SCOPED HERITAGE IMPACT ASSESSMENT
SEWELL'S BRIDGE, MILNE BAILEY BRIDGE, STOTT'S BRIDGE, MAXWELL'S BRIDGE, HILLSIDE BRIDGE

ROUGE PARK BRIDGES TRANSPORTATION MASTER PLAN
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

FORMER TOWNSHIP OF SCARBOROUGH, YORK COUNTY
CITY OF TORONTO, ONTARIO

FINAL REPORT

Prepared for:

Dillon Consulting Limited
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London, ON N6A 5R2

ASI File: 19CH-105

December 2020 (Revised March 2021, January and December 2023, and January and October 2024)

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EXECUTIVE SUMMARY

ASI was contracted by Dillon Consulting Limited, on behalf of the City of Toronto, to conduct a Scoped Heritage Impact Assessment (HIA) of five bridges as part of the Rouge Park Bridges Transportation Master Plan Municipal Class Environmental Assessment. A draft report prepared in December 2020 provided the preliminary impact assessment that was used to provide context for the evaluation of project alternatives. Following the selection of the preferred recommended alternative in June 2022, this report was updated to include a high-level assessment of the potential impacts of the preferred alternatives on the identified heritage attribute(s) of the subject bridges. The five bridges include: Sewell's Bridge, which is located over the Rouge River on Sewells Road; the Milne Bailey Bridge, which is located over the Rouge River on Old Finch Avenue; Stott's Bridge, which is located over the Rouge River on Twyn Rivers Drive; Maxwell's Bridge, which is located over the Little Rouge Creek on Twyn Rivers Drive; and Hillside Bridge, which is located over the Little Rouge Creek on Meadowvale Road. All five bridges are municipally owned and are located in the Rouge National Urban Park (RNUP) in the City of Toronto.

A Cultural Heritage Resource Assessment (CHRA) was previously completed and is a separate, stand-alone report (ASI, 2020). The CHRA outlined that five bridges were anticipated to be impacted as part of the project works, four of which are designated under Part IV of the *Ontario Heritage* Act, including Sewell's Bridge, Stott's Bridge, Maxwell's Bridge, and Hillside Bridge:

- Sewell's Bridge (Structure ID 812) is one of only a few suspension bridges on a public road in Ontario. It was designed by Frank Barber and built in 1912. The bridge carries a single lane of predominantly vehicular traffic over the Rouge River on Sewells Road.
- Stott's Bridge (Structure ID 803) is a Warren pony truss bridge constructed in 1915. The bridge carries a single lane of predominantly vehicular traffic over the Rouge River on Twyn Rivers Drive.
- Maxwell's Bridge (Structure ID 802) is a reinforced concrete, bowstring arch bridge constructed in 1927. The bridge carries two lanes of predominantly vehicular traffic over the Little Rouge Creek on Twyn Rivers Drive.
- Hillside Bridge (Structure ID 806) is a Warren pony truss bridge constructed in 1917. The bridge carries a single lane of predominantly vehicular traffic over the Little Rouge Creek on Meadowvale Road.

Given that each of these four bridges meets Ontario Regulation 9/06 of the *Ontario Heritage Act*, the associated by-laws, including the *Reasons for the Designation*, are included as appendices in this report.

The CHRA further outlined that one bridge, the Milne Bailey Bridge (Structure ID 813), had already been listed on the City of Toronto Heritage Register and has potential to retain historical and design value. An evaluation of this bridge against criteria outlined in Ontario Regulation 9/06 is provided below to identify any formal cultural heritage value or interest or attributes associated with this potential cultural heritage resource.

The evaluation of potential impacts on the subject bridges in the draft preliminary HIA prepared in 2020 recommended that each of the five bridges be rehabilitated and retained in place, if feasible. The best strategy from a cultural heritage perspective is continual maintenance, rehabilitation, and conservation. This recommendation was reviewed and considered by the project team when developing the preferred alternative for each bridge site. At the time of this updated report (2023), the preferred alternative for each bridge site includes: retention of Sewell's Bridge (Structure ID 812) and Maxwell's Bridge (Structure ID 802), and the removal and replacement of the Milne Bailey Bridge (Structure ID 813), Stott's Bridge (Structure ID 803), and Hillside Bridge (Structure ID 806).

As the Transportation Master Plan has only recommended the preferred alternative for each bridge, and only conceptual design work has been completed, this report is scoped to evaluate potential impacts in a broad sense related only to either the rehabilitation or replacement of the bridges. As each of the subject bridges are identified as built heritage resources by the City of Toronto, and there are direct impacts anticipated to each in the recommended alternatives, a resource-specific HIA will be required to assess the specific impacts to each structure and provide specific mitigation measures for each. These HIAs should be prepared by a qualified heritage consultant with recent and relevant experience with heritage bridges according to the *City of Toronto's Terms of Reference for Heritage Impact Assessments* (City of Toronto, 2019) as early as possible in preliminary or detailed design. These HIAs should be submitted for review and comment to the Ministry of Citizenship and Multiculturalism and Heritage Planning at the City of Toronto. The resource specific HIAs will include an updated Ontario Regulation 9/06 evaluation for each structure designated before 2005.

Recommendations for Sewell's Bridge (Structure ID 812)

Given the identified cultural heritage value of Sewell's Bridge (Structure ID 812) and the preferred alternative including the retention of the suspension bridge with sympathetic maintenance repairs, the following recommendations and mitigation measures should be considered and implemented:

1. Where feasible, the preferred alternative should be selected to ensure the fewest direct and permanent impacts to the identified heritage attributes of the subject bridge. In this respect, the preferred alternative including the retention of Sewell's Bridge (Structure ID 812) is the preferred conservation option from a cultural heritage perspective. Retention with sympathetic

maintenance repairs with allowances made for inclusion of modern materials to meet current design and safety codes is the preferred option from a heritage perspective as it would retain the heritage attributes of the bridge and retain the historical and contextual value of the subject crossing.

2. Sympathetic maintenance repairs would require the replacement of deteriorated structural members and would be considered a direct, permanent, and irreversible impact. While considered to be direct impacts, these interventions are positive from the cultural heritage perspective as they would enable the retention of the suspension bridge and continue its historical function at the subject crossing.

3. Sympathetic maintenance repairs should be planned to limit the visual impacts of the modifications, where feasible, based on technical constraints. In order to reduce the visual impacts of the proposed truss hanger and concrete repairs, consideration should be given to using materials, colours, and finishes that will make the repairs physically and visually compatible with, subordinate to, and distinguishable from the subject bridge.

4. To mitigate any unanticipated indirect impacts to the subject bridge as a result of sympathetic maintenance repairs, activities should be suitably planned and executed to ensure all heritage attributes are avoided and protected. Suitable staging activities may include temporary barriers and the establishment of no-go zones throughout repairs. On-site workers should be notified of the cultural heritage significance of the subject bridge in general and the character-defining elements in advance of the starting of construction. Plans for construction and staging activities may be finalized in consultation with a qualified heritage professional, and any changes to the proposed work should undergo review for potential impacts to the subject bridge.

5. The proposed sympathetic maintenance repairs should be carried forward with an emphasis on decreasing the physical and visual impacts of the intervention where practicable. The detailed design and implementation of sympathetic maintenance repairs at Sewell's Bridge should be guided by a qualified person(s), such as a heritage engineer, architect, or conservator with recent and relevant experience in the conservation of cultural heritage resources. Qualified persons should have specialized knowledge and experience with road bridges and should be a member in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice.

6. As the subject bridge is anticipated to be directly impacted in the preferred alternative, a Strategic Conservation Plan (SCP) should be completed for this structure. This SCP should be completed by a qualified cultural heritage professional, with individual expertise, recent experience, and knowledge relevant to road bridges and the nature of the activity being proposed, such as a heritage engineer, architect, or conservator. Membership in good standing with the Canadian

Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice is considered to be an asset. The SCP should be completed as early in Detailed Design as possible and submitted to the Ministry of Citizenship and Multiculturalism, (MCM) and other applicable stakeholders to review prior to finalization.

7. Consideration should be given to a commemorative strategy, such as developing a plaque in the location of the bridge. In this respect, an interpretive historical plaque/commemoration could be prepared including historical information and images of Sewell's Bridge. Heritage Planning at the City of Toronto and heritage staff with Parks Canada should be consulted for input regarding this commemoration.

Recommendations for Maxwell's Bridge (Structure ID 802)

Given the identified cultural heritage value of Maxwell's Bridge (Structure ID 802) and the preferred alternative including the retention of the concrete bowstring arch bridge with sympathetic maintenance repairs, the following recommendations and mitigation measures should be considered and implemented:

8. Where feasible, the preferred alternative should be selected to ensure the fewest direct and permanent impacts to the identified heritage attributes of the subject bridge. In this respect, the preferred alternative including the retention of Maxwell's Bridge (Structure ID 802) is the preferred conservation option from a cultural heritage perspective. Retention and sympathetic maintenance repairs with allowances made for inclusion of modern materials to meet current design and safety codes is the preferred option from a heritage perspective as it would retain the heritage attributes of the bridge and retain the historical and contextual value of the subject crossing.

9. Sympathetic maintenance repairs would require the replacement of deteriorated structural members and would be considered a direct, permanent and irreversible impact. While considered to be direct impacts, these interventions are positive from the cultural heritage perspective as they would enable the retention of the concrete arch bridge and continue its historical function at the subject crossing.

10. The sympathetic maintenance repairs should be planned to limit the visual impacts of the modifications, where feasible, based on technical constraints. In order to reduce the visual impacts of the proposed concrete repairs, consideration should be given to using materials, colours, and finishes that will make the rehabilitations physically and visually compatible with, subordinate to, and distinguishable from the subject bridge.

11. To mitigate any unanticipated indirect impacts to the subject bridge, sympathetic maintenance repairs should be suitably planned and executed to ensure all heritage attributes are avoided and

protected. Suitable staging activities may include temporary barriers and the establishment of no-go zones throughout repairs. On-site workers should be notified of the cultural heritage significance of the subject bridge in general and the character-defining elements in advance of the starting of construction. Plans for construction and staging activities may be finalized in consultation with a qualified heritage professional, and any changes to the proposed work should undergo review for potential impacts to the subject bridge.

12. The proposed sympathetic maintenance repairs should be carried forward with an emphasis on decreasing the physical and visual impacts of the intervention where practicable. The detailed design and implementation of sympathetic maintenance repairs at Maxwell's Bridge should be guided by a qualified person(s), such as a heritage engineer, architect, or conservator with recent and relevant experience in the conservation of cultural heritage resources. Qualified persons should have specialized knowledge and experience with road bridges and should be a member in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice.

13. As the subject bridge is anticipated to be directly impacted in the preferred alternative, a Strategic Conservation Plan (SCP) should be completed for this structure. This SCP should be completed by a qualified cultural heritage professional, with individual expertise, recent experience, and knowledge relevant to road bridges and the nature of the activity being proposed, such as a heritage engineer, architect, or conservator. Membership in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice is considered to be an asset. The SCP should be completed as early in Detailed Design as possible and submitted to the Ministry of Citizenship and Multiculturalism (MCM) and other applicable stakeholders to review prior to finalization.

14. Consideration should be given to a commemorative strategy, such as developing a plaque in the location of the bridge. In this respect, an interpretive historical plaque/commemoration could be prepared including historical information and images of Maxwell's Bridge. Heritage Planning at the City of Toronto and heritage staff with Parks Canada should be consulted for input regarding this commemoration.

Recommendations for Milne Bailey Bridge (Structure ID 813)

Given the identified cultural heritage value of the Milne Bailey Bridge (Structure ID 813) and the preferred alternative including the removal of the subject bridge and replacement with a new modular steel truss panel bridge at the crossings, the following recommendations and mitigation measures should be considered and implemented:

15. Where feasible, the preferred alternative should be selected to ensure the fewest direct and permanent impacts to the identified heritage attributes of the subject bridges. In this respect, retention and rehabilitation of the Milne Bailey Bridge (Structure ID 813) is the preferred conservation option from a cultural heritage perspective. However, as rehabilitation and retention of this bridge was demonstrated to be infeasible, replacement with a sympathetically-designed replacement modular panel bridge should be carried forward for consideration.

16. Consideration should be given to replacing the bridge with a sympathetically-designed replacement structure that is compatible with the design qualities of the 1954 and 1988 Bailey bridges at the crossing. Where feasible, the replacement bridge should be sympathetically-designed to be compatible with the style and character of the subject bridge and setting, be based on physical and documentary evidence such as photographs and original structural drawings, and be mindful of the context, scale, massing, and material of the original. In this respect, the removal of the subject bridge and replacement with stylistically-similar modular panel replacement bridge should be carried forward as it would continue the historical and contextual associations of the crossing as a road bridge over the Rouge River in the City of Toronto.

17. As both the 1954 and the 1988 Bailey bridges were constructed in whole or in part by members of the Canadian Military Engineers, consideration should be given to engaging with Canadian Miliary Engineers in the proposed modular panel replacement structure to continue this historical connection to the crossing. In this respect, the City of Toronto should consider engaging with members of the Canadian Military Engineers to determine the feasibility of their participation in the removal of the existing bridge and the construction of the proposed replacement structure.

18. The new replacement bridge should be designed to ensure the continued visual experiences of users of the roads and be designed to permit views of the Rouge River and of the associated river valley. In this respect, the replacement bridge should limit the scale and height of the panels to the extent practicable while still meeting safety and design guidelines to ensure suitable visibility of the surroundings to motorists.

19. Consideration should be given to relocating the 1988 Milne Bailey Bridge (Structure ID 813) for adaptive re-use as a pedestrian or cycling bridge at another crossing. In this respect, a qualified structural engineer with recent and relevant experience in assessing Bailey bridges should be consulted to determine the feasibility of dismantling and relocating the structure. Further, the City of Toronto should be consulted to determine if there is a suitable location for the relocated bridges to be erected, or if appropriate storage facilities exist that could be used to house the structural elements until suitable locations for adaptive re-use are determined.

20. Should relocation for adaptive re-use or salvaging select structural elements for rehabilitating a similar bridge at another crossing be determined to be infeasible, consideration should be given

to salvaging structural steel elements or individual panels of the Bailey bridge for use in commemorative or interpretive displays. In this respect, the City of Toronto could investigate the feasibility of salvaging select structural elements for incorporation in a commemorative interpretation at the bridge site or in another appropriate location. Consultation should also be undertaken with Canadian Military Engineers to determine if salvaged panels or elements of this bridge could be retained and used in any interpretation or commemoration programs at the Royal Military College or any other Department of Defence site.

21. Prior to removal, full recording of the structure would ensure proper documentation for archival purposes and ensure suitable material is available for inclusion with a commemoration strategy. In this respect, a Heritage Documentation Report should be prepared by a qualified person(s), with recent and relevant experience in the conservation of cultural heritage resources. Qualified persons should have specialized knowledge and experience with road bridges and should be a member in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice.

22. Consideration should be given to a commemorative strategy, such as developing a plaque in the location of the bridge. In this respect, an interpretive historical plaque/commemoration could be prepared including historical information, images, and featuring salvaged heritage components from the subject bridge, where feasible. Select steel truss elements of the subject bridge could be retained and incorporated into this commemoration. Heritage Planning at the City of Toronto and Parks Canada should be consulted for input regarding this commemoration.

23. The existing heritage plaque on the southwest of the bridge has the potential to be impacted during construction. This commemorative feature should be removed prior to construction if impacts are anticipated and stored in a secure facility to prevent damage. This plaque should be re-installed at the crossing or at another suitable location, based on consultation with the City of Toronto, following construction.

Recommendations for Stott's Bridge (Structure ID 803) and Hillside Bridge (Structure ID 806)

Given the identified cultural heritage value of the Stott's Bridge (Structure ID 803) and Hillside Bridge (Structure ID 806) and the preferred alternative including the removal of the Warren pony truss bridges and replacement with new bridges at the crossings, the following recommendations and mitigation measures should be considered and implemented:

24. Where feasible, the preferred alternative should be selected to ensure the fewest direct and permanent impacts to the identified heritage attributes of the subject bridges. In this respect, retention and rehabilitation of Stott's Bridge (Structure ID 803) and Hillside Bridge (Structure ID 806) is the preferred conservation option from a cultural heritage perspective. However, as

rehabilitation and retention of these bridges was demonstrated to be infeasible, replacement with a sympathetically-designed replacement structure should be carried forward for consideration.

25. Consideration should be given to replacing the bridges with sympathetically-designed replacement structures that are compatible with the design qualities of the original Warren pony truss structures. Where feasible, the replacement bridges should be sympathetically-designed to be compatible with the style and character of the subject bridges and settings, be based on physical and documentary evidence such as photographs and original structural drawings, and be mindful of the context, scale, massing, and material of the originals. In this respect, the replacement structures should be a moderate complexity pony truss bridges, which are noted as an option in the Evaluation Tables in the Technical Memo (Dillon Consulting Limited, 2022a). The replacement of the 1915 Stott's Bridge and 1917 Hillside steel Warren pony truss structures with Warren pony truss structures with a slightly larger scales and massing to improve hydraulics and on the same alignments as the existing road bridges is considered to be sympathetic replacements and should be carried forward as a suitable means of reducing the impacts to the physical and design values of the crossings.

26. The new replacement bridges should be designed to ensure the continued visual experiences of users of the roads and be designed to permit views of the Rouge River, Little Rouge Creek, and of the associated river valleys. In this respect, the replacement bridges should limit the scale and height of the railings to the extent practicable while still meeting safety and design guidelines to ensure suitable visibility of the surroundings to motorists.

27. Consideration should be given to relocating Stott's Bridge (Structure ID 803) and Hillside Bridge (Structure ID 806) for adaptive re-use as pedestrian or cycling bridges at other crossings. In this respect, a qualified structural engineer with recent and relevant experience in assessing Warren pony truss road bridges should be consulted to determine the feasibility of dismantling and relocating the Warren pony truss structures. Further, the City of Toronto should be consulted to determine if there is a suitable location for the relocated bridges to be erected, or if appropriate storage facilities exist that could be used to house the structural elements until suitable locations for adaptive re-use are determined.

28. Should relocating the structures be determined to be infeasible based on an evaluation of the structural condition of steel elements, salvaged elements of the superstructure should be retained for inclusion in future conservation work, or for commemorative displays, where feasible. In this respect, an engineer with recent and relevant experience in the field of heritage bridge conservation should determine the feasibility of salvage and reuse of these elements.

29. Prior to removal, full recording of the structures would ensure proper documentation for archival purposes and ensure suitable material is available for inclusion with a commemoration strategy. In this respect, a Heritage Documentation Report should be prepared by a qualified person(s), with recent and relevant experience in the conservation of cultural heritage resources. Qualified persons should have specialized knowledge and experience with road bridges and should be a member in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice.

30. Consideration should be given to a commemorative strategy, such as developing a plaque in the location of the bridges. In this respect, an interpretive historical plaque/commemoration could be prepared including historical information, images, and featuring salvaged heritage components from the subject bridges, where feasible. Select steel truss elements of the subject bridges could be retained and incorporated into this commemoration. Heritage Planning at the City of Toronto and Parks Canada should be consulted for input regarding this commemoration.

General Recommendations for the Rouge Park Bridges Transportation Master Plan

31. As each of the subject bridges are identified as built heritage resources by the City of Toronto, and there are direct impacts anticipated, a resource-specific HIA is required to assess the specific impacts to heritage attributes of each bridge in the proposed intervention and provide specific mitigation measures to eliminate or reduce these impacts to the extent feasible. These HIAs should be prepared by a qualified heritage consultant with recent and relevant experience assessing heritage road bridges in accordance with the *City of Toronto's Terms of Reference for Heritage Impact Assessments* (City of Toronto, 2019) as early as possible in preliminary or detailed design. These HIAs should be submitted for review and comment to the Ministry of Citizenship and Multiculturalism and Heritage Planning at the City of Toronto.

32. As Sewell's Bridge (Structure ID 812), Maxwell's Bridge (Structure ID 802), Stott's Bridge (Structure ID 803), and Hillside Bridge (Structure ID 806) are designated under Part IV of the *Ontario Heritage Act*, any alterations to, and removal of, heritage attributes of the heritage bridges will require City Council approval and a report to the Toronto Preservation Board. The demolition (including relocation) of a heritage bridge will require City Council approval and a report to the Toronto Preservation Board (Heritage Planning, City of Toronto Memorandum, 2 February 2022).

33. Post-construction rehabilitation and landscaping should be conducted at all bridge sites to ensure that their relationship to the scenic roadways in the Rouge Park and the forested, riverine context of the crossings are maintained. In this respect, post-construction rehabilitation should include planting with sympathetic species where any tree or vegetation removals are required.

34. This Scoped HIA should be submitted for review and comment to Heritage Planning at the City of Toronto, to the Ministry of Citizenship and Multiculturalism, heritage staff at Parks Canada, and any other relevant heritage stakeholder with an interest in this project. Upon completion, the final HIA should be submitted to the City of Toronto and other applicable stakeholders for archival purposes.

PROJECT PERSONNEL

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1.0 INTRODUCTION

ASI was contracted by Dillon Consulting Limited, on behalf of the City of Toronto, to conduct a Heritage Impact Assessment (HIA) of five bridges as part of the Rouge Park Bridges Transportation Master Plan Municipal Class Environmental Assessment. A draft report prepared in December 2020 provided the preliminary impact assessment that was to be used to provide context for the evaluation of project alternatives. Following the selection of the preferred alternative in June 2022, this report was updated to assess the specific impacts of the preferred alternative on the identified heritage attribute(s) of the subject bridges. The five bridges include: Sewell's Bridge, which is located over the Rouge River on Sewells Road; the Milne Bailey Bridge, which is located over the Rouge River on Old Finch Avenue; Stott's Bridge, which is located over the Rouge River on Twyn Rivers Drive; Maxwell's Bridge, which is located over the Little Rouge Creek on Twyn Rivers Drive; and Hillside Bridge, which is located over the Little Rouge Creek on Meadowvale Road. All five bridges are municipally owned and are located in the Rouge National Urban Park (RNUP) in the City of Toronto (Figure 1).

Figure 1: Location of the study areas
Source: ©OpenStreetMap and contributors, Creative Commons-Share Alike License (CC-BY-SA ESRI Street Maps)

Based on the age of the bridges and their structural conditions observed in biennial inspections, the Class EA process for these bridges is required to address the transportation goals of the project and to identify short and/or long-term plans for the structures. The assessment is required to assess potential impacts to each of the five structures and to outline suitable mitigation recommendations for the structures. The study is a part of the Rouge Park Bridges Transportation Master Plan EA.

The site visit and project management for this assessment was carried out by John Sleath, Cultural Heritage Specialist and Project Manager, with research and analysis conducted by Michael Wilcox, Cultural Heritage Technician, under the senior project direction of Annie Veilleux, Senior Cultural

Heritage Specialist and Manager of the Cultural Heritage Division, all of ASI. Additional research with a focus on the historical engineering context was provided to ASI by Michael Bartlett, Professor Emeritus of Civil and Environmental Engineering, University of Western Ontario. This Heritage Impact Assessment follows the Ministry of Citizenship and Multiculturalism's, *Ontario Heritage Toolkit* (Ministry of Culture, 2006), the *Standards and Guidelines for the Conservation of Historic Places in Canada* (Parks Canada, 2010), the *Ontario Heritage Bridge Guidelines* (Ministry of Culture and Ministry of Transportation, 2008), and the City of Toronto's *Terms of Reference for Heritage Impact Assessments*[1] (City of Toronto, 2019). Research was completed to investigate, document, and evaluate the properties and to measure the impact of the proposed developments on the existing cultural heritage resources. A draft report prepared in December 2020 provided the preliminary impact assessment that was to be used to provide context for the evaluation of project alternatives. Following the selection of the preferred alternative in June 2022, this report was updated to assess the specific impacts of the preferred alternative on the identified heritage attribute(s) of the subject bridges.

The scope of an HIA is provided by the MHSTCI's *Ontario Heritage Toolkit.* An HIA is a useful tool to help identify cultural heritage value and provide guidance in supporting environmental assessment work. As part of a heritage impact assessment, proposed site alterations and project alternatives are analysed to identify impacts of the undertaking on the heritage resource and its heritage attributes. The impact of the proposed development on the cultural heritage resource is assessed, with attention paid to identifying potential negative impacts, which may include, but are not limited to:

- 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;
- Shadows created that alter the appearance of a heritage attribute or change the viability of an associated 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 church to a multi-unit residence) where the change in use negates the property's cultural heritage value;
- Land disturbances such as a change in grade that alters soils, and drainage patterns that adversely affect a cultural heritage resource, including archaeological resources.

Where negative impacts of the development on the cultural heritage resource and/or attributes are identified, mitigative or avoidance measures or alternative development or site alteration approaches are considered. Conservation options are outlined in the *Ontario Heritage Bridge Guidelines* (OHBG) (Ministry of Culture and Ministry of Transportation, 2008), which is regarded as current best practice for

[1] The preliminary draft version of this report with the original designation By-Laws for Sewell's Bridge, Stott's Bridge, Hillside Bridge, and Maxwell's Bridge, and the Ontario Regulation 9/06 evaluation of the Milne Bailey Bridge was prepared in accordance with the *Terms of Reference for Heritage Impact Assessments* in effect at that time. Since this draft preliminary report was prepared in 2020, the City of Toronto updated their *Terms of Reference for Heritage Impact Assessments*. Heritage Planning at the City of Toronto confirmed that this report could adhere to the Terms of Reference in effect in 2020 (Dillon Consulting Limited email communication 25 November 2022).

conserving heritage bridges in Ontario. While intended for use in the assessment of provincially-owned structures and not directly applicable to the municipal context, the OHBG ensures that heritage concerns and appropriate mitigation options are considered.

ASI's *Cultural Heritage Resource Assessment: Rouge Park Bridges Transportation Master Plan* (ASI, 2020), concluded that Sewell's Bridge, Stott's Bridge, Maxwell's Bridge, and Hillside Bridge all have cultural heritage value and have previously met the criteria outlined in O. Reg. 9/06 of the *Ontario Heritage Act*. Further, the CHRA concluded that the Milne Bailey Bridge has potential to retain historical and design value and that an evaluation of this bridge against criteria outlined in O. Reg. 9/06 is required to identify any formal cultural heritage value or interest or attributes associated with this potential cultural heritage resource. This report satisfies this requirement and includes a 9/06 evaluation for the Milne Bailey Bridge.

1.1 Description of Properties

Sewell's Bridge (Structure ID 812)
Sewell's Bridge is designated under Part IV of the *Ontario Heritage Act* (By-law No. 25155) and it is found on the Ontario Heritage Bridge List (2010). It was designed by Frank Barber and built in 1912 and is one of only a few suspension bridges on a public road in Ontario. The bridge is three spans and the deck is 49.2 m long and 4.2 m wide. The bridge carries a single lane of predominantly vehicular traffic over the Rouge River on Sewells Road, which in this area is a two-lane winding road set in a largely forested rural environment.


Figure 2: Sewell's Bridge, looking west (ASI, 2020)

Figure 3: Location of Sewell's Bridge

(ESRI Digital Globe 2018)

Milne Bailey Bridge (Structure ID 813)

The Milne Bailey Bridge (also known as the Finch Meander Bridge) is identified as a Listed property on the City of Toronto *Heritage Register* and has been nominated for individual designation under the Ontario Heritage Act (City of Toronto Heritage Planning Memorandum, 2 February 2022). The bridge was erected by Ellis Engineering with assistance from Canadian Military Engineers in 1988, replacing a 1954 bridge erected by the Second Field Engineer Regiment of the Canadian Military Engineers. The bridge is two spans and the deck is 57.90 m long and 5.47 m wide. The bridge carries a single lane of predominantly vehicular traffic over the Rouge River on Old Finch Avenue, which in this area is a two-lane winding road with dense woods on both sides and set in a rural environment.

Figure 4: Milne Bailey Bridge, looking northeast (ASI, 2020)

Figure 5: Location of the Milne Bailey Bridge

(ESRI Digital Globe 2018)

Stott's Bridge (Structure ID 803)

Stott's Bridge is designated under Part IV of the *Ontario Heritage Act* (By-law No. 25154). It is a Warren pony truss bridge constructed in 1915. The single-span bridge's deck is 22.4 m long and 4.28 m wide. The bridge carries a single lane of predominantly vehicular traffic over the Rouge River on Twyn Rivers Drive, which in this area is a two-lane winding road with dense forest on both sides and set among rolling hills in a rural environment.

Figure 6: Stott's Bridge, looking southwest (ASI, 2020)

Figure 7: Location of Stott's Bridge

(ESRI Digital Globe 2018)

Maxwell's Bridge (Structure ID 802)

Maxwell's Bridge is designated under Part IV of the *Ontario Heritage Act* (By-law No. 25152). It is a reinforced concrete, bowstring arch bridge constructed in 1927. The single-span bridge's deck is 20.9 m long and 7.52 m wide. The bridge carries two lanes of predominantly vehicular traffic over the Little Rouge Creek on Twyn Rivers Drive, which in this area is a two-lane winding road with dense forest on both sides and set among rolling hills in a rural environment.

Figure 8: Maxwell's Bridge, looking east (ASI, 2020)

Figure 9: Location of Maxwell's Bridge

(ESRI Digital Globe 2018)

Hillside Bridge (Structure ID 806)

Hillside Bridge is designated under Part IV of the *Ontario Heritage Act* (By-law No. 25153). It is a Warren pony truss bridge constructed in 1917.[2] The single-span bridge's deck is 25.6 m long and 5.14 m wide. The bridge carries a single lane of predominantly vehicular traffic over the Little Rouge Creek on Meadowvale Road, which in this area is a two-lane stretch of road with a mix of large open land and dense forest and set in a rural environment.

