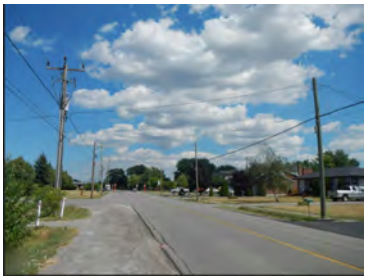
Hamilton

Municipal Class Environmental Assessment

Environmental Study Report

(June 2025)



Contents

List of Figures

List of Tables

LIST OF ACRONYMS

AADT	Annual Average Daily Traffic
ANSI	Areas of Natural and Scientific Interest
AODA	Accessibility for Ontarians with Disabilities Act
AWSC	All-Way Stop Control
City	City of Hamilton
Class EA	Municipal Class Environmental Assessment
CLI	Canada Land Inventory
CN	Canadian National Railway
EB	East Bound
EBL	East Bound Left
EBT	East Bound Through
ESA	Environmentally Sensitive Area
ESR	Environmental Study Report
ha	hectare
HCA	Hamilton Conservation Authority
HDI	Haudenosaunee Development Institute
HSR	Hamilton Street Railway
HWN	Huron-Wendat Nation
LID	Low Impact Development
LOS	Level of Service
m	metres
MCFN	Mississaugas of the Credit First Nation
MECP	Ministry of the Environment, Conservation and Parks
MTCS	Ministry of Culture and Sport
MNO	Métis Nation of Ontario
MTO	Ministry of Transportation
MUP	Multi-use Pathway
NB	Northbound
NBL	Northbound Left

NEP	Niagara Escarpment Plan
OPSS / OPSD	Ontario Provincial Standards
OTM	Ontario Traffic Manual
PGAC	Performance Graded Asphalt Cement
PIC	Public Information Centre
PIU	Public Information Update
PPS	Provincial Policy Statement
PTTW	Permit to Take Water
QEW	Queen Elizabeth Way
ROW	Right-of-Way
SAR	Species at Risk
SB	Southbound
SBL	Southbound Left
SBT	Southbound Through
SCUBE	Stoney Creek Urban Boundary Expansion Area
SLS	Serviceability Limit State
SNGR	Six Nations of the Grand River
TAC	Technical Agency Committee
TCS	Traffic Control Signal
TMP	Transportation Master Plan
TWSC	Two Way Stop Control
ULS	Ultimate Limit State
WB	Westbound
WBL	Westbound Left
WBT	Westbound Through
WSP	Williams Sale Partnership

EXECUTIVE SUMMARY

Numerous studies completed by the City of Hamilton including Fruitland-Winona Secondary Plan (2013), Stoney Creek Urban Boundary Expansion Transportation Master Plan (SCUBE TMP - 2008), Hamilton's (City-Wide) Transportation Master Plan (TMP, 2018), and confirmed in the 2024 Strategic Transportation Network Review have identified the need for additional transportation capacity, transit, and active transportation facilities within the Barton Street and Fifty Road corridors encompassed by this EA process.

The Stoney Creek Urban Boundary Expansion Transportation Master Plan (2008) recommended improvements to Barton Street between Fruitland Road and Fifty Road, and Fifty Road between South Service Road and Highway 8 to accommodate planned population growth in the Stoney Creek Urban Boundary Expansion Area (Study Area Map Figure 1-1).

The City of Hamilton has undertaken a **Phases 3 and 4** Schedule "C" Municipal Class Environmental Assessment (Class EA) study for improvements to Barton Street (Fruitland Road to Fifty Road) and Fifty Road (Highway 8 to South Service Road) as well as a **Phases 1 and 2** Schedule "C" EA study for a potential grade separation of the CN Rail crossing at Fifty Road. The culmination of the studies is documented in this Environmental Study Report (ESR). The study process considered Complete Street Design Manual principles, and future transit plans (Barton Street and Fifty Road form part of the future B-Line rapid transit network connecting to the Winona Crossing commercial node).

Barton Street and Fifty Road improvements are strategic growth projects and are intended to:

- **Provide safe, comfortable, accessible, and efficient pedestrian and cycling facilities** to encourage active transportation and healthier lifestyles within the growing community of lower Stoney Creek.
- **Improve connectivity** between residential areas, schools, workplaces, and other community 'Points of Interest.'
- **Improve safety and reduce delays at intersections**, including the crossing with the CN Rail and Metrolinx line on Fifty Road, for all vehicles and modes of transportation.
- **Create an innovative, landscaped, linear green space along the south side of Barton Street** to encourage active transportation and provide a buffer between residential communities to the south and employment areas to the north.
- **Ensure both commuter and recreational transportation needs are met** across all age groups and transportation modes.

Consistent with the EA process, the proposed improvements were evaluated against criteria related to transportation service, engineering, cost, socioeconomics, cultural environment, and natural environment factors. The study public engagement exceeded legislated public engagement requirements for projects subject to the Municipal Class Environmental Assessment process in that it included the creation of a Community Liaison Committee, multiple stakeholder engagements and three public meetings. The proposed Barton Street and Fifty Road improvements were refined to address feedback received and to meet the growth needs of the transportation corridors.

Various technical studies were completed to assess the existing conditions and potential impacts of the alternatives being considered. Studies included: Transportation and Traffic Analysis, Natural Heritage, Built Heritage and Cultural Heritage Landscape Assessment, Stage 1 Archaeological Assessment, Stormwater Management, Traffic Noise Study and Geotechnical Investigations. The findings of these studies along with feedback from the public, agencies and Indigenous Nations were incorporated into the evaluation of alternatives.

In accordance with the Official Plan, Barton Street is designated as a 40.576m wide arterial road and Fifty Road is designated as a 26.213m wide arterial road. The existing road allowance on Barton Street east of Fruitland Road varies between approximately 20m and 36m. As development along Barton Street has proceeded, the City has been gradually acquiring lands to establish the designated road allowance through land dedications at the time of development. The existing road allowance on Fifty Road varies from approximately 20 m to 23 m with only limited land dedication occurring on the west side of the road north of Barton Street.

The Fruitland-Winona Secondary Plan (2014) recommended that Barton Street include a 4 m wide Promenade on the south side of the corridor between Fruitland Road and Fifty Road, increasing the original road allowance designation from 36.576 m to 40.576 m.

As part of the Study, an updated Transportation Impact Study was conducted to confirm results of the 2008 SCUBE Transportation Master Plan and to address any changes since approval of the Secondary Plan in 2014. Through the analysis it was determined that east-west lane traffic demand and future transit would be more appropriately serviced with 4 lanes on Barton Street rather than 4 lanes on Highway 8. This outcome has been reflected in the 2024 Strategic Transportation Network Review which was approved as part of the 2024 DC By-Law as well as the ongoing Highway 8 Improvements Class EA process.

Barton Street

Alternatives for Barton Street were developed taking into consideration the approved right-of-way, Complete Streets Guidelines Design Manual and geometric road design criteria, impacts to properties, natural and built heritage, planned traffic growth, future transit plans, and both short- and long-term land use development plans. All alternatives

included a 4 m linear Promenade planned for the corridor, approved as part of the Fruitland Winona Secondary Plan.

In response to community feedback, changes were made to the Preferred Alternative for Barton Street following PIC #1. These changes include:

Reduced property requirements. The road allowance for the Barton Street Preferred Alternative was reduced in width by 4 metres by incorporating the linear Promenade within the original 36.6m road corridor.

Development of an interim three-lane interim configuration east of Lewis Road. The interim configuration will meet the near-term needs of the corridor and improve local access for residents and businesses, while protecting for the future road widening to 5-lanes when increased travel demand requires it; and,

Reduced environmental impacts. The Preferred Alternative was optimized by applying Complete Street Design Manual principles which resulted in reduction in the overall paved surface area.

Analysis and evaluation of alternatives for **Barton Street** resulted in the following recommendations for the corridor:

1. A cross-section with five lanes between Fruitland Road and Fifty Road in its ultimate configuration. An interim configuration of three lanes is to be implemented for the short - medium term east of Lewis Road.

2. Sidewalk on the north side of the road throughout the corridor and a meandering multi-use path on the south side of the road throughout the corridor to be employed as the Promenade contemplated in the Secondary Plan.

3. Incorporation of the Promenade (4m) into a 36.6 m road allowance reducing the required width of the corridor from 40.6 m to 36.6 m.

4. Traffic signals at major intersections with two-way stop control at other intersections.

5. Minor shifts of the road centre line throughout the corridor as a result of improvements to the design and to minimize property impacts.

6. A design that is consistent with the City's Complete Streets Design Manual.

Refer to **Section 6.3.4** for a graphical depiction of the recommended cross-sections for Barton Street.

Fifty Road

Alternatives for Fifty Road were developed taking into consideration the approved right-of-way, Complete Streets Design Manual and geometric road design criteria, impacts to properties, natural and built heritage, planned traffic growth, future transit plans, and both short- and long-term land use development plans.

Analysis and evaluation of alternatives for **Fifty Road** resulted in the following recommendations for the corridor:

1. A cross-section with three lanes between south of Barton Street to Highway 8 and four lanes north of Barton Street to South Service Road in its ultimate configuration.
2. A multi-use-path on the west side of the road throughout the corridor.
3. An intersection realignment at Highway 8 to improve intersection safety and bring the intersection angle closer to 90 degrees.
4. A four-metre shift of the road centre line to the east, to minimize residential property impacts on the west side of the corridor.
5. Widening of the road allowance north of Barton Street to 30m, from 26.2 m.
6. A design that is consistent with the City's Complete Street Design Guidelines Manual.

Notwithstanding that the limits of the Study was South Service Road there are deficiencies on Fifty Road north of South Service Road. Specifically, this segment of Fifty Road, which includes the interchange with the QEW, lacks pedestrian and cycling facilities and is a barrier for people walking and cycling between the waterfront and the commercial node (Winona Common). Capacity deficiencies have also been identified for the eastbound and westbound QEW ramp terminals. Through a separate project, City staff are working to advance solutions to address these issues.

Refer to **Section 6.3.4** for a graphical depiction of the recommended cross-sections for Fifty Road.

Canadian National Rail Crossing at Fifty Road

Through the study process for Fifty Road, feedback from the public triggered additional investigation into the need for improvements to the level of service and safety at the Fifty Road crossing at the CN Rail line immediately south of South Service Road. Based strictly on the projected growth in road traffic expected on Fifty Road, it is not anticipated that a grade-separation of the crossing is warranted based on the road exposure index used to assess such improvements although it could be triggered by growth in rail traffic. Physically separating rail traffic from road traffic with a bridge over or under the tracks will improve safety for both rail and vehicular traffic as well as users

of active transportation (pedestrian and cycling). The analysis of alternatives for the crossing included:

- Assessment of existing and future road and rail volumes at the crossing to determine the potential need for a grade-separation.
- Proximity of the intersection at South Service Road and hydro towers on the north side of the Rail line.
- Grade separation options which looked at the feasibility and potential land requirements for Fifty Road extending over or under the Rail line.

Analysis and evaluation of alternatives for the Rail crossing at Fifty Road resulted in the following recommendation for future study following the Phase 3 and 4 Class EA process to confirm the need for, and scope of, improvement:

- Potential new grade-separation with Fifty Road extending under the Rail line.
- Assess the impacts of alternative designs, including property requirements and the cost to construct.

In that the Study indicates that Fifty Road traffic would not likely be the primary driver for grade-separating the crossing, the future grade-separation study may be initiated by provincial interests for expansion of rail service to Niagara Region.

Subject to Council approval, a formal Notice of Study Completion will be issued, and the ESR will be filed with the Ministry of Environment, Conservation and Parks (MECP) and placed on public record for a 30-day public comment period. The ESR will also be subject to a ministry Section 16 Order (appeal) on the basis of Indigenous Rights and Treaties. Upon successful resolution of any comments received and/or Section 16 Orders, the project will be deemed to be completed and will be able to proceed to Detailed Design Concept and implementation, subject to budget approvals.

1

1 INTRODUCTION

The City of Hamilton (City) has undertaken Municipal Class Environmental Assessments (Class EA) for improvements to Barton Street, from Fruitland Road to Fifty Road, and Fifty Road from the Queen Elizabeth Way (QEW) to Highway 8 to address current and future transportation needs in the Stoney Creek Urban Boundary Expansion Area (SCUBE), planned for by the Fruitland-Winona Secondary Plan (2013). The contents of these Class EAs are together referred to as “the Study” in this Environmental Study Report (ESR) report.

This ESR was prepared to specifically document Phases 3 and 4 of the Class EA process for the improvements to Barton Street and Fifty Road and Phase 1 and 2 of the Class EA process for a potential grade-separation at the CN Rail crossing with Fifty Road. This Study builds on the recommendations of Hamilton’s (City-Wide) Transportation Master Plan (TMP, 2018), confirmed in the Strategic Transportation Network Review (2024), and SCUBE TMP (2008). The City-Wide TMP and the SCUBE TMP fulfilled the requirements of Phases 1 and 2 of the Class EA process for this Project.

The study area extends approximately 5.1km on Barton Street between Fruitland Road to the west and Fifty Road to the east, and approximately 790m on Fifty Road between the South Service Road to the north and Highway 8 to the south. It is located within the communities of Stoney Creek and Winona in the City of Hamilton. To the north of the study area is the QEW and Lake Ontario and to the south is Highway 8 and the Niagara Escarpment (Figure 1-1).

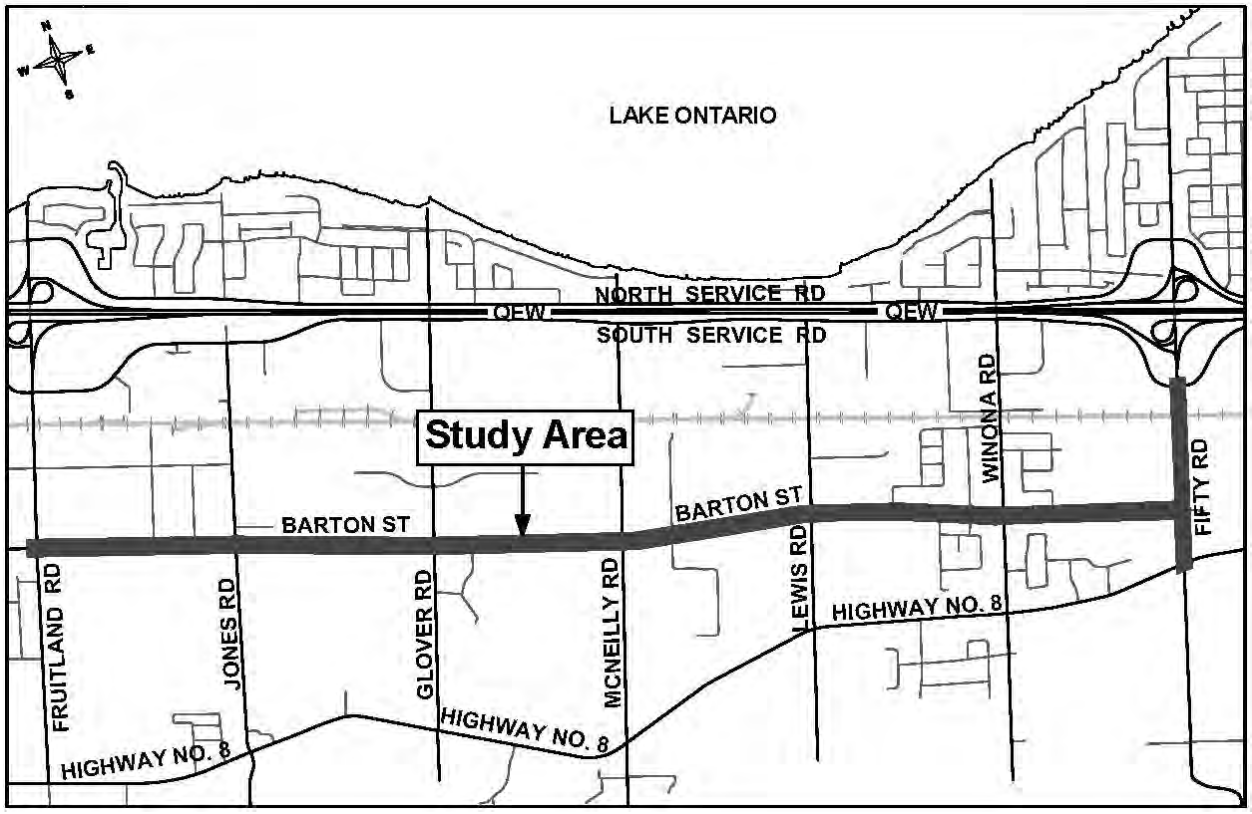


Figure 1-1. Study Area

1.1 ENVIRONMENTAL ASSESSMENT ACT

The Environmental Assessment Act of Ontario (R.S.O. 1990, c. E.18) was put into place to provide for the protection, conservation, and wise management of the environment within the province of Ontario. The EA Act applies to all projects being undertaken by provincial, municipal, or other public bodies within the Province of Ontario (unless explicitly exempt). It defines the environmental assessment works that must be completed prior to commencement of any undertaking, as well as the proponent's duty to consult with all affected and/or interested parties.

No undertaking that falls under the scope of the Environmental Assessment Act of Ontario is allowed to proceed until such time as the Ministry of Environment, Conservation and Parks (MECP) provides approval of the submitted environmental assessment documentation. This includes resolution of appeals based on Indigenous Rights and Treaties, made in accordance with section 16 of the EA Act. Municipal Class Environmental Assessment.

This Study is subject to the process and requirements of the Municipal Engineers Association Municipal Class Environmental Assessment (MCEA) document (February 2024).

The Study approach has been designed to meet the following objectives:

- Protection of the environment, including natural, social, and economic components of the environment.
- Participation of a broad range of stakeholders in the study process to allow for sharing of ideas, education, testing of creative solutions and developing alternatives.
- Documentation of the Study process in compliance with the Environmental Assessment Act and applicable phases of the Class EA process.

The Class EA process classifies projects according to their level of complexity and potential environmental impacts. These are termed "Schedules" and are summarized below:

Schedule A and A+ projects / studies involve minor modifications to existing facilities. Environmental effects of these projects / studies are generally small; therefore, the projects / studies are considered pre-approved.

Schedule B includes improvements and minor expansion to existing facilities. There is a potential for some adverse environmental impacts and, therefore, the proponent is required to proceed through a screening process, including consultation with those affected. Schedule B projects / studies are required to proceed through Phases 1, 2 and 5 of the Class EA process.

Schedule C includes the construction of new facilities and major expansion of existing facilities. These projects / studies proceed through the environmental assessment planning process outlined in the Class EA document. These projects / studies are required to fulfill the requirements of all five (5) phases of the Class EA process.

This Study is being completed under the requirements of a ***Schedule C Class EA***. The following Schedule C trigger applies to this Study:

> Reconstruction or widening where the reconstructed road or other linear paved facilities (i.e., High-occupancy vehicle lanes) will not be for the same purpose, use, capacity or at the same location (i.e., additional motor vehicle lanes, continuous centre turn lane) where the estimated cost is greater than or equal to $3 million (MCEA 2024).

The Study includes the Fifty Road/CN Rail crossing – future grade separation, which is being completed under the requirements of a ***Schedule B Class EA***. This following Schedule B trigger applies to this Study:

> *Construction of new grade separations and interchanges (MCEA 2024)*

The Class EA requires notification of, and consultation with, relevant stakeholders. The Project Team ensures stakeholders are notified early in the planning process, and throughout the Study. Should stakeholders raise issues that cannot be resolved through

discussion, these concerns would be referred to the Ministry of the Environment, Conservation and Parks (MECP) for resolution.

1.1.1 CLASS EA PROCESS

The Class EA process for this Study is illustrated in Figure 1-2. Requirements of Phases 1 and 2 for Barton Street and Fifty Road improvements were previously met through completion of the Stoney Creek Urban Boundary Expansion Transportation Master Plan (2008). This Study is fulfilling the requirements of Phases 3 and 4 of the Schedule C Class EA process for Barton and Fifty Road Improvements. This Study is also fulfilling requirements for Phases 1 and 2 for potential improvements to the CN Rail crossing at Fifty Road.

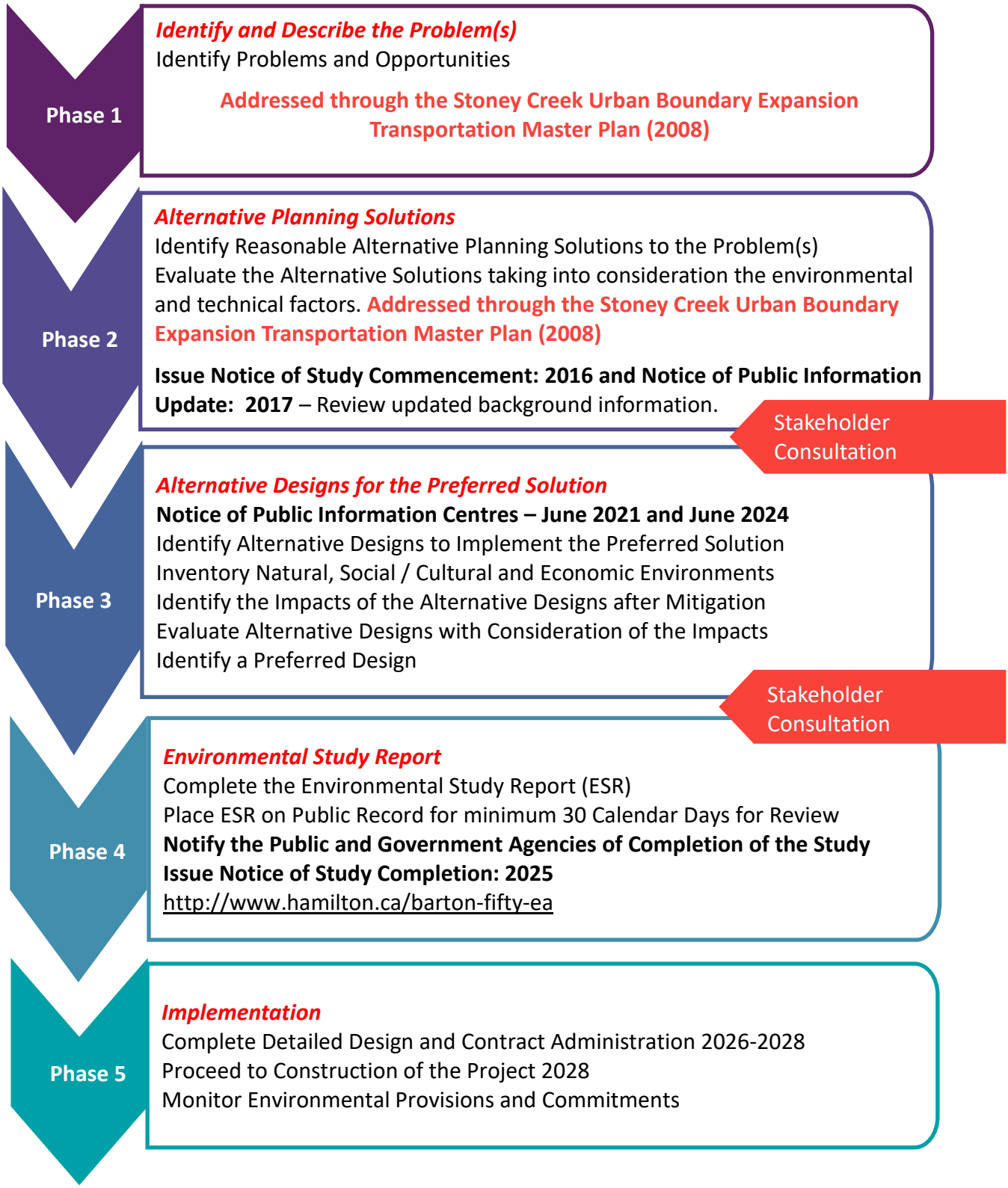


Figure 1-2. Municipal Class Environmental Assessment Process

1.1.2 THE ENVIRONMENTAL STUDY REPORT

This ESR explains the purpose of the Study, its background, current and future conditions in the area, the planning and design process, public consultation, the Preferred Alternatives (including costs), expected impacts (positive and negative), considerations for detailed design, suggested mitigation measures to reduce negative effects and filing of the ESR with the Ministry of Environment, Conservation, and Parks (MECP).

All parties having expressed an interest in the Study, including all abutting property owners, will be notified by letter, regarding the completion of the Study and filing of the ESR. In addition, a Notice of the Study Completion will be placed in the local newspapers, and Hamilton Spectator, in accordance with the requirements of the Class EA process. Hardcopies of the ESR will be made available at the following locations:

Hamilton City Hall – City Clerk's Office 71 Main Street West, Second Floor Hamilton, ON L8P 4Y5 Tel: 905-546-2489 Monday – Friday: 8:30 a.m. to 4:30 p.m.	
Hamilton City Hall 71 Main Street, **Sixth Floor** Hamilton, ON L8N 4E4 Tel: 905-546-3200 Hours: Mon- Friday: 8:30 a.m. to 4:30 p.m.	**Hamilton Public Library – Stoney Creek Branch** 777 Highway 8 Stoney Creek, ON L8E 5J4; Tel: 289-779-7588 Hours: Mon, Tues, Wed, Thurs, and Fri: 9:00 a.m. to 7:00 p.m. Saturday: 9:00 a.m. to 5:00 p.m. Sunday – Closed

Electronic copies of the ESR will be made available at https://www.hamilton.ca/barton-street-and-fifty-road-improvements and https://engage.hamilton.ca/bartonfiftyea

A review period of minimum 30 - days will be provided, during which comments can be submitted by the public and stakeholders. For matters dealing with Indigenous Nations rights and treaties a Section 16 (appeal) process can initiated with the MECP for any unresolved issues (see section 1.1.3)

1.1.3 SECTION 16 ORDER REQUEST PROCESS

Should stakeholders have concerns related to potential adverse impacts to constitutionally protected Indigenous rights and treaties, the stakeholder may request the Minister to review the matter in accordance with Section 16 (5) of the Environmental Assessment Act, R.S.O. 1990. This is known as an "Order Request". It is anticipated

that all other concerns will be resolved through discussion between the City and the concerned party.

Any Order Requests are to be addressed in writing to the Ministry offices below, and copied to the proponent:

Minister Ministry of the Environment, Conservation and Parks 777 Bay Street, 5th Floor. Toronto ON, M7A 2J3 minister.mecp@ontario.ca	Director, Environmental Assessment Branch Ministry of the Environment, Conservation and Parks 135 St. Clair Ave. W, 1st Floor. Toronto ON, M4V 1P5 EABDirector@ontario.ca	Proponent: Margaret Fazio Senior Project Manager, City of Hamilton, City Hall 71 Main Street West, 6th Floor. Hamilton, ON, L8R 4Y5 iplanning@hamilton.ca

1.2 STUDY ORGANIZATION

1.2.1 PROJECT TEAM

The Project Team originally consisted of staff from the City of Hamilton, WSP Canada and Paradigm Transportation Solutions Limited. In May 2024, Arcadis was also retained to update the preferred alternative for Barton Street, conduct a noise assessment, and host a Public Information Centre (PIC) event.

Proponent	**City of Hamilton**, Study Lead: Growth Management Division, Planning, Planning and Economic Development Department (PED) with input from: Transportation Planning, Traffic and Transportation, Planning, Economic Development, Environmental Services, Environmental Services, Transit - Hamilton Street Railway (HSR) and Hamilton Water.
Consultant #1 (Initiation to PIC #1)	WSP Canada (Originally retained as Wood, Environment, and Infrastructure Solutions). Paradigm Transportation Solutions Limited (Traffic sub-consultant)
Consultant #2 (PIC #2 to Notice of Completion)	Arcadis

1.2.2 TECHNICAL AGENCY COMMITTEE (TAC)

Representatives from provincial and federal agencies and utilities were offered the opportunity to participate in the Technical Agency Committee (TAC). Representatives who volunteered to participate met with the Project Team at two (2) critical points in the Study process to provide feedback on key aspects of the Study.

Prior to TAC meetings, project status information and the results of technical studies were circulated to the agencies for review. Meetings consisted of a brief presentation highlighting project status, followed by roundtable discussions regarding agency, comments, concerns, and recommendations. Detailed discussions and minutes from TAC meetings are provided in **Appendix C**.

1.2.3 COMMUNITY LIAISON COMMITTEE / FOCUS GROUP

Adjacent landowners, businesses owners and land developers identified as study stakeholders were offered the opportunity to participate in the Community Liaison Committee / Focus Group (CLC). The CLC was made up of volunteers who represented various types of stakeholders in the area, e.g. business owners and residents within the study area. The group met with the Project Team twice over the course of the Study:

- At the Study Commencement (to identify primary concerns); and,
- Prior to identification of a preferred alternative (to identify any potential issues with the recommendation).

The involvement of the CLC was guided by a “Barton Street and Fifty Road Municipal Class Environmental Assessment - Phases 3 and 4 Focus Group Role and Mandate” (refer to **Appendix A**). The meetings held provided a smaller forum for discussion and dialogue between the Project Team and stakeholders with specific interests and those that may be directly affected by the project.

2

2 CONSULTATION

This section outlines the City of Hamilton's approach to public and Indigenous engagement as part of the Class EA process. Engagement has been a critical component of this study, designed to ensure transparency, gather meaningful input, and respond to community and Indigenous concerns. This section details the consultation schedule, methods of communication, and summaries of input received from various stakeholders, including the general public, Indigenous Nations, agencies, and technical advisory committees. These efforts have informed and shaped the preferred designs for Barton Street and Fifty Road.

2.1 ENGAGEMENT SCHEDULE

Study consultation was initiated in November 2016 through publication and mailing of a formal Notice of Study Commencement. Comments received from the public, stakeholders, and Indigenous Nations throughout the Study including responses from the City and Project Team and further details are contained in **Appendix A** and **Appendix B.**

General consultation and engagement milestones follow in the table below.

Table 2-1 Consultation and Engagement Schedule

CONSULTATION ACTIVITY	DATE
Start-up Meeting (Project Team)	June 29, 2016
Study Introduction and Baseline Confirmation	**September 2016 through September 2017**
Municipal Team Meeting No. 1	July 15, 2016
Notice of Commencement	November 24, 2016
Community Liaison Committee Meeting (CLC) / Focus Group No. 1	June 14, 2017
Technical Agency Committee Meeting	June 20, 2017
Notice of Public Information Update No. 1	September 7 and 14, 2017
Public Information Update	September 22, 2017
Alternatives and Their Evaluation	**September 2017 through June 2024**
Community Liaison Committee Meeting (CLC) / Focus Group No. 2	May 27, 2021
Municipal Team Meeting No. 2	June 3, 2021
Notice of Public Information Centre No. 1	June 3 and June 10, 2021

Public Information Centre No. 1*	June 17, 2021
Public Information Centre No. 2*	June 20, 2024
Notice of Completion	Subject to Council approval

*Note: Public Information Update was a public meeting held by the City of Hamilton. The purpose of this event was to introduce the Study to the public and stakeholders to provide some continuity between the previously completed Fruitland-Winona Secondary Plan and Stoney Creek Urban Boundary Expansion (SCUBE) Transportation Master Plan (TMP). The meeting provided updated existing conditions information as well as sought input.

Public Information Centre No. 1 was the second consultation event but represented the first mandatory point of contact required by the Class EA process. The purpose of this meeting was to present alternative designs in support of the problem and opportunities statement (refer to section 4), their evaluation and recommend a preferred alternative(s) for Barton Street and Fifty Road.

Public Information Centre No. 2 was the third public consultation event and second mandatory public meeting. The purpose of this meeting was to:

- Provide an **opportunity to participate in the planning and decision-making process.**
- Confirm the **preferred alternative and designs,** based on the materials presented at the June 2021 Public Information Centre.
- Present **refinements to the preferred alternative for Barton Street**.
- Report on **how community feedback was addressed**.
- **Collect feedback and answer questions** about the preferred alternatives and recommended designs.

A study mailing list included all landowners of properties on streets bordering the study area, within 120m of study roadways' centre lines.

2.1.1 NOTICE OF STUDY COMMENCEMENT

A Notice of Study Commencement, detailing the study area, summarizing the objectives of the Study, and requesting comments, was mailed to property owners in the Study Area, agencies, stakeholders, and Indigenous Nations. The Notice was also published in the Stoney Creek News and Hamilton Spectator (At Your Service), on November 24 and December 1, 2016, by the Project Team. (**Appendix A**).

2.2 INDIGENOUS ENGAGEMENT

Indigenous engagement is a key component of the Class EA process. The MECP delegated the procedural aspects of the duty to consult to the Project Team in its response to the Notice of Commencement (letter dated January 19, 2017).

The Stage 1 Archaeology Report informed this study process and identified the need for specific locations needing subsequent stages of study. The City's corporate policy compensating Indigenous Nations for field monitoring and report reviews, will apply during the Detailed Design stage following this EA process when field work related to Stage 2 Archaeology is carried out.

Copies of all Indigenous engagement documents can be found in **Appendix B**.

2.2.1 IDENTIFICATION AND INTERACTION WITH INDIGENOUS NATIONS

In consultation with the MECP, the Project Team sought direction on the identification of Indigenous Nations that may have an interest in the Study. The MECP confirmed on January 19, 2017, that the following Indigenous Nations should be engaged:

- Six Nations of the Grand River (SNGR).
- Haudenosaunee Confederacy Council as represented by the Haudenosaunee Development Institute (HDI).
- Mississaugas of the Credit First Nation (MCFN).
- Huron-Wendat First Nation
- Métis Nation of Ontario (MNO).

The City's consultation list for Indigenous Nations included, SNGR, HDI, MCFN and Huron-Wendat Nation (HWN), and MNO (the latter added after the Study commenced). On November 23, 2016, an email including an introductory letter was sent to SNGR, HDI, MCFN and HWN. Follow-up contact was made on December 20, 2016, and on January 5, 2017, to SNGR and MCFN to gauge interest in the Study.

The Project Team met with SNGR, HDI, MCFN and HWN on July 2, 2021, to provide information regarding materials to be presented at Public Information Centre 1, and contacted MNO on October 7, 2021, about availability of the Archaeology Stage 1 Report, available via link on the https://engage.hamilton.ca/bartonfiftyea, for review.

2.2.2 HURON-WENDAT NATION

In November 2016, the Huron-Wendat Nation (HWN) requested access to digital files of a study area. By December 7, 2016, the requested files were provided by the City in response to their request. HWN also sought clarification on whether any archaeological assessment had been conducted for the study. HWN was notified about the availability of the Stage 1 Archaeological Assessment Report, available on the Study website, in a follow-up letter sent following Public Information Centre No. 1.

No other Indigenous Nations provided comments or questions. No concerns were expressed by Indigenous Nations.

2.3 PUBLIC CONSULTATION

2.3.1 PUBLIC INFORMATION UPDATE

The project team hosted a Public Information Update (PIU) on September 22, 2017, at the Stoney Creek Municipal Centre from 5:00 p.m. to 7:00 p.m. This event was advertised through the City of Hamilton website and notices in the Stoney Creek News on September 7 and September 14, 2017. Additionally, the Ward councillor distributed copies of the Notice to attendees at the Winona Peach Festival.

The PIU comprised 27 project information panels about the Study's progress, the problem and opportunity statement, initial findings from background studies, alternatives being considered, and next steps. Members of the Project Team were present to assist attendees in understanding the displayed information, engage in discussions about the Study, and respond to queries. Attendees were encouraged to sign in and complete comment forms. Forty-one individuals signed in at the PIU, and four comment forms were received during the event, with an additional comment received via email following the PIU. Further details regarding this PIU can be found in **Appendix A**.

Details of this PIU content, public engagement and comments are presented in **Appendix A.**

2.3.2 PUBLIC INFORMATION CENTRE #1

Due to Covid restrictions, the project team hosted a virtual Public Information Centre (PIC) #1 on June 17, 2021, from 6:00 pm to 8:00 pm. The PIC consisted of a presentation, followed by an open question and answer period. A video recording of the presentation was uploaded on the City's YouTube account, and the presentation slides and draft roll plans were placed on the Engage Hamilton online platform.

