AECOM

Region of Peel

Mississauga Road Improvements from North of Bovaird Drive West to Mayfield Road Municipal Class Environmental Assessment Environmental Study Report

VOLUME 1 – MAIN REPORT

April 2013

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Project Number:

60116610

Date:

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-	1	CN Rail
-	1	GO Transit
-	1	TransCanada Pipeline
-	1	Credit Valley Conservation

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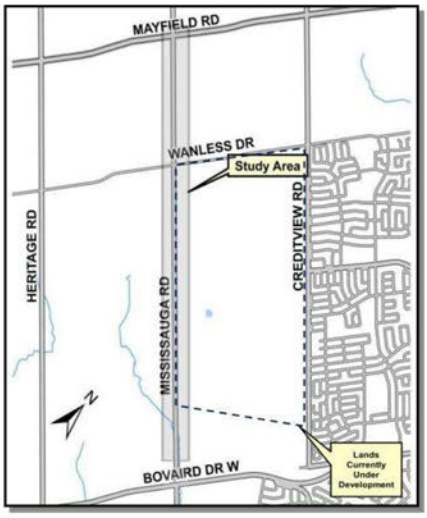
Executive Summary

A. BACKGROUND



The Region of Peel (the Region), through their consultant AECOM, has completed a Municipal Class Environmental Assessment (Class EA) Study to address the short term (2017) and long term (2031) road improvement requirements for Regional Road 1 (Mississauga Road). Mississauga Road is located in the northwest part of the City of Brampton and is a two lane regional arterial road with a rural cross section. The Mississauga Road study area limits (see map) extend from approximately 300 metres north of Regional Road 107 (Bovaird Drive West) to Regional Road 14 (Mayfield Road) which forms the municipal boundary between Caledon and Brampton.

The Region has various mandates, two of which are to minimize impacts to the environment and maintain and operate a safe and functional regional road network that serves a variety of users. The proposed improvements include the addition of lanes and a new CNR overpass and will support planned future growth in the Northwest Brampton Development Area.

B. MUNICIPAL CLASS EA PLANNING SCHEDULE

In Ontario, municipal road projects are subject to the Municipal Class EA process and must follow a series of mandatory steps outlined in the Ontario Municipal Class EA document. The approved Municipal Class EA document was updated and prepared by the Municipal Engineers Association (MEA) in October of 2000, and was amended in 2007 & 2011. As the project described in this report involves the reconstruction or widening (i.e., additional lanes) of Mississauga Road, with a construction cost of over $2.4 million, a Schedule C Municipal Class EA (Phases 1 to 4) was completed for this study.

C. CONSULTATION PROGRAM

Recognizing that public and regulatory agency consultation is a significant and integral part of the Municipal Class EA process, a consultation program was initiated from the outset of the study and continued throughout.

A wide range of stakeholders were identified and contacted at the outset of the study to 'scope' potential issues and areas of interest or concern. Interest in the project was considered to be any feedback received from a stakeholder indicating that they could be directly affected during the planning, construction and/or operation of the proposed undertaking. A number of methods were undertaken to achieve the above stated objectives, including:

- Placement of Notices of Study Commencement, Public Information Centres 1 and 2 as well as Study Completion within the Brampton Guardian and Caledon Enterprise newspapers;
- Scheduling of two Public Information Centres during Phases 2 and 3 of the study;
- Placement of notices on Region's website;
- Distribution of informational mailings (i.e., notices) to regulatory agencies, First Nations and the public during various stages of the study;
- Receiving and responding to written submissions;

- Participation in meetings and telephone discussions with regulatory agencies, utilities, stakeholders including development communities, and the public; and
- Placement of this ESR on the Public Record and provision of a Notice of Study Completion to regulatory agencies and the public during Phase 4 of the study.

D. PROBLEM/OPPORTUNITY STATEMENT

The Region of Peel Long Range Transportation Master Plan (LRTP) and City of Brampton Transportation and Transit Master Plan provide the need and justification for road improvements along Mississauga Road from Bovaird Drive West to Mayfield Road. The opportunities for improvement have been defined by the following issues:

- The LRTP Update identified the need to widen and improve Mississauga Road between Bovaird Drive West to Mayfield Road (from a two lane cross section to a four lane cross section and a four lane cross section to six lane cross section from Bovaird Drive West northerly to Sandalwood Parkway;
- The Brampton Transportation and Transit Master also identifies the widening of Mississauga Road to 4 lanes from Bovaird Drive West to Mayfield Road and 6 lanes from Bovaird Drive West to Sandalwood Parkway; and
- The Town of Caledon Transportation Needs Study identifies Mississauga Road as a short term (year 2011) roadway project.

Considering the above, the problem/opportunity statement for this Municipal Class EA Study is defined as follows:

- Approved and planned growth in the study area will contribute to an increase in traffic congestion and deterioration of road conditions over the next 10 to 25 years;
- The CN Railway crossing currently results in delay for motorists and will worsen over time with the additional traffic on Mississauga Road and increased rail traffic within the CN corridor. Traffic analysis has confirmed the warrants for a grade separation at the CN Railway crossing;
- These factors affect the level of service and adequacy of the road resulting in the need for improvements; and
- Alternative solutions to address these problems will consider opportunities to enhance streetscape conditions and facilitate alternative modes of transportation by providing supporting infrastructure (e.g., transit stops, sidewalks, multi-use paths and cycling lanes).
- In order to serve short and long term transportation needs related to planned future growth, this study examined possible road widening, intersection improvements, and opportunities to facilitate public transit, bicycle traffic pedestrian movement and active transportation.

E. ALTERNATIVE SOLUTIONS TO THE PROBLEM

The following six alternative solutions were considered:

- Do Nothing;
- Optimize Existing Infrastructure;
- Transportation Demand Management[1] (TDM);

[1] *Improve the current operation of the transportation system by managing travel demand independent of expanding or constructing new infrastructure (e.g., shift demands to alternative modes of transportation like cycling or walking, carpooling).*

- New Transit Services on Mississauga Road;
- Widening and urbanization (converting from rural to urban cross section) of Mississauga Road; and
- Hybrid Alternatives.

The evaluation process took into consideration traffic demands as a result of new development and the opportunity to coordinate stormwater management. The process also included the various discipline's experience, knowledge and input on the alternative solutions concluded that the preferred solution to solve the current congestion, capacity and operational deficiencies should be a combination of all the alternatives including optimize existing infrastructure (e.g., turning lanes, signal timing), TDM, transit service improvements, and widening Mississauga Road to a four/six lane urban cross section.

F. ALTERNATIVE DESIGN CONCEPTS

The following alternative design concepts were developed and evaluated.

- Road Widening:
  - Do Nothing (screened out due to traffic volumes);
  - Widen equally about the Centre line;
  - Widen Entirely to the West;
  - Widen Entirely to the East; and
  - Widen from the Centreline north of CNR tracks and to the West, south of CNR tracks.
- Grade Separation:
  - Do Nothing (screened out due to traffic volumes);
  - Overpass; and
  - Underpass.
- Huttonville Creek Crossing:
  - Do Nothing (screened out due to traffic volumes);
  - 42 metre Span Bridge; and
  - Open Bottom Concrete Elbowed Culvert, 9.5 metre (inlet) to 12 metre (outlet).

The evaluation of the Huttonville Creek crossings took into consideration a review of the MNR's fish compensation plan based on established buffer requirements.

Based on the evaluation of the above noted design concepts, the following concepts were identified as the preferred design:

- Widen from the centerline north of the CNR tracks and widen to the west south of the CNR tracks;
- New CNR Overpass; and
- 42 metre span bridge at Huttonville Creek (subject to a separate City of Brampton EA study for an East-West Collector Road, the bridge span may increase).

G. REMAINING APPROVALS

The Region of Peel will work with the CNR, CVC, MNR, MOE, Ministry of Tourism, Culture and Sport and the City of Brampton, including Brampton Hydro and Hydro One prior to the start of construction during detailed design to ensure that the proposed works are acceptable and to obtain required permits.

H. CAPITAL CONSTRUCITON SCHEDULE

Under the Region's 2012 Capital Roads Construction Program, Mississauga Road between Bovaird Drive West and Mayfield Road is identified for roadway improvements under the following current schedule:

- Year 2017 – Reconstruction and widening to 4 lanes between Bovaird Drive West and Mayfield Road, including construction of CN grade separation
- Year 2027 – Widening to 6 lanes between Bovaird Drive West and Sandalwood Parkway
- Year 2031 – Widening to 6 lanes between Sandalwood Parkway and Mayfield Road

The Region's Capital Construction Program is reviewed on an annual basis with respect to project schedules (accelerated or deferred), new projects and overall capital cost estimates and budget. Since the Capital Program is approved by Regional Council annually, the noted schedule for Mississauga Road improvements under the 2012 Program are therefore potentially open to change.

I. MITIGATION MEASURES

The overall conclusion drawn from this ESR is that construction of the proposed improvements can be achieved with minimal disruption to and impact upon the natural, physical, socio-economic and cultural environment. The principal negative impacts will include:

- Impacts to residents and business owners in addition to the traveling public during construction;
- Impacts to vegetation property frontages along the corridor;
- Permanent and temporary easements required from several property owners along both sides of the corridor; and
- Potential impacts to fisheries and aquatic habitat.

The significance to these effects can be mitigated through the measures prescribed in this report, along with the use of standard design measures and best construction management practices. It is noted that construction of the proposed roadway improvements are not expected to have any discernible adverse impact on the environment.

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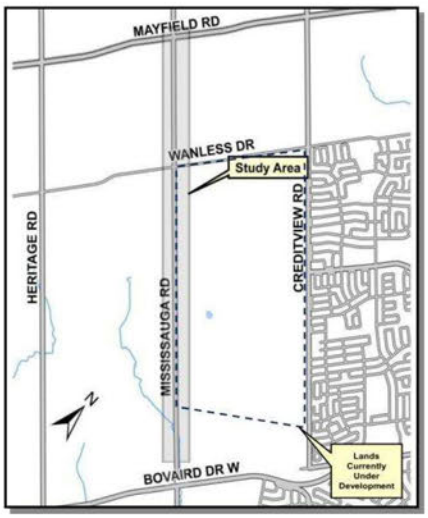
List of Acronyms

AADT	Average Annual Daily Traffic
ANSI	Area of Natural or Scientific Interest
ASI	Archaeological Services Inc.
CEAA	*Canadian Environmental Assessment Act*
Class EA	Municipal Class Environmental Assessment
CN Railway	Canadian National Railway
COSEWIC	Committee on the Status of Endangered Species in Canada
CVC	Credit Valley Conservation
DFO	Department of Fisheries and Oceans
EA	Environmental Assessment
EAA	*Environmental Assessment Act*
ESA	Environmentally Sensitive Area or *Endangered Species Act*
ELC	Ecological Land Classification
ESR	Environmental Study Report
GGH	Greater Golden Horseshoe
GTA	Greater Toronto Area
ha	hectare
HADD	Harmful Alteration, Disruption or Destruction of Fish Habitat
HOV	High Occupancy Vehicle
HPBATS	Halton Peel Boundary Area Transportation Study
INAC	Indian and Northern Affairs Canada
km	kilometre
LRTP	Long Range Transportation Plan
LOS	Level of Service
m	metre
ML	Mega Litre
MEA	Ontario Municipal Engineers Association
MMAH	Ontario Ministry of Municipal Affairs and Housing
MNR	Ontario Ministry of Natural Resources
MOE	Ontario Ministry of the Environment
MTO	Ontario Ministry of Transportation
NHIC	Natural Heritage Information Centre
NSTC	North South Transportation Corridor
OMB	Ontario Municipal Board
OPSD	Ontario Provincial Standards Specifications Document
PDSB	Peel District School Board
PIC	Public Information Centre
PPS	Provincial Policy Statement
Province	Province of Ontario
Region	Region of Peel
ROPA	Region of Peel Official Plan Amendment
ROW	Right-of-Way
TIA	Traffic Impact Assessment
TMP	Traffic Management Plan
TNHS	Terrestrial Natural Heritage Strategy
TTMP	Transportation and Transit Master Plan

PART A: PHASE 1 OF THE CLASS EA PLANNING PROCESS

1. Introduction

1.1 Background



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The Region has various mandates, two of which are to maintain and operate a safe and functional regional road network that serves a variety of users. The proposed improvements include the addition of lanes and a new CNR overpass which will support planned future growth in the Northwest Brampton Development Area.

1.2 Format of this Report

This report was prepared to meet the requirements of the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment (Class EA) document (October 2000, as amended in 2007 & 2011). The report combines all phases of the planning process (described in Section 1.5.1) under one cover and incorporates steps considered essential for compliance with the requirements of the *Environmental Assessment Act* (*EAA*) in the following sections:

- **Section 1** provides background information about the initiation of this study, outlines the format of the report, and describes the study objectives and team organization. This section also provides an overview of the Municipal Class EA planning process, including the project planning schedule followed for this study, public review procedures and next steps;
- **Section 2** summarizes the public, agency and First Nations consultation activities undertaken as part of this Municipal Class EA;
- **Section 3** identifies and describes the problems/opportunities addressed by this Class EA Study including supplemental background information pertaining to transportation planning;
- **Section 4** provides a review of the study area features and considerations, including the existing and future Mississauga Road transportation conditions, which led to the conclusion that improvements are warranted. This section also includes an overview of traffic analysis, socio-economic environment, cultural environment, natural environment, surface water and stormwater management, noise/air quality, geotechnical/hydrogeological conditions, existing and future infrastructure/utilities and related planning studies;
- **Section 5** describes the alternative planning solutions considered and presents the Phase 2 evaluation of alternative solutions, including the preferred solution;

- **Section 6** presents the alternative design concepts including road widening alternatives, grade separation alternatives and Huttonville Creek crossing alternatives;
- **Section 7** summarizes the evaluation of road widening design concept alternatives;
- **Section 8** summarizes the evaluation of grade separation design concept alternatives;
- **Section 9** summarizes the evaluation of Huttonville Creek crossing design concept alternatives;
- **Section 10** describes the road widening project including plan and profile, design criteria, typical cross section, water crossings, cost estimates and utilities
- **Section 11** describes the grade separation project including plan and profile, design criteria, typical cross sections, property requirements and grading easements as well as discussion regarding the future CNR track expansion;
- **Section 12** describes the potential environmental impacts, proposed mitigation measures and monitoring requirements associated with the preferred design concepts as well as remaining approvals and commitments; and
- **Section 13** presents the summary of the planning process followed for this Class EA study.

1.3 Study Objectives and Location

The purpose of this Municipal Class EA study is to provide a comprehensive and environmentally sound planning process which is open to public participation to meet the following objectives:

- Improve traffic operations by addressing congestion and deteriorating road conditions;
- Investigate traffic and access management measures with the potential to improve safety and traffic operations;
- Support area development and approved growth for lands along the corridor;
- Improve safety for all roadway users (e.g., motorists, cyclists and pedestrians);
- Improve access delineation and management; and
- Improve efficiency throughout the corridor including the intersections of Wanless Drive and the future Sandalwood Parkway.

The location and context of the study area is illustrated on **Figure 1**. The study area is comprised of lands along the east and west side of the Mississauga Road corridor and is located within the northwest quadrant of the City of Brampton. It is generally bounded by Mayfield Road to the north and to the south, just north of the Bovaird Drive West-Mississauga Road intersection.

AERIAL PHOTOGRAPHY 2009

0 250 500 750m

STUDY AREA

LANDS CURRENTLY UNDER DEVELOPMENT

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT STUDY

MISSISSAUGA ROAD IMPROVEMENTS FROM NORTH OF BOVAIRD DRIVE TO MAYFIELD ROAD

FIGURE 1:
STUDY AREA

Region of Peel
Working for you

AECOM

DWG NAME: L:\ET\work\105000\105183 - Mississauga Road EA (Markham)\02a-CAD\Mount Pleasant\FIGURE 1 STUDY AREA.dwg Nov 19/12 1:39pm bolan

1.4 Study Team Organization

This Class EA study was undertaken as a collaborative effort between the Region of Peel and AECOM. General direction was provided by representatives from the Region with project team meetings being held at key points throughout the planning process. Key members from the Region's Environment, Transportation and Planning Services department included the following individuals:

- Hitesh Topiwala, MCIP, RPP., Project Manager;
- Neal Smith, C.E.T. Project Manager, Transportation Program Planning;
- Steve Ganesh, MCIP, RPP., Manager, Transportation Program Planning; and
- Liz Brock, Technical Analyst.

Key AECOM team members included the following individuals:

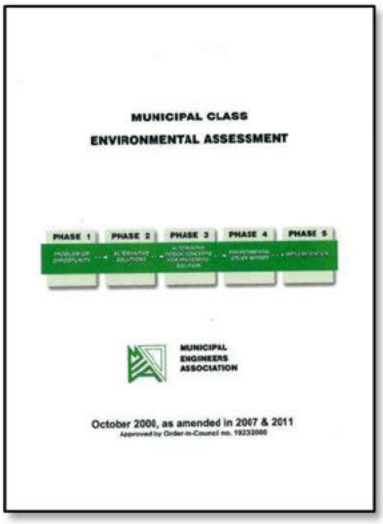
- Peter Cholewa, P. Eng., Project Manager;
- Khalid Khan, P.Eng, Transportation Planning Engineer;
- Karl Grueneis, B.A., Class EA Lead;
- Jessica Mollo, B.Sc, Environmental Planner;
- Brian Richert, P. Eng., Water Resources Engineer;
- Jillian deMan, B.Sc., Terrestrial Ecologist; and
- Nicola Lower, B.Sc., M.Sc., Aquatic Ecologist.

Additional subject-specific expertise was provided by Shaheen and Peaker (hydrogeology), Geo-Canada (geotechnical), Archaeological Services Inc. (archaeology) and Lura Consulting (public consultation).

1.5 Municipal Class Environmental Assessment Planning Process

1.5.1 Overview

All municipalities in Ontario, including the Region of Peel, are subject to the provisions of the *Environmental Assessment Act* (*EAA*) and its requirements to prepare an Environmental Assessment for applicable public works projects. The Ontario Municipal Engineers Association (MEA) "Municipal Class Environmental Assessment" document (October 2000, as amended in 2007 & 2011) provides municipalities with a five-phase planning procedure approved under the *EAA* to plan and undertake all municipal sewage, water, stormwater management, and transportation projects that occur frequently, are usually limited in scale, and have a predictable range of environmental impacts and applicable mitigation measures.



In Ontario, road projects are subject to the Municipal Class EA process and must follow a series of mandatory steps as outlined in the Municipal Class EA document. The Class EA consists of five phases as summarized below:

- **Phase 1 – Problem or Opportunity:** Identify the problem or opportunity to be addressed and the need and justification;

- **Phase 2 – Alternative Solutions:** Identify alternative solutions to the problem by taking into consideration the existing environment, and establish the preferred solution taking into account public and agency review and input;
- **Phase 3 – Alternative Design Concepts for the Preferred Solution:** Examine alternative methods of implementing the preferred solution, based upon the existing environment, public and agency input, anticipated environmental effects and methods of minimizing negative effects and maximizing positive effects;
- **Phase 4 – Environmental Study Report:** Document, in an Environmental Study Report (ESR) a summary of the rationale, planning, design and consultation process for the project as established through Phases 1 to 3 above and make such documentation available for scrutiny by review agencies and the public; and
- **Phase 5 – Implementation:** Complete contract drawings and documents, proceed to construction and operation, and monitor construction for adherence to environmental provisions and commitments. Where special conditions dictate, also monitor the operation of the complete facilities.

The Class EA process ensures that all projects are carried out with effectiveness, efficiency and fairness. This process serves as a mechanism for understanding economic, social and environmental concerns while implementing improvements to municipal infrastructure.

Mandatory Principals

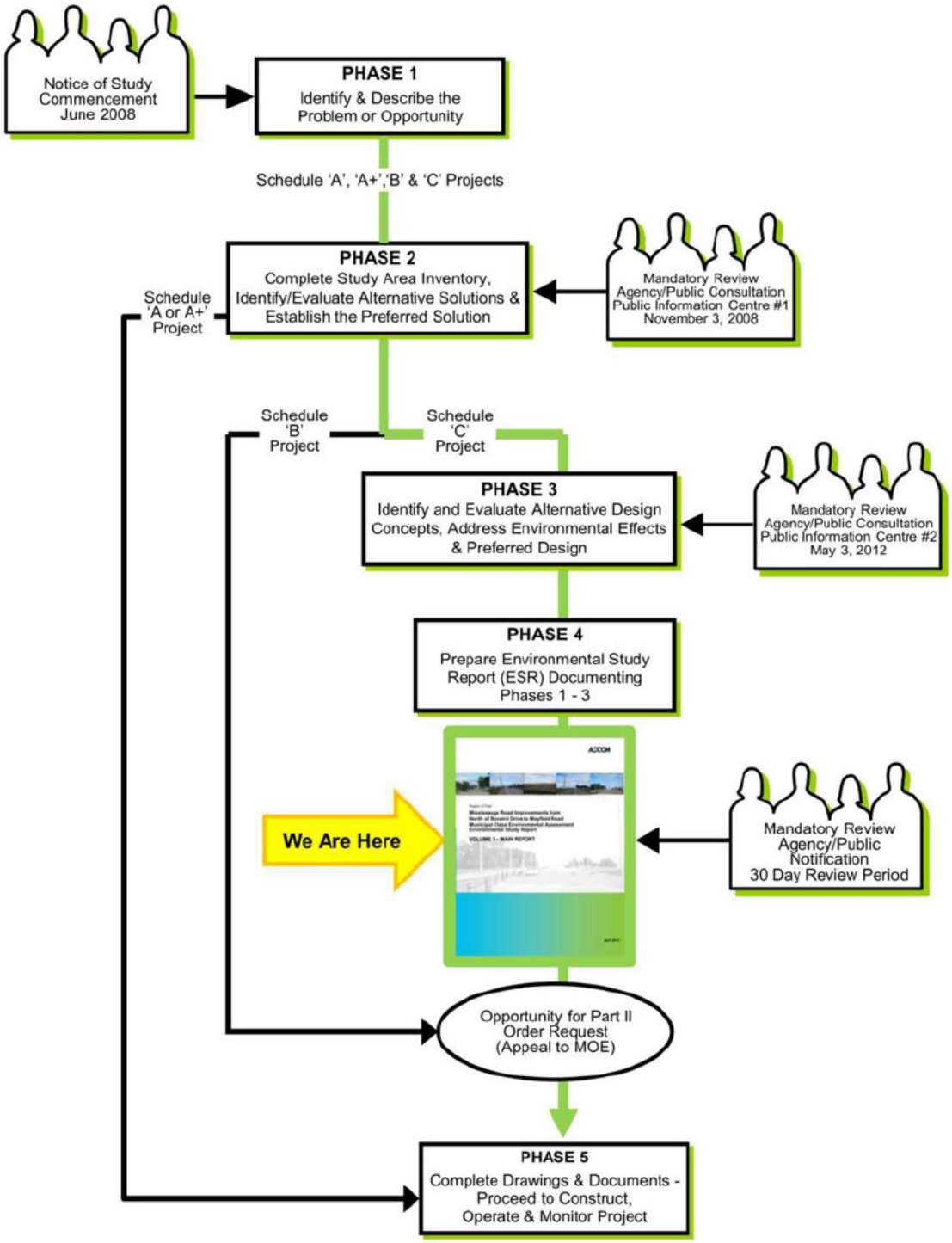
The planning process followed not only adheres to the guidelines outlined by the Municipal Class EA document but reflects the following five mandatory principals of Class EA planning under the *EAA*:

- Consultation with affected parties early on and throughout the process, such that the planning process is a co-operative venture;
- Consideration of a reasonable range of alternatives, both the functionally different alternatives to the project (known as alternative solutions) and the alternative methods of implementing the preferred solution;
- Identification and consideration of the effects of each alternative on all aspects of the environment;
- Systematic evaluation of alternatives in terms of their advantages and disadvantages, to determine their net environmental effects; and
- Provision of clear and complete documentation of the planning process followed, to allow 'traceability' of decision-making with respect to the project.

Following these five principals ensures that the Class EA process is devoted to the prevention of problems and environmental damage through planning and decision-making, recognizing that research and evaluation of possible impacts have been taken into account prior to implementation of the project.

Figure 2 illustrates the process followed in the planning and design of projects covered by a Municipal Class EA, including the Mississauga Road Improvements Class EA study.

Figure 2 Overview of the Municipal Class EA Planning Process



1.5.2 Project Classifications

The Municipal Class EA document defines four types of projects and the planning processes required for each (referred to as Schedule A, A+, B or C). This project was completed under the Municipal Class EA Schedule C planning process (see below).

The selection of the appropriate project planning schedule is dependent on the anticipated level of environmental impact and, for some projects, the anticipated construction costs. Projects are categorized according to their environmental significance and their effects on the surrounding environment. Planning methodologies are described within the Municipal Class EA document and are different according to Class type, described as follows:

Schedule A: Projects are limited in scale, have minimal adverse environmental effects and include a number of municipal maintenance and operational activities. These projects are pre-approved and may proceed to implementation without following the Class EA planning process. Schedule A projects generally include normal or emergency operational and maintenance activities where environmental effects of these activities are usually minimal. Examples of Schedule A projects include shaping and cleaning of roadside ditches or road resurfacing with no changes to road alignment. As such, these projects are pre-approved and subsequently do not require any further planning and public consultation.

Schedule A+: The purpose of Schedule A+ is to ensure some type of public notification is provided for projects that are pre-approved under the Class EA. The proponent is required to inform the affected public of municipal infrastructure projects prior to being constructed or implemented in their area. However, there is no ability for the public to request a Part II Order[2]. If the public has any comments, they should be directed to the municipal council where they would be more appropriately addressed. Examples of Schedule A+ projects include construction or operation of sidewalks or bicycle paths or bike lanes within existing rights-of-way, construction of localized operational improvements at specific locations (e.g., addition of a ramp to an existing interchange, turning lanes at an intersection, but not a continuous centre left turn lane) where there is no financial limit.

Schedule B: These projects have the potential for some adverse environmental effects. The proponent is required to undertake a screening process, involving mandatory contact with directly affected public and with relevant government agencies to ensure that they are aware of the project and that their concerns are addressed. If there are no outstanding concerns, then the proponent may proceed to implementation. Schedule B projects generally include improvements and minor expansions to existing facilities. Examples of Schedule B projects include reconstruction or widening where the reconstructed road or other linear paved facilities (i.e., High Occupancy Vehicle (HOV) lanes) which result in additional lanes and has a construction cost of less than $2.4 million.

At the end of Phase 2, a Project File documenting the planning process followed through Phases 1 and 2 shall be finalized and made available for public and agency review. However if the screening process raises a concern which cannot be resolved, the Part II Order may be requested and considered by the Minister of the Environment; alternatively, the proponent may elect voluntarily to plan the project as a Schedule C undertaking.

Schedule C: These projects have the potential for significant adverse environmental effects and must proceed under the full planning and documentation procedures (Phases 1 to 4) specified in the Municipal Class EA document. Schedule C projects require that an Environmental Study Report (ESR) be prepared

[2] *Part II Order refers to a request to the Minister of the Environment for a project to comply with Part II (addresses Individual Environmental Assessments) of the Environmental Assessment Act. The need for an Individual EA is based on the conclusion that based on predicted project impacts the MEA Class EA planning process is not sufficient and a more comprehensive EA planning process is required. The requirement to prepare an Individual EA involves the preparation of Terms of Reference and EA document that are submitted to the Ministry of the Environment (MOE), other government agencies and the public for review.*

and filed for review by the public and review agencies. If concerns raised cannot be resolved, a Part II Order may be requested and considered by the Minister of the Environment to elevate to an Individual Environmental Assessment. Schedule C projects generally include the construction of new facilities and major expansions to existing facilities. Examples of Schedule C projects include construction of new roads or other linear paved facilities with a construction cost over $2.4 million, or reconstruction or widening where the reconstructed road or other linear paved facilities (e.g., HOV lanes) will not be for the same purpose, use, capacity or at the same location as the facility being reconstructed (i.e., additional lanes, continuous centre left turn lanes).

Appendix A.1: Overview of the Municipal Class Environmental Assessment Planning Process further expands on the steps required to complete the Municipal Class EA planning process.

1.5.3 Mississauga Road Class EA Project Planning Schedule

As the project described in this report involves the reconstruction or widening (> $2.4 million) where the reconstructed road will not be for the same purpose, use, capacity or at the same location as the facility being reconstructed (i.e., additional lanes), Schedule C activities where Phases 1 to 4 of the Municipal Class EA planning process were completed for this study.

1.5.4 Canadian Environmental Assessment Act Triggers

The *Canadian Environmental Assessment Act (CEAA)* was recently repealed and replaced with CEAA 2012 which received Royal Assent on July 6th, 2012. Recent changes to CEAA include replacing "triggers" with the CEAA 2012 Regulation Designating Physical Activities list. A proponent is not required to complete the Federal Process if a project is not on this list. Review of this list has determined that the Mississauga Road project is not a Designated Project and that it is therefore not subject to the new federal EA process.

Although the Federal Minister of the Environment has the discretion to require a federal EA to be undertaken if the project type is not on the Projects list, this situation is not anticipated.

1.5.5 Communications and Consultation Program

As part of the Municipal Class EA Schedule C planning process, several steps have been undertaken to inform government agencies, affected landowners, the local community and the general public of the project and to solicit comments.

The MEA Municipal Class EA document outlines specific mandatory public and agency consultation contact points and methods. In order to properly communicate the project and to solicit feedback throughout the planning process, the following activities were undertaken:

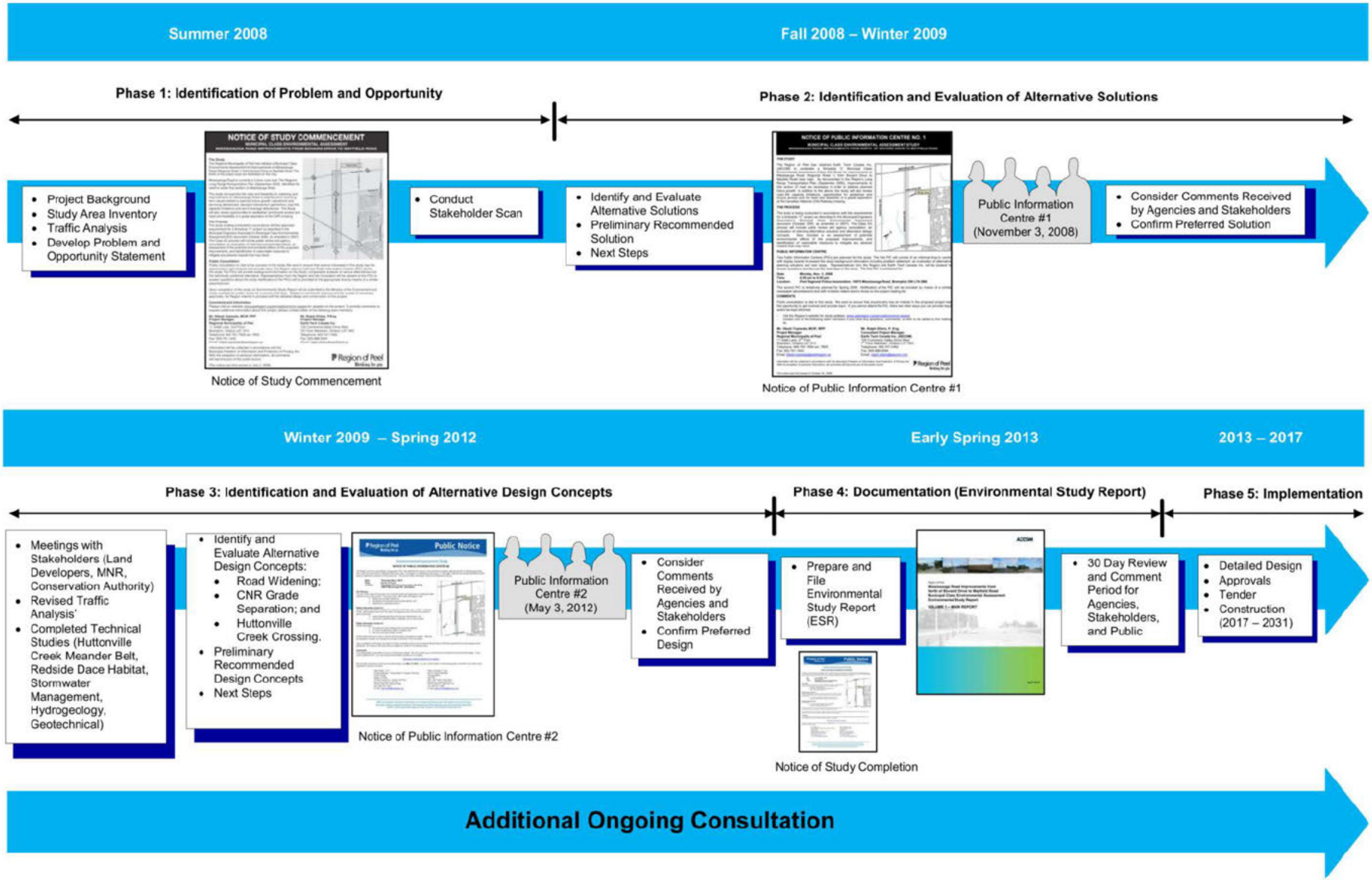
- Completion of a stakeholder scan (telephone interviews) to identify and engage key stakeholders as required;
- Posting project milestones on the Region's project website, including notices of Study Commencement, Public Information Centres (two), Study Completion, as well as materials presented at the Public Information Centres;
- Publication of newspaper advertisements (2 circulations) for all project milestones;
- Direct mailing of notices to stakeholders, affected land owners and review agencies regarding project milestones;
- Holding two Public Information Centres (PICs) to engage and obtain input from the public, review agencies and stakeholders;

- Holding Technical Advisory Meetings with the City of Brampton prior to the PICs to solicit feedback and incorporate staff comments into the display boards before being presented to the public; and
- Holding individual meetings with key affected stakeholders and review agencies (e.g., City of Brampton, Ministry of Natural Resources, Brampton Hydro One, development community, Credit Valley Conservation, CN Rail, Town of Caledon) as required or as opportunities arose.

The above communications and consultation program outputs are further described in Section 2.

Figure 3 illustrates the planning and consultation process followed for this project.

Figure 3 Overview of the Communication and Consultation Program



1.6 Public Review of this Report and Next Steps

The documentation for this Schedule C project consists of an Environmental Study Report (ESR), which is presented as this document. Placement of the ESR for public review completes the planning and preliminary design stages of the project.