Figure 10: Hillside Bridge, looking west (ASI, 2020)

[2] The OSIM report and the City of Toronto's Bridge and Structure Information website note that the bridge was constructed in 1966, which is assumed to be an error. The 1966 date could erroneously refer to the date of significant rehabilitation. However, this could not be confirmed at the time of report completion.

Figure 11: Location of the Hillside Bridge

(ESRI Digital Globe 2018)

1.1.1 Adjacent Cultural Heritage Resources

The subject bridges are not adjacent to any listed or designated heritage properties on the City of Toronto Heritage Register. There are eleven built heritage resources and/or cultural heritage landscapes within the surrounding road right-of-way for a distance of 500 metres from the centre of each bridge, all of which were identified in the CHRA (ASI, 2020).[3] These eleven resources were identified following a review of federal, provincial, and municipal registers, inventories, and databases or were identified during fieldwork. The CHRA also determined that four of the subject bridges were included within two separate cultural heritage landscapes, with mapping provided in Section 10.0 of the CHRA:

- Old Finch Avenue and Sewells Road roadscape (CHR 13) which includes Sewell's Bridge and Milne Bailey Bridge
- Twyn Rivers Drive roadscape (CHR 14) which includes Stott's Bridge and Maxwell's Bridge

1.1.2 Historical Background

A summary of the historical development of the five bridges and their surroundings was completed as part of the *Rouge Park Bridges Cultural Heritage Resource Assessment* (ASI, 2020).[4] The summary

[3] These eleven identified CHRs are outside the scope of this HIA. Once a preferred alternative or detailed designs of the proposed bridge work is made available, a separate HIA or series of HIAs will be completed with a confirmation of impacts of the undertaking on these cultural heritage resources as well as appropriate mitigation measures.

[4] Note that the CHRA divided the study area into three zones, with Zone A consisting of the Sewell's Bridge and Milne Bailey Bridge and surrounding road right-of-way for a distance of 500 metres from the centre of the bridges, Zone B consisting of Stott's Bridge and Maxwell's Bridge and surrounding road right-of-way for a distance of 500

included a review of available primary and secondary source material and was undertaken to produce a contextual overview of the study area, including a general description of physiography, Indigenous land use, and Euro-Canadian settlement, including a history of the Township of Scarborough, a history of the Rouge National Urban Park, and a detailed review of historical mapping from the nineteenth and twentieth centuries. For more information, please read Section 4.0 of the CHRA (ASI, 2020).

1.1.3 Historical Engineering Perspective on the Subject Bridges

The following information was prepared by Michael Bartlett and included in this report to provide additional context on the history of bridge design and engineering in the Province of Ontario and City of Toronto. Information in this section is extracted directly from a memorandum prepared by Dr. Bartlett entitled Historical Engineering Perspective on Five Bridges in the Rouge Urban National Park (Bartlett, 2021).

> *Sewell's Road Bridge (1912)*
>
> Frank Barber designed the Sewell's Road suspension bridge and Lewis Construction was the contractor for the original construction.
>
> James Franklin Barber (1875-1935) was a very prominent and active bridge designer in Ontario. Born in Milton, he was educated at Mount Allison University and the School of Practical Science (Civil Engineering), which became the Faculty of Applied Science and Engineering at the University of Toronto in 1901. He apprenticed under James McDougall, York County Engineer, and subsequently served as Engineer for the counties of York and Haldimand and for the townships of York, Vaughan, Etobicoke, King and Bruce. His entry in *Who's Who and Why 1921* indicates that he had "supervised over 200 bridges in Canada in the period 1908-1920". He was an illustrious bridge engineer, designing major concrete arch bridges including the Hunter Street (Ashburnham) Bridge in Peterborough, at 235 ft (71.6 m) the longest concrete span in Canada at the time of its completion, and, with C. R. Young, the Middle Road Bridge, the first reinforced concrete arch-truss bridge in Canada.
>
> Cuming (1985 – *Discovering Heritage Bridges on Ontario Roads*, pg. 48) says that Barber "…built three suspension bridges between 1909 and 1915. These were not large bridges, but simple spans designed to be erected in a minimum amount of time and with the minimum labour and cost of materials. Only one now remains" (i.e., Sewell's Road Bridge).
>
> Barber published a short paper (1911 – "Stiffened suspension bridge, applied to a short span") that describes one of his other short suspension bridges, a 90 ft. (27 m) span across the Don River. The cost, exclusive of abutment fill, for this 14 ft. (4.3 m) wide structure with a 15 ton live load capacity is stated to be less than $1000. The concrete Middle Road Bridge was opened in 1909 with an 80 ft (24 m) span, 16 ft (5 m) wide, with a 10 ton live

metres from the centre of the bridges, and Zone C consisting of Hillside Bridge and surrounding road right-of-way for a distance of 500 metres from the centre of the bridge. The subject HIA does not include zones.

load capacity: it cost $3,190. So the claim in the paper that "the suspension bridge is much cheaper than any other form of bridge for this situation" seems justifiable. Savings were realized because it was constructed by farmhands "during slack times on the farm".

The paper also talks about reduced floorbeam spacing for the suspension bridge that makes the stringers markedly more economical compared to conventional through trusses. The hangers for the bridge over the Don are at 10 ft (3 m) centres. At Sewell's Road Bridge, they're 5 ft (1.5 m) centres, so the stringers are even more economical.

The bridge is designated under the Ontario Heritage Act. The heritage designation documentation describes it as the "only remaining suspension bridge on a public road in Ontario", a dubious claim given several major international suspension bridge crossings exist, including the Ambassador Bridge, the longest span in the world when it opened in 1929, the Thousand Islands (1938), the Three Nations Crossing (1958), and the Ogdensburg-Prescott (1960) bridges. Sewell's Road Bridge was constructed before these other structures and is interesting because, with a main span length of only 30 m and a total length of 49 m, it is uncommonly short for a suspension bridge. Subsequent investigations suggest that the heritage designation should read the "only remaining **single lane** suspension bridge on a public road in Ontario".

Not much of the original structure remains. Drawings describing a major rehabilitation completed in 1981 indicate that the main cable, tower bent, thrust blocks, abutment cap, pier cap, concrete abutments, and stiffening trusses were replaced. The original floor beams, main cable clamps and 25 mm diameter hangers were specified to be blast cleaned, painted and re-used. U-bolts have been installed on the main suspension cables. These are likely intended to prevent the tops of the hangers from slipping down the main cables, and to prevent cable from slipping on the tower saddles. It is difficult to assess whether slip has taken place, as the 1981 rehabilitation drawings do not specify the profile of the main cable. It would perhaps be prudent to verify that the hangers in their current configuration are indeed vertical, and to document any out-of-plumbness for future reference.

Further significant repairs were made circa 2013 including replacing stiffening truss diagonals and verticals, top chord gusset plates, and deteriorated hanger-truss-floorbeam connections.

One is reminded of the story of Grandfather's axe – it has had two heads and six handles but it is still Grandfather's axe! Although much of its historic integrity has been lost, Sewell's Road Bridge is clearly celebrated by the local community as indicated by a commemorative plaque installed at the time of the 1981 rehabilitation.

In summary, Sewell's Road Bridge is the last remaining example of a very unusual bridge type, a single-lane short-span suspension bridge, with links to a prolific bridge designer, J. Frank Barber. It should be preserved if possible.

Should it eventually be replaced, the current structure might be reconstructed as a pedestrian crossing. Pedestrian loadings are heavy, often in the order of 100 pounds per square foot (4.8 kPa), so it might also be necessary to control the loading by reducing the deck area. This could be accomplished through reducing the bridge width by shortening the floorbeams and the bracing between the tower legs.

Milne Bailey Bridge (1988)

In October 1954, a Bailey bridge was erected in a week at this site after the previous bridge was washed out by rainfall from Hurricane Hazel. It was replaced in 1988 by a similar-looking but stronger Bailey bridge – the 1954 structure had two lines of panels in each truss and the present structure has three. The public may believe that the present bridge is the 1954 structure – virtually every reference to the structure on the internet, for example, erroneously indicates that the present bridge is the 1954 structure. In fact, only the centre pier – which is not particularly noteworthy from a historical perspective - dates from 1954.

The bridge is not designated under the Ontario Heritage Act, but has been listed on the City of Toronto Heritage Register. Bailey bridges are becoming rare in Ontario, there's a vehicular bridge at Jordan Valley, 21st Street over 20 Mile Creek (see GPS Co-ordinates 43.1520064, -79.3744661), a pedestrian bridge at Strathroy (42.959180, -81.626820), and a bridge exhibited on the ground of the Royal Military College in Kingston (44.235970, -76.465100). The form is historically significant given the success of Bailey bridges in the Second Word War, which eventually caused the designer, Donald Bailey of the British War Office, to be knighted.

Current thinking is to replace it with a modern deeper, stronger panel-type structure – perhaps preserving the tradition of having the Canadian military erect it. Given the history of the use of Bailey bridges at this location, it would seem appropriate to use a similar form of structure, as proposed.

Maxwell's Bridge (1927)

Maxwell's Bridge is a reinforced concrete tied-arch ("rainbow") bridge with a 60 ft (18 m) span.

It is designated under the Ontario Heritage Act. The heritage designation documentation says "few of these bridge types remain in Ontario today" – a recent survey of the website HistoricBridges.com suggests that 34 remain in Ontario. However, many rainbow bridges in Ontario have been replaced – of the seven Wellington County concrete bowstrings listed by Cuming (1985 – Discovering Heritage Bridges on Ontario Roads, pg. 70), for example, only two remain. The documentation says the bridge is "one of the last of its type to be constructed in the province" – roughly one-third of these remaining 34 bridges

were constructed after 1927 with the most recent, two reinforced concrete rainbow bridges in Essex County, constructed in 1937 and 1938.

Cuming (1985 – Discovering Heritage Bridges on Ontario Roads, pg. 69) notes:
"The single-lane concrete bowstring trusses of Wellington County are excellent examples [of a form of bridge that has become particularly popular in a region]. Unique in the province because of their age, style and concentration in numbers, they are certainly worth a visit. Built primarily in the period 1915 to 1925, these single lane, at best one-and-a-half lane, structures reflect the transition from horse-drawn vehicles to the new motorized age. Whereas timber could withstand, within reasonable limits, the occasional encounter with the wheels of a buggy or wagon, the new juggernauts of the late nineteenth and early twentieth century – threshing machines and road rollers – proved more than a match for many a span. The introduction of the bowstring truss reflects the need to provide a safe and durable structure, capable of withstanding frequent use, heavy loads, and the inevitable scrape or two."

Maxwell's Bridge has undergone very sympathetic rehabilitation in 1997, when the deck was replaced and minor repairs were carried out, and in 2013, when deteriorated concrete was removed and repaired. It is an excellent example of the century-old reinforced concrete "rainbow" arch form and should continue to be preserved.

Stotts (1915) and Hillside (1917) Bridges

The Stotts and Hillside Bridges can be considered together because they share many similarities. Both are Warren half-through (i.e., pony) trusses constructed during the First World War: Stotts Bridge has five panels and a 75 ft (23 m) span, and Hillside Bridge has six panels and a 82 ft (25 m) span

Both are designated under the Ontario Heritage Act, primarily, it would seem, for their age. The overall historic integrity of both structures is good: there have been repairs, but the essential load carrying members are original. The Warren truss form has been extensively used in Ontario, across Canada and the United States: both the Stotts and Hillside Bridges are therefore not examples of a rare truss form.

Both are likely candidates for replacement: Stotts Bridge was closed for emergency repairs in the fall of 2020 and the Hillside Bridge was also closed for strengthening that summer. The superstructures of both bridges have the potential to be relocated and repurposed as pedestrian/cyclist bridges, with some rehabilitation. This would likely involve shortening the floorbeams to reduce the bridge width and thereby control the maximum loading.

2.0 MILNE BAILEY BRIDGE O. REG. 9/06 EVALUATION

ASI's *Rouge Park Bridges Cultural Heritage Resource Assessment* (ASI, 2020) concluded that Sewell's Bridge, Stott's Bridge, Maxwell's Bridge, and Hillside Bridge all have cultural heritage value and have previously met the criteria outlined in O. Reg. 9/06 of the *Ontario Heritage Act*. Further, the CHRA concluded that the Milne Bailey Bridge crossing has potential to retain historical and design value and that an evaluation of this bridge crossing against criteria outlined in O. Reg. 9/06 is required to identify any formal cultural heritage value or interest or attributes associated with this potential cultural heritage resource. The following evaluation satisfies this requirement.

2.1 Historical and Associative Research

A comprehensive overview of the Indigenous and Euro-Canadian settlement and land uses of the bridge site is provided in Section 4.0 of the CHRA and is not repeated here. The results of background historical research and a review of secondary source material, including historical mapping, indicate that the Milne Bailey Bridge site has an Indigenous land use history spanning thousands of years, and a rural Euro-Canadian land use history dating back to the mid-nineteenth century. The following section provides detailed information on the historical land uses of the crossing based on a review of historical mapping and aerial photographs.

2.1.1 Nineteenth and Twentieth Century Mapping

The Milne Bailey Bridge is located on Lot 8, Concession 4 in the former Township of Scarborough, County of York.

Both nineteenth and twentieth-century maps and photographs were examined to assess any changes over time and cover a range of land uses that may have occurred. The 1860 *Map of the County of York* (Tremaine, 1860) and the 1878 *Illustrated Historical Atlas of the County of York* (Miles & Co., 1878), were examined to determine the presence of historical features within the study area during the nineteenth century (Figure 12 and Figure 13).[5] Historic topographic maps and aerial photographs were examined to determine the presence of historical features within the study area during the twentieth century (Figure 14 to Figure 18).

[5] It should be noted, however, that not all features of interest were mapped systematically in the Ontario series of historical atlases. For instance, they were often financed by subscription limiting the level of detail provided on the maps. Moreover, not every feature of interest would have been within the scope of the atlases. The use of historical map sources to reconstruct or predict the location of former features within the modern landscape generally begins by using common reference points between the various sources. The historical maps are geo-referenced to provide the most accurate determination of the location of any property on a modern map. The results of this exercise can often be imprecise or even contradictory, as there are numerous potential sources of error inherent in such a process, including differences of scale and resolution, and distortions introduced by reproduction of the sources.

The 1860 map shows the Rouge River following a similar path to its present alignment. A sawmill is located on the property of William A. Milne, and the surrounding area was likely wooded. A boundary (now Old Finch Avenue) traverses east-west and another boundary (now Sewells Road) traverses north-south; both follow a straight line and may reflect concession and lot boundaries rather than operational roadways.

The 1878 map continues to show the sawmill in the same location as the 1860 map. A roadway (now Old Finch Avenue) appears to be complete travelling along an arced route, perhaps to reach the sawmill. The road crosses the Rouge River, and it may have been carried by a predecessor of the subject bridge, though they are not depicted at the same location. Dense forest appears on the entirety of Milne's property. A house and small orchard appear at the northwest corner of Old Finch and Sewells Road on a different property belonging to Milne, and which is now a designated heritage property (Milne House).

Twentieth-century mapping consistently shows the area in a rural setting, with woods to the north and south and agricultural fields to the west and east. Only the 1992 aerial photograph shows that there has been some suburban development to the west. All maps show the Rouge River as well as Sewells Road and Old Finch Avenue running along their present alignment. The Old Finch Avenue crossing is shown as an iron bridge in 1914 and 1936 and was likely the one replaced by the first Milne Bailey Bridge in 1954, and its subsequent replacement in 1988. A photograph of the precursor to the 1954 Bailey Bridge is included in Appendix E.

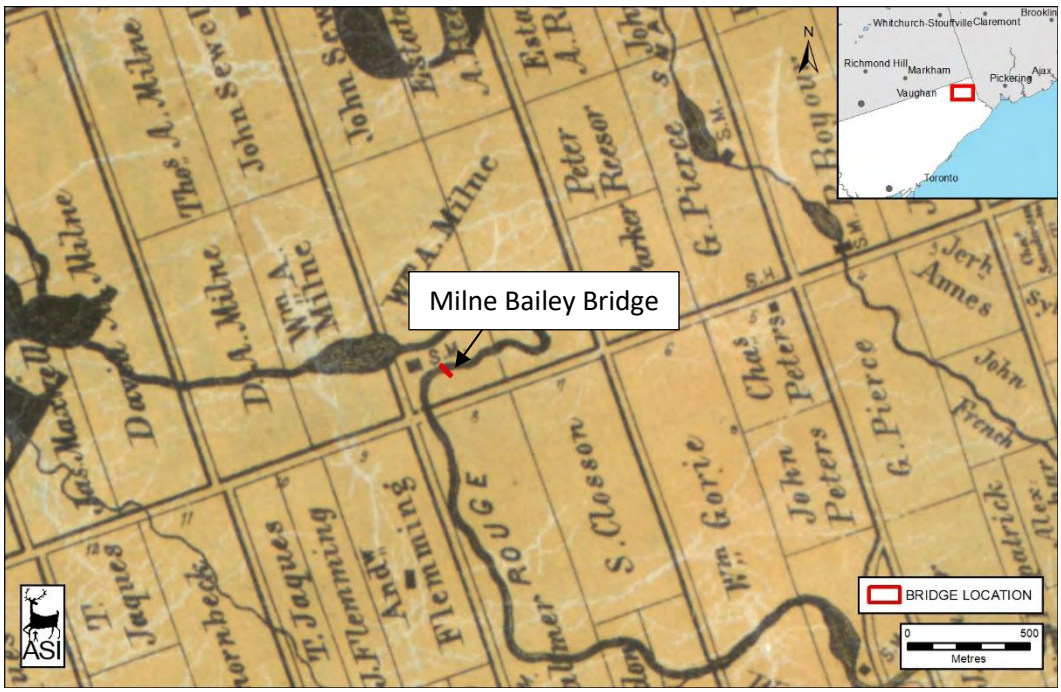

Figure 12: The location of the Milne Bailey Bridge overlaid on the 1860 Tremaine's Map of the County of York

Base Map: (Tremaine, 1860)

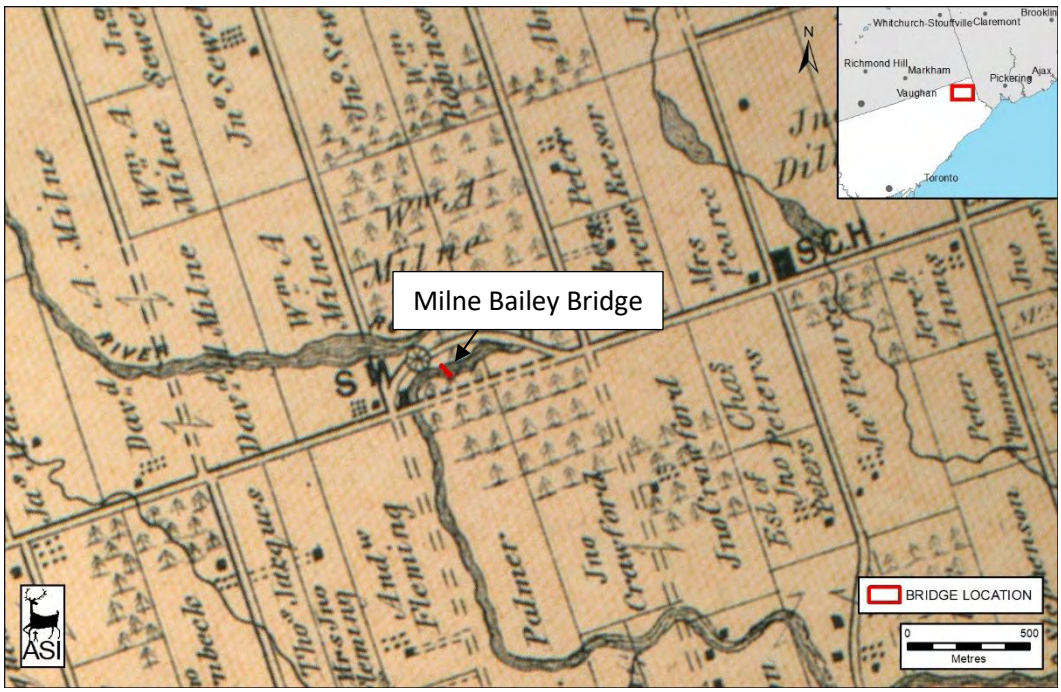

Figure 13: The location of the Milne Bailey Bridge overlaid on the 1878 Illustrated Historical Atlas of the County of York

Base Map: (Miles & Co., 1878)

Figure 14: The location of the Milne Bailey Bridge overlaid on the 1914 Markham topographic map

Base Map: (Department of Militia and Defence, 1914)

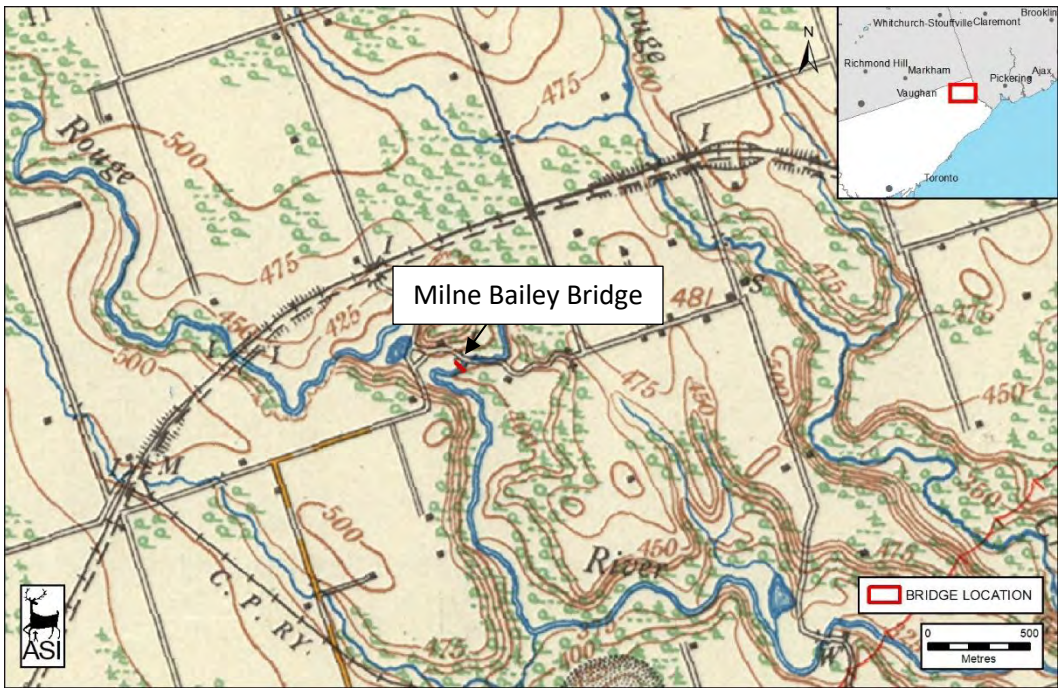

Figure 15: The location of the Milne Bailey Bridge overlaid on the 1936 Markham topographic map

Base Map: (Department of National Defence, 1936)

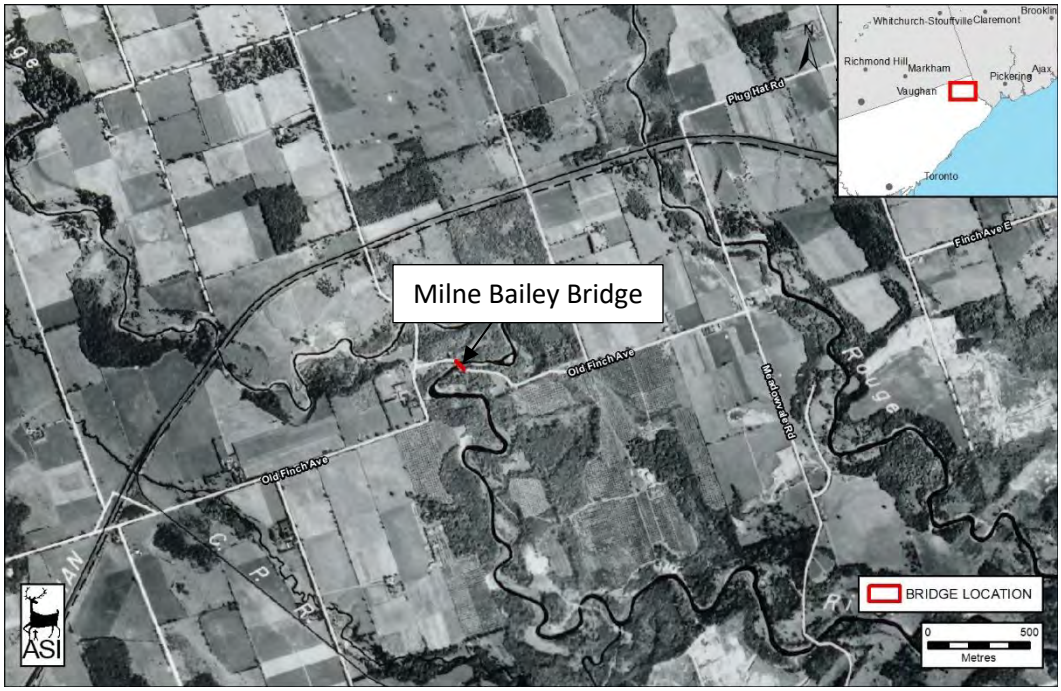

Figure 16: The location of the Milne Bailey Bridge overlaid on merged 1954 aerial photograph

Base Map: (Hunting Survey Corporation Limited, 1954)

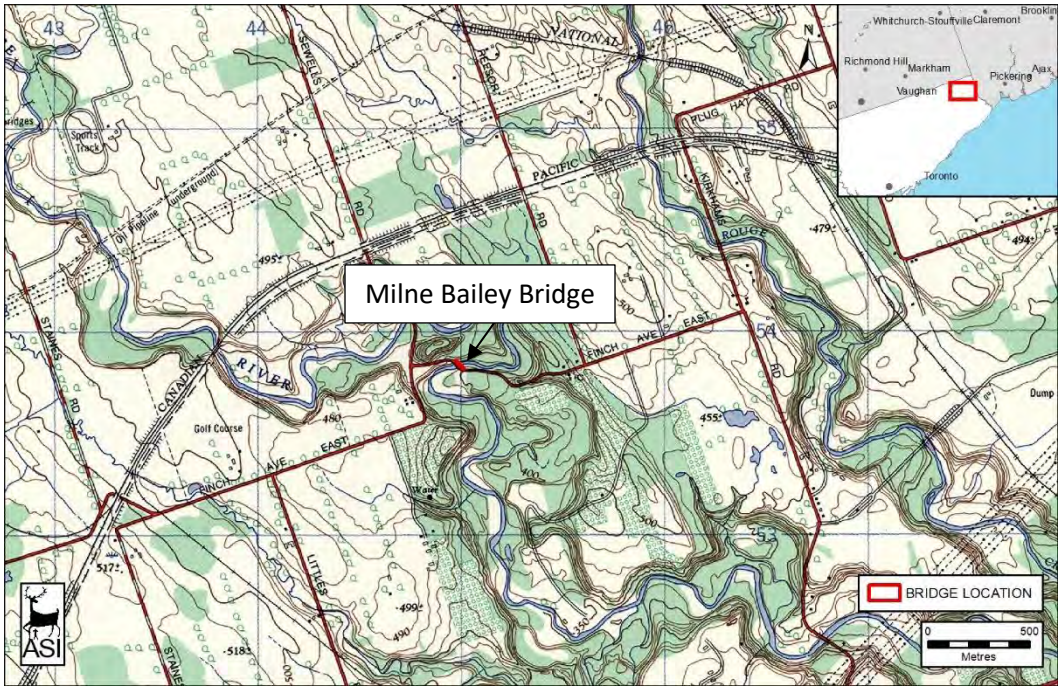

Figure 17: The location of the Milne Bailey Bridge overlaid on the 1974 Highland Creek topographic map

Base Map: (Department of Energy, Mines and Resources, 1974)

Figure 18: The location of the Milne Bailey Bridge overlaid on merged 1992 aerial photographs

Base Map: (City of Toronto Archives, no date)

2.1.2 Early Bridge Building in Ontario

Timber truss bridges were the most common bridge type built in southern Ontario until the 1890s. Stone and wrought iron materials were also employed. However, due to their higher costs and a lack of skilled craftsman, stone and wrought iron bridges were generally restricted to market towns. By the 1890s, steel was commonly used in bridge construction as it was less expensive and more durable than wood or wrought iron. Steel truss structures and steel girder bridges were increasingly common by 1900. Concrete was introduced in bridge construction at the beginning of the twentieth century, and by the 1930s was challenging steel as the primary bridge construction material in Ontario (Heritage Resources Centre, 2005, pp. 7–8).

The increased use of automobiles in the 1930s directly impacted the course of highway design and planning, which in turn affected the design and construction of highway bridges. Factors impacting bridge design included increasing road allowances and clearance requirements, heavier traffic, higher speeds, safety standards and cost limitations (Cuming, 1983, p. 56). From the 1930s to the early 1950s, fewer bridges were constructed because of a steel shortage. Builders were challenged to develop more efficient ways to build structures with more concrete and less steel. Some of the new techniques developed included pre-casting concrete components off site, "hi-bond type" of reinforcing concrete and pre-stressed concrete beam construction (Heritage Resources Centre, 2005, p. 9). The rigid frame, hollow concrete box beam and post-tensioned voided slab are some of the bridge types to develop during this period.