Notifications were circulated through the following channels:

- **Newspaper**: Notices were placed in the Stoney Creek News on June 3 and June 10, 2021.
- **City Website**: Information regarding the PIC was advertised on the City of Hamilton website.
- **Property Owner letters**: Landowners within 120 m from existing centre line of both roadways within study area were mailed the Notice and accompanying cover letter directly on June 2, 2021.
- **Indigenous community letters**: Indigenous Nations received a letter and copy of the Notice, sent on June 2, 2021.
- **Agency Notifications**: Agencies were notified via email.
- **Social media**: The City's social media accounts were used to advertise the PIC.

  Example of City of Hamilton Social Media messaging on X:

There were 41 attendees present at the virtual live event. Engagement statistics and the PIC #1 consultation summary can be found in **Appendix A**.

Participants provided feedback, questions, and comments to staff members during the open question and answer period. Discussions focused on major themes and significant areas of concern or support for the project. Some of the key themes are summarized below:

- The project should minimize property impacts and impacts on the natural environment and surrounding trees. Concerns were raised about the impact that the 40-metre right-of-way would have on properties, particularly the potential for a large number of full properties takes to implement the design.
- There are drainage and flooding issues within the study area.
- Concerns about safety at the CN Rail Crossing at Fifty Road.
- Noise concerns with transport trucks travelling on Barton Street, specifically when trucks pass over manhole covers.
- The volume of traffic on Barton Street makes it difficult for some residents to get in and out of their driveways.

2.3.3 PUBLIC INFORMATION CENTRE #2

The project team hosted Public Information Centre (PIC) #2 on June 20, 2024, from 6:00 to 8:00 pm at the Stoney Creek Municipal Service Centre. The PIC followed a drop-in format and provided opportunities for attendees to learn about the project and provide their input. Fourteen project information panels were arranged in an easy-to-view format. A narrated video of the panels was uploaded on the City's YouTube account, while a copy of the display panels and draft roll plan, were placed on the Engage Hamilton online platform.

Notifications were circulated through the following channels:

- **Newspaper:** Notices were placed in the Stoney Creek News on June 7 and June 14, 2024.
- **City Website:** Information regarding the PIC was advertised on the City of Hamilton website.
- **Property owner letters:** Landowners within 120 m from existing centre line of both roadways within study area were mailed the Notice and accompanying cover letter directly on June 14, 2024.
- **Indigenous community letters:** Indigenous Nations received a letter and copy of the Notice, sent on June 14, 2024.
- **Agency Notifications:** Agencies were notified via email.
- **Social media:** The City's social media accounts were used to advertise the PIC.

Participants provided feedback, questions, and comments to staff members, posted sticky notes with site-specific comments on the roll plans and completed the comment

form either on hardcopy or provided comments via email following the PIC. There were 38 attendees present at this drop-in event. Engagement statistics and the PIC #2 consultation summary can be found in **Appendix A**.

Comments received focused on major themes and significant areas of concern or support. Some of the key themes are summarized below:

- Continued concerns with property impacts and request for the City to re-consider the design rather than buying out multiple residential properties.
- Concerns with cyclist safety on Fifty Road from Highway 8 to South Service Road as the multi-use path design is offset north and south of Barton Street. Concern that safety risks will be heightened with the addition of a Promenade, a multi-use pathway, and the added lanes as residents need to back out of their driveways.
- Continued concerns with trucks causing ground vibrations and noise impacts.

2.4 TECHNICAL AGENCY CONSULTATION

In EA terms “agency”, refers to parties outside of the Indigenous Nations and the general public. It usually refers to other/higher levels government. Agency consultation included creation of a Technical Agency Committee comprised of agencies most impacted by the CN Rail crossing, e.g. Ministry of Transportation of Ontario and Hydro One.

2.4.1 TECHNICAL AGENCY COMMITTEE MEETING

The first TAC meeting was held on June 20, 2017, at Hamilton City Hall. Key items discussed included Right-Of-Way requirements as outlined in the Fruitland-Winona Secondary Plan, potential for higher order (bus rapid transit) and a multi-modal hub in the area, traffic conditions, the Canadian National (CN) Rail crossing at Fifty Road, cycling infrastructure, utility infrastructure and a review of the PIU #1 project information panels. Table 2.2 in **Appendix C** provides a summary of comments from the meeting.

2.5 COMMUNITY LIAISON COMMITTEE / FOCUS GROUP CONSULTATION

2.5.1 FOCUS GROUP ROLE AND MANDATE

A Committee Liaison Committee / Focus Group (CLC) was created at the start of the Study to ensure that stakeholders had input into the project. CLC members are intended to include residents, property owners and other stakeholders, such as business owners,

neighbourhood association representatives, institutions and/or other area groups and associations. Membership was derived from an open call, via advertisement in Stoney Creek News, City of Hamilton's social media accounts, and Hamilton Spectator as well as direct mail to all abutting Study Area landowners.

The role and mandate of the CLC was published on November 13, 2016, on the City's website (https://www.hamilton.ca/sites/default/files/2022-08/barton-fifty-ea-focus-group-role-mandate.pdf). The CLC supported the Project Team in meeting the requirements of the Municipal Class Environmental Assessment process by proving meaningful input into development of the Study's evaluation criteria and design alternatives.

Feedback received and documented in this Study will inform the Detailed Design process that precedes construction.

Detailed information on the document and detailed minutes from meetings held before each Public Information Centre, can be found in **Appendix A**.

3

3 EXISTING AND FUTURE CONDITIONS

The lands surrounding both Barton Street and Fifty Road consist primarily of rural residential land uses (centred at major intersections), open greenspaces, and light industrial / commercial (north side of Barton Street). The highest density residential land uses exist on Barton Street immediately to the west and east of Winona Road, which makes up a portion of the historic community of Winona (established in the late 1700s).

This section describes the existing and future conditions within the Barton Street and Fifty Road study area, which encompasses parts of the Fruitland-Winona Secondary Plan and adjacent communities. A comprehensive assessment of current land use, socio-economic characteristics, transportation infrastructure, environmental features, and utilities was conducted to establish baseline conditions. The analysis also includes results from numerous technical studies that evaluated the physical, natural, and cultural environments. This foundational understanding supports the evaluation of potential impacts associated with future transportation improvements.

3.1 BACKGROUND STUDIES

Numerous studies completed by the City of Hamilton identified the need for additional transportation capacity, transit, and active transportation facilities along Barton Street and Fifty Road within the Study Area. Other supporting documents also provided the guidance on other aspects of this EA process, as follows:

A Place to Grow: Growth Plan for The Greater Golden Horseshoe (2020)

- Biodiversity Action Plan (2024)
- City-Wide Transportation Master Plan (TMP) (2018)
- Climate Change Action Strategy (2022)
- Complete Streets Design Guidelines (2023)
- Cycling Master Plan Review and Update (2018)
- Fruitland Road Class EA (Phases 1&2)
- Fruitland-Winona Secondary Plan (2013)
- Gordon Dean Class EA (Phases 3 & 4 of Fruitland Road EA - 2022).
- Growth Plan for The Greater Golden Horseshoe (2020).
- Greenbelt Plan (2017).
- Niagara Escarpment Plan (2017).
- Niagara Rail Service Expansion Environmental Study Report (2011)
- Ontario Regulation 567/22 – Designation of Greenbelt Area
- Stoney Creek Urban Boundary Expansion (SCUBE) Subwatershed Study (2008)
- Stoney Creek Urban Boundary Expansion (SCUBE) Transportation Master Plan (2008)

- Strategic Transportation Network Review (2024)
- Ten Year Local Transit Strategy (2015, Draft - 2025)
- Urban Forestry Strategy (2022)
- Vision Zero Action Plan (2019-2025)

3.2 SOCIO-ECONOMIC ENVIRONMENT

3.2.1 POPULATION

Per the 2021 Census, the population of the City of Hamilton is 569,355, which is a 6.7% increase from the 2016 population of 536,920 (Statistics Canada 2021). The population in Stoney Creek per 2021 Census data is 112,028, which is a 3.9% increase from the 2016 (City of Hamilton 2022).

The Fruitland-Winona Secondary Plan area comprises 370 hectares, including the existing community of Winona, and originally planned to accommodate an estimated population of approximately 15,400 people, at a density of 70 persons/jobs per hectare. Recent 2051 projections released in 2024 indicate the future population to exceed 23,400.

3.2.2 LAND USE

3.2.2.1 EXISTING LAND USES

The existing land use within the study area is primarily low-density residential and rural residential to the south of Barton Street and industrial and commercial to the north. Within the study area, north of Barton Street, the land use is predominantly designated as Business Park. To the south of Barton Street are residential neighborhoods, a few areas of institutional use, and pockets of open space (e.g. parks). Commercial uses are located at the intersection of Barton Street and Fruitland Road, as well as at the intersection of Fifty Road and South Service Road. Barton Street also is subdivided by a large open space (green belt) to the south, between Glover Road and McNeilly Road. Located north of the Barton Street and Fifty Road intersection is the QEW interchange. Barton Street (except Lewis Road to Fifty Road part time) and Fifty Road are truck routes, which serve as exit and entrance points to the QEW and Highway 8. Fifty Road also crosses the CN Rail just south of the South Service Road.

3.2.2.2 RESIDENTIAL AND RECREATIONAL COMMUNITY FEATURES

The City's Urban Hamilton Official Plan (– Chapter 2 – Stoney Creek Secondary Plans, and specifically Section 7.4 Fruitland-Winona Secondary Plan (2014) identifies most of the study area as part of the Urban Area, except for lands south of Barton Street between McNeilly Road and Glover Road, and some lands along Fifty Road, which are

in the Rural Area (ref. Urban Hamilton Official Plan - Schedule E-1 - Land Use Designations provided in Figure 3-0).

Two (2) schools are located within the study area: Winona Elementary School located in the southwest quadrant of the Barton Street / Lewis Road intersection; and St. Gabriel's Catholic Elementary School located on the north side of Barton Street just west of Fifty Road.

Stoney Creek Christian Fellowship is the only church within the study area, located at the northwest corner of the Barton Street and Glover Road intersection.

3.2.2.3 AGRICULTURE AND BUSINESS

The lands to the north of Barton Street serve primarily industrial and commercial functions. Although varied, most businesses along Barton Street can be categorized as manufacturing companies, automotive parts and service centres, or building material supply stores. Agricultural lands are located with the Secondary Plan area primarily to the south of Barton Street between Fruitland Road and Lewis Road and along the east side of Fifty Road.

3.2.2.4 LAND USE DESIGNATIONS

The City of Urban Hamilton's Official Plan (2017) designates urban land use within the study area and the study location is within the Fruitland-Winona Secondary Plan (ref.B.7 Stoney Creek Secondary Plans, section 7.4, which provide the following direction for development:

Strengthen Existing Neighbourhoods

> *a) Ensure new development maintains a balance of residential uses, commercial uses, open space, and community facilities/services that interface well with existing communities.*
>
> *b) Ensure new development respects and enhances the character of existing neighbourhoods.*
>
> *c) Encourage new commercial uses that cater to the existing and proposed local neighbourhoods; and,*
>
> *d) Ensure existing and future neighbourhoods are well served by community facilities/services such as schools, health care, libraries, emergency services, public transportation, and community recreation facilities.*

The Fruitland-Winona Secondary Plan /Official Plan Urban Land Use Designations (Map B.7.4-1) are provided in Figure 3-0**.**

According to Schedule C of the Urban Hamilton Official Plan, Barton Street and Fifty Road in the study area are classified as Major Arterial Roadways, and the Fruitland-Winona Secondary Plan recommends that Barton Street shall have the Right-of-Way of 36.6m with an additional widening of 4.0m, to the south, where the pedestrian

Promenade shall be located, to provide pedestrian connectivity from Fruitland Road and Fifty Road.

Figure 3-0. Urban Hamilton Official Plan – Schedule E-1 Urban Land Use Designations

According to Schedule D of the City of Hamilton Rural Official Plan, rural land uses within the study area are also designated, as identified in Figure 3-1. Most of the rural portions of the study area are designated as Specialty Crop lands.

Figure 3-1. Rural Hamilton Official Plan – Schedule D Rural Land Use Designations

Schedule B in Figure 3-2 of the Rural Hamilton Official Plan designates the area between Glover Road and McNeilly Road, and both sides of Fifty Road south of South Service Road as Greenbelt Protected Countryside.

Figure 3-2. Rural Hamilton Official Plan – Schedule B Natural Heritage System

3.2.2.5 *FUTURE LAND USES*

The Fruitland-Winona Secondary Plan, section 7.4.1. Vision describes area is as follows:

> *Fruitland-Winona is a community that recognizes the character of two distinct areas that will together strive for a safe, clean community with green canopy neighbourhoods connected by safe transportation corridors. The heritage community of Fruitland-Winona will accommodate people of all ages within a variety of housing choices that will be supported by excellent schools, parks, and trail systems. Within the heart of the community, people oriented focal points will provide for activities such as a farmers' market, recreation centre and other community activities. This generally low-density community will support neighbourhood commercial and other higher density housing at appropriate locations. The Fruitland-Winona community provides a balance between a forward-looking community and a small - town place to live.*

3.3 TRANSPORTATION NETWORK ANALYSIS

3.3.1 EXISTING ROAD NETWORK AND INFRASTRUCTURE

Figure 3-3 illustrates the Urban Hamilton Official Plan Schedule C Functional Road Classifications. The following subsections provide an overview of the existing Barton Street and Fifty Road corridors.

Figure 3-3. Urban Hamilton Official Plan - Schedule C Functional Road Classification

The road network within, and adjacent to, the study area primarily follows a grid pattern, with South Service Road, Barton Street and Highway 8 serving as the primary east-west arterials, and Fruitland Road and Fifty Road serving as the primary north-south arterials. Both Fruitland Road and Fifty Road have full movement grade-separated interchanges with the QEW. North-south collectors, including Jones Road, Glover Road, McNeilly Road, Lewis Road and Winona Road intersect Barton Street at an approximate regular spacing of 850 m, aligned with historic concession lines.

A dual-track Canadian National Rail line crosses Fifty Road perpendicularly at grade just south of the South Service Road. The crossing is protected by a gate arm with reflective materials and flashing lights. Road signs notify drivers of the upcoming crossing at two locations on Fifty Road: 100 m north and 200 m south of the crossing.

3.3.1.1 BARTON STREET

Barton Street is a two-lane major arterial roadway in accordance with the Urban Hamilton Official Plan, Schedule C in Figure 3-3 and has a rural cross section. Lane widths vary from approximately 3.0 m to 4.0 m with gravel shoulders and ditches on both sides, from east of Fruitland Road to Fifty Road. Discontinuous concrete or asphalt sidewalks and pathways, of various widths, are located along some segments. With respect to alignment, Barton Street's horizontal alignment is mostly straight, with exception of a shift to the north of approximately 100 m between the intersections at

McNeilly Road and Lewis Road which includes gentle curves to accommodate the shift. The posted speed limit is 60 km/hr, and the design speed is 80 km/hr.

3.3.1.2 *FIFTY ROAD*

Fifty Road is a two-lane major arterial roadway in accordance with the Urban Hamilton Official Plan, Schedule C in Figure 3-3 and has a rural cross section. Lane widths vary from approximately 2.7 m to 3.7 m with gravel shoulders and ditches on both sides, from south of South Service Road to Highway 8. The intersection with Highway 8 is tightly constrained by the Fifty Creek which crosses under the east and south approaches of the intersection. As a result, this intersection includes steel beam guiderail in the southeast and northeast quadrants, with little to no shoulder provided. There are no sidewalks on Fifty Road. With respect to alignment, Fifty Road's horizontal alignment is linear between South Service Road and Highway 8. The posted speed limit is 60 km/hr, and the design speed is 80 km/hr.

3.3.1.3 *SIDEWALKS*

Figure 3-1 shows the variability in sidewalk width, condition, and material along Barton Street. There are no pedestrian facilities along Fifty Road.

Table 3-1. Existing Sidewalk Conditions

ADJACENT STREET ADDRESS	LOCATION	Clear WIDTH (M)	CONDITION	MATERIAL
760 Barton Street	South	1.50	New	Concrete
754 Barton Street	South	1.50	Fair - Uneven	Asphalt
716 Barton Street	South	1.50	Poor	Asphalt
785 Barton Street	North	1.00	Poor	Asphalt
849 Barton Street	North	0.80	Poor	Asphalt
1376 Barton Street	South	1.88	Good	Asphalt
1361 Barton Street	North	2.00	New	Concrete
Winona Park	South	1.50	Fair	Asphalt
1283 Barton Street	North	1.50	New - Fair	Concrete
1317 Barton Street	North	1.50	Fair	Asphalt
Across From Winona School	North	1.80	Fair	Asphalt
1170 Barton Street	South	1.40	Fair	Asphalt
1004 Barton Street	South	1.20	Poor	Asphalt
1023 Barton Street	North	1.50	Fair	Asphalt
1023 Barton Street	North	1.20	Fair	Asphalt
954 Barton Street	South	1.00	Poor	Asphalt

The study area was reviewed for compliance with the Accessibility for Ontarians with Disabilities Act (AODA).

The area's road construction pre-dates AODA standards. With exception of the newly constructed sidewalk adjacent to St. Gabriel's School and the Barton Street / Fruitland Road intersection, sidewalks within the study area are not AODA-compliant. Tactile walking surface indicators are also missing from the base of all curb ramps. There are no AODA-compliant pedestrian signals or on-street parking within the study area.

3.3.1.4 *PAVEMENT CONDITIONS*

The existing pavement condition is outlined in **Table 3-2**.

Table 3-2. Existing Pavement Condition

PREDOMINANT DISTRESS		FEB. 2020 CONDITION RATING
Barton Street		
Fruitland Road to McNeilly Road (~2.6 km)	• Ravelling & Coarse Aggregate Loss – Moderate to Severe / Frequent. • Potholes Moderate / Few. • Wheel Track Rutting / Distortion – Moderate / Frequent. • Longitudinal Cracking (single, multiple and alligator) – Moderate / Frequent. • Alligator Cracking – Moderate / Frequent / Extensive. • Centreline Cracking (single, multiple and alligator) – Moderate / Frequent. • Pavement Edge Cracking – Moderate / Intermittent with Potholes. • Transverse Cracking (Half, full and multiple – alligator cracking) – Moderate / Frequent to Extensive.	Fair to Poor Condition
McNeilly Road to Fifty Road (~2.5 km)	• Ravelling & Coarse Aggregate Loss – Moderate / Frequent. • Wheel Track Rutting / Distortion – Slight / Intermittent. • Longitudinal Cracking (single, multiple and alligator) – Moderate / Frequent to Extensive. • Alligator Cracking – Moderate / Frequent / Extensive. • Centreline Cracking (single, multiple and alligator) – Moderate / Frequent. • Pavement Edge Cracking – Moderate / Frequent. • Transverse Cracking (Half, full and multiple – alligator cracking) – Moderate / Frequent.	Poor to Fair Condition
West of Fifty Road ~ 200m – Excellent Condition		
Fifty Road		
Barton Street to Highway 8 (~790m)	• Ravelling & Coarse Aggregate Loss – Slight / Intermittent. • Wheel Track Rutting / Distortion – Slight / Intermittent. • Longitudinal Cracking (single, multiple and alligator) – Moderate / Intermittent. • Centreline Cracking (single, multiple and alligator) – Moderate / Frequent. • Pavement Edge Cracking – Slight / Intermittent. • Transverse Cracking (single, multiple and alligator) – Moderate / Frequent.	Fair to Poor Condition
North of CN to South Service Road ~110 m – Excellent Condition		

3.3.1.5 UTILITIES

ALECTRA (ELECTRICITY)

Alectra owns and maintains all utility poles on north side of Barton Street in the study area and owns and maintains all poles on the west side of Fifty Road, north of Barton Street to the South Service Road. Along Fifty Road, south of Barton Street to Highway 8, Alectra owns and maintains all poles on the east side and most poles on the west side are owned and maintained by Bell.

Alectra also owns below-ground infrastructure along Barton Street. Most significantly, there are several subsurface ducts that cross Barton Street including one (1) on the west side of the Barton Street / Fruitland Road intersection, two (2) between Tuscani Drive and Dubonnet Drive and one (1) just east of Dubonnet Drive. There are also a few longer runs of overhead wires between east of Tuscani Drive and just west of Winona Road along the south side of Barton Street as well as between just west of Winona Road to Napa Lane along the north side of Barton Street. There is one (1) transformer located at 743 Barton Street on the east side of Kenmore Avenue and there are four (4) transformers located between Lewis Road and Fifty Road.

At Fifty Road there is a Ontario Hydro corridor extending along the north side and parallel to the CN Rail line, with overhead wires and a tower located on the east side of Fifty Road. A transformer is located at the southwest corner of the Fifty Road / South Service Road intersection and is the point of connection of two (2) ducts running along the west side of Fifty Road.

TELECOMMUNICATIONS

Telus has leased Bell 306 fiber along the CN Rail right of way intersecting Fifty Road. There is a cell tower on the south side of CN Rail just east of Fifty Road. Majority of the utility poles on the south side of Barton Street in the study area are owned and maintained by Bell, while Cogeco has aerial lines on existing Bell and/or Hydro poles along both roads.

PIPELINES

Utility companies were consulted as part of the Study and were asked to confirm if facilities were in the study area or would be impacted by potential future road improvement works. Please refer to the Agency Mailing List in **Appendix C.**

WATERMAINS

Both Fifty Road and Barton Street are serviced with municipal watermains through the study area. There are two watermains on Barton and one on Fifty Road.

STORM SEWERS

Although Barton Street has a rural cross-section, there are existing storm sewers conveying local drainage intermittently along the corridor as well as its cross streets. Moving from west to east along Barton Street, storm sewers are located at intersections

with Fruitland Road, Sunnyhurst Avenue, Tuscani Drive and Dubonnet Drive. They are also located along the south side of Barton Street between Dubonnet Drive and just east of Winona Road, and from just west of to just east of Sunnyhurst Avenue

CULVERTS

Existing culverts located along Barton Street consist primarily of those required for driveway approaches and range in size from 300 mm to 600 mm in diameter. Other culverts cross below Barton Street at the various watercourse/creek locations:

- two (2) double culvert crossings at:
  - 210 m east of Jones Road (Watercourse 7) and
  - mid-block between Glover Road and McNeilly Road (Watercourse 7)
- single culverts located at:
  - just east of Fruitland Road (Watercourse 5.0),
  - approximately mid-block between Jones Road and Glover Road (Watercourse 6.0),
  - mid-block between Christina Avenue and McNeilly Road (Watercourse 7.0),
  - through the intersection with Lewis Road (Watercourse 9.0)

In addition to driveway culverts on Fifty Road, there are three culverts at the Fifty Road and Highway 8 intersection (Fifty Creek).

3.3.2 EXISTING TRAFFIC AND TRANSPORTATION LEVEL OF SERVICE

The findings identified in the 2024 Strategic Transportation Network Review and 2024 Development Charge Study Update indicate that the 2031, 2041 and 2051 EMME forecasts are consistent with the findings of the Barton Road and Fifty Road transportation analysis, summarized below, with full details provided in **Appendix D**.

3.3.2.1 TRAFFIC VOLUMES

Existing mid-block traffic volumes for both Barton Street and Fifty Road are well below capacity during the peak hours (highest measured volume-to-capacity ratio is 0.42). The highest volumes along Barton Street currently occur between Fruitland Road and Jones Road, with estimated peak hour volumes of 325 vehicles / hour during the a.m. (eastbound) and 380 vehicles / hour during the p.m. (westbound), assuming a lane capacity of 900 vehicles / hour. The highest volumes along Fifty Road occur between Barton Street and South Service Road, with estimated peak hour volumes of 362 vehicles / hour in the a.m. (northbound) and 359 vehicles / hour in the p.m. (southbound).

3.3.2.2 *INTERSECTION CONTROLS AND LEVEL OF SERVICE*

Intersections at Fruitland Road and South Service Road are signalized and all remaining intersections along the study corridors are two-way, or four-way stop controlled. Details for intersections along Barton Street and Fifty Road are provided in Table 3.2 and Table 3.3, respectively.

With exception of the intersection of Fifty Road and South Service Road, all intersections within the study area currently operate at acceptable Level of Service (LOS) during the peak periods. All movements at the intersection of Fifty Road and South Service Road are congested during both peak periods, with significant queues forming in both the northbound and southbound directions.

Table 3-3. Existing Intersection Controls Along Barton Street

INTERSECTING ROADWAY	CONTROL TYPE			
	SIGNALIZED		STOP-CONTROLLED	
	NO TURNING LANES	TURNING LANES	2-WAY	4-WAY
Fruitland Road		✓		
Sunnyhurst Avenue			✓	
Kenmore Avenue			✓	
Jones Road			✓	
Glover Road				✓
Christina Avenue			✓	
McNeilly Road				✓
Lewis Road				✓
Escarpment Drive			✓	
Tuscani Drive			✓	
Dubonnet Drive / West Avenue			✓	
Winona Road				✓
Napa Lane			✓	
Fifty Road			✓	

Table 3-4. Existing Intersection Controls Along Fifty Road

INTERSECTING ROADWAY	CONTROL TYPE			
	SIGNALIZED		STOP-CONTROLLED	
	NO AUXILIARY	AUXILIARY LANES	2-WAY	4-WAY
Highway 8				✓
Barton Street			✓	
CN Rail Corridor			✓	
South Service Road	✓			

3.3.2.3 *FIFTY ROAD / CANADIAN NATIONAL RAILWAY AT-GRADE CROSSING*

The CN Rail crossing at Fifty Road is currently at-grade. During this Study a separate City-led Safety Assessment for Grade Level Railway Crossings Study

(October 2020) was carried out for all at-grade railway crossings in the City. The assessment was conducted to satisfy responsibilities of the City as road authority in accordance with new At-Grade Crossings regulations. The safety assessment highlighted issues regarding signage, pavement marking and queuing issues at the crossing and recommended several improvements. Table 3.4 shows the implementation status of recommended improvements.

Table 3-5. Improvements to CN Rail Crossing

REQUIRED IMPROVEMENT	STATUS OF IMPROVEMENT
Install "Do Not Stop on Tracks" warning sign as specified in the Manual of Uniform Traffic Control Devices for Canada on both approaches.	— Complete
Conduct traffic operation studies to examine the underlying causal factors that are contributing to the queue at the crossing, in order to determine solutions to address this issue.	— Complete. Signals installed 2021
On the north approach, install an additional "Railway Crossing Ahead" warning sign at 225 m from the stop bar and as per Ontario Traffic Manual (OTM) Book 1B.	— Complete
On the south approach, install the "Railway Crossing Ahead" warning sign at a minimum distance of 225 m from the stop bar as per the OTM Book 1B.	— Complete
Install an Emergency Notification sign that provides information on the location of the grade crossing and Railway Company's emergency phone number.	— Signage under the railway responsibility. A complete list was sent to CN Rail for all crossings.

3.3.3 TRAFFIC AND CORRIDOR SAFETY REVIEW

The collision history along the Barton and Fifty corridors were analysed at mid-block locations and at intersections, as illustrated in the Transportation and Traffic Analysis Report (2018) – **Appendix D**. Since the Appendix was completed, additional data was gathered and analyzed from 2018 to 2023. In the latter time period, 68 mid-block collisions occurred along Barton Street while 75 occurred along Fifty Road between Highway 8 and South Service Road. Neither Barton Street nor Fifty Road ranked in the City's top 10 2022 Annual Collision Report for improvement. Within the City's overall network screening, based on pre-covid collision data (2015 to 2019), the intersection of Barton Street at Fifty Road is ranked number 495 out of the 1093 intersections that were considered in the screening. The observed trends are summarized in Table 3.5. There may be discrepancies between the data in Table 3.5 and the total counts in **Appendix D**, due to overlapping categories (e.g., occurring in a clear environment and involving non-fatal injuries).

Table 3-6. Collison History Data – Midblock

Barton Street Collisions	Fifty Road Collisions
— 55 (81%) in a clear environment (no fog, clouds, rain, etc.)	— 67 (89%) in clear environment
— 57 (84%) during the day	— 38 (51%) during the day
— 11 (16%) during the night	— 8 (11%) during the night
— 7 (10%) single vehicles	— 3 (4%) single vehicles
— 13 (19%) property damage only	— 10 (13%) property damage only
— 23 (34%) rear ends	— 29 (39%) rear ends
— 11 (16%) non-fatal injuries	— 11 (15%) non-fatal injuries
— 0 (0%) fatal	— 0 (0%) fatal

During the same period, within the study area, a total of 68 collisions occurred at intersections along Barton Street and 75 collisions occurred at Fifty Road intersections.

To address high frequency of collisions, interventions such as infrastructure improvements will be required, including:

- intersection and mid-block improvements,
- enhanced signing and lighting conditions,
- separation of facilities for all modes of transportation,
- alignment with recommendations of the City of Hamilton Complete Street Design Guidelines Manual,
- alignment to City of Hamilton Vision Zero Guidelines and Transit needs.

3.3.4 TRANSIT SERVICE

The Hamilton Street Railway (HSR) provides limited scheduled service within the study area. Route 55 - Stoney Creek Central bus serves 34 bus stops in Stoney Creek departing from the Stoney Creek Community Centre at Jones / Highway 8 and ending at the Eastgate Terminal (Eastgate Mall) as shown in Figure 3-4. Operating primarily on Highway 8 and Barton Street through the study area, it generally runs at 30-minute frequencies 7 days per week. It operates from 5AM to 9PM on weekdays and Saturdays; and from 6AM to 9PM on Sundays.

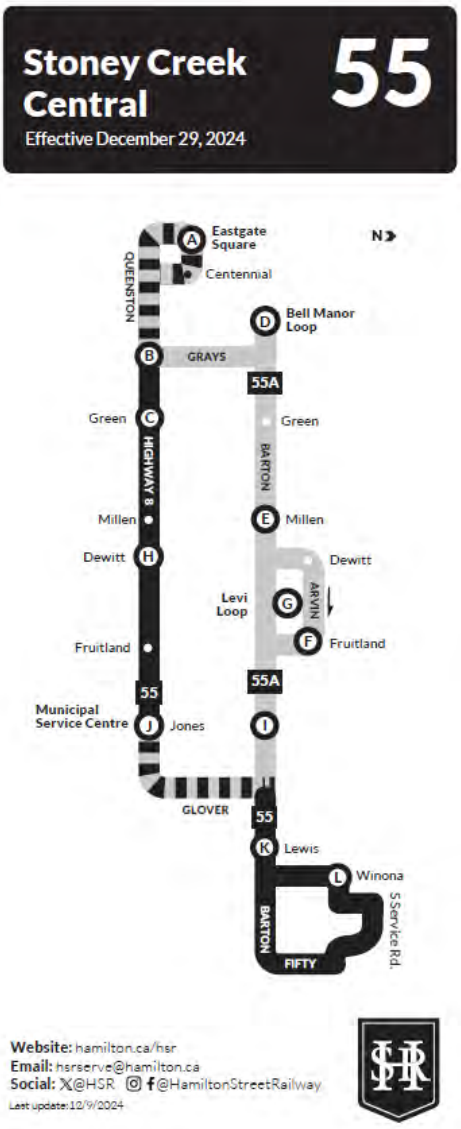


Figure 3-4. HSR Bus Route 55.

Operated by HSR, **Trans-Cab** provides shared-ride taxi service along Barton Street and Fifty Road and to the area outside of where HSR buses operates (refer to he Hwy #8 & Jones Trans-Cab Zone in Figure 3-5). **Trans-cab Service** is currently provided to 1am on weekdays and Saturdays, and until 12 on Sundays.

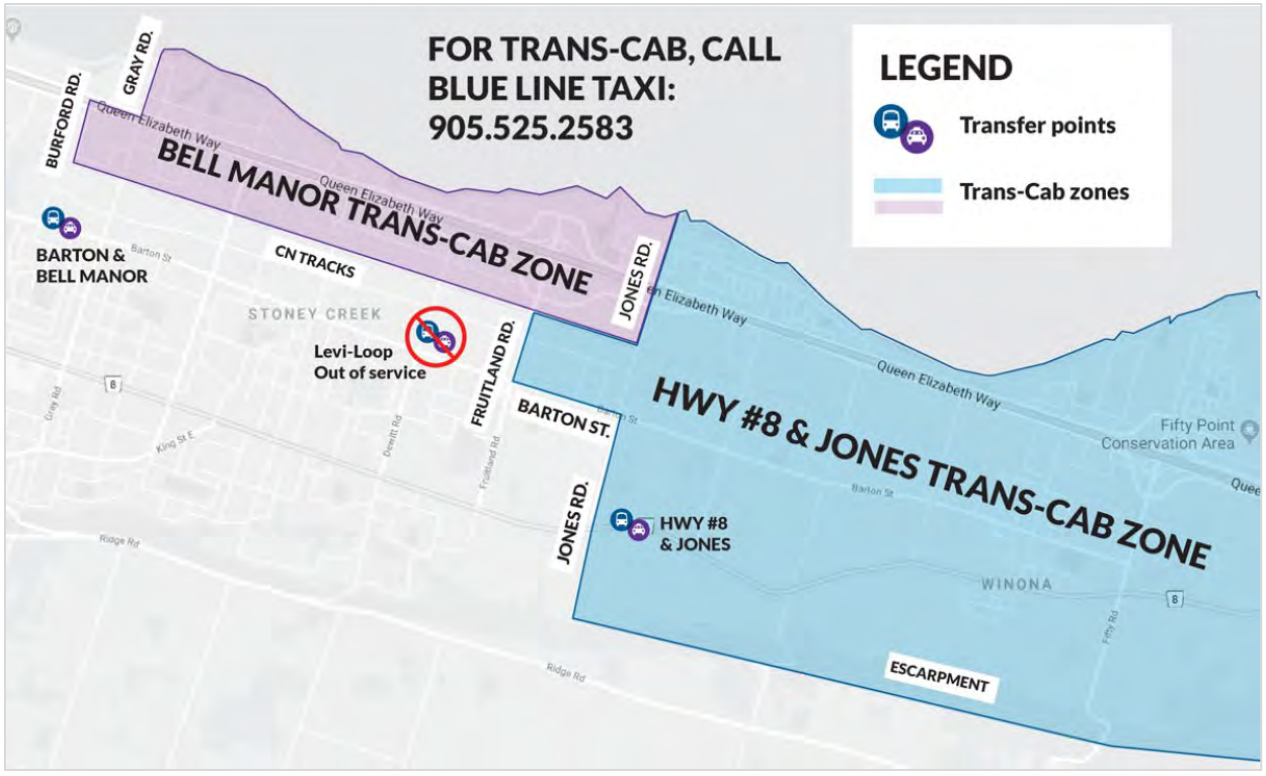


Figure 3-5. HSR Trans-Cab Zones.

3.3.5 FUTURE ROAD NETWORK

This section describes future road network (Figure 3-6) relevant to Barton Street and Fifty Road improvements as per the Fruitland-Winona Secondary Plan recommendations.

3.3.5.1 HIGHWAY 8

Highway 8 is a two-lane major arterial roadway in accordance with the Urban Hamilton Official Plan, Schedule C, and has a rural cross-section between Fruitland Road and Fifty Road, and an urban cross-section west of Fruitland Road to Dewitt Road.
It forms a border between the Stoney Creek Urban Boundary Expansion area and Rural lands to the south, east of Fruitland Road. It has a posted speed limit of 60km/hr.

The City is undertaking a Phase 3 and 4 Municipal Class Environmental Assessment (Class EA) for improvements to Highway 8 between Dewitt Road and Fifty Road - Fig. 3-3 and Figure 3-6. The Highway 8 study area overlaps with this Study's Fifty Road EA study area at the intersection of Fifty Road and Highway 8. This Study's scope includes required improvements at the intersection.

Given that Highway 8 and Barton Street form major east-west corridors through Fruitland-Winona Secondary Plan area, additional attention was paid to confirming how in combination they will provide for the needs of this growing community.