This ESR is available for public review and comment for a period of 30 calendar days starting on April 11, 2013 and ending on May 11, 2013. A public notice (Notice of Study Completion) was published to announce commencement of the review period. To facilitate public review of this document, copies are available at the following locations during regular business hours:

Region of Peel, Clerk's Department
10 Peel Centre Drive
5th Floor, Suite A
Brampton, ON L6T 4B9
Phone: 905.791.7800 ext. 4526

City of Brampton, Clerk's Department
2 Wellington Street West, 1st Floor
Brampton, ON L6Y 4R2
Phone: 905.874.2101

Town of Caledon, Clerk's Department
6311 Old Church Road,
4th Floor
Caledon, ON L7C 1J6
Phone: 905.584.2272

Mount Pleasant Village Branch Library
100 Commuter Drive
Brampton, ON L7A 0G2
Phone: 905.793.INFO(4636)
Mon. - Thurs. 2 p.m. - 9 p.m.
Fri. 2 p.m. - 6 p.m.,
Sat. 10 a.m. - 5 p.m.
Sun. 1 p.m. - 5 p.m.

Margaret Dunn Valleywood Branch Library
20 Snelcrest Drive
Caledon, ON L7C 1BC
Phone: 905.843.0457
Mon. 4 p.m. – 8:30 p.m.
Tues. Thurs. and Fri. 2 p.m. – 8:30 p.m.
Wed. 10 a.m. – 5 p.m.
Sat. 10 a.m. – 4 p.m.

If, after reviewing this report, you have questions or concerns, please follow this procedure:

1. Contact Mr. Neal Smith at the address below to discuss your questions or concerns:

Mr. Neal Smith, C.E.T
Project Manager, Transportation Division
Transportation Program Planning
Region of Peel
10 Peel Centre Drive, Suite B
Brampton, Ontario L6T 4B9
Tel: 905-791-7800 ext. 7866; Fax: 905-791-1442
Email: neal.smith@peelregion.ca

2. Arrange a meeting with the above if you have significant concerns that may require more detailed explanations;

3. If you raise major concerns, the Region of Peel will attempt to resolve the issue(s). A mutually acceptable time period for this meeting will be set. If the issues remain unresolved, you may request the Minister of the Environment (see contact information below), by order, to require the Region of Peel to comply with Part II of the *EAA* before proceeding with the project; this is called a Part II Order request. The Minister may make one of the following decisions:

   - Deny the request with or without conditions;
   - Refer the matter to mediation; or
   - Require the Region of Peel to comply with Part II of the *EAA* by undertaking one of the following:

- Set out directions with respect to preparing the Terms of Reference and an Individual EA for the undertaking; or
- Declare that the Region (proponent) has satisfied the requirements for the preparation of a Terms of Reference, however, the proponent must still prepare an Individual EA.

Minister's Office
Ministry of the Environment
77 Wellesley Street West, 11th Floor, Ferguson Block
Toronto, Ontario M7A 2T5

A copy of the request must also be forwarded to the attention of Mr. Neal Smith at the Region of Peel at the address provided above.

If no Part II Order requests are received, the Region may proceed with detailed design and construction of the recommended works as presented in this report.

Information will be collected in accordance with the *Municipal Freedom of Information and Protection of Privacy Act*. All comments, with the exception of personal information, will become part of the public record.

2. Public and Agency Consultation

Throughout the planning process (see **Figure 2**), a variety of communications and consultation methods were undertaken with numerous stakeholders, including the Region of Peel, Ministry of Natural Resources, Credit Valley Conservation, City of Brampton, Brampton Hydro One, CN Rail, GO Transit, Ministry of Aboriginal Affairs, various First Nations bands, external government review agencies, property owners including developers-consultants and other interested members of the public.

2.1 General

Several steps were undertaken to inform the affected stakeholders about this Municipal Class EA Study, obtain their input, and address their comments or concerns as much as possible as they arose. This was accomplished throughout the study beginning with the notification of study commencement, stakeholder scan, continuing through two Public Information Centres (PICs), and meetings with stakeholder groups (e.g., land developers).

The following means of communication was used in this study to ensure that all potentially affected and interested stakeholders were notified of the project.

- **Notices** – Notices appeared in the Brampton Guardian and Caledon Enterprise to announce the Study Commencement, Public Information Centre (PIC) No. 1, PIC No. 2, as well as Study Completion. These notices were also attached to the letters issued to those on the contact lists;
- **Letters** – Initial contact letter, invitation letter to the PICs were delivered by mail to those on the master contact list including agencies, fronting landowners including residents in the study area, as well as other public stakeholders;
- **PIC Materials** – Display boards, handouts and comment sheets were produced for use during the PICs;
- **Webpage** – The Region's main website was the host webpage for this project providing background information, relevant documents and contact information. The web page was updated at key milestones during the span of the project. The link for the webpage was noted on all communication materials; and
- **Environmental Study Report (ESR)** – All forms of communication and consultation with agencies and the public are included in the ESR.

Refer to **Appendices A.2, A.3, A.4, A.5 and A.6** for copies of the letters, newspaper notices, Stakeholder Scan results and PIC materials.

2.2 Public Consultation

2.2.1 Stakeholder Scan

At the beginning of the public consultation process, a stakeholder scan (telephone interviews) was conducted with five landowners and developers within the study area that would potentially be affected by the improvements to Mississauga Road. The purpose of the scan was:

- To inform and educate key stakeholders regarding the proposed project;
- To better understand who may have an interest in the proposed project;
- To identify what those interests might be and the reason for the interest;

- To identify other potentially interested individuals/organizations, and any barriers they may face to participation;
- To determine if the proposed methods for consultation are reasonable, or if there are more effective methods that could be used; and
- To identify important aspects of the community (landscape features, land uses, past and current issues) that will need to be considered.

The results of the interviews were added to the comment database.

The stakeholders that were part of the scan were identified based on recommendations from the project team along with suggestions from other stakeholders. Five stakeholders were interviewed, including two residents, two developers and one agricultural business. The questions used to interview the stakeholders are provided below:

- Prior to this call, have you heard about this project? If so, what have you heard?
- Is there anything you think the Region should be aware of as they begin this study (e.g., the community, the use of the road, yourself, and/or your organization)?
- Would you/your group like to be consulted on this project? How would you like to be consulted and receive information (confirm contact information)?
- What are you/your group's specific interests regarding this project? What issues do you think need to be considered?
- Are there any other groups or individuals that you think we should consult?
- The Region intends to hold two Public Information Centres to provide information to the public at key stages in the project planning. Does this sound like a reasonable way to consult with the community? Is there any other type of consultation you would recommend?
- Do you have any additional thoughts about this project that you would like to share?

2.2.1.1 Key findings

The following identifies the key findings of the stakeholder scan including the opportunities, issues and concerns, questions and suggestions.

Opportunities

The opportunities identified by the participants included:

- Address the rush hour traffic back-ups;
- Trunk sewer and watermain extensions could to be integrated into this project;
- Additional east-west intersections should be considered; and
- Plan to support the access needs of the expanded Mount Pleasant GO Train Station east of Mississauga Road.

Issues and Concerns

The issues and concerns expressed by the participants included:

- Limited driveway access during construction;
- Potential limits to access caused by railway grade separation;

- Special sensitivity to Huttonville Creek; and
- Some stakeholders would like to see the area stay agricultural.

Questions

The questions raised by the participants included:

- Will construction affect the local natural gas supply?
- Will this project introduce municipal water and/or sewage services?
- What is the construction timeline?

Suggestions

The suggestions provided by the participants included:

- Both email and postal notices are acceptable for future communications;
- The plan for hosting Public Information Centres is also acceptable; and
- Direct meetings are recommended for Norval Farm Supply.

2.2.2 EA Phase 1 Consultation

During Phase 1 of this project, a Notice of Study Commencement was issued to surrounding property owners, government review agencies and well as First Nations groups. Surrounding property owners and agencies also received a response form that requested the following information:

- Does your agency wish to participate in the study?
- To provide the appropriate contact information of the person(s) who will be participating in the study.
- Any additional comments/concerns that the agency may have regarding this study.

Six (6) responses to the Notice of Study Commencement were received. Five (5) agencies were interested in participating in the study and one (1) did not have any concerns with this undertaking.

One (1) form was received from a surrounding property owner who would like to be kept up to date on study progress.

2.2.3 EA Phase 2 Consultation

2.2.3.1 Public Information Centre No. 1

The first Public Information Centre (PIC) No. 1 was held on Monday November 3, 2008 from 6:00 pm to 8:00 pm at the Peel Region Police Association building located at 10675 Mississauga Road, City of Brampton.

The purpose of PIC No. 1 was to provide an opportunity for review agencies, local municipalities, special interest groups, potentially affected property owners and the public to review the background information, problem and opportunity statement, significant study area features, evaluation of alternative planning solutions, the preliminary recommended planning solution, and to meet and discuss their concerns with the project team.

The notice of PIC No. 1 (see **Appendix A.3**) was placed in the Brampton Guardian (October 22 and November 2, 2008) and Caledon Enterprise newspapers (October 22 and November 1, 2008). Invitation

letters were mailed to the agencies and property owners on the contact list on Wednesday October 22, 2008.

The venue for PIC No. 1 followed an informal "drop-in" format with large display boards presenting the project information, including:

- Background Information;
- Study Purpose and Study Area Map;
- The Problem/Opportunity Statement;
- Overview of the Class EA Process;
- Existing Land Uses and Natural Heritage Features;
- Alternative Planning Solutions;
- Proposed Evaluation Criteria;
- Evaluation of Alternative Planning Solutions;
- Preliminary Recommended Planning Solution;
- Existing Traffic Conditions;
- Schedule; and
- Next Steps.

A total of 26 participants signed in at the PIC with the majority of the attendees being fronting property owners and representatives from the development community. Other attendees included representatives from the Town of Caledon and Regional Councillors. Three comment sheets were submitted at the PIC and can be found in **Appendix A.3**.

2.2.3.2 Key Findings

The key themes and points from the verbal and written comments received included:

- Support for proposed road improvements including widening;
- Interest in a prompt project completion date;
- Property impacts, driveway access to property during construction, potential limits to access caused by railway grade separation;
- Truck noise and high speeds;
- Difficulty of exiting driveways during rush hour - current traffic backups at Bovaird Drive West requires immediate action;
- In the interim, provide a longer left turn light for southbound traffic on Mississauga Road at Bovaird Drive West in order to address current traffic back-ups;
- Modify the northwest corner of Mississauga Road at Bovaird Drive West to accommodate large trucks;
- Potential impacts to local wells;
- Need for pedestrian safety improvement;
- Include shrubs and trees in the design of a new centre median;

- Build the road to accommodate future expansions with an aim to reduce future construction costs;
- Include sidewalks in the project plan;
- Include lighting in the plan, similar to Bovaird Drive West; and
- There is some doubt that bike lanes and sidewalks would be used.

2.2.4 EA Phase 3 Consultation

2.2.4.1 Public Information Centre No. 2

Public Information Centre No. 2 was held on May 3, 2012 from 6:00 pm to 8:00 pm at the Peel Region Police Association located at 10675 Mississauga Road, City of Brampton.

The purpose of PIC No. 2 was to provide an opportunity for review agencies, local municipalities, special interest groups, potentially affected property owners and the public to review comments received from PIC No. 1, work completed since then, evaluation of alternative design concepts including the preliminary recommended design, and to meet and discuss their concerns with the project team.

The notice of PIC No. 2 was placed in the Brampton Guardian on April 18 and 27, 2012 and Caledon Enterprise newspapers on April 17 and 26, 2012. Invitation letters were mailed to the agencies and property owners on the contact list on Thursday April 19, 2012.

The venue for PIC No. 2 followed an informal "drop-in" format with large display boards presenting the project information, including:

- Purpose of PIC No. 2;
- Strategic Plan and Term of Council Priorities for 2011-2014;
- Relevant Planning Studies;
- Municipal Class EA Process;
- Approved and Future Development Plans;
- Overview of Study Area, Organization and Objectives;
- Traffic Assessment and Problems/Opportunities;
- Traffic Study Results;
- Recommended Planning Alternative;
- Feedback received from PIC No. 1;
- Technical Reports/Studies;
- Drainage Areas;
- Identification and Evaluation of Alternative Design Concepts;
- Huttonville Creek Crossing Alternatives;
- Proposed Mitigation;
- Preliminary Recommended Design for CN Grade Separation;
- Preliminary Recommended Design Concept; and
- Next Steps.

A total of 44 participants signed in at the PIC with the majority of the attendees being fronting property owners and representatives from the development community. Other attendees included representatives from the Town of Brampton, Town of Caledon and Regional Councillors. 1 comment sheet was submitted at the PIC and can be found in **Appendix A.4**.

Following the PIC, two letters were received that expressed concerns regarding access to development lands on the west side of Mississauga Road in the vicinity of the proposed CNR overpass and visual impact and land requirements for the proposed grade separation which reduces the amount of developable land. Correspondence can be found in **Appendix A.6.1**.

2.2.4.2 Key Findings

The key themes and points from the verbal and written comments received included:

- Support for proposed road improvements including widening;
- Clarification regarding property taking and impact on front yards and driveways; and
- Potential impacts on adjacent development lands.

2.2.5 EA Phase 4 Consultation

The Notice of Study Completion was published in the Brampton Guardian on April 12 and 19, 2013 and the Caledon Enterprise on April 11 and 18, 2013 newspapers. Letters along with a Notice were sent to agencies and property owners on the mailing list advising them of the location and dates that this ESR will be on public review. The notice can be found in **Appendix A.5** and the letters can be found in **Appendix A.6**.

Comments received during the 30 day review period will be collected by the Region and accordingly addressed and documented. All correspondence received during the 30 day review period; including any Part II Order Requests will be appended to this ESR.

2.2.6 Agency Consultation

The following describes agency consultation throughout the course of the project.

2.2.6.1 Brampton Hydro and Hydro One Networks

An initial meeting was held with Hydro One Networks and Brampton Hydro on November 17, 2010. At that time, Brampton Hydro outlined plans for an upgraded hydro line along the Mississauga Road corridor within the limits of the EA. The utility company also described their plans to replace existing poles with taller wood poles to accommodate a new Hydro One line with the final pole location on the east side of Mississauga Road. Following discussion on constructability, Brampton Hydro agreed to investigate constructing hydro facilities on the west side of Mississauga Road.

Due to an emerging need to upgrade and enhance hydro service north of Mayfield Drive, meetings were held with Brampton Hydro One and Hydro One Networks in early 2011 to establish an ideal location for both temporary and permanent hydro pole locations in relation to the future reconstruction and widening of Mississauga Road, including grade separation at the CN tracks and adjacent land development. Construction of the hydro pole line was scheduled for 2011. A hydro design plan was identified which

provided for a temporary pole line on the east side of Mississauga Road to north of the grade separation (HP #29), with permanent line onward northerly. The location of the permanent hydro line section north of HP #29 was reviewed by the project team and accepted to suit the future road improvement on Mississauga Road. Ultimately, with the reconstruction and widening of Mississauga Road, the temporary pole line south of HP #29 would be converted to a permanent pole line on the west side of Mississauga Road with provisions for access to the line at the grade separation and undergrounding of services within the hydro easement along the railway corridor at the grade separation through the Mississauga Road right-of-way. Correspondence can be found in **Appendix A.6.2.**

2.2.6.2 CNR and GO Transit

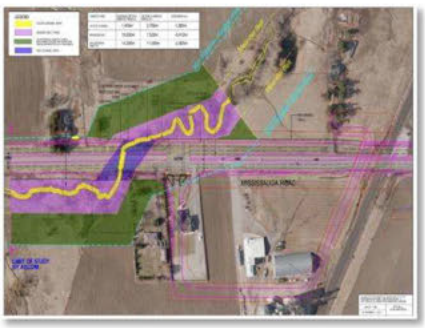
In a letter dated August 7, 2008, the CN Railway expressed interest in this project due to the existing railway at-grade crossing at Mile 19.17 on the Halton Subdivision and requested to be kept informed of study progress. CNR also attended a special meeting on May 7, 2009 where they confirmed their preference for an overpass opposed to an underpass.

With the identification of a proposed overpass (road over rail) to eliminate the existing CN level crossing, a meeting was held with CN representatives on June 5, 2012 to discuss the General Arrangement proposed for the grade separation and open discussions with respect to cost sharing for the future grade separation. CN requirements for the future grade separation requires only two CN track, along with provisions for two additional GO Transit lines. Additional span requirements were also identified to accommodate road access between the east and west side of Mississauga Road at the grade separation. In general, CN requirements were to provide a bridge structure that spans track requirements, both existing and proposed. At the meeting in June 2012, CN confirmed that they have no requirements for any more than two tracks for their own operations.

Cost sharing negotiations were deemed more appropriate to be discussed at the detail design stage with GO Transit and the City of Brampton as included parties with the Region of Peel. Correspondence can be found in **Appendix A.6.3.**

2.2.6.3 Ministry of Natural Resources

The first meeting with the Ministry of Natural Resources (MNR) took place on February 9, 2011 to provide the MNR with an overview of the proposed road improvements as the proposed crossing of Huttonville Creek is protected under the 2007 Endangered Species Act (ESA) due to the presence of Redside Dace habitat. The MNR reviewed the alternative crossings of Huttonville Creek that were being considered (e.g., skewed angle open bottom versus 90° angle open bottom culvert crossing). Suggestions from the MNR included investigating other creek crossing options such as span structures to avoid impacts to Redside Dace habitat and therefore not contravene the ESA.



A second meeting with the MNR was held on March 29, 2011 to review a number of different approaches to designing the Huttonville Creek crossing (as per suggestion at February 9, 2011 meeting to try and avoid contravention of the ESA. The assessment of alternatives included consideration of specific habitat features of relevance to the Redside Dace (such as flow, thermal regime, substrate and fish passage), as well as engineering and cost

implications. The result of this meeting was that further habitat area impact analysis would be completed for the short list of Huttonville Creek crossing options, detailing the amount of active channel and meander belt habitat that would be affected by each of the alternatives.

Another meeting with MNR was held on October 26, 2011. At this meeting it was confirmed that the Region will proceed with a 42 metre clear span crossing of Huttonville Creek with a 'T' intersection immediately north of the structure to provide access to the east side development south of the CNR tracks and slip road under the grade separation to the property on the west side. This arrangement is acceptable, in principle, with the MNR although a permit (overall benefit permit) will be required under Section 17(2) (c) of the *Endangered Species Act (ESA).* Correspondence can be found in **Appendix A.6.4.**

2.2.6.4 Credit Valley Conservation

A meeting took place on Tuesday June 24, 2008 with the Region of Peel and the Credit Valley Conservation (CVC). The purpose of the meeting was to introduce the Mississauga Road Improvement Class EA Study, and to review the potential impacts on the watercourses in the study area (e.g., Huttonville Creek), potential drainage and stormwater issues, and the extent of widening the road.

Another meeting with CVC took place on Wednesday March 3, 2010. The purpose of the meeting was to:

- Discuss the development community's work-supporting studies being carried out and/or completed and how it may affect the Mississauga Road Class EA Study;
- Provide an overview of the alternative design concepts for Mississauga Road including water crossings and the grade separation alternatives;
- Identify the approach(s) to address stormwater management;
- Discuss the additional technical studies (floodplain analysis and meander belt and habitat calculation methodology) that need to be completed in order to assess impacts to the Huttonville Creek and Redside Dace habitat; and
- Discuss the next steps and additional meetings to review the results and recommendations of the studies.

CVC also participated in the previously described meetings with MNR as described above and received notification of all study milestones (e.g., PICs, Notice of Study Completion). Correspondence can be found in **Appendix A.6.5.**

2.2.6.5 Ministry of Tourism, Culture and Sport

In response to the Notice of Study Commencement, dated August 27, 2008, the Ministry of Culture had no comments to make at that time. However, they requested to be kept informed of study progress and will provide comments on the impact of the assessment to heritage resources.

The Ministry has also been involved in supplementary archaeological assessments that were co-ordinated by the Region. Correspondence can be found in **Appendix A.6.6.**

2.2.6.6 Ministry of the Environment

In a letter dated August 27, 2008, MOE outlined the planning process requirements for the Mississauga Road Municipal Class EA Schedule "C" project. The letter also requested a copy of the ESR and Notice of Completion for review, filing and comment. Correspondence can be found in **Appendix A.6.7.**

2.2.6.7 City of Brampton

A municipal technical advisory committee coordination meeting was held with the City of Brampton and the Region on September 25, 2008 to introduce the project to the City, receive feedback on project design issues, discuss PIC No. 1 materials (e.g., display boards) and present the recommended planning solution.

A second meeting was held on May 20, 2010 to discuss the project status and the potential implementation of roundabouts. Concerns (e.g., emergency vehicles and education) about roundabouts were discussed. It was agreed that education for motorists and the use of the roundabout is required prior to implementation.

Following analysis; the use of roundabouts was eliminated primarily based on the extensive property acquisition conflicts with approved secondary plans and high cost.

The preliminary design plan/profile was circulated to the City of Brampton on March 16, 2012 for review and comment. The City provided comments on May 2, 2012 which included direction on planning for utilities, impacts to trees/vegetation, built heritage, clarifying property access and suggestions for locating bus stops along the Mississauga Road corridor.

The City of Brampton will also be assessing, through a soon to be initiated Class EA, an east- west collector road connecting Mount Pleasant GO Station to west of Mississauga Road with consideration given to an alternative intersection at Mississauga Road at the location of the preferred Huttonville Creek clear span bridge structure.

Refer to **Appendix A.6.8** for City of Brampton correspondence.

2.2.6.8 Town of Caledon

The Town of Caledon Clerk's, Planning and Development and Engineering Departments received all Class EA notifications and to date has not provided any formal comments. Correspondence can be found in **Appendix A.6.9.**

2.2.6.9 TransCanada

A response to the Notice of Study Commencement dated December 1, 2008 was received and summarized National Energy Board and TransCanada requirements. Detailed plans were also requested when available for comment.

In October 2011, TransCanada PipeLine Limited provided notification of the agencies intention to re-file an application with the National Energy Board to expand their pipeline right-of-way and crossing of Mississauga Road north of the CN tracks.

On February 15, 2012, TransCanada's provided plans for the proposed crossing under Mississauga Road. The plans submitted by the agency included Temporary Workspace requirements on private lands on the east and west sides of Mississauga Road. In addition, temporary construction entrances on the north and south sides of the CN Railway to facilitate boring operations under the railway were identified.

In this regard, planning under the Mississauga Road EA has accounted for a 10 metre expansion of the TransCanada corridor and additional pipeline as it crosses the roadway. The Region of Peel is committed to the following conditions provided by TransCanada PipeLines Limited for the implementation of the roadway improvements proposed under the EA:

1. All crossings of the pipeline right-of-way by any facility as defined by National Energy Board Act (NEB Act) Section 112 must have TransCanada's prior written authorization;

2. Any grading not otherwise permitted by Section 112 of the NEB Act and regulations that may affect the right-of-way or drainage onto it, regardless of whether or not the grading is conducted on the right-of-way, must receive TransCanada's prior written approval. Grading activities on the right-of-way will only be permitted when a TransCanada representative is present to inspect and supervise them;
3. Section 112 of the National Energy Board Act requires that anyone excavating with power-operated equipment or explosives within 30m of the pipeline right-of-way must obtain leave from the pipeline company before starting any work;
4. No fill or building material may be stored on the pipeline right-of-way before, during or after construction unless prior written approval is obtained from TransCanada;
5. Paving is not permitted on the pipeline right-of-way, except at authorized crossings. Parking is not permitted on the pipeline right-of-way; and
6. Landscaping of TransCanada's right-of-way is to be approved in writing by TransCanada and done in accordance with TransCanada's Landscaping Guidelines.

Correspondence can be found in **Appendix A.6.10.**

2.2.6.10 Enbridge

Enbridge was circulated all EA notices and to date, no comments have been received. There are indications of a 4 inch gas line on the west side of Mississauga Road which will be assessed in consultation with Enbridge during detail design for relocation prior to construction. Correspondence can be found in **Appendix A.6.11.**

2.2.6.11 Peel District School Board

As noted in the November 6, 2008 response to the Notice of PIC No. 1, the Peel District School Board (PDSB) is interested in this project and would like to be kept informed of study progress so that they may provide comments as necessary.

Correspondence can be found in **Appendix A.6.12.**

2.3 Stakeholder Consultation

2.3.1 Northwest Brampton Landowner Consultants Meeting

A meeting took place on Thursday April 9, 2009 with the Region of Peel and the Northwest Brampton Landowner Consultants. The attendees at this meeting primarily included the land development consultants and land developers within the Northwest Brampton Area as well as several Regional staff members.

The purpose of the meeting was to:

- Discuss the Secondary Plan work underway or completed for the Northwest Brampton Area;
- Discuss the work being carried out for the Mississauga Road Improvement Class EA Study;
- Identify the constraints and opportunities in the study area; and
- Discuss the other ongoing or completed planning projects within the study area (e.g., Alloa Feedermain and Reservoir EA, Sandalwood Parkway Extension EA, North-South Transportation Corridor Study).

For more details of the meeting, see **Appendix A.6.1**.

2.3.2 CN Rail and Fronting Landowner Consultants Meeting

A meeting took place on Thursday May 7, 2009 with the Region of Peel and the CN Railway and fronting landowner consultants. The attendees at this meeting included the land development consultants representing the property owners fronting Mississauga Road, as well as several Regional staff members.

The purpose of the meeting was to:

- Provide a status overview of the Mississauga Road Class EA Study;
- Discuss the technical studies that have been completed or underway for the Mississauga Road Class EA Study;
- Discuss the landowner's-developer's future plans and proposed developments;
- Present the alternative design concepts for widening of Mississauga Road and the grade separation alternatives;
- Present the proposed evaluation criteria to be used in the Phase 3 evaluation of alternative design concepts;
- Obtain CN Railway's perspective and input into the grade separation alternatives; and
- Identify other constraints and opportunities in the study area (e.g., potential future intersecting road with Mississauga Road, stormwater ponds).

For more details of the meeting, see **Appendix A.6.1.**

2.3.3 Additional Meeting with Landowners

Subsequent meetings were held with landowners to discuss stormwater management strategies and are further described in Section 10.8.

2.4 First Nations Consultation

Consultation with the First Nations is an integral component in the consultation process for planning projects. At the outset of this study all relevant and directly affiliated First Nations groups and government representatives were contacted by the initial Study Commencement letter dated July 18, 2008. Another letter, dated October 22, 2008 was provided inviting those interested to attend the first Public Information Centre. Notification of PIC # 2 was sent on April 12, 2012.

In a letter dated June 5, 2012, the Ministry of Aboriginal Affairs noted that the project appears to be in an area where First Nations may have existing or asserted rights or claims that could be impacted by this project. As such they suggested that Six Nations of the Grand River Territory, Haudenosaunee Confederacy and Mississaugas of New Credit First Nation be contacted. As the Six Nations of the Grand River Territory and Mississaugas of New Credit First Nations have been kept informed of study progress, the Haudenosaunee Confederacy was notified on June 14, 2012 of the study purpose, preferred planning solution and design concept.

Any requests for information and/or opportunities to meet with the First Nations was encouraged by the project team throughout the course of the study, however no requests were brought forward.

First Nations correspondence can be found in **Appendix A.7.**

3. Identification and Description of Problem/Opportunity

3.1 Transportation Network

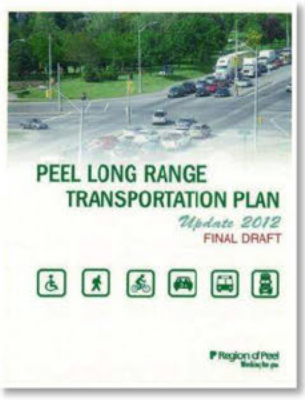
Within the study area, Bovaird Drive West and Mayfield Road (running east to west) and Mississauga Road (running north to south) provide the major transportation access to parts of the Region and adjacent municipalities. Mississauga Road links with Highways 401 and 407 ETR to the south and north of Bovaird Drive West is bisected by the Canadian National (CN) Rail Halton Subdivision.

GO Transit operates its Georgetown service on the CNR line with the Mount Pleasant GO Station located on the north side of Bovaird Drive West, east of Mississauga Road. Lastly, Wanless Drive, a two lane rural road, under the jurisdiction of the City of Brampton runs east-west and intersects with Mississauga Road as an unsignalized intersection.

3.2 Transportation Planning

3.2.1 Region of Peel Long Range Transportation Master Plan

The Peel Region Long Range Transportation Plan (LRTP) study was initiated in late 2002 as part of the Regional Official Plan Strategic Update and was recently updated in 2012. The purpose of the study was to identify and address the transportation challenges anticipated by the forecasted growth in the Region over the next 10, 15 and 25 years and to develop appropriate policies, strategies and a road improvement plan to address the challenges.



The Peel Region LRTP has recently been updated and provides a policy implementation framework for the Region's Official Plan to address the transportation challenges the Region faces.

Key components of the LRTP Update include:

- Transportation vision, goals, objectives and policies, which provide framework for developing and coordinating future actions and programs to improve transportation in Peel;
- Regional road improvements required by 2021 and 2031;
- Regional strategies, studies and action plans in goods movement, transportation demand management and other sustainability initiatives; and
- Implementation and performance measurement plan.

Identified road improvements were based on projections for future population growth between the years 2021 to 2031 and development within the existing urban boundary. For the section of Mississauga Road studied in the EA, the LRTP identified the need to widen Mississauga Road from its current two lane section to a four lane section by the year 2017.

Section 4.6.1 of the 2005 LRTP identifies the regional road needs and right-of-way (ROW) requirements to meet the future population and employment growth projections for Peel Region. The process used to identify the requirements was based on a number of assumed regional practices:

- According to the Region's Level of Service Policy, regional criteria of volume-capacity of 0.90 and greater was applied to indicate which road segments may require widening;

- It was assumed that the maximum number of through lanes on Regional roads should not exceed 6 lanes; and
- Future proposals for added streetscaping, new transit facilities or High Occupancy Vehicle (HOV) lane implementations on Regional roads that require additional ROW were not considered in the analysis due to the lack of information and policies at the present time.

The indicated ranges for the ROW reflect the different requirements that apply depending on local conditions, the particular type of development in the area, special safety requirements and engineering design. In some cases it is possible to carry through recommended road improvements without substantially increasing the ROW, whereas in other cases, ROW criteria for a certain number of lanes is more rigid and an improvement has to be rejected if the corresponding ROW is not feasible.

The LRTP Update identified the need to widen and improve Mississauga Road between Bovaird Drive West and Mayfield Road from a two lane cross section to a six lane cross section. For this portion of Mississauga Road, the LRTP indicates a 45 metre ROW is required[3]. However, in order to accommodate the preferred road cross section, including utilities and multi-use path, an ultimate 50.5 metre ROW requirement has been identified. Initial (interim) road improvements will schedule widening of Mississauga Road to 6 lanes between Bovaird Drive West and Sandalwood Parkway and widening to 4 lanes between Sandalwood Parkway and Mayfield Road. Ultimate improvements will be carried out in the future when traffic volumes warrant widening of the section between Sandalwood Parkway and Mayfield Road to 6 lanes.

3.2.2 City of Brampton Transportation and Transit Master Plan

In 2004, the City of Brampton undertook a Transportation and Transit Master Plan (TTMP) which identified the need to widen the section of Mississauga Road within the study area to 6 lanes by 2031. The City of Brampton, in July 2009, approved and adopted an update to the TTMP. The updated City of Brampton TTMP followed the Municipal Class EA process for Phase 1 and Phase 2, establishing the need and justification for the projects proposed in its study. The City's updated TTMP had taken into consideration a number of changes to the road network and has resulted in changes to the recommended implementation plan. Changes pertaining to this Class EA study area are: widening of Mississauga Road to 4 lanes from Bovaird Drive West to Mayfield Road by 2016, 6 lanes from Bovaird Drive West to Sandalwood Parkway by 2021 and 6 lanes from Sandalwood Parkway to Mayfield Road beyond 2031.

A Development Charges study undertaken by the Region of Peel in 2007, reviewed road improvements required to support growth in the area. This study indicated that the section of Mississauga Road between Mayfield Drive and Bovaird Drive West will require widening to 6 lanes by 2023.

This report documents the traffic volumes in the study area under existing (2008) and future conditions, to the horizon years 2018 and 2031. It identifies any need for additional road improvements required along Mississauga Road, between Bovaird Drive West and Mayfield Road to accommodate anticipated future traffic volumes associated with growth in the area.

The City of Brampton undertook a Transportation Master Plan (TMP) for the Mount Pleasant Secondary Plan Area in July 2009. The Mount Pleasant Secondary Plan Area TMP Study addressed the transportation requirements for the Mount Pleasant Secondary Plan area by ensuring that both the road network and community-friendly transit service are planned and implemented in conjunction with one

[3] *Source: Region of Peel: Long Range Transportation Plan Update, 2012, Final Draft.*

another. The City of Brampton has identified the need for growth in Northwest Brampton in a phased manner. The first phase of future urban expansion will be in the Mount Pleasant Community, it is forecasted that this community will reach a population of more than 40,000 people and employment of over 3,000 employees, prior to year 2021.

The existing transportation system of roads, transit and associated pedestrian linkages and pathways are insufficient to meet the demands of this expanding community.[4] The TMP, under Alternative 2, identified a preliminary planning transportation network for the Mount Pleasant Secondary Plan Area to address the deficiency within the current network. Improvements, under Alternative 2 comprise of:[5]

- Creditview Road as a Minor Arterial Road (36.0 m ROW) with a south re-alignment (Bovaird Drive West - Mayfield Road) and widened to four lanes;
- Four-lane extension of Sandalwood Parkway as a Minor Arterial Road (36.0 m ROW) from Creditview Road to Mississauga Road; and
- Required additional (beyond programmed improvements) arterial road improvements in the Study Area, including:
  - Bovaird Drive West widened to six lanes (east of Mississauga Road);
  - Wanless Drive widened to four lanes (Chinguacousy Road – Mississauga Road);
  - Mayfield Road widened to six lanes (McLaughlin Road – Chinguacousy Road);
  - Mayfield Road widened to four lanes (Chinguacousy Road – Creditview Road);
  - Mississauga Road widened to six lanes (Bovaird Drive West – Sandalwood Parkway);
  - A north-south collector road (i.e., the TOD corridor), comprising four lanes (26.0 m ROW) (Creditview Road - Mayfield Road); and
  - A grid network of collector roads in the Mount Pleasant Secondary Plan area.