2.1.3 Bailey Bridges

Bailey bridges are named for their inventor, British engineer and civil servant Donald Bailey. His design was first put into use in 1941 while working in the British War Office. Amidst the context of the Second World War, Bailey bridges were used extensively by militaries because they were versatile and temporary modular crossings, whether for emergencies, detours, or in isolated locations. Donald Bailey was later knighted for his invention, which proved crucial to the Allies' success in the war. In the postwar period, Bailey bridges were adapted for civilian use, especially in Ontario which was for a time the world's largest holder of Bailey bridges (Noonan, 2016). They were often erected where the need was for a relatively straightforward assemblage, without requiring specialized tools or equipment (Heritage Resource Centre, 2008).

Bailey bridges are simple prefabricated steel structures. The panels are the key part of the design, consisting of uniformly-sized steel truss sections. These panels are cross braced and connected via pins to create a continuous girder. The number of spans and panels can vary depending on the length or strength required. The bridge floor consists of transoms, chords, and stringers (Heritage Resource Centre, 2008).

2.1.4 Previous Bridges at this Crossing

The first indication of a bridge crossing at this location may be found on the 1878 *Illustrated Historical Atlas* (see Figure 13). That map shows a roadway (now Old Finch Avenue) with an arced route crossing

the Rouge River between what is now Sewells Road (to the west) and Reesor Road (to the east). While that crossing and the subject bridge are not depicted in the exact same location, nineteenth-century mapping was not always accurate, and the prior crossing may have been at the site of the subject bridge. Whether at the exact site or not, it was likely a timber truss structure of a simple design.

An iron bridge that was built at some point before 1914 is depicted in the 1914 and 1936 mapping (Figure 14 and Figure 15), and in an historical photograph in Appendix E. Its location does not coincide with the straight east-west line of Old Finch Avenue to both the east and west of the bridge. This may be because of challenging physiography associated with the Rouge River and its embankments along that axis, or simply due to a cartographical error. This iron bridge was destroyed by Hurricane Hazel on 15-16 October 1954. The first Milne Bailey Bridge was constructed between 20-24 October 1954, and its replacement is the subject bridge constructed by Ellis Engineering in 1988. Photographs of the 1988 replacement are included in Appendix E.

2.2 Design and Physical Value Research

A field review was undertaken by John Sleath, ASI, on 5 October 2020, to conduct photographic documentation of the bridge and to collect data relevant for completing a heritage evaluation. No original structural drawings were available for the subject bridge. However, drawings from the 1988 replacement work and a representative drawing of Bailey bridge components were reviewed and are included here for reference (Appendix C). Results of the field review and research were then utilized to describe the existing conditions of the subject bridge. This section provides a general description of the bridge and photographic documentation of the subject bridge and surrounding area is provided in Appendix B (Plate 41 to Plate 50).

2.2.1 Construction of the First Milne Bailey Bridge

The bridge is located on property formerly owned by William A. Milne, a prominent sawmill owner and operator in the area. The first Milne Bailey Bridge was erected by the Second Field Engineer Regiment of the Canadian Military Engineers in just three days in October 1954. The Bailey design emerged in the 1940s as a temporary military bridge type that was used by the Allies during the Second World War. The first Milne Bailey Bridge was built as a replacement for an iron bridge that was destroyed by Hurricane Hazel in 1954.

No original design drawings of the first Bailey bridge were available, and as the bridge was built expediently to meet the requirements of the crossing by Canadian Military Engineers, it is assumed that few design drawings were prepared in advance. As a field engineering regiment using a modular bridge design, it is assumed that the specific bridge components and dimensions were established in the field without a significant degree of prior preparation. Bailey bridges excelled for use in expedient structures specifically because of their ability to be employed rapidly in a variety of contexts, with limited planning and design work conducted before construction.

2.2.2 Construction of the Second Milne Bailey Bridge

The subject bridge is located in the exact same location as the First Milne Bailey Bridge and its predecessor. This bridge was constructed by Ellis Engineering in 1988, replacing the superstructure and abutments of the First Milne Bailey Bridge, but retaining the central pier. The bridge is similar in type to the 1954 bridge, but has a stronger configuration and is longer. The Canadian Military participated in the erection of the bridge. Original design drawings for the 1988 subject bridge are provided in Appendix C, with photographs of its construction included in Appendix E.

2.2.3 Comparative Geographic and Historical Bailey Bridges

The Milne Bailey Bridge is a two-span 57.90 m long Bailey bridge that was constructed in 1988. The subject bridge is located in MTO's Central Region.

Comparative bridge information is available in the MTO Bridge Inventory (Ministry of Transportation, Ontario, n.d.), the Ontario Heritage Bridge List, and the historical bridge inventory on *Historicbridges.org*. A review of the MTO Bridge Inventory for the Central Region did not uncover any examples of Bailey bridges under MTO ownership, and no examples of Bailey bridges are on the Ontario Heritage Bridge List. According to the inventory in *HistoricBridges.org*, the subject bridge is one of three existing Bailey bridges in Ontario[6]. The other two identified Bailey bridges are:

- Royal Military College Bridge, a two-span pedestrian Bailey bridge built in 1945 in Kingston, Ontario.
- The Strathroy Victoria Park Bridge, a single-span pedestrian Bailey bridge constructed at an unknown date over the Sydenham River in Strathroy, Ontario.

One additional single-span Bailey bridge is located in the City of Toronto and carries a pedestrian walkway from the Canadian National Exhibition to Ontario Place over six lanes of Lakeshore Boulevard West traffic. It was constructed in 1952 and rehabilitated in 1998 (ACO, 2020).

2.3 Contextual Research

2.3.1 Setting and Character

The subject bridge carries a single lane of predominantly vehicular Old Finch Avenue traffic over the Rouge River in the RNUP in a rural, riverine setting in the City of Toronto. Old Finch Avenue is a two-lane winding road with dense woods on both sides and set in a rural environment in the location of the subject bridge, although the roadway constricts at the bridge approaches to carry only one lane of vehicular traffic. The subject bridge is located in a scenic crossing with significant views of the Rouge River and associated valley lands on both sides.

[6] While other modular panel-type bridges are also on Ontario roadways, this comparison only considers those specifically noted as Bailey bridges.

2.3.2 Community Landmark

The subject bridge is a single-lane crossing of the Rouge River on Old Finch Avenue with traffic controlled by stop lights at both approaches. As Old Finch Avenue is the only roadway in the vicinity crossing the Rouge River, a significant watercourse in the area, the subject bridge is considered a familiar structure to motorists on Old Finch Avenue. Further, given the unique design of the bridge and the setting, and the scenic nature of the roadway through the Rouge River Valley in general, the subject bridge could be considered to be a landmark to local motorists in the area.

2.4 Ontario Regulation 9/06 Evaluation of the Milne Bridge

Table 1 contains the evaluation of the Milne Bailey Bridge within the framework set out in Ontario Regulation 9/06. Within the Municipal Environmental Assessment process, Ontario Regulation 9/06 is the prevailing evaluation tool when determining if a heritage resource, in this case a bridge, has cultural heritage value at the local level.

Table 1: Evaluation of the Milne Bailey Bridge using Ontario Regulation 9/06

1. The property has design value or physical value because it:	
Ontario Heritage Act Criteria	Analysis
i. is a rare, unique, representative or early example of a style, type, expression, material or construction method;	The subject bridge was constructed in 1988 as a sympathetic replacement for an earlier (1954) Bailey bridge at this crossing and retains the central pier of the 1954 bridge. Bailey bridges are modular panel bridges that emerged in the 1940s as a temporary military bridge type that was used by the Allies during the Second World War, making an important contribution to transportation of people and equipment in the war effort. These bridges were used in civilian applications following the war. The subject bridge, built in 1988 with the assistance of Canadian Military Engineers, is the last remaining Bailey bridge in Scarborough, and one of only a few remaining Bailey bridges in Ontario. While other types of modular panel bridges are in use across the province, the subject bridge is considered to be a rare and representative example of the Bailey design and construction method developed by the Military in the 1940s. The subject bridge meets this criterion.
ii. displays a high degree of craftsmanship or artistic merit, or;	Modular panel bridges in general, and Bailey Bridges in particular, were often erected where a relatively straightforward and expedient construction was required, without requiring specialized tools or equipment. The subject bridge was constructed according to a common bridge design and does not display a high degree of craftsmanship or artistic merit compared with other Bailey bridges. The subject bridge does not meet this criterion.
iii. demonstrates a high degree of technical or scientific achievement.	The subject bridge does not demonstrate a high degree of technical achievement or scientific achievement.
2. The property has historical value or associative value because it:	
Ontario Heritage Act Criteria	Analysis
i. has direct associations with a theme, event,	Based on available documentation, the subject bridge has a direct association with the Canadian Military Engineers, as the Second Field Engineer Regiment was

Table 1: Evaluation of the Milne Bailey Bridge using Ontario Regulation 9/06

belief, person, activity, organization or institution that is significant to a community;	responsible for the construction of the 1954 Bailey bridge in the aftermath of Hurricane Hazel, and the Canadian Military Engineers also participated in the construction of the 1988 Bailey bridge. Participation of the military in the 1988 bridge replacements is considered to be a significant association to the construction of this Bailey bridge, and continues the association of this structure type and with the military from its development in the 1940s until the late twentieth century. This association is commemorated in an historical plaque at the bridge site. Further, the crossing location retains concrete abutments from a previous structure and the central pier of the 1954 structure, which have direct associations with Hurricane Hazel and the First Milne Bailey Bridge. The subject bridge meets this criterion.
ii. yields, or has the potential to yield, information that contributes to an understanding of a community or culture, or;	The subject bridge is not known to have the potential to yield information that contributes to an understanding of a community or culture.
iii. demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.	The subject bridge reflects the design of British engineer Sir Donald Bailey. However, Bailey is responsible for the design of this style of modular panel bridge at large, and has no direct association with the subject bridge, former bridges at the crossing, or to the community of Scarborough. As such, the subject bridge does not meet this criterion.
3. The property has contextual value because it:	
Ontario Heritage Act Criteria	Analysis
i. is important in defining, maintaining or supporting the character of an area;	The subject bridge carries a single lane of predominantly vehicular Old Finch Avenue traffic over the Rouge River in the Rouge National Urban Park in a rural, riverine setting in the City of Toronto. Old Finch Avenue is a two-lane winding road with dense woods on both sides set in a rural environment in the location of the subject bridge. The subject bridge is located in a scenic crossing with significant views of the Rouge River and associated valley lands on both sides. The subject bridge meets this criterion.
ii. is physically, functionally, visually or historically linked to its surroundings, or;	The subject bridge retains its functional links to the Rouge Valley as an important crossing in the local road network. The subject bridge also retains historical links to the Rouge Valley as the third crossing at this location, and physical and visual links to the scenic riverine character of the area. The subject bridge meets this criterion.
iii. is a landmark.	As the subject bridge carries Old Finch Avenue, one of the only through-roads in the vicinity over the Rouge River, the subject bridge is considered a familiar structure to motorists in the area. Further, given the unique design of the bridge in the local context and the setting and the scenic nature of the roadway through the Rouge River Valley in general, the subject bridge could be considered to be a landmark to local motorists in the area. As such, the subject bridge meets this criterion.

An evaluation using the criteria outlined in Ontario Regulation 9/06 determined that the Milne Bailey Bridge does retain cultural heritage value or interest at the local level. As the subject bridge was found to retain cultural heritage value, a draft Statement of Cultural Heritage Value was prepared and is included in Section 2.5 below.

2.5 Draft Statement of Cultural Heritage Value or Interest

Description of Property

Name: Milne Bailey Bridge
Alternate Names: Finch Meander Bridge, Old Finch Bailey Bridge

The Milne Bailey Bridge is located on Old Finch Avenue, east of Sewells Road in the former Township of Scarborough, now the City of Toronto. The bridge is owned by the City of Toronto, but the surrounding area is federally-owned lands within the Rouge National Urban Park (RNUP). The Milne Bailey Bridge is two spans and the deck is 57.90 m long and 5.47 m wide. The bridge carries a single lane of predominantly vehicular traffic over the Rouge River. It was constructed in 1988 as a replacement to an earlier Bailey bridge in this location (constructed in 1954) and retains the central pier from the 1954 bridge.

Cultural Heritage Value or Interest

The Milne Bailey Bridge was built by Ellis Engineering in 1988. It is, at a minimum, the third crossing at this location. The first definitive crossing was an iron bridge that was built at some point before 1914 but was destroyed by Hurricane Hazel in 1954. A second crossing was the first Milne Bailey Bridge which was constructed by the Second Field Engineer Regiment of the Canadian Military Engineers in 1954. The bridge is located on property formerly owned by William A. Milne, a prominent sawmill owner and operator in the area.

This bridge may be considered representative of the Bailey design, which emerged in the 1940s as a temporary military bridge type used by the Allies during the Second World War because they were prefabricated and portable. In the postwar period, Bailey bridges were often erected where the need was for a relatively quick and easy construction, without requiring specialized tools or equipment. The subject bridge is also considered a rare example of a Bailey bridge on a municipal roadway in the City of Toronto.

The subject bridge crossing has historical and associative value due to its association with a significant event – Hurricane Hazel – that is significant to the City of Toronto. The crossing location retains the concrete abutments from a previous structure and the central pier of the 1954 structure, which have direct associations with Hurricane Hazel and the First Milne Bailey Bridge. The subject bridge also retains contextual value as it supports the scenic riverine character of Old Finch Avenue through the RNUP; retains physical, functional, and visual links to its surroundings; and is a landmark to local motorists.

The Milne Bailey Bridge is a single-lane two-span bridge. It is situated along an historic transportation route in a rural setting over the Rouge River. As the last surviving example of this bridge type in

Scarborough, and a representative example of a Bailey bridge, this structure contributes to the understanding of bridge construction and transportation developments in the Greater Toronto Area.

Heritage Attributes

Key heritage attributes that embody the heritage value of this bridge crossing in the local context include:

- Bailey construction and design;
- Steel trusses, arches, stringers, and deck grating;
- Wood pier from 1954 Bailey bridge;
- Cast-in-place concrete abutments from former bridge at the crossing;
- Single-lane construction; and
- Scenic view of the Rouge River Valley.

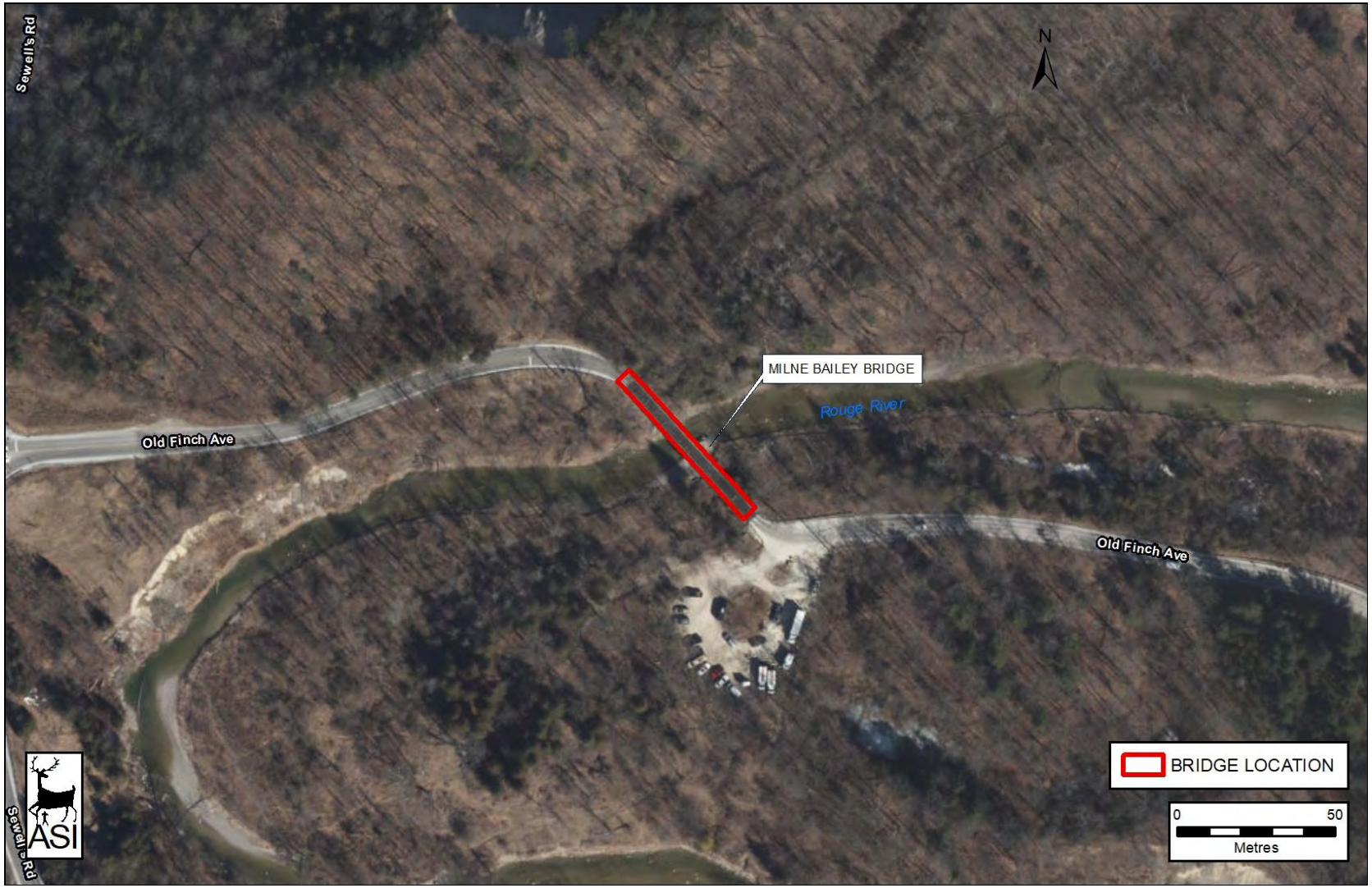

Figure 19: Location of the Milne Bailey Bridge

(ESRI Digital Globe 2018)

3.0 STATEMENTS OF CULTURAL HERITAGE VALUE OF THE REMAINING BRIDGES

The following statements of cultural heritage value were prepared by ASI to provide context and detail conducive to an informed assessment of impacts for the remaining bridges designated under Part IV of the OHA. The information is based on historical background research, a review of inspection reports, field review, and an analysis of bridge design and construction. The Reasons for Designation section for each bridge is copied from the associated Heritage Designation By-Law. This process was undertaken to prepare a more robust description of the design, contextual, and associative value of the subject bridges and identify heritage attributes, which are not included in the existing designation by-laws for the bridges. Heritage Designation By-Laws are available in Appendix A.

3.1 Sewell's Bridge

Description of Property (Adapted by ASI from By-Law 25155)

Sewell's Bridge is located on Sewells Road, north of Old Finch Avenue in the former Township of Scarborough, now the City of Toronto. The bridge is owned by the City of Toronto, but the surrounding area is federally-owned lands within the RNUP. Sewell's Bridge is a three-span suspension bridge and the deck is 49.2 m long and 4.2 m wide. It was designed by Frank Barber and built in 1912. The bridge carries a single lane of predominantly vehicular traffic over the Rouge River.

Reasons for Designation

"The Sewells Bridge is [designated] for historical and engineering reasons. The bridge, built in 1912, is technically described as a "stiffened suspension bridge". In 1911, Frank Barber, C.E. was commissioned to design a bridge to replace an old timber crossing. The Sewell Family occupied large farms in Lot 8 and 9. The road leading past their farms became known as Sewells Road and the bridge likewise became known as the Sewells Road Bridge. Beside being one of the oldest bridges in Scarborough, the bridge is believed to be the only remaining suspension bridge on a public road in Ontario" (Corporation of the City of Scarborough, 1997d).

Heritage Attributes[7]

Key heritage attributes that embody the heritage value of this bridge in the local context include:

- Warren type stiffening trusses;
- Multi-strand wire suspension cables;
- Cast-in-place abutment walls and piers;
- Single-lane construction; and
- Scenic views of the Rouge River.

[7] This bullet list is based on historical background research, a review of inspection reports, field review, and an analysis of the bridge design and construction. This information is not found in By-law No. 25155, included below in Appendix A.

3.2 Stott's Bridge

Description of Property (Adapted by ASI from By-Law 25154)

Stott's Bridge is located on Twyn Rivers Drive in the former Township of Scarborough, now the City of Toronto. The bridge is owned by the City of Toronto, but the surrounding area is federally-owned lands within the RNUP. Stott's bridge is a single-span Pony Warren Truss bridge and the deck is 22.4 m long and 4.28 m wide. It was constructed in 1915 and carries a single lane of predominantly vehicular traffic over the Rouge River.

Reasons for Designation

"The Stotts Bridge is [designated] for historical and structural reasons. The bridge, built in 1915, is technically described as a Pony Warren Truss Bridge. Pony Warren Truss bridges do not require cross bracing, thereby eliminating height restrictions. The bridge's name was once associated with William Stotts' family who owned adjacent property and did repair work on the steep hill road which approaches the bridge from the west" (Corporation of the City of Scarborough, 1997c).

Heritage Attributes[8]

Key heritage attributes that embody the heritage value of this bridge in the local context include:

- Pony Warren Truss design;
- Steel-grated deck top;
- Steel chords, beams, stringers, and trusses;
- Cast-in-place concrete abutment walls; and
- Single-lane construction; and
- Scenic views of the Rouge River.

3.3 Maxwell's Bridge

Description of Property (Adapted by ASI from By-Law 25152)

Maxwell's Bridge is located on Twyn Rivers Drive in the former Township of Scarborough, now the City of Toronto. The bridge is owned by the City of Toronto, but the surrounding area is federally-owned lands within the RNUP. Maxwell's Bridge is a single-span reinforced concrete, bowstring arch bridge and the deck is 20.9 m long and 7.52 m wide. It was constructed in 1927 and carries two lanes of predominantly vehicular traffic over the Little Rouge Creek.

Reasons for Designation

[8] This bullet list is based on historical background research, a review of inspection reports, field review, and an analysis of the bridge design and construction. This information is not found in By-law No. 25154, included below in Appendix A.

"The Maxwell Bridge is [designated] for historical and structural reasons. The bridge, built in 1927, is [a] reinforced concrete, bowstring arch "through" structure, of a type pioneered in Canada by Frank Barber C.E. in the early 1900's. The bridge name was once associated with Maxwell's Mill which was located just north of the bridge structure. It was built to replace earlier access roads to the saw and grist mills and a woollen factory on the Rouge. Few of these bridge types remain in Ontario and the Maxwell Bridge was one of the last of this type to be constructed in the province" (Corporation of the City of Scarborough, 1997a).

Heritage Attributes[9]

Key heritage attributes that embody the heritage value of this bridge in the local context include:

- Bowstring arch "through" design;
- Cast-in-place concrete arch chords and associated structural elements; and
- Cast-in-place concrete abutment walls, barrows, and railings.

3.4 Hillside Bridge

Description of Property (Adapted by ASI from By-Law 25153)

Hillside Bridge is located on Meadowvale Road in the former Township of Scarborough, now the City of Toronto. The bridge is owned by the City of Toronto, but the surrounding area is federally-owned lands within the RNUP. Hillside Bridge is a single-span Pony Warren Truss bridge and the deck is 25.6 m long and 5.14 m wide. It was constructed in 1917 and carries a single lane of predominantly vehicular traffic over the Little Rouge Creek.

Reasons for Designation

"The Hillside Bridge is [designated] for historical and engineering reasons. The bridge, built in 1917, is technically described as a Pony Warren Truss Bridge similar in design to the Stotts bridge. The structure does not require cross bracing, thereby eliminating height restrictions. The bridge was designed to carry local traffic across the Little Rouge in a rural environmental setting. It continues to serve this purpose today as this area of Scarborough forms part of the Rouge Valley Park. It is important that this bridge be preserved for future generations to understand and appreciate our rural heritage" (Corporation of the City of Scarborough, 1997b).

[9] This bullet list is based on historical background research, a review of inspection reports, field review, and an analysis of the bridge design and construction. This information is not found in By-law No. 25152, included below in Appendix A.

Heritage Attributes[10]

Key heritage attributes that embody the heritage value of this bridge in the local context include:

- Pony Warren Truss design;
- Steel-grated deck top;
- Steel chords, beams, stringers, and trusses;
- Cast-in-place concrete abutment walls; and
- Single-lane construction.

4.0 ASSESSMENT OF EXISTING CONDITIONS

A field review was undertaken by John Sleath, ASI, on 5 October 2020 to conduct photographic documentation of the bridge crossings and to collect data relevant for completing a heritage evaluation of the Milne Bailey Bridge. Results of the field review and bridge inspection reports were then used to describe the existing conditions of each bridge crossing. This section provides a general description of the bridge crossings and immediate vicinity. The location of the subject bridges are provided in Figure 1 and photographic documentation of the bridge crossings are provided in Appendix B.

4.1 Sewell's Bridge

Sewell's Bridge is a stiffened suspension bridge built in 1912. It is located on Sewells Road approximately 250 m north of the east side of Old Finch Avenue. This stretch of Sewells Road is largely wooded on both the east and west sides. The bridge crosses the Rouge River. Historically, the bridge is located on Concession 4, Lot 8 in the former Scarborough Township in York County. Late twentieth-century photographs of Sewell's Bridge are included in Appendix E.

The superstructure of Sewell's Bridge includes Warren type steel stiffening trusses, with six panels – each measuring approximately 1.5 m – in the approach spans and 20 panels in the main span. The main span is the stretch between the two towers, with each tower linked at the top by steel sway bracing. The suspension cables are made of multi-stranded wire and travel over concrete piers with saddles that guide the wire into turnbuckles which are buried at the end of each side of the bridge. The concrete deck is supported by steel floor beams.

The substructure includes abutment walls and piers, both of which are cast-in-place concrete and sit on foundations below ground level.

The deck top is made with cast-in-place concrete. Expansion joints are found at opposing ends. The deck length is 49.2 m and the overall structure width is 4.2 m for a combined total deck area of 206.6 m^2. The

[10] This bullet list is based on historical background research, a review of inspection reports, field review, and an analysis of the bridge design and construction. This information is not found in By-law No. 25153, included below in Appendix A.

bridge carries one lane of vehicular traffic with a posted speed limit is 20km/hr. There is a current load limit of 5 tonnes. The roadway is bound by cast-in-place concrete curbs and barrier posts at deck level.

Sewell's Bridge has been designated under Part IV of the *Ontario Heritage Act* (By-law No. 25155) and it is found on the Ontario Heritage Bridge List (2010).

Sewell's Bridge is currently owned and maintained by the City of Toronto. According to an inspection undertaken in 2021 (City of Toronto, 2021c), significant rehabilitation took place in 1980: the deck and main cables were replaced and the trusses, piers, and abutments were repaired. In 1987, further rehabilitation took place whereby the vertical hangers were repositioned and trusses were repaired. The inspection recommended that ongoing maintenance was required. The following is a summary of the principal deficiencies and maintenance needs documented in 2021:

- Cast-in-place concrete deck top: Narrow to medium transverse crack, sealed cracks and light scaling, abrasions at deck ends.
- Deck Drainage: Medium corrosion at south end drains and interior span partially filled with debris.
- Cast-in-place concrete soffit (thin slab exterior and interior): narrow to medium cracks, concrete patches, and delamination near north pier, minor spall at end soffit NE, delamination on exterior soffit around drain at East side.
- Cast-in-place concrete Barriers/posts: Narrow efflorescence-stained cracks, concrete patches. Wide crack at base of NW barrier wall.
- Steel floor beams: Light to moderate localized corrosion at connections.
- Steel bracing: Permanent deformation to SE bracing due to vehicular impact (Monitor every six month), minor impact damage on North.
- Structural Steel Coatings: Partial localized coating breakdown, few areas of complete coating breakdown. It is recommended to prioritize cleaning and coating of vertical hangers.
- Steel Trusses/Arches Top Chords: Horizontal misalignment of trusses, light corrosion, rotating outward slight at north pier (60mm) Monitor every six months.
- Steel Trusses/Arches verticals/diagonals: Impact damage at diagonal truss member at SE, light corrosion. Minor loss of section at one south hanger at connection point. Loss of coating and corrosion in three cables, light to moderate localized corrosion.
- Steel Trusses/Arches Bottom Chords: Light to moderate localized corrosion at connections.
- Steel Trusses/Arches Connections: Light to moderate corrosion noted at few location.
- Cast-in-place concrete abutment walls: Narrow water-stained cracks, light scaling, moderate honeycombing, concrete patches, surface rust stains, spalls and wide crack at south abutment, minor delamination below bearing at South abutment and few efflorescence cracks.
- Cast-in-place concrete piers: Piers have been refaced, narrow cracks. Medium to severe scaling, map cracking at North pier, spall with exposed rebar on North pier at top, delamination at south pier, concrete patches, surface rust stains and efflorescence cracks at North shaft.
- Cast-in-place concrete curbs: Popouts, narrow to wide cracks - NW, disintegration at NE.
- Asphalt approaches: Minor abrasions, asphalt patches, narrow cracks, narrow to medium map cracking at north and south.

- Slope Protection: Protection recently replaced at north side, disintegration slope paving at north approach sidewalk, wide cracks, concrete patches at south. Undermining below slope protection at south, erosion at north-side in front of abutment.

4.2 Stott's Bridge

Stott's Bridge is a Warren pony truss bridge constructed in 1915. It is located on Twyn Rivers Drive approximately 550 m east of Sheppard Avenue East in Toronto. This stretch of Twyn Rivers Drive is largely wooded on both the east and west sides and includes rolling hills and winding curves. The bridge crosses the Rouge River. Historically, the bridge is located on Concession 3, Lot 2 in the former Scarborough Township in York County.

The superstructure of Stott's Bridge is a Warren pony truss design. Each truss is made of steel and has five panels – measuring approximately 4.3 m long and 2.4 m high – across the span. The top chord is flat and horizontal through the middle, but angles down at both ends to connect with the bottom chords at the abutment bearing. The steel-grated deck is supported by steel floor beams, stringers, and bracings.