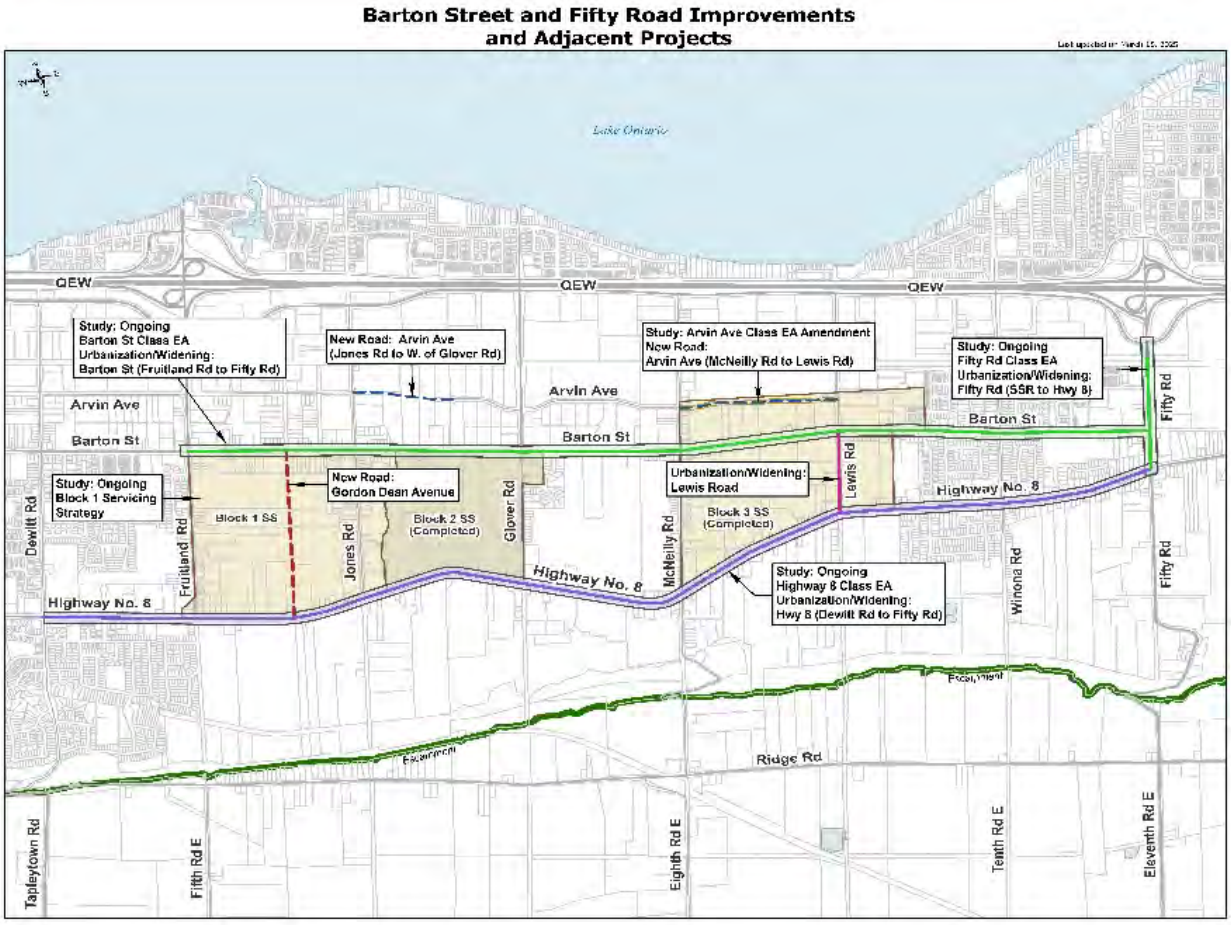


Figure 3-6. Future Road Network

3.3.5.2 ARVIN AVENUE EXTENSION

A Schedule “C” Class EA was undertaken in 2008 for the completion of Arvin Avenue through the Stoney Creek Industrial Business Park, located north of Barton Street – Figure 3-6. Arvin Avenue is intended to carry industrial / commercial traffic, therefore reducing that burden from parallel routes such as Barton Street. In its current state, Arvin Avenue is discontinuous between both Jones Road and Glover Road and McNeilly Road and Lewis Road. Connecting these segments will allow for further development within the industrial park, provide better network connectivity, as well as reduce truck traffic along segments of Barton Street. Currently work is ongoing for the adjustment of the alignment of Arvin Avenue between McNeilly Road and Lewis Road, expected to be completed in 2025. Implementation is planned in the 0-5 year times frame.

3.3.5.3 FRUITLAND ROAD

The realignment of Fruitland Road has been considered through two Class EA studies; the first was completed in 1992 by the Regional Municipality of Hamilton-Wentworth, and the second of was completed in 2010 by the City of Hamilton and satisfied Phases 1 and 2 for Schedule C projects under the Municipal Engineers Association document for Class EA process. Building on the findings of the earlier study, the 2010 Class EA ultimately recommended that Fruitland Road be replaced by a new arterial road to the east, as illustrated in Figure 3-7. Diverting arterial type traffic to this new road would result in significantly lower traffic volumes, traffic noise and vibration, as well as improved air quality to the existing residential area along Fruitland Road south of Barton Street.

Requirements for this new road were studied in the Gordon Dean Avenue Class EA. Section 3.3.5.4 summarizes the Gordon Dean Avenue Class EA recommendations, which forms the subsequent Phase 3 and 4 EA resulting from the Fruitland Road Class EA.

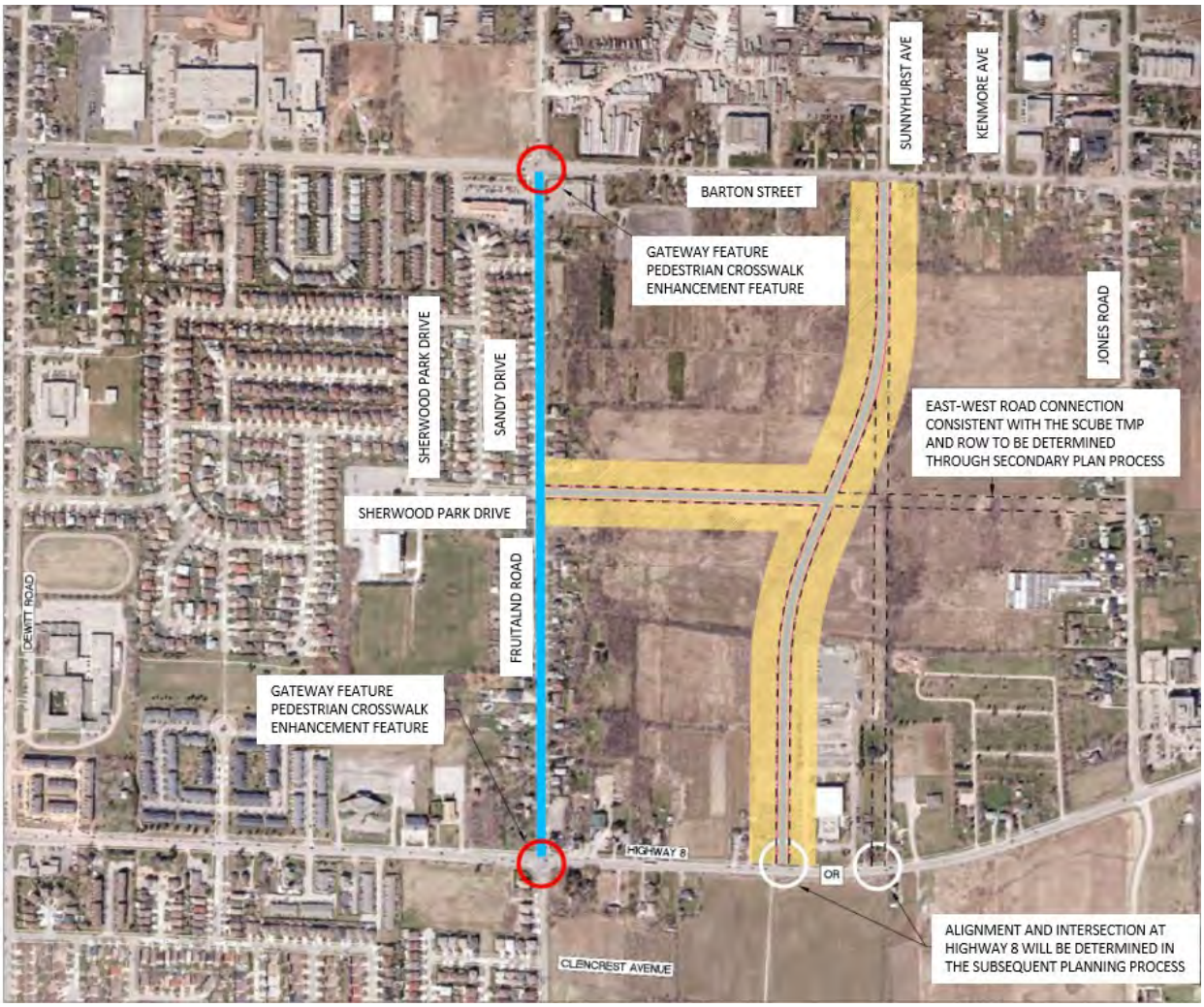


Figure 3-7. Fruitland Road Realignment – Preferred Alternative

3.3.5.4 GORDON DEAN AVENUE

A Municipal Class Phases 3 and 4 EA was completed in 2022 to confirm the location and design of the future north-south arterial road, Gordon Dean Avenue, and an associated east-west connection from Fruitland Road to Jones Road referred to as Collector Road "B". The Preferred Alternative for Gordon Dean Avenue and Collector Road 'B' is shown in Figure 3-8. As a replacement for Fruitland Road between Barton Street and Highway 8, Gordon Dean Avenue is intended to form part of the truck route and a link for transit (bus service). The improvements proposed for Barton Street therefore need to consider a future intersection with Gordon Dean Avenue in the development of the alternatives.

Figure 3-8. Gordon Dean Avenue / Collector Road 'B' – Preferred Alternative

3.3.5.5 NORTH-SOUTH COLLECTORS

Jones Road, Glover Road, McNeilly Road, Lewis Road, Winona Road within the Fruitland-Winona Secondary Plan area will be urbanized to be consistent with requirements of Complete Street Guidelines Manual, as development proceeds.

3.4 EXISTING AND FUTURE TRAFFIC OPERATIONS

3.4.1 LEVEL OF SERVICE

Level of service (LOS) is a qualitative measure used to relate the quality of motor vehicle traffic service. LOS is used to analyze roadways and intersections by categorizing vehicular traffic flow and assigning quality levels of traffic based on performance measure like vehicle speed, density, congestion, etc. LOS for signalized and unsignalized intersections is defined as a function of the average vehicle control delay (e.g. traffic signals). A description of the impact of various LOS is provided in Table 3.6.

Table 3.6. Correlation of Anticipated Vehicle Delay with Level of Service

Level of Service (LOS)	DESCRIPTION OF OPERATIONS
A	Little to no delay at intersections
B	Minimal delay
C	Some queuing and delay (<35 sec/vehicle)
D	Frequent queuing and delay (<55 sec/vehicle)
E	Significant delay and queuing, occasionally vehicles may need to wait for a second green
F	Intolerable delays and queues.

Tables 3.7 and 3.8 illustrate the intersection Level of Service (LOS) under existing conditions and future conditions for the A.M. Peak Hour and the P.M. Peak Hour, both with and without improvements, respectively.

At full build-out of the Secondary Plan area, without added lane capacity, mid-block volumes for Barton Street will remain below capacity, with the largest volume to capacity (v/c) ratio of 0.87 occurring in the eastbound direction between Jones Road and Glover Road during the P.M. Peak Hour.

Table 3.7: Barton Street Intersection Operations Summary (A.M. Peak Hour) Existing and Future Level of Service Without Improvements.

INTERSECTION OPERATIONS SUMMARY (AM PEAK HOUR)

	Eastbound				Westbound				Northbound				Southbound				Overall
Intersection	Left Existing & (Future)	Thru Existing & (Future)	Right Existing & (Future)	Approach Existing & (Future)	Left Existing & (Future)	Thru Existing & (Future)	Right Existing & (Future)	Approach Existing & (Future)	Left Existing & (Future)	Thru Existing & (Future)	Right Existing & (Future)	Approach Existing & (Future)	Left Existing & (Future)	Thru Existing & (Future)	Right Existing & (Future)	Approach Existing & (Future)	
Barton Street and Fruitland Road	B (F)	B (B)		B (F)	A (B)	B (B)		B (B)	B (F)	B (C)		B (F)	B (F)	B (C)		B (F)	B (F)
Fifty Road at Highway 8		A (C)		A (C)		A (B)		A (B)		A (B)		A (B)		A (B)		A (B)	A (B)
Barton Street at Sunnyhurst Avenue/Gordon Dean Avenue (*NEW*)	(A)	(A)		(A)	(A)	(A)		(A)		(F)		(F)		(C)		(C)	
Barton Street at Jones Road	(A)	A (A)		A (A)	(A)	A (A)		A (A)		C (F)		C (F)		C (D)		C (D)	
Barton Street at Glover Road	(B)	B (D)		B (C)	(A)	B (F)		B (F)		A (B)		A (B)		A (B)		A (B)	B (E)
Barton Street at McNeilly Road	(B)	A (D)		A (C)	(B)	A (F)		A (F)		A (D)		A (D)		A (B)		A (B)	A (F)
Barton Street at Lewis Road	(B)	A (D)		A (C)	(B)	A (E)		A (D)		A (C)		A (C)		A (C)		A (C)	A (C)
Barton Street at Winona Road	(B)	A (E)		A (E)	(B)	A (C)		A (C)		A (C)		A (C)		A (C)		A (C)	A (D)
Barton Street at Fifty Road	B (F)		(B)	B (F)						A (A)		A (A)		A (A)		A (A)	
Fifty Road at South Service Road	(D)	C (B)		C (C)	(C)	B (C)		C (C)	(B)	C (B)		C (B)	(C)	F (C)	(C)	F (C)	F (C)

Table 3.8: Barton Street Intersection Operations Summary (P.M. Peak Hour) – Existing and Future Lever of Service Without Improvements.

INTERSECTION OPERATIONS SUMMARY (PM PEAK HOUR)

	Eastbound				Westbound				Northbound				Southbound				Overall
Intersection	Left Existing & Future	Thru Existing & Future	Right Existing & Future	Approach Existing & Future	Left Existing & Future	Thru Existing & Future	Right Existing & Future	Approach Existing & Future	Left Existing & Future	Thru Existing & Future	Right Existing & Future	Approach Existing & Future	Left Existing & Future	Thru Existing & Future	Right Existing & Future	Approach Existing & Future	
Barton Street and Fruitland Road	C (F)	B (B)		B (F)	B (B)	B (B)		B (B)	B (B)	B (B)		B (B)	B (C)	C (D)		C (D)	B (D)
Fifty Road at Highway 8		B (C)		B (C)		A (B)		A (B)		B (B)		B (B)		B (F)		B (F)	B (F)
Barton Street at Sunnyhurst Avenue/Gordon Dean Avenue (*NEW*)	(A)	(A)		(A)	(A)	(A)		(A)		(D)		(D)		(B)		(B)	
Barton Street at Jones Road	(A)	A (A)		A (A)	(B)	A (A)		A (A)		C (F)		C (F)		C (F)		C (F)	
Barton Street at Glover Road	(B)	C (F)		C (F)	(B)	B (F)		B (F)		B (C)		B (C)		B (C)		B (C)	B (F)
Barton Street at McNeilly Road	(B)	A (F)		A (F)	(B)	A (D)		A (D)		A (C)		A (C)		A (C)		A (C)	A (F)
Barton Street at Lewis Road	(B)	A (F)		A (F)	(B)	A (D)		A (D)		A (C)		A (C)		A (D)		A (D)	A (F)
Barton Street at Winona Road	(B)	A (F)		A (F)	(B)	A (D)		A (D)		A (C)		A (C)		A (D)		A (D)	A (F)
Barton Street at Fifty Road	C (F)		(C)	C (F)						A (A)		A (A)		A (A)		A (A)	
Fifty Road at South Service Road	(F)	F (B)		F (F)	(C)	C (E)		C (D)	(F)	E (C)		E (D)	(C)	F (E)	(C)	F (D)	F (E)

The findings identified in the 2024 Strategic Transportation Network Review and 2024 Development Charge Study Update indicate that the 2031, 2041 and 2051 EMME model forecasts are consistent with the findings of the Barton Road and Fifty Road transportation analysis.

Future mid-block volumes for Fifty Road were also found to remain below capacity, with the largest v/c ratio of 0.76 occurring in the northbound direction between the South Service Road and Barton Street during the A.M. Peak Hour, with all other v/c ratios falling between 0.76 and 0.33. The highest volumes along Barton Street will occur between Jones Road and Glover Road, with approximately 626 vehicles / hour during the A.M. Peak Hour (westbound) and approximately 865 vehicles / hour during the P.M. Peak Hour (eastbound). Along Fifty Road, the highest volumes occur between the South Service Road and Barton Street, with approximately 755 vehicles / hour travelling northbound during the A.M. Peak Hour, and approximately 699 vehicles / hour travelling southbound during the P.M. Peak Hour.

At full build-out, without added lane capacity, many intersections throughout the study area will experience poor Level of Service (LOS), with volume to capacity ratios exceeding 1.0 (LOS F). Figure 3-10 illustrates the LOS during the P.M. Peak Period without Intersection Improvements at full build-out of the area.

Figure 3-9. Full Build-Out Intersection LOS During the P.M. Peak Period without Intersection Improvements

Table 3.9 identifies intersection modifications that would address the capacity issue. Generally, if sufficient auxiliary (turning) lanes are provided, overall intersection LOS will improve, as illustrated in Figure 3-10.

Table 3.9. Intersection Improvements to Address Poor LOS at Full Build-out

INTERSECTION	RECOMMENDED AUXILIARY LANES
Barton Street at Fruitland Road	EB, SB, and NB right turn lanes
Barton Street at Glover Road	EB and WB left turn lanes
Barton Street at McNeilly Road	EB and WB left turn lanes
Barton Street at Lewis Road	EB and WB left turn lanes
Barton Street at Winona Road	EB and WB left turn lanes
Barton Street at Fifty Road	EB left turn lane and SB right turn lane
Fifty Road at South Service Road	SB through and WB right turn
Fifty Road at Highway 8	Left turn lanes on all approaches

EB = East Bound
NB = North Bound
SB = South Bound
WB = West Bound

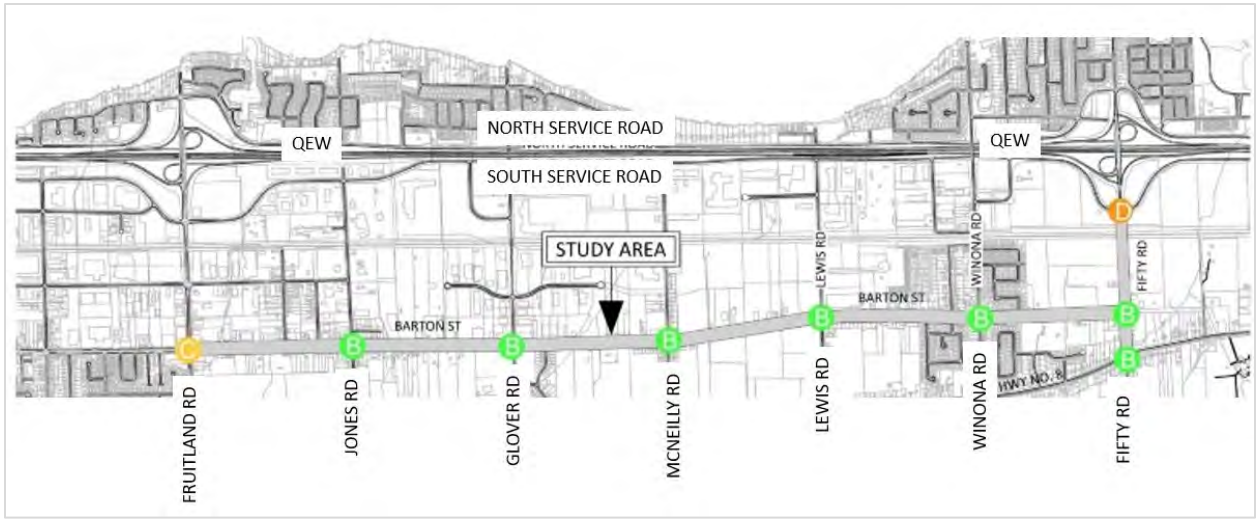


Figure 3-10. Full Build-Out Intersection LOS During the P.M. Peak Period with Intersection Improvements

3.4.2 FIFTY ROAD AND CANADIAN NATIONAL RAILWAY CROSSING

The Study investigated potential changes to the Fifty Road and Canadian National Railway (CNR) crossing in anticipation of future increase in vehicular and train traffic that would require that the crossing be grade-separated with a bridge.

The assessment was based on the "road exposure index", which is calculated as the cross-product of the daily number of trains and the Annual Average Daily Traffic (AADT). An index value exceeding 200,000 is a primary indicator that grade separation should be considered as there is currently no nationally recognized approach for assessing merit.

Between 13 and 20 trains cross Fifty Road on the CNR track daily under existing conditions, with 13 to 24 trains forecasted at full build-out of the area. Based on existing and forecasted traffic volumes, a grade separation is not required under existing conditions, but should be considered by the area's full build out subject to a more detailed safety assessment, specifically if GO Transit rail service extends to the Niagara Region. Annual monitoring of train and traffic numbers at this crossing is a recommended approach including revisiting the cross-product with trains to monitor the need for the grade separation.

3.4.3 FUTURE TRAFFIC AND TRANIST CONSIDERATIONS

The City conducted a network-wide infrastructure needs assessment, as part of the "Strategic Transportation Network Review" (2024) which further informed the recommendation of this Study.

The 2008 Stoney Creek Urban Boundary Expansion Study (SCUBE) Transportation Master Plan concluded that no significant through lane capacity was required on Barton Street by 2021, but the road should be widened to four lanes between Fruitland Road and Sunnyhurst Avenue / Gordon Dean Avenue and to three lanes easterly for operational reasons and to improve access to the adjacent low density residential, commercial, and industrial developments. The study also recommended that Highway 8 be widened to 4 lanes to address east-west capacity and to provide a suitable corridor for transit.

With a combined 3 lanes of capacity in each direction across the road corridors (Barton Street and Highway 8) east of future Gordon Dean Avenue, the study concluded that adequate capacity would exist in the future to serve full build out midblock traffic volumes on Barton Street and Fifty Road within the Study Area.

Additional studies were undertaken to inform this Study process:

- A Long-term Rapid Transit/Higher Order Transit analysis completed during the Fruitland-Winona Secondary Plan process identified greater ridership potential on Barton Street rather than Highway 8 noting that known Transportation Demand Management trends, indicate a preference for separate traffic lanes for transit vehicles as the best way to encourage drivers to switch to transit use, due to a faster commute time.

- As part of the concurrent Highway 8 Class EA process, a Traffic Impact Study was carried out to confirm findings from the transit analysis and to update it relative to 2018 City-Wide TMP and its modal split direction. Through this Traffic Impact Study, it confirmed that east-west traffic demand and future transit would be more appropriately serviced with four lanes on Barton Street rather than four lanes on Highway 8. This is also confirmed in the 2024 Strategic Transportation Network Review, approved as part of the 2024 DC By-law.

- The "HSR Next" process is ongoing at the time of writing this report and is scheduled to appear before Council in 2025. Draft Transit Route Improvements are proposed as shown in Fig 3-4.

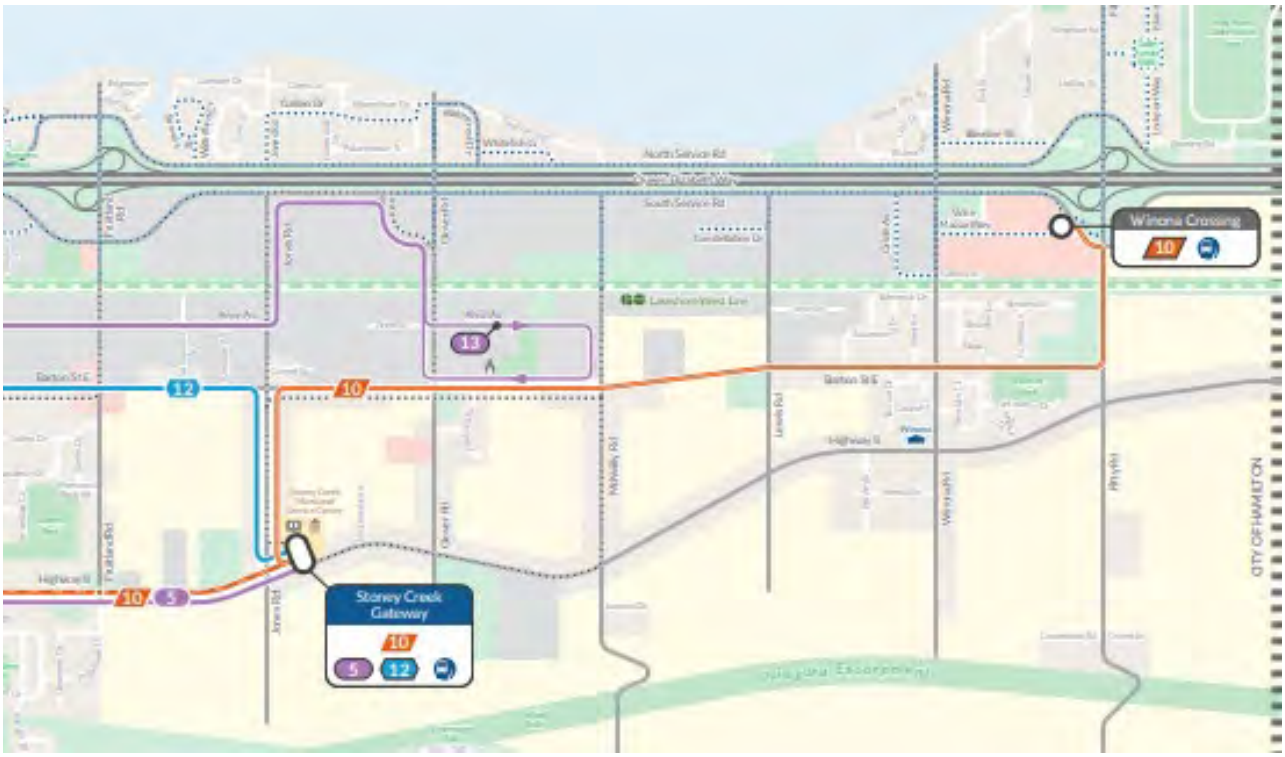


Figure 3-11. Proposed HSR Next Route Map

3.5 TRAFFIC NOISE STUDY

A Noise Study (**Appendix L**) was undertaken as part of the Study. The Ontario Ministry of Transportation (MTO) “Environmental Noise Guide” (February 2022) policy document was referenced to determine the noise assessment and mitigation methodology along Barton Street and Fifty Road. This policy establishes environmental noise criteria for road improvements or modifications to roadways on Noise Sensitive Areas (NSAs) as defined by the Guide. Noise assessments for road improvement projects typically considers only noise levels at Outdoor Living Areas (OLAs). Noise mitigation for existing building interiors is typically not considered as it is not practical to implement given the subject building exists and its sensitive receiver locations are typically elevated precluding the use of exterior noise barriers.

It was determined that Fifty Road, with no OLAs facing the proposed road improvement, does not have any NSAs that would be impacted by the proposed improvement. As such, no further assessment was carried out for Fifty Road.

The Ministry of Environment, Conservation and Parks noise modelling software, STAMSON v5.04, which incorporates “Ontario Road Noise Analysis Method for Environment and Transportation”, was used to model the predicted noise levels generated for both existing and future conditions on Barton Street. For the future condition, noise levels were predicted with recommended improvements to determine if

changes in noise levels resulting from recommended changes to the road exceeded legislated thresholds. Existing and future traffic data was used as input to this Study. The data contained detailed information for annual average daily traffic and truck data for Barton Street and Fifty Road. Representative sensitive receiver locations were selected along each road segment.

The receiver locations along Barton Street are summarized in Table 3.7.

Table 3.10. Receiver Locations Along Barton Street

Receiver ID	Address	OLA Receiver Location	Distance to Barton Street Centreline (m)
A	302 Jones Road	Southeast corner of Barton Street & Jones Road Rear yard of side-lotted property	27.5
B	301 Christina Avenue	East of Glover Road Rear yards of side-lotted properties on both side of Christina Avenue	20.9
C	299 Winona Road	Southwest corner of Winona Road & Barton Street Rear yards of side-lotted properties	32.0
D	315 Winona Road	Northwest corner of Winona Road & Barton Street Rear yards of side-lotted properties	25.0
E	1 Mockingbird Lane	Rear yards of side-lotted properties (new Townhome development)	19.4

3.6 NATURAL ENVIRONMENT FEATURES

A Natural Environment assessment was completed for aquatic and terrestrial resources and can be found in **Appendix E.**

Within the study area, there are nine (9) drainage features which cross Barton Street, including:

- three (3) ephemeral drainages (watercourse crossings 5.2, 7.2 and 9.0); and,
- five (5) intermittent features (watercourse crossings 5.0, 6.0, 7.0, 7.1 and 12.0 (Fifty Creek)).

The drainage features are under the regulatory jurisdiction of the Hamilton Conservation Authority and the Guelph District Ministry of Natural Resources and Forestry. Drainage systems from Watercourse 5.0 to 9.0 are known as the Stoney Creek numbered watercourses and are considered as core areas within the City's Natural Heritage System. All drainage features are within the Niagara Escarpment drainage and are

classified as first order streams except for Fifty Creek, which is a second order watercourse.

Fish were observed in Fifty Creek during the on-site investigations. The remaining drainage features likely provide minimal seasonal contributions to downstream reaches and may be seasonally or periodically occupied by fish. No aquatic Species at Risk (SAR) have been recorded in the drainage features present on site.

The following key findings were noted in the study area:

- Confirmation of three avian SAR species: Barn Swallow, Bank Swallow and Eastern Meadowlark. Although Bobolink were not observed during the field investigations, it was documented within the Block 2 Secondary Plan prepared by Aquafor Beech Ltd. 2018, and therefore should be considered moving forward into future planning phases.

- Although a number of SAR and locally rare species were noted during the secondary source review of the study area, no rare mammals, reptiles, amphibians, or vegetative species were observed / documented during field investigations.

- Three significant woodlands are present within the study area as identified through both the Urban and Rural City of Hamilton Official Plans, along with other Core Areas (i.e., wetlands, linkages, environmentally sensitive areas (ESA)).

- No significant wildlife habitat was observed during the field investigations based on either species occurrence observations, or habitat which meets size and function criteria.

- Due to the length of the study process exceeding 5 years from the time of collection of the original field data, and because nature is dynamic it is noted that some changes may have occurred since the original field data were gathered for this report. It is also standard practice that the next phase before implementation, i.e. Detailed Design stage the study scope will require another full field inventory, including an arborist report.

3.7 STORMWATER

A Stormwater Management Assessment was completed and can be found in **Appendix F**. The study area drains to Watercourses 5.0, 6.0, 7.0, 7.1, 9.0, and 12.0 (Fifty Creek) with all events up to and including the 100-year event being captured and conveyed by the existing roadside ditch system and limited storm sewer systems within the road allowance.

The minor system conveys storm events up to the 5-year storm event, and the major system conveys storm events greater than the 5-year, up to the 100-year storm event.

The rural road sections of Barton Street and Fifty Road drain to roadside ditches, which are intended to convey drainage up to the 100-year event.

There are hydraulic crossings within the study area as follows:

- Watercourse 5: 1.86 m by 1.035 m box culvert.
- Watercourse 6: 1.25 m by 1.4 m concrete arch, 1.88 m by 1.31 m elliptical Corrugated Steel Pipe (CSP).
- Watercourse 7: 2.1 m elliptical CSP and 1.0 m CSP.
- Watercourse 7.1: 0.95 m by 0.70 m box culvert and a 0.80 m CSP.
- Watercourse 9.0: A 1450 mm x 1850 mm concrete box culvert. This watercourse is planned to be moved to align with Lewis Road, east of its current position, as part of Block 3 Servicing Strategy for Fruitland-Winona Secondary Plan.
- Watercourse 12 (Highway 8 Crossing): 3.50 m by 1. 25 m box culvert.
- Watercourse 12 (Fifty Road Crossing): 3.50 m by 1.25 m box culvert.

3.8 FLUVIAL GEOMORPHOLOGY

Watercourses 5.0, 6.0, 7.0 and 7.1 have been investigated based on fluvial geomorphic requirements for Fifty Road, Highway 8, and Barton Street crossings to determine the impacts of roadway changes on those Watercourses and provide appropriate mitigation measures, if required.

Scoping level characterization review included rapid assessments, summary of meander belt and erosion limits, recommendations for crossing geometry, and guidance recommendations for scour treatment and channel design.

The Fluvial Geomorphological Assessment is included as **Appendix G**. This Study includes original reporting for Fifty Creek and Watercourse 7.0 undertaken in 2018 and additional reporting for Watercourse 5.0. 6.0. and 7.1 completed in 2021.

Fifty Creek is a second order watercourse with an upstream topographic drainage area of 2.16 km^2 to the study area. Watercourse 5.0 is a first order watercourse with an upstream topographic drainage area of approximately 1.67 km^2. Watercourse 6.0 is a first order watercourse with an upstream topographic drainage area of approximately 1.72 km^2. Watercourse 7.0 is a first order watercourse with an upstream topographic drainage area of approximately 1.59 km^2. Watercourse 7.1 is a first order watercourse with an upstream topographic drainage area of approximately 1.0 km^2.

Three rapid assessment protocols were undertaken for the upstream and downstream sub-reaches of each crossing and for the intervening sub-reach of Fifty Creek between crossings.

The results for Fifty Creek show good to optimal channel stability and habitat conditions above Fifty Road and below Highway 8. Watercourse 5.0 scores on the upstream as just slightly transitional in terms of stability, or in other words very close to dynamically stable. Watercourse 6.0 scores as 'in regime', or dynamically stable, on both sides of Barton. Watercourse 7.0 shows high stability based on RGA score but poor to fair habitat conditions based on the observed lack of base flow which precludes resident fish.

3.9 GEOTECHNICAL INVESTIGATION

A Geotechnical Investigation Report was completed and is provided in **Appendix H.** The purpose of the geotechnical investigation was to obtain information on the subsurface conditions by means of a limited number of boreholes in the study area corridors, and based on the results of the investigation, to provide recommendations for improvements to Barton Street and Fifty Road, and installation of underground utilities.

Subsurface conditions were observed using data from 41 boreholes drilled for the geotechnical investigation. The subsurface soil profile through the study area consists of surficial cover (asphaltic concrete or exposed sand and gravel fill) underlain by various fill soils (sand and gravel, silty clay and/or silty sand / sand / silt) overlying silty clay till and/or weathered shale which extended to the termination depths of the boreholes. Groundwater was not encountered in any of the boreholes during or upon completion of drilling.

3.10 HYDROGEOLOGY ASSESSMENT

A Hydrogeological Assessment Report was completed and is provided in **Appendix I**. The purpose of this report is to provide a preliminary hydrogeological assessment of the local area and the impacts of road improvements on the surrounding groundwater users and local environment. The report summarizes the findings of the geotechnical investigation completed at the site, completed in-situ hydraulic conductivity testing and groundwater level measurements.

The hydrogeological investigation identified that there are no major creek crossings or surface water features in the vicinity of the site or alignment, or in the planned construction area. No impacts to surface water would be expected during the completion of construction activities. No active water supply wells were found through a detailed inspection of water well records. It's presumed all study area properties are connected to municipal water and sewer services, and any remaining wells that may exist are private and located outside the municipal boundary to the south of Highway 8.

