Canada's expected role**.

   Below is a summary of the most common Acts that have applied to projects in an Environmental Assessment context:

   - ***Canadian Navigable Waters Act (CNWA)*** – the Act applies primarily to works constructed or placed in, on, over, under, through, or across navigable waters set out under the Act. The Navigation Protection Program administers the CNWA through the review and authorization of works affecting navigable waters. Information about the Program, CNWA and approval process is available at: http://www.tc.gc.ca/eng/programs-621.html. Enquiries can be directed to NPPONT-PPNONT@tc.gc.ca or by calling (519) 383-1863.

   - ***Railway Safety Act (RSA)*** – the Act provides the regulatory framework for railway safety, security, and some of the environmental impacts of railway operations in Canada. The Rail Safety Program develops and enforces regulations, rules, standards and procedures governing safe railway operations. Additional information about the Program is available at: https://www.tc.gc.ca/eng/railsafety/menu.htm. Enquiries can be directed to RailSafety@tc.gc.ca or by calling (613) 998-2985.

- ***Transportation of Dangerous Goods Act (TDGA)*** – the transportation of dangerous goods by air, marine, rail and road is regulated under the TDGA. Transport Canada, based on risks, develops safety standards and regulations, provides oversight and gives expert advice on dangerous goods to promote public safety. Additional information about the transportation of dangerous goods is available at: https://www.tc.gc.ca/eng/tdg/safety-menu.htm. Enquiries can be directed to TDG-TMDOntario@tc.gc.ca or by calling (416) 973-1868.

- ***Aeronautics Act*** – Transport Canada has sole jurisdiction over aeronautics, which includes aerodromes and all related buildings or services used for aviation purposes. Aviation safety in Canada is regulated under this Act and the Canadian Aviation Regulations (CARs). Elevated Structures, such as wind turbines and communication towers, would be examples of projects that must be assessed for lighting and marking requirements in accordance with the CARs. Transport Canada also has an interest in projects that have the potential to cause interference between wildlife and aviation activities. One example would be waste facilities, which may attract birds into commercial and recreational flight paths. The *Land Use In The Vicinity of Aerodromes* publication recommends guidelines for and uses in the vicinity of aerodromes, available at: https://www.tc.gc.ca/eng/civilaviation/publications/tp1247-menu-1418.htm. Enquires can be directed to aviation.ont@tc.gc.ca or by calling 1 (800) 305-2059 / (416) 952-0230.

PUBLIC COMMENTS (Not in any specific order):

1. **Larry M: Township of Woolwich:**

   - Uses that bridge one or more times daily, for vehicle trips.
   - Supports the single sidewalk alternative under the assumption that the buggy / bikeway paved shoulder, on the opposite side of the bridge, could be utilized as a pedestrian walkway.
   - Initial concerns, that pedestrians (agreed that there are not that many) going along the non-sidewalk side would have to cross the busy highway twice, is alleviated knowing that the wide paved shoulder on the opposite side of the bridge could be used by pedestrians.
   - Advises that there are several marathons, and similar runs and bicycle groups, to consider.

2. **Bruce B: Township of Woolwich:**

   - Uses the bridge daily for vehicle trips.
   - Does not specify support for, or against, the single sidewalk alternative.
   - Notes that the existing bridge only has a single sidewalk on the west side, inferring that nothing would really change.
   - Questions whether there would still be wide shoulders on both sides of the bridge for buggy travel. (Answer: Yes).

3. **Scott A: Township of Woolwich:**

    - Uses the bridge once per week, for vehicle trips.
    - Does not specify support for, or against, the single sidewalk alternative.

4. Jillebean (Email Name): Township of Woolwich:

    - Uses the bridge daily for vehicle trips.
    - Supports the single sidewalk alternative because of the modest volume of pedestrian traffic and the absence of sidewalks on Northfield Drive, between Waterloo and Conestogo.

5. **Doug Joy: Township of Woolwich:**

    - Uses the bridge daily for vehicle trips.
    - Suggests that the Region should save the $1.5 million by going to one sidewalk.
    - While using this road daily, resident notes that there are rarely walkers, so one sidewalk will make little difference.
    - Numerous cyclists use this road regularly, so resident assumes that the wide paved shoulders can be used as bike lanes on both sides of the bridge.
    - if there are no bike lanes on both sides, two sidewalks are a must.

6. **Lkuinder (Email name): Township of Woolwich:**

    - Uses the bridge more than twice a week for vehicle trips.
    - Based on usage data provided and associated cost savings data, supports the concept of one sidewalk only on the east side of the bridge.

7. **David Kramp: Township of Woolwich:**

    - Uses the bridge more than once a week for vehicle trips.
    - Supports the concept of one sidewalk since it seems very adequate for crossing the bridge.
    - Suggests that the Region should investigate providing a better connection to the Health Valley Trail along the Conestogo River, which crosses under the bridge near the south abutment. Walkers and cyclists using the trail must climb a 4-meter steep embankment, and cross over a guiderail, to access Northfield Drive from the trail. A more suitable design should be provided to increase safety and accessibility for cyclists and pedestrians using the trail.

8. **Joseph Goodwin: Township of Woolwich:**

    - Crosses the bridge daily as a pedestrian. Also uses the bridge for cycling and vehicle trips.
    - Resident owns one of the six properties adjacent to the Scheifele Bridge. Family uses the bridge multiple times daily, multiple times, as pedestrians, cyclists, truck passage, and very often with heavy farm equipment.

- Does not support the concept of a single sidewalk and firmly believes that there needs to be a sidewalk on both sides of the bridge, for the following reasons:
    - The pedestrian study was carried out during the height of the COVID-19 pandemic. It is not a fair evaluation of the active transportation needs along the bridge. The pedestrian traffic has visibly and dramatically increased, with the resident's family of nine accounting for the supposed weekly pedestrian crossings alone. Resident has young children who use the bridge every day, and frequently at night or in reduced visibility conditions, which occur frequently at that elevation over the river.
    - The Woolwich active transportation plan requires capacity for increased active traffic along this stretch of Northfield Drive, as it connects the Township to the amenities of the City of Waterloo, especially RIM Park and the Health Valley Trail. If we are looking at this bridge lasting 60 years again (and it should be 100 years), two sidewalks almost seem a firm requirement as a preparation for inevitable growth.
- This is a high-speed zone (80Km/hr) closely connected to a slower zone (60Km/hr), which creates sudden changes in driving. Combined with the elimination of the road shoulder at the bridge, the sudden change of conditions makes for a dangerous stretch of road to walk, cycle, or even drive, especially heavy equipment which requires extra width.

9. Crowsfoot (Email name): Township of Woolwich:

- Uses the bridge daily for vehicle trips.
- Does not provide any comments on the single sidewalk concept, either in support of, or against, the design alternative.

10. Mvankaln606 (Email name): Township of Woolwich:

- Uses the bridge daily as a cyclist.
- Does not support the concept of a single sidewalk on the bridge.
- Suggests that bicycle and pedestrian lanes are required on both sides, stating that the existing situation is very dangerous to bike across the bridge as well as all along Northfield.

11. David Juniper: Village of Conestogo:

- Does not comment on frequency or use of bridge (vehicle or otherwise).
- Does not provide any comments on the single sidewalk concept, either in support of, or against, the design alternative.
- Expresses concern for any long-term construction closure of Northfield Drive.

12. John C: Village of Conestogo:

- Uses the bridge daily for vehicle trips.
- Supports the concept of a single sidewalk because of the modest volume of pedestrian traffic crossing the bridge.

COMMENTS FROM THE MENNONITE COMMUNITY:

- The Deacon of the Mennonite Community was contacted, and it was confirmed that there were no comments received from Mennonite community members. It was also noted that no comments are anticipated in the future.

Stantec Consulting Ltd.
July 13, 2023

SCHEIFELE BRIDGE CLASS EA STUDY

PUBLIC INFORMATION CENTRE MEETING 3 COMMENTS

SYNOPSIS OF PUBLIC SUBMISSIONS

GENERAL PUBLIC (12 Comments):

1. **Alternative Design Concept:**
   Sidewalk on East Side of Bridge Only:

   - **Supports Design Concept: 6**
   - **Does Not Support Design Concept: 2**
   - **Non-Committal: 4**

2. **Significant General Comments:**

   - There are several marathons runs and bicycle groups crossing the bridge on a regular basis.
   - With a single sidewalk on the east side, the west side shoulder would need to be fully cleared of snow in the winter to permit pedestrian crossings without having to cross busy Northfield Drive to access the east side sidewalk.
   - A sidewalk on one side is suitable given the relatively small number of pedestrians crossing the bridge.
   - The Region should save $1.5 million by constructing a sidewalk on one side of the bridge.
   - If cyclists are restricted to using the sidewalks, then sidewalks need to be constructed on both sides. (Footnote: Cyclists will be able to use the wide paved shoulders which will be on both sides of the bridge).
   - Region should investigate providing a better connection to the Health Valley Trail along the Conestogo River, which crosses under the bridge near the south abutment. Walkers and cyclists using the trail must climb a 4-meter steep embankment, and cross over a guiderail, to access Northfield Drive from the trail. A more suitable design should be provided to increase safety and accessibility for cyclists and pedestrians using the trail.
   - Northfield Drive is a high-speed zone (80Km/hr.) closely connected to a slower zone (60Km/hr.), which creates sudden changes in driving patterns. Combined with the elimination of the road shoulder at the bridge, the sudden change of conditions makes for a dangerous stretch of road to walk, cycle, or even drive, especially heavy equipment which requires extra width.
   - The Woolwich Active Transportation Plan requires capacity for increased active traffic along this stretch of Northfield Drive, as it connects the Township to the amenities of the City of Waterloo, especially RIM Park and the Health Valley Trail. If the bridge life span is 60 years (it should be 100 years), then two sidewalks are a must to accommodate inevitable growth.

MENNONITE COMMUNITY:

3. General Comments:

- The Deacon of the Mennonite Community was contacted, and it was confirmed that there were no comments received from Mennonite community members. It was also noted that no comments are anticipated in the future.

Stantec Consulting Ltd.
July 13, 2023

THE TOWNSHIP OF
WOOLWICH

BOX 158, 24 CHURCH ST. W.
ELMIRA, ONTARIO N3B 2Z6
TEL. 519-669-1647 / 1-877-969-0094
INFRASTRUCTURE SERVICES FAX 519-669-4669

August 9, 2023

Ken Brisbois
Regional Municipality of Waterloo
150 Frederick Street
Kitchener, ON N2G 4J3
kbrisbois@regionofwaterloo.ca

Dear Mr. Brisbois,

The Township of Woolwich has reviewed the proposed cross-section changes to the Scheifele Bridge reconstruction project, as presented at the meeting between the Region and the Township that took place on August 3rd, 2023. The proposed cross-section change would remove the west sidewalk as part of the reconstruction of the Scheifele Bridge, in an effort to reduce the overall construction costs for the project.

The Township understands that the Region undertook an additional online public consultation center (PCC#3) from June 7th to June 28th, 2023, to present the proposed change to the public. The Township also understands that of the 12 responses received no major concerns were raised from the public, although 2 responses were not in favor of the removal of the sidewalk. The Township has no objections to the proposed change to remove the sidewalk on the west side of the structure. Please keep the Township informed of the anticipated approval of the project at Regional Council on September 27, 2023.

Sincerely,

Ryan Tucker, P.Eng.
Engineering Project Supervisor
Township of Woolwich
24 Church Street West
Elmira, ON N3B 1M5

 WOOLWICH OBSERVER JUNE 8/23

Region of Waterloo

Public Notice

Public Consultation Centre #3

Scheifele Bridge Replacement - Township of Woolwich

We want your feedback

Join the Public Consultation Centre (PCC) #3 by sharing your comments with us as we continue to plan for the replacement of Scheifele Bridge that crosses over the Conestogo River in the Township of Woolwich.

This virtual public consultation is open from **June 7, 2023 to June 28, 2023 at** Engagewr.ca/scheifele-bridge-superstructure-replacement.

What to expect

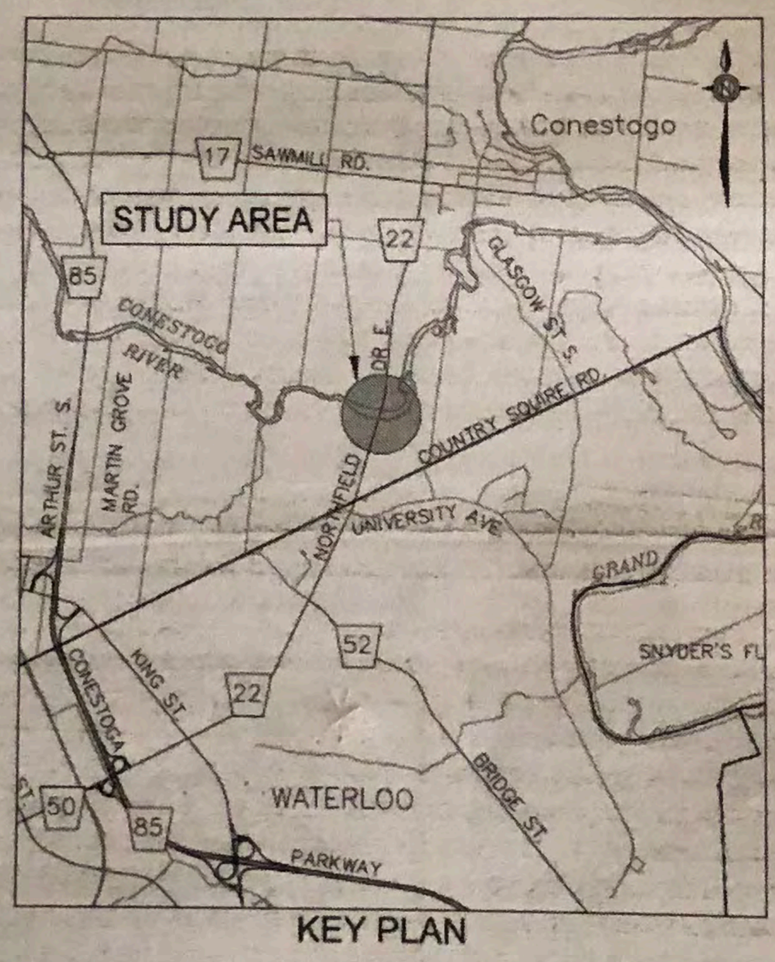
At this virtual PCC, we are seeking comments regarding a revision to the bridge cross section since the preferred alternative was presented at PCC#2. The revision considers a new sidewalk on only one side of the new bridge instead of the previous option that provided sidewalks on both sides.

Public consultation

Visit our Scheifele Bridge project page and complete the online survey by June 28 to share your comments with the project team. Project documents, including frequently asked questions, are also available.

Project background

The Region of Waterloo is conducting a Schedule C Municipal Class Environmental Assessment (Class EA) for the Scheifele Bridge Replacement on Regional Road 22 (Northfield Drive at Conestogo River), in the Township of Woolwich. This structure replacement will address deteriorating infrastructure needs as well as provide opportunity to enhance pedestrian, cycling, and buggy facilities.



KEY PLAN

All interested parties are invited to complete the online survey and add any comments at the Region's Engagewr.ca/scheifele-bridge-superstructure-replacement by June 28, 2023, or by email to either of the contacts listed.

If you would like further information on the project please contact:

Ken Brisbois, C. Tech.
Region Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: 519-575-4606
Fax: 519-575-4430
kbrisbois@regionofwaterloo.ca

Garry E. Leveck, P.Eng.
Consultant Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Telephone: 519-585-7316
Fax: 519-579-6733
garry.leveck@stantec.com

All comments and information received from individuals, stakeholder groups, and agencies regarding this project are collected to assist the Region of Waterloo in making a decision. Under the "Municipal Act", personal information such as name, address, telephone number and property location that may be included in a submission becomes part of the public record.

Public Consultation Centre #3
Scheifele Bridge Replacement
June 7, 2023 - June 28, 2023

www.engagewr.ca/regionofwaterloo

Region of Waterloo

For more information:
www.regionofwaterloo.ca
519-575-4400

Region of Waterloo

SCHEIFELE BRIDGE REPLACEMENT

Northfield Drive (Regional Road 22)
Township of Woolwich

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT STUDY

APPENDIX D: Technical Reports

Stantec

Draft Preliminary Geotechnical Investigation Report – Proposed Scheifele Bridge Reconstruction

Northfield Drive East, Township of Woolwich, Ontario

November 11, 2020

Prepared for:

Regional Municipality of Waterloo
150 Frederick Street
Kitchener, ON N2G 4J3

Prepared by:

Stantec Consulting Ltd.
100-300 Hagey Boulevard,
Waterloo, ON N2L 0A4

Project No. 165010600

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Revision	Description	Author		Quality Check		Independent Review	
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1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was retained by the Regional Municipality of Waterloo (Client) to carry out design of a replacement for the Scheifele Bridge located over the Conestogo River on Northfield Drive East (Regional Road 22) in the Township of Woolwich, Ontario.

This preliminary geotechnical investigation was prepared to provide preliminary recommendations for design and construction of the proposed replacement of Scheifele Bridge. Additional geotechnical investigation is recommended to support detailed design of the bridge replacement.

The information provided in this report is specific to the scope of the investigation and the scope of the proposed project as discussed herein and should not be used for any application or purpose other than that stated herein. The scope of this report includes focusing on the geotechnical aspects of the project and does not include hydrogeological or environmental components.

Use of this report is subject to the Statement of General Conditions provided in **Appendix A**.

2.0 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

Scheifele Bridge crosses the Conestogo River on Northfield Drive East (Regional Road 22) between the Village of Conestogo in the north and the City of Waterloo in the south. The existing Scheifele Bridge structure is approximately 110 m long, approximately 12 m wide, and supported on three piers and two abutments. The bridge includes two lanes of Northfield Drive as well as a sidewalk along the west side of the bridge. The ground surface along Northfield Drive slightly slopes down toward Scheifele Bridge from the north and south. Surrounding grades of Northfield Drive along the approach and at the bridge are generally lower. At the current alignment, the bridge crosses a relatively straight section of Conestogo River. At its greatest extent at Scheifele Bridge, Conestogo River is approximately 90 m wide.

It is understood that the existing bridge is to be replaced with a four-lane structure including sidewalks or multi-use trails on either side. The following options are currently being reviewed:

- Construction of a new wider bridge to the west of Scheifele Bridge (full offset bridge). The existing bridge would be demolished.
- Construction of a new wider bridge along the existing alignment extending the structure to the west (partial offset bridge). Consideration is given on partially reusing the existing piers / foundations.
- Construction of a new wider bridge along the existing alignment extending the structure to the east (partial offset bridge). Consideration is given on partially reusing the existing piers / foundations.

Specific design loads were not available at the time of preparation of this preliminary geotechnical investigation and design report.

For purposes of this report, design and construction of the road bridge has been addressed with consideration for the Canadian Highway Bridge Design Code (CHBDC).

3.0 METHOD OF INVESTIGATION

3.1 DESKTOP REVIEW

Available geological mapping within the general area of the Site as well as previous investigations completed at the Site were reviewed as part of this investigation.

3.1.1 Regional Geology

The Physiography of Southern Ontario by Chapman and Putnam (1984) indicates that the study area is located within a spillway of the physiographic region identified as the Oxford Till Plain, which is described to consist of loamy soils and variable stoniness.

Based on available data from the Ontario Geological Survey (MRD128-Revised, Surficial Geology of Southern Ontario, 2010), the native overburden soils at the subject Site are expected to comprise modern alluvial deposits (clay, silt, sand, gravel, may contain organic remains) along Conestogo River as well as till deposits and glaciofluvial deposits (sandy deposits) to the north and south.

Bedrock underlying the overburden deposits is expected to comprise dolostone and shale of the Salina Formation (Ontario Geological Survey, MRD219, Paleozoic Geology of Southern Ontario, 2007). According to the map P3210 Bedrock Topography Conestogo Area (Mines and Mineral Division Ontario Geological Survey, 1993), the bedrock surface is anticipated below Elevation 280 m Above Mean Sea Level (AMSL), approximately 36 m Below Ground Surface (BGS) at Conestogo River.

3.1.2 Previous Reports

In 2011, Peto MacCallum Ltd. (PML), completed a geotechnical investigation for a proposed watermain crossing at Conestogo River on Northfield Drive. (PML Ref. No. 19KF012, dated July 26, 2019). The scope included the drilling of four boreholes to 9.8 m BGS on either side of the existing bridge abutments. Two of these boreholes were equipped with monitoring wells. The subsurface soil conditions contacted at the borehole / monitoring well locations BH1, MW2, MW3, and BH4 included deposits of sand and gravel interlayered with deposits of silt with trace to some gravel. Stabilized groundwater was measured at 0.3 m BGS to 1.9 m BGS (Elevations 315.5 m AMSL to 316.6 m AMSL) between June 18, 2019 and July 2, 2019.

The previous borehole / monitoring well locations are illustrated on the attached Borehole Location Plan, Drawing 1 in **Appendix B**. The borehole logs from the previous geotechnical investigation are included in **Appendix C.**

3.2 FIELD INVESTIGATION

Prior to commencing the field investigation, the various public utility companies were consulted to identify where public utilities crossed the property boundaries. In addition, a private locator was contracted to clear the boreholes of any private on-site services.

The fieldwork for the investigation was carried out from May 19 to 21, 2020 and from September 22 to 24, 2020. A total of seven boreholes (BH01-20 to BH07-20) were advanced to depths of 9.8 m BGS to 20.4 m BGS. The borehole locations are shown on the attached Borehole Location Plan, Drawing No. 1 in **Appendix B** and the borehole logs are included in **Appendix C**.

Permission to advance boreholes within the Northfield Drive East right of way was obtained from the Regional Municipality of Waterloo. A Grand River Conservation Authority permit was obtained for boreholes advanced through the riverbed.

The boreholes were advanced using CME track and truck mounted drilling rigs operated by Aardvark Drilling Inc., a specialist drilling subcontractor. Boreholes BH01-20 to BH04-20 were advanced with hollow stem augers. The auger cuttings were spread near the borehole locations. Boreholes BH05-20 to BH07-20 were advanced through existing weep holes from the bridge deck using casing and mud rotary drilling. The drilling mud was contained and removed from the Site using hydrovacuum equipment.

Stantec personnel recorded the subsoil and groundwater conditions encountered in the boreholes. The soil samples were recovered at regular 0.76 m and 1.52 m intervals using a 51 mm (outside diameter) split-tube sampler by conducting Standard Penetration Tests (SPTs) in accordance with the procedures outlined in ASTM specification D1586.

Where cohesive soils were contacted, handheld pocket penetrometer tests were performed to determine approximate undrained shear strengths and the results are provided on the borehole logs.

On completion of drilling, the boreholes were backfilled with bentonite consistent with the intent of Ontario Regulation 903 as amended and the ground surface restored using well-compacted asphalt cold patch or topsoil.

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3.3 BOREHOLE LOCATION AND ELEVATION SURVEY

The coordinates and elevations collected by Stantec's Geomatics division are provided in Table 3.1 below. The borehole locations are shown on the Borehole Location Plan, Drawing No. 1 in **Appendix B**.

Table 3.1: Borehole Elevations and Coordinates

Borehole Number	Ground Surface Elevation (m AMSL)	UTM Coordinates (NAD83 - Zone 17)	
		Northing (UTM)	Easting (UTM)
BH01-20	321.5	4,819,146	539,221
BH02-20	322.1	4,819,261	539,255
BH03-20	316.6	4,819,164	539,202
BH04-20	317.6	4,819,267	539,230
BH05-20	321.7*	4,819,178	539,229
BH06-20	321.8*	4,819,199	539,235
BH07-20	321.9*	4,819,227	539,243

- * The "ground surface elevation" at BH05-20 through BH07-20 is the top of bridge deck elevation

3.4 GEOTECHNICAL LABORATORY TESTING PROGRAM

All samples recovered from the geotechnical investigation were returned to Stantec's geotechnical and materials testing laboratory and were visually examined by a geotechnical specialist. Geotechnical Laboratory testing was completed by Englobe Corp.

The scope of the geotechnical laboratory testing program is outlined below in Table 3.2.

Table 3.2: Geotechnical Laboratory Testing Program

Laboratory Test	Number of Samples Tested
ASTM D2216-10 – Natural Moisture Content	84
ASTM D422-63 (2007) – Grain Size Distribution with Hydrometer	3
ASTM D6913-17 – Grain Size Distribution using Sieve	1
ASTM D4318-10 – Atterberg Limits	1

The results of the laboratory tests are discussed in the text of this report. The results of the moisture content tests are shown on the Borehole Records in **Appendix C**. The results of the grain size distribution tests and Atterberg Limits tests are reported on the borehole records and are illustrated on Figures 1 through 4 in **Appendix D**.

Samples remaining after testing will be placed in storage for a period of three months after issue of this geotechnical report. After the storage period, the samples will be discarded.

4.0 RESULTS OF INVESTIGATION

4.1 SUBSURFACE CONDITIONS

4.1.1 Overview

The subsurface conditions observed in the current boreholes are presented in detail on the logs provided in **Appendix C**. An explanation of the symbols and terms used to describe the Borehole Records is also provided.

The soils encountered in the boreholes and reported herein have been classified in accordance with the Unified Soil Classification System as defined in ASTM D2487 and D2488, with modifications consistent with the methods of the Ontario Ministry of Transportation (MTO). The modifications specifically include the removal of the descriptions “lean” and “fat” with reference to clay soils and include a “Medium” category with respect to plasticity.

The internal diameter (I.D.) of the SPT sampler is 38 mm and hence the grain size test results and soil classifications may not reflect the entire gravel size fraction which extends to 75 mm diameter. The presence of cobbles (particles from 75 mm to 300 mm) and boulders (particles > 300 mm) where inferred to be present are described separately from the gravel content.

The stratigraphic boundaries shown on the logs are inferred from non-continuous sampling and should be considered approximate only. Variations to the conditions reported and discussed herein must be anticipated.

4.1.2 Stratigraphic Summary

The boreholes through the Northfield Drive road corridor encountered pavement structure and embankment fill overlying native deposits. Surficial topsoil was found at the boreholes advanced at the bottom of the road embankment along the Conestogo River. The native soils contacted at the borehole locations comprised sand, sand and gravel, and silt interlayered with glacial till deposits. The glacial till deposits ranged from non-cohesive silty sand till to cohesive clay with sand till. Cobbles and boulders in varying amounts should be expected within the native deposits at the site.

The native soil strata encountered in the boreholes typically have the following characteristics:

- broad grain size (gravel, sand, silt and clay particles);
- variable gravel content (low to high) with cobbles and boulders;
- are predominantly cohesionless or weakly cohesive (e.g. low plasticity); and,
- are generally in a dense to very dense state (where characterized as cohesionless) or very stiff hard state (where characterized as cohesive).

Bedrock was not encountered to the maximum depth of the boreholes (e.g. 20.4 m BGS).

Saturated deposits were observed at 0.8 m BGS to 6.9 m BGS (Elevation 314.7 m AMSL to 316.8 m AMSL) at the time of drilling. Stantec's geomatics team measured the edge of water of Conestogo River near Elevation 315.5 m AMSL.

4.2 SOIL STRATIGRAPHY

The following sections summarize the soil strata encountered in the boreholes advanced during the current and previous investigations at Scheifele Bridge.

4.2.1 Topsoil

Topsoil was contacted at borehole BH03-20 and BH04-20 advanced in the river valley adjacent to the bridge embankments and was 760 mm thick. The topsoil thicknesses noted on the PML borehole logs ranged from 200 mm to 290 mm.

4.2.2 Pavement Structure

Boreholes BH01-20 and BH02-20 were advanced through the existing pavement structure of Northfield Drive East to the north and south of Scheifele Bridge. The pavement structure consisted of 150 mm and 165 mm of asphaltic concrete underlain by 345 mm and 600 mm of sand and gravel (granular fill) with traces to some silt.

4.2.3 Embankment Fill / Possible Embankment Fill

Boreholes BH01-20 and BH02-20 were advanced through the existing road embankment of Northfield Drive East to the north and south of Scheifele Bridge. The embankment fill / possible embankment fill contacted at the borehole locations and underlying the granular fill of the pavement structure was 5.3 m and 5.6 m thick, extending to depths of 6.1 m BGS (Elevation 315.4 m AMSL and 316.0 m AMSL).

The embankment fill / possible embankment fill varied in composition from silty sand and gravel to silt with some sand and traces of gravel. Trace to some cobbles were noted throughout the embankment fill / possible embankment fill. Traces of organics were noted within the embankment fill at borehole BH02-20 to 2.8 m BGS.

One particle size distribution analysis was completed on a representative sample of the embankment fill and the results are summarized in Table 4.1 and illustrated on Figure 1 in **Appendix D**.

Table 4.1: Grain Size Distribution – Embankment Fill

Borehole	Sample	Median Depth (m BGS)	Soil Classification	% Gravel	% Sand	% Silt	% Clay
BH01-20	SS2 + SS3	1.4	Sand and Gravel with Silt FILL	41	50	9	

At the time of fieldwork, the embankment fill / possible embankment fill was described as moist to wet with laboratory determined moisture contents ranging from 5% to 11%.

SPT N-values within the embankment fill / possible embankment fill ranged from 9 to 30 blows per 300 mm penetration of a split spoon sampler.

4.2.4 Organic Silt (OL), Silt (ML), Sandy Silt (ML), Clayey Silt (CL-ML)

A 450 mm thick layer of organic silt (OL) was contacted at borehole BH05-20 at the top of the riverbed. The organic silt contained some gravel, pieces of wood and roots and was saturated at the time of fieldwork. A moisture content of 20% was determined.

A 1.0 m thick layer of clayey silt (CL-ML) was encountered at borehole BH05-20 underlying the organic silt. The clayey silt contained some sand and gravel, trace cobbles, and trace organics and was described as wetter than the plastic limit.

Layers of silt (ML) with trace to some sand and gravel were contacted at boreholes BH03-20 and BH04-20 underlying the topsoil. The silt at borehole BH03-20 contained traces of organics. At the time of fieldwork, the silt was described as moist to wet with saturated seams at borehole BH04-20. Laboratory determined moisture contents were 11% and 12%. SPT N-values of 4 and 16 blows per 300 mm indicate very loose to compact relative densities.

A 300 mm thick layer of loose sandy silt (ML) was contacted at borehole BH04-20 underlying the silt. The sandy silt was described as wet.

A deeper silt deposit was contacted at borehole BH07-20 extending from 13.7 m BGS to 18.3 m BGS. The silt contained some sand and nil to trace gravel and clay. Trace organics were noted at 15.5 m BGS. The silt was described as wet to saturated with moisture contents ranging from 11% to 14%. SPT N-values ranged from 44 to greater than 50 blows per 300 mm indicating dense to very dense relative densities.

4.2.5 Silty Sand (SM), Sand (SP/SW/SP-SM/SW-SM), Sandy Silt (ML) to Silty Sand (SM)

Layers of silty sand (SM) and silty sand (SM) to sandy silt (ML) were contacted at boreholes BH01-20 and BH02-20 underlying the embankment fill as well as interlayered with glacial till deposits at boreholes BH05-20 and BH07-20. The silty sand and sandy silt contained trace to some gravel and were described as wet at the time of fieldwork. Moisture contents were determined at 12% to 17%. SPT N-values of 6 and to greater than 50 blows per 300 mm indicate loose to very dense conditions with the relative density increasing with depth.

Layers and deposits of sand (SP/SW/SP-SM/SW-SM) were contacted interlayered with the glacial till deposits at most of the boreholes. The sand generally contained nil to some gravel and cobbles as well as trace to some silt.

One particle size distribution analysis was completed on a representative sample of the sand and the results are summarized in Table 4.2 and illustrated on Figure 4 in **Appendix D**.

Table 4.1: Grain Size Distribution – Sand with Silt and Gravel (SW-SM)

Borehole	Sample	Median Depth (m BGS) [1]	Soil Classification	% Gravel	% Sand	% Silt	% Clay
BH07-20	SS5	11.7	Sand with Silt and Gravel (SW-SM)	27	53	14	6

Notes: [1] It is noted that ground surface of BH05-20 is referenced to top of bridge deck.

At the time of fieldwork, the sands were described as wet to saturated. Laboratory determined moisture contents ranged from 10% to 19%. SPT N-values vary from 2 to greater than 50 blows per 300 mm indicating very loose to very dense relative densities. It is noted that the very loose conditions were contacted at boreholes BH01-20 and BH02-20 at depths of 19.8 m BGS and 16.8 m BGS, respectively and it is possible that these N-values are not representative of in-situ conditions but have been disturbed by subartesian conditions.

4.2.6 Sand and Gravel (SW-SM, GW-GM), Silty Sand and Gravel (SM, GM), Sandy Gravel (GW/GM), Gravel (GP)

Sand and gravel (GW-GM, SW-SM/SM, GM), sandy gravel (GW/GM), and gravel (GP) were contacted at or near the top of the river bed in BH05-20 through BH07-20 and at variable depths interlayered with the sand and glacial till deposits throughout the Site. These granular layers and deposits contained varying content of silt and trace to some cobbles. Trace organic silt inclusions were noted within the sand and gravel at borehole BH03-20 at 2.3 m BGS and at borehole BH06-20 from the surficial riverbed material. Boulders were observed within the riverbed as well as were previously described within the sand and gravel deposits contacted by PML.

The granular layers and deposits were described as wet to saturated at the time of sampling. Laboratory determined moisture contents ranged from 8% to 17%. SPT N-values varied from 6 to greater than 50 blows per 300 mm indicating variable loose to very dense relative densities. It is noted that the relative density generally increases with depth.

4.2.7 Sandy Silt (ML) Till to Silty Sand (SM) Till, Silt (ML) Till, Clayey Silt (CL-ML) Till, Clay with Sand (CL) Till

Glacial till was contacted at variable depths at the borehole locations. The glacial till deposits contacted included non-cohesive sandy silt (ML) till to silty sand (SM) till and silt (ML) till as well as cohesive clayey silt (ML) till and clay with sand (CL) till.

The non-cohesive sandy silt (SM) to silty sand (SM) till generally contained trace to some clay and gravel. The silt (ML) till generally contained variable sand and gravel content and traces of clay. The clay with

sand (CL) till contained traces of gravel. The clayey silt (CL-ML) till contained nil to some sand and gravel. Traces of cobbles as well as seams of silt, sand, and gravel were noted within the glacial till deposits at variable depths.

Two particle size distribution analyses were completed on representative samples of the glacial till and the results are summarized in Table 4.3 and illustrated on Figures 2 and 3 in **Appendix D**.

Table 4.2: Grain Size Distribution – Glacial Till Deposits

Borehole	Sample	Median Depth (m BGS) [1]	Soil Classification	% Gravel	% Sand	% Silt	% Clay
BH05-20	SS3	9.5	Sandy Silt (ML) Till	11	32	45	12
BH05-20	SS5	11.0	Clay with Sand (CL) Till	3	18	53	26

Notes: [1] It is noted that ground surface of BH05-20 is referenced to top of bridge deck.

The results of one Atterberg limits test completed on a sample of the clay with sand (CL) till is shown below in Table 4.4 and included on Figure No. 3 in **Appendix D**.

Table 4.3: Atterberg Limits Test Results – Clay with Sand (CL) Till

Borehole	Sample	Median Depth (m BGS)	Description	Liquid Limit	Plastic Limit	Plasticity Index	Moisture Content (%)
BH05-20	SS5	11.0	Clay with Sand (CL) Till	21	13	8	11

Notes: [1] It is noted that ground surface of BH05-20 is referenced to top of bridge deck.

The grain size distribution and Atterberg Limits test results show that the tested soils would be classified as clay with sand (CL) according to the Unified Soil Classification System (USCS). Based on the Atterberg Limits test and moisture content test results, the clay with sand till was assessed to have been drier than the plastic limit. The clayey silt till was described as drier than to about the plastic limit. The non-cohesive sandy silt till, silty sand till and silt till were described as moist to wet with laboratory obtained moisture contents of 8% and 20%.

SPT N-values in the cohesive clay with sand till and clayey silt till ranged from 16 to greater than 50 blows per 300 mm, and pocket penetrometer testing indicated approximate undrained shear strengths of 175 to greater than 200 kPa. Based on this, the cohesive till deposits have a very stiff to hard consistency. SPT N-values in the non-cohesive sandy silt till, silty sand till and silt till ranged from 28 to greater than 50 blows per 300 mm indicating a compact to very dense relative density. It is noted that the relative density increases with depth.

4.3 GROUNDWATER CONDITIONS

Installation of monitoring wells was not part of this scope of work. Saturated deposits were noted at depths of 6.9 m BSG (Elevations 314.7 m AMSL and 315.3 m AMSL) at boreholes BH01-20 and BH02-20 and at depths of 1.3 m BGS (Elevation 315.3 m AMSL) and 0.8 m BGS (Elevation 316.8 m AMSL) at boreholes BH03-20 and BH04-20. Boreholes BH05-20 to BH07-20 were advanced through the riverbed with saturated soils contacted surficially.

It is noted that potential subartesian conditions may be present within the lower sand deposits encountered at 19.8 m BGS (Elevation 301.7 m AMSL) at borehole BH01-20 and at 16.8 m BGS (Elevation 305.3 m AMSL) at borehole BH02-20.

Two monitoring wells were installed by PML (MW2 and MW3). Stabilized groundwater was measured at 0.3 m BGS to 1.9 m BGS (Elevations 315.5 m AMSL to 316.6 m AMSL) between June 18, 2019 and July 2, 2019.

Based on the topographic survey completed by Stantec's Geomatics team dated June 22, 2020, the edge of water of Conestogo River was near Elevation 315.5 m AMSL. It is possible that the actual groundwater level at the Site is closer to the water level observed within Conestogo River.

Fluctuations in the groundwater levels should be anticipated throughout the various seasons.

5.0 DESIGN DISCUSSION & RECOMMENDATIONS

5.1 PROJECT DESCRIPTION AND BACKGROUND

The project involves the replacement of Scheifele Bridge on Northfield Drive East in the Township of Woolwich, Ontario. It is understood that the existing bridge is to be replaced with a four-lane structure including sidewalks or multi-use trails on either side. Multiple bridge alignments are currently being reviewed. Specific design loads were not available at the time of preparation of this preliminary geotechnical investigation and design report.

5.2 GEOTECHNICAL CONSIDERATIONS AND CONSTRAINTS

The following general development considerations and constraints are provided with respect to observations made during the geotechnical investigation, the subsurface conditions encountered, and the intended scope of development:

- Any associated structures, underground infrastructure and services located within the area of the planned development should be demolished, decommissioned, and relocated as part of the planned construction.
- Embankment fill and possible embankment fill were contacted within the road boreholes to depths of 6.1 m BGS. Native soils in loose condition and/or containing organics were noted to depths between

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1.5 m BGS and 6.9 m BGS. The fill / possible fill materials as well as native soils in loose condition or containing organic content are not considered suitable for support of the proposed bridge structure.

- Saturated deposits were noted at depths between ground surface, where advanced through the riverbed, and 6.9 m BSG (Elevations 314.7 m AMSL to 316.8 m AMSL). The edge of water of Conestogo River was measured near Elevation 315.5 m AMSL on June 22, 2020 and it is possible that the actual groundwater level at the Site is closer to the water level observed within Conestogo River. The saturated soils will need to be dewatered prior to excavations extending below the groundwater table through sump pumps or positive dewatering.
- It is noted that possible subartesian conditions were contacted at boreholes BH01-20 and BH02-20 at depths of 19.8 m BGS and 16.8 m BGS (Elevations 301.7 m AMSL and 305.3 m AMSL), respectively. Additional geotechnical investigation including boreholes equipped with monitoring wells are recommended to investigate the potential for subartesian conditions below the Site, should deep foundations be considered.
- The inorganic native soils at shallow depths beneath the riverbed level are generally in compact to dense condition and are considered suitable to support conventional foundations for the proposed bridge piers and abutments. Higher bearing resistances are available within the dense to very dense native soils underlying the Site. Deep foundations on piles may be considered; however, additional deeper boreholes would be required for deep foundation system on piles.
- The silty soils contacted at the Site are considered susceptible to softening in the presence of construction activity and water. Construction activities should be minimized on finished subgrade surfaces and prepared surfaces protected to minimize the amount of degradation during wet weather conditions.
- The native soils have a high silt content and should therefore not be considered as free draining. The majority of the native soils are further assessed to have a high to very high frost susceptibility. The native soils should not be used in any application requiring the use of free draining material such as backfill for foundation infrastructure, for trench backfill, or in any area where settlement would jeopardize the serviceability of existing or planned infrastructure.

Additional geotechnical comments, discussion, and recommendations are provided in the following sections with respect to the design and construction of the planned project.

5.3 CONSTRAINTS DUE TO NATURAL ENVIRONMENT

5.3.1 Frost Penetration

The design frost depth for the subject site is approximately 1.2 m below grade. Foundations for abutments, piers, retaining walls, sign supports, lighting poles, etc., should therefore be protected from frost action by a minimum soil cover of 1.2 m, or be provided with equivalent protection using manufactured insulation.

The frost susceptibility of soils is generally related to the percentage of the soil finer than 0.02 mm (7.9 x 10^{-4} in.). Based on the classification system developed by the U.S. Corps of Engineers, soils are grouped into categories. The soils contacted at the boreholes range from having a negligible to low frost susceptibility (i.e., gravels) to a very high frost susceptibility (i.e., silt, silty sands, low plasticity clays) with the majority of the soils being classified as Frost Group F3 (high) to Frost Group F4 (very high).

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5.3.2 Seismic Conditions

5.3.2.1 Seismic Site Class

The selection of the seismic site classification is based on the average soil conditions encountered in the upper 30 m of the stratigraphy. For this project, the boreholes were terminated at a maximum depth of 20.4 m BGS. The stratigraphy below this depth has therefore been interpreted from geologic mapping and soil and bedrock data available from online public data bases.

For the purposes of this report, the SPT N-value method has been used to assess the Seismic Site Classification for this project location, consistent with the second of three methods stated in the Canadian Highway Bridge Design Code (CHBDC, 2014), Table 4.1. For this purpose, a mean N-value was calculated for each soil stratum and weighted harmonic average of the mean N-values was calculated over a depth of 30 m below grade.

The calculations yielded a weighted harmonic average N-value of 29 assuming a conservative N-value of 50 for the underlying very dense soil. Therefore, in accordance with the CHBDC, Table 4.1, Seismic Site Class 'D' is suggested for design. Consideration may be given to conducting a geophysical survey to measure the shear wave velocity at the site to confirm or improve the site class.

5.3.2.2 Seismic Hazard Data

A copy of the National Building Code (NBC) Seismic Hazard Calculation Data sheet prepared by Natural Resources Canada (NRC) is provided in **Appendix E** for reference. The peak horizontal ground acceleration (PGA) for various return periods based on the Natural Resource Canada values are summarized below in Table 5.1 for reference.

Table 5.1: Summary of Peak Horizontal Ground Accelerations

Return Period	Probability of Exceedance in 50 years	PGA (g)
100 yrs	40%	0.008
475 yrs	10%	0.026
1,000 yrs	5%	0.042
2,475 yrs	2%	0.069

5.3.2.3 Liquefaction Potential

Seismic liquefaction is the sudden loss in stiffness and strength of soil due to the cyclic loading effects of an earthquake. Based on a preliminary review, liquefaction of the foundation soils is not a concern for study area due to:

- The relatively low PGA values referenced above;
- The presence of the very stiff to hard and compact to very dense soils; and
- The relatively high fines content in the soils.

The potential for liquefaction of the soils at the Site under seismic loading should be further assessed in the case that shallow foundations are considered for support of the proposed structure.

5.4 GEOTECHNICAL MODEL

5.4.1 Soil Parameters

The information obtained from the field investigation and laboratory testing program was used to develop geotechnical parameters for consideration and use in design and construction. The parameters are summarized in Table 5.2 below consistent with the stratigraphy encountered in the majority of boreholes.

Table 5.2: Geotechnical Design Parameters

Material (average compactness/consistency)	Total Unit Weight [2] γ (kN/m³)	Drained Friction Angle Ø ' (°)	Undrained Shear Strength S_u (kPa)	Modulus of Elasticity E (MPa)	Horizontal Subgrade Reaction, n_h (kPa/m)
Fill Materials					
- Granular Fills	22	32	N/A	50	5,000
- Embankment Fills / Possible Fills	21	28	N/A	25	3,000
Silt / Sandy Silt / Silty Sand (loose to compact)	18	28	N/A	10	1,300
Silty Sand / Sand / Sandy Silt / Silt (compact to very dense)	20	30	N/A	20	5,000
Sand and Gravel / Silty Sand and Gravel / Sandy Gravel / Gravel (compact to dense)	21	34	N/A	50	7,000
Sand and Gravel / Silty Sand and Gravel / Sandy Gravel / Gravel (very dense)	21	36	N/A	75	11,000
Sandy Silt Till / Silty Sand Till / Silt Till (compact to dense)	21	32	N/A	40	5,000
Sandy Silt Till / Silty Sand Till / Silt Till (very dense)	21	34	N/A	75	11,000
Clayey Silt Till / Clay with Sand Till (very stiff to hard)	21	30	175	50	N/A
OPSS Granular B Type I Fill[1]	21	32	N/A	50	5,000
OPSS Granular A & B Type II Fill[1]	22	35	N/A	75	7,000

Notes:

N/A Not applicable

[1] OPSS Granular materials are included specific to design and construction requirements and recommendations contained herein.

[2] Effective unit weight below the groundwater table can be estimated by subtracting the unit weight of water (9.8 kN/m³) from the total unit weight of the soil.

The parameters provided in Table 5.2 were selected based on the consistency/compactness condition of the soils encountered in the boreholes and consideration of the range in values provided in the literature

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references. The friction values presented above represent the critical state values and should not be assumed as peak values. The modulus of elasticity values presented above represent the secant values and are associated with large strains.

5.4.2 Groundwater Level

Saturated deposits were noted at depths of 6.9 m BSG (Elevations 314.7 m AMSL and 315.2 m AMSL) at boreholes BH01-20 and BH02-20 and at depths of 1.3 m BGS (Elevation 315.3 m AMSL) and 0.8 m BGS (Elevation 316.8 m AMSL) at boreholes BH03-20 and BH04-20. Boreholes BH05-20 to BH07-20 were advanced through the riverbed with saturated soils contacted surficially. The edge of water of Conestogo River was measured near Elevation 315.5 m AMSL on June 22, 2020 and it is possible that the actual groundwater level at the Site is closer to the water level observed within Conestogo River.

It is noted that potential subartesian conditions may be present within the lower sand deposits encountered at 19.8 m BGS (Elevation 301.7 m AMSL) at borehole BH01-20 and at 16.8 m BGS (Elevation 305.3 m AMSL) at borehole BH02-20.

5.4.3 Static Conditions

For preliminary design purposes, lateral earth pressure parameters have been developed for two "simplified" soil layers as shown in Table 5.3 below. The upper layer is for the combination of the fill materials and native soils encountered above Elevation 312.0 m AMSL and the lower layer is for the combination of the native glacial till interlayered with sand / sand and gravel deposits.

Table 5.3: Static Lateral Earth Pressure Parameters (Horizontal Backfill)

Parameter [1,2]	OPSS Gran B Type I [3]	OPSS Gran A and Gran B Type II [3]	"Simplified" Soils [4]	
			≥ EL. 312.0 m	< EL. 312.0 m
Bulk Unit Weight (kN/m^3)	21	22	20	21
Effective Friction Angle (°)	32	35	28	32
Coefficient of Active Earth Pressure, K_a	0.31	0.27	0.36	0.31
Coefficient of Passive Earth Pressure, K_p	3.25	3.69	2.77	3.25
Coefficient of at Rest Earth Pressure, K_o	0.47	0.43	0.53	0.47
Height of Application of P_p/P_a from base as a ratio of wall height, (H)	0.33	0.33	0.33	0.33

Notes:

1 Parameters provided above are for consideration in the design of temporary shoring, if required

2 The coefficients provided are for a level ground surface, static conditions and a smooth shoring wall surface

3 Parameters for the OPSS granular materials are provided for consideration in the evaluation of earth pressures where granular material is placed as backfill, such as behind the bridge abutments.

4 Magnitude of wall rotation to reach active and passive earth pressures is described in CFEM Section 24.4, Table 24.3

Where traffic is present in proximity to the planned infrastructure, a minimum surcharge load of 12 kPa should be considered in design.

5.4.4 Lateral Resistance and Reaction Pile Design Parameters

For preliminary design purposes, the lateral resistance of pile foundations (e.g. driven steel piles or drilled cast-in-place concrete piles) may be evaluated for deflection and resistance using the coefficient of horizontal sub-grade reaction (k_s) and lateral resistance (p_{ult}) as follows:

For cohesionless soils:

$k_s = n_h \cdot z / D$ [kN/m^3]
$p_{ult} = 3 \cdot Kp \cdot [\gamma D_w + (\gamma - \gamma_w)(z - D_w)]$ [kPa]

For cohesive soils:

$k_s = 67 \cdot S_u / D$ [kN/m^3]
$p_{ult} = 3 \cdot [\gamma z + 2 S_u]$ [kPa]

where:

z: depth of embedment of pile	[m]
D: pile diameter	[m]
S_u: undrained shear strength of cohesive soil	[kPa]
n_h: coefficient of horizontal subgrade reaction	[kPa/m]
γ: unit weight of soil	[kN/m^3]
γ_w: unit weight of water	(9.8 kN/m^3)
D_w: depth of groundwater below excavation base	[m]
K_p : passive earth pressure coefficient	[unitless]

The values for unit weight (γ), undrained shear strength (S_u), and subgrade modulus (n_h) are provided in Table 5.2, and the values for K_p are provided in Table 5.3. The design groundwater level is discussed in Section 5.4.2 above.

The spring constant (K_{spr}) for use in the analysis of potential deflection of the pile may be obtained from the following expression:

K_{spr} = reduction factor (see Table 5.4) $\cdot k_s \cdot L \cdot D$ [kN/m]

The factored lateral resistance of the pile (P_{ult}) may be obtained from the expression:

P_{ult} = reduction factor (see Table 5.4) $\cdot p_{ult} \cdot L \cdot D$ [kN]

where:

L = pile length or element used in the analysis	[m]
D = pile diameter	[m]

Reduction factors for a group of piles/caissons are provided in Table 5.4 below.

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Table 5.4: Reduction Factors for a Group of Piles/Caissons

Pile Spacing (Center to Center) [1]	Reduction Factor
k_s Reduction Factor - Piles Perpendicular to Loading Direction [2]	
> 4D	1.0
4D	1.0
1D	0.5
ks Reduction Factor - Piles Parallel to Loading Direction [3]	
8D	1.0
6D	0.7
4D	0.4
3D	0.25
P_{ult} Reduction Factor [2]	
> 4D	1.0
1D	0.33

Notes:

1 Reductions factors for intermediate pile/caisson spacing can be calculated by linear interpolation

2 Reduction factors calculated from charts in Poulos and Davis (1980)

3 Reduction factors from CFEM

It is suggested that the benefit of the soil within the depth of frost penetration (1.2 m) be disregarded in the evaluation of the pile lateral resistance and reaction calculations.

Given the soil behavior is nonlinear, the approach described above to estimate lateral displacement can be used only where maximum pile deflections are small (e.g. less than 1% of the caisson/pile diameter), the loading is static, and the pile material is uniform. This is consistent with the recommendations of the CFEM (4th Edition).

For detailed design purposes, the commercial computer software L pile with a p-y analysis approach is recommended to estimate the soil spring coefficients for pile lateral deflection analyses. The Brom's method can also be used to evaluate lateral resistance of piles. Parameters provided above in Table 5.2 can be used in the analysis.

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5.5 FOUNDATION RECOMMENDATIONS

5.5.1 General Foundation Overview

Fill and possible fills as well as native soils in loose condition and/or with organic content are not considered suitable for support of the proposed road bridge. Footings must be founded in the native inorganic soils.

Shallow footings founded within the upper compact to dense native inorganic soils will provide relatively low bearing resistances. Deep foundations such as driven piles founded in the underlying dense to very dense soils would provide higher bearing resistances.

Due to the complex interlayering of soils and presence of saturated sandy layers with potential subartesian pressure, installation of caissons could be problematic. Driven piles are considered the preferred deep foundation method.

It is noted that possible subartesian conditions were contacted at boreholes BH01-20 and BH02-20 at depths of 19.8 m BGS and 16.8 m BGS (Elevations 301.7 m AMSL and 305.3 m AMSL), respectively. Additional geotechnical investigation including boreholes equipped with monitoring wells are recommended to investigate the potential for subartesian conditions below the site, should deep foundations be considered.

Due to the potential for disturbance of the native soil subgrade during rebar placement and forming, all footing subgrade for conventional foundations must be provided with a 75 mm mud slab following excavation and inspection.

For the purposes of this report, the geotechnical design of the foundation components has considered the requirements of the CHBDC.

5.5.2 Shallow Foundations

Shallow spread footings can be considered for the road bridge abutments and bridge piers founded on the upper compact to dense non-cohesive / very stiff cohesive native inorganic soils, generally contacted below Elevation 313.0 m AMSL (BH07-20) to 314.7 m AMSL (BH01-20). Proposed footings must be founded at a frost-free depth and protected from scour. The excavations must be properly dewatered to ensure seepage from the base of excavation does not occur and disturb the subgrade.

For preliminary design purposes, the footings can be designed using the capacities provided in Table 5.5 below and the design methods specified in the CHBDC. A preliminary embedment depth of 2.5 m has been assumed for the pier and abutment footings with a founding elevation near 313.0 m AMSL.

Table 5.5: Footing on Native Soils Foundation Design Parameters

Footing size Length x Width (m)	Factored Geotechnical Resistance at ULS (kPa) [1]	Geotechnical Reaction at SLS (kPa) [2,3]
12.5 x 2.7 (approximate size of existing pier foundations)	435	300
11.5 x 4.9 (approximate size of abutment foundations not including wingwalls)	500	280
24.0 x 3.0	425	185
24.0 x 5.0	475	140

Notes

1 The ULS values include a resistance factor of 0.5 in accordance with the CHBDC. The ULS values have been calculated for a minimum embedment depth of 2.5 m.

2 The SLS values include a resistance factor of 0.8 in accordance with CHBDC.

3 The SLS values have been calculated for a settlement of 25 mm or less. Higher bearing pressures can be provided if potential settlements of over 25 mm are considered allowable for the proposed structure.

5.5.2.1 Sliding Resistance

In the absence of values for un-factored friction factor in CHBDC, it is recommended that a value of 0.35 (i.e., silts, sands, clays) or 0.45 (i.e., sand and gravels) is considered in the design of footings placed on the undisturbed, prepared surface of the native soils, consistent with CFEM Section 24.5.

An adhesion of 65 kPa should be considered for use in the design of footings placed on the very stiff to hard clayey silt till soils. The adhesion and friction should be used in separate analyses and whichever less favorable should be considered for design purposes.

The passive earth pressure at the face of the footing should not be considered in the design because of implications for the presence of frost and associated disturbance to the soil.

Resistance factors of 0.8 and 0.6 should be applied to the friction factor and adhesion values, respectively, in accordance with the methods described in CHBDC S6-14.

5.5.3 Driven Pile Foundations

The abutments and piers for the proposed road bridge can be supported on driven steel H-Piles and pile caps. The presence of cobbles and boulders must be considered for pile driving activities. Additional deeper boreholes are recommended to confirm the depth of practical refusal for driven piles (N-values greater than 100 blows per 300 mm). SPT N-values in excess of 100 blows were noted at boreholes BH05-20 and BH06-20 below approximate Elevation 310 m AMSL. Installation of monitoring wells in the additional boreholes is also needed to determine if the groundwater in the lower sand deposits has subartesian pressure. If high subartesian pressure is present in the lower sand, then design of lower capacity piles designed to terminate above the level of the lower sand may be warranted.

5.5.3.1 Preliminary Driven Pile Axial Capacity

The bearing capacities provided in Table 5.6: below may be used for HP 310 x 125 piles driven to practical refusal into the underlying very dense glacial tills using pile driving equipment with a minimum specified hammer energy of 50 kJ. The bearing capacity is based on industry standard capacities for H-piles driven to practical refusal into glacial till / granular soils with SPT N-values above 100 and is consistent with the values obtained from the Hiley formula and the results of historic field testing. For the purpose of this preliminary report a pile length of 15 m has been assumed. No consistent depth with soils having SPT N-values greater than 100 blows was found at the borehole locations and additional deeper boreholes would be required to confirm pile lengths and axial capacities.

The parameters provided in Table 5.2 can be used in design, however, it is acknowledged that lower bearing capacities will be obtained from software such as APILE as the soil models in the software may not represent the over-consolidated glacial tills that are present in Southern Ontario.

Table 5.6: H-Pile Foundation Design Parameters

Driven Steel H (310×125) Piles	
Factored Geotechnical Resistance at ULS [1,2] (kN)	**Geotechnical Reaction at SLS (kN) [3,4,5]**
850	850

Notes:

1. The ULS values includes a resistance factor of 0.4 in accordance with the CHBDC.
2. The ULS loads are not expected to cause settlements more than 25 mm. The ULS condition will govern the design.
3. The SLS values includes a resistance factor of 0.8 in accordance with CHBDC.
4. The SLS values have been calculated for a settlement of 25 mm or less.
5. The SLS values are defined relative to the point that the bridge is about to be placed.

The capacities of the piles should be confirmed in the field using a Pile Driving Analyzer (PDA). The use of a greater than typical driving energy or predrilling may be required to mitigate the potential for early refusal and to achieve the design capacity.

A minimum center to center spacing of 4 times the pile diameter is recommended. Recommendations for reduction factors for group effects are provided in Section C6.11.3.2 of the CHBDC.

5.5.3.2 Driven Pile Lateral Capacity

Parameters and equations provided in Sections 5.4.1 and 5.4.4 can be used to evaluate the lateral capacity of the driven piles.

5.5.4 Backfill for Bridge Abutments

To prevent hydrostatic build-up, the backfill against the abutments should consist of free draining granular material meeting the requirements of OPSS Granular A, OPSS Granular B Type I or OPSS Granular B

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Type II. The geometry of the granular zone behind the abutments should be a wedge, bound by a plane rising at 60° to the horizontal. The granular material should drain to a frost-free outlet.

Given the nature of the "closed face" abutment, it is presumed that the entire area to the rear of the abutment will be backfilled with the granular materials noted above.

To prevent the migration of fines from the prevailing native soils into the granular backfill, it is recommended that a geosynthetic be placed on the exposed surface of the native soils.

5.5.5 Lateral Earth Pressures on Abutments

5.5.5.1 Static Conditions

Parameters for OPSS granular material included in Table 5.3 in Section **Error! Reference source not found.** above can be used to evaluate the lateral pressures on the bridge abutments.

The earth pressures on the abutments should be assessed in accordance with Section 6.12 of the CHBDC.

Where the bridge abutments are laterally restrained by the bridge deck (i.e. non-yielding) the at-rest earth pressure (P_o) should be used for design.

The effects of backfill compaction should be accounted for by estimating the compaction-induced load in accordance with the method described in Section 24.8 of the CFEM or by applying a compaction surcharge as shown in Figure 6.8 of the CHBDC.

6.0 CONSTRUCTION RECOMMENDATIONS AND DISCUSSIONS

6.1 TEMPORARY EXCAVATIONS

Temporary excavations must be carried out in accordance with the latest edition of the Occupational Health and Safety (OH&S) Act & Regulations for Construction Projects.

Any fill and possible fill materials as well as non-cohesive native soils (i.e., sand and gravel, sand, silt) from above the water table should be classified as Type 3 soils. In accordance with the OH&S Act, the maximum excavation side slope for a Type 3 soil is 1H:1V (Horizontal: Vertical) extending from the base of the excavation or the top of the trench box. The cohesive native soils (i.e., silty clay, clay) should be classified as Type 2 soil. The maximum excavation side slope for a Type 2 soil is 1:1 (Horizontal: Vertical) and a 1.2 m vertical cut extending from the base of the excavation is permitted, in accordance with the OH&S Act.

Some sloughing and caving must be anticipated for excavations, particularly where excess moisture (precipitation, ground surface runoff, or the groundwater table) is present. Unsupported excavation slopes that extend through wet soils may slough to angles as flat as 3H:1V.

For the purpose of this report and the comments provided above, we have presumed that temporary excavations without lateral support will remain open for relatively short periods (e.g. typically 48 hours to 72 hours).

For excavations without lateral support that remain open for longer periods sloughing and caving of side slopes must be anticipated, particularly if left exposed to periods of precipitation, ground surface runoff, or freeze-thaw cycles. The slopes of these excavations should be protected from erosion and the slopes should be inspected frequently for signs or indications of erosion and/or instability.

If localized instability is noted at the time of excavation or while an excavation remains open, or if wet conditions are encountered, the side slopes of the excavations should be flattened as required to maintain safe working conditions.

Stockpiling of any materials adjacent to excavations should be avoided. Similarly, traffic should not be permitted in proximity to open excavations. For this purpose, it is recommended that all storage of materials and traffic be restricted from a 3 m wide strip around the excavations, measured from the crest of the excavation designed and constructed in accordance with the OH&S Act.

Trench boxes can be used to maintain safe working conditions if space is restricted such that the side slope cannot be safely cut back in accordance with the OH&S Act & Regulations, if sloughing and cave-in are encountered in the excavations, or if the excavations are to remain open for a longer period.

6.2 TEMPORARY SHORING

Temporary shoring may be used to facilitate the required excavations at the Site. Comments regarding the design of the temporary shoring system are therefore provided below.

The shoring system should be designed in accordance with the methods described in the Canadian Foundation Engineering Manual (2006 Edition).

The selection and design of the temporary shoring system should consider whether deflection of the supported soils is permitted (i.e., no structures or infrastructure sensitive to deformation exist within the zone of influence of the planned excavation) and whether penetration below the prevailing groundwater table or groundwater infiltration is an issue. The selection and design should further consider related structural and serviceability requirements.

The design of the shoring system should also consider any surcharges or loads from adjacent buildings, road embankment, and machinery or stockpiled materials that may be present within the zone of influence of the excavation and shoring system.

The design of the shoring and anchorage system should be carried out by a professional engineer specialized in shoring design and the soil parameters presented in Tables 5.2 and 5.3 may be used in the design.

6.3 TEMPORARY CONSTRUCTION DEWATERING

Saturated deposits were noted at depths of 6.9 m BSG (Elevations 314.7 m AMSL and 315.2 m AMSL) at boreholes BH01-20 and BH02-20 and at depths of 1.3 m BGS (Elevation 315.3 m AMSL) and 0.8 m BGS (Elevation 316.8 m AMSL) at boreholes BH03-20 and BH04-20. Boreholes BH05-20 to BH07-20 were advanced through the riverbed with saturated soils contacted surficially. The edge of water of Conestogo River was measured near Elevation 315.5 m AMSL on June 22, 2020 and it is possible that the actual groundwater level at the Site is closer to the water level observed within Conestogo River.

Two monitoring wells were installed by PML (MW2 and MW3) and stabilized groundwater levels were measured at 0.3 m BGS to 1.9 m BGS (Elevations 315.5 m AMSL to 316.6 m AMSL) between June 18, 2019 and July 2, 2019.

It is further noted that potential subartesian conditions may be present within the lower sand deposits encountered at 19.8 m BGS (Elevation 301.7 m AMSL) at borehole BH01-20 and at 16.8 m BGS (Elevation 305.3 m AMSL) at borehole BH02-20.

The soils should be dewatered prior to the excavation work and dewatering activities maintained during construction, where excavations for bridge foundations extend below the stabilized groundwater table. Dewatering must be maintained during construction to a depth sufficient to prevent disturbing (piping/boiling) of the founding subgrade using sump pumps or positive dewatering.

Minor to moderate groundwater inflow is expected for excavations extending below the stabilized groundwater table in silt, clay, or glacial till soils. Moderate to major groundwater inflow is expected for excavations below the stabilized groundwater table in sand and sand and gravel soils.

An Environmental Activity and Sector Registry or Permit to Take Water must be obtained from the MECP for groundwater dewatering in excess of 50,000 L/day or 400,000 L/day, respectively.

In addition to the dewatering activities, construction of a cofferdam and/or diversion of the river flow will be required for construction of the bridge piers and possibly abutments.

The preceding comments are intended for general reference and information only. The Contractor is solely responsible for the design and implementation of any required unwatering and/or dewatering, including requirements for withdrawal, handling, treatment, and discharge.

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6.4 REUSE OF EXCAVATED MATERIAL

6.4.1 Embankment Fill Materials

The embankment fill contacted at boreholes BH01-20 and BH02-20 generally ranged from silty sand and gravel to silt with some sand and traces of gravel. Portions of the embankment fill may be suitable for reuse as OPSS Granular 'B' or OPSS Select Subgrade Material; however, additional testing is recommended at the time of construction. The embankment fill may further be used as Earth Borrow provided cobbles and organic content are separated from soils prior to reuse.

6.4.2 Native Soils

The underlying inorganic native soils contacted at the borehole locations comprise sands, sand and gravels, silts, and glacial tills and could be considered for Earth Borrow. The non-cohesive sand and gravel, sand and silt soils are expected to be wet to saturated and should be excluded from reuse onsite unless sufficiently dried to +/- 2.0 % of the optimum moisture content level prior to reuse. Any cobbles greater than 150 mm or organic content should be excluded from materials considered for reuse onsite.

Further, the glacial till soils contacted at the Site may be particularly difficult to work with depending on their moisture levels, and the climatic conditions at the time of use. The high percentage of clay and silt will make these soils difficult to handle, place, and compact, in any "less-than-ideal" weather conditions. Disturbance and loss of strength in the presence of excess moisture and/or construction traffic is a concern. It is recommended that reuse of this soil be limited to prevailing "dry" conditions and during favourable seasons.

In general, the native soils have a high silt content and should therefore not be considered as free draining. The majority of the native soils are further assessed to have a high to very high frost susceptibility. The native soils should not be used in any application requiring the use of free draining material such as backfill for foundation infrastructure.

6.5 IMPORTED FILL MATERIALS

All fill materials imported to the Site must meet all applicable municipal, provincial, and federal guidelines and requirements associated with environmental characterization of the materials.

Imported soils for use as backfill adjacent to foundations for the planned bridge should comprise OPSS.MUNI 1010 Granular 'B' or Select Subgrade Material.

6.6 SHALLOW FOUNDATION CONSTRUCTION

The founding surfaces should be inspected by geotechnical personnel prior to placing concrete to confirm the founding conditions are consistent with the recommendations described herein, and to ensure that there is no disturbance of the soil at the founding surface. Any deleterious materials, organics, or loose / soft or wet conditions observed, should be sub-excavated and removed and the excavations backfilled

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with lean mix concrete or the foundations lowered in accordance with the recommendations provided in Section 5.5.2.

Where lean mass concrete is required to level the ground surface or develop a specific elevation for the foundations, the lean mass concrete will also serve to protect the exposed surface of the native soils from disturbance that can occur when exposed to adverse weather conditions or construction disturbance. The founding surface should be maintained in a dry condition throughout the construction process.

If construction is undertaken in the winter, the following is recommended to be included in the contract regarding the construction of foundations.

- Foundations shall be constructed on non-frozen ground where non-frozen ground includes the exposed material/soil at the founding surface and all underlying soils. The conditions must be confirmed via geotechnical inspection within 1 hour prior to the placement of concrete.
- Following construction of footings, protection must be provided to avoid freezing of the bearing surface and the concrete during curing.
- Within the frost zone, foundations shall be backfilled with free-draining granular material and drainage shall be provided to prevent lifting of the foundations due to adfreeze.

6.7 DRIVEN PILE CONSTRUCTION

Due to the expected hard driving conditions through the till soils and possible presence of cobbles and boulders within the till, the H-pile tips should be equipped with driving shoes in accordance with OPSD3000.100 or Titus H Bearing Pile Point to prevent any damage during pile driving.

The use of a larger than typical driving energy or predrilling may be required to mitigate the potential for early refusal and achieve the design capacity.

The capacities of the piles should be confirmed in the field using a Pile Driving Analyzer (PDA). Testing should be conducted at End of Initial Drive (EOID) and at Restrike. The EOID tests can be used to develop driving/installation criteria. The EOID tests will also provide estimates of axial compressive resistance of the piles, confirmation of hammer assembly performance, and measured stresses in the pile.

Typically, the Restrike tests are carried out a minimum of 24 hours after initial installation (typical industry practice is to restrike piles between 24 hours and 72 hours after EOID). Notwithstanding the industry practice, it is noted that the rest period recommended in the CFEM is 2 weeks, irrespective of pile-soil conditions. The Restrike tests are carried out on the same piles as the EOID tests were completed.

6.8 ADVERSE WEATHER CONSTRUCTION

Additional precautions, effort, and measures may be required, when and where construction is undertaken during late fall, winter, and early spring when the temperature and climatic conditions have an adverse influence on the standard construction practices or during periods of inclement weather.

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The native silty soils as well as imported fills, may pose a concern, subject to the prevailing weather conditions. The founding soils are considered frost-susceptible and must be protected from freezing during construction. Imported materials that contain ice, snow, or any frozen material should not be accepted for use.

If construction is undertaken in the winter, the following is recommended to be included in the contract regarding the placement of any fill material:

- At temperatures below -5°C placement of fill should be halted and the existing fill materials protected from frost penetration;
- Frost protection (e.g. straw, insulated tarps, or similar) should be placed on the exposed surface of the fill at the end of the workday. All fill that freezes overnight shall be removed. Any snow and ice shall be removed. Fill surfaces should be sloped to prevent ponding of water during milder weather;
- The finished subgrade surface of all fills should be protected from freezing. If the final fill surface is exposed to freezing temperatures, thawing via the application of heat, and re-compaction to achieve the project specification shall be required. Test pits and temperature readings will be required to determine if the soil is above freezing;
- Regular checks of the temperature of imported or stockpiled fill should be made. The soil temperatures should be greater than +2°C in order to be placed and compacted; and,
- Full-time inspection and testing services are required during earthworks in winter conditions.

Additional considerations for heating of concrete, heating of forms and reinforcing steel, protection of concrete from freezing, and similar measures may also be required subject to climatic conditions at the time of construction.

Appropriate scheduling of the work may also require specific consideration and revision from the typical adopted. The scope of work intended may have to be reduced or adjusted, and/or only select construction activities be undertaken during specific climatic conditions. The extent of excavations may have to be limited, with all excavating and associated backfilling completed without delay.

6.9 BACKFILL MATERIALS AND METHODS

For foundation backfilling, reference should be made to OPSS 902 Construction Specification for Excavation and Backfilling – Structures.

It is recommended that the backfill adjacent to foundations for the planned bridge consist of free-draining, non-frost susceptible granular materials, such as OPSS Granular ‘B’.

The backfill should be placed in maximum 300 mm lifts and compacted to a minimum of 98% SPMDD. The compaction level for backfill below any landscaped areas may be reduced to 95% SPMDD. Due care should be exercised during the backfilling and compaction process to avoid damaging the foundations and superstructure.

7.0 CLOSURE

Use of this report is subject to the Statement of General Conditions provided in **Appendix A** of this report. It is the responsibility of the Client and its agents to review the conditions and to notify Stantec Consulting Ltd. should any of these not be satisfied. The Statement of General Conditions addresses the following:

- Use of the report;
- Basis of the report;
- Standard of care;
- Interpretation of site conditions;
- Varying or unexpected site conditions; and,
- Planning, design or construction.

This report has been prepared by Karen Thrams and reviewed by Jeff Dietz.

Respectfully Submitted,

STANTEC CONSULTING LTD.

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APPENDICES

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Appendix A

A.1 STATEMENT OF GENERAL CONDITIONS

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STATEMENT OF GENERAL CONDITIONS

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Stantec Consulting Ltd. and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Stantec Consulting Ltd.'s present understanding of the site specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Stantec Consulting Ltd. is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state or province of execution for the specific professional service provided to the Client. No other warranty is made.

INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Stantec Consulting Ltd. at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behavior. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock and groundwater conditions as influenced by geological processes, construction activity, and site use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Stantec Consulting Ltd. must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Stantec Consulting Ltd. will not be responsible to any party for damages incurred as a result of failing to notify Stantec Consulting Ltd. that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Stantec Consulting Ltd., sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Stantec Consulting Ltd. cannot be responsible for site work carried out without being present.

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Appendix B

B.1 DRAWINGS

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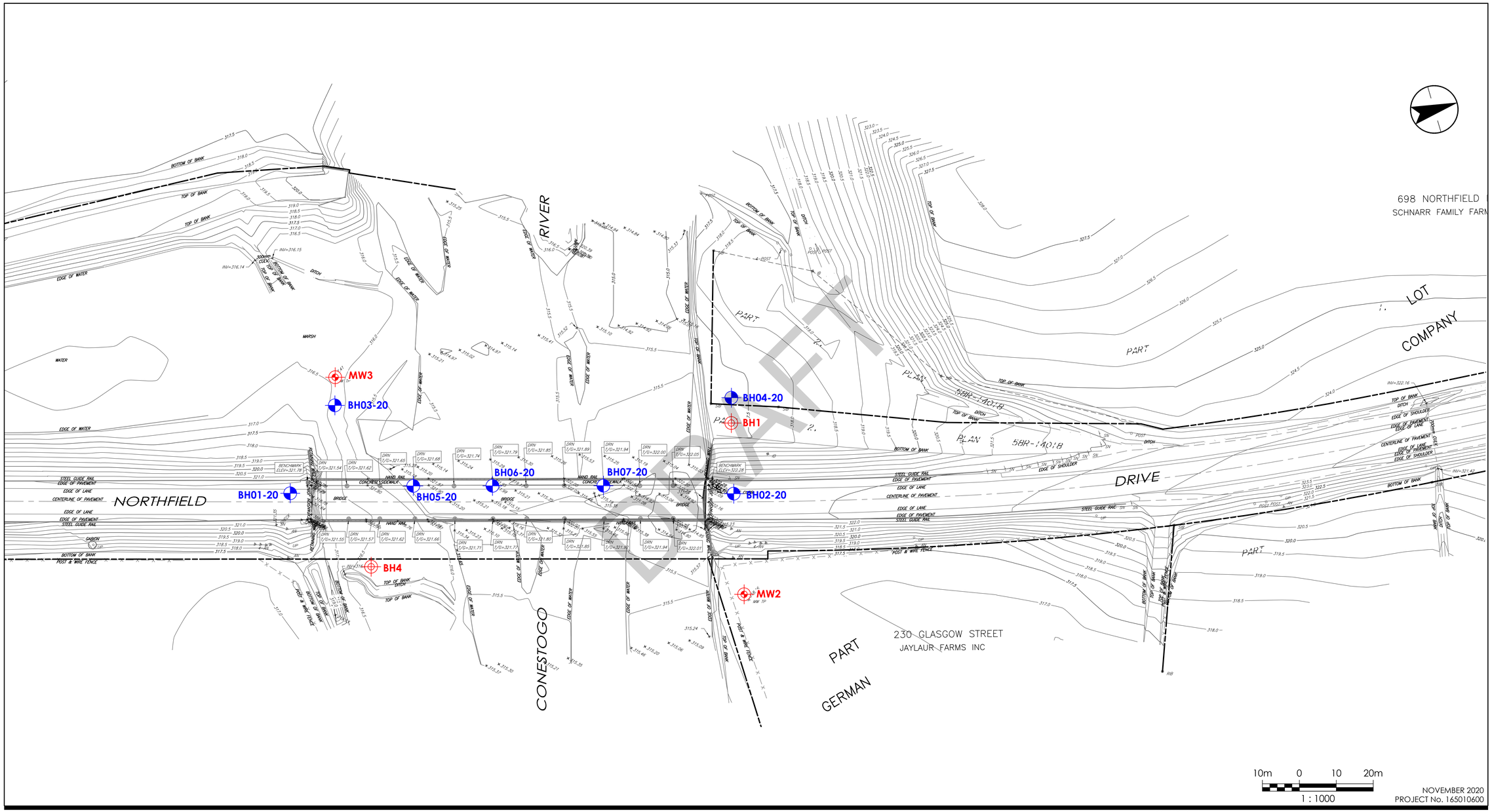

10m 0 10 20m

1 : 1000

NOVEMBER 2020

PROJECT No. 165010600

C:\CAD Drawings\Acad2019 Drawings\2020\165010600\165010600_ScheifeleBridge_Borehole Locations.dwg
2020/11/03 1:20 PM By: Briones, Gilceria

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100-300 HAGEY BOULEVARD
WATERLOO ON N2L 0A4
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LEGEND

- BOREHOLE (2020 INVESTIGATION, STANTEC)
- BOREHOLE (2019 INVESTIGATION, PETO MACCALLUM LTD)
- BOREHOLE WITH MONITORING WELL (2019 INVESTIGATION, PETO MACCALLUM LTD)

NOTES

1. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N.
2. BASEPLAN PROVIDED BY STANTEC GEOMATICS LTD. FILENAME: 165010600-V-ET_ScheifeleBridge_20200845.DWG REVISED: AUGUST 26, 2020.

Client/Project

REGIONAL MUNICIPALITY OF WATERLOO
SCHEIFELE BRIDGE RECONSTRUCTION
NORTHFIELD DRIVE EAST, TOWNSHIP OF WOOLWICH, ON

Drawing No.

1

Title

BOREHOLE LOCATION PLAN

Appendix C

C.1 SYMBOLS & TERMS USED ON BOREHOLE RECORDS

C.2 BOREHOLE RECORDS

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SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis:

Rootmat	- vegetation, roots and moss with organic matter and topsoil typically forming a mattress at the ground surface
Topsoil	- mixture of soil and humus capable of supporting vegetative growth
Peat	- mixture of visible and invisible fragments of decayed organic matter
Till	- unstratified glacial deposit which may range from clay to boulders
Fill	- material below the surface identified as placed by humans (excluding buried services)

Terminology describing soil structure:

Desiccated	- having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
Fissured	- having cracks, and hence a blocky structure
Varved	- composed of regular alternating layers of silt and clay
Stratified	- composed of alternating successions of different soil types, e.g. silt and sand
Layer	- > 75 mm in thickness
Seam	- 2 mm to 75 mm in thickness
Parting	- < 2 mm in thickness

Terminology describing soil types:
The classification of soil types are made on the basis of grain size and plasticity in accordance with the Unified Soil Classification System (USCS) (ASTM D 2487 or D 2488) which excludes particles larger than 75 mm. For particles larger than 75 mm, and for defining percent clay fraction in hydrometer results, definitions proposed by Canadian Foundation Engineering Manual, 4th Edition are used. The USCS provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing cobbles, boulders, and non-matrix materials (organic matter or debris):
Terminology describing materials outside the USCS, (e.g. particles larger than 75 mm, visible organic matter, and construction debris) is based upon the proportion of these materials present:

Trace, or occasional	Less than 10%
Some	10-20%
Frequent	> 20%

Terminology describing compactness of cohesionless soils:
The standard terminology to describe cohesionless soils includes compactness (formerly "relative density"), as determined by the Standard Penetration Test (SPT) N-Value - also known as N-Index. The SPT N-Value is described further on page 3. A relationship between compactness condition and N-Value is shown in the following table.

Compactness Condition	SPT N-Value
Very Loose	<4
Loose	4-10
Compact	10-30
Dense	30-50
Very Dense	>50

Terminology describing consistency of cohesive soils:
The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by *in situ* vane tests, penetrometer tests, or unconfined compression tests. Consistency may be crudely estimated from SPT N-Value based on the correlation shown in the following table (Terzaghi and Peck, 1967). The correlation to SPT N-Value is used with caution as it is only very approximate.

Consistency	Undrained Shear Strength		Approximate SPT N-Value
	kips/sq.ft.	kPa	
Very Soft	<0.25	<12.5	<2
Soft	0.25 - 0.5	12.5 - 25	2-4
Firm	0.5 - 1.0	25 - 50	4-8
Stiff	1.0 - 2.0	50 – 100	8-15
Very Stiff	2.0 - 4.0	100 - 200	15-30
Hard	>4.0	>200	>30

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ROCK DESCRIPTION

Except where specified below, terminology for describing rock is as defined by the International Society for Rock Mechanics (ISRM) 2007 publication "The Complete ISRM Suggested Methods for Rock Characterization, Testing and Monitoring: 1974-2006"

Terminology describing rock quality:

RQD	Rock Mass Quality
0-25	*Very Poor Quality*
25-50	*Poor Quality*
50-75	*Fair Quality*
75-90	*Good Quality*
90-100	*Excellent Quality*

Alternate (Colloquial) Rock Mass Quality	
Very Severely Fractured	*Crushed*
Severely Fractured	*Shattered or Very Blocky*
Fractured	*Blocky*
Moderately Jointed	*Sound*
Intact	*Very Sound*

RQD (Rock Quality Designation) denotes the percentage of intact and sound rock retrieved from a borehole of any orientation. All pieces of intact and sound rock core equal to or greater than 100 mm (4 in.) long are summed and divided by the total length of the core run. RQD is determined in accordance with ASTM D6032.

SCR (Solid Core Recovery) denotes the percentage of solid core (cylindrical) retrieved from a borehole of any orientation. All pieces of solid (cylindrical) core are summed and divided by the total length of the core run (It excludes all portions of core pieces that are not fully cylindrical as well as crushed or rubble zones).

Fracture Index (FI) is defined as the number of naturally occurring fractures within a given length of core. The Fracture Index is reported as a simple count of natural occurring fractures.

Terminology describing rock with respect to discontinuity and bedding spacing:

Spacing (mm)	Discontinuities	Bedding
>6000	*Extremely Wide*	-
2000-6000	*Very Wide*	*Very Thick*
600-2000	*Wide*	*Thick*
200-600	*Moderate*	*Medium*
60-200	*Close*	*Thin*
20-60	*Very Close*	*Very Thin*
<20	*Extremely Close*	*Laminated*
<6	-	*Thinly Laminated*

Terminology describing rock strength:

Strength Classification	Grade	Unconfined Compressive Strength (MPa)
Extremely Weak	R0	<1
Very Weak	R1	1 – 5
Weak	R2	5 – 25
Medium Strong	R3	25 – 50
Strong	R4	50 – 100
Very Strong	R5	100 – 250
Extremely Strong	R6	>250

Terminology describing rock weathering:

Term	Symbol	Description
Fresh	W1	No visible signs of rock weathering. Slight discoloration along major discontinuities
Slightly	W2	Discoloration indicates weathering of rock on discontinuity surfaces. All the rock material may be discolored.
Moderately	W3	Less than half the rock is decomposed and/or disintegrated into soil.
Highly	W4	More than half the rock is decomposed and/or disintegrated into soil.
Completely	W5	All the rock material is decomposed and/or disintegrated into soil. The original mass structure is still largely intact.
Residual Soil	W6	All the rock converted to soil. Structure and fabric destroyed.

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STRATA PLOT

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols. The dimensions within the strata symbols are not indicative of the particle size, layer thickness, etc.

Boulders Cobbles Gravel | Sand | Silt | Clay | Organics | Asphalt | Concrete | Fill | Igneous Bedrock | Meta-morphic Bedrock | Sedi-mentary Bedrock

SAMPLE TYPE

SS	Split spoon sample (obtained by performing the Standard Penetration Test)
ST	Shelby tube or thin wall tube
DP	Direct-Push sample (small diameter tube sampler hydraulically advanced)
PS	Piston sample
BS	Bulk sample
HQ, NQ, BQ, etc.	Rock core samples obtained with the use of standard size diamond coring bits.

WATER LEVEL MEASUREMENT

measured in standpipe, piezometer, or well

inferred

RECOVERY

For soil samples, the recovery is recorded as the length of the soil sample recovered. For rock core, recovery is defined as the total cumulative length of all core recovered in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

N-VALUE

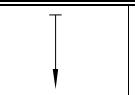
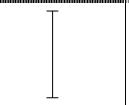
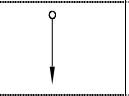
Numbers in this column are the field results of the Standard Penetration Test: the number of blows of a 140 pound (63.5 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (300 mm) into the soil. In accordance with ASTM D1586, the N-Value equals the sum of the number of blows (N) required to drive the sampler over the interval of 6 to 18 in. (150 to 450 mm). However, when a 24 in. (610 mm) sampler is used, the number of blows (N) required to drive the sampler over the interval of 12 to 24 in. (300 to 610 mm) may be reported if this value is lower. For split spoon samples where insufficient penetration was achieved and N-Values cannot be presented, the number of blows are reported over sampler penetration in millimetres (e.g. 50/75). Some design methods make use of N-values corrected for various factors such as overburden pressure, energy ratio, borehole diameter, etc. No corrections have been applied to the N-values presented on the log.

DYNAMIC CONE PENETRATION TEST (DCPT)

Dynamic cone penetration tests are performed using a standard 60 degree apex cone connected to 'A' size drill rods with the same standard fall height and weight as the Standard Penetration Test. The DCPT value is the number of blows of the hammer required to drive the cone one foot (300 mm) into the soil. The DCPT is used as a probe to assess soil variability.

OTHER TESTS

S	Sieve analysis
H	Hydrometer analysis
k	Laboratory permeability
γ	Unit weight
G_s	Specific gravity of soil particles
CD	Consolidated drained triaxial
CU	Consolidated undrained triaxial with pore pressure measurements
UU	Unconsolidated undrained triaxial
DS	Direct Shear
C	Consolidation
Q_u	Unconfined compression
I_p	Point Load Index (I_p on Borehole Record equals $I_p(50)$ in which the index is corrected to a reference diameter of 50 mm)

	Single packer permeability test; test interval from depth shown to bottom of borehole
	Double packer permeability test; test interval as indicated
	Falling head permeability test using casing
	Falling head permeability test using well point or piezometer

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BOREHOLE RECORD

N: 4 819 146 E: 539 221

BH01-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING May 19, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	321.5	**Asphalt Roadway**	0				
	321.4	Asphaltic Concrete - 150 mm					
		Brown, sand and gravel FILL, trace silt (Granular Fill) - damp	1	SS	1	460/610	68
	320.8		2				
1		EMBANKMENT FILL: Brown, sand and gravel with silt FILL - trace cobbles - damp to moist	3	SS	2	380/610	20
			4				
			5				
2			6	SS	3	410/610	14
			7				
			8	SS	4	280/610	9
			9				
3		- trace clay	10				
			11	SS	5	250/610	15
			12				
4			13				
			14				
	317.0		15				
		Brown, silty sand FILL, some gravel, trace clay - damp to moist	16	SS	6	410/610	15
5			17				
			18				
			19				
6	315.4		20				
		Loose, brown SILTY SAND (SM) - some gravel - wet	21	SS	7	230/610	6
	314.7		22				
7		Dense, brown, SAND AND GRAVEL (SW-SM, GW-GM) - trace to some silt - trace cobbles	23	SS	8	480/610	41
			24				

Continued Next Page

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

41 50 9

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

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Stantec

BOREHOLE RECORD

N: 4 819 146 E: 539 221

BH01-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING May 19, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
	314.0						
	313.9	- saturated	25				
8		Very stiff, CLAYEY SILT (CL-ML) TILL - some gravel, trace sand	26	SS	9	460/610	16
	313.2	- DTPL	27				
		Dense to very dense, grey, SANDY SILT (SM) TILL - trace to some clay and gravel - wet to moist	28	SS	10	530/610	49
9			29				
			30	SS	11	380/280	50/130
			31				
			32				
10			33	SS	12	330/250	50/100
			34				
			35	SS	13	430/330	99
11			36				
			37				
			38				
12			39				
			40				
			41	SS	14	430/590	98
13			42				
			43				
			44				
			45				
14			46	SS	15	480/610	91
			47				
			48				
15			49				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

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Stantec

BOREHOLE RECORD

N: 4 819 146 E: 539 221

BH01-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING May 19, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
15	**306.5**								
	306.3				50				
		Hard, grey, CLAYEY SILT (CL-ML) TILL - DTPL - some gravel layers/seams			51	SS	16	610/610	57
16					52				
					53				
					54				
	304.8				55				
		Dense, grey, SAND (SP) - some gravel - wet			56	SS	17	610/610	47
17					57				
					58				
					59				
18	303.3				60				
		Hard, brown, CLAYEY SILT (CL-ML) TILL - trace sand and gravel - DTPL - silt, trace sand seams/layers			61	SS	18	530/610	42
					62				
19					63				
					64				
	301.7				65				
		Very loose, grey, SAND (SW) - trace to some silt - wet			66	SS	19	610/610	3
20	301.1				67				
		Borehole terminated at 20.4 m BGS. Borehole backfilled with bentonite grout and bentonite pellets. Road surface restored using well-compacted cold patch.			68				
					69				
21					70				
					71				
					72				
22					73				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m

STANDARD PENETRATION TEST, BLOWS/0.3m

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

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BOREHOLE RECORD

N: 4 819 261 E: 539 255

BH02-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING May 20, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	322.1	**Asphalt Roadway**	0				
	321.9	Asphaltic Concrete - 165 mm					
	321.6	Brown, sand and gravel FILL, some silt (Granular Fill) - wet	1	SS	1	410/610	26
1	321.1	EMBANKMENT FILL: Dark brown, to black, silt FILL, some sand, trace gravel - moist - trace organics - trace cobbles	2 3 4	SS	2	510/610	26
		Brown, sand and gravel FILL, some silt to silty - trace to some cobbles - trace organics at 1.5 m BGS - moist	5 6 7	SS	3	300/610	25
2			8 9	SS	4	410/610	30
3	319.1	- black silt with cobbles layer, trace organics at 2.8 m BGS	10				
		Dark brown to black, sandy silt and gravel FILL - some cobbles - moist to wet	11 12	SS	5	200/610	20
4			13 14				
	317.5		15				
5		POSSIBLE EMBANKMENT FILL: Compact, greybrown, silty sand and gravel FILL - trace cobbles - wet	16 17 18 19	SS	6	180/610	12
6	316.0		20				
		Loose, greybrown, SANDY SILT (ML) to SILTY SAND (SM) - some gravel - wet	21 22	SS	7	280/610	7
	315.3	- slight organic smell					
7		Compact, greybrown, SAND AND GRAVEL (SM, GM) - some silt to silty	23 24	SS	8	330/610	14

Continued Next Page

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

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BOREHOLE RECORD

N: 4 819 261 E: 539 255

BH02-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING May 20, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
	314.6						
	314.5	- trace to some cobbles - saturated	25				
8		Dense, greybrown, SANDY GRAVEL (GW) - trace silt - trace cobbles - saturated	26	SS	9	150/610	46
			27				
			28	SS	10	430/610	33
9			29				
			30				
	312.6		31	SS	11	560/610	36
		Dense, greybrown, SANDY SILT (ML) TILL - trace to some gravel - moist to wet	32				
10			33	SS	12	380/610	47
			34				
	311.4		35				
		Very dense, greybrown, SANDY SILT (ML) to SILTY SAND (SM) TILL - trace gravel - moist to wet	36	SS	13	410/590	56
11			37				
			38				
			39				
12			40				
			41	SS	14	510/610	61
	309.2		42				
13		Hard, grey, CLAYEY SILT (CL-ML) TILL - some sand, trace gravel - DTPL - silt, some sand and clay seams/layers, wet	43	SS	15	460/460	46
			44				
			45				
14			46	SS	16	460/610	54
			47				
			48				
15			49				

Continued Next Page

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m

STANDARD PENETRATION TEST, BLOWS/0.3m

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

DRAFT

Stantec

BOREHOLE RECORD

N: 4 819 261 E: 539 255

BH02-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING May 20, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
15	307.1		50				
			51	SS	17	460/610	36
16			52				
			53				
			54				
	305.3		55				
17		Very loose to compact, greybrown, fine to medium SAND (SW) - trace silt, nil to trace gravel - saturated	56	SS	18	460/610	2
			57				
			58				
18			59				
			60				
			61	SS	19	510/530	25
19			62				
			63				
			64				
	302.3		65				
20		Hard, reddish grey, CLAYEY SILT (CL-ML) TILL - some sand, trace to some gravel - DTPL	66	SS	20	460/560	44
	301.7		67				
		Borehole terminated at 20.4 m BGS. Borehole backfilled with bentonite grout and bentonite pellets. Road surface restored using well-compacted cold patch. Water level in augers rose by 1.2 m to 1.5 m upon contacting sand layer at 16.8 m BGS.	68				
21			69				
			70				
			71				
22			72				
			73				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m

STANDARD PENETRATION TEST, BLOWS/0.3m

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

DRAFT

Stantec

BOREHOLE RECORD

N: 4 819 164 E: 539 202

BH03-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING May 21, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	316.6	**Field Grasses**	0				
		Loose to compact, dark brown, to black, SILT (ML), trace sand (Topsoil) - some organics - trace cobbles - moist	1	SS	1	180/610	10
	315.8		2				
1		Compact, brown to dark brown, SILT (ML) - some sand and gravel - trace organics - moist to wet	3	SS	2	230/610	16
	315.3		4				
	315.1		5				
			6	SS	3	200/610	24
2		Compact, greybrown, SAND AND GRAVEL (GW-GM, SW-SM) - some silt - trace cobbles - saturated	7				
	314.3		8				
			9	SS	4	300/610	16
3		Compact, greybrown, SANDY GRAVEL (GM) - some silt - trace cobbles - saturated	10				
	313.2		11	SS	5	460/610	37
			12				
		Compact to dense, greybrown, SAND AND GRAVEL (GW-GM, SW-SM) - trace to some silt - some cobbles - saturated - trace organic silt inclusions at 2.3 m BGS	13				
4			14				
			15	SS	6	51/76	50/76
			16				
5		Dense, grey, SILTY SAND (SM) TILL - trace to some gravel - trace cobbles - wet to moist	17				
			18				
			19				
6	310.5		20				
		Hard, grey, CLAYEY SILT (CL-ML) TILL - some sand, trace to some gravel - DTPL - silt, some sand and clay seams/layers, wet	21	SS	7	510/590	62
			22				
7			23				
			24				

Continued Next Page

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m

STANDARD PENETRATION TEST, BLOWS/0.3m

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

DRAFT

Stantec

BOREHOLE RECORD

N: 4 819 164 E: 539 202

BH03-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING May 21, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
	309.1								
8					25				
					26	SS	8	510/610	45
					27				
					28				
9					29				
	307.5				30				
		Very dense, greybrown, SANDY SILT (SM) TILL - trace to some gravel - trace cobbles - wet to moist			31	SS	9	460/560	99
	306.8	- sandy silt seams/layers, saturated			32				
10		Borehole terminated at 9.8 m BGS. Borehole backfilled with bentonite grout and bentonite pellets.			33				
					34				
					35				
11					36				
					37				
					38				
12					39				
					40				
					41				
13					42				
					43				
					44				
14					45				
					46				
					47				
					48				
15					49				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

DRAFT

Stantec

BOREHOLE RECORD

N: 4 819 267 E: 539 230

BH04-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING May 21, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	317.6	**Field Grasses**	0				
		Loose, brown to dark brown, SILT (ML), some sand, trace gravel (Topsoil) - moist to wet	1	SS	1	410/610	9
	316.8	- trace organic inclusions to 0.3 m BGS	2				
1		Very loose to loose, brown SILT (ML), trace sand and gravel - wet	3	SS	2	410/610	4
	316.0	- trace fine gravel and coarse sand seams, saturated	4				
	315.7		5				
2		Loose, brown, SANDY SILT (SM) - wet	6	SS	3	300/610	6
	315.3		7				
		Loose, greybrown, SAND AND GRAVEL (GM, SM) - some silt to silty - trace cobbles - saturated	8	SS	4	330/610	30
3			9				
			10				
		Dense to compact, yellow brown, SANDY GRAVEL (GM) - some silt - some cobbles - saturated - grey, sand and gravel seam, saturated, slight organic smell	11	SS	5	330/610	22
4			12				
			13				
			14				
	313.0		15				
		Very stiff to hard, mottled, greybrown to grey, CLAYEY SILT (CL-ML) TILL - trace sand and gravel - DTPL	16	SS	6	460/610	17
5			17				
			18				
			19				
6			20				
			21	SS	7	480/610	30
			22				
			23				
7			24				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

>>△

>>△

Continued Next Page

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

DRAFT

Stantec

BOREHOLE RECORD

N: 4 819 267 E: 539 230

BH04-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING May 21, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
	310.0								
8	309.6	Dense to very dense, greybrown, SANDY SILT (ML) TILL - trace to some gravel - moist to wet			25 26 27 28 29 30 31	SS	8	530/610	41
9						SS	9	480/610	74
	307.8	- clayey silt layer			32				
10		Borehole terminated at 9.8 m BGS. Borehole backfilled with bentonite grout and bentonite pellets.			33 34 35				
11					36 37 38				
12					39 40 41				
13					42 43 44				
14					45 46 47				
15					48 49				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

DRAFT

Stantec

BOREHOLE RECORD

N: 4 819 178 E: 539 229

BH05-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING September 22, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	321.7	**Bridge Deck**			0				
					1				
					2				
1					3				
					4				
					5				
2					6				
					7				
					8				
					9				
3					10				
					11				
					12				
4					13				
					14				
					15				
5					16				
					17				
					18				
6	315.6	150 mm water depth			19				
		Dark brown to black, ORGANIC SILT (OL)			20				
	315.1	- some gravel, pieces of wood, roots			21	SS	1	300/610	**
		- saturated			22				
7		Dark grey to black, CLAYEY SILT (CL-ML)			23				
		- some sand and gravel			24				

Continued Next Page

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

DRAFT

Stantec

BOREHOLE RECORD

N: 4 819 178 E: 539 229

BH05-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING September 22, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	314.1							
	314.0	- trace cobbles, trace organics - WTPL	25					
8	313.7	Compact, greybrown, GRAVEL (GP) - some sand - trace cobbles - saturated	26	SS	2	360/610	28	
			27					
			28					
		Compact, dark grey, SANDY SILT (ML) TILL	29					
9	312.5	- trace to some gravel - wet	30					11 32 45 12
			31	SS	3	510/610	80	
		Very dense, greybrown, SANDY SILT (ML) TILL	32					
	311.7	- trace to some clay and gravel - trace cobbles - moist to wet	33	SS	4	510/280	57	
10			34					
		Very dense, greybrown, SILTY SAND (SM) to SANDY SILT (ML)	35	SS	5	510/250	54	3 18 53 26
	310.9	- wet - 100 mm greybrown silt layer, some clay, wet with clayey silt seams	36					
11			37					
	310.2	Hard, greybrown, CLAY with SAND (CL) TILL - trace gravel - DTPL - silty sand seams, wet	38	SS	6	280/300	50/150	
			39					
12			40					
		Very dense, greybrown, SILT (ML) TILL - some sand to sandy, trace to some gravel and clay - moist to wet - clayey silt seams, trace gravel, APL	41	SS	7	510/430	50/130	
			42					
13			43					
			44					
	307.9		45					
		Very dense, greybrown, SILTY SAND AND GRAVEL (SM, GM) - wet to saturated	46	SS	8	200/250	50/100	
14			47					
			48					
15			49					

UNDRAINED SHEAR STRENGTH (kPa)
50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m

STANDARD PENETRATION TEST, BLOWS/0.3m

10 20 30 40 50 60 70 80 90 100

Continued Next Page

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

DRAFT

Stantec

BOREHOLE RECORD

N: 4 819 178 E: 539 229

BH05-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING September 22, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
15	**306.6**		50				
	306.4	Very dense, greybrown, SILTY SAND (SM) to SANDY SILT (ML) - some gravel - wet	51	SS	9	430/430	50/130
16	306.1	Very dense, greybrown, medium SAND (SP-SM) - trace to some silt - wet to saturated	52				
	304.9		53				
	304.6	Very dense, dark grey, SAND (SW-SM) - some silt and gravel - saturated	54				
17	304.3		55				
		Very dense, dark grey, SILT (ML) TILL - some sand and gravel, trace clay - wet	56	SS	10	430/610	70
		Borehole terminated at 17.4 m BGS. Borehole backfilled with bentonite pellets. ** N-values not listed as not representative.	57				
18			58				
			59				
			60				
			61				
19			62				
			63				
			64				
			65				
20			66				
			67				
			68				
			69				
21			70				
			71				
			72				
22			73				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m

STANDARD PENETRATION TEST, BLOWS/0.3m

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100 GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

DRAFT

Stantec

BOREHOLE RECORD

N: 4 819 199 E: 539 235

BH06-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING September 23, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	321.8	**Bridge Deck**			0				
					1				
					2				
1					3				
					4				
					5				
2					6				
					7				
					8				
					9				
3					10				
					11				
					12				
4					13				
					14				
					15				
5					16				
					17				
					18				
6					19				
					20				
	315.5	150 mm water depth			21				
		Greybrown, SILTY SAND AND GRAVEL (SM, GM) - trace cobbles - saturated - trace black organics at SS1			22				
7					23				
					24	SS	1	150/610	**

Continued Next Page

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

DRAFT

Stantec

BOREHOLE RECORD

N: 4 819 199 E: 539 235

BH06-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING September 23, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
	314.3						
8			25				
			26				
			27				
			28	SS	2	100/290	**
9			29				
			30	SS	3	25/76	*
			31				
	311.9		32				
10		Compact to dense, greybrown, SILT (ML) TILL - some sand to sandy, some gravel, trace clay - wet	33	SS	4	460/610	30
			34				
			35				
11	310.7		36	SS	5	460/610	47
		Dense, greybrown, SILTY SAND AND GRAVEL (SM, GM) - trace cobbles - wet to saturated	37				
			38	SS	6	330/430	50/130
12			39				
			40	SS	7	0.0/24	*
			41				
13			42				
			43				
			44				
	308.1		45				
	307.8	Very dense, greybrown, SANDY GRAVEL (GP) - trace to some cobbles - wet to saturated	46	SS	8	530/610	99
14		Very dense, grey, SAND (SP-SM) - trace to some silt - saturated	47				
			48				
15			49				

Continued Next Page

UNDRAINED SHEAR STRENGTH (kPa)
50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

DRAFT

Stantec

BOREHOLE RECORD

N: 4 819 199 E: 539 235

BH06-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING September 23, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
15	**306.8**								
	306.6				50				
		Very dense, grey, SILT (ML) TILL - some sand, some gravel to gravelly, trace clay - wet			51	SS	9	250/410	50/100
16					52				
					53				
					54				
	305.0				55				
	304.8	Very dense, grey, SAND (SW) - trace to some gravel, trace cobbles - saturated				SS	10	300/250	50/100
17		Borehole terminated at 17.0 m BGS. Borehole backfilled with bentonite pellets. ** N-values not listed as not representative. * Sampler bouncing on cobble.			56				
					57				
					58				
18					59				
					60				
					61				
					62				
19					63				
					64				
					65				
					66				
20					67				
					68				
					69				
					70				
21					71				
					72				
					73				
22									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100 GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

DRAFT

Stantec

BOREHOLE RECORD

N: 4 819 227 E: 539 243

BH07-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING September 24, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)	UNDRAINED SHEAR STRENGTH (kPa) 50 100 150 200 / WATER CONTENT & ATTERBERG LIMITS W_P W W_L / DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m / STANDARD PENETRATION TEST, BLOWS/0.3m	REMARKS & GRAIN SIZE DISTRIBUTION (%) 10 20 30 40 50 60 70 80 90 100 GR SA SI CL
0	321.9	**Bridge Deck**			0						
					1						
					2						
1					3						
					4						
					5						
2					6						
					7						
					8						
					9						
3					10						
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					12						
4					13						
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					15						
5					16						
					17						
					18						
					19						
6					20						
		300 mm water depth			21						
	315.4										
		Greybrown, SILTY SANDY GRAVEL (GM) - trace cobbles - saturated			22						
7					23						
					24						

Continued Next Page

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

DRAFT

Stantec

BOREHOLE RECORD

N: 4 819 227 E: 539 243

BH07-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING September 24, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
	314.4						
8			25	SS	1	200/250	*
			26				
			27				
			28				
9	312.8		29				
		Very dense, greybrown to brown, SILTY SAND AND GRAVEL (SM, GM) - trace cobbles - wet to saturated - faint PHC odor	30				
	312.0		31	SS	2	230/560	50/100
10	311.9		32				
		Compact, greybrown, SANDY SILT (ML) TILL - trace gravel - wet	33	SS	3	460/610	16
			34				
			35				
11	310.8	Hard to very stiff, greybrown, CLAYEY SILT (ML) TILL - trace sand and gravel - APL - silt seams/layers, wet	36	SS	4	510/610	28
	310.5		37				
			38	SS	5	410/610	75
12		Compact, greybrown, SILTY SAND (SM) - trace gravel - wet	39				
	309.7		40				
			41	SS	6	430/610	48
		Very dense, greybrown, SAND with SILT and GRAVEL (SW-SM) - trace to some cobbles - wet to saturated	42				
13	309.0		43				
			44	SS	7	360/610	74
		Dense, greybrown, SILTY SAND AND GRAVEL (SM, GM) - wet to saturated	45				
	308.2		46	SS	8	430/610	44
14		Very dense, greybrown, SILT (ML) TILL - some sand to sandy, some gravel, trace cobbles - wet to moist	47				
			48				
		Dense, greybrown, SILT (ML)	49				
15							

Continued Next Page

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

27 53 14 6

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

DRAFT

Stantec

BOREHOLE RECORD

N: 4 819 227 E: 539 243

BH07-20

CLIENT Regional Municipality of Waterloo PROJECT No. 165010600

LOCATION Northfield Drive East, Township of Woolwich, Ontario DATUM

DATES: BORING September 24, 2020 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
15	**306.9**		50				
	306.7	- some sand, trace clay - wet - 50 mm dark grey silty clay layer, APL - sand seams	51	SS	9	510/610	62
16		Very dense, greybrown, SILT (ML) - some sand, trace gravel - wet - trace organic inclusions to 15.5 m BGS	52 53 54 55				
	305.2	- sand seams					
17	304.9	Very dense, greybrown, SAND (SM) - some silt, nil to trace gravel - wet	56	SS	10	510/610	78
		Very dense, greybrown, SILT (ML) - some sand - wet to saturated	57 58 59				
18	303.6	Very dense, greybrown, SILT (ML) TILL - some sand and gravel, trace clay and cobbles - wet	60 61	SS	11	410/610	79
	303.0		62				
19		Borehole terminated at 18.9 m BGS. Borehole backfilled with bentonite pellets. ** N-values not listed as not representative.	63 64 65				
20			66 67 68				
21			69 70 71				
22			72 73				

UNDRAINED SHEAR STRENGTH (kPa)
50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)
10 20 30 40 50 60 70 80 90 100
GR SA SI CL

□ Field Vane Test, kPa
■ Remoulded Vane Test, kPa
△ Pocket Penetrometer Test, kPa

DRAFT

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. À

PROJECT Q)/ $5')2)ÃN.4$%Ã' $%. /ÃQ%)5 5/2

LOCATION 3)%\(.$#6Ã'%4$JÃ' $%#) JÃ/' %)

BORING METHOD Q)/ './1)1 5Ã7#2\ 'Ã5)##)& ÃÃ'$!ÃK12$%5

BORING DATE] 1/ $Ã*>JÃ-* ?

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ENGINEER M+ÃT-\ $#

TECHNICIAN F+ÃB''$%5)/

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Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE/MONITORING WELL NO.

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Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE/MONITORING WELL NO. !

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Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. "

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PML REF. *? Y7: *;

ENGINEER M+ÃT-\ $#

TECHNICIAN F+ÃB"'$ %5)/

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Appendix D

D.1 LABORTAORY TEST RESULTS

DRAFT

Englobe
353 Bridge Street East, Kitchener, ON N2K 2Y5
Tel: (519) 741-1313 Fax: (519) 741-5422
E-Mail: kitchener@englobecorp.com Website: www.englobecorp.com

GRAIN SIZE ANALYSIS AND HYDROMETER TEST REPORT
MTO LS-602, 702, AND 703/704

PROJECT NO.: 162-P-0019533-0-01-500 PROJECT NAME: Scheifele Bridge / 165010600

LAB SAMPLE ID: S-1104 PROJECT LOCATION: Ontario FIGURE No.: 1

BOREHOLE / TEST PIT NUMBER:	BH 01-20
SAMPLING DEPTH:	2.5' - 4.5' & 5.0' - 7.0'
SAMPLE NUMBER:	SS-2 & SS-3
SAMPLED BY:	Client
SAMPLE DESCRIPTION:	Sand and Gravel with Silt
SAMPLING DATE:	-
SAMPLE RECEIVED DATE:	28/09/2020

GRAIN SIZE PROPORTIONS, %

% GRAVEL (> 4.75 mm):	41.0
% SAND (75 µm to 4.75 mm):	50.4
% Silt (2 µm to 75 µm):	8.6
% Clay (<2 µm):	
SUSCEPTIBILITY TO FROST HEAVING:	--

GRAIN SIZE ANALYSIS		HYDROMETER ANALYSIS	
SIEVE SIZE mm	% PASSING	DIAMETER mm	% PASSING
53.0	100.0	0.037	
37.5	100.0	0.026	
26.5	100.0	0.017	
19.0	94.6	0.010	
13.2	80.6	0.007	
9.5	71.1	0.005	
4.75	59.0	0.003	
2.36	51.2	0.001	
1.18	45.1	ATTERBERG LIMITS, %	
0.60	36.1		
0.30	20.4	Plastic Limit	
0.15	12.1	Liquid Limit	
0.075	8.6	Plastic Index	

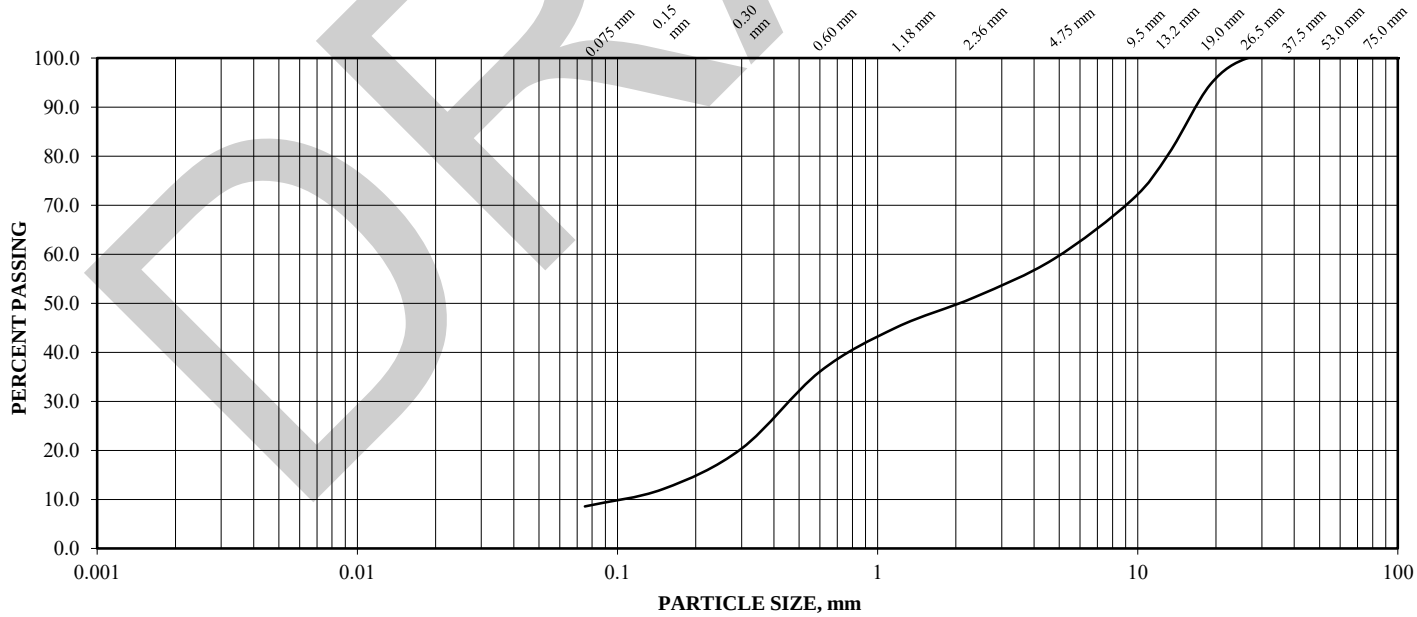
PARTICLE SIZE DISTRIBUTION, MTO LS-702

U.S. BUREAU OF SOILS CLASSIFICATION (AS USED IN MINISTRY OF TRANSPORTATION OF ONTARIO PAVEMENT DESIGNS)

CLAY	SILT	VERY FINE SAND	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	GRAVEL

UNIFIED SOILS CLASSIFICATION ASTM D 2487

FINES (SILT & CLAY)	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL



SIGNED: _____ DATE: 19/10/2020

DRAFT

Englobe
353 Bridge Street East, Kitchener, ON N2K 2Y5
Tel: (519) 741-1313 Fax: (519) 741-5422
E-Mail: kitchener@englobecorp.com Website: www.englobecorp.com

GRAIN SIZE ANALYSIS AND HYDROMETER TEST REPORT
MTO LS-602, 702, AND 703/704

PROJECT NO.: 162-P-0019533-0-01-500 PROJECT NAME: Scheifele Bridge / 165010600

LAB SAMPLE ID: S-1105 PROJECT LOCATION: Ontario FIGURE No.: 2

BOREHOLE / TEST PIT NUMBER:	BH05-20
SAMPLING DEPTH:	30.0' - 32.0'
SAMPLE NUMBER:	SS-3
SAMPLED BY:	Client
SAMPLE DESCRIPTION:	Sandy Silt
SAMPLE NATURAL MOISTURE:	-
SAMPLE RECEIVED DATE:	28/09/2020

GRAIN SIZE PROPORTIONS, %

% GRAVEL (> 4.75 mm):	10.8
% SAND (75 µm to 4.75 mm):	31.7
% Silt (2 µm to 75 µm):	45.3
% Clay (<2 µm):	12.2
SUSCEPTIBILITY TO FROST HEAVING:	-

GRAIN SIZE ANALYSIS		HYDROMETER ANALYSIS	
SIEVE SIZE mm	% PASSING	DIAMETER mm	% PASSING
53.0	100.0	0.037	49.6
37.5	100.0	0.026	44.4
26.5	100.0	0.017	39.2
19.0	95.3	0.010	33.3
13.2	94.0	0.007	27.4
9.5	92.1	0.005	22.9
4.75	89.2	0.003	15.5
2.00	85.2	0.001	10.4
0.850	82.0	ATTERBERG LIMITS, %	
0.425	78.2		
0.250	74.2	Plastic Limit	-
0.106	62.4	Liquid Limit	-
0.075	57.5	Plastic Index	-

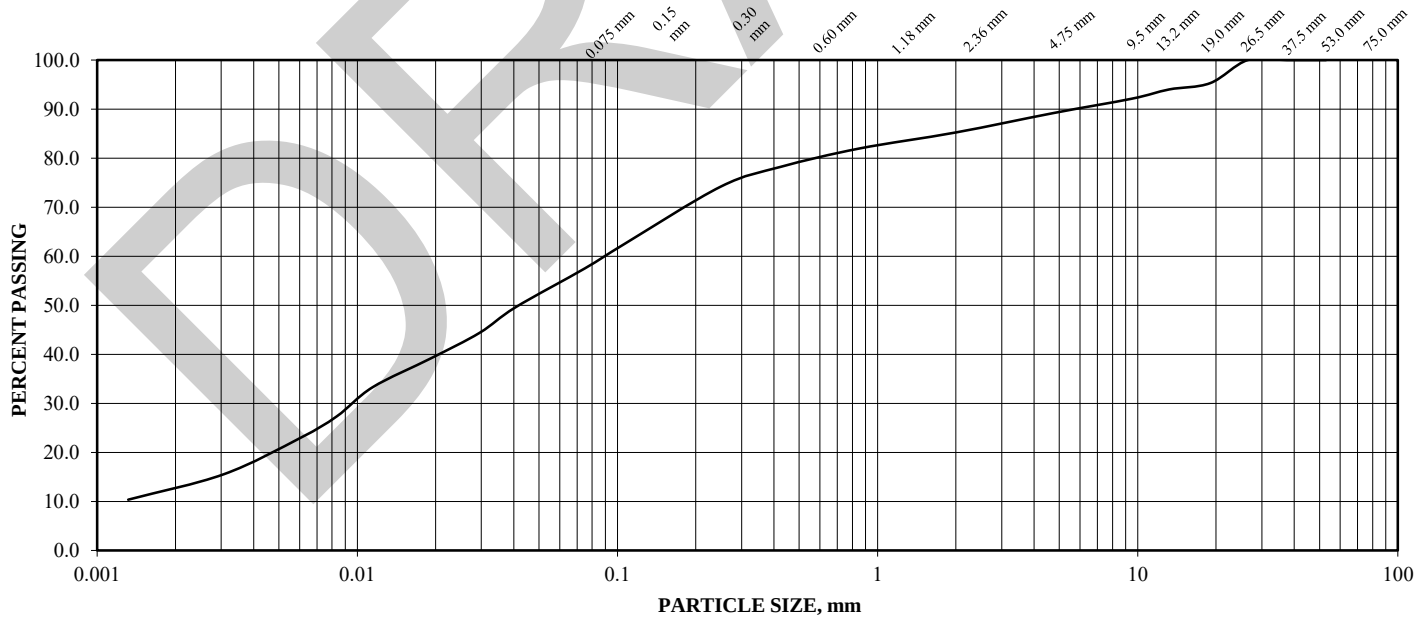
PARTICLE SIZE DISTRIBUTION, MTO LS-702

U.S. BUREAU OF SOILS CLASSIFICATION (AS USED IN MINISTRY OF TRANSPORTATION OF ONTARIO PAVEMENT DESIGNS)

CLAY	SILT	VERY FINE SAND	FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL

UNIFIED SOILS CLASSIFICATION ASTM D 2487

FINES (SILT & CLAY)	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL



SIGNED: _____ DATE: 08/10/2020

O. Rexha

DRAFT

Englobe
353 Bridge Street East, Kitchener, ON N2K 2Y5
Tel: (519) 741-1313 Fax: (519) 741-5422
E-Mail: kitchener@englobecorp.com Website: www.englobecorp.com

GRAIN SIZE ANALYSIS AND HYDROMETER TEST REPORT
MTO LS-602, 702, AND 703/704

PROJECT NO.: 162-P-0019533-0-01-500 PROJECT NAME: Scheifele Bridge / 165010600

LAB SAMPLE ID: S-1106 PROJECT LOCATION: Ontario FIGURE No.: 3

BOREHOLE / TEST PIT NUMBER:	BH05-20
SAMPLING DEPTH:	35.0' - 37.0'
SAMPLE NUMBER:	SS-5
SAMPLED BY:	Client
SAMPLE DESCRIPTION:	Clay with Sand
SAMPLE NATURAL MOISTURE:	-
SAMPLE RECEIVED DATE:	28/09/2020

GRAIN SIZE PROPORTIONS, %

% GRAVEL (> 4.75 mm):	2.6
% SAND (75 µm to 4.75 mm):	17.6
% Silt (2 µm to 75 µm):	53.4
% Clay (<2 µm):	26.4
SUSCEPTIBILITY TO FROST HEAVING:	-

GRAIN SIZE ANALYSIS		HYDROMETER ANALYSIS	
SIEVE SIZE mm	% PASSING	DIAMETER mm	% PASSING
53.0	100.0	0.037	72.2
37.5	100.0	0.026	67.6
26.5	100.0	0.017	63.1
19.0	100.0	0.010	56.7
13.2	98.3	0.007	50.3
9.5	98.1	0.005	43.9
4.75	97.4	0.003	32.0
2.00	96.4	0.001	21.0
0.850	95.3	ATTERBERG LIMITS, %	
0.425	94.0		
0.250	92.9	Plastic Limit	13
0.106	85.1	Liquid Limit	21
0.075	79.8	Plastic Index	8

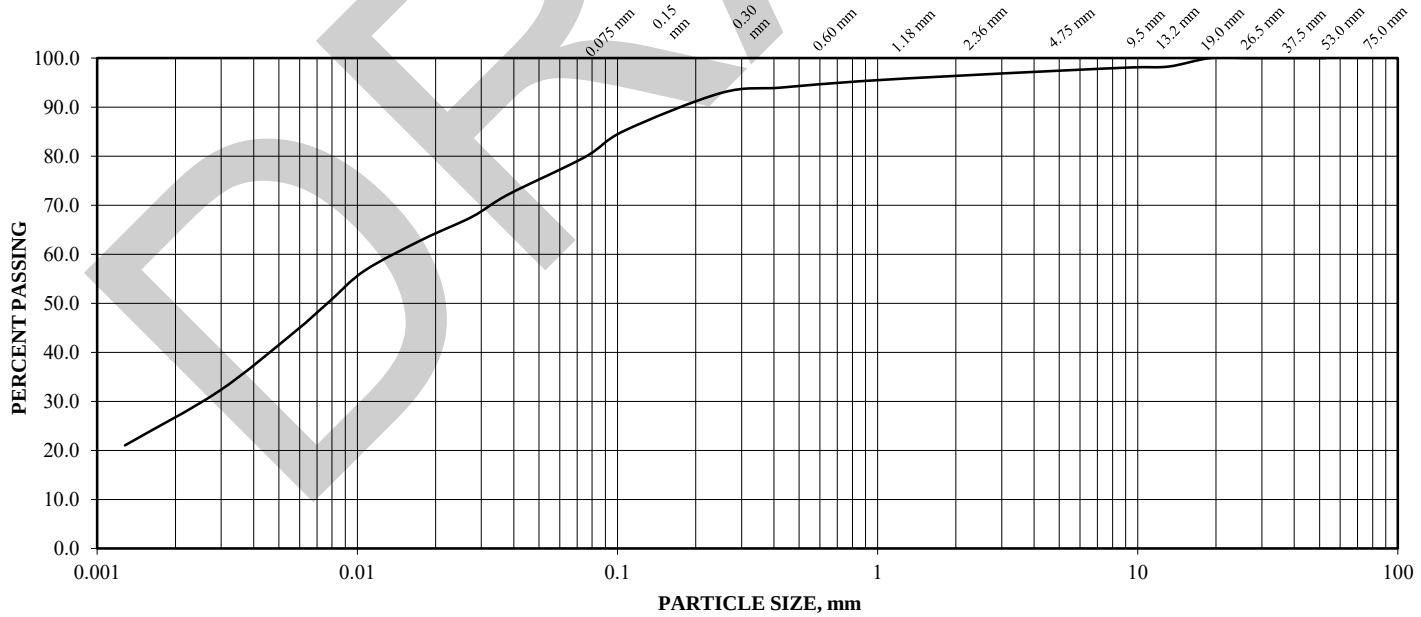
PARTICLE SIZE DISTRIBUTION, MTO LS-702

U.S. BUREAU OF SOILS CLASSIFICATION (AS USED IN MINISTRY OF TRANSPORTATION OF ONTARIO PAVEMENT DESIGNS)

CLAY	SILT	VERY FINE	FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL

UNIFIED SOILS CLASSIFICATION ASTM D 2487

FINES (SILT & CLAY)	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL



SIGNED: _____ DATE: 08/10/2020

DRAFT

Englobe
353 Bridge Street East, Kitchener, ON N2K 2Y5
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E-Mail: kitchener@englobecorp.com Website: www.englobecorp.com

GRAIN SIZE ANALYSIS AND HYDROMETER TEST REPORT
MTO LS-602, 702, AND 703/704

PROJECT NO.: 162-P-0019533-0-01-500 PROJECT NAME: Scheifele Bridge / 165010600

LAB SAMPLE ID: S-1108 PROJECT LOCATION: Ontario FIGURE No.: 4

BOREHOLE / TEST PIT NUMBER:	BH07-20
SAMPLING DEPTH:	37.5' - 39.5'
SAMPLE NUMBER:	SS-5
SAMPLED BY:	Client
SAMPLE DESCRIPTION:	Sand with Silt and Gravel
SAMPLE NATURAL MOISTURE:	-
SAMPLE RECEIVED DATE:	28/09/2020

GRAIN SIZE PROPORTIONS, %

% GRAVEL (> 4.75 mm):	27.0
% SAND (75 µm to 4.75 mm):	52.9
% Silt (2 µm to 75 µm):	13.6
% Clay (<2 µm):	6.5
SUSCEPTIBILITY TO FROST HEAVING:	-

GRAIN SIZE ANALYSIS		HYDROMETER ANALYSIS	
SIEVE SIZE mm	% PASSING	DIAMETER mm	% PASSING
53.0	100.0	0.037	18.4
37.5	100.0	0.026	16.5
26.5	96.0	0.017	15.1
19.0	94.6	0.010	13.2
13.2	83.9	0.007	11.8
9.5	79.2	0.005	9.9
4.75	73.0	0.003	7.5
2.00	64.7	0.001	5.7
0.850	51.1	ATTERBERG LIMITS, %	
0.425	34.2		
0.250	27.8	Plastic Limit	-
0.106	21.8	Liquid Limit	-
0.075	20.1	Plastic Index	-

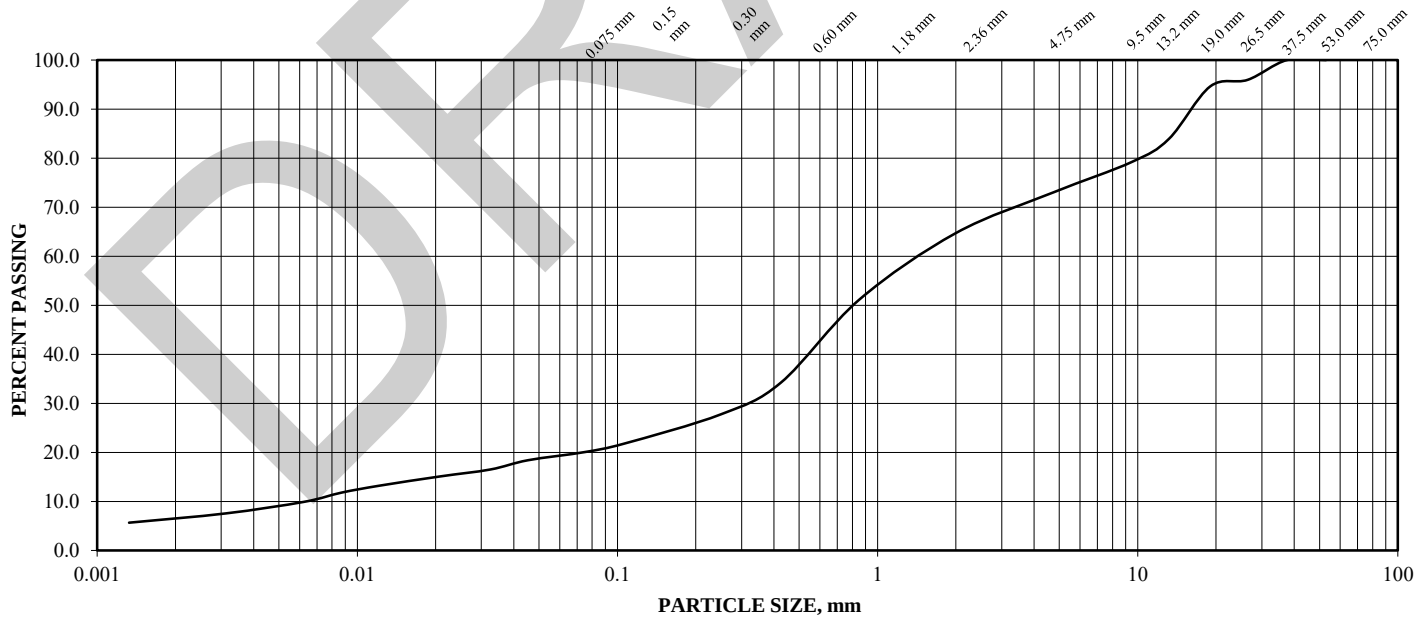
PARTICLE SIZE DISTRIBUTION, MTO LS-702

U.S. BUREAU OF SOILS CLASSIFICATION (AS USED IN MINISTRY OF TRANSPORTATION OF ONTARIO PAVEMENT DESIGNS)

CLAY	SILT	VERY FINE SAND	FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL

UNIFIED SOILS CLASSIFICATION ASTM D 2487

FINES (SILT & CLAY)	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL



SIGNED: _____ DATE: 08/10/2020

O. Rexha

DRAFT

Appendix E

E.1 SEISMIC DATA

DRAFT

2015 National Building Code Seismic Hazard Calculation

INFORMATION: Eastern Canada English (613) 995-5548 français (613) 995-0600 Facsimile (613) 992-8836
Western Canada English (250) 363-6500 Facsimile (250) 363-6565

Site: 43.525N 80.514W **User File Reference:** Scheifele Bridge, Northfield Drive East, Twp of Woolwich 2020-11-09 01:34 UT

Requested by: Stantec

Probability of exceedance per annum	0.000404	0.001	0.0021	0.01
Probability of exceedance in 50 years	2 %	5 %	10 %	40 %
Sa (0.05)	0.093	0.054	0.033	0.009
Sa (0.1)	0.124	0.075	0.047	0.015
Sa (0.2)	0.115	0.072	0.047	0.016
Sa (0.3)	0.095	0.060	0.040	0.015
Sa (0.5)	0.074	0.048	0.033	0.011
Sa (1.0)	0.044	0.029	0.019	0.006
Sa (2.0)	0.022	0.014	0.009	0.002
Sa (5.0)	0.005	0.003	0.002	0.001
Sa (10.0)	0.002	0.001	0.001	0.000
PGA (g)	0.069	0.042	0.026	0.008
PGV (m/s)	0.060	0.037	0.023	0.007

Notes: Spectral (Sa(T), where T is the period in seconds) and peak ground acceleration (PGA) values are given in units of g (9.81 m/s^2). Peak ground velocity is given in m/s. Values are for "firm ground" (NBCC2015 Site Class C, average shear wave velocity 450 m/s). NBCC2015 and CSAS6-14 values are highlighted in yellow. Three additional periods are provided - their use is discussed in the NBCC2015 Commentary. Only 2 significant figures are to be used. **These values have been interpolated from a 10-km-spaced grid of points. Depending on the gradient of the nearby points, values at this location calculated directly from the hazard program may vary. More than 95 percent of interpolated values are within 2 percent of the directly calculated values.**

References

National Building Code of Canada 2015 NRCC no. 56190; Appendix C: Table C-3, Seismic Design Data for Selected Locations in Canada

Structural Commentaries (User's Guide - NBC 2015: Part 4 of Division B)
Commentary J: Design for Seismic Effects

Geological Survey of Canada Open File 7893 Fifth Generation Seismic Hazard Model for Canada: Grid values of mean hazard to be used with the 2015 National Building Code of Canada

See the websites www.EarthquakesCanada.ca and www.nationalcodes.ca for more information

DRAFT

Monday May 31st

File: **1**
Site: **2000100001**
Facing: **NORTH**

DATE
5/31/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	3	0	0	0	0	3		0
0:15:00	3	0	0	0	0	3		0
0:30:00	1	0	0	0	0	1		0
0:45:00	3	0	0	0	0	3	10	0
1:00:00	0	0	0	0	0	0	7	0
1:15:00	1	0	0	0	0	1	5	0
1:30:00	2	0	0	0	0	2	6	0
1:45:00	1	0	0	0	0	1	4	0
2:00:00	0	0	0	0	0	0	4	0
2:15:00	0	0	0	0	0	0	3	0
2:30:00	0	0	0	0	0	0	1	0
2:45:00	2	0	0	0	0	2	2	0
3:00:00	0	0	1	0	0	1	3	0
3:15:00	0	0	0	0	0	0	3	0
3:30:00	1	0	0	0	0	1	4	0
3:45:00	2	0	0	0	0	2	4	0
4:00:00	3	0	0	0	0	3	6	0
4:15:00	3	0	0	0	0	3	9	0
4:30:00	3	0	0	0	0	3	11	0
4:45:00	5	0	0	0	0	5	14	0
5:00:00	6	0	1	0	0	7	18	0
5:15:00	14	0	0	0	0	14	29	0
5:30:00	14	1	0	0	0	15	41	0
5:45:00	25	0	1	0	0	26	62	0
6:00:00	28	1	1	0	0	30	85	0
6:15:00	46	0	1	0	0	47	118	0
6:30:00	53	2	0	0	0	55	158	0
6:45:00	44	1	2	0	0	47	179	0
7:00:00	57	2	0	0	0	59	208	0
7:15:00	74	3	0	0	1	78	239	0
7:30:00	63	1	3	0	0	67	251	0
7:45:00	55	1	6	0	0	62	266	0
8:00:00	54	5	1	0	0	60	267	0
8:15:00	46	1	1	0	0	48	237	0
8:30:00	43	2	3	0	0	48	218	0
8:45:00	55	4	0	0	1	60	216	0
9:00:00	43	1	5	0	0	49	205	0
9:15:00	59	5	2	0	0	66	223	0
9:30:00	52	0	1	0	0	53	228	0
9:45:00	38	1	0	0	0	39	207	0
10:00:00	36	2	2	0	0	40	198	0
10:15:00	75	1	4	0	0	80	212	0
10:30:00	53	2	6	0	1	62	221	0
10:45:00	53	2	4	0	0	59	241	0
11:00:00	40	2	0	0	0	42	243	0
11:15:00	45	1	0	0	0	46	209	0
11:30:00	46	2	3	0	0	51	198	0
11:45:00	62	2	1	0	0	65	204	0
12:00:00	48	2	2	0	1	53	215	0
12:15:00	56	2	3	0	0	61	230	0
12:30:00	44	2	1	0	0	47	226	0
12:45:00	71	0	2	0	0	73	234	0
13:00:00	66	0	3	0	0	69	250	0
13:15:00	60	2	0	0	0	62	251	0
13:30:00	71	1	3	0	1	76	280	0
13:45:00	70	2	5	0	2	79	286	0
14:00:00	85	2	6	0	2	95	312	0
14:15:00	63	2	0	0	0	65	315	0
14:30:00	83	0	0	0	0	83	322	0
14:45:00	80	1	0	0	0	81	324	0
15:00:00	102	1	2	0	2	107	336	0
15:15:00	79	0	0	0	1	80	351	1
15:30:00	90	0	0	0	0	90	358	0
15:45:00	84	1	2	0	0	87	364	0
16:00:00	100	1	1	0	0	102	359	0
16:15:00	102	6	0	0	0	108	387	0
16:30:00	130	3	1	0	0	134	431	0
16:45:00	114	3	2	0	0	119	463	0
17:00:00	128	1	0	0	0	129	490	0
17:15:00	126	1	0	0	2	129	511	0
17:30:00	82	3	0	0	1	86	463	0
17:45:00	84	1	1	0	0	86	430	0
18:00:00	56	0	0	0	2	58	359	0
18:15:00	59	0	0	0	0	59	289	0
18:30:00	35	0	0	0	0	35	238	0
18:45:00	43	1	0	1	1	46	198	0
19:00:00	43	0	1	2	1	47	187	0
19:15:00	32	0	0	0	0	32	160	0
19:30:00	17	0	0	0	0	17	142	1
19:45:00	36	0	0	0	0	36	132	0
20:00:00	27	0	0	0	0	27	112	0
20:15:00	32	0	0	0	0	32	112	0
20:30:00	20	0	0	0	0	20	115	0
20:45:00	13	0	1	0	0	14	93	0

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	4	0	0	0	0	4		0
0:15:00	1	0	0	0	0	1		0
0:30:00	1	0	0	0	0	1		0
0:45:00	1	0	0	0	0	1	7	0
1:00:00	2	0	0	0	0	2	5	0
1:15:00	0	0	0	0	0	0	4	0
1:30:00	1	0	0	0	0	1	4	0
1:45:00	2	0	0	0	0	2	5	0
2:00:00	1	0	0	0	0	1	4	0
2:15:00	0	0	0	0	0	0	4	0
2:30:00	1	0	0	0	0	1	4	0
2:45:00	0	0	0	0	0	0	2	0
3:00:00	0	0	0	0	0	0	1	0
3:15:00	1	0	0	0	0	1	2	0
3:30:00	1	0	0	0	0	1	2	0
3:45:00	1	0	0	0	0	1	3	0
4:00:00	2	0	0	0	0	2	5	0
4:15:00	1	0	0	0	0	1	5	0
4:30:00	0	0	0	0	0	0	4	0
4:45:00	6	0	0	0	0	6	9	0
5:00:00	5	0	0	0	0	5	12	0
5:15:00	5	0	0	0	0	5	16	0
5:30:00	18	0	0	0	0	18	34	0
5:45:00	19	0	0	0	0	19	47	0
6:00:00	35	0	0	0	0	35	77	0
6:15:00	42	0	0	0	0	42	114	0
6:30:00	77	1	0	0	0	78	174	0
6:45:00	84	0	0	0	0	84	239	0
7:00:00	53	1	1	0	0	55	259	0
7:15:00	53	0	4	0	0	57	274	0
7:30:00	68	1	4	0	0	73	269	0
7:45:00	98	3	1	0	0	102	287	0
8:00:00	61	1	0	0	0	62	294	0
8:15:00	77	0	1	0	0	78	315	0
8:30:00	58	1	1	0	0	60	302	0
8:45:00	65	2	2	0	0	69	269	0
9:00:00	55	0	0	0	0	55	262	0
9:15:00	39	4	4	0	0	47	231	0
9:30:00	43	2	1	0	0	46	217	0
9:45:00	37	1	3	0	0	41	189	0
10:00:00	27	2	1	0	0	30	164	0
10:15:00	48	1	2	0	0	51	168	0
10:30:00	49	2	1	0	0	52	174	0
10:45:00	41	0	2	0	0	43	176	0
11:00:00	41	0	1	0	0	42	188	0
11:15:00	47	1	0	0	1	49	186	0
11:30:00	56	1	2	0	1	60	194	0
11:45:00	69	1	3	0	0	73	224	0
12:00:00	47	0	2	0	0	49	231	0
12:15:00	40	1	3	0	0	44	226	0
12:30:00	64	1	3	0	0	68	234	0
12:45:00	57	0	1	0	0	58	219	0
13:00:00	57	2	0	0	0	59	229	0
13:15:00	52	0	2	0	1	55	240	0
13:30:00	63	1	5	0	0	69	241	0
13:45:00	54	1	1	0	0	56	239	0
14:00:00	41	2	1	0	0	44	224	0
14:15:00	56	2	3	0	4	65	234	0
14:30:00	65	0	5	0	1	71	236	0
14:45:00	56	0	3	0	0	59	239	0
15:00:00	60	0	0	0	0	60	255	1
15:15:00	71	1	3	0	0	75	265	0
15:30:00	78	0	4	0	1	83	277	0
15:45:00	62	2	3	1	1	69	287	0
16:00:00	87	3	0	0	2	92	319	0
16:15:00	90	1	1	0	2	94	338	0
16:30:00	84	0	1	0	0	85	340	0
16:45:00	95	2	1	0	2	100	371	0
17:00:00	77	0	2	0	0	79	358	0
17:15:00	75	0	2	0	0	77	341	0
17:30:00	68	2	1	0	0	71	327	0
17:45:00	58	0	1	0	0	59	286	0
18:00:00	54	1	2	0	0	57	264	0
18:15:00	43	0	0	0	0	43	230	0
18:30:00	58	0	0	0	1	59	218	0
18:45:00	37	0	0	0	1	38	197	0
19:00:00	27	0	0	0	0	27	167	0
19:15:00	45	1	0	0	1	47	171	0
19:30:00	37	1	0	0	0	38	150	0
19:45:00	35	0	1	0	1	37	149	0
20:00:00	35	0	0	1	2	38	160	0
20:15:00	34	0	0	0	0	34	147	0
20:30:00	27	0	0	2	3	32	141	0
20:45:00	26	0	0	0	0	26	130	0

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
0:00:00	7	
0:15:00	4	
0:30:00	2	
0:45:00	4	17
1:00:00	2	12
1:15:00	1	9
1:30:00	3	10
1:45:00	3	9
2:00:00	1	8
2:15:00	0	7
2:30:00	1	5
2:45:00	2	4
3:00:00	1	4
3:15:00	1	5
3:30:00	2	6
3:45:00	3	7
4:00:00	5	11
4:15:00	4	14
4:30:00	3	15
4:45:00	11	23
5:00:00	12	30
5:15:00	19	45
5:30:00	33	75
5:45:00	45	109
6:00:00	65	162
6:15:00	89	232
6:30:00	133	332
6:45:00	131	418
7:00:00	114	467
7:15:00	135	513
7:30:00	140	520
7:45:00	164	553
8:00:00	122	561
8:15:00	126	552
8:30:00	108	520
8:45:00	129	485
9:00:00	104	467
9:15:00	113	454
9:30:00	99	445
9:45:00	80	396
10:00:00	70	362
10:15:00	131	380
10:30:00	114	395
10:45:00	102	417
11:00:00	84	431
11:15:00	95	395
11:30:00	111	392
11:45:00	138	428
12:00:00	102	446
12:15:00	105	456
12:30:00	115	460
12:45:00	131	453
13:00:00	128	479
13:15:00	117	491
13:30:00	145	521
13:45:00	135	525
14:00:00	139	536
14:15:00	130	549
14:30:00	154	558
14:45:00	140	563
15:00:00	167	591
15:15:00	155	616
15:30:00	173	635
15:45:00	156	651
16:00:00	194	678
16:15:00	202	725
16:30:00	219	771
16:45:00	219	834
17:00:00	208	848
17:15:00	206	852
17:30:00	157	790
17:45:00	145	716
18:00:00	115	623
18:15:00	102	519
18:30:00	94	456
18:45:00	84	395
19:00:00	74	354
19:15:00	79	331
19:30:00	55	292
19:45:00	73	281
20:00:00	65	272
20:15:00	66	259
20:30:00	52	256
20:45:00	40	223

Monday May 31st

File: **1**
Site: **2000100001**
Facing: **NORTH**

DATE
5/31/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
21:00:00	17	0	0	0	0	17	83	0
21:15:00	9	0	0	0	0	9	60	0
21:30:00	10	0	0	0	0	10	50	0
21:45:00	19	0	0	0	0	19	55	0
22:00:00	16	0	0	0	0	16	54	0
22:15:00	12	0	0	0	0	12	57	0
22:30:00	11	0	1	0	0	12	59	0
22:45:00	4	0	0	0	0	4	44	0
23:00:00	10	0	0	0	0	10	38	0
23:15:00	7	0	0	0	0	7	33	0
23:30:00	1	1	0	0	0	2	23	0
23:45:00	3	0	0	0	0	3	22	0
TOTAL	3862	84	86	3	19	4054		2

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
21:00:00	25	0	0	0	0	25	117	0
21:15:00	17	0	0	0	0	17	100	0
21:30:00	13	0	0	0	0	13	81	0
21:45:00	15	0	0	0	0	15	70	0
22:00:00	9	0	1	0	1	11	56	0
22:15:00	12	0	0	0	0	12	51	0
22:30:00	8	0	0	0	0	8	46	0
22:45:00	8	0	0	0	0	8	39	0
23:00:00	8	0	0	0	0	8	36	0
23:15:00	7	0	1	0	0	8	32	0
23:30:00	6	0	0	0	0	6	30	0
23:45:00	3	0	0	0	0	3	25	0
TOTAL	3542	49	87	4	26	3708		1

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
21:00:00	42	200
21:15:00	26	160
21:30:00	23	131
21:45:00	34	125
22:00:00	27	110
22:15:00	24	108
22:30:00	20	105
22:45:00	12	83
23:00:00	18	74
23:15:00	15	65
23:30:00	8	53
23:45:00	6	47
TOTAL	7762	

Tuesday June 1st

File: **1**
Site: **2000100001**
Facing: **NORTH**

DATE
6/1/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	2	0	0	0	0	2		0
0:15:00	4	0	0	0	0	4		0
0:30:00	2	0	0	0	0	2		0
0:45:00	3	0	0	0	0	3	11	0
1:00:00	1	0	0	0	0	1	10	0
1:15:00	1	0	0	0	0	1	7	0
1:30:00	2	0	0	0	0	2	7	0
1:45:00	0	0	0	0	0	0	4	0
2:00:00	0	0	1	0	0	1	4	0
2:15:00	2	0	0	0	0	2	5	0
2:30:00	0	0	0	0	0	0	3	0
2:45:00	3	0	0	0	0	3	6	0
3:00:00	0	0	0	0	0	0	5	0
3:15:00	1	0	0	0	0	1	4	0
3:30:00	0	0	0	0	0	0	4	0
3:45:00	2	0	0	0	0	2	3	0
4:00:00	2	1	0	0	0	3	6	0
4:15:00	4	0	0	0	0	4	9	0
4:30:00	1	0	0	0	0	1	10	0
4:45:00	6	0	0	0	0	6	14	0
5:00:00	3	1	1	0	0	5	16	0
5:15:00	10	0	0	0	0	10	22	0
5:30:00	23	1	1	0	0	25	46	1
5:45:00	23	0	0	0	0	23	63	0
6:00:00	28	0	2	0	0	30	88	0
6:15:00	42	1	1	0	0	44	122	0
6:30:00	56	0	3	0	0	59	156	0
6:45:00	43	0	1	0	0	44	177	0
7:00:00	54	2	2	0	0	58	205	0
7:15:00	55	0	1	0	0	56	217	0
7:30:00	71	3	2	0	0	76	234	0
7:45:00	62	2	1	0	0	65	255	0
8:00:00	61	3	4	0	0	68	265	0
8:15:00	43	4	4	0	0	51	260	0
8:30:00	61	1	3	0	0	65	249	0
8:45:00	52	1	1	0	0	54	238	0
9:00:00	50	1	0	0	2	53	223	0
9:15:00	66	1	3	0	0	70	242	0
9:30:00	47	1	1	0	0	49	226	0
9:45:00	50	4	0	0	0	54	226	0
10:00:00	59	0	1	0	1	61	234	0
10:15:00	47	2	3	0	0	52	216	0
10:30:00	49	2	1	0	0	52	219	0
10:45:00	64	3	5	0	1	73	238	0
11:00:00	41	2	0	0	0	43	220	0
11:15:00	56	0	1	0	1	58	226	0
11:30:00	44	0	1	0	1	46	220	0
11:45:00	72	1	2	0	0	75	222	0
12:00:00	59	0	1	0	0	60	239	0
12:15:00	49	1	2	0	1	53	234	0
12:30:00	68	4	1	1	1	75	263	0
12:45:00	57	4	1	0	0	62	250	0
13:00:00	89	2	3	0	1	95	285	0
13:15:00	58	0	5	0	0	63	295	0
13:30:00	64	1	2	0	0	67	287	0
13:45:00	75	0	2	0	1	78	303	0
14:00:00	82	1	1	0	0	84	292	0
14:15:00	67	2	0	0	0	69	298	0
14:30:00	64	0	0	0	0	64	295	0
14:45:00	78	1	2	0	0	81	298	0
15:00:00	94	0	0	0	1	95	309	0
15:15:00	45	1	1	0	0	47	287	0
15:30:00	75	0	2	1	0	78	301	0
15:45:00	85	0	0	0	1	86	306	0
16:00:00	123	4	1	0	2	130	341	0
16:15:00	132	0	0	0	0	132	426	0
16:30:00	138	2	1	0	0	141	489	0
16:45:00	114	1	2	0	1	118	521	0
17:00:00	126	0	1	0	4	131	522	0
17:15:00	122	0	1	0	4	127	517	0
17:30:00	94	1	0	0	0	95	471	0
17:45:00	89	1	1	0	2	93	446	0
18:00:00	59	0	0	0	1	60	375	0
18:15:00	57	0	0	0	0	57	305	0
18:30:00	61	0	1	0	1	63	273	0
18:45:00	48	0	0	0	0	48	228	0
19:00:00	45	0	0	0	1	46	214	2
19:15:00	48	1	0	0	0	49	206	0
19:30:00	50	0	0	0	0	50	193	0
19:45:00	44	0	1	0	0	45	190	0
20:00:00	47	1	0	0	0	48	192	0
20:15:00	27	0	0	0	1	28	171	0
20:30:00	33	0	0	0	0	33	154	0

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	2	0	0	0	0	2		0
0:15:00	3	0	0	0	0	3		0
0:30:00	4	0	0	0	0	4		0
0:45:00	3	0	0	0	0	3	12	0
1:00:00	0	0	0	0	0	0	10	0
1:15:00	0	0	0	0	0	0	7	0
1:30:00	1	0	0	0	0	1	4	0
1:45:00	1	0	0	0	0	1	2	0
2:00:00	0	0	0	0	0	0	2	0
2:15:00	0	0	0	0	0	0	2	0
2:30:00	1	0	0	0	0	1	2	0
2:45:00	2	0	0	0	0	2	3	0
3:00:00	1	0	0	0	0	1	4	0
3:15:00	4	0	0	0	0	4	8	0
3:30:00	2	0	0	0	0	2	9	0
3:45:00	3	0	0	0	0	3	10	0
4:00:00	2	0	0	0	0	2	11	0
4:15:00	2	0	0	0	0	2	9	0
4:30:00	1	0	0	0	0	1	8	0
4:45:00	8	0	0	0	0	8	13	0
5:00:00	4	0	0	0	0	4	15	0
5:15:00	6	0	0	0	0	6	19	0
5:30:00	17	0	0	0	0	17	35	1
5:45:00	24	0	0	0	0	24	51	0
6:00:00	27	0	0	0	0	27	74	0
6:15:00	31	0	0	0	0	31	99	0
6:30:00	78	0	0	0	0	78	160	0
6:45:00	85	0	1	0	0	86	222	0
7:00:00	64	1	2	0	0	67	262	0
7:15:00	64	0	1	0	0	65	296	0
7:30:00	56	1	2	0	0	59	277	0
7:45:00	88	2	1	0	0	91	282	0
8:00:00	55	0	0	0	0	55	270	0
8:15:00	70	3	1	0	0	74	279	0
8:30:00	74	2	1	0	0	77	297	0
8:45:00	69	0	3	0	0	72	278	0
9:00:00	46	4	0	0	0	50	273	0
9:15:00	59	1	1	0	0	61	260	0
9:30:00	52	0	1	0	0	53	236	0
9:45:00	50	4	0	0	0	54	218	0
10:00:00	46	0	3	0	1	50	218	0
10:15:00	39	2	2	0	1	44	201	0
10:30:00	46	1	0	0	0	47	195	0
10:45:00	48	4	1	0	0	53	194	0
11:00:00	56	0	0	0	0	56	200	0
11:15:00	53	1	0	0	0	54	210	0
11:30:00	51	1	2	0	0	54	217	0
11:45:00	53	3	1	0	0	57	221	0
12:00:00	54	2	3	0	0	59	224	0
12:15:00	68	3	1	0	0	72	242	0
12:30:00	59	2	3	0	0	64	252	0
12:45:00	50	0	0	0	0	50	245	0
13:00:00	57	1	1	0	0	59	245	0
13:15:00	39	0	3	0	0	42	215	0
13:30:00	62	0	3	0	0	65	216	0
13:45:00	55	3	0	0	2	60	226	0
14:00:00	55	1	3	0	0	59	226	0
14:15:00	68	2	2	0	0	72	256	0
14:30:00	52	1	1	0	0	54	245	0
14:45:00	70	3	1	1	1	76	261	0
15:00:00	60	1	2	0	1	64	266	0
15:15:00	43	0	0	0	0	43	237	0
15:30:00	41	1	1	0	0	43	226	0
15:45:00	70	6	1	0	0	77	227	0
16:00:00	73	2	0	0	0	75	238	0
16:15:00	84	2	1	0	0	87	282	0
16:30:00	91	0	1	0	0	92	331	0
16:45:00	93	1	2	0	0	96	350	0
17:00:00	67	0	0	0	0	67	342	0
17:15:00	115	0	2	1	0	118	373	0
17:30:00	78	0	1	0	0	79	360	0
17:45:00	73	0	2	0	1	76	340	0
18:00:00	59	0	0	0	0	59	332	0
18:15:00	55	1	0	0	0	56	270	0
18:30:00	71	0	1	0	0	72	263	0
18:45:00	36	0	0	0	1	37	224	0
19:00:00	48	0	0	0	1	49	214	2
19:15:00	33	0	0	0	0	33	191	0
19:30:00	49	0	0	0	1	50	169	0
19:45:00	42	0	0	0	0	42	174	0
20:00:00	26	0	0	0	1	27	152	0
20:15:00	37	0	0	0	1	38	157	0
20:30:00	26	0	0	0	0	26	133	0

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
0:00:00	4	
0:15:00	7	
0:30:00	6	
0:45:00	6	23
1:00:00	1	20
1:15:00	1	14
1:30:00	3	11
1:45:00	1	6
2:00:00	1	6
2:15:00	2	7
2:30:00	1	5
2:45:00	5	9
3:00:00	1	9
3:15:00	5	12
3:30:00	2	13
3:45:00	5	13
4:00:00	5	17
4:15:00	6	18
4:30:00	2	18
4:45:00	14	27
5:00:00	9	31
5:15:00	16	41
5:30:00	42	81
5:45:00	47	114
6:00:00	57	162
6:15:00	75	221
6:30:00	137	316
6:45:00	130	399
7:00:00	125	467
7:15:00	121	513
7:30:00	135	511
7:45:00	156	537
8:00:00	123	535
8:15:00	125	539
8:30:00	142	546
8:45:00	126	516
9:00:00	103	496
9:15:00	131	502
9:30:00	102	462
9:45:00	108	444
10:00:00	111	452
10:15:00	96	417
10:30:00	99	414
10:45:00	126	432
11:00:00	99	420
11:15:00	112	436
11:30:00	100	437
11:45:00	132	443
12:00:00	119	463
12:15:00	125	476
12:30:00	139	515
12:45:00	112	495
13:00:00	154	530
13:15:00	105	510
13:30:00	132	503
13:45:00	138	529
14:00:00	143	518
14:15:00	141	554
14:30:00	118	540
14:45:00	157	559
15:00:00	159	575
15:15:00	90	524
15:30:00	121	527
15:45:00	163	533
16:00:00	205	579
16:15:00	219	708
16:30:00	233	820
16:45:00	214	871
17:00:00	198	864
17:15:00	245	890
17:30:00	174	831
17:45:00	169	786
18:00:00	119	707
18:15:00	113	575
18:30:00	135	536
18:45:00	85	452
19:00:00	95	428
19:15:00	82	397
19:30:00	100	362
19:45:00	87	364
20:00:00	75	344
20:15:00	66	328
20:30:00	59	287

Tuesday June 1st

File: **1**
Site: **2000100001**
Facing: **NORTH**

DATE
6/1/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	26	0	0	0	0	26	135	0
21:00:00	27	0	0	0	0	27	114	0
21:15:00	17	0	0	0	0	17	103	0
21:30:00	21	0	0	0	0	21	91	0
21:45:00	15	0	0	0	0	15	80	0
22:00:00	19	0	0	0	0	19	72	0
22:15:00	13	0	0	0	0	13	68	0
22:30:00	7	0	0	0	0	7	54	0
22:45:00	9	0	0	0	0	9	48	0
23:00:00	11	0	0	0	0	11	40	0
23:15:00	5	0	0	0	0	5	32	0
23:30:00	4	0	1	0	0	5	30	0
23:45:00	3	0	0	0	0	3	24	0
TOTAL	4111	65	79	2	29	4286		3

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	28	0	0	0	0	28	119	0
21:00:00	28	0	0	0	0	28	120	0
21:15:00	31	0	0	0	0	31	113	0
21:30:00	25	0	0	0	0	25	112	0
21:45:00	13	0	0	0	0	13	97	0
22:00:00	7	1	0	0	0	8	77	0
22:15:00	11	0	0	0	0	11	57	0
22:30:00	12	0	0	0	0	12	44	0
22:45:00	6	0	0	0	0	6	37	0
23:00:00	6	0	0	0	0	6	35	0
23:15:00	7	0	0	0	0	7	31	0
23:30:00	6	0	0	0	0	6	25	0
23:45:00	2	0	0	0	0	2	21	0
TOTAL	3692	63	58	2	12	3827		3

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
20:45:00	54	254
21:00:00	55	234
21:15:00	48	216
21:30:00	46	203
21:45:00	28	177
22:00:00	27	149
22:15:00	24	125
22:30:00	19	98
22:45:00	15	85
23:00:00	17	75
23:15:00	12	63
23:30:00	11	55
23:45:00	5	45
TOTAL	8113	

Wednesday June 2nd

File: 1
Site: 2000100001
Facing: NORTH

DATE
6/2/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	3	0	0	0	0	3		0
0:15:00	6	0	0	0	0	6		0
0:30:00	4	0	0	0	0	4		0
0:45:00	3	0	0	0	0	3	16	0
1:00:00	1	0	0	0	0	1	14	0
1:15:00	1	0	0	0	0	1	9	0
1:30:00	0	0	0	0	0	0	5	0
1:45:00	3	0	0	0	0	3	5	0
2:00:00	0	0	0	0	0	0	4	0
2:15:00	1	0	0	0	0	1	4	0
2:30:00	0	0	0	0	0	0	4	0
2:45:00	0	0	0	0	0	0	1	0
3:00:00	0	0	0	0	0	0	1	0
3:15:00	3	0	0	0	0	3	3	0
3:30:00	1	0	0	0	0	1	4	0
3:45:00	2	0	0	0	0	2	6	0
4:00:00	2	0	0	0	0	2	8	0
4:15:00	4	0	0	0	0	4	9	0
4:30:00	2	0	0	0	0	2	10	0
4:45:00	5	0	0	0	0	5	13	0
5:00:00	5	0	0	0	0	5	16	0
5:15:00	19	0	1	0	0	20	32	0
5:30:00	22	1	1	0	0	24	54	1
5:45:00	38	0	0	0	0	38	87	0
6:00:00	39	0	0	0	0	39	121	0
6:15:00	52	0	1	0	0	53	154	0
6:30:00	56	2	3	0	0	61	191	0
6:45:00	47	1	1	0	0	49	202	0
7:00:00	57	2	3	0	1	63	226	0
7:15:00	68	5	3	0	0	76	249	0
7:30:00	90	2	2	0	0	94	282	0
7:45:00	70	2	1	0	0	73	306	0
8:00:00	74	4	1	0	0	79	322	0
8:15:00	67	1	3	0	0	71	317	0
8:30:00	70	2	3	0	0	75	298	0
8:45:00	70	4	1	0	0	75	300	0
9:00:00	43	5	2	0	0	50	271	0
9:15:00	52	2	2	0	1	57	257	0
9:30:00	58	1	1	0	0	60	242	0
9:45:00	41	2	3	0	1	47	214	0
10:00:00	44	3	1	0	0	48	212	0
10:15:00	57	2	3	0	0	62	217	0
10:30:00	65	0	0	0	1	66	223	0
10:45:00	54	6	1	0	0	61	237	0
11:00:00	53	3	2	0	0	58	247	0
11:15:00	80	3	2	0	1	86	271	0
11:30:00	44	1	1	0	1	47	252	0
11:45:00	70	3	4	0	0	77	268	0
12:00:00	72	0	3	0	0	75	285	0
12:15:00	80	1	2	0	1	84	283	0
12:30:00	56	0	1	0	0	57	293	0
12:45:00	68	1	3	0	1	73	289	0
13:00:00	73	1	2	0	0	76	290	0
13:15:00	73	4	4	0	0	81	287	0
13:30:00	73	2	1	0	0	76	306	0
13:45:00	73	2	3	0	0	78	311	0
14:00:00	84	1	3	0	0	88	323	0
14:15:00	72	2	1	0	0	75	317	0
14:30:00	77	3	0	0	1	81	322	0
14:45:00	94	0	2	0	0	96	340	1
15:00:00	114	5	1	0	2	122	374	0
15:15:00	89	1	1	0	0	91	390	0
15:30:00	107	0	0	0	0	107	416	0
15:45:00	86	1	1	1	0	89	409	0
16:00:00	111	4	1	1	0	117	404	0
16:15:00	132	1	2	0	1	136	449	0
16:30:00	145	0	1	0	1	147	489	0
16:45:00	126	4	2	0	0	132	532	0
17:00:00	147	0	2	0	1	150	565	1
17:15:00	131	1	1	0	1	134	563	0
17:30:00	96	0	1	0	0	97	513	0
17:45:00	97	4	2	0	1	104	485	0
18:00:00	97	1	0	0	0	98	433	0
18:15:00	63	0	0	0	0	63	362	0
18:30:00	55	0	0	0	0	55	320	0
18:45:00	46	0	0	0	0	46	262	0
19:00:00	41	0	0	0	0	41	205	0
19:15:00	36	0	0	0	0	36	178	0
19:30:00	34	0	0	0	0	34	157	0
19:45:00	41	0	0	0	0	41	152	0
20:00:00	25	0	1	0	0	26	137	0
20:15:00	34	0	0	0	0	34	135	0
20:30:00	28	0	0	0	0	28	129	0

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	7	0	0	0	0	7		0
0:15:00	3	0	0	0	0	3		0
0:30:00	3	0	0	0	0	3		0
0:45:00	8	0	0	0	0	8	21	0
1:00:00	1	0	0	0	0	1	15	0
1:15:00	0	0	0	0	0	0	12	0
1:30:00	1	0	0	0	0	1	10	0
1:45:00	1	0	0	0	0	1	3	0
2:00:00	1	0	0	0	0	1	3	0
2:15:00	1	0	0	0	0	1	4	0
2:30:00	1	0	0	0	0	1	4	0
2:45:00	2	0	0	0	0	2	5	0
3:00:00	1	0	0	0	0	1	5	0
3:15:00	3	0	0	0	0	3	7	0
3:30:00	4	0	0	0	0	4	10	0
3:45:00	2	0	0	0	0	2	10	0
4:00:00	0	0	0	0	0	0	9	0
4:15:00	2	1	0	0	0	3	9	0
4:30:00	2	0	0	0	0	2	7	0
4:45:00	7	0	0	0	0	7	12	0
5:00:00	5	0	0	0	0	5	17	0
5:15:00	5	0	0	0	0	5	19	0
5:30:00	13	0	0	0	0	13	30	1
5:45:00	38	0	0	0	0	38	61	0
6:00:00	37	0	2	0	0	39	95	0
6:15:00	43	0	0	0	0	43	133	0
6:30:00	72	0	1	0	0	73	193	0
6:45:00	82	0	1	0	0	83	238	0
7:00:00	70	3	1	0	0	74	273	0
7:15:00	75	0	2	0	0	77	307	0
7:30:00	73	2	4	0	0	79	313	0
7:45:00	97	2	2	0	0	101	331	0
8:00:00	69	2	3	0	0	74	331	0
8:15:00	92	0	3	0	0	95	349	0
8:30:00	64	4	0	0	2	70	340	0
8:45:00	77	2	0	0	0	79	318	0
9:00:00	55	1	0	0	1	57	301	0
9:15:00	52	1	2	0	0	55	261	0
9:30:00	40	3	1	0	1	45	236	0
9:45:00	58	3	2	0	0	63	220	0
10:00:00	43	2	4	0	2	51	214	0
10:15:00	44	0	1	0	0	45	204	0
10:30:00	56	0	4	0	1	61	220	0
10:45:00	54	3	1	0	2	60	217	0
11:00:00	54	1	2	0	0	57	223	0
11:15:00	38	0	0	1	0	39	217	0
11:30:00	52	2	2	0	2	58	214	0
11:45:00	44	1	2	0	1	48	202	0
12:00:00	47	0	2	0	0	49	194	0
12:15:00	53	2	1	0	0	56	211	0
12:30:00	50	4	0	0	0	54	207	1
12:45:00	72	3	3	0	0	78	237	0
13:00:00	41	2	0	0	0	43	231	0
13:15:00	50	0	2	0	0	52	227	0
13:30:00	59	5	2	0	0	66	239	0
13:45:00	57	3	1	0	0	61	222	0
14:00:00	61	0	1	0	0	62	241	0
14:15:00	66	1	2	0	0	69	258	0
14:30:00	65	5	1	0	0	71	263	0
14:45:00	77	1	2	0	0	80	282	0
15:00:00	78	4	2	0	0	84	304	1
15:15:00	66	1	1	0	0	68	303	0
15:30:00	89	1	1	1	0	92	324	0
15:45:00	64	2	5	0	0	71	315	0
16:00:00	91	4	2	0	1	98	329	0
16:15:00	91	3	2	0	0	96	357	0
16:30:00	99	1	0	0	1	101	366	0
16:45:00	98	0	3	0	0	101	396	0
17:00:00	87	2	0	0	1	90	388	0
17:15:00	95	1	0	0	0	96	388	0
17:30:00	83	0	3	0	0	86	373	0
17:45:00	70	0	6	0	0	76	348	0
18:00:00	69	1	0	0	1	71	329	0
18:15:00	66	0	0	0	0	66	299	0
18:30:00	57	0	0	0	0	57	270	0
18:45:00	45	0	0	0	2	47	241	0
19:00:00	34	0	1	0	2	37	207	0
19:15:00	37	1	0	0	1	39	180	0
19:30:00	42	0	0	0	0	42	165	0
19:45:00	38	0	0	0	0	38	156	0
20:00:00	38	0	0	0	0	38	157	0
20:15:00	37	0	0	0	1	38	156	0
20:30:00	33	0	0	0	0	33	147	0

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
0:00:00	10	
0:15:00	9	
0:30:00	7	
0:45:00	11	37
1:00:00	2	29
1:15:00	1	21
1:30:00	1	15
1:45:00	4	8
2:00:00	1	7
2:15:00	2	8
2:30:00	1	8
2:45:00	2	6
3:00:00	1	6
3:15:00	6	10
3:30:00	5	14
3:45:00	4	16
4:00:00	2	17
4:15:00	7	18
4:30:00	4	17
4:45:00	12	25
5:00:00	10	33
5:15:00	25	51
5:30:00	37	84
5:45:00	76	148
6:00:00	78	216
6:15:00	96	287
6:30:00	134	384
6:45:00	132	440
7:00:00	137	499
7:15:00	153	556
7:30:00	173	595
7:45:00	174	637
8:00:00	153	653
8:15:00	166	666
8:30:00	145	638
8:45:00	154	618
9:00:00	107	572
9:15:00	112	518
9:30:00	105	478
9:45:00	110	434
10:00:00	99	426
10:15:00	107	421
10:30:00	127	443
10:45:00	121	454
11:00:00	115	470
11:15:00	125	488
11:30:00	105	466
11:45:00	125	470
12:00:00	124	479
12:15:00	140	494
12:30:00	111	500
12:45:00	151	526
13:00:00	119	521
13:15:00	133	514
13:30:00	142	545
13:45:00	139	533
14:00:00	150	564
14:15:00	144	575
14:30:00	152	585
14:45:00	176	622
15:00:00	206	678
15:15:00	159	693
15:30:00	199	740
15:45:00	160	724
16:00:00	215	733
16:15:00	232	806
16:30:00	248	855
16:45:00	233	928
17:00:00	240	953
17:15:00	230	951
17:30:00	183	886
17:45:00	180	833
18:00:00	169	762
18:15:00	129	661
18:30:00	112	590
18:45:00	93	503
19:00:00	78	412
19:15:00	75	358
19:30:00	76	322
19:45:00	79	308
20:00:00	64	294
20:15:00	72	291
20:30:00	61	276

Wednesday June 2nd

File: **1**
Site: **2000100001**
Facing: **NORTH**

DATE
6/2/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	25	0	0	0	0	25	113	0
21:00:00	22	0	1	0	0	23	110	0
21:15:00	27	1	0	0	0	28	104	0
21:30:00	8	0	0	0	0	8	84	0
21:45:00	15	0	0	0	0	15	74	0
22:00:00	8	0	0	0	0	8	59	0
22:15:00	9	0	0	0	0	9	40	0
22:30:00	13	0	0	0	0	13	45	0
22:45:00	11	0	0	0	0	11	41	0
23:00:00	10	0	0	0	0	10	43	0
23:15:00	5	0	0	0	0	5	39	0
23:30:00	2	0	0	0	0	2	28	0
23:45:00	0	0	0	0	0	0	17	0
TOTAL	4477	97	88	2	16	4680		3

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	27	0	0	0	3	30	139	0
21:00:00	27	1	1	0	0	29	130	0
21:15:00	34	0	0	0	0	34	126	0
21:30:00	25	0	0	0	0	25	118	0
21:45:00	17	0	0	0	0	17	105	0
22:00:00	15	0	1	0	0	16	92	0
22:15:00	10	0	0	0	0	10	68	0
22:30:00	4	0	0	0	0	4	47	0
22:45:00	5	0	0	0	0	5	35	0
23:00:00	4	0	1	0	0	5	24	0
23:15:00	4	0	0	0	0	4	18	0
23:30:00	4	0	0	0	0	4	18	0
23:45:00	5	0	0	0	0	5	18	0
TOTAL	3938	81	86	2	25	4132		3

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
20:45:00	55	252
21:00:00	52	240
21:15:00	62	230
21:30:00	33	202
21:45:00	32	179
22:00:00	24	151
22:15:00	19	108
22:30:00	17	92
22:45:00	16	76
23:00:00	15	67
23:15:00	9	57
23:30:00	6	46
23:45:00	5	35
TOTAL	8812	

Thursday June 3rd

File: **1**
Site: **2000100001**
Facing: **NORTH**

DATE
6/3/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	1	0	0	0	0	1		0
0:15:00	3	0	0	0	0	3		0
0:30:00	0	0	0	0	0	0		0
0:45:00	2	0	0	0	0	2	6	0
1:00:00	1	0	0	0	0	1	6	0
1:15:00	1	0	0	0	0	1	4	0
1:30:00	3	0	0	0	0	3	7	0
1:45:00	1	0	0	0	0	1	6	0
2:00:00	3	0	0	0	0	3	8	0
2:15:00	0	0	0	0	0	0	7	0
2:30:00	1	0	0	0	0	1	5	0
2:45:00	0	0	0	0	0	0	4	0
3:00:00	1	0	0	0	0	1	2	0
3:15:00	0	0	0	0	0	0	2	0
3:30:00	3	0	0	0	0	3	4	0
3:45:00	3	0	0	0	0	3	7	0
4:00:00	1	0	0	0	0	1	7	0
4:15:00	4	0	0	0	0	4	11	0
4:30:00	1	0	0	0	0	1	9	0
4:45:00	6	0	0	0	0	6	12	0
5:00:00	9	0	0	0	0	9	20	0
5:15:00	15	0	0	0	0	15	31	0
5:30:00	13	2	0	0	0	15	45	0
5:45:00	29	0	1	0	0	30	69	0
6:00:00	34	2	0	0	0	36	96	0
6:15:00	41	0	4	0	0	45	126	0
6:30:00	54	0	2	0	0	56	167	0
6:45:00	41	0	2	0	0	43	180	0
7:00:00	49	0	2	0	0	51	195	0
7:15:00	54	1	4	0	0	59	209	0
7:30:00	53	2	0	0	0	55	208	0
7:45:00	57	0	3	0	0	60	225	0
8:00:00	59	0	5	0	0	64	238	0
8:15:00	59	2	6	0	0	67	246	0
8:30:00	77	4	5	0	0	86	277	0
8:45:00	66	1	1	0	1	69	286	0
9:00:00	42	1	2	0	0	45	267	0
9:15:00	55	2	1	0	1	59	259	0
9:30:00	45	1	1	0	1	48	221	0
9:45:00	53	2	1	0	0	56	208	0
10:00:00	59	3	2	0	1	65	228	0
10:15:00	57	1	0	0	0	58	227	0
10:30:00	55	0	1	0	0	56	235	0
10:45:00	51	0	2	0	0	53	232	0
11:00:00	77	1	2	0	0	80	247	0
11:15:00	81	1	1	0	0	83	272	0
11:30:00	60	2	8	0	0	70	286	0
11:45:00	59	0	2	0	1	62	295	0
12:00:00	47	1	1	0	1	50	265	0
12:15:00	84	2	0	0	0	86	268	1
12:30:00	57	0	1	0	0	58	256	0
12:45:00	79	1	0	0	0	80	274	0
13:00:00	73	4	3	0	0	80	304	1
13:15:00	61	2	2	0	0	65	283	0
13:30:00	80	0	2	0	0	82	307	0
13:45:00	71	1	2	0	0	74	301	0
14:00:00	84	0	1	0	0	85	306	0
14:15:00	70	3	0	0	0	73	314	0
14:30:00	85	1	4	1	0	91	323	0
14:45:00	86	0	1	0	1	88	337	0
15:00:00	108	2	1	0	2	113	365	0
15:15:00	93	0	1	0	0	94	386	0
15:30:00	115	1	0	0	1	117	412	0
15:45:00	78	0	0	0	1	79	403	0
16:00:00	126	1	3	1	0	131	421	0
16:15:00	111	2	1	0	0	114	441	0
16:30:00	124	1	0	0	0	125	449	0
16:45:00	110	1	1	0	0	112	482	0
17:00:00	154	2	2	0	0	158	509	0
17:15:00	110	1	2	0	2	115	510	0
17:30:00	97	0	3	0	0	100	485	0
17:45:00	94	0	2	0	1	97	470	0
18:00:00	79	0	0	0	2	81	393	0
18:15:00	62	1	2	0	3	68	346	0
18:30:00	56	0	0	1	1	58	304	0
18:45:00	58	1	0	0	1	60	267	0
19:00:00	59	0	1	0	1	61	247	0
19:15:00	58	0	0	0	1	59	238	0
19:30:00	41	0	0	0	0	41	221	0
19:45:00	37	0	1	0	0	38	199	0
20:00:00	40	0	0	0	0	40	178	0
20:15:00	28	0	0	0	1	29	148	0
20:30:00	30	0	0	0	1	31	138	0

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	2	0	0	0	0	2		0
0:15:00	2	0	0	0	0	2		0
0:30:00	1	0	0	0	0	1		0
0:45:00	4	0	0	0	0	4	9	0
1:00:00	3	0	0	0	0	3	10	0
1:15:00	0	0	0	0	0	0	8	0
1:30:00	1	0	0	0	0	1	8	0
1:45:00	3	0	0	0	0	3	7	0
2:00:00	3	0	0	0	0	3	7	0
2:15:00	1	0	0	0	0	1	8	0
2:30:00	1	0	0	0	0	1	8	0
2:45:00	2	0	0	0	0	2	7	0
3:00:00	2	0	0	0	0	2	6	0
3:15:00	0	0	0	0	0	0	5	0
3:30:00	1	0	0	0	0	1	5	0
3:45:00	1	0	0	0	0	1	4	0
4:00:00	3	0	0	0	0	3	5	0
4:15:00	0	0	0	0	0	0	5	0
4:30:00	3	0	0	0	0	3	7	0
4:45:00	7	0	0	0	0	7	13	0
5:00:00	6	0	0	0	0	6	16	0
5:15:00	7	0	0	0	0	7	23	0
5:30:00	17	0	0	0	0	17	37	0
5:45:00	29	0	0	0	0	29	59	0
6:00:00	29	0	1	0	0	30	83	0
6:15:00	42	0	0	0	0	42	118	0
6:30:00	68	1	0	0	0	69	170	0
6:45:00	79	1	1	0	0	81	222	0
7:00:00	53	0	2	0	0	55	247	0
7:15:00	63	0	4	0	0	67	272	0
7:30:00	67	2	6	0	0	75	278	0
7:45:00	93	2	2	0	0	97	294	0
8:00:00	63	0	0	0	0	63	302	0
8:15:00	72	1	0	0	0	73	308	0
8:30:00	65	4	2	0	0	71	304	0
8:45:00	56	0	0	0	0	56	263	0
9:00:00	56	3	1	0	1	61	261	0
9:15:00	67	1	1	0	0	69	257	0
9:30:00	46	0	1	0	0	47	233	0
9:45:00	55	0	0	0	0	55	232	0
10:00:00	44	1	1	0	1	47	218	0
10:15:00	52	0	1	0	0	53	202	0
10:30:00	63	2	2	1	0	68	223	0
10:45:00	51	0	0	0	0	51	219	0
11:00:00	57	2	1	0	0	60	232	0
11:15:00	66	1	3	0	0	70	249	0
11:30:00	49	1	0	1	0	51	232	0
11:45:00	66	0	1	0	1	68	249	0
12:00:00	41	3	0	0	0	44	233	0
12:15:00	70	1	0	0	0	71	234	0
12:30:00	54	0	1	0	0	55	238	1
12:45:00	55	2	1	0	0	58	228	0
13:00:00	51	1	2	0	0	54	238	0
13:15:00	47	3	4	0	0	54	221	0
13:30:00	55	1	1	0	0	57	223	0
13:45:00	55	0	1	0	0	56	221	0
14:00:00	45	0	2	0	0	47	214	0
14:15:00	73	4	8	0	0	85	245	0
14:30:00	55	0	1	0	0	56	244	0
14:45:00	71	2	0	0	0	73	261	0
15:00:00	68	3	2	0	0	73	287	0
15:15:00	81	1	0	0	0	82	284	0
15:30:00	83	2	4	0	0	89	317	0
15:45:00	58	2	0	1	0	61	305	0
16:00:00	80	1	1	0	1	83	315	0
16:15:00	83	2	0	0	0	85	318	0
16:30:00	97	0	2	0	0	99	328	0
16:45:00	86	0	1	0	0	87	354	0
17:00:00	76	1	1	0	1	79	350	0
17:15:00	76	0	1	0	0	77	342	0
17:30:00	84	0	1	0	0	85	328	0
17:45:00	60	0	1	0	0	61	302	0
18:00:00	68	1	0	0	0	69	292	0
18:15:00	44	0	0	0	0	44	259	0
18:30:00	38	1	0	0	0	39	213	0
18:45:00	49	1	0	0	0	50	202	0
19:00:00	39	1	1	0	2	43	176	0
19:15:00	44	1	0	0	0	45	177	0
19:30:00	39	0	0	0	1	40	178	0
19:45:00	33	0	0	0	0	33	161	0
20:00:00	43	0	0	0	1	44	162	0
20:15:00	28	0	0	0	1	29	146	0
20:30:00	36	0	0	0	1	37	143	0

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
0:00:00	3	
0:15:00	5	
0:30:00	1	
0:45:00	6	15
1:00:00	4	16
1:15:00	1	12
1:30:00	4	15
1:45:00	4	13
2:00:00	6	15
2:15:00	1	15
2:30:00	2	13
2:45:00	2	11
3:00:00	3	8
3:15:00	0	7
3:30:00	4	9
3:45:00	4	11
4:00:00	4	12
4:15:00	4	16
4:30:00	4	16
4:45:00	13	25
5:00:00	15	36
5:15:00	22	54
5:30:00	32	82
5:45:00	59	128
6:00:00	66	179
6:15:00	87	244
6:30:00	125	337
6:45:00	124	402
7:00:00	106	442
7:15:00	126	481
7:30:00	130	486
7:45:00	157	519
8:00:00	127	540
8:15:00	140	554
8:30:00	157	581
8:45:00	125	549
9:00:00	106	528
9:15:00	128	516
9:30:00	95	454
9:45:00	111	440
10:00:00	112	446
10:15:00	111	429
10:30:00	124	458
10:45:00	104	451
11:00:00	140	479
11:15:00	153	521
11:30:00	121	518
11:45:00	130	544
12:00:00	94	498
12:15:00	157	502
12:30:00	113	494
12:45:00	138	502
13:00:00	134	542
13:15:00	119	504
13:30:00	139	530
13:45:00	130	522
14:00:00	132	520
14:15:00	158	559
14:30:00	147	567
14:45:00	161	598
15:00:00	186	652
15:15:00	176	670
15:30:00	206	729
15:45:00	140	708
16:00:00	214	736
16:15:00	199	759
16:30:00	224	777
16:45:00	199	836
17:00:00	237	859
17:15:00	192	852
17:30:00	185	813
17:45:00	158	772
18:00:00	150	685
18:15:00	112	605
18:30:00	97	517
18:45:00	110	469
19:00:00	104	423
19:15:00	104	415
19:30:00	81	399
19:45:00	71	360
20:00:00	84	340
20:15:00	58	294
20:30:00	68	281

Thursday June 3rd

File: **1**
Site: **2000100001**
Facing: **NORTH**

DATE
6/3/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	26	0	0	0	0	26	126	0
21:00:00	20	0	0	0	0	20	106	0
21:15:00	20	0	0	0	0	20	97	0
21:30:00	30	0	0	0	0	30	96	0
21:45:00	13	0	0	0	0	13	83	0
22:00:00	14	0	0	0	0	14	77	0
22:15:00	15	0	0	0	0	15	72	0
22:30:00	18	0	0	0	0	18	60	0
22:45:00	4	0	0	0	0	4	51	0
23:00:00	8	0	0	0	0	8	45	0
23:15:00	6	0	0	0	0	6	36	0
23:30:00	1	0	0	0	0	1	19	0
23:45:00	6	0	0	0	0	6	21	0
TOTAL	4365	56	95	3	25	4544		2

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	33	0	0	0	0	33	143	0
21:00:00	25	0	0	0	0	25	124	0
21:15:00	36	0	0	0	0	36	131	0
21:30:00	16	0	0	0	0	16	110	0
21:45:00	18	0	0	0	0	18	95	0
22:00:00	13	0	0	0	0	13	83	0
22:15:00	16	0	0	0	0	16	63	0
22:30:00	12	0	0	0	0	12	59	0
22:45:00	8	0	0	0	0	8	49	0
23:00:00	6	0	0	0	0	6	42	0
23:15:00	9	0	0	0	0	9	35	0
23:30:00	7	0	0	0	0	7	30	0
23:45:00	2	0	0	0	0	2	24	0
TOTAL	3787	56	66	3	11	3923		1

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
20:45:00	59	269
21:00:00	45	230
21:15:00	56	228
21:30:00	46	206
21:45:00	31	178
22:00:00	27	160
22:15:00	31	135
22:30:00	30	119
22:45:00	12	100
23:00:00	14	87
23:15:00	15	71
23:30:00	8	49
23:45:00	8	45
TOTAL	8467	

Friday June 4th

File: **1**
Site: **2000100001**
Facing: **NORTH**

DATE
6/4/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	2	0	0	0	0	2		0
0:15:00	2	0	0	0	0	2		0
0:30:00	1	0	0	0	0	1		0
0:45:00	1	0	0	0	0	1	6	0
1:00:00	1	0	0	0	0	1	5	0
1:15:00	1	0	0	0	0	1	4	0
1:30:00	1	0	0	0	0	1	4	0
1:45:00	0	0	0	0	0	0	3	0
2:00:00	1	0	0	0	0	1	3	0
2:15:00	1	0	0	0	0	1	3	0
2:30:00	1	0	0	0	0	1	3	0
2:45:00	1	0	0	0	0	1	4	0
3:00:00	0	0	0	0	0	0	3	0
3:15:00	0	0	0	0	0	0	2	0
3:30:00	1	0	1	0	0	2	3	0
3:45:00	2	0	0	0	0	2	4	0
4:00:00	4	0	0	0	0	4	8	0
4:15:00	4	1	0	0	0	5	13	0
4:30:00	2	0	1	0	0	3	14	0
4:45:00	7	0	0	0	0	7	19	0
5:00:00	8	0	1	0	0	9	24	0
5:15:00	23	0	0	0	0	23	42	0
5:30:00	10	2	1	0	0	13	52	0
5:45:00	18	0	1	0	0	19	64	0
6:00:00	37	0	0	0	1	38	93	0
6:15:00	35	0	1	0	0	36	106	0
6:30:00	21	0	1	0	0	22	115	0
6:45:00	20	0	0	0	0	20	116	0
7:00:00	36	1	2	0	1	40	118	0
7:15:00	56	2	1	0	0	59	141	0
7:30:00	66	2	0	0	1	69	188	0
7:45:00	49	2	0	0	0	51	219	0
8:00:00	47	1	2	0	1	51	230	0
8:15:00	51	1	4	0	0	56	227	0
8:30:00	67	2	1	0	0	70	228	0
8:45:00	70	0	3	0	0	73	250	0
9:00:00	77	2	3	0	0	82	281	0
9:15:00	60	0	0	0	1	61	286	0
9:30:00	85	1	1	0	0	87	303	0
9:45:00	80	0	0	0	3	83	313	0
10:00:00	53	3	1	0	2	59	290	0
10:15:00	75	5	2	0	0	82	311	0
10:30:00	64	1	3	0	0	68	292	0
10:45:00	73	2	2	0	0	77	286	0
11:00:00	87	0	0	0	1	88	315	0
11:15:00	70	1	5	0	0	76	309	1
11:30:00	81	2	1	0	0	84	325	0
11:45:00	81	1	1	0	1	84	332	0
12:00:00	80	1	1	0	0	82	326	0
12:15:00	82	0	2	0	3	87	337	0
12:30:00	96	2	2	0	0	100	353	0
12:45:00	111	1	5	0	0	117	386	0
13:00:00	79	1	3	0	0	83	387	0
13:15:00	99	2	2	0	0	103	403	0
13:30:00	92	2	3	0	2	99	402	0
13:45:00	88	2	1	0	1	92	377	0
14:00:00	128	0	2	0	1	131	425	0
14:15:00	101	2	2	0	1	106	428	0
14:30:00	110	1	1	0	0	112	441	0
14:45:00	124	0	1	0	0	125	474	0
15:00:00	137	2	0	0	1	140	483	0
15:15:00	110	0	3	0	0	113	490	0
15:30:00	142	2	2	0	2	148	526	0
15:45:00	116	0	3	0	1	120	521	0
16:00:00	135	4	1	0	0	140	521	0
16:15:00	127	0	0	0	0	127	535	0
16:30:00	115	0	0	0	0	115	502	0
16:45:00	128	1	0	0	0	129	511	0
17:00:00	131	1	2	0	0	134	505	0
17:15:00	111	0	1	0	1	113	491	0
17:30:00	125	0	1	0	0	126	502	0
17:45:00	103	0	0	0	0	103	476	0
18:00:00	74	0	0	0	0	74	416	0
18:15:00	76	0	0	0	3	79	382	0
18:30:00	75	0	0	0	1	76	332	0
18:45:00	58	0	1	0	1	60	289	0
19:00:00	56	0	0	0	0	56	271	1
19:15:00	59	1	1	0	0	61	253	0
19:30:00	43	1	0	0	1	45	222	0
19:45:00	52	0	0	0	0	52	214	0
20:00:00	30	0	0	0	0	30	188	2
20:15:00	24	0	0	0	0	24	151	0
20:30:00	32	0	0	0	0	32	138	0

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	4	0	0	0	0	4		0
0:15:00	2	0	0	0	0	2		0
0:30:00	4	0	1	0	0	5		0
0:45:00	4	0	0	0	0	4	15	0
1:00:00	1	0	0	0	0	1	12	0
1:15:00	0	0	0	0	0	0	10	0
1:30:00	0	0	0	0	0	0	5	0
1:45:00	2	0	0	0	0	2	3	0
2:00:00	0	0	0	0	0	0	2	0
2:15:00	2	0	0	0	0	2	4	0
2:30:00	0	0	0	0	0	0	4	0
2:45:00	3	0	0	0	0	3	5	0
3:00:00	1	0	0	0	0	1	6	0
3:15:00	2	0	0	0	0	2	6	0
3:30:00	1	1	0	0	0	2	8	0
3:45:00	3	0	0	0	0	3	8	0
4:00:00	0	0	0	0	0	0	7	0
4:15:00	2	0	0	0	0	2	7	0
4:30:00	3	0	0	0	0	3	8	0
4:45:00	6	0	0	0	0	6	11	0
5:00:00	9	0	0	0	0	9	20	0
5:15:00	8	0	1	0	0	9	27	0
5:30:00	9	0	0	0	0	9	33	0
5:45:00	26	0	0	0	0	26	53	0
6:00:00	10	0	0	0	0	10	54	0
6:15:00	29	1	0	0	0	30	75	0
6:30:00	31	0	0	0	0	31	97	0
6:45:00	22	0	0	0	0	22	93	0
7:00:00	29	1	2	0	0	32	115	0
7:15:00	60	0	0	0	0	60	145	0
7:30:00	60	0	4	0	1	65	179	0
7:45:00	56	0	0	0	0	56	213	0
8:00:00	49	2	0	0	0	51	232	0
8:15:00	62	0	3	0	0	65	237	0
8:30:00	66	6	0	0	0	72	244	0
8:45:00	65	2	1	0	0	68	256	0
9:00:00	49	2	2	0	1	54	259	0
9:15:00	43	2	2	0	0	47	241	0
9:30:00	51	0	3	0	0	54	223	0
9:45:00	49	1	1	0	1	52	207	0
10:00:00	54	0	1	0	1	56	209	0
10:15:00	45	0	4	0	0	49	211	0
10:30:00	59	2	0	0	1	62	219	0
10:45:00	62	1	1	0	0	64	231	0
11:00:00	55	2	2	0	0	59	234	0
11:15:00	64	1	3	0	0	68	253	0
11:30:00	64	0	2	0	0	66	257	1
11:45:00	57	3	3	0	0	63	256	0
12:00:00	71	3	2	0	0	76	273	0
12:15:00	73	2	1	0	0	76	281	0
12:30:00	76	2	1	0	0	79	294	0
12:45:00	68	1	0	0	0	69	300	0
13:00:00	72	1	1	0	0	74	298	0
13:15:00	70	0	2	0	0	72	294	0
13:30:00	77	2	5	0	0	84	299	0
13:45:00	57	0	0	0	0	57	287	0
14:00:00	49	1	0	0	0	50	263	0
14:15:00	70	0	1	0	2	73	264	0
14:30:00	85	3	0	0	2	90	270	0
14:45:00	77	1	0	0	0	78	291	0
15:00:00	77	1	2	0	0	80	321	0
15:15:00	95	3	2	0	0	100	348	0
15:30:00	75	2	1	0	0	78	336	0
15:45:00	93	0	0	0	0	93	351	0
16:00:00	106	0	0	0	0	106	377	0
16:15:00	95	0	3	0	1	99	376	0
16:30:00	103	0	1	0	0	104	402	0
16:45:00	106	0	2	0	1	109	418	0
17:00:00	92	1	1	0	2	96	408	0
17:15:00	89	0	2	0	0	91	400	0
17:30:00	67	0	0	0	0	67	363	0
17:45:00	77	1	0	0	0	78	332	0
18:00:00	68	0	1	0	0	69	305	0
18:15:00	60	0	1	0	0	61	275	0
18:30:00	58	0	0	0	0	58	266	0
18:45:00	45	0	0	0	0	45	233	0
19:00:00	36	0	0	0	1	37	201	0
19:15:00	47	0	0	0	0	47	187	0
19:30:00	42	1	0	0	1	44	173	0
19:45:00	31	0	0	0	2	33	161	0
20:00:00	47	0	0	0	0	47	171	0
20:15:00	42	0	0	0	0	42	166	0
20:30:00	29	0	0	0	1	30	152	0

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
0:00:00	6	
0:15:00	4	
0:30:00	6	
0:45:00	5	21
1:00:00	2	17
1:15:00	1	14
1:30:00	1	9
1:45:00	2	6
2:00:00	1	5
2:15:00	3	7
2:30:00	1	7
2:45:00	4	9
3:00:00	1	9
3:15:00	2	8
3:30:00	4	11
3:45:00	5	12
4:00:00	4	15
4:15:00	7	20
4:30:00	6	22
4:45:00	13	30
5:00:00	18	44
5:15:00	32	69
5:30:00	22	85
5:45:00	45	117
6:00:00	48	147
6:15:00	66	181
6:30:00	53	212
6:45:00	42	209
7:00:00	72	233
7:15:00	119	286
7:30:00	134	367
7:45:00	107	432
8:00:00	102	462
8:15:00	121	464
8:30:00	142	472
8:45:00	141	506
9:00:00	136	540
9:15:00	108	527
9:30:00	141	526
9:45:00	135	520
10:00:00	115	499
10:15:00	131	522
10:30:00	130	511
10:45:00	141	517
11:00:00	147	549
11:15:00	144	562
11:30:00	150	582
11:45:00	147	588
12:00:00	158	599
12:15:00	163	618
12:30:00	179	647
12:45:00	186	686
13:00:00	157	685
13:15:00	175	697
13:30:00	183	701
13:45:00	149	664
14:00:00	181	688
14:15:00	179	692
14:30:00	202	711
14:45:00	203	765
15:00:00	220	804
15:15:00	213	838
15:30:00	226	862
15:45:00	213	872
16:00:00	246	898
16:15:00	226	911
16:30:00	219	904
16:45:00	238	929
17:00:00	230	913
17:15:00	204	891
17:30:00	193	865
17:45:00	181	808
18:00:00	143	721
18:15:00	140	657
18:30:00	134	598
18:45:00	105	522
19:00:00	93	472
19:15:00	108	440
19:30:00	89	395
19:45:00	85	375
20:00:00	77	359
20:15:00	66	317
20:30:00	62	290

Friday June 4th

File: **1**
Site: **2000100001**
Facing: **NORTH**

DATE
6/4/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	41	0	1	0	0	42	128	0
21:00:00	28	0	0	0	0	28	126	0
21:15:00	19	0	0	0	0	19	121	0
21:30:00	24	0	0	0	0	24	113	0
21:45:00	16	0	0	0	0	16	87	0
22:00:00	16	0	0	0	0	16	75	0
22:15:00	16	0	1	0	0	17	73	0
22:30:00	13	0	0	0	0	13	62	0
22:45:00	9	0	0	0	0	9	55	0
23:00:00	16	0	0	0	0	16	55	0
23:15:00	8	0	0	0	0	8	46	0
23:30:00	5	0	0	0	0	5	38	0
23:45:00	6	0	0	0	0	6	35	0
TOTAL	4999	58	81	0	31	5169		4

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	24	0	1	0	0	25	144	0
21:00:00	38	0	0	0	0	38	135	0
21:15:00	31	0	0	0	0	31	124	0
21:30:00	31	0	0	0	0	31	125	0
21:45:00	19	0	0	0	0	19	119	0
22:00:00	21	0	0	0	0	21	102	0
22:15:00	13	0	0	0	0	13	84	0
22:30:00	11	0	0	0	0	11	64	0
22:45:00	12	0	0	0	0	12	57	0
23:00:00	14	0	0	0	0	14	50	0
23:15:00	10	0	0	0	0	10	47	0
23:30:00	13	0	0	0	0	13	49	0
23:45:00	2	0	0	0	0	2	39	0
TOTAL	3947	52	66	0	18	4083		1

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
20:45:00	67	272
21:00:00	66	261
21:15:00	50	245
21:30:00	55	238
21:45:00	35	206
22:00:00	37	177
22:15:00	30	157
22:30:00	24	126
22:45:00	21	112
23:00:00	30	105
23:15:00	18	93
23:30:00	18	87
23:45:00	8	74
TOTAL	9252	

Saturday June 6th

File: 1
Site: 2000100001
Facing: NORTH

DATE
6/5/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	4	0	0	0	0	4		0
0:15:00	2	0	0	0	0	2		0
0:30:00	9	0	0	0	0	9		0
0:45:00	6	0	0	0	0	6	21	0
1:00:00	1	0	0	0	0	1	18	0
1:15:00	5	0	0	0	0	5	21	0
1:30:00	1	0	0	0	0	1	13	0
1:45:00	2	0	0	0	0	2	9	0
2:00:00	3	0	0	0	0	3	11	0
2:15:00	5	0	0	0	0	5	11	0
2:30:00	1	0	0	0	0	1	11	0
2:45:00	0	0	0	0	0	0	9	0
3:00:00	0	0	0	0	0	0	6	0
3:15:00	1	1	0	0	0	2	3	0
3:30:00	0	0	0	0	0	0	2	0
3:45:00	1	0	0	0	0	1	3	0
4:00:00	4	0	0	0	0	4	7	0
4:15:00	0	0	0	0	0	0	5	0
4:30:00	1	0	0	0	0	1	6	0
4:45:00	2	0	0	0	0	2	7	0
5:00:00	1	0	0	0	0	1	4	0
5:15:00	9	0	0	0	0	9	13	0
5:30:00	6	0	0	0	0	6	18	0
5:45:00	9	0	0	0	0	9	25	0
6:00:00	13	0	0	0	0	13	37	0
6:15:00	17	0	0	0	0	17	45	0
6:30:00	22	0	0	0	0	22	61	0
6:45:00	21	0	0	0	1	22	74	0
7:00:00	25	0	0	0	1	26	87	0
7:15:00	41	1	0	0	0	42	112	0
7:30:00	32	0	0	0	0	32	122	0
7:45:00	36	0	0	0	0	36	136	0
8:00:00	36	1	0	0	0	37	147	0
8:15:00	58	1	0	0	4	63	168	0
8:30:00	59	0	0	0	0	59	195	2
8:45:00	60	0	0	0	2	62	221	0
9:00:00	66	0	3	0	0	69	253	0
9:15:00	89	0	0	0	0	89	279	2
9:30:00	80	1	0	0	1	82	302	0
9:45:00	67	0	1	0	3	71	311	0
10:00:00	79	0	0	0	2	81	323	0
10:15:00	82	0	1	0	0	83	317	0
10:30:00	99	1	0	0	0	100	335	0
10:45:00	81	1	1	0	0	83	347	0
11:00:00	97	0	0	0	1	98	364	0
11:15:00	104	0	0	0	2	106	387	0
11:30:00	67	0	0	0	1	68	355	0
11:45:00	89	1	0	0	1	91	363	0
12:00:00	105	0	0	0	0	105	370	0
12:15:00	111	1	0	0	0	112	376	0
12:30:00	79	1	0	0	1	81	389	0
12:45:00	96	2	0	0	0	98	396	0
13:00:00	95	1	1	0	3	100	391	0
13:15:00	87	0	1	0	1	89	368	0
13:30:00	85	0	0	0	1	86	373	0
13:45:00	77	0	0	0	1	78	353	1
14:00:00	95	0	2	0	1	98	351	0
14:15:00	116	1	0	0	1	118	380	0
14:30:00	90	1	0	0	1	92	386	0
14:45:00	93	1	2	0	0	96	404	1
15:00:00	101	1	0	0	1	103	409	1
15:15:00	78	0	0	0	0	78	369	0
15:30:00	74	0	1	0	0	75	352	0
15:45:00	74	0	0	0	0	74	330	0
16:00:00	70	0	1	0	0	71	298	0
16:15:00	58	0	0	1	0	59	279	0
16:30:00	48	0	0	0	0	48	252	0
16:45:00	60	0	0	0	0	60	238	0
17:00:00	66	0	1	0	0	67	234	0
17:15:00	60	0	0	0	0	60	235	0
17:30:00	38	0	0	0	0	38	225	0
17:45:00	43	0	0	0	0	43	208	0
18:00:00	33	0	0	0	0	33	174	0
18:15:00	51	0	0	0	0	51	165	0
18:30:00	42	0	0	0	0	42	169	0
18:45:00	40	0	0	0	0	40	166	0
19:00:00	42	0	0	0	1	43	176	0
19:15:00	45	0	0	0	0	45	170	0
19:30:00	42	0	1	0	0	43	171	0
19:45:00	28	0	1	0	1	30	161	0
20:00:00	38	0	0	0	0	38	156	0
20:15:00	26	0	0	0	0	26	137	0
20:30:00	32	0	1	0	0	33	127	0

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	10	0	0	0	0	10		0
0:15:00	3	0	0	0	0	3		0
0:30:00	8	0	0	0	0	8		0
0:45:00	3	0	0	0	0	3	24	0
1:00:00	3	0	0	0	0	3	17	0
1:15:00	5	0	0	0	0	5	19	0
1:30:00	0	0	0	0	0	0	11	0
1:45:00	2	0	0	0	0	2	10	0
2:00:00	0	0	0	0	0	0	7	0
2:15:00	2	0	0	0	0	2	4	0
2:30:00	3	0	0	0	0	3	7	0
2:45:00	0	0	0	0	0	0	5	0
3:00:00	1	0	0	0	0	1	6	0
3:15:00	1	0	0	0	0	1	5	0
3:30:00	0	0	0	0	0	0	2	0
3:45:00	2	0	0	0	0	2	4	0
4:00:00	1	0	0	0	0	1	4	0
4:15:00	0	0	0	0	0	0	3	0
4:30:00	0	0	0	0	0	0	3	0
4:45:00	3	0	0	0	0	3	4	0
5:00:00	3	0	0	0	0	3	6	0
5:15:00	1	0	0	0	0	1	7	0
5:30:00	7	0	0	1	0	8	15	0
5:45:00	8	0	0	0	0	8	20	0
6:00:00	9	0	0	0	0	9	26	0
6:15:00	8	0	0	0	0	8	33	0
6:30:00	11	0	0	0	0	11	36	0
6:45:00	12	0	0	1	0	13	41	0
7:00:00	19	0	0	0	0	19	51	0
7:15:00	24	0	0	0	0	24	67	0
7:30:00	27	0	0	0	0	27	83	0
7:45:00	26	0	0	0	1	27	97	0
8:00:00	21	0	1	0	0	22	100	0
8:15:00	56	1	0	0	1	58	134	0
8:30:00	33	0	1	0	0	34	141	0
8:45:00	35	1	0	0	0	36	150	0
9:00:00	39	2	1	0	1	43	171	0
9:15:00	43	0	0	0	0	43	156	2
9:30:00	65	1	3	0	0	69	191	0
9:45:00	66	0	1	0	0	67	222	0
10:00:00	59	0	0	0	0	59	238	0
10:15:00	63	0	0	0	1	64	259	0
10:30:00	62	0	0	0	1	63	253	0
10:45:00	58	1	1	0	0	60	246	0
11:00:00	46	0	0	0	3	49	236	0
11:15:00	65	0	0	0	4	69	241	0
11:30:00	60	0	0	0	0	60	238	0
11:45:00	61	0	0	0	5	66	244	0
12:00:00	53	1	0	0	0	54	249	0
12:15:00	69	0	0	0	1	70	250	3
12:30:00	79	0	0	0	0	79	269	0
12:45:00	64	0	0	0	1	65	268	0
13:00:00	62	0	0	0	1	63	277	0
13:15:00	84	1	0	0	0	85	292	0
13:30:00	65	1	0	0	1	67	280	0
13:45:00	76	0	0	0	0	76	291	1
14:00:00	83	1	0	0	0	84	312	0
14:15:00	61	0	1	0	0	62	289	0
14:30:00	56	0	1	0	0	57	279	1
14:45:00	61	0	0	0	0	61	264	1
15:00:00	63	0	0	0	0	63	243	0
15:15:00	57	0	0	0	1	58	239	1
15:30:00	81	0	0	0	1	82	264	1
15:45:00	75	0	0	0	2	77	280	2
16:00:00	56	0	0	0	1	57	274	0
16:15:00	58	0	3	0	0	61	277	0
16:30:00	73	0	0	0	0	73	268	0
16:45:00	64	0	0	0	2	66	257	0
17:00:00	76	0	0	0	0	76	276	0
17:15:00	61	0	0	0	0	61	276	0
17:30:00	53	0	1	0	0	54	257	0
17:45:00	50	0	0	0	0	50	241	0
18:00:00	52	0	0	0	0	52	217	0
18:15:00	63	0	0	0	0	63	219	0
18:30:00	40	0	0	0	0	40	205	0
18:45:00	48	0	0	0	1	49	204	0
19:00:00	36	0	0	0	0	36	188	0
19:15:00	54	0	0	0	2	56	181	0
19:30:00	40	0	0	0	0	40	181	0
19:45:00	31	0	0	0	1	32	164	0
20:00:00	44	0	2	0	2	48	176	0
20:15:00	42	0	0	0	0	42	162	0
20:30:00	45	0	0	0	0	45	167	0

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
0:00:00	14	
0:15:00	5	
0:30:00	17	
0:45:00	9	45
1:00:00	4	35
1:15:00	10	40
1:30:00	1	24
1:45:00	4	19
2:00:00	3	18
2:15:00	7	15
2:30:00	4	18
2:45:00	0	14
3:00:00	1	12
3:15:00	3	8
3:30:00	0	4
3:45:00	3	7
4:00:00	5	11
4:15:00	0	8
4:30:00	1	9
4:45:00	5	11
5:00:00	4	10
5:15:00	10	20
5:30:00	14	33
5:45:00	17	45
6:00:00	22	63
6:15:00	25	78
6:30:00	33	97
6:45:00	35	115
7:00:00	45	138
7:15:00	66	179
7:30:00	59	205
7:45:00	63	233
8:00:00	59	247
8:15:00	121	302
8:30:00	93	336
8:45:00	98	371
9:00:00	112	424
9:15:00	132	435
9:30:00	151	493
9:45:00	138	533
10:00:00	140	561
10:15:00	147	576
10:30:00	163	588
10:45:00	143	593
11:00:00	147	600
11:15:00	175	628
11:30:00	128	593
11:45:00	157	607
12:00:00	159	619
12:15:00	182	626
12:30:00	160	658
12:45:00	163	664
13:00:00	163	668
13:15:00	174	660
13:30:00	153	653
13:45:00	154	644
14:00:00	182	663
14:15:00	180	669
14:30:00	149	665
14:45:00	157	668
15:00:00	166	652
15:15:00	136	608
15:30:00	157	616
15:45:00	151	610
16:00:00	128	572
16:15:00	120	556
16:30:00	121	520
16:45:00	126	495
17:00:00	143	510
17:15:00	121	511
17:30:00	92	482
17:45:00	93	449
18:00:00	85	391
18:15:00	114	384
18:30:00	82	374
18:45:00	89	370
19:00:00	79	364
19:15:00	101	351
19:30:00	83	352
19:45:00	62	325
20:00:00	86	332
20:15:00	68	299
20:30:00	78	294

Saturday June 6th

File: **1**
Site: **2000100001**
Facing: **NORTH**

DATE
6/5/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	20	0	0	0	0	20	117	0
21:00:00	21	1	0	0	0	22	101	0
21:15:00	27	0	0	0	0	27	102	0
21:30:00	20	0	0	0	0	20	89	0
21:45:00	17	0	0	0	0	17	86	0
22:00:00	21	0	0	0	0	21	85	0
22:15:00	17	0	0	0	0	17	75	0
22:30:00	9	0	1	0	0	10	65	0
22:45:00	14	1	0	0	0	15	63	0
23:00:00	7	0	0	0	0	7	49	0
23:15:00	10	0	0	0	0	10	42	0
23:30:00	5	0	0	0	0	5	37	0
23:45:00	3	0	0	0	0	3	25	0
TOTAL	4002	19	19	1	32	4073		7

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	30	0	0	0	0	30	165	0
21:00:00	51	0	1	0	1	53	170	0
21:15:00	24	0	0	0	1	25	153	0
21:30:00	28	0	0	0	0	28	136	0
21:45:00	27	0	0	0	0	27	133	0
22:00:00	29	0	0	0	0	29	109	0
22:15:00	19	0	0	0	0	19	103	0
22:30:00	15	0	0	0	0	15	90	0
22:45:00	10	0	0	0	0	10	73	0
23:00:00	8	0	0	0	0	8	52	0
23:15:00	12	0	0	0	0	12	45	0
23:30:00	13	0	0	0	0	13	43	0
23:45:00	5	0	0	0	1	6	39	0
TOTAL	3380	10	17	2	37	3446		12

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
20:45:00	50	282
21:00:00	75	271
21:15:00	52	255
21:30:00	48	225
21:45:00	44	219
22:00:00	50	194
22:15:00	36	178
22:30:00	25	155
22:45:00	25	136
23:00:00	15	101
23:15:00	22	87
23:30:00	18	80
23:45:00	9	64
TOTAL	7519	

Sunday June 6th

File: 1
Site: 2000100001
Facing: NORTH

DATE
6/6/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	7	1	0	0	0	8		0
0:15:00	2	1	0	0	0	3		0
0:30:00	3	0	0	0	0	3		0
0:45:00	7	1	0	0	0	8	22	0
1:00:00	2	0	0	0	0	2	16	0
1:15:00	2	0	0	0	0	2	15	0
1:30:00	1	0	0	0	0	1	13	0
1:45:00	1	0	0	0	0	1	6	0
2:00:00	0	1	0	0	0	1	5	0
2:15:00	1	0	0	0	0	1	4	0
2:30:00	1	0	0	0	0	1	4	0
2:45:00	1	0	0	0	0	1	4	0
3:00:00	2	0	0	0	0	2	5	0
3:15:00	1	0	0	0	0	1	5	0
3:30:00	1	0	0	0	0	1	5	0
3:45:00	0	0	0	0	0	0	4	0
4:00:00	4	0	0	0	0	4	6	0
4:15:00	0	1	0	0	0	1	6	0
4:30:00	1	0	0	0	0	1	6	0
4:45:00	1	0	0	0	0	1	7	0
5:00:00	2	0	0	0	0	2	5	0
5:15:00	5	0	0	0	0	5	9	0
5:30:00	5	0	0	0	0	5	13	0
5:45:00	4	0	0	0	0	4	16	0
6:00:00	12	0	0	0	0	12	26	0
6:15:00	8	0	0	0	0	8	29	0
6:30:00	18	3	1	0	0	22	46	1
6:45:00	8	0	0	0	1	9	51	0
7:00:00	19	0	0	0	0	19	58	0
7:15:00	20	0	0	0	0	20	70	0
7:30:00	22	0	0	0	1	23	71	0
7:45:00	26	0	0	0	2	28	90	0
8:00:00	28	1	0	0	0	29	100	0
8:15:00	27	2	0	0	2	31	111	0
8:30:00	31	0	0	0	0	31	119	0
8:45:00	38	0	0	0	0	38	129	0
9:00:00	36	0	0	0	1	37	137	0
9:15:00	40	0	0	0	2	42	148	0
9:30:00	54	1	0	0	2	57	174	0
9:45:00	59	0	0	0	0	59	195	0
10:00:00	49	0	0	0	1	50	208	2
10:15:00	59	0	1	0	1	61	227	0
10:30:00	63	1	0	0	3	67	237	0
10:45:00	53	0	0	0	2	55	233	0
11:00:00	74	0	0	0	2	76	259	0
11:15:00	77	0	0	0	3	80	278	0
11:30:00	75	0	0	0	0	75	286	0
11:45:00	73	0	0	0	1	74	305	1
12:00:00	79	2	0	0	1	82	311	0
12:15:00	65	0	0	0	1	66	297	0
12:30:00	67	1	0	0	2	70	292	0
12:45:00	65	0	0	0	1	66	284	0
13:00:00	78	0	0	0	0	78	280	0
13:15:00	80	1	0	0	0	81	295	0
13:30:00	78	0	0	0	0	78	303	0
13:45:00	70	0	0	0	0	70	307	0
14:00:00	67	1	0	0	1	69	298	0
14:15:00	73	0	0	0	2	75	292	0
14:30:00	54	0	0	0	1	55	269	0
14:45:00	67	0	0	0	4	71	270	0
15:00:00	65	2	0	0	0	67	268	0
15:15:00	72	0	0	0	0	72	265	0
15:30:00	77	2	0	0	1	80	290	0
15:45:00	60	0	0	0	0	60	279	0
16:00:00	70	0	0	0	0	70	282	0
16:15:00	59	0	0	0	0	59	269	0
16:30:00	68	0	0	0	0	68	257	0
16:45:00	53	0	0	0	0	53	250	0
17:00:00	56	0	0	0	0	56	236	0
17:15:00	46	0	0	0	0	46	223	0
17:30:00	44	0	0	0	0	44	199	0
17:45:00	41	0	0	0	0	41	187	0
18:00:00	48	0	0	0	0	48	179	0
18:15:00	44	0	0	0	0	44	177	0
18:30:00	43	0	0	0	0	43	176	0
18:45:00	27	0	0	0	0	27	162	0
19:00:00	36	0	0	0	0	36	150	0
19:15:00	34	0	0	0	0	34	140	0
19:30:00	28	0	0	0	0	28	125	0
19:45:00	30	0	0	0	1	31	129	0
20:00:00	32	0	0	0	0	32	125	0
20:15:00	32	0	0	0	0	32	123	0
20:30:00	22	0	0	0	0	22	117	0

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	11	0	0	0	0	11		0
0:15:00	9	0	0	0	0	9		0
0:30:00	5	0	0	0	0	5		0
0:45:00	5	0	0	0	0	5	30	0
1:00:00	2	0	0	0	0	2	21	0
1:15:00	3	0	0	0	1	4	16	0
1:30:00	5	0	0	0	0	5	16	0
1:45:00	2	0	0	0	0	2	13	0
2:00:00	2	0	0	0	0	2	13	0
2:15:00	0	0	0	0	0	0	9	0
2:30:00	0	0	0	0	0	0	4	0
2:45:00	2	0	0	0	0	2	4	0
3:00:00	0	0	0	0	0	0	2	0
3:15:00	2	0	0	0	0	2	4	0
3:30:00	0	0	0	0	0	0	4	0
3:45:00	2	0	0	0	0	2	4	0
4:00:00	1	0	0	0	0	1	5	0
4:15:00	1	0	0	0	0	1	4	0
4:30:00	0	0	0	0	0	0	4	0
4:45:00	0	0	0	0	0	0	2	0
5:00:00	3	0	0	0	0	3	4	0
5:15:00	1	0	0	0	0	1	4	0
5:30:00	7	0	0	0	0	7	11	0
5:45:00	2	0	0	0	0	2	13	0
6:00:00	3	0	0	0	0	3	13	0
6:15:00	7	0	0	0	0	7	19	0
6:30:00	8	0	0	0	0	8	20	0
6:45:00	9	0	0	0	0	9	27	0
7:00:00	10	0	0	0	0	10	34	0
7:15:00	8	0	0	0	0	8	35	0
7:30:00	14	0	0	0	0	14	41	0
7:45:00	11	0	1	0	1	13	45	0
8:00:00	15	0	0	0	0	15	50	0
8:15:00	18	0	0	0	0	18	60	0
8:30:00	17	0	0	1	3	21	67	0
8:45:00	27	0	0	0	1	28	82	0
9:00:00	14	0	0	0	1	15	82	0
9:15:00	21	0	0	0	2	23	87	0
9:30:00	30	0	2	0	0	32	98	1
9:45:00	38	0	0	0	0	38	108	0
10:00:00	41	0	1	0	0	42	135	0
10:15:00	33	0	0	0	0	33	145	0
10:30:00	32	0	0	0	0	32	145	0
10:45:00	60	0	1	0	0	61	168	0
11:00:00	51	0	0	0	0	51	177	0
11:15:00	49	0	1	0	1	51	195	0
11:30:00	48	0	0	0	0	48	211	0
11:45:00	57	0	0	0	1	58	208	0
12:00:00	52	0	0	0	5	57	214	1
12:15:00	69	0	0	0	0	69	232	0
12:30:00	64	0	0	0	0	64	248	0
12:45:00	61	0	0	0	0	61	251	0
13:00:00	65	0	0	0	1	66	260	0
13:15:00	71	0	0	0	1	72	263	0
13:30:00	64	0	0	0	3	67	266	0
13:45:00	88	1	0	0	0	89	294	0
14:00:00	78	0	0	0	0	78	306	0
14:15:00	81	0	0	0	0	81	315	0
14:30:00	73	1	1	0	0	75	323	0
14:45:00	62	0	1	0	0	63	297	0
15:00:00	73	0	0	0	0	73	292	0
15:15:00	79	5	0	0	6	90	301	0
15:30:00	90	0	0	0	0	90	316	0
15:45:00	82	0	0	0	0	82	335	0
16:00:00	84	0	0	0	0	84	346	0
16:15:00	58	1	1	0	0	60	316	0
16:30:00	75	1	0	0	0	76	302	0
16:45:00	76	0	0	0	1	77	297	0
17:00:00	83	0	0	0	0	83	296	0
17:15:00	76	1	0	0	2	79	315	0
17:30:00	77	1	0	0	3	81	320	0
17:45:00	69	1	0	0	0	70	313	0
18:00:00	60	0	0	0	1	61	291	0
18:15:00	55	0	0	0	0	55	267	0
18:30:00	62	1	0	0	2	65	251	0
18:45:00	55	0	0	0	0	55	236	0
19:00:00	60	0	0	0	0	60	235	0
19:15:00	62	0	0	0	0	62	242	0
19:30:00	61	0	0	0	1	62	239	0
19:45:00	64	1	0	0	0	65	249	0
20:00:00	67	0	0	0	4	71	260	0
20:15:00	56	0	0	0	0	56	254	0
20:30:00	60	0	0	0	0	60	252	0

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
0:00:00	19	
0:15:00	12	
0:30:00	8	
0:45:00	13	52
1:00:00	4	37
1:15:00	6	31
1:30:00	6	29
1:45:00	3	19
2:00:00	3	18
2:15:00	1	13
2:30:00	1	8
2:45:00	3	8
3:00:00	2	7
3:15:00	3	9
3:30:00	1	9
3:45:00	2	8
4:00:00	5	11
4:15:00	2	10
4:30:00	1	10
4:45:00	1	9
5:00:00	5	9
5:15:00	6	13
5:30:00	12	24
5:45:00	6	29
6:00:00	15	39
6:15:00	15	48
6:30:00	30	66
6:45:00	18	78
7:00:00	29	92
7:15:00	28	105
7:30:00	37	112
7:45:00	41	135
8:00:00	44	150
8:15:00	49	171
8:30:00	52	186
8:45:00	66	211
9:00:00	52	219
9:15:00	65	235
9:30:00	89	272
9:45:00	97	303
10:00:00	92	343
10:15:00	94	372
10:30:00	99	382
10:45:00	116	401
11:00:00	127	436
11:15:00	131	473
11:30:00	123	497
11:45:00	132	513
12:00:00	139	525
12:15:00	135	529
12:30:00	134	540
12:45:00	127	535
13:00:00	144	540
13:15:00	153	558
13:30:00	145	569
13:45:00	159	601
14:00:00	147	604
14:15:00	156	607
14:30:00	130	592
14:45:00	134	567
15:00:00	140	560
15:15:00	162	566
15:30:00	170	606
15:45:00	142	614
16:00:00	154	628
16:15:00	119	585
16:30:00	144	559
16:45:00	130	547
17:00:00	139	532
17:15:00	125	538
17:30:00	125	519
17:45:00	111	500
18:00:00	109	470
18:15:00	99	444
18:30:00	108	427
18:45:00	82	398
19:00:00	96	385
19:15:00	96	382
19:30:00	90	364
19:45:00	96	378
20:00:00	103	385
20:15:00	88	377
20:30:00	82	369

Sunday June 6th

File: **1**
Site: **2000100001**
Facing: **NORTH**

DATE
6/6/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	18	0	0	0	0	18	104	0
21:00:00	23	0	0	0	0	23	95	0
21:15:00	24	0	0	0	0	24	87	0
21:30:00	19	0	0	0	0	19	84	0
21:45:00	18	0	1	1	0	20	86	0
22:00:00	11	1	0	0	0	12	75	0
22:15:00	16	1	0	0	0	17	68	0
22:30:00	11	0	0	0	0	11	60	0
22:45:00	9	0	0	0	0	9	49	0
23:00:00	4	0	0	0	0	4	41	0
23:15:00	1	0	0	0	0	1	25	0
23:30:00	5	0	0	0	0	5	19	0
23:45:00	3	0	0	0	0	3	13	0
TOTAL	3115	24	3	1	39	3182		4

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	50	1	0	0	0	51	238	0
21:00:00	63	0	0	0	0	63	230	0
21:15:00	40	0	0	0	0	40	214	0
21:30:00	39	0	0	0	0	39	193	0
21:45:00	31	0	0	0	0	31	173	0
22:00:00	17	0	0	0	0	17	127	0
22:15:00	20	0	0	0	0	20	107	0
22:30:00	15	0	0	0	0	15	83	0
22:45:00	12	0	0	0	0	12	64	0
23:00:00	11	0	0	0	0	11	58	0
23:15:00	7	0	0	0	0	7	45	0
23:30:00	10	0	0	0	0	10	40	0
23:45:00	4	0	0	0	0	4	32	0
TOTAL	3417	15	9	1	41	3483		2

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
20:45:00	69	342
21:00:00	86	325
21:15:00	64	301
21:30:00	58	277
21:45:00	51	259
22:00:00	29	202
22:15:00	37	175
22:30:00	26	143
22:45:00	21	113
23:00:00	15	99
23:15:00	8	70
23:30:00	15	59
23:45:00	7	45
TOTAL	6665	

Monday May 31st

File: **1**
Site: **2000100001**
Facing: **SOUTH**

DATE
5/31/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	3	0	0	0	0	3		0
0:15:00	3	0	0	0	0	3		0
0:30:00	1	0	0	0	0	1		0
0:45:00	3	0	0	0	0	3	10	0
1:00:00	0	0	0	0	0	0	7	0
1:15:00	1	0	0	0	0	1	5	0
1:30:00	2	0	0	0	0	2	6	0
1:45:00	1	0	0	0	0	1	4	0
2:00:00	0	0	0	0	0	0	4	0
2:15:00	0	0	0	0	0	0	3	0
2:30:00	0	0	0	0	0	0	1	0
2:45:00	2	0	0	0	0	2	2	0
3:00:00	0	0	1	0	0	1	3	0
3:15:00	0	0	0	0	0	0	3	0
3:30:00	1	0	0	0	0	1	4	0
3:45:00	2	0	0	0	0	2	4	0
4:00:00	3	0	0	0	0	3	6	0
4:15:00	3	0	0	0	0	3	9	0
4:30:00	3	0	0	0	0	3	11	0
4:45:00	5	0	0	0	0	5	14	0
5:00:00	6	0	1	0	0	7	18	0
5:15:00	14	0	0	0	0	14	29	0
5:30:00	14	1	0	0	0	15	41	0
5:45:00	25	0	1	0	0	26	62	0
6:00:00	28	1	1	0	0	30	85	0
6:15:00	46	0	1	0	0	47	118	0
6:30:00	53	2	0	0	0	55	158	0
6:45:00	44	1	2	0	0	47	179	0
7:00:00	57	2	0	0	0	59	208	0
7:15:00	74	3	0	0	1	78	239	0
7:30:00	63	1	3	0	0	67	251	0
7:45:00	55	1	6	0	0	62	266	0
8:00:00	54	5	1	0	0	60	267	0
8:15:00	46	1	1	0	0	48	237	0
8:30:00	43	2	3	0	0	48	218	0
8:45:00	55	4	0	0	1	60	216	0
9:00:00	43	1	5	0	0	49	205	0
9:15:00	59	5	2	0	0	66	223	0
9:30:00	52	0	1	0	0	53	228	0
9:45:00	38	1	0	0	0	39	207	0
10:00:00	36	2	2	0	0	40	198	0
10:15:00	75	1	4	0	0	80	212	0
10:30:00	53	2	6	0	1	62	221	0
10:45:00	53	2	4	0	0	59	241	0
11:00:00	40	2	0	0	0	42	243	0
11:15:00	45	1	0	0	0	46	209	0
11:30:00	46	2	3	0	0	51	198	0
11:45:00	62	2	1	0	0	65	204	0
12:00:00	48	2	2	0	1	53	215	0
12:15:00	56	2	3	0	0	61	230	0
12:30:00	44	2	1	0	0	47	226	0
12:45:00	71	0	2	0	0	73	234	0
13:00:00	66	0	3	0	0	69	250	0
13:15:00	60	2	0	0	0	62	251	0
13:30:00	71	1	3	0	1	76	280	0
13:45:00	70	2	5	0	2	79	286	0
14:00:00	85	2	6	0	2	95	312	0
14:15:00	63	2	0	0	0	65	315	0
14:30:00	83	0	0	0	0	83	322	0
14:45:00	80	1	0	0	0	81	324	0
15:00:00	102	1	2	0	2	107	336	0
15:15:00	79	0	0	0	1	80	351	1
15:30:00	90	0	0	0	0	90	358	0
15:45:00	84	1	2	0	0	87	364	0
16:00:00	100	1	1	0	0	102	359	0
16:15:00	102	6	0	0	0	108	387	0
16:30:00	130	3	1	0	0	134	431	0
16:45:00	114	3	2	0	0	119	463	0
17:00:00	128	1	0	0	0	129	490	0
17:15:00	126	1	0	0	2	129	511	0
17:30:00	82	3	0	0	1	86	463	0
17:45:00	84	1	1	0	0	86	430	0
18:00:00	56	0	0	0	2	58	359	0
18:15:00	59	0	0	0	0	59	289	0
18:30:00	35	0	0	0	0	35	238	0
18:45:00	43	1	0	1	1	46	198	0
19:00:00	43	0	1	2	1	47	187	0
19:15:00	32	0	0	0	0	32	160	0
19:30:00	17	0	0	0	0	17	142	1
19:45:00	36	0	0	0	0	36	132	0
20:00:00	27	0	0	0	0	27	112	0
20:15:00	32	0	0	0	0	32	112	0
20:30:00	20	0	0	0	0	20	115	0
20:45:00	13	0	1	0	0	14	93	0

