Bramalea Road Corridor Improvements, Municipal Class Environmental Assessment Study

Environmental Study Report

Prepared for:
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Sign-off Sheet

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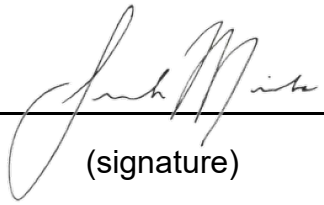
Prepared by 

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1.0 Introduction

Stantec Consulting Ltd. was retained by the City of Brampton to undertake a Schedule C Municipal Class Environmental Assessment (EA) study for the Bramalea Road Corridor Improvements, from Queen Street East to the southern city limits. The study area is located in the City of Brampton, within the Region of Peel. Improvements to Bramalea Road are vital for connectivity and relief to the existing congested road corridor. Improvements will provide opportunities for better links to active transportation, will facilitate more efficient transit connections within and beyond the City of Brampton, and will provide accessibility improvements for users of all ages and abilities.

1.1 Study Area

The study area for this EA includes the Bramalea Road corridor from the intersection at Queen Street East to the southern city limits, approximately 4.3 km in length. Intersections within the study area include:

- Queen Street East and Bramalea Road
- Knightsbridge Road/Fleetwood Crescent and Bramalea Road
- Clark Boulevard and Bramalea Road
- Balmoral Drive and Bramalea Road
- Avondale Boulevard/Dearbourne Boulevard and Bramalea Road
- East Drive and Bramalea Road
- Orenda Road and Bramalea Road
- Steeles Avenue and Bramalea Road

The study area also includes an overpass, crossing above Highway 407 ETR, as well as GO Transit railways.

The approximate limits of the study area are shown in **Figure 1**.

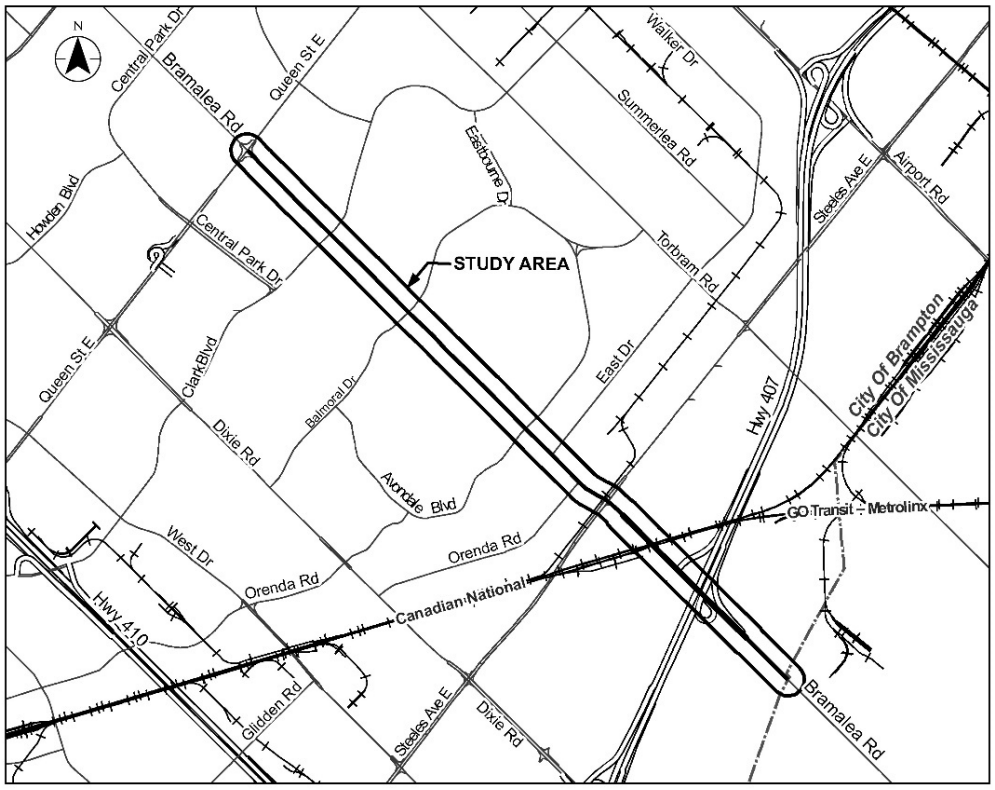

Figure 1: Study Area

1.2 Study Team Organization

General direction was provided by City of Brampton staff, with progress meetings held at key points throughout the planning process. Key members of the study team included the following individuals:

<u>City of Brampton</u>

- Ghazanfar Mohammad, P.Eng, Senior Project Engineer, Infrastructure Planning
- Bishnu Parajuli, Manager, P.Eng, Infrastructure Planning

<u>Stantec Consulting Ltd.</u>

- Isaac Bartlett, P.Eng, Project Manager
- Paula Hohner, M.Sc.Pl, MCIP, RPP, Lead Environmental Planner
- Sarah Micks, B.E.S., Environmental Planner

2.0 Planning Process

2.1 Municipal Class Environmental Assessment Process

The *Environmental Assessment Act of Ontario* (EAA) provides for the protection, conservation, and management of the environment in Ontario. The EAA mandates the completion of a Municipal Class EA study before constructing municipal infrastructure projects. The Ministry of the Environment, Conservation and Parks (MECP) is responsible for administration of the EAA.

The Municipal Engineers Association (MEA) *Municipal Class Environmental Assessment* document (October 2000, as amended in 2007, 2011, & 2015) applies to municipal infrastructure projects including roads, transit, water and wastewater. Key components of the Class EA planning process include:

- Consultation with potentially affected parties early and throughout the process.
- Consideration of a reasonable range of alternative solutions.
- Systematic evaluation of alternatives.
- Clear and transparent documentation.
- Traceable decision-making.

The MEA Class EA document provides a framework by which projects are classified as Schedule A, A+, B, or C based on a variety of factors including the general complexity of the project, level of investigation required, and the potential impacts on the natural, social, cultural, and economic environments that may occur. Each schedule classification requires a different level of documentation and review to be compliant with the EAA and satisfy the requirements of the Class EA. The proponent is responsible for identifying the appropriate schedule for any given project and reviewing the applicability of the schedule at multiple stages throughout the project.

Schedule A projects are limited in scale with minimal anticipated environmental impacts. They are pre-approved and may be implemented without undertaking public consultation or following the planning process as outlined in the Class EA. Examples of Schedule A projects include construction or removal of sidewalks, and multiuse pathways or cycling facilities within protected rights-of-way (ROWs).

Schedule A+ projects are similarly pre-approved but require that proponents notify potentially affected parties prior to implementation. An example of a Schedule A+ project includes streetscaping within protected ROWs.

Schedule B projects have the potential for some adverse environmental and social impacts. Schedule B projects require the completion of Phases 1 and 2 of the Class EA planning process, which is documented in a Project File and submitted for a mandatory 30-day review period. If concerns are raised that cannot be resolved, the Section 16 Order process may be invoked, as described in **Section 6**.

Schedule C projects have the potential for significant environmental impacts and must follow the full planning process specified in the Class EA document, including Phases 1 through 4. The project is documented in an Environmental Study Report (ESR), which is then filed for review by the public, review agencies, and Indigenous communities. If concerns are raised that cannot be resolved, the Section 16 Order process may be invoked, as described in **Section 6**. Projects generally include the construction of new facilities, and major expansions to existing facilities.

Due to the type of project, anticipation for potential effects, and estimated capital costs, the Bramalea Road Improvements EA is defined as a Schedule 'C' project. A Schedule 'C' project involves either the construction of new facilities or major modifications to existing facilities. Modifications to existing facilities could include road widening, intersection improvements, and/or other operational improvements.

2.1.1 Planning Process

Figure 2 illustrates the Class EA planning process and identifies the steps considered mandatory for compliance with the requirements of the EAA. The following provides an overview of the five-phase planning process:

- Phase 1 – identify the problem and opportunity statement
- Phase 2 – identify and evaluate alternative solutions
- Phase 3 – identify and evaluate alternative design concepts for the preferred solution
- Phase 4 – prepare design plans and ESR for a minimum 30-day public review period
- Phase 5 – prepare detailed design and contract/tender documents followed by construction, operation, and monitoring. This phase is not within the scope of the Bramalea Road Improvements EA study.

Figure 2 follows the process of the MCEA amended in 2015.

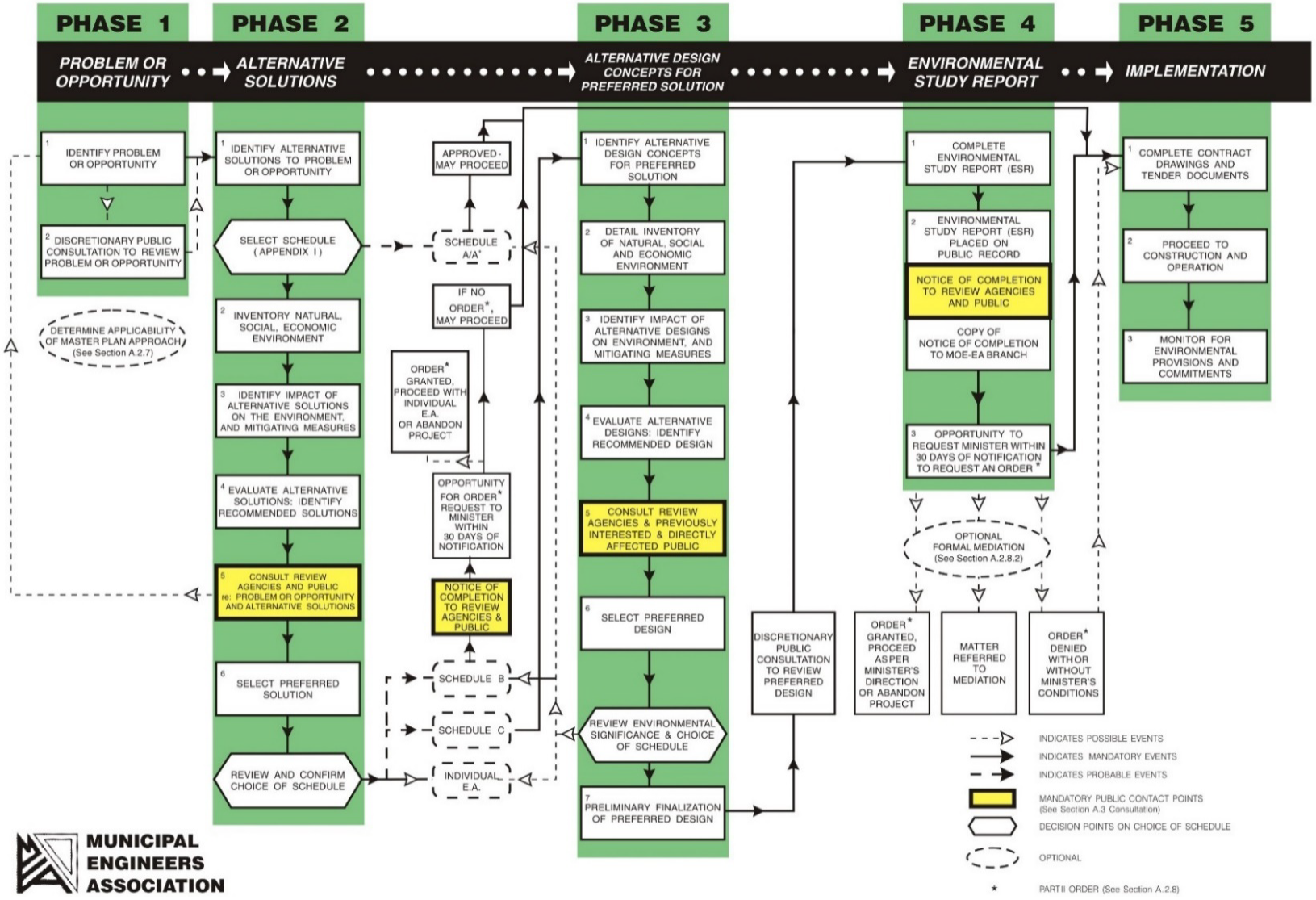

Figure 2: Municipal Class Environmental Assessment Process

2.1.2 Section 16 Order Process

Interested persons may provide written comments to the City of Brampton for a response using the following contact information:

Ghazanfar Mohammad, M.Eng, P.Eng.
Senior Project Engineer, Infrastructure Planning
City of Brampton
Ghazanfar.Mohammad@brampton.ca
905-874-2949

In addition, a request may be made to the Minister of the Environment, Conservation and Parks under Section 16 of the EAA requiring a higher level of study (i.e., requiring an individual/comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g., require further studies), only on the grounds that the requested order may prevent, mitigate, or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Requests should include the requester contact information and full name for the ministry.

Requests should specify what kind of order is being requested (request for additional conditions or a request for an individual/comprehensive environmental assessment), how an order may prevent, mitigate, or remedy those potential adverse impacts, and any information in support of the statements in the request. This will ensure that the ministry is able to efficiently begin reviewing the request.

The request should be sent in writing by mail or by email to:

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

and

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

Requests should also be sent to the City.

2.2 Canadian Environmental Assessment Act

Under the *Canadian Environmental Assessment Act, 2012* (CEAA, 2012), a federal environmental assessment study may be required to comply with the physical activities that constitute a “designated project”, under the project list identified in the Regulations Amending the Regulations Designating Physical Activities, 2013. This project list ensures that federal environmental assessments are focused on the major projects with the greatest potential for significant adverse environmental impacts to matters of federal jurisdiction.

The Bramalea Road Improvements EA study does not constitute a “designated project” and therefore does not require an EA under the CEAA, 2012. However, the Minister of the Environment, Conservation and Parks may order an assessment for any project not included in the project list, where there may be adverse environmental effects related to federal jurisdiction.

3.0 Consultation

Consultation is an integral part of the Class EA process. Active engagement with all potentially affected parties including government agencies, community members, special interest groups, and Indigenous communities ensures a transparent and responsible planning process. In addition, the urban design and placemaking elements of this project will benefit immensely from meaningful and engaging consultation with members of the community.

3.1 Project Contact List

A project contact list was created which includes representatives from relevant government and regulatory agencies, City of Brampton staff, Region of Peel staff, emergency service contacts, utilities, community organizations, interested members of the public (residential and business), landowners, developers, and Indigenous communities. The list was regularly updated to include those who expressed interest in the study. A copy of the contact list is provided in **Appendix A.1**.

3.2 Project Notices

Notices were sent via mail or email (where requested) to the project contact list, published in the Brampton Guardian newspaper and the Mississauga News newspaper, and posted to the City's website (www.brampton.ca/BramaleaEA). A copy of each notice is provided in **Appendix A.1**, including:

- Notice of Study Commencement – published in the Brampton Guardian and Mississauga News on Thursday, August 30, 2018, and Thursday, September 6, 2018, and mailed to contact list on Friday, September 7, 2018.
- Notice of Public Information Centre No. 1 – published in the Brampton Guardian and Mississauga News on Thursday, January 7, 2021, and Thursday, January 14, 2021, and mailed to the contact list on Friday, January 8, 2021. The notice was mailed to 6,044 residents and businesses on the week of January 4, 2021.
- Notice of Public Information Centre No. 2 – published in the Brampton Guardian and Mississauga News on Thursday, September 22, 2022, and Thursday, September 29, 2022, and mailed to the contact list on Thursday, September 22, 2022.
- Notice of Study Completion – published in the Brampton Guardian and Mississauga News on Thursday, May 18, 2023, and Thursday, May 25, 2023; mailed to the contact list on Monday, May 18, 2023.

3.3 Technical Advisory Committee

A Technical Advisory Committee (TAC) was formed at the outset of the project. An invitation package was sent to the contact list with the Notice of Study Commencement. TAC meetings were held to update interested and impacted stakeholders on the study status and provide input to the study team. Meeting minutes are provided in **Appendix A.2**, and a summary of each meeting is provided below. The meetings included stakeholders from the following organizations:

- Region of Peel
- City of Mississauga
- Toronto and Region Conservation Authority (TRCA)
- Ministry of Environment, Conservation and Parks (MECP)
- Ministry of Natural Resources and Forestry (MNRF)
- 407 ETR
- Metrolinx
- Ministry of Transportation (MTO)
- Hydro One
- Bell Canada
- Peel District School Board

Each meeting was attended by the Consultant Project Manager and Environmental Planner, and City staff representatives as required.

3.3.1 TAC Meeting #1

The first TAC Meeting was held on November 18, 2020, via Microsoft Teams. The purpose of the first meeting was to provide a review of the work completed for the multi-modal level or service assessment, existing background studies, problem and opportunity statement, and evaluation of alternative solutions.

During the meeting, Hydro One noted the presence of existing infrastructure directly south of the study area. It was later determined that the infrastructure was outside of the study area, and impacts are not anticipated as a result of the project.

The Region of Peel noted that the Steeles Avenue and Bramalea Road intersection experiences traffic delays, and suggested the project team evaluate alternative intersection configurations. Continued discussions were completed with Peel Region throughout the duration of the project, and will continue into detailed design.

3.3.2 TAC Meeting #2

The second TAC Meeting was held on September 7, 2022, via Microsoft Teams. The purpose of the second meeting was to provide a project update and review the draft PIC

#2 presentation and updated roll plan. The project team presented the draft preliminary preferred plan.

The Region of Peel provided additional feedback on the design of the regional intersections, including locations of the BRT stop locations, and will continue to be consulted into detailed design.

3.4 Agency Consultation

Several ministries, agencies and authorities were contacted during project initiation and throughout the study to notify them of the project and to request information related to the study area and feedback pertaining to the study. Agency comments received are included in **Appendix A.2**.

Elected Officials

- City of Brampton – Mayor
- City of Brampton – City Councilor, Wards 7 & 8
- City of Brampton – Regional Councilor, Wards 7 & 8

Provincial Agencies

- Ministry of Transportation
- Ministry of Natural Resources and Forestry
- Ministry of Citizenship and Multiculturalism (MCM)
- Ministry of the Environment, Conservation and Parks
- Ministry of Municipal Affairs and Housing
- Ministry of Indigenous Relations and Reconciliation
- Ministry of Education
- Infrastructure Ontario
- Toronto Region Conservation Authority

School Boards

- Peel District School Board
- Dufferin-Peel Roman Catholic Separate School Board

Municipal/Agency Staff

- City of Brampton
- Region of Peel
- City of Mississauga
- Peel Region Health Service
- 407 ETR
- Metrolinx
- CN Rail

Utilities

- Alectra
- Enbridge
- Hydro One
- Bell Canada
- Rogers Communication
- Zayo Canada Ltd.
- Telus Network

Emergency Services

- Region of Peel EMS
- Brampton Regional Police
- Peel Regional Police

Local Interest Groups

- Brampton Historical Society

The City of Brampton corresponded with key agencies throughout the duration of the study. Agencies provided invaluable feedback to ensure the project meets their specific standards and policies. Individual meetings were held with agencies as required to provide an update on the study status and to obtain input and comments at key points in the study. Meeting minutes are provided in **Appendix A.2**, and a summary of each meeting is provided below.

3.4.1 Region of Peel

The study area is located in the Region of Peel and includes two Regional Road intersections at Queen Street East and at Steeles Avenue, as such, Peel Region has been a key agency throughout the Bramalea Road Improvements EA study to ensure coordination with other initiatives in the Region.

Representatives from Peel Region attended TAC Meeting #1 and TAC Meeting #2, in addition to participating in an individual meeting on February 24, 2022. During and following these meetings, the Region of Peel has provided comments, specifically related to intersection improvements at Queen Street East and Bramalea Road, and Steeles Avenue and Bramalea Road. The comments were provided to ensure the intersections meet the Region's standards.

The Region of Peel will continue to be consulted during detailed design to refine the preferred intersection designs.

3.4.2 Toronto and Region Conservation Authority

Communications with the Toronto and Region Conservation Authority (TRCA) commenced September 17, 2018, at which time the TRCA approved a data request for background information on the study area, and provided interests in the study. TRCA continued to be engaged throughout the duration of the study. Representatives from TRCA attended TAC Meeting #1 and TAC Meeting #2. The TRCA will continue to be consulted during detailed design.

The ESR was provided to TRCA on November 25, 2022, for a 30-day review period. TRCA requested that additional water quality measures for the entire paved area be included in the ESR, in addition to preliminary Oil and Grit Separator sizing, and some discussion of Low Impact Development features within the study area.

3.4.3 407 ETR and Ministry of Transportation

The 407 ETR and MTO were engaged during the study through project notices and invitations to meetings. The first meeting was held jointly with 407 ETR and MTO on February 15, 2022. Staff from 407 ETR attended TAC meeting #2 on September 7, 2022. An individual meeting with 407 ETR was held on September 15, 2022. Meetings focused on discussing the proposed improvements on the Highway 407 overpass

structure, which includes the provision of active transportation facilities and sidewalks on both sides of the structure. The 407 ETR and MTO will continue to be consulted during detailed design to refine the improvements on the 407 ETR overpass structure.

3.4.4 Metrolinx

Metrolinx was engaged during the study through project notices, and attended TAC #1, TAC #2, and an individual meeting on July 7, 2022. The individual meeting discussed the improvements on the CN Rail overpass structure, which crosses over rail lines owned by CN Rail, which Metrolinx leases to accommodate their transit systems. Metrolinx advised of standards that need to be adhered to during construction. Metrolinx will continue to be consulted during detailed design.

An email was received from Metrolinx on October 24, 2022, with the following comments:

1. With regards to the Steeles-Bramalea intersection: Metrolinx has property along the south-west area. Please ensure that Metrolinx is copied on future iterations to ensure that there are no impacts to our lands. Further, Metrolinx may require agreements for works occurring adjacent to this space.
2. For the rail overpass section: please note that Metrolinx and CN will require flagging and other protective measures during construction.

3.4.5 CN Rail

The project team contacted CN Rail to discuss the proposed improvements to the overpass structure. CN Rail had no immediate issues with the improvements on the overpass. It was noted that once detail design is completed, the City will be required to submit the design to CN for review, in addition to obtaining a work permit from CN Rail. CN Rail will continue to be consulted during detailed design.

3.4.6 Alectra Utilities

The City initiated engagement with Alectra Utilities to discuss the potential impacts to existing utility infrastructure along Bramalea Road. Alectra attended TAC Meeting #2. Alectra will be consulted during detailed design.

3.4.7 Ministry of Environment, Conservation and Parks

The ESR was provided to MECP on November 25, 2022, for a 30-day review period. MECP provided feedback on the Air Quality Impact Assessment, requesting supporting data for the heavy-duty vehicle estimates, and studies to support the conclusion that queue jump lanes will alleviate congestion at main intersections. MECP also requested that the City commits to vegetation areas where the highest air quality impacts are expected, with coniferous hedges and/or shrubs due to the proximity to sensitive

receptors. Additional initiatives, such as potential implementation of electric buses, was added into the Air Quality Impact Assessment report. These items are noted in Section 10.4.