3.11 ARCHAEOLOGICAL RESOURCES

A Stage 1 Archaeological Assessment Report was completed by and is provided in **Appendix J**. The Stage 1 Archaeological Assessment was carried out in accordance with the Ministry of Tourism, Culture and Sport's (MTCS) Standards and Guidelines for Consultant Archaeologists (2011) pursuant to the Ontario Heritage Act, R.S.O. 1990, c. O.18. As part of Stage 1 Archaeological Assessment, the following activities to identify areas of archaeological potential within the study area were undertaken:

- Desktop-based review of various resources, including Ontario Archaeological Sites Database, Ontario Public Register of Archaeological Reports, and City's Archaeological Master Plan.
- A review of previously completed archaeological assessments within and adjacent to the study area.
- Information gathering from the Bereavement Authority of Ontario and City of Hamilton.
- A visual inspection of the study area.

A total of 21.28 hectares (ha) or about 50% of the study area has been determined to have had archaeological potential removed due to existing roads, driveways, sidewalks, houses, and gravel ditches. The remaining 20.32 ha (49%) will require Stage 2 assessment at 5-m intervals by means of either test pit survey, or pedestrian survey where appropriate.

3.12 BUILT AND CULTURAL HERITAGE LANDSCAPE RESOURCES

A Built Heritage and Cultural Heritage Landscape Assessment was completed and is provided in **Appendix K**. As part of this assessment, several tasks to identify recognized heritage properties and potential heritage properties that may be of cultural heritage value within the study area were undertaken:

- Background historic research, including consultation of primary and secondary literature and historic mapping to elucidate the evolution of built environments and cultural heritage landscapes within and adjacent to the study area.
- Data collection to obtain listing of cultural heritage structures / objects and cultural heritage landscapes on current National, Provincial and Municipal heritage lists.
- Site review including photography documentation, to confirm or update the data collected from secondary sources and to identify any new information.

- Consultation of library, municipal and archival sources for historic information pertinent to the surrounding cultural heritage.
- Identification of cultural and built heritage resources and specific recommendations within 200 m on either side of each of the study corridors.
- Provision of graphic images of areas of cultural heritage potential.
- Provision of recommendations with the regard to any further cultural heritage assessments that may be needed.
- Public input for any built heritage properties that may have missed during the above.

Any improvements to Barton Street and Fifty Road have the potential to affect cultural heritage resources in a variety of ways. These include the loss or displacement of resources through the removal or demolition and the disruption of resources by introducing physical, visual audible or atmospheric elements that are not in keeping with the heritage resources and/or their settings.

There are 16 cultural heritage resources identified in the report as having heritage interest and value, including 15 built heritage resources and one (1) cultural heritage landscape resource. BH1 (670 Barton Street), BH2 (692 Barton Street), BH3 (696 Barton Street), BH4 (738 Barton Street), and BH15 (336 Fifty Road) are all currently listed with the City, none though are designated. A built heritage resource, at 315 Barton Street was not originally identified by the City but was found to have heritage value or interest and subsequently has been added to the City directory's heritage resources list.

4

4 PROBLEM AND OPPORTUNITY STATEMENT

This section presents the Problem and Opportunity Statement guiding the Class EA. The existing conditions for all modes of transportation were identified in previous studies and described in Section 3, which indicated deficiencies within Barton Street and Fifty Road corridor's existing infrastructure (e.g. general lack of cycling infrastructure and intermittent pedestrian facilities). These deficiencies along with substandard rural road cross sections are not consistent with the City's Complete Streets principles. Additionally, planned growth within the Fruitland-Winona Secondary Plan Area will further exacerbate the above issues.

4.1 PROBLEM AND/OR OPPORTUNITY STATEMENT FOR BARTON STREET AND FIFTY ROAD

Fruitland-Winona is an actively growing community, anticipated to provide live / work opportunities for approximately 23,400 residents and 11,750 jobs by 2051. To support the City's 'Community Vision' and ensure the areas surrounding the study corridors are attractive to both families and employers, the City is taking this opportunity improve Barton Street and Fifty Road. The City of Hamilton's Community Vision themes are:

City of Hamilton's 'Community Vision'

Theme 1: Community Engagement and Participation
Theme 2: Economic Prosperity and Growth
Theme 3: Healthy and Safe Communities
Theme 4: Clean and Green
Theme 5: Built Environment and Infrastructure
Theme 6: Culture and Diversity

The following "Problem and Opportunity Statement" has been developed as a result of the above and confirmed via public engagement at Public Information Update (PIU) - record of this can be found in **Appendix A:**

- Provide *safe, comfortable, accessible, and efficient pedestrian and cycling facilities* to encourage active transportation and healthier lifestyles within the growing community of lower Stoney Creek, based on recommendations from Fruitland-Winona Secondary Plan – SCUBE TMP. Confirm the need for 36.0 m Road ROW and 4.0 m Promenade along southern edge.

- Ensure both commuter and recreational transportation needs are met across *all age groups and transportation modes.*

- *Improve connectivity* between residential areas, schools, workplaces, and other community 'Points of Interest'.

- *Improve safety and reduce delays* at intersections, including the CN Rail crossing at Fifty Road, for all vehicles and other modes of transportation.

- *Create an innovative, landscaped, linear green space* along the south side of Barton Street to encourage active transportation and provide a buffer between residential communities to the south and employment areas to the north.

- Plan, and reserve ROW, for future implementation of *transit* within the study roadways.

To accommodate the expected short- and long-term growth in the area, the City, is actively planning for a multi-modal transportation and green space network that will meet the needs of all users through provision of improved vehicular, transit and active transportation facilities.

Planned growth in the Fruitland-Winona Secondary Plan triggers a need to improve the quality of road infrastructure required to support increased number and types of users. Additionally, as the lands adjacent to the study area are in the process of being developed, it is the opportune time for the City and local residents to identify and protect for the types of facilities that they would ultimately like to see within the roadway corridors.

4.2 REFINEMENT TO PROBLEM AND/OR OPPORTUNITY STATEMENT

Numerous comments were received from the members of the Community Liaison Committee, as well as other members of the public who attended Public Information Update meeting in relation to the recent development of traffic delays at the CN Rail crossing at Fifty Road in both southerly and northerly directions.

Therefore, the Problem and Opportunity was revised to include a Phase 1 & 2 of the Municipal Class Environmental Assessment for the CN Rail crossing.

Problem and Opportunity Statement for CN Rail Crossing:

- *Improve safety and reduce delays at the CN Rail crossing at Fifty Road, for all vehicles and other modes of transportation.*

5

5 DEVELOPMENT AND EVALUATION OF ALTERNATIVE ALIGNMENTS AND DESIGNS FOR BARTON STREET AND FIFTY ROAD

This section includes the evaluation criteria and evaluation of alignment alternatives and cross-sections for Barton Street and Fifty Road. Subsection 5.1 speaks about overall evaluation criteria and their definitions. Subsection

s 5.2 and 5.3 include the evaluation of alignment alternatives for Barton Street and Fifty Road. Subsection 5.4 describes the evaluation of intersection improvements at Fifty Road and Highway 8. Subsections 5.5 describes CN Rail crossing alternatives on Fifty Road and 5.6 and 5.7 focus on the evaluation of Barton Street and Fifty Road cross-sections, respectively.

5.1 EVALUATION CRITERIA

As part of the initial phases of this Study, standard road study evaluation criteria were identified and then further refined to better reflect the study area and interests of various stakeholders, as communicated through consultation. Table 5-1 provides the evaluation criteria used through the evaluation process:

Table 5-1. Evaluation of Criteria for Alternatives

COMPONENT	EVALUATION CRITERIA	DESCRIPTION
Natural Environment	Natural Heritage System Impacts	Impact to ANSI and Environmentally Sensitive Area
	Species at Risk Impacts	Impact to Species at Risk habitat
	Avian and Wildlife Environment Impacts	Impact to terrestrial habitats
	Watercourses and Aquatic Environment Impacts	Impact on aquatic features
	Vegetation and Wetland Impacts	Impact to important vegetation and wetland features
	Groundwater Impacts	Impact to groundwater quality and quantity
Social / Cultural Environment	Residential and Business Impacts, including Future Land Use	Number of residential properties / businesses impacted
	Emergency Services	Impact to the provision of emergency services

COMPONENT	EVALUATION CRITERIA	DESCRIPTION
	Noise Level Impacts	Impact to ambient noise levels
	Community / recreational features impacts	Impact access to existing community / recreational features
	Cultural features / landscapes impacts	Impacts to cultural or landscape features
	Archaeological and built heritage impacts	Impact to archaeological and built heritage features
	Agricultural impacts	Impact to agricultural land uses
Engineering – Transportation/ Other	Utility Relocation	Utility relocation costs
	Property Acquisition	Cost of acquisition
	Capital Cost	Capital costs
	Operating costs	Costs of operating
	Pedestrian, cyclist, and driver (bus – HSR, truck and personal vehicle safety)	Safety concerns associated with pedestrian, cyclists and drivers including transit users and level of service
	Urban design	Space available for landscaping
	Structural impacts	Impacts to structural features such retaining walls, bridges, culverts, etc.
	Hydraulics and hydrology	Impacts to hydraulics / hydrology
	Stormwater management and low impact development (LID) design Incorporated innovative products / practices	Impacts to stormwater management facilities and incorporation of innovative products and practices

5.2 BARTON STREET ALIGNMENT ALTERNATIVES

5.2.1 DETAILED EVALUATION OF BARTON STREET ALIGNMENT ALTERNATIVES

Three alignment alternatives were originally developed prior to PIC #1, to establish the best fit for the road widening given that the current ROW width for Barton Street varies between **36.6m at Fruitland Road** to **20m at Fifty Road**. The three alternative alignments could be described as follows, and are graphically represented in Figure 5-1 **(not to scale – schematic only)**:

- **Alternative 1**: Widen the corridor equally along the existing ROW center line to 40.6m (includes 4m Promenade on the south side per the Fruitland-Winona Secondary Plan)

- **Alternative 2**: Widen the corridor equally along the existing ROW center line to 36.6m and add 4m to the **north** to accommodate the Promenade on the south side per the Fruitland-Winona Secondary Plan.

- **Alternative 3**: Widen the corridor equally along the existing ROW center line to 36.6m and add 4m to the **south** to accommodate the Promenade on the south side per the Fruitland-Winona Secondary Plan.

Alternative 3 was the initial Preferred Alternative alignment presented to the public at PIC #1. Due to public concerns regarding property impacts and the implementation of new Complete Street Design Guidelines Manual, additional alignment alternatives were developed.

Alternative 4 was developed to minimize the potential for multiple land takings from landowners who have developed their properties and have already dedicated lands to the City to establish the ultimate right-of-way. Most of these land takings have taken place on the north side of Barton Street, therefore this alternative was developed to align predominantly with existing widened property limits on the north side of the corridor. Alternative 4 can be described as follows:

- **Alternative 4**: Widen the corridor to 40.6 m and establish a new meandering center line to minimize impacts on properties; Promenade on the south side.

In addition to Alternative 4, it was determined that with the Promenade as established in the Fruitland - Winona Secondary Plan as a 4m addition on the south side of the original 36.6m right-of-way, significant impact on properties would result. Given these potential significant impacts, a review of the Secondary Plan policy concluded that the Promenade could be incorporated into the original 36.6m right-of-way without taking away from the overall intent of its inclusion in the Secondary Plan. This resulted in the development of Alternative 5, described below:

- **Alternative 5**: Widen the corridor equally along the existing ROW center line to 36.6m and incorporate 4m Promenade on the south side per the Fruitland-Winona Secondary Plan.

Barton Street – Alternative 1

Alternative 1:
Widen the corridor **equally** along the existing ROW centre line to 40.6m (includes 4m Promenade on the south side per recommendation from the Fruitland-Winona Secondary Plan)

Legend

- Additional Property Requirement
- Existing Property Line
- Existing ROW Width
- Future ROW Centerline
- Ultimate Required Right of Way Width

Barton Street – Alternative 2

Alternative 2:
Widen the corridor equally along the existing ROW centre line to 36.6m and add 4m to the **north** to accommodate the Promenade space as per the Fruitland-Winona Secondary Plan Recommendation.

Legend

- Additional Property Requirement
- Existing Property Line
- Existing ROW Width
- Future ROW Centerline
- Ultimate Required Right of Way Width

Barton Street – Alternative 3

Alternative 3:
Widen the corridor **equally** along the existing ROW centre line to 36.6m and add 4m to the **south** to accommodate the Promenade space as per the Fruitland-Winona Secondary Plan Recommendation.

Legend

- Additional Property Requirement
- Existing Property Line
- Existing ROW Width
- Future ROW Centerline
- Ultimate Required Right of Way Width

Barton Street – Alternative 4

Alternative 4:
Widen the corridor to 40.6m along the existing ROW centerline and establish a new meandering centre line to minimize impacts on property.

Legend

- Additional Property Requirement
- Existing Property Line
- Existing ROW Width
- Future ROW Centerline
- Ultimate Required Right of Way Width
- Meandering property line

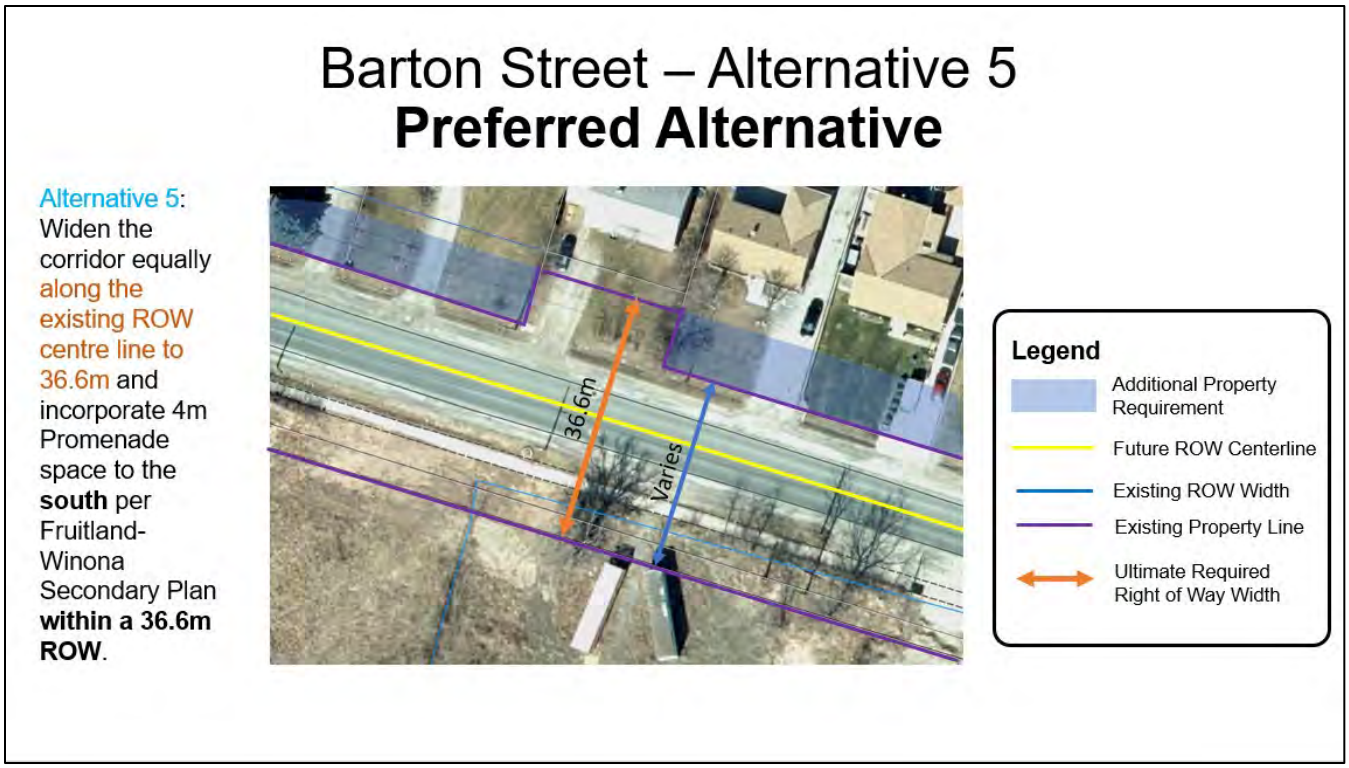


Figure 5-1. Barton Street Alignment Alternatives

(Drawings are Schematic Only – Not to Scale)

Table 5-2 presents the evaluation undertaken to assess the five (5) alignment alternatives, each with different widening scenarios to accommodate a multi-modal corridor and with consideration of property, environmental, heritage impacts, community and public services and cost. All criteria were considered to carry equivalent weight.

Table 5-2. Detailed Evaluation of Barton Street Alternatives

CATEGORY AND CRITERIA		ALT 1: WIDENED ON BOTH SIDES FROM CENTRE. ROW is 36.6 m + 4 m SOUTH SIDE FOR PROMENADE.	ALT 2: WIDENED EQUALLY FROM ROAD CENTRELINE ON BOTH SIDES TO 36.6m AND SHIFTED NORTH BY 4 m, ROW IS 40.6m	ALT 3: SAME AS Alt 2, Except WIDENED TO THE SOUTH BY 4 m (PROMENADE - SECONDARY PLAN), ROW IS 40.6m.	ALT 4: WIDEN EQUALLY ON BOTH SIDES OF CENTRE LINE ROW = 40.6m (36.6m + 4m PROMENADE); MEANDER TO AVOID IMPACTING CONSTRAINTS.	ALT 5: WIDEN THE EQUALLY ON BOTH SIDES OF THE ROW ALONG EXISTING ROW CENTRELINE to 36.6m, AND INCORPORATE 4m PROMENADE TO THE SOUTH.
Natural Environment	Natural Heritage Feature Impacts	No ANSI or ESAs identified along the Barton Street corridor between Fruitland Road and Fifty Road. No difference between alternatives.				
	Species at Risk Impacts	• No aquatic SAR found in the study area ROW. • Barn swallow has potential to be impacted regardless of the location of ROW due to the study area located in a critical habitat zone. • Bank swallow uses study area for foraging purposes; however, the study area is not located in a critical habitat zone. • The ROW would potentially impact approx. 0.89 ha. The entire corridor has several agricultural / pastured land pockets, which is suitable Bobolink and Eastern meadowlark habitat.	• Aquatic SAR found in the study area ROW. • Barn swallow has potential to be impacted regardless of the location of ROW due to the study area located in a critical habitat area. • Bank swallow uses study area for foraging purposes; however, the study area is not located in a critical habitat zone. • The ROW would potentially impact approx. 0.65 ha. The entire corridor has several agricultural / pastured land pockets, which is suitable Bobolink and Eastern meadowlark habitat.	• No aquatic SAR found in the study area ROW. • Barn swallow has potential to be impacted regardless of the location of ROW due to study area located in a critical habitat area. • Bank swallow uses study area for foraging purposes; however, this is not a critical habitat zone. • The ROW would potentially impact approx. 1.10 ha. The entire corridor has several agricultural / pastured land pockets, which is suitable Bobolink and Eastern meadowlark habitat.	• No aquatic SAR found in the study area ROW. • Barn swallow has potential to be impacted regardless of the location of ROW due to the study area located in a critical habitat area. • Bank swallow uses study area for foraging purposes; however, this is not a critical habitat zone. • The ROW would potentially impact approx. 0.64 ha. The entire corridor has several agricultural / pastured land pockets, which is suitable Bobolink and Eastern meadowlark habitat.	• No aquatic SAR found in the study area ROW. • Barn swallow has potential to be impacted regardless of the location of ROW due to the study area located in a critical habitat area. • Bank swallow uses study area for foraging purposes; however, this is not a critical habitat zone. • The ROW would potentially impact approx. 0.65 ha. The entire corridor has several agricultural / pastured land pockets, which is suitable Bobolink and Eastern meadowlark habitat.
	Avian and Wildlife Environment Impacts	• The impact on the Fresh- Moist Green Ash- Hardwood Lowland Deciduous Forest (located north-east of Barton Street and Glover) would be approx. 0.14 ha. • The impact on the Fresh- Moist Green Ash-Hardwood Lowland Deciduous Forest (located north-east of the Barton Street and Jones Road intersection) would be approx. 0.04 ha. • Rare sedge reported by Hamilton Conservation Authority (HCA) in a ditch along the south side of Barton Street (between Jones Road and Glover Road). Widening of the roadway has the potential to impact this plant.	• The Fresh- Moist Green Ash- Hardwood Lowland Deciduous Forest (located north-east of the Barton Street and Glover Road intersection) would be impacted by approx. 0.06 ha. This is a significant woodland area. • The Fresh-Moist Green Ash-Hardwood Lowland Deciduous Forest (located north-east of the Barton Street and Jones Road intersection) would potentially impact approx. 0.01 ha. • Rare sedge reported by HCA in a ditch along the south side of Barton Street (between Jones Road and Glover Road). Widening of the roadway has the potential to impact this plant.	• The Fresh- Moist Green Ash-Hardwood Lowland Deciduous Forest (located north-east of the Barton Street and Glover Road intersection) would result in no impact as the road would move further away from this eco-site. • Shifting the ROW 4 m south would provide a greater distance and result in no impact to the Fresh- Moist Green Ash- Hardwood Lowland Deciduous Forest (located north-east of Barton Street and Jones Road intersection). • Rare sedge reported by HCA in a ditch along the south side of Barton Street (between Jones Road and Glover Road). Widening of the roadway has the potential to impact this plant.	• The ROW would not be shifted south and instead would be shifted north near Glover Road and Barton Street intersection. This is the location of the Fresh-Moist Green Ash-Hardwood Lowland Deciduous Forest, which would impact the woodlot by approx. 0.06 ha. • The ROW would be shifted in the northerly direction accordingly, which would impact the Fresh- Moist Green Ash- Hardwood Lowland Deciduous Forest (located north-east of Barton Street and Jones Road intersection) by approx. 0.01 ha. • Rare sedge reported by HCA in a ditch along the south side of Barton Street (between Jones Road and Glover Road). Widening of the roadway has the potential to impact this plant.	• The Fresh-Moist Green Ash-Hardwood Lowland Deciduous Forest (located north-east of the Barton Street and Glover Road intersection) would be impacted by approx. 0.06 ha. This is a significant woodland area. • The Fresh-Moist Green Ash-Hardwood Lowland Deciduous Forest (located north-east of the Barton Street and Jones Road intersection) would potentially impact approx. 0.03 ha. • Rare sedge reported by HCA in a ditch along the south side of Barton Street (between Jones Road and Glover Road). Widening of the roadway has the potential to impact this plant.

CATEGORY AND CRITERIA		ALT 1: WIDENED ON BOTH SIDES FROM CENTRE. ROW is 36.6 m + 4 m SOUTH SIDE FOR PROMENADE.	ALT 2: WIDENED EQUALLY FROM ROAD CENTRELINE ON BOTH SIDES TO 36.6m AND SHIFTED NORTH BY 4 m, ROW IS 40.6m	ALT 3: SAME AS Alt 2, Except WIDENED TO THE SOUTH BY 4 m (PROMENADE - SECONDARY PLAN), ROW IS 40.6m.	ALT 4: WIDEN EQUALLY ON BOTH SIDES OF CENTRE LINE ROW = 40.6m (36.6m + 4m PROMENADE); MEANDER TO AVOID IMPACTING CONSTRAINTS.	ALT 5: WIDEN THE EQUALLY ON BOTH SIDES OF THE ROW ALONG EXISTING ROW CENTRELINE to 36.6m, AND INCORPORATE 4m PROMENADE TO THE SOUTH.
Social / Cultural Environment	Watercourses and Aquatic Environment Impacts	No increase in number of watercourse crossings. All alternatives would require lengthening and upsizing of existing crossings. No significant impacts to existing aquatic features for any of the alternatives.				
	Vegetation and Wetland Impacts	• A total of 71 trees with diameters larger than 40 cm at chest height would be located within the clear zone for the roadway. • No wetland to be impacted.	• A total of 43 trees with diameters larger than 40 cm at chest height would be located within the clear zone for the roadway. • No wetland to be impacted.	• A total of 75 trees with diameters larger than 40 cm at chest height would be located within the clear zone for the roadway. This includes the stand of mature trees between Dean Vista Park and McNeilly Road. • No wetland to be impacted.	• A total of 73 trees with diameters larger than 40 cm at chest height would be located within the clear zone for the roadway. This includes the stand of mature trees between Dean Vista Park and McNeilly Road. Consideration should be given to planning a long-term shift in the ROW towards the north, avoiding this line of mature trees. • No wetland to be impacted.	• A total of 49 trees with diameters larger than 40 cm at chest height would be located within the clear zone for the roadway. • No wetland to be impacted.
	Groundwater Impacts	All alternatives have identical increases in impervious area, which has the potential to decrease groundwater quality or quantity if adequate counter measures are not taken. No significant difference between alternatives.				
	Residential Impacts	• A total of 88 residential properties, 26 of which are within Block Plan areas, would be significantly impacted by widening the ROW under this scenario. • 2.80 ha of residential property would be required.	• A total of 80 residential properties, none of which are within Block Plan areas, would be significantly impacted by widening the ROW under this scenario. • 2.46 ha of residential property would be required.	• A total of 88 residential properties, 37 of which are within Block Plan areas, would be significantly impacted by widening the ROW under this scenario. • 3.74 ha of residential property would be required. • All require property is identified through the Fruitland-Winona Secondary Plan.	• A total of 55 residential properties, 23 of which are within Block Plan areas, would be significantly impacted by widening the ROW under this scenario. • 2.85 ha of residential property would be required.	• A total of 66 residential properties, none of which are within Block Plan areas, would be significantly impacted by widening the ROW under this scenario. • 3.02 ha of residential property would be required.
	Business Impacts	• A total of nine (9) businesses, one of which is in a Block Plan area, would be impacted by widening the ROW to 40 m under this scenario. • 2.74 ha of property zoned for commercial / industrial would be required.	• A total of ten (10) businesses, one of which is in a Block Plan area, would be impacted by widening the ROW to 40 m under this scenario. • 3.81 ha of property zoned for commercial / industrial would be required.	• A total of seven (7) businesses, two (2) of which is in a Block Plan area, would be impacted by widening the ROW to 40 m under this scenario. • 1.8 ha of property zoned for commercial / industrial would be required. • All require property is identified through the Fruitland-Winona Secondary Plan.	• A total of four (4) businesses, one of which is in a Block Plan area, would be impacted by widening the ROW to 40 m under this scenario. • 3.07 ha of property zoned for commercial / industrial would be required.	• A total of eight (8) businesses, one of which is in a Block Plan area, would be impacted by widening the ROW to 40 m. • 2.52 ha of property zoned for commercial / industrial would be required.
	Emergency Services	No difference between alternatives during construction. Ultimately, response times are expected to decrease because of providing additional lanes that could be used by emergency vehicles. No difference between alternatives.				

CATEGORY AND CRITERIA		ALT 1: WIDENED ON BOTH SIDES FROM CENTRE. ROW is 36.6 m + 4 m SOUTH SIDE FOR PROMENADE.	ALT 2: WIDENED EQUALLY FROM ROAD CENTRELINE ON BOTH SIDES TO 36.6m AND SHIFTED NORTH BY 4 m, ROW IS 40.6m	ALT 3: SAME AS Alt 2, Except WIDENED TO THE SOUTH BY 4 m (PROMENADE - SECONDARY PLAN), ROW IS 40.6m.	ALT 4: WIDEN EQUALLY ON BOTH SIDES OF CENTRE LINE ROW = 40.6m (36.6m + 4m PROMENADE); MEANDER TO AVOID IMPACTING CONSTRAINTS.	ALT 5: WIDEN THE EQUALLY ON BOTH SIDES OF THE ROW ALONG EXISTING ROW CENTRELINE to 36.6m, AND INCORPORATE 4m PROMENADE TO THE SOUTH.
	Noise Level Impacts	• Southern limit of road maintained in almost the exact location as existing roadway. Road not moving closer to existing residential receivers. • All alternatives result in a northerly shift in the roadway surface in the interim condition.	• Southern limit of road would be shifted slightly north of the existing south edge of pavement. Reduction in road noise anticipated for residential receivers compared to other alternatives. • All alternatives result in a northerly shift in the roadway surface in the interim condition.	• Southern limit of roadway moving approx. 3.5 m south of the existing roadway edge of pavement. As a result, road noise generators would be moved closer to residential receivers. • All alternatives result in a northerly shift in the roadway surface in the interim condition.	• Southern limit of roadway is primarily maintained at, or north of, the existing southern edge of pavement. Reduction in road noise anticipated for residential receivers compared to other alternatives. • All alternatives result in a northerly shift in the roadway surface in the interim condition.	• Southern limit of road would be shifted slightly north of the existing south edge of pavement. Reduction in road noise anticipated for residential receivers compared to other alternatives. • All alternatives result in a northerly shift in the roadway surface in the interim condition.
	Community / Recreational Features Impacts	• No anticipated impact to Grand Olympia, Winona Public School, or Winona Park. • Ultimate cross-section to encroach an additional 12 m into Dean Vista Park and an additional 2 m into the St. Gabriel Elementary property. • Roadway could be shifted south at Dean Vista Park and St. Gabriel to reduce impacts by up to 6 m.	• No anticipated impact to Grand Olympia, Winona Public School, or Winona Park. • Ultimate cross-section to encroach an additional 17 m into Dean Vista Park and 4 m onto the St. Gabriel Elementary property. • Roadway could be shifted south at Dean Vista Park and St. Gabriel to reduce impacts by up to 6 m. • Additional greenspace would be made available along Winona Park.	• No anticipated impact to Grand Olympia, Winona Public School, or St. Gabriel Elementary. • Ultimate cross-section to encroach an additional 10 m into Dean Vista Park and an additional 4 m into Winona Park. • Roadway could be shifted south at Dean Vista Park to reduce impacts by up to 6 m.	• No anticipated impact to Grand Olympia, Winona Public School, or St. Gabriel Elementary. • Ultimate cross-section to encroach an average of additional 18 m into Dean Vista Park and an additional 4 m into Winona Park. • Roadway could be shifted south at Dean Vista Park to reduce impacts by up to 6 m.	• No anticipated impact to Winona Public School. • 0.04 ha of property impact at Grand Olympia, including the main building • 0.14 ha of property impact at Winona Park • No anticipated impact to Dean Vista Park, or St. Gabriel Elementary.
	Cultural Features / Landscapes Impacts	• The only identified cultural heritage resource within the study area is Winona Park. No impacts are anticipated.	• The only identified cultural heritage resource within the study area is Winona Park. No impacts are anticipated. • Additional greenspace would be made available along the north limit of the park.	• The only identified cultural heritage resource within the study area is Winona Park. Roadway is anticipated to encroach approx. 4 m into the park. Modification of the recommended cross-section would be required to minimize impacts to mature trees and other park features.	• The only identified cultural heritage resource within the study area is Winona Park. Roadway is anticipated to encroach approx. 4 m into the park. Modification of the recommended cross-section would be required to minimize impacts to mature trees and other park features.	• The only identified cultural heritage resource within the study area is Winona Park. No impacts are anticipated. • Additional greenspace would be made available along the north limit of the park.
	Archaeological Impacts	Stage 1 Archaeological Assessment has identified archaeological potential for all existing green spaces along the corridor. No significant difference in areas to be evaluated between alternatives.				
	Built Heritage Impacts	• One (1) listed and three (3) unlisted heritage structures fall within the ROW. • Cross-section could be modified to avoid impacts to the listed and two (2) other heritage structures.	• Two (2) unlisted heritage structures located within the ROW. • Cross-section could be modified to avoid impacts to these features.	• Two (2) listed heritage buildings and three (3) unlisted heritage structures located within the ROW. • Cross-section could be modified to avoid impacts to avoid impacts to the 2 listed, and one (1) of the non-listed heritage buildings.	• One (1) listed and four (4) unlisted heritage structures fall within the ROW. • Cross-section could be modified to avoid impacts to the listed structure.	• Five (5) listed and one (1) unlisted heritage structures located within the ROW. • Cross-section could be modified to avoid impacts to the one (1) unlisted property.

CATEGORY AND CRITERIA		ALT 1: WIDENED ON BOTH SIDES FROM CENTRE. ROW is 36.6 m + 4 m SOUTH SIDE FOR PROMENADE.	ALT 2: WIDENED EQUALLY FROM ROAD CENTRELINE ON BOTH SIDES TO 36.6m AND SHIFTED NORTH BY 4 m, ROW IS 40.6m	ALT 3: SAME AS Alt 2, Except WIDENED TO THE SOUTH BY 4 m (PROMENADE - SECONDARY PLAN), ROW IS 40.6m.	ALT 4: WIDEN EQUALLY ON BOTH SIDES OF CENTRE LINE ROW = 40.6m (36.6m + 4m PROMENADE); MEANDER TO AVOID IMPACTING CONSTRAINTS.	ALT 5: WIDEN THE EQUALLY ON BOTH SIDES OF THE ROW ALONG EXISTING ROW CENTRELINE to 36.6m, AND INCORPORATE 4m PROMENADE TO THE SOUTH.
Financial	Agricultural Impacts	• 0.89 ha of land designated as AS (Agricultural Specialty) falls within the proposed ROW limits. Edge impacts only.	• 0.65 ha of land designated as AS (Agricultural Specialty) falls within the proposed ROW limits. Edge impacts only.	• 1.10 ha of land designated as AS (Agricultural Specialty) falls within the proposed ROW limits. Edge impacts only.	• 0.64 ha of land designated as AS (Agricultural Specialty) falls within the proposed ROW limits. Edge impacts only.	• 0.68 ha of land designated as AS (Agricultural Specialty) falls within the proposed ROW limits. Edge impacts only.
	Utility Relocation	• Bell: Relocation of 61 pedestals, 1,200 m buried cable, 3,500 m conduit cables. • 235 overhead poles would require relocation. • Approx. 5,700 m of gas line would potentially require relocation. • Approx. 4,200 m of watermain would potentially require relocation. • Estimated cost for utility relocation is $4.6 M.	• Bell: Relocation of 53 pedestals, 980 m buried cable, 3,600 m conduit cables. • 218 overhead poles would require relocation. • Approx. 5,700 m of gas line would potentially require relocation. • Approx. 1,900 m of watermain would potentially require relocation. • Estimated cost for utility relocation is $3.3 M.	• Bell: Relocation of 74 pedestals, 500 m buried cable, 3,300 m conduit cables. • 243 overhead poles would require relocation. • Approx. 5,500 m of gas line would potentially require relocation. • Approx. 4,700 m of watermain would potentially require relocation. • Estimated cost for utility relocation is $4.8 M.	• Bell: Relocation of 59 pedestals, 750 m buried cable, 3,700 m conduit cables. • 210 overhead poles would require relocation. • Approx. 5,700 m of gas line would potentially require relocation. • Approx. 3,400 m of watermain would potentially require relocation. • Estimated cost for utility relocation is $4.0 M.	• Bell: Relocation of 51 pedestals, 1,050 m buried cable, 3,550 m conduit cables. • 216 overhead poles would require relocation. • Approx. 5,700 m of gas line would potentially require relocation. • Approx. 2,000 m of watermain would potentially require relocation. • Estimated cost for utility relocation is $3.4 M.
	Property Acquisition	• 0.93 ha required beyond what is identified as part of the Fruitland Winona Secondary Plan. • 2.63 ha required beyond what has been identified for redevelopment through the Block Planning process.	• 1.81 ha required beyond what is identified as part of the Fruitland Winona Secondary Plan. • 3.08 ha required beyond what has been identified for redevelopment through the Block Planning process.	• 0 ha required beyond what is identified as part of the Fruitland Winona Secondary Plan. • 2.44 ha required beyond what has been identified for redevelopment through the Block Planning process.	• 1.14 ha required beyond what is identified as part of the Fruitland Winona Secondary Plan. • 3.30 ha required beyond what has been identified for redevelopment through the Block Planning process.	• 1.69 ha required beyond what is identified as part of the Fruitland Winona Secondary Plan. • 2.95 ha required beyond what has been identified for redevelopment through the Block Planning process.
	Capital Costs	• Estimated cost for property acquisition is $850 K. • Estimated cost for residential buyout is $34.5 M.	• Estimated cost for property acquisition is $1.65 M. • Estimated cost for residential buyout is $32.5 M.	• Estimated cost for property acquisition is $0 • Estimated cost for residential buyout is $28 M.	• Estimated cost for property acquisition is $1.04 M. • Estimated cost for residential buyout is $17.5 M.	• Estimated cost for property acquisition is $1.56 M. • Estimated cost for residential buyout is $30 M.
	Operating Costs	No significant difference in roadway length between alternatives, and therefore no significant difference in annual operating costs. No difference between alternatives.				
Engineering	Pedestrians, Cyclists and Driver Safety	All alternative alignments consider the same roadway cross-section. Adequate sight distance throughout corridor.				
	Urban Design	All alternatives contemplate implementation of similar cross-sections, allowing for implementation of similar urban design features. No significant difference between alternatives.				
	Structural Impacts	All alternatives would require modification of six (6) existing major culverts. No significant difference between alternatives.				
	Hydraulics and Hydrology	Roadway profile and existing culvert sizes would be designed to mitigate flood risks to the extent possible. No significant difference between alternatives.				