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	4	0	0	0	0	4		0
0:15:00	1	0	0	0	0	1		0
0:30:00	1	0	0	0	0	1		0
0:45:00	1	0	0	0	0	1	7	0
1:00:00	2	0	0	0	0	2	5	0
1:15:00	0	0	0	0	0	0	4	0
1:30:00	1	0	0	0	0	1	4	0
1:45:00	2	0	0	0	0	2	5	0
2:00:00	1	0	0	0	0	1	4	0
2:15:00	0	0	0	0	0	0	4	0
2:30:00	1	0	0	0	0	1	4	0
2:45:00	0	0	0	0	0	0	2	0
3:00:00	0	0	0	0	0	0	1	0
3:15:00	1	0	0	0	0	1	2	0
3:30:00	1	0	0	0	0	1	2	0
3:45:00	1	0	0	0	0	1	3	0
4:00:00	2	0	0	0	0	2	5	0
4:15:00	1	0	0	0	0	1	5	0
4:30:00	0	0	0	0	0	0	4	0
4:45:00	6	0	0	0	0	6	9	0
5:00:00	5	0	0	0	0	5	12	0
5:15:00	5	0	0	0	0	5	16	0
5:30:00	18	0	0	0	0	18	34	0
5:45:00	19	0	0	0	0	19	47	0
6:00:00	35	0	0	0	0	35	77	0
6:15:00	42	0	0	0	0	42	114	0
6:30:00	77	1	0	0	0	78	174	0
6:45:00	84	0	0	0	0	84	239	0
7:00:00	53	1	1	0	0	55	259	0
7:15:00	53	0	4	0	0	57	274	0
7:30:00	68	1	4	0	0	73	269	0
7:45:00	98	3	1	0	0	102	287	0
8:00:00	61	1	0	0	0	62	294	0
8:15:00	77	0	1	0	0	78	315	0
8:30:00	58	1	1	0	0	60	302	0
8:45:00	65	2	2	0	0	69	269	0
9:00:00	55	0	0	0	0	55	262	0
9:15:00	39	4	4	0	0	47	231	0
9:30:00	43	2	1	0	0	46	217	0
9:45:00	37	1	3	0	0	41	189	0
10:00:00	27	2	1	0	0	30	164	0
10:15:00	48	1	2	0	0	51	168	0
10:30:00	49	2	1	0	0	52	174	0
10:45:00	41	0	2	0	0	43	176	0
11:00:00	41	0	1	0	0	42	188	0
11:15:00	47	1	0	0	1	49	186	0
11:30:00	56	1	2	0	1	60	194	0
11:45:00	69	1	3	0	0	73	224	0
12:00:00	47	0	2	0	0	49	231	0
12:15:00	40	1	3	0	0	44	226	0
12:30:00	64	1	3	0	0	68	234	0
12:45:00	57	0	1	0	0	58	219	0
13:00:00	57	2	0	0	0	59	229	0
13:15:00	52	0	2	0	1	55	240	0
13:30:00	63	1	5	0	0	69	241	0
13:45:00	54	1	1	0	0	56	239	0
14:00:00	41	2	1	0	0	44	224	0
14:15:00	56	2	3	0	4	65	234	0
14:30:00	65	0	5	0	1	71	236	0
14:45:00	56	0	3	0	0	59	239	0
15:00:00	60	0	0	0	0	60	255	1
15:15:00	71	1	3	0	0	75	265	0
15:30:00	78	0	4	0	1	83	277	0
15:45:00	62	2	3	1	1	69	287	0
16:00:00	87	3	0	0	2	92	319	0
16:15:00	90	1	1	0	2	94	338	1
16:30:00	84	0	1	0	0	85	340	0
16:45:00	95	2	1	0	2	100	371	0
17:00:00	77	0	2	0	0	79	358	0
17:15:00	75	0	2	0	0	77	341	0
17:30:00	68	2	1	0	0	71	327	0
17:45:00	58	0	1	0	0	59	286	0
18:00:00	54	1	2	0	0	57	264	0
18:15:00	43	0	0	0	0	43	230	0
18:30:00	58	0	0	0	1	59	218	0
18:45:00	37	0	0	0	1	38	197	0
19:00:00	27	0	0	0	0	27	167	0
19:15:00	45	1	0	0	1	47	171	0
19:30:00	37	1	0	0	0	38	150	0
19:45:00	35	0	1	0	1	37	149	0
20:00:00	35	0	0	1	2	38	160	0
20:15:00	34	0	0	0	0	34	147	0
20:30:00	27	0	0	2	3	32	141	0
20:45:00	26	0	0	0	0	26	130	0

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
0:00:00	7	
0:15:00	4	
0:30:00	2	
0:45:00	4	17
1:00:00	2	12
1:15:00	1	9
1:30:00	3	10
1:45:00	3	9
2:00:00	1	8
2:15:00	0	7
2:30:00	1	5
2:45:00	2	4
3:00:00	1	4
3:15:00	1	5
3:30:00	2	6
3:45:00	3	7
4:00:00	5	11
4:15:00	4	14
4:30:00	3	15
4:45:00	11	23
5:00:00	12	30
5:15:00	19	45
5:30:00	33	75
5:45:00	45	109
6:00:00	65	162
6:15:00	89	232
6:30:00	133	332
6:45:00	131	418
7:00:00	114	467
7:15:00	135	513
7:30:00	140	520
7:45:00	164	553
8:00:00	122	561
8:15:00	126	552
8:30:00	108	520
8:45:00	129	485
9:00:00	104	467
9:15:00	113	454
9:30:00	99	445
9:45:00	80	396
10:00:00	70	362
10:15:00	131	380
10:30:00	114	395
10:45:00	102	417
11:00:00	84	431
11:15:00	95	395
11:30:00	111	392
11:45:00	138	428
12:00:00	102	446
12:15:00	105	456
12:30:00	115	460
12:45:00	131	453
13:00:00	128	479
13:15:00	117	491
13:30:00	145	521
13:45:00	135	525
14:00:00	139	536
14:15:00	130	549
14:30:00	154	558
14:45:00	140	563
15:00:00	167	591
15:15:00	155	616
15:30:00	173	635
15:45:00	156	651
16:00:00	194	678
16:15:00	202	725
16:30:00	219	771
16:45:00	219	834
17:00:00	208	848
17:15:00	206	852
17:30:00	157	790
17:45:00	145	716
18:00:00	115	623
18:15:00	102	519
18:30:00	94	456
18:45:00	84	395
19:00:00	74	354
19:15:00	79	331
19:30:00	55	292
19:45:00	73	281
20:00:00	65	272
20:15:00	66	259
20:30:00	52	256
20:45:00	40	223

Monday May 31st

File: **1**
Site: **2000100001**
Facing: **SOUTH**

DATE
5/31/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
21:00:00	17	0	0	0	0	17	83	0
21:15:00	9	0	0	0	0	9	60	0
21:30:00	10	0	0	0	0	10	50	0
21:45:00	19	0	0	0	0	19	55	0
22:00:00	16	0	0	0	0	16	54	0
22:15:00	12	0	0	0	0	12	57	0
22:30:00	11	0	1	0	0	12	59	0
22:45:00	4	0	0	0	0	4	44	0
23:00:00	10	0	0	0	0	10	38	0
23:15:00	7	0	0	0	0	7	33	0
23:30:00	1	1	0	0	0	2	23	0
23:45:00	3	0	0	0	0	3	22	0
TOTAL	3862	84	86	3	19	4054		2

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
21:00:00	25	0	0	0	0	25	117	0
21:15:00	17	0	0	0	0	17	100	0
21:30:00	13	0	0	0	0	13	81	0
21:45:00	15	0	0	0	0	15	70	0
22:00:00	9	0	1	0	1	11	56	0
22:15:00	12	0	0	0	0	12	51	0
22:30:00	8	0	0	0	0	8	46	0
22:45:00	8	0	0	0	0	8	39	0
23:00:00	8	0	0	0	0	8	36	0
23:15:00	7	0	1	0	0	8	32	0
23:30:00	6	0	0	0	0	6	30	0
23:45:00	3	0	0	0	0	3	25	0
TOTAL	3542	49	87	4	26	3708		2

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
21:00:00	42	200
21:15:00	26	160
21:30:00	23	131
21:45:00	34	125
22:00:00	27	110
22:15:00	24	108
22:30:00	20	105
22:45:00	12	83
23:00:00	18	74
23:15:00	15	65
23:30:00	8	53
23:45:00	6	47
TOTAL	7762	

Tuesday June 1st

File: **1**
Site: **2000100001**
Facing: **SOUTH**

DATE
6/1/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	2	0	0	0	0	2		0
0:15:00	4	0	0	0	0	4		0
0:30:00	2	0	0	0	0	2		0
0:45:00	3	0	0	0	0	3	11	0
1:00:00	1	0	0	0	0	1	10	0
1:15:00	1	0	0	0	0	1	7	0
1:30:00	2	0	0	0	0	2	7	0
1:45:00	0	0	0	0	0	0	4	0
2:00:00	0	0	1	0	0	1	4	0
2:15:00	2	0	0	0	0	2	5	0
2:30:00	0	0	0	0	0	0	3	0
2:45:00	3	0	0	0	0	3	6	0
3:00:00	0	0	0	0	0	0	5	0
3:15:00	1	0	0	0	0	1	4	0
3:30:00	0	0	0	0	0	0	4	0
3:45:00	2	0	0	0	0	2	3	0
4:00:00	2	1	0	0	0	3	6	0
4:15:00	4	0	0	0	0	4	9	0
4:30:00	1	0	0	0	0	1	10	0
4:45:00	6	0	0	0	0	6	14	0
5:00:00	3	1	1	0	0	5	16	0
5:15:00	10	0	0	0	0	10	22	0
5:30:00	23	1	1	0	0	25	46	1
5:45:00	23	0	0	0	0	23	63	0
6:00:00	28	0	2	0	0	30	88	0
6:15:00	42	1	1	0	0	44	122	0
6:30:00	56	0	3	0	0	59	156	0
6:45:00	43	0	1	0	0	44	177	0
7:00:00	54	2	2	0	0	58	205	0
7:15:00	55	0	1	0	0	56	217	0
7:30:00	71	3	2	0	0	76	234	0
7:45:00	62	2	1	0	0	65	255	0
8:00:00	61	3	4	0	0	68	265	0
8:15:00	43	4	4	0	0	51	260	0
8:30:00	61	1	3	0	0	65	249	0
8:45:00	52	1	1	0	0	54	238	0
9:00:00	50	1	0	0	2	53	223	0
9:15:00	66	1	3	0	0	70	242	0
9:30:00	47	1	1	0	0	49	226	0
9:45:00	50	4	0	0	0	54	226	0
10:00:00	59	0	1	0	1	61	234	0
10:15:00	47	2	3	0	0	52	216	0
10:30:00	49	2	1	0	0	52	219	0
10:45:00	64	3	5	0	1	73	238	0
11:00:00	41	2	0	0	0	43	220	0
11:15:00	56	0	1	0	1	58	226	0
11:30:00	44	0	1	0	1	46	220	0
11:45:00	72	1	2	0	0	75	222	0
12:00:00	59	0	1	0	0	60	239	0
12:15:00	49	1	2	0	1	53	234	0
12:30:00	68	4	1	1	1	75	263	0
12:45:00	57	4	1	0	0	62	250	0
13:00:00	89	2	3	0	1	95	285	0
13:15:00	58	0	5	0	0	63	295	0
13:30:00	64	1	2	0	0	67	287	0
13:45:00	75	0	2	0	1	78	303	0
14:00:00	82	1	1	0	0	84	292	0
14:15:00	67	2	0	0	0	69	298	0
14:30:00	64	0	0	0	0	64	295	0
14:45:00	78	1	2	0	0	81	298	0
15:00:00	94	0	0	0	1	95	309	0
15:15:00	45	1	1	0	0	47	287	0
15:30:00	75	0	2	1	0	78	301	0
15:45:00	85	0	0	0	1	86	306	0
16:00:00	123	4	1	0	2	130	341	0
16:15:00	132	0	0	0	0	132	426	0
16:30:00	138	2	1	0	0	141	489	0
16:45:00	114	1	2	0	1	118	521	0
17:00:00	126	0	1	0	4	131	522	0
17:15:00	122	0	1	0	4	127	517	0
17:30:00	94	1	0	0	0	95	471	0
17:45:00	89	1	1	0	2	93	446	0
18:00:00	59	0	0	0	1	60	375	0
18:15:00	57	0	0	0	0	57	305	0
18:30:00	61	0	1	0	1	63	273	0
18:45:00	48	0	0	0	0	48	228	0
19:00:00	45	0	0	0	1	46	214	2
19:15:00	48	1	0	0	0	49	206	0
19:30:00	50	0	0	0	0	50	193	0
19:45:00	44	0	1	0	0	45	190	0
20:00:00	47	1	0	0	0	48	192	0
20:15:00	27	0	0	0	1	28	171	0
20:30:00	33	0	0	0	0	33	154	0

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	2	0	0	0	0	2		0
0:15:00	3	0	0	0	0	3		0
0:30:00	4	0	0	0	0	4		0
0:45:00	3	0	0	0	0	3	12	0
1:00:00	0	0	0	0	0	0	10	0
1:15:00	0	0	0	0	0	0	7	0
1:30:00	1	0	0	0	0	1	4	0
1:45:00	1	0	0	0	0	1	2	0
2:00:00	0	0	0	0	0	0	2	0
2:15:00	0	0	0	0	0	0	2	0
2:30:00	1	0	0	0	0	1	2	0
2:45:00	2	0	0	0	0	2	3	0
3:00:00	1	0	0	0	0	1	4	0
3:15:00	4	0	0	0	0	4	8	0
3:30:00	2	0	0	0	0	2	9	0
3:45:00	3	0	0	0	0	3	10	0
4:00:00	2	0	0	0	0	2	11	0
4:15:00	2	0	0	0	0	2	9	0
4:30:00	1	0	0	0	0	1	8	0
4:45:00	8	0	0	0	0	8	13	0
5:00:00	4	0	0	0	0	4	15	0
5:15:00	6	0	0	0	0	6	19	0
5:30:00	17	0	0	0	0	17	35	1
5:45:00	24	0	0	0	0	24	51	0
6:00:00	27	0	0	0	0	27	74	0
6:15:00	31	0	0	0	0	31	99	0
6:30:00	78	0	0	0	0	78	160	0
6:45:00	85	0	1	0	0	86	222	0
7:00:00	64	1	2	0	0	67	262	0
7:15:00	64	0	1	0	0	65	296	0
7:30:00	56	1	2	0	0	59	277	0
7:45:00	88	2	1	0	0	91	282	0
8:00:00	55	0	0	0	0	55	270	0
8:15:00	70	3	1	0	0	74	279	0
8:30:00	74	2	1	0	0	77	297	0
8:45:00	69	0	3	0	0	72	278	0
9:00:00	46	4	0	0	0	50	273	0
9:15:00	59	1	1	0	0	61	260	0
9:30:00	52	0	1	0	0	53	236	0
9:45:00	50	4	0	0	0	54	218	0
10:00:00	46	0	3	0	1	50	218	0
10:15:00	39	2	2	0	1	44	201	0
10:30:00	46	1	0	0	0	47	195	0
10:45:00	48	4	1	0	0	53	194	0
11:00:00	56	0	0	0	0	56	200	0
11:15:00	53	1	0	0	0	54	210	0
11:30:00	51	1	2	0	0	54	217	0
11:45:00	53	3	1	0	0	57	221	0
12:00:00	54	2	3	0	0	59	224	0
12:15:00	68	3	1	0	0	72	242	0
12:30:00	59	2	3	0	0	64	252	0
12:45:00	50	0	0	0	0	50	245	0
13:00:00	57	1	1	0	0	59	245	0
13:15:00	39	0	3	0	0	42	215	0
13:30:00	62	0	3	0	0	65	216	0
13:45:00	55	3	0	0	2	60	226	0
14:00:00	55	1	3	0	0	59	226	0
14:15:00	68	2	2	0	0	72	256	0
14:30:00	52	1	1	0	0	54	245	0
14:45:00	70	3	1	1	1	76	261	0
15:00:00	60	1	2	0	1	64	266	0
15:15:00	43	0	0	0	0	43	237	0
15:30:00	41	1	1	0	0	43	226	0
15:45:00	70	6	1	0	0	77	227	0
16:00:00	73	2	0	0	0	75	238	0
16:15:00	84	2	1	0	0	87	282	0
16:30:00	91	0	1	0	0	92	331	0
16:45:00	93	1	2	0	0	96	350	0
17:00:00	67	0	0	0	0	67	342	0
17:15:00	115	0	2	1	0	118	373	0
17:30:00	78	0	1	0	0	79	360	0
17:45:00	73	0	2	0	1	76	340	0
18:00:00	59	0	0	0	0	59	332	0
18:15:00	55	1	0	0	0	56	270	0
18:30:00	71	0	1	0	0	72	263	0
18:45:00	36	0	0	0	1	37	224	0
19:00:00	48	0	0	0	1	49	214	2
19:15:00	33	0	0	0	0	33	191	0
19:30:00	49	0	0	0	1	50	169	0
19:45:00	42	0	0	0	0	42	174	0
20:00:00	26	0	0	0	1	27	152	0
20:15:00	37	0	0	0	1	38	157	0
20:30:00	26	0	0	0	0	26	133	0

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
0:00:00	4	
0:15:00	7	
0:30:00	6	
0:45:00	6	23
1:00:00	1	20
1:15:00	1	14
1:30:00	3	11
1:45:00	1	6
2:00:00	1	6
2:15:00	2	7
2:30:00	1	5
2:45:00	5	9
3:00:00	1	9
3:15:00	5	12
3:30:00	2	13
3:45:00	5	13
4:00:00	5	17
4:15:00	6	18
4:30:00	2	18
4:45:00	14	27
5:00:00	9	31
5:15:00	16	41
5:30:00	42	81
5:45:00	47	114
6:00:00	57	162
6:15:00	75	221
6:30:00	137	316
6:45:00	130	399
7:00:00	125	467
7:15:00	121	513
7:30:00	135	511
7:45:00	156	537
8:00:00	123	535
8:15:00	125	539
8:30:00	142	546
8:45:00	126	516
9:00:00	103	496
9:15:00	131	502
9:30:00	102	462
9:45:00	108	444
10:00:00	111	452
10:15:00	96	417
10:30:00	99	414
10:45:00	126	432
11:00:00	99	420
11:15:00	112	436
11:30:00	100	437
11:45:00	132	443
12:00:00	119	463
12:15:00	125	476
12:30:00	139	515
12:45:00	112	495
13:00:00	154	530
13:15:00	105	510
13:30:00	132	503
13:45:00	138	529
14:00:00	143	518
14:15:00	141	554
14:30:00	118	540
14:45:00	157	559
15:00:00	159	575
15:15:00	90	524
15:30:00	121	527
15:45:00	163	533
16:00:00	205	579
16:15:00	219	708
16:30:00	233	820
16:45:00	214	871
17:00:00	198	864
17:15:00	245	890
17:30:00	174	831
17:45:00	169	786
18:00:00	119	707
18:15:00	113	575
18:30:00	135	536
18:45:00	85	452
19:00:00	95	428
19:15:00	82	397
19:30:00	100	362
19:45:00	87	364
20:00:00	75	344
20:15:00	66	328
20:30:00	59	287

Tuesday June 1st

File: **1**
Site: **2000100001**
Facing: **SOUTH**

DATE
6/1/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	26	0	0	0	0	26	135	0
21:00:00	27	0	0	0	0	27	114	0
21:15:00	17	0	0	0	0	17	103	0
21:30:00	21	0	0	0	0	21	91	0
21:45:00	15	0	0	0	0	15	80	0
22:00:00	19	0	0	0	0	19	72	0
22:15:00	13	0	0	0	0	13	68	0
22:30:00	7	0	0	0	0	7	54	0
22:45:00	9	0	0	0	0	9	48	0
23:00:00	11	0	0	0	0	11	40	0
23:15:00	5	0	0	0	0	5	32	0
23:30:00	4	0	1	0	0	5	30	0
23:45:00	3	0	0	0	0	3	24	0
TOTAL	4111	65	79	2	29	4286		3

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	28	0	0	0	0	28	119	0
21:00:00	28	0	0	0	0	28	120	0
21:15:00	31	0	0	0	0	31	113	0
21:30:00	25	0	0	0	0	25	112	0
21:45:00	13	0	0	0	0	13	97	0
22:00:00	7	1	0	0	0	8	77	0
22:15:00	11	0	0	0	0	11	57	0
22:30:00	12	0	0	0	0	12	44	0
22:45:00	6	0	0	0	0	6	37	0
23:00:00	6	0	0	0	0	6	35	0
23:15:00	7	0	0	0	0	7	31	0
23:30:00	6	0	0	0	0	6	25	0
23:45:00	2	0	0	0	0	2	21	0
TOTAL	3692	63	58	2	12	3827		3

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
20:45:00	54	254
21:00:00	55	234
21:15:00	48	216
21:30:00	46	203
21:45:00	28	177
22:00:00	27	149
22:15:00	24	125
22:30:00	19	98
22:45:00	15	85
23:00:00	17	75
23:15:00	12	63
23:30:00	11	55
23:45:00	5	45
TOTAL	8113	

Wednesday June 2nd

File: 1
Site: 2000100001
Facing: SOUTH

DATE
6/2/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	3	0	0	0	0	3		0
0:15:00	6	0	0	0	0	6		0
0:30:00	4	0	0	0	0	4		0
0:45:00	3	0	0	0	0	3	16	0
1:00:00	1	0	0	0	0	1	14	0
1:15:00	1	0	0	0	0	1	9	0
1:30:00	0	0	0	0	0	0	5	0
1:45:00	3	0	0	0	0	3	5	0
2:00:00	0	0	0	0	0	0	4	0
2:15:00	1	0	0	0	0	1	4	0
2:30:00	0	0	0	0	0	0	4	0
2:45:00	0	0	0	0	0	0	1	0
3:00:00	0	0	0	0	0	0	1	0
3:15:00	3	0	0	0	0	3	3	0
3:30:00	1	0	0	0	0	1	4	0
3:45:00	2	0	0	0	0	2	6	0
4:00:00	2	0	0	0	0	2	8	0
4:15:00	4	0	0	0	0	4	9	0
4:30:00	2	0	0	0	0	2	10	0
4:45:00	5	0	0	0	0	5	13	0
5:00:00	5	0	0	0	0	5	16	0
5:15:00	19	0	1	0	0	20	32	0
5:30:00	22	1	1	0	0	24	54	1
5:45:00	38	0	0	0	0	38	87	0
6:00:00	39	0	0	0	0	39	121	0
6:15:00	52	0	1	0	0	53	154	0
6:30:00	56	2	3	0	0	61	191	0
6:45:00	47	1	1	0	0	49	202	0
7:00:00	57	2	3	0	1	63	226	0
7:15:00	68	5	3	0	0	76	249	0
7:30:00	90	2	2	0	0	94	282	0
7:45:00	70	2	1	0	0	73	306	0
8:00:00	74	4	1	0	0	79	322	0
8:15:00	67	1	3	0	0	71	317	0
8:30:00	70	2	3	0	0	75	298	0
8:45:00	70	4	1	0	0	75	300	0
9:00:00	43	5	2	0	0	50	271	0
9:15:00	52	2	2	0	1	57	257	0
9:30:00	58	1	1	0	0	60	242	0
9:45:00	41	2	3	0	1	47	214	0
10:00:00	44	3	1	0	0	48	212	0
10:15:00	57	2	3	0	0	62	217	0
10:30:00	65	0	0	0	1	66	223	0
10:45:00	54	6	1	0	0	61	237	0
11:00:00	53	3	2	0	0	58	247	0
11:15:00	80	3	2	0	1	86	271	0
11:30:00	44	1	1	0	1	47	252	0
11:45:00	70	3	4	0	0	77	268	0
12:00:00	72	0	3	0	0	75	285	0
12:15:00	80	1	2	0	1	84	283	0
12:30:00	56	0	1	0	0	57	293	0
12:45:00	68	1	3	0	1	73	289	0
13:00:00	73	1	2	0	0	76	290	0
13:15:00	73	4	4	0	0	81	287	0
13:30:00	73	2	1	0	0	76	306	0
13:45:00	73	2	3	0	0	78	311	0
14:00:00	84	1	3	0	0	88	323	0
14:15:00	72	2	1	0	0	75	317	0
14:30:00	77	3	0	0	1	81	322	0
14:45:00	94	0	2	0	0	96	340	1
15:00:00	114	5	1	0	2	122	374	0
15:15:00	89	1	1	0	0	91	390	0
15:30:00	107	0	0	0	0	107	416	0
15:45:00	86	1	1	1	0	89	409	0
16:00:00	111	4	1	1	0	117	404	0
16:15:00	132	1	2	0	1	136	449	0
16:30:00	145	0	1	0	1	147	489	0
16:45:00	126	4	2	0	0	132	532	0
17:00:00	147	0	2	0	1	150	565	1
17:15:00	131	1	1	0	1	134	563	0
17:30:00	96	0	1	0	0	97	513	0
17:45:00	97	4	2	0	1	104	485	0
18:00:00	97	1	0	0	0	98	433	0
18:15:00	63	0	0	0	0	63	362	0
18:30:00	55	0	0	0	0	55	320	0
18:45:00	46	0	0	0	0	46	262	0
19:00:00	41	0	0	0	0	41	205	0
19:15:00	36	0	0	0	0	36	178	0
19:30:00	34	0	0	0	0	34	157	0
19:45:00	41	0	0	0	0	41	152	0
20:00:00	25	0	1	0	0	26	137	0
20:15:00	34	0	0	0	0	34	135	0
20:30:00	28	0	0	0	0	28	129	0

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	7	0	0	0	0	7		0
0:15:00	3	0	0	0	0	3		0
0:30:00	3	0	0	0	0	3		0
0:45:00	8	0	0	0	0	8	21	0
1:00:00	1	0	0	0	0	1	15	0
1:15:00	0	0	0	0	0	0	12	0
1:30:00	1	0	0	0	0	1	10	0
1:45:00	1	0	0	0	0	1	3	0
2:00:00	1	0	0	0	0	1	3	0
2:15:00	1	0	0	0	0	1	4	0
2:30:00	1	0	0	0	0	1	4	0
2:45:00	2	0	0	0	0	2	5	0
3:00:00	1	0	0	0	0	1	5	0
3:15:00	3	0	0	0	0	3	7	0
3:30:00	4	0	0	0	0	4	10	0
3:45:00	2	0	0	0	0	2	10	0
4:00:00	0	0	0	0	0	0	9	0
4:15:00	2	1	0	0	0	3	9	0
4:30:00	2	0	0	0	0	2	7	0
4:45:00	7	0	0	0	0	7	12	0
5:00:00	5	0	0	0	0	5	17	0
5:15:00	5	0	0	0	0	5	19	0
5:30:00	13	0	0	0	0	13	30	1
5:45:00	38	0	0	0	0	38	61	0
6:00:00	37	0	2	0	0	39	95	0
6:15:00	43	0	0	0	0	43	133	0
6:30:00	72	0	1	0	0	73	193	0
6:45:00	82	0	1	0	0	83	238	0
7:00:00	70	3	1	0	0	74	273	0
7:15:00	75	0	2	0	0	77	307	0
7:30:00	73	2	4	0	0	79	313	0
7:45:00	97	2	2	0	0	101	331	0
8:00:00	69	2	3	0	0	74	331	0
8:15:00	92	0	3	0	0	95	349	0
8:30:00	64	4	0	0	2	70	340	0
8:45:00	77	2	0	0	0	79	318	0
9:00:00	55	1	0	0	1	57	301	0
9:15:00	52	1	2	0	0	55	261	0
9:30:00	40	3	1	0	1	45	236	0
9:45:00	58	3	2	0	0	63	220	0
10:00:00	43	2	4	0	2	51	214	0
10:15:00	44	0	1	0	0	45	204	0
10:30:00	56	0	4	0	1	61	220	0
10:45:00	54	3	1	0	2	60	217	0
11:00:00	54	1	2	0	0	57	223	0
11:15:00	38	0	0	1	0	39	217	0
11:30:00	52	2	2	0	2	58	214	0
11:45:00	44	1	2	0	1	48	202	0
12:00:00	47	0	2	0	0	49	194	0
12:15:00	53	2	1	0	0	56	211	0
12:30:00	50	4	0	0	0	54	207	1
12:45:00	72	3	3	0	0	78	237	0
13:00:00	41	2	0	0	0	43	231	0
13:15:00	50	0	2	0	0	52	227	0
13:30:00	59	5	2	0	0	66	239	0
13:45:00	57	3	1	0	0	61	222	0
14:00:00	61	0	1	0	0	62	241	0
14:15:00	66	1	2	0	0	69	258	0
14:30:00	65	5	1	0	0	71	263	0
14:45:00	77	1	2	0	0	80	282	0
15:00:00	78	4	2	0	0	84	304	1
15:15:00	66	1	1	0	0	68	303	0
15:30:00	89	1	1	1	0	92	324	0
15:45:00	64	2	5	0	0	71	315	0
16:00:00	91	4	2	0	1	98	329	0
16:15:00	91	3	2	0	0	96	357	0
16:30:00	99	1	0	0	1	101	366	0
16:45:00	98	0	3	0	0	101	396	0
17:00:00	87	2	0	0	1	90	388	0
17:15:00	95	1	0	0	0	96	388	0
17:30:00	83	0	3	0	0	86	373	0
17:45:00	70	0	6	0	0	76	348	0
18:00:00	69	1	0	0	1	71	329	0
18:15:00	66	0	0	0	0	66	299	0
18:30:00	57	0	0	0	0	57	270	0
18:45:00	45	0	0	0	2	47	241	0
19:00:00	34	0	1	0	2	37	207	0
19:15:00	37	1	0	0	1	39	180	0
19:30:00	42	0	0	0	0	42	165	0
19:45:00	38	0	0	0	0	38	156	0
20:00:00	38	0	0	0	0	38	157	0
20:15:00	37	0	0	0	1	38	156	0
20:30:00	33	0	0	0	0	33	147	0

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
0:00:00	10	
0:15:00	9	
0:30:00	7	
0:45:00	11	37
1:00:00	2	29
1:15:00	1	21
1:30:00	1	15
1:45:00	4	8
2:00:00	1	7
2:15:00	2	8
2:30:00	1	8
2:45:00	2	6
3:00:00	1	6
3:15:00	6	10
3:30:00	5	14
3:45:00	4	16
4:00:00	2	17
4:15:00	7	18
4:30:00	4	17
4:45:00	12	25
5:00:00	10	33
5:15:00	25	51
5:30:00	37	84
5:45:00	76	148
6:00:00	78	216
6:15:00	96	287
6:30:00	134	384
6:45:00	132	440
7:00:00	137	499
7:15:00	153	556
7:30:00	173	595
7:45:00	174	637
8:00:00	153	653
8:15:00	166	666
8:30:00	145	638
8:45:00	154	618
9:00:00	107	572
9:15:00	112	518
9:30:00	105	478
9:45:00	110	434
10:00:00	99	426
10:15:00	107	421
10:30:00	127	443
10:45:00	121	454
11:00:00	115	470
11:15:00	125	488
11:30:00	105	466
11:45:00	125	470
12:00:00	124	479
12:15:00	140	494
12:30:00	111	500
12:45:00	151	526
13:00:00	119	521
13:15:00	133	514
13:30:00	142	545
13:45:00	139	533
14:00:00	150	564
14:15:00	144	575
14:30:00	152	585
14:45:00	176	622
15:00:00	206	678
15:15:00	159	693
15:30:00	199	740
15:45:00	160	724
16:00:00	215	733
16:15:00	232	806
16:30:00	248	855
16:45:00	233	928
17:00:00	240	953
17:15:00	230	951
17:30:00	183	886
17:45:00	180	833
18:00:00	169	762
18:15:00	129	661
18:30:00	112	590
18:45:00	93	503
19:00:00	78	412
19:15:00	75	358
19:30:00	76	322
19:45:00	79	308
20:00:00	64	294
20:15:00	72	291
20:30:00	61	276

Wednesday June 2nd

File: **1**
Site: **2000100001**
Facing: **SOUTH**

DATE
6/2/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	25	0	0	0	0	25	113	0
21:00:00	22	0	1	0	0	23	110	0
21:15:00	27	1	0	0	0	28	104	0
21:30:00	8	0	0	0	0	8	84	0
21:45:00	15	0	0	0	0	15	74	0
22:00:00	8	0	0	0	0	8	59	0
22:15:00	9	0	0	0	0	9	40	0
22:30:00	13	0	0	0	0	13	45	0
22:45:00	11	0	0	0	0	11	41	0
23:00:00	10	0	0	0	0	10	43	0
23:15:00	5	0	0	0	0	5	39	0
23:30:00	2	0	0	0	0	2	28	0
23:45:00	0	0	0	0	0	0	17	0
TOTAL	4477	97	88	2	16	4680		3

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	27	0	0	0	3	30	139	0
21:00:00	27	1	1	0	0	29	130	0
21:15:00	34	0	0	0	0	34	126	0
21:30:00	25	0	0	0	0	25	118	0
21:45:00	17	0	0	0	0	17	105	0
22:00:00	15	0	1	0	0	16	92	0
22:15:00	10	0	0	0	0	10	68	0
22:30:00	4	0	0	0	0	4	47	0
22:45:00	5	0	0	0	0	5	35	0
23:00:00	4	0	1	0	0	5	24	0
23:15:00	4	0	0	0	0	4	18	0
23:30:00	4	0	0	0	0	4	18	0
23:45:00	5	0	0	0	0	5	18	0
TOTAL	3938	81	86	2	25	4132		3

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
20:45:00	55	252
21:00:00	52	240
21:15:00	62	230
21:30:00	33	202
21:45:00	32	179
22:00:00	24	151
22:15:00	19	108
22:30:00	17	92
22:45:00	16	76
23:00:00	15	67
23:15:00	9	57
23:30:00	6	46
23:45:00	5	35
TOTAL	8812	

Thursday June 3rd

File: **1**
Site: **2000100001**
Facing: **SOUTH**

DATE
6/3/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	1	0	0	0	0	1		0
0:15:00	3	0	0	0	0	3		0
0:30:00	0	0	0	0	0	0		0
0:45:00	2	0	0	0	0	2	6	0
1:00:00	1	0	0	0	0	1	6	0
1:15:00	1	0	0	0	0	1	4	0
1:30:00	3	0	0	0	0	3	7	0
1:45:00	1	0	0	0	0	1	6	0
2:00:00	3	0	0	0	0	3	8	0
2:15:00	0	0	0	0	0	0	7	0
2:30:00	1	0	0	0	0	1	5	0
2:45:00	0	0	0	0	0	0	4	0
3:00:00	1	0	0	0	0	1	2	0
3:15:00	0	0	0	0	0	0	2	0
3:30:00	3	0	0	0	0	3	4	0
3:45:00	3	0	0	0	0	3	7	0
4:00:00	1	0	0	0	0	1	7	0
4:15:00	4	0	0	0	0	4	11	0
4:30:00	1	0	0	0	0	1	9	0
4:45:00	6	0	0	0	0	6	12	0
5:00:00	9	0	0	0	0	9	20	0
5:15:00	15	0	0	0	0	15	31	0
5:30:00	13	2	0	0	0	15	45	0
5:45:00	29	0	1	0	0	30	69	0
6:00:00	34	2	0	0	0	36	96	0
6:15:00	41	0	4	0	0	45	126	0
6:30:00	54	0	2	0	0	56	167	0
6:45:00	41	0	2	0	0	43	180	0
7:00:00	49	0	2	0	0	51	195	0
7:15:00	54	1	4	0	0	59	209	0
7:30:00	53	2	0	0	0	55	208	0
7:45:00	57	0	3	0	0	60	225	0
8:00:00	59	0	5	0	0	64	238	0
8:15:00	59	2	6	0	0	67	246	0
8:30:00	77	4	5	0	0	86	277	0
8:45:00	66	1	1	0	1	69	286	0
9:00:00	42	1	2	0	0	45	267	0
9:15:00	55	2	1	0	1	59	259	0
9:30:00	45	1	1	0	1	48	221	0
9:45:00	53	2	1	0	0	56	208	0
10:00:00	59	3	2	0	1	65	228	0
10:15:00	57	1	0	0	0	58	227	0
10:30:00	55	0	1	0	0	56	235	0
10:45:00	51	0	2	0	0	53	232	0
11:00:00	77	1	2	0	0	80	247	0
11:15:00	81	1	1	0	0	83	272	0
11:30:00	60	2	8	0	0	70	286	0
11:45:00	59	0	2	0	1	62	295	0
12:00:00	47	1	1	0	1	50	265	0
12:15:00	84	2	0	0	0	86	268	1
12:30:00	57	0	1	0	0	58	256	0
12:45:00	79	1	0	0	0	80	274	0
13:00:00	73	4	3	0	0	80	304	1
13:15:00	61	2	2	0	0	65	283	0
13:30:00	80	0	2	0	0	82	307	0
13:45:00	71	1	2	0	0	74	301	0
14:00:00	84	0	1	0	0	85	306	0
14:15:00	70	3	0	0	0	73	314	0
14:30:00	85	1	4	1	0	91	323	0
14:45:00	86	0	1	0	1	88	337	0
15:00:00	108	2	1	0	2	113	365	0
15:15:00	93	0	1	0	0	94	386	0
15:30:00	115	1	0	0	1	117	412	0
15:45:00	78	0	0	0	1	79	403	0
16:00:00	126	1	3	1	0	131	421	0
16:15:00	111	2	1	0	0	114	441	0
16:30:00	124	1	0	0	0	125	449	0
16:45:00	110	1	1	0	0	112	482	0
17:00:00	154	2	2	0	0	158	509	0
17:15:00	110	1	2	0	2	115	510	0
17:30:00	97	0	3	0	0	100	485	0
17:45:00	94	0	2	0	1	97	470	0
18:00:00	79	0	0	0	2	81	393	0
18:15:00	62	1	2	0	3	68	346	0
18:30:00	56	0	0	1	1	58	304	0
18:45:00	58	1	0	0	1	60	267	0
19:00:00	59	0	1	0	1	61	247	0
19:15:00	58	0	0	0	1	59	238	0
19:30:00	41	0	0	0	0	41	221	0
19:45:00	37	0	1	0	0	38	199	0
20:00:00	40	0	0	0	0	40	178	0
20:15:00	28	0	0	0	1	29	148	0
20:30:00	30	0	0	0	1	31	138	0

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	2	0	0	0	0	2		0
0:15:00	2	0	0	0	0	2		0
0:30:00	1	0	0	0	0	1		0
0:45:00	4	0	0	0	0	4	9	0
1:00:00	3	0	0	0	0	3	10	0
1:15:00	0	0	0	0	0	0	8	0
1:30:00	1	0	0	0	0	1	8	0
1:45:00	3	0	0	0	0	3	7	0
2:00:00	3	0	0	0	0	3	7	0
2:15:00	1	0	0	0	0	1	8	0
2:30:00	1	0	0	0	0	1	8	0
2:45:00	2	0	0	0	0	2	7	0
3:00:00	2	0	0	0	0	2	6	0
3:15:00	0	0	0	0	0	0	5	0
3:30:00	1	0	0	0	0	1	5	0
3:45:00	1	0	0	0	0	1	4	0
4:00:00	3	0	0	0	0	3	5	0
4:15:00	0	0	0	0	0	0	5	0
4:30:00	3	0	0	0	0	3	7	0
4:45:00	7	0	0	0	0	7	13	0
5:00:00	6	0	0	0	0	6	16	0
5:15:00	7	0	0	0	0	7	23	0
5:30:00	17	0	0	0	0	17	37	0
5:45:00	29	0	0	0	0	29	59	0
6:00:00	29	0	1	0	0	30	83	0
6:15:00	42	0	0	0	0	42	118	0
6:30:00	68	1	0	0	0	69	170	0
6:45:00	79	1	1	0	0	81	222	0
7:00:00	53	0	2	0	0	55	247	0
7:15:00	63	0	4	0	0	67	272	0
7:30:00	67	2	6	0	0	75	278	0
7:45:00	93	2	2	0	0	97	294	0
8:00:00	63	0	0	0	0	63	302	0
8:15:00	72	1	0	0	0	73	308	0
8:30:00	65	4	2	0	0	71	304	0
8:45:00	56	0	0	0	0	56	263	0
9:00:00	56	3	1	0	1	61	261	0
9:15:00	67	1	1	0	0	69	257	0
9:30:00	46	0	1	0	0	47	233	0
9:45:00	55	0	0	0	0	55	232	0
10:00:00	44	1	1	0	1	47	218	0
10:15:00	52	0	1	0	0	53	202	0
10:30:00	63	2	2	1	0	68	223	0
10:45:00	51	0	0	0	0	51	219	0
11:00:00	57	2	1	0	0	60	232	0
11:15:00	66	1	3	0	0	70	249	0
11:30:00	49	1	0	1	0	51	232	0
11:45:00	66	0	1	0	1	68	249	0
12:00:00	41	3	0	0	0	44	233	0
12:15:00	70	1	0	0	0	71	234	0
12:30:00	54	0	1	0	0	55	238	1
12:45:00	55	2	1	0	0	58	228	0
13:00:00	51	1	2	0	0	54	238	0
13:15:00	47	3	4	0	0	54	221	0
13:30:00	55	1	1	0	0	57	223	0
13:45:00	55	0	1	0	0	56	221	0
14:00:00	45	0	2	0	0	47	214	0
14:15:00	73	4	8	0	0	85	245	0
14:30:00	55	0	1	0	0	56	244	0
14:45:00	71	2	0	0	0	73	261	0
15:00:00	68	3	2	0	0	73	287	0
15:15:00	81	1	0	0	0	82	284	0
15:30:00	83	2	4	0	0	89	317	0
15:45:00	58	2	0	1	0	61	305	0
16:00:00	80	1	1	0	1	83	315	0
16:15:00	83	2	0	0	0	85	318	0
16:30:00	97	0	2	0	0	99	328	0
16:45:00	86	0	1	0	0	87	354	0
17:00:00	76	1	1	0	1	79	350	0
17:15:00	76	0	1	0	0	77	342	0
17:30:00	84	0	1	0	0	85	328	0
17:45:00	60	0	1	0	0	61	302	0
18:00:00	68	1	0	0	0	69	292	0
18:15:00	44	0	0	0	0	44	259	0
18:30:00	38	1	0	0	0	39	213	0
18:45:00	49	1	0	0	0	50	202	0
19:00:00	39	1	1	0	2	43	176	0
19:15:00	44	1	0	0	0	45	177	0
19:30:00	39	0	0	0	1	40	178	0
19:45:00	33	0	0	0	0	33	161	0
20:00:00	43	0	0	0	1	44	162	0
20:15:00	28	0	0	0	1	29	146	0
20:30:00	36	0	0	0	1	37	143	0

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
0:00:00	3	
0:15:00	5	
0:30:00	1	
0:45:00	6	15
1:00:00	4	16
1:15:00	1	12
1:30:00	4	15
1:45:00	4	13
2:00:00	6	15
2:15:00	1	15
2:30:00	2	13
2:45:00	2	11
3:00:00	3	8
3:15:00	0	7
3:30:00	4	9
3:45:00	4	11
4:00:00	4	12
4:15:00	4	16
4:30:00	4	16
4:45:00	13	25
5:00:00	15	36
5:15:00	22	54
5:30:00	32	82
5:45:00	59	128
6:00:00	66	179
6:15:00	87	244
6:30:00	125	337
6:45:00	124	402
7:00:00	106	442
7:15:00	126	481
7:30:00	130	486
7:45:00	157	519
8:00:00	127	540
8:15:00	140	554
8:30:00	157	581
8:45:00	125	549
9:00:00	106	528
9:15:00	128	516
9:30:00	95	454
9:45:00	111	440
10:00:00	112	446
10:15:00	111	429
10:30:00	124	458
10:45:00	104	451
11:00:00	140	479
11:15:00	153	521
11:30:00	121	518
11:45:00	130	544
12:00:00	94	498
12:15:00	157	502
12:30:00	113	494
12:45:00	138	502
13:00:00	134	542
13:15:00	119	504
13:30:00	139	530
13:45:00	130	522
14:00:00	132	520
14:15:00	158	559
14:30:00	147	567
14:45:00	161	598
15:00:00	186	652
15:15:00	176	670
15:30:00	206	729
15:45:00	140	708
16:00:00	214	736
16:15:00	199	759
16:30:00	224	777
16:45:00	199	836
17:00:00	237	859
17:15:00	192	852
17:30:00	185	813
17:45:00	158	772
18:00:00	150	685
18:15:00	112	605
18:30:00	97	517
18:45:00	110	469
19:00:00	104	423
19:15:00	104	415
19:30:00	81	399
19:45:00	71	360
20:00:00	84	340
20:15:00	58	294
20:30:00	68	281

Thursday June 3rd

File: **1**
Site: **2000100001**
Facing: **SOUTH**

DATE
6/3/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	26	0	0	0	0	26	126	0
21:00:00	20	0	0	0	0	20	106	0
21:15:00	20	0	0	0	0	20	97	0
21:30:00	30	0	0	0	0	30	96	0
21:45:00	13	0	0	0	0	13	83	0
22:00:00	14	0	0	0	0	14	77	0
22:15:00	15	0	0	0	0	15	72	0
22:30:00	18	0	0	0	0	18	60	0
22:45:00	4	0	0	0	0	4	51	0
23:00:00	8	0	0	0	0	8	45	0
23:15:00	6	0	0	0	0	6	36	0
23:30:00	1	0	0	0	0	1	19	0
23:45:00	6	0	0	0	0	6	21	0
TOTAL	4365	56	95	3	25	4544		2

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	33	0	0	0	0	33	143	0
21:00:00	25	0	0	0	0	25	124	0
21:15:00	36	0	0	0	0	36	131	0
21:30:00	16	0	0	0	0	16	110	0
21:45:00	18	0	0	0	0	18	95	0
22:00:00	13	0	0	0	0	13	83	0
22:15:00	16	0	0	0	0	16	63	0
22:30:00	12	0	0	0	0	12	59	0
22:45:00	8	0	0	0	0	8	49	0
23:00:00	6	0	0	0	0	6	42	0
23:15:00	9	0	0	0	0	9	35	0
23:30:00	7	0	0	0	0	7	30	0
23:45:00	2	0	0	0	0	2	24	0
TOTAL	3787	56	66	3	11	3923		1

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
20:45:00	59	269
21:00:00	45	230
21:15:00	56	228
21:30:00	46	206
21:45:00	31	178
22:00:00	27	160
22:15:00	31	135
22:30:00	30	119
22:45:00	12	100
23:00:00	14	87
23:15:00	15	71
23:30:00	8	49
23:45:00	8	45
TOTAL	8467	

Friday June 4th

File: 1
Site: 2000100001
Facing: SOUTH

DATE
6/4/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	2	0	0	0	0	2		0
0:15:00	2	0	0	0	0	2		0
0:30:00	1	0	0	0	0	1		0
0:45:00	1	0	0	0	0	1	6	0
1:00:00	1	0	0	0	0	1	5	0
1:15:00	1	0	0	0	0	1	4	0
1:30:00	1	0	0	0	0	1	4	0
1:45:00	0	0	0	0	0	0	3	0
2:00:00	1	0	0	0	0	1	3	0
2:15:00	1	0	0	0	0	1	3	0
2:30:00	1	0	0	0	0	1	3	0
2:45:00	1	0	0	0	0	1	4	0
3:00:00	0	0	0	0	0	0	3	0
3:15:00	0	0	0	0	0	0	2	0
3:30:00	1	0	1	0	0	2	3	0
3:45:00	2	0	0	0	0	2	4	0
4:00:00	4	0	0	0	0	4	8	0
4:15:00	4	1	0	0	0	5	13	0
4:30:00	2	0	1	0	0	3	14	0
4:45:00	7	0	0	0	0	7	19	0
5:00:00	8	0	1	0	0	9	24	0
5:15:00	23	0	0	0	0	23	42	0
5:30:00	10	2	1	0	0	13	52	0
5:45:00	18	0	1	0	0	19	64	0
6:00:00	37	0	0	0	1	38	93	0
6:15:00	35	0	1	0	0	36	106	0
6:30:00	21	0	1	0	0	22	115	0
6:45:00	20	0	0	0	0	20	116	0
7:00:00	36	1	2	0	1	40	118	0
7:15:00	56	2	1	0	0	59	141	0
7:30:00	66	2	0	0	1	69	188	0
7:45:00	49	2	0	0	0	51	219	0
8:00:00	47	1	2	0	1	51	230	0
8:15:00	51	1	4	0	0	56	227	0
8:30:00	67	2	1	0	0	70	228	0
8:45:00	70	0	3	0	0	73	250	0
9:00:00	77	2	3	0	0	82	281	0
9:15:00	60	0	0	0	1	61	286	0
9:30:00	85	1	1	0	0	87	303	0
9:45:00	80	0	0	0	3	83	313	0
10:00:00	53	3	1	0	2	59	290	0
10:15:00	75	5	2	0	0	82	311	0
10:30:00	64	1	3	0	0	68	292	0
10:45:00	73	2	2	0	0	77	286	0
11:00:00	87	0	0	0	1	88	315	0
11:15:00	70	1	5	0	0	76	309	1
11:30:00	81	2	1	0	0	84	325	0
11:45:00	81	1	1	0	1	84	332	0
12:00:00	80	1	1	0	0	82	326	0
12:15:00	82	0	2	0	3	87	337	0
12:30:00	96	2	2	0	0	100	353	0
12:45:00	111	1	5	0	0	117	386	0
13:00:00	79	1	3	0	0	83	387	0
13:15:00	99	2	2	0	0	103	403	0
13:30:00	92	2	3	0	2	99	402	0
13:45:00	88	2	1	0	1	92	377	0
14:00:00	128	0	2	0	1	131	425	0
14:15:00	101	2	2	0	1	106	428	0
14:30:00	110	1	1	0	0	112	441	0
14:45:00	124	0	1	0	0	125	474	0
15:00:00	137	2	0	0	1	140	483	0
15:15:00	110	0	3	0	0	113	490	0
15:30:00	142	2	2	0	2	148	526	0
15:45:00	116	0	3	0	1	120	521	0
16:00:00	135	4	1	0	0	140	521	0
16:15:00	127	0	0	0	0	127	535	0
16:30:00	115	0	0	0	0	115	502	0
16:45:00	128	1	0	0	0	129	511	0
17:00:00	131	1	2	0	0	134	505	0
17:15:00	111	0	1	0	1	113	491	0
17:30:00	125	0	1	0	0	126	502	0
17:45:00	103	0	0	0	0	103	476	0
18:00:00	74	0	0	0	0	74	416	0
18:15:00	76	0	0	0	3	79	382	0
18:30:00	75	0	0	0	1	76	332	0
18:45:00	58	0	1	0	1	60	289	0
19:00:00	56	0	0	0	0	56	271	1
19:15:00	59	1	1	0	0	61	253	0
19:30:00	43	1	0	0	1	45	222	0
19:45:00	52	0	0	0	0	52	214	0
20:00:00	30	0	0	0	0	30	188	2
20:15:00	24	0	0	0	0	24	151	0
20:30:00	32	0	0	0	0	32	138	0

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	4	0	0	0	0	4		0
0:15:00	2	0	0	0	0	2		0
0:30:00	4	0	1	0	0	5		0
0:45:00	4	0	0	0	0	4	15	0
1:00:00	1	0	0	0	0	1	12	0
1:15:00	0	0	0	0	0	0	10	0
1:30:00	0	0	0	0	0	0	5	0
1:45:00	2	0	0	0	0	2	3	0
2:00:00	0	0	0	0	0	0	2	0
2:15:00	2	0	0	0	0	2	4	0
2:30:00	0	0	0	0	0	0	4	0
2:45:00	3	0	0	0	0	3	5	0
3:00:00	1	0	0	0	0	1	6	0
3:15:00	2	0	0	0	0	2	6	0
3:30:00	1	1	0	0	0	2	8	0
3:45:00	3	0	0	0	0	3	8	0
4:00:00	0	0	0	0	0	0	7	0
4:15:00	2	0	0	0	0	2	7	0
4:30:00	3	0	0	0	0	3	8	0
4:45:00	6	0	0	0	0	6	11	0
5:00:00	9	0	0	0	0	9	20	0
5:15:00	8	0	1	0	0	9	27	0
5:30:00	9	0	0	0	0	9	33	0
5:45:00	26	0	0	0	0	26	53	0
6:00:00	10	0	0	0	0	10	54	0
6:15:00	29	1	0	0	0	30	75	0
6:30:00	31	0	0	0	0	31	97	0
6:45:00	22	0	0	0	0	22	93	0
7:00:00	29	1	2	0	0	32	115	0
7:15:00	60	0	0	0	0	60	145	0
7:30:00	60	0	4	0	1	65	179	0
7:45:00	56	0	0	0	0	56	213	0
8:00:00	49	2	0	0	0	51	232	0
8:15:00	62	0	3	0	0	65	237	0
8:30:00	66	6	0	0	0	72	244	0
8:45:00	65	2	1	0	0	68	256	0
9:00:00	49	2	2	0	1	54	259	0
9:15:00	43	2	2	0	0	47	241	0
9:30:00	51	0	3	0	0	54	223	0
9:45:00	49	1	1	0	1	52	207	0
10:00:00	54	0	1	0	1	56	209	0
10:15:00	45	0	4	0	0	49	211	0
10:30:00	59	2	0	0	1	62	219	0
10:45:00	62	1	1	0	0	64	231	0
11:00:00	55	2	2	0	0	59	234	0
11:15:00	64	1	3	0	0	68	253	0
11:30:00	64	0	2	0	0	66	257	1
11:45:00	57	3	3	0	0	63	256	0
12:00:00	71	3	2	0	0	76	273	0
12:15:00	73	2	1	0	0	76	281	0
12:30:00	76	2	1	0	0	79	294	0
12:45:00	68	1	0	0	0	69	300	0
13:00:00	72	1	1	0	0	74	298	0
13:15:00	70	0	2	0	0	72	294	0
13:30:00	77	2	5	0	0	84	299	0
13:45:00	57	0	0	0	0	57	287	0
14:00:00	49	1	0	0	0	50	263	0
14:15:00	70	0	1	0	2	73	264	0
14:30:00	85	3	0	0	2	90	270	0
14:45:00	77	1	0	0	0	78	291	0
15:00:00	77	1	2	0	0	80	321	0
15:15:00	95	3	2	0	0	100	348	0
15:30:00	75	2	1	0	0	78	336	0
15:45:00	93	0	0	0	0	93	351	0
16:00:00	106	0	0	0	0	106	377	0
16:15:00	95	0	3	0	1	99	376	0
16:30:00	103	0	1	0	0	104	402	0
16:45:00	106	0	2	0	1	109	418	0
17:00:00	92	1	1	0	2	96	408	0
17:15:00	89	0	2	0	0	91	400	0
17:30:00	67	0	0	0	0	67	363	0
17:45:00	77	1	0	0	0	78	332	0
18:00:00	68	0	1	0	0	69	305	0
18:15:00	60	0	1	0	0	61	275	0
18:30:00	58	0	0	0	0	58	266	0
18:45:00	45	0	0	0	0	45	233	0
19:00:00	36	0	0	0	1	37	201	0
19:15:00	47	0	0	0	0	47	187	0
19:30:00	42	1	0	0	1	44	173	0
19:45:00	31	0	0	0	2	33	161	0
20:00:00	47	0	0	0	0	47	171	0
20:15:00	42	0	0	0	0	42	166	0
20:30:00	29	0	0	0	1	30	152	0

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
0:00:00	6	
0:15:00	4	
0:30:00	6	
0:45:00	5	21
1:00:00	2	17
1:15:00	1	14
1:30:00	1	9
1:45:00	2	6
2:00:00	1	5
2:15:00	3	7
2:30:00	1	7
2:45:00	4	9
3:00:00	1	9
3:15:00	2	8
3:30:00	4	11
3:45:00	5	12
4:00:00	4	15
4:15:00	7	20
4:30:00	6	22
4:45:00	13	30
5:00:00	18	44
5:15:00	32	69
5:30:00	22	85
5:45:00	45	117
6:00:00	48	147
6:15:00	66	181
6:30:00	53	212
6:45:00	42	209
7:00:00	72	233
7:15:00	119	286
7:30:00	134	367
7:45:00	107	432
8:00:00	102	462
8:15:00	121	464
8:30:00	142	472
8:45:00	141	506
9:00:00	136	540
9:15:00	108	527
9:30:00	141	526
9:45:00	135	520
10:00:00	115	499
10:15:00	131	522
10:30:00	130	511
10:45:00	141	517
11:00:00	147	549
11:15:00	144	562
11:30:00	150	582
11:45:00	147	588
12:00:00	158	599
12:15:00	163	618
12:30:00	179	647
12:45:00	186	686
13:00:00	157	685
13:15:00	175	697
13:30:00	183	701
13:45:00	149	664
14:00:00	181	688
14:15:00	179	692
14:30:00	202	711
14:45:00	203	765
15:00:00	220	804
15:15:00	213	838
15:30:00	226	862
15:45:00	213	872
16:00:00	246	898
16:15:00	226	911
16:30:00	219	904
16:45:00	238	929
17:00:00	230	913
17:15:00	204	891
17:30:00	193	865
17:45:00	181	808
18:00:00	143	721
18:15:00	140	657
18:30:00	134	598
18:45:00	105	522
19:00:00	93	472
19:15:00	108	440
19:30:00	89	395
19:45:00	85	375
20:00:00	77	359
20:15:00	66	317
20:30:00	62	290

Friday June 4th

File: **1**
Site: **2000100001**
Facing: **SOUTH**

DATE
6/4/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	41	0	1	0	0	42	128	0
21:00:00	28	0	0	0	0	28	126	0
21:15:00	19	0	0	0	0	19	121	0
21:30:00	24	0	0	0	0	24	113	0
21:45:00	16	0	0	0	0	16	87	0
22:00:00	16	0	0	0	0	16	75	0
22:15:00	16	0	1	0	0	17	73	0
22:30:00	13	0	0	0	0	13	62	0
22:45:00	9	0	0	0	0	9	55	0
23:00:00	16	0	0	0	0	16	55	0
23:15:00	8	0	0	0	0	8	46	0
23:30:00	5	0	0	0	0	5	38	0
23:45:00	6	0	0	0	0	6	35	0
TOTAL	4999	58	81	0	31	5169		4

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	24	0	1	0	0	25	144	0
21:00:00	38	0	0	0	0	38	135	0
21:15:00	31	0	0	0	0	31	124	0
21:30:00	31	0	0	0	0	31	125	0
21:45:00	19	0	0	0	0	19	119	0
22:00:00	21	0	0	0	0	21	102	0
22:15:00	13	0	0	0	0	13	84	0
22:30:00	11	0	0	0	0	11	64	0
22:45:00	12	0	0	0	0	12	57	0
23:00:00	14	0	0	0	0	14	50	0
23:15:00	10	0	0	0	0	10	47	0
23:30:00	13	0	0	0	0	13	49	0
23:45:00	2	0	0	0	0	2	39	0
TOTAL	3947	52	66	0	18	4083		1

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
20:45:00	67	272
21:00:00	66	261
21:15:00	50	245
21:30:00	55	238
21:45:00	35	206
22:00:00	37	177
22:15:00	30	157
22:30:00	24	126
22:45:00	21	112
23:00:00	30	105
23:15:00	18	93
23:30:00	18	87
23:45:00	8	74
TOTAL	9252	

Saturday June 5th

File: **1**
Site: **2000100001**
Facing: **SOUTH**

DATE
6/5/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	4	0	0	0	0	4		0
0:15:00	2	0	0	0	0	2		0
0:30:00	9	0	0	0	0	9		0
0:45:00	6	0	0	0	0	6	21	0
1:00:00	1	0	0	0	0	1	18	0
1:15:00	5	0	0	0	0	5	21	0
1:30:00	1	0	0	0	0	1	13	0
1:45:00	2	0	0	0	0	2	9	0
2:00:00	3	0	0	0	0	3	11	0
2:15:00	5	0	0	0	0	5	11	0
2:30:00	1	0	0	0	0	1	11	0
2:45:00	0	0	0	0	0	0	9	0
3:00:00	0	0	0	0	0	0	6	0
3:15:00	1	1	0	0	0	2	3	0
3:30:00	0	0	0	0	0	0	2	0
3:45:00	1	0	0	0	0	1	3	0
4:00:00	4	0	0	0	0	4	7	0
4:15:00	0	0	0	0	0	0	5	0
4:30:00	1	0	0	0	0	1	6	0
4:45:00	2	0	0	0	0	2	7	0
5:00:00	1	0	0	0	0	1	4	0
5:15:00	9	0	0	0	0	9	13	0
5:30:00	6	0	0	0	0	6	18	0
5:45:00	9	0	0	0	0	9	25	0
6:00:00	13	0	0	0	0	13	37	0
6:15:00	17	0	0	0	0	17	45	0
6:30:00	22	0	0	0	0	22	61	0
6:45:00	21	0	0	0	1	22	74	0
7:00:00	25	0	0	0	1	26	87	0
7:15:00	41	1	0	0	0	42	112	0
7:30:00	32	0	0	0	0	32	122	0
7:45:00	36	0	0	0	0	36	136	0
8:00:00	36	1	0	0	0	37	147	0
8:15:00	58	1	0	0	4	63	168	0
8:30:00	59	0	0	0	0	59	195	2
8:45:00	60	0	0	0	2	62	221	0
9:00:00	66	0	3	0	0	69	253	0
9:15:00	89	0	0	0	0	89	279	2
9:30:00	80	1	0	0	1	82	302	0
9:45:00	67	0	1	0	3	71	311	0
10:00:00	79	0	0	0	2	81	323	0
10:15:00	82	0	1	0	0	83	317	0
10:30:00	99	1	0	0	0	100	335	0
10:45:00	81	1	1	0	0	83	347	0
11:00:00	97	0	0	0	1	98	364	0
11:15:00	104	0	0	0	2	106	387	0
11:30:00	67	0	0	0	1	68	355	0
11:45:00	89	1	0	0	1	91	363	0
12:00:00	105	0	0	0	0	105	370	0
12:15:00	111	1	0	0	0	112	376	0
12:30:00	79	1	0	0	1	81	389	0
12:45:00	96	2	0	0	0	98	396	0
13:00:00	95	1	1	0	3	100	391	0
13:15:00	87	0	1	0	1	89	368	0
13:30:00	85	0	0	0	1	86	373	0
13:45:00	77	0	0	0	1	78	353	1
14:00:00	95	0	2	0	1	98	351	0
14:15:00	116	1	0	0	1	118	380	0
14:30:00	90	1	0	0	1	92	386	0
14:45:00	93	1	2	0	0	96	404	1
15:00:00	101	1	0	0	1	103	409	1
15:15:00	78	0	0	0	0	78	369	0
15:30:00	74	0	1	0	0	75	352	0
15:45:00	74	0	0	0	0	74	330	0
16:00:00	70	0	1	0	0	71	298	0
16:15:00	58	0	0	1	0	59	279	0
16:30:00	48	0	0	0	0	48	252	0
16:45:00	60	0	0	0	0	60	238	0
17:00:00	66	0	1	0	0	67	234	0
17:15:00	60	0	0	0	0	60	235	0
17:30:00	38	0	0	0	0	38	225	0
17:45:00	43	0	0	0	0	43	208	0
18:00:00	33	0	0	0	0	33	174	0
18:15:00	51	0	0	0	0	51	165	0
18:30:00	42	0	0	0	0	42	169	0
18:45:00	40	0	0	0	0	40	166	0
19:00:00	42	0	0	0	1	43	176	0
19:15:00	45	0	0	0	0	45	170	0
19:30:00	42	0	1	0	0	43	171	0
19:45:00	28	0	1	0	1	30	161	0
20:00:00	38	0	0	0	0	38	156	0
20:15:00	26	0	0	0	0	26	137	0
20:30:00	32	0	1	0	0	33	127	0

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	10	0	0	0	0	10		0
0:15:00	3	0	0	0	0	3		0
0:30:00	8	0	0	0	0	8		0
0:45:00	3	0	0	0	0	3	24	0
1:00:00	3	0	0	0	0	3	17	0
1:15:00	5	0	0	0	0	5	19	0
1:30:00	0	0	0	0	0	0	11	0
1:45:00	2	0	0	0	0	2	10	0
2:00:00	0	0	0	0	0	0	7	0
2:15:00	2	0	0	0	0	2	4	0
2:30:00	3	0	0	0	0	3	7	0
2:45:00	0	0	0	0	0	0	5	0
3:00:00	1	0	0	0	0	1	6	0
3:15:00	1	0	0	0	0	1	5	0
3:30:00	0	0	0	0	0	0	2	0
3:45:00	2	0	0	0	0	2	4	0
4:00:00	1	0	0	0	0	1	4	0
4:15:00	0	0	0	0	0	0	3	0
4:30:00	0	0	0	0	0	0	3	0
4:45:00	3	0	0	0	0	3	4	0
5:00:00	3	0	0	0	0	3	6	0
5:15:00	1	0	0	0	0	1	7	0
5:30:00	7	0	0	1	0	8	15	0
5:45:00	8	0	0	0	0	8	20	0
6:00:00	9	0	0	0	0	9	26	0
6:15:00	8	0	0	0	0	8	33	0
6:30:00	11	0	0	0	0	11	36	0
6:45:00	12	0	0	1	0	13	41	0
7:00:00	19	0	0	0	0	19	51	0
7:15:00	24	0	0	0	0	24	67	0
7:30:00	27	0	0	0	0	27	83	0
7:45:00	26	0	0	0	1	27	97	0
8:00:00	21	0	1	0	0	22	100	0
8:15:00	56	1	0	0	1	58	134	0
8:30:00	33	0	1	0	0	34	141	0
8:45:00	35	1	0	0	0	36	150	0
9:00:00	39	2	1	0	1	43	171	0
9:15:00	43	0	0	0	0	43	156	2
9:30:00	65	1	3	0	0	69	191	0
9:45:00	66	0	1	0	0	67	222	0
10:00:00	59	0	0	0	0	59	238	0
10:15:00	63	0	0	0	1	64	259	0
10:30:00	62	0	0	0	1	63	253	0
10:45:00	58	1	1	0	0	60	246	0
11:00:00	46	0	0	0	3	49	236	0
11:15:00	65	0	0	0	4	69	241	0
11:30:00	60	0	0	0	0	60	238	0
11:45:00	61	0	0	0	5	66	244	0
12:00:00	53	1	0	0	0	54	249	0
12:15:00	69	0	0	0	1	70	250	3
12:30:00	79	0	0	0	0	79	269	0
12:45:00	64	0	0	0	1	65	268	0
13:00:00	62	0	0	0	1	63	277	0
13:15:00	84	1	0	0	0	85	292	0
13:30:00	65	1	0	0	1	67	280	0
13:45:00	76	0	0	0	0	76	291	1
14:00:00	83	1	0	0	0	84	312	0
14:15:00	61	0	1	0	0	62	289	0
14:30:00	56	0	1	0	0	57	279	1
14:45:00	61	0	0	0	0	61	264	1
15:00:00	63	0	0	0	0	63	243	0
15:15:00	57	0	0	0	1	58	239	1
15:30:00	81	0	0	0	1	82	264	1
15:45:00	75	0	0	0	2	77	280	2
16:00:00	56	0	0	0	1	57	274	0
16:15:00	58	0	3	0	0	61	277	0
16:30:00	73	0	0	0	0	73	268	0
16:45:00	64	0	0	0	2	66	257	0
17:00:00	76	0	0	0	0	76	276	0
17:15:00	61	0	0	0	0	61	276	0
17:30:00	53	0	1	0	0	54	257	0
17:45:00	50	0	0	0	0	50	241	0
18:00:00	52	0	0	0	0	52	217	0
18:15:00	63	0	0	0	0	63	219	0
18:30:00	40	0	0	0	0	40	205	0
18:45:00	48	0	0	0	1	49	204	0
19:00:00	36	0	0	0	0	36	188	0
19:15:00	54	0	0	0	2	56	181	0
19:30:00	40	0	0	0	0	40	181	0
19:45:00	31	0	0	0	1	32	164	0
20:00:00	44	0	2	0	2	48	176	0
20:15:00	42	0	0	0	0	42	162	0
20:30:00	45	0	0	0	0	45	167	0

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
0:00:00	14	
0:15:00	5	
0:30:00	17	
0:45:00	9	45
1:00:00	4	35
1:15:00	10	40
1:30:00	1	24
1:45:00	4	19
2:00:00	3	18
2:15:00	7	15
2:30:00	4	18
2:45:00	0	14
3:00:00	1	12
3:15:00	3	8
3:30:00	0	4
3:45:00	3	7
4:00:00	5	11
4:15:00	0	8
4:30:00	1	9
4:45:00	5	11
5:00:00	4	10
5:15:00	10	20
5:30:00	14	33
5:45:00	17	45
6:00:00	22	63
6:15:00	25	78
6:30:00	33	97
6:45:00	35	115
7:00:00	45	138
7:15:00	66	179
7:30:00	59	205
7:45:00	63	233
8:00:00	59	247
8:15:00	121	302
8:30:00	93	336
8:45:00	98	371
9:00:00	112	424
9:15:00	132	435
9:30:00	151	493
9:45:00	138	533
10:00:00	140	561
10:15:00	147	576
10:30:00	163	588
10:45:00	143	593
11:00:00	147	600
11:15:00	175	628
11:30:00	128	593
11:45:00	157	607
12:00:00	159	619
12:15:00	182	626
12:30:00	160	658
12:45:00	163	664
13:00:00	163	668
13:15:00	174	660
13:30:00	153	653
13:45:00	154	644
14:00:00	182	663
14:15:00	180	669
14:30:00	149	665
14:45:00	157	668
15:00:00	166	652
15:15:00	136	608
15:30:00	157	616
15:45:00	151	610
16:00:00	128	572
16:15:00	120	556
16:30:00	121	520
16:45:00	126	495
17:00:00	143	510
17:15:00	121	511
17:30:00	92	482
17:45:00	93	449
18:00:00	85	391
18:15:00	114	384
18:30:00	82	374
18:45:00	89	370
19:00:00	79	364
19:15:00	101	351
19:30:00	83	352
19:45:00	62	325
20:00:00	86	332
20:15:00	68	299
20:30:00	78	294

Saturday June 5th

File: **1**
Site: **2000100001**
Facing: **SOUTH**

DATE
6/5/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	20	0	0	0	0	20	117	0
21:00:00	21	1	0	0	0	22	101	0
21:15:00	27	0	0	0	0	27	102	0
21:30:00	20	0	0	0	0	20	89	0
21:45:00	17	0	0	0	0	17	86	0
22:00:00	21	0	0	0	0	21	85	0
22:15:00	17	0	0	0	0	17	75	0
22:30:00	9	0	1	0	0	10	65	0
22:45:00	14	1	0	0	0	15	63	0
23:00:00	7	0	0	0	0	7	49	0
23:15:00	10	0	0	0	0	10	42	0
23:30:00	5	0	0	0	0	5	37	0
23:45:00	3	0	0	0	0	3	25	0
TOTAL	4002	19	19	1	32	4073		7

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	30	0	0	0	0	30	165	0
21:00:00	51	0	1	0	1	53	170	0
21:15:00	24	0	0	0	1	25	153	0
21:30:00	28	0	0	0	0	28	136	0
21:45:00	27	0	0	0	0	27	133	0
22:00:00	29	0	0	0	0	29	109	0
22:15:00	19	0	0	0	0	19	103	0
22:30:00	15	0	0	0	0	15	90	0
22:45:00	10	0	0	0	0	10	73	0
23:00:00	8	0	0	0	0	8	52	0
23:15:00	12	0	0	0	0	12	45	0
23:30:00	13	0	0	0	0	13	43	0
23:45:00	5	0	0	0	1	6	39	0
TOTAL	3380	10	17	2	37	3446		12

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
20:45:00	50	282
21:00:00	75	271
21:15:00	52	255
21:30:00	48	225
21:45:00	44	219
22:00:00	50	194
22:15:00	36	178
22:30:00	25	155
22:45:00	25	136
23:00:00	15	101
23:15:00	22	87
23:30:00	18	80
23:45:00	9	64
TOTAL	7519	

Sunday June 6th

File: **1**
Site: **2000100001**
Facing: **SOUTH**

DATE
6/6/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	7	1	0	0	0	8		0
0:15:00	2	1	0	0	0	3		0
0:30:00	3	0	0	0	0	3		0
0:45:00	7	1	0	0	0	8	22	0
1:00:00	2	0	0	0	0	2	16	0
1:15:00	2	0	0	0	0	2	15	0
1:30:00	1	0	0	0	0	1	13	0
1:45:00	1	0	0	0	0	1	6	0
2:00:00	0	1	0	0	0	1	5	0
2:15:00	1	0	0	0	0	1	4	0
2:30:00	1	0	0	0	0	1	4	0
2:45:00	1	0	0	0	0	1	4	0
3:00:00	2	0	0	0	0	2	5	0
3:15:00	1	0	0	0	0	1	5	0
3:30:00	1	0	0	0	0	1	5	0
3:45:00	0	0	0	0	0	0	4	0
4:00:00	4	0	0	0	0	4	6	0
4:15:00	0	1	0	0	0	1	6	0
4:30:00	1	0	0	0	0	1	6	0
4:45:00	1	0	0	0	0	1	7	0
5:00:00	2	0	0	0	0	2	5	0
5:15:00	5	0	0	0	0	5	9	0
5:30:00	5	0	0	0	0	5	13	0
5:45:00	4	0	0	0	0	4	16	0
6:00:00	12	0	0	0	0	12	26	0
6:15:00	8	0	0	0	0	8	29	0
6:30:00	18	3	1	0	0	22	46	1
6:45:00	8	0	0	0	1	9	51	0
7:00:00	19	0	0	0	0	19	58	0
7:15:00	20	0	0	0	0	20	70	0
7:30:00	22	0	0	0	1	23	71	0
7:45:00	26	0	0	0	2	28	90	0
8:00:00	28	1	0	0	0	29	100	0
8:15:00	27	2	0	0	2	31	111	0
8:30:00	31	0	0	0	0	31	119	0
8:45:00	38	0	0	0	0	38	129	0
9:00:00	36	0	0	0	1	37	137	0
9:15:00	40	0	0	0	2	42	148	0
9:30:00	54	1	0	0	2	57	174	0
9:45:00	59	0	0	0	0	59	195	0
10:00:00	49	0	0	0	1	50	208	2
10:15:00	59	0	1	0	1	61	227	0
10:30:00	63	1	0	0	3	67	237	0
10:45:00	53	0	0	0	2	55	233	0
11:00:00	74	0	0	0	2	76	259	0
11:15:00	77	0	0	0	3	80	278	0
11:30:00	75	0	0	0	0	75	286	0
11:45:00	73	0	0	0	1	74	305	1
12:00:00	79	2	0	0	1	82	311	0
12:15:00	65	0	0	0	1	66	297	0
12:30:00	67	1	0	0	2	70	292	0
12:45:00	65	0	0	0	1	66	284	0
13:00:00	78	0	0	0	0	78	280	0
13:15:00	80	1	0	0	0	81	295	0
13:30:00	78	0	0	0	0	78	303	0
13:45:00	70	0	0	0	0	70	307	0
14:00:00	67	1	0	0	1	69	298	0
14:15:00	73	0	0	0	2	75	292	0
14:30:00	54	0	0	0	1	55	269	0
14:45:00	67	0	0	0	4	71	270	0
15:00:00	65	2	0	0	0	67	268	0
15:15:00	72	0	0	0	0	72	265	0
15:30:00	77	2	0	0	1	80	290	0
15:45:00	60	0	0	0	0	60	279	0
16:00:00	70	0	0	0	0	70	282	0
16:15:00	59	0	0	0	0	59	269	0
16:30:00	68	0	0	0	0	68	257	0
16:45:00	53	0	0	0	0	53	250	0
17:00:00	56	0	0	0	0	56	236	0
17:15:00	46	0	0	0	0	46	223	0
17:30:00	44	0	0	0	0	44	199	0
17:45:00	41	0	0	0	0	41	187	0
18:00:00	48	0	0	0	0	48	179	0
18:15:00	44	0	0	0	0	44	177	0
18:30:00	43	0	0	0	0	43	176	0
18:45:00	27	0	0	0	0	27	162	0
19:00:00	36	0	0	0	0	36	150	0
19:15:00	34	0	0	0	0	34	140	0
19:30:00	28	0	0	0	0	28	125	0
19:45:00	30	0	0	0	1	31	129	0
20:00:00	32	0	0	0	0	32	125	0
20:15:00	32	0	0	0	0	32	123	0
20:30:00	22	0	0	0	0	22	117	0

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
0:00:00	11	0	0	0	0	11		0
0:15:00	9	0	0	0	0	9		0
0:30:00	5	0	0	0	0	5		0
0:45:00	5	0	0	0	0	5	30	0
1:00:00	2	0	0	0	0	2	21	0
1:15:00	3	0	0	0	1	4	16	0
1:30:00	5	0	0	0	0	5	16	0
1:45:00	2	0	0	0	0	2	13	0
2:00:00	2	0	0	0	0	2	13	0
2:15:00	0	0	0	0	0	0	9	0
2:30:00	0	0	0	0	0	0	4	0
2:45:00	2	0	0	0	0	2	4	0
3:00:00	0	0	0	0	0	0	2	0
3:15:00	2	0	0	0	0	2	4	0
3:30:00	0	0	0	0	0	0	4	0
3:45:00	2	0	0	0	0	2	4	0
4:00:00	1	0	0	0	0	1	5	0
4:15:00	1	0	0	0	0	1	4	0
4:30:00	0	0	0	0	0	0	4	0
4:45:00	0	0	0	0	0	0	2	0
5:00:00	3	0	0	0	0	3	4	0
5:15:00	1	0	0	0	0	1	4	0
5:30:00	7	0	0	0	0	7	11	0
5:45:00	2	0	0	0	0	2	13	0
6:00:00	3	0	0	0	0	3	13	0
6:15:00	7	0	0	0	0	7	19	0
6:30:00	8	0	0	0	0	8	20	0
6:45:00	9	0	0	0	0	9	27	0
7:00:00	10	0	0	0	0	10	34	0
7:15:00	8	0	0	0	0	8	35	0
7:30:00	14	0	0	0	0	14	41	0
7:45:00	11	0	1	0	1	13	45	0
8:00:00	15	0	0	0	0	15	50	0
8:15:00	18	0	0	0	0	18	60	0
8:30:00	17	0	0	1	3	21	67	0
8:45:00	27	0	0	0	1	28	82	0
9:00:00	14	0	0	0	1	15	82	2
9:15:00	21	0	0	0	2	23	87	0
9:30:00	30	0	2	0	0	32	98	1
9:45:00	38	0	0	0	0	38	108	0
10:00:00	41	0	1	0	0	42	135	0
10:15:00	33	0	0	0	0	33	145	0
10:30:00	32	0	0	0	0	32	145	2
10:45:00	60	0	1	0	0	61	168	0
11:00:00	51	0	0	0	0	51	177	0
11:15:00	49	0	1	0	1	51	195	0
11:30:00	48	0	0	0	0	48	211	0
11:45:00	57	0	0	0	1	58	208	0
12:00:00	52	0	0	0	5	57	214	1
12:15:00	69	0	0	0	0	69	232	0
12:30:00	64	0	0	0	0	64	248	0
12:45:00	61	0	0	0	0	61	251	0
13:00:00	65	0	0	0	1	66	260	0
13:15:00	71	0	0	0	1	72	263	0
13:30:00	64	0	0	0	3	67	266	0
13:45:00	88	1	0	0	0	89	294	0
14:00:00	78	0	0	0	0	78	306	0
14:15:00	81	0	0	0	0	81	315	0
14:30:00	73	1	1	0	0	75	323	0
14:45:00	62	0	1	0	0	63	297	2
15:00:00	73	0	0	0	0	73	292	0
15:15:00	79	5	0	0	6	90	301	0
15:30:00	90	0	0	0	0	90	316	0
15:45:00	82	0	0	0	0	82	335	0
16:00:00	84	0	0	0	0	84	346	0
16:15:00	58	1	1	0	0	60	316	0
16:30:00	75	1	0	0	0	76	302	0
16:45:00	76	0	0	0	1	77	297	0
17:00:00	83	0	0	0	0	83	296	0
17:15:00	76	1	0	0	2	79	315	0
17:30:00	77	1	0	0	3	81	320	0
17:45:00	69	1	0	0	0	70	313	0
18:00:00	60	0	0	0	1	61	291	0
18:15:00	55	0	0	0	0	55	267	0
18:30:00	62	1	0	0	2	65	251	0
18:45:00	55	0	0	0	0	55	236	0
19:00:00	60	0	0	0	0	60	235	0
19:15:00	62	0	0	0	0	62	242	0
19:30:00	61	0	0	0	1	62	239	0
19:45:00	64	1	0	0	0	65	249	0
20:00:00	67	0	0	0	4	71	260	0
20:15:00	56	0	0	0	0	56	254	0
20:30:00	60	0	0	0	0	60	252	0

NORTHBOUND & SOUTHBOUND

TIME	Total Vehicles	Hourly
0:00:00	19	
0:15:00	12	
0:30:00	8	
0:45:00	13	52
1:00:00	4	37
1:15:00	6	31
1:30:00	6	29
1:45:00	3	19
2:00:00	3	18
2:15:00	1	13
2:30:00	1	8
2:45:00	3	8
3:00:00	2	7
3:15:00	3	9
3:30:00	1	9
3:45:00	2	8
4:00:00	5	11
4:15:00	2	10
4:30:00	1	10
4:45:00	1	9
5:00:00	5	9
5:15:00	6	13
5:30:00	12	24
5:45:00	6	29
6:00:00	15	39
6:15:00	15	48
6:30:00	30	66
6:45:00	18	78
7:00:00	29	92
7:15:00	28	105
7:30:00	37	112
7:45:00	41	135
8:00:00	44	150
8:15:00	49	171
8:30:00	52	186
8:45:00	66	211
9:00:00	52	219
9:15:00	65	235
9:30:00	89	272
9:45:00	97	303
10:00:00	92	343
10:15:00	94	372
10:30:00	99	382
10:45:00	116	401
11:00:00	127	436
11:15:00	131	473
11:30:00	123	497
11:45:00	132	513
12:00:00	139	525
12:15:00	135	529
12:30:00	134	540
12:45:00	127	535
13:00:00	144	540
13:15:00	153	558
13:30:00	145	569
13:45:00	159	601
14:00:00	147	604
14:15:00	156	607
14:30:00	130	592
14:45:00	134	567
15:00:00	140	560
15:15:00	162	566
15:30:00	170	606
15:45:00	142	614
16:00:00	154	628
16:15:00	119	585
16:30:00	144	559
16:45:00	130	547
17:00:00	139	532
17:15:00	125	538
17:30:00	125	519
17:45:00	111	500
18:00:00	109	470
18:15:00	99	444
18:30:00	108	427
18:45:00	82	398
19:00:00	96	385
19:15:00	96	382
19:30:00	90	364
19:45:00	96	378
20:00:00	103	385
20:15:00	88	377
20:30:00	82	369

Sunday June 6th

File: **1**
Site: **2000100001**
Facing: **SOUTH**

DATE
6/6/2021

NORTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	18	0	0	0	0	18	104	0
21:00:00	23	0	0	0	0	23	95	0
21:15:00	24	0	0	0	0	24	87	0
21:30:00	19	0	0	0	0	19	84	0
21:45:00	18	0	1	1	0	20	86	0
22:00:00	11	1	0	0	0	12	75	0
22:15:00	16	1	0	0	0	17	68	0
22:30:00	11	0	0	0	0	11	60	0
22:45:00	9	0	0	0	0	9	49	0
23:00:00	4	0	0	0	0	4	41	0
23:15:00	1	0	0	0	0	1	25	0
23:30:00	5	0	0	0	0	5	19	0
23:45:00	3	0	0	0	0	3	13	0
TOTAL	3115	24	3	1	39	3182		4

SOUTHBOUND

TIME	CAR	TRUCK	HEAVY	horse and buggy	CYCLIST	Total Vehicles	Hourly	Pedestrians
20:45:00	50	1	0	0	0	51	238	0
21:00:00	63	0	0	0	0	63	230	0
21:15:00	40	0	0	0	0	40	214	0
21:30:00	39	0	0	0	0	39	193	0
21:45:00	31	0	0	0	0	31	173	0
22:00:00	17	0	0	0	0	17	127	0
22:15:00	20	0	0	0	0	20	107	0
22:30:00	15	0	0	0	0	15	83	0
22:45:00	12	0	0	0	0	12	64	0
23:00:00	11	0	0	0	0	11	58	0
23:15:00	7	0	0	0	0	7	45	0
23:30:00	10	0	0	0	0	10	40	0
23:45:00	4	0	0	0	0	4	32	0
TOTAL	3417	15	9	1	41	3483		8

NORTHBOUND & SOUTHBOUND

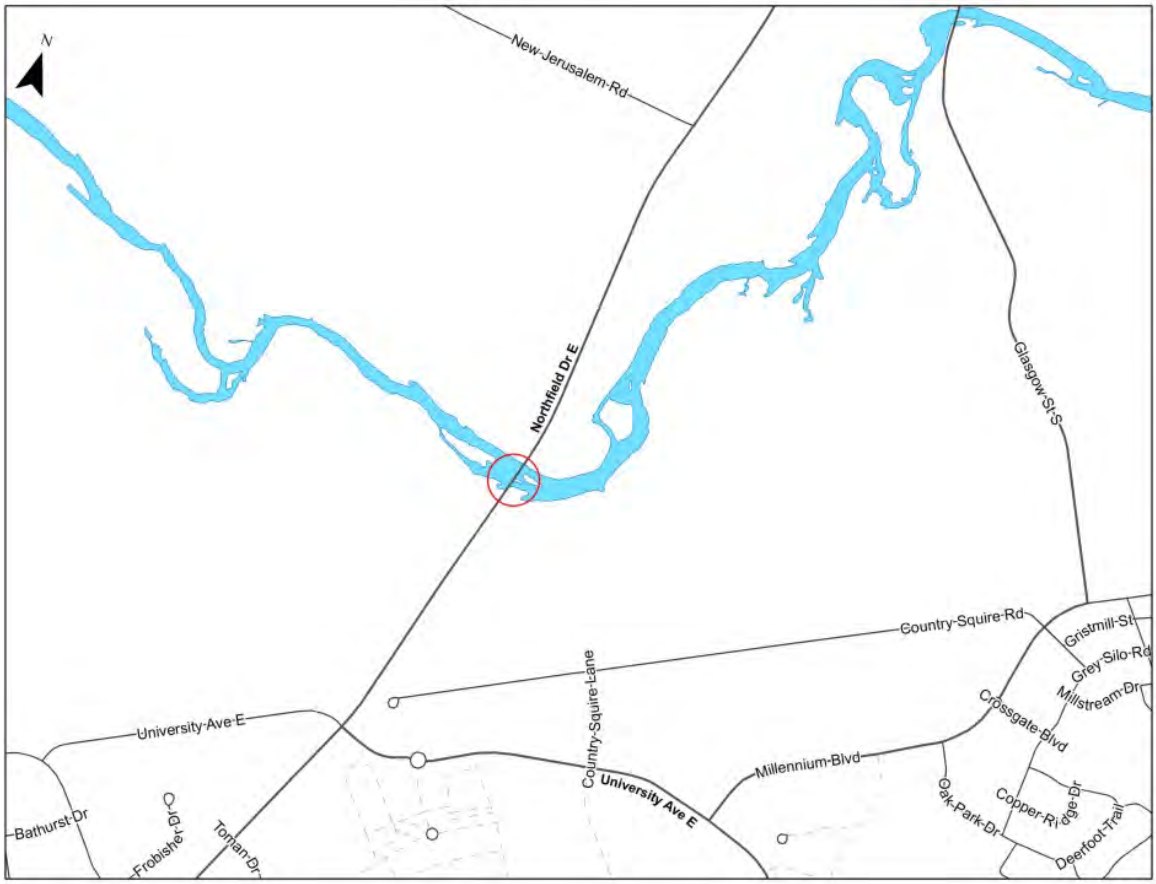
TIME	Total Vehicles	Hourly
20:45:00	69	342
21:00:00	86	325
21:15:00	64	301
21:30:00	58	277
21:45:00	51	259
22:00:00	29	202
22:15:00	37	175
22:30:00	26	143
22:45:00	21	113
23:00:00	15	99
23:15:00	8	70
23:30:00	15	59
23:45:00	7	45
TOTAL	6665	

REGIONAL MUNICIPALITY OF WATERLOO

PRELIMINARY INFORMATION REPORT

RR22 (Northfield Dr.), Scheifele Bridge at Conestogo River (#2201)
July 2019

PROJECT NUMBER:	5954
AREA MUNICIPALITY:	Township of Woolwich
LENGTH:	107 m
CONSTRUCTION YEAR:	2021
PROJECT TYPE:	Rehabilitation - Superstructure Replacement



Preliminary Information Report (PIR) Version Control and PIR Acceptance Sheet

Project Name	RR22 (Northfield Dr.), Scheifele Bridge at Conestogo River (#2201)
Community	
Area Municipality	Township of Woolwich
Project Number	5954
Length	107 m
Project Type	Rehabilitation – Superstructure Replacement
Construction Year (2019 TCP)	~~2022~~ 2021

Date	Version Control	Name	Title	Signature
May 29/2019	Draft Complete	Arnold Xaykongsa	Student - Preliminary Design Assistant	
May 29/2019	Draft Complete	Steve Yonemitsu	Project Manager	
June 4/2019	Draft Review	Ruba Al Assar	Supervisor - Transportation ~~Capital Program~~ Project Development	
June 20/2019	Edits	Steve Yonemitsu	Project Manager	
June 24/2019	Final Review	Ruba Al Assar	Supervisor - TPD	
July 10/2019	*see suggested revisions	Mike Henderson	Manager TPD	
July 11/2019	Revisions	STUDY	PM	
July 12, 2019		Ruba Al Assar	Supervisor TPD	
July 17, 2019	corrections made	Mike Henderson	Manager TPD	

Upon final acceptance of the PIR, this document will be scanned into DOCS.

PROJECT INFORMATION REPORT

Based on the 2019 TCP

July, 2019

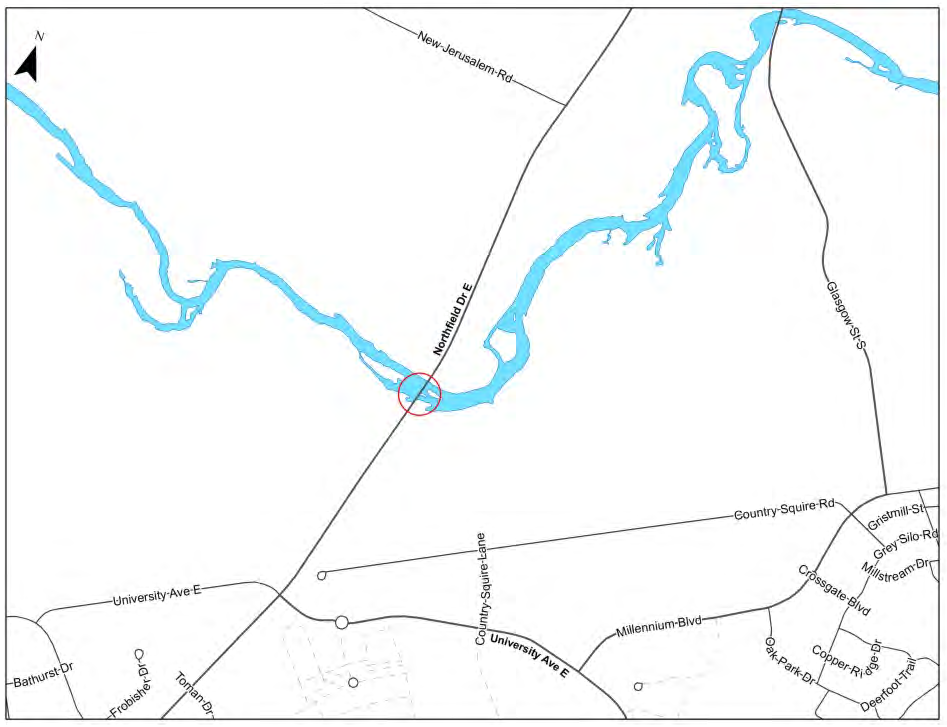
PROJECT INFORMATION

Reg. Rd. No.:	22	**Reg. Rd. Name:**	Northfield Dr.
Project Limits:	Scheifele Bridge (#2201) at Conestoga River		
Municipality:	Woolwich	**Length (m):**	107.2
Project Number:	5954	**Construction Year:**	2021
2019 TCP Program Section:	Rehabilitation – Superstructure Replacement		

2019 TCP Budget:

Year	2019	2020	2021	2022	Total
$ 000's	225	100	5135	1365	6825

Transportation Corridor Design Guidelines (CDG) Connector Type:	Rural Connector – "Rural Connectors focus on both vehicular movement and active transportation. Many of the Region's Rural Connectors provide important transportation connections to the townships and surrounding communities." Preferred Lane Width: 3.65 m Preferred Cycling Facility Width: 1.5 m Preferred Pedestrian Clearway: 2.1 m
Designated Road Allowance (Regional Official Plan):	30.48 m. Northfield Drive E (Waterloo/ Twp. of Woolwich) from King Street N (RR15) to Elgin Street W (Conestogo)
Nearby Projects – Linking Opportunities :	None
Notes and Observations :	None
Traffic Routing:	Large detour routes (greater than 5 km). Possible extended closure.



PRELIMINARY COST ESTIMATE (APPENDIX A)

Available Funding (2019 TCP):	$6,825,000 is allocated in the 2019 TCP.
Preliminary Cost Estimate:	No further cost estimates were made for this project.

INTIAL PROJECT DRIVER AND INFRASTRUCTURE NEEDS (APPENDIX B)

Project Driver (IMS)	Full replacement of superstructure is needed based on the following areas of concern: deterioration of the girders at South Span (and other locations) and abutment bearings, non-code Barriers and Handrails, and section loss at the Soffits Railing connection. A detailed delamination inspection completed by WSP in the spring of 2018 confirmed this need.
IMS Feedback Date	April, 2018 and updated April, 2019 (IMS)

Infrastructure	Date	Inventory	Needs	Costs ($)
Bridge/Culvert:	Apr., 2019 (IMS)	Scheifele Bridge (Structure #2201) is a 2-lane, four span continuous, haunched T-girder slab bridge on wall piers, built in 1960.	- Full replacement of superstructure is needed as per the 2010 Structure Investigation and Alternative Assessment Report. Interim repair works are also needed to address the structural integrity issue of the Abutment Bearing(s). - Potential works which could be included in the project scope include scour protection measures at Piers and raising of the structure height. - Pedestrian needs: pathways exist under and near structure at North and South that are actively used.	6,500,000 (estimated)
Retaining Walls/ Noise Walls/Fences:	N/A	N/A	N/A	N/A
Guide Rails:	N/A	N/A	N/A	N/A
Regional Storm Drainage and Sewer:	N/A	N/A	N/A	N/A
Region Watermain:	June, 2019 (Water)	There is a watermain. See feedback for details.	There are plans for watermain work along Northfield Drive which may impact the bridge. The consultant GM BluePlan is developing alternatives. There are no details to report at this time. The D&C Project Manager should follow up with Kevin Dolishny in Water Services for updates.	N/A
Local Sidewalk/Paved Shoulder :	Mar., 2019 (Woolwich)	There is an existing sidewalk on the west side of the bridge approximately 1.5 m wide. There is existing paved shoulder, approximately 1.0 m wide.	The Township of Woolwich requested the removal of the sidewalk to eliminate winter maintenance and that the paved shoulder be widened instead to facilitate cycling, horse & buggy and pedestrian traffic. For clarification on cycling/pedestrian needs, please refer to the Transportation Planning section below.	N/A

TRANSPORTATION ENGINEERING NEEDS (APPENDIX C)

Item	Date	Needs	Costs ($)
Collisions:	Pending	Feedback pending. Requested May 9, 2019.	N/A
Illumination:	Pending	See above.	N/A
Contamination Issues:	Pending	See above.	N/A
Utilities:	Pending	See above.	N/A
Signal Warrants:	Pending	See above.	N/A
Turn Lane Warrants:	Pending	See above.	N/A
Traffic Controls:	Pending	See above.	N/A
Traffic Systems:	Pending	See above.	N/A

TRANSPORTATION PLANNING NEEDS (APPENDIX D)

Item	Date	Needs	Costs ($)
AADT:	Apr., 2019	(Information) The predicted 2029 AADT is 13,500 vehicles.	N/A
ATMP Sidewalk/ Cycling:	June, 2019	Based on ATMP, a 1.5m wide cycling facility is required in the form of a paved shoulder. In addition, Transportation Planning recommended maintaining the existing sidewalk or protecting for 1.5m wide sidewalk. However, rather than providing a 3.0m wide paved shoulder, Transportation Planning recommended constructing a 3.0m wide multi-use trail as facility for pedestrians and cyclists.	N/A

Transit Needs:	Oct., 2008	There is no current transit service within the project limits.	N/A
Corridor Planning:	Oct., 2008	Corridor Planning has no concerns.	N/A
Known development applications:	Oct., 2008	No known development applications were mentioned in Transportation Planning comments.	N/A
Studies – ICS, TIS Etc.:	Oct., 2008	No studies were mentioned in Transportation Planning comments.	N/A

UTILITY NEEDS (APPENDIX E)

Region of Waterloo Comments:	N/A			
Utility	**Feedback Date**	**Inventory**	**Needs**	**Costs ($)**
Hydro (WNH):	N/A	None collected	Will be forwarded when received	N/A
Gas:	N/A	None collected	Will be forwarded when received	N/A
Bell:	June, 2019	Buried plant: 4 concrete encased ducts and 48 fibre cable (toll cable)	None noted.	N/A
Rogers:	June, 2019	No plant or property within or near project limits	No needs – no plant and no plans for future works.	N/A
Other:	N/A	None	Will be forwarded when received	N/A

ADDITIONAL STAKEHOLDER INFORMATION AND NEEDS (APPENDIX F)

Stakeholder	**Date**	**Information and Needs**	**Cost ($)**
Region Heritage Designations:	Aug., 2018	There are no designated properties, no municipally registered properties, 1 unofficially listed resource (the bridge) and no pre-1900 residential properties adjacent to the road corridor.	N/A
Region Archaeological:	Aug., 2018	An archaeological assessment may be required if construction/ grading is to be completed outside of the existing Regional Road allowance. If assessment is required, forward a copy to Cultural Heritage staff.	N/A
Region Scenic Road:	Aug., 2018	The section of road corridor is not considered scenic or of special character.	N/A
Region Eco Passage/ ESL:	Apr., 2018	There are no concerns for this project, provided that passage under the bridge for wildlife is maintained.	N/A
Region Contamination Agreements or Land Uses:	May, 2018	No issues.	N/A
Region Operations:	May, 2019	Issues have been encountered in the past with settlement of the approach slabs on both ends at the expansion joint; they have been topped up with asphalt in the past. This should be rectified during reconstruction.	N/A
Region - Well Head and Sensitivity Areas:	Mar., 2018	The project does not pass through any areas of Sensitivity. The project is not within 200 m of a wellhead.	N/A
Other MTO, GRCA, Rail :	N/A	N/A	N/A
Township of Woolwich:	Mar., 2019	The Township suggested that if the Region intends to close Northfield Drive for the construction, flagging at Glasgow St. bridge should be included to minimize complaints from the public. The Township inquired about a future 300mm watermain planned to provide looping for Conestogo. Please see Water Services feedback (Appendix B) for comments.	N/A

CONSTRUCTION HISTORY (APPENDIX G)

IMS Comments (Apr., 2018)	The structure was rehabilitated with major works in 1982. Of significance to this project was repair/replacement of the top of the abutment and ballast walls. Other works completed (e.g. deck joints replacement) are deemed to be irrelevant to mention since the structure is planned for a full super structure replacement.

Contract No.	**Date**	**Limits**	**Type of Work**
N/A	Feb., 1958	Scheifele Bridge over Conestogo River	Bridge Construction
82-16	May, 1982	Scheifele Bridge over Conestogo River	Bridge Rehabilitation (major)
2011-009	Apr., 2011	Scheifele Bridge over Conestogo River	Bridge Rehabilitation (minor)

PRIOR ENGINEERING INVESTIGATIONS AND INSPECTIONS (APPENDIX H)

Document Type	**Date**	**Document Name**	**Prepared By**	**Notes**
Detailed Condition Survey (DCS)	Jan., 2005	Final Report on Bridge Deck Condition Survey	AMEC Earth & Environmental	Not attached
Structural Evaluation (SEV)	Sep., 2005	Structural Evaluation Report	McCormick Rankin Corporation	Not attached
Rehabilitation Study	Apr., 2010	Structure Investigation and Alternative Assessment Report	McCormick Rankin Corporation	Attached (CD)
Scheduled, Detailed Delamination Study (DDS)	June, 2018	Inspection and Recommendations Report	WSP Global Inc.	Attached (CD)
OSIM (2018)	Nov., 2018	Bridge Inspection Form	Stantec Inc.	Attached (CD)

Appendix A

PRELIMINARY COST ESTIMATES AND CAPITAL FUNDING

Appendix B

REGION INFRASTRUCTURE

Bridges and Culverts
Retaining Walls/ Noise Walls/ Guiderail/ Fences
Regional Storm Drainage/ Sewer
Regional Storm Manholes/ Catch Basins

REGION WATERMAIN

Region Watermain

LOCAL INFRASTRUCTURE

Local Watermain
Local Flooding
Local Paved Shoulder

REGION INFRASTRUCTURE

Bridges and Culverts
Retaining Walls/ Noise Walls/ Guiderail/ Fences
Regional Storm Drainage/ Sewer
Regional Manholes/ Catch Basins

REGIONAL STRUCTURE
PRELIMINARY DESIGN SUMMARY REPORT

Project # 5954 - RR#22 Northfield Drive – Scheifele Bridge at Conestoga River (#2201)

Executive Summary

Current State: Condition of Structure

- Structure #2201 is located on Northfield Drive, 800 m North of University Ave.
- It is a 2-lane, four span continuous, haunched T-girder slab bridge on wall piers.
- The bridge was built in 1960 and had a major rehabilitation in 1982.
- Based on visual inspections, the overall condition is classified as Fair (BCI 57)
- The primary issues of concern are deterioration of the girders at South Span (and at other locations), abutment bearings, as well as concerns about the non-code Barriers and Handrails, and section loss at the Soffits Railing connection.
- The structure's assumed repair status is a full replacement of the superstructure
- In the spring of 2018, a detailed delamination inspection was completed to update condition, and determine the remaining service life of the structure.
- That report confirmed the need for super structure replacement in 2021.
- Interim repair works are also required to address the Abutment Bearing(s) structural integrity issue.
- The current Status is that WSP (consultant) are completing a drawing for the Hanger Bracket at one location as an interim repair.
- Potential works, outside superstructure replacement, that may influence the project scope include: scour protection measures at Piers, structure height raising, accommodation of Active Transportation needs, and significant traffic control costs.
- The (2019) TCP budget for this project is $6,825,000; and should be adjusted based on Detailed Design and construction methodology.

1.0 Structure Summary Data

The following summary table outlines key information about structure #2201.

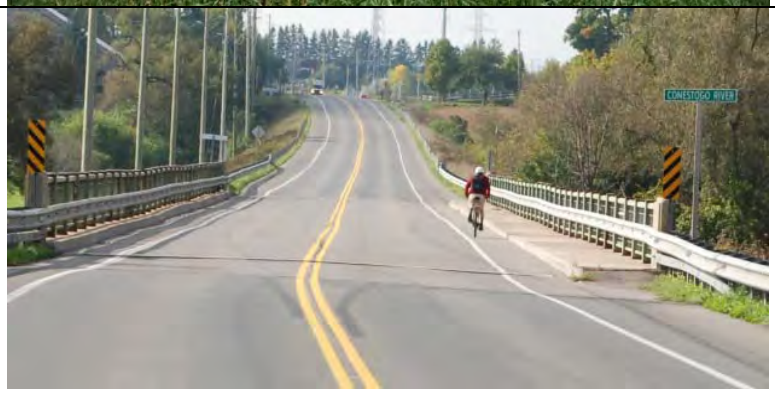
Table 1: Structure Summary Data

Item	Summary Information
Asset ID#	#2201
Regional Road	RR# (22) Northfield Drive
Location	800 meters (N) of University Avenue
Crossing	Conestoga River
Municipality	Woolwich
Owned By	Region of Waterloo
Maintained By	Region of Waterloo
Deck Area (m²)	1254.2
Structure Width (m)	11.7
Structure Length (m)	107.2
Number of Spans	4
Age	The structure is 59 years old
Last Rehab	The last major rehab works were in 1982
Last OSIM Inspection	2018
Current Condition	Generally Fair
Lanes on Structure	2
AADT	11,000 estimated only
Active Transportation Needs	Long Term On-Road Route
Utilities on Structure	Communications – 6 Bell ducts
Pedestrian Needs	Walking Trails exist under and near structure at North and South
Est. Replacement Value	$6,500,000.

2.0 Discussion of Structure Type and Size

The structure is a concrete beam/girder bridge situated in a north- south direction. Its structural configuration consists of continuous cast-in-place, reinforced T-beams. It has 4 spans. The deck surface has two lanes. The structure is 11.7 m wide by a length (total span) of 107.2 m - resulting in 1254.2 m² of total deck area. It crosses over the Conestogo River, and has pedestrian pathways underneath the structure that are actively used. Pictures in Table 3 below illustrate the basic configuration of the structure.

Table 2: Structure Pictures Circa

General Arrangement	
Road View	
Typical Girders	

3.0 History of Prior Rehabilitation Works

The structure was rehabilitated with major works in 1982. Of significance to the upcoming project was repair/replacement of the top of the abutment and ballast walls. Other works completed (e.g. deck joints replacement) are deemed to be irrelevant to mention since the structure is planned for a full super structure replacement.

4.0 Prior Engineering Investigations

The Scheifele Bridge has undergone several detailed investigations. These include:

- Detailed Condition Survey (DCS) 2004;
- Structural Evaluation (SEV) 2004;
- Rehabilitation Study 2010;
- Scheduled, Detailed Delamination Study (DDS) 2018.

These Reports and the latest OSIM, and any available drawings will be provided on a CD.

5.0 Current Condition Assessment

Based on visual inspections, the structure is generally rated as being in Fair condition. Looking forward towards the super structure replacement scheduled, the main issues of concern will likely relate to:

- The condition of the abutment walls and ballast walls;
- The condition of the piers and caps;
- The type of foundation present below the piers and abutments;
- The ability to convert to semi-integral configuration;
- Possible new structure height and width;
- Construction and demolition timing and durations;
- Public notice and traffic.

6.0 Specific Factors Potentially Affecting Project

The following summary chart is provided to outline information on factors that could impact construction costs and timelines.

Item	Comments
Aesthetic Considerations	Potential since high public visibility
Active Transportation Needs	On Long Term On-Road Route
Traffic Management	Detour Routes > 5 km ; possible extended closure, high AADT
Utilities Present on Structure	Bell Communications

REGION WATERMAIN

Region Watermain

From: Kevin Dolishny
Sent: June 17, 2019 3:39 PM
To: Steve Yonemitsu <SYonemitsu@regionofwaterloo.ca>; Erin Hobbs <EHobbs@regionofwaterloo.ca>
Cc: Ken Brisbois <KBrisbois@regionofwaterloo.ca>
Subject: RE: Northfield Drive at the Conestogo River (Scheifele Bridge). 300mm Diameter Watermain Looping Project #5954

Hi Steve,

I don't have any solid recommendations at this time regard what we will do with the watermain. I have a consultant GM BluePlan evaluating the options. In talking with Ken Brisbois, the plan for the bridge is also unclear. The work that needs to happen is a complete deck replacement. However, he has told me that the Township is adamant that the existing bridge cannot be taken out of service, as this is a crucial link from Waterloo to Conestogo and beyond. Ken mentioned that they may look at twinning the bridge so that the old one is in service until traffic can be switched over to a new one, complete with a new road alignment and approach on both sides, or a temporary bridge, or replacing one lane at a time. This obviously has an impact on what our watermain alignment would look like. If we drilled under the river, we would not want it to be in conflict with new abutments or related grading. Property is an issue too and the new alignment will have an impact on whether we need new property or not. Ken please correct me if I am wrong about any of this or if you have any more information/direction.

The next step in my consultant's assignment is drilling some boreholes in each quadrant around the bridge. From that we will have a better understanding of the feasibility of drilling underneath, if open cut across the river is an option (not likely) or putting on the downstream side of a new bridge. We will not be putting anything on the existing bridge.

Kevin Dolishny, P.Eng.
Senior Project Engineer – Servicing and Development Planning
Water Services
Region of Waterloo
t.519-575-4757 x 3862
f.519-575-4452
kdolishny@regionofwaterloo.ca

From: Steve Yonemitsu
Sent: June-17-19 3:07 PM
To: Erin Hobbs; Kevin Dolishny
Subject: FW: Northfield Drive at the Conestogo River (Scheifele Bridge). 300mm Diameter Watermain Looping Project #5954

Hi Kevin,

Can you please provide a bit more information on this project?

Thanks so much, Steve.

From: Steve Yonemitsu
Sent: June 4, 2019 3:26 PM
To: Kevin Dolishny <KDolishny@regionofwaterloo.ca>; Erin Hobbs <EHobbs@regionofwaterloo.ca>; Steve Sieunarine <SSieunarine@regionofwaterloo.ca>

Cc: Ruba Al Assar <RAlAssar@regionofwaterloo.ca>; Arnold Xaykongsa <AXaykongsa@regionofwaterloo.ca>; Josh Graham <JGraham@regionofwaterloo.ca>
Subject: Northfield Drive at the Conestogo River (Scheifele Bridge). 300mm Diameter Watermain Looping

Hi folks,

Just wondering if you can give us any more information on this project.

If there are any plans to go on the bridge at this location or under the river. Or will the watermain loop at the bridge back to Conestogo.

Steve S, can you please provide comment about utilities hanging on the bridge, "or not" and what is corridors preference.

Thanks so much and have a great day, Steve.

From: Erin Hobbs
Sent: Wednesday, March 21, 2018 2:55 PM
To: Steve Yonemitsu
Cc: Richard Pinder; Ruba Al Assar; Michelle Pinto; Kevin Dolishny
Subject: RE: PDR Feedback Request 2018

Steve:

Please find attached PDR responses for the following:

5795	REG. RD. 75 (SPRAGUES ROAD), WRIGLEY RD. (RR49) TO CAMBRIDGE/NORTH DUMFRIES BDRY.
5679	REG. RD. 97 (CEDAR CREEK ROAD), CAMBRIDGE/NORTH DUMFRIES BDRY. TO EDWORTHY SIDE ROAD (RR71)
5792	REG. RD. 42 (BLAIR ROAD), BLAIR SETTLEMENT LIMITS (`120M EAST OF LANGDON DR.) TO 125M SOUTHEAST OF FOUNTAIN ST. (RR28)
7405	REG. RD.21 (ARTHUR ST. N.), BRIDGE #2101 TO SANDY HILLS DR.
5760	REG. RD. 24 (HELSPELER ROAD), BROOKLYN RD./ NORFOLK AVE. TO MUNCH AVE.
5687	REG. RD. 9 (ERB STREET), MENNO ST. TO WESTMOUNT RD. (RR50)

I did not provide responses for the TCPs related to the Bridge/Drainage Work (TCP 5954, 5893, 5901). In addition, we previously provided responses for TCP 5750 and 6759 in June of 2017. Nothing has changed. Let me know if you would like copies of the responses previously provided.

Kind Regards,

Erin Hobbs
T 519 575 4757 ext 3416
M 519 505 6732
E ehobbs@regionofwaterloo.ca

LOCAL INFRASTRUCTURE

Local Watermain
Local Sidewalk
Local Paved Shoulder

TOWNSHIP OF WOOLWICH.

Steve Yonemitsu

From: Ryan Tucker <rtucker@woolwich.ca>
Sent: March 20, 2019 12:23 PM
To: Steve Yonemitsu
Cc: J Puppe; bbaldasaro
Subject: RE: PDR Information Request

Steve,

Please see below for comments from the Township in regards to the planned bridge works on Northfield Drive:

- Is the Region considering a full closure of the bridge, or maintaining a single lane of traffic? (The Township intends to close the Glasgow Street bridge during this work to stop overuse of the heritage structure). The last time Glasgow Street bridge was closed was due to road works on Sawmill Road in Conestogo. The Region made the decision to pay to reopen the bridge during construction due to complaints, which required extensive flagging. If the Region is planning on closing Northfield Drive then you may want to include flagging at the Glasgow Street bridge in your budget.
- Has the Region considered widening the "paved shoulders" across the bridge to facilitate biking and horse & buggy traffic across the structure? At the Glasgow Street EA PCC a lot of residents made comments about avoiding biking on Northfield due to the speed of traffic, a larger buffer would help to make cyclists and horse & buggy traffic feel safer.
- Is the existing sidewalk on the west side of the bridge going to remain? The Township requests that the sidewalk be removed, as there are no pedestrian facilities in the area, and the Township does not want to maintain the sidewalk during the winter. Having a nice wide paved shoulder would allow for pedestrian traffic to cross the bridge, without a sidewalk.
- Will this project include other planned future services? (300mm watermain was planned to provide looping for Conestogo).

Thank you,

WOOLWICH TOWNSHIP

Ryan Tucker, P.Eng.
Engineering Project Supervisor
Township of Woolwich
24 Church Street West, P.O. Box 158
Ph: (519) 669-1647 ext. 6048
Fx: (519) 669-4669
E-mail – rtucker@woolwich.ca
www.woolwich.ca

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From: Steve Yonemitsu <SYonemitsu@regionofwaterloo.ca>
Sent: March 19, 2019 11:45 AM
To: Ryan Tucker <rtucker@woolwich.ca>
Subject: RE: PDR Information Request

Hi Ryan,

Just confirming that the Township has no concerns with respect to the planned bridge work.

Thanks, Steve

From: Ryan Tucker [mailto:rtucker@woolwich.ca]
Sent: Wednesday, March 13, 2019 3:32 PM
To: Steve Yonemitsu
Subject: RE: PDR Information Request

Steve,

Thank you for the clarification. I am only looking after this project for Jared, so please continue to send Jared any PDR requests in the future. I don't think we need a site visit at this time, but if things change I will let you know.

Thank you,

Ryan Tucker, P.Eng.
Engineering Project Supervisor
Township of Woolwich
24 Church Street West, P.O. Box 158
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From: Steve Yonemitsu <SYonemitsu@regionofwaterloo.ca>
Sent: March 13, 2019 11:59 AM
To: Ryan Tucker <rtucker@woolwich.ca>
Subject: RE: PDR Information Request

Hi Ryan,

The work will be limited to the bridge itself and the approaches to the bridge which will be +/- say 30m on either side of the bridge. They will be replacing the whole upper portion of the deck and re-using the foundations and abutments. The remaining road section from say University Ave. to the limits of Conestogo is not planned for resurfacing.

We are in the process of creating requests for other projects in the Township of Woolwich. Should I contact you direct or still go through Jared.

If you wish to meet on site for anything in the future or Township offices, I'm more than happy to meet up.

Thanks so much and have a great day,

Steve

From: Ryan Tucker [mailto:rtucker@woolwich.ca]
Sent: Wednesday, March 13, 2019 11:55 AM
To: Steve Yonemitsu
Subject: RE: PDR Information Request

Steve,

Would you be able to clarify the project limits for the bridge work? The Township has some concerns in regards to Northfield Road, but they are most likely outside of your planned work area. Once you can confirm the work limits the Township can provide comments.

Thank you,

Ryan Tucker, P.Eng.
Engineering Project Supervisor
Township of Woolwich
24 Church Street West, P.O. Box 158
Ph: (519) 669-1647 ext. 6048
Fx: (519) 669-4669
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From: Steve Yonemitsu <SYonemitsu@regionofwaterloo.ca>
Sent: Tuesday, March 12, 2019 12:16 PM
To: Jared Puppe <JPuppe@woolwich.ca>
Subject: PDR Information Request

Hi Jared,

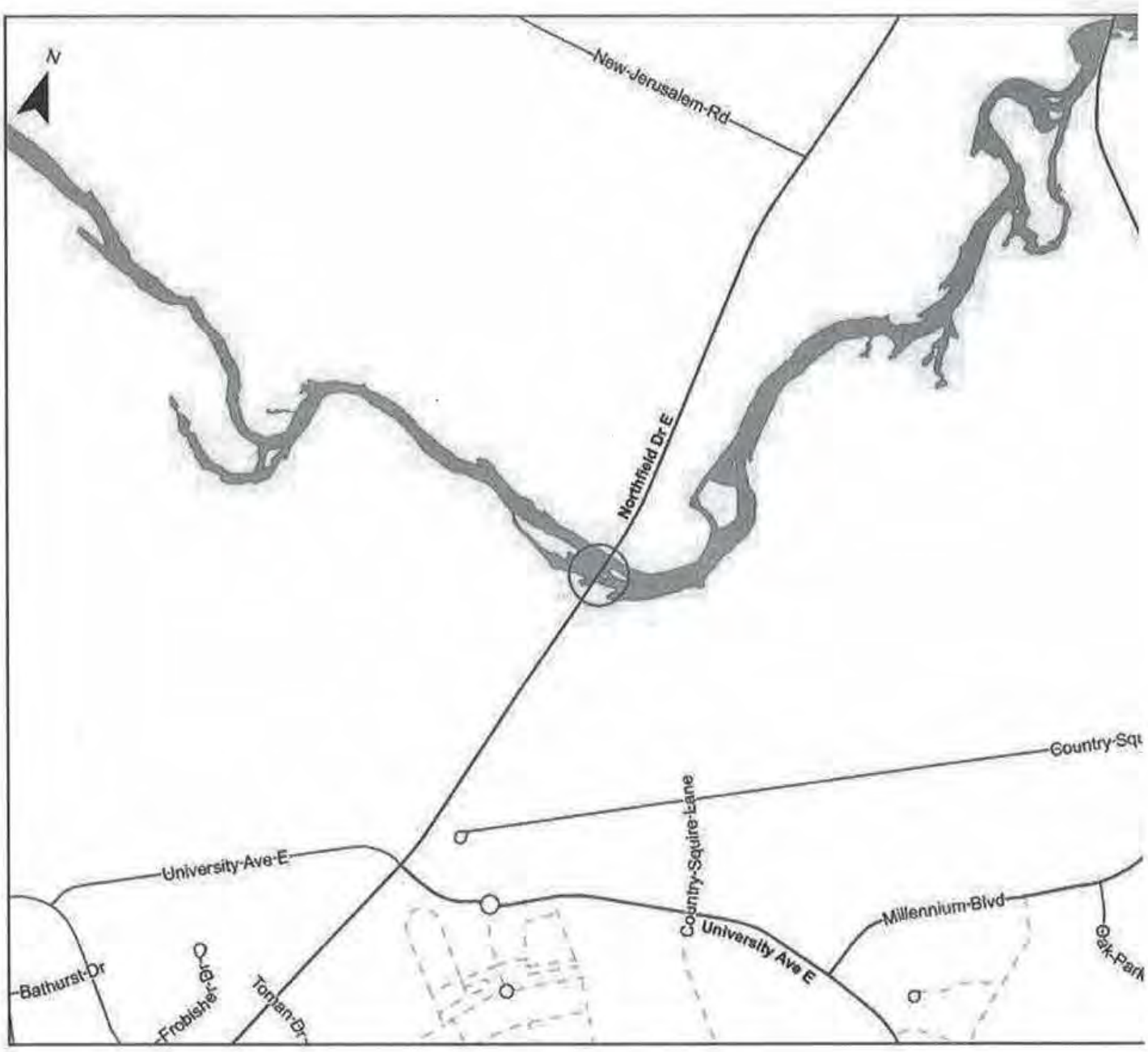
I hope you are well these days. I am not sure if you are doing the PDR requests anymore, if not, can you please forward to the appropriate person.

I am requesting and Township needs for this bridge structure.

It is currently planned for super structure replacement in 2021. The Design and Construction Project Manager is Ken Brisbois and he is looking for preliminary information late spring from me.

Thanks so much and have a great day!
Steve.

5954	REG. RD. 22 (NORTHFIELD DRIVE), SCHEIFELE BRIDGE AT CONESTOGA RIVER (#2201)	WOOL



Appendix C

TRANSPORTATION ENGINEERING

Traffic Engineering
Traffic Signals
Traffic Systems

Will be provided when available

Appendix D

TRANSPORTATION PLANNING

Corridor Planning
Transportation Growth Related Improvements
Transit
Cycling Facilities

From: Michelle Pinto
Sent: June 4, 2019 4:46 PM
To: Steve Yonemitsu <SYonemitsu@regionofwaterloo.ca>; Ruba Al Assar <RAlAssar@regionofwaterloo.ca>
Cc: Hanan Wahib <HWahib@regionofwaterloo.ca>
Subject: RE: PDR Update - 5954, 5893, 5901

Hi Steve,

Yes, a 3.0m MUT on both sides would be satisfactory. As long as there's a facility for peds and cyclists on both sides, we're good. In this case, the MUT should be constructed instead of just protected for, because if nothing were constructed, this would be too wide of a paved shoulder and may be confused as a driving lane.

Let me know if you have any further questions or would like to discuss further.

Michelle

From: Steve Yonemitsu
Sent: Tuesday, June 04, 2019 3:21 PM
To: Michelle Pinto; Ruba Al Assar
Cc: Hanan Wahib
Subject: RE: PDR Update - 5954, 5893, 5901

Hi Michelle,

We are trying to finalise the report for Project #5954. We were wondering since you want 1.5m paved shoulder and protection of 1.5m, would a MUT be satisfactory for you.

Thanks very much, Steve.

From: Michelle Pinto
Sent: April 26, 2019 4:14 PM
To: Steve Yonemitsu <SYonemitsu@regionofwaterloo.ca>; Ruba Al Assar <RAlAssar@regionofwaterloo.ca>
Cc: Hanan Wahib <HWahib@regionofwaterloo.ca>
Subject: RE: PDR Update - 5954, 5893, 5901

Hi Steve and Ruba,

Please see the comments below for the following PDRs:

Northfield Dr, Scheifele Bridge at Conestogo River (5954):
The predicted 2029 AADT is 13,500 vehicles. Since this project is a replacement of the superstructure, we recommend widening the existing paved shoulders on the bridge to 1.5m wide on each side, and protecting for 1.5m sidewalks on both sides of the bridge. Steve, you mentioned the Township wants to remove the existing sidewalk on the bridge because of maintenance. If the Township does not want to maintain a new sidewalk on both sides of the bridge, we recommend at least protecting for the space (1.5m on each side, in addition to the 1.5m paved shoulders), if we are not building a new sidewalk.

Manser Rd @ Boomer Creek S and Manser Rd @ Boomer Creek N. (5893 and 5901):
The predicted 2029 AADT is 3,400 vehicles. Sorry I did not include this in my previous response attached.

Let me know if you have any questions or want to discuss further.

Michelle

From: Hanan Wahib
Sent: Monday, April 15, 2019 9:15 AM
To: Michelle Pinto
Cc: Steve Yonemitsu
Subject: FW: PDR Update

Hi Michele,

Please update the comments of the attached PDR . Most likely the update is just for the AADT.

If you have any question, please let us discuss.

Regards,

h

From: Steve Yonemitsu
Sent: Thursday, April 11, 2019 2:29 PM
To: Hanan Wahib
Cc: Ruba Al Assar
Subject: PDR Update

Hi Hanan,

I was wondering if I can get an update to this project.

It is 10yrs old and the project number has been changed to #5954.

Ken Brisbois is getting the package together to create a terms of reference for a consultant.

I was hoping to collect your feedback as soon as possible on this one.

Thanks very much, Steve.

interoffice
MEMORANDUM REGIONAL MUNICIPALITY OF WATERLOO

To: Ruba Al Assar Steve Yonemitsu	File No:
	Date: October 26, 2008
From: Hanan Wahib	Signature: _____

Subject: **Transportation Planning Division Comments for the Preliminary Design of Scheiflie Bridge, RR# 22 (Rehabilitation/ and Drainage Work), Project # 5511**

Transportation Planning have reviewed the aforementioned project and provide the following comments:

4.2.1 Transportation Growth related improvements:

Transportation Planning have reviewed the historical traffic data and the Regional Transportation Model and suggest the following:

- The AADT volume along Scheiflie Bridge (Northfield Rd -RR#28) at the Grand River (P# 5511) is predicted to be 11000 vehicles in 2018.

4.2.2 Corridor Planning

Corridor planning have no concerns.

4.2.3 Transit:

The is no current transit service at this stretch of Northfield Rd

4.2.4 Cycling Facilities:

- This section of Northfield Rd is identified in the Cycling Master Plan as a Long Term On-Road Route. The identified facility is a 1.5 meters paved shoulder.

Appendix E

UTILITIES

Rogers
Bell

From: Michael OToole [mailto:Michael.OToole@rci.rogers.com]
Sent: June 13, 2019 7:45 PM
To: Saman Ajamzadeh <SAjamzadeh@regionofwaterloo.ca>
Subject: RE: PDR Feedback from Utilities. Bridge projects in Woolwich, Wellesley and Wilmot Twp.

Hi Saman,

The only bridge that we are in proximity to is the one on Erb's Road, Phillipsburg.
We have aerial plant attached to Waterloo North Hydro poles that are not attached to the bridge itself but are on the North side of the bridge.
I have attached the checklist as requested. We are not scheduled for any future works on this bridge.
The 3 other locations we have no plant or property anywhere close and have no plans for future works.
If you need anything else, let me know.

Thanks,
Mike O'Toole
System Planner – SWO Outside Plant Engineering
Wireline Access Networks
Rogers Communications Canada Inc.
85 Grand Crest Pl.
Kitchener, ON N2C 2E6

michael.otoole@rci.rogers.com
m 519-498-3642

ROGERS

From: Saman Ajamzadeh [mailto:SAjamzadeh@regionofwaterloo.ca]
Sent: Wednesday, May 29, 2019 2:09 PM
To: 'Norris, Richard A' <richard.a.norris@bell.ca>; daniel.steffler@bell.ca; janet.cleghorn@bell.ca; SWOGR-PERMITS <SWOGR.PERMITS@rci.rogers.com>; Richard Bolliger <Richard.Bolliger@rci.rogers.com>; Michael OToole <Michael.OToole@rci.rogers.com>; Kevin Schimus (kschimus@uniongas.com) <kschimus@uniongas.com>; Chapman, Aaron <AChapman@uniongas.com>; 'John Stauffer' <JStauffer@uniongas.com>; 'BHartung@wnhydro.com' <BHartung@wnhydro.com>; RWei@wnhydro.com; Adrien Alexson <adrien.alexson@netflash.ca>; Mustafa, Shevan <SMustafa@kwhydro.ca>; Briand, Israel <IBriand@KWHydro.ca>
Cc: Ruba Al Assar <RAlAssar@regionofwaterloo.ca>
Subject: PDR Feedback from Utilities. Bridge projects in Woolwich, Wellesley and Wilmot Twp.

Good afternoon all,

I would like to introduce myself as the new Project Manager with the Program Development Group. I will be developing Project Design Reports for the Regional Capital Roads Program. I have worked with some of you in the past both at the Region of Waterloo and City of Kitchener and look forward to working with you in this new capacity.

Please fill out the attached Utility Agency PDR Review Checklist, for the four (4) bridge projects on the list in the attached file (2 in Wellesley Township, 1 in the Woolwich Township and 1 in Wilmot Township).

1. 5901 Manser Rd. – At Boomer Creek #0506 **(Bridge Rehab)**
2. 5893 Manser Rd. – At Boomer Creek #0505 **(Bridge Rehab)**
3. 5508 Erb St. – Phillipsburg Bridge at Nith River **(Bridge Rehab)**
4. 5511 Northfield Dr. – Schiefele Bridge at Conestogo River **(Bridge Replacement)**

Feedback is needed on:

1. Identification of existing infrastructure
2. Structural condition of your existing infrastructure
3. Identification of future plant expansion

I understand that this is preliminary and subject to available information. We are however trying to identify and allocate funds for utility re-locations that may occur as part of a particular project. **Please respond by June 28th, 2019.** Feedback can be emailed back to me by completing the attached checklist (one per project). Hard copies can also be mailed to the below address, or provided back to myself at the Kitchener and Waterloo UCC meetings.

Please don't hesitate to contact me if you have any questions.

Best regards,
Saman

Region of Waterloo

TRANSPORTATION AND ENVIRONMENTAL SERVICES

Saman Ajamzadeh, C.E.T., rcji
Project Manager, Transportation Infrastructure
150 Fredrick Street, 7th Floor
Kitchener ON Canada N2G 4J3
Telephone: 519-575-4557
Mobile: 226-750-7503
Fax: 519-575-4453
Email:Sajamzadeh@regionofwaterloo.ca

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From: Cleghorn, Janet [mailto:janet.cleghorn@bell.ca]
Sent: June 12, 2019 5:38 PM
To: Saman Ajamzadeh <SAjamzadeh@regionofwaterloo.ca>
Subject: PDR 5511 Northfield Dr_Bell

Hi Saman,

Please see attached.

The diagram here is even worse than normal as this is a Bell Boundary between Waterloo and St Jacobs, so the cables and conduits do not look like they met, but they do. Any questions let me know
Green is structure 4 ducts
Purple is our toll cable

Janet

Bell
Janet Cleghorn
Implementation Manager
575 Riverbend Dr, Floor 1, Kitchener, ON, N2K 3S3
T: 519-568-5767 M: 519-580-4248

Regional Municipality of Waterloo
Utility Agency Preliminary Design Report Review Checklist

Project #, Name and Limits: 5511 Northfield Dr _Schiefele Bridge at Conestogo river

Utility Agency/Company Name: Bell

Existing Infrastructure?: Yes ☒ No ☐

If "Yes," provide:

Type of Infrastructure:
Aerial Plant ☐ Buried Plant ☒ Surface ☐

Details (e.g. size, length, type, location and limits within project right-of-way):
4 concrete encases ducts
48 Fibre cable (toll cable)

Attachments:
- Detailed Drawings ☐
- Site Plans Indicating Existing Infrastructure ☐
- GIS Layers ☐

Note: GIS information is considered to be notification that plant exists or does not exist within the project limits. It is not a replacement for detailed drawings and will not be used for the design of the Regional Capital project

Specific Comments or Concerns on the Drawings or Site Plans:

This location is at a Bell boundary between Waterloo and St Jacobs so the Bell plans Are disconnected _ Please call with questions

Age of plant _ placed in 1990, OR Date of Municipal Consent Approval __Not available

Condition: Poor ☐ Fair ☐ Good ☒

If relocation is required, how much would it cost? This job would be tendered as it is concrete encased structure, my pricing tool does not really allow me to price replacing a 4 duct structure. Call me to discuss if you like

Repair/Replacement Requirements: Yes☐ No ☒
If "Yes," provide:

In Capital Program ☐ Maintenance Program ☐

Year Budgeted: _____

Repair/Replacement Location/Limits/Details/Recommendations:_____

_____

_____

_____

Impacts on Other Utilities or Infrastructures: Yes ☐ No ☐

Impact Details (e.g.: joint use trench, tenants on poles, tenants in structure):

_____

_____

New Infrastructure Installation Required?: Yes ☐ No ☒
If "Yes," provide:

In Capital Program ☐ Maintenance Program ☐

Year Budgeted _____

New Installation Location/Limits/Details/Recommendations:_____

_____

_____

Additional Comments on the Above Information: _____

_____

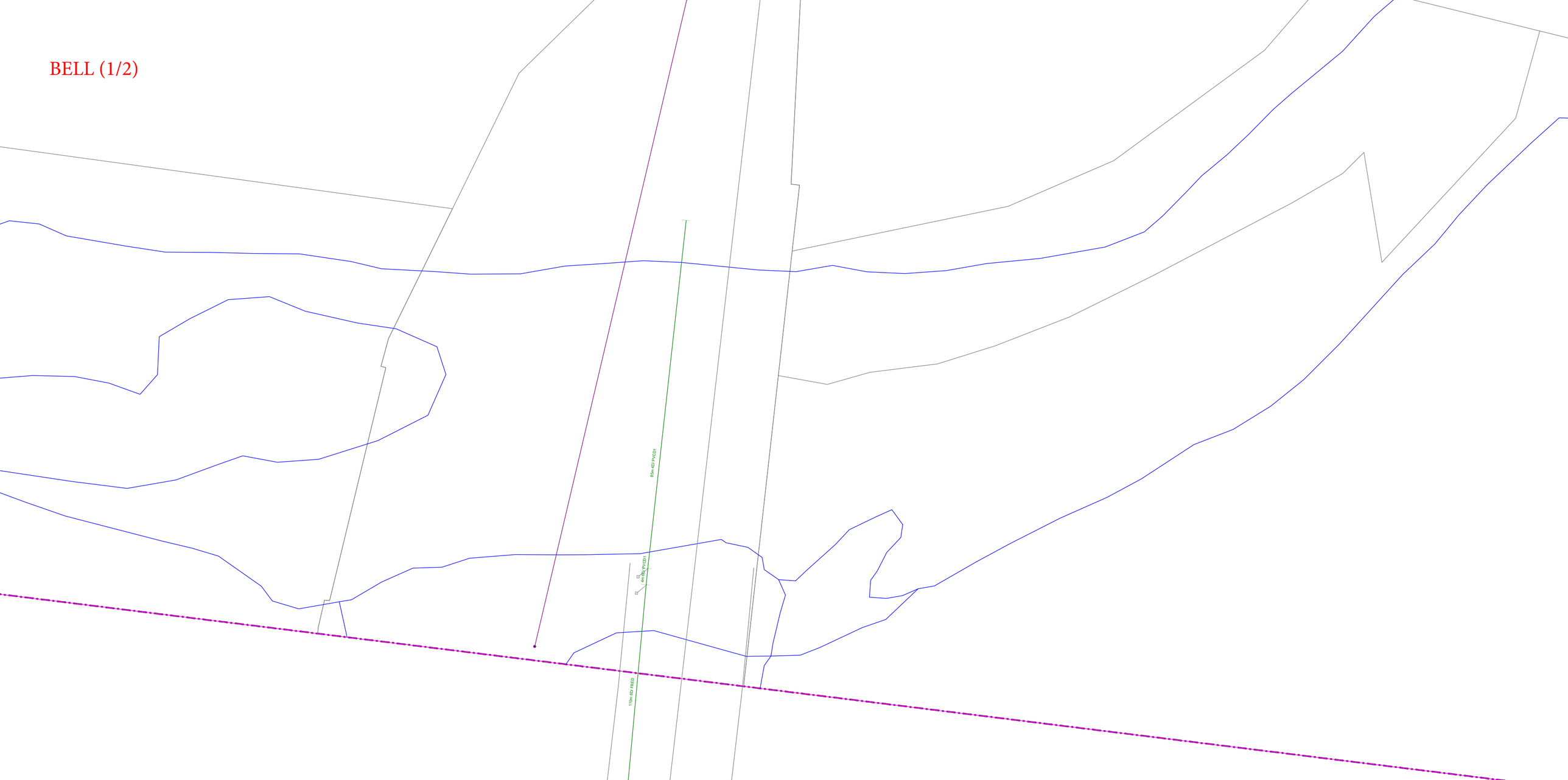
_____

Name: Janet Cleghorn

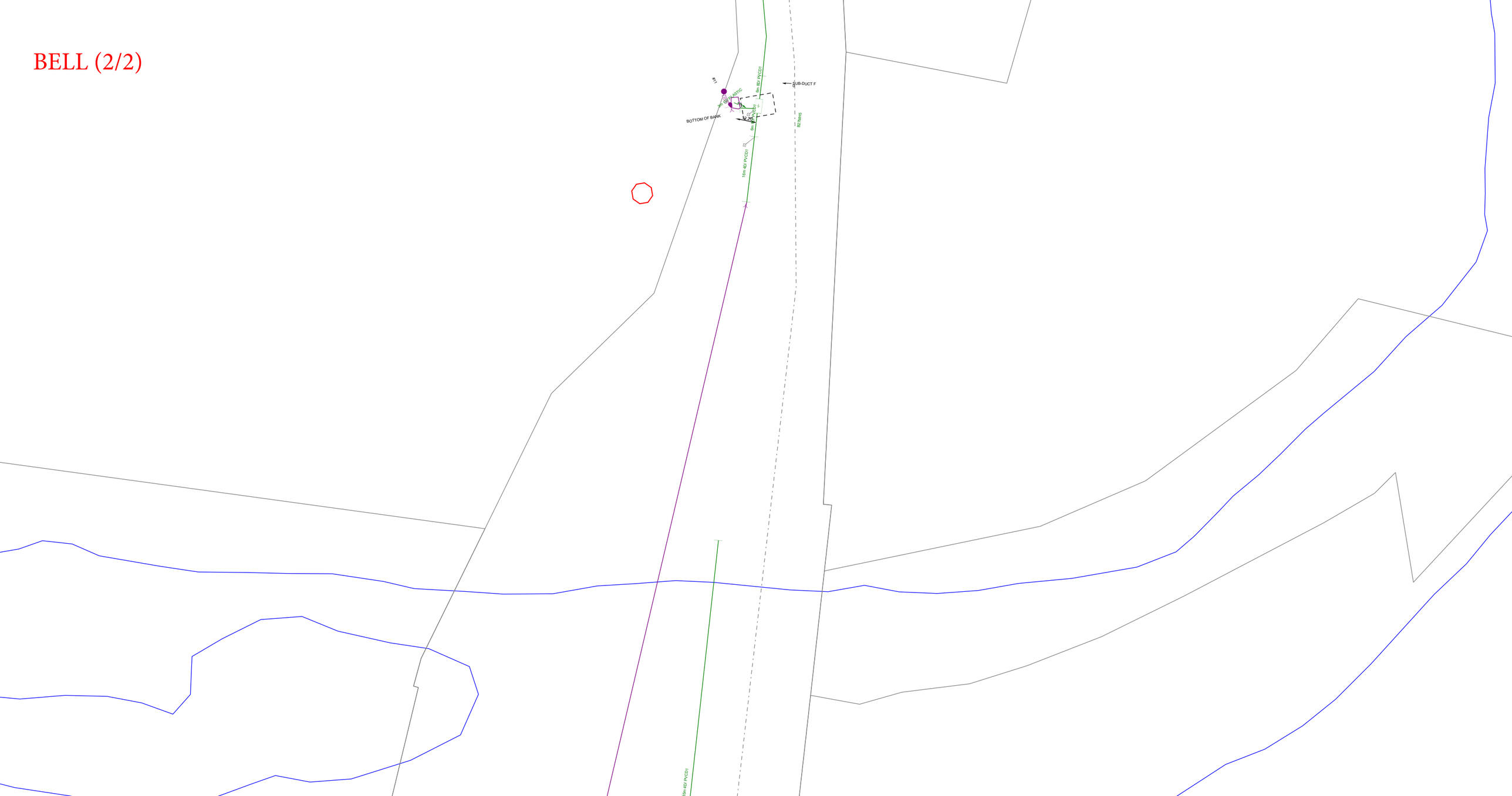
Date: June 3 2019

E-mail or Phone #: janet.cleghorn@bell .ca 519-568-5767

BELL (1/2)



BELL (2/2)


SUB-DUCT F
BOTTOM OF BANK
16m 4D PVCO1
8m 4D PVCO1
8m 4D PVCO1
15m 4D PVCO1

Appendix F

ADDITIONAL STAKEHOLDER INFORMATION

Cultural Heritage
Environmentally Sensitive Landscapes
Contaminated Sites
Wellhead Protection
Region Operations

HERITAGE

Cultural Heritage Comments - Current as August 2018

Project #: 5954 Regional Road 22 (Northfield Drive), Scheifele Bridge (No. 2201) at Conestoga River – Bridge and Drainage
Woolwich

Summary

There are no designated properties, no municipally registered properties, 1 unofficially listed resource (the bridge) and no pre-1900 residential properties adjacent to the road corridor. The section of road corridor not considered scenic or of special character. An archaeological assessment may be required if construction/grading is to be completed outside of the existing Regional Road allowance.

The area municipal heritage contact for this project is Jeremy Vink, Senior Planner, Township of Woolwich, jvink@woolwich.ca, 519-669-6038

Beyond providing these comments, unless an Archaeological Assessment is required, Cultural Heritage staff at the Region does not have further concerns that would require continued involvement in this project. If an Archaeological Assessment is required, please forward a copy to Cultural Heritage Staff for our records.

The following information is compiled from an inventory of cultural heritage resources that is maintained by the Region. The inventory is updated regularly with data that is provided by the area

Document Number: 2797434

municipalities. To ensure the accuracy of the information it should be verified with the area municipality. For more information please contact the Cultural Heritage Principal Planner at 519-575-4500 x. 3112.

This information is intended to provide a general overview of the cultural heritage resources in the project area. A Heritage Impact Assessment and/or Archaeological Assessment must be completed if identified as a requirement in the Class Environmental Assessment.

Inventory of Heritage Features

	Pre-1900 Date Built	Designated Properties	Municipally Registered	Unofficially Listed
Scheifele Bridge (#2201) A four span Continuous Haunched T-Girder Slab Bridge on Wall Piers	1960			
Grand Valley North Cultural Heritage Landscape (identified only)				X

Cultural Heritage Definitions

Designated Properties – Protected from demolition and other adverse impacts
A designation confers a legal status on a property by a specific municipal by-law under the Ontario Heritage Act. Designation may fall under one of two categories under the Ontario Heritage Act: Part IV (individual designation) or Part V (district designation). Designation is an Area Municipal responsibility. The Area Municipal Council has the legal authority to refuse an application that will adversely affect the property's heritage attributes.

Municipally Registered/Listed Properties – Interim protection from demolition
The municipal register is the official list or record of cultural heritage properties that have been identified as being important to the community. The register includes all properties in the municipality that are designated under Part IV (individual designation) and Part V (district designation) of the Ontario Heritage Act. In addition, the municipal register may include properties of cultural heritage value or interest that have not been designated under the Ontario Heritage Act. This is commonly known as "listing." The Area Municipal Council must be given at least 60 days notice of intention to demolish or remove a building or structure on the property. This allows time for the municipality to decide whether to begin the designation process to give long term protection to the property.

The Process for Protected (Listed or Designated) Heritage Properties
If there are protected heritage properties located within the project boundaries of a Schedule B or C project a Heritage Impact Assessment (HIA) must be completed and Heritage Planning Staff at the Region and Area Municipality should be notified. The first phase of the HIA will provide an inventory of the heritage resources that are located within the project area. This inventory will provide more detail

about the resources that have been identified in the PDR and may identify additional resources. The inventory should be used to identify and evaluate the impacts that the alternative solutions and design concepts will have on the heritage properties. Impacts to protected (listed/designated) heritage properties within the project boundaries should be avoided whenever possible.

Unofficially Identified Cultural Heritage Resources – No legal protection
Cultural Heritage Staff maintain a broad inventory of cultural heritage resources in the Region. These resources have been identified using a variety of sources including walking tours, local inventories, local histories, planning documents, heritage research projects, etc. Although these properties do not have any official heritage status or protection they may be potential candidates for designation or listing on a municipal register. If a historically significant property is threatened, a community may recognize its value and attempt to acquire some sort of heritage protection for the resource.

Regionally Significant Heritage Resources
Cultural Heritage staff have established Council approved criteria to evaluate and subsequently inventory Regionally Significant Heritage Resources (RSHR). RSHRs are defined as buildings, structures, monuments, bridges, railway stations, rivers, waterways, streets, parks, gardens, open spaces, districts, cemeteries, cultural landscapes, or archaeological sites of heritage importance that are significant regionally, provincially, nationally or internationally.

Cultural Heritage Landscapes
Cultural Heritage Landscapes are a defined geographical area that may have been modified by human activity and are identified as having cultural heritage value or interest by a community, including an Aboriginal community. The area may involve features such as structures, spaces, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association. Examples may include, but are not limited to, heritage conservation districts designated under the Ontario Heritage Act; villages, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trailways, viewsheds, natural areas and industrial complexes of heritage significance; and areas recognized by federal or international designation authorities (e.g. a National Historic Site or District designation, or a UNESCO World Heritage Site).

Pre -1900 Residential Properties – For information
Residential structures in the project area that were built prior to 1900 have been identified. These identified historic structures have no formal heritage protection. However, historic buildings that have maintained their heritage value could be candidates for further heritage protection. Property data is taken from the Municipal Property Assessment Corporation (MPAC). The date that is assigned to a property represents the oldest structure on the lot.

Scenic Roads – Identified as possessing cultural value and require additional design consideration
Certain transportation corridors are characterized by natural, cultural heritage and recreational features that contribute to their scenic value or special character. Area municipalities are responsible for the designation of those municipal roads that possess scenic or cultural value. Likewise, the Region has identified sections of Regional road corridors that are considered scenic. The Special Character Streets

and Scenic Roads Resource Document is a supplement to the Implementation Guidelines for Regional Transportation Corridor Design. It identifies and provides recommendations for the treatment of Scenic Roads and Special Character Streets that are part of the Regional road system within the Region of Waterloo. These recommendations should be considered before undertaking any work on a road that has been identified as possessing scenic value.

For conservation recommendations please consult the Scenic Road Resource Document (DOCs # 675554).

Additional Definitions

Heritage Easements – Property specific protection that is registered on title
A Heritage Easement Agreement is a tool used to ensure a building's preservation. It is an agreement that is entered into between the property owner and the Area Municipality and registered on title. A Heritage Easement Agreement identifies elements of a building which are to be retained in perpetuity and may also set out permitted alterations and development.

Heritage Bridges
The Region's Heritage Planning Advisory Committee has produced *Spanning the Generations: a Study of Old Bridges in Waterloo Region*. Phase I is an inventory and ranking of more than 100 bridges based on their heritage attributes. Phase 2 documents the 10 most historically significant bridges. Phase 3 focuses on steel truss bridges. The document also contains protection and maintenance strategies for historic bridges in the Region. Any road work on an identified historic bridge should be done in conjunction with this document. For a hard copy of this document please contact the Cultural Heritage Planner at 519-575-4094.

A supplemental Regional Bridge Inventory was compiled in July 2012 by Cultural Heritage Planning Staff. The inventory provides a general overview of Regionally owned bridges built post-1930 and contains information and photos on each structure. The inventory was compiled as a resource to help assess the heritage value of the bridge structures. The study does not include Regionally owned culverts. Because the data contained in this report is reviewed and evaluated on a continual basis, it is only accurate as of July 2012. For the most accurate and up-to-date data on Regional bridges please contact Shawn Buckley sbuckley@regionofwaterloo.ca.

For ease, the Regional Bridge Inventory is sorted both by date of construction (DOCs # 1329552) and by Structure ID No. (DOCs # 1329856).

Inventory of Modern Architecture
In 1996, the Kitchener Waterloo Art Gallery published, *Images of Progress: 1946-1996 Modern Architecture in Waterloo Region*. The book inventoried good examples of modern architecture throughout the Region of Waterloo. The identified resources should be noted when any road work is done in their vicinity.

Archaeological Potential – Areas with a high potential for discovering artefacts
If the project area is **wholly or partially** located within an area that has been identified as having archaeological potential then an archaeological assessment is required to be undertaken by a licensed archaeologist in accordance with the Ontario Heritage Act. Alternatively, if the project area is located in an area that does not have archaeological potential or that has been previously assessed and cleared, then no archaeological assessment is required.

When an assessment is required:
Archaeological Assessment
That prior to any grading, construction or other site disturbance, a licensed Archaeologist shall carry out an Archaeological Resource Assessment of the project area to be acknowledged by the Ministry of Tourism, Culture and Sport, and any adverse impacts to significant archaeological resources found shall be mitigated, through preservation or resource removal and documentation.

When an assessment is not required:
Archaeological Resources Found during Construction
Although the project area appears to be disturbed through past development, the Region should be aware of the possibility of unearthing archaeological remains during construction, and be prepared to follow proper procedure should any cultural or human remains be encountered.

If any other archaeological resources are encountered during construction all activity must cease and the Ministry of Culture (519-675-6898 or 416-212-8002) should be contacted immediately. In most cases, additional investigation and reporting of the cultural deposits will be required to be undertaken by a provincially licensed archaeologist at the expense of the proponent.

If human remains or artifacts associated with human remains are encountered during construction, all activity at the discovery site and in the immediate area of the discovery must cease immediately. The Region is required to contact the local police and coroner. In addition, the Ministry of Culture (519-675-6898 or 416-212-8002), and the Registrar of the Cemeteries Regulation Unit of the Ministry of Consumer and Business Services (416-326-8404) should be notified. Appropriate procedures for dealing with the human remains will be determined by these organizations.

Cemeteries
If a cemetery is located adjacent to the road corridor the area municipality should be informed of any potential impacts to the cemetery. If land acquisition is required then the Cemeteries Regulation Unit at the Ministry of Consumer Services should be contacted.

ESL / ECOPASSAGES

Steve Yonemitsu

From: Jane Gurney
Sent: Monday, April 08, 2019 12:46 PM
To: Steve Yonemitsu
Subject: RE: PDR Request Bridge over the Conestoga River - Scheifele Bridge #2201

Thanks a lot for your help Steve - I am floundering around trying to figure out what is 'in scope' and 'out of scope' for environmental planning comments, and the information you were able to provide that Chris submitted previously was really helpful. I also appreciate you starting me off with some relatively easy ones!
Thanks,
Jane

From: Steve Yonemitsu
Sent: Monday, April 08, 2019 12:33 PM
To: Jane Gurney
Subject: RE: PDR Request Bridge over the Conestoga River - Scheifele Bridge #2201

Hi Jane,

I got your phone message. Thanks very much and not worries.

I will typically contact people when I start to finalize things and their information is still outstanding.

This email is perfect.

Thanks again, Steve.

From: Jane Gurney
Sent: Monday, April 08, 2019 11:27 AM
To: Steve Yonemitsu
Subject: RE: PDR Request Bridge over the Conestoga River - Scheifele Bridge #2201

Hi Steve,
Sorry for the delay in getting a response to you on the PDR for the Northfield Bridge over the Conestoga River (Scheifele Bridge #2201), and I hope that these are not too late.

There are no designated Environmental Features in this area other than "Significant Valley" which does not have any associated protections in the Regional Official Plan (ROP). Notwithstanding this, it is clear that the current bridge affords enough space under it for wildlife to move through the surrounding hedgerows and fields and move under Northfield rather than crossing it. I assume that this will be maintained based on the grades in this area, and would support maintaining passage under the bridge to avoid animal mortalities.

There are no studies of this general area that we have on file which may offer any additional information.

If you have any questions or concerns please let me know.
Thank you,
Jane

Jane E. Gurney
Principal Planner
Community Planning
Region of Waterloo
Tel: 519-575-4500 Ext. 3454
JGurney@regionofwaterloo.ca

From: Steve Yonemitsu
Sent: Tuesday, March 12, 2019 12:13 PM
To: Bridget Coady; Kate Hagerman
Subject: PDR Request Bridge over the Conestoga River - Scheifele Bridge #2201

Hello folks,

I hope you are well these days.

I am requesting your Heritage and Eco passage comments for this bridge structure.

The Design and Construction Project Manager is Ken Brisbois and he is looking for something late spring from me.

Thanks so much and have a great day!
Steve.

5954	REG. RD. 22 (NORTHFIELD DRIVE), SCHEIFELE BRIDGE AT CONESTOGA RIVER (#2201)	WOOL

CONTAMINATION

From: Alana MacKinnon
Sent: Tuesday, May 15, 2018 12:33 PM
To: Steve Yonemitsu; Michelle Pinto
Subject: RE: PDR Feedback 2018

Hi Steve and Michelle,

I've gone through your project list where you need a response by May 31. My apologies for not getting you the April responses sooner. My comments are below.

- Reg Road 22: Northfield at Conestoga River - no issues.

I think that's it for this month and May. Any questions, let me know.

Regards,

Alana MacKinnon, P.Eng.
Project Engineer (Environmental)

From: Martin Bajtos
Sent: May 17, 2019 11:37 AM
To: Steve Yonemitsu <SYonemitsu@regionofwaterloo.ca>
Cc: Ruba Al Assar <RAlAssar@regionofwaterloo.ca>
Subject: RE: Preliminary Information Request - Scheifele Bridge - Woolwich Township

Steve,

The only issue that we have had at this structure is the settlement of the approach slabs on either end at the expansion joint. We have topped it up with asphalt in the past and its been holding. This should get rectified during the construction so there are no other issues with that deck.

Thanks

Martin Bajtos A.Sc.T.
Area Supervisor (Heidelberg)
Region Of Waterloo – Transportation Operations
Ph: 519-699-5558
Fax: 519-699-5851
Email: mbajtos@regionofwaterloo.ca

From: Steve Yonemitsu
Sent: Friday, May 17, 2019 9:53 AM
To: Martin Bajtos
Cc: Ruba Al Assar
Subject: Preliminary Information Request - Scheifele Bridge - Woolwich Township

Hi Martin,

The Region is planning on replacing the deck of the Scheifele Bridge 2021. The bridge is located in the Township of Woolwich on Northfield Dr., between University Ave. and new Jerusalem.

I was wondering if you are dealing with any major issues that you would like addressed as part of the deck replacement in 2021.

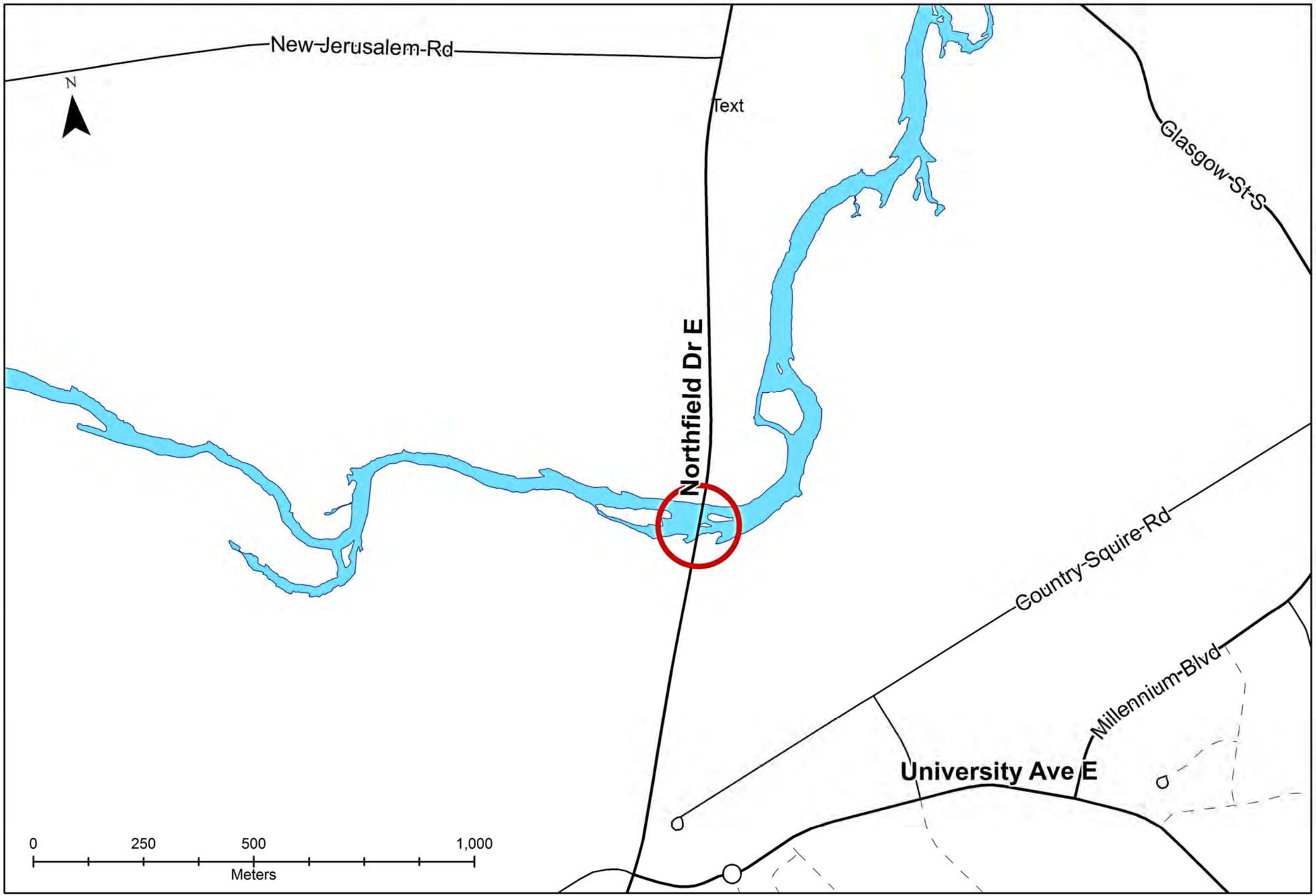
Thanks in advance for your response.

I have attached our standard checklist for your use for any comments.

Have a great day, Steve.

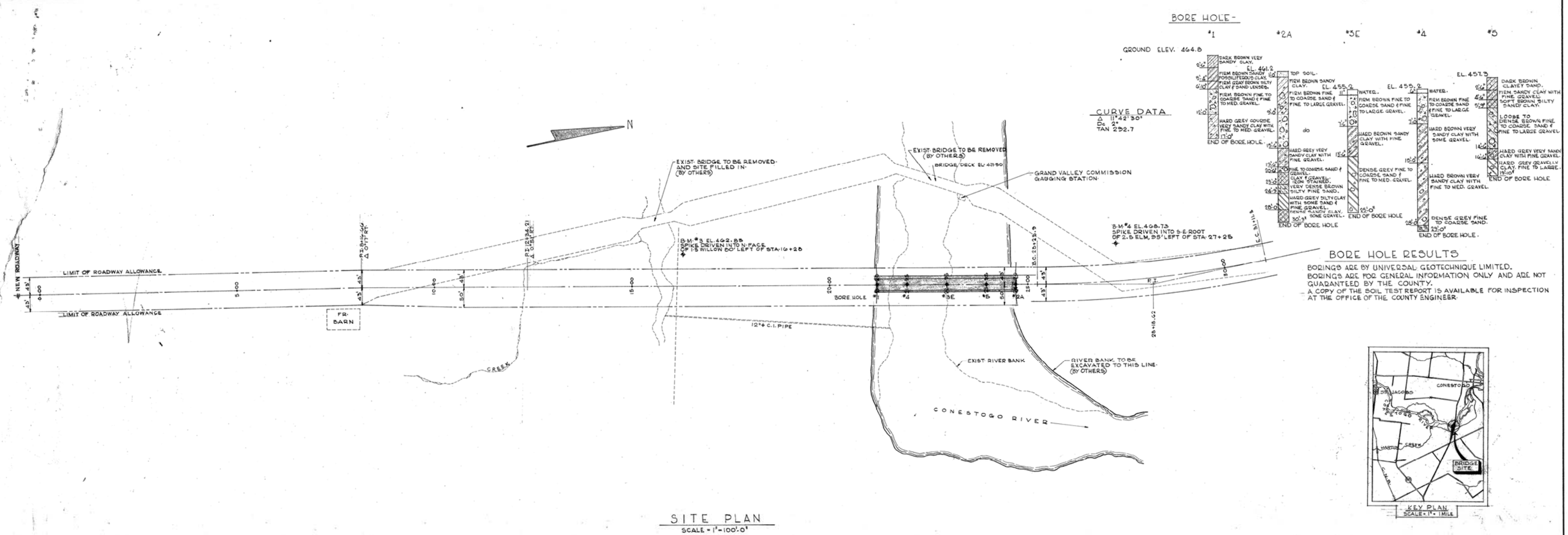
Map of Wellhead Protection Areas: RR22 (NORTHFIELD DR.) - SCHEIFELE BRIDGE AT CONESTOGA RIVER (#2201)

- The project does not pass through any areas of Sensitivity
- The project is not within 200m of a wellhead

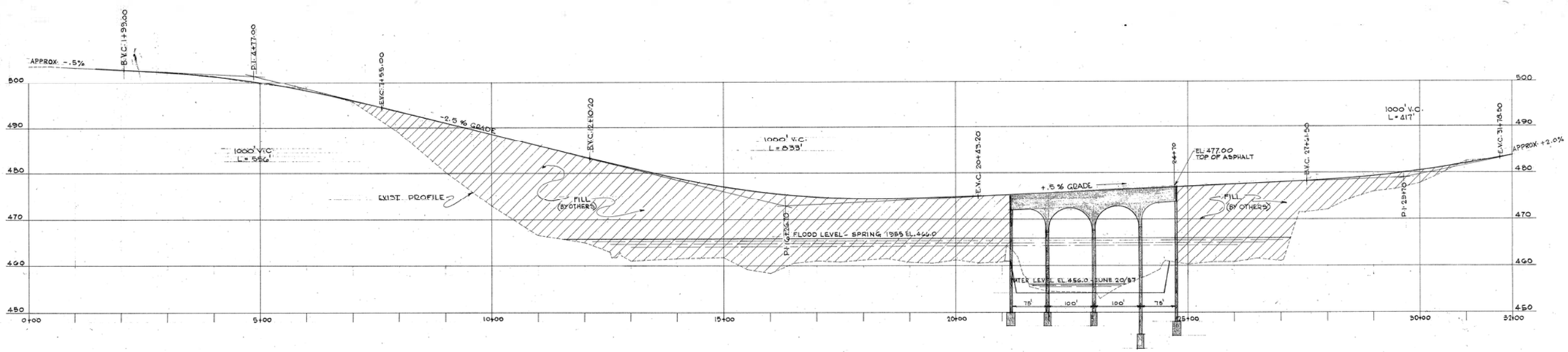


Appendix G

CONSTRUCTION HISTORY DRAWINGS



SITE PLAN
SCALE = 1" = 100'-0"



PROFILE ON ℄ OF NEW ROADWAY
HORIZ. = 1" = 100'-0" SCALES VERT. = 1" = 10'-0"

REVISIONS		
DATE	BY	REMARKS

I. A. KOLSI
REGISTERED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

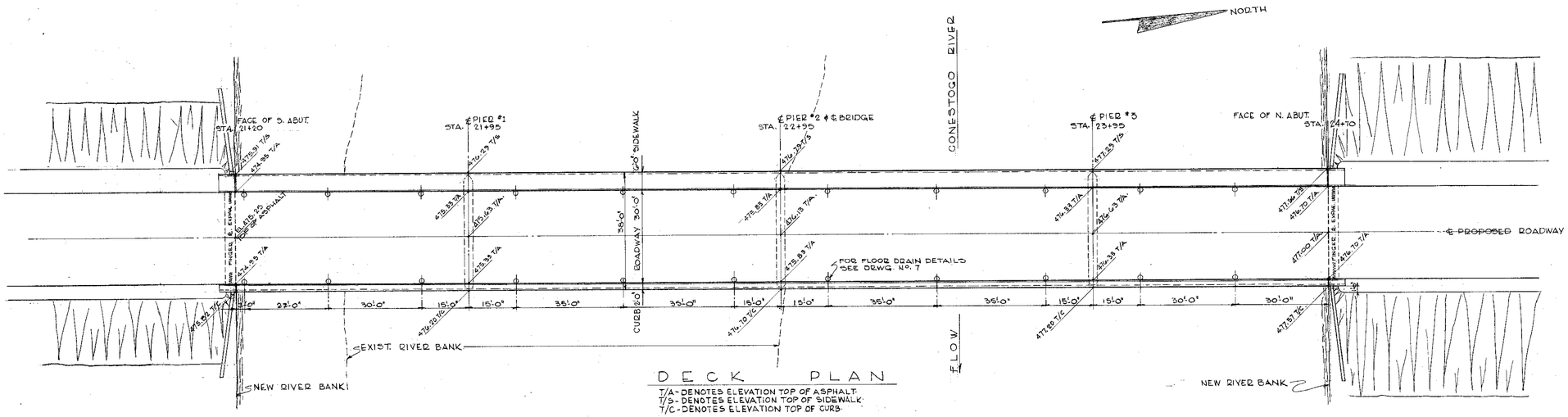
CLIENT & JOB:
SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
COUNTY ROAD 22
LOT 3, TOWNSHIP OF WOOLWICH
COUNTY OF WATERLOO
J.M. JORDAN — COUNTY ENGINEER

NAME OF DRWG.
SITE PLAN & PROFILE

C. C. PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS
LONDON HAMILTON EDMONTON

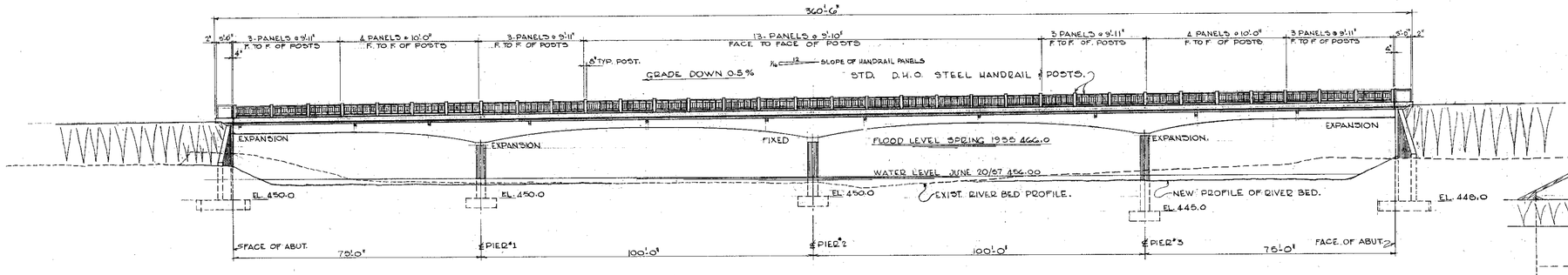
DESIGNED BY	K.
DRAWN BY	G.S.N.
CHECKED BY	K.
SCALE	AS NOTED
DATE	FEB. 25/58
JOB NO.	H-519
SET NO.	
DRAWING NO.	1

#022-01 22-01 RGN. RD. 22 B22-01

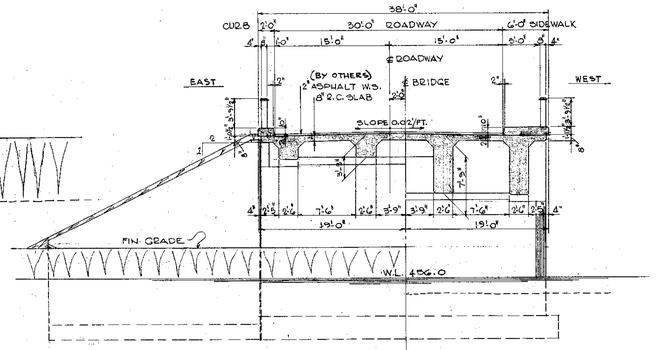


DECK PLAN

T/A - DENOTES ELEVATION TOP OF ASPHALT.
T/S - DENOTES ELEVATION TOP OF SIDEWALK.
T/C - DENOTES ELEVATION TOP OF CURB.

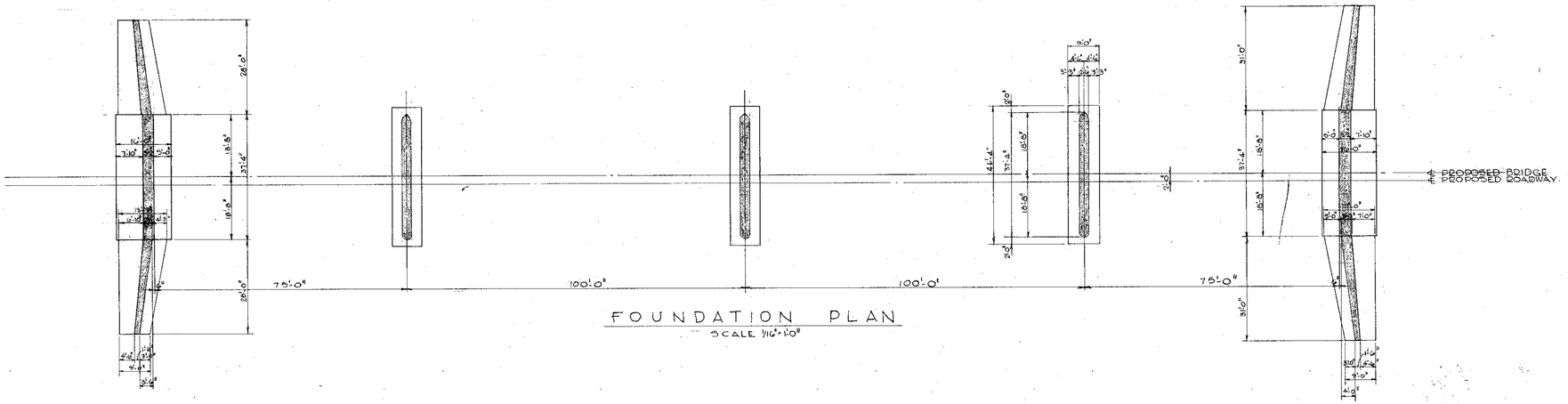


EAST SIDE ELEVATION



HALF CROSS SECTION AT ABUTMENT | HALF CROSS SECTION AT PIER

SCALE 1/8"=1'-0"



FOUNDATION PLAN

SCALE 1/16"=1'-0"

GENERAL NOTES:

1. ALLOWABLE BEARING PRESSURE OF SOIL UNDER FOOTINGS 7,000 P.S.F.
2. NO CONC. SHALL BE POURED BEFORE MATERIALS, MIX, FORMWORK, FALSEWORK & REINF. STEEL HAVE BEEN CHECKED & APPROVED BY THE ENGINEER.
3. ALL EXPOSED CONC. EDGES TO HAVE 3/4" CHAMFER UNLESS OTHERWISE NOTED.
4. STRUCTURE DESIGNED FOR H20-S16 LOADING.
5. DECK SHORING SHALL NOT BE STRUCK BEFORE INSPECTION AND APPROVAL OF THE CONCRETE DECK HAS BEEN GIVEN BY THE ENGINEER.
6. NO CONC. SHALL BE PLACED IN THE FOOTINGS BEFORE THE EXCAVATION FOR FOOTINGS HAS BEEN APPROVED BY THE ENGINEER.
7. SIDEWALK AND CURB TO BE POURED ONLY AFTER SHORING HAS BEEN STRUCK.
8. ALL CONC. TO HAVE 1/2 LB. POZZOLITH "S" PER BAG OF CEMENT.
9. BACKFILL AND APPROACH GRADING BY OTHERS.
10. HANDRAIL SUPPLIED BY COUNTY ENGINEER & ERECTED BY THIS CONTRACTOR.
11. CONSTRUCTION JOINTS MAY BE MADE ONLY IN LOCATIONS SHOWN, UNLESS OTHERWISE PERMITTED BY THE ENGINEER.
12. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE ENGINEER WHEN THE PROGRESS OF THE WORK REQUIRES THE ABOVE MENTIONED INSPECTIONS. CONTRACTORS FAILURE TO DO SO SHALL BE CONSIDERED A BREACH OF CONTRACT.
13. CONCRETE IN GIRDERS AND DECK TO HAVE A MIN. COMPRESSIVE STRENGTH OF 4000 P.S.I. AT 28 DAYS AS MEASURED FROM TEST CYLINDERS.
14. ALL OTHER CONCRETE TO HAVE A MIN. COMPRESSIVE STRENGTH OF 3300 P.S.I. AT 28 DAYS AS MEASURED FROM TEST CYLINDERS.
15. CONCRETE COVER :-
FOOTINGS 3" FOR ALL FACES — PIERS 2" FOR ALL FACES
ABUTMENTS 3" FOR ALL FACES — SLABS 1½" FOR TOP & BOTTOM
RETAINING WALLS 2" O.F. 3" I.F. — ALL OTHERS 2" UNLESS NOTED OTHERWISE

TABLE OF QUANTITIES

(APPROXIMATE ONLY)

EXCAVATION	2,000 CU. YDS.
CONCRETE	2,050 CU. YDS.
REINF. STEEL	177 TONS

I. A. KOLSI — REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

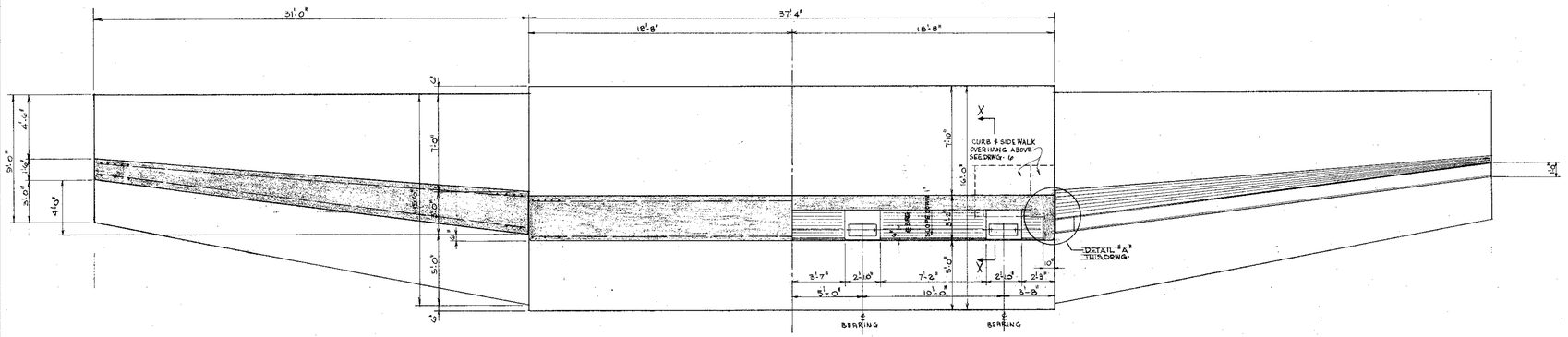
REVISIONS		
DATE	BY	REMARKS

CLIENT & JOB:
SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
COUNTY ROAD 22
LOT 3, TOWNSHIP OF WOOLWICH
COUNTY OF WATERLOO
J. M. JORDAN — COUNTY ENGINEER

NAME OF DRWG.
GENERAL ARRANGEMENT

C. C. PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS
LONDON HAMILTON EDMONTON

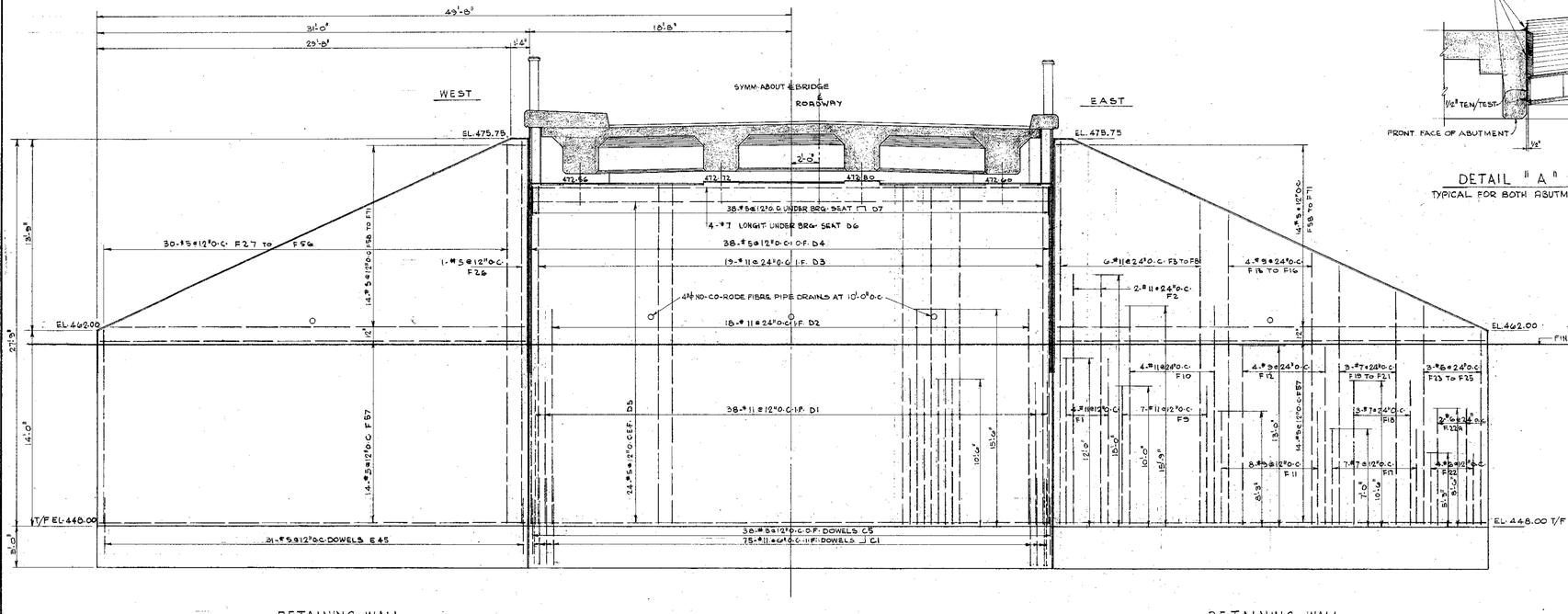
DESIGNED BY	K.
DRAWN BY	T. J. B.
CHECKED BY	K.
SCALE	AS NOTED
DATE	FEB. 25/58
JOB NO.	H-519
SET NO.	
DRAWING NO.	2

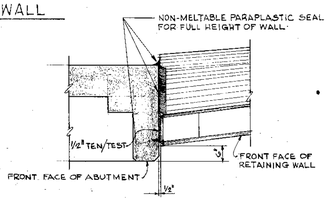


PLAN AT BASE OF RETAINING WALL

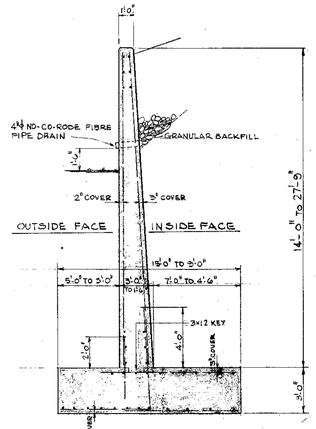
HALF PLAN AT ABUTMENT FOOTING

HALF PLAN AT BEARING SEAT

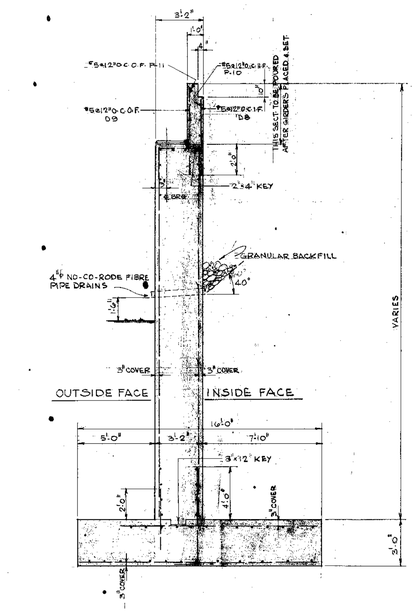




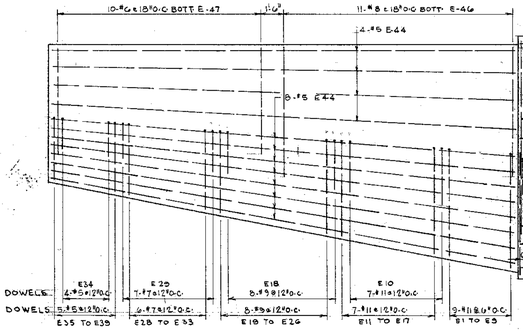
DETAIL "A"
TYPICAL FOR BOTH ABUTMENTS



TYPICAL SECTION THRU RETAINING WALL



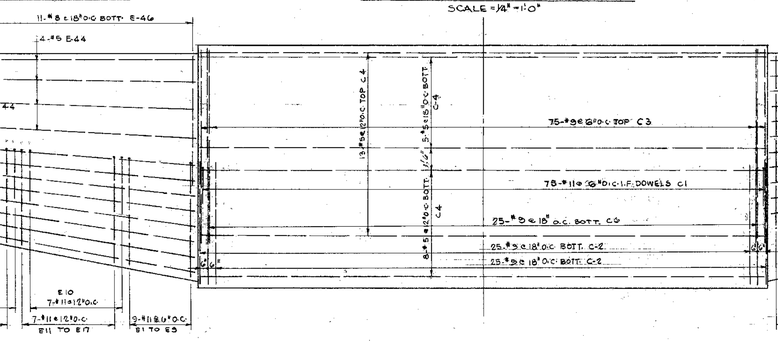
SECTION THRU ABUTMENT



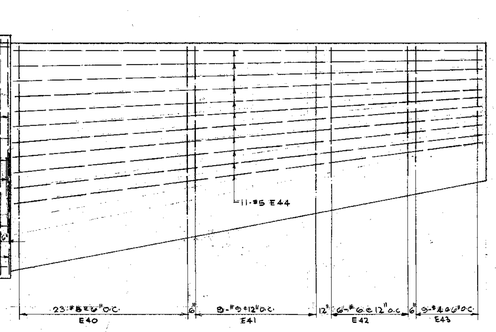
BOTT. REINF. FOR RETAINING WALL FOOTING

ABUTMENT REINFORCING

SCALE ¼" = 1'-0"



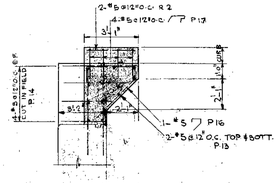
PLAN OF ABUTMENT FOOTING REINF.



TOP REINF. FOR RETAINING WALL FOOTING

RETAINING WALL
OUTSIDE FACE REINFORCING

RETAINING WALL
INSIDE FACE REINFORCING



SECT. THRU CURB OVERHANG
SECT. X-X

FOR GENERAL NOTES SEE DWG. 2

I. A. KOLSI
REGISTERED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

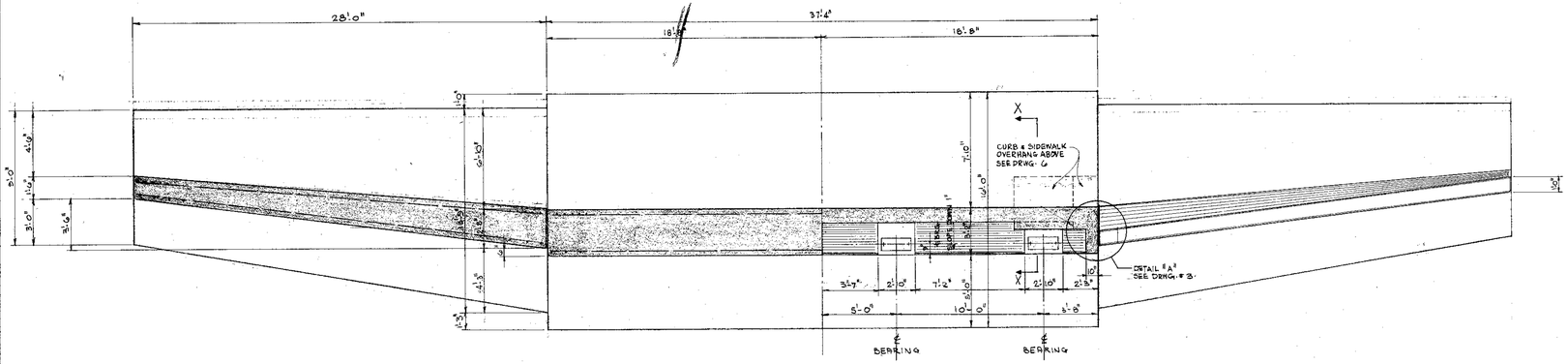
REVISIONS		
DATE	BY	REMARKS

CLIENT & JOB NO.
SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
COUNTY ROAD 22
LOT 3, TOWNSHIP OF WOOLWICH
COUNTY OF WATERLOO
J.M. JORDAN — COUNTY ENGINEER

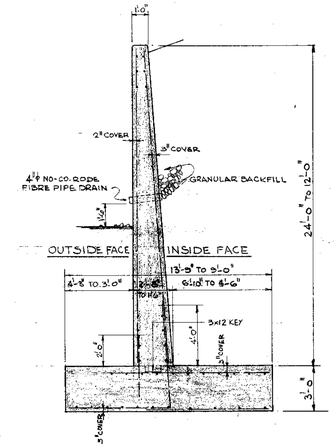
NAME OF DWG.
NORTH ABUTMENT & RETAINING WALL

C. C. PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS
LONDON HAMILTON EDMONTON

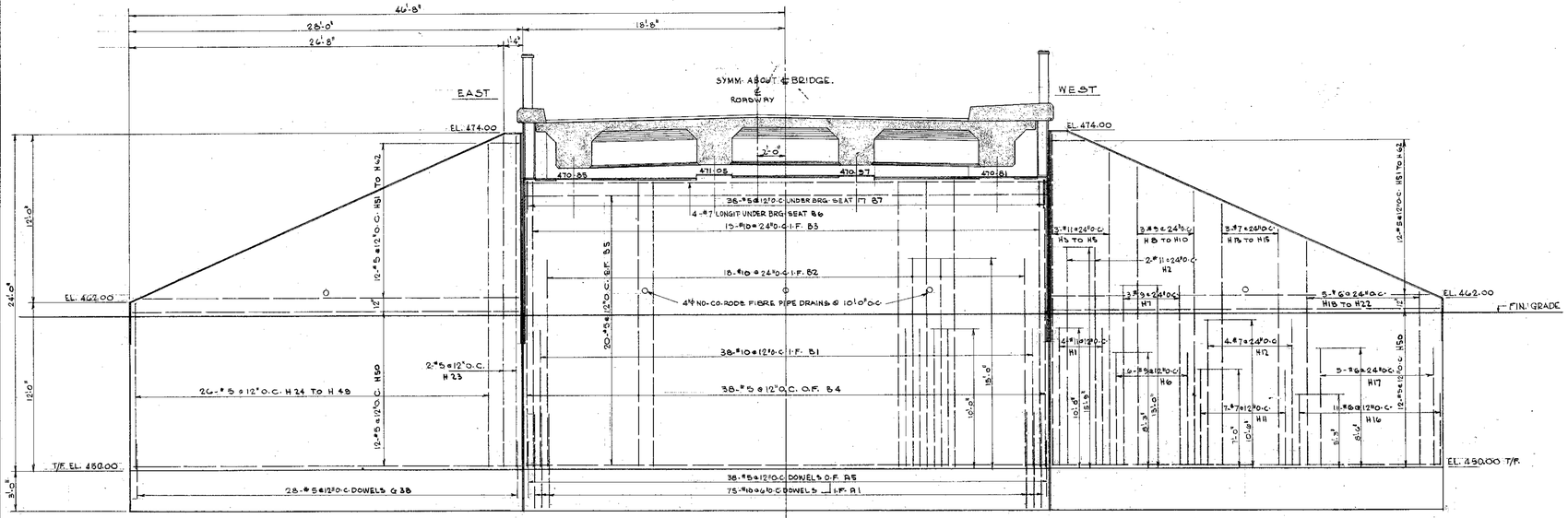
DESIGNED BY	I.K. & V.R.A.
DRAWN BY	T.J.B.
CHECKED BY	K
SCALE	1/4" = 1'0"
DATE	FEB. 25/66
JOB NO.	4-615
DRY NO.	
DRAWING NO.	3.



PLAN AT BASE OF RETAINING WALL — HALF PLAN AT ABUTMENT FOOTING — HALF PLAN AT BEARING SEAT — PLAN AT TOP OF RETAINING WALL

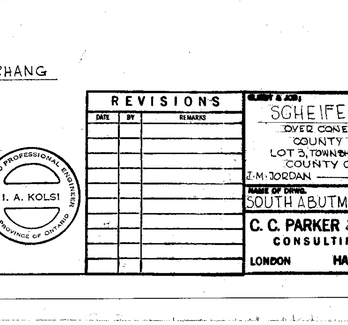


TYPICAL CROSS SECTION THRU RETAINING WALL

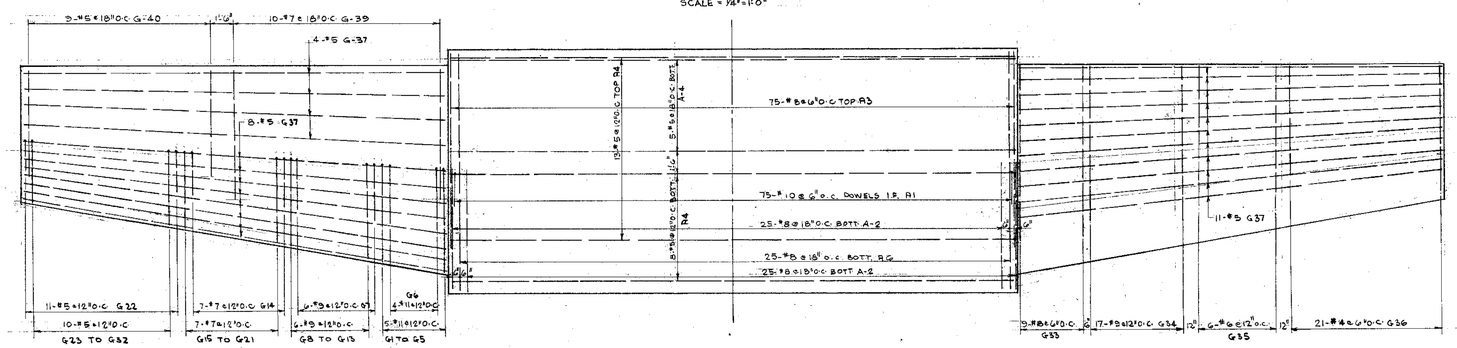


RETAINING WALL OUTSIDE FACE REINFORCING — ABUTMENT REINFORCING — RETAINING WALL INSIDE FACE REINFORCING

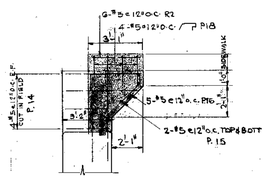
SCALE = 1/8"=1'-0"



SECTION THRU ABUTMENT



BOTT. REINF. FOR RETAINING WALL FOOTING — PLAN OF ABUTMENT FOOTING REINF. — TOP REINF. FOR RETAINING WALL FOOTING



SECT. THRU SIDEWALK OVERHANG
SECT. X-X

FOR GENERAL NOTES SEE DWG. 2

REVISIONS		
DATE	BY	REMARKS

I. A. KOLSI — REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

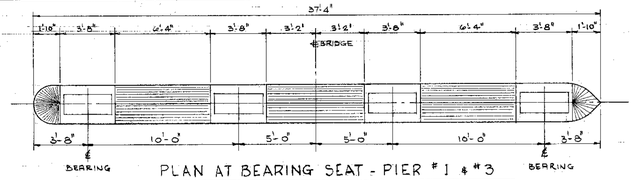
CLIENT & ADD.

SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
COUNTY ROAD 22
LOT 3, TOWNSHIP OF WOOLWICH
COUNTY OF WATERLOO
J.M. JORDAN — COUNTY ENGINEER

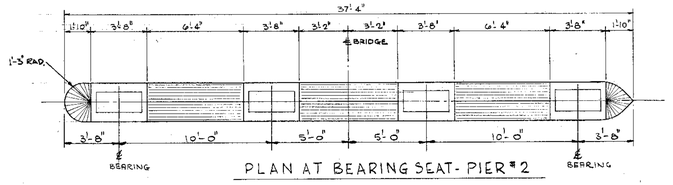
NAME OF DRWG.
SOUTH ABUTMENT & RETAINING WALL

C. C. PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS
LONDON HAMILTON EDMONTON

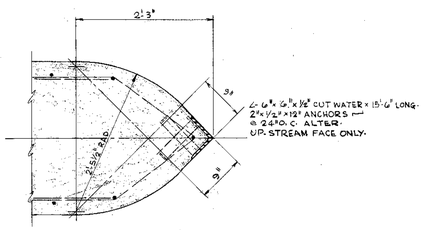
DESIGNED BY	I.K. A.Y.R.A.
DRAWN BY	G.S.N.
CHECKED BY	K.
SCALE	1/4" = 1'-0"
DATE	FEB. 25/58
JOB NO.	4-519
DWG NO.	
DRAWING NO.	4



PLAN AT BEARING SEAT - PIER # 1 & # 3

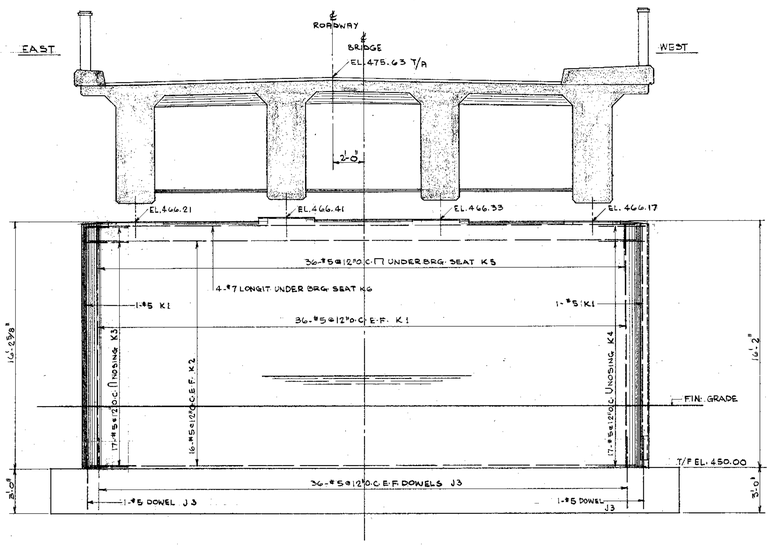


PLAN AT BEARING SEAT - PIER # 2

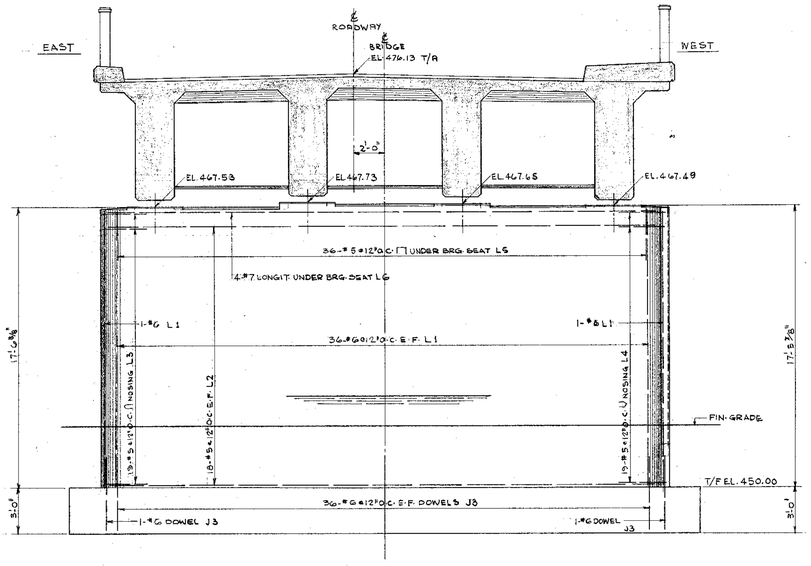


PIER CUTWATER

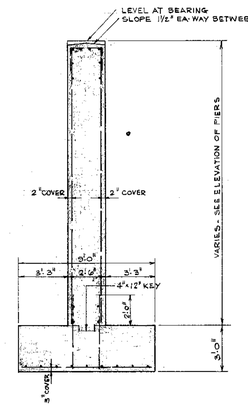
SCALE 1" = 1'-0"



ELEVATION PIER # 1

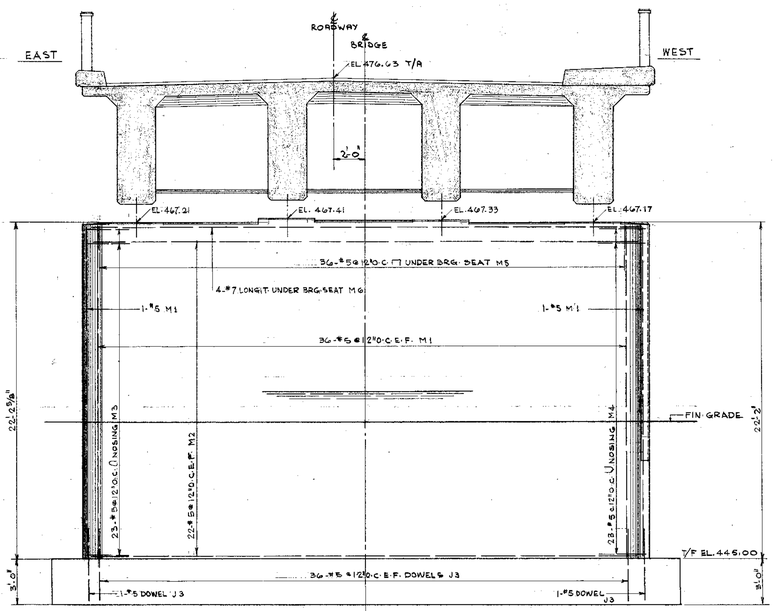


ELEVATION PIER # 2



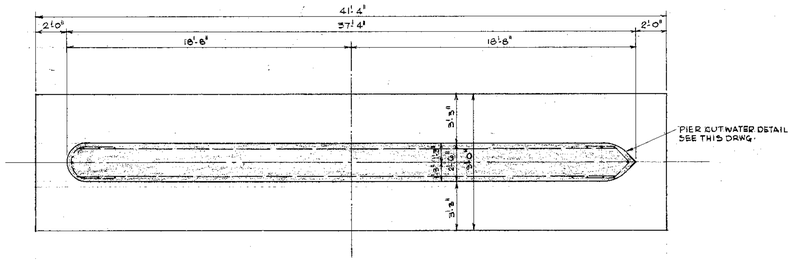
TYPICAL SECTION - ALL PIERS

SCALE 1/4" = 1'-0"

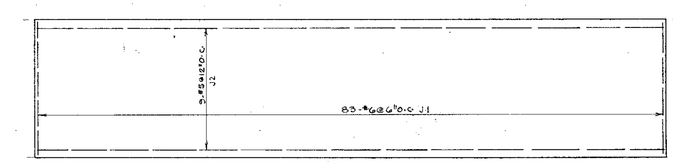


ELEVATION PIER # 3

SCALE 1/4" = 1'-0"



PLAN AT BASE - ALL PIERS



FOOTING REINFORCING - ALL PIERS

SCALE 1/4" = 1'-0"

FOR GENERAL NOTES SEE DRWG. 2

REGISTERED PROFESSIONAL ENGINEER
I. A. KOLSI
PROVINCE OF ONTARIO

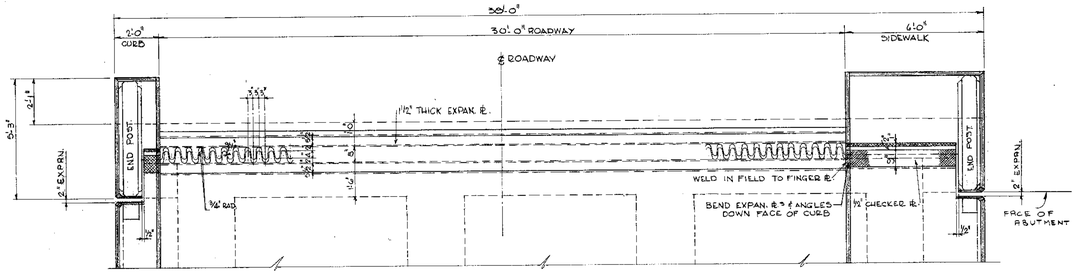
REVISIONS		
DATE	BY	REMARKS

CLIENT & JOB:
SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
COUNTY ROAD 22
LOT 3, TOWNSHIP OF WOOLWICH
COUNTY OF WATERLOO
J.M. JORDAN ——— COUNTY ENGINEER

NAME OF DRWG.
PIER REINF. & DETAILS

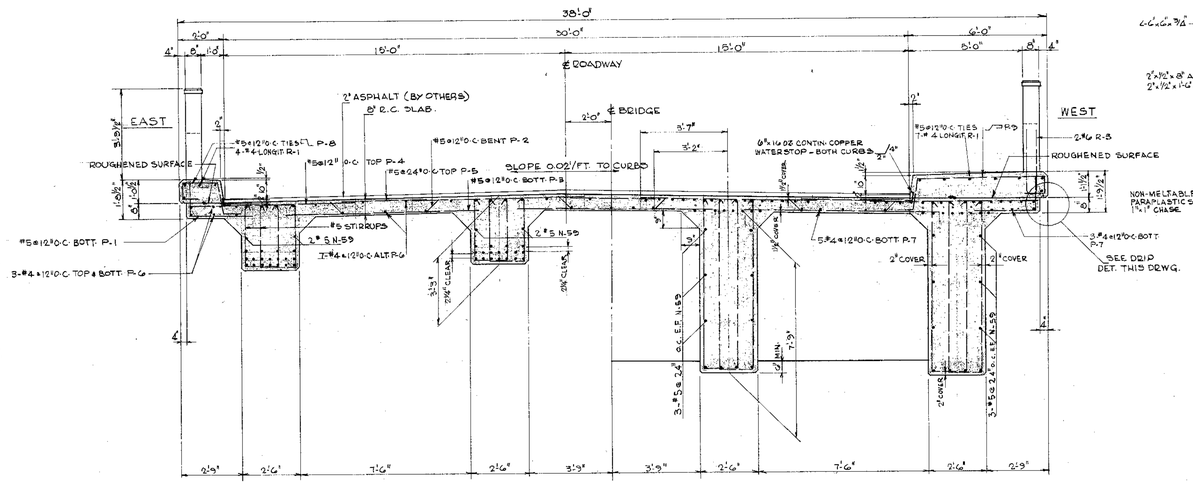
C. C. PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS
LONDON HAMILTON EDMONTON

DESIGNED BY	K
DRAWN BY	T. J. B.
CHECKED BY	K
SCALE	AS NOTED
DATE	FEB. 25/68
JOB NO.	H-319
DWG NO.	
DRAWING NO.	5



PLAN OF ABUT. EXPANSION

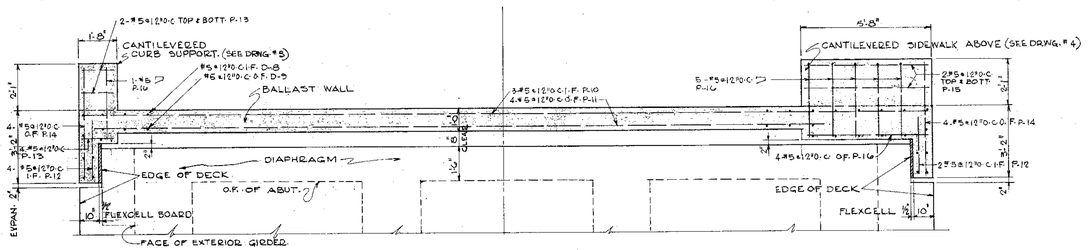
SIMILAR FOR NORTH & SOUTH ABUTMENTS



HALF CROSS SECTION AT MID-SPAN

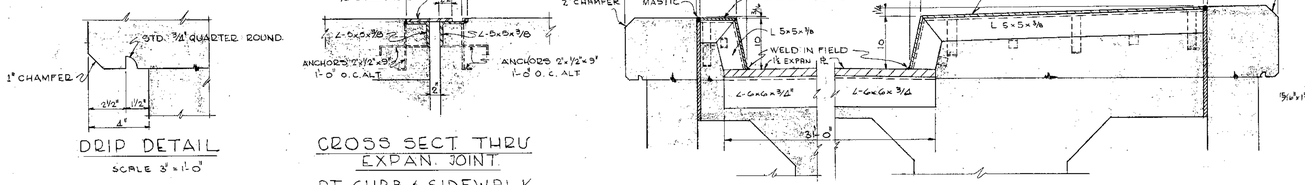
SCALE 3/8"=1'-0"

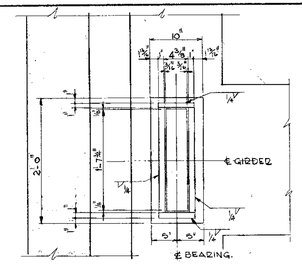
HALF CROSS SECTION AT PIER



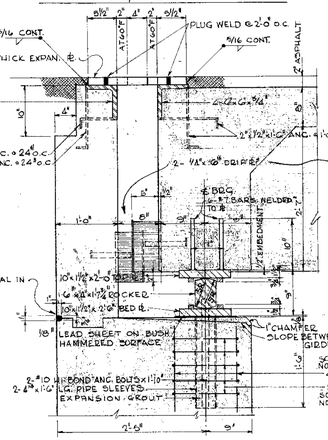
PLAN OF ABUT. BELOW CURB & SIDEWALK

SCALE = 3/8"=1'-0"

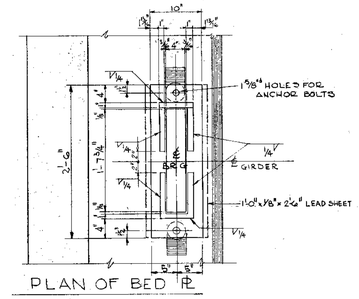




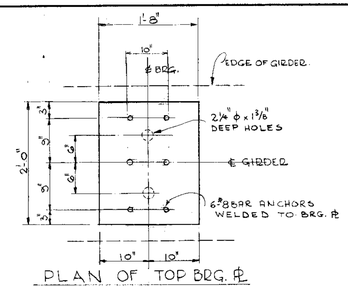
PLAN OF U/S OF TOP BRG. PL.



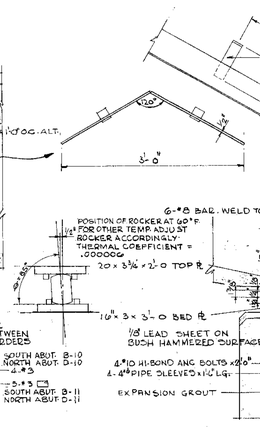
SECT. THRU. ABUT. BEARING.



PLAN OF BED ℄

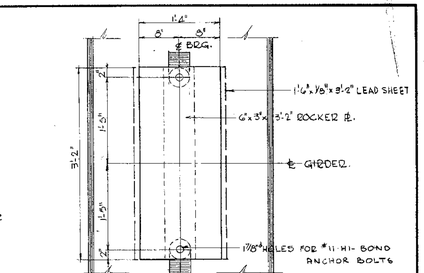


PLAN OF TOP BRG. ℄



SECT. THRU. FIXED PIER BEARING

SECT. THRU. FIXED PIER BEARING

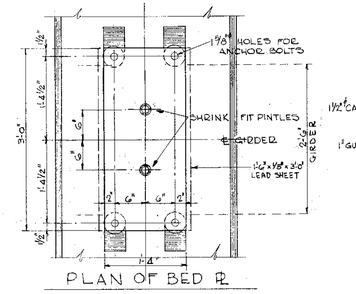


ELEV. OF PIER BRG.

PLAN OF BED ℄

ABUTMENT ROCKER BEARING.

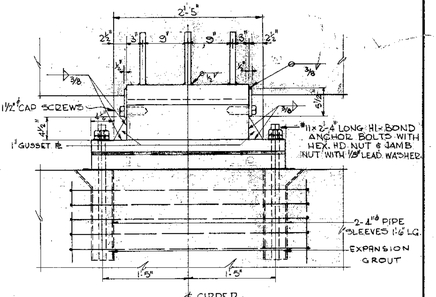
FOR NORTH & SOUTH ABUTMENTS



PLAN OF BED ℄

FIXED PIER BEARING

FOR PIER #2



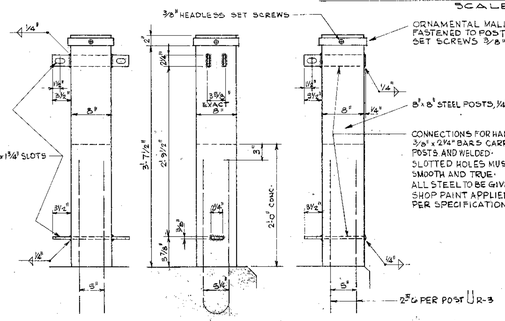
FRONT ELEV.

PIER ROCKER BEARING

FOR PIERS # 1, & # 3.

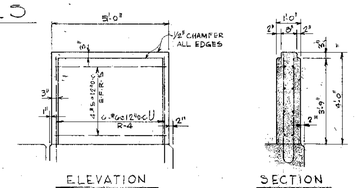
BEARING DETAILS

SCALE 1"=1'-0"



STEEL HANDRAIL POST DETAILS

SCALE = 1"=1'-0"



CONCRETE END POST DETAILS

SCALE = 3/8"=1'-0"

REGISTERED PROFESSIONAL ENGINEER — I. A. KOLSI — PROVINCE OF ONTARIO

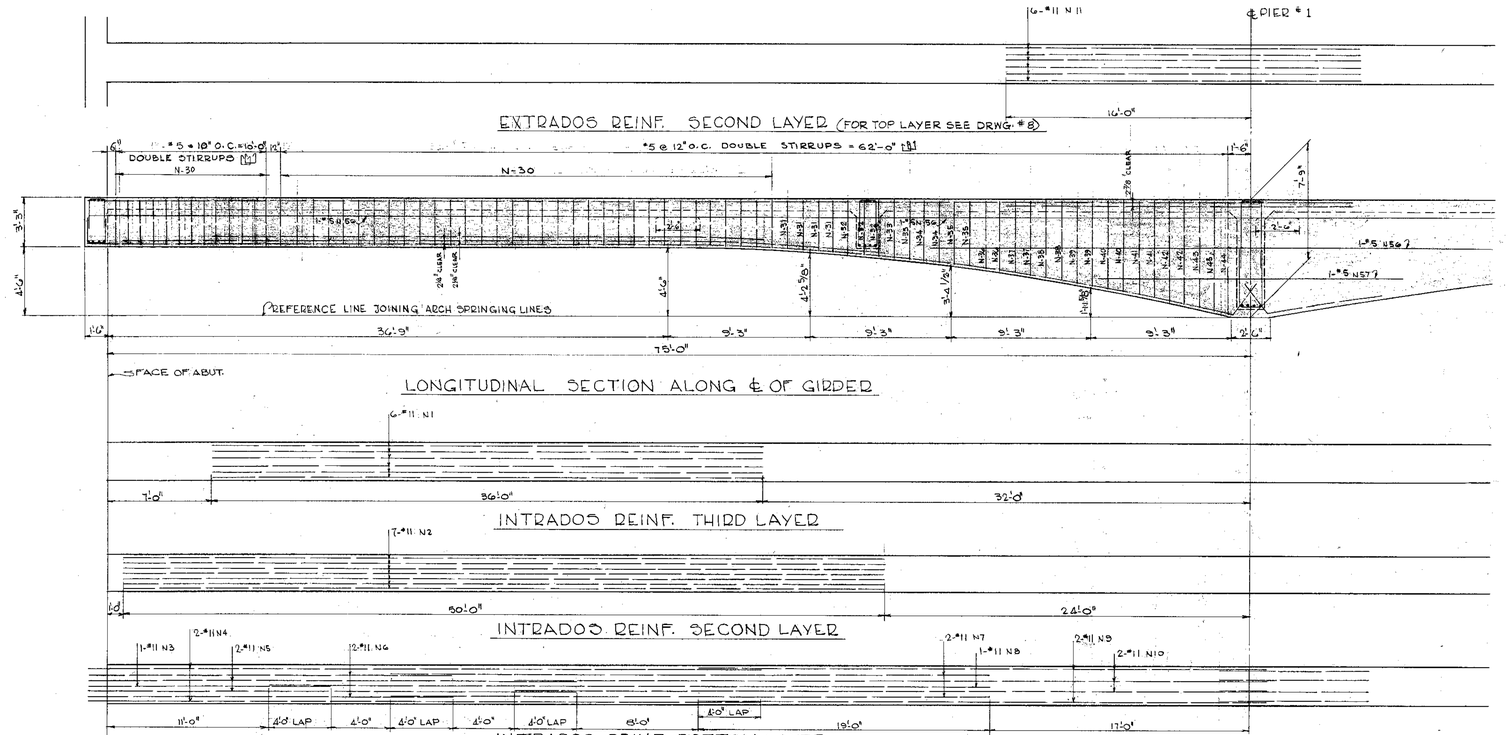
REVISIONS		
DATE	BY	REMARKS

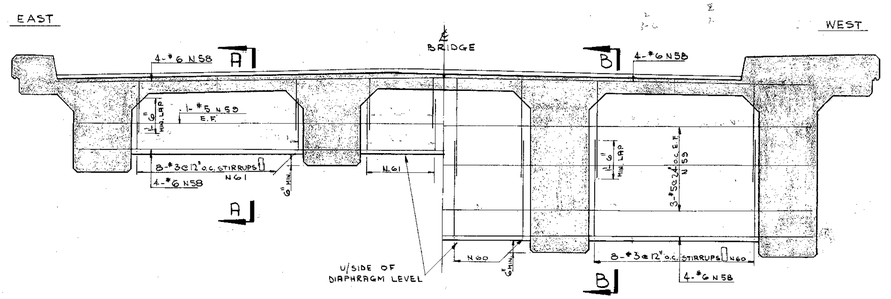
CLIENT & JOB: SCHEIFELE BRIDGE
OVER CONESTOGO RIVER.
COUNTY ROAD 22
LOT 3, TOWNSHIP OF WOOLWICH
COUNTY OF WATERLOO
J. M. JORDAN — COUNTY ENGINEER

NAME OF DRWG.: CROSS SECT. & BRG. DETAILS

C. C. PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS
LONDON HAMILTON EDMONTON

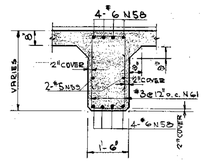
DESIGNED BY	K.
DRAWN BY	T.J.B.
CHECKED BY	K.
SCALE	AS NOTED
DATE	FEB. 25/58.
JOB NO.	H-519
SET NO.	
DRAWING NO.	6



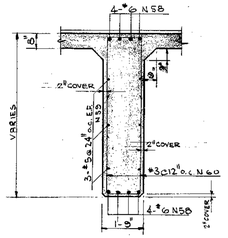


ELEVATIONS OF DIAPHRAGMS

SCALE 3/8" = 1'-0"

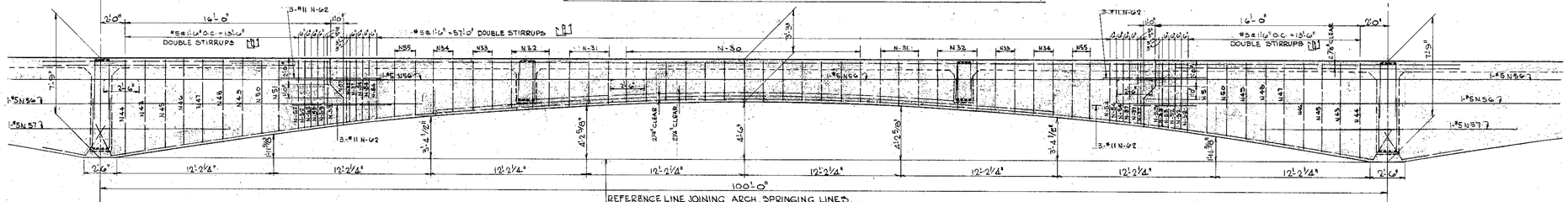


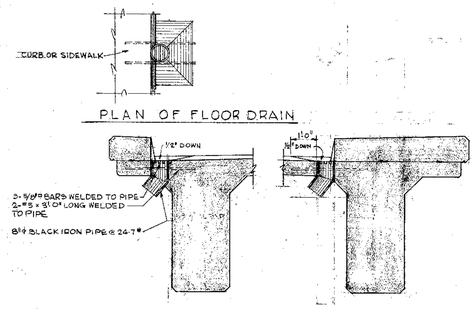
SECTION A-A



SECTION B-B

SYMM. ABOUT ℄ PIER #2 OR ℄ BRIDGE.





SECT. AT CURB SECT. AT SIDEWALK

FLOOR DRAIN DETAILS

SCALE = 3/8" = 1'-0"

FOR GENERAL NOTES SEE DRWG. 2

CONCRETE IN GIRDERS AND DECK TO HAVE A MIN. COMPRESSIVE STRENGTH OF 4,000 P.S.I. AT 28 DAYS, AS MEASURED FROM TEST CYLINDERS.

REGISTERED PROFESSIONAL ENGINEER I. A. KOLSI PROVINCE OF ONTARIO

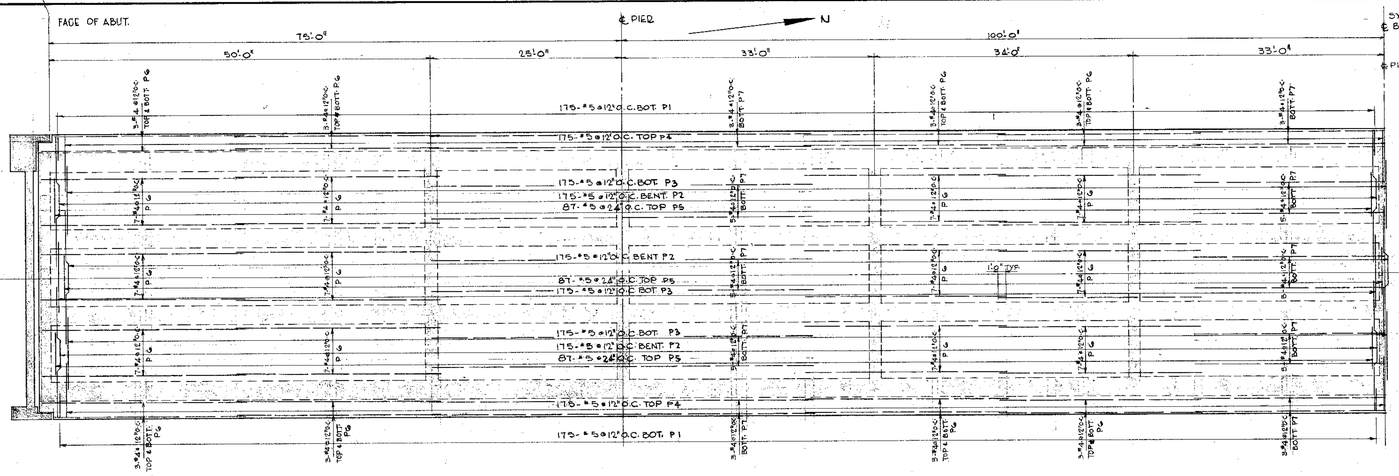
REVISIONS		
DATE	BY	REMARKS

OBJECT & JOB: SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
COUNTY ROAD 22
LOT 5, TOWNSHIP OF WOOLWICH
COUNTY OF WATERLOO
J.M. JORDAN — COUNTY ENGINEER

NAME OF DRWG: GIRDER REINF. & DETAILS

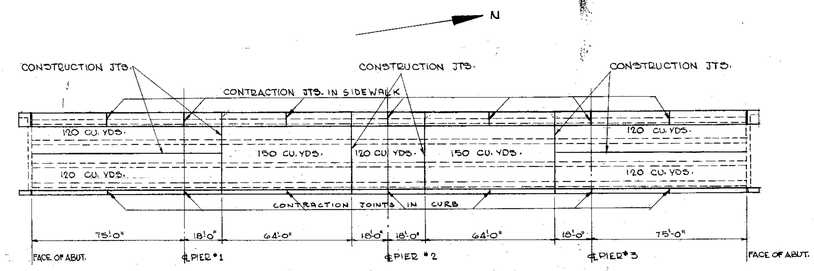
C. C. PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS
LONDON HAMILTON EDMONTON

DESIGNED BY	I.K.
DRAWN BY	T.J.B.
CHECKED BY	I.K.
SCALE	AS NOTED
DATE	FEB. 25/58
JOB NO.	H-319
REV. NO.	
DRAWING NO.	7



HALF DECK REINFORCING PLAN

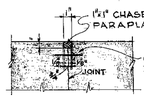
SCALE 1/8"=1'-0"



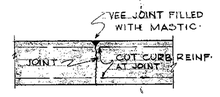
DECK PLACING SCHEDULE

SHOWING CONSTRUCTION AND CONTRACTION JOINTS.

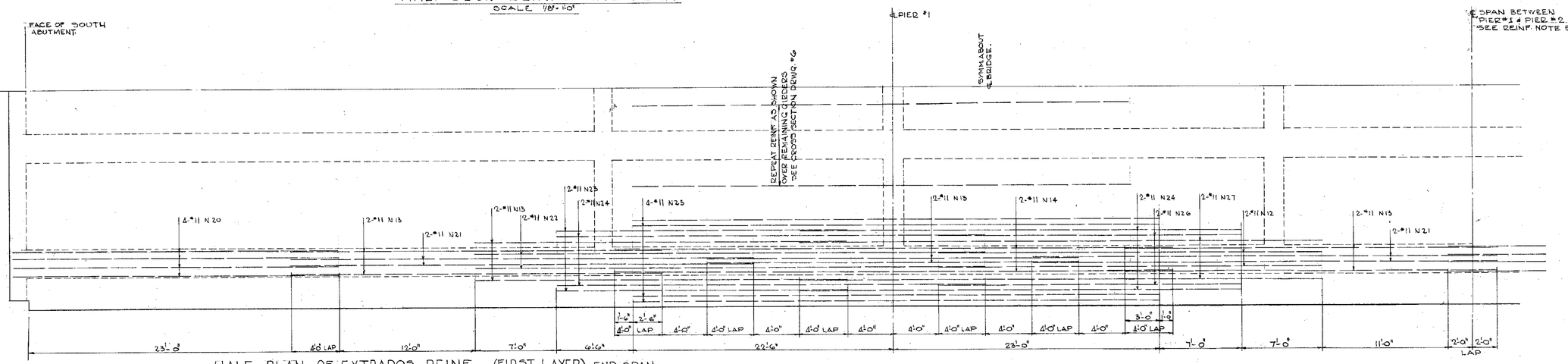
APPROXIMATE CONCRETE QUANTITIES SHOWN.