3.5 Indigenous Community and First Nations Engagement

The following Indigenous communities and First Nations were engaged as part of this study:

• Haudenosaunee Confederacy Chiefs Council	• Mississaugas of the Credit First Nation
• Six Nations of the Grand River	• Munsee-Delaware Nation
• Hiawatha First Nation	• Mississaugas of Scugog Island First Nation
• Alderville First Nation	• Métis Nation of Ontario

The first point of contact for this project was the Notice of Public Information Centre # 1, which was sent via email to the above communities on January 11, 2021. All public material has been forwarded to the above communities, and follow-up phone calls/emails were completed to ensure that communities had sufficient information to determine consultation interests. All interested parties were notified and invited to all PICs and given the opportunity to express concerns and provide feedback through an invitation to meet and via telephone calls soliciting discussion.

Correspondence was received from Mississaugas of the Credit First Nation, stating their interest in the study and requesting invitation to participate in a technical review of the archaeological assessment. The Project Team provided a copy of the Stage 1 Archaeological Assessment report, as requested. No comments were received regarding the archaeological assessment report.

The Indigenous community communication log, letters, and correspondence are provided in **Appendix A.3**.

3.6 Public Consultation

Two Public Information Centres (PICs) were held as a key component of the consultation process for this project to provide the public with an opportunity to ask questions and share comments, while assisting the development of a preferred plan.

PICs were held in a virtual format. A recorded presentation for public review was provided on the City's website (www.brampton.ca/BramaleaEA).

3.6.1 Public Information Centre 1

The first PIC was provided as a pre-recorded presentation on the City of Brampton project website, from January 11, 2021, to February 8, 2021, to present and solicit input on the problems being addressed, background information and the planning alternatives being considered. An online comment form was provided on the City's website, asking individuals to answer several questions related to the study. A total of 42 comment forms were submitted through the online form. Common themes of concern among participants included:

- Traffic delays/congestions
- Safety issues
- Risk of collisions
- Road conditions (driving surface, potholes, flooding, cracks)
- Lack of street trees and landscaping

In addition to the comment forms, 46 comments were received from agencies, members of the public and stakeholders. Presentation materials, the comment form, and a copy of all correspondence related to PIC 1 is provided in **Appendix A.4**.

3.6.2 Public Information Centre 2

The second PIC was provided as a pre-recorded presentation on the City of Brampton project website, from September 22, 2022, to October 21, 2022, to present and solicit input on the preliminary preferred design alternative. An online comment form was provided on the City's website, asking individuals to answer several questions related to the study. A total of 7 comment forms were submitted. Common themes of concern among participants included:

- Traffic delays/congestion
- Risk of collisions
- Lack of street trees and landscaping
- Lack of cycling facilities
- Road condition
- Safety issues

In addition to the comment forms, 3 comments were received from agencies, members of the public and stakeholders. Presentation materials, the comment form, and a copy of all correspondence related to PIC 2 is provided in **Appendix A.5**.

4.0 Policy Context

A summary of the provincial and municipal planning and policy context is provided below as it relates to the Bramalea Road Improvements Class EA. As the study aims to serve future travel demands, the planning documents reviewed consider long-term recommendations and vision for the study area and surroundings.

4.1 Provincial Policy Statement

The Provincial Policy Statement (PPS 2020) is issued under the Planning Act, R.S.O. 1990, c.P.13 and supports the planning of land uses across the province. The PPS 2020 provides policy direction for the use and management of land, as well as infrastructure, while protecting the environment and resources and to ensure opportunities for employment and residential development.

Sections of the PPS 2020 that are applicable to the planning of transportation infrastructure include Part V Policies. Specifically, Section 1.6.7 outlines the policies for infrastructure and public service facilities under transportation systems. The policies state that, “Transportation systems should be provided which are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs.” A multimodal transportation system is to provide connectivity within and amongst the transportation systems. Improving connections across jurisdictional boundaries should be considered where possible. Land use patterns should be planned to minimize the length and number of vehicle trips, as well as to support existing and future active transportation and transit services.

Through the PPS 2020, the province seeks to ensure that its resources are managed in a sustainable manner to protect essential ecological processes and public health and safety, minimizing environmental and social impacts to meet long terms needs.

4.2 City of Brampton Official Plan

The City of Brampton Official Plan was adopted in 2006 and approved by the Ontario Municipal Board (OMB) in 2008. The updated September 2020 Office Consolidation includes OMB decisions and LPAT decisions that have resolved several of the appeals the to 2006 Official Plan as well as amendments made to reflect Council decisions. The Official Plan is authorized under Part I of the *Planning Act*, which constitutes a legal document upon adoption, by The City of Brampton and approval by the Region of Peel.

The purpose of the 2006 Official Plan was to build on the sense of civic pride and to move more aggressively towards a sustainable community that caters to the needs and desires of its residents, which will ultimately develop a distinct community. The Official

Plan charts the land use decision-making within the municipality until 2031, which is used as the groundwork for addressing future infrastructure development decisions for built, form, transportation, and environment opportunities.

The Plan gives clear direction on how physical development and land-use decisions should take place to meet current and future needs of its residents and provides policy guidance for businesses in their decision to grown and invest in the City of Brampton.

4.3 City of Brampton Transportation Master Plan

The City of Brampton's Transportation and Transit Master Plan (TTMP) was developed in 2004 and revised in 2015 as the City of Brampton Transportation Master Plan to address the existing transportation challenges and provide strategic solutions to help facilitate the population and employment growth the City is anticipating to experience by 2041. The policies outlined in the TMP promote an "integrated and efficient transportation system to support a vibrant economy and high quality of life". The strategy highlights the importance of implementing transit, active transportation, and transportation demand management measures to improve the overall road network for horizon years to the years 2041.

According to the TMP Strategic Framework Elements, Queen Street and Steeles Avenue will be designated BRT routes within the study area. A commuter parking lot is identified on the northeast corner of Bramalea Road and Steeles Avenue East. The proposed 2021 Road Network first introduced the widening of Bramalea Road from 4 to 6 lanes from Queen Street East to the south city limits as a possible transportation network improvement.

The existing level of transit service within the study area is a service frequency of 10-20 min along Bramalea Road, which is classified as a Secondary Corridor. The 2011 Strategic Transit Framework improves the service frequency to 10-15 minutes. The 2021 Strategic Transit Framework classifies Bramalea Road as a Primary Corridor and improves the transit frequency to 5 - 7.5 minutes.

4.4 City of Brampton 2040 Vision

In 2019, the City of Brampton opted to develop a new Official Plan. The Brampton 2040 Vision is a comprehensive document guiding Brampton's future as a connected, inclusive, and innovative city. The vision gathered feedback from residents through extensive public engagement to bring together the vision for the plan, with guides for implementation to outline actions for change to be achieved by the year 2040. This includes the development of complete neighbourhoods and refreshed communities as a model of next generation comfort and sustainable living, while remaining true to its mid-century image. In order for the vision to take reality, street and traffic improvements are

vital to complete streets and improve the overall transportation network within and beyond the City of Brampton.

Specific to Bramalea Road, the Vision 2040 plan upholds the proposed improvements of the Transportation Master Plan to the widen from 4 to 6 lanes, include multi-use paths / boulevard paths for pedestrians and cyclists, and accommodate for a future ZUM corridor. The Vision 2040 plan highlights the importance of prioritizing pedestrian, cyclists, transit then auto within the transportation network, and proposes open space and trail connections along Bramalea Road.

4.5 City of Brampton PathWays Master Plan

The City of Brampton's PathWays Master Plan (2002) outlines objectives and guidelines to aid in the development and maintenance of the pathway system in Brampton. The pathway system is an important component of the City's open space infrastructure and seeks to connect parks and valleys together and provide convenient routes for pedestrians and cyclists.

The Recommended PathWays Network map shows that the Bramalea Road study area will be primarily lined with neighbourhood/planning district pathway networks. These networks are intended to provide neighbourhood connections to the community network. The pathway is classified as Class I (off-road multi-use path) from Queen Street East to Avondale Boulevard. The remainder of Bramalea Road is classified as Class II (on-road bike lanes).

4.6 City of Brampton Active Transportation Master Plan

The City of Brampton's Active Transportation Master Plan (ATMP) highlights the importance of developing an integrated, attractive, and accessible system of active transportation facilities, to keep Brampton a safe and convenient city with accessibility connecting all modes of transportation. The plan outlines the key goals which will improve the safety, accessibility, and value of existing and proposed active transportation facilities in the expanding transportation network.

The ATMP proposes a Multi-Use Path / Boulevard Path along the Bramalea Road Corridor, where cycling facilities currently do not exist. Multi-use paths provide a multi-modal function for both pedestrians and cyclists.

4.7 Region of Peel Official Plan

The purpose of the Region Official Plan is to establish a long-term regional strategic policy framework for guiding growth and development while protecting the natural

environment; managing resources; outlining a regional structure; interpreting provincial policy within the Peel context; providing the basis for area municipal planning; recognizing the duality of urban and rural Peel; protecting and enhancing Peel's heritage; ensuring health and safety for those living and working in Peel; and maintaining fiscal sustainability.

The general objectives of the transportation system in the Region of Peel are to achieve the safe, convenient, and efficient movement of people and goods in the Region. The plan seeks to develop and promote a sustainable, safe, efficient, effective, and integrated multi-modal transportation system. The Region is focused on maximizing the capacity of the transportation system by focusing on moving people and goods rather than on moving vehicles. The improvements will minimize adverse environmental and human health impacts caused by transportation and support transportation alternatives that foster improved health and well-being in the Region.

These practices are being carried within the Bramalea Road EA, as this project is focused on creating a balanced multi-modal corridor, which prioritizes alternate modes of transportation before vehicles.

4.8 Region of Peel Long Range Transportation Master Plan

The Region of Peel Long-Range Transportation Master Plan “Let’s Move Peel” was developed in 2019 and is intended to guide transportation development and accommodate future growth. The plan was endorsed by Regional Council on June 13, 2019.

The Plan serves as the basis for:

- recommended Transportation Infrastructure Programming;
- the Transportation Capital Budget and 10-year Program; and,
- input into the Development Charges Background Study and By-law Update in 2020.

The overall focus of the Plan is to improve mobility from the lens of sustainability, safety, and efficiency to meet the demand of the growing Region. The Plan supports planned road improvements based on capital plans and master plans from local municipalities, and encourages enhanced transit, active transportation, and carpool infrastructure.

4.9 Region of Peel Active Transportation Master Plan

The Region of Peel undertook a study to complete the Active Transportation Plan to encourage a balanced, integrated, and sustainable transportation system. Specifically, this Plan supports the integration of active transportation facilities to promote the reduction of vehicle gas emissions and improve citizen health.

The Region of Peel Pathways Routing Plan (2010) for the City of Brampton proposes a Class I (off-street) pathway along Bramalea Road within the study area. There is an area between Balmoral Drive and Avondale Boulevard that is additionally classified as an Existing Master Plan Pathway, which is outlined in the City of Brampton's Official Plan.

4.10 Region of Peel Strategic Goods Movement Network Study

The Region of Peel is an important centre for the multi-modal movement of goods and good-generating industries. As a result, the Region of Peel, and its encompassed municipalities (City of Brampton, City of Mississauga and Town of Caledon) agree that a comprehensive analysis of truck routes is necessary to maintain and improve the Region's economic standing. The goal of the Strategic Goods Movement Network Study (SGMNS) was to develop a "systematic, hierarchical truck route network throughout Peel".

After the evaluation of several alternatives, the final SGMN strategy is to use Bramalea Road between Steeles Avenue East and the south city limit as a connector truck route. A connector truck route is meant to be maintained and operated for general mixed-use traffic but must also accommodate safe and efficient truck movements through key segments and intersections. Both Queen Street East and Steeles Avenue East are classified as primary truck routes.

4.11 Climate Change

The MECP's guide, *Consideration of Climate Change in the Environmental Assessment Process*, outlines two approaches for consideration and addressing climate change in project planning including:

- Reducing a projects impact on climate change (climate change mitigation).
- Increasing the projects and local ecosystems resilience to climate change (climate change adaptation).

The objectives of the climate change document have been considered and incorporated into the generation and evaluation of alternatives and mitigation approaches.

4.12 Other Related Initiatives and Studies

4.12.1 Bramalea GO Station Improvements and Parking Expansion

The existing Bramalea GO Station is located in the southwest corner of the Bramalea Road/Steeles Avenue East intersection. The associated parking lot is located on three

properties to the north and south of the rail line, on both sides of Bramalea Road. Two driveways access Bramalea Road at the north parking lot (west and east sides of Bramalea Road), which currently operates under stop control and traffic signal control respectively.

The proposed improvements to the Bramalea GO Station include increased bus accommodations, greater levels of bus segregation, improved routing flexibility and access, increased parking capacity, and increased public connectivity within the station area.

Off-site road improvements are also recommended to accommodate potential traffic volume increases at the GO Station. With the Bramalea Road improvements highlighted in the Bramalea GO Station Improvements Master Plan, traffic analyses indicate the new signalized driveway will not interfere with the north or south signalized intersection operations.

4.12.2 Metrolinx 2041 Regional Transportation Plan (RTP)

The Metrolinx 2041 Regional Transportation Plan (RTP) outlines a plan to provide people with access to fast, frequent and reliable transit, making it easier for travelers to use transit, or travel by bike or on foot. The 2041 RTP guides the transportation system in the Greater Toronto and Hamilton Area (GTHA), to build an integrated multimodal regional transportation system.

The RTP identifies the Dixie/Bramalea corridor as a Priority Bus. Key characteristics of a Priority Bus corridor includes enforced HOV lanes or other traffic restrictions (typically aligned to curb), queue jump lanes and signal priority at intersections, and faster operating speeds than mixed-traffic operation.

5.0 Existing Conditions

5.1 Transportation

A transportation assessment was completed to identify the existing transportation conditions in the corridor, considering all modes of transportation (i.e., motorists, cyclists, pedestrians, and transit). A copy of the report is provided in **Appendix B** of the ESR. A summary of the findings is provided below.

5.1.1 Major Road Network

Bramalea Road: A four-lane minor arterial roadway which runs north-south and has a posted speed limit of 60 km/h. As per the City of Brampton Traffic Bylaws, trucks are restricted from driving along Bramalea Road from East Drive to beyond Queen Street East. Bramalea Road is identified within the City of Brampton Transportation Master Plan as a candidate for widening from four to six lanes by 2021 for the segments from Queen Street East to the south City limits, and Bovaird Drive East (north of the study area) to Queen Street East. In addition, a Züm corridor is proposed, between Bovaird Drive and Steeles Avenue by 2031. Queue jump lanes may be implemented along Bramalea Road at the far-side of the intersections with Queen Street and Steeles Avenue.

Queen Street East: A six-lane major arterial roadway under the jurisdiction of Peel Region which runs east-west. Queen Street East has a posted speed limit of 60 km/h. Bus queue jump lanes are provided far-side at the signalized intersection of Queen Street East with Bramalea Road.

Fleetwood Crescent-Knightsbridge Road: A local roadway with a four-lane cross-section west of Bramalea Road and a two-lane cross-section east of Bramalea Road. There is no posted speed limit along Fleetwood Crescent and Knightsbridge Road, therefore it is assumed that the statutory speed limit of 50 km/h applies. Fleetwood Crescent-Knightsbridge Road forms a signalized intersection with Bramalea Road.

Clark Boulevard: A four-lane collector roadway which runs east-west and has a posted speed limit of 50 km/h. Clark Boulevard forms a signalized intersection with Bramalea Road.

Balmoral Drive: A four-lane collector roadway which runs east-west and has a posted speed limit of 50 km/h. Balmoral Drive tapers down to a two-lane cross-section approximately 100 m west of Bramalea Road. Balmoral Drive forms a signalized intersection with Bramalea Road.

Avondale Boulevard-Dearbourne Boulevard: A collector roadway with a four-lane cross-section east of Bramalea Road (Dearbourne Boulevard) and a two-lane cross-section west of Bramalea Road (Avondale Boulevard). The posted speed limit along Avondale Boulevard and Dearbourne Boulevard is 50 km/h. Avondale Boulevard-Dearbourne Boulevard forms a signalized intersection with Bramalea Road.

East Drive: A two-lane collector roadway on the east side of Bramalea Road which runs east-west and has a posted speed limit of 60 km/h. East Drive forms a signalized intersection with Bramalea Road.

Orenda Road: A two-lane collector roadway on the west side of Bramalea Road which runs east-west and has a posted speed limit of 60 km/h. Orenda Road forms a signalized intersection with Bramalea Road.

Steeles Avenue East: A six-lane major arterial roadway under the jurisdiction of Peel Region which runs east-west and has a posted speed limit of 70 km/h. Steeles Avenue East forms a signalized intersection with Bramalea Road. Steeles Avenue is identified within the City of Brampton TMP as having improved transit operations by 2041, possibly in the form of rail or bus services operating in their own exclusive lanes.

Highway 407: A ten-lane provincial highway which runs east-west and has a posted speed limit of 100 km/h. The Highway 407 Westbound Off-ramp forms a signalized intersection with Bramalea Road. The interchange is a “partial” interchange in that it has eastbound on and off-ramps, a westbound off ramp, but no access to the westbound lanes.

Study area road classifications are illustrated in **Figure 3**.

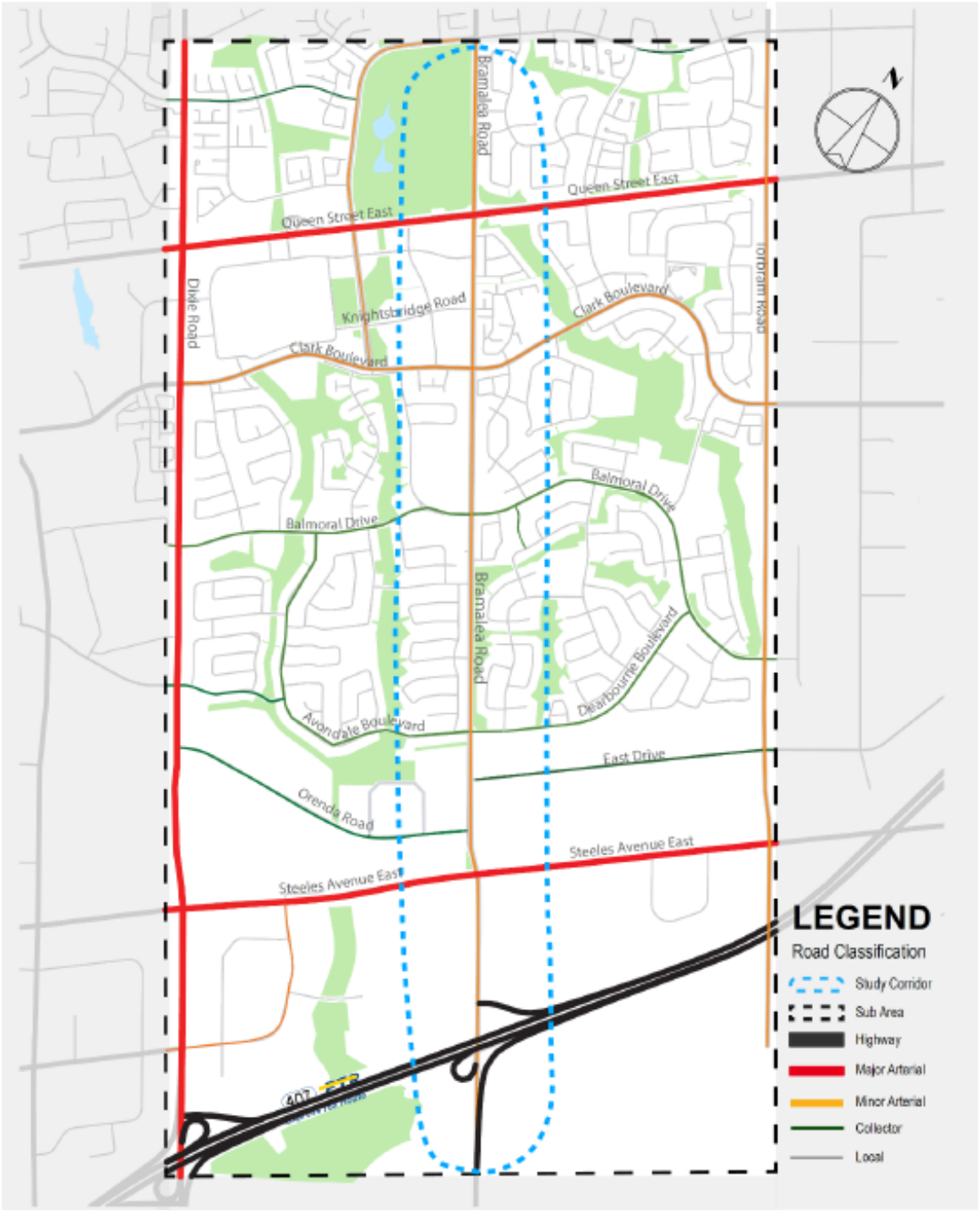

Figure 3: Study Area Road Classifications

5.1.2 Intersections

The study area includes the following intersections along the Bramalea Road corridor:

- Queen Street East and Bramalea Road
- Knightsbridge Road/Fleetwood Crescent and Bramalea Road
- Clark Boulevard and Bramalea Road
- Balmoral Drive and Bramalea Road
- Avondale Boulevard/Dearbourne Boulevard and Bramalea Road
- East Drive and Bramalea Road
- Orenda Road and Bramalea Road
- Steeles Avenue and Bramalea Road
- Highway 407 Westbound off ramp

5.1.3 Transit Network

The study corridor is well served by public transit, with bus options available via GO Transit, Brampton Transit, and Züm. The Bramalea GO Station, located at the intersection of Bramalea Road / Steeles Avenue East, is a mobility hub which services bus and GO rail connections. Bus stops are provided along the Bramalea Road corridor and intersecting roads, with east-west transit queue jump lanes provided on the far side of the intersection of Bramalea Road / Queen Street East. The Bramalea GO Station and the nearby area are the subject of an on-going study to assess the opportunities and constraints for future development and will likely see significant intensification. Transit routes servicing the stops within the Study corridor are detailed in Appendix B of the Traffic Analysis report.

Bus capacity information was provided by Brampton Transit Staff as follows:

- Non-Züm Buses: Standard loads are 58 to 40’ buses (including 115 Airport Express) during weekday peak periods, and 39 during weekday off-peaks and weekends.
- Züm Buses: Standard loads are 52 for 40’ buses and 74 for 60’ buses during weekday peak periods for 39 for 40’ buses and 56 for 60’ buses during off-peaks and weekends.