CATEGORY AND CRITERIA		ALT 1: WIDENED ON BOTH SIDES FROM CENTRE. ROW is 36.6 m + 4 m SOUTH SIDE FOR PROMENADE.	ALT 2: WIDENED EQUALLY FROM ROAD CENTRELINE ON BOTH SIDES TO 36.6m AND SHIFTED NORTH BY 4 m, ROW IS 40.6m	ALT 3: SAME AS Alt 2, Except WIDENED TO THE SOUTH BY 4 m (PROMENADE - SECONDARY PLAN), ROW IS 40.6m.	ALT 4: WIDEN EQUALLY ON BOTH SIDES OF CENTRE LINE ROW = 40.6m (36.6m + 4m PROMENADE); MEANDER TO AVOID IMPACTING CONSTRAINTS.	ALT 5: WIDEN THE EQUALLY ON BOTH SIDES OF THE ROW ALONG EXISTING ROW CENTRELINE to 36.6m, AND INCORPORATE 4m PROMENADE TO THE SOUTH.
	Stormwater Management and LID	Management of stormwater quality and quantity would be addressed, and LID techniques implemented to the extent possible for all alternatives. No difference between alternatives.				
	Incorporates innovative products / practices	Use of solar-powered lights and innovative active transportation facility materials (e.g., permeable pavements) would be recommended for consideration for all alignment alternatives. Exact materials to be determined during Detailed Design. No difference between alternatives.				
Preferred Alternative: Alternative 5 (Shift Alignment North and Maintain Property Line on South Side. ROW of 36.6 m).						

Legend:	**Not Feasible**	⟷	**Most Preferred**
Colour			

5.2.2 BARTON STREET PROPERTY IMPACTS

Impacts to properties were considered when developing road widening alternatives. The widening of Barton Street generally would have detrimental impacts on both residential and non-residential property by encroaching on driveways, parking areas, landscaping, and in some instances buildings. It is also possible encroachments would not comply with existing zoning bylaws for driveway depth. The City of Stoney Creek Zoning By-Law No. 3692-92 outlines the bylaw for driveways and parking lots:

Of particular importance are minimum lot setbacks where either a driveway or parking lot is provided between an existing structure and the proposed widened limits of the ROW. For private residential parking spaces, the minimum length of a single perpendicular parking space is 6.0 m (By-law 5068-00). For parking lots, the minimum dimensions for perpendicular parking spaces are 2.75 m by 5.8 m (By-law 5068-00) with a minimum access lane width of 6.0 m.

Property impacts would be expected for all alignment alternatives and was considered a primary design constraint along Barton Street because the designated right-of-way (ROW) of 40.6m has not been established yet along the corridor.

For all alignment alternatives property impacts would result in either full purchase of properties or a partial acquisition along property frontages impacting driveways and parking spaces, and trees. Based on the existing predominantly 20m right-of-way in the corridor east of Lewis Road, acquisition of property would be significant on both sides of the road and could result in several full purchases in order to establish the approved 40.6m ROW.

Table 5-3 and **Table 5-4** provide a summary of the total number of properties where land would be required to establish the right-of-way, as well as the total property measured in hectares for each of the alignment alternatives considered.

Table 5-3. Summary of Buildings Impacted by ROW Widening Alignment Alternatives

LOCATION OF IMPACTED BUILDINGS	ROW LOCATION RELATIVE TO EXISTING CENTRELINE				
	ALT 1: WIDENED ON BOTH SIDES FROM CENTRE. ROW is 36.0m + 4m SOUTH SIDE FOR PROMENADE	ALT 2: WIDENED EQUALLY FROM ROAD CENTRELINE ON BOTH SIDES TO 36.6m, AND SHIFTED NORTH BY 4 m, ROW IS 40.6 m.	ALT 3: SAME AS Alt 2, Except WIDENED TO THE SOUTH BY 4m (PROMENADE - SECONDARY PLAN). ROW IS 40.6m.	ALT 4: WIDEN EQUALLY ON BOTH SIDES OF CENTRE LINE ROW = 40.6m (36.6m + 4m PROMENADE); MEANDER TO AVOID IMPACTING CONSTRAINTS.	ALT 5: WIDEN THE EQUALLY ON BOTH SIDES OF THE ROW ALONG EXISTING ROW CENTRELINE to 36.6m, AND INCORPORATE 4m PROMENADE TO THE SOUTH.
North Side	46	59	20	21	68
South Side	51	31	75	38	135
Total	**97**	**90**	**95**	**59**	**203**

Table 5-4. Area and Location of Property Required for the Various ROW Alignment Alternatives

LOCATION OF REQUIRED PROPERTY RELATIVE TO EXISTING BARTON STREET ROW	ROW ALIGNMENT RELATIVE TO EXISTING CENTRELINE				
	ALT 1: WIDENED ON BOTH SIDES FROM CENTRE. ROW is 36.0m + 4m SOUTH SIDE FOR PROMENADE	ALT 2: WIDENED EQUALLY FROM ROAD CENTRELINE ON BOTH SIDES TO 36.6m, AND SHIFTED NORTH BY 4 m, ROW IS 40.6 m.	ALT 3: SAME AS Alt 2, Except WIDENED TO THE SOUTH BY 4m (PROMENADE - SECONDARY PLAN). ROW IS 40.6m.	ALT 4: WIDEN EQUALLY ON BOTH SIDES OF CENTRE LINE ROW = 40.6m (36.6m + 4m PROMENADE); MEANDER TO AVOID IMPACTING CONSTRAINTS.	ALT 5: WIDEN THE EQUALLY ON BOTH SIDES OF THE ROW ALONG EXISTING ROW CENTRELINE to 36.6m, AND INCORPORATE 4m PROMENADE TO THE SOUTH.
North Side	2.74 ha	3.61 ha	1.80 ha	3.07 ha	1.93 ha
South Side	2.80 ha	2.46 ha	3.74 ha	2.85 ha	1.89 ha
Total	**5.54 ha**	**6.07 ha**	**5.54 ha**	**5.92 ha**	**3.82 a**

5.2.2 LOCATIONS OF IMPACTED PROPERTIES

On the north side of Barton Street, anticipated full property purchases include:

- 13 Barton Street
- 733 Barton Street
- 835 Barton Street
- 1219 Barton Street
- 1315 Barton Street

On the south side of Barton Street, anticipated full property purchases include:

- 692 Barton Street
- 722 Barton Street
- 1024 Barton Street
- 1026 Barton Street
- 1164 Barton Street
- 1224 Barton Street
- 1298 Barton Street
- 1304 Barton Street
- 300 Winona Road

All other properties would be for partial takings along the lot frontage.

5.2.3 BARTON STREET PREFERRED ALIGNMENT ALTERNATIVE

The preferred alignment for Barton Street is Alternative 5. Alternative 5 is preferred because:

- It would reduce the amount of property impacts, and significantly decrease the number of full buy-outs of building/properties for implementation.
    - The total number of properties affected with this alternative is 169 (north and south side of the street combined).
    - The number of properties requiring full purchase on the north side of Barton Street is five (5) and on the south side is nine (9).
- It offers a multi-modal solution to accommodate personal vehicles, transit buses, trucks, pedestrians, and cyclists.
- It would have lower impacts to several agricultural / pastured land pockets, which is suitable Bobolink and Eastern meadowlark habitat compared to Alternatives 1, 2, 3 and 4.
- Compared to Alternatives 1, 2, 3, and 4, Alternative 5 has lower or the same impacts to utility infrastructure relocation that includes Bell, utility poles, and watermains.

5.3 FIFTY ROAD ALIGNMENT ALTERNATIVES

Alternatives for Fifty Road were developed that take into consideration of impacts to property, CN railway, natural environmental features, built heritage, and short- and long-term land use development plans.

5.3.1 DETAILED EVALUATION OF FIFTY ROAD ALTERNATIVES

Table 5.5 presents the evaluation of five (5) alternatives considered for Fifty Road, each have been developed to accommodate a multi-modal corridor and with consideration of property, environmental, heritage impacts, community and public services and cost. All criteria were considered to carry equivalent weight.

5.3.1 DETAILED EVALUATION OF FIFTY ROAD ALTERNATIVES

Table 5-5. Detailed Evaluation of Fifty Road Alternatives

CATEGORY AND CRITERIA		ALT 1: CENTRED WIDENING – 8 m ON BOTH SIDES ALONG EXISTING CENTRELINE. ROW IS 30.0 M	ALT 2: WIDEN 8.0 m TO THE WEST SIDE OF FIFTY ROAD. WIDEN 4.0 M TO THE EAST SIDE ROW IS 26.0 M	ALT 3: WIDEN 4m TO THE EAST FROM CENTRE LINE OF EXISTING ROW. ROW IS 26.0 M SOUTH OF BARTON, 30.0 M NORTH OF BARTON	ALT 4: HYBRID ALIGNMENT: ACTIVE TRANSPORTATION FACILITIES MINIMIZED; ROW IS 30.0m; MAINTAIN EASTERN EDGE OF NORTH OF BARTON ST. UP TO ~ 25.0 M SOUTH OF CN RAIL	ALT 5: WIDENED NORTH OF BARTON STREET – 30.0 m; ROW / WIDENING ON EAST SIDE
Natural Environment	Natural Heritage Feature Impacts	No ANSI or ESAs identified along the Barton Street corridor on Fifty Road. No difference between alternatives.				
	Species at Risk Impacts	• No aquatic SAR found in the study area. • Barn swallow has potential to be impacted regardless of the location of ROW due to the study area located in a critical habitat zone. • Bank swallow uses study area for foraging purposes; however, the study area is not located in a critical habitat zone. • The ROW would potentially impact 75 approx. 0.892 ha. The entire corridor has several agricultural / pastured land pockets, which is suitable Bobolink and Eastern meadowlark habitat.	• No aquatic SAR found in the study area. • Barn swallow has potential to be impacted regardless of the location of ROW due to the study area located in a critical habitat zone. • Bank swallow uses study area for foraging purposes; however, the study area is not located in a critical habitat zone. • The ROW would potentially impact 75 approx. 0.926 ha. The entire corridor has several agricultural / pastured land pockets, which is suitable Bobolink and Eastern meadowlark habitat.	• No aquatic SAR found in the study area. • Barn swallow has potential to be impacted regardless of the location of ROW due to the study area located in a critical habitat zone. • Bank swallow uses study area for foraging purposes; however, the study area is not located in a critical habitat zone. • The ROW would potentially impact 75 approx. 0.859 ha. The entire corridor has several agricultural / pastured land pockets, which is suitable Bobolink and Eastern meadowlark habitat.	• No aquatic SAR found in the study area. • Barn swallow has potential to be impacted regardless of the location of ROW due to the study area located in a critical habitat zone. • Bank swallow uses study area for foraging purposes; however, the study area is not located in a critical habitat zone. • The ROW would potentially impact 75 approx. 0.039 ha. The entire corridor has several agricultural / pastured land pockets, which is suitable Bobolink and Eastern meadowlark habitat.	• No aquatic SAR found in the study area. • Barn swallow has potential to be impacted regardless of the location of ROW due to the study area located in a critical habitat zone. • Bank swallow uses study area for foraging purposes; however, the study area is not located in a critical habitat zone. • The ROW would potentially impact 75 approx. 0.963 ha. The entire corridor has several agricultural / pastured land pockets, which is suitable Bobolink and Eastern meadowlark habitat.
	Avian and Wildlife Environment Impacts	• The impact to the Fresh- Moist Willow Lowland Deciduous Forest (located north-east of Fifty Road and Highway 8) would be 75 approx. 0.045 ha.	• There would be no impact to the Fresh- Moist Willow Lowland Deciduous Forest (located north-east of Fifty Road and Highway 8).	• The impact to the Fresh- Moist Willow Lowland Deciduous Forest (located north-east of Fifty Road and Highway 8) would be 75 approx. 0.0897 ha.	• The impact to the Fresh- Moist Willow Lowland Deciduous Forest (located north-east of Fifty Road and Highway 8) would be 75 approx. 0.037 ha.	• There would be no impact to the Fresh- Moist Willow Lowland Deciduous Forest (located north-east of Fifty Road and Highway 8).
	Watercourses and Aquatic Environment Impacts	No increase in number of watercourse crossings. All alternatives would require lengthening and upsizing of existing crossings. No significant impacts to existing aquatic features for any of the alternatives.				
	Vegetation and Wetland Impacts	No significant wetlands or vegetative features along this corridor. All alternatives would impact Fifty Creek equally. No difference between alternatives.				
	Groundwater Impacts	All alternatives have identical increases in impervious area, which has the potential to decrease groundwater quality or quantity if adequate counter measures are not taken. No significant difference between alternatives.				

CATEGORY AND CRITERIA		ALT 1: CENTRED WIDENING – 8 m ON BOTH SIDES ALONG EXISTING CENTRELINE. ROW IS 30.0 M	ALT 2: WIDEN 8.0 m TO THE WEST SIDE OF FIFTY ROAD. WIDEN 4.0 M TO THE EAST SIDE ROW IS 26.0 M	ALT 3: WIDEN 4m TO THE EAST FROM CENTRE LINE OF EXISTING ROW. ROW IS 26.0 M SOUTH OF BARTON, 30.0 M NORTH OF BARTON	ALT 4: HYBRID ALIGNMENT: ACTIVE TRANSPORTATION FACILITIES MINIMIZED; ROW IS 30.0m; MAINTAIN EASTERN EDGE OF NORTH OF BARTON ST. UP TO ~ 25.0 M SOUTH OF CN RAIL	ALT 5: WIDENED NORTH OF BARTON STREET – 30.0 m; ROW / WIDENING ON EAST SIDE
Social /Cultural Environment	Residential Impacts	• Through minimization of boulevards and locally combining the sidewalk and cycle track, impacts to existing residential buildings could be reduced to one (1) property. • It is anticipated that up to three (3) planned residential properties within the Foothills of Winona Development would be impacted.	• A total of seven (7) existing residential properties would be impacted. • Up to 18 planned residential properties would be impacted within the Foothills of Winona Development.	• Through minimization of boulevards and locally combining the sidewalk and cycle track, impacts to existing residential buildings could be mitigated. • No planned residential properties would be impacted.	• Through minimization of boulevards and locally combining the sidewalk and cycle track, impacts to existing residential buildings could be reduced to one (1) property. • Up to 20 planned residential properties would be impacted within the Foothills of Winona Development.	• Through minimization of boulevards and locally combining the sidewalk and cycle track, impacts to existing residential buildings could be reduced to five (5) properties. • Up to 15 planned residential properties would be impacted within the Foothills of Winona Development.
	Business Impacts	• No businesses impacted; however, property would be required.	• Greenhouse at Winona Gardens would require removal / relocation.	• Through minimization of boulevards and locally combining the sidewalk and cycle track, impacts to existing business could be mitigated. • Some commercial property still required.	• Through minimization of boulevards and locally combining the sidewalk and cycle track, impacts to existing business could be mitigated. • Some commercial property still required.	• One (1) business would be impacted.
	Emergency Services	All alternatives would improve Emergency Services response. No significant difference between alternatives.				
	Noise Level Impacts (See Appendix L)	• Roadway would be moved closer to seven (7) existing residential buildings (to be maintained), as well as 15 planned residential properties (Foothills of Winona).	• Roadway would be moved closer to one (1) existing residential building, and further from three (3). All other existing residential buildings would be removed. • Alignment would require that planned properties along the east side of the Foothills of Winona development be relocated, minimizing impacts.	• Roadway would be moved closer to one (1) existing residential property and stay at the same location relative to other buildings that are to be maintained. • Roadway is not moved significantly closer to the planned properties within the Foothills of Winona development.	• Roadway would be moved closer to one (1) and further from two (2) existing residential properties (to be maintained). • Alignment would require that planned properties along the east side of the Foothills of Winona development be relocated, minimizing impacts.	• Roadway would be moved closer to five (5) existing residential properties and stay the same location relative to other buildings that are to be maintained. • Alignment would require that planned properties along the east side of the Foothills of Winona development be relocated, minimizing impacts.
	Community / Recreational Features Impacts	No community / recreational facility along this portion of Fifty Road. No difference between alternatives.				
	Cultural Features / Landscapes Impacts	No cultural features or landscapes located along this portion of Fifty Road. No difference between alternatives.				
	Archaeological Impacts	As equivalent ROW widening is required for all alternatives, and the majority of properties abutting Fifty Road between Highway 8 and South Service Road have archaeological potential, there is insignificant difference in the area to be disturbed between alternatives.				
	Built Heritage Impacts	• Heritage wall at 336 Fifty Road would require relocation.	• Heritage buildings at 279 / 299 Fifty Road would need to be removed / relocated.	• Heritage wall at 336 Fifty Road would require relocation.	• Heritage buildings at 279 / 299 Fifty Road would need to be removed / relocated.	• Heritage buildings at 279 / 299 Fifty Road would need to be removed / relocated.

CATEGORY AND CRITERIA		ALT 1: CENTRED WIDENING – 8 m ON BOTH SIDES ALONG EXISTING CENTRELINE. ROW IS 30.0 M	ALT 2: WIDEN 8.0 m TO THE WEST SIDE OF FIFTY ROAD. WIDEN 4.0 M TO THE EAST SIDE ROW IS 26.0 M	ALT 3: WIDEN 4m TO THE EAST FROM CENTRE LINE OF EXISTING ROW. ROW IS 26.0 M SOUTH OF BARTON, 30.0 M NORTH OF BARTON	ALT 4: HYBRID ALIGNMENT: ACTIVE TRANSPORTATION FACILITIES MINIMIZED; ROW IS 30.0m; MAINTAIN EASTERN EDGE OF NORTH OF BARTON ST. UP TO ~ 25.0 M SOUTH OF CN RAIL	ALT 5: WIDENED NORTH OF BARTON STREET – 30.0 m; ROW / WIDENING ON EAST SIDE
Financial			• Impact to heritage wall would be avoided.			• Heritage wall at 336 Fifty Road would require relocation.
	Agricultural Impacts	• Widening of the ROW would require purchase of 0.16 ha of AS (Agricultural Specialty) and 0.34 ha of A1 (Agricultural) land for widening of the ROW to 36 m. • Total of 0.5 ha of Canada Land Inventory (CLI) Class 4 agricultural land would be impacted.	• Widening of the ROW would require purchase of 0.28 ha of AS and 0.13 ha of A1 land for widening of the ROW to 36 m. • Total of 0.41 ha of CLI Class 4 agricultural land would be impacted.	• Widening of the ROW would require purchase of 0.10 ha of AS and 0.61 ha of A1 land for widening of the ROW. • Total of 0.71 ha of CLI Class 4 agricultural land would be impacted.	• Widening of the ROW would require purchase of 0.38 ha of AS and 0.13 ha of A1 land for widening of the ROW to 36 m. • Total of 0.51 ha of CLI Class 4 agricultural land would be impacted.	• Widening of the ROW would require purchase of 0.23 ha of AS and 0.11 ha of A1 land for widening of the ROW to 36 m. • Total of 0.34 ha of CLI Class 4 agricultural land would be impacted.
	Utility Relocation	• Bell: Relocation of 14 pedestals, 290m conduit cables, 140m of buried cable. • 40 overhead poles would require relocation. • Approx. 480 m of gas line would potentially require relocation. • Approx. 10 m of watermain would potentially require relocation. • Estimated cost for utility relocation is $330 K.	• Bell: Relocation of 14 pedestals, 290m conduit cables, 140m of buried cable. • 30 overhead poles would require relocation. • Approx. 400 m of gas line would potentially require relocation. • Approx. 60 m of watermain would potentially require relocation. • Estimated cost for utility relocation is $282 K.	• Bell: Relocation of 14 pedestals, 290m conduit cables, 140m of buried cable. • 39 overhead poles would require relocation. • Approx. 190 m of gas line would potentially require relocation. • Approx. 60 m of watermain would potentially require relocation. • Estimated cost for utility relocation is $312 K.	• Bell: Relocation of seven (7) pedestals, 340m of conduit cables, 90m of buried cable. • 29 overhead poles would require relocation. • Approx. 190 m of gas line would potentially require relocation. • Approx. 10 m of watermain would potentially require relocation. • Estimate cost for utility relocation is $231 K.	• Bell: Relocation of seven (7) pedestals, 290m of conduit cables, 45m of buried cable. • 29 overhead poles would require relocation. • Approx. 375 m of gas line would potentially require relocation. • Approx. 60 m of watermain would potentially require relocation. • Estimate cost for utility relocation is $273 K.
	Property Acquisition	• All alternatives would require 1 ha (2.48 acres) of property (road widenings), with an estimated value of $2.25 M. • One (1) residential property estimated at $500 K would be required to be purchased. • Total property costs estimated at $2.75 M.	• All alternatives would require 1 ha (2.48 acres) of property (road widenings), with an estimated value of $2.25 M. • Seven (7) residential properties estimated at $3.5 M would be required to be purchased. • Total property costs estimated at $5.75 M.	• All alternatives would require 1 ha (2.48 acres) of property (road widenings), with an estimated value of $2.25 M. • No residential property would be required to be purchased. • Total property costs estimated at $2.25 M.	• All alternatives would require 1 ha (2.48 acres) of property (road widenings), with an estimated value of $2.25 M. • One (1) residential property estimated at $500 K[1] would be required to be purchased. • Total property costs estimated at $2.75 M.	• All alternatives would require 1 ha (2.48 acres) of property (road widenings), with an estimated value of $2.25 M. • One (1) residential property estimated at $500 K[1] would be required to be purchased. • Total property costs estimated at $2.75 M.
	Capital Costs	Estimated capital cost for construction of all alternative alignments is estimated at $3.7 M. No significant difference between alternatives.				

CATEGORY AND CRITERIA		ALT 1: CENTRED WIDENING – 8 m ON BOTH SIDES ALONG EXISTING CENTRELINE. ROW IS 30.0 M	ALT 2: WIDEN 8.0 m TO THE WEST SIDE OF FIFTY ROAD. WIDEN 4.0 M TO THE EAST SIDE ROW IS 26.0 M	ALT 3: WIDEN 4m TO THE EAST FROM CENTRE LINE OF EXISTING ROW. ROW IS 26.0 M SOUTH OF BARTON, 30.0 M NORTH OF BARTON	ALT 4: HYBRID ALIGNMENT: ACTIVE TRANSPORTATION FACILITIES MINIMIZED; ROW IS 30.0m; MAINTAIN EASTERN EDGE OF NORTH OF BARTON ST. UP TO ~ 25.0 M SOUTH OF CN RAIL	ALT 5: WIDENED NORTH OF BARTON STREET – 30.0 m; ROW / WIDENING ON EAST SIDE
	Operating Costs	All alternatives have identical roadway, active transportation, and intersection requirements, with an estimated annual operation cost of $130 K. No significant difference between alternatives.				
Engineering- Transportation	Pedestrians- Safety, walking environment, encourages walking	• To minimize impacts to existing residential and industrial properties, active transportation facilities would be combined, and boulevards narrowed (where necessary) south of Barton Street. • 3.0 MUP would be provided south of Barton Street, with 2.0 m separate sidewalk to the north.	• As this option requires purchase of all existing residential properties on the west side of Fifty Road, full cycle track and separate 2.0 m sidewalk could be provided along the study portion of Fifty Road.	• To minimize impacts to existing residential and industrial properties, active transportation facilities would be combined, and boulevards narrowed (where necessary) south of Barton Street. • 3.0 MUP would be provided south of Barton Street, with 2.0 m separate sidewalk to the north.	• To minimize impacts to existing residential and industrial properties, active transportation facilities would be combined, and boulevards narrowed (where necessary) south of Barton Street. • 3.0 MUP would be provided south of Barton Street, with 2.0 m separate sidewalk to the north.	• As this option requires purchase of all existing residential properties on the west side of Fifty Road, full cycle track and separate 2.0 m sidewalk could be provided along the study portion of Fifty Road.
						
	Cyclists- Safety, cycling environment, encourages cycling	• To minimize impacts to existing residential and industrial properties, active transportation facilities would be combined, and boulevards narrowed (where necessary) south of Barton Street. • 3.0 MUP would be provided south of Barton Street, with 1.5 m separate cycle track to the north.	• As this option requires purchase of all existing residential properties on the west side of Fifty Road, full 1.5 m cycle track and 2.0 m sidewalk would be provided along the study portion of Fifty Road.	• To minimize impacts to existing residential and industrial properties, active transportation facilities would be combined, and boulevards narrowed (where necessary) south of Barton Street. • 3.0 MUP would be provided south of Barton Street, with 1.5 m separate cycle track to the north.	• To minimize impacts to existing residential and industrial properties, active transportation facilities would be combined, and boulevards narrowed (where necessary) south of Barton Street. • 3.0 MUP would be provided south of Barton Street, with 1.5 m separate cycle track to the north.	• As this option requires purchase of all existing residential properties on the west side of Fifty Road, full 1.5 m cycle track and 2.0 m sidewalk would be provided along the study portion of Fifty Road.
						
	Drivers - Capacity, speed, intersection operations, safety	Intersections for all alternatives would be designed to provide the same level of safety, capacity, and operations. No difference between alternatives.				
	Urban Design	All alternatives contemplate implementation of similar cross-sections, allowing for implementation of similar urban design features. No significant difference between alternatives.				
Engineering- Other	Structural Impacts	• No impact to major culverts.	• No impact to major culverts.	• May require modification to one (1) major culvert.	• No impact to major culverts.	• No impact to major culverts.
						

CATEGORY AND CRITERIA		ALT 1: CENTRED WIDENING – 8 m ON BOTH SIDES ALONG EXISTING CENTRELINE. ROW IS 30.0 M	ALT 2: WIDEN 8.0 m TO THE WEST SIDE OF FIFTY ROAD. WIDEN 4.0 M TO THE EAST SIDE ROW IS 26.0 M	ALT 3: WIDEN 4m TO THE EAST FROM CENTRE LINE OF EXISTING ROW. ROW IS 26.0 M SOUTH OF BARTON, 30.0 M NORTH OF BARTON	ALT 4: HYBRID ALIGNMENT: ACTIVE TRANSPORTATION FACILITIES MINIMIZED; ROW IS 30.0m; MAINTAIN EASTERN EDGE OF NORTH OF BARTON ST. UP TO ~ 25.0 M SOUTH OF CN RAIL	ALT 5: WIDENED NORTH OF BARTON STREET – 30.0 m; ROW / WIDENING ON EAST SIDE
	Hydraulics and Hydrology	• Roadway would be widened towards from the eastern Fifty Creek crossing under Highway 8. • Roadway profile and existing culverts under Fifty Road and Highway 8 would be designed to mitigate flood risks to the extent possible.	• Roadway would be widened away from the eastern Fifty Creek crossing under Highway 8. • Roadway profile and existing culverts under Fifty Road and Highway 8 would be designed to mitigate flood risks to the extent possible.	• Roadway would be widened towards the eastern Fifty Creek crossing under Highway 8. • Roadway profile and existing culverts under Fifty Road and Highway 8 would be designed to mitigate flood risks to the extent possible.	• Roadway would be widened away from the eastern Fifty Creek crossing under Highway 8. • Roadway profile and existing culverts under Fifty Road and Highway 8 would be designed to mitigate flood risks to the extent possible.	• Roadway would be widened away from the eastern Fifty Creek crossing under Highway 8. • Roadway profile and existing culverts under Fifty Road and Highway 8 would be designed to mitigate flood risks to the extent possible.
	Stormwater Management	Management of stormwater quality and quantity would be addressed, and LID techniques implemented to the extent possible for all alternatives. No difference between alternatives.				
	Incorporates innovative products / practices	Use of solar-powered lights and innovative active transportation facility materials (i.e., permeable pavements) would be recommended for all alignment alternatives. Exact materials to be determined during Detailed Design. No difference between alternatives.				

Preferred Alternative: Alternative 3 (ROW Widened to the East).

Legend:	Not Feasible	⟷	Most Preferred
Colour			

5.3.2 DESIGN CONSTRAINTS AND PROPERTY IMPACTS

The ability to widen the Fifty Road ROW is limited by several key constraints, including: Fifty Creek crossing at Highway 8, existing land uses south of Barton Street including Winona Gardens (garden supply store) at Highway 8, an at-grade CN Rail crossing immediately south of South Service Road, and a heritage stone wall north of Barton Street.

5.3.2.1 FIFTY ROAD (HIGHWAY 8 TO BARTON STREET)

South of Barton Street, Fifty Road is a 20m ROW, constraints include:

- Fifty Creek, which crosses under the east and south approaches to the Highway 8 / Fifty Road intersection. The intersection skew is also less than 90 degrees.
- Overhead utilities (hydro, cable etc.).
- A 300 mm watermain.
- Six (6) residential properties on the west side of Fifty Road with minimal front yard setbacks (measured from right-of-way limit to front face of house).
- One (1) commercial and one (1) residential property on the east side of Fifty Road.

Along with the Highway 8 and Fifty Road intersection, the primary constraint for road widening is the existing buildings.

5.3.2.2 FIFTY ROAD (BARTON STREET TO SOUTH SERVICE ROAD)

North of Barton Street, the Fifty Road ROW varies as follows:

- Barton Street to Sonoma Lane – 20m
- Sonoma Lane to CN Rail – 23m
- Across CN Rail – 20m
- CN Rail to South Service Road – 27.4m

The following constraints are noted in the corridor:

- Existing residential properties on both the west (1 property) and east (3 properties) sides of the road.
- Overhead utilities on both sides of the roadway.

- Listed heritage stone wall on the east side at 336 Fifty Road.
- CN Rail at-grade crossing immediately south of South Service Road.
- Hydro One Transmission corridor along the north side of the CN Rail Line (perpendicular to Fifty Road).
- Planned residential development on the west side of Fifty Road between Sonoma Lane and the CN Rail crossing.

5.3.3 FIFTY ROAD PREFERRED ALIGNMENT ALTERNATIVE

The preferred alignment for Fifty Road is Alternative 3: Widen to the east from centre line of existing ROW. The preferred ROW is 26 m south of Barton Street and 30m north of Barton Street (confirmed at PIC#2). Alternative 3 is selected to be the preferred alternative based on:

- A widening of the ROW to 30m is proposed to accommodate four (4) lanes north of Barton Street and supports future transit plans.
- The existing designated 26.213m ROW is adequate to accommodate two (2) lanes south of Barton Street plus a centre turn lane to improve road safety and access to abutting properties.
- Minimizing impacts to Fifty Creek and the profile and existing culverts under Fifty Road and Highway 8 will be designed to mitigate flood risks. The scenario incorporates the potential for stormwater management features (–green infrastructure) accommodating road run-off from both sides of the road.
- No properties along Fifty Road in the study area are required to be purchased in full comparted to the other alternatives. Therefore, property costs are estimated to be lower than other alternatives.

5.4 FIFTY ROAD / HIGHWAY 8 INTERSECTION ALTERNATIVES

Feedback from the PIU led to an intersection analysis to address a desire to improve review intersection safety where Fifty Road connects with Highway 8. The intersection skew angle is angling less than 70 degrees, which is not desirable. Ideally intersection skews should be within 10 degrees of a right angle (i.e. between 80 and 90 degrees). Intersecting roads at less than 90 degrees can exhibit higher operational issues and collisions due to decreased driver sight-distance. American Association of State Highway and Transportation Officials (AASHTO) policy suggests maintaining an intersection angle of 75 to 90 degrees for new construction, but angles as low as 60 degrees are acceptable if cost and other constraints dictate a need for this degree of

skew. The Transportation Association of Canada Geometric Design Guidelines indicate that a 70-degree skew is acceptable. As such, roadway geometrics were reviewed to improve the existing skew and evaluated against other factors such as impacts to property, Fifty Creek, and cost.

The intersection of Fifty Road at Highway 8 is somewhat constrained with residential properties at the southwest and southeast corner, a garden supply store at the northwest corner, and natural heritage features including Fifty Creek at the northeast corner. Two concrete culverts, one on the south and the other on east approach provide for conveyance of Fifty Creek in a north easterly direction through the intersection. The collision history at the intersection is low with only four collisions reported between 2006 and 2015.

Three (3) alternatives for the Fifty Road and Highway 8 intersection were developed to assess the impacts of improving the intersection skew (Figure 5-2). It's important to note that major changes to the intersection were not considered (e.g. realignment to 90 degrees) because of the substantial impact to abutting properties and Fifty Creek, but also because of the relative low incidences of collisions didn't merit a review of significant changes to the intersection.

Alternative 1. Shift Alignment East.

Alternative 2: Shift Alignment 4 m to the West

Alternative 3: Alignment 4 m West & Shift Highway 8 m South

Figure 5-2. Fifty Road / Highway 8 Intersection Alternatives

In that respect, alternatives attempted to find improvements in the configuration that would improve operations and safety without significantly impacting the natural environment, adjacent properties, and Fifty Creek.

- **Alternative 1: Shift Fifty Road Alignment to the East** – Fifty Road through the intersection is shifted to the east to minimize property acquisitions on the west side of Fifty Road. One left turn lane for each approach is recommended.

- **Alternative 2: Shift Fifty Road Alignment to the West** – Fifty Road through the intersection is shifted 4m to the west, beginning approximately 125 m north of the intersection to minimize impacts to the culvert located on the south approach. One left turn lane for each approach is recommended.

- **Alternative 3: Shift Fifty Road Alignment West & Shift Highway 8 Alignment South** – Through the intersection, Fifty Road is shifted 4m to the west, beginning approximately 125 m north of the intersection to minimize impacts to culvert located on the south approach and Highway 8 is shifted approximately 3.5 m to the south. This alternative includes left turn lanes on all approaches within the existing ROW limits.

An evaluation of the intersection alternatives is provided in Table 5.6.

5.4.1 EVALUATION OF FIFTY ROAD AND HIGHWAY 8 INTERSECTION CONFIGURATION ALTERNATIVES

Table 5.6 presents the evaluation of three (3) alternatives, each with different alignments with consideration of property, environmental, and heritage impacts, design standards, and cost. All criteria were considered to carry equivalent weight.

Table 5-6. Evaluation of Fifty Road and Highway 8 Intersection Alternatives

CATEGORY AND CRITERIA	ALTERNATIVE 1: SHIFTING FIFTY ROAD TO THE EAST	ALTERNATIVE 2: SHIFTED FIFTY ROAD 4 M TO THE WEST	ALTERNATIVE 3: SHIFTED FIFTY ROAD 4 M TO THE WEST AND SHIFTING HIGHWAY 8 TO THE SOUTH
Natural Environment	• Minor impact on wetlands on the northeast quadrant. • Minor impact on wetlands on the southwest quadrant.	• Lower impact on wetlands than Alternative 1.	• Lower impact on wetlands than Alternative 1 and 2.
			