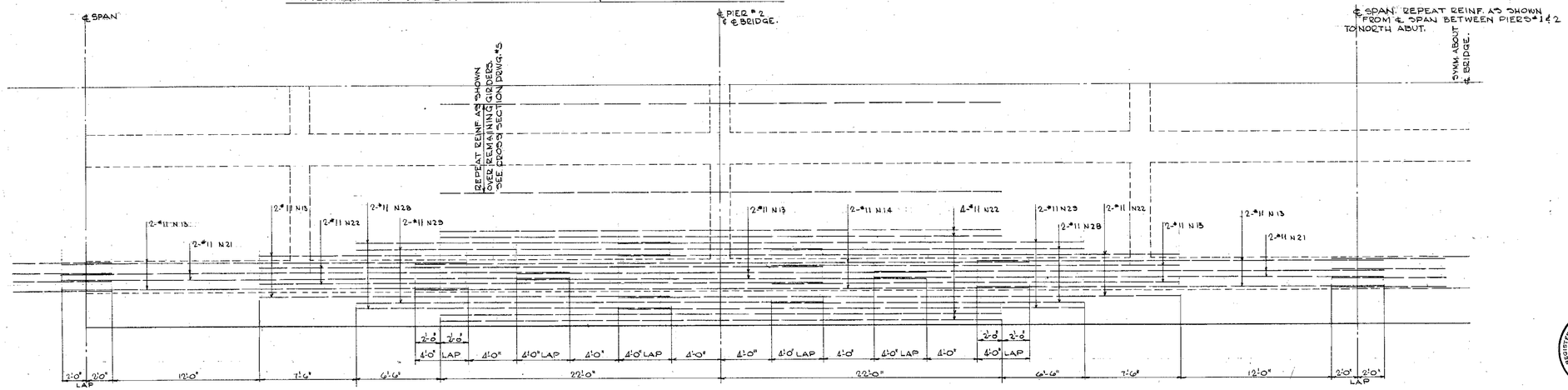
DECK CONSTRUCTION JOINT



SIDEWALK & CURB CONTRACTION JOINT



HALF PLAN OF EXTRADOS REINF. (FIRST LAYER) END SPAN



HALF PLAN OF EXTRADOS REINF. (FIRST LAYER) INTERIOR SPAN.

I. A. KOLSI
REGISTERED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

REVISIONS		
DATE	BY	REMARKS

CLIENT & JOB:
SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
COUNTY ROAD 22
LOT 3 TOWNSHIP OF WOOLWICH
COUNTY OF WATERLOO
J.M. JORDAN — COUNTY ENGINEER

NAME OF DRWG.
DECK REINFORCING DET'S

C. C. PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS
LONDON HAMILTON EDMONTON

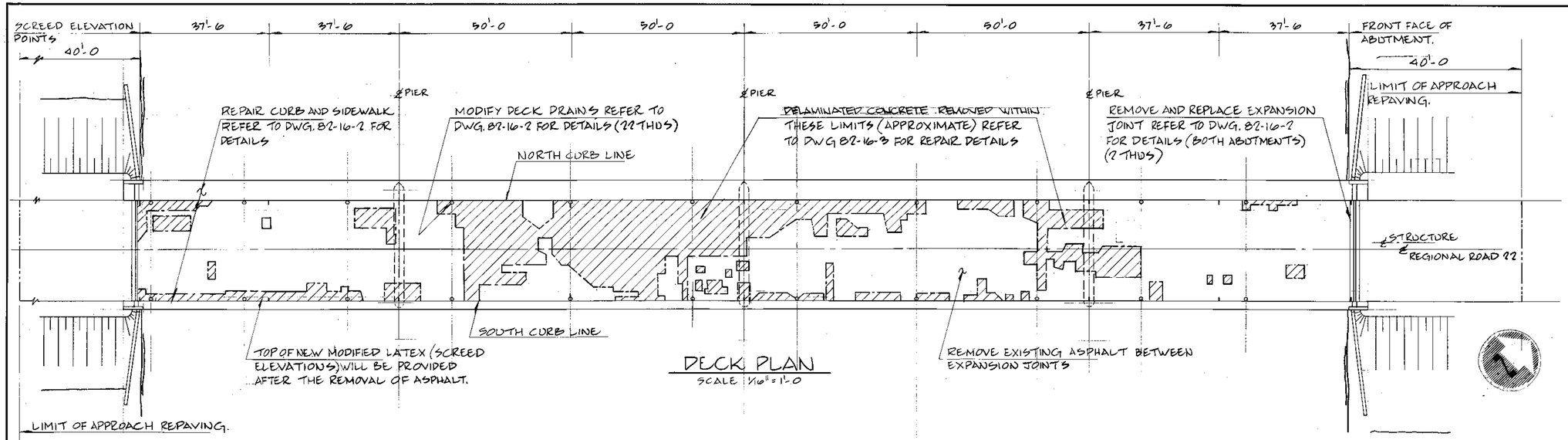
DESIGNED BY K.
DRAWN BY T.J.B.
CHECKED BY K.
SCALE AS NOTED
DATE FEB. 25/58
JOB NO. A-819
SET NO.
DRAWING NO. 8

THE REGIONAL
MUNICIPALITY
OF WATERLOO

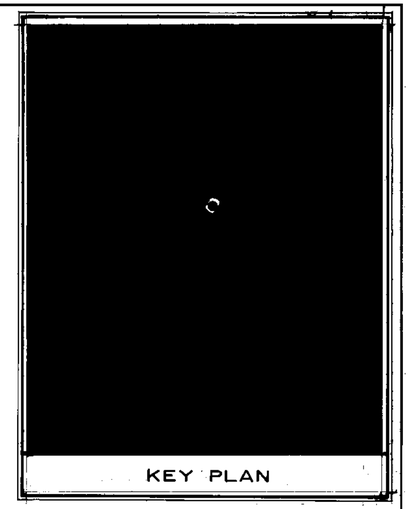
CONTRACT Nº. 82-16.

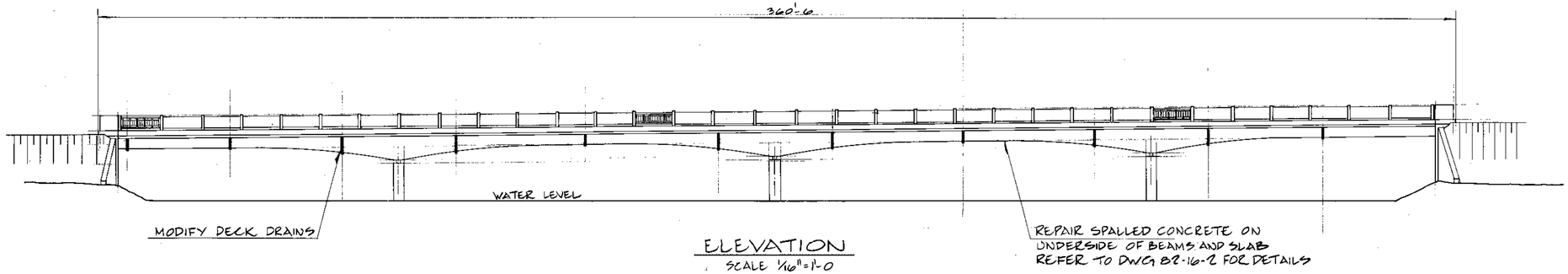
1982 BRIDGE REHABILITATION CONTRACT

DILLON
Consulting Engineers & Planners



DECK PLAN
SCALE 1/16" = 1'-0

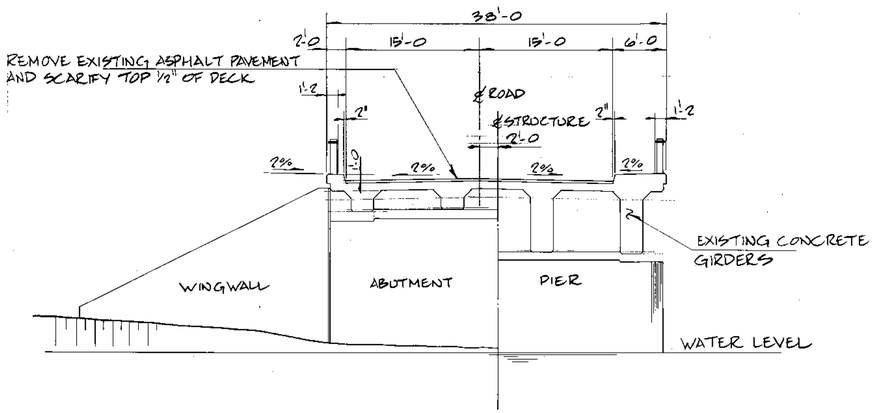




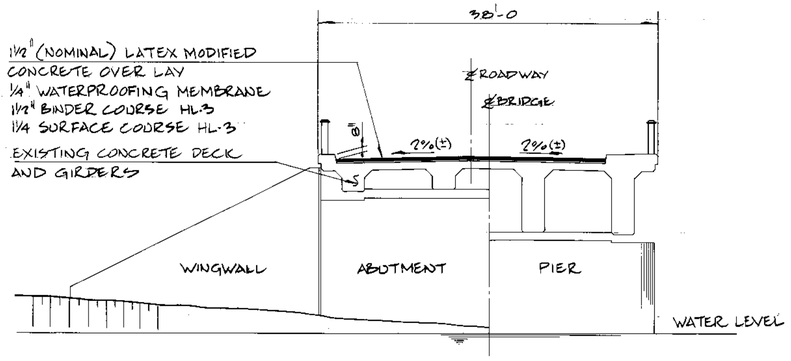
ELEVATION
SCALE 1/16" = 1'-0

SEQUENCE OF OPERATIONS

1. INSTALL TRAFFIC BARRIERS, CLOSE BRIDGE TO TRAFFIC.
2. REMOVE ASPHALT AND DELAMINATED CONCRETE.
3. REPLACE EXPANSION JOINTS AND INSTALL DECK DRAINS.
4. PREPARE DECK FOR LATEX MODIFIED CONCRETE OVERLAY.
5. REPAIR CURB AND SIDEWALK WITH LATEX MODIFIED CONCRETE PATCHING
6. PLACE LATEX MODIFIED CONCRETE OVERLAY ON DECK (1½" NOMINAL THICKNESS) IN ONE CONTINUOUS OPERATION
7. CURE CONCRETE OVERLAY AS SPECIFIED
8. APPLY MEMBRANE WATERPROOFING AND PAVE.
9. REPAIR UNDERSIDE OF BEAMS
10. REMOVE BARRIERS AND RE-OPEN BRIDGE TO TRAFFIC



CROSS SECTION
EXISTING AND REMOVALS
SCALE 1/8" = 1'-0



CROSS SECTION
EXISTING AND PROPOSED
SCALE 1/8" = 1'-0

NOTES

1. CONSTRUCTION JOINTS IN THE LATEX MODIFIED CONCRETE OVERLAY WILL NOT BE PERMITTED WITHOUT PRIOR APPROVAL OF THE ENGINEER
2. SCREED ELEVATIONS WILL BE PROVIDED TO THE CONTRACTOR AFTER REMOVAL OF THE ASPHALT
3. REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF C.S.A. STANDARD G30.12M 1977 GRADE 400.
4. CONCRETE TO HAVE A MINIMUM 28 DAY STRENGTH OF 30MPa
5. ALL EXPOSED EDGES TO BE CHAMFERED ¾" x ¾"
6. CLEAR COVER TO REINFORCING:-
   - 3" EARTH FACE
   - 2" ELSEWHERE
7. REAR SURFACES OF ABUTMENT BALLAST WALL TO RECEIVE TWO COATS OF EMULSIFIED ASPHALT COMPOUND.

PRINT RECORD

NO.	DATE	FOR

D.S.McC. Gunnor
W.M. DILLON LIMITED
19 May 82
DATE

REGISTERED PROFESSIONAL ENGINEER D.S. McGUNNOR PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER M. RADOLLI PROVINCE OF ONTARIO

THE REGIONAL MUNICIPALITY OF WATERLOO

for C.B. BAUMAN P.Eng.
COMMISSIONER of ENGINEERING

May 19/82
DATE

DILLON Consulting Engineers & Planners

NO.	REVISIONS	DATE	BY
1	"AS BUILT"	OCT/82	GH

DESIGN	M.R.
DRAWN	M.A.S.
CHECKED	M.R.
APPROVED	D.S.M.
DATE	MAY 1982
SCALE	AS SHOWN

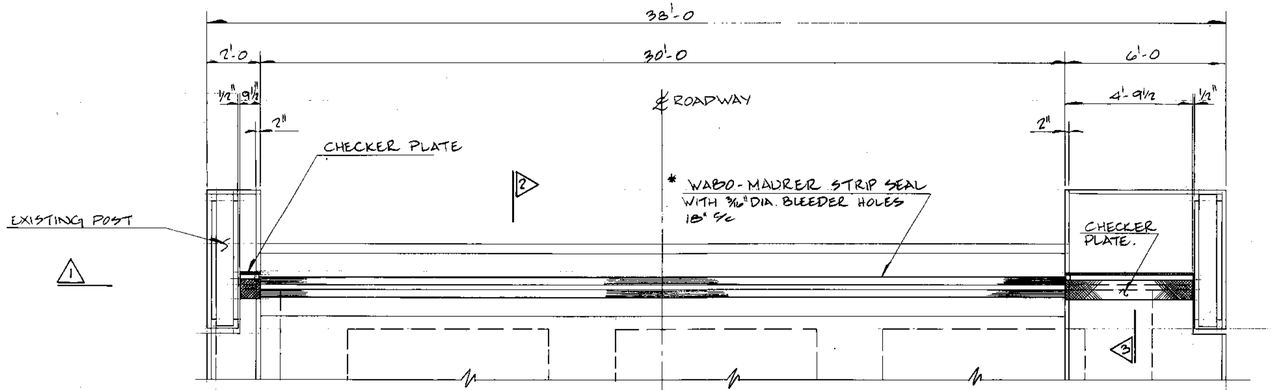
1982 BRIDGE REHABILITATION CONTRACT

REGIONAL STRUCTURE Nº 2201
SCHEIFELE BRIDGE
GENERAL ARRANGEMENT

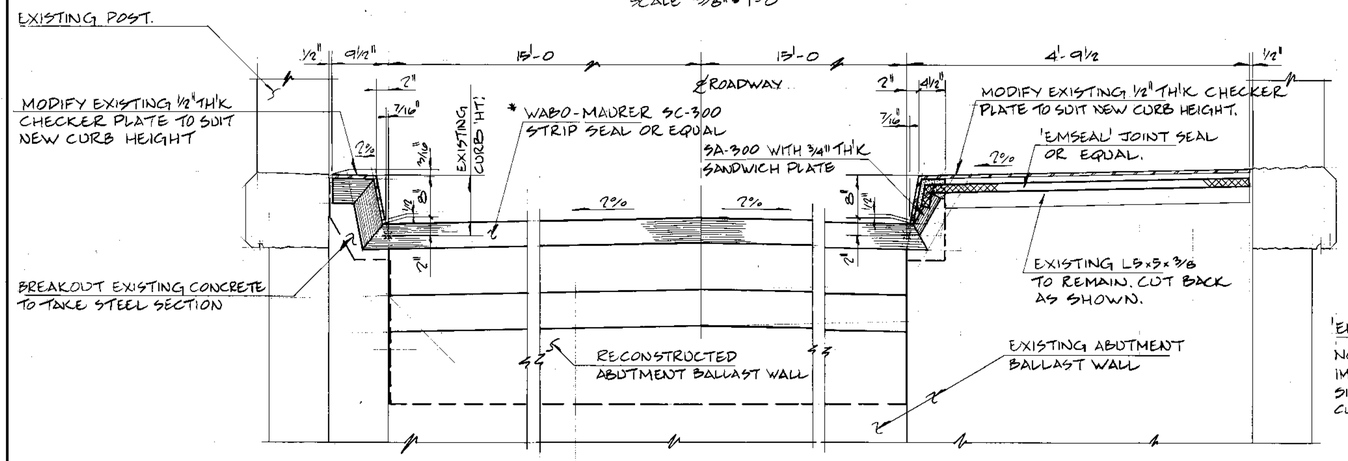
PROJECT NO. 9168-01
SHEET NO. 82-16-1
OF 9

AD TRANSLAR 500-3-79

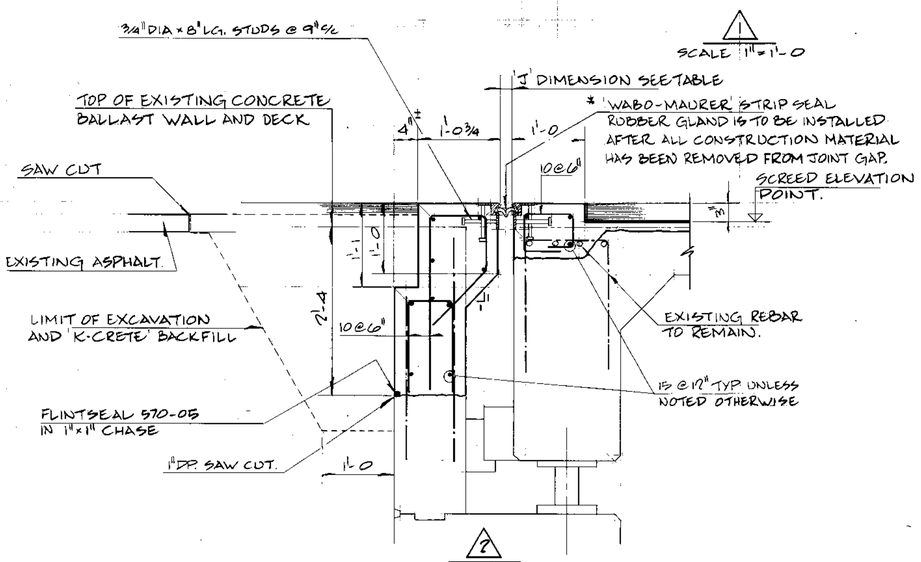
B-22-02



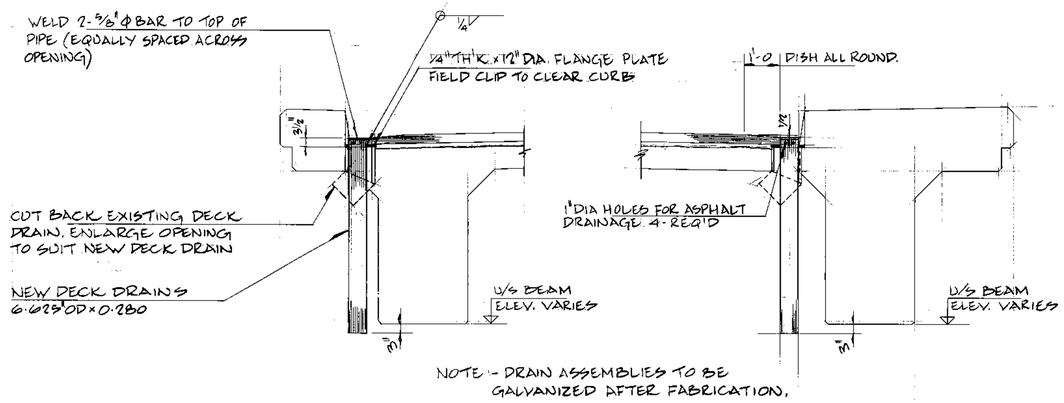
PLAN OF EXPANSION JOINT.
SCALE 3/8" = 1'-0



1 SCALE 1" = 1'-0



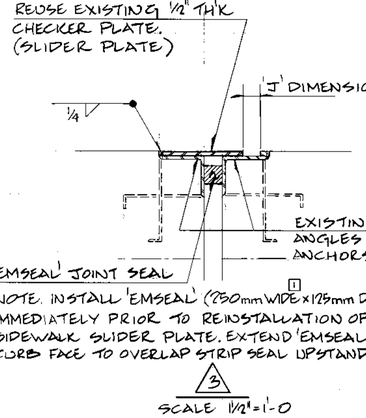
2 SCALE 1" = 1'-0



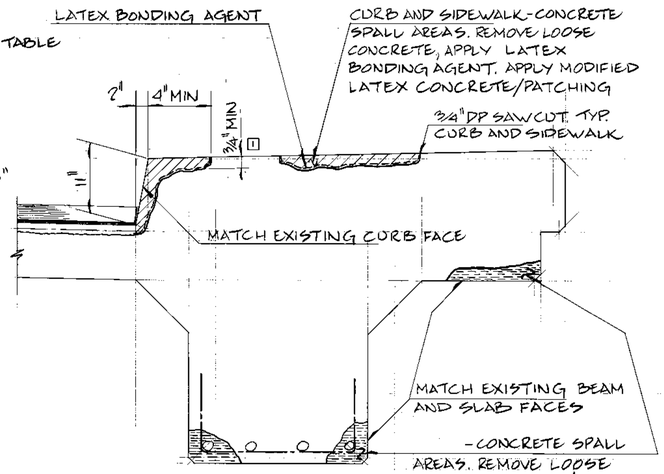
NOTE :- DRAIN ASSEMBLIES TO BE GALVANIZED AFTER FABRICATION.

SECTION AT CURB SECTION AT SIDEWALK

DECK DRAIN MODIFICATION DETAIL
SCALE ½" = 1'-0



3 SCALE 1½" = 1'-0



CURB, SIDEWALK & BEAM REPAIR DETAILS
SCALE 1" = 1'-0

NOTES:

1. EXPANSION JOINTS SHALL BE ELASTOMETAL WABO-MAURER STRIP SEALING SYSTEM, OR APPROVED EQUIVALENT
2. EXPANSION JOINTS SHALL BE COMPLETELY SHOP ASSEMBLED AND PRESET FOR 'J' AT 16°C PRIOR TO SHIPMENT.
3. MAUFACTURERS SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION.
4. NEOPRENE SEAL SHALL CONFORM TO THE REQUIREMENTS OF M.T.C. FORM 1310.
5. STEEL SHALL BE IN ACCORDANCE WITH C.S.A SPECIFICATION G40·21 GRADE 44W OR EQUIVALENT. STEEL EXTRUSIONS SHALL BE IN ACCORDANE WITH ASTM A242.
6. STUDS SHALL BE KSM OR NELWELD OR APPROVED EQUIVALENT AND ATTACHED USING FUSION WELD PROCESS.
7. ALL STEEL INCLUDING STUDS, SHALL BE HOT DIP GALVANIZED (C.S.A STANDARD G164) OR ZINC METALLIZED IN ACCORDANCE WITH C.S.A. STANDARD G189, AFTER FABRICATION.
8. WELDING SHALL BE OF A LOW HYDROGEN CLASSIFICATION, MANUAL ELECTRODES SHALL BE E7016 OR E7018. ALL WELDING SHALL BE IN ACCORDANCE WITH C.S.A. STANDARD W59.
9. JOINT ASSEMBLY SHALL BE SET TO FINAL ELEVATION AND GRADE OF BRIDGE DECK
10. FINAL WITH ADJUSTMENT SHALL BE MADE AND CLAMPING DEVICES TIGHTENED JUST PRIOR TO PLACING OF THE CONCRETE IN BALLAST WALL.
11. ALL BOLTS CONNECTING CLAMPS AND LEVELLING DEVICES TO STEEL EXTRUSIONS TO BE LIBERALLY COATED WITH WHITE NON-STAINING GREASE.
12. AFTER REMOVAL OF CLAMPING AND LEVELLING DEVICES, BOLT HOLES SHALL BE FILLED WITH AN APPROVED EPOXY GROUT.

(* GODDCO W-100 EXPANSION JOINTS WERE USED)

SEAL INSTALLATION DATA.							
TEMPERATURE	°C	5	10	15	21	27	32
	°F	40	50	60	70	80	90
DIMENSION. 'J'		2·20"	2·13"	2·06"	1·99"	1·92"	1·85"

PRINT RECORD — DATE — FOR — NO.

D.S.McKinnon
M.M. DILLON LIMITED
13 May 82
DATE

REGISTERED PROFESSIONAL ENGINEER D. S. McKINNON PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER M. RADOLLI PROVINCE OF ONTARIO

THE REGIONAL MUNICIPALITY OF WATERLOO

for C.B. BAUMAN P.Eng. COMMISSIONER of ENGINEERING

May 19/82
DATE

DILLON Consulting Engineers & Planners

NO.	REVISIONS	DATE	BY
1	SIZE OF EMSEAL AND DEPTH OF CONCRETE REMOVAL AT CURB REVISED	22 JUNE 82	MAS
2	AS BUILT	OCT 82	GH

DESIGN M.R. | DRAWN M.A.S. | CHECKED M.R. | APPROVED D.S.M. | DATE MAY 1982 | SCALE AS SHOWN

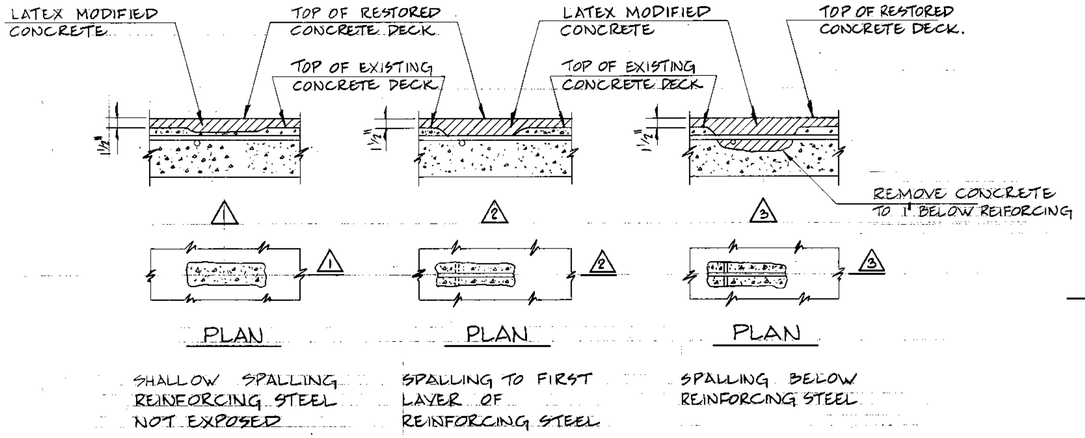
1982 BRIDGE REHABILITATION CONTRACT

REGIONAL STRUCTURE Nº 2201
SCHEIFELE BRIDGE
DETAILS I

PROJECT NO. 9168-01
SHEET NO. 82-16-2
OF 9

TRANSLAR 800-3-79

1322-02



DECK REPAIR DETAILS
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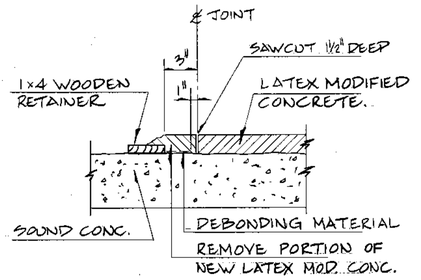

OPTIONAL CONSTRUCTION JOINT
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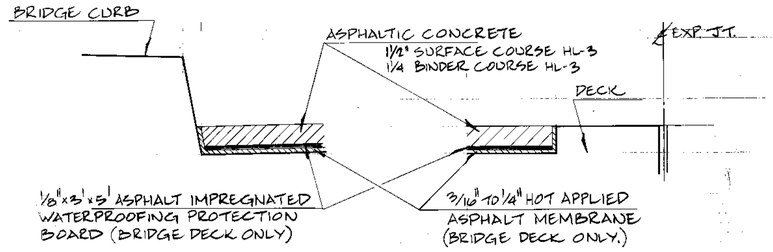
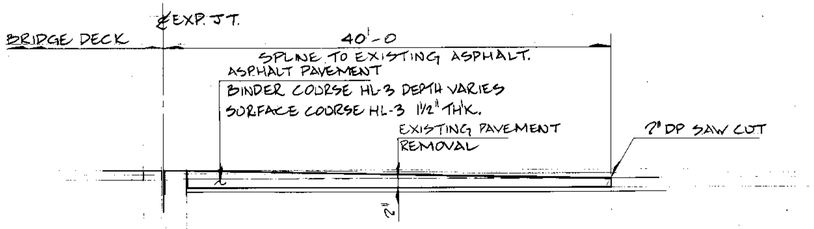


BRIDGE DECK WATERPROOFING DETAIL



PAVEMENT DETAIL AT BRIDGE APPROACH.

PRINT RECORD

NO.	DATE	FOR

M.M. DILLON LIMITED
19 May 82
DATE

REGISTERED PROFESSIONAL ENGINEER D. S. McMillan PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER M. RADOLLI PROVINCE OF ONTARIO

THE REGIONAL MUNICIPALITY OF WATERLOO
for C. S. BAUMAN P.Eng.
COMMISSIONER of ENGINEERING
May 1982
DATE

DILLON Consulting Engineers & Planners

NO.	REVISIONS	DATE	BY
1	"AS BUILT"	OCT 82	GH

DESIGN M.R.
DRAWN M.A.S.
CHECKED M.R.
APPROVED D.S.M.
DATE MAY 1982
SCALE AS SHOWN

1982 BRIDGE REHABILITATION CONTRACT

REGIONAL STRUCTURE Nº 2201
SCHEIFELE BRIDGE
DETAILS II

PROJECT NO. 9168-01
SHEET NO. 82-16-3
OF 9

TRANSLAR 500-3-79

B22-02

Region of Waterloo

DESIGN AND CONSTRUCTION
DIVISION

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER (REGIONAL ROAD 22)

CONTRACT No: 2011-009

"ISSUED FOR CONSTRUCTION"

APRIL, 2011

McCORMICK RANKIN CORPORATION
A member of MMM GROUP

KEN SEILING
REGIONAL CHAIR

THOMAS SCHMIDT, P. ENG.
COMMISSIONER OF TRANSPORTATION
AND ENVIRONMENTAL SERVICES

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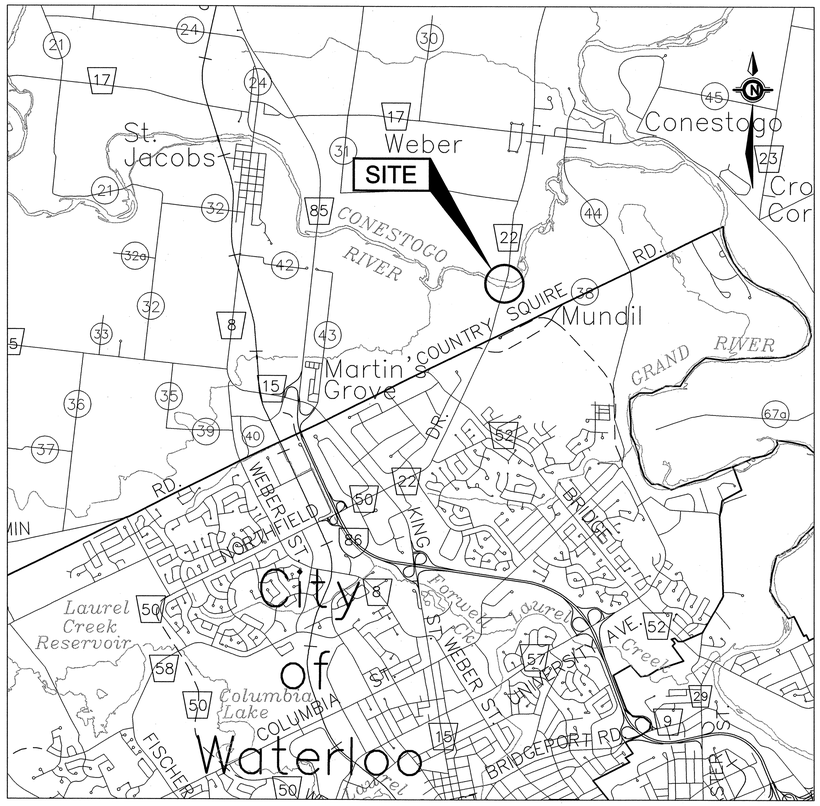
Region of Waterloo

McCORMICK RANKIN CORPORATION
A member of MMM GROUP

KEY PLAN



NTS

SCHEIFELE BRIDGE

ROAD No 22 ROAD NAME NORTHFIELD DRIVE
WORK OF REPAIRS TO SCHEIFELE BRIDGE

CONTRACT No 2011-009
FILE No 5511 (B) SECTION No
LOCATION OVER CONESTOGO RIVER

MUNICIPALITY CITY OF WATERLOO

	DRAWING INDEX
SHEET	DESCRIPTION
	TITLE PAGE
	INDEX PAGE
	REPAIRS TO BRIDGE
S1	GENERAL ARRANGEMENT
S2	CONSTRUCTION STAGING STAGE I
S3	CONSTRUCTION STAGING STAGE 2
S4	REMOVALS AND REPAIRS DETAILS I
S5	REMOVALS AND REPAIRS DETAILS II
S6	GUIDE RAIL SYSTEM
S7	EXPANSION JOINT ASSEMBLY
S8	EXPANSION JOINT DETAILS
E1	STAGE 1 TRAFFIC CONTROL
E2	STAGE 2 TRAFFIC CONTROL
T1	PERMANENT LANE MARKINGS

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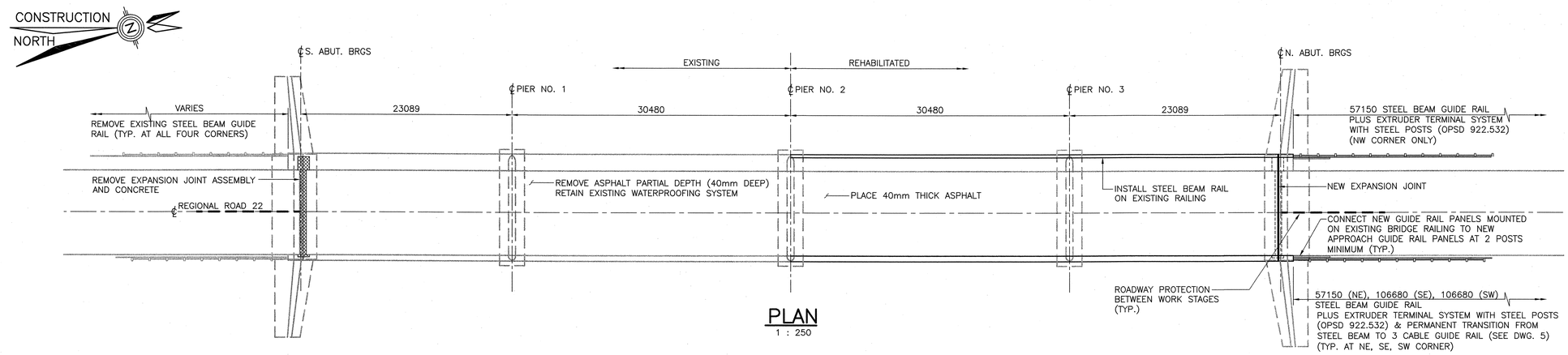

PLAN
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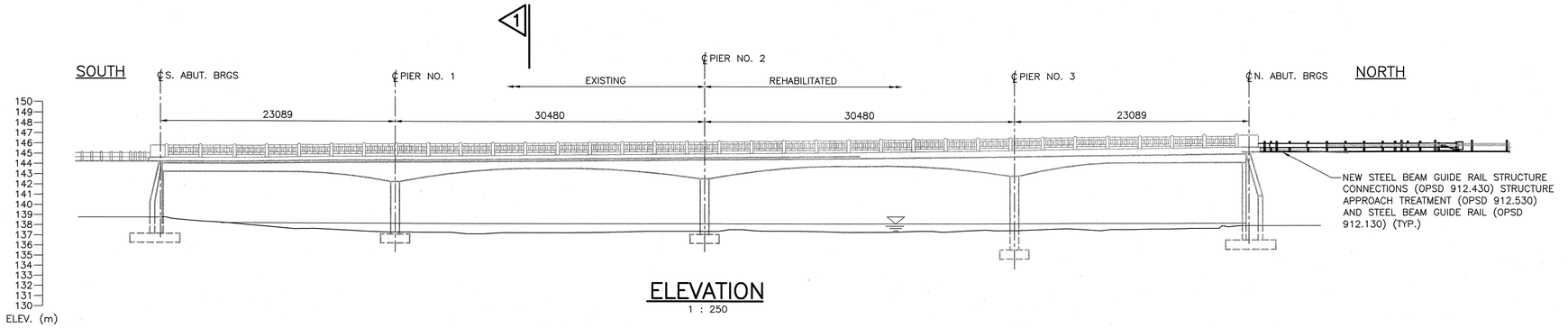

ELEVATION
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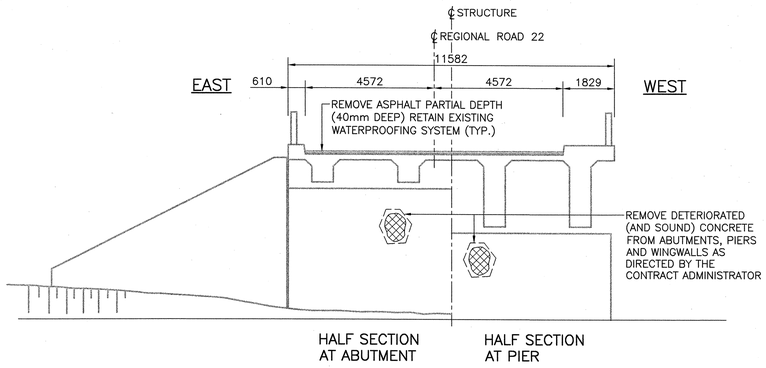

1 SECTION–EXISTING
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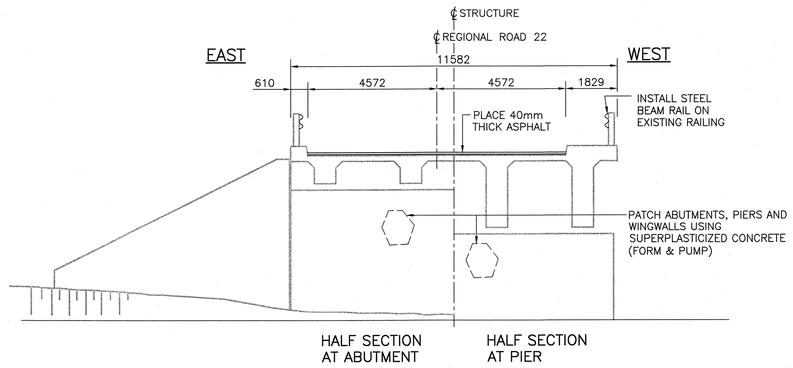

1 SECTION–REHABILITATED
1 : 100

GENERAL NOTES:

1. ALL WORK SHALL BE UNDERTAKEN IN ACCORDANCE WITH ONTARIO PROVINCIAL STANDARD SPECIFICATIONS AND THE SPECIAL PROVISIONS OF THE CONTRACT.
2. CLASS OF CONCRETE: 35 MPa.
3. REINFORCING STEEL SHALL BE GRADE 400W.
4. CLEAR COVER TO REINFORCING STEEL UNLESS OTHERWISE NOTED 70±20.
5. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS OF THE CASTING WORK AND ALL DETAILS ON SITE AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK.
6. BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH MTO STRUCTURAL STANDARD DRAWINGS SS12–1 AND SS12–2 (UNLESS OTHERWISE NOTED).
7. SAWCUTS AT LIMITS OF REMOVAL SHALL BE 25mm DEEP OR TO THE FIRST LAYER OF REINFORCING STEEL, WHICHEVER IS LESS (UNLESS OTHERWISE NOTED)
8. EPOXY GROUT FOR DOWELS SHALL BE FROM THE MTO'S DESIGNATED SOURCES FOR MATERIAL AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
9. ALL CONSTRUCTION ACTIVITIES SHALL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO THE WATERCOURSE. VEHICLE REFUELING AND MAINTENANCE SHALL BE CONDUCTED AWAY FROM THE WATERCOURSE.
10. DRAWINGS ARE NOT TO BE SCALED.
11. ALL DIMENSION SHOWN HERE ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

LIST OF DRAWINGS:

S1. GENERAL ARRANGEMENT
S2. CONSTRUCTION STAGING
S3. REMOVALS AND REPAIR DETAILS I
S4. REMOVALS AND REPAIR DETAILS II
S5. GUIDE RAIL SYSTEM, STEEL BEAM PERMANENT TRANSITION INSTALLATION STEEL BEAM WITH EXTRUDER TO 3 CABLE DIVIDED
S6. STRIP SEAL EXPANSION JOINT ASSEMBLY TYPE 'C'
S7. STRIP SEAL EXPANSION JOINT DETAILS TYPE 'C'
E1. ELECTRICAL LAYOUT STAGE 1 TRAFFIC CONTROL
E2. ELECTRICAL LAYOUT STAGE 2 TRAFFIC CONTROL
T1. PERMANENT LANE MARKINGS

APPLICABLE ATANDARD DRAWINGS:

OPSD 912.130	GUIDE RAIL SYSTEM, STEEL BEAM STEEL POST WITH OFFSET BLOCK ASSEMBLY INSTALLATION – SINGLE RAIL
OPSD 912.430	GUIDE RAIL SYSTEM, STEEL BEAM STRUCTURE CONNECTION
OPSD 912.530	GUIDE RAIL SYSTEM, STEEL BEAM STRUCTURE APPROACH TREATMENT
OPSD 912.532	ENERGY ATTENUATOR, END TREATMENT EXTRUDER TERMINAL SYSTEM WITH STEEL POSTS, INSTALLATION

KEY PLAN

THESE DESIGN DOCUMENTS ARE PREPARED SOLELY FOR THE USE BY THE PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS ENTERED INTO A CONTRACT AND THERE ARE NO REPRESENTATIONS OF ANY KIND MADE BY THE DESIGN PROFESSIONAL TO ANY PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS NOT ENTERED INTO A CONTRACT.

McCORMICK RANKIN CORPORATION
A member of MMM GROUP

No.	ISSUE/REVISION	BY	DATE
1	ISSUED FOR CONSTRUCTION	RSS	APR. 29, 2011

CONTROLLING B.M.

FIELD BOOK No.

DISCLAIMER:
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CADD FILE: S7474-300-001GA.dwg

LICENSED PROFESSIONAL ENGINEER U. KHAN 100106507 PROVINCE OF ONTARIO Apr. 27/11

LICENSED PROFESSIONAL ENGINEER R. S. STOFKO Apr. 27/11 PROVINCE OF ONTARIO

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

GENERAL ARRANGEMENT

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
MC	JP	2011–009	
SCALE: AS SHOWN	DATE: APR/2011	FILE No. 5511	SHEET S1 OF S8

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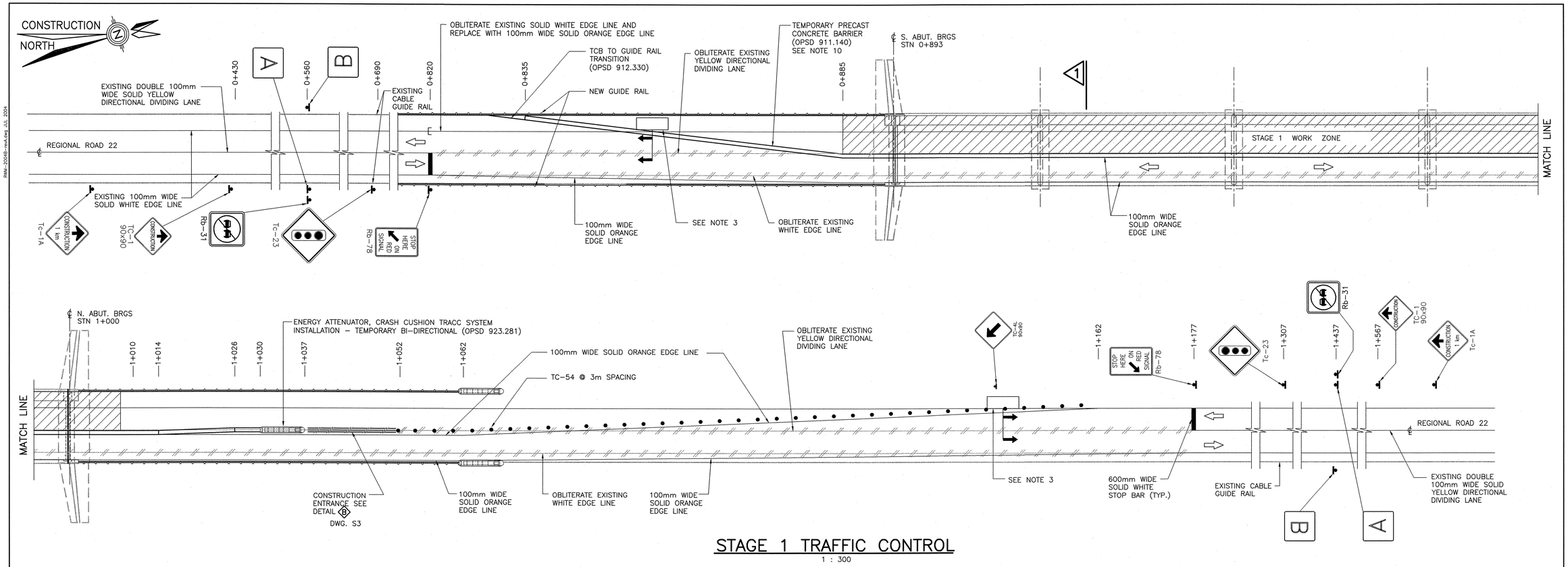
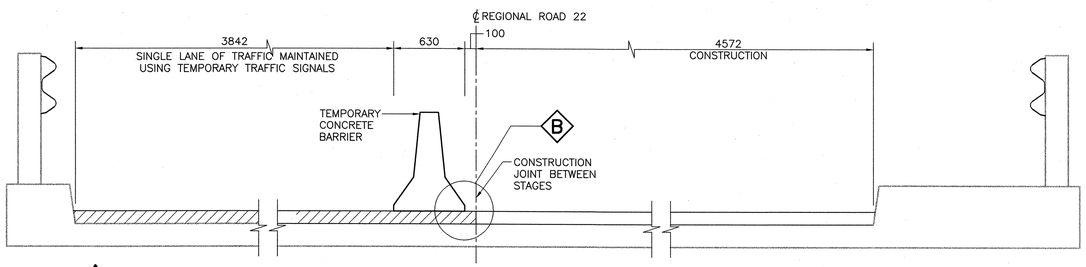
RWM-2004B-mwA.dwg JUL 2004



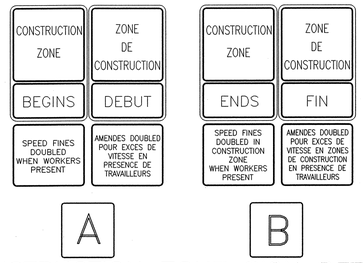
STAGE 1 TRAFFIC CONTROL

1 : 300



⚠1 STAGE 1 SHOWN, STAGE 2 SIMILAR BUT OPPOSITE HAND

1 : 25



CONSTRUCTION ZONE SIGN DETAILS

GENERAL NOTES

1. ALL TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE SUPPLIED, INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE LATEST EDITION OF BOOK 7 (TEMPORARY CONDITIONS) OF THE MTO's ONTARIO TRAFFIC MANUAL.
2. TRAFFIC CONTROL IS BASED UPON THE POSTED REGULATORY SPEED LIMIT OF 80km/hr
3. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE ELECTRICAL WORK (PORTABLE TRAFFIC SIGNAL UNITS DRAWING).
4. THE CONTRACTOR SHALL PREPARE AND SUBMIT TO THE CONTRACT ADMINISTRATOR A COPY OF THEIR TRAFFIC PROTECTION PLAN FOR THIS PROJECT, IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT.
5. THE CONTRACTOR SHALL COVER ANY EXISTING TRAFFIC CONTROL SIGNS THAT CONFLICT WITH TEMPORARY SIGNS REQUIRED FOR CONSTRUCTION STAGING.
6. ANY EXISTING TRAFFIC CONTROL SIGNS SHALL BE REINSTATED UPON REMOVAL OF THE TEMPORARY TRAFFIC CONTROL DEVICES.
7. TEMPORARY PAVEMENT MARKINGS AND TEMPORARY TRAFFIC CONTROL SIGNS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
8. EXISTING PAVEMENT MARKINGS WHICH CONFLICT WITH THE TEMPORARY MARKINGS SHALL BE OBSCURED USING WATER/SODA BLAST OR BY GRINDING IN ACCORDANCE WITH CONTRACT SPECIFICATION.
9. ALL TEMPORARY PAVEMENT MARKING SHALL BE TEMPORARY PAINT.
10. TEMPORARY CONCRETE BARRIERS SHALL BE SUPPLIED WITH TAB TYPE, BARRIER MOUNTED DELINEATORS.

KEY PLAN

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McCORMICK RANKIN CORPORATION
A member of MMM GROUP

No.	ISSUE/REVISION	BY	DATE
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CADD FILE: 57474-300-002CS.dwg

LICENSED PROFESSIONAL ENGINEER R. S. STOFKO PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER O. KHAN 100106507 PROVINCE OF ONTARIO

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

CONSTRUCTION STAGING STAGE 1

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
ZP	JP	2011-009	
SCALE: AS SHOWN	DATE: APR/2011	FILE No. 5511	SHEET S2 OF S8

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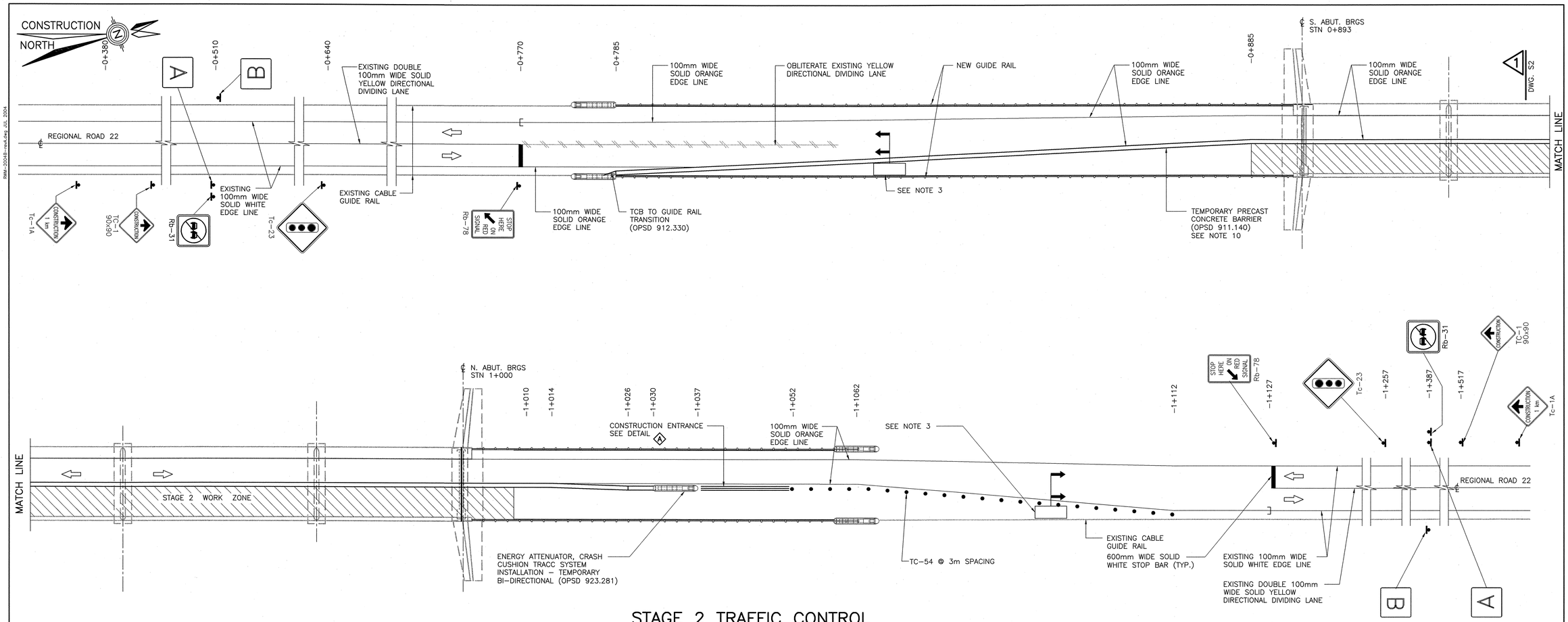
RMW-2004B-mm4.dwg JUL 2004



STAGE 2 TRAFFIC CONTROL

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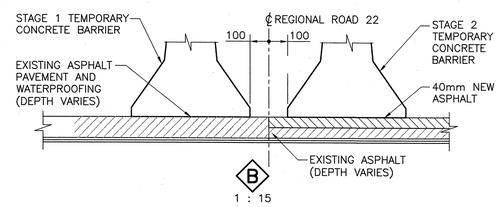

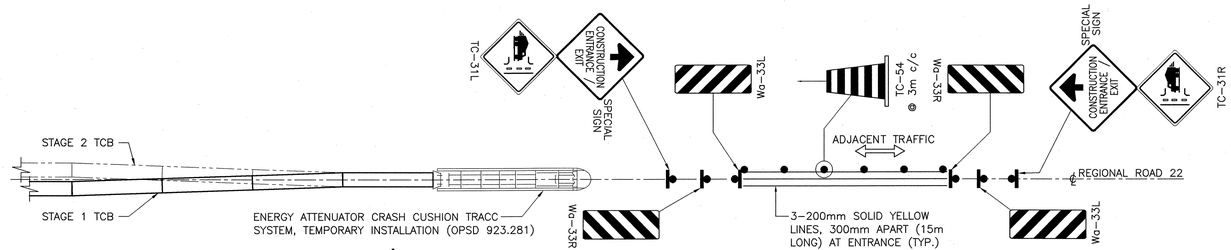

A DETAIL – CONSTRUCTION ENTRANCE / EXIT

1 : 125

KEY PLAN

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McCORMICK RANKIN CORPORATION
A member of MMM GROUP

No.	ISSUE/REVISION	BY	DATE
1	ISSUED FOR CONSTRUCTION	RSS	APR. 29, 2011

CONTROLLING B.M.

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LICENSED PROFESSIONAL ENGINEER R. S. STOFKO PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER O. KHAN 100106507 PROVINCE OF ONTARIO

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

CONSTRUCTION STAGING STAGE 2

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
ZP	JP	2011-009	
SCALE: AS SHOWN	DATE: APR/2011	FILE No. 5511	SHEET S3 OF S8

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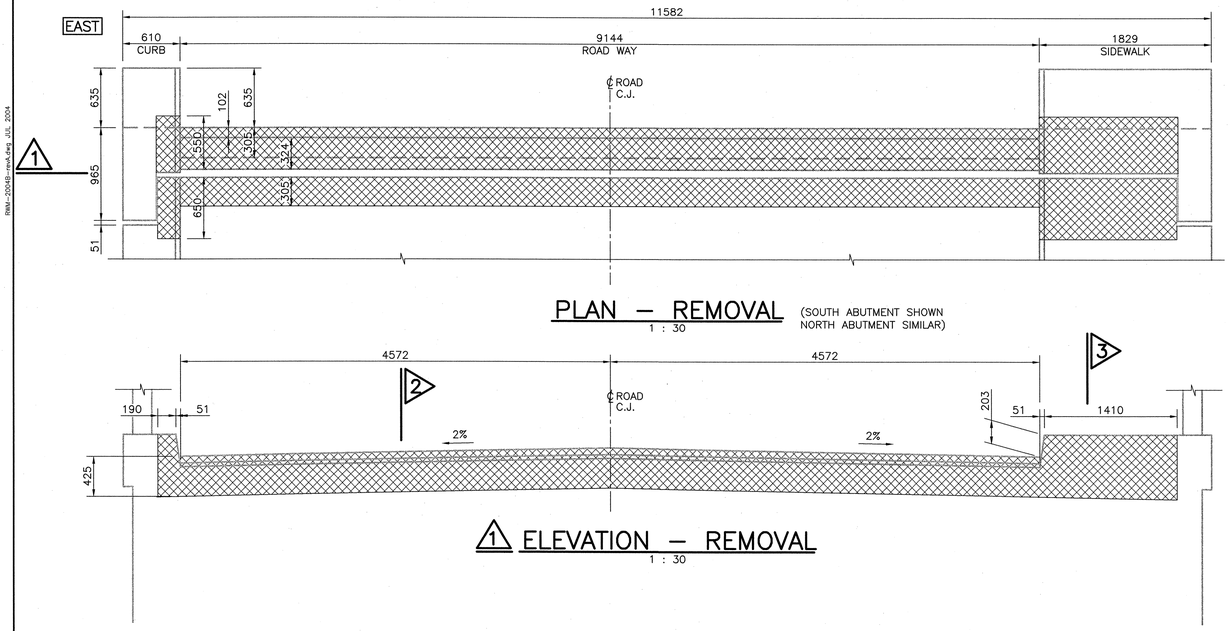

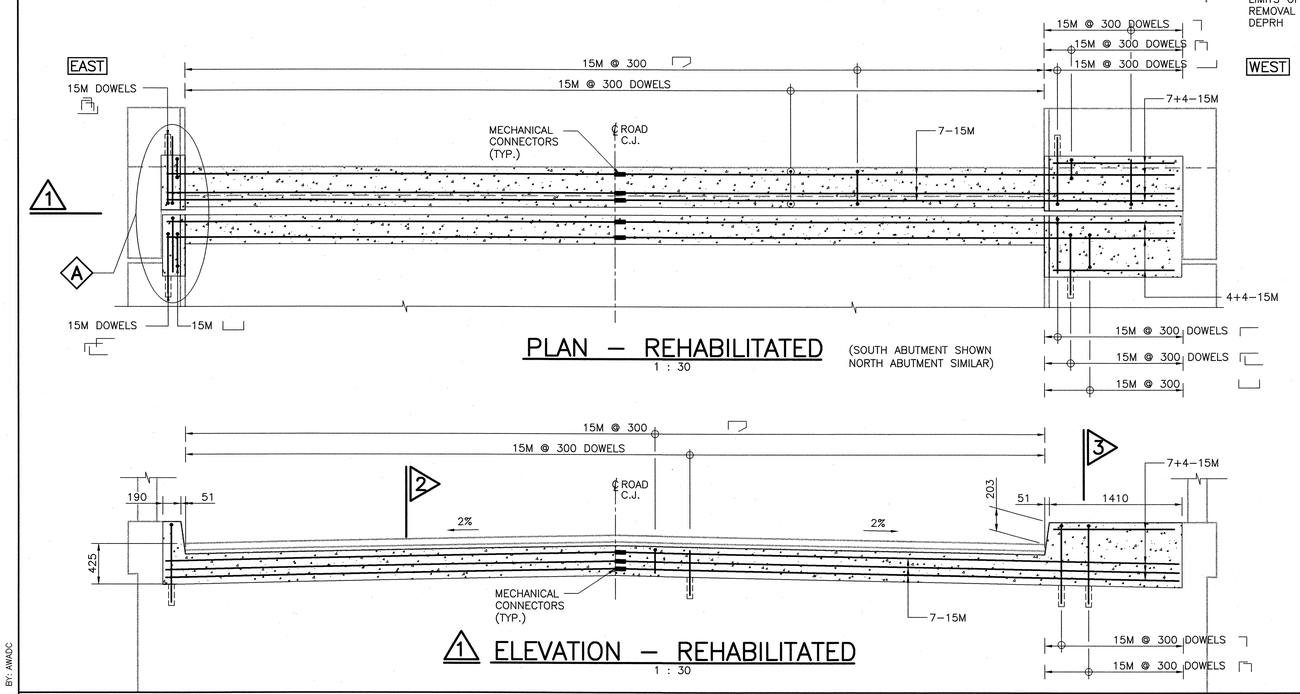

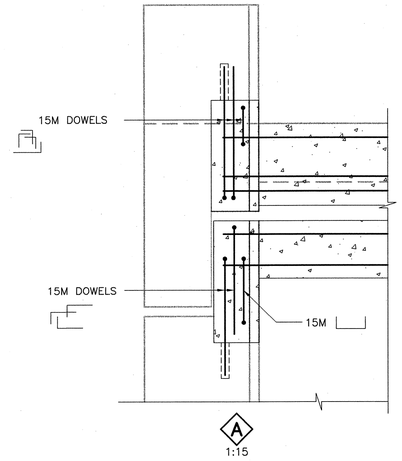

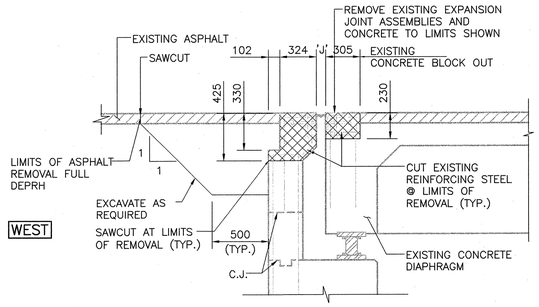

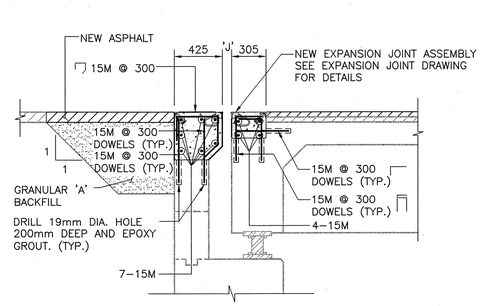

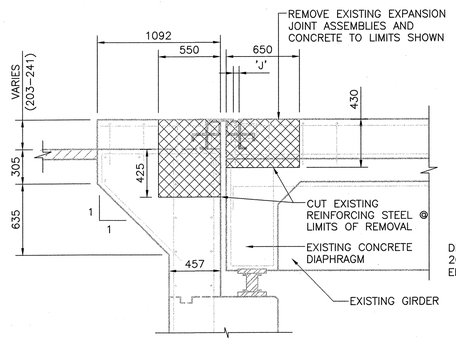

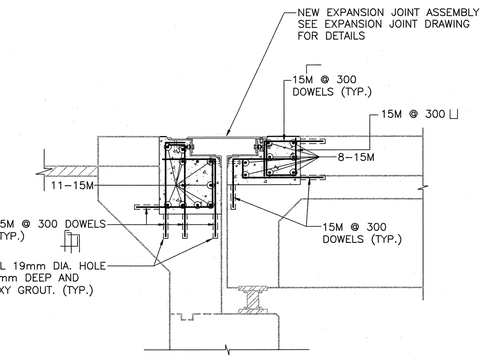

NOTES:

1. EPOXY SHALL BE IN ACCORDANCE WITH MTO DSM #9.40.13

LEGEND:

- ASPHALT WEARING SURFACE
- REMOVAL
- NEW CONCRETE

KEY PLAN

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McCORMICK RANKIN CORPORATION
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CONTROLLING B.M.

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CADD FILE:
S7474-300-0044RR.dwg

LICENSED PROFESSIONAL ENGINEER
U. KHAN
100106507
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
R. S. STOFKO
PROVINCE OF ONTARIO

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

REMOVALS AND REPAIR DETAILS I

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
MC	JP	2011–009	
SCALE: AS SHOWN	DATE: APR/2011	FILE No. 5511	SHEET S4 OF S8

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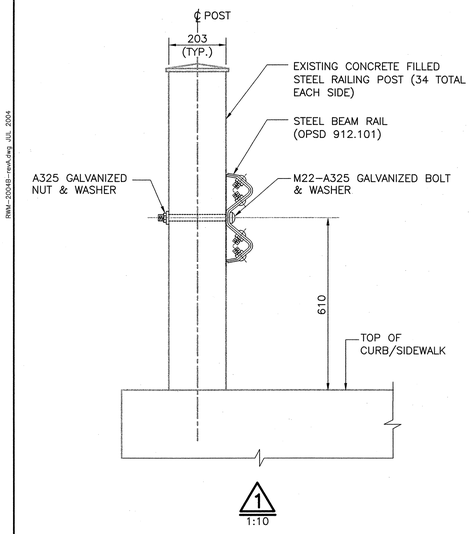

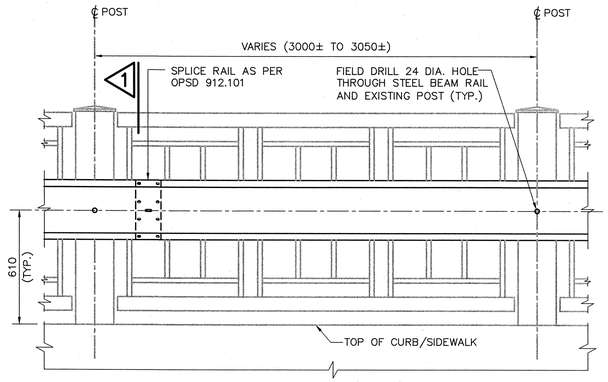

DETAILS FOR INSTALLATION OF STEEL BEAM RAIL ON EXISTING RAILING SYSTEM

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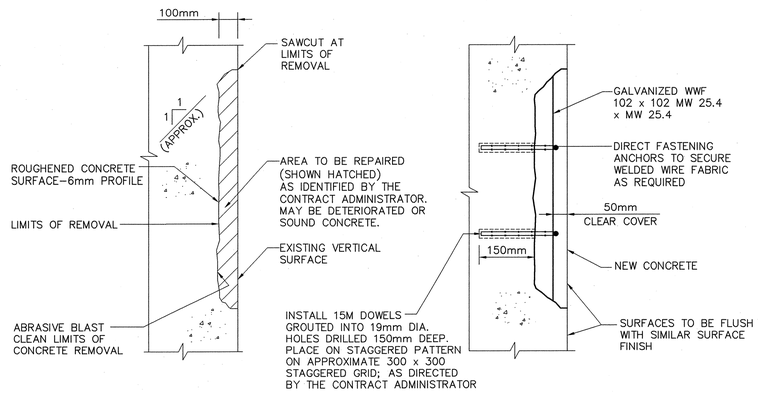


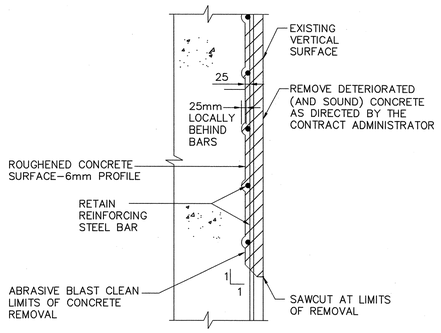
EXISTING / REMOVAL REHABILITATED

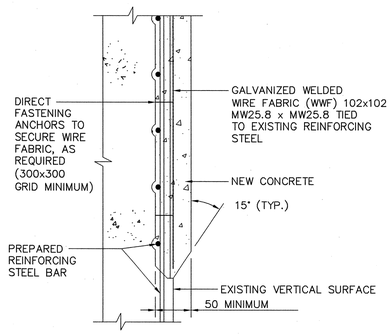
TYPICAL CONCRETE REPAIR DETAIL NO REINFORCING STEEL BARS

N.T.S.

TYPICAL CONCRETE REPAIR NOTES:

1. RE–TIE EXPOSED REINFORCING STEEL BARS AT ALL INTERSECTIONS.
2. REPLACE BADLY CORRODED OR DAMAGED REINFORCING STEEL BARS AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
3. CLEAN ALL EXISTING CONCRETE FACES, REMOVAL AREAS AND EXPOSED REINFORCING STEEL BARS BY ABRASIVE BLAST CLEANING.
4. PLACE ANCHOR INSERTS AS REQUIRED, INSERTS TO BE GALVANIZED AS PER ASTM 123.
5. PLACE WELDED GALVANIZED STEEL WIRE FABRIC.
6. PRE–WET 24 HOURS PRIOR TO PLACING CONCRETE.
7. PLACE CONCRETE.
8. FINISH AND CURE CONCRETE.





EXISTING/REMOVAL REHABILITATED

TYPICAL CONCRETE REPAIR DETAIL – VERTICAL SURFACE LESS THAN 70mm EXISTING COVER TO REINFORCING STEEL BARS

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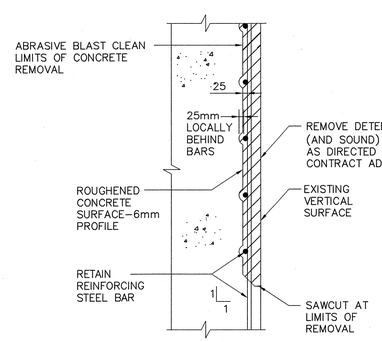

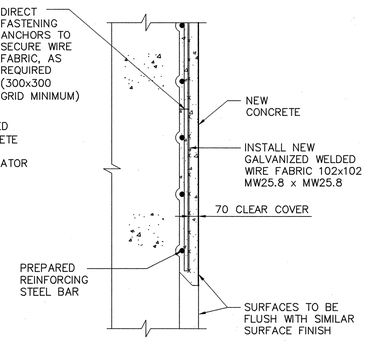

EXISTING/REMOVAL REHABILITATED

TYPICAL CONCRETE REPAIR DETAIL – VERTICAL SURFACE GREATER THAN 70mm EXISTING COVER TO REINFORCING STEEL BARS

N.T.S.

CAD FILE LOCATION AND NAME: S:\7474\300\S7474–300–005RR.dwg
MODIFIED: 4/26/2011 2:09:41 PM BY: AWADC
DATE PLOTTED: 4/27/2011 1:39:09 PM BY: AWADC

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McCORMICK RANKIN CORPORATION
A member of MMM GROUP

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CADD FILE:
S7474–300–005RR.dwg

LICENCED PROFESSIONAL ENGINEER U. KHAN 100106507 PROVINCE OF ONTARIO

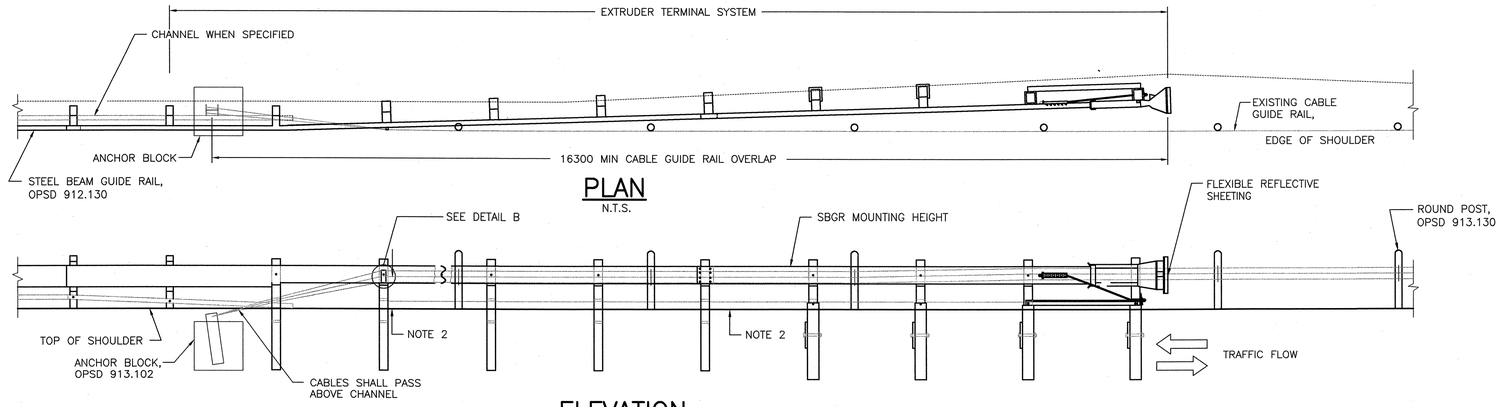
LICENCED PROFESSIONAL ENGINEER R. S. STOFKO PROVINCE OF ONTARIO

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

REMOVALS AND REPAIR DETAILS II

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
MC	JP	2011–009	
SCALE: AS SHOWN	DATE: APR/2011	FILE No. 5511	SHEET S5 OF S8

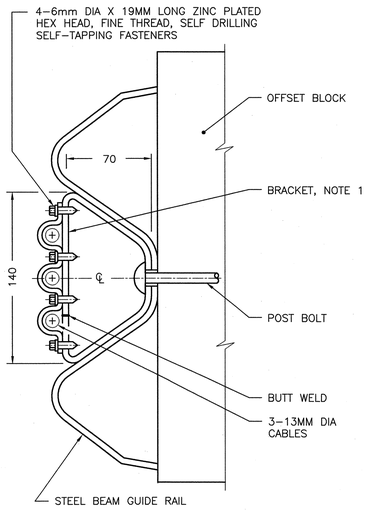


PLAN
N.T.S.

ELEVATION
N.T.S.

NOTES:

1. 3MM THICK GALVANIZED STEEL PLATE SHAPED TO FIT INSIDE STEEL BEAM GUIDE RAIL.
2. CENTRE CABLE SHALL MATCH ELEVATION OF SBGR CENTRELINE.
3. DIMENSION TO TOP OF TOP CABLE.



SECTION A–A
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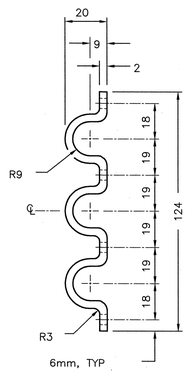
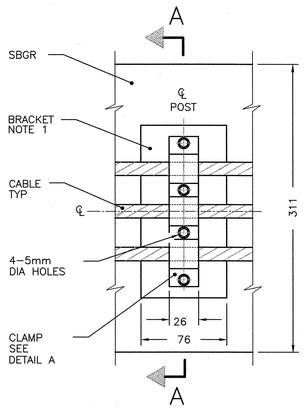


DETAIL A
N.T.S.



DETAIL B
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LICENSED PROFESSIONAL ENGINEER U. KHAN 100106507 PROVINCE OF ONTARIO

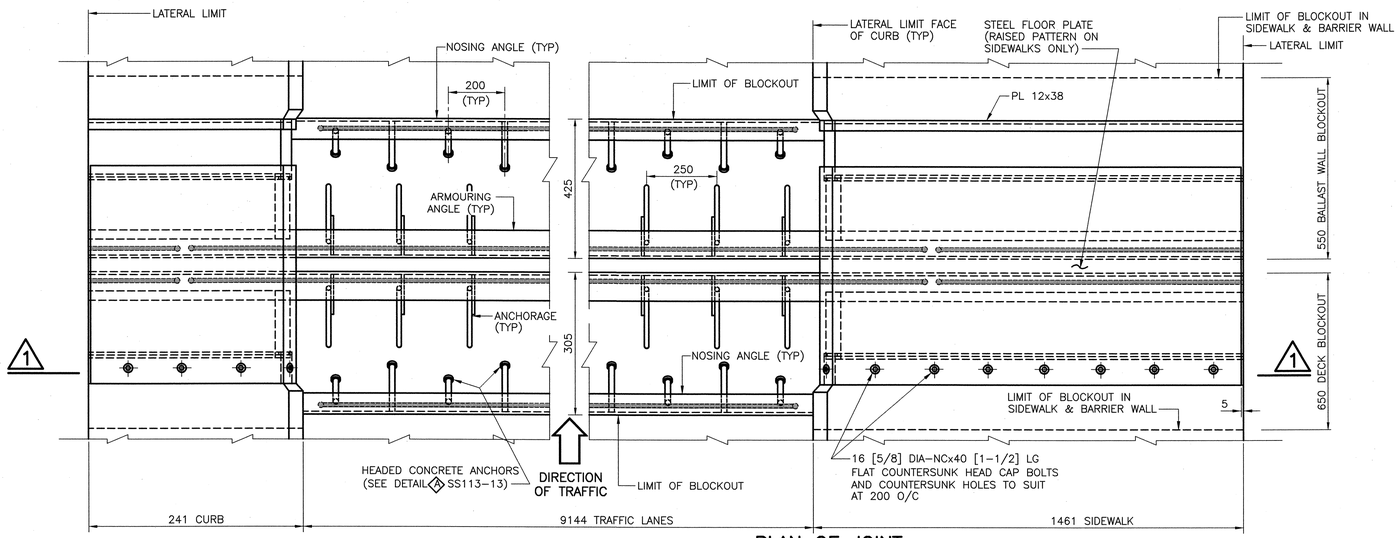
LICENSED PROFESSIONAL ENGINEER R. S. STOFKO PROVINCE OF ONTARIO

Region of Waterloo

PERMANENT TRANSITION INSTALLATION OVER CONESTOGO RIVER

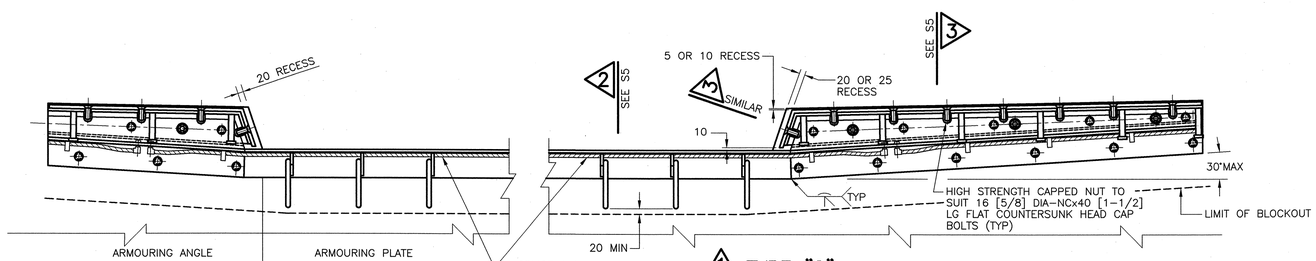
GUIDE RAIL SYSTEM, STEEL BEAM PERMANENT TRANSITION INSTALLATION STEEL BEAM WITH EXTRUDER TO 3 CABLE DIVIDED

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
ZP	JP	2011–009	
SCALE: AS SHOWN	DATE: APR/2011	FILE No. 5511	SHEET S6 OF S8

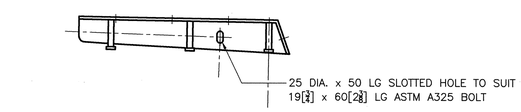


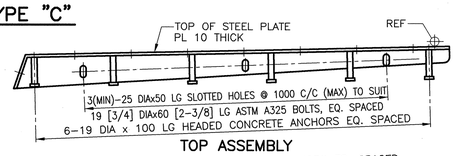
PLAN OF JOINT

NOTE: PLOUGH GUARD AND CLAMPING BAR FOR TYPE "A" NOT SHOWN

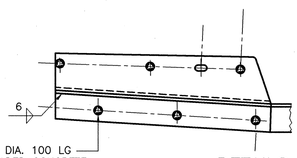


1 TYPE "C"

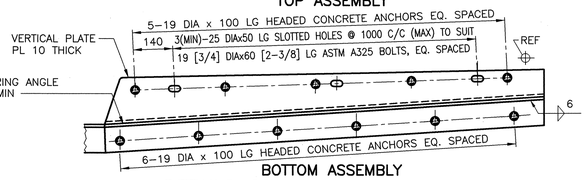




TOP ASSEMBLY



DETAILS OF ARMOURING WITHOUT SIDEWALK



BOTTOM ASSEMBLY

DETAILS OF ARMOURING AT SIDEWALK

DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

NOTES:

1. EXPANSION JOINT SHALL BE IN ACCORDANCE WITH THE DESIGNATED SOURCES FOR MATERIALS LIST DSM 9.40.27, TYPE "C". DETAILS SHOWN FOR OTHER TYPES ARE NOT APPLICABLE.
2. EXPANSION JOINT ASSEMBLY CONSTRUCTION AND MATERIAL SHALL BE ACCORDING TO OPSS 920 AND OPSS 1210, AND AS SPECIFIED IN THE CONTRACT DOCUMENTS.
3. STEEL PLATE 10mm THICK UNLESS OTHERWISE NOTED.
4. WELDING ELECTRODES SHALL BE OF A LOW HYDROGEN CLASSIFICATION.
5. JOINT ASSEMBLIES SHALL BE COMPLETELY SHOP ASSEMBLED (EXCEPT FOR SEALS) AND PRESET TO DIMENSION 'J' FOR 15°C AND ADJUSTED IN THE FIELD TO SUIT INSTALLATION TEMPERATURE.
6. JOINT ASSEMBLY INSTALLATION TEMPERATURE SHALL BE TAKEN AS MEAN SHADE AIR TEMPERATURE AT STRUCTURE PRIOR TO JOINT INSTALLATION AS FOLLOWS:
   – FOR CONCRETE STRUCTURES – 48 HOURS
   – FOR STEEL STRUCTURES – 24 HOURS
7. FIELD SPLICES IN JOINT ASSEMBLY ARE ONLY PERMITTED AT STAGED CONSTRUCTION, AND/OR AS SHOWN ON THE CONTRACT DRAWINGS.
8. IF THE JOINT ARMOURING FOR A SKEWED STRUCTURE IS SPLICED AT A CROWN, THE SPLICE SHALL BE DETAILED PARALLEL TO THE CENTRELINE OF THE TRAFFIC LANE.
9. SETTING ANGLES SHALL BE FLAME CUT ACCORDING TO OPSS 920, BUT IN NO CASE PRIOR TO CONCRETE REACHING INITIAL SET.
10. AFTER CURING OF THE CONCRETE FOR A MINIMUM OF 7 DAYS, THE SETTING DEVICES MAY BE REMOVED. THE VOIDS UNDER THE ARMOURING ANGLE AND NOSING ANGLE SHALL THEN BE PRESSURE INJECTED.
11. PREFORMED SEALS SHALL HAVE MINIMUM THICKNESS OF 5mm OR AS PER DSM.
12. ALL STEEL RETAINER SURFACES COMING IN CONTACT WITH PREFORMED SEAL SHALL BE CLEANED PRIOR TO INSTALLATION OF THE SEAL.
13. PREFORMED SEALS SHALL BE INSTALLED AFTER JOINT ASSEMBLY HAS BEEN CAST IN PLACE, STYROFOAM OR FILLER BETWEEN DECK AND BALLAST WALL REMOVED, AND EXPANSION GAP CLEARED OF ANY DEBRIS.
14. ALL JOINT ANCHORAGES SHALL BE DETAILED ON WORKING DRAWINGS PERPENDICULAR TO THE EXPANSION JOINT ON BOTH THE DECK SIDE AND THE ABUTMENT SIDE EXCEPT AS FOLLOWS. STRUCTURES SKEWED FROM OVER 15° AND UP TO 45° SHALL HAVE ANCHORAGES DETAILED 30° OFFSET FROM THE PERPENDICULAR TO THE EXPANSION JOINT ON THE DECK SIDE.
15. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING SS113-12 OR SS113-13.
16. LEGEND: [ ] DENOTES FASTENER SIZE IN INCHES.

ADDITIONAL NOTES FOR BOLTS:

1. 19 [3/4] DIAMETER BOLTS SHALL BE IN ACCORDANCE WITH WITH ASTM A325. ALL BOLTS USED IN 25 DIA. x 50 LONG SLOTTED HOLES SHALL BE INSTALLED WITH OVERSIZE WASHERS.
2. 16 [5/8] DIAMETER FLAT COUNTERSUNK HEAD CAP BOLTS SHALL BE IN ACCORDANCE WITH ASTM F835.
3. CLAMPING BAR BOLTS FOR TYPE 'A' JOINTS SHALL BE EITHER 19 [3/4] DIAMETER FLAT COUNTERSUNK HEAD CAP BOLTS TENSIONED TO 140kN AND IN ACCORDANCE WITH ASTM F835, OR 19 [3/4] DIAMETER HEX HEAD BOLTS TENSIONED TO 125kN AND IN ACCORDANCE WITH ASTM A325.
4. ALL BOLTS SHALL BE INSTALLED USING MOLY50 LUBRICANT.
5. ALL BOLTS SHALL BE TENSIONED USING THE TURN-OF-NUT TIGHTENING METHOD IN ACCORDANCE WITH CAN/CSA S16.1.

STANDARD DRAWING APRIL 2008	MODIFIED SS113-10
STRIP SEAL EXPANSION JOINT ASSEMBLY FOR BARRIER WALLS	

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CADD FILE: S7474-300-007XJ.dwg

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LICENSED PROFESSIONAL ENGINEER R. S. STOFKO PROVINCE OF ONTARIO

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

STRIP SEAL EXPANSION JOINT ASSEMBLY TYPE 'C'

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
MC	JP	2011-009	
SCALE: AS SHOWN	DATE: APR/2011	FILE No. 5511	SHEET S7 OF S8

CAD FILE LOCATION AND NAME: S:\7474\300\S7474-300-007XJ.dwg
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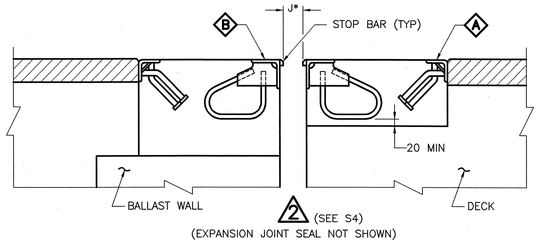
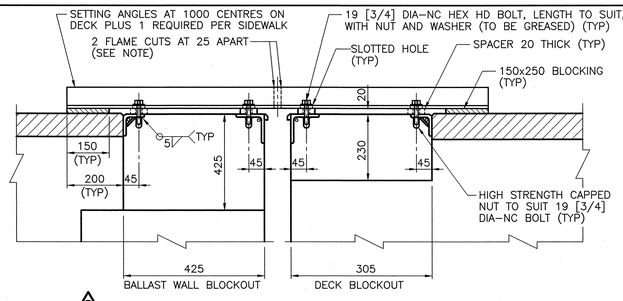
DATE PLOTTED: 4/27/2011 1:41:25 PM BY: AWADC

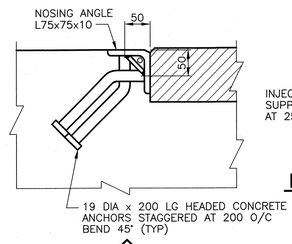
RMW-2004B-mod.dwg JUL 2004

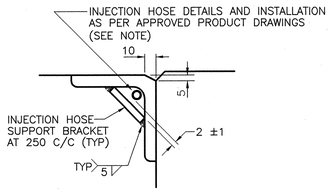


2 (SEE S4)
(EXPANSION JOINT SEAL NOT SHOWN)



2 SETTING DEVICE AND BLOCKOUTS
(SEE S4)



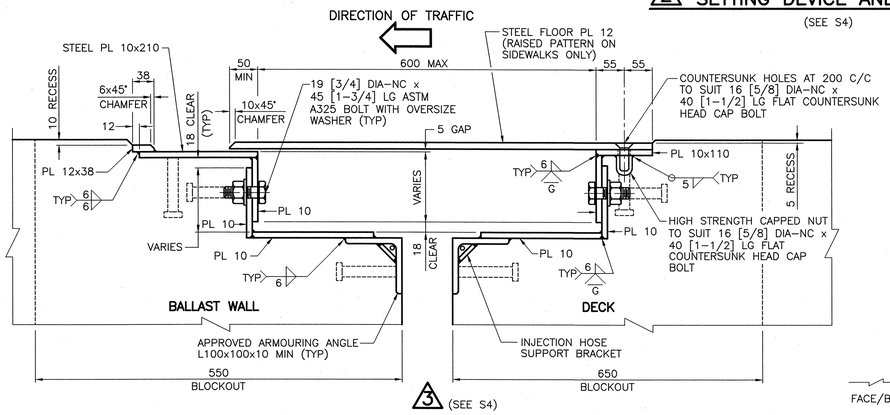


INJECTION HOSE SUPPORT BRACKET DETAIL

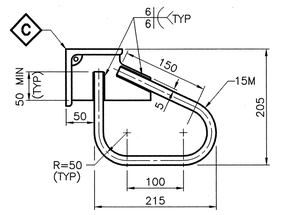
METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

NOTES:

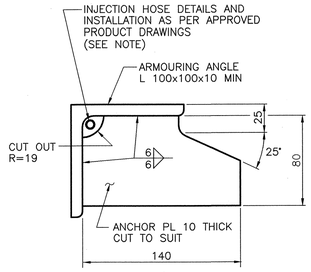
1. FOR DETAILS OF REINFORCING IN EXPANSION JOINT BLOCKOUT, SEE DWG. S2.
2. HEADED CONCRETE ANCHORS IN NOSING ANGLES SHALL BE LOCATED WITHIN 75 mm OF EITHER SIDE OF FIELD SPLICES.
3. PROTECT INJECTION HOSE AND FITTINGS ADJACENT TO FIELD SPLICE DURING WELDING AND REMOVE PROTECTION PRIOR TO PLACING OF CONCRETE IN BLOCKOUT.
4. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING SS113–10.
5. LEGEND: [ ] DENOTES FASTENER SIZE IN INCHES.



3 (SEE S4)
(STOP BARS AND RETAINER PLATES NOT SHOWN FOR CLARITY)



B ANCHORAGE DETAIL



C

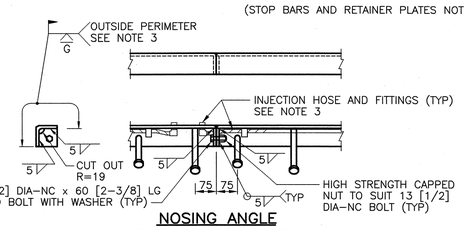
TABLE OF DESIGN REQUIREMENTS (TO BE FULLY COMPLETED BY DESIGNER)

EXP. JOINT LOCATION	MTO GAP ** RATING (mm)		DESIGN *** MOVEMENT	* "J" AT INSTALLATION TEMPERATURE (C) (mm)							
	MIN	MAX		–5°	0°	5°	10°	15°	21°	27°	32°
NORTH & SOUTH ABUTMENTS	35	100	40	60	58	55	53	50	47	45	42

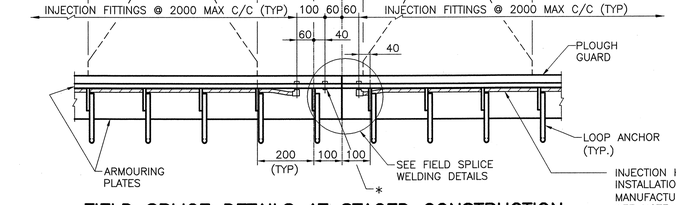
* DIMENSION 'J' MEASURED PERPENDICULAR TO CENTRELINE EXPANSION JOINT. WHERE MIN. AND MAX. FOR JOINT SUPPLIED DIFFER FROM THOSE SHOWN IN TABLE, 'J' DIMENSIONS SHALL BE REVISED BY CONTRACTOR AND SHOWN ON SHOP DRAWINGS. FOR STAGED CONTRUCTION ON STRUCTURES OTHER THAN POST–TENSIONED, THE CONTRACTOR SHALL USE THE FIRST STAGE OBSERVED 'J' GAP TO INSTALL THE SECOND STAGE.

** MTO GAP, MEASURED BETWEEN PROJECTING FACES OF STOP BARS, IS TAKEN FROM DSM 9.40.27, TYPE "C".

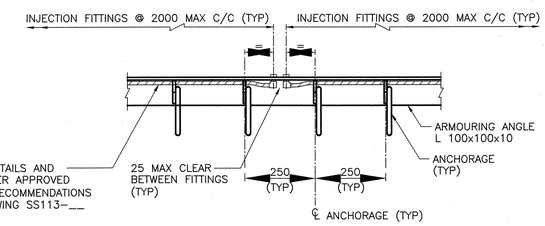
*** CALCULATED TOTAL MOVEMENT AT SLS OCCURRING AFTER TIME OF JOINT INSTALLATION. (MEASURED PARALLEL TO CENTRELINE OF STRUCTURE)



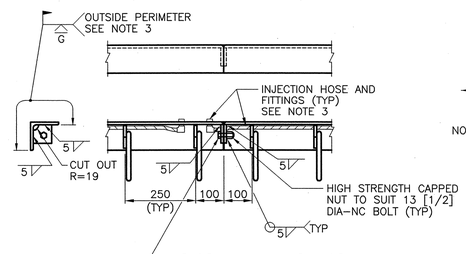
NOSING ANGLE FIELD SPLICE DETAIL



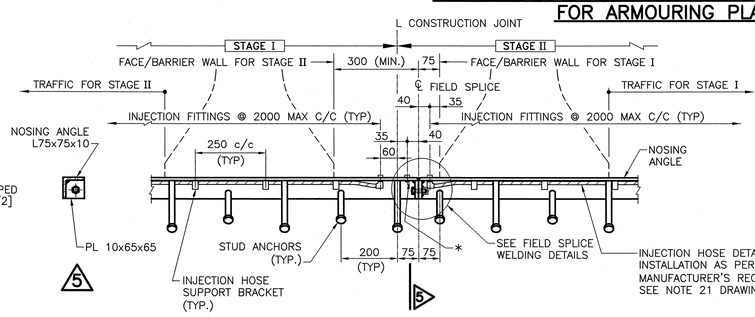
FIELD SPLICE DETAILS AT STAGED CONSTRUCTION FOR ARMOURING PLATES



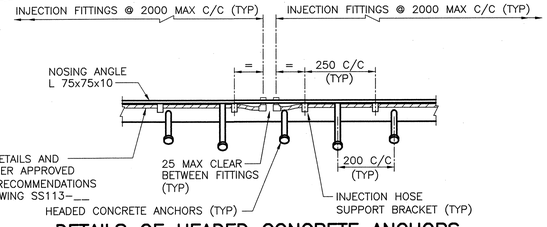
DETAILS OF ANCHORAGE AND INJECTION HOSE FOR ARMOURING ANGLE



ARMOURING ANGLE FIELD SPLICE DETAIL



FIELD SPLICE DETAILS AT STAGED CONSTRUCTION FOR NOSING ANGLE



DETAILS OF HEADED CONCRETE ANCHORS AND INJECTION HOSE FOR NOSING ANGLE

	MODIFIED
STANDARD DRAWING MARCH 2006	SS113–13
STRIP SEAL EXPANSION JOINT – TYPE "C" DETAILS	

KEY PLAN

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McCORMICK RANKIN CORPORATION
A member of MMM GROUP

No.	ISSUE/REVISION	BY	DATE
1	ISSUED FOR CONSTRUCTION	RSS	JAN. 14, 2011

CONTROLLING B.M.

FIELD BOOK No.

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CADD FILE: S7474–300–008XJ.dwg

LICENSED PROFESSIONAL ENGINEER U. KHAN 100106507 PROVINCE OF ONTARIO Apr 27/11

LICENSED PROFESSIONAL ENGINEER R. S. STOFKO Apr 27/11 PROVINCE OF ONTARIO

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

STRIP SEAL EXPANSION JOINT DETAILS TYPE 'C'

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
MC	JP	2011–009	
SCALE: AS SHOWN	DATE: APR/2011	FILE No. 5511	SHEET S8 OF S8

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DATE PLOTTED: 4/27/2011 1:43:30 PM BY: AWADC

RMM–2004B–mnA.dwg JUL 2004

ESTIMATE OF MATERIALS

SCHEIFELE BRIDGE (#2201) OVER CONESTOGO RIVER

LOCATION: REGIONAL ROAD 22 (NORTHFIELD DRIVE)

TOWNSHIP OF WOOLWICH

ITEMS	QUANTITY P	QUANTITY S
SIGNAL HEADS		
STANDARD HIGHWAY HEAD 300mm x 200mm x 200mm (LED)		
SPECIAL HIGHWAY HEAD 300mm x 200mm x 200mm x 300mm WITH ARROW WITH PLUMIZER (LED)		
SPECIAL HIGHWAY HEAD 300mm x 300mm x 300mm (LED)		
SPECIAL HIGHWAY HEAD 4 x 300mm WITH ARROW (LED)		
PEDESTRIAN SIGNAL HEAD (LED)		

ARMS AND BRACKETS

ARM LENGTHS	No. 5		No. 6		CONC OR WOOD 10–12"		CONC OR WOOD 12–14"		CONC OR WOOD 14–16"	
1.2m (4 ft)	4TR78		4TR81		4TR112		4TR114		4TR116	
1.8m (6 ft)	4TR78		4TR81		4TR112		4TR114		4TR116	
2.4m (8 ft)	4TR78		4TR81		4TR112		4TR114		4TR116	
3.0m (10 ft)	5TR78		5TR81		5TR112		5TR114		5TR116	
3.6m (12 ft)	5TR78		5TR81		5TR112		5TR114		5TR116	
4.6m (15 ft)	5TR78		5TR81		5TR112		5TR114		5TR116	
5.5m (18 ft)	6TR78		6TR81		6TR112		6TR114		6TR116	
6.1m (20 ft)	6TR78		6TR81		6TR112		6TR114		6TR116	
6.7m (22 ft)	6TR78		6TR81		6TR112		6TR114		6TR116	
0.6m (2 ft)	R2JA		CONC POLE D=(C/3.14)–3 WOOD POLE D=(C/3.14)							

POLES

- SS–23B (3.8m)
- SS–25R (7.1m)
- SS–35R (5.3m)
- TB–05R (10.8m)
- TB–15R (8.9m)
- SS–36R (6.9m)
- TB–26R (8.7m)
- POWCO 8620 (6.0m)
- POWCO 8624 (7.3m)
- ACRO–RICHMOND ANCHOR ASSEMBLY 230mm CENTRE
- ACRO–RICHMOND ANCHOR ASSEMBLY 280mm CENTRE
- ACRO–RICHMOND ANCHOR ASSEMBLY 320mm CENTRE

HANDWELLS AND DUCTWORK

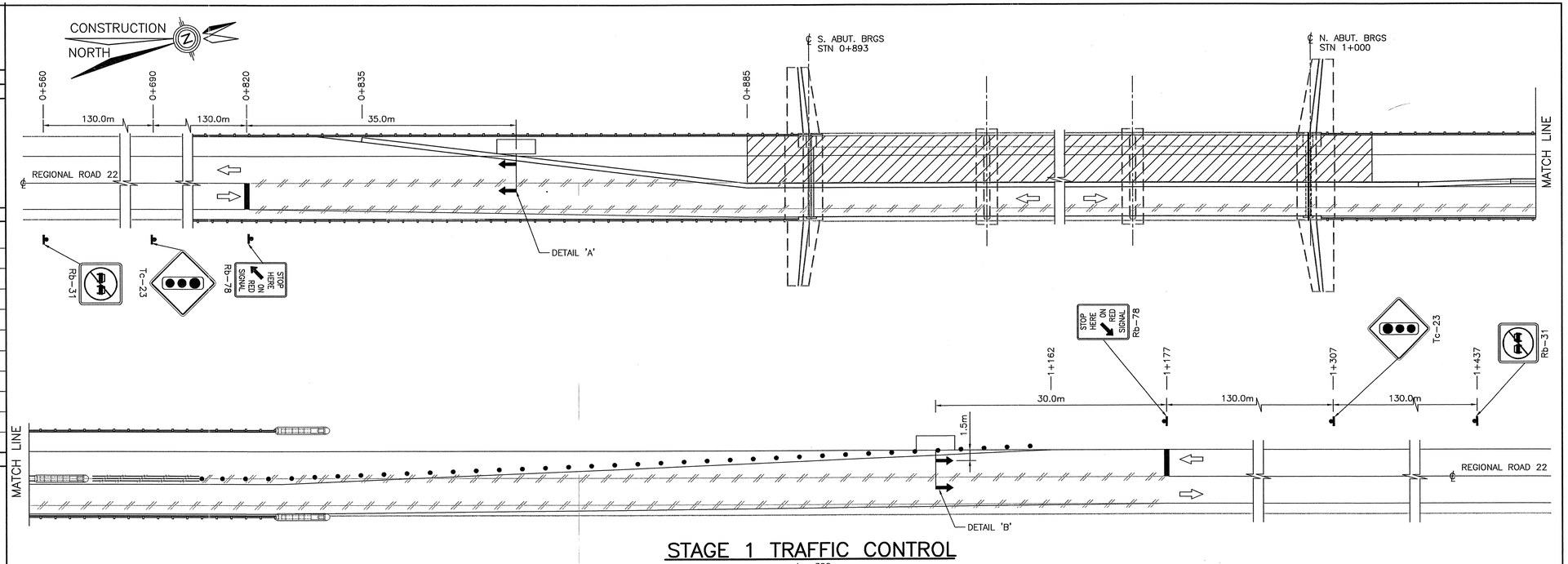
- 12 X 12 HANDWELL/COVER
- 10 X 15 HANDWELL/COVER
- 13 X 24 HANDWELL/COVER
- 17 X 30 HANDWELL/COVER
- RIGID PVC SCEPTRE 25mm BOULEVARD
- RIGID PVC SCEPTRE 32mm BOULEVARD
- RIGID PVC SCEPTRE 50mm BOULEVARD
- RIGID PVC SCEPTRE 75mm BOULEVARD
- RIGID PVC SCEPTRE 100mm BOULEVARD
- RIGID PVC SCEPTRE 50mm ROADWAY
- RIGID PVC SCEPTRE 75mm ROADWAY
- RIGID PVC SCEPTRE 100mm ROADWAY
- RIGID PVC SCEPTRE 25mm , 25mm BOULEVARD
- RIGID PVC SCEPTRE 50mm , 50mm BOULEVARD
- RIGID PVC SCEPTRE 100mm , 50mm BOULEVARD
- RIGID PVC SCEPTRE 100mm , 50mm ROADWAY
- RIGID PVC SCEPTRE 100mm , 50mm , 50mm BOULEVARD
- RIGID PVC SCEPTRE 100mm , 50mm , 50mm ROADWAY
- DIRECTIONAL BORING 100mm PVC CONDUIT
- DIRECTIONAL BORING 100mm , 50mm PVC CONDUIT
- RIGID PVC SCEPTRE WEATHERHEAD
- SCEPTRE JUNCTION BOX

WIRING

- No. 4 CONDUCTOR CABLE
- No. 7 CONDUCTOR CABLE
- No. 8 TWH BLACK / WHITE (POWER SUPPLY)
- No. 19 CONDUCTOR CABLE
- No. 6 TWH GROUND WIRE
- GROUND PLATE C/W GROUND WIRE CLAMP
- 8mm POLYPROPYLENE FISHROPE

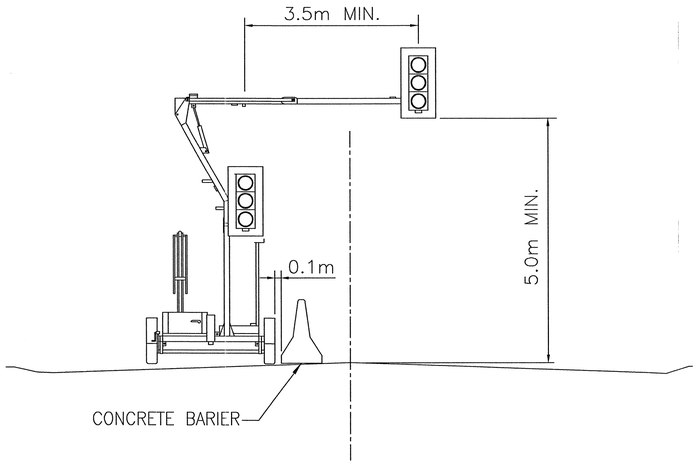
LOOP DETECTORS

- No. 14 RWU–90 LOOP WIRE
- LOOP SAW CUT & SEALANT
- No. 14 BELDEN 8720 RUN WIRE
- PEDESTRIAN PUSH BUTTON
- VEHICLE DETECTOR AMPLIFIER (DUAL)



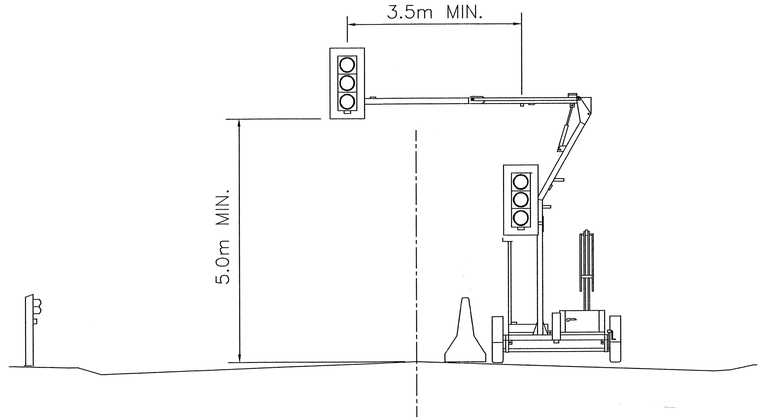
STAGE 1 TRAFFIC CONTROL

1 : 300



TYPICAL PORTABLE SIGNAL LAYOUT DETAIL 'A'

N.T.S



TYPICAL PORTABLE SIGNAL LAYOUT DETAIL 'B'

N.T.S

NOTES:

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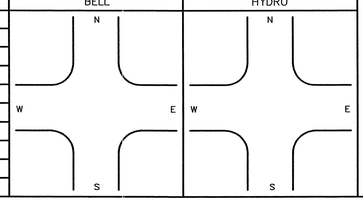
2. MOUNTING HEIGHT IS FROM GRADE LEVEL OF TRAVEL PORTION OF ROADWAY TO BOTTOM OF HEAD. MINIMUM 16'–6"(5.0m) TO MAXIMUM 18'–0" (5.5m) RECORD ACTUAL.
3. ELECTRICAL DETAILS ARE PROVIDED ON THIS DRAWING FOR CONSTRUCTION PURPOSES ONLY AND DO NOT FORM PART OF THE TRAFFIC CONTROL SIGNAL APPROVAL REQUIRED UNDER HTA 144(31).
4. TEMPORARY ILLUMINATION SHALL BE PROVIDED AS PER CONTRACT SPECIFICATION.
5. THE POSITION OF THE TRAFFIC SIGNAL PLANT TO BE INSTALLED, AS SHOWN ON THE DRAWING, IS APPROXIMATE ONLY. THE EXACT LOCATION WHERE THE PLANT IS TO BE INSTALLED SHALL BE CONFIRMED BY THE REGION OF WATERLOO INSPECTOR PRIOR TO INSTALLATION.

POLE No	POLE TYPE	POLE HEIGHT	BASE TYPE	SIGNAL HEADS MOUNTING HEIGHT @	SIGNAL HEADS ARM LENGTH	PED. HEADS MOUNTING HEIGHT (min)	PED. HEADS ARM LENGTH	PUSH BUTTON	BELL DATE	BELL BY
P–1	SS25R	7.1	CONC			2.75m	0.6m	YES		
P–2	SS25R	7.1	CONC			2.75m	0.6m	YES		
P–3	SS36R	6.9	CONC			2.75m	0.6m	YES		
P–4	SS25R	7.1	CONC			2.75m	0.6m	YES		
P–5	SS25R	7.1	CONC			2.75m	0.6m	YES	HYDRO	
P–6	SS25R	7.1	CONC			2.75m	0.6m	YES	DATE	BY
P–7	SS25R	7.1	CONC			2.75m	0.6m	YES		
P–8	SS25R	7.1	CONC			2.75m	0.6m	YES		
P–9	SS25R	7.1	CONC			2.75m	0.6m	YES		
P–10	SS25R	7.1	CONC			2.75m	0.6m	YES		

CONSTRUCTION UTILITY LOCATION



LEGEND

- HIGHWAY SIGNAL HEAD (300 X 200 X 200) WITH BACKBOARD AND MAST ARM
- HIGHWAY SIGNAL HEAD WITH BACKBOARD AND OVERHEAD CABLE
- HIGHWAY SIGNAL HEAD WITH BACKBOARD (300 X 300 X 300)
- SPECIAL HEAD WITH ARROW INDICATION AND BACKBOARD
- PEDESTRIAN SIGNAL HEAD
- PEDESTRIAN PUSH BUTTON
- TC TRAFFIC SIGNAL CONTROLLER
- QUADRUPOLE LOOP DETECTOR
- DIAMOND LOOP DETECTOR
- CONCRETE TRAFFIC CONTROLLER PAD
- TRAFFIC SIGN
- HANDWELL (12x12)
- HANDWELL (17x30)
- NEW OR RELOCATED POLE
- EXISTING POLE
- LUMINAIRE
- CB CATCH BASIN
- FIRE HYDRANT
- BICYCLE LANE
- OPTICOM
- GROUND PLATE
- I — 25mm RIGID PVC SCEPTRE
- II — 50mm RIGID PVC SCEPTRE
- III — 75mm RIGID PVC SCEPTRE
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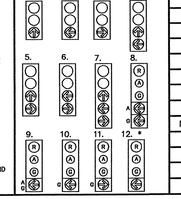
- SAN — SANITARY SEWER
- STM — STORM SEWER
- G — GAS MAIN
- W — WATER MAIN
- BCU — BELL CABLE UNDERGROUND
- HCU — HYDRO CABLE UNDERGROUND
- TVCU — TV CABLE UNDERGROUND

SPECIAL HEADS (#)



REVISIONS

No.	DATE	BY	DESCRIPTION OF REVISIONS
1	APR. 29, 2011	RSS	ISSUED FOR CONSTRUCTION

TRAFFIC CONTROL SIGNAL INSPECTION

	DATE	BY	WORK ORDER NUMBER
ABOVE			
BELOW			

LOCATION : SCHEIFELE BRIDGE (#2201) OVER CONESTOGO RIVER

REGIONAL ROAD 22 (NORTHFIELD DRIVE)

TOWNSHIP OF WOOLWICH

DWN BY : CA

CHK'D BY : JP

DATE : APRIL 2011

SCALE : AS SHOWN

CONTRACT No. : 2011–009

SHEET E1 of E2

DWG No. : TC –

Region of Waterloo

MANAGER TRANSPORTATION ENGINEERING

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ESTIMATE OF MATERIALS

SCHEIFELE BRIDGE (#2201) OVER CONESTOGO RIVER

LOCATION: REGIONAL ROAD 22 (NORTHFIELD DRIVE)

TOWNSHIP OF WOOLWICH

ITEMS	QUANTITY P	QUANTITY S
SIGNAL HEADS		
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SPECIAL HIGHWAY HEAD 4 x 300mm WITH ARROW (LED)		
PEDESTRIAN SIGNAL HEAD (LED)		

ARMS AND BRACKETS

ARM LENGTHS	No. 5		No. 6		CONC OR WOOD 10–12"		CONC OR WOOD 12–14"		CONC OR WOOD 14–16"	
1.2m (4 ft)	4TR78		4TR81		4TR112		4TR114		4TR116	
1.8m (6 ft)	4TR78		4TR81		4TR112		4TR114		4TR116	
2.4m (8 ft)	4TR78		4TR81		4TR112		4TR114		4TR116	
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- RIGID PVC SCEPTRE 100mm BOULEVARD
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- RIGID PVC SCEPTRE 75mm ROADWAY
- RIGID PVC SCEPTRE 100mm ROADWAY
- RIGID PVC SCEPTRE 25mm , 25mm BOULEVARD
- RIGID PVC SCEPTRE 50mm , 50mm BOULEVARD
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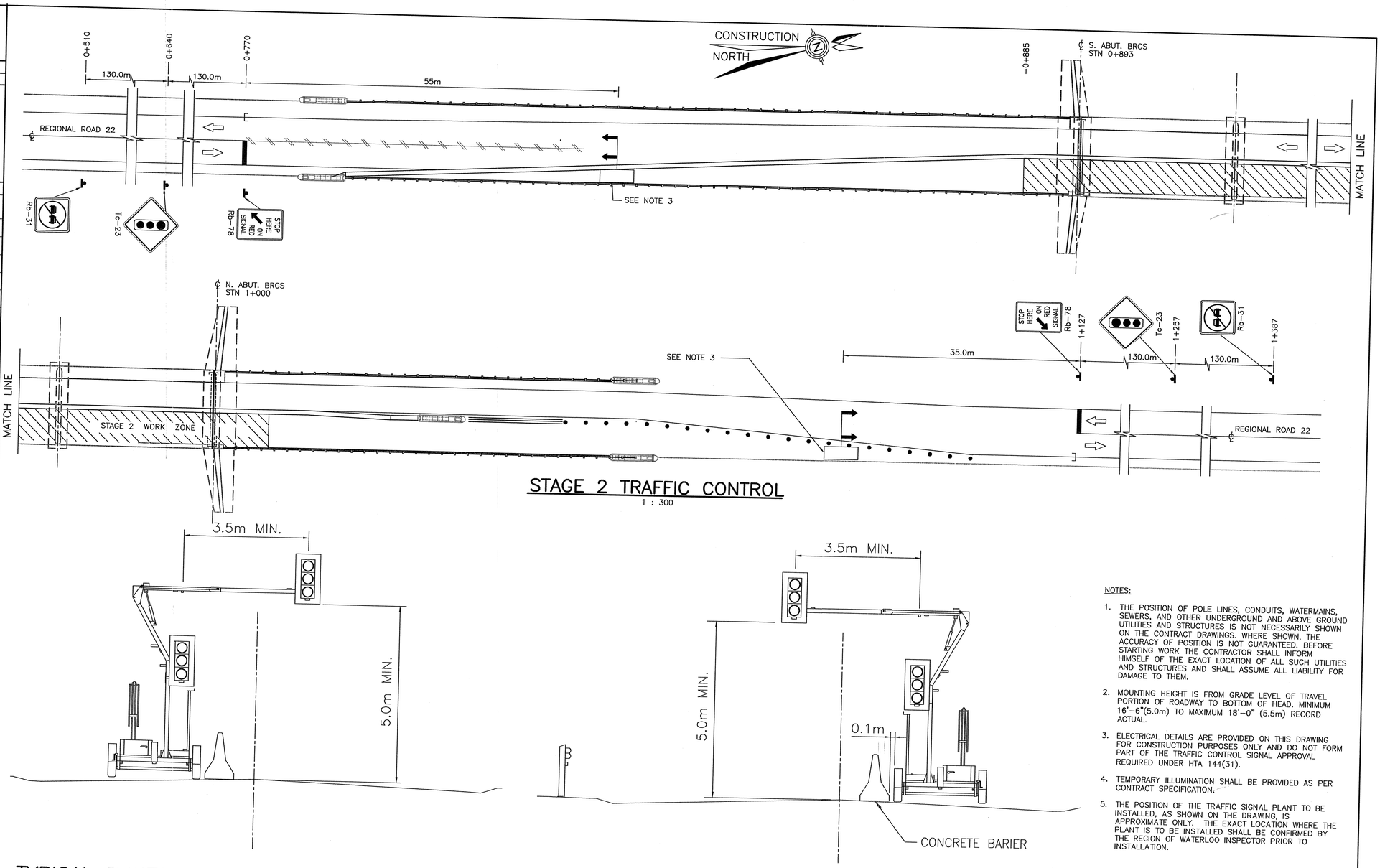

STAGE 2 TRAFFIC CONTROL

1 : 300

TYPICAL PORTABLE SIGNAL LAYOUT DETAIL 'A'

N.T.S

TYPICAL PORTABLE SIGNAL LAYOUT DETAIL 'B'

N.T.S

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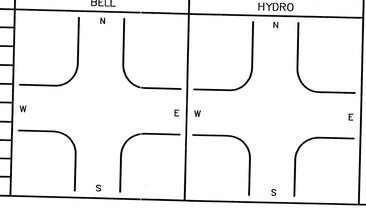
POLE No	POLE TYPE	POLE HEIGHT	BASE TYPE	SIGNAL HEADS MOUNTING HEIGHT @	SIGNAL HEADS ARM LENGTH	PED. HEADS MOUNTING HEIGHT (min)	PED. HEADS ARM LENGTH	PUSH BUTTON
P–1	SS25R	7.1	CONC			2.75m	0.6m	YES
P–2	SS25R	7.1	CONC			2.75m	0.6m	YES
P–3	SS36R	6.9	CONC			2.75m	0.6m	YES
P–4	SS25R	7.1	CONC			2.75m	0.6m	YES
P–5	SS25R	7.1	CONC			2.75m	0.6m	YES
P–6	SS25R	7.1	CONC			2.75m	0.6m	YES
P–7	SS25R	7.1	CONC			2.75m	0.6m	YES
P–8	SS25R	7.1	CONC			2.75m	0.6m	YES
P–9	SS25R	7.1	CONC			2.75m	0.6m	YES
P–10	SS25R	7.1	CONC			2.75m	0.6m	YES

CONSTRUCTION UTILITY LOCATION

BELL		HYDRO	
DATE	BY	DATE	BY



LEGEND

- HIGHWAY SIGNAL HEAD (300 X 200 X 200) WITH BACKBOARD AND MAST ARM
- HIGHWAY SIGNAL HEAD WITH BACKBOARD AND OVERHEAD CABLE
- HIGHWAY SIGNAL HEAD WITH BACKBOARD (300 X 300 X 300)
- SPECIAL HEAD WITH ARROW INDICATION AND BACKBOARD
- PEDESTRIAN SIGNAL HEAD
- PEDESTRIAN PUSH BUTTON
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- QUADRUPOLE LOOP DETECTOR
- DIAMOND LOOP DETECTOR
- CONCRETE TRAFFIC CONTROLLER PAD
- TRAFFIC SIGN
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- HANDWELL (17x30)
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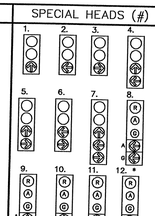
SPECIAL HEADS (#)



REVISIONS

No.	DATE	BY	DESCRIPTION OF REVISIONS
1	APR. 29, 2011	RSS	ISSUED FOR CONSTRUCTION

TRAFFIC CONTROL SIGNAL INSPECTION

	DATE	BY	WORK ORDER NUMBER
ABOVE			
BELOW			

LOCATION : SCHEIFELE BRIDGE (#2201) OVER CONESTOGO RIVER

REGIONAL ROAD 22 (NORTHFIELD DRIVE)

TOWNSHIP OF WOOLWICH

DWN BY : CA

CHK'D BY : JP

Region of Waterloo

MANAGER TRANSPORTATION ENGINEERING

DATE : APRIL 2011

SCALE : AS SHOWN

CONTRACT No. : 2011–009

SHEET E2 of E2

DWG No. : TC –

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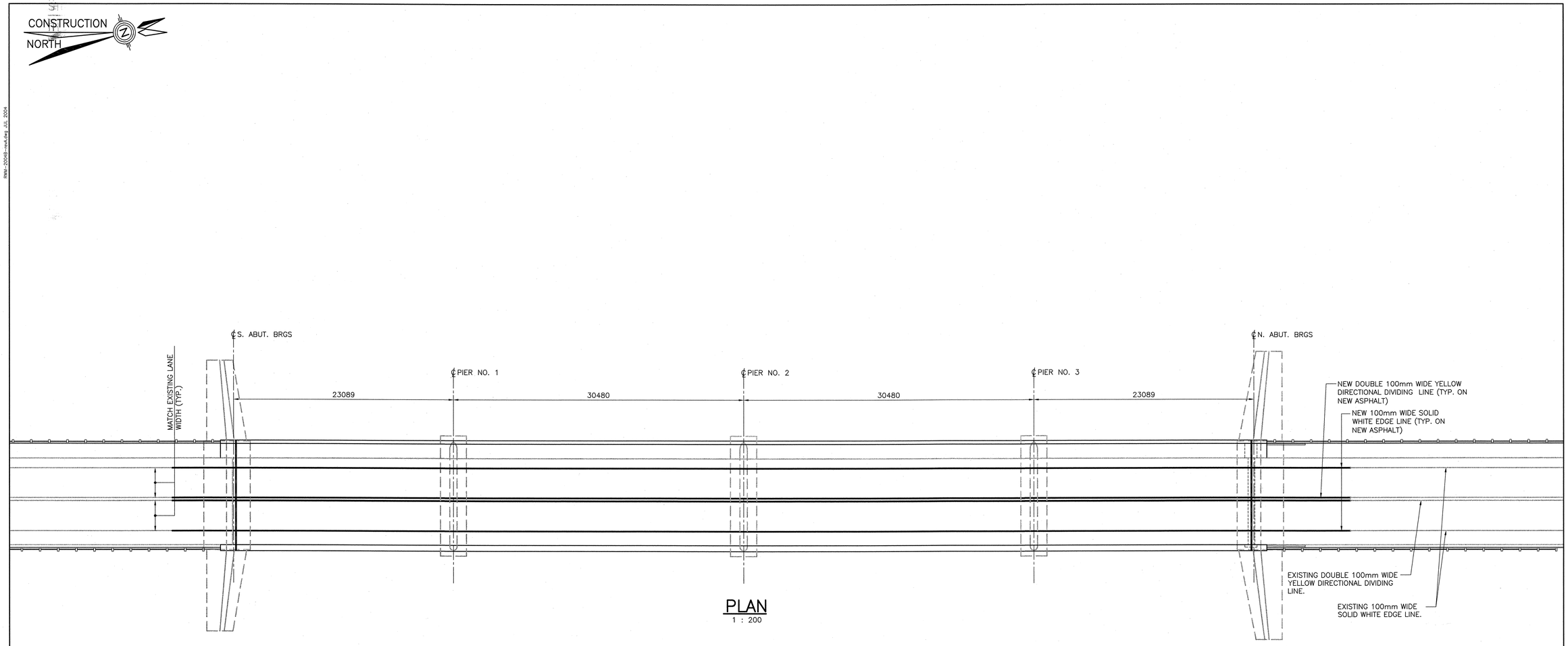

PLAN
1 : 200

FOR INFORMATION ONLY

NOT INCLUDED IN CONTRACT

RWM-2004B-mrk4.dwg JUL 2004

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DATE PLOTTED: 4/27/2011 1:46:14 PM BY: AWADC

KEY PLAN

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McCORMICK RANKIN CORPORATION
A member of MMM GROUP

No.	ISSUE/REVISION	BY	DATE
1	ISSUED FOR CONSTRUCTION	RSS	APR. 29, 2011

CONTROLLING B.M.

FIELD BOOK No.

DISCLAIMER:
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May 4, 2011

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

PERMANENT LANE MARKING

DRAWN BY: MC	CHECKED BY: JP	CONTRACT No. 2011-009	DRAWING No.
SCALE AS SHOWN	DATE: APR/2011	FILE No. 5511	SHEET T1 OF T1

Appendix H

PRIOR ENGINEERING INVESTIGATIONS

Documents are on Attached CD (Hard Copy)

REGIONAL MUNICIPALITY OF WATERLOO

STRUCTURE INVESTIGATION AND ALTERNATIVE ASSESSMENT REPORT

Scheifele Bridge over Conestogo River

Regional Road 22 (Northfield Drive)

Township of Woolwich Bridge No. 2201

A member of MMM GROUP
McCormick Rankin Corporation
April 2010

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STRUCTURE IDENTIFICATION SHEET

GENERAL INFORMATION

STRUCTURE NAME Scheifele Bridge over Conestogo River

BRIDGE NUMBER 2201 **DISTRICT NUMBER** -

HIGHWAY **Above** - **Below** -

TYPE OF STRUCTURE Continuous cast-in-place reinforced concrete T-beam

NUMBER OF SPANS 4 **SPAN LENGTHS** 22.86 m, 30.48 m, 30.48 m, 22.86 m

ROADWAY WIDTH 9.14 m **YEAR BUILT** 1960

DIRECTION OF STRUCTURE north-south

SEQUENCE NUMBER - **TOWNSHIP NUMBER** Woolwich

LHRS NUMBER - **MTO SITE No.** -

LOCATION 0.7 km north of Waterloo City limits **JURISDICTION** Waterloo

INSPECTOR'S NAME Jigish Naik, P.Eng.

PARTY MEMBERS Agostino Monteleone, E.I.T., Gideon Tjandra, E.I.T., Giovanni Italiano, City Concrete Drilling Services, Almon Equipment Ltd.

DATE OF INSPECTION April 27, April 28, April 29, April 30, May 1, 2009

TEMPERATURE 24 °C **WEATHER** Sunny / Cloudy / Rainy

MTO REGION Southwest **AADT** 11 000 (2018)

DECK RIDING SURFACE Asphalt

YEAR LAST REHABILITATED N/A

ENGINEERS STAMP

Scheifele Bridge over Conestogo River
Regional Road 22 (Northfield Drive)
Regional Municipality of Waterloo – Township of Woolwich

KEY PLAN

1. INTRODUCTION

McCormick Rankin Corporation (MRC) was retained by the Regional Municipality of Waterloo (Region) in 2009 to undertake a detailed condition survey of the Scheifele Bridge, Regional Road 22 over Conestogo River (Bridge No. 2201) in the Township of Woolwich, Ontario.

The bridge was constructed in 1960 and is a four span (22.9m±, 30.4m±, 30.4m±, 22.9m±) cast-in-place continuous T-beam structure with asphalt wearing surface, reinforced concrete abutments, piers, soffits and bridge deck. There are four (4) T-beams that vary in depth from 0.99 m at mid-span and abutments to 2.36 m at the piers. The original specified deck thickness was 203 mm. The substructure consists of reinforced concrete abutments and piers supported by spread footings. There are reinforced concrete retaining walls at all four corners. The overall width of the deck is 11.6m. The deck accommodates two (2) lanes of traffic, one northbound and one southbound, a 0.61 m wide safety curb on the east side, and a 1.83 m wide sidewalk on the west side of the structure. The clear width between curbs is 9.14 m. Armoured strip-seal expansion joints are present at each end of the bridge. A reinforced concrete curb with painted galvanized steel handrail and posts are provided on the each side of the bridge. There are six Bell Canada ducts supported on a rack (2W x 3H) suspended from the west deck cantilever. Surface mounted ducts are located on the south abutment.

General views of the structure are shown in Photographs 1 and 2 of Appendix E.

In 1982, the structure was rehabilitated by the Region under Contract No. 82-16. Based on rehabilitation contract drawings completed by Dillon Consulting Engineers & Planners, the following rehabilitation was completed:

– Removal of asphalt and waterproofing;
– Scarify 12 mm from top of concrete deck;
– Removal of delaminated concrete from top of deck;
– Placement of a 38 mm thick latex modified concrete overlay;
– Repairs to concrete curb and sidewalk;
– Shotcrete repairs to Tbeams and deck soffit;
– Replacement of expansion joints with armoured strip seal system;
– Replacement of top of abutment ballast walls;
– Modification to deck drains; and,
– Placement of new waterproofing and asphalt wearing surface.

In 2004, AMEC Earth & Environmental carried out a bridge deck condition survey and the region completed a bridgemaster inspection.

MRC undertook a visual inspection of the bridge and completed a structural evaluation in September 2005. The results indicate the following:

– theoretical overstressing in negative bending at a few isolated locations; and,
– shear capacity of the girders is theoretically adequate.

In addition, some FRP testing has been carried out to the second westerly girder near the south abutment by the University of Waterloo. Philips Engineering Ltd completed an Ontario Bridge Management System (OBMS) bridge inspection in July 2006.

This report summarizes the findings from a comprehensive field investigation completed from April 27 to May 1, 2009 by MRC. The work consisted of a detailed bridge deck condition survey (BDCS) and a detailed inspection of the deck slab soffit, girders, diaphragms, piers, abutments, curbs and drains by visual inspection and hammer sounding. In addition, crack monitors were installed across some of the largest existing cracks on the girders to monitor changes in crack width. Access to inspect the deck soffit, girders and substructure was provided by the Bridgemaster Inspection vehicle supplied by Almon Equipment Ltd. Deep coring was completed through the deck and into the T-beams to determine the general condition and bond between concrete lifts.

2. STRUCTURE INVESTIGATION

2.1 Deck Condition Survey

2.1.1 General

The bridge deck condition survey was conducted in accordance with Part 1 of the Ministry of Transportation Ontario (MTO) Bridge Deck Rehabilitation Manual. For the purpose of this report, the structure is assumed to run in the north-south direction. Girders are identified with a prefix 'G' and are numbered 1 to 4, east to the west. For example, 'G4' is the west most girder in the span. Sketch 1, in Appendix E, illustrates the general arrangement of the structure and girder labelling referenced throughout this report. For the remainder of this report all photographs referenced are found in Appendix D. Similarly all condition survey / inspection drawings referenced are found in Appendix E.

A total of six (6) sawn asphalt samples were extracted from the asphalt-riding surface and 26 core samples were retrieved from the deck.

The sawn asphalt samples and core samples were subject to several qualitative and quantitative observations. These observations included the bond of the asphalt to the waterproofing as well as the bond of the waterproofing to the deck; the concrete deck was inspected for any delaminations, scaling or cracks; and measurements of concrete cover and asphalt thickness were taken.

Descriptions and photographs of the sawn asphalt samples and core samples are included in Appendix B and C.

Locations of sawn asphalt and core samples are included in Drawing 1 and 2.

2.1.2 Bituminous Surface and Waterproofing

The asphalt wearing surface on the bridge is in poor-to-fair condition with many transverse, longitudinal and random cracking. Transverse cracking spans the entire length of the roadway spaced at approximately 2 m as shown in Photograph 3. Longitudinal cracks were found in the centre of the lanes between the wheel paths and along the edges

of the wheel paths toward the curbs. One large unsealed longitudinal crack ran the entire length of the bridge along the centreline as shown in Photograph 4. Photograph 5 illustrates the general condition of the wearing surface.

The asphalt wearing surface comprises HL-3 surface course and binder course material. Asphalt thickness at the location of the sawn asphalt samples and core samples ranged from 30 mm to 95 mm and averaged 65 mm.

The deck waterproofing is of a hot applied asphalt membrane and was applied during the last rehabilitation. Membrane thickness at the location of the sawn asphalt samples and core samples ranged from 2 mm to 6 mm and average 4 mm. The waterproofing was generally fairly bonded to the concrete and the overlying asphalt layer. Upon removal of the asphalt, the deck was noted as being completely dry, indicating that the waterproofing system is performing adequately. Full-depth cracking of the asphalt was found in five (5) of the six (6) samples.

2.1.3 Concrete Deck

The deck consists of a reinforced concrete slab that has been resurfaced with a latex modified concrete overlay.

All six (6) asphalt sawn samples taken revealed that the concrete deck was in good condition. No defects were observed in the deck at sawn asphalt sample locations.

Concrete cover readings at sawn asphalt sample locations were taken upon removal of the asphalt layer. These readings ranged from 49 mm to 122 mm for longitudinal steel and 51 mm to 130 mm for transverse steel. Average cover for the longitudinal and transverse steel was found to be 82 mm and 85 mm, respectively.

Examination of the 26 cores recovered from the bridge revealed that the original base concrete is of a light grey colour and noticeably more porous than the darker overlay material. The overlay was present on most cores and ranged in thickness from 25 mm to 120 mm. It was well bonded to the deck except at two core locations where the sample broke during removal at the interface between the overlay and the original concrete (Cores 7 and 8).

At all core locations, the concrete deck and overlay appeared to be in good condition except at three core locations (Cores 9, 11, 18). Core 9 contained a large void in the lower portion of the core; Core 11 had a vertical crack extending from the bottom of the deck slab up to 70 mm; and Core 18 had disintegrated at the bottom of sample. Core 18 was full depth of the deck and was located at observed spalling in the soffit.

Deck reinforcing steel was intercepted at 15 out of the 26 cores. The reinforcing steel in all instances was found in good condition with the exception of severe corrosion noted at Core 18 and light corrosion noted at eight (8) other cores.

2.1.4 Core Testing

Physical testing of the concrete cores recovered from the bridge deck was conducted by Golder Associates Ltd. certified Material Laboratory in Whitby, Ontario. Testing includes the determination of chloride-ion content, hardened air-void system analysis,

and compressive strength testing. The test reports are included in Appendix F and are summarized within the core sample logs in Appendix B.

Chloride-Ion Content

The chloride ion content of the deck was determined by testing five (5) core samples for acid soluble chloride ion content. The core samples tested were retrieved from areas of low- to mid-range corrosion potentials. The chloride content profile was measured from successive 10 mm thick slices to a depth of 110 mm. In order to accurately examine the chloride content of the original concrete, the depth of examination was increased to 150 mm in three (3) core samples. Testing procedures and review of the cores were in accordance with Cores for Total Soluble Chloride Ion Content, (MTO LS-417), and the *MTO Structure Rehabilitation Manual*.

The *Structure Rehabilitation Manual* states that a chloride content of 0.200 % or greater by mass of cement is necessary to react with embedded steel and permit corrosion. For a typical cement factor of 300 kg/m^3 this corresponds to a chloride content of 0.025 % by mass of concrete. In determining the chloride content profile, it is necessary to establish a background chloride content value. The value is taken as the lowest measured reading from all the cores to set a benchmark. This value represents the chloride content which may have already been in place at the time of construction, and does not contribute to the corrosion. The actual chloride content reading is subtracted by the background value to obtain a corrected measurement. For the Scheifele Bridge, two backgrounds were established, one for the overlay and one for the original concrete below. The background chloride ion content was 0.020 % and was found in the 20-30 mm horizon of Core 18 for the overlay. The original concrete was found to have a background chloride ion content of 0.058 % and was found in the 120-130 mm horizon of Core 11.

Table 2.1 summarizes the chloride-ion content test at the depths in which the chloride-ion content provides an ideal environment for corrosive activity. Cover meter readings taken from sawn asphalt and cover measurements at concrete core samples reveal that the reinforcing steel is located approximately 82 mm below the concrete surface. The table below shows that the chloride ion content at the level of the reinforcing steel bars may be sufficient to cause corrosion of the reinforcing steel at two of the five locations tested.

Table 2.1 – Chloride Ion Content Testing Summary

Core Sample Tested for Chloride Ion Content	Depth at Which Chloride Ion Content of 0.025 % is Exceeded*
C1	-
C3	40 – 50 mm
C7	-
C11	0 – 70 mm
C18	80 – 150 mm
** A chloride content of 0.025 % by mass of concrete is the minimum required to permit corrosion of embedded reinforcing steel.*	

By comparison, as noted in the 2004 condition survey report by AMEC, chloride levels in both of the tested cores were below the minimum chloride content required to permit corrosion. Light corrosion was noted at one (1) of the cores where reinforcing steel had been exposed.

Reinforcing steel was not intercepted at Core 3 and 11, however was intercepted at Core 18. Severe corrosion of the steel was noted at Core 18 which confirms the high chloride ion content results. The soffit plan (Drawing 3) identifies a large area of spalling adjacent to the location where Core 18 was taken.

Hardened Air Void System Analysis

The *MTO Structure Rehabilitation Manual* classifies concrete as properly entrained with air if the following parameters are met:

- Air content > 3 %;
- Spacing factor < 0.20 mm; and,
- Specific surface > 24 mm^2/mm^3

Core 6 was tested for hardened air void system parameters and was found to have an air content of 7.8 %, a spacing factor of 0.25 mm and a specific surface of 15.94 mm^2/mm^3. Based on the laboratory results, the spacing factor and specific surface do not satisfy material requirements. Both components are important in contributing to the effectiveness of air entrainment since the deck is frequently subjected to cycles of freezing and thawing in the presence of moisture or deicing materials.

The above is consistent with the results noted in the 2004 AMEC report.

Compressive Strength Testing

Cores 5 and 12 were tested for compressive strength and were reported to have corrected compressive strengths of 65.9 and 66.9MPa, respectively.

The strength results are consistent with the results noted in the 2004 AMEC report.

2.1.5 Corrosion Potential Survey

The corrosion potential readings are grouped into three ranges as follows:

- ***Low Range:*** If potentials over an area are numerically less than - 0.200 V, there is a greater than 90 % probability that no reinforcing steel corrosion is occurring in that area at the time of measurement;
- ***Mid Range:*** If potentials over an area are within the range of - 0.200 V to - 0.350 V, corrosion activity of the reinforcing steel in that area is uncertain; and
- ***High Range:*** If potentials over an area are numerically greater than - 0.350 V, there is a greater than 90 % probability that reinforcing steel corrosion is occurring in that area at the time of measurement.

The corrosion potential readings are presented in Appendix E and a summary of the findings are presented in Table 2.2. The findings suggest a small portion of the bridge deck, approximately 1 %, has a greater than 90 % probability that reinforcing steel is corroding. These areas were restricted to two areas: adjacent to the sidewalk at the south expansion joint and along the concrete curb over the south main span. 17 % of the bridge deck was reported to be in the uncertain corrosion activity range, which represents a slight increase from the survey carried out by AMEC Earth & Environmental in October 2004, when only 10 % of the bridge deck was reported to be within this range. The survey also reveals a slight reduction in areas with no corrosive activity in comparison with the AMEC survey, declining from 85 % (2004) to 82 % (2009). These comparisons may suggest a minimal ongoing corrosion activity that is escalating over time.

Table 2.2 - Corrosion Potential Reading Summary

Corrosion Potential (V)	% of Surveyed Deck Area	
	MRC (2009)	AMEC (2004)
0 to -0.190	82	85
-0.200 to -0.350	17	10
Less than -0.350	1	5

By comparison, the 2004 condition survey report by AMEC noted that the chloride levels in both of the tested cores were below the minimum chloride ion content required to permit corrosion. Corrosion potential readings taken at two (2) core locations by AMEC in 2004 were within the low potential range (0.0 V to - 0.200 V).

The corrosion potential readings at Cores 3, 11 and 18 are within the low corrosion potential range as well. However, as shown in Table 2.1, the chloride ion content of

0.025 % is exceeded at the level of reinforcing steel. This finding indicates that although corrosion potentials are low, conditions are suitable for corrosion to occur.

For example, Core 18 is within a low corrosion potential area (-0.133 V) however exceeds a chloride ion content of 0.025 % at the level of reinforcing steel. Severe corrosion of the reinforcing steel was noted upon removal of the core from the bridge deck.

Corrosion potential results are shown in Drawing 1 and 2. Contours are used to identify areas of low-, mid-, and high-range areas of corrosion potential.

2.1.6 Deck Soffit

A visual inspection and delamination survey were completed on the deck soffit. Refer to Sketch 1 of Appendix E for general arrangement of the structure, girder, span, and pier labeling referenced throughout this report. Refer to Drawing 3 and 4 for a plan of the soffit and the defects / deteriorations noted in the following sub-sections.

Many areas of delaminations were noted over the entire span length but generally were found in the north approach and south approach span. In total, approximately 53 m^2 (6 %) of delaminations on the soffit were noted.

Spalling and exposed steel areas were found in various locations and totaled 21.8 m^2 (2.4 %) over the entire area of the soffit. Patched spalls were observed in several areas, 3.3 m^2 in total.

Honeycombing was typically found at girder haunches, totaling 0.6 m^2. Scaling was not noted in any area of the deck soffit.

Cracking was noted as three different crack widths: narrow, medium, and wide. In total, approximately 50 m of cracks were observed. Cracks comprised 35.3 m of narrow, 9.4 m of medium, and 3.4 m of wide. Stained cracks (medium in width) were noted, however do not account for a large portion of cracking (3.1 m).

The following summarizes the findings during the inspection of the deck soffit.

2.1.6.1 North Approach Span

Approximately 14.5 m^2 (7.6 %) of the soffit was delaminated. The majority of the delaminations were noted in the southern half of the span. Rust staining, exposed rusted rebar, and cracks were observed in this area as shown in Photograph 44. Furthermore, spalling and honeycombing were noted in a few areas.

2.1.6.2 North Main Span

Roughly 2.2 m^2 and 6.5 m^2 of the soffit had spalls and delaminations, respectively (total 3.4 % of deck soffit area). The majority of these deteriorations were noted near the north and centre pier and in the west cantilever. The centre third of the span was in good condition. Photograph 45 shows typical delaminated soffit areas found.

The west cantilever of the north main span was found to be in poor condition with significant areas of concrete spalling, exposed rusted rebar, delamination and cracking as shown in Photographs 46-48.

Other notable defects / deteriorations of the soffit were honeycombing and rust stains.

2.1.6.3 South Main Span

The soffit of the south main span has approximately 4.0 m^2 and 12.5 m^2 of spalls and delaminations, respectively, as shown in Photograph 49 (total 6.4 % of the soffit area). Exposed corroded rebar was also visible at some spalls.

Several medium-to-wide cracks were found in the third of the span adjacent to the centre pier. A wide longitudinal crack between the concrete soffit and the east side of Girder G3 haunch was also found, as shown in Photograph 50.

The east fascia was found to be in poor condition where over 70 % of the concrete surface has spalled. The west fascia was also found to be in poor condition where a large amount of the concrete has spalled and delaminated. Previous shotcrete patches were noted in poor-to-fair condition. Photograph 51 illustrates the poor condition of the fascia in the south main span.

2.1.6.4 South Approach Span

The soffit of the south approach span has approximately 2.0 m^2 and 21.2 m^2 of spalls and delaminations, respectively, as shown in Photograph 52 (Total 12 % of the soffit area). Exposed corroded rebar was also visible at some spalls.

The east fascia was found in poor condition with approximately 10-15% of the concrete spalled or delaminated. Exposed corroded rebar and concrete staining was noted along the fascia. The west fascia is also in poor condition with 50 % of the concrete found to have spalled or delaminated. Photographs 53 to 54 show the condition of both sides of the fascia.

2.2 Girders

The concrete girders were assessed by visual inspection and delamination survey with the use of a bridgemaster inspection unit. The following sub-sections divide the girder inspection into their respective spans. Refer to Sketch 1 in Appendix E for general arrangement of the structure, girder, span, and pier labeling referenced in this section. A separate drawing of each girder in each span is included in Appendix E (16 drawings in total). Refer to the cover page of Appendix E for a list of drawings.

Many areas of delaminations were noted over the entire span length but generally were found in the south approach span. In total, approximately 58 m^2 (4 % of total surface area) of delaminations on the girders were noted. Each span contained the following amount of delaminations:

- North Approach Span: 5.1m^2;
- North Main Span: 1.3 m^2;
- South Main Span: 12.0 m^2;
- South Approach Span: 39.0 m^2.

Spalling and exposed steel areas were found in various areas and amounted to 4.7 m^2. Patched spalls were observed in several areas, 6.6 m^2 in total.

Honeycombing was typically found at girder haunches or concrete cold joint interfaces and amounts to 2.4 m^2. Scaling was generally observed in areas which have been exposed to weathering or water runoff, an area of 0.3 m^2 was recorded.

Cracking was noted as three different crack widths: narrow, medium, and wide. In total, 120 m of cracks were observed. Cracks comprised 2.4 m of narrow, 98.2 m of medium, and 18.6 m of wide. Stained cracks were noted, however do not account for a large portion of cracking (0.6 m).

2.2.1 North Approach Span

All girders are shown in Drawing 5, 6, 7 and 8.

G1 was noted to be in fair-to-good condition. On the west side of G1, short narrow cracks were found to span the length of the girder, at 300 mm c/c, from the north abutment to the interior diaphragm. Five (5) medium width cracks were found along both the east and west side of the girder (two full-height and three mid-height). One area of honeycombing was found on the west side of the girder adjacent to the north abutment face. The east side also had an area of honeycombing north of the diaphragm, as well as spalling at the north abutment face.

G2 was found to be in fair condition. Three (3) narrow and two (2) medium width transverse cracks were found along the west side of the girder. Three (3) separate areas of honeycombing in addition to an area of scaling and exposed rebar were found. The east face of the girder was noted to be in good condition with only four (4) medium width cracks found. The soffit of G2 contained approximately 4.4 m^2 of delaminations.

G3 was found to be in good condition with only a single area of honeycombing found on the west side and three (3) localized areas of honeycombing found on the east side of the girder.

G4 was found to be in good condition. Four (4) medium width cracks were found on the west side of G4 and several areas of spalling and honeycombing were found on the east side. Refer to Photographs 54 to 55 for the above defects along the girders.

2.2.2 North Main Span

All girders are shown in Drawing 9, 10, 11 and 12.

G1 was found to be in fair-to-good condition. The east side of G1 had a few areas of honeycombing, spalling, and concrete delamination with three (3) medium width cracks.

G2 was found to be in good condition. The east side of G2 had one (1) medium width crack located near the north pier and a series of 300 mm high narrow-medium width cracks spaced at 400 mm c/c ± extending between the intermediate diaphragms.

G3 was found to be in good condition. Both sides of the girder had three (3) medium width cracks and an area of honeycombing near the diaphragm.

G4 was found to be in fair-to-good condition. The east side of the girder had five (5) medium width cracks all located between the north pier and intermediate diaphragm. In addition, a series of medium width cracks were noted approximately 125 mm in height and spaced at 400 mm c/c spanning between the intermediate diaphragms. The west side of the girder had three (3) medium and two (2) wide cracks located between the north pier and diaphragm.

2.2.3 South Main Span

All girders are shown in Drawing 13, 14, 15 and 16.

G1 was found to be in fair condition with nine (9) narrow- and medium-width cracks noted on the west and east side of the girder, respectively. The soffit was found to be in good condition with some areas of concrete delamination, medium width cracks and exposed rusted rebar. Photograph 58 shows a general photo of the medium width cracks spanning the east side of the girder. Photograph 59 illustrates the soffit delamination.

G2 was found to be in fair-to-good condition. A total of five (5) cracks (four narrow and one medium) were found on the east side of the girder with an area of delamination adjacent to the centre pier. In total, 1.3 m^2 of concrete delaminations were found on the girder (0.5 m^2 on the east face and 0.8 m^2 on the soffit). Four (4) narrow cracks were found on the west side of the girder with an area of concrete delamination near the centre pier.

G3 was found to be in fair condition. Four (4) medium width cracks and roughly 3.3 m^2 of concrete delaminations were found on the east side of the girder. One (1) medium crack, two (2) wide cracks and roughly 4.6 m^2 of concrete delaminations were found in total (generally on the east face). The concrete delamination was found to be located adjacent to the south pier. Local areas of honeycombing and concrete spalling were noted as well.

G4 was found to be in fair condition. The east side of the girder was reported to have four (4) medium width cracks adjacent to the intermediate diaphragms and some areas of concrete delamination and previously patched spalls. Roughly 3.3 m^2 of concrete delamination was found on the west side of the girder (concentrated near the south pier as shown in Photograph 60) along with two (2) medium width cracks. In addition, 2.3 m^2 of delaminations were noted on the east face. Areas of concrete delamination and exposed

corroded rebar, due to inadequate cover, were also found on the underside of the girder, as shown in Photograph 61.

2.2.4 South Approach Span

All girders are shown in Drawing 17, 18, 19 and 20.

G1 was noted in fair-to-good condition. On the east side of the girder 1.6 m^2 of concrete was found to have delaminated adjacent to the south abutment face. The east face also had a spalled area and a medium width crack. The bottom of the girder contained local areas of delamination in addition to three areas of exposed rusted rebar.

G2 was noted in fair-to-good condition. Narrow mid-height cracks spaced at 300 mm c/c span the entire length of the girder on both faces. The west side of the girder had three (3) medium cracks located between the intermediate diaphragm and the pier. The soffit of the girder has areas of spalling, delamination and exposed rusted rebar as shown in Photograph 56.

G3 was found to be in poor-to-fair condition. The east side of the girder contained 5.0 m^2 of delaminations, along with four (4) medium width cracks and one (1) area of concrete spalling. Nearly 3.5 m^2 of concrete delamination and one (1) medium and two (2) wide cracks were found on the west side of the girder. The soffit was found in poor condition and was noted to be almost completely delaminated (approximately 10.7 m^2). The soffit of the girder was found to be in poor condition with over half of the girder delaminated. The remaining portion of the soffit was repaired with fibre reinforced polymer (FRP) laminates.

G4 was found to be in poor-to-fair condition. The east side of the girder had approximately 2.0 m^2 of concrete delamination, two (2) wide cracks, and some minor areas of spalling and exposed rusted rebar. The west side of the girder was in poor condition with roughly 8.3 m^2 of delamination. The soffit of the girder has 4.5 m^2 of concrete delamination, with areas of exposed rusted rebar and three medium cracks. Photograph 57 shows a rust-stained leaking crack along the soffit of G4.

2.2.5 Deep Cores

The condition of the girders was of concern due to the noticeable cracking and concrete deterioration noted over recent years. As part of the structure investigation, deep coring into the girders was completed to assess the condition of the girders and the bond between concrete lifts.

Deep coring was completed using drill extensions and a coring unit from the deck surface. Diamond core bits of 100 mm and 75 mm diameter were used to retrieve core samples. In some locations, coring was completed successfully and cores of desired depth into the girders were retrieved. In other instances, steel reinforcing bars and stirrups were intercepted, and prevented the core bit from penetrating deeper into the girders. This was especially true for deep cores attempted in Girder G4. Girder G4 lies below the sidewalk and it is believed that the added sidewalk reinforcing steel prevented deeper penetration.

In total 16 deep cores were attempted, away from negative moment areas (over piers). For the purpose of this investigation, deep cores are considered to have a depth lower than the original deck. Based on original contract drawings, on the deck wearing surface this corresponds to a concrete thickness of 203 mm. At the 254 mm thick sidewalk (Girder G4), this depth corresponds to a concrete thickness of 457 mm.

Seven (7) deep cores were recovered from the bridge. A summary of each core is included in Appendix B and the locations are shown in Drawing 1 and 2.

G1, one (1) deep core was retrieved from the girder. Core 9 had a concrete thickness of 585 mm, which includes a 120 mm thick overlay. The first mechanical break of the core was intentional and was needed in order to remove the core from the deck and drill further. The second break was due to removal operations to retrieve the core. A large void, approximately 25 mm x 75 mm, was observed approximately 300 mm from the top of the concrete surface.

G2, one (1) deep core was retrieved from the girder. Core 10 had a concrete thickness of 295 mm, which includes a 25 mm thick overlay. The core broke during removal at the longitudinal reinforcing bar that was intercepted. A vertical steel reinforcing stirrup was encountered and prevented the core bit to drill further into the girder. Light corrosion was noted on the deck reinforcing steel bar but not the girder stirrup.

G3, two (2) deep cores were retrieved from the girder. The concrete thickness of the cores measured 530 mm for Core 15-2 and 640 mm for Core 19. Core 15-2 was taken adjacent to another core where reinforcing steel stirrups were intercepted. Core 15-2 contained a mechanical break due to core removal operations. At Core 19, the girder is completely encased in a fibre reinforced polymer wrap, preventing visual inspection of the girder. No deteriorations were noted upon the removal of Core 19.

G4, three (3) deep cores were retrieved from the girder. The concrete thickness of the cores measured 465 mm for Core 14, 545 mm for Core 21-1 and 460 mm for Core 21-2. These cores contain the sidewalk, original concrete deck, and a nominal thickness of Girder G4. In two (2) of the three (3) cores, the bond between the sidewalk and deck broke during removal. This indicates a fair bond between the sidewalk and deck. In all three cores, congested reinforcing steel of the girder, deck and sidewalk prevented deeper coring in the girder.

2.2.6 Girder Cracks and Crack Monitors

Seven crack monitors were installed across some of the widest existing cracks on girders to provide a qualitative measure of any change in crack width that may occur over time. Monitors were installed on diagonal cracks which resemble shear cracking. Table 2.3 summaries the crack gauge installation. Appendix G provides further details and photographs of the cracks and monitors.

We note that these cracks are considered ‘medium’ in width as per *MTO Ontario Structure Inspection Manual (OSIM).*

Table 2.3 – Summary of Crack Monitor Installation

Gauge No.	Span / Girder	Crack Width (mm)	Remarks
1	N. Approach Span / G3-West	0.3	1.0 m south of N. abutment
2	S. Main Span / G3-West	0.33	2.8 m north of N. diaphragm
3	S. Main Span / G1-East	0.5	9.5 m north of S. pier bearing
4	N. Main Span / G4-West	0.6	7.8 m south of N. pier bearing
5	N. Main Span / G4-West	0.5	8.0 m south of N. pier bearing
6	N. Main Span / G3-West	0.6	8.0 m south of N. pier bearing
7	S. Approach Span / G3-West	0.5	0.8 m north of N. diaphragm

Previous inspections identified the presence of what appeared to be shear cracks in the girders. The detailed inspection by MRC described in this report confirmed the presence of cracks of various orientation and width. However, in our opinion, these cracks are not considered to be of immediate structural concern for the following reasons:

1. There is not a consistent pattern of shear cracks that would suggest a deficiency. For example, girder G1 has two diagonal cracks on the east face in the north span near the north pier. However, they are not present on the west face at this location nor are there any cracks at the similar location in the south span near the north pier.
2. The diagonal cracks that resemble shear cracks are not widespread.
3. As described in Section 1.0 of this report, the results of the 2005 structural evaluation did not identify a theoretical shear deficiency.
4. Load testing by the MTO on similar bridges has identified much higher load carrying capacity of this type of structure than can be predicted by theoretical analysis.

2.3 Substructure

A bridgemaster inspection was performed to assess the condition of the abutments, and by visual inspection and hammer sounding. Refer to Sketch 1 of Appendix E for a general arrangement of the structure, girder, span, and pier labeling referenced throughout this report. Most of the surface of the abutment ballast walls are hidden by the girders and end diaphragms and therefore could not be inspected.

2.3.1 North Abutment

Drawing 21 shows the observations recorded for the north abutment.

The north abutment is in fair condition with areas of spalling and delaminations. Approximately 14 % (9.2 m^2) of the exposed surface of the wall has delaminated. Delaminations were found to be mainly located in the centre third of the abutment, as shown in Photograph 17. The seal between the west wingwall and north abutment was found to be broken and is shown in Photograph 18. In addition, concrete spalling and leached cracking were noted in the ballast wall as shown in Photograph 20. The east curtain wall was found severely scaled / disintegrated.

A covermeter was used to determine the depth of the steel reinforcing in concrete. These readings ranged from 73 mm to 77 mm for vertical steel and 81 mm to 87 mm for horizontal steel. The average cover for the vertical and horizontal steel was found to be 74 mm and 83 mm, respectively.

2.3.2 South Abutment

Drawing 21 shows the observations recorded for the south abutment.

The south abutment is in better condition than the north abutment. There are localized areas of cracking, spalling, delaminations, exposed rebar and staining. Vertical medium width cracks were found in the centre portion of the wall. Spalling of the bearing seat was found between G3 and G4, and directly beneath G4, as shown in Photograph 22. Areas of delamination were found at the bearing seat under G2. Delamination was found at the bottom of the diaphragm between G2 and G3, and directly under G4 as shown in Photographs 23 and 24, respectively. In total, delaminations and spalling amounted 0.8 % (0.5 m^2) of the south abutment face. Exposed rebar and rust strains are found at the bottom of the diaphragm under G3 and at the face of the ballast wall between G1 and G3 as shown in Photographs 25 and 26, respectively. Concrete debris buildup was also found on the bearing seat under G4 as shown in Photograph 27.

The south abutment exhibits large wet staining due to a leaking expansion joint in the deck. Ponding was noted on the bearing seat in areas where concrete had spalled and/or delaminated. At one point during the inspection, the heavy rainfall resulted in nearly 50 mm of water accumulation along the abutment as shown in Photograph 28.

2.3.3 North Pier

Drawing 22 shows the observations recorded for the north pier.

The north face of the north pier is generally in good condition with a few small areas of concrete delamination as shown in Photograph 33.

The covermeter readings ranged from 35 mm to 40 mm for vertical steel and 53 mm to 61 mm for horizontal steel. Average cover for the vertical and horizontal steel was found to be 37 mm and 57 mm, respectively.

The south face of the north pier is also generally in good condition with two small areas of concrete delamination along the top third of the pier adjacent to G1 and G3. The rocker bearings are generally in good condition with areas of light to moderate rusting along the sides and bottom. Concrete has spalled off and exposed the end of the top plate of the bearing supporting G1 (east side) and G4 (west and east side), as shown in Photographs 36 and 37, respectively.

The covermeter readings ranged from 40 mm to 42 mm for vertical steel and 54 mm to 60 mm for horizontal steel. Average cover for the vertical and horizontal steel was found to be 41 mm and 56 mm, respectively.

Less than 1 % of the concrete surface was noted to be either delaminated or spalled.

2.3.4 Centre Pier

Drawing 23 shows the observations recorded for the centre pier.

The north face of the centre pier is generally in good condition with local areas of cracking, delamination and spalling. Two medium vertical cracks were noted in the centre portion of the wall extending from the water level to top of pier. Two areas of delamination were found under G2 and G3. The top of pier has spalled adjacent to the bearing at G2 as shown in Photograph 38.

A covermeter was used to determine the location of the steel reinforcing in concrete and these reading ranged from 42 mm to 45 mm for vertical steel, and 57 mm to 66 mm for horizontal steel. Average cover for the longitudinal and transverse steel was found to be 43 mm and 61 mm, respectively.

The south face of the centre pier is also generally in good condition with local areas of spalling, delamination and visible cracks. Spalling is found under G3 as shown in Photograph 39. Areas of delamination were found along the top of the pier. A vertical medium crack was noted in the visible height of the pier under G3.

The covermeter readings ranged from 46 to 48mm for vertical steel and 61 to 68mm for horizontal steel. Average cover for the vertical and horizontal steel was found to be 47 and 65mm, respectively.

Less than 2 % of the concrete surface was noted to be either delaminated or spalled.

2.3.5 South Pier

Drawing 24 shows the observations recorded for the south pier.

The north face of the south pier is generally in good condition with a few vertical medium cracks in the centre portion of the pier. Only one spalled area was observed along the west side of the pier. The concrete over the bearing under G4 (east side) appeared disintegrated as shown in Photograph 43.

The south face of the south pier is generally in fair condition. Several minor areas of delaminations were noted on the east half of the surface. Two (2) narrow vertical concrete cracks were observed, approximately 1 m. Under G3, three (3) medium vertical stained cracks were noted to extend from the top of the water level to 3 m above water level.

Less than 2 % of the concrete surface was noted to be either delaminated or spalled.

2.3.6 Retaining Walls

Inspection of the retaining walls was limited due to maneuvering capabilities of the bridgemaster unit. However, visual inspection and a delamination survey were completed where possible. The retaining walls on the structure are generally in good condition with little deterioration noted, which included few areas of narrow cracking and minor / localized areas of delaminations.

2.3.7 Bearings and Bearing Seats

Expansion steel rocker bearings are located at the north and south abutment. Bearing seats at both abutments were noted to be in poor condition. The majority of the bearing seat area was found delaminated, spalled, and severely scaled / disintegrated. As a result, ponding was noted on the abutment bearing seats to have depths greater than 25 mm. The bearings located at the north abutment are in poor condition, bearings were observed moderately to severely corroded as shown in Photographs 20 and 21. The south abutment bearings were found in worst condition as all four bearings exhibited severe corrosion as shown in Photographs 29 to 32.

Expansion steel rocker bearings are located at the north and south piers. At the north pier, the rocker bearings are generally in good condition with areas of light to moderate corrosion along the sides and bottom. Photographs 34 and 35 show the bearing supporting G2 (east side) and G4 (east side), respectively, where concrete has spalled off and exposed the edge of the top plate of the bearings. At the south pier, the rocker bearings appeared to be in good condition with light corrosion along the bottom. Concrete had spalled off and exposed the end of the top plate of the bearing supporting G1 (east side) and G3 (west side), as shown in Photographs 41 and 42, respectively.

Fixed steel pin bearings are located at the centre pier. The bearings were found to be in generally good condition with light corrosion found at the bottom of the bearings supporting G2, G3, and G4. Photograph 40 shows a general view of the bearing supporting G2.

The tilting of the bearings supporting the girders is summarized in Table 2.4 below. The positive (+) sign indicates that the bearing is tilting to the north and the negative (-) sign indicates that the bearing is tilting to the south.

Table 2.4 – Bearing Tilt Measurements

	Tilt Measured (°)			
Bearing Location	G1	G2	G3	G4
North Abutment	+6	+14	+12	+6
North Pier	+8	+5	+8	+6
Centre Pier	Fixed	Fixed	Fixed	Fixed
South Pier	-10	-13	-8	-8
South Abutment	-8	-10	-4	-9

2.4 Other Components

2.4.1 Expansion Joints

Two expansion joints are present on the bridge; one at each abutment. The expansion joints at the abutments consist of steel armouring angles with elastomeric strip seal joint seal concrete end dams. The joints are filled with debris, possibly restricting movement of the joint, as shown in Photograph 6. The concrete end dams have extensive localized delaminations / spalls adjacent to the armouring angles and a number of damaged areas, likely from snow plows. No water was noted at the north abutment but condition of the bearings and abutment suggests previous leakage. The south expansion joint permits leakage to the south abutment as shown in Photograph 7. The side cover-plate of the expansion joint on the sidewalk portion of the bridge is missing, as shown in Photograph 8.

A summary of measurements recorded at the time of inspection is included in Appendix A.

2.4.2 Concrete Sidewalks and Curbs

The west side of the Scheifele Bridge has a 1.8 m wide sidewalk, while the east side has a 0.6 m wide safety curb. The surface of the sidewalk is generally in fair condition with widespread popouts at an average spacing of approximately 350 mm and transverse medium cracks spaced along the sidewalk at approximately 1 m intervals, as shown in Photograph 9. There are several areas on the sidewalk where the concrete has been previously repaired. Furthermore, there are a few areas where concrete spalling, scaling and delaminations have occurred as illustrated in Photographs 10, 11 and 12, respectively. Photograph 13 illustrates map cracking which was found on the north approach span under the handrail near the north abutment.

The curb has similar crack patterns as the west sidewalk and several areas of spalling, scaling, delamination, rust staining and cracking as shown in Photograph 14 to 16.

For the sidewalks and curbs, 1.4 % (3.7 m^2) of the total area was found either delaminated or spalled. Patched areas were noted and accounted for 0.2 % (0.6 m^2) of the total area. Areas of scaling were recorded to total 3.5 m^2 (1.3% of the total area).

2.4.3 Drainage

A total of 22 galvanized steel pipe deck drains (152 mm diameter), 11 on each side, were found on the Scheifele Bridge. The drains were relatively clean with some debris deposited over the steel grates. The drains extend below the bottom of the girders and appear to be functioning properly, directing runoff away from the superstructure. Coating on most drain pipe has failed at the bottom portion, where rust was noted, as shown in Photograph 62.

2.4.4 Steel Railings

Galvanized steel railing and posts are mounted on top of the east curb and west sidewalk. The steel posts consist of 200 mm square tubing filled with concrete and covered with

ornamental malleable iron caps. Most of the iron caps on the posts are missing. The majority of the caps have been patched with concrete, while roughly a third of the post-tops on the west rail are exposed. A summary of the top-post detail can be found in Table 2.5.

Table 2.5 – Summary of Posts Tops

	No. of Top-Posts with:		
	Iron Caps	**Patch Material**	**Exposed**
West rail	3	21	10
East rail	0	33	1

The top and bottom 50 mm on the posts have light to medium corrosion noted. Furthermore, the sides of the posts have developed wide cracks due to expansion from freezing water inside the posts. The general condition of a post is shown in Photograph 63. Light to medium corrosion was noted on the railing panels as shown in Photograph 64.

It should be noted that the existing railings do not meet current standards for bridge traffic barriers.

2.4.5 Concrete End Walls

The concrete end walls at the north end of the railings are in good condition with some spalling along the sides where the SBGR is connected. The concrete end walls at the south end are in fair condition with spalling on the sides where the SBGR is connected. Scaling and disintegration were noted on the west wall, whereas the east wall had three wide cracks as shown in Photographs 69 and 70, respectively.

Concrete spalling and corrosion activity were noted in these areas as illustrated in Photographs 67 to 69.

2.4.6 Steel Beam Guide Rails

There are steel beam guide rails (SBGR) on all four corners at the approaches. Traffic impact damage was noted in all four, as shown in Photographs 65 to 66. The guide rails do not meet current standards in terms of post spacing, absence of channel and connection to the bridge.

2.4.7 Approaches

The asphalt wearing surface on the approaches is in fair condition. There is moderate transverse and longitudinal cracking that becomes more severe closer to the expansion joints.

Based on contract drawings, approach slabs were not constructed at the approaches. Cores taken at the approaches confirmed that no approach slabs exist at either end.

APPENDIX A
DECK CONDITION SURVEY FORMS

SURVEY EQUIPMENT AND CALIBRATION PROCEDURES

Component Type: Deck **Site No.** 2201

1. Delaminations:

Weight of Chain: 2.2 **Kg/m**
Other Equipment: Mason's hammer

2. Concrete Cover:

Covermeter Make and Model: Elcometer Protovale 331, Model T
Battery Check: **Reading at Start of Test:** O.K.
Reading at End of Test: O.K.
Concrete Cover Check: **Location of Check:** Concrete Block with Rebar
Actual Depth & Rebar Dia: Cover: 75 mm & Size: 15M
Reading Before Test: 75 mm
Readings Each 30 min During Test: 75 mm
Readings End of Test: 75 mm

3.0 Corrosion Activity

3.1 Corrosion Activity (April 27th, 2009):

Half Cell Make & Model: Cupric Sulphate, MCM RE-5
Multimeter Make & Model: Radio Shack CAT NO. 22-813
Length and Gauge of Lead Wires: 120m - #16
Deck Temp: **Start of Test:** 20 ^{0}C **End of Test:** 25 ^{0}C
Ambient Temp: **Start of Test:** 23 ^{0}C **End of Test:** 29 ^{0}C
Battery Check: O.K.
Ground Check: **Method of Connection:** Compression clamp

Ground Location:	C1 D2: 100 E & 300 S	**Check Location:**	C6 G71: 550 W & 200 N
Lead Resistance:	1.2 Ω	**Voltage Drop (mV's):**	0.4 mV
Resistance:	3.2 Ω	**Resistance Reversed:**	3.2 Ω

Grid Point Potential Readings Check - See Table Below

Location	Initial Reading	Check Reading*	Check Reading - Latex Concrete Overlay**
E33	-0.112 V	-0.119 V	-
E34	-0.082 V	-0.099 V	-
E35	-0.072 V	-0.071 V	-
E36	-0.074 V	-0.085 V	-
E37	-0.090 V	-0.092 V	-

3.2 Corrosion Activity (April 29th, 2009):

Half Cell Make & Model: Cupric Sulphate, MCM RE-5
Multimeter Make & Model: Radio Shack CAT NO. 22-813
Length and Gauge of Lead Wires: 120m - #16
Deck Temp: **Start of Test:** 11 ^{0}C **End of Test:** 12 ^{0}C
Ambient Temp: **Start of Test:** 11 ^{0}C **End of Test:** 14 ^{0}C
Battery Check: O.K.
Ground Check: **Method of Connection:** Compression clamp

Ground Location:	C1 D2: 100 E & 300 S	**Check Location:**	C13 B69: 700 S & 200 W
Lead Resistance:	1.7 Ω	**Voltage Drop (mV's):**	0.2 mV
Resistance:	5.4 Ω	**Resistance Reversed:**	5.5 Ω

Grid Point Potential Readings Check - See Table Below

Location	Initial Reading	Check Reading*	Check Reading - Latex Concrete Overlay**
B8	-0.221 V	-0.214 V	-
B9	-0.230 V	-0.222 V	-
B10	-0.223 V	-0.209 V	-
B11	-0.178 V	-0.172 V	-
B12	-0.190 V	-0.182 V	-

* Check at least 5 readings at beginning of test and each change in ground.

** On decks with latex modified concrete overlay, check at least 5 locations by drilling holes through the latex concrete overlay into the original concrete substrate.

Note that the latex modified concrete overlay was not removed due to the uncertainty of the exact location of the previously patched local areas.

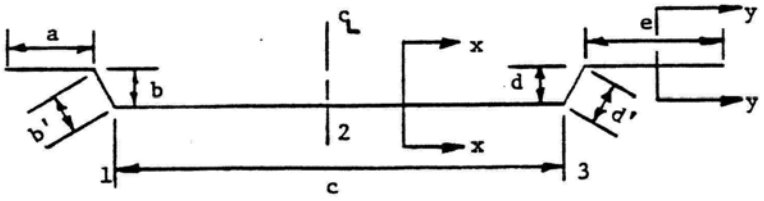
DETAILED CONDITION SURVEY SUMMARY SHEET
EXPANSION JOINTS

Site No. 2201

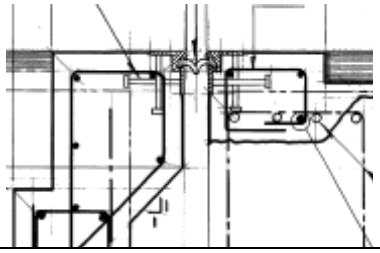
Dimensions	Abutments				Intermediate			
	Joint 1		Joint 2		Joint 3		Joint 4	
	N	E	S	W				
a (mm)	1440	-	1390	-	-		-	
b (mm)	220	-	185	-	-		-	
b' (mm)	330	-	215	-	-		-	
c (mm)	9120	-	9120	-	-		-	
d (mm)	220	-	220	-	-		-	
d' (mm)	225	-	240	-	-		-	
e (mm)	240	-	250	-	-		-	
Depth of Asphalt @ Deck Side					N/E	S/W	N/E	S/W
1 (mm)	-		-		-	-	-	-
2 (mm)	-		-		-	-	-	-
3 (mm)	-		-		-	-	-	-
Width: Top of Ballast Wall and End Dams								
	N	S	N	S	N/E	S/W	N/E	S/W
1 (mm)	200	260	250	250	-	-	-	-
2 (mm)	180	260	255	200	-	-	-	-
3 (mm)	200	240	265	240	-	-	-	-
Gap Dimensions								
1 (mm)	36		36		-		-	
2 (mm)	38		38		-		-	
3 (mm)	40		36		-		-	
Miscellaneous Joint Details								
Skew Angle	0		0		-		-	
Exp.	Yes		Yes		-		-	
Fixed	No		No		-		-	
Type	Seal Type		Seal Type		-		-	
Leaking	Yes		Yes		-		-	
Angle Size	127 x 127		127 x 127		-		-	
Temp. (°C)	Deck		24		Ambient		19	

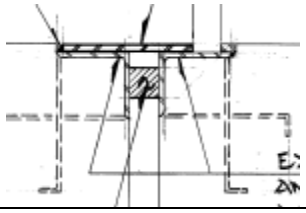
Remarks

W **Joint Dimensions** **E**



Typical Sections At Joints





X-X **Y-Y**

DETAILED CONDITION SURVEY SUMMARY SHEET
ASPHALT COVERED DECK
DECK RIDING SURFACE

Site No. **2201**

OSIM Identifier **Deck**

1. Dimensions and Area of Survey

Width between E abutment curbs	9.1 m	Width between W abutment curbs	9.1 m
Length between abutment joints	107.620 m	Area of deck riding surface	976 m²

2. Asphalt Surface Cracks

Remarks

Orientation	Unsealed	Sealed	
Transverse	283	0	**m**
Longitudinal	143	0	**m**
Diagonal	11	0	**m**

3. Asphalt Condition and Depth

Condition *	Thickness (mm)		
	Min	Max	Avg
F	55	100	82

* G - Good F - Fair P - Poor V- Variable Good to Poor

4. Waterproofing

Type	Condition	Conc. Bond	Thickness (mm)		
			Min.	Max.	Avg.
Hot Applied Asphalt	**G**	**G**	**3**	**13**	**8**

Note:
The protection board bond to the asphalt was found in fair condition.

* G - Good F - Fair P - Poor V- Variable Good to Poor

DETAILED CONDITION SURVEY SUMMARY SHEET
ASPHALT COVERED DECK
DECK RIDING SURFACE

Site **2201**

OSIM Identifier **Deck**

5. Concrete Cover – Cores and Sawn Samples

Minimum	Maximum	Average	
57	110	76	**mm**

Note: Only includes cover for top upper layer of rebar measured at sawn sample locations.

6. Corrosion Activity

Minimum	Maximum	Average	
-0.068	-0.504	-0.229	**V**

0 to -0. 20	-0. 20 to -0. 35	-0. 35 to -0.45	<-0. 45	
805.1	171.2	7.5	0.3	**m^2**
82	17	0.8	0.2	**%**

7. Defective Cores and Sawn Samples

Corrosion Activity (Volts)	Cores and Sawn Samples						
	Total in Each Area	Delaminated, Spalled, Severe			Medium Scaling*		
		No.	m^2	%	No.	m^2	%
0 to –0.20	13	-	-	-	-	-	-
-0.20 to –0.35	20	-	-	-	-	-	-
-0.35	6	1	-	-	-	-	-

* The percent calculation should be of the entire deck area investigated. The values obtained should be used with caution as large errors may occur when a small number of samples are used for the calculation or when the samples are not randomly distributed over the entire deck area.

DETAILED CONDITION SURVEY SUMMARY SHEET
ASPHALT COVERED DECK
DECK RIDING SURFACE

Site 2201
OSIM Identifier Deck

8. Adjusted Chloride Content Profile

Corrosion Activity at Core Location (volts)		0 to -. 20	-. 20 to -. 35	<-. 35
Chloride Content *	0-10 mm	0.003	0.020	-
	20-30 mm	0.000	0.005	-
	40-50 mm	0.000	0.007	-
	60-70 mm	0.003	0.009	-
	80-90 mm	0.081	0.007	-
	100-110 mm	0.094	0.052	-
	120-130 mm	0.084	-	-
	140-150 mm	0.066	-	-

***** Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

- 0.000 V to – 0.200 V: Core C18
- 0.200 V to – 0.350 V: Core C7
< - 0.350 V: No Cores

9. Chloride Content at Level of Rebar

Core No.	C1	C3	C7	C11	C18
Chloride Content *	0.014	0.020	0.027	0.016	0.081
Corrosion Potential (V)	- 0.178	- 0.144	- 0.312	- 0.110	- 0.133

Note: Reinforcing steel located Approximately 82 mm below the concrete surface

* Chloride content as % chloride by weight of concrete after deducting background chlorides, Chloride content taken 80 – 90 mm below the deck surface

10. AC Resistance Test Data of Epoxy Coated Rebar

Measured AC Resistance between Connection # 1 and # 2						Calculated AC Resistance*
Connection #1	Connection # 2					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

12. Concrete Air Entrainment

Concrete Air Entrained? Yes _____ No _____ Marginal ✓

13. Compressive Strength

Average Compressive Strength 66.4 MPa

APPENDIX B
CORE PHOTOGRAPHS, SKETCHES, AND LOGS

Core C1

Core C2

Core C3

Core C4

Core C5

Core C6

Core C7

Core C8

Core C9

Core C10

Core C11

Core C12

Core C13

Core C14

Core C15-1

Core C15-2

Core C16

Core C17

Core C18

Core C19

Core C20

Core C21-1

Core C21-2

Core C22-1

Core C22-2

Core C23

CORE LOG ASPHALT COVERED BRIDGE DECKS

 Scheifele Bridge Bridge No: 2201

Core no.		C1		C2		C3	
Location		D2 100 E & 300 S		D2 200 S		D3 150 W & 50 S	
Diameter, mm		100		100		100	
Thickness of Asphalt, mm		95		85		90	
Thickness of asphalt @ nearest grid point		-		-		-	
Thickness of Concrete, mm		116		180		165	
Full Depth, (yes/no)		N		N		N	
Condition of asphalt[1]		P		F		F	
Waterproofing (W/P) Type		Hot Applied Asphalt		Hot Applied Asphalt		Hot Applied Asphalt	
Condition of W/P[1]		F		F		F	
W/P Thickness, mm		6		4		5	
Bond of Asphalt or W/P to Concrete		F		F		F	
Defects in Concrete[2]		None		None		None	
Condition Rebar[3]		G		N/A		N/A	
Corrosion Potential, V		- 0.178		- 0.178		- 0.144	
Compressive Strength, MPa		-		-		-	
Chloride Content % Chloride by weight of concrete		Total	Corrected	Total	Corrected	Total	Corrected
	0 - 10 mm	0.038	0.018	-	-	0.033	0.013
	20 – 30 mm	0.036	0.016	-	-	0.033	0.013
	40 – 50 mm	0.082	0.024	-	-	0.084	0.026
	60 – 70 mm	0.072	0.014	-	-	0.079	0.021
	80 – 90 mm	0.072	0.014	-	-	0.078	0.020
	100 – 110 mm	0.069	0.011	-	-	0.065	0.007
	120 – 130 mm	-	-	-	-	0.066	0.008
	140 – 150 mm	-	-	-	-	0.059	0.001
Air Voids	Air Content, %	-		-		-	
	Spec. surf., mm^2/mm^3	-		-		-	
	Spacing factor, mm	-		-		-	
Testing Laboratory		Golder Associates		-		Golder Associates	
Remarks - Orientation of rebars and cover (L=Longitudinal, T=Transverse) - Presence of overlay, patch, and thickness - Other observed defects		- 110mm cover to 15mm dia. trans. rebar - Poor bond between asphalt lifts - 40mm concrete overlay (good bond between overlay & deck) - Half-cell survey ground connection		- 45mm concrete overlay (good bond between overlay & deck).		- 40mm concrete overlay (good bond between overlay & deck).	

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed

CORE LOG ASPHALT COVERED BRIDGE DECKS

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Core no.		C4		C5		C6	
Location		F27 700 E		D44 600 E		G71 550 W & 200 N	
Diameter, mm		100		100		100	
Thickness of Asphalt, mm		55		65		60	
Thickness of asphalt @ nearest grid point		-		-		-	
Thickness of Concrete, mm		130		155		110	
Full Depth, (yes/no)		N		N		N	
Condition of asphalt[1]		F		F		F	
Waterproofing (W/P) Type		Hot Applied Asphalt		Hot Applied Asphalt		Hot Applied Asphalt	
Condition of W/P[1]		F		G		G	
W/P Thickness, mm		3		4		4	
Bond of Asphalt or W/P to Concrete		F		F		F	
Defects in Concrete[2]		None		None		None	
Condition Rebar[3]		G		N/A		G	
Corrosion Potential, V		- 0.247		- 0.082		- 0.165	
Compressive Strength, MPa		-		65.9		-	
Chloride Content % Chloride by weight of concrete		Total	Corrected	Total	Corrected	Total	Corrected
	0 - 10 mm	-	-	-	-	-	-
	20 – 30 mm	-	-	-	-	-	-
	40 – 50 mm	-	-	-	-	-	-
	60 – 70 mm	-	-	-	-	-	-
	80 – 90 mm	-	-	-	-	-	-
	100 – 110 mm	-	-	-	-	-	-
	120 – 130 mm	-	-	-	-	-	-
	140 – 150 mm	-	-	-	-	-	-
Air Voids	Air Content, %	-		-		7.8	
	Spec. surf., mm^2/mm^3	-		-		15.94	
	Spacing factor, mm	-		-		0.250	
Testing Laboratory		-		-		Golder Associates	
Remarks - Orientation of rebars and cover (L=Longitudinal, T=Transverse) - Presence of overlay, patch, and thickness - Other observed defects		- Core broke during removal - 60mm concrete overlay (good bond between overlay & deck) - 125mm cover to 15mm dia. long. rebar		- 50mm concrete overlay (good bond between overlay & deck)		- 50mm concrete overlay (good bond between overlay & deck) - 110mm cover to 15mm dia. rebar - Rebar used for ground check location	

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed

CORE LOG ASPHALT COVERED BRIDGE DECKS

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Core no.		C7		C8		C9	
Location		G20 400 W		G20 400 W & 130 S		G20 520 W & 160 S	
Diameter, mm		100		100		100	
Thickness of Asphalt, mm		45		45		45	
Thickness of asphalt @ nearest grid point		-		-		-	
Thickness of Concrete, mm		130		125		585	
Full Depth, (yes/no)		N		N		N	
Condition of asphalt[1]		F		F		F	
Waterproofing (W/P) Type		Hot Applied Asphalt		Hot Applied Asphalt		Hot Applied Asphalt	
Condition of W/P[1]		F		F		F	
W/P Thickness, mm		4		5		4	
Bond of Asphalt or W/P to Concrete		G		G		P	
Defects in Concrete[2]		None		None		None	
Condition Rebar[3]		LR		N/A		N/A	
Corrosion Potential, V		- 0.315		- 0.315		- 0.171	
Compressive Strength, MPa		-		-		-	
Chloride Content % Chloride by weight of concrete		Total	Corrected	Total	Corrected	Total	Corrected
	0 - 10 mm	0.040	0.020	-	-	-	-
	20 – 30 mm	0.025	0.005	-	-	-	-
	40 – 50 mm	0.027	0.007	-	-	-	-
	60 – 70 mm	0.029	0.009	-	-	-	-
	80 – 90 mm	0.027	0.007	-	-	-	-
	100 – 110 mm	0.052	0.032	-	-	-	-
	120 – 130 mm	-	-	-	-	-	-
	140 – 150 mm	-	-	-	-	-	-
Air Voids	Air Content, %	-		-		-	
	Spec. surf., mm^2/mm^3	-		-		-	
	Spacing factor, mm	-		-		-	
Testing Laboratory		Golder Associates		-		-	
Remarks - Orientation of rebars and cover (L=Longitudinal, T=Transverse) - Presence of overlay, patch, and thickness - Other observed defects		- 110mm cover to 15mm dia. stirrup rebar - 110mm concrete overlay (fair bond between overlay & deck) - Core broke between overlay and base concrete interface during removal.		- 120mm concrete overlay (fair bond between overlay & deck) - Core broke between overlay and base concrete interface during removal.		- Core taken into girder G1 - 120mm concrete overlay (good bond between overlay & deck) - Core broke due to coring operation - Large void at 430 mm ± below top of sidewalk - Core broke during removal near the void location.	

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed

CORE LOG ASPHALT COVERED BRIDGE DECKS

 Scheifele Bridge Bridge No: 2201

Core no.		C10		C11		C12	
Location		D66 300 E		E66 300 E		B71 750 W & 100 S	
Diameter, mm		100		100		100	
Thickness of Asphalt, mm		70		70		55	
Thickness of asphalt @ nearest grid point		-		-		-	
Thickness of Concrete, mm		295		265		190	
Full Depth, (yes/no)		N		Y		N	
Condition of asphalt[1]		P		P		P	
Waterproofing (W/P) Type		Hot Applied Asphalt		Hot Applied Asphalt		Hot Applied Asphalt	
Condition of W/P[1]		F		F		F	
W/P Thickness, mm		3		3		5	
Bond of Asphalt or W/P to Concrete		P		P		G	
Defects in Concrete[2]		None		C		None	
Condition Rebar[3]		LR		N/A		N/A	
Corrosion Potential, V		- 0.093		- 0.074		- 0.110	
Compressive Strength, MPa		-		-		66.9	
Chloride Content % Chloride by weight of concrete		Total	Corrected	Total	Corrected	Total	Corrected
	0 - 10 mm	-	-	0.130	0.110	-	-
	20 – 30 mm	-	-	0.083	0.063	-	-
	40 – 50 mm	-	-	0.144	0.086	-	-
	60 – 70 mm	-	-	0.104	0.046	-	-
	80 – 90 mm	-	-	0.074	0.016	-	-
	100 – 110 mm	-	-	0.063	0.005	-	-
	120 – 130 mm	-	-	0.058	0.000	-	-
	140 – 150 mm	-	-	0.063	0.005	-	-
Air Voids	Air Content, %	-		-		-	
	Spec. surf., mm^2/mm^3	-		-		-	
	Spacing factor, mm	-		-		-	
Testing Laboratory		-		Golder Associates		Golder Associates	
Remarks - Orientation of rebars and cover (L=Longitudinal, T=Transverse) - Presence of overlay, patch, and thickness - Other observed defects		- 25mm concrete overlay (good bond between overlay & deck) - 135mm cover to 35mm dia. long. rebar - Stirrup within core - Core broke due to coring operation .- Core taken into Girder G2		- 35mm concrete overlay (good bond between overlay & deck) - Vertical crack extends from the deck soffit to 70 mm into the base concrete		- 61mm concrete overlay (good bond between overlay & deck) - Lower layer of asphalt disintegrated.	

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed

CORE LOG ASPHALT COVERED BRIDGE DECKS

Page 5 of 9 Scheifele Bridge Bridge No: 2201

Core no.		C13		C14		C15-1	
Location		B69 700 S & 200 W		A63 800 W & 750 N		B43 500 E	
Diameter, mm		100		100		100	
Thickness of Asphalt, mm		-		-		75	
Thickness of asphalt		-		-		-	
Thickness of Concrete, mm		120		465		105	
Full Depth, (yes/no)		N		N		N	
Condition of asphalt[1]		-		-		P	
Waterproofing (W/P) Type		-		-		Hot Applied Asphalt	
Condition of W/P[1]		-		-		F	
W/P Thickness, mm		-		-		5	
Bond of Asphalt or W/P to Concrete		-		-		G	
Defects in Concrete[2]		None		None		None	
Condition Rebar[3]		G		LR		LR	
Corrosion Potential, V		- 0.112		- 0.175		- 0.138	
Compressive Strength, MPa		-		-		-	
Chloride Content % Chloride by weight of concrete		Total	Corrected	Total	Corrected	Total	Corrected
	0 - 10 mm	-	-	-	-	-	-
	20 – 30 mm	-	-	-	-	-	-
	40 – 50 mm	-	-	-	-	-	-
	60 – 70 mm	-	-	-	-	-	-
	80 – 90 mm	-	-	-	-	-	-
	100 – 110 mm	-	-	-	-	-	-
	120 – 130 mm	-	-	-	-	-	-
	140 – 150 mm	-	-	-	-	-	-
Air Voids	Air Content, %	-		-		-	
	Spec. surf., mm^2/mm^3	-		-		-	
	Spacing factor, mm	-		-		-	
Testing Laboratory		-		-		-	
Remarks - Orientation of rebars and cover (L=Longitudinal, T=Transverse) - Presence of overlay, patch, and thickness - Other observed defects		- 120mm cover to 15mm dia. transv. rebar - Core taken at sawn sample 6 - Core broke during removal - Rebar used for ground check connection - 75mm concrete overlay (good bond between overlay & deck)		- 425mm cover to 35mm dia. long. rebar - 125mm cover to 15mm dia. transv. rebar - 140mm cover to 15mm dia. long. rebar - Core broke at sidewalk & deck concrete interface during removal - (Fair bond between sidewalk & deck) - Core taken into Girder G4		- 40mm concrete overlay (good bond between overlay & deck) - 100mm cover to 35mm dia. rebar.	

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed

CORE LOG ASPHALT COVERED BRIDGE DECKS

 Scheifele Bridge Bridge No: 2201

Core no.		C15-2		C16		C17	
Location		B43 500 E		C41 750 W & 500 N		A5 900 W & 700 N	
Diameter, mm		100		100		100	
Thickness of Asphalt, mm		75		55		-	
Thickness of asphalt @ nearest grid point		-		-		-	
Thickness of Concrete, mm		530		115		345	
Full Depth, (yes/no)		N		N		N	
Condition of asphalt[1]		F		P		-	
Waterproofing (W/P) Type		Hot Applied Asphalt		Hot Applied Asphalt		-	
Condition of W/P[1]		F		F		-	
W/P Thickness, mm		5		3		-	
Bond of Asphalt or W/P to Concrete		G		G		-	
Defects in Concrete[2]		None		None		None	
Condition Rebar[3]		N/A		G		N/A	
Corrosion Potential, V		- 0.138		- 0.130		- 0.172	
Compressive Strength, MPa		-		-		-	
Chloride Content % Chloride by weight of concrete		Total	Corrected	Total	Corrected	Total	Corrected
	0 - 10 mm	-	-	-	-	-	-
	20 – 30 mm	-	-	-	-	-	-
	40 – 50 mm	-	-	-	-	-	-
	60 – 70 mm	-	-	-	-	-	-
	80 – 90 mm	-	-	-	-	-	-
	100 – 110 mm	-	-	-	-	-	-
	120 – 130 mm	-	-	-	-	-	-
	140 – 150 mm	-	-	-	-	-	-
Air Voids	Air Content, %	-		-		-	
	Spec. surf., mm^2/mm^3	-		-		-	
	Spacing factor, mm	-		-		-	
Testing Laboratory		-		-		-	
Remarks - Orientation of rebars and cover (L=Longitudinal, T=Transverse) - Presence of overlay, patch, and thickness - Other observed defects		- Core taken into girder G3 - Core taken adjacent to C15-1 to avoid stirrup - Core broken during removal.		- Full depth asphalt crack - 115mm cover to 35mm dia. long. rebar - Core broken during removal - 60mm concrete overlay (good bond between overlay & deck)		- Rebar encountered within deck, unable to core further - Core is of sidewalk only, broke off at sidewalk & deck interface during removal. - (Fair bond between sidewalk & deck)	

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed

CORE LOG ASPHALT COVERED BRIDGE DECKS

 Scheifele Bridge Bridge No: 2201

Core no.		C18		C19		C20	
Location		B3 200 N & 700 W		C2 600 S & 600 W		B72 3000 N & 700 E	
Diameter, mm		100		100		100	
Thickness of Asphalt, mm		85		80		120	
Thickness of asphalt @ nearest grid point		-		-		-	
Thickness of Concrete, mm		240		640		-	
Full Depth, (yes/no)		Y		N		Y	
Condition of asphalt[1]		P		F		F	
Waterproofing (W/P) Type		Hot Applied Asphalt		Hot Applied Asphalt		-	
Condition of W/P[1]		P		F		-	
W/P Thickness, mm		2		5		-	
Bond of Asphalt or W/P to Concrete		P		F		-	
Defects in Concrete[2]		D, C		None		-	
Condition Rebar[3]		SR		LR		-	
Corrosion Potential, V		- 0.133		- 0.120		- 0.144	
Compressive Strength, MPa		-		-		-	
Chloride Content % Chloride by weight of concrete		Total	Corrected	Total	Corrected	Total	Corrected
	0 - 10 mm	0.023	0.003	-	-	-	-
	20 – 30 mm	0.020	0.000	-	-	-	-
	40 – 50 mm	0.020	0.000	-	-	-	-
	60 – 70 mm	0.023	0.003	-	-	-	-
	80 – 90 mm	0.101	0.081	-	-	-	-
	100 – 110 mm	0.152	0.094	-	-	-	-
	120 – 130 mm	0.142	0.084	-	-	-	-
	140 – 150 mm	0.124	0.066	-	-	-	-
Air Voids	Air Content, %	-		-		-	
	Spec. surf., mm^2/mm^3	-		-		-	
	Spacing factor, mm	-		-		-	
Testing Laboratory		Golder Associates		-		-	
Remarks - Orientation of rebars and cover (L=Longitudinal, T=Transverse) - Presence of overlay, patch, and thickness - Other observed defects		- Concrete disintegrated at the bottom of the deck slab (spall in deck soffit) - Unable to remove delaminated portion - 90mm concrete overlay (good bond between overlay & deck) - 233mm cover to 15mm dia. trans. rebar		- Core taken into girder G3 - Core broke during removal - 135mm cover to 35mm dia. long. rebar - 200mm concrete overlay (good bond between overlay & deck).		- No approach slab found - Granular material underlying asphalt	

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed

CORE LOG ASPHALT COVERED BRIDGE DECKS

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Core no.		C21-1		C21-2		C22-1	
Location		A64 800 S & 800 W		A64 800 W & 920 S		A5 550 N & 800 W	
Diameter, mm		75		75		75	
Thickness of Asphalt, mm		-		-		-	
Thickness of asphalt @ nearest grid point		-		-		-	
Thickness of Concrete, mm		545		460		425	
Full Depth, (yes/no)		N		N		N	
Condition of asphalt[1]		-		-		-	
Waterproofing (W/P) Type		-		-		-	
Condition of W/P[1]		-		-		-	
W/P Thickness, mm		-		-		-	
Bond of Asphalt or W/P to Concrete		-		-		-	
Defects in Concrete[2]		None		None		None	
Condition Rebar[3]		LR		LR		LR	
Corrosion Potential, V		- 0.170		- 0.170		- 0.172	
Compressive Strength, MPa		-		-		-	
Chloride Content % Chloride by weight of concrete		Total	Corrected	Total	Corrected	Total	Corrected
	0 - 10 mm	-	-	-	-	-	-
	20 – 30 mm	-	-	-	-	-	-
	40 – 50 mm	-	-	-	-	-	-
	60 – 70 mm	-	-	-	-	-	-
	80 – 90 mm	-	-	-	-	-	-
	100 – 110 mm	-	-	-	-	-	-
	120 – 130 mm	-	-	-	-	-	-
	140 – 150 mm	-	-	-	-	-	-
Air Voids	Air Content, %	-		-		-	
	Spec. surf., mm^2/mm^3	-		-		-	
	Spacing factor, mm	-		-		-	
Testing Laboratory		-		-		-	
Remarks - Orientation of rebars and cover (L=Longitudinal, T=Transverse) - Presence of overlay, patch, and thickness - Other observed defects		- Core taken into girder G4 - 425mm cover to 35mm dia. long. rebar - 350mm & 480mm cover to two 15mm dia. transv. rebar - Stirrups encountered, unable to core further		- 440mm cover to 35mm dia. long. rebar - 405mm cover to 15mm dia. transv. rebar - Stirrups encountered, unable to core further - 350mm measured sidewalk depth - Core broke at sidewalk & deck interface during removal (fair bond) - Core taken into Girder G4		- 70mm cover to 15mm dia. transv. rebar - 435mm cover to stirrup, unable to core further - Core broke during removal - Fair bond between sidewalk & deck	

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed

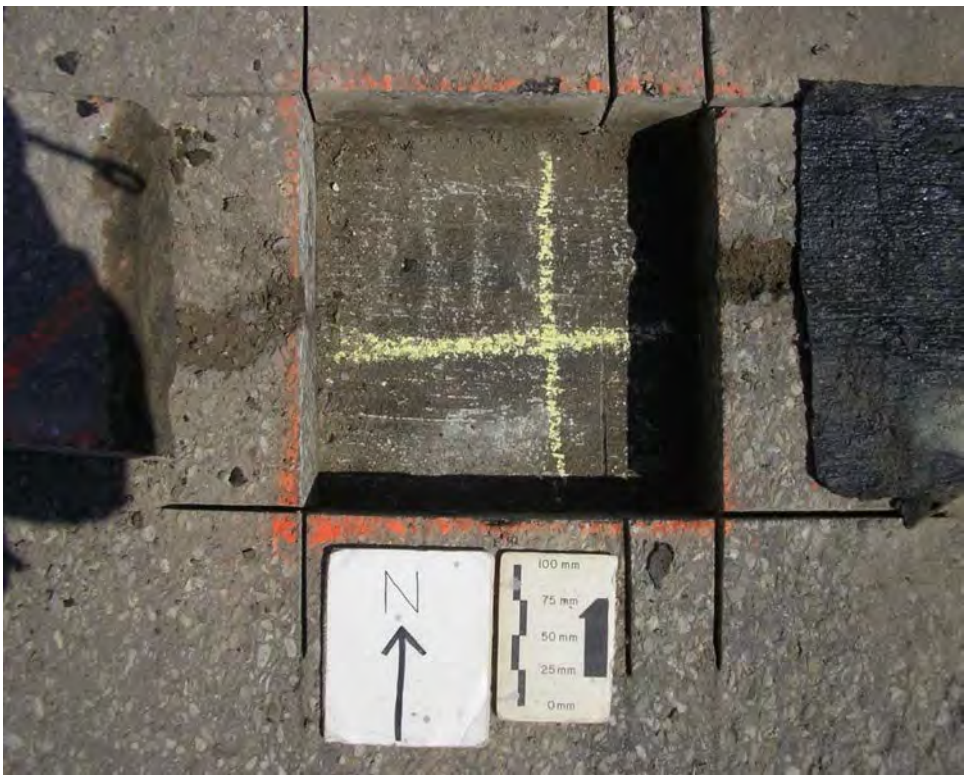
CORE LOG ASPHALT COVERED BRIDGE DECKS

Page 9 of 9 Scheifele Bridge Bridge No: 2201

Core no.		C22-2		C23			
Location		A5 470 N & 800 W		C1 2800 S & 300 W			
Diameter, mm		75		100			
Thickness of Asphalt, mm		-		100			
Thickness of asphalt @ nearest grid point		-		-			
Thickness of Concrete, mm		445		-			
Full Depth, (yes/no)		N		Y			
Condition of asphalt[1]		-		-			
Waterproofing (W/P) Type		-		-			
Condition of W/P[1]		-		-			
W/P Thickness, mm		-		-			
Bond of Asphalt or W/P to Concrete		-		-			
Defects in Concrete[2]		None		-			
Condition Rebar[3]		G		-			
Corrosion Potential, V		- 0.172		-			
Compressive Strength, MPa		-		-			
Chloride Content % Chloride by weight of concrete		Total	Corrected	Total	Corrected		
	0 - 10 mm	-	-	-	-		
	20 – 30 mm	-	-	-	-		
	40 – 50 mm	-	-	-	-		
	60 – 70 mm	-	-	-	-		
	80 – 90 mm	-	-	-	-		
	100 – 110 mm	-	-	-	-		
	120 – 130 mm	-	-	-	-		
	140 – 150 mm	-	-	-	-		
Air Voids	Air Content, %	-		-			
	Spec. surf., mm^2/mm^3	-		-			
	Spacing factor, mm	-		-			
Testing Laboratory		-		-			
Remarks - Orientation of rebars and cover (L=Longitudinal, T=Transverse) - Presence of overlay, patch, and thickness - Other observed defects		- 440mm cover to 15mm dia. transv. rebar - Stirrups encountered, unable to core further		- Core taken on South approach - Granular material underlying asphalt			

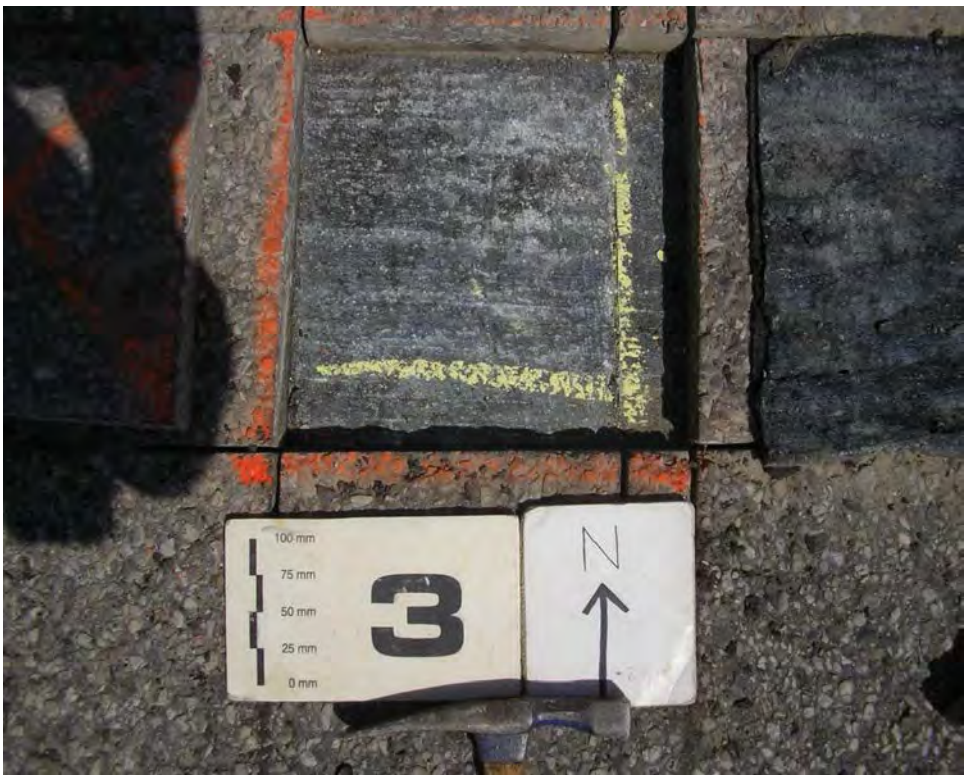
1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed

APPENDIX C
SAWN ASPHALT SAMPLE PHOTOGRAPHS AND LOGS



Sawn sample S1

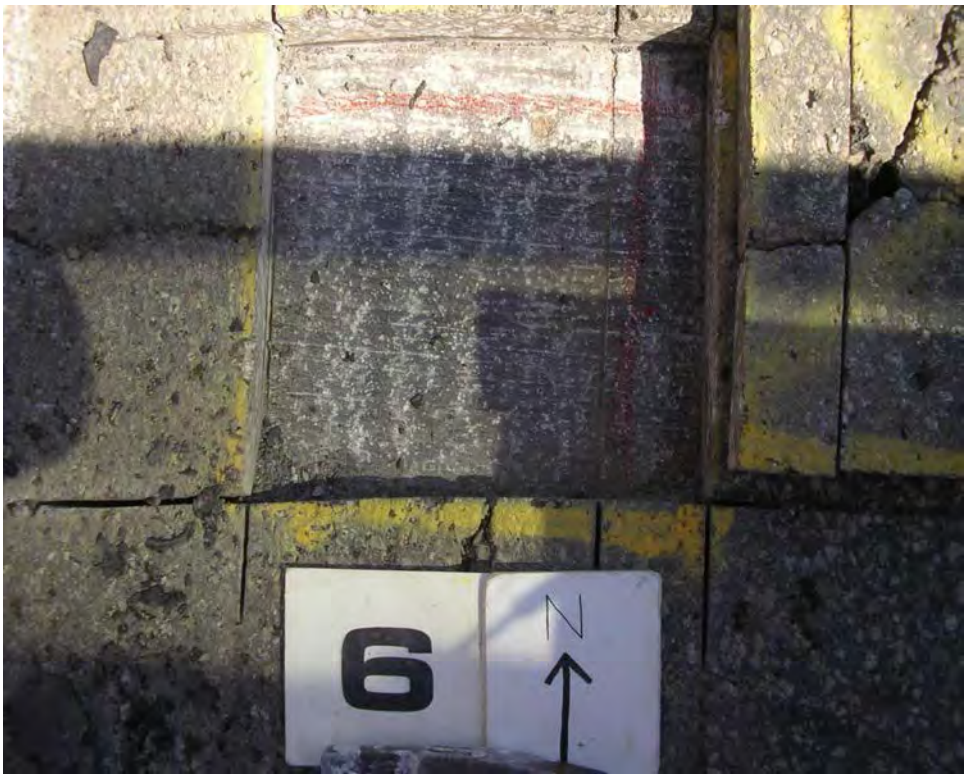
Sawn sample S2



Sawn sample S3

Sawn sample S4

Sawn sample S5



Sawn sample S6

SAWN ASPHALT SAMPLE LOG

Page 1 of 2 Scheifele Bridge Site No. 2201

Sample no.	S1	S2	S3
Location	9E 300 N	35F 600 E & 200 N	54D 500 N & 700 E
Size, mm x mm	310 x 300	320 x 300	320 x 310
Thickness of Asphalt, mm	86	45	45
Thickness of Asphalt @ Nearest Grid Point, mm	-	-	-
Condition of Asphalt	P	P	F
Waterproofing (W/P) Type	Hot Applied Asphalt	Hot Applied Asphalt	Hot Applied Asphalt
W/P Thickness, mm	4	4	4
Condition of W/P (1)	F	F	F
Bond of W/P to Asphalt	P	P	P
Bond of Asphalt or W/P to Concrete	F	F	P
Concrete Cover to Reinforcing, mm (Note orientation of rebar)	75T 87L	51T 49L	68T 64L
Defects in Concrete Surface[2]	None	None	None
Corrosion Potential @ Nearest Grid Point	-	-	-
Remarks	- Moisture on waterproofing surface - Full depth transverse medium width crack in asphalt	- Full depth transverse medium width crack in asphalt	- Full depth transverse small width crack in asphalt

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling,

SAWN ASPHALT SAMPLE LOG

Page 2 of 2 Scheifele Bridge Site No. 2201

Sample no.	S4	S5	S6
Location	3B 600 E & 500 N	32A 200 S	69B 300 W & 770 S
Size, mm x mm	330 x 330	340 x 310	340 x 340
Thickness of Asphalt, mm	90	30	35
Thickness of Asphalt @ Nearest Grid Point, mm	-	-	-
Condition of Asphalt	G	F	F
Waterproofing (W/P) Type	Hot Applied Asphalt	Hot Applied Asphalt	Hot Applied Asphalt
W/P Thickness, mm	4	5	4
Condition of W/P (1)	F	F	F
Bond of W/P to Asphalt	G	P	P
Bond of Asphalt or W/P to Concrete	F	F	F
Concrete Cover to Reinforcing, mm (Note orientation of rebar)	87T 94L	96T 76L	130T 122L
Defects in Concrete Surface[2]	None	None	None
Corrosion Potential @ Nearest Grid Point	-	-	-
Remarks	- Partial depth transverse medium width crack in asphalt	- Full depth transverse medium width crack in asphalt	- Full depth transverse & longitudinal medium width crack in asphalt

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling,

APPENDIX D
SITE PHOTOGRAPHS

Photograph 1 – General view. South end; west side looking north.

Photograph 2 – General view. Looking north along the bridge.

Photograph 3 – Transverse asphalt cracks along entire length of bridge at approximately 2m spacing (east lane, looking north).

Photograph 4 – Longitudinal asphalt crack extending over entire length of bridge along centerline (looking south).

Photograph 5 – Typical wearing surface. Note: Transverse and longitudinal cracks (looking east, south main span).

Photograph 6 – South expansion joint looking east. Note the debris build up in gap.

Photograph 7 – Severe leaking from expansion joint at S. Abutment bearing seat (looking SE).

Photograph 8 – Missing cover plate of expansion joint in side of sidewalk (south expansion joint looking west).

Photograph 9 –Pop-outs in sidewalk and transverse crack (main span, looking west).

Photograph 10 –Spalling of side of sidewalk. At south expansion joint, looking west.

Photograph 11 – Scaling of sidewalk (south main span, looking west).

Photograph 12 –Delamination of patch in sidewalk (north approach span, looking west).

Photograph 13 – Map cracking on sidewalk near north abutment (looking west).

Photograph 14 – General view of west concrete curb (at south expansion joint, looking north). Note the staining, spalling, and delaminations.

Photograph 15 –Spalling of east curb due to corrosion of reinforcement (south main span, looking east)

Photograph 16 – East concrete curb (looking east, south approach span). Note the spalling caused by reinforcing steel corrosion.

Photograph 17 – Delaminations in N. Abutment (mid height, between G2 and G3).

Photograph 18 – Seal broken between west wingwall and N. Abutment.

Photograph 19 – Bearing at N. Abutment under G1 (looking NE). Note the severe corrosion.

Photograph 20 –Bearing at N. Abutment under G2 (looking east). Note the medium corrosion of the bearing plate.

Photograph 21 –Bearing at N. Abutment under G3 (looking NE). Note the moderate to severe rusting of the bearing plate.

Photograph 22 - Spalling at top of S. Abutment bearing wall between G3 and G4 (looking SW).

Photograph 23 –Bottom of diaphragm at S. Abutment between G2 and G3. Note the delamination.

Photograph 24 –Delamination at top of S. Abutment bearing wall under G4 (looking SE). Note the concrete debris buildup on bearing seat.

Photograph 25 –Exposed rusted rebar at bottom of diaphragm at G3 (S. Abutment, looking south).

Photograph 26 –Face of ballast wall between G2 and G3 (S. Abutment, looking south). Note the spalled areas and exposed-rusted rebar.

Photograph 27 – S. Abutment bearing seat west of G4 (looking SE). Note the concrete debris buildup.

Photograph 28 - Severe leaking from south expansion joint on south abutment bearing seat (end to end).

Photograph 29 – Bearing at S. Abutment under G1 (looking SE). Note the severe corrosion.

Photograph 30 - Bearing at S. Abutment under G2 (looking SE). Note the severe corrosion.

Photograph 31 – Bearing at S. Abutment under G3 (looking SW). Note the severe corrosion.

Photograph 32 – Bearing at S. Abutment under G4 (looking SW). Note the severe corrosion and concrete debris between ballast wall and bearing.

Photograph 33 – General view of north face of north pier. Note the delaminated area at the top right corner.

Photograph 34 – Bearing at north face of the north pier under G2 (looking west). Note the light rust and spall on the east side of the bearing seat.

Photograph 35 – Bearing at north face of the north pier under G4 (looking west). Note the rust and spalled concrete exposing the top plate on the east side of the bearing.

Photograph 36 – Bearing at south face of the north pier under G1 (looking west). Note the spalled concrete exposing the top plate on the east side of the bearing.

Photograph 37 – Bearing at south face of the north pier under G4 (looking east). Note the light rust, concrete staining and the spalled concrete which exposes the end of the top plate of the bearing

Photograph 38 - Delamination and spalling at north side of centre pier under G2 (looking south).

Photograph 39 – Spalling and delamination at south side of centre pier under G3 (looking NW).

Photograph 40 – Bearing at south side of centre pier under G2 (looking north). Note the rusting at along the bottom of the bearing.

Photograph 41 – Bearing at north side of south pier under G1 (looking west). Note the concrete has spalled off exposing the end of the top plate.

Photograph 42 – Bearing at north side of south pier under G3 (looking east). Note the concrete has spalled off exposing the end of the top plate.

Photograph 43 –Bearing at north side of south pier under G4 (looking west). Note the disintegrating concrete in a previous patch over the bearing.

Photograph 44 - Deck soffit of east cantilever overhang in centre third of north approach span (looking south). Note the delaminated soffit area, rust stains and longitudinal cracks.

Photograph 45 – Delamination of deck soffit between G2 and G3 of north main span at centre third of deck located near centre pier (looking south). Note the transverse cracks as well.

Photograph 46 - Spalling and exposed rusted rebar along the underside of the west fascia of the north main span (looking south).

Photograph 47 – Delamination and spalling along west cantilever of north main span adjacent to north pier (looking east). Note the exposed rusted rebar, spalled areas, and cracking.

Photograph 48 –Concrete spalling and exposed rusted rebar along west cantilever of north main span (looking east).

Photograph 49 –Spalling of concrete soffit and exposed rusted rebar of south main span between G2 and G3 (third of span located adjacent to centre pier).

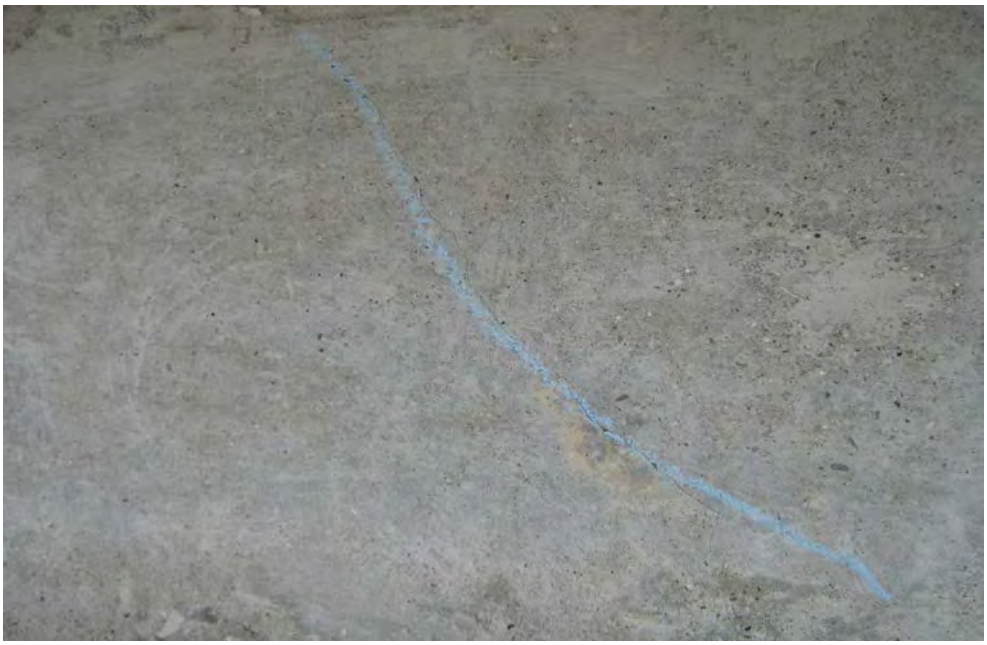
Photograph 50 – Wide longitudinal crack on between deck soffit girder haunch on east side of girder G3 in south main span (third of span located adjacent to centre pier).

Photograph 51 – Spalling of east fascia in centre third of south main span. Note the exposed rusted rebar.

Photograph 52 – Spalling and exposed corroded rebar between G2 and G3 at the centre third of the south approach span (looking south).

Photograph 53 – East fascia of south approach span (looking north). Note the concrete pop-outs, spalling, scaling, and staining.

Photograph 54 - West fascia of south approach slab (looking south). Note the concrete spalling, previous patchwork, cracking and exposed corroded rebar.



Photograph 55 – Typical medium width crack (mid-depth) on the west side of G4 of north approach span.

Photograph 55 –Honeycombing (along bottom) along east side of G4 of north approach span.

Photograph 56 - Spalling and delamination of soffit of girder G2 in the south approach span near the south abutment face. Note the exposed rusted rebar.

Photograph 57 –Wide stained crack extending 1.0m along the mid-span of the soffit of G4 in the south approach span. Note the leachate and rust staining surrounding the crack.

Photograph 58 –General view of east side of girder G1 in south main span (looking north). Note the medium width cracks along the girder.

Photograph 59 - Delamination of soffit of girder G1 in south main span near the south pier.

Photograph 60 – Concrete delamination of west side of girder G4 in south main span (adjacent to south pier, looking south).

Photograph 61 - Exposed rusted rebar in soffit at mid-span of girder G4 in south main span.

Photograph 62 – Deck drain (south main span, between G3 and G4, looking north).

Photograph 63 – Typical railing post (east side, south approach span). Note the corrosion and cracking along the post.

Photograph 64 – Corrosion of handrail (east side, north main span, looking east).

Photograph 65 - Damaged steel beam guide rail (north approach slab, east side, looking north).

Photograph 66 – Damaged steel beam guide rail (south approach slab, east side, looking south).

Photograph 67 – Steel beam guide rail to concrete end wall connection (south approach, east side, looking east). Note the loose connection.

Photograph 68 – Steel beam guide rail to concrete end wall connection (north approach, east side, looking east). Note the broken connection.

Photograph 69 - Concrete end wall (at south approach, west side, looking west). Note the scaling and disintegration at the top of the wall.

Photograph 70 – Concrete end wall (at south approach east side, looking east). Note the cracking at the bottom to mid portion of the wall.

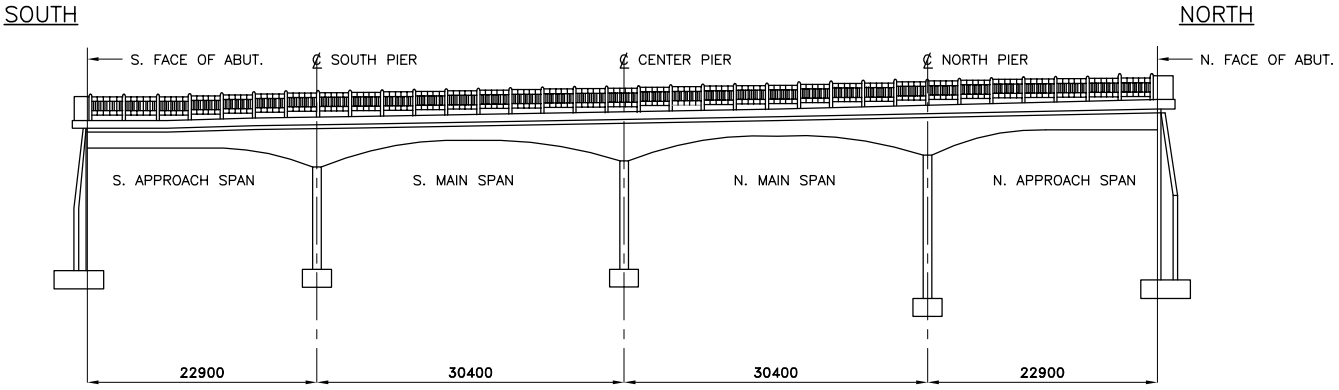
APPENDIX E
DECK CONDITION SURVEY DRAWINGS

List of Sketches

1. Geometric Details of Scheifele Bridge

List of Drawings

1. Corrosion Potentials (1 of 2)
2. Corrosion Potentials (2 of 2)
3. Soffit Plan – Surface Deterioration (1 of 2)
4. Soffit Plan – Surface Deterioration (2 of 2)
5. North Approach Span – Girder 1
6. North Approach Span – Girder 2
7. North Approach Span – Girder 3
8. North Approach Span – Girder 4
9. North Main Span – Girder 1
10. North Main Span – Girder 2
11. North Main Span – Girder 3
12. North Main Span – Girder 4
13. South Main Span – Girder 1
14. South Main Span – Girder 2
15. South Main Span – Girder 3
16. South Main Span – Girder 4
17. South Approach Span – Girder 1
18. South Approach Span – Girder 2
19. South Approach Span – Girder 3
20. South Approach Span – Girder 4
21. Abutment
22. North Pier
23. Centre Pier
24. South Pier



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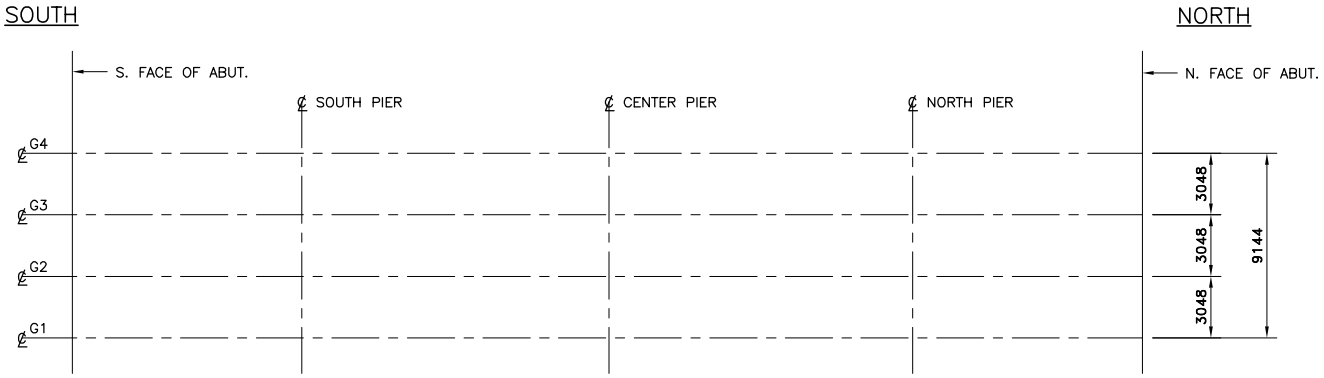

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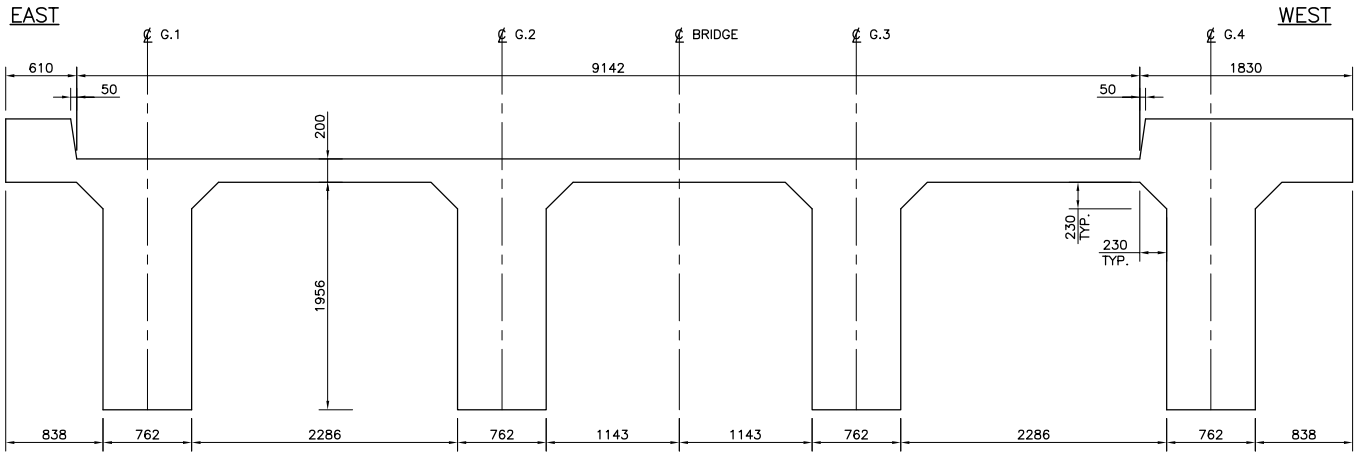

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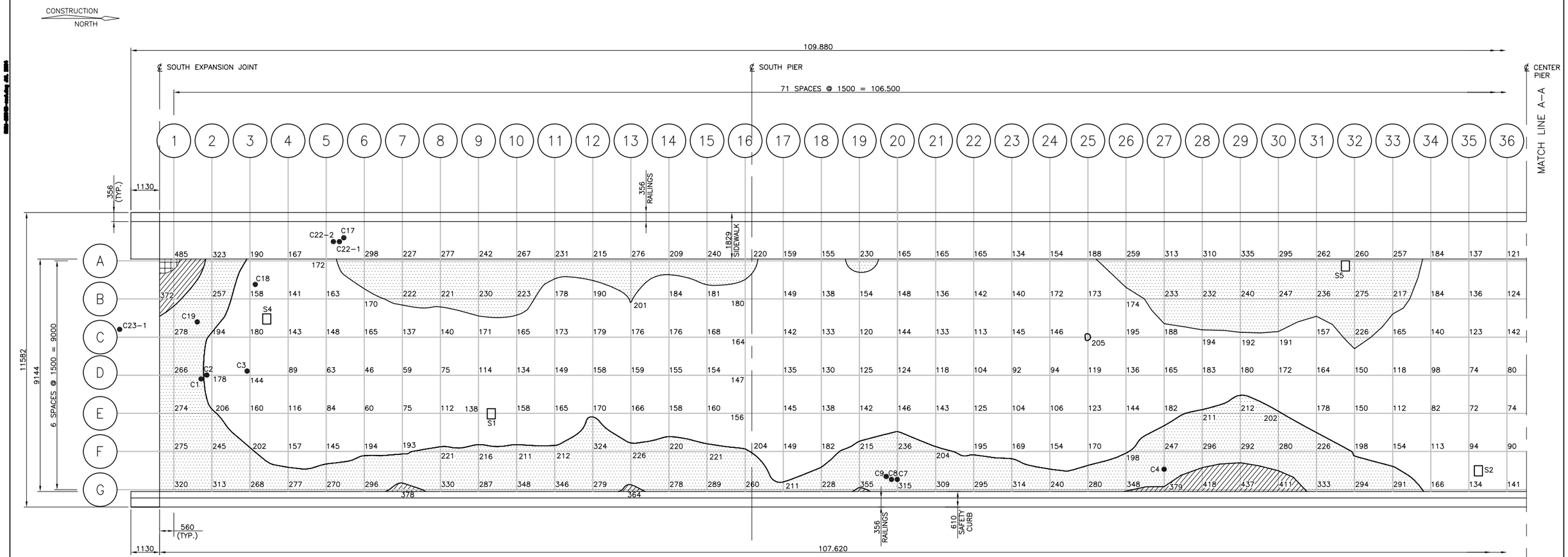
McCORMICK RANKIN CORPORATION

GEOMETRIC DETAILS OF SCHEIFELE BRIDGE

DATE: JUNE 2009

DRAWING:

SKETCH 1



LEGEND FOR SAMPLE LOCATION:

C1● CORE SAMPLE LOCATION & IDENTIFICATION

S1 □ SAWN SAMPLE LOCATION & IDENTIFICATION

LEGEND:

0 TO −190 mV

200 TO −350 mV

350 TO −450 mV

MORE NEGATIVE THAN 450 mV

175 HALF CELL POTENTIAL (NEGATIVE VOLTS $\times 10^{-3}$)

INSPECTOR AM & GT

DATE APRIL 27, 29 & 30, 2009

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Region of Waterloo

SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
CONDITION SURVEY

CORROSION POTENTIALS

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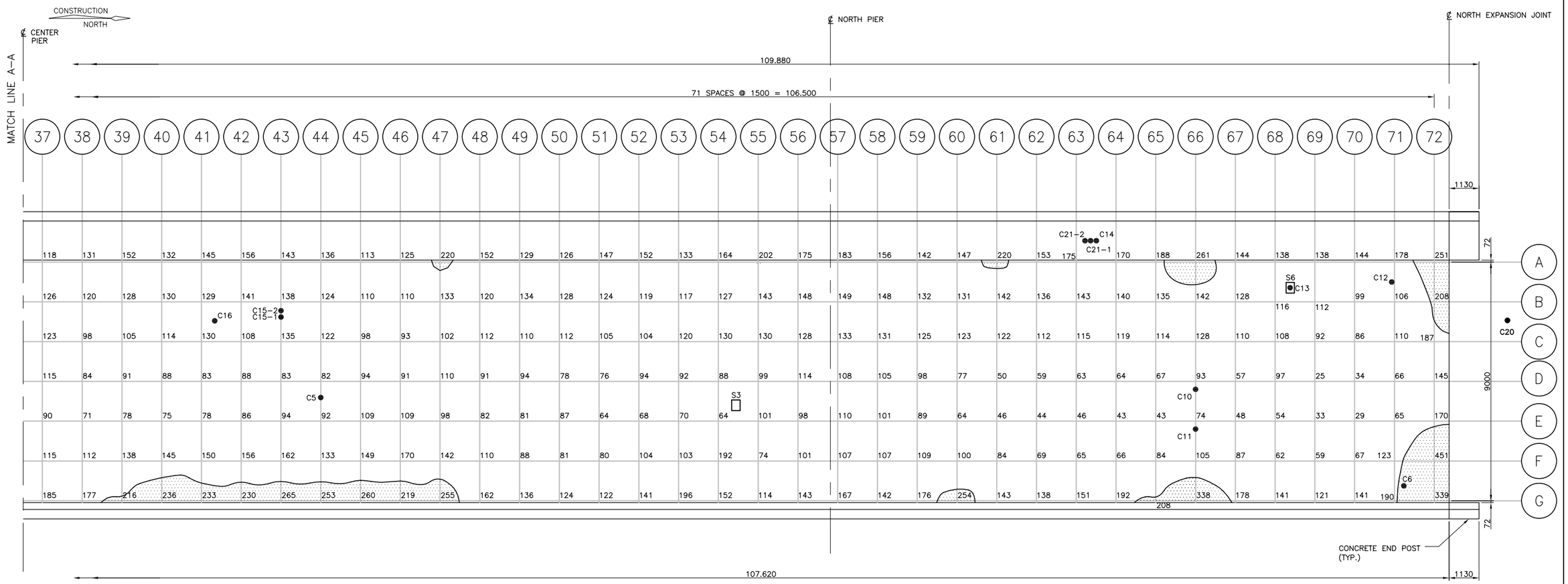

LEGEND FOR SAMPLE LOCATION:

C1● CORE SAMPLE LOCATION & IDENTIFICATION

S1 □ SAWN SAMPLE LOCATION & IDENTIFICATION

LEGEND:

0 TO −190 mV

200 TO −350 mV

350 TO −450 mV

MORE NEGATIVE THAN 450 mV

175 HALF CELL POTENTIAL (NEGATIVE VOLTS $\times 10^{-3}$)

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SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

CORROSION POTENTIALS

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MODIFIED: 09/11/02 16:40:08
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CONSTRUCTION
NORTH

℄ SOUTH EXPANSION JOINT

71 SPACES @ 1500 = 106.500

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36

MATCH LINE A–A

356 (TYP.)