The estimated daily and peak hour capacity of the Brampton Transit routes is summarized in Appendix B of the transportation report. The peak hour transit passenger capacities are calculated based on assuming 60’ buses will be used in Züm routes during the peak hour. Under the existing conditions, the buses within the study corridor operate within the available capacity. Appendix B includes the typical weekday total boarding and alighting information for bus routes traveling along Bramalea corridor by route at stops located along Bramalea corridor within the study area. Existing Transit routes are illustrated in **Figure 4**.

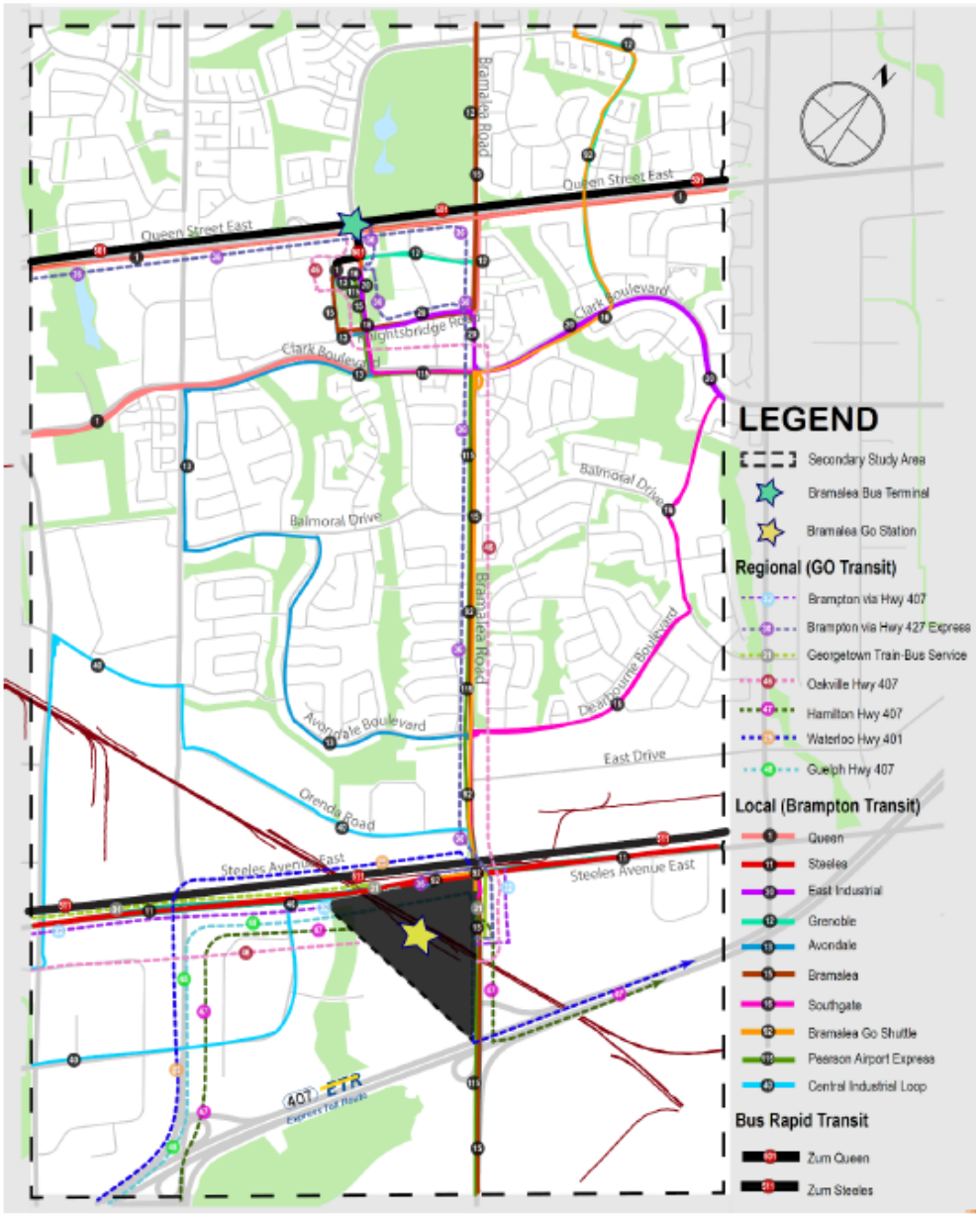

Figure 4: Existing Transit Routes

5.1.4 Active Transportation Network

Overall, the study corridor is able to accommodate pedestrian movements through sidewalks and multi-use paths, however, some segments of the corridor do not currently have pedestrian facilities available. Multi-use paths are provided along the north-west and south-east quadrants of Bramalea Road / Queen Street East, and along the east side of Bramalea Road between Darras Court and Avondale Boulevard-Dearbourne Boulevard. The following areas do not have pedestrian facilities available:

3. Bramalea Road, east side between Steeles Avenue East and Bramalea GO Access;
4. Bramalea Road, east and west sides between Bramalea GO Access and south city limits; and
5. Various local road connections.

It is noted that although pedestrian facilities are provided adjacent to Bramalea Road, connections are occasionally not provided to all townhouse complexes, or to all bus stops and shelters, such as opposite to Algonquin Boulevard and Alexandria Gate.

Currently, there are no designated bicycle facilities provided within the Study corridor. Cyclists travelling through the study area are therefore required to travel within the vehicle travelled portion of the roadway, or along the limited multi-use paths. The existing active transportation facilities are illustrated in **Figure 5**.

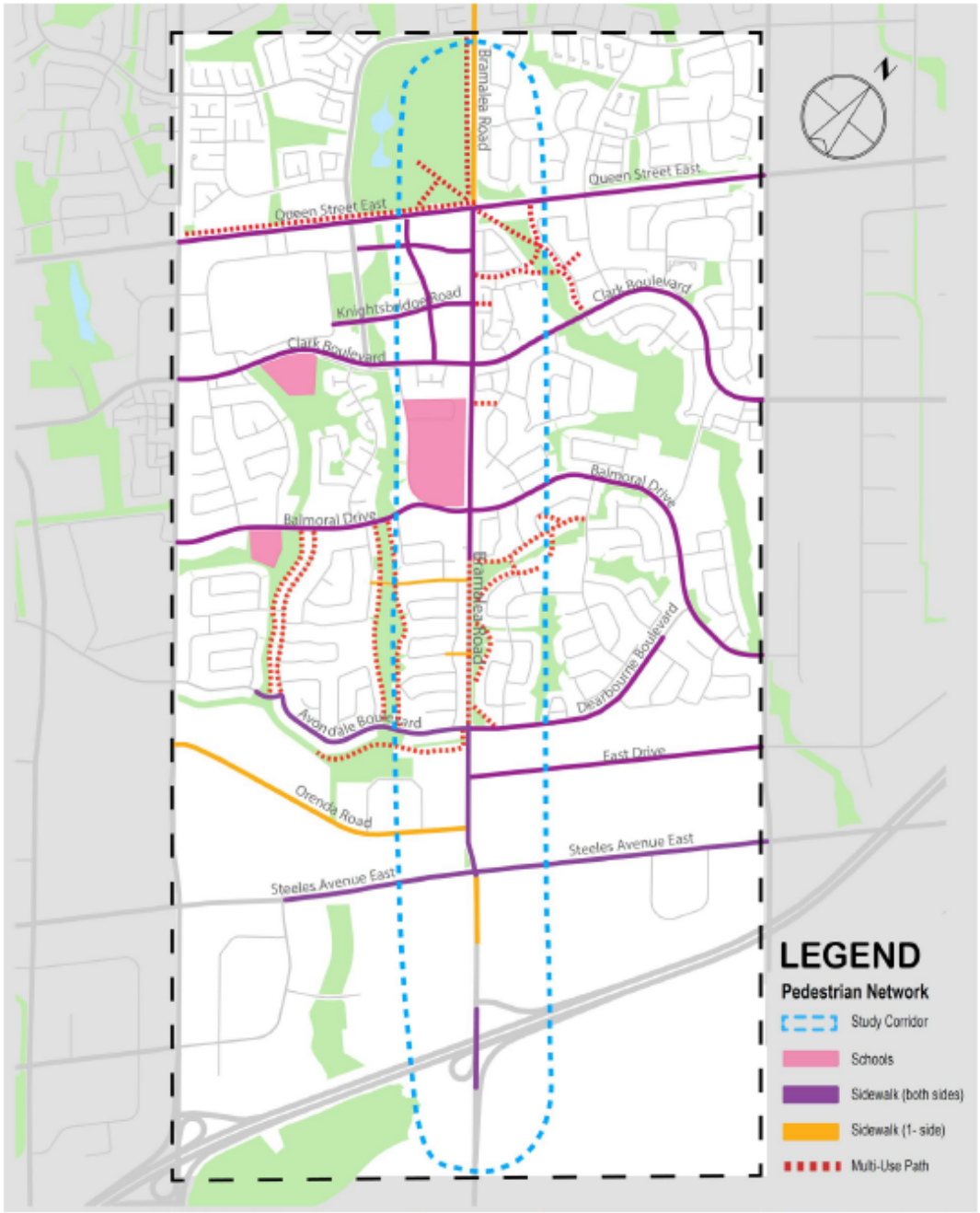

Figure 5: Existing Active Transportation Facilities

5.1.5 Truck Network

The City of Brampton enforces a General Traffic Bylaw (No. 93-93 Part IX), updated October 26, 2021, designating Bramalea Road from East Drive northerly as “No Heavy Vehicles Anytime”. This status will be maintained following the improvements to

Bramalea Road. Truck traffic is directed to alternative roads within Brampton. The redirection of truck traffic allows for safer and more efficient movement for alternative modes of transportation along Bramalea Road.

5.1.6 Existing Level of Service

Level of Service (LOS) is a mechanism used to determine how well transportation facility is operating from a traveler's perspective. The existing conditions transportation assessment considered the LOS for transit, bicycles, pedestrians and automotive. As illustrated in **Figure 6,** Level of Service A, B, C, and D are considered to have high LOS, meaning these modes of transportation are functioning relatively well along the corridor. Alternatively, Level of Service E and F are considered to have low LOS, meaning these modes of transportation are functioning poorly along the corridor.

Mode	High Level of Service (LOS A, B, C, D)		Low Level of Service (LOS E, F)	
	A / B / C	D	E	F
Transit	Short delays, high levels of reliability		Long delays, low levels of reliability	
Bicycles	High level of comfort, low level of risk/stress		Low level of comfort, high level of risk/stress	
Pedestrians	High level of comfort, low risk, short delays		Low level of comfort, high risk, long delays	
Automotive	Low lane utilization		High lane utilization	
Trucks	Unimpeded movement, short delays		Impeded movement, long delays	

Figure 6: Definition of Level of Service

The Multi-Modal Level of Service (MMLOS) for Transit, Bicycles, Pedestrians, Automobiles, and Trucks is shown in **Figure 7**, representing the existing morning peak hour conditions along Bramalea Road. Transit has a LOS 'E" or 'F", meaning poor function along the corridor. Bicycles have LOS 'E' or 'F' along the majority of the corridor indicating poor function and availability, with LOS A/B/C between Balmoral Drive and Dearbourne Boulevard where there is an existing multi-use path, operating well in this section. Pedestrians have LOS 'E' or 'F' along the majority of the corridor, with LOS D between Balmoral Drive and Dearbourne Boulevard where there is an existing multi-use path, meaning it is generally functioning poorly. Automotive has LOS 'A/B/C', 'D' and 'E' along the corridor. The LOS for automobiles is better on the west side of the corridor and has lower LOS on the east side during the am peak hour. Trucks have LOS 'A/B/C' along the corridor.

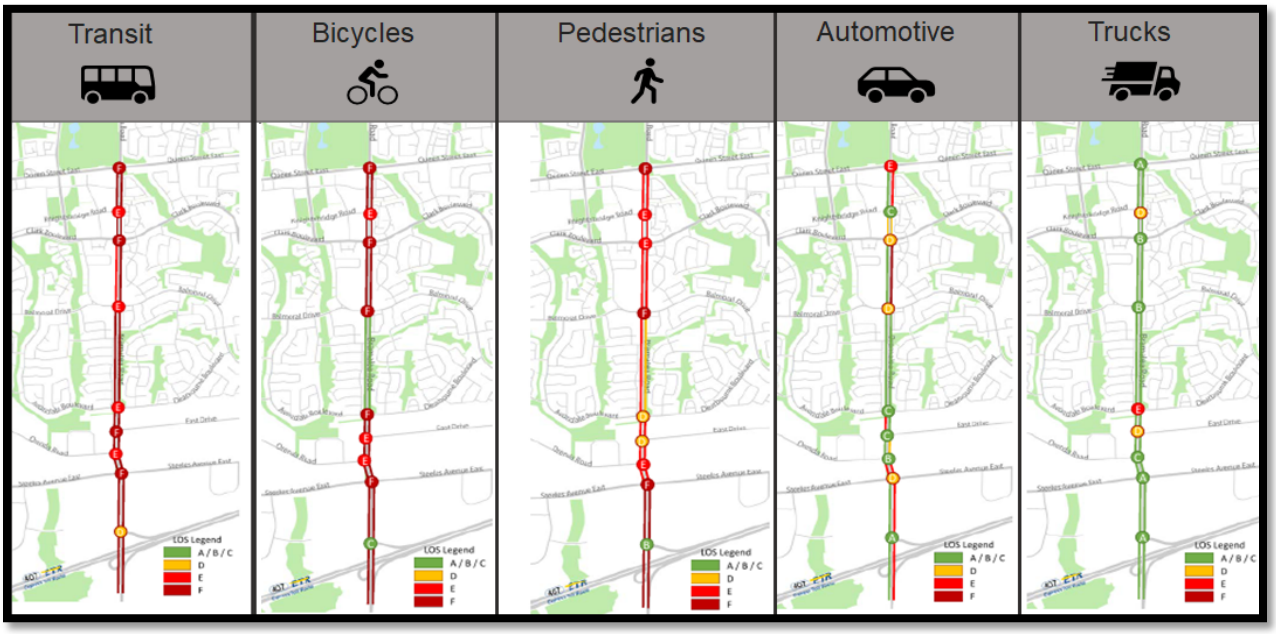

Figure 7: Existing Level of Service

5.2 Socio-Economic Environment

According to the City of Brampton's General Land Use Designations Map (2017), the land use in the study area is primarily Residential, with Industrial, Office and Business Corridor designated lands to the south. Brampton's Central Area also lines the corridor west of Bramalea Road from Queen Street East to Clark Boulevard. This area is a designated "Growth Centre" according to the Provincial Growth Plan and is an important Regional Node which includes significant Civic, Institutional, Cultural, Entertainment, Commercial, Employment and Residential uses.

The designated Industrial, Business and Office areas are predominantly located south of Avondale Boulevard. The adjacent areas located south of the GO rail line are generally designated as provincial highway areas, with small pockets of industrial land-use on both the east and west side of Bramalea Road. Areas north of Avondale Boulevard are designated as residential areas, with the exception of the Central Area land located to the west of Bramalea Road.

The City of Brampton's Secondary Plan Areas Map (2017), **Figure 8**, identifies that the Bramalea Road corridor is within or directly adjacent to by 3 separate secondary areas, including:

- Queen Street Corridor
- Bramalea
- Bramalea Mobility Hub

These plans influence transportation along the Bramalea Road corridor.

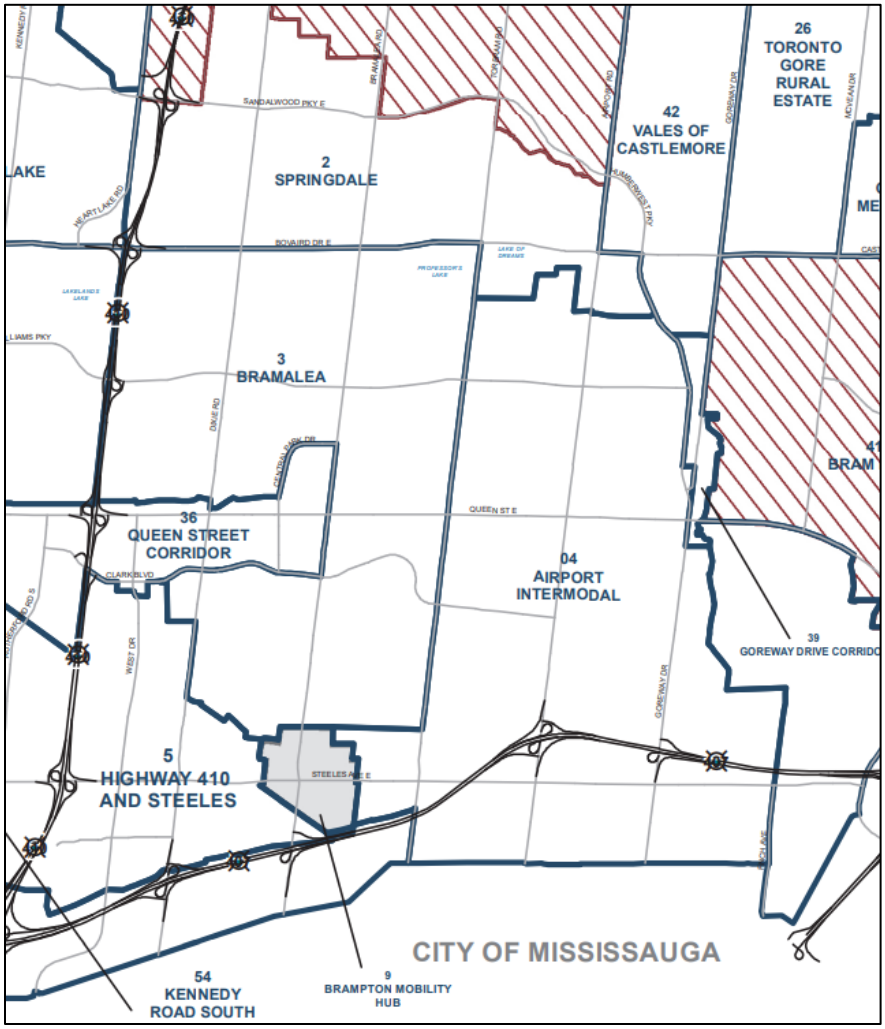

Figure 8: City of Brampton Secondary Plan Areas

5.3 Cultural Environment

5.3.1 Cultural Heritage Resources

As required by the MCEA EA document and the Provincial Policy Statement (PPS), a Cultural Heritage Resources Assessment (CHRA) was completed to identify cultural heritage resources, including built heritage and cultural heritage landscapes, present in the study area. Potential heritage resources were identified, inventoried, and evaluation according to *Ontario Regulation* (O. Reg.) *9/06*, the criteria for determining cultural heritage value or interest (CHVI) (Government of Ontario 2006a). Where CHVI was

identified, the resource was mapped, and recommendations made for further study. A copy of the Cultural Heritage Resource Assessment report is included in **Appendix C**.

In order to identify protected properties, the Ontario Heritage Trust (OHT), and the City were consulted. As a result of the consultation, three previously recognized properties were identified in relation to the study area. Two of these properties were determined to be situated within the study area.

A windshield survey was undertaken on December 11, 2018, to identify potential heritage resources and confirm the presence of previously identified potential heritage properties. Where identified, the potential heritage properties were photographed from the public right-of-way. A total of 140 properties were identified as potential heritage properties. In each case, evaluation of CHVI of the property was undertaken according to O. Reg. 9/06. Each potential heritage resource was considered both as an individual structure and as a landscape. Following the evaluation, six cultural heritage resources (CHRs) were identified within the study area, **Figure 9**. **Section 10.6** discusses potential impacts and proposed mitigation measures.

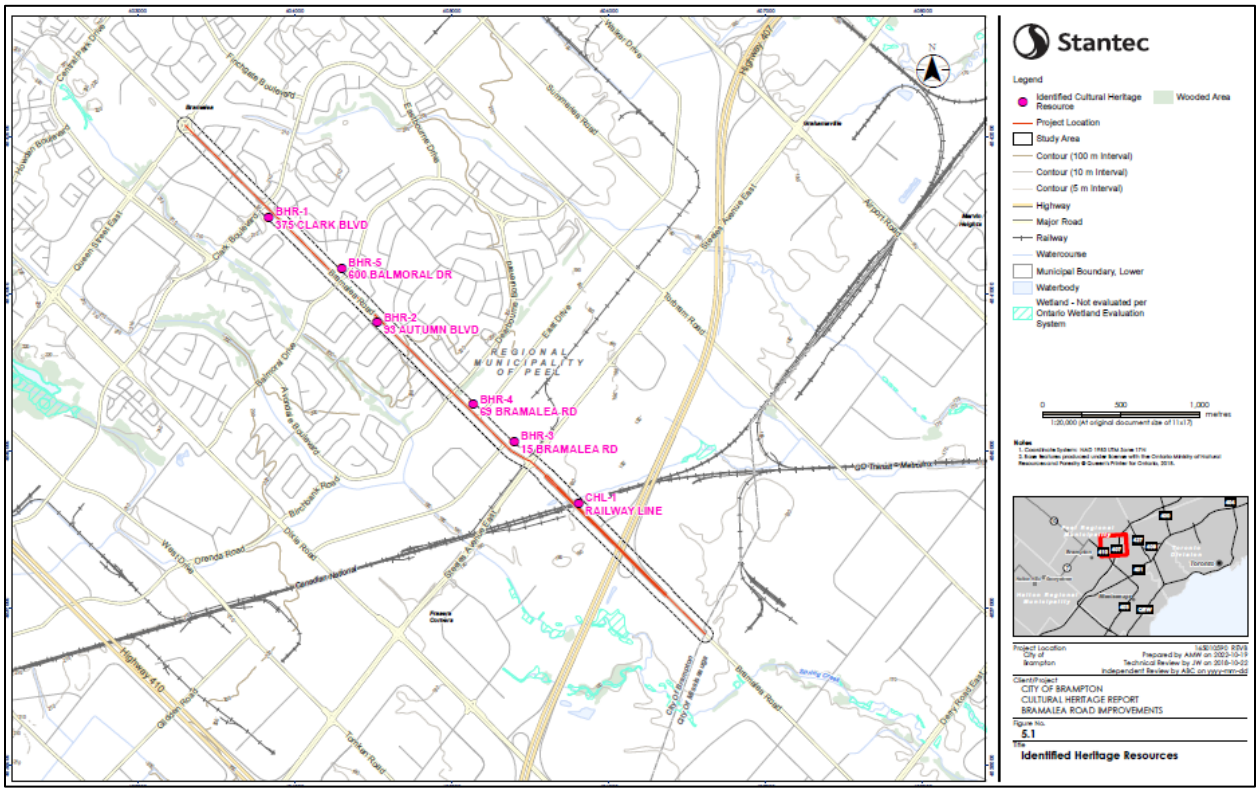

Figure 9: Identified Cultural Heritage Resources

5.3.2 Archaeological Resources

A Stage 1 Archaeological Assessment was completed in accordance with the *Environmental Assessment Act* (Government of Ontario 1990c). The Stage 1 archaeological assessment property inspection took place on December 15, 2018. The results of the Stage 1 archaeological assessment determined that much of the study area retains low to no archaeological potential as it includes extensive land disturbance related to urban residential, commercial and industrial development. However, the remaining portion of the study area retains potential for the identification and documentation of archaeological resources. A Stage 2 archaeological assessment is recommended for portions of the study area which impact an area of archaeological potential and will be completed during detailed design.