The substructure includes abutment walls, abutment wingwalls, and retaining walls, all of which are cast-in-place concrete and sit on foundations below ground level.

The deck wearing surface is made with galvanized steel grating. Expansion joints are found at both ends of the deck. The deck length is 22.4 m long and the overall structure width is 4.28 m for a combined total deck area of 95.9 m^2. The bridge carries one lane of vehicular traffic with a posted speed limit of 50km/hr. There is a current load limit of 3 tonnes. The guard rails and hand railings are made of steel and are affixed to the steel truss on the bridge (though the guard rails are affixed to wood posts at both approaches).

Stott's Bridge has been designated under Part IV of the *Ontario Heritage Act* (By-law No. 25154).

Stott's Bridge is currently owned and maintained by the City of Toronto. According to an inspection undertaken in 2021 (City of Toronto, 2021a), significant rehabilitation took place in 1997: the bottom chord stringer was replaced, there were repairs to the structural steel, a new guiderail was installed, the abutments and wingwalls were patched, new abutment bearings were installed, the deck was replaced, and slope protection was added. The inspection recommended that replacement would offer better value due to the age and condition, with the following summary comment: "Given the age of the structure, advanced corrosion in steel, and load limit, it may be prudent to replace the structure rather than to repair and clean and coat steel, as a Life Cycle Cost analysis would likely indicate replacement would offer better value". The following is a summary of the principal deficiencies and maintenance needs documented in 2021:

- Cast-in-place concrete abutment walls: Medium to wide vertical cracks, rust stains.
- Cast-in-place concrete abutment wingwalls: Narrow efflorescence-stained cracks, minor delaminations, wide cracks, spall at SE.
- Abutment Bearings: Light to medium corrosion, flaking on bearing base plate, bolt tilted noted on exterior bearing of NE.

- Steel floor beams: Light to severe corrosion, small perforations noted on Northwest end, significant flaking in west side bottom flanges, missing bolt at connections of floor beam and stringer.
- Steel stringers/beams: Light to severe corrosion throughout all stringers. Stringers reinforced at 2nd stringer from East in 2020; flanges around reinforced plates should be monitored for fatigue cracks, missing bolt at connections.
- Steel trusses/arches (top chords): Rust jacking on top chord, light to severe corrosion at connections, perforations on top chord ends.
- Steel trusses/arches (bottom chords): Light to severe corrosions, minor deformations and twisting of steel, perforations noted.
- Steel trusses/arches (verticals and diagonals): Minor deformations and twisting of steel, light to severe corrosion. Deformation and twisting of diagonals at North, minor deformations and light rust jacking on diagonal connection plates, light to medium corrosion on diagonals.
- Steel Trusses/Arches Connections: Rust jacking noted at connection plates, light to severe corrosion and perforations noted, minor deformation noted.
- Steel bracing: Light to severe corrosion, broken bracing noted on East end, midspan not attached. Perforations at some connections.
- Steel barrier posts: Missing bolts (NE).
- Asphalt approaches: medium map cracking, pot hole at east near expansion joints.

4.3 Maxwell's Bridge

Maxwell's Bridge is a reinforced concrete, bowstring arch bridge constructed in 1927. It is located on Twyn Rivers Drive, which in this area is a two-lane winding road with dense forest on both sides and set among rolling hills in in a rural environment. The bridge crosses the Little Rouge Creek. Historically, the bridge is located on Concession 3, Lot 2 in the former Scarborough Township in York County.

The superstructure of Maxwell's Bridge is a bowstring arch design. The arches are 19 inches (48 cm) thick and 21 inches (53 cm) deep, and they rise approximately 1.8 m above the roadway at the mid-point of the span. The barriers/parapet walls are cast-in-place concrete, as are the barrows and top and bottom chords of the arches. The deck is supported by cast-in-place concrete floor beams.

The substructure includes abutment walls and wingwalls which are both cast-in-place concrete and sit on foundations below ground level.

The deck surface is asphalt with cast-in-place concrete underneath. The deck length is 20.9 m, and the overall structure width is 7.52 m for a combined total deck area of 157.2 m^2. The bridge carries two lanes of vehicular traffic with a posted speed limit of 40km/hr. There is a current load limit of 3 tonnes. The guard rails and hand railings are made of cast-in-place concrete and are affixed to the concrete arches on the bridge.

Maxwell's Bridge has been designated under Part IV of the *Ontario Heritage Act* (By-law No. 25152).

Maxwell's Bridge is currently owned and maintained by the City of Toronto. According to an inspection undertaken in 2021 (City of Toronto, 2021e), significant rehabilitation took place in 1997: the deck was

replaced and patch repairs were done to the top chord, verticals, floor beams, bottom chord, abutments, and wingwalls. The inspection recommended that ongoing maintenance was required. The following is a summary of the principal deficiencies and maintenance needs documented in 2021:

- Cast-in-place concrete curbs: Narrow to medium cracks, minor abrasions, light scaling, asphalt patch on east side, spalling on northeast side.
- Cast-in-place concrete barrier/parapet walls: Rust stains, narrow to medium vertical cracks, concrete patches. Delamination on concrete patches, few localized spall. Minor spall, narrow cracks and concrete patches.
- Cast-in-place concrete Barriers Railing System: Concrete patches, narrow to medium cracks, localized spalls, light to moderate scaling, delaminated concrete over railing.
- Cast-in-place concrete Trusses/Arches Bottom Chords: Narrow to medium cracks, stalactites, light scaling, concrete patch on east side, light spalling on SE.
- Cast-in-place concrete Trusses/Arches Top Chords: Narrow to medium crack, few spalls, concrete patches. Light to moderate scaling, delamination on NW.
- Cast-in-place concrete verticals/diagonals: Narrow to medium vertical cracks, delaminations on exterior - east, concrete patches, narrow cracks, rust stained crack.
- Cast-in-place concrete abutment walls: Narrow to medium cracks, rust stains, concrete patches, efflorescence, light to moderate scaling, Bird nest at NE, scouring noted on SW corner (monitor biennially), localized wide crack with delamination on NW.
- Cast-in-place concrete abutment wingwalls: Narrow to medium cracks, concrete patches, efflorescence cracks, moderate scaling on SW.
- Approaches Wearing Surface: Medium map cracking beyond approaches, wide crack at North approach, light to moderate raveling localized.
- Decks Wearing Surface: Medium to wide longitudinal and transverse crack, light to moderate raveling. Localized severe raveling near joints at South (previously patched), minor pothole on NBL.

4.4 Hillside Bridge

Hillside Bridge is a Warren pony truss bridge constructed in 1917. It is located on Meadowvale Road in the former Township of Scarborough, now the City of Toronto. This stretch of Meadowvale Road is a mix of large open land and dense forest and set in a rural environment. The bridge crosses the Little Rouge Creek. Historically, the bridge is located on Concession 4, between Lots 4 and 5 in the former Scarborough Township in York County.

The superstructure of Hillside Bridge is a Warren pony truss design. Each truss is made of steel and has six panels – measuring approximately 4.2 m long and 2.6 m high – across the span. The top chord is flat and horizontal through the middle, but angles down at both ends to connect with the bottom chords at the abutment bearing. The deck is supported by I type steel floor beams, stringers, and bracings. I beams are located at each panel point, approximately 1.8 m below the top of the truss.

The substructure is supported by abutment walls, abutment wingwalls, and ballast walls, all of which are cast-in-place concrete and sit on foundations below ground level.

The deck wearing surface is galvanized steel grating. Expansion joints are found at the limits of the deck at both ends. The deck length is 25.6 m long and the overall structure width is 5.14 m for a combined total deck area of 131.6 m^2. The bridge carries one lane of vehicular traffic with a posted speed limit of 50km/hr. There is a current load limit of 15 tonnes. The guard rails and hand railings are made of steel and are affixed to the steel truss on the bridge (though the guard rails are affixed to wood posts at both approaches).

Hillside Bridge has been designated under Part IV of the *Ontario Heritage Act* (By-law No. 25153).

Hillside Bridge is currently owned and maintained by the City of Toronto. According to an inspection undertaken in 2021 (City of Toronto, 2021b), significant rehabilitation took place in 1986: concrete patch repairs were made to the abutments, new deck grating was installed, gabion baskets were rebuilt, new stringers were installed, and the steel was cleaned and painted. The inspection recommended that major rehabilitation in 1-5 years was required, with the following general comment: "Abutment walls, ballast wall, abutment bearing, wingwalls and truss members exhibit significant deterioration". The following is a summary of the principal deficiencies and maintenance needs documented in 2021:

- Steel floor beams: Light to medium corrosion, localized severe corrosion on bottom flanges on beams and connections, localized perforation noted on floor beam. Light to severe corrosion at ends, light flaking, perforation on floor beam noted at few location with crack.
- Steel Stringers: Light corrosion at ends near abutment and moderate flaking with moderate to severe corrosion on every connections of stringers and floor beams. Moderate localized corrosion on few joints of stringers.
- Steel Bracing: Light to medium corrosion throughout, few localized area of severe flaking and corrosion. More severe corrosion and perforation on connection plates at trusses.
- Steel Deck Wearing Surface: Abrasion, impact damage and light corrosion. Slightly damaged grating, few locations of disconnected steel grating.
- Gabion Retaining Walls: Broken gabion basket with loss of rock material at SE.
- Steel trusses/arches (top chords): Light to severe corrosion at North abutment, perforation at SE, abrasion.
- Steel trusses/arches (bottom chords): Light to severe corrosion, perforations mostly at connections to vertical and diagonal bracing. System rated. Severe corrosion at NE
- Steel trusses/arches Connections: Medium to severe corrosion.
- Steel trusses/arches (verticals/diagonals): Light to medium corrosion, light to medium rust jacking, moderate to severe corrosion with minor perforation on few locations.
- Cast-in-place concrete abutment walls: Light to severe scaling and disintegration at north. Wet staining, rust stains, wide cracks and spall at south. Severe spalling below bearings at North. Delamination, narrow to medium cracks.
- Cast-in-place concrete ballast walls: delamination, narrow to wide cracks, medium scaling.
- Cast-in-place concrete abutment wingwalls: Light to severe scaling, horizontal separation, scaling more severe at north end. Narrow to medium cracks, efflorescence, rust stains.
- Abutment bearings: Light to medium corrosion on plates, buildup of debris, spalling below bearing at North abutment.

- Asphalt Approaches, Wearing Surface: Minor settlement, pothole at north near expansion joint. Asphalt patches.

4.5 Milne Bailey Bridge

The Milne Bailey Bridge is a Bailey panel design, constructed in 1988. It is located on Old Finch Avenue, east of Sewell's Road, which in this area is a two-lane winding road with dense woods on both sides and set in a rural environment. The bridge crosses the Rouge River. Historically, the bridge is located on Concession 4, Lot 8 in the former Scarborough Township in York County.

The superstructure of the Milne Bailey Bridge is of the Bailey design. It is a single-lane two-span bridge. Each truss is made of steel and has top and bottom chords, and verticals and diagonals. Panels are cross braced and connected via pins to create a continuous girder. The deck is supported by steel floor beams, stringers, diaphragms, and bracings.

The substructure includes a wood pier (shafts/columns/pile bents) and cast-in-place concrete abutment walls and ballast walls which sit on foundations below ground level. The wooden pier was constructed in 1954 to support the first Bailey bridge at this crossing. The cast-in-place concrete abutments adjacent to the 1988 abutments are from a previous crossing and they do not support the subject bridge.

The deck is a metal grating made of steel. The deck length is 57.9 m long and the overall structure width is 5.47 m for a combined total deck area of 316.7 m^2. The bridge carries one lane of motor traffic with a posted speed limit of 20km/hr. There is a current load limit of 5 tonnes. The railing system is made of steel.

The Milne Bailey Bridge (also known as the Finch Meander Bridge) is identified as a Listed property on the City of Toronto *Heritage Register* and has been nominated for individual designation under the Ontario Heritage Act (City of Toronto Heritage Planning Memorandum, 2 February 2022).

The Milne Bailey Bridge is currently owned and maintained by the City of Toronto. The 2021 inspection (City of Toronto, 2021d) provided the following general comment: "Current deck grating has broken welds, loose bolts, cracks. missing pieces of grating and large plates are used as patches. It is recommended to replace deck grating". The following is a summary of the principal deficiencies and maintenance needs documented in 2021:

- Steel deck top: Light corrosion, broken sections of grating at North, steel plate covers welded on deck - most welds on plates are broken, loose sections of steel grating due to missing bolts on grating, cracks on grating, missing pieces of grating.
- Steel railing system: impact damage noted on flex beam at NE.
- Steel trusses/arches (top chords): Light corrosion, missing bolt on bracing frame.
- Steel trusses/arches (verticals/diagonals): light corrosion, impact damage to NE end vertical.
- Asphalt approaches: Asphalt patches, narrow to medium map cracking, minor settlement on both approaches. Minor pothole in north approach. Narrow to wide cracks.
- Steel Diaphragms: Light corrosion, localized medium corrosion. Severe corrosion with perforations.

- Steel Pier Caps: Moderate to severe corrosion with flaking in web and flanges.

5.0 DESCRIPTION AND PURPOSE OF PROPOSED ACTIVITY

Based on the age of the bridges and their structural conditions observed in biennial inspections, the Transportation Master Plan (TMP) process for these bridges is required to address the transportation goals of the project and to identify short and/or long-term plans for the structures. The assessment is required to assess potential impacts to each of the five structures and to outline suitable mitigation recommendations for the structures. The study is a part of the Rouge Park Bridges TMP.

The evaluation of potential impacts on the heritage resources in the draft preliminary Heritage Impact Assessment (HIA) prepared in 2020 recommended that each of the five bridges be rehabilitated and retained in place, if feasible. The best strategy from a cultural heritage perspective is continual maintenance, rehabilitation, and conservation. This recommendation was reviewed and considered by the project team when developing the preferred alternative for each bridge site.

The Rouge Park Bridges TMP was scoped to evaluate alternative solutions including retention, rehabilitation, replacement, and retirement of the structures with consideration for the following (Dillon Consulting Limited, 2022a, p. 5):

- Safe and efficient emergency vehicle and maintenance vehicle access
- Access to existing and future land uses, including park-related trails and infrastructure
- Traffic volumes, future demands and available network capacity
- Maintenance of the two-lane rural character of the existing roadways
- Low clearance constraints at CP Rail crossings of Sewells Road and Meadowvale Road
- Improvements to pedestrian and cycling infrastructure
- RNUP's legislation to conserve nature, culture, and agriculture, including first management priority for ecological integrity
- Provincial Greenbelt policies and City of Toronto policies regarding infrastructure improvements, as well as Parks Canada's RNUP Management Plan guidance in relation to ecological integrity and infrastructure
- Provincial requirements for treatment of heritage bridges.

5.1 Preliminary Alternatives Considered

The four preliminary alternative solutions under consideration during the Transportation Master Plan (TMP) were evaluated based on how each alternative supported the main goals and requirements of the TMP. These four preliminary alternative solutions included:

- Remove- Remove the existing bridge and block roadway access to across the river
- Retain- Keep the existing bridge with minimal changes ("Do Nothing")
- Rehabilitate- Keep the existing bridge with major changes and potential widening
- Replace- Construct a new bridge to current standards and remove the existing one

As a preliminary evaluation determined that a bridge was required at each of the crossing locations, the removal option was eliminated from consideration. Factors such as bridge condition and function, transportation requirements, heritage and archaeological potential, natural environment and hydraulics, public uses in the Rouge National Urban Park (RNUP), and cost and complexity of implementation were considered during the selection of the preferred alternative at each site.

The preferred alternative for each bridge site includes: retention of Sewell's Bridge (Structure ID 812) and Maxwell's Bridge (Structure ID 802) with sympathetic maintenance repairs , and the replacement of Milne Bailey Bridge (Structure ID 813), Stott's Bridge (Structure ID 803), and Hillside Bridge (Structure ID 806). Mitigation measures discussed in Section 7.2 have been developed in consideration of the impact assessment in Section 6.0 and have been prepared to reduce or eliminate direct, negative impacts to the identified heritage attributes of the structures to the extent practicable.

As Sewell's Bridge (Structure ID 812), Maxwell's Bridge (Structure ID 802), Stott's Bridge (Structure ID 803), and Hillside Bridge (Structure ID 806) are designated under Part IV of the *Ontario Heritage Act*, any alterations to, and removal of heritage attributes of the heritage bridges will require City Council approval and a report to the Toronto Preservation Board. The demolition (including relocation) of a heritage bridge will require City Council approval and a report to the Toronto Preservation Board (Heritage Planning, City of Toronto Memorandum, 2 February 2022).

5.2 Ontario Heritage Bridge Guidelines Options

Evaluation of feasible conservation alternatives was based on the *Standards and Guidelines for the Conservation of Historic Places in Canada* (Parks Canada, 2010) which provides principles for infrastructure conservation and references the *Ontario Heritage Bridge Guidelines* (OHBG) (Ministry of Culture and Ministry of Transportation, 2008), for the specific case of bridges. This provides a rank-order approach to heritage bridge conservation options, ranging from least to most heritage impact. The rank-order approach requires each option to be evaluated and found to be non-viable before the subsequent option is considered.

The following section evaluates the viability of the OHBG Conservation Options at each bridge site with respect to the project goals and opportunities of the TMP. The eight rank-order OHBG Conservation Options include:

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

a) Where possible, salvage elements/ members of heritage bridge for incorporation into new structure or for future conservation work or displays
b) Replacement/removal of existing bridge with full recording and documentation of the heritage bridge

Evaluations were competed for each site on the basis of practical constraints and engineering judgement related to the feasibility to achieve a rehabilitation that meets industry strength, serviceability, reliability and safety requirements[11]. Practical considerations may include property constraints, level of service, durability, constructability and the degree of alteration to the existing structure. As alterations become more extensive, they become increasingly impractical from an engineering standpoint and they also tend to have increasing impact on heritage value of the bridge by changing materials, massing, proportions, and overall appearance.

For the sake of evaluating bridge heritage options, a narrow context related to engineering is the primary consideration relative to heritage impacts. Broader factors (such as natural environment impacts, hydraulic conveyance, future growth, etc.) would be evaluated in the context of the overall Transportation Master Plan, and have limited consideration in this report.

The engineering evaluations were undertaken by Dillon Consulting Limited, in consultation with Archaeological Services Inc., and are summarized below.

It should be noted that single-lane bridges with signage for drivers to yield to alternating traffic were viewed as undesirable from a safety standpoint, but that consideration alone was not considered sufficient to be considered non-viable. Strengthening of the bridges to improve access in the park for fire trucks and emergency vehicles from the south and west was considered important, with a target rehabilitation level to CL3-ONT, as defined in Table 15.1 of the Canadian Highway Bridge Design Code (2019), corresponding to a posted load limit of approximately 25 tonnes.

It should be noted that detailed alterations would be the subject of further study in the detailed design phase of project implementation, following completion of the Transportation Master Plan.

The full OHBG Conservation Option evaluation tables are included in in Appendix D. A summary of the OHBG evaluations determined that the preferred Conservation Options for the subject bridges are:

- Sewell's Bridge: Retention of existing bridge with no major modifications undertaken (OHBG Conservation Option 1) was the recommended option.

- Stott's Bridge: Bridge removal and replacement with a sympathetically designed structure (OHBG Conservation Option 8) was the recommended option, with the potential for Relocation of bridge to appropriate new site for continued use or adaptive re-use (OHBG Conservation Option 7).

[11] The OHBG Conservation Options were evaluated by Dillon Consulting Limited and provided to ASI for inclusion in this report. Portions of the evaluation and discussion in Section 7.2 was also prepared by Dillon Consulted Limited.

- Maxwell's Bridge: Retention of existing bridge with no major modifications undertaken (OHBG Conservation Option 1) was the recommended option.

- Hillside Bridge: Bridge removal and replacement with a sympathetically designed structure (OHBG Conservation Option 8) was the recommended option, with the potential for Relocation of bridge to appropriate new site for continued use or adaptive re-use (OHBG Conservation Option 7).

- Milne Bailey Bridge: Bridge removal and replacement with a sympathetically designed structure (OHBG Conservation Option 8) was the recommended option, with the potential for Relocation of bridge to appropriate new site for continued use or adaptive re-use (Conservation Option 7).

5.3 Preferred Alternative for Sewell's Bridge (Structure ID 812)

The preferred alternative for Sewell's Bridge includes the retention of the structure with sympathetic maintenance repairs. According to the Functional Design Report prepared for this project, retention is the preferred option as the bridge has remaining service life, and a regular monitoring and maintenance program is recommended. Retention with maintenance repairs is noted to also be preferred as it represents the lowest capital cost alternative, and it will conserve the cultural heritage value of the bridge, which is identified as an important consideration in the assessment of bridge alternatives (Dillon Consulting Limited, 2023d, p. 13,17).

Rehabilitation was eliminated from consideration as it cannot address the safety concerns and functional limitation of the single lane crossing without replacing a large portion of the superstructure, which would eliminate the bridge's heritage value. Further, removal and replacement was eliminated from consideration as it is not warranted based on the bridge condition (Dillon Consulting Limited, 2023d, pp. 16–17).

The maintenance repairs for Sewell's Bridge are anticipated to be confined to deteriorated structural elements that are in need of replacement or repair to ensure the long-term safe function of the structure as a vehicular crossing, but would not remove the existing 5 tonne load posting. Elements in need of rehabilitation or replacement are outlined in the 2021 OSIM Inspection report (City of Toronto, 2021c) and in Section 4.1, and are anticipated to include (Dillon Consulting Limited, 2023d, p. 13):

- Localized steel repairs to address severe section loss (particularly at the connections);
- Localized blasting and spot recoating at locations of coating failure;
- Installation of guard rails on the existing stiffening trusses to reduce damage from collisions; and
- Patch repairs to the concrete deck, piers and abutments.

A preliminary conceptual general arrangement drawing of the proposed rehabilitation of Sewell's Bridge (representing 10% design development) is included in Appendix C.

5.4 Preferred Alternative for Stott's Bridge (Structure ID 803),

Based on a review of the structural deficiencies outlined in the 2021 OSIM Inspection report (City of Toronto, 2021a) and in Section 4.2, the preferred alternative for Stott's Bridge includes the removal and replacement of the structure. According to the Functional Design Report prepared for this project, this alternative:

> …provides the most improvements to the safety and overall function of the crossing. The replacement structure would be designed in accordance with current standards and would provide access for truck traffic, including emergency vehicles and large service trucks…A new two-lane configuration would reduce collision risk and improve access for commuter cyclists. A concrete deck and asphalt wearing surface could be provided to improve the rideability for users and help protect the primary structural members from corrosion, reducing maintenance requirements. Minimal maintenance would be expected for the first 20 years. Modern structural configurations and materials could be used, resulting in a more durable structure with lower ongoing maintenance requirements (Dillon Consulting Limited, 2023e, p. 17).

Retaining the bridge was determined to be infeasible based on the current condition, because the existing design is obsolete, and because rehabilitation could not address all of the safety concerns and functional deficiencies without major modifications (Dillon Consulting Limited, 2023e, p. 18). Based on information available, the scope and number of deteriorated elements that would require replacement to ensure public safety would have the potential to significantly diminish the bridge's cultural heritage value. At the time of report preparation (November 2023), a sympathetically-designed modern pony-truss had been recommended as the preferred replacement structure type. A preliminary conceptual general arrangement drawing of the proposed replacement of Stott's Bridge (representing 10% design development) is included in Appendix C.

Further, the salvage and retention of the existing bridge for rehabilitation and reuse at another crossing for pedestrian and cycling loading, potentially within the Rouge National Urban Park (RNUP), is under consideration at the time of report preparation. Relocation of the existing bridge to another crossing within the RNUP would reduce the impacts to the identified cultural heritage value of the structure, and should be carried forward for consideration.

Consideration is being given to installing commemorative interpretation at the subject crossing following construction of the replacement bridge (Dillon Consulting Limited, 2023e, p. 18).

As the preferred alternative involves the complete removal and replacement of the subject bridge, all of the heritage attributes outlined in Section 3.2 are anticipated to be completely removed. The historical and contextual associations of the crossing could be maintained with a sympathetically-designed structure.

5.5 Preferred Alternative for Maxwell's Bridge (Structure ID 802)

The preferred alternative for Maxwell's Bridge includes the retention of the structure with sympathetic maintenance repairs. According to the Functional Design Report prepared for this project, retention is the preferred option as the bridge has remaining service life, and a regular monitoring and maintenance program is recommended. Retention with maintenance repairs is noted to also be preferred as it represents the lowest capital cost alternative, and it will conserve the cultural heritage value of the bridge, which is identified as an important consideration in the assessment of bridge alternatives (Dillon Consulting Limited, 2023b, p. 13,17).

Rehabilitation to permit truck traffic was eliminated from consideration and considered infeasible as modest strengthening would significantly alter the form and appearance of the structure and negatively impact the bridge's cultural heritage value. Further, removal and replacement was eliminated from consideration as it is not warranted based on the bridge condition (Dillon Consulting Limited, 2023b, p. 16)

The maintenance repairs for Maxwell's Bridge are anticipated to be confined to deteriorated structural elements that are in need of replacement or repair to ensure the long-term safe function of the structure as a vehicular crossing. Elements in need of rehabilitation or replacement are outlined in the 2021 OSIM Inspection report (City of Toronto, 2021e) and in Section 4.3, and are anticipated to include: concrete patch repairs to address areas of medium to severe deterioration, for example, where delamination, spalls, and scaling are observed.

A preliminary conceptual general arrangement drawing of the proposed rehabilitation of Maxwell's Bridge (representing 10% design development) is included in Appendix C.

5.6 Preferred Alternative for Hillside Bridge (Structure ID 806)

Based on a review of the structural deficiencies outlined in the 2021 OSIM Inspection report (City of Toronto, 2021b) and in Section 4.4, the preferred alternative for Hillside Bridge includes the removal and replacement of the structure. According to the Functional Design Report prepared for this project, this alternative:

> …provides the most improvements to the safety and overall function of the crossing. The replacement structure would be designed in accordance with current standards and would provide access for truck traffic, including emergency vehicles and large service trucks.
>
> A new two-lane configuration would reduce collision risk and improve access for commuter cyclists. A concrete deck and asphalt wearing surface could be provided to improve the rideability for users and help protect the primary structural members from corrosion, reducing maintenance requirements. Minimal maintenance would be expected for the first 20 years. Modern structural configurations and materials could be used, resulting in a more durable structure with lower ongoing maintenance requirements (Dillon Consulting Limited, 2023a, p. 17).

Retaining the bridge was determined to be infeasible based on the current condition, because the existing design is obsolete, and because rehabilitation could not address all of the safety concerns and functional deficiencies without major modifications (Dillon Consulting Limited, 2023a, p. 18). Based on information available, the scope and number of deteriorated elements that would require replacement to ensure public safety would have the potential to significantly diminish the bridge's cultural heritage value. At the time of report preparation (November 2023), a sympathetically-designed modern pony-truss had been recommended as the preferred replacement structure type. A preliminary conceptual general arrangement drawing of the proposed replacement of Hillside Bridge (representing 10% design development) is included in Appendix C.

Further, the salvage and retention of the existing bridge for rehabilitation and reuse at another crossing for pedestrian and cycling loading, potentially within the Rouge National Urban Park, was under consideration at the time of report preparation. Relocation of the existing bridge to another crossing within the RNUP would reduce the impacts to the identified cultural heritage value of the structure, and should be carried forward for consideration.

Consideration is being given to installing commemorative interpretation at the subject crossing following construction of the replacement bridge (Dillon Consulting Limited, 2023a, p. 17).

As the preferred alternative involves the complete removal and replacement of the subject bridge, all of the heritage attributes outlined in Section 3.4 are anticipated to be completely removed. The historical and contextual associations of the crossing could be maintained with a sympathetically-designed structure.

5.7 Preferred Alternative for Milne Bailey Bridge (Structure ID 813)

Based on a review of the structural deficiencies outlined in the 2021 OSIM Inspection report (City of Toronto, 2021d) and in Section 4.5, the preferred alternative for Milne Bailey Bridge includes the removal and replacement of the structure. According to the Functional Design Report prepared for this project, this alternative:

> …allows the greatest improvement in the functional adequacy of the bridge such as load-carrying capacity, width, and service life… Replacement would remove constraints such as load limits, span limits, bridge clearance for hydraulics, bridge width, number of lanes, shoulder widths, roadside safety barriers, bicycle lanes, and pedestrian accommodation. It also provides the opportunity to use new materials and structure forms to improve durability (Dillon Consulting Limited, 2023c, p. 12).

Retaining the bridge was determined to be infeasible based on the current condition of the existing pier bent. Rehabilitating the structure was determined to be infeasible as the proprietary Bailey design is no longer manufactured, and so sourcing replacement panels in good condition to complete the rehabilitation would add significant risk to the project (Dillon Consulting Limited, 2023a, p. 18). At the time of report preparation (November 2023), a sympathetically-designed steel modular panel bridge, similar to a modular Bailey bridge, had been recommended as the preferred replacement structure type.

A preliminary conceptual general arrangement drawing of the proposed replacement of Milne Bailey Bridge (representing 10% design development) is included in Appendix C.

Further, the salvage and retention of the existing bridge for rehabilitation and reuse at another crossing for pedestrian and cycling loading, potentially within the RNUP, was under consideration at the time of report preparation. Relocation of the existing bridge to another crossing within the RNUP would reduce the impacts to the identified cultural heritage value of the structure, and should be carried forward for consideration.

Consideration is being given to installing a commemorative monument, plaque, or sign at the subject crossing following construction of the replacement bridge (Dillon Consulting Limited, 2023c, p. 13).