11582

6 SPACES @ 1500 = 9000

A B C D E F G

1300x500 C22–2 C17 C22–1 C18 3600x1900 C19 1900x1500 S4 C23–1 1800x800 C3 C1 C2 600x400 800x500 800x500 1900x800 1900x600 1900x900 1500x500 400x300 1700x300 300x400 600x300 750x600 1100x300 1300x600 1500x1100 300x300 200x600 300x300 800x400 1800x350 1500 ℄ GIRDER 4 200x200 1000x800 3000 200x200 200x200 S5 1800x1200 ℄ GIRDER 3 3000 380x300 ℄ BRIDGE 1200x500 400x400 3000x700 3000x600 ℄ GIRDER 2 550x400 300x300 650x300 3000x700 1800x400 1900x500 M S1 M 1900x500 W 500x150 200x200 1000x400 1400x700 C4 C8 C9 C7 ℄ GIRDER 1 S2 1300x150 900x200 200x200 200x200 1100x300 450x400 800x300 400x200 200x100 1200x350 200x200 4000x300 2000x300 1200x300 400x100 200x200

1219 3048 1524 1524 3048 1219

471 15240 7620 10058 10363 10058

FRONT FACE OF S. ABUT. ℄ DIAPHRAGM ℄ SOUTH PIER ℄ DIAPHRAGM ℄ DIAPHRAGM ℄ CENTER PIER

560 (TYP.)

107.620

LEGEND:

- NARROW CRACK
- M MEDIUM CRACK
- W WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
- HONEYCOMBED AREAS

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

INSPECTOR JN, GI, AM & GT

DATE APRIL 27, 28, 29 & 30, 2009

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SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOFFIT PLAN SURFACE DETERIORATION

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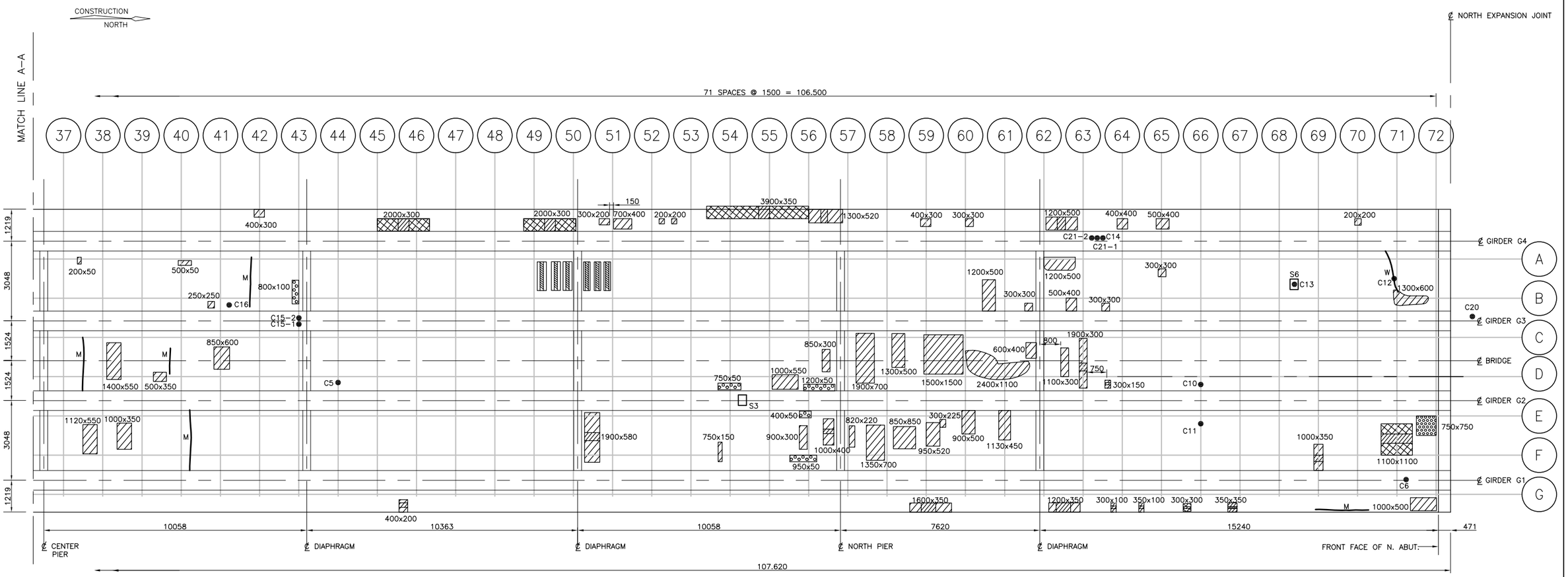

NOTE:
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- M MEDIUM CRACK
- W WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
- HONEYCOMBED AREAS

INSPECTOR JN, GI, AM & GT

DATE APRIL 27, 28, 29 & 30, 2009

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GSS-FILE

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOFFIT PLAN SURFACE DETERIORATION

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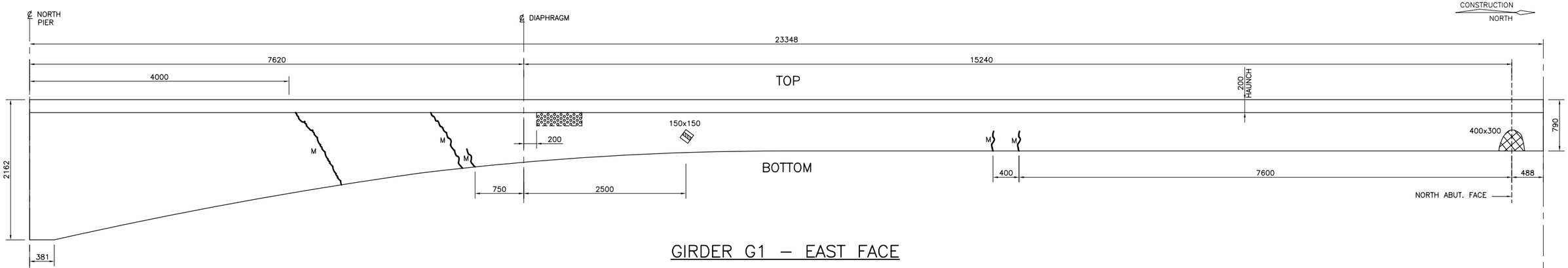
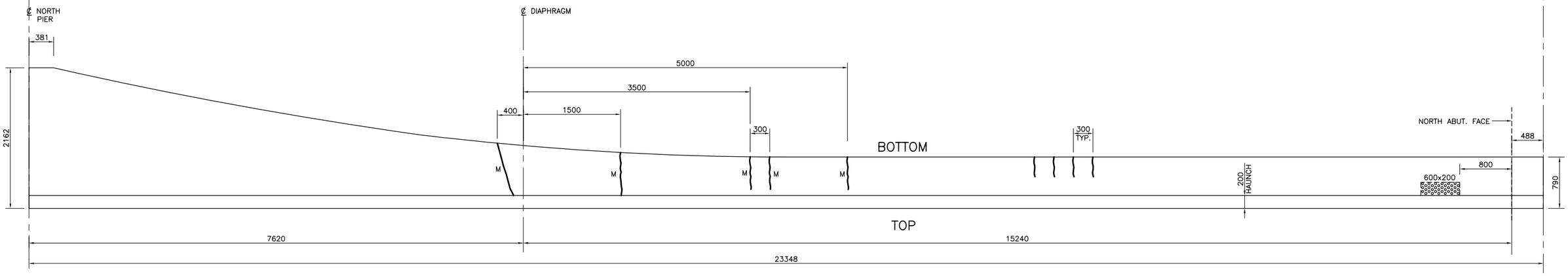


GIRDER G1 – EAST FACE

GIRDER G1 – BOTTOM FACE



GIRDER G1 – WEST FACE

LEGEND:

- NARROW CRACK
- M MEDIUM CRACK
- W WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
- HONEYCOMBED AREAS

NOTE:
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INSPECTOR AM & GT

DATE APRIL 28, 2009

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CADD FILE:
[illegible]

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH APPROACH SPAN GIRDER 1

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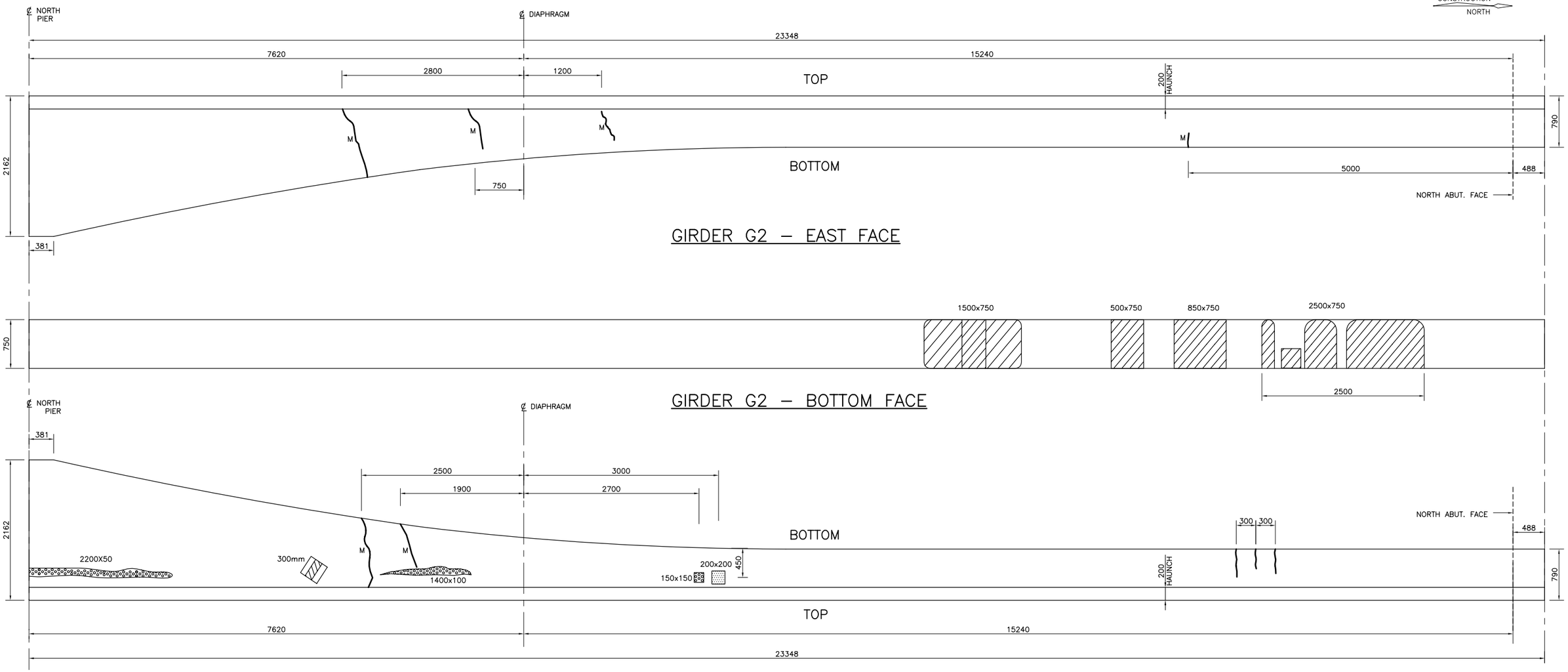

GIRDER G2 – EAST FACE

GIRDER G2 – BOTTOM FACE

GIRDER G2 – WEST FACE

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

LEGEND:

- NARROW CRACK
- M MEDIUM CRACK
- W WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
- HONEYCOMBED AREAS

INSPECTOR: AM & GT

DATE: APRIL 28, 2009

KEY PLAN

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McCORMICK RANKIN CORPORATION

No.	ISSUE/REVISION	BY	DATE

CONTROLLING B.M.

FIELD BOOK No.

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CADD FILE:
GSD-FILE

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH APPROACH SPAN GIRDER 2

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	GT		6
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET ____ OF ____

FILE LOCATION=S:\7474\CONDITION SURVEY\
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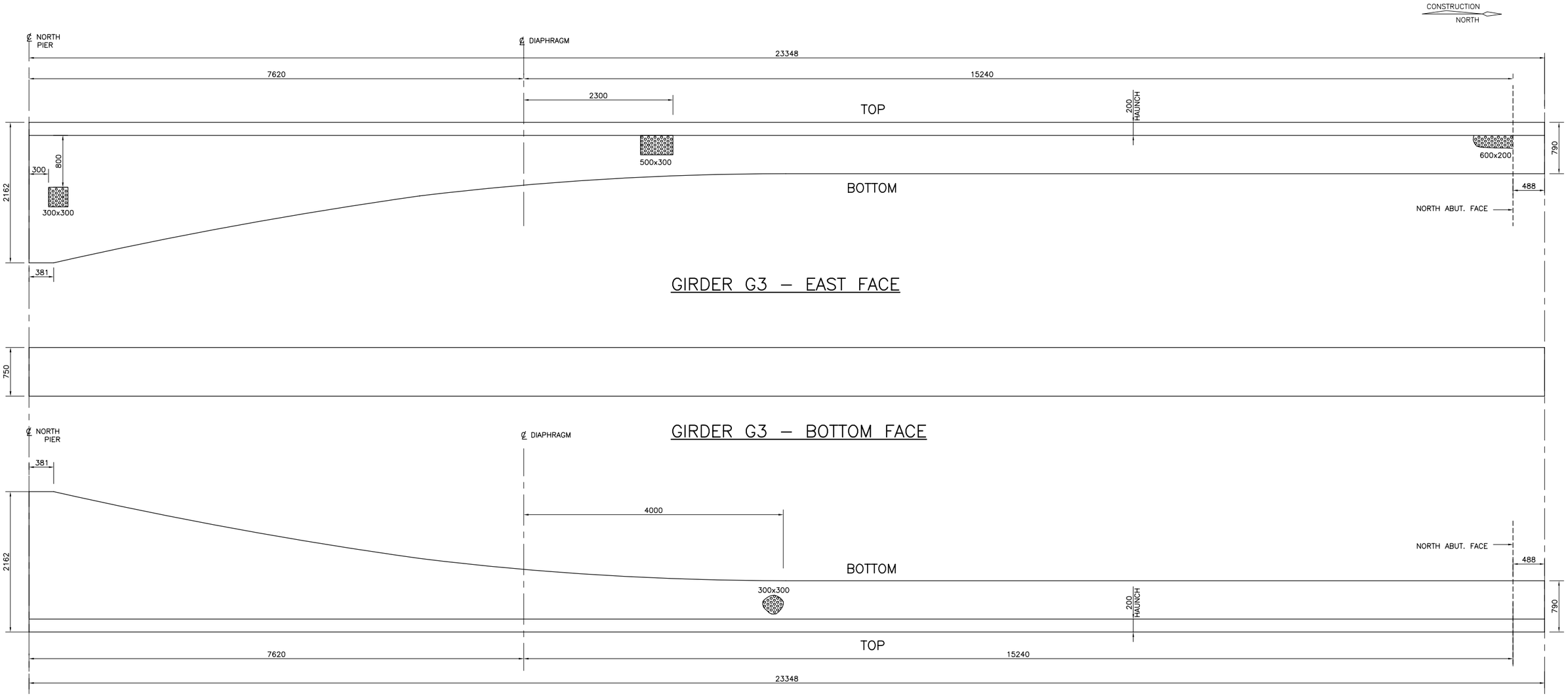
DRAWN BY: C. AWAD
MODIFIED: 2009/08/28 3:30:11
DATE PLOTTED: 2009/08/28 3:26:54



GIRDER G3 – EAST FACE

GIRDER G3 – BOTTOM FACE

GIRDER G3 – WEST FACE

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

LEGEND:

- NARROW CRACK
- M MEDIUM CRACK
- W WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
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- PATCHED SPALLS
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INSPECTOR AM & GT

DATE APRIL 28, 2009

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CADD FILE:
GSD-RAE

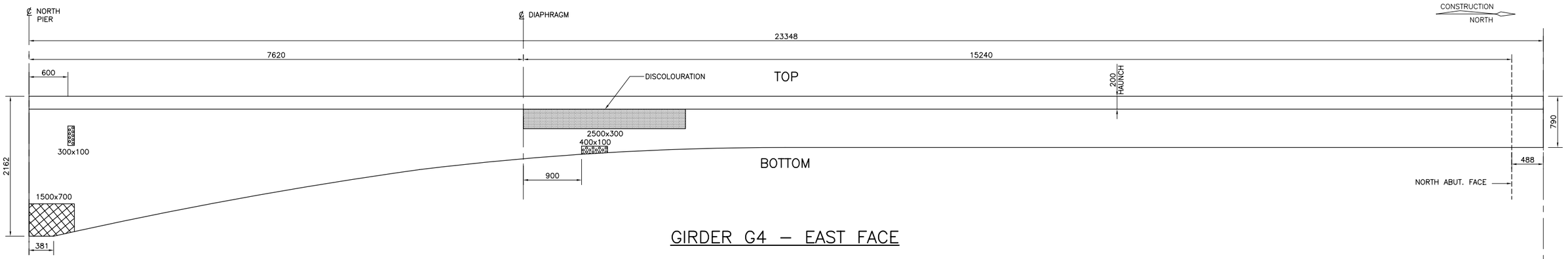
Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

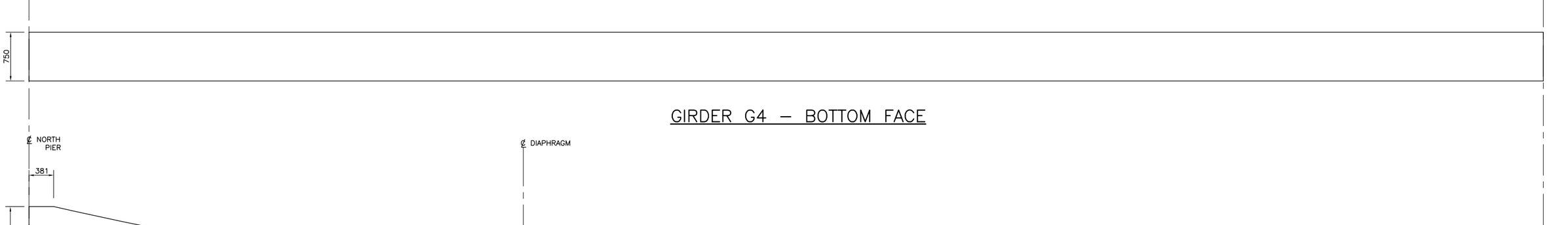
NORTH APPROACH SPAN GIRDER 3

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	GT		7
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET ____ OF ____

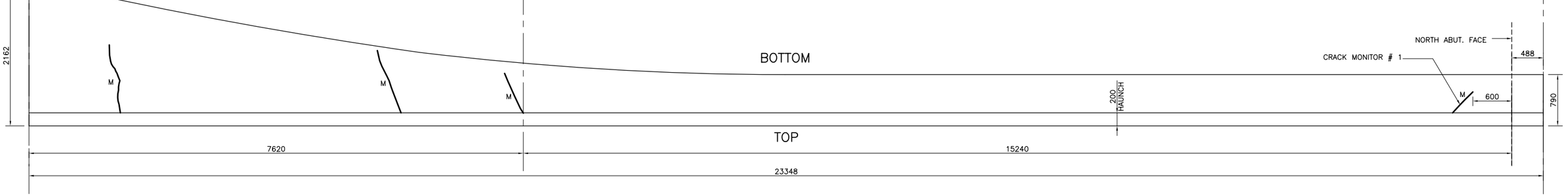
FILE LOCATION=S:\7474\CONDITION SURVEY\
DRAWING NAME: S7474-300-007CS.DWG
DRAWN BY: C. AWAD
MODIFIED: 2009/08/28 3:39:1
DATE PLOTTED: 2009/08/28 3:36:41



GIRDER G4 – EAST FACE



GIRDER G4 – BOTTOM FACE



GIRDER G4 – WEST FACE

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

LEGEND:

- NARROW CRACK
- M MEDIUM CRACK
- W WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
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INSPECTOR AM & GT

DATE APRIL 28, 2009

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CADD FILE:
GEO-FILE

Region of Waterloo

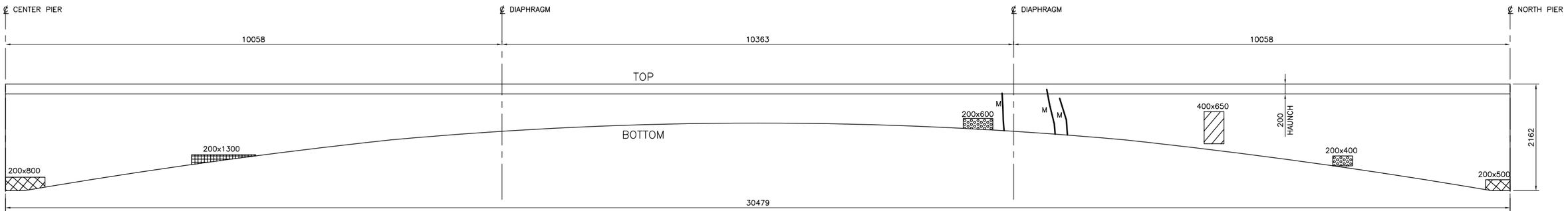
SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH APPROACH SPAN GIRDER 4

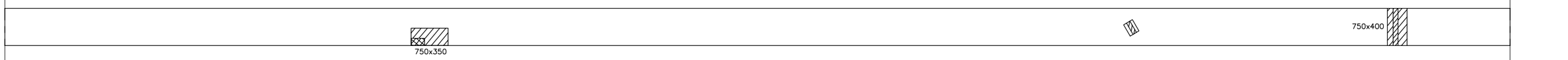
DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	GT		8
SCALE AS NOTED	DATE: APRIL/2009	FILE No.	SHEET ____ OF ____

FILE LOCATION=S:\7474\CONDITION SURVEY\
DRAWING NAME: S7474-300-0086S.DWG
DRAWN BY: C. AWAD
MODIFIED: 2009/08/28 4:00:18
DATE PLOTTED: 2009/08/28 3:57:01

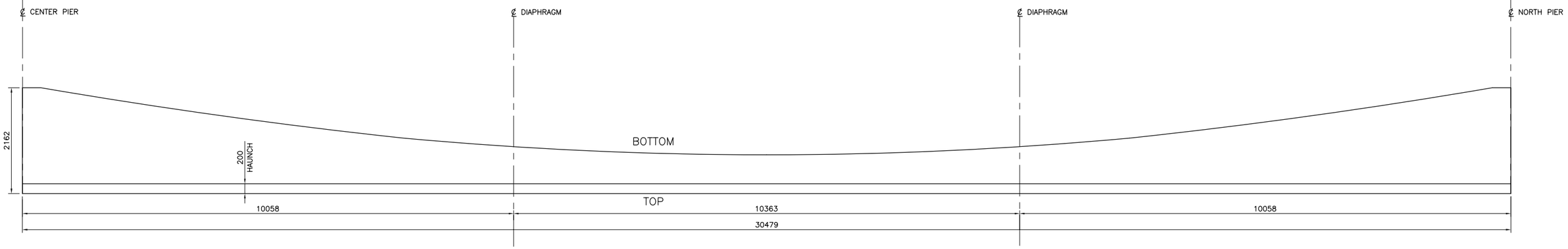
CONSTRUCTION
NORTH



GIRDER 1–EAST FACE



GIRDER 1–BOTTOM FACE



GIRDER 1–WEST FACE

LEGEND:

- NARROW CRACK
- M — MEDIUM CRACK
- W — WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
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INSPECTOR AM & GT

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CADD FILE:
[redacted]

Region of Waterloo

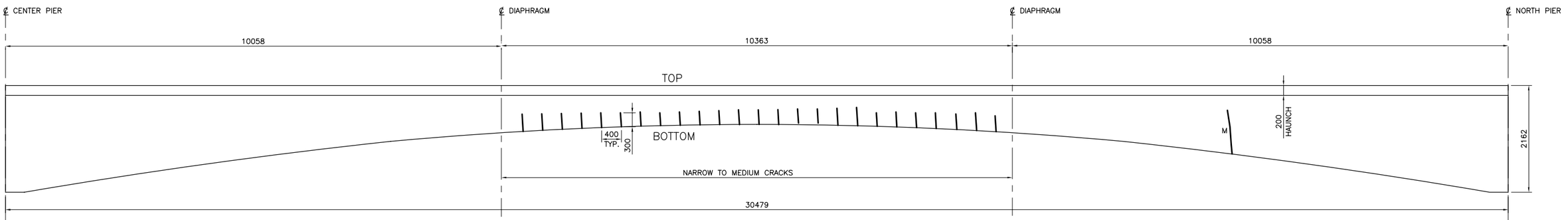
SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH MAIN SPAN GIRDER 1

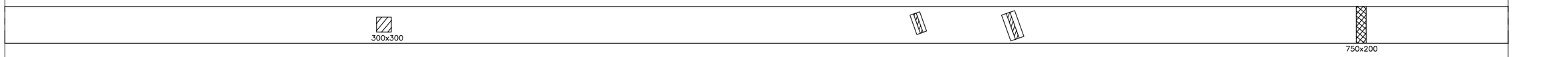
DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	GT		9
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET ____ OF ____

FILE LOCATION=S:\747A\CONDITION SURVEY\
DRAWING NAME: 5747A-300-009GS.DWG
DRAWN BY: C. AWAD
MODIFIED: 2009/08/28 4:32:15
DATE PLOTTED: 2009/08/28 4:04:05

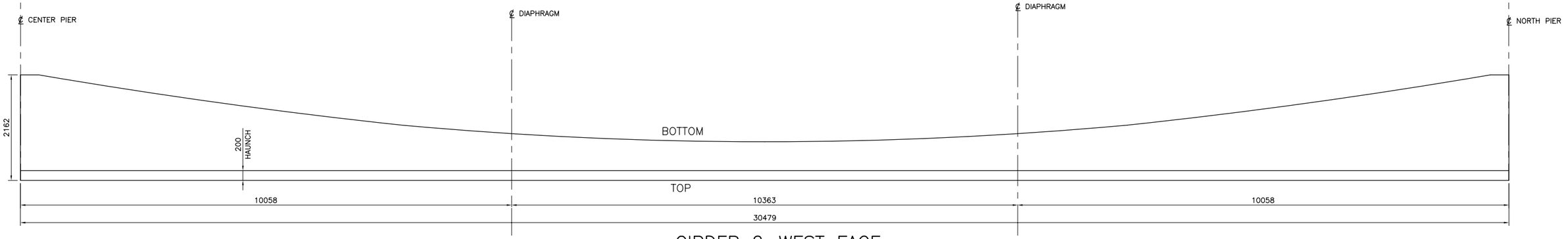
CONSTRUCTION
NORTH



GIRDER 2–EAST FACE



GIRDER 2–BOTTOM FACE



GIRDER 2–WEST FACE

LEGEND:

- NARROW CRACK
- M — MEDIUM CRACK
- W — WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
- HONEYCOMBED AREAS

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INSPECTOR AM & GT

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CADD FILE:
[illegible]

Region of Waterloo

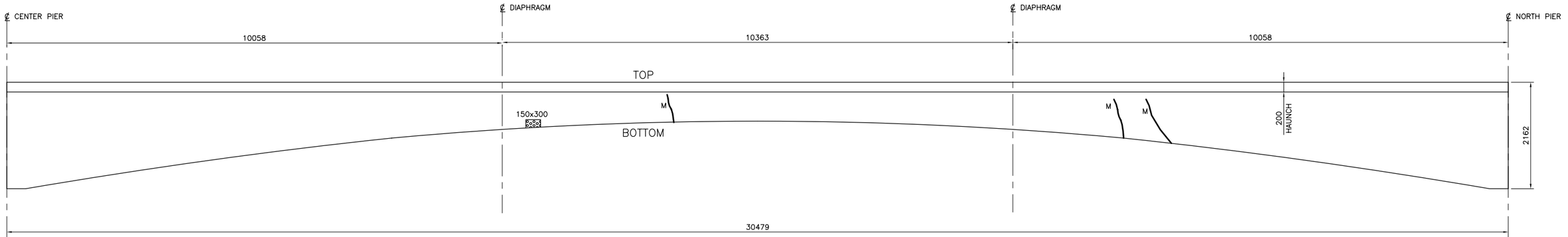
SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH MAIN SPAN GIRDER 2

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	GT		10
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET ____ OF ____

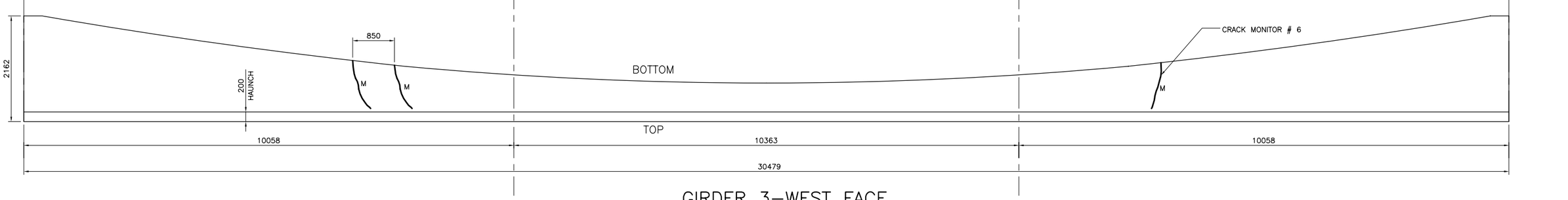
FILE LOCATION=S:\7474\CONDITION SURVEY\
DRAWING NAME: S7474-300-0100S.DWG
DRAWN BY: C. AWAD
MODIFIED: 2009/08/28 4:15:22
DATE PLOTTED: 2009/08/28 4:10:59

CONSTRUCTION
NORTH



GIRDER 3–EAST FACE

GIRDER 3–BOTTOM FACE



GIRDER 3–WEST FACE

LEGEND:

- NARROW CRACK
- M — MEDIUM CRACK
- W — WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
- HONEYCOMBED AREAS

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CADD FILE:

Region of Waterloo

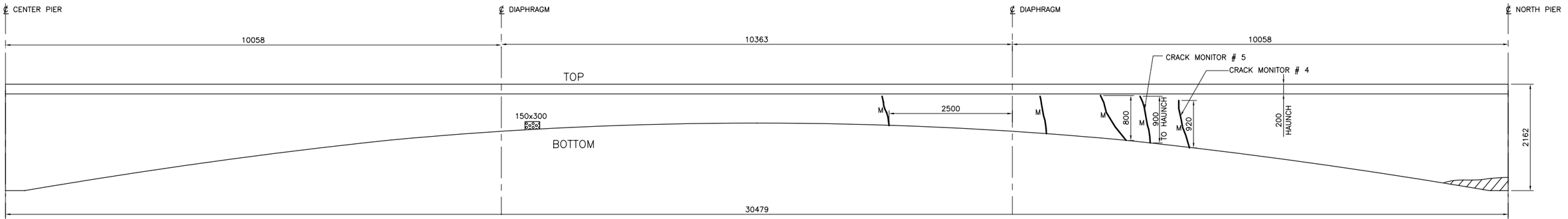
SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH MAIN SPAN GIRDER 3

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	GT		11
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET ___ OF ___

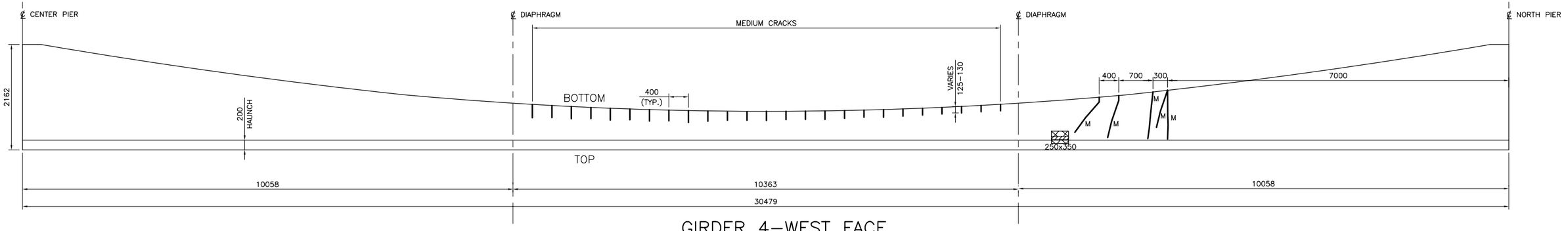
FILE LOCATION=S:\7474\CONDITION SURVEY\
DRAWING NAME: S7474-300-011CS.DWG
DRAWN BY: C. AMAD
MODIFIED: 2009/08/28 5:09:43
DATE PLOTTED: 2009/08/28 4:29:16

CONSTRUCTION
NORTH



GIRDER 4–EAST FACE

GIRDER 4–BOTTOM FACE



GIRDER 4–WEST FACE

LEGEND:

- NARROW CRACK
- M — MEDIUM CRACK
- W — WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
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CADD FILE:
[redacted]

Region of Waterloo

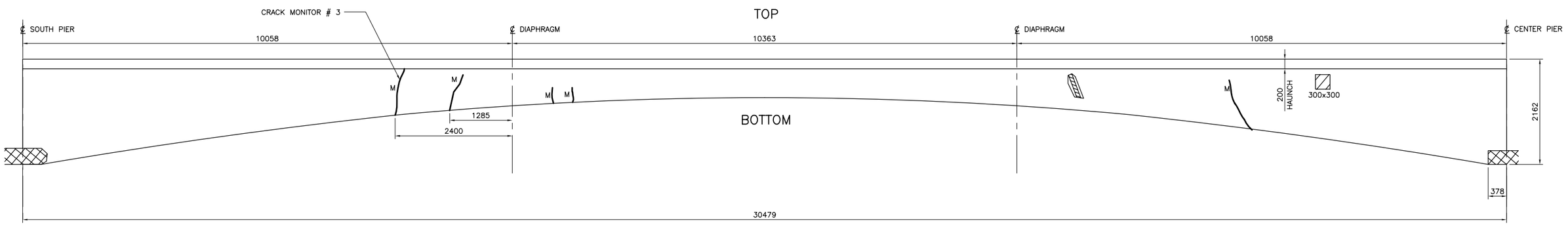
SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH MAIN SPAN GIRDER 4

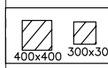
DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	GT		12
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET OF

FILE LOCATION=S:\7474\CONDITION SURVEY\
DRAWING NAME: 57474-300-01253.DWG
DRAWN BY: C. AWAD
MODIFIED: 2009/08/28 5:20:21
DATE PLOTTED: 2009/08/28 5:07:12

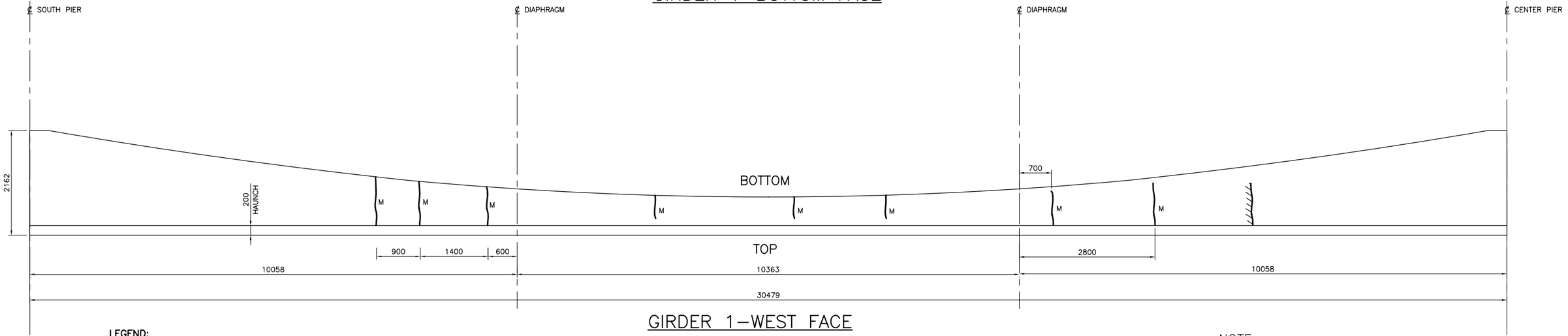
CONSTRUCTION NORTH



GIRDER 1–EAST FACE



GIRDER 1–BOTTOM FACE



GIRDER 1–WEST FACE

LEGEND:

- NARROW CRACK
- M — MEDIUM CRACK
- W — WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
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- SURFACE RUST STAIN
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- SPALLS
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CADD FILE:
GSD-FILE

Region of Waterloo

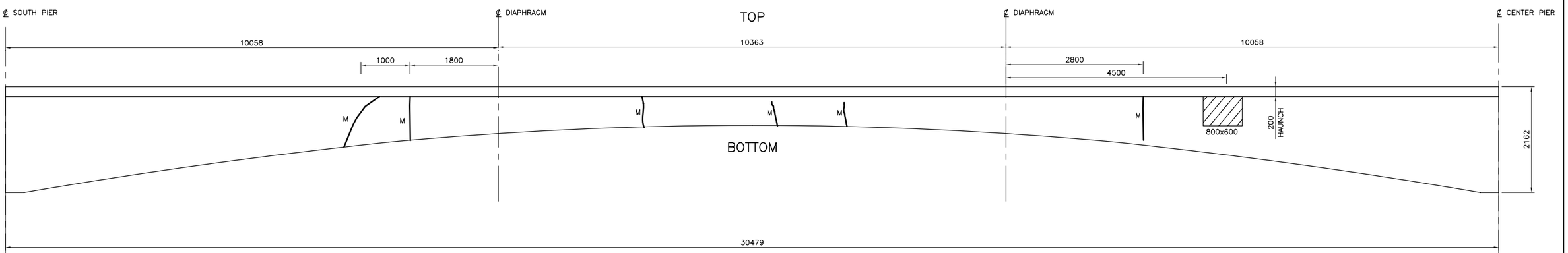
SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOUTH MAIN SPAN GIRDER 1

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JN		13
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET ____ OF ____

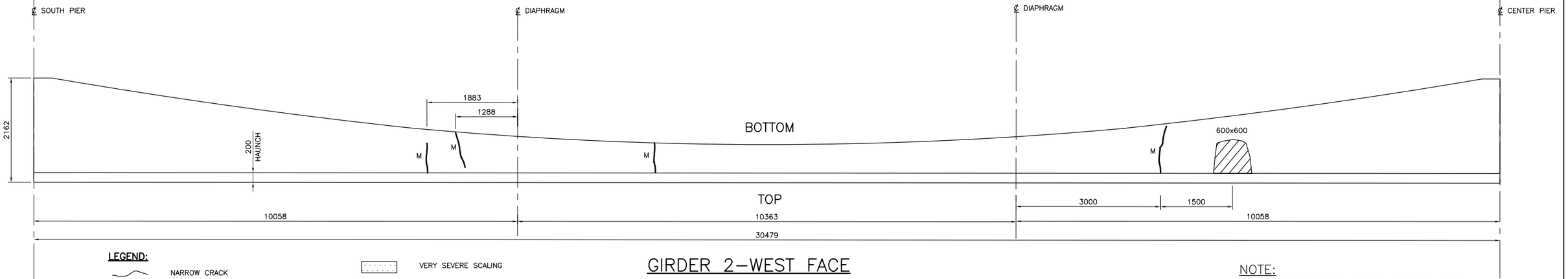
FILE LOCATION=S:\7474\CONDITION SURVEY\
DRAWING NAME: S7474-300-013CS.DWG
DRAWN BY: C. AMID
MODIFIED: 2009/08/28 5:29:16
DATE PLOTTED: 2009/08/28 5:14:54

CONSTRUCTION
NORTH



GIRDER 2–EAST FACE

GIRDER 2–BOTTOM FACE



LEGEND:

- NARROW CRACK
- M — MEDIUM CRACK
- W — WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
- HONEYCOMBED AREAS

GIRDER 2–WEST FACE

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INSPECTOR JN & GI

DATE APRIL 29, 2009

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FIELD BOOK No.

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CADD FILE:
S474-FILE

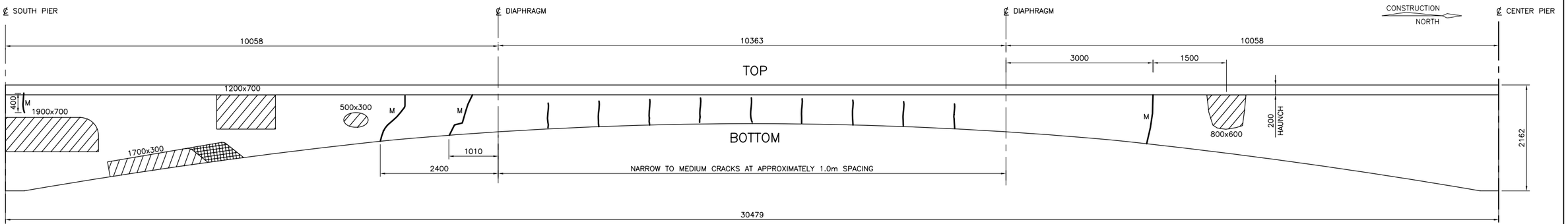
Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOUTH MAIN SPAN GIRDER 2

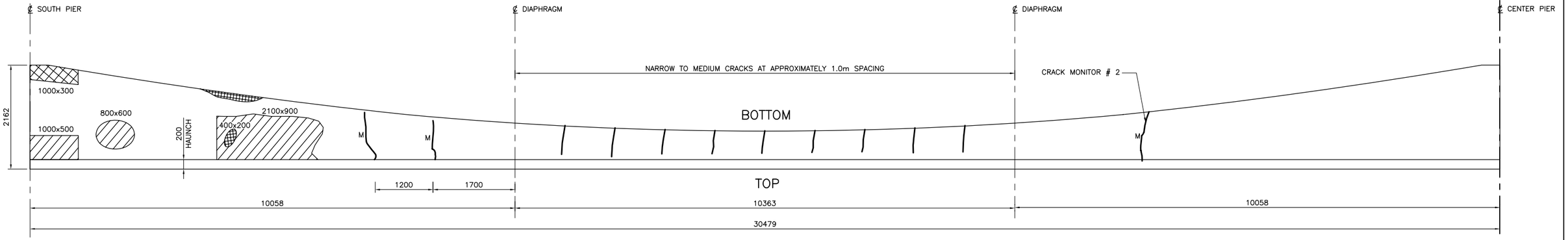
DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JN		14
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET ____ OF ____

FILE LOCATION=S:\7474\CONDITION SURVEY\
DRAWING NAME: S7474-S00-01403.DWG
DRAWN BY: C. AWAD
MODIFIED: 2009/08/28 5:41:46
DATE PLOTTED: 2009/08/28 5:26:01



GIRDER 3–EAST FACE

GIRDER 3–BOTTOM FACE



GIRDER 3–WEST FACE

LEGEND:

- NARROW CRACK
- M — MEDIUM CRACK
- W — WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
- HONEYCOMBED AREAS

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

INSPECTOR JN & GI

DATE APRIL 29, 2009

KEY PLAN

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McCORMICK RANKIN CORPORATION

No.	ISSUE/REVISION	BY	DATE

CONTROLLING B.M.

FIELD BOOK No.

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CADD FILE:

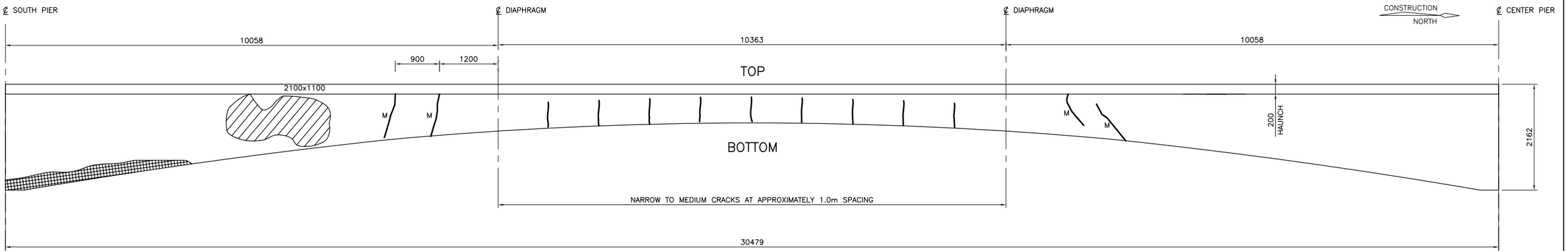
Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

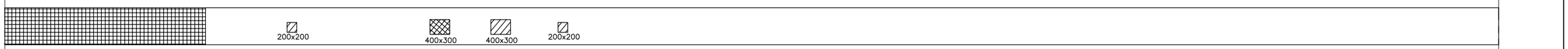
SOUTH MAIN SPAN GIRDER 3

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JN		15
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET ____ OF ____

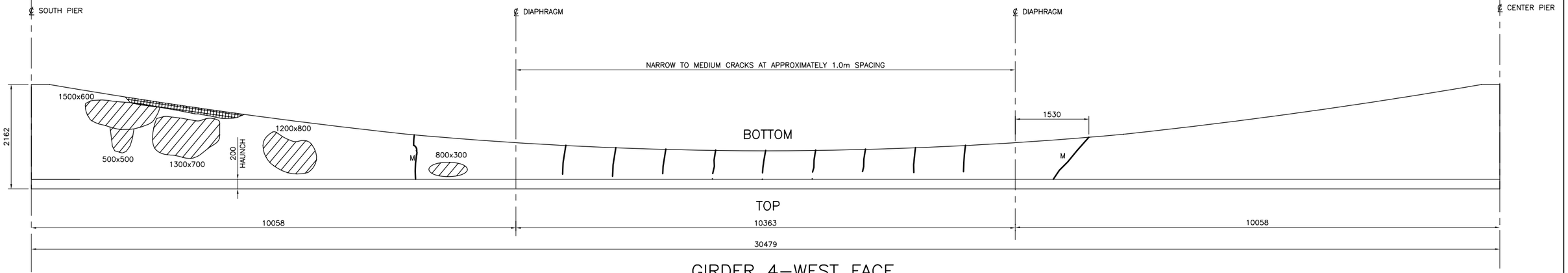
FILE LOCATION=S:\7474\CONDITION SURVEY\
DRAWING NAME: S7474-300-015CS.DWG
DRAWN BY: C. AHAD
MODIFIED: 2009/08/28 5:59:26
DATE PLOTTED: 2009/08/28 5:57:27



GIRDER 4–EAST FACE



GIRDER 4–BOTTOM FACE



GIRDER 4–WEST FACE

LEGEND:

- NARROW CRACK
- M MEDIUM CRACK
- W WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
- HONEYCOMBED AREAS

NOTE:
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INSPECTOR JN & GI

DATE APRIL 29, 2009

KEY PLAN

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McCORMICK RANKIN CORPORATION

No.	ISSUE/REVISION	BY	DATE

CONTROLLING B.M.

FIELD BOOK No.

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CADD FILE:
GSD-FILE

Region of Waterloo

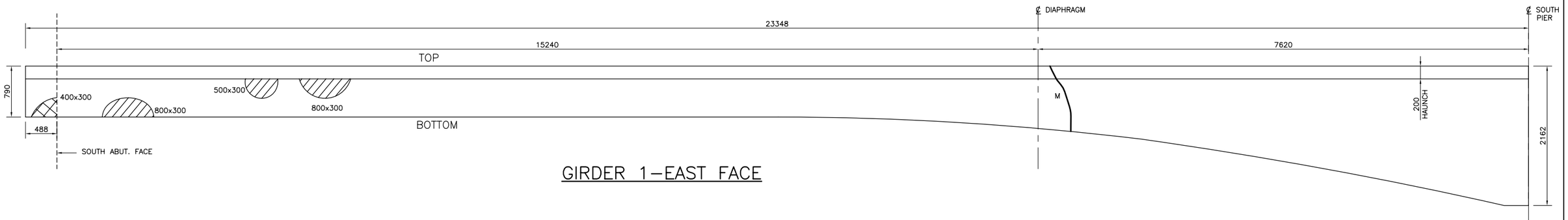
SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOUTH MAIN SPAN GIRDER 4

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JN		16
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET OF

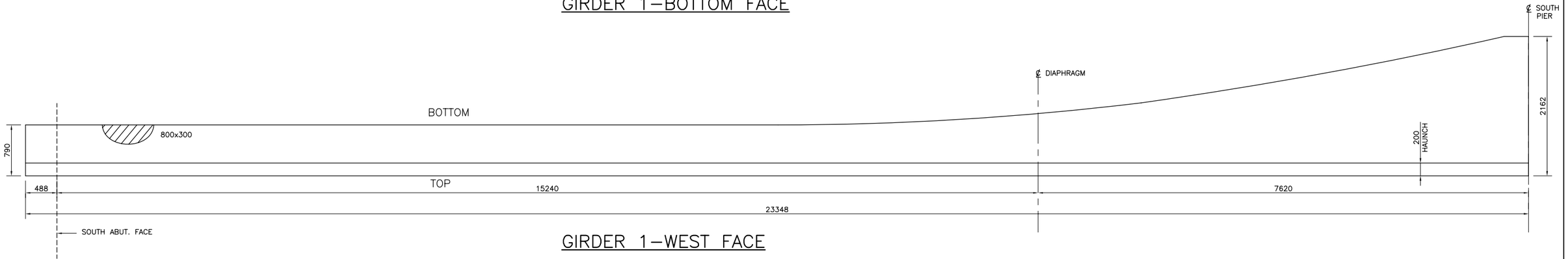
FILE LOCATION=S:\7474\CONDITION SURVEY\
DRAWING NAME: S7474-300-01GCS.DWG
DRAWN BY: C. AMAD
MODIFIED: 2009/08/26 10:19
DATE PLOTTED: 2009/08/26 15:57:

CONSTRUCTION
NORTH



GIRDER 1–EAST FACE

GIRDER 1–BOTTOM FACE



GIRDER 1–WEST FACE

LEGEND:

- NARROW CRACK
- M — MEDIUM CRACK
- W — WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
- HONEYCOMBED AREAS

NOTE:
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INSPECTOR JN & GT

DATE APRIL 30, 2009

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McCORMICK RANKIN CORPORATION

No.	ISSUE/REVISION	BY	DATE

CONTROLLING B.M.

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CADD FILE:
GRID-FILE

Region of Waterloo

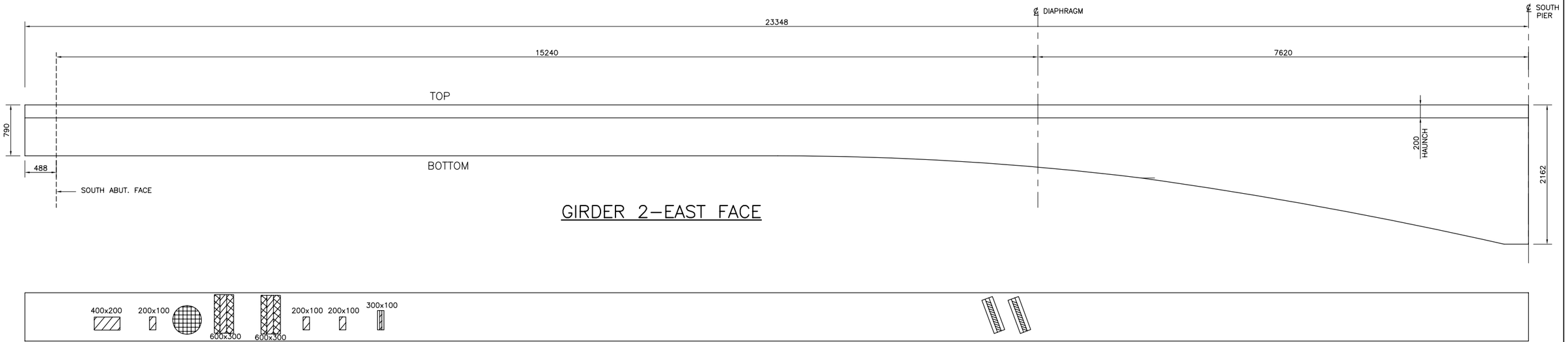
SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOUTH APPROACH SPAN GIRDER 1

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JN		17
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET ____ OF ____

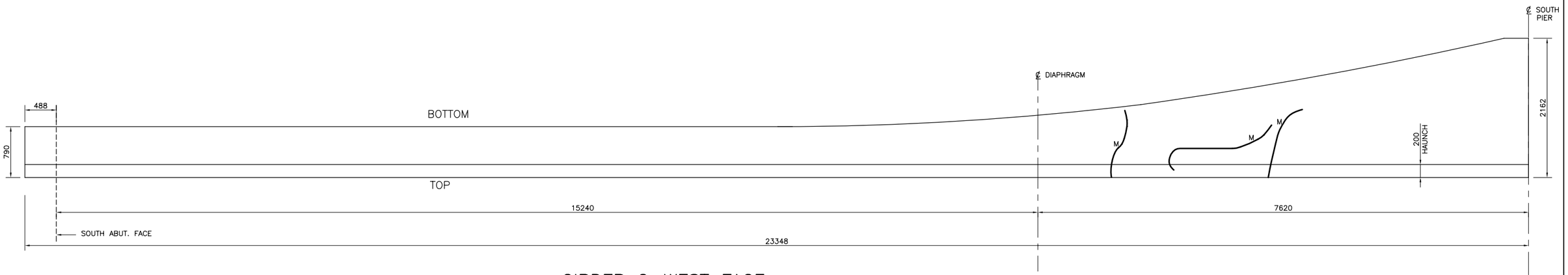
FILE LOCATION=S:\7474\CONDITION SURVEY\
DRAWING NAME: S7474-300-00172S.DWG
DRAWN BY: C. AWAD
MODIFIED: 2009/08/26@22:07
DATE PLOTTED: 2009/08/26@08:51

CONSTRUCTION
NORTH



GIRDER 2–EAST FACE

GIRDER 2–BOTTOM FACE



GIRDER 2–WEST FACE

LEGEND:

- NARROW CRACK
- M — MEDIUM CRACK
- W — WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
- HONEYCOMBED AREAS

NOTE:
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INSPECTOR JN & GT

DATE APRIL 30, 2009

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McCORMICK RANKIN CORPORATION

No.	ISSUE/REVISION	BY	DATE

CONTROLLING B.M.

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CADD FILE:
GSD-FILE

Region of Waterloo

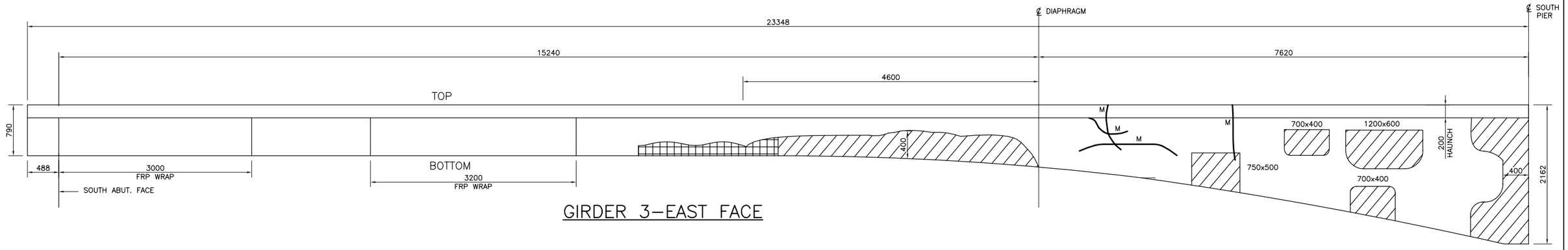
SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOUTH APPROACH SPAN GIRDER 2

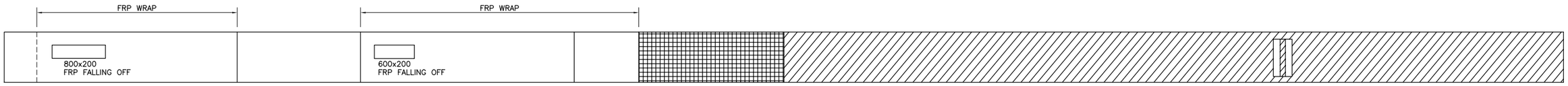
DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JN		18
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET ____ OF ____

FILE LOCATION=S:\7474\CONDITION SURVEY\
DRAWING NAME: S7474-300-00185.DWG
DRAWN BY: C. AWAD
MODIFIED: 2009/08/26@14:44:23
DATE PLOTTED: 2009/08/26@14:36

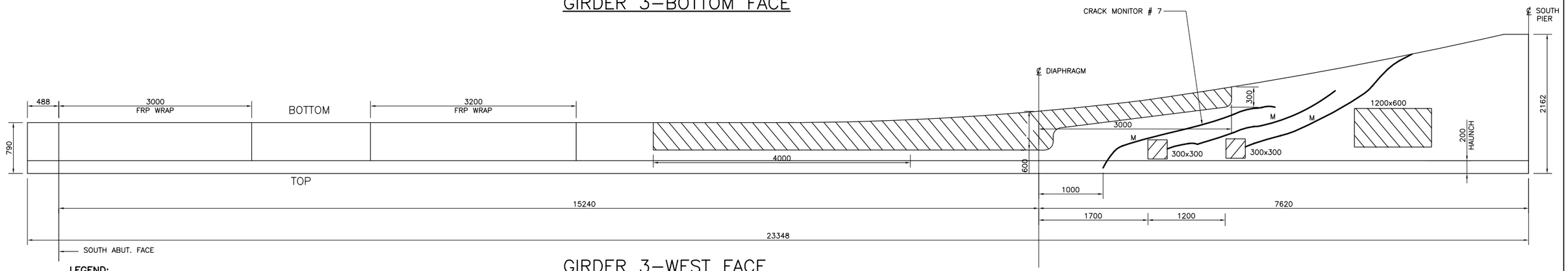
CONSTRUCTION
NORTH



GIRDER 3–EAST FACE



GIRDER 3–BOTTOM FACE



GIRDER 3–WEST FACE

LEGEND:

- NARROW CRACK
- M — MEDIUM CRACK
- W — WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
- HONEYCOMBED AREAS

NOTE:
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INSPECTOR JN & GT

DATE APRIL 30, 2009

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McCORMICK RANKIN CORPORATION

No.	ISSUE/REVISION	BY	DATE

CONTROLLING B.M.

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CADD FILE:
GSD-FILE

Region of Waterloo

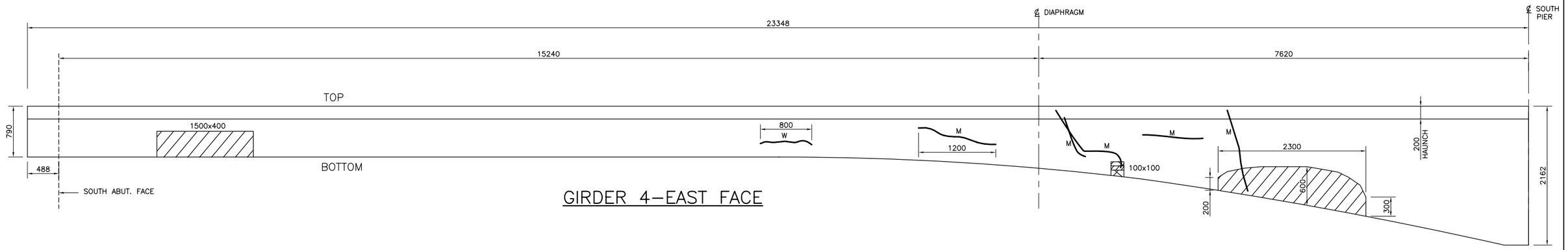
SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOUTH APPROACH SPAN GIRDER 3

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JN		19
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET ___ OF ___

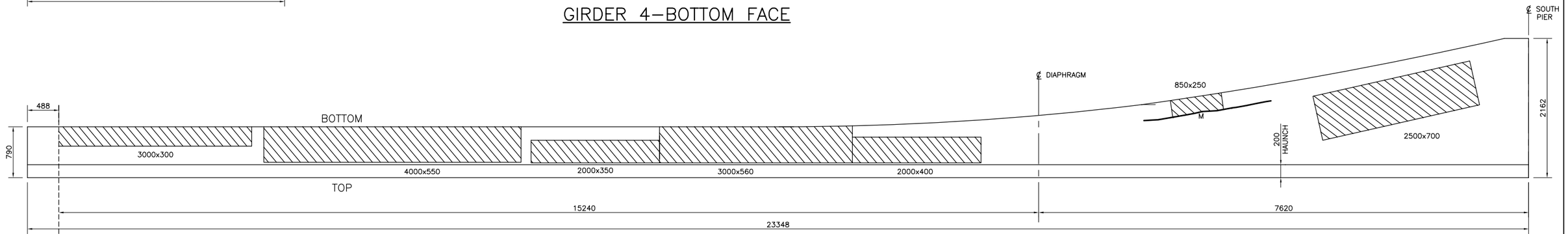
FILE LOCATION=S:\7474\CONDITION SURVEY\
DRAWING NAME: 57474-300-01GS.DWG
DRAWN BY: C. AWAD
MODIFIED: 2009/08/28 6:57:25
DATE PLOTTED: 2009/08/28 6:39:07

CONSTRUCTION NORTH



GIRDER 4–EAST FACE

GIRDER 4–BOTTOM FACE



GIRDER 4–WEST FACE

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

LEGEND:

- NARROW CRACK
- M — MEDIUM CRACK
- W — WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
- HONEYCOMBED AREAS

INSPECTOR JN & GT

DATE APRIL 30, 2009

KEY PLAN

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MRC MORMICK RANKIN CORPORATION

No.	ISSUE/REVISION	BY	DATE

CONTROLLING B.M.

FIELD BOOK No.

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CADD FILE:

Region of Waterloo

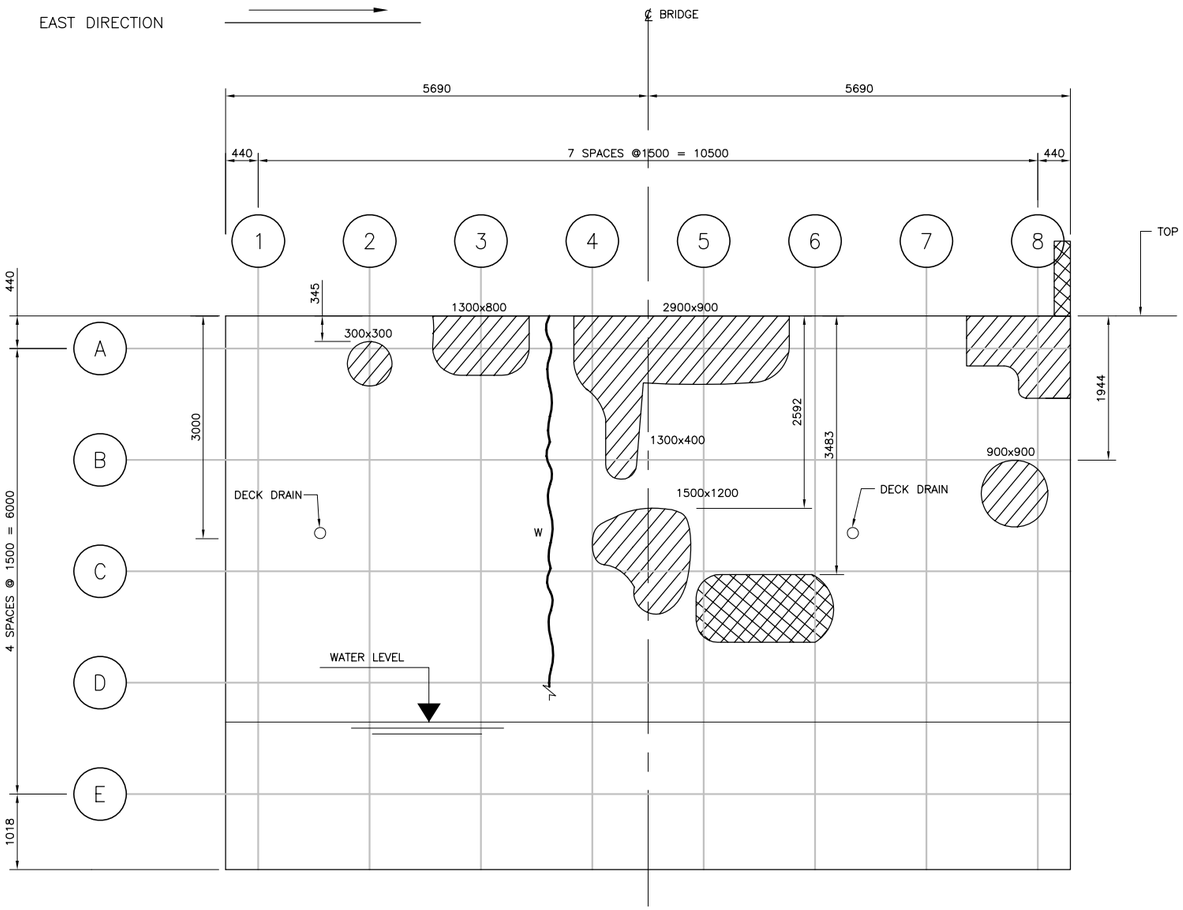
SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOUTH APPROACH SPAN GIRDER 4

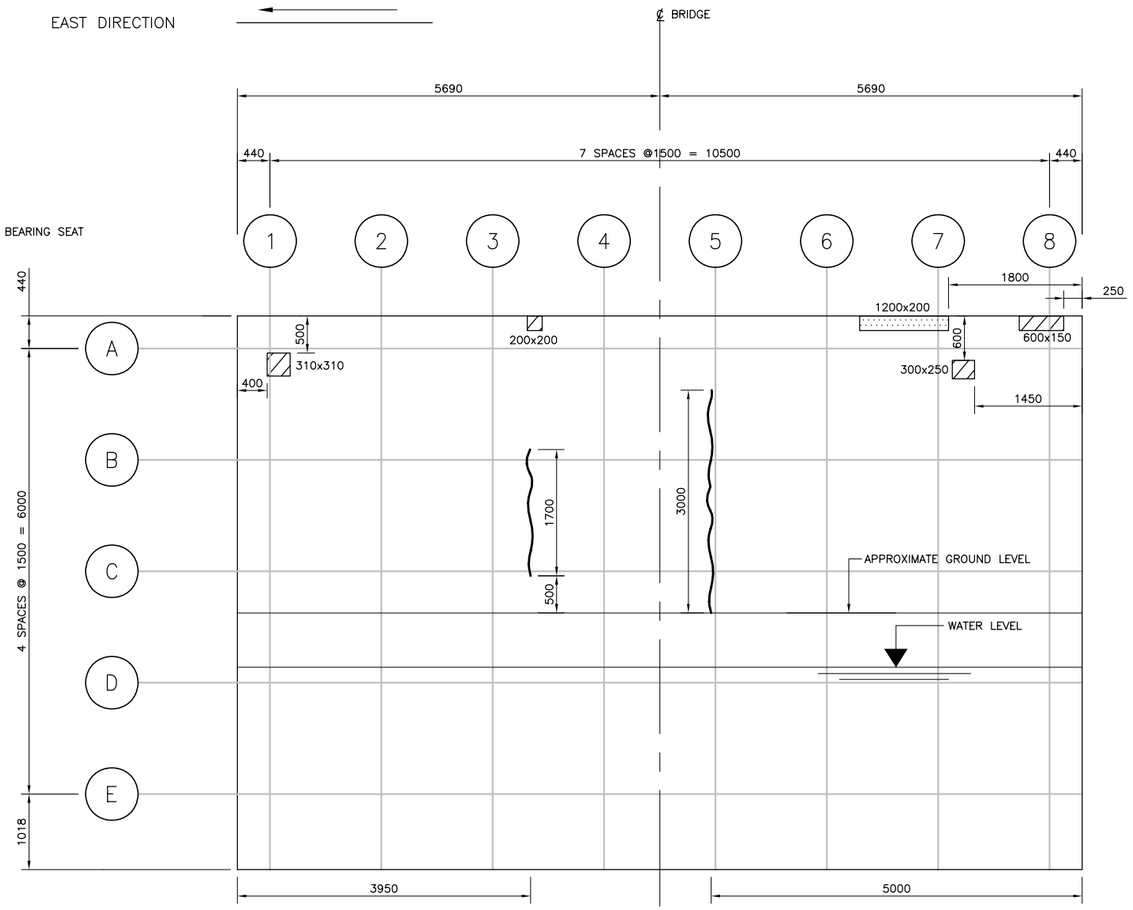
DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JN		20
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET OF

FILE LOCATION: S:\7474\CONDITION SURVEY\
DRAWING NAME: S:\7474-300-020CS.DWG
DRAWN BY: C. AHAD
MODIFIED: 2009/08/28 7:17:07
DATE PLOTTED: 2009/08/28 6:52:13

ABUTMENT ID — NORTH
FACE — NORTH
EAST DIRECTION →



ABUTMENT ID — SOUTH
FACE — SOUTH
EAST DIRECTION ←



NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

LEGEND:

- NARROW CRACK
- M — MEDIUM CRACK
- W — WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
- HONEYCOMBED AREAS

INSPECTOR — JN
DATE — APRIL 27 & 30, 2009

KEY PLAN

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McCORMICK RANKIN CORPORATION

No.	ISSUE/REVISION	BY	DATE

CONTROLLING B.M.

FIELD BOOK No.

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CADD FILE:

Region of Waterloo

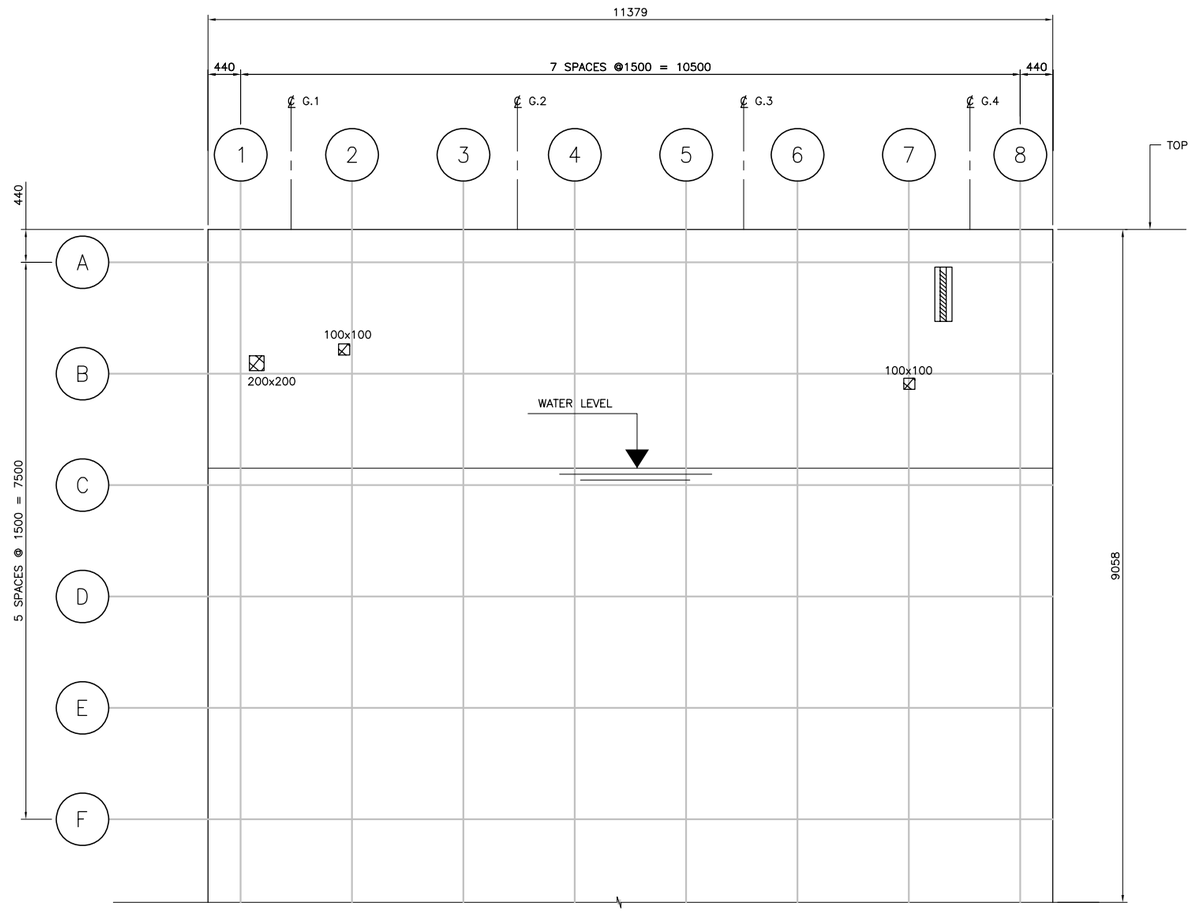
SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
CONDITION SURVEY

ABUTMENT

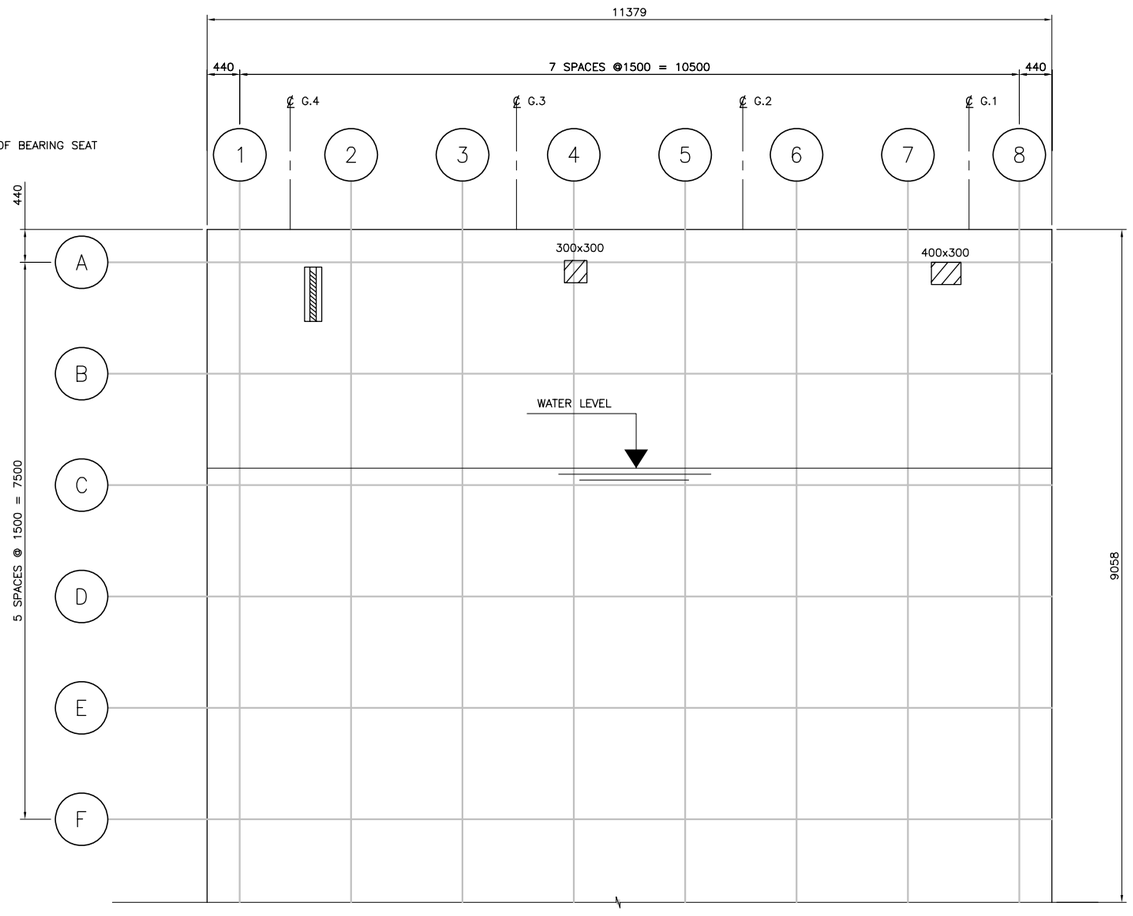
DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	GT		21
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET ____ OF ____

FILE LOCATION=S:\7474\CONDITION SURVEY\
DRAWING NAME: S7474-300-0215.DWG
DRAWN BY: C. AWAD
MODIFIED: 2009/08/27@10:46:5
DATE PLOTTED: 2009/08/28@12:58

PIER ID — NORTH
FACE — NORTH
EAST DIRECTION ←



PIER ID — NORTH
FACE — SOUTH
EAST DIRECTION →



LEGEND:

- NARROW CRACK
- M — MEDIUM CRACK
- W — WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
- HONEYCOMBED AREAS

NOTE:
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INSPECTOR — JN
DATE — APRIL 28, 2009

KEY PLAN

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McCORMICK RANKIN CORPORATION

No.	ISSUE/REVISION	BY	DATE

CONTROLLING B.M.

FIELD BOOK No.

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CADD FILE:
GSD-PLE

Region of Waterloo

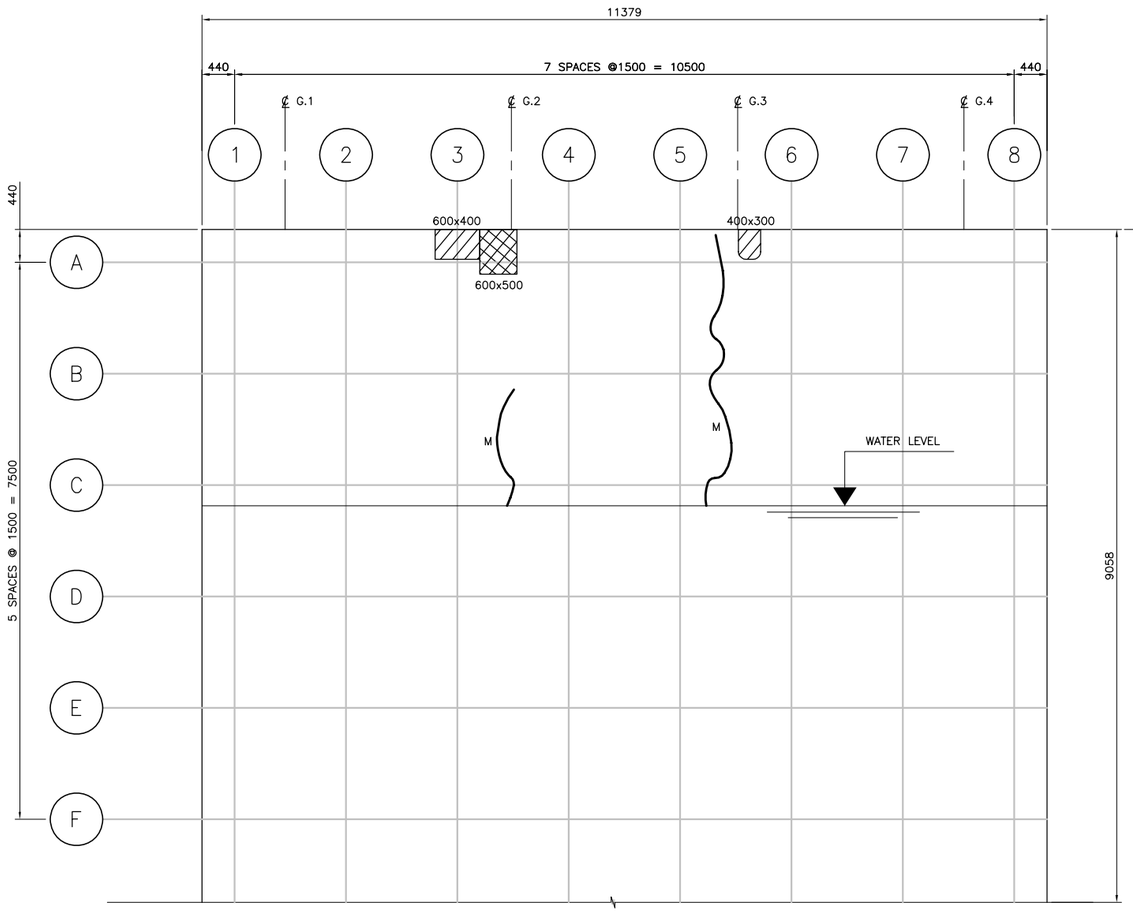
SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH PIER

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	GT		22
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET ___ OF ___

FILE LOCATION=S:\47471\CONDITION SURVEY\
DRAWING NAME: 57474-300-022CS.DWG
DRAWN BY: C. AWAD
MODIFIED: 2009/08/28@29:26
DATE PLOTTED: 2009/08/28@24:6

PIER ID — CENTER
FACE — NORTH
EAST DIRECTION ←



PIER ID — CENTER
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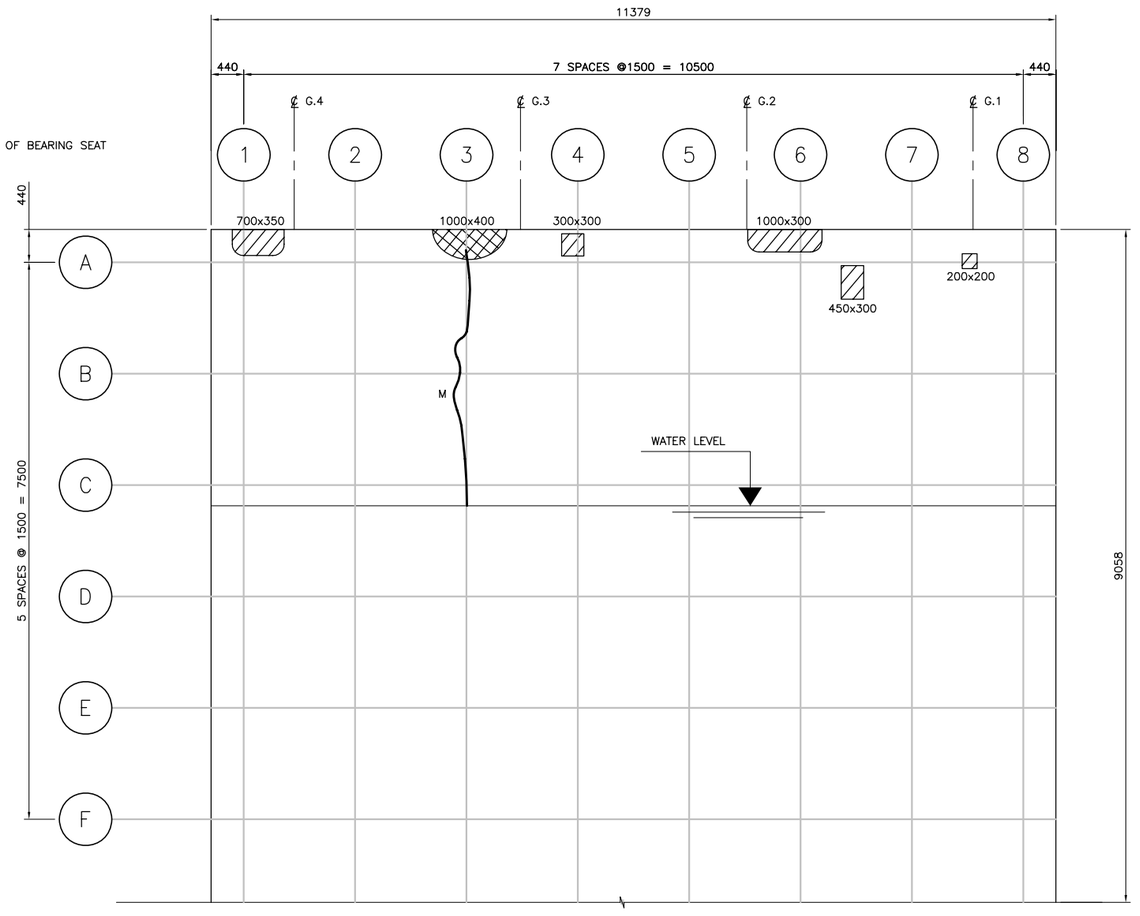
EAST DIRECTION →



LEGEND:

- NARROW CRACK
- M — MEDIUM CRACK
- W — WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAIN
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- EXPOSED REINFORCING STEEL
- HONEYCOMBED AREAS

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

INSPECTOR — JN & GI
DATE — APRIL 29, 2009

KEY PLAN

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McCORMICK RANKIN CORPORATION

No.	ISSUE/REVISION	BY	DATE

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[redacted]

Region of Waterloo

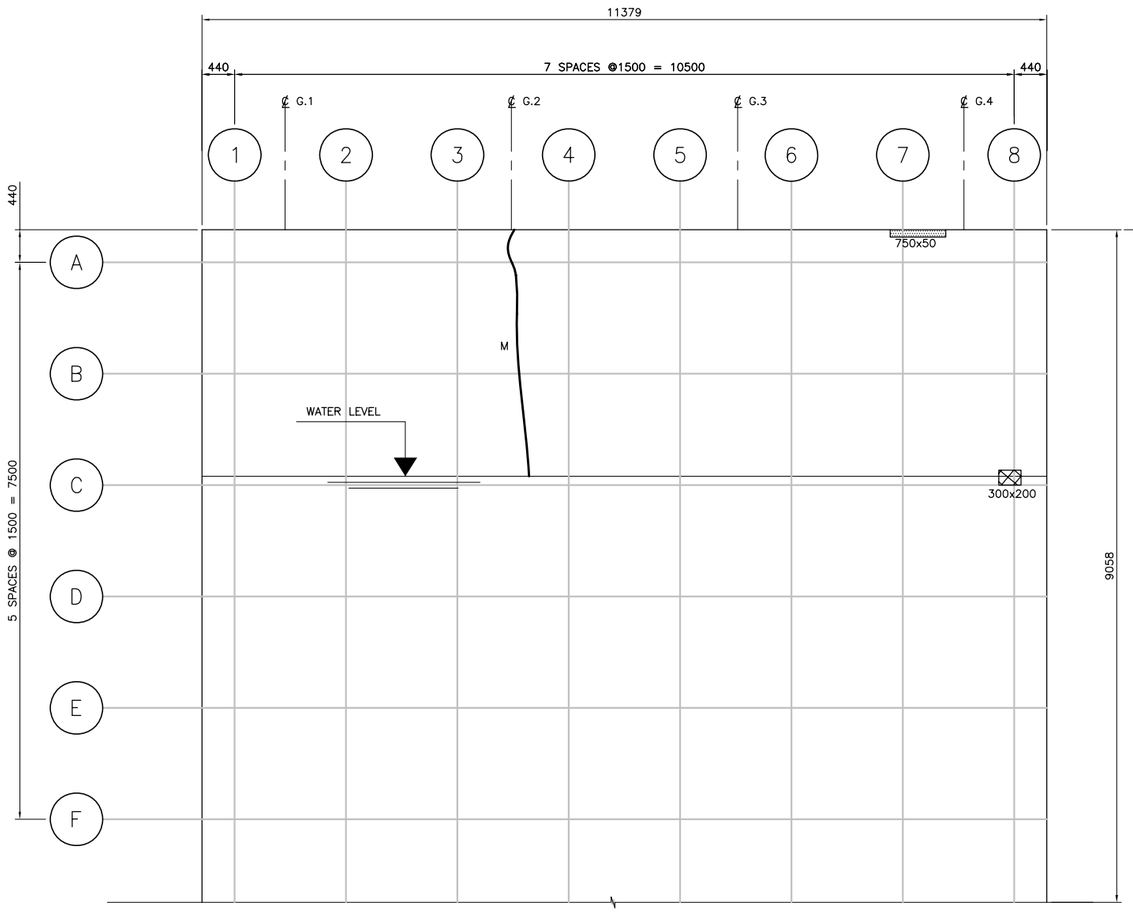
SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

CENTER PIER

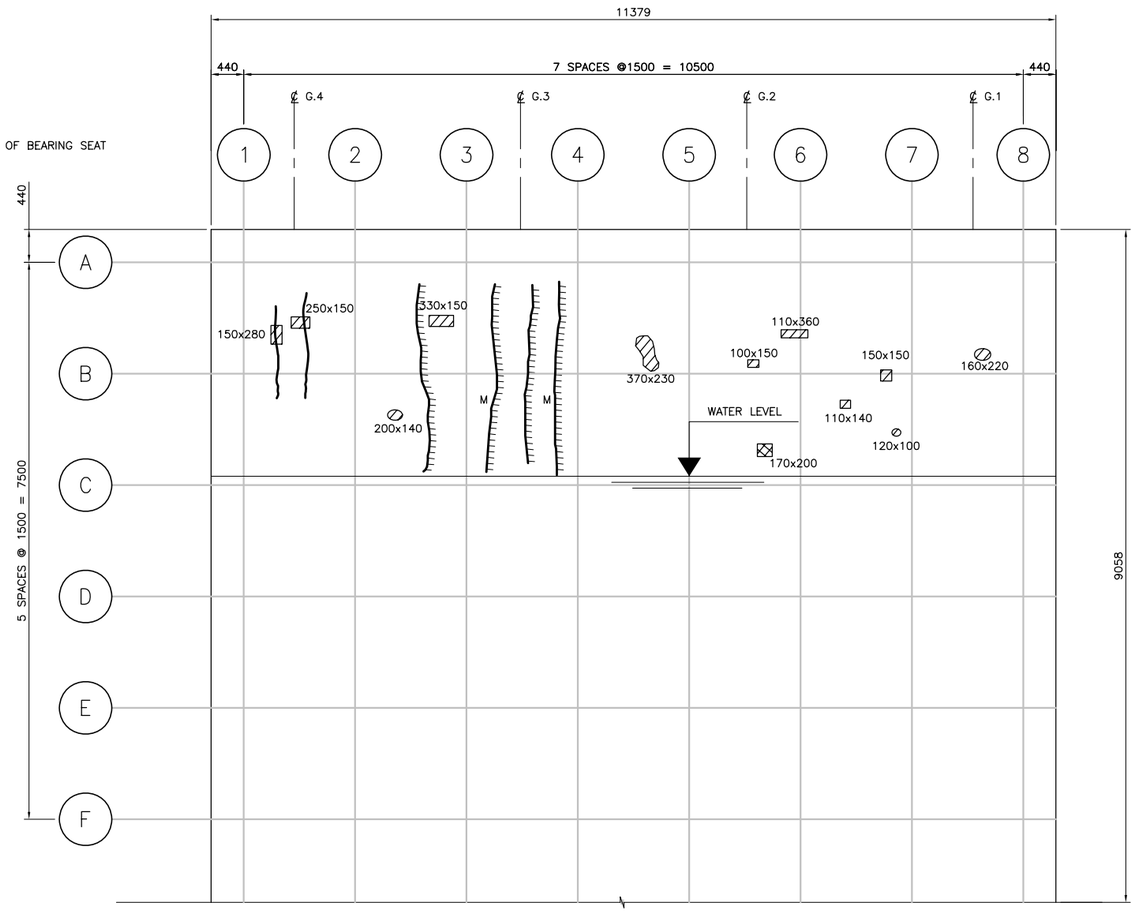
DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JN		23
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET ___ OF ___

FILE LOCATION=S:\7474\CONDITION SURVEY\
DRAWING NAME: 57474-300-02SCS.DWG
DRAWN BY: C. AWAD
MODIFIED: 2009/08/28@49:45
DATE PLOTTED: 2009/08/28@46:04

PIER ID — SOUTH
FACE — NORTH
EAST DIRECTION ←



PIER ID — SOUTH
FACE — SOUTH
EAST DIRECTION →



LEGEND:

- NARROW CRACK
- M — MEDIUM CRACK
- W — WIDE CRACK
- STAINED CRACKS
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
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NOTE:
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INSPECTOR — JN & GI
DATE — APRIL 29, 2009

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Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOUTH PIER

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	GT		24
SCALE: AS NOTED	DATE: APRIL/2009	FILE No.	SHEET ___ OF ___

FILE LOCATION=S:\747A\CONDITION SURVEY\
DRAWING NAME: 57474-300-02405.DWG
DRAWN BY: C. AWAD
MODIFIED: 2009/08/21 10:46:28
DATE PLOTTED: 2009/08/21 10:42:14

APPENDIX F
LABORATORY TESTING RESULTS

Golder Associates

McCORMICK RANKIN CORPORATION
MAY 26 2009
MISSISSAUGA OFFICE

May 25, 2009

09-1175-0021

Client: McCormick Rankin Corporation
2655 North Sheridan Way
Mississauga, ON L5K 2P8

Attention: Gideon Tjandra

RE: SUMMARY OF CONCRETE CORE TESTING
SCHEIFELE BRIDGE
MRC FILE NO.: 7474.300

Core Number **Golder Lab Number**	C1 C-09-297	C7 C-09-300
Acid Soluble Chloride Ion Content *(% Cl by Weight of Concrete)*		
0 – 10 mm	0.038	0.040
20 – 30 mm	0.036	0.025
40 – 50 mm	0.082	0.027
60 – 70 mm	0.072	0.029
80 – 90 mm	0.072	0.027
100 – 110 mm	0.069	0.052
Remarks:		

Note:

1. Acid soluble chloride ion content was determined according to MTO Test Method LS-417, Rev.16.

Issued by: _____

John A. Watkins, Laboratory Services Manager

FF WJ/JAW/ls

09-1175-0021 TBL 2009/05/25 Scheifele Bridge C-09-297-301

BEST WORKPLACES IN CANADA 2009 GLOBE AND MAIL REPORT ON BUSINESS

Golder Associates Ltd.
100 Scotia Court, Whitby, Ontario Canada L1N 8Y6
Tel: (905) 723 2727 Fax: (905) 723 2182 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder Associates

McCORMICK RANKIN CORPORATION
MAY 26 2009
MISSISSAUGA OFFICE

May 25, 2009 09-1175-0021

Client: McCormick Rankin Corporation
2655 North Sheridan Way
Mississauga, ON L5K 2P8

Attention: Gideon Tjandra

RE: SUMMARY OF CONCRETE CORE TESTING
SCHEIFELE BRIDGE
MRC FILE NO.: 7474.300

Core Number	C5	C6	C12
Golder Lab Number	C-09-298	C-09-299	C-09-301
Compressive Strength			
Capped Height (mm)	100.3	-	129.1
Average Diameter (mm)	100.0	-	100.0
Density (Mg/m^3)	2.430	-	2.393
Capping Materials	End Grinder	-	End Grinder
Load (kN)	594.9	-	561.6
Compressive Strength (MPa)	75.8	-	71.5
Corrected Compressive Strength (MPa)	65.9	-	68.9
Moisture Condition at time of Test	Moist	-	Moist
Air Voids Parameters			
Total Air Content (%)	-	7.8	-
Specific Surface (mm^2/mm^3)	-	15.94	-
Spacing Factor (mm)	-	0.250	-
Remarks			

Note:
1. Compressive strength testing was carried out according to CSA A23.2-00-14C.
2. Air void content and parameters were determined according to ASTM C457 using a modified point count method.

Issued by: _____
John A. Watkins, Laboratory Services Manager

FF/AJ/AW/nj

09-1175-0021 TBL 2009/05/25 Scheifele Bridge C-09-297-301

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Golder Associates

JUL - 7 2009

June 25, 2009 09-1175-0021

Client: McCormick Rankin Corporation
2655 North Sheridan Way
Mississauga, ON L5K 2P8

Attention: Mr. Gideon Tjandra

RE: SUMMARY OF CONCRETE CORE TESTING
SCHEIFELE BRIDGE
MRC FILE NO.: 7474.300

Core Number	C3	C11	C18
Golder Lab Number	C-09-517	C-09-518	C-09-519
Acid Soluble Chloride Ion Content *(% Cl by Weight of Concrete)*			
0 – 10 mm	0.033	0.130	0.023
20 – 30 mm	0.033	0.083	0.020
40 – 50 mm	0.084	0.144	0.020
60 – 70 mm	0.079	0.104	0.023
80 – 90 mm	0.078	0.074	0.101
100 – 110 mm	0.065	0.063	0.152
120 – 130 mm	0.066	0.058	0.142
140 – 150 mm	0.059	0.063	0.124
Remarks:			

Note:
1. Acid soluble chloride ion content was determined according to MTO Test Method LS-417, Rev.16.

Issued by: _____
John A. Watkins, Laboratory Services Manager

AJ/JAW/aj

09-1175-0021 TBL 20090625 Scheifele C-09-517-519

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REPORT ON BUSINESS

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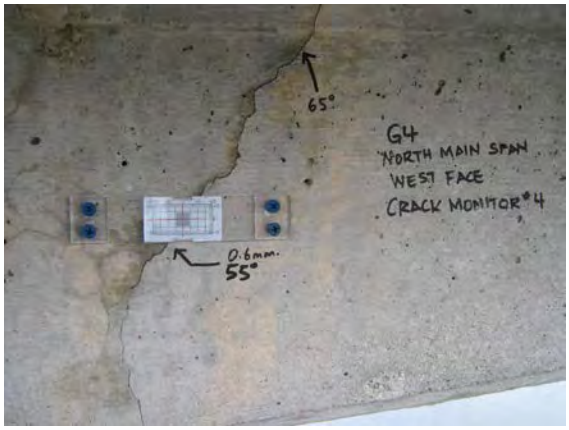
APPENDIX G
CRACK MONITOR LOGS

Crack monitoring gauge #:	1
Location:	N. Approach Span Girder 4 West face 1.0 m south of N. Abut. brg.
Date of installation:	April 30, 2009
Installation temperature:	15 °C
x-coordinate (horizontal):	- 4
y-coordinate (vertical):	+ 1
Crack width	0.3 mm
Crack inclination	50°

Crack monitoring gauge #:	2
Location:	S. Main Span Girder 3 West face 2.8 m north of N. diaphragm
Date of installation:	April 30, 2009
Installation temperature:	20 °C
x-coordinate (horizontal):	0
y-coordinate (vertical):	0
Crack width	0.33 mm
Crack inclination	75°

Crack monitoring gauge #:	3
Location:	S. Main Span Girder 1 East face 9.5 m north of S. pier brg.
Date of installation:	April 30, 2009
Installation temperature:	17 °C
x-coordinate (horizontal):	- 1
y-coordinate (vertical):	+ 2
Crack width	0.5 mm
Crack inclination	30°

Crack monitoring gauge #:	4
Location:	N. Main Span Girder 4 West face 7.8 m south of N. pier brg.
Date of installation:	April 30, 2009
Installation temperature:	18 °C
x-coordinate (horizontal):	0
y-coordinate (vertical):	0
Crack width	0.6 mm
Crack inclination	50°



Crack monitoring gauge #:	5
Location:	N. Main Span Girder 4 West face 8.0 m south of N. pier brg.
Date of installation:	April 30, 2009
Installation temperature:	18 °C
x-coordinate (horizontal):	- 1
y-coordinate (vertical):	- 2
Crack width	0.5 mm
Crack inclination	45°

Crack monitoring gauge #:	6
Location:	N. Main Span Girder 3 West face 8.0 m south of N. pier brg.
Date of installation:	April 30, 2009
Installation temperature:	16 °C
x-coordinate (horizontal):	0
y-coordinate (vertical):	+ 1
Crack width	0.6 mm
Crack inclination	50°

Crack monitoring gauge #:	7
Location:	S. Approach Span Girder 3 West face 0.8 m N. of N. diaphragm
Date of installation:	April 30, 2009
Installation temperature:	18 °C
x-coordinate (horizontal):	0
y-coordinate (vertical):	- 3
Crack width	0.5 mm
Crack inclination	40°

Region of Waterloo

REGIONAL MUNICIPALITY OF WATERLOO

SCHEIFELE BRIDGE OVER CONESTOGO RIVER

Regional Road No. 22
(Northfield Drive)

INSPECTION AND RECOMMENDATIONS REPORT

June 2018

wsp

SIGNATURES

PREPARED BY

Morgan Herrell, E.I.T.
Designer – Bridge Engineering

REVIEWED BY

Joseph Stoner, P.Eng.
Project Engineer – Bridge Engineering

APPROVED BY

Kyle Yusek, P.Eng.
Project Manager – Bridge Engineering

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KEY PLAN

Scheifele Bridge over Conestogo River

Regional Road No. 22 (Northfield Drive East)
Regional Municipality of Waterloo

Scale: Not to scale

AERIAL VIEW

Scheifele Bridge over Conestogo River

Regional Road No. 22 (Northfield Drive East)
Regional Municipality of Waterloo

Scale: Not to scale

EXECUTIVE SUMMARY

The Regional Municipality of Waterloo (Region) retained WSP Canada Group Limited (WSP) in February 2018 to investigate the current condition and rate of deterioration of the Scheifele Bridge over the Conestogo River, located in the Township of Woolwich. The focus of the current report is to provide the general condition of the bridge and discuss significant deficiencies, updated recommendations on the timing of the superstructure replacement, and recommendations for necessary repairs in the interim.

The existing structure, constructed in 1960, is a four-span (22.9 m±, 30.4 m±, 30.4 m±, 22.9 m±) cast-in-place continuous reinforced concrete T-beam structure with an asphalt wearing surface. There are four T-beams that vary in depth from 0.99 m at mid-span and the abutments to 2.36 m at the piers. The structure has undergone two rehabilitations, in 1982 and 2011, and a pilot project rehabilitation involving CFRP girder strengthening in 2005 by the University of Waterloo.

On April 24th and 25th, 2018 WSP performed a detailed concrete deterioration and delamination survey of the concrete T-beams, soffit, diaphragms and substructure elements using specialized access equipment ("Bridgemaster"). WSP also performed a visual inspection and general overview of the remainder of the bridge elements to identify any significant deficiencies.

Concrete delaminations and spalls in the deck soffit were noted throughout each span, but were generally concentrated in the north and south end spans. In total, approximately 82 m^2 (9.2 %) of combined delaminations, spalls, and localized popouts with exposed reinforcing steel on the soffit were noted, whereas this quantity was approximately 8.0% at the time of the 2010 investigation. No areas of immediate concern were identified; however, multiple areas of spalled soffit with exposed / debonded reinforcing bars were noted, which should continue to be monitored, and a repair should be implemented if the superstructure replacement is to be deferred. Deterioration in the south end span soffit alone has reached 12.8%; a large area of delaminated concrete is directly above the pedestrian trail below the south end span along the south embankment, which represents a safety concern that should be addressed as soon as practical.

The total quantity of delaminated concrete and spalled concrete on the girders has increased by 7 m^2 and 2 m^2, respectively, since the 2010 investigation. The south end span girders exhibit large areas of spalling and delaminations with wide longitudinal cracks. Deterioration in Girder G3 has reached 37.7% in the south end span; an increase of approximately 5% since the 2010 investigation.

As part of the 2010 Structure Investigation, seven crack monitors were installed on what appeared to be shear cracks in the girders; the current investigation determined that no significant changes in crack width have occurred since installation of the monitors.

This report provides recommendations and discussion for urgent repairs to be implemented as soon as practical. Due to the inconsistent movement of the abutment bearings, and the significant rotation of the G1 bearing at the south abutment, it is recommended that the Region install temporary blocking between the abutment bearing seat and concrete end diaphragm at each abutment bearing. This

blocking would provide temporary support should a bearing become unstable. To address the poor condition of the bridge railing posts / anchorages, it is recommended that temporary concrete barriers (TCB) be placed along both the east and west railings for the full length of the structure, as soon as practical. It is recommended that the Region remove delaminated / loose concrete, or install nets in high risk regions, within the South End Span over the pedestrian trail to minimize the risk of concrete falling onto the pedestrian traffic below. Due to the girder deterioration, and anticipated ongoing reinforcement section loss, the Region may wish to consider completing a structural evaluation to address current concerns with the corrosion of the bottom layer of reinforcing bars in the girders.

This report also recommends routine maintenance and inspection items, including flushing the expansion joints to ensure the joints perform as desired, and continued monitoring of the condition/stability of the abutment bearings until the superstructure is replaced.

It is WSP's understanding that the Scheifele Bridge is programmed for superstructure replacement in 2021, with the existing abutments and piers to remain. Based on the findings of the current investigation, the rate of deterioration noted since the previous 2010 investigation, and reviewing the condition of the bridge as a system, it is WSP's opinion that the current schedule for superstructure replacement in 2021 should be maintained.

Should replacement of the superstructure be deferred, it is anticipated that significant rehabilitation would be required to maintain the bridge in a state of good repair, including but not limited to: replacement of abutment bearings, extensive concrete patch repairs on soffit, fasciae, and girders, concrete patch repairs to substructure, and replacement of the existing railing system with a crash tested barrier. Further engineering analyses would also be required, including a structural evaluation of the bridge and life cycle cost analyses to determine the benefit of deferring the superstructure replacement.

1 INTRODUCTION

The Regional Municipality of Waterloo (Region) retained WSP Canada Group Limited (WSP) in February 2018 to investigate the current condition and rate of deterioration of the Scheifele Bridge over the Conestogo River, located in the Township of Woolwich. The focus of the current report is to discuss the general condition of the bridge describing significant deficiencies, updated recommendations on the timing of the superstructure replacement, and recommendations for necessary repairs in the interim.

The findings outlined in the 2010 Structure Investigation and Alternatives Assessment Report, prepared by McCormick Rankin (a member of MMM Group Limited, later acquired by WSP) for the same bridge were used as a baseline and comparison to the 2018 inspection.

1.1 REFERENCES

1. Original Drawings, "Scheifele Bridge over Conestogo River", C.C. Parker & Associates Consulting Engineers, Dated February 1958.
2. Rehabilitation Drawings, "1982 Bridge Rehabilitation Contract", Contract No. 82-16, Dillon Consulting Engineers & Planners, Dated May 1982.
3. "Structural Evaluation Report, Scheifele Bridge over Conestogo River", McCormick Rankin, Dated September 2005.
4. "Structure Investigation and Alternatives Assessment Report", McCormick Rankin / MMM Group Limited, Dated April 2010.
5. Rehabilitation Drawings, "Repairs to Scheifele Bridge over Conestogo River (Regional Road 22)", Contract No. 2011-009, McCormick Rankin / MMM Group Limited, Dated April 2011.

2 BACKGROUND

2.1 LOCATION

The Scheifele Bridge is located on Regional Road No. 22 (Northfield Drive East) in the Township of Woolwich within the Regional Municipality of Waterloo, approximately 0.8 km north of University Avenue East, and crosses over the Conestogo River. Refer to the Key Plan provided on page iv for details.

For the purposes of this report, the bridge is considered to have a north-south alignment.

2.2 EXISTING STRUCTURE

The bridge was constructed in 1960 and is a four span (22.9 m±, 30.4 m±, 30.4 m±, 22.9 m±) cast-in-place continuous reinforced concrete T-beam structure with asphalt wearing surface. There are four T-beams that vary in depth from 0.99 m at mid-span and the abutments to 2.36 m at the piers. The original specified deck thickness was 203 mm (8"), and a 38 mm thick latex modified concrete overlay was placed on the deck as part of Rehabilitation Contract 82-16 (1982).

The overall width of the deck is 11.6 m. The deck accommodates two lanes of traffic, one northbound and one southbound. A 0.61 m wide safety curb is located on the east side of the structure, and a 1.83 m wide sidewalk is located on the west side of the structure. The clear width between curbs is 9.14 m. Painted galvanized steel handrails with concrete filled steel posts and concrete end walls are located on each side of the bridge; steel beam guiderail has been attached to the front face of the posts for the full length of the structure on both sides as part of Rehabilitation Contract 2011-009 (2011). Armoured strip-seal expansion joints are present at each abutment ballast wall. The original drawings indicate the bridge does not have approach slabs at either end of the structure.

The superstructure is supported on steel rocker bearings at the abutments and the north and south piers, and on fixed steel pin bearings at the centre pier. The substructure comprises conventional concrete abutments supported by concrete spread footings. The structure has thee piers, each comprising a concrete stem supported by concrete spread footings. There are reinforced concrete cantilevered retaining walls supported by spread footings at all four corners of the structure.

There are six utility ducts supported on a rack (2W x 3H) suspended from the west deck cantilever. Surface mounted ducts are located on the south abutment.

General views of the bridge and typical photographs of deterioration referenced within this report are provided in Appendix A. A General Arrangement Drawing for this bridge is provided in Appendix B.

2.3 REHABILITATION AND INVESTIGATION HISTORY

In 1982, the structure was rehabilitated under Contract No. 82-16. Based on the rehabilitation Contract Drawings (see References), the rehabilitation work included:

- Removal of asphalt and waterproofing;
- Scarifying 12 mm from top of existing concrete deck;
- Removal of delaminated concrete from top of concrete deck;
- Placement of a 38 mm thick latex modified concrete overlay;
- Repairs to concrete curb and sidewalk with latex concrete/patching;
- Shotcrete repairs to T-beams and deck soffit;

- Replacement of expansion joints with armoured strip seal system, including removal and partial reconstruction of the ballast walls;
- Modification to deck drains; and
- Placement of new waterproofing and asphalt wearing surface (76 mm total thickness).

In 2004, AMEC Earth & Environmental carried out a bridge deck condition survey and the Region completed an enhanced inspection using specialized access equipment ("Bridgemaster").

In 2005, McCormick Rankin undertook a visual inspection of the bridge and completed a structural evaluation. The results indicated that the girders are theoretically overstressed in negative bending at a few isolated areas, and the shear capacity of the girders is theoretically adequate (see References).

In 2005, a pilot project was performed by Dr. Khal Soudki of the University of Waterloo, which involved the rehabilitation of the girders in the south-most span using carbon fibre reinforced polymer (CFRP) wraps to strengthen the girders and to provide confinement to the concrete.

In 2009, McCormick Rankin performed a comprehensive field investigation, comprising a detailed bridge deck condition survey, and a detailed delamination and deterioration survey of all components. Crack monitors were installed during this investigation to monitor the largest cracks observed. Alternatives to address the structure's needs were considered and evaluated, including preliminary cost estimates. The findings of this investigation and recommendations for future work are documented in the 2010 Structure Investigation and Alternatives Assessment Report (see References).

In 2011, the structure underwent minor rehabilitation work to extend its life under Contract No. 2011-009. Based on the rehabilitation Contract Drawings (see References), the rehabilitation work included:

- Partial depth removal of asphalt (40 mm deep);
- Concrete patch repairs to the abutments, piers, and retaining walls;
- Replacement of expansion joints with new armoured strip seal assembly, including partial reconstruction of the ballast walls;
- Installation of steel beam rails (OPSD 912.101) on the existing railing posts on bridge;
- Replacement of steel beam guide rail at all four corners of the bridge, including connection of new approach guide rail panels to rails mounted on existing bridge railing; and
- Placement of new 40 mm surface course asphalt.

2.4 EXISTING STRUCTURAL DRAWINGS

The original contract drawings for the Scheifele Bridge are available. Contract drawings are also available for the rehabilitations completed in 1982 (Contract 82-16) and 2011 (Contract 2011-009).

2.5 TRAFFIC DATA

The posted speed limit along this section of Regional Road No. 22 is 80 km/h.

The approximate average annual daily traffic (AADT) for Northfield Drive East at the structure location is 10,356 (2015).

Alternate routes to travel between the intersection of Sawmill Road (Regional Road 17) / Northfield Drive and the intersection of University Avenue East / Northfield Drive include, but are not limited to:

a) Via Glasgow Street South: Southbound traffic - Travel east on Sawmill Road, south on Glasgow Street South and west on Country Squire Road / University Avenue East (reverse for northbound traffic). This detour is approximately 5.0 km (compared to 2.7 km using Northfield Drive). Note that this route crosses the Glasgow Street Bridge, which is a historic structure built in the 1880s. This bridge is a single lane structure, with warning signs including "Narrow Bridge", "One Vehicle on Bridge at a Time", and "3.0 m Vertical Clearance". The structure is also load posted at "Maximum 5 tonnes".

b) Via Regional Road 85: Southbound traffic - Travel west on Sawmill Road, south on Regional Road 85, exit at King Street North, and west on Bridge Street West / University Avenue East (reverse for northbound traffic). This detour is approximately 9.7 km (compared to 2.7 km using Northfield Drive).

3 DETAILED INSPECTION FINDINGS

3.1 GENERAL

On April 24th and 25th, 2018 WSP performed a detailed concrete deterioration and delamination survey of the concrete T-beams, soffit, diaphragms and substructure elements of the Scheifele Bridge. WSP also performed a visual inspection and general overview of the remainder of the bridge elements to identify any significant deficiencies. This inspection was completed by Joseph Stoner, P. Eng. and Morgan Herrell, E.I.T., under the direction of Kyle Yusek, P. Eng.

It is understood that this structure in currently programmed for superstructure replacement in 2021, with the abutments and piers to remain. The purpose of the current investigation was to identify any deficiencies that may require repairs in the interim, and to provide discussion and recommendations on the timing of the superstructure replacement.

The findings from this investigation were also compared to the findings documented in the 2010 Structure Investigation and Alternatives Assessment Report to assess the structure's rate of deterioration.

Specialized access equipment ("Bridgemaster") was used to inspect the deck soffit, girders, bearings, and substructure elements. A single lane closure with flagging and a crash truck with a truck mounted attenuator (TMA) were utilized to provide work area protection for the Bridgemaster.

For the purposes of this report, the following naming conventions have been used:

- The T-beam stems are identified as 'Girders' with a prefix 'G' and are numbered incrementally from east to west (G1 to G4).
- The structure has four spans; the spans are identified as 'North End Span', 'North Centre Span', 'South Centre Span', and 'South End Span', from north to south.

The following sections describe material defects, severity levels, and condition states of bridge elements using terminology consistent with the Ontario Structure Inspection Manual (OSIM), 2008.

3.2 DECK

3.2.1 ASPHALT WEARING SURFACE AND APPROACHES

The asphalt wearing surface was generally in good condition. A wide longitudinal crack was noted along the roadway centreline for the entire length of the bridge (Photograph 6). A few isolated light and medium cracks were observed in the southbound lane above the north pier.

The asphalt wearing surface at the approaches is in generally fair condition. There is moderate transverse and longitudinal cracking and extensive patching adjacent to the expansion joints (see Photographs 4, 5, 88, 89).

3.2.2 DECK SOFFIT AND FASCIA

A detailed visual inspection and concrete deterioration and delamination survey of the deck soffit were completed. Refer to the General Arrangement Drawing in Appendix B for structure details including the girder, span, and pier labelling referenced in this section. Drawings 1 and 2 found in Appendix C present a plan of the soffit which maps all defects and deterioration documented during the inspection and as summarized in the following sections.

NORTH END SPAN

Approximately 3.4 m^2 and 19.3 m^2 of the soffit had concrete spalls and delaminations respectively (total 11.8 % of deck soffit area), with the majority of these delaminations and spalls noted in the southern half of the span. Large areas of spalled concrete with exposed corroded reinforcing steel were noted.

Fascia deterioration for the North End Span is shown on Drawings 3 and 6 in Appendix C.

The east and west fasciae were found to be in generally poor condition with approximately 20% of the concrete delaminated or spalled on each. Spalling with exposed reinforcing steel and cracking with efflorescence were noted.

See Photographs 7 - 12 for typical views of soffit and fascia deterioration within the north end span.

NORTH CENTRE SPAN

Approximately 2.6 m^2 and 8.6 m^2 of the soffit had concrete spalls and delaminations, respectively (total 4.4 % of deck soffit area). Most of these deteriorations were noted near the north and centre piers and in the west cantilever. Localized areas of spalled concrete with exposed reinforcing steel were noted. The centre third of the span was in generally good condition. The west cantilever soffit of the north centre span was found to be in generally fair condition with many areas of poor condition with significant areas of concrete spalling, exposed corroded reinforcing steel, delamination and cracking. Popouts and honeycombing were also noted throughout the span.

Fascia deterioration for the North Centre Span is shown on Drawings 7 and 10 in Appendix C.

The west fascia was found to be in generally poor condition with approximately 16% of concrete delaminated or spalled. Exposed reinforcing steel, severe scaling, and failed patch repairs were noted throughout. The east fascia was also in generally poor condition with spalling and rust staining noted throughout.

See Photographs 13 - 16 for typical views of soffit and fascia deterioration within the north centre span.

SOUTH CENTRE SPAN

Approximately 6.3 m^2 and 16.7 m^2 of the soffit had concrete spalls and delaminations, respectively (total 9.1 % of the soffit area), with exposed corroded reinforcing steel visible at some spalls.

Several medium-wide transverse cracks were found in the third of the span adjacent to the centre pier, including a wide crack with efflorescence surrounded by delaminated concrete located between Girders G1 to G3 and extends partially down the faces of the adjacent girders. There is also an area of spalled concrete between G2 and G3 where two reinforcing bars were observed to be debonded from the concrete.

Fascia deterioration for the South Centre Span is shown on Drawings 11 and 14 in Appendix C.

The west fascia was found to be in generally poor condition with approximately 27% of concrete spalled or delaminated. Exposed reinforcing steel, severe scaling, and failed patch repairs were noted throughout. An exposed transverse reinforcing bar has failed. The east fascia was found to be in generally poor condition, with spalling at bridge railing post locations, cracking with efflorescence, and rust staining throughout.

See Photographs 17 - 22 for typical views of soffit and fascia deterioration within the south centre span.

SOUTH END SPAN

Approximately 3.7 m^2 and 21.3 m^2 of the soffit had concrete spalls and delaminations, respectively (Total 12.8 % of the soffit area), with exposed corroded reinforcing steel visible at some spalls. Three reinforcing steel bars were observed to be debonded from the concrete at an area of spalled concrete between Girders G2 and G3 and adjacent to the south abutment. There is also a 6.8 m^2 area of delaminated concrete adjacent to the south abutment between Girders G3 and G4 with a visible void and exposed reinforcing steel bars; this delamination is above a walkway, which poses a safety hazard to the public.

Fascia deterioration for the South End Span is shown on Drawings 15 and 18 in Appendix C.

The west fascia is in generally poor condition with localized areas of delaminations and a severe spall noted. The east fascia was found to be in generally poor condition with approximately 25% of the concrete spalled or delaminated. Exposed corroded rebar and concrete staining was noted along the fascia.

See Photographs 23 - 28 for typical views of soffit and fascia deterioration within the south end span.

SUMMARY OF SOFFIT DETERIORATION

Table 1 presents a summary of the deck soffit deterioration noted in each of the four spans.

Table 1 Summary of Deck Soffit Deterioration

Span	Medium / Wide Cracking (m)	Delamination (m^2)	Spalling (m^2)	Exposed / Corroded Reinforcement (m^2)	Other Defects
North End Span	4.8	19.34	3.38	0.00	0.56
North Centre Span	7.6	8.58	2.57	0.30	0.25
South Centre Span	0.0	16.68	6.34	0.10	1.20
South End Span	4.5	21.30	3.66	0.12	0.20

Concrete delaminations and spalls in the soffit were noted throughout each span, but were generally concentrated in the north and south end spans. In total, approximately 82 m^2 (9.2 %) of combined delaminations, spalls, and localized popouts with exposed reinforcing steel on the soffit were noted, whereas this quantity was approximately 8.0% at the time of the 2010 investigation.

Other defects including scaling, discolouration, patched spalls and honeycombing were also observed with a total quantity of approximately 2.2 m^2.

The previous report from 2010 estimated a 5-10 year time frame before punch-through failure of the deck may become a structural concern. Presently (8 years since this estimate), no areas of immediate concern have been identified. Multiple areas of spalled soffit with exposed reinforcing steel were observed, with debonded reinforcing identified in some instances. These areas should continue to be monitored, and a repair should be implemented if the superstructure replacement is anticipated to be delayed.

Deterioration in the south end span alone has reached 12.8%. Spalls with debonded rebar were noted in the south end span and south centre span. A large area of delaminated concrete is directly above the pedestrian trail below the south end span along the south embankment; this is a safety concern that should be addressed as soon as practical.

3.3 GIRDERS

A detailed visual inspection and concrete deterioration and delamination survey of the concrete girders were completed. Refer to the General Arrangement Drawing in Appendix B for structure details including the girder, span, and pier labelling referenced in this section. Drawings 3 to 18 in Appendix C present all defects and deterioration documented during the inspection and as summarized in the following sections.

NORTH END SPAN

Girder deterioration for the North End Span is shown on Drawings 3, 4, 5 and 6 in Appendix C.

G1 was noted to be in generally good condition with localized areas in fair and poor condition. On the west face of G1, narrow to medium vertical cracks were found throughout the span, at a typical spacing of 300 mm c/c, from the north abutment to the intermediate diaphragm. A full-height medium width crack and narrow width crack were found along the west face, south of the diaphragm. Areas of honeycombing were found on the west face of the girder adjacent to the north abutment face and south of the diaphragm. Deterioration on the east face was similar, with an area of delaminated concrete south of the diaphragm, honeycombing north of the diaphragm, as well as spalling and delaminated concrete at the north abutment face. Delaminated concrete was noted on the east face at the north pier bearing.

G2 was found to be in generally good condition with localized areas in fair and poor condition. Two medium width vertical cracks, three areas of honeycombing, two areas of delaminated concrete, an area of scaling and exposed rebar were noted on the west girder face. The east face of the girder was noted to be in generally good condition with four medium width vertical cracks. The soffit of G2 contained approximately 4.4 m^2 of delaminations.

G3 was found to be in generally good condition with some small areas in poor condition. Narrow vertical cracking was noted throughout each face. Two medium longitudinal cracks were found along the

haunch on the east face. Two localized areas of delaminated concrete were found on both faces, and a spall with exposed reinforcing steel was observed on the east face of the girder. A single area of honeycombing was found on the west face and three areas of honeycombing were found on the east face. Delaminated concrete was noted on the east face at the north pier bearing.

G4 was found to be in generally good condition. Four medium width cracks were found on the west face of G4 and one medium crack and honeycombing were found on the east face. A crack monitor was found at a crack on the west face near the north abutment that was previously identified as medium width; this crack remains medium width. Delaminated concrete was noted on the east face at the north pier bearing.

See Photographs 29 - 32 for typical views of the girder deterioration within the north end span.

NORTH CENTRE SPAN

Girder deterioration for the North Centre Span is shown on Drawings 7, 8, 9 and 10 in Appendix C.

G1 was found to be in generally good condition with localized areas in fair condition. On both faces of G1, short narrow to medium vertical cracks were found throughout the span between the interior diaphragms, at a typical spacing of 400 mm c/c. The east face of G1 had a few areas of honeycombing, spalling, and concrete delamination with three medium width vertical cracks. The west face of G1 had two medium width cracks in the north third of the span.

G2 was found to be in generally good condition. The east and west faces of G2 had two medium width vertical cracks located between the intermediate diaphragm and north pier, one medium width crack located near the centre pier, and a series of 300 mm high narrow-medium width vertical cracks spaced at 400 mm c/c ± extending between the intermediate diaphragms. Cracking was observed at approximately the same locations on both faces of the girder. On the west face, an area of delaminated concrete was found adjacent to each pier bearing. Localized spalling with exposed reinforcing steel was noted on the girder soffit.

G3 was found to be in generally good condition with localized areas in fair condition. Both the east and west faces of G3 had several 300 mm high narrow to medium width vertical cracks spaced at 400 mm c/c ± between the intermediate diaphragms. Both faces of the girder also had three medium width diagonal cracks between the piers and intermediate diaphragms. A crack monitor was found at a crack on the west face between the intermediate diaphragm and north pier that was previously identified as medium width; this crack remains to be medium width. An area of honeycombing was observed on the east face. Areas of delaminated concrete were found adjacent to the pier bearings on both faces of the girder.

G4 was found to be in generally good condition with localized areas in fair condition. The east and west faces of G4 had multiple full-height medium vertical cracks located between the intermediate diaphragm and north pier. On both faces of the girder, a series of narrow-medium width vertical cracks were noted approximately 125 mm in height and spaced at 400 mm c/c ± spanning between the

intermediate diaphragms. On the east face, a full-height medium width crack was noted between the intermediate diaphragms and a longitudinal medium width crack was noted along the haunch adjacent to the north pier. Vertical cracking was observed at approximately the same locations on both faces of the girder. Areas of spalled and delaminated concrete were found adjacent to the pier bearings on both faces of the girder. Localized spalling with exposed reinforcing steel was noted on the girder soffit.

See Photographs 33 - 37 for typical views of the girder deterioration within the north centre span.

SOUTH CENTRE SPAN

Girder deterioration for the South Centre Span is shown on Drawings 11, 12, 13 and 14 in Appendix C.

G1 was found to be in generally fair condition. Both faces of G1 had several 150 to 300 mm high narrow-medium width vertical cracks spaced at 450 mm c/c ± between the intermediate diaphragms. In the areas between the piers and intermediate diaphragms the east face of G1 had three full height medium cracks, and the west face of the girder had five full-height medium cracks and one crack with efflorescence. Spalls were noted on both sides of the girder at the pier bearings. Localized areas of delaminated concrete, exposed reinforcing steel, and honeycombing were also observed on both faces and soffit of the girder.

G2 has many areas in fair and poor condition. Several mid-height to full-height narrow and medium width cracks spaced at 300 to 400 mm c/c ± were found on both faces of the girder between the intermediate diaphragms. Additionally, three medium cracks were found on each face between the diaphragm and piers. In total, 1.6 m^2 of concrete delaminations were found on the girder (0.6 m^2 on the east face, 0.5 m^2 on the soffit and 0.5 m^2 on the west face). An efflorescent vertical crack and area of delaminated concrete extending from the soffit were found on either face of the girder near the centre pier. Areas of honeycombing were found on each face of the girder.

G3 was found to be in generally fair condition with multiple areas in poor condition. On both faces of G3, narrow-medium width cracks with a spacing of 300-400 mm c/c were found between the intermediate diaphragms. Multiple medium width vertical cracks were found on both faces between the diaphragms and piers. Approximately 5.0 m^2 and 3.7 m^2 of concrete delaminations were found on the east and west faces of the girder, respectively, predominately adjacent to the south pier. A crack with efflorescence extending down from the soffit was found on the east face near the centre pier. Localized areas of honeycombing and concrete spalling were noted as well. Previous concrete patching was noted at the bottom of the girder near the south pier.

G4 was found to be in generally fair condition. On both faces of G4, narrow-medium width vertical cracks were found between the intermediate diaphragms, typically spaced at 300 to 400 mm c/c. Multiple medium width vertical cracks were found on both faces between the diaphragms and piers. A full-height crack with efflorescence was noted on the east face near the centre pier. Approximately 2.6 m^2 of delaminations and spalled concrete with exposed reinforcing steel was noted on the east face, and approximately 3.3 m^2 of concrete delamination on the west face. A severe spall on the east side was noted, with a depth of approximately 80 mm. Areas of concrete delamination and exposed corroded

rebar, due to inadequate cover, were also found on the underside of the girder. Previous concrete patching was noted at the bottom of the girder near the south pier.

See Photographs 38 - 42 for typical views of the girder deterioration within the south centre span.

SOUTH END SPAN

Girder deterioration for the South End Span is shown on Drawings 15, 16, 17 and 18 in Appendix C.

G1 was noted to be in good condition with localized areas in fair condition. Approximately 1.6 m^2 of delaminated concrete was noted on the east face of the girder near the south abutment. A medium width vertical crack was noted on both faces adjacent to the intermediate diaphragm. Narrow-medium width mid-height cracks spaced at 400 mm c/c span a 3.2 m segment near mid-span of the girder on the west face. The soffit of the girder contained localized areas of delamination and three areas of exposed corroded rebar.

G2 was noted to be in generally good condition with localized areas in fair condition. Narrow mid-height cracks spaced at 300 mm c/c span the entire length of the girder on both faces. The west face of the girder had three medium cracks located between the intermediate diaphragm and the south pier. The east face of the girder had one medium crack between the intermediate diaphragm and south pier. The soffit of the girder has areas of spalling, delamination and exposed corroded rebar.

G3 was found to be in generally poor condition. Approximately 7.0 m^2 of delaminations were measured on the east face of the girder, with three medium width cracks and one area of concrete spalling. Approximately 7.9 m^2 of delaminations were measured on the west face, with three medium- width cracks and one concrete spall. The soffit of the girder was found to be in poor condition with over half of the girder delaminated (approximately 8.8 m^2) or patched (approximately 1.6 m^2). In total, deterioration was noted over 20.6 m^2, or 37.7% of the girder surface. The remaining portion of the soffit and adjacent girder faces were previously repaired with fibre reinforced polymer (FRP) wraps. The FRP was found to be peeling off in a few 200 mm wide sections.

G4 was found to be in generally fair condition with many areas in poor condition. The east side of the girder had approximately 3.5 m^2 of concrete delamination, one wide longitudinal crack, four medium vertical cracks, four mid-height narrow-medium cracks spaced at 300 – 400 mm, an area of patched concrete near the south abutment, and some minor areas of spalling and exposed corroded rebar. The west side of the girder was in poor condition with roughly 8.3 m^2 of delamination. The soffit of the girder has 2.5 m^2 of concrete delamination with areas of exposed corroded rebar, and three medium cracks. There is a spalled area near the south abutment face adjacent to a large patched spall (approximately 1.6 m^2). Delamination was found at the bottom of the diaphragm between G2 and G3, and directly under G4 at the pier.

See Photographs 43 - 48 for typical views of the girder deterioration within the south end span.

GIRDER CRACKS AND CRACK MONITORS

Previous inspections identified the presence of what appeared to be shear cracks in the girders. As part of the 2010 Structure Investigation, seven crack monitors were installed across some of the widest existing cracks by McCormick Rankin in April 2009 to provide a qualitative measure of any change in crack width over time. Table 2 presents the crack width measurements recorded during the current investigation at these seven crack locations, and compares them to the measurements taken in 2009.

Measurements taken in 2018 indicate no significant changes in the width of the cracks since installation of the crack width monitors. All seven cracks were initially identified as medium width in 2009; these cracks remain as medium width in 2018.

Table 2 Summary of Crack Widths at Monitor Locations

Gauge No.	Span / Girder	Remarks	2009 Crack Width (mm)	2018 Crack Width (mm)
1	N. End Span / G4-West	1.0 m south of N. abutment brg.	0.3	0.2
2	S. Centre Span / G3-West	2.8 m north of N. diaphragm	0.33	0.5
3	S. Centre Span / G1-East	9.5 m north of S. pier brg.	0.5	0.5
4	N. Centre Span / G4-West	7.8 m south of N. pier brg.	0.6	0.8
5	N. Centre Span / G4-West	8.0 m south of N. pier brg.	0.5	0.7
6	N. Centre Span / G3-West	8.0 m south of N. pier brg.	0.6	0.7
7	S. End Span / G3-West	0.8 m north of N. diaphragm	0.5	0.5

SUMMARY OF GIRDER DETERIORATION

Table 3 presents a summary of the girder deterioration noted in each of the four spans.

Table 3 Summary of Girder Deterioration

Span	Defects	Girder			
		G4 (west)	G3	G2	G1 (east)
North End Span	Medium/Wide Cracking (m)	3.7	4.9	4.1	4.8
	Delaminations (m^2)	0.00	0.39	4.40	0.57
	Spalling (m^2)	1.05	0.00	0.00	0.21
	Exposed/Corroded Reinforcing (m^2)	0.00	0.00	0.09	0.02
	Other Defects	0.79	0.51	0.31	0.31
North Centre Span	Medium/Wide Cracking (m)	17.2	7.5	7.8	5.5
	Delaminations (m^2)	0.56	0.52	0.31	0.78
	Spalling (m^2)	0.13	0.00	0.15	0.42
	Exposed/Corroded Reinforcing (m^2)	0.25	0.10	0.04	0.06
	Other Defects	0.00	0.09	0.00	0.46
South Centre Span	Medium/Wide Cracking (m)	11.30	12.85	8.45	9.10
	Delaminations (m^2)	6.09	8.78	1.57	0.34
	Spalling (m^2)	0.56	0.61	0.00	0.51
	Exposed/Corroded Reinforcing (m^2)	0.00	0.07	0.00	0.22
	Other Defects	2.66	1.00	0.51	0.18
South End Span	Medium/Wide Cracking (m)	13.7	9.9	4.8	2.4
	Delaminations (m^2)	14.43	23.75	0.14	1.84
	Spalling (m^2)	0.76	0.24	0.36	0.55
	Exposed/Corroded Reinforcing (m^2)	0.00	0.16	0.25	0.30
	Other Defects	2.30	2.15	0.20	0.00

Overall, the quantity of delaminated concrete on the girders increased by 7 m^2 and quantity of spalls increased by 2 m^2 since the 2010 investigation.

There are several spalls with exposed reinforcing steel and delaminations on the girder faces and girder soffits. A majority of these delaminations are within the south end span. The south end span girders exhibit large areas of delaminations with wide longitudinal cracks. Deterioration in Girder G3 has reached 37.7% in the south end span, an increase of approximately 5% since the 2010 investigation. These pieces of concrete may become a fall hazard to pedestrians using the walkway along the south embankment. Although there were no structural concerns highlighted at the time of the 2010 structural evaluation, we would flag a potential structural concern at this time as we might expect some section loss in the reinforcing steel, given the substantial concrete deterioration.

3.4 SUBSTRUCTURE

3.4.1 BEARINGS

A visual inspection of all bearings was performed. The angle of tilt for each expansion rocker bearing (abutments, north pier, and south pier) was measured using a digital tiltmeter. Table 4 compares the recorded bearing tilts to the measurements taken during the 2010 structure investigation. Positive tilts (+) indicate that the bearing is tilting to the north and negative tilts (-) indicate that the bearing is tilting to the south.

Expansion steel rocker bearings are located at the north and south abutments. The abutment bearings comprise a steel base plate, top plate, rocker assembly, and two base plate anchors. The original drawings show square retaining bars welded to the base plate and top plate around the perimeter of the rocker assembly. The abutment bearings are in generally poor condition with moderate to severe corrosion of the base plate, top plate, rocker assembly and anchor bolts typical throughout (see Photographs 49-56). The south abutment rocker bearings were found to be in generally worse condition than the north abutment with all four bearings exhibiting severe corrosion. At most bearing locations, the top and bottom retaining bars are either missing or are no longer fixed to the plates. The original drawings indicate that there are no pins connecting the rocker assemblies to either plate; therefore, these bearings are free to move unrestrained in all directions as the bridge expands and contracts.

A tilt measurement of 18° (expansion, ambient temperature of 15°C) was recorded at the expansion rocker bearing supporting Girder G1 at the south abutment (see Photograph 53). This rotation is approaching a limit which may cause instability of the bearing, and is a significant increase in tilt as compared to the 2010 investigation measurement of 8° (expansion, ambient temperature of 24°C). Furthermore, this bearing appears to have rotated in plan; permitted by the lack of restraining bars. Similarly, although the expansion rocker bearing supporting Girder G4 at the south abutment had a similar tilt as recorded in 2010, this bearing has also rotated in plan (see Photograph 56). Another notable observation was that the north abutment G3 bearing decreased in tilt from 12° in 2010 to 5° in 2018, which represents a significant change. These observations and recommendations for urgent remediation is discussed further in Section 4.

Expansion steel rocker bearings are located at the north and south piers, with restraint provided by a pin connected to the girders. The north pier rocker bearings are in generally good condition with areas of light to moderate corrosion along the base plates, top plates and anchor bolts. The south pier rocker bearings were also in generally good condition with light corrosion along the base plates, top plates and anchor bolts (see Photographs 57-64). Spalling of the girder face concrete at the bearing top plates was observed at multiple bearing locations (Girders G1 and G4 at north pier, Girders G3 and G4 at south pier),

Table 4 Bearing Tilt Measurements

	Girder	Date / Temp.	South	Measured Tilt (°)			North
			South Abutment	South Pier	Centre Pier	North Pier	North Abutment
West	G4	2010 (24°C)	(\ ) - 9	(\ ) - 8	Fixed	+ 6 (/)	+ 6 (/)
		2018 (15°C)	(\ ) - 7	(\ ) - 6	Fixed	+ 5 (/)	+ 6 (/)
	G3	2010 (24°C)	(\ ) - 4	(\ ) - 8	Fixed	+ 8 (/)	+ 12 (/)
		2018 (15°C)	(\ ) - 1	(\ ) - 9	Fixed	+ 7 (/)	+ 5 (/)
	G2	2010 (24°C)	(\ ) - 10	(\ ) - 13	Fixed	+ 5 (/)	+ 14 (/)
		2018 (15°C)	(\ ) - 8	(\ ) - 11	Fixed	+ 4 (/)	+ 12 (/)
East	G1	2010 (24°C)	(\ ) - 8	(\ ) - 10	Fixed	+ 8 (/)	+ 6 (/)
		2018 (15°C)	(\ ) - 18	(\ ) -10	Fixed	+ 7 (/)	+ 4 (/)

(+) (/) means tilt to the north, (-) (\ ) means tilt to the south

exposing the bearing top plates which were found to be corroded (see typical Photograph 57). This location was found to be delaminated at most other bearing locations (see typical Photograph 61).

Overall, the rocker bearing tilt measurements at the north and south piers generally match the tilts measured during the 2010 investigation, considering the temperature differences between the two investigations. The rocker bearing measurements for the abutments, however, have inconsistencies. Presumably, the lack of restrainer bars has allowed the bearings to "walk" along the corroded shoe plate, leading to unintended bearing tilts since the last inspection. For example, the north abutment G3 bearing decreased from 12° to 5°, while the south abutment G1 bearing increased from 8° to 18°.

Fixed steel pin bearings are located at the centre pier. The bearings were found to be in generally good condition with light corrosion at the base plates of all girders (see Photographs 65 and 66).

3.4.2 ABUTMENTS AND PIERS

A visual inspection and delamination survey were completed on the concrete abutments and piers. Refer to Drawing 19 for deterioration recorded for the abutments and Drawings 20, 21 and 22 for deterioration recorded for the north, centre, and south piers, respectively.

NORTH ABUTMENT

The north abutment is in generally good condition with some areas in fair or poor condition (see Photograph 67). Localized areas of concrete delamination and a vertical wide crack were noted on the abutment wall. Previous patch repairs throughout the abutment face and bearing seat are in good condition. Staining was noted at the abutment drain outlets. Debris accumulation was noted along the top of the abutment.

Concrete spalling, severe scaling, honeycombing, leached cracking and rust stains were noted on the lower portion of the north abutment ballast wall (see Photographs 68-70). Inspection of the upper portion of the ballast wall was not possible. The east curtain wall was noted to be severely disintegrated with multiple exposed corroded reinforcing bars (see Photographs 69 and 109).

There are two steel drip plates at each girder end; one fixed to the ballast wall and one fixed to the girder end. These drip plates have accumulated significant debris and are severely corroded with complete section loss and perforations throughout (see Photograph 68).

Evidence of leakage of the expansion joint was not observed at the north abutment.

SOUTH ABUTMENT

The south abutment is in generally fair condition with localized areas of delamination, vertical narrow to medium cracking and rust staining (see Photograph 71). Previous patch repairs along the bearing seats are in good condition.

Concrete spalling, severe scaling, leached cracking and rust stains were noted on the lower portion of the south ballast wall (see Photographs 72 and 73). Inspection of the upper portion of the ballast wall was not possible. Disintegration and exposed corroded reinforcing bars were noted at the east curtain wall (see Photograph 74).

The south abutment drip plates appear to have been removed (see Photograph 73).

Wet areas were noted throughout the ballast wall and abutment bearing seat. It was not obvious whether this moisture was due to leakage of the expansion joint above or due to spray from the continuous rain that occurred during the inspection of the south abutment.

NORTH PIER

The north and south faces of the north pier are in generally good condition with localized areas of concrete delamination and exposed reinforcing steel (see Photographs 75 and 76). The pier bearing seat is also in good condition with light to medium scaling.

CENTRE PIER

The north face of the centre pier is in generally good condition with localized areas of vertical cracking, delamination and spalling. A large area of spalling and delamination was noted at the bearing seat for Girder G2 (see Photograph 77). The south face of the centre pier is in generally good to fair condition with localized areas of vertical cracking and delaminations. Delaminations were noted at the bearing seats for Girders G2 and G4, and spalling was noted at the bearing seat at Girder G3 (similar to the spall on north face at Girder G2, see Photograph 80).

SOUTH PIER

The north face of the south pier is in generally good condition with vertical medium cracks in the centre portion of the pier. Only one spalled area was observed along the west side of the pier. The south face of the south pier is in generally fair condition with several localized areas of delaminations on the east half of the surface, medium vertical stained cracks extending 3 m above water level, and narrow vertical cracks. The pier bearing seat is in generally good condition with light to medium scaling (see Photographs 81 and 82).

3.4.3 RETAINING WALLS

The south retaining walls were accessible from the south embankment. The Bridgemaster was required to access the north retaining walls; however, inspecting within "arm's reach" was limited due to maneuvering restrictions of the Bridgemaster. A visual inspection of the walls was performed, and a delamination survey was completed where accessible. All four retaining walls are in generally good condition with little deterioration noted (see Photographs 83-86), including areas of narrow cracking and localized areas of suspected delaminations. The joint seal between retaining wall and abutment was noted to be failing at all four corners of the bridge, as shown in Photograph 87.

3.5 OTHER COMPONENTS

WSP performed a visual inspection of the expansion joints, concrete sidewalk and curbs, deck drains, steel bridge railings and concrete end walls, steel beam guide rails, and approaches.

3.5.1 EXPANSION JOINTS

Two expansion joints are present on this bridge: one at each abutment. Debris accumulation within the joint was noted at both north and south expansion joints as shown in Photographs 88 and 89, thus

preventing inspection of the full seal. Debris was removed locally at both joints; the seal was found to be in good condition at these locations. The concrete end dams were noted to be in good condition with light abrasion on the armouring angles. The gap at the north abutment was measured to be 54 mm and the gap at the south abutment was measured to be 52 mm. The gaps are uniform and indicative that there has been no unusual movement between the deck and abutments (i.e. shifting)

The sliding plates on the west sidewalk and east curb are in generally good condition at both joints.

3.5.2 CONCRETE SIDEWALK AND CURBS

The concrete sidewalk located on the west side of the structure was found to be in generally fair condition with widespread popouts and transverse medium cracks. There are several areas where concrete spalling, scaling and delamination have occurred, in addition to areas of previous concrete patch repairs. Some instances, including a 1.1 x 0.85 m delamination located within the south end span (Photograph 93), may create a potential tripping hazard if left to develop further. Photographs 90 to 94 illustrate deterioration along the sidewalk.

The concrete curb located on the east side of the structure was found to be in generally fair condition with transverse cracking and several areas of spalling, scaling, delamination, and previous patch repairs. Exposed corroding reinforcing bars were noted in multiple locations. Photographs 95 to 97 illustrate typical deterioration along the east curb.

3.5.3 DECK DRAINS

There are 22 galvanized steel pipe deck drains (152 mm diameter) on this structure: 11 on each side along the edge of pavement. The deck drains were observed to be in generally good condition with localized areas in fair or poor condition including coating failure and corrosion at the bottom portion as shown in Photograph 98. The drains were free of debris accumulation and appeared to be functioning properly.

3.5.4 STEEL BRIDGE RAILINGS, CONCRETE END WALLS, AND SBGR

Galvanized steel railings with concrete filled steel posts are located along the east and west sides of the structure. There are 34 railing posts on each side, spaced at 3.2 m. The steel posts comprise 200 mm square tubing filled with concrete. The original posts were detailed with ornamental caps; this cap was observed on only one post at the time of the inspection, while all others are missing or have been removed.

The railing panels were found to be in generally good to fair condition with coating breakdown and light to medium corrosion throughout the top rails, bottom rails, and balusters. A perforation was noted in the top rail of the 12th panel from the north within the east railing (see Photograph 99). Impact damage to the balusters was noted in multiple locations, including the 2nd and 12th panels from the north

within the east railing. The 10th panel from the north within the west railing appears to have been replaced recently (posts remain original).

The railing posts were found to be in generally fair condition with many posts in poor condition. Coating breakdown was noted throughout, with light to medium corrosion noted typically at the top (likely where original cap was) and bottom of the posts. Localized severe corrosion and perforations were noted in the post webs in some instances (see Photograph 101). Many of the railing posts (45% of west railing posts and 82% of east railing posts) have developed wide vertical splitting cracks in the steel for a majority of the post height (see Photographs 100 and 102); this cracking is likely due to expansion of freezing water trapped within the post between the steel and concrete. It was noted that weld repairs have been attempted at some locations, but have either failed or have new cracks beyond the repair.

The concrete within the posts was noted to be cracked or disintegrating in some locations, with deterioration significantly worse at the east railing. Within the east railing, a gap between the bottom of the steel post and the top of concrete curb (approximately 12-25 mm) was observed at many posts. Upon inspection of these gaps, it was observed that the concrete fill at the base of these posts has generally disintegrated, with approximately 80% concrete section loss in some instances (see Photographs 103 and 104). The original drawings indicate that each post is anchored to the concrete deck with 2-20M U-bars cast-into the post concrete. Based on the limited visibility of these post bases, it is estimated that this anchorage could be reduced to a single bar at some locations. This poor anchorage was observed at six consecutive posts within the east railing, which may potentially constitute a safety concern; if one post is impacted by an errant vehicle, the anchorage of this post and neighbouring posts is at risk of failing, which may result in the vehicle breaking through the railing system. It is questionable whether this system will be effective at keeping an errant vehicle on the structure if a railing post(s) were to fail.

The concrete end walls were noted to be in generally fair condition. Light scaling and vertical wide cracking were noted at the northwest and southeast end walls, respectively (see Photographs 105 and 106). Severe scaling, delamination, and disintegration with exposed reinforcing bars were noted at the southwest wall (see Photograph 107). Disintegration with exposed reinforcing bars was observed at the base of the northeast wall, and a void has formed under the wall at the south end adjacent to the north expansion joint (see Photographs 108-110).

Steel beam rails were fixed to both the east and west bridge railings as part of the 2011 rehabilitation work. These rails are strapped to the original posts using 2 bolts and a back plate as shown in Photograph 111. The steel beam rails were found to be in generally good condition, with typical light corrosion of the back plate noted throughout.

Steel beam guide rail (SBGR) with channel are present at all four corners of the structure, which are anchored to the concrete end walls and to the panels fixed to the bridge railings. The SBGR and posts were found to be in generally good condition.

4 RECOMMENDATIONS

This section presents recommendations for urgent repairs, routine maintenance and inspection activities, and timing for the programmed superstructure replacement. Discussion for each recommendation is provided in this section.

4.1 RECOMMENDATIONS FOR URGENT REPAIRS

The following urgent repairs are recommended to be implemented as soon as practical:

- Installation of temporary blocking between bearing seat and end diaphragm at rocker bearing supporting Girder G1 at the south abutment as a temporary measure should the bearing become unstable. It is also recommended to provide blocking at all other abutment bearings (north and south), owing to the inconsistency between individual tilt measurements;
- Installation of temporary concrete barriers (TCB) along both east and west bridge railings including new transitions to the approach steel beam guide rail (SBGR);
- Scale / remove delaminated concrete from deck soffit and girder faces over the pedestrian trail in the south end span; and
- The Region may wish to consider completing a structural evaluation based on current conditions.

Due to the inconsistent movement of the abutment bearings, and the significant rotation of the G1 bearing at the south abutment, it is recommended that the Region install temporary blocking between the abutment bearing seat and concrete end diaphragm adjacent to the G1 bearing at the south abutment to reduce the risk associated with a bearing failure. This blocking would provide temporary support (in addition to some anticipated load redistribution to the other girders/bearings) should this bearing become unstable. Furthermore, due to the inconsistent behaviour of the other abutment bearings, it is recommended to install blocking adjacent to all other abutment bearings. We note that WSP has not checked the existing diaphragms for capacity; rather, this blocking would be a temporary measure until such time that the superstructure is replaced; however, should a bearing fail, immediate repairs would be required. This blocking should be designed to accommodate the superstructure movements caused by thermal expansion and contraction, and could be comprised of a bottom steel plate, solid wood (oak) blocking, and two upper plates with a layer of grease between the two to provide a sliding surface. It is recommended that this blocking be installed as soon a practical. The estimated cost to install temporary blocking at all abutment bearings is $20,000. Alternatively, a more robust solution would be to design a system comprised of steel brackets bolted to the face of the abutment below each girder, with a steel pedestal, similar to what is typically employed when jacking a bridge for a bearing replacement. The Region may wish to consider a check of the existing diaphragm capacity and / or design of a more robust system as part of a structural evaluation.

To address the poor condition of the railing posts and the poor condition of the post anchorages, it is recommended that temporary concrete barriers (TCB) be placed along both the east and west railings for the full length of the structure, as soon as practical. The TCB for the west railing would be installed on the sidewalk, and the TCB for the east railing would be installed within the east shoulder. The new east TCB would reduce / eliminate the existing east shoulder; consideration could be given to adjusting the roadway pavement markings to shift the traffic lanes west to within the existing west shoulder; however, this may alter the roadway alignment over the bridge. New connections of the existing approach SBGR to the new TCB would be required at all four corners of the structure. The estimated cost to supply and install TCB along the east and west sides of the structure, including installation of new connections to the approach SBGR and roadway marking modifications, is $25,000.

Many areas of delaminated concrete were noted on the concrete deck soffit and girder faces. Of primary concern is the deterioration observed within the south end span; large areas of delaminated concrete were noted within this span, which has a pedestrian trail below it. This delaminated concrete poses a hazard to navigation and pedestrian traffic passing below. It is recommended that the Region remove delaminated / loose concrete to minimize the risk of concrete falling. Alternatively, the Region could consider designing / installing nets in high risk regions to catch falling material. Note that some scaling/removal of delaminated concrete would be necessary prior to net installation.

There are some concerns with the corrosion of the bottom layer of steel reinforcing bars in the girders. Section loss does not appear to have been considered during the structural evaluation discussed in the 2010 Report. Due to the girder deterioration, and anticipated ongoing section loss, the Region may wish to consider completing a structural evaluation.

4.2 RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION WORK

The following routine maintenance and inspection items are recommended:

- Flush debris both expansion joints;
- Inspection of abutment rocker bearings every six months until superstructure replacement is complete.

Debris accumulation was noted at both expansion joints. Flushing of the expansion joint seals to remove all debris is recommended to ensure the joints perform as desired. Joints filled with debris may restrict the movement of the superstructure, thereby introducing unintended stresses to the structure. Additionally, debris may be packed down into the seal by wheel loads, potentially leading to perforations / tears, ultimately reducing the service life and durability of the seal.

Based on the condition of the abutment bearings as discussed previously, it is recommended that the condition / stability of the abutment bearings be monitored every 6 months, until the superstructure replacement work is completed.

4.3 RECOMMENDATIONS FOR TIMING OF SUPERSTRUCTURE REPLACEMENT

It is WSP's understanding that Scheifele Bridge is programmed for superstructure replacement in 2021, with the existing abutments and piers to remain. Based on the findings of the current condition investigation, the Region has requested that WSP provide discussion and recommendations on the timing of the superstructure replacement (i.e. maintain, delay, or advance the current schedule).

Based on the findings of the current investigation, the rate of deterioration noted since the previous 2010 investigation, and reviewing the condition of the bridge as a system, it is our opinion that the current schedule for superstructure replacement should be maintained.

WSP's opinion to maintain the superstructure replacement schedule for 2021 is based on the following comments:

- The abutment rocker bearings are in poor condition, with some bearings exhibiting significant tilts, unrestrained movements, and illogical behaviour. Although the installation of temporary blocking at the abutment bearings as recommended in Section 5.1 minimizes the risk associated with a bearing failure, this blocking is not to be a practical long-term solution.
- Since the 2010 investigation, the area of delaminations and spalling in the deck soffit has increased from approximately 8.0% to 9.2%, and presumably, the rate of deterioration will continue to accelerate. Typically, once the amount of deterioration exceeds 10% it is no longer economically feasible to complete concrete patch repairs, and deck replacement is often warranted. It is anticipated that this threshold may be reached within the next three years.
- Since the 2010 investigation, the area of delaminations and spalling on Girder G3 in the south end span has increased from approximately 32.4% to 37.7%, combined with anticipated ongoing section loss.
- The substructure elements, including abutments, piers, and retaining walls, remain in good condition, with minimal increase in deterioration since the previous 2010 investigation.

At the time of superstructure replacement, it is anticipated that some concrete patch repairs will be completed to the piers and abutments, including the spalling and delamination previously noted at the centre pier bearing seat.

Should replacement of the superstructure be deferred, it is anticipated that significant rehabilitation would be required to maintain the bridge in a state of good repair, including but not limited to:

- Confirm that the bridge has served its useful service life and is beyond the point where additional major rehabilitation work would be financially advisable by completing an updated life cycle cost analysis;

- Jack the superstructure to facilitate replacement of the abutment bearings;
- Extensive concrete patch repairs on the soffit, fasciae, and girders;
- Concrete patch repairs on the substructure, including areas of spalling and delamination on the centre pier bearing seats; and
- Replacement of the existing railing system with a crash tested barrier, which may require some strengthening of the deck.

APPENDIX

A SITE PHOTOGRAPHS

Photograph 1 – East elevation, looking south

Photograph 2 – West elevation, looking south

Photograph 3 – General view of bridge deck top, looking north

Photograph 4 – North approach, looking north

Photograph 5 – South approach, looking south

Photograph 6 – Asphalt wearing surface, looking south – Note wide longitudinal crack at centreline

Photograph 7 – General View of Girders and Soffit, North End Span, Looking South towards North Pier

Photograph 8 – Deck Soffit in North End Span between G1 and G2, looking north – Note delaminated concrete

Photograph 9 – Deck Soffit in North End Span between G2 and G3, looking south at south third of soffit – Note delaminated concrete and spalls with corroded reinforcing steel

Photograph 10 – West Fascia in North End Span, Looking North – Note spalling with exposed corroded reinforcing steel

Photograph 11 – East Fascia in North End Span, looking south – Note cracking with efflorescence and rust staining

Photograph 12 – Deck Soffit of East Cantilever in North End Span, looking south – Note delaminated concrete, rust stains, and spalls with exposed rebar. *Approximate location of Photograph 44 from 2010 report.*

Photograph 13 – Deck Soffit in North Centre Span between G1 and G2, adjacent to north pier – Note area of delaminated concrete and spall with exposed reinforcing steel

Photograph 14 – Deck Soffit in North Centre Span between G3 and G4, looking south – Note popouts with exposed reinforcing steel

Photograph 15 – Deck Soffit and Fascia of West Cantilever in North Centre Span at North Pier, looking south – Note delaminated concrete, rust stains, and spalls with exposed reinforcing steel. *Approximate location of Photographs 46, 47, and 48 from 2010 report.*

Photograph 16 – Deck Soffit and Fascia of East Cantilever in North Centre Span, Looking North – Note spalling and rust staining throughout

Photograph 17 – General View of Girders and Deck Soffit within South Centre Span, Looking North

Photograph 18 – Deck Soffit in South Centre Span between G1 and G2, looking south – Note delaminated concrete at transverse crack with efflorescence

Photograph 19 – Deck Soffit in South Centre Span between G2 and G3, looking north – Note spall with two debonded reinforcing steel bars. *Approximate location of Photograph 49 from 2010 report.*

Photograph 20 – Fascia of East Cantilever in South Centre Span, looking north – Note spalls with exposed reinforcing steel and railing post base and deteriorating patch

Photograph 21 – Fascia of West Cantilever in South Centre Span, at middle third of span – Note severe spalls with exposed reinforcing steel adjacent to railing post

Photograph 22 – Fascia of West Cantilever in South Centre Span – Note severe spalling with exposed corroded and failed reinforcing steel

Photograph 23 – General View of Girders and Soffit in South End Span, Looking North

Photograph 24 – Deck Soffit in South End Span between G2 and G3, adjacent to south abutment – Note concrete spall with exposed corroded and debonded reinforcing steel

Photograph 25 – Deck Soffit in South End Span between G3 and G4, adjacent to south abutment – Note delaminated concrete with visible void

Photograph 26 – Fascia of West Cantilever in South End Span, Looking North – Note severe spall and rust staining

Photograph 27 – Fascia of East Cantilever of South End Span, Looking North – Note severe spalls with exposed corroded and debonded reinforcing steel. *Approximate location of Photographs 53 from 2010 report.*

Photograph 28 – Fascia of East Cantilever in South End Span – Note severe spalling at bridge railing post base with exposed corroded and debonded reinforcing steel

Photograph 29 – General view of girders in north end span, looking north – Note localized delaminated concrete on girder soffits

Photograph 30 – Girder G3 in north end span, looking south – Note typical localized delamination on girder face

Photograph 31 – Girder G1 at north pier, looking south – Note typical girder face spalling at bearing

Photograph 32 – Girder G4 in North End Span, west face – Note medium width crack with crack monitor

Photograph 33 – Girder G3 in North Centre Span, west face – Note typical honeycombing

Photograph 34 – Girder G4 in North Centre Span, west face, north third of span – Note medium cracks with crack monitors

Photograph 35 – Girder G4 in North Centre Span, west face – Note medium cracks (same crack as Photograph 34)

Photograph 36 – Girder G4 in North Centre Span, east face, north third of span – Note medium cracks

Photograph 37 – Girder G3 in North Centre Span, west face, north third of span – Note medium width crack with crack monitor

Photograph 38 – Girder G2 in South Centre Span, east face, north third of span – Note crack with efflorescence and delaminated concrete

Photograph 39 – Girder G3 in South Centre Span, east face, adjacent to south pier – Note areas of delaminated concrete above patch repair

Photograph 40 – Girder G4 in South Centre Span, east face, north third of span – Note crack with efflorescence

Photograph 41 – Girder G4 in South Centre Span, east face, near south pier – Note delaminated concrete and severe spall approx. 80mm deep with exposed reinforcing steel bars

Photograph 42 – Girder G1 in South Centre Span – Note delaminated concrete in girder soffit at south pier bearing

Photograph 43 – Girder G4 in South End Span, east face at south pier – Note delaminated concrete and wide longitudinal cracking

Photograph 44 – Girder G3 in South End Span, west face, north third of span – Note delaminated concrete and longitudinal wide cracking along bottom of girder

Photograph 45 – Girder G3 in South End Span, west face, at south abutment – Typical FRP repair, some peeling of repair noted

Photograph 46 – South End Span, diaphragm between Girders G1 and G2 – Note wide crack

Photograph 47 – Girder G3, west face, south two-thirds of south end span – Note delaminated concrete and longitudinal wide cracking along bottom edge of girder

Photograph 48 – Girder G4, south end span – Note delaminated concrete and exposed reinforcing steel adjacent to previous patch repair

Photograph 49 – Bearing at North Abutment under G1, looking east – Note severe corrosion and loss of top and bottom guide bars

Photograph 50 – Bearing at North Abutment under G2, looking east – Note moderate to severe rusting of the bottom plate and loss of bottom guide bars

Photograph 51 – Bearing at North Abutment under G3, looking east – Note moderate to severe rusting of the bottom plate and loss of bottom guide bars. *Approximate location of Photograph 21 from 2010 report.*

Photograph 52 – Bearing at North Abutment under G4, looking east – Note severe corrosion and loss of top and bottom guide bars

Photograph 53 – Bearing at South Abutment under G1, looking east – Note severe corrosion, loss of top and bottom guide bars, and inclination of bearing. *Approximate location of Photograph 29 from 2010 report.*

Photograph 54 – Bearing at South Abutment under G2 – Note severe corrosion

Photograph 55 – Bearing at South Abutment under G3, looking west – Note severe corrosion and loss of top and bottom guide bars

Photograph 56 – Bearing at South Abutment under G4, looking west – Note severe corrosion and twisting of bearing, moisture on the ballast wall, and water ponding on the bearing seat.

Photograph 57 – Bearing at North Pier under G1, looking west – Note rust and spalled concrete exposing top plate on the west side of the bearing. *Approximate location of Photograph 36 from 2010 report.*

Photograph 58 – Baring at North Pier under G2, looking east – Note rust on base plate and top of bearing. Concrete adjacent to top of bearing was noted to be delaminated.

Photograph 59 – Baring at North Pier under G3, looking east – Note rust on base plate and top of bearing

Photograph 60 – Bearing at North Pier under G4, looking west – Note rust and spalled concrete exposing top plate on the east side of the bearing. *Approximate location of Photograph 35 from 2010 report.*

Photograph 61 – Bearing at South Pier under G1, looking east – Note rust on base plate and top of bearing. Concrete adjacent to top of bearing was noted to be delaminated.

Photograph 62 – Bearing at South Pier under G2, looking east

Photograph 63 – Bearing at South Pier under G3, looking east – Note rust and spalled concrete exposing top plate on the east side of the bearing. *Approximate location of Photograph 42 from 2010 report.*

Photograph 64 – Bearing at South Pier under G4, looking west – Note deteriorated patch. *Approximate location of Photograph 43 from 2010 report.*

Photograph 65 – Bearing at Centre Pier under G1, looking north – Note rusting on sides of the bearing and at bottom of the base plate and sides of bearing

Photograph 66 – Bearing at Centre Pier under G4, looking east – Note rusting on sides of the bearing and spalling of girder at bearing

Photograph 67 – North Abutment

Photograph 68 – North Abutment drip plates and ballast wall – Note debris accumulation and severe section loss of drip plates

Photograph 69 – Ballast Wall at East End of North Abutment – Note efflorescent cracking on ballast wall, disintegrated curtain wall, and spalled and delaminated concrete at girder end

Photograph 70 – Bearing Seat and Ballast Wall at North Abutment between G1 and G2 – Note spalling and scaling areas, leached cracking, and rust staining on ballast wall

Photograph 71 – South Abutment

Photograph 72 – Bearing Seat and Ballast Wall at South Abutment between G2 and G3 – Note spalled areas and corroded rebar on ballast wall, and patch repairs on the bearing. *Approximate location of Photograph 26 from 2010 report.*

Photograph 73 – South Abutment ballast wall looking east

Photograph 74 – South Abutment bearing seat at Girder G1, looking west – Note spalling at girder end, disintegration of east curtain wall, and significant tilt of rocker bearing

Photograph 75 – North Face of North Pier

Photograph 76 – South Face of North Pier

Photograph 77 – North Face of Centre Pier

Photograph 78 – South Face of Centre Pier

Photograph 79 – North Side of Centre Pier – Note spalled concrete in bearing seat at Girder G2

Photograph 80 – South Side of Centre Pier – Note spalled concrete in bearing seat adjacent to G3

Photograph 81 – North Face of South Pier

Photograph 82 – South Face of South Pier

Photograph 83 – Northwest Retaining Wall

Photograph 84 – Northeast Retaining Wall

Photograph 85 – Southwest Retaining Wall

Photograph 86 – Southeast Retaining Wall

Photograph 87 – Northwest Retaining Wall – Note typical failed joint seal between retaining wall and abutment

Photograph 88 – North Expansion Joint, Looking East – Note debris accumulation in joint

Photograph 89 – South Expansion Joint, Looking West – Note debris accumulation in joint

Photograph 90 – Sidewalk at north end of structure – typical condition

Photograph 91 – Sidewalk, south centre span – Note delaminated and spalled concrete in curb

Photograph 92 – Sidewalk, south centre span – Note disintegrated concrete around railing post

Photograph 93 – Sidewalk, south end span – Note delaminated patch and popouts throughout sidewalk surface

Photograph 94 – Sidewalk, south end span – Note scaling

Photograph 95 – East Curb, north centre span – Note spalled patch between railing posts. Delamination was observed at the patch between the next two railing posts to the left.

Photograph 96 – East Curb, south centre span – Note disintegrating concrete both adjacent to the roadway and on the deck fascia

Photograph 97 – East Curb, south end span – Note spalling in curb with exposed reinforcing steel

Photograph 98 – Typical deck drain, south centre span between G3 and G4, looking north – Note typical corrosion at bottom of drain

Photograph 99 – East bridge railing, north centre span (12th post from north) – Note perforation in top rail

Photograph 100 – West bridge railing, south end span – Note vertical typical wide cracking in steel post and cracking in post concrete

Photograph 101 – West bridge railing, north end span (6th post from north) – Note vertical cracking and perforations in steel post

Photograph 102 – East bridge railing, south end span (28th post from north) – Note vertical wide crack and loose bolt on top rail

Photograph 103 – East bridge railing, south end span (28th post from north) – Note gap between steel post and concrete curb, and 80% section loss of concrete in post

Photograph 104 – East bridge railing (4th post from south) – Note 50% concrete section loss at base and debonded reinforcing steel in curb

Photograph 105 – Northwest concrete end wall

Photograph 106 – Southeast concrete end wall

Photograph 107 – Southwest concrete end wall – Note scaling and disintegrated concrete with exposed reinforcing steel

Photograph 108 – Northeast concrete end wall – Note void below wall adjacent to expansion joint

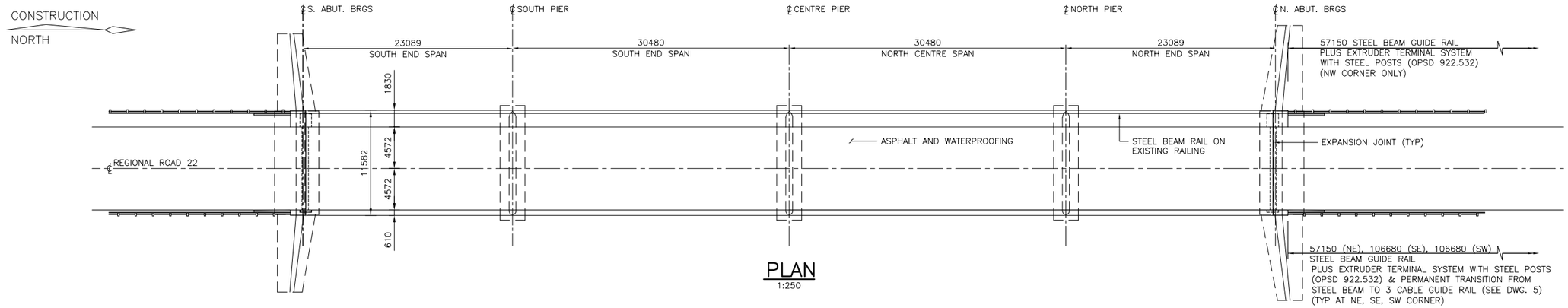
Photograph 109 – Northeast concrete end wall – Note disintegrated concrete with exposed reinforcing steel

Photograph 110 – Northeast concrete end wall – Note disintegrated concrete

Photograph 111 – West Railing Post, typical SBGR to railing connection

APPENDIX

B GENERAL ARRANGEMENT DRAWING



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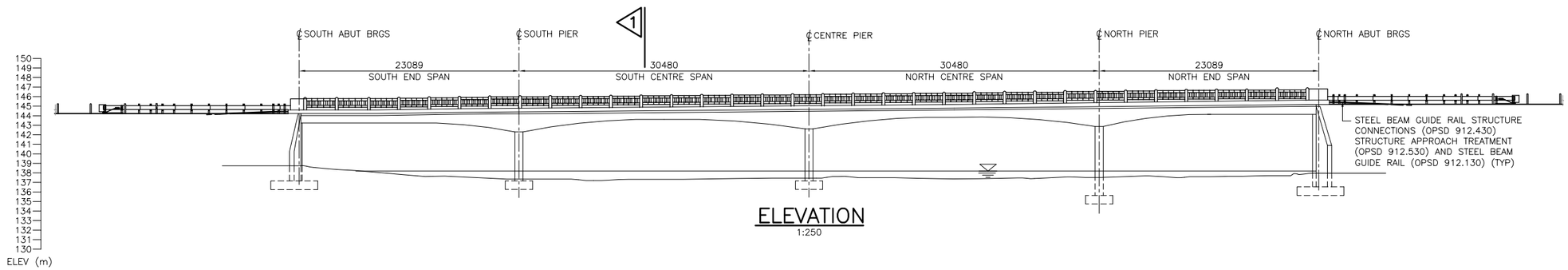

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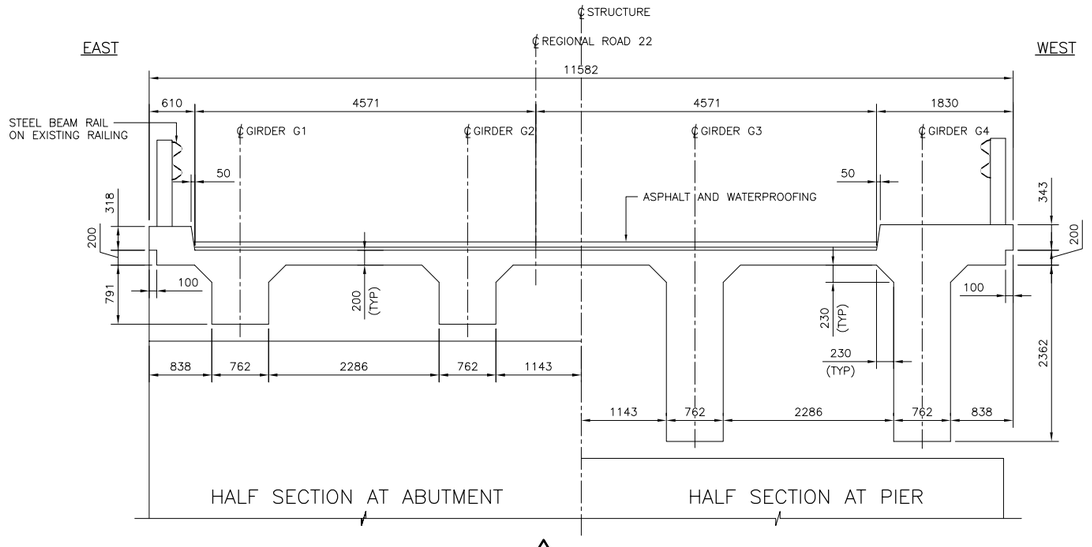

1 SECTION
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Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

GENERAL ARRANGEMENT

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DPV	KY		1
SCALE: AS SHOWN	DATE: June/2018	FILE No.	SHEET ____ OF ____

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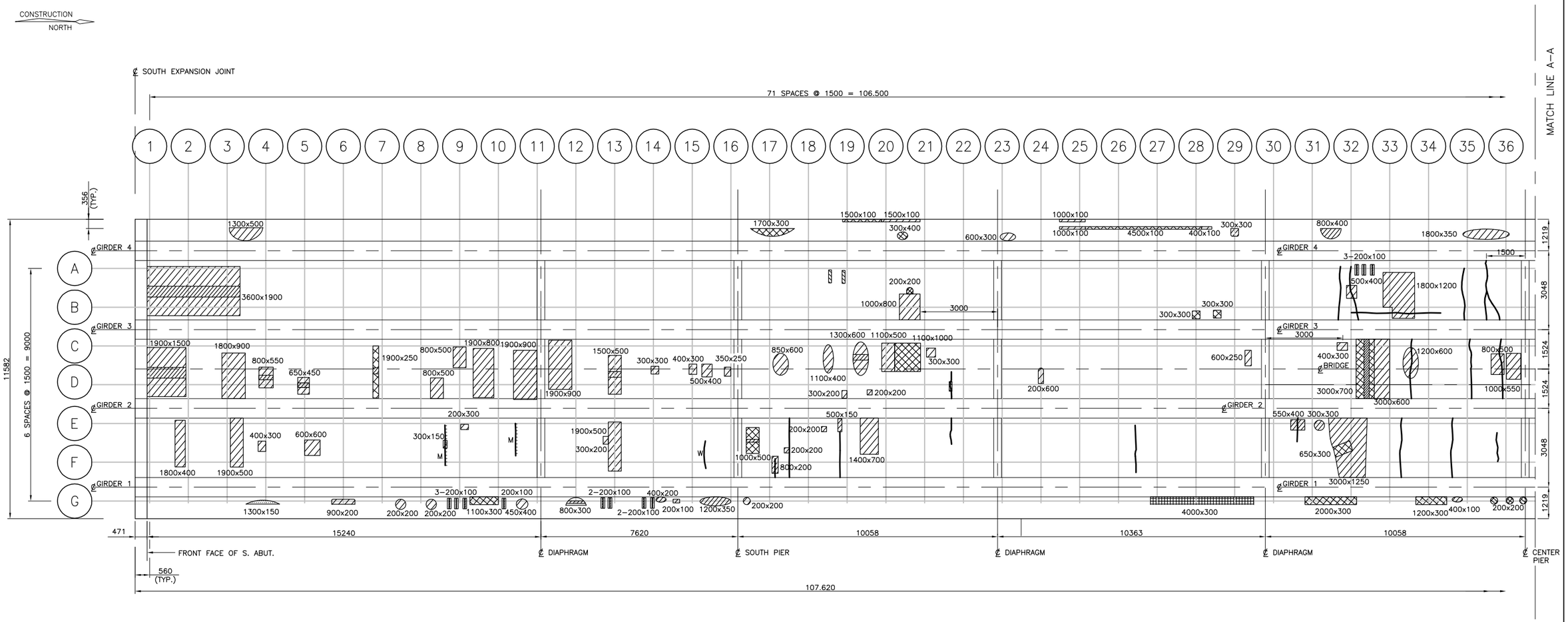
MODIFIED: 6/21/2018 2:29:46 PM BY: VILLASENORD
DATE PLOTTED: 6/21/2018 3:28:40 PM BY: VILLASENOR, DANILO

RWM-20048-mmA.dwg JUL 2004

APPENDIX

C BRIDGE CONDITION SKETCHES



NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

LEGEND:

CRACKING:

- NARROW CRACK (GOOD)
- M MEDIUM CRACK (FAIR)
- W WIDE CRACK (POOR)
- STAINED CRACKS (POOR)

SCALING:

- LIGHT SCALING (GOOD)
- MEDIUM SCALING (FAIR)
- SEVERE SCALING (POOR)
- VERY SEVERE SCALING (POOR)

DELAMINATION AND SPALLS:

- DELAMINATIONS (POOR)
- SPALLS (POOR)

CORROSION OF REBAR:

- EXPOSED REINFORCING STEEL (POOR)
- SURFACE RUST STAIN (FAIR)

OTHER DEFECTS:

- PATCHED SPALLS (GOOD)
- MEDIUM HONEYCOMBED AREAS (FAIR)

SUMMARY OF DECK SOFFIT DETERIORATION

DEFECT	UNITS	SOUTH END SPAN	SOUTH CENTRE SPAN
MEDIUM/WIDE CRACKING	m	4.5	0.0
DELAMINATION	m^2	21.30	16.68
SPALLING	m^2	3.66	6.34
EXPOSED/CORRODED REINFORCEMENT	m^2	0.12	0.10
OTHER DEFECTS	m^2	0.20	1.20

INSPECTOR JS & MH

DATE APRIL 24 & 25, 2018

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Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOFFIT PLAN SURFACE DETERIORATION I

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
JS	JS		1
SCALE: AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ___ OF ___

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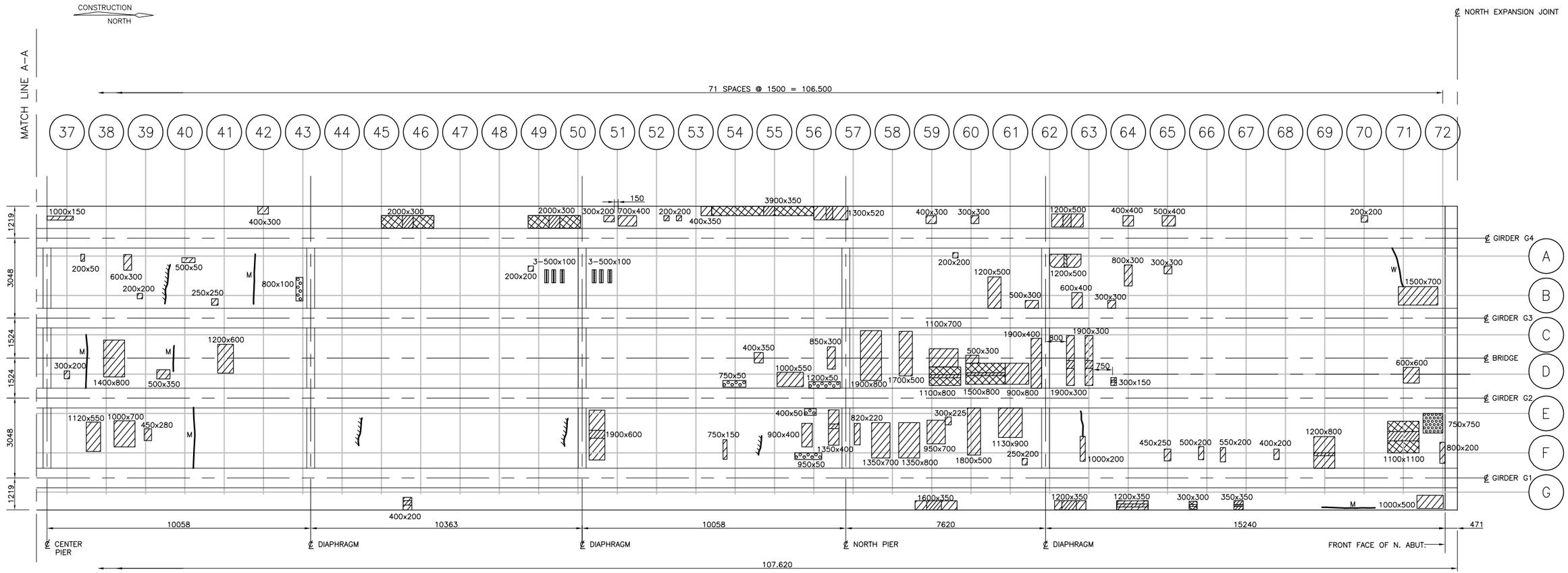

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

SUMMARY OF DECK SOFFIT DETERIORATION

DEFECT	UNITS	NORTH CENTRE SPAN	SOUTH CENTRE SPAN
MEDIUM/WIDE CRACKING	m	7.6	4.8
DELAMINATION	m^2	8.58	19.34
SPALLING	m^2	2.57	3.38
EXPOSED/CORRODED REINFORCEMENT	m^2	0.30	0.00
OTHER DEFECTS	m^2	0.25	0.56

INSPECTOR JS & MH

DATE APRIL 24, 2018

KEY PLAN

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wsp

No.	ISSUE/REVISION	BY	DATE

CONTROLLING B.M.

FIELD BOOK No.

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CADD FILE:

Region of Waterloo

SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
CONDITION SURVEY

SOFFIT PLAN
SURFACE DETERIORATION II

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JS		2
SCALE: AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ___ OF ___

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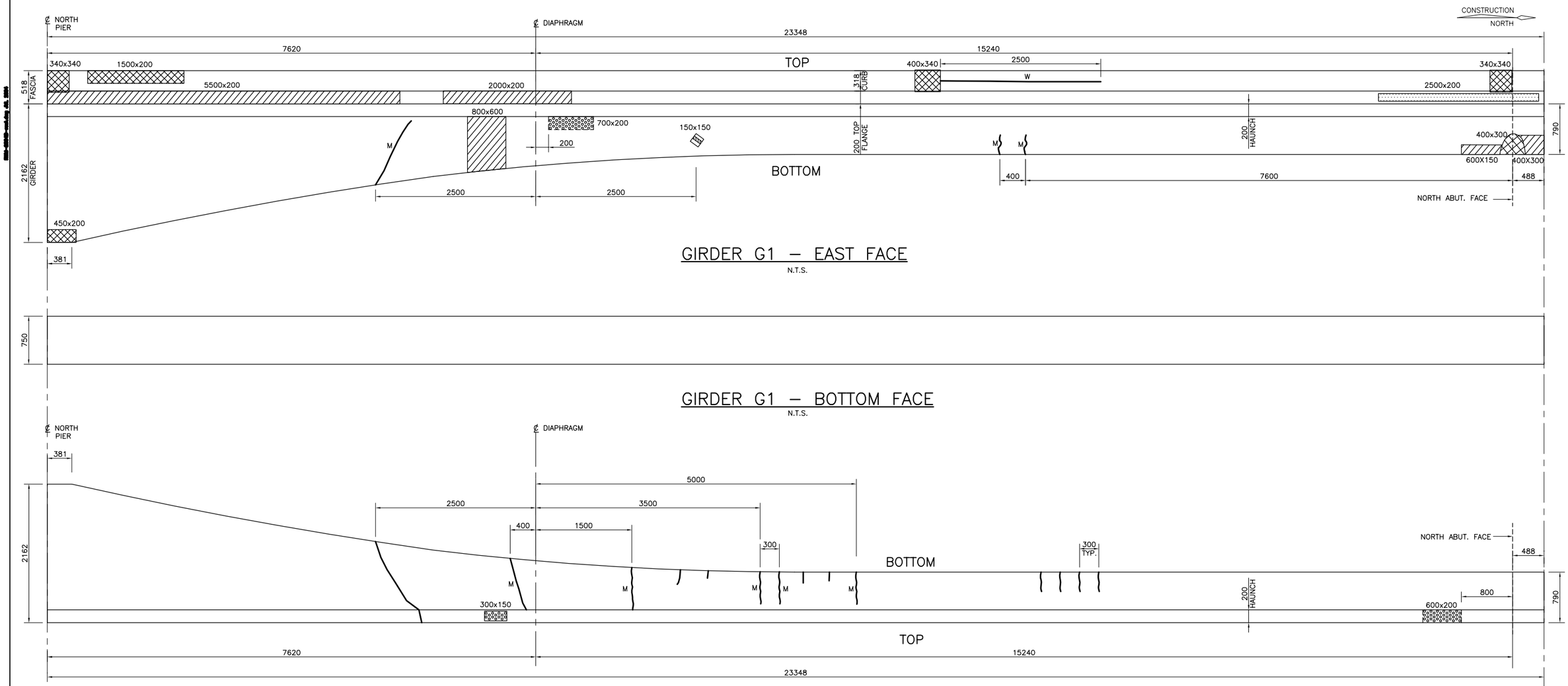

GIRDER G1 – EAST FACE

N.T.S.

GIRDER G1 – BOTTOM FACE

N.T.S.

GIRDER G1 – WEST FACE

N.T.S.

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

SUMMARY OF DETERIORATION

DEFECT	UNITS	GIRDER	FASCIA
MEDIUM/WIDE CRACKING	m	4.8	2.5
DELAMINATION	m^2	0.57	1.5
SPALLING	m^2	0.21	0.7
EXPOSED/CORRODED REINFORCEMENT	m^2	0.02	0.0
OTHER DEFECTS	m^2	0.31	0.5

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

INSPECTOR JS & MH

DATE APRIL 24, 2018

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CADD FILE: [illegible]

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH END SPAN GIRDER 1

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JS		3
SCALE: AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ____ OF ____

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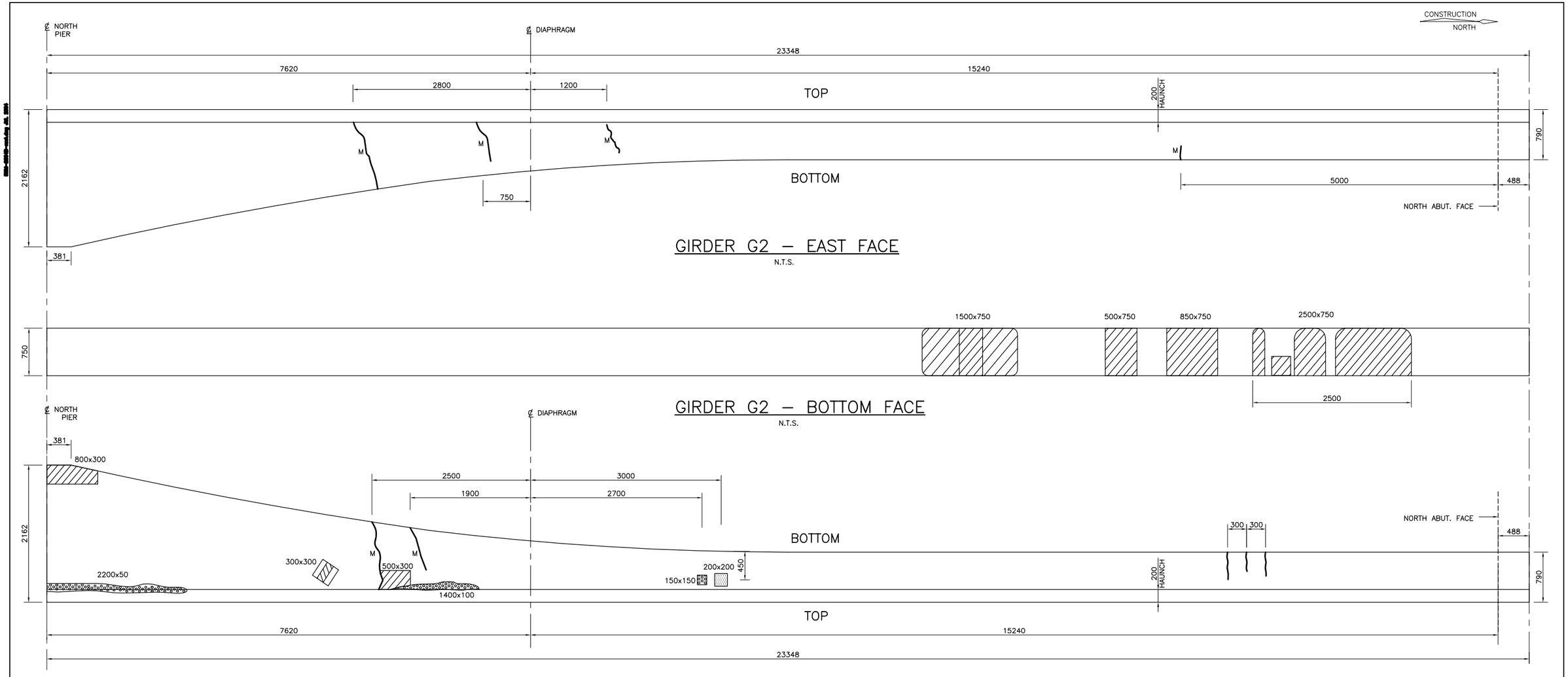

GIRDER G2 – EAST FACE

N.T.S.

GIRDER G2 – BOTTOM FACE

N.T.S.

GIRDER G2 – WEST FACE

N.T.S.

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

LEGEND:

CRACKING:

- NARROW CRACK (GOOD)
- M MEDIUM CRACK (FAIR)
- W WIDE CRACK (POOR)
- STAINED CRACKS (POOR)

SCALING:

- LIGHT SCALING (GOOD)
- MEDIUM SCALING (FAIR)
- SEVERE SCALING (POOR)
- VERY SEVERE SCALING (POOR)

DELAMINATION AND SPALLS:

- DELAMINATIONS (POOR)
- SPALLS (POOR)

CORROSION OF REBAR:

- EXPOSED REINFORCING STEEL (POOR)
- SURFACE RUST STAIN (FAIR)

OTHER DEFECTS:

- PATCHED SPALLS (GOOD)
- MEDIUM HONEYCOMBED AREAS (FAIR)

SUMMARY OF DETERIORATION

DEFECT	UNITS	
MEDIUM/WIDE CRACKING	m	4.10
DELAMINATION	m^2	4.40
SPALLING	m^2	0.00
EXPOSED/CORRODED REINFORCEMENT	m^2	0.09
OTHER DEFECTS	m^2	0.31

INSPECTOR JS & MH

DATE APRIL 24, 2018

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CADD FILE: [illegible]

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH END SPAN GIRDER 2

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JS		4
SCALE AS NOTED	DATE: JUNE/2018	FILE No.	SHEET OF

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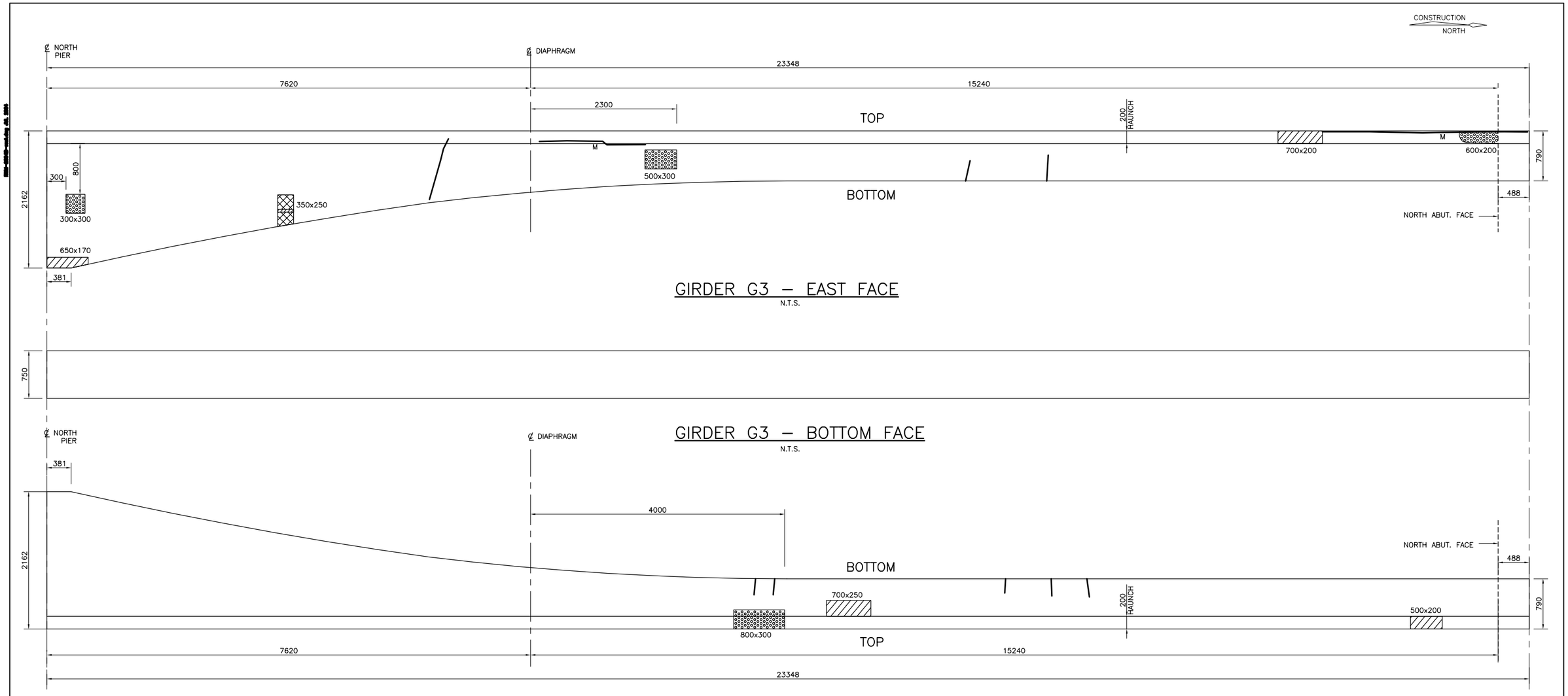

GIRDER G3 – EAST FACE
N.T.S.

GIRDER G3 – BOTTOM FACE
N.T.S.

GIRDER G3 – WEST FACE
N.T.S.

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

SUMMARY OF DETERIORATION

DEFECT	UNITS	
MEDIUM/WIDE CRACKING	m	4.90
DELAMINATION	m^2	0.39
SPALLING	m^2	0.00
EXPOSED/CORRODED REINFORCEMENT	m^2	0.00
OTHER DEFECTS	m^2	0.51

NOTE:
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INSPECTOR JS & MH

DATE APRIL 24, 2018

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wsp

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CADD FILE:
GRID-FILE

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH END SPAN GIRDER 3

DRAWN BY: CA	CHECKED BY: JS	CONTRACT No.	DRAWING No. 5
SCALE AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ____ OF ____

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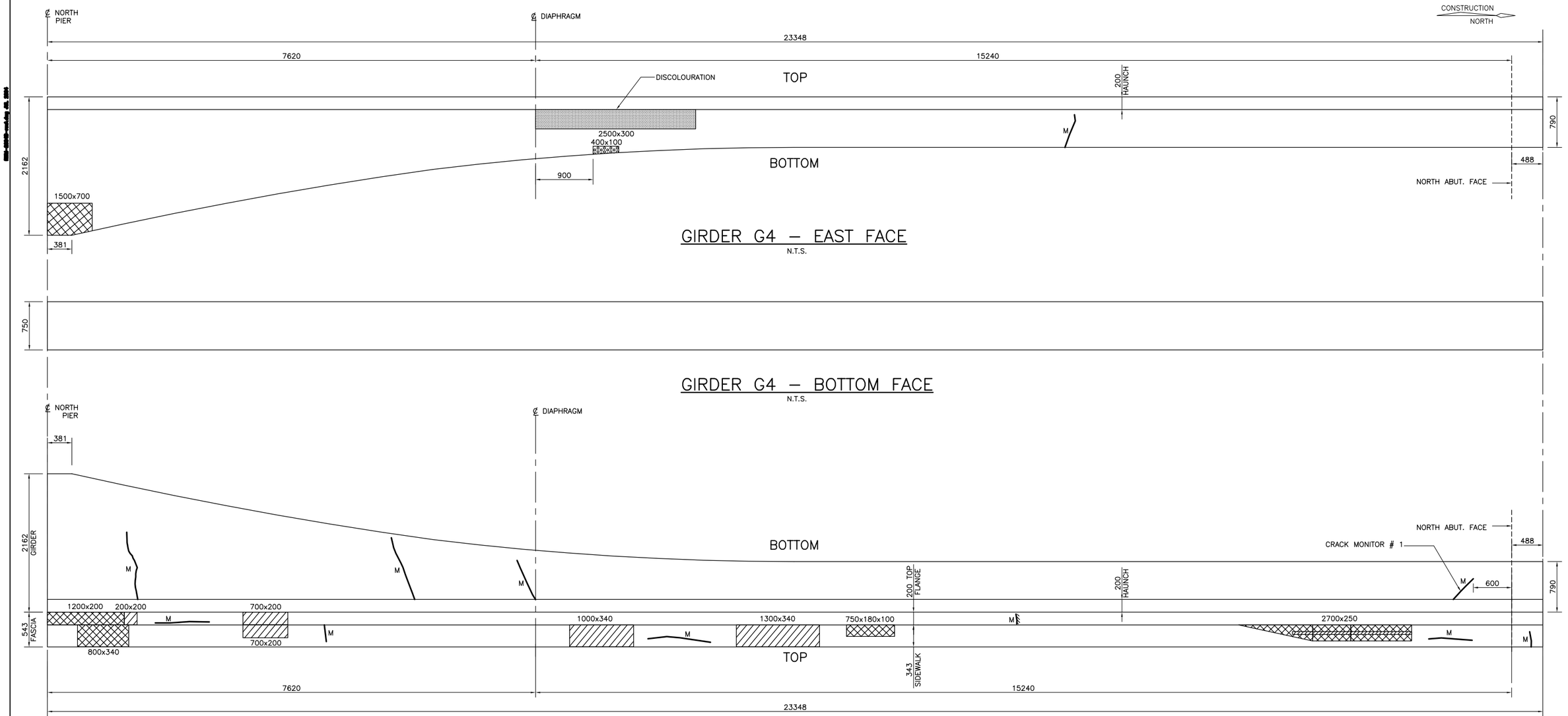

GIRDER G4 – EAST FACE

N.T.S.

GIRDER G4 – BOTTOM FACE

N.T.S.

GIRDER G4 – WEST FACE

N.T.S.

LEGEND:

CRACKING:

- NARROW CRACK (GOOD)
- M MEDIUM CRACK (FAIR)
- W WIDE CRACK (POOR)
- STAINED CRACKS (POOR)

SCALING:

- LIGHT SCALING (GOOD)
- MEDIUM SCALING (FAIR)
- SEVERE SCALING (POOR)
- VERY SEVERE SCALING (POOR)

DELAMINATION AND SPALLS:

- DELAMINATIONS (POOR)
- SPALLS (POOR)

CORROSION OF REBAR:

- EXPOSED REINFORCING STEEL (POOR)
- SURFACE RUST STAIN (FAIR)

OTHER DEFECTS:

- PATCHED SPALLS (GOOD)
- MEDIUM HONEYCOMBED AREAS (FAIR)

SUMMARY OF DETERIORATION

DEFECT	UNITS	GIRDER	FASCIA
MEDIUM/WIDE CRACKING	m	3.70	3.10
DELAMINATION	m^2	0.00	1.10
SPALLING	m^2	1.05	1.32
EXPOSED/CORRODED REINFORCEMENT	m^2	0.00	0.00
OTHER DEFECTS	m^2	0.79	0.00

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

INSPECTOR JS & MH

DATE APRIL 24, 2018

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wsp

No.	ISSUE/REVISION	BY	DATE

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CADD FILE: [illegible]

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH END SPAN GIRDER 4

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JS		6
SCALE: AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ___ OF ___

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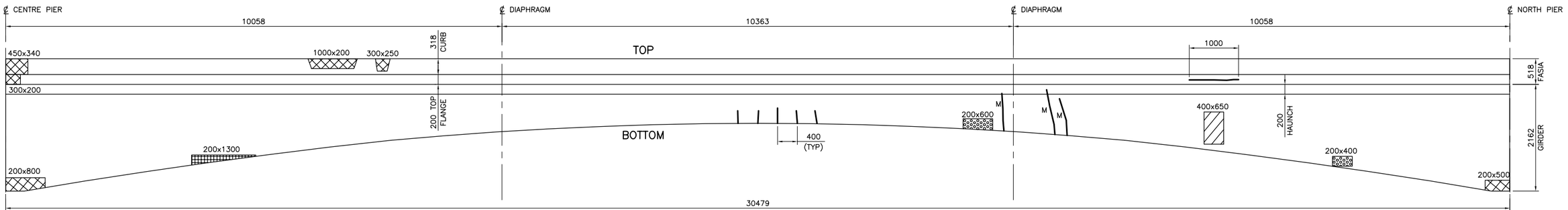
CONSTRUCTION NORTH

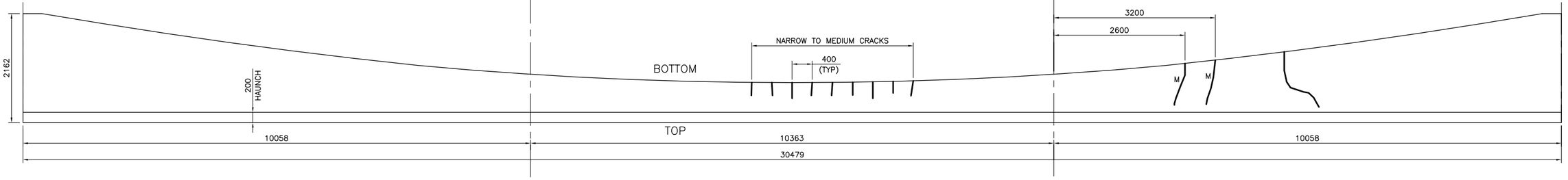


GIRDER 1–EAST FACE

N.T.S.

GIRDER 1–BOTTOM FACE

N.T.S.



GIRDER 1–WEST FACE

N.T.S.

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

SUMMARY OF DETERIORATION

DEFECT	UNITS	GIRDER	FASCIA
MEDIUM/WIDE CRACKING	m	5.5	0.00
DELAMINATION	m^2	0.78	0.00
SPALLING	m^2	0.42	0.49
EXPOSED/CORRODED REINFORCEMENT	m^2	0.06	0.00
OTHER DEFECTS	m^2	0.46	0.00

NOTE:
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INSPECTOR JS & MH

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CADD FILE: 0300-FILE

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH CENTRE SPAN GIRDER 1

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JS		7
SCALE: AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ____ OF ____

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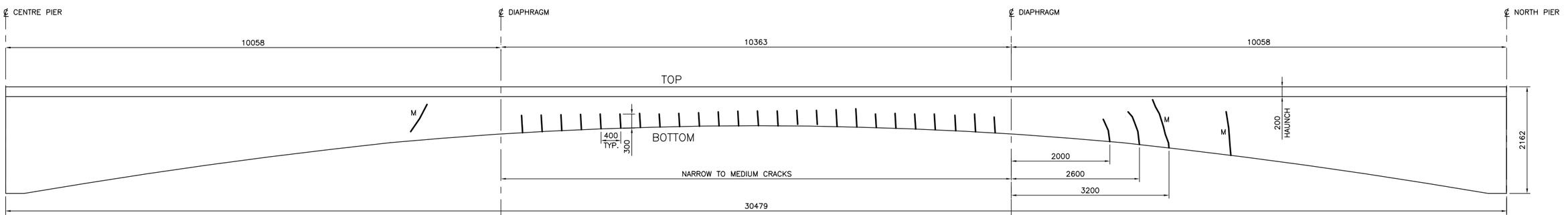
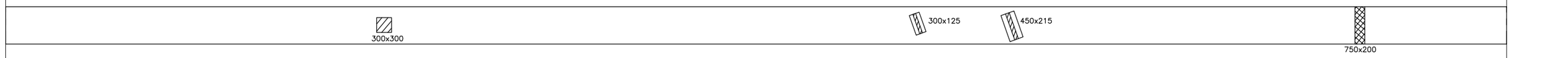
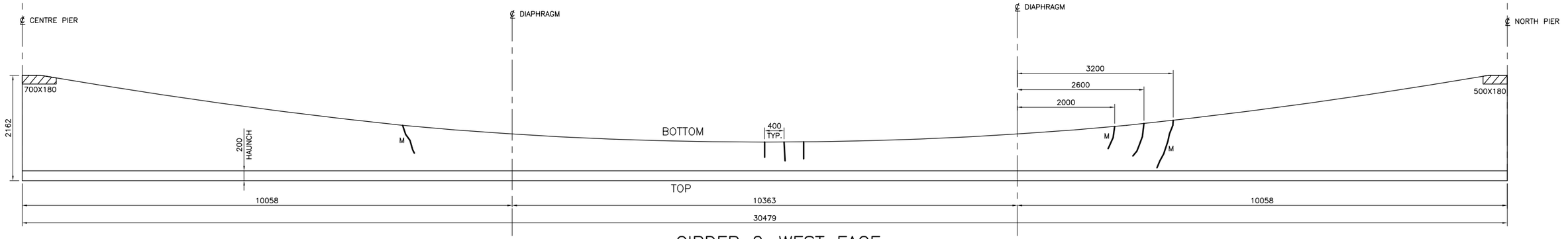
CONSTRUCTION
NORTH



GIRDER 2–EAST FACE
N.T.S.



GIRDER 2–BOTTOM FACE
N.T.S.



GIRDER 2–WEST FACE
N.T.S.

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

SUMMARY OF DETERIORATION

DEFECT	UNITS	
MEDIUM/WIDE CRACKING	m	7.80
DELAMINATION	m^2	0.31
SPALLING	m^2	0.15
EXPOSED/CORRODED REINFORCEMENT	m^2	0.04
OTHER DEFECTS	m^2	0.00

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

INSPECTOR JS & MH

DATE APRIL 24, 2018

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CADD FILE:
cadd-file

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH CENTRE SPAN GIRDER 2

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JS		8
SCALE: AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ____ OF ____

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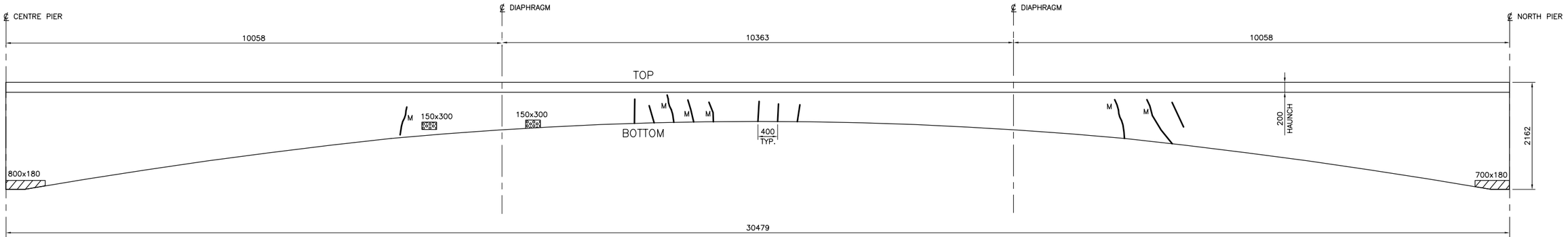
DATE PLOTTED: 6/20/2018 12:55:23 PM BY: AHAQ, CLAIR

CONSTRUCTION
NORTH

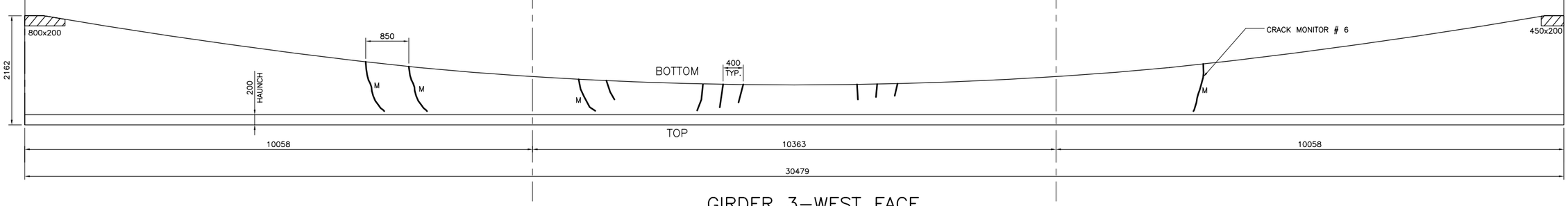


GIRDER 3–EAST FACE

N.T.S.

GIRDER 3–BOTTOM FACE

N.T.S.



GIRDER 3–WEST FACE

N.T.S.

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

SUMMARY OF DETERIORATION

DEFECT	UNITS	
MEDIUM/WIDE CRACKING	m	7.50
DELAMINATION	m^2	0.52
SPALLING	m^2	0.00
EXPOSED/CORRODED REINFORCEMENT	m^2	0.10
OTHER DEFECTS	m^2	0.09

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

INSPECTOR JS & MH

DATE APRIL 24, 2018

KEY PLAN

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wsp

No.	ISSUE/REVISION	BY	DATE

CONTROLLING B.M.

FIELD BOOK No.

DISCLAIMER:
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CADD FILE: [redacted]

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH CENTRE SPAN GIRDER 3

DRAWN BY: CA	CHECKED BY: JS	CONTRACT No.	DRAWING No. 9
SCALE AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ___ OF ___

CAD FILE LOCATION AND NAME: S:\2018\18M-00475-00\CONDITION SURVEY\S7474-300-009CS.dwg
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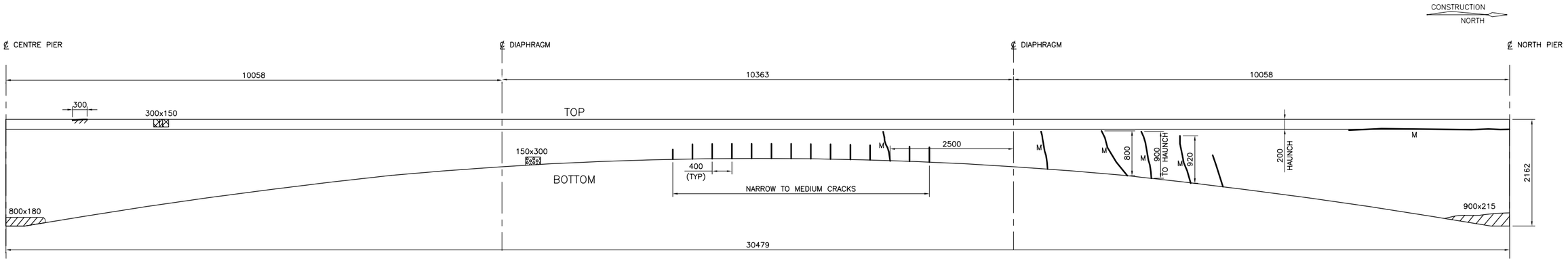

GIRDER 4–EAST FACE

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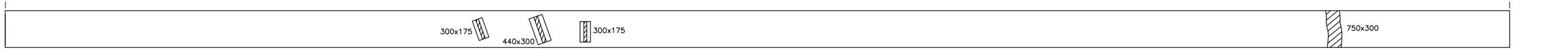
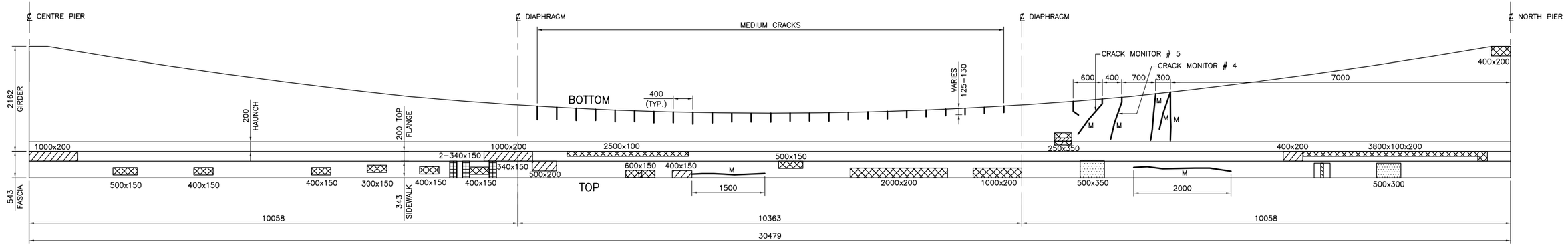


GIRDER 4–BOTTOM FACE

N.T.S.



GIRDER 4–WEST FACE

N.T.S.

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

SUMMARY OF DETERIORATION

DEFECT	UNITS	GIRDER	FASCIA
MEDIUM/WIDE CRACKING	m	17.2	3.50
DELAMINATION	m^2	0.56	0.44
SPALLING	m^2	0.13	1.96
EXPOSED/CORRODED REINFORCEMENT	m^2	0.25	0.00
OTHER DEFECTS	m^2	0.00	0.48

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

INSPECTOR JS & MH

DATE APRIL 24, 2018

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CADD FILE:
GIRD-FILE

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH CENTRE SPAN GIRDER 4

DRAWN BY: CA	CHECKED BY: JS	CONTRACT No.	DRAWING No. 10
SCALE AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ____ OF ____

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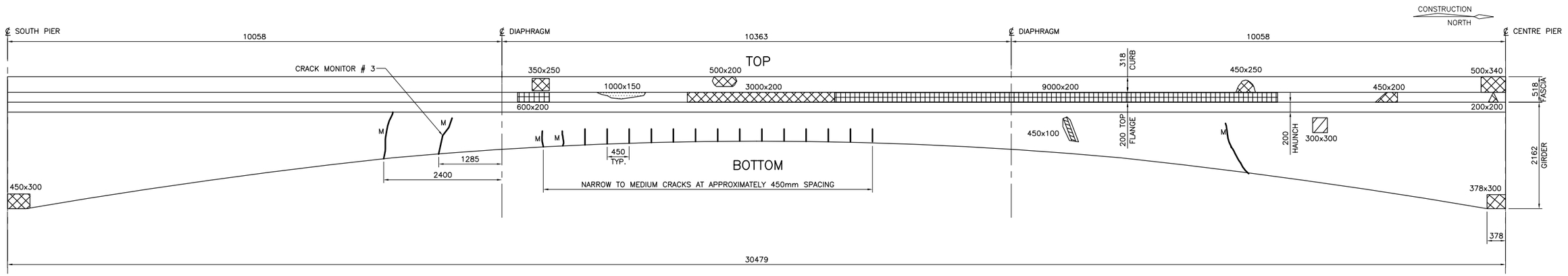
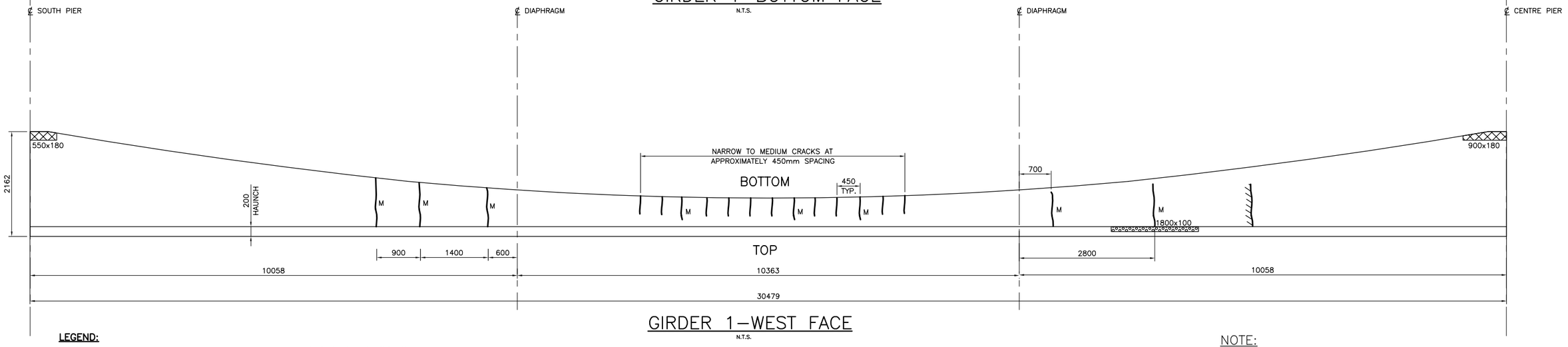


GIRDER 1–EAST FACE

N.T.S.

GIRDER 1–BOTTOM FACE

N.T.S.



GIRDER 1–WEST FACE

N.T.S.

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

SUMMARY OF DETERIORATION

DEFECT	UNITS	GIRDER	FASCIA
MEDIUM/WIDE CRACKING	m	9.1	0.00
DELAMINATION	m^2	0.34	0.00
SPALLING	m^2	0.51	1.20
EXPOSED/CORRODED REINFORCEMENT	m^2	0.22	0.00
OTHER DEFECTS	m^2	0.18	2.07

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

INSPECTOR JS & MH

DATE APRIL 25, 2018

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Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOUTH CENTRE SPAN GIRDER 1

DRAWN BY: CA	CHECKED BY: JS	CONTRACT No.	DRAWING No. 11
SCALE AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ____ OF ____

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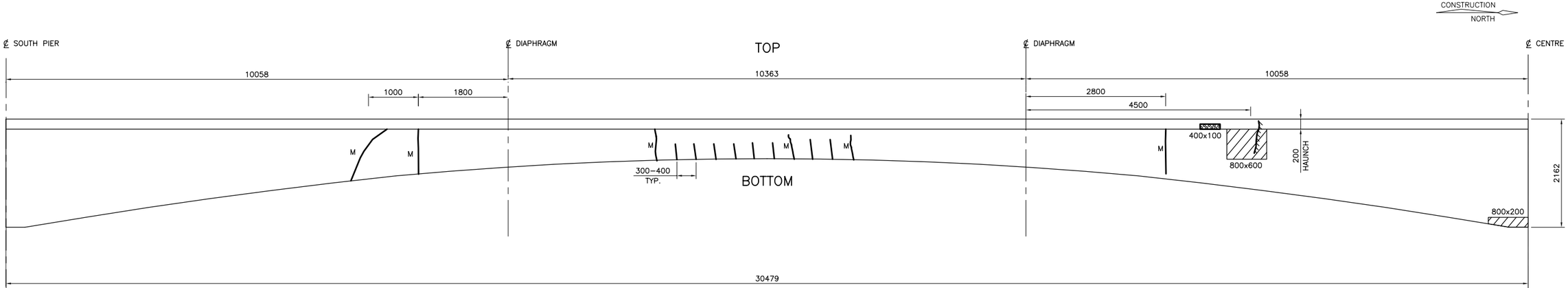
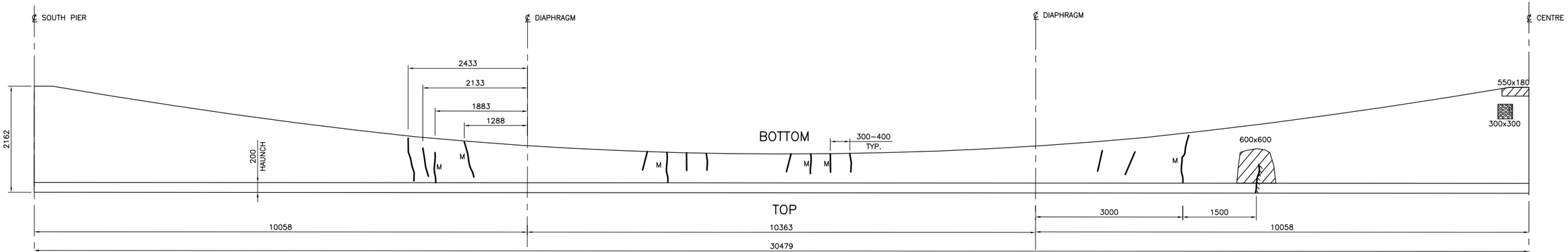


GIRDER 2–EAST FACE

N.T.S.

GIRDER 2–BOTTOM FACE

N.T.S.



GIRDER 2–WEST FACE

N.T.S.

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

SUMMARY OF DETERIORATION

DEFECT	UNITS	
MEDIUM/WIDE CRACKING	m	8.5
DELAMINATION	m^2	1.57
SPALLING	m^2	0.00
EXPOSED/CORRODED REINFORCEMENT	m^2	0.00
OTHER DEFECTS	m^2	0.51

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

INSPECTOR JS & MH

DATE APRIL 25, 2018

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CADD FILE:
GIRDER-FACE

Region of Waterloo

SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
CONDITION SURVEY

SOUTH CENTRE SPAN
GIRDER 2

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JS		12
SCALE: AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ___ OF ___

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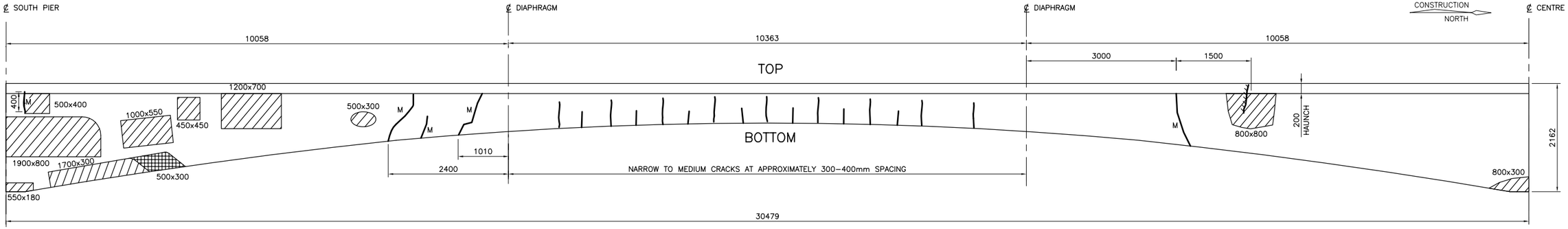
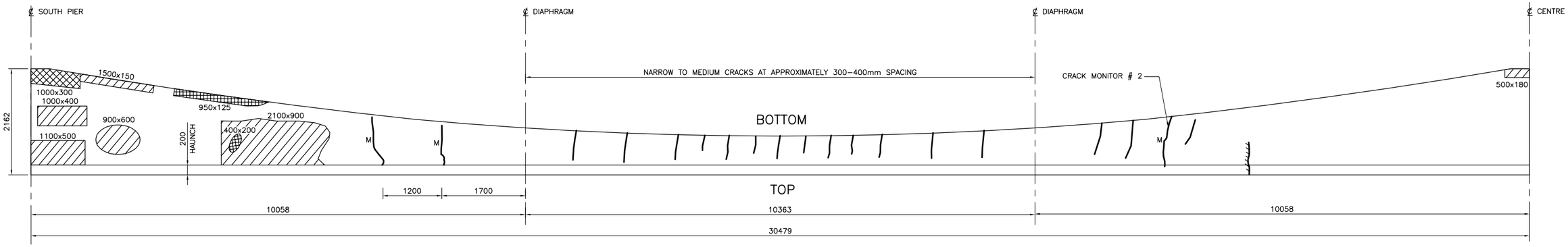


GIRDER 3–EAST FACE

N.T.S.

GIRDER 3–BOTTOM FACE

N.T.S.



GIRDER 3–WEST FACE

N.T.S.