The Stage 1 archaeological assessment was submitted to MCM and has been accepted into the Ontario Public Register of Archaeological Reports. A copy of the report is provided in **Appendix D**.

5.4 Natural Environment

A terrestrial habitat assessment was completed to identify natural and anthropogenic vegetation and wildlife habitat features in the study area and to evaluate their significance. The work included Ecological Land Classification (ELC) of vegetation communities using the ELC system for Southern Ontario (Lee et al. 1998), a detailed tree inventory and bat root assessment, and identification of wildlife habitat features according to the Significant Wildlife Habitat Criteria Schedules for EcoRegion 7E. A copy of the report is provided in **Appendix E**, with a summary provided below.

5.4.1 Natural Heritage Features and Areas

There were no significant natural heritage features identified in the study area according to Land Information Ontario mapping (MNRF 2018b).

A candidate significant wildlife habitat (SWH) assessment was conducted using guidance provided in the SWH Criteria Schedules for Ecoregion 7E (MNRF 2015). The SWH Criteria Schedules include four (4) general types of significant wildlife habitat: seasonal concentration areas, rare or specialized habitat, habitat for species of conservation concern, and wildlife movement corridors. Potential suitable habitat for Common Nighthawk (Special Concern and provincially rare (S1-S3) wildlife) was identified in the meadow communities in the study area.

5.4.2 Vegetation

Vegetation communities were first delineated on aerial imagery and then verified in the field on November 21, 22 and 27, 2018. Provincial significance of vegetation

communities was based on the ranking assigned by the Natural Heritage Information Centre (MNRF 2018a). The vegetation community types are briefly described below in **Table 1**. All ELC vegetation community types are common in Ontario.

Table 1: Ecological Land Classification Vegetation Types

ELC Type	Community Description
Meadow (ME)	
ME Meadow	The ME meadow community was part of a complex of meadow and thicket south of Highway 407, on the west side of Bramalea Road.
MEGM3 Dry-Fresh Graminoid Meadow	The MEGM3 meadow communities occurred at the south end of the study area near the railroad tracks and Highway 407. Meadow species were dominated by grasses.
MEMM3 Dry-Fresh Mixed Meadow	The MEMM3 meadow communities occurred at the south end of the study area near the railroad tracks and Highway 407. Meadow species were dominated by herbaceous plant species.
Thicket (TH)	
THD Deciduous Thicket	The THD deciduous thicket community was located in the eastbound Highway 407 ramp, and was part of a complex of meadow and thicket south of Highway 407, on the west side of Bramalea Road.
Open Water (OA)	
OA Open Water	The OA community consisted of a stormwater management pond in the Go-Station parking lot.
Agricultural (OAG)	
OAGM1 Annual Row Crops	The OAGM1 communities occurred at the south end of the study area on both sides of Bramalea Road.
Constructed	
CGL_2 Parkland	The CGL_2 parkland communities occurred in the north end of the study area and consisted of manicured lawn with occasional planted trees. Recreational trails occurred throughout these features
CGL_4 Recreational	The CGL_4 recreational community was at the north end of the study area, and consisted of manicured lawn adjacent to a football stadium.

ELC Type	Community Description
CVC_1 Business Sector	The CVC_1 business communities were scattered throughout the study area.
CVC_2 Light Industry	The CVC_2 industrial communities were located at the south end of the study area.
CVI_1 Transportation	The CVI_1 transportation communities represented roadways throughout the study area, and the Go Train Station immediately north of the railroad tracks.
CVI_4 Power Generation	The CVI_4 power generation community consisted of an electrical transformer station.
CVR Residential	The CVR communities consisted of residential properties.
CVR_2 High Density Residential	The CVR_2 communities consisted of high-rise apartment buildings and townhouse complexes.
CVR_3 Single Family Residential	The CVR_3 communities consisted of residential subdivisions with single family homes.
CVS_1 Education	The CVS_1 community represented a school on the west side of Bramalea Road.
Lawn	Manicured lawn was associated with the above constructed communities.

All trees in the road right-of way were assessed during a detailed tree inventory. Tree details are provided in **Appendix D** and included tree species, diameter at breast height (DBH), dripline radius, and an assessment of general tree health. There were no species at risk or provincially rare trees recorded in the right-of-way. All trees were also assessed for suitability for bat roosts, which resulted in no suitable bat roost trees observed in the right-of-way.

5.4.3 Wildlife

There were no recent occurrences (within the past 20 years) of provincially rare species or SAR in the study area in the NHIC database. The background review of wildlife atlases identified thirteen (13) provincially rare species that have been previously documented or have potential to occur within the study area. Of these, eight (8) species are provincially listed as threatened or endangered.

The following provincially rare species have potential suitable habitat within the study area:

- Common Nighthawk
- Eastern Meadowlark
- Monarch
- Rusty-patched Bumble Bee

5.4.4 Species at Risk Habitat Assessment

The SAR habitat assessment is based on the results of the background information review and the Terrestrial Habitat Assessment.

5.4.4.1 Birds

The Ontario Breeding Bird Atlas (Cadman et. al 2007) identified seven (7) bird species from the 10k x 10km square that overlaps with the study area: four provincially and federally threatened species (Bank Swallow, Barn Swallow[1], Chimney Swift and Eastern Meadowlark) and three provincial special concern species (Common Nighthawk, Eastern Wood-Pewee and Wood Thrush).

Common Nighthawk and Eastern Meadowlark are grassland species. Potential suitable habitat was present for these species in the study area.

5.4.4.2 Invertebrates

The study area is within the range of Monarch in Southern Ontario (MNRF 2018b). Potentially suitable foraging habitat for Monarch was present in the study area.

Species range maps on the Species at Risk Ontario website (MNRF 2018b) identified occurrences of Rusty-patched Bumblebee close to the study area (Mississauga). Potential suitable foraging habitat for Rusty-patched Bumblebee was present within the study area.

5.4.4.3 Potential Impacts

Meadow habitat in the southern section of the study area has the potential to provide habitat for Common Nighthawk, Eastern Meadowlark, Monarch and Rusty-patched

[1] The Committee on the Status of Species at Risk in Ontario (COSSARO) submitted their 2021 Annual Report to MECP on January 26, 2022. The report recommended the down-listing of Barn Swallow from threatened to special concern. The MECP has until January 25, 2023, to make and file any corresponding amendments to O. Reg. 230/08 (i.e., the Species at Risk in Ontario [SARO] List). If Barn Swallow is down-listed to special concern on the SARO List, authorization under the ESA will not be required to remove the nests. Active nests will continue to be protected under the MBCA.

Bumblebee; however, construction activities are limited to the road right-of-way, and no impacts to the habitat are anticipated.

5.5 Drinking Water Source Protection

The study area falls within the Toronto & Region Source Protection Authority. Information provided by interactive mapping through the Drinking Water Source Protection website indicates that the study area is not within Well Head Protection Areas, Intake Protection Zones, Highly Vulnerable Aquifers or Significant Groundwater Recharge Areas. It should be noted that in the area south of Steeles Avenue and west of Bramalea Road, adjacent to the project study area, there is a Highly Vulnerable Aquifer, where it is easier for water to pass through the ground surface, and is easily changed or affected by contamination. **Figure 10** displays the source water protection mapping.

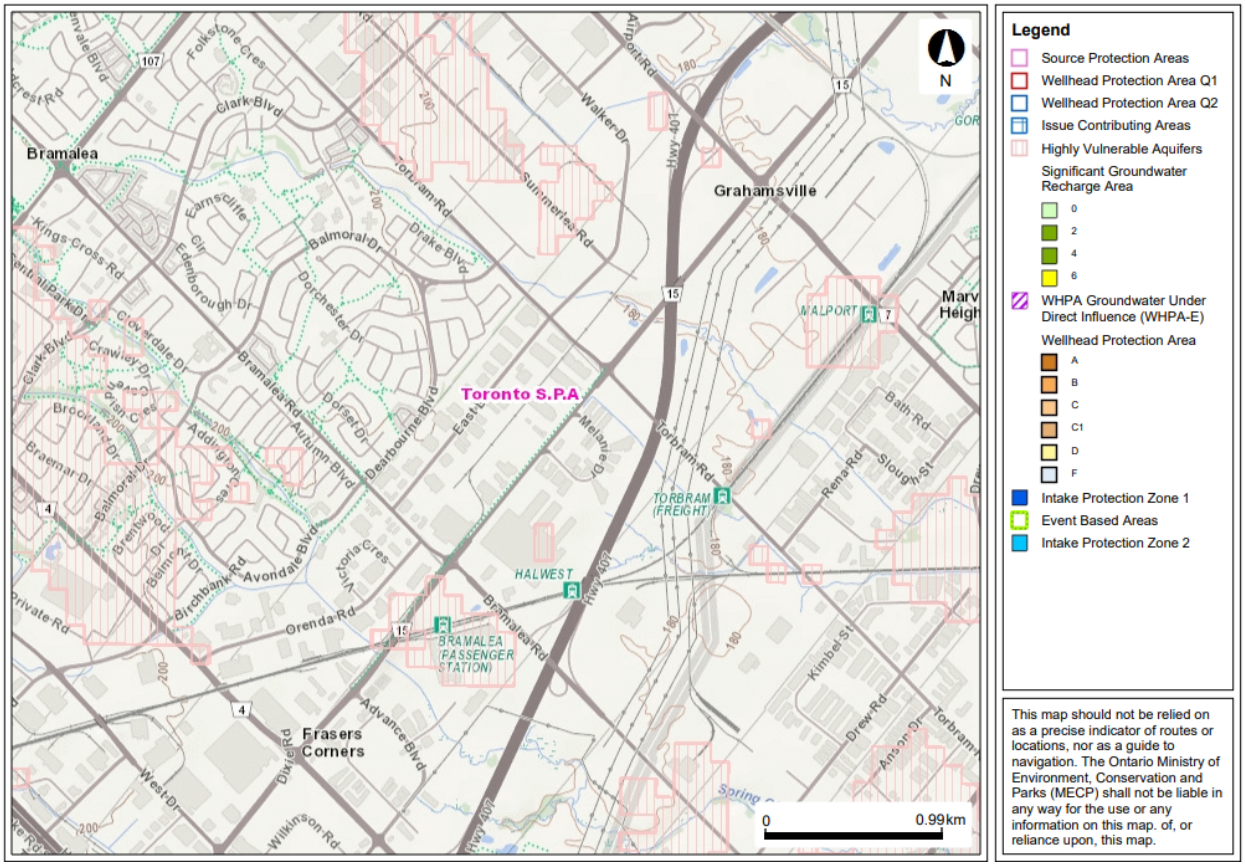

Figure 10: Source Water Protection Mapping

6.0 Problems Being Addressed

The City of Brampton is transitioning from a historically “suburban” to a more “urban” development context. New infrastructure, transportation services, and travel demand management measures are required to accommodate this rapid growth while protecting established communities and businesses. The City of Brampton aims to curb urban sprawl, develop “complete communities”, protect employment lands, foster intensified development, and is committed to rethinking how their transportation system can meet future demand.

Based on the review of existing conditions, background studies, planning documents, preliminary traffic studies and collision data, there are opportunities to improve the Bramalea Road study area. The problems are identified in **Table 2** below.

Table 2: Problems Being Addressed

Active Transportation	Poor pedestrian and bicycle level of service due to narrow sidewalks, high traffic volumes and operating speeds, along with missing sidewalks at the south limit of the study area. Bicycle facilities are generally missing throughout the corridor.
Transit	Operates generally at a poor level of service because of buses travelling in mixed traffic and in congested conditions during peak periods, with no transit priority measures.
Automobiles	Shows issues with level of service at certain locations that will worsen by 2031 and 2041.
Goods Movement	Shows issues with level of service at certain locations that will worsen by 2031 and 2041.

Due to projected growth in travel demand, Bramalea Road corridor is forecasted to experience multi-modal deficiencies. If not addressed, the corridor will become more congested, and alternative modes of transportation will continue to be underutilized.

7.0 Alternative Solutions

Alternative Solutions are functionally different approaches to address a problem or opportunity. The Class EA process requires documentation and examination of all reasonable alternatives to address the problem; referred to as Alternative Solutions.

The development of alternative solutions explored the need to accommodate pedestrians, cyclists, transit, autos, goods movement, access, streetscaping, and other public realm elements. The alternative solutions considered transportation functional needs, as well as broader socio-economic, environmental, and placemaking contributions to provide opportunities to be compatible with, and supportive of, existing and planned land uses.

The Alternative Solutions developed for the study area vary in complexity, construction cost, and their potential ability to address the identified problems and opportunities, and include the following:

- **Do Nothing -** With the Do Nothing alternative, the existing road will be maintained as status quo. The existing roadway would be retained in its present configuration and operational problems would continue to grow. Only planned improvements will be in place on surrounding roadways (e.g., Dixie Road, Torbram Road), as shown in the City of Brampton Transportation Master Plan, 2015. The Do Nothing alternative would not address future transportation needs of the Bramalea Road corridor, and result in the escalation of congestion issues. Failure to implement additional capacity under the Do Nothing approach will result in operational problems, extensive queuing, and deficiencies in the active transportation network. Although this alternative is not considered feasible, it is carried forward throughout the EA process and used as a baseline for comparison purposes.

- **Improvements to Other Roadways -** Under this scenario, capacity improvements would take place on parallel roadways, beyond what is identified in long range transportation plans (e.g., Queen Street East Bus Rapid Transit, Dixie Road, Torbram Road). Widening of other Regional roadways in the immediate study area beyond planned improvements would not be consistent with the City of Brampton Transportation Master Plan and the Peel Region Transportation Master Plan. This would lead to impacts beyond the planned rights-of-way and would not support the current and future transportation demands of the Bramalea Road corridor.

- **Travel Demand Management (TDM) -** TDM measures include measures to reduce the number of vehicles during the peak hours, e.g., carpooling, ridesharing, etc., and encourage the use of sustainable modes of transportation. Although these measures are part of the City of Brampton's and Region of Peel's overall transportation strategies, they will not address the need for additional capacity on their own. As

development increases, the need for additional capacity remains high, and while combined efforts with TDM measures may help alleviate traffic congestion associated with growth rates, additional measures are required to address the primary problem. Therefore, this alternative will be carried forward as part of the overall transportation strategy and not a standalone solution.

- **Active Transportation Improvements (Pedestrian and Cyclists) -** Improvements to the Active Transportation corridor would occur through widening the right-of-way where needed to accommodate continuous cycling and pedestrian facilities along Bramalea Road. Improvements to pedestrian comfort and reduction to intersection delay by reducing speeds along Bramalea Road and increasing the effective walk time. The Region's Sustainable Transportation Master Plan, and the City of Brampton's Active Transportation Master Plan, have identified the need for sidewalks and bike lanes, which will be included in the improvements to Bramalea Road and will be carried forward as part of the overall transportation strategy and preferred design.

- **Widen Corridor to Accommodate Queue Jump Lanes, including AT Improvements -** Under this scenario, Bramalea Road would maintain the existing number of general purpose lanes with a widened corridor to accommodate queue jump lanes for buses, with provisions for active transportation. The Region of Peel and the City of Brampton's Transportation Master Plans' have identified the need for improvements to transit facilities, which will be included in the improvements to Bramalea Road.

- **Conversion of Curb Lanes to Dedicated HOV/Transit Lane ("Road Diet") (with AT Improvements) -** The conversion of curb lanes to a dedicated HOV/Transit lane maintains the existing number of lanes with a widened corridor to accommodate queue jump lanes for buses, with provisions for active transportation.

- **Widen Corridor to Accommodate 6 General Purpose Lanes, including AT Improvements -** Improvements to the Bramalea Road corridor to address corridor capacity involves widening from 4 to 6 general purpose traffic lanes, with provisions for active transportation.

- **Widen Corridor to Accommodate 4 GPL and 2 Dedicated Transit/HOV Lanes, including AT Improvements -** Improvements to the Bramalea Road corridor to address future corridor requirements involve widening from 4 to 6 traffic lanes, with 4 dedicated general purpose traffic lanes, 2 dedicated transit/HOV lanes, and provisions for active transportation facilities.

7.1 Evaluation of Alternative Solutions

Criteria for evaluating alternative solutions were identified to determine the potential impacts to the surrounding physical, socio-economic, natural, and cultural environment. Consultation with landowners, public, agencies, and Indigenous communities was completed to identify a preferred solution.

Alternative solutions were assessed in terms of how well they would address the problems and opportunities and on the basis of a comprehensive set of factors and criteria that reflected the following considerations:

- Provincial and federal government legislation, policies, and guidelines;
- Municipal policy;
- Existing and future conditions within the study area;
- Issues and concerns identified during consultation with agencies, interest groups and the public; and
- Study team investigations and expertise.

Each factor was evaluated using a range indicator ranking system, evaluating each alternative as *Most Preferred, Moderately Preferred,* or *Least Preferred.* The evaluation is provided in **Table 3**, with a summary of the detailed evaluation provided in **Figure 11**:

Evaluation Criteria / Alternatives:	Planning Objectives	Technical Considerations	Natural Environment	Cultural Environment	Socio-Economic Environment	Recommendation
1. Do Nothing	○	○	○	●	○	*Not Recommended*
2. Improvements to Other Roadways	○	○	○	●	◐	*Not Recommended*
3. Travel Demand Management (TDM)	○	○	●	●	◐	**Carried forward as part of overall recommended solution.**
4. Active Transportation (AT) Improvements (Pedestrian and Cyclists)	◐	◐	●	●	●	**Carried forward as part of overall recommended solution.**
5. Widen Corridor to Accommodate Transit Queue Jump Lanes (with AT Improvements)	◐	●	◐	●	◐	**Carried forward as part of overall recommended solution.**
6. Conversion of Curb Lanes to Dedicated HOV/Transit Lane ("Road Diet") (with AT Improvements)	○	○	●	●	●	*Not Recommended*
7. Widen Corridor to Accommodate 4 General Purpose Lanes and 2 Dedicated /HOV Lanes (with AT Improvements)	●	●	◐	◐	○	*Not Recommended*

Figure 11: Summary of Detailed Evaluation

7.2 Preferred Solution

To support future growth and travel demands within the City of Brampton, and to improve capacity along the Bramalea Road corridor, the following combination of alternative solutions are recommended to allow flexibility to address the identified problems and opportunities:

- Transportation Demand Management to provide techniques to alter travel behaviour; assist in the management of transportation impacts; and address travel demand associated with the anticipated population growth of the City over the next 30 years. A few program options in the City's TDM Toolkit include a Workplace Commuter Program, Rideshare, and Carshare.
- Active transportation improvements (pedestrian and cyclists) including a multi-use pathway on either side of the corridor to provide proper facilities for all users.
- Widen the northern portion of the corridor to accommodate transit queue jump lanes.
- Widen the southern portion of the corridor to accommodate 4 general purpose lanes and due to closely spaced intersections, queue jump lanes are extended throughout as continuous transit lanes

Queue Jump Lanes provide additional capacity along the corridor creating designated space for transit facilities. Queue Jump Lanes approaching intersections allow transit facilities to pull away from vehicular traffic at transit stops, and continuous Queue Jump Lanes provide designated lanes specifically for transit.

This combination of alternative solutions will prioritize the needs for pedestrians, cyclists, transit then auto users, providing sufficient capacity for future growth and development in the City.

Table 3: Assessment of Alternative Solutions for Bramalea Road Corridor

Factors and Criteria	Do Nothing	Improvements to Other Roadways	Travel Demand Management (TDM)	Active Transportation (AT) Improvements (Pedestrian and Cyclists)	Widen Corridor to Accommodate Transit Queue Jump Lanes (with AT Improvements)	Conversion of Curb Lanes to Dedicated HOV/Transit Lane ("Road Diet") (with AT Improvements)	Widen Corridor to Accommodate 4 General Purpose Lanes and 2 Dedicated Transit/HOV Lanes (with AT Improvements)
PLANNING OBJECTIVES							
Provincial Plans and Policies • Provincial Policy Statement, Places to Grow Act (PGA): Growth plan for the Greater Golden Horseshoe, Greenbelt Plan	Not consistent with provincial plans and policies. This alternative does not meet density targets outlined in the PGA. This alternative does not adhere to the direction on land use and transportation planning and development outlined in the Provincial Policy Statement.	Not consistent with provincial plans and policies. This alternative does not meet density targets outlined in the PGA. This alternative does not adhere to the direction on land use and transportation planning and development outlined in the Provincial Policy Statement.	Not consistent with provincial plans and policies. This alternative does not meet density targets outlined in the PGA. This alternative does not adhere to the direction on land use and transportation planning and development outlined in the Provincial Policy Statement.	This alternative is consistent with meeting some objectives and direction outlined in provincial plans and policies. However, AT improvements alone are insufficient to meet objectives.	This alternative is consistent with meeting some objectives and direction outlined in provincial plans and policies.	Not consistent with provincial plans and policies. This alternative does not meet density targets outlined in *A Place to Grow: Growth plan for the Greater Golden Horseshoe*. This alternative does not adhere to the direction on land use and transportation planning and development outlined in the Provincial Policy Statement.	This alternative is consistent with meeting the objectives and direction outlined in provincial plans and policies.
Regional Plans and Policies • Peel Region Official Plan, Peel Region Long Range Transportation Plan, Region of Peel Road Characterization Study, Region of Peel Active Transportation Study, Region of Peel Strategic Goods Movement Network Study	Not consistent with regional plans and policies. This alternative does not meet the objectives outlined in the Peel Regional Official Plan; This alternative does not meet the goal of improving the safety of walking and cycling, and active transportation trip targets.	Not consistent with regional plans and policies. This alternative does not meet the objectives outlined in the Peel Regional Official Plan; This alternative does not meet the goal of improving the safety of walking and cycling, and active transportation trip targets.	Not consistent with regional plans and policies. This alternative does not meet the objectives outlined in the Peel Regional Official Plan; This alternative does not meet the goal of improving the safety of walking and cycling, and active transportation trip targets.	This alternative is consistent with meeting some objectives and direction outlined in regional plans and policies. This alternative promotes a sustainable, safe, efficient, effective, and integrated multi-modal transportation system as outlined in Regional plans. However, AT improvements alone are insufficient to meet objectives.	This alternative is consistent with meeting some objectives and direction outlined in regional plans and policies. This alternative promotes a sustainable, safe, efficient, effective and integrated transportation system.	This alternative is consistent with meeting some objectives and direction outlined in regional plans and policies. This alternative promotes a sustainable, safe, efficient, effective and integrated transportation system.	This alternative is consistent with meeting the objectives and direction outlined in provincial plans and policies.