Social / Cultural Environment	• Impacts to properties in all three (3) quadrants: northeast, southeast, southwest. • Total property impact: 6,443 sqm.	• Impacts to properties in all four (4) quadrants. • Total property impact: 6,244 sqm.	• Impacts to properties in all four (4) quadrants. • Total property impact: 6,242 sqm.
			
Financial	• High cost due to potential culvert extension.	• Mid-high cost due to property impacts.	• Mid-high cost due to property impacts.
			
Engineering - Transportation	• Intersection skew angle: 69.3 degrees.	• Intersection skew angle: 69.3 degrees.	• Improved intersection skew angle: 71.3 degrees.
			
Engineering - Other	• An extension of existing culvert couth of Highway 8 may be required.	• Culvert extension may not be required.	• Culvert extension may not be required.
			
Preferred Alternative: Alternative 3 (Shifting 4 m to the West and Shifting to the South).			

Legend:	Least Preferred	More Preferred	Most Preferred
Colour			

5.4.2 PREFERRED INTERSECTION ALTERNATIVE

The preferred alternative alignment for Fifty Road and the Highway 8 intersection is Alternative 3 because it would:

- Improve the intersection skew angle slightly to 71.3 degrees vs 69.3 degrees for alternatives 1 and 2, bringing it within the range of acceptable intersection skew limits as defined in the Transportation Association of Canada Geometric Design Guidelines.
- Potentially does not affect the existing culvert on Fifty Road south approach, i.e. no modification may be necessary.
- Require less property acquisition to implement compared to alternatives 1 and 2.

Given the relatively good performance of the intersection under existing conditions and only modest improvement being demonstrated with the preferred alignment, implementation of the preferred intersection configuration should be re-investigated at the time of detail design to confirm impacts and measure them against the cost to implement. That is, the impact of changes to the creek, culverts, trees, property, and cost should be reassessed at the detailed design stage against leaving the configuration the same as existing.

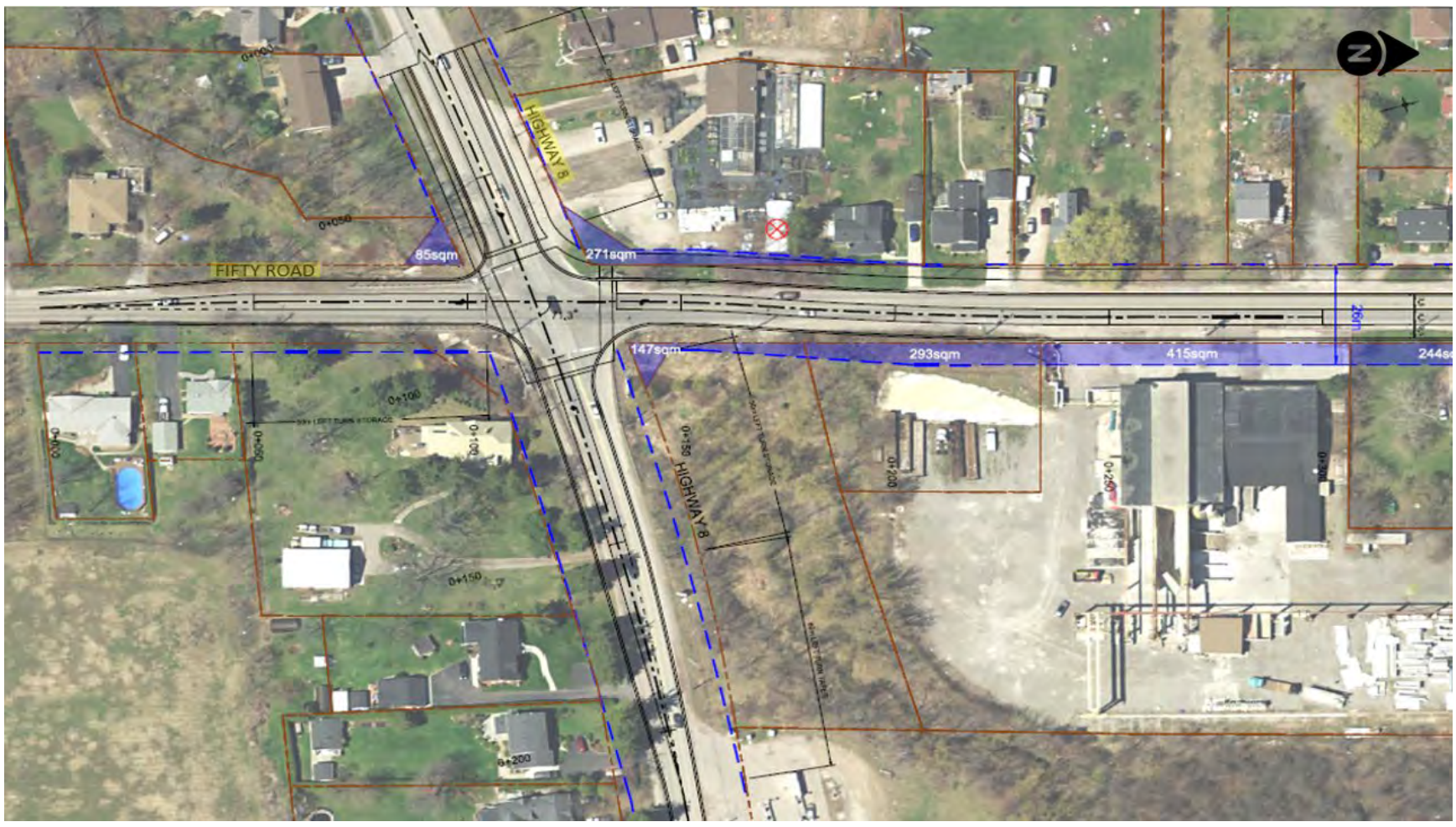


Figure 5-3. Fifty Road / Highway 8 Intersection Preferred Alternative

5.5 CN RAIL CROSSING ALTERNATIVES

This section focuses on the evaluation of planning alternatives for the CN Rail crossing at Fifty Road, a key constraint in the local transportation network. Drawing on feedback from the public and technical stakeholders, the study assessed the potential for grade separation to enhance safety and reduce delays at the existing at-grade rail crossing. The evaluation considered current and projected traffic and train volumes using the road exposure index methodology, as well as engineering, environmental, and social impacts. Multiple alternatives, including overpass and underpass options, were assessed to determine feasibility and alignment with future transportation and development needs.

The Stoney Creek Urban Boundary Expansion Transportation Master Plan (SCUBE TMP 2008) identified constraints to north-south traffic flows caused by the east-west CN Rail corridor in the area.

While there are other at-grade CN Rail crossings west of Fruitland Road, Fifty Road is also connected to the QEW. The traffic flows to and from QEW and the CN Rail crossing form a point of delays and frustration to road users.

The need for enhanced protection at the rail crossing was assessed based on the “road exposure index,” which is calculated as the cross product of the number of trains and the Annual Average Daily Traffic (AADT). An index value of over 200,000 is a primary indicator that a grade separation should be considered. Based on existing and forecasted road traffic volumes, a grade separation is not required, but should be considered in the future subject to a more detailed safety assessment with consideration of the potential increase in the number of trains over time.

Table 5.1 and Figure 5.1 in the Transportation and Traffic Analysis Report (**Appendix D**) shows that under a scenario with the minimum number of trains (13 per day), the cross-product threshold is expected to be exceeded around 2029. For the maximum train scenario (24 per day), the threshold was expected to be reached by 2019.

Table 5.7 presents the evaluation of alternatives for the rail crossing.

Table 5-7. CN Rail Crossing Evaluation (Phase 2 – Assessment of Alternative Planning Solutions).

CATEGORY AND CRITERIA	ALTERNATIVE 1: DO NOTHING	ALTERNATIVE 2: GRADE SEPARATION – UNDERPASS	ALTERNATIVE 3: GRADE SEPARATION – OVERPASS
Natural Environment	• No Change	• Potential impacts to SAR habitat	• Potential impacts to SAR habitat
			
Social Environment	• No Change	• No change	• Potential visual impacts to nearby residences
			
Transportation	• Traffic safety would remain a concern • Impact associated with increased traffic not addressed	• Improved traffic conditions (safety and operations)	• Improved traffic conditions (safety and operations)
			
Capital Cost	• No capital cost	• Incurs capital cost for excavation and road reconstruction • Stormwater systems for an underpass would incur higher cost than at-grade and over-pass • A track diversion must be constructed for the same number of tracks and with the same design speed as the existing tracks.	• Incurs capital cost excavation, road reconstruction and overpass structure and reconstruction of rail line to accommodate clearance requirements and accommodate grade changes • Gravity-fed solutions for stormwater management
			
Technical Considerations	• No construction • No upgrading of existing infrastructure	• Lower clearance requirement (5.3 m above a railway) • Improved air quality and lower noise nuisance due to reduction of idling at rail crossing	• Higher clearance requirement (7.0 m above a railway) • Improved air quality and lower noise nuisance due to reduction of idling at rail crossing
			
Transportation Plans and Policies	• No recommended improvements for crossing. City of Hamilton Transportation Master Plan recommends strategic assessments of future grade separation candidate locations and estimated cost	• Improvements would address transportation plans and policies. City of Hamilton Transportation Master recommends strategic assessments of future grade separation candidate locations and estimated cost	• Improvements would address transportation plans and policies. City of Hamilton Transportation Master Plan recommends strategic assessments of future grade separation candidate locations and estimated cost
			
• **Preferred Alternative: Alternative 2: Grade Separation – Underpass**			

Legend:	Not Feasible	⟷	Most Preferred
Colour			

5.5.1 RAIL PREFERRED PLANNING SOLUTION

The warrants calculation which determines need for a Grade Separation does not require the determination of causality, e.g., whether it is the vehicular or train traffic which would drive the change, but rather it is determined as a cross-product of the interaction between the two streams and when it would require separation. In the case of this CN Rail crossing, it is caused by both increase in train and vehicular traffic.

The preferred planning solution for the CN Rail crossing is Alternative 2 – Grade Separation – Underpass due to a future potential cross-product of vehicular and train traffic.

The current Study identifies the future ROW to accommodate an overpass or an underpass for a grade separation and to evaluate if it is warranted in the future. Subsequent Phases 3 & 4 will further review the need in a separate Class EA process and a future study will be required to determine the cost of a grade separation.

The geotechnical investigation program for the potential future grade separation between Fifty Road and CNR tracks consisted of one (1) borehole (BH 49) to obtain subsurface conditions. Based on the existing site condition, road widening will generally involve fill sections along the investigation limits, with slope heights less than 1 m. The embankment required for road widening should be constructed with compacted engineered fill at 2H:1V (or flatter) side slopes

5.6 BARTON STREET CROSS-SECTION ALTERNATIVES

Cross-section alternatives for Barton Street can be found in **Appendix N**.

5.6.1 INFRASTRUCTURE REQUIREMENTS

CLEAR ZONE

Based on design speed and anticipated Annual Average Daily Traffic (AADT), the clear zone width for Barton Street is calculated to be 5.0 m. The clear zone is an unobstructed, traversable roadside area that allows a driver to stop safely or regain control of a vehicle that has left the roadway. A clear zone recommendation for a speed limit of 60 km/hr* is at a minimum 4.5-5.0 m. The clear zone is measured from the edge of the travel lane and includes paved or unpaved shoulders, bike lanes, shoulder rounding, recoverable (firm surfaces) or non-recoverable slopes (falling slope), traversable features, and/or a clear runout area. The border may be located on the outside of the road or within the median. Table 5.7 shows a clear zone of 5.0 m calculated for the estimated average daily traffic for Barton Street. For AADT of 6,000 or greater, a 5.0 m minimum clear zone is required (MTO Roadside Design Manual, 2017). Slope was also considered. A foreslope of 1V:6H or less may have a minimum clear zone of 5.0 m.

Table 5-8. Clear Zone Width - Barton Street (Table 2.2.1 MTO Roadside Safety Manual)

DESIGN SPEED	PM PEAK HOUR TRAFFIC VOLUMES (PHT, 2031)	# OF LANES PER DIRECTION	AADT (CALCULATED ASPHT/K, K=0.09)	CLEAR ZONE WIDTH
80 km/h	Avg. of 720 (EB) Avg. of 450 (WB)	1	~ 8000 vehicles/day ~ 5000 vehicles/day	AADT>= 6000, CZ = 5 m

VEHICULAR LANES

A four (4) lane and one (1) center turning lane/planted median where feasible cross-section is recommended for this roadway. City standards for through lanes were originally considered to be between 3.50 m and 3.75 m wide, while auxiliary lanes should be 3.50 m wide. Wider lane widths do not support the City's desire to reduce operating speeds along this roadway. The Transportation Association of Canada's *Geometric Design Guide for Canadian Roads* (2017) recommends the use of narrowed lane widths to promote reductions in operating speeds. Consequently, to encourage reduced operating speeds on Barton Street, lane widths as per City standards is 3.30 m (curb lanes) and 3.0 m (inside lanes) are recommended. Barton Street up to Lewis Road is a truck route and 3.50 m lanes exceed standards for truck route lane widths.

The narrower lane widths have been amended to as shown in the final cross-sections and are consistent with the above-mentioned Canadian study, and the City of Hamilton's Complete Streets Guidelines (2023).

The SCUBE TMP recommended widening of Highway 8 to 4 lanes and an upgrade to Barton Street to include a continuous centre turn lane. A feasibility study as part of also the ongoing Highway 8 Class EA indicated that Highway 8 may not need the originally proposed 4 lanes of traffic along its entire corridor. A screen-line analysis was undertaken across the Barton/Highway 8 corridors which illustrated improved level of service overall with 4 lanes on Barton Street. Changes to vehicular lane requirements because of the analysis resulted in the following:

- Barton Street – 4 lanes with a continuous centre turn lane.
- Highway 8 – 4 lanes from Dewitt Road to McNeilly Road; 2 lanes east of McNeilly Road to the east City limits.

BOULEVARDS

Boulevards on Barton Street are designed to accommodate landscaping, transit stops, utility infrastructure (poles, cabinets, etc.) and snow storage. The boulevards also offer a buffer between vehicle lanes and pedestrian facilities.

To accommodate landscaping, trees require 2.0 m minimum width with a soft surface width of at least 1.75 m for utility poles and signage. Accessible transit stops must have a landing pad connected to the sidewalk to accommodate mobility device users. The dimensions should be a minimum of 2.5 m wide and 9.0 m in length. To facilitate snow storage, a minimum area of 1.5 m should be provided where feasible. This can be accommodated by utilizing curbs / buffers as well as increasing the width of boulevards to accommodate snow storage.

ACTIVE TRANSPORTATION

Pedestrian Facilities

The need for high quality pedestrian facilities along Barton Street was identified in the SCUBE TMP and Fruitland-Winona Secondary Plan and reiterated during public consultation in this Study. The Complete Street Design Guidelines Manual identifies Transitioning Avenues as requiring 1.8-2.5 m walkability zone-width. The Fruitland-Winona Secondary Plan approved a 4.0 m wide pedestrian Promenade on the south side of Barton Street, to be located within a linear greenspace. There will also be a 2.5 m sidewalk along the north side of Barton Street.

Cycling Facilities

Cycling facility types and standards recommended for this study was referenced from MTO's OTM Book 18. Table 5.8 provides a summary of the evaluation used to determine appropriate cycling infrastructure types for Barton Street at full build out

Table 5-9. Evaluation of Suitable Cycling Facility Types for Barton Street

EVALUATION CRITERIA			SUITABLE CYCLING FACILITY TYPE(S)			
			SHARED LANES	NON_BUFFERED CYCLE LANES	BUFFERED CYCLE LANES	CYCLE TRACK OR MUP
Secondary Plan Recommendation			**No**	**Yes**	**Yes**	**Yes**
OTM Book 18 Recommendation Based On:						
Figure 3.3. Direct Routing of Cycling Facilities within an Existing Network	Estimated AADT	8,000	Not an appropriate facility types for design speed of 80 km/h.	Not a desirable facility types for an 80 km/h design speed. Use only where space for higher order facilities is not available.	Preferred facility types for higher design speeds.	Preferred facility types for higher design speeds.
	Design Speed km/h	80				
Roadway Function	Mobility (Arterial)		Not an appropriate facility types for arterial roadways which are meant to facilitate movement of people and vehicles.	Non-buffered lanes allow vehicles and cyclists to have their own space. However, not all age and abilities of cyclists may not feel comfortable near faster moving vehicles.	Preferred facility types due to clearly designated operating spaces and physical separation between vehicular and cyclist facilities.	Preferred facility types due to clearly designated operating spaces and physical separation between vehicular and cyclist facilities.

EVALUATION CRITERIA		SUITABLE CYCLING FACILITY TYPE(S)			
		SHARED LANES	NON_BUFFERED CYCLE LANES	BUFFERED CYCLE LANES	CYCLE TRACK OR MUP
Vehicle Mix	Heavy Trucks Future Transit	Adequate separation is not provided between heavy vehicles and cyclists.	Wide lanes would be required to provide rider safety and comfort. Clear marking needed near transit stops.	Would provide increased rider safety. Clear marking needed near transit stops.	Most suitable option for corridors where high truck volumes are anticipated due to physical separation of the facility from the roadway.
Available Space	More than adequate for any facility type.	Higher order facility recommended as space is available.	Appropriate facility type.	Appropriate facility type.	Appropriate facility type.
Anticipated Users	All ages and abilities	May not be appropriate for all ages and abilities.	Appropriate for all ages and abilities.	Appropriate for all ages and abilities.	MUP may not be preferred by all cyclist commuters because of potential conflicts with pedestrians. Cycle track recommended.
Anticipated Cycle Volumes	Potential for high cycle volumes following build-out.	Inadequate space for higher cyclist volumes.	Wide cycle lanes required for higher volumes.	Wide cycle lanes required for higher volumes.	MUP may not be preferred by all cyclist commuters because of potential conflicts with

EVALUATION CRITERIA		SUITABLE CYCLING FACILITY TYPE(S)			
		SHARED LANES	NON_BUFFERED CYCLE LANES	BUFFERED CYCLE LANES	CYCLE TRACK OR MUP
					pedestrians. Cycle track recommended
Route Function	Access & Connection	Does not encourage use by riders of all ages and abilities.	Encourages use by riders of all ages and abilities.	Encourages use by riders of all ages and abilities.	Encourages use by riders of all ages and abilities.
On-Street Parking	Not permitted on arterial roadways	Any facility type would be appropriate for roadways where on-street parking is not permitted.			
Other considerations		• City-wide desire to increase modal split and encourage healthy, active lifestyles is best supported by higher-order cycling facilities including buffered cycle lanes, MUP and/or cycle track. • Combination of high pedestrian and cyclist volumes would not be compatible with provision of shared facilities (i.e., MUP)			
Recommended Cycling Facility Type(s)		• **MUP recommended for the Interim Scenario.** • **Cycle track recommended for the Ultimate Scenario.**			
Legend		**Least Preferred**	**More Preferred**	**Most Preferred**	

5.6.2 EVALUATION OF ALTERNATIVES

Short List Selection of Alternatives

Fruitland-Winona Secondary Plan recommended that the LRT B-line continue from Highway 8 North through future Gordon Dean Avenue (between Fruitland Road and Jones Road) to Barton Street. The light rail rapid transit location that would be consistent with the remainder of the proposed LRT line in the B-line would be located in the dedicated center lanes. However, it is more likely that the transit line at full buildout will be in the form of bus transit only, as opposed to rail due to lesser anticipated ridership than in the rest of the B-line. Therefore, two (2) alternatives were removed from the short list evaluation as they had been designed to accommodate transit in the centre lane. The remaining three alternatives were altered to include four (4) lanes of vehicle traffic, as opposed to two (2) with two (2) transit lanes. Cross-sections were designed for the remaining three (3) alternatives and carried forward for further evaluation. All alternatives incorporated pedestrian and cycling facilities and were evaluated based on the suitability of active transportation facilities for all ages and abilities as well as ease and safety of all transportation modes. Alternative sections are summarized in Table 5.9. Evaluation of the alternative cross-sections is provided in Table 5.10.

Table 5-10. Cross-Section Alternatives for Barton Street.

CROSS-SECTION DETAILS		ALTERNATIVE #		
		1	**2**	**3**
		36.6m interim & 40.6m ultimate width, 4 lanes, north sidewalk, 4.0m south Promenade	36.6m interim & 40.6m ultimate width, 4 lanes, north sidewalk, 4.0m south Promenade	36.6m interim & 40.6m ultimate width, 4 lanes, north sidewalk, 3.0m south Promenade
Interim ROW Width (m)		36.6		
Ultimate ROW Width (m)		40.6		
Interim # of Lanes		3	3	4
Ultimate # of Lanes		4	4	4
Median Width (m), including curbs		None	5.0 (ultimate)	4.0 (Interim & Ultimate)
Two-Way-Left Turn Lane or Median Width Including Curbs (m)		4.0 (Interim)	5.0 (Ultimate)	4.0 (Interim & Ultimate)
MUP, Including Buffers (m)		None	None	3.0
Boulevard Width, m	Interim, North Side	5.0	5.0	3.0
	Ultimate, North Side	5.0	1.5	3.0
	Interim, South Side	Up to 5.6	Up to 5.6	Up to 8.1
	Ultimate, South Side	Up to 8.0	Up to 5.5	Up to 8.5
	Interim Total South Side	14.1	11.6	17.1
	Ultimate Total South Side	17.0	11.5	16.0
Sidewalk Width, North (m)		*2.0*	*2.0*	*1.5*
Promenade Width, South (m)		*4.0*	*4.0*	*3.0*

Table 5-11. Evaluation of Cross-Section Alternatives for Barton Street

DESIGN OBJECTIVES	DESCRIPTION OF OBJECTIVE MET BY CROSS-SECTION ALTERNATIVES					
	ALTERNATIVE 1 -		ALTERNATIVE 2		ALTERNATIVE 3	
	Interim: Sidewalk (north side) Two travel lanes Centre turn lane Parking lane (south side) Cycle track (south side) Promenade (south side)	Ultimate: Sidewalk (north side) Four travel lanes Cycle track (south side) Promenade (south side)	Interim: Sidewalk (north side) Two travel lanes Centre turn lane Bike lanes (on-street both sides) Promenade (south side)	Ultimate: Sidewalk (north side) Four travel lanes Bike lanes (on-street both sides) Promenade (south side)	Interim: Sidewalk (north side) Four travel lanes Centre turn lane Multi-use pathway (south side)	Ultimate: Sidewalk (north side) Four travel lanes Centre turn lane Cycle track (south side) Promenade (south side)
Meets or Exceeds City Standards	• The parking lane (interim) could be used as a passing/through lane in the ultimate alternative.		• Two-way-left-turn lane would be wider than standard, may encourage excessive speeds.		• Meets City standards.	
						
Operations considerations for left and right turning vehicles in the ultimate condition	• Centre turn lane would be provided in interim scenario. No special consideration for left turning vehicles in ultimate design.		• No special consideration for left turning vehicles in ultimate scenario. Vehicles turning right would have to be aware of on-street cyclists.		• Centre turn lane would be provided in interim and ultimate scenario.	
						
Meets Pedestrian Needs	No difference between alternatives. Similar higher-order pedestrian facilities would be provided in all alternatives.					
Meets Cyclist Needs	• Would not provide cycling connectivity on north side of the roadway where employment and one (1) of the elementary schools are located. • Consideration would be given to converting the north sidewalk to a MUP to accommodate cyclists.		• Provides cycling facilities on both sides of Barton Street, however on-road facilities would not provide physical separation from the vehicle lanes to better avoid intra-vehicle conflict.		• Would not provide cycling connectivity on north side of the roadway where employment and one (1) of the elementary schools are located (localized improvements to be considered). • MUP would be provided on south side in interim and ultimate scenario. Buffered cycle track would be provided in the ultimate scenario.	
						
Natural Environment	No significant difference between alternatives.					
Socio-economic Environment	No significant difference between alternatives.					
Cultural / Archaeological Environment	No significant difference between alternatives.					
Compatible with Adjacent Land Uses (Current and Future)	No significant difference between alternatives.					

DESIGN OBJECTIVES	DESCRIPTION OF OBJECTIVE MET BY CROSS-SECTION ALTERNATIVES		
	ALTERNATIVE 1 -	ALTERNATIVE 2	ALTERNATIVE 3
Provides adequate width for utilities outside of clear zone	No significant difference between alternatives.		
Provides adequate width for linear greenspace on south side	• Would provide the greatest width for the south side linear greenspace away from intersections, where the available width would be reduced by at least half the width of the auxiliary lane (3.5 m) in the ultimate condition.	• Would provide significant width for the south side linear greenspace, with available width for auxiliary lanes provided within the median.	• Would provides significant width for the south side linear greenspace, with available width for auxiliary lanes provided within the median.
Construction Impacts	• Significant construction impacts at the interim stage. • Minor restriping at the ultimate stage.	• Significant construction impacts at the interim stage. • Further impacts at the ultimate stage (addition of median).	• Significant construction impacts at the interim stage. • Minor construction impacts at the ultimate stage (addition of cycle track on south side).
High level implementation cost for ultimate condition (not including auxiliary lanes)	$3,600/m x 5,100 m length $18,400,000 total for corridor	$4,000/m x 5,100 m length $20,400,000 total for corridor	$3,800/m x 5,200 m length $19,400,000 for corridor
			
Preferred Alternative: Alternative 3			

Legend:	**Not Feasible**					**Most Preferred**
Colour						

5.6.3 PREFERRED BARTON STREET CROSS-SECTION

The preferred cross-section for Barton Street is Alternative 3. The option includes a ROW of 36.6 m with a 2.0 m sidewalk on the north side, four (4) travel lanes plus a centre turn lane, 3.0 m boulevard on both north and south sides, and a meandering 4.0 m multi-use path on the south side representing the Promenade approved in the Secondary Plan.

The preferred cross section is consistent with the Complete Street Guidelines Design Manual.

The linear greenspace on the south side of Barton Street will separate the residential land use on the south side and the commercial / industrial land use on the north side. It will function as a buffer to help reduce potential traffic noise impacts on residential properties and will likely vary in length (meander).

5.7 FIFTY ROAD CROSS-SECTION ALTERNATIVES

Cross-section alternatives for Fifty Road can be found in **Appendix N**.

5.7.1 INFRASTRUCTURE REQUIREMENTS

Clear Zone

Based on design speed and anticipated annual average daily traffic (AADT), clear zone width for Barton Street is calculated to be 5.0 m. The clear zone is an unobstructed, traversable roadside area that allows a driver to stop safely or regain control of a vehicle that has left the roadway. A clear zone recommendation for a speed limit of 60 km/hr is at a minimum 4.5 -5.0 m. The clear zone is measured from the edge of the travel lane and includes paved or unpaved shoulders, bike lanes, shoulder rounding, recoverable (firm surfaces) or non-recoverable slopes (falling slope), traversable features, and/or a clear runout area. The border may be located on the outside of the road or within the median. Table 5.9 shows a clear zone of 5.0 m calculated for the estimated average daily traffic for Barton Street. For AADT of 6,000 or greater, a 5.0 m minimum clear zone required (MTO Roadside Design Manual, 2017). Slope was also considered. A foreslope of 1V:6H or less may have a minimum clear zone of 5.0 m.

Table 5-12. Clear Zone Width - Fifty Road (Table 2.2.1 MTO Roadside Safety Manual)

DESIGN SPEED	PM PEAK HOUR TRAFFIC VOLUMES (PHT, 2031)	# OF LANES PER DIRECTION	AADT (CALCULATED ASPHT/K, K=0.09)	CLEAR ZONE WIDTH
80 km/h	Avg. of 600 (NB) Avg. of 650 (SB)	1	~ 6700 veh/day ~ 7200 veh/day	AADT>= 6000, CZ = 5 m

VEHICULAR LANES

The traffic analysis completed as part of this study did not recommend widening Fifty Road. City standards for through lanes should be between 3.50 m and 3.75 m wide, while auxiliary lanes should be 3.50 m wide. Wider lane widths do not support the City's desire to reduce operating speeds along this roadway. The Transportation Association of Canada's *Geometric Design Guide for Canadian Roads* (2017) recommends the use of narrowed lane widths to promote reductions in operating speeds. Consequently, to encourage reduced operating speeds on, lane widths as per City standards is 3.50 m are recommended. Truck routes are designated on Fifty Road and Highway 8. As a truck route, lane widths exceed the minimum standard of 3.3 m.

BOULEVARDS

Boulevards on Fifty Road are designed to accommodate landscaping, transit stops, utility infrastructure (poles, cabinets, etc.) and snow storage. The boulevards also offer a buffer between vehicle lanes and pedestrian facilities.

To accommodate landscaping, trees require 2.0 m minimum width with a soft surface width of at least 1.75 m. for utility poles and signage, a minimum of 1.0 m wide area is required when located next to cycling facilities. Accessible transit stops must have a landing pad connected to the sidewalk to accommodate mobility device users. The dimensions should be a minimum of 2.5 m wide and 9.0 m in length. To facilitate snow storage, a minimum area of 1.5 m will be provided where feasible. This can be accommodated by utilizing curbs / buffers as well as increasing the width of boulevards, to accommodate snow storage where feasible.

ACTIVE TRANSPORTATION

Pedestrian Facilities

The need for high quality, continuous, pedestrian facilities along Fifty Road was identified in the SCUBE TMP and Fruitland-Winona Secondary Plan, and reiterated during public consultation completed as part of the current Class EA. As a starting point, the City's sidewalk standards for major are a minimum 1.5 m wide facilities on both sides of the roadway (City of Hamilton, Comprehensive Development Guidelines).

Cycling Facilities

Cycling facility types and standards recommended for this study was referenced from MTO's OTM Book 18. **Table 5-13** provides a summary of the evaluation used to determine appropriate cycling infrastructure types of Fifty Road at full build out.

Table 5-13. Evaluation of Suitable Cycling Facility Types for Fifty Road

EVALUATION CRITERIA			SUITABLE CYCLING FACILITY TYPE(S)			
			SHARED LANES	EXCLUSIVE CYCLE LANES	BUFFERED CYCLE LANES	CYCLE TRACK OR MUP
Secondary Plan Recommendation			No	No	No	Yes
OTM Book 18 Recommendation Based On:						
Figure 3.3 – Direct Routing of Cycling Facilities within an Existing Road Network	Estimated AADT	7,200	Not an appropriate facility type for design speed of 80 km/h.	Not a desirable facility type for an 80 km/h design speed. Use only where space for higher order facilities is not available.	Preferred facility type for higher design speeds.	Preferred facility type for higher design speeds.
	Design Speed	80 km/hr				
Roadway Function	Mobility (Arterial)		Not an appropriate facility type for arterial roadways which are meant to facilitate movement of people and vehicles.	Exclusive lanes allow vehicles and cyclists to have their own space. However, cyclists may not feel comfortable near faster moving vehicles.	Preferred facility types due to clearly designated operating spaces and physical separation between vehicular and cyclist facilities.	Preferred facility types due to clearly designated operating spaces and physical separation between vehicular and cyclist facilities.
Vehicle Mix	Heavy Trucks Future Transit		Adequate separation is not provided between heavy vehicles and cyclists.	Wide lanes would be required to provide rider safety and comfort. Clear marking needed near transit stops.	Would provide increased rider safety. Clear marking needed near transit stops.	Most suitable option for corridors where high truck volumes are anticipated due to physical separation of the facility from the roadway.

EVALUATION CRITERIA		SUITABLE CYCLING FACILITY TYPE(S)			
		SHARED LANES	EXCLUSIVE CYCLE LANES	BUFFERED CYCLE LANES	CYCLE TRACK OR MUP
Available Space	More than adequate for any facility type.	Higher order facility recommended as space is available.	Appropriate facility type.	Appropriate facility type.	Appropriate facility type.
Anticipated Users	All ages and abilities	Not appropriate for riders of all ages and abilities.	Appropriate for riders of all ages and abilities.	Appropriate for riders of all ages and abilities.	MUP less preferred by commuters. Cycle track recommended.
Anticipated Cycle Volumes	Potential for high cycle volumes following build-out.	Inadequate space for higher cyclist volumes.	Wide cycle lanes required for higher volumes.	Wide cycle lanes required for higher volumes.	MUP less preferred due to potential conflicts with pedestrians. Cycle track recommended.
Route Function	Access & Connection	Does not encourage use by riders of all ages and abilities.	Encourages use by riders of all ages and abilities.	Encourages use by riders of all ages and abilities	Encourages use by riders of all ages and abilities
On-Street Parking	Not permitted on arterial roadways	Any facility type would be appropriate for roadways where on-street parking is not permitted.			
Other considerations		• City-wide desire to increase modal split and encourage healthy, active lifestyles is best supported by higher-order cycling facilities including buffered cycle lanes, MUP and/or cycle track. • Combination of high pedestrian and cyclist volumes would not be compatible with provision of shared facilities (i.e., MUP).			
Recommended Cycling Facility Type(s)		*Multi-Use Path*			
Legend		Least Preferred	More Preferred	Most Preferred	

5.7.2 EVALUATION OF ALTERNATIVES

Short List Evaluation of Alternatives

Two (2) alternatives were removed from the short list evaluation as they had been designed to accommodate transit in a centre lane. The remaining three alternatives were altered to have four (4) lanes of vehicle traffic, as opposed to two (2) with two (2) transit lanes. Cross-sections were designed for the remaining three (3) alternatives and carried forward for further evaluation. All alternatives incorporated pedestrian and

cycling facilities and were evaluated based on the suitability of active transportation facilities for all ages and abilities as well as ease and safety of all transportation modes. Alternative sections are summarized in Table 5.13. Evaluation of the alternative cross-sections is provided in Table 5.14.

Table 5-14. Alternative Cross-Sections for Fifty Road

CROSS-SECTION DETAILS	ALTERNATIVE #		
	1	2	3
	36m ROW; sidewalks and cycle tracks on both sides	36m ROW; sidewalks on both sides; cycling on Fifty Road	30m and 26m ROW; MUP west side and swale on east side
ROW Width (m)	36.0	36.0	30.0 – North 26.0 - South
Ultimate # of Lanes (north of Barton Street)	4	4	4 – North 3 – South
Two-Way-Left Turn Lane or Median Width Including Curbs (m)	None	5.0 (median)	None – North 4.0 – South (Two-Way-Left-Turn)
Through-Lane Width (m)	3.0	3.0	3.5
Cycle Lane Width in Each Direction, Including Buffers (m)	1.5 (Cycle Track)	2.0 (On-Street)	None – North 3.0 – South (MUP)
Total Boulevard (m)	7.0	7.0	3.5
Sidewalk Width (m)	2.0		

Table 5-15. Evaluation of Alternative Cross-Sections for Fifty Road

DESIGN OBJECTIVES	DESCRIPTION OF OBJECTIVE MET BY CROSS-SECTION ALTERNATIVES			
	ALTERNATIVE 1:	ALTERNATIVE 2:	ALTERNATIVE 3:	
	Sidewalk (both sides) Cycle track (both sides) Four through lanes	Sidewalk (both sides) Bike lane (on-street both sides) Four through lanes • Median	North of Barton Street: Multi-use pathway (west side) Four travel lanes Low Impact Development (east side)	South of Barton Street: Multi-use pathway (west side) Two travel lanes Centre turn lane Low Impact Development (east side)
Meets or Exceeds City Standards	Meets City standards.			
Operations considerations for left and right turning vehicles in the ultimate condition	• No special consideration for left turning vehicles.	• No special consideration for left turning vehicles.	• Centre turn lane provided south of Barton Street into residential/commercial properties.	
Meets Pedestrian Needs	• Sidewalks on both sides of roadway (minimal benefit on east side).	• Sidewalks on both sides of roadway (minimal benefit on east side).	• MUP provided on the west side (servicing adjacent residential development and commercial area off South Service Road).	
Meets Cyclist Needs	• Cycle track on both sides of roadway.	• Provides cycling facilities on Fifty Road, however on-road facilities are not favoured for inexperienced riders and does not provide physical separation to minimize intra-vehicle and cyclist conflict.	• MUP provided on the west side (servicing adjacent residential development and commercial area off South Service Road).	
Natural Environment	• No special provisions for natural environment.	• No special provisions for natural environment.	• LID (swale) proposed for east side of roadway.	
Socio-economic Environment	No significant difference between alternatives.			
Cultural / Archaeological Environment	No significant difference between alternatives.			
Compatible with Adjacent Land Uses (Current and Future)	No significant difference between alternatives.			
Provides adequate width for utilities outside of clear zone	No significant difference between alternatives.			
High level implementation cost for ultimate condition (not including auxiliary lanes)	$4,300/m x 820m length $3,500,000 for corridor total	$4,500/m x 820m length $3,700,000 for corridor total	$3,800/m x 820m length $3,100,000 for corridor total	
Preferred Alternative: Alternative 3				

Legend:	Not Feasible	⟷	Most Preferred
Colour			

5.7.3 PREFERRED FIFTY ROAD CROSS-SECTION

The preferred cross-section for Fifty Road is Alternative 3. The option includes a ROW of 30.0 m north of Barton and a 26.2 m ROW south of Barton, four (4) vehicle lanes north of Barton and three (3) vehicle lanes south of Barton, a 3.5 m through-lane, a 3.0 m multi-use trail, and a 3.5m boulevard.