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

SUMMARY OF DETERIORATION

DEFECT	UNITS	
MEDIUM/WIDE CRACKING	m	12.9
DELAMINATION	m^2	8.78
SPALLING	m^2	0.61
EXPOSED/CORRODED REINFORCEMENT	m^2	0.07
OTHER DEFECTS	m^2	1.00

NOTE:
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INSPECTOR JS & MH

DATE APRIL 25, 2018

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CADD FILE:

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOUTH CENTRE SPAN GIRDER 3

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JS		13
SCALE: AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ____ OF ____

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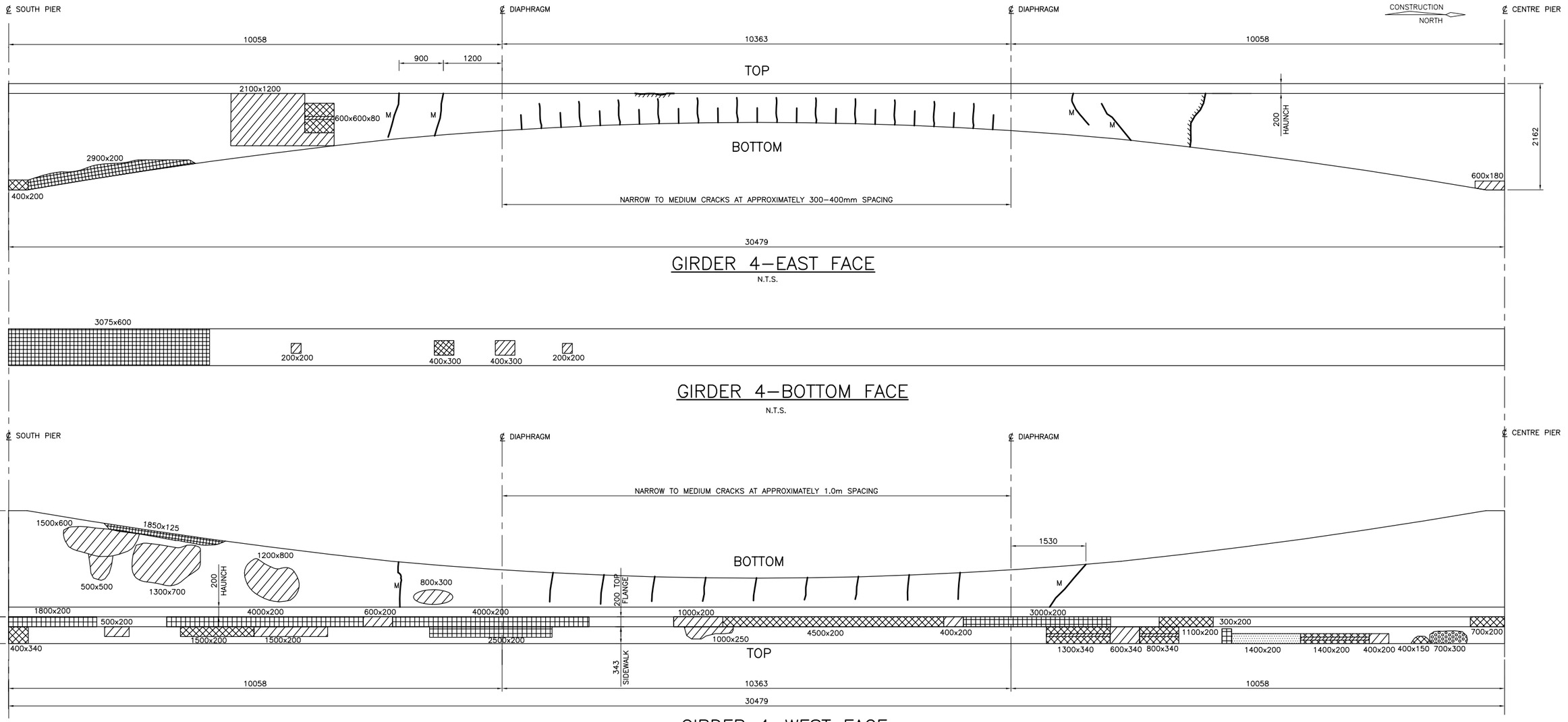

GIRDER 4–EAST FACE

N.T.S.

GIRDER 4–BOTTOM FACE

N.T.S.

GIRDER 4–WEST FACE

N.T.S.

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

SUMMARY OF DETERIORATION

DEFECT	UNITS	GIRDER	FASCIA
MEDIUM/WIDE CRACKING	m	11.3	0.00
DELAMINATION	m^2	6.09	1.33
SPALLING	m^2	0.56	2.75
EXPOSED/CORRODED REINFORCEMENT	m^2	0.00	0.00
OTHER DEFECTS	m^2	2.66	3.61

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

INSPECTOR JS & MH

DATE APRIL 25, 2018

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CADD FILE:
GIRD-FILE

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOUTH CENTRE SPAN GIRDER 4

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JS		14
SCALE: AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ____ OF ____

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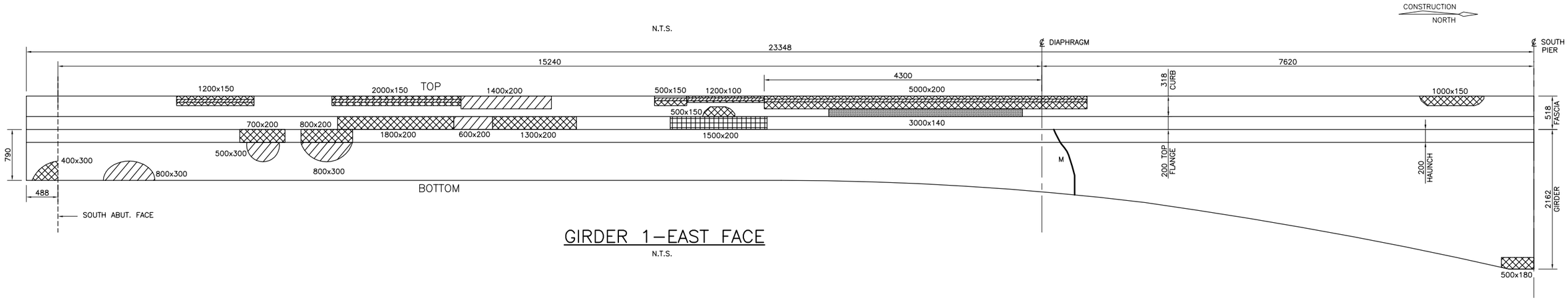
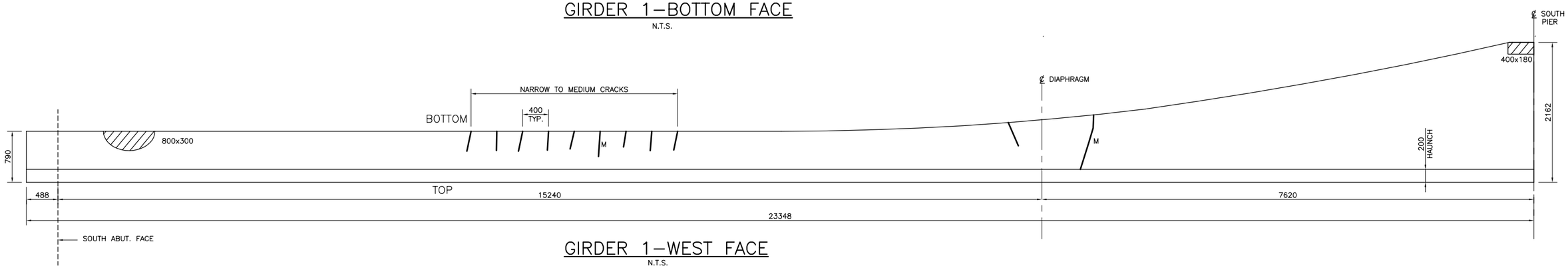


GIRDER 1—EAST FACE

N.T.S.

GIRDER 1—BOTTOM FACE

N.T.S.



GIRDER 1—WEST FACE

N.T.S.

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

SUMMARY OF DETERIORATION

DEFECT	UNITS	GIRDER	FASCIA
MEDIUM/WIDE CRACKING	m	2.40	0.00
DELAMINATION	m^2	1.84	0.40
SPALLING	m^2	0.55	2.52
EXPOSED/CORRODED REINFORCEMENT	m^2	0.30	0.00
OTHER DEFECTS	m^2	0.00	0.72

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

INSPECTOR JS & MH

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CADD FILE:

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOUTH END SPAN GIRDER 1

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JS		15
SCALE AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ____ OF ____

CAD FILE LOCATION AND NAME: S:\2018\18M-00475-00\CONDITION SURVEY\S7474-300-015CS.dwg
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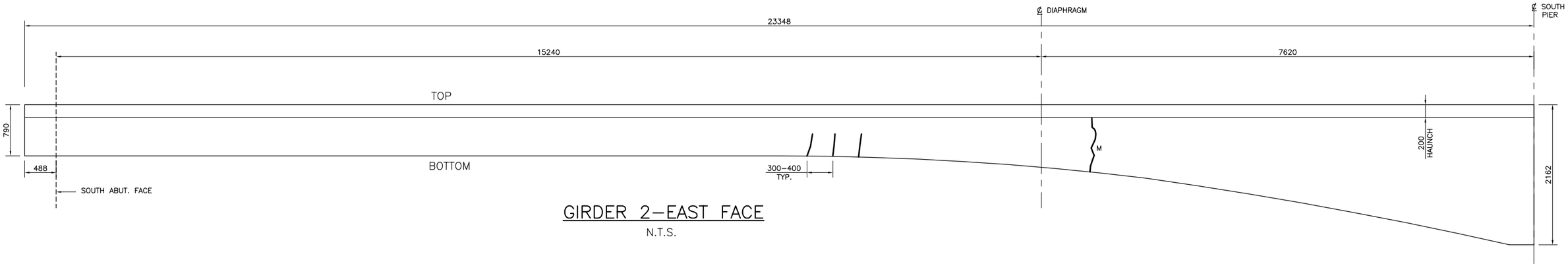
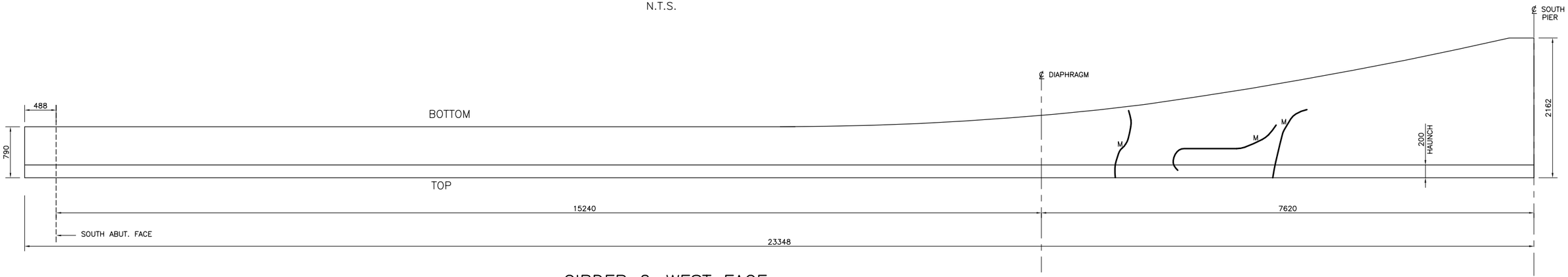


GIRDER 2–EAST FACE

N.T.S.

GIRDER 2–BOTTOM FACE

N.T.S.



GIRDER 2–WEST FACE

N.T.S.

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

SUMMARY OF DETERIORATION

DEFECT	UNITS	
MEDIUM/WIDE CRACKING	m	4.80
DELAMINATION	m^2	0.14
SPALLING	m^2	0.36
EXPOSED/CORRODED REINFORCEMENT	m^2	0.25
OTHER DEFECTS	m^2	0.20

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

INSPECTOR JS & MH

DATE APRIL 25, 2018

KEY PLAN

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wsp

No.	ISSUE/REVISION	BY	DATE

CONTROLLING B.M.

FIELD BOOK No.

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CADD FILE:

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOUTH END SPAN GIRDER 2

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JS		16
SCALE: AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ___ OF ___

CAD FILE LOCATION AND NAME: S:\2018\18M-00475-00\CONDITION SURVEY\S7474-300-016GS.dwg
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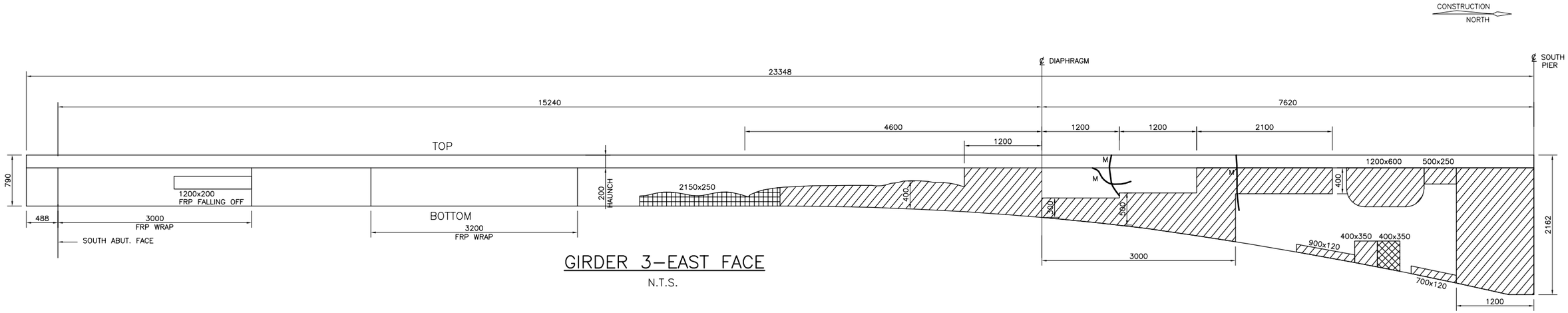
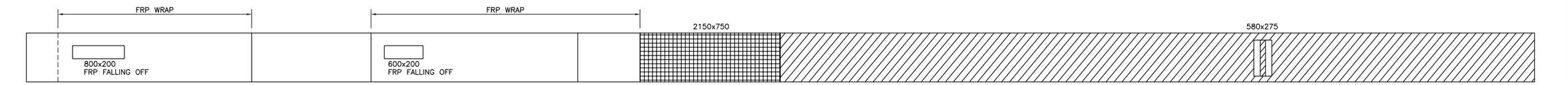
DATE PLOTTED: 6/20/2018 3:36:22 PM BY: AMAD, CLAIR



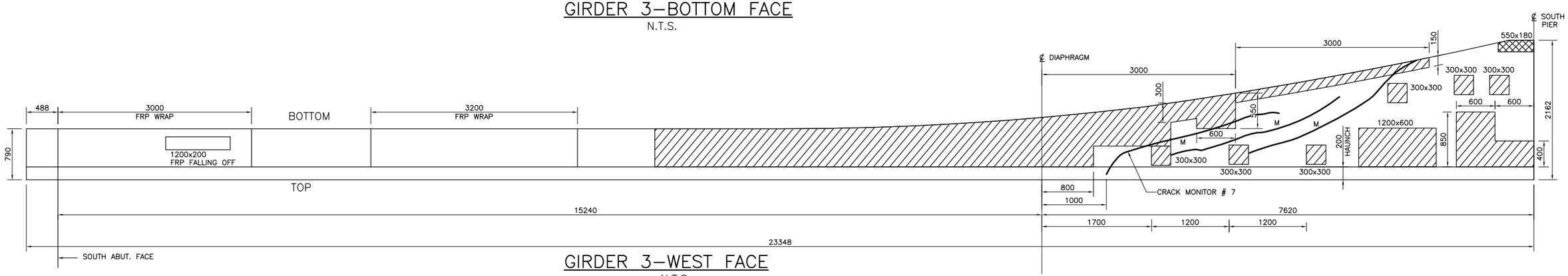
GIRDER 3–EAST FACE

N.T.S.



GIRDER 3–BOTTOM FACE

N.T.S.



GIRDER 3–WEST FACE

N.T.S.

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

SUMMARY OF DETERIORATION

DEFECT	UNITS	
MEDIUM/WIDE CRACKING	m	9.90
DELAMINATION	m^2	23.75
SPALLING	m^2	0.24
EXPOSED/CORRODED REINFORCEMENT	m^2	0.16
OTHER DEFECTS	m^2	2.15

NOTE:
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INSPECTOR JS & MH

DATE APRIL 25, 2018

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No.	ISSUE/REVISION	BY	DATE

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CADD FILE:

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOUTH END SPAN GIRDER 3

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JS		17
SCALE: AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ___ OF ___

CAD FILE LOCATION AND NAME: S:\2018\18M-00475-00\CONDITION SURVEY\S7474-300-017CS.dwg
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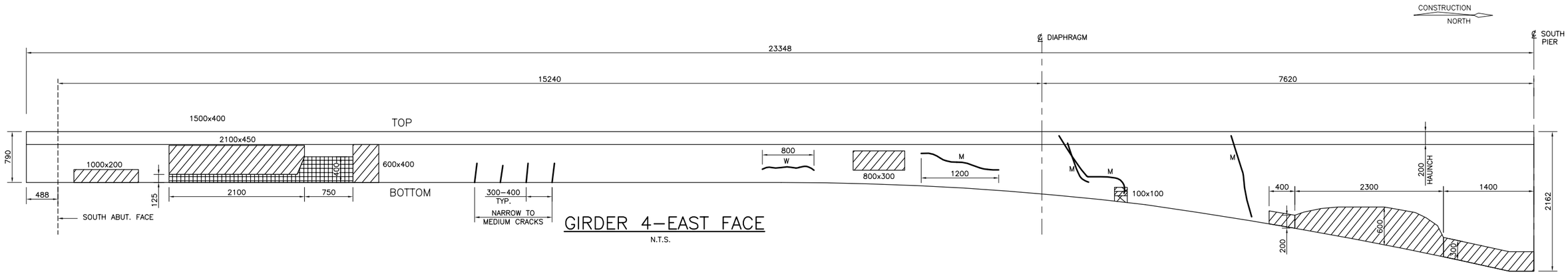
DATE PLOTTED: 6/20/2018 3:48:18 PM BY: AWAD, CLAIR

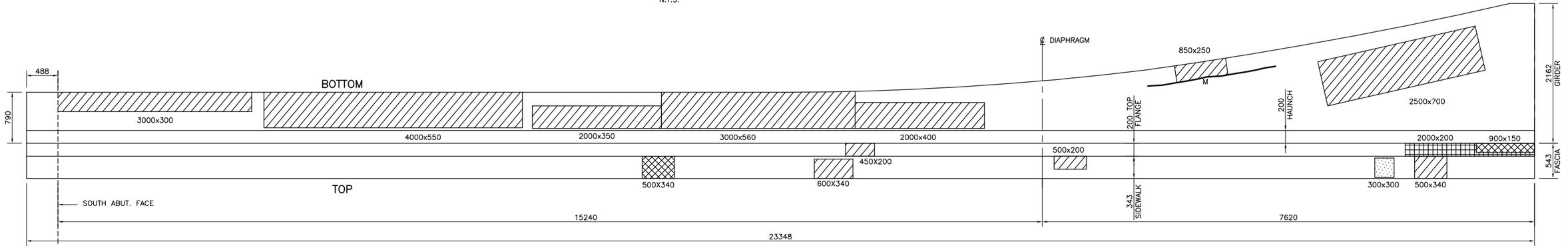


GIRDER 4–EAST FACE

N.T.S.

GIRDER 4–BOTTOM FACE

N.T.S.



GIRDER 4–WEST FACE

N.T.S.

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

SUMMARY OF DETERIORATION

DEFECT	UNITS	GIRDER	FASCIA
MEDIUM/WIDE CRACKING	m	13.7	0.00
DELAMINATION	m^2	14.43	0.55
SPALLING	m^2	0.76	0.34
EXPOSED/CORRODED REINFORCEMENT	m^2	0.00	0.00
OTHER DEFECTS	m^2	2.30	0.36

NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

INSPECTOR JS & MH

DATE APRIL 24 & 25, 2018

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No.	ISSUE/REVISION	BY	DATE

CONTROLLING B.M.

FIELD BOOK No.

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CADD FILE:
GIRD-FILE

Region of Waterloo

SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
CONDITION SURVEY

SOUTH END SPAN
GIRDER 4

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JS		18
SCALE AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ___ OF ___

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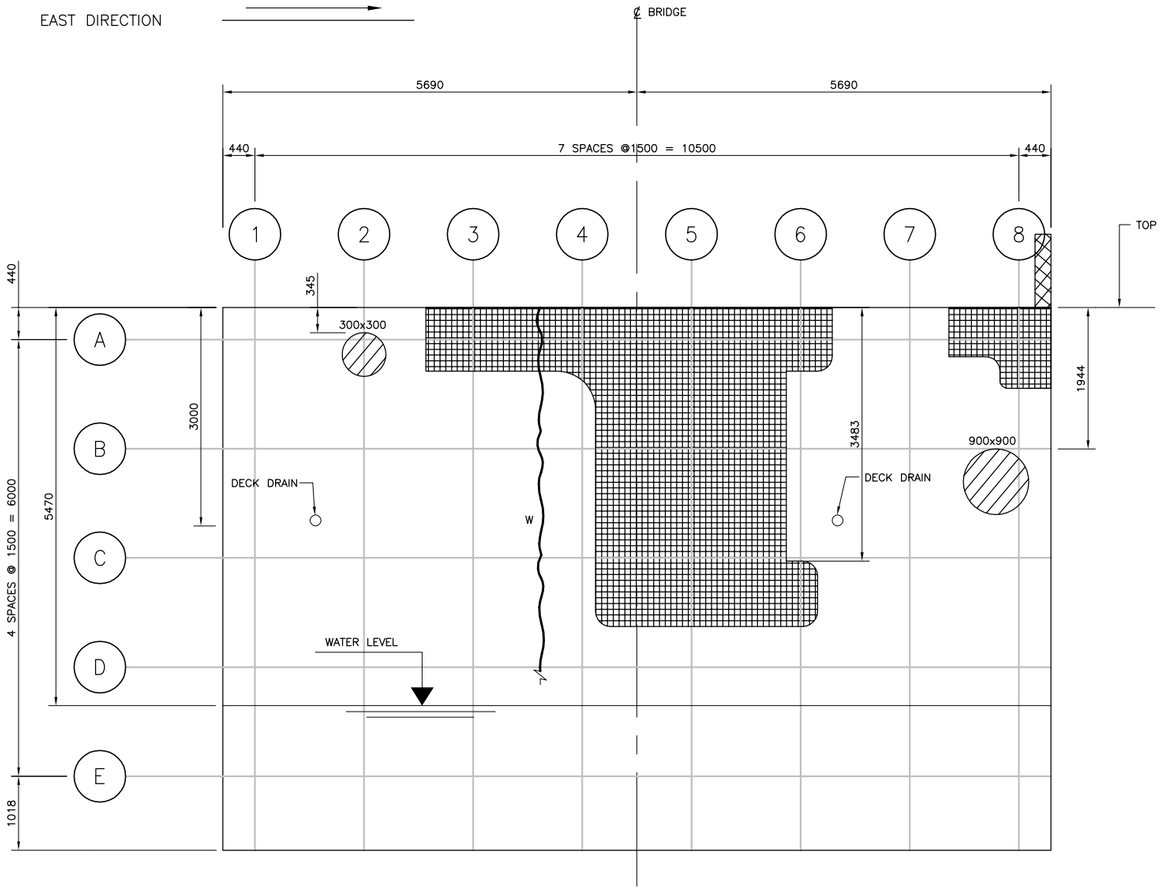
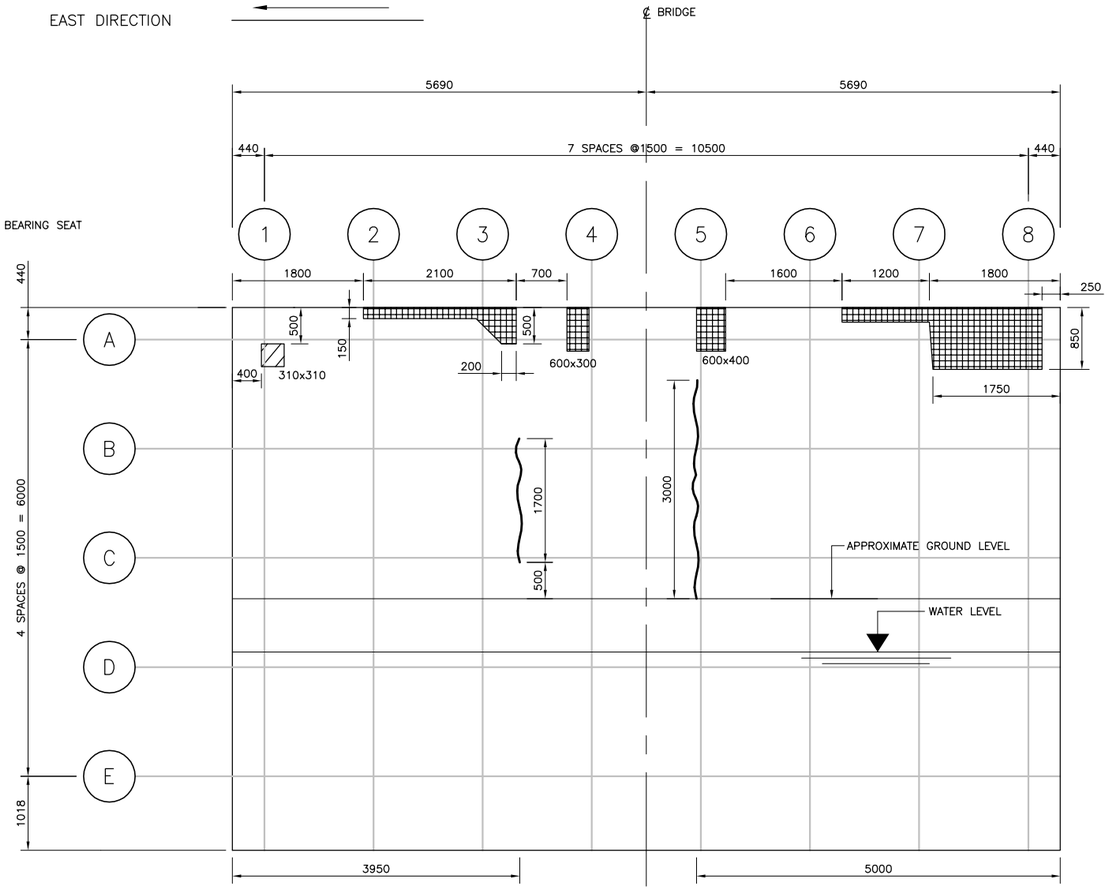
DATE PLOTTED: 6/21/2018 3:44:47 PM BY: WLASENOR, DANILO

ABUTMENT ID — NORTH
FACE — NORTH
EAST DIRECTION →



ABUTMENT ID — SOUTH
FACE — SOUTH
EAST DIRECTION ←



NOTE:
DIMENSIONS ON SURFACE DEFECTS ARE APPROXIMATE ONLY.

INSPECTOR — JS & MH
DATE — APRIL 24 & 25, 2018

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

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wsp

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CADD FILE:
[illegible]

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

ABUTMENTS

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JS		19
SCALE: AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ___ OF ___

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DATE PLOTTED: 6/20/2018 4:47:44 PM BY: AWAD, CLAIR

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FACE — NORTH

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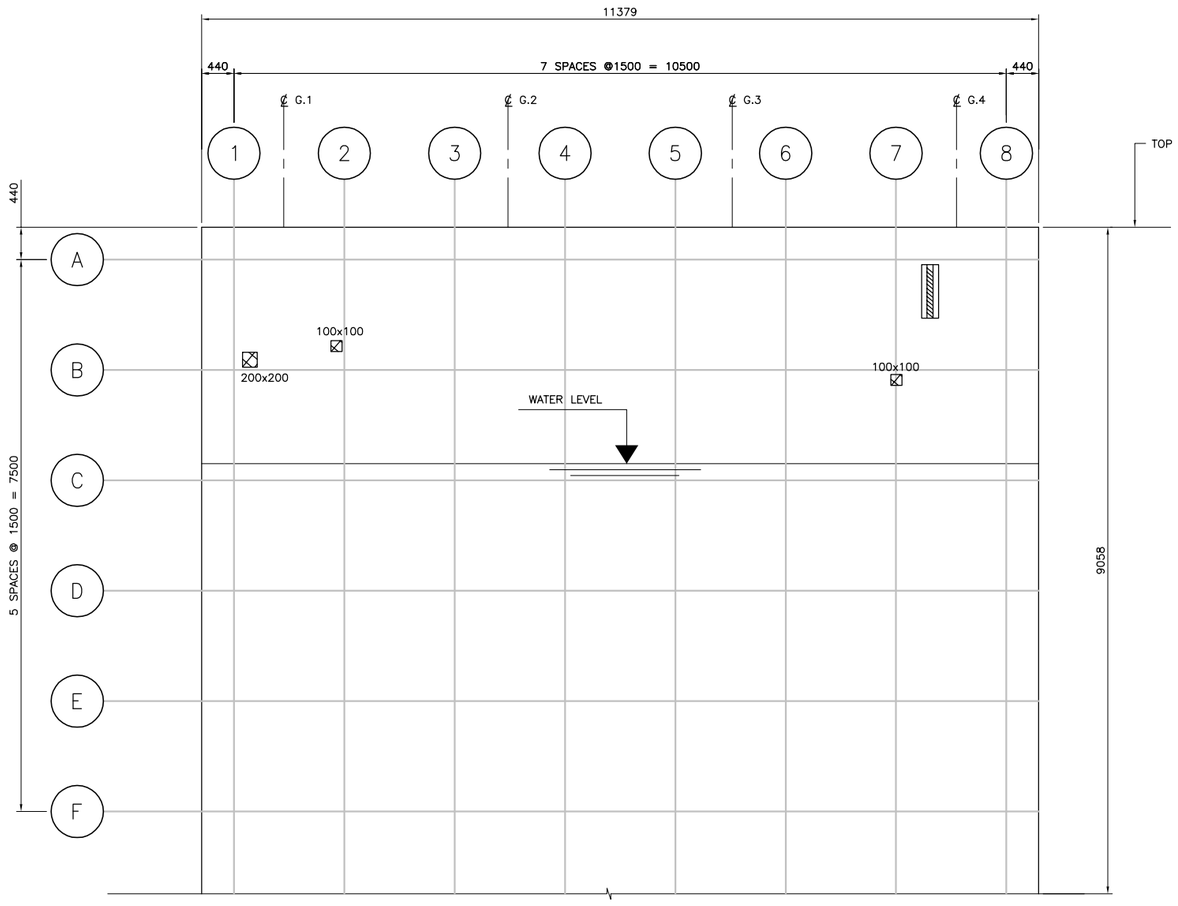
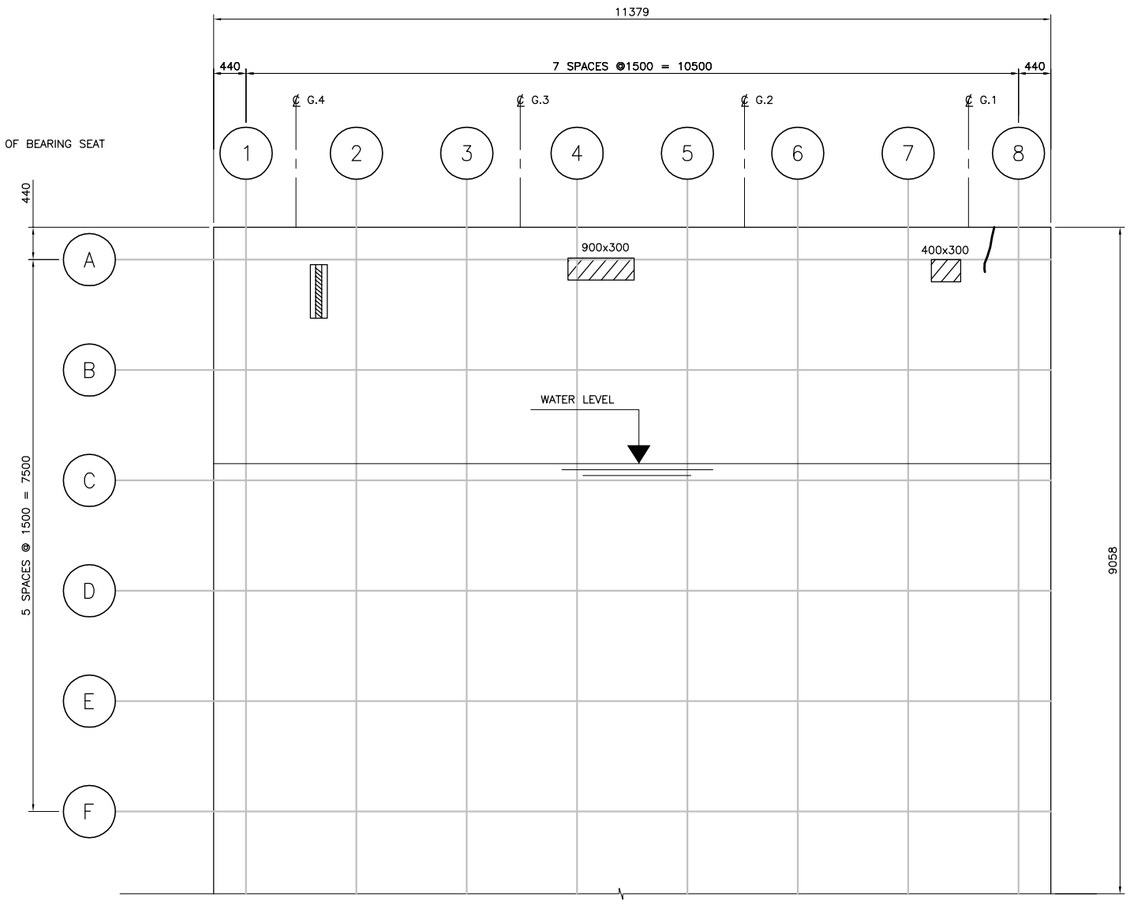


PIER ID — NORTH

FACE — SOUTH

EAST DIRECTION — →



LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

NOTE:
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INSPECTOR — JS & MH

DATE — APRIL 25, 2018

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wsp

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CADD FILE: [redacted]

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

NORTH PIER

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JS		20
SCALE: AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ___ OF ___

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DATE PLOTTED: 6/20/2018 5:00:12 PM BY: AWAD, CLAIR

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FACE — NORTH
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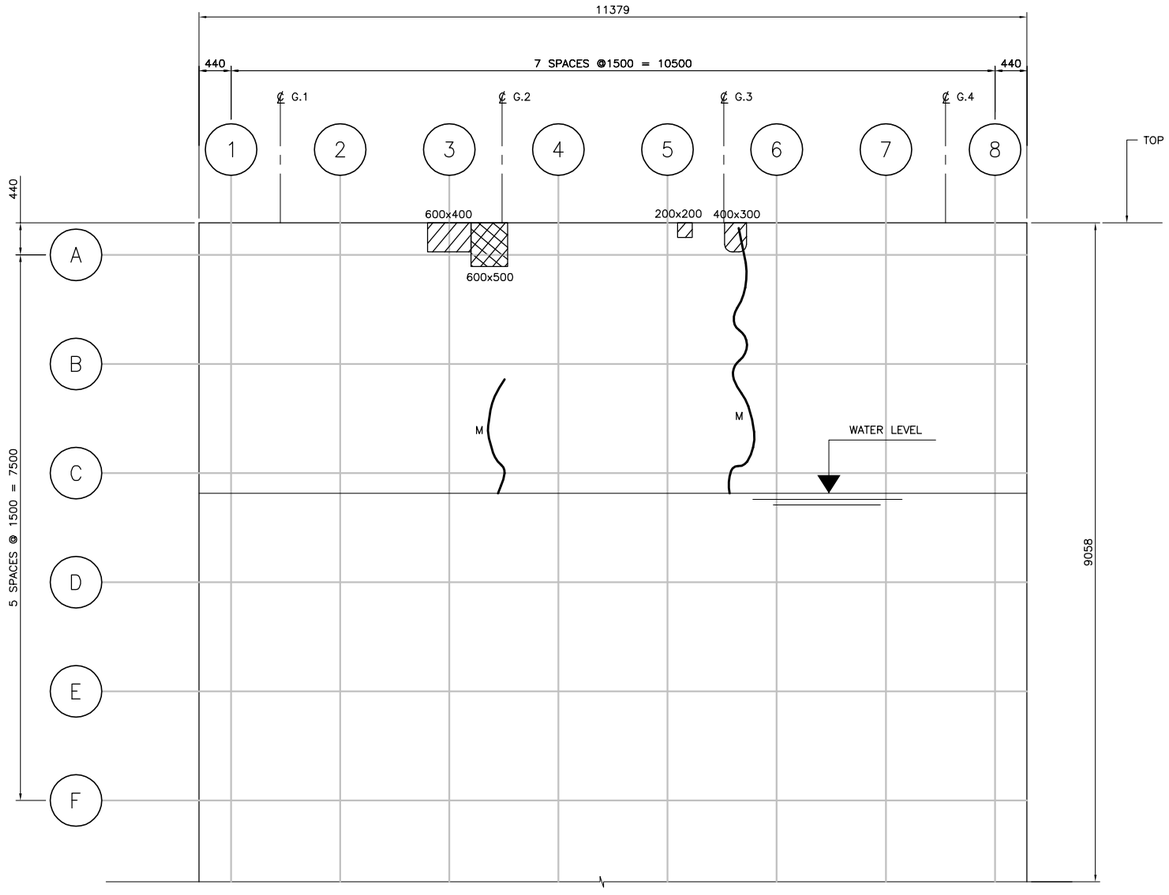
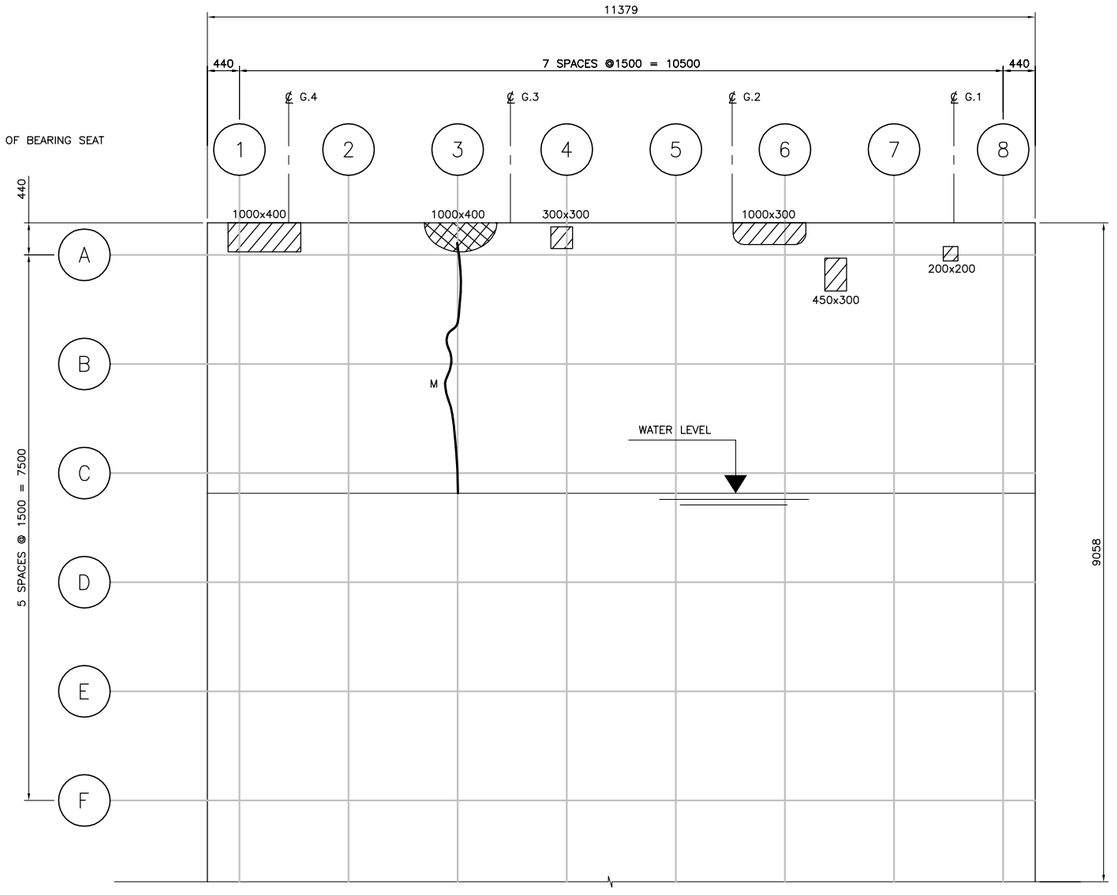


PIER ID — CENTER
FACE — SOUTH
EAST DIRECTION →



LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

NOTE:
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INSPECTOR — JS & MH
DATE — APRIL 25, 2018

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wsp

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CADD FILE:
[redacted]

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

CENTRE PIER

DRAWN BY: CA	CHECKED BY: JS	CONTRACT No.	DRAWING No. 21
SCALE AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ___ OF ___

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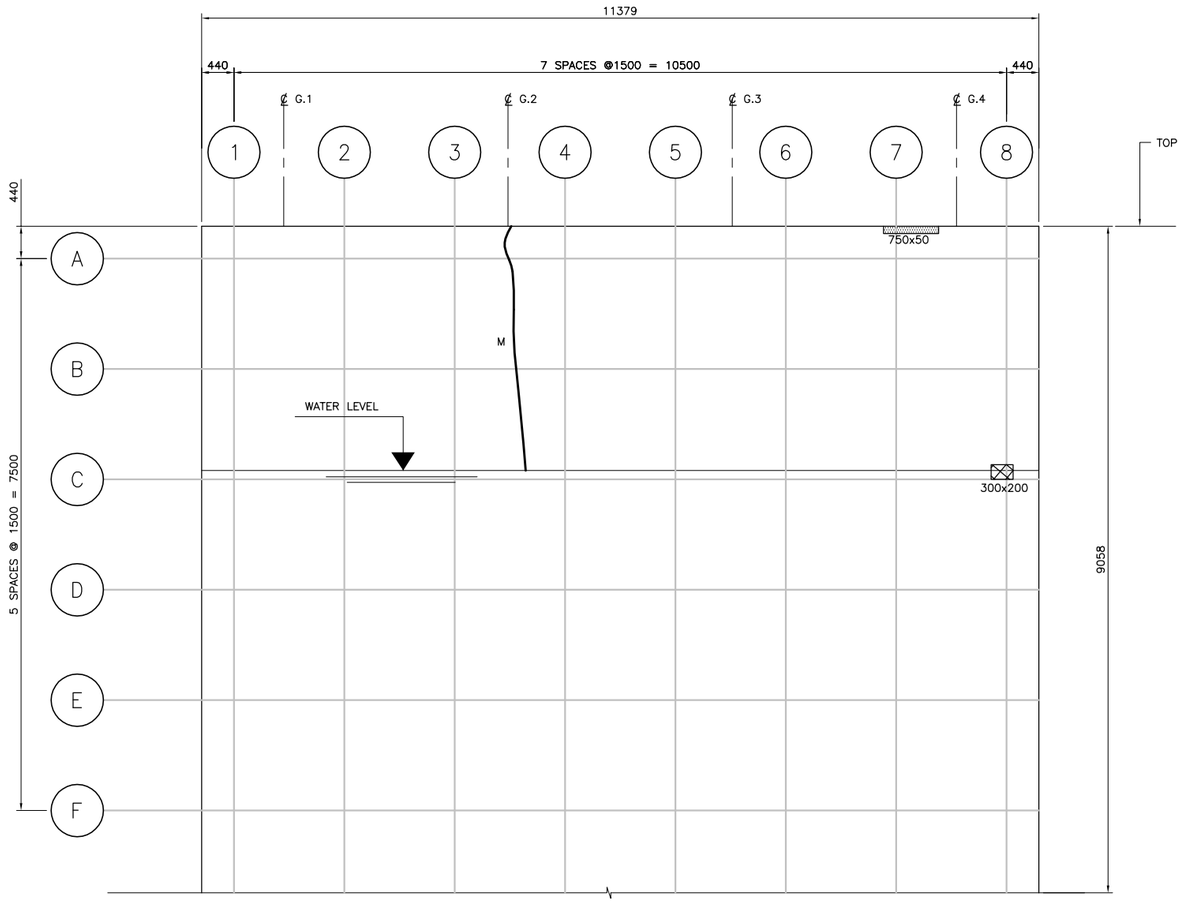
DATE PLOTTED: 6/21/2018 3:45:54 PM BY: VILLASENOR, DANILO

PIER ID — SOUTH
FACE — NORTH
EAST DIRECTION



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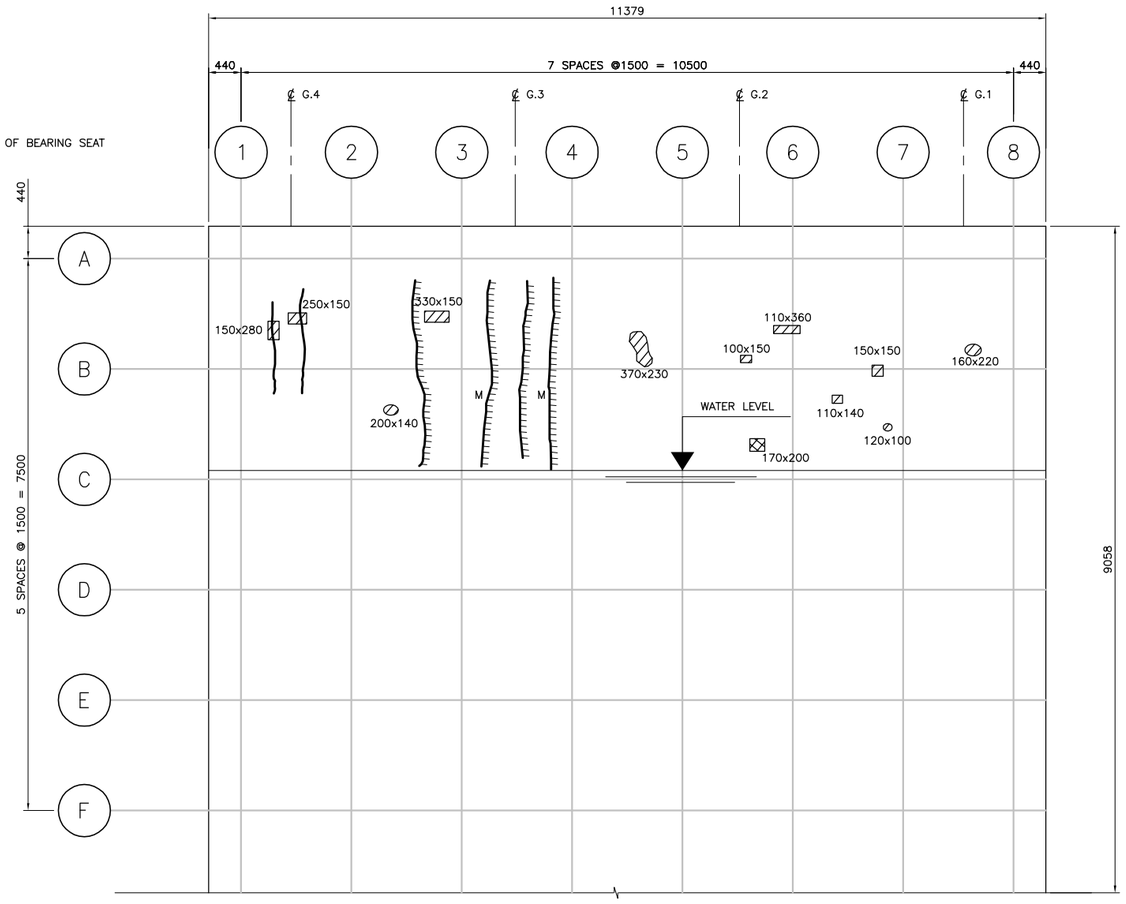

LEGEND:

CRACKING:

	NARROW CRACK	(GOOD)
M	MEDIUM CRACK	(FAIR)
W	WIDE CRACK	(POOR)
	STAINED CRACKS	(POOR)

SCALING:

	LIGHT SCALING	(GOOD)
	MEDIUM SCALING	(FAIR)
	SEVERE SCALING	(POOR)
	VERY SEVERE SCALING	(POOR)

DELAMINATION AND SPALLS:

	DELAMINATIONS	(POOR)
	SPALLS	(POOR)

CORROSION OF REBAR:

	EXPOSED REINFORCING STEEL	(POOR)
	SURFACE RUST STAIN	(FAIR)

OTHER DEFECTS:

	PATCHED SPALLS	(GOOD)
	MEDIUM HONEYCOMBED AREAS	(FAIR)

NOTE:
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INSPECTOR — JS & MH
DATE — APRIL 25, 2018

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wsp

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CONTROLLING B.M.

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CADD FILE:

Region of Waterloo

SCHEIFELE BRIDGE OVER CONESTOGO RIVER CONDITION SURVEY

SOUTH PIER

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CA	JS		22
SCALE: AS NOTED	DATE: JUNE/2018	FILE No.	SHEET ___ OF ___

CAD FILE LOCATION AND NAME: S:\2018\18M-00475-00\CONDITION SURVEY\57474-300-022CS.dwg
MODIFIED: 6/20/2018 4:37:25 PM BY: AHMADC
DATE PLOTTED: 6/20/2018 5:25:21 PM BY: AHMAD, CLAIR

Stantec

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Inventory Data

Structure Name	Northfield Drive / Conestogo River		
Structure Location	0.8 km North of University Ave E		
Road Number		**On** [X] **Under** [ ]	
Road Name	Northfield Drive		
Watercourse Name	Conestogo River		
Crossing Type:	Road [ ] Rail [ ] Water [ ] Navigable waterway [ ] River [X] Other [ ] Creek [ ] Pedestrian [ ]		
Hwy Direction	1-NORTH/SOUTH		
Owner Category			
Maint.Resp.		**Northing**	0
District	TCP SCHEDULED	**Easting**	0
Area Mgr	WOOLWICH	**National Highway System**	
County	RMOW	**Highway Designation**	
Supervisor		**Hwy Functional Classification**	
Structure Category	Bridge	**AADT**	**No. of Lanes**
Main Struct. Subcateg.	Beam/Girder	**Trucks (%)**	**Posted Speed**
Main Struct. Type	T-Beams	**District Bridge Engineer**	
Deck Length (Total)	107.20 (m)	**Road Authority**	
Overall Structure Width	11.70 (m)	**Bridge Plan #**	
Deck Area (Total)	1,254.20 (Sq.m)	**Min. Vertical Clearance**	(m)
Width (Traffic)	(m)	**Detour Distance**	(km)
Skew Angle		**Speed on Detour**	(kph)
Number of spans		**Fill Height**	(m)
Total Length / Spans (m)	Total = 106.60; (1) = 22.9; (2) = 30.4; (3) = 30.4; (4) = 22.9		

Historical Data

Year Built	1960	**Evaluation Year**	
Last Biennial Inspection	November 07, 2018	**Current Load Limit**	
Last Bridge Master Inspection		**Current BCI**	57.10
Last Condition Survey		**Current BCU**	36.10
Last Underwater Inspection		**Current SI**	12.10

Rehab. History

2004 - DCS
2004 - SEV
2011 - Contract # 5511-2011-009 Drawings Available (This was minimal repairs until the replacement of the structure is completed at a later time)

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Scheduled Improvements

Regional Priority Number		Programmed Work Year	

Nature of Programmed Work

Appraisal Indices		Comments
Load Capacity Index		
Flood Index		
Barrier Index		
Curb Index		
Seismic Index		
Fatigue Index		
Scour Index		
Structure Index		

Suspected Performance Deficiencies

00	None	06	Bearings not uniformly loaded/unstable	12	Slippery surface
01	Load carrying capacity	07	Jammed expansion joint	13	Flooding/channel blockage
02	Excessive deformations (deflections and rotations)	08	Pedistrian/vehicular hazard	14	Undermining of foundation
03	Continuing settlement	09	Rough riding surface	15	Unstable embankments
04	Continuing movements	10	Surface ponding	16	Other
05	Seized bearings	11	Deck drainage		

Maintenance Needs

01	Lift and Swing Bridge Maintenance	07	Repairs to Structural Steel	13	Erosion Control at Bridges
02	Bridge Cleaning	08	Repair of Bridge Concrete	14	Concrete Sealing
03	Bridge Handrail Maintenance	09	Repair of Bridge Timber	15	Rout and Seal
04	Painting Steel Bridge Structures	10	Bailey bridges - Maintenance	16	Bridge Deck Drainage
05	Bridge Deck Joint Repair	11	Animal/Pest Control	17	Other
06	Bridge Bearing Maintenance	12	Bridge Surface Repair		

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Field Inspection Information

Inspection Date	November 07, 2018	**Weather**	Cloudy
Inspector	Rick Nesbitt	**Temperature**	10
Others in Party			
Equipment Used	PPE, Tablet, Tape		
Access Equipment Used	Ladder ☐ Boat ☐ Bucket Truck ☐ Hip Waders ☐ Access Key ☐ Climbing Inspection ☐ Under Bridge Inspection Unit ☐		

Special Notes

TCP Con 2021

Upcoming Inspections and Investigations

Inspection Type	Due Date	Priority	Comment

Recommended Inspections and Investigations

Recommended Inspection Type	Due Date	Priority			Estimated Cost ($)	Comments
		None	Normal	Urgent		
Material Condition Survey:						
Detailed Deck Condition Survey		☐	☐	☐		
Non-destructive Delamination Survey of Asphalt-Covered Deck		☐	☐	☐		
Concrete Substructure Condition Survey		☐	☐	☐		
Detailed Coating Condition Survey		☐	☐	☐		
Detailed Timber Investigation		☐	☐	☐		
Post-Tensioned Strand Investigation		☐	☐	☐		
Underwater Investigation		☐	☐	☐		
Fatigue Investigation		☐	☐	☐		
Seismic Investigation		☐	☐	☐		
Structure Evaluation		☐	☐	☐		
Monitoring						
Monitoring of Deformations, Settlements and Movements		☐	☐	☐		
Monitoring Crack Widths		☐	☐	☐		
Boat Inspection		☐	☐	☐		
Bridge master		☐	☐	☐		

Overall Structure Recommendations:

Work Category	None ☐	Minor Rehab ☐	Major Rehab ☒	Replacement ☐	
Timing	None ☐	Urgent ☐	< 1 year ☐	1 - 5 year ☐	6 - 10 year ☒
Est. Total Cost	$6,825,000				
Comments	The main issue of concern is the south span with deteriorated bearings at abutment and three girders which are structurally compromised also south pier bearing have section loss and severe spalling above bearing, which are tilted				

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Element Data

Group	Decks						Length	106.70 (m)
Element	Wearing surface						Width	9.14 (m)
Span Num							Height	(m)
Material	Asphalt						Count	N/A
Type	N/A						Quantity	975.000 (Sq.m)
Env't	Benign ☐	Moderate ☐	Severe ☒				Not Inspected	☐
Location	all					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	0.000	975.000	0.000	0.000			

Comments CR = 3

New Asphalt in 2011. In good condition

1

Group	Decks						Length	108.00 (m)
Element	Soffit - Thin Slab						Width	8.53 (m)
Span Num							Height	N/A (m)
Material	Cast-in-place concrete						Count	N/A
Type	N/A						Quantity	921.000 (Sq.m)
Env't	Benign ☒	Moderate ☐	Severe ☐				Not Inspected	☐
Location	All spans					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	0.000	507.001	230.001	183.997			

Comments CR = 2

Severe spalls with exposed rebar, medium leaching cracks and severe delamination in S span; 3 medium spalls with medium transverse leaching cracks in S center span. Severe spalls w/exposed rebar and severe de laminations throughout E overhang and W.

2

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Element Data

Group	Decks						Length	1.20 (m)
Element	Soffit - Thin Slab						Width	108.00 (m)
Span Num							Height	N/A (m)
Material	Cast-in-place concrete						Count	N/A
Type	N/A						Quantity	260.000 (Sq.m)
Env't	Benign ☐	Moderate ☒	Severe ☐				Not Inspected	☐
Location	Exterior of the soffit					Description	Exterior (Edge/Drip Wall etc.)	
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	0.000	65.000	125.000	70.000			

Comments CR = 2

Severe spalling, scaling, pop outs along with material loss. Especially on the E side.

3

Group	Decks						Length	N/A (m)
Element	Drainage						Width	N/A (m)
Span Num							Height	N/A (m)
Material	Steel						Count	N/A
Type	Metal drain pipes						Quantity	22.000 (Each)
Env't	Benign ☐	Moderate ☐	Severe ☒				Not Inspected	☐
Location	Along east & west sides					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Each	0.000	22.000	0.000	0.000			

Comments CR = 1

Typical light to medium rusted on top of the drain pipes (150 mm diameter, 1.25m long).

4

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Element Data

Group	Joints						Length	9.14 (m)
Element	Seals/sealants						Width	N/A (m)
Span Num							Height	N/A (m)
Material	N/A						Count	2.00
Type	Strip seal						Quantity	2.000 (m)
Env't	Benign ☐	Moderate ☐	Severe ☒				Not Inspected	☐
Location	North - South					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	m	0.000	2.000	0.000	0.000			

Comments CR = 5

Road debris accumulated at the joint seal. Seals leaking.

5

Group	Joints						Length	9.14 (m)
Element	Concrete end dams						Width	(m)
Span Num							Height	N/A (m)
Material	Cast-in-place concrete						Count	4.00
Type	N/A						Quantity	37.000 (Sq.m)
Env't	Benign ☐	Moderate ☐	Severe ☒				Not Inspected	☐
Location	North - South					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	0.000	34.000	3.000	0.000			

Comments CR = 5

Some spalling on the S dams.

6

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Element Data

Group	Joints						Length	9.14 (m)
Element	Armoring/retaining devices						Width	N/A (m)
Span Num							Height	N/A (m)
Material	Unknown						Count	4.00
Type	N/A						Quantity	37.000 (m)
Env't	Benign ☐	Moderate ☐	Severe ☒				Not Inspected	☐
Location	North & South abutment					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	m	0.000	37.000	0.000	0.000			

Comments CR = 5

N joint become sharp; significant traffic impact. S joint has 25mm dip.

7

Group	Sidewalks/curbs						Length	106.80 (m)
Element	Sidewalk and medians						Width	1.83 (m)
Span Num							Height	0.25 (m)
Material	Cast-in-place concrete						Count	1.00
Type	N/A						Quantity	222.000 (Sq.m)
Env't	Benign ☐	Moderate ☐	Severe ☒				Not Inspected	☐
Location	West only					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	0.000	175.000	44.000	3.000			

Comments CR = 2

Several large patches and narrow to medium transverse cracks over the entire deck length. On the W sidewalk there are 6 patches which were made in 2011. There is no sidewalks on the approach. Some medium scaling. Isolated medium spalling w exposed rebar

8

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Element Data

Group	Sidewalks/curbs						Length	106.80 (m)
Element	Curbs						Width	0.61 (m)
Span Num							Height	0.25 (m)
Material	Cast-in-place concrete						Count	1.00
Type	N/A						Quantity	92.000 (Sq.m)
Env't	Benign ☐	Moderate ☐	Severe ☒				Not Inspected	☐
Location	East only					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	0.000	68.000	20.000	4.000			

Comments CR = 2

Rehabbed in 2011. Medium spalls with exposed rebar. medium scaling throughout. Medium de laminations on curb exterior. Medium spalls w/ exposed rebar, rust staining, and medium map cracking throughout outer face.

9

Group	Barriers						Length	1.50 (m)
Element	Barrier/Parapet Walls						Width	N/A (m)
Span Num							Height	1.22 (m)
Material	Cast-in-place concrete						Count	4.00
Type	Parapet Wall without railing						Quantity	7.000 (Sq.m)
Env't	Benign ☐	Moderate ☐	Severe ☒				Not Inspected	☐
Location	Endposts					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	0.000	3.000	3.000	1.000			

Comments CR = 6

Concrete end-walls are in fair to good condition with medium scaling. The SW wall has severe scaling. The SE wall has vertical cracks.

10

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Element Data

Group	Barriers						Length	110.00 (m)
Element	Railing Systems						Width	N/A (m)
Span Num							Height	1.10 (m)
Material	Steel						Count	2.00
Type	Steel Post and steel panel						Quantity	242.000 (Sq.m)
Env't	Benign [X]	Moderate [ ]	Severe [ ]				Not Inspected	[ ]
Location	East - West					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	0.000	0.000	174.000	68.000			

Comments CR = 0

The railings are sub-standard and the steel panels are typically light rusted in places, many posts have no caps or broken caps as well many posts have split open. Several panels are deformed and/or damaged. In 2011 a steel flex beam was added to railing system to address any safety concerns.

11

Group	Barriers						Length	35.00 (m)
Element	Railing Systems						Width	N/A (m)
Span Num							Height	(m)
Material							Count	4.00
Type	Steel Flex Beam on wood post						Quantity	140.000 (Sq.m)
Env't	Benign [ ]	Moderate [ ]	Severe [X]				Not Inspected	[ ]
Location	4 Corners - Guide Rails					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	0.000	140.000	0.000	0.000			

Comments CR = 8

New guiderail in 2011. Guide rail is not anchored properly in end walls, but extends across the entire deck

12

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Element Data

Group	Barriers						Length	108.00 (m)
Element	Railing Systems						Width	N/A (m)
Span Num							Height	(m)
Material	Steel						Count	2.00
Type	Steel Flex Beam over other railing						Quantity	216.000 (Sq.m)
Env't	Benign ☐	Moderate ☐	Severe ☒				Not Inspected	☐
Location	Flex Beam Over Existing Railing					Description	Flex Beam Over Existing Railing System	
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	216.000	0.000	0.000	0.000			

Comments CR = 8

Flex beam added in 2011 to the existing railing system for added safety and strength.

13

Group	Beams/MLE's						Length	108.00 (m)
Element	Girders						Width	0.76 (m)
Span Num							Height	1.47 (m)
Material	Cast-in-place concrete						Count	4.00
Type	T type						Quantity	1,598.000 (Sq.m)
Env't	Benign ☒	Moderate ☐	Severe ☐				Not Inspected	☐
Location	All spans					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	0.000	598.000	500.000	500.000			

Comments CR = 6

Girders Numbered West Girder =1 and East Girder = 4
Girder 1 and 2 have severe de laminations throughout at flex rail steel in south span and south center span, and severe spalls with exposed rebar. Patches on girders 1 and 2 are delaminating.

14

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Element Data

Group	Beams/MLE's						Length	(m)
Element	Diaphragms						Width	(m)
Span Num							Height	(m)
Material	Cast-in-place concrete						Count	
Type	Rectangular-solid						Quantity	33.000 (Sq.m)
Env't	Benign [X]	Moderate [ ]	Severe [ ]				Not Inspected	[ ]
Location	all					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	0.000	29.000	2.000	2.000			

Comments CR = 7

Delamination and severe transverse cracking in the diaphragm between the central 2 girders at the E end. There is a vertical crack in span 1.

15

Group	Coatings						Length	N/A (m)
Element	Railing Systems / Hand Railings						Width	N/A (m)
Span Num							Height	N/A (m)
Material	N/A						Count	N/A
Type	Other						Quantity	242.000 (m)
Env't	Benign [ ]	Moderate [ ]	Severe [X]				Not Inspected	[ ]
Location	@ hand railings (used barrier #)					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	m	0.000	0.000	194.000	48.000			

Comments CR = 1

Medium to severe coating loss throughout.

16

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Element Data

Group	Abutments						Length	N/A (m)
Element	Abutment walls						Width	11.40 (m)
Span Num							Height	7.50 (m)
Material	Cast-in-place concrete						Count	2.00
Type	Conventional closed						Quantity	171.000 (Sq.m)
Env't	Benign [X]	Moderate [ ]	Severe [ ]				Not Inspected	[ ]
Location	North - South					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	0.000	149.001	20.000	2.001			

Comments CR =

South AB has Severe scaling at SE and is covered with graffiti. Some minor concrete repairs at S around elec. boxes.
North Abut has limited inspection.

17

Group	Abutments						Length	N/A (m)
Element	Ballast walls						Width	11.40 (m)
Span Num							Height	1.47 (m)
Material	Cast-in-place concrete						Count	2.00
Type	N/A						Quantity	34.000 (Sq.m)
Env't	Benign [X]	Moderate [ ]	Severe [ ]				Not Inspected	[ ]
Location	North - South					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	0.000	25.000	7.000	2.000			

Comments CR = 2

Wet staining at the SW corner as well as some spalling and exposed rusted rebar.

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Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Element Data

Group	Abutments						Length	N/A (m)
Element	Bearings						Width	N/A (m)
Span Num							Height	N/A (m)
Material	N/A						Count	8.00
Type	Rocker						Quantity	8.000 (Each)
Env't	Benign [X]	Moderate [ ]	Severe [ ]				Not Inspected	[ ]
Location	@ abutments					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Each	0.000	0.000	0.000	8.000			

Comments CR = 3

4 very severely rusted bearing at the S abutment need replacement or semi-integral abutment. Limited inspection

Need Timing

Performance Deficiencies

6-Brng. not Unif.Load/Unstbl.

Recommended Work	Category	Timing	Quantity	Unit Cost	Total Cost ($)
	Major Rehab	6 - 10 year			

19

Group	Piers						Length	0.76 (m)
Element	Shafts/columns/Pile Bents						Width	11.40 (m)
Span Num							Height	5.68 (m)
Material	Cast-in-place concrete						Count	3.00
Type	Concrete shafts, pier walls						Quantity	414.000 (Sq.m)
Env't	Benign [X]	Moderate [ ]	Severe [ ]				Not Inspected	[ ]
Location	North, Centre, South					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	0.000	331.001	75.000	7.998			

Comments CR = 2

On the S pier there are a few full height cracks on the N face, shotcrete repairs are on the top NW corner, along with a few vertical cracks on the central face. Piers are generally in good condition

20

Region of Waterloo

Bridge Inspection Form

Struct. ID 2201

Element Data

Group	Piers						Length	N/A (m)
Element	Bearings						Width	N/A (m)
Span Num							Height	N/A (m)
Material	N/A						Count	8.00
Type	Rocker						Quantity	8.000 (Each)
Env't	Benign [X]	Moderate [ ]	Severe [ ]				Not Inspected	[ ]
Location	North & South piers					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Each	0.000	7.000	1.000	0.000			

Comments CR = 2

Light rusting on the W bearing on the S pier which is tilted more than 15degrees S ward. The connection to piers has spalling in spots.

21

Group	Piers						Length	N/A (m)
Element	Bearings						Width	N/A (m)
Span Num							Height	N/A (m)
Material	N/A						Count	4.00
Type	Other						Quantity	4.000 (Each)
Env't	Benign [X]	Moderate [ ]	Severe [ ]				Not Inspected	[ ]
Location	Centre pier					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Each	0.000	4.000	0.000	0.000			

Comments CR = 2

Connection to the piers have spalling in spots. The large spall at the W face centre pier is under girder 2 (2 from the W side).

22

Region of Waterloo

Bridge Inspection Form

Struct. ID 2201

Element Data

Group	Retaining walls						Length	9.00 (m)
Element	Walls						Width	N/A (m)
Span Num							Height	5.90 (m)
Material	Cast-in-place concrete						Count	4.00
Type	Reinforced concrete						Quantity	212.000 (Sq.m)
Env't	Benign [X]	Moderate [ ]	Severe [ ]				Not Inspected	[ ]
Location	@ 4 corners					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	0.000	212.000	0.000	0.000			

Comments CR = 2

There are 6 Bell conduits at the top of the corner of the SW wall, no other defects were observed on the other walls. All 4 of the walls appear to be straight with no severe deficiencies.

23

Group	Embankments & Streams						Length	N/A (m)
Element	Streams and Waterways						Width	N/A (m)
Span Num							Height	N/A (m)
Material	N/A						Count	N/A
Type	N/A						Quantity	1.000 (All)
Env't	Benign [ ]	Moderate [ ]	Severe [ ]				Not Inspected	[ ]
Location	@ bridge location					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	All	0.000	1.000	0.000	0.000			

Comments CR = 1

Wide open stream.

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Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Element Data

Group	Embankments & Streams						Length	N/A (m)
Element	Slope protection						Width	N/A (m)
Span Num							Height	N/A (m)
Material	N/A						Count	N/A
Type							Quantity	4.000 (Each)
Env't	Benign ☐	Moderate ☐	Severe ☐				Not Inspected	☐
Location	4 corners					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Each	0.000	4.000	0.000	0.000			

Comments CR = 1

No evidence of slope erosion or unstable slopes at all four of the corners as well it is well vegetated.

25

Group	Attachments, Signs, and Utilities						Length	N/A (m)
Element	Signs						Width	N/A (m)
Span Num							Height	N/A (m)
Material	N/A						Count	N/A
Type	N/A						Quantity	6.000 (Each)
Env't	Benign ☐	Moderate ☐	Severe ☐				Not Inspected	☐
Location						Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Each	0.000	6.000	0.000	0.000			

Comments CR = 6

2 right marker, 2 left marker. 2 Conestogo River

26

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Element Data

Group	Approaches						Length	6.00 (m)
Element	Wearing surface						Width	9.14 (m)
Span Num							Height	(m)
Material	Asphalt						Count	2.00
Type	N/A						Quantity	110.000 (Sq.m)
Env't	Benign ☐	Moderate ☐	Severe ☒				Not Inspected	☐
Location	North - South					Description		
Condition Data	Unit	Excellent	Good	Fair	Poor	V. Poor	Perform. Deficiencies	Maintenance Needs
	Sq.m	100.000	5.000	5.000	0.000			

Comments

CR = 2

New asphalt in 2011. Medium map cracking adjacent to joints at both abutments.Centerline crack

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Region of Waterloo

Bridge Inspection Form

Struct. ID 2201

Recommended Work (Element Level)

Element	Repair / Rehabilitation	Time					Estimated Cost ($)
		None	Urgent	< 1 year	1 - 5 year	6 - 10 year	
Abutments / Bearings / Rocker						X	
						Total Cost	

Recommended Work (Structure Level)

Associated Work	Comments	Estimated Cost ($)
Approaches		
Detours		
Other		
Traffic Control		
Utilities		
	Total Cost	
	Grand Total Cost:	$0

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description

Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18 2.jpg

Description

Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18 Exp Joint.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Abutment Walls N.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Abutment Walls S.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Abutment Walls S2.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Abutment Walls Section Loss Se.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description

Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Ballast Walls N.jpg

Description

Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Ballast Walls Sw.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description

Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Ballast Walls .jpg

Description

Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Bearings Close To Failure.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Bearings Mid.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Bearings S 2.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Bearings S.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Bearings .jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Signs Typical.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Slope Protection Typical Steep.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Soffit - Thin Slab East 2.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Soffit - Thin Slab East.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Soffit - Thin Slab Middle South.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Soffit - Thin Slab Midspan.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Soffit - Thin Slab S Span.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Streams And Waterways West Entry.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Walls Se.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Walls Sw.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Wearing Surface Drain.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Wearing Surface Mid.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Wearing Surface N.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Wearing Surface S.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Wearing Surface Typical Condition.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Wearing Surface View N.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-West.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Concrete End Dams N.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Concrete End Dams S.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Curbs Nw.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Curbs Plow Damage Midspan.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Curbs .jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Delam.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Diaphragms S.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Diaphragms .jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Drainage System Typical.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-East 2.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-East.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Girders G4 South.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Girders Mid.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Girders N.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Girders S.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Girders South.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Girders .jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Girders 2 .jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Girders 3 .jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description

Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18Hand Railings Typical Coating Loss.jpg

Description

Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18Hand Railings .jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18Parapet Walls N.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18Parapet Walls Ne.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description

Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18Parapet Walls S.jpg

Description

Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18Pile Bents S Pier.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18Pile Bents .jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18Pile Bents 2.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description

Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Railing Systems S.jpg

Description

Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Railing Systems S2.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description

Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Railing Systems Typical Condition And Configuration.jpg

Description

Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Railing Systems Typical.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Railing Systems West Ext.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18Retaining Devices N.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18Retaining Devices S.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18Sealants N.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18Sealants S.jpg

Description	
Elem Grp/Class	
Elem Type	
Sub Element	
Material Type	
Locator	
Defect Descript1	
Defect Descript2	
Defect	
Other	

File Name	2201_Nov18-Sidewalks And Medians Typical Condition.jpg

Region of Waterloo

Bridge Inspection Form

Struct. ID	2201

Element Comments

Flag	Field Label	Comment
22	Type	Fixed
23	Length	average

Stage 1 Archaeological Assessment: Scheifele Bridge – Superstructure Replacement, Regional Road 22 (Northfield Drive), Conestogo River

Part of Block 3 and Block 32, Township of Woolwich, former Waterloo County, now Regional Municipality of Waterloo, Ontario

February 8, 2021

Prepared for:

Regional Municipality of Waterloo
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License Number: P256
PIF Number: P256-0611-2020
Project Number: 165010600

REVISED REPORT

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Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by the Regional Municipality of Waterloo (the Client) to complete a Stage 1 Archaeological Assessment for the environmental assessment (EA), preliminary design, detailed design, construction administration, and inspection of the Scheifele Bridge – Superstructure Replacement Regional Road 22 (Northfield Drive) Conestogo River (the Project). The Project is being completed as a Schedule C Class EA in compliance with the Municipal Engineers Association MCEA (June 2000, as amended 2007, 2011, and 2015) (Government of Ontario 1990a, 2020a). The study area for the Stage 1 archaeological assessment of the Project comprises approximately 12.8 hectares and is located on part of Block 3 and Block 32, Township of Woolwich, former Waterloo County, now Regional Municipality of Waterloo, Ontario. The Stage 1 archaeological assessment was conducted in accordance with the Ministry of Heritage, Sport, Tourism and Culture Industries' (MHSTCI) 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). A property inspection was completed on April 20, 2020 under Project Information Form (PIF) number P256-0611-2020.

The Stage 1 archaeological assessment of the study area for the Project, involving background research and a property inspection, determined that a portion of the study area, approximately 53.6%, retains potential for the identification and documentation of archaeological resources. In accordance with Section 1.3.1 and Section 7.7.4 of the MHSTCI's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), **Stage 2 Archaeological Assessment is required for any portion of the Project's anticipated construction which impacts an area of archaeological potential.** The Stage 1 archaeological assessment also determined that a portion of the study area, approximately 46.4%, retains low to no archaeological potential for the identification or recovery of archaeological resources due to, areas of previous disturbance, steep slope, and low and permanently wet areas. In accordance with Section 1.3.2 and Section 7.7.4 of the MHSTCI's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), **Stage 2 Archaeological Assessment is not required for any portion of the Project's anticipated construction which impacts an area of low to no archaeological potential.**

In addition to the above, the portion of the study area containing the Conestogo River retains potential for the identification of marine archaeological resources. It is anticipated that impacts to the Conestogo River will occur as part of the Project and will be finalized during detailed design phase. Thus, **it is recommended that potential for marine archaeological resources be evaluated using the MHSTCI's *Criteria for Evaluating Marine Archaeological Potential Checklist***

Full and detailed recommendations are provided in the body of the report. The MHSTCI is asked to review the results presented and to accept this report into the *Ontario Public Register of Archaeological Reports*.

The Executive Summary highlights key points from the report only; for complete information and findings, the reader should examine the complete report.

Project Personnel

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Project Manager:	Garry E. Leveck, P.Eng.
Licensed Field Director:	Parker Dickson, MA (P256)
Report Writer:	Parker Dickson, MA (P256)
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Quality Review:	Tracie Carmichael, BA. B.Ed. (R140)
Independent Review:	Colin Varley, MA, RPA (P002)

Acknowledgements

Proponent Contacts:	Ken Brisbois – Project Manager, Environmental/Transportation Engineering John Stephenson – Senior Project Manager, Transportation Engineering
Ministry of Heritage, Sport, Tourism and Culture Industries:	Robert von Bitter – Archaeological Data Coordinator Wai Hadlari – Archaeology Review Officer

1.0 PROJECT CONTEXT

1.1 DEVELOPMENT CONTEXT

Stantec Consulting Ltd. (Stantec) was retained by the Regional Municipality of Waterloo (the Client) to complete a Stage 1 Archaeological Assessment for the environmental assessment (EA), preliminary design, detailed design, construction administration, and inspection of the Scheifele Bridge – Superstructure Replacement Regional Road 22 (Northfield Drive) Conestogo River (the Project). The Scheifele Bridge on Regional Road 22 (Northfield Drive) over the Conestogo River is a major arterial connection between the Village of Conestogo and the City of Waterloo. The Project was identified as part of the Regional Municipality of Waterloo's 10-Year Transportation Capital Program and improvements to the bridge are to include consideration of enhanced vehicle, pedestrian, buggy, and cycling facilities, as well as maintain the bridge structure and surrounding area aesthetics.

The Project is being completed as a Schedule C Class EA in compliance with the Municipal Engineers Association MCEA (June 2000, as amended 2007, 2011, and 2015) (Government of Ontario 1990a, 2020a). The study area for the Stage 1 archaeological assessment of the Project comprises approximately 12.8 hectares and is located on part of Block 3 and Block 32, Township of Woolwich, former Waterloo County, now Regional Municipality of Waterloo, Ontario (Figure 1). Generally, the study area follows the existing alignment of Regional Road 22 (Northfield Drive) for approximately 800 metres and is approximately 160 metres wide (Figure 2).

1.1.1 Objectives

In compliance with the provincial standards and guidelines set out in the Ministry of Heritage, Sport, Tourism and Culture Industries' (MHSTCI) 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the objectives of the Stage 1 Archaeological Assessment are as follows:

- To provide information about the study area's geography, history, previous archaeological fieldwork, and current land conditions;
- To evaluate the study area's archaeological potential, which will support recommendations for Stage 2 survey for all or parts of the property; and
- To recommend appropriate strategies for Stage 2 survey.

To meet these objectives, Stantec archaeologists employed the following research strategies:

- A review of relevant archaeological, historic, and environmental literature pertaining to the study area;
- A review of the land use history, including pertinent historic maps;
- A review of the relevant and applicable archaeological master plans and potential mapping;
- An examination of the *Ontario Archaeological Sites Database* to determine the presence of registered archaeological sites in and around the study area; and
- A property inspection of the study area for the Project.

Permission for Stantec staff to enter private lands within the study area was not obtained for the purposes of the Stage 1 property inspection. As a result, the property inspection was limited to the municipal road right-of-way (ROW) and public property.

1.2 HISTORICAL CONTEXT

1.2.1 Post-contact Indigenous Resources

"Contact" is typically used as a chronological benchmark when discussing Indigenous archaeology in Canada and describes the contact between Indigenous and European cultures. The precise moment of contact is a constant matter of discussion. Contact in what is now the province of Ontario is broadly assigned to the 16th century (Loewen and Chapdelaine 2016).

The post-contact Indigenous occupation of southern Ontario was heavily influenced by the dispersal of various Iroquoian-speaking communities by the New York State Iroquois and the subsequent arrival of Algonkian-speaking groups from northern Ontario at the end of the 17th century and beginning of the 18th century (Konrad 1981; Schmalz 1991). Broadly, numerous Indigenous groups and communities are associated with the post-contact occupation of southern Ontario and the general area of the Project.

At the turn of the 17th century, the region of the study area was occupied by Iroquoian populations who are historically described as the *Neutre* Nations (by the French) or the *Attiwandaron* (by the Huron-Wendat); their autonym is not conclusively known (Birch 2015). Claude Bernou's 1680 map indicates the then dispersed *Attiragenga* (near modern day Hamilton) and *Antouaronon* (west of the Grand River along the Lake Erie north shore) Nations occupied the region of the study area (White 1978: Figure 2). To the north was territory occupied by the Wendat-Tionantaté (Huron-Wendat) (Heidenreich 1978). The Five Nations Iroquois, located in present-day upstate New York, failed in an attempt to convince the Wendat-Tionantaté to join them in an alliance (Warrick 2013). In 1626, French Recollet Father Daillon reportedly travelled the length of the Grand River and counted 28 Neutral villages in the area (Harper 1950:10-11; White 1978:410). This initial survey of the Grand River and the lands adjacent to it demonstrated the significance of the area and its resources to Indigenous peoples and their communities. In 1649, the Seneca and the Mohawk led a campaign into southern Ontario and dispersed the Attiwandaron (Neutral) Nations and the Wendat-Tionantaté, and established dominance over the region (Heidenreich 1978; Konrad 1981).

In 1667, surviving Huron-Wendat warriors joined alliance with the French-allied Ojibwa and Mississaugas to counterattack the Iroquois who had settled along the north shore of Lake Ontario. By 1690, Ojibwa (Anishinaabe) speaking people had begun moving south into the lower Great Lakes basin (Konrad 1981; Rogers 1978). Mississauga oral traditions, as told by Chief Robert Paudash and recorded in 1905, indicate that after the Mississauga defeat of the Mohawk Nation the Mohawk retreated to their homeland south of Lake Ontario and a peace treaty was negotiated between those groups around 1695 (Paudash 1905). Upon the Mississaugas' return they decided to settle permanently in southern Ontario. In southwestern Ontario, however, members of the Three Fires Confederacy (Chippewa, Ottawa and

Potawatomi) were immigrating from Ohio and Michigan in the late 1700s (Feest and Feest 1978). Thus, numerous Indigenous groups are associated with the post-contact occupation of southern Ontario.

The Mississaugas settled and inhabited a large area at the western end of Lake Ontario throughout the 1700s and into the 1800s. Between 1695 and the mid-1820s the Mississaugas continued to follow a yearly cycle of resource harvest and movement throughout their southern Ontario territory (Praxis Research Associates n.d.). With the end of the American Revolutionary War in 1783, the Six Nations Iroquois returned to southern Ontario, when approximately 2,000 Iroquois were given land by the British for their loyalty during the war and to compensate for the land they had lost in their traditional homeland. The largest group settled in the Grand River valley near Brantford, Ontario, to become the Six Nations of the Grand River.

Since contact with European explorers and immigrants, and, later, with the establishment of provincial and federal governments (the Crown), the lands within Ontario and the Township of Woolwich have been included in various treaties, land claims, and land cessations. Though not an exhaustive list, Morris (1943) provides a general outline of some of the treaties within the Province of Ontario from 1783 to 1923. Based on Morris (1943), the study area is situated within the Haldimand Tract. While it is difficult to exactly delineate treaty boundaries today, Figure 3 provides an approximate outline of the Haldimand Tract, identified by the letter “E”. As described by Morris (1943:19-21) the Haldimand Tract:

> *…is a parcel or tract of land given to the Six Nations Indians, by Governor Haldimand October 25th, 1784, …and conveyed by Grant the 14th of January, 1793. … This Grant was composed of the following townships: Dunn, Cherbrooke, Moulton, Canborough, North and South Cayuga, Oneida and Seneca in Haldimand County; Tusc[aro]ra, Onondaga, Brantford and South Dumfries in Brant County; North Dumfries, Waterloo and Woolwich in Waterloo County; Pilkington and Nichol in Wellington County; and is described as a parcel or tract of land six miles on each side of the Ouse or Grand River from its mouth toward its source, to be bounded by the tract of land deeded December the 7th, 1792 by the Mississa[u]ga Chiefs and people to the Crown. This part was set aside as a suitable retreat for the Six Nation Indians who had shewn attachment and Fidelity to the British Government during the troublous times 1759 to 1783 and was granted to the Chiefs, Warriors, Women and People of the Six nations and their heirs forever.*

The original Haldimand Tract consisted of approximately 273,000 hectares and occupied an approximately 10-kilometre deep tract on either side of the Grand River from mouth to source. This tract was purchased from the Mississaugas by the Crown and granted to the Mohawks “…and such others of the Six Nations Indians as wish to settle in that quarter” in restitution for the loss of their homeland following the American Revolutionary War and in recognition of their loyalty to the Crown during that war (Haldimand 1784). The original Six Nations (Haudenosaunee) settlers were also accompanied by members of the Delaware, Nanticoke, Tutelo, Cree, and Cherokee communities who had previously settled with the Haudenosaunee prior to the beginning of the war. Initial controversy existed over the sovereignty of the Haudenosaunee, with the Crown asserting that the lands granted were non-transferrable. The assertion was made in 1792 with the Simcoe patent, stipulating that all land

transactions required Crown approval. This patent was rejected by the Haudenosaunee and subsequently more than 142,000 hectares were leased or sold to Euro-Canadian settlers. In 1834, a Crown investigation was held and the Crown concluded that removal of the Euro-Canadian settlers would be too costly, and the leases were confirmed as legal (Weaver 1978:525).

Further controversy existed over the description of the extent of the tract, specifically regarding the headwaters of the Grand River beyond Nichol Township (in present day Wellington County). The inconsistency between the description of the Haldimand Tract in the 1784 treaty and the surveyed extent of the tract asserted by the Crown continues into the modern day (Six Nations Lands & Resources Department 2018). The Haudenosaunee and accompanying Indigenous peoples settled in villages along the Grand River. In the area around Brantford, villages were occupied by the Mohawk, (Upper) Cayuga, Oneida, Tutelo, and Tuscarora Nations. In the late 1820s and into the 1830s, itinerant Christian missionaries became increasingly active across the Haldimand Tract and many Haudenosaunee who settled up-river converted to Christianity. While clan and lineage affiliations under the Longhouse social organization had been important aspects of Haudenosaunee society, this affiliation became rare among Christians, for whom the nuclear family became the primary social and economic unit (Weaver 1978:525-527).

From 1830 onward, the Crown pursued an active assimilation policy, such as in 1869 with the statutorily enacted patrilineal kinship, contrary to traditional matrilineal kinship. Despite these policies, Longhouse traditionalism persisted into the late 19th century. By the late 1830s, most of the Haudenosaunee population had left the original villages and settled farms along the Haldimand Tract. The Indigenous economy in the 19th century was comparable to that of neighbouring Euro-Canadian inhabitants, cultivating maize only on a small scale, with larger scale cultivation of cash crops such as wheat, oats, hay, and peas. With the continued piecemeal sale of lands, by 1841, the remaining approximately 89,000 hectares of the Haldimand Tract was surrendered to the Crown and the Six Nations Reserve was established south of Brantford (Weaver 1978:525-526).

The expansion of the fur trade led to increased interaction between European and Indigenous people, and ultimately intermarriage between European men and Indigenous women. During the 18th century the progeny of these marriages began to no longer identify with either their paternal or maternal cultures, but instead as Métis. The ethnogenesis of the Métis progressed with the establishment of distinct Métis communities along the major waterways in the Great Lakes of Ontario. Métis communities were primarily focused around the upper Great Lakes and along Georgian Bay, however, Métis people have historically lived throughout Ontario (Métis Nation of Ontario 2016; Stone and Chaput 1978:607-608).

The nature of Indigenous settlement size, population distribution, and material culture shifted as European settlers encroached upon their territory. However, despite this shift, “written accounts of material life and livelihood, the correlation of historically recorded villages to their archaeological manifestations, and the similarities of those sites to more ancient sites have revealed an antiquity to documented cultural expressions that confirms a deep historical continuity to…systems of ideology and thought” (Ferris 2009:114). As a result, Indigenous peoples have left behind archaeological resources throughout Ontario which show continuity with past peoples, even if they have not been recorded in Euro-

Canadian documentation. The study area for the Project is situated within the traditional lands and territory of several Indigenous communities and groups, including the Mississaugas of the Credit First Nation (Wybenga and Dalton 2018), the Six Nations of the Grand River, the Huron Wendat Nation, and the Haudenosaunee Confederacy.

1.2.2 Euro-Canadian Resources

In 1791, the Provinces of Upper Canada and Lower Canada were created from the former Province of Quebec by an act of British Parliament (Craig 1963:17). At this time, Colonel John Graves Simcoe was appointed as the Lieutenant Governor of Upper Canada and was tasked with governing the new province, directing its settlement and establishing a constitutional government modelled after that of Britain (Coyne 1895). In 1792, Simcoe divided Upper Canada into 19 counties consisting of previously settled lands, new lands opened for settlement, and lands not yet acquired by Crown. These new counties stretched from Essex in the west to Glengarry in the east.

In discussing the late 19th century mapping it must be remembered that historical county atlases were produced primarily to identify factories, offices, residences, and landholdings of subscribers and were funded by subscription fees. Landowners who did not subscribe were not always listed on the maps (Caston 1997:100). As such, structures were not necessarily depicted or placed accurately (Gentilcore and Head 1984). Review of historic mapping also has inherent accuracy difficulties due to potential error in geo-referencing. Geo-referencing is conducted by assigning spatial coordinates to fixed locations and using these points to spatially reference the remainder of the map. Due to changes in 'fixed' locations over time (e.g., road intersections, road alignment, watercourses, etc.), errors/difficulties of scale and the relative idealism of the historic cartography, historic maps may not translate accurately into real space points. This may provide obvious inconsistencies during the historic map review.

The Stage 1 study area for the Project is located in part of Block 3 and Block 32 in the Township of Woolwich, former Waterloo County, now Regional Municipality of Waterloo, Ontario. The Township of Woolwich was one of the earliest townships secured for settlement in Waterloo County. As discussed in Section 1.2.1, Woolwich Township has its origins as a part of the Haldimand Tract. After the Treaty of Paris of 1783 recognized the independence of the United States, members of the Haudenosaunee (Iroquois) who remained loyal to Great Britain petitioned the Governor of Quebec, Frederick Haldimand, for a land grant in Canada to replace lost territory in New York State. Joseph Brant, a prominent Indigenous Loyalist also known as Thayendanegea, selected the Grand River Valley, which includes the study area, as the location for the grant.

The future site of Woolwich Township was located within the Haldimand Tract. The fertility of the Grand River Valley soon attracted Euro-Canadian interest in the area and in 1798 Joseph Brant, acting as land agent, sold Block 3, encompassing 86,078 acres, to William Wallace of Niagara for £16,364 (Devitt 1948:38). However, by 1806 Wallace had failed to honour the terms of the sale and Brant limited Wallace to 7,000 acres in the township. In 1807, Augustus Jones and Jacob and John Erb were deeded 46,000 acres in Block 3 (Hayes 1997:6-7). Jacob and John Erb were officials with the German Company, which had been formed to settle Waterloo Township (Woolwich Township 2016). In preparation for settlement,

the township was surveyed by Augustus Jones. By the end of 1807, the German Company portion of the township had been surveyed into 130 lots or blocks and was opened for settlement. Around the same time, the Crooks Tract in Woolwich Township, which was not owned by the German Company and encompassed 893 acres, was opened for settlement (Devitt 1948:38-39). The first recorded European settler in Woolwich Township was a squatter named Thomas Smith who arrived in 1807. Many of the early European settlers to Woolwich Township were Pennsylvanian Germans who were experienced New World farmers (Leibbrandt 1980:12). In 1841, Woolwich Township had a population of 1,009 (Township of Woolwich 2016) and by 1864, the township had a population of 5,256 (Sutherland 1864:10).

Settlement of Woolwich Township increased beginning in the 1830s once most of the land in the adjacent Waterloo Township was settled. This settlement was concentrated in the southern portion of the township, adjacent to the more densely settled Waterloo Township. The closest European settlement to the study area is Conestogo, which was founded in 1830 by David Musselman (Moyer 1970). Musselman also owned the land of the future site of the village of Elmira, which he kept forested and held in speculation. In 1840, Musselman established a sawmill on Spring Creek, and in 1844 he dammed the Conestogo River and built the township's first flour mill, and a second sawmill. In 1846, the village of Conestogo was laid out by David Musselman and Charles Hendry (Irwin and Burnham 1867:77). A post office opened in the village in 1852, with Charles Hendry as the first postmaster (Library and Archives Canada 2014). In 1856, Musselman sold the mill operations to Henry Snider.

The village of Conestogo grew quickly, reaching a population of about 400 by 1867 . The community at the time had a large flour mill operated by Henry Snider, flax mills operated by the Perine brothers, and two sawmills. It also contained a Lutheran church, a common school, two general stores, three hotels, three carriage and wagon maker's shops, and several other mercantile and mechanical establishments. By 1887, Conestogo had a population of about 450 (Union Publishing Company 1877:166) and in 1897, Conestogo had a population of about 410 (Union Publishing Company 1897:19).

The current Scheifele Bridge was constructed through the study area in 1958. The current bridge was not the first structure to cross the Conestogo River within the study area. Early European settlers to the area constructed bridges out of the timber that was readily available as they cleared adjacent land for farming. Early timber structures consisted of two straight logs with smaller boards placed across to create a deck.

Tremaine's Map of the County of Waterloo, Canada West (Tremaine 1861) shows some of the development of Woolwich Township within Block 3 and Block 32 in 1861 and, particularly, illustrates Regional Road 22 (Northfield Drive) as an open roadway with a structure across the Conestogo River (Figure 4). The 1861 map illustrates a number of landowners and structures related to the study area, including the Shifely family (alternatively spelled 'Scheifele') (Table 1). Listed on the south side of the river are Mathew and Frederick Scheifele, and Christian Scheifele on the northwest side of the river. They were brothers and sons of Andrew and Anna Maria Scheifele. The Scheifele's were a pioneer family to the area, as Andrew and Anna Maria arrived with their children Matthew, Louisa, and Christian to Berlin (City of Kitchener) in 1815 (Eby 1896:222).

Table 1: Applicable Landowner Information from the 1861 Map of Woolwich Township

Lot / Block	Portion / Parcel	Landowner	Comment
3	West of Regional Road 22 (Northfield Drive)	Mathew Shifely	Structure illustrated fronting Regional Road 22, likely corresponding to existing farmhouse at 550 Northfield Drive
3	East of Regional Road 22 (Northfield Drive)	Frederick Shifely	Structure illustrated fronting Regional Road 22, likely corresponding to the property at 531 Northfield Drive
32	Adjacent to north side of Conestogo River, west of Regional Road 22 (Northfield Drive)	Christian Shifely	No structures illustrated
32	Parcel adjacent to west side of Regional Road 22 (Northfield Drive)	J. Shifely	Structure illustrated fronting Regional Road 22, likely corresponding to existing farmhouse at 776 Northfield Drive
32	Small parcel adjacent to west side of Regional Road 22 (Northfield Drive)	M. Shifely	No structures illustrated
32	Small parcel adjacent to east side of Regional Road 22 (Northfield Drive)	S. Shifely	No structures illustrated
32	Adjacent to north side of Conestogo River, east of Regional Road 22 (Northfield Drive)	F. Roch	No structures illustrated

On the 1881 map of the Township of Woolwich map in the *Illustrated Historical Atlas of the County of Waterloo* (Parsell 1881), a structure or bridge is depicted across the Conestogo River in the study area (Figure 5). The bridge in 1881 is in the same location as the structure shown on the 1861 map. No landowners are depicted on the 1881 map for Block 3 and Block 32 as they relate to the study area. bridge structure.

In the late 19th century, flooding became an issue on the Conestogo River and controlling spring floods was first advocated in the 1890s (Thorning 2008). In the mid-1930s, the Grand River Conservation Commission proposed a system of dams on the Grand River watershed. The first dam, the Shand Dam, was built to the northeast in 1942. Following the Second World War, planning to control the water levels on the Conestogo River became the focus. Planning for a dam was mostly complete by the end of 1952, but a freeze on federal spending influenced by the Korean War held up work for another three years. In 1954, the Grand River Conservation Commission hired C.A. Pitts & Company to construct the dam. Except for the gates, work was mostly completed on the dam by the end of the summer of 1957. The dam was completed on October 15, 1958 (Thorning 2008).

The current Scheifele Bridge was constructed in 1958 to replace two deteriorated bridge structures. In the spring of 1958, the Road and Bridge Committee called for tenders for the construction of Scheifele Bridge and for the grading of its approaches (County of Waterloo 1958:88). In June 1958, the contract for the construction of the bridge and approaches was awarded to E. & E. Seegmiller (County of Waterloo

1958:119). In September 1958, County Council approved the construction of the new bridge (The Waterloo Chronicle 1958). The bridge was completed, with the exception of the approaches, by December 1958 (County of Waterloo 1958:209). The new bridge was constructed just east of the previous bridge structure and was named for the Scheifele family who were early landowners around the bridge area.

1.3 ARCHAEOLOGICAL CONTEXT

1.3.1 The Natural Environment

The study area is situated within the "Oxford Till Plain" physiographic region, as described by Chapman and Putnam 1984). The Oxford Till Plain consists of a 600 square mile drumlinized area situated mostly in Oxford County, with a portion of the plain identified in the Township of Woolwich in the former Waterloo County. Chapman and Putnam (1984:143-144) note:

> *…good drumlins appear south of Woodstock, where the glacier apparently overrode an older moraine…The valleys that cut across this till plain area at present are occupied by headwaters of the Thames River. These are obviously misfit streams, too small for the valleys they occupy… In much of the area, the dominant soil type is Guelph Loam, a typical Grey Brown Luvisol, developed under a maple-beech forest.*

In looking specifically at the study area, the soils are classified in the Grand – Kirkland association which includes the following soil series: Grand loam, Macton loam, Elmira loam, Kirkland loamy sand, Haysville loamy sand, Hespeler loamy sand, Boomer loam over gravel, Donald loam over gravel, Hawkesville loam over gravel, and Martin sand and gravel (Presant and Wicklund 1971). With the exception of Elmira loam, Hespeler loam, and Hawkesville loam over gravel, which exhibit poor drainage, the remaining soil series within the study area range from imperfect to good drainage (Presant and Wicklund 1971). Generally, the soil types within the study area are suitable for Indigenous and European agricultural practices.

Potable water is the single most important resource for any extended human occupation or settlement and since water sources in southwestern Ontario have remained relatively stable over time, proximity to drinkable water is regarded as a useful index for the evaluation of archaeological site potential. In fact, distance to water is one of the most commonly used variables for predictive modeling of archaeological site location in Ontario. The Conestogo River bisects the study area. Martin Creek, which drains into the Conestogo River, is located approximately 650 metres west of the study area. Additional ancient and/or relic tributaries of water sources may have existed but are not identifiable today.

1.3.2 Pre-contact Indigenous Resources

It has been demonstrated that Indigenous people began occupying southern Ontario as the Laurentide glacier receded, as early as 11,000 years ago (Ellis and Ferris 1990:13). Much of what is understood about the lifeways of these Indigenous peoples is derived from archaeological evidence and ethnographic analogy. In Ontario, Indigenous culture prior to the period of contact with European peoples has been distinguished into cultural periods based on observed changes in material culture. These cultural periods

are largely based on observed changes to formal lithic tools, and separated into the Early Paleo-Indian, Late Paleo-Indian, Early Archaic, Middle Archaic, Late Archaic and Terminal Archaic periods. Following the advent of ceramic technology in the Indigenous archaeological record, cultural periods are separated into the Early Woodland, Middle Woodland, and Late Woodland periods, based primarily on observed changes in formal ceramic decoration. It should be noted that these cultural periods do not necessarily represent specific cultural identities but are a useful paradigm for understanding changes in Indigenous culture through time. The current understanding of Indigenous archaeological culture is summarized in Table 2, based on Ellis and Ferris (1990). The provided time periods are based on the "Common Era" calendar notation system, i.e., Before Common Era (BCE) and Common Era (CE).

Table 2: Generalized Cultural Chronology of the Study Area

Period	Characteristics	Time Period	Comments
Early Paleo-Indian	Fluted Projectiles	9000 – 8400 BCE	spruce parkland/caribou hunters
Late Paleo-Indian	Hi-Lo Projectiles	8400 – 8000 BCE	smaller but more numerous sites
Early Archaic	Kirk and Bifurcate Base Points	8000 – 6000 BCE	slow population growth
Middle Archaic	Brewerton-like points	6000 – 2500 BCE	environment similar to present
Late Archaic	Narrow Points	2500 – 1800 BCE	increasing site size
	Broad Points	1800 – 1500 BCE	large chipped lithic tools
	Small Points	1500 – 1100 BCE	introduction of bow hunting
Terminal Archaic	Hind Points	1100 - 950 BCE	emergence of true cemeteries
Early Woodland	Meadowood Points	950 - 400 BCE	introduction of pottery
Middle Woodland	Dentate/Pseudo-Scallop Pottery	400 BCE – 500 CE	increased sedentism
	Princess Point	550 – 900 CE	introduction of corn
Late Woodland	Early Ontario Iroquoian	900 – 1300 CE	emergence of agricultural villages
	Middle Ontario Iroquoian	1300 – 1400 CE	long longhouses (100m +)
	Late Ontario Iroquoian	1400 – 1650 CE	tribal warfare and displacement
Contact Indigenous	Various Algonkian Groups	1650 – 1875 CE	early written records and treaties
Late Historic	Euro-Canadian	1796 CE – present	European settlement

Between 9000 and 8000 BCE, Indigenous populations were sustained by hunting, fishing, and foraging and lived a relatively mobile existence across an extensive geographic territory. Despite these wide territories, social ties were maintained between groups. One method of maintaining social ties was through gift exchange, evident through exotic lithic material documented on many sites (Ellis 2013:35-40).

By approximately 8000 BCE, evidence exists and becomes more common for the production of ground-stone tools such as axes, chisels, and adzes. These tools themselves are believed to be indicative specifically of woodworking. This evidence can be extended to indicate an increase in craft production and arguably craft specialization. This latter statement is also supported by evidence, dating to approximately 7000 BCE of ornately carved stone objects which would be laborious to produce and have explicit aesthetic qualities (Ellis 2013:41). This is indirectly indicative of changes in social organization

which permitted individuals to devote time and effort to craft specialization. Since 8000 BCE, the Great Lakes basin experienced a low-water phase, with shorelines significantly below modern lake levels (Stewart 2013: Figure1.1.C). It is presumed that the majority of human settlements would have been focused along these former shorelines. At approximately 6500 BCE the climate had warmed considerably since the recession of the glaciers and the environment had grown more similar to the present day. By approximately 4500 BCE, evidence exists from southern Ontario for the utilization of native copper (naturally occurring pure copper metal) (Ellis 2013:42). The known origin of this material along the north shore of Lake Superior indicates the existence of extensive exchange networks across the Great Lakes basin.

At approximately 3500 BCE, the isostatic rebound of the North American plate following the melt of the Laurentide glacier had reached a point which significantly affected the watershed of the Great Lakes basin. Prior to this, the Upper Great Lakes had drained down the Ottawa Valley via the French-Mattawa river valleys. Following this shift in the watershed, the drainage course of the Great Lakes basin had changed to its present course. This also prompted a significant increase in water-level to approximately modern levels (with a brief high-water period); this change in water levels is believed to have occurred catastrophically (Stewart 2013:28-30). This change in geography coincides with the earliest evidence for cemeteries (Ellis 2013:46). By 2500 BCE, the earliest evidence exists for the construction of fishing weirs (Ellis *et al.* 1990: Figure 4.1). Construction of these weirs would have required a large amount of communal labour and are indicative of the continued development of social organization and communal identity. The large-scale procurement of food at a single location also has significant implications for permanence of settlement within the landscape. This period is also marked by further population increase and by 1500 BCE evidence exists for substantial permanent structures (Ellis 2013:45-46).

By approximately 950 BCE, the earliest evidence exists for populations using ceramics. Populations are understood to have continued to seasonally exploit natural resources. This advent of ceramic technology correlated, however, with the intensive exploitation of seed foods such as goosefoot and knotweed as well as mast such as nuts (Williamson 2013:48). The use of ceramics implies changes in the social organization of food storage as well as in the cooking of food and changes in diet. Fish also continued to be an important facet of the economy at this time. Evidence continues to exist for the expansion of social organization (including hierarchy), group identity, ceremonialism (particularly in burial), interregional exchange throughout the Great Lakes basin and beyond, and craft production (Williamson 2013:48-54).

By approximately 550 CE, evidence emergences for the introduction of maize into southern Ontario. This crop would have initially only supplemented Indigenous peoples' diet and economy (Birch and Williamson 2013:13-14). Maize-based agriculture gradually became more important to societies and by approximately 900 CE permanent communities emerge which are primarily focused on agriculture and the storage of crops, with satellite locations oriented toward the procurement of other resources such as hunting, fishing, and foraging. By approximately 1250 CE, evidence exists for the common cultivation of historic Indigenous cultigens, including maize, beans, squash, sunflower, and tobacco. The extant archaeological record demonstrates many cultural traits similar to historic Indigenous nations (Williamson 2013:55). Both Huron-Wendat and Anishnaabeg traditional history indicate that the Huron-Wendat and Anishnaabeg cohabitated the region (Kapyrka 2018).

1.3.3 Registered Archaeological Sites and Surveys

In Canada, archaeological sites are registered within the Borden system, a national grid system designed by Charles Borden in 1952 (Borden 1952). The grid covers the entire surface area of Canada and is divided into major units containing an area that is two degrees in latitude by four degrees in longitude. Major units are designated by upper case letters. Each major unit is subdivided into 288 basic unit areas, each containing an area of 10 minutes in latitude by 10 minutes in longitude. The width of basic units reduces as one moves north due to the curvature of the earth. In southern Ontario, each basic unit measures approximately 13.5 kilometres east-west by 18.5 kilometres north-south. In northern Ontario, adjacent to Hudson Bay, each basic unit measures approximately 10.2 kilometres east-west by 18.5 kilometres north-south. Basic units are designated by lower case letters. Individual sites are assigned a unique, sequential number as they are registered. These sequential numbers are issued by the MHSTCI who maintain the *Ontario Archaeological Sites Database*. The study area is located within Borden block AjHd, and Borden block AjHc is located within one kilometre.

Information concerning specific site locations is protected by provincial policy and is not fully subject to the *Freedom of Information and Protection of Privacy Act* (Government of Ontario 1990b). The release of such information in the past has led to looting or various forms of illegally conducted site destruction. Confidentiality extends to media capable of conveying location, including maps, drawings, or textual descriptions of a site location. The MHSTCI will provide information concerning site location to the party or an agent of the party holding title to a property, or to a licensed archaeologist with relevant cultural resource management interests.

An examination of the *Ontario Archaeological Sites Database* has shown that there are 18 registered archaeological sites within one kilometre of the study area (Government of Ontario 2020b). Table 3 provides a summary of the registered archaeological sites within one kilometre of the study area. No registered archaeological sites are within the study area or are within 50 metres of the study area.

Table 3: Registered Archaeological Sites within One Kilometre of the Study Area

Borden Number	Site Name	Site Type	Cultural Affiliation
AjHd-2	Not applicable (n/a)	Findspot	Indigenous
AjHd-3	Harvey Martin House	Farmstead	Euro-Canadian
AjHd-8	Northfield Industrial Subdivision	Scatter	Indigenous
AjHd-12	Eastbridge 2	Scatter	Indigenous, Early Archaic
AjHd-13	Eastbridge 3	Findspot	Indigenous
AjHd-14	Eastbridge 4	Findspot	Indigenous
AjHd-15	Eastbridge 5	Findspot	Indigenous, Late Archaic
AjHd-16	Eastbridge 6	Findspot	Indigenous
AjHd-21	Black Walnut III	Homestead	Euro-Canadian
AjHd-22	n/a	Findspot	Indigenous
AjHd-23	Black Walnut V	Findspot	Indigenous, Middle Archaic

Borden Number	Site Name	Site Type	Cultural Affiliation
AjHd-31	n/a	Findspot	Indigenous, Middle Archaic
AjHc-4	n/a	Findspot	Indigenous
AjHc-5	n/a	Findspot	Indigenous
AjHc-14	n/a	Farmstead	Euro-Canadian
AjHc-15	Location 1	Scatter	Indigenous
AjHc-16	n/a	Scatter	Indigenous
AjHc-17	n/a	Scatter	Indigenous

A query of the *Ontario Public Register of Archaeological Reports* indicates that there are no previous archaeological studies undertaken within 50 metres of the study area (Government of Ontario 2020c).

1.3.4 Archaeological Master Plan

An *Archaeological Facilities Master Plan* was developed by the Regional Municipality of Waterloo (Regional Municipality of Waterloo 1989). The purpose of the plan "is to identify and evaluate the archaeological resources in the Region and to study the feasibility of developing an archaeological facility" (Regional Municipality of Waterloo 1989:2). Distance to water, and distance to multiple different water sources, provided the basis for the most efficient model for Indigenous site potential modelling. Euro-Canadian site potential modelling focused on areas which would provide evidence for some of the earliest settlements of the area, including historic roads, early historic communities, and structures illustrated on historic mapping. Based on the archaeological potential modelling criteria included in the *Archaeological Facilities Master Plan* (Regional Municipality of Waterloo 1989), portions of the study area are situated within areas that retain potential for the identification of archaeological resources.

1.3.5 Related Reports

A Cultural Heritage Evaluation Report (CHER) is being prepared by Stantec (n.d.) specifically for the Scheifele Bridge. A CHER is completed where a potential built heritage resource or cultural heritage landscape requires evaluation to determine its cultural heritage value or interest. Where cultural heritage value or interest is identified, the CHER includes a description of heritage attributes and a Statement of Cultural Heritage Value. The CHER represents the foundation upon which future work is based, including a heritage impact assessment or a Strategic Conservation Plan.

1.3.6 Existing Conditions

The study area for the Project is located in part of Block 3 and Block 32 in the Township of Woolwich, former Waterloo County, now Regional Municipality of Waterloo, Ontario. Overall, the study area comprises approximately 12.8 hectares and includes residential and commercial structures, gravel and paved driveways or parking lots, municipal road ROWs, buried and above ground utilities, steep slope, woodlot and scrubland, active agricultural field, and the Conestogo River.

2.0 FIELD METHODS

Initial background research compiled information concerning known and/or potential archaeological resources within the study area. A property inspection was conducted under archaeological consulting license P256 issued to Parker Dickson, MA, of Stantec by the MHSTCI. The property inspection was completed on April 20, 2020 under Project Information Form (PIF) number P256-0611-2020 in accordance with Section 1.2 of the MHSTCI' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The property inspection involved spot-checking the entirety of the study area to identify the presence or absence of any features of archaeological potential. Permission to enter the study area and identify features of archaeological potential was provided by the Client. However, access to private property within the study area was not arranged. Thus, photo documentation obtained as part of the Stage 1 property inspection was restricted to municipal road ROWs and public properties. During the property inspection the weather was mainly sunny and mild, and visibility of land features was adequate. Overall, the lighting, weather, and field conditions were not detrimental to the identification of features of archaeological potential.

The study area comprises approximately 12.8 hectares and includes residential and commercial structures, gravel and paved driveways or parking lots, municipal road ROWs, buried and above ground utilities, steep slope, woodlot and scrubland, active agricultural field, and the Conestogo River. The photography from the property inspection is presented in Section 7.1 and confirms that the requirements for a Stage 1 property inspection were met, as per Section 1.2 and Section 7.7.2 Standard 1 of the MHSTCI's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

The property inspection demonstrated that approximately 53.6% of the study area comprises agricultural field, scrubland, and sparse wood lot (Photos 1 to 8). The property inspection also confirmed that 23.3% of the study area comprises previously disturbed areas from the existing municipal road ROW, bridge, buried utilities, gravel laneways, and a commercial property with various outbuildings. The manner in which the existing bridge was constructed has left little to no land or riverbank beneath the bridge deck, depending on water levels (see Photo 33). Photos 9 to 25, and 33, illustrate typical areas of previous disturbance within the study area.

The remaining portion of the study area comprises low and permanently wet areas (approximately 22.1.%) and areas of steep slope (approximately 1.0%). The low and permanently wet areas within the study area includes low marshy areas and a portion of the Conestogo River. While the river is low and permanently wet, the area retains potential for marine archaeological resources. Photos 26 to 31 illustrate low and permanently wet areas, while Photo 32 illustrates the area of steep slope.

3.0 ANALYSIS AND CONCLUSIONS

3.1 ARCHAEOLOGICAL POTENTIAL

Archaeological potential is established by determining the likelihood that archaeological resources may be present on a subject property. Stantec applied archaeological potential criteria commonly used by the MHSTCI (Government of Ontario 2011) to determine areas of archaeological potential within the study area. These variables include proximity to registered archaeological sites, distance to various types of water sources, soil texture and drainage, glacial geomorphology, elevated topography, and the general topographic variability of the area. However, it is worth noting that extensive land disturbance can eradicate archaeological potential (Government of Ontario 2011).

Potable water is the single most important resource for any extended human occupation or settlement and since water sources in Ontario have remained relatively stable over time, proximity to drinkable water is regarded as a useful index for the evaluation of archaeological site potential. In fact, distance to water is one of the most commonly used variables for predictive modeling of archaeological site locations. Distance to modern or ancient water sources is generally accepted as the most important determinant of past human settlement patterns and considered alone, may result in a determination of archaeological potential. However, any combination of two or more other criteria, such as well-drained soils or topographic variability, may also indicate archaeological potential.

As discussed above, distance to water is an essential factor in archaeological potential modeling. When evaluating distance to water it is important to distinguish between water and shoreline, as well as natural and artificial water sources, as these features affect site location and type to varying degrees. The MHSTCI categorizes water sources in the following manner:

- Primary water sources: lakes, rivers, streams, creeks;
- Secondary water sources: intermittent streams and creeks, springs, marshes and swamps;
- Past water sources: glacial lake shorelines, relic river or stream channels, cobble beaches, shorelines of drained lakes or marshes; and
- Accessible or inaccessible shorelines: high bluffs, swamp or marshy lake edges, sandbars stretching into marsh.

The study area is crossed by the Conestogo River, and Martin Creek which drains into the Conestogo River, is located approximately 650 metres west of the study area. Additional ancient and/or relic tributaries of water sources may have existed but are not identifiable today. The confluences of primary water sources are frequently the focus of human settlement and activity. Further examination of the study area's natural environment identified soil conditions suitable for Indigenous and Euro-Canadian agriculture, as well as areas of elevated topography. The northwestern portion of the study area includes an elevated terrace overlooking the Conestogo river to the south. Storck (1982) notes that archaeological sites, particularly Paleo-Indian sites, tend to be situated in areas of elevated topography as these areas would possess better drainage and would provide a broad view of the surrounding terrain for game watching.

An examination of the *Ontario Archaeological Sites Database* identified 18 registered archaeological sites within one kilometre of the study area: 15 are Indigenous, and three are Euro-Canadian.

For Euro-Canadian sites, archaeological potential can be extended to areas of early Euro-Canadian settlement, including places of military or pioneer settlements; early transportation routes; and properties listed on the municipal register or designated under the *Ontario Heritage Act* (Government of Ontario 1990c) or property that local histories or informants have identified with possible historical events, activities, or occupations. Historical documentation shows that the community of Conestogo, located approximately 1.5 kilometres north of the study area, developed around a mill site established by David Musselman in 1830. The bridge crossing the Conestogo River was identified on historic mapping as early 1861 and was named after the Shifely, or Scheifele, family who settled around the crossing.

In addition to the above, based on the archaeological potential modelling criteria included in the *Archaeological Facilities Master Plan* (Regional Municipality of Waterloo 1989), portions of the study area are situated within areas that retain potential for the identification of archaeological resources.

The property inspection completed for the study area identified areas which retain archaeological potential (see Photos 1 to 8) and areas that retain low to no archaeological potential, such as areas of previous disturbance, steep slope, and low and permanently wet areas (see Photos 9 to 32).

When the above listed criteria are applied and the results from the property inspection are considered, a portion of the study area, approximately 53.6%, retains potential for land-based Indigenous and Euro-Canadian archaeological resources. In accordance with Section 1.3.1 of the MHSTCI's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), further land-based archaeological assessment is required for any portion of the study area retaining land-based archaeological potential. The remaining portion of the study area, approximately 46.4%, is considered to retain no to low potential for land-based Indigenous and Euro-Canadian archaeological resources. The areas of no to low potential include previously disturbed areas (23.3%), low and permanently wet areas (22.1%), and areas of steep slope (1.0%). In accordance with Section 1.3.2 of the MHSTCI's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), no further land-based archaeological assessment is required for any portion of the study area retaining low to no archaeological potential for land-based resources.

In addition to the above, while the Conestogo River represents a low and permanently wet area and does not retain potential for land-based archaeological resources, it does retain potential for the identification of marine archaeological resources.

Figure 6 illustrates the archaeological potential of the study area.

4.0 RECOMMENDATIONS

The Stage 1 archaeological assessment of the study area for the Project, involving background research and a property inspection, determined that a portion of the study area, approximately 53.6%, retains potential for the identification and documentation of archaeological resources. In accordance with Section 1.3.1 and Section 7.7.4 of the MHSTCI's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), **Stage 2 Archaeological Assessment is required for any portion of the Project's anticipated construction which impacts an area of archaeological potential (Figure 6).**

The objective of Stage 2 archaeological assessment will be to document archaeological resources within the portions of the study area still retaining archaeological potential and to determine whether these archaeological resources require further assessment. Stage 2 archaeological assessment will include the systematic walking of open ploughed fields at five metre intervals as outlined in Section 2.1.1 of the MHSTCI's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The MHSTCI standards further require that agricultural land, both active and inactive, be recently ploughed and sufficiently weathered to improve the visibility of archaeological resources. Ploughing must be deep enough to provide total topsoil exposure, but not deeper than previous ploughing, and must provide at least 80% ground surface visibility.

For areas inaccessible for ploughing, Stage 2 archaeological assessment will include a test pit survey at five metre intervals as outlined in Section 2.1.2 of the MHSTCI's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The MHSTCI standards require that each test pit be approximately 30 centimetres in diameter, excavated to at least five centimetres into subsoil, and have all soil screened through six millimetre hardware cloth to facilitate the recovery of any cultural material that may be present. Prior to backfilling, each test pit will be examined for stratigraphy, cultural features, or evidence of fill.

If the archaeological field team determines any lands to be low and wet, steeply sloped, or disturbed during the course of the Stage 2 field work, those areas will not require survey, but will be photographically documented in accordance with Section 2.1 of the MHSTCI's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

The Stage 1 archaeological assessment also determined that a portion of the study area, approximately 46.4%, retains low to no archaeological potential for the identification or recovery of archaeological resources due to areas of previous disturbance, steep slope, and low and permanently wet areas. In accordance with Section 1.3.2 and Section 7.7.4 of the MHSTCI's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), **Stage 2 Archaeological Assessment is not required for any portion of the Project's anticipated construction which impacts an area of low to no archaeological potential (Figure 6).**

Further, Stantec encourages engagement with Indigenous communities with interests in the Project area. As it pertains to archaeological assessment, engagement may include notification of any upcoming Stage 2 archaeological field work and an invitation to interested Indigenous communities to join the archaeological field crew during the Stage 2 survey work. Indigenous engagement practices must be completed in accordance with the MHSTCI's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011) and the draft technical bulletin on *Engaging Aboriginal Communities in Archaeology*.

In addition to the above, the portion of the study area containing the Conestogo River retains potential for the identification of marine archaeological resources (Figure 6). It is anticipated that impacts to the Conestogo River will occur as part of the Project and will be finalized during detailed design phase. Thus, **it is recommended that potential for marine archaeological resources be evaluated using the MHSTCI's *Criteria for Evaluating Marine Archaeological Potential Checklist*.** A copy of the checklist is provided in Appendix A.

The MHSTCI is asked to review the results presented and to accept this report into the *Ontario Public Register of Archaeological Reports*.

5.0 ADVICE ON COMPLIANCE WITH LEGISLATION

This report is submitted to the Minister of Heritage, Sport, Tourism and Culture Industries as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c O.18 (Government of Ontario 1990c). The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the study area of a development proposal have been addressed to the satisfaction of the Ministry of Heritage, Sport, Tourism and Culture Industries, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* (Government of Ontario 1990c) for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the *Ontario Heritage Act* (Government of Ontario 1990c).

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990c). The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990c).

The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 (Government of Ontario 2002) requires that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Government and Consumer Services.

Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990c) and may not be altered, or have artifacts removed, except by a person holding an archaeological license.

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7.0 IMAGES

7.1 PHOTOGRAPHS

Photo 1: Typical agricultural field within the study area, facing east

Photo 2: Typical agricultural field within the study area, facing east

Photo 3: Typical agricultural field within the study area, facing northeast

Photo 4: Typical agricultural field within the study area, facing southeast

Photo 5: Typical agricultural field within the study area, facing southwest

Photo 6: Typical area of scrubland within the study area, facing southwest

Photo 7: Typical agricultural field within the study area, facing west

Photo 8: Typical agricultural field within the study area, facing north

Photo 9: Typical disturbed municipal road ROW within the study area, facing northeast

Photo 10: Typical disturbed municipal road ROW within the study area, facing northeast

Photo 11: Typical disturbed municipal road ROW within the study area, facing northeast

Photo 12: Typical disturbed municipal road ROW within the study area, facing southwest

Photo 13: Typical disturbed municipal road ROW within the study area, facing north

Photo 14: Typical disturbed municipal road ROW within the study area, facing north

Photo 15: Typical disturbed municipal road ROW within the study area, facing south

Photo 16: Typical disturbed municipal road ROW within the study area, facing south

Photo 17: Typical disturbed municipal road ROW within the study area, facing southwest

Photo 18: Typical disturbed municipal road ROW within the study area, facing southwest

Photo 19: Typical disturbed municipal road ROW within the study area, facing southwest

Photo 20: Typical disturbed municipal road ROW within the study area, facing northeast

Photo 21: Disturbed laneway within the study area, facing southeast

Photo 22: Disturbed laneway within the study area, facing west

Photo 23: Disturbed laneway within the study area, facing west

Photo 24: Existing commercial property with various buildings within the study area, facing east

Photo 25: Existing commercial property with various buildings within the study area, facing east

Photo 26: Low and permanently wet area within the study area, facing northeast

Photo 27: Low and permanently wet area within the study area, facing northeast

Photo 28: Low and permanently wet area within the study area, facing east

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Photo 29: Conestogo River, low and permanently wet area within the study area, facing west

Photo 30: Low and permanently wet area within the study area, facing southwest

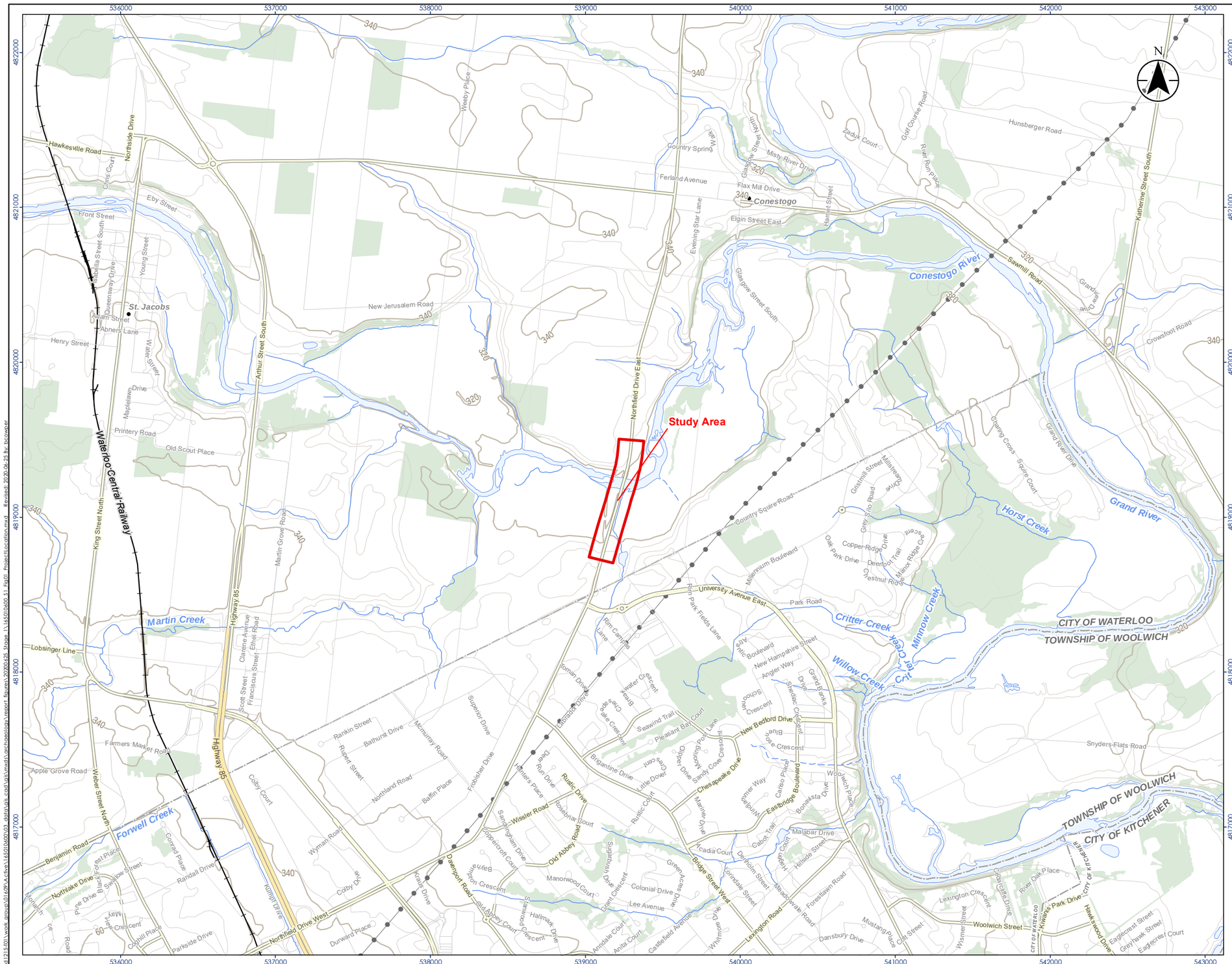
Photo 31: Low and permanently wet area within the study area, facing north

Photo 32: Area of steep slope within the study area, facing west

Photo 33: Study area conditions beneath existing bridge deck, facing southeast

8.0 MAPS

General maps of the study area for the Project follow on succeeding pages.


Study Area
Conestogo
Conestogo River
St. Jacobs
Martin Creek
Forwell Creek
Horst Creek
Grand River
Critter Creek
Minnow Creek
Willow Creek
CITY OF WATERLOO
TOWNSHIP OF WOOLWICH
CITY OF KITCHENER
Waterloo Central Railway
Hawkesville Road
Eby Street
Front Street
King Street North
Weber Street North
Arthur Street South
Northfield Drive East
New Jerusalem Road
Sawmill Road
Hunsberger Road
Katherine Street South
Crowsfoot Road
Glasgow Street South
Evening Star Lane
Ferland Avenue
Flax Mill Drive
Elgin Street East
Misty River Drive
Golf Course Road
River Run Place
Country Spring
Weeby Place
Northside Drive
Queensway Drive
Young Street
Abner's Lane
Henry Street
Maplelawn Drive
Printery Road
Old Scout Place
Lobsinger Line
Highway 85
Martin Grove Road
Clarence Avenue
Ethel Road
Scott Street
Francisous Street
Farmers Market Road
Apple Grove Road
Benjamin Road
Nothlake Drive
Northfield Drive West
Parkside Drive
Durward Place
Colby Court
Wyman Road
Rankin Street
Bathurst Drive
Rupert Street
Mcmurray Road
Northland Road
Baffin Place
Fridolshire Drive
Superior Drive
Wiesler Road
Rustic Drive
Old Abbey Road
Davenport Road
Bridge Street West
Lexington Road
Woolwich Street
Kiwanis Park Drive
Hawkswood Drive
Eaglecrest Street
Greyhawk Street
Eaglecrest Court
Dansbury Drive
Forestlawn Road
Meadowvale Road
Derrydown Street
Hillside Street
Malabar Drive
Eastbridge Boulevard
Chesapeake Drive
New Bedford Drive
Brigantine Drive
Seawind Trail
Pleasant Bay Court
Millennium Boulevard
Country Squire Road
Park Road
University Avenue East
Rim Park Fields Lane
New Hampshire Street
Grand Trunk Drive
Snyders Flats Road
Woolwich Place
Bonnieksta Drive
Cabot Trail
Lee Avenue
Colonial Drive
Manorwood Court
Hallmark Drive
Annadale Court
Anita Court
Castlefield Avenue
Whitmore Lake Road
Oak Park Drive
Copper Ridge Drive
Deerfoot Trail
Chestnut Ridge
Manor Ridge Crescent
Grey Silo Road
Glasshill Street
Milestrip Drive
Cedarcliffe Drive
River Oak Place
Grand River Drive
Queen Street
Glen Forest Drive
Swallow Street
Randall Drive
Conrad Place
Forest Place
Pine Drive
Kerr Street
Cobhill Place
Colby Drive
Kramp Drive
Kraus Drive
Bleam Crescent
Green Valley Drive
Sandringham Drive
Rosemar Court
Roseanne Court
Rim Park Drive
Rim Canada Lane
Toman Drive
Water Crescent
Lake Crescent
Bayview Crescent
Schade Crescent
Sandy Cove Crescent
Moonglow Crescent
Bluebell Crescent
Bluebell Place
Carlton Place
Marine Drive
Rustic Court
Little Dover
Dover Court
Dover Crescent
Dover Place
Harriet Street
Glasgow Street North
Evening Star Lane
Angler Way
Stardale Crescent
Grand Parks Drive
Glasgow Street North
Mill Street
Queen Street
Isabella Street South
Chris Court
Abner's Lane
Wilmot Street
Arthur Street South
Northfield Drive East
Glasgow Street South
Harriet Street
Golf Course Road
Zaduk Court
Katherine Street South
Grandview Drive
Crowsfoot Road
Grand River Drive
Horst Creek
Critter Creek
Minnow Creek
Willow Creek
Woolwich Street
Kiwanis Park Drive
Hawkswood Drive
Eaglecrest Street
Greyhawk Street
Eaglecrest Court
Lexington Crescent
Cedarcliffe Drive
River Oak Place
Wismer Street
Mustang Place
Cott Street
Malabar Drive
Hillside Street
Derrydown Street
Meadowvale Road
Forestlawn Road
Dansbury Drive
Lee Avenue
Colonial Drive
Manorwood Court
Hallmark Drive
Annadale Court
Anita Court
Castlefield Avenue
Whitmore Lake Road
Lexington Road
Bridge Street West
Old Abbey Court
Davenport Road

Stantec

Legend

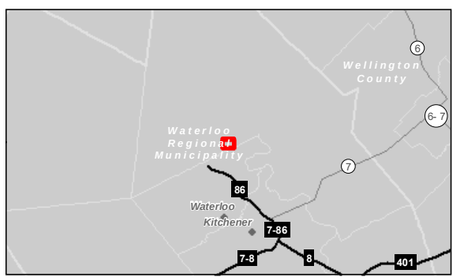
- Study Area (Approx.)
- Hydro Line
- Waterbody

0 80 160 Metres

1:3,500 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2020.
3. Orthoimagery © First Base Solutions, 2020, imagery date 2018.



Project Location
Region of
Waterloo, ON

165010600 REV4
Prepared by BCC on 2020-06-25

Client/Project
REGION OF WATERLOO
SCHEIFELE BRIDGE
STAGE 1 ARCHAEOLOGICAL ASSESSMENT

Figure No.
2

Title
Location of the Study Area

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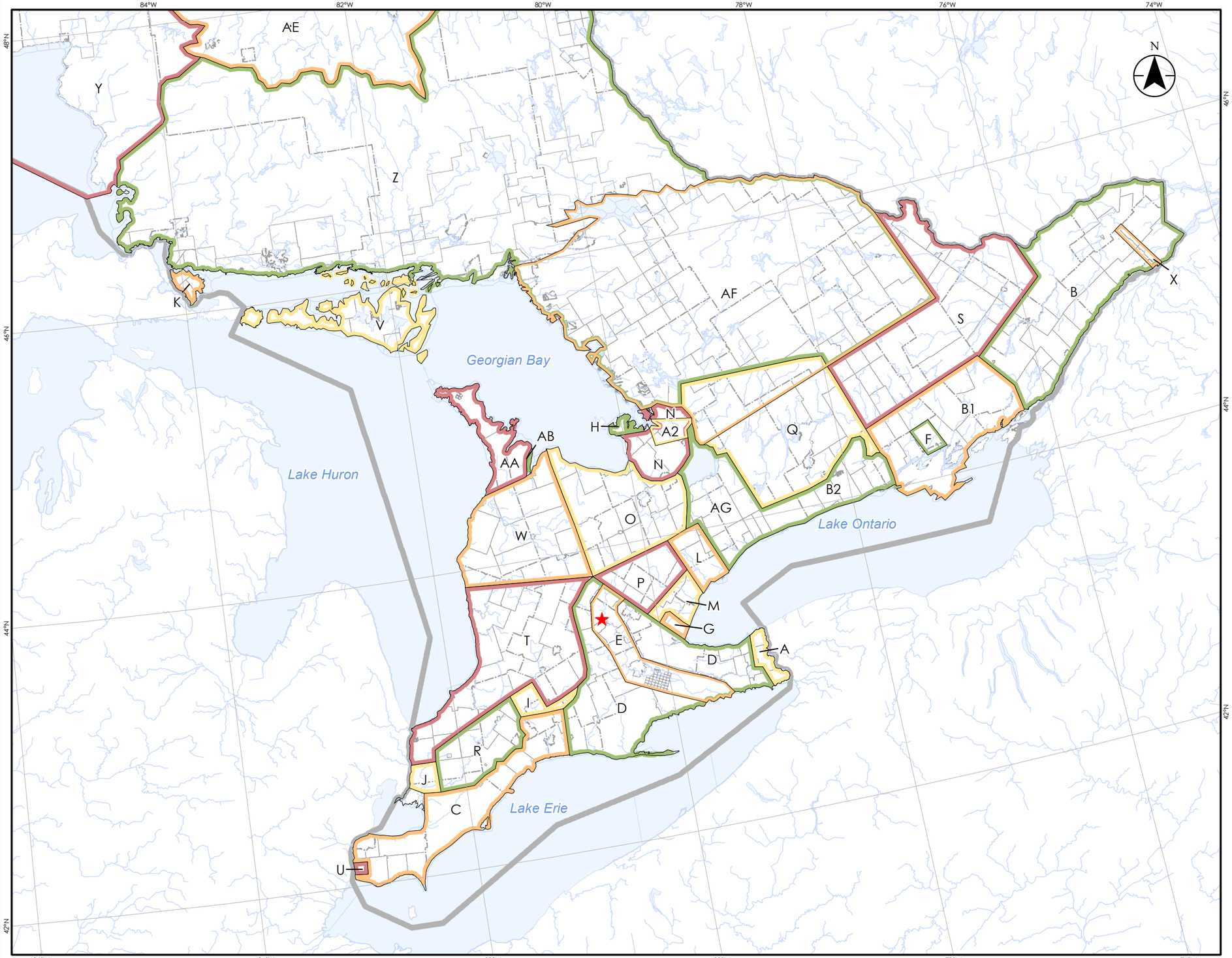

Stantec

Legend

- Location of Project
- Municipal Boundary - Upper Tier
- Municipal Boundary - Lower or Single Tier
- Watercourse
- Waterbody

A Treaty No. 381, May 9th, 1781 (Mississauga and Chippewa)
B Crawford's Purchase, October 9th, 1783 (Algonquin and Iroquois)
B1 Crawford's Purchase, October 9th, 1783 (Mississauga)
B2 Crawford's Purchases, 1784, 1787 And 1788 (Mississauga)
A2 John Collins' Purchase, 1785 (Chippewa)
C Treaty No. 2, May 19th, 1790 (Odawa, Chippewa, Pottawatomi, and Huron)
D Treaty No. 3, December 2nd, 1792 (Mississauga)
E Haldimand Tract:from the Crown to the Mohawk, 1793
F Tyendinaga:from the Crown to the Mohawk, 1793
G Treaty No. 3 3/4:from the Crown to Joseph Brant, October 24th, 1795
H Treaty No. 5, May 22nd, 1798 (Chippewa)
I Treaty No. 6, September 7th, 1796 (Chippewa)
J Treaty No. 7, September 7th, 1796 (Chippewa)
L Treaty No. 13, August 1st, 1805 (Mississauga)
M Treaty No. 13A, August 2nd, 1805 (Mississauga)
N Treaty No.16, November 18th, 1815 (Chippewa)
O Treaty No. 18, October 17th, 1818 (Chippewa)
P Treaty No. 19, October 28th 1818 (Chippewa)
Q Treaty No. 20, November 5th, 1818 (Chippewa)
R Treaty No. 21, March 9th, 1819 (Chippewa)
S Treaty No. 27, May 31st, 1819 (Mississauga)
T Treaty No. 27½, April 25th, 1825 (Ojibwa and Chippewa)
U Treaty No. 35, August 13th, 1833 (Wyandot or Huron)
V Treaty No. 45, August 9th, 1836 (Chippewa and Odawa, "For All Indians To Reside Thereon")
W Treaty No. 45½, August 9th, 1836 (Saugeen)
X Treaty No. 57, June 1st, 1847 (Iroquois of St. Regis)
Z Treaty No. 61, September 9th, 1850 (Robinson Treaty:Ojibwa)
AA Treaty No. 72, October 30th, 1854 (Chippewa)
AB Treaty No. 82, February 9th, 1857 (Chippewa)
AF Williams Treaty, October 31st and November 15th, 1923 (Chippewa and Mississauga)
AG Williams Treaty, October 31st, 1923 (Chippewa)

0 75 150 km
1:3,000,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 Statistics Canada Lambert
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
3. Treaty boundaries adapted from Morris 1943 (1964 reprint).

Project Location
Province of Ontario

165010600 REVA
Prepared by BCC on 2020-06-25

Client/Project
REGION OF WATERLOO
SCHEIFELE BRIDGE
STAGE 1 ARCHAEOLOGICAL ASSESSMENT

Figure No.
3

Title
Treaties and Purchases (Adapted from Morris 1943)

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Stantec

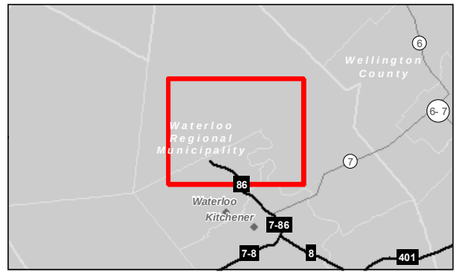
Legend

Study Area (Approx.)

NOT TO SCALE

Notes

1. Source:
Tremaine, Geo. R. & G.M. 1861. Tremaine's Map of the County of Waterloo, Canada West. Toronto: Geo. R. & G.M. Tremaine.



Project Location
Region of
Waterloo, ON

165010600 REV4
Prepared by BCC on 2020-06-25

Client/Project
REGION OF WATERLOO
SCHEIFELE BRIDGE
STAGE 1 ARCHAEOLOGICAL ASSESSMENT

Figure No.
4

Title
Portion of the 1861 Map of Woolwich Township

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Stantec

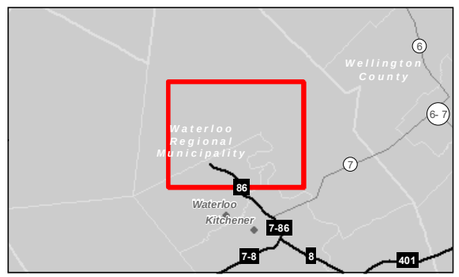
Legend

Study Area (Approx.)

NOT TO SCALE

Notes

1. Source:
Parsell, H. & Co. 1881. Illustrated Historical Atlas of the County of Waterloo. Port Elgin: Ross Cumming.



Project Location
Region of
Waterloo, ON

165010600 REV4
Prepared by BCC on 2020-06-25

Client/Project
REGION OF WATERLOO
SCHEIFELE BRIDGE
STAGE 1 ARCHAEOLOGICAL ASSESSMENT

Figure No.
5

Title
Portion of the 1881 Map of Woolwich Township

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Stantec

Legend

- Study Area
- Photo Location and Direction
- Hydro Line

Assessment Method

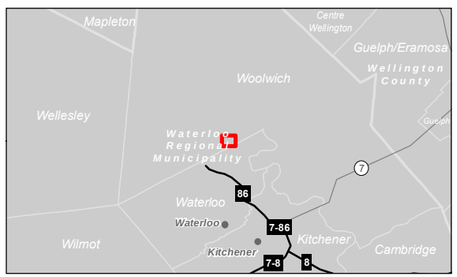
- Area of Archaeological Potential - Further Archaeological Work Required (Stage 1)
- Area of Steep Slope, Low to No Archaeological Potential - No Further Archaeological Work Required
- Low and Permanently Wet Area, Low to No Archaeological Potential - No Further Archaeological Work Required
- Previously Disturbed, Low to No Archaeological Potential - No Further Archaeological Work Required
- Conestogo River - Retains Potential for Marine Archaeological Resources

0 100 200 m

1:3,500 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 CSRS MTM 11
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Orthoimagery © First Base Solutions, 2020, imagery date 2018.



Project Location
Region of Waterloo, ON

165010600 REVA
Prepared by BCC on 2021-02-08

Client/Project
REGION OF WATERLOO
SCHEIFELE BRIDGE
STAGE 1 ARCHAEOLOGICAL ASSESSMENT

Figure No.
5

Title
Stage 2 Survey Methods and Results

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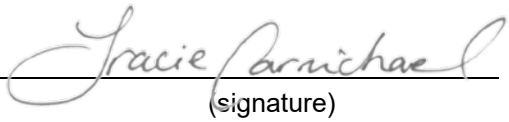
9.0 CLOSURE

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential archaeological resources associated with the identified property.

All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report and are based solely on the scope of work described in the report, the limited data available and the results of the work. The conclusions are based on the conditions encountered by Stantec at the time the work was performed. Due to the nature of archaeological assessment, which consists of systematic sampling, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire property.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities, or claims, howsoever arising, from third party use of this report. We trust this report meets your current requirements. Please do not hesitate to contact us should you require further information or have additional questions about any facet of this report.

Quality Review 
(signature)

Tracie Carmichael, Managing Principal, Environmental Services

Independent Review
(signature)

Colin Varley, Senior Associate, Senior Archaeologist

APPENDIX A

Appendix A MHSTCI'S MARINE ARCHAEOLOGICAL POTENTIAL CHECKLIST

A copy of the MHSTCI's (formerly, Ministry of Tourism, Culture and Sport) *Criteria for Evaluating Marine Archaeological Potential Checklist* is provided on the following pages.

Ontario

Ministry of Tourism, Culture and Sport

Programs & Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7

Criteria for Evaluating Marine Archaeological Potential

A Checklist for Non-Marine Archaeologists

Purpose

The **purpose of this checklist** is to help proponents determine:

- if a property or project area may contain marine archaeological resources or have marine archaeological potential

A marine archaeological site is fully or partially submerged, or lies below or partially below the high-water mark of any body of water.

The property or project area includes all submerged areas that may be impacted by project activities, including, but not limited to:

- the main project area
- temporary storage and stockpiling locations
- staging and work areas, such as docking platforms and dredging locations
- temporary features such as access routes, anchors, moorings and cofferdams.

Please refer to the **instructions** on pages 4 through 9 when completing this checklist

Processes covered

- *Planning Act*
- *Environmental Assessment Act*
- *Aggregate Resources Act*
- *Ontario Heritage Act*
  - Standards & Guidelines for Conservation of Provincial Heritage Properties
- *Canadian Environmental Assessment Act*
- *Canada Shipping Act*

Marine archaeological assessment

The assessment will help you:

- identify, evaluate and protect marine archaeological resources on your property or project area
- reduce potential delays and risks to your project

If you are not sure how to answer one or more of the questions on the checklist, you may want to hire a licensed marine archaeologist (defined on page 5) to undertake a marine archaeological assessment.

Note: Under Part VI of the *Ontario Heritage Act*, all marine archaeological assessments **must** be done by a licensed marine archaeologist. Only a licensed marine archaeologist can assess – or alter – a marine archaeological site.

Have you found a site?

If you find something you think may be of marine archaeological value during project work, you **must** – by law – stop all activities immediately and contact a licensed marine archaeologist. The marine archaeologist will carry out the fieldwork in compliance with the *Ontario Heritage Act*.

Have you found human remains?

If you find remains (e.g., bones) that could be of human origin, you **must** – by law - immediately notify the appropriate authorities (police, coroner's office, or Registrar of Cemeteries) and comply with the *Funeral, Burial and Cremation Services Act*.

Other Checklists

Please use a separate checklist for your project if:

- your Parent Class EA document has approved screening criteria
- your ministry's or prescribed public body's approved Identification and Evaluation Process includes approved screening criteria

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Project or Property Name

Project or Property Location (upper and lower or single tier municipality)

Proponent Name

Proponent Contact Information

Telephone Number	Fax Number	Email Address

Screening Questions

1. Is there a government-authorized, pre-approved screening checklist, methodology or process in place?

☐ Yes ☐ No

If **Yes**, please follow the pre-approved screening checklist, methodology or process. Do not complete the rest of this checklist.
If **No**, continue to Question 2.

2. Has a marine archaeological assessment been prepared for the property or project area and been entered by MTCS into the Ontario Public Register of Archaeological Reports?

☐ Yes ☐ No

If **Yes**, do **not** complete the rest of the checklist. You are expected to follow the recommendations in the marine archaeological assessment report(s).

The proponent and/or approval authority will:

- summarize the previous marine archaeological assessment
- follow any recommendations for further marine archaeological assessment work, as applicable
- add this checklist to the project file, with the appropriate documents that demonstrate a marine archaeological assessment was undertaken (e.g. MTCS letter that states that the report has been entered into the Ontario Public Register of Archaeological Reports)

The summary and appropriate documentation may be:

- submitted as part of a report requirement, e.g. environmental assessment document
- maintained by the proponent or approval authority

If **No**, continue to Question 3.

3. Are there known marine or land-based archaeological sites on or within 500 metres of the property or project area?

☐ Yes ☐ No

4. Is there Aboriginal or local knowledge of marine or land-based archaeological sites on or within 500 metres of the property or project area?

☐ Yes ☐ No

5. Is there Aboriginal knowledge or historically documented evidence of past Aboriginal use on or within 500 metres of the property or project area?

☐ Yes ☐ No

6. Is there a known burial site or cemetery on the property or adjacent to the property or project area?

☐ Yes ☐ No

7. Has the property or project area been recognized for its cultural heritage value?

☐ Yes ☐ No

If **Yes** to any of questions 3 to 7, do **not** complete the checklist. Your property or project area could contain marine archaeological resources: please hire a licensed marine archaeologist to conduct a marine archaeological assessment.
If **No**, continue to Question 8.

8. Has the entire property or project area been subjected to recent, extensive and intensive disturbance?

☐ Yes ☐ No

If **Yes**, do **not** complete the checklist. Instead, please keep and maintain a summary of documentation that provides evidence of the recent disturbance. A marine archaeological assessment is not required.
If **No**, continue to Question 9.

9. Are there two or more reported or registered ship wreck sites or reports of lost ships within a five kilometre radius of the property or project area?

☐ Yes ☐ No

If **Yes**, a marine archaeological assessment is required.

If **No**, continue to Question 10.

10. Is the property or project area within one kilometre of an active or historic harbour, seaplane or floatplane base, tunnel, ferry route, marine terminal, or winter road?

☐ Yes ☐ No

If **Yes**, a marine archaeological assessment is required.

If **No**, continue to Question 11.

11. Where the project impacts fourth order or higher watercourses, are there existing narrows, rapids, waterfalls or does the watercourse enter or leave a body of water within 300 metres of the property or project area?

☐ Yes ☐ No

If **Yes**, a marine archaeological assessment is required.

If **No**, continue to Question 12.

12. Are there potential built heritage or cultural heritage landscape resources that may be of cultural heritage value or interest adjacent to the watercourse or water body?

☐ Yes ☐ No

If **Yes**, a marine archaeological assessment is required.

If **No**, continue to Question 13.

13. Are there inundated beaches, bluffs, lakeshores, streams or river banks within 300 metres of the property or project area?

☐ Yes ☐ No

If **Yes**, a marine archaeological assessment is required.

If **No**, continue to Question 14.

14. Are there inundated beaches, lakeshores or river/creek banks beyond 300 metres and at greater depth than the project area with evidence of two or more of the following in the project area?

- elevated bathymetric features such as drumlins, eskers, kames, ridges, etc.
- pockets of sandy lakebed
- distinctive bathymetric formations such as escarpments, shoals, promontories, reefs, etc.
- inundated resource extraction areas (quarry, fishery)
- inundated historical settlement including built heritage resources or cultural heritage landscapes
- inundated historical transportation routes

☐ Yes ☐ No

If **Yes**, a marine archaeological assessment is required.

If **No**, there is low potential for marine archaeological resources at the property (or project area).

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project report or file

The summary and appropriate documentation may be:

- submitted as part of a report requirement, e.g. under the *Environmental Assessment Act*, *Planning Act* processes
- maintained and retained by the property owner, proponent or approval authority

Instructions

Please have the following available, when requesting information related to the screening questions:

- a clear map or chart showing the location and boundary of the property or project area
  - large scale and small scale maps/charts showing nearby islands or township names for context
- the municipal addresses of all properties or water lots within or adjacent to the project area, if any
- the lot, concession, parcel number or mining claims of any properties within the project area

In this context, the following definitions apply:

- **licensed marine archaeologist** means an archaeologist who has a valid marine archaeology licence issued by the Ministry of Tourism, Culture and Sport to practice in Ontario. As a consultant, a licensed marine archaeologist enters into an agreement with a client to carry out or supervise marine archaeological work on behalf of the client, produce reports for or on behalf of the client and provide technical advice to the client.
- **proponent** means a person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

1. Is there a pre-approved screening checklist, methodology or process in place?

An existing checklist, methodology or process may be already in place to identify marine archaeological potential, including:

- one prepared and adopted by the municipality, such as an archaeological management plan
- an environmental assessment process, such as a screening checklist for municipal bridges
- projects being reviewed under the Canadian *Environmental Assessment Act*.
- one that is approved by the Ministry of Tourism, Culture and Sport under the Ontario government's Standards & Guidelines for Conservation of Provincial Heritage Properties [s. B.2.]

2. Has a marine archaeological assessment been prepared for the property or project area and been entered into the Ontario Public register of Archaeological Reports?

Respond 'yes' to this question, if all of the following are true:

- a marine archaeological assessment report has been prepared and complies with MTCS requirements
  - a letter has been sent by MTCS to the licensed marine archaeologist confirming that MTCS has entered the report into to the Ontario Public Register of Archaeological Reports (Register)
- the report contains a recommendation stating that there are no further concerns regarding impacts to marine archaeological sites

If a marine archaeological assessment report has been completed and deemed compliant by MTCS, and the report contains a recommendation that further marine archaeological assessment work be undertaken, this work will need to be completed.

For more information about previously conducted marine archaeological assessments, contact:

- approval authority (such as a municipality or conservation authority)
- proponent for whom the marine archaeological assessment was carried out
- consultant archaeologist qualified to hold a marine archaeology licence in Ontario
- Ministry of Tourism, Culture and Sport at archaeology@ontario.ca

3. Are there known marine or land-based archaeological sites on or within 500 metres of the property or project area?

MTCS maintains a database of marine and land-based archaeological sites reported to the ministry. Land-based archaeological sites may extend into adjacent waterbodies.

For more information, contact MTCS Archaeological Data Coordinator at archaeology@ontario.ca.

4. Is there Aboriginal or local knowledge of marine or land-based archaeological sites on or within 500 metres of the property or project area?

Check with:

- Aboriginal communities in your area
- local municipal staff

Aboriginal communities may have knowledge that can contribute to the identification of cultural heritage resources, and we suggest that any engagement with Aboriginal communities includes a discussion about known or potential cultural heritage resources that are of value to these communities. Aboriginal communities and local municipal staff may have information about marine archaeological sites that are not included in the MTCS database or reported to the ministry.

Other sources of local knowledge include the following:

- property owner
- local heritage organizations and historical societies, Association for Great Lakes Maritime History
- local and provincial dive organizations (Save Ontario Shipwrecks, Ontario Underwater Council), Preserve Our Wrecks, Ontario Marine Heritage Committee)
- local dive shops
- local amateur divers and diving associations
- local museums
- municipal heritage committees
- published local histories

5. Is there Aboriginal knowledge or historically documented evidence of past Aboriginal use on or within 500 metres of the property or project area?

Check with:

- Aboriginal communities in your area
- local municipal staff

Other sources of local knowledge include the following:

- property owner
- local heritage organizations and historical societies
- local museums
- municipal heritage committees
- published local histories

6. Is there a known burial site or cemetery on the property or adjacent to the property or project area?

For more information on known cemeteries or burial sites contact the following:

- Cemeteries Regulation Unit, Ontario Ministry of Consumer Services – for database of registered cemeteries
- Ontario Genealogical Society (OGS) – to locate records of Ontario cemeteries, both currently and no longer in existence; cairns, family plots and burial registers
- Canadian County Atlas Digital Project – to locate early cemeteries

In this context, 'adjacent' means 'contiguous', or as otherwise defined in a municipal official plan.

When wrecks are associated with a loss of life, the area in the vicinity of the wreck may be established as a cemetery.

7. Has the property or project area been recognized for its cultural heritage value?

There is a strong chance there may be marine archaeological resources on the property or project area if it has been listed, designated or otherwise identified as being of cultural heritage value by:

- Municipal government
- Ontario government
- Canadian government

This includes a property that is:

- designated under *Ontario Heritage Act* (the OHA), including:
  - individual designation (Part IV)
  - part of a heritage conservation district (Part V)
  - a land or marine archaeological site (Part VI)
- subject to:
  - an agreement, covenant or easement entered into under the OHA (Parts II or IV)
  - a notice of intention to designate (Part IV)
  - a heritage conservation district study area by-law (Part V) of the OHA
- included on:
  - a municipal register or inventory of heritage properties
  - Ontario government's list of provincial heritage properties
  - Federal government's list of federal heritage buildings
- part of a:
  - National Historic Site
  - UNESCO World Heritage Site
- designated under:
  - *Heritage Railway Station Protection Act*
  - *Heritage Lighthouse Protection Act*
- subject of a municipal, provincial or federal commemorative or interpretive plaque.

To determine if your property or project area is covered by any of the above, see:

- Part A of the MTCS Criteria for Evaluating Potential for Built Heritage and Cultural Heritage Landscapes

Part VI – Archaeological Sites
Includes three marine archaeological sites prescribed under Ontario Regulation 11/06 and five terrestrial archaeological sites designated by the Minister under Regulation 875 of the Revised Regulation of Ontario, 1990.

For more information, refer to Regulation 875 and Ontario Regulation 11/06.

8. Has the entire property or project area been subjected to recent, extensive and intensive disturbance?

Recent: after-1960

Extensive: over all or most of the area

Intensive: thorough or complete disturbance

Examples of ground disturbance include:

- quarrying
- dredging
- structural footprints and associated construction areas
  - where the structure has deep foundations or footings
- infrastructure development such as:
  - dams
  - pipelines, hydro lines or other utility trenches
  - causeways
  - bridges

Note: this applies only to the excavated part of the right-of-way or corridor as the remainder may not be impacted

A ground disturbance does not include:

- aqua-cultural activities, such as a fish farm
- areas of traditional or commercial harvesting of fish, shellfish or water-based vegetation
- traditional agricultural areas that have been inundated

Property (Project Area) Inspection

Some documentation may provide evidence of prior disturbance, such as:

- photographs
- maps
- detailed descriptions and blueprints of prior projects

If complete disturbance isn't clear from documents available, an archaeologist licensed for marine archaeology can be hired to undertake an underwater and/or remote-sensing inspection of the study area to determine whether there is any remaining marine archaeological potential.

9. Are there two or more reported or registered ship wreck sites or reports of lost ships within a five kilometre radius of the property or project area?

The presence of two or more ship wreck sites or reports of lost ships in the vicinity may indicate increased marine archaeological potential for additional marine wrecks.

10. Is the property or project area within one kilometre of an active or historic harbour, seaplane or floatplane base, tunnel, ferry route, marine terminal, or winter road?

Focussed areas of marine activity on- and off-shore are indicators for potential marine archaeology due to:

- deliberate structures built in or on the water, such as:
  - mooring and anchoring structures
  - weirs, piers, docks, cribwork
  - groynes, breakwaters, artificial reefs
  - vessels scuttled for utilitarian or other purposes
  - infrastructure related to the construction or operation of a facility like marine railways
- incidental features, such as:
  - beached or sunken vessels or aircraft
  - dropped objects

As a result, there is potential for marine archaeological features or artifacts.

11. Where the project impacts fourth order or higher watercourses, are there existing narrows, rapids, waterfalls or does the watercourse enter or leave a body of water within 300 metres of the property or project area?

Fourth order and higher watercourses (on the Strahler scale) have potential association with human activity around narrows, rapids, waterfalls and proximity to waterbodies such as lakes due to:

- fish harvesting and related dams or weirs
- portage locations for navigable waterways
- early historical fording locations
- early historical water power sources for mills

These activities may result in marine archaeological features or artifacts.

12. Are there potential built heritage or cultural heritage landscape resources that may be of cultural heritage value or interest adjacent to the watercourse or water body?

Euro-Canadian settlement immediately adjacent to water bodies or watercourses may be focussed on the water for specific industrial, commercial or residential uses resulting in marine archaeological features or artifacts. For guidance, see the MTCS Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes

13. Are there inundated beaches, bluffs, lakeshores, streams or river banks within 300 metres of the property or project area?

The margins of water bodies are associated with past human occupations and use of the land. About 80-90% of archaeological sites are found within 300 metres of water bodies.

- water body types:
  - primary - lakes, rivers, streams, creeks
  - secondary - springs, marshes, swamps and intermittent streams and creeks
- water bodies can include constructed water bodies or watercourses, such as:
  - temporary channels for surface drainage
  - rock chutes and spillways
- Accessible or inaccessible shorelines can also have archaeological potential, for example:
  - high bluffs or cliffs
  - sandbars

You can get information about inundated shoreline features through:

- a site visit
- aerial photographs
- bathymetric data
- geological and physiographic studies

14. Are there inundated beaches, lakeshores or river/creek banks beyond 300 metres and at greater depth than the project area with evidence of two or more of the following in the project area?

- elevated bathymetric features such as drumlins, eskers, kames, ridges, etc.
- pockets of sandy lakebed
- distinctive bathymetric formations such as escarpments, shoals, promontories, reefs, etc.
- inundated resource extraction areas (quarry, fishery)
- inundated historical settlement including built heritage resources or cultural heritage landscapes
- inundated historical transportation routes

Landforms associated with past human occupations that have later been inundated, as historically documented or demonstrated through water-level chronologies, retain their archaeological potential.

- **Elevated bathymetric features**
  Higher ground and elevated positions, surrounded by low or level topography, often indicate past settlement and land use. Features such as eskers, drumlins, sizeable knolls, plateaus next to lowlands or other such features are a strong indication of archaeological potential.
  Find out if your property or project area had elevated topography prior to inundation through:
  - nautical charts
  - bathymetric data

- **Pockets of sandy lakebed**

  Areas of sandy soil, prior to being inundated, that would be well-drained and in areas characterized by heavy soil or rocky ground may indicate archaeological potential

  Find out if your property or project area had sandy soil through:

  - site visits
  - lakebed studies and sediment borehole data

- **Distinctive bathymetric formations**

  Distinctive land formations include – but are not limited to:

  - waterfalls
  - rock outcrops or faces
  - caverns
  - mounds

  Prior to inundation such features were often important to past inhabitants as special or sacred places. The following sites may be present at – or close to – these formations:

  - burials
  - structures
  - offerings
  - rock paintings or carvings

  Find out if your property or project area has a distinctive land formation through:

  - site visits
  - aerial photographs
  - bathymetric data

- **Inundated resource extraction areas**

  Prior to inundation, the following resources were collected in these extraction areas:

  - food or medicinal plants e.g. migratory routes, spawning areas, prairie
  - scarce raw materials e.g. quartz, copper, ochre or outcrops of chert
  - resources associated with early historic industry e.g. fur trade, logging, prospecting, mining

  Aboriginal communities may hold traditional knowledge about their past use or resources in the area.

- **Inundated early historic settlement**

  Early Euro-Canadian settlements include – but are not limited to:

  - early military or pioneer settlement, e.g. pioneer homesteads, isolated cabins, farmstead complexes
  - early wharf or dock complexes
  - pioneers churches and early cemeteries

- **Inundated early historic transportation routes** - such as trails, passes, roads, railways, portage routes, canals.

  For more information, see:

  - historical maps or atlases
    - for information on early settlement patterns such as trails (including Aboriginal trails), monuments, structures, fences, mills, historic roads, rail corridors, canals, etc.
    - Archives of Ontario holds a large collection of historical maps and atlases
    - digital versions of historical atlases are available on the Canadian County Atlas Digital Project
  - commemorative markers or plaques such as those posted by local, provincial or federal agencies
  - municipal heritage committees or other local heritage organizations
    - for information on early historic settlements or landscape features (e.g. fences, mill races)
    - for information on commemorative markers or plaques

Print Clear

SCHEIFELE BRIDGE IMPROVEMENTS ENVIRONMENTAL IMPACT STUDY

FINAL REPORT

October 14, 2022

Prepared for:
Regional Municipality of Waterloo
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Kitchener, ON N2G 4J3

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165010600

Limitations and Sign-off

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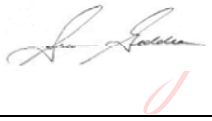
Approved by: 

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Acronyms / Abbreviations

ANSI	Areas of Natural and Scientific Interest
CAA	*Conservation Authorities Act*
CC	coefficient of conservatism
cm	centimetres
COSSARO	Committee on the Status of Species at Risk in Ontario
CRC	Consolidated Regulations of Canada
CSP	corrugated steel pipe
DBH	diameter at breast height
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
ECCC	Environment and Climate Change Canada
EIS	Environmental Impact Study
ELC	Ecological Land Classification
END	Endangered
ESA	*Endangered Species Act*
FWCA	*Fish and Wildlife Conservation Act*
GPGGH	Growth Plan for Greater Golden Horseshoe
GRCA	Grand River Conservation Authority
HADD	harmful alteration, disruption, or destruction
IGF	Information Gathering Form
KHAs	key hydrologic areas
KHFs	key hydrologic features
km²	square kilometre
KNHFs	key natural heritage features

LIO	Land Information Ontario
m	Metres
MBCA	*Migratory Birds Convention Act*
MECP	Ministry of the Environment, Conservation and Parks
MNRF	Ministry of Natural Resources and Forestry
NAR	not at risk
NHIC	Natural Heritage Information Centre
NHS	Natural Heritage System
O. Reg.	Ontario Regulation
OMB	Ontario Municipal Board
PA	*Planning Act*
PPS	Provincial Policy Statement
Region	Regional Municipality of Waterloo
ROP	Region of Waterloo Official Plan
ROW	right-of-way
SARA	*Species at Risk Act*
SARO	Species at Risk in Ontario
SC	Special Concern
SOCC	Species of Conservation Concern
Stantec	Stantec Consulting Ltd.
SWH	Significant Wildlife Habitat
THR	Threatened
VPZ	Vegetation Protection Zone
WTOP	Woolwich Township Official Plan

1 Project Overview

1.1 Introduction

Stantec Consulting Ltd. (Stantec) has been retained by the Region of Waterloo (Region) to complete an ecological inventory and assessment study as part of a Schedule 'C' Municipal Class Environmental Assessment (Class EA) for the Scheifele Bridge Replacement (the Project). The Scheifele Bridge is located on Northfield Drive East (Regional Road 22) over the Conestogo River, in the Township of Woolwich, and is a major arterial connection between the Village of Conestogo and the City of Waterloo (**Figure 1, Appendix A**). The current bridge was constructed in 1958 and is a four-span concrete T-beam bridge. Funds to complete the EA were provided in the Region's 10-Year Transportation Capital Program for the period of 2019-2022. The Class EA will present and evaluate various designs and alternatives for the Scheifele Bridge replacement. Improvements that will be considered include, but are not limited to:

- Enhanced pedestrian, buggy and cycling facilities
- Maintaining the bridge structure and surrounding area aesthetics

A preliminary impact study titled Natural Environment Impact Assessment Study for the Scheifele Bridge Class EA was submitted to the Region of Waterloo on December 2, 2020. Based on feedback from the Region of Waterloo, a second report titled: Scheifele Bridge Improvements Environmental Impact Study dated February 19, 2021 was drafted and submitted. This current version of the EIS is an update of the February 19, 2021 to address consultation with the Grand River Conservation Authority (GRCA) as well as subsequent design updates.

For this EIS, the Study Area includes the Northfield Drive right-of-way (ROW) from 300 metres (m) south of the bridge to 150 m north of the bridge, plus an additional 120 m area of investigation (**Figure 1, Appendix A**). Methods for the background review, field investigations, and assessment of natural heritage features are provided in the sections below. This report will characterize the significance and sensitivity of the natural features in the Study Area, identify potential impacts of the Project on these natural features, and recommend appropriate measures to avoid or minimize potential negative environmental impacts.

This EIS was prepared in accordance with the Region of Waterloo's Greenlands Network Implementation Guide and the Guideline for the Preparation of Full Environmental Impact Statements (Region of Waterloo 2016).

2 Policy Overview

This report has been prepared to address policies and guidelines from federal and provincial legislation and municipal policy relevant to the Scheifele Bridge Project. The policy documents discussed below were used to assess the natural heritage features and functions of the Study Area, scope the study methods, and determine natural heritage constraints or opportunities for the Project.

2.1 Federal Policy

2.1.1 Fisheries Act

The Government of Canada is responsible for the management of fisheries resources in Canada through the *Fisheries Act,* 1985 administered primarily by Fisheries and Oceans Canada (DFO). The *Fisheries Act* addresses national interests in marine and fresh waters. On June 21, 2019, changes to the Act (Bill C68) received royal assent and became law, restoring lost protections and incorporating modern safeguards into the *Fisheries Act*. On August 28, 2019 provisions of the new *Fisheries Act* came into force including new protections for fish and fish habitat in the form of standards, codes of practice, and guidelines for projects near water.

The *Fisheries Act* includes prohibitions against harmful alteration, disruption, or destruction (HADD) of fish habitat. It extends protection to all fish and fish habitat. When a HADD cannot be avoided or mitigated, a subsection 35(2) authorization with appropriate offsetting of residual adverse effects is required. Section 6 of the Act lists the factors taken into account by the Minister when considering the approval of an authorization, which are:

- Fisheries management objectives
- Whether there are measures and standards to avoid, mitigate or offset HADD to fish or fish habitat
- The public interest

2.1.2 Species at Risk Act

Federal species at risk are assessed and assigned a status by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The federal *Species at Risk Act*, 2002 (SARA) protects wildlife species listed as extirpated, endangered, or threatened under Schedule 1 of the Act from harm, harassment, killing or capture or collection. SARA also prohibits the damage or destruction of the residence of listed species, and the destruction of their critical habitat. SARA protections also extend to migratory birds and some aquatic species at risk (SAR) on non-federal land. The Ministry of the Environment, Conservation and Parks (MECP), may make an order to protect species on non-federal lands if the species is not adequately protected under provincial laws. Permits for prohibited activities may be issued under Section 73 of SARA.

2.1.3 Migratory Birds Convention Act

The *Migratory Birds Convention Act* (MBCA) protects migratory birds and their nests (S.4). Section 6 of the Migratory Bird Regulations (Consolidated Regulations of Canada (CRC), c. 1035) prohibits the disturbance, destruction or taking of a nest, egg, or nest shelter of a migratory bird. Disturbance to nests of protected species during the course of vegetation clearing or bridge construction is a contravention of the MBCA. The primary nesting period (i.e., the period when the percent of total nesting species is greater than 10%) identified for southern Ontario is April 1 - August 15, although nesting also infrequently occurs outside of this period (Environment Canada 2014).

2.2 Provincial Policy

2.2.1 Planning Act

The Provincial Policy Statement (PPS; MMAH 2020) was issued under Section 3 of the *Planning Act* (PA) and came into effect in 1996, with the most recent revision in March 2020. The PA requires that decisions made by planning authorities are consistent with the policy statements, such as the PPS, which includes policies on development and land use patterns, resources and public health and safety. Municipal official plans are the most important vehicle for implementation of this Provincial Policy Statement (MMAH 2020). Section 2.1 of the PPS deals with natural heritage and requires that natural heritage systems be identified in certain ecoregions. This includes Ecoregion 6E, where the Study Area is located.

Although the PPS provides direction on land use planning and development projects, the policies provide a useful framework for identifying and evaluating the significance of natural heritage features on other projects. According to Section 2.1.5 of the PPS, development and site alteration are not permitted in the following features unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions:

a) Significant Wetlands

b) Significant Woodlands

c) Significant Valley lands

d) Significant Wildlife Habitat

e) Significant Areas of Natural and Scientific Interest

f) Coastal Wetlands

Development and site alterations are not permitted in the following features, except in accordance with provincial and federal requirements:

a) Significant portions of the habitat of endangered or threatened species

b) Fish Habitat

Development and site alteration are not permitted on lands that are adjacent to the natural heritage features and areas identified above unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.

2.2.2 Growth Plan for the Greater Golden Horseshoe

The Growth Plan for Greater Golden Horseshoe (GPGGH, 2019) provides direction for development planning including policies regarding a provincial Natural Heritage System (NHS), key hydrologic features (KHFs), key hydrologic areas (KHAs), and key natural heritage features (KNHFs). The 2019 GPGGH area includes the Region of Waterloo in which the Project is situated, however the Project is noted to be outside the settlement area of Waterloo. The GPGGH (Section 4.2.2.4) states that provincial mapping of the *Natural Heritage System for the Growth Plan* does not apply until it has been implemented in the applicable upper- or single-tier official plan. Until that time, the policies in the GPGGH that refer to the *Natural Heritage System for the Growth Plan* apply outside *settlement areas* to the *natural heritage systems* identified in official plans that were approved and in effect as of July 1, 2017. The Region of Waterloo Official Plan was last approved in June 2015 and identifies an NHS referred to as the Greenlands Network. The policies of GPGGH have been therefore considered for the key natural heritage features that have been identified as part of the Greenlands Network in the Study Area.

Section 4.2.3.1c of the GPGGH states that, outside of settlement areas, development or site alteration is generally not permitted in KNHFs that are part of the NHS or in KHFs except for activities that create or maintain infrastructure authorized under an environmental assessment process. Section 4.2.4 states that, outside of settlement areas, a proposal for new development or site alteration within 120 m of a KNHF within the NHS or a KHF will require a natural heritage evaluation that identifies a suitable vegetation protection zone. The VPZ for key hydrogeological features, fish habitat and significant woodlands is no less than 30 m measured from the outside boundary of the feature. Development or site alteration is not permitted in the VPZ, with the exception of that described in Section 4.2.3.1 (including Section 4.3.2.1c of the GPGGH, as noted above). In summary, the NHS areas identified on site (known as KNHF) and a 30 m buffer (VPZ) are considered protected areas and constraints to general development, however under an EA process for infrastructure, feature protection is subject to demonstrating that the natural heritage feature's function and form are maintained.

2.2.3 Endangered Species Act

Provincial species at risk are identified and assessed by the Committee on the Status of Species at Risk in Ontario (COSSARO). The Ontario *Endangered Species Act,* 2007 (ESA) protects species on the Species at Risk in Ontario (SARO) which are threatened, endangered or extirpated and their habitats by prohibiting anyone from killing, harming, harassing or possessing protected species, as well as prohibiting any damage or destruction to the habitat of the listed species. Under the ESA, all listed species are provided with general habitat protection aimed at protecting areas that species depend on to carry out their life processes such as reproduction, rearing, hibernation, migration or feeding. For some species, detailed habitat regulations have been passed that go beyond the general habitat protection to define specifically the extent and character of protected habitats.

Activities that may impact a protected species or its habitat require a permit from the Ministry of the Environment, Conservation and Parks (MECP), unless the activities are exempt from the requirements of the regulation. The current Ontario Regulation (O. Reg.) 242/08 identifies activities which are exempt from the permitting requirements of the ESA, but which are subject to controls outside of the permit process, including registration of the activity and preparation of mitigation. Activities that are not exempt by O. Reg. 242/08 require a complete permit application process.

2.2.4 Grand River Conservation Authority

The *Conservation Authorities Act,* 1990 (CAA), was created to provide for the organization and delivery of programs and services that further the conservation, restoration, development, and management of natural resources in watersheds in Ontario. The CAA is administered by the Ministry of Natural Resources and Forestry (MNRF); however, it grants each of Ontario's 36 Conservation Authorities the authority to make regulations within the areas under their respective jurisdictions.

The Grand River Conservation Authority (GRCA) has the responsibility to regulate activities in wetlands, watercourses and hazard lands (e.g. areas in and near rivers, streams, floodplains, wetlands, slopes and shorelines) through the Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (O. Reg.150/06). The GRCA implements the regulation by issuing permits for works in or near watercourses, valleys, wetlands, or shorelines when required.

Under the CAA of Ontario, the Authority has certain regulations whose objectives are:

- To prevent the loss of life and property due to flooding and erosion,
- To prevent pollution, and
- To conserve and enhance natural resources.

These policies apply to fill placement and removal or site grading in flood prone areas, erosion prone areas, dynamic beach areas, as well as alteration of watercourses, and interference with wetlands. GRCA (2015) policies specific to the Scheifele Bridge Replacement Class are summarized as follows:

Public Infrastructure in wetlands (Policy 8.4.6)	Public infrastructure may be permitted if it can be demonstrated that: • Alternatives to avoid wetland loss or interference have been considered and the proposed alignment minimizes wetland loss; and • Where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices including site and infrastructure design and appropriate remedial measures will adequately restore and enhance features and functions.

Public Infrastructure in wetlands (Policy 8.4.7)	Where an EA (or similar) is supported by the GRCA, the precise wetland boundary will be determined in accordance with the Ontario Wetland Evaluation System, and the hydrological and ecological functions of the wetland will be restored and enhanced.
Public Infrastructure in floodplains (Policy 8.1.15)	Public infrastructure may be permitted provided there is no feasible alternative outside the Riverine Flooding Hazard, and where it can be demonstrated that: • Adverse hydraulic or fluvial impacts are limited and risk of flood damage is not increased or is minimized through site design and the affected landowners are informed of the risk; • There is no loss of flood storage wherever possible; and, • Where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices including site and infrastructure design and appropriate remedial measures will adequately restore and enhance features and functions.
Watercourse crossings (Policy 9.1.2)	Bridge crossings may be permitted to be constructed, replaced or upgraded provided that all feasible alternative sites and alignments have been considered, and where it can be demonstrated that: • Crossings avoid any bends in the watercourse to the extent practical; • Crossings are located to take advantage of existing impacted or open areas on the channel, bank or valley slope, wherever possible; • Crossing structures avoid the Riverine Erosion Hazard in order to accommodate natural watercourse movement, wherever possible, • The risk of flood damage to upstream or downstream properties is reduced through site and infrastructure design, wherever possible • There is no inhibition of fish passage; • Where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices including site and infrastructure design and appropriate remedial measures will adequately restore and enhance features and functions. • Physical realignments or alterations to the river, creek, stream or watercourse channel associated with a new crossing are avoided or are in accordance with the policies in Section 9.1.16 [below]; and, • Maintenance requirements are minimized.

Watercourse alterations (Policy 9.1.16)	Realignment, channelization or straightening of a river, creek, stream or watercourse may be permitted to improve hydraulic characteristics and fluvial processes or to improve aquatic habitat or water quality where it can be demonstrated that: • Feasible alternative alignments have been considered • Stream bank stability is enhanced, where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices including site design and appropriate remedial measures will adequately restore and enhance features and functions; and, • Natural channel design principles are followed to the extent possible.

2.2.5 Fish and Wildlife Conservation Act

The *Fish and Wildlife Conservation Act,* 1997 (FWCA) provides protection to birds, mammals, reptiles, amphibians, and specially protected invertebrates, as well as protection for habitat features such as mammal dens or beaver dams. Birds, such as raptors, which are not protected by the MBCA may also receive protection for individuals and their habitat (e.g. nests) under the FWCA.

2.3 Municipal policy

2.3.1 Region of Waterloo Official Plan

The Region of Waterloo Official Plan (ROP; Region of Waterloo, 2015) was approved by the Ontario Municipal Board (OMB) on June 18, 2015. The ROP identifies Landscape Level Systems, Core Environmental Features and Supporting Environmental Features and the linkages between them as components of the Greenlands Network.

Landscape Level Systems consist of: Environmentally Sensitive Landscapes, Significant Valleys, Regional Recharge Areas, and the Provincial Greenbelt System.

Core Environmental Features consist of: Significant Habitat of Endangered or Threatened Species, Provincially Significant Wetlands, Environmentally Sensitive Policy Areas, Significant Woodlands, Environmentally Significant Valley Features, and Significant Areas of Natural and Scientific Interest (ANSI).

Supporting Environmental Features are those natural features which do not meet criteria for regional significance but play an important role in maintaining the ecological functions of the Greenlands Network.

Per the Official Plan Policy 7.C.12, an Environmental Impact Study (EIS) is required which identifies potential impacts, mitigation and compensation for infrastructure projects, such as the widening or upgrade of an existing roadway.

2.3.2 Woolwich Township Official Plan

The Woolwich Township Official Plan (WTOP) was approved in July 2012. Chapter 13 of the WTOP provides policies to protect elements of the Natural Habitat Network, which includes:

- Environmental Preservation Areas
- Environmentally Sensitive Policy Areas
- Provincially Significant Wetlands
- Significant Valleylands
- Sensitive Groundwater Areas, Recharge Areas, Discharge
- Areas and Headwaters and Aquifers
- Significant Woodlands
- Fish Habitat
- Significant Wildlife Habitat
- Locally Significant Natural Areas

Within a Restricted Land Use Area, such as a floodplain, the GRCA shall advise the municipality with respect to potential impacts and proposed mitigation measures.

3 Natural Heritage Data Review and Agency Consultation

Designated features and records of rare or protected species were identified through a review of background documents, online databases, and agency consultation.

3.1 Natural Heritage Data Review

Background documents and other applicable sources of information were consulted during the preparation of this report to identify natural heritage features for the Study Area, including the following data sources:

- The Ecosystems of Ontario, Part 1: Ecozones and Ecoregions (Crins et al. 2009)
- Land Information Ontario (LIO) database (MNRF 2020a)
- Region of Waterloo Official Plan (2015)
- The Physiography of Southern Ontario (Chapman and Putnam 2007)

Data was compiled in a GIS database to support mapping and data query requirements of the natural heritage assessment.

For the potential occurrence of SAR or provincially rare species, the following sources were consulted for recent (1990-present) records in the vicinity of the Study Area:

- Natural Heritage Information Centre (NHIC) Biodiversity Explorer database (MNRF 2020b)
- Atlas of the Mammals of Ontario (Dobbyn 1994)
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2019)
- Ontario Breeding Bird Atlas (Cadman et al. 2007)
- Fisheries and Oceans Canada – Aquatic Species at Risk Map (DFO 2020)
- MNRF data (MNRF 2020c)
- Species at Risk Public Registry. (Environment and Climate Change Canada, accessed April 2020)
- SARO List (MECP 2020, accessed April 2020)

Many of these resources do not note the exact locations of a species occurrence, with accuracy ranging from 1 square kilometre (km²) (NHIC) to 10 km² (wildlife atlases), to municipal boundaries or watersheds. As such they are used as an indicator of potential occurrence in the Study Area.

3.1.1 Species at Risk

For the purpose of this assessment, SAR are species list as Threatened (THR) or Endangered (END) on SARO or aquatic species classified as THR or END on SARA Schedule 1. The ESA prohibits harm or harassment to threatened or endangered species, and damage or disturbance to their habitat. The ESA applies on all private and Crown owned lands in Ontario. Habitat protection under the ESA typically includes all habitats that directly or indirectly support SAR. SARA protects aquatic species on private and Crown owned lands in Ontario and Canada.

SAR occurrences were obtained from the NHIC (MNRF 2019a) and other online databases (**Section 3.1**).

3.1.2 Species of Conservation Concern

Species of Conservation Concern (SOCC) may be designated at the global, national, provincial, or local level. For this report, SOCC includes species that are provincially rare (with a Provincial S-rank of S1 to S3), listed as Special Concern (SC) on the SARO list, or terrestrial species listed on Schedule 1 of SARA but not included on the SARO list.

Provincial ranks (S-ranks) are used by the NHIC to set protection priorities for rare species and vegetation communities. They are based on the number of factors such as abundance, distribution, population trends and threats in Ontario and are not legal designations. By comparing the global and provincial ranks, the status, rarity, and the urgency of conservation needs can be determined. Species with provincial ranks of S1 to S3, and those tracked by the MNRF, are considered SOCC. Provincial S-ranks are defined as follows:

S1: Critically imperiled; usually fewer than 5 occurrences
S2: Imperiled; usually fewer than 20 occurrences
S3: Vulnerable; usually fewer than 100 occurrences
S4: Apparently secure; uncommon but not rare, usually more than 100 occurrences
S5: Secure, common, widespread, and abundant
S-rank followed by a “?” indicates the rank is still uncertain

3.2 Agency Consultation

Consultation with the Region and GRCA was initiated on April 28, 2020 with submission of a draft Terms of Reference for the EIS. A response was received from the Region’s Planner, Jane Gurney, on April 30, 2020. The agreed upon Terms of Reference was circulated to the Region on May 21, 2020 and GRCA on May 27, 2020.

Comments on the Project through the Environmental Assessment process were received from both the Region and GRCA as outlined below, and provided in **Appendix C**:

- The Region provided comments on February 3, 2021 on the preliminary environmental report
- The GRCA provided comments on May 15, 2020, June 7, 2020 and culminated in their May 31, 2022 correspondence

The GRCA requested additional studies and details and advice on the following:

- Policy assessment
- Floodplain analysis
- Requirement for an EIS and wetland boundary delineation
- Construction staging plans at the detailed design phase
- In water work timelines
- Restoration and design opportunities.

A natural heritage information request was submitted to MNRF and MECP on April 28, 2020 for the following information:

- Natural Heritage Features
- Natural Hazards Features
- Fish/Mussel data
- Benthic Sampling Records
- Terrestrial SAR data
- Aquatic SAR data
- GRCA Owned Lands data
- Watercourse thermal regime and flow regime
- Special habitat features (e.g. groundwater upwelling, spawning areas)
- In-water construction timing window
- MNRF fisheries management objectives, if applicable

MNRF provided a response email on April 29, 2020, (MNRF 2020c) noting a warm water fishery and listing fish species found within the Conestogo River. No information was available for the unnamed tributaries within the Study Area. An email response from MECP on May 6, 2020 indicated that they had nothing to add to the existing species list submitted at that time.

A letter of advice addressed to Ken Brisbois, Project Manager with the Region, was received on November 18, 2020 and provided guidance on the avoidance of harm to migratory birds while undertaking the Project. This guidance will be included in the impact and mitigation sections of this report once the preferred design concept has been selected. Correspondence with MNRF, MECP and ECCC appear in **Appendix C**.

3.3 Results of Records Review and Agency Consultation

3.3.1 Physical Environment

The Study Area is in Ecoregion 6E (Lake Simcoe-Rideau Ecoregion), and more specifically the Ecodistrict of 6E-1 (Stratford). This Ecodistrict consists of smooth clay areas and gently rolling till moraines, known as the Stratford Till Plain and the Oxford Till Plain. The land use in this Ecodistrict is predominately agriculture with cropland constituting a large portion of the land cover (44%). Other land uses include gravel pits, quarries, and settlement areas. Sixteen percent (16%) of the Ecodistrict remains as natural cover and includes forests and wetland pockets of swamp (Henson and Brodribb 2005).

3.3.2 Vegetation

The Study Area is within the Niagara section of the Deciduous Forest Region (Rowe 1972). This section covers the Ontario peninsula which is enclosed by lakes Ontario, Erie, and Huron. Forest communities are dominated by broadleaved trees that are common to both the Great Lakes-St. Lawrence and Deciduous Forest Regions. They consist of beech and sugar maple, together with basswood, red maple, red oak, white oak, and bur oak.

3.3.3 Designated Natural Heritage Features

The Study Area includes the following environmental planning designations and natural heritage features or areas:

- GRCA regulated features (Ontario Regulation 150/06), including the Conestogo River and its associated tributaries, floodplain, and regulation limit
- Significant Valley features within the Regional Greenlands Network (ROP)
- Restricted Land Use Area (WTOP)
- Components of the Natural Heritage System for the Growth Plan (Growth Plan for the Greater Golden Horseshoe, Province of Ontario 2019)

3.3.4 Terrestrial SAR and SOCC

A review of the background databases identified ten terrestrial SAR and nine SOCC with records that overlap with the Study Area (**Table 3.1**). An assessment of suitable habitat for terrestrial SAR and SOCC is detailed in **Tables B-1 and B-2, Appendix B**.

Table 3.1 Records of Potential of Terrestrial SAR and SOCC in the Study Area

Common Name	Latin Name	Provincial S-rank	SARO Status	SARA Schedule 1	Source
SAR					
Butternut	*Juglans cinerea*	S3?	END	END	SARO List, 2020
Blanding's Turtle	*Emydoidea blandingii*	S3	THR	THR	ORAA, 2019
Bank Swallow	*Riparia riparia*	S4B	THR	THR	eBird, 2020
Barn Swallow	*Hirundo rustica*	S4B	THR	THR	SARO List, 2020
Bobolink	*Dolichonyx oryzivorous*	S4B	THR	THR	eBird, 2020
Chimney Swift	*Chaetura pelagica*	S4B, S4N	THR	THR	OBBA, 2007
Eastern Meadowlark	*Sturnella magna*	S4B	THR	THR	SARO List, 2020
Little Brown Myotis	*Myotis lucifugus*	S3	END	END	SARO List, 2020
Eastern Small-footed Myotis	*Myotis leibii*	S2S3	END	-	SARO List, 2020
Tricolored Bat	*Perimyotis subflavus*	S3?	END	END	SARO List, 2020
SOCC					
Western Chorus Frog (Great Lakes – St. Lawrence pop.)	*Pseudacris triseriata*	S3	NAR	THR	ORAA, 2019
Snapping Turtle	*Chelydra serpentina*	S3	SC	SC	ORAA, 2019
Northern Map Turtle	*Graptemys geographica*	S3	SC	SC	ORAA, 2019
Eastern Milksnake	*Lampropeltis triangulum*	S3	NAR	SC	ORAA, 2019
Bald Eagle	*Haliaeetus leucocephalus*	S4B, S2N	SC	NAR	eBird, 2020
Caspian Tern	*Hydroprogne caspia*	S3B	NAR	NAR	eBird, 2020
Common Nighthawk	*Chordeiles minor*	S4B	SC	THR	OBBA, 2007
Eastern Wood-pewee	*Contopus virens*	S4B	SC	SC	OBBA, 2007
Great Egret	*Ardea alba*	S2B	-	-	eBird, 2020

3.3.5 Aquatic SAR and SOCC

A review of background information databases identified three aquatic SAR, two SOCC (**Table 3.2**) and an additional 26 fish and mussel species that were not at risk (NAR) with records that overlap with the Study Area (**Table B-3, Appendix B**). Background aquatic habitat and fish community data are shown in **Figure 2 Appendix A**. MNRF indicated in correspondence (**Appendix C**) that the Conestogo River and its tributaries have a thermal regime designated as warmwater. A restricted in-water work timing window based on fish species present falls between March 15 and July 15 in any given year. This is consistent with the timing required by the DFO for another project 2 km downstream, the Conestogo Bridge, as detailed by GRCA in their May 31, 2021 correspondence. The relocation timing window based on mussel species and habitat present restricts handling of mussels to a period when water temperatures are above 16°C, which typically occurs between June 15 and September 30 in any given year.

Table 3.2 Records of Aquatic SAR and SOCC in the Study Area

Common Name	Scientific Name	Provincial S-rank	SARO Status	SARA Schedule 1	Source
SAR					
Black Redhorse	*Moxostoma duquesnei*	S2	THR	THR	DFO 2019, MNRF 2020b
Silver Shiner	*Notropis photogenis*	S2/S3	THR	THR	DFO 2019, MNRF 2020b
Wavy-rayed Lampmussel	*Lampsilis fasciola*	S1	THR	SC	MNRF 2020b, DFO 2019
SOCC					
Greater Redhorse	*Moxostoma valenciennesi*	S3	NAR	NAR	MNRF 2020c
Rainbow	*Villosa iris*	S2/S3	SC	SC	DFO, 2019, MNRF, 2020b

4 Field Investigations

Background information was supplemented with field investigations undertaken by Stantec ecologists in 2020 to document existing conditions within the Study Area and provide a general assessment of significance (**Table 4.1**). Terrestrial field investigations included a three-season botanical inventory, vegetation community assessment, a bat tree roost survey, turtle basking surveys, breeding bird surveys and a wildlife habitat assessment. An aquatic habitat assessment was also completed for the Conestogo River and its tributaries in the Study Area. Additionally, the wetlands identified in background information and documented in 2020 were revisited in 2022 with the GRCA.

Table 4.1 Summary of Field Investigations

Type of Field Work	Date of Field Work	Surveyors
Terrestrial Field Investigations		
Botanical Surveys including Ecological Land Classification	May 6, July 7, August 31, 2020	J. Ball
Bat Tree Roost Survey	May 6, 2020	J. Ball
Turtle Basking Surveys	May 6, June 1 and 15, 2020	
Breeding Bird Surveys	June 1, 15 and 25, 2020	J. Ball
General wildlife habitat assessment	May 6, 2020	J. Ball
Wetland staking with GRCA	June 23, 2022	M. Straus, Tony Zammit (GRCA)
Incidental wildlife observations	Completed during all surveys	J. Ball
Aquatic Field Investigations		
Fish and mussel habitat assessment	June 5, 2020	J. Keene, M. Ellah

4.1 Vegetation Surveys

Vegetation community assessments were conducted using the protocols outlined in the Ecological Land Classification (ELC) System for Southern Ontario (Lee et al. 1998), and 2008 ELC code updates were used to classify vegetation communities that were not listed in the 1998 manual. Vegetation assessments included a general description of the community, lists of the dominant species in the canopy, sub-canopy, shrub and ground layers, a tree size class summary, and a detailed plant species list.

The limit of wetland communities was refined in the field by GRCA and Stantec using methods described in the Ontario Wetland Evaluation System, Southern Manual (MNR 2013). Wetland limits were surveyed by an Ontario Land Surveyor.

Vegetation communities and botanical species observed were reviewed to determine whether any of the communities were rare in the province, contained any provincially significant plant species, or had the potential to provide significant habitat for wildlife. The nomenclature and provincial status of all plant species was based on a vascular plant species list provided by the Natural Heritage Information Centre

(MNRF 2020b). Identification of potentially sensitive native plant species was based on their assigned coefficient of conservatism (CC) value, as determined by Oldham et al. (1995). This CC value, ranging from 0 (low) to 10 (high), is based on a species' tolerance of disturbance and fidelity to a specific natural habitat. Species with a CC value of 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters.

4.1.1 Vegetation Communities

Eighteen vegetation communities were identified in the Study Area, including 12 natural or naturalized communities, two agricultural communities and four constructed communities based on by ELC for Southern Ontario (Lee et al., 1998) and the updated 2008 ELC Catalogue.

Agricultural communities dominated the landscape, including open pasture, hay fields and annual row crops. Wetlands were present on the south side of the Conestogo River on either side of Scheifele Bridge and extended approximately 250m south on the west side of Northfield Drive. Forest communities were fragmented and consisted of lowland deciduous forest communities on the west side of Northfield Drive immediately north of the Conestogo River, and bordered wetlands south of the Conestogo River. Meadow communities were small and fragmented throughout the Study Area. Naturalized hedgerows occurred on the east side of Northfield Road on both sides of the Conestogo River. There was also a well-established naturalized hedgerow on a berm on the west side of Northfield Drive south of the Conestogo River.

Table 4.2 includes a list of all vegetation communities identified during this study. Vegetation communities are mapped on **Figure 3, Appendix A**.

Table 4.2 Vegetation Communities in the Scheifele Bridge Study Area

Type	Code	Description	Dominant Species
Forest	FODM7	Fresh – Moist Lowland Deciduous Forest Ecosite	Black walnut, green ash (abundance of dead standing trees), crack willow, white pine, swamp maple, black raspberry, garlic mustard
	FODM7-3	Fresh – Moist Willow Lowland Deciduous Forest Ecosite	Crack willow, Manitoba maple, common buckthorn; Butternut present in FODM7-3 west of the SAS community (**Figure 4, Appendix A**)
Meadow	MEGM3	Dry - Fresh Graminoid Meadow Ecosite	Dominated by smooth brome
	MEGM4	Fresh - Moist Graminoid Meadow Ecosite	Reed-canary grass, wild red raspberry
	MEMM3	Dry - Fresh Mixed Meadow Ecosite	Smooth brome, common milkweed, Canada goldenrod
Hedgerow	FODM11	Naturalized Deciduous Hedgerow	Crack willow, Manitoba maple, hackberry; Kentucky bluegrass dominates understory of FODM11 along Conestogo River east of Northfield Drive; wild red raspberry, common buckthorn, garlic mustard dominates the understory of the FODM11 on the berm west of Northfield Drive and south of the Conestogo River

Type	Code	Description	Dominant Species
Wetland	MAMM1-3	Reed-canary Grass Graminoid Mineral Meadow Marsh Type	Reed-canary grass, Joe Pye-weed, spotted jewelweed, Himalayan balsam, giant ragweed, becoming wetter towards MASM1-1
	MASM1-1	Cattail Mineral Shallow Marsh Type	Narrow-leaved cattail, reed-canary grass, climbing nightshade, hedge bindweed; Himalayan balsam in cattail marsh on east side of Scheifele Bridge
Aquatic	OA	Open Water	Conestogo River: various submerged aquatic plant species and emergent vegetation at edges Species presence unknown for pond associated with residential property at the south end of Study Area
	SAS	Submerged Shallow Aquatic	Submerged aquatic plant species abundant; Limited emergent vegetation at edges of feature
Shoreline	SHOM1	Mineral Open Shoreline Ecosite	Limited vegetation growth on beach bar, especially early in the season
Agriculture	OAGM1	Annual Row Crops	Fields south of the Conestogo River comprised of corn
	OAGM2	Perennial Cover Crops	Fields north of the Conestogo River comprised of hay
	OAGM4	Open Pasture	Comprised of hay for grazing horses
Constructed	CVC_1	Business Sector	Heavily grazed land associated with horseback riding farm
	CVR_1	Low Density Residential	Planted trees and manicured lawn associated with large single-family residential properties
	CVR_4	Rural Property	Planted trees and manicured landscape associated with former homestead
	CVI_1	Transportation (Roads)	Comprised of Northfield Road and residential driveways. No vegetation growth

4.1.2 Flora

The following is a floristic summary for the Study Area based on spring, summer and fall surveys. A detailed list with scientific plant names and the status of plant species is provided in **Table B-4, Appendix B**.

- A total of 143 vascular plants were recorded. This total includes 10 plants that were identified to genus only. These plants are not included in the species assessment below.
- 73 species are native to Ontario, while 60 are exotic species not native to Ontario.
- 65 native species have a provincial rank of S5, indicating they are common with a secure population in Ontario.
- Six native species have a provincial rank of S4, indicating they are uncommon to common, but not rare in the province and populations are apparently secure.

- One provincially rare native species (butternut) with a provincial rank of S2?was observed in the Study Area. Butternut is also listed as an endangered species provincially and federally. A single butternut was observed in the FODM7-3 community west of Northfield Drive and adjacent to the SAS community.
- One SAR plant (the above-mentioned butternut) was observed in the Study Area.

4.2 Wildlife and Wildlife Habitat

4.2.1 Breeding Bird Surveys

Three breeding bird surveys were conducted in the Study Area on June 1, 15 and 25, 2020 in accordance with the methods described in the Environment and Climate Change Canada's (ECCC) Breeding Bird Survey (ECCC 2018). Surveys consisted of 10 minute stationary point counts that targeted natural vegetation features, hay fields and pastures. Eight point count stations were established in the Study Area (**Figure 3, Appendix A**). Surveys of habitat suitable for grassland birds (hay fields and pastures) generally followed the MNRF Bobolink Survey Methodology (MNRF 2012). Grassland bird surveys included three surveys in June compared to the regular breeding bird survey protocol requirement of two surveys. Grassland bird survey transects were not completed due to property access restrictions. Birds seen or heard outside the 10 minute point counts were also recorded.

A conservative approach to determining breeding status was taken; all birds seen or heard in appropriate habitat during the breeding season were assumed to be breeding. Nest searches were also conducted for species protected by the ESA (specifically Barn Swallow under Scheifele Bridge) and the MBCA.

Thirty-seven bird species were recorded during the breeding bird surveys (**Table B-5, Appendix B**), including two SAR (Barn Swallow and Eastern Meadowlark) and SOCC (Eastern Wood-pewee). SAR and SOCC observations are detailed below:

- One Barn Swallow was observed foraging over the pasture during the second breeding bird survey. No Barn Swallow nests were observed under Scheifele Bridge; however, Barn Swallow may be nesting in buildings and other structures in the Study Area.
- One Eastern Meadowlark was observed singing in the OAGM2 hay field immediately north of the Conestogo River on the east side of Northfield Drive. This habitat was mowed prior to the second breeding bird survey.
- One Eastern Wood-pewee was observed singing in the FODM7 woodland north of the Conestogo River during the first breeding bird survey.

An estimated 35 Cliff Swallow nests were observed on the underside of Scheifele Bridge during the breeding bird surveys. No nests of Barn Swallow or other migratory bird species were observed during field investigations.

An additional 5 bird species were recorded outside of the breeding bird survey as incidental observations (Caspian Tern, Solitary Sandpiper, Red-tailed Hawk, Eastern Phoebe and Pileated Woodpecker).

4.2.2 Reptile Surveys

Three turtle surveys were completed in the Study Area in the spring of 2020 focusing on basking turtles, turtles in water and turtle nests on riverbanks and the roadside. Turtle surveys were completed in appropriate weather using guidance from the Survey Protocol for Blanding's Turtle (MNRF 2015b). Given the timing and effort associated with these surveys, they are not considered sufficient to confirm presence or absence of turtle overwintering habitat. Incidental observations of turtles were also noted during site visits conducted in both 2020 and 2022.

Weather conditions for the surveys are summarized in **Table 4.3** below.

Table 4.3 Reptile Survey Dates, Times, and Weather Conditions

Date	Time	Temp. (°C)	Wind (Beaufort)	Cloud (%)	Precipitation
May 6, 2020	1:00-2:00 pm	14	1	25-50	None
June 1, 2020	9:00-10:00 am	14	2	10	None
June 15, 2020	9:00-10:00 am	15	1	0	None

Two reptile species were observed during field investigations at the locations listed in **Table 4.4** below.

Table 4.4 Reptile Survey Observations

Feature ID (ELC Code)	May 6, 2020	June 1, 2020	June 15, 2020
Conestogo River (OA)	No turtles observed	No turtles observed	1 Midland Painted Turtle in pond area on south side of Conestogo River immediately west of Scheifele Bridge
Dug Pond (SAS)	No turtles observed	1 Midland Painted Turtle basking at edge of pond	2 Midland Painted Turtles basking at edge of pond
Cattail Marsh west of Northfield Road (MASM1-1)	7 Midland Painted Turtles basking 1 Snapping Turtle in water	5 Midland Painted Turtles basking	6 Midland Painted Turtles basking 1 Snapping Turtle basking

No SAR were observed during field investigations. Snapping Turtle and Midland Painted Turtle (SOCC) was observed in the cattail marsh west of Northfield Road, as well as within the Conestogo River as an incidental observation during the aquatic habitat assessment (see **Section 4.2.4**). Additionally, in 2022, a turtle was noted within the SAS ELC community, and although it disappeared quickly it was determined to be a Midland Painted Turtle. Evidence of turtle nesting was also documented in the gravel shoulder of Northfield Drive East, also in proximity to the SAS community.

4.2.3 Bat and Bat Habitat Surveys

Treed communities within the Study Area were assessed for their suitability to support bat maternity roost habitat as per Species at Risk Bats within Treed Habitats Little Brown Myotis, Northern Myotis & Tri-Colored Bat (MNRF 2017) and Survey Methodology for the Use of Buildings and Isolated Trees by Species at Risk (SAR) Bats (MNR 2014). Each tree with a diameter at breast height (DBH) larger than 10 centimetres (cm) was assessed, with details recorded for:

- Species
- DBH
- Height
- Presence of loose/peeling bark
- Cavity height (if present)
- Decay class
- Presence of other snags in proximity
- Open canopy

Eleven candidate bat maternity colony trees were observed in the Study Area during the bat maternity colony survey (shown on **Figure 4, Appendix A** and detailed in **Table 4.5** below). Trees 1 and 2 were crack willows located in the FODM11 hedgerow east of Scheifele Bridge on the south side of the Conestogo River. Trees 3 to 9 were crack willows located in the FODM11 hedgerow west of Northfield Drive. Trees 10 and 11 were dead standing trees (snags) in the FODM7 woodland north of the Conestogo River.

Trees 2-5 and 8 represented the best examples of preferred habitat for bat maternity colonies in the Study Area, meeting 4 and 5 out of the 8 suitability criteria listed in **Table 4.6**. These tall trees exhibited high cavities, they were large in diameter and/or had an open canopy.

Other trees were considered to be lower quality examples of candidate bat maternity colony trees, meeting only 2 or 3 out of the 8 suitability criteria listed in **Table 4.6**. Although these trees exhibited cavities, the trees displayed one or more of the following characteristics that are not preferred by bats: low cavities, smaller diameters, advanced stages of decay and closed canopies.

Table 4.5 Candidate Bat Maternity Roost Trees

Tree #	Species	Approximate DBH (cm)	Estimated Tree Height (m)	Estimated Cavity Height (m)
1	Crack Willow	45	8	8
2	Crack Willow	80	20	20
3	Crack Willow	75	24	24
4	Crack Willow	60, 50	24	24

Tree #	Species	Approximate DBH (cm)	Estimated Tree Height (m)	Estimated Cavity Height (m)
5	Crack Willow	55	24	24
6	Crack Willow	60	10	10
7	Crack Willow	60	14	14
8	Crack Willow	50, 50	22	22
9	Crack Willow	50	16	16
10	Snag	60	11	11
11	Snag	30	20	20

Table 4.6 Candidate Bat Maternity Roost Tree Suitability Criteria

Tree #	One of tallest trees in community	Exhibits cavities/ crevices/ scars/ woodpecker holes	Largest DBH in community	Cavity or crevice is high up in tree (>10m)	Within highest density or cluster of cavity trees	Large amount of loose, peeling bark	Open canopy	Early stages of decay (class 1-3)	Number of Suitability Criteria met
1		X					X		2
2	X	X	X	X					4
3	X	X	X	X			X		5
4	X	X	X	X					4
5	X	X		X			X		4
6		X					X	X	3
7		X		X					2
8	X	X	X	X			X		5
9		X		X			X		3
10		X		X					2
11		X		X					2

4.2.4 Incidental Wildlife Observations

Wildlife (birds, reptiles, mammals, amphibians, and insects) were noted incidentally by sight, sound and/or through distinctive signs (e.g., tracks, scat). Species, number, notes on habitat and behavior were recorded. Species observed included Cabbage White, American Toad, Green Frog, Northern Leopard Frog, Caspian Tern, Solitary Sandpiper, Snapping Turtle, Midland Painted Turtle, Red-tailed Hawk, Eastern Phoebe and Pileated Woodpecker, Grey Squirrel, Muskrat, Raccoon and White-tailed Deer. Caspian Tern is designated as a provincially rare breeder (S3B); however, there was no colonial breeding habitat for this species observed in the Study Area.

All other incidental species observed are common and secure in Ontario and are not SAR or SOCC.

4.2.5 Wildlife Habitat Assessment

General wildlife habitat assessments were completed at the Study Area. These assessments focused on the identification of wildlife habitat features, specifically Significant Wildlife Habitat (SWH) features as outlined in the MNRF's Criteria Schedules for Ecoregion 6E (MNRF 2015a). When encountered, these features were identified, recorded, and assessed for significance.

Wildlife habitat suitability assessments were also completed for SAR and SOCC that may occur in the area, including species identified in the NHIC database and Ontario wildlife atlases during the literature review process. Results of the wildlife habitat assessment are discussed in **Section 5.4**.

4.3 Aquatic Habitat Assessment

Fish and mussel habitat assessments were conducted on June 5, 2020. The Study Area for the habitat assessment included the area of the Conestogo River between 50 m upstream and 50 m downstream of the existing Scheifele Bridge. Also assessed were two unnamed tributaries to the Conestogo River, upstream (Western Tributary) and downstream (Eastern Tributary) on the south bank (**Appendix A, Figure 5**). A photographic log of the assessed habitats is presented in **Appendix D**.

Conestogo River at Scheifele Bridge

Substrates of the Conestogo River within the Study Area were generally dominated by gravel and cobble, with silt, sand, and boulder present in lower proportions. Sand and silt substrates were in higher proportion in the southwest quadrant of the river (west of the Scheifele Bridge on the south side of the Conestogo River) in an area of slack water or back-eddy resulting from an upstream island bar formation (Photos D16 and D17). A large gravel bar supporting some vegetation in its centre was located downstream (east) of the northern in-water pier and a smaller, similar bar was located downstream of the southern in-water pier (**Figure 5, Appendix A**; Photos D1 to D8, **Appendix D**). A small, dry, gravel bar was located upstream of the bridge in the middle of the channel and acted to separate the faster flowing northern half of the river channel from the slower flowing depositional half of the river to the south (**Figure 5, Appendix A**; Photo D15 and D16, **Appendix D**).

In-stream cover was provided by cobble, boulder and aquatic macrophytes. Aquatic macrophytes included curly-leaf pondweed (*Potamogeton crispus*), narrow-leaf pondweed (*Potamogeton sp*.), duck weed (*Lemna* sp.), common waterweed (*Elodea canadensis*) and white waterlily (*Nymphaea odorata*). Filamentous green algae (*Cladophora* sp.) was abundant throughout the Study Area (Photos D11, D20 and D22, **Appendix D**). No areas of deep pools were present within the Study Area, although deep runs were present within the northern half of the river, upstream and downstream of the bridge.

The northwest bank was steep but stable with well vegetated slopes and no obvious signs of erosion (Photo D13 and D14, **Appendix D**). The northeast bank of the river, adjacent to the bridge abutment showed signs of erosion with undercut banks and slumping of bank material into the river (Photo D9, **Appendix D**). The south bank of the Conestogo River was depositional with grassed banks or marshy areas dominated by cattails (*Typha sp.*) (Photos D17, D23 and D28, **Appendix D**).

The section of the Conestogo River that was assessed provides foraging, rearing, spawning and overwintering habitat for unionid mussels and warmwater fish species.

During the habitat assessment, shell evidence for a single mussel species, Fluted Shell (*Lasmigona costata*),- was found within the Study Area. Only one empty shell of this species was found in relatively deep water (1 m deep), 30 m east of the northern bridge abutment.

A pair of Rock Bass (*Ambloplites rupestris*) were observed spawning/nesting 10 m south of the northern bridge abutment (Photo D12, **Appendix D**). A pair of Smallmouth Bass (*Micropterus dolomieu*) were observed spawning/nesting 30 m southwest of the northern bridge abutment. Several adult young-of-the-year cyprinids were observed along the north and south shorelines of the Conestogo River, among aquatic macrophytes, near the bridge. Also observed were Yellow Perch (*Perca flavescens*) Common Carp (*Cyprinus carpio*) and an unidentified sucker (likely White Sucker – *Catastomus commersonii*), moving upstream through the Study Area.

Western Tributary of Conestogo River

The Western Tributary confluence (Photo D23, **Appendix D**) with the Conestogo River is located approximately 50 m upstream from the Scheifele Bridge and drains an area of wetland and grassy marsh between Highway 22/Northfield Drive and agricultural lands farther west. The channel was dry at the time of assessment but was approximately 0.3 m wide with grassed banks (Photos D24, D25 and D26, **Appendix D**). Substrate within the channel was comprised of dried muck, sand, and small amounts of gravel. The tributary had two main sources or channels that met prior to emptying into the Conestogo River, both originating from the wetland to the south (Photo D27). The east branch was conveyed through a 20 cm plastic pipe and the west branch was conveyed through a 30 cm corrugated steel pipe (CSP) under the Health Valley Trail horse path that runs parallel to the Conestogo River. The area south of the horse path was a wide, flat wetland dominated by grasses (reed canary grass) and cattails.

No fish were observed in the Western Tributary at the time of the assessment; however, the area may support suitable spawning habitat for Northern Pike (*Esox lucius*) and Common Carp, which prefer grassy vegetated flats that are inundated in the spring.

Eastern Tributary of Conestogo River

The Eastern Tributary confluence (Photos D28 and D30, **Appendix D**) with the Conestogo River is located approximately 25 m downstream from the Scheifele Bridge and drains a small area of the Conestogo River floodplain. The 35 m long watercourse exits a partially collapsed, 30 cm CSP that connects to underground drainage tile on the east side and parallel to Highway 22/Northfield Drive (Photo D31). Water for this system originates from a farm pond approximately 185 m to the south (Photo D32, **Appendix D**) and flows through pasture areas of the Conestoga River Horseback Adventures property.

Channel water depth ranged between 0.03 and 0.1 m and had a wetted width of 0.05 m to 0.2 m wide. Mean bank full width was approximately 2 m. Substrate was dominated by silt with lesser amounts of sand, cobble, and gravel. Banks were well vegetated with cattails, grasses, and small willow trees. Banks showed some evidence of erosion (undercutting) but were primarily depositional or vulnerable to erosion

(Photo D29, **Appendix D**). Very little in-stream cover was present and riparian vegetation provided 10 % partly open coverage.

No fish were observed within the Eastern Tributary at the time of the assessment; however, the area may be suitable spawning habitat for Northern Pike and Common Carp, which prefer grassy vegetated flats that are inundated in the spring.

5 Assessment of Significance

5.1 Significant Wetlands

There are no mapped significant wetlands in the Study Area. Unevaluated wetlands are present in the Study Area:

- A linear cattail dominated marsh meadow community (MASM1-1). shallow aquatic feature (SAS), and small pocket of reed-canary grass meadow marsh (MAMM1-3) west of Northfield Drive and south of the river.
- The north and south banks of the Conestogo River consist of large areas of reed-canary grass meadow marsh (MAMM1-3) and a small cattail dominated meadow marsh in the southeast quadrant (MASM1).

5.2 Significant Woodlands

ROP Policy 7.C.6 provides three criteria to assess woodlands (**Table 5.1**). Per this policy, to be identified as significant, a woodland must meet all three criteria. None of the woodlands in the Study Area meet the minimum size requirement (greater than 4 hectares); therefore, significant woodlands are considered absent.

Table 5.1 Criteria for Woodland Significance per Region of Waterloo Official Plan Policy 7.C.6

Region of Waterloo Significant Woodlands Criteria	
a.	greater than four hectares in size, excluding any adjoining hedgerows;
b.	consisting primarily of native species of trees;
c.	meets the criteria of a woodland in accordance with the provisions of the Regional Woodland Conservation By-law.

The largest woodland in the Study Area is the FODM7 unit located on the north bank of the Conestogo River west of Northfield, which is less than 2 hectares. Per Policy 7.E.1 of the ROP, this unit would become a Supporting Environmental Feature because it is connected to the Conestogo River corridor and supports the ecological functions of the Greenlands Network.

5.3 Significant Valleys

Per Policy 7.B.20 of the ROP, and as shown on Map 4, the valley of the Conestogo River is a Significant Valley. Furthermore, the Conestogo River is nationally recognized as part of the Grand River Canadian Heritage River system. Significant Valleys comprise the entire river channel up to where the valley slope grades into the surrounding upland.

5.4 Areas of Natural and Scientific Interest

There are no ANSIs within the Study Area.

5.5 Significant Wildlife Habitat

Wildlife habitat includes habitat for SOCC and the four categories of SWH. The Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (MNRF 2015a) provide descriptions of wildlife habitats and guidance on criteria for determining the presence of candidate and confirmed wildlife habitats. Targeted wildlife surveys are typically required to confirm habitat use and significance.

This section discusses these categories of SWH relative to the Study Area. A full description of the evaluation of specific types of wildlife habitat is provided in **Table B-6**, **Appendix B**. SWH (candidate and confirmed) is also shown on **Figure 4, Appendix A**.

5.5.1 Seasonal Concentration Areas

Seasonal concentration areas are sites where large numbers of a species gather together at one time of the year, or where several species congregate. Only the best examples of these concentration areas are typically designated as SWH. Review of the NHIC & LIO databases did not identify any confirmed seasonal concentration areas within the Study Area. The following candidate seasonal concentration areas were identified in the Study Area:

- Bat maternity colony (candidate)
- Turtle wintering areas (confirmed in MASM1-1 and candidate)
- Reptile hibernaculum (candidate)

As noted in **Section 4.2.1**, a large Cliff Swallow colony was observed on the underside of Scheifele Bridge during the breeding bird surveys. Because the colony in on an anthropogenic structure, it does not qualify as SWH (MNRF 2015).

5.5.2 Rare Vegetation Communities or Specialized Habitats for Wildlife

Rare Vegetation Communities or Specialized Habitats for Wildlife are defined as separate components of SWH. Rare habitats are habitats with vegetation communities that are considered rare (S1-S3) in the province. These habitats are generally at risk and may support wildlife species that are considered significant. Specialized habitats are microhabitats that are critical to some wildlife species. No rare vegetation communities were identified in the Study Area. The following specialized habitats for wildlife were identified:

- Turtle nesting area (candidate)
- Amphibian breeding habitat (candidate)

Although evidence of at least one turtle nest was documented on the shoulder of Northfield Drive in 2022, roadside habitat does not qualify as SWH (MNRF 2015). It is possible turtles are nesting elsewhere and as such turtle nesting areas remain as candidate SWH.

5.5.3 Habitat for Species of Conservation Concern

Habitat for SOCC includes four types of species: those that are rare, those whose populations are significantly declining, those that have been identified as being at risk to certain common activities, and those with relatively large populations in Ontario compared to the remainder of the globe. An evaluation of candidate habitats for species of conservation concern that were identified during the background review, is provided in **Table B-2, Appendix B**. The following habitat for species of conservation concern were identified in the Study Area:

- Common Nighthawk (candidate)
- Eastern Wood-Pewee (confirmed; see **Figure 4, Appendix A**)
- Monarch (candidate)
- Western Chorus Frog (candidate)
- Eastern Milksnake (candidate)
- Northern Map Turtle (candidate)
- Midland Painted Turtle (confirmed, see **Figure 4, Appendix A**)
- Snapping Turtle (confirmed; see **Figure 4, Appendix A**)

5.5.4 Animal Movement Corridors

Animal movement corridors are distinct passageways or defined natural features that are used by wildlife to move between habitats, usually in response to seasonal requirements. Movement corridors are identified once the following seasonal concentration areas or specialized habitats are confirmed as SWH: amphibian breeding habitat and deer wintering habitat. Candidate animal movement corridors are discussed in **Table B-6, Appendix B**.

Without targeted amphibian breeding surveys, it is unknown whether the wetlands in the Study Area provide SWH for breeding amphibians and animal movement corridors. Riparian wetlands and the vegetated shoreline along the Conestogo River in the Study Area has the potential to support a movement corridor for amphibians.

5.6 Fish Habitat

The section of the Conestogo River provides foraging, rearing, spawning and overwintering habitat for a number of unionid mussels and warmwater fish species, including aquatic SAR (see **Section 5.7**).

5.7 Species at Risk

Eight SAR and/or their habitat were identified as confirmed or potentially present in the Study Area based on a review of background documents as well as habitat assessments and/or targeted surveys undertaken in the field:

- Butternut (END) – confirmed in the FODM7-3 community adjacent to the SAS pond.
- Eastern Meadowlark (THR) – the species was observed by Stantec in suitable habitat (OAGM2) east of Northfield Drive on the north side of the Conestogo River during the first breeding bird survey; however, it was absent during the second and third surveys due to the plowing of the hay field, an operation that is expected to continue to interrupt breeding in subsequent years. Additionally, the sloped road embankment and disturbance from Northfield Drive may limit actual habitat use in the right of way by this species. Habitat use by this species is considered unconfirmed in the Study Area.
- Three bat species: Little Brown Myotis, Northern Myotis, Tri-coloured Myotis (END) – suitable habitat is present in the FODM11 hedgerow east of Scheifele Bridge on the south side of the Conestogo River, the FODM11 community west of Northfield Drive and in the FODM7 community on the north side of the Conestogo River; however, species presence was not confirmed in the Study Area through acoustic monitoring. Large areas of forest cover along the Conestoga River corridor upstream and downstream indicate that habitat for these species is not limited to the Study Area.
- Silver Shiner (THR) – species presence was identified using DFO aquatic species at risk mapping and was not observed by Stantec during field investigations. Suitable habitat for spawning, rearing, foraging and overwintering is present within the Conestogo River east (downstream) of the Scheifele Bridge as well as the north half of the river on the west (upstream) side of the bridge. This species has been treated as present in the Study Area.
- Black Redhorse (THR) – species presence was identified using DFO aquatic species at risk mapping and was not observed by Stantec during field investigations. Suitable habitat for spawning, rearing, foraging and overwintering is present within the Conestogo River east (downstream) of the Scheifele Bridge as well as the north half of the river on the west (upstream) side of the bridge. This species has been treated as present in the Study Area.
- Wavy-rayed Lampmussel (THR) – species presence was identified using DFO aquatic species at risk mapping and was not observed by Stantec during field investigations. Suitable habitat for spawning, rearing, feeding and overwintering is present within the Conestogo River east (downstream) of the Scheifele Bridge as well as the north half of the river on the west (upstream) side of the bridge. This species has been treated as present in the Study Area.

An assessment of habitat presence and use for the species listed above is provided in **Table B-1, Appendix B**.

5.8 Region of Waterloo Greenlands Network

5.8.1 Landscape Level Systems

Landscape Level Systems consist of: Environmentally Sensitive Landscapes, Significant Valleys, Regional Recharge Areas, and the NHS of the GPGGH.

As described in **Section 5.3**, the Conestogo River Valley is a confirmed Significant Valley. The Study Area is also identified in the GPGGH as part of the NHS.

Although the Conestogo River valley in the Study Area has not been designated an Environmentally Sensitive Landscape on Map 4 of the ROP, the feature meets many criteria for significance. However, the presence of Northfield Drive bisecting the landscape may reduce the significance and sensitivity of the feature. At this time, it is assumed that the Study Area does not contain or overlap with an Environmentally Sensitive Landscape.

5.8.2 Core Environmental Features

Core Environmental Features consist of: Significant Habitat of Endangered or Threatened Species, Provincially Significant Wetlands, Environmentally Sensitive Policy Areas, Significant Woodlands, Environmentally Significant Valley Features, and Significant Areas of Natural and Scientific Interest (ANSI).

The Study Area contains habitat of endangered or threatened species, Significant Woodlands, and Environmentally Significant Valley Features. In accordance with the policies in Section 7.C of the ROP, the Environmentally Significant Valley Features are those habitats for regionally significant fauna which are described in **Section 5.5.3**, above.

5.8.3 Supporting Environmental Features

Supporting Environmental Features are those natural features which do not meet criteria for regional significance but play an important role in maintaining the ecological functions of the Greenlands Network.

5.9 Summary

This section provides a summary of natural heritage features within the Study Area. Features were assessed using criteria in the Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement (MNR, 2010), policies of the ROP, and the SWH Criteria Schedules for Ecoregion 7E (MNRF, 2015). **Table 5.2** provides a summary of the natural heritage features within the Study Area. Confirmed features are also shown on **Figure 4, Appendix A**.

Table 5.2 Summary of Significant Natural Heritage Features in the Study Area

Natural Heritage Features	Present within the Study Area
Significant Wetlands	N
Other unevaluated wetlands	Y
Significant Woodlands	N
Significant Valleys	Y
Areas of Natural & Scientific Interest	N
Significant Wildlife Habitat	
• Seasonal concentration areas	Y
• Rare vegetation communities or specialized habitats	Y
• Habitats of species of conservation concern	Y
• Animal movement corridors	Y
Fish habitat	Y
Habitat of endangered and threatened species • 1 species – confirmed present (butternut) • 3 species – assumed present based on background data and habitat suitability (Silver Shiner, Black Redhorse, Wavy-rayed Lampmussel) • 4 species – potentially present based on habitat suitability (Eastern Meadowlark, Little Brown Myotis, Northern Myotis, Tri-coloured Myotis)	Y
Region of Waterloo Greenlands Network	
• Landscape Level Systems	Y
• Core Environmental Features	Y
• Supporting Environmental Features	Y

6 Recommended Preferred Design

The Region of Waterloo is undertaking the EA and preliminary design for the replacement of Scheifele Bridge on Northfield Drive East (Regional Road 22) over the Conestogo River. The development of Alternative Design Concepts for the Scheifele Bridge study was grouped into two categories based on the interaction between various bridge design options, the function of Northfield Drive, and the impacts of construction on traffic control and staging (Stantec 2022). The two categories of Alternative Design Concepts included the following:

- Alternative Northfield Drive Alignment Design Concepts
- Alternative Scheifele Bridge Cross Section Design Concepts

Alternative Design Concept alternatives, evaluation criteria and results are documented in the Environmental Study Report (ESR; Stantec 2022). **Table B-7, Appendix B** provides the evaluation of alternatives from the perspective of the natural environment. The preferred alternatives are described below and carried forward to the impact assessment in **Section 8**.

6.1 Preferred Northfield Drive Alignment

The Recommended Northfield Drive Alignment Design Concept was determined to be **Alternative Concept 2: West Side Stage Construction**. The preferred alternative proposes a new bridge constructed to the west of the existing Scheifele Bridge (**Figure 6, Appendix A**), with an approximate 9.7 m centerline to centerline separation between the new and existing structures. The existing road embankments, on the west side of Northfield Drive, will be widened on the north and south approaches to permit the proposed shift in the road and bridge alignments.

6.2 Preferred Scheifele Bridge Cross Section

The Recommended Preferred Bridge Cross Section Design Concept for the Scheifele Bridge replacement was determined to be **Alternative Concept 5**. The preferred alternative is a 3-span, symmetrical, haunched steel plate girder bridge, with a 117 m length as shown in **Appendix E**. Features of Recommended Preferred Bridge Cross Section Design Concept 5 include:

- Two 3.35 m lanes, one each for northbound and southbound traffic
- 2.45 m paved shoulders for shared use by buggy traffic and cyclists
- 1.8 m walkway / sidewalk on each side of the bridge
- Decorative pedestrian handrails (design details to be confirmed)
- Concrete protection barriers between the road and each walkway
- Total width of the proposed structure is 16.65 meters

6.3 Construction Plan

A staged construction plan is proposed in conjunction with the recommended preferred Northfield Drive **Alignment Design Concept 2: West Side Staged Construction** to provide for uninterrupted traffic operations on Northfield Drive and the Scheifele Bridge.

Construction access for the in-river piers will occur from the from the south side of the Conestoga River. There is an existing access from Northfield Drive to the northwest quadrant of the bridge / river, which is used by the public for fishing and hiking, etc. This access will likely be removed as part of the embankment filling operations for the bridge construction; however, the contractor may opt to temporarily use this existing access for construction equipment of the north abutment.

7 Impact Assessment and Mitigation

The potential impacts to natural features that might reasonably be expected to occur as a result of the preferred design are discussed in this section. Both direct and indirect impacts are identified, and appropriate mitigation, restoration and enhancement recommendations are provided. The impact assessment addresses the Project Area, which includes the preferred alignment and grading areas for the embankments (**Figure 6, Appendix A**). Temporary work areas and other refinements may be identified during detailed design, and this impact assessment should be updated at that time, as appropriate.

Site specific impacts and mitigation strategies are discussed for vegetation and wetlands, wildlife and wildlife habitat, aquatic species and habitat, and SAR. Standard mitigation measures (that are commonly applied to construction projects) and environmental monitoring recommendations are also discussed under separate headers below.

7.1 Vegetation and Wetlands

The Project Area was overlaid on vegetation community mapping to identify direct loss by community type (**Figure 6, Appendix A**). The losses are quantified by community type in **Table 7.1**.

The area of direct loss reported in **Table 7.1** includes areas that will be retained beneath the proposed bridge, including the OA and MASM1-14 aquatic and wetland units. These losses are considered a conservative estimate of loss.

Table 7.1 Direct Loss by Vegetation Community

Type	ELC Vegetation Community	Direct Loss (m^2)
Meadow	MEGM3 (Dry - Fresh Graminoid Meadow Ecosite)	10
Meadow	MEGM4 (Fresh - Moist Graminoid Meadow Ecosite)	3521
Meadow	MEMM3 (Dry - Fresh Mixed Meadow Ecosite)	2721
Woodland	FODM7 (Fresh – Moist Lowland Deciduous Forest Ecosite)	25
Woodland	FODM7-3 (Fresh – Moist Willow Lowland Deciduous Forest Type)	1137
Hedgerow	FODM11 (Naturalized Deciduous Hedge-row Ecosite)	101
Wetland	MAMM1-3 (Reed-canary Grass Graminoid Mineral Meadow Marsh Type)	357
Wetland	MASM1-1 (Cattail Mineral Shallow Marsh Type)	73
Wetland	MASM1-14 (Reed Canary Grass Mineral Shallow Marsh Type)	174
Wetland	SAS (Submerged Shallow Aquatic)	62
Aquatic	OA (Open Water)	996
Agriculture	OAGM1 (Annual Row Crops)	668
Agriculture	OAGM1 (Annual Row Crops)	8
Agriculture	OAGM1 (Annual Row Crops)	135

Type	ELC Vegetation Community	Direct Loss (m^2)
Constructed	CVC_1 (Business Sector)	179
Constructed	CVI_1 (Transportation)	7540

Direct loss to vegetation communities will occur along the edge of the existing road, and there will be no new fragmentation effects; however, newly created edges may expose features to increased sunlight penetration, susceptibility to windthrow, desiccation, and possibly road salt, and create new pathways for invasive species. The wetlands (SAS and MASM1-1) may be particularly sensitive to these changes. Standard mitigation strategies are available to prevent inadvertent encroachment into natural areas during construction, protect features including wetlands from sedimentation, and re-vegetation disturbed areas once work is complete (**Section 7.4**). As per GRCA (2015) policy 8.4.6, remedial measures must also enhance features and functions. The re-vegetation strategies include methods to plant and "seal" the newly exposed wetland edges.