Factors and Criteria	Do Nothing	Improvements to Other Roadways	Travel Demand Management (TDM)	Active Transportation (AT) Improvements (Pedestrian and Cyclists)	Widen Corridor to Accommodate Transit Queue Jump Lanes (with AT Improvements)	Conversion of Curb Lanes to Dedicated HOV/Transit Lane ("Road Diet") (with AT Improvements)	Widen Corridor to Accommodate 4 General Purpose Lanes and 2 Dedicated Transit/HOV Lanes (with AT Improvements)
Municipal Plans and Policies • City of Brampton Official Plan, City of Brampton Transportation Master Plan (TMP) Update, Brampton Vision 2040, City of Brampton Active Transportation Master Plan (ATMP)	Not consistent with the Official Plan and TMP Update. This alternative does not implement the recommended active transportation facilities identified in the TMP and ATMP. No infrastructure improvements to support the growth and intensification identified in the Vision 2040 at the north end of the study corridor, at Bramalea New Town Centre.	Not consistent with the Official Plan and TMP Update. This alternative does not implement the recommended active transportation facilities identified in the TMP and ATMP. No infrastructure improvements to support the growth and intensification identified in the Vision 2040 at the north end of the study corridor, at Bramalea New Town Centre.	Not consistent with the Official Plan and TMP Update. This alternative does not implement the recommended active transportation facilities identified in the TMP and ATMP. No infrastructure improvements to support the growth and intensification identified in the Vision 2040 at the north end of the study corridor, at Bramalea New Town Centre.	On its own, this alternative is not consistent with local and regional planning/2040 Planning Vision, considering that the Bramalea Road corridor is designated as a future transit priority route.	Consistent with local and regional planning/2040 Planning Vision to prioritize transit service and improve AT facilities.	Consistent with local and regional planning/2040 Planning Vision to prioritize transit service and improve AT facilities.	Consistent with local and regional planning/2040 Planning Vision to prioritize transit service and improve AT facilities.
PLANNING OBJECTIVES SUMMARY	○	○	○	◐	◐	○	●
TECHNICAL CONSIDERATIONS							
Safety • Potential to improve travel safety based on the opportunity to reduce congestion and potential for collisions • Potential to provide safe and comfortable street experience for all modes of travel, including pedestrians and cyclists • Potential to accommodate Vision Zero initiatives • Potential to improve at-grade rail crossing	Does not address potential safety concerns for all modes of travel along Bramalea Road corridor.	Potential to reduce transportation demand/congestion but would not sufficiently address safety needs for all modes of travel. No potential to improve at grade rail crossing.	Potential to reduce transportation demand. Would require significant changes to travel behaviour to achieve improved levels of safety. No potential to improve at grade rail crossing.	Moderate potential to provide a safe and comfortable street experience for pedestrians and cyclists only. No potential to improve at grade rail crossing.	High potential to reduce traffic congestion and high potential for collisions. High potential to provide safe and comfortable improvements for pedestrians and cyclists. Potential to improve at grade rail crossing.	Moderate potential to provide safer transportation facilities for all modes of travel through AT improvements. Potential to improve at grade rail crossing.	Highest potential to reduce traffic congestion and potential for collisions. High potential to provide a safe and comfortable street for all modes of travel, including pedestrians, cyclists and transit-users. Potential to improve at grade rail crossing.

Factors and Criteria	Do Nothing	Improvements to Other Roadways	Travel Demand Management (TDM)	Active Transportation (AT) Improvements (Pedestrian and Cyclists)	Widen Corridor to Accommodate Transit Queue Jump Lanes (with AT Improvements)	Conversion of Curb Lanes to Dedicated HOV/Transit Lane ("Road Diet") (with AT Improvements)	Widen Corridor to Accommodate 4 General Purpose Lanes and 2 Dedicated Transit/HOV Lanes (with AT Improvements)
Accommodation of Future Travel Demands (Capacity and Overall Travel Time) • Potential to accommodate future auto and transit travel demands • Potential to maintain or improve existing travel times • Potential to provide a 'complete street' and balance travel modes • Potential to support the City's 2040 Planning Vision by prioritizing pedestrians, cycling, transit then auto	Does not accommodate future travel demands. Low potential to improve overall travel time through the corridor. Possible incremental increases to travel time due to unaddressed transportation demands.	Does not accommodate future travel demands. Low potential to improve overall travel time through the corridor. Possible incremental increases to travel time due to unaddressed transportation demands.	Does not accommodate future travel demands. Low potential to improve overall travel time through the corridor. Possible incremental increases to travel time due to unaddressed transportation demands.	Does not accommodate future travel demands. Low potential to improve overall travel time through the corridor, with the exception of pedestrians and cyclists. Possible incremental increases to travel time due to unaddressed transportation demands.	Highest potential to improve overall travel time with queue jump lanes, allowing for more efficient transportation for transit users while not impacting the other users as heavily. Considers the City's 2040 Planning Vision.	Potential to improve transit travel time but does not address general vehicular demands. Benefit is offset by the reduced thru lane capacity. Encourages travelers to use transit, carpool and carshare by creating a dedicated lane for HOV.	Accommodates future vehicular travel demands and improves existing travel times. Provides a "complete street" and balance of travel modes. Added capacity of GPL, Transit/HOV Lanes, and AT improvements allows for more efficient transportation for all users. Consistent with the City's 2040 Planning Vision to prioritize pedestrians, cycling, transit, then auto.
Road Network Compatibility / Connectivity • Potential to be consistent with the planned transportation network (i.e., City of Brampton Transportation and Transit Master Plan) • Potential to facilitate improved access between Town Centres and Major Growth Areas • Network improvement to accommodate goods movement	Does not address road network compatibility/connectivity requirements.	Moderate potential to address road network compatibility/connectivity requirements.	Does not address road network compatibility/connectivity requirements.	Moderate potential to address road network compatibility/connectivity requirements. On its own, does not sufficiently address future road network needs.	High potential to address road network compatibility/connectivity requirements for transit while maintaining general use vehicle capacity.	Low potential to address road network compatibility/connectivity requirements, particularly for transit but at the expense of general use vehicular traffic.	High potential to address road network compatibility/connectivity requirements. Consistent with City of Brampton's TMP. High potential to improve network to accommodate goods movement.

Factors and Criteria	Do Nothing	Improvements to Other Roadways	Travel Demand Management (TDM)	Active Transportation (AT) Improvements (Pedestrian and Cyclists)	Widen Corridor to Accommodate Transit Queue Jump Lanes (with AT Improvements)	Conversion of Curb Lanes to Dedicated HOV/Transit Lane ("Road Diet") (with AT Improvements)	Widen Corridor to Accommodate 4 General Purpose Lanes and 2 Dedicated Transit/HOV Lanes (with AT Improvements)
Accommodation of Public Transit Service • Potential to improve the Transit Level of Service (TLOS) • Potential to provide improved integration of local and regional transit services into the existing and planned system, including the Proposed Queens Boulevard East Rapid Transit system and GO Train • Potential to provide safer and more pleasant pedestrian linkages and access to transit service • Potential to facilitate complete trips and support an increase in transit ridership • Potential to provide transit priority measures • Connectivity to mobility hub (Bramalea GO Station) • Potential to provide safe and comfortable passenger amenities • Protection from mixed traffic	Low potential to provide improvements to the Transit Level of Service (TLOS) or consider future transit services integration in the Bramalea Road transportation corridor.	Low potential to provide improvements to the Transit Level of Service (TLOS) or consider future transit services integration in the Bramalea Road transportation corridor.	Low potential to provide improvements to the Transit Level of Service (TLOS) or consider future transit services integration in the Bramalea Road transportation corridor.	Low potential to provide improvements to the Transit Level of Service (TLOS) or consider future transit services integration in the Bramalea Road transportation corridor.	High potential to accommodate public transit service and improve the TLOS and integration of local and regional transit services. High potential to provide safer pedestrian access to transit service and protection from mixed traffic.	High potential to accommodate public transit service and improve the TLOS and integration of local and regional transit services. High potential to provide safer pedestrian access to transit service and protection from mixed traffic.	High potential to accommodate public transit service and improve the TLOS and integration of local and regional transit services. High potential to provide safer pedestrian access to transit service and protection from mixed traffic.

Factors and Criteria	Do Nothing	Improvements to Other Roadways	Travel Demand Management (TDM)	Active Transportation (AT) Improvements (Pedestrian and Cyclists)	Widen Corridor to Accommodate Transit Queue Jump Lanes (with AT Improvements)	Conversion of Curb Lanes to Dedicated HOV/Transit Lane ("Road Diet") (with AT Improvements)	Widen Corridor to Accommodate 4 General Purpose Lanes and 2 Dedicated Transit/HOV Lanes (with AT Improvements)
Accommodation of Pedestrians / Cyclists • Potential to accommodate Greenway Network improvements and associated connections to Queens Boulevard East and Clark Boulevard • Potential to improve the Bike Level of Service (BLOS) based on facility type, street width, operating speed, and parking characteristics • Potential to offer visual appeal and encourage walking and cycling as preferred mode of travel for day-to-day trips • Potential to provide connections to recreational trails and pathways to natural settings • Consistent with the City's AT Master Plan	No potential to improve accommodation of pedestrians/cyclists within the Bramalea Road corridor.	No potential to improve accommodation of pedestrians/cyclists within the Bramalea Road corridor.	No potential to improve accommodation of pedestrians/cyclists within the Bramalea Road corridor; although this alternative encourages walking/ cycling as a preferred mode of travel for day-to-day trips. On its own, does not sufficiently address BLOS.	Potential to improve accommodation of pedestrians/cyclists within the Bramalea Road corridor. Is consistent with the City's AT Master Plan to support integration with local trail connections and provide Multi-Use Path/ Boulevard Paths along Bramalea Road.	Potential to improve accommodation of pedestrians/cyclists within the Bramalea Road corridor. Is consistent with the City's AT Master Plan to support integration with local trail connections and provide Multi-Use Path/ Boulevard Paths along Bramalea Road.	Potential to improve accommodation of pedestrians/cyclists within the Bramalea Road corridor. Is consistent with the City's AT Master Plan to support integration with local trail connections and provide Multi-Use Path/ Boulevard Paths along Bramalea Road.	Potential to improve accommodation of pedestrians/cyclists within the Bramalea Road corridor. Is consistent with the City's AT Master Plan to support integration with local trail connections and provide Multi-Use Path/ Boulevard Paths along Bramalea Road.
Response Times / Access for Emergency Vehicles • Potential to impact response times/ accessibility for emergency vehicles due to changes in travel time	No potential to improve response times/access for emergency vehicles. Possible increase in response times due to traffic congestion.	No potential to improve response times/access for emergency vehicles. Possible increase in response times due to traffic congestion.	Low potential to improve response times/accessibility for emergency vehicles travel times.	Low potential to improve response times/accessibility for emergency vehicles travel times.	Moderate potential to improve response times/accessibility for emergency vehicles travel times	Moderate potential to improve response times/accessibility for emergency vehicles travel times	High potential to improve response times/accessibility for emergency vehicles travel times due to additional capacity and accessibility through the dedicated HOV/transit lane.
Accessibility • Potential to improve accessibility/reduce barriers in the built environment • Potential to accommodate accessibility (City/AODA) design guidelines	No potential to improve accessibility or reduce barriers in the built environment. Does not accommodate AODA design. guidelines.	No potential to improve accessibility or reduce barriers in the built environment. Does not accommodate AODA design. guidelines.	No potential to improve accessibility or reduce barriers in the built environment. Does not accommodate AODA design. guidelines.	High potential to improve accessibility and reduce barriers in the built environment. High potential to accommodate AODA design guidelines and impact existing and future land uses.	High potential to improve accessibility and reduce barriers in the built environment. High potential to accommodate AODA design guidelines and impact existing and future land uses.	High potential to improve accessibility and reduce barriers in the built environment. High potential to accommodate AODA design guidelines and impact existing and future land uses.	High potential to improve accessibility and reduce barriers in the built environment. High potential to accommodate AODA design guidelines and impact existing and future land uses.

Factors and Criteria	Do Nothing	Improvements to Other Roadways	Travel Demand Management (TDM)	Active Transportation (AT) Improvements (Pedestrian and Cyclists)	Widen Corridor to Accommodate Transit Queue Jump Lanes (with AT Improvements)	Conversion of Curb Lanes to Dedicated HOV/Transit Lane ("Road Diet") (with AT Improvements)	Widen Corridor to Accommodate 4 General Purpose Lanes and 2 Dedicated Transit/HOV Lanes (with AT Improvements)
Neighbourhood Traffic Infiltration • Potential to impact traffic using minor/ local roads in the area • Potential to reduce vehicular through traffic within residential land use zones	Low potential to reduce vehicular through traffic within residential land use zones as a result of increased traffic congestion along the Bramalea Road corridor.	Low potential to reduce vehicular through traffic within residential land use zones as a result of increased traffic congestion along the Bramalea Road corridor.	Low potential to reduce vehicular through traffic within residential land use zones as a result of increased traffic congestion along the Bramalea Road corridor.	Low potential to reduce vehicular through traffic within residential land use zones as a result of increased traffic congestion along the Bramalea Road corridor.	Moderate potential to reduce vehicular through traffic within residential land use zones with improved flow of traffic.	Low potential to reduce vehicular through traffic within residential.	High potential to reduce vehicular through traffic within residential land use zones with increased capacity along corridor.
Overall Travel Time • Potential to impact travel time through the corridor	Low potential to improve overall travel time through the corridor. Possible incremental increases to travel time due to unaddressed transportation demands.	Low potential to improve overall travel time through the corridor. Possible incremental increases to travel time due to unaddressed transportation demands.	Low potential to improve overall travel time through the corridor. Possible incremental increases to travel time due to unaddressed transportation demands.	Low potential to improve overall travel time through the corridor, with the exception of pedestrians and cyclists. Possible incremental increases to travel time due to unaddressed transportation demands.	Highest potential to improve overall travel time with queue jump lanes, allowing for more efficient transportation for transit users while not impacting the other users.	Low potential to improve overall travel time through the corridor, with the exception of transit / HOV users, pedestrians, and cyclists. Benefit is offset by the reduced thru lane capacity.	Moderate potential to improve overall travel time through the corridor. Added capacity of GPL, Transit/HOV Lanes, and AT improvements allows for more efficient transportation for all users.
Municipal Services / Utilities • Potential impact to existing municipal services and/or utilities within the corridor • Potential to accommodate planned services/utilities	N/A	N/A	N/A	Low potential to impact existing services or utilities within the corridor. Low potential to accommodate planned services/utilities.	Moderate potential to impact existing services or utilities within the corridor. Low potential to accommodate planned services/utilities.	Low potential to impact existing services or utilities within the corridor. Low potential to accommodate planned services/utilities.	High potential to impact existing services or utilities within the corridor.
Benefit of Transportation Investment • Relative impact of transportation investment on all travel modes • Benefit to adjacent land uses • Benefit to development areas and associated potential tax revenue	Low cost alternative; no potential to benefit transportation system, adjacent land uses or development areas.	N/A (to be determined by other studies)	Low cost alternative; low potential to benefit transportation system, adjacent land uses or development areas.	Low cost alternative; investment would benefit AT users only.	Moderate cost alternative; investment would benefit transit and AT users. Potential benefits to adjacent land users and development areas.	Moderate cost alternative; investment would benefit transit, HOV and AT users. Potential benefits to adjacent land users and development areas.	High cost alternative; investment would benefit AT and auto users. Potential benefits to adjacent land users and development areas.

Factors and Criteria	Do Nothing	Improvements to Other Roadways	Travel Demand Management (TDM)	Active Transportation (AT) Improvements (Pedestrian and Cyclists)	Widen Corridor to Accommodate Transit Queue Jump Lanes (with AT Improvements)	Conversion of Curb Lanes to Dedicated HOV/Transit Lane ("Road Diet") (with AT Improvements)	Widen Corridor to Accommodate 4 General Purpose Lanes and 2 Dedicated Transit/HOV Lanes (with AT Improvements)
Construction Staging • Impact to existing traffic operations during construction	N/A	N/A	N/A	Minor impacts to existing traffic operations during construction to implement AT facilities.	Moderate potential to impact existing traffic operations during construction.	Significant impacts to existing traffic operations during construction.	Significant impacts to existing traffic operations during construction.
TECHNICAL CONSIDERATIONS SUMMARY	○	○	○	◐	●	○	●
NATURAL ENVIRONMENT							
Vegetation and Wildlife • Potential impact to woodlots and vegetation communities • Potential to impact plant and or animal Species at Risk (SAR)	No impacts anticipated - vegetation communities, suitable habitat for SAR and wildlife habitat are limited within urbanized corridor (potentially suitable foraging habitat for Monarch and Rusty-patched Bumblebee was present in the study area).	No impacts anticipated - vegetation communities, suitable habitat for SAR and wildlife habitat are limited within urbanized corridor (potentially suitable foraging habitat for Monarch and Rusty-patched Bumblebee was present in the study area).	No impacts anticipated - vegetation communities, suitable habitat for SAR and wildlife habitat are limited within urbanized corridor (potentially suitable foraging habitat for Monarch and Rusty-patched Bumblebee was present in the study area).	No impacts anticipated - vegetation communities, suitable habitat for SAR and wildlife habitat are limited within urbanized corridor (potentially suitable foraging habitat for Monarch and Rusty-patched Bumblebee was present in the study area).	No impacts anticipated - vegetation communities, suitable habitat for SAR and wildlife habitat are limited within urbanized corridor (potentially suitable foraging habitat for Monarch and Rusty-patched Bumblebee was present in the study area).	No impacts anticipated - vegetation communities, suitable habitat for SAR and wildlife habitat are limited within urbanized corridor (potentially suitable foraging habitat for Monarch and Rusty-patched Bumblebee was present in the study area).	No impacts anticipated - vegetation communities, suitable habitat for SAR and wildlife habitat are limited within urbanized corridor (potentially suitable foraging habitat for Monarch and Rusty-patched Bumblebee was present in the study area).
Street Trees • Potential impact to existing trees along the corridor	No impact within the Bramalea Road corridor.	Lower potential for impact in areas where improvements occur.	Lower potential for impact in areas where improvements occur.	Moderate potential for impact in areas where improvements occur.	Lower potential for impact in areas where improvements occur.	Lower potential for impact in areas where improvements occur.	Higher potential for impact due to a widened right-of-way.
Air Quality • Potential to impact air quality and emissions	Lower potential to improve air quality and emissions as a result of increased traffic congestion.	Moderate potential to improve air quality and emissions as a result of reduction in traffic congestion within the Bramalea Road corridor.	Higher potential to improve air quality and emissions (potential exists to improve air quality and reduce emissions if dependence on personal auto use shifts to AT).	Moderate potential to improve air quality and emissions as a result of reduction in traffic congestion, and potential to shift from personal auto use to AT.	Moderate potential to improve air quality and emissions as a result of reduction in traffic congestion, and potential to shift from personal auto use to AT.	Moderate potential to improve air quality and emissions as a result of reduction in traffic congestion, and potential to shift from personal auto use to AT.	Moderate potential to improve air quality and emissions as a result of reduction in traffic congestion, and potential to shift from personal auto use to AT.