3.2.3 Future East-West Collector Road

As mentioned earlier, the City of Brampton will soon be initiating a separate EA study for a new east-west collector road connecting Mount Pleasant GO Station to the west side of Mississauga Road at the location of the proposed Huttonville Creek clear span crossing. Should the City's EA study recommendations affect the preferred design of the road widening, overpass and Huttonville Creek crossing, then the City will consult with the Region on how to address an EA addendum to the ESR. In addition to the EA's approval, this EA Addendum is subject to written agreement-in-principle from MNR, Aurora District Office.

3.2.4 Caledon Transportation Needs Update

The 2009 Caledon Transportation Needs Study Update[6] was completed jointly by the Town of Caledon and the Region of Peel to assess and identify the potential transportation improvements needed to accommodate future traffic demand within the Town. This study is an update of the previously completed Caledon Transportation Needs Study completed in September 2004 due to a number of changes that have occurred (e.g., current plan for extension of Highway 410, additional growth guidelines, etc).

In this study, Mississauga Road has been identified as a short term (year 2011) roadway project.

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[4] *.Mount Pleasant Secondary Plan Area Transportation Master Plan, City of Brampton, July 2009, Pg. ii*

[5] *.Mount Pleasant Secondary Plan Area Transportation Master Plan, City of Brampton, July 2009, Pg. 155*

[6] *Caledon Transportation Needs Study Update. Phillips Engineering and Paradigm Transportation Solutions Limited. March 2009.*

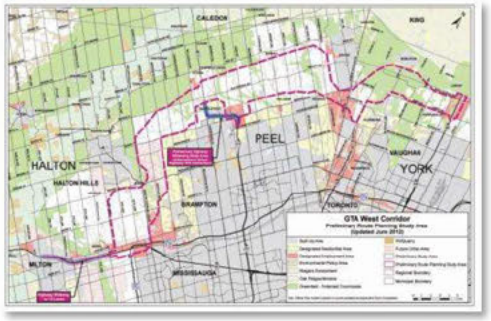
3.2.5 Halton Peel Boundary Area Transportation Plan

The Halton Peel Boundary Area Transportation Study (HPBATS)[7] is a joint study undertaken by the Regions of Peel and Halton, the City of Brampton and Towns of Caledon and Halton Hills. The study area encompasses the eastern part of Halton Hills, west Brampton, the northeast corner of Milton, northwest corner of Mississauga and the southwest corner of Caledon. This study addresses issues related to transportation network planning, long range land use planning, demand management and corridor protection planning. The study recommends protection of a north-south high speed Halton-Peel freeway corridor (alignment subject to a future EA) that would connect the 407 ETR to a future GTA West highway (see Section 3.2.6). For EA study purposes, the north-south corridor was assumed to be located just west of Mississauga Road. The location of the north-south corridor will be determined under a separate study. This Class EA has not precluded any location of where the final location of the corridor will be.

As part of this study, Mississauga Road was also identified as a planned road improvement that includes widening from 2 to 6 lanes from Highway 407 to Sandalwood Parkway and from 2 to 4 lanes from Sandalwood Parkway to Mayfield Road.

3.2.6 GTA West Corridor EA Study

The Greater Toronto Area (GTA) West study area[8] includes parts of Peel, York and Halton Regions. The purpose of this study is to examine long term transportation problems and opportunities and consider alternative solutions to provide better linkages between Urban Growth Centres in the GTA West Corridor Preliminary Study Area, as identified in the Province's Growth Plan. Planned implementation of the GTA West Corridor is 2031.



Specific to Mississauga Road, a preliminary route planning study area has been identified immediately west of Mississauga Road and north of Mayfield Road.

3.3 Problem/Opportunity Statement

Phase 1 of the five phased Municipal Class EA planning process requires the proponent of an undertaking (the Region) to first document factors leading to the conclusion that road improvements are required, and ultimately, develop a clear statement of the identified problem to be investigated and/or opportunity to be realized.

As such, the **Problem/Opportunity Statement** is the principle starting point in the undertaking of a Municipal Class EA and becomes the central theme integrating elements of the project. It also assists in setting the scope of the project.

The Problem/Opportunity Statement for the Mississauga Road Improvements from north of Bovaird Drive West to Mayfield Road Municipal Class EA is defined as follows:

- *Approved and planned growth in the study area will contribute to an increase in traffic congestion and deterioration of road conditions over the next 10 to 25 years;*
- *The CN Railway crossing currently results in delay for motorists and will worsen over time with the additional vehicular traffic on Mississauga Road and increased rail traffic within the CN*

[7] *Halton-Peel Boundary Area Transportation Study Amended Final Report, Peel Halton. HDR iTrans. May 2010.*

[8] *GTA West Corridor Environmental Assessment, Transportation Development Strategy Report, Executive Summary – Draft. McCormick Rankin, URS, AECOM and Ecoplans Limited. February 2011.*

corridor. Traffic analysis has confirmed the warrants for a grade separation at the CN Railway crossing;

- *These factors affect the level of service and adequacy of the road resulting in the need for improvements; and*
- *Alternative solutions to address these problems will consider opportunities to enhance streetscape conditions and facilitate alternative modes of transportation by providing supporting infrastructure (e.g., transit stops, sidewalks, multi-use paths and cycling lanes).*

In order to address the above problem/opportunity, the Region initiated this Municipal Class EA planning process in 2008 which identifies and evaluates alternative solutions and design concepts and accordingly addresses the above problem/opportunity statement. This ESR has been prepared to determine how the proposed road improvements can be best sited, designed, constructed and operated.

PART B: PHASE 2 OF THE CLASS EA PLANNING PROCESS

4. Study Area Existing and Future Conditions

4.1 Traffic Analysis

A traffic analysis[9] (**Appendix B.1**) was conducted for this study, including an assessment of traffic volumes in the study area under existing and future conditions, for the horizon years 2008, 2018 and 2031. These volumes were used to identify if there is any need for additional road improvements required along Mississauga Road north of Bovaird Drive West and south of Mayfield Road to accommodate anticipated future traffic volumes associated with growth in the area.

4.1.1 Road Network

The study area road network is characterized as follows.

Mississauga Road is a major north-south arterial road under the jurisdiction of the Region of Peel. It is currently a two lane road with a rural cross-section and has a posted speed limit of 80km/hour. The existing lane configuration along Mississauga Road is illustrated in **Figure 4**.

Bovaird Drive West intersects Mississauga Road at the south end of the EA study limit. Bovaird Drive West is under the jurisdiction of the Region of Peel and is currently a two lane arterial road and is signal controlled. A separate EA for improvements within the Bovaird Drive West corridor is currently in the draft ESR phase and is anticipated to be filed for public review by early 2013.

Wanless Drive is a two lane rural road that runs east-west intersecting Mississauga Road. The intersection of Mississauga Road and Wanless Drive is unsignalized. The City of Brampton has jurisdiction over Wanless Drive and has recently completed an EA for road improvements within the Wanless Drive corridor.

Sandalwood Parkway is a four lane urban road that runs east-west terminating at Creditview Road and is identified in the Region's Official Plan to intersect with Mississauga Road in 2013. Refer to Section 4.9.3 for additional information.

Mayfield Road is located at the north end of the EA study limit and is a two lane rural arterial road which runs east-west. Mayfield Road is under the jurisdiction of the Region of Peel and intersects Mississauga Road at a signalized intersection. A separate EA is planned to commence in 2013 to investigate potential roadway improvements within the Mayfield Road corridor.

4.1.2 Non-Auto Network

At the present time, local transit does not service the study area. The closest transit stop is the GO Transit on-street bus stop located on Bovaird Drive West immediately west of the intersection with Mississauga Road. The current infrastructure along Mississauga Road, within the study area, does not provide for any pedestrian or cycling facilities. Under the City of Brampton's Revised Pathways Routing Plan (2006), a Class I Pathway will be located along Mississauga Road as a 3.0 m wide multi-use trail. Through the Class EA process, the City of Brampton has identified preferred locations for bus stops along the corridor which have been captured in the preferred design concept.

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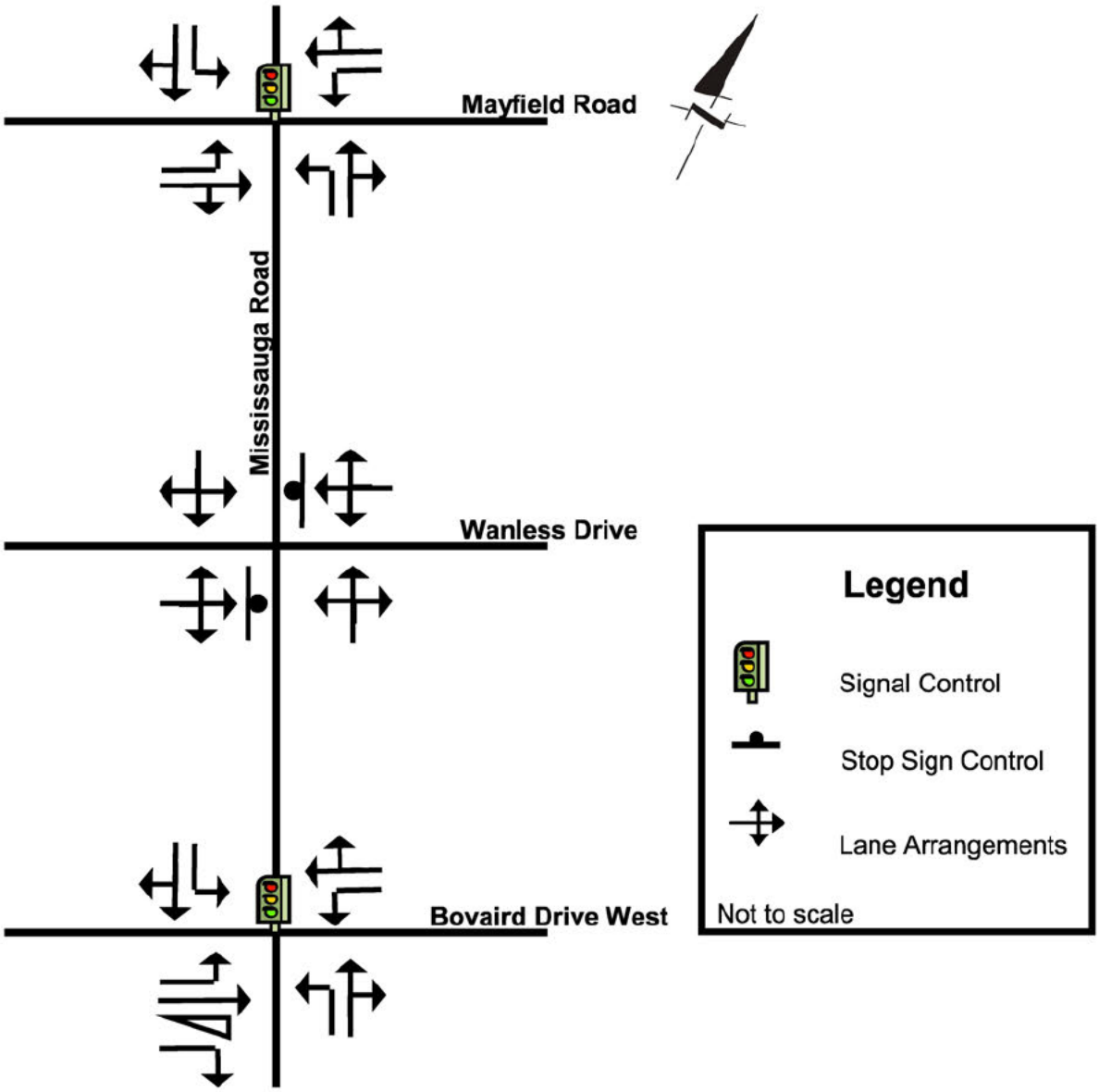
[9] *Mississauga Road Class EA Study (North of Bovaird Drive to Mayfield Road) Needs Assessment and Traffic Performance. AECOM. DRAFT January 2012.*

Figure 4 Mississauga Road Existing Lane Configuration



4.1.3 Existing 2008 Traffic Conditions

Historical and existing traffic data available for the study area was provided by the Region. The Region also provided updated turning movement counts reflecting September 2008 conditions for the intersection of Mississauga Road at Bovaird Drive West, Mississauga Road at Mayfield Road, and Mississauga Road at Wanless Drive.

While it is recognized that the intersection of Mississauga Road and Bovaird Drive West is not within the Study area, it has been included in the analysis as the operations of the north leg of the intersection could influence the lane recommendations on Mississauga Road. **Figure 5** illustrates the intersection turning movement volumes for the existing conditions (2008), while the existing turning movement volumes are attached in **Appendix A** of **Appendix B.1**.

Along Mississauga Road, there is a significant peak directional flow with the dominant movement in the southbound direction during the AM Peak hour and in the reverse, northbound direction, in the PM peak hour. At the point just north of Bovaird Drive West, the peak directional traffic flow is in the southbound direction during the AM Peak carrying in the order of 520 vehicle trips. During the PM peak hour, the peak traffic flow is in the northbound direction and carries approximately 460 vehicle trips during the PM peak hour. In the non-peak direction, the AM volume in the northbound direction is approximately 140 vehicle trips and during the PM peak hour there are 220 vehicle trips in the southbound direction.

4.1.4 Truck Traffic

The 24 hour classification counts for the study area (2.1km north of Bovaird Drive West) were done on September 18, 2008. The average of medium and heavy truck percentage throughout the day along Mississauga Road is approximately 10%.

4.1.5 Level of Service Definition

Key indicators are used to identify the operating conditions of a corridor. The capacity of a road facility reflects its ability to accommodate a moving stream of vehicles and represents the maximum number of vehicles that can reasonably be expected to pass a given point during a specified period.

Level of service (LOS) describes the range of operating conditions of a roadway through intersections including:

- Speed and travel time;
- Freedom to manoeuvre (density);
- Traffic interruptions;
- Comfort;
- Convenience; and
- Safety.

Six levels of LOS are defined using the letters "A" to "F". **Table 1** describes the LOS for signalized and unsignalized intersections considering the average delay in seconds per vehicle.

Figure 5 Existing 2008 Turning Movements

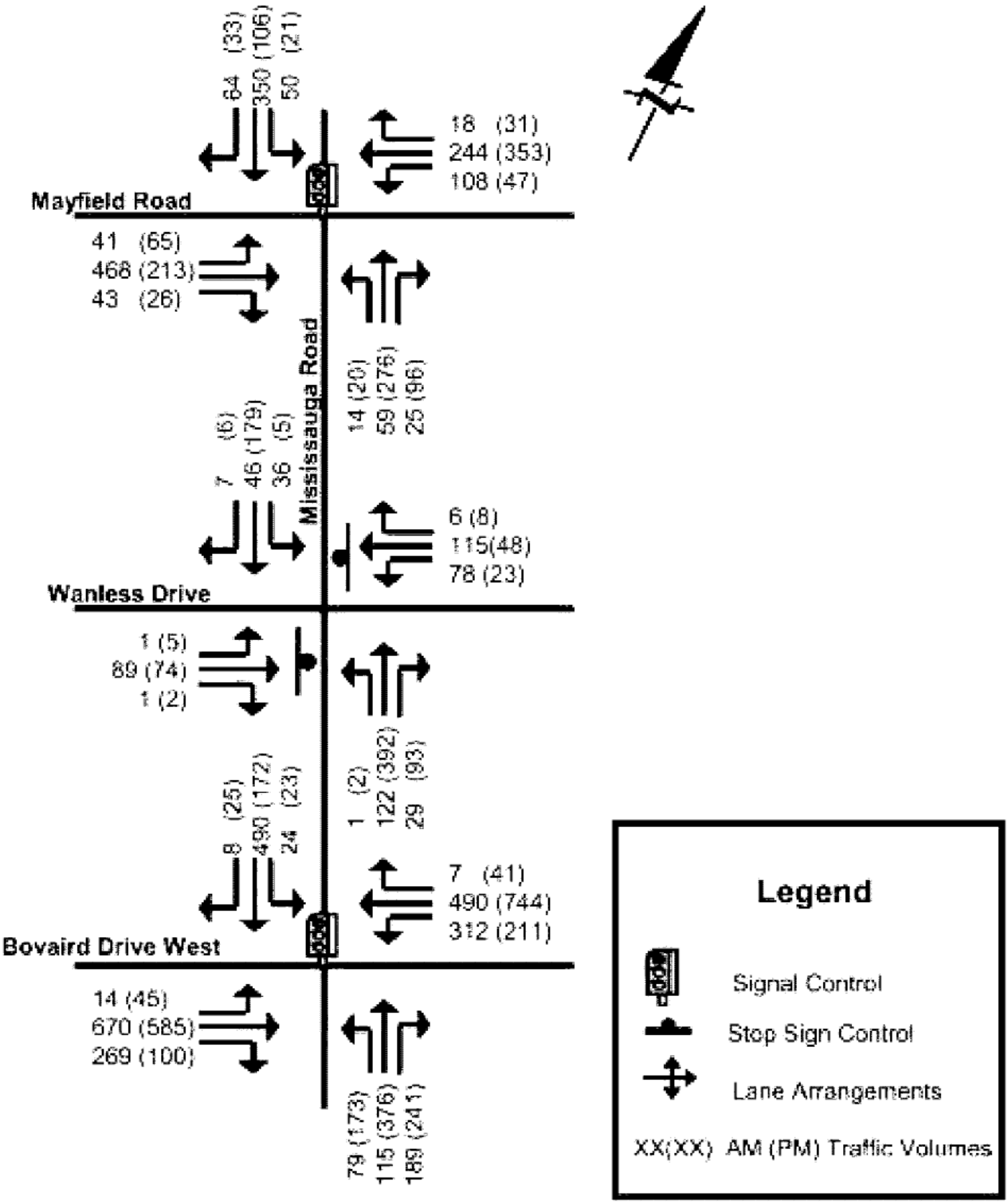


Table 1 Level of Service Description

LOS Description		Signalized Intersection	Unsignalized Intersection
		Average Delay per Vehicle (s/veh)	Average Delay per Vehicle (s/veh)
A	Vehicles rarely need to stop. Excellent conditions.	≤ 10	≤ 10
B	Some traffic stopped. Very good conditions.	> 10 – 20	> 10 – 15
C	Greater percentage of traffic is stopped. An occasional signal cycle "fails". Good conditions.	> 20 – 35	> 15 – 25
D	Most vehicles breakdown in operation. Long vehicular queues. Greater number of signal cycle "failures". Fair conditions.	> 35 – 55	> 25 – 35
E	Noticeable breakdown in operation. Long vehicular queues. Poor conditions.	> 55 – 80	> 35 – 50
F	Traffic arrivals exceed capacity. Severe congestion. Extremely poor conditions.	> 80	> 50

4.1.6 Link/Mid-Block Analysis

Key indicators are used to identify the operating conditions of a corridor. The capacity of a facility reflects its ability to accommodate a moving stream of vehicles and represents the maximum number of vehicles that can reasonably be expected to pass a given point during a specified period.

The Region identifies level of service (LOS) indicators for the corridor operations on a desired service volume for a lane capacity of 900 vehicles per lane for a major arterial road. For a two lane road, the desired capacity per lane is 1800, and 2700 for a three lane road. The volume to capacity ratio threshold typically used to identify problems in an intersection of a corridor is the volume to capacity (v/c) of 0.90 representing a LOS D. **Table 2** outlines the current operating conditions of the corridor.

Table 2 Existing 2008 Corridor Volumes and Level of Service

Road Section	No. of Lanes per Direction	Desired Capacity	AM Peak Hour				PM Peak Hour			
			NB		SB		NB		SB	
			Vol	v/c	Vol	v/c	Vol	v/c	Vol	v/c
Bovaird Drive West to Wanless Drive	1	900	150	0.17	540	0.60	490	0.54	220	0.24
Wanless Drive to Mayfield Road	1	900	130	0.14	500	0.56	405	0.45	190	0.21

Results from the assessment indicate that the existing volumes on Mississauga Road are within the desired volume to capacity ratios for acceptable level of service. The current two lane section can accommodate existing traffic volumes.

4.1.7 Intersection Analysis

Based on the 2008 intersection traffic volumes, operations of the key intersections within the study area were investigated using Synchro 7.0 (Build 739) software, in accordance with the methodology outlined in the Transportation Research Board's "*Highway Capacity Manual, HCM 2000*". The capacity analysis

(**Appendix C** of **Appendix B.1**) results, including the existing v/c ratios, level of service (LOS) and delays for the signalized and unsignalized intersections are summarized in **Tables 3 and 4** respectively. The intersection calculations undertaken for this assignment were in accordance with the most up to date Region of Peel's Guidelines for using Synchro, (Version 5.0) Revision 1.2 dated March 2003 at the time of the capacity analysis. The parameters for the analysis were based on requirements set out in the guidelines and as requested by the Region (e.g., lost time adjustment parameter).

Table 3 Existing 2008 Traffic Capacity Analysis – Signalized Intersection

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road/Bovaird Drive West	EB	Left	21.3	C	0.04	31.9	C	0.40
		Thru	46.9	D	0.89	42.9	D	0.83
		Right	25.0	C	0.23	0.1	A	0.07
	WB	Left	84.4	F	0.98	46.3	D	0.81
		Thru/Right	14.8	B	0.47	30.6	C	0.82
	NB	Left	46.1	D	0.55	25.2	C	0.42
		Thru/Right	30.8	C	0.42	39.3	D	0.81
	SB	Left	23.3	C	0.09	26.4	C	0.18
		Thru/Right	60.2	E	0.94	26.7	C	0.35
	Overall Intersection		**43.4**	**D**	**0.91**	**34.6**	**C**	**0.82**
Mississauga Road/Mayfield Road	EB	Left	21.3	C	0.11	35.9	D	0.42
		Thru/Right	32.2	C	0.70	33.0	C	0.40
	WB	Left	35.7	D	0.61	30.7	C	0.20
		Thru/Right	24.6	C	0.38	39.1	D	0.66
	NB	Left	8.6	A	0.04	4.5	A	0.03
		Thru/Right	7.9	A	0.09	5.7	A	0.34
	SB	Left	14.2	B	0.08	8.5	A	0.04
		Thru/Right	18.9	B	0.44	9.1	A	0.13
	Overall Intersection		**24.9**	**C**	**0.55**	**23.5**	**C**	**0.45**

Table 4 Existing 2008 Traffic Capacity Analysis – Unsignalized Intersection

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road/Wanless Drive	EB	Left/Thru/Right	18.5	C	0.25	17.3	C	0.22
	WB	Left/Thru/Right	31.8	D	0.61	17.0	C	0.21
	NB	Left/Thru/Right	0.1	A	0.00	0.0	A	0.00
	SB	Left/Thru/Right	0.8	A	0.03	0.3	A	0.00
	Overall Intersection		**8.9**	**A**	**0.61**	**3.4**	**A**	**0.22**

Under the existing traffic conditions, the signalized intersection of Mississauga Road/ Mayfield Road operates at good level of service during both weekday AM and PM peak hours. However, the intersection of Mississauga Road/Bovaird Drive West, experiences some delays and poor levels of services due to the heavy westbound/eastbound traffic along Bovaird Drive West. In particular, the eastbound through and westbound left-turn movements operate at capacity during the AM peak hour, while all movements are operating below capacity during the PM peak hour.

The unsignalized intersection of Mississauga Road/ Wanless Drive currently operates well as indicated by the average delay, with residual capacity for each movement during both weekdays AM and PM peak hours.

4.1.8 Collision Data

Reported collision data from years 2002 to 2009 was obtained from the Region of Peel. Detailed summary of the collision records are attached in **Appendix D** of **Appendix B.1**. A total of 149 reported collisions occurred along the subject section of Mississauga Road (from Bovaird Drive West to Mayfield Road) during 2002 to 2009. The majority of collisions (approximately 62%) occurred at/near Mississauga Road/Bovaird Drive West intersection. Over 80% of the collisions involved only property damage. None of the collisions reported resulted in fatal injuries. Rear end collisions and angle (T-bone) collisions at the intersections were most prevalent.

The majority of the collisions (approximately 65%) occurred after year 2007, among which, over 50% of the collisions occurred between May to October. The majority of the collisions occurred during the daylight under clear environmental conditions. Furthermore, approximately 50% of the collisions occurred during either the AM (6:00 a.m. to 9:00 a.m.) or PM (3:00 p.m. to 6:00 p.m.) peak periods, when the heaviest traffic volumes happen along the road (more than 1,000 two-way vehicles per hour during the PM peak hour).

4.1.9 Future Traffic Conditions

4.1.9.1 Background Traffic Growth

Based on analysis from the Halton-Peel Boundary Study (HPBATS), the Region of Peel, given historic traffic and land use forecasts, provided an annual growth rate of 4% to estimate the future traffic demand in the horizon years 2018 and 2031.

4.1.9.2 Development Traffic

In addition to the growth in background traffic, there will be traffic associated with the development of the Northwest Brampton Development Area which immediately surrounds the study area. According to the

land use forecast published in June 2008 by the City of Brampton, 41% of the expected population and employment in Northwest Brampton will occur by 2021 and 100% by the year 2031.

As the time horizons examined in this study are 10 and 25 years, the traffic volumes were projected to reflect anticipated development in 2018 and 2031.

As per Region of Peel's request, AECOM reviewed the anticipated future background developments on the east and west side of Mississauga Road in order to assess the future transportation needs. The "Mount Pleasant Block 51-1 Transportation Study and Collector Road Environmental Assessment Study", report[10] was reviewed and their findings were included for the traffic analysis:

This study investigated and recommended the collector road network as well as associated transportation infrastructure to support the development of Block 51-1 Mount Pleasant Secondary Master Plan Area on the east side of Mississauga Road. It also formed part of Phases 3 and 4 of the EA process for the collector road network contained within the block.

The preferred road network and the transportation solutions for the Mount Pleasant Secondary Plan Area are focused on developing an innovative, pedestrian-friendly and transit-oriented community. The transit spine (shown as North-South Spine Road and East-West Spine Road in **Figure 6**) represents one of the major elements of the Mount Pleasant transit-oriented development. It extends from the Village Core at the southern end to the northeast limits of the community. The function of the transit spine is to provide convenient access to public transit and reduce the number of automobiles and increase the frequency of transit usage in the Mount Pleasant area and adjacent communities. The transit spine is expected to offer a high level of transit service (i.e. less than 10 minutes) that connects from north to south to the Mount Pleasant GO Station.

The study assumed that the Block 51-1 will be fully built out by 2016, which will connect all planned collector roads with Regional Road 1 (Mississauga Road) except Roads D and F. Collector Roads D and F will be built out after 2018 horizon year.

The study assessed the 2031 traffic forecasts and examined the operations of the collector road network. The study also included the interim 2016 road network assessment.

Based on the study the following four collector roads were assumed to be built-out by the two horizon years considered:

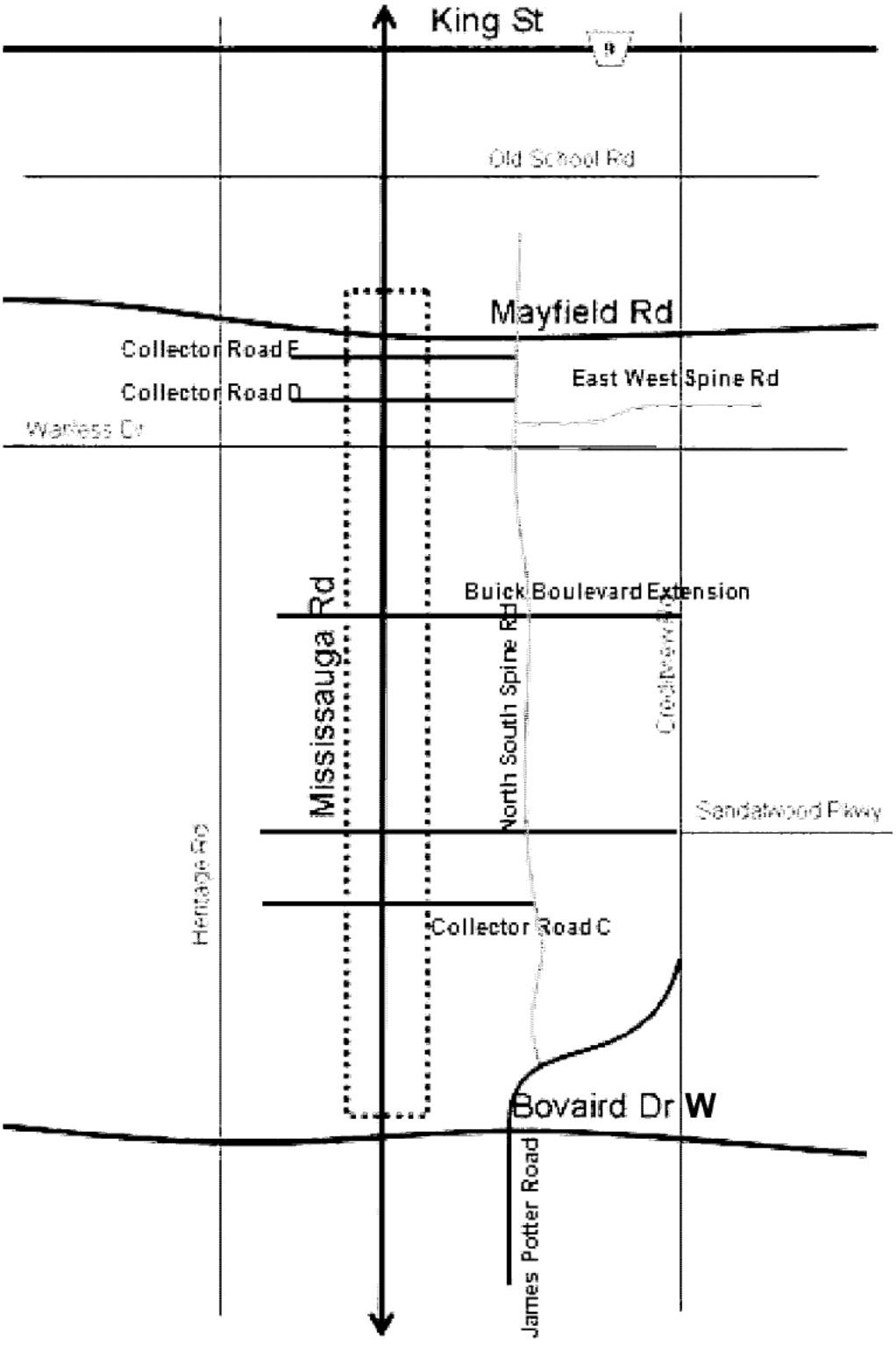
By 2018	By 2031
• Collector Road C • Extension of Buick Boulevard up to Mississauga Road	• Collector Road D • Collector Road F

Location of these collector roads are shown in **Figure 6**.

The site traffic volumes resulting from the development of the Block 51-1, as reflected in the Mount Pleasant Report, were utilized to estimate future traffic demand for the two horizon years 2018 and 2031. **Figures 3.5 and 3.6** of **Appendix B.1** provide the future 2018 and 2031 turning movement volumes during the AM and PM peak hours along Mississauga Road between Bovaird Drive West and Mayfield Road.

[10] *Mount Pleasant Block 51-1 Transportation Study and Collector Road Environmental Assessment Study, BA Group Transportation Consultants, August 2011*

Figure 6 Location of Collector Roads



4.1.9.3 Other Planned Road Improvements

In 2004, the City of Brampton undertook a Transportation and Transit Master Plan (TTMP). In July 2009, the City approved and adopted an update to the TTMP. The updated City of Brampton TTMP followed the Municipal Class EA process for Phase 1 and Phase 2, establishing the need and justification for the projects proposed in its study. TTMP recommended that Mississauga Road to be widened to:

- 4 lanes from Bovaird Drive West to Mayfield Road by 2016;
- 6 lanes from Bovaird Drive West to Sandalwood Parkway by 2021; and
- 6 lanes from Sandalwood Parkway to Mayfield Road beyond 2031.

The City of Brampton undertook a Transportation Master Plan (TMP) for the Mount Pleasant Secondary Plan Area in July 2009, which addressed the transportation requirements for the area by ensuring that both the road network and the community-friendly transit service are planned and implemented in conjunction with one another. The existing transportation system of roads, transit and associated pedestrian linkages and pathways are insufficient to meet the demands of this expanding community. The TMP identified a preliminary planning transportation network for the Mount Pleasant Secondary Plan Area to address the deficiency within the current network. Improvements comprise of:

- Creditview Road as a Minor Arterial Road with a south re-alignment and widened to four lanes.
- Four-lane extension of Sandalwood Parkway as a Minor Arterial Road from Creditview Road to Mississauga Road.
- Required additional (beyond programmed improvements) arterial road improvements in the Study Area, including:
  - Bovaird Drive West widened to six lanes (east of Mississauga Road);
  - Wanless Drive widened to four lanes (Chinguacousy Road – Mississauga Road);
  - Mayfield Road widened to six lanes (McLaughlin Road – Chinguacousy Road);
  - Mayfield Road widened to four lanes (Chinguacousy Road – Creditview Road);
  - Mississauga Road widened to six lanes (Bovaird Drive West – Sandalwood Parkway);
  - a north-south collector road (i.e., the TOD corridor), comprising four lanes (Creditview Road - Mayfield Road); and
  - a grid network of collector roads in the Mount Pleasant Secondary Plan area.

The Halton-Peel Boundary Area Transportation Study (HPBATS) as summarized in Section 3 is a joint study between the Region of Peel, Halton Region, City of Brampton, Town of Caledon, and the Town of Halton Hills. The study had been initiated to identify the long-term (2021 – 2031) transportation infrastructure needed to support provincial and inter-municipal planning goals, and to serve future transportation demands.[11] One of the specific goals and objectives of the HPBATS is to examine the requirement for a new north/south high speed arterial to the west of Mississauga Road (North South Transportation Corridor, (NSTC)). Since the HPBATS study has not arrived at its recommendations yet, the updated Brampton TTMP performed a number of study specific analyses to conceptualize the role, function, geographic limits, costs and connectivity of NSTC if located only within the limits of the City of Brampton and Peel Region.[12]

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11. West Brampton Development Analyses – Appendix H, City of Brampton, May 2009
12. Ibid.

It is within the HPBATS scope and mandate to make further recommendations on the NSTC. As a result, this traffic assessment examined two case scenarios:

Scenario #1: NSTC not be in place by 2031
Scenario #1: NSTC in place by 2031, as recommended in the updated TTMP.

The Region of Peel LRTP, identified Mayfield Road (part of **Appendix D, Table 3**) to be widened to 4-lanes between Hurontario Street and Winston-Churchill Blvd in the short and medium term and to 6-lanes in the long term. The recent update to the LRTP has identified the need for a six lane cross-section along Mayfield Road (up to 1.5 km west of Mississauga Road) by 2031. For planning purposes, Mayfield Road is assumed to be widened to 4-lanes through the intersection by 2018 and to 6-lanes by 2031.