7.2 Wildlife and Wildlife Habitat

The Project Area was overlaid on mapping of important habitat features to identify direct impacts, including loss to SAR habitat, and candidate and confirmed SWH habitat shown on **Figure 4, Appendix A**. The losses are quantified by community type in **Table 7.2**.

Table 7.2 Direct Loss by Wildlife Habitat Type

Habitat Type	Corresponding ELC Vegetation Community	Direct Loss (m^2)
Candidate Monarch habitat	MEMM3 (Dry - Fresh Mixed Meadow Ecosite)	2721
Candidate Turtle Overwintering habitat	OA (Open Water)	996
	SAS (Submerged Shallow Aquatic)	62
Candidate Amphibian habitat	MASM1-14 (Reed Canary Grass Mineral Shallow Marsh Type)	174
	SAS (Submerged Shallow Aquatic)	62

The candidate Monarch habitat does not qualify as significant migratory habitat described by the Criteria Schedules for Ecoregion 6E (MNRF 2015a); however, it provides nectaring plants and host plants (milkweed) that may be used by adults and larvae, respectively. Nectaring plants and milkweed are common in Ontario, the Ecoregion and regionally. Further, given the relatively small size of the habitat, it is not expected to be considered SWH for these functions. However, Monarch is a SOCC, and strategies to avoid harm to individuals during construction are provided below.

Direct loss of wetlands may result in slight decreases in productive amphibian breeding and turtle overwintering habitat. Targeted surveys for amphibian and overwintering turtles would be required to determine if these features qualify as SWH for either function. Given there were summer observations of SOCC turtles (Snapping Turtle and Midland Painted Turtle) in the SAS and MASM1-1 communities, it is likely this part of the wetland is also used for overwintering. Because the direct loss is relatively minor, the features would be anticipated to retain existing functions post-construction, with the implementation of

standard mitigation strategies (**Section 7.4**). Strategies to avoid harm to individual amphibians and turtles during construction are provided below.

In addition to the direct loss of habitat features identified above, the project may impact the following species:

- **Cliff Swallow -** An estimated 35 Cliff Swallow nests were observed on the underside of Scheifele Bridge during the breeding bird survey. Cliff Swallow nests are protected by the MBCA. Work on the existing bridge has the potential to disturb Cliff Swallow nests and breeding behavior. Mitigation measures to protect active Cliff Swallow nests are provided below.
- **Maternity roosting bats -** Although suitable bat roost trees were not identified in the Project Area (**Figure 4, Appendix A)**, suitability of trees can change over time. Removal of suitable maternity / summer roost trees has the potential to harm bats if present, including bat SAR. Mitigation measures to protect bats are below.

There is no direct loss to other important habitat features noted for the Study Area, such as butternut habitat, suitable habitat for Eastern Meadowlark, Eastern Wood-pewee habitat, candidate snake hibernacula, confirmed turtle overwintering habitat, and candidate turtle nest areas (**Figure 4, Appendix A**). Strategies to avoid harm to individual snakes and turtles during construction are provided below. This impact assessment should be updated if there changes to the Project Area during subsequent design phases and construction activity will encroach upon these features.

7.2.1 Wildlife Protection

Mitigation recommendations are provided below to protect Monarch, herptiles (amphibians, turtles and snakes), breeding birds (including Cliff Swallow) and bats during construction, and to restore habitats post construction. Standard mitigation strategies are available to protect adjacent features during construction (**Section 7.4**).

7.2.1.1 Monarch

To reduce potential harm to Monarch, vegetation clearing in MEMM3 should be avoided between the peak season for eggs, caterpillar or pupae which is generally May 1 to August 31 (Mission Monarch 2020). If vegetation clearing will proceed during this period, inspection of milkweed plants may be completed to locate Monarch individuals. If present, they may be moved to a location that is suitable and safe under the direction of a qualified professional. Monarch caterpillars may be moved to other milkweed plants; for other immature stages (i.e., eggs and chrysalis), entire milkweed plants should be transplanted. A Wildlife Scientific Collector's Authorization may be required for the relocation of Monarchs and/or their caterpillars.

7.2.1.2 Herptiles

Sediment fencing is recommended between the work areas and natural areas as a standard mitigation measure to prevent sedimentation and encroachment of equipment (**Section 7.4**). This sediment fence will serve the dual purpose of limiting herptiles (amphibians, turtles, and snakes) and other ground-dwelling wildlife access into work areas. Fencing materials with plastic mesh will not be used during construction due to risk of entanglement of reptiles. Similarly, landscape fabric and other construction material with plastic mesh will be avoided.

If possible, installation of sediment fencing/other exclusionary measures will occur before June 1 or after September 1 (i.e., outside of turtle nesting season) to define and restrict the movement of nesting turtles into the working area. If the installation of fencing occurs during the turtle nesting season, it is recommended that the area be searched for the presence of turtles or nests prior to installation of fencing. If a turtle nest is encountered during construction, work at that location will stop and a qualified biologists will be contacted for further protection measures, such as the installation of a protective nest cage.

In addition to sediment fencing, construction contractors will conduct a thorough visual search of the work area prior to commencement of work each day to reduce the likelihood of interaction with herptiles and other wildlife, particularly during the active period between April 15 and November 1. Visual searches should include careful inspection of brushing, grading, and ditching areas immediately prior to work, and inspection of machinery and equipment prior to starting equipment. If herptiles are encountered during construction, work at that location will stop and the animal will be permitted a reasonable amount of time to leave the area on their own. If wildlife must be moved, a person knowledgeable in handling techniques may relocate it to a location that is both safe and suitable. Safe wildlife handling techniques are described in MNRF's (undated) Ontario Species at Risk Handling Manual: For Endangered Species Act Authorization Holders.

If wildlife rescues are required for the removal herptiles for construction (e.g., dewatering and regrading of wetlands units OA, MASM1-1, or SAS), prior authorization is required under the FWCA (see also **Section 8.5**). The risk of herptile encounters may be further refined using targeted amphibian breeding and reptile (turtles and snakes) overwintering surveys, during later design stages and prior to construction.

7.2.1.3 Breeding Birds

To avoid damaging or disturbing bird nests and contravening the MBCA, the timing of vegetation clearing should occur outside of the primary nesting period (i.e., the period when the percent of total nesting species is greater than 10% based on ECCC 's (2014) Nesting Calendars and the period for which due diligence mitigation measures are generally recommended). The primary nesting period identified for the Study Area is generally April 1 – August 15. However, birds may also nest outside this period and nests should be avoided until no longer active.

Cliff Swallow

The primary means of avoiding direct harm to Cliff Swallow nests on the existing bridge is to avoid construction when the nests are active. Cliff Swallows are migratory birds that return to their Ontario breeding ground in April, but nests are not initiated until early to mid-May. Based on Birds Canada (2022), Cliff Swallow nests are active in the Guelph Drumlin Fields ecodistrict (that includes that Study Area) between May 24 to August 15. Given the anticipated duration of construction, work on the bridge will occur with the active nesting period. In this case, the following steps are recommended:

- Cliff Swallows commonly reuse old nests from previous years and preferentially settle in them if suitable (Gauthier et al. 1994, Meek and Barclay 1996). If feasible, locate nests from previous years and remove them to discourage the birds from establishing nests on the structures. Nests should be removed before April 1.
- If Cliff Swallows are excluded from a nesting site they have used before, they may move to a different location on the same structure. Barriers should prevent access to all suitable nesting sites on the structure (or within the area of the activity), regardless of historical evidence of nesting. The method of exclusion should be carefully designed, installed and monitored to prevent Cliff Swallows from gaining access. If Cliff Swallows enter the structure to establish nests in a work area where any part of the activity may result in harm or harassment to the species, work must be stopped immediately, and the ECCC should be consulted to determine next steps.
- There are many different methods available to dissuade Cliff Swallows from nesting on the bridge. Netting is not recommended due to risk of entanglement. Methods of exclusion that can be considered include (see MNRF 2017 for more details):
    - Corner slope panels can be used to block access to ledges, pipes and corners. These panels cover the area with a barrier that prevents access to the 90 degree angle at which birds would construct their nests (MNRF 2017). This will result in a concave or sloped surface (at a 45 degree angle to the bridge wall) that does not offer the preferred nest site conditions. If corner slope panels are applied, care must be taken to block access to all potential nesting sites. However, installing corner slope panels over the water below the deck may be challenging.
    - Flexible barriers (tarps, geotextile fabric) can be used to exclude Cliff Swallows from bridges but this method requires rigorous monitoring because its susceptible to weather related damage. Further, Swallows can nest on top of flexible barriers if it is not installed properly. MNRF 2017 provides details on factors to consider when using flexible barriers to exclude Swallows from nesting on bridges.
    - Any type of exclusion or deterrence must be monitored for the presence of Cliff Swallows. If a Swallow begins to nest on the bridge, it cannot be disturbed until nesting is complete. Daily monitoring is recommended early in the season. This creates opportunity for exclusion or deterrence to be implemented if birds are observed scouting the area for potential nesting sites.
    - Exclusion will be installed prior to April 1.

- An educational factsheet describing identification tips, timing, and recommended activities to avoid impacts to Cliff Swallow will be distributed to all workers.

7.2.1.4 Bats

To reduce the likelihood of harm to bats, it is recommended that trees > 10 cm diameter at breast height (DBH) are removed outside the bat maternity roost season which is generally between April 1 and September 30. If tree removal is required within this window, maternity exit surveys may be conducted prior to the tree removals to determine if bats are using the trees. Maternity exit surveys are conducted during the evening and include visual and acoustic surveys using accepted protocols. There is potential for bat SAR to use suitable roost trees in the area. Mitigation for bat SAR is provided in **Section 7.3**.

7.2.2 Aquatic Species and Habitat

The existing bridge is a 4-span structure that sits on three piers and two abutments, with two of the piers within the mid-channel of the Conostogo River. The preferred alternative is a 3-span, symmetrical, haunched steel plate girder bridge, that will have two piers and two abutments, with one of the piers within the mid-channel. The existing and proposed bridge profiles are shown in **Appendix E**. The reduction of piers is a positive impact, as it provides an opportunity to restore aquatic habitat in the areas currently covered by the existing piers that will be removed.

Potential impacts to aquatic habitat can include direct habitat loss or indirect impacts to habitat.

Direct fish and aquatic habitat loss will occur at the proposed mid-channel pier. However, the removal of the existing in-channel piers will result in a gain of habitat at those two locations. Specific mitigation measures associated with the bridge construction will be finalized during detailed design as appropriate. Areas requiring in-water works should be isolated, and fish and mussels should be collected from the work areas and relocated beyond the work area limits prior to any dewatering. Pump intakes for any dewatering or water taking should be fitted with fish screens to reduce potential for entrainment and impingement of fish. Finally, fish passage should be maintained and flow diversion should be utilized to maintain flows in the Conestogo River during construction phases that require isolation and dewatering of in-water work area.

Indirect impacts may result from the potential for sediment transport from exposed soil surfaces, potential entry of construction debris (e.g., concrete slurry, dust, etc.) into the water and spills associated with refueling of equipment. Sediment introductions can affect fish due to increased turbidity of the water column, which can impair vision and subsequent feeding by fish that are sight-hunters. Suspended sediments can also abrade gill membranes leading to physical stress, and impact prey organism's behavioral changes (i.e., avoidance, etc.). Heavier sediments can deposit on bottom substrates that may be used for spawning, incubation of juvenile fish, or food production, thereby impacting those habitat functions.

In-water work and access should adhere to applicable fisheries timing windows to reduce the risk of impacts occurring during sensitive life periods such as spawning and emergence of young fish. For works in the Conestogo River, no in-water work or access should take place from March 15 to July 15. Harm to fish can be reduced through isolation of work areas using coffer dams or other work area isolation techniques, removal of fish from the isolated area and performing works in the dry work area to reduce resuspension of sediments during construction.

In general, potential indirect impacts to aquatic habitat can be mitigated through site control measures, such as sediment and erosion controls, and other measures to prevent the entry of substances and debris into the water. Construction design should consider the standard measures of sediment and erosion control in **Section 7.4**.

7.3 Species At Risk

This section provides species-specific mitigation recommendations for SAR were either confirmed or considered potentially present in the Project Area, including endangered bats, Silver Shiner, Black Redhorse, and Wavy-rayed Lampmussel. Butternut and potentially suitable habitat for Eastern Meadowlark were also identified in the Study Area, but outside the Project Area. Additional mitigation may be required If the Project Area changes during later design stages and encroaches into habitat for butternut and Eastern Meadowlark (**Figure 4, Appendix A**). Authorization requirements for SAR are discussed in **Section 8**.

7.3.1 Endangered Bats

Mitigation strategies to avoid harm to maternity roosting bats during construction is summarized in **Section 7.2.1**, including timing restrictions for the removal of large diameter trees (greater than 10 cm DBH). Although no suitable bat trees were documented in Project Area, there is potential for bat SAR in the Study Area, and suitability of trees can change over time. If removal of large diameter trees is required, targeted surveys are recommended to identify trees with suitable roost structures and determine presence / absence of maternity roosting bat SAR. Surveys should follow MECP approved methods, and may include leaf-off tree assessments (i.e., winter assessments) to identify suitable roost structures, and/or visual exist and acoustic surveys during peak maternity roost season (June). If bat SAR are determined to be present, MECP should be consulted prior to tree removal (i.e., submission of an Information Gathering Form (IGF)) to determine authorization and mitigation requirements under the ESA. Mitigation might include timing restrictions for tree removals (see **Section 7.2.1**) and installation of alternate roost habitat such as bat boxes.

7.3.2 Silver Shiner

Mitigation approaches for aquatic habitat and animals will also provide protection to Silver Shiner as part of the resident fish community. Regulated habitat for Silver Shiner includes the Conestogo River channel, areas within the meander belt of the channel and 30 m on either side of the meander belt line. Consultation with DFO will be required to determine if a SARA permit will be required for the works.

MECP should also be consulted for Silver Shiner, and submission of an IGF will likely be required to determine if a permit is required.

7.3.3 Black Redhorse

Mitigation approaches for aquatic habitat and animals will also provide protection to Black Redhorse as part of the resident fish community. Consultation with DFO will be required to determine if a SARA permit will be required for the works. MECP should also be consulted for Black Redhorse, and submission of an IGF will likely be required to determine if a permit is required.

7.3.4 Wavy-rayed Lampmussel

Prior to the commencement of in-water construction, a mussel search and relocation program should be initiated. The relocation timing window based on mussel species and habitat present restricts handling of mussels to a period when water temperatures are above 16°C, which typically occurs between June 15 and September 30 in any given year. MECP should be consulted on the presence of Wavy-rayed Lampmussel and submission of an IGF will likely be required to determine if a permit is needed. The species is listed federally as Special Concern but is identified on Schedule 1. Consultation with DFO will identify if a SARA permit is required.

7.4 Standard Mitigation Recommendations for Construction

Potential indirect impacts may result from construction phase activities such as inadvertent encroachment of heavy equipment, siltation and/or spills of deleterious substances, noise, and dust migration into natural features (woodlands, wetlands and the Conestogo River). These impacts may alter species composition by compacting and smothering vegetation and introducing substances that could be harmful to vegetation and wildlife, such as fuel used by construction vehicles.

Additional disturbance may be required to facilitate spill clean-up activities. Where they occur, these impacts are expected to be localized to the construction area and adjacent areas.

These potential indirect effects are common to various types of construction and can be controlled using standard mitigation measures for erosion and sediment control. The primary principles associated with sedimentation and erosion protection measures are to:

- Minimize the duration of soil exposure
- Retain existing vegetation, where feasible
- Encourage re-vegetation
- Divert runoff away from exposed soils
- Keep runoff velocities low
- Trap sediment as close to the source as possible

To address these principles, the following mitigation measures will be implemented during construction:

- Silt fencing will be used along all construction areas adjacent to natural features. No equipment will be permitted to enter natural features beyond the fencing.
- Natural features inadvertently disturbed during construction will be stabilized and re-vegetated, through the placement of seed and mulching or seed and an erosion control blanket, promptly upon completion of construction activities.
- Equipment will be re-fueled >30 m away from natural features avoid potential impacts, in the event that an accidental spill occurs. Spill control materials, including absorbent barriers and mats, should be kept on site to quickly address any accidental spills immediately.
- In addition to any specified requirements, additional silt fence will be available on site, prior to grading operations, to provide a contingency supply in the event of an emergency. All exposed soil areas should be stabilized and re-vegetated (see **Section 7.4.1**).
- All sediment and erosion controls will be monitored regularly and properly maintained, as required. Controls will be removed only after the construction area has been stabilized.
- Proper muffling of machinery and equipment will be maintained to mitigate noise during construction.

7.4.1 Re-vegetation Strategies

Areas that are disturbed during construction should be re-vegetation as soon as feasible to control erosion and sedimentation and reduce the potential for undesirable species. Re-vegetation plans should include native seed and appropriate (non-invasive) cover crops that are suited to the site conditions to quickly stabilize soil and establish vegetation cover. To enhance local native species biodiversity, planting plans will include a variety of plant forms (e.g., woody, forb, graminoid, emergent) to create a diverse vegetation structure, and a variety of species that are beneficial to wildlife such as nectar, berry and nut producing plants.

Newly created edges that are cut along existing wetland features SAS and MASM1-1 should be addressed with restoration plantings to protect and mitigate for potential negative effects, such as increased sunlight penetration, susceptibility to windthrow, desiccation, and spread of invasive species. Restoration plans should use native species that are tolerant of the site conditions, including roadside stresses such as salt, pollution and soil compaction. Restoration should include broadcast seeding to replace seed banks that are lost, as well as planting of woody shrubs and trees to create vertical structure.

Monitoring plans should be developed and implemented to track survivorship and effectiveness of restoration plans and include recommendations to adapt management as appropriate (see also **Section 7.5**).

7.4.2 Invasive Species Management

Disturbed substrates are readily colonized by European reed (*Phragmites australis subsp. australis*; which was not identified in the Study Area) and other invasive plants. Standard construction phase mitigation measures for sediment and erosion control (**Section 7.4** and **7.4.1**) will reduce substrate disturbance to the extent possible and re-vegetate disturbed areas with desirable species as soon as possible following disturbance. In addition to these measures, development and implementation of a clean equipment protocol is also recommended to reduce the potential to introduce invasive species. The clean equipment protocol should incorporate the following strategies:

- Equipment and vehicles will be inspected inside and out prior to for debris such as mud or accumulation of dirt, plant material or snow/ice prior to entering the Project Area.
- Equipment and vehicles with debris noted above will be cleaned in an area where risk of contamination is low, ideally on a mud free hard surface, at least 30 m away from watercourses or other drainage features, waterbodies, wetlands or other natural areas, if possible. Where risk of runoff is high, cleaning stations will be contained by sediment fence as per standard erosion and sediment control specifications.
- Large accumulations of debris may be removed using a compressed air device, high pressure hose or other device as necessary. Clean the top of equipment and vehicles first and work down, with particular attention to the undersides, wheels, wheel arches, guards, chassis, engine bays, grills and other attachments.
- Clean inside vehicles by sweeping, vacuuming or using a compressed air device, including the floor, foot wells, pedals, seats and under the seats.
- Cleaning is complete when no accumulations of dirt or snow/ice are visible on the vehicle exterior, radiators, and grills, and the vehicle interior is free of dirt, plant material and snow/ice.
- Avoid driving through any wastewater from when exiting the cleaning site.
- Place and seal any Phragmites and other invasive species material removed during cleaning in a plastic bag and deposit it in a landfill.

7.5 Environmental Monitoring

Construction monitoring should be undertaken to track implementation of the planned mitigation measures, including compliance with the final grading, and erosion and sediment control plans. This includes proper functioning of controls throughout all phases of development, and proper containment of work in designated work areas. Remedial action should be undertaken as soon as possible wherever discrepancies are identified.

Monitoring should also occur to identify new occurrences of invasive species such as European reed during construction. If identified, an action plan should be designed and implemented as soon as reasonably possible to eradicate this species before it becomes established.

Compliance monitoring reports should be prepared and submitted to the municipality and GRCA twice annually (or other agreed to frequency) while construction is active. The reports should include a log of dates when inspections occurred, the condition of the facilities at the time and any recommended remedial actions, if any, that were implemented. This monitoring should continue until substantial completion of the grading and construction. Inspection activities will include:

- Inspection of erosion and control measures after each significant rainfall event (e.g., greater than 12 mm) or every other week, whichever is shorter
- Inspections should include all silt fence installations
- Noticeable erosion shall be repaired immediately, with investigation into the cause so implementation of mitigation measures to prevent recurrence will be more successful
- Encroachment beyond work zones should be noted.

7.5.1 Post-Construction Monitoring

Post-construction monitoring is recommended to track compliance with the approved construction and re-vegetation plans. Monitoring plans should be designed to track and recommend remedial action for:

- Removal of construction material such as sediment and erosion controls and stockpiles
- Presence of invasive species and management options, if applicable
- Installation and survivorship of planting material (e.g., correct species and quantities were planted)
- Vegetation monitoring should include adaptive management strategies to correct any deficiencies that are noted. Adaptive management may be triggered by poor survival of planted material, insufficient vegetation cover, and presence of invasive species in planted areas. Adaptive strategies may include supplemental plantings and/or control of unacceptable species.
- Post-construction monitoring plans should establish monitoring and reporting frequencies for the components recommended above.

Post-construction monitoring requirements for aquatic species will be identified through the consultation process with DFO and will be dependent on whether habitat offsetting/compensation will be required for approval. Similarly, any permit requirements, if applicable, stipulated by MECP will guide the post-construction monitoring approach for aquatic SAR and habitats.

8 Authorization Considerations

8.1 Fisheries Act

Determination regarding the applicability of the *Fisheries Act* (most recently amended on August 28, 2019) requires details of the Project layout, such as the location and nature of permanent and temporary construction activities to occur below the high-water mark of the Conestogo River. With detailed design information, a determination will be made following guidance and criteria provided on DFO's website regarding whether the in or near water work will require DFO review. If it is determined that DFO review is required, DFO's Request for Review Form will be submitted and a decision on the approvals approach will be administered by DFO. Based on Stantec's experience, projects of this nature typically require the submission of a Request for Review.

8.2 Species at Risk Act

Critical habitat for Silver Shiner and Black Redhorse is mapped throughout the Study Area (DFO, 2019).

This mapping also indicates that, in addition to Silver Shiner and Black Redhorse, Wavy-rayed Lampmussel are also considered to inhabit or potentially inhabit the study area. Species at Risk permits may be required by DFO for in-water works and/or potentially handling these species during fish and mussel rescues and relocations. A project Request for Review will be submitted to DFO, and will determine the course of action required for dealing with SAR.

8.3 Endangered Species Act

This section summarizes ESA authorization requirements for SAR that were either confirmed or considered potentially present in the Project Area, including endangered bats, Silver Shiner, Black Redhorse, and Wavy-rayed Lampmussel. Butternut and habitat for Eastern Meadowlark were also identified in the Study Area, but outside the Project Area. Additional authorizations may be required if the Project Area changes during later design stages and encroaches into habitat for butternut and Eastern Meadowlark (**Figure 4, Appendix A**).

8.3.1 Endangered Bats

Although no suitable bat trees were documented in Project Area, there is potential for bat SAR in the Study Area, and suitability of trees can change over time. If removal of large diameter trees is required, targeted surveys are recommended to determine if bat SAR are present (see **Section 7.3**). If bat SAR are determined to be present, MECP should be consulted prior to tree removal (i.e., submission of an Information Gathering Form) to determine authorization and mitigation requirements under the ESA. Authorization under the ESA can take several months to obtain, so targeted surveys and submission of an Information Gathering Form should be planned accordingly to achieve the desired construction schedule.

8.3.2 Silver Shiner, Black Redhorse and Wavy-rayed Lampmussel

The presence, or potential presence of these three aquatic species and their habitat in the Study Area will require consultation with MECP to determine the required course of action for approvals for construction. This is facilitated by the submission of an IGF to MECP. The requirement for a permit under the ESA will be determined following a review of the IGF by MECP.

8.4 Conservation Authorities Act

Prior to any work, including the placement or removal of fill material, grading activities, and construction within the GRCA's regulated area (O. Reg.150/06), the proponent will require written approval (i.e., a Permit or a Letter of Permission) from GRCA. Applications for authorization typically include detail design plans, including detailed strategies for erosion and sediment and control plans and re-vegetation and enhancement plans.

8.5 Fish and Wildlife Conservation Act

The FWCA provides protection for listed wildlife species including birds, mammals, reptiles, amphibians, and invertebrates, nests and eggs of protected species including birds and turtles, and for habitat features such as mammal dens. The contractor and environmental inspector should understand requirements under the FWCA so that wildlife interactions can be appropriately managed during construction, including requirements to rescue and relocate wildlife during work in wetlands and the Conestogo River. Planned wildlife relocations, such as fish and turtle rescues, and potentially Monarch larval relocations may require a permit from the MNRF.

9 Summary

This report evaluates the potential for significant natural heritage features in the Study Area using guidance from provincial and regional policy. Significant features and sensitive species that were either observed or could potentially be present within the Study Area are listed in **Section 5.9, Table 5.2**, including unevaluated wetlands, Significant Valleys, candidate and confirmed significant wildlife habitat, habitat of endangered and threatened species, fish habitat, and Region of Waterloo Greenland components (e.g., Landscape Level Systems, Core Environmental Features, and Supporting Environmental Features).

Alternative Design Concept alternatives, evaluation criteria and results are documented in the Environmental Study Report (ESR; Stantec 2022). The recommended preferred design includes:

- **Alternative Concept 2: West Side Stage Construction** - new bridge construction to the west of the existing Scheifele Bridge (**Figure 6, Appendix A**), with an approximate 9.7 m centerline to centerline separation between the new and existing structures
- **Alternative Concept 5: Bridge Cross-section** - a 3-span, symmetrical, haunched steel plate girder bridge, with a 117 m length (**Appendix E**)

The recommended preferred design was assessed to identify potential impacts to the significant features and sensitive species. This assessment identified direct loss to wetlands, woodland, meadows and aquatic habitat. Direct loss to natural areas will occur along the edge of the existing road and are considered relatively minor (see the areas are present by community type in **Section 7.1, Table 7.1**). Mitigation strategies were recommended to offset potential impacts and enhance existing features, including:

- Standard measures for vegetation protection, erosion and sediment control, re-vegetation and invasive species management
- Timing restrictions to avoid sensitive wildlife periods, including fish, migratory birds and maternity roosting bats
- Measures to avoid interactions with herptiles including wildlife exclusion fencing
- Requirements for in-water work
- Environmental Monitoring

Section 8 identifies authorization considerations under natural heritage legislation, including:

- Federal Acts: Fisheries Act, 1985, Species at Risk Act, 2002
- Provincial Acts: *Endangered Species Act*, 2007, *Conservation Authorities Act*, 1990, and the *Fish and Wildlife Act*, 1997.

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APPENDICES

Appendix A Figures

Stantec

Legend
- Study Area (Approx.)
- Road
- Watercourse (Intermittent)
- Watercourse (Permanent)
- Waterbody
- Wooded Area

0 100 200 m

1:5,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
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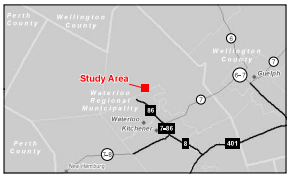

Project Location
Township of Woolwich

165010600 REV4
Prepared by PRM on 2022-10-14
Technical Review by SS on 2022-10-14

Client/Project
REGION OF WATERLOO
SCHEIFELE BRIDGE

Figure No.
1

Title
Study Area

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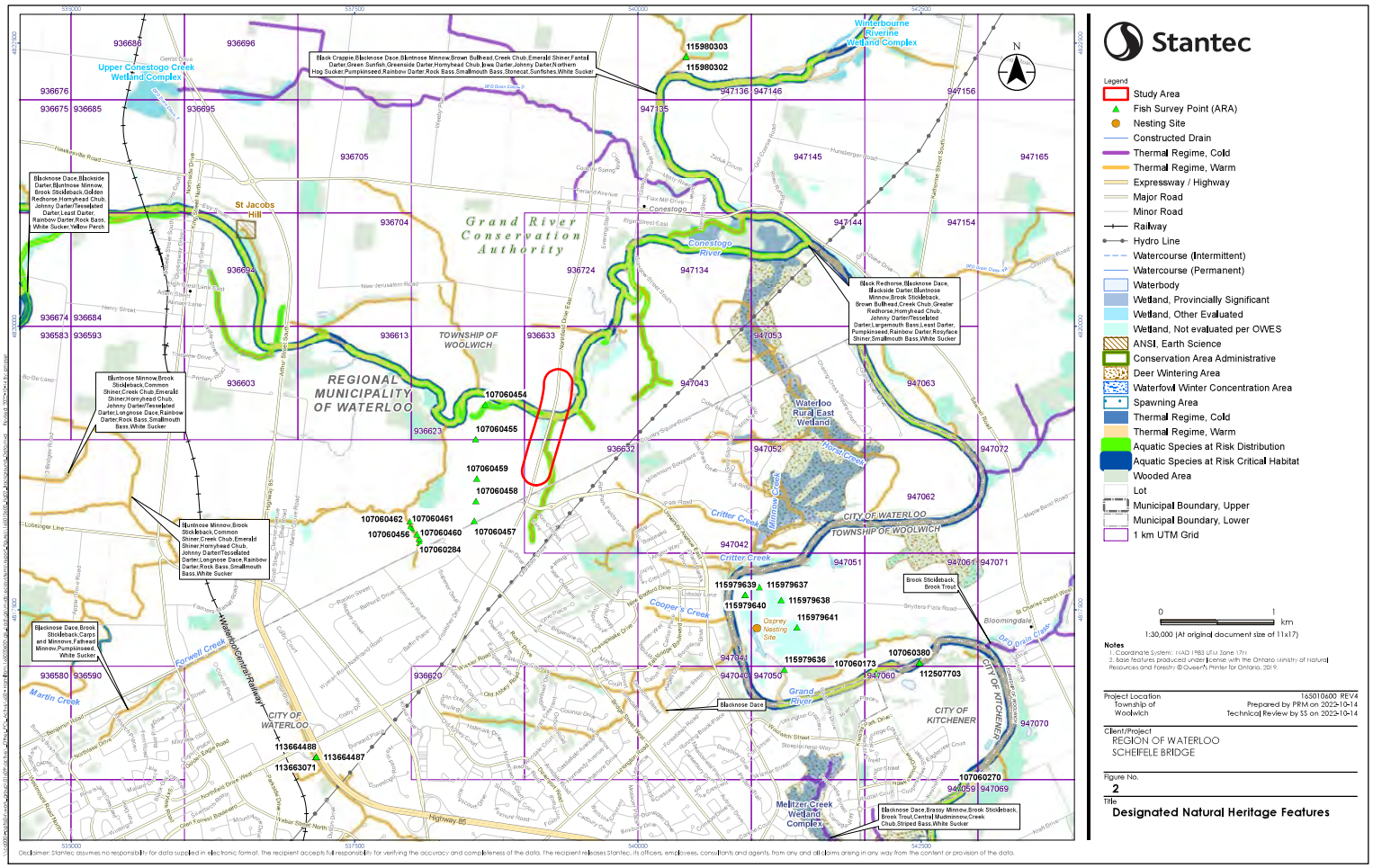

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Stantec

Legend

- Study Area
- Breeding Bird Point Count Location
- Watercourse (Intermittent)
- Watercourse (Permanent)
- Waterbody
- Wooded Area
- Ecological Land Classification Boundary
- **CVC_1 -** Business Sector
- **CVI_1 -** Transportation
- **CVR_1 -** Low Density Residential
- **CVR_4 -** Rural Property
- **FODM11 -** Naturalized Deciduous Hedge-row Ecosite
- **FODM7-3 -** Fresh – Moist Willow Lowland Deciduous Forest Type
- **FODM7 -** Fresh – Moist Lowland Deciduous Forest Ecosite
- **MAMM1 -** Cattail Mineral Shallow Marsh Type
- **MAMM1-3 -** Reed-canary Grass Graminoid Mineral Meadow Marsh Type
- **MASM1-14 -** Reed Canary Grass Mineral Shallow Marsh Type
- **MASM1-1 -** Cattail Mineral Shallow Marsh Type
- **MEGM3 -** Dry - Fresh Graminoid Meadow Ecosite
- **MEGM4 -** Fresh - Moist Graminoid Meadow Ecosite
- **MEMM3 -** Dry - Fresh Mixed Meadow Ecosite
- **OA -** Open Water
- **OAGM1 -** Annual Row Crops
- **OAGM2 -** Perennial Cover Crops
- **OAGM4 -** Open Pasture
- **SAS -** Submerged Shallow Aquatic
- **SHOM1 -** Mineral Open Shoreline Ecosite

0 100 200 m

1:5,000 (At original document size of 11x17)

Notes

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Project Location
Township of Woolwich

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Technical Review by SS on 2022-10-14

Client/Project
REGION OF WATERLOO
SCHEIFELE BRIDGE

Figure No.
3

Title
ELC and Survey Locations

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Stantec

Legend

- Study Area
- Turtle Observation
- Candidate Bat Tree Roost Location
- Candidate Snake Hibernacula
- Butternut Location
- Other Significant Observations
- Candidate Amphibian Habitat
- Candidate Monarch Habitat
- Candidate Turtle Overwintering Areas
- Confirmed Turtle Overwintering Habitat
- Eastern Wood-Pewee Habitat
- Snapping Turtle Habitat
- Potentially Suitable Habitat for Eastern Meadowlark
- Turtle Nesting Area
- Waterbody
- Wooded Area

0 100 200 m

1:5,000 (At original document size of 11x17)

Notes

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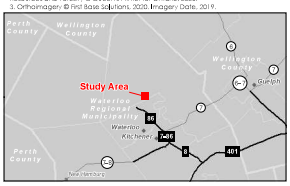

Project Location
Township of Woolwich

165010600 REV4
Prepared by PRM on 2022-10-14
Technical Review by SS on 2022-10-14

Client/Project
REGION OF WATERLOO
SCHEIFELE BRIDGE

Figure No.
4

Title
Significant Natural Heritage Features

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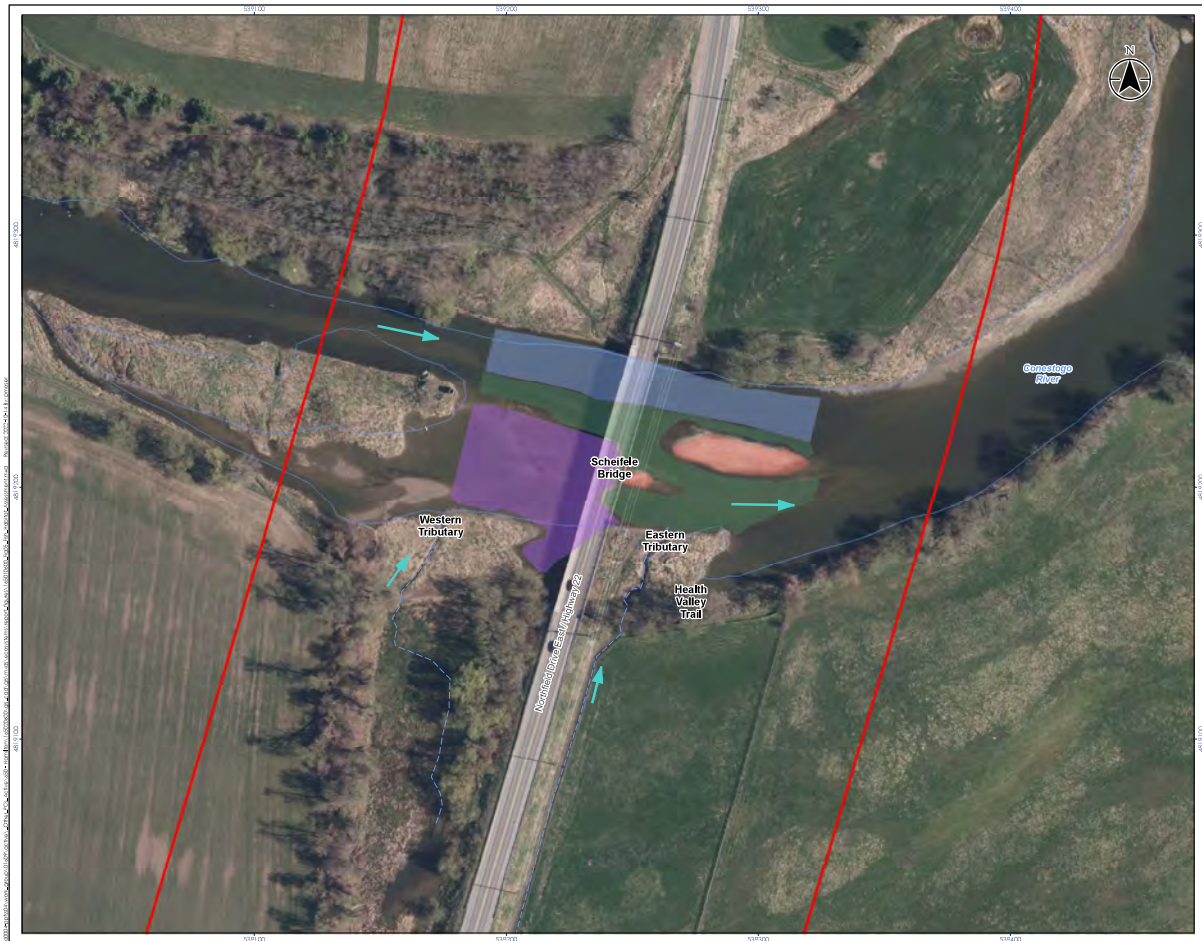

Stantec

Legend

- Study Area
- Flow Direction
- Watercourse (Intermittent)
- Waterbody
- Depositional Slack-Water Area
- Gravel Bar
- Riffle Morphology
- Run Morphology

0 25 50 m

1:1,500 (At original document size of 11x17)

Notes

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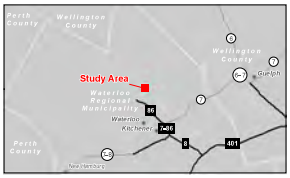
3. Orthoimagery: © First Base Solutions, 2020. Imagery Date, 2019.
4. Watercourse data from City of Waterloo Open Data.



Project Location
Township of Woolwich

165010600 REV4
Prepared by PRM on 2022-10-14
Technical Review by SS on 2022-10-14

Client/Project
REGION OF WATERLOO
SCHEIFELE BRIDGE

Figure No.
5

Title
Aquatic Habitat Assessment

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Stantec

Legend

- Study Area
- Recommended Preferred Northfield Drive Alignment Concept 2
- Grading Limit
- Watercourse (Intermittent)
- Watercourse (Permanent)
- Waterbody
- Staked Wetland Limit (2022; field verified and approved by GRCA)
- Wooded Area
- Ecological Land Classification Boundary
- **CVC_1 -** Business Sector
- **CVI_1 -** Transportation
- **CVR_1 -** Low Density Residential
- **CVR_4 -** Rural Property
- **FODM11 -** Naturalized Deciduous Hedge-row Ecosite
- **FODM7-3 -** Fresh – Moist Willow Lowland Deciduous Forest Type
- **FODM7 -** Fresh – Moist Lowland Deciduous Forest Ecosite
- **MAMM1 -** Cattail Mineral Shallow Marsh Type
- **MAMM1-3 -** Reed-canary Grass Graminoid Mineral Meadow Marsh Type
- **MASM1-14 -** Reed Canary Grass Mineral Shallow Marsh Type
- **MASM1-1 -** Cattail Mineral Shallow Marsh Type
- **MEGM3 -** Dry - Fresh Graminoid Meadow Ecosite
- **MEGM4 -** Fresh - Moist Graminoid Meadow Ecosite
- **MEMM3 -** Dry - Fresh Mixed Meadow Ecosite
- **OA -** Open Water
- **OAGM1 -** Annual Row Crops
- **OAGM2 -** Perennial Cover Crops
- **OAGM4 -** Open Pasture
- **SAS -** Submerged Shallow Aquatic
- **SHOM1 -** Mineral Open Shoreline Ecosite

0 100 200 m

1:5,000 (At original document size of 11x17)

Notes

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Project Location
Township of Woolwich

165010600 REV4
Prepared by PRM on 2022-10-14
Technical Review by SS on 2022-10-14

Client/Project
REGION OF WATERLOO
SCHEIFELE BRIDGE

Figure No.
6

Title
Impact Assessment

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Appendix B Tables

APPENDIX B

Table B-1: Species at Risk Habitat Assessment

Species	Habitat Preference	Species and Habitat Potential
PLANTS		
Butternut	Found in a variety of habitats throughout Southern Ontario, including woodlands and hedgerows (Farrar, 1995).	**Species and Habitat Present.** One Butternut tree was recorded by Stantec in the FODM7-3 community west of Northfield drive and west of the SAS pond.
MOLLUSCS		
Wavy-rayed Lampmussel	Lives mainly in gravel or sand bottoms of riffle areas in clear, medium-sized streams, and can be particularly sensitive to siltation.	**Habitat Present.** The study reach provides suitable foraging, rearing, spawning and overwintering habitat for Wavy-rayed Lampmussel. Live individuals and shell evidence for Wavy-rayed Lampmussel were not observed by Stantec during 2020 field investigations.
FISH		
Black Redhorse	Black Redhorse are found in moderate to fast-flowing areas in large warmwater streams, 25 – 130 m wide. They prefer well-developed riffles and pools adjacent to riffles. They are associated with clean, coarse substrate consisting of gravel and cobble but have also been found in areas with sand, silt and boulders. Adults are rarely associated with submerged aquatic vegetation. They have been known to migrate and spawn at the edge of riffles, avoiding the highest velocity areas, over substrates ranging in size from fine gravel to large cobble. Juveniles and young-of-the-year are found in low-gradient habitat, with reduced flow. They use shallow pools with heterogeneous substrate composed of clean pebble and cobble with a mixture of sand and silt. Both adult and juvenile Black Redhorse have been found in areas influenced by groundwater (COSEWIC 2015)	**Habitat Present.** The study reach provides suitable foraging, rearing, spawning and overwintering habitat for Black Redhorse.
Silver Shiner	Silver shiners prefer moderate to large size streams with swift currents that are free of weeds and have clean gravel or boulder bottoms. They live in schools and feed on crustaceans and adult flies that fall in the water or fly just above the surface (MECP, 2019).	**Habitat Present.** The study reach provides suitable foraging, rearing, spawning and overwintering habitat for Silver Shiner. General Habitat Protections under the ESA apply; however, habitat definition includes not only the watercourse and habitat elements therein, but also the riparian and floodplain areas adjacent to occupied reaches.

APPENDIX B

Table B-1: Species at Risk Habitat Assessment

Species	Habitat Preference	Species and Habitat Potential
REPTILES		
Blanding's Turtle	Generally, occur in freshwater lakes, permanent or temporary pools, slow- flowing streams, marshes and swamps. They prefer shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest in a variety of loose substrates, including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in slow-flowing streams.	**Species Absent, Suitable Habitat Present.** Although suitable habitat for Blanding's Turtle is present in shallow, marsh wetlands, background data and targeted surveys undertaken in the active season Blanding's Turtle did not confirm the species presence within the Study Area. Blanding's Turtle and its habitat are considered absent from the Study Area.
BIRDS		
Bank Swallow	Bank Swallows excavate nests in exposed earth banks along watercourses and lakeshores, roadsides, stockpiles of soil, and the sides of sand and gravel pits (Falconer et al., 2016). Any suitable habitat may be present if stockpiles of soil are present or in areas of sand/gravel extraction.	**Species and Habitat Absent.** No suitable nesting habitat for Bank Swallow was identified in the Study Area during field investigations.
Barn Swallow	Nest on walls or ledges of barns and other human-made structures such as bridges, culverts or other buildings; forages in open areas for flying insects (COSEWIC 2011a).	**Species absent, Suitable Habitat Present.** Barn Swallow nests were not observed on the bridge structure; however, the structure has characteristics which could permit nesting and pre-construction surveys are recommended.
Bobolink	Nests primarily in forage crops with a mixture of grasses and broad-leaved forbs, predominantly hayfields and pastures (COSEWIC 2010).	**Species absent, Suitable Habitat Present.** No Bobolinks were observed during grassland bird surveys that targeted large hay fields and pastures in the Study Area. These grassland areas were managed for agriculture and consequently mowed/harvested in June which would make them unsuitable for successful Bobolink breeding. Bobolink is therefore considered absent from the Study Area.
Chimney Swift	Chimney Swift uses chimneys for roosting and breeding, and less commonly, nest in large hollow trees (Cadman et al. 2007).	**Species and Habitat Absent.** No suitable chimney structures for nesting Chimney Swifts were observed in the Study Area.

APPENDIX B

Table B-1: Species at Risk Habitat Assessment

Species	Habitat Preference	Species and Habitat Potential
Eastern Meadowlark	Meadows, hayfields and pastures; also, other open habitat types including mown lawn (COSEWIC 2011b). Prefers large (~5 ha), low-lying wet grasslands with abundant litter (COSEWIC 2011b).	**Species and Habitat Present.** Eastern Meadowlark was observed in the OAGM1 hay field on the east side of Northfield Drive, north of the Conestogo River during the June 1, 2020 breeding bird survey. Other grasslands in the Study Area may also provide habitat, however these areas were managed for agriculture and consequently mowed/harvested in June which would make them unsuitable for successful Eastern Meadowlark breeding.
MAMMALS		
Small-footed Myotis	Small-footed myotis hibernate in caves and abandoned mines in winter, and roost under rocks, in rock outcrops, buildings, under bridges, or in caves, mines, or hollow trees in the spring and summer (MNRF 2017).	**Suitable Habitat Present.** Suitable roosting habitat is available on the bridge structure. Candidate maternity roost trees were identified within the FODM7 and FODM11 communities in the Study Area.
Little Brown Myotis	Trees, buildings and bridges for roosting; trees for nesting; caves and mines for hibernation (COSEWIC 2013).	**Suitable Habitat Present.** Candidate maternity roost trees were identified within the FODM7 and FODM11 communities in the Study Area.
Northern Myotis	Caves provide overwintering habitat (COSEWIC 2013). Rarely uses human-made structures for roosting (COSEWIC 2013).	**Suitable Habitat Present.** Candidate maternity roost trees were identified within the FODM7 and FODM11 communities in the Study Area.
Tri-colored Bat	Found in a variety of habitats; caves provide overwintering habitat (COSEWIC 2013).	**Suitable Habitat Present.** Candidate maternity roost trees were identified within the FODM7 and FODM11 communities in the Study Area.

APPENDIX B

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APPENDIX B

Table B-2: Species of Conservation Concern Habitat Assessment

Species	Habitat Preference	Habitat Potential
AMPHIBIANS		
Western Chorus Frog	The Western Chorus Frog prefers small, ephemeral wetlands disconnected from other water sources for breeding (Environment Canada 2015; COSEWIC 2008). The temporary nature of these wetlands leads to a reduction in predation pressure, but also makes entire populations susceptible to seasonal events such as premature drying due to climate conditions. The vegetation composition in breeding ponds is typically herbaceous with the presence of occasional shrubs or partially submerged trees forming a discontinuous or open canopy. Some populations may breed at the edges of closed-canopy habitats (Environment Canada 2015).	**Candidate.** MASM1-1, MAMM1-3 and SAS communities have the potential to support habitat for Western Chorus Frog.
MOLLUSCS		
Rainbow Mussel	Mainly small streams to small rivers in coarse sand or gravel substrates in or near riffles along the edges of emergent vegetation in moderate to strong current.	**Candidate.** Habitat containing coarse sand or gravel substrates in or near riffles along the edges of emergent vegetation in moderate to strong current is present within the Conestogo River. Live individuals and shell evidence for Rainbow Mussel were not observed by Stantec during 2020 field investigations.
FISH		
Greater Redhorse	Moderate to swift current riffles, runs and pools of medium to large rivers with clear water and substrates of gravel, cobble, or boulders	**Candidate.** Swift current riffles and shallow runs with clear water and gravel/cobble substrates are common in the Study Area. No Live individuals were observed by Stantec during 2020 field investigations.
REPTILES		
Eastern Milksnake	Generally occur in rural areas, where it is most frequently reported in and around buildings, especially old structures. It is also found in a wide variety of habitats, from prairies, pastures, and hayfields, to rocky hillsides and a wide variety of forest types. They must also be in proximity of water, and suitable locations for basking and egg-laying.	**Candidate.** Four former bridge abutments were identified as potential hibernacula features in the Study Area west of Northfield Road.
Snapping Turtle	Generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	**Confirmed.** Snapping Turtle was identified in the Study Area in the Conestogo River and in a pond area in the MASM1-1 wetland west of Northfield Drive.

APPENDIX B

Table B-2: Species of Conservation Concern Habitat Assessment

Species	Habitat Preference	Habitat Potential
Northern Map Turtle	Generally inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. These turtles need suitable basking sites (such as rocks and logs) and exposure to the sun for at least part of the day.	**Candidate.** Although Northern Map Turtle was not observed during turtle basking surveys, there is a potential for this species to occur in the Study Area in the Conestogo River. No suitable nesting habitat (eg. loose, exposed, dry soils) was observed in the Study Area.
BIRDS		
Bald Eagle	Almost always nests near water, usually on large lakes. Large stick nests are placed in trees located within mature woodlots. (Sandilands, 2005).	**Absent.** No large stick nests were identified in the Study Area during field investigations.
Caspian Tern	The Caspian Tern generally nests in colonies and prefers sparsely vegetated flat rocky islands, beaches, and sandy shores of James Bay and the Great Lakes in Ontario (Cuthbert and Wires, 1999). It usually nests on the more elevated areas of islands and it often found nesting with Ring-billed Gulls (Cadman et al., 2007)	**Absent.** No colonial nesting habitat was identified in the Study Area during field investigations.
Common Nighthawk	Generally prefer open, vegetation- free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks. This species also inhabits mixed and coniferous forests. Can also be found in urban areas (nest on flat roof-tops).	**Candidate.** Potential habitat for Common Nighthawk occurs in the OAGM4 pasture. This species is unlikely to be observed during breeding bird surveys since it is most active in the evening.
Eastern Wood-Pewee	Associated with deciduous and mixed forests. Within mature and intermediate age stands it prefers areas with little understory vegetation as well as forest clearings and edges.	**Confirmed.** Eastern Wood-Pewee was observed in the FODM7 woodland on the west side of Northfield Drive, north of the Conestogo River during the June 1, 2020 breeding bird survey.
INSECTS		
Monarch	Exist primarily wherever milkweed and wildflowers exist; abandoned farmland, along roadsides, and other open spaces.	**Candidate.** Monarch's larval host, common milkweed, was abundant in the MEMM3 meadow west of Northfield Drive.

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APPENDIX B

Table B-3: Aquatic Species Recorded in the Schiefele Bridge Study Area

Common Name	Scientific Name	Provincial S-rank	SARO Status	SARA Schedule 1	Source
Species at Risk					
Black Redhorse	*Moxostoma duquesnei*	S2	THR	THR	DFO, 2019, MNRF, 2020
Silver Shiner	*Notropis photogenis*	S2/S3	THR	THR	DFO, 2019, NHIC, 2011
Wavy-rayed Lampmussel	*Lampsilis fasciola*	S1	THR	SC	NHIC, 2011; DFO, 2019
Species of Conservation Concern					
Greater Redhorse	*Moxostoma valenciennesi*	S3	NAR	NAR	MNRF, 2020 NHIC, 2011
Rainbow	*Villosa iris*	S2/S3	SC	SC	DFO, 2019; NHIC, 2011
Not at Risk					
Brown Bullhead	*Ameiurus nebulosus*	S5	NAR	NAR	MNRF, 2020
Blacknose Dace	*Rhinichthys atratulus*	S5	NAR	NAR	LIO, 2011, MNRF, 2020
Blackside Darter	*Percina maculata*	S4	NAR	NAR	MNRF, 2020
Bluntnose Minnow	*Pimephales notatus*	S5	NAR	NAR	MNRF, 2020
Brook Stickleback	*Culaea inconstans*	S5	NAR	NAR	LIO, 2011, MNRF, 2020
Common Carp	*Cyprinus carpio*	S5	NAR	NAR	Stantec, 2020
Common Shiner	*Luxilus cornutus*	S5	NAR	NAR	LIO, 2011
Creek Chub	*Semotilus atromaculatus*	S5	NAR	NAR	LIO, 2011, MNRF, 2020
Hornyhead Chub	*Nocomis biguttatus*	S4	NAR	NAR	MNRF, 2020
Fathead Minnow	*Pimephales promelas*	S5	NAR	NAR	LIO, 2011
Golden Redhorse	*Moxostoma erythrurum*	S4	NAR	NAR	LIO, 2015
Johnny Darter/Tessellated Darter	*Etheostoma nigrum/Etheostoma olmstedi*	S5/S4	NAR	NAR	MNRF, 2020
Largemouth Bass	*Micropterus salmoides*	S5	NAR	NAR	MNRF, 2020
Least Darter	*Etheostoma microperca*	S4	NAR	NAR	MNRF, 2020
Pumpkinseed	*Lepomis gibbosus*	S5	NAR	NAR	MNRF, 2020
Rainbow Darter	*Etheostoma caeruleum*	S4	NAR	NAR	MNRF, 2020
Rock Bass	*Ambloplites rupestris*	S5	NAR	NAR	LIO, 2011, Stantec 2020
Rosyface Shiner	*Notropis rubellus*	S4	NAR	NAR	MNRF, 2020

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Common Name	Scientific Name	Provincial S-rank	SARO Status	SARA Schedule 1	Source
Smallmouth Bass	*Micropterus dolomieu*	S5	NAR	NAR	LIO, 2011, MNRF, 2020, Stantec 2020
Yellow Perch	*Perca flavescens*	S5	NAR	NAR	Stantec, 2020
White Sucker	*Catostomus commersonii*	S5	NAR	NAR	MNRF, 2020, Stantec, 2020
Creek Heelsplitter	*Lasmigona compressa*	S5	NAR	NAR	Mackie, 1996
Fluted Shell	*Lasmigona costata*	S5	NAR	NAR	Mackie, 1996, Stantec, 2020
Giant Floater	*Pyganodon grandis*	S5	NAR	NAR	Mackie, 1996
Spike	*Elliptio dilatata*	S5	NAR	NAR	Mackie, 1996
Creeper	*Strophitus undulatus*	S5	NAR	NAR	Mackie, 1996

Table B-4: Vascular Plant Species List

SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO STATUS	COSEWIC STATUS	COEFFICIENT OF CONSERVATISM (C VALUE)
PTERIDOPHYTES (Ferns and Allies)					
Equisetum arvense	Field Horsetail	S5			0
GYMNOSPERMS (Conifers)					
Pinus strobus	Eastern White Pine	S5			4
ANGIOSPERMS (Dicots)					
Acer negundo	Manitoba Maple	S5			0
Acer nigrum	Black Maple	S4?			7
Acer saccharinum	Silver Maple	S5			5
Acer x freemanii	(Acer rubrum X Acer saccharinum)	S5			6
Achillea millefolium	Common Yarrow	SE5?			
Alliaria petiolata	Garlic Mustard	SE5			
Ambrosia artemisiifolia	Common Ragweed	S5			0
Ambrosia trifida	Great Ragweed	S5			0
Anemonastrum canadense	Canada Anemone	S5			3
Apocynum cannabinum	Hemp Dogbane	S5			3
Asclepias incarnata	Swamp Milkweed	S5			6
Asclepias syriaca	Common Milkweed	S5			0
Bidens cernua	Nodding Beggarticks	S5			2
Bidens frondosa	Devil's Beggarticks	S5			3
Celtis occidentalis	Common Hackberry	S4			8
Chenopodium album	Common Lamb's-quarters	SE5			
Cichorium intybus	Wild Chicory	SE5			
Cicuta bulbifera	Bulbous Water-hemlock	S5			5
Cicuta maculata	Spotted Water-hemlock	S5			6
Circaea canadensis	Broad-leaved Enchanter's Nightshade	S5			2
Cirsium arvense	Canada Thistle	SE5			
Cirsium palustre	Marsh Thistle	SE2?			
Cirsium vulgare	Bull Thistle	SE5			
Clematis virginiana	Virginia Clematis	S5			3
Convolvulus arvensis	Field Bindweed	SE5			
Cornus alternifolia	Alternate-leaved Dogwood	S5			6
Cornus obliqua	Silky Dogwood	S5			2
Cornus sericea	Red-osier Dogwood	S5			2
Crataegus sp.	Hawthorn species	SNA			
Cuscuta gronovii	Swamp Dodder	S5			4
Daucus carota	Wild Carrot	SE5			
Dipsacus fullonum	Common Teasel	SE5			
Echinocystis lobata	Wild Cucumber	S5			3
Echium vulgare	Common Viper's Bugloss	SE5			
Epilobium sp.	Willowherb species	SNA			

Table B-4: Vascular Plant Species List

SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO STATUS	COSEWIC STATUS	COEFFICIENT OF CONSERVATISM (C VALUE)
Epilobium hirsutum	Hairy Willowherb	SE5			
Erigeron annuus	Annual Fleabane	S5			0
Eupatorium altissimum	Tall Boneset	S1			3
Euphorbia virgata	Leafy Spurge	SE5?			
Eutrochium maculatum	Spotted Joe Pye Weed	S5			3
Fallopia dumetorum	Hedge Bindweed	SEH			
Fraxinus pennsylvanica	Red Ash	S4			3
Galium sp.	Bedstraw species	SNA			
Galium asprellum	Rough Bedstraw	S5			6
Galium mollugo	Smooth Bedstraw	SE5			
Galium palustre	Common Marsh Bedstraw	S5			5
Geranium robertianum	Herb-Robert	S5			2
Geum urbanum	Wood Avens	SE3			
Glechoma hederacea	Ground-ivy	SE5			
Hesperis matronalis	Dame's Rocket	SE5			
Hypericum perforatum	Common St. John's-wort	SE5			
Impatiens capensis	Spotted Jewelweed	S5			4
Impatiens glandulifera	Purple Jewelweed	SE4			
Inula helenium	Elecampane	SE5			
Juglans cinerea	Butternut	S2?	END	END	6
Juglans nigra	Black Walnut	S4?			5
Lactuca sp.	Lettuce species	SNA			
Lapsana communis	Common Nipplewort	SE5			
Leonurus cardiaca	Common Motherwort	SE5			
Leucanthemum vulgare	Oxeye Daisy	SE5			
Linaria vulgaris	Butter-and-eggs	SE5			
Lonicera tatarica	Tatarian Honeysuckle	SE5			
Lotus corniculatus	Garden Bird's-foot Trefoil	SE5			
Lycopus uniflorus	Northern Water-horehound	S5			5
Lysimachia nummularia	Creeping Yellow Loosestrife	SE5			
Lythrum salicaria	Purple Loosestrife	SE5			
Malus pumila	Common Apple	SE4			
Matricaria chamomilla	Wild Chamomile	SE3			
Medicago sativa	Alfalfa	SE5			
Melilotus albus	White Sweet-clover	SE5			
Mentha canadensis	Canada Mint	S5			3
Mimulus ringens	Square-stemmed Monkeyflower	S5			6
Morus alba	White Mulberry	SE5			
Myosotis sp.	Forget-me-not species	SE			
Nasturtium officinale	Watercress	SE			

Table B-4: Vascular Plant Species List

SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO STATUS	COSEWIC STATUS	COEFFICIENT OF CONSERVATISM (C VALUE)
Nepeta cataria	Catnip	SE5			
Nymphaea odorata	Fragrant Water-lily	S5			5
Oenothera biennis	Common Evening-primrose	S5			0
Oxalis stricta	Upright Yellow Wood-sorrel	S5			0
Parthenocissus quinquefolia	Virginia Creeper	S4?			6
Pastinaca sativa	Wild Parsnip	SE5			
Persicaria hydropiperoides	False Waterpepper	S5			4
Persicaria maculosa	Spotted Lady's-thumb	SE5			
Persicaria pensylvanica	Pennsylvania Smartweed	S5			3
Pilea pumila	Dwarf Clearweed	S5			5
Potentilla anserina	Silverweed	S5			5
Prunella vulgaris	Common Self-heal	S5			0
Prunus virginiana	Chokecherry	S5			2
Quercus macrocarpa	Bur Oak	S5			5
Ranunculus abortivus	Kidney-leaved Buttercup	S5			2
Ranunculus acris	Common Buttercup	SE5			
Rhamnus cathartica	European Buckthorn	SE5			
Ribes sp.	Currant species	SNA			
Rosa sp.	Rosa species	SNA			
Rubus idaeus	Red Raspberry	S5			2
Rubus occidentalis	Black Raspberry	S5			2
Rumex crispus	Curled Dock	SE5			
Salix euxina	Crack Willow	SE			
Salix interior	Sandbar Willow	S5			1
Sambucus canadensis	Common Elderberry	S5			5
Saponaria officinalis	Bouncing-bet	SE5			
Silene latifolia	White Campion	SE5			
Solanum dulcamara	Bittersweet Nightshade	SE5			
Solidago canadensis	Canada Goldenrod	S5			1
Solidago gigantea	Giant Goldenrod	S5			4
Sonchus sp.	Sow-thistle species	SE			
Symphyotrichum lanceolatum	Panicled Aster	S5			3
Symphyotrichum novae-angliae	New England Aster	S5			2
Syringa vulgaris	Common Lilac	SE5			
Tanacetum vulgare	Common Tansy	SE5			
Teucrium canadense	Canada Germander	S4S5			6
Tilia americana	Basswood	S5			4
Tragopogon dubius	Yellow Goatsbeard	SE5			
Trifolium hybridum	Alsike Clover	SE5			
Tussilago farfara	Coltsfoot	SE5			

Table B-4: Vascular Plant Species List

SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO STATUS	COSEWIC STATUS	COEFFICIENT OF CONSERVATISM (C VALUE)
Ulmus americana	White Elm	S5			3
Urtica dioica	Stinging Nettle	S5			2
Verbascum thapsus	Common Mullein	SE5			
Verbena hastata	Blue Vervain	S5			4
Verbena urticifolia	White Vervain	S5			4
Veronica anagallis-aquatica	Water Speedwell	SE			
Vicia cracca	Tufted Vetch	SE5			
Viola sp.	Violet species	SNA			
Vitis riparia	Riverbank Grape	S5			0
ANGIOSPERMS (Monocots)					
Alisma triviale	Northern Water-plantain	S5			1
Bromus inermis	Smooth Brome	SE5			
Dactylis glomerata	Orchard Grass	SE5			
Echinochloa sp.	Barnyard Grass species	SNA			
Eleocharis sp.	Spikerush species	SNA			
Elymus virginicus	Virginia Wildrye	S5			5
Hemerocallis fulva	Orange Daylily	SE5			
Iris virginica	Southern Blue Flag	S5			5
Juncus sp.	Rush species	SNA			
Leersia oryzoides	Rice Cutgrass	S5			3
Lemna minor	Small Duckweed	S5?			5
Phalaris arundinacea	Reed Canarygrass	S5			0
Phleum pratense	Common Timothy	SE5			
Poa pratensis	Kentucky Bluegrass	S5			0
Sagittaria latifolia	Broad-leaved Arrowhead	S5			4
Scirpus microcarpus	Red-tinged Bulrush	S5			4
Typha angustifolia	Narrow-leaved Cattail	SE5			

FLORISTIC SUMMARY	TOTAL
Total Species	143
Native Species (S1-S5)	73
Introduced (exotic) species (SE)	60
Identified to Genus only (SNA)	10
Species at Risk in Ontario (END, THR or SC)	1
Rare in Ontario (S1, S2 or S3)	2
Uncommon to common in Ontario (S4)	6
Common to very common in Ontario (S5)	65
Highly sensitive plant species with C value greater than 7	1

Table B-5: Wildlife Species List

COMMON NAME	SCIENTIFIC NAME	ONTARIO S-RANK	SARO List	SARA Schedule 1
BUTTERFLIES				
Cabbage White	*Pieris rapae*	SNA		
AMPHIBIANS				
American Toad	*Anaxyrus americanus*	S5		
Northern Green Frog	*Lithobates clamitans*	S5		
Northern Leopard Frog	*Lithobates pipiens*	S5	NAR	NAR
REPTILES				
Snapping Turtle	*Chelydra serpentina*	S3	SC	SC
Midland Painted Turtle	*Chrysemys picta marginata*	S5		
Eastern Gartersnake	*Thamnophis sirtalis*	S5		
BIRDS				
Canada Goose	*Branta canadensis*	S5		
Mallard	*Anas platyrhynchos*	S5		
Rock Pigeon	*Columba livia*	SNA		
Mourning Dove	*Zenaida macroura*	S5		
Killdeer	*Charadrius vociferus*	S5B, S5N		
Solitary Sandpiper	*Tringa solitaria*	S4B		
Ring-billed Gull	*Larus delawarensis*	S5B,S4N		
Herring Gull	*Larus argentatus*	S5B,S5N		
Caspian Tern	*Hydroprogne caspia*	S3B	NAR	NAR
Great Blue Heron	*Ardea herodias*	S5		
Osprey	*Pandion haliaetus*	S5B		
Red-tailed Hawk	*Buteo jamaicensis*	S5	NAR	NAR
Belted Kingfisher	*Megaceryle alcyon*	S4B		
Pileated Woodpecker	*Dryocopus pileatus*	S5		
Eastern Wood-Pewee	*Contopus virens*	S4B	SC	SC
Willow Flycatcher	*Empidonax traillii*	S5B		
Eastern Phoebe	*Sayornis phoebe*	S5B		
Eastern Kingbird	*Tyrannus tyrannus*	S4B		
Warbling Vireo	*Vireo gilvus*	S5B		
Blue Jay	*Cyanocitta cristata*	S5		
Tree Swallow	*Tachycineta bicolor*	S4B		
Barn Swallow	*Hirundo rustica*	S4B	THR	THR
Cliff Swallow	*Petrochelidon pyrrhonota*	S4B		
Black-capped Chickadee	*Poecile atricapillus*	S5		
House Wren	*Troglodytes aedon*	S5B		
American Robin	*Turdus migratorius*	S5B		
Gray Catbird	*Dumetella carolinensis*	S4B		
European Starling	*Sturnus vulgaris*	SNA		
Cedar Waxwing	*Bombycilla cedrorum*	S5B		
House Sparrow	*Passer domesticus*	SNA		
American Goldfinch	*Spinus tristis*	S5B		
Chipping Sparrow	*Spizella passerina*	S5B		
Savannah Sparrow	*Passerculus sandwichensis*	S4B		
Song Sparrow	*Melospiza melodia*	S5B		
Eastern Meadowlark	*Sturnella magna*	S4B	THR	THR
Baltimore Oriole	*Icterus galbula*	S4B		
Red-winged Blackbird	*Agelaius phoeniceus*	S4		
Brown-headed Cowbird	*Molothrus ater*	S4B		
Common Grackle	*Quiscalus quiscula*	S5B		
Common Yellowthroat	*Geothlypis trichas*	S5B		
Yellow Warbler	*Setophaga petechia*	S5B		
Northern Cardinal	*Cardinalis cardinalis*	S5		
MAMMALS				
Grey Squirrel	*Sciurus carolinensis*	S5		

Table B-5: Wildlife Species List

COMMON NAME	SCIENTIFIC NAME	ONTARIO S-RANK	SARO List	SARA Schedule 1
Muskrat	*Ondatra zibethicus*	S5		
Raccoon	*Procyon lotor*	S5		
White-tailed Deer	*Odocoileus virginianus*	S5		

SUMMARY
Total Butterflies: 1
Total Amphibians: 3
Total Reptiles: 3
Total Birds: 42
Total Breeding Birds: 37
Total Mammals: 4

SIGNIFICANT SPECIES
National: 5
Provincial: 4

Explanation of Status and Acronymns
COSSARO: Committee on the Status of Species at Risk in Ontario
COSEWIC: Committee on the Status of Endangered Wildlife in Canada
S1: Critically Imperiled—Critically imperiled in the province (often 5 or fewer occurrences)
S2: Imperiled—Imperiled in the province, very few populations (often 20 or fewer),
S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)
S4: Apparently Secure—Uncommon but not rare
S5: Secure—Common, widespread, and abundant in the province
SX: Presumed extirpated
SH: Possibly Extirpated (Historical)
SNR: Unranked
SU: Unrankable—Currently unrankable due to lack of information
SNA: Not applicable—Rank not applicable because the species is not a suitable target for conservation activities.
S#S#: Range Rank—Range (e.g., S2S3) used to indicate range of uncertainty about the status of the species
S#B- Breeding status rank
S#N- Non Breeding status rank
?: Indicates uncertainty in the assigned rank
T: Denotes that the rank applies to a subspecies or variety
Q: Denotes that the taxonomic status of the species, subspecies, or variety is **questionable**.
END: Endangered
THR: Threatened
SC: Special Concern
2, 3 or NS after COSEWIC ranking indicates species is either on Schedule 2 or 3 or No Schedule of SARA
NAR: Not At Risk

LATEST STATUS UPDATE
Butterflies: Sept 2020
Amphibans: Sept 2020
Reptiles: Sept 2020
Birds: Sept 2020
Mammals: Sept 2020
S ranks and explanations: December 2011

NOTE
All rankings for birds refer to breeding birds unless the ranking is followed by N

REFERENCES
COSSARO Status
Endangered Species Act, 2007 (Bill 184). Species at Risk in Ontario List.
COSEWIC Status
COSEWIC. 2007. Canadian Species at Risk. Committee on the Status of Endangered Wildlife in Canada.

Table B-6: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria	Methods	Potential Habitat Present in the Study Area?
Seasonal Concentration Areas			
Waterfowl Stopover and Staging Area (Terrestrial)	Fields with sheet water or utilized by tundra swans during spring (mid-March to May), or annual spring melt water flooding found in any of the following Community Types: Meadow (ME), Thicket (TH). Agricultural fields with waste grains are commonly used by waterfowl, and these are not considered SWH unless used by Tundra swans in the Long Point, Rondeau, Lake St. Clair, Grand Bend and Point Pelee Areas.	ELC surveys were used to assess features within the Study Area that may support waterfowl stopover and staging areas (terrestrial).	Absent. No large areas of meadow or thicket occurred in the Study Area. No water was observed pooling in agricultural fields in the Study Area during the May 6, 2020 field visit.
Waterfowl Stopover and Staging Area (Aquatic)	The following Community Types: Meadow Marsh (MAM), Shallow Marsh (MAS), Shallow Aquatic (SA), Deciduous Swamp (SWD). Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. The combined area of the ELC ecosites and a 100 m radius area is the SWH. Sewage treatment ponds and storm water ponds do not qualify as a SWH; however, a reservoir managed as a large wetland or pond/lake does qualify.	ELC surveys were used to assess features within the Study Area that may support waterfowl stopover and staging areas (aquatic).	Absent. The Conestogo River Corridor is shallow and fast-moving in the Study Area and unlikely to provide suitable habitat to support SWH for waterfowl stopover and staging areas (aquatic). No congregations of waterfowl observed during field investigations.
Shorebird Migratory Stopover Area	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of amour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a significant wildlife habitat. The following community types: Meadow Marsh (MAM), shoreline (SH), or Sand Dune (SB).	ELC surveys and wildlife habitat assessments were used to assess features within the Study Area that may support migratory shorebirds.	Absent. Shoreline habitat is comprised of gravel in the Study Area.
Raptor Wintering Area	At least one of the following Forest Community Types: Deciduous Forest (FOD), Mixed Forest (FOM) or Coniferous Forest (FOC), in combination with one of the following Upland Community Types: Meadow (ME), Thicket (TH), Savannah (SV), Woodland (WOD) (<60% cover) that are >20 ha and provide roosting, foraging and resting habitats for wintering raptors. Upland habitat (ME, TH, SV, WOD), must represent at least 15 ha of the 20 ha minimum size.	ELC surveys and GIS analysis were used to assess features within the Study Area that may support wintering raptors.	Absent.

Table B-6: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria	Methods	Potential Habitat Present in the Study Area?
Bat Hibernacula	Hibernacula may be found in caves, mine shafts, underground foundations and karsts. May be found in these Community Types: Crevice (CCR), Cave (CCA).	ELC surveys were used to assess features within the Study Area that may support bat hibernacula.	Absent.
Bat Maternity Colonies	Maternity colonies considered significant wildlife habitat are found in forested ecosites. Either of the following Community Types: Deciduous Forest (FOD), Mixed Forest (FOM), Coniferous Forest (FOC), Deciduous Swamp (SWD), Mixed Forest (SWM) and Coniferous Forest (SWC) that have wildlife trees >10 cm diameter at breast height (dbh). Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2. Northern Myotis prefer contiguous tracts of older forest cover for foraging and roosting in snags and trees. Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred.	ELC surveys were used to assess features within the Study Area that may support bat maternity colonies. A roost tree suitability assessment was performed on trees in the Project Footprint and up to 60m from the Project Footprint.	**Confirmed: Two potential bat roost trees were identified in the FODM7 woodland west of Northfield Drive and north of the Conestogo River. Other potential bat roost trees in the Study Area were identified in naturalized deciduous hedgerows that do not qualify as SWH.**
Turtle Wintering Areas	Snapping and Midland Painted turtles utilize ELC community classes: Swamp (SW), Marsh (MA) and Open Water (OA). Shallow water (SA), Open Fen (FEO) and Open Bog (BOO). Northern Map turtle- open water areas such as deeper rivers or streams and lakes can also be used as over-wintering habitat. Water has to be deep enough not to freeze and have soft mud substrate. Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate dissolved oxygen.	ELC surveys and wildlife habitat assessments were used to assess features within the Study Area that may support areas of permanent standing water but not deep enough to freeze.	**Confirmed: MASM1-1 provides turtle overwintering habitat based on the number of Painted Turtles observed in spring 2020.** **Candidate: The SAS pond in the Study Area has to potential to support turtle wintering areas for Snapping Turtle and Midland Painted Turtle.** The section of the Conestogo River in the Study Area was relatively shallow and fast-flowing and is not likely to provide habitat for turtle wintering areas.

Table B-6: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria	Methods	Potential Habitat Present in the Study Area?
Snake Hibernacula	Hibernation occurs in sites located below frost lines in burrows, rock crevices, broken and fissured rock and other natural features. Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. Any ecosite in southern Ontario other than very wet ones may provide habitat. The following Community Types may be directly related to snake hibernacula: Talus (TA), Rock Barren (RB), Crevice (CCR), Cave (CCA), and Alvar (RBOA1, RBSA1, RBTA1).	ELC surveys and wildlife habitat assessments were used to assess features within the Study Area that may support snake hibernacula.	**Candidate: There were four former cement bridge abutments in the Study Area on the west side of Northfield Road that have the potential to support snake hibernacula.**
Colonial-Nesting Bird Breeding Habitat (Bank and Cliff)	Eroding banks, sandy hills, borrow pits, steep slopes, sand piles, cliff faces, bridge abutments, silos, or barns found in any of the following Community Types: Meadow (ME), Thicket (TH), Bluff (BL), Cliff (CL). Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. Does not include a licensed/permitted Mineral Aggregate Operation.	ELC surveys and wildlife habitat assessments were used to assess features within the Study Area that may support colonial bird breeding habitat.	Absent. Although Cliff Swallow nests were observed on the bridge in the Study Area, man-made structures do not qualify as SWH.
Colonial-Nesting Bird Breeding Habitat (Tree/Shrubs)	Identification of stick nests in any of the following Community Types: Mixed Swamp (SWM), Deciduous Swamp (SWD), Treed Fen (FET). The edge of the colony and a minimum 300 m area of habitat or extent of the Forest Ecosite containing the colony or any island <15.0 ha with a colony is the SWH. Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used.	ELC surveys and wildlife habitat assessments were used to assess features within the Study Area that may support colonial bird breeding habitat (Trees/Shrubs).	Absent.
Colonial-Nesting Bird Breeding Habitat (Ground)	Any rocky island or peninsula within a lake or large river. For Brewer's Blackbird close proximity to watercourses in open fields or pastures with scattered trees or shrubs found in any of the following Community Types: Meadow Marsh (MAM1-6), Shallow Marsh (MAS1-3), Meadow (ME), Thicket (TH), Savannah (SV).	ELC surveys and wildlife habitat assessments were used to assess features within the Study Area that may support colonial bird breeding habitat (Ground).	Absent.
Migratory Butterfly Stopover Areas	Located within 5 km of Lake Ontario. A combination of ELC communities, one from each land class is required: Field (ME, TH) and Forest (FOC, FOM, FOD). Minimum of 10 ha in size with a combination of field and forest habitat present.	ELC surveys and GIS analysis were used to assess features within the Study Area that may support migratory butterfly stopover areas.	Absent.

Table B-6: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria	Methods	Potential Habitat Present in the Study Area?
Landbird Migratory Stopover Areas	The following community types: Forest (FOD, FOM, FOC) or Swamp (SWC, SWM, SWD). Woodlots must be >10 ha in size and within 5 km of Lake Ontario – woodlands within 2 km of Lake Ontario are more significant.	ELC surveys and GIS analysis were used to assess features within the Study Area that may support landbird migratory stopover areas.	Absent.
Deer Winter Congregation/Yarding Areas	Woodlots typically >100 ha in size unless determined by the MNR as significant. (If large woodlots are rare in a planning area >50 ha). All forested ecosites within Community Series: FOC, FOM, FOD, SWC, SWM, SWD. Conifer plantations much smaller than 50 ha may also be used.	No studies required as the MNRF delineates this habitat.	Absent.
Rare Vegetation Communities			
Cliffs and Talus Slopes	A Cliff is vertical to near vertical bedrock >3 m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris. Any ELC Ecosite within Community Series: TAO, TAS, TAT, CLO, CLS, CLT. Most cliff and talus slopes occur along the Niagara Escarpment.	ELC surveys were used to assess features within the Study Area that would be considered cliffs or talus slopes.	Absent.
Sand Barrens	Sand barrens typically are exposed sand, generally sparsely vegetated and cause by lack of moisture, periodic fires and erosion. Vegetation can vary from patchy and barren to tree covered but less than 60%. Any of the following Community Types: SBO1 (Open Sand Barren Ecosite), SBS1 (Shrub Sand Barren Ecosite), SBT1 (Treed Sand Barren Ecosite).	ELC surveys were used to assess features within the Study Area that would be considered to be sand barrens.	Absent.
Alvars	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animal species. Vegetation cover varies from patchy to barren with a less than 60% tree cover. Any of the following Community Types: ALO1(Open Alvar Rock Barren Ecosite), ALS1 (Alvar Shrub Rock Barren Ecosite), ALT1 (Treed Alvar Rock Barren Ecosite), FOC1 (Dry-Fresh Pine Coniferous Forest), FOC2 (Dry-Fresh Cedar Coniferous Forest), CUM2 (Bedrock Cultural Meadow), CUS2 (Bedrock Cultural Savannah), CUT2-1 (Common Juniper Cultural Alvar Thicket), or CUW2	ELC surveys were used to assess features within the Study Area that would be considered to be alvar communities.	Absent.

Table B-6: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria	Methods	Potential Habitat Present in the Study Area?
	(Bedrock Cultural Woodland). An Alvar site >0.5 ha in size.		
Old-growth Forest	Old-growth forests tend to be relatively undisturbed, structurally complex, and contain a wide variety of trees and shrubs in various age classes. These habitats usually support a high diversity of wildlife species. No minimum size criteria t in any of the following Community Types: FOD (Deciduous Forest), FOM (Mixed Forest), FOC (Coniferous Forest). Forests greater than 120 years old and with no historical forestry management was the main criteria when surveying for old-growth forests.	ELC surveys were used to assess features within the Study Area that would be considered to be old-growth forest communities.	Absent.
Savannahs	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%. In Ecoregion 6E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario). Any of the following Community Types: TPS1 (Dry-Fresh Tallgrass Mixed Savannah Ecosite), TPS2 (Fresh-Moist Tallgrass Deciduous Savannah Ecosite), TPW1 (Dry-Fresh Black Oak Tallgrass Deciduous Woodland Ecosite), TPW2 (Fresh-Moist Tallgrass Deciduous Woodland Ecosite), CUS2 (Bedrock Cultural Savannah Ecosite).	ELC surveys were used to assess features within the Study Area that would be considered to be savannah communities.	Absent.
Tall-grass Prairies	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has <25% tree cover. In Ecoregion 6E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario). Any of the following Community Types: TPO1 (Dry Tallgrass Prairie Ecosite), TPO2 (Fresh-Moist Tallgrass Prairie Ecosite).	ELC surveys were used to assess features within the Study Area that would be considered to be tall-grass communities.	Absent.
Other Rare Vegetation Communities	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG.	ELC surveys were used to assess features within the Study Area that would be considered to be other rare vegetation communities.	Absent.

Table B-6: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria	Methods	Potential Habitat Present in the Study Area?
Specialized Habitat for Wildlife			
Waterfowl Nesting Area	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SWT1, SWT2, SWD1, SWD2, SWD3, SWD4. Note: includes adjacency to Provincially Significant Wetlands.	ELC surveys were used to assess features within the Study Area that may support nesting waterfowl. Habitats adjacent to wetlands without standing water were not considered candidate SWH.	Absent. Upland habitat adjacent to wetland and aquatic communities is comprised of active agriculture and rural residential properties, and therefore not suitable to support nesting waterfowl.
Bald Eagle and Osprey nesting, Foraging, and Perching Habitat	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. Nests located on man-made objects are not to be included as SWH (e.g., telephone poles and constructed nesting platforms). ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands.	ELC surveys and wildlife habitat assessments were used to assess features within the Study Area that may support nesting, foraging and perching habitat for large raptors.	Absent.
Woodland Raptor Nesting Habitat	All natural or conifer plantation woodland/forest stands combined >30 ha and with >4 ha of interior habitat. Interior habitat determined with a 200 m buffer. Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3.	ELC surveys, wildlife habitat assessments and GIS analysis were used to assess features within the Study Area that may support nesting habitat for woodland raptors.	Absent.
Turtle Nesting Areas	Exposed mineral soil (sand or gravel) areas adjacent (<100 m) or within the following ELC Ecosites: MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SAS1, SAM1, SAF1, BOO1, FEO1. Best nesting habitat for turtles is close to water, away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.	ELC surveys, wildlife habitat assessments and GIS analysis were used to assess features within the Study Area that may support turtle nesting areas.	Candidate. Gravel portions of the Conestogo River shoreline may provide suitable and natural turtle nesting habitat.
Seeps and Springs	Seeps/Springs are areas where ground water comes to the surface. Often they	ELC surveys were used to assess	Absent.

Table B-6: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria	Methods	Potential Habitat Present in the Study Area?
	are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs. Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system.	features within the Study Area that may support seeps/springs.	
Amphibian Breeding Habitat (Woodland)	All Ecosites associated with these ELC Community Series; FOC, FOM, FOD, SWC, SWM, SWD. Presence of a wetland, lake, or pond within or adjacent (within 120 m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat.	ELC surveys were used to assess features within the Study Area that may support woodland breeding amphibians.	**Candidate. MASM1-1, MAMM1-3 and SAS communities and pools along the Conestogo River have the potential to support SWH for amphibian breeding habitat (woodland).**
Amphibian Breeding Habitat (Wetland)	ELC Community Classes SW, MA, FE, BO, OA and SA. Wetland areas >120 m from woodland habitats. Wetlands and pools (including vernal pools) >500 m^2 (about 25 m diameter) supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNR mapping and could be important amphibian breeding habitats. Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. Bullfrogs require permanent water bodies with abundant emergent vegetation.	ELC surveys were used to assess features within the Study Area that may support wetland breeding amphibians.	Absent. Wetlands in the Study Area are within 120m from woodland habitats and have been discussed above.
Species of Conservation Concern			
Marsh Bird Breeding Habitat	All wetland habitats with shallow water and emergent aquatic vegetation. May include any of the following Community Types: Meadow Marsh (MAM), Shallow Aquatic (SA), Open Bog (BOO), Open Fen (FEO), or for Green Heron: Swamp (SW), Marsh (MA) and Meadow (ME) Community Types.	ELC surveys were used to identify marshes with shallow water and emergent vegetation that may support marsh breeding birds.	Absent. No marsh breeding birds were observed during field investigations.
Woodland Area-sensitive Bird Breeding Habitat	Habitats >30ha where interior forest is present (at least 200 m from the forest edge); typically >60 years old. These include any of the following Community Types: Forest (FO), Treed Swamp (SW).	ELC surveys and GIS analysis were used to determine whether woodlots that occurred within the Study Area that were >30 ha with interior habitat present (>200 m from edge).	Absent.
Open Country Bird Breeding Habitat	Grassland areas > 30 ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or hay or livestock pasturing in the last 5 years, in the following	ELC surveys and GIS analysis were used to identify grassland communities within the Study Area	Absent.

Table B-6: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria	Methods	Potential Habitat Present in the Study Area?
	Community Type: Meadow (ME).	that may support area-sensitive breeding birds.	
Shrub/Early Successional Bird Breeding Habitat	Old field areas succeeding to shrub and thicket habitats >10 ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or intensive hay or livestock pasturing in the last 5 years, in the following Community Types: Thickets (TH), Savannahs or Woodlands (WOD).	ELC surveys and GIS analysis were used to identify large communities that may support shrub/early successional breeding birds.	Absent.
Terrestrial Crayfish	Meadow marshes and edges of shallow marshes (no minimum size). Vegetation communities include MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, MAS1, MAS2, MAS3. Construct burrows in marshes, mudflats, meadows. Can be found far from water.	ELC surveys and wildlife habitat assessments were used to identify shallow marsh and meadow marsh communities that may support Terrestrial Crayfish within the Study Area.	Absent. No crayfish chimneys observed in or adjacent to wetlands during field investigations.
Special Concern and Rare Wildlife Species	All special concern and provincially rare (S1-S3, SH) plant and animal species (SOCC) within potential to occur in the Study Area.	ELC surveys were used to identify suitable habitat for each potential SOCC listed in **Table B-2, Appendix B**. Vegetation surveys and bird nest surveys on the bridge also assisted with the habitat assessment.	**Confirmed: Habitat for Eastern Wood-Pewee and Snapping Turtle was identified in the Study Area. Potential habitat was identified in the Study Area for Common Nighthawk, Monarch, Western Chorus Frog, Eastern Milksnake and Northern Map Turtle.**
Animal Movement Corridors			
Amphibian Movement Corridor	Corridors may be found in all ecosites associated with water. Determined based on identifying significant amphibian breeding habitat (wetland).	Identified after Amphibian Breeding Habitat is confirmed. Movement corridors should be considered when amphibian breeding habitat is confirmed as SWH from Amphibian Breeding Habitat.	Unconfirmed.
Deer Movement Corridor	Corridors may be found in all forested ecosites.	Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH.	Absent

APPENDIX B

Table B-7: Evaluation of Alternatives

		ALTERNATIVE SOLUTIONS		
Factors	**Evaluation Criteria**	**Concept 1 New Road and Bridge Alignment to West Side**	**Concept 2 New Bridge Partially Offset to West Side**	**Concept 3 New Bridge Partially Offset to East Side**
POTENTIAL IMPACTS				
Aquatic Species and Habitat	Impacts to aquatic species and habitat Aquatic species at risk described in row below	Potential aquatic habitat impacts (silt and sediment loading) due to in-water work for new bridge piers and removal of existing piers/abutments. May involve temporary causeways, access for borehole testing, access roads for construction and vegetation removal within meander belt width of Conestogo River +30 m. Will require mussel relocations for in-water work areas prior to activities and fish removals from isolated areas prior to dewatering. Potential temporary increases in silt and sediment from in-water works and vegetation clearing within meander belt width + 30 m of Conestogo River. Larger area of potential impact within meander belt width +30 m of the three options. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Southwest quadrant of the Conestogo River has less suitable habitat (backwater with fine depositional sediment) for aquatic species.	Potential aquatic habitat impacts (silt and sediment loading) due to in-water work for TMB piers in undisturbed areas, new bridge piers on same alignment and removal of existing piers/abutments. May involve temporary causeways, access for borehole testing, access roads for construction and vegetation removal within meander belt width of Conestogo River +30 m. Will require mussel relocations for in-water work areas prior to activities and fish removals from isolated areas prior to dewatering. Potential temporary increases in silt and sediment from in-water works and vegetation clearing within meander belt width + 30 m of Conestogo River. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Southwest quadrant of the Conestogo River has less suitable habitat (backwater with fine depositional sediment) for aquatic species.	Potential aquatic habitat impacts (silt and sediment loading) due to in-water work for new bridge piers in undisturbed areas and removal of existing piers/abutments. May involve temporary causeways, access for borehole testing, access roads for construction and vegetation removal within meander belt width of Conestogo River +30 m. Will require mussel relocations for in-water work areas prior to activities and fish removals from isolated areas prior to dewatering. Potential temporary increases in silt and sediment from in-water works and vegetation clearing within the meander belt width of the Conestogo River + 30 m. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Potential impacts to Eastern Tributary of Conestogo River. East side of the Conestogo River has more suitable habitat for aquatic species.
	Impact Rating High = highest impact Medium = moderate impact Low = least impact	**High**	**Low**	**Medium**
Wildlife and Wildlife Habitat	Impacts to wildlife and wildlife habitat Confirmed habitat in the Study Area for: Eastern Wood-Pewee, Snapping Turtle and turtle wintering area. Candidate habitat in Study Area for: bat maternity colony, turtle wintering area, reptile hibernaculum, turtle nesting, amphibian breeding, and habitat for species of conservation concern (Common Nighthawk, Monarch, Western Chorus Frog, Eastern Milksnake, Northern Map Turtle)	Loss of confirmed turtle wintering area and confirmed Snapping Turtle habitat, and candidate amphibian breeding habitat in wetlands adjacent to existing road where dam removal (SAS) and grading (MASM1-1) are proposed. Potential disturbance to confirmed Snapping Turtle habitat, candidate turtle overwintering area and candidate amphibian breeding habitat along shoreline of Conestogo River (displacement of habitat around bridge piers). Potential for displacement of Snapping Turtle during sensitive over-wintering period if in-water work occurs Nov 1 – Apr 1. Loss or displacement of candidate habitat for Monarch. Temporary disturbances to wildlife and wildlife habitat during construction from vegetation trampling/removal, noise, dust, risk of sedimentation. Limited or no impacts to candidate bat maternity roost habitat (treed), candidate reptile (snake) hibernaculum, candidate turtle nesting area, candidate habitat for Common Nighthawk and Eastern Milksnake, or confirmed habitat for Eastern Wood-Pewee.	Minor loss of candidate amphibian breeding habitat in area of retaining wall construction. Potential disturbance to candidate turtle overwintering habitat and candidate amphibian breeding habitat in Conestogo River (displacement of habitat around bridge piers). Potential for displacement of Snapping Turtle during sensitive over-wintering period if in-water work occurs Nov 1 – Apr 1. Loss or displacement of candidate habitat for Monarch. Temporary disturbances to wildlife and wildlife habitat during construction from vegetation trampling/removal, noise, dust, risk of sedimentation. Limited or no impacts to candidate bat maternity roost habitat (treed), candidate reptile (snake) hibernaculum,candidate turtle nesting area, candidate habitat for Common Nighthawk and Eastern Milksnake, or confirmed habitat for Eastern Wood-Pewee.	Potential loss or displacement of candidate habitat for Common Nighthawk and Monarch due to embankment grading. Potential disturbance to candidate turtle overwintering habitat and candidate amphibian breeding habitat in Conestogo River (displacement of habitat around bridge piers). Potential for displacement of Snapping Turtle during sensitive over-wintering period if in-water work occurs Nov 1 – Apr 1. Temporary disturbances to wildlife and wildlife habitat during construction from vegetation trampling/removal, noise, dust, risk of sedimentation. Limited or no impacts to candidate bat maternity roost habitat (treed), candidate reptile (snake) hibernaculum, candidate turtle nesting area, candidate habitat for Eastern Milksnake, or confirmed habitat for Eastern Wood-Pewee.

APPENDIX B

Table B-7: Evaluation of Alternatives

	ALTERNATIVE SOLUTIONS			
Factors	**Evaluation Criteria**	**Concept 1 New Road and Bridge Alignment to West Side**	**Concept 2 New Bridge Partially Offset to West Side**	**Concept 3 New Bridge Partially Offset to East Side**
	Impact Rating High = highest impact Medium = moderate impact Low = least impact	**High**	**Medium**	**Low**
Vegetation and Wetlands	Impact to vegetation communities and wetlands	Largest footprint due to new road alignment. Loss of roadside meadow, marsh (wetland) and treed (FODM7) communities. Temporary impacts due to staging and earthworks during construction.	Loss of roadside meadow (lower quality vegetation) due to embankment grading. Permanent wetland loss limited due to proposed retaining wall, but some temporary impacts during construction.	Loss of roadside meadow (lower quality vegetation, or more easily restored) and hedgerow due to embankment grading.
	Impact Rating High = highest impact Medium = moderate impact Low = least impact	**High**	**Medium**	**Low**
Species at Risk (SAR; Threatened and Endangered species per SARO)	Impact to Species at Risk (SAR) and SAR habitat Butternut, Eastern Meadowlark, Bobolink, SAR bats, Barn Swallow, Wavy-rayed Lampmussel, Silver Shiner, Black Redhorse	Butternut: Alignment appears to avoid 30 m radius of protected habitat around tree, but to be confirmed. Assume no impacts. Eastern Meadowlark and Bobolink: No impacts to habitat, potential for sensory disturbance during construction. SAR bats: No impacts to roosting habitat, potential for sensory disturbance during construction. Barn Swallow: Although no nests were observed in 2020, the existing bridge provides suitable nesting habitat and the species may build nests in any given year. Silver Shiner: Potential temporary increases in silt and sediment from in-water works and vegetation clearing within meander belt width + 30 m of Conestogo River. Larger area of potential impact within meander belt width +30 m of the three options. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Southwest quadrant of the Conestogo River has less suitable habitat (backwater with fine depositional sediment) for the species. Black Redhorse: Potential temporary increases in silt and sediment from in-water works. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Southwest quadrant of the Conestogo River has less suitable habitat (backwater with fine depositional sediment) for the species.	Butternut: No impacts to habitat. Eastern Meadowlark and Bobolink: No impacts to habitat, potential for sensory disturbance during construction. SAR bats: No impacts to roosting habitat, potential for sensory disturbance during construction. Barn Swallow: Although no nests were observed in 2020, the existing bridge provides suitable nesting habitat and the species may build nests in any given year. Silver Shiner: Potential temporary increases in silt and sediment from in-water works and vegetation clearing within 30 m of meander belt width of Conestogo River. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Southwest quadrant of the Conestogo River has less suitable habitat (backwater with fine depositional sediment) for the species. Black Redhorse: Potential temporary increases in silt and sediment from in-water works. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Southwest quadrant of the Conestogo River has less suitable habitat (backwater with fine depositional sediment) for the species. Wavy-rayed Lampmussel: Potential temporary increases in silt and sediment from in-water works. Temporary disturbance and permanent loss of in-water habitat at sites	Butternut: No impacts to habitat. Eastern Meadowlark and Bobolink: Small loss of habitat due to grading of embankment into grassland habitat. Potential for sensory disturbance during construction. Impacts can be reduced by removing habitat (grassland) outside nesting period (~ Apr 1 to Aug 31) SAR bats: No impacts to roosting habitat, potential for sensory disturbance during construction. Barn Swallow: Although no nests were observed in 2020, the existing bridge provides suitable nesting habitat and the species may build nests in any given year. Silver Shiner: Potential temporary increases in silt and sediment from in-water works and vegetation clearing within 30 m of meander belt width of Conestogo River. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Potential impacts to Eastern Tributary of Conestogo River. East side of the Conestogo River has more suitable habitat for the species. Black Redhorse: Potential temporary increases in silt and sediment from in-water works. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Potential impacts to Eastern Tributary of

Table B-7: Evaluation of Alternatives

	ALTERNATIVE SOLUTIONS			
Factors	**Evaluation Criteria**	**Concept 1 New Road and Bridge Alignment to West Side**	**Concept 2 New Bridge Partially Offset to West Side**	**Concept 3 New Bridge Partially Offset to East Side**
		Wavy-rayed Lampmussel: Potential temporary increases in silt and sediment from in-water works. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Southwest quadrant of the Conestogo River has less suitable habitat (backwater with fine depositional sediment) for the species.	of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Southwest quadrant of the Conestogo River has less suitable habitat (backwater with fine depositional sediment) for the species.	Conestogo River. East side of the Conestogo River has more suitable habitat for the species. Wavy-rayed Lampmussel: Potential temporary increases in silt and sediment from in-water works. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Potential impacts to Eastern Tributary of Conestogo River. East side of the Conestogo River has more suitable habitat for the species.
	Impact Rating High = highest impact Medium = moderate impact Low = least impact	**High**	**Low**	**Medium**

Appendix C Relevant Correspondence

Stantec Consulting Ltd.
600-171 London ON N6A 5J7

April 28, 2020
File: 165010600

Attention: Graham Buck, Management Biologist
Ministry of Natural Resources and Forestry, Guelph District
1 Stone Road, Guelph, ON N1G 4Y2
Email: graham.buck@ontario.ca

Dear Mr. Buck,

Reference: Natural Heritage Information Request for the Scheifele Bridge Replacement: Schedule "C" Class Environmental Assessment Study: Region of Waterloo

Stantec Consulting Ltd. has been retained by the Region of Waterloo to complete an ecological inventory and assessment study (EIS) as part of a Schedule "C" Class Environmental Assessment for the Scheifele Bridge Replacement Project, in the Region of Waterloo. The Scheifele Bridge is located on Northfield Drive East over the Conestogo River, between the Village of Conestogo and the City of Waterloo (17T 539249 E, 4819236 N). (Attachment 1).

Our work will document the existing ecological (terrestrial and aquatic) features at the bridge location, assess the potential impacts of alternative bridge design concepts on the natural environment, and identify appropriate measures that our design team may implement to avoid, or mitigate, impacts on the local environment

The purpose of this letter is to request your input with respect to existing conditions within the Study Area, and to identify issues, concerns, or approval requirements that your agency may have. Stantec has conducted a search of the Natural Heritage Information Center (NHIC) Database (MNRF 2020a), natural heritage data on MNRF's Land Information Ontario (LIO) mapping website (MNRF 2020b), and various species databases; however, we would like to request updates and/or corrections to the information, as available. This information is required to complete our natural heritage review for the project.

FISH AND FISH HABITAT

A background review was completed to identify fish and fish habitat, and aquatic Species at Risk (SAR) or rare species within the vicinity of the Study Area. The Conestogo River within the Study Area (Figure 1; UTM coordinates 17T 539261 E, 4819231 N) is a permanent, warm-water, fish-bearing river). West of the Study Area is Martin Creek which drains into the Conestogo River approximately 420 m upstream from the Scheifele Bridge (17T 538847E, 4819313N). The Study Area contains several small tributaries and agricultural drains, including one located approximately 60 m upstream of the bridge (17T 539174E, 4819185N) and one located approximately 30 m downstream of the bridge (17T 539263E, 4819179N). An additional one is located east of the Study Area, approximately 400 m downstream of the bridge (17 T 539387E, 4819431N).

Four aquatic SAR records occurred within the Study Area. Fish and mussel SAR recorded in the Fisheries and Oceans Canada (DFO) Aquatic Species at Risk mapping are provided in **Table 1**.

Reference: Natural Heritage Information Request for the Scheifele Bridge Replacement: Schedule "C" Class Environmental Assessment Study: Region of Waterloo

Table 1: Records of Aquatic Species at Risk Near the Study Area

Common Name	Latin Name	Provincial S-rank	SARO Status	SARA Schedule 1
Wavy-rayed Lampmussel[1,3]	*Lampsilis fasciola*	S1	THR	SC
Rainbow[1,3]	*Villosa iris*	S2S3	SC	SC
Silver Shiner[1,3]	*Notropis photogenis*	S2S3	THR	THR
Black Redhorse[1]	*Moxostoma duquesnei*	S2	THR	THR

1 DFO SAR Mapping

2 Ontario Reptile and Amphibian Atlas

3 NHIC

4 eBird

5 Based on potential habitat and species biology

6 iNaturalist

7 Atlas of the Breeding Birds of Ontario

We are requesting confirmation or updates to the following information related to fish and fish habitat in the Study Area:

- Species/community information from locations within the Study Area (Figure 1)
- Watercourse thermal regime(s) and flow regime(s)
- Special habitat features (e.g. groundwater upwelling, spawning areas, refugia, migratory routes)
- In-water construction timing window(s)
- MNRF fisheries management objectives, if applicable

TERRESTRIAL RESOURCES

A background review was completed to identify species at risk or rare species and natural areas in the vicinity of the Study Area. The NHIC database (MNRF 2020a), Ontario Reptile and Amphibian Atlas (Ontario Nature 2020), Atlas of the Breeding Birds of Ontario (Cadman et al. 2007), iNaturalist database (iNaturalist 2020) and eBird database (eBird 2020) had records of ten threatened or endangered species and nine special concern or provincially rare species within the vicinity of the Study Area (**Table 2**).

Reference: Natural Heritage Information Request for the Scheifele Bridge Replacement: Schedule "C" Class Environmental Assessment Study: Region of Waterloo

Table 2: Recent records of rare terrestrial species or terrestrial Species at Risk (1990 – present).

Common Name	Latin Name	Provincial S-rank	SARO Status	SARA Schedule 1
Western Chorus Frog (Great Lakes – St. Lawrence pop.)[2]	*Pseudacris triseriata*	S3	NAR	THR
Snapping Turtle[2,3,6]	*Chelydra serpentina*	S3	SC	SC
Blanding's Turtle[2]	*Emydoidea blandingii*	S3	THR	THR
Northern Map Turtle[2]	*Graptemys geographica*	S3	SC	SC
Eastern Milksnake[2]	*Lampropeltis triangulum*	S3	NAR	SC
Bald Eagle[4]	*Haliaeetus leucocephalus*	S4B, S2N	SC	NAR
Bank Swallow[4]	*Riparia riparia*	S4B	THR	THR
Bobolink[4]	*Dolichonyx oryzivorous*	S4B	THR	THR
Caspian Tern[4]	*Hydroprogne caspia*	S3B	NAR	NAR
Great Egret[4]	*Ardea alba*	S2B	-	-
Barn Swallow[5]	*Hirundo rustica*	S4B	THR	THR
Eastern Meadowlark[5]	*Sturnella magna*	S4B	THR	THR
Chimney Swift[7]	*Chaetura pelagica*	S4B, S4N	THR	THR
Common Nighthawk[7]	*Chordeiles minor*	S4B	SC	THR
Eastern Wood-pewee[7]	*Contopus virens*	S4B	SC	SC
Little Brown Myotis[5]	*Myotis lucifugus*	S3	END	END
Eastern Small-footed Myotis[5]	*Myotis leibii*	S2S3	END	-
Tricolored Bat[5]	*Perimyotis subflavus*	S3?	END	END
Butternut[6]	*Juglans cinerea*	S3?	END	END

1 DFO SAR Mapping
2 Ontario Reptile and Amphibian Atlas
3 NHIC
4 eBird
5 Based on potential habitat and species biology
6 iNaturalist
7 Atlas of the Breeding Birds of Ontario

Natural heritage mapping on the MNRF's Land Information Ontario Website (MNRF 2020b) did not identify any designated natural features in the vicinity of the Study Area.

Reference: Natural Heritage Information Request for the Scheifele Bridge Replacement: Schedule "C" Class Environmental Assessment Study: Region of Waterloo

CLOSING

We respectfully request confirmation of the above findings and the identification of any additional natural heritage resources information you may have for the Study Area. This information request has also been distributed to GRCA and MECP.

Please contact the undersigned if you have any questions regarding this information request.

Regards,

Stantec Consulting Ltd.

Kimberly Zupfer M.Sc.
Ecologist
Phone: 519-585-7287
Kim.zupfer@stantec.com

Melissa Cameron M.Sc., M.LA.
Ecologist / Landscape Architect
Phone: 519-645-3351
melissa.cameron@stantec.com

CC: Ken Brisbois, Region of Waterloo
Garry Leveck, Stantec Consulting Ltd.
Michael McGann, Stantec Consulting Ltd.

Attachment 1: Figure 1

REFERENCES

Cadman, M. D., D.A. Sutherland, G.G. Beck, D. Lepage, A.R. Couturier. 2007. Atlas of the Breeding Birds of Ontario, 2001-2005. (eds) Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of natural resources, and Ontario Nature, Toronto, xxii + 318pp

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eBird. 2020. eBird species observation database. Available Online: https://ebird.org/map

iNaturalist. 2020. iNatualist species observation database. Available online: https://www.inaturalist.org/observations?place_id=any

(MNRF) Ontario Ministry of Natural Resources and Forestry. 2020a. Natural Heritage Information Centre (NHIC) Data on the Land Information Ontario mapping website. Ontario Ministry of Natural Resources and Forestry. Available Online: http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US

(MNRF) Ontario Ministry of Natural Resources and Forestry. 2020b. Land Information Ontario Digital mapping of natural heritage features, Ontario Ministry of Natural Resources. Available Online: http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US

Reference: Natural Heritage Information Request for the Scheifele Bridge Replacement: Schedule "C" Class Environmental Assessment Study: Region of Waterloo

(MNRF) Ontario Ministry of Natural Resources and Forestry. 2020c. Species at Risk in Ontario List. Available online: https://www.ontario.ca/environment-and-energy/species-risk-ontario-list

Ontario Nature. 2020. Ontario Reptile and Amphibian Atlas [web application]. Toronto, Ontario. Available online: https://ontarionature.org/oraa/maps/

Stantec

Legend
- Study Area (Approx.)
- Hydro Line
- Waterbody

0 80 160 Metres

1:3,500 (A1 original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2020.
3. Orthoimagery © First Base Solutions, 2020, imagery date 2018.

Project Location
Region of
Waterloo, ON

165010600 REV4
Prepared by BCC on 2020-04-15
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
REGION OF WATERLOO
SCHEIFELE BRIDGE

Figure No.
1

DRAFT

Title
Study Area

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

Conway, Terryn

From: Buck, Graham (MNRF) <Graham.Buck@ontario.ca>
Sent: Wednesday, April 29, 2020 9:09 AM
To: Cameron, Melissa
Subject: RE: Region of Waterloo - Scheifele Bridge Municipal Class "C" EA - Natural Heritage Information Request

Hello Melissa,

The Conestoga river at this location contains the following fish species:
Black Redhorse, Blacknose Dace, Blackside Darter, Bluntnose Minnow, Brook Stickleback, Brown Bullhead, Creek Chub, Greater Redhorse, Hornyhead Chub, Johnny Darter x Tesselated Darter, Largemouth Bass, Least Darter, Pumpkinseed, Rainbow Darter, Rosyface Shiner, Smallmouth Bass, White Sucker.

There is no fish community information available for anyone of the tributaries within the study area.

The river and tributaries support warm water fish. The Conservation Authority will establish the in water work period in their permit.

Sincerely,

Graham Buck

From: Cameron, Melissa <Melissa.Cameron@stantec.com>
Sent: April-28-20 2:26 PM
To: Buck, Graham (MNRF) <Graham.Buck@ontario.ca>
Cc: Ball, Janice <Janice.Ball@stantec.com>; Zupfer, Kimberly <Kimberly.Zupfer@stantec.com>; Leveck, Garry <Garry.Leveck@stantec.com>; McGann, Michael <Michael.McGann@stantec.com>; kbrisbois@regionofwaterloo.ca; Species at Risk (MECP) <SAROntario@ontario.ca>
Subject: Region of Waterloo - Scheifele Bridge Municipal Class "C" EA - Natural Heritage Information Request

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Dear Mr. Buck,

Please find attached our request for terrestrial and aquatic natural heritage information for the Scheifele Bridge Replacement Project, a Schedule “C” Class Municipal Environmental Assessment Study. We have completed a background data search using available resources, but would appreciate any additional information you may be able to provide. I have also copied the SAR branch of MECP for their information, and note that should any SAR or SAR habitat be observed over the course of our Study we will initiate consultation with MECP at that time.

Thank you and best regards,

Melissa

Melissa Cameron M.Sc, M.LA, OALA
Ecologist / Landscape Architect

Direct: 519 645-3351
Mobile: 226 971-0042
melissa.cameron@stantec.com

Stantec
600-171 Queens Avenue
London ON N6A 5J7

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Conway, Terryn

From: Species at Risk (MECP) <SAROntario@ontario.ca>
Sent: Wednesday, May 6, 2020 9:25 AM
To: Cameron, Melissa
Subject: RE: Region of Waterloo - Scheifele Bridge Municipal Class "C" EA - Natural Heritage Information Request

Melissa;

MECP has nothing to add to your extensive list of species.

Kind Regards;

JJA

JEFF J. ANDERSEN

MANAGEMENT BIOLOGIST
PERMISSIONS AND COMPLIANCE SECTION, SPECIES AT RISK BRANCH
LAND AND WATER DIVISION
ONTARIO MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS

50 Bloomington Road, Aurora ON L4G 0L8 | jeff.andersen@ontario.ca | 289-221-1705

From: Cameron, Melissa <Melissa.Cameron@stantec.com>
Sent: April 28, 2020 2:26 PM
To: Buck, Graham (MNRF) <Graham.Buck@ontario.ca>
Cc: Ball, Janice <Janice.Ball@stantec.com>; Zupfer, Kimberly <Kimberly.Zupfer@stantec.com>; Leveck, Garry <Garry.Leveck@stantec.com>; McGann, Michael <Michael.McGann@stantec.com>; kbrisbois@regionofwaterloo.ca; Species at Risk (MECP) <SAROntario@ontario.ca>
Subject: Region of Waterloo - Scheifele Bridge Municipal Class "C" EA - Natural Heritage Information Request

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Dear Mr. Buck,

Please find attached our request for terrestrial and aquatic natural heritage information for the Scheifele Bridge Replacement Project, a Schedule “C” Class Municipal Environmental Assessment Study. We have completed a background data search using available resources, but would appreciate any additional information you may be able to provide. I have also copied the SAR branch of MECP for their information, and note that should any SAR or SAR habitat be observed over the course of our Study we will initiate consultation with MECP at that time.

Thank you and best regards,

Melissa

Melissa Cameron M.Sc, M.LA, OALA
Ecologist / Landscape Architect

Direct: 519 645-3351
Mobile: 226 971-0042
melissa.cameron@stantec.com

Stantec
600-171 Queens Avenue
London ON N6A 5J7

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Conway, Terryn

From: Jane Gurney <JGurney@regionofwaterloo.ca>
Sent: Friday, May 22, 2020 2:24 PM
To: Cameron, Melissa
Cc: Ken Brisbois; Ellah, Mitch; Ball, Janice; Keene, Joe; Leveck, Garry; McGann, Michael
Subject: RE: Natural Heritage Terms of Reference for the Scheifele Bridge Replacement Project

Hello Melissa,
Thank you for your reply. I didn't intend to add too much extra effort for you with regard to the Provincial Natural Heritage System (NHS), I just wanted to ensure that it was acknowledged. The subject area is outside of a settlement area, as you have stated. It is my understanding of the Growth Plan that although the NHS mapping does not apply outside of settlement areas until the Regional Official Plan (ROP) is brought into conformity with the Growth Plan, the policies are still to be applied to areas outside of settlement areas (4.2.2.4). The ROP identifies a Significant Valleyland in the study area, and as such, some developments would be subject to the NHS policies in this area base don the ROP designations. Notwithstanding this, the bridge replacement project has been subject to an Environmental Assessment process, and as such is not required to meet the requirements of the NHS policies. This is based on the definition of "development" in the Growth Plan. My suggestion is to acknowledge the ROP and NHS designations, but reference the EA process to clarify why the NHS policies are not being applied in this case. I would be happy to discuss if any of the above requires clarification or if your staff have a different opinion. And again, apologize for the extra work my comments may have made for you.

Trevor Heywood is the correct GRCA contact. Melissa Larion is the GRCA supervisor for planning in this area and you may want to include her as well in case there are any staffing impacts related to the layoffs at the GRCA.

Please let me know if you have any questions or concerns, and I am happy to discuss by phone if it is more efficient.

Jane E. Gurney
Principal Planner
Community Planning
Region of Waterloo
Mobile: 519-589-6921
JGurney@regionofwaterloo.ca

From: Cameron, Melissa <Melissa.Cameron@stantec.com>
Sent: May 21, 2020 10:11 PM
To: Jane Gurney <JGurney@regionofwaterloo.ca>
Cc: Ken Brisbois <KBrisbois@regionofwaterloo.ca>; Ellah, Mitch <Mitch.Ellah@stantec.com>; Ball, Janice <Janice.Ball@stantec.com>; Keene, Joe <Joe.Keene@stantec.com>; Leveck, Garry <Garry.Leveck@stantec.com>; McGann, Michael <Michael.McGann@stantec.com>
Subject: RE: Natural Heritage Terms of Reference for the Scheifele Bridge Replacement Project

Hello Jane,

I apologize that it has taken me so long to get this revision back to you. I made the edits requested and was waiting to clarify the items related to the Provincial Growth Plan with one of our environmental planners. The policies in this plan are still fairly new to our team. Here is some text to describe our understanding of how the Growth Plan policies apply to the Scheifele Bridge Replacement Project:

The Growth Plan for Greater Golden Horseshoe (GPGGH, 2019) provides direction for development planning including policies for natural heritage features. The 2019 GPGGH area includes the Region of Waterloo in which the project is situated. The Subject Property is noted to outside the settlement area. The GPGGH states that the mapped Natural Heritage Systems for the Growth Plan does not apply until the NHS has been implemented in the applicable official plan. Until such time, the policies in the GPGGH plan will apply outside the settlement area in official plans approved and in effect as of July 1, 2017. The Region of Waterloo Official Plan was last approved in December 2010 and as such the GPGGH policies do not yet apply until the OP is updated.

Notwithstanding this interpretation, the policies of GPGGH will be considered in the EIS and I've included text to this effect at the end of the letter (revision attached).

Could you let me know if our interpretation is correct? If not, perhaps we could discuss by phone. Also, could you please let me know if Trevor Heywood is the correct Resource Planner(s) at GRCA to whom I should circulate this TOR to for comment? I will also copy Nancy Davy, Director of Resource Management, when I send this out.

Thank you and best regards,

Melissa

From: Jane Gurney <JGurney@regionofwaterloo.ca>
Sent: Thursday, April 30, 2020 8:44 AM
To: Cameron, Melissa <Melissa.Cameron@stantec.com>
Cc: Ken Brisbois <KBrisbois@regionofwaterloo.ca>; Ellah, Mitch <Mitch.Ellah@stantec.com>; Ball, Janice <Janice.Ball@stantec.com>; Keene, Joe <Joe.Keene@stantec.com>; Leveck, Garry <Garry.Leveck@stantec.com>; McGann, Michael <Michael.McGann@stantec.com>
Subject: FW: Natural Heritage Terms of Reference for the Scheifele Bridge Replacement Project

Hello Melissa,
Kate Hagerman forwarded your Terms of Reference for the Scheifele Bridge reconstruction project to me for review. Generally Regional Environmental Planning is supportive of the approaches outlined in the Terms of Reference, and I am providing the following minor comments for your consideration.

1. The last paragraph on page 1 provides the environmental planning designations and natural heritage features and areas included in the study area, including only the GRCA and ROP designations. The subject lands and surrounding areas are identified as part of the Natural Heritage System (NHS) of the Provincial Growth Plan, and it is recommended that this should also be noted in this section, subject to comment 2.b., below.
2. Section 2.1
    a. If the TOR are finalized and/or dated after May 1, the PPS reference in section 2.1 can be updated;
    b. If there is a specific reason that the Growth Plan is not included here, please advise as this may impact comment #1.
    c. There is an "and" included after the last bullet that can be removed, or an additional reference may have been omitted.
3. Is it anticipated that an assessment of impacts to the ability of wildlife to move under/around the bridge will be included, and if so, is it possible to specify this within the TOR.

If you have any questions or require clarification on any of the comments above, please do not hesitate to contact me.
Sincerely,

Jane E. Gurney

Principal Planner
Community Planning
Region of Waterloo
Mobile: 519-589-6921
JGurney@regionofwaterloo.ca

From: Kate Hagerman <KHagerman@regionofwaterloo.ca>
Sent: April 28, 2020 3:10 PM
To: Jane Gurney <JGurney@regionofwaterloo.ca>
Subject: Fw: Natural Heritage Terms of Reference for the Scheifele Bridge Replacement Project

---

From: Cameron, Melissa <Melissa.Cameron@stantec.com>
Sent: 28 April 2020 14:35
To: Kate Hagerman
Cc: Ellah, Mitch; Ball, Janice; Keene, Joe; Leveck, Garry; McGann, Michael; Ken Brisbois
Subject: Natural Heritage Terms of Reference for the Scheifele Bridge Replacement Project

Dear Ms. Hagerman,

Manager of Environmental Planning and Sustainability,

Stantec Consulting Ltd. (Stantec) has been retained by the Region of Waterloo to complete an ecological inventory and assessment study (EIS) as part of a Schedule "C" Class Environmental Assessment for the Scheifele Bridge Replacement Project. The Project Manager for the Region of Waterloo is Ken Brisbois, while Stantec's Project Manager is Garry Leveck.

As part of our scope of work for the natural heritage study we have prepared a Terms of Reference (attached) for your perusal and comment. Ultimately we would like to circulate this document to GRCA for their review as well. Any comments and/or suggestions you can provide that will assist us in improving our study approach, and final documentation, of the EIS are much appreciated.

Sincerely,

Melissa

Melissa Cameron M.Sc, M.LA, OALA

Ecologist / Landscape Architect

Direct: 519 645-3351
Mobile: 226 971-0042
melissa.cameron@stantec.com

Stantec
600-171 Queens Avenue
London ON N6A 5J7

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Conway, Terryn

From: Cameron, Melissa
Sent: Wednesday, May 27, 2020 2:38 PM
To: planning@grandriver.ca
Subject: FW: Natural Heritage Terms of Reference for the Scheifele Bridge Replacement Project
Attachments: let_Scheifele_Bridge_ToR_20200527_rev1_signed.pdf

Dear GRCA Planning Department,

Based on the automated email responses I received from Trevor Heywood and Melissa Larion I am copying this general email account for further assistance. If you could please direct this message to the appropriate planner it would be much appreciated!

Sincerely,

Melissa

Melissa Cameron M.Sc, M.LA, OALA
Ecologist / Landscape Architect

Direct: 519 645-3351
Mobile: 226 971-0042
melissa.cameron@stantec.com

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600-171 Queens Avenue
London ON N6A 5J7

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From: Cameron, Melissa
Sent: Wednesday, May 27, 2020 2:34 PM
To: theywood@grandriver.ca; mlarion@grandriver.ca
Cc: Jane Gurney <JGurney@regionofwaterloo.ca>; Ken Brisbois <KBrisbois@regionofwaterloo.ca>; Leveck, Garry <Garry.Leveck@stantec.com>; McGann, Michael <Michael.McGann@stantec.com>; Ball, Janice <Janice.Ball@stantec.com>; Ellah, Mitch <Mitch.Ellah@stantec.com>
Subject: Natural Heritage Terms of Reference for the Scheifele Bridge Replacement Project

Dear Mr. Heywood and Ms. Larion,

Stantec Consulting Ltd. (Stantec) has been retained by the Region of Waterloo to complete an ecological inventory and assessment study (EIS) as part of a Schedule "C" Class Environmental Assessment for the Scheifele Bridge Replacement Project. The Project Manager for the Region of Waterloo is Ken Brisbois, while Stantec's Project Manager is Garry Leveck. Jane Gurney is the planner for the Region of Waterloo who has been assisting with this file.

As part of our scope of work for the natural heritage study we have prepared a Terms of Reference (attached) for your perusal and comment. The attached document incorporates revisions suggested by Jane Gurney. Any comments and/or suggestions you can provide that will assist us in improving our study approach, and final documentation, of the EIS are much appreciated. Field assessments completed to date are: bat habitat, ELC, spring botanical inventory, turtle basking and significant wildlife habitat.

Sincerely,

Melissa

Melissa Cameron M.Sc, M.LA, OALA
Ecologist / Landscape Architect

Direct: 519 645-3351
Mobile: 226 971-0042
melissa.cameron@stantec.com

Stantec
600-171 Queens Avenue
London ON N6A 5J7

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Canadian Wildlife Service
Environment and Climate Change Canada
4905 Dufferin St.
Toronto, ON, M3H 5T4

18 November 2020

Ken Brisbois
Project Manager- Design & Construction
Scheifele Bridge Superstructure Replacement
Region of Waterloo
150 Frederick St.
Kitchener, ON, N2G 4J3
Tel: 519-575-4400
E-mail: kbrisbois@regionofwaterloo.ca

Dear Mr. Brisbois,

It has been brought to our attention that the Scheifele Bridge Superstructure Replacement project will be underway in the near future. Bridge structures are popular nesting sites for many species of migratory birds and we wanted to reach out to provide initial guidance and offer our contact information in case you had any questions regarding your legal responsibilities under the *Migratory Birds Convention Act* (MBCA), and the Migratory Birds Regulations (MBR).

As you may know, under the MBCA, migratory birds, eggs and nests are protected. For a list of the species protected, please refer to the Birds Protected in Canada webpage. It is important to note that some species of birds protected under the MBCA have also been listed in Schedule 1 of the *Species at Risk Act* (SARA). These species receive protection from both the MBCA and SARA. One key responsibility under the MBCA, which is stipulated in the associated Migratory Birds Regulations (MBR) relates to the protection of migratory birds and their nests:

6 Subject to subsection 5(9), no person shall

- (a) disturb, destroy or take a nest, egg, nest shelter, eider duck shelter or duck box of a migratory bird, or
- (b) have in his possession a live migratory bird, or a carcass, skin, nest or egg of a migratory bird

except under authority of a permit therefor.

To minimize the possibility of contravening the law, proponents must understand the potential effect(s) of their activities on migratory birds, nests, and eggs and implement appropriate avoidance and mitigation measures. Although disturbance or destruction of migratory bird nests and eggs is prohibited under the Act and Regulations (except under authority of a permit), it is important to note that the removal of trees, shrubs, stumps or roots, or grading or mowing of areas used by ground nesting birds in itself is not necessarily prohibited by the MBCA and MBR, providing the activity does not disturb or destroy migratory bird nests or eggs.

To this end, Environment and Climate Change Canada (ECCC) recommends that non-intrusive survey methods, such as point counts, be used to determine whether migratory birds are breeding in the area where the activity is planned. If signs of nesting or breeding are detected, ECCC recommends:

- halt all disruptive activities,
- avoid disturbing surrounding vegetation,
- protect the nest with a buffer zone,
- avoid the immediate area until the young have left the vicinity of the nest
- avoid, adapt, reschedule or relocate planned activities

Additional information on avoiding harm to migratory birds is available on our website. Specifically, the following pages may provide information of use to you:

- Published general nesting periods support planning activities;
- The nesting calendar query tool; and,
- Technical information for how to determine the presence of a nest.

This advice does not provide an authorization for harming or killing migratory birds or for the disturbance, destruction or taking of nests or eggs under the MBR. It does not provide a guarantee that implementing the recommended measures will avoid contravening the MBR or other federal, provincial or municipal regulations, laws and bylaws because each situation must be assessed individually. The guidance provided is not intended to be relied on as official advice concerning the legal consequences of any specific activity. It is not a substitute for the MBCA, the MBR, or any other legislation.

If, after reviewing the information on our website, you have additional questions please contact us via e-mail (ec.faune.ontario-wildlife.ontario.ec@canada.ca) or telephone (613-990-8355).

Yours sincerely,

Lesley Dunn,
Regional Director
Canadian Wildlife Service, Ontario Region

Cc:

Elyse Howat, Permit and Regulations Biologist, Canadian Wildlife Service-Ontario Region
Ewen Eberhardt, Manager, Regulatory Affairs, Canadian Wildlife Service-Ontario Region

Administration Centre: 400 Clyde Road, P.O. Box 729 Cambridge, ON N1R 5W6

Phone: 519-621-2761 Toll free: 1-866-900-4722 Fax: 519-621-4844 www.grandriver.ca

May 15, 2020

Ken Brisbois
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener ON N2G 4J3
kbrisbois@regionofwaterloo.ca

Re: Municipal Class Environmental Assessment – Schiefele Bridge
Northfield Drive East and Conestogo River, Conestogo
Township of Woolwich

Dear Mr. Brisbois,

The Grand River Conservation Authority (GRCA) has received the Notice of Commencement for the above-noted Class Environmental Assessment (Class EA).

The study area contains the Conestogo River, two unnamed tributaries, and their associated floodplains, riverine valleys, and wetlands. As the Class EA may propose measures that have the potential to impact these regulated features, the GRCA wishes to stay involved as the EA process moves forward.

Please include the GRCA on the project mailing list. If you have any questions or require additional information, please contact me at 519-621-2763 ext. 2292 or theywood@grandriver.ca.

Sincerely,

Trevor Heywood
Resource Planner
Grand River Conservation Authority

Attachment

c.c. Garry Leveck, Stantec

Administration Centre: 400 Clyde Road, P.O. Box 729 Cambridge, ON N1R 5W6

Phone: 519-621-2761 Toll free: 1-866-900-4722 Fax: 519-621-4844 www.grandriver.ca

June 7, 2021

Ken Brisbois
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener ON N2G 4J3
kbrisbois@regionofwaterloo.ca

Re: Municipal Class Environmental Assessment – Schiefele Bridge
Northfield Drive East and Conestogo River, Conestogo
Township of Woolwich

Dear Mr. Brisbois,

The Grand River Conservation Authority (GRCA) has received the notice and materials from Public Consultation Centre #1 for the above-noted Class Environmental Assessment (Class EA).

The study area contains the Conestogo River, an unnamed tributary, and their associated floodplains, riverine valleys, and wetlands. We now understand that a full replacement of the structure is being considered, which has the potential to significantly impact these regulated features. As such, we wish to provide the following comments as the Region evaluates both alignment and cross-sectional alternatives for the replacement:

1. A new bridge could potentially impact the hydraulic and ecological functions of the Conestogo River, its associated floodplain and the unnamed tributary. As per GRCA's policies for watercourse crossings (9.1.2) and public infrastructure in floodplains (8.1.15), the bridge should be designed to:
    a. Limit hydraulic or fluvial impacts, and not impact upstream or downstream floodplain elevations;
    b. Avoid, and where unavoidable, minimize intrusions on significant natural features or hydrologic or ecological functions. Where intrusions occur, features / functions are restored and enhanced;
    c. Avoid any bends in the river to the extent practical,
    d. Take advantage of existing impacted or open areas on the channel bank or valley slope, wherever possible;
    e. Not inhibit fish passage; and,

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f. Minimize maintenance requirements.

We note that while impacts to aquatic species and habitat are captured, impacts to the river, tributary and floodplain are not included in the evaluation criteria. We would ask that this is considered going forward, as it will be a key consideration in reviewing the GRCA permit application for the preferred alternative.

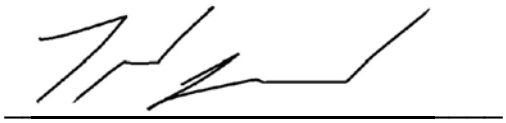
2. The potential hydraulic impacts of the bridge replacement should be verified through HEC-RAS modelling and analysis. Please reach out to the GRCA to obtain a copy of the approved HEC-RAS model for this reach of the river. The analysis will be required as part of detailed design, but we recommend doing preliminary modelling to ensure that the selected alternative can meet GRCA policy requirements.

3. GRCA's wetland policies depend on a wetland's characteristics. We would ask the Region to provide any preliminary characteristics of the wetland present in the study area (e.g. size, origin, features) so that we can confirm what policy requirements apply. Please refer to GRCA policies 8.4.4-8.4.7 for more info.

4. Based on the above, we agree that Design Alternative 1 would have the highest impact on wetlands. We also believe it would have the highest impact on the unnamed Conestogo River tributary originating from the East / Labrador Drive area. Impacts from Design Alternatives 2 and 4 would range from medium to low depending on the detailed design and final alignment of the approaches.

Please continue to consult the GRCA on the project. We would appreciate any opportunity to review and comment on the preliminary preferred alternative. If you have any questions or require additional information, please contact me at 519-621-2763 ext. 2292 or theywood@grandriver.ca.

Sincerely,



Trevor Heywood
Resource Planner
Grand River Conservation Authority

c.c. Garry Leveck, Stantec

Administration Centre: 400 Clyde Road, P.O. Box 729 Cambridge, ON N1R 5W6
Phone: 519-621-2761 Toll free: 1-866-900-4722 Fax: 519-621-4844 www.grandriver.ca

May 31, 2021

Ken Brisbois
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener ON N2G 4J3
kbrisbois@regionofwaterloo.ca

Re: Municipal Class Environmental Assessment – Schiefele Bridge
Northfield Drive East and Conestogo River, Conestogo
Township of Woolwich

Dear Mr. Brisbois,

The Grand River Conservation Authority (GRCA) has received the notice and materials from Public Consultation Centre #2 for the above-noted Class Environmental Assessment (Class EA).

The study area contains the Conestogo River and two unnamed tributaries, as well as their associated floodplains, riverine valleys, and wetlands. We have reviewed the preferred alignment and cross-section alternatives for the bridge replacement, and wish to provide the following comments.

1. A new bridge could potentially impact the hydrologic and ecological functions of the resource features noted above. While the proposed replacement is mostly within the area of the existing bridge, the Class EA must speak to how the preferred alternative alignment / cross-section meets GRCA's policies for watercourse crossings (9.1.2) and alterations (9.1.16), as well as public infrastructure in floodplains (8.1.15) and wetlands (8.4.6-8.4.7).

2. A floodplain analysis must demonstrate that hydraulic / fluvial impacts of the new bridge are limited, and the flooding hazard is not exacerbated upstream or downstream. This should be confirmed through HEC-RAS modelling and analysis.

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3. Wetlands will be impacted by the new alignment. As such, an environmental impact study (EIS) will be required as part of the Class EA. We request that wetland boundaries are verified in the field to assist the Region in quantifying and characterizing the impacted wetlands. The EIS should then demonstrate:
    a. Avoiding, and where unavoidable, minimizing intrusions on significant natural features or hydrologic / ecological functions; and,
    b. Where intrusions occur, features / functions are restored and enhanced through a restoration plan.

4. During detailed design, we will require plans that show construction staging, erosion and sediment controls, and temporary works (e.g. isolation / dewatering). Cofferdams must be designed to hold back flows from the 2 year flood event with some freeboard. If a significant portion of the channel will be obstructed resulting in increased flood elevations to design storms, it should be included in the hydraulic analysis and the cofferdam height adjusted accordingly.

5. Please note that this bridge is downstream of our Conestogo Dam. Prior to construction, we will request site contacts and construction scheduling to notify personnel of significant outflows and forecasted flooding. We will also request a contingency plan or appropriate notes for work / equipment in or near the water.

Advisory Comments

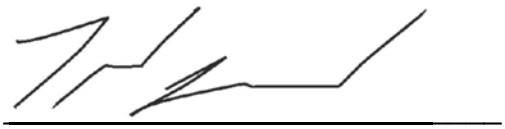
A. We recommend no in-water work from March 15 to June 30, however this is advisory, and the window must be approved by Fisheries and Oceans Canada (DFO). We are aware that DFO previously requested a more restrictive window for no in-water work from March 15 to July 15 for another bridge project two kilometres downstream (Conestogo Bridge).

B. The lower reach of the “eastern tributary”, the eastern watercourse adjacent to the bridge, is currently enclosed for 150 metres. The westward shift of the alignment may present an opportunity to daylight this watercourse and introduce other enhancements within the current right-of-way after the new bridge is built.

C. The Public Consultation Centre materials state that there were no comments from the public related to architectural enhancements. We would offer that the Grand River and its major tributaries have national status as Canadian Heritage Rivers, and the project team may find inspiration by reviewing *Arch, Truss & Beam: The Grand River Watershed Heritage Bridge Inventory* (University of Waterloo, March 2013).

Please continue to consult the GRCA on the project. If you have any questions or require additional information, please contact me at 519-621-2763 ext. 2292 or theywood@grandriver.ca.

Sincerely,



Trevor Heywood
Resource Planner
Grand River Conservation Authority

c.c. Garry Leveck, Stantec

From:	Straus, Melissa
To:	Straus, Melissa
Subject:	FW: SCHEIFELE BRIDGE CLASS EA: NATURAL ENVIRONMENT IMPACT ASSESSMENT STUDY
Date:	Tuesday, October 4, 2022 3:06:32 PM

From: Ken Brisbois <KBrisbois@regionofwaterloo.ca>
Sent: Wednesday, February 3, 2021 10:35 AM
To: Leveck, Garry <Garry.Leveck@stantec.com>
Subject: RE: SCHEIFELE BRIDGE CLASS EA: NATURAL ENVIRONMENT IMPACT ASSESSMENT STUDY

Hi Garry,

Please see some comments Jane G.

Thanks,

Ken

From: Jane Gurney <JGurney@regionofwaterloo.ca>
Sent: February 3, 2021 10:06 AM
To: Ken Brisbois <KBrisbois@regionofwaterloo.ca>
Subject: RE: SCHEIFELE BRIDGE CLASS EA: NATURAL ENVIRONMENT IMPACT ASSESSMENT STUDY

Hi Ken,
Below are some comments for consideration in the Scheifele Bridge Class EA Natural Environment Impact Assessment Study. If the consultants have any questions or concerns or would like to discuss any of these further, please feel free to pass along my contact information and I am happy to discuss.

- 2.1.3 – should dates around MBCA be included to ensure no disturbance during critical periods?
- Page 10, interpretation of 2.2.2 is not consistent with our understanding and application of the NHS. As provided previously, and appended to the report, the policies of the NHS do apply, and as such the last sentence of the first paragraph of Section 2.2.2 should be deleted or corrected.

- The assessment of the NHS policies is also not consistent with our interpretation of the Growth Plan policies. Infrastructure that is authorized through an EA is permitted within and adjacent to the NHS in accordance with Section 4.2.3.1.c) of the Growth Plan.

- Page 5.4, Section 5.8.1 identifies area as part of Provincial Greenbelt System, but this is incorrect, it is within the Natural Heritage System of the Growth Plan, not the Greenbelt System.

- Section 7.0 – last sentence “Where direct impacts to SAR habitat or are expected to occur…”

- Ideally, the Region’s Greenlands Network Implementation Guide should be referenced and included in the list of references.

Jane E. Gurney, RPP, MCIP, AICP
Principal Planner
Community Planning
Region of Waterloo
Mobile: 519-589-6921
Office: 519-575-4500 Ext. 3454
JGurney@regionofwaterloo.ca

From: Ken Brisbois <KBrisbois@regionofwaterloo.ca>
Sent: December 3, 2020 10:11 AM
To: Jane Gurney <JGurney@regionofwaterloo.ca>
Subject: FW: SCHEIFELE BRIDGE CLASS EA: NATURAL ENVIRONMENT IMPACT ASSESSMENT STUDY

Hi Jane – Hope you are well.

Would you typically review these and provide any comment prior to finalizing?

Thanks,

Ken

Ken Brisbois
Project Manager - Transportation Engineering
Design & Construction Division of Transportation & Environmental Services
Regional Municipality of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3
519-575-4606 (Desk)
519-240-2995 (Cell)
kbrisbois@regionofwaterloo.ca

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From: Leveck, Garry <Garry.Leveck@stantec.com>
Sent: December 2, 2020 4:52 PM

To: Ken Brisbois <KBrisbois@regionofwaterloo.ca>
Cc: Cameron, Melissa <Melissa.Cameron@stantec.com>
Subject: SCHEIFELE BRIDGE CLASS EA: NATURAL ENVIRONMENT IMPACT ASSESSMENT STUDY

Hi Ken:

Further to our recent conversation, I attach a copy of Stantec's Natural Environment Impact Assessment Study for the Scheifele Bridge Class EA.

This is for your personal perusal and comment, as well as forwarding to the appropriate Region of Waterloo representative of EEAC.

We look forward to any feedback from EEAC or yourself.

Best regards.

GARRY

Garry E. Leveck, P. Eng.
Senior Consultant
Senior Project Manager

Direct: 519 585-7316
Mobile: 519 240-3686
Fax: 519 579-6733
Garry.Leveck@stantec.com

Stantec
100-300 Hagey Boulevard
Waterloo ON N2L 0A4

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Appendix D Photolog

Photo D1: Downstream (east) side of Scheifele Bridge, facing south, from northern mid-channel gravel bar.

Photo D2: Downstream (east) side of Scheifele Bridge, facing south, from Bridge deck. Note large northern and smaller southern mid-channel gravel bars downstream from piers

Photo D3: Downstream (east) side of Scheifele Bridge, facing west, from south side of the Conestogo River.

Photo D4: Downstream (east) side of Scheifele Bridge, facing northwest, from south side of the Conestogo River.

Photo D5: Downstream (east) side of Scheifele Bridge, facing west, from north side of the Conestogo River.

Photo D6: Downstream (east) side of Scheifele Bridge, facing northwest from north side of Conestogo River.

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Photo D7: Downstream (east) side of Scheifele Bridge northern abutment, facing north from mid-channel bar.

Photo D8: Downstream (east) side of Scheifele Bridge, facing south from mid-channel bar.

Photo D9: Eroding bank on the northeast side of Scheifele Bridge, facing east.

Photo D10: Substrate from the downstream (east) side of Scheifele Bridge on the south side of the Conestogo River.

Photo D11: Substrate from the downstream (east) side of Scheifele Bridge on the north side of the Conestogo River.

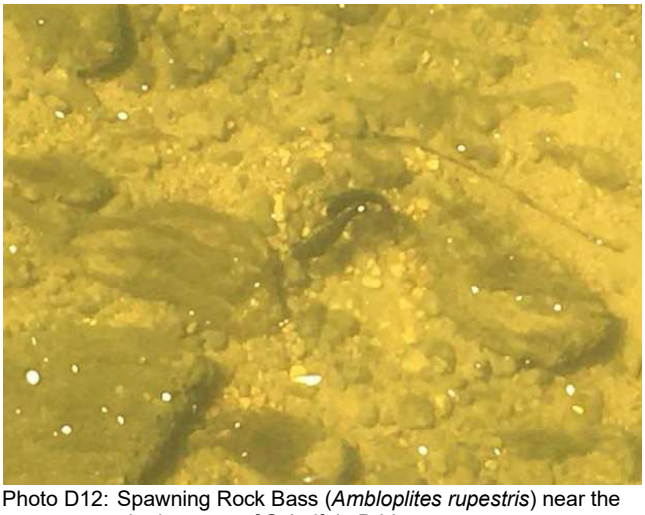

Photo D12: Spawning Rock Bass (*Ambloplites rupestris*) near the north abutment of Scheifele Bridge.

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Photo D13: Shoreline at upstream (west) side of Scheifele Bridge on the north bank, facing east.

Photo D14: Shoreline at upstream (west) side of Scheifele Bridge on the north bank, facing west.

Photo D15: Upstream (west) side of Scheifele Bridge, facing north (upstream) from the bridge deck.

Photo D12: Upstream (west) side of Scheifele Bridge, facing northeast (upstream) from the bridge deck.

Photo D13: Upstream (west) side of Scheifele Bridge, facing northeast (upstream) from the bridge deck.

Photo D18: Upstream (west) side of Scheifele Bridge, facing south from the north shore of the Conestogo River.

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Photo D19: Upstream (west) side of Scheifele Bridge, facing north from a mid-channel bar of the Conestogo River.

Photo D20: Substrate from the upstream (west) side of Scheifele Bridge on the north side of the Conestogo River.

Photo D21: Substrate from the upstream (west) side of Scheifele Bridge in the middle of the Conestogo River. Note the adult snapping turtle (*Chelydra serpentina*).

Photo D14: Substrate from the upstream (west) side of Scheifele Bridge on the south side of the Conestogo River.

Photo D23: Confluence of Western Tributary to the Conestogo River, facing south, 50 m upstream from Scheifele Bridge.

Photo D24: Dry channel of the Western Tributary to the Conestogo River, facing south (upstream).

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Photo D25: Dry eastern branch of the Western Tributary to the Conestogo River, facing northwest (downstream) toward the Conestogo River.

Photo D26: Western branch of the Western Tributary to the Conestogo River, facing north (downstream) toward the Conestogo River.

Photo D27: Grassed wetland drained by the Western Tributary to the Conestogo River, facing south.

Photo D28: Confluence of Eastern Tributary to the Conestogo River, facing east, 25 m downstream from Scheifele Bridge.

Photo D29: Flowing channel of the Eastern Tributary to the Conestogo River, facing south (upstream).

Photo D30: Flowing channel of the Eastern Tributary to the Conestogo River, facing north (downstream) toward the Conestogo River.

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Photo D31: Collapsed corrugated steel culvert that is the origin of the Eastern Tributary to the Conestogo River.

Photo D32: Area upstream from collapsed culvert, facing south, confirming no surface features beyond 35 m upstream from the Conestogo River on the Eastern Tributary.

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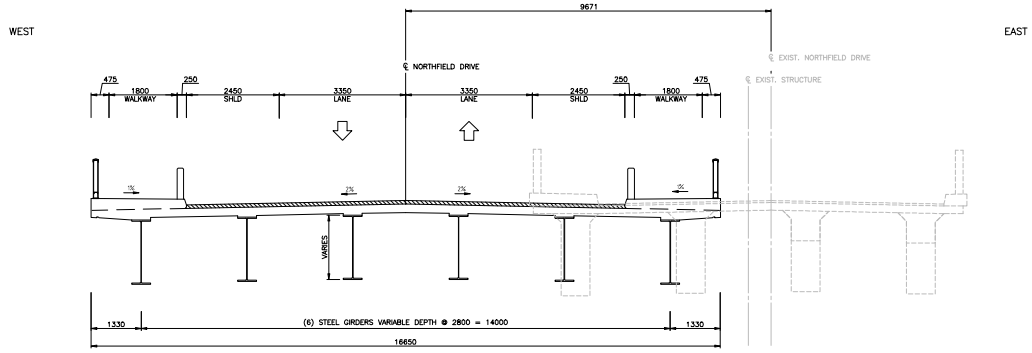
Appendix E Recommended Preferred Bridge Cross Section Design Concept



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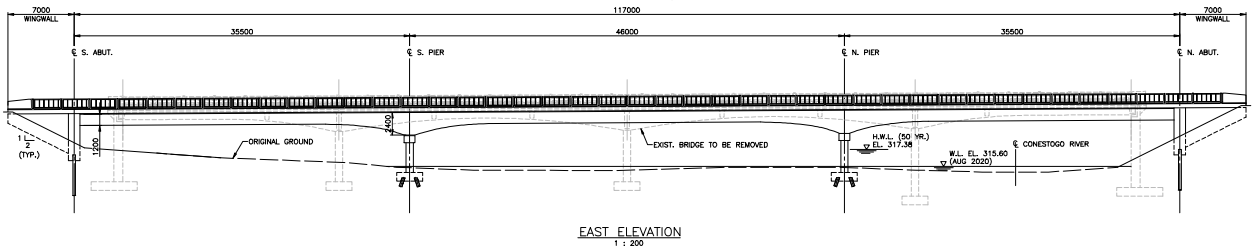
1 : 50



EAST ELEVATION
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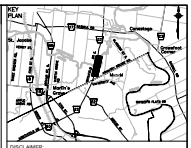
KEY PLAN



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No.	Description	Int	Date
No.	ISSUE/REVISION	BY	DATE

SCHEIFELE BRIDGE REPLACEMENT
CLASS ENVIRONMENTAL ASSESSMENT

TOWNSHIP OF WOOLWICH

ALTERNATIVE BRIDGE DESIGN
CONCEPT 3
3 SPAN HAUNCHED STEEL PLATE GIRDER STRUCTURE

DRAWN BY: H.L.	CONTRACT No. N/A
CHECKED BY: A.F.	FILE No. 1650-10600
DATE: 2022-02-16	DRAWING No. -
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Scheifele Bridge Replacement, Fluvial Geomorphological Assessment – Conestogo River

November 2, 2022

Prepared for:

Regional Municipality of Waterloo
150 Frederick Street
Kitchener, ON N2G 4J3

Prepared by:

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON, N2L 0A4

Project No. 165010600

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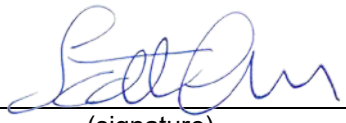
Prepared by 
(signature)

Scott Cowan, P.Geo., CTech
Fluvial Geomorphologist

Reviewed by
(signature)

Heather Amirault, P.Eng.
Water Resources Engineer

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1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) has been retained by the Region of Waterloo, to conduct a fluvial geomorphological assessment in support of the proposed Scheifele Bridge replacement. The proposed bridge alignment will be shifted slightly west (upstream) and will have a wider span and width than the existing bridge. Additionally, it will contain two piers compared to the current three piers on the existing structure.

The following report documents the fluvial geomorphological assessment completed within the Study Area in support of the proposed Scheifele Bridge replacement. The Study Area is outlined in the existing conditions figure in Appendix A (Figure 1).

1.1 SCOPE OF WORK

The scope of this assessment involved various desktop and field components. The tasks completed within the Study Area included:

i. Review background information including topographic mapping, land use mapping, and historic aerial photographs;

ii. fluvial geomorphological site assessment to document existing conditions; and

iii. discussion on riverbank stabilization and other considerations for detailed design.

2.0 BACKGROUND REVIEW

2.1 TOPOGRAPHY

Topographic mapping (1 m contours) provided by the Region of Waterloo Open Data was reviewed to understand the topographic setting within the Study Area. Downstream of the existing Scheifele Bridge the Conestogo River (the River) meanders through a relatively flat floodplain. Upstream of the existing Scheifele Bridge, the River has access to a large floodplain along the right bank (looking downstream), and a narrow floodplain bench along the left bank (looking downstream). The floodplain bench is confined by a valley wall approximately 20 m north of the River.

2.2 WATERSHED

The River watershed drains approximately 820 km^2. The land use within the watershed is largely made up of agricultural lands (83%) with only a small portion designated as community/ infrastructure (4%) (OMNRF, 2020). Land use has remained relatively constant over the period of record as shown by available aerial imagery; however, development in the north end of Waterloo, south of the site has increased over the period of record.

2.3 HISTORICAL ANALYSIS

A sequence of historic aerial photographs (1966, 2000 and 2018) were reviewed to gain insight into channel form and to identify any changes that have occurred during the period of record (1966 to 2018). Within the Study Area, the River is nested within a floodplain that is vegetated with dense shrubs and grasses and some mature trees along the bank slopes. The riparian vegetation within the Study Area has remained relatively unchanged over the period of record. The River has maintained a similar planform within the Study Area during the period of record with no observed evidence of river realignment and/or bank stabilization works.

Within the Study Area the formation, morphological change, and removal of bar features is observed throughout the period of record. These features include mid-channel bars and a lateral bar attached to the right bank. A summary of the observed changes in bar formations and flow paths is provided in Table 1 below.

Table 1: Summary of the observed changes in bar formations and flow paths within the Study Area (1966-2018)

Year (Source)	Image Quality	Observed Changes in Bar Formations and Flow Paths
1966 (National Air Photo Library)	Black and white. medium resolution	• Several poorly defined mid-channel bars are observed upstream and downstream of the existing Scheifele Bridge. • A lateral bar is observed attached to the right bank of the River. The lateral bar extends downstream for approximately 130 m from the outlet of the drainage feature located immediately upstream of the bridge. The lateral bar extends approximately 20 m laterally into the River. • The main flow path of the River is observed to be mid-River.
2000 (Region of Waterloo – Open Data)	Black and white. medium resolution	• A well-defined mid-channel bar is observed approximately 60 m upstream of the existing Scheifele Bridge. The bar is approximately 150 m long 50 m wide. Vegetation on the mid-channel bar appears to be establishing. • The upstream mid-channel bar splits the flow during low flow conditions. The main flow path of the River is observed along the north margin of the River, parallel to the left bank. A secondary flow path is observed along the southern margin of the River, parallel to the right bank. • A lateral bar is attached to the right bank (looking downstream) of the river. The lateral bar extends downstream for approximately 130 m from the outlet of the drainage feature located immediately upstream of the bridge. The lateral bar extends approximately 30 m laterally into the River. • A small mid-channel bar (approximately 20 m long a 5 m wide) is observed immediately downstream of the existing Scheifele Bridge. It lacks vegetation cover.
2018 (Region of Waterloo – Open Data)	Colour. High resolution image.	• Upstream expansion and narrowing of the mid-channel bar upstream of the existing bridge is observed. The bar is approximately 180 m long and 40 m wide. Grasses are well established on the bar, with some shrubs. • The upstream mid-channel bar continues to split low flows. The main flow path of the River is observed along the north margin of the River, parallel to the left bank. The secondary flow path is smaller in dimension as result of the expansion of the mid-channel bar. • A lateral bar attached to the right bank of the river appears similar in dimension from 2000. The lateral bar appears to be vegetated with grasses. • Two mid-channel bars are observed immediately downstream of the existing Scheifele Bridge. The smaller of the two bars is approximately 20 m long and 5 m wide. The larger of the two bars is approximately 70 m long and 20 m in width.

3.0 SITE OBSERVATIONS

Existing site conditions were observed during site visits completed by Stantec on November 9, 2020. A summary of the reach characteristics observed is provided in the following sections. Typical photographs are provided in Appendix B.

3.1 STUDY AREA

The River within the study area exhibits low entrenchment, riffle-pool bed morphology, a naturally sinuous planform with low banks, and good floodplain access along both banks (unconfined). The riparian corridor is dominated by shrubs and grasses with some mature trees. Paths have been cut through the riparian area for recreational activities such as horseback riding. Agricultural lands are located within the floodplain beyond the riparian corridor on both banks. The river appeared to be generally stable, and there did not appear to be excessive degradation or aggradation within the channel. Visual observation indicates that the bank material within the reach consists of sandy loam and the bed material is primarily gravel and cobbles.

3.2 BRIDGE CROSSING

To identify the existing site conditions within the immediate vicinity of the existing bridge crossing, an assessment of the channel along the right and left bank both upstream and downstream of the existing bridge was completed. The sections below describe observations per quadrant. A figure summarizing existing observed conditions is provided in Appendix A (Figure 1). Photographs from the site visit are included in Appendix B.

3.2.1 Southwest Quadrant

Located between the existing Scheifele Bridge and an abandoned pier there is a drainage feature that is comprised of soft cohesive material and vegetated heavily with aquatic plants. The abutment of the existing bridge is located approximately 10-15 m from the right bank of the river. At the time of assessment, no flow was going through the right span. The major flow path of the River is located adjacent to the left bank. A lateral bar is attached to the right bank of the river, indicating a relatively low energy environment along the southern margin of the river. The lateral bar extends from the outlet of the drainage feature located immediately upstream of the bridge. The lateral bar blocks moderate flows from being conveyed between the existing bridge abutment and the southernmost pier. Within the southwest quadrant, the right bank of the creek appears to be stable and well vegetated with moderate slopes.

3.2.2 Northwest Quadrant

The main flow path of the Conestogo River travels adjacent to the left bank within the immediate vicinity of the existing bridge crossing. The left bank within the northwest quadrant exhibits evidence of erosion (i.e., steep gradient with low-density vegetation and exposed soils) extending approximately 60 m

upstream of the existing bridge. Visual observation indicated that the bank material consists of firm sandy loam. Vegetation on banks and riparian area is mostly grasses with some milkweeds and small shrubs directly adjacent to the bridge. Upstream of the eroding bank, the riverbank becomes less steep, and a few deciduous trees were present. The abutment on the left bank is located within the river.

3.2.3 Southeast Quadrant

Immediately downstream of the bridge there is a large depositional feature that is well vegetated with cattails. Banks are vegetated with shrubs and woody vegetation than the left bank. At the time of site observation, the downstream right bank was well vegetated with a shallow slope. Approximately 90 m downstream of the existing bridge, bank erosion was observed along the outside bend of a meander bend. This erosion along this bend does not currently present a risk to the existing Scheifele Bridge.

3.2.4 Northeast Quadrant

The left bank immediately downstream of the bridge is approximately 2 m high with some soil loss noted behind the abutment. Approximately 15 m downstream of the bridge, the bank height decreases, and bank slopes are shallow with good floodplain access. Some horse trails were noted along the bank. The point bar along the left bank approximately 120 m downstream of the bridge was vegetated with small shrubs and contained loose gravel and cobble.

4.0 PREFERRED ALTERNATIVE

The existing Scheifele Bridge is proposed to be replaced by an approximately 117.0 m long, 16.65 m wide, and 5.0 m high concrete bridge which has a wider opening and one less pier. The north abutment will be located approximately 6.5 m further inland from the left bank of the river and the south abutment will be located approximately 5.0 m further inland from the right bank of the river. The two piers are proposed to be positioned outside of the existing main flow path of the River. The main flow path is expected to be maintained between the north pier and the north abutment.

4.1 DESIGN CONSIDERATIONS

4.1.1 Bank Stabilization

Continued erosion of the left bank has the potential to result in future interaction between the River and the north abutment. Subsequently, bank stabilization is recommended along the left bank, extending for a total length of approximately 120 m as shown in Figure 2 in Appendix A. The bank stabilization should tie into stable portions of existing riverbank at the upstream and downstream limits. To minimize the in-water footprint of the stabilization work, it is recommended that the bank treatments extend from the existing river toe to the elevation of the existing top of bank.

To provide improved riparian habitat, in areas outside of the proposed bridge footprint, it is recommended that bank stabilization be completed with vegetated stone bank protection. Vegetated stone bank protection is a system that consists of the placement of stone and plantings to protect against channel degradation and widening. The incorporation of plantings within the treatment increases the effectiveness of the stone placement by forming a living root mat within the treatment. Over time, the implementation of plantings will set in place a broad range of habitat enhancement opportunities, be aesthetically pleasing, and have natural streambank appearance. Ecologically, this approach provides shade over the area, providing cover for improved aquatic and terrestrial habitat.

Within the bridge footprint, vegetation is unlikely to establish because of limited sunlight. Subsequently, rock bank protection is recommended in this area. The approximate locations of the recommended bank treatments are provided in Figure 2 in Appendix A. The footprint and limits of the bank protection treatment are subject to refinement during detailed design.

The right bank was observed to be stable and well-vegetated with moderate slopes at the proposed crossing location. Additionally, erosion of this bank was not observed during the historic air photo record. Assuming that no significant channel modifications are required to support the implementation of the new bridge, stabilization of the right bank is not recommended.

4.1.2 Riverbed Stabilization

It is understood that the existing bridge piers may be removed as part of this project. If the existing bridge piers are removed, the riverbed may require stabilization within the footprint of the pier removal work area. As a result, riverbed stabilization may be required during detailed design and shall consider substrate stability and regulatory requirements.

5.0 SUMMARY

Stantec Consulting Ltd. (Stantec) has been retained by the Region of Waterloo to conduct a fluvial geomorphological assessment in support of the proposed Scheifele Bridge replacement. The proposed bridge alignment will be shifted slightly west (upstream) and will have a wider span and width than the existing bridge. Additionally, it will contain two piers compared to the current three piers on the existing structure.

A fluvial geomorphological assessment was completed for the River within the Study Area, including the completion of a site assessment and a historical aerial photograph review. The results of the fluvial geomorphological assessment indicate that the left bank (looking downstream) within the immediate vicinity of the proposed bridge crossing is prone to bank erosion.

In support of the implementation of the proposed bridge, bank stabilization measures are recommended along the left bank (looking downstream) of the River for a length of approximately 120 m. Lastly, the riverbed may require stabilization within the footprint of the pier removal work areas. The need for riverbed stabilization should be investigated during detailed design

6.0 REFERENCES

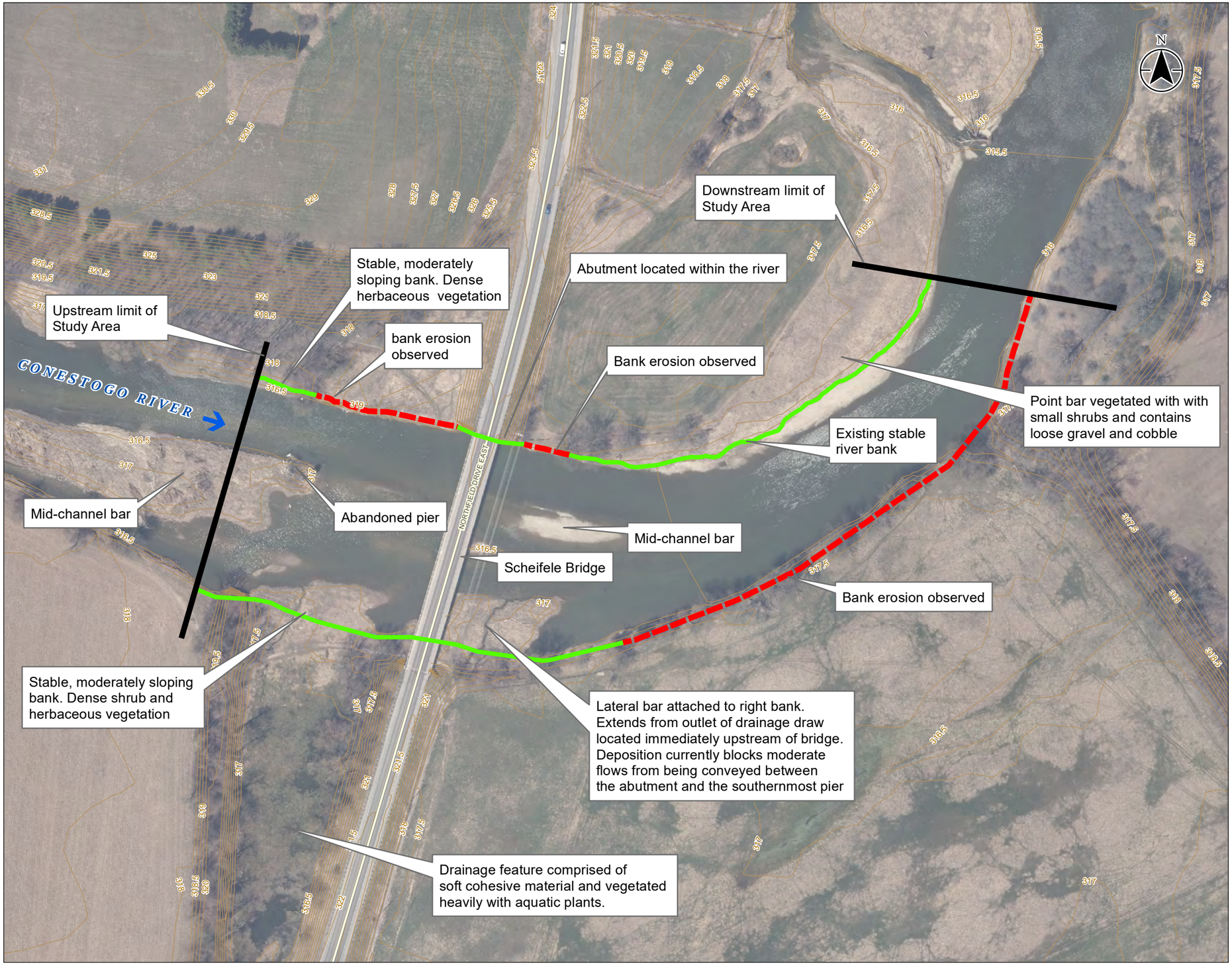
Ontario Ministry of Natural Resources and Forestry (OMNRF), 2002. Technical Guide – River and Stream Systems: Erosion Hazard Limit.

Ontario Ministry of Natural Resources and Forestry (OMNRF), 2020. Ontario Watershed Information Tool.

Toronto and Region Conservation Authority (TRCA), 2004. Belt Width Delineation Procedures.

APPENDIX A

FIGURES



Stantec

Legend

- Limits of Study Area
- Major Road
- Contours (1m)

Top of Bank (2018)

- Stable Bank
- Eroding Bank

50 25 0 50 Meters

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Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2021.
3. Orthoimagery from Region of Waterloo, Open Data, 2018
4. Contours from the Region of Waterloo
5. Top of bank (2018) estimated from orthoimagery.

Project Location
Region of Waterloo

165010600

Client/Project
REGIONAL MUNICIPALITY OF WATERLOO
SCHEIFELE BRIDGE RECONSTRUCTION
FLUVIAL GEOMORPHOLOGICAL ASSESSMENT

Figure No.
1

Title
STUDY AREA AND SITE OBSERVATIONS

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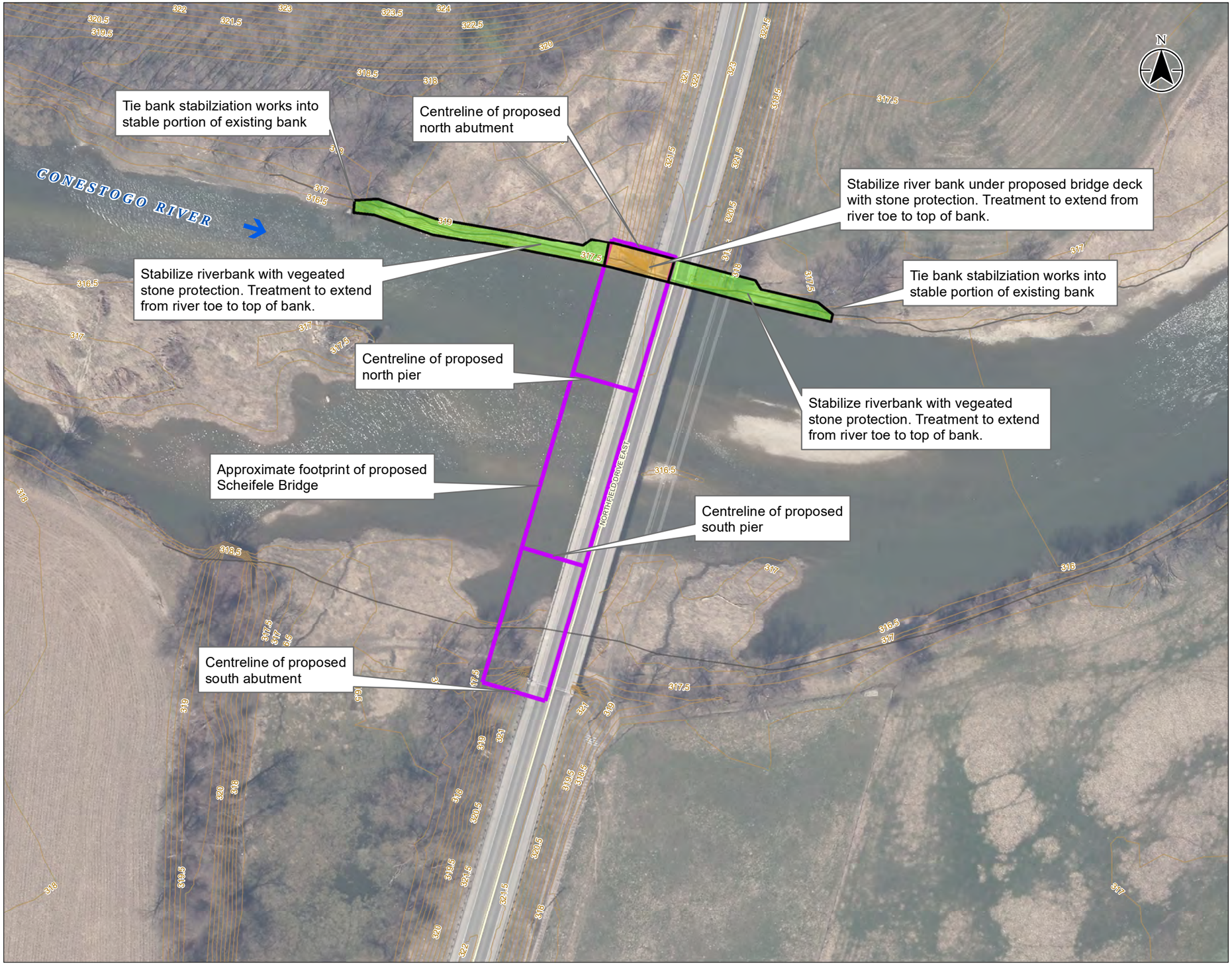

Stantec

Legend

- Major Road
- Contours (1m)
- Proposed Stone Bank Stabilization
- Proposed Vegetated Stone Bank Stabilization
- Proposed_Bridge
- Top of Bank (2018)

25 12.5 0 25 Meters

1:1,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2021.
3. Orthoimagery from Region of Waterloo, Open Data, 2018
4. Contours from the Region of Waterloo
5. Top of bank (2018) estimated from orthoimagery

Project Location
Region of Waterloo

165010600

Client/Project
REGIONAL MUNICIPALITY OF WATERLOO
SCHEIFELE BRIDGE RECONSTRUCTION
FLUVIAL GEOMORPHOLOGICAL ASSESSMENT

Figure No.
2

Title
PROPOSED SCHEIFELE BRIDGE AND RIVERBANK STABILIZATION

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APPENDIX B

PHOTO APPENDIX

Stantec

CONESTOGO RIVER – DOWNSTREAM OF SCHEIFELE – NOV 9, 2020

Figure 1: Looking upstream at existing Scheifele Bridge. Mid-channel bar extending from downstream side of existing pier

Figure 2: Looking at the right bank on the downstream side of the bridge. Stable, well-vegated

Figure 3: Looking at the left bank on the downstream side of the bridge. Bank erosion on left bank immediately downstream of abutment

Figure 4: Looking downstream from the right bank.

Figure 5: Looking downstream from the left bank.

Figure 6: looking upstream at south abutment. No low flow access between abutment and pier

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CONESTOGO RIVER – UPSTREAM OF SCHEIFELE BRIDGE – NOV 9, 2020

Figure 7: Looking downstream at Scheifele Bridge.

Figure 8: Looking upstream from Scheifele Bridge.

Figure 9: Looking upstream at the right bank. Stable, well-vegetated, depositional

Figure 10: Looking upstream at the left bank. Bank erosion observed

Figure 11: Looking upstream, bank erosion observed along left bank.

Figure 12: Looking downstream at north abutment in main channel

Stantec Consulting Ltd.
100-300 Hagey Boulevard, Waterloo ON N2L 0A4

November 3, 2022
File: 1650-10600

Attention: Mr. Trevor Heywood
Grand River Conservation Authority
400 Clyde Road
Cambridge ON, N1R 5W6

Dear Mr. Heywood,

Reference: Scheifele Bridge Replacement - Hydraulic Analysis

The following hydraulic analysis has been completed in support of the proposed bridge replacement of Scheifele Bridge located on Northfield Drive East over the Conestogo River between University Avenue and Sawmill Road in the Township of Woolwich, Ontario. The Proposed bridge alignment will be shifted slightly west (upstream) and will have a wider span and width than the existing bridge. Additionally, it will contain two piers compared to the current three piers on the existing structure. The following letter documents the hydraulic analysis and results of the proposed Scheifele Bridge replacement.

1.0 DESIGN CRITERIA

The design of watercourse crossings in Ontario is influenced by several design criteria. Although this road is not a provincial highway, the following criteria used by the Ministry of Transportation of Ontario (MTO) can be used to evaluate existing water crossings and to design future crossings. Additionally, flood level increases upstream or downstream of the proposed structure will be checked to ensure no negative impacts to adjacent lands occur.

1.1 DESIGN FLOOD

Northfield Drive East is classified as an arterial road through the project area. In accordance with MTO Highway Drainage Design Standards (HDDS, 2008, WC-1) for urban arterials, structures less than 6 m wide should be designed to pass the 2% flood (2% probability of occurrence in a given year or a 50-year return period) and structures greater than 6 m wide should be designed to pass the 1% flood (100–year return period). Since the span of the existing structure is less than 6 m, the 2% flood was used for design purposes. A flow of 130% of the 1% flood (100-year return period) was used as the check flow for scour (HDDS, 2008, WC-1).

1.2 FREEBOARD

MTO design criteria specify that freeboard shall not be less than 1.0 m for highways, arterials, and collector roads unless otherwise approved (HDDS, 2008, WC-7). Freeboard for culvert design is measured from the high-water level (design flood level) to the edge of the travelled lane (HDDS,2008, WC-7).

1.3 RELIEF FLOW

The fraction of the Regulatory Flow that bypasses the main structure at a water crossing by flowing over the roadway or through a relief culvert or bridge is called the Relief Flow. The Regulatory Flow is typically

calculated as the peak flow generated by the Regional Storm. The design of a water crossing shall incorporate passage of the Relief Flow over the roadway on Regulated Watercourses where Floodline Mapping is available, where there is a potential risk to public safety, or where there is potential damage to adjacent properties. Where Relief Flow is provided:

- The maximum depth of flow on the roadway shall not exceed 0.3 m.
- The product of the velocity and depth of flow on the roadway shall not exceed 0.8 m^2/s.

2.0 EXISTING BRIDGE

The existing Scheifele Bridge is an approximately 11.6 m wide, 6 m high, 109 m long concrete bridge that is supported by three piers and two abutments. The bridge includes two lanes of Northfield Drive as well as a sidewalk along the west side of the bridge.

2.1 UPDATED EXISTING CONDITIONS MODEL (GRAND RIVER CONSERVATION AUTHORITY MODEL)

The Grand River Conservation Authority (GRCA) provided Stantec with the latest HEC-RAS models for the Conestoga River through the study area at the onset of the project. The most current HEC-RAS model for the Scheifele bridge was prepared as part of a Dam break analysis of the Conestogo Dam (MTE, 2015), but contained unsteady flows produced through the dam break scenario and did not have the correct design and Regional flow rates. The GRCA also provided an older, non-georeferenced HEC-RAS model that contained appropriate design and Regional flows but appeared to represent a simplified design of Scheifele Bridge containing only one pier. As the dam break model provided a more accurate depiction of the Scheifele bridge and was properly geo-referenced, this model was used to create the existing conditions model for this analysis.

Using the project and geometry files from the Dam Break model, steady state flows and boundary conditions were taken from the older HEC-RAS model (containing the proper design and Regional flows) to create an updated existing model. Additionally, recent topographic survey along Northfield Drive was imported to the model to compare existing cross sections to as well as to allow for the addition and relocation of existing cross-sections.

Some additional model updates were performed, with a summary of all modifications to the original model below:

- Cross section terrain upstream and downstream of the Scheifele bridge were updated based on current topographic information.
- The road profile was updated based on current topographic information.
- Two new cross-sections upstream and one new section downstream were added in order to provide an accurate comparison of existing and proposed conditions. Additionally, this created a more accurate model around the bridge as the previous model cross-section spacing was too far from the structure outside of the bounding sections.
- Steady state flow values and boundary conditions from a previous GRCA provided model were added

- Manning's 'n' values were updated to be more representative of channel and overbank conditions in the vicinity of the Scheifele Bridge
- Ineffective flow areas were added in order to provide a more accurate representation of flow behavior around the bridge opening

In Table 1, below, the updated existing conditions model water levels and velocities for several locations around the bridge are provided.

Table 1: Updated Existing Conditions Model Hydraulic Analysis

Cross Section	Water Surface Elevation (m)			Velocity (m/s)		
	Design Flow	Check Flow	Regulatory Flow	Design Flow	Check Flow	Regulatory Flow
3771 - 56 m upstream of bridge	318.49	318.93	319.82	2.16	2.49	1.79
3745 – 30 m upstream of bridge	318.50	318.96	319.64	1.89	2.17	2.39
3721 – 6 m upstream of bridge	318.41	318.82	319.43	2.13	2.50	2.85
Scheifele Bridge	-	-	-	-	-	-
3687 – 16 m downstream of bridge	318.06	318.27	318.41	3.04	3.80	4.79
3674 – 29 m downstream of bridge	318.18	318.46	318.81	2.08	2.34	2.61

Comparing the exiting bridge conditions to MTO design standards summarized previously provides the following results.

- The design flow (2% probability of occurrence in a given year or a 50-year return period) water level is 318.41 m upstream of the bridge. The spill elevation of the road, based on available data is approximately 321.60 m. The clearance of the bridge was determined to be 1.70 from the water surface elevation to the soffit (bottom of the bridge). Freeboard modeled under existing conditions is 3.19 m, meeting MTO design criteria of 1 m. In addition, the check flow (130% of the 100-year return period) has a water level of 318.82 m upstream of the bridge which does not overtop the roadway at its low point of 321.60 m, also meeting MTO design criteria.
- The regulatory flow has a water level of 319.43 m upstream of the bridge and does not overtop the road, which meets MTO criteria. Therefore, there is no relief flow which also meets MTO criteria.

3.0 PROPOSED BRIDGE

The existing Scheifele Bridge is proposed to be replaced by an approximately 117.0 m long, 16.65 wide, and 5.0 m high concrete bridge which has a wider opening and one less pier that will reduce the flooding risk at Northfield Drive East.

3.1 PROPOSED CONDITIONS MODEL

The updated existing conditions HEC-RAS model as described above was updated to reflect the proposed widening of the Northfield Drive East section and replacement of Scheifele Bridge. Since Northfield Drive East will be widened under proposed conditions, Scheifele bridge was also widened and shifted westwards, resulting in 1 cross-section being removed from the model (3721) and a new upstream cross-section added (3735). In addition, the road profile was updated to match that of the proposed road. A single pier was removed in the proposed model and the remaining pier widths were increased from 0.6 m to 0.8 m. The opening was widened to 117.0 m and shifted westwards approximately 9.7 m and bridge grade was adjusted to 0.6%. Pedestrian railings were updated to match the proposed design; however, the style of railing is assumed to remain the same as under existing conditions.

The proposed conditions model showed a slight increase in water levels (approximately 0.05 m in the design storm) of the cross section immediately upstream of Scheifele Bridge when compared to the Updated Existing Conditions Model. However, these cross sections cannot be directly compared as they are in different locations due to the shifted nature of the new bridge. The remaining cross sections further upstream that are in the same location as the existing model, show lowered water surface elevations, which is to be expected for a bridge with a wider opening and less piers. Model results are illustrated in Table 2 with model details appended for reference.

Table 2: Proposed Conditions Hydraulic Analysis

Cross Section	Water Surface Elevation (m)			Velocity (m/s)		
	Design Flow	Check Flow	Regulatory Flow	Design Flow	Check Flow	Regulatory Flow
3771 - 46 m upstream of bridge	318.48	318.90	319.79	2.17	2.50	1.81
3745 – 20 m upstream of bridge	318.50	318.95	319.61	1.90	2.18	2.41
3735 – 10 m upstream of bridge	318.46	318.89	319.51	1.98	2.30	2.61
Scheifele Bridge	-	-	-	-	-	-
3687 – 22 m downstream of bridge	318.08	318.27	318.50	2.93	3.61	4.43
3674 – 35 m downstream of bridge	318.18	318.46	318.81	2.08	2.34	2.61

Comparing the proposed bridge conditions to MTO design standards summarized previously provides the following results:

- The design flow (2% probability of occurrence in a given year or a 50-year return period) water level is 318.46 m upstream of the bridge. The spill elevation of the road, based on available data is approximately 321.29 m. The clearance of the bridge was determined to be 1.61 from the water surface elevation to the soffit (bottom of the bridge). Freeboard modeled under proposed conditions is 2.83 m, which is greater than the MTO design criteria of 1 m. The check flow has a water level of 318.89 m upstream of the bridge which does not overtop the roadway at its low point of 321.29 m, therefore meeting MTO design criteria.

- The regulatory flow has a water level of 319.51 m upstream of the bridge and does not overtop the road which meets MTO criteria. Therefore, there is no velocity and depth for the relief flow which also meets MTO criteria.

Reference: Scheifele Bridge Replacement - Hydraulic Analysis

Additionally, the Regional Water surface elevations are lower upstream, but outside of the immediate vicinity of the bridge; therefore, reducing upstream flood risk.

Where earth fill is used in design of the banks adjacent to the bridge, slope protection should be provided consisting of rip rap having a D_{50} of 400 mm diameter (Waterbody Material Designation WB-400) placed in a minimum 600 mm thick layer underlain by a geotextile fabric up to a minimum elevation of 318.8 m (the design flow elevation + 0.3 m). The slope protection shall be placed to the toe of slope and extended approximately 5 m upstream and downstream of the edge of the structure.

4.0 CONCLUSIONS AND RECOMMENDATIONS

A hydraulic analysis of Scheifele Bridge along Northfield Drive East indicates that the proposed bridge meets all hydraulic design requirements and will not cause any increase in flood risk upstream or downstream of the bridge. Although water surface elevations immediately upstream of the bridge increase from existing to proposed, these values cannot be compared as the bridge was moved upstream and therefore up gradient. The remaining cross sections at comparable locations just outside of the immediate bridge vicinity showed lower water surface elevations between proposed and existing models due to the increased hydraulic capacity of the bridge.

Sincerely,

STANTEC CONSULTING LTD.

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Attachment: Scheifele Bridge Construction Staging
Scheifele Bridge Design Concept
Scheifele Bridge Profile and cross section
HEC-RAS Modelling output
HEC-RAD Profiles
Scheifele Bridge Plan views

c. Garry Leveck, Stantec Consulting Ltd.

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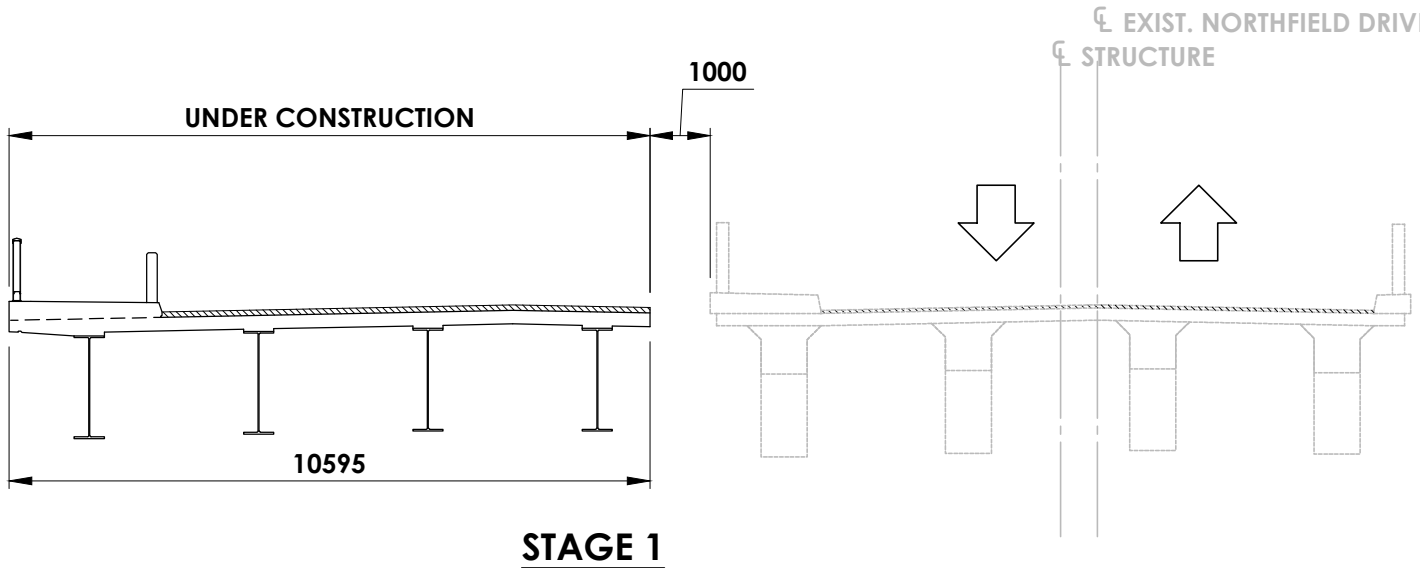

STAGE 1

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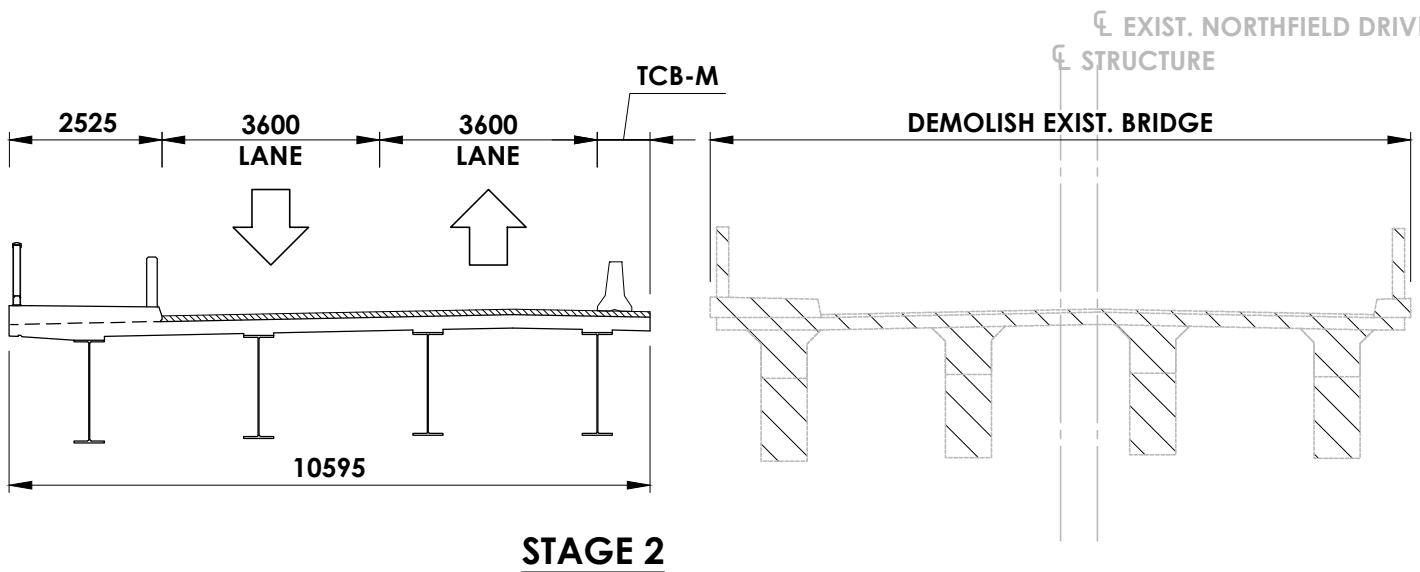

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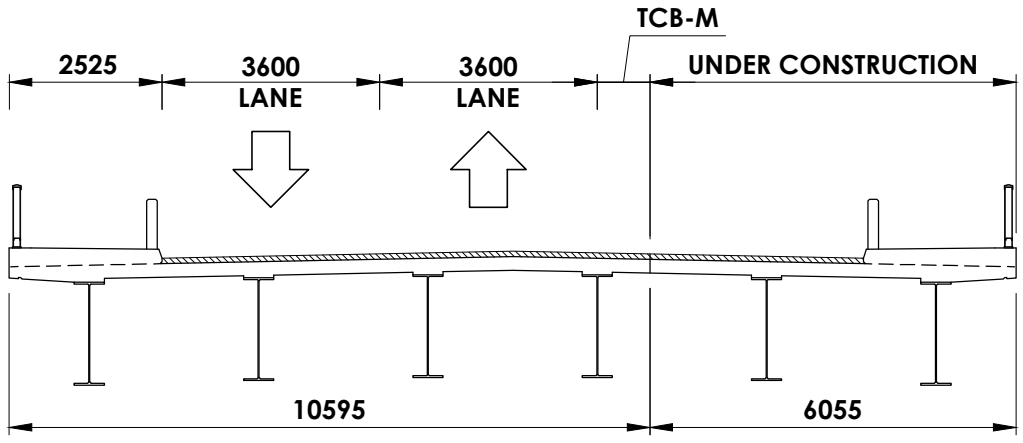

STAGE 3

STAGE 4

Region of Waterloo

Stantec

CONSTRUCTION STAGING

SCHEIFELE BRIDGE
(SITE No. 2201)

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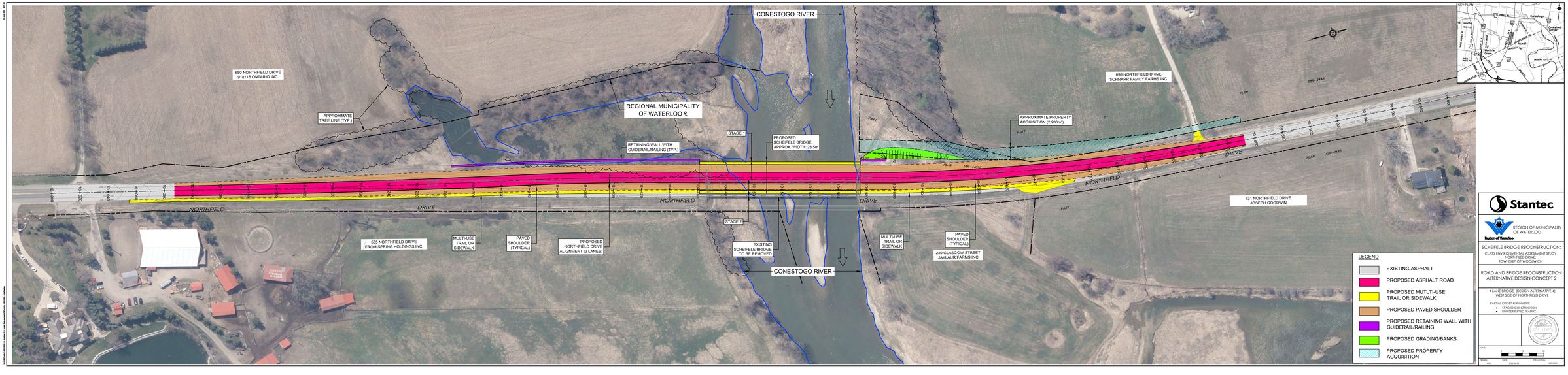


Stantec

REGION OF MUNICIPALITY OF WATERLOO

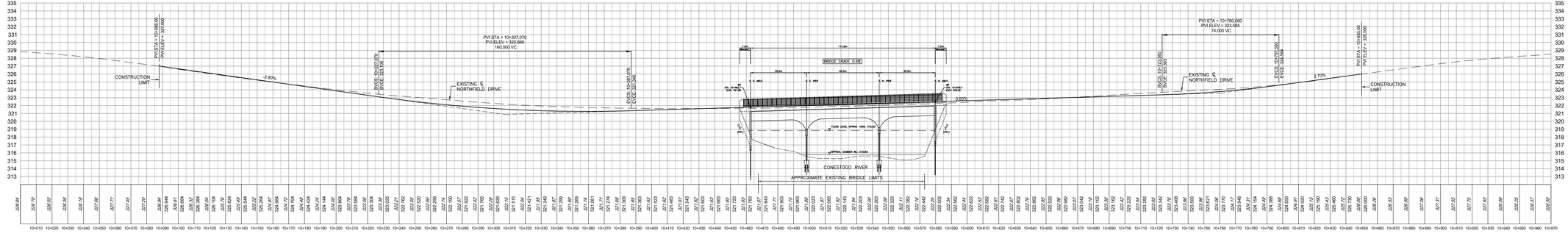
SCHEIFELE BRIDGE RECONSTRUCTION:
CLASS ENVIRONMENTAL ASSESSMENT STUDY
NORTHFIELD DRIVE
TOWNSHIP OF WOOLWICH

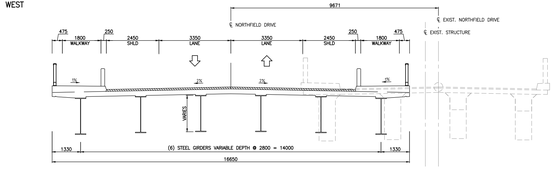
ROAD AND BRIDGE RECONSTRUCTION
ALTERNATIVE DESIGN CONCEPT 2

4 LANE BRIDGE (DESIGN ALTERNATIVE 4)
WEST SIDE OF NORTHFIELD DRIVE

PARTIAL OFFSET ALIGNMENT
- STAGED CONSTRUCTION
- UNINTERRUPTED TRAFFIC

DESIGN: MRA | DRAWN: | CHECKED: | DATE: 2019-09-24 | PROJECT NO: | SHEET NO:





LEGEND

326.04 EXISTING NORTHFIELD DRIVE CENTER LINE ELEVATION

326.104 RECOMMENDED BRIDGE CONCEPT 5 WEST SIDE OF NORTHFIELD DRIVE CENTER LINE ELEVATION

Stantec

REGION OF MUNICIPALITY OF WATERLOO

Region of Waterloo

SCHEIFELE BRIDGE RECONSTRUCTION:
CLASS ENVIRONMENTAL ASSESSMENT STUDY
NORTHFIELD DRIVE
TOWNSHIP OF WOOLWICH

RECOMMENDED PREFERRED DESIGN PROFILE AND
RECOMMENDED PREFERRED BRIDGE CROSS SECTION

RECOMMENDED BRIDGE CONCEPT 5
WEST SIDE OF NORTHFIELD DRIVE

PARTIAL OFFSET ALIGNMENT
- STAGED CONSTRUCTION
- UNINTERRUPTED TRAFFIC

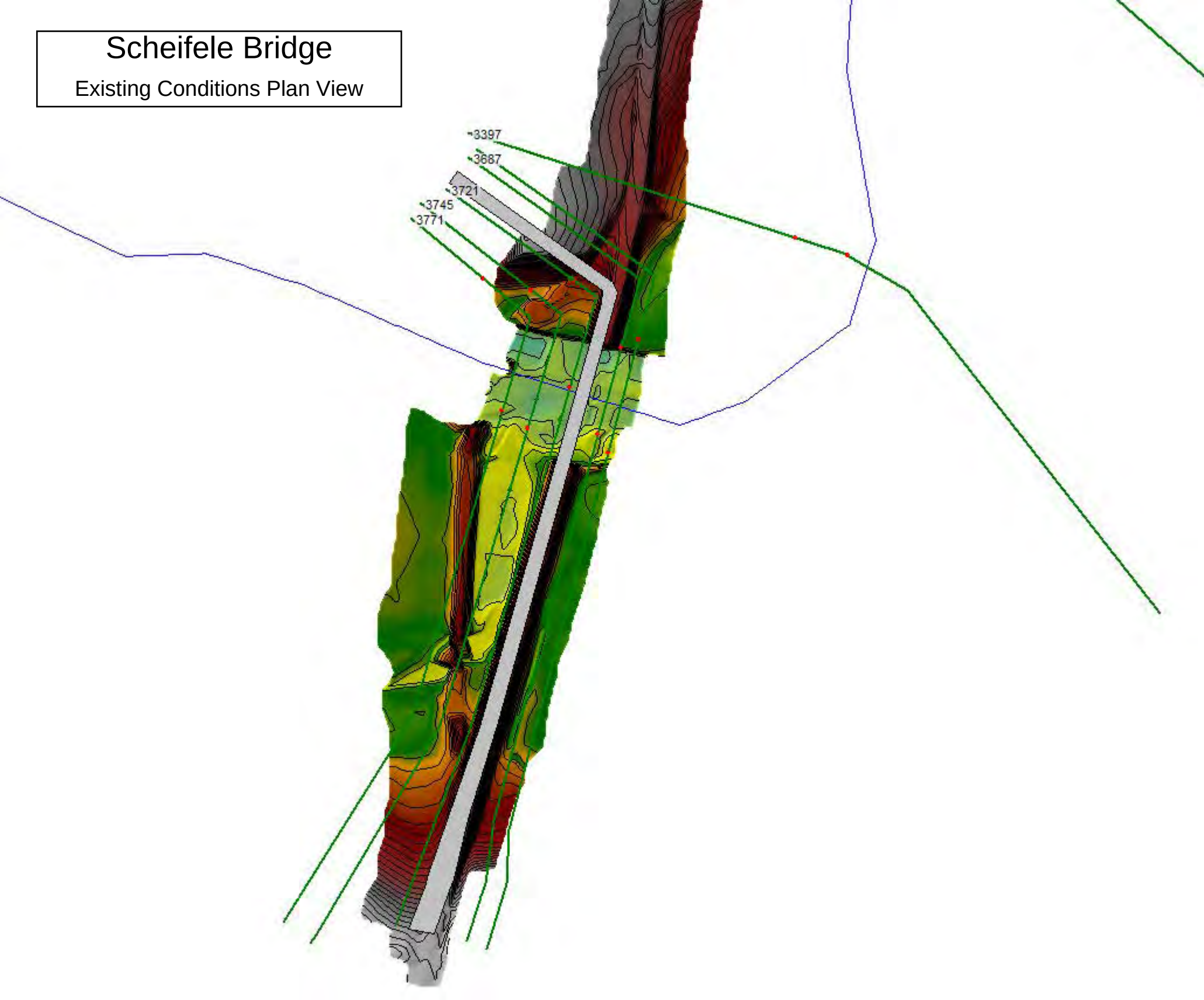
DESIGN: MMA | DRAWN: MMA | CHECKED: | DATE: 2022-06-07 | PROJECT NO.: | SHEET NO.: 1

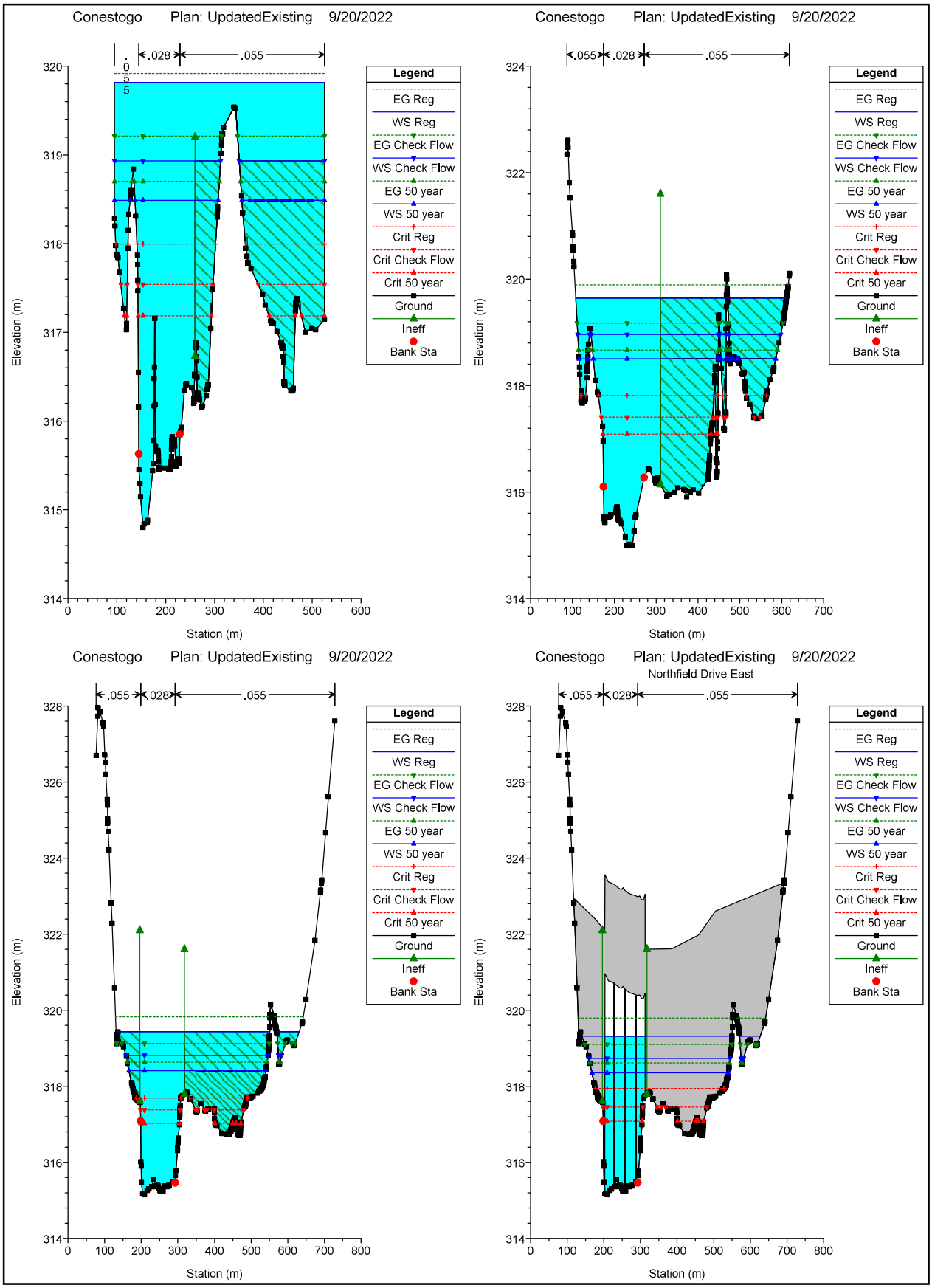
Project # 165010600 - Scheifele Bridge
HEC-RAS Modelling Results

Reach	River Sta	Profile	Plan	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Lower Reach	3771	Reg	Exist2	1160	314.8	319.82	318	319.92	0.000356	1.79	1192.47	429.7	0.27
Lower Reach	3771	Reg	Proposed_Bridge	1160	314.8	319.79	318	319.89	0.000366	1.81	1180.22	429.7	0.28
Lower Reach	3771	50 year	Exist2	634	314.8	318.49	317.19	318.7	0.000841	2.16	358.93	371.25	0.39
Lower Reach	3771	50 year	Proposed_Bridge	634	314.8	318.48	317.19	318.7	0.000845	2.17	358.24	371.02	0.39
Lower Reach	3771	Check Flow	Exist2	853.3	314.8	318.93	317.54	319.21	0.000932	2.49	430.38	391.4	0.42
Lower Reach	3771	Check Flow	Proposed_Bridge	853.3	314.8	318.92	317.54	319.2	0.000941	2.5	428.89	391.19	0.43
Lower Reach	3745	Reg	Exist2	1160	314.99	319.64	317.81	319.89	0.00067	2.39	631.36	500.97	0.37
Lower Reach	3745	Reg	Proposed_Bridge	1160	314.99	319.61	317.81	319.86	0.000689	2.41	624.99	499.94	0.38
Lower Reach	3745	50 year	Exist2	634	314.99	318.5	317.09	318.67	0.000645	1.89	410.19	432.13	0.35
Lower Reach	3745	50 year	Proposed_Bridge	634	314.99	318.5	317.09	318.66	0.000649	1.9	409.39	430.73	0.35
Lower Reach	3745	Check Flow	Exist2	853.3	314.99	318.96	317.41	319.17	0.000702	2.17	495.4	472.02	0.37
Lower Reach	3745	Check Flow	Proposed_Bridge	853.3	314.99	318.95	317.41	319.16	0.000709	2.18	493.68	471.4	0.37
Lower Reach	3735	Reg	Proposed_Bridge	1160	315.09	319.51	317.87	319.84	0.000852	2.61	498.94	479	0.42
Lower Reach	3735	50 year	Proposed_Bridge	634	315.09	318.46	317.11	318.65	0.00074	1.98	354.87	395.4	0.37
Lower Reach	3735	Check Flow	Proposed_Bridge	853.3	315.09	318.89	317.46	319.14	0.000832	2.3	413.64	440.08	0.4
Lower Reach	3721	Reg	Exist2	1160	315.15	319.43	317.69	319.83	0.00099	2.85	449.19	480.65	0.45
Lower Reach	3721	50 year	Exist2	634	315.15	318.41	317.02	318.63	0.00081	2.13	324.34	373.94	0.39
Lower Reach	3721	Check Flow	Exist2	853.3	315.15	318.82	317.38	319.12	0.000949	2.5	373.96	397.28	0.43
Lower Reach	3703		Bridge										
Lower Reach	3687	Reg	Exist2	1160	315.25	318.41	318.34	319.46	0.004601	4.79	294.87	440.17	0.91
Lower Reach	3687	Reg	Proposed_Bridge	1160	315.25	318.5	318.33	319.36	0.00378	4.43	342.27	444.6	0.83
Lower Reach	3687	50 year	Exist2	634	315.25	318.06	317.47	318.49	0.002209	3.04	250.15	433.21	0.62
Lower Reach	3687	50 year	Proposed_Bridge	634	315.25	318.08	317.51	318.47	0.002034	2.93	276.18	433.56	0.59
Lower Reach	3687	Check Flow	Exist2	853.3	315.25	318.23	317.85	318.9	0.00317	3.8	271.84	436.12	0.75
Lower Reach	3687	Check Flow	Proposed_Bridge	853.3	315.25	318.27	317.88	318.85	0.002796	3.61	306.47	436.83	0.71
Lower Reach	3674	Reg	Exist2	1160	315.37	318.81		319.01	0.001114	2.61	886	472.98	0.46
Lower Reach	3674	Reg	Proposed_Bridge	1160	315.37	318.81		319.01	0.001114	2.61	886	472.98	0.46
Lower Reach	3674	50 year	Exist2	634	315.37	318.18		318.33	0.000945	2.08	593.8	461.56	0.41
Lower Reach	3674	50 year	Proposed_Bridge	634	315.37	318.18		318.33	0.000945	2.08	593.8	461.56	0.41
Lower Reach	3674	Check Flow	Exist2	853.3	315.37	318.46		318.63	0.001043	2.34	720.55	466.46	0.44
Lower Reach	3674	Check Flow	Proposed_Bridge	853.3	315.37	318.46		318.63	0.001043	2.34	720.55	466.46	0.44

Scheifele Bridge

Existing Conditions Plan View

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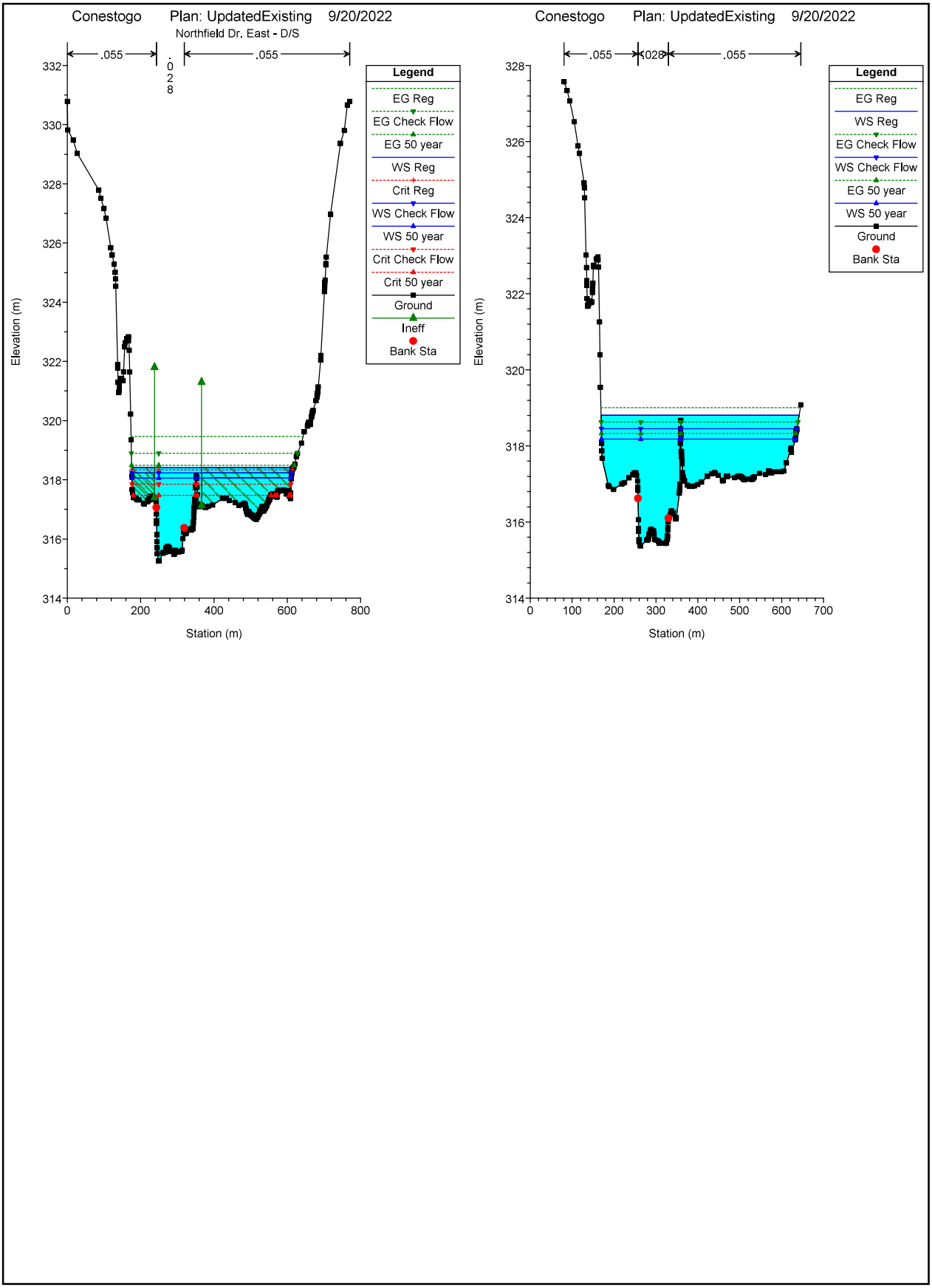
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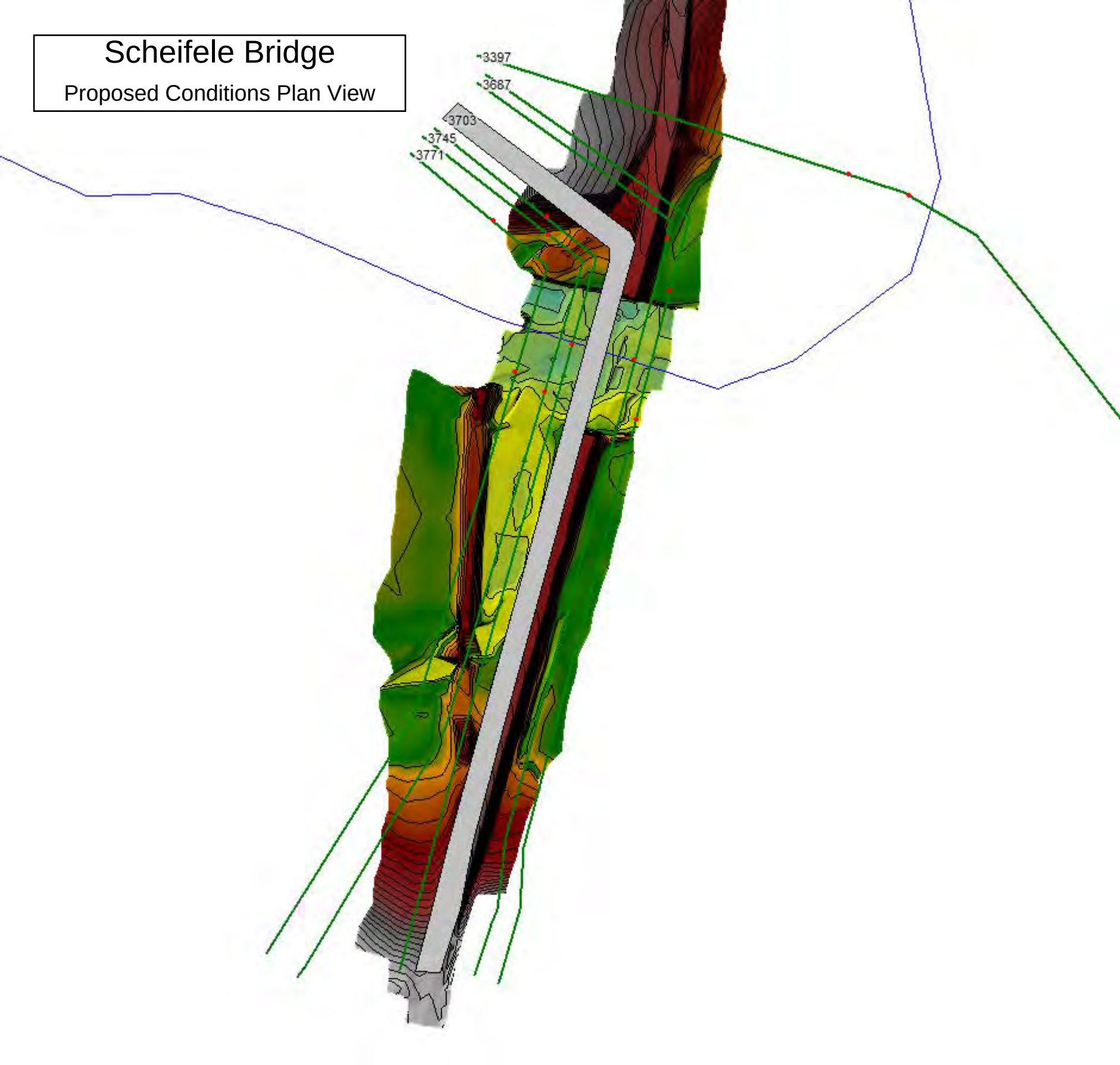
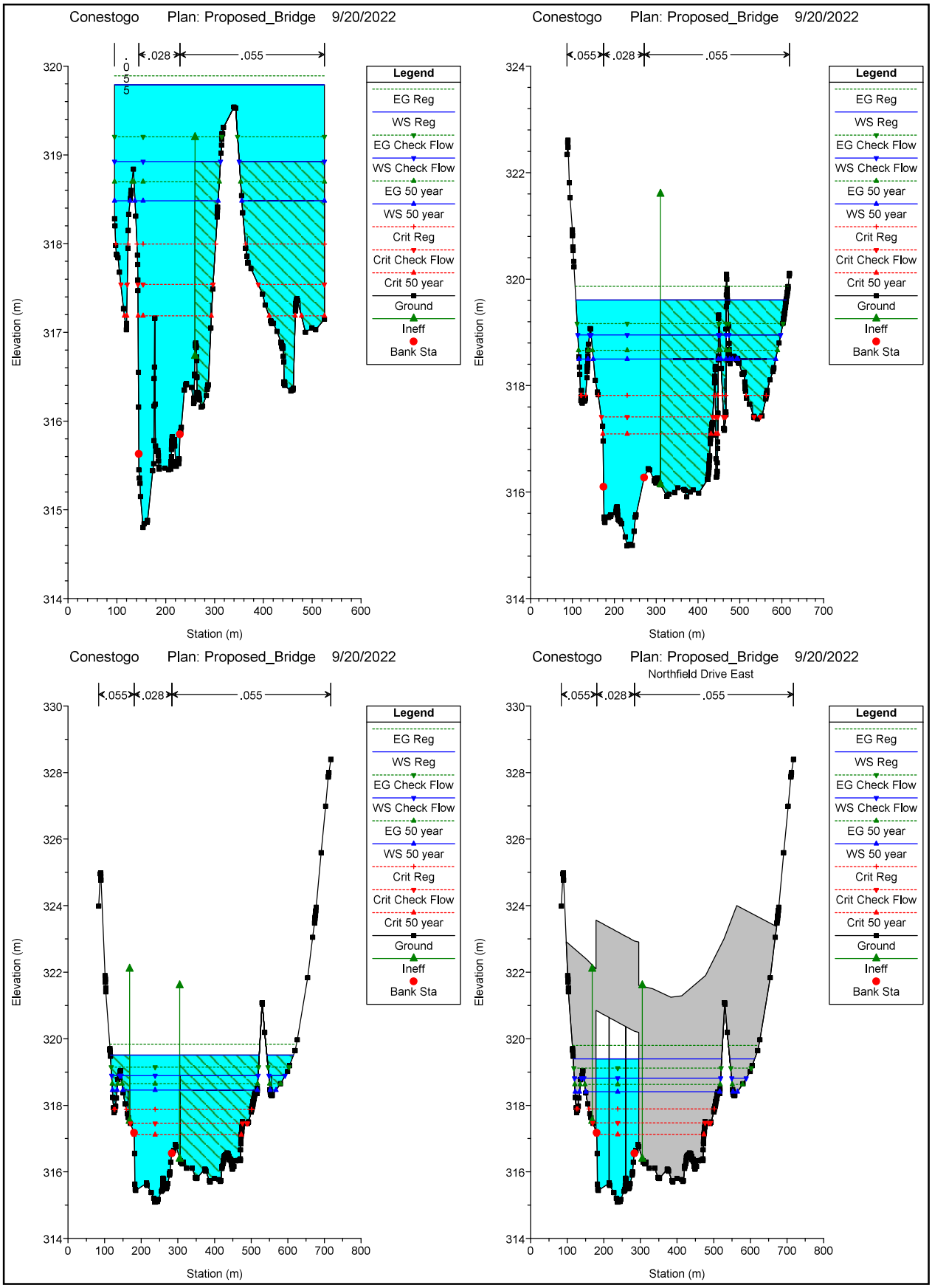
Scheifele Bridge

Proposed Conditions Plan View

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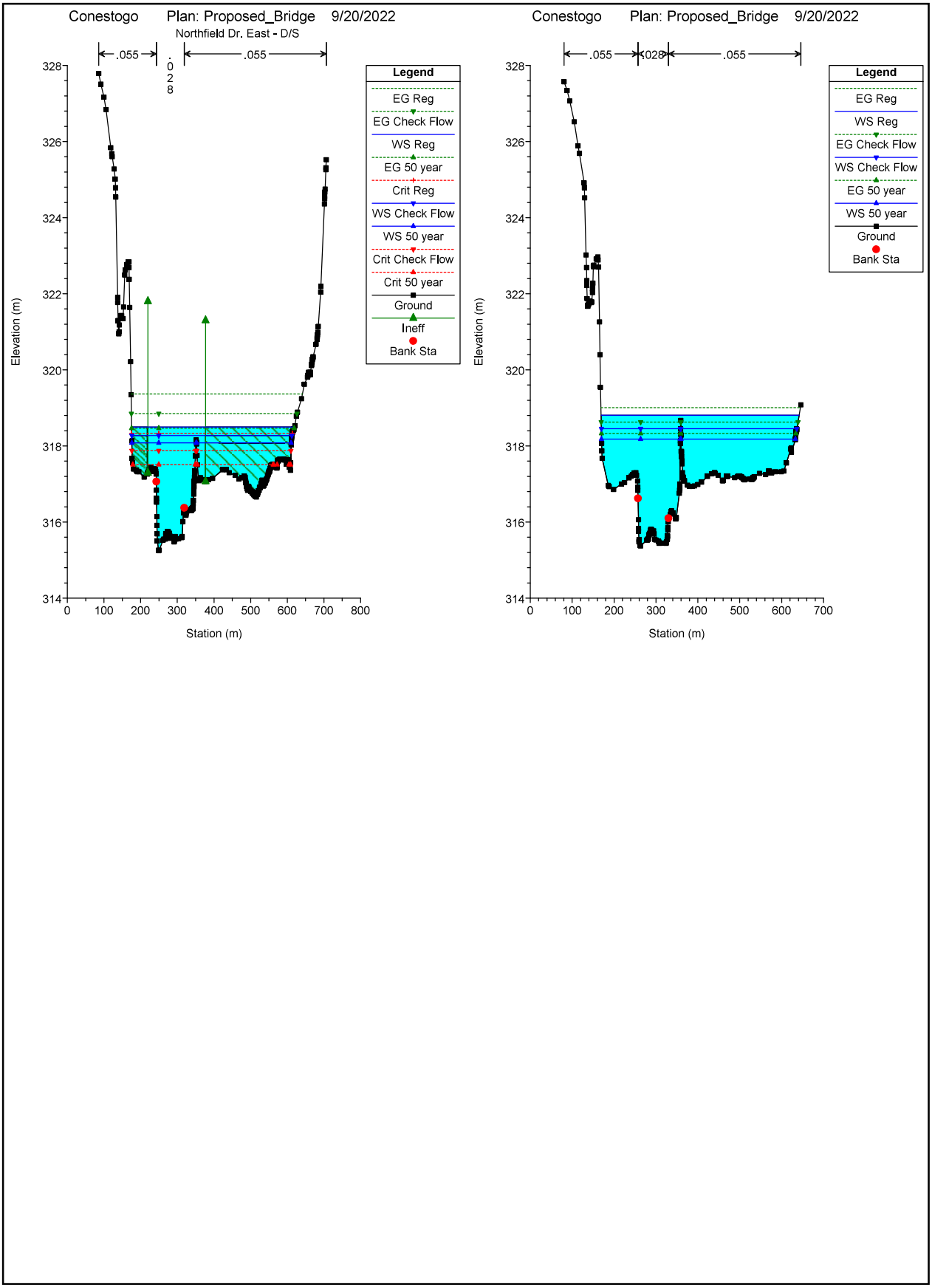
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Cultural Heritage Evaluation Report (CHER) and Heritage Impact Assessment (HIA): Scheifele Bridge

FINAL REPORT

September 29, 2022

Prepared for:

Region of Waterloo
150 Frederick Street
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Executive Summary

The Regional Municipality of Waterloo (the Region) retained Stantec Consulting Ltd. (Stantec) to undertake a Municipal Class Environmental Assessment (Class EA) Study for the replacement of Scheifele Bridge (ID 2201) spanning the Conestogo River on Northfield Drive East (Regional Road 22) in the Township of Woolwich, within the Region of Waterloo, Ontario. The study is being undertaken in accordance with the requirements for Schedule 'C' projects within the Municipal Class EA document, under the Ontario Environmental Assessment Act. The Class EA will present and evaluate various designs and alternatives for the Scheifele Bridge replacement.

As part of this study, a Cultural Heritage Evaluation Report (CHER) and Heritage Impact Assessment (HIA) was completed for structures within the Study Area that are 40 years old or older. A CHER is completed where a potential built heritage resource or cultural heritage landscape requires evaluation to determine its cultural heritage value or interest (CHVI). Where CHVI is identified, the CHER includes a description of heritage attributes and a Statement of Cultural Heritage Value. The HIA includes an impact assessment that identifies potential impacts brought on by the preferred design concept. This report includes the evaluation of Scheifele Bridge. In November 2020, the CHER for the Scheifele Bridge project was completed. The CHER was amended to include HIA requirements in September 2022 based on the Recommended Preferred Design Concepts presented by the Class EA Project Team. The impact assessment is based on the findings of the CHER and the preferred design concepts.

The Scheifele Bridge is in the Township of Woolwich, within the Region. The bridge forms part of Northfield Drive East spanning the Conestogo River. The bridge was constructed in 1958 to replace two deteriorated bridge structures and aid in mid-20th century flood control measures on the Conestogo River as part of the Grand River watershed. The bridge is a four-span cast-in-place concrete T-beam bridge. It carries two lanes of traffic on Northfield Drive East over the Conestogo River.

Situated directly west and adjacent to the Scheifele Bridge is a cultural heritage landscape (CHL) candidate. The CHL is composed of a remnant county roadway and abutments of two former bridge structures. The roadway dates prior to 1861 determined through historic mapping, while the bridge abutments date to the early 20th century, determined through their concrete materials. An evaluation of the CHL against O. Reg. 9/06 was also undertaken. This identification and evaluation of a CHL candidate is in accordance with the Region's *Draft Regional Implementation Guideline for Cultural Heritage Landscape Conservation* (Region of Waterloo 2018).

The Scheifele Bridge did not meet criteria of *Ontario Regulation* (O. Reg.) *9/06* and scored 36 points per the Ontario Heritage Bridge Guidelines. The conclusion that the bridge has no Cultural Heritage Value or Interest is supported by the evaluation carried out against O. Reg. 9/06, which is the only criteria required for establishing CHVI in the *Municipal Class Environmental Assessment* (MCEA) *Manual*. **Accordingly, the Scheifele Bridge was not found to have CHVI since it did not meet criteria set out under O. Reg. 9/06 and attained a score of 36 per the Ontario Heritage Bridge Guidelines out of a possible 100 points.**

The CHL candidate was found to have CHVI as it met multiple criteria of O. Reg. 9/06. The CHL candidate was determined to satisfy criteria 1(i) as it is representative of a historic streetscape in Woolwich Township. The CHL candidate also met criteria 2 (i) as it is directly connected to historic roadway and bridge development from the mid-19th to the early 20th century in Woolwich Township and County of Waterloo. The CHL candidate also met criteria 3 (i, ii, and iii) as it supports the rural character of the area, and is physically, historically, and visually connected to the Conestogo River and the community of Conestogo. While the north concrete abutment of the former bridge in the CHL was determined to be a local landmark.

Given the close location of the CHL to the Class EA Study Area of Scheifele Bridge, as per Step 3 of the MCEA Process, an impact assessment was completed. The impact assessment identified that no direct impacts were anticipated, but that potential indirect impacts caused by land disturbances may impact the CHL. Accordingly, the following mitigation measures were recommended:

- *Site identification & communication:* The boundaries of the CHL should be clearly marked on project mapping and communicated to all project personnel for avoidance during design, construction, and subsequent operation.
- *Create a physical buffer:* Temporary fencing should be erected at the boundary of the CHL to limit all excavation, installation, and associated vehicle traffic from encroaching on the CHL during construction.
- *Conditions surveys:* A qualified environmental specialist or civil engineer should be engaged to develop a strategy to carry out condition surveys where required. The pre-construction survey completed by a qualified environmental specialist may include screening activities to identify areas where tree roots may have extended into the proposed construction area and whether they will be impacted by construction. The pre-construction survey conducted by a civil engineer should assess whether the modifications to the soil will affect the remnants of the built-up roadway and associated land patterns of the CHL. Recommendations to limit impacts to the deciduous trees and vegetation within the CHL should be adhered to in the Environmental Impact Study.

Additionally, copies of this report should be deposited with the Region of Waterloo and a local repository of historic material. Therefore, it is recommended that this report be deposited at the following location:

Ellis Little Local History Room – Waterloo Public Library
35 Albert Street
Waterloo, ON N2L 5E2

Woolwich Heritage Committee
24 Church Street West
P.O. Box 158
Elmira, ON, N3B 2Z6

The Executive Summary highlights key points from the report only; for complete information and findings the reader should examine the complete report.

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Abbreviations

CHER	Cultural Heritage Evaluation Report
CHRS	Canadian Heritage Rivers System
CHVI	Cultural Heritage Value or Interest
Class EA	Class Environmental Assessment
GRCA	Grand River Conservation Authority
HIA	Heritage Impact Assessment
km	Kilometres
m	Metres
MTCS	Ministry of Tourism, Culture and Sport
MRC	McCormick Rankin Corporation
MTO	Ministry of Transportation Ontario
O. Reg.	*Ontario Regulation*
OHBG	Ontario Heritage Bridge Guidelines
WSP	WSP Canada Group Limited

1.0 INTRODUCTION

1.1 STUDY PURPOSE

The Regional Municipality of Waterloo (the Region) retained Stantec Consulting Ltd. (Stantec) to undertake a Municipal Class Environmental Assessment (Class EA) Study for the replacement of the Scheifele Bridge (ID 2201) spanning the Conestogo River on Northfield Drive East (Regional Road 22) in the Township of Woolwich, within the Region, Ontario. The study is being undertaken in accordance with the requirements for Schedule 'C' projects within the Class EA document, under the *Ontario Environmental Assessment Act*. The Class EA will present and evaluate various designs and alternatives for the Scheifele Bridge replacement.