Fifty Road North of Barton Street:

- Considers the existing truck route by providing lane widths that exceed City of Hamilton standards.
- Minimizing impacts to Fifty Creek and the profile and existing culverts under Fifty Road and Highway 8 will be designed to mitigate flood risks.
- Four (4) lanes north of Barton Street support future Rapid Transit from Barton Street to future Transit Hub.
- Incorporates stormwater management features (LID - swale) accommodating road run-off from both sides of the road.

Fifty Road South of Barton Street:

- Centre turn lane provides for easier access to residential / commercial properties.
- Incorporates stormwater management features on east side of Fifty Road (LID - swale).

6

6 BARTON STREET AND FIFTY ROAD RECOMMENDED DESIGN

This section outlines the recommended designs for Barton Street and Fifty Road as determined through this Class EA process. It explains how the Preferred Alternatives align with the City's planning goals, transportation needs, and community feedback. The section includes designs, visual illustrations of the proposed changes, and discussions of potential impacts. Mitigation measures and long-term commitments are also identified to ensure the proposed designs minimize adverse effects on the community and environment.

6.1 REFINEMENTS TO THE BARTON STREET RECOMMENDED DESIGN

In response to community feedback, refinements were made to the preferred alternative for the Barton Street cross-section following PIC #1. These refinements include:

- **Reduced property requirements**. The updated recommended design for Barton Street has reduced the required right-of-way width by 4 metres by including the Promenade within a 36.6-metre road corridor (instead of 40.6m per Fruitland-Winona Secondary Plan recommendation). This is considered a minor change as it related to official plan policy but is a significant change for the community because it will result in significantly less properties requiring a full buy-out (reduced from 68 to 14) with a corresponding reduction in cost to implement.

- **Development of an interim three-lane design to be implemented on Barton Street from Lewis Road to Fifty Road.** The 3-lane design concept will meet the needs of the corridor as the area develops and maintain improved local access for residents and businesses and should not negatively impact planned transit service expansion in the corridor. The timing to implement the widening to 5 lanes will be driven by the growth in traffic. Of significance, the delay in widening of the road to its ultimate configuration will allow property owners in the area some time to adjust as the area transitions from one that is generally rural to one that is urban.

- **Increased Pervious Area in the Corridor.** By applying a Complete Streets design lens to the preferred alternative, the recommended design concept reflects changes to the design that have resulted in more impervious area within the corridor (i.e. less hard surface). Changes include reducing the width of the travel lanes, replacing the cycle-track and sidewalk, and combining the functions into a multi-use path which also functions as the Promenade.

6.2 DESIGN CRITERIA

The recommended design criteria for Barton Street and Fifty Road are outlined in Table 6.1 and Table 6.2 respectively. The criteria are based on the Transportation Association of Canada Geometric Design Guide for Canadian Roads (2017) and Hamilton's Complete Streets Design Manual (2022).

6.3 PRELIMINARY DESIGN

Preliminary design drawings (Preliminary Design Plates) for both Barton Street and Fifty Road are included in **Appendix M**.

6.3.1 HORIZONTAL ALIGNMENT

For Barton Street, the road allowance for the recommended horizontal alignment generally follows that of what has been contemplated through land dedications since prior to amalgamation (prior to 2001) but has been optimized in the area of McNeilly Road and Lewis Road to achieve proper horizontal curvature necessary for the travelled portion of the road. The curves in the roads transitioning through these intersections are back-to-back, but generally flat to provide a comfortable navigation and safe operation of motor vehicles.

For Fifty Road, the alignment is straight other than at the north leg of the intersection with Highway 8 where modest improvements to the intersection will results in a slight curve to achieve a better skew ant the intersection.

6.3.2 VERTICAL ALIGNMENT

For Barton Street, the natural topography of the area is generally flat, with the gradient rising from west to east. The vertical alignment for Barton Street has been designed to follow the existing gradient, while maintaining a minimum 0.5% slope.

For Fifty Road, the road grade ranges from 0.5% to 4.5%, rising from Highway 8 to Barton Street and then descending from Barton Street to the South Service Road. The vertical alignment for Fifty Road has been designed to generally follow the existing profile, while maintaining a minimum 0.5% grade.

Table 6-1. Design Criteria – Barton Street

CLASSIFICATION		EXISTING CONDITION	DESIGN STANDARDS	PROPOSED
GENERAL				
Road Classification		RAU 80 (Minor Arterial)	UAU 80 (Major Arterial)	UAU 80 (Major Arterial)
Posted Speed (km/h)		50 – 60 km/h	60 km/h	60 km/h
Design Speed (km/h)		70 – 80 km/h	80 km/h	80 km/h
Design Vehicle		Unknown	WB20.5	WB20.5
Normal Crown (-0.02 m/m) R_{min} (m)		-	2,130	2,130
Curve Radius with Superelev. R_{min} for e=0.04 (m)		-	280	280
Reverse Crown (+0.02 m/m) R_{min} for e = 0.04 (m)		-	400	400
Curve Radius with Superelev. R_{min} for e=0.06 (m)		-	250	250
Reverse Crown (+0.02 m/m) R_{min} for e=0.06 (m)		-	450	450
Stopping Sight Distance (m)		-	115 -152	150
Right Turn Taper		-	17:1 - 24:1	~17:1 (60 m)
Left Turn Taper		-	15:1 - 48:1	~15:1 (54 m)
Min. Left & Right Turn Parallel		-	15.0	15.0
Min. Tangent Length at Intersections (m)		-	20.0	20.0
Lane Widths (m)	Through Lane	3.00-3.65	3.00 – 3.75	3.00
	Left Turn Lane	3.30	3.30 – 3.50	3.30
	Right Turn Lane	-	3.30 – 3.50	3.50
	Curb Lane	-	3.30 – 3.75	3.30
	Two-Way-Left-Turn	-	4.50	4.00
	Cycling Lane	-	1.50 – 1.80	1.50
Min. Flush Median Width (m)		1.50	1.50 (Concrete) 5.00 (Planted)	1.50 (Concrete) 4.50 (Planted)
Boulevard Width (m)		-	1.50 (min)	1.50 (min)
Sidewalk Width (m)		1.20-2.00	1.50 - 2.00	1.8
MUP Width (m)		-	2.40 - 3.00	3.00
Promenade Width (m)		-	N/A	4.00
Tangent Section Cross Fall		Unknown	2%	2.0%
Sidewalk Cross Fall		Unknown	-	2.0%
Driveway Grades (max) Behind Sidewalk		Unknown	-	8.0%
Driveway Grades (max) B/W Curb and Sidewalk		Unknown	-	8.0%
Maximum Grade		Unknown	5%	5%
Minimum Grade		Unknown	0.5%	0.5%
Sag Vertical Curve K_{min}		Unknown	25 - 32	25
Crest Vertical Curve Kmin		Unknown	24 - 36	25
Layout				
Radius of Curbs at Intersections				
	Arterial to Local	12.0 m	11.0 m	12.0 m
	Arterial to Collector	15.0 m	14.0 m	15.0 m
	Arterial to Arterial	15.0 m	14.0 m	15.0 m
Minimum Daylighting Triangle		12 m x 12 m	12 m x 12 m	12 m x 12 m
ROW Width (m)		19.8 – 36.8	26 – 36	36.6m

Table 6-2. Design Criteria – Fifty Road

CLASSIFICATION		EXISTING CONDITION	DESIGN STANDARDS	PROPOSED
General				
Road Classification		RAU 80 (Major Arterial)	UAU 80 (Major Arterial)	UAU 80 (Major Arterial)
Posted Speed (km/h)		60 km/h	60 km/h	60 km/h
Design Speed (km/h)		80 km/h	80 km/h	80 km/h
Usage		Truck Route	N/A	Truck Route
Design Vehicle		Unknown	WB20.5	WB20.5
Normal Crown (-0.02 m/m) R_{min} (m)		-	2,130	2,130
Curve Radius with Superelev. R_{min} for e=0.04 (m)		-	280	280
Reverse Crown (+0.02 m/m) R_{min} for e = 0.04 (m)		-	400	400
Curve Radius with Superelev. R_{min} for e=0.06 (m)		-	250	250
Reverse Crown (+0.02 m/m) R_{min} for e=0.06 (m)		-	450	450
Stopping Sight Distance (m)		-	115 -152	150
Right Turn Taper		-	17:1 - 24:1	~24:1 (80 m)
Left Turn Taper		-	15:1 - 48:1	~24:1 (80 m)
Min. Left & Right Turn Parallel		-	15.0	15.0
Min. Tangent Length at Intersections (m)		-	20.0	20.0
Lane Widths (m)	Through Lane	2.90 – 3.65	3.00 – 3.75	3.00
	Left Turn Lane	-	3.30 – 3.50	3.30
	Right Turn Lane	-	3.30 – 3.50	3.50
	Curb Lane	-	3.30 – 3.75	3.30
	Two-Way-Left-Turn	-	4.50	4.00
Min. Flush Median Width (m)		-	1.50 (Concrete) 5.00 (Planted)	1.50 – 1.80
Boulevard Width (m)		-	1.5 (min)	1.5 (min)
Sidewalk Width (m)		-	1.50 - 2.00	N/A
MUP Width (m)		-	2.40 - 3.00	3.00
Tangent Section Cross Fall		Unknown	2%	2.0%
Sidewalk Cross Fall		Unknown	-	2.0%
Driveway Grades (max) Behind Sidewalk		Unknown	-	8.0%
Driveway Grades (max) B/W Curb and Sidewalk		Unknown	-	8.0%
Maximum Grade		Unknown	5%	5%
Minimum Grade		Unknown	0.5%	0.5%
Sag Vertical Curve K_{min}		Unknown	25 - 32	25
Crest Vertical Curve K_{min}		Unknown	24 - 36	25
Layout				
Radius of Curbs at Intersections				
	Arterial to Local	-	11.0 m	12.0 m
	Arterial to Collector	-	14.0 m	15.0 m
	Arterial to Arterial	9.0 m	14.0 m	15.0 m
Minimum Daylighting Triangle		12 m x 12 m	12 m x 12 m	12 m x 12 m
ROW Width (m)		20.0	26 – 36	26.2 - 30

6.3.3 INTERSECTION TREATMENTS

Barton Street - The following stop-controlled intersections are recommended to be signalized along Barton Street:

- Sunnyhurst Avenue / Future Gordon Dean Avenue
- Jones Road
- Glover Road
- McNeilly Road
- Lewis Road
- Winona Road
- Fifty Road

An existing T-intersection will be modified on Barton Street at Sunnyhurst Avenue. A new leg will be constructed on the south approach (Gordon Dean Avenue). Gordon Dean Avenue will have a four (4) lane cross-section with a northbound left turn lane.

At all signalized intersections along Barton Street, a median will be provided on the east and west approaches, in addition to left turn lanes. At Fifty Road, an eastbound dual left turn lane and a right turn lane will be provided. Continuous two-way-left turn lanes and streetlighting is recommended to help address mid-block collisions and auxiliary turn lanes to help address turning movement issues.

Fifty Road - At Fifty Road and Highway 8, left turn lanes will be provided on all approaches. The skew of the intersection will be slightly improved. At Barton Street, the northbound continuous two-way left-turn lane will become a northbound left turn lane. The outer southbound through lane will become an exclusive right turn lane for traffic turning onto Barton Street.

All intersections will require further evaluation and treatment at the detailed design stage with consideration of Hamilton's Multi-Modal Level of Service Guidelines (2024), which will consider bike crossings, priority signalization for buses, etc.

6.3.4 CROSS-SECTIONS

Recommended cross-sections for both Barton Street and Fifty Road are included in **Appendix N**.

The improvement to both Barton Street and Fifty Road contemplates multi-modal facilities with using a Complete Streets Design approach. Each will include facilities for active transportation on both sides of the street, street lighting, tree-planted boulevards, space for bus stop/shelters, snow storage and green infrastructure.

Barton Street - In its ultimate configuration, Barton Street from Fruitland Road to Fifty Road is recommended to carry two lanes of travel in each direction with continuous left turning lanes interchangeable with planted medians where feasible (refer to Figure 6-1) in a 36.6m right-of-way.

Features of the recommended design concept include:

- A five-lane road for vehicles, with two lanes in each direction and a two-way continuous centre left-turn lane interchangeable with planted medians where feasible. The additional travel lanes will meet the needs of future multi-modal travel demands, while two-way left-turn middle lane will enable enhanced access/egress for abutting property owners. Planted medians where feasible will enhance the complete streets design, reduce the impervious area, improve corridor aesthetics.

- A continuous sidewalk (north side) and a meandering multi-use Promenade (south side) for leisure purposes and to provide safe access to schools, access transit stops, and visit local businesses/destinations.

- Boulevard space that can be used for public tree plantings, street lighting, utilities, and green infrastructure.

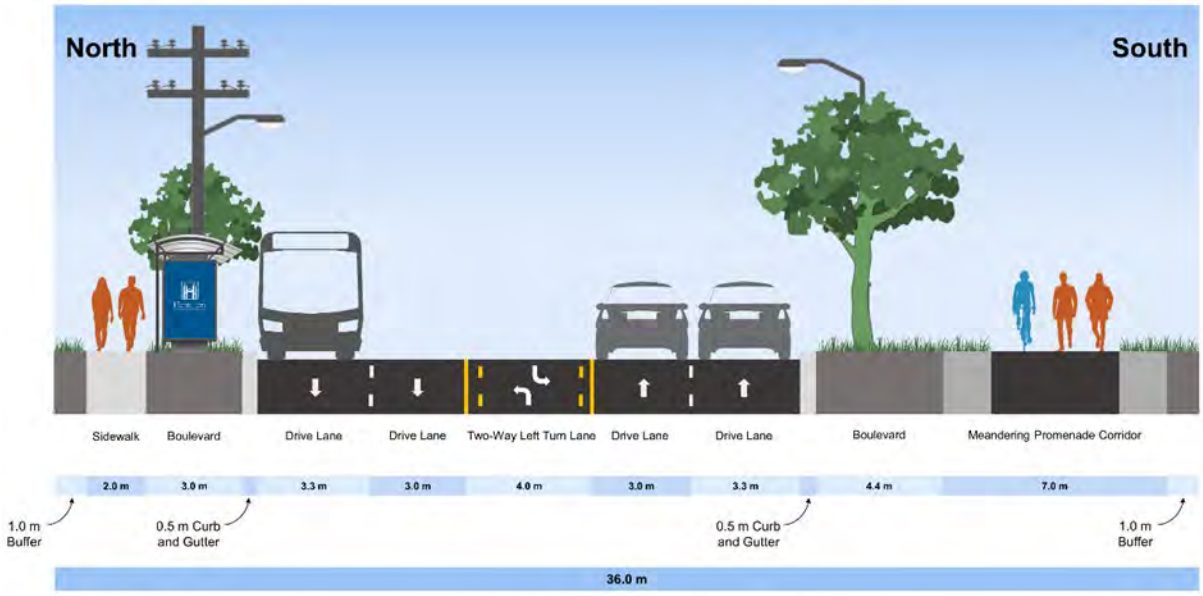


Figure 6-1. Barton Street - Fruitland Road to Fifty Road Recommended Design Concept

The ultimate design would impact a total of 169 properties and require 14 full property buy-outs.

In the interim condition, east of Lewis Road, Barton Street is recommended to carry one lane of travel in each direction with a continuous left turning lane (refer to Figure 6-2. Widening to the ultimate configuration will occur when travel demand warrants it.

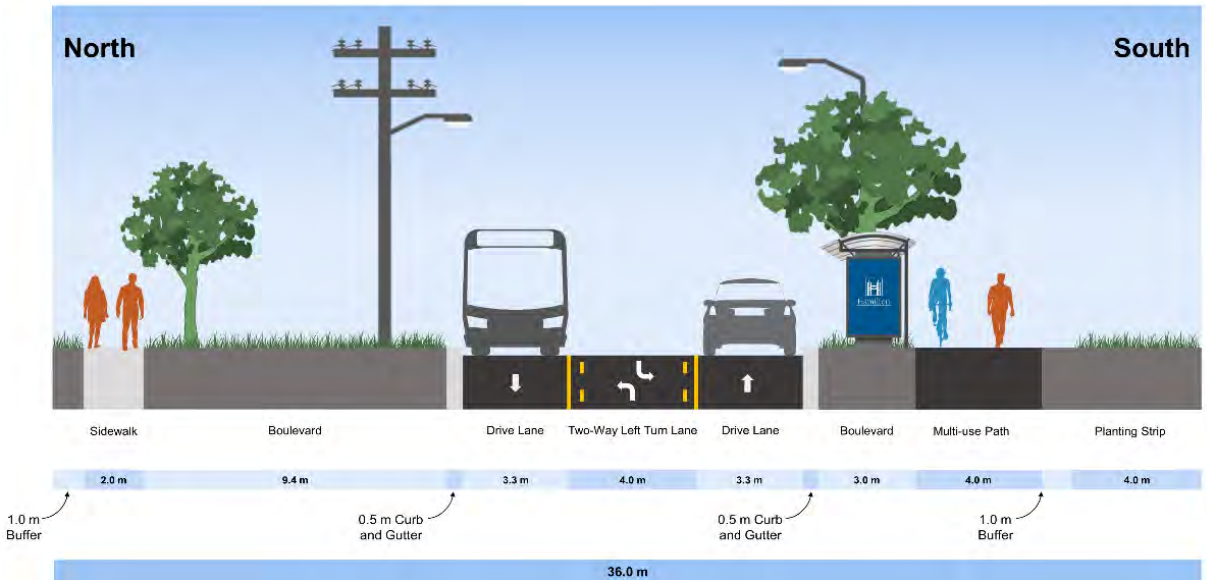


Figure 6-2. Barton Street - Lewis Road to Fifty Road Interim Configuration

Additional design considerations:

- In accordance with the Secondary Plan a streetscape plan will be prepared prior to, or concurrently, with the detailed design of the roads.
- Tree plantings in are intended to be maximized within boulevards and medians, and trees will be planned in their permanent locations for the interim configuration for Barton Street east of Lewis Road to avoid potential removal in the future when the road is widened to 5 lanes.
- Tree plantings along hydro lines are possible with smaller tree species that would limit aerial interference.
- Areas adjacent to the Promenade on Barton Street is intended to contain low landscaping, gateways, street furniture and pedestrian lighting.

Fifty Road - The Highway 8 to Barton Street design concept did not change since Public Information Centre #1. In its ultimate configuration, Fifty Road is recommended to carry two lanes of travel in each direction north of Barton Street to South Service Road in a 30m right-of-way. South of Barton Street to Highway 8 is recommended to carry one lane of travel in each direction with a continuous left turn lane in a 26.2m right-of-way.

Highway 8 to Barton Street (See Figure 6-3)

Features of the recommended design concept include:

- A three-lane road for vehicles south of Barton Street that includes a continuous centre turn lane that will enable enhanced access/egress for abutting property owners.
- A continuous multi-use path on the west side, for leisure purposes and to provide safe access to schools, access transit stops, and visit local businesses/destinations.
- Boulevard space that can be used for public tree plantings, street lighting, utilities, and green infrastructure.

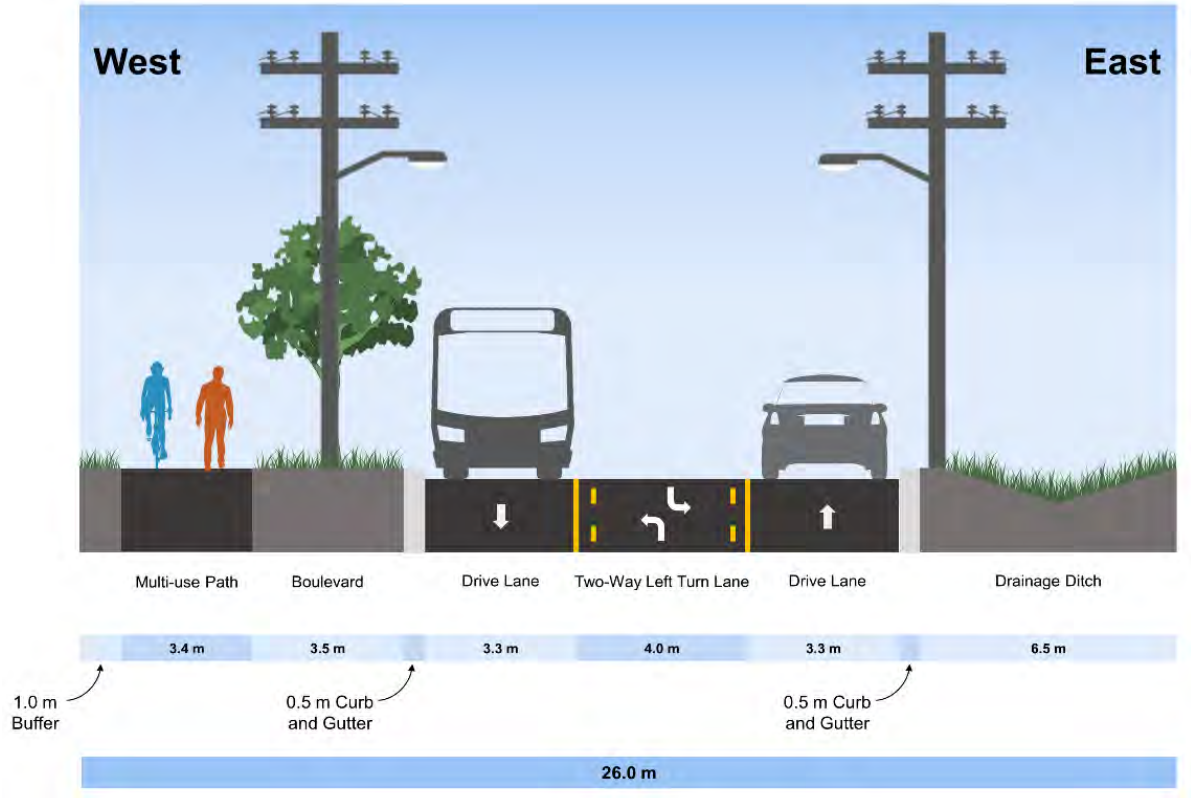


Figure 6-3. Fifty Road - Highway 8 to Barton Street Recommended Design Concept

Barton Street to South Service Road (See Figure 6-4)

Features of the recommended design concept include:

- A four-lane road north for vehicles including north of Barton Street that retains the existing at-grade crossing configuration with the CN Rail line south of South Service Road. The additional travel lanes north of Barton Street will meet the needs of future multi-modal travel demand.

- A continuous multi-use path on the west side, for leisure purposes and to provide safe access to schools, access transit stops, and visit local businesses/destinations.

- Potential for a grade-separation with the CN Rail line to improve user safety when traffic volumes driven by an increase in rail traffic deems it to be required. The need for enhancement will need to be confirmed through future study and completion of Phases 3 & 4 of the Municipal Class Environmental Assessment process.

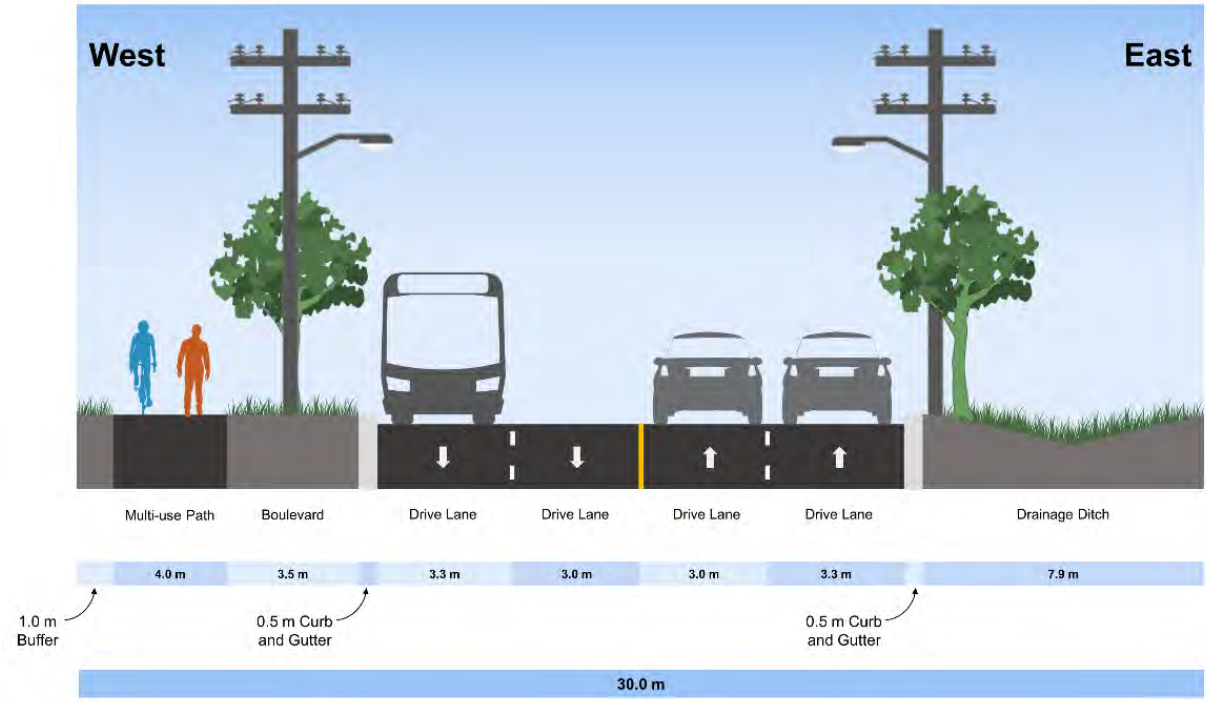


Figure 6-4. Fifty Road - Barton Street to South Service Road Recommended Design Concept

6.3.5 TRANSIT

Expanded transit service along Barton Street and Fifty Road is planned to support growth in the area. In the much longer term, Barton Street is also planned to potentially have a bus rapid transit route as part of the future transit network, extending from

Highway 8, along future Gordon Dean Avenue, then along Barton Street easterly to a future planned transit hub at the Wilson Crossing commercial hub on South Service Road at Fifty Road. In the future, transit stops along Barton Street and Fifty Road will be implemented as part of route and network expansions. Transit shelters will be provided along Barton Street in accordance with HSR's Transit Bus Stop Accessibility Criteria and Guidelines.

6.3.6 PEDESTRIAN CONNECTIONS

Based on the *Fruitland-Winona Urban Design Principles and Guidelines for Special Character Area* (2013), the following elements are recommended to create pedestrian connections: pedestrian friendly, promoting connectivity with other green spaces and provide street trees, promote placemaking, where possible.

The recommended designs would provide pedestrian and cycling connectivity along with transit and vehicular modes of transportation (including goods movement), street trees and boulevards on both sides of Barton Street, planted medians where feasible. The recommended design will also feature a meandering Promenade on the south side of Barton Street, with additional landscaping on both sides. The Streetscape Master Plan will incorporate street furniture and other amenities (including gateway features) during detailed design.

6.3.7 UTILITIES

Accurate determination of the location and need for relocation of underground utilities shall be determined during Detailed Design; however, a standard 1m corridor at the ROW limits is reserved for utility purposes. Any collateral impacts to adjacent property and natural features due to relocation of utilities will be determined during Detailed Design. The utility composite plan is provided in **Appendix O**.

6.3.8 ACCESSIBILITY FOR ONTARIANS WITH DISABILITIES ACT MEASURES

The Accessibility for Ontarians with Disabilities Act (AODA) sets out a process for developing and enforcing accessibility standards and aims to identify, remove, and prevent barriers for people with disabilities. The Integrated Accessibility Standards Regulation (IASR) sets standards for information and communications, employment, transportation, design of public spaces, and customer service. It identifies the specific requirements to be implemented for public spaces and the associated timelines. Municipalities are required to comply with the IASR as a provider of services to the public. During the Detailed Design phase, the project team will develop the alignments for Barton Street and Fifty Road and the intersection of Fifty Road and Highway 8 to meet requirements for trails, sidewalks (including curb ramps), and transit stops.

6.3.9 AGENCY APPROVALS / PERMITTING

Agency approvals are required as part of Detailed Design and before construction can begin. Approval requirements are summarized in Table 6.3.

Table 6-3. Agency Approvals/Potential Permitting Requirements

AGENCY	APPROVAL / PERMIT REQUIRED	DESCRIPTION
Ministry of the Environment, Conservation and Parks	EASR – Self Registration of Water Taking Activity	For road construction and construction site dewatering
	PTTW – Permit to Take Water	For dewatering rates in excess of 400 m^3 / day
City of Hamilton	City of Hamilton Sewer Use By law (Bylaw 14-090)	For dewatering activities where water is disposed in the sewer system
Hamilton Conservation Authority	A Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Regulation Permit under O. Reg. 166 / 06	Required to develop in areas within regulated limit
Ministry of Natural Resources and Forestry	ESA Section 17 I	Permit for Approval for Activities that may affect Species or Habitat protected under the ESA (17C)
City of Hamilton	Hamilton's Tree By-law No. 15-125	Required for the removal of trees during construction
Niagara Escarpment Commission Ministry of Natural Resources and Forestry	Niagara Escarpment Permit	Permit to expand the width of the road
Potential Permits and/or approvals associated with Eastern Meadowlark and Bobolink. To be further investigated during Detailed Design, similar to those requirements for Bank and Barn Swallow foraging habitat		
Potential Wildlife Scientific Collectors Permit for potential wildlife relocation during construction		

6.3.10 PROPERTY REQUIREMENTS

The widening of both Barton Street and Fifty Road right-of-way results in property acquisition requirements on both sides of each road to accommodate the recommended design, including daylight triangles at intersections.

Property acquisition during the development process allows the City to acquire the right-of-way through land dedications as a condition of development approval. Development of the Fruitland Winona Secondary Plan area will take place over a long period of time, therefore, if not part of the development process, the approach the City takes for property acquisition is generally a willing buyer - willing seller format and efforts are made to limit acquisitions where practical; however, the City generally intends to acquire the property necessary to establish the ultimate right-of-way. In areas where this is not practicable, e.g. front yard setbacks would be less than minimum, then only enough property required to implement the recommended design may be acquired. The City

may also choose to acquire property through provisions of the Expropriation Act of Ontario.

In general, the threshold for full buy-out of existing residential properties generally occurs when less than 6.0 m is available for parking in front of the property (access to Barton Street only, side street access excluded) and a ROW that touches / crosses a building.

On Barton Street, as part of the ultimate configuration, five (5) properties have been identified for full purchase on the north side of the corridor and nine (9) properties have been identified having potential for full purchase on the south side. Other properties along the north and south sides of Barton Street will have a minor property taking along the frontage that will reduce front yard and driveway depth. Municipal addresses #716 to #720 Barton Street properties have already been identified as required as part of the Gordan Dean Avenue Extension Class EA and have been purchased by private developers.

East of Lewis Road, the ultimate configuration can be implemented without requiring significant buyouts by limiting the property taking on the south side of the road to such that a 31.5 m right-of-way is established.

On Fifty Road, no properties are identified for full purchase to implement the recommended design concept; however, minor property takings are required along the entire length to establish the designated right-of-way.

Appendix M shows the planned property taking on Barton Street and Fifty Road.

6.3.11 CONSTRUCTION STAGING AND PHASING

The interim configuration for Barton Street will be implemented in phases to match the pace of development with options being evaluated as part of the capital budget and detail design process. Construction is expected to proceed in the 3–5-year time frame.

Fifty Road improvements will be implemented in phases to match the pace of development and traffic. Notwithstanding that the limits of the Study was South Service Road, it is recognized that there are deficiencies on Fifty Road north of South Service Road. Specifically, this segment of Fifty Road, which includes the interchange with the QEW, lacks pedestrian and cycling facilities and is a barrier for people walking and cycling between the waterfront and the commercial node (Winona Common). Capacity deficiencies have also been identified for the eastbound and westbound QEW ramp terminals. Through a separate project, Transportation Planning staff are working to advance solutions to address these issues. Potential for grade separation at the CN Rail crossing is subject to future studies that will include a warrant analysis and future Class EA (Phase 3 and 4).

6.2.13 PROPERTY ACQUISITION

The City will continue to acquire lands through land dedications as part of the planning application process. The City will need to approach individual landowners to purchase land if development/redevelopment of a property does not proceed.

6.4 DESCRIPTION OF POTENTIAL IMPACTS, PROPOSED MITIGATION AND COMMITMENTS

6.4.1 NATURAL ENVIRONMENT

The Natural Environment Report completed an impact assessment for both aquatic and terrestrial environment. In terms of aquatic environment, the proposed construction activities may lead to the modification, or alteration of the drainage features found on site. Improvement, extension, or replacement of the existing watercourses' crossing structures is likely and may lead to a minor increase in the area of enclosed channel and may require channel plan alterations to facilitate new inlet and outlet channels.

Additional areas of temporary impact will occur during the construction stage, but these impacts would be considered short lived and mitigatable. In-water works should proceed during the appropriate open timing windows for the thermal regime and fish species present to avoid impacts to these species during sensitive timing periods. Sections of the waterbodies may need to be dewatered. In these instances, cofferdams and bypass pumping and/or flumes should be utilized to isolate the work areas. Isolating and dewatering work areas may leave fish stranded within work areas which would require fish salvage efforts prior to construction to prevent fish mortality.

During the works, runoff from construction activities may lead to a temporary increase in erosion risk due to increased area of exposed soil, the presence of stockpiled materials or the concentration of flow during flow bypass. This poses an increased risk of siltation to the watercourse leading to increased surface water turbidity and decrease water clarity which would be harmful for fish.

Spills and leaks such as the introduction of sediment, concrete outwash, and other deleterious substances during construction could allow contaminated water to enter a watercourse. The potential for such effects is low if appropriate mitigation and environmental protection planning measures are applied consistent with Ontario Provincial Standards and federal measures to avoid serious harm.

Limited temporary and/or permanent removal of shrubs / trees and/or riparian vegetation may be required. Vegetation removals can result in a temporary increase in erosion and sedimentation risk. Furthermore, vegetation removal may cause a temporary loss of overhead cover for fish and could result in increased water temperatures and instability in channel banks.

For the terrestrial environment, the following is noted:

- As the entire study area was not exhaustively searched due to access restrictions there is a possibility for SAR or significant wildlife habitat to occur, however, these occurrences (with the exception of those noted above) are not within the area proposed for Project impact based on the Alternative 3 (ROW widened north by maintain property line) for Barton Street and Alternative 3 (ROW widened to the east) of Fifty Road.

- With the application of the appropriate mitigation and restoration measures, the potential impacts of the proposed road widening to the surrounding natural environment are anticipated to be minimal and temporary in nature.

The Natural Environment in **Appendix E** outlines all potential impacts, mitigation, and monitoring measures; field work data originally gathered for the purpose of this Class EA will be repeated at the Detailed Design stage to also incorporate full construction footprint impacts.