4.1.9.4 Future Link/Midblock Analysis

AECOM analyzed two different time horizons, a medium term time horizon of 2018 and a long term horizon of 2031. The traffic assessment first determines the operating conditions and levels of service of the adjacent intersections and road segment corridors under the do-nothing scenario. The do-nothing scenario includes the existing lane configuration of Mississauga Road through the study area and planned road improvements for roads adjacent to the study corridor. **Tables 5 and 6** summarize mid-block volumes with the existing configuration of one lane along Mississauga Road for the years 2018 and 2031.

Table 5 2018 Mid-Block Volumes – Do-Nothing Configuration

Road Section	No. of Lanes per direction	Desired Capacity	AM Peak Hour				PM Peak Hour			
			NB		SB		NB		SB	
			Volume	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*
Bovaird Drive West to Collector Road C	1	900	469	0.52	1729	**1.92**	1789	**1.99**	928	**1.03**
Collector Road C to Sandalwood Parkway	1	900	379	0.42	1643	**1.83**	1571	**1.75**	755	0.84
Sandalwood Parkway to Buick Boulevard	1	900	389	0.43	1392	**1.55**	1339	**1.49**	536	0.60
Buick Boulevard to Wanless Drive	1	900	335	0.37	1194	**1.33**	1106	**1.23**	471	0.52
Wanless Drive to Mayfield Road	1	900	265	0.29	1051	**1.17**	824	**0.92**	406	0.45

In 2018, the section of Mississauga Road between Bovaird Drive West and Mayfield Road Drive will experience capacity problems in the peak direction (i.e., southbound during the AM Peak and northbound during the PM peak); therefore, one lane per direction is not sufficient for the 2018 traffic demand along Mississauga Road between Bovaird Drive West and Mayfield Road.

Table 6 2031 Mid-Block Volumes – Do-Nothing Configuration

Road Section	No. of Lanes per direction	Desired Capacity	AM Peak Hour				PM Peak Hour			
			NB		SB		NB		SB	
			Volume	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*
Bovaird Drive West to Collector Road C	1	900	727	0.81	2407	**2.67**	2370	**2.63**	1250	**1.39**
Collector Road C to Sandalwood Parkway	1	900	602	0.67	2093	**2.33**	2085	**2.32**	855	**0.95**
Sandalwood Parkway to Buick Boulevard	1	900	547	0.61	1922	**2.14**	1818	**2.02**	737	0.82
Buick Boulevard to	1	900	485	0.54	1728	**1.92**	1585	**1.76**	672	0.75

Road Section	No. of Lanes per direction	Desired Capacity	AM Peak Hour				PM Peak Hour			
			NB		SB		NB		SB	
			Volume	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*
Wanless Drive										
Wanless Drive to Collector Road D	1	900	392	0.44	1551	**1.72**	1223	**1.36**	593	0.66
Collector Road D to Collector Road F	1	900	374	0.42	1407	**1.56**	1139	**1.27**	549	0.61
Collector Road F to Mayfield Road	1	900	353	0.39	1267	**1.41**	1056	**1.17**	477	0.53

By 2031, the existing lane configuration of one lane in each direction on Mississauga Road between Bovaird Drive West and Mayfield Road will not be sufficient to accommodate the anticipated traffic volumes. The anticipated peak directional traffic demand in 2031 is higher than the capacity of the one lane.

4.1.9.5 Future Intersection Operations

In addition to the corridor levels of services, the operating conditions at the intersections within the study area were also examined under 2018 and 2031 time horizons under the do-nothing condition.

Before proceeding with the operational analysis for the study area intersections, traffic signal warrant analysis was also completed for the following intersections for the horizon year 2018 and 2031 based on **MTO Book-12** methodologies as follows:

- Mississauga Road and Sandalwood Parkway Extension;
- Mississauga Road and Buick Boulevard Extension;
- Mississauga Road and Wanless Drive;
- Mississauga Road and Collector Road C;
- Mississauga Road and Collector Road D; and
- Mississauga Road and Collector Road F.

The results of signal warrant analysis indicated that traffic signals are warranted by 2018 at the following intersections.

- Mississauga Road and Sandalwood Parkway Extension
- Mississauga Road and Wanless Drive

Appendix E of **Appendix B.1** includes detailed signal warrant calculation sheets.

Tables 7, 8, 9 and 10 show the traffic analysis results for signalized and unsignalized intersections for the future 2018 and 2031 time horizons with no roadway improvements along Mississauga Road, while planned improvements for other intersecting roads were taken into consideration. These “Do-Nothing” scenarios assumed the following:

- Sandalwood Parkway would be extended to Mississauga Road by 2018;
- The intersections of Mississauga Road/ Sandalwood Parkway Extension and Mississauga Road/ Wanless Drive are assumed to be signalized by 2018;
- Buick Boulevard would be extended to Mississauga Road by 2018;
- Collector Road D and Collector Road F would be built-out and extended further west of Mississauga Road by 2031 forming 4-legged intersection with Mississauga Road; and

- Collector Road C, Sandalwood Parkway, Buick Boulevard would be extended further west of Mississauga Road by 2031 forming 4-legged intersection with Mississauga Road.

Appendix F of **Appendix B.1** shows detailed intersection calculation sheets for 2018 and **Appendix G** of **Appendix B.1** includes calculation sheets for 2031 Do-Nothing scenario.

Table 7 Future 2018 Traffic Capacity Analysis-Signalized Intersections (Do-Nothing)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road & Bovaird Dr. West	EB	Left	24.1	C	0.18	>80	F	1.37
		Thru	60.5	E	0.96	>80	F	2.10
		Right	0.1	A	0.04	0.1	A	0.09
	WB	Left	48.4	D	0.79	>80	F	1.60
		Thru/Right	19.7	B	0.45	>80	F	1.94
	NB	Left	29.7	C	0.21	>80	F	1.44
		Thru/Right	20.7	C	0.19	>80	F	2.41
	SB	Left	21.1	C	0.18	>80	F	2.27
		Thru/Right	31.5	C	0.90	>80	F	1.12
	Overall Intersection		**37.1**	**D**	**0.90**	**>80**	**F**	**2.25**
Mississauga Road/Sandalwood Pkwy	WB	Left	>80	F	1.30	>80	F	2.85
		Right	36.5	D	0.13	54.3	D	0.41
	NB	Thru/Right	6.0	A	0.29	35.5	D	1.02
	SB	Left/Thru	>80	F	1.33	>80	F	3.14
	Overall Intersection		**>80**	**F**	**1.32**	**>80**	**F**	**3.11**
Mississauga Road/Wanless Drive	EB	Left/Thru/Right	24.4	C	0.27	35.8	D	0.41
	WB	Left/Thru/Right	>80	F	1.08	50.5	D	0.77
	NB	Left/Thru/Right	17.0	B	0.35	30.7	C	0.95
	SB	Left/Thru/Right	71.6	E	1.10	13.0	B	0.35
	Overall Intersection		**65.2**	**E**	**1.09**	**30.1**	**C**	**0.90**
Mississauga Road/Mayfield Road	EB	Left	18.7	B	0.14	42.2	D	0.67
		Thru/Right	53.4	D	0.96	25.2	C	0.47
	WB	Left	48.7	D	0.78	22.3	C	0.23
		Thru/Right	14.8	B	0.43	40.3	D	0.84
	NB	Left	37.6	D	0.34	22.2	C	0.07
		Thru/Right	24.2	C	0.33	33.9	C	0.73
	SB	Left	25.7	C	0.23	17.8	B	0.21
		Thru/Right	65.1	E	0.97	16.9	B	0.26
	Overall Intersection		**45.4**	**D**	**0.94**	**31.7**	**C**	**0.78**

Table 8 Future 2018 Traffic Capacity Analysis-Unsignalized Intersections (Do-Nothing)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road/Collector Road C	WB	Left/Right	>50	F	>1.0	>50	F	0.78
	NB	Thru/Right	0.0	A	0.22	0.0	A	0.90
	SB	Left/Thru	0.7	A	0.01	0.6	A	0.02
	Overall Intersection		**>50**	**F**	**19.72**	**3.9**	**A**	**0.90**
Mississauga Road/Buick Boulevard	WB	Left/Right	>50	F	1.69	>50	F	0.93
	NB	Thru/Right	0.0	A	0.23	0.0	A	0.79
	SB	Left/Thru	0.4	A	0.01	0.9	A	0.03
	Overall Intersection		**49.2**	**E**	**1.69**	**7.7**	**A**	**0.93**

Table 7 above illustrates that, many of the individual turning movements will operate at a level of service F, resulting in an overall level of service F at the intersections of Mississauga Road/Bovaird Drive West and Mississauga Road/Sandalwood Parkway during PM peak hour. The peak directional through traffic flow at Mississauga Road/ Sandalwood Parkway will operate at level of service F with the intersection signalized. At Mississauga Road/Bovaird Drive West, a number of turning movements will experience long delays or the traffic demand will exceed the traffic capacity of the intersection. Although some of the movements at the other two signalized intersections are either over capacity or experience long delays overall, both the intersections are expected to operate at an overall level of service E or better during the AM and PM peak hours of operations.

Table 8 above illustrates the results of operational analysis of the unsignalized intersections. Some of the individual cross traffic movements at these intersections will experience long delays resulting in level of service F. Overall, when factoring in the north and south-bound traffic; delay at the intersections will be within the acceptable operating conditions. The westbound movement at the intersections of Mississauga Road/Collector Road C and Mississauga Road/Buick Boulevard will experience long delays during both the AM and PM peak hours of operation.

Table 9 Future 2031 Traffic Capacity Analysis-Signalized Intersections (Do-Nothing)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road & Bovaird Dr. West	EB	Left	>80	F	0.81	>80	F	2.43
		Thru	>80	F	3.06	>80	F	2.97
		Right	0.8	A	0.42	0.2	A	0.16
	WB	Left	>80	F	3.15	>80	F	2.08
		Thru/Right	>80	F	1.70	>80	F	2.68
	NB	Left	>80	F	1.39	>80	F	1.98
		Thru/Right	>80	F	1.48	>80	F	3.93
	SB	Left	>80	F	1.77	>80	F	2.27
		Thru/Right	>80	F	3.42	>80	F	2.13

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
	Overall Intersection		**>80**	**F**	**3.07**	**>80**	**F**	**3.36**
Mississauga Road/Sandalwood Pkwy	EB	Left	20.6	C	0.07	25.8	C	0.27
		Thru/Right	24.9	C	0.44	26.2	C	0.42
	WB	Left	>80	F	1.34	65.0	E	0.92
		Thru/Right	25.3	C	0.47	46.7	D	0.88
	NB	Left/Thru/Right	31.2	C	0.78	>80	F	2.37
	SB	Left/Thru/Right	>80	F	3.17	>80	F	3.52
	Overall Intersection		**>80**	**F**	**2.35**	**>80**	**F**	**2.42**
Mississauga Road/Wanless Drive	EB	Left/Thru/Right	27.5	C	0.41	36.1	D	0.54
	WB	Left/Thru/Right	>80	F	1.55	71.6	E	0.93
	NB	Left/Thru/Right	19.3	B	0.50	>80	F	1.41
	SB	Left/Thru/Right	>80	F	1.62	13.5	B	0.54
	Overall Intersection		**>80**	**F**	**1.60**	**>80**	**F**	**1.26**
Mississauga Road/Mayfield Road	EB	Left	28.2	C	0.41	36.6	D	0.68
		Thru/Right	>80	F	1.64	59.8	E	0.93
	WB	Left	>80	F	1.36	32.5	C	0.59
		Thru/Right	25.9	C	0.72	>80	F	1.72
	NB	Left	>80	F	0.66	25.9	C	0.15
		Thru/Right	43.9	D	0.49	>80	F	1.53
	SB	Left	29.9	C	0.40	31.7	C	0.49
		Thru/Right	>80	F	1.50	24.2	C	0.44
	Overall Intersection		**>80**	**F**	**1.55**	**>80**	**F**	**1.48**

Table 10 Future 2031 Traffic Capacity Analysis-Unsignalized Intersections (Do-Nothing)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road/Collector Road C	EB	Left/Thru/Right	-	-	-	-	-	-
	WB	Left/Thru/Right	>50	F	>1.0	>50	F	4.71
	NB	Left/Thru/Right	-	-	-	0.0	A	0.03
	SB	Left/Thru/Right	0.0	A	0.01	1.2	A	0.03
	Overall Intersection		**>50**	**F**	**>1.0**	**>50**	**F**	**4.71**
Mississauga Road/Buick Boulevard	EB	Left/Thru/Right	-	-	-	-	-	-
	WB	Left/Thru/Right	>50	F	6.91	>50	F	3.72
	NB	Left/Thru/Right	-	-	-	0.0	A	0.01

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
	SB	Left/Thru/Right	0.1	A	0.01	1.6	A	0.05
	Overall Intersection		**>50**	**F**	**6.91**	**>50**	**F**	**3.72**
Mississauga Road/Collector Road D	EB	Left/Thru/Right	-	-	-	-	-	-
	WB	Left/Thru/Right	>50	F	2.80	>50	F	3.66
	NB	Left/Thru/Right	0.0	A	0.01	0.0	A	0.01
	SB	Left/Thru/Right	0.1	A	0.01	0.4	A	0.01
	Overall Intersection		**>50**	**F**	**2.80**	**>50**	**F**	**3.66**
Mississauga Road/Collector Road F	EB	Left/Thru/Right	>50	F	0.03	28.8	D	0.03
	WB	Left/Thru/Right	>50	F	3.48	>50	F	0.66
	NB	Left/Thru/Right	0.2	A	0.01	0.0	A	0.01
	SB	Left/Thru/Right	0.1	A	0.01	0.2	A	0.01
	Overall Intersection		**>50**	**F**	**3.48**	**3.7**	**A**	**0.66**

Tables 9 and **10** above illustrate that under the 2031 future traffic and without improvements to Mississauga Road, the signalized intersections within the study area are expected to operate at an unsatisfactory level of service and operating conditions will include significant delays during the peak hours.

Due to high traffic volumes along Mississauga Road, the movements at the intersecting roadways will experience long delays resulting in an unsatisfactory operating condition at the unsignalized intersections.

Figure 7 illustrates the midblock and intersection operations under the future 2018 and 2031 traffic condition without any improvement along Mississauga Road**.**

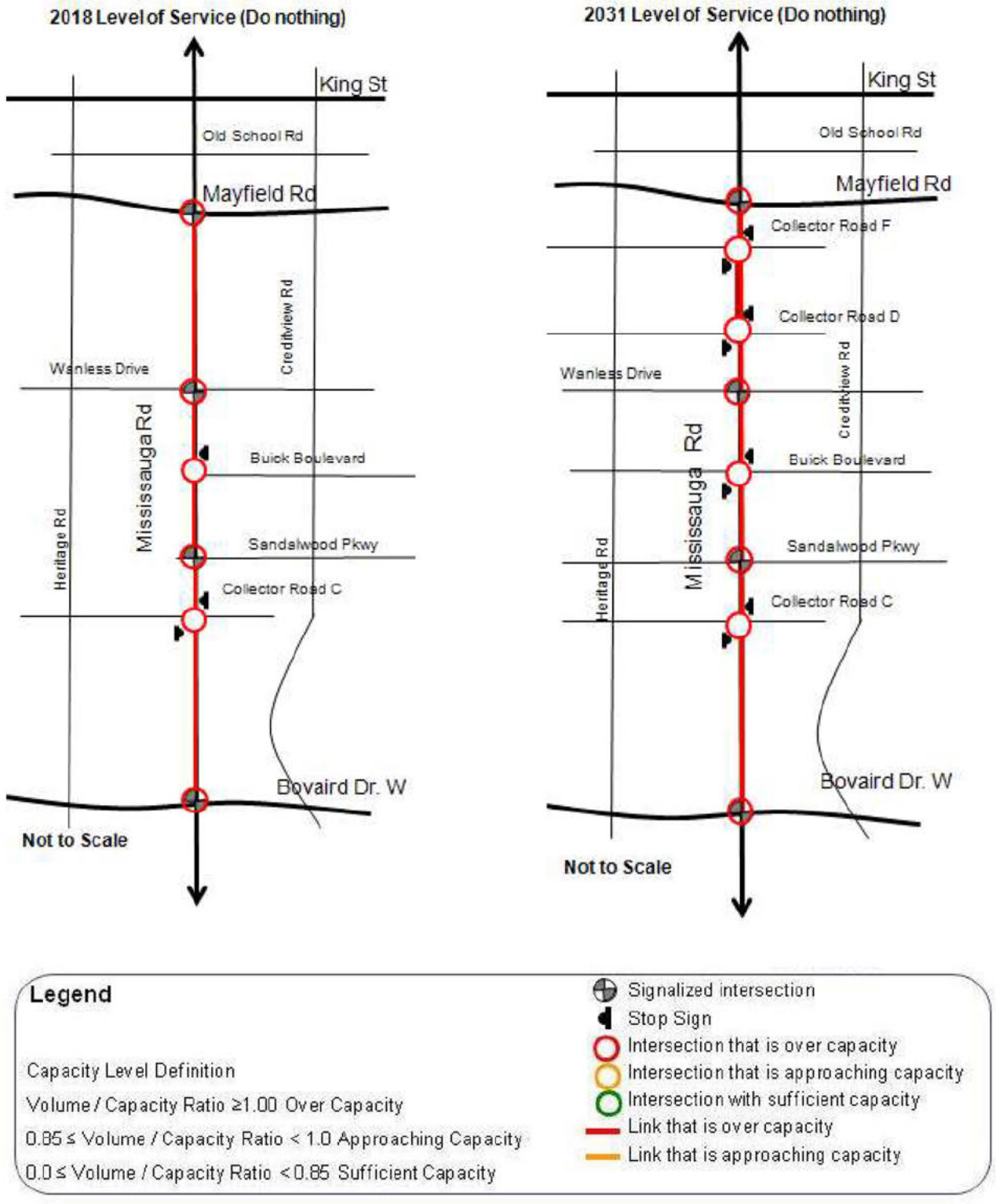
4.1.10 Road Network Needs

The planned land developments adjacent to Mississauga Road will generate a significant amount of traffic and as shown in the preceding tables the traffic demand cannot be properly accommodated by the existing road network and lane configurations for the future horizon years 2018 and 2031.

For the future horizon 2018, the study area intersections and roadway links will be either over capacity or approaching capacity. However, for the future horizon year 2031, with the existing road network and lane configurations, all the intersections and roadway links within the study area will experience LOS F.

Some traffic relief would be provided by the planned widening of Creditview Road and the extension of Sandalwood Parkway to the west of Creditview Road as shown in the Mount Pleasant Community Transportation Strategy study and the updated TTMP, however, the analysis indicates that improvements will still be required on Mississauga Road in order to accommodate the anticipated future traffic volumes.

Figure 7 Midblock and Intersection Operations Under 2018 and 2031 Traffic Conditions Without Improvements to Mississauga Road



4.1.10.1 Road Improvements by 2018

Based on the future 2018 traffic analysis and also the road network suggested in the updated TTMP for 2016, a 4-lane section would be needed for Mississauga Road between Bovaird Drive West and Mayfield Road. **Figure 8** shows the proposed lane configuration for the 2018 time horizon.

Figure 8 Future 2018 Improved Lane Configuration

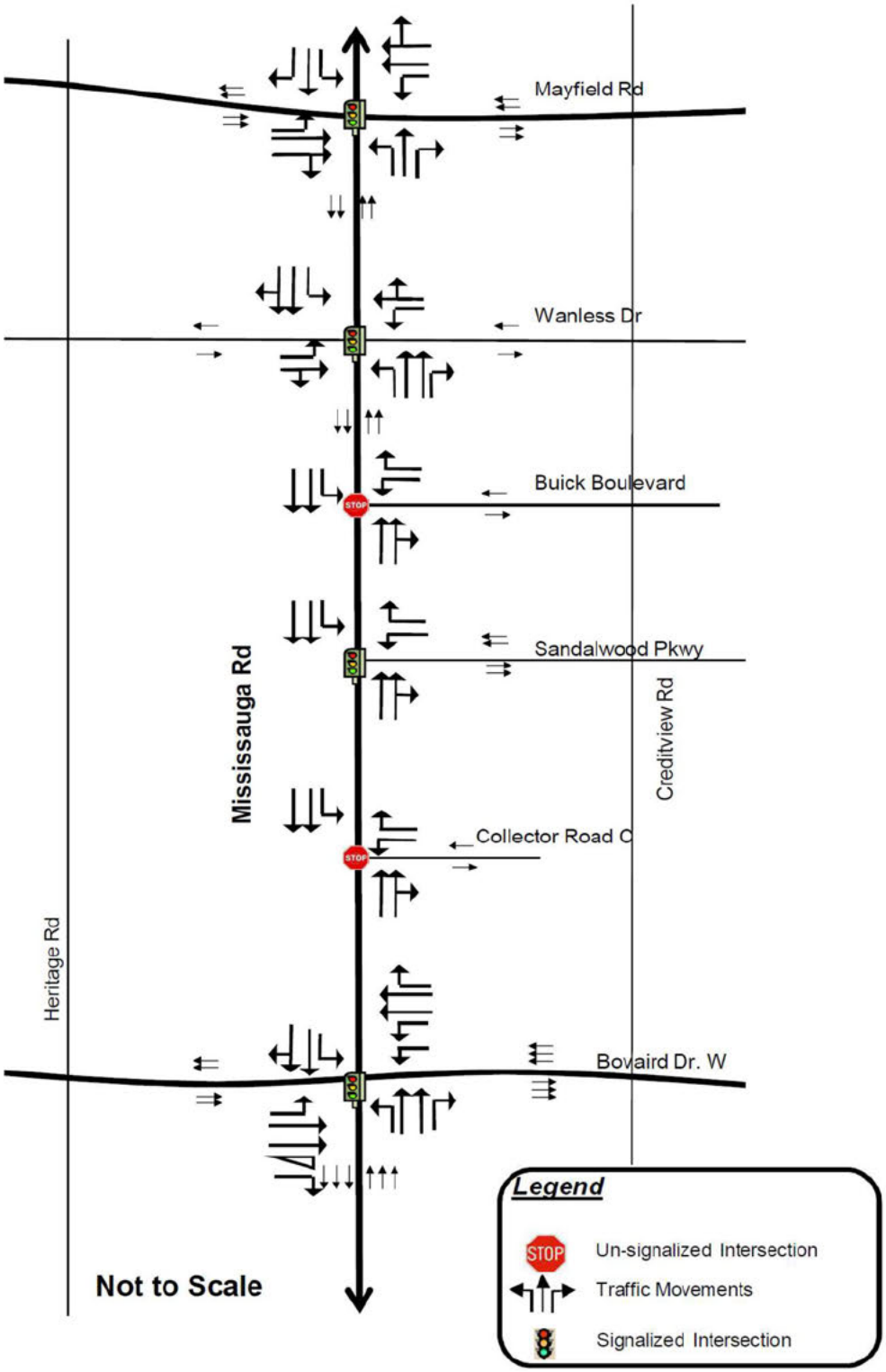


Table 11 shows the corridor level of service with road improvement. With four lanes on Mississauga Road between Bovaird Drive West and Mayfield Road, the corridor is expected to operate with residual capacity during both the AM and PM peak period.

Table 11 2018 Mid-Block Volumes – Proposed Road Improvements

Road Section	No. of Lanes per Direction	Desired Capacity	AM Peak Hour				PM Peak Hour			
			NB		SB		NB		SB	
			Volume	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*
Bovaird Drive West to Collector Road C	2	1800	469	0.26	1729	**0.96**	1789	**0.99**	928	0.52
Collector Road C to Sandalwood Parkway	2	1800	379	0.21	1643	**0.91**	1571	0.87	755	0.42
Sandalwood Parkway to Buick Boulevard	2	1800	389	0.22	1392	0.77	1339	0.74	536	0.30
Buick Boulevard to Wanless Drive	2	1800	335	0.19	1194	0.66	1106	0.61	471	0.26
Wanless Drive to Mayfield Road	2	1800	265	0.15	1051	0.58	824	0.46	406	0.23

The results from the corridor analysis, presented in **Table 11** are further supported by the capacity calculations undertaken for the intersections within the study corridor. **Table 12** and **13** show the results of the analysis.

Table 12 Future 2018 Traffic Capacity Analysis-Signalized Intersections (Improved)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road & Bovaird Dr. West	EB	Left	39.1	D	0.16	39.6	D	0.57
		Dual Thru	>80	F	1.13	>80	F	1.04
		Right	0.4	A	0.25	0.1	A	0.09
	WB	Dual Left	>80	F	1.17	>80	F	1.25
		Dual Thru	28.8	C	0.55	>80	F	1.08
		Right	21.4	C	0.03	27.2	C	0.15
	NB	Left	74.1	E	0.84	53.7	D	0.84
		Dual Thru	19.6	B	0.23	>80	F	1.12
		Right	19.5	B	0.20	38.9	D	0.65
	SB	Left	24.4	C	0.14	82.8	F	0.88
		Dual Thru/Right	>80	F	1.1	44.1	D	0.70
	Overall Intersection		**79.8**	**E**	**1.11**	**>80**	**F**	**1.10**
Mississauga Road/Sandalwood Pkwy	WB	Left	31.9	C	0.71	39.1	D	0.71
		Right	20.7	C	0.08	28.4	C	0.17
	NB	Dual Thru/Right	15.2	B	0.19	27.8	C	0.89
	SB	Left	24.1	C	0.54	36.7	D	0.64
		Dual Thru	21.7	C	0.60	13.8	B	0.15
	Overall Intersection		**23.1**	**C**	**0.65**	**28.3**	**C**	**0.81**

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road/Wanless Drive	EB	Left	45.9	D	0.06	30.3	C	0.08
		Thru/Right	48.5	D	0.40	30.9	C	0.15
	WB	Left	32.3	C	0.53	20.1	C	0.18
		Thru/Right	28.8	C	0.20	19.5	B	0.09
	NB	Left	14.1	B	0.04	21.0	C	0.03
		Dual Thru	13.4	B	0.12	21.7	C	0.45
		Right	25.8	C	0.05	32.5	C	0.25
	SB	Left	10.3	B	0.09	15.9	B	0.04
		Dual Thru/Right	15.4	B	0.47	15.5	B	0.23
	Overall Intersection		**22.0**	**C**	**0.49**	**22.8**	**C**	**0.33**
Mississauga Road/Mayfield Road	EB	Left	31.3	C	0.21	22.1	C	0.28
		Dual Thru/Right	41.0	D	0.75	21.4	C	0.24
	WB	Left	25.2	C	0.56	34.2	C	0.27
		Dual Thru/Right	20.2	C	0.28	40.3	D	0.67
	NB	Left	11.5	B	0.09	24.5	C	0.06
		Thru	12.4	B	0.15	33.3	C	0.55
		Right	7.7	A	0.03	78.2	E	0.10
	SB	Left	17.6	B	0.15	16.5	B	0.15
		Right	25.8	C	0.62	16.5	B	0.21
		Right	16.3	B	0.06	14.6	B	0.03
	Overall Intersection		**28.1**	**C**	**0.66**	**33.4**	**C**	**0.55**

Table 13 Future 2018 Traffic Capacity Analysis-Unsignalized Intersections (Improved)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road/Collector Road C	WB	Left	22.1	C	0.33	>80	F	0.56
		Right	9.4	A	.01	15.7	C	0.03
	NB	Thru	0.0	A	.014	0.0	A	0.56
		Thru/Right	0.0	A	0.08	0.0	A	0.34
	SB	Left	8.1	A	0.01	13.5	B	0.02
		Thru	0.0	A	0.46	0.0	A	0.17
		Thru	0.0	A	0.46	0.0	A	0.17
	Overall Intersection		**1.2**	**A**	**0.46**	**2.1**	**A**	**0.56**
Mississauga Road/Buick Boulevard	WB	Left	62.9	F	0.82	>80	F	0.71
		Right	9.5	A	0.02	14.6	B	0.06

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
	NB	Thru	0.0	A	0.12	0.0	A	0.42
		Thru/Right	0.0	A	0.10	0.0	A	0.36
	SB	Left	0.0	A	0.01	12.3	B	0.03
		Thru	0.0	A	0.35	0.0	A	0.13
		Thru	0.0	A	0.35	0.0	A	0.13
	Overall Intersection		**7.2**	**A**	**0.82**	**4.1**	**A**	**0.71**

As illustrated in **Table 12** above, all signalized intersections will operate at an overall level of service C or better except for the Mississauga Road intersection at Bovaird Drive West. The Mississauga Road/Bovaird Drive West intersection will operate at poor level of service for the AM and PM peak hours because some movements at this intersection will operate over or near capacity and will experience long delays. Summaries of the 2018 intersection capacity calculations for these intersections operating with proposed improvements are provided in **Appendix H** of **Appendix B.1**

As illustrated in **Table 13** above, all unsignalized intersections will experience minimal overall delay with westbound shared left/right operating at unsatisfactory level of service due to heavy northbound and southbound traffic.

Figure 9 illustrates the midblock and intersection operations under the future 2018 traffic condition with road widening along Mississauga Road**.**

The results summarized in **Tables 12** and **Table 13** illustrates the need for 4 lanes along Mississauga Road between Bovaird Drive West and Mayfield Road. The intersection at Sandalwood Parkway will require an exclusive southbound left lane. At Wanless Drive, exclusive left turn lanes should be provided in the northbound and southbound directions.

4.1.10.2 Need and Justification for a Grade Separation at Rail Crossing

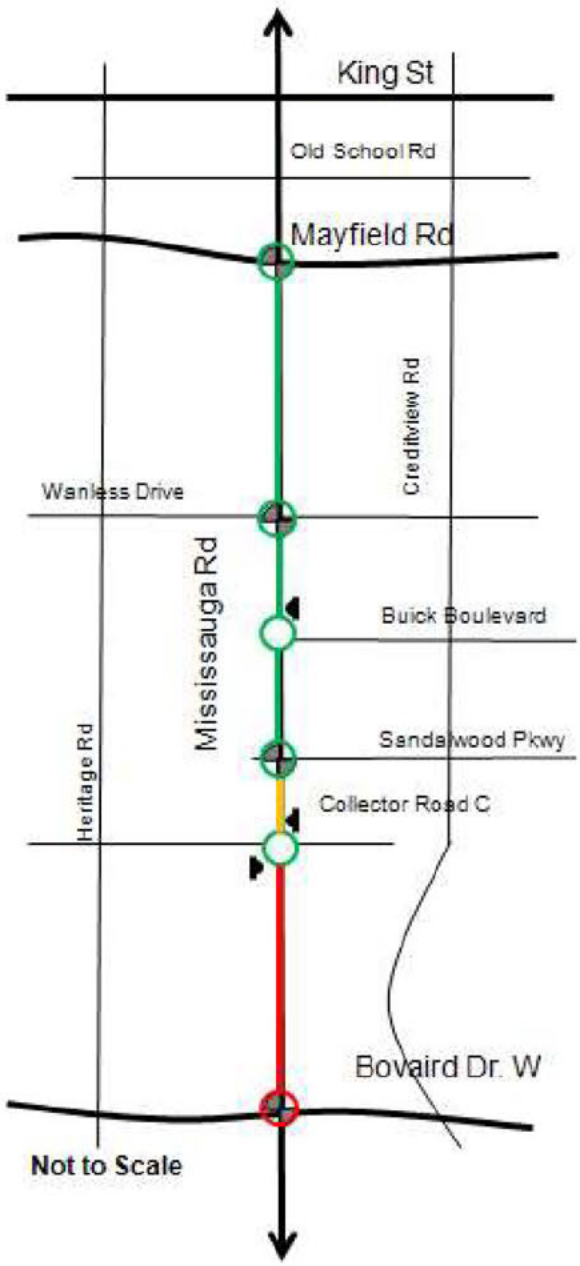
An Exposure Index (EI) calculation, which was traditionally adopted by Ontario Ministry of Transportation (MTO), Transport Canada, municipalities and railway companies, provides a warrant to eliminate an existing railway level crossing through the construction of a grade separation.

EI = Annual Daily Traffic x Daily Number of Trains

By 2018 daily travel demand on Mississauga Road is expected to be greater than 14,000 vehicles at the rail crossing and it is also expected that at least 40 trains per day will be moved through the crossing by GO Transit alone.

An EI threshold of 200,000 is the criteria used for determining whether a grade separation is warranted. The EI value by 2018 is anticipated to exceed 560,000, and hence, a grade separation is supported from a transportation safety perspective.

Figure 9 Midblock and Intersection Operations Under 2018 Traffic Conditions with Road Improvements



Legend

Capacity Level Definition

Volume / Capacity Ratio ≥1.00 Over Capacity

0.85 ≤ Volume / Capacity Ratio < 1.0 Approaching Capacity

0.0 ≤ Volume / Capacity Ratio <0.85 Sufficient Capacity

Signalized intersection

Stop Sign

Intersection that is over capacity

Intersection that is approaching capacity

Intersection with sufficient capacity

Link that is over capacity

Link that is approaching capacity

4.1.10.3 Road Improvements by 2031 – Without North South Transportation Corridor (NSTC) in Place

Based on the future 2031 traffic analysis, without the proposed North South Arterial Road in place, six traffic lanes will be needed for Mississauga Road between Bovaird Drive West and Sandalwood Parkway Extension. Based on the material provided and the assumptions made in this report it is anticipated that the 4-lane section on Mississauga Road between Sandalwood Parkway Extension and Mayfield Road will be sufficient to accommodate the expected traffic volumes. **Table 14** summarizes the future 2031 corridor levels of service with proposed road improvements, while **Table 15** and **16** summarizes the intersection levels of services and operating conditions with proposed road improvements.