As part of the Class EA, a Cultural Heritage Evaluation Report (CHER) and Heritage Impact Assessment (HIA) has been completed for structures within the Study Area that are 40 years old or older. This includes the subject of this report, Scheifele Bridge (Figure 1 and Figure 2). A CHER is completed where a potential built heritage resource or cultural heritage landscape requires evaluation to determine its cultural heritage value or interest (CHVI). Where CHVI is identified, the CHER includes a description of heritage attributes and a Statement of Cultural Heritage Value. The HIA includes an impact assessment guided by the Ministry of Tourism, Culture and Sport's (MTCS) Info Sheet #5 in *Heritage Resources in the Land Use Planning Process, Cultural Heritage and Archaeology Policies of the Ontario Provincial Policy Statement, 2005* (Government of Ontario 2006a) (Info Sheet #5). In November 2020, the CHER for the Scheifele Bridge project was completed. The CHER was amended to include HIA requirements in September 2022 based on the Recommended Preferred Design Concepts presented by the Class EA Project Team. The impact assessment is based on the findings of the CHER and the preferred design concepts.

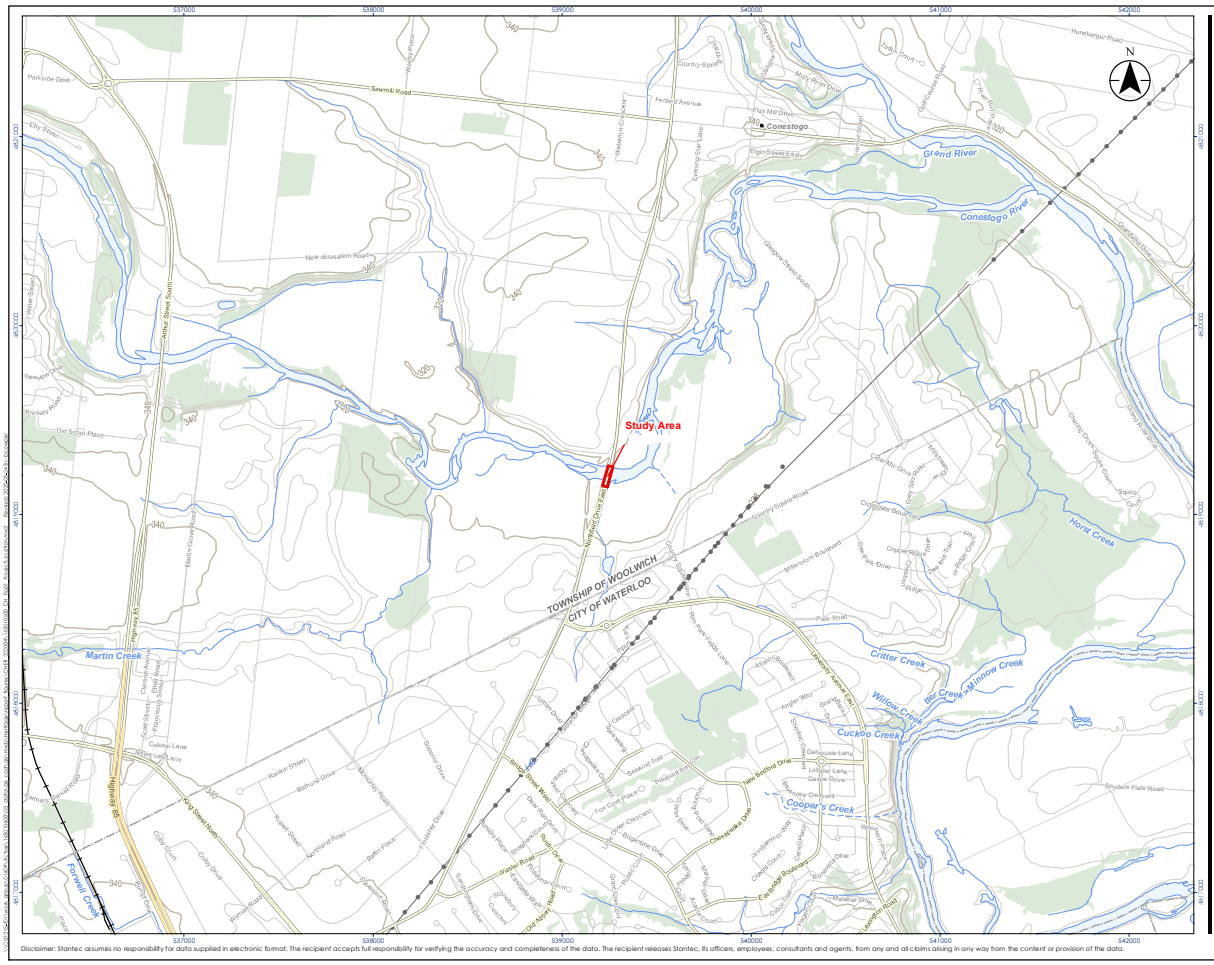
To meet these objectives, the report will:

- Review the historical context of the area surrounding the Study Area
- Summarize the results of the field investigation and provide photographic documentation of current conditions
- Describe the Study Area based on an understanding of the historical and current conditions
- Evaluate the CHVI of the bridges and surrounding landscape per Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) requirements and relevant heritage frameworks
- Include a statement of cultural heritage value and description of heritage attributes where CHVI is identified
- Include a description of the proposed undertaking

Introduction

- Identify direct and indirect impacts caused by the proposed undertaking and provide mitigation measures to address the identified impacts

The Scheifele Bridge spans the Conestogo River as part of Northfield Drive East (Regional Road 22) and is situated 740 metres (m) northeast of University Avenue East, and 1 kilometre (km) south of New Jerusalem Road (Regional Road 31), in the Township of Woolwich, within the Region of Waterloo, Ontario (Figure 1). The bridge was constructed in 1958 and is a four-span concrete T-beam bridge. The Study Area boundary for the bridge was defined by the bridge structure itself and includes the embankments approaching the bridge structure (Figure 2).



Stantec

Legend
- Study Area
- Railway
- Hydro Line
- Watercourse (Intermittent)
- Watercourse (Permanent)
- Waterbody
- Wooded Area
- Lot
- Municipal Boundary, Lower

0 1 km

1:20,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2020.

Project Location
Region of Waterloo, ON

165010600 REV4
Prepared by BCC on 2020-03-24
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
REGION OF WATERLOO - SCHEIFELE BRIDGE CULTURAL HERITAGE EVALUATION REPORT AND HERITAGE IMPACT ASSESSMENT

Figure No.
1

Title
Project Location

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Stantec

Legend
- Study Area
- Waterbody

0 50 100 Metres

1:2,000 (A1 original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2020.
3. Orthoimagery © First Base Solutions, 2020, imagery date 2018.

Project Location
Region of Waterloo, ON

165010600 REV4
Prepared by BCC on 2020-03-24
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Client/Project
REGION OF WATERLOO – SCHEIFELE BRIDGE CULTURAL HERITAGE EVALUATION REPORT AND HERITAGE IMPACT ASSESSMENT

Figure No.
2

Title
Study Area

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2.0 ENVIRONMENTAL ASSESSMENT FRAMEWORK

2.1 REQUIREMENTS

The requirement to consider cultural heritage in Class EAs is discussed in the *Municipal Class Environmental Assessment* (MCEA) *Manual* (MCEA Manual) (Municipal Engineers Association 2015) and the revised 2020 *Provincial Policy Statement* (PPS) (Government of Ontario 2020). The MCEA Manual considers the cultural environment, including built heritage resources and cultural heritage landscapes, as well as archaeological resources, as one in a series of environmental factors to be considered when undertaking a Class EA, particularly when describing existing and future conditions, development alternatives, and determination of the preferred alternative.

The MCEA Manual further suggests that cultural heritage resources that retain heritage attributes should be identified early in the EA process and that these resources should be avoided where possible. Where avoidance is not possible, potential impacts to these attributes should be identified and minimized. Adverse impacts should be mitigated in keeping with provincial and municipal guidelines, as available.

2.2 MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT PROCESS

In 2000, the Minister of the Environment and Climate Change approved the MCEA process proposed by the Municipal Engineers Association (MEA). The MEA is an association of public sector Professional Engineers in the province. This included a provision to complete a heritage assessment for any bridge over the age of 40 years. Since this time, a series of amendments and clarifications have been made to the MCEA process. One of these clarifications was released in 2003 by the MEA regarding the inclusion of a 40-year threshold for schedule determination (see Section 2.2.2 below for the process of determining schedule). The intent of the MEA was to provide for the protection of potentially significant bridges throughout the province; the 40-year threshold is generally accepted by both the federal and provincial authorities as a preliminary screening measure for CHVI. The MCEA Manual was most recently updated in 2015.

To provide clarity regarding the 40-year threshold for schedule determination, the MEA released guidelines in the form of a series of questions contained within a Checklist. This Checklist assists the proponent in the determination of future study requirements and a copy is provided in Appendix A. The MCEA requirements for bridges are addressed in Part B of the Checklist. In this section, there are 19 “Descriptions” to which answers of “Yes” or “No” are required. Requirements for additional studies are determined based on the responses to each question. There are three basic steps to carrying out the requirements of the Checklist as outlined in Section 2.2.1.

2.2.1 The Process

Step 1: Undertake Municipal Heritage Bridges Cultural, Heritage and Archaeological Resources Assessment Checklist (Part B) to determine if the bridge may have CHVI.

1. If no potential for CHVI is identified, then the proposed work can be a considered a Schedule A or A+ Class EA and no further investigation regarding cultural heritage is required.

- Schedule A:
  - These projects are limited in scale, have minimal adverse environmental effects, and include a number of municipal maintenance and operational activities. These projects are pre-approved and may proceed to implementation without following the full Class EA planning process. Schedule A projects generally include normal or emergency operational and maintenance activities (Municipal Engineers Association 2015: A-3).
- Schedule A+:
  - These projects are similar to Schedule A projects in that they are pre-approved. Where they differ is in notice issued to the public. Schedule A+ projects include municipal infrastructure projects where, although the public has no ability to change the outcome, they are notified of planned work. These EAs are typically approved by municipal councils through budget or special project funding. There is also more flexibility in the ways in which the public is notified of this work and varies greatly from one municipality to the next (Municipal Engineers Association 2015: A-4).

2. If potential for CHVI is identified, then proceed to Step 2.

Step 2: Undertake a cultural heritage evaluation of the bridge against *Ontario Regulation* (O. Reg.) *9/06* of the *Ontario Heritage Act* and prepare a CHER.

1. If the bridge is determined not to contain CHVI as per O. Reg. 9/06 then the CHER should be submitted to the proponent for review and approval. No further work is required and an EA is not triggered from a cultural heritage perspective.

2. If the bridge is determined to contain CHVI as per O. Reg. 9/06, prior to schedule determination, further work will be required in the form of an HIA. Once the proponent understands the proposed (or potential) scope of work, proceed to Step 3.

Step 3: Undertake an HIA to assess the impacts of the proposed change/impact, identify mitigation measures, and establish a conservation strategy, if needed.

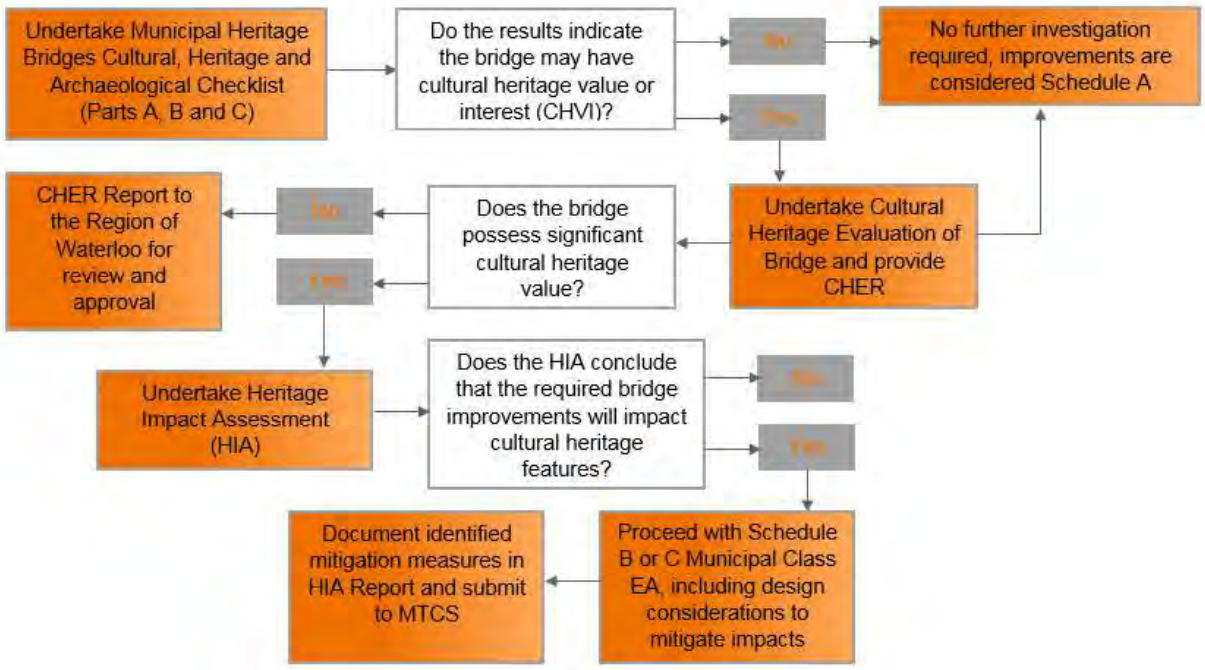
1. If no impacts to the heritage attributes identified in the CHER will result from the proposed work, then the HIA should be submitted to the proponent for review and approval. No further work is required and the proposed work can be considered a Schedule A or A+ EA, from a cultural heritage perspective.

If the HIA determines that the project has the potential to impact the resource, proceed to Schedule B or C to consider alternative solutions. As part of the HIA, mitigation measures to lessen the impacts of the proposed undertaking and a conservation strategy should be prepared. The HIA should be submitted to the proponent for review and approval and to the MHSTCI for review and comment.

- Schedule B:
  - These projects have the potential for some adverse environmental impacts. The proponent is required to undertake a screening process involving mandatory contact with directly affected public and relevant review agencies (i.e. MHSTCI), to confirm that they are aware of the project and that their concerns are addressed. If there are no outstanding concerns, then the proponent may proceed to implementation. Schedule B projects typically include improvements and minor expansions to existing facilities (Municipal Engineers Association 2015: A-4).
- Schedule C:
  - These projects have the potential for significant environmental impacts and must proceed under the full planning and documentation procedures specified in the MCEA Manual. Schedule C projects require the preparation and filing of an Environmental Study Report (ESR) for review by the public and relevant agencies. Schedule C projects generally include the construction of new facilities and major expansions to existing facilities (Municipal Engineers Association 2015: A-4).

This report represents “Steps 2 and 3” of the MCEA process. A flowchart depicting the MCEA Process as it pertains to municipal bridges is provided in Plate 1.

Plate 1: Flowchart of the Municipal Class Environmental Assessment Process (MEA 2015)



2.2.2 Determining Project Schedule

Generally, the MCEA Project Schedule is determined by the magnitude of the environmental impacts resulting from the project. As such, projects with minimal impacts are carried out under Schedules A or A+, projects with moderate adverse impacts are carried out under Schedule B, and projects with the potential for significant environmental effects are carried out under Schedule C.

In the case of bridges found to have CHVI, all reconstruction and/or alteration activities to the structure, or grading activities adjacent to the structure, should be carried out under Schedules B or C. As indicted in Appendix 1 of the MCEA Manual, projects involving a bridge with CHVI that cost less than $2.4 million should be carried out under Schedule B and projects with a cost greater than $2.4 million should be carried out under Schedule C (Municipal Engineers Association 2015).

While the magnitude of the impact to the bridge and the cost of the project can be used to determine whether to proceed under Schedule B or C, the MCEA Manual notes that the divisions among project Schedules is often not distinct and proponents are encouraged to document their rationale for the selection (Municipal Engineers Association 2015: Appendix 1).

3.0 METHODOLOGY

3.1 FIELD PROGRAM

A site assessment was undertaken on March 18, 2020, by Senior Heritage Consultant Meaghan Rivard, and Cultural Heritage Specialist Laura Walter, both of Stantec. The weather conditions were cool and partly cloudy. Historical research was conducted online through available primary and secondary source materials, including newspapers, mapping, local history books, and archival documents.

3.2 REPORTING

The Cultural Heritage Evaluation Report was composed of a program of archival research focused on the Study Area (Figure 2). To familiarise the study team with the Study Area, local historical resources were consulted, archival documents were reviewed, and a summary of the historical background of the local area was prepared. Specifically, mapping from 1861, 1877, 1930, 1936, 1939, 1955, and 1963 was reviewed.

The metric system was adopted in Canada between 1971 and 1984. Given the construction date of the bridge, measurements would have been prepared according to Imperial standards. Converting measurements that are often standardized into metric may obscure patterns and relationships between features. Therefore, when discussing dimensions of historic structures Imperial units may be used. In all other areas, measurement of distance for example, metric units are applied.

3.3 EVALUATION OF CULTURAL HERITAGE VALUE OR INTEREST

The criteria for determining Cultural Heritage Value or Interest is defined by O. Reg. 9/06 of the *Ontario Heritage Act*. These criteria are considered in the EA process, as no other formal criteria for identifying Cultural Heritage Value or Interest is identified in the Municipal Class Environmental Assessment manual. This regulation considers three main indicators of cultural heritage value: design or physical value, historic or associative value, and contextual value. Each indicator contains three additional sub-criteria. A property may be considered to have Cultural Heritage Value or Interest if it meets one or more of the criteria in O. Reg. 9/06. These criteria are provided below, as they appear in O. Reg. 9/06 of the *Ontario Heritage Act*:

1. *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.*

2. *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.*

3. *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.*

(Government of Ontario 2006b)

3.3.1 Ontario Heritage Bridge Guidelines

This report also evaluates the bridge using criteria identified in the *Ontario Heritage Bridge Guidelines for Provincially Owned Bridges* (OHBG) to supplement O. Reg. 9/06 evaluation (Ontario Ministry of Transportation 2008). The OHBG, similar to O. Reg. 9/06, are divided into three categories: Design/Physical Value, Historic/Associative Value, and Contextual Value, but provide a rating system more specific to bridge structures. The OHBG evaluation criteria include a numerical scoring for the separate categories and a total score.

It must be noted that the OHBG are intended to apply to provincially owned (Ministry of Transportation) bridges and are not required to determine the CHVI of a non-provincially owned bridge. However, the OHBG are useful in evaluating bridges as they have been designed and weighted specifically for this resource type, unlike O. Reg. 9/06, which is more general in nature. As such, the OHBG have been used in this report as a supplementary evaluation tool in addition to O. Reg. 9/06, which is the official tool for recognizing CHVI at the local/municipal level. The OHBG evaluation criteria are included in Appendix B.

4.0 HISTORICAL SUMMARY

4.1 INTRODUCTION

Scheifele Bridge spans the Conestogo River as part of Northfield Drive East (Regional Road 22) between University Avenue East and New Jerusalem Road (Regional Road 31), in the Township of Woolwich, within the Region of Waterloo. The Study Area spans lots 3 and 32, in the Township of Woolwich, within the former County of Waterloo, now Region of Waterloo. The Study Area boundary for the bridge was defined by the bridge structure itself and includes the embankments approaching the bridge structure.

4.2 PHYSIOGRAPHY

The Study Area is situated within the Oxford Till Plain physiographic region of southwestern Ontario (Chapman and Putnam 1984: 113). This physiographic region covers an area of about 966 km^2 and has an upland surface ranging from 305 m to 366 m above sea level. The majority of the Oxford Till Plain is located with Oxford County, to the southwest, except for a smaller section in the Region (Chapman and Putnam 1984: 143). The Study Area is situated within a spillway portion of the Oxford Till Plain. Running adjacent to the spillways are till plains composed of drumlinized surfaces. The dominant soil type in the physiographic region is Guelph loam (Chapman and Putnam 1984: 143).

The Study Area is located within the Conestogo River watershed, a main tributary of the larger Grand River watershed. The Conestogo River was named in the early 19th century by Mennonite settlers after the Conestogo River in Pennsylvania (Mercer 2018). The Conestogo River watershed drains approximately 820 km^2. Its system generates an extremely high runoff, however due to an efficient drainage system, peak flows rarely last long. The Conestogo Dam situated northwest of the Study Area controls the water levels on the river (Lake Erie Source Protection Region Technical Team 2008: 43). The Conestogo River together with the Nith River to the southwest drains the western half of the Grand River watershed (Lake Erie Source Protection Region Technical Team 2008: 3). The Grand River watershed covers an area of approximately 6,800 km^2. The watershed extends 300 km and contributes about 10% of the drainage to Lake Erie (Lake Erie Source Protection Region Technical Team 2008: 1).

4.3 SURVEY AND SETTLEMENT

The Township of Woolwich was one of the earliest townships secured for settlement in the later Waterloo County. Land for the township was included within Block Three (86,078-acres) of the Six Nations Haldimand Tract. This land had been given by the British to the Six Nations in the late 18th century for their loyalty to the Crown during the American War of Independence. On behalf of the Six Nations, Joseph Brant sold Block Three to William Wallace in 1798. In failing to honour his land contract in 1806, Wallace's title in Block 3 was forfeited. In 1807, 45,195-acres was purchased from Block 3 by the German Company, under Augustus Jones, and John and Jacob Erb (Waterloo Region Museum 2017).

The triangular shaped township was surveyed by Augustus Jones and was laid out in an irregular pattern of 350-acre lots that were oriented to facilitate access to the rivers or streams. There were no road allowances (Grand River Conservation Authority [GRCA] 2004: 14).

Land was purchased in the township beginning in 1808, with 26,600 acres taken up that year. Most of the early settlers were of German-Mennonite descent, who arrived in the township from Pennsylvania and the adjacent Township of Waterloo. Early settler families included the Bowman, Bruchacher, Martin, Reist, Weaver, Mayer, Oberholtzer, Stouffer, Sherek, Shenk, Eby, Erb, Stolzfoos, Hurst, Koenig, Wenger, Schaeffer, and Gresman (Uttley 1935: 11).

4.4 19TH CENTURY DEVELOPMENT

The Township of Woolwich was officially established in 1816 as part of the County of Halton, within the Gore District (Archives of Ontario 2015). It is believed the township is named after Woolwich, in southeast London, England (Waterloo Museum 2017). Government business was initially undertaken by a bench of magistrates sitting in Hamilton, while local landowners met periodically (Uttley 1935: 12). In 1838, the township became part of the County of Waterloo under the District of Wellington (Wellington County 2020).

Settlement in the early 19th century into the Township of Woolwich was slow with most of the settlement beginning in the 1830s. Hamlets developed in the township in relation to its watercourses and the establishment of mill sites. The first industries in the township were sawmills. Conestogo, the closest settlement to the Study Area, was founded in 1830 by the area's first settler, David Musselman. In 1840, Musselman established a sawmill on Spring Creek, and in 1844 he dammed the Conestogo River and built the township's first flour mill, and a second sawmill (Waterloo Region Museum 2017). In 1846, the village was laid out by David Musselman and Charles Hendry (Irwin and Burnham 1867: 77). It was known as Musselman's Mills, until a post office opened in the village in 1852, and the name changed to Conestogo, for the river. The first postmaster was Charles Hendry (Library and Archives Canada 2014).

In the mid-19th century, the Township of Woolwich council was organized on January 21, 1850. The first meeting was held in Conestogo at Kurtz's tavern, with John Meyer elected as the Reeve (Uttley 1933: 14). The township has a population that year of 3,501 (Waterloo Museum 2017). Bridge construction was an initial concern in the township and discussion in 1850 included a plan for the building of a bridge across the Conestogo River (Uttley 1935: 14).

In 1861, 49,861-acres were taken up in the township with 29,043 under cultivation (Sutherland 1864: 62). The 1861 Map of the County of Waterloo shows the township taken up by various landowners, and the village of Conestogo northeast of the Study Area (Figure 3). In 1864, the township had a population of 5,256 (Sutherland 1864: 10). Industrial development was never achieved in the township, in comparison to the townships of Waterloo and North Dumfries in the County of Waterloo, due to the lack of a railway line until the very late 19th century. In 1891, a branch line of the Grand Trunk Railway was constructed from Waterloo to St. Jacobs and Elmira. By this time, the railway boom had come and gone. The township remained an important farming centre in the county (Waterloo Museum 2017).

The village of Conestogo grew quickly in the mid- to late 19th century, reaching a population in 1867 of approximatley400. The community at the time had a large flour mill operated by Henry Snider (who purchased the Musselman mill in 1856), flax mills operated by the Perine brothers, and two sawmills. It also contained a Lutheran church, a common school, two general stores, three hotels, three carriage and wagon maker's shops, and several other mercantile and mechanical establishments (Irwin and Burnham 1867: 77). The 1881 Township of Woolwich map in the *Illustrated Historical Atlas of the County of Waterloo*, shows the village's development northeast of the Study Area (Figure 3). By 1887, Conestogo had a population of about 450 and in 1897, about 410 (Union Publishing Company 1897: 19).

4.5 20TH CENTURY DEVELOPMENT

The Township of Woolwich remained primarily agriculturally based throughout the 20th century, with small communities and trading centers for the farmlands. The population of the township remained stable until the mid-20th century (Waterloo Museum 2017). Conestogo remained a small village into the 20th century with a population in 1900 of about 410. That year, the community had two general stores, a carriage maker, a cooper, a tinware manufacturer, a brick manufacturer, a printer, a harness maker, a tailor, two millers, three blacksmiths, a wagon maker, a shoemaker, and a hotel (Union Publishing Company 1900: 208).

Accessibility in the township increased with the creation of Highway 85 and 7. In the southern part of the township, in 1920, the roadway between Sarnia and Guelph was assumed and designated as provincial Highway 7 (Bevers 2020). With Highway 7 as its southern terminus, work occurred during the 1960s and early 1970s on a new four-lane highway, known as the Conestoga Parkway or Highway 85. In 1998, the portion of the highway within the Township of Woolwich in the Region of Waterloo was renamed as Waterloo Road 85 (Bevers 2013).

In 1972, the current structure of the township's government was established by the *Regional Municipality of Waterloo Act*. The act was created as regional government structure and established the limits of local municipalities in the Region of Waterloo on January 1, 1973 (Woolwich Township 2016). Late 20th century growth in the township was influenced by its proximity to Kitchener-Waterloo and became an area for commuter families to live (Waterloo Museum 2017). The township is still composed of an extensive rural area with residential communities and industrial/commercial areas. It contains 10 small communities and has a population of 26,000 (Woolwich Township 2016). Conestogo remains a small community in the township with a population in 2016 of 1,270 (Statistics Canada 2017).

4.6 SITE HISTORY

The current Scheifele Bridge was constructed through the Study Area in 1958. It spans lots 3 and 32, in the Township of Woolwich. As indicated on historic and topographic mapping the bridge was not the first structure to cross the Conestogo River in relation to the Study Area. Early settlers to the area built bridges out of timber that was readily available as they cleared land for farming. Early timber structures consisted of two straight logs with smaller boards placed across to create a deck (Benjamin *et al.* 2013: 6).

The 1861 map of the County of Waterloo shows an open roadway with a structure across the Conestogo River just west of the Study Area (Figure 3). The map also depicts early property owners surrounding the bridge structure, including the Scheifele (Shifely) family. Listed on the south side of the river are Mathias and Frederick Scheifele, and Christian Scheifele on the northwest side of the river. The Scheifele's were brothers and sons of Andrew and Anna Maria Scheifele. The Scheifele's were a pioneer family to the area, as Andrew and Anna Maria emigrated from Germany with their children Matthias, Louisa, and Christian to Berlin in 1815 (Eby 1896: 222). Frederick Scheifele purchased 113 ½ acre parcel of Lot 3 in 1849, while his brother Matthias purchased a 119-acre parcel of Lot 3 in 1853 (Onland 2019a). On Lot 32, Christian Scheifele purchased a 70-acre portion in 1847 (Onland 2019b).

On the 1881 Township of Woolwich map in the *Illustrated Historical Atlas of Waterloo,* a structure is depicted across the Conestogo River, just west of the Study Area, in the same location as the structure shown on the 1861 map (Figure 3). No property owners are listed surrounding the bridge structure. In the late 19th century, flooding became an issue on the Conestogo River and controlling spring floods was first advocated in the 1890s (Thorning 2008). The reason for the flooding was the settler's transformation of the land throughout the 19th century from forest to farmland, that by the end of the 19th century left only 5 to 6% of the river valley under forest cover (GRCA 2004: 15).

In relation to the Study Area, Aaron Scheifele (son of Frederick) and his sons in the early 20th century, to stop flooding on their farmlands adjacent to the Conestogo River started to build a number of earthen levees. To help with erosion and secure the levees, they also planted willow trees. In 1922, Aaron's son Oliver, developed an innovative system to stop erosion on the river banks. Oliver Scheifele patented the design in both Canada and the United States. In the 1920s, he attained numerous contracts for his design with prominent government agencies and compies including the Department of Public Highways Ontario, Dominion Public Works, Canadian Pacific Railway, Canadian National Railway, and Grand River Railway (The Waterloo Chronicle 1926).

Historical Summary

In the mid-1930s, to control flooding the Grand River Conservation Commission proposed a system of dams on the Grand River watershed. The first dam, the Shand Dam was built to the northeast in 1942. Following the Second World War, planning to control the water levels on the Conestogo River became the focus. Planning for a dam was mostly complete by the end of 1952, but a freeze on federal spending influenced by the Korean War, held up work for another three years. In 1954, the Grand River Conservation Commission hired C.A. Pitts & Company to construct the dam. Except for the gates, work was mostly completed on the dam by the end of the summer of 1957. The dam was completed on October 15, 1958 (Thorning 2008).

Alongside the construction of the dam, the Scheifele Bridge was constructed that same year. The Scheifele Bridge was constructed to replace two deteriorated bridge structures in the Conestogo watershed. Based on previous flood levels, the new concrete and steel bridge would be built at a height that would provide for adequate crossing of the Conestogo River. The two previous structures are depicted on the 1936 topographic map of Conestogo (Figure 4). Both bridges were steel structures supported on concrete abutments. A tender was released by the Township of Woolwich in about 1904 for construction and installation of the two steel structures on concrete abutments (Region of Waterloo Archives n.d.).

In 1958, Waterloo County set aside the largest road budget in the history of the county, to date, with an estimated expenditure of $1,152,000. The County's share of the budget for road building and bridge construction was set at $337,500, while the remaining amount was made up with provincial and other grants. The estimated cost of the Scheifele Bridge was $175,000, with the County providing $36,000 for its construction (The Waterloo Chronicle March 1958).

In the spring of 1958, the Road and Bridge Committee called for tenders for the construction of Scheifele Bridge and for the grading of its approaches (County of Waterloo 1958: 88). In June 1958, the contract for the construction of the bridge and approaches was awarded to E. & E. Seegmiller (County of Waterloo 1958: 119). The new bridge would be constructed to replace two old bridges that spanned the Conestogo River watershed. County Engineer, J.M. Jordan asked for the replacement of the two structures given their poor and unsafe conditions. In September 1958, County Council approved the construction of the new bridge at a cost of $140,000 (The Waterloo Chronicle 1958: 1). The old bridges were to come down in November that year and their road approaches closed to traffic. The Waterloo Chronicle described the former roadway across these two bridges as a scenic drive and motorists would be losing the charming drive through a leafy tunnel, formed by masses of willow trees on either side of the roadway (The Waterloo Chronicle September 1958).

The new bridge was constructed just east of the previous bridge structures. A large amount of work was undertaken to build-up the new roadway approaches from the old roadway. Work was also completed on the Conestogo River as land was cut for the diversion of the watercourse under the new bridge (The Waterloo Chronicle 1958). The original construction drawings show the layout of existing bridge structures and riverbank prior to construction (Appendix B). The change to the watercourse is visible between the 1930 and 1963 aerial photographs of the Study Area (Figure 5). The bridge was completed,

with the exception of the approaches and paving, by December 1958 (County of Waterloo 1958: 209). The bridge was named for the Scheifele family.

4.7 STRUCTURE AND BRIDGE CONSTRUCTION

Until the late 19th century, bridges were constructed with either timber or stone. In the mid-19th century with the development of the railways, bridge technology and bridge construction boomed in the province. The railway bridges constructed in mid- to late 19th century were bigger and stronger structures that were required to carry large locomotives with heavy loads. Iron became a preferred building material as it was stronger and cheaper than wood. In the late 19th century, structural steel was introduced into bridge construction and was a lighter option than iron. In the early 20th century, the use of reinforced concrete in bridge construction became popular in the province. Reinforcing iron or steel with concrete created a stronger structure. Concrete was readily used in bridges in Ontario after 1930 (Bradford 2015).

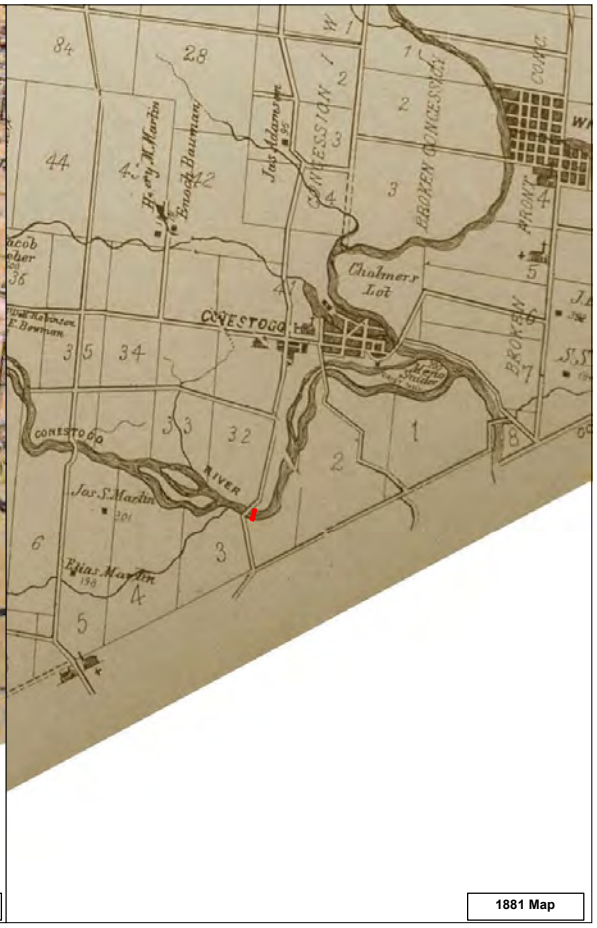
Following the Second World War, bridge construction rapidly increased in the province as part of a building boom. With an increase in population, there was a greater demand for bridge capacity, along with an increased focus on safety. The design of bridges changed to those where the motorist is unaware that they are crossing a structure. The new designs implemented had no bridge projecting above the road deck, except for simple guiderails. Many of the bridges built during this period were simple and plain in design to reduce construction time (Heritage Resources Centre 2013: 8). During the 1950s in Ontario, concrete rigid frame bridges remained the dominant form of bridge construction in the province. In the 1960s, the pre-stressed precast concrete beam and post-tension cast-in-place structures replaced the rigid frame structures as the dominant types (Heritage Resources Centre 2013: 237).

Scheifele Bridge is a T-beam bridge that was constructed in 1958. Beam and girder are one of the most common styles of bridge construction. Beam and girder construction consist of a series of solid members running longitudinally the length of the span, often with bracing between the parallel members. Each beam or girder is fastened to the abutments or piers and the deck is laid down on top. These bridges are more complex than a simple slab bridge but use less material than slab bridges. Typically, beam and girder bridges are used for long spans of greater than 10 m. There are a variety of beam and girder styles, which include I-Beams, Box-style, Rectangular, and T-shape. Beams and girder bridges are usually made of concrete or steel (Heritage Resources Centre n.d.:31).

4.8 BRIDGE DESIGNER

Scheifele Bridge was designed and engineered by C.C. Parker & Associates Consulting Engineers. The original bridge drawings are stamped by Registered Professional Engineer I.A. Kolsi (Appendix B).

1861 Map



1881 Map

Stantec

Legend

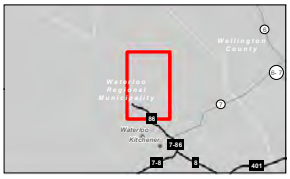
Study Area (Approx.)

NOT TO SCALE

Notes

1. Sources:
Tremaine, Geo. R. & G.M. 1861. Tremaine's Map of the County of Waterloo, Canada West. Toronto: Geo. R. & G.M. Tremaine.

Parsell, H. & Co. 1972. Illustrated Historical Atlas of the County of Waterloo. Owen Sound: Richardson, Bond & Wright.



Project Location
Region of Waterloo, ON

165010600 REV4
Prepared by BCC on 2020-03-24
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
REGION OF WATERLOO – SCHEIFELE BRIDGE
CULTURAL HERITAGE EVALUATION REPORT AND HERITAGE IMPACT ASSESSMENT

Figure No.
3

Title
19th Century Mapping

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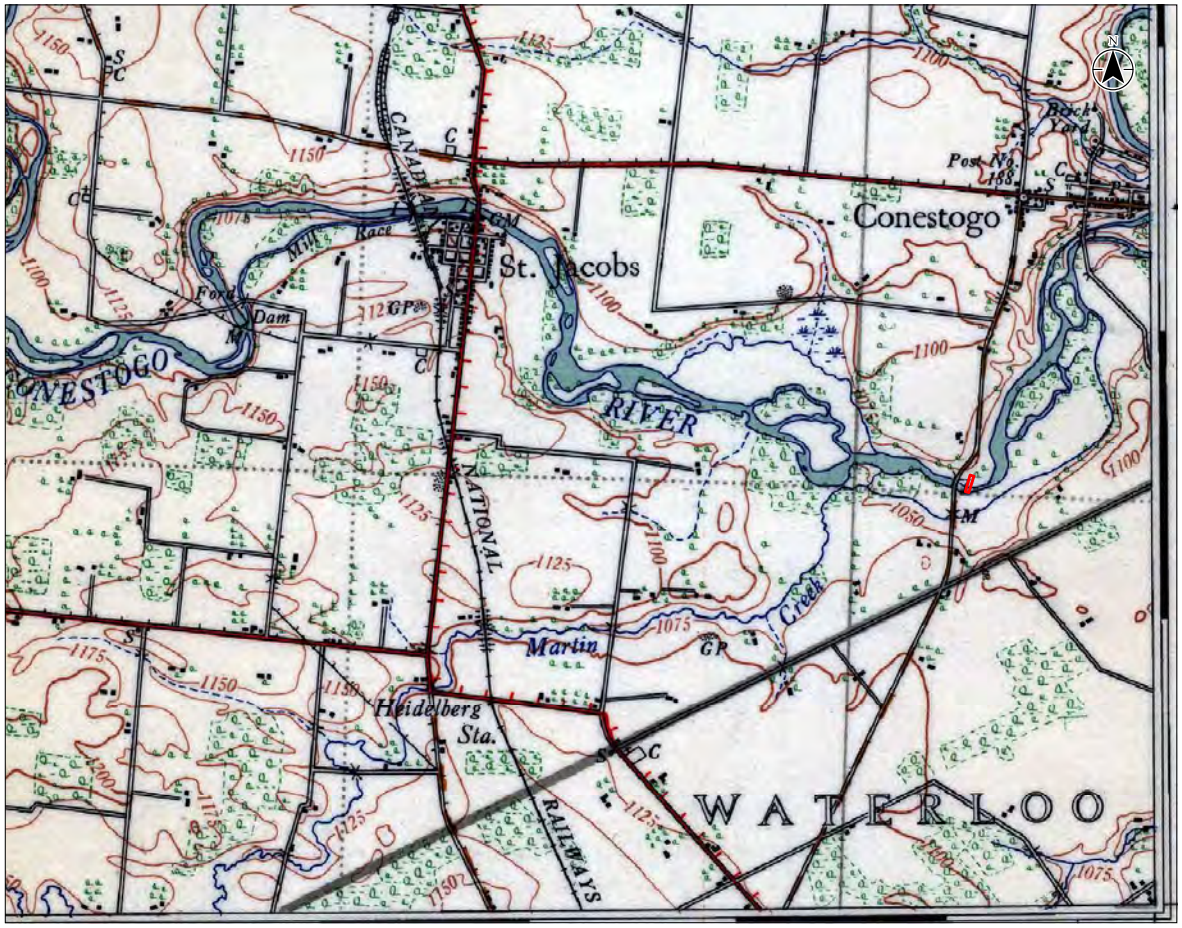

Stantec

Legend

Study Area (Approx.)

0 610 1,220 Metres

1:24,343 (At original document size of 11x17)

Notes

1. Source: Department of National Defence. 1936. Conestogo, Ontario. Surveyed 1933 with aerial photography by R.C.A.F.

Project Location
Region of Waterloo, ON

165010600 REV4
Prepared by BCC on 2020-03-24
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

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REGION OF WATERLOO - SCHEIFELE BRIDGE CULTURAL HERITAGE EVALUATION REPORT AND HERITAGE IMPACT ASSESSMENT

Figure No.
4

Title
1936 Conestogo Topographic Map

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1930 Air Photo

1963 Air Photo

Stantec

Legend

NOT TO SCALE

Notes
1. Sources:
University of Waterloo. 1930. 1930_IM14. Air Photos Digitalization Project, University Map Library.

University of Waterloo. 1963. 1963_IM14. Air Photos Digitalization Project, University Map Library.

Project Location
Region of
Waterloo, ON

165010600 REV4
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Client/Project
REGION OF WATERLOO - SCHEIFELE BRIDGE
CULTURAL HERITAGE EVALUATION REPORT AND
HERITAGE IMPACT ASSESSMENT

Figure No.
5

Title
20th Century Air Photos

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5.0 BRIDGE DESCRIPTION

5.1 SCHEIFELE BRIDGE

5.1.1 Surrounding Context

Scheifele Bridge spans the Conestogo River as part of Northfield Drive East (Regional Road 22) between University Avenue East and New Jerusalem Road, in the Township of Woolwich, within the Region of Waterloo. The bridge is situated southwest of the small rural community of Conestogo. The bridge is set within a rural and natural area of the township. The bridge spans the Conestogo River over GRCA lands that are composed of the naturalized river valley (Plate 2 to Plate 4). Running under the bridge, the Conestogo River, at the time of the site assessment (March 18, 2020), had a steady slow flow, with a recorded velocity to the north at St. Jacobs of 25.83 m^3/s (GRCA 2020). Lining the grassed riverbanks are deciduous trees and bushes, with the majority being black willow trees.

The bridge is oriented in a general north-south direction and carries two lanes of traffic over the Conestogo River. Set within the river valley, Northfield Drive East declines in slope as the roadway approaches the Scheifele Bridge from both the north and south approaches (Plate 5 to Plate 9). Northfield Drive East over the bridge has a double centre line with narrow shoulders. The northwest abutment is set on a gradual sloped grassed embankment (Plate 10 and Plate 11). The northeast embankment has a steeper grassed embankment with adjacent deciduous trees and wood post and beam fence line (Plate 12 and Plate 13). The south embankment has a steep grassed sloped embankment with adjacent deciduous shrubs and black willow trees (Plate 14 to Plate 17).

Bridge Description

Plate 2: Naturalized Conestogo River valley west of Scheifele Bridge looking south

Plate 3: Naturalized Conestogo River valley west of Scheifele Bridge looking northwest

Bridge Description

Plate 4: Naturalized Conestogo River valley east of bridge looking east

Plate 5: North approach looking south

Bridge Description

Plate 6: North approach to Scheifele Bridge looking south

Plate 7: North approach to Scheifele Bridge looking north

Plate 8:South approach to Scheifele Bridge looking north

Plate 9: South approach to Scheifele Bridge looking south

Bridge Description

Plate 10: Northwest embankment looking south

Plate 11: Northwest embankment looking north

Plate 12: Northeast embankment looking north

Plate 13: Northeast embankment steep slope and adjacent trees

Bridge Description

Plate 14: Southwest embankment looking northwest

Plate 15: Southwest embankment looking southeast

Plate 16: Southeast embankment looking northeast

Plate 17: Southeast embankment looking south

5.1.2 Cultural Heritage Landscape Candidate

To the west of the bridge is a cultural heritage landscape (CHL) candidate that is composed of the remnant roadway and bridge abutments of the two previous bridge structures (Plate 18 to Plate 23) (Figure 6). The abutments of the former smaller bridge are located approximately 175 m southwest of the Scheifele Bridge. From the smaller bridge, the remnant roadway that is lined with deciduous trees runs parallel to Northfield Drive East in a northwest direction and is separated by a marsh area. At the north end of the remnant road is the south abutment of the former larger bridge. The aggregate in the concrete of the abutment of the larger bridge points to it dating to the early 20th century, between 1910 and 1930 (Plate 21). The alteration of the Conestogo River in the 1950s, is evident given the location of the north abutment of the former bridge directly west of the Scheifele Bridge now situated on an island in the middle of the river. The alteration is also evident on the east side of the bridge where there is a build-up of sediment (Plate 24). Perched atop the north abutment of the former bridge across the Conestogo River is a folk art piece of a blue heron.

Plate 18: Northwest side of Conestogo River looking south towards former bridge

Bridge Description

Plate 19: North abutment of former bridge looking west from Scheifele Bridge

Plate 20: South abutment of former bridge looking southwest from Scheifele Bridge

Plate 21: Close-up of south abutment of former bridge looking west

Plate 22: Remnant roadway looking northwest

Plate 23: Former smaller bridge abutments looking west

Plate 24: Sediment build-up in Conestogo River on east side of Scheifele Bridge

5.1.3 Bridge Description

Detailed information regarding the Scheifele Bridge was taken from the 2010 *Structural Investigation and Alternative Assessment Report* prepared by McCormick Rankin Corporation (MRC), the 2018 *Scheifele Bridge Over Conestogo River, Regional Road No.22 (Northfield Drive), Inspection and Recommendations Report* prepared by WSP Canada Group Limited (WSP), and the *Bridge Inspection Form* completed by Stantec in 2019.

Scheifele Bridge is a four-span cast-in-place continuous reinforced concrete T-beam bridge. The four continuous spans are 22.9 m, 30.4 m, 30.4 m, and 22.9 m in length. The bridge has a total length of 107.2 m. The overall deck width is 11.6 m, while the asphalt wearing surface is 9.14 m wide (Plate 25). The total deck area is 1254.2 m^2. The east side of the bridge has a raised concrete curb that is 0.61 m wide, and the west side of the bridge has a concrete sidewalk that is 1.83 m wide. The bridge deck is a cast-in-place concrete thin slab supported by four variable depth concrete T-beams. Each side of the bridge has galvanized steel handrails with concrete filled steel posts and concrete end walls (Plate 26 to Plate 30). Steel beam guiderails are also attached to the front face of the concrete posts (Plate 31 and Plate 32). Armoured strip-seal expansion joints are located at each end of the bridge (Plate 33 to Plate 35). There are 22 galvanized steel pipe deck drains on the bridge, with 11 on each side along the edge of the pavement (Plate 36 and Plate 37).

The superstructure of the bridge is supported on steel rocker bearings at the abutments, north and south piers, and fixed steel pin bearings at the centre pier (Plate 38). The north and south abutments are composed of cast-in-place concrete, that are each 11.4 m wide and 7.5 m tall (Plate 39 to Plate 44). Each abutment has cast-in-place concrete wingwalls. The bridge is supported by three piers, each composed of a concrete stem supported by concrete spread footings (Plate 45 to Plate 47). Each pier is 11.4 m wide, 5.68 m tall, and 0.76 m thick. At all four corners of the structure are reinforced concrete cantilevered retaining walls supported by spread footings. The bridge deck is supported by concrete T-beams, that are

each 108 m long, 0.76 m wide, and 1.47 m tall (Plate 48 and Plate 49). Running the west side of the bridge are the utility pipes (Plate 50).

Plate 25: Bridge deck looking south

Plate 26: Railing on east side of bridge

Plate 27: Northeast concrete end wall looking southeast

Plate 28: Northwest concrete end wall looking southwest

Bridge Description

Plate 29: Southwest concrete end wall looking southwest

Plate 30: Southeast concrete end wall looking northwest

Plate 31: Attached steel guiderail looking southwest

Plate 32: Close-up of attached steel guiderail

Plate 33: North end expansion joint looking northeast

Plate 34: Close-up of north end expansion joint looking east

Plate 35: South end expansion looking southeast

Plate 36: Close-up of steel drainage pipe from bridge deck

Plate 37: Close-up of steel drainage pipe from underside of bridge

Plate 38: Steel rocker bearings on south pier looking northwest

Plate 39: South abutment looking southwest

Plate 40: Southeast wingwall looking south

Plate 41: Southwest wingwall looking southeast

Plate 42: North abutment looking northeast

Plate 43: Northwest wingwall looking northwest

Bridge Description

Plate 44: Northeast wingwall looking north

Plate 45: Scheifele Bridge piers looking southeast

Plate 46: Close-up of north pier looking southeast

Plate 47: Scheifele Bridge piers looking northeast

Bridge Description

Plate 48: View of T-beams looking north

Plate 49: Close-up of T-beams and concrete forms

Plate 50: Utilities running west side of bridge looking northeast

5.2 MODIFICATIONS

In 1982, the Scheifele Bridge was rehabilitated under Contract No. 82-16, by the Region of Waterloo and Dillon Consulting Engineers & Planners (See Appendix B). The rehabilitation work included:

- Removal of asphalt and waterproofing
- Scarifying 12 mm from top of existing concrete deck
- Removal of delaminated concrete from top of concrete deck
- Placement of a 38 mm thick latex modified concrete overlay
- Repairs to concrete curb and sidewalk with latex concrete/patching
- Shotcrete repairs to T-beams and deck soffits
- Replacement of expansion joints and armoured strip seal system, including removal and partial reconstruction of the ballast walls
- Modification to deck drains
- Placement of new waterproofing and asphalt wearing surface

(Dillon Consulting Engineers & Planners 1982)

In 2005, a pilot project was completed on the bridge by Dr. Khal Soudki of the University of Waterloo, which involved the rehabilitation of the south girders using carbon fibre reinforced polymer wraps to strengthen the girders and to provide confinement to the concrete (WSP 2018: 3).

In 2011, minor rehabilitation work was undertaken by the Region of Waterloo and MRC on the bridge under Contract No. 2011-009 (see Appendix D). The rehabilitation work included:

- Partial depth removal of asphalt (40 mm deep)
- Concrete patch repairs to the abutments, piers, and retaining walls
- Replacement of expansion joints with new armoured strip seal assembly, including partial reconstruction of the ballast walls
- Installation of steel beam rails on the existing railing posts on the bridge
- Replacement of steel beam guiderail at all four corners of the bridge, including concrete of new approach guiderail panels to rails mounted on existing bridge railing
- Placement of new 40 mm surface course asphalt

(MRC 2011)

In 2019, temporary bearing repairs were completed on the bridge that comprised a steel bracket cantilevered from the south abutment wall at the east girder. The bracket supports a hollow structural section post complete with a base plate and cap plate. Steel shims were also provided between the hollow structural section cap plate and girder plate (WSP 2020).

5.3 COMPARATIVE ANALYSIS

To determine the design/physical value of Scheifele Bridge a comparative analysis was undertaken against bridge inventories completed in the Region of Waterloo, the Grand River watershed, and for provincially owned structures.

5.3.1 Regional Municipality of Waterloo

The Region of Waterloo provided a bridge listing for examination that includes 178 structures. According to the listing, of the total structures in the Region, there are only three T-beam concrete bridges that exist. Besides Scheifele Bridge, the two other structures in the Township of Woolwich and the Region include:

- Northfield Drive East bridge spanning Canagagigue Creek (ID 2202), built in 1960, with a total deck area of 451.5 m^2
- Line 86 bridge spanning the Grand River (ID 8602), built in 1958, with a total deck area of 808.1 m^2

In 2004, the Region of Waterloo completed *Spanning the Generations: A Study of Old Bridges in Waterloo Region*. Phase 1 inventoried bridges into seven categories including Pre-1950 Bridges, Post-1950 Bridges, Pedestrian Walkways, Railway Overpasses and Underpasses, Viaducts, Culverts, and Abandoned Bridges. Under the category of Post-1950 Bridges, the report identified two structures in the Township of Woolwich as having potential heritage value, including the Mennonite Bridge, a concrete slab bridge (built in 1962), and Breslau Bridge, a reinforced concrete beam bridge (built in 1972). The report did not include the Scheifele Bridge as a potential heritage structure. Only two T-beam structures were identified, the Speedville North Bridge and Speedville South Bridge (both built in 1959), in the City of Cambridge (Region of Waterloo 2004a). Following evaluation under Phase 2 according to Ontario Heritage Bridge Program Criteria, a pre-cursor to the OHBG in 2008, only the Mennonite Bridge of the above noted structures was identified as having heritage merit (Region of Waterloo 2004b).

5.3.2 Grand River Watershed Bridges

In 2004, the *Grand Old Bridges: The Grand River Watershed Bridge Inventory* was prepared for the GRCA by Robinson Heritage Consulting. The inventory examined 99 bridges within the Grand River watershed to determine which structures display qualities of architectural/engineering, historical or contextual heritage significance. Within the Township of Woolwich two bridges were identified has having significant heritage value, including the Conestogo Bridge (built in 1886), and McNabb's Bridge (built in 1948). The Scheifele Bridge was not identified as having heritage value in this inventory (Robinson Heritage Consulting 2004).

In the 2013, *Arch, Truss & Beam, The Grand River Watershed Heritage Bridge Inventory*, was prepared by the Heritage Resources Centre at the University of Waterloo, in partnership with the GRCA and the Heritage Working Group. The team undertook an inventory of heritage bridges in the Grand River watershed with the goal of the inventory to identify as many bridges as possible (Heritage Resources Centre 2013: 5). The preliminary inventory included 678 bridges. Site visits were carried out for bridges with potential cultural heritage value, determined by a bridge's age, construction type, its surrounding

context, public recommendations, and Ontario Structural Integrity Management reports (Heritage Resources Centre 2013: 11). To create a listing of heritage structures, bridges were evaluated according to O. Reg. 9/06 (Heritage Resources Centre 2013: 13). Seven bridges in the Township of Woolwich were identified as having cultural heritage value under O. Reg. 9/06, this includes:

- West Montrose Covered Bridge, a covered bridge built in 1881
- Winterbourne Bridge, Pratt Camelback Through Truss bridge built in 1913
- Conestogo Bridge, Pratt Through Truss bridge built in 1886
- Chamber's Bridge, Camelback Pratt Through Truss bridge built in 1930
- St. Jacob's Viaduct, Deck Truss bridge built in 1890
- Mennonite Bridge, Solid Slab bridge built in 1962
- Floradale Bridge, Concrete Earth-filled Arch bridge built in 1913

The Scheifele Bridge was not recognized in the Township of Woolwich as having cultural heritage value according to O. Reg. 9/06. The inventory identified 11 T-beam bridges in the Grand River Watershed has having cultural heritage value under O. Reg. 9/06. These 11 structures were determined to have cultural heritage value either as early examples of T-beam bridges in the Grand River watershed, or for their detailed design elements. The following are the 11 T-beam structures recognized in the report:

- Harry Martin Bridge, County of Brant, built in 1955, with an overall length of 30.6 m
- Township of Mapleton Bridge MB009, built in 1958, with an overall length of 26 m
- Township of Mapleton Bridge PB001, built ca. 1950, with an overall length of 10.6 m
- Township of Mapleton Bridge PB016, built ca. 1950, with an overall length of 13.8 m
- Township of Mapleton Bridge PB019, built ca. 1940, with an overall length of 10 m
- Centre Wellington Bridge 26-P, built in 1940, with an overall length of
- Centre Wellington Bridge 28-P, built in 1926, with an overall length of 11.3 m
- Centre Wellington Bridge 3-N, built in 1942, with an overall length of 26.3 m
- Centre Wellington Bridge 6-E, built ca. 1921, with an overall length of 10.4 m
- Bridge 3-N, Township of Erin, built in 1920, with an overall length of 26.3 m
- Gordonville Bridge, County of Wellington, built in 1930, with an overall length of 23.8 m

(Heritage Resources Centre 2013)

5.3.3 Provincial Bridges

Outside the Region of Waterloo and Grand River watershed, Scheifele Bridge is a more common type of bridge in the province. By comparison, examination of that type on the Ministry of Transportation (MTO) bridge list that includes 2,801 structures, it was determined there are 65 provincially owned reinforced cast-in-place concrete beam/girder structures in the province with T-beams constructed between 1913 and 2014. Of these bridges, 10 are specifically located in the West region of Ontario, that date between 1930 and 1960. Two of the 10 structures are located in the Region and are four span structures that date to 1960:

Bridge Description

- Site 33-176, Waterloo Regional Road #97 Underpass (Cedar Creek Road), total length 79.8 m (14.9 m, 26.2 m, 26.2 m, and 12.5 m)
- Site 33-177, Waterloo Regional Road #46 Underpass (Roseville Road), total length 58 m (9.6 m, 19.4 m, 19.4 m, and 9.6 m)
- Site 33-143, Breslau Road, total length 67.4 m (14 m, 18.6 m, 18.6 m, 16.2 m) (This structure was recently replaced)

In comparison to the two provincially owned structures in the Region of Waterloo, Scheifele Bridge is a longer four span bridge with a total length of 107.2 m (22.9 m, 30.4 m, 30.4 m, 22.9 m).

Stantec

Legend
- Study Area
- Cultural Heritage Landscape
- Waterbody

0 50 100 Metres

1:2,253 (A1 original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2020.
3. Orthoimagery © First Base Solutions, 2020, imagery date 2018.

Project Location
Region of Waterloo, ON

165010600 REV4
Prepared by BCC on 2020-03-25
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
REGION OF WATERLOO – SCHEIFELE BRIDGE CULTURAL HERITAGE EVALUATION REPORT AND HERITAGE IMPACT ASSESSMENT

Figure No.
6

Title
Adjacent Cultural Heritage Landscape

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

6.0 CULTURAL HERITAGE VALUE OR INTEREST

6.1 CANADIAN HERITAGE RIVER SYSTEM

The Grand River system including its major tributaries, the Conestogo, Eramosa, Nith, and Speed rivers were designated as a Canadian Heritage Rivers System (CHRS) in 1994 (CHRS 2017). The CHRS is Canada's national river conservation program. The purpose of the designation is to encourage the river's long-term management to conserve the identified natural, cultural, and cultural values for the benefit and enjoyment of Canadians, now and in the future (CHRS 2019: 8). The designation carries no regulatory or legal authority or restrictions (GRCA 2020b).

The Grand River was designated based on its outstanding and abundant human heritage and recreational features. The five major themes listed for human heritage values include:

- The watershed's cultural mosaic since the mid-19th century
- The strong association of Indigenous peoples with the watershed for thousands of years
- The Grand River's industrial heritage
- Human adaption to fluctuating river flows
- The many famous people associated with the watershed

(GRCA 2014)

6.2 EVALUATION OVERVIEW

It was determined during the field program that a CHL candidate is located west of the Scheifele Bridge. This includes the remnant county roadway and former bridge abutments. Given the close location of the CHL candidate to the Study Area, an evaluation of the CHL against O. Reg. 9/06 was also undertaken. This identification and evaluation of a CHL candidate is in accordance with the Region's *Draft Regional Implementation Guideline for Cultural Heritage Landscape Conservation* (Region of Waterloo 2018). The CHL candidate evaluation is included in 6.3.2.

For Scheifele Bridge, two separate evaluation criteria were considered in the evaluation of Scheifele Bridge as outlined in Section 3.3. Within the EA process, O. Reg. 9/06 is typically used to identify Cultural Heritage Value or Interest (see Table 1). For this project, the OHBG evaluation framework was also considered as they contain bridge-specific evaluation criteria and are part of a process recognized by the province for assessing the heritage value of bridges (see Table 2). It must be noted that the OHBG are intended to apply to provincially owned (MTO) bridges and are not required to determine the Cultural Heritage Value or Interest of a non-provincially owned bridge. However, the OHBG are useful in evaluating bridges as they have been designed and weighted specifically for this resource type, unlike O. Reg 9/06 which is more general in nature. An overall summary of cultural heritage value identified in the two evaluation frameworks is provided in Section 6.3.

6.3 EVALUATION

6.3.1 Scheifele Bridge

6.3.1.1 Ontario Regulation 9/06

Design/Physical Value

Scheifele Bridge is a T-beam bridge that was constructed in 1958. It is one of three T-beam concrete bridges in the Township of Woolwich and the Region of Waterloo that span watercourses. It is also the largest of the three identified structures. Although, the Scheifele Bridge as a T-beam structure is an uncommon type in the Region, beam bridges were common structures constructed by the 1960s. Available comparative data, including the Region's 2004 inventory, and the 2004 and 2013 GRCA inventories, did not identify the structure has having potential cultural heritage value or interest in comparison to other bridges in the Region and GRCA watershed. Through examination of additional sources, it was determined that beam/girder bridges are one of the most common styles of bridge construction in the province. Scheifele Bridge in comparison to the two provincially owned structures in the Region was by far the longest structure. While it may be the longest, it includes typical span lengths and is consistent in design to other T-beam concrete bridges.

The bridge is unique for its retention of its original railings. Although the visual appearance of the railings has been altered with the addition of a steel guiderail. The original drawings for the bridge noted the railings to be of a standard Department of Highways Ontario handrail and posts that were provided by the County of Waterloo for installation (Appendix B). The design of the railings is similar to Michigan's signature R4 railings, that were first constructed in 1932 (Historic Bridges 2020). Thus, this bridge is not a rare, unique, representative, or an early example of this style or construction method. Scheifele Bridge is a standard design that does not demonstrate a high degree of craftmanship or artistic merit.

Based on the above discussion, Scheifele Bridge does not meet criteria of Section 1 of the O. Reg. 9/06.

Historic/Associative Value

Scheifele Bridge was constructed in 1958 under the County of Waterloo to replace two deteriorating bridge structures and to provide a more durable and suitable structure to the Conestogo River valley. It was constructed during a period when flood control measures were being undertaken in the Grand River watershed, including the Conestogo Dam that was constructed in 1958 to the northwest. The bridge was designed by C.C. Parker & Associates Consulting Engineers of Hamilton, Ontario, and constructed by E. & E. Seegmiller of Kitchener, Ontario. Its mid-20th century construction serves a functional purpose, and thus the bridge has no direct historical connection with the early development of the Township of Woolwich or the nearby community of Conestogo.

Cultural Heritage Value or Interest

The bridge is named for the Scheifele family who were early landowners on the south and north side of the Conestogo River. The family was also known for the early flood control measures to stop flooding on their farmlands adjacent to the river. Oliver Scheifele, also known as the 'Willow King,' was well-known in the 1920s for his innovative flood control system utilizing planted willows. While the bridge is named for the Scheifele family, the connection is not significant to the bridge structure itself, but rather means of commemoration. The Scheifele name is not used on the bridge or nearby signage.

The bridge does not yield information that contributes to an understanding of a community or culture. The bridge demonstrates the work of C.C. Parker & Associates Consulting Engineers who were prolific engineers in the province, but not significant to a community. It also demonstrates the work of E. & E. Seegmiller, a construction company in the Region of Waterloo, but also known for their work throughout the province.

Based on the above discussion, the bridge does not meet criteria of Section 2 of O. Reg. 9/06.

Contextual Value

The visible sections of the Scheifele Bridge are of common design and are not important in defining, maintaining, or supporting the character of the area. The bridge is functionally linked to its surroundings as it carries Northfield Drive East over the Conestogo River. However, this functional relationship is standard to all water crossings and does not confer a high degree of contextual value. With the exception of the concrete barriers with steel railings, Scheifele Bridge is not visible while travelling along Northfield Drive East. The bridge is within the viewscape of travelers along the Conestogo River or those on the GRCA lands, but the bridge is not a historic landmark, but rather a familiar structure in the context of the area.

Based on the above discussion, the bridge does not meet criteria of Section 3 of O. Reg. 9/06.

Table 1: Evaluation of Scheifele Bridge According to *Ontario Regulation* 9/06 of the *Ontario Heritage Act*

Criteria of O. Reg. 9.06	Y/N	Comments
Is a rare, unique, representative, or early example of a style, type, expression, material, or construction method	N	Scheifele Bridge is a concrete T-beam bridge that was constructed in 1958. It is one of three remaining concrete T-beam structures in Woolwich Township and the Region of Waterloo over a watercourse. Although the bridge is an uncommon type in the Region, beam bridges were common structures in the mid-20th century. Through examination of additional sources, it was determined that beam/girder bridges were one of the most common styles of bridge construction in the province. Many were constructed in the 1950s and 1960s and many remain. While Scheifele Bridge is the longest identified structure from the local and provincial bridge inventories, it includes typical span lengths and is consistent in design to other T-beam structures. The bridge is unique for its retention of its original railings. Although the visual appearance of the railings has been altered with the addition of a steel guiderail. The original drawings for the bridge noted the railings to be of a standard Department of Highways Ontario handrail and posts that were provided by the County of Waterloo for installation (Appendix B).

Cultural Heritage Value or Interest

Criteria of O. Reg. 9.06	Y/N	Comments
		The design of the railings is similar to Michigan's signature R4 railings, that were first constructed in 1932 (Historic Bridges 2020). Thus, this bridge is not a rare, unique, representative, or an early example of this style or construction method. Scheifele Bridge is a standard design that does not demonstrate a high degree of craftmanship or artistic merit. Accordingly, the bridge does not meet this criterion.
Displays a high degree of craftsmanship or artistic merit	N	The bridge does not contain decorative features or other elements that demonstrate a high degree of craftsmanship or artistic merit. Accordingly, the bridge does not meet this criterion.
Demonstrates a high degree of technical or scientific achievement	N	The bridge is a common beam design that uses steel T-beams and concrete, common bridge materials at the time of construction. As such, it does not demonstrate a high degree of technical or scientific achievement. Accordingly, the bridge does not meet this criterion.
Has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community	N	The bridge was constructed in 1958 to replace two deteriorated bridge structure and aid in the mid-20th century flood control measures on the Conestogo River as part of the Grand River watershed. The bridge is not the first constructed across the Conestogo River in relation to the Study Area. A structure appears just west of the Study Area on historic mapping from 1861. Its construction serves a functional purpose, and thus the bridge has no direction connection with the early development of the Township of Woolwich or nearby community of Conestogo. Accordingly, the bridge does not meet this criterion.
Yields, or has the potential to yield, information that contributes to an understanding of a community or culture	N	The bridge is T-beam structure that does not contribute significantly to an understanding of a community or culture. Accordingly, the bridge does not meet this criterion.
Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community	N	The bridge was designed by C.C. Parker & Associates Consulting Engineers of Hamilton, Ontario, and constructed by E. & E. Seegmiller of Kitchener, Ontario. C.C. Parker & Associates Consulting Engineers were prolific engineers in the province, but not significant to a community. It also demonstrates the work of E. & E. Seegmiller, a construction company in the Region, but also known for their work throughout the province. They are also not significant to a specific community. Accordingly, the bridge does not meet this criterion.
Is important in defining, maintaining or supporting the character of an area	N	The visible sections of the bridge are of common design and are not important in defining, maintaining, or supporting the character of the area. Accordingly, the bridge does not meet this criterion.
Is physically, functionally, visually or historically linked to its surroundings	N	The bridge is functionally linked to its surroundings as it carries Northfield Drive East over the Conestogo River. However, this functional relationship is standard to all water crossings and does not confer a high degree of contextual value. Accordingly, the bridge does not meet this criterion.
Is a landmark	N	The superstructure of the bridge is not visible along Northfield Drive East. Within the viewscape along the roadway are the steel railings with concrete ends, and steel guiderails. The bridge is within the viewscape from the Conestogo River or GRCA lands. The structure is not a historic landmark but rather a familiar structure within the context of the area. Accordingly, the bridge does not meet this criterion.

6.3.1.2 Ontario Heritage Bridge Guidelines

Following evaluation against the OHBG, Scheifele Bridge was determined to be a common example of a mid-20th century T-beam structure. The majority of its score was attributed to its functional design, visual appeal, and its bridge designers (Table 2).

Table 2: Ontario Heritage Bridge Guidelines

	Criteria	Details	Maximum Score	Assigned Score	Comments
Design/Physical Value (Total marks 50)	Functional Design	Excellent	20	12	Scheifele Bridge is a four-span concrete T-beam bridge. Although comparative data was limited for the Region, the bridge is a common structure type in the province. The MTO bridge list indicated that there are 65 reinforced cast-in-place concrete beam/girder bridges with T-beams in the province, 10 of this type in the West Region, and two in the Region. The bridge does not display a high degree of technical merit or scientific achievement, as its design was an emerging standard for the 1950s.
		Very Good	16		
		Fair	12		
		Common	0		
	Visual Appeal	Excellent	20	12	Scheifele Bridge is a well-proportioned structure that is appropriate to the landscape within the Conestogo River valley. The bridge is unique for its retention of original railings and simple plain design, that were intended to not impede a driver's view of the Conestogo River. Where changes have occurred, including maintenance, this has been done sympathetically and maintained the visual integrity of the original structure primarily through retention of original railings. Although simple in appearance, this reflects an approach to bridge design popular in the mid-20th century focused on simplicity and enhancing driver experience.
		Good	12		
		Fair	4		
		None	0		
	Materials	Excellent	10	0	Concrete and steel are common materials and are not rare or unusual combinations.
		Very Good	8		
		Good	5		

Cultural Heritage Value or Interest

	Criteria	Details	Maximum Score	Assigned Score	Comments
		Common	0		
Contextual Value (Total marks 25)	Landmark	Excellent	15	3	With the exception of the steel railings, with concrete ends and steel guiderail, Scheifele Bridge is not visible while travelling along Northfield Drive East. The bridge is visible from the Conestogo River and GRCA lands. The bridge is a familiar structure in the context of the area.
		Good	9		
		Fair	3		
		Common	0		
	Character Contribution	Excellent	10	0	The bridge is set within a rural and natural landscape. The common construction and design elements of the bridge are in keeping with the character of the area but do not significantly contribute to it
		Good	6		
		Common	0		
Historical Association (Maximum Score 25)	Designer/ Construction Firm	Excellent	15	9	Scheifele Bridge was designed by C.C. Parker & Associates, a company out of Hamilton, Ontario, that existed from 1951 to 1980. The construction of the bridge and its approaches was completed by E. & E. Seegmiller, of Kitchener, Ontario. The company still operates throughout the Region and the province. Both the designer and builder were prolific in the southwestern region.
		Good	9		
		Fair	3		
		Unknown	0		
	Association with a Historical theme,	Excellent	10	0	Scheifele Bridge was constructed in 1958 to replace two deteriorated bridge structures and aid with flood control measures on

Cultural Heritage Value or Interest

	Criteria	Details	Maximum Score	Assigned Score	Comments
	person or event	Good	6		the Conestogo River. The bridge is named for a local pioneer family and adjacent landowners. Although this commemoration does not have significant heritage value and is not represented on or nearby the bridge structure. Given its mid-20th century construction date and common connection as part of flood control measures on the Conestogo River, the bridge does not merit historic value.
		Common	0		
	Total Score:			**36**	

6.3.2 Cultural Heritage Landscape Candidate

6.3.2.1 Ontario Regulation 9/06

Design/Physical Value

The CHL contains a remnant county roadway and bridge abutments of two former structures. The roadway is built up and lined with mature deciduous trees including Black Willow trees. The design/layout of the roadway has been maintained at least since 1861, when it appears on the County of Waterloo map (Figure 3). Prior to the construction of the Scheifele Bridge, the roadway was described in The Waterloo Chronicle as scenic drive, with a leafy tunnel, formed by masses of willow trees on either side of the roadway (The Waterloo Chronicle September 1958). The CHL is representative of a historic roadscape.

The CHL does not display a high degree of craftmanship or merit, or scientific or technical achievement, but instead common elements of evolved roadway and bridge construction from the early to mid-20th century.

Based on the above discussion, the CHL meets one criterion (1.i) of Section 1 of the O. Reg. 9/06.

Historic/Associative Value

The CHL is connected to early roadway and bridge development in the Township of Woolwich. The layout of the former county roadway in the CHL appears on the 1861 map of the County of Waterloo, as an open roadway with a structure across the Conestogo River (Figure 3). The roadway is also shown in the same location on the 1881 Township of Woolwich map in the *Illustrated Historical Atlas of the County of Waterloo* (Figure 3). The roadway facilitated access for local farmers and travelers from adjacent communities including Waterloo to the community of Conestogo.

Although the number of previous bridge structures in the CHL was undetermined, the bridge location and orientation according to the historical mapping was consistent. As determined through local history sources, bridge construction in the mid-19th century across the Conestogo River was a top priority in the

Cultural Heritage Value or Interest

Township of Woolwich. In the early to mid-19th century, bridges were either constructed of timber or stone, until the introduction of the railways in the 1850s when iron structures were first used in the province. According to the 1936 topographic map, the larger bridge across the Conestogo River was an iron structure, while the smaller bridge was a masonry structure (Figure 4). The map shows other iron structures across the Conestogo River, including two to the northwest in St. Jacobs, and one to the northeast in Conestogo. Both bridges in the CHL were set on concrete abutments that date between 1910 and 1936, determined through the early concrete.

The CHL does not have the potential to contribute to understanding of a community or culture. While the CHL functionally provided access to the community of Conestogo from the south, it was not the only access road with a bridge structure in the area. The roadway was constructed under the local government through the aid of local landowners. While the remaining bridge abutments would have been constructed under the County of Waterloo. The CHL does not reflect the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.

Based on the above discussion, the CHL meets one criterion (2.i) of Section 2 of O. Reg. 9/06.

Contextual Value

The CHL is situated within a rural and natural area of the Township of Woolwich. Directly west and south of the CHL are agricultural fields, to the east is a natural marsh area, and to the north is the Conestogo River. The CHL with its remnant county streetscape and early 20th century bridge abutments support the rural character of the surrounding area. It is also physically, visually, and historically linked to its surroundings including the Conestogo River and the community of Conestogo. The roadway and bridge abutments were constructed to facilitate access across the Conestogo River for local farmers and travelers to and from the community of Conestogo. The CHL served as roadway from at least 1861 to 1958. The Black Willow trees that make up a portion of the tree lined roadway are also connected to those along the Conestogo Riverbanks.

The concrete north abutment of the former larger bridge across the Conestogo River is easily discernible in the natural landscape and viewscape of travelers along the river or Northfield Drive East. Perched atop the abutment is folk art piece of a blue heron. While the remaining portion of the CHL blends in with the surrounding natural area, the north abutment is recognizable human-made feature that can be considered a landmark.

Based on the above discussion, the CHL meets three criteria (3. i.ii.iii) of Section 3 of O. Reg. 9/06.

Table 3: Evaluation of the CHL Candidate According to *Ontario Regulation* 9/06 of the *Ontario Heritage Act*

Criteria of O. Reg. 9.06	Y/N	Comments
Is a rare, unique, representative or early example of a style, type, expression, material or construction method	Y	The CHL contains a remnant county roadway and bridge abutments of two former structures. The roadway is built up and lined with mature deciduous trees including Black Willow trees. Prior to the construction of the Scheifele Bridge, the roadway was described in The Waterloo

Cultural Heritage Value or Interest

Criteria of O. Reg. 9.06	Y/N	Comments
		Chronicle as scenic drive, with a leafy tunnel, formed by masses of willow trees on either side of the roadway. The CHL is representative of historic roadway landscape.
Displays a high degree of craftsmanship or artistic merit	N	The CHL does not display a high degree of craftmanship or artistic merit. Accordingly, the CHL does not meet this criterion.
Demonstrates a high degree of technical or scientific achievement	N	The CHL does not display a high degree of technical or scientific achievement. Accordingly, the CHL does not meet this criterion.
Has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community	Y	The CHL is connected to early county road and bridge construction in the Township of Woolwich. The layout of the roadway appears on historic mapping as early as 1861 as an open surveyed road. This layout was maintained up until 1958, when Northfield Drive East was altered for the construction of Scheifele Bridge. While the number of previous bridge structures in the CHL were undetermined, the layout of the structures is consistent on historic and topographic mapping from 1861 until their removal in 1958. Local history sources determined road and bridge construction across the Conestogo River to be a main concern of the Township of Woolwich from the mid-19th century. The roadway facilitated access for local farmers and travelers from Waterloo to the community of Conestogo.
Yields, or has the potential to yield, information that contributes to an understanding of a community or culture	N	While the CHL facilitated access to and from the community of Conestogo, it was not the only roadway with a bridge structure to do so in the area. The CHL does not contribute significantly to an understanding of a community or culture. Accordingly, the CHL does not meet this criterion.
Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community	N	The roadway was constructed under the local government with the assistance local landowners in the Township of Woolwich. While the remaining bridge abutments would have been constructed under the County of Waterloo. The CHL does not directly reflect the work or ides of a particular architect, artist, builder, designer or theorist that was significant to a community. Accordingly, the CHL does not meet this criterion.
Is important in defining, maintaining or supporting the character of an area	Y	The CHL including its build-up roadway lined with trees and early 20th century bridge abutments support the rural character of the area. Directly west and south of the CHL are rural agricultural fields, to the east is a natural marsh area, and to the north is the Conestogo River.
Is physically, functionally, visually or historically linked to its surroundings	Y	The CHL is physically, visually and historically linked to its surroundings including the Conestogo River and the community of Conestogo. The roadway and bridge abutments were constructed to facilitate access across the Conestogo River for local farms and travelers to and from the community of Conestogo. The CHL served as roadway from at least 1861 until it was closed in 1958. The Black Willow trees that make up a portion of the tree lined roadway are also connected to those along the Conestogo Riverbanks.
Is a landmark	Y	The north concrete abutment of the former bridge across the Conestogo River is easily discernible in the natural landscape and viewscaope of travelers along the river and Northfield Drive East. Perched atop the abutment is a folk art piece of blue heron. While the remaining portion of the CHL blends in with the surrounding natural landscape, the north

Criteria of O. Reg. 9.06	Y/N	Comments
		abutment is a recognizable human-made feature that is a landmark within a natural area.

6.4 SUMMARY OF EVALUATION

Scheifele Bridge was found not to have CHVI since it did not meet criteria set out under O. Reg. 9/06. The bridge scored 36 points per the OHBG, and it does not meet the threshold of 60 points to be considered provincially important and worthy of inclusion on the *Ontario Heritage Bridge List*. Accordingly, a statement of cultural heritage value or interest is not required for this site.

The CHL candidate was found to have CHVI as it met multiple criteria of O. Reg. 9/06. The CHL candidate was determined to satisfy criteria 1(i) as it is representative of a historic streetscape in Woolwich Township. The CHL candidate also met criteria 2 (i) as it is directly connected to historic roadway and bridge development from the mid-19th to the early 20th century in the Township of Woolwich and County of Waterloo. The CHL candidate also met criteria 3 (i, ii, and iii) as it supports the rural character of the area, and is physically, historically, and visually connected to the Conestogo River and the community of Conestogo. While the north concrete abutment of the former bridge in the CHL was determined to be a local landmark. A statement of cultural heritage value or interest has been prepared for the CHL, in the following section.

6.5 STATEMENT OF CULTURAL HERITAGE VALUE OR INTEREST

6.5.1 Description of Property

The cultural heritage landscape (CHL) includes a remnant county roadway and bridge abutments of two former structures. The CHL is located within a wetland portion of Grand River Conservation Area (GRCA), in Woolwich Township, within the Regional Municipality of Waterloo (the Region). The CHL is situated within the Conestogo River watershed, a tributary of the larger Grand River Watershed. Directly west and south of the CHL are rural agricultural fields that are within the GRCA floodplain, while to east is a marsh area, and to the north the Conestogo River.

6.5.2 Cultural Heritage Value

The CHL is representative of a historic streetscape in Woolwich Township and Region of Waterloo. The layout of the roadway has been maintained since at least the mid-19th century. The roadway is built up and lined with mature deciduous trees including Black Willow trees. Prior to the construction of the adjacent Scheifele Bridge in 1958, the CHL was a scenic county roadway facilitating access across the Conestogo River.

Cultural Heritage Value or Interest

The CHL is historically connected to early roadway and bridge development in Woolwich Township. In the mid-19th century roadway and bridge construction was a primary focus and undertaking in the township. The roadway facilitated access for local farmers and travelers from adjacent communities including Waterloo to the community of Conestogo. Although the number of previous bridge structures in the CHL was undetermined, the bridge location and orientation according to the historical and topographic mapping was consistent. The last bridges structures in the CHL included a larger iron bridge and a smaller masonry bridge. Both were set on concrete abutments that date to the early 20th century.

The CHL supports the rural character of the surrounding area. It is also physically, visually, and historically linked to its surroundings including the Conestogo River and the community of Conestogo. The Black Willow trees that make up a portion of the tree lined roadway are also connected to those along the Conestogo Riverbanks. The concrete north abutment of the former larger bridge across the Conestogo River is local landmark that is an easily discernible human-made feature in the natural landscape.

6.5.3 Heritage Attributes

The following heritage attributes had been identified for the CHL:

- Build-up remnant roadway lined with mature deciduous trees
- Concrete abutments of the two former bridge structures

7.0 IMPACT ASSESSMENT AND MITIGATION

7.1 DESCRIPTION OF THE PROPOSED UNDERTAKING

The Region of Waterloo is undertaking a Class EA for the Schiefele Bridge Replacement project. The Project Team has selected "Recommended Preferred Design Concepts" for the replacement of the Scheifele Bridge which includes a realignment and offset of Northfield Drive. This is required to construct the new bridge while maintaining uninterrupted traffic on the bridge and on Northfield Drive. Concept drawings of the cross section, the Northfield Drive Alignment and of the staging area are included in Appendix E.

7.2 IMPACT ASSESSMENT

The assessment of impacts on heritage resources is based on the impacts defined in Info Sheet #5 (Government of Ontario 2006a). Impacts to heritage resources may be direct or indirect. Direct impacts include:

- **Destruction** of any, or part of any, significant heritage attributes or features
- **Alteration** that is not sympathetic, or is incompatible, with the historic fabric and appearance

Indirect impacts to cultural heritage resources do not result in the direct destruction or alteration of the feature or its heritage attributes, but may indirectly affect the cultural heritage value of a property by causing:

- **Shadows** created that alter the appearance of a heritage attribute or change the viability of a natural feature or plantings, such as a garden
- **Isolation** of a heritage attribute from its surrounding environment, context or a significant relationship
- **Direct or indirect obstruction** of significant views or vistas within, from, or of built and natural features
- **A change in land** use such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces
- **Land disturbances** such as a change in grade that alters soil, and drainage patterns that adversely affect an archaeological resource

(Government of Ontario 2006a)

Table 4 and Table 5 provide an overview of potential direct and indirect impacts related to the identified cultural heritage landscape.

Table 4: Evaluation of Potential Direct Impacts

Direct Impact	Relevance to the CHL
Destruction of any, or part of any, *significant heritage attributes* or features.	The proposed realignment of Northfield Drive is adjacent to the boundaries of the identified CHL but will not result in the destruction of significant heritage attributes or features. **Accordingly, mitigation measures are not required.**
Alteration that is not sympathetic, or is incompatible, with the historic fabric and appearance.	The proposed realignment of Northfield Drive is adjacent to the boundaries of the identified CHL but will not result in alterations that are not sympathetic or incompatible with its historic fabric and appearance. **Accordingly, mitigation measures are not required.**

Table 5: Evaluation of Potential Indirect Impacts

Indirect Impact	Relevance to the CHL
Shadows created that alter the appearance of a *heritage attribute* or change the viability of a natural feature or plantings, such as a garden	The removal of the existing Scheifele Bridge and the construction of the replacement bridge will not create shadows that will alter the appearance of a heritage attribute. **Accordingly, mitigation measures are not required.**
Isolation of a *heritage attribute* from its surrounding environment, context or a *significant* relationship	The removal of the existing Scheifele Bridge and the construction of the replacement bridge will not isolate a heritage attribute. **Accordingly, mitigation measures are not required.**
Direct or indirect obstruction of *significant* views or vistas within, from, or of built and natural features	The removal of the existing Scheifele Bridge and the construction of the replacement bridge will not obstruct any significant views or vistas. **Accordingly, mitigation measures are not required.**
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	The removal of the existing Scheifele Bridge and the construction of the replacement bridge will require changes to land uses to accommodate the construction of the realigned roadway. However, the change in land use falls outside the boundaries of the identified CHL. **Accordingly, mitigation measures are not required.**
Land disturbances such as a change in grade that alters soil, and drainage patterns that adversely affect an *archaeological resource*	The removal of the existing Scheifele Bridge and the construction of the replacement bridge will create land disturbances to accommodate the construction of the realigned roadway and of the associated grading and bank east of the roadway. This change in land use falls outside the boundaries of the identified CHL but has the potential to indirectly impact the roots of the mature deciduous trees or the positioning of the roadway. **Accordingly, mitigation measures are required.**

7.2.1 Summary of Impact Assessment

Following the assessment of impacts presented in Table 4 and Table 5, no direct impacts are anticipated to impact the identified CHL based on the requirements of the preferred concept design. It was identified

that there may be potential for indirect impacts to the CHL caused by land disturbances. Therefore, mitigation measures for the identified CHL are required.

7.3 MITIGATION MEASURES

Mitigation options in this HIA were developed using those provided in the MTCS Info Sheet #5, this includes but are not limited to:

- *Alternative development approaches*
- *Isolating development and site alteration from significant built and natural features and vistas*
- *Design guidelines that harmonize mass, setback, setting, and materials*
- *Limiting height and density*
- *Allowing only compatible infill and additions*
- *Reversible alterations*
- *Buffer zones, site plan control, and other planning mechanisms*

(Government of Ontario 2006a)

Consideration was given for each of the above options, the options selected from Info Sheet #5 below are appropriate to the mitigation of indirect impacts to the CHL.

7.3.1 Site Plan Controls

To mitigate potential impacts to the CHL caused by land disturbances, the following measures are recommended:

- *Site identification & communication:* The boundaries of the CHL identified in Figure 6 should be clearly marked on project mapping and communicated to all project personnel for avoidance during design, construction, and subsequent operation.
- *Create a physical buffer:* Temporary fencing should be erected at the boundary of the CHL to limit all excavation, installation, and associated vehicle traffic from encroaching on the CHL during construction.
- *Conditions surveys:* A qualified environmental specialist or civil engineer should be engaged to develop a strategy to carry out condition surveys where required. The pre-construction survey completed by a qualified environmental specialist may include screening activities to identify areas where tree roots may have extended into the proposed construction area and whether they will be impacted by construction. The pre-construction survey conducted by a civil engineer should assess whether the modifications to the soil will affect the remnants of the built-up roadway and associated land patterns of the CHL. Recommendations to limit impacts to the deciduous trees and vegetation within the CHL should be adhered to in the Environmental Impact Study.

8.0 RECOMMENDATIONS

Scheifele Bridge was evaluated against O. Reg. 9/06 and the OHBG. The bridge did not meet any criteria under O. Reg. 9/06 and scored low on the OHBG. Scheifele Bridge is not considered to have CHVI as per the requirements of the MCEA Process. No further technical studies are required for Scheifele Bridge.

The CHL candidate was found to have CHVI as it met multiple criteria of O. Reg. 9/06. The CHL candidate was to determine to satisfy criteria 1(i) as it is representative of a historic streetscape in Woolwich Township. The CHL candidate also met criteria 2 (i) as it is directly connected to historic roadway and bridge development from the mid-19th to the early 20th century in Woolwich Township and County of Waterloo. The CHL candidate also met criteria 3 (i, ii, and iii) as it supports the rural character of the area, and is physically, historically, and visually connected to the Conestogo River and the community of Conestogo. While the north concrete abutment of the former bridge in the CHL was determined to be a local landmark.

Given the close location of the CHL to the Class EA Study Area of Scheifele Bridge, as per Step 3 of the MCEA Process, an impact assessment was completed. The impact assessment identified that no direct impacts were anticipated, but that potential indirect impacts caused by land disturbances may impact the CHL. Accordingly, the following mitigation measures were recommended:

- *Site identification & communication:* The boundaries of the CHL should be clearly marked on project mapping and communicated to all project personnel for avoidance during design, construction, and subsequent operation.
- *Create a physical buffer:* Temporary fencing should be erected at the boundary of the CHL to limit all excavation, installation, and associated vehicle traffic from encroaching on the CHL during construction.
- *Conditions surveys:* A qualified environmental specialist or civil engineer should be engaged to develop a strategy to carry out condition surveys where required. The pre-construction survey completed by a qualified environmental specialist may include screening activities to identify areas where tree roots may have extended into the proposed construction area and whether they will be impacted by construction. The pre-construction survey conducted by a civil engineer should assess whether the modifications to the soil will affect the remnants of the built-up roadway and associated land patterns of the CHL. Recommendations to limit impacts to the deciduous trees and vegetation within the CHL should be adhered to in the Environmental Impact Study.

Additionally, copies of this report should be deposited with the Region of Waterloo and a local repository of historic material. Therefore, it is recommended that this report be deposited at the following location:

Ellis Little Local History Room – Waterloo Public Library
35 Albert Street
Waterloo, ON N2L 5E2

Woolwich Heritage Committee
24 Church Street West
P.O. Box 158
Elmira, ON, N3B 2Z6

9.0 CLOSURE

This report has been prepared for the sole benefit of the Regional Municipality of Waterloo and may not be used by any third party without the express written consent of Stantec Consulting Ltd. Any use which a third party makes of this report is the responsibility of such third party.

We trust this report meets your current requirements. Please do not hesitate to contact us should you require further information or have additional questions about any facet of this report.

Yours truly,

STANTEC CONSULTING LTD.

Digitally signed by Walter, Laura
Date: 2022.09.29 09:56:12 -04'00'

Laura Walter, MA, CAHP
Cultural Heritage Specialist
Cell: (226) 962-6017
laura.walter@stantec.com

Tracie Carmichael
2022.09.30 09:01:31 -04'00'

Tracie Carmichael BA, B.Ed.
Managing Principal, Environmental Services
Cell: (226) 927-3586
tracie.carmichael@stantec.com

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APPENDIX A:
ONTARIO HERITAGE BRIDGE GUIDELINES

Appendix A: Evaluation Criteria

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

Criteria	Details	Score	Comments
Design / Physical Value (Total marks 50)			The Score for Design/Physical Value is comprised of three elements: Functional Design, Visual Appeal and Materials.
Functional Design (Maximum score 20)	Excellent	20	Displays a high degree of technical merit or scientific achievement and; • Is one of a kind or prototype (first or earliest example of its kind), or • Is exemplary for its kind (i.e. the longest, highest, etc. of its kind). Examples: Rainy Lake Causeway, reinforced concrete bridge at Massey
	Very Good	16	Displays a high degree of technical merit or scientific achievement and; • Includes types in which fewer than five survive within a Region.
	Fair	12	This category includes types of which fewer than five survive within a Region, regardless of degree of technical merit or scientific achievement, even if many were originally constructed.

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

Criteria	Details	Score	Comments
Contextual Value (Total marks 25)			
Landmark (Maximum score 15)	Excellent	15	Physically prominent: The bridge is highly significant physically and a primary symbol in the area. This includes 'gateway' structures. o It is a critical element in understanding a family of bridges within a corridor
	Good	9	Locally significant: The bridge is perceived in the community as having symbolic value rather than purely visual or aesthetic value. o It is an important element in understanding a family of bridges within a corridor.
	Fair	3	A familiar structure in the context of the area. o It is a contributory element in understanding a family of bridges within a corridor.
	Common	0	No prominence in area
Character Contribution (Maximum score 10)	Excellent	10	The bridge is the critical element in defining the character of the area and is of great importance in establishing or protecting this character.
	Good	6	Maintains or contributes to the overall character of the area and is of municipal importance in establishing or protecting this character.

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

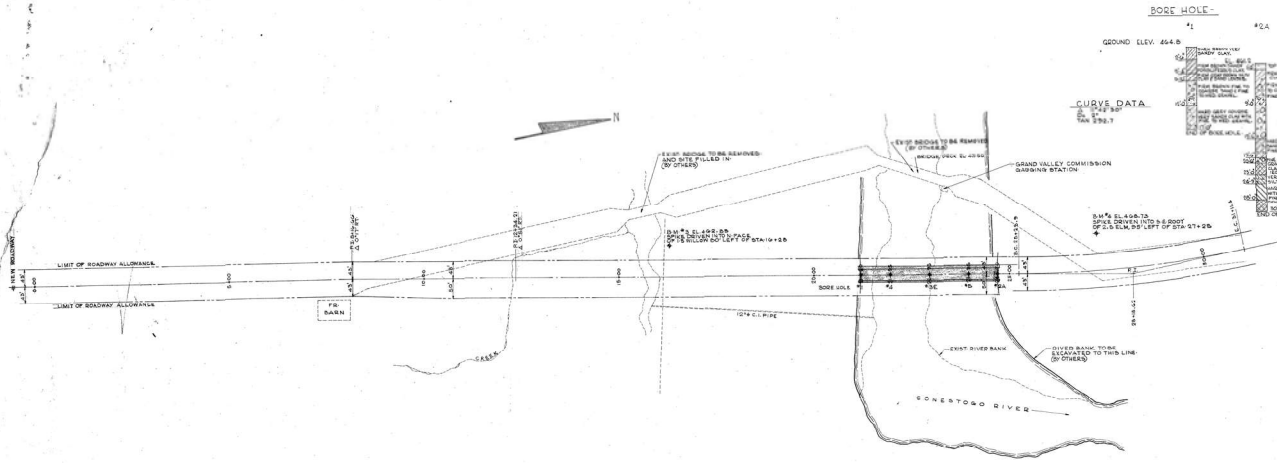
Appendix B1 – Blank Bridge Form

Criteria	Details	Maximum Score	Assigned Score	Comments – Provide justification for the assigned score
Design/Physical Value (Total marks 50)				
Functional Design (Maximum score 20)	Excellent	20		
	Very Good	16		
	Fair	12		
	Common	0		
Visual Appeal (Maximum score 20)	Excellent	20		
	Good	12		
	Fair	4		
	None	0		
Materials (Maximum score 10)	Excellent	10		
	Very Good	8		
	Good	5		
	Common	0		

Criteria	Details	Maximum Score	Assigned Score	Comments – Provide justification for the assigned score
Contextual Value (Total marks 25)				
Landmark (Maximum score 15)	Excellent	15		
	Good	9		
	Fair	3		
	Common	0		
Character Contribution (Maximum score 10)	Excellent	10		
	Good	6		
	Common	0		
Historical Association (Maximum score 25)				
Designer/Construction Firm (Maximum 15 points	Excellent	15		
	Good	9		
	Fair	3		
	Unknown	0		

Criteria	Details	Maximum Score	Assigned Score	Comments – Provide justification for the assigned score
Association with a Historical theme, person or event (Maximum score 10 points)	Excellent	10		
	Good	6		
	Common	0		
		Total		

APPENDIX B:
ORIGINAL DRAWINGS



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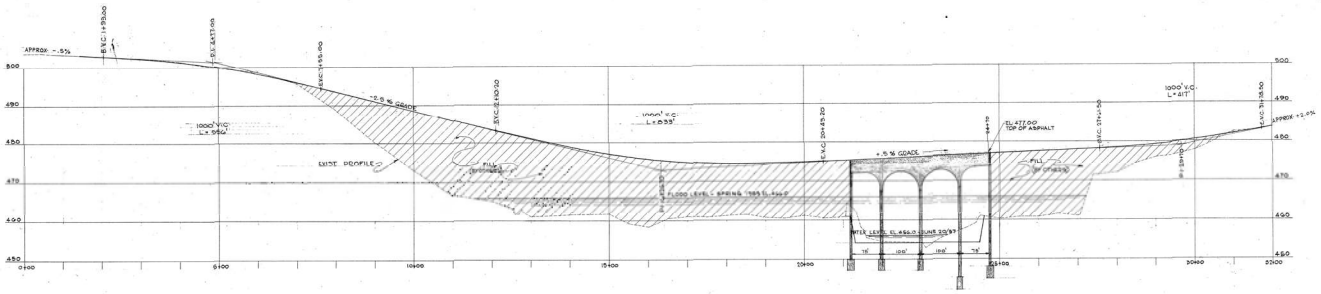


PROFILE ON ℄ OF NEW ROADWAY
HORIZ.-1"=100.0" SCALES VERT.-1"=10.0'

REVISIONS		
DATE	BY	REMARKS

I. A. KOLSI

SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
COUNTY ROAD 22
LOT 2, TOWNSHIP OF WOOLWICH
COUNTY OF WATERLOO
D.M. JORDAN — COUNTY ENGINEER

SITE PLAN & PROFILE

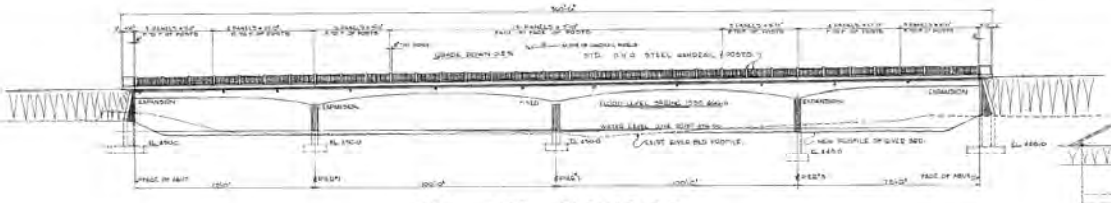
C. C. PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS
LONDON HAMILTON EDMONTON

DESIGNED BY K
DRAWN BY G.S.N.
CHECKED BY
SCALE AS NOTED
DATE FEB 5/75
JOB NO. 14-519
DRAWING NO. 1

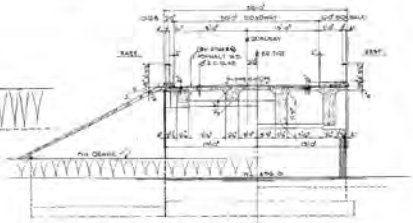
#022-01 22-01/RGN RD 22 B22-01

DECK PLAN

T/A - DENOTES ELEVATION TOP OF ASPHALT
T/S - DENOTES ELEVATION TOP OF SIDEWALK
T/C - DENOTES ELEVATION TOP OF CURB

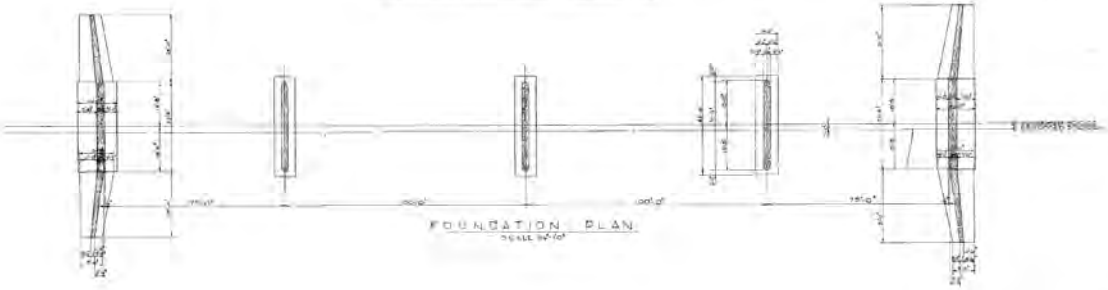


EAST SIDE ELEVATION



HALF CROSS SECTION AT ABUTMENT

HALF CROSS SECTION AT PIER



FOUNDATION PLAN

TABLE OF QUANTITIES
(APPROXIMATE ONLY)

EXCAVATION	2,000 CU.YDS.
CONCRETE	2,000 CU.YDS.
REINF. STEEL	177 TONNES

GENERAL NOTES:

1. ALL CONCRETE BEARING PRESSURE OF BOULDER FOOTINGS 7,000 P.S.F.
2. NO CONC. POURED OR PLACED BEFORE WATER HAS BEEN REMOVED.
3. FOR BRACE & POINT STEEL (MIN. GRADE) CHECKED APPROVED BY THE ENGINEER.
4. ALL EXPOSED CONC. EDGES TO HAVE 3/4" CHAMFER UNLESS OTHERWISE NOTED.
5. STRUCTURE DESIGNED FOR H20-S16 LOADING.
6. DECK SHOWN SHALL NOT BE OPENED BEFORE INSPECTION AND APPROVAL OF THE CONCRETE DECK HAS BEEN GIVEN BY THE ENGINEER.
7. NO CONC. SHALL BE PLACED IN THE FOOTINGS BEFORE THE EXCAVATION AND FOOTINGS HAVE BEEN APPROVED BY THE ENGINEER.
8. SIDEWALK AND CURB TO BE POURED ONLY AFTER SCAFFOLDING HAS BEEN STRUCK.
9. ALL CONC. TO HAVE 7½ LBS. PORTLAND "A" REG. BAG OF CEMENT.
10. BACKFILL AND APPROACH GRADING BY OTHERS.
11. HANDRAIL PANELLED BY COUNTY ARCHITECT IN THIS CONSTRUCTION.
12. CONSTRUCTION JOINTS MAY BE MADE ONLY IN LOCATIONS SHOWN, UNLESS OTHERWISE PERMITTED BY THE ENGINEER.
13. IF WORK BY THE CONTRACTOR IS FOUND LIABLE TO AFFECT THE SUBSURFACE WHILE THE PROGRESS OF THE WORK REQUIRES THE MAKE MOTIONS EXCAVATIONS, CONTRACTOR FAILED TO DO SO SHALL BE CONSIDERED A BREACH OF CONTRACT.
14. CONCRETE GIRDERS AND DECK TO HAVE A MIN. COMPRESSIVE STRENGTH OF 4000 P.S.I. AT 28 DAYS, AS MEASURED FROM TEST CYLINDERS.
15. CONCRETE COVER -
FOOTINGS 3" FOR ALL FACES — PIERS 3" FOR ALL FACES
ABUTMENTS 2" FOR ALL FACES — SLABS 1" FOR TOP REINFORCEMENT
RETAINING WALLS 2" FOR SOIL — ALL OTHERS UNLESS NOTED OTHERWISE

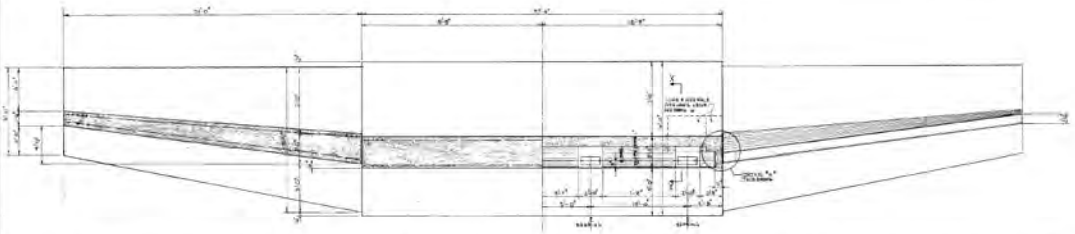
REVISIONS		
NO.	BY	REMARKS

SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
COUNTY ROAD NO. 52
LOT 1, TOWNSHIP OF WOOLWICH
COUNTY OF WATERLOO
DRAWING NO. 3002-04 — COUNTY ENGINEER

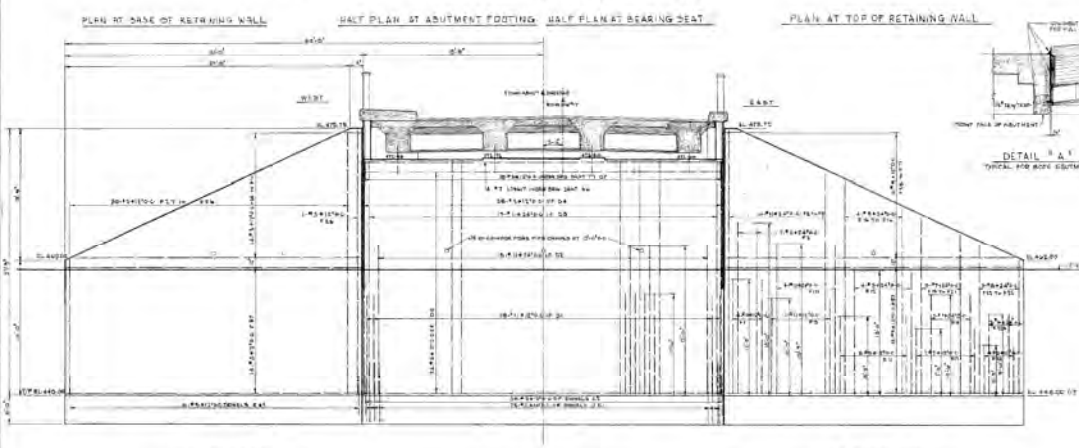
GENERAL ARRANGEMENT

C. C. PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS
LONDON HAMILTON EDMONTON

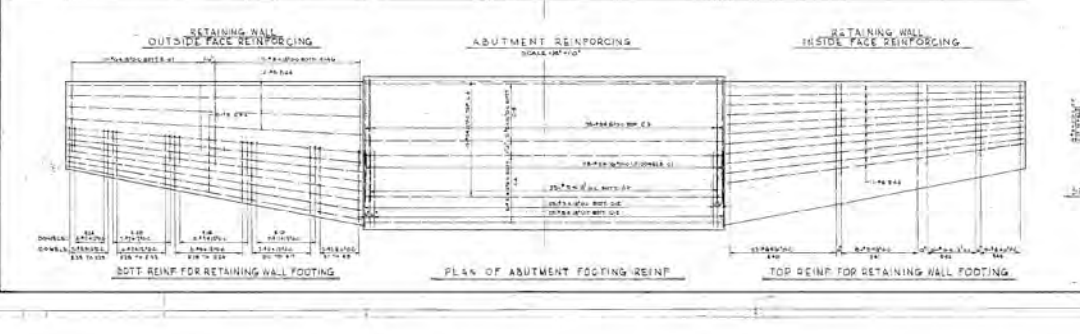
DESIGNED K.
DRAWN J.B.
CHECKED K.
DATE AS NOTED
FILE NO. 74-34
SHEET NO. 1 OF 2
DATE 11-01-19
REVISED



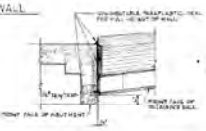
PLAN AT BASE OF RETAINING WALL



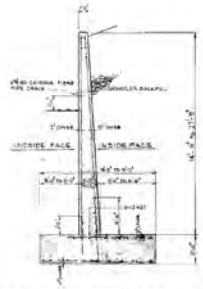
HALF PLAN AT ABUTMENT FOOTING HALF PLAN AT BEARING SEAT



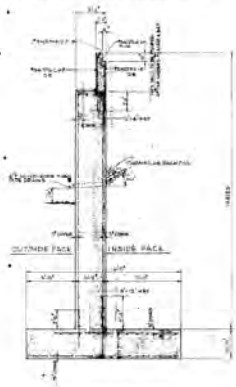
PLAN AT TOP OF RETAINING WALL



DETAIL 'A'
TYPICAL FOR BOTH ABUTMENTS



TYPICAL SECTION THRU RETAINING WALL



SECTION THRU ABUTMENT

RETAINING WALL
OUTSIDE FACE REINFORCING

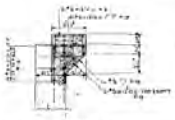
BOTT REINF FOR RETAINING WALL FOOTING

ABUTMENT REINFORCING
SCALE 1/8"=1'-0"

PLAN OF ABUTMENT FOOTING REINF

RETAINING WALL
INSIDE FACE REINFORCING

TOP REINF FOR RETAINING WALL FOOTING



SECT THRU CURB OVERHANG
SECT X-X

FOR GENERAL NOTES SEE DWG 2

I. A. ROLM

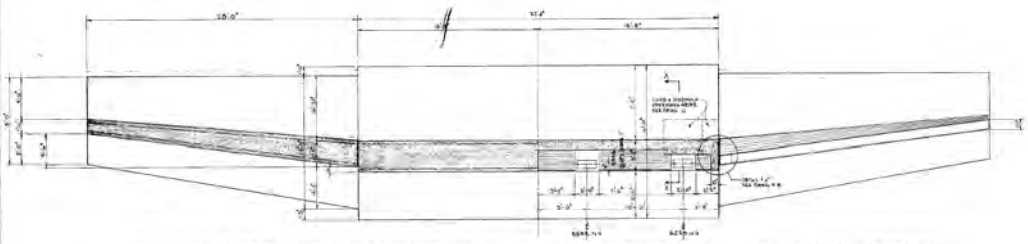
REVISIONS		
NO.	BY	DATE

OREIFELE BRIDGE
OVER CONESTOGO RIVER
COUNTY ROAD 12
LOT 5 TOWNSHIP OF WOOLWICH
COUNTY OF WATERLOO
CH. 3000M COUNTY ENGINEER

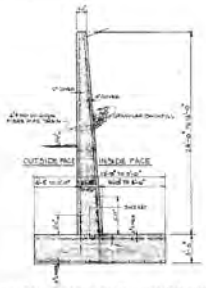
NORTH ABUTMENT & RETAINING WALL

C. C. PARKER & ASSOCIATES Ltd.
CONSULTING ENGINEERS
LONDON HAMILTON EDMONTON

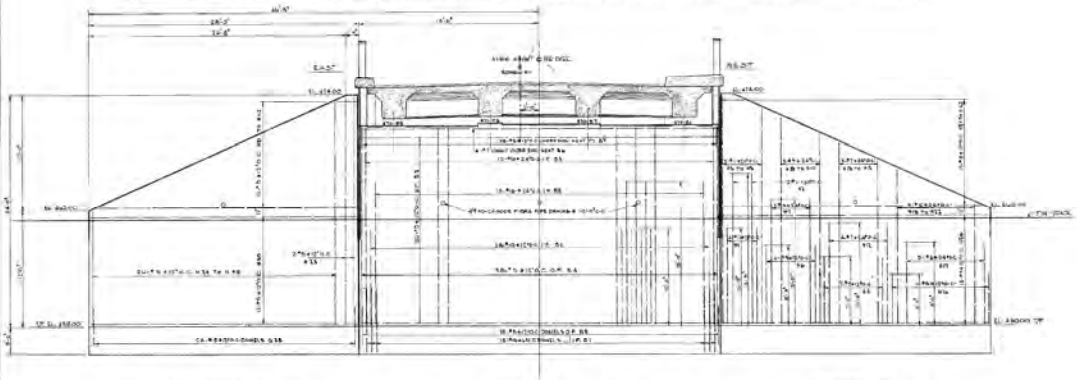
DRAWING NO. 3

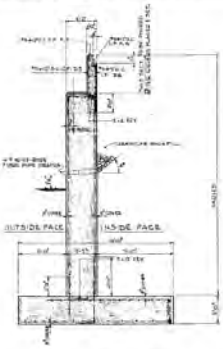


PLAN AT BASE OF RETAINING WALL HALF PLAN AT ABUTMENT FOOTING HALF PLAN AT BEARING SEAT PLAN AT TOP OF RETAINING WALL



TYPICAL CROSS SECTION THRU RETAINING WALL



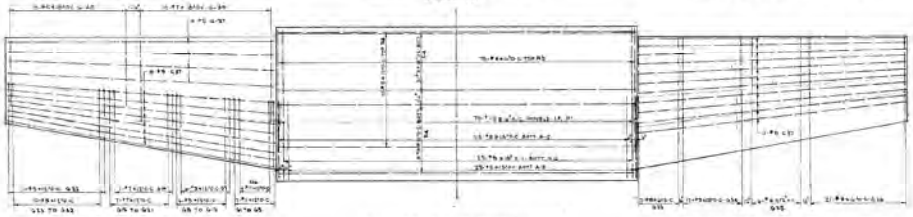


SECTION THRU ABUTMENT

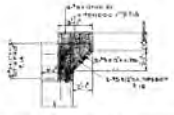
RETAINING WALL OUTSIDE FACE REINFORCING

ABUTMENT REINFORCING

RETAINING WALL INSIDE FACE REINFORCING



BOTT. REINF. FOR RETAINING WALL FOOTING PLAN OF ABUTMENT FOOTING REINF. TOP REINF. FOR RETAINING WALL FOOTING



SECT. THRU SIDEWALK OVERHANG SECT. X-X

FOR GENERAL NOTES SEE DWG. 4

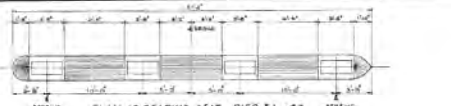
REVISIONS			
NO.	BY		

SCHEIFELE BRIDGE
OVER CONESTOGO R.M.C.
COUNTY ROAD 22
LOT 3, CONCESSION OF WOOLWICH
COUNTY OF WATERLOO
(IN JOSEPH ——— COUNTY ENGINEER)

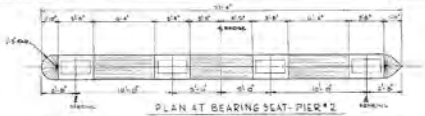
SOUTH ABUTMENT & RETAINING WALLS

C. C. PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS
LONDON HAMILTON TORONTO

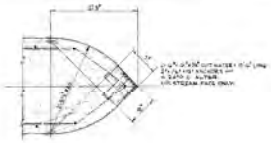
DESIGNED	D.E.N.
DRAWN	D.E.N.
CHECKED	K.
DATE	APR. 1/67
SCALE	AS SHOWN
JOB NO.	66-1-107
DRG. NO.	3



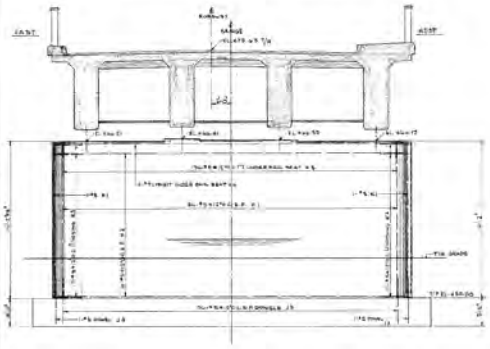
PLAN AT BEARING SEAT - PIER # 1 & # 3



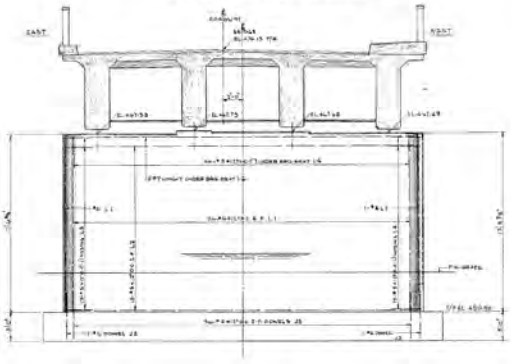
PLAN AT BEARING SEAT - PIER # 2



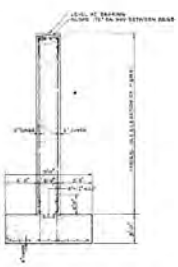
PIER CUTWATER



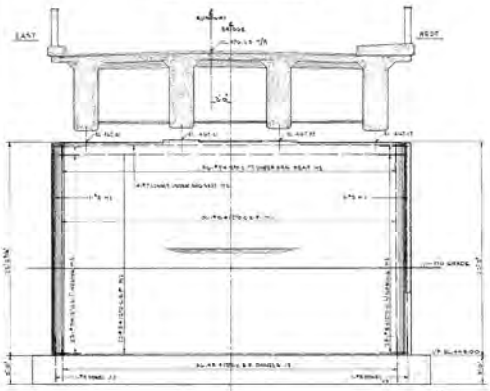
ELEVATION PIER # 1



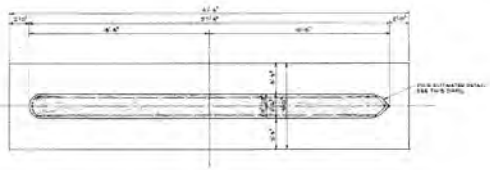
ELEVATION PIER # 2



TYPICAL SECTION - ALL PIERS



ELEVATION PIER # 3



PLAN AT BASE - ALL PIERS

FOR GENERAL NOTES SEE DRWG. 2

FOOTING REINFORCING - ALL PIERS

REVISIONS			
NO.	BY	DATE	

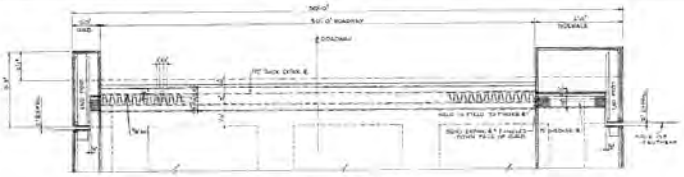
R. A. KOLEF

SCHEIPELE BRIDGE
OVER CONESTOGO RIVER
COUNTY ROAD 28
LOT 2, TOWNSHIP OF WOOLWICH
COUNTY OF WATERLOO
DIVISIONAL ENGINEER — COUNTY ENGINEER

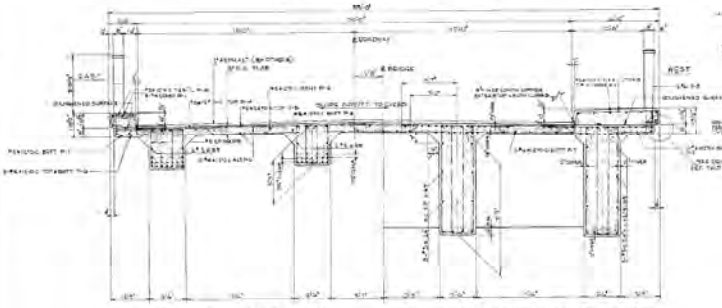
PIER REINF. + DETAILS

C. C. PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS
LONDON HAMILTON EDMONTON

DESIGNED BY: L
DRAWN BY: T.S.B.
CHECKED BY: R.K.
DATE: JUNE 1966
SCALE: AS NOTED
JOB NO. 1566
DRWG. NO. 3

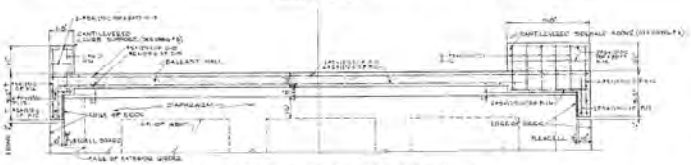


PLAN OF ABUT EXPANSION
SIMILAR FOR NORTH & SOUTH ABUTMENTS

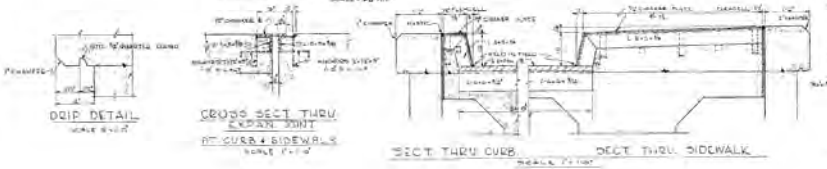


HALF CROSS SECTION AT MID-SPAN

HALF CROSS SECTION AT PIER



PLAN OF ABUT BELOW CURB & SIDEWALK

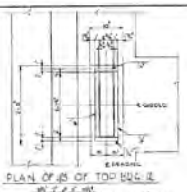


DRIP DETAIL

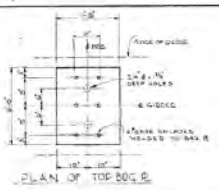
CROSS SECT THRU EXPAN. JOINT AT CURB & SIDEWALK

SECT THRU CURB

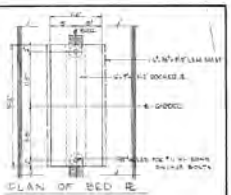
SECT THRU SIDEWALK



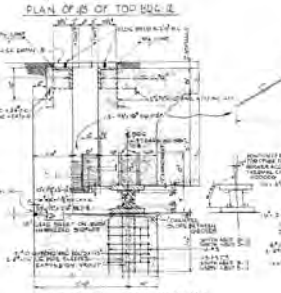
PLAN OF ½ OF TOP BOG R.



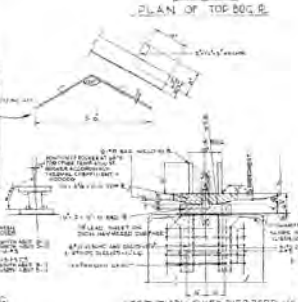
PLAN OF TOP BOG R.



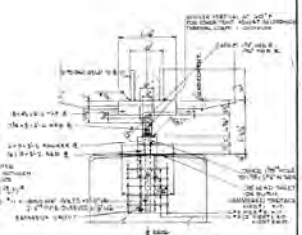
PLAN OF BED R.



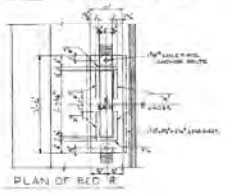
SECT THRU ABUT BEARING



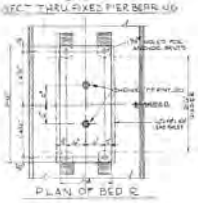
SECT THRU FIXED PIER BEARING



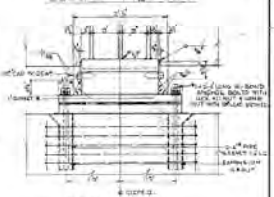
ELEV OF PIER BRG.



PLAN OF BED R.



PLAN OF BED R.



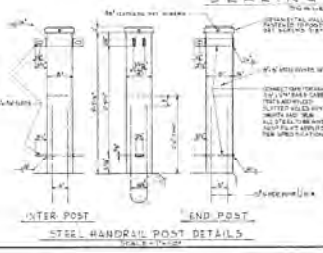
FRONT ELEV.

ABUTMENT ROCKER BEARING
FOR NORTH & SOUTH ABUTMENTS

FIXED PIER BEARING
FOR PIER #2

PIER ROCKER BEARING
FOR PIERS #1 & #3

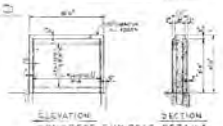
BEARING DETAILS



INTER POST

END POST

STEEL HANDRAIL POST DETAILS



ELEVATION

SECTION

CONCRETE END POST DETAILS

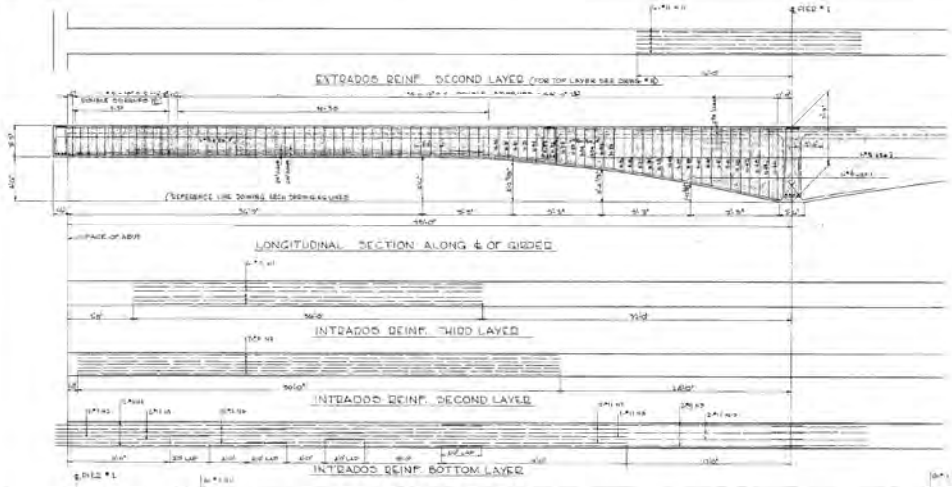
REVISIONS		
NO.	BY	DATE

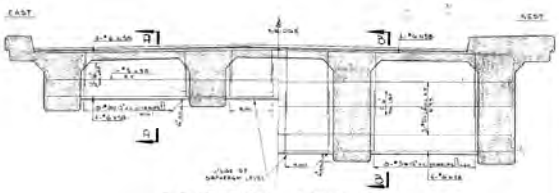
SCHEIFELE BRIDGE
OVER SOUTH TOWER RIVER
COUNTY ROAD 28
LOT 5 TOWNSHIP OF MACKENZIE
COUNTY OF WATERLOO
J.M. MORAN — COUNTY ENGINEER

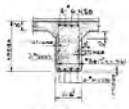
DRAWING NO. 10050 SECT & BRG. DETAILS

C. C. PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS
LONDON HAMILTON TORONTO

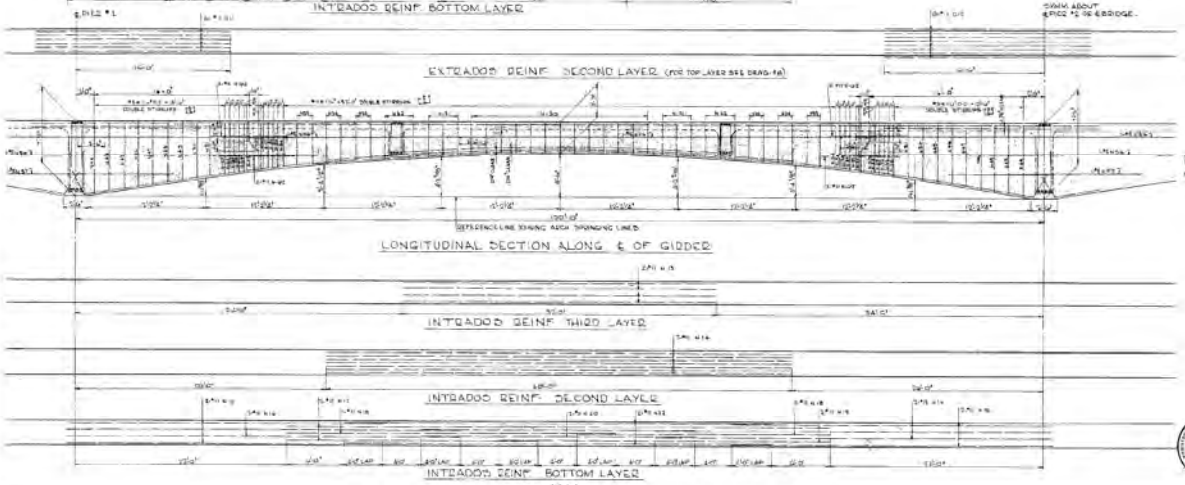
DESIGNED BY: D.S.H.
DRAWN BY: D.S.H.
CHECKED BY: J.A.K.
DATE: AS NOTED
JOB NO. 10050
SCALE: AS NOTED
DRAWING NO. W-5/10
SHEET NO. 10

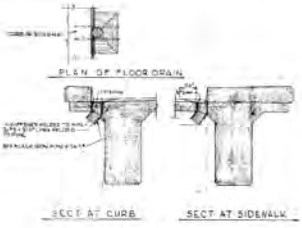





SECTION A-A

SECTION B-B





FLOOR DRAIN DETAILS

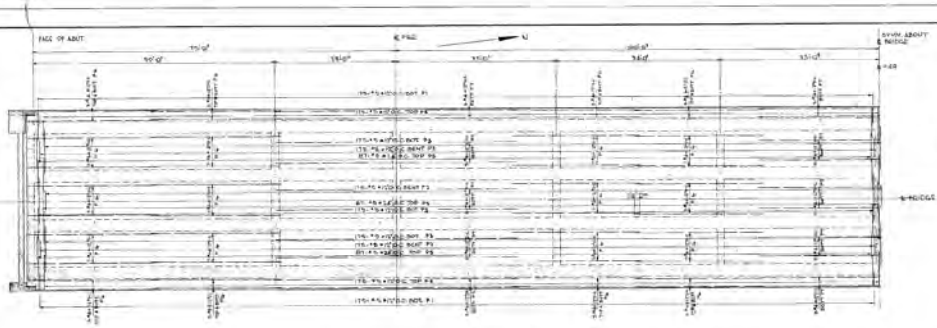
FOR GENERAL NOTES SEE DRWG 2

CONCRETE IN GIRDERS AND DECK TO HAVE A MIN COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS, AS MEASURED FROM TEST CYLINDERS

REVISIONS		
NO.	BY	DATE

SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
COUNTY ROAD 52
LOT 5, TOWNSHIP OF WOOLWICH
COUNTY OF WATERLOO
S.M. JORDAN — COUNTY ENGINEER
GIRDER REINF. & DETAILS
C. C. PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS
LONDON HAMILTON EDMONTON

DESIGNED BY: LG
DRAWN BY: T.B.
CHECKED BY: SL
SCALE: AS NOTED
DATE: FEB. 12/88
JOB NO.: 87-179
DRAWING NO.: 7

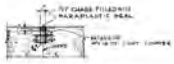


HALF DECK REINFORCING PLAN

DECK PLACING SCHEDULE

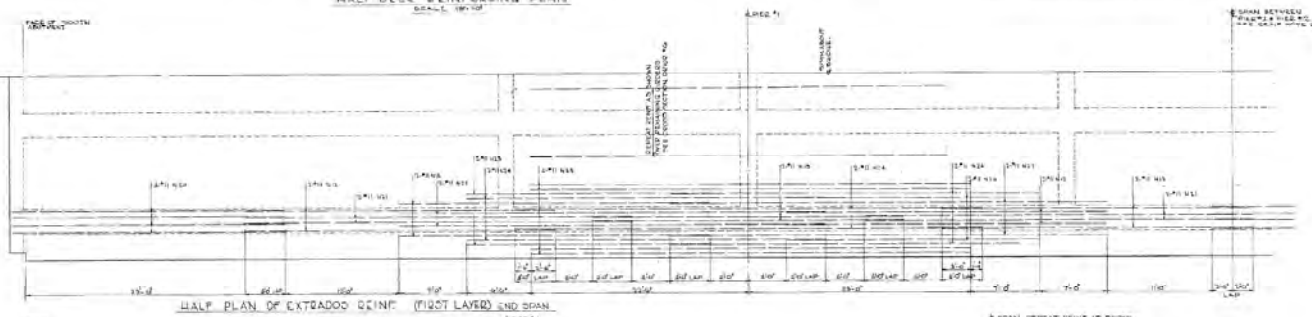
SHOWING CONSTRUCTION AND CONTRACTION JOINTS

APPROXIMATE CONCRETE QUANTITIES SHOWN

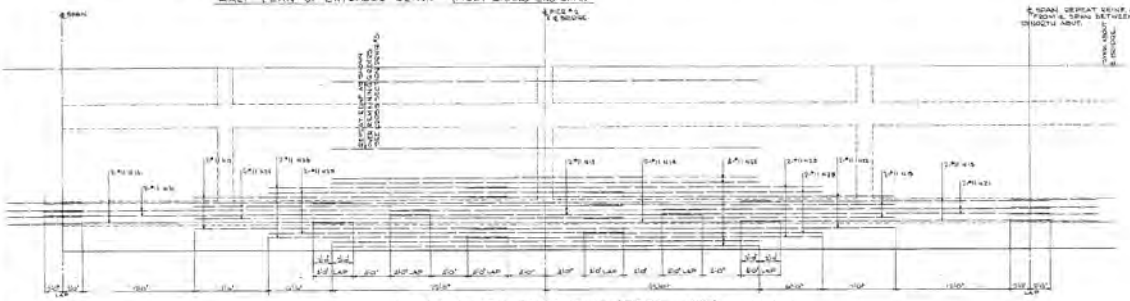


DECK CONSTRUCTION JOINT

SIDEWALK & CURB CONTRACTION JOINT



HALF PLAN OF EXTRADOS REINF. (FIRST LAYER) END SPAN



HALF PLAN OF EXTRADOS REINF. (FIRST LAYER) INTERIOR SPAN.

REVISIONS		
NO.	BY	DATE

SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
COUNTY ROAD 11
LOT 5, TOWNSHIP OF WOOLWICH
COUNTY OF WATERLOO
J.M. JORDAN ——— COUNTY ENGINEER

DECK REINFORCING DETS

C. C. PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS
LONDON HAMILTON EDMONTON

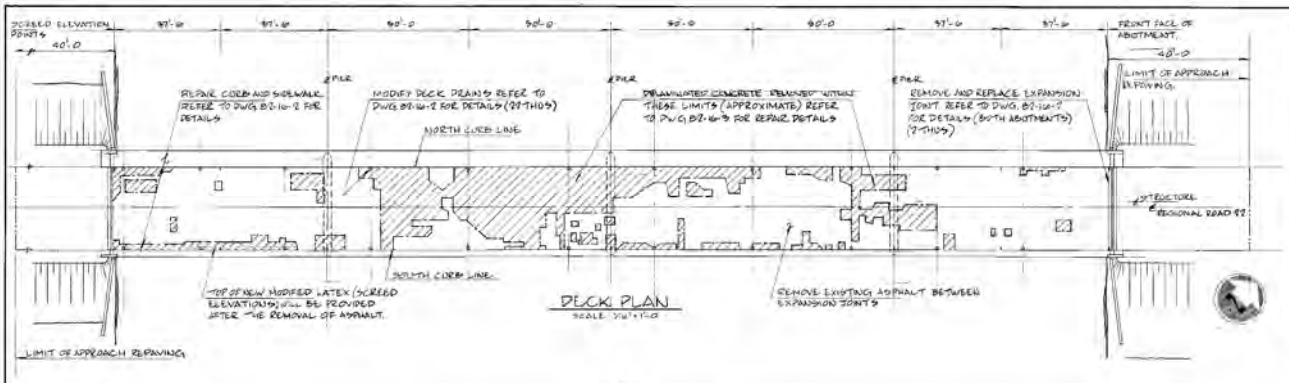
SHEET OF SHEETS: 5
DRAWN BY: R.D.B.
CHECKED BY: K.
SCALE: AS NOTED
DATE: FEB. 15/68
JOB NO.: 67-515
DRAWING NO.: 5

THE REGIONAL
MUNICIPALITY
OF WATERLOO

CONTRACT Nº. 82-16.

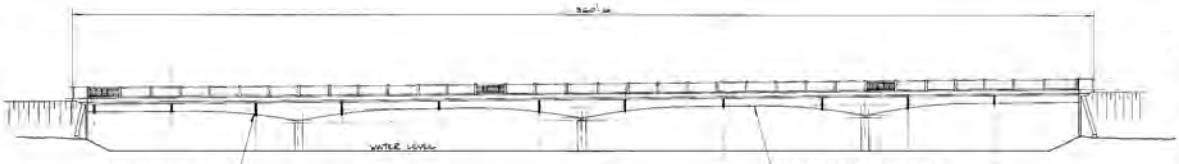
1982 BRIDGE REHABILITATION CONTRACT

DILLON
Consulting Engineers & Planners



DECK PLAN
SCALE 1/16"=1'-0

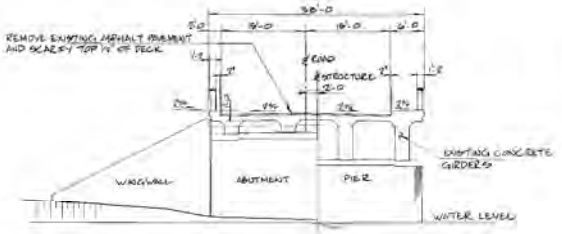
KEY PLAN



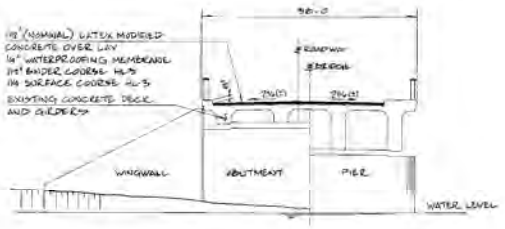
ELEVATION
SCALE 1/16"=1'-0

SEQUENCE OF OPERATIONS

1. INSTALL TRAFFIC BARRIERS, CLOSE BRIDGE TO TRAFFIC.
2. REMOVE ASPHALT AND DELAMINATED CONCRETE.
3. REPLACE EXPANSION JOINTS AND INSTALL DECK DRAINS.
4. PREPARE DECK FOR LATEX MODIFIED CONCRETE OVERLAY.
5. REPAIR CURB AND SIDEWALK WITH LATEX MODIFIED CONCRETE PATCHING
6. PLACE LATEX MODIFIED CONCRETE OVERLAY ON DECK. (1½" NOMINAL THICKNESS) IN ONE CONTINUOUS OPERATION
7. CURE CONCRETE OVERLAY AS SPECIFIED
8. APPLY MEMBRANE WATERPROOFING AND PAVE.
9. REPAIR UNDERSIDE OF BEAMS
10. REMOVE BARRIERS AND RE-OPEN BRIDGE TO TRAFFIC



CROSS SECTION
EXISTING AND REMOVALS
SCALE 1/8"=1'-0

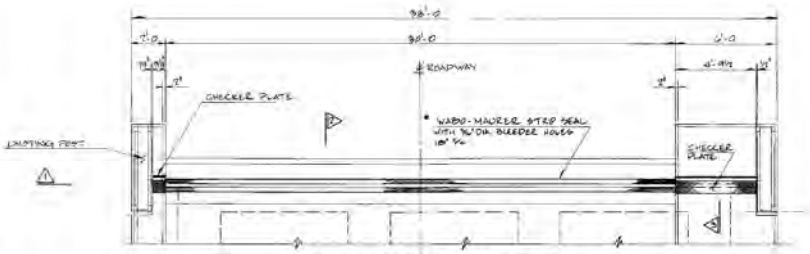


CROSS SECTION
EXISTING AND PROPOSED
SCALE 1/8"=1'-0

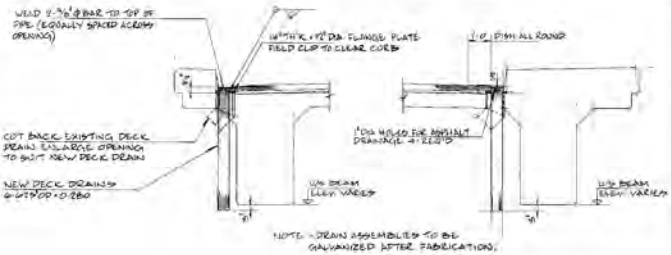
NOTES

1. CONSTRUCTION JOINTS IN THE LATEX MODIFIED CONCRETE OVERLAY WILL NOT BE PERMITTED WITHOUT PRIOR APPROVAL OF THE ENGINEER
2. SCREED ELEVATIONS WILL BE PROVIDED TO THE CONTRACTOR AFTER REMOVAL OF THE ASPHALT
3. REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF CSA STANDARD G30.18 (CM 1977 GRADE 400.
4. CONCRETE TO HAVE A MINIMUM 28 DAY STRENGTH OF 30 MPa
5. ALL EXPOSED EDGES TO BE CHAMFERED ¾"x¾"
6. CLEAR COVER TO REINFORCING:
   - 3" EARTH FACE
   - 2" ELSEWHERE
7. REAR SURFACES OF ABUTMENT BACKWALL WALL TO RECEIVE TWO COATS OF EMULSIFIED ASPHALT COMPOUND.

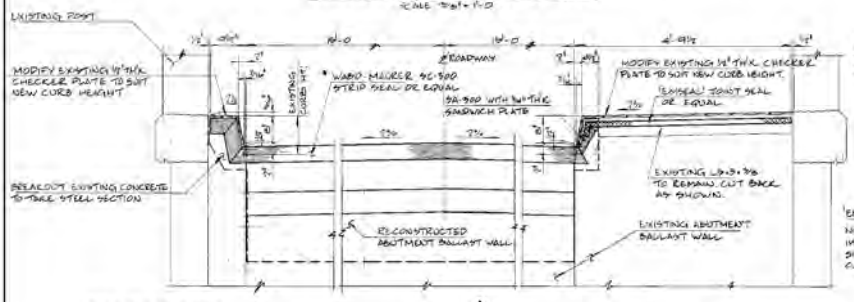
| | | |



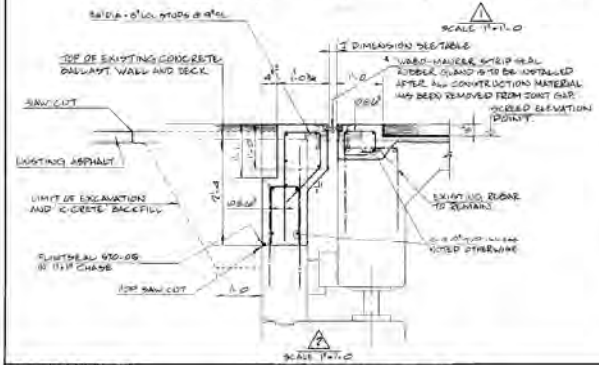
PLAN OF EXPANSION JOINT
SCALE 3/8"=1'-0



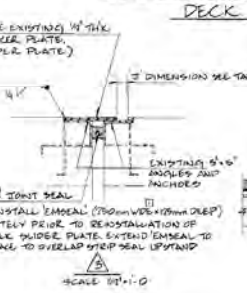
SECTION AT CURB SECTION AT SIDEWALK
DECK DRAIN MODIFICATION DETAIL
SCALE 1½"=1'-0



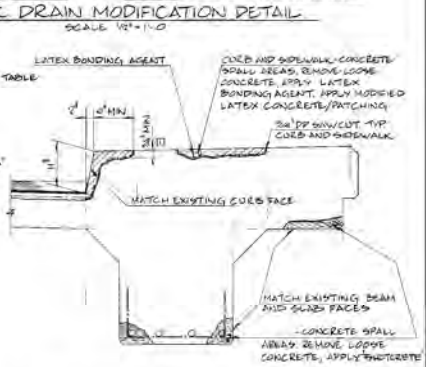
SCALE 1"=1'-0



SCALE 1"=1'-0



SCALE 1½"=1'-0



CURB, SIDEWALK & BEAM REPAIR DETAILS
SCALE 1"=1'-0

NOTES:
1. EXPANSION JOINTS SHALL BE ELASTOMETAL WABO-MAURER STRIP SEAL (4C) SYSTEM, OR APPROVED EQUIVALENT.
2. EXPANSION JOINTS SHALL BE COMPLETELY SHOP ASSEMBLED AND PRE-SET FOR 2" AT 16°C PRIOR TO SHIPMENT.
3. MANUFACTURER'S SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION.
4. NEOPRENE SEAL SHALL CONFORM TO THE REQUIREMENTS OF M.T.C. FORM 1310.
5. STEEL SHALL BE IN ACCORDANCE WITH C.S.A. SPECIFICATION G40.21 GRADE 400W OR EQUIVALENT. STEEL EXTRUSIONS SHALL BE IN ACCORDANCE WITH ASTM A847.
6. STUDS SHALL BE KNM OR NELWELD OR APPROVED EQUIVALENT AND ATTACHED USING FORCE WELD PROCESS.
7. ALL STEEL INCLUDING STUDS, SHALL BE HOT DIP GALVANIZED (CSA STANDARD G164) OR ZINC METALLIZED IN ACCORDANCE WITH C.S.A. STANDARD G189, AFTER FABRICATION.
8. WELDING SHALL BE OF A LOW HYDROGEN CLASSIFICATION, MANUAL ELECTRODES SHALL BE E7018 OR E7018. ALL WELDING SHALL BE IN ACCORDANCE WITH C.S.A. STANDARD W59.
9. JOINT ASSEMBLY SHALL BE SET TO FINAL ELEVATION AND GRADE OF BRIDGE DECK.
10. FINAL WITH ADJUSTMENT SHALL BE MADE AND CLAMPING DEVICES TIGHTENED JOINT PRIOR TO PLACING OF THE CONCRETE IN BALLAST WALL.
11. ALL BOLTS CONNECTING CLAMPS AND LEVELLING DEVICES TO STEEL EXTRUSIONS TO BE LIBERALLY COATED WITH WHITE NON-STAINING GREASE.
12. AFTER REMOVAL OF CLAMPING AND LEVELLING DEVICES, BOLT HOLES SHALL BE FILLED WITH AN APPROVED EPOXY GROUT.

(* WOODEN WEDGE EXPANSION JOINTS WHERE USED)

SEAL INSTALLATION DATA

TEMPERATURE	°C	5	10	15	21	27	32
	°F	40	50	60	70	80	90
DIMENSION U	"	2 1/16	2 1/8	2 3/16	1 3/4	1 5/16	1 1/16

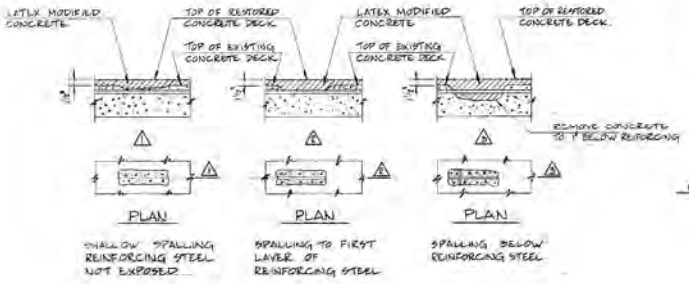
2	AS BUILT		OCT 87	GH	
1	REVISIONS		DATE	BY	

DESIGN M.N.
DRAWN N.A.S.
CHECKED M.P.
APPROVED D.R.M.
DATE MAY 1982
SCALE AS SHOWN

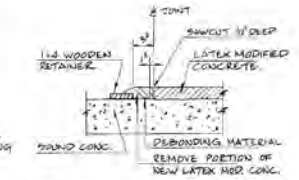
Consulting Engineers & Planners

1982 BRIDGE REHABILITATION CONTRACT
REGIONAL STRUCTURE N° 2201
SCHEIFELE BRIDGE
DETAILS I

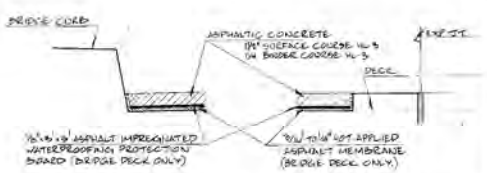
CONTRACT NO. 9168-01
SHEET NO. 82-16-2
DRAWING NO. 9



DECK REPAIR DETAILS
N.T.S.



OPTIONAL CONSTRUCTION JOINT
N.T.S.



BRIDGE DECK WATERPROOFING DETAIL

PAVEMENT DETAIL AT BRIDGE APPROACH

												1982 BRIDGE REHABILITATION CONTRACT	9168-01
												REGIONAL STRUCTURE Nº 2201 SCHEIFELE BRIDGE	82-16-3
												DETAILS II	9

Consulting Engineers & Planners

Region of Waterloo

DESIGN AND CONSTRUCTION
DIVISION

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER (REGIONAL ROAD 22)

CONTRACT No: 2011-009

"ISSUED FOR CONSTRUCTION"

APRIL, 2011

McCORMICK RANKIN CORPORATION
A member of MMM GROUP

KEN SEILING
REGIONAL CHAIR

THOMAS SCHMIDT, P. ENG.
COMMISSIONER OF TRANSPORTATION
AND ENVIRONMENTAL SERVICES

2011-009

2011-009

Region of Waterloo

McCORMICK RANKIN CORPORATION
A member of MMM GROUP

SCHEIFELE BRIDGE

ROAD No 22 ROAD NAME NORTHFIELD DRIVE
WORK OF REPAIRS TO SCHEIFELE BRIDGE

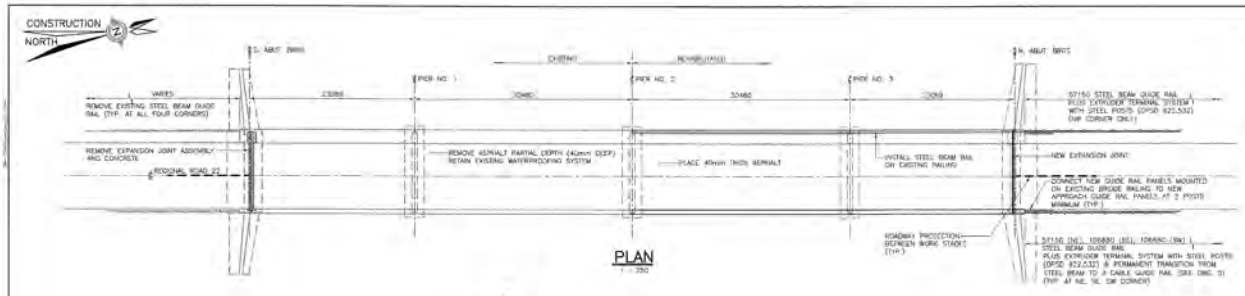
CONTRACT No 2011-009
FILE No 5511 (B) SECTION No
LOCATION OVER CONESTOGO RIVER

MUNICIPALITY CITY OF WATERLOO

KEY PLAN

NTS

	DRAWING INDEX
SHEET	DESCRIPTION
	TITLE PAGE
	INDEX PAGE
	REPAIRS TO BRIDGE
S1	GENERAL ARRANGEMENT
S2	CONSTRUCTION STAGING STAGE I
S3	CONSTRUCTION STAGING STAGE 2
S4	REMOVALS AND REPAIRS DETAILS I
S5	REMOVALS AND REPAIRS DETAILS II
S6	SLIDE RAIL SYSTEM
S7	EXPANSION JOINT ASSEMBLY
S8	EXPANSION JOINT DETAILS
E1	STAGE 1 TRAFFIC CONTROL
E2	STAGE 2 TRAFFIC CONTROL
T1	PERMANENT LANE MARKINGS



GENERAL NOTES:

1. ALL WORK SHALL BE UNDERTAKEN IN ACCORDANCE WITH ONTARIO PROVINCIAL STANDARD SPECIFICATIONS AND THE SPECIAL PROVISIONS OF THE CONTRACT.
2. CLASS OF CONCRETE: 35 MPa
3. REINFORCING STEEL SHALL BE GRADE 400W.
4. CLEAR COVER TO REINFORCING STEEL UNLESS OTHERWISE NOTED: 75MM.
5. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS OF THE CASTING WORK AND ALL DETAILS ON SITE AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK.
6. BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH MTO STRUCTURAL STANDARD DRAWINGS 3372-1 AND 3372-2 (UNLESS OTHERWISE NOTED)
7. SPACERS AT LIMITS OF REMOVAL SHALL BE 25mm (MIN.) UP TO THE FIRST LAYER OF REINFORCING STEEL, WHICHEVER IS LESS (UNLESS OTHERWISE NOTED)
8. EPOXY GROUT FOR DOWELS SHALL BE FROM THE MTO'S DESIGNATED SOURCES FOR NATURAL AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
9. ALL CONSTRUCTION ACTIVITIES SHALL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO THE WATERCOURSE. VEHICLE REFUELING AND MAINTENANCE SHALL BE CONDUCTED AWAY FROM THE WATERCOURSE.
10. DRAWINGS ARE NOT TO BE SCALED
11. ALL DIMENSION SHOWN HERE ARE IN MILLIMETERS UNLESS OTHERWISE NOTED

LIST OF DRAWINGS:

S1. GENERAL ARRANGEMENT
S2. CONSTRUCTION STAGING
S3. REMOVALS AND REPAIR DETAILS I
S4. REMOVALS AND REPAIR DETAILS II
S5. GUIDE RAIL SYSTEM, STEEL BEAM PERMANENT TRANSITION INSTALLATION STEEL BEAM WITH CATHODIC TO 3 CABLE DWG'D
S6. STRIP SEAL EXPANSION JOINT ASSEMBLY TYPE 'C'
S7. STRIP SEAL EXPANSION JOINT DETAILS TYPE 'C'
E1. ELECTRICAL LAYOUT STAGE 1 TRAFFIC CONTROL
E2. ELECTRICAL LAYOUT STAGE 2 TRAFFIC CONTROL
T1. PERMANENT LANE MARKINGS

APPLICABLE ATANDARD DRAWINGS:

OPSD 912.120 GUIDE RAIL SYSTEM, STEEL BEAM STEEL POST WITH OFFSET BLOCK ASSEMBLY INSTALLATION — SINGLE RAIL
OPSD 912.430 GUIDE RAIL SYSTEM, STEEL BEAM STRUCTURE CONNECTION
OPSD 912.530 GUIDE RAIL SYSTEM, STEEL BEAM STRUCTURE APPROACH TREATMENT
OPSD 912.532 ENERGY ATTENUATOR END TREATMENT EXTRUSION TERMINAL SYSTEM WITH STEEL POSTS - INSTALLATION

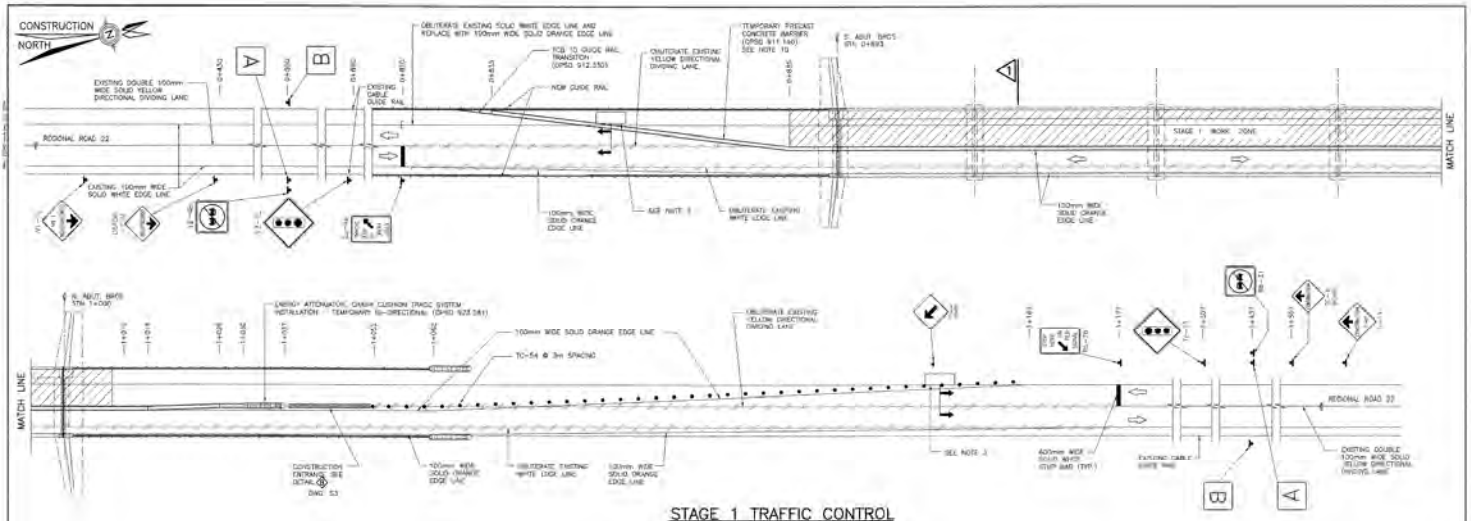
McCORMICK RANKIN CORPORATION
A member of MMM GROUP

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

GENERAL ARRANGEMENT

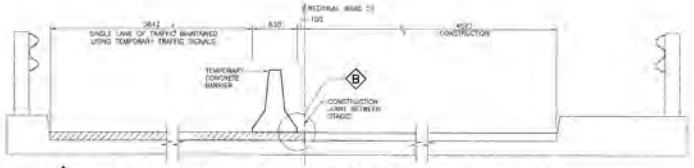
Region of Waterloo

DRAWN BY: JK | CHECKED BY: JK | SUBMITTED No.: 2007-0608 | DRAWING No.:
SCALE: AS SHOWN | DATE: APR/07 | PROJECT No.: 3511 | SHEET: S1 OF 38



STAGE 1 TRAFFIC CONTROL

1 : 300



⚠1 STAGE 1 SHOWN, STAGE 2 SIMILAR BUT OPPOSITE HAND

1 : 75

CONSTRUCTION ZONE SIGN DETAILS

GENERAL NOTES

1. ALL TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE SUPPLIED, INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE LATEST EDITION OF BOOK 7 (TEMPORARY CONDITIONS) OF THE MTO's ONTARIO TRAFFIC MANUAL.
2. TRAFFIC CONTROL IS BASED UPON THE POSTED REGULATORY SPEED LIMIT OF 80km/hr
3. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE ELECTRICAL WORK (PORTABLE TRAFFIC SIGNAL UNITS DRAWING)
4. THE CONTRACTOR SHALL PREPARE AND SUBMIT TO THE CONTRACT ADMINISTRATOR A COPY OF THEIR TRAFFIC PROTECTION PLAN FOR THIS PROJECT, IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT.
5. THE CONTRACTOR SHALL COVER ANY EXISTING TRAFFIC CONTROL SIGNS THAT CONFLICT WITH TEMPORARY SIGNS REQUIRED FOR CONSTRUCTION STAGING.
6. ANY EXISTING TRAFFIC CONTROL SIGNS SHALL BE REINSTATED UPON REMOVAL OF THE TEMPORARY TRAFFIC CONTROL DEVICES.
7. TEMPORARY PAVEMENT MARKINGS AND TEMPORARY TRAFFIC CONTROL SIGNS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
8. EXISTING PAVEMENT MARKINGS WHICH CONFLICT WITH THE TEMPORARY MARKINGS SHALL BE OBSCURED USING WATER/SODA BLAST OR BY GRINDING IN ACCORDANCE WITH CONTRACT SPECIFICATION.
9. ALL TEMPORARY PAVEMENT MARKING SHALL BE TEMPORARY PAINT.
10. TEMPORARY CONCRETE BARRIERS SHALL BE SUPPLIED WITH STAB TYPE, BARRIER MOUNTED DELINEATORS.

UNDER SEPARATE SEAL

UNLESS SIGNED AND SEALED BY THE ENGINEER, THESE DRAWINGS ARE NOT TO BE USED FOR ANY PURPOSE INCLUDING BIDDING, PERMITTING, CONSTRUCTION OR RECORD.

McCORMICK RANKIN CORPORATION
A member of WSP GROUP

NO.	DESCRIPTION	BY	DATE
	ISSUED FOR CONSTRUCTION		

CONSULTANT

FIELD WORK BY:

DESIGN BY:

DRAFT BY:

CHECKED BY:

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

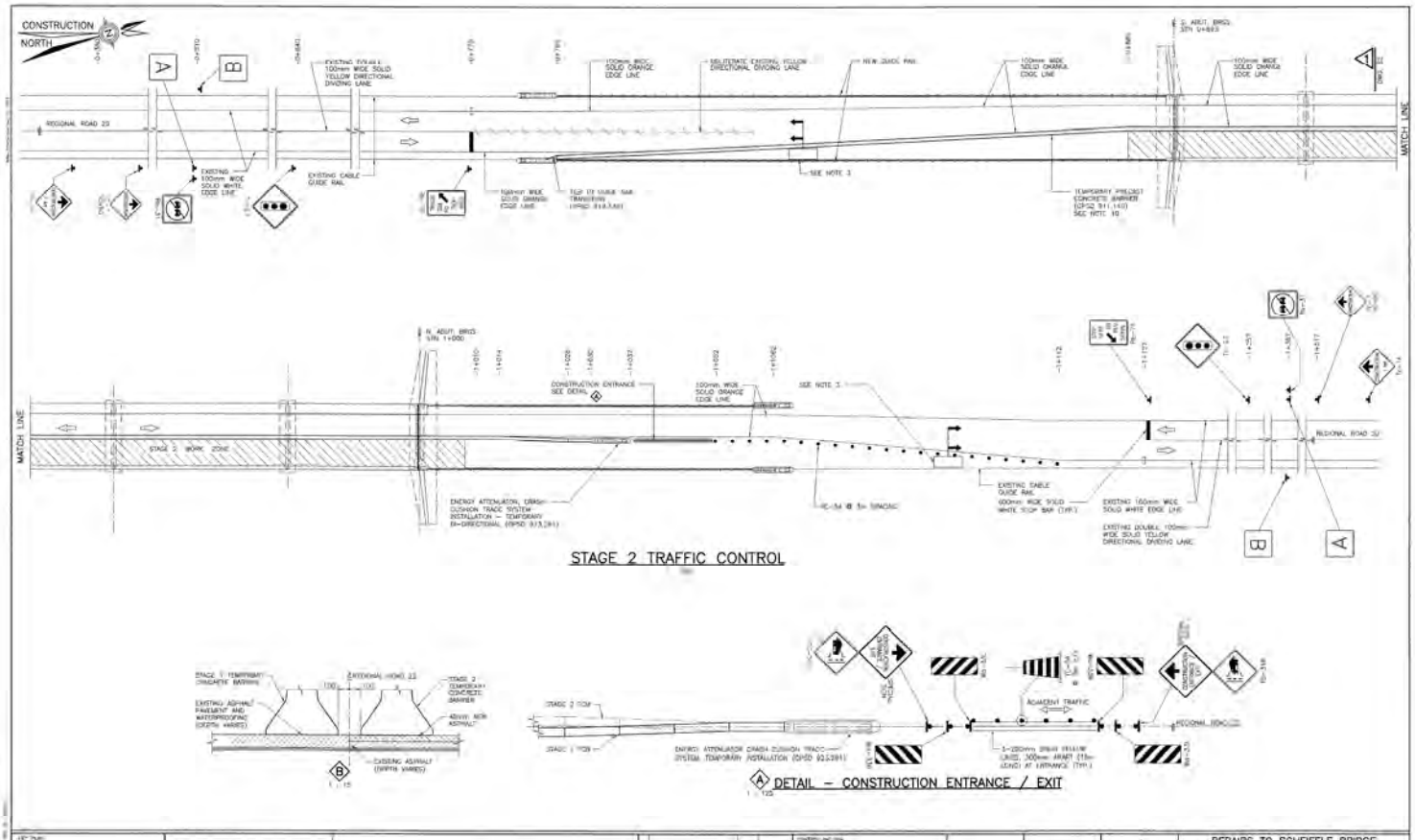
CONSTRUCTION STAGING STAGE 1

DESIGNED BY	CONTRACT NO.	DRAWING NO.
DP	2011-109	
DATE	REV. No.	SHEET
JANUARY 2012	50.81	52 OF 58

DRAWN BY: DP

CHECKED BY: BP

SCALE: AS SHOWN



STAGE 2 TRAFFIC CONTROL

DETAIL – CONSTRUCTION ENTRANCE / EXIT

THESE DESIGN DOCUMENTS ARE PREPARED SOLELY FOR THE USE BY THE PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS ENTERED INTO A CONTRACT AND SHALL NOT BE REPRODUCED OR USED IN ANY MANNER BY THE DESIGN PROFESSIONAL TO ANY PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS NOT ENTERED INTO A CONTRACT.

McCORMICK RANKIN CORPORATION
A member of WSP GROUP

No.	ISSUED FOR CONSTRUCTION	REQ'D	APP'D	DATE
1	ISSUED FOR CONSTRUCTION	RG	JAM	06 Oct
No.	ISSUE/REVISION	BY		DATE

CONTROLLING SURVEY

FIELD BOOK No.

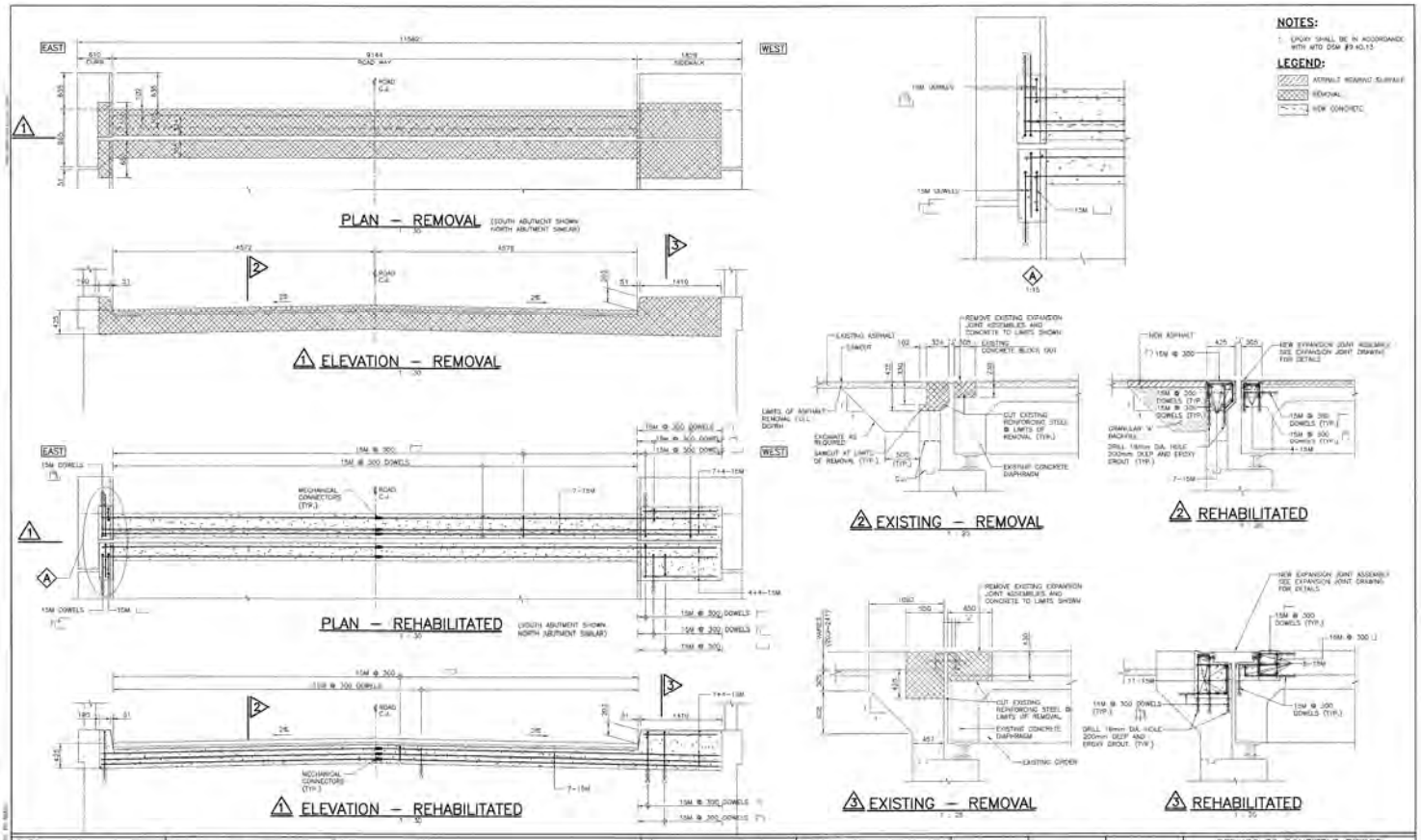
DATUM

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

CONSTRUCTION STAGING
STAGE 2

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CF	JAM	2011-009	
SCALE: AS SHOWN	DATE:	REF. No.	SHEET



McCORMICK RANKIN CORPORATION
A member of MMM GROUP

Region of Waterloo

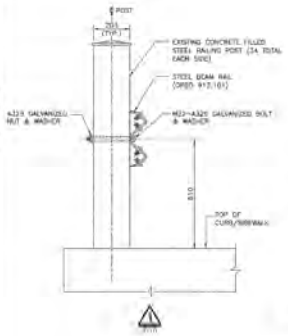
REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

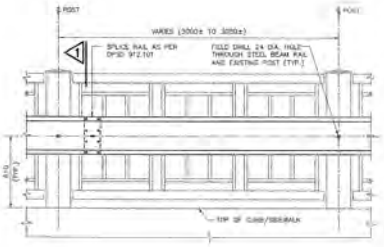
REMOVALS AND REPAIR DETAILS I

CONTRACT No. 2011-XXX

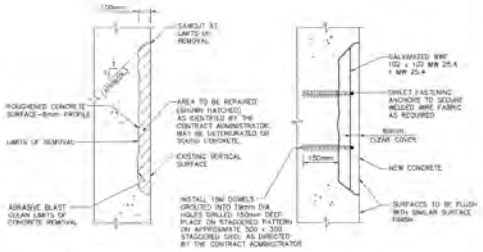
FILE No. 16511

SHEET No. 54 OF 54





DETAILS FOR INSTALLATION OF STEEL BEAM RAIL ON EXISTING RAILING SYSTEM

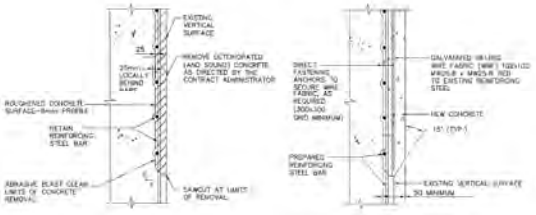


EXISTING / REMOVAL REHABILITATED

TYPICAL CONCRETE REPAIR DETAIL NO REINFORCING STEEL BARS

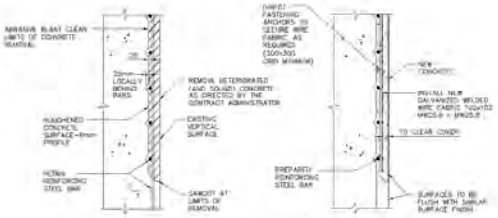
TYPICAL CONCRETE REPAIR NOTES:

1. WIRE-TIE EXPOSED REINFORCING STEEL BARS AT ALL INTERSECTIONS.
2. REPLACE BADLY CORRODED OR DAMAGED REINFORCING STEEL BARS AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
3. CLEAN ALL EXISTING CONCRETE FACES, REMOVAL AREAS AND EXPOSED REINFORCING STEEL BARS BY ABRASIVE BLAST CLEANING.
4. PLACE ANCHOR RODS/PINS AS REQUIRED, INSERTS TO BE GALVANIZED AS PER ASTM 123.
5. PLACE WELDED GALVANIZED STEEL WIRE FABRIC.
6. PRE-WET 24 HOURS PRIOR TO PLACING CONCRETE.
7. PLACE CONCRETE.
8. FINISH AND CURE CONCRETE.



EXISTING/REMOVAL REHABILITATED

TYPICAL CONCRETE REPAIR DETAIL – VERTICAL SURFACE LESS THAN 70mm EXISTING COVER TO REINFORCING STEEL BARS



EXISTING/REMOVAL REHABILITATED

TYPICAL CONCRETE REPAIR DETAIL – VERTICAL SURFACE GREATER THAN 70mm EXISTING COVER TO REINFORCING STEEL BARS

THESE DESIGN DOCUMENTS ARE PREPARED SOLELY FOR THE USE BY THE PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS ENTERED INTO A CONTRACT. THERE ARE NO REPRESENTATIONS OF ANY KIND MADE BY THE DESIGN PROFESSIONAL TO ANY PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS NOT ENTERED INTO A CONTRACT.

McCORMICK RANKIN CORPORATION
A member of WSP GROUP

NO.	DESCRIPTION	BY	DATE
1	ISSUED FOR CONSTRUCTION	TEH	APR 20 '15

CONSULTANT'S SEAL

CONTRACTOR'S SEAL

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

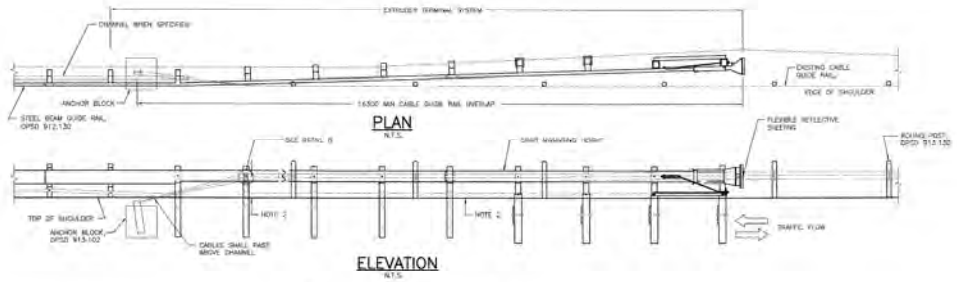
REMOVALS AND REPAIR DETAILS II

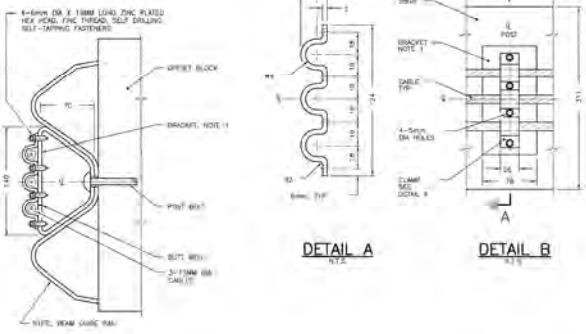
DRAWN BY	CHECKED BY	CONTRACT NO.	DRAWING No.
MC	G	2011-009	
MAM	M. Bolton	APR/2015	FILE No. 6871

SHEET 25 OF 28

NOTES:

1. 5MM THICK GALVANIZED STEEL PLATE SHAPED TO FIT INSIDE STEEL BEAM GUIDE RAIL.
2. CENTRE CABLE SHALL MATCH ELEVATION OF GBGR CENTRELINE.
3. DIMENSION TO TOP OF TOP CABLE.





SEE PLAN

THESE DESIGN DRAWINGS ARE PREPARED SOLELY FOR THE USE BY THE PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS ENTERED INTO A CONTRACT AND THERE ARE NO REPRESENTATIONS OF ANY KIND MADE BY THE DESIGN PROFESSIONAL TO ANY PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS NOT ENTERED INTO A CONTRACT.

McCORMICK RANKIN CORPORATION
A member of MMM GROUP

NO.	DESCRIPTION	BY	DATE
1	ISSUED FOR CONSTRUCTION	MD	APR 24 '20

CONSULTANTS S.A.

FIELD WORK BY:

DESIGNED BY:

CHECKED BY:

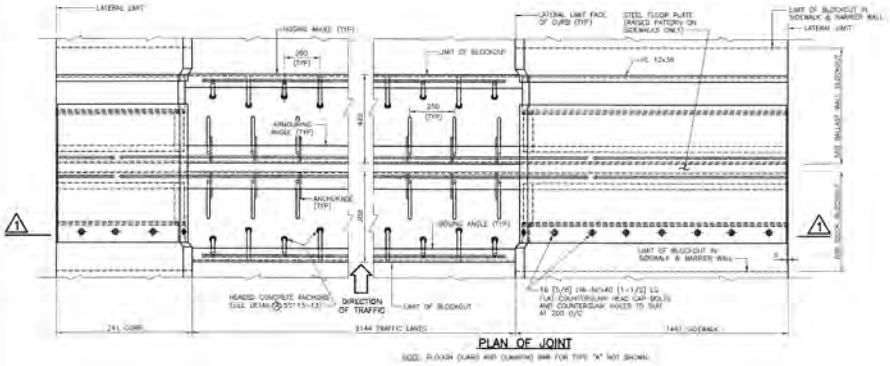
Region of Waterloo

PERMANENT TRANSITION INSTALLATION OVER CONESTOGO RIVER

GUIDE RAIL SYSTEM, STEEL BEAM PERMANENT TRANSITION INSTALLATION STEEL BEAM WITH EXTRUDER TO 3 CABLE DIVIDED

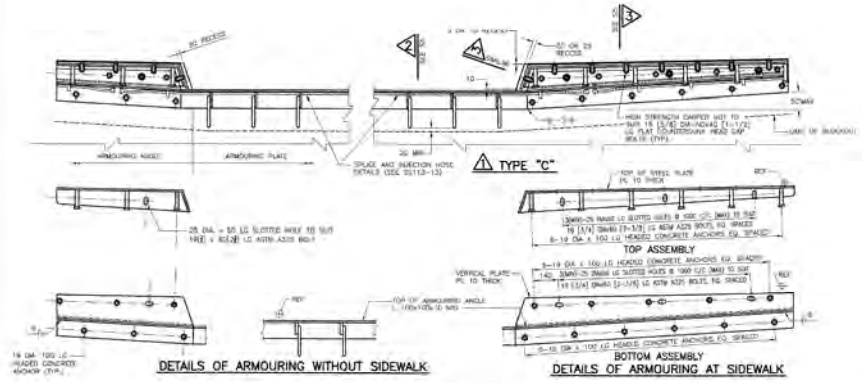
DRAWN BY:	CHECKED BY:	DISTRICT No.	DRAWING No.
JP	JK	2011-009	
DATE: JUNE/2021	FILE No. 0511	SHEET 25 OF 28	

METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



PLAN OF JOINT

NOTE: FLOOR (LAND AND (UNDER) BAR FOR TYPE "A" NOT SHOWN.



DETAILS OF ARMOURING WITHOUT SIDEWALK

DETAILS OF ARMOURING AT SIDEWALK

NOTES:

1. EXPANSION JOINT SHALL BE IN ACCORDANCE WITH THE DESIGNATED SOURCES FOR MATERIALS LIST ITEM 3.40.21, TYPE "C". DETAILS SHOWN FOR OTHER TYPES ARE NOT APPLICABLE.
2. EXPANSION JOINT ASSEMBLY CONSTRUCTION AND MATERIAL SHALL BE ACCORDING TO OPSS 920 AND OPSS 1210, AND AS SPECIFIED IN THE CONTRACT DOCUMENTS.
3. STEEL PLATE 10mm THICK UNLESS OTHERWISE NOTED.
4. WELDING ELECTRODES SHALL BE OF A LOW HYDROGEN CLASSIFICATION.
5. JOINT ASSEMBLIES SHALL BE COMPLETELY SHOP ASSEMBLED (SUBJECT FOR SEALS) AND PRESET TO DIMENSION "J" FOR 10°C AND ADJUSTED IN THE FIELD TO SUIT INSTALLATION TEMPERATURE.
6. JOINT ASSEMBLY INSTALLATION TEMPERATURE SHALL BE TAKEN AS MEAN SHADE AIR TEMPERATURE AT STRUCTURE PRIOR TO JOINT INSTALLATION AS FOLLOWS:
   - FOR CONCRETE STRUCTURES – 48 HOURS
   - FOR STEEL STRUCTURES – 24 HOURS
7. FIELD SPLICES IN JOINT ASSEMBLY ARE ONLY PERMITTED AT STAGED CONSTRUCTION AND/OR AS SHOWN ON THE CONTRACT DRAWINGS.
8. IF THE JOINT ARMOURING FOR A SKEWED STRUCTURE IS SPLICED AT A BUSHING, THE SPLICE SHALL BE DETAILED PARALLEL TO THE CENTERLINE OF THE TRAFFIC LANE.
9. SETTING ANGLES SHALL BE FLAME CUT ACCORDING TO OPSS 920, BUT IN NO CASE PRIOR TO CONCRETE REACHING INITIAL SET.
10. AFTER SLIPPING OF THE CONCRETE FOR A MINIMUM OF 7 DAYS, THE SETTING DEVICES MAY BE REMOVED. THE JOINTS UNDER THE ARMOURING ANGLE AND HOOKED ANGLE SHALL THEN BE PRESSURE GROUTED.
11. PREFORMED SEALS SHALL HAVE MINIMUM THICKNESS OF 5mm OR AS PER MFR.
12. ALL STEEL RETAINER SURFACES COMING IN CONTACT WITH PREFORMED SEAL SHALL BE CLEANED PRIOR TO INSTALLATION OF THE SEAL.
13. PREFORMED SEALS SHALL BE INSTALLED AFTER JOINT ASSEMBLY HAS BEEN GRIT (OR FLAME, STHROTOMA OR FILLER SCREEN SEEK AND BALLAST WALL REMOVED) AND EXPANSION GAP CLEARED OF ANY DEBRIS.
14. ALL JOINT ANCHORAGES SHALL BE DETAILED ON WORKING DRAWINGS PERPENDICULAR TO THE EXPANSION JOINT ON BOTH THE DECK SIDE AND THE ABUTMENT SIDE EXCEPT AS FOLLOWS: STRUCTURES SKEWED FROM OVER 15° AND UP TO 45° SHALL HAVE ANCHORAGES DETAILED TO OFFSET FROM THE PERPENDICULAR TO THE EXPANSION JOINT ON THE DECK SIDE.
15. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING SS113-12 OR SS113-13.
16. LEGEND: [ ] DENOTES FASTENER SIZE IN INCHES.

ADDITIONAL NOTES FOR BOLTS:

1. 19 [3/4] DIAMETER BOLTS SHALL BE IN ACCORDANCE WITH WITH ASTM A449. ALL BOLTS USED IN 25 DIA x 50 LONG SLOTTED HOLES SHALL BE INSTALLED WITH OVERSIZE WASHERS.
2. 16 [5/8] DIAMETER FLAT COUNTERSUNK HEAD CAP BOLTS SHALL BE IN ACCORDANCE WITH ASTM F835.
3. CLAMPING BAR BOLTS FOR TYPE "A" JOINTS SHALL BE EITHER 13 [1/4] DIAMETER FLAT COUNTERSUNK HEAD CAP BOLTS TENSIONED TO 140kN AND IN ACCORDANCE WITH ASTM F835, OR 19 [3/4] DIAMETER HEX HEAD BOLTS TENSIONED TO 123kN AND IN ACCORDANCE WITH ASTM A325.
4. ALL BOLTS SHALL BE INSTALLED USING NOVOCK LOCKBOLTS.
5. ALL BOLTS SHALL BE TENSIONED USING THE TURN-OF-NUT TIGHTENING METHOD IN ACCORDANCE WITH CSA/CSA S16.1.

MODIFIED
STANDARD DRAWING APPROVAL 2008 — SS113-10
STRIP SEAL EXPANSION JOINT ASSEMBLY FOR BARRIER WALLS

DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

KEY PLAN

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McCORMICK RANKIN CORPORATION
A member of MMM GROUP

NO.	ISSUED FOR / DESCRIPTION	BY	DATE
1	ISSUED FOR CONSTRUCTION	RLL	APR. 24, 2014

CONSULTING ENGINEERS

FIELD BOOK NO.

DRAWN BY

CHECKED BY

PROFESSIONAL ENGINEERS OF ONTARIO — LICENSED — 100 YEARS

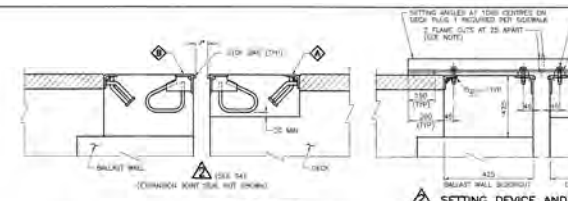
PROFESSIONAL ENGINEERS OF ONTARIO

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

STRIP SEAL EXPANSION JOINT ASSEMBLY TYPE 'C'

DRAWN BY	CHECKED BY	CONTRACT NO.	DRAWING NO.
RLL	JP	2011-029	
SCALE	DATE	FILE NO.	SHEET NO.
AS SHOWN	MAY/2014	5551	57 OF 58



SETTING DEVICE AND BLOCKOUTS

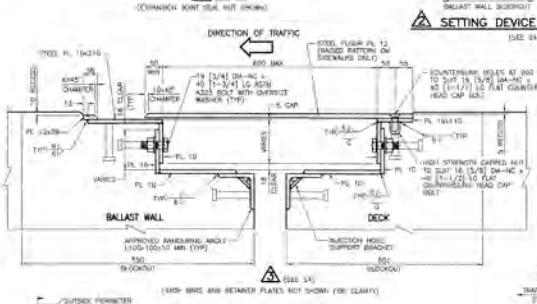
INJECTION HOSE SUPPORT BRACKET DETAIL

METRIC

DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

NOTES:

1. FOR DETAILS OF REINFORCING IN EXPANSION JOINT BLOCKOUT, SEE DWG. 02.
2. HEADED CONCRETE ANCHORS IN NOSING ANGLES SHALL BE LOCATED WITHIN 75 mm OF EITHER SIDE OF FIELD SPLICES.
3. PROTECT INJECTION HOSE AND FITTINGS ADJACENT TO FIELD SPLICES DURING WELDING AND REMOVE PROTECTION PRIOR TO PLACING OF CONCRETE IN BLOCKOUT.
4. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING SS113-10.
5. (ADDED) ( ) DENOTES IMPERIAL SIZE IN METRIC



BALLAST WALL / DECK

ANCHORAGE DETAIL

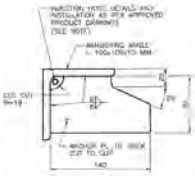


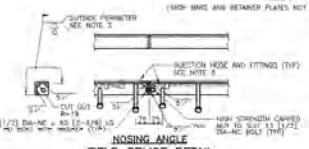
TABLE OF DESIGN REQUIREMENTS (TO BE FULLY COMPLETED BY DESIGNER)

EXP. JOINT LOCATION	MTO SMP RATING* (mm)		DESIGN S & S MOVEMENT** (mm)	"a" AT INSTALLATION TEMPERATURE (C) (mm)						
	MIN.	MAX.		-5°	0°	5°	10°	15°	20°	25°
NORTH & SOUTH ABUTMENTS	55	105	40	80	58	55	54	48	43	46	42

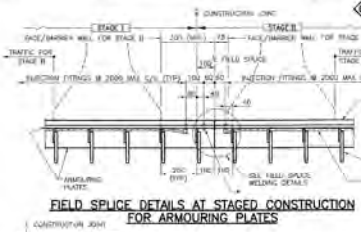
* DIMENSION "J" MEASURED PERPENDICULAR TO CENTRELINE EXPANSION JOINT WHERE MIN. AND MAX. FOR JOINT SUPPLIED DIFFER FROM THOSE SHOWN IN TABLE, 'J' DIMENSIONS SHALL BE REVISED BY CONTRACTOR AND SHOWN ON SHOP DRAWINGS. FOR STAGED CONSTRUCTION ON STRUCTURES OTHER THAN POST-TENSIONED, THE CONTRACTOR SHALL USE THE FIRST STAGE OBSERVED "J" GAP TO INSTALL THE SECOND STAGE.

** MTO SMP MEASURED BETWEEN PROJECTING FACES OF STOP (MPS). IS TAKEN FROM OSM 9-40.17, TYPE "C".

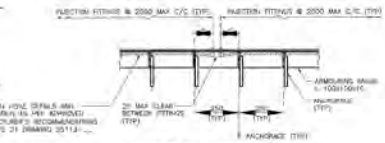
*** CALCULATED TOTAL MOVEMENT AT SLS OCCURRING AFTER END OF JOINT INSTALLATION. (MEASURED PARALLEL TO CENTRELINE OF STRUCTURE)



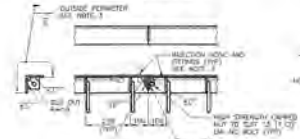
NOSING ANGLE FIELD SPLICE DETAIL



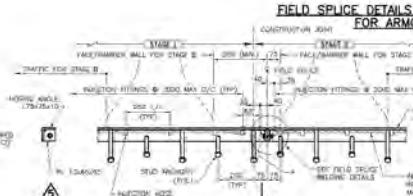
FIELD SPLICE DETAILS AT STAGED CONSTRUCTION FOR ARMOURING PLATES



DETAILS OF ANCHORAGE AND INJECTION HOSE FOR ARMOURING ANGLE



ARMOURING ANGLE FIELD SPLICE DETAIL



FIELD SPLICE DETAILS AT STAGED CONSTRUCTION FOR NOSING ANGLE

DETAILS OF HEADED CONCRETE ANCHORS AND INJECTION HOSE FOR NOSING ANGLE

MODIFIED

STANDARD DRAWING NUMBER	SS113-13
STRIP SEAL EXPANSION JOINT – TYPE "C" DETAILS	

McCORMICK RANKIN CORPORATION
A member of the SNC-LAVALIN GROUP

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

STRIP SEAL EXPANSION JOINT DETAILS TYPE 'C'

Region of Waterloo

DESIGN BY: MC | DRAWN BY: | CHECKED BY: | CONTRACT No.: 2011-999 | DRAWING No.: SS113 | SHEET No.: 5 OF 5 | DATE: NOVEMBER 2011 | SCALE: AS SHOWN

ESTIMATE OF MATERIALS

LOCATION: REGIONAL ROAD 22 (NORTHFIELD DRIVE)
TOWNSHIP OF WOOLWICH

ITEMS	QUANTITY P.	S.
SIGNAL HEADS		
STANDARD HIGHWAY HEAD 300mm x 300mm x 200mm (LED)		
VERTICAL HIGHWAY MAST ARM 300mm x 300mm x 200mm x 300mm WITH 600MM WITH PLANNER (LED)		
VERTICAL HIGHWAY HEAD 300mm x 300mm x 200mm (LED)		
VERTICAL HIGHWAY HEAD 4 x 300mm WITH HARDOR (LED)		
PEDESTRIAN SIGNAL HEAD (LED)		

ARMS AND BRACKETS

ESTIMATE OF MATERIALS

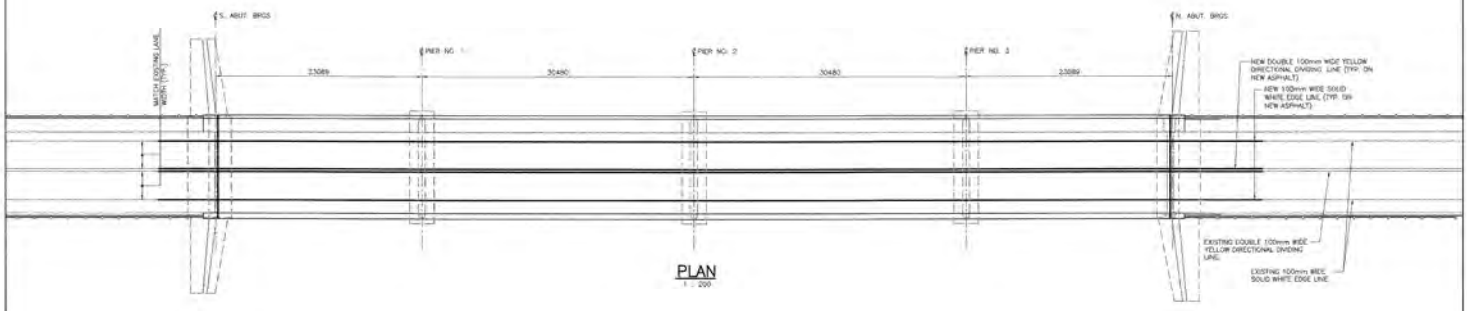
LOCATION: SCHEFFLER ARMS (4220) (AXIS CONSTRUCTION) WARD
REGIONAL ROAD 22 (NORTHFIELD DRIVE)
TOWNSHIP OF WOOLWICH

ITEMS	QUANTITY N	S
SIGNAL HEADS:		
STANDARD HORIZONTAL HEAD 300mm x 200mm x 200mm (LED)		
SPECIAL HORIZONTAL HEAD 300mm x 200mm x 200mm WITH ARROW WITH FLASHER (LED)		
SPECIAL HORIZONTAL HEAD 300mm x 300mm x 300mm (LED)		
SPECIAL HORIZONTAL HEAD 4 x 300mm WITH ARROW (LED)		
PEDESTRIAN SIGNAL HEAD (LED)		

ARMS AND BRACKETS

7.0m (1 @ 0)	4410	4780	11410	6380kg	
10m (1 @ 0)	4410	4780	11410	6380kg	

CONSTRUCTION NORTH



PLAN
1 : 200

FOR INFORMATION ONLY

NOT INCLUDED IN CONTRACT

KEY PLAN

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McCORMICK RANKIN CORPORATION
A member of MMM GROUP

No.	Issue / Revision	By	Date
1	ISSUED FOR CONSTRUCTION	MD	APR. 26 2011

CONSULTING Eng.

FIELD REVIEW Inc.

CHECKED FILE

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

PERMANENT LANE MARKING

DESIGNED BY	CHECKED BY	CONTRACT No.	DRAWING No.
MC	RWL	2011-009	
DRAWN	DATE	FILE No.	SHEET
AS SHOWN	APR/2011	0511	T1 OF T1

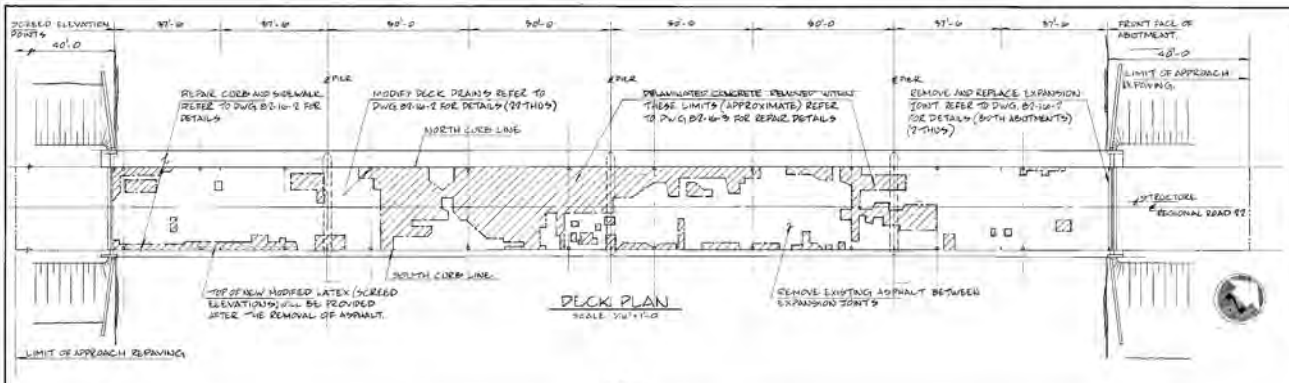
APPENDIX C:
1982 REHABILITATION DRAWINGS

THE REGIONAL
MUNICIPALITY
OF WATERLOO

CONTRACT Nº. 82-16.

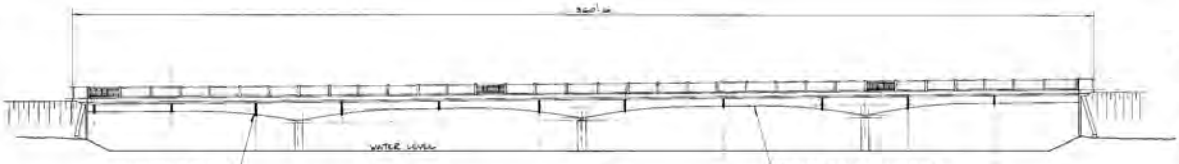
1982 BRIDGE REHABILITATION CONTRACT

DILLON
Consulting Engineers & Planners



DECK PLAN
SCALE 1/16"=1'-0

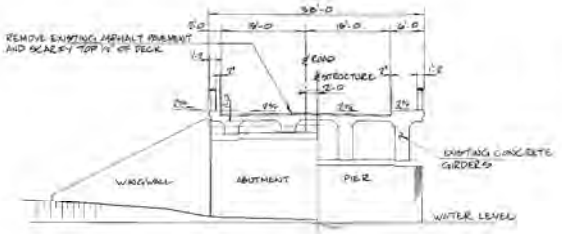
KEY PLAN



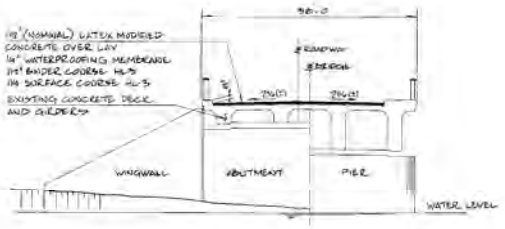
ELEVATION
SCALE 1/16"=1'-0

SEQUENCE OF OPERATIONS

1. INSTALL TRAFFIC BARRIERS, CLOSE BRIDGE TO TRAFFIC.
2. REMOVE ASPHALT AND DELAMINATED CONCRETE.
3. REPLACE EXPANSION JOINTS AND INSTALL DECK DRAINS.
4. PREPARE DECK FOR LATEX MODIFIED CONCRETE OVERLAY.
5. REPAIR CURB AND SIDEWALK WITH LATEX MODIFIED CONCRETE PATCHING
6. PLACE LATEX MODIFIED CONCRETE OVERLAY ON DECK. (1½" NOMINAL THICKNESS) IN ONE CONTINUOUS OPERATION
7. CURE CONCRETE OVERLAY AS SPECIFIED
8. APPLY MEMBRANE WATERPROOFING AND PAVE.
9. REPAIR UNDERSIDE OF BEAMS
10. REMOVE BARRIERS AND RE-OPEN BRIDGE TO TRAFFIC



CROSS SECTION
EXISTING AND REMOVALS
SCALE 1/8"=1'-0

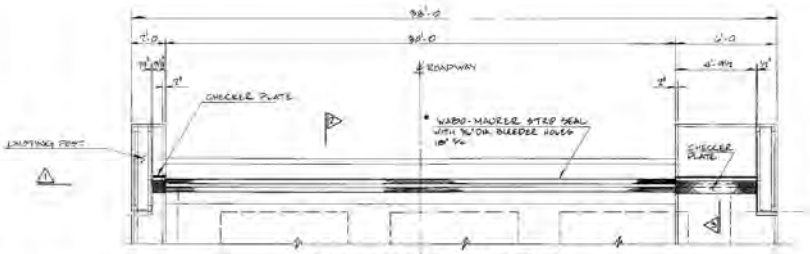


CROSS SECTION
EXISTING AND PROPOSED
SCALE 1/8"=1'-0

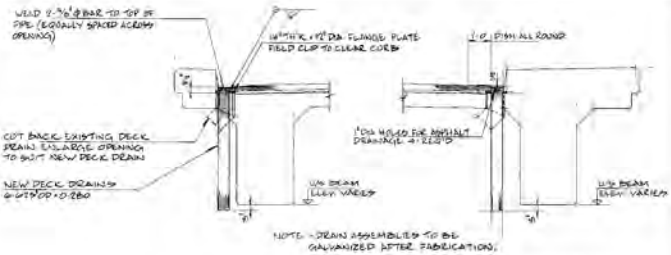
NOTES

1. CONSTRUCTION JOINTS IN THE LATEX MODIFIED CONCRETE OVERLAY WILL NOT BE PERMITTED WITHOUT PRIOR APPROVAL OF THE ENGINEER
2. SCREED ELEVATIONS WILL BE PROVIDED TO THE CONTRACTOR AFTER REMOVAL OF THE ASPHALT
3. REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF CSA STANDARD G30.18 (CM 1977 GRADE 400.
4. CONCRETE TO HAVE A MINIMUM 28 DAY STRENGTH OF 30 MPa
5. ALL EXPOSED EDGES TO BE CHAMFERED ¾"x¾"
6. CLEAR COVER TO REINFORCING:
   - 3" EARTH FACE
   - 2" ELSEWHERE
7. REAR SURFACES OF ABUTMENT BACKWALL WALL TO RECEIVE TWO COATS OF EMULSIFIED ASPHALT COMPOUND.

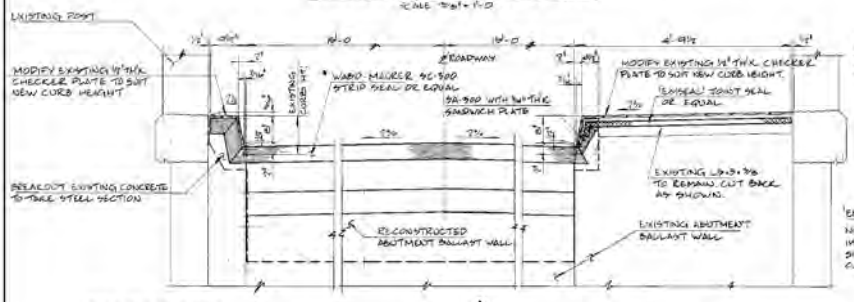
| | | |



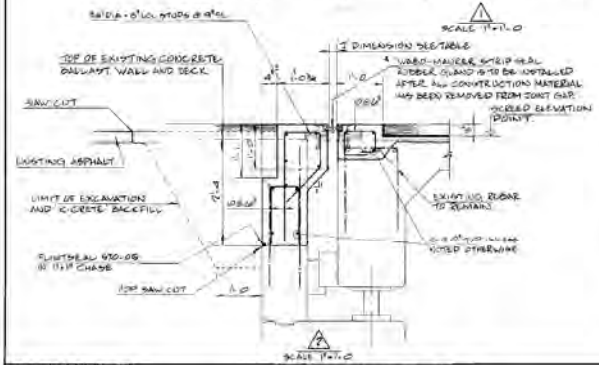
PLAN OF EXPANSION JOINT
SCALE 3/8"=1'-0



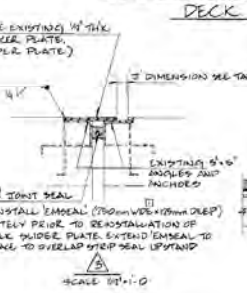
SECTION AT CURB SECTION AT SIDEWALK
DECK DRAIN MODIFICATION DETAIL
SCALE 1½"=1'-0



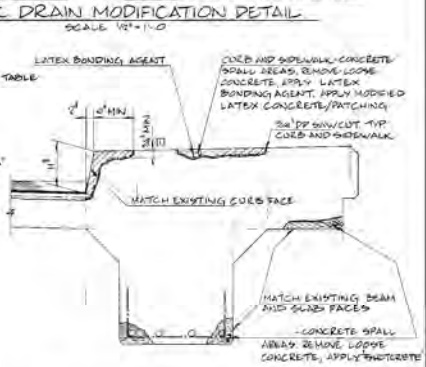
SCALE 1"=1'-0



SCALE 1"=1'-0



SCALE 1½"=1'-0



CURB, SIDEWALK & BEAM REPAIR DETAILS
SCALE 1"=1'-0

NOTES:
1. EXPANSION JOINTS SHALL BE ELASTOMETAL WABO-MAURER STRIP SEAL (4C) SYSTEM, OR APPROVED EQUIVALENT.
2. EXPANSION JOINTS SHALL BE COMPLETELY SHOP ASSEMBLED AND PRE-SET FOR 2" AT 16°C PRIOR TO SHIPMENT.
3. MANUFACTURER'S SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION.
4. NEOPRENE SEAL SHALL CONFORM TO THE REQUIREMENTS OF M.T.C. FORM 1310.
5. STEEL SHALL BE IN ACCORDANCE WITH C.S.A. SPECIFICATION G40.21 GRADE 400W OR EQUIVALENT. STEEL EXTRUSIONS SHALL BE IN ACCORDANCE WITH ASTM A847.
6. STUDS SHALL BE KNM OR NELWELD OR APPROVED EQUIVALENT AND ATTACHED USING FORCE WELD PROCESS.
7. ALL STEEL INCLUDING STUDS, SHALL BE HOT DIP GALVANIZED (CSA STANDARD G164) OR ZINC METALLIZED IN ACCORDANCE WITH C.S.A. STANDARD G189, AFTER FABRICATION.
8. WELDING SHALL BE OF A LOW HYDROGEN CLASSIFICATION, MANUAL ELECTRODES SHALL BE E7018 OR E7018. ALL WELDING SHALL BE IN ACCORDANCE WITH C.S.A. STANDARD W59.
9. JOINT ASSEMBLY SHALL BE SET TO FINAL ELEVATION AND GRADE OF BRIDGE DECK.
10. FINAL WITH ADJUSTMENT SHALL BE MADE AND CLAMPING DEVICES TIGHTENED JOINT PRIOR TO PLACING OF THE CONCRETE IN BALLAST WALL.
11. ALL BOLTS CONNECTING CLAMPS AND LEVELLING DEVICES TO STEEL EXTRUSIONS TO BE LIBERALLY COATED WITH WHITE NON-STAINING GREASE.
12. AFTER REMOVAL OF CLAMPING AND LEVELLING DEVICES, BOLT HOLES SHALL BE FILLED WITH AN APPROVED EPOXY GROUT.

(* WOODEN WEDGE EXPANSION JOINTS WHERE USED)

SEAL INSTALLATION DATA

TEMPERATURE	°C	5	10	15	21	27	32
	°F	40	50	60	70	80	90
DIMENSION U	"	2 1/16	2 1/8	2 3/16	1 3/4	1 5/16	1 1/16

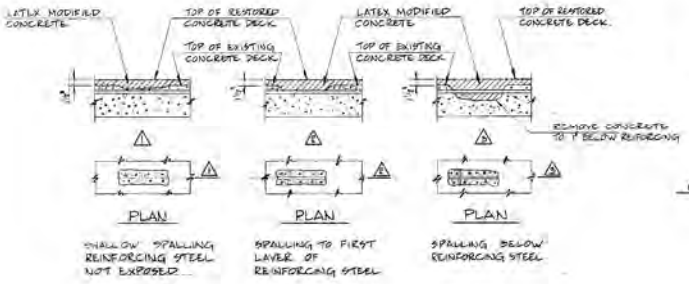
2	AS BUILT		OCT 87	GH	
1	REVISIONS		DATE	BY	

DESIGN M.N.
DRAWN N.A.S.
CHECKED M.P.
APPROVED D.R.M.
DATE MAY 1982
SCALE AS SHOWN

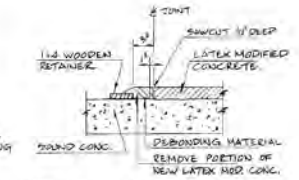
Consulting Engineers & Planners

1982 BRIDGE REHABILITATION CONTRACT
REGIONAL STRUCTURE N° 2201
SCHEIFELE BRIDGE
DETAILS I

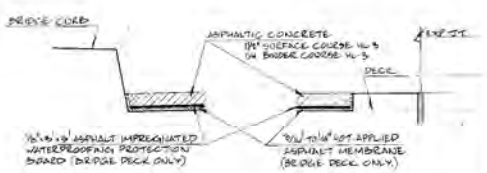
CONTRACT NO. 9168-01
SHEET NO. 82-16-2
DRAWING NO. 9



DECK REPAIR DETAILS
N.T.S.



OPTIONAL CONSTRUCTION JOINT
N.T.S.



BRIDGE DECK WATERPROOFING DETAIL

PAVEMENT DETAIL AT BRIDGE APPROACH

												1982 BRIDGE REHABILITATION CONTRACT	9168-01
												REGIONAL STRUCTURE Nº 2201 SCHEIFELE BRIDGE	82-16-3
												DETAILS II	9

Consulting Engineers & Planners

APPENDIX D:
2011 BRIDGE REPAIR DRAWINGS

Region of Waterloo

DESIGN AND CONSTRUCTION
DIVISION

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER (REGIONAL ROAD 22)

CONTRACT No: 2011-009

"ISSUED FOR CONSTRUCTION"

APRIL, 2011

McCORMICK RANKIN CORPORATION
A member of MMM GROUP

KEN SEILING
REGIONAL CHAIR

THOMAS SCHMIDT, P. ENG.
COMMISSIONER OF TRANSPORTATION
AND ENVIRONMENTAL SERVICES

2011-009

2011-009

Region of Waterloo

McCORMICK RANKIN CORPORATION
A member of MMM GROUP

SCHEIFELE BRIDGE

ROAD No 22 ROAD NAME NORTHFIELD DRIVE
WORK OF REPAIRS TO SCHEIFELE BRIDGE

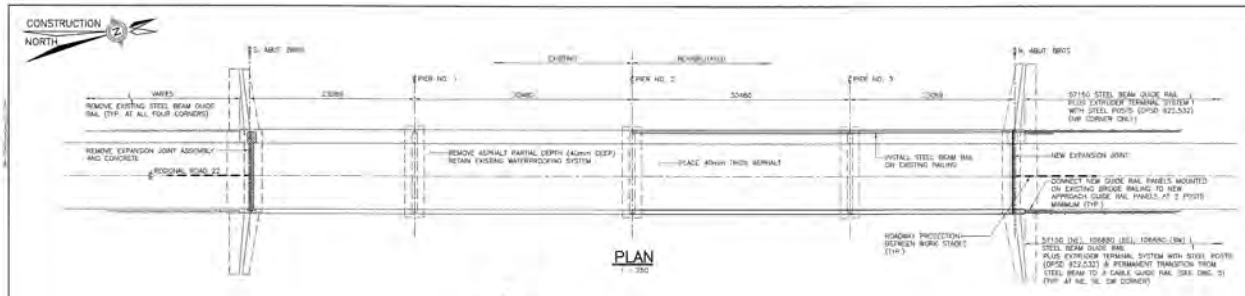
CONTRACT No 2011-009
FILE No 5511 (B) SECTION No
LOCATION OVER CONESTOGO RIVER

MUNICIPALITY CITY OF WATERLOO

KEY PLAN

NTS

	DRAWING INDEX
SHEET	DESCRIPTION
	TITLE PAGE
	INDEX PAGE
	REPAIRS TO BRIDGE
S1	GENERAL ARRANGEMENT
S2	CONSTRUCTION STAGING STAGE I
S3	CONSTRUCTION STAGING STAGE 2
S4	REMOVALS AND REPAIRS DETAILS I
S5	REMOVALS AND REPAIRS DETAILS II
S6	SLIDE RAIL SYSTEM
S7	EXPANSION JOINT ASSEMBLY
S8	EXPANSION JOINT DETAILS
E1	STAGE 1 TRAFFIC CONTROL
E2	STAGE 2 TRAFFIC CONTROL
T1	PERMANENT LANE MARKINGS



GENERAL NOTES:

1. ALL WORK SHALL BE UNDERTAKEN IN ACCORDANCE WITH ONTARIO PROVINCIAL STANDARD SPECIFICATIONS AND THE SPECIAL PROVISIONS OF THE CONTRACT.
2. CLASS OF CONCRETE: 35 MPa
3. REINFORCING STEEL SHALL BE GRADE 400W.
4. CLEAR COVER TO REINFORCING STEEL UNLESS OTHERWISE NOTED: 75MM.
5. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS OF THE CASTING WORK AND ALL DETAILS ON SITE AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK.
6. BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH MTO STRUCTURAL STANDARD DRAWINGS 3372-1 AND 3372-2 (UNLESS OTHERWISE NOTED)
7. SPACERS AT LIMITS OF REMOVAL SHALL BE 25mm (MIN.) UP TO THE FIRST LAYER OF REINFORCING STEEL, WHICHEVER IS LESS (UNLESS OTHERWISE NOTED)
8. EPOXY GROUT FOR DOWELS SHALL BE FROM THE MTO'S DESIGNATED SOURCES FOR NATURAL AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
9. ALL CONSTRUCTION ACTIVITIES SHALL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO THE WATERCOURSE. VEHICLE REFUELING AND MAINTENANCE SHALL BE CONDUCTED AWAY FROM THE WATERCOURSE.
10. DRAWINGS ARE NOT TO BE SCALED
11. ALL DIMENSION SHOWN HERE ARE IN MILLIMETERS UNLESS OTHERWISE NOTED

LIST OF DRAWINGS:

S1. GENERAL ARRANGEMENT
S2. CONSTRUCTION STAGING
S3. REMOVALS AND REPAIR DETAILS I
S4. REMOVALS AND REPAIR DETAILS II
S5. GUIDE RAIL SYSTEM, STEEL BEAM PERMANENT TRANSITION INSTALLATION STEEL BEAM WITH CATHODIC TO 3 CABLE DWG'D
S6. STRIP SEAL EXPANSION JOINT ASSEMBLY TYPE 'C'
S7. STRIP SEAL EXPANSION JOINT DETAILS TYPE 'C'
E1. ELECTRICAL LAYOUT STAGE 1 TRAFFIC CONTROL
E2. ELECTRICAL LAYOUT STAGE 2 TRAFFIC CONTROL
T1. PERMANENT LANE MARKINGS

APPLICABLE ATANDARD DRAWINGS:

OPSD 912.120 GUIDE RAIL SYSTEM, STEEL BEAM STEEL POST WITH OFFSET BLOCK ASSEMBLY INSTALLATION — SINGLE RAIL
OPSD 912.430 GUIDE RAIL SYSTEM, STEEL BEAM STRUCTURE CONNECTION
OPSD 912.530 GUIDE RAIL SYSTEM, STEEL BEAM STRUCTURE APPROACH TREATMENT
OPSD 912.532 ENERGY ATTENUATOR END TREATMENT EXTRUSION TERMINAL SYSTEM WITH STEEL POSTS - INSTALLATION

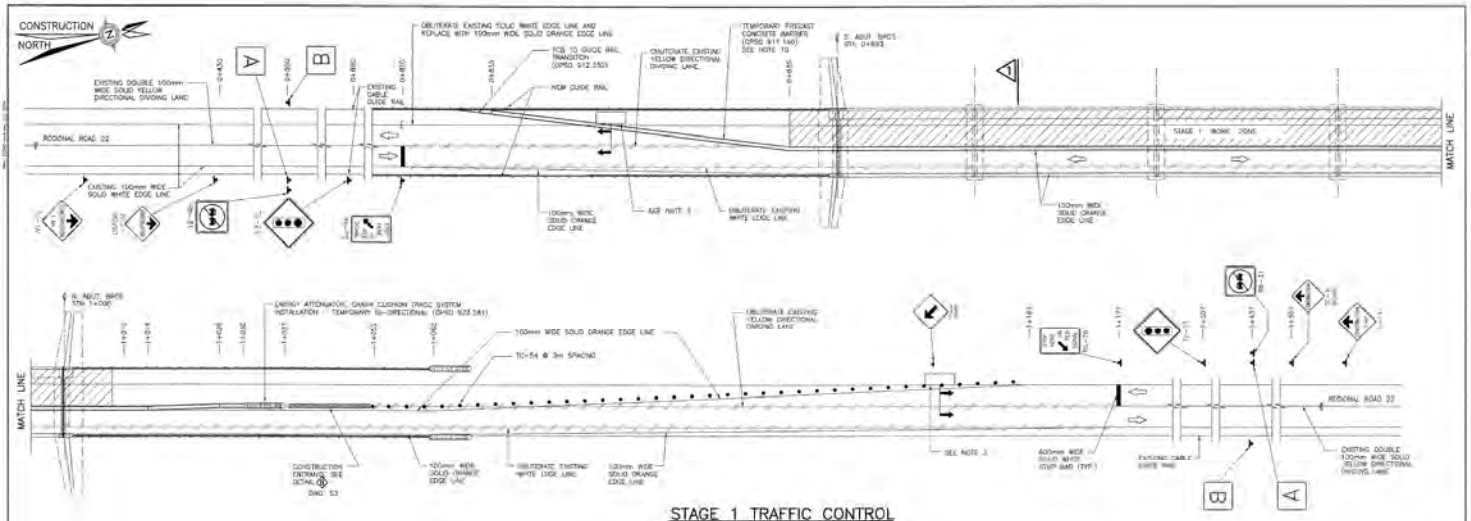
McCORMICK RANKIN CORPORATION
A member of MMM GROUP

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

GENERAL ARRANGEMENT

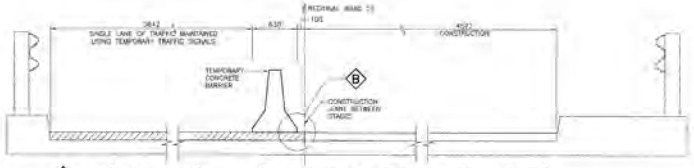
Region of Waterloo

DRAWN BY: JK | CHECKED BY: JK | SUBMITTED No.: 2007-0608 | DRAWING No.:
SCALE: AS SHOWN | DATE: APR/07 | PROJECT No.: 3511 | SHEET: S1 OF 38



STAGE 1 TRAFFIC CONTROL

1 : 300



⚠1 STAGE 1 SHOWN, STAGE 2 SIMILAR BUT OPPOSITE HAND

1 : 75

CONSTRUCTION ZONE SIGN DETAILS

GENERAL NOTES

1. ALL TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE SUPPLIED, INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE LATEST EDITION OF BOOK 7 (TEMPORARY CONDITIONS) OF THE MTO's ONTARIO TRAFFIC MANUAL.
2. TRAFFIC CONTROL IS BASED UPON THE POSTED REGULATORY SPEED LIMIT OF 80km/hr
3. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE ELECTRICAL WORK (PORTABLE TRAFFIC SIGNAL UNITS DRAWING)
4. THE CONTRACTOR SHALL PREPARE AND SUBMIT TO THE CONTRACT ADMINISTRATOR A COPY OF THEIR TRAFFIC PROTECTION PLAN FOR THIS PROJECT, IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT.
5. THE CONTRACTOR SHALL COVER ANY EXISTING TRAFFIC CONTROL SIGNS THAT CONFLICT WITH TEMPORARY SIGNS REQUIRED FOR CONSTRUCTION STAGING.
6. ANY EXISTING TRAFFIC CONTROL SIGNS SHALL BE REINSTATED UPON REMOVAL OF THE TEMPORARY TRAFFIC CONTROL DEVICES.
7. TEMPORARY PAVEMENT MARKINGS AND TEMPORARY TRAFFIC CONTROL SIGNS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
8. EXISTING PAVEMENT MARKINGS WHICH CONFLICT WITH THE TEMPORARY MARKINGS SHALL BE OBSCURED USING WATER/SODA BLAST OR BY GRINDING IN ACCORDANCE WITH CONTRACT SPECIFICATION.
9. ALL TEMPORARY PAVEMENT MARKING SHALL BE TEMPORARY PAINT.
10. TEMPORARY CONCRETE BARRIERS SHALL BE SUPPLIED WITH STAB TYPE, BARRIER MOUNTED DELINEATORS.

UNDER SEPARATE SEAL

UNLESS SIGNED AND SEALED BY THE ENGINEER, THESE DRAWINGS ARE NOT TO BE USED FOR ANY PURPOSE INCLUDING BIDDING, PERMITTING, CONSTRUCTION OR RECORD.

McCORMICK RANKIN CORPORATION
A member of WSP GROUP

NO.	DESCRIPTION	BY	DATE
	ISSUED FOR CONSTRUCTION		

CONSULTANT

FIELD WORK BY:

DESIGN BY:

DRAFT BY:

CHECKED BY:

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

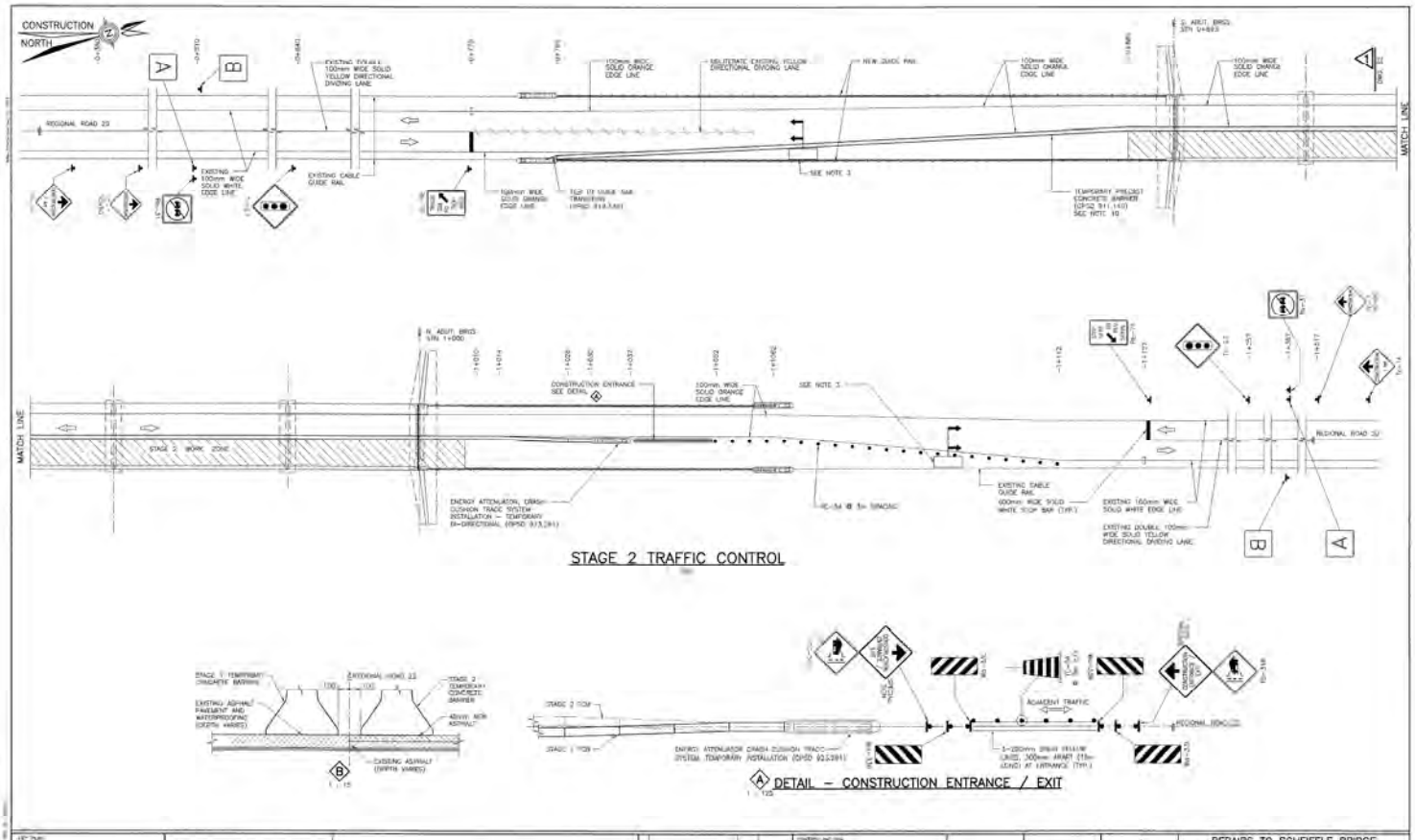
CONSTRUCTION STAGING STAGE 1

DESIGNED BY	CONTRACT NO.	DRAWING NO.
DP	2011-109	
DATE	REV. No.	SHEET
JANUARY 2012	50.81	52 OF 58

DRAWN BY: DP

CHECKED BY: BP

SCALE: AS SHOWN



STAGE 2 TRAFFIC CONTROL

DETAIL – CONSTRUCTION ENTRANCE / EXIT

THESE DESIGN DOCUMENTS ARE PREPARED SOLELY FOR THE USE BY THE PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS ENTERED INTO A CONTRACT AND SHALL NOT BE REPRODUCED OR USED IN ANY MANNER BY THE DESIGN PROFESSIONAL TO ANY PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS NOT ENTERED INTO A CONTRACT.

McCORMICK RANKIN CORPORATION
A member of WSP GROUP

No.	ISSUED FOR CONSTRUCTION	REQ'D	APP'D	DATE
1	ISSUED FOR CONSTRUCTION	RG	JAM	06 Oct
No.	ISSUE/REVISION	BY		DATE

CONTROLLING SURVEY

FIELD BOOK No.