6.4.2 STORMWATER MANAGEMENT

The Stormwater Management Report notes various sections of the road that have flow depths that exceed the capacity of the roadside ditches while select storm sewers have been identified that do not meet the City's 5-year hydraulic performance criteria and surcharge to the surface during the 100-year storm event. Stormwater management controls are required to offset the increases in impervious coverages due to the proposed road improvements and to meet stormwater management requirements as per the SCUBE East and West Subwatershed Studies, the various agencies, and City requirements. The hydraulic capacity of the Fifty Creek culverts has been reviewed and they are capable of conveying the 100-year storm event peak flow rate.

The following recommendations have been made for drainage system improvements and stormwater management:

- Stormwater management controls are being recommended to meet the various criteria of SCUBE East and West Subwatershed Studies, the various agencies, and City of Hamilton.

- Extensive new and upgraded storm sewers will be required to provide adequate flow conveyance as per City of Hamilton design requirements.

- Quantity controls are recommended to meet the peak flow rate requirements established through the SCUBE East and West Subwatershed Studies, the various agencies, and City of Hamilton.

- Water quality controls are recommended in the form of oil / grit separators to address the criteria within the SCUBE East and West Subwatershed Studies.

- Groundwater recharge has been provided as per the SCUBE East and West Subwatershed Studies through infiltration controls to be further investigated at the next stages of planning and design.
- Erosion control for the 2-year storm event has been provided as per the criteria established within the SCUBE East and West Subwatershed Studies.
- The cost to implement the stormwater management and drainage infrastructure would be approximately $61,030,000.
- The Fifty Creek culverts located at Highway 8 and Fifty Road will remain in place for the duration of the remaining lifespans and would be upgraded at that time to meet stream morphology requirements.
- Culverts for Watercourses which cross Barton Street should be further assessed during Detailed Design to determine required sizing.

The Stormwater Management Assessment Report can be found in **Appendix F.**

6.4.3 FLUVIAL GEOMORPHOLOGY

The fluvial geomorphology assessment identifies that at this point in preliminary design analysis of the two (2) crossings of Fifty Creek are not explicitly proposed for replacement. At some future point when the Fifty Creek crossings become structurally deficient, the recommended opening width should be considered in new design work. The four (4) tributary crossings appear currently to require replacement based on a combination of hydraulic and structural deficiencies. The recommended opening widths should therefore be used as targets during Detailed Design.

Scour treatment finalization at detail design should be undertaken using proposed conditions indicators from HEC-RAS modeling. Recognizing that the Fifty Creek crossings are not currently proposed for replacement, analysis of risk could be done using existing modelling. Furthermore, based on the potential final design length of each crossing and the intervening shelter from bedform sequencing, there are no constraints foreseen to the size range of typical fish that will pass the designs during high flows.

The Fluvial Geomorphology Assessment Report can be found in **Appendix G**.

6.4.4 GEOTECHNICAL INVESTIGATION

6.4.4.1 RECOMMENDED CONSTRUCTION FEATURES FOR PAVEMENT

Table 6.4 presents the proposed strategy which is partial depth reconstruction.

Table 6-4. Proposed Rehabilitation Strategy

ROAD SECTION	PAVEMENT CONDITION	REHABILITATION STRATEGY	URBAN / RURAL
Barton Street from Fruitland Road to Fifty Road	Fair to Poor Condition	Excavate to depth of 315 mm including HMA and existing granular, proof roll, compact, add 150 mm of granular A compact, and resurface with **165 mm of HMA.** – 40 mm of SP12.5FC2 – 55 mm + 70 mm of SP 19 – 150 mm Granular A *(No raise in grade)*	Urban
Fifty Road from Highway 8 to South Service Road		Excavate to depth of 305 mm including HMA and existing granular, proof roll, compact, add 150 mm of granular A compact, and resurface with **155 mm of HMA.** – 40 mm of SP12.5FC2 – 55 mm + 60 mm of SP 19 – 150 mm Granular A *(No raise in grade)*	

Pavement recommendations for widening are presented in Table 6.5, including hot mix type, lift thickness, and Performance Graded Asphalt Cement (PGAC) type making up the recommended asphalt thickness, as well as the traffic category, in accordance with Ontario Provincial Standard Specification 1151.

Table 6-5. Pavement Design for Widening

PAVEMENT COMPONENTS ROAD SECTION	BARTON STREET FROM FRUITLAND ROAD TO FIFTY ROAD	FIFTY ROAD FROM HIGHWAY 8 TO SOUTH SERVICE ROAD
SP12.5FC2 / PGAC 64-28 - TRAFFIC CATEGORY C	40 MM	40 MM
SP 19.0 / PGAC 58-28 - TRAFFIC CATEGORY C	55 MM	55 MM
SP 19.0 / PGAC 58-28 - TRAFFIC CATEGORY C	70 MM	60 MM
GRANULAR A	150 MM	150 MM
GRANULAR B TYPE II (1)	300+MM	300+MM
TOTAL PAVEMENT STRUCTURE	615 MM	605 MM

Notes:

(1) The granular thicknesses of the widening given in the table is a minimum thickness and should match the adjacent existing pavement granular thickness to promote positive lateral drainage. Also, the thicknesses can be increased depending on grading requirements.

To meet the design requirements for the pavement life, the road subgrade and granular courses should be well drained at all times. This can be accomplished by ensuring proper grading of the subgrade and positive lateral drainage of the granular base daylighting at the ditch. Alternatively, full-length perforated subdrain pipes of 150 mm diameter should be installed along both sides of the road, below the roadbed level and drain to suitable outlets for effective drainage, in accordance with Ontario Provincial Standard Drawing 216.021.

The Geotechnical Investigation Report can be found in **Appendix H**.

6.4.4.2 POTENTIAL GRADE SEPARATION

Based on the borehole drilled in the vicinity of a potential grade separation, geotechnical reaction at Serviceability Limit State (SLS) and geotechnical resistance at Ultimate Limit State (ULS) values provided in Table 6.6 may be used for design.

Table 6-6. Recommended ULS / SLS Bearing Values for Potential Grade Separation Structure

BOREHOLE NO.	FOUNDING STRATUM	DEPTH BELOW EXISTING GRADE (M)	ELEVATION (M)	GEOTECHNICAL REACTION AT SLS (KPA)	FACTORED GEOTECHNICAL RESISTANCE AT ULS (1) (KPA)
BH 49	Fill Hard silty clay till Hard weathered shale	Above 2.2 (±) 2.2 to 4.9 (±) Below 4.9 (±)	Above 86.2 (±) 86.2 to 83.5 (±) Below 89.7 (±)	Not recommended 200 300	Not recommended 300 450

(1) A resistance factor of Φ = 0.5 has been applied to the ULS values provided.

6.4.5 HYDROGEOLOGICAL INVESTIGATION

The hydrogeological investigation notes that there is likely no impact from construction activities on surface water or active water supply wells. Furthermore, groundwater was not encountered in the boreholes drilled as part of Wood's geotechnical investigation. No monitoring wells were installed to conduct groundwater level monitoring. If groundwater is encountered during excavations, the dewatering effort may be expected to be low.

Once a design has been determined, dewatering rates should be calculated to determine whether any permitting is required to support construction. Ultimately if construction dewatering rates range between 50 m^3/day and 400 m^3/day, an Environmental Activity and Sector Registry registration may be sufficient to support construction. For dewatering rates in excess of 400 m^3/day, a PTTW will be required.

No groundwater chemistry sampling has been performed for this site. If water was to be disposed of to the sewer system, the discharge would be required to comply with the requirements outlined under the City of Hamilton Sewer Use By law (Bylaw 14-090). Should dewatering activities consist of discharge towards a water body, the discharge would be required to comply with Provincial Water Quality Objectives. A sewer discharge permit or related permissions may be required should dewatering activities be required to discharge into a sewer system.

The Hydrogeological Assessment can be found in **Appendix I**.

6.4.6 ARCHAEOLOGICAL RESOURCES

The following recommendations related to the Stage 1 Archaeological Assessment **(Appendix J)** are made:

- Prior to land altering activities, any portion of the study area deemed to have archaeological potential requires Stage 2 assessment by means of shovel test pit survey or pedestrian survey, as appropriate, in accordance with the Standards and Guidelines for Consultant Archaeologists. Where ploughing is viable, all open land greater than 10 m by 10 m in area must be freshly ploughed (and disked if necessary) and then allowed to weather sufficiently before being subjected to pedestrian survey at 5 m intervals. Where ploughing is not viable, a test pit survey must be executed. Such lands may include woodlots, pasture with high rock content, abandoned farmland with heavy brush and weed growth, orchards and vineyards that cannot be strip ploughed, parkland, residential lawns that will remain as lawns for an extended length of time, and properties with existing infrastructure. Within each test pit the topsoil and first 5 cm of subsoil should be screened for artifacts through 6 mm mesh. All test pits should be completely backfilled, and any sod caps replaced and tamped down by foot. Any additional areas of disturbance and consequent archaeological potential removal should be fully documented and delineated.

Mitigation measures and/or alternative development measures and/or alternative development approaches are required as a part of the approval conditions to amend potential adverse impacts of the proposed road widening on cultural heritage resources and their heritage attributes.

It is suggested that the following mitigation measures be taken:

- The rural character of Barton Street and Fifty Road that have cultural heritage landscape value should be maintained as far as possible while ensuring that safety is not impacted.

- Construction fencing and tree hoarding should be installed around and in front of those heritage resources, which are closer to the roadway, at a sufficient distance to

ensure that there will be no direct construction impacts on built heritage resources as a result of the movement of construction equipment or machinery.

- Standard road construction techniques should be used where possible, excluding all avoidable construction techniques (such as deep foundation work or piling) that could cause structural damage to heritage resources.

- All trees that cannot be saved should be replaced with large caliper nursery stock that are appropriate for roadside use (i.e., salt resistant). Replacement trees should replicate as closely as possible the heritage appearance, assortment, and placement of the current trees.

- Wherever possible, roadways should be engineered to ensure that the heritage character of the roads are not obscured or unduly impacted.

- Provisions for public art shall be a part of all public realm improvement projects and should be incorporated as feasible.

The Built and Cultural Heritage Landscape Assessment can be found in **Appendix K**.

6.4.7 TRAFFIC NOISE STUDY

A free-field analysis was completed using STAMSON to determine the maximum limits (offset distance from centreline of road) of impact on each of the identified road segments. This analysis facilitates a worst-case review (i.e., without any mitigation), and thus identifies any areas of potential concern that can be further investigated if needed.

The free-field analysis considered two noise levels:

- 60 dBA: This is the lower noise limit where possible noise mitigation might be warranted; and,

- 65 dBA: This is the limit above which would require mitigation.

The analysis found that several road segments have an increase in the 60 dBA free-field offset distance from road centreline. While this demonstrates that noise levels are increasing, the criteria states that the increase must exceed 5 dBA and be above 60 dBA to warrant noise mitigation.

The future traffic volumes will cause some increases in noise levels as compared to existing conditions (maximum 3.8 dBA). However, based on the results of the noise study and the noise level criteria utilized, mitigation measures are not warranted as the increase does not exceed 5 dBA, and the noise levels remain below 65 dBA.

The Traffic Noise Study report can be found in **Appendix L**.

6.4.8 CLIMATE CHANGE CONSIDERATIONS

In 2017, the MECP released a document entitled “Considering Climate Change in the Environmental Assessment Process” (2017) that provides guidance relating to the ministry’s expectations for considering climate change during the environmental assessment process. There are two key approaches to address climate change, including reducing a project’s impact on climate change (climate change mitigation) and increasing the local ecosystem’s resilience to climate change (climate change adaptation).

The Barton Street and Fifty Road Class EA project impacts to climate change can be considered in terms of the City planning improvements which will better serve the community and provide safe, comfortable, accessible, and efficient pedestrian and cycling facilities that would encourage active transportation and healthier lifestyles within the growing community of lower Stoney Creek.

For this Class EA study, key elements such as natural environment, stormwater management, and noise were factored into the development of the improvements to reduce the project’s contribution to known climate change drivers. Prior to commencement of works, design and implementation, construction timing will be taken into consideration and disturbance and removal of existing trees and vegetation will be minimized where possible and confined to the footprint of the project. Section 7 further details the environmental commitments and mitigation measures that will be implemented for this project.

The City of Hamilton Cycling Master Plan identified that reserved bike lanes are to be provided on both Barton Street and Fifty Road which will generally contribute to the reduction of greenhouse gases. Additionally, alternatives were developed with the consideration of a Promenade and linear greenspace to be located on the south side of Barton Street as per the Fruitland-Winona Secondary Plan. Further opportunities to incorporate ecosystem services into landscaping and stormwater elements/components will continue into detail design.

Climate change has the potential to result in increased storm events that can lead to flooding. Further opportunities to incorporate ecosystem services into landscaping and stormwater elements/components will continue into detail design. Detailed Design process shall follow the recommendations from the City of Hamilton’s Green Standards and Guidelines for Site Servicing (Stormwater), (2024), and provide measures for increased quantity and quality stormwater control Detailed Design. This will assist in reducing potential flooding impacts. This undertaking is expected to make the area less vulnerable to climate change.

7

7 SUMMARY OF ENVIRONMENTAL ISSUES, COMMITMENTS AND MITIGATION MEASURES

This section provides a consolidated summary of the anticipated environmental impacts associated with the recommended designs and the measures proposed to mitigate them. It outlines the City's commitments to environmental monitoring and further investigations during detailed design. The summary draws on the findings of earlier technical studies and reflects the City's commitment to responsible planning and environmental stewardship throughout the lifecycle of the project.

7.1 MONITORING

A monitoring program will be established to ensure that the mitigation measures identified in Section 6.4 are undertaken. The key impacts to the environment are the short-term impacts that require monitoring during construction. The construction of this Project will be monitored on site by the City to ensure that the Contractor is implementing standard construction practices. This will include erosion and sedimentation control, dust and noise control, protection of existing vegetation, assurance of traffic safety and maintenance of traffic flow without causing unnecessary delays, etc. The overall performance and effectiveness of the environmental mitigating measures will be specified and assessed during and subsequent to the construction of the project.

The environmental impacts outlined in Section 6.4 are considered as typical impacts associated with road construction projects. The Contract Administrator is to ensure that mitigating measures as described are undertaken during construction. Should unforeseen environmental concerns and/or issues arise during the construction period, the appropriate ministry and agencies will be contacted, and appropriate measures will be taken to mitigate the environmental concerns / issues.

7.2 COMMITMENTS TO FURTHER INVESTIGATIONS

Commitments to further investigation during Detailed Design stage include:

- **Heritage impact study** under the Ontario Heritage Act - 315 Winona.
- **Future Multi-Modal Level of Service (MMLOS)** analysis based on MMLOS Guidelines (2024).
- **Transit review to support a priority bus corridor**, including some combination of signal priority, queue jump lanes, dedicated lanes, and enhanced shelters.

- **Review north-east corner of Fifty / Barton intersection** to accommodate turning trucks and coordinate with Highway 8 EA.
- **Utilities coordination** and possible sub-surface utility engineering to determine types, location, and depths of the existing and any new facilities.
- **Detailed Stormwater Management** design and coordination with agencies**.**
- **Investigation of applying innovative (sustainable) surface treatments** in a small part of the Promenade as a pilot project and investigate using internal and/or external funding sources for it (Contact: Office of Climate Change Innovation).
- **Landscape design and Streetscape Master Plan**, including The Fruitland-Winona Urban Design Principles and Guidelines for Special Character Area (2013) recommendations.
- **Determination of property requirements** for implementation.
- **Monitoring of traffic and development patterns** for decision on implementation of the ultimate configuration east of Lewis Road.
- **Additional investigations** identified by agencies (Refer to **Appendix C** for details).
- **Indigenous Engagement during Archaeology Stage 2 Field work** per City policy.
- **Indigenous Engagement during Natural Heritage Field Work** per City policy.

Table 7-1. Summary of Environmental Issues and Commitment to Environmental Impacts and Mitigation Measures

POTENTIAL ENVIRONMENTAL EFFECTS	EXPRESSED BY	MITIGATION MEASURES AND WORK COMMITMENTS
Aquatic Resources (Fisheries/ Watercourse)	MECP, HCA, Project Team	Prior to commencement of works, design and implement standard Erosion and Sediment Control measures, consistent with Ontario Provincial Standards and Specifications and maintain Erosion and Sediment Control measures through all phases of the Project until vegetation is re-established, and all disturbed ground is permanently stabilized.
		All materials and equipment used for the purpose of site preparation and Project construction will be operated and stored in a manner that prevents any deleterious substance (petroleum products, silt, i.e.) from entering a watercourse.
		Stabilize stockpiles and embankments when not in use/as soon as possible following use, to prevent sedimentation to the watercourse.
		A protocol to minimize spills/leaks and their impact to the environment should be provided in an Emergency Spill Response Plan. Routine inspections of the Project construction site should be conducted to ensure continued use and function of best management practices, mitigation measures and spill control and prevention measures. As appropriate, spills will be reported to the MECP Spills Action Centre.
		Staging of the Project will limit vegetation disturbance and minimize the amount of time disturbed soil is exposed.
		Land drainage systems, whether naturally occurring or man-made are not to be used as receptors for any substance or material other than clean water complying with local municipal bylaws or stormwater as intended.
		All disturbed areas of the work site should be stabilized and revegetated promptly, and/or treated with appropriate erosion protection materials. In riparian and aquatic habitats, all temporarily disturbed areas will be reinstated to original condition, or better, upon completion of works.
		Should the watercourse bed and/or bank be temporarily impacted because of construction activities, these areas should be rehabilitated to pre-construction condition.
		Enhancement of watercourse buffers through riparian restoration and revegetation.
		Redesign existing structures or select new structures to improve fish passage: - Consider flow velocities and select structures, grading, etc. that will ensure crossing structures are passable by fish species known to inhabit the watercourse. - Embed culverts/crossings to avoid perching, appropriately tie-in structures at inlet and outlet to prevent fish passage issues.
		Enhance riparian vegetation to increase shading to the watercourse and maintain cooler water temperatures as well as increase bank stability and provide scour protection.
		Implement restricted timing for the activities to protect warm water fish species as follows: The timing restrictions for the warm water watercourses present on site permit in-water work from July 1 to March 31 of any year.
		Implement restricted timing for the activities to protect warm water fish species as follows: Works should be scheduled during a period in which flows within the channels are absent or minimal where practicable. Include City's Natural Heritage Planning Staff in Next Steps of Detailed Design
Terrestrial	MECP, HCA, Ministry of, Natural Resources and Forestry, Project Team	Construction timing should take into consideration natural heritage features, more specifically the wildlife that inhabit the features within the study area. Vegetation removal should not take place during the local breeding bird season, March 31 through August 31, to comply with the Migratory Bird Convention Act. Due to the uncertainty that lies with nest sweeps during construction, especially during leaf-on conditions, it is recommended that all tree clearing occur outside the above-noted breeding bird window.
		Disturbance and removal of existing trees and vegetation should be minimized where possible and confined to the footprint of the Project.
		Efforts should be made to reduce areas of exposed soils, and erosion and sediment transport during the construction phase.
		All materials and equipment shall be operated and stored in such a manner that prevents any deleterious substance from entering the water and drainage ditches.
		Minimizing dust production to the extent practical by implementing dust suppression methods and thereby minimizing the zone of influence. Primary dust suppression methods can include road watering in cases where watering will not promote entry of chemicals into nearby wetlands or waterways.
		All erosion and sediment control measures should be monitored/inspected during construction to confirm they are maintained and functioning as designed. If the erosion and sediment control measures are not performing, additional measures should be investigated and implemented immediately. All erosion and sediment measures (e.g., sediment control logs) should be reflected on all construction drawings with notes on requirements.
		No development, construction or grading should occur outside of the construction envelope once it has been confirmed during the Detailed Design phase.
		Vegetation protection zones should be established for those woodlands as per the respective Official Plan (Rural or Urban) requirements (e.g., 15 m buffers or 30 m buffers) where feasible.
		Trees shall be protected in accordance with the City's Tree By-laws.
		All disturbed areas should be restored with native, non-invasive seed mix, in addition to native trees and shrubs that are reflective of existing communities.
		Compensation for loss of woodland and wetland should be coordinated with HCA, with exact details of compensation to be further identified during Detailed Design.
		Efforts should be made for the protection of wildlife during construction. The contractor should refer to the Ministry of Natural Resources and Forestry SAR Handling Manual (2011) to ensure wildlife encountered during construction are properly handled and/or reported as necessary.
		If clearing (or other work) in migratory bird habitat is required during the active breeding season, a nest survey must be conducted by a qualified avian biologist immediately (e.g., within 1 day) prior to commencement of the works to identify and locate active nests of species protected under the MBCA. If bird nests protected under the MBCA, FWCA or ESA are encountered during construction, work must stop in the vicinity of the sighting until further direction is provided. These species and their nests must not be disturbed, tormented, injured in any way, destroyed, and/or separated from young. A protective buffer area should be established around the nest and should be determined in consultation with a qualified avian biologist, as well as the Ministry of Natural Resources and Forestry, MECP and/or Canadian Wildlife Service, as necessary.
		Permit required: A Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Regulation permit from the HCA under Ontario Regulation 161/06 to facilitate works within the regulated areas associated with the road corridor (e.g., culvert works).
		Permit required: MECP PTTW or Registration. Approval is required if more than 50,000 litres of water per day will be taken during Project activities. For those transportation projects that will take more than 50,000 litres but less than or equal to 400,000 litres per day, may meet the requirements to register their Project using the MECP EASR protocol.

POTENTIAL ENVIRONMENTAL EFFECTS	EXPRESSED BY	MITIGATION MEASURES AND WORK COMMITMENTS
		Permit required: Permits and/or approvals associated with Eastern Meadowlark and Bobolink will be further investigated during Detailed Design, like those requirements for Bank and Barn Swallow foraging habitat.
		Permit required: Wildlife Scientific Collectors Permit for potential wildlife relocation during construction.
		Road widening should be designed so that they are not barriers to herptiles moving between habitats. Suitable eco-passages may be required to allow movement.
		Sufficient culverts should be installed under the road to ensure that lateral drainage is not impeded. Where possible, roadside ditches should never be designed so that they remove water from the wetland and cause localized drying.
		Where feasible, works will be conducted during daylight hours, unless otherwise necessary, to avoid potential effects of artificial night lighting on crepuscular and nocturnal species.
		Minimize sources of unnecessary noise or encroachment of worker activities into nearby habitats to limit the extent of the Project of influence when possible.
		Three (3) SAR (Eastern Meadowlark, Barn Swallow and Bank Swallow) were documented during the field investigations, with an additional SAR (Bobolink) reported from secondary source review. Additional consultation with MECP will be required during Detailed Design to identify permit and approval requirements
		All vegetation clearing and grubbing should be kept to a minimum and areas shall be restored to equal or better condition with native, non-invasive species that are reflective of the vegetation observed and/or known to the City of Hamilton.
		Where possible, the city should try to mitigate effects of the Project on existing barriers to wildlife movement from culvert extension, repair or replacement. This can be done by investigating wildlife passage at any new culverts during Detailed Design and incorporating them where feasible. Treed areas to be preserved shall be protected in accordance with the City's specifications and by-law requirements.
		Core Areas identified shall be protected in accordance with respective buffers and protection zones as identified in the City's Urban and Rural Official Plans.
		Monitoring during construction is recommended with additional monitoring as per restoration and SAR requirements post-construction.
		During Detailed Design a wildlife rescue restoration plan should be developed and implemented in advance of construction to prevent potential impacts to natural heritage features within the Project Limits
		Mitigation measures identified herein should be further reviewed and refined during Detailed Design.
		Compensation for loss of vegetation communities shall be discussed further with the City and HCA to ensure some form of offsetting is implemented within the same watershed. All field work which will be updated for both Terrestrial and/or Aquatic environment within the study area within Detailed Design stage, shall include re-engagement and consultation with indigenous Nations early in the process and offer for Report review compensation etc., as per City's Policies. Include City's Natural Heritage Planning staff during Detailed Design process.
Traffic and Access	Project Team	A Multi-Modal Level of Service traffic management and construction staging plan will be prepared at the Detailed Design phase. The staging plan will identify roads to be maintained and any temporary road construction. Consideration for both emergency access and for residents will be made as part of the detailed staging plan. Detailed Design process shall utilize the City of Hamilton's 2024 Multi-Modal Level of Service Screening Tool to assign detailed plans for active transportation crossings at all intersections. Transit review to support a priority bus corridor, including some combination of signal priority, queue jump lanes, dedicated lanes, and enhanced shelters. Intersection of Fifty Road and Highway 8 - implementation of the preferred intersection configuration should be re-investigated to confirm impacts and measure them against the cost to implement. That is, the impact of changes to the creek, culverts, trees, property, and cost should be reassessed against leaving the configuration the same as existing.
Geotechnical	Project Team	Existing incompetent fill soils encountered at the founding level should be sub-excavated and backfilled with compacted soil. For manholes and catch basins founded on the silty clay till or weathered shale, if required, a Geotechnical Reaction at Serviceability Limit State of 100 to 150 kPa and a factored Geotechnical Resistance at Ultimate Limit State of 150 to 225 kPa may be used, which should be verified by a geotechnical engineer during construction. Under the SLS bearing values, settlements of up to 25 mm may take place. The frost penetration depth for the project area should be considered as 1.2 m.
		Trench excavation should be carried out as per the Ontario's Occupational Health and Safety Regulations for Construction Projects. Based on the soils encountered in the boreholes, the side slopes of excavations should be 1H:1V for Type 2 and Type 3 soils, provided excavations are properly dewatered and underground utilities are installed and backfilled within a reasonable short period of time. Provisions should be made for dewatering. Trenching should be in accordance with Ontario Provincial Standards (OPSS) 401.
		Bedding for underground pipes should be placed in accordance with the design requirements and current OPS specifications, Ontario Provincial Standards (OPSD) 802.10 for flexible pipes and OPSD 802.30, 802.31 and 802.32 for rigid pipes. Construction of underground pipes should be carried out in accordance with the relevant OPSS 410, or other relevant applicable municipal standards.
		Anti-seepage collars are recommended for pipes installed under groundwater table in silty / sandy soils to prevent erosion of the silty / sandy soils around the pipes. The anti-seepage collar, if required, should follow the City's standards / specifications.
		Potential Grade Separation: Detail foundation analysis should be carried out, if necessary, to confirm SLS/ULS and corresponding settlements. The design frost depth penetration is 1.2 m. All foundations should be covered by at least 1.2 m deep soil or equivalent synthetic thermal insulation.
		Potential Grade Separation: Backfill materials behind structures should consist of non-frost susceptible, free-draining granular materials in accordance with OPSS. Backfill, backfill transition and cover for structure, if applicable, should conform to (OPSD 3101.150 or applicable City standard.
		Site preparation will generally include stripping of topsoil / asphalt, excavation to subgrade, proof-rolling, repairing soft spots (if encountered), and backfilling (if necessary) with engineered fill. Any loose, soft, or unstable areas in the exposed subgrade should be sub-excavated and replaced with approved fill and compacted. Lean concrete may be used to backfill sub-excavated areas. Excavation should be carried out with a temporary slope of 1H:1V or flatter. If one lane of road is to be maintained during construction, a roadway shoring protection system may be required.
		The embankment required for road widening should be constructed with compacted engineered fill at 2H:1V (or flatter) side slopes. High embankment (fill or cut) may be required for construction of the potential grade separation structure. If a steeper than 2H:1V slope is required or if the height of the embankment / cut slope is greater than 4.5 m, slope stability analysis should be carried out to assess stability of the planned slope. Grading, backfilling, and compacting should follow OPSS 206, OPSS 401, OPSS 501, and / or the City's requirements. Engineered fill should be prepared according to the City's standards / contract specifications. The fill soils used for embankment widening should consist of approved clean fill.

POTENTIAL ENVIRONMENTAL EFFECTS	EXPRESSED BY	MITIGATION MEASURES AND WORK COMMITMENTS
		Engineered fill, where required, may be used to backfill excavated areas, backfill around manholes and behind structures, replace soft/incompetent soils, and / or raise grades. Engineered fill can be prepared by placing fill soil and compacted as per OPSS.MUNI 501 and/or applicable City standards. Full-time geotechnical inspection and quality control are necessary for the construction of a certifiable engineered fill. The compaction procedures and quality control should be overseen by a geotechnical engineer.
		All excavations should be carried out in accordance with the Ontario's Occupational Health and Safety Act and Regulations for Construction Projects (O. Reg. 213/91). Trenching should be carried out in accordance with OPSS 401. It is recommended that qualified geotechnical personnel be present during excavation to review the conditions of the subgrade for supporting structures / utilities.
		Temporary shoring (roadway protection) may be required for vertical excavation, if necessary, during construction of the potential grade separation structure and/or underground utilities. Temporary shoring design and construction should comply with OPSS.MUNI 539, or applicable City standard. The shoring system should be designed and approved by a professional engineer.
		The excavated soils should be suitable for being reused as engineered fill, provided they can be properly compacted and are environmentally acceptable. Fill soils containing construction debris and organic matter should not be reused. Soils that are too wet to compact will require additional processing. Cobbles and boulders, if any, should be discarded by mechanical means or manual removal.
		Further assessment and/or chemical analyses may be needed depending on the soil management options and/or receiver's requirements that would be specified in a Fill Management Plan authored by a Qualified Person, as defined under O. Reg. 153/04, as amended.
Hydrogeological	Project Team	As no confirmation of the presence or absence of potential groundwater quality impacts has been completed at this time, the groundwater quality will need to be confirmed to establish disposal options for any water collected during dewatering efforts during construction.
		Dewatering rates should be calculated to determine whether any permitting is required to support construction (such as an Environmental Activity and Sector Registry (EASR) / Permission to Take Water (PTTW).
		No groundwater chemistry sampling has been performed for this site. If water was to be disposed of to the sewer system, the discharge would be required to comply with the requirements outlined under the City of Hamilton Sewer Use By law (Bylaw 14-090). Should dewatering activities consist of discharge towards a water body, the discharge would be required to comply with Provincial Water Quality Objectives. A Sewer discharge permit or related permissions may be required should dewatering activities be required to discharge into a sewer system.
Illumination	Project Team	An Illumination Plan will be created along Barton Street and Fifty Road during Detailed Design to determine light spacing. It is recommended that cost saving and environmentally sustainable measures, such as the installation of LED lights, will be determined in at that time, along with the Streetscape Master Plan.
Property Requirements and Impacts	Project Team	Property acquisition shall be addressed during Detailed Design. Any land acquisitions required to implement this project will involve consultation with the landowner(s) to determine and negotiate compensation requirements and emphasis willing buyer – willing seller approach for sales and land dedication through development process. Interim process will work with land we have today within the ROW, and ultimate ROW is to be implemented as land becomes available.
		Coordination with development plans during Detailed Design is required.
Built and Cultural Heritage	MTCS	The rural character of Barton Street and Fifty Road that have cultural heritage landscape value should be maintained as far as possible while ensuring that safety is not impacted. Streetscape Master Plan to be created as per Fruitland-Winona Secondary Plan policies, and which shall include landscaping, illumination, cultural heritage, street furniture and public art, together with direction for gateway features.
		Construction fencing and tree hoarding should be installed around and in front of those heritage resources, which are closer to the roadway, at a sufficient distance to ensure that there will be no direct construction impacts on built heritage resources as a result of the movement of construction equipment or machinery.
		Standard road construction techniques should be used where possible, excluding all avoidable construction techniques (such as deep foundation work or piling) that could cause structural damage to heritage resources.
		All trees that cannot be saved should be replaced with large caliper nursery stock that are appropriate for roadside use (i.e., salt resistant). Replacement trees should replicate as closely as possible the heritage appearance, assortment, and placement of the current trees.
		Wherever possible, roadways should be engineered to ensure that the heritage character of the roads are not obscured or unduly impacted. Include Cultural Heritage Planning Staff in Detailed Design process.
Archaeology	MTCS	As part of the Detailed Design, a Stage 1 will be updated, and Stage 2 should be carried out by means of hand-shovel test pits at 5-m intervals (while avoiding buried utilities) and the screening of test-pit soils for artifacts through 6-mm mesh. All areas of disturbance should be documented to determine their spatial limits. Additionally, an offer for field work monitoring and Report Review involvement and financial compensation should be made available to all Indigenous Nations who have Treaty Rights within the study area and who wish to participate, as per City policies for the same.
		The City will coordinate with Indigenous Nations to ensure Field Liaison Representatives are involved in Stage 2 Archaeological Assessment (and any additional archaeological fieldwork) during Detailed Design phase of this Project.
		No grading or other activities that may result in the destruction or disturbance to the Study Area is permitted until notice of the Ministry of Tourism, Culture and Sport approval has been received.
Utilities	Project Team	Update utility information prior to construction to ensure that the data is accurate. Confirm location and resulting impacts to existing utilities and future services. Determine formal definition of impacts on utilities during Detailed Design, in consultation with individual utility companies. Finalize relocation requirements with utility companies as necessary
Noise	Project Team	Further study is recommended as part of Detailed Design to determine the possible need for noise barriers (i.e., berms and/or noise walls) at selected locations.
Stormwater Management	Project Team, HCA	Stormwater management controls are being recommended to meet the various criteria of SCUBE East and West Subwatershed Studies, the various agencies, and City of Hamilton.
		Extensive new and upgraded storm sewers will be required to provide adequate flow conveyance as per City of Hamilton design requirements.
		Quantity controls are recommended to meet the peak flow rate requirements established through the SCUBE East and West Subwatershed Studies, the various agencies, and City of Hamilton.
		Water quality controls are recommended in the form of oil/grit separators to address the criteria within the SCUBE East and West Subwatershed Studies.
		Groundwater recharge has been provided as per the SCUBE East and West Subwatershed Studies through infiltration controls to be further investigated at the next stages of planning and design.
		Erosion control for the 2 - year storm event has been provided as per the criteria established within the SCUBE East and West Subwatershed Studies.
		The cost to implement the stormwater management and drainage infrastructure would be $61,030,000.

POTENTIAL ENVIRONMENTAL EFFECTS	EXPRESSED BY	MITIGATION MEASURES AND WORK COMMITMENTS
		The Fifty Creek culverts located at Highway #8 and Fifty Road will remain in place for the duration of the remaining lifespans and would be upgrades at that time for stream morphology requirements.
		Culverts for Watercourses which cross Barton Street should be further assessed during Detailed Design to determine required sizing.
Fluvial Geomorphology	Project Team, HCA	Scour treatment finalization at detail design should be undertaken using proposed conditions indicators from HEC-RAS modeling.
		In daylight areas upstream and downstream of each new crossing face, it is recommended that low bank height vegetated stone revetments be used as flow contraction and expansion zone extensions, based on the same standards used for scour treatment. Existing vegetation shading around tie-in areas might impact some new vegetative growth but using vegetation within stone treatment will protect rooting development from potential flow impact.
		Within each crossing the proposed bankfull cross-section and overbanks will be shaped within the recommended scour treatment minus cover cap depth for overbank terraces and bed cover depth for fish habitat. The overbanks from the bankfull limits should be essentially flat to the crossing wall limits. The upstream and downstream crossing tie-ins will need to have overbank grading that blends and ties in to existing.
		Planform alignment is recommended as simple straight channel plotting given the identified lack of need to account for adjustments occurring external to the crossings. This also allows the crossings to contain the least possible total amount of scour protection.
AODA	Project Team	Develop the alignment for Barton Street and Fifty Road to meet requirements for trails, sidewalks (including curb ramps), and transit stops in accordance with City's Engineering Development Guidelines and AODA Guidelines.
Consultation	City	SNGR, HDI, MCFN and HWN will need to be further engaged during Detailed Design, including involvement and participation in fieldwork (i.e., Stage 2 Archaeological Assessment and Natural Heritage – as per City Policies).
Phasing of Construction	Project Team	Simple approach is ~ 2km grid, west to east along Barton. Fifty Road – to be split into 1. North of Barton and 2. South of Barton. Details to be determined during Detailed Design Detailed DesignDetailed Design stage.