Table 14 2031 Mid-Block Volumes – Proposed Lane Configuration without North South Transportation Corridor

Road Section	No. of Lanes per Direction	Desired Capacity	AM Peak Hour				PM Peak Hour			
			NB		SB		NB		SB	
			Volume	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*
Bovaird Drive West to Collector Road C	3	2700	727	0.27	2407	0.89	2370	0.88	1250	0.46
Collector Road C to Sandalwood Parkway	3	2700	602	0.22	2093	0.78	2085	0.77	855	0.32
Sandalwood Parkway to Buick Boulevard	2	1800	547	0.30	1922	**1.07**	1818	**1.01**	737	0.41
Buick Boulevard to Wanless Drive	2	1800	485	0.27	1728	**0.96**	1585	0.88	672	0.37
Wanless Drive to Collector Road D	2	1800	392	0.22	1551	0.86	1223	0.68	593	0.33
Collector Road D to Collector Road F	2	1800	374	0.21	1407	0.78	1139	0.63	549	0.31
Collector Road F to Mayfield Road	2	1800	353	0.20	1267	0.70	1056	0.59	477	0.27

Table 15 Future 2031 Traffic Capacity Analysis-Signalized Intersections – Improved (without North South Transportation Corridor)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road & Bovaird Dr. West	EB	Left	31.1	C	0.30	75.0	E	0.86
		Triple Thru	>80	F	1.26	>80	F	1.22
		Right	0.8	A	0.42	0.2	A	0.16
	WB	Dual Left	>80	F	1.45	>80	F	1.25
		Triple Thru/Right	32.9	C	0.71	>80	F	1.24
	NB	Dual Left	>80	F	1.15	72.0	E	0.85
		Triple Thru	34.1	C	0.36	>80	F	1.15
		Right	39.2	D	0.52	>80	F	1.07
	SB	Dual Left	74.2	E	0.51	73.0	E	0.65
		Triple Thru	>80	F	1.27	51.5	D	0.78
		Right	29.0	C	0.03	38.5	D	0.10
	Overall Intersection		**>80**	**F**	**1.27**	**>80**	**F**	**1.18**

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road/Sandalwood Pkwy	EB	Left	44.7	D	0.12	45.3	D	0.15
		Dual Thru/Right	47.9	D	0.50	48.1	D	0.44
	WB	Left	50.4	D	0.91	52.6	D	0.85
		Dual Thru	22.5	C	0.10	30.0	C	0.17
		Right	23.2	C	0.16	34.3	C	0.50
	NB	Left	25.2	C	0.28	24.9	C	0.27
		Dual Thru	31.3	C	0.26	35.3	D	0.72
		Right	49.5	D	0.18	54.8	D	0.76
	SB	Left	25.1	C	0.70	35.7	D	0.67
		Dual Thru	40.8	D	0.84	12.1	B	0.19
		Right	23.2	C	0.12	16.8	B	0.04
	Overall Intersection		**38.0**	**D**	**0.86**	**38.1**	**D**	**0.78**
Mississauga Road/Wanless Drive	EB	Left	24.4	C	0.03	40.7	D	0.15
		Dual Thru	26.1	C	0.21	42.0	D	0.32
		Right	24.1	C	0.01	38.3	D	0.01
	WB	Left	49.4	D	0.83	29.4	C	0.33
		Dual Thru/Right	26.8	C	0.27	28.4	C	0.17
	NB	Left	11.1	B	0.11	13.6	B	0.03
		Dual Thru	11.4	B	0.18	18.3	B	0.56
		Right	9.1	A	0.07	52.3	D	0.26
	SB	Left	21.4	C	0.17	8.6	A	0.08
		Dual Thru/Right	33.7	C	0.73	9.5	A	0.27
	Overall Intersection		**29.7**	**C**	**0.77**	**24.9**	**C**	**0.48**
Mississauga Road/Mayfield Road	EB	Left	25.3	C	0.33	70.4	E	0.90
		Dual Thru	36.8	D	0.84	18.0	B	0.31
		Right	22.4	C	0.16	15.4	B	0.05
	WB	Left	53.2	D	0.85	19.3	B	0.34
		Dual Thru/Right	12.7	B	0.36	22.9	C	0.62
	NB	Left	72.0	E	0.57	24.6	C	0.14
		Dual Thru	30.5	C	0.16	31.1	C	0.52
		Right	60.4	E	0.04	34.2	C	0.29
	SB	Left	31.3	C	0.36	25.4	C	0.32
		Dual Thru/Right	45.2	D	0.87	20.8	C	0.24
	Overall Intersection		**35.5**	**D**	**0.85**	**26.6**	**C**	**0.72**

Table 16 Future 2031 Traffic Capacity Analysis-Unsignalized Intersections – Improved (without North South Transportation Corridor)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road/Collector Road C	EB	Left	-	-	-	-	-	-
		Thru/Right	-	-	-	-	-	-
	WB	Left	10.6	B	0.14	>50	F	1.7
		Thru/Right	9.3	A	0.01	14.4	B	0.03
	NB	Left	-	-	-	-	-	-
		Thru	0.0	A	0.11	0.0	A	0.44
		Thru	0.0	A	0.11	0.0	A	0.44
		Thru/Right	0.0	A	0.07	0.0	A	0.28
	SB	Left	8.4	A	0.01	17.9	C	0.03
		Thru	0.0	A	0.49	0.0	A	0.19
		Thru	0.0	A	0.49	0.0	A	0.19
		Thru/Right	0.0	A	0.25	0.0	A	0.09
	Overall Intersection		**0.5**	**A**	**0.49**	**9.9**	**A**	**1.70**
Mississauga Road/Buick Boulevard	EB	Left	-	-	-	-	-	-
		Thru/Right	-	-	-	-	-	-
	WB	Left	>50	F	1.89	>50	F	2.08
		Thru/Right	9.8	A	0.02	16.4	C	0.07
	NB	Left	-	-	-	-	-	-
		Thru	0.0	A	0.14	0.0	A	0.46
		Thru	0.0	A	0.14	0.0	A	0.46
		Right	0.0	A	0.04	0.0	A	0.15
	SB	Left	0.0	A	0.01	16.3	C	0.05
		Thru	0.0	A	0.67	0.0	A	0.26
		Thru/Right	0.0	A	0.34	0.0	A	0.13
	Overall Intersection		**41.1**	**E**	**1.89**	**22.7**	**C**	**2.08**
Mississauga Road/Collector Road D	EB	Left	-	-	-	-	-	-
		Thru/Right	-	-	-	-	-	-
	WB	Left	47.6	E	0.66	43.5	E	0.34
		Thru/Right	9.3	A	0.1	9.2	A	0.01
	NB	Left/Thru	-	-	-	0.0	A	0.39
		Thru/Right	0.0	A	0.12	0.0	A	0.39
	SB	Left/Thru	0.0	A	0.41	0.2	A	0.01
		Thru/Right	0.0	A	0.41	0.0	A	0.16

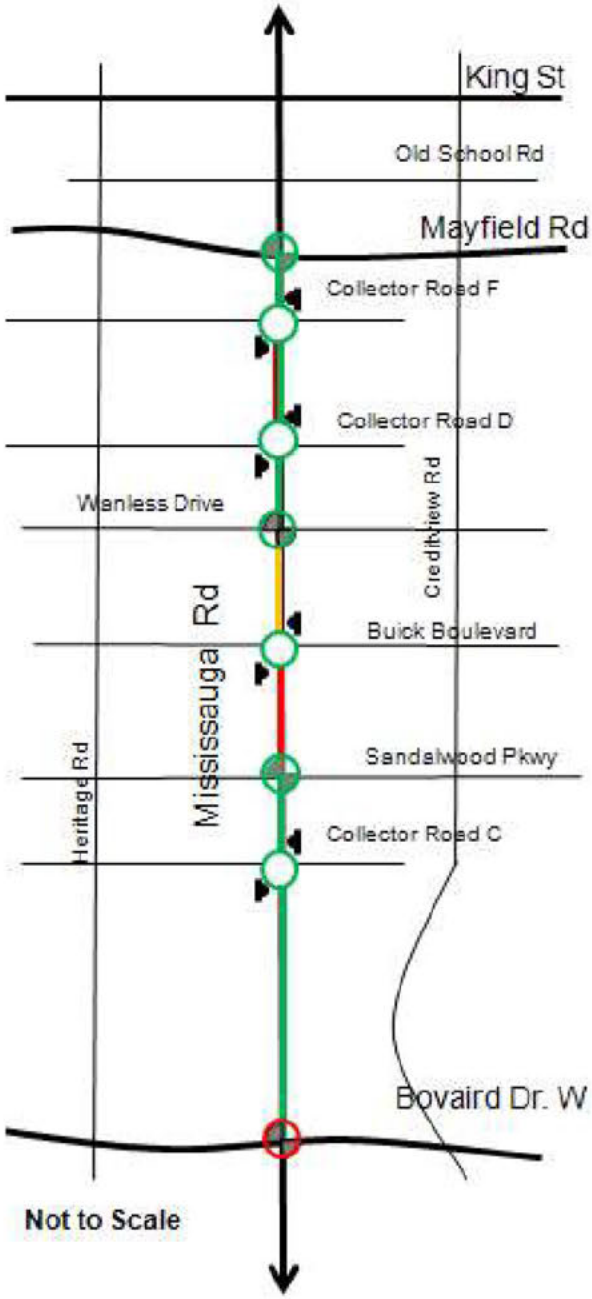
Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
	Overall Intersection		3.6	A	0.66	1.2	A	0.34
Mississauga Road/Collector Road F	EB	Left	-	-	-	-	-	-
		Thru/Right	20.1	C	0.01	-	-	-
	WB	Left	15.6	C	0.27	>80	F	0.53
		Thru/Right	9.4	A	0.01	13.3	B	0.01
	NB	Left/Thru	0.1	A	0.12	0.0	A	0.39
		Thru/Right	0.1	A	0.12	0.0	A	0.39
	SB	Left/Thru	0.1	A	0.01	0.3	A	0.01
		Thru/Right	0.0	A	0.37	0.0	A	0.16
	Overall Intersection		1.2	A	0.37	2.3	A	0.53

Under the future 2031 traffic condition all the signalized intersections (except the intersection of Mississauga Road/Bovaird Drive West) are expected to operate at overall level of service C or better.

Individual cross traffic movement, westbound left movement at the unsignalized intersection of Mississauga Road/Collector Road C and Mississauga Road/Buick Boulevard will experience significant delays and will operate at unsatisfactory levels of services. The intersections of Mississauga Road/Collector Road D and Mississauga Road/Collector Road F will experience long delays for the individual cross traffic movement (westbound shared left-through/right) during AM and PM peak hour, respectively. As indicated in **Section 4.1.9.5,** signals are not warranted at these four intersections based on the available future forecast for the horizon year 2031. It is suggested that close monitoring of future traffic volumes be continued at these four intersections and traffic warrant analysis should be revised to reflect the change in future traffic volumes (if any); where signalization would improve the operation of these intersections.

At the present time, based on the land use, trip generation and road networks assumptions used in this assessment, four lanes on Mississauga Road north of Sandalwood Parkway to Mayfield Road with associated auxiliary turn lanes will be capable of accommodating expected traffic volumes projected for the year 2031. **Figure 10** illustrates the midblock and intersection operations under the future 2031 traffic condition with recommended widening along Mississauga Road, and **Figure 11** shows the lane configurations in 2031 without NSTC in place.

Figure 10 2031 Traffic Conditions without NSTC in Place



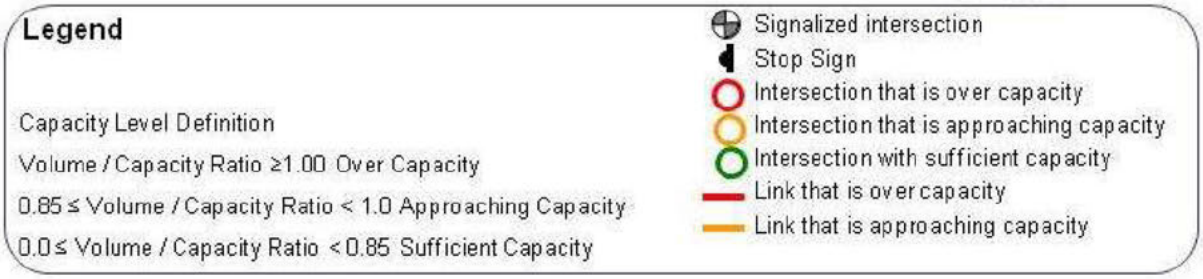
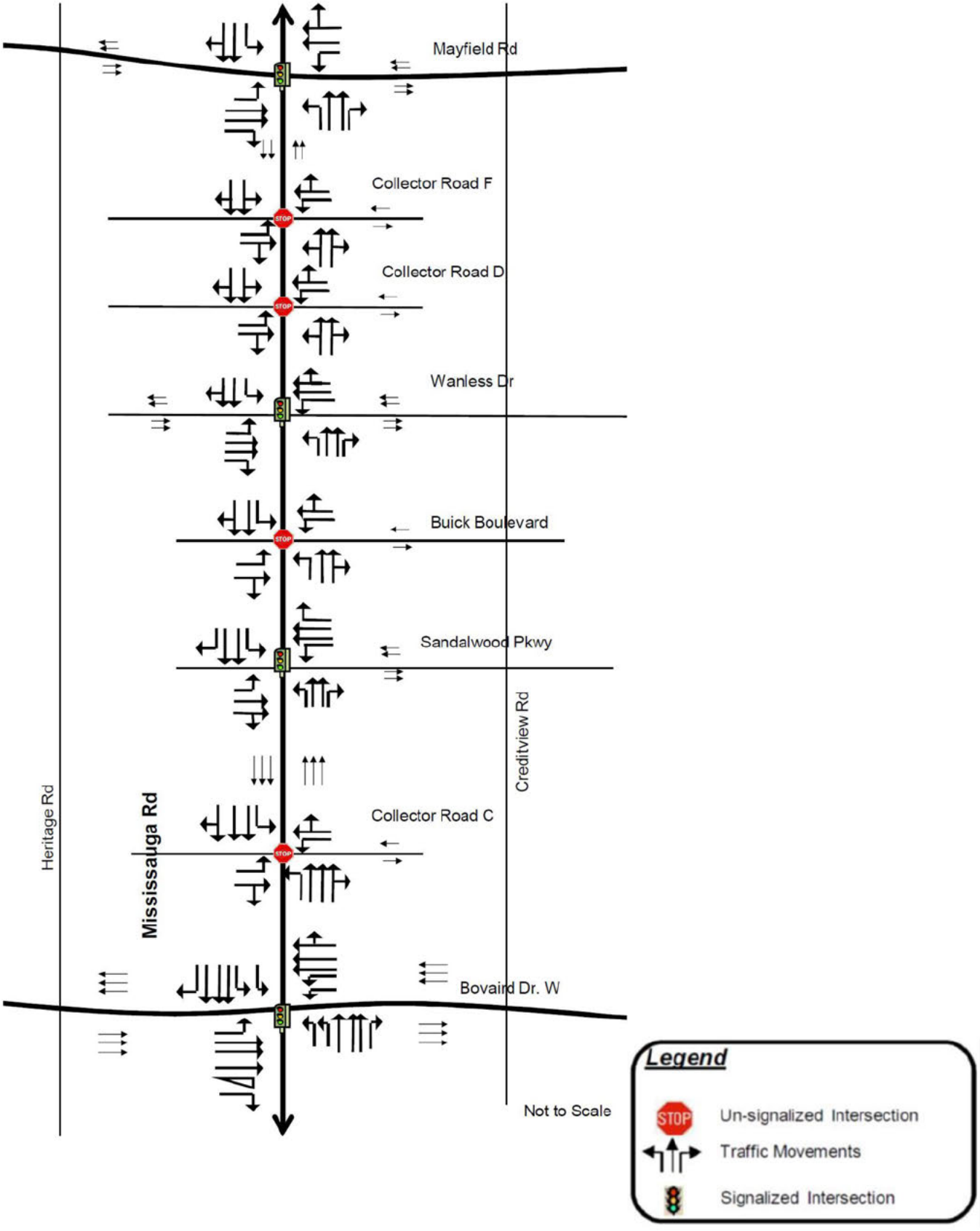


Figure 11 2031 Lane Configurations Without NSTC in Place



4.1.10.4 2031 Road Improvements with North South Transportation Corridor (NSTC) in Place

Under the updated City of Brampton's Transportation and Transit Master Plan (TTMP), the recommended road network for 2031 includes a new north/south high speed arterial road to the west of Mississauga Road. Based on the City's transportation model output, some of the forecasted north-south traffic along Mississauga Road would be diverted to use the NSTC should it be in place by 2031 (See Appendix for model output); thereby improve traffic operations at the study area intersections. Based on the City's transportation model forecast for 2031, with NSTC in place north-south traffic volumes on Mississauga Road are reduced significantly as well as the east-west traffic on the intersection roads within the study area east of Mississauga Road. West of Mississauga Road, the east-west traffic is projected to increase when NSTC is in place, suggesting that the reduced traffic along Mississauga Road represents the existing longer distance through traffic. Shorter distance trips, local and/ or development traffic in the immediate areas will travel via Mississauga Road and use the intersecting east-west collector roads to access the NSTC or the new development areas. **Figures 4.6** of **Appendix B.1** shows the resulting traffic demand within the study area with NSTC in place. **Table 17** summarizes the future 2031 corridor levels of service, while **Tables 18 and 19** summarize the intersection levels of service and operating conditions with future traffic demand within the study area with NSTC in place. Summaries of the 2031 intersection capacity calculations for these intersections are provided in **Appendix J** of **Appendix B.1**.

With the NSTC in place, all the signalized and unsignalized intersections within the study limit are expected to operate at acceptable level of service with the exception at the intersection of Mississauga Road/Bovaird Drive West, which will remain with capacity deficiencies and long delays for some traffic movements. **Figure 12** shows the proposed lane configuration in 2031 should the NSTC be in place.

Table 17 2031 Mid-Block Volumes – 2031 Road Network with North South Transportation Corridor

Road Section	No. of Lanes per Direction	Desired Capacity	AM Peak Hour				PM Peak Hour			
			NB		SB		NB		SB	
			Volume	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*
Bovaird Drive West to Collector Road C	3	2700	468	0.17	1541	0.57	1615	0.60	750	0.28
Collector Road C to Sandalwood Parkway	3	2700	355	0.13	1609	0.60	1376	0.51	730	0.27
Sandalwood Parkway to Buick Boulevard	2	1800	455	0.25	1269	0.71	1245	0.69	434	0.24
Buick Boulevard to Wanless Drive	2	1800	319	0.18	1108	0.62	964	0.54	448	0.25
Wanless Drive to Collector Road D	2	1800	242	0.13	946	0.53	748	0.42	362	0.20
Collector Road D to Collector Road F	2	1800	223	0.12	816	0.45	663	0.37	319	0.18
Collector Road F to Mayfield Road	2	1800	211	0.12	867	0.48	599	0.33	388	0.22

Table 18 Future 2031 Traffic Capacity Analysis-Signalized Intersections – Improved (with North South Transportation Corridor)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road & Bovaird Dr. West	EB	Left	29.8	C	0.29	60.7	E	0.75
		Triple Thru	>80	F	1.14	>80	F	1.12
		Right	1.3	A	0.52	0.3	A	0.20
	WB	Dual Left	>80	F	1.16	>80	F	1.20
		Triple Thru/Right	13.8	B	0.38	36.3	D	0.88
	NB	Left	>80	F	0.84	>80	F	1.04
		Dual Thru	41.0	D	0.29	74.5	E	1.00
		Right	40.3	D	0.19	64.5	E	0.83
	SB	Left	32.6	C	0.19	46.4	D	0.53
		Dual Thru	>80	F	1.03	53.3	D	0.62
		Right	36.1	D	0.03	44.8	D	0.06
	Overall Intersection		**72.4**	**E**	**1.06**	**73.6**	**E**	**1.09**
Mississauga Road/Sandalwood Pkwy	EB	Left	40.5	D	0.13	38.1	D	0.12
		Dual Thru/Right	46.8	D	0.63	41.7	D	0.42
	WB	Left	37.4	D	0.82	27.7	C	0.64
		Dual Thru	16.2	B	0.08	21.0	C	0.13
		Right	17.1	B	0.17	25.7	C	0.49
	NB	Left	19.7	B	0.17	15.4	B	0.13
		Dual Thru	16.7	B	0.10	25.8	C	0.50
		Right	18.1	B	0.11	24.0	C	0.34
	SB	Left	39.4	D	0.57	27.0	C	0.40
		Dual Thru	36.2	D	0.55	33.0	C	0.16
		Right	33.6	C	0.07	50.8	D	0.03
	Overall Intersection		**33.6**	**C**	**0.70**	**28.2**	**C**	**0.50**
Mississauga Road/Wanless Drive	EB	Left	37.8	D	0.06	31.0	C	0.14
		Dual Thru	43.3	D	0.48	32.4	C	0.29
		Right	36.9	D	0.01	29.1	C	0.01
	WB	Left	19.7	B	0.47	20.0	C	0.25
		Dual Thru/Right	17.1	B	0.18	19.2	B	0.12
	NB	Left	18.9	B	0.04	23.3	C	0.02
		Dual Thru	18.5	B	0.14	28.2	C	0.40
		Right	21.6	C	0.04	69.0	E	0.15

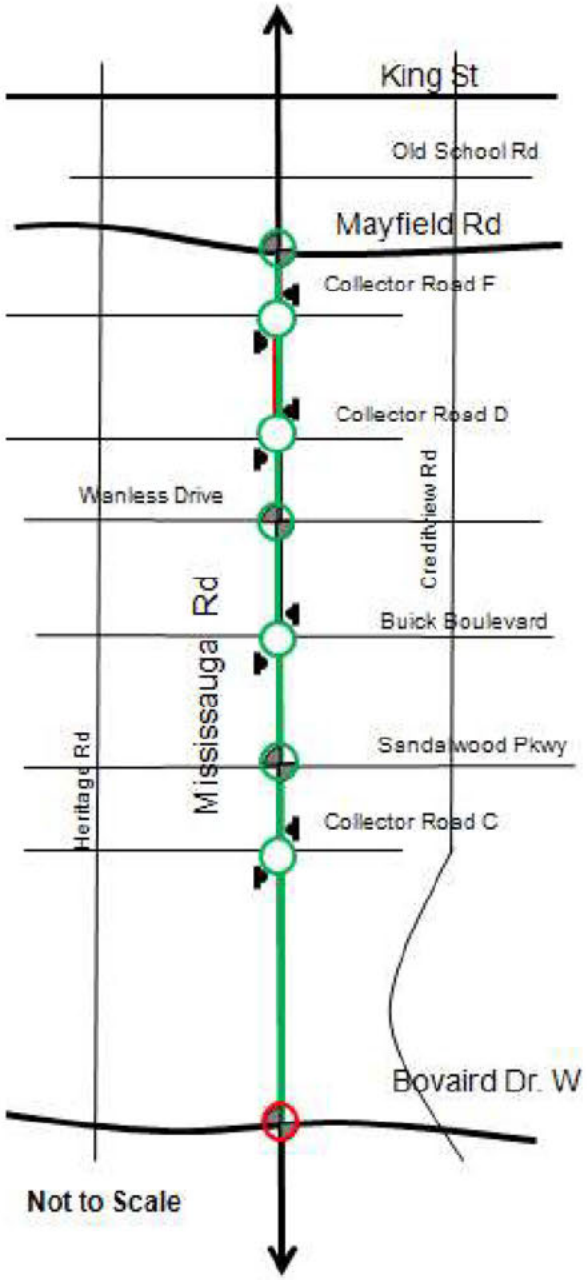
Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
	SB	Left	32.5	C	0.11	13.9	B	0.03
		Dual Thru/Right	38.3	D	0.54	14.3	B	0.19
	Overall Intersection		**31.0**	**C**	**0.50**	**30.0**	**C**	**0.34**
Mississauga Road/Mayfield Road	EB	Left	18.5	B	0.29	16.5	B	0.46
		Dual Thru	28.7	C	0.81	13.5	B	0.32
		Right	16.6	B	0.16	11.3	B	0.05
	WB	Left	52.7	D	0.83	27.6	C	0.36
		Dual Thru/Right	8.7	A	0.28	32.8	C	0.69
	NB	Left	43.6	D	0.19	29.1	C	0.08
		Dual Thru	40.3	D	0.14	31.3	C	0.36
		Right	74.4	E	0.03	52.6	D	0.15
	SB	Left	34.0	C	0.23	26.4	C	0.18
		Dual Thru/Right	39.4	D	0.60	25.7	C	0.20
	Overall Intersection		**29.3**	**C**	**0.73**	**26.5**	**C**	**0.51**

Table 19 Future 2031 Traffic Capacity Analysis – Unsignalized Intersections – Improved (With North South Transportation Corridor)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road/Collector Road C	EB	Left	45.3	E	0.14	22.7	C	0.06
		Thru/Right	28	D	0.15	29.3	D	0.16
	WB	Left	27	D	0.33	50.0	E	0.27
		Thru/Right	23.1	C	0.07	26.9	D	0.12
	NB	Left	11.3	B	0.03	8.3	A	0.01
		Thru	0.0	A	0.08	0.0	A	0.25
		Thru	0.0	A	0.08	0.0	A	0.25
		Thru/Right	0.0	A	0.05	0.0	A	0.16
	SB	Left	8.0	A	0.01	11.00	B	0.01
		Thru	0.0	A	0.27	0.0	A	0.11
		Thru	0.0	A	0.27	0.0	A	0.11
		Thru/Right	0.0	A	0.15	0.0	A	0.06
	Overall Intersection		**2.5**	**A**	**0.27**	**1.9**	**A**	**0.27**
Mississauga Road/Buick Boulevard	EB	Left	40.0	C	1.12	24.5	C	0.07
		Thru/Right	24.5	D	0.13	25.0	C	0.13
	WB	Left	34.9	C	0.46	47.8	E	0.43

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
		Thru/Right	22.3	B	0.13	21.4	C	0.14
	NB	Left	10.5	A	0.02	8.1	A	0.01
		Thru	0.0	A	0.09	0.0	A	0.27
		Thru	0.0	A	0.09	0.0	A	0.27
		Right	0.0	A	0.03	0.0	A	0.09
	SB	Left	8.0	A	0.01	10.7	B	0.01
		Thru	0.0	A	0.40	0.0	A	0.14
		Thru/Right	0.0	A	0.21	0.0	A	0.08
	Overall Intersection		**3.6**	**A**	**0.46**	**3.1**	**A**	**0.43**
Mississauga Road/Collector Road D	EB	Left	-	-	-	-	-	-
		Thru/Right	-	-	-	-	-	-
	WB	Left	20.3	C	0.36	17.0	C	0.13
		Thru/Right	8.9	A	0.01	9.0	A	0.01
	NB	Left/Thru	0.0	A	0.01	0.0	A	0.22
		Thru/Right	0.0	A	0.07	0.0	A	0.22
	SB	Left/Thru	0.1	A	0.24	0.1	A	0.09
		Thru/Right	0.0	A	0.24	0.0	A	0.09
	Overall Intersection		**2.3**	**A**	**0.36**	**0.8**	**A**	**0.22**
Mississauga Road/Collector Road F	EB	Left	18.9	C	0.05	15.5	C	0.09
		Thru/Right	14.4	B	0.07	14.8	B	0.07
	WB	Left	14.4	B	0.12	21.4	C	0.10
		Thru/Right	14.0	B	0.04	14.9	B	0.03
	NB	Left/Thru	1.5	A	0.02	1.0	A	0.02
		Thru/Right	0.0	A	0.07	0.0	A	0.20
	SB	Left/Thru	0.8	A	0.02	0.8	A	0.01
		Thru/Right	0.8	A	0.22	0.0	A	0.07
	Overall Intersection		**2.0**	**A**	**0.22**	**1.7**	**A**	**0.20**

Figure 12 2031 Traffic Conditions with NSTC in Place



Legend

Capacity Level Definition

Volume / Capacity Ratio ≥1.00 Over Capacity

0.85 ≤ Volume / Capacity Ratio < 1.0 Approaching Capacity

0.0 ≤ Volume / Capacity Ratio <0.85 Sufficient Capacity

Signalized intersection

Stop Sign

Intersection that is over capacity

Intersection that is approaching capacity

Intersection with sufficient capacity

Link that is over capacity

Link that is approaching capacity

4.1.11 Roundabout Analysis

In order to cope better with the heavy travel demand in the future scenarios, AECOM has completed a separate roundabout analysis at the three key intersections within the study area in an attempt to further investigate the needs of the 6-lane widening of the Mississauga Road. The analyses included the review of the intersections with two-lane roundabouts as the traffic control option. All analyses were conducted with Sidra Intersection 3.2 using the Highway Capacity Manual (Metric) settings.

The conceptual intersection configuration was used along with the same projected traffic volumes, truck percentages and peak hour factors described in earlier sections. Sidra Intersection includes multiple measures of effectiveness, including level of service (LOS) and volume to capacity ratio (v/c) for each approach and the overall intersection. The LOS criteria are summarized in **Table 20**.

Table 20 Intersection Level of Service Criteria

Level of Service	Average Control Delay (Seconds per Vehicle)	
	Signals and Roundabouts	Stop Signs
A	≤ 10	≤ 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55 - 80	> 35 - 50
F	> 80	> 50

Sidra Intersection output tables are attached in **Appendix K** of **Appendix B.1**.

Table 21 summarizes the analysis results in terms of a LOS and v/c for each of the intersections. The scenarios being assessed are as follows:

- **2018** - forecasted 2018 traffic demand with 2-lane roundabouts
- **2031 without NSTC** - 2031 traffic demand as per land use as shown in updated TTMP and as provided by the City of Brampton, 2 lanes roundabouts
- **2031 with NSTC** - 2031 traffic demand as per land use as shown in updated TTMP with the North South Transportation Corridor in place, 2 lanes roundabouts

Table 21 Roundabout Analysis Results

Intersection	Approach	2018				2031 TTMP without NSTC				2031 TTMP with NSTC			
		AM		PM		AM		PM		AM		PM	
		LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c
Mississauga Road & Mayfield Road	NB	B	0.45	B	0.19	B	0.53	B	0.25	B	0.35	B	0.13
	SB	B	0.14	B	0.44	B	0.28	C	0.86	B	0.16	C	0.66
	EB	B	0.34	B	0.56	B	0.42	C	0.79	B	0.34	B	0.60
	WB	B	0.61	B	0.24	D	**0.99**	B	0.55	C	0.84	B	0.56
	All	*B*	*0.61*	*A*	*0.56*	*C*	***0.99***	*B*	*0.86*	*B*	*0.84*	*B*	*0.66*
Mississauga Road & Wanless Drive	N	B	0.60	B	0.22	C	**0.96**	B	0.32	B	0.53	B	0.16
	S	B	0.15	B	0.44	B	0.32	C	0.70	B	0.18	C	0.52
	E	B	0.33	B	0.41	B	0.44	B	0.65	B	0.38	B	0.47
	W	B	0.15	B	0.08	**F**	**1.21**	B	0.63	C	0.68	B	0.64
	All	*B*	*0.60*	*A*	*0.44*	*D*	***1.21***	*B*	*0.70*	*B*	*0.68*	*C*	*0.64*

Intersection	Approach	2018				2031 TTMP without NSTC				2031 TTMP with NSTC			
		AM		PM		AM		PM		AM		PM	
		LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c
Mississauga Road & Sandalwood Pkwy	N	B	0.49	B	0.25	B	0.78	B	0.41	B	0.46	B	0.23
	S	A	0.22	A	0.53	B	0.46	C	0.86	B	0.26	B	0.50
	E	B	0.28	B	0.47	B	0.28	C	0.78	B	0.25	B	0.54
	W	- -	- -	- -	- -	C	0.47	B	0.19	B	0.40	B	0.20
	All	*A*	*0.49*	*A*	*0.53*	*B*	*0.78*	*B*	*0.86*	*A*	*0.46*	*A*	*0.54*

Notes: 1) LOS is for the worst movement for each approach.
2) v/c is for the worst movement for each approach.
3) "All" LOS includes all movements.
4) "All" v/c is for the worst movement in the entire intersection

4.1.11.1 2018 Two-lane Roundabouts

As shown in **Table 21** in year 2018 with two-lane roundabouts as the traffic control, there are no operational issues for any peak hour movements at any of the intersections. All movements operate at level of service B or better throughout the day.

4.1.11.2 2031 TTMP Scenario with Two-lane roundabouts – Without NSTC

As shown in **Table 21**, under the 2031 TTMP scenario, with two-lane roundabouts as the traffic control in the corridor, most of the movements operate at an acceptable level of service throughout the day.

Sandalwood Parkway - all movements operate at level of service C or better throughout the day.

Wanless Drive – with the assumption that right turn bypass lanes are in place in northwest, southwest and southeast quadrants, the north and west approaches will experience long delays during the AM Peak hour. The west approach is expected to operate at a v/c ratio of 1.21 which is beyond the capacity and at level of service F. This intersection will experience delays during peak periods due to high directional flows. During the AM peak hour, the west approach is expected to experience 95th percentile queues of approximately 270 meters. Although the north approach is projected to operate with a high v/c ratio (0.96), the delays are manageable (LOS C) and the queues are reasonable (95th percentile queues will be approximately 140 m). During the PM peak hour, all movements operate at level of service C or better.

Mayfield Road - experiences delay during AM peak period due to high north-south directional flow. Assuming a right turn bypass lane is in place in northwest quadrant, the west approach is expected to experience 95th percentile queues of approximately 175 meters during the AM peak hour, with manageable delays at level of service D. The overall intersection will operate at level of service C in the AM peak hour and level of service B in the PM peak hour.

4.1.11.3 2031 TTMP Scenario with Two-lane roundabouts – With NSTC

As shown in **Table 21**, with two-lane roundabouts as the traffic control in the corridor and with the same assumptions of the right turn bypass lanes in place as the previous section, all of the movements operate at an acceptable level of service throughout the day. All movements at all intersections operate well throughout the day at level of service C or better and v/c ratio at 0.84 or better.

4.1.12 Traffic Analysis Conclusion

4.1.12.1 Midblock Link Volume to Capacity Assessment

Existing (2008) Condition

Both the sections along Mississauga Road from Bovaird Drive West to Mayfield Road are operating with residual capacity, indicating that the current two lane section of Mississauga Road is sufficient to accommodate existing traffic volumes.

2018 Horizon Year

Do Nothing

In 2018 and without improvement, the traffic demand in the peak direction (i.e., southbound during the AM Peak and northbound during the PM peak) along the section of Mississauga Road between Bovaird Drive West and Mayfield Road will significantly exceed the available capacity; therefore, one lane per direction is not sufficient for the 2018 traffic demand along Mississauga Road between Bovaird Drive West and Mayfield Road.

With Improved Road Network

With Mississauga Road widened to 4-lanes, all the sections along Mississauga Road within the study limit are expected to operate with residual capacity during both the AM and PM peak period except the sections between Bovaird Drive West and Sandalwood Pkwy Extension, where the 4-lane capacity will be insufficient to accommodate traffic demand for the horizon year 2018.

2031 Horizon Year

Do Nothing

In year 2031 and without road improvement, the traffic demand in the peak direction (i.e., southbound during the AM Peak and northbound during the PM peak) along the section of Mississauga Road between Bovaird Drive West and Mayfield Road will significantly exceed the available capacity; therefore, one lane in each direction will not be sufficient to accommodate the anticipated traffic demand in 2031.