As the preferred alternative involves the complete removal and replacement of the subject bridge, all of the heritage attributes outlined in Section 2.5 are anticipated to be completely removed. The historical and contextual associations of the crossing could be maintained with a sympathetically-designed modular panel replacement structure.

6.0 IMPACT ASSESSMENT

To assess the potential impacts of the proposed alternatives, each cultural heritage resource and their identified heritage attributes were considered against a range of possible impacts (Table 2) as outlined in the Ministry of Citizenship and Multiculturalism's document entitled *Screening for Impacts to Built Heritage and Cultural Heritage Landscapes* (MTCS, 2010), which include:

- Destruction of any, or part of any, significant heritage attribute or feature (III.1).
- Alteration which means a change in any manner and includes restoration, renovation, repair or disturbance (III.2).
- Shadows created that alter the appearance of a heritage attribute or change the visibility of a natural feature of plantings, such as a garden (III.3).
- Isolation of a heritage attribute from its surrounding environment, context, or a significant relationship (III.4).
- Direct or indirect obstruction of significant views or vistas from, within, or to a built and natural feature (III.5).
- A change in land use such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces (III.6).
- Soil disturbance such as a change in grade, or an alteration of the drainage pattern, or excavation, etc. (III.7)

Where negative impacts of the development on the cultural heritage resource and/or attributes are identified, mitigative or avoidance measures or alternative development or site alteration approaches are considered. Conservation options are outlined in the *Ontario Heritage Bridge Guidelines* (OHBG) (Ministry of Culture and Ministry of Transportation, 2008), which is regarded as current best practice for conserving heritage bridges in Ontario. While intended for use in the assessment of provincially-owned structures and not directly applicable to the municipal context, the OHBG ensures that heritage concerns and appropriate mitigation options are considered.

The proposed potential options for the rehabilitation or replacement of the subject bridges are anticipated to have a range of potential impacts to the identified heritage attributes. At the time of this updated report (2023), the preferred alternative for each bridge site includes: retention of Sewell's Bridge (Structure ID 812) and Maxwell's Bridge (Structure ID 802) with sympathetic maintenance repairs, and the replacement of Milne Bailey Bridge (Structure ID 813), Stott's Bridge (Structure ID 803), and Hillside Bridge (Structure ID 806).

As the Transportation Master Plan has only recommended the preferred alternative for each bridge, and only conceptual design work has been completed, this report is scoped to evaluate potential impacts in a broad sense related only to either the rehabilitation or replacement of the bridges. As each of the subject bridges are identified as built heritage resources by the City of Toronto, and there are direct impacts anticipated to each in the recommended alternatives, a resource-specific HIA will be required to assess the specific impacts to each structure and provide specific mitigation measures for each. These HIAs should be prepared by a qualified heritage consultant with recent and relevant experience with heritage bridges according to the *City of Toronto's Terms of Reference for Heritage Impact Assessments* (City of Toronto, 2019) as early as possible in preliminary or detailed design. These HIAs should be submitted for review and comment to the Ministry of Citizenship and Multiculturalism and Heritage Planning at the City of Toronto. The resource specific HIAs will include an updated Ontario Regulation 9/06 evaluation for each structure designated before 2005.

6.1 Sewell's Bridge (Structure ID 812)

The preferred alternative for Sewell's Bridge includes the retention of the structure with sympathetic maintenance repairs and is anticipated to result in minor impacts to the cultural heritage value or interest of the bridge. While the removal and replacement of deteriorated elements will result in direct impacts to the subject bridge, routine maintenance and repairs are considered to be necessary to enable the continued operation of the bridge and to ensure public safety. As such, the following impact assessment considers the net impacts of the intervention on the subject bridge, whereby the severity, duration, and magnitude of the intervention is anticipated to be reduced with suitable mitigation measures and sympathetic rehabilitations. Completing routine maintenance and performing sympathetic repairs, where required, is considered to be the best strategy to ensure the long-term preservation of the structure in a manner that is minimally impactful to the identified heritage attributes.

Direct impacts to the steel trusses and hangers are anticipated to be minor if the repairs or replacements are carried out in a sympathetic manner and are limited only to the deteriorated elements. Additional direct impacts to the concrete on the deck top and soffit, the barriers, abutment walls, and piers are anticipated to include localized concrete removals to ensure a suitable bonding surface and spot patching cracks or deteriorated sections of concrete. While considered to be direct impacts, these interventions are positive from the cultural heritage perspective as they would enable the retention of the cast-in-place concrete elements and continue their historical function at the subject crossing.

Asphalt repair on the approaches is required, however this is anticipated to be limited in scope and will not result in negative direct impacts to the subject bridge. As the roadway and subject bridge have been at this crossing since 1912, road repairs at the approaches are not believed to represent a significant impact as they could be expected as part of maintenance operations and do not represent a change inconsistent with historical uses or functions of the area.

No impacts to the function of the bridge as an important crossing or to its relationship to the roads or other bridges in the Rouge River area are anticipated. The subject bridge will continue to function as an important crossing in the City of Toronto, will retain its distinction as the only single lane suspension bridge on a municipal roadway, and will retain its landmark status to road users.

The repair or replacement of deteriorated elements in the superstructure are not anticipated to result in any direct adverse impacts to identified heritage attributes if construction and staging are suitably planned to prevent unintended impacts.

Localized concrete removals and asphalt repair on the approaches has the potential for unintended indirect impacts to the heritage attributes of this structure through potential vibration damage due to construction activity adjacent to the structure. Asphalt removal, grinding, and the use of heavy machinery on the approaches have the potential to result in temporary vibration impacts during construction. The scale, magnitude, and duration of construction related vibrations depend on a number of factors, and it is unclear at the time of reporting if they would present any impacts to the subject bridge. In this respect, a vibration monitoring plan should be implemented and followed during construction.

The impacts of the preferred alternative for Sewell's Bridge, including the rehabilitation and retention of the 1912, suspension bridge are considered to be of a low magnitude, severity, duration, and frequency. These impacts can be mitigated through further design refinement with regard to sympathetic maintenance repairs and replacement of deteriorated elements and selection of exterior finishes, materials, and palettes. Suitable construction planning and execution would prevent or reduce temporary or unintended impacts, and post-construction landscaping plans may also mitigate visual impacts to the bridge setting. Mitigation measures outlined in Section 7.1 of this report have been prepared to further reduce these impacts and should be implemented as appropriate to the extent practicable.

6.2 Stott's Bridge (Structure ID 803),

The preferred alternative for Stott's Bridge includes the removal and replacement of the structure at the crossing, which is anticipated to involve the complete removal of the 1915 steel Warren pony truss superstructure and cast-in-place concrete substructure. The replacement bridge is anticipated to be a sympathetically-designed modern pony-truss with a slightly larger scale and massing to accommodate two lanes of traffic, and with a similar alignment in the road right-of-way as the existing structure. According to a preliminary conceptual general arrangement drawing (representing 10% design development and featured in Appendix C), the proposed replacement bridge is anticipated to be 40 m in length, approximately 3 m in height, and 12.6 m in overall width. The proposed replacement bridge is slightly longer than the existing structure, and the soffit will have slightly higher clearance over the

watercourse to ensure the deck is above the 1 in 100-year watermark. To accommodate this increased length, minor grading will be required at the banks of the watercourse to enable construction of the abutments. The proposed replacement structure is a five panel Warren pony truss with verticals, and will rest on concrete abutments. The proposed replacement bridge is considered to be a sympathetic-replacement of the 1915 steel Warren pony truss structure, and should be carried forward to subsequent design phases.

All identified heritage attributes of the subject bridge included in Section 3.2 are expected to be subject to direct, permanent, adverse impacts through removal as a result of the preferred alternative.

The removal of the subject bridge and replacement with a sympathetically-designed replacement structure would continue the historical and contextual associations of the crossing as a road bridge over the Rouge River in the City of Toronto. The installation of suitable commemorative interpretation following construction, noted as being under consideration at this site, should be implemented to further support the historical association of the crossing. Mitigation measures outlined in Section 7.2 of this report have been prepared to reduce these impacts and should be implemented as appropriate to the extent practicable.

6.3 Maxwell's Bridge (Structure ID 802)

The preferred alternative for Maxwell's Bridge includes retention of the structure with sympathetic maintenance repairs and is anticipated to result in minor impacts to the cultural heritage value or interest of the bridge. While the rehabilitation of deteriorated elements will result in direct impacts to the subject bridge, routine maintenance and repairs are considered to be necessary to enable the continued operation of the bridge and to ensure public safety. As such, the following impact assessment considers the net impacts of the intervention on the subject bridge, whereby the severity, duration, and magnitude of the intervention is anticipated to be reduced with suitable mitigation measures and sympathetic rehabilitations. Completing routine maintenance and performing sympathetic repairs, where required, is considered to be the best strategy to ensure the long-term preservation of the structure in a manner that is minimally impactful to the identified heritage attributes.

Direct impacts to the concrete of the curbs, barrier walls and parapet, and arch verticals and diagonals are anticipated to include localized concrete removals to ensure a suitable bonding surface and spot patching cracks or deteriorated sections of concrete. While considered to be direct impacts, these interventions are positive from the cultural heritage perspective as they would enable the retention of the cast-in-place concrete elements and continue their historical function at the subject crossing.

No impacts to the function of the bridge as an important crossing or to its relationship to the roads or other bridges in the Rouge River area are anticipated. The subject bridge will continue to function as an important crossing in the City of Toronto, and will retain its landmark status to road users.

The impacts of the preferred alternative for Maxwell's Bridge, including the rehabilitation and retention of the 1927 concrete bowstring arch bridge, are considered to be of a low magnitude, severity, duration, and frequency. These impacts can be mitigated through further design refinement with regard to sympathetic maintenance repairs of deteriorated elements with the appropriate selection of exterior

finishes, materials, and palettes. Suitable construction planning and execution would prevent or reduce temporary or unintended impacts, and post-construction landscaping plans may also mitigate visual impacts to the bridge setting. Mitigation measures outlined in Section 7.3 of this report have been prepared to further reduce these impacts and should be implemented as appropriate to the extent practicable.

6.4 Hillside Bridge (Structure ID 806)

The preferred alternative for Hillside Bridge includes the removal and replacement of the structure at the crossing, which is anticipated to involve the complete removal of the 1917 steel Warren pony truss superstructure and cast-in-place concrete substructure. The replacement bridge is anticipated to be a sympathetically-designed modern pony-truss with a slightly larger scale and massing to accommodate two lanes of traffic, and with a similar alignment in the road right-of-way as the existing structure. According to a preliminary general arrangement drawing (representing 10% design development and featured in Appendix C), the proposed replacement bridge is anticipated to be 40 m in length, approximately 3 m in height, and 12.6 m in overall width. The proposed replacement bridge is slightly longer than the existing structure, and features a generally similar vertical alignment and clearance above the watercourse. To accommodate this slight increase in length, minor grading will be required at the banks of the watercourse to enable construction of the abutments. The structure is a five panel Warren pony truss with verticals, and will rest on concrete abutments. The proposed replacement bridge is considered to be a sympathetic-replacement of the 1917 steel Warren pony truss structure, and should be carried forward to subsequent design phases.

All identified heritage attributes of the subject bridge included in Section 3.4 are expected to be subject to direct, permanent, adverse impacts through removal as a result of the preferred alternative.

The removal of the subject bridge and replacement with a sympathetically-designed replacement structure would continue the historical and contextual associations of the crossing as a road bridge over Little Rouge Creek in the City of Toronto. The installation of suitable commemorative interpretation following construction, noted as being under consideration at this site, should be implemented to further support the historical association of the crossing. Mitigation measures outlined in Section 7.4 of this report have been prepared to reduce these impacts and should be implemented as appropriate to the extent practicable.

6.5 Milne Bailey Bridge (Structure ID 813)

The preferred alternative for the Milne Bailey Bridge includes the removal and replacement of the structure at the crossing, which is anticipated to involve the complete removal of the 1988 Bailey bridge superstructure, cast-in-place concrete substructure, and central wooden pier. The replacement bridge is anticipated to be a sympathetically-designed modern modular steel panel truss with a shorter span and greater width to accommodate two lanes of traffic, on a similar alignment in the road right-of-way as the existing structure. According to a preliminary general arrangement drawing (representing 10% design development and featured in Appendix C), the proposed replacement bridge is anticipated to be 36.6 m in length, 2.5 m in height, and 12.5 m in overall width. The proposed replacement bridge is

slightly shorter than the existing structure to eliminate the requirement for a pier in the watercourse and allow for a single span. The proposed replacement features a generally similar vertical alignment and clearance above the watercourse. To accommodate this slight decrease in length, minor infilling will be required at the banks of the watercourse to enable construction of the abutments. The proposed structure is a 12-panel modular steel truss with an epoxy aggregate on steel deck, and will rest on concrete abutments. While the existing Milne Bailey Bridge, and Old Finch Avenue itself lack pedestrian sidewalks, the proposed replacement bridge includes a cantilevered sidewalk on the east elevation 1.52 m in width in the event that sidewalks are added to the roadway in the future.

All identified heritage attributes of the subject bridge included in Section 2.5 are expected to be subject to direct, permanent, adverse impacts through removal as a result of the preferred alternative.

No direct, permanent, adverse impacts to the riverine setting or to the established roadways within the RNUP are anticipated as a result of the preferred alternative.

The removal of the subject bridge and replacement with a sympathetically-designed replacement modular panel bridge would continue the historical and contextual associations of the crossing as a road bridge over the Rouge River in the City of Toronto. The installation of suitable commemorative interpretation following construction, noted as being under consideration at this site, should be implemented to further support the historical association of the crossing. Mitigation measures outlined in Section 7.5 of this report have been prepared to reduce these impacts and should be implemented as appropriate to the extent practicable.

7.0 MITIGATION MEASURES

According to the *Ontario Heritage Toolkit* (MTCS, 2006) the following mitigation or avoidance measures are recommended to prevent or limit the impacts of proposed developments on identified cultural heritage resources:

- 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; and
- Buffer zones, site plan control, and other planning mechanisms

7.1 Sewell's Bridge (Structure ID 812)

The proposed intervention should be planned and executed to limit all direct impacts to the subject bridge while allowing for maintenance repairs and continued use of the structure to carry road traffic at the subject crossing. In this respect, the preferred alternative should involve sympathetic maintenance repairs to retain the subject bridge in situ to maintain the physical, historical, and contextual associations of the Sewell's Bridge. Retention and sympathetic maintenance repairs with allowances

made for inclusion of modern materials to meet current design and safety codes is the preferred option from a heritage perspective as it would retain the heritage attributes of the bridge and retain the historical and contextual value of the subject crossing. Rehabilitation would require the replacement of deteriorated structural members and would be considered to be a permanent and irreversible impact. However, these repairs are considered necessary to ensure the continued use of the structure as a watercourse crossing and will ensure the retention and long-term preservation of the structure.

The rehabilitation or replacement of deteriorated elements should be designed to be compatible with the style and character of the subject bridge, be based on physical and documentary evidence such as photographs and original structural drawings, and be mindful of the context, scale, massing, and material of the original structure (Ministry of Culture and Ministry of Transportation, 2008). Based on a review of background documents and the recommendations put forward in the TMP, the proposed maintenance repairs are anticipated to be designed in a sympathetic manner, with due consideration given to reducing the net impacts of the intervention on the heritage character of the bridge. In this respect, the proposed sympathetic maintenance repairs are considered to be a positive impact to the heritage value of the structure and of the crossing and should be carried forward.

To ensure that the repair or replacement of deteriorated structural elements are sympathetic with the original, the colour and the appearance of the replacement elements and repairs should be selected to match the existing structure. In this respect, replacement steel elements including truss hangers should be selected to match the existing hangers, and patch repairs to the concrete on the superstructure or should be selected to match the existing cast-in-place concrete. Visual impacts to the structure can be reduced though the appropriate selection of exterior finishes, materials, and palettes to ensure that rehabilitated elements are subordinate to, and compatible and sympathetic with the naturalized setting of the bridge.

Asphalt repair on the approaches has the potential for unintended indirect impacts to the heritage attributes of this structure through potential vibration damage due to construction activity adjacent to the structure. Asphalt removal, grinding, and the use of heavy machinery on the approaches have the potential to result in temporary vibration impacts during construction. The scale, magnitude, and duration of construction related vibrations depend on a number of factors, and it is unclear at the time of reporting if they would present any impacts to the subject bridge. In this respect, a vibration monitoring plan should be implemented and followed during construction.

To mitigate any unanticipated indirect impacts to the subject bridge as a result of sympathetic maintenance repairs, activities should be suitably planned and executed to ensure all heritage attributes are avoided and protected. Suitable staging activities may include temporary barriers and the establishment of no-go zones throughout construction. On-site workers should be notified of the cultural heritage significance of the subject bridge in general and the character-defining elements in advance of the starting of construction. Plans for construction and staging activities may be finalized in consultation with a qualified heritage professional, and any changes to the proposed work should undergo review for potential impacts to the subject bridge.

The proposed sympathetic maintenance repairs should be carried forward with an emphasis on decreasing the physical and visual impacts of the intervention where practicable. The detailed design and implementation of sympathetic maintenance repairs at Sewell's Bridge should be guided by a

qualified person(s), such as a heritage engineer, architect, or conservator with recent and relevant experience in the conservation of cultural heritage resources. Qualified persons should have specialized knowledge and experience with road and/or rail bridges and should be a member in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice.

As the subject bridge is anticipated to be directly impacted in the preferred alternative, a Strategic Conservation Plan (SCP) should be completed for this structure. This SCP should be completed by a qualified cultural heritage professional, with individual expertise, recent experience, and knowledge relevant to road bridges and the nature of the activity being proposed, such as a heritage engineer, architect, or conservator. Membership in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice is considered to be an asset. The SCP should be completed as early in Detailed Design as possible and be submitted to the MCM and other applicable stakeholders to review prior to finalization.

Consideration should be given to a commemorative strategy, such as developing a plaque in the location of the bridge. In this respect, an interpretive historical plaque/commemoration could be prepared including historical information and images of Sewell's Bridge. Heritage Planning at the City of Toronto and the Rouge National Urban Park should be consulted for input regarding this commemoration.

A resource-specific HIA will be required to assess the specific impacts to heritage attributes of Sewell's Bridge in the proposed intervention and provide specific mitigation measures to eliminate or reduce these impacts to the extent feasible. This HIA should be prepared by a qualified heritage consultant with recent and relevant experience assessing heritage road bridges in accordance with the *City of Toronto's Terms of Reference for Heritage Impact Assessments* (City of Toronto, 2019) as early as possible in preliminary or detailed design. This HIA should be submitted for review and comment to the Ministry of Citizenship and Multiculturalism and Heritage Planning at the City of Toronto. The resource specific HIA will include an updated Ontario Regulation 9/06 evaluation for this structure as it was designated before 2005.

7.2 Stott's Bridge (Structure ID 803)

Where feasible, the proposed intervention should be planned and executed to limit all direct impacts to the subject bridge while allowing for the use of the structure to carry road traffic at the subject crossing. An evaluation of the preliminary alternatives determined that the retention of Stott's Bridge was infeasible based on project constraints, and as such, the subject bridge will be removed and replaced with a new bridge at the crossing.

As the retention of Stott's Bridge following rehabilitation was demonstrated to be infeasible, the replacement of the Warren pony truss superstructure with a sympathetically-designed replacement superstructure employing modern materials and designs should be considered as a suitable means of reducing the impacts to the physical and design value of the crossing. A sympathetic replacement superstructure should be designed to be compatible with the style and character of the subject bridge, be based on physical and documentary evidence such as photographs and original structural drawings,

and be mindful of the context, scale, massing, and material of the original structure (Ministry of Culture and Ministry of Transportation, 2008). In this respect, the proposed replacement structure should be a moderate complexity pony truss bridge with a similar scale and massing as the existing structure. The replacement of the 1915 steel Warren pony truss bridge with a five panel Warren pony truss structure with a slightly larger scale and massing to accommodate two lanes of vehicular traffic and ensure clearance over the 1 in 100-year watermark on the same alignment as the existing road bridge is considered to be a sympathetic replacement and should be carried forward as a suitable means of reducing the impacts to the physical and design value of the crossing
The new replacement bridge should be designed to ensure the continued visual experiences of users of the road and be designed to permit view of the Rouge River and of the associated river valley. In this respect, the replacement bridge should limit the scale and height of the railings to the extent practicable while still meeting safety and design guidelines to ensure suitable visibility of the surroundings to motorists. The proposed replacement Warren pony truss bridge will ensure continued good visibility through truss elements and with the low (approximately 3 m) height of the structure.

Consideration should be given to relocating the subject bridge for adaptive re-use as a pedestrian or cycling bridge at another crossing. In this respect, a qualified structural engineer with recent and relevant experience in assessing Warren pony truss road bridges should be consulted to determine the feasibility of dismantling and relocating the Warren pony truss superstructure. Further, the City of Toronto should be consulted to determine if there is a suitable location for the relocated bridge to be erected, or if appropriate storage facilities exist that could be used to house the structural elements until a suitable location for adaptive re-use is determined. Should relocating the superstructure for re-use be determined to be infeasible based on an evaluation of the structural condition of steel elements, consideration should be given to salvaging select structural elements for use in rehabilitating a similar structure at another crossing.

Should relocation for adaptive re-use or salvaging select structural elements for rehabilitating a similar bridge at another crossing be determined to be infeasible, consideration should be given to salvaging structural steel elements of the Warren pony truss superstructure for use in commemorative or interpretive displays. In this respect, the City of Toronto should investigate the feasibility of salvaging select structural elements in the trusses including girders, stringers, or beams for incorporation in a commemorative interpretation at the bridge site or in another appropriate location.

Prior to removal, full recording of the structure would ensure proper documentation for archival purposes and ensure suitable material is available for inclusion with a commemoration strategy. In this respect, a Heritage Documentation Report should be prepared by a qualified person(s), with recent and relevant experience in the conservation of cultural heritage resources. Qualified persons should have specialized knowledge and experience with road and/or rail bridges and should be a member in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice.

Consideration should be given to a commemorative strategy, such as developing a plaque in the location of the bridge. In this respect, an interpretive historical plaque/commemoration could be prepared including historical information, images, and featuring salvaged heritage components from the subject bridge, where feasible. Select steel truss elements of the subject bridge could be retained and

incorporated into this commemoration. Heritage Planning at the City of Toronto and the Rouge National Urban Park should be consulted for input regarding this commemoration.

A resource-specific HIA will be required to assess the specific impacts to heritage attributes of Stott's Bridge in the proposed intervention and provide specific mitigation measures to eliminate or reduce these impacts to the extent feasible. This HIA should be prepared by a qualified heritage consultant with recent and relevant experience assessing heritage road bridges in accordance with the *City of Toronto's Terms of Reference for Heritage Impact Assessments* (City of Toronto, 2019) as early as possible in detailed design. This HIA should be submitted for review and comment to the Ministry of Citizenship and Multiculturalism and Heritage Planning at the City of Toronto. The resource specific HIA will include an updated Ontario Regulation 9/06 evaluation for this structure as it was designated before 2005.

7.3 Maxwell's Bridge (Structure ID 802)

Where feasible, the preferred alternative is to retain the subject bridge in situ to maintain the physical, historical, and contextual associations of the Maxwell's Bridge. Retention and sympathetic maintenance repairs with allowances made for inclusion of modern materials to meet current design and safety codes is the preferred option from a heritage perspective as it would retain the heritage attributes of the bridge and retain the historical and contextual value of the subject crossing. Maintenance repairs would require the replacement of deteriorated structural members and would be considered to be a permanent and irreversible impact. However, these repairs are considered necessary to ensure the continued use of the structure as a watercourse crossing and will ensure the retention and long-term preservation of the structure.

The rehabilitation of deteriorated elements should be designed to be compatible with the style and character of the subject bridge, be based on physical and documentary evidence such as photographs and original structural drawings, and be mindful of the context, scale, massing, and material of the original structure (Ministry of Culture and Ministry of Transportation, 2008). Based on a review of background documents and the recommendations put forward in the TMP, the proposed maintenance repairs are anticipated to be designed in a sympathetic manner, with due consideration given to reducing the net impacts of the intervention on the heritage character of the bridge. In this respect, the proposed sympathetic maintenance repairs are considered to be a positive impact to the heritage value of the structure and of the crossing and should be carried forward.

To ensure that the repair or replacement of deteriorated structural elements is sympathetic with the original, the colour and the appearance of the replacement elements and repairs should be selected to match the existing structure and patch repairs to the concrete on the superstructure and substructure should be selected to match the existing cast-in-place concrete. Visual impacts to the structure can be reduced though the appropriate selection of exterior finishes, materials, and palettes to ensure that repaired elements are subordinate to, and compatible and sympathetic with the naturalized setting of the bridge.

Asphalt repair on the approaches has the potential for unintended indirect impacts to the heritage attributes of this structure through potential vibration damage due to construction activity adjacent to the structure. Asphalt removal, grinding, and the use of heavy machinery on the approaches have the potential to result in temporary vibration impacts during construction. The scale, magnitude, and duration of construction related vibrations depend on a number of factors, and it is unclear at the time of reporting if they would present any impacts to the subject bridge. In this respect, a vibration monitoring plan should be implemented and followed during construction.

To mitigate any unanticipated indirect impacts to the subject bridge, sympathetic maintenance repair should be suitably planned and executed to ensure all heritage attributes are avoided and protected. Suitable staging activities may include temporary barriers and the establishment of no-go zones throughout construction. On-site workers should be notified of the cultural heritage significance of the subject bridges in general and the character-defining elements in advance of the starting of construction. Plans for construction and staging activities may be finalized in consultation with a qualified heritage professional, and any changes to the proposed work should undergo review for potential impacts to the subject bridges.

The proposed sympathetic maintenance repairs should be carried forward with an emphasis on decreasing the physical and visual impacts of the intervention where practicable. The detailed design and implementation of sympathetic maintenance repairs at Maxwell's Bridge should be guided by a qualified person(s), such as a heritage engineer, architect, or conservator with recent and relevant experience in the conservation of cultural heritage resources. Qualified persons should have specialized knowledge and experience with road and/or rail bridges and should be a member in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice.

As the subject bridge is anticipated to be directly impacted in the preferred alternative, a Strategic Conservation Plan (SCP) should be completed for this structure. This SCP should be completed by a qualified cultural heritage professional, with individual expertise, recent experience, and knowledge relevant to road bridges and the nature of the activity being proposed, such as a heritage engineer, architect, or conservator. Membership in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice is considered to be an asset. The SCP should be completed as early in Detailed Design as possible and submitted to the MCM and other applicable stakeholders to review prior to finalization.

Consideration should be given to a commemorative strategy, such as developing a plaque in the location of the bridge. In this respect, an interpretive historical plaque/commemoration could be prepared including historical information and images of Maxwell's Bridge. Heritage Planning at the City of Toronto and the Rouge National Urban Park should be consulted for input regarding this commemoration.

A resource-specific HIA will be required to assess the specific impacts to heritage attributes of Maxwell's Bridge in the proposed intervention and provide specific mitigation measures to eliminate or reduce these impacts to the extent feasible. This HIA should be prepared by a qualified heritage consultant with recent and relevant experience assessing heritage road bridges in accordance with the *City of Toronto's Terms of Reference for Heritage Impact Assessments* (City of Toronto, 2019) as early as

possible in detailed design. This HIA should be submitted for review and comment to the Ministry of Citizenship and Multiculturalism and Heritage Planning at the City of Toronto. The resource specific HIA will include an updated Ontario Regulation 9/06 evaluation for this structure as it was designated before 2005.

7.4 Hillside Bridge (Structure ID 806)

Where feasible, the proposed intervention should be planned and executed to limit all direct impacts to the subject bridge while allowing for the use of the structure to carry road traffic at the subject crossing. An evaluation of the preliminary alternatives determined that the retention of the Hillside Bridge was infeasible based on project constraints, and as such, will be removed and replaced with a new bridge at the crossing.

As the retention of the Hillside Bridge following rehabilitation was demonstrated to be infeasible, the replacement of the Warren pony truss superstructure with a sympathetically-designed replacement superstructure employing modern materials and designs should be considered as a suitable means of reducing the impacts to the physical and design value of the crossing. A sympathetic replacement superstructure should be designed to be compatible with the style and character of the subject bridge, be based on physical and documentary evidence such as photographs and original structural drawings, and be mindful of the context, scale, massing, and material of the original structure (Ministry of Culture and Ministry of Transportation, 2008). In this respect, the proposed replacement structure should be a moderate complexity pony truss bridge with a similar scale and massing as the existing structure. The proposed replacement of the 1917 steel Warren pony truss structure with a Warren pony truss structure with a slightly larger scale and massing to accommodate two lanes of vehicular traffic on the same alignment as the existing road bridge is considered to be a sympathetic replacement and should be carried forward as a suitable means of reducing the impacts to the physical and design value of the crossing.

The new replacement bridge should be designed to ensure the continued visual experiences of users of the road and be designed to permit view of Little Rouge Creek and of the associated river valley. In this respect, the replacement bridge should limit the scale and height of the railings to the extent practicable while still meeting safety and design guidelines to ensure suitable visibility of the surroundings to motorists.

Consideration should be given to relocating the subject bridge for adaptive re-use as a pedestrian or cycling bridge at another crossing. In this respect, a qualified structural engineer with recent and relevant experience in assessing Warren pony truss road bridges should be consulted to determine the feasibility of dismantling and relocating the Warren pony truss superstructure. Further, the City of Toronto should be consulted to determine if there is a suitable location for the relocated bridge to be erected, or if appropriate storage facilities exist that could be used to house the structural elements until a suitable location for adaptive re-use is determined. Should relocating the superstructure for re-use be determined to be infeasible based on an evaluation of the structural condition of steel elements, consideration should be given to salvaging select structural elements for use in rehabilitating a similar structure at another crossing.