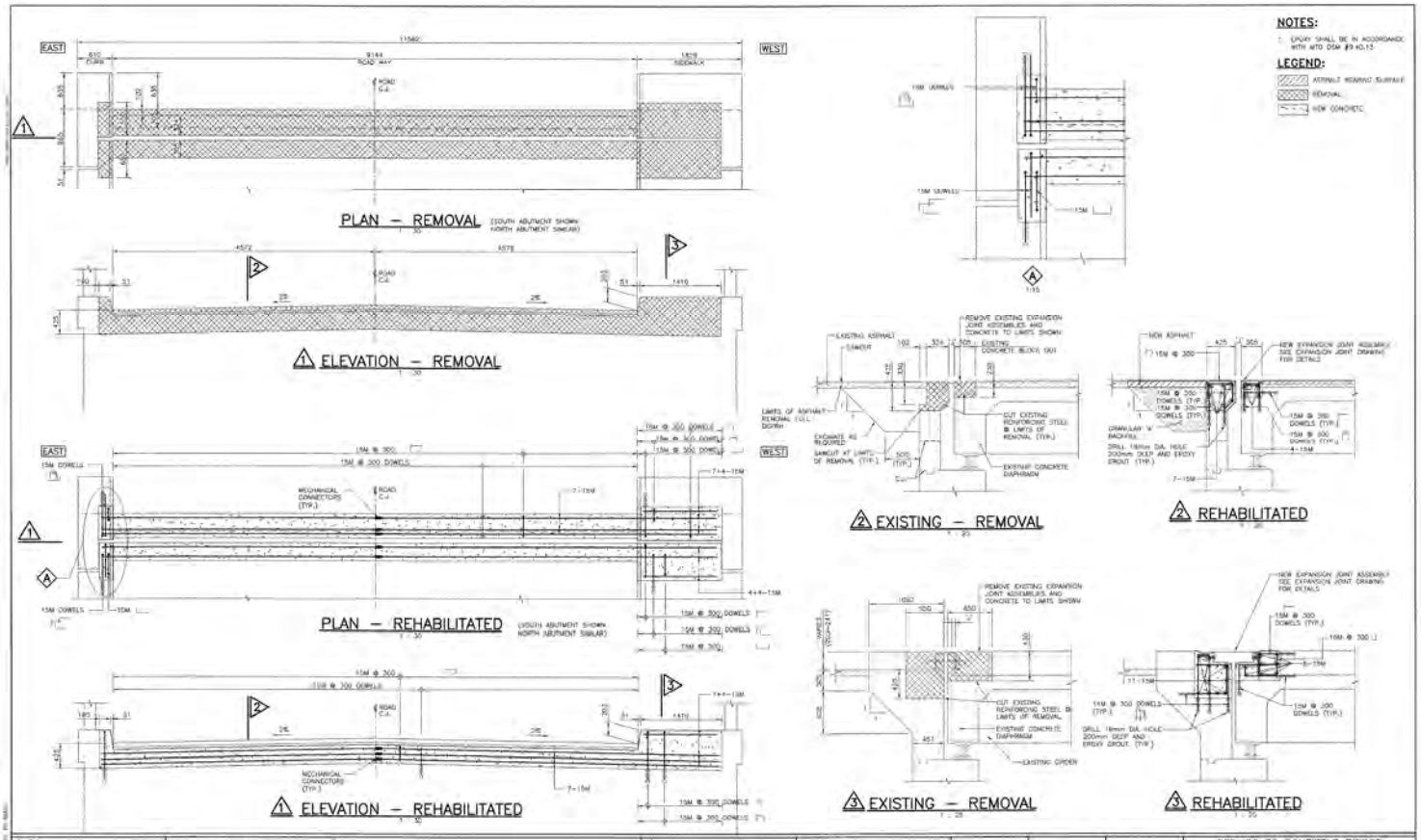
DATUM

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

CONSTRUCTION STAGING
STAGE 2

DRAWN BY:	CHECKED BY:	CONTRACT No.	DRAWING No.
CF	JAM	2011-009	
SCALE: AS SHOWN	DATE:	REF. No.	SHEET



McCORMICK RANKIN CORPORATION
A member of MMM GROUP

Region of Waterloo

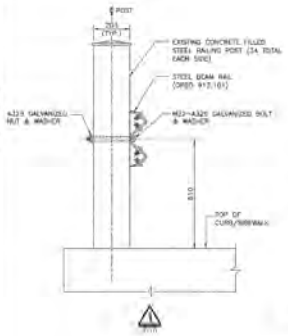
REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

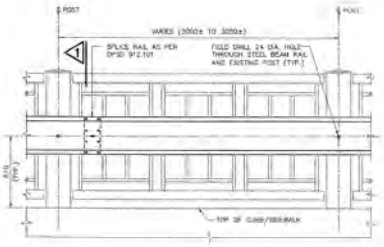
REMOVALS AND REPAIR DETAILS I

CONTRACT No. 2011-XXX

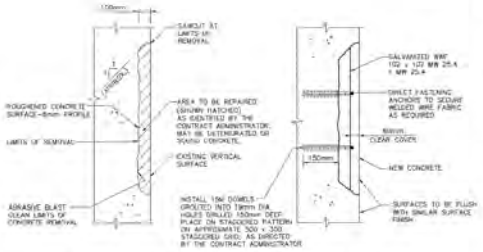
FILE No. 16511

SHEET No. 54 OF 54





DETAILS FOR INSTALLATION OF STEEL BEAM RAIL ON EXISTING RAILING SYSTEM

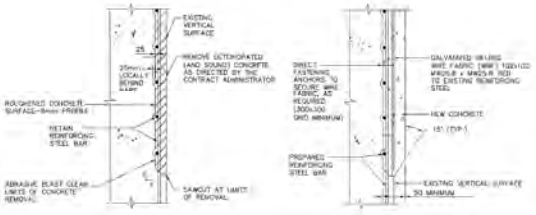


EXISTING / REMOVAL REHABILITATED

TYPICAL CONCRETE REPAIR DETAIL NO REINFORCING STEEL BARS

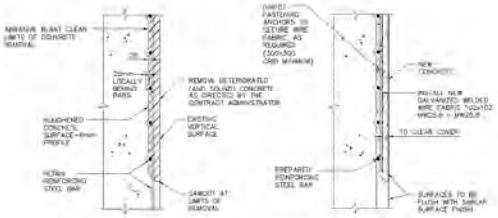
TYPICAL CONCRETE REPAIR NOTES:

1. WIRE-TIE EXPOSED REINFORCING STEEL BARS AT ALL INTERSECTIONS.
2. REPLACE BADLY CORRODED OR DAMAGED REINFORCING STEEL BARS AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
3. CLEAN ALL EXISTING CONCRETE FACES, REMOVAL AREAS AND EXPOSED REINFORCING STEEL BARS BY ABRASIVE BLAST CLEANING.
4. PLACE ANCHOR RODS/PINS AS REQUIRED, INSERTS TO BE GALVANIZED AS PER ASTM 123.
5. PLACE WELDED GALVANIZED STEEL WIRE FABRIC.
6. PRE-WET 24 HOURS PRIOR TO PLACING CONCRETE.
7. PLACE CONCRETE.
8. FINISH AND CURE CONCRETE.



EXISTING/REMOVAL REHABILITATED

TYPICAL CONCRETE REPAIR DETAIL – VERTICAL SURFACE LESS THAN 70mm EXISTING COVER TO REINFORCING STEEL BARS



EXISTING/REMOVAL REHABILITATED

TYPICAL CONCRETE REPAIR DETAIL – VERTICAL SURFACE GREATER THAN 70mm EXISTING COVER TO REINFORCING STEEL BARS

THESE DESIGN DOCUMENTS ARE PREPARED SOLELY FOR THE USE BY THE PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS ENTERED INTO A CONTRACT. THERE ARE NO REPRESENTATIONS OF ANY KIND MADE BY THE DESIGN PROFESSIONAL TO ANY PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS NOT ENTERED INTO A CONTRACT.

McCORMICK RANKIN CORPORATION
A member of WSP GROUP

NO.	DESCRIPTION	BY	DATE
1	ISSUED FOR CONSTRUCTION	TEH	APR 20 '15

CONSULTANT'S SEAL

CONTRACTOR'S SEAL

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

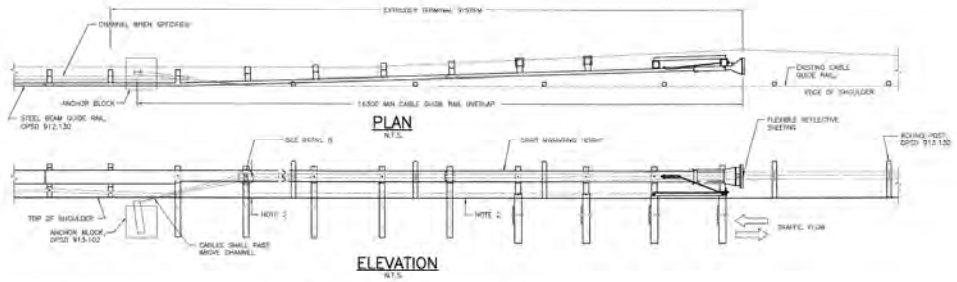
REMOVALS AND REPAIR DETAILS II

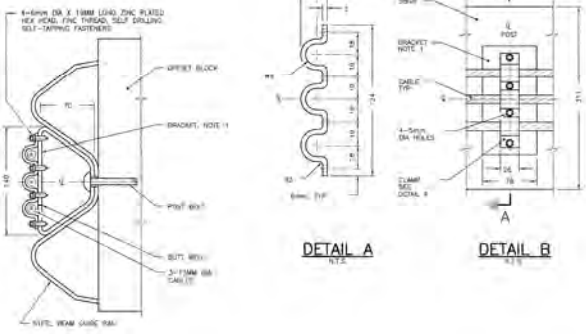
DRAWN BY	CHECKED BY	CONTRACT NO.	DRAWING No.
MC	G	2011-009	
MAM	M. Bolton	APR/2015	FILE No. 6871

SHEET 25 OF 28

NOTES:

1. 5MM THICK GALVANIZED STEEL PLATE SHAPED TO FIT INSIDE STEEL BEAM GUIDE RAIL.
2. CENTRE CABLE SHALL MATCH ELEVATION OF GBGR CENTRELINE.
3. DIMENSION TO TOP OF TOP CABLE.





SEE PLAN

THESE DESIGN DRAWINGS ARE PREPARED SOLELY FOR THE USE BY THE PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS ENTERED INTO A CONTRACT AND THERE ARE NO REPRESENTATIONS OF ANY KIND MADE BY THE DESIGN PROFESSIONAL TO ANY PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS NOT ENTERED INTO A CONTRACT.

McCORMICK RANKIN CORPORATION
A member of MMM GROUP

NO.	DESCRIPTION	BY	DATE
1	ISSUED FOR CONSTRUCTION	MD	APR 24 '20

CONSULTANTS S.A.

FIELD WORK BY:

DESIGNED BY:

CHECKED BY:

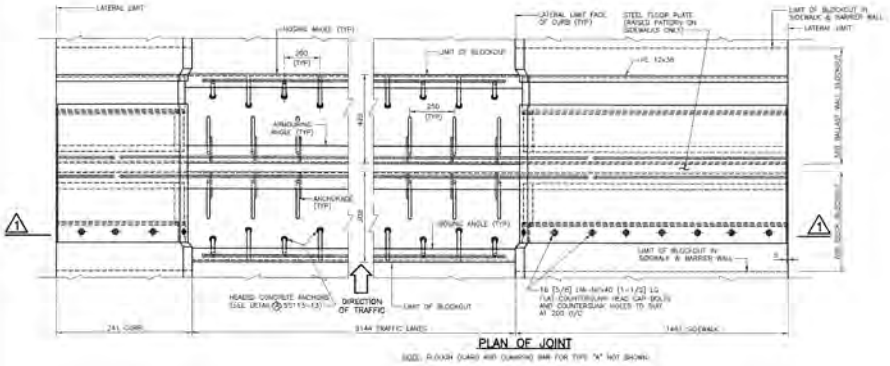
Region of Waterloo

PERMANENT TRANSITION INSTALLATION OVER CONESTOGO RIVER

GUIDE RAIL SYSTEM, STEEL BEAM PERMANENT TRANSITION INSTALLATION STEEL BEAM WITH EXTRUDER TO 3 CABLE DIVIDED

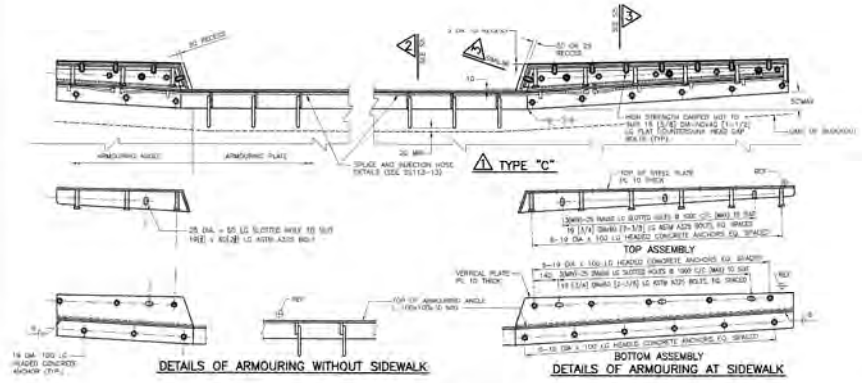
DRAWN BY:	CHECKED BY:	DISTRICT No.	DRAWING No.
JP	JK	2011-009	
DATE: JUNE/2021	FILE No. 0511	SHEET 25 OF 28	

METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



PLAN OF JOINT

NOTE: FLOOR (LAND AND (UNDER) BAR FOR TYPE "A" NOT SHOWN.



DETAILS OF ARMOURING WITHOUT SIDEWALK

DETAILS OF ARMOURING AT SIDEWALK

NOTES:

1. EXPANSION JOINT SHALL BE IN ACCORDANCE WITH THE DESIGNATED SOURCES FOR MATERIALS LIST ITEM 3.40.21, TYPE "C". DETAILS SHOWN FOR OTHER TYPES ARE NOT APPLICABLE.
2. EXPANSION JOINT ASSEMBLY CONSTRUCTION AND MATERIAL SHALL BE ACCORDING TO OPSS 920 AND OPSS 1210, AND AS SPECIFIED IN THE CONTRACT DOCUMENTS.
3. STEEL PLATE 10mm THICK UNLESS OTHERWISE NOTED.
4. WELDING ELECTRODES SHALL BE OF A LOW HYDROGEN CLASSIFICATION.
5. JOINT ASSEMBLIES SHALL BE COMPLETELY SHOP ASSEMBLED (SUBJECT FOR SEALS) AND PRESET TO DIMENSION "J" FOR 10°C AND ADJUSTED IN THE FIELD TO SUIT INSTALLATION TEMPERATURE.
6. JOINT ASSEMBLY INSTALLATION TEMPERATURE SHALL BE TAKEN AS MEAN SHADE AIR TEMPERATURE AT STRUCTURE PRIOR TO JOINT INSTALLATION AS FOLLOWS:
   - FOR CONCRETE STRUCTURES – 48 HOURS
   - FOR STEEL STRUCTURES – 24 HOURS
7. FIELD SPLICES IN JOINT ASSEMBLY ARE ONLY PERMITTED AT STAGED CONSTRUCTION AND/OR AS SHOWN ON THE CONTRACT DRAWINGS.
8. IF THE JOINT ARMOURING FOR A SKEWED STRUCTURE IS SPLICED AT A BUSHING, THE SPLICE SHALL BE DETAILED PARALLEL TO THE CENTERLINE OF THE TRAFFIC LANE.
9. SETTING ANGLES SHALL BE FLAME CUT ACCORDING TO OPSS 920, BUT IN NO CASE PRIOR TO CONCRETE REACHING INITIAL SET.
10. AFTER SLIPPING OF THE CONCRETE FOR A MINIMUM OF 7 DAYS, THE SETTING DEVICES MAY BE REMOVED. THE JOINTS UNDER THE ARMOURING ANGLE AND HOOKED ANGLE SHALL THEN BE PRESSURE GROUTED.
11. PREFORMED SEALS SHALL HAVE MINIMUM THICKNESS OF 5mm OR AS PER MFR.
12. ALL STEEL RETAINER SURFACES COMING IN CONTACT WITH PREFORMED SEAL SHALL BE CLEANED PRIOR TO INSTALLATION OF THE SEAL.
13. PREFORMED SEALS SHALL BE INSTALLED AFTER JOINT ASSEMBLY HAS BEEN GRIT (OR FLAME, STHROTOMA OR FILLER SCREEN SEEK AND BALLAST WALL REMOVED) AND EXPANSION GAP CLEARED OF ANY DEBRIS.
14. ALL JOINT ANCHORAGES SHALL BE DETAILED ON WORKING DRAWINGS PERPENDICULAR TO THE EXPANSION JOINT ON BOTH THE DECK SIDE AND THE ABUTMENT SIDE EXCEPT AS FOLLOWS: STRUCTURES SKEWED FROM OVER 15° AND UP TO 45° SHALL HAVE ANCHORAGES DETAILED TO OFFSET FROM THE PERPENDICULAR TO THE EXPANSION JOINT ON THE DECK SIDE.
15. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING SS113-12 OR SS113-13.
16. LEGEND: [ ] DENOTES FASTENER SIZE IN INCHES.

ADDITIONAL NOTES FOR BOLTS:

1. 19 [3/4] DIAMETER BOLTS SHALL BE IN ACCORDANCE WITH WITH ASTM A449. ALL BOLTS USED IN 25 DIA x 50 LONG SLOTTED HOLES SHALL BE INSTALLED WITH OVERSIZE WASHERS.
2. 16 [5/8] DIAMETER FLAT COUNTERSUNK HEAD CAP BOLTS SHALL BE IN ACCORDANCE WITH ASTM F835.
3. CLAMPING BAR BOLTS FOR TYPE "A" JOINTS SHALL BE EITHER 13 [1/4] DIAMETER FLAT COUNTERSUNK HEAD CAP BOLTS TENSIONED TO 140kN AND IN ACCORDANCE WITH ASTM F835, OR 19 [3/4] DIAMETER HEX HEAD BOLTS TENSIONED TO 123kN AND IN ACCORDANCE WITH ASTM A325.
4. ALL BOLTS SHALL BE INSTALLED USING NOVOCK LOCKBOLTS.
5. ALL BOLTS SHALL BE TENSIONED USING THE TURN-OF-NUT TIGHTENING METHOD IN ACCORDANCE WITH CSA/CSA S16.1.

MODIFIED
STANDARD DRAWING APPROVAL 2008 — SS113-10
STRIP SEAL EXPANSION JOINT ASSEMBLY FOR BARRIER WALLS

DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

KEY PLAN

THESE DESIGN DOCUMENTS ARE PREPARED SOLELY FOR THE USE BY THE PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS ENTERED INTO A CONTRACT AND THERE ARE NO REPRESENTATIONS OF ANY KIND MADE BY THE DESIGN PROFESSIONAL TO ANY PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS NOT ENTERED INTO A CONTRACT.

McCORMICK RANKIN CORPORATION
A member of MMM GROUP

NO.	ISSUED FOR / DESCRIPTION	BY	DATE
1	ISSUED FOR CONSTRUCTION	RLL	APR. 24, 2014

CONSULTING ENGINEERS

FIELD BOOK NO.

DRAWN BY

CHECKED BY

PROFESSIONAL ENGINEERS OF ONTARIO — LICENSED — 100 YEARS

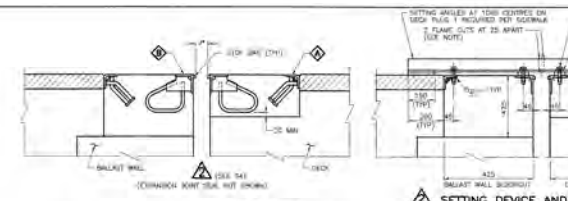
PROFESSIONAL ENGINEERS OF ONTARIO

Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

STRIP SEAL EXPANSION JOINT ASSEMBLY TYPE 'C'

DRAWN BY	CHECKED BY	CONTRACT NO.	DRAWING NO.
RLL	JP	2011-029	
SCALE	DATE	FILE NO.	SHEET NO.
AS SHOWN	MAY/2014	5551	57 OF 58



SETTING DEVICE AND BLOCKOUTS

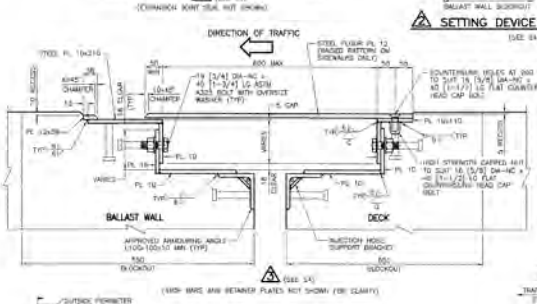
INJECTION HOSE SUPPORT BRACKET DETAIL

METRIC

DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

NOTES:

1. FOR DETAILS OF REINFORCING IN EXPANSION JOINT BLOCKOUT, SEE DWG. 02.
2. HEADED CONCRETE ANCHORS IN NOSING ANGLES SHALL BE LOCATED WITHIN 75 mm OF EITHER SIDE OF FIELD SPLICES.
3. PROTECT INJECTION HOSE AND FITTINGS ADJACENT TO FIELD SPLICES DURING WELDING AND REMOVE PROTECTION PRIOR TO PLACING OF CONCRETE IN BLOCKOUT.
4. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING SS113-10.
5. (ADDED) ( ) DENOTES IMPERIAL SIZE IN METRIC



BALLAST WALL / DECK

ANCHORAGE DETAIL

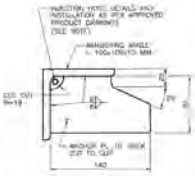


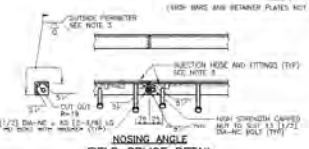
TABLE OF DESIGN REQUIREMENTS (TO BE FULLY COMPLETED BY DESIGNER)

EXP. JOINT LOCATION	MTO SMP RATING* (mm)		DESIGN S & S MOVEMENT** (mm)	"a" AT INSTALLATION TEMPERATURE (C) (mm)						
	MIN.	MAX.		-5°	0°	5°	10°	15°	20°	25°
NORTH & SOUTH ABUTMENTS	55	105	40	80	58	55	54	48	43	46	42

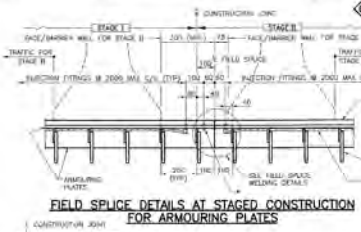
* DIMENSION "J" MEASURED PERPENDICULAR TO CENTRELINE EXPANSION JOINT WHERE MIN. AND MAX. FOR JOINT SUPPLIED DIFFER FROM THOSE SHOWN IN TABLE, 'J' DIMENSIONS SHALL BE REVISED BY CONTRACTOR AND SHOWN ON SHOP DRAWINGS. FOR STAGED CONSTRUCTION ON STRUCTURES OTHER THAN POST-TENSIONED, THE CONTRACTOR SHALL USE THE FIRST STAGE OBSERVED "J" GAP TO INSTALL THE SECOND STAGE.

** MTO SMP MEASURED BETWEEN PROJECTING FACES OF STOP (MPS). IS TAKEN FROM OSM 9-40.17, TYPE "C".

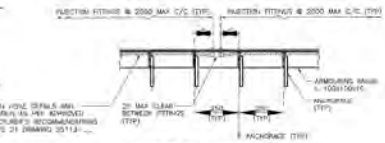
*** CALCULATED TOTAL MOVEMENT AT SLS OCCURRING AFTER END OF JOINT INSTALLATION. (MEASURED PARALLEL TO CENTRELINE OF STRUCTURE)



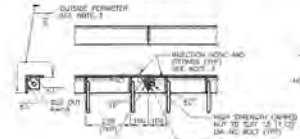
NOSING ANGLE FIELD SPLICE DETAIL



FIELD SPLICE DETAILS AT STAGED CONSTRUCTION FOR ARMOURING PLATES



DETAILS OF ANCHORAGE AND INJECTION HOSE FOR ARMOURING ANGLE



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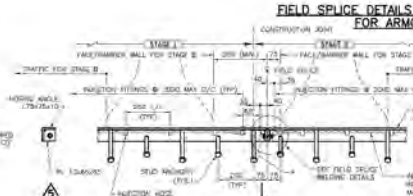

FIELD SPLICE DETAILS AT STAGED CONSTRUCTION FOR NOSING ANGLE

DETAILS OF HEADED CONCRETE ANCHORS AND INJECTION HOSE FOR NOSING ANGLE

MODIFIED

STANDARD DRAWING NUMBER	SS113-13
STRIP SEAL EXPANSION JOINT – TYPE "C" DETAILS	

McCORMICK RANKIN CORPORATION
A member of the SNC-LAVALIN GROUP

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

STRIP SEAL EXPANSION JOINT DETAILS TYPE 'C'

Region of Waterloo

DESIGN BY: MC | DRAWN BY: | CHECKED BY: | CONTRACT No.: 2011-999 | DRAWING No.: SS113 | SHEET No.: 5 OF 5 | DATE: NOVEMBER 2011 | SCALE: AS SHOWN

ESTIMATE OF MATERIALS

LOCATION: REGIONAL ROAD 22 (NORTHFIELD DRIVE)
TOWNSHIP OF WOOLWICH

ITEMS	QUANTITY P.	S.
SIGNAL HEADS		
STANDARD HIGHWAY HEAD 300mm x 300mm x 200mm (LED)		
VERTICAL HIGHWAY MAST ARM 300mm x 300mm x 200mm x 300mm WITH 600MM WITH PLANNER (LED)		
VERTICAL HIGHWAY HEAD 300mm x 300mm x 200mm (LED)		
VERTICAL HIGHWAY HEAD 4 x 300mm WITH HARDOR (LED)		
PEDESTRIAN SIGNAL HEAD (LED)		

ARMS AND BRACKETS

ESTIMATE OF MATERIALS

LOCATION: SCHEFFLER ARMS (4220) (AXIS CONSTRUCTION) WARD
REGIONAL ROAD 22 (NORTHFIELD DRIVE)
TOWNSHIP OF WOOLWICH

ITEMS	QUANTITY N	S
SIGNAL HEADS:		
STANDARD HORIZONTAL HEAD 300mm x 200mm x 200mm (LED)		
SPECIAL HORIZONTAL HEAD 300mm x 200mm x 200mm WITH ARROW WITH FLASHER (LED)		
SPECIAL HORIZONTAL HEAD 300mm x 300mm x 300mm (LED)		
SPECIAL HORIZONTAL HEAD 4 x 300mm WITH ARROW (LED)		
PEDESTRIAN SIGNAL HEAD (LED)		

ARMS AND BRACKETS

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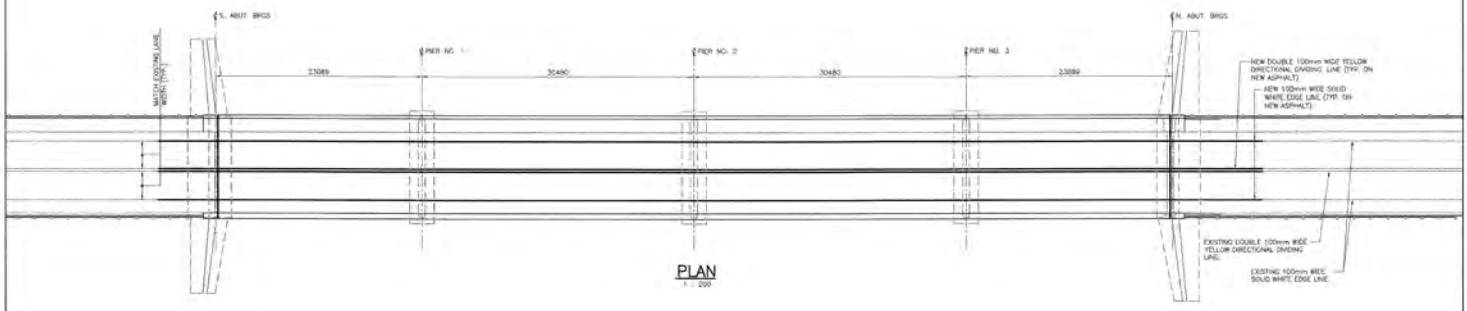
10m (1 @ 0)	4410	4780	11410	6380kg	

CONSTRUCTION NORTH



PLAN
1 : 200

FOR INFORMATION ONLY

NOT INCLUDED IN CONTRACT

KEY PLAN

THESE DESIGN DOCUMENTS ARE PREPARED SOLELY FOR THE USE BY THE PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS ENTERED INTO A CONTRACT AND THERE ARE NO REPRESENTATIONS OF ANY KIND MADE BY THE DESIGN PROFESSIONAL TO ANY PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS NOT ENTERED INTO A CONTRACT

McCORMICK RANKIN CORPORATION
A member of MMM GROUP

No.	Issue / Revision	By	Date
1	ISSUED FOR CONSTRUCTION	MD	APR. 26 2011

CONSULTING Eng.

FIELD REVIEW Inc.

CHECKED FILE

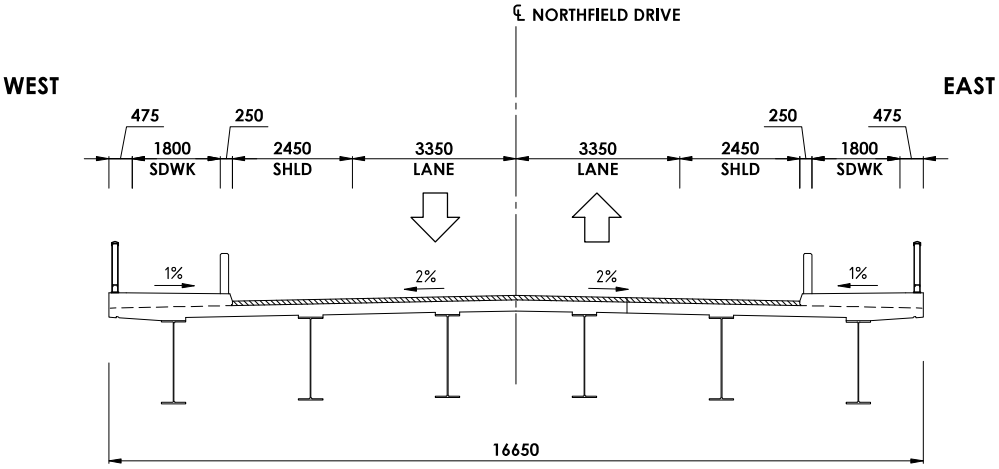
Region of Waterloo

REPAIRS TO SCHEIFELE BRIDGE OVER CONESTOGO RIVER

PERMANENT LANE MARKING

DESIGNED BY	CHECKED BY	CONTRACT No.	DRAWING No.
MC	RWL	2011-009	
DRAWN	DATE	FILE No.	SHEET
AS SHOWN	APR/2011	0511	T1 OF T1

APPENDIX E:
DESIGN CONCEPTS



ALTERNATIVE 5

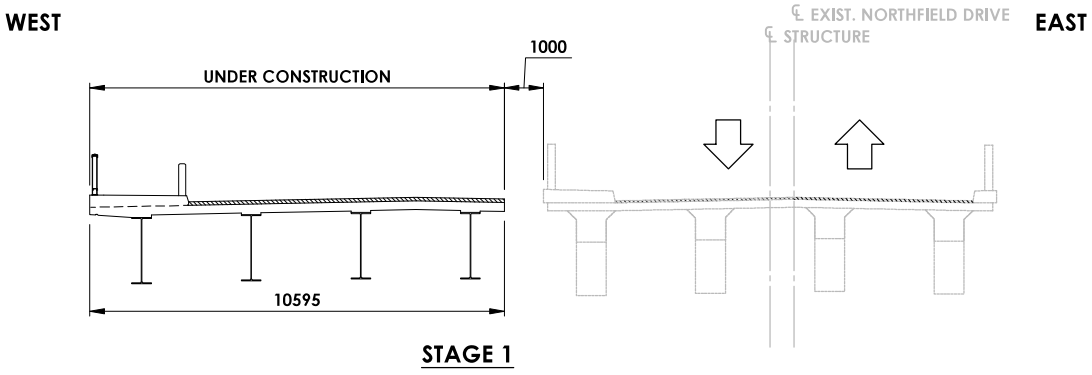
Region of Waterloo

Stantec

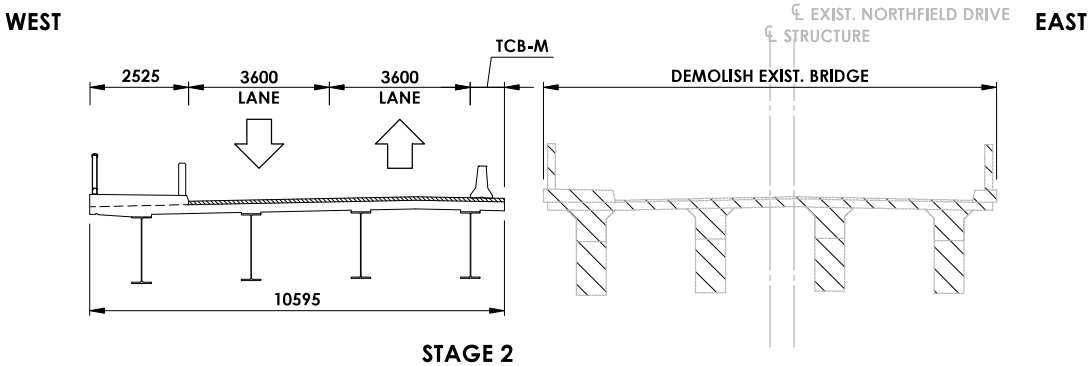
CROSS-SECTION ALTERNATIVES

SCHEIFELE BRIDGE
(SITE No. 2201)

Scale: 1 : 100



STAGE 1



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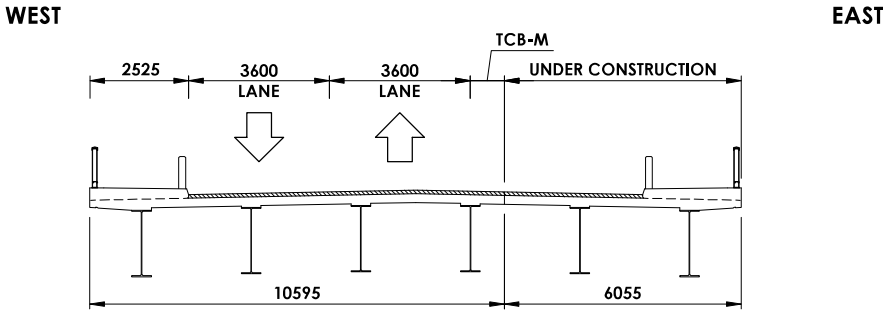
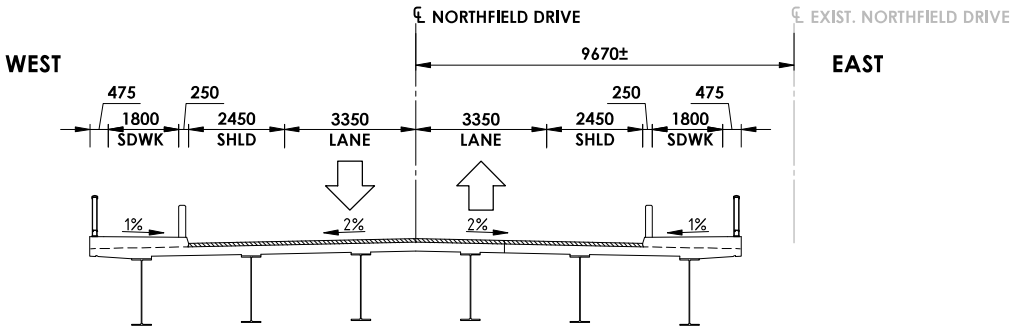


STAGE 3



STAGE 4

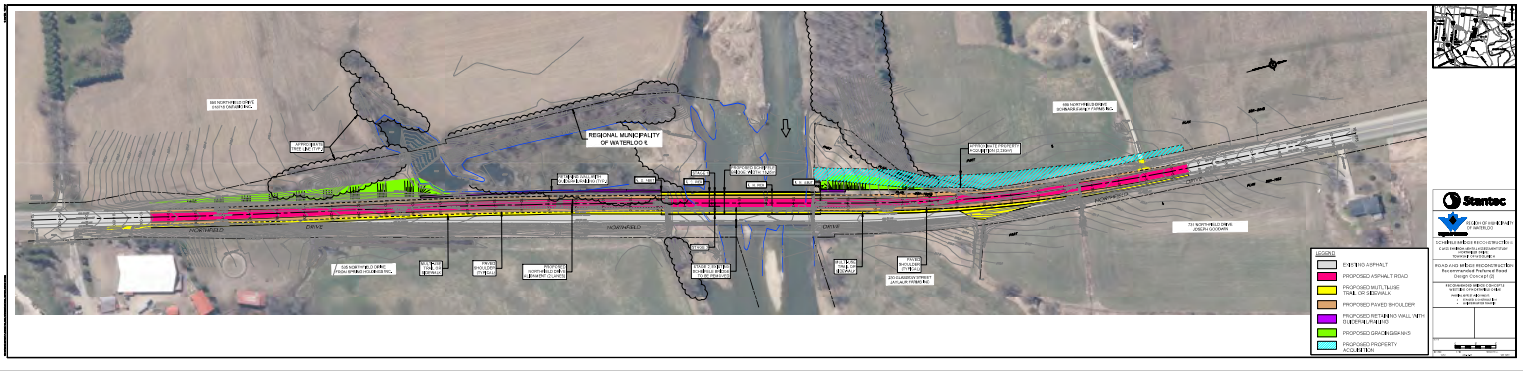
Region of Waterloo

Stantec

CONSTRUCTION STAGING

SCHEIFELE BRIDGE
(SITE No. 2201)

Scale: 1 : 125


REGIONAL MUNICIPALITY OF WATERLOO
HOMEFIELD
DRIVE
PROPOSED ROAD
EXISTING ASPHALT
PROPOSED ASPHALT ROAD
PROPOSED MULTI-USE TRAIL OR SIDEWALK
PROPOSED PAVED SHOULDER
PROPOSED RETAINING WALL (WITH SLOPE PROTECTION)
PROPOSED GRADING LIMITS
PROPOSED PROPERTY ACQUISITION
Stantec
CITY OF WATERLOO
ROAD AND MAJOR INTERSECTION RECONSTRUCTION
Recommended Preferred Road Design Concept (2)
RECOMMENDED MINOR CONCEPTS WITHIN CONSTRAINED ZONES
PROPOSED MULTI-USE TRAIL OR SIDEWALK
PROPOSED PAVED SHOULDER
PROPOSED RETAINING WALL (WITH SLOPE PROTECTION)
PROPOSED GRADING LIMITS
PROPOSED PROPERTY ACQUISITION

Bridge Alternatives Structural Planning Study Report

Scheifele Bridge over the Conestogo River, Regional Road 22 (Northfield Drive), Township of Woolwich

DRAFT

February 2022

Prepared for:
Region of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3

Prepared by:
Stantec Consulting. Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4

File: 165010600

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1.0 INTRODUCTION

The Region of Waterloo retained Stantec Consulting Ltd. (Stantec) to complete a Class Environmental Assessment and Detailed Design, and to provide Construction Administration services for the replacement of the Scheifele Bridge, which crosses the Conestogo River on Regional Road 22 (Northfield Drive) in the Township of Woolwich.

The Region's 10-Year Transportation Capital Plan includes funding for reconstruction of the Scheifele Bridge in 2023. Due to recent budget programming adjustments and scheduling issues, the Region anticipates that bridge replacement will be delayed 1-3 years.

The purpose of this supplementary report to the Class Environmental Assessment study is to summarize the development and evaluation of structural alternatives for the replacement of the Scheifele Bridge, including a construction staging program. This study examines various bridge span alternatives, bridge cross-sections, girder material options, construction access and procedures, and preliminary cost estimates. Geometric road and bridge designs, hydrological river modelling, geotechnical foundation conditions, and environmental issues have been reviewed in preliminary studies but will be revisited in more detail after a final bridge design concept is selected.

This report documents the preliminary design process, various bridge alternatives, preliminary cost estimates, and an evaluation process leading to a recommended preferred bridge concept for replacement of the Scheifele Bridge.

2.0 PROJECT LOCATION

The Scheifele Bridge is located on Regional Road 22 (Northfield Drive) in the Township of Woolwich. The bridge will be referenced as being oriented south to north for the purposes of this report. A Key Plan is included below.

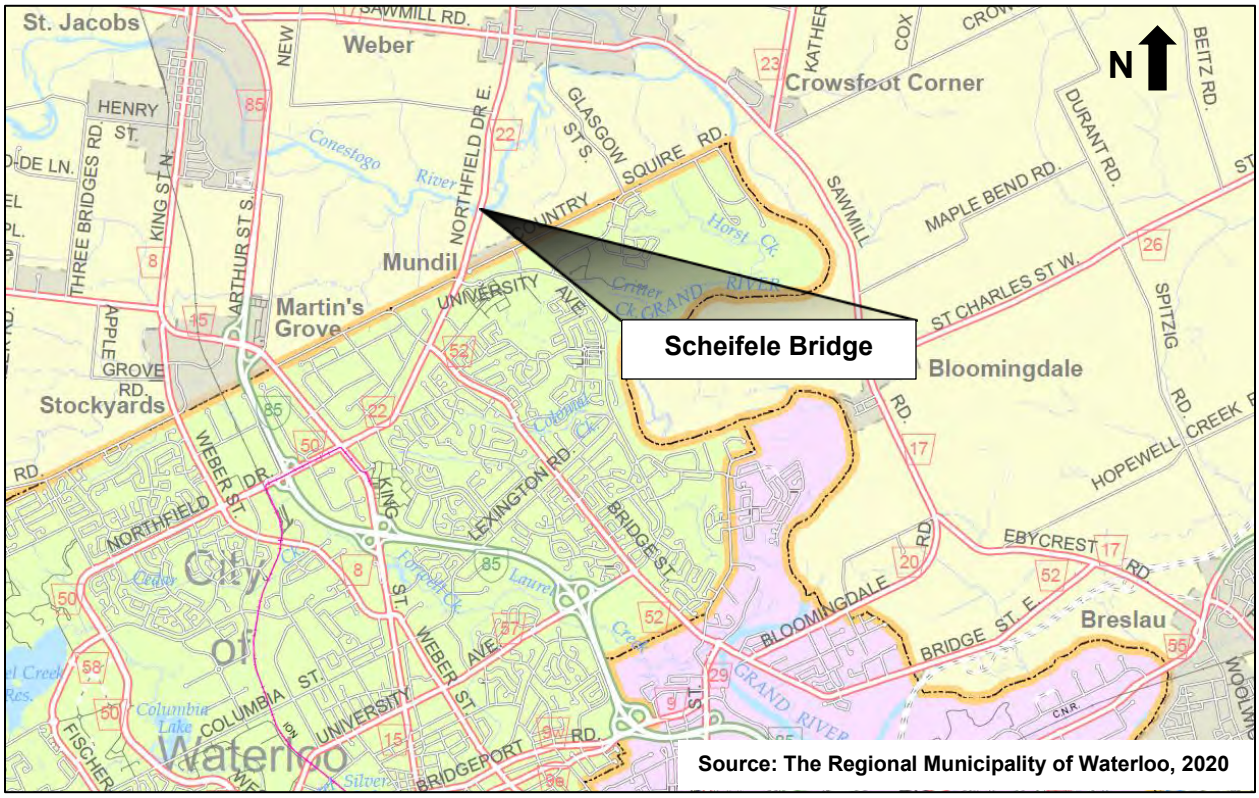

Figure 1: Key Map

3.0 EXISTING CONDITIONS

The Scheifele Bridge is a four-span continuous structure with a cast-in-place reinforced concrete deck on haunched T-beam girders. Span lengths are 22.86 m – 30.48 m – 30.48 m – 22.86 m from south to north. The T-beams are spaced at 3.048 m and the beam depths vary parabolically from 0.99 m at mid-spans to 2.36 m near the piers. In the end spans, the beams are a constant depth of 0.99 m from mid-span to the abutments. The bridge is fixed at the centre pier and is free to expand / contract at all other supports. There are steel rocker bearings at each movable support location.

The bridge has no skew. The overall bridge length is 106.7 m, the width is 11.58 m, and the roadway width is 9.14 m. The wearing surface is asphalt. There is a 1.83 m wide concrete sidewalk along the west side of the bridge and a 0.61 m wide concrete curb along the east side. There is a steel post and panel railing system on each side of the bridge which consists of concrete filled steel posts that are connected to the sidewalk along the west edge and to the curb along the east edge of the bridge. There are expansion joints at the two abutments but there are no approach slabs. The abutments and piers are founded on spread footings. There are no wingwalls at the abutments; however, there are retaining walls which are also founded on spread footings.

Reference drawings indicate that Northfield Drive is on a tangent alignment at the bridge location. However, the roadway is curved beyond the bridge at the north end. The existing bridge is on a 0.5% grade increasing from south to north. Northfield Drive consists of a single lane in each direction and there are no sidewalks beyond the bridge, either north or south of the structure.

There is a major overhead Waterloo North Hydro transmission line running along the east side of Northfield Drive. The utility is not connected to the bridge and crosses the Conestoga River east of the bridge. There is a Bell Canada communications utility that runs along the west side of Northfield Drive and crosses the Conestogo River along the west edge of the bridge. The Bell Canada ducts (six ducts) are supported on a rack system suspended from the cantilevered west side of the bridge deck.

The General Arrangement drawings from the original bridge construction are in included in Appendix A.

Photographs of the existing bridge are included in Appendix B.

.

4.0 DESIGN CRITERIA

4.1 DESIGN CODES, STANDARDS, AND GUIDELINES

The design of this structure will be carried out in accordance with the *Canadian Highway Bridge Design Code* (CHBDC), 2019 Edition. Design details will be in accordance with the MTO *Structural Manual* and the *Integral Abutment Manual.*

4.2 GEOMETRICS

The horizontal alignment of Northfield Drive at the bridge may need to be shifted to accommodate the preferred replacement strategy for the Scheifele Bridge and any traffic control proposals for a staged construction program. The discussion of horizontal alignment alternatives is found in Section 9.0 of this report.

Although there is no expected major change to the vertical alignment of Northfield Drive, the final vertical profile may need to be slightly adjusted to accommodate any shift in the horizontal alignment of the bridge.

4.3 TRAFFIC

Northfield Drive is classified as a rural arterial with a posted speed limit of 80 kph carrying vehicles, horse buggies, cyclists, and pedestrians. The 2020 AADT for Northfield Drive at the bridge location was approximately 10,350 with 3.5% heavy truck traffic.

The projected 2030 AADT is 14,000 with 4.0% heavy truck traffic. An on-site, one week, camera count study was completed in May / June 2021 to secure updated buggy, cyclist, and pedestrian crossing data, which is summarized in Table 1.

Table 1: Active Transportation Travel Camera Counts in 2021

Transportation Method	Max Daily Count	Seven Day Total Count
Horse / Buggy	-	26
Cyclists	80	361
Pedestrians	19	55

4.4 CROSS-SECTION

The Region created four alternative cross-sections for replacement of the Scheifele Bridge, which were presented to the public at the first on-line Public Consultation Centre (PCC) meeting in May / June 2021. Of the 4 alternative bridge cross sections, one design concept provided for four lanes of traffic on the bridge.

Subsequent consultations with Region Transportation Planning staff, and a review of the Region's Transportation Master Plan (TMP), confirmed that Northfield Drive will not be widened to four lanes before 2050. Recognizing that a 4-lane structure is not warranted as part of the current planning process, a refined bridge cross section concept was developed which retains a single traffic lane in each direction. In addition to the two traffic lanes, wider shoulders are proposed on each side for the shared use of buggies and cyclists, as well as sidewalks on each side of the bridge for pedestrians.

The Canadian Highway Bridge Design Code (CHBDC) requires that concrete separation barriers be provided between the roadway and the sidewalks of new bridges, where the posted speed is greater than 70 km/h. Since the current posted speed of Northfield Drive is 80 kph, concrete barriers are proposed between the paved shoulders and the sidewalks on each side of the bridge.

A full review of the alternative bridge cross-section concepts, along with the decision process leading to a preferred design, will be presented in greater detail in the final Environmental Assessment Report (ESR).

The recommended preferred bridge design cross-section for the Scheifele Bridge, which is the basis of this Structural Planning Study Report, shown in Figure 2. The design is a symmetrical structure with the following features and dimensions:

- 475 mm: Space for Curb / Pedestrian Railing
- 1800 mm: Sidewalk / Walkway
- 250 mm: Concrete Protection Parapet Wall
- 2450 mm: Paved Shoulder for Shared Buggy / Cyclist Traffic
- 3350 mm: Vehicular Traffic Lane

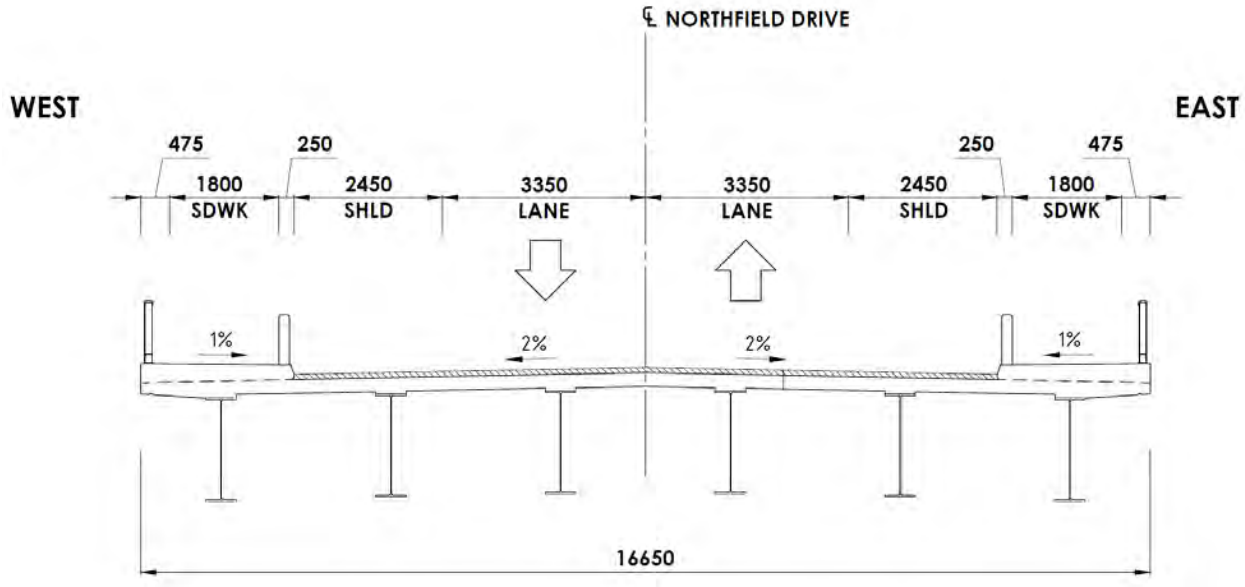

Figure 2: Proposed Scheifele Bridge Cross-Section

5.0 FOUNDATIONS

A draft geotechnical foundation report was prepared for the project based on a borehole program that was completed in 2020. The existing subsurface conditions found in the 2020 investigations, supplemented with background information near the study area, was reviewed to provide preliminary foundation design recommendations for the new bridge abutments and piers.

The geotechnical foundation report proposed that both shallow and deep foundation designs would be feasible options for the Scheifele Bridge. After further structural review, it is felt that deep foundations, such as driven steel piles founded in the underlying dense to very dense soils, will provide higher bearing resistances and are, therefore, the preferred alternative for the bridge foundations. The presence of cobbles and boulders will need to be considered as part of any future pile driving operation. Prior to detailed design, it is recommended that additional geotechnical / foundation investigations be completed to confirm pile founding depths and possible sub-artesian conditions within the lower sand deposits.

The new abutments should be setback from the existing abutments to provide adequate clearance for driving new piles and to avoid conflict with the existing abutment shallow footings. The use of integral abutments on a single row of steel H-piles is considered appropriate for the expected bridge configuration and length.

Based on the alignment of the roadway and the Conestogo River, the new bridge piers are proposed in similar locations as the existing bridge. The construction of piers will require the dewatering of soils prior to excavation, and the dewatering activities should be maintained during construction where the foundation extends below the stabilized groundwater table. In addition to dewatering activities, construction of a cofferdam, or river flow diversion, will be required for the construction of the piers. The Contractor will be responsible for the design and implementation of any required dewatering and flow diversion.

6.0 HYDROLOGY AND NAVIGATION

The Conestogo River flows from west to east at the Scheifele Bridge. The main channel is situated within the north span of the existing bridge, but the watercourse widens out near the structure, resulting in shallower water levels spilling into the other three spans.

The normal water level is approximately 315.6 m. The high-water level for the 50-year storm, which is the applicable design event for a rural arterial, is 317.38 m. Since Clause 1.9.8.2 of the CHBDC requires a 1.0 m clearance between the underside of a structure and the high-water level, the underside of the Scheifele Bridge can be no lower than 318.40 m. The above noted high-water level (317.38) is subject to verification after completion of the final Hydraulic River Modelling Study for the preferred Scheifele Bridge design concept.

The Conestogo River is not considered a Navigable Water under the *Canadian Navigable Waters Act* (CNWA). However, there appears to be some documented canoe and kayak use of the waterway. Following MTO's Navigable Water Guidelines flow chart, the Conestogo River should be considered as navigable for the purposes of the CNWA process. Therefore, a navigation clearance window for canoes and kayaks, equal to 1.5 m tall by 3.0 m wide, should be maintained during construction.

7.0 ENVIRONMENTAL CONSIDERATIONS

An environmental impact study was prepared for the project based on field investigations by Stantec ecologists in 2020. Background information was supplemented with the findings of the field investigations to confirm the presence of any Species-at-Risk (SAR) in the area that may impact the construction of the new Scheifele Bridge.

The investigations revealed the potential presence of three Species-at-Risk (SAR) near the existing Scheifele Bridge, which include a single Butternut Tree, a single Barn Swallow, and a single Eastern Meadowlark. Additionally, the site is considered as potential habitat for five (5) other SAR. The Butternut Tree was found west of Northfield Drive on the north side of the Conestogo River. The Barn Swallow and the Eastern Meadowlark were observed near the Scheifele Bridge; however, no Barn Swallow or Eastern Meadowlark nests were observed under the bridge. Approximately 35 Cliff Swallow nests were observed under the bridge, which can only be removed outside of specified breeding periods. Some trees within the study area are potential habitat for Bat colony nesting. There was no significant habitat observed for SAR turtles.

The Conestogo River is part of the Grand River Heritage River System “Significant Valley” designation and may be a consideration during the formal agency approval process for the bridge replacement. The Conestogo River is a warm water system habitat for certain fish and a potential SAR habitat; however, no aquatic SAR were observed during field investigations.

Typically, there are limits on in-water access and construction work, particularly if the watercourse provides direct fish habitat. It is expected that in-water work will only be permitted in the period between July 15 and March 15, however, these details will be further addressed during the detailed design phase.

Although the environmental impact study identified certain SAR, and potential habitat for SAR, near the existing Scheifele Bridge, there does not appear to be any identified issues that will restrict, or dictate, the positioning of the new substructure elements.

A horizontal shift of Northfield Drive to the west will require widening of the approach embankments to the Conestogo River and will require agency approvals for work in sensitive areas and the potential loss of habitat. The conclusions of the preliminary environmental impact study will be further reviewed, based on the layout of the preferred bridge and road alignment concepts, and updated in conjunction with the final Environmental Assessment Report (ESR).

8.0 HERITAGE AND BRIDGE AESTHETICS

A Cultural Heritage Environmental Report (CHER) was completed as part of the Scheifele Bridge Class Environmental Assessment. The existing bridge was found to have no Cultural Heritage Value or Interest, is not listed on the *Ontario Heritage Bridge List*, and is not on the Candidate Bridge List within the *Heritage Bridges: Identification and Assessment Guide* 1945-1965 (Ministry of Culture and Ministry of Transportation). However, it is deemed appropriate that the bridge replacement alternatives consider architectural enhancements in recognition of the previous bridge crossings at this location and their connection to the “Scheifele” name.

The existing bridge does not offer significant architectural features other than the haunched girders. Although the underside of the bridge is not visible from the road level, the MTO’s *Aesthetic Guidelines for Bridges* manual suggests that a river crossing with a total bridge length greater than 50 m be classified as having “medium” aesthetic importance, and consideration should be given to enhancing the bridge appearance. Haunching of the new girders and implementing architectural enhancements for the railings have, therefore, been considered in the presentation of a recommended bridge design concept.

The cultural heritage investigation found a Cultural Heritage Landscape feature west of the existing Scheifele Bridge, comprised of a remnant county road and abutments of two former bridges. The preferred bridge replacement must avoid any disruption to these Cultural Heritage Landscape features.

The Cultural Heritage Environmental Report (CHER) will be included in the final Environmental Assessment Report.

9.0 NORTHFIELD DRIVE / BRIDGE CONSTRUCTION STAGING

During the preliminary design phase, four alternative alignments were developed for reconstructing the Scheifele Bridge and Northfield Drive, including the following:

Alternative Alignment Concept 1:

> Full offset of the new bridge to the west of the existing structure. Construction of the new bridge could be completed without any impacts on the existing structure or traffic on Northfield Drive.

Alternative Alignment Concept 2:

> Partial offset of the new bridge to the west of the existing structure. A staged construction program of the new bridge would provide for uninterrupted traffic on Northfield Drive, thereby avoiding any lengthy and long-term detours.

Alternative Alignment Concept 3:

> Partial offset of the new bridge to the east of the existing structure. A staged construction program of the new bridge would provide for uninterrupted traffic on Northfield Drive, thereby avoiding any lengthy and long-term detours.

Alternative Alignment Concept 4:

> Construct the new bridge at the location of the existing structure and on the existing Northfield Drive alignment. Northfield Drive would need to be closed, and traffic detoured, for the full duration of the bridge and road construction.

The four bridge/road alternative alignment concepts were evaluated based on their impacts on the surrounding environment and community traffic operations. Based on Project Team review and feedback from the first PCC meeting, it was concluded that Alternative Alignment Concept 2, partial offset of the new bridge to the west of the existing structure with a staged construction program, was the preferred design. One of the primary considerations in the selection of Alternative Alignment Concept 2 was the ability to maintain uninterrupted traffic on Northfield Drive during construction, thereby avoiding a lengthy and impactful detour within the community.

To accommodate a staged construction program and avoid closure of Northfield Drive, the bridge will need to be replaced while accommodating all current modes of transportation over the structure, including vehicular traffic, buggies, cyclists, and pedestrians. For planning purposes, it is proposed that temporary construction lanes be a minimum of 3.35 m wide in each direction, plus a single pedestrian walkway. Cyclists and buggies are proposed to share the 3.35 m roadway vehicular lanes during the staged construction program. The proposed construction staging program, for preferred Road and Bridge Design Concept 2, is shown in Figure 3. It is noted that, because of the spacing of the girders on the proposed bridge structure, wider temporary construction lanes of 3.60 m are possible in Stage 2 and 3, providing increased safety for the bridge contractor and the travelling public.

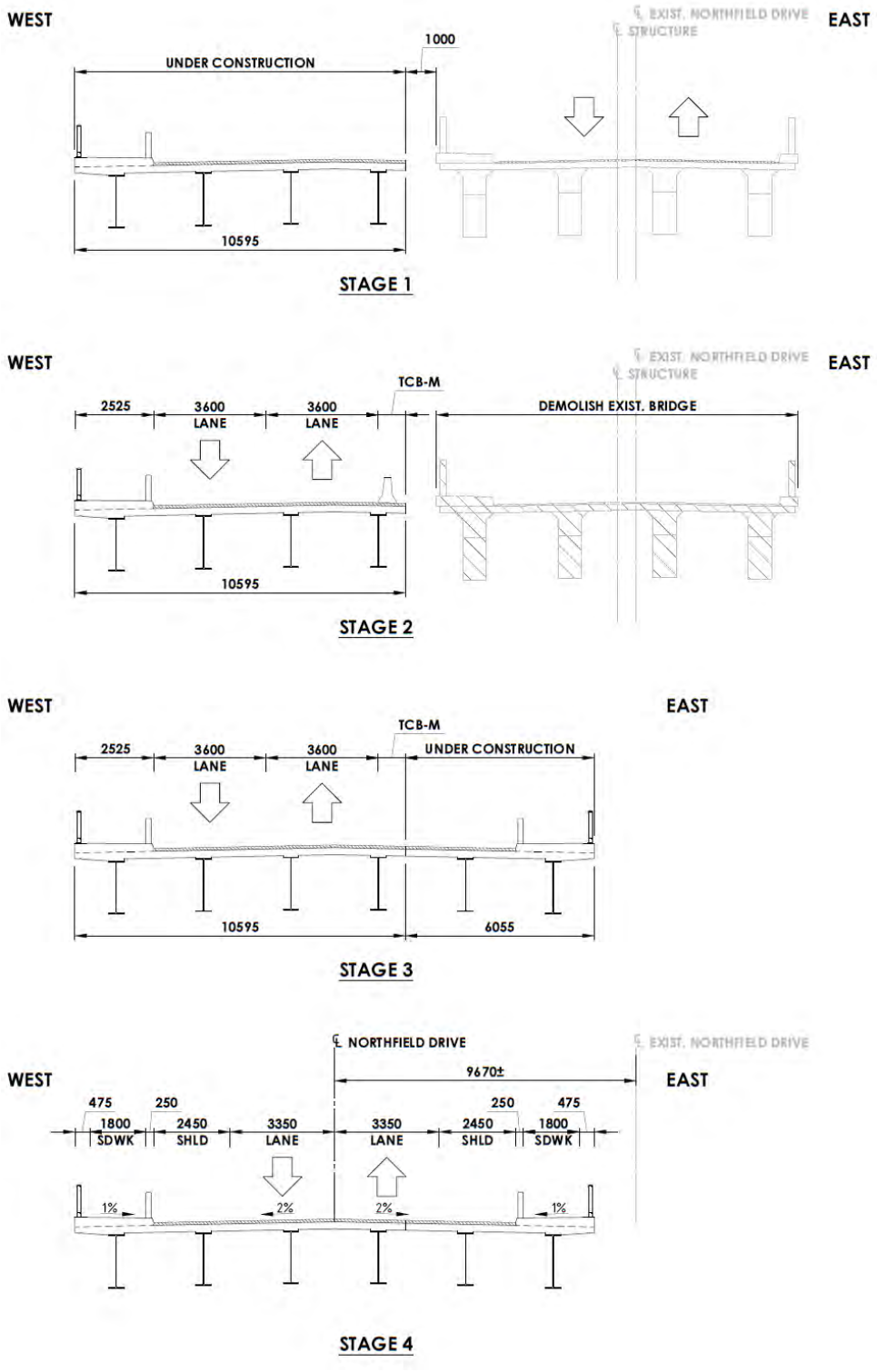

Figure 3: Proposed Traffic Staging for Partial Offset Alignment to the West

10.0 PRELIMINARY REPLACEMENT BRIDGE ALTERNATIVES

The purpose of the Scheifele Bridge Class Environmental Assessment Study is to evaluate alternative road alignment and bridge reconstruction concepts leading to the selection of a recommended preferred design. To date, the Project Team has confirmed the selection of a preferred bridge cross-section and a preferred bridge alignment for the new structure.

The objective of this component of the overall Class Environmental Assessment study is to examine various bridge span alternatives, girder material options, construction access and procedures, and preliminary cost estimates for the new structure.

The Region was initially considering a 'superstructure replacement' approach for the bridge. However, after considering traffic staging needs which dictate a new alignment, the opportunity to salvage and reuse existing substructures is minimized. Further, the poor condition of the existing abutments warrants their replacement. Therefore, none of the alternatives being considered will attempt to salvage any components of the existing bridge, all of which has been acknowledged by the Project Team and presented to the public at Public Consultation Center Meeting 1.

10.1 STRUCTURAL DESIGN PLANNING ALTERNATIVES

10.1.1 General

Starting with preferred Northfield Drive Alternative Design Concept #2 and preferred Bridge Design Concept #5, the development of structural design planning alternatives began with identifying a range of potential bridge replacement options to accommodate the site constraints, which primarily consists of crossing a relatively wide Conestogo River. Since the bridge is over a watercourse, there are environmental constraints which limit opportunities of using a cast-in-place concrete, post-tensioned deck type structure which requires falsework in the watercourse. The high costs associated with less traditional bridge types, such as precast segmental decks, arches, and trusses also cannot be justified at this site. Therefore, the preferred structure type consists of a concrete-deck-on-girder type bridge.

The following three bridge replacement options have been considered for the span arrangements:

1. 4-span Bridge Structure
2. 3-span Bridge Structure
3. 2-span Bridge Structure

These three options provide a reasonable range of alternatives that can, in turn, offer variety in the elevation profile of the bridge. The girder materials that have been considered for the superstructure include precast concrete NU girders, steel plate girders, and haunched steel plate girders, all of which are considered as subcategories for the primary span arrangement options. A steel box shape was

considered as a substitute for the I-shape steel plate girder, but a steel box girder shape is generally more expensive and was not considered suitable at this site.

The existing Scheifele Bridge consists of haunched concrete T-beams and, based on the site's cultural heritage, preference should be given to retaining a haunched girder design on the new structure. There is a considerable cost premium associated with precast concrete, variable-depth, haunched girders, which cannot be justified for this relatively short crossing. Steel haunched girders are economically viable.

The concrete deck is proposed to be a 225 mm thick reinforced concrete slab for all girder span alternatives and all girder material options. The deck could be constructed using a cast-in-place concrete approach or using partial depth precast concrete deck panels with a cast-in-place concrete topping. The benefit of partial depth precast deck panels is that they are also used as the formwork for the cast-in-place concrete topping which eliminates the need for other formwork requirements. Full-depth precast concrete panels can also be considered if a reduced construction duration is desired.

All bridge replacement options are considered to include an integral abutment design which provides increased durability and reduced future maintenance. The new abutments should be placed beyond the existing abutments to provide adequate clearance for driving new piles and to avoid conflicts with the shallow footings of the existing abutments. For the purposes of this structural planning study, it was assumed that the new abutments would be shifted by approximately 5 m beyond the existing abutments resulting in a proposed new bridge length of 117.0 m. Shifting the south abutment back 5 meters behind the existing abutment will enhance the usability of the current pedestrian and horseback riding trail (Conestogo River Horseback Adventures) at this location.

The existing piers are also founded on shallow footings which could result in vibration related issues during the installation of new foundation piles in the vicinity of the existing piers, while traffic is being maintained on the existing bridge during the first construction stage. To avoid any potential disturbance to the existing substructure, an emphasis was given to positioning the new piers as far away as possible from the existing piers. In addition, the natural depth of the riverbed and in-water access constraints were considered in the positioning of new bridge piers.

The preferred alignment for the new bridge (west side alignment with a staged construction program) requires the construction of retaining walls along the southwest and northwest approaches to the bridge to support the new roadway alignment. The natural area in the southwest quadrant is wetland consisting of marshes. Therefore, the base of the retaining wall will be founded in the wetland which may pose difficulty in using Retained Soil Systems (RSS) for this retaining wall. Additional foundation investigations must be completed prior to the detailed design phase to confirm the retaining wall design parameters. The southwest retaining wall is currently proposed to be approximately 150 to 200 m long, extending south from the southwest bridge abutment. Subject to further environmental assessments of the preferred bridge and road alignment concepts, the final length of this major retaining wall may be reduced and replaced with a less costly earth fill embankment.

10.1.2 4-Span Bridge Replacement Option

The first bridge design concept is a 4-span bridge that is similar to the existing 4 span Scheifele Bridge. Initially, symmetrical span lengths of 25.5 m - 33.0 m - 33.0 m - 25.5 m were selected. However, because of the staged construction program associated with preferred Alternative Alignment Concept 2, the centre pier would be in direct conflict with the existing centre pier, and the north and south piers would be very close to the existing piers. Due to the conflict and the potential vibration issues during the deep pile foundation construction for the new bridge, the structure spans were altered, resulting in unsymmetrical span lengths of 20.0 m – 33.0 m – 33.0 m – 31.0 m. The longer north span length, under this concept, is proposed to avoid placing the new north pier within the main channel of the Conestogo River.

The 4-span bridge can be constructed with NU girders, steel plate girders, or haunched steel plate girders. For the proposed bridge cross-section and span lengths, the following girder types would be suitable:

- Seven (7) - NU1600 concrete girders spaced at 2.4 m centre to centre.
- Six (6) - 1300 mm deep straight steel plate girders spaced at 2.8 m centre to centre.
- Six (6) haunched steel plate girders spaced at 2.8 m centre to centre, with girder depths varying between approximately 1800 mm at the piers and 1000 mm at the mid-spans and abutments.

10.1.3 3-Span Bridge Replacement Option

The second bridge design concept is a 3-span bridge with span lengths of 35.5 m – 46.0 m – 35.5 m. The locations of the two new piers are approximately 7 m away from the existing south and north piers, which should eliminate any of the potential conflicts and vibration issues noted above.

The 3-span bridge can be constructed with NU girders, steel plate girders, or haunched steel plate girders. For the proposed bridge cross-section and span lengths, the following girder types would be suitable:

- Seven (7) - NU2200 concrete girders spaced at 2.4 m centre to centre.
- Six (6) - 1700 mm deep steel plate girders spaced at 2.8 m centre to centre.
- Six (6) haunched steel plate girders spaced at 2.8 m centre to centre, with girder depths varying between approximately 2400 mm at the piers and 1200 mm at the mid-spans and abutments.

10.1.4 2-Span Bridge Replacement Option

The third bridge design concept considered is a 2-span bridge with span lengths of 58.5 m - 58.5 m. However, with this design concept the centre pier would be directly adjacent to the existing centre pier, creating the potential construction conflict and vibration issues noted above.

To eliminate the centre pier conflicts, two alternatives were considered:

- Symmetrical Bridge: The location of the new centre pier was shifted approximately 4 m south of the existing pier, while keeping equal span lengths on the new structure. However, this design requires an approximate 9 m increase in the overall bridge length (126 m), which adds to the base construction cost.

- Unsymmetrical Bridge: The location of the new centre pier was shifted approximately 4 m south of the existing pier, and incorporating unequal span lengths of 54.0 m and 63.0 m. This design produces an unsymmetrical bridge design, but the total bridge length is consistent with other designs (117 m).

The 2-span bridge can be constructed with steel plate girders or haunched steel plate girders. The use of NU concrete girders is not feasible for the long spans of this design concept. For the proposed bridge cross-section and span lengths, the following girder types would be suitable:

- Six (6) - 2600 mm deep steel plate girders spaced at 2.8 m centre to centre.

- Six (6) haunched steel plate girders spaced at 2.8 m centre to centre, with girder depths varying between approximately 3000 mm at the piers and 2000 mm at the mid-spans and abutments.

10.1.5 Short-Listing of Bridge Span Options

The combination of span arrangements and girder material options results in many possible alternatives to consider in the selection of a preferred design concept. To simplify the process, a preliminary review of the alternatives was completed, leading to a short-listing of the most feasible and desirable alternatives as follows:

- The 4-span bridge option was removed from further consideration because it is anticipated to result in the most environmental constraints related to in-water construction impacts. The main channel is situated within the north span of the existing bridge and the proposed 4-span arrangement consists of the smallest watercourse clear width compared to the other span arrangements. The 4-span concept is also not as “sleek”, thereby presenting the least aesthetic profile among the three different span arrangements.

- The positioning of the piers was a major factor in the short listing of bridge span options, with a goal of avoiding potential conflicts between the installation of piles for the new piers and the existing piers, while traffic is maintained on the existing structure. With the 2-span design concept, avoiding conflicts between new and existing piers can be achieved by longer spans which may be more appealing than an unsymmetric span arrangement. For these reasons, the unsymmetrical 2-span design was eliminated from further consideration.

Based on the above, three short listed bridge design concepts were reviewed in more detail, as follows:

- Short List Alternative 1: 3-Span NU Girder Bridge

- Short List Alternative 2: 3-Span Steel Plate Girder Bridge

- Short List Alternative 3: 2-Span Symmetrical Steel Plate Girder Bridge

Preliminary sketches depicting these schemes have been provided in Appendix C.

All alternatives provide the minimum vertical clearance from the high-water level according to CHBDC requirements. All alternatives can be constructed using the proposed staging plan, maintaining uninterrupted traffic on Northfield Drive during construction.

10.2 EVALUATION OF SHORT-LISTED ALTERNATIVES

The goal of the evaluation process was to select a cost-effective bridge replacement plan that considers environmental and watercourse impacts, bridge durability and future maintenance, impacts to the watercourse during and after construction, impacts on the neighbouring properties and natural areas, and the overall appearance of the new bridge.

10.2.1 Evaluation Criteria and Comparison of Alternatives

An evaluation process was developed to provide an objective approach to the evaluation of the alternatives and to form a justifiable tool for the selection of the preferred bridge replacement alternative. The evaluation does not consider the impacts associated with the preferred partial offset alignment of Northfield Drive (Concept #2) since the realignment of the new bridge equally impacts all three alternatives.

The factors used for the evaluation of alternatives are environmental and watercourse impacts, constructability and watercourse access, durability and maintenance, aesthetic and span configuration, and preliminary construction cost. The cost estimates consider only the new structure construction costs, and do not include the cost of the removal of the existing bridge or the cost of new retaining walls at the bridge approaches required for the new roadway alignment, which are considered consistent with all alternatives.

The evaluation of the bridge replacement alternatives is presented in Table 2**.**

10.2.2 Recommended Preferred Bridge Design Concept

Based on the detailed evaluation of the three short-listed alternatives, **Design Concept 2: Symmetrical 3-Span Steel Girder Bridge,** is the recommended structure replacement option and is illustrated in Appendix D. The estimated cost for this structure is $9,940,000.

Although the 3-span NU girder alternative is the least expensive alternative, the cost premium of approximately $600,000 to use straight steel girders is considered a justifiable expense as steel offers a more aesthetically pleasing and “lighter looking” bridge design, with a shallower superstructure depth. In addition, steel girders provide a distinct colour contrast between the girders and the concrete deck fascia and substructure components.

The proposed 3-span steel girder structure consists of shorter and lighter plate girder segments compared to the 2-span alternative, which will greatly simplify the transport and erection processes. The

lighter steel girders should also reduce pier and foundation sizing requirements, further improving the overall “lighter” look to the structure.

The proposed two piers are located away from the existing piers which will eliminate physical conflicts and reduce any potential vibration-related issues during deep pile foundation construction, especially while live traffic remains on Northfield Drive. With the new north pier located further south of the existing pier, the width of the primary watercourse will be increased below the north span. The 3-span steel girder structure will also require far fewer bearings than the NU girder option.

Finally, haunched steel girders are recommended over straight steel girders, as they capture the architectural character of the existing haunched-girder bridge. There is cost premium of approximately $100,000 over the straight steel plate girder bridge option and a premium of approximately $700,000 relative to the NU concrete girder option.

Table 2: Comparison of Bridge Replacement Alternatives

Evaluation Factor	Alternative 1: 3-Span NU Girder Bridge	Alternative 2: 3-Span Steel Girder Bridge	Alternative 3: 2-Span Steel Girder Bridge
Span Lengths	• 35.5 m – 46.0 m – 35.5 m (117 m)	• 35.5 m – 46.0 m – 35.5 m (117 m)	• 63.0 m – 63.0 m (126 m)
Environmental and Watercourse Impacts	• Two piers will have moderate in-water impacts; the clear width of the main watercourse at the north span will be increased compared to the existing structure • Deeper girders will have a reduced vertical clearance compared to Alternatives 2 • No significant environmental impacts expected	• Two piers will have moderate in-water impacts; the clear width of the main watercourse will be increased compared to the existing structure • Shallower girders will provide greatest vertical clearance compared to the deep girders needed for other alternatives; haunched girder will provide better vertical clearance through main watercourse at the north span compared to straight steel girder • No significant environmental impacts expected	• Only one pier equates to the least amount of in-water construction impacts • The “central” pier will be larger and contain more piles than other alternatives • The clear width of the main watercourse at the north span will be maximized and is expected to enhance overall river hydraulics • Deeper girders will reduce vertical clearance compared to Alternative 2 • A haunched girder design will provide improved vertical clearance through the main watercourse at the north span compared to a straight steel girder design • No significant environmental impacts expected
Constructability and Watercourse Access	• Both piers should be accessible from the south end where water elevations are lowest • Least amount of conflict and difficulty with construction of the new piers • Construction duration may be slightly longer than 2-span option due to more piers needing to be constructed and more girders needing to be installed • Middle span girders (46.0 m) may pose greater challenges with transport and installation compared to Alternative 2	• Both piers should be accessible from the south end where water elevations are lowest • Least amount of conflict and difficulty with construction of the new piers • Construction duration may be slightly longer than 2-span option due to more piers needing to be constructed and more girder segments needing to be installed • Moderate steel girder lengths for transport under this alternative where girder segments will be continuous over piers between points of inflection. The girder segments for this alterative will be the shortest when compared to the other two alternatives	• This alternative will likely have the least of any potential environmental challenges with only one pier required • Vibration concerns for existing pier footing due to pile driving more likely than for the 3-span alternatives • The single pier should be accessible from the south end where water elevations are lower • The required girder depths, for both straight and haunched options, introduce a horizontal weld in the web due to plate heights exceeding 2.4 m • Construction duration may be slightly faster since only one pier needs to be constructed and fewer girder segments need to be installed. • The girder segments will be continuous over the centre pier between points of inflection. The end steel segments will be approximately 45.0 m long and may pose greater challenges with transport and installation processes compared to Alternative 2
Durability and Maintenance	• Most number of bearings compared to the other 2 alternatives which may require increased future maintenance • Jointless integral abutment bridge is durable • NU girder bottom flange will not contain flat surface for bird nests	• More bearings compared 2-span option which may require more future maintenance • Jointless integral abutment bridge is durable • Steel girder bottom flanges may attract birds and nesting • Potential for rust staining on substructures but can be addressed by proper detailing	• Only one pier with least number of bearings and likely to have lesser maintenance needs • Jointless integral abutment bridge is durable • Steel girder bottom flanges may attract birds and nesting • Potential for rust staining on substructures but can be addressed by proper detailing
Aesthetic / Span Configuration	• Most favourable span configuration and aesthetics; odd number of spans with a single main span will have the best aesthetics for a bridge over water. • The main watercourse section is adjacent to the north abutment and not through the mid-span of the structure • NU girder option has deeper girders than steel girder option which may be less appealing with a “heavier” appearance • NU girder option will lack colour contrast between girder and deck fascia / abutments compared to steel girders • Haunching is not economically viable	• Most favourable span configuration and aesthetics; odd number of spans with a single main span will have the best aesthetics for a bridge over water. • The main watercourse section is adjacent to the north abutment and not through the mid-span of the structure • Steel girders will be shallower than the NU girder option making the structure appear “lighter” • Steel girder option will provide a better colour contrast with the deck fascia / abutments compared to NU girders • Haunched girder option will have more aesthetic appeal compared to straight girders	• Single pier in the middle may not be as aesthetically appealing compared to a 3-span bridge over a watercourse; however, long spans will provide a clean and “light” looking structure. • Deeper girders compared to both 3-span options • Steel girder option will have better colour contrast with deck fascia compared to NU girders • Haunched girder option will have more aesthetic appeal compared to straight girders
Preliminary Cost Estimate (Structure Only)	• \$9.36M (\$4800/m^2 of deck)	• \$9.94M for straight steel girder (\$5100/m^2 of deck) • \$10.04M for haunched steel girder (\$5150/m^2 of deck)	• \$10.70M for straight steel girder (\$5100/m^2 of deck) • \$10.81M for haunched steel girder (\$5150/m^2 of deck)

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11.0 CONSTRUCTABILITY CONSIDERATIONS

The recommended west side alignment design for the new bridge includes a staged construction program for the recommended preferred **Design Concept 2: Symmetrical 3-Span Haunched Steel Girder Bridge**.

The preferred bridge replacement alterative requires two piers to be constructed in the watercourse. Rock causeways are proposed to be constructed from the south shore to provide access to the new pier locations and for crane access to erect girders. The preferred alternative was chosen to limit the amount of in-water construction and to environmental and construction constraints, as well as providing sufficient clearance to the existing substructure abutments and piers. It is expected that in-water work will be limited to the period between July 15 and March 15 of any year.

Due to the expected work-in-water timing constraint, it will not be possible to construct each stage within a construction season since work on the causeway and piers cannot commence until mid-July. The following construction timelines are proposed at this preliminary stage of the project:

Season 1, July Start: Mobilize, construct access roads and rock causeway, drive piles, and construct piers for Stage 1.

Season 2, Spring and Summer: Complete Stage 1 structure, divert traffic to new bridge, and demolish existing bridge.

Season 2, Summer and Fall: Modify rock causeway, drive piles and construct piers for Stage 2

Season 3: Complete Stage 2 structure

Current traffic patterns would be maintained on the existing structure while the first “half” of the new structure is constructed, including the construction of widened roadway approaches and retaining walls north and south of the bridge. Traffic would then be shifted to the newly built “half” structure, the existing structure would be demolished, and the remainder of the new structure would be constructed.

Pedestrians will have access across the bridge throughout the construction period.

12.0 SUMMARY AND RECOMMENDATIONS

The recommended preferred bridge design concept for replacement of the Scheifele Bridge consists of a **Symmetrical 3-Span Haunched Steel Plate Girder Bridge** with a reinforced concrete deck and integral abutments. The estimated bridge construction cost is $10,040,000.

The preferred alignment of the new bridge is a partial offset of Northfield Drive to the west of the existing structure. A staged construction program will allow uninterrupted traffic on Northfield Drive throughout the three-year construction period.

A Preliminary General Arrangement drawing for the preferred bridge replacement alternative is included in Appendix D.

STANTEC CONSULTING LTD.

Report prepared by:

DRAFT

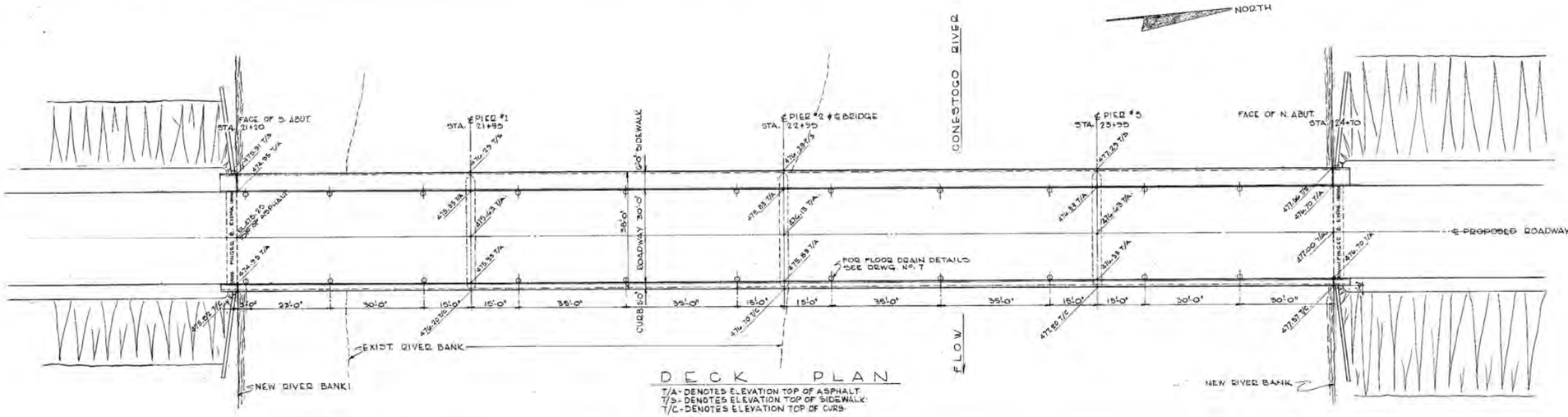
Adam Felinczak, M.A.Sc., P.Eng.
Structural Engineer, Transportation

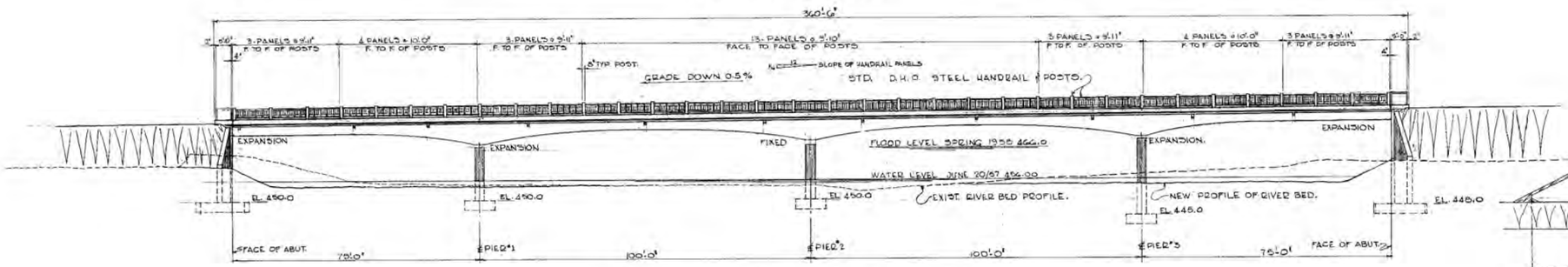
Report reviewed by:

DRAFT

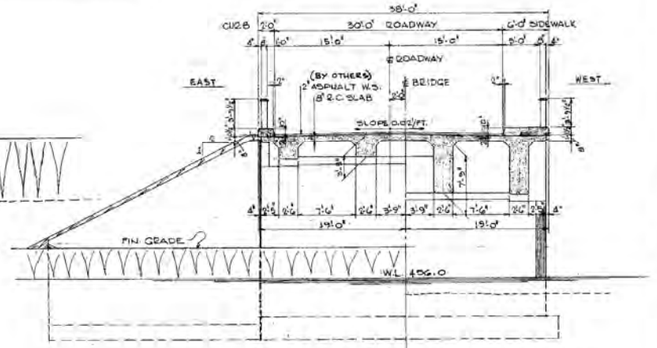
Mike Trader, P.Eng.
Senior Structural Engineer

APPENDIX A:
Existing Bridge General Arrangement Drawing



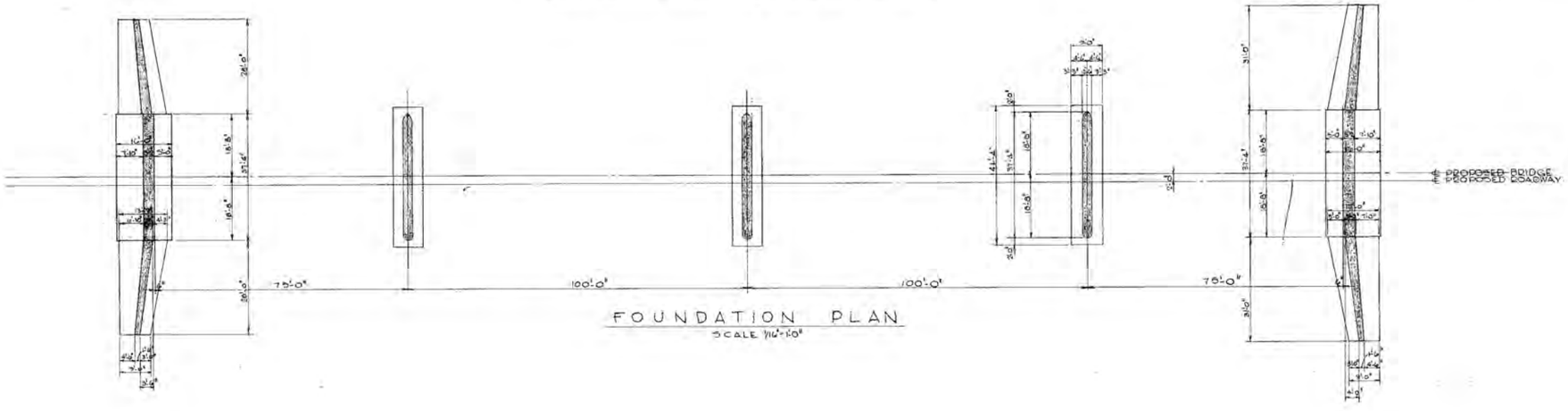


EAST SIDE ELEVATION



HALF CROSS SECTION AT ABUTMENT — HALF CROSS SECTION AT PIER

SCALE 1/8"=1'-0"



FOUNDATION PLAN

SCALE 1/16"=1'-0"

GENERAL NOTES:

1. ALLOWABLE BEARING PRESSURE OF SOIL UNDER FOOTINGS 7,000 P.S.F.
2. NO CONC. SHALL BE POURED BEFORE MATERIALS, MIX, FORMWORK, FALSEWORK & REINF. STEEL HAVE BEEN CHECKED & APPROVED BY THE ENGINEER.
3. ALL EXPOSED CONC. EDGES TO HAVE ¾" CHAMFER UNLESS OTHERWISE NOTED.
4. STRUCTURE DESIGNED FOR H20-S16 LOADING.
5. DECK SHORING SHALL NOT BE STRUCK BEFORE INSPECTION AND APPROVAL OF THE CONCRETE DECK HAS BEEN GIVEN BY THE ENGINEER.
6. NO CONC. SHALL BE PLACED IN THE FOOTINGS BEFORE THE EXCAVATION FOR FOOTINGS HAS BEEN APPROVED BY THE ENGINEER.
7. SIDEWALK AND CURB TO BE POURED ONLY AFTER SHORING HAS BEEN STRUCK.
8. ALL CONC. TO HAVE ¼ LB. POZZOLITH "S" PER BAG OF CEMENT.
9. BACKFILL AND APPROACH GRADING BY OTHERS.
10. HANDRAIL SUPPLIED BY COUNTY AND ERECTED BY THIS CONTRACTOR.
11. CONSTRUCTION JOINTS MAY BE MADE ONLY IN LOCATIONS SHOWN, UNLESS OTHERWISE PERMITTED BY THE ENGINEER.
12. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE ENGINEER WHEN THE PROGRESS OF THE WORK REQUIRES THE ABOVE MENTIONED INSPECTIONS. CONTRACTORS FAILURE TO DO SO SHALL BE CONSIDERED A BREACH OF CONTRACT.
13. CONCRETE IN GIRDERS AND DECK TO HAVE A MIN. COMPRESSIVE STRENGTH OF 4000 P.S.I. AT 28 DAYS AS MEASURED FROM TEST CYLINDERS.
14. ALL OTHER CONCRETE TO HAVE A MIN. COMPRESSIVE STRENGTH OF 3300 P.S.I. AT 28 DAYS AS MEASURED FROM TEST CYLINDERS.
15. CONCRETE COVER :-
    FOOTINGS 3" FOR ALL FACES — PIERS 2" FOR ALL FACES
    ABUTMENTS 3" FOR ALL FACES — SLABS 1½" FOR TOP & BOTTOM
    RETAINING WALLS 2" O.F. 3" I.F. — ALL OTHERS 2" UNLESS NOTED OTHERWISE

TABLE OF QUANTITIES
(APPROXIMATE ONLY)

EXCAVATION	2,000 CU. YDS.
CONCRETE	2,050 CU. YDS.
REINF. STEEL	177 TONS

I. A. KOLSI — REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

REVISIONS		
DATE	BY	REMARKS

CLIENT & JOB:
SCHEIFELE BRIDGE
OVER CONESTOGO RIVER
COUNTY ROAD 22
LOT 3, TOWNSHIP OF WOOLWICH
COUNTY OF WATERLOO
J. M. JORDAN — COUNTY ENGINEER

NAME OF DRWG.
GENERAL ARRANGEMENT

C. C. PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS
LONDON HAMILTON EDMONTON

DESIGNED BY	K.
DRAWN BY	I. J. B.
CHECKED BY	K.
SCALE	AS NOTED
DATE	FEB. 25/88
JOB NO.	H-519
SET NO.	
DRAWING NO.	2

APPENDIX B:
Site Photos

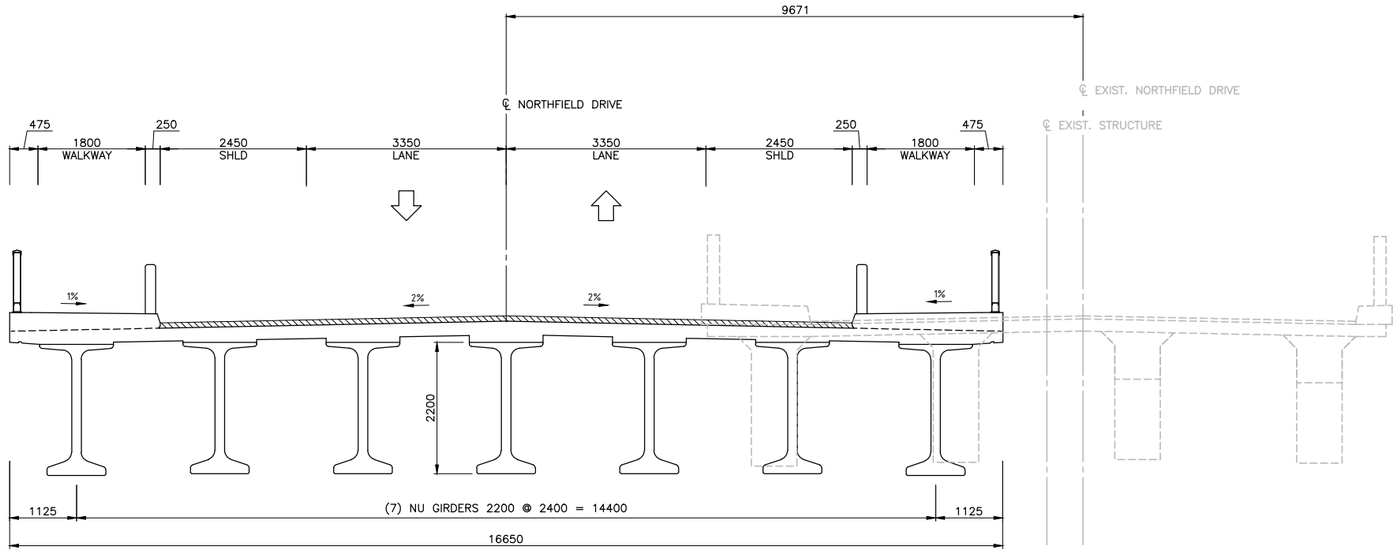
Photo 1: West elevation.

Photo 2: East elevation.

APPENDIX C:
Alternative Bridge Planning Concepts

WEST

EAST



1 CROSS–SECTION
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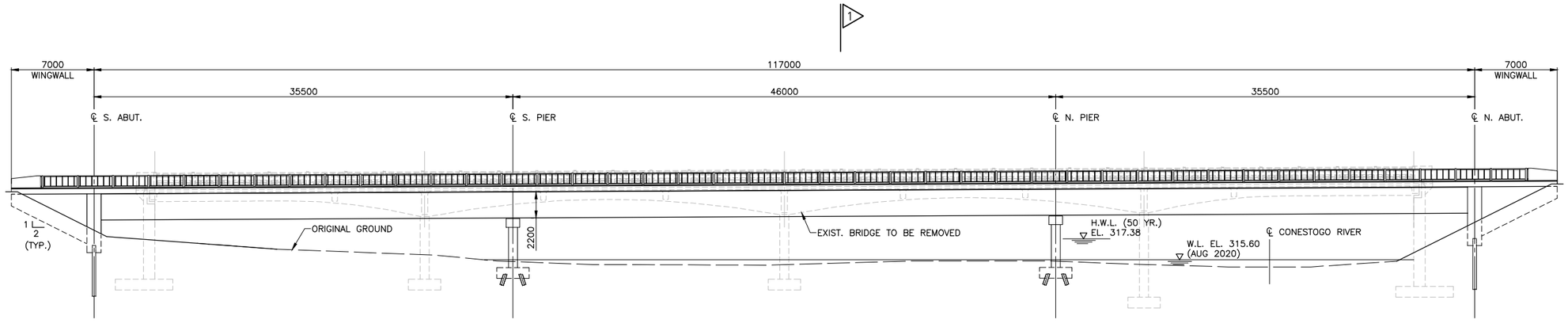

EAST ELEVATION
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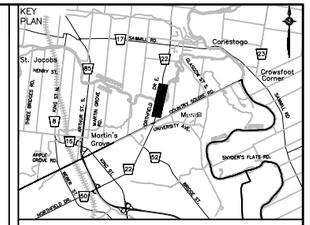

DISCLAIMER:
THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS, AND OTHER UNDERGROUND AND ABOVE GROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

NOTES:

Stantec

Region of Waterloo

No.	Description	Int	Date
No.	ISSUE/REVISION	BY	DATE

SCHEIFELE BRIDGE REPLACEMENT
CLASS ENVIRONMENTAL ASSESSMENT

TOWNSHIP OF WOOLWICH

ALTERNATIVE BRIDGE DESIGN
CONCEPT 1
3 SPAN NU GIRDER
STRUCTURE

DRAWN BY: H.L.	CONTRACT No. N/A
CHECKED BY: A.F.	FILE No. 1650-10600
DATE: 2022-02-16	DRAWING No. .
SCALE NTS	SHEET . OF .
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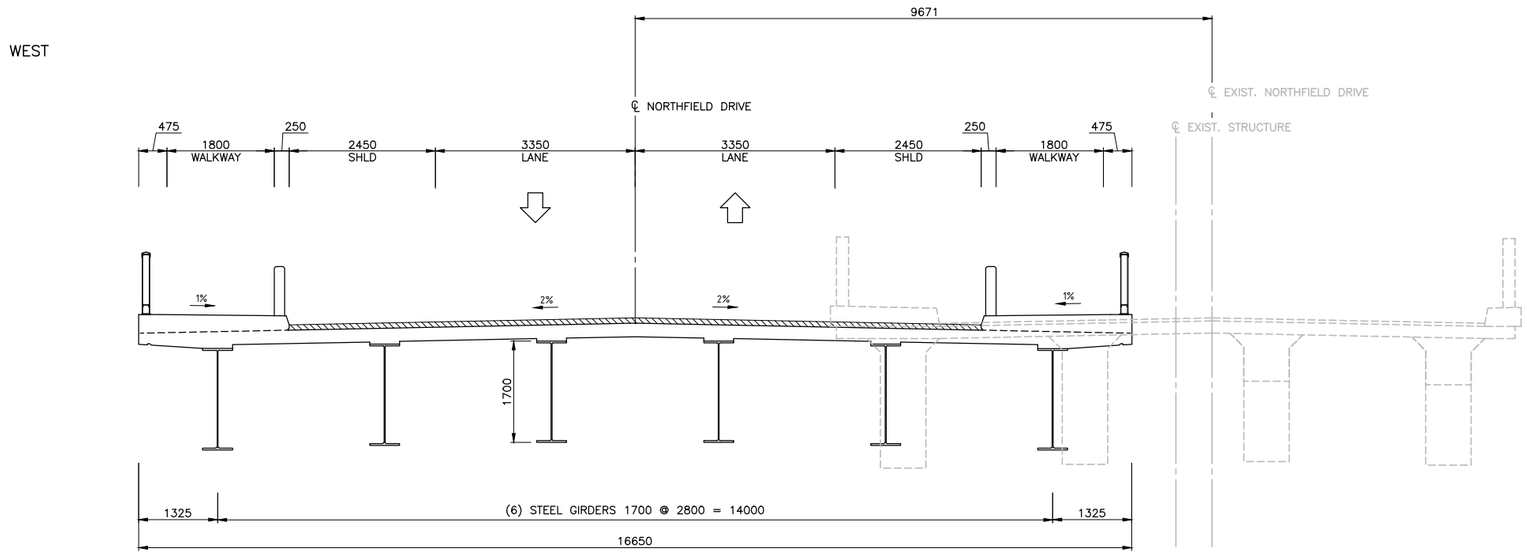
2022/02/23 by: LL, HaJ



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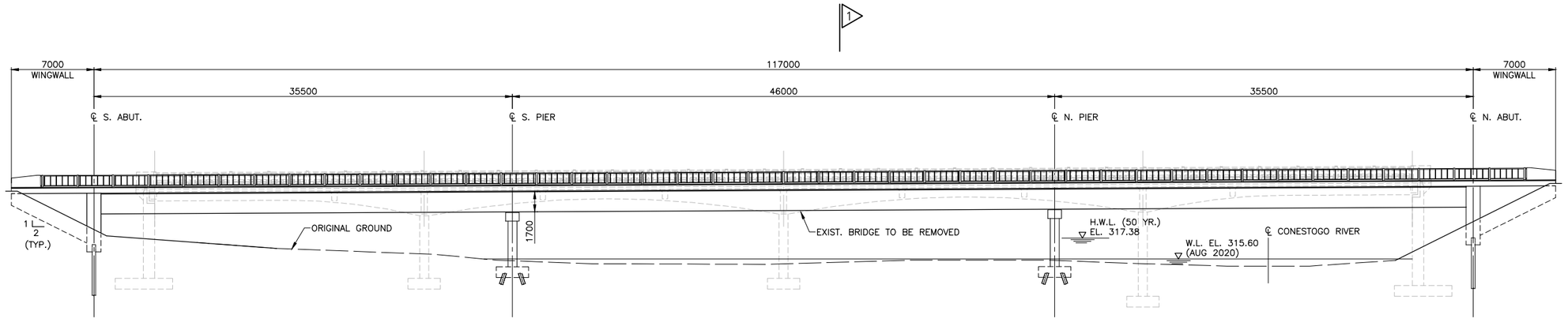

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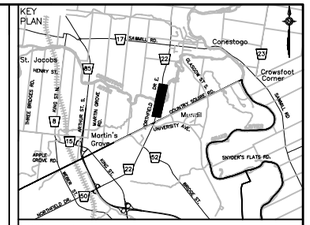

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Region of Waterloo

No.	Description	Int	Date
No.	ISSUE/REVISION	BY	DATE

SCHEIFELE BRIDGE REPLACEMENT
CLASS ENVIRONMENTAL ASSESSMENT

TOWNSHIP OF WOOLWICH

ALTERNATIVE BRIDGE DESIGN
CONCEPT 2
3 SPAN STEEL PLATE GIRDER
STRUCTURE

DRAWN BY: H.L.	CONTRACT No. N/A
CHECKED BY: A.F.	FILE No. 1650-10600
DATE: 2022-02-16	DRAWING No. .
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CADD FILE/LAYOUT: 650\10600_BRIDGE_SKETCHES/OPT4_3SPAN_STL	ISSUE/REVISION: 0

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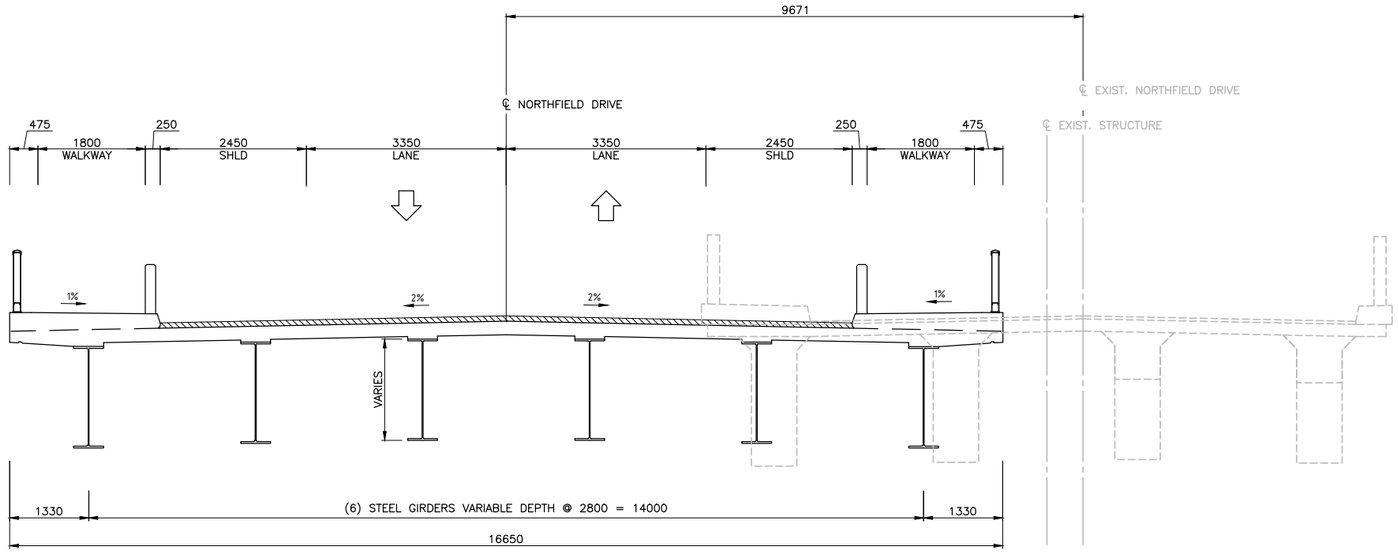
2022/02/23 by: LL, HaJ

WEST

EAST



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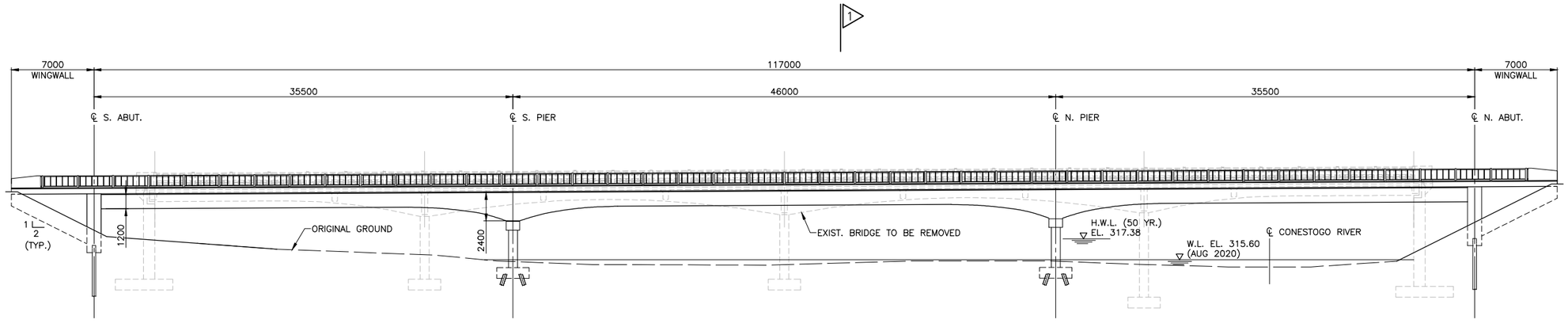

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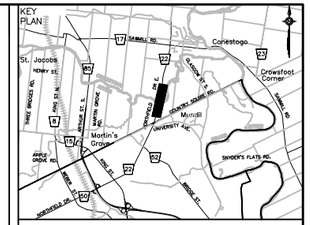
KEY PLAN



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SCHEIFELE BRIDGE REPLACEMENT
CLASS ENVIRONMENTAL ASSESSMENT

TOWNSHIP OF WOOLWICH

ALTERNATIVE BRIDGE DESIGN
CONCEPT 3
3 SPAN HAUNCHED STEEL PLATE
GIRDER STRUCTURE

DRAWN BY: H.L.	CONTRACT No. N/A
CHECKED BY: A.F.	FILE No. 1650-10600
DATE: 2022-02-16	DRAWING No. .
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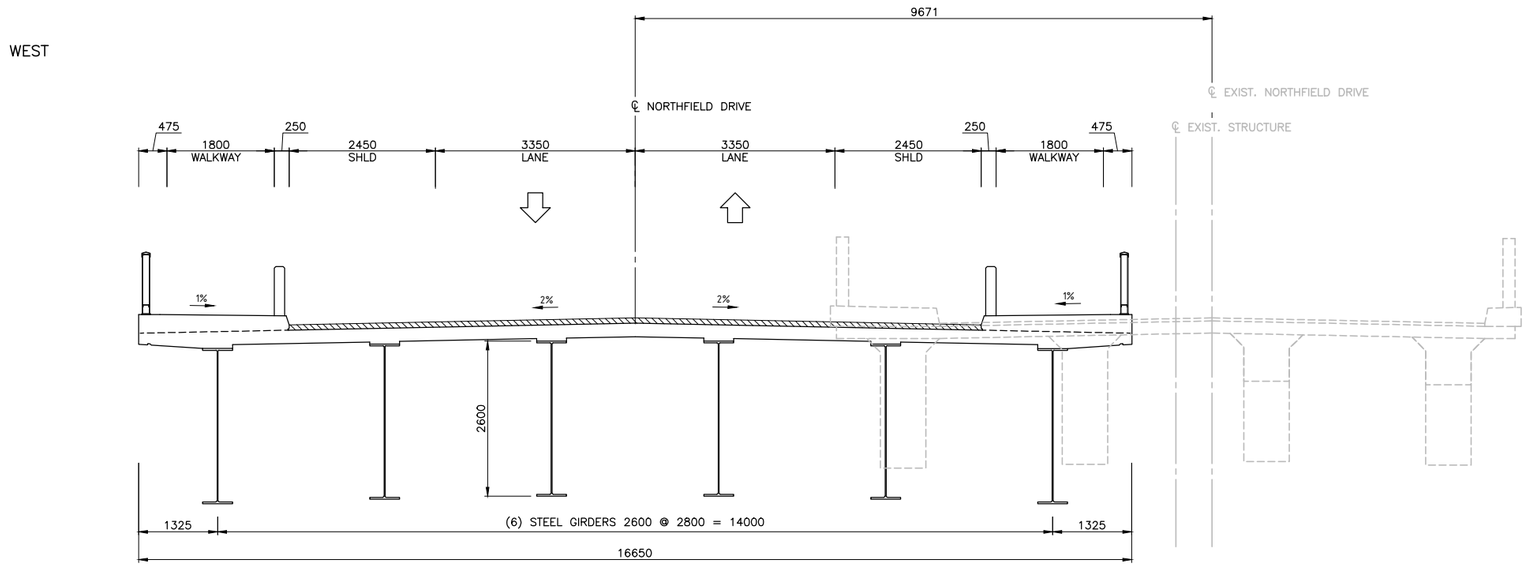

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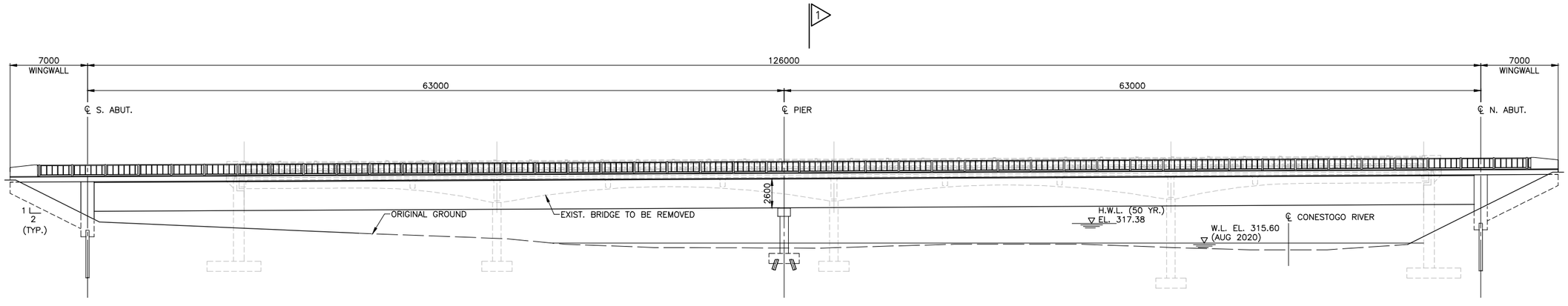

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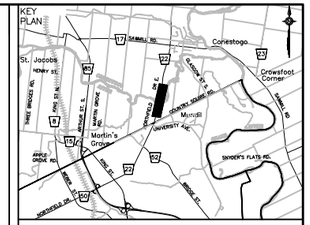

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No.	ISSUE/REVISION	BY	DATE

SCHEIFELE BRIDGE REPLACEMENT
CLASS ENVIRONMENTAL ASSESSMENT

TOWNSHIP OF WOOLWICH

ALTERNATIVE BRIDGE DESIGN
CONCEPT 4
2 SPAN STEEL PLATE GIRDER
STRUCTURE

DRAWN BY: H.L.	CONTRACT No. N/A
CHECKED BY: A.F.	FILE No. 1650-10600
DATE: 2022-02-16	DRAWING No. .
SCALE NTS	SHEET . OF .
CADD FILE/LAYOUT: 650010600_BRIDGE_SKETCHES/OPT6_2SPAN_STL	ISSUE/REVISION: 0

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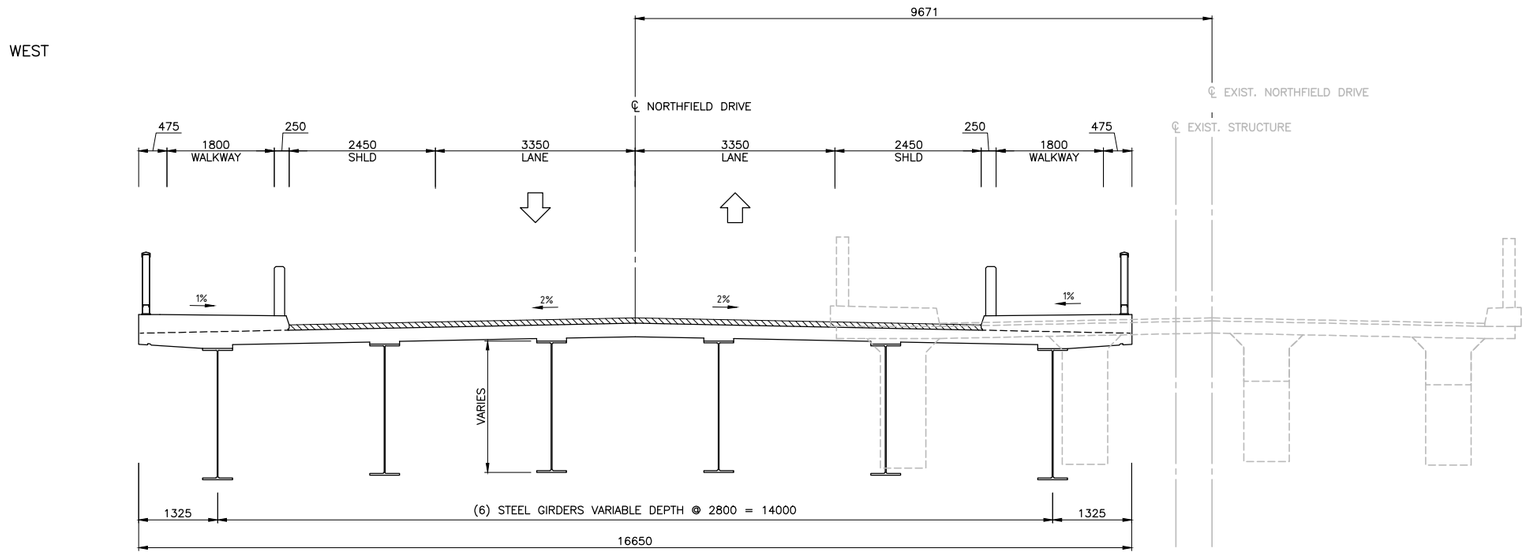
2022/02/23 by: LL, HaJ



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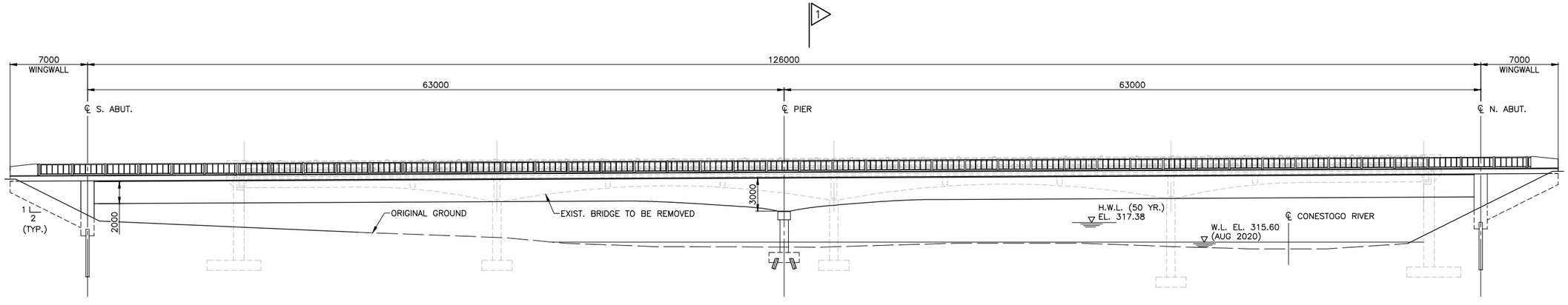

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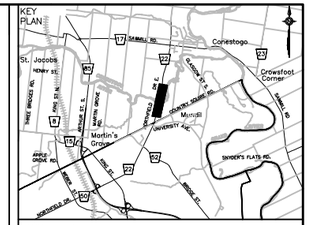

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SCHEIFELE BRIDGE REPLACEMENT
CLASS ENVIRONMENTAL ASSESSMENT

TOWNSHIP OF WOOLWICH

ALTERNATIVE BRIDGE DESIGN
CONCEPT 5
2 SPAN HAUNCHED STEEL PLATE GIRDER STRUCTURE

DRAWN BY: H.L.	CONTRACT No. N/A
CHECKED BY: A.F.	FILE No. 1650-10600
DATE: 2022-02-16	DRAWING No. .
SCALE NTS	SHEET . OF .
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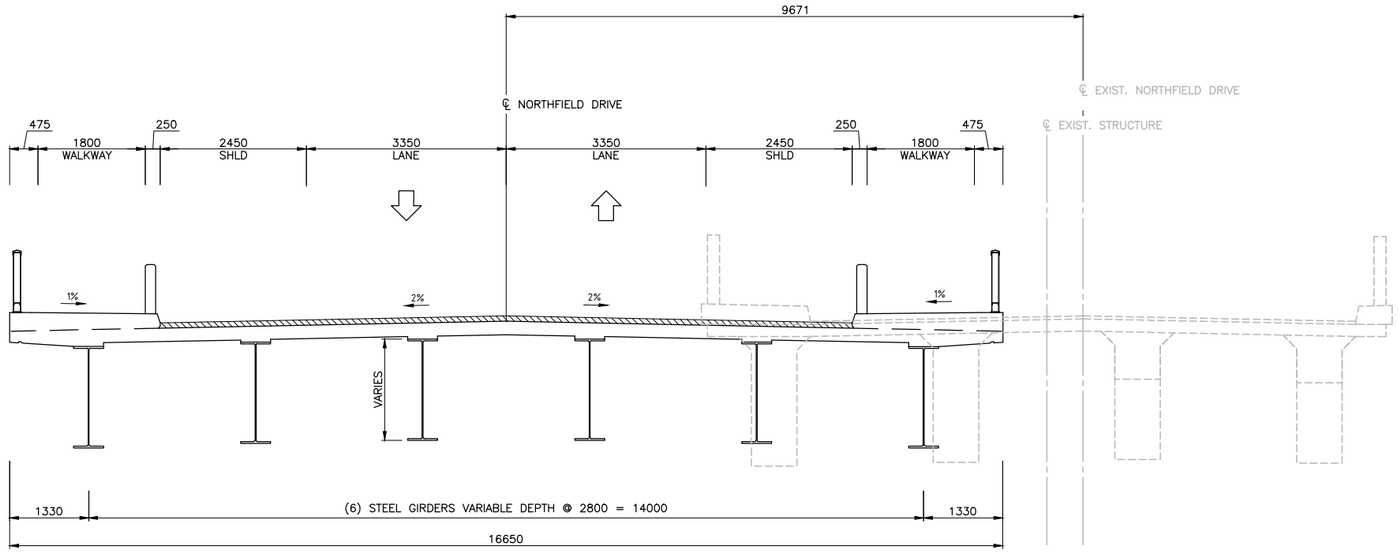
2022/02/23 by: LL, HaJ

APPENDIX D:
Recommended Bridge Concept: Preliminary General Arrangement Drawing

WEST

EAST



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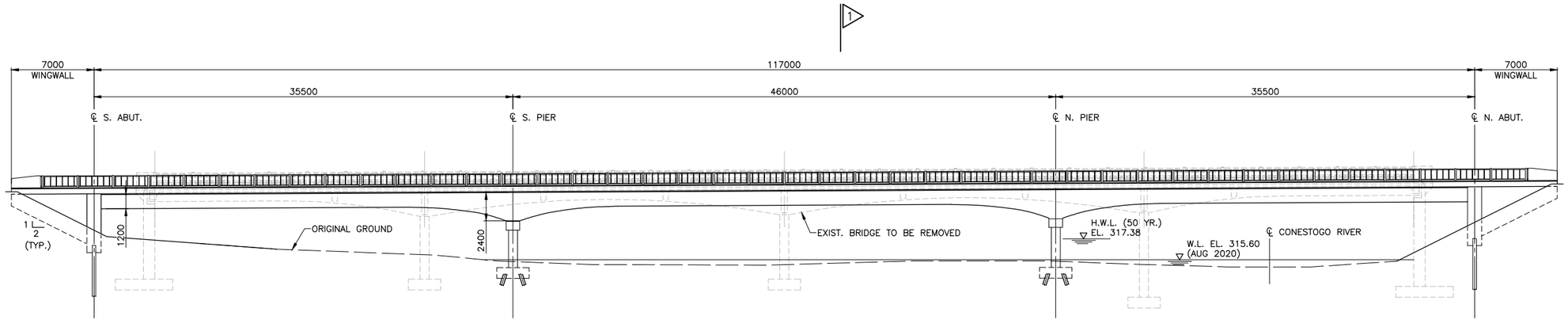

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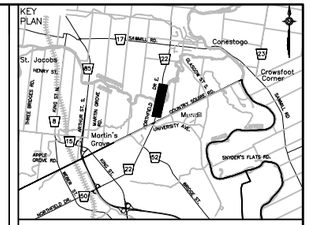

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SCHEIFELE BRIDGE REPLACEMENT
CLASS ENVIRONMENTAL ASSESSMENT

TOWNSHIP OF WOOLWICH

ALTERNATIVE BRIDGE DESIGN
CONCEPT 3
3 SPAN HAUNCHED STEEL PLATE
GIRDER STRUCTURE

DRAWN BY: H.L.	CONTRACT No. N/A
CHECKED BY: A.F.	FILE No. 1650-10600
DATE: 2022-02-16	DRAWING No. .
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CADD FILE/LAYOUT: 1650106OO_BRIDGE_SKETCHES/OPT5_3SPAN_STL_HAUNCHED	ISSUE/REVISION: 0

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Region of Waterloo

SCHEIFELE BRIDGE REPLACEMENT

Northfield Drive (Regional Road 22)
Township of Woolwich

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT STUDY

APPENDIX E: Northfield Drive Alternate Design Concepts 1 to 4

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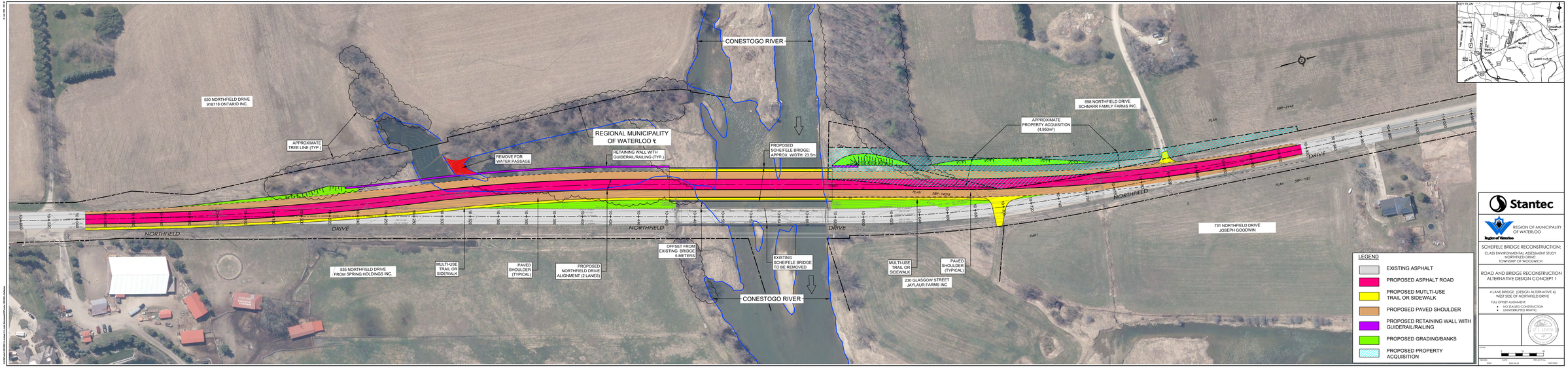
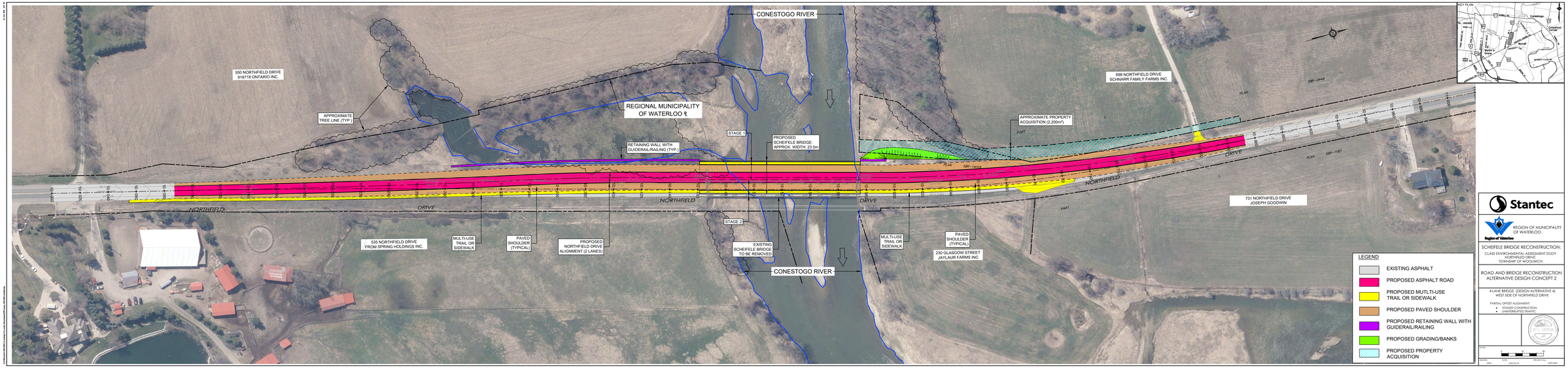

CONESTOGO RIVER
REGIONAL MUNICIPALITY OF WATERLOO
550 NORTHFIELD DRIVE
918718 ONTARIO INC.
APPROXIMATE TREE LINE (TYP.)
REMOVE FOR WATER PASSAGE
RETAINING WALL WITH GUIDERAIL/RAILING (TYP.)
PROPOSED SCHEIFELE BRIDGE APPROX. WIDTH 23.5m
698 NORTHFIELD DRIVE
SCHNARR FAMILY FARMS INC.
APPROXIMATE PROPERTY ACQUISITION (4,950m²)
731 NORTHFIELD DRIVE
JOSEPH GOODWIN
535 NORTHFIELD DRIVE
FROM SPRING HOLDINGS INC.
MULTI-USE TRAIL OR SIDEWALK
PAVED SHOULDER (TYPICAL)
PROPOSED NORTHFIELD DRIVE ALIGNMENT (2 LANES)
OFFSET FROM EXISTING BRIDGE 5 METERS
EXISTING SCHEIFELE BRIDGE TO BE REMOVED
230 GLASGOW STREET
JAYLAUR FARMS INC.
NORTHFIELD DRIVE
NORTHFIELD
DRIVE
LEGEND
EXISTING ASPHALT
PROPOSED ASPHALT ROAD
PROPOSED MUTLTI-USE TRAIL OR SIDEWALK
PROPOSED PAVED SHOULDER
PROPOSED RETAINING WALL WITH GUIDERAIL/RAILING
PROPOSED GRADING/BANKS
PROPOSED PROPERTY ACQUISITION
KEY PLAN
Conestogo
Crowsfoot Corner
Maryhill
Martin's Corners
Shirley's Corners
Bloomingdale
Waterloo
Kitchener
Stantec
REGION OF MUNICIPALITY OF WATERLOO
SCHEIFELE BRIDGE RECONSTRUCTION:
CLASS ENVIRONMENTAL ASSESSMENT STUDY
NORTHFIELD DRIVE
TOWNSHIP OF WOOLWICH
ROAD AND BRIDGE RECONSTRUCTION
ALTERNATIVE DESIGN CONCEPT 1
4 LANE BRIDGE (DESIGN ALTERNATIVE 4)
WEST SIDE OF NORTHFIELD DRIVE
FULL OFFSET ALIGNMENT:
NO STAGED CONSTRUCTION
UNINTERRUPTED TRAFFIC



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REGION OF MUNICIPALITY OF WATERLOO

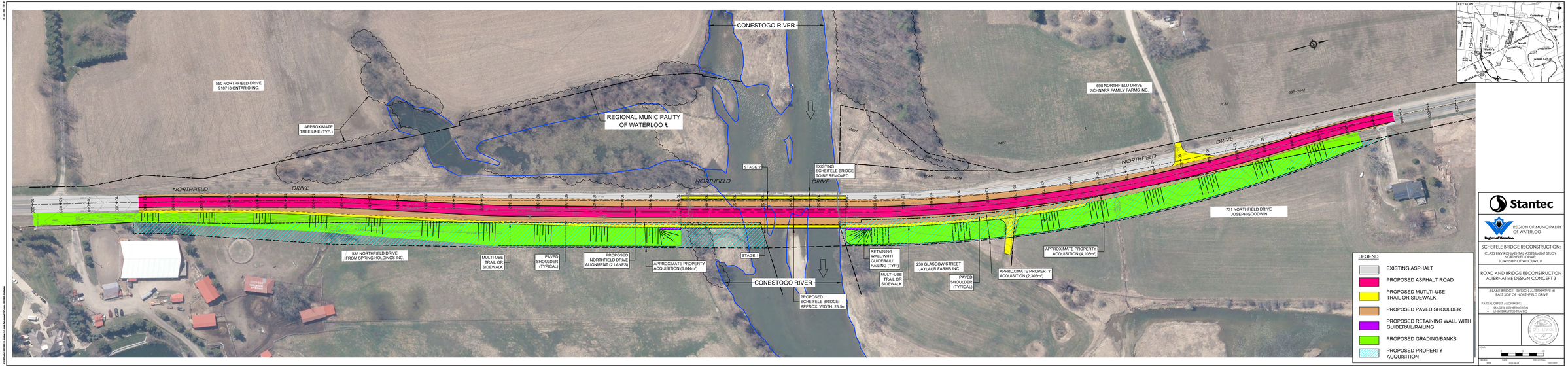
SCHEIFELE BRIDGE RECONSTRUCTION:
CLASS ENVIRONMENTAL ASSESSMENT STUDY
NORTHFIELD DRIVE
TOWNSHIP OF WOOLWICH

ROAD AND BRIDGE RECONSTRUCTION
ALTERNATIVE DESIGN CONCEPT 2

4 LANE BRIDGE (DESIGN ALTERNATIVE 4)
WEST SIDE OF NORTHFIELD DRIVE

PARTIAL OFFSET ALIGNMENT
- STAGED CONSTRUCTION
- UNINTERRUPTED TRAFFIC

DESIGN: MRA | DRAWN: | CHECKED: | DATE: 2019-09-24 | PROJECT NO: | SHEET NO:



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REGION OF MUNICIPALITY OF WATERLOO

Region of Waterloo

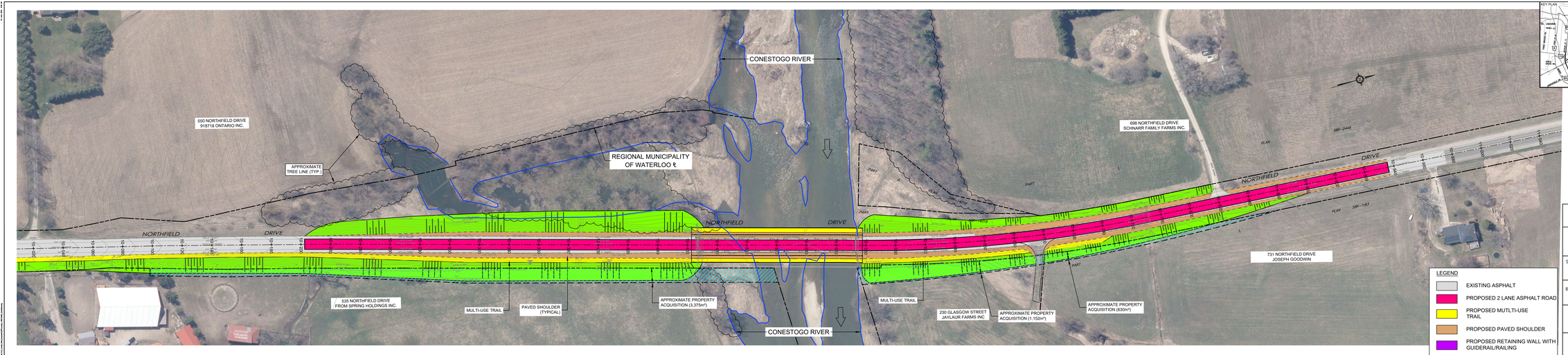
SCHEIFELE BRIDGE RECONSTRUCTION:
CLASS ENVIRONMENTAL ASSESSMENT STUDY
NORTHFIELD DRIVE
TOWNSHIP OF WOOLWICH

ROAD AND BRIDGE RECONSTRUCTION
ALTERNATIVE DESIGN CONCEPT 3

4 LANE BRIDGE (DESIGN ALTERNATIVE 4)
EAST SIDE OF NORTHFIELD DRIVE

PARTIAL OFFSET ALIGNMENT
- STAGED CONSTRUCTION
- UNINTERRUPTED TRAFFIC

DESIGN: MRA | DRAWN: | CHECKED: | DATE: 2019-09-24 | PROJECT NO. | SHEET NO.



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Region of Waterloo

REGION OF MUNICIPALITY OF WATERLOO

SCHEIFELE BRIDGE RECONSTRUCTION:
CLASS ENVIRONMENTAL ASSESSMENT STUDY
NORTHFIELD DRIVE
TOWNSHIP OF WOOLWICH

ROAD AND BRIDGE RECONSTRUCTION
ALTERNATIVE DESIGN CONCEPT 4

4 LANE BRIDGE (DESIGN ALTERNATIVE 4)
EXISTING NORTHFIELD DRIVE ALIGNMENT

- NO STAGED CONSTRUCTION
- FULL ROAD CLOSURE/DETOUR

0 5 10 20 30 40 50 m

DESIGN: MRA | DRAWN: DMD | 2023-09-29 | PROJECT NO. | SHEET NO.

Region of Waterloo

SCHEIFELE BRIDGE REPLACEMENT

Northfield Drive (Regional Road 22)
Township of Woolwich

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT STUDY

APPENDIX F: Evaluation Matrices

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	SCHEIFELE BRIDGE CLASS ENVIRONMENTAL ASSESSMENT STUDY NORTHFIELD DRIVE ALTERNATIVE ALIGNMENTS: ENVIRONMENTAL IMPACT EVALUATION MATRIX			
Factors	**Evaluation Criteria**	**Concept 1** **New Road and Bridge Alignment to West Side**	**Concept 2** **New Bridge Partially Offset to West Side**	**Concept 3** **New Bridge Partially Offset to East Side**
POTENTIAL IMPACTS				
Aquatic Species and Habitat	Impacts to aquatic species and habitat Aquatic species at risk described in row below	Potential aquatic habitat impacts (silt and sediment loading) due to in-water work for new bridge piers and removal of existing piers/abutments. May involve temporary causeways, access for borehole testing, access roads for construction and vegetation removal within meander belt width of Conestogo River +30 m. Will require mussel relocations for in-water work areas prior to activities and fish removals from isolated areas prior to dewatering. Potential temporary increases in silt and sediment from in-water works and vegetation clearing within meander belt width + 30 m of Conestogo River. Larger area of potential impact within meander belt width +30 m of the three options. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Southwest quadrant of the Conestogo River has less suitable habitat (backwater with fine depositional sediment) for aquatic species.	Potential aquatic habitat impacts (silt and sediment loading) due to in-water work for TMB piers in undisturbed areas, new bridge piers on same alignment and removal of existing piers/abutments. May involve temporary causeways, access for borehole testing, access roads for construction and vegetation removal within meander belt width of Conestogo River +30 m. Will require mussel relocations for in-water work areas prior to activities and fish removals from isolated areas prior to dewatering. Potential temporary increases in silt and sediment from in-water works and vegetation clearing within meander belt width + 30 m of Conestogo River. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Southwest quadrant of the Conestogo River has less suitable habitat (backwater with fine depositional sediment) for aquatic species.	Potential aquatic habitat impacts (silt and sediment loading) due to in-water work for new bridge piers in undisturbed areas and removal of existing piers/abutments. May involve temporary causeways, access for borehole testing, access roads for construction and vegetation removal within meander belt width of Conestogo River +30 m. Will require mussel relocations for in-water work areas prior to activities and fish removals from isolated areas prior to dewatering. Potential temporary increases in silt and sediment from in-water works and vegetation clearing within the meander belt width of the Conestogo River + 30 m. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Potential impacts to Eastern Tributary of Conestogo River. East side of the Conestogo River has more suitable habitat for aquatic species.
	Impact Rating High = highest impact Medium = moderate impact Low = least impact	**High**	**Low**	**Medium**
Wildlife and Wildlife Habitat	Impacts to wildlife and wildlife habitat Confirmed habitat in the Study Area for: Eastern Wood-Pewee, Snapping Turtle and turtle wintering area. Candidate habitat in Study Area for: bat maternity colony, turtle wintering area, reptile hibernaculum, turtle nesting, amphibian breeding, and habitat for species of conservation concern (Common Nighthawk,	Loss of confirmed turtle wintering area and confirmed Snapping Turtle habitat, and candidate amphibian breeding habitat in wetlands adjacent to existing road where dam removal (SAS) and grading (MASM1-1) are proposed. Potential disturbance to confirmed Snapping Turtle habitat, candidate turtle overwintering area and candidate amphibian breeding habitat along shoreline of Conestogo River (displacement of habitat around bridge piers). Potential for displacement of Snapping Turtle during sensitive over-wintering period if in-water work occurs Nov 1 – Apr 1. Loss or displacement of candidate habitat for Monarch. Temporary disturbances to wildlife and wildlife habitat during construction from vegetation trampling/removal, noise, dust, risk of sedimentation.	Minor loss of candidate amphibian breeding habitat in area of retaining wall construction. Potential disturbance to candidate turtle overwintering habitat and candidate amphibian breeding habitat in Conestogo River (displacement of habitat around bridge piers). Potential for displacement of Snapping Turtle during sensitive over-wintering period if in-water work occurs Nov 1 – Apr 1. Loss or displacement of candidate habitat for Monarch. Temporary disturbances to wildlife and wildlife habitat during construction from vegetation trampling/removal, noise, dust, risk of sedimentation. Limited or no impacts to candidate bat maternity roost habitat (treed), candidate reptile (snake) hibernaculum,candidate turtle nesting area, candidate	Potential loss or displacement of candidate habitat for Common Nighthawk and Monarch due to embankment grading. Potential disturbance to candidate turtle overwintering habitat and candidate amphibian breeding habitat in Conestogo River (displacement of habitat around bridge piers). Potential for displacement of Snapping Turtle during sensitive over-wintering period if in-water work occurs Nov 1 – Apr 1. Temporary disturbances to wildlife and wildlife habitat during construction from vegetation trampling/removal, noise, dust, risk of sedimentation. Limited or no impacts to candidate bat maternity roost habitat (treed), candidate reptile (snake)

	Monarch, Western Chorus Frog, Eastern Milksnake, Northern Map Turtle)	Limited or no impacts to candidate bat maternity roost habitat (treed), candidate reptile (snake) hibernaculum, candidate turtle nesting area, candidate habitat for Common Nighthawk and Eastern Milksnake, or confirmed habitat for Eastern Wood-Pewee.	habitat for Common Nighthawk and Eastern Milksnake, or confirmed habitat for Eastern Wood-Pewee.	hibernaculum, candidate turtle nesting area, candidate habitat for Eastern Milksnake, or confirmed habitat for Eastern Wood-Pewee.
	Impact Rating High = highest impact Medium = moderate impact Low = least impact	**High**	**Medium**	**Low**
Vegetation and Wetlands	Impact to vegetation communities and wetlands	Largest footprint due to new road alignment. Loss of roadside meadow, marsh (wetland) and treed (FODM7) communities. Temporary impacts due to staging and earthworks during construction.	Loss of roadside meadow (lower quality vegetation) due to embankment grading. Permanent wetland loss limited due to proposed retaining wall, but some temporary impacts during construction.	Loss of roadside meadow (lower quality vegetation, or more easily restored) and hedgerow due to embankment grading.
	Impact Rating High = highest impact Medium = moderate impact Low = least impact	**High**	**Medium**	**Low**
Species at Risk (SAR; Threatened and Endangered species per SARO)	Impact to Species at Risk (SAR) and SAR habitat Butternut, Eastern Meadowlark, Bobolink, SAR bats, Barn Swallow, Wavy-rayed Lampmussel, Silver Shiner, Black Redhorse	Butternut: Alignment appears to avoid 30 m radius of protected habitat around tree, but to be confirmed. Assume no impacts. Eastern Meadowlark and Bobolink: No impacts to habitat, potential for sensory disturbance during construction. SAR bats: No impacts to roosting habitat, potential for sensory disturbance during construction. Barn Swallow: Although no nests were observed in 2020, the existing bridge provides suitable nesting habitat and the species may build nests in any given year. Silver Shiner: Potential temporary increases in silt and sediment from in-water works and vegetation clearing within meander belt width + 30 m of Conestogo River. Larger area of potential impact within meander belt width +30 m of the three options. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Southwest quadrant of the Conestogo River has less suitable habitat (backwater with fine depositional sediment) for the species. Black Redhorse: Potential temporary increases in silt and sediment from in-water works. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Southwest quadrant of	Butternut: No impacts to habitat. Eastern Meadowlark and Bobolink: No impacts to habitat, potential for sensory disturbance during construction. SAR bats: No impacts to roosting habitat, potential for sensory disturbance during construction. Barn Swallow: Although no nests were observed in 2020, the existing bridge provides suitable nesting habitat and the species may build nests in any given year. Silver Shiner: Potential temporary increases in silt and sediment from in-water works and vegetation clearing within 30 m of meander belt width of Conestogo River. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Southwest quadrant of the Conestogo River has less suitable habitat (backwater with fine depositional sediment) for the species. Black Redhorse: Potential temporary increases in silt and sediment from in-water works. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Southwest quadrant of the Conestogo River	Butternut: No impacts to habitat. Eastern Meadowlark and Bobolink: Small loss of habitat due to grading of embankment into grassland habitat. Potential for sensory disturbance during construction. Impacts can be reduced by removing habitat (grassland) outside nesting period (~ Apr 1 to Aug 31) SAR bats: No impacts to roosting habitat, potential for sensory disturbance during construction. Barn Swallow: Although no nests were observed in 2020, the existing bridge provides suitable nesting habitat and the species may build nests in any given year. Silver Shiner: Potential temporary increases in silt and sediment from in-water works and vegetation clearing within 30 m of meander belt width of Conestogo River. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Potential impacts to Eastern Tributary of Conestogo River. East side of the Conestogo River has more suitable habitat for the species. Black Redhorse: Potential temporary increases in silt and sediment from in-water works. Temporary disturbance and permanent loss of in-water habitat

		the Conestogo River has less suitable habitat (backwater with fine depositional sediment) for the species. Wavy-rayed Lampmussel: Potential temporary increases in silt and sediment from in-water works. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Southwest quadrant of the Conestogo River has less suitable habitat (backwater with fine depositional sediment) for the species.	has less suitable habitat (backwater with fine depositional sediment) for the species. Wavy-rayed Lampmussel: Potential temporary increases in silt and sediment from in-water works. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Southwest quadrant of the Conestogo River has less suitable habitat (backwater with fine depositional sediment) for the species.	at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Potential impacts to Eastern Tributary of Conestogo River. East side of the Conestogo River has more suitable habitat for the species. Wavy-rayed Lampmussel: Potential temporary increases in silt and sediment from in-water works. Temporary disturbance and permanent loss of in-water habitat at sites of new piers. Temporary disturbance and permanent gain of in-water habitat at sites of old pier removals. Potential impacts to Eastern Tributary of Conestogo River. East side of the Conestogo River has more suitable habitat for the species.
	Impact Rating High = highest impact Medium = moderate impact Low = least impact	**High**	**Low**	**Medium**

SCHEIFELE BRIDGE CLASS ENVIRONMENTAL ASSESSMENT

Alternative Bridge Cross Section Concepts Evaluation Matrix

BRIDGE DESIGN DESCRIPTION	EVALUATION CRITERIA	"DO NOTHING" DESIGN ALTERNATIVE	DESIGN ALTERNATIVE 1:	DESIGN ALTERNATIVE 2:	DESIGN ALTERNATIVE 3:	DESIGN ALTERNATIVE 4:	DESIGN ALTERNATIVE 5:
		Retain the existing Scheifele Bridge and rehabilitate deteriorating components on an as-required basis. A Structural monitoring program will be needed on a regular basis to confirm scope and timing of repair contracts.	This alternative proposes a new 2-lane bridge (3.75 m lanes) with 1.5 m paved shoulders on each side of the travelled lanes. Concrete barriers are proposed to separate the travelled roadway from proposed 1.5 m walkways / sidewalks on each side of the structure. Pedestrian railings are proposed on the outside of the walkways / sidewalks. -	This alternative proposes a new 2-lane bridge (3.75 m lanes) with 3.0 m multi-purpose paved shoulders on each side of the travelled lanes. Concrete barriers are proposed between the travelled roadway and a proposed 3.0 m multi-use trail on one side of the structure (preferred side for MUT to be determined), and on the opposite side of the structure. A pedestrian handrail is proposed on the outside of the MUT. -	This alternative proposes a new 2-lane bridge (3.75 m lanes) with 3.0 m multi-purpose paved shoulders on each side of the travelled lanes. Concrete barriers are proposed to separate the travelled roadway from proposed 1.5 m walkways / sidewalks, or optional 3.0 m multi-use trails, on each side of the structure. Pedestrian railings are proposed on the outside of the walkways / sidewalks or MUTs.	This alternative proposes an "Interim Stage" cross section, consisting of a new 2-lane bridge (3.75 m lanes) with 5.25 m multi-purpose paved shoulders on each side of the travelled lanes. Concrete barriers are proposed to separate the travelled roadway from proposed 1.5 m walkways/sidewalks, or optional 3.0 m multi-use trails, on each side of the structure. Pedestrian railings are proposed on the outside of the walkways / sidewalks or MUTs. An "Ultimate Stage" cross section provides for the conversion of the interim 2-lane design into a 4-lane (3.75 m lanes) cross section. The interim 5.25 m shoulders would be converted to 3.75 m lanes and 1.5 m shoulders, based on an assumed future widening of Northfield Drive to 4 lanes. -	This "recommended preferred" bridge cross section design alternative proposes a new 2-lane bridge (3.35 m lanes) with 2.45 m multi-purpose paved shoulders on each side of the travelled lanes. Concrete barriers are proposed to separate the travelled roadway from proposed 1.8 m walkways / sidewalks on each side of the structure. Pedestrian railings are proposed on the outside of the walkways / sidewalks.

PROBLEM STATEMENT

The Scheifele Bridge, on Regional Road 22 (Northfield Drive) over the Conestogo River, requires reconstruction to address its deteriorating condition, including a full superstructure (deck) replacement and partial, or full, replacement of the substructure piers and abutments. In conjunction with the bridge deck replacement, the planning and design process shall consider the addition of facilities for pedestrians, buggies and cyclists who will use the bridge now and into the future. In addition, provisions shall be made in the design to accommodate a Region trunk watermain.

As part of the Class Environmental Assessment, four Alternative Road Alignment Design Concepts were developed for the replacement of the Scheifele Bridge. In addition to a "Do-Nothing" Alternative, the 4 alternative alignment concepts were subjectively examined in an Evaluation Matrix, which was presented to the public and interested agencies via Public Consultation Center Meeting #1 (on-line forma). To minimize confusion and to compare the alternatives on an equal base, each of the options was assessed using the widest possible replacement bridge cross section, which, in turn, represented the most expensive base cost. A copy of the "Preliminary Alternative Alignment Design Concepts Evaluation Matrix" will be included in the final Class Environmental Assessment Study Report (ESR).

An important extension to the assessment of the 4 Alternative Road Alignment Design Concepts (including the "Do-Nothing" option) is the evaluation of Alternative Bridge Cross Section Concepts. At the beginning of the Class EA study, four Alternative Bridge Cross Section options were created to illustrate how current and future vehicular / active transportation needs on Northfield Drive would translate into various design widths for the Scheifele Bridge. At the time of development of the preliminary cross sections, vehicular data on Northfield Drive was known from previous traffic counts, however, accurate data on active transportation travel modes (pedestrians, cyclists, buggies) was not well known. Therefore, an accurate and reliable evaluation of the four preliminary bridge cross sections was not possible prior to the first Public Consultation Center meeting in May 2021.

In June 2021, the Region completed a one-week camera inspection and count of active transportation movements on the Scheifele Bridge, which provided important insight into the existing movements of pedestrians, cyclists, and Mennonite buggy traffic. Data from the June 2021 camera counts is documented in the Environmental Study Report. In addition to the active transportation data counts from June 2021, the Region of Waterloo Traffic Department also provided comments on the expected timeline for widening Northfield Drive from 2 lanes to 4 lanes. According to the current Region of Waterloo Transportation Master Plan (TMP), it is anticipated that Northfield Drive is not likely to be considered for widening to 4 lanes prior to 2050.

Using the supplementary Active Transportation and TMP data, the following ***Alternative Bridge Cross Section Concepts Evaluation Matrix*** was developed to assess the four (4) preliminary bridge design cross sections with the objective of confirming a recommended preferred bridge design concept. Based on the detail presented in the Evaluation Matrix and following debate by the Project Team, a modified Bridge Design Cross Section was developed, shown as **Design Alternative #5**. A complete evaluation of this "recommended preferred design concept" is presented herein for completeness of the Evaluation Matrix. Details of the Cross Section for Design Alternative #5 are as follows:

- Vehicle Lanes: 2 @ 3.35 m
- Paved Shoulders / Buggy / Cycle Lanes: 2 @ 2.45 m
- Roadside Barriers: 2 @ 0.325 m
- Walkways / Sidewalks: 2 @ 1.80 m
- Pedestrian Railings: 2 @ 0.40 m
- TOTAL DECK WIDTH: 16.65 M

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SCHEIFELE BRIDGE CLASS ENVIRONMENTAL ASSESSMENT

Alternative Bridge Cross Section Concepts Evaluation Matrix

VEHICULAR AND ACTIVE TRANSPORTATION							
Two Lane Vehicular Traffic Capacity and Operations	How does the alternative affect current 2-lane traffic capacity on Northfield Drive?	• No change in traffic capacity or traffic operations under the status quo. • There is a potential for significant future traffic disruptions, or road closures, in conjunction with any bridge repair contracts, as the bridge continues to deteriorate and needs regular rehabilitation	• No change in traffic capacity or traffic operations with the new 2-lane bridge. • New structure will eliminate the need for any rehabilitation well into the future, avoiding major disruptions to traffic for many years.	• No change in traffic capacity or traffic operations with the new 2-lane bridge. • New structure will eliminate the need for any rehabilitation well into the future, avoiding major disruptions to traffic for many years. .	• No change in traffic capacity or traffic operations with the new 2-lane bridge. • New structure will eliminate the need for any rehabilitation well into the future, avoiding major disruptions to traffic for many years. .	• No change in traffic capacity or traffic operations with the new 2-lane (Interim) bridge design concept. • New structure will eliminate the need for any rehabilitation well into the future, avoiding major disruptions to traffic for many years.	• No change in traffic capacity or traffic operations with the new 2-lane bridge. • New structure will eliminate the need for any rehabilitation well into the future, avoiding major disruptions to traffic for many years.
Four Lane Vehicular Traffic Capacity	Will the Design Concept accommodate four (4) lanes of traffic in the future, or will the bridge need to be widened to add an additional two (2) lanes of traffic?	• No, the existing bridge will not accommodate potential 4 lanes of vehicular traffic. • Due to the limited remaining lifespan of the current bridge, full removal will be required, along with building a new bridge, to increase roadway capacity to 4 lanes.	• No, the proposed bridge deck width will not accommodate potential 4 lanes of vehicular traffic. • The bridge would need to be structurally widened to safely accommodate 4-lanes of traffic in the future.	• No, the proposed bridge deck width will not accommodate potential 4 lanes of vehicular traffic. • Although the deck width, as shown, could accommodate 4 lanes @ 3.35 m each, the resultant shoulder width of 50 mm would be inadequate based on current design standards. • The bridge would need to be structurally widened to safely accommodate 4-lanes of traffic in the future.	• No, the proposed bridge deck width will not accommodate potential 4 lanes of vehicular traffic. • Although the deck width, as shown, could accommodate 4 lanes @ 3.35 m each, the resultant shoulder width of 50 mm would be inadequate based on current design standards. • The bridge would need to be structurally widened to safely accommodate 4-lanes of traffic in the future.	• Yes, the **Interim** 2-lane bridge design concept could be readily transformed to accommodate 4-lanes of vehicular traffic by changing the pavement markings. An **Ultimate** 4-lane design concept is shown in the Bridge Cross Section drawings. • Structural widening of the bridge would not be required in the future.	• Based on the Region's Transportation Master Plan (TMP), it is anticipated that Northfield Drive will not likely be considered for widening to 4 lanes prior to 2050. • Therefore, there is no immediate need for the bridge to accommodate 4 lanes of traffic. • The bridge would need to be structurally widened in the future to safely accommodate 4-lanes of traffic.
Provisions for Dedicated Cycle Lanes	Does the existing or proposed bridge cross section provide for dedicated cycle lanes?	• The existing bridge does not have dedicated cycle lanes, but there are 1.2 m paved shoulders that provide bike lanes for experienced cyclists. • Inexperienced cyclists would likely resort to using the 1.25 m sidewalk on the west side of the structure but would have to cross Northfield Drive, at some point, to access the bridge sidewalk.	• The proposed bridge deck includes 1.50 m paved shoulders that will serve as dedicated bike lanes for experienced cyclists. • Inexperienced cyclists would be able to use the 1.5 m walkways proposed for both sides of this bridge design concept (see "Pedestrian Walkways" below).	• The proposed bridge deck includes 3.0 m paved "multi-purpose" shoulders that may serve as dedicated bike lanes for experienced cyclists, with buggies also using the multi-purpose shoulders (see Mennonite Buggy Travel" below). • Inexperienced cyclists would be able to use the 3.0 m Multi-Use Trail proposed for one side of this bridge design concept (see "Pedestrian Walkways" below). If selected as the preferred design concept, a decision would be needed on which side to build the single-sided MUT.	• The proposed bridge deck includes 3.0 m paved "multi-purpose" shoulders that may serve as dedicated bike lanes for experienced cyclists, with buggies also using the multi-purpose shoulders (see Mennonite Buggy Travel" below). • Inexperienced cyclists would be able to use the 1.8 m Walkways / Sidewalks (Optional Multi-Use Trails) proposed for both sides of this bridge design concept (see "Pedestrian Walkways" below).	• Under the **Interim** Stage, the proposed bridge deck includes 5.25 m paved "multi-purpose" shoulders that may readily serve as dedicated bike lanes for cyclists, with buggies also using the multi-purpose shoulders (see Mennonite Buggy Travel" below). • Inexperienced cyclists could choose between the wide paved shoulders and 1.8 m Walkways / Sidewalks (Optional Multi-Use Trails) proposed for both sides of this bridge design concept (see "Pedestrian Walkways" below). • Under the **Ultimate** Stage, the converted bridge deck lane layout would provide 1.5 m paved shoulders that may still serve as dedicated bike lanes for cyclists.	• The proposed bridge deck includes 2.45 m paved "multi-purpose" shoulders that may serve as dedicated bike lanes for experienced cyclists, with buggies also using the multi-purpose shoulders (see Mennonite Buggy Travel" below). • Inexperienced cyclists would be able to use the 1.8 m Walkways / Sidewalks proposed for both sides of the bridge (see "Pedestrian Walkways" below).

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Alternative Bridge Cross Section Concepts Evaluation Matrix

Provisions for Pedestrian Walkways and/or Multi-Use Trail Facilities on bridge structure	Does the existing or proposed bridge cross section provide for safe pedestrian walkways / sidewalks and/or Multi-Use Trails?	• The existing bridge has a 1.25 m sidewalk on the west side only. • Pedestrians must cross Northfield Drive, at some point, to access the existing sidewalk. • The existing sidewalk presents safety issues due to its narrow width, its proximity to high-speed traffic, and the length of the structure.	• The proposed bridge deck includes 1.50 m protected walkways / sidewalks (optional MUTs) on both sides of the structure. • Pedestrians do not need to cross Northfield Drive to access the walkways and the proposed roadside barriers provide a safe refuge from vehicular traffic. • If Multi-Use Trails are provided, pedestrians would share the MUT with inexperienced cyclists (see above).	• The proposed bridge deck includes a 3.0 m protected Multi-Use Trail on one side of the structure. • Pedestrians must cross Northfield Drive, at some point, to access the proposed MUT on either side of the structure (TBC). • Pedestrians would share the MUT with inexperienced cyclists (see above). • The protected MUT provides a safe refuge from vehicular traffic.	• The proposed bridge deck includes 1.50 m protected walkways / sidewalks (optional MUTs) on both sides of the structure. • Pedestrians do not need to cross Northfield Drive to access the walkways and the proposed roadside barriers provide a safe refuge from vehicular traffic. • If Multi-Use Trails are provided, pedestrians would share the MUT with inexperienced cyclists (see above).	• The proposed bridge deck includes 1.50 m protected walkways / sidewalks (optional MUTs) on both sides of the structure. • Pedestrians do not need to cross Northfield Drive to access the walkways and the proposed roadside barriers provide a safe refuge from high-speed traffic. • If Multi-Use Trails are provided, pedestrians would share the MUTs with inexperienced cyclists (see above).	• The proposed bridge deck includes 1.80 m protected walkways / sidewalks on both sides of the structure. • Pedestrians do not need to cross Northfield Drive to access the walkways and proposed roadside barriers provide a safe refuge from vehicular traffic.
Provisions for Safe Mennonite Buggy Travel crossing bridge	Does the existing or proposed bridge cross section accommodate the operational needs of the Mennonite community by providing a safe travel lane while crossing the 107 m long bridge?	• Buggies currently cross the existing bridge by straddling the narrow, paved shoulder and the vehicle travel lane. This creates an unsafe condition, as vehicles, travelling at 80 kph or more, must quickly recognize the situation and either wait for the buggy to clear the bridge or pass the buggy when safe to do so.	• Bridge Cross Section provides a modest safety improvement for buggy traffic, compared to the existing condition. • Operationally, the total width of the thru lane (3.75 m) plus paved shoulder (1.5 m) is 5.25 m, which could provide a passable 3.35 m travel lane and 1.9 m buggy lane, which would be an even safer condition for buggy traffic on the new structure. • Alternatively, the vehicle lane could be permanently striped with a 3.35 width, resulting in a permanent paved shoulder / cycle and buggy lane width of 1.9 m.	• Bridge Cross Section provides a significant safety improvement for buggy traffic, compared to the existing condition and Alternative #1. • The 3.0 m paved multi-purpose shoulder provides adequate space for buggy traffic without interfering with regular traffic.	• Bridge Cross Section provides a significant safety improvement for buggy traffic, compared to the existing condition and Alternative #1. • The 3.0 m paved multi-purpose shoulder provides adequate space for buggy traffic without interfering with regular traffic.	• Under the **Interim** condition, the Bridge Cross Section provides a significant safety improvement for buggy traffic, compared to the existing condition and Alternatives 1-3. • The 5.25 m paved multi-purpose shoulder provides significant space for buggy traffic without interfering with regular vehicular traffic. • Under the **Ultimate** condition, the Bridge Cross Section still provides a safe condition for buggy travel, even with the 1.5 paved shoulders. • Operationally, vehicular traffic may safely pass buggies on the bridge by moving from the shoulder lane to the passing lane.	• Bridge Cross Section provides a significant safety improvement for buggy traffic, compared to the existing condition and Alternative #1. • The 2.45 m paved multi-purpose shoulder provides adequate space for buggy traffic without interfering with regular traffic.
Subjective "Safety Rating" for Bridge Cross Section design concept, accounting for all Modes of Traffic Operations: **High = Excellent to Good** **Medium = Average** **Low = Fair to Poor**		• Roadway Traffic: High • Pedestrian Use: Low • Cycle Use: Medium • Buggy Use: Low	• Roadway Traffic: High • Pedestrian Use: High • Cycle Use: High • Buggy Use: Med	• Roadway Traffic: High • Pedestrian Use: Medium • Cycle Use: High • Buggy Use: High	• Roadway Traffic: High • Pedestrian Use: High • Cycle Use: High • Buggy Use: High	**INTERIM STAGE:** • Roadway Traffic: High • Pedestrian Use: High • Cycle Use: High • Buggy Use: High **ULTIMATE STAGE:** • Roadway Traffic: High • Pedestrian Use: High • Cycle Use: High • Buggy Use: Medium	• Roadway Traffic: High • Pedestrian Use: High • Cycle Use: High • Buggy Use: High
2) CONSTRUCTABILITY, OPERATIONS, AND TECHNICAL DESIGN ISSUES							
Traffic control during construction and viability for a staged construction program	How does the proposed bridge cross section lend itself to a staged construction program, thereby retaining uninterrupted	• Not applicable	• The proposed deck width and preliminary girder spacing will enable a staged construction program, thereby keeping	• The proposed deck width and preliminary girder spacing will enable a staged construction program, thereby keeping	• The proposed deck width and preliminary girder spacing will enable a staged construction program, thereby keeping	• The proposed deck width and preliminary girder spacing will enable a staged construction program, thereby keeping	• The proposed deck width and preliminary girder spacing will enable a staged construction program, thereby keeping

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	traffic on Northfield Drive during construction?		Northfield Drive open during construction. • However, the proposed deck width slightly limits options for construction staging, when compared to Alternatives 2, 3 and 4.	Northfield Drive open during construction. • The slightly wider deck width provides more flexibility in the implementation of staging options, compared to Cross Section Alternative 1.	Northfield Drive open during construction. • The wider deck width offers greater flexibility in the implementation of staging options, compared to Cross Section Alternatives 1 and 2.	Northfield Drive open during construction. • The largest of the proposed deck width alternatives offers the greatest flexibility implementing various staging options, compared to Cross Section Alternatives 1, 2 & 3.	Northfield Drive open during construction. • However, the proposed 16.65 m deck width slightly limits options for construction staging, when compared to Alternatives 2, 3 and 4.
Deck-Level bridge maintenance operations, lane restrictions and traffic disruptions	During regular maintenance operations at deck level, such as barrier repairs, surface paving restoration, sidewalk rehabilitation, etc., what is the predicted extent of lane restrictions, and traffic disruptions, to complete the maintenance operations?	• The relatively narrow deck width generally necessitates lane closures and traffic restrictions to complete deck-level maintenance.	• The relatively narrow deck width does not represent a significant improvement over the existing structure and will still require lane closures and traffic restrictions to complete deck-level maintenance.	• The wider deck width, between barriers, will permit staged maintenance and the retention of two lanes of uninterrupted traffic on each side of the bridge. • This alternative represents a significant improvement over the existing condition and Alternative 1.	• The wider deck width, between barriers, will permit staged maintenance and the retention of two lanes of uninterrupted traffic on each side of the bridge. • This alternative is the same as Alternative 2 and represents a significant improvement over the existing condition and Alternative 1.	• The largest deck width, between barriers, will easily permit staged maintenance and the retention of two lanes of uninterrupted traffic on each side of the bridge. • This alternative is superior to all other alternatives, in many aspects related to the future maintenance of deck level features.	• The wider deck width, between barriers, should permit staged maintenance and the retention of two lanes of uninterrupted traffic on each side of the bridge. • This alternative represents a significant improvement over the existing condition and Alternative 1.
Winter maintenance	How does the proposed deck width facilitate winter snow-clearing operations?	• No change	• The addition of paved shoulders, on both sides of the deck, increases the bridge width and adds to the winter snow plowing requirements. However, the snow clearing requirements are not much greater (1.4 m) than that required for the existing bridge. • The addition of barrier walls, between the road and the Walkways / MUTs, will require separate passes of walkway plows to clear snow on these pedestrian/cycle facilities. • The slightly wider deck width, compared to the existing bridge, provides more space for temporary snow storage until second snowplow passes can occur.	• The addition of paved shoulders, on both sides of the deck, increases the bridge width and adds to the winter snow plowing requirements. • An additional 4.36 m and 3.0 m of additional deck width must be cleared, compared to the existing bridge and Alternative 1 respectively. • The addition of a barrier wall, between the road and the MUT (one side), will require separate passes of walkway plows to clear snow on this pedestrian/cycle facility. • The wider deck width, compared to the existing bridge and Alternative 1, provides more space for temporary snow storage until second snowplow passes can occur.	• The addition of paved shoulders, on both sides of the deck, increases the bridge width and adds to the winter snow plowing requirements. • An additional 4.36 m and 3.0 m of additional deck width must be cleared, compared to the existing bridge and Alternative 1 respectively. • The addition of barrier walls, between the road and the Walkways/MUTs, will require separate passes of walkway plows to clear snow on these pedestrian/cycle facilities. • The wider deck width, compared to the existing bridge and Alternative 1, provides more space for temporary snow storage until second snowplow passes can occur.	**INTERIM and ULTIMATE STAGES** • The wide paved shoulders, on both sides of the deck, increase the bridge width and add significantly to winter snow plowing needs. • An additional 7.5 m and 4.5 m of additional deck must be cleared when compared to Alternative 1 and Alternatives 2 and 3 respectively. • The addition of a barrier walls, between the road and the Walkways/MUTs, will require separate passes of walkway plows to clear snow on these pedestrian/cycle facilities. • The wider deck width, compared to the existing bridge and Alternatives 1-3 provides more space for temporary snow storage until second snowplow passes can occur.	• The addition of paved shoulders, on both sides of the deck, increases the bridge width and adds to the winter snow plowing requirements. • An additional 2.46 m and 1.1 m of additional deck width must be cleared, compared to the existing bridge and Alternative 1, while less deck width must be cleared compared to Alternatives 2 (1.9 m), 3 (1.9 m) and 4 (6.4 m). • The addition of a barrier wall, between the road and the walkways, will require separate passes of walkway plows to clear snow on this pedestrian facility. • The wider deck width, compared to the existing bridge and Alternative 1, provides more space for temporary snow storage until second snowplow passes can occur.
Provision for accommodating existing and/or future Utilities	Will the existing or proposed bridge decks accommodate existing or future utilities, either within the superstructure or attached to the outside of the deck structure?	• Bell Canada has an existing concrete encased duct structure attached to the west side of the bridge. • The Region typically does not allow "Third Party" utilities to be attached to existing or proposed bridge structures.	• Bell Canada has an existing concrete encased duct structure attached to the west side of the existing bridge. • With the reconstruction of the bridge, the existing Bell duct structure may be reattached	• Bell Canada has an existing concrete encased duct structure attached to the west side of the existing bridge. • With the reconstruction of the bridge, the existing Bell duct structure may be reattached	• Bell Canada has an existing concrete encased duct structure attached to the west side of the existing bridge. • With the reconstruction of the bridge, the existing Bell duct structure may be reattached	• Bell Canada has an existing concrete encased duct structure attached to the west side of the existing bridge. • With the reconstruction of the bridge, the existing Bell duct structure may be reattached	• Bell Canada has an existing concrete encased duct structure attached to the west side of the existing bridge. • With the reconstruction of the bridge, the existing Bell duct structure may be reattached

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		• Based on current Region policy, the existing Bell ducts may stay but no new utility ducts/cables would be allowed on the existing structure.	to the side of the new bridge deck regardless of the deck cross section. Details will be confirmed during detailed design. • The Region typically does not allow "Third Party" pipes and/or utilities to be attached to proposed bridge structures. Therefore, no new utility plant will be allowed on the new Scheifele Bridge.	to the side of the new bridge deck regardless of the deck cross section. Details will be confirmed during detailed design. • The Region typically does not allow "Third Party" pipes and/or utilities to be attached to proposed bridge structures. Therefore, no new utility plant will be allowed on the new Scheifele Bridge.	to the side of the new bridge deck regardless of the deck cross section. Details will be confirmed during detailed design. • The Region typically does not allow "Third Party" pipes and/or utilities to be attached to proposed bridge structures. Therefore, no new utility plant will be allowed on the new Scheifele Bridge.	to the side of the new bridge deck regardless of the deck cross section. Details will be confirmed during detailed design. • The Region typically does not allow "Third Party" pipes and/or utilities to be attached to proposed bridge structures. Therefore, no new utility plant will be allowed on the new Scheifele Bridge.	to the side of the new bridge deck regardless of the deck cross section. Details will be confirmed during detailed design. • The Region typically does not allow "Third Party" pipes and/or utilities to be attached to proposed bridge structures. Therefore, no new utility plant will be allowed on the new Scheifele Bridge.
Provision for future Region Trunk Watermain construction	The Region is proposing a new 300 trunk watermain on Northfield Drive. Ideally, the watermain will be installed in conjunction with the bridge reconstruction. A 2019 study concluded that the watermain should be attached to the side of the replacement structure. Will the proposed bridge deck accommodate the proposed Region trunk watermain?	• The Region's proposed 300 watermain could potentially be attached to the side of the existing bridge. However, it would be undesirable to do so because of the age and deteriorated condition of the Scheifele Bridge.	• Since the proposed 300 mm watermain will be Region owned, the new pipe may be attached to the side of the bridge regardless of the deck cross section. • The final location, and engineering details, of supporting the 300 watermain on the proposed bridge will be confirmed at the detailed design stage of the project.	• Since the proposed 300 mm watermain will be Region owned, the new pipe may be attached to the side of the bridge regardless of the deck cross section. • The final location, and engineering details, of supporting the 300 watermain on the proposed bridge will be confirmed at the detailed design stage of the project.	• Since the proposed 300 mm watermain will be Region owned, the new pipe may be attached to the side of the bridge regardless of the deck cross section. • The final location, and engineering details, of supporting the 300 watermain on the proposed bridge will be confirmed at the detailed design stage of the project.	• Since the proposed 300 mm watermain will be Region owned, the new pipe may be attached to the side of the bridge regardless of the deck cross section. • The final location, and engineering details, of supporting the 300 watermain on the proposed bridge will be confirmed at the detailed design stage of the project.	• Since the proposed 300 mm watermain will be Region owned, the new pipe may be attached to the side of the bridge regardless of the deck cross section. • The final location, and engineering details, of supporting the 300 watermain on the proposed bridge will be confirmed at the detailed design stage of the project.
Subjective Rating of "CONSTRUCTABILITY, OPERATIONS, AND TECHNICAL DESIGN ISSUES" for Bridge Cross Section design concepts: **High = Excellent to Good** **Medium = Average** **Low = Fair to Poor**		• Staged Construction: NA • Deck Level Maintenance: Low • Winter Maintenance: High • Existing & Future Utilities: Med • Region Watermain: Low	• Staged Construction: Med • Deck Level Maintenance: Low • Winter Maintenance: Med • Existing & Future Utilities: High • Region Watermain: High	• Staged Construction: Med • Deck Level Maintenance: Med • Winter Maintenance: Med • Existing & Future Utilities: High • Region Watermain: High	• Staged Construction: High • Deck Level Maintenance: High • Winter Maintenance: Med • Existing & Future Utilities: High • Region Watermain: High	• Staged Construction: High • Deck Level Maintenance: High • Winter Maintenance: Med • Existing & Future Utilities: High • Region Watermain: High	• Staged Construction: Med • Deck Level Maintenance: Med • Winter Maintenance: Med • Existing & Future Utilities: High • Region Watermain: High
OVERALL COMPARATIVE RATING OF BRIDGE DESIGN ALTERNATIVES BEFORE COST CONSIDERATIONS **High = Excellent to Good** **Medium = Average** **Low = Fair to Poor**		**LOW**	**MEDIUM**	**MEDIUM**	**HIGH**	**HIGH**	**HIGH**
Comparative Bridge Construction Cost Estimates	What is the Base Estimated Construction Cost for the Alternative Bridge Design Concept, including a 30% Allowance for Engineering and Contingencies but not road	• No Capital Cost to Replace the Existing Bridge. • Long term rehabilitation costs will be significant if the current bridge is retained for the foreseeable future.	• Base Construction: $6.70 M • Eng / Contingencies: $2.00 M • **Total Alternative 1: $8.70 M**	• Base Construction: $7.60 M • Eng / Contingencies: $2.30 M • **Total Alternative 2: $9.90 M**	• Base Construction: $8.00 M • Eng / Contingencies: $2.40 M • **Total Alternative 3: $10.4 M**	• Base Construction: $9.90 M • Eng / Contingencies: $3.0 M • **Total Alternative 4: $12.9 M**	• Base Construction: $7.20 M • Eng / Contingencies: $2.10 M • **Total Alternative 5: $9.30 M**

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SCHEIFELE BRIDGE CLASS ENVIRONMENTAL ASSESSMENT

Alternative Bridge Cross Section Concepts Evaluation Matrix

	construction and associated costs? Note: Base Cost Assumes $4,000 per m2 of Deck Area.	• Rehabilitation will not eliminate the need for a full bridge replacement in within the next 10 years.					
Estimated Construction Cost, Including Bridge Construction, Road Construction, Property Acquisition, Engineering, and Contingencies: **Using Recommended Preferred Road Design Concept #2: West Side Staged Construction:**	Preliminary Construction Estimate: - Construction Base Cost - Approximate Property Acquisition Cost - Engineering (24%) - Contingencies (12%) **TOTAL**	• Total Preliminary Estimated Construction Cost: $ N/A **$ N/A**	• Total Preliminary Estimated Construction Cost: $13,460,000 $25,000 $3,300,000 $1,700,000 **$18,485,000**	• Total Preliminary Estimated Construction Cost: $16,480,000 $25,000 $4,000,000 $2,000,000 **$22,505,000**	• Total Preliminary Estimated Construction Cost: $17,450,000 $35,000 $4,200,000 $2,100,000 **$23,785,000**	• Total Preliminary Estimated Construction Cost: $18,965,000 $50,000 $4,600,000 $2,300,000 **$25,915,000**	• Total Preliminary Estimated Construction Cost: $15,850,000 $25,000 $3,800,000 $1,900,000 **$21,575,000**
Overall Ranking of Alternative Bridge Design Concepts, Including Overall Project Costs		**NOT APPLICABLE**	**HIGH**	**MEDIUM**	**MEDIUM**	**LOW**	**HIGH**

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SCHEIFELE BRIDGE CLASS ENVIRONMENTAL ASSESSMENT
Preliminary Alternative Alignment Design Concepts Evaluation Matrix

DESIGN CONCEPT DESCRIPTION	EVALUATION CRITERIA	"DO NOTHING" DESIGN ALTERNATIVE	DESIGN ALTERNATIVE 1: FULL OFFSET BRIDGE CONSTRUCTION	DESIGN ALTERNATIVE 2: STAGED CONSTRUCTION WEST SIDE	DESIGN ALTERNATIVE 3: STAGED CONSTRUCTION EAST SIDE	DESIGN ALTERNATIVE 4: EXISITNG ALIGNMENT
		Retain the existing Scheifele Bridge and rehabilitate deteriorating components on an as-required basis. A Structural monitoring program will be needed on a regular basis to confirm scope and timing of repair contracts.	This alternative proposes a new bridge constructed offset to the west from the existing structure, with a 22.0 m centerline to centerline separation between the two bridges. New road embankments would need to be constructed on the north and south approaches. The new bridge and roadway could be constructed without the need for any long-term closure of Northfield Drive. Other features of this alternative include: - Major encroachment on the west side environmental area and watercourse - Significant retaining wall construction on west side to minimize watercourse impacts. - Provides "fair to very good" new road alignment. - Approximate property acquisition (north west side): 5,030 m2 - Potentially significant archaeological and natural environmental impacts - May require protracted agency permit approvals.	This alternative proposes a new bridge constructed slightly offset to the west from the existing structure, with an 8.7 m centerline to centerline separation between the two bridges. The existing road embankments on the west side would need to be widened on the north and south approaches. The new bridge and roadway would be constructed under a "Staged Work Plan" without the need for any long-term closure of Northfield Drive. Other features of this alternative include: - Significantly reduced encroachment on the west side environmental area and watercourse, compared to Alternative Concept 1 - Reduced retaining wall construction on west side compared to Alternative Concept 1 - Provides "very good to excellent" new road alignment. - Approximate property acquisition (north west side): 2,250 m2 - Potential archaeological and natural environmental impacts are reduced compared to Alternative Concept 1 - Agency permit approvals are still required but may be less onerous than with Alternative Concept 1	This alternative proposes a new bridge constructed slightly offset to the east from the existing structure, with an 8.7 m centerline to centerline separation between the two bridges (mirror image of Alternative Concept 2). The existing road embankments on the east side would need to be widened on the north and south approaches. The new bridge and roadway would be constructed under a "Staged Work Plan" without the need for any long-term closure of Northfield Drive. Other features of this alternative include: - Encroachment on the west side environmental area and watercourse is eliminated. - Major retaining wall construction on west side is eliminated. - Provides "fair to good" new road alignment. - Property acquisition requirements are significantly more than Alternative Concepts 1 and 2. Approximate property acquisition: North side: 5,730 m2 South Side: 6,480 m2 - Potential archaeological and natural environmental impacts are much like Alternative Concept 2 but less than Alternative Concept 1 - Agency permit approvals are much like Alternative Concept 2 but may be less onerous than with Alternative Concept 1 - Requires the relocation of a major overhead hydro pole owned by Waterloo North Hydro	This alternative proposes a new bridge constructed at its current location, including either full replacement of the superstructure, piers and abutments, or replacement of the bridge deck on widened/rehabilitated piers and abutments. The road embankments on Northfield Drive would need to be widened to accommodate the wider bridge. There are two options for building a new bridge on the existing alignment: Long Term Road Closure: - A long-term (2 year) closure of Northfield Drive would be required to remove and replace the bridge and reconstruct the road approaches. Advanced Bridge Construction Method (ABC): - Sliding the new bridge into place onto rehabilitated and widened piers and abutments. This option requires about closure of Northfield Drive, about 4 weeks Other features of this alternative include: - Encroachment on the west side environmental area ad watercourse is minimal. - Major retaining wall on west side is eliminated. - Provides "excellent" road alignment. - Property acquisition needs are minimal. - Potential archaeological and natural environmental impacts are minimal. - Agency permits approvals, although still required, are minimal
PROBLEM STATEMENT	The Scheifele Bridge, on Regional Road 22 (Northfield Drive) over the Conestogo River, requires reconstruction to address its deteriorating condition, including a full superstructure (deck) replacement and partial, or full, replacement of the substructure piers and abutments. In conjunction with the bridge deck replacement, the planning and design process shall consider the addition of facilities for pedestrians, buggies and cyclists who will use the bridge now and into the future. In addition, provisions shall be made in the design to accommodate a Region trunk watermain. The purpose of the Scheifele Bridge Class Environmental Assessment Study is to provide recommendations for improvements which address the deteriorating bridge structure and consider how best to implement optional enhancements, consistent with Regional policies, practices, and guidelines. The subject improvements are proposed so that the Region can continue its ongoing pursuit of implementing all modes of travel within the community, improving municipal streetscapes and achieving traffic operational improvements, all while minimizing potential adverse impacts to adjacent properties plus the natural and built environments.					

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SCHEIFELE BRIDGE CLASS ENVIRONMENTAL ASSESSMENT
Preliminary Alternative Alignment Design Concepts Evaluation Matrix

1) VEHICULAR AND ACTIVE TRANSPORTATION						
Traffic Capacity, Operations and Access to Abutting Properties	How does the alternative affect current traffic capacity, traffic operations and access to abutting properties?	• No change in traffic capacity, traffic operations or access to abutting properties under the status quo • There is a potential for future traffic disruptions, or road closures, in conjunction with any bridge repair contracts, as the structure continues to deteriorate and show signs of distress.	• No change in traffic capacity or traffic operations with 2-lane roadway • 230 Glasgow Street: Driveway extended by about 18 meters on East Side of Northfield Drive • Assuming bridge is constructed to accommodate future 4 lanes (Alternative Cross Section 4), future traffic disruptions will be minimized for the long term.	• No change in traffic capacity or traffic operations with 2-lane roadway • No appreciable change to access at abutting properties • Assuming bridge is constructed to accommodate future 4 lanes (Alternative Cross Section 4), future traffic disruptions will be minimized for the long term. .	• No change in traffic capacity or traffic operations with 2-lane roadway • No appreciable change to access at abutting properties • Assuming bridge is constructed to accommodate future 4 lanes (Alternative Cross Section 4), future traffic disruptions will be minimized for the long term.	• No change in traffic capacity or traffic operations with 2-lane roadway • No change to access at abutting properties • Assuming bridge is constructed to accommodate future 4 lanes (Alternative Cross Section 4), future traffic disruptions will be minimized for the long term.
Four Lane Bridge Capacity	Will the Design Concept accommodate four (4) lanes of traffic in the future or will the bridge need to be widened to add an additional two (2) lanes of traffic?	• NO: Due to the limited remaining lifespan of the current bridge full removal will be required, along with building a new bridge, to increase roadway capacity to 4 lanes. Current bridge is restricted to 2 lanes	• YES and NO: Bridge Cross Section Design Concepts 1, 2 and 3 will need to be widened in the future to accommodate 4 lanes. Bridge Cross Section Design Concept 4 does not need widening in the future to accommodate 4 lanes. • Alternative road alignment will accommodate 4 lanes.	• YES and NO: Bridge Cross Section Design Concepts 1, 2 and 3 will need to be widened in the future to accommodate 4 lanes. Bridge Cross Section Design Concept 4 does not need widening in the future to accommodate 4 lanes. • Alternative road alignment will accommodate 4 lanes.	• YES and NO: Bridge Cross Section Design Concepts 1, 2 and 3 will need to be widened in the future to accommodate 4 lanes. Bridge Cross Section Design Concept 4 does not need widening in the future to accommodate 4 lanes. • Alternative road alignment will accommodate 4 lanes.	• YES and NO: Bridge Cross Section Design Concepts 1, 2 and 3 will need to be widened in the future to accommodate 4 lanes. • Bridge Cross Section Design Concept 4 does not need widening in the future to accommodate 4 lanes. • Alternative road alignment will accommodate 4 lanes.
Traffic Control During Construction	Can the Bridge Reconstruction be completed while maintaining uninterrupted traffic on Northfield Drive, or will an extended detour be required to facilitate construction?	• Not applicable	• The new bridge and roadway can be constructed without the need for any long-term closure of Northfield Drive.	• The new bridge and roadway can be constructed under a "Staged Work Plan" without the need for any long-term closure of Northfield Drive	• The new bridge and roadway can be constructed under a "Staged Work Plan" without the need for any long-term closure of Northfield Drive	• Either a long-term 2-year full closure of Northfield Drive is required, or a shorter (4 week), closure may be possible with an ABC construction method.
Provisions for Mennonite Buggy Traffic	Does the alternative facilitate the operational needs of the Mennonite community by providing added width for buggy use?	• NO: Buggies currently cross the existing bridge but are forced to use vehicular traffic lanes, posing a dangerous situation	• YES and NO: Bridge Cross Section Design Concept 1 provides a modest safety improvement for buggy traffic, with a 2-lane roadway layout. Bridge Cross Section Design Concepts 2 and 3 provide significantly improved safe zones for buggy traffic, with a 2-lane roadway layout. Bridge Cross Section Design Concept 4 provides a superior safe zone for buggy traffic with a 2-lane roadway while also providing a reasonable safe zone with a future 4-lane roadway layout.	• YES and NO: Bridge Cross Section Design Concept 1 provides a modest safety improvement for buggy traffic, with a 2-lane roadway layout. Bridge Cross Section Design Concepts 2 and 3 provide significantly improved safe zones for buggy traffic, with a 2-lane roadway layout. Bridge Cross Section Design Concept 4 provides a superior safe zone for buggy traffic with a 2-lane roadway while also providing a reasonable safe zone with a future 4-lane roadway layout.	• YES and NO: Bridge Cross Section Design Concept 1 provides a modest safety improvement for buggy traffic, with a 2-lane roadway layout. Bridge Cross Section Design Concepts 2 and 3 provide significantly improved safe zones for buggy traffic, with a 2-lane roadway layout. Bridge Cross Section Design Concept 4 provides a superior safe zone for buggy traffic with a 2-lane roadway while also providing a reasonable safe zone with a future 4-lane roadway layout.	• YES and NO: Bridge Cross Section Design Concept 1 provides a modest safety improvement for buggy traffic, with a 2-lane roadway layout. Bridge Cross Section Design Concepts 2 and 3 provide significantly improved safe zones for buggy traffic, with a 2-lane roadway layout. Bridge Cross Section Design Concept 4 provides a superior safe zone for buggy traffic with a 2-lane roadway while also providing a reasonable safe zone with a future 4-lane roadway layout.

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SCHEIFELE BRIDGE CLASS ENVIRONMENTAL ASSESSMENT
Preliminary Alternative Alignment Design Concepts Evaluation Matrix

2) NATURAL ENVIRONMENT						
Aquatic Species and Habitat	How does the design alternative impact fish and other aquatic habitat in the Conestogo River?	• No Impact	• Potential for habitat impacts (silt and sediment loading) due to in-water construction, access road construction, and removal of habitat for road and bridge alignment. • Will require mussel relocations for in-water work and possible fish removals prior to dewatering operations. • Largest impact (30 + meters) on meander belt. • SW quadrant of Conestogo River has less significant habitat for aquatic species • **Overall Impact Rating: HIGH**	• Potential for habitat impacts (silt and sediment loading) due to in-water construction, access road construction, and removal of habitat for road and bridge alignment. • Will require mussel relocations for in-water work and possible fish removals prior to dewatering operations. • Lesser impact (20 + meters) on meander belt. • SW quadrant of Conestogo River has less significant habitat for aquatic species • **Overall Impact Rating: LOW**	• Potential for habitat impacts (silt and sediment loading) due to in-water construction, access road construction, and removal of habitat for road and bridge alignment. • Will require mussel relocations for in-water work and possible fish removals prior to dewatering operations. • Lesser impact (20 + meters) on meander belt. • Does not impact the SW quadrant of Conestogo River. However, the east (downstream) side of the Conestogo River has more suitable habitat for aquatic species. • **Overall Impact Rating: MED**	• Potential for habitat impacts (silt and sediment loading) due to in-water construction, access road construction, and removal of habitat for road and bridge alignment. • Will require mussel relocations for in-water work and possible fish removals prior to dewatering operations. • Least impact on meander belt. • For the most part, does not impact the SW quadrant of Conestogo River or the east (downstream) side of the Conestogo River. • **Overall Impact Rating: LOW**
Wildlife and Wildlife Habitat	How does the design alternative impact Wildlife Habitat, including bat tree roosting; turtles, reptiles, and other amphibians; bird nesting; and other wildlife?	• No Impact	• Loss of confirmed turtle wintering area and Snapping Turtle habitat, as well as candidate amphibian breeding habitat in wetlands where dam removal is proposed. • Temporary disturbances to wildlife and wildlife habitat during construction from vegetation removal, noise, dust, and sedimentation load • Limited or no impacts to candidate bat roost habitat, reptile (snake), turtle nesting areas, or other bird species. • **Overall Impact Rating: HIGH**	• Minor loss of candidate breeding habitat in areas of construction, including Snapping Turtle and various amphibians. • Temporary disturbances to wildlife and wildlife habitat during construction from vegetation removal, noise, dust, and sedimentation load • Limited or no impacts to candidate bat roost habitat, reptile (snake), turtle nesting areas, or other bird species. • **Overall Impact Rating: MED**	• Potential loss or displacement of candidate habitat for Common Nighthawk and Monarch. • Potential loss of candidate breeding habitat in areas of construction, including Snapping Turtle and various amphibians. • Temporary disturbances to wildlife and wildlife habitat during construction from vegetation removal, noise, dust, and sedimentation load • Limited or no impacts to candidate bat roost habitat, reptile (snake), turtle nesting areas, or other bird species. • **Overall Impact Rating: LOW**	• Potential loss of candidate breeding habitat in areas of construction, including Snapping Turtle and various amphibians. • Temporary disturbances to wildlife and wildlife habitat during construction from vegetation removal, noise, dust, and sedimentation load • Limited or no impacts to candidate bat roost habitat, reptile (snake), turtle nesting areas, or other bird species. • **Overall Impact Rating: LOW**
Terrestrial Vegetation and Wetlands	How does the design alternative impact vegetation communities and wetlands?	• No Impact	• Largest vegetative impact footprint due to offset road alignment. • Loss of roadside meadow, marsh (wetland) and treed communities. • Temporary impacts due to staging and earthworks during construction. • **Overall Impact Rating: HIGH**	• Loss of roadside meadow (lower quality vegetation) due to embankment grading • Limited permanent wetland loss due to proposed retaining wall but impacts unavoidable during construction. • **Overall Impact Rating: MED**	• Loss of roadside meadow (lower quality vegetation) and hedgerow due to embankment grading. • **Overall Impact Rating: LOW**	• Potential loss of roadside meadow (lower quality vegetation) and hedgerow due to embankment grading • **Overall Impact Rating: LOW**

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SCHEIFELE BRIDGE CLASS ENVIRONMENTAL ASSESSMENT
Preliminary Alternative Alignment Design Concepts Evaluation Matrix

Species at Risk (SAR) and Other Habitat	How does the design alternative impact on observed, and/or, potential Species at Risk (SAR) habitat?	• No Impact	• Appears to avoid impact on Butternut Tree • Eastern Meadowlark and Bobolink: No defined impact although a potential for sensory disturbance • SAR Bats: No defined impact although a potential for sensory disturbance • Silver Shiner, Black Redhorse and Wavy-rayed Lamp Mussel: Potential increases in silt and sediment may impact noted SAR habitat areas (not confirmed) • Barn Swallow: Exiting bridge provides suitable nesting habitat. • **Overall Impact Rating: HIGH**	• Avoids impact on Butternut Tree • Eastern Meadowlark and Bobolink: No defined impact although a potential for sensory disturbance • SAR Bats: No defined impact although a potential for sensory disturbance • Silver Shiner, Black Redhorse and Wavy-rayed Lamp Mussel: Potential increases in silt and sediment may impact noted SAR habitat areas (not confirmed) • Barn Swallow: Exiting bridge provides suitable nesting habitat. • **Overall Impact Rating: MED**	• Avoids impact on Butternut Tree • Eastern Meadowlark and Bobolink: Small loss of habitat due to grading on downstream side • SAR Bats: No defined impact although a potential for sensory disturbance • Silver Shiner, Black Redhorse and Wavy-rayed Lamp Mussel: Potential increases in silt and sediment may impact noted SAR habitat areas (not confirmed) • Barn Swallow: Exiting bridge provides suitable nesting habitat. • **Overall Impact Rating: MED**	• Avoids impact on Butternut Tree • Eastern Meadowlark and Bobolink: No defined impact although a potential for sensory disturbance • SAR Bats: No defined impact although a potential for sensory disturbance • Silver Shiner, Black Redhorse and Wavy-rayed Lamp Mussel: Potential increases in silt and sediment may impact noted SAR habitat areas (not confirmed) • Barn Swallow: Exiting bridge provides suitable nesting habitat. • **Overall Impact Rating: LOW**
Archaeological	How does the design alternative impact Potential Archaeological resources, as observed in the Stage 1 study?	• No Impact	• Alignment crosses a portion of the zone of archaeological potential on the west side. • A Stage 2 Assessment will be required, along with a potential Marine Review. • **Overall Impact Rating: MED**	• Alignment crosses a small portion of the zone of archaeological potential on the west edge of Northfield Drive. • A Stage 2 Assessment will be required, along with a potential Marine Review. • **Overall Impact Rating: LOW**	• Alignment crosses a larger portion of the zone of archaeological potential on the east side. • A Stage 2 Assessment will be required, along with a potential Marine Review. • **Overall Impact Rating: HIGH**	• Alignment may crosse a shallow portion of the zones of archaeological potential on the east and west sides of Northfield Drive arising from widening of roadway. • A Stage 2 Assessment may be required, along with a potential Marine Review, depending on selection of preferred bridge cross section. • **Overall Impact Rating: LOW**
3) CULTURAL AND SOCIAL ENVIRONMENTS						
Cultural Heritage	How does the design alternative impact on the Cultural Heritage Landscape (CHL) in the study area?	• No Impact	• Alignment avoids impacting remnant county road and bridge abutments (Circa 1861 and early 1900's) which are deemed CHL Candidates, located on the west side of the site. • Existing Scheifele Bridge has no Cultural Heritage Value or Interest (CHVI) and has a low rating under the Ontario Heritage Bridge Guidelines. • **Overall Impact Rating: LOW**	• Alignment avoids impacting remnant county road and bridge abutments (Circa 1861 and early 1900's) which are deemed CHL Candidates, located on the west side of the site. • Existing Scheifele Bridge has no Cultural Heritage Value or Interest (CHVI) and has a low rating under the Ontario Heritage Bridge Guidelines. • **Overall Impact Rating: LOW**	• Alignment avoids impacting remnant county road and bridge abutments (Circa 1861 and early 1900's) which are deemed CHL Candidates, located on the west side of the site. • Existing Scheifele Bridge has no Cultural Heritage Value or Interest (CHVI) and has a low rating under the Ontario Heritage Bridge Guidelines. • **Overall Impact Rating: LOW**	• Alignment avoids impacting remnant county road and bridge abutments (Circa 1861 and early 1900's) which are deemed CHL Candidates, located on the west side of the site. • Existing Scheifele Bridge has no Cultural Heritage Value or Interest (CHVI) and has a low rating under the Ontario Heritage Bridge Guidelines. • **Overall Impact Rating: LOW**
Property Acquisitions and Landscape Opportunities	How does the design alternative affect abutting properties? How does the design alternative provide for enhanced landscape or streetscape opportunities?	• No Change	• Property acquisition required on NW quadrant: 5,030 m2. • There are various opportunities for enhanced landscape improvements under this design alternative. • **Overall Impact Rating: MED**	• Property acquisition required on NW quadrant: 2,250 m2. • There are limited opportunities for enhanced landscape improvements under this design alternative. • **Overall Impact Rating: LOW**	• Property acquisition required on NE quadrant: 5,730 m2. • Property acquisition required on SE quadrant: 6,500 m2. • There are limited opportunities for enhanced landscape improvements under this design alternative. • **Overall Impact Rating: HIGH**	• Property acquisition will depend on proposed bridge cross section. With wider bridge option, property acquisition requirements will be approximately 4,650 m2. • There are limited opportunities for enhanced landscape improvements under this design alternative. • **Overall Impact Rating: LOW**
4) TECHNICAL DESIGN DETAILS						

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SCHEIFELE BRIDGE CLASS ENVIRONMENTAL ASSESSMENT
Preliminary Alternative Alignment Design Concepts Evaluation Matrix

Winter Operations	How does the design alternative affect winter snow-clearing operations?	• No change.	• The addition of paved shoulders on all Bridge Design Cross Sections adds to the road width, and hence added winter plowing requirements. • The width of bridge required to be cleared of snow increases from Alternative Bridge Design Cross Section 1 through 4, with alternative 4 having the greatest amount of snow clearing. • With all Bridge Design Cross Sections, the addition of barrier walls between the road and the walkway / MUT will require separate passes of walkway plows to clear snow on these pedestrian/cycle facilities. • The new Road alignment has no appreciable impact on snow clearing requirements.	• The addition of paved shoulders on all Bridge Design Cross Sections adds to the road width, and hence added winter plowing requirements. • The width of bridge required to be cleared of snow increases from Alternative Bridge Design Cross Section 1 through 4, with alternative 4 having the greatest amount of snow clearing. • With all Bridge Design Cross Sections, the addition of barrier walls between the road and the walkway / MUT will require separate passes of walkway plows to clear snow on these pedestrian/cycle facilities. • The new Road alignment has no appreciable impact on snow clearing requirements.	• The addition of paved shoulders on all Bridge Design Cross Sections adds to the road width, and hence added winter plowing requirements. • The width of bridge required to be cleared of snow increases from Alternative Bridge Design Cross Section 1 through 4, with alternative 4 having the greatest amount of snow clearing. • With all Bridge Design Cross Sections, the addition of barrier walls between the road and the walkway / MUT will require separate passes of walkway plows to clear snow on these pedestrian/cycle facilities. • The new Road alignment has no appreciable impact on snow clearing requirements.	• The addition of paved shoulders on all Bridge Design Cross Sections adds to the road width, and hence added winter plowing requirements. • The width of bridge required to be cleared of snow increases from Alternative Bridge Design Cross Section 1 through 4, with alternative 4 having the greatest amount of snow clearing. • With all Bridge Design Cross Sections, the addition of barrier walls between the road and the walkway / MUT will require separate passes of walkway plows to clear snow on these pedestrian/cycle facilities. • The new Road alignment has no appreciable impact on snow clearing requirements.
Municipal Services and Utilities	What is the extent of impacts on existing/proposed municipal services and/or utilities for the alternative?	• No impacts	• Existing Bell Ducts are currently hanging on the west side of the bridge, which needs relocation. • The new bridge design must accommodate a proposed Region trunk watermain in lieu of placement under the river. • No noted additional service requirements.	• Existing Bell Ducts are currently hanging on the west side of the bridge, which needs relocation. • The new bridge design must accommodate a proposed Region trunk watermain in lieu of placement under the river. • No noted additional service requirements.	• Existing Bell Ducts are currently hanging on the west side of the bridge, which needs relocation. • The new bridge design must accommodate a proposed Region trunk watermain in lieu of placement under the river. • Existing Waterloo North Hydro Overhead Powerline will need to be relocated. • No noted additional service requirements.	• Existing Bell Ducts are currently hanging on the west side of the bridge, which needs relocation. • The new bridge design must accommodate a proposed Region trunk watermain in lieu of placement under the river. • No noted additional service requirements.
Estimated Construction cost	Preliminary Construction Estimate: - Construction Base Cost (including property) - Engineering (24%) - Contingencies (12%) • TOTAL ESTIMATE	• Total Preliminary Estimated Construction Cost: $ N/A	• Total Preliminary Estimated Construction Cost: $18,200,000 $4,500,000 $2,200,000 **$24,900,000**	• Total Preliminary Estimated Construction Cost: $19,100,000 $4,500,000 $2,300,000 **$25,900,000**	• Total Preliminary Estimated Construction Cost: $17,500,000 $4,200,000 $2,100,000 **$23,800,000**	• Total Preliminary Estimated Construction Cost: $15,300,000 $3,700,000 $1,900,000 **$20,900,000**
Overall Ranking of Alternative Design Concepts	● ⟶ ○ PREFERRED	**NOT APPLICABLE**	**TBC AFTER PCC#1**	**TBC AFTER PCC#1**	**TBC AFTER PCC#1**	**TBC AFTER PCC#1**

Stantec Document Classification: Limited Access

Region of Waterloo

SCHEIFELE BRIDGE REPLACEMENT

Northfield Drive (Regional Road 22)
Township of Woolwich

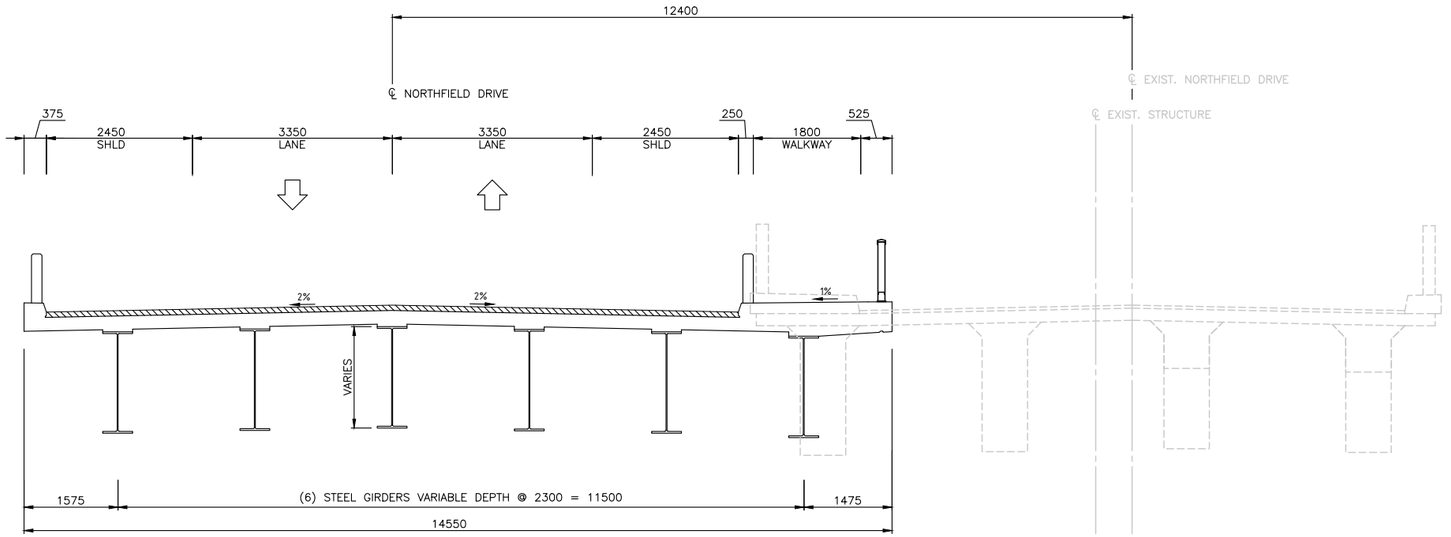
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT STUDY

APPENDIX G: Recommended Design Concepts: Northfield Drive and Scheifele Bridge

Stantec

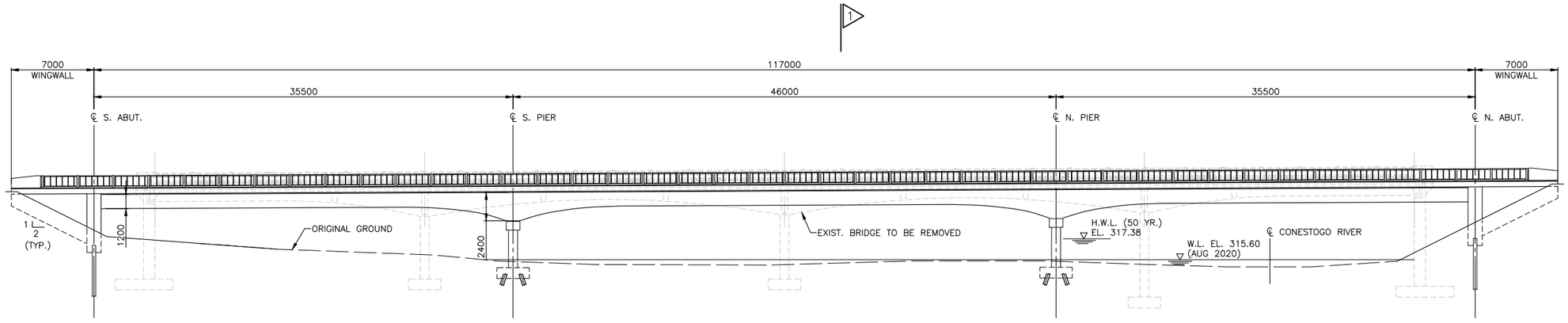
WEST

EAST



1 CROSS–SECTION: MODIFIED

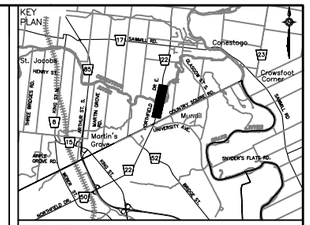
1 : 50



EAST ELEVATION

1 : 200

KEY PLAN



DISCLAIMER:
THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS, AND OTHER UNDERGROUND AND ABOVE GROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

NOTES:

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No.	Description	Int	Date
No.	ISSUE/REVISION	BY	DATE

SCHEIFELE BRIDGE REPLACEMENT
CLASS ENVIRONMENTAL ASSESSMENT

TOWNSHIP OF WOOLWICH

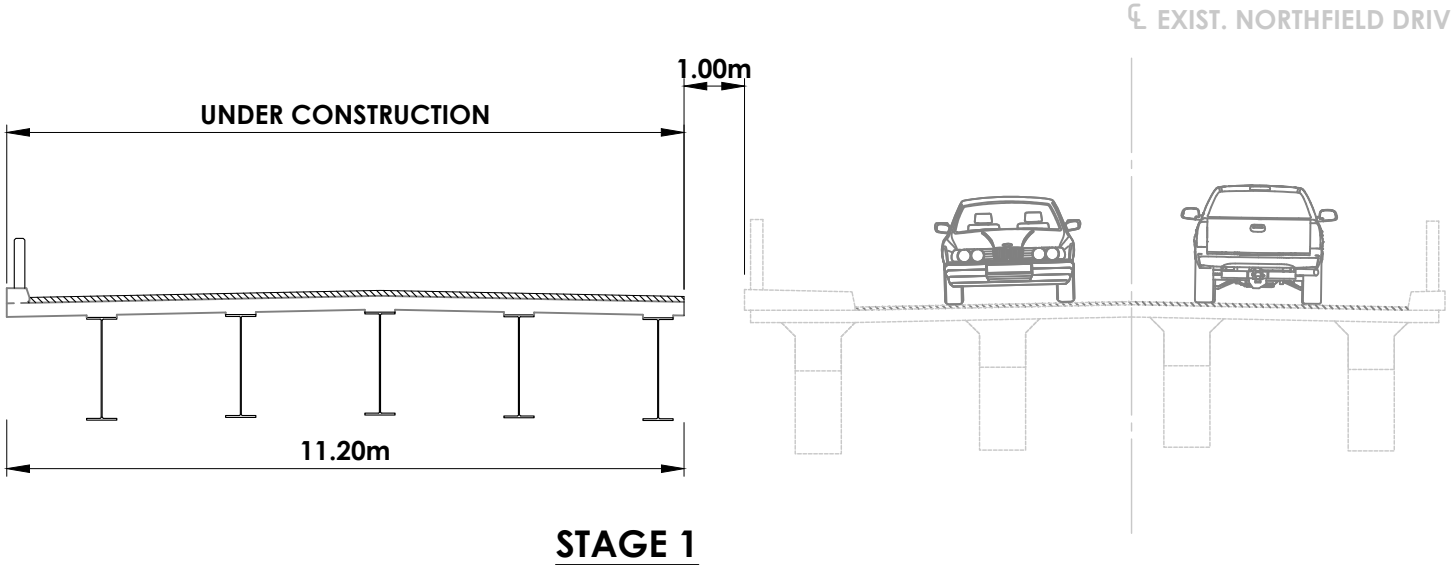
RECOMMENDED BRIDGE DESIGN
CONCEPT 3 (MODIFIED)
3 SPAN HAUNCHED STEEL PLATE
GIRDER STRUCTURE

DRAWN BY: H.L.	CONTRACT No. N/A
CHECKED BY: A.F.	FILE No. 1650-10600
DATE: 2022-02-16	DRAWING No. .
SCALE NTS	SHEET ___ . OF ___ .
CADD FILE/LAYOUT: 165010600_BRIDGE_SKETCHES	ISSUE/REVISION: 0

V:\01650\active\165010600\10_drawings\10.3_models_files\preliminary\165010600_bridge_sketches.dwg Layout: OPTS_3SPAN_STL_HAUNCHED (M00)
2023/09/14 by: White, Bill

WEST

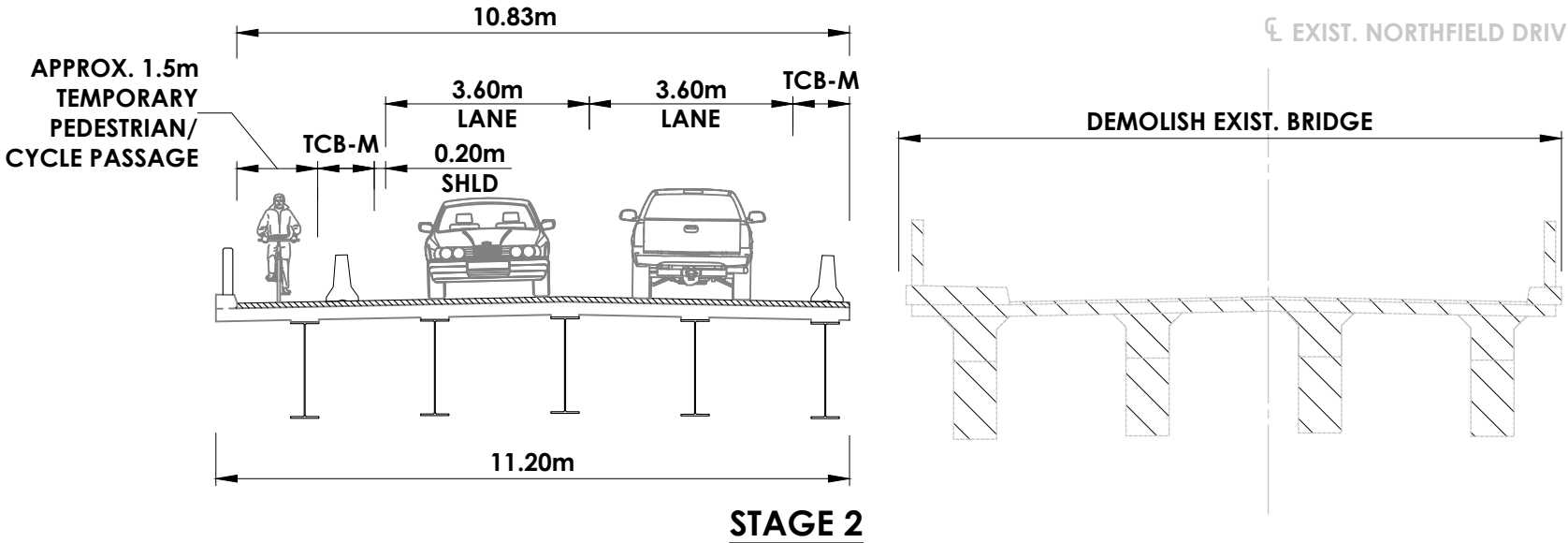
EAST



STAGE 1

WEST

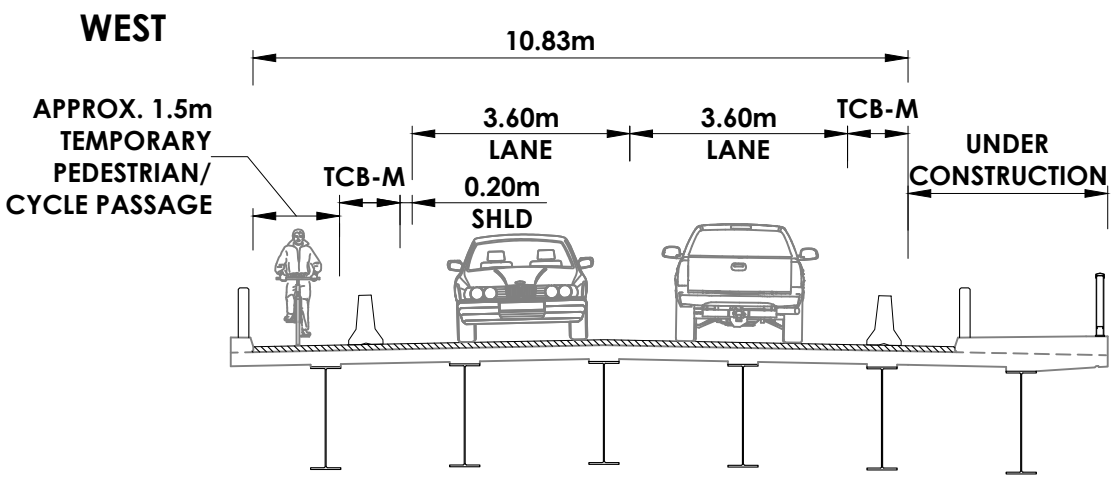
EAST



STAGE 2

WEST

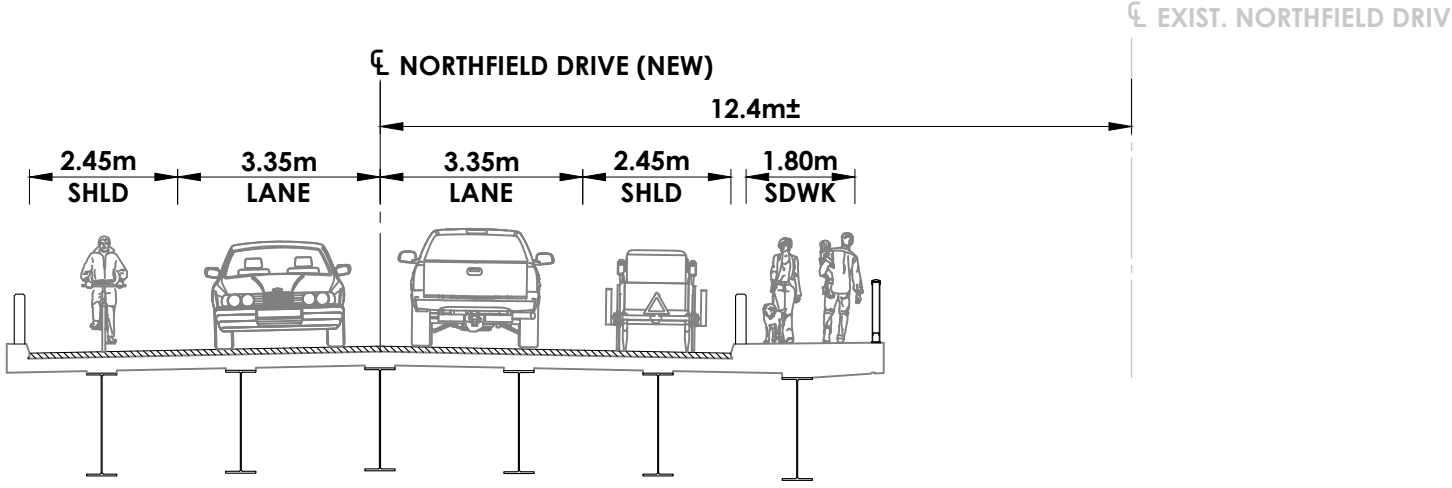
EAST



STAGE 3

WEST

EAST



STAGE 4

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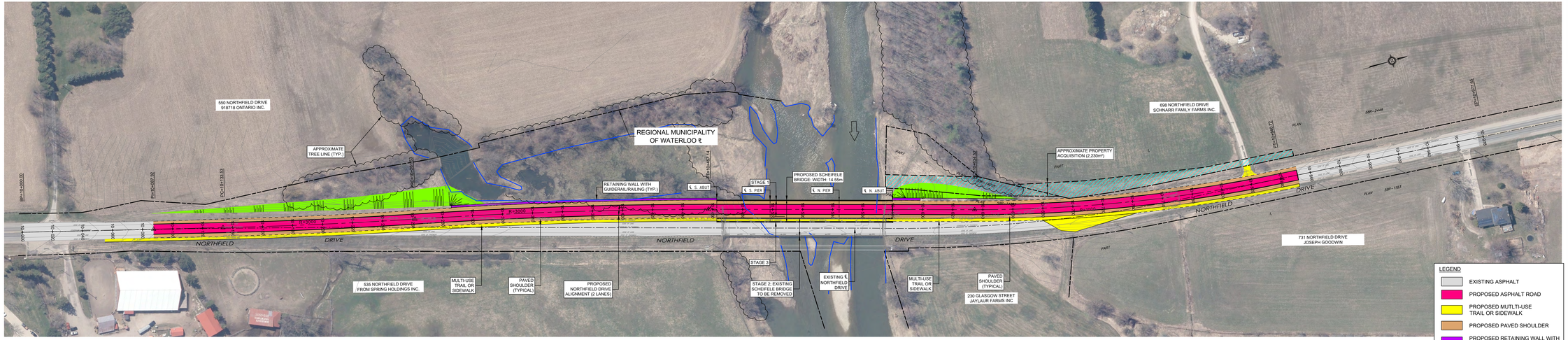
CONSTRUCTION STAGING (MODIFIED)

SCHEIFELE BRIDGE
(SITE No. 2201)

Scale: 1 : 125



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Region of Waterloo

SCHEIFELE BRIDGE RECONSTRUCTION:
CLASS ENVIRONMENTAL ASSESSMENT STUDY
NORTHFIELD DRIVE
TOWNSHIP OF WOOLWICH

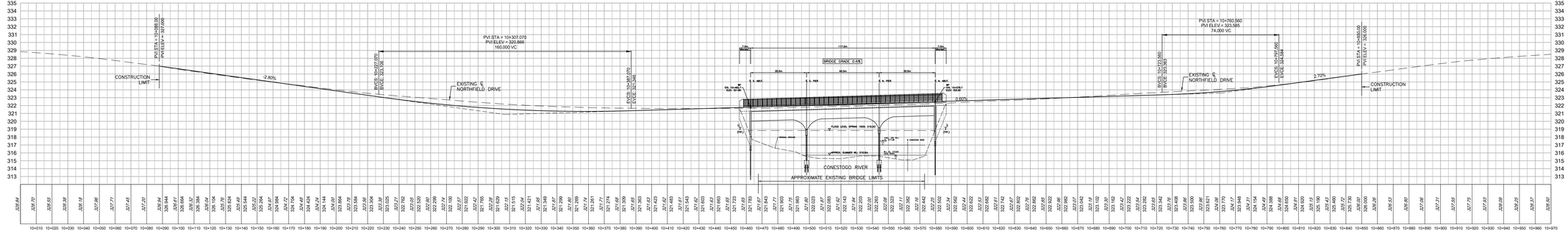
ROAD AND BRIDGE RECONSTRUCTION
Recommended Preferred Road
Design Concept 2 Modified

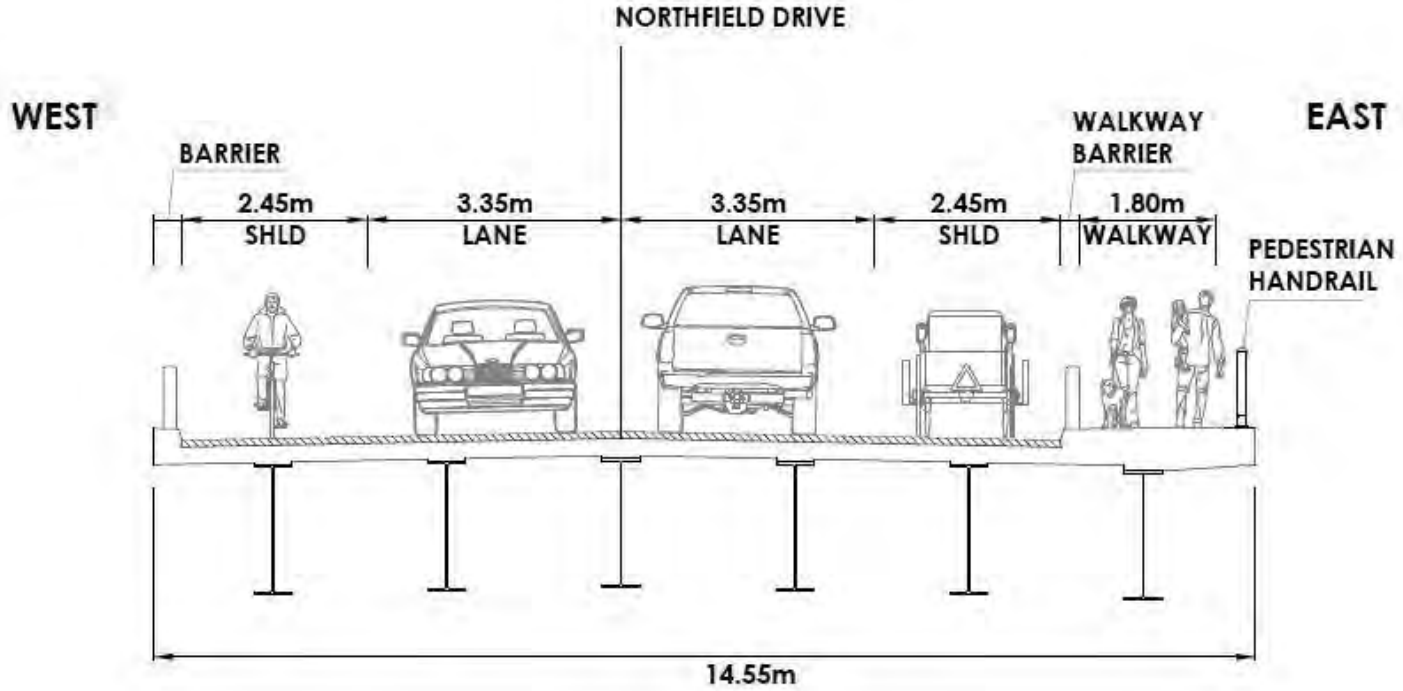
RECOMMENDED BRIDGE
CONCEPT 5 MODIFIED
WEST SIDE OF NORTHFIELD DRIVE

PARTIAL OFFSET ALIGNMENT:
- STAGED CONSTRUCTION
- UNINTERRUPTED TRAFFIC

SCALE
METRES

DESIGN | DRAWN | CHECKED | DATE | ISSUED | PROJECT NO. | SHEET NO.


PVI STA = 10+068.00
PVI ELEV = 327.000
CONSTRUCTION LIMIT
-7.80%
BVCTL 10+227.070
BVCE 323.106
PVI STA = 10+307.070
PVI ELEV = 320.866
160.000 VC
EXISTING ℄ NORTHFIELD DRIVE
EVCTR 10+387.070
EVCE 322.906
1.0m
117.0m
1.0m
BRIDGE GRADE 0.6%
30.5m
45.0m
30.5m
E. N. ABUT.
E. S. PIER
E. N. PIER
E. S. ABUT.
PL 10.0m
SDC 321.50
SDC 321.50
PL 10.0m
0.60%
2
(HA)
2
(HA)
FLOOD LEVEL SPRING 1850: 319.20
SPRING 1850
1.5m RC SLAB
1.5m RC SLAB
1.5MASS RIP
APPROX. SUMMER WL: 315.8m
CONESTOGO RIVER
APPROXIMATE EXISTING BRIDGE LIMITS
PVI STA = 11+760.560
PVI ELEV = 323.585
74.000 VC
EVCTR 10+797.560
EVCE 324.048
BVCTL 10+723.560
BVCE 323.363
EXISTING ℄ NORTHFIELD DRIVE
2.70%
PVI STA = 11+845.00
PVI ELEV = 325.600
CONSTRUCTION LIMIT
335 334 333 332 331 330 329 328 327 326 325 324 323 322 321 320 319 318 317 316 315 314 313
328.44 328.70 328.65 328.38 328.18 327.86 327.71 327.45 327.20 326.84 326.841 326.644 326.32 326.394 326.04 325.704 325.824 325.49 325.344 325.22 325.264 324.87 324.984 324.772 324.754 324.48 324.424 324.114 324.144 324.00 323.864 323.706 323.58 323.56 323.504 323.36 323.305 323.21 322.710 322.55 322.555 322.50 322.560 322.74 322.709 322.57 321.922 321.62 321.786 321.39 321.629 321.15 321.515 321.14 321.421 321.05 321.349 321.01 321.299 320.91 320.961 320.80 320.961 320.69 320.965 320.62 321.483 321.41 321.543 321.43 321.662 321.65 321.693 321.73 321.65 321.80 322.023 322.08 322.085 321.92 321.843 321.71 321.903 321.85 321.683 321.80 322.020 322.08 322.085 321.92 322.002 322.03 322.093 322.14 322.092 322.14 322.022 322.03 322.052 322.01 322.142 322.07 322.002 322.01 322.044 322.00 322.082 322.05 322.086 322.08 322.017 322.04 321.916 321.92 321.742 321.77 321.642 321.67 321.602 321.64 321.582 321.58 321.542 321.52 321.502 321.49 321.462 321.43 321.422 321.38 321.382 321.34 321.342 321.30 321.302 321.26 321.262 321.22 321.222 321.18 321.182 321.14 321.142 321.10 321.102 321.06 321.062 321.02 321.042 321.00 320.992 320.96 320.952 320.92 320.912 320.88 320.872 320.84 320.832 320.80 320.792 320.76 320.752 320.72 320.712 320.68 320.672 320.64 320.632 320.60 320.592 320.56 320.552 320.52 320.512 320.48 320.472 320.44 320.432 320.40 320.392 320.36 320.352 320.32 320.312 320.28 320.272 320.24 320.232



CROSS-SECTION ALTERNATIVE 5 MODIFIED

SCHEIFELE BRIDGE: WALKWAY ONE SIDE
(SITE No. 2201)

Scale: 1 : 100

Region of Waterloo

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