With Improved Road Network and without the North South Transportation Corridor (NSTC)

Based on the future 2031 traffic analysis, without the proposed North South Arterial Road in place, six traffic lanes will be required for Mississauga Road between Bovaird Drive West and Sandalwood Parkway Extension. Under this condition, 4 lanes on Mississauga Road between Sandalwood Parkway Extension and Mayfield Road will be able to accommodate the expected traffic volumes. The road section between Sandalwood Parkway and Wanless Drive will reach its capacity with 2031 traffic volume. As such, close monitoring will be required for this section beyond 2031.

With Improved Road Network and with the North South Transportation Corridor (NSTC)

With the reduced traffic along Mississauga Road, it is anticipated that 6-lanes from Bovaird Drive West to Sandalwood Parkway Extension and 4-lanes from Sandalwood Parkway Extension and Mayfield Road will be able to accommodate the expected future traffic demand for the horizon year 2031.

4.1.12.2 Intersection Operations

Existing Condition

Under the existing traffic conditions, signalized intersection of Mississauga Road/Mayfield Road operates at good levels of service during both weekday AM and PM peak hours. Although the overall delay and

level of service at the intersection of Mississauga Road/Bovaird Drive West is satisfactory (LOS D and LOS C) during both the AM and PM peak hours of operation, some delays and poor levels of services are experienced at some movements due to the heavy westbound/eastbound traffic along Bovaird Drive West.

The unsignalized intersection of Mississauga Road/Wanless Drive operates well as indicated by the average delay, with residual capacity for each movement during both weekdays AM and PM peak hours.

2018 Horizon Year

Do Nothing

In 2018 and without improvement, many of the individual turning movements at the intersections of Mississauga Road/Bovaird Drive West for PM peak hour and Mississauga Road/Sandalwood Parkway for both the AM and PM peak hours are expected to exceed the desired level of service resulting in overall level of service F. Although some of the movements at the other two signalized intersections are expected to either operate at or over capacity or experience long delays, overall both intersections are expected to operate at a level of service E or better during the AM and PM peak hours of operations.

Although some of the individual movements at the unsignalized intersections are expected to experience long delays resulting in level of service F, the overall delay at these intersections will be within the acceptable operating conditions.

With Improved Road Network

With the improved road network all the signalized intersections are expected to operate at an overall Level of Service C or better except for the Mississauga Road/Bovaird Road West intersection, where some movements experience longer delays with poor LOS. All the unsignalized intersections are expected to experience acceptable delay and levels of services, resulting in good operating conditions.

The proposed lane configuration is shown in **Figure 8**.

In addition, based on the Exposure Index calculation, grade separating the existing level railway crossing is warranted from a transportation safety perspective.

2031 Horizon Year

Do Nothing

Under the 2031 future traffic and without improvements to Mississauga Road, the signalized intersections within the study area are expected to operate at an unsatisfactory level of service and operating conditions, and experience significant delays during the peak hours.

Due to high traffic volumes along Mississauga Road, the movements at the intersecting roadways will experience long delays resulting in an unsatisfactory operating condition at the unsignalized intersections.

With Improved Road Network and without the North South Transportation Corridor (NSTC)

Under the future 2031 traffic condition with the improved road network all the signalized intersections (except the intersection of Mississauga Road/Bovaird Drive West) are expected to operate at level of service D or better.

Some of the individual movements at the unsignalized intersection of Mississauga Road at Collector Road C, Buick Boulevard and Collector Road F are expected to experience long delays during the AM and PM peak hours of operation.

It is suggested that close monitoring of future traffic volumes be continued at these three unsignalized intersections and traffic warrant analysis should be revised to reflect the change in future traffic volumes (if any); where signalization would improve the operation of these intersections.

The intersection of Mississauga Road and Bovaird Drive West is expected to continue to operate at a poor level of service during the AM and PM peak hours of operation. In order to accommodate the anticipated traffic volumes at this intersection, improvements assumed at this intersection includes three through lanes in both the northbound and southbound direction in addition to three through lanes in the eastbound and westbound directions, as per the TMP recommendations.

The proposed lane configurations in year 2031 assuming NSTC not in place is shown in **Figure 11**.

Roundabout Configuration without the North South Transportation Corridor (NSTC)

With two-lane roundabout option, the intersections will improve in the following level of service:

Mississauga Road & Mayfield Road – overall levels of service will not be improved.

Mississauga Road & Wanless Drive – overall levels of service will not be improved.

Mississauga Road & Sandalwood Parkway – improve from overall level of service C during both AM and PM peak hours to overall level of service B for both peak hours in the roundabout option.

With Improved Road Network and with the North South Transportation Corridor (NSTC)

With North South Transportation Corridor in place and improved lane configurations as shown on **Figure 12** all the signalized intersections within the study limit are expected to operate at good level of service C or better with the exception at the intersection of Mississauga Road/Bovaird Drive West, which will still have capacity deficiencies and will experience long delays.

All unsignalized intersections in the study area, with future traffic demand for the horizon year 2031 (NSTC in place) and improved lane configurations, are expected at excellent levels of services.

Roundabout Configuration with the North South Transportation Corridor (NSTC)

An alternative to widening Mississauga Road from four to six lanes from Bovaird Drive West to Sandalwood Parkway Extension is to consider a two-lane roundabout option. With the roundabout option the intersections will improve in the following level of service:

Mississauga Road & Mayfield Road – improve from overall level of service C in AM Peak hour to level of service B.

Mississauga Road & Wanless Drive – overall levels of service will not be improved.

Mississauga Road & Sandalwood Parkway – improve from overall level of service C during the AM peak hour to level of service A and improve from overall level of service B during the PM peak hour to level of service A.

4.2 Socio-Economic Environment

The following sections describe the project study area, including its existing and future land uses, social/cultural and terrestrial and aquatic environmental features. Planning considerations are also presented. This information was considered when reviewing the potential effects of alternative planning solutions and design concepts.

4.2.1 Existing Land Uses

Exiting land uses within the study area can be described as primarily rural/agricultural, open space that is now emerging as urban. Agricultural uses include several noteworthy farms as well as cash crop and livestock farming operations. Other land uses include single family residences (approximately 20 residential dwelling units), commercial

(e.g., Norval Farm Supply) and institutional (e.g., Peel Region Police Association). Refer to **Figure 13** for the existing land uses.

Currently, there are few major employers, cultural facilities or tourist attractions in the area; however, this will change as lands become developed based on the City's Official Plan and Secondary Plans. Lands east of Creditview Road are quickly transitioning from agricultural/open space to urban area, based primarily on residential and other urban uses. As of 2012, development has been initiated on the east side of Mississauga Road from north of the CNR to Wanless Drive.

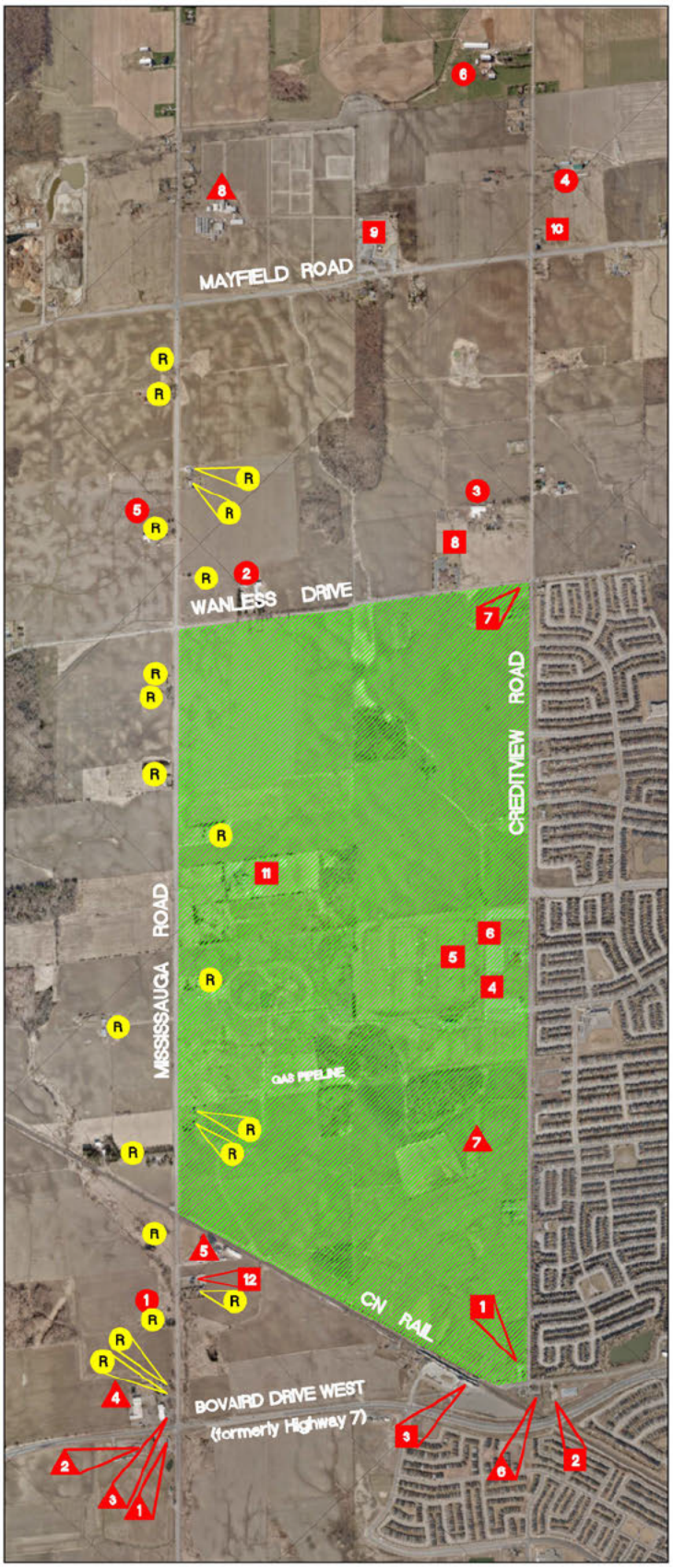
4.2.2 Future Land Uses

The Region of Peel, City of Brampton, and Town of Caledon Official Plans are used to guide future land use. **Figure 14** illustrates future land uses on the east side of Mississauga Road based on the approved City of Brampton Mount Pleasant Secondary Plan (does not illustrate future grade separation, which was discussed and accepted by the City). Lands on the west side of Mississauga Road will be developed through the Heritage Heights Community Secondary Plan which includes Secondary Plan Areas 52 (Huttonville North) and 53 (Mount Pleasant West), collectively referred to as the "Heritage Heights Community (see **Figure 15**). In support of the secondary plan, the City has initiated the following Phase 1 studies:

- A subwatershed study and landscape scale analysis update;
- A transportation master plan;
- A servicing and infrastructure study; and
- An employment implementation study.

Other components include a shale resource update, a community visioning study and working collaboratively with the Heritage Heights Landowners' Group, agencies and other stakeholders to develop a framework plan for Heritage Heights.

The City is currently considering a private application to amend the City of Brampton's Official Plan (OP) and Zoning By-Law and a private application to amend the Region of Peel's Official Plan to facilitate the development of a regional retail centre, office, hotel, multiple housing and related community uses, at the northwest quadrant of Mississauga Road and Bovaird Drive West in the "Heritage Heights Community". No approved secondary plan is in force for the subject lands as the City is proposing a draft OP Amendment that identifies the Osmington lands as a "Special Policy Area" in the Brampton OP and adds these lands into the Mount Pleasant Secondary Plan (Area 51). The purpose of the Special Policy Area is to establish specific criteria to guide the processing of a development application for the subject lands in absence of an approved secondary plan for the lands west of Mississauga Road, referred to as the Heritage Heights Community.



AERIAL PHOTOGRAPHY 2009

LEGEND

NOTEWORTHY AGRICULTURAL OPERATIONS

1 CRAWFLYN FARMS
2 ONTARIO CENTURY FARM
3 MISTY MORNING MEADOWS
4 FRADOL FARMS
5 FARM OPERATION
6 FARM OPERATION

BUSINESSES

1 PETRO CANADA GAS STATION
2 OLD PRO DRIVING RANGE
3 APPLE FACTORY
4 ROYAL LEPAGE OFFICE
5 NORVAL FARM SUPPLY (TO BE REDEVELOPED)
6 BECKFORD'S MOTEL
7 ABSOLUTE ANGELS CHILD DEVELOPMENT CENTRE
8 PIONEER SEED (DUPONT CANADA)

COMMUNITY FEATURES

1 CANADIAN REFORMED CHURCH OF BRAMPTON
2 FAITH GOSPEL TABERNACLE
3 MOUNT PLEASANT GO STATION
4 BRAMPTON LIBRARY
5 SPORTS FIELDS (SOCCER, LACROSSE AND FOOTBALL)
6 BRAMPTON FIRE & EMERGENCY SERVICES
7 PIONEER CEMETERY
8 CHURCH OF JESUS CHRIST OF LATERDAY SAINTS
9 ALLOA PUBLIC SCHOOL
10 HOME UNITED CHURCH
11 REGION OF PEEL POLICE ASSOCIATION
12 GURU GRANTH SAHIB ACADEMY

RESIDENCE

LANDS CURRENTLY UNDER DEVELOPMENT

0 250 500 750m

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT STUDY

MISSISSAUGA ROAD IMPROVEMENTS FROM NORTH OF BOVAIRD DRIVE TO MAYFIELD ROAD

FIGURE 13
EXISTING STUDY AREA LAND USES

Region of Peel
Working for you

AECOM

DWG NAME: L:\ET\work\105000\105163 – Mississauga Road EA (Markham)\02a–CAD\Mount Pleasant\Figure 14_Existing Study Area Land Uses.dwg Dec 13/12 10:50am bolanj

Figure 14 Future Study Area Land Uses

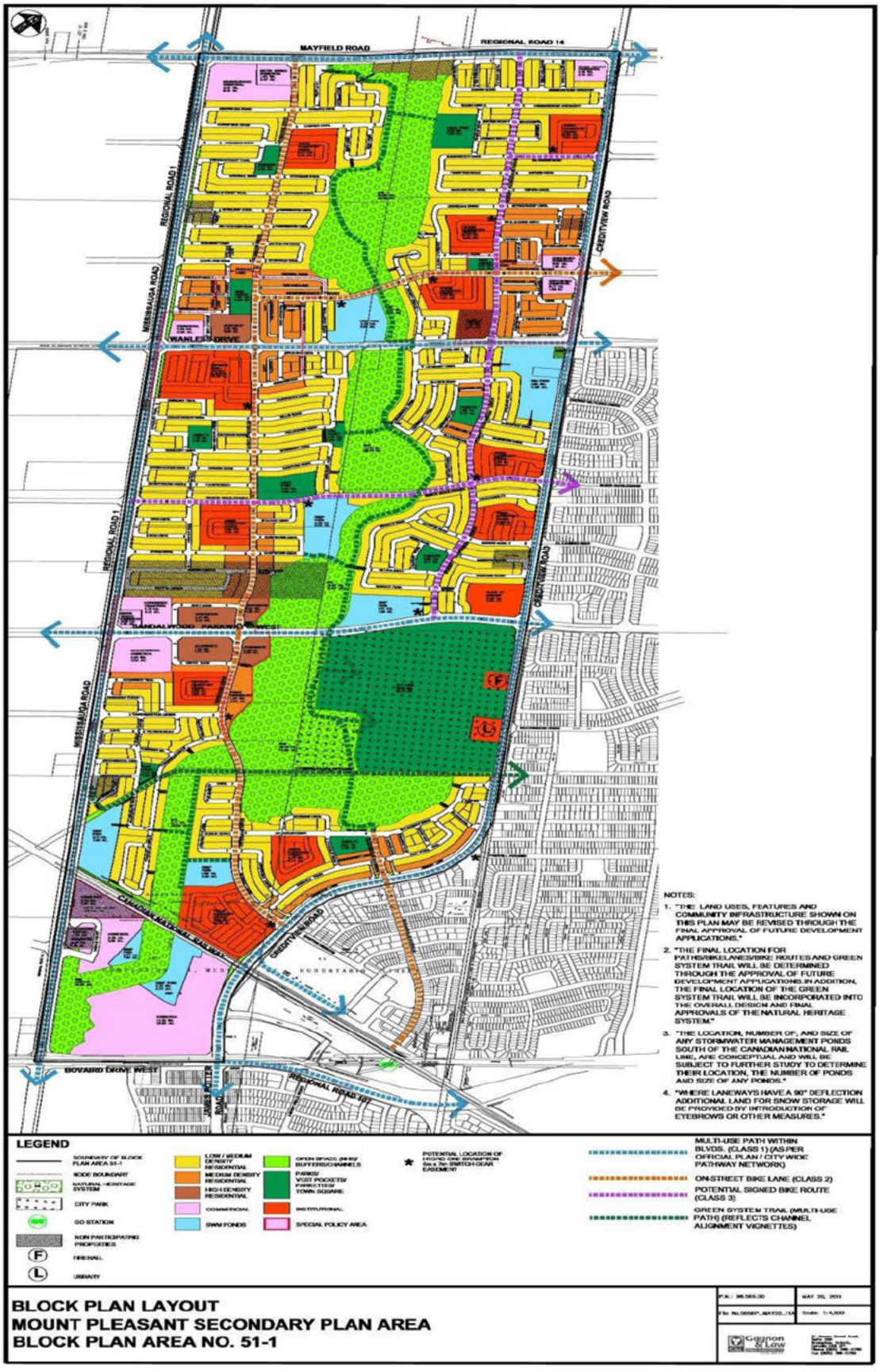


Figure 15 Heritage Heights Community (Areas 52 & 53) Secondary Plan

4.3 Cultural Environment

4.3.1 Archaeological Assessment

In May 2007, Archaeological Services Inc. (ASI) completed a Stage 1 Archaeological Assessment for the Region of Peel Alloa Reservoir, Pumping Station and Feedermain Municipal Class EA[13]. The study area limits for the Alloa Feedermain Class EA included the Mississauga Road corridor from Bovaird Drive West to Mayfield Road which allowed for the Stage 1 Archaeological Assessment to be used for this study. The Stage 1 assessment identified areas of archaeological resource potential within the corridor and subsequently recommended a Stage 2 assessment for those areas.

The Region of Peel co-ordinated the Stage 2 Archaeological Assessments along Mississauga Road to ensure that the Stage 2 work covered the entire future Mississauga Road right of way up to the future Sandalwood Parkway road right of way and captured all planned infrastructure (e.g., Alloa feedermain, sewers and watermains). Based on Stage 2 findings, a small area located on the west side of Mississauga Road, north of the CNR, will be subject to a Stage 3 Archaeological Assessment, which is to be completed at detailed design.

The Stage 3 work will be completed in conjunction with remaining Stage 2 work (north of Sandalwood Parkway to Mayfield Road), which is to be completed at detailed design.

Refer to **Appendices C.1** for the Stage 1 and 2 Archaeological Assessment Reports.

4.3.2 Built Heritage and Cultural Landscape Assessment

In May 2007, ASI also completed a Built Heritage and Cultural Landscape Assessment for the Alloa Reservoir, Pumping Station and Feedermain Municipal Class EA. The assessment confirmed that there are 7 built heritage features consisting of farms and farm houses along the Mississauga Road corridor. There are 6 cultural landscape features spanning Mississauga Road (from Bovaird Drive West to Mayfield Road) which includes farm complexes and a roadscape (i.e., CN Rail).

Refer to **Appendix C.2** for the Built Heritage/Cultural Landscape Report.

4.4 Natural Environment

A Natural Heritage Assessment was completed for this study in August 2008. The assessment was conducted between 20 – 30 metres proximity to Mississauga Road and was focused on the terrestrial and aquatic environments.

The following briefly describes the methods used for the natural heritage assessment:

- **Terrestrial Methods** – Combination of Rapid Assessment Ecological Land Classification (ELC) delineation following the guidelines outlined by Ministry of Natural Resources (Lee et al., 1998) for the description of vegetation communities over 0.5 ha in size; documentation of individual tree/shrub surveys of trees which occurred within proximity to the road proposed right-of-way; and a comprehensive floral species list. Information collected for each tree included; species, diameter at breast height (DBH), health and location.
- **Aquatic Methods** – Comprised of a background information review of data and mapping from the Credit Valley Conservation Authority and Ministry of Natural Resources. Field investigations were conducted at every CVC regulated watercourse crossing and drainage crossing which included

[13] *Source: Alloa Reservoir, Pumping Station and Feedermain Municipal Class Environmental Assessment: Environmental Study Report – Appendix F, Region of Peel, December 2008.*

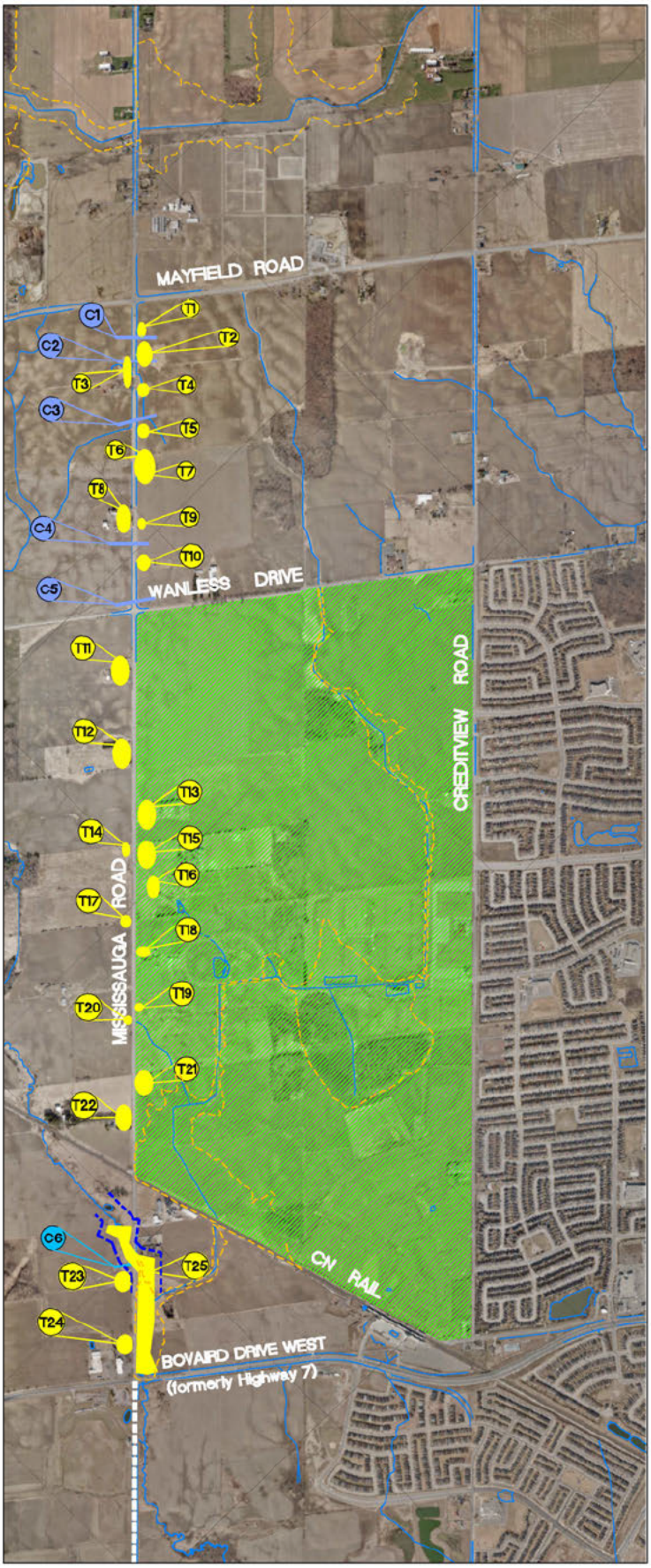
habitat assessments with observations pertaining to channel morphology (i.e., channelized or natural), fish presence/absence, and water conveyance status (i.e., permanent, intermittent, seasonal), as well as habitat features such as substrate, wetted width and riparian cover.

- Aquatic field investigations were also conducted in 2011 at the area of Huttonville Creek where the most significant watercourse crossing is proposed. This consisted of reconnaissance-level site investigations to confirm existing conditions.

Figure 16 illustrates terrestrial and aquatic features described below. Refer to **Appendix C.3** for ecological investigations and impact assessment.

4.4.1 Trees and Vegetation

The major terrestrial feature along the Mississauga Road corridor consists of active agricultural corn/soya fields. No major woodland or wetlands, greater than 2 hectares (ha), are within 20 – 30 metres of the road allowance. Along the corridor there are also several stands of planted trees most of which relate to residential properties and driveways. Vegetation communities associated with the riparian zone of all the watercourses/water conveyance channels were present. Dominant species consisted of emergent grasses such as reed canary grass and cattails. Riparian vegetation associated with water conveyance systems either consisted of a very small patch at the culverts or were only constrained to the channels themselves. Riparian vegetation associated with Huttonville Creek consists of poplar, willow and ash trees with hawthorn, dogwood shrubs and emergent grasses.



LEGEND

- FLOODLINE
- 30m RIPARIAN HABITAT
- WATERCOURSE
- LIMITS OF VEGETATION UNITS
- T# VEGETATION UNIT NUMBER
- C# REGULATED WATERCOURSE CROSSING NUMBER
- C# DRAINAGE CROSSING NUMBER
- LANDS CURRENTLY UNDER DEVELOPMENT

0 250 500 750m

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT STUDY

MISSISSAUGA ROAD IMPROVEMENTS FROM NORTH OF BOVAIRD DRIVE TO MAYFIELD ROAD

FIGURE 16
TERRESTRIAL AND AQUATIC FEATURES
(REFER TO APPENDIX C FOR A DESCRIPTION OF EACH FEATURE)

Region of Peel
Working for you

AECOM

4.4.2 Fisheries and Aquatic Ecosystems

The field observations revealed a total of two water crossings that are regulated by CVC and five drainage crossings (not regulated by CVC). Huttonville Creek is the primary watercourse in the study area and runs parallel along the east and west side of Mississauga Road north of Bovaird Drive West. This section of Huttonville Creek recently received habitat improvements (part of a Department of Fisheries and Ocean Authority action). Field investigations confirmed the presence of fish habitat however, the overall aquatic habitat availability was considered to be poor for the majority of the water crossings, the exception being Huttonville Creek. Fish habitat was observed at one of the crossings at Huttonville Creek which had the best quality fish habitat in the study area. The field investigations also revealed typical riffle/pool sequencing with evidence of dramatic water level variation (i.e., bare banks and trapped debris) over 1 metre above current water levels.

In reconnaissance level fish sampling during August 2008 Blacknose Dace, Creek Chub and Brook Stickleback were caught in Huttonville Creek. In the Credit Valley's Subwatershed Study completed in January 2004, additional species sampled in the reach upstream included White Sucker, Fathead Minnows and Redside Dace, an endangered species (ESA, 2007).

As input to the evaluation of Huttonville Creek water crossing design concepts, Redside Dace protected habitat areas were defined and mapped. They can be found in **Appendix C.3.**

4.4.3 Huttonville Creek Meander Belt Assessment

A meander belt assessment of Huttonville Creek at Mississauga Road was completed in May 2010 to characterize the local fluvial geomorphology of Huttonville Creek, identify its trends and rates in lateral and down-valley erosion, and establish its meander belt boundaries.

In the area of Mississauga Road, Huttonville Creek exhibits a sinuous to irregularly meandering pattern within a mostly unconfined, shallow valley setting on both sides of Mississauga Road. Channel adjustment occurs through progressive bank erosion, as opposed to meander cut off, predominately through down-valley meander migration. The existing culvert through which Huttonville Creek flows beneath Mississauga Road is approximately 4 metres wide.

Based on the results of this study, a replacement crossing structure with an open span of at least 9.5 metres is required to accommodate fluvial processes, including channel migration, within the expected lifespan of the structure. Refer to **Appendix C.4** for the Meander Belt Study.

4.4.4 Federally, Provincially, Regionally and/or Locally Significant Features

Based on observed declines and threats to remaining populations, the Redside Dace was uplisted to endangered in 2009 under Ontario's *Endangered Species Act*, 2007 (ESA, 2007), Redside Dace was assessed as endangered in Canada by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in April 2007. The Redside Dace is currently being considered for listing as endangered under the federal *Species at Risk Act (SARA).*

There were no other provincially significant features observed within the study area. The regionally/locally recognized features and species found within the study area consists of the wetland communities surrounding Huttonville Creek as identified on Schedule 'D' of City of Brampton's Official Plan as "Other Wetland" (October 2006).

Considering the above, the MNR accordingly recommended the project team review the use of alternative crossings of Huttonville Creek in an attempt to avoid contravention of the ESA, and to demonstrate that reasonable alternatives have been considered, including alternatives that would not adversely affect the Redside Dace and the protected habitat.

4.5 Surface Water and Stormwater Management

A stormwater management assessment was completed for the Mississauga Road corridor and recommended the following to address the control of stormwater quantity, quality and downstream erosion:

North of Wanless Drive

- For interim conditions (initial 4 lanes from Sandalwood to Mayfield), storm sewers will discharge to oil grit separators and enhanced swales upstream of storm outlets. The enhanced swales will be constructed within the ultimate right-of-way. The additional road imperviousness will result in slightly higher flow to the storm outlets used; this will be mitigated by storage in the enhanced swales; and,
- For ultimate conditions (6 lanes), the enhanced swales will be removed. Storm sewers servicing future development west of Mississauga Road will pick up Mississauga Road storm sewers, and water quality treatment will be provided in future downstream stormwater management facilities west of Mississauga Road.

South of Wanless Drive

- An oil grit separator will receive Mississauga Road drainage from the high point south of Wanless Drive, draining northward to Wanless Drive;
- From the high point south of Wanless Drive, storm drainage will be conveyed to a stormwater management pond constructed by development on adjacent lands east of Mississauga Road, which will provide quality, erosion, and quantity control. Drainage will be conveyed from the low point on Mississauga Road (just north of the future CN overpass) to the pond via a developer constructed storm sewer conveying 100-year flows; and
- Two additional oil grit separators, with an enhanced swale required for the Mississauga Road drainage south of the CN rail crossing, will be located just north of Bovaird Drive West.

The above strategies have been captured in the preliminary design for Mississauga Road.

Refer to **Appendix C.5** for more details.

4.6 Noise

A noise assessment was completed and concluded that the proposed Mississauga Road widening is expected to have a negligible noise impact on existing noise sensitive areas according to the MOE/MTO Protocol Assessment. Therefore, no noise mitigation measures are recommended for this project.

Refer to **Appendix C.6** for the noise assessment report.

4.7 Air Quality

An air quality assessment was completed and concluded that efficient traffic management at the intersections of Mississauga Road and Mayfield Road and Mississauga Road and Bovaird Drive West is essential in order to moderate the most significant impacts resulting from the anticipated increase in traffic within the study area. Overall, air quality will meet MOE Guidelines and no adverse effects are associated with the proposed road improvements.

Refer to **Appendix C.7** for the air quality assessment report.

4.8 Geotechnical/Hydrogeological

The surficial geology of the project area consists of Halton till of silty clay to silty sand texture over bedrock of the Queenston Shale Formation. Interbedded within the till at random locations and of viable thickness are cohesionless granular deposits.

Fourteen (14) boreholes were drilled in August 2008. Of the 14 boreholes, one (1) was dry upon completion of drilling while the others encountered water at some depths. During construction, it is anticipated that dewatering will be required and further hydrogeological investigations may be required to determine the amount of dewatering. This particularly applies to the area around the Huttonville Creek.

Refer to **Appendix C.8** for the geotechnical/hydrogeological report.

4.9 Existing and Future Infrastructure/Utilities

Utilities along Mississauga Road include Bell Canada, Hydro One, Rogers Cable, Enbridge Gas and TransCanada pipelines.

There is a TransCanada high pressure natural gas pipeline crossing Mississauga Road north of the CN Rail line. TransCanada is proposing to extend the existing pipeline with a 10 metre easement to accommodate future improvements to that line. TransCanada has stipulated a requirement that the agency needs to review proposed development within 200 metres of the pipeline so that the safety and integrity of the facility is not impacted.

Apart from the new storm sewers that will be provided with the reconstruction and urbanization of Mississauga Road, the Region of Peel will be constructing a sanitary sewer (1200mm diameter) and two watermain pipes (1200mm and 600mm diameter) on Mississauga Road as a separate undertaking under the Region's Water and Wastewater Capital program.

As outlined under Section 2.2.6.1, Brampton Hydro One will be placing temporary and permanent hydro poles on the east side of Mississauga Road. These poles will be placed in advance of the Mississauga road improvement and only the temporary poles will require relocation to a new permanent location with the road reconstruction and construction of the railway grade separation. In addition, existing overhead lines with the hydro easement within the railway corridor will require undergrounding within the limits of the Mississauga Road right-of-way. Cost sharing for the relocation of hydro utilities will be initiated between the Region and the respective hydro utility company during detail design.

Although CNR has no requirement for additional track for their own operations in the Halton Subdivision Corridor, provisions have been incorporated in the proposed General Arrangement for the grade

separation at the rail crossing to protect for two additional future GO Transit rail lines. This is further discussed in Section 11.6.

4.9.1 Mississauga Road Widening South of Bovaird Drive West Class EA Study

A Class Environmental Assessment study was completed in 2006 for the widening of Mississauga Road (from Queen Street West to Bovaird Drive West) from 2 lanes to 4 lanes. Construction of this portion of Mississauga Road commenced in 2010 and is anticipated to be completed by the end of 2014, which also includes construction of a watermain and trunk sewer.

4.9.2 Bovaird Drive West Widening Class EA

The Region of Peel is currently completing a separate Class EA for the widening of Bovaird Drive West from Lake Louise Drive/Worthington Street to 1.45km west of Heritage Road, including the Mississauga Road intersection. This project was also co-ordinated with PIC # 2. It is anticipated that the Environmental Study Report will be filed for public review by early 2013.

4.9.3 Future Sandalwood Parkway Extension

In 2010, the City of Brampton completed a Class EA for the extension of Sandalwood Parkway from Creditview Road to Mississauga Road. The preferred alternative recommends the extension of Sandalwood Parkway from Creditview Road west to Mississauga Road within a 36 metre ROW comprising of 2 travel lanes in each direction. The preferred alternative for the extension of Sandalwood Parkway also includes a sidewalk and multiuse path.

Planning for the future extension has been incorporated within the planning for roadway improvements for Mississauga Road.