Should relocation for adaptive re-use or salvaging select structural elements for rehabilitating a similar bridge at another crossing be determined to be infeasible, consideration should be given to salvaging structural steel elements of the Warren pony truss superstructure for use in commemorative or interpretive displays. In this respect, the City of Toronto should investigate the feasibility of salvaging select structural elements in the trusses including girders, stringers, or beams for incorporation in a commemorative interpretation at the bridge site or in another appropriate location.

Prior to removal, full recording of the structure would ensure proper documentation for archival purposes and ensure suitable material is available for inclusion with a commemoration strategy. In this respect, a Heritage Documentation Report should be prepared by a qualified person(s), with recent and relevant experience in the conservation of cultural heritage resources. Qualified persons should have specialized knowledge and experience with road and/or rail bridges and should be a member in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice.

Consideration should be given to a commemorative strategy, such as developing a plaque in the location of the bridge. In this respect, an interpretive historical plaque/commemoration could be prepared including historical information, images, and featuring salvaged heritage components from the subject bridge, where feasible. Select steel truss elements of the subject bridge could be retained and incorporated into this commemoration. Heritage Planning at the City of Toronto and the Rouge National Urban Park should be consulted for input regarding this commemoration.

A resource-specific HIA will be required to assess the specific impacts to heritage attributes of Hillside Bridge in the proposed intervention and provide specific mitigation measures to eliminate or reduce these impacts to the extent feasible. This HIA should be prepared by a qualified heritage consultant with recent and relevant experience assessing heritage road bridges in accordance with the *City of Toronto's Terms of Reference for Heritage Impact Assessments* (City of Toronto, 2019) as early as possible in detailed design. This HIA should be submitted for review and comment to the Ministry of Citizenship and Multiculturalism and Heritage Planning at the City of Toronto. The resource specific HIA will include an updated Ontario Regulation 9/06 evaluation for this structure as it was designated before 2005. The resource specific HIA will include an updated Ontario Regulation 9/06 evaluation for this structure as it was designated before 2005.

7.5 Milne Bailey Bridge (Structure ID 813)

Where feasible, the proposed intervention should be planned and executed to limit all direct impacts to the subject bridge while allowing for the use of the structure to carry road traffic at the subject crossing. An evaluation of the preliminary alternatives determined that the retention of the Milne Bailey Bridge was infeasible based on project constraints, and as such, will be removed and replaced with a new bridge at the crossing.

As the retention of the Milne Bailey Bridge following rehabilitation was demonstrated to be infeasible, the replacement of the Baily Bridge superstructure with a sympathetically-designed replacement superstructure employing modern materials and designs should be considered as a suitable means of reducing the impacts to the physical and design value of the crossing. A sympathetic replacement superstructure should be designed to be compatible with the style and character of the subject bridge, be based on physical and documentary evidence such as photographs and original structural drawings, and be mindful of the context, scale, massing, and material of the original structure (Ministry of Culture and Ministry of Transportation, 2008). The replacement of the 1988 Bailey bridge with a modular panel replacement bridge on the same alignment as the existing road bridge is considered to be a sympathetic replacement to the original 1954 and later 1988 Bailey bridges at the crossing.

As both the 1954 and the 1988 Bailey bridges were constructed in whole or in part by members of the Canadian Military Engineers, consideration should be given to engaging with Canadian Miliary Engineers in the proposed modular panel replacement structure to continue this historical connection to the crossing. In this respect, the City of Toronto could engage with members of the Canadian Military Engineers to determine the feasibility of their participation in the removal of the existing bridge and the construction of the proposed replacement structure.

The new replacement bridge should be designed to ensure the continued visual experiences of users of the road and be designed to permit view of the Rouge River and of the associated river valley. In this respect, the replacement bridge should limit the scale and height of the panels and the scale of the structural members to the extent practicable while still meeting safety and design guidelines to ensure suitable visibility of the surroundings to motorists.

Consideration should be given to relocating the subject bridge for adaptive re-use as a pedestrian or cycling bridge at another crossing. In this respect, a qualified structural engineer with recent and relevant experience in assessing Bailey or modular truss bridges should be consulted to determine the feasibility of dismantling and relocating the Bailey bridge superstructure. Further, the City of Toronto should be consulted to determine if there is a suitable location for the relocated bridge to be erected, or if appropriate storage facilities exist that could be used to house the structural elements until a suitable location for adaptive re-use is determined. Additionally, consultation with the Canadian Military Engineers could be completed to determine if the structure could be relocated to a suitable Canadian Forces base if no suitable location in the RNUP is available. Relocation of the bridge, or a portion of the bridge to a Canadian Forces Base would retain the association of the subject bridge with Canadian Military Engineers. Should relocating the superstructure for re-use be determined to be infeasible based on an evaluation of the structural condition of steel elements, consideration should be given to salvaging select elements or panels of the bridge for use in rehabilitating a similar structure at another crossing.

Should relocation for adaptive re-use or salvaging select structural elements for rehabilitating a similar bridge at another crossing be determined to be infeasible, consideration should be given to salvaging structural steel elements or individual panels of the Bailey bridge for use in commemorative or interpretive displays. In this respect, the City of Toronto should investigate the feasibility of salvaging select structural elements for incorporation in a commemorative interpretation at the bridge site or in another appropriate location. Consultation could also be undertaken with Canadian Military Engineers to determine if salvaged panels or elements of this bridge could be retained and used in any

interpretation or commemoration programs at the Royal Military College or any other Canadian Forces Base.

Prior to removal, full recording of the structure would ensure proper documentation for archival purposes and ensure suitable material is available for inclusion with a commemoration strategy. In this respect, a Heritage Documentation Report should be prepared by a qualified person(s), with recent and relevant experience in the conservation of cultural heritage resources. Qualified persons should have specialized knowledge and experience with road bridges and should be a member in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice.

Consideration should be given to a commemorative strategy, such as developing a plaque in the location of the bridge. In this respect, an interpretive historical plaque/commemoration could be prepared including historical information, images, and featuring salvaged heritage components from the subject bridge, where feasible. Select steel elements of the subject bridge could be retained and incorporated into this commemoration. Heritage Planning at the City of Toronto and the Rouge National Urban Park should be consulted for input regarding this commemoration. The existing heritage plaque on the southwest of the bridge has the potential to be impacted during construction. This commemorative feature should be removed prior to construction if impacts are anticipated and stored in a secure facility to prevent damage. This plaque should be re-installed at the crossing or at another suitable location, based on consultation with the City of Toronto, following construction.

A resource-specific HIA will be required to assess the specific impacts to heritage attributes of the Milne Bailey Bridge in the proposed intervention and provide specific mitigation measures to eliminate or reduce these impacts to the extent feasible. This HIA should be prepared by a qualified heritage consultant with recent and relevant experience assessing heritage road bridges in accordance with the *City of Toronto's Terms of Reference for Heritage Impact Assessments* (City of Toronto, 2019) as early as possible in detailed design. This HIA should be submitted for review and comment to the Ministry of Citizenship and Multiculturalism and Heritage Planning at the City of Toronto.

8.0 COMMUNITY ENGAGEMENT

Staff from the City of Toronto provided structural drawings, inspection reports, historic aerial photography, and heritage by-laws for each of the five bridges. Chris Haines from Dillon Consulting Limited, Brian Ellis from Ellis Engineering Inc., and Michael Bartlett from the University of Western Ontario all provided historical and construction information about the Milne Bailey Bridge. Further, several stakeholders were contacted to gather information on the subject bridges as part of the CHRA (ASI, 2020), including the following:

Table 2: Results of Community Engagement

Person and Title	Organization	Date(s) of Communication	Response
Yasmina Shamji	Heritage Preservation	9 October 2020	A response was still outstanding at the time of report submission

Person and Title	Organization	Date(s) of Communication	Response
	Services, City of Toronto		
Karla Barboza	Ministry of Citizenship and Multiculturalism (MCM)	9, 13, 14, and 16 October 2020	A response confirmed that there are no additional previously identified heritage resources or concerns regarding the study area
Kevin DeMille	Ontario Heritage Trust	9 and 19 October 2020	A response confirmed that there are no conservation easements or Trust-owned properties within or immediately adjacent to the study area
Staff at Scarborough Historical Society	Scarborough Historical Society	9 October 2020	A response was still outstanding at the time of report submission

Consultation by Dillon Consulting Limited with City of Toronto Heritage Planning has been completed at numerous project meetings at various points during the project beginning in 2020. This consultation is ongoing at the time of report preparation (November 2023). Comments and feedback from this ongoing consultation will be incorporated into this report prior to finalization.

Additionally, information was provided by Dillon Consulting Limited to the Scarborough Preservation Panel on 26 February and 19 March 2021, with a meeting and presentation on 1 March and 24 May 2022. Comments arising from these meetings and presentations were incorporated into this report.

A draft of the preliminary HIA prepared in 2020 was provided to Heritage Planning at the City of Toronto for review, and some general comments and legislative and policy requirements to frame the assessment were provided and incorporated into the updated HIA. Following completion of the updated HIA, this report was circulated to Heritage Planning for review, and additional comments and revisions received 1 March 2023 and discussed on a conference call (3 March 2023 between ASI, Dillion Consulting Limited, and City of Toronto staff) were incorporated into a revised draft of the report.

9.0 CONCLUSIONS AND RECOMMENDATIONS

Four of the five bridges (Sewell's Bridge, Stott's Bridge, Maxwell's Bridge, and Hillside Bridge) were already determined to retain cultural heritage value and have previously been designated under Part IV of the *Ontario Heritage Act*. It was further determined that the Milne Bailey Bridge crossing retains cultural heritage value following the application of Ontario Regulation 9/06 of the *Ontario Heritage Act*.

The preferred alternative for each bridge site includes: retention of Sewell's Bridge (Structure ID 812) and Maxwell's Bridge (Structure ID 802), and the replacement of Milne Bailey Bridge (Structure ID 813), Stott's Bridge (Structure ID 803), and Hillside Bridge (Structure ID 806). Mitigation measures discussed in Section 7.2 have been developed in consideration of the impact assessment in Section 6.0 and have been prepared to reduce or eliminate direct, negative impacts to the identified heritage attributes of the structures to the extent practicable.

9.1 Recommendations for Sewell's Bridge (Structure ID 812)

Given the identified cultural heritage value of Sewell's Bridge (Structure ID 812) and the preferred alternative including the retention of the suspension bridge, the following recommendations and mitigation measures should be considered and implemented:

1. Where feasible, the preferred alternative should be selected to ensure the fewest direct and permanent impacts to the identified heritage attributes of the subject bridge. In this respect, the preferred alternative including the retention of Sewell's Bridge (Structure ID 812) is the preferred conservation option from a cultural heritage perspective. Retention with sympathetic maintenance repairs with allowances made for inclusion of modern materials to meet current design and safety codes is the preferred option from a heritage perspective as it would retain the heritage attributes of the bridge and retain the historical and contextual value of the subject crossing.

2. Sympathetic maintenance repairs would require the replacement of deteriorated structural members and would be considered a direct, permanent, and irreversible impact. While considered to be direct impacts, these interventions are positive from the cultural heritage perspective as they would enable the retention of the suspension bridge and continue its historical function at the subject crossing.

3. Sympathetic maintenance repairs should be planned to limit the visual impacts of the modifications, where feasible, based on technical constraints. In order to reduce the visual impacts of the proposed truss hanger and concrete repairs, consideration should be given to using materials, colours, and finishes that will make the repairs physically and visually compatible with, subordinate to, and distinguishable from the subject bridge.

4. To mitigate any unanticipated indirect impacts to the subject bridge as a result of sympathetic maintenance repairs, activities should be suitably planned and executed to ensure all heritage attributes are avoided and protected. Suitable staging activities may include temporary barriers and the establishment of no-go zones throughout repairs. On-site workers should be notified of the cultural heritage significance of the subject bridge in general and the character-defining elements in advance of the starting of construction. Plans for construction and staging activities may be finalized in consultation with a qualified heritage professional, and any changes to the proposed work should undergo review for potential impacts to the subject bridge.

5. The proposed sympathetic maintenance repairs should be carried forward with an emphasis on decreasing the physical and visual impacts of the intervention where practicable. The detailed design and implementation of sympathetic maintenance repairs at Sewell's Bridge should be guided by a qualified person(s), such as a heritage engineer, architect, or conservator with recent and relevant experience in the conservation of cultural heritage resources. Qualified persons should have specialized knowledge and experience with road bridges and should be a member in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice.

6. As the subject bridge is anticipated to be directly impacted in the preferred alternative, a Strategic Conservation Plan (SCP) should be completed for this structure. This SCP should be completed by a qualified cultural heritage professional, with individual expertise, recent experience, and knowledge relevant to road bridges and the nature of the activity being proposed, such as a heritage engineer, architect, or conservator. Membership in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice is considered to be an asset. The SCP should be completed as early in Detailed Design as possible and submitted to the Ministry of Citizenship and Multiculturalism, (MCM) and other applicable stakeholders to review prior to finalization.

7. Consideration should be given to a commemorative strategy, such as developing a plaque in the location of the bridge. In this respect, an interpretive historical plaque/commemoration could be prepared including historical information and images of Sewell's Bridge. Heritage Planning at the City of Toronto and heritage staff with Parks Canada should be consulted for input regarding this commemoration.

9.2 Recommendations for Maxwell's Bridge (Structure ID 802)

Given the identified cultural heritage value of Maxwell's Bridge (Structure ID 802) and the preferred alternative including the retention of the concrete bowstring arch bridge, the following recommendations and mitigation measures should be considered and implemented:

8. Where feasible, the preferred alternative should be selected to ensure the fewest direct and permanent impacts to the identified heritage attributes of the subject bridge. In this respect, the preferred alternative including the retention of Maxwell's Bridge (Structure ID 802) is the preferred conservation option from a cultural heritage perspective. Retention and sympathetic maintenance repairs with allowances made for inclusion of modern materials to meet current design and safety codes is the preferred option from a heritage perspective as it would retain the heritage attributes of the bridge and retain the historical and contextual value of the subject crossing.

9. Sympathetic maintenance repairs would require the replacement of deteriorated structural members and would be considered a direct, permanent and irreversible impact. While considered to be direct impacts, these interventions are positive from the cultural heritage perspective as they would enable the retention of the concrete arch bridge and continue its historical function at the subject crossing.

10. The sympathetic maintenance repairs should be planned to limit the visual impacts of the modifications, where feasible, based on technical constraints. In order to reduce the visual impacts of the proposed concrete repairs, consideration should be given to using materials, colours, and finishes that will make the rehabilitations physically and visually compatible with, subordinate to, and distinguishable from the subject bridge.

11. To mitigate any unanticipated indirect impacts to the subject bridge, sympathetic maintenance repairs should be suitably planned and executed to ensure all heritage attributes are avoided

and protected. Suitable staging activities may include temporary barriers and the establishment of no-go zones throughout repairs. On-site workers should be notified of the cultural heritage significance of the subject bridge in general and the character-defining elements in advance of the starting of construction. Plans for construction and staging activities may be finalized in consultation with a qualified heritage professional, and any changes to the proposed work should undergo review for potential impacts to the subject bridge.

12. The proposed sympathetic maintenance repairs should be carried forward with an emphasis on decreasing the physical and visual impacts of the intervention where practicable. The detailed design and implementation of sympathetic maintenance repairs at Maxwell's Bridge should be guided by a qualified person(s), such as a heritage engineer, architect, or conservator with recent and relevant experience in the conservation of cultural heritage resources. Qualified persons should have specialized knowledge and experience with road bridges and should be a member in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice.

13. As the subject bridge is anticipated to be directly impacted in the preferred alternative, a Strategic Conservation Plan (SCP) should be completed for this structure. This SCP should be completed by a qualified cultural heritage professional, with individual expertise, recent experience, and knowledge relevant to road bridges and the nature of the activity being proposed, such as a heritage engineer, architect, or conservator. Membership in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice is considered to be an asset. The SCP should be completed as early in Detailed Design as possible and submitted to the Ministry of Citizenship and Multiculturalism (MCM) and other applicable stakeholders to review prior to finalization.

14. Consideration should be given to a commemorative strategy, such as developing a plaque in the location of the bridge. In this respect, an interpretive historical plaque/commemoration could be prepared including historical information and images of Maxwell's Bridge. Heritage Planning at the City of Toronto and heritage staff with Parks Canada should be consulted for input regarding this commemoration.

9.3 Recommendations for Milne Bailey Bridge (Structure ID 813)

Given the identified cultural heritage value of the Milne Bailey Bridge (Structure ID 813) and the preferred alternative including the removal of the Baily Bridge and replacement with a new modular panel bridge at the crossings, the following recommendations and mitigation measures should be considered and implemented:

15. Where feasible, the preferred alternative should be selected to ensure the fewest direct and permanent impacts to the identified heritage attributes of the subject bridges. In this respect, retention and rehabilitation of the Milne Bailey Bridge (Structure ID 813) is the preferred conservation option from a cultural heritage perspective. However, as rehabilitation and retention of this bridge was demonstrated to be infeasible, replacement with a sympathetically-designed replacement modular panel bridge should be carried forward for consideration.

16. Consideration should be given to replacing the bridge with a sympathetically-designed replacement structure that is compatible with the design qualities of the 1954 and 1988 Bailey bridges at the crossing. Where feasible, the replacement bridge should be sympathetically-designed to be compatible with the style and character of the subject bridge and setting, be based on physical and documentary evidence such as photographs and original structural drawings, and be mindful of the context, scale, massing, and material of the original. In this respect, the removal of the subject bridge and replacement with stylistically-similar modular panel replacement bridge should be carried forward as it would continue the historical and contextual associations of the crossing as a road bridge over the Rouge River in the City of Toronto.

17. As both the 1954 and the 1988 Bailey bridges were constructed in whole or in part by members of the Canadian Military Engineers, consideration should be given to engaging with Canadian Miliary Engineers in the proposed modular panel replacement structure to continue this historical connection to the crossing. In this respect, the City of Toronto should consider engaging with members of the Canadian Military Engineers to determine the feasibility of their participation in the removal of the existing bridge and the construction of the proposed replacement structure.

18. The new replacement bridge should be designed to ensure the continued visual experiences of users of the roads and be designed to permit views of the Rouge River and of the associated river valley. In this respect, the replacement bridge should limit the scale and height of the panels to the extent practicable while still meeting safety and design guidelines to ensure suitable visibility of the surroundings to motorists.

19. Consideration should be given to relocating the 1988 Milne Bailey Bridge (Structure ID 813) for adaptive re-use as a pedestrian or cycling bridge at another crossing. In this respect, a qualified structural engineer with recent and relevant experience in assessing Bailey bridges should be consulted to determine the feasibility of dismantling and relocating the structure. Further, the City of Toronto should be consulted to determine if there is a suitable location for the relocated bridges to be erected, or if appropriate storage facilities exist that could be used to house the structural elements until suitable locations for adaptive re-use are determined.

20. Should relocation for adaptive re-use or salvaging select structural elements for rehabilitating a similar bridge at another crossing be determined to be infeasible, consideration should be given to salvaging structural steel elements or individual panels of the Bailey bridge for use in commemorative or interpretive displays. In this respect, the City of Toronto could investigate the feasibility of salvaging select structural elements for incorporation in a commemorative interpretation at the bridge site or in another appropriate location. Consultation should also be undertaken with Canadian Military Engineers to determine if salvaged panels or elements of this bridge could be retained and used in any interpretation or commemoration programs at the Royal Military College or any other Department of Defence site.

21. Prior to removal, full recording of the structure would ensure proper documentation for archival purposes and ensure suitable material is available for inclusion with a commemoration strategy.

In this respect, a Heritage Documentation Report should be prepared by a qualified person(s), with recent and relevant experience in the conservation of cultural heritage resources. Qualified persons should have specialized knowledge and experience with road bridges and should be a member in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice.

22. Consideration should be given to a commemorative strategy, such as developing a plaque in the location of the bridge. In this respect, an interpretive historical plaque/commemoration could be prepared including historical information, images, and featuring salvaged heritage components from the subject bridge, where feasible. Select steel truss elements of the subject bridge could be retained and incorporated into this commemoration. Heritage Planning at the City of Toronto and Parks Canada should be consulted for input regarding this commemoration.

23. The existing heritage plaque on the southwest of the bridge has the potential to be impacted during construction. This commemorative feature should be removed prior to construction if impacts are anticipated and stored in a secure facility to prevent damage. This plaque should be re-installed at the crossing or at another suitable location, based on consultation with the City of Toronto, following construction.

9.4 Recommendations for Stott's Bridge (Structure ID 803) and Hillside Bridge (Structure ID 806)

Given the identified cultural heritage value of the Stott's Bridge (Structure ID 803) and Hillside Bridge (Structure ID 806) and the preferred alternative including the removal of the Warren pony truss bridges and replacement with a new bridge at the crossings, the following recommendations and mitigation measures should be considered and implemented:

24. Where feasible, the preferred alternative should be selected to ensure the fewest direct and permanent impacts to the identified heritage attributes of the subject bridges. In this respect, retention and rehabilitation of Stott's Bridge (Structure ID 803) and Hillside Bridge (Structure ID 806) is the preferred conservation option from a cultural heritage perspective. However, as rehabilitation and retention of these bridges was demonstrated to be infeasible, replacement with a sympathetically-designed replacement structure should be carried forward for consideration.

25. Consideration should be given to replacing the bridges with sympathetically-designed replacement structures that are compatible with the design qualities of the original Warren pony truss structures. Where feasible, the replacement bridges should be sympathetically-designed to be compatible with the style and character of the subject bridges and settings, be based on physical and documentary evidence such as photographs and original structural drawings, and be mindful of the context, scale, massing, and material of the originals. In this respect, the replacement structures should be a moderate complexity pony truss bridges, which are noted as an option in the Evaluation Tables in the Technical Memo (Dillon Consulting Limited, 2022a). The replacement of the 1915 Stott's Bridge and 1917 Hillside steel Warren pony truss structures with Warren pony truss structures with a slightly larger scales and massing to improve hydraulics and on the same alignments as the existing road bridges is considered to be

sympathetic replacements and should be carried forward as a suitable means of reducing the impacts to the physical and design values of the crossings.

26. The new replacement bridges should be designed to ensure the continued visual experiences of users of the roads and be designed to permit views of the Rouge River, Little Rouge Creek, and of the associated river valleys. In this respect, the replacement bridges should limit the scale and height of the railings to the extent practicable while still meeting safety and design guidelines to ensure suitable visibility of the surroundings to motorists.

27. Consideration should be given to relocating Stott's Bridge (Structure ID 803) and Hillside Bridge (Structure ID 806) for adaptive re-use as pedestrian or cycling bridges at other crossings. In this respect, a qualified structural engineer with recent and relevant experience in assessing Warren pony truss road bridges should be consulted to determine the feasibility of dismantling and relocating the Warren pony truss structures. Further, the City of Toronto should be consulted to determine if there is a suitable location for the relocated bridges to be erected, or if appropriate storage facilities exist that could be used to house the structural elements until suitable locations for adaptive re-use are determined.

28. Should relocating the structures be determined to be infeasible based on an evaluation of the structural condition of steel elements, salvaged elements of the superstructure should be retained for inclusion in future conservation work, or for commemorative displays, where feasible. In this respect, an engineer with recent and relevant experience in the field of heritage bridge conservation should determine the feasibility of salvage and reuse of these elements.

29. Prior to removal, full recording of the structures would ensure proper documentation for archival purposes and ensure suitable material is available for inclusion with a commemoration strategy. In this respect, a Heritage Documentation Report should be prepared by a qualified person(s), with recent and relevant experience in the conservation of cultural heritage resources. Qualified persons should have specialized knowledge and experience with road bridges and should be a member in good standing with the Canadian Association of Heritage Professionals (or comparable accredited organization) in a relevant area of practice.

30. Consideration should be given to a commemorative strategy, such as developing a plaque in the location of the bridges. In this respect, an interpretive historical plaque/commemoration could be prepared including historical information, images, and featuring salvaged heritage components from the subject bridges, where feasible. Select steel truss elements of the subject bridges could be retained and incorporated into this commemoration. Heritage Planning at the City of Toronto and Parks Canada should be consulted for input regarding this commemoration.

9.5 General Recommendations for the Rouge Park Bridges Transportation Master Plan

31. As each of the subject bridges are identified as built heritage resources by the City of Toronto, and there are direct impacts anticipated, a resource-specific HIA is required to assess the specific impacts to heritage attributes of each bridge in the proposed intervention and provide specific mitigation measures to eliminate or reduce these impacts to the extent feasible. These HIAs should be prepared by a qualified heritage consultant with recent and relevant experience

assessing heritage road bridges in accordance with the *City of Toronto's Terms of Reference for Heritage Impact Assessments* (City of Toronto, 2019) as early as possible in detailed design. These HIAs should be submitted for review and comment to the Ministry of Citizenship and Multiculturalism and Heritage Planning at the City of Toronto.

32. As Sewell's Bridge (Structure ID 812), Maxwell's Bridge (Structure ID 802), Stott's Bridge (Structure ID 803), and Hillside Bridge (Structure ID 806) are designated under Part IV of the *Ontario Heritage Act*, any alterations to, and removal of, heritage attributes of the heritage bridges will require City Council approval and a report to the Toronto Preservation Board. The demolition (including relocation) of a heritage bridge will require City Council approval and a report to the Toronto Preservation Board (Heritage Planning, City of Toronto Memorandum, 2 February 2022).

33. Post-construction rehabilitation and landscaping should be conducted at all bridge sites to ensure that their relationship to the scenic roadways in the Rouge Valley and the forested, riverine context of the crossings are maintained. In this respect, post-construction rehabilitation should include planting with sympathetic species where any tree or vegetation removals are required.

34. This Scoped HIA should be submitted for review and comment to the Heritage Planning at the City of Toronto, to the Ministry of Citizenship and Multiculturalism, heritage staff at Parks Canada, and any other relevant heritage stakeholder with an interest in this project. Upon completion, the final HIA should be submitted to the City of Toronto and other applicable stakeholders for archival purposes.

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APPENDIX A: HERITAGE DESIGNATION BY-LAWS

BILL NO. 0183

THE CORPORATION OF THE CITY OF SCARBOROUGH

BY-LAW NUMBER
25155

to designate the Sewells Bridge
Concession IV, Part Lot 8
now designated as Part 1 on Plan 64R-15213
as being of historical and architectural value

WHEREAS the Ontario Heritage Act, R.S.O. 1990, Chapter O.18 as amended, authorizes the Council of a municipality to enact by-laws to designate real property, including all the buildings and structures thereon, to be of historical and architectural value or interest;

AND WHEREAS the Council of The Corporation of the City of Scarborough has caused to be served upon the owners of the lands and premises known as the Sewells Bridge at property more particularly denoted in Schedule "A" hereto and upon the Ontario Heritage Foundation notice of intention to so designate the aforesaid real property and has caused such notice of intention to be published in a newspaper having a general circulation in the municipality once for each of three consecutive weeks;

AND WHEREAS the reasons for designation are set out in Schedule "B" hereto;

AND WHEREAS no notice of objection to the said proposed designation has been served upon the Clerk of the municipality;

THEREFORE THE COUNCIL OF THE CORPORATION OF THE CITY OF SCARBOROUGH ENACTS AS FOLLOWS:

1. The real property, more particularly described in Schedule "A" hereto, known as the Sewells Bridge, is hereby designated as being of historical and architectural value or interest.

2. The City Solicitor is hereby authorized to cause a copy of this by-law to be

registered against the property described in Schedule "A" hereto in the proper Land Registry office.

3. The City Clerk is hereby authorized to cause a copy of this by-law to be served upon the owner of the aforesaid property and upon the Ontario Heritage Foundation and to cause notice of this by-law to be published in a newspaper having general circulation in the City of Scarborough.

FIRST, SECOND and **THIRD** readings, this 24th day of June 1997.

Mayor

Deputy City Clerk

SCHEDULE "A" TO BY-LAW

DESCRIPTION OF LAND

Part of Lot 8 in Concession 4 of the City of Scarborough in the Municipality of Metropolitan Toronto, originally in the township of Scarborough in the County of York, designated as Part 1 on Reference Plan 64R-15213 deposited in the Land Registry Office for the Registry Division of Metropolitan Toronto (No. 64). PIN #06053-0306(R)

TYPE Designation under The Ontario Heritage Act.

OWNER The Corporation of the City of Scarborough

SCHEDULE "B" TO BY-LAW

REASONS FOR THE DESIGNATION OF "THE SEWELLS BRIDGE"

The Sewells Bridge is recommended for designation for historical and engineering reasons. The bridge, built in 1912, is technically described as a "stiffened suspension bridge". In 1911, Frank Barber, C.E. was commissioned to design a bridge to replace an old timber crossing. The Sewell Family occupied large farms in Lot 8 and 9. The road leading past their farms became known as Sewells Road and the bridge likewise became known as the Sewells Road Bridge. Besides being one of the oldest bridges in Scarborough, the bridge is believed to be the only remaining suspension bridge on a public road in Ontario.

Sewell's Road Bridge

Sewell's Road Bridge is recommended for designation under the terms of the Ontario Heritage Act for historical and engineering reasons. It is located in the Third Concession, Scarborough, near the boundary between Lots 8 and 9 and north of the fourth concession road allowance known today as Old Finch Avenue.

Sewell's Road bridge was built in 1912 and carries the road across the main branch of the Rouge River. For over a century the Sewell family occupied large farms in Lots 8 and 9 in the Fourth concession. In time, the road leading past their farms became known as Sewell's Road and the bridge likewise became known as the Sewell's Road Bridge.