Factors and Criteria	Do Nothing	Improvements to Other Roadways	Travel Demand Management (TDM)	Active Transportation (AT) Improvements (Pedestrian and Cyclists)	Widen Corridor to Accommodate Transit Queue Jump Lanes (with AT Improvements)	Conversion of Curb Lanes to Dedicated HOV/Transit Lane ("Road Diet") (with AT Improvements)	Widen Corridor to Accommodate 4 General Purpose Lanes and 2 Dedicated Transit/HOV Lanes (with AT Improvements)
Climate Change • Potential impacts to carbon sinks (e.g., soils and wetlands) • Potential to reduce greenhouse gas emissions • Potential to reduce vulnerability to changing climatic conditions	Lower potential to minimize impacts on climate change and reduce greenhouse gas emissions as a result of traffic congestion within the corridor.	Lower potential to minimize impacts on climate change and reduce greenhouse gas emissions as a result of traffic congestion within the corridor.	Moderate potential to minimize impacts on climate change and reduce greenhouse gas emissions through ridesharing, carpooling, AT, etc.	Higher potential to minimize impacts on climate change and reduce greenhouse gas emissions as a result of decreased traffic congestion, increase in transit and AT use and reduction in personal auto use.	Higher potential to minimize impacts on climate change and reduce greenhouse gas emissions as a result of decreased traffic congestion, increase in transit and AT use and reduction in personal auto use.	Higher potential to minimize impacts on climate change and reduce greenhouse gas emissions as a result of decreased traffic congestion, increase in transit and AT use and reduction in personal auto use.	Higher potential to minimize impacts on climate change and reduce greenhouse gas emissions as a result of decreased traffic congestion, increase in transit and AT use and reduction in personal auto use
Groundwater • Potential to impact Source Water Protection areas	The study area is not located within a source protection planning area. The City of Brampton's drinking water source is Lake Ontario. Improvements associated with the Bramalea Road Class EA are not anticipated to impact drinking water.	The study area is not located within a source protection planning area. The City of Brampton's drinking water source is Lake Ontario. Improvements associated with the Bramalea Road Class EA are not anticipated to impact drinking water.	The study area is not located within a source protection planning area. The City of Brampton's drinking water source is Lake Ontario. Improvements associated with the Bramalea Road Class EA are not anticipated to impact drinking water.	The study area is not located within a source protection planning area. The City of Brampton's drinking water source is Lake Ontario. Improvements associated with the Bramalea Road Class EA are not anticipated to impact drinking water.	The study area is not located within a source protection planning area. The City of Brampton's drinking water source is Lake Ontario. Improvements associated with the Bramalea Road Class EA are not anticipated to impact drinking water.	The study area is not located within a source protection planning area. The City of Brampton's drinking water source is Lake Ontario. Improvements associated with the Bramalea Road Class EA are not anticipated to impact drinking water.	The study area is not located within a source protection planning area. The City of Brampton's drinking water source is Lake Ontario. Improvements associated with the Bramalea Road Class EA are not anticipated to impact drinking water.
NATURAL ENVIRONMENT CONSIDERATIONS SUMMARY	○	○	●	●	◐	●	◐
CULTURAL ENVIRONMENT							

Factors and Criteria	Do Nothing	Improvements to Other Roadways	Travel Demand Management (TDM)	Active Transportation (AT) Improvements (Pedestrian and Cyclists)	Widen Corridor to Accommodate Transit Queue Jump Lanes (with AT Improvements)	Conversion of Curb Lanes to Dedicated HOV/Transit Lane ("Road Diet") (with AT Improvements)	Widen Corridor to Accommodate 4 General Purpose Lanes and 2 Dedicated Transit/HOV Lanes (with AT Improvements)
Archaeological Resources • Potential to impact undisturbed lands (e.g., having archaeological potential)	No impact anticipated.	No impact anticipated.	No impact anticipated.	A Stage 1 Archaeological Assessment identifies an area on the east side of Bramalea Road (parkland) with moderate to high potential for the identification and recovery of archaeological resources and require a Stage 2 Archaeological Assessment if the land is to be impacted.	A Stage 1 Archaeological Assessment identifies an area on the east side of Bramalea Road (parkland) with moderate to high potential for the identification and recovery of archaeological resources and require a Stage 2 Archaeological Assessment if the land is to be impacted.	A Stage 1 Archaeological Assessment identifies an area on the east side of Bramalea Road (parkland) with moderate to high potential for the identification and recovery of archaeological resources and require a Stage 2 Archaeological Assessment if the land is to be impacted.	A Stage 1 Archaeological Assessment identifies an area on the east side of Bramalea Road (parkland) with moderate to high potential for the identification and recovery of archaeological resources and require a Stage 2 Archaeological Assessment if the land is to be impacted.
Cultural Landscapes • Potential to impact known Cultural Landscapes and/or features	No cultural landscapes identified within study area.	No cultural landscapes identified within study area.	No cultural landscapes identified within study area.	No cultural landscapes identified within study area.	No cultural landscapes identified within study area.	No cultural landscapes identified within study area.	No cultural landscapes identified within study area.
Built Heritage Resources • Potential to impact known built heritage resources (i.e., Listed/Designated under Part IV or V of the Ontario Heritage Act and/or identified as 'culturally significant')	No impact anticipated.	No impact anticipated.	No impact anticipated.	No impact anticipated.	No impact anticipated.	No impact anticipated.	6 cultural heritage resources (CHRs) were identified within the study area. Low potential to impact CHRs (preferred alternative should be designed to avoid the identified CHRs).
CULTURAL ENVIRONMENT CONSIDERATIONS SUMMARY	●	●	●	●	●	●	◐
SOCIO-ECONOMIC ENVIRONMENT							

Factors and Criteria	Do Nothing	Improvements to Other Roadways	Travel Demand Management (TDM)	Active Transportation (AT) Improvements (Pedestrian and Cyclists)	Widen Corridor to Accommodate Transit Queue Jump Lanes (with AT Improvements)	Conversion of Curb Lanes to Dedicated HOV/Transit Lane ("Road Diet") (with AT Improvements)	Widen Corridor to Accommodate 4 General Purpose Lanes and 2 Dedicated Transit/HOV Lanes (with AT Improvements)
Community / Urban Design • Potential to minimize vehicular right-of-way and create a people-friendly dimension (e.g., safety features, trees, local culture, pleasant ambiance, multiple uses, and environmental features)	Provides no improvements to create a people-friendly environment.	Provides no improvements to create a people-friendly environment.	Moderate potential to include people-friendly dimensions with improved AT facilities. Low potential to improve streetscape, landscape, and green canopy embellishment.	Low potential to include people-friendly dimensions with right-of-way constraints. Low potential to improve streetscape, landscape, and green canopy embellishment.	High potential to include people-friendly dimensions, AT facilities, with a wider right-of-way. High potential to improve streetscape, landscape and green canopy embellishment.	High potential to include people-friendly dimensions, AT facilities, with a wider right-of-way. High potential to improve streetscape, landscape and green canopy embellishment.	Moderate potential to include people-friendly dimensions, transit and AT facilities, with a wider right-of-way. High potential to improve streetscape, landscape, and green canopy embellishment.
Compatibility with Existing and Proposed Developments • Potential to support Major Growth Area development of lands within the Bramalea Road corridor • Potential to support Queens Boulevard East Rapid Transit system and Go Train development • Potential to accommodate needs of Bramalea New Town proposed developments (e.g., Rapid Transit, Open Space & Greenway/Trail, mixed-use including retail, employment and residential uses)	Lower potential to sufficiently support demands of existing and future developments within the Bramalea Road corridor (i.e., Queens Boulevard East Rapid Transit, Go Train, Bramalea New Town).	Lower potential to sufficiently support demands of existing and future developments within the Bramalea Road corridor (i.e., Queens Boulevard East Rapid Transit, Go Train, Bramalea New Town).	High potential to support existing and future development within the Bramalea Road corridor. Improvements will support the needs of the proposed Queens Boulevard East Rapid Transit system, Go Train, and Bramalea New Town development.	High potential to support existing and future development within the Bramalea Road corridor. Improvements will support the needs of the proposed Queens Boulevard East Rapid Transit system, Go Train, and Bramalea New Town development.	High potential to support existing and future development within the Bramalea Road corridor. Improvements will support the needs of the proposed Queens Boulevard East Rapid Transit system, Go Train, and Bramalea New Town development.	High potential to support existing and future development within the Bramalea Road corridor. Improvements will support the needs of the proposed Queens Boulevard East Rapid Transit system, Go Train, and Bramalea New Town development.	High potential to support existing and future development within the Bramalea Road corridor. Improvements will support the needs of the proposed Queens Boulevard East Rapid Transit system, Go Train, and Bramalea New Town development.
Aesthetics • Potential to impact streetscaping, and landscaped areas • Ability to accommodate a Greenway Boulevard • Ability to integrate with the existing and planned Green Park Framework • Ability to embellish the green canopy by incorporating new green additions, such as additional trees	Provides no aesthetic improvement opportunities within the Bramalea Road corridor.	Provides no aesthetic improvement opportunities within the Bramalea Road corridor.	Moderate potential to improve streetscape, landscape, and green canopy embellishment. Potential to integrate with a Greenway Boulevard and Green Park.	Moderate potential to improve streetscape, landscape, and green canopy embellishment. Potential to integrate with a Greenway Boulevard and Green Park.	High potential to improve streetscape, landscape, and green canopy embellishment with wider right-of-way. Potential to integrate with a Greenway Boulevard and Green Park.	High potential to improve streetscape, landscape, and green canopy embellishment with wider right-of-way. Potential to integrate with a Greenway Boulevard and Green Park.	Moderate potential to improve streetscape, landscape, and green canopy embellishment. Potential to integrate with a Greenway Boulevard and Green Park.

Factors and Criteria	Do Nothing	Improvements to Other Roadways	Travel Demand Management (TDM)	Active Transportation (AT) Improvements (Pedestrian and Cyclists)	Widen Corridor to Accommodate Transit Queue Jump Lanes (with AT Improvements)	Conversion of Curb Lanes to Dedicated HOV/Transit Lane ("Road Diet") (with AT Improvements)	Widen Corridor to Accommodate 4 General Purpose Lanes and 2 Dedicated Transit/HOV Lanes (with AT Improvements)
Property Impacts • Potential impacts to property • Impacts to residences (use, enjoyment, perceived value)	No impacts to adjacent properties due to implementation of AT facilities along the Bramalea Road corridor.	No impacts to adjacent properties due to implementation of AT facilities along the Bramalea Road corridor.	Relatively minor impacts to adjacent properties due to implementation of AT facilities along the Bramalea Road corridor.	Moderate potential to negatively impact adjacent properties. Higher potential to positively impact use/enjoyment and perceived value due to implementation of AT and transit service facilities along the Bramalea Road corridor.	Moderate potential to negatively impact adjacent properties. Higher potential to positively impact use/enjoyment and perceived value due to implementation of AT and transit service facilities along the Bramalea Road corridor.	Moderate potential to negatively impact adjacent properties. Higher potential to positively impact use/enjoyment and perceived value due to implementation of AT and transit service facilities along the Bramalea Road corridor.	Significant impacts to adjacent properties due to corridor widening, however, still has a higher potential to positively impact use/enjoyment and perceived value due to implementation of AT and transit service facilities along the Bramalea Road corridor.
Business Operations • Potential to impact businesses/business operations, such as displacement, access or reductions in parking	No potential to physically impact businesses.	No potential to physically impact businesses.	No potential to physically impact businesses.	No potential to physically impact businesses.	No potential to physically impact businesses.	No potential to physically impact businesses.	Higher potential to negatively impact to business operations as a result of corridor widening. This may include land acquisition, limited access and reductions in parking.
Noise Impacts • Potential to impact noise sensitive areas (NSA) (i.e., residential dwellings, daycares, etc.)	Low potential to impact NSAs within the Bramalea Road corridor.	Low potential to impact NSAs within the Bramalea Road corridor.	Low potential to impact NSAs within the Bramalea Road corridor.	Moderate potential to increase in noise level to NSA adjacent to the corridor.	Moderate potential to increase in noise level to NSA adjacent to the corridor.	Moderate potential to increase in noise level to NSA adjacent to the corridor.	Higher potential to increase in noise level to NSA adjacent to the corridor.
Cost • Relative cost in terms of capital, property, operational and maintenance	N/A	N/A	Low	Moderate	Low	Low	High
SOCIO-ECONOMIC ENVIRONMENT CONSIDERATIONS SUMMARY	○	◐	◐	●	◐	●	◐

8.0 Alternative Design Concepts

The Preferred Solution, as determined in Phase 2 of the EA process, includes the development of a combination of alternative design concepts for queue jump lanes and active transportation.

A set of Design Criteria was formulated as a basis for implementation throughout the corridor. These criteria were based on City, Regional and Provincial design standards and guided the development of alternative design concepts.

Consideration was given to reducing the lane widths on Bramalea Road based on feedback received at PIC #1. The reduction of the lane widths will help influence the driver perception of a more confined driving space and encourage a reduction in travel speed. In addition, the reduction of the lane widths will allow for an increase width of the boulevards, enhancing the proposed active transportation infrastructure.

These criteria were reviewed in areas where the right-of-way was constrained (i.e., narrow right-of-way and abutting property) and the project developed constrained design criteria where required.

8.1 Corridor Improvements

Corridor constraints along Bramalea Road restrict the feasibility of implementation of the preferred alternative solution in various sections of the study area. The study area is 4.3 km in length, with various land uses such as residential, commercial, and overpass structures through the corridor. As such the study area was separated into three segments to allow the overall preferred solution to best suit the needs along the entire corridor. The segments are displayed in **Figure 12**, and described below.

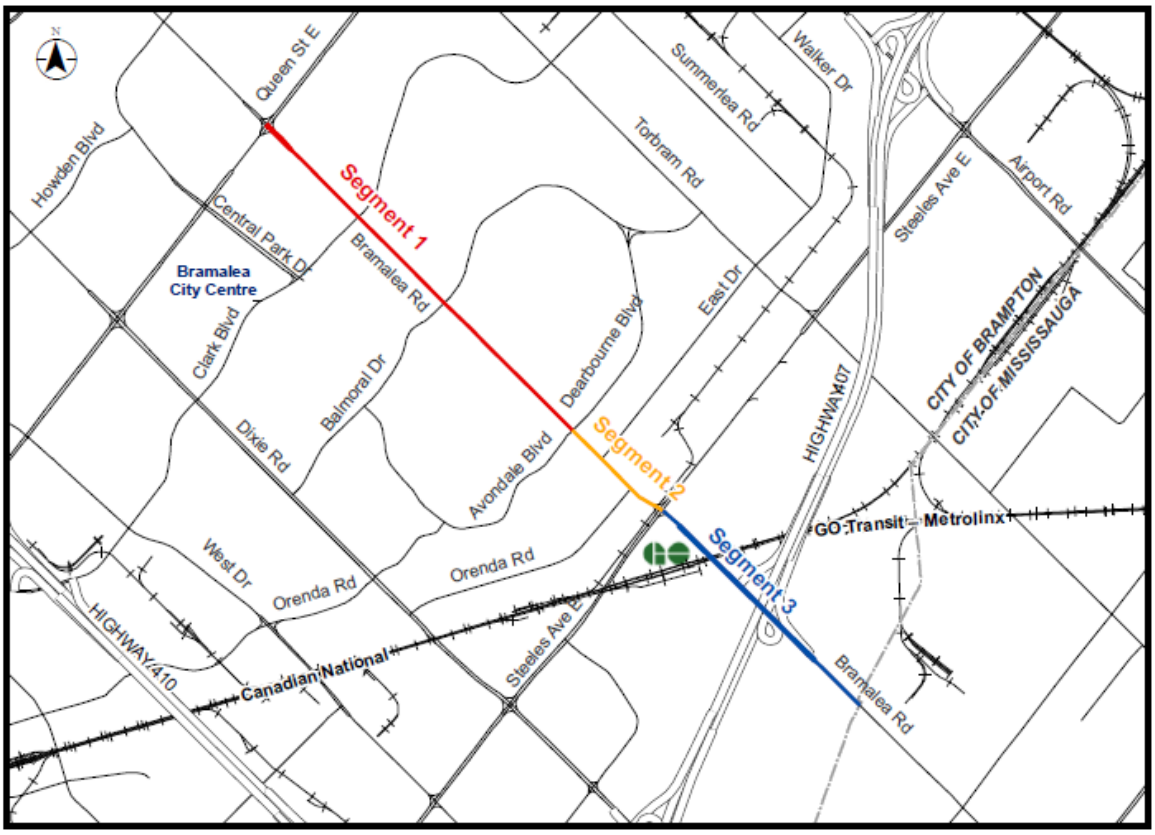

Figure 12: Bramalea Road Corridor Segments

Segment 1 – Queen Street East to Dearbourne Boulevard: This segment of Bramalea Road is approximately 2.4km, with existing sidewalks on both sides of the road. Constraints within this segment include residential infrastructure directly adjacent to the right-of-way, apartment buildings and underground parking structures, and a secondary school. This segment has an existing multi-use pathway between Balmoral Drive and Dearbourne Boulevard.

Segment 2 – Dearbourne Boulevard to Steeles Avenue: This Segment of Bramalea Road is 650m, with existing sidewalks on both sides of the road. Constraints include commercial/industrial uses with several access points to Bramalea Road, an at-grade rail crossing (north of Steeles Ave intersection), and a deflection in the alignment of Bramalea Road south of Orenda Road.

Segment 3 – Steeles Avenue to southern City limits: This segment of Bramalea Road is approximately 1.2km, with discontinuous sidewalks on both sides of the road. Constraints include parking infrastructure, industrial buildings, Bramalea GO Station and railway infrastructure, overpass above rail lines, overpass over Highway 407.

The design alternatives were modified and fine-tuned to reduce impacts in each segment of the corridor considering the following factors:

Technical

- Safety for all travel modes
- Traffic operations
- Utilities
- Transit service/facilities
- Bicycle and pedestrian facilities
- Cost

Socio-Economic Environment

- Land requirements/property impacts
- Existing and proposed developments/business operations
- Archaeological/cultural heritage resources
- Construction staging
- Community/urban design
- Traffic/noise

Natural Environment

- Vegetation
- Climate change
- Air quality impacts

8.1.2 Segment 1

The recommended alternative design concept for Segment 1 is to implement Active Transportation Facilities, reduce the driving lane widths, and implement improved transit stops. Queue Jump Lanes were considered at each of the intersections and were evaluated by the team to determine their benefit versus the impacts to the private properties. With the exception of Avondale Boulevard (south), it was determined that the residential property impacts outweighed the localized benefit of the Queue Jump Lane, and the improvements focused on the implementation of active transportation and improved transit stop infrastructure within the existing right-of-way. Bus bays are recommended at Balmoral Drive.

The cross section of the preferred alternative design concept for Segment 1 shows the addition of the multi-use pathway on both sides and the reduced lane width. Discussions are underway with the utility companies to determine the cost/benefit of maintaining overhead utility lines versus burying the infrastructure.

8.1.3 Segment 2

The recommended alternative design concept for Segment 2 is to implement Queue Jump Lanes, Active Transportation Facilities, reduce the driving lane widths, and implement improved transit stops. Due to the closely spaced intersections, the Queue Jump Lanes run continually through this segment. The multi-use pathway and the reduced driving lanes are carried through this segment, and the continual dual left turn lane is proposed to maintain full access for the commercial properties. Some frontage and parking impacts may be required, though the right-of-way requirements have been condensed and minimized where possible.

The cross section of the preferred alternative design concept for Segment 2 shows the addition of the multi-use pathway and queue jump lanes on both sides, and the reduced lane width on Bramalea Road. As noted for to Segment 1, discussions are underway with the utility companies to determine the cost/benefit of maintaining overhead utility lines versus burying the infrastructure.

8.1.4 Segment 3

The recommended alternative design concept for Segment 3 is to implement Active Transportation Facilities and reduce the driving lane width. This new multi-use pathway will connect Bramalea Road southerly to the City limits and connect to the existing sidewalks in Mississauga.

At the CN bridge, it is proposed to widen the existing sidewalk on the structure to implement the multi-use pathway by utilizing the wide shoulder. A barrier between the multi-use pathway and the adjacent road would be recommended to help improve safety.

Discussions are ongoing with the MTO/407 groups for the implementation of these same strategies over Highway 407 and the MUP crossing the highway ramps.

8.2 Intersection Improvements

Two major intersections along Bramalea Road require improvements to accommodate the improvements to the corridor: Queen Street East and Bramalea Road, and Steeles Avenue and Bramalea Road. These intersections are under the jurisdiction of the Region of Peel.

8.2.1 Queen Street East / Bramalea Road

The preferred alternative design for the intersection of Bramalea Road and Queen Street East is to implement Queue Jump Lanes with improved transit facilities and connect the new Active Transportation network to Queen Street East (see Figure 13).

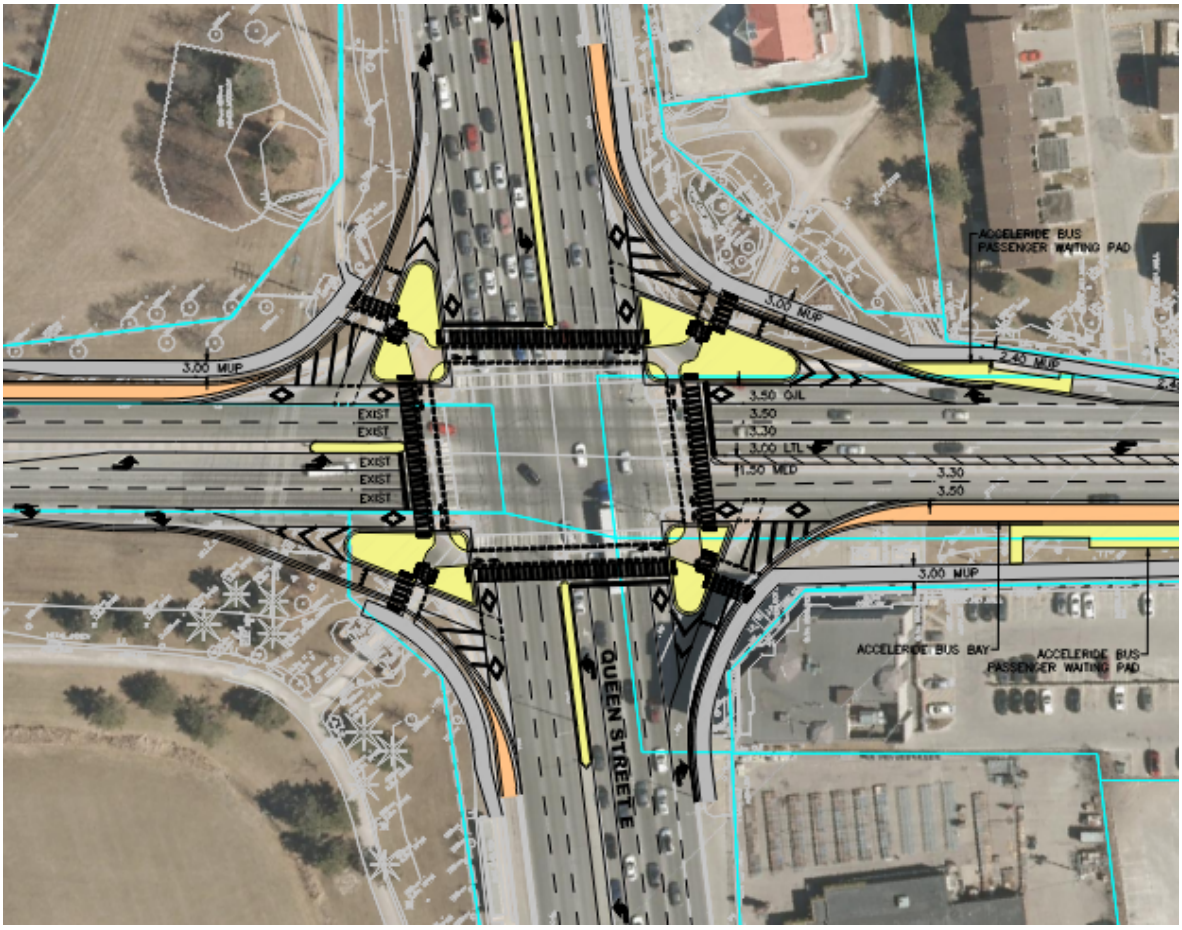

Figure 13: Queen Street East Intersection Improvements

In consultation with the Region of Peel, the intersection configuration is to implement the smart islands subject to the detailed design of traffic signal equipment and ensuring enough room for pedestrians and cyclists in the refuge area in accordance with AODA practices. With the smart islands, concrete aprons (for larger commercial vehicle) are to be reviewed during detail design to better guide the vehicles. All islands refuge area are to be raised and on the same level, except at the cyclists and pedestrians crossing areas.

8.2.2 Steeles Avenue / Bramalea Road

Similar to the intersection at Queen Street East, the preferred alternative design for the intersection of Bramalea Road and Steeles Avenue is to implement Queue Jump Lanes with improved transit facilities and connect the new Active Transportation network to Steeles Avenue (see Figure 14). New crossings at the CN rail line will be required to provide safe pedestrian crossings.