Sandalwood Parkway between Creditview Road and Mississauga Road will be constructed by Block 51-1 Developers (Mattamy and Northwest Brampton Development). Subject to ongoing discussions between the City of Brampton, the Region of Peel, Block 51-1 Developers and other stakeholders (CVC, MNR), construction of underground works is anticipated to commence in the fall 2012, with road work in 2013.

4.9.4 Future City of Brampton East West Collector Road Class EA

As mentioned earlier, the City of Brampton will be assessing, through a soon to be initiated Class EA, an east to west collector road connecting the Mount Pleasant GO Station to the west side of Mississauga Road with consideration to an alternative intersecting Mississauga Road at the location of the preferred clear span bridge crossing.

4.9.5 Alloa Reservoir, Pumping Station and Feedermain Class EA

In December 2008, the Region of Peel completed a Municipal Class EA for the routing of a proposed 1200-mm diameter feedermain, and siting of a proposed 25 mega litre (ML) reservoir and pumping station. The preferred 1200-mm diameter feedermain alignment will extend northerly on Mississauga Road from an existing feedermain at the intersection of the Mississauga Road and Bovaird Drive West to the new Alloa reservoir and pumping station located on the north side of Mayfield Road in the Town of

Caledon. The proposed works are to be in place by 2014 and will address the water supply servicing demands from future anticipated development in the Northwest Brampton Development Area.

Considering the timing for the Mississauga Road improvements, the Region has decided to coordinate the construction of the feedermain along Mississauga Road with the planned road improvements for Mississauga Road such that potential effects and implications with the road design and construction are avoided.

4.10 Related Planning Studies

There are several studies that have been completed or are currently being carried out by the provincial and regional/local governments. The following sections highlight the significance of these planning studies and their influence on the recommended improvements to Mississauga Road from north of Bovaird Drive West to Mayfield Road.

4.10.1 Places to Grow Plan

The provincial *Places to Grow Act,* approved in June 2005, enables the Province of Ontario to put in place regional growth plans. As part of its membership in the Greater Toronto Area (GTA), the Region of Peel is part of the Greater Golden Horseshoe (GGH) Growth Plan Area, the fastest growing urban area in Canada. In 2006, the Province (former Ministry of Public Infrastructure Renewal) approved its "Growth Plan for the Greater Golden Horseshoe" which set specific population and employment forecasts (25 year planning horizon to year 2031) for upper tier municipalities, as well as prescribed density targets for intensification and greenfield development (i.e., lands currently not urbanized but designated for future urban development).

Provincial Places to Grow Growth Outlook for the Greater Golden Horseshoe forecasted the Region of Peel to grow to 1.49 million by 2021 and 1.64 million by 2031. This represents a 59% growth from the 2001 population of 1.03 million.

According to the *Growth Outlook for the Greater Golden Horseshoe* document released by the Province of Ontario in January 2005, the forecast for the Region of Peel is expected to grow to 1.49 million by 2021 and 1.64 million by 2031. This represents a 59% growth from the 2001 population of 1.03 million and is higher than the Region's currently adopted forecasts used for official plan development charge purposes[14].

To address this future growth, the City of Brampton and Region of Peel have amended their urban service area boundaries to include the Northwest Brampton Future Urban Development Area, which was approved by the Province. The Northwest Brampton Future Urban Development Area consists of about 2,400 ha (6,000 acres) and Mississauga Road from Bovaird Drive West to Mayfield Road is located within the Northwest Brampton Future Urban Development Area.

4.10.2 Provincial Policy Statement

The Provincial Policy Statement (PPS) is issued under the authority of Section 3 of the *Planning Act*. It provides direction on matters of provincial interest related to land use planning and development, and promotes the provincial "policy-led" planning system. The PPS came into effect in 2005 and recognizes the complex inter-relationships among economic, environmental and social factors in planning and embodies good planning principles. It includes enhanced policies on key issues that affect communities such as the efficient use and management of land and infrastructure; protection of the environment and

[14] *Source: Hemson Consulting Ltd. – The Growth Outlook for the Greater Golden Horseshoe, January 2005.*

resources; and ensuring appropriate opportunities for employment and residential development, including support for a mix of uses[15].

Where applicable, the policies related to Transportation Systems and Transportation and Infrastructure Corridors will be incorporated into the generation of planning alternatives and design concepts, particularly designing to accommodate for transit services and facilities in the corridor for future use.

4.10.3 Greenbelt Planning Area

The study area is located outside of the Greenbelt Planning Area; therefore, policies contained in the Greenbelt Plan (Ministry of Municipal Affairs and Housing, 2005) do not apply to this study.

4.10.4 Niagara Escarpment Plan

The study area is located outside of the Niagara Escarpment Plan area; therefore, policies contained in the Niagara Escarpment Plan (Niagara Escarpment Commission, 2006) do not apply to this study.

4.10.5 Region of Peel Official Plan

The Region of Peel Official Plan Office Consolidation (November 2005) designates the lands south of Mayfield Road (City of Brampton), as "Urban System" and "Northwest Brampton Urban Development Area". Lands north of Mayfield Road (Town of Caledon) are designated as "Prime Agricultural Area" and "Rural System" respectively.

The Region's Official Plan Office Consolidation Report also identifies requirements for urban and rural areas are as follows:

- 2 through lanes with 20 to 30 metre ROW;
- 4 through lanes with 30 to 45 metre ROW; and
- 6 through lanes with 36 to 50 metre ROW.

4.10.6 City of Brampton Official Plan

4.10.6.1 Official Plan

The majority of the study area is designated as "North West Brampton Urban Development Area" as per Schedule A of the City of Brampton Official Plan (October 2006). The City of Brampton is currently completing several Secondary Plan exercises and supporting studies for the North West Brampton Urban Area, including:

- East side of Mississauga Road - Mount Pleasant Secondary Plan Area 51 (approved);
- East side of Mississauga Road - Fletchers Meadow Secondary Plan Area 44 (approved); and
- West side of Mississauga Road - Heritage Heights Secondary Plan (study underway).

Specific policies to guide the planning of the North West Brampton and the Mount Pleasant Secondary Plan form part of the planning documents known as ROPA 15 and OP93-245 that were approved by the Ontario Municipal Board in December 2006 expanding the urban boundaries of the Region of Peel and Brampton Official Plans.

[15] *Source: Provincial Policy Statement, 2005.*

4.10.6.2 City of Brampton Development Allocation Growth Management Strategy

The City of Brampton has completed a Development Allocation Growth Management Strategy, which has addressed servicing allocation issues. The 2006 Development Allocation Strategy provides the City with more opportunity to manage growth using a combination of Community Block Planning and an annual development cap. An annual growth target of approximately 5,500 draft units per year is to be primarily implemented through the use of Community Block Planning and applied at the Draft Approval stage of the development process. Each Block Plan will contain a detailed staging and sequencing plan to ensure adequate and timely provision of infrastructure and services such as schools, parks, water and sewer and roads.

Additionally, Community Block Planning will provide the basis for managing direction of growth (annual allocation) based on quality and priority criteria. The Northwest Brampton Area population specifically, is expected to grow from 400 in 2006 to 75,000 people in 2031[16]. Phase 1 urban development will take place within the inverted 'L' formed by the intersection of Mississauga Road and Mayfield Road and has commenced below Wanless Drive between Creditview Road and Mississauga Road.

4.10.7 Town of Caledon Official Plan

At the north end of the study area, lands fronting on the north side of Mayfield Road are within the Town of Caledon municipal boundary. Lands along this corridor are designated as "Agricultural Area" as per Schedule A of the Town's Official Plan (December 2008 Consolidation).

4.10.8 Other Related Planning Studies

Other related planning studies that have been completed for lands within the Mississauga Road study area include the following:

- Mount Pleasant Comprehensive Fish Compensation Plan (2012);
- Mount Pleasant Block 51-1 Environmental Impact Report (2011); and
- Mount Pleasant Secondary Plan for Block 51-1 (2009).

[16] *Source: Presentation on Growth Management and Places to Grow, Brampton Real Estate Board Workshop, November 23, 2006.*

5. Alternative Planning Solutions

5.1 Identification of Alternative Planning Solutions

The Class EA process recognizes that there are many ways of solving a particular problem and requires various alternative solutions to be considered. The six alternative solutions for consideration in this study are described in **Table 22**.

Table 22 Alternative Planning Solutions

Planning Alternative Solutions		Description
Alternative 1	Do Nothing	Maintain the status quo. The transportation system would not change.
Alternative 2	Optimize Existing Infrastructure	Improve the efficiency and safety of the transportation system. Optimize the existing and planned infrastructure through adding auxiliary turn lanes, optimizing signal timings etc.
Alternative 3	Transportation Demand Management (TDM)	Improve the current operation of the transportation system by managing travel demand independent of expanding or constructing new infrastructure (e.g., shift demands to alternative modes of transportation like cycling and walking, carpooling).
Alternative 4	New Transit Services on Mississauga Road	Accommodating new transit services (e.g., reserved bus lanes) on Mississauga Road to help relieve traffic congestion and increase the performance of the transportation network. Requires an urban cross section including curb and gutter and sidewalks for pedestrians.
Alternative 5	Improve Mississauga Road	Reduce congestion, provide grade separation at CN Railway crossing, and improve the performance of Mississauga Road by providing additional capacity. Requires an urban cross section including curb and gutter and sidewalks for pedestrians.
Alternative 6	Hybrid Alternatives	Hybrid elements of Alternatives 2, 3, 4 and 5 with improvements to Mississauga Road (e.g., additional lanes/additional capacity), traffic signal improvements, concrete sidewalks, Multi-Use Path, storm water management, curb/gutter, transit improvements, and providing transportation choices for the commuting public.

5.2 Evaluation Framework and Criteria

An evaluation framework was developed as presented in **Table 23**, including technical considerations and environmental components that address the broad definition of the environment[17] as described in the *Environmental Assessment Act* (*EAA*) and those based on comments received from relevant agencies.

[17] *The Environmental Assessment Act (Section 1.(c)(i) to (vi) defines the "environment" as "air, land, water, plant, and animal life including human life; the social and cultural conditions that influence the life of humans or a community; any building, structure, machine or other device or thing made by humans; any solid, liquid, gas, odour, heat, sound vibration or radiation resulting directly or indirectly from the human activities; or, any part or combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario." This definition of the environment was used and is reflected in the environmental components used in the evaluation.*

Table 23 Evaluation Framework Components

Component	Description
Technical Considerations	Component that evaluates the technical suitability and other engineering aspects of the road network system.
Natural Environmental	Component that evaluates the potential effects on the natural and physical aspects of the environment (e.g., air, land, water and biota) including natural heritage/environmentally sensitive areas.
Social/Economic Environment	Component that evaluates the potential effects on residents, neighbourhoods, businesses, community character, social cohesion and community features, in addition to municipal development objectives.
Cultural Environment	Component that evaluates the potential effects on historical/archaeological and built heritage resources.

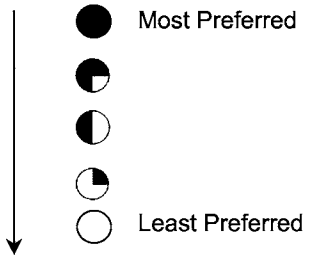
Table 24 presents the evaluation criteria based on the above components used to evaluate the alternative solutions.

Table 24 Criteria for Evaluating Alternative Solutions

Component	Evaluation Criteria
Natural Environmental	• Potential impacts on: – Terrestrial/vegetation species and habitats; – Aquatic/fisheries species and habitats; – Wildlife species and habitats; – Environmentally significant areas/wetlands; and – Air quality impacts.
Social/Economic Environment	• Potential impacts on: – Private properties; – Driveways/accesses; – Agricultural lands and farming operations; – Noise impacts; and – Ability to meet the programmed or approved provincial, regional or local municipal initiatives/Official Plans/Secondary Plans/Transportation Master Plans (Long Range Transportation Plan).
Cultural Environment	• Potential impacts on: – Archaeological resources; – Built heritage features; and – Cultural landscapes.
Technical Considerations	• Engineering characteristics (e.g., horizontal/vertical alignments; cross section); and • Ability to address problem and opportunity statement.

Use of Descriptive Information and Qualitative Evaluation

A detailed assessment of each alternative was completed based on the previously described evaluation components. The evaluation used for this study was not based on a numerical ranking system. To ensure statistical validity, such an approach would have to strictly adhere to statistical methods that are often difficult to apply in a multi-faceted project such as a Municipal Class EA. Instead, a descriptive or qualitative evaluation was used to consider the suitability and feasibility of alternative solutions and design concepts. In this respect, trade-offs considering the advantages or disadvantages of each alternative to address the problem and opportunity statement with the least environmental effects and the most technical benefits will result in a higher priority and forms the rationale for the identification of the preferred solution.



5.3 Evaluation of Alternative Planning Solutions

The following sections provide the highlights of the advantages and disadvantages of the environmental and technical components for each alternative. A comparative evaluation in a matrix format was prepared and is shown in **Table 25** (at the end of the section).

5.3.1 Alternative 1: Do Nothing

This alternative would have no change to the existing conditions along the Mississauga Road corridor and the road would remain as a two-lane arterial road with a rural cross section.

Natural Environment

This alternative would result in no negative effects on the physical environment including the terrestrial and vegetative features as well as on the watercourses in the study area (e.g., Huttonville Creek). With the exception of future urban development, there would not be additional runoff into the flood plain.

Social/Economic Environment

This alternative would not require additional property or impact private property accesses and driveways along the corridor. However, this alternative does not meet the programmed or approved provincial, regional, or local municipal initiatives (e.g., Official Plan, Long Range Transportation Plan, Development Charges Road Program, etc.) that demonstrate the need for additional capacity on Mississauga Road.

Cultural Environment

This alternative would have no impact on archaeological resources, built heritage features, or cultural landscapes since there are no changes to the Region's current right-of-way.

Technical Considerations

This alternative would maintain the existing two lane rural road cross section and would not address the problem and opportunity statement. Maintaining the existing operational and capacity levels on Mississauga Road will cause the road to lose its ability to handle traffic flow demands at acceptable operational level of service. Congested conditions on Mississauga Road are more likely to produce undesirable consequences and generate traffic spill over to adjacent roadways and further reduce intersection level of service, particularly at Bovaird Drive West.

Summary

Although this alternative would have negligible direct effects on the natural, social-cultural and economic environments, this alternative does not address the problem-opportunity statement and could have intangible impacts such as increased congestion, which could lead to the potential increase in air emissions and traffic noise due to idling.

Therefore, this alternative was not carried forward for further consideration.

5.3.2 Alternative 2: Optimize Existing Infrastructure

This alternative would improve the efficiency and safety of the transportation system by optimizing the existing and planned infrastructure through the addition of auxiliary turn lanes and adjustments to the traffic signal timing.

Natural Environment

This alternative would potentially result in relatively minor impacts on known terrestrial/vegetation (e.g., tree removal) outside of the Region's current right-of-way.

Social/Economic Environment

This alternative would have potential impacts on private property as well as temporary disruption during construction to driveways and accesses that are located in proximity to the intersections in order to accommodate auxiliary turn lanes. This alternative does not completely meet the objectives outlined in the programmed or approved provincial, regional, or local municipal initiatives (e.g., Official Plan, Long Range Transportation Plan, Development Charges Road Program, etc.).

Cultural Environment

This alternative may impact archaeological resources, built heritage features, or cultural landscapes since construction would be outside the Region's current right-of-way on undisturbed lands.

Technical Considerations

This alternative would maintain the existing two lane rural road cross section and would not fully address the problem and opportunity statement. Existing infrastructure upgrades (e.g., traffic signals) would only address the short term improvements to Mississauga Road. This type of improvement would not address the long term road capacity issues anticipated from the continued growth in the study area. Further, auxiliary turn lanes and traffic signal improvements do not provide opportunities for improved public facilities (e.g., sidewalks, bike lanes) to promote Active Transportation (e.g., walking, cycling).

Summary

This alternative would have minor effects on the natural, social and economic environments. Technically, this alternative would have a marginal improvement to the congestion issues at the intersections but would not address the capacity issues over the long term (10 – 25 years). Furthermore, this alternative would not provide opportunities for pedestrian facilities or transportation choices other than vehicle use along this corridor.

Therefore, independently this alternative was not carried forward for further consideration.

5.3.3 Alternative 3: Transportation Demand Management (TDM)

This alternative would improve the current operation of the transportation system by managing travel demand independent of expanding or constructing new infrastructure (e.g., shift demands to alternative modes of transportation like cycling and walking, carpooling).

Natural Environment

This alternative would result in potential impacts on known terrestrial/vegetation and watercourses (e.g., Huttonville Creek), species and habitats to accommodate pedestrian facilities (e.g., sidewalks, multi-use path) and commuter parking lots outside of the Region's current right-of-way.

Social/Economic Environment

This alternative would have potential impacts on private property as well as temporary disruption during construction to driveways and accesses to accommodate pedestrian facilities (e.g., sidewalks, multi-use

path) outside of the Region's right-of-way. This alternative would provide users of the road with transportation choices but does not completely meet the objectives outlined in the programmed or approved provincial, regional, or local municipal initiatives (e.g., Official Plan, Long Range Transportation Plan, Development Charges Road Program, etc.).

Cultural Environment

This alternative may impact archaeological resources, built heritage features, or cultural landscapes since construction would be outside the current Region's right-of-way on undisturbed lands.

Technical Considerations

This alternative would maintain the existing rural two lane road cross section. Some of the TDM strategies address components of the problem and opportunity statement especially since these strategies help to reduce the overall traffic volumes Region-wide but would not address the long term road capacity issues anticipated from the continued growth in the study area on its own. This alternative would provide opportunities for improved public facilities (e.g., sidewalks, bike lanes) to promote Active Transportation (e.g., walking, cycling).

Summary

This alternative would have minor effects on the natural, social and economic environments. Technically, this alternative can provide opportunities for transportation choices and pedestrian facilities but would not address the capacity issues over the long term (10 – 25 years).

Therefore, independently this alternative was not carried forward for further consideration.

5.3.4 Alternative 4: New Transit Services on Mississauga Road

This alternative would accommodate new transit services (e.g., reserved bus lanes) on Mississauga Road to help relieve traffic congestion and increase the performance of the transportation network. This would require an urban cross section including curb and gutter and sidewalks for pedestrians.

Natural Environment

This alternative would result in potential impacts on known terrestrial/vegetation and watercourses (e.g., Huttonville Creek), species and habitats to accommodate the additional lanes dedicated for transit located inside and outside of the Region's current right-of-way.

Social/Economic Environment

This alternative would have potential impacts on private property as well as temporary disruption during construction to driveways and accesses to accommodate the additional lanes dedicated to transit services that are outside of the Region's right-of-way. This alternative would provide users of the road with transportation choices but does not completely meet the objectives outlined in the programmed or approved provincial, regional, or local municipal initiatives (e.g., Official Plan, Long Range Transportation Plan, Development Charges Road Program, etc.).

Cultural Environment

This alternative may impact archaeological resources, built heritage features, or cultural landscapes since construction would be outside the Region's current right-of-way on undisturbed lands.

Technical Considerations

This alternative would change the existing rural two lane road cross section to an urban cross section including curb and gutter and sidewalks for pedestrians. Alone this alternative would not address the problem and opportunity statement especially because this section along Mississauga Road is not in the

planning horizon (2011 – 2031) for transit services and strictly a new transit corridor through the study area would be underutilized.

Summary

This alternative would have minor to moderate effects on the natural, social and economic environments. Technically, this alternative can provide opportunities for transportation choices and pedestrian facilities but would not address the capacity issues over the long term (10 – 25 years).

Therefore, independently this alternative was not carried forward for further consideration.

5.3.5 Alternative 5: Improve Mississauga Road

This alternative would reduce congestion, provide grade separation at the CN Railway crossing, and improve the performance of Mississauga Road by providing additional capacity (e.g., new four lane cross section). This would require an urban cross section including curb and gutter and sidewalks for pedestrians.

Natural Environment

This alternative would result in potential impacts on known terrestrial/vegetation and watercourses (e.g., Huttonville Creek), species and habitats to accommodate the additional lanes that are outside of the Region's current right-of-way.

Social/Economic Environment

This alternative would have potential impacts on private property as well as temporary disruption during construction to driveways and accesses but would also result in permanent impacts caused by the relocation of driveways and accesses to accommodate the additional lanes and grade separation of the CN Railway tracks. This alternative satisfactorily meets the objectives outlined in the programmed or approved provincial, regional, or local municipal initiatives (e.g., Official Plan, Long Range Transportation Plan, Development Charges Road Program, etc.).

Cultural Environment

This alternative may impact archaeological resources, built heritage features, or cultural landscapes since construction would be outside the Region's current right-of-way on undisturbed lands.

Technical Considerations

This alternative would improve the horizontal and vertical alignment of Mississauga Road in addition to changing the existing rural two lane road cross section to an urban four lane cross section including curb and gutter and sidewalks for pedestrians. This alternative does address the problem and opportunity statement by widening the road to improve the short and long term traffic congestion issues over the next 10 – 25 years. Furthermore, the improvements to the road platform would allow an opportunity to provide a grade separation at the CN Railway crossing to address the congestion related issues faced at this location. The overall performance of the transportation network would improve with the additional road capacity and the opportunity for improved public facilities (e.g., sidewalks, bike lanes) to promote Active Transportation (e.g., walking, cycling).

Summary

This alternative would have some adverse effects on the terrestrial/vegetation and (e.g., Huttonville Creek), species and habitats in addition to the impacts on the social and economic environments to accommodate the additional lanes that are outside of the Region's current right-of-way. Technically, the overall performance and level of service of Mississauga Road would improve significantly with the additional road capacity and the provision for pedestrian facilities.

Although this alternative meets the problem and opportunity statement this alternative does lack some of the elements and benefits offered in the other alternatives. Therefore, independently this alternative was not carried forward for further consideration.

5.3.6 Alternative 6: Hybrid Alternatives

This alternative would consist of the technical elements contained in Alternatives 2, 3, 4 and 5 including operational and capacity improvements to Mississauga Road (e.g., additional lanes, traffic signal and transit improvements, pedestrian facilities).

Natural Environment

This alternative would have some adverse effects on the terrestrial/vegetation and watercourses (e.g. Huttonville Creek), species and habitats to accommodate the additional lanes, intersection improvements, pedestrian facilities, which are all located inside and outside of the Region's current right-of-way.

Social/Economic Environment

This alternative would have potential impacts on private property as well as temporary disruption during construction to driveways and accesses. It would also result in permanent impacts caused by the relocation of driveways and accesses to accommodate the additional lanes and grade separation of the CN Railway tracks. However, different from the other alternatives is that Alternative 6 meets all of the objectives outlined in the programmed or approved provincial, regional, or local municipal initiatives (e.g., Official Plan, Long Range Transportation Plan, Development Charges Road Program, etc.).

Cultural Environment

This alternative may impact archaeological resources, built heritage features, or cultural landscapes since construction would be outside the Region's current right-of-way on undisturbed lands.

Technical Considerations

This alternative would have the technical advantages of Alternatives 2, 3, 4, and 5 and therefore would completely meet the problem and opportunity statement.

Summary

This alternative would include all of the technical elements and benefits of Alternatives 2, 3, 4 and 5 and therefore carried forward for further consideration.

5.4 Rationale for the Selection of the Preferred Planning Solution

The evaluation process including the various discipline's experience, knowledge and input on the alternative solutions concluded that the preferred solution to solve the current congestion, capacity and operational deficiencies should be a combination of all the alternatives including optimize existing infrastructure (e.g., turning lanes, signal timing), TDM, transit service improvements, and widening Mississauga Road to an ultimate six-lane urban cross section as captured in Alternative 6.

Key features of the Preferred Solution (Alternative 6) include the following:

- Widening Mississauga Road from approximately 300 metres north of Bovaird Drive West to Mayfield Road to a four and/or six lane urban cross section;
- New intersection at Mississauga Road and Sandalwood Parkway;
- Improving the level of service and correcting the intersection operational servicing deficiencies along Mississauga Road;

- Addresses the short and long term traffic congestion issues by providing additional road capacity;
- Improves the flow of traffic at the CN Railway Crossing by constructing a grade separation; and
- Improves streetscape conditions and facilitates alternative modes of transportation by providing supporting infrastructure (e.g. transit stops, sidewalks or multi-use paths).

Table 25 Evaluation of Alternative Solutions

Planning Alternative Solutions		Description	Potential to Address the Problem/Provide an Opportunity with the Least Environmental Impacts and Most Technical Benefits				Evaluation Summary
			Natural[1]	Socio-Economic[2]	Cultural[3]	Technical[4]	
Alternative 1	Do Nothing	Maintain the status quo. The transportation system would not change.	• No impacts on known terrestrial/vegetation, aquatic/fisheries, or wildlife species and habitats. • Increased congestion may cause increased air emissions due to idling. • Potential impacts can be mitigated.	• No impacts on private property. • No temporary disruption to driveways/access. • Driver frustration and travel time delay may increase as a result of traffic congestion and potentially impact business operations (e.g., difficulty entering property). • Does not meet the programmed or approved provincial, regional, or local municipal initiatives (e.g., Official Plan, Long Range Transportation Plan, Development Charges Road Program, etc.) for additional capacity on Mississauga Road.	• No known archaeological resources within the right-of-way. • No impacts on known built heritage and cultural landscape features (e.g., 19th century homes, churches, farm complexes). These features are distant from the right-of-way.	• No change to the horizontal and vertical alignment. • No change to the existing rural two lane road cross section. • Does not address the problem and opportunity statement. Maintaining the existing operational and capacity on Mississauga Road will cause the road to lose its ability to handle traffic flow demands at acceptable operational level of service. • Congested conditions on Mississauga Road are more likely to produce undesirable consequences and generate traffic spill over to adjacent roadways and further reduce intersection level of service, particulalry at Bovard Drive.	• Does not address the Problem and Opportunity Statement. • Despite not having physical impacts on the natural and social environments, this alternative could have intangible impacts such as loss of business due to less favourable access opportunities, increased congestion may cause increased air emissions and traffic noise due to idling. • Technically, this alternative will not address the capacity issues over the next 10 – 25 years nor will it address the operational deficiencies of the road. Therefore, this road will operate at a poor level of service. **Not carried forward for further consideration.**
Alternative 2	Optimize Existing Infrastructure	Improve the efficiency and safety of the transportation system. Optimize the existing and planned infrastructure through adding auxiliary turn lanes, optimizing signal timings etc.	• Potential impacts on known terrestrial/vegetation, aquatic/fisheries, or wildlife species and habitats, especially at the intersections to accommodate auxiliary turn lanes outside of the Region's right-of-way. • Potential impacts can be mitigated.	• Potential impacts on private property at the intersections to accommodate auxiliary turn lanes. • Temporary disruption to driveways/access. • Potential impacts can be mitigated. • Provides limited or no opportunities for additional capacity on Mississauga Road. • Does not completely meet the objectives outlined in the programmed or approved provincial, regional, or local municipal initiatives (e.g., Official Plan, Long Range Transportation Plan, Development Charges Road Program, etc.).	• No known archaeological resources within the right-of-way. • No impacts on known built heritage and cultural landscape features (e.g., 19th century homes, churches, farm complexes). These features are distant from the right-of-way.	• No change to the horizontal and vertical alignment. • No change to the existing rural two lane road cross section. • Does not fully address the problem and opportunity statement. Existing infrastructure upgrades (e.g., traffic signals) will only address the short term improvements to Mississauga Road. This type of improvement will not address the long term road capacity issues anticipated from the continued growth in the study area. • Auxiliary turn lanes and traffic signal improvements do not provide opportunities for improved public facilities (e.g., sidewalks, bike lanes) to promote Active Transportation (e.g., walking, cycling).	• Does not fully address the Problem and Opportunity Statement. • May have minor impacts on the natural and social environments but can be mitigated. • Technically, this alternative will not address the capacity issues over the next 10 – 25 years. Furthermore, there are no opportunities for pedestrian facilities or transportation choices other than vehicle use. **Independently not carried forward for further consideration.**

LEGEND	Most Preferred				Least Preferred	Preferred Alternative

Planning Alternative Solutions		Description	Potential to Address the Problem/Provide an Opportunity with the Least Environmental Impacts and Most Technical Benefits				Evaluation Summary
			Natural[1]	Socio-Economic[2]	Cultural[3]	Technical[4]	
Alternative 3	Transportation Demand Management (TDM)	Improve the current operation of the transportation system by managing travel demand independent of expanding or constructing new infrastructure (e.g., shift demands to alternative modes of transportation like cycling and walking, carpooling).	• Potential impacts on known terrestrial/vegetation, aquatic/fisheries, or wildlife species and habitats to accommodate pedestrian facilities (e.g., sidewalks) and commuter parking lots outside of the Region's right-of-way. • Potential impacts can be mitigated.	• Potential impacts on private property to accommodate pedestrian facilities (e.g., sidewalks) and commuter parking lots outside of the Region's right-of-way. • Temporary disruption to driveways/access. • Potential impacts can be mitigated. • Provides limited or no opportunities for additional capacity on Mississauga Road. • Provides users of the road with transportation choices but does not completely meet the objectives outlined in the programmed or approved provincial, regional, or local municipal initiatives (e.g., Official Plan, Long Range Transportation Plan, Development Charges Road Program, etc.).	• No known archaeological resources within the right-of-way. • No impacts on known built heritage and cultural landscape features (e.g., 19th century homes, churches, farm complexes). These features are distant from the right-of-way.	• No change to the horizontal and vertical alignment. • No change to the existing rural two lane road cross section. • Some of the TDM strategies address components of the problem and opportunity statement. • TDM strategies are good at reducing the overall traffic volumes Region-wide but will not alone address the long term road capacity issues anticipated from the continued growth in the study area. Therefore, in areas where the road results in poor levels of service, additional capacity via road widening is required. • Provide opportunities for improved public facilities (e.g., sidewalks, bike lanes) to promote Active Transportation (e.g., walking, cycling).	• Does not fully address the Problem and Opportunity Statement. • May have minor impacts on the natural and social environments but can be mitigated. • Technically, this alternative can provide opportunities for transportation choices and pedestrian facilities, but will not address the capacity issues over the next 10 – 25 years. **Independently not carried forward for further consideration.**
Alternative 4	New Transit Services on Mississauga Road	Accommodating new transit services (e.g., reserved bus lanes) on Mississauga Road to help relieve traffic congestion and increase the performance of the transportation network. Requires an urban cross section including curb and gutter and sidewalks for pedestrians.	• Potential impacts on known terrestrial/vegetation, aquatic/fisheries, or wildlife species and habitats to accommodate additional lanes for transit and pedestrian facilities (e.g., sidewalks) outside of the Region's right-of-way. • Potential impacts can be mitigated.	• Potential impacts on private property to accommodate transit and pedestrian facilities. • Temporary disruption to driveways/access. • Potential impacts can be mitigated. • Provides no opportunities for additional capacity on Mississauga Road. • Provides users of the road with transportation choices but does not completely meet the objectives outlined in the programmed or approved provincial, regional, or local municipal initiatives (e.g., Official Plan, Long Range Transportation Plan, Development Charges Road Program, City of Brampton Transportation and Transit Master Plan).	• No known archaeological resources within the right-of-way. • No impacts on known built heritage and cultural landscape features (e.g., 19th century homes, churches, farm complexes). These features are distant from the right-of-way.	• No major improvement to the horizontal and vertical alignment. • Change the existing rural two lane road cross section to an urban cross section including curb and gutter and sidewalks for pedestrians. • Does not fully address the problem and opportunity statement. This section along Mississauga Road is not in the planning horizon (2011- 2031) for transit services and strictly a new transit corridor through the study area would be underutilized.	• Does not fully address the Problem and Opportunity Statement. • May have minor impacts on the natural and social environments but can be mitigated. • Technically, this alternative can provide opportunities for transportation choices and pedestrian facilities, but will not address the capacity issues over the next 10 – 25 years. • The Region and City are promoting transit use in urban areas, however this section along Mississauga Road is not in the planning horizon (2011-2031) for transit services and strictly a new transit corridor through the study area would be underutilized. **Independently not carried forward for further consideration.**

LEGEND	Most Preferred				Least Preferred	Preferred Alternative

Planning Alternative Solutions		Description	Potential to Address the Problem/Provide an Opportunity with the Least Environmental Impacts and Most Technical Benefits				Evaluation Summary
			Natural[1]	Socio-Economic[2]	Cultural[3]	Technical[4]	
Alternative 5	Improve Mississauga Road	Reduce congestion, provide grade separation at the CN Railway crossing, and improve the performance of Mississauga Road by providing additional capacity (e.g. new four lane cross section). Requires an urban cross section including curb and gutter and sidewalks for pedestrians.	• Potential impacts on known terrestrial/vegetation, aquatic/fisheries, or wildlife species and habitats to accommodate the additional lanes outside of the Region's right-of-way. • Potential impacts can be mitigated.	• Potential impacts on private property to accommodate the additional right-of-way requirements for additional lanes and pedestrian facilities. • Temporary disruption to driveways/access. • Potential impacts can be mitigated. • Provides opportunities for additional capacity on Mississauga Road. Does not completely meet the objectives outlined in the programmed or approved provincial, regional, or local municipal initiatives (e.g., Official Plan, Long Range Transportation Plan, Development Charges Road Program, etc.).	• No known archaeological resources within the right-of-way. • No impacts on known built heritage and cultural landscape features (e.g., 19th century homes, churches, farm complexes). These features are distant from the right-of-way.	• Improved horizontal and vertical alignment. • Change the existing rural two lane road cross section to an urban four lane cross section including curb and gutter and sidewalks for pedestrians. • Does address the problem and opportunity statement. Widening Mississauga Road will improve the short and long term traffic congestion issues over the next 10 – 25 years and at the CN Railway crossing with the possible grade separation. The overall performance of the transportation network will improve with the additional road capacity. • Provides opportunities for improved public facilities (e.g., sidewalks, bike lanes) to promote Active Transportation (e.g., walking, cycling).	• Does address the Problem and Opportunity Statement. • May have minor impacts on the natural and social environments but can be mitigated. • Technically, this alternative will improve the short and long term traffic congestion issues over the next 10 – 25 years and at the CN Railway crossing with the possible grade separation. The overall performance and level of serive of Mississuaga Road will improve with the additional road capacity. • Provides opportunities for pedestrian facilities. **Independently not carried forward for further consideration.**
Alternative 6	Hybrid Alternatives	Hybrid elements of Alternatives 2, 3, 4 and 5 with improvements to Mississauga Road (e.g., additional lanes/additional capacity), traffic signal improvements, transit improvements, and providing transportation choices for the commuting public.	• Potential impacts on known terrestrial/vegetation, aquatic/fisheries, or wildlife species and habitats to accommodate additional lanes and pedestrian facilities outside of the Region's right-of-way. • Potential impacts can be mitigated.	• Potential impacts on private property to accommodate the additional right-of-way requirements for additional lanes and pedestrian facilities. • Temporary disruption to driveways/access. • Potential impacts can be mitigated. • Provides opportunities for additional capacity on Mississauga Road. Meets all of the programmed or approved provincial, regional, or local municipal initiatives (e.g., Official Plan, Long Range Transportation Plan, Development Charges Road Program, City of Brampton Transportation and Transit Master Plan, etc.)	• No known archaeological resources within the right-of-way. • No impacts on known built heritage and cultural landscape features (e.g., 19th century homes, churches, farm complexes). These features are distant from the right-of-way.	• Improved horizontal and vertical alignment. • Change the existing rural two lane road cross section to an urban four lane cross section including curb and gutter and sidewalks for pedestrians. • Does address the problem and opportunity statement. Widening Mississauga Road will improve the short and long term traffic congestion of the road and at the CN Railway with the possible grade separation as well as the overall performance of the transportation network with the additional road capacity. • Provides opportunities for improved public facilities (e.g., sidewalks, bike lanes) to promote Active Transportation (e.g., walking, cycling). • Provides opportunities for transportation choices other than vehicle use.	• Does address the Problem and Opportunity Statement. • May have minor impacts on the natural and social environments but can be mitigated. • Technically, this alternative will improve the short and long term traffic congestion issues over the next 10 – 25 years and at the CN Railway crossing with the possible grade separation. The overall performance and level of serive of Mississuaga Road will improve with the additional road capacity. • Provides opportunities for pedestrian facilities as well as transportation choices other than vehicle use. **Carried forward for further consideration.**

1. Natural: Potential impacts on terrestrial/vegetation species and habitats; aquatic/fisheries species and habitats; wildlife species and habitats; environmentally significant areas/wetlands; air quality impacts
2. Socio-Economic: Potential impacts on private properties, impacts on driveways/accesses, impacts on agricultural lands and farming operations, noise impacts, ability to meet the programmed or approved provincial, regional, or local municipal initiatives/Official Plans/Seconday Plans/Transportation Master Plans (Long Range Transportation Plan).
3. Cultural: Potential impacts on archaeological resources; built heritage features; cultural landscapes.
4. Technical: Engineering characteristics (e.g., horizontal/vertical alignments; cross section); ability to address problem and opportunity statement.