In 1911, Frank Barber, C.E. was commissioned to design a bridge to replace an old timber crossing. Barber's original plans for a steel topped, concrete floor bridge were rejected and he was instructed to call tenders for a less expensive, suspension bridge. The bridge was completed in 1912 and a total cost of $8,197 and spans 160 feet.

Technically described as a "stiffened suspension bridge", Sewell's bridge measures 100 feet between the towers, with a 30 foot approach span at each end. Stiffening trusses are Warren type, 54 inches high each with 6 panels in the approach spans and twenty in the main span. Panels are five feet long, making each truss 160 feet in total length. The width between trusses is 12 feet clear. Each of the two multi strand wire suspension cables are approx. 170 feet long and two inches in diameter. Each pair of hangers is in turn, connected to a floor beam which is attached to the trusses at panel points.

At each end of the main span are towers which are fabricated from rolled steel channel sections joined together by riveted cover plates resulting in a approx. square cross section. Each tower is supported on a pivot bearing and rises 15 feet above the poured concrete piers to a saddle over which the suspension cable passes. The tops of each pair of towers is linked by sway bracing, allowing a clear height of 13 feet for vehicles.

Sewell's bridge (cont.)

Each end of the suspension cables terminates in a massive turnbuckle which is attached to the anchorage, deeply buried beyond the bridge. The poured concrete deck is 12 feet wide with a 6 inch curb on each side, resting on the steel cross beams. Like other Barber-designed bridges, the Sewell's Road bridge survived both the disastrous flooding of 1929 and Hurricane Hazel of 1954.

Besides being one of the oldest bridges in Scarborough, the suspension bridge is believed to be the only remaining suspension bridge on a public road in Ontario. In 1980 the bridge was refurbished at a cost of $262,548 and was declared a historic site by Scarborough in 1981. Although the city has erected a historic plaque on the site, adjacent to the bridge, the structure has not yet formally been designated under the terms of the Heritage Act.

BILL NO. 0182

THE CORPORATION OF THE CITY OF SCARBOROUGH

BY-LAW NUMBER
25154

to designate the Stotts Bridge
part of original road allowance between
Concession 2 and 3, in front of Lot 2
now designated as Part 1 on Plan 64R-15230
as being of historical and architectural value

WHEREAS the Ontario Heritage Act, R.S.O. 1990, Chapter O.18 as amended, authorizes the Council of a municipality to enact by-laws to designate real property, including all the buildings and structures thereon, to be of historical and architectural value or interest;

AND WHEREAS the Council of The Corporation of the City of Scarborough has caused to be served upon the owners of the lands and premises known as the Stotts Bridge at property more particularly denoted in Schedule "A" hereto and upon the Ontario Heritage Foundation notice of intention to so designate the aforesaid real property and has caused such notice of intention to be published in a newspaper having a general circulation in the municipality once for each of three consecutive weeks;

AND WHEREAS the reasons for designation are set out in Schedule "B" hereto;

AND WHEREAS no notice of objection to the said proposed designation has been served upon the Clerk of the municipality;

THEREFORE THE COUNCIL OF THE CORPORATION OF THE CITY OF SCARBOROUGH ENACTS AS FOLLOWS:

1. The real property, more particularly described in Schedule "A" hereto, known as the Stotts Bridge, is hereby designated as being of historical and architectural value or interest.

2. The City Solicitor is hereby authorized to cause a copy of this by-law to be registered against the property described in Schedule "A" hereto in the proper Land Registry office.

3. The City Clerk is hereby authorized to cause a copy of this by-law to be served upon the owner of the aforesaid property and upon the Ontario Heritage Foundation and to cause notice of this by-law to be published in a newspaper having general circulation in the City of Scarborough.

FIRST, SECOND and **THIRD** readings, this 24th day of June 1997

Mayor

Deputy City Clerk

SCHEDULE "A" TO BY-LAW

DESCRIPTION OF LAND

Part of original Road Allowance between Concessions 2 and 3 in Front of Lot 2 in the City of Scarborough in the Municipality of Metropolitan Toronto, originally in the township of Scarborough in the County of York, designated as Part 1 on Reference Plan 64R-15230 deposited in the Land Registry Office for the Registry Division of Metropolitan Toronto (No. 64). PIN #06054-0917(R)

TYPE Designation under The Ontario Heritage Act.

OWNER The Corporation of the City of Scarborough

SCHEDULE "B" TO BY-LAW

REASONS FOR THE DESIGNATION OF "THE STOTTS BRIDGE"

The Stotts Bridge is recommended for designation for historical and structural reasons. The bridge, built in 1915, is technically described as a Pony Warren Truss Bridge. Pony Warren Truss bridges do not require cross bracing, thereby eliminating height restrictions. The bridge's name was once associated with William Stotts' family who owned adjacent property and did repair work on the steep hill road which approaches the bridge from the west.

Stott's Bridge

Stott's Bridge is recommended for designation under the terms of the Ontario Heritage Act for historical and structural reasons. It is located in the Third Concession, Scarborough, in Lot 2, and forms part of the third concession road allowance.

Stott's bridge was built 1915 at a cost of $ 3254 and carried Twyn Rivers Drive over the west, main branch of the Rouge River. The bridge name was once associated with William Stott's family who owned adjacent property and did repair work for many years on the steep hill road which approaches the bridge from the west.

The bridge is similar is design to the Hillside Bridge built two years later. The bridge construction was likely supervised by Frank Barber C.E. who described the bridge as a Pony Warren Truss Bridge. Pony Warren Truss bridges (unlike the Through Warren Truss style which required cross bracing) do not require cross bracing, thereby eliminating height restrictions. The bridge has a span of 68 feet clear, consisting of two trusses each with five panels approximately 14 feet long and 8 feet high, a clear inside width of 14 feet, fabricated from rolled steel sections and plates, riveted together. The deck is supported on cross beams, located at each panel point, approximately seven feet below the top of the trusses. The original reinforced concrete deck was replaced with a galvanized steel grating and later coated with zinc. The bridge is supported at each end on mass concrete abutments with wing walls.

The government of Ontario has stated in their *Ontario Heritage Bridge Program* (revised 1991) that: "Bridges can be important parts of our engineering and architectural heritage. Perhaps more than any other structure built by man, they exhibit major historical changes and innovation in the development and use of materials, in design, and in construction methods. Oftentimes bridges are a visual delight and make a positive contribution to amenity in their surroundings." This is certainly the case with the Stott's bridge as well as other such structures in the Rouge Valley area.

BILL NO. 0180

THE CORPORATION OF THE CITY OF SCARBOROUGH

BY-LAW NUMBER
25152

to designate the Maxwell Bridge
Concession III, Part Lot 2
now designated as Part 1 on Plan 64R-15231
as being of historical and architectural value

WHEREAS the Ontario Heritage Act, R.S.O. 1990, Chapter O.18 as amended, authorizes the Council of a municipality to enact by-laws to designate real property, including all the buildings and structures thereon, to be of historical and architectural value or interest;

AND WHEREAS the Council of The Corporation of the City of Scarborough has caused to be served upon the owners of the lands and premises known as the Maxwell Bridge at property more particularly denoted in Schedule "A" hereto and upon the Ontario Heritage Foundation notice of intention to so designate the aforesaid real property and has caused such notice of intention to be published in a newspaper having a general circulation in the municipality once for each of three consecutive weeks;

AND WHEREAS the reasons for designation are set out in Schedule "B" hereto;

AND WHEREAS no notice of objection to the said proposed designation has been served upon the Clerk of the municipality;

THEREFORE THE COUNCIL OF THE CORPORATION OF THE CITY OF SCARBOROUGH ENACTS AS FOLLOWS:

1. The real property, more particularly described in Schedule "A" hereto, known as the Maxwell Bridge, is hereby designated as being of historical and architectural value or interest.

2. The City Solicitor is hereby authorized to cause a copy of this by-law to be

registered against the property described in Schedule "A" hereto in the proper Land Registry office.

3. The City Clerk is hereby authorized to cause a copy of this by-law to be served upon the owner of the aforesaid property and upon the Ontario Heritage Foundation and to cause notice of this by-law to be published in a newspaper having general circulation in the City of Scarborough.

FIRST, SECOND and **THIRD** readings, this 24th day of June 1997

Mayor

Deputy City Clerk

SCHEDULE "A" TO BY-LAW

DESCRIPTION OF LAND

Part of Lot 2 in Concession 3 of the City of Scarborough in the Municipality of Metropolitan Toronto, originally in the township of Scarborough in the County of York, designated as Part 1 on Reference Plan 64R-15231 deposited in the Land Registry Office for the Registry Division of Metropolitan Toronto (No. 64). PIN #06054-0917(R)

TYPE Designation under The Ontario Heritage Act.

OWNER The Corporation of the City of Scarborough

SCHEDULE "B" TO BY-LAW

REASONS FOR THE DESIGNATION OF "THE MAXWELL BRIDGE"

The Maxwell Bridge is recommended for designation for historical and structural reasons. The bridge, built in 1927, is reinforced concrete, bowstring arch "through" structure, of a type pioneered in Canada by Frank Barber C.E. in the early 1900's. The bridge name was once associated with Maxwell's Mill which was located just north of the bridge structure. It was built to replace earlier access roads to the saw and grist mills and a woollen factory on the Rouge. Few of these bridge types remain in Ontario and the Maxwell Bridge was one of the last of this type to be constructed in the province.

Maxwell's Bridge

Maxwell's Bridge is recommended for designation under the terms of the Ontario Heritage Act for historical and engineering reasons. It is located in the Third Concession, Scarborough, near the boundary between lots 1 and 2 and just north of third concession road allowance.

Maxwell's bridge was built in 1927 at a cost of under $ 8,000. and carries Twyn Rivers Drive over the east branch of the Rouge River, which is also known as the Little Rouge. The bridge name was once associated with Maxwell's Mill which was located just north of the bridge structure. Historically, what is now Twyn Rivers Drive is an extension of Sheppard Avenue and was built to replace earlier access roads to the saw and grist mills and a woollen factory on the Rouge and Little Rouge. These 19th century industries were an important part of our rural heritage and the Rouge area today continues to reflect our past rural environment.

The bridge itself is a reinforced concrete, bowstring arch "through" structure, of a type pioneered in Canada by Frank Barber C.E. in the early 1900's. Barber is considered one of the most influential designers to work with reinforced concrete and was one of the first to build reinforced concrete truss bridges in Canada. Maxwell's bridge was patterned after the Freeman Bridge, which once spanned the Rouge River just west of the 9th Line, Markham, on Steeles Avenue. Few of these bridge types remain in Ontario today and Maxwell's Bridge was one of the last of this type to be constructed in the province. The bridge has a span of approximately 60 feet and a clear roadway width of 21 feet. The arches are a massive 19 inches thick and 21 inch deep, rising about six feet above the roadway at mid-span. The builder was likely C.E. Fraser, professional engineer , but there appears to be no surviving records to verify this.

The bridge survived a disastrous flooding of the valley in 1929 as well has Hurricane Hazel and other major storms over its seventy year history. Although road salt has resulted in concrete flaking, the bridge still appears to be structurally sound, although repairs such as those used in the past (srayed-on concrete "gunnite") are again required.

0181

THE CORPORATION OF THE
CITY OF SCARBOROUGH

BY-LAW NUMBER
25153

to designate the Hillside Bridge
part of original road allowance between Part Lots 4 and 5, Concession IV,
now designated as Part 1 on Plan 64R-15214
as being of historical and architectural value

WHEREAS the Ontario Heritage Act, R.S.O. 1990, Chapter O.18 as amended, authorizes the Council of a municipality to enact by-laws to designate real property, including all the buildings and structures thereon, to be of historical and architectural value or interest;

AND WHEREAS the Council of The Corporation of the City of Scarborough has caused to be served upon the owners of the lands and premises known as the Hillside Bridge at property more particularly denoted in Schedule "A" hereto and upon the Ontario Heritage Foundation notice of intention to so designate the aforesaid real property and has caused such notice of intention to be published in a newspaper having a general circulation in the municipality once for each of three consecutive weeks;

AND WHEREAS the reasons for designation are set out in Schedule "B" hereto;

AND WHEREAS no notice of objection to the said proposed designation has been served upon the Clerk of the municipality;

THEREFORE THE COUNCIL OF THE CORPORATION OF THE CITY OF SCARBOROUGH ENACTS AS FOLLOWS:

1. The real property, more particularly described in Schedule "A" hereto, known as the Hillside Bridge, is hereby designated as being of historical and architectural value or interest.

2. The City Solicitor is hereby authorized to cause a copy of this by-law to be

registered against the property described in Schedule "A" hereto in the proper Land Registry office.

3. The City Clerk is hereby authorized to cause a copy of this by-law to be served upon the owner of the aforesaid property and upon the Ontario Heritage Foundation and to cause notice of this by-law to be published in a newspaper having general circulation in the City of Scarborough.

FIRST, SECOND and **THIRD** readings, this 24th day of June 1997

Mayor

Deputy City Clerk

SCHEDULE "A" TO BY-LAW

DESCRIPTION OF LAND

Part of original Road Allowance between Lots 4 and 5 in Concession 4 of the City of Scarborough in the Municipality of Metropolitan Toronto, originally in the township of Scarborough in the County of York, designated as Part 1 on Reference Plan 64R-15214 deposited in the Land Registry Office for the Registry Division of Metropolitan Toronto (No. 64). PIN #06053-0385(R)

TYPE Designation under The Ontario Heritage Act.

OWNER The Corporation of the City of Scarborough

SCHEDULE "B" TO BY-LAW

REASONS FOR THE DESIGNATION OF "THE HILLSIDE BRIDGE"

The Hillside Bridge is recommended for designation for historical and engineering reasons. The bridge, built in 1917, is technically described as a Pony Warren Truss Bridge similar in design to the Stotts bridge. The structure does not require cross bracing, thereby eliminating height restrictions. The bridge was designed to carry local traffic across the Little Rouge in a rural environmental setting. It continues to serve this purpose today as this area of Scarborough forms part of the Rouge Valley Park. It is important that this bridge be preserved for future generations to understand and appreciate our rural heritage.

Hillside Bridge

The Hillside Bridge is recommended for designation under the terms of the Ontario Heritage Act for historical and engineering reasons. It is located in the Third Concession, Scarborough, on the road allowance separating Lots 4 and 5. Formerly known as Kirkham's Road the right-of-way is now called Meadowvale.

Hillside Bridge was built in 1917 at a cost of $ 3000 and carries Meadowvale Road over the Little Rouge just north of the third concession road allowance known today as Finch Avenue. Just south of the bridge is Hillside School (S.S. # 4) and to the west, Hillside Church and Wm. Milne's gothic style farmhouse know as "Hillside". Although the community was never formerly identified by a post office the name Hillside has been associated with the area for more than a century and the bridge thus named.

The bridge is a Pony Warren Truss bridge similar in design to the Stott's bridge on Twyn Rivers Drive. Hillside bridge;s desk is 16 feet wide and comprises on each side. trusses having six panels about 13.75 feet long for a total length of 82.5 feet. Panel depth is 8.5 feet. The trusses were fabricated from rolled steel angle sections and plates, riveted together. The deck is carried by I-beams at each panel point located about six feet below the top of the truss. The original concrete deck has been replaced by galvanized steel grating, later zinc coated. The bridge is supported at each each on massive poured concrete abutments with wing walls which now stand well above the river bed. In recent years, underpinning of the original footings has been necessary to prevent undermining of the bridge foundations due to the eroding the the river bed, now five feet lower than original.

The bridge was designed to carry local traffic across the river in a rural environmental setting. It continues to serve this purpose today as this area of Scarborough forms part of the Rouge Valley Park. It is important that this bridge be preserved for future generations to understand and appreciate our rural heritage.

APPENDIX B: PHOTOGRAPHS OF THE SUBJECT BRIDGES

Sewell's Bridge

Plate 1: Sewell's Bridge, looking north across the deck

Plate 2: North approach of Sewell's Bridge, looking south

Plate 3: View of Sewell's Bridge, looking northeast

Plate 4: View of Sewell's Bridge, looking east

Plate 5: View of Sewell's Bridge, looking southeast

Plate 6: Sewell's Bridge tower with steel sway bracings and suspension cables, looking northeast

Plate 7: View of the soffit and steel floor beams of Sewell's Bridge, looking north

Plate 8: Connection between the stiffening trusses and steel floor beams of Sewell's Bridge

Plate 9: Suspension cables, concrete pier with saddle, and turnbuckle of Sewell's Bridge, looking northeast

Plate 10: Warren type steel stiffening trusses of Sewell's Bridge, looking northeast

Stott's Bridge

Plate 11: East approach of Stott's Bridge, looking west

Plate 12: Stott's Bridge, looking west across the deck

Plate 13: Steel truss and west abutment wall of Stott's Bridge, looking northwest

Plate 14: Steel truss and west abutment wall of Stott's Bridge, looking southwest

Plate 15: Deck soffit, including steel floor beams, stringers, and bracings of Stott's Bridge, looking west

Plate 16: Steel guard rail and hand railings, and the east expansion joint of Stott's Bridge, looking northwest

Plate 17: The angled-down portion of the truss connecting with the bottom chord at the abutment bearing of Stott's Bridge, looking north

Plate 18: Truss and hand railing of Stott's Bridge, looking south

Plate 19: Steel truss on north side of Stott's Bridge, looking west

Plate 20: Bottom chord of the truss connection with steel floor beam, stringers, and bracings of Stott's Bridge

Maxwell's Bridge

Plate 21: South approach of Maxwell's Bridge, looking north

Plate 22: North approach of Maxwell's Bridge, looking south

Plate 23: West arch of Maxwell's Bridge, looking east

Plate 24: East arch of Maxwell's Bridge, looking northwest south

Plate 25: Asphalt deck top and east arch of Maxwell's Bridge, looking northeast

Plate 26: Asphalt deck top and west arch of Maxwell's Bridge, looking northwest

Plate 27: Deck top of Maxwell's Bridge, looking north

Plate 28: Cast-in-place concrete floor beams of Maxwell's Bridge, looking south

Plate 29: Cast-in-place concrete north abutment wall of Maxwell's Bridge, looking northeast

Plate 30: Connection point of cast-in-place concrete south abutment wall and bottom chord of Maxwell's Bridge, looking southeast

Hillside Bridge

Plate 31: North approach of Hillside Bridge, looking south

Plate 32: South approach of Hillside Bridge, looking north

Plate 33: View of Hillside Bridge, looking east

Plate 34: View of Hillside Bridge, looking west

Plate 35: North abutment wall and abutment bearings, and steel floor beams, stringers, and bracings of Hillside Bridge, looking northeast

Plate 36: Steel floor beams, stringers, and bracings of Hillside Bridge

Plate 37: Connection/panel point of steel truss with floor beam on Hillside Bridge

Plate 38: Steel truss on west side of Hillside Bridge, looking southeast

Plate 39: Angled portion of the west truss at connection with north abutment wall of Hillside Bridge, looking south

Plate 40: Galvanized steel grating on deck surface of Hillside Bridge, looking south

Milne Bailey Bridge

Plate 41: South approach to Milne Bailey Bridge, looking north

Plate 42: North approach to Milne Bailey Bridge, looking south

Plate 43: Milne Bailey Bridge, looking west

Plate 44: Milne Bailey Bridge, looking east

Plate 45: Steel floor beams, stringers, diaphragms, and bracings under the deck of Milne Bailey Bridge, looking north

Plate 46: Steel deck connection with asphalt of Milne Bailey Bridge, looking north

Plate 47: Truss panel connections with steel beams on Milne Bailey Bridge

Plate 48: Cross-braced panels of steel truss above wooden piers of Milne Bailey Bridge, looking east

Plate 49: Top and bottom chords of steel truss, with verticals and diagonals of Milne Bailey Bridge, looking north

Plate 50: Original south pier of a predecessor to the Milne Bailey Bridge, looking south

Note displacement caused by Hurricane Hazel

APPENDIX C: BRIDGE DRAWINGS

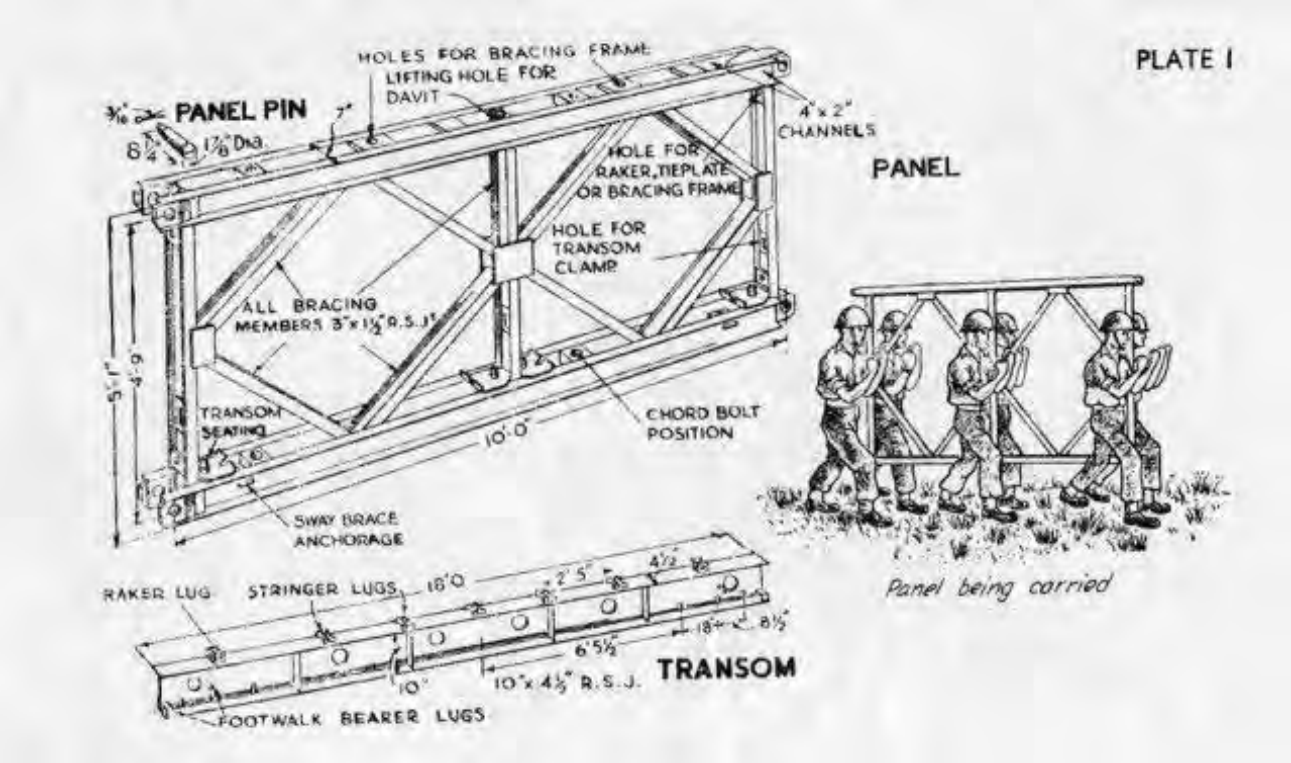


Figure 20: Representative drawing of Bailey Bridge components (Red House Museum)

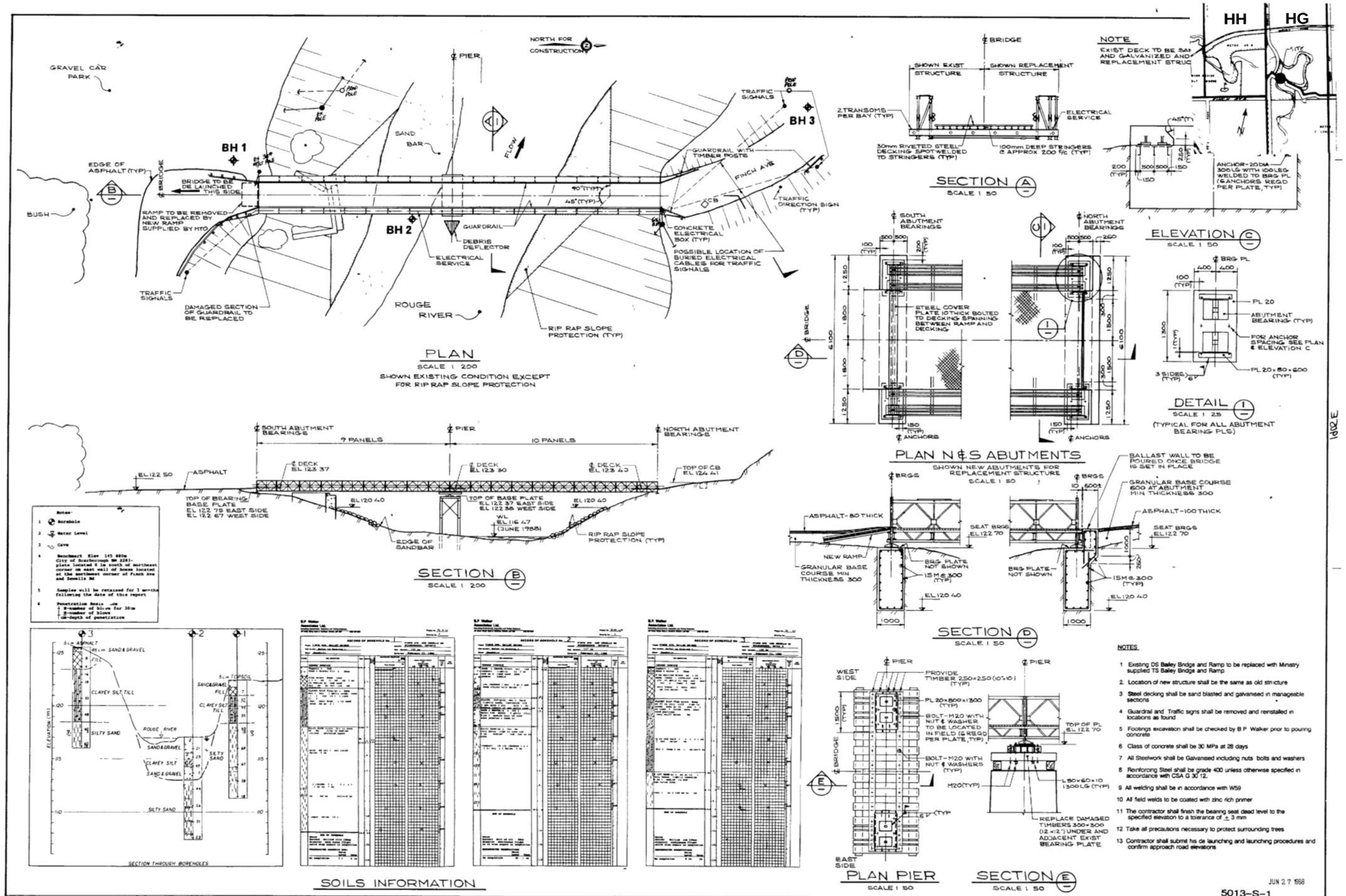
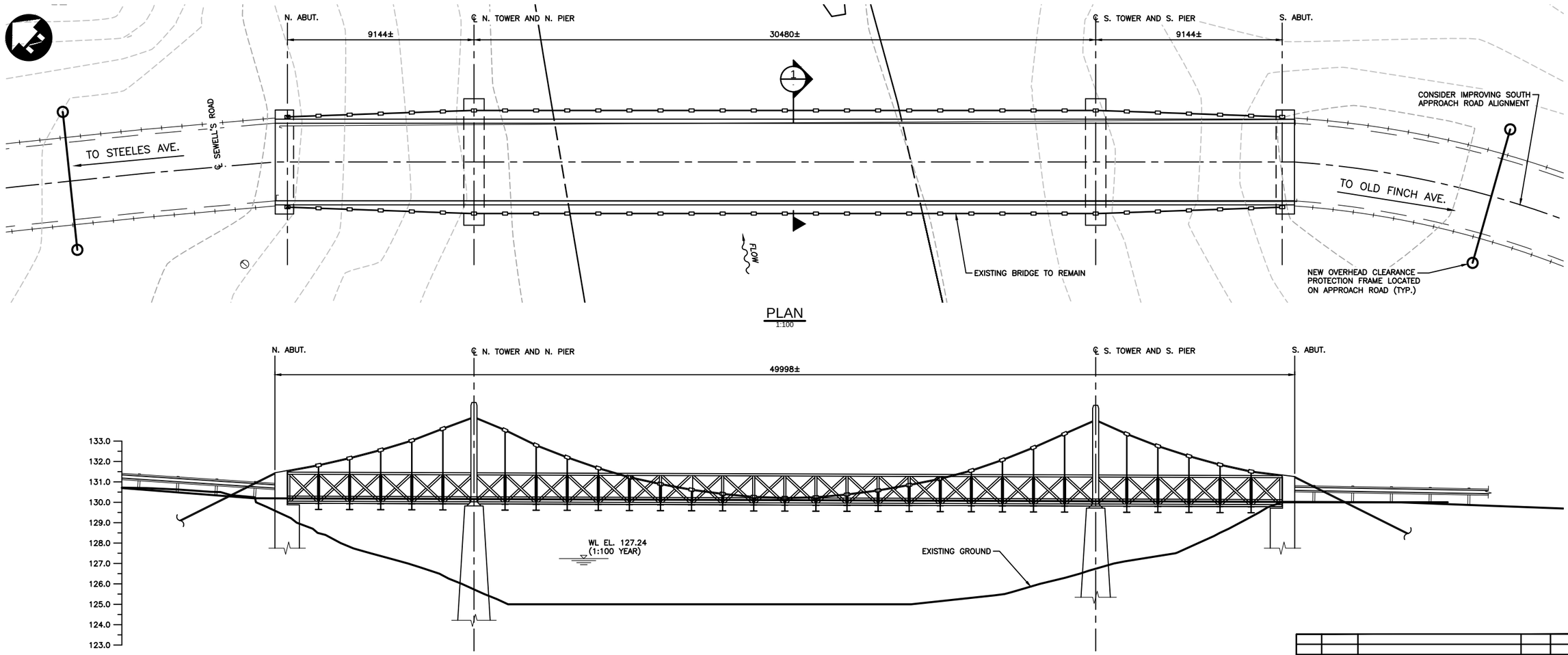
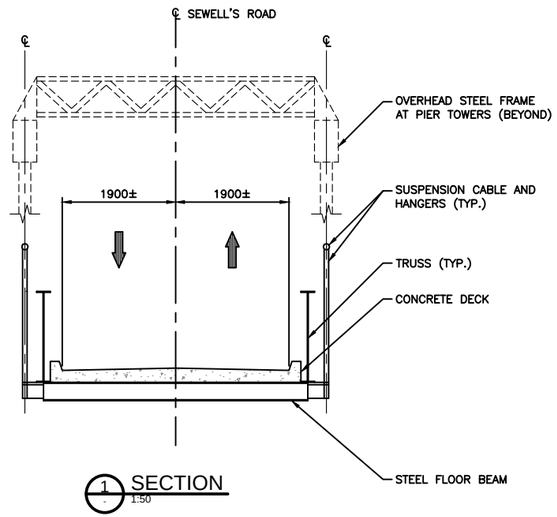