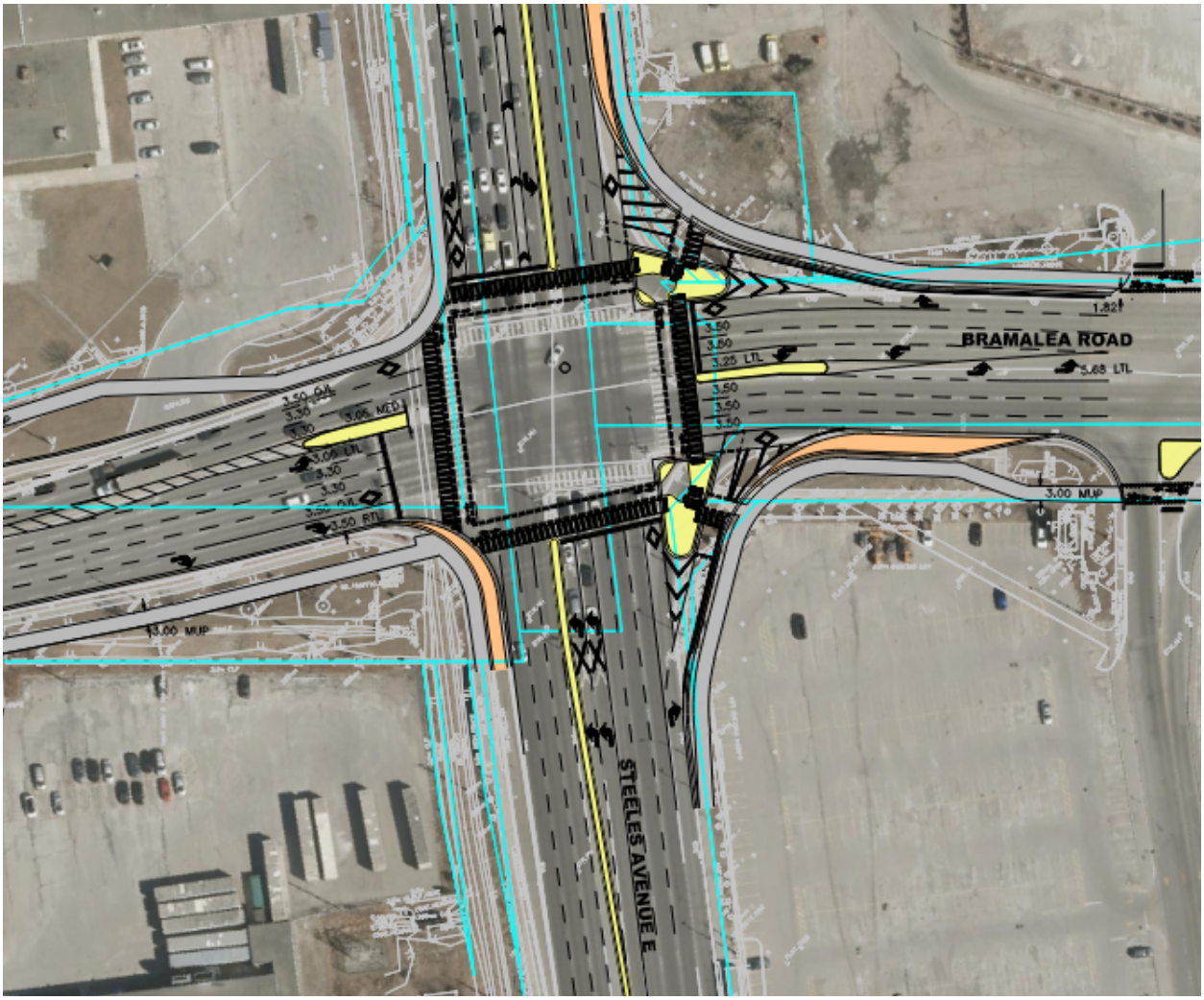

Figure 14: Steeles Avenue Intersection Improvements

In consultation with the Region of Peel, the intersection configuration is to implement the smart islands on the south leg, subject to the detailed design of traffic signal equipment and ensuring enough room for pedestrians and cyclists in the refuge area in accordance with AODA practices. With the smart islands, concrete aprons (for larger commercial vehicle) are to be reviewed during detail design to better guide the vehicles. All islands refuge area are to be raised and on the same level, except at the cyclists and pedestrians crossing areas.

8.3 Summary of Preferred Alternative Design

In summary, the overall preferred alternative design for the Bramalea Road corridor includes reduced lanes widths throughout the corridor, as well as the following improvements by segment:

Bramalea Road & Queen Street East Intersection - Queue Jump Lanes with Bus Pads and Active Transportation Facilities (where possible)

Queen Street East to Dearbourne Boulevard (Segment 1) - Active Transportation Facilities, Bus Pads

Dearbourne Boulevard to Steeles Avenue (Segment 2) - Active Transportation Facilities, Continual Queue Jump Lanes with Bus Pads, Two-way Left Turn Lane

Bramalea Road & Steeles Avenue Intersection - Queue Jump Lanes with Bus Pads and Active Transportation Facilities (where possible)

Steeles Avenue to Southern City Limits (Segment 3) - Active Transportation Facilities

The Preliminary Design of the preferred design plan is provided in **Appendix F**.

9.0 Project Description

The purpose of the project is to identify improvements throughout the Bramalea Road corridor. Following the process to select the Preferred Alternative Design, the selected preliminary design was further developed. This section describes the project recommendations for major elements of this preliminary design, including construction stages, costs, and environmental impacts.

9.1 Road Design Elements

9.1.1 Road Improvement Details

The recommended improvements to Bramalea Road generally include the implementation of Active Transportation measures, Transit improvements including Queue Jump Lanes and Bus Bays.

North of Dearbourne Boulevard / Avondale Boulevard, **Figure 16**, the corridor is proposed to be comprised of a 3.0 m multi-use pathway on each side of the road, 3.5 m outside general use driving lanes, 3.3 m inside general use lanes, and turning lanes where required.

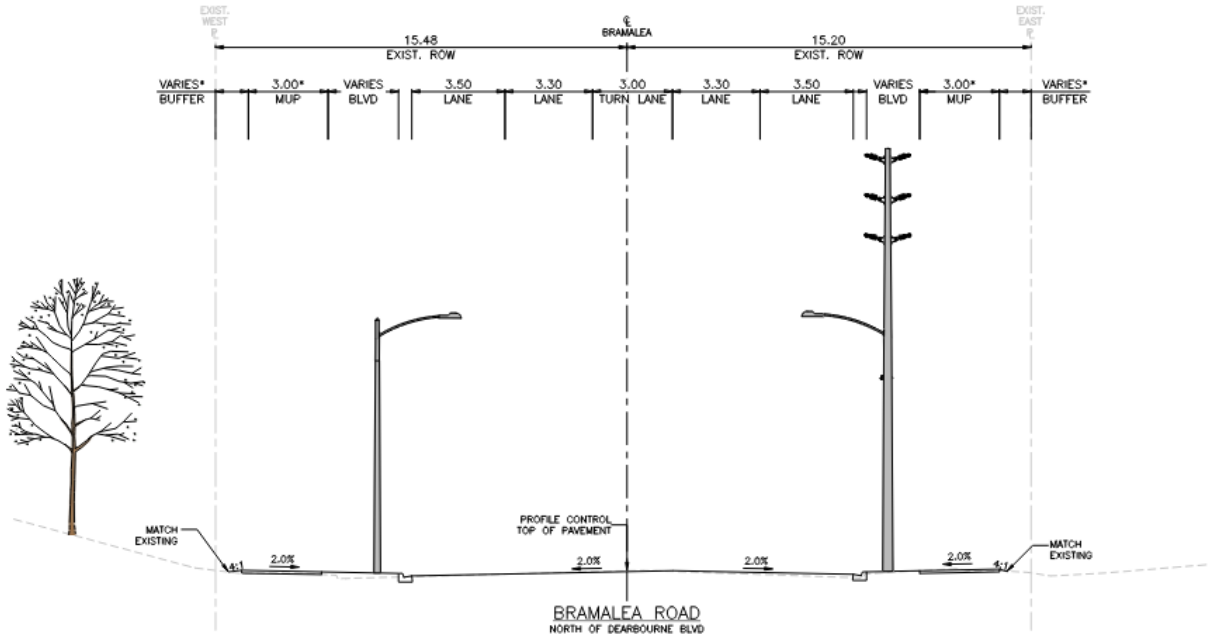

Figure 15: Bramalea Road North of Dearbourne Boulevard

South of Dearbourne Boulevard / Avondale Boulevard, **Figure 17**, the corridor is proposed to be comprised of a 3.0 m multi-use pathway on each side of the road, 3.5 m Queue Jump Lanes, 3.5 m outside general use driving lanes, 3.3 m inside general use lanes, and turning lanes where required, including a 4.5 m two-way left turn lane in sections. AS the corridor develops and the land use changes, the two-way left turn lane is to be replaced with a median, as access points along the corridor are shifted and consolidated as part of future development.

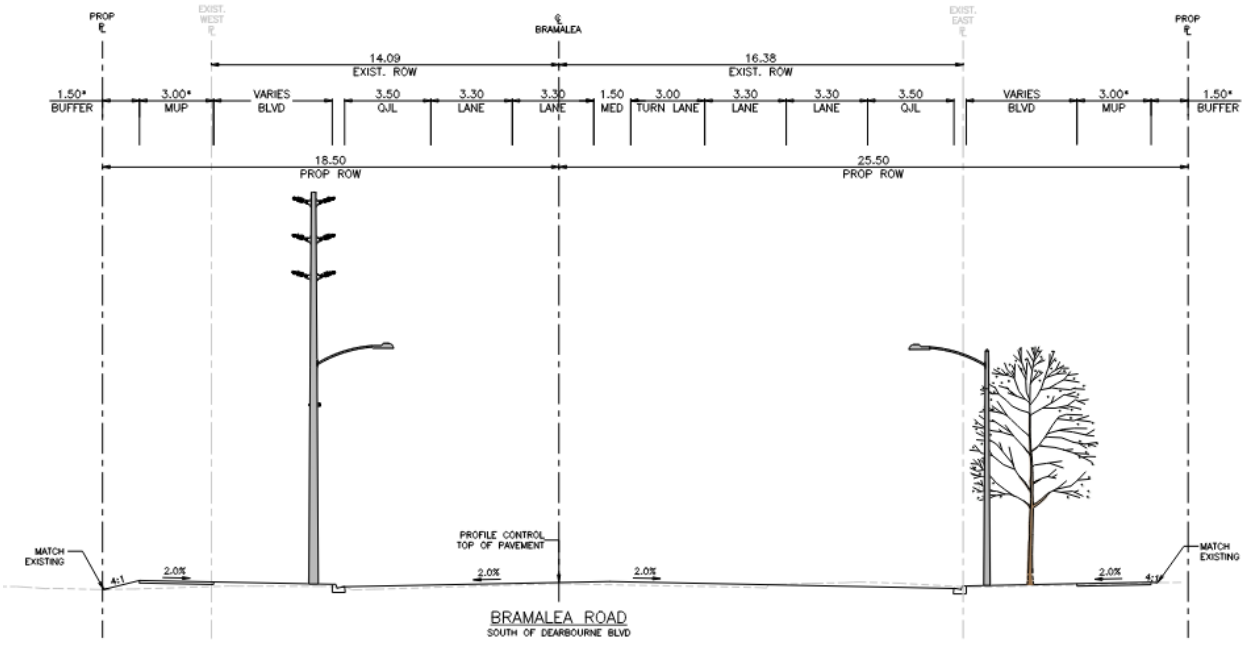

Figure 16: Bramalea Road South of Dearbourne Blvd

South of Steeles Avenue, **Figure 18**, the corridor is proposed to be comprised of 3.5 m lanes matching the current lane configuration and include 3.0 m multi-use pathways on each side of the corridor. At the CN bridge, it is proposed to widen the existing sidewalk on the structure to implement the multi-use pathway by utilizing the wide shoulder. A barrier between the multi-use pathway and the adjacent road would be recommended to help improve safety.

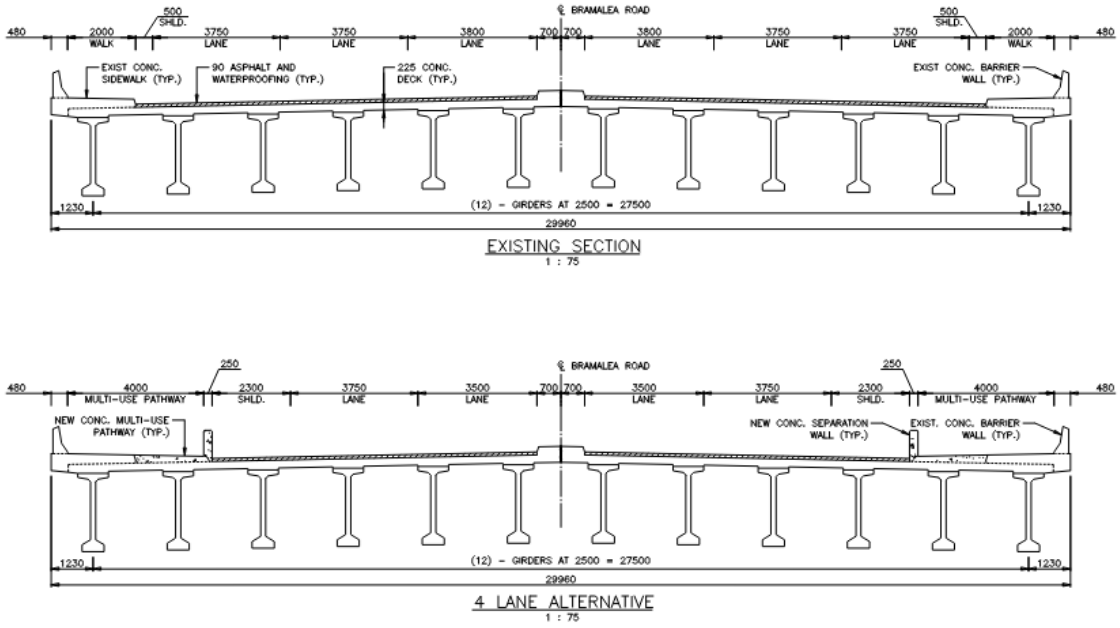

Figure 17: South of Steeles Ave

Discussions are ongoing with the MTO/407 groups for the implementation of these same strategies over Highway 407 and the multi-use path crossing the highway ramps. For the Highway 407 structure, **Figure 19**, a future option to widen the structure to include both the multi-use pathway and six lanes should be considered as an “ultimate” configuration. Discussion relating to the phasing of the above 4 Lane Alternative and the ultimate 6 lane configuration on this structure shall continue with Highway 407 ETR and MTO into detailed design.

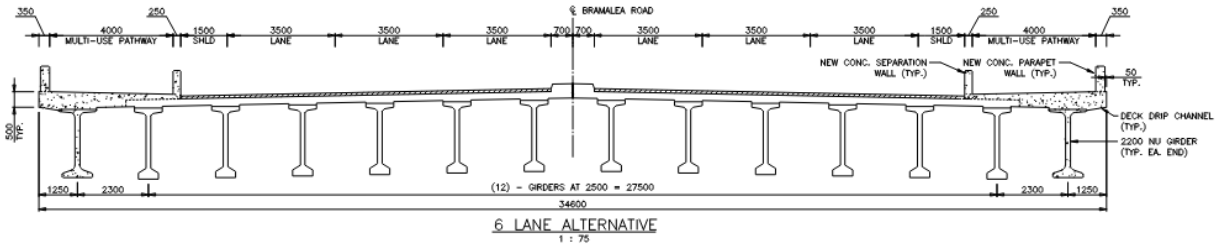

Figure 18: Highway 407 Structure

In general, speed limits along Bramalea Road were reviewed and were noted to be in compliance with City policies. The narrowing of the lanes will contribute to the regulation of driver speeds by increasing the driver’s feel of confinement. Existing access to Bramalea Road will be maintained under their current land use.

9.1.2 Transit

Transit measures were prioritized during the evaluation of the recommended plan. Through discussions between the Region of Peel, Brampton Transit and Metrolinx, transit infrastructure was added to the corridor where feasible.

Locations for queue jump lanes were evaluated against the impacts to the corridor, and recommended where the benefits outweighed the impacts. A wider outside lane is recommended to accommodate buses, and additional bus bays and bus pads are included per transit's recommendations. In locations of constraints, a modified bus pad layout is recommended.

At the time of this study, the Region of Peel is initiating BRT studies along Queen Street East. These recommendations may impact and alter the recommendations at that intersection. Prior to the start of the detailed design phase, the Region of Peel should be notified for coordination of the studies.

9.1.3 Active Transportation

Active transportation measures were also prioritized during the evaluation of the recommended plan. Continuity of facilities to support both pedestrians and cyclists is achieved throughout the corridor with the recommended plan. With the narrowing of the driving lanes and select property requirements, additional boulevard width will be available to enhance the active transportation experience.

Discussions with both CN and MTO/407 ETR will be ongoing into detail design to confirm the final configuration of the active transportation connection on the two structures, as well as across the Highway 407 ramps.

9.2 Geotechnical Design

The geotechnical investigation undertaken as part of this study included field investigations where 102 boreholes were drilled to depths ranging between 1.4 m and 8.1 m. In addition, the pavement was cored at 20 locations to test the existing asphalt depths and composition, and 39 test pits were dug in the boulevard.

In general, the existing pavement along Bramalea Road from Queen Street to the south city limit was observed to be mainly in fair to poor condition with localized relatively newly paved asphalt concrete and very poor areas. The average thickness of the granular base was measured at 610 mm, with an additional 175 mm of asphalt structure at the surface. As part of the recommended improvements, partial depth reconstruction is recommended, including the removal of all asphalt and the partial removal of the granular material. New granular A material would be placed to a depth of 250 mm and topped with 200 mm of hot mix asphalt. The existing road elevation would be maintained to tie into the existing curb and gutter.

It was noted that asbestos was found in two core samples in BH104 and BH136. Further investigation during detail design is recommended to determine the limits of this material and specifications included in the construction contract to handle the removal and disposal of the material. Removal methods where excess dust is created (i.e., grinding or milling) of these areas is not recommended. Chemical testing was undertaken on a number of samples, and additional soil sampling and chemical testing may be required to help delineate areas where specific disposal procedures will be required.

Groundwater conditions were observed and recorded at the time of drilling, as well as monitoring well measurements on two occasions and water levels were observed to fluctuate. Should replacement of the sewers be required at the time of road reconstruction, an EASR/PTTW may be required. This will be determined during detail design.

In accordance with O.Reg 406/19, onsite and excess soil management planning will be required as part of the detail design phase. Details of the preliminary geotechnical investigation and results are included in **Appendix G**.

9.3 Stormwater Design

The existing road along Bramalea Road from Queen Street to the south city limit has an urban cross-section (curb and catch basins). Drainage infrastructure within the study area includes roadside curbs, stormwater drains and municipal storm sewers, with roadside ditches and culverts in some locations. There are no documented watercourses within the study area.

Observations along the roadway within the project limits indicated that pavement surface water generally flowed along the existing pavement grades and was being directed to catch basins. The overall condition surface drainage was generally considered to be fair to poor because the drainage was impaired by poor grading and surface distresses with unsealed cracks and potholes allowing surface water to infiltrate into the underlying pavement and subgrade.

Existing catchbasins were observed to be in a poor to fair condition. These deficiencies will be addressed through the reconstruction of the pavement and replacement of the existing catchbasins. Existing catchbasins will require minor adjustment or relocation where curb lines are proposed to be adjusted as part of the proposed works. The proposed works have minor increases in total pavement surface area and are not expected to have significant impact on the drainage along Bramalea Road within the project area.

In accordance with erosion control criteria, the proposed stormwater management design must provide onsite capacity to infiltrate 5 mm of runoff from the ROW. The volumes will be provided by using infiltration based Low Impact Development (LID)

measures within the ROW, where soil conditions are suitable. For the majority of catchment areas, perforated pipe below the traditional storm sewer are recommended. In addition, infiltration bioswale are recommended where space permits. During detailed design, additional treatment methods shall be examined to ensure each LID feature receives water quality treatment before infiltration. Detailed geotechnical and hydrogeological investigations are required during detailed design to review feasibility and design of infiltration and LID features.

A detailed survey and Closed Circuit Television Video (CCTV) are recommended to determine any deficiencies or missing information in the existing storm sewer, and identify sewer sizing and placement upgrades. Details of the preliminary stormwater management report are included in **Appendix H**.

9.4 Utilities

In general, the existing utilities along the corridor will be maintained. Aboveground services and pedestals will require relocation to accommodate the proposed multi-use pathway and sections of road widening. Underground utilities will be reviewed during detail design to confirm any conflicts and relocations needed prior to construction.

Watermains

Watermain runs generally throughout the corridor at various offsets. As part of the proposed improvements, water valves may require adjustment to suit the new boulevard grades and location. Relocation of the existing watermains is not anticipated. At the time of implementation of the recommended plan, the remaining lifecycle of the watermains should be considered and if required, replace as part of the overall works to recognize efficiencies in construction.

Storm Sewers

Storm sewers run generally throughout the corridor, capturing water runoff within the ROW. Ditches and culverts are present in Segment 3 at the south end of the study area. The proposed works are anticipated to have relatively minor increases in the overall pavement surface area and are not anticipated to have significant impact on the drainage along Bramalea Road. The recommended plan will similarly collect stormwater through the network of catchbasins and convey the water through the storm sewer system. Major storm events (greater than 5 years) will drain by overland flow along the roadway.

Some additional storm sewer capacity will be required to accommodate the relatively minor increases in runoff. It is anticipated that twelve legs of storm sewer will require an increase in capacity. Stormwater control measures for both quality and quantity control will be required prior to discharging to the receiving municipal sewer system. It is also recommended to review Low Impact Development (LID) measure locations during detail

design in order to help maintain the groundwater recharge balance within the study area.

Sanitary Sewers

Sanitary sewers run generally throughout the corridor between Queen Street East and Steeles Avenue at various offsets. As part of the proposed improvements, maintenance hole covers may require adjustment to suit the new boulevard grades and location. Relocation of the existing sanitary sewers is not anticipated. At the time of implementation of the recommended plan, the remaining lifecycle of the sanitary sewers should be considered and if required, replace as part of the overall works to recognize efficiencies in construction.

Enbridge Gas

Distribution gas lines generally run parallel within the corridor under the west boulevard between Steeles Avenue and Clark Boulevard. North of Clark Boulevard, the gas line crosses to the east side of the road to Queen Street East. High pressure lines run south from Steeles Avenue, with significant underground plant in the vicinity of the Hydro One station. The Enbridge infrastructure is to remain in the boulevard. Potential conflicts with the future street illumination and underground gas line relocation to be confirmed during detailed design.

Bell

Underground Bell conduit runs along the west side of the corridor from Queens Street East southerly to Orenda Road, where it shifts to the east side of the corridor just north of Steeles Avenue. The Bell infrastructure is to be retained in the boulevard. Potential conflicts with the future street illumination and overhead hydro relocation to be confirmed during detailed design.