Figure 21: Finch Avenue Bailey Bridge Replacement, 1988



PLAN
1:100

WEST ELEVATION
1:100



1 SECTION
1:50

PRELIMINARY

No.	DATE	REVISIONS	INITIAL	SIGNED

DILLON CONSULTING
235 Yorkland Blvd., Suite 800, Toronto, ON M2J 4Y8
Phone: (416) 229-4646 Fax (416) 229-4692

APPROVED _____

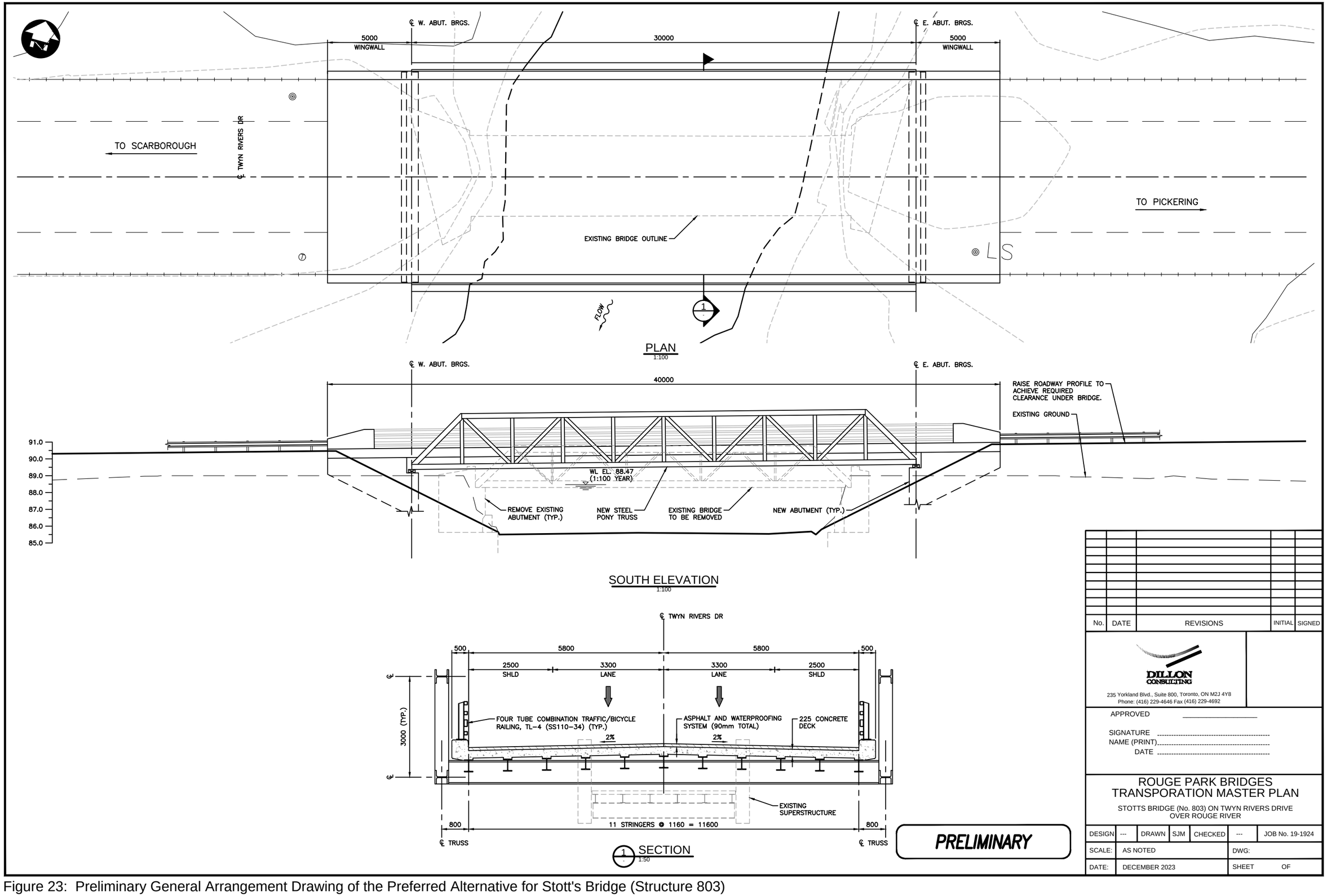
SIGNATURE _____
NAME (PRINT) _____
DATE _____

ROUGE PARK BRIDGES
TRANSPORATION MASTER PLAN

SEWELL'S ROAD BRIDGE (No. 812) ON SEWELL'S ROAD OVER ROUGE RIVER

DESIGN	---	DRAWN	SJM	CHECKED	---	JOB No. 19-1924
SCALE:	AS NOTED				DWG:	
DATE:	DECEMBER 2023				SHEET	OF

Figure 22: Preliminary General Arrangement Drawing of the Preferred Alternative for Sewell's Bridge (Structure 812)



No.	DATE	REVISIONS	INITIAL	SIGNED

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DATE

ROUGE PARK BRIDGES
TRANSPORATION MASTER PLAN

STOTTS BRIDGE (No. 803) ON TWYN RIVERS DRIVE OVER ROUGE RIVER

DESIGN	---	DRAWN	SJM	CHECKED	---	JOB No. 19-1924
SCALE:	AS NOTED				DWG:	
DATE:	DECEMBER 2023				SHEET	OF

PRELIMINARY

Figure 23: Preliminary General Arrangement Drawing of the Preferred Alternative for Stott's Bridge (Structure 803)

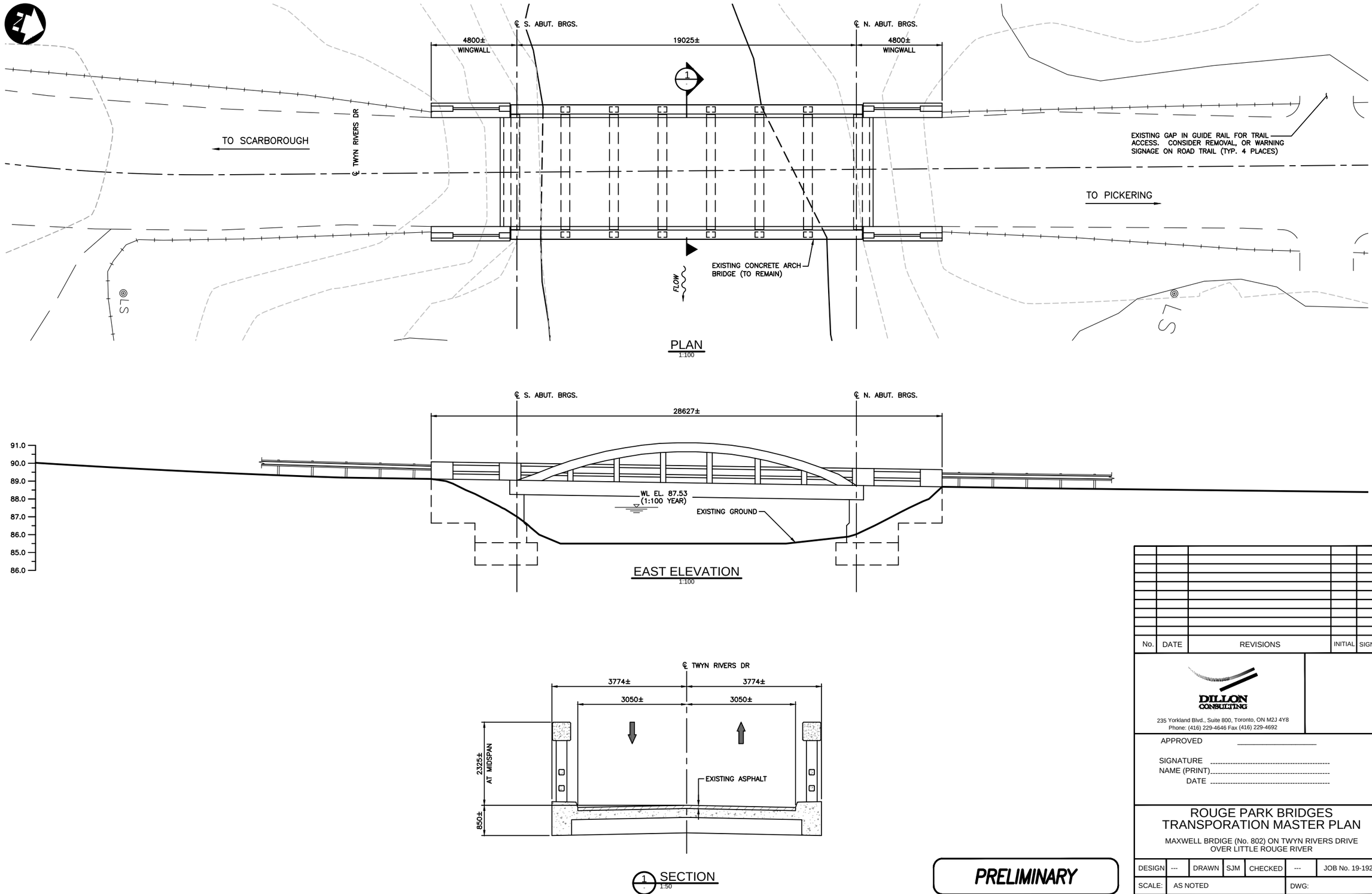
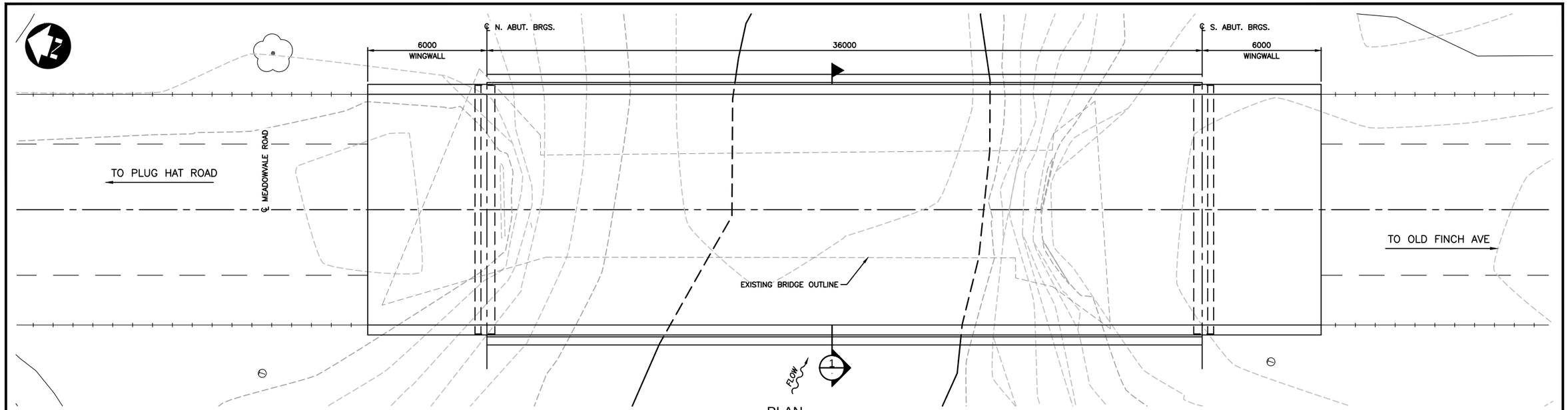


Figure 24: Preliminary General Arrangement Drawing of the Preferred Alternative for Maxwell's Bridge (Structure 802)



PLAN
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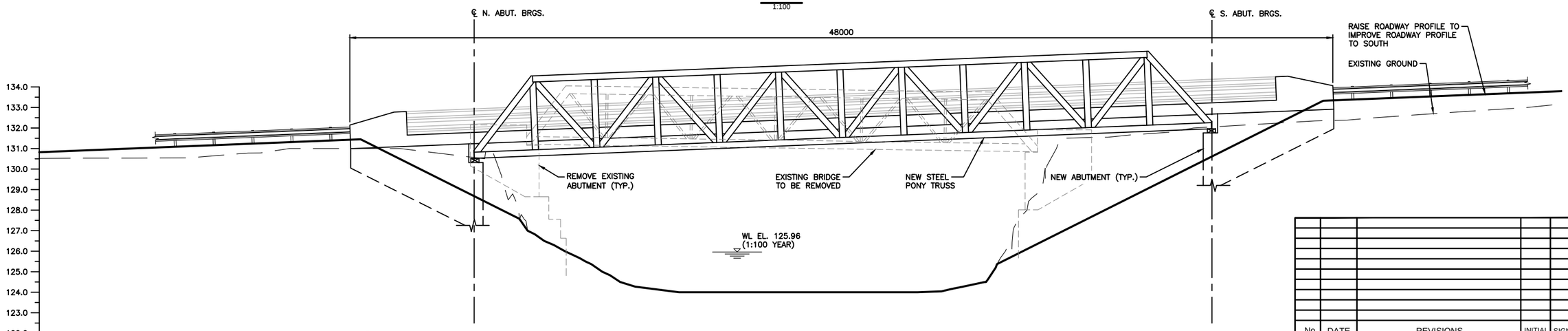
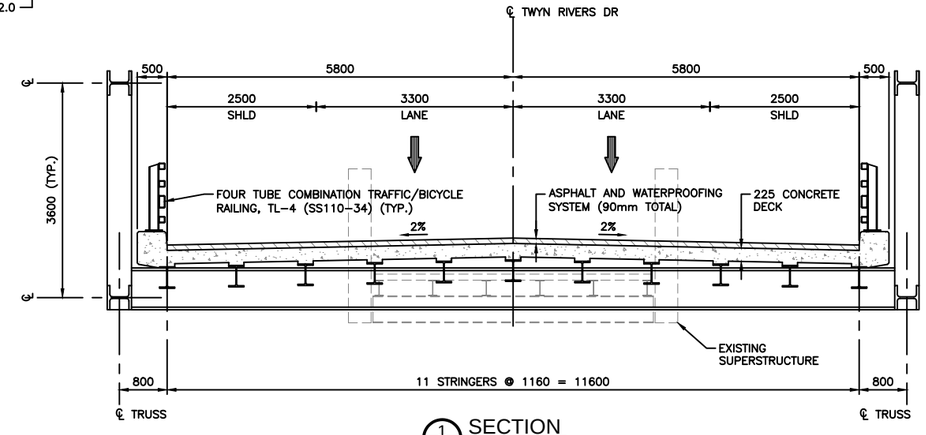


WEST ELEVATION
1:100



1 SECTION
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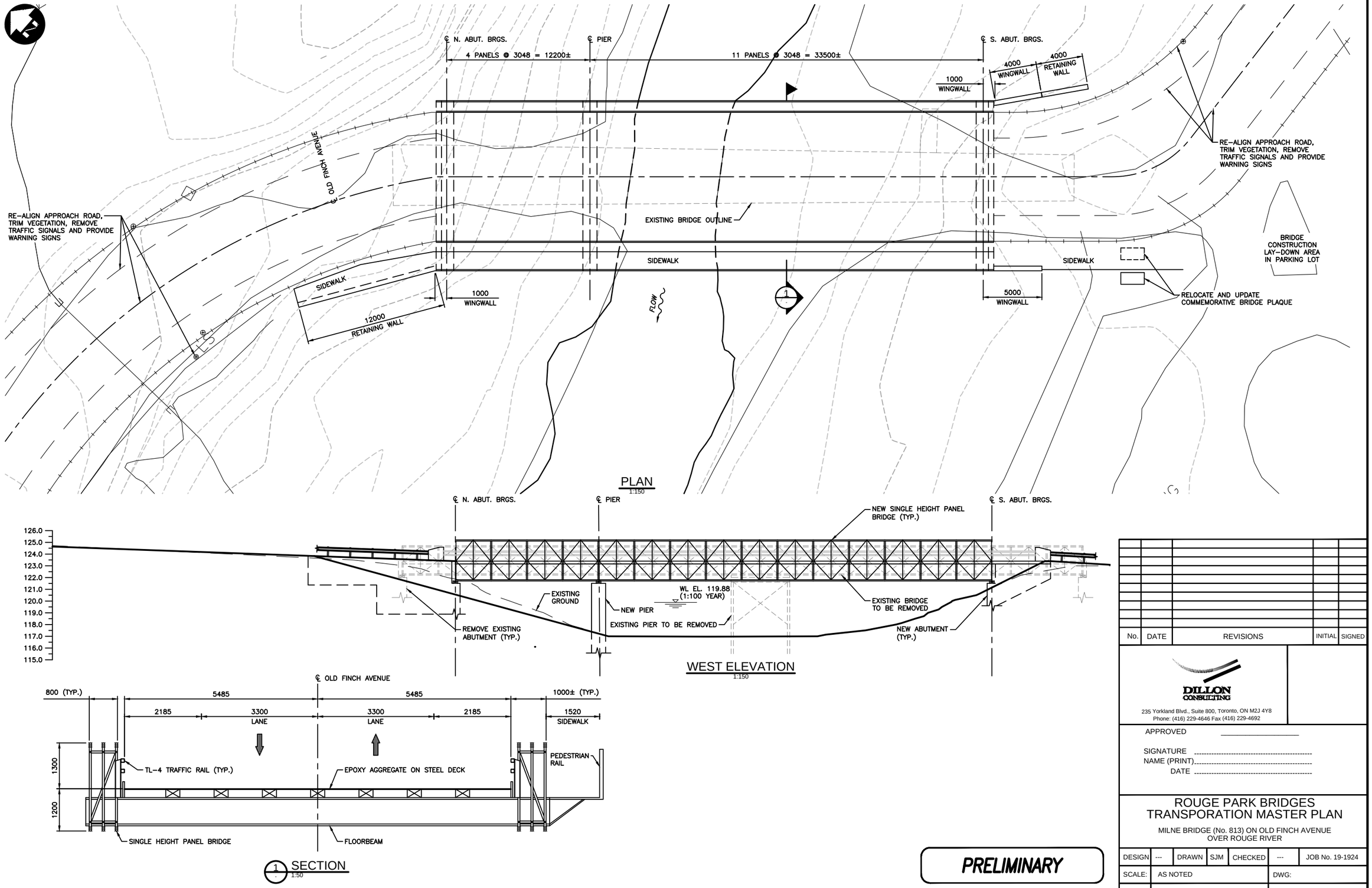
ROUGE PARK BRIDGES
TRANSPORATION MASTER PLAN

HILLSIDE BRIDGE (No. 806) ON MEADOWVALE ROAD
OVER LITTLE ROUGE RIVER

DESIGN	---	DRAWN	SJM	CHECKED	---	JOB No. 19-1924
SCALE:	AS NOTED				DWG:	
DATE:	DECEMBER 2023				SHEET	OF

Figure 25: Preliminary General Arrangement Drawing of the Preferred Alternative for Hillside Bridge (Structure 806)



No.	DATE	REVISIONS	INITIAL	SIGNED

DILLON CONSULTING
235 Yorkland Blvd., Suite 800, Toronto, ON M2J 4Y8
Phone: (416) 229-4646 Fax (416) 229-4692

APPROVED _____

SIGNATURE _____

NAME (PRINT) _____

DATE _____

PRELIMINARY

ROUGE PARK BRIDGES TRANSPORATION MASTER PLAN

MILNE BRIDGE (No. 813) ON OLD FINCH AVENUE OVER ROUGE RIVER

DESIGN	---	DRAWN	SJM	CHECKED	---	JOB No. 19-1924
SCALE:	AS NOTED				DWG:	
DATE:	DECEMBER 2023				SHEET	OF

Figure 26: Preliminary General Arrangement Drawing of the Preferred Alternative for Milne Bailey Bridge (Structure 813)

APPENDIX D: ONTARIO HERITAGE BRIDGE GUIDELINES CONSERVATION OPTIONS EVALUATIONS

NOTE: These evaluations of OHBG Conservation Options was prepared by Dillon Consulting Limited based on engineering and technical expertise, and provided to ASI for inclusion in this report as justification for the selection of preliminary preferred alternative for each bridge site.

Heritage conservation options are based on the 'Conservation of Historic Places in Canada;' (Parks Canada, 2010) which provides principles for infrastructure conservation and references the Ontario Heritage Bridge Guidelines (MTO, 2008) for the specific case of bridges. This provides a rank-order approach to heritage bridge conservation options, ranging from least to most heritage impact. The rank-order approach requires each option to be evaluated and found to be non-viable before the subsequent option is considered.

The rank-order options that were considered are listed in the tables below.

Conservation Options Overview — Sewell's Bridge (Bridge ID #812)

Conservation Option	Evaluation Summary
1. Retain existing bridge with no major modifications	Viable for study period based on condition, recognizing it is on a "no trucks" route, it has had proven performance to date, and recognizing that for fire and emergency access to both ends of the bridge is achievable on existing roadways. Ongoing maintenance and monitoring is recommended.
Recommendation:	**Retain existing bridge (option #1)**

Conservation Options Overview — Milne Bailey Bridge (Bridge ID #813)

Conservation Option	Evaluation Summary
1. Retain existing bridge with no major modifications	Not viable due to the poor condition of the bridge pier.
2. Retain & restore missing or deteriorated elements	Same evaluation as option #1. Not viable to restore because this type of bridge uses proprietary ("Bailey Bridge") panels that cannot be sourced in new condition, used panels are difficult to find, and there are known fatigue details that greatly increase the risk associated with the reuse of these panels.
3. Retain bridge with sympathetic modification	Same evaluation as option #2.
4. Retain with sympathetically designed new structure nearby	Same evaluation as option #1. Since existing bridge cannot be retained, bypass options are not considered further.
5. Retain & adapt for alternative use	Not viable to retain the bridge in-place for alternative use because a vehicular crossing is required at this location.
6. Retain as heritage monument for viewing purposes	Not viable to retain the bridge in-place as a monument because a vehicular crossing is required at this location.
7. Relocate – applicable for smaller, lighter structures	Relocation of the steel modular panel truss and floor is a viable option, requiring modifications for an alternative use (e.g. pedestrian crossing on a trail). This option may be considered if a suitable site can be determined, and it should be recognized the rehabilitation or replacement of the floor system and a shorter bridge span will likely be required to reduce the load demands, and to account for disposal of deteriorated components. The bridge could be reconstructed at a new location using fewer panels. This option could be applied in conjunction with a replacement bridge (option 8), but is considered optional, since a suitable site may not be available, and sympathetic replacement is recommended for the vehicular bridge.
8. Remove & replace – consider sympathetic details	For sympathetic details, the replacement bridge could be constructed using a modern type of panel bridge. The span lengths and pier placement would be modified to suit the site. Removal of the existing bridge could also include relocation for alternative use as outlined under option 7.
Recommendation:	**Remove and replace bridge (option #8, perhaps with option #7).**

Conservation Options Overview — Hillside Bridge (Bridge ID #806)

Conservation Option	Evaluation Summary
1. Retain existing bridge with no major modifications	Not viable due to the poor condition of the bridge.
2. Retain & restore missing or deteriorated elements	Not viable because localized repairs will not achieve the required structural capacity and durability.
3. Retain bridge with sympathetic modification	Not viable because sympathetic modification would require strengthening of all members and connections to an impractical size and scale, obscuring the original bridge from sight and destroying any residual heritage appearance or value.
4. Retain with sympathetically designed new structure nearby	Not viable to retain the bridge on its current alignment because it cannot be rehabilitated for the required loads, and changing the roadway alignment to bypass the bridge would create road safety concerns. This option would also not be feasible within the roadway right-of-way allowance.
5. Retain & adapt for alternative use	Not viable to retain the bridge in-place for alternative use because a vehicular crossing is required at this location.
6. Retain as heritage monument for viewing purposes	Not viable to retain the bridge in-place as a monument because a vehicular crossing is required at this location.
7. Relocate – applicable for smaller, lighter structures	Relocation of the steel pony truss is a viable option, requiring strengthening for an alternative use (e.g. pedestrian crossing on a trail). This option may be considered if a suitable site can be determined, and it should be recognized the rehabilitation will be extensive for any use and may involve modifying the bridge to make it narrower and reduce the load demands. This option could be applied in conjunction with a replacement bridge (option 8) to address the need for a vehicular crossing.
8. Remove & replace – consider sympathetic details	For sympathetic details, the replacement bridge could be constructed using a modern type of pony truss bridge. The span lengths would be modified to suit the site. Removal of the existing bridge may also include relocation for alternative use as outlined under option 7.
Recommendation:	**Remove and replace bridge (option #8, perhaps with option #7).**

Conservation Options Overview — Maxwell Bridge (Bridge ID #802)

Conservation Option	Evaluation Summary
1. Retain existing bridge with no major modifications	Viable for look-ahead period based on condition, and two lane width, recognizing it is on a "no trucks" route, it has had proven performance to date, and recognizing that the nearby Stott's Bridge (Site E) has been identified for replacement which will allow fire and emergency access to the west of the Maxwell Bridge. Ongoing maintenance and monitoring is recommended.
Recommendation:	**Retain existing bridge (option #1)**

Conservation Options Overview — Stott's Bridge (Site E, Bridge ID #803)

Conservation Option	Evaluation Summary
1. Retain existing bridge with no major modifications	Not viable due to the poor condition of the bridge.
2. Retain & restore missing or deteriorated elements	Not viable because localized repairs will not achieve the required structural capacity and durability.
3. Retain bridge with sympathetic modification	Not viable because sympathetic modification would require strengthening of all members and connections to an impractical size and scale, obscuring the original bridge from sight and destroying any residual heritage appearance or value.
4. Retain with sympathetically designed new structure nearby	Not viable to retain the bridge on its current alignment because it cannot be rehabilitated for the required loads, and changing the roadway alignment to bypass the bridge would create road safety concerns. This option would also not be feasible within the roadway right-of-way allowance.
5. Retain & adapt for alternative use	Not viable to retain the bridge in-place for alternative use because a vehicular crossing is required at this location.
6. Retain as heritage monument for viewing purposes	Not viable to retain the bridge in-place as a monument because a vehicular crossing is required at this location.
7. Relocate – applicable for smaller, lighter structures	Relocation of the steel pony truss is a viable option, requiring strengthening for an alternative use (e.g. pedestrian crossing on a trail). This option may be considered if a suitable site can be determined, and it should be recognized the rehabilitation will be extensive for any use and may involve modifying the bridge to make it narrower and reduce the load demands. This option could be applied in conjunction with a replacement bridge (option 8) to address the need for a vehicular crossing.
8. Remove & replace – consider sympathetic details	For sympathetic details, the replacement bridge could be constructed using a modern type of pony truss bridge. The span lengths would be modified to suit the site. Removal of the existing bridge may also include relocation for alternative use as outlined under option 7.
Recommendation:	**Remove and replace bridge (option #8, perhaps with option #7).**

APPENDIX E: HISTORICAL IMAGES OF THE ROUGE PARK BRIDGES

Sewell's Bridge

Figure 27: "The Sewell's Road Suspension Bridge over the Rouge River", October 1970. City of Toronto Archives (Fonds 218, Series 2502, File 90).

Figure 28: Sewell's Bridge, c.1980s. City of Toronto Archives (Fonds 218, Series 2502, File 128).

Milne Bailey Bridge

Figure 29: Milne Bailey Bridge, c. 1980s. City of Toronto Archives (Fonds 218, Series 2502, File 128)

Figure 30: Milne Baily Bridge, 1984 (https://www.intergon.net/handson/) https://www.toronto.com/news/stories-from-rouge-park-canadian-military-builds-baily-bridge-to-get-traffic-moving-after-hurricane/article_90df8e38-884c-5b6d-b110-18b455d87433.html?

Figure 31: Milne Bailey Bridge reconstruction, 1988 (https://www.intergon.net/handson/)

Figure 32: Milne Bailey Bridge reconstruction, 1988 (https://www.intergon.net/handson/)

Figure 33: Milne Bailey Bridge reconstruction, 1988 (https://www.intergon.net/handson/)

Figure 34: Milne Bailey Bridge reconstruction, 1988 (https://www.intergon.net/handson/)

Figure 35: Milne Bailey Bridge reconstruction, 1988 (https://www.intergon.net/handson/)

Figure 36: Milne Bailey Bridge reconstruction, 1988 (https://www.intergon.net/handson/)

Figure 37: Milne Bailey Bridge reconstruction, 1988 (https://www.intergon.net/handson/)

Figure 38: "Rouge Hills and Bridge", suspected to be the Old Finch Avenue crossing of the Rouge River in the location of the Milne Bailey Bridge, looking southeast, 1915. City of Toronto Archives (Fonds 70, Series 330, File 371).