Rogers

Underground Rogers conduit runs along the west side of the corridor from Queens Street East southerly to Algonquin Boulevard, where it twins, and a second line runs southerly along the east side of the corridor to nearly Queen Street East. The Rogers infrastructure is to be retained in the boulevard. Potential conflicts with the future street illumination and overhead hydro relocation to be confirmed during detailed design.

Alectra Utilities

Overhead hydro runs along both the west side and east side of Bramalea Road at various locations along the corridor.

The overhead hydro lines are being reviewed for the cost-benefit of maintaining the overhead lines versus burying the lines. If the hydro line is to remain overhead, joint use

poles will be explored to mount street lighting fixtures similar to the existing conditions. If the hydro line is to be buried, new street poles along the corridor will be required. This will be carried forward into detailed design.

Hydro One

A Hydro One transmission station and line is located at the south end of the study area. No impacts to the Hydro One infrastructure are proposed. The recommended plan includes the addition of multi-use pathways adjacent to the road which may require coordination and permitting of construction adjacent to and under the Hydro One transmission lines.

9.5 Property

Property acquisition is required at select locations in order to accommodate the proposed improvements. The property requirement is focused between Dearbourne Boulevard and Steeles Avenue to accommodate the proposed queue jump lanes. **Table 4** notes the required property acquisition.

Table 4: Property Acquisition

Property Address	Approximate Property Setback (from existing)	Anticipated Property Required
600 Balmoral Drive	0.4 m	1.6 m^2
80 Bramalea Road	6.1 m	230.0 m^2
75 Bramalea Road	3.9 m	120.7 m^2
73 Bramalea Road 71 Bramalea Road 69 Bramalea Road	3.9 m	299.5 m^2
68 Bramalea Road	3.9 m	346.2 m^2
64 Bramalea Road	2.8 m	205.9 m^2
60 Bramalea Road	2.0 m	244.8 m^2
59 Bramalea Road	4.4 m	195.1 m^2
58 Bramalea Road	9.1m	782.1 m^2
56 Bramalea Road	4.5 m	155.3 m^2
52 Bramalea Road	4.5 m	198.8 m^2
50 Bramalea Road	4.6 m	140.7 m^2
45 Bramalea Road	1.5 m	91.3 m^2
41 Bramalea Road	9.0 m	438.4 m^2

24 Bramalea Road	9.1 m	411.6 m^2
17 Bramalea Road 15 Bramalea Road 11 Bramalea Road	4.5 m	258.9 m^2
391 Orenda Road 387 Orenda Road	8.8 m	758.3 m^2

9.6 Staging

The anticipated staging will involve maintaining at least a single lane of traffic in both directions, adjacent to the construction activities.

Segment 1

Two main construction stages are envisioned in order to maintain traffic. Each stage would divert the traffic onto either the northbound or southbound lanes and construct the other half of the road and boulevard improvements. Once one side is done, traffic would be shifted to the newly constructed half, and the other half would be constructed.

Segment 2

In order to construct the widening associated with this segment, it is envisioned that traffic will be redirected into the southbound lanes in order to maintain a single lane in each direction. The east side of the corridor would be constructed. Once complete, traffic would be diverted to the new northbound lanes and the existing southbound lanes would be reconstructed.

Segment 3

Similar to Segment 1, two main construction stages are envisioned in order to maintain traffic. Each stage would divert the traffic onto either the northbound or southbound lanes and construct the other half of the road and boulevard improvements. Once one side is done, traffic would be shifted to the newly constructed half, and the other half would be constructed.

9.7 Preliminary Cost Estimate

The capital costs associated with the transit, active transportation and associated roadwork improvements is estimated to be approximately $36,766,425.73. Note that these costs assume the hydro lines are buried (City costs only) and new street lighting is required. Costs exclude property. The preliminary cost estimate is provided in **Table 5**.

Table 5: Preliminary Cost Estimate

Capital Cost	Estimated $
Roadwork	$13,789,065.12
Electrical	$3,240,000.00
Structural	$800,000.00
Miscellaneous	$1,150,000.000
Sub Total	**$18,979,065.12**
Utilities (buried hydro + 10% Roadworks)	$9,078,906.51
20% Contingency (Sub Total + Utilities)	$5,611,594.33
Environmental Mitigation	$250,000.00
15% Engineering (Sub Total + Utilities w/o buried hydro premium)	**$2,846,859.77**
Total Estimated Cost	**$36,766,425.73**

9.8 Implementation Timeframe and Schedule

The implementation of the preferred improvements to Bramalea Road is recommended to begin construction in 2026. Based on City's current 10-year capital program (to be updated to align with a future TMP update), including but not limited to Council approval and availability of funds, the tentative schedules are as below:

- Confirmation of available property and property acquisition: 2025
- Detailed Design: 2024 – 2025
- Tendering: 2025
- Construction start: 2026

10.0 Potential Environmental Impacts and Proposed Mitigation

This section outlines the potential environmental impacts and proposed mitigation measures, as well as commitments to future work during the detailed design and construction phases.

10.1 Natural Environment

The road improvements along Bramalea Road are primarily within the existing road allowance. The preliminary design footprint has a low potential to negatively impact natural heritage features and species at risk given the magnitude and duration of the project and extent of the proposed improvements. However, even small areas of encroachment can have an impact on features and species, and poorly managed on-site construction or design elements can inadvertently affect adjacent areas and associated flora and fauna beyond the planned construction footprint if not properly mitigated.

Many of the environmental concerns related to this project have been avoided or mitigated through the process by which the preferred design was developed.

Site-specific and standard recommendations are identified below to mitigate potential impacts to natural features and enhance the natural heritage system where appropriate. Site-specific measures are recommended to address the specific natural heritage features and functions, while standard measures address strategies that are typically required for construction such as erosion and sediment control, flagging, signage, etc.

10.1.1 Wildlife, Species at Risk and Bird Nesting

The study area is very urbanized, and does not contain many existing natural heritage features, with little to be disturbed as a result of improvements to Bramalea Road. An existing meadow habitat in the southern section of the study area has the potential to provide SAR habitat; however, construction activities are limited to the road-right-of-way, and no impacts to the habitat are anticipated.

Migratory birds and their nests are protected from harm and disturbance under the Migratory Bird Convention Act (MBCA). Although nests of migratory birds were not observed during field investigations, there is potential for nests to occur in vegetation that will be cleared in the new road and sidewalk ROW. To address restrictions of the MBCA, tree and vegetation clearing should occur outside of the breeding bird window (i.e., April 1 to August 31) in accordance with the policies of the MBCA.

Accidental encroachment by heavy machinery may damage the root zone, limbs or trunks of edge species or disturb/destabilize natural vegetation. Construction fencing is recommended adjacent to the naturalized meadow and thicket communities to clearly delineate the work area and protect vegetation.

10.1.2 Sediment and Erosion

Erosion and sediment (E&S) transport is possible at all construction sites. The goal of E&S mitigation is to reduce the potential for erosion and subsequent sediment release through various methods of control.

In areas where erosion (wind, rain, slope erosion) has the potential to occur, minimizing the extent of erosion and its advancement within the disturbed construction area is critical to avoiding impact to natural areas near the road improvement area.

Mitigation measures for sedimentation, erosion, and dust control should be implemented to prevent sediment and dust from entering sensitive natural features. The primary principles associated with sedimentation and erosion protection measures are to: (1) minimize the duration of soil exposure; (2) retain existing vegetation where feasible; (3) encourage re-vegetation; (4) divert runoff away from exposed soils; (5) keep runoff velocities low; and to (6) trap sediment as close to the source as possible. To address these principles, the following mitigation measures are proposed:

- Silt fencing and/or barriers should be used along all construction areas adjacent to any natural areas.
- Equipment should not be permitted to enter any natural areas beyond the vegetation protection fencing.
- All exposed soil areas should be stabilized and re-vegetated, through the placement of seed and mulching or seed and an erosion control blanket, promptly upon completion of construction activities.
- Equipment should be re-fueled a minimum of 30 m away from all watercourses to avoid potential impacts if an accidental spill occurs. Spill control materials, including absorbent barriers and mats, should be kept on site to immediately address any accidental spills.
- In addition to any specified requirements and prior to grading operations, additional silt fence should be available on site to provide a contingency supply in the event of an emergency.
- All sediment and erosion controls should be monitored regularly and properly maintained as required. Controls are to be removed only after the soils of the construction area have been stabilized and adequately protected or until cover is re-established.
- Disturbed natural areas should be restored to pre-construction conditions, or better, where areas for restoration are available locally beyond the footprint of the sidewalk and road ROW.

10.1.3 Clean Equipment Protocol

Standard measures for erosion and sediment control, and revegetation of disturbed areas will be implemented to reduce opportunities for invasive plants. A clean equipment protocol will be implemented during construction to reduce the potential for the introduction and spread of invasive plants. The protocol should be developed in consideration of the *Clean Equipment Protocol for Industry.*

10.2 Property Impacts

Property acquisition is required in order to implement the preferred design. The actual new right-of-way and the limits of property acquisition required will be confirmed during the Detailed Design phase.

Permission-to-enter onto private properties will be required with roadway reconstruction. Continued correspondence with property owners will be conducted to address issues that may arise.

10.3 Noise Analysis

A noise assessment completed for the study involved the following steps:

1. Through noise modelling, predict road traffic noise levels with and without the proposed project improvements at noise sensitive areas (NSAs) along Bramalea Road.
2. Compare the existing and predicted road traffic noise levels against the noise criteria for noise mitigation measures, and where warranted, recommend mitigation with the City of Brampton ROW.

The assessment considered road traffic noise levels for the following scenarios:

1. Existing (2023)
2. Future No-build (without project) scenario (2041)
3. Future Build (with project) scenario (2041 representing the following elements of the preferred design
    - Bramalea Road & Queen Street East Intersection – Queue Jump Lanes with Bus Pads and Active Transportation Facilities
    - Queen Street East to Dearbourne Boulevard – Active Transportation Facility and Bus Pads

- Dearbourne Boulevard to Steeles Avenue – Active Transportation Facilities, Continual Queue Jump Lanes with Bus Pads, Two-way Left Turn Lane

The Future No-build scenario was not separately modelled as it is expected to be acoustically equivalent to the Future Build scenario. Based on the Stantec transportation study for the project (Stantec Consulting Ltd. 2020), traffic volume demand is not expected to be impacted by the preferred design. Other design elements such as roadway width changes are small in comparison to what typically can cause a net change in traffic noise and the future road traffic noise levels with and without the project are expected to be the same. Therefore, only the Future-Build scenario was modelled and assessed against the 60 and 65 dBA limit under the City of Brampton Noise Wall Policy and the MTO Guide, respectively. Existing noise walls within the study area were inventoried, and are observed to be in good condition.

The noise assessment considers traditional NSAs, including the following land uses, with an outdoor living area (OLAs):

- Private Homes
- Townhouses
- Multiple unit buildings (e.g., as apartments with OLAs used by all occupants
- Hospital, nursing homes for the aged, where there are OLAs for the patients

The assessment focused on existing residential dwellings within the study area that are adjacent to Bramalea Road (i.e., first-row dwellings). Road traffic noise levels were predicted at 22 receptors representing the OLAs of the first-row dwellings. Based on proximity, these dwellings are expected to sustain the highest road traffic noise levels from Bramalea Road.

The Future Build noise level exceeds the MTO noise limit of 65 dBA at nine receptors. The Future Build noise level exceeds the City of Brampton noise limit of 60dBA at all modelled receptors, except one. Therefore, noise mitigation investigation is warranted for the exceeding receptors.

The City of Brampton Noise Wall Policy allowable noise wall height is 2.2 m for noise mitigation, though a 2.4 m noise wall can be considered. The noise barriers are evaluated for feasibility of providing a minimum of 5 dB noise reduction averaged over the first row of receptors. It was determined that 17 of the noise walls would achieve a noise reduction of 5 dB or more at the targeted receptors, and are recommended for implementation. The effectiveness of other noise walls considered were limited by one or more of the following factors: noise wall height constraints, setback distances to the receptor, receptor elevation, existing noise walls, and exposure to road traffic noise from Queen Street East, Clark Boulevard, and Balmoral Drive. The noise walls were also observed to be of solid construction without visible gaps or cracks. As such they are in good condition acoustically speaking. Advising on the need for immediate or in near

time replacement of the concrete walls is beyond the scope of practice as there may be other non-acoustical considerations that may warrant replacement of the walls.

A copy of the Noise Analysis is provided in **Appendix I.**

10.3.1 Construction Noise

Construction noise impacts are temporary in nature, and largely unavoidable. With adequate controls, impacts can be reduced. However, for some periods of time and types of work, construction noise will be noticeable at some receptor locations. The expected construction activities within the Bramalea Road improvements include:

- Road paving/repaving and widening in some areas
- Construction of multi-use paths, bus passenger waiting pads, active transportation facilities and medians

This section of the report provides an evaluation of construction equipment noise and discusses guidelines and Code of Practice to reduce construction impacts.

10.3.1.1 Local Noise Control By-law

The City noise by-law 93-84 (The Corporation of the City of Brampton 1984) prohibits and regulates noise within the City. Section 4 (10) of the by-law exempts any sound arising from road work and road improvements undertaken by or on behalf of the MTO or the Region of Peel and the presence of these sounds is not to be considered a contravention of the by-law. Section 4.2 of the by-law indicates that the Chief of Planning and Infrastructure Services can grant an exemption to provisions of the by-law subject to conditions specified in Section 4.2 (1).

10.3.1.2 MECP Model Municipal Noise Control By-law

MECP stipulates limits on noise emissions from each equipment. In the presence of persistent noise complaints, sound emission standards for the various types of construction equipment used will be verified to ensure they meet the specified limits contained in MECP Publication NPC-115, and NPC-118.

10.3.1.3 Construction Noise Levels

Construction activities will vary temporally and spatially as the project progresses. Noise levels from construction at a given receptor location will also vary over time as different activities take place, and as those activities change location within the right-of-way.

Once the construction equipment and schedules are finalized, the equipment sound levels should be reviewed to confirm that noise emissions are within the permissible limits. If they are higher than the limits, noise control options should be explored for the construction equipment exceeding the limits.

10.3.1.4 Construction Code of Practice

The following best practices should be considered for the Project construction:

- All construction equipment should be properly maintained to limit noise emissions. As such, all construction equipment should be operated with effective muffling devices that are in good working order.
- There should be explicit indication that Contractors are expected to comply with all applicable requirements of the contract and local noise by-laws. Enforcement of noise control by-laws is the responsibility of the Municipality for all work done by Contractors.
- The Contract documents should contain a provision that any initial noise complaint will trigger verification of construction noise and typical noise control measures.
- In the presence of persistent noise complaints, all construction equipment should be verified to comply with MECP NPC-115 and NPC-118 guidelines
- In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measures may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration should be given to the technical, administrative, and economic feasibility of the various alternatives.

A construction noise impact assessment will be completed during detailed design based on the expected construction equipment typically used for this kind of project.

10.4 Air Quality Analysis

The existing ambient air quality is affected by the nearby road traffic emission sources, as well as other human activities from commercial/institutional uses along the corridor, and natural sources. The background ambient air quality levels for the contaminants of interest (COI) in the study area are lower than their related criteria, with the noted exceptions of benzene (annual average), ozone (8-hour) and B(a)P (both 24-hour and annual), which are exceeding their respective criteria. These exceedances are common in southern Ontario and are not unique to the study area. Project implementation is not expected to have a significant impact on local air quality and is likely to be an improvement in air quality with project implementation.

For the construction phase, a construction dust management plan should be prepared and implemented. Non-chloride dust suppressants shall be applied during construction as per MECP requirements. For a comprehensive list of fugitive dust prevention and control measures, refer to *Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities* report prepared for Environment Canada. March 2005.

With implementation of mitigation measures and purposeful management of construction dust and combustion gases, emissions from the construction phase and impacts to the local air quality can be reduced and controlled.

The operation of the project has the potential to impact the ambient air quality. The local traffic will increase regardless of the project implementation due to significant growth and development in the City of Brampton. The project will support the shift to alternative modes of transportation, improve transit service reliability and travel times and make transit a more attractive alternative. The purpose of a 3.0 m multi-use pathway is to encourage users to shift to active transportation such as walking and cycling. Queue jump lanes will be implemented, which will decrease delay at traffic signals and reduce bus idling time at intersections. Modelling using MicroSim has shown to reduce transit delays by 3% to 17% by combining queue jump lanes and near-side stop with active transit signal priority compared to far-side stop with transit signal priority with no queue jump. The model simulation also showed that major street general traffic can also benefit from the queue jump transit signal priority.

The impact on the air quality is expected to be lower with project implementation than without, as it helps improve traffic flow in the road network, provides connectivity for the active transportation network, and encourages the shift to sustainable modes of transportation. In addition, reduction in vehicle and train fuel combustion emissions are expected in the future with implementation of new vehicle emissions standards and the transition to electric vehicles and buses as well as the electrification of the GO Transit facilities.

The City is also committed to incorporate vegetation in the design of the corridor. For example, the proposed design for the Bramalea Road segment between Dearbourne Boulevard and Steeles Avenue includes generous boulevards with enhanced tree planting. The updated Official Plan has a larger ROW in this segment to accommodate trees / vegetation, which will be incorporated through site development applications.

A copy of the air quality assessment memo is provided in **Appendix J**

10.5 Archaeological Resources

The Stage 1 archaeological assessment of the study area determined that portions of the study area retain the potential for the identification and documentation of archaeological resources. In accordance with Section 1.3.1 and Section 7.7.4 of the MHSTCI's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011a), Stage 2 archaeological assessment is required for any portion of the Project's anticipated construction footprint which impacts an area of archaeological potential.

The Stage 1 archaeological assessment was submitted to MCM and has been accepted into the Ontario Public Register of Archaeological Reports. The Stage 2 archaeological

assessment will be completed during detailed design and must be reviewed by MCM and accepted into the Ontario Public Register of Archaeological Reports.

Consultation and engagement will continue with interested Indigenous communities during detailed design as it relates to the project and the Stage 2 archaeological assessment. The City will contact Indigenous communities to arrange an on-site monitor as part of the fieldwork, as requested.

The Stage 1 archaeological assessment is provided in **Appendix D**.

10.6 Cultural Environment

Where the cultural heritage resources were identified within the study area, an assessment of potential impacts resulting from the Project was undertaken. No direct impacts are anticipated to any previously identified or potential cultural heritage resources. Three built heritage resources were identified to be situated within 50 metres of planned construction activity and are at risk for potential indirect vibration related impacts:

- 375 Clark Boulevard
- 92 Autumn Boulevard
- 69 Bramalea Road

Where potential for impacts has been identified, measures to mitigate them have been prepared. Precautions are required to conserve previously identified or potential built heritage resources or cultural heritage landscapes through avoidance and mitigation where the potential for the project to cause an impact has been identified. Vibration velocity, peak particle velocity, should be limited to three millimetres per second. Therefore, the below mitigation options have been developed to provide for the conservation of previously identified or potential built heritage resources or cultural heritage landscapes identified.

The potential for indirect impacts resulting from vibration effects is related to the construction phase of the Project. Where potential impacts have been identified, components of the previously known or potential built heritage resource within the 50-metre buffer but outside the direct Project Location. As a result, a preventive approach to mitigation measures will contribute to a reduction in risk of indirect impacts. The following is the preferred and alternative mitigation options:

Preferred Option: Avoid properties containing previously known or potential built heritage resources or cultural heritage landscapes by establishing a buffer zone around the resource to avoid construction activity within 50 metres of the built heritage resource or cultural heritage landscape. This should use appropriate preventative measures such as mapping on construction maps and temporary fencing. Staging and laydown areas should also be selected to be non-invasive and avoid the previously identified or

potential built heritage resource. Where avoidance is not feasible, the alternative option should be applied.

Alternative Option: For resources within 50 metres of the Project Location that cannot be avoided, the alternative option to mitigate this risk is for a qualified building condition specialist or engineer to develop a strategy to carry out condition surveys and vibration monitoring, where required. The pre-condition survey may include screening activities to identify critical properties and determine appropriate vibration levels based on building type, age, and condition. Vibration monitoring may consist of random confirmatory vibration monitoring at the most critical properties during pipeline installation. A postcondition survey should be carried out on an as-needed basis to be determined by the qualified building condition specialist or engineer.

10.7 Climate Change

The MECP's guide, *Consideration of Climate Change in the Environmental Assessment Process*, outlines two approaches for consideration and addressing climate change in project planning including:

- Reducing a projects impact on climate change (climate change mitigation).
- Increasing the projects and local ecosystems resilience to climate change (climate change adaptation).

The objectives of the climate change document have been considered in the generation and evaluation of alternatives, recommended design, and mitigation approaches.

The proposed improvements provide the opportunity to reduce the project's impact on climate change through the identification of an efficient transportation network and through the provision of facilities that encourage active forms of transportation (e.g., cycling facilities, sidewalks, transit improvements). Further discussion related to reducing GHG emissions is provided in Section 10.4.

The MECP's guide will also be considered during detailed design.

11.0 Approvals and Agreements

Any permits required should be identified during detailed design. Based on the preliminary design, no works are proposed within potential or confirmed SAR habitat, and consultation with the MECP is not required for the project. The study area falls within the jurisdiction of the TRCA, is not located within a regulated areas and no approvals or permits through TRCA are anticipated.

During detailed design, consultation with CN and Metrolinx will be required to execute required agreements. Metrolinx has property adjacent to the study area and Metrolinx may require agreements for works occurring adjacent to this area. The project team will submit the detail design work to CN Rail to review, so CN Rail can determine if there are any issues with respects to the Railway Corridor and Rail Right-of-Way. Prior to construction, once the project proceeds to tendering/construction, the City will be required to obtain a work permit from CN Rail. The work permit will determine the scope of construction, methodology, necessary insurances, and provide approval to proceed. The work permit will determine if the City needs to arrange for Rail Flagging on the overpass section for protective measures. The City will engage Metrolinx following the decisions from CN Rail.

12.0 Closing

This Environmental Study Report has been prepared following the Municipal Class EA study process for Schedule C projects. It outlines the process which the City of Brampton has undertaken to address the problems identified, and the preferred solution and preliminary design to be implemented.

The Class EA study process has involved consultation with directly affected members of the public, Indigenous communities, stakeholders, and review agencies to ensure that they were aware of the project and that their concerns have been addressed.

The filing of this report represents the conclusion of Phase 1 through Phase 4 of the Class EA planning process as outlined in the MCEA document. Provided that no Section 16 Order requests are received, the City may proceed with detailed design and implementation (Phase 5) 30 days following the completion of the public review period.