LEGEND	Most Preferred				Least Preferred	Preferred Alternative

PART C: PHASE 3 OF THE CLASS EA PLANNING PROCESS

6. Alternative Design Concepts of the Preferred Solution

6.1 Identification and Description of Alternative Design Concepts

A series of initial design concepts were developed for the preferred solution at a preliminary level of detail to properly assess the potential impacts and benefits associated with each alternative. The functional designs were generated to a suitable level of detail to illustrate location, general design issues (e.g., alignment, intersection, lane arrangements, utility conflicts, and property impacts) along the entire corridor such that the public and property owners can provide meaningful input on the alternatives.

The alternative design concepts that were developed and evaluated are shown below.

6.1.1 Road Widening Alternatives

The following **Table 26** describes the road widening alternatives.

Table 26 Road Widening Alternatives

Widening Alternatives		Description
Alternative 1	Widen equally from the Centre line	• Shift the existing road alignment of the current Mississauga Road platform equally on both sides with centre median.
Alternative 1	Widen Entirely to the West	• Shift the existing road alignment to the west of Mississauga Road with centre median.
Alternative 3	Widen Entirely to the East	• Shift the existing road alignment to the east of the current Mississauga Road platform with no centre median.
Alternative 4	Widen from the Centreline north of CNR tracks and to the West, south of CNR tracks	• Shift the existing road alignment to the west of Mississauga Road, south of CNR tracks to avoid the most sensitive part of Huttonville Creek. • Shift the existing road alignment of the current Mississauga Road platform equally on both sides with centre median.

The evaluation for the above is presented in Section 7.

6.1.2 Grade Separation Alternatives

The following **Table 27** outlines the grade separation alternatives.

Table 27 Grade Separation Alternatives

Grade Separation Alternatives/Description	
1	Road Over Rail (Overpass) • Provide appropriate structure to span track and slip road requirements and ensure required clearance over railway tracks is provided, including future tracks; • Maintain integrity of hydro service within hydro easement; • Requires slip road to maintain access to existing properties on both the east and west side; • Provide fill embankments on approaches and retaining walls where slope grading restricted; • CNR service is maintained on existing tracks during construction; • Temporary road detour during staged construction; and • CN preferred option.

Grade Separation Alternatives/Description	
2	Road Under Rail (Underpass) • Temporary rail diversion during construction; • Temporary road detour during staged construction; • Access consideration to adjacent properties on both the east and west side; • Requirement for pumping station to address high ground water level and stormwater drainage; • Consideration for adjacent land development and stormwater management; • Maintain functionality of hydro easement; • Consideration for future tracks (GO Transit); and • Provide cut embankments on approaches and retaining walls where slope grading restricted.

The evaluation for the above is presented in Section 8.

6.1.3 Huttonville Creek Crossing Alternatives

After several meetings with the MNR regarding the protection of Huttonville Creek and Species at Risk (Redside Dace habitat), AECOM screened eleven (11) Huttonville Creek Crossing alternatives that included the following range of options and alternatives:

- Do Nothing;
- Extend Existing 4.5m Culvert;
- 9.5m Culvert;
- 45 degree culvert Crossing;
- Skewed culvert Replacement;
- 9.5 – 12 m Elbowed Culvert;
- 14.5m Span Culvert;
- 31m Clear Span Bridge;
- Two Span Bridge (2 x 31m);
- 42m Clear Span Bridge; and
- 55m Clear Span Bridge.

The screening resulted in three Huttonville Creek Crossing alternatives being short listed for evaluation as described in **Table 28**.

Table 28 Huttonville Creek Crossing Alternatives

Huttonville Creek Crossing Alternatives/Description	
1	Do Nothing (existing 4.5 metre culvert) • No improvements-status quo.
2	42 metre Span Bridge • 42 metre clear span required to clear Redside Dace habitat protection area including Creek meander belt; • Requires retaining walls; and • Traffic maintained by staged construction.
3	Open Bottom Concrete Elbowed Culvert, 9.5 metre (inlet) to 12 metre (outlet) • Culvert with elbow to address creek alignment; • Minor realignment of Huttonville Creek at inlet; • Requires retaining walls; and • Traffic reduced to a single lane for both directions (regulated by temporary traffic signals).

The evaluation for the above is presented in Section 9.

7. Evaluation of Road Widening Alternatives

7.1 Evaluation Criteria

Consistent with the approach to evaluate and select the preferred solution, the above alternative design concepts were evaluated against the criteria described below in **Table 29**.

Table 29 Criteria for Evaluating Road Widening Alternatives

Category	Criteria	Criteria Indicators
Engineering	Constructability	• Ability to minimize construction constraints and complexity of construction. • Ability to facilitate phasing requirements.
	Transportation	• Ability to maximize road capacity.
	Overall Safety	• Ability to improve vehicular safety along the corridor.
	Stormwater Management	• Ability to address stormwater within the right-of-way (e.g., water quantity and quality).
	Utility Conflicts	• Ability to minimize adverse effects on utilities located within the Region's right-of-way.
Natural Environment	Terrestrial Features	• Adverse effects on terrestrial species and habitats (i.e. trees, shrubs, vegetation).
		• Potential to enhance local terrestrial communities.
	Aquatic Features	• Adverse effects on Huttonville Creek and other watercourses in the study area.
		• Potential to enhance fisheries and aquatic habitat.
	Drainage	• Ability to minimize infringement into floodplain areas.
Socio-Economic Environment	Property Requirements	• Amount of property required (ha).
	Accessibility to Properties	• Ability to maintain and/or maximize opportunities for improved access to adjacent residential and commercial properties.
		• Ability to accommodate future development.
	Business Operations	• Ability to minimize adverse effects on adjacent business operations. • Ability to maximize opportunities to enhance business attractiveness due to improved access and streetscape features.
	Active Transportation	• Ability to maximize opportunities to provide active transportation facilities (e.g., sidewalks and multi-use trails).

		• Ability to meet pedestrian requirements.
	Noise	• Ability to minimize adverse effects on ambient noise levels after construction (as per the Region's criteria).
Cultural Environment	Archaeological Resources	• Potential for disruption of archaeological resources.
	Built Heritage and Cultural Landscape	• Potential for disruption of built heritage and cultural landscape features.
Cost	Capital and Operating Costs	• Cost of construction and operating costs.

Table 30 presents the evaluation of road widening alternatives including a summary of how expected impacts differ from each alternative. The evaluation of alternatives is based on a matrix that provides brief text describing the evaluation of each alternative against each criterion, supported by color-coding of each cell within the matrix so that the comparative evaluation can be seen at a glance.

7.2 Preferred Road Widening Alternative

The preferred road widening alternative is Alternative 4 widen from the centerline north of the CNR tracks and to the west south of the CNR tracks. Rationale for this alternative includes the following:

- Can accommodate future development;
- Meets pedestrian requirements;
- Least impacts to utilities within the ROW;
- Enhances local terrestrial communities;
- Reduces adverse effects on Huttonville Creek on the west side of Mississauga Road and avoids significant disruption to Huttonville Creek on east side of Mississauga Road;
- Equitable property taking (e.g., same amount from both sides of the road) for majority of road widening, north of CNR tracks; and
- Maximizes road capacity.

Refer to **Appendix D** for plan and profile drawings.

Table 30 Evaluation of Road Widening Alternatives

Category	Criteria	Criteria indicators	Alternative 1 Widen to the West		Alternative 2 Widen from the Centreline		Alternative 3 Widen to the East		Alternative 4 (Hybrid) Widen from the Centreline (North of CNR) and to the West (South of CNR)	
Engineering	Constructability	Ability to minimize construction constraints and complexity of construction.	• Minor traffic disruption associated with widening the road can be expected. • Opportunities for construction staging can be provided (i.e., keep 2 lanes operational during construction).	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕
		Ability to facilitate phasing requirements.	• Opportunities to accommodate phasing requirements (2 to 4 lanes) with minimal impact on road operations and adjacent right-of-way features can be provided.	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕
	Transportation	Ability to maximize road capacity.	• Provides a 6 and 4 lane configuration from north of Bovaird Drive West to Mayfield Road.	●	• Same as Alternative 1.	●	• Same as Alternative 1	●	• Same as Alternative 1.	●
	Overall Safety	Ability to improve vehicular safety along the corridor.	• Overall safety of the road is improved by the additional road capacity thereby minimizing conflict points. However, typical conflicts at intersections can be expected (i.e., rear end accidents).	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕
	Stormwater Management	Ability to address stormwater within the right-of-way (e.g., water quantity, water quality).	• Offers the best opportunities to manage stormwater flows within the proposed right-of-way since a wider landscaped boulevard on the east side of the road can be provided.	◕	• Offers some opportunities to manage stormwater flows within the proposed right-of-way since a moderate landscaped boulevard on both sides of the road can be provided.	◑	• Offers best opportunities to manage stormwater flows within the proposed right-of-way since a wider landscaped boulevard on the west side of the road can be provided.	◕	• Offers good opportunities to manage stormwater flows within the proposed right-of-way since a moderate landscaped boulevard on both sides of the road can be provided.	◕
	Utility Conflicts	Ability to minimize adverse effects on existing and planned utilities located within the Region's right-of-way.	• Existing utilities would require relocation however opportunities to accommodate the utility services within a wider boulevard can be provided. • More difficult to accommodate planned infrastructure (large water feedermains, sanitary sewer and hydro).	◑	• Same as Alternative 1. • Can best accommodate planned infrastructure (large water feedermains, sanitary sewer and hydro) by better distributing utilities in ROW.	●	• Same as Alternative 1. • More difficult to accommodate planned infrastructure (large water feedermains, sanitary sewer and hydro).	◑	• Same as Alternative 2. • Can best accommodate planned infrastructure (large water feedermains, sanitary sewer and hydro) by better distributing utilities in ROW.	●
Natural Environment	Terrestrial Features	Adverse effects on terrestrial species and habitats (e.g., trees, shrubs, vegetation).	• Reduces adverse effects on the terrestrial species and habitats which are located on the east side of Mississauga Road.	◕	• Same as Alternative 1.	◕	• Increases adverse effects on the terrestrial species and habitats which are located on the east side of Mississauga Road.	◔	• Same as Alternative 1.	◕
		Potential to enhance local terrestrial communities.	• Offers some opportunities to enhance the boulevard on the east side of the road since there would be more available space to improve the local terrestrial communities.	◕	• Offers the most opportunities to enhance the boulevards on both sides of the road.	●	• Offers some opportunities to enhance the boulevard on the west side of the road since there would be more available space to improve the local terrestrial communities.	◕	• Offers the most opportunities to enhance the boulevards on both sides of the road.	●
	Aquatic Features	Adverse effects on Huttonville Creek and other watercourses in the study area.	• Reduces adverse effects on Huttonville Creek on the west side of Mississauga Road. • Avoids significant disruption to Huttonville Creek on east side of Mississauga Road. • Potential minor temporary and permanent effects on 7 watercourse crossings (6 ditches and 1 tributary to Huttonville Creek) possibly requiring culvert extensions.	◑	• Reduces adverse effects on Huttonville Creek on the east and west side of Mississauga Road. • Potential minor temporary and permanent effects on 7 watercourse crossings (6 ditches and 1 tributary to Huttonville Creek) possibly requiring culvert extensions.	◔	• Increases adverse effects on Huttonville Creek east side of Mississauga Road. • Potential minor temporary and permanent effects on 7 watercourse crossings (6 ditches and 1 tributary to Huttonville Creek) possibly requiring culvert extensions.	○	• Reduces adverse effects on Huttonville Creek on the east and west side of Mississauga Road. • Avoids significant disruption to Huttonville Creek on east side of Mississauga Road. • Potential minor temporary and permanent effects on 7 watercourse crossings (6 ditches and 1 tributary to Huttonville Creek) possibly requiring culvert extensions.	◑

LEGEND	● Most Preferred	◕	◑	◔	○ Least Preferred	Preferred Alternative

Category	Criteria	Criteria indicators	Alternative 1 Widen to the West		Alternative 2 Widen from the Centreline		Alternative 3 Widen to the East		Alternative 4 (Hybrid) Widen from the Centreline (North of CNR) and to the West (South of CNR)	
		Potential to enhance fisheries and aquatic habitat.	• Fish habitat is present within Huttonville Creek. The proposed road improvements including a new structure at Huttonville Creek can provide for an opportunity to enhance the habitat through mitigation. • There are no fish species or habitat found in the remaining 7 water course crossings. Therefore there are no opportunities to enhance aquatic habitat.	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕
	Drainage	Ability to minimize infringement into floodplain areas.	• Potential minor infringement into the Huttonville Creek floodplain (west side of Mississauga Road). • Mitigation measures such as retaining structures can be implemented.	◕	• Potential minor infringement into the Huttonville Creek floodplain (east and west side of Mississauga Road). • Mitigation measures such as retaining structures can be implemented.	◑	• Potential major infringement into the Huttonville Creek floodplain (east side of Mississauga road). • Mitigation measures such as retaining structures can be implemented.	◔	• Potential minor infringement into the Huttonville Creek floodplain (west side of Mississauga Road). • Mitigation measures such as retaining structures can be implemented.	
Socio-Economic Environment	Property Requirements	Amount of property required (ha).	• Proposed property required to accommodate the new right-of-way is approximately 10.1 ha.	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◑	• Same as Alternative 1.	◕
	Accessibility to Properties	Ability to maintain and/or maximize opportunities to improve access into existing residential and commercial properties.	• 1 commercial and 3 residential properties located south of the CN Railway tracks will have their direct access on Mississauga Road removed due to the grade separation however access to Mississauga Road would be provided by a service road. • Existing accesses to 10 residential properties, 4 farm complex/commercial type businesses and 1 administration/recreational property would be maintained.	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕
		Ability to accommodate future development.	• Widening on the west side of the road can accommodate the new right-of-way and would minimize impacts on the Mount Pleasant Secondary Plan Area No. 51 (a) which has draft conceptual land use designations and is proceeding through block plan and plan subdivision approvals. • Future development plans on the west side of Mississauga Road are in early stages of initiation-no impacts to specific land uses identified.	●	• Widening equally on both sides of the road can accommodate the new right-of-way and will not constrain the future land uses designated in the Mount Pleasant Secondary Plan Area No. 51 (a). • Future development plans on the west side of Mississauga Road are in early stages of initiation-no impacts to specific land uses identified.	◕	• Widening to the east side of the road may not compliment the development associated with the Mount Pleasant Secondary Plan Area No. 51 (a) (e.g. reduced boulevard and pedestrian amenities). • Future development plans on the west side of Mississauga Road are in early stages of initiation-no impacts to specific land uses identified.	◔	• Widening equally on both sides of the road can accommodate the new right-of-way and would minimize impacts on the Mount Pleasant Secondary Plan Area No. 51 (a). • Future development plans on the west side of Mississauga Road are in early stages of initiation-no impacts to specific land uses identified.	●
	Business Operations	Ability to minimize adverse effects on existing business operations.	• Business operations and farm complexes along Mississauga Road will experience temporary disruption impacts as a result of construction (e.g., dust, noise).	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕
		Ability to maximize opportunities to enhance business attractiveness due to improved access and streetscape features.	• 1 Business located south of the CN Railway tracks will have the direct access on Mississauga Road removed because of the grade separation, however, access to Mississauga Road would be provided by a service road. • Where feasible, streetscape features will be incorporated into the overall design.	◑	• Same as Alternative 1.	◑	• Same as Alternative 1.	◑	• Same as Alternative 1.	◑
	Active Transportation	Ability to maximize opportunities to provide active transportation facilities (e.g., sidewalks and multi-use trails).	• Widening on the west side of the road will provide an opportunity for a sidewalk on both sides of the road however can provide for a wider boulevard and multi-use trail on the east side of Mississauga Road and adjacent to the Mount Pleasant Community development.	◕	• Widening on both sides of the road will provide sidewalks on both sides of the road but a reduced boulevard and multi-use trail.	◑	• Widening on the east side of the road will provide an opportunity for a sidewalk on both sides of the road however can provide for a wider boulevard on the west side of Mississauga Road but a reduced width to accommodate a multi-use trail on the east side of Mississauga Road adjacent to the	◔	• Widening on both sides of the road will provide sidewalks on both sides of the road but a reduced boulevard and multi-use trail, however south of CNR, can provide for a wider boulevard and multi-use trail.	◑

LEGEND	● Most Preferred	◕	◑	◔	○ Least Preferred	Preferred Alternative

Category	Criteria	Criteria indicators	Alternative 1 Widen to the West		Alternative 2 Widen from the Centreline		Alternative 3 Widen to the East		Alternative 4 (Hybrid) Widen from the Centreline (North of CNR) and to the West (South of CNR)	
							Mount Pleasant Community development.			
		Ability to meet pedestrian requirements.	• Pedestrian requirements are accommodated with a sidewalk on both sides of the road as well as a boulevard between the road and the sidewalk which offers a greater level of safety for the pedestrians.	●	• Same as Alternative 1.	●	• Same as Alternative 1.	●	• Same as Alternative 1.	●
	Noise	Ability to minimize adverse effects on ambient noise levels after construction (as per the Region's criteria).	• Noise levels are not expected to significantly increase as a result of the road improvements. • All adjacent properties are forward facing and according to the Region's criteria, noise mitigation is considered for rear facing or side planked properties where noise levels increase as a result of a road improvement project.	○	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕
Cultural Environment	Archaeological Resources	Potential for disruption of archaeological resources.	• There are no known archaeological sites located within the existing right-of-way. • There may be the potential to disturb archaeological resources outside of the proposed right-of-way and further archaeological assessments would be required to confirm the possibility of such occurrence.	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕
	Built Heritage and Cultural Landscape	Potential for disruption of built heritage and cultural landscape features.	• Mississauga Road is classified as a cultural roadscape however offers no great significance but has historical interest value for its association with transportation and township surveys. • Notable built heritage features are located outside of the proposed right-of-way (e.g., farm or farmhouse date pre-1878 or 19th century) and there is little or no potential for impacts to these features but mitigation (e.g., pre-construction building survey, landscaping/buffering and keeping with the resources of the existing setting) could lessen the impacts if they occur.	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕	• Same as Alternative 1.	◕
Cost	Capital and Operating Costs	Cost of construction and operating costs.	• Moderate construction and operating costs.	●	• Same as Alternative 1.	●	• Same as Alternative 1.	●	• Same as Alternative 1.	●
		PRELIMINARY OVERALL RANKING		◕		◑		◔		●

LEGEND	● Most Preferred	◕	◑	◔	○ Least Preferred	Preferred Alternative

8. Evaluation of Grade Separation Alternatives

8.1 Evaluation Criteria

Consistent with the approach to evaluate and select the preferred solution, the above alternative design concepts were evaluated against the criteria described below in **Table 31**.

Table 31 Criteria for Evaluating Grade Separation Alternatives

Category	Criteria	Criteria Indicators
Engineering	Constructability	• Ability to minimize construction constraints and complexity of construction. • Ability to facilitate phasing requirements.
	Transportation	• Ability to maximize road capacity.
	Overall Safety	• Ability to improve vehicular safety along the corridor.
	Stormwater Management	• Ability to address stormwater within the right-of-way (e.g., water quantity and quality).
	Utility Conflicts	• Ability to minimize adverse effects on utilities located within the Region's right-of-way.
Natural Environment	Terrestrial Features	• Adverse effects on terrestrial species and habitats (i.e. trees, shrubs, vegetation).
		• Potential to enhance local terrestrial communities.
	Aquatic Features	• Adverse effects on Huttonville Creek and other watercourses in the study area.
		• Potential to enhance fisheries and aquatic habitat.
	Drainage	• Ability to minimize infringement into floodplain areas.
Socio-Economic Environment	Property Requirements	• Amount of property required (ha).
	Accessibility to Properties	• Ability to maintain and/or maximize opportunities for improved access to adjacent residential and commercial properties.
		• Ability to accommodate future development.
	Business Operations	• Ability to minimize adverse effects on adjacent business operations. • Ability to maximize opportunities to enhance business attractiveness due to improved access and streetscape features.
	Active Transportation	• Ability to maximize opportunities to provide active transportation facilities (e.g., sidewalks and multi-use trails).

		• Ability to meet pedestrian requirements.
	Noise	• Ability to minimize adverse effects on ambient noise levels after construction (as per the Region's criteria).
Cultural Environment	Archaeological Resources	• Potential for disruption of archaeological resources.
	Built Heritage and Cultural Landscape	• Potential for disruption of built heritage and cultural landscape features.
Cost	Capital and Operating Costs	• Cost of construction and operating costs.

Table 32 presents the evaluation of grade separation alternatives including a summary of how expected impacts differ from each alternative.

8.2 Preferred Grade Separation Alternative

The preferred grade separation alternative is an overpass. Rationale for this alternative includes the following:

- Does not require rail diversion and as a result is supported by CNR;
- Less impact on traffic operations;
- Less complicated construction;
- Minor impact to Huttonville Creek anticipated;
- Lower impact to groundwater; and
- Low construction and operation costs.

Refer to **Appendix E** for general arrangement drawings. Refer to **Appendix F** for the grade separation construction detour plan.

Table 32 Evaluation of Grade Separation Alternatives

Category	Criteria	Criteria Indicators	Alternative 1 ROAD OVER RAIL (OVERPASS)		Alternative 2 ROAD UNDER RAIL (UNDERPASS)	
Engineering	Drainage	Ability to integrate with adjacent drainage configuration.	• Easy integration with adjacent drainage configuration.	◕	• Difficult to integrate with adjacent configuration and will require permanent dewatering measures (i.e. pumping station for storm runoff management).	○
	Utility Conflicts	Ability to minimize adverse effects on existing utilities.	• Potential mitigation measures required due to increased fill over TransCanada and Enbridge Pipelines.	◑	• Conflict with TransCanada Pipelines located immediately north of the CN Railway tracks due to excavation (i.e. insufficient or no cover over the pipeline).	○
	Rail Operations	Ability to reduce the potential need for rail diversion.	• Does not require rail diversion.	●	• Requires temporary rail diversion.	○
		Ability to minimize disruption to existing freight and passenger services.	• Construction will not require rail diversion and therefore less disruptive to freight and passenger services.	◕	• Construction will require the need for temporary rail diversion and will be disruptive to freight and passenger services.	◔
	Roadway Operations	Ability to minimize disruption to existing road users.	• Less impact on traffic operations due to shorter construction period.	◑	• Greater Impact on traffic operations due to longer construction period.	◔
	Constructability	Ability to minimize construction constraints and complexity of construction.	• Construction is less complicated and can be accommodated within 1 to 1½ years. • Provides more opportunities for construction staging.	◕	• Construction is more complex. Conflict with underground utilities, dewatering and temporary shoring is expected. Construction will require 2 -3years. • Provides less opportunity for construction staging.	◑
Natural Environment	Terrestrial Features	Potential adverse effects on terrestrial species and habitats (e.g. trees, shrubs, vegetation).	• Potential adverse effect (removal of trees and vegetation) located on the southwest and northwest quadrants of Mississauga Road and the CN Railway tracks.	◔	• Potential adverse effect (removal of trees and vegetation) located primarily on the southwest quadrant of Mississauga Road and the CN Railway tracks.	◔
	Aquatic Features	Adverse effects on Huttonville Creek.	• Potential minor impact on Huttonville Creek west of Mississauga Road. • Impact on floodplain will be mitigated by using retaining structures. • Overpass presents an opportunity for enhancing the structure over the creek.	◑	• Potential minor impact on Huttonville Creek west of Mississauga Road. • Impact to Huttonville Creek south of structure. • Impact on floodplain will be mitigated by using retaining structures. • Required excavation (cut) will limit the opportunities to enhance the structure over the creek.	○
	Groundwater	Ability to minimize dewatering and the adverse effects on water quantity (i.e. water table) from dewatering.	• Low impact to groundwater. • Some dewatering will be required during construction but not during road operations.	◕	• High impact to groundwater. • Significant dewatering will be required during construction and during road operations.	○
Socio-economic Environment	Property Requirements	Amount of property required (ha).	• Approximately 0.80 ha of property will be required. • Easement for road construction will be required.	◑	• Approximately 0.25 ha of property will be required. • Easement for road construction will be required. • Easement for temporary rail diversion will be required.	◑
	Accessibility to Properties	Degree of access disruption to adjacent properties.	• Major impact during construction to 6 adjacent properties (3 residential properties; 1 residence/farm complex; 1 business (Norval Farm Supply); and 1 field access). • Permanent access through a service road would be required south of the CN Railway tracks.	◔	• Major impact to during construction to 4 adjacent properties (1 residential property; 1 residence/farm complex; 1 business (Norval Farm Supply); and 1 field access). • Permanent access through a service road would be required south of the CN Railway tracks. • Service road will require independent structure parallel to rail bridge.	◔
	Active Transportation	Ability to maximize opportunities to provide active transportation facilities (e.g., sidewalks and multi-use trails).	• Sidewalks on both sides can be accommodated within the structure. • Limited allowance for exclusive multi-use trail.	◑	• Sidewalks can be accommodated underneath the structure. • Limited allowance for exclusive multi-use trail.	◔
	Business Operations	Ability to minimize adverse effects on existing business operations.	• Business operations will be maintained during construction through proper mitigation measures (i.e. construction staging, signage, detours).	◕	• Same as Alternative 1.	◕

LEGEND	● Most Preferred	◕	◑	◔	○ Least Preferred	Preferred Alternative

Category	Criteria	Criteria Indicators	Alternative 1 ROAD OVER RAIL (OVERPASS)		Alternative 2 ROAD UNDER RAIL (UNDERPASS)	
	Construction Disruption	Ability to minimize temporary construction noise, dust and vibration, and construction traffic.	• Major construction disruption impacts as construction will require temporary lane closings, detour and increased levels of noise and dust. • Disruption impacts normally occur over one construction season (1 to 1½ years).	◑	• Major construction disruption impacts as construction will require road closures, as well as increased levels of noise and dust. • Disruption impacts likely to occur over two construction seasons (2 to 3 years).	◔
	Noise (After Construction)	Ability to minimize adverse effects on ambient noise levels after construction (as per the Region's criteria).	• Road traffic noise level predicted to be within Ministry protocol levels. Rail traffic noise level as existing. Train whistle not warranted on approach to road crossing.	◑	• Minor improvement to the existing noise level predicted by lowering the roadway. • Train whistle not warranted on approach to road crossing.	◕
	Visual (After Construction)	Visual impact of structure.	• Embankment and structure is perceived to be intrusive to adjoining residences and businesses on the north and south side of CN Railway tracks.	◑	• Structure is less intrusive to adjoining residences and businesses on the north and south side of the CN Railway tracks.	◕
Cultural Environment	Archaeological Resources	Potential for disruption of archaeological resources in the right-of-way.	• There are no known archaeological sites located within the existing right-of-way. • There may be the potential to disturb archaeological resources outside of the right-of-way during earth excavation, therefore further archaeological assessments are required to confirm the possibility of such occurrences.	◕	• Same as Alternative 1.	◕
	Built Heritage and Cultural Landscape	Potential for disruption of built heritage and cultural landscapes in the study area.	• One built heritage feature (farm house and barn) located on the southwest side of the CN Railway tracks and Mississauga Road. • No significant impact on this property is expected as a result of the grade separation. In the event that the property is impacted, mitigation (e.g., pre-construction building survey, landscaping/buffering and keeping with the resources of the existing setting) could lessen the adverse effect.	◕	• Same as Alternative 1.	◕
Cost	Capital Costs	Approximate capital costs to construct the structure.	• Moderate capital and maintenance costs.	◑	• High capital and maintenance costs.	○
PRELIMINARY OVERALL RANKING				●		○

LEGEND	● Most Preferred	◕	◑	◔	○ Least Preferred	Preferred Alternative

9. Evaluation of Huttonville Creek Crossing Alternatives

9.1 Evaluation Criteria

Consistent with the approach to evaluate and select the preferred solution, the above alternative design concepts were evaluated against the criteria described below in **Table 33**.

Table 33 Criteria for Evaluating Huttonville Creek Crossing Alternatives

Category	Criteria	Criteria Indicators
Natural Environment	Aquatic Features/Fisheries	• Potential impacts to aquatic features, water quality, and fish habitat (including Riparian Zone and Species at Risk, Redside Dace – Endangered Species Act).
	Fluvial Geomorphology	• Potential impacts to fluvial processes and channel morphology.
	Terrestrial Features/Wetlands/Vegetation	• Removal/replacement of terrestrial/vegetation (e.g., trees, shrubs).
	Wildlife Movements	• Presence of identified or documented wildlife habitat areas and potential to adversely affect existing wildlife due to the loss of habitat.
Social/Cultural	Land Use/Property Requirements and Access	• Potential impacts to existing land uses (i.e., temporary and/or permanent property requirements) and property accesses.
	Archaeology and Cultural Heritage Resources	• Potential impacts to archaeological and cultural heritage resources.
Engineering	Constructability	• Time to complete, complexity and constraints including soil conditions, construction equipment access, restoration, etc.
	Approvals	• Design and approval (MNR/CVC/DFO) requirements.
		• Potential adverse effects to groundwater resources and private water wells and interference with groundwater discharge or recharge.
	Groundwater Management	• Change to regime and velocity.
	Hydraulic Capacity/Surface Water	• Potential to address existing and future capacity and operation needs and roadway geometrics (alignment).
	Traffic Capacity and Safety	• Time to complete, complexity and constraints including soil conditions, construction equipment access, restoration, etc.
Socio-Economic Environment	Construction Disruptions	• Potential adverse effects such as noise , dust and vibration to adjacent properties.
	Road Users and Travelling Public	• Temporary disruption to road users/traveling public during construction.
Cost	Capital Costs	• Estimated capital cost to construct.

	Operations and Maintenance Costs	• Estimated costs to operate and maintain.

Table 34 presents the evaluation of grade separation alternatives including a summary of how expected impacts differ from each alternative.

9.2 Preferred Huttonville Creek Crossing Alternative

The preferred Huttonville Creek crossing is to be a minimum 42 metre span bridge (subject to a separate City of Brampton EA study for an East-West Collector Road, the bridge span may increase). Rationale for this alternative includes the following:

- Does not require channel realignment and allows for best allowance for lateral adjustments of the Huttonville Creek channel over time;
- No obstruction to fish habitat;
- Potential loss of Redside Dace habitat minimized;
- Required permitting process (e.g., MNR ESA, DFO Authorization, Cut/Fill) is anticipated to be relatively straight forward; and
- Wide span reduces velocities through crossing and easily accommodates regional floodline.

Table 34 Evaluation of Huttonville Creek Crossings

Category	Criteria	Criteria Indicators	Option 1 Do Nothing (existing 4.5 metre culvert) Active Channel Area: 1,400 m2 Meander Belt Area: 10,930 m2 30 Riparian Habitat Area: 14,300 m2 Enclosure Length: 17 m		Option 2 42 Metre Span Bridge with T-Intersection Active Channel Area: 1,400 m2 Meander Belt Area: 8,880 m2 30 Riparian Habitat Area: 11,500 m2 Enclosure Length: 55 m		Option 3 Open Bottom Concrete Elbowed Culvert 9.5 metre (inlet) to 12 metre (outlet) Active Channel Area: 1950 m2 Meander Belt Area: 6,800m2 30 Riparian Habitat Area: 8,825m2 Enclosure Length: 86 m	
Natural Environment	Aquatic Features/Fisheries	Potential impacts to aquatic features, water quality, and fish habitat (including Riparian Zone and Species at Risk, Redside Dace – *Endangered Species Act*)	Negative: • No opportunity for substrate enhancement. • No opportunities for improved riparian cover. • 4.5 m span accommodates the natural bankfull width of the channel but no opportunity for any channel movement over time. • Unnaturally deep and fast flow during floods due to confinement. • Great potential for bed scour as floods confined by culvert walls. Positive: • No channel realignment required. • Existing conditions remain status quo, therefore no loss of riparian vegetation, no loss of fish habitat including Redside Dace habitat. • No obstructions for fish passage. • No change to habitat within the meander belt (10,930m^2).		Negative: • Increased construction footprint and schedule. • Watercourse runs adjacent to bridge abutment of bridge. • Loss of riparian vegetation. • Loss of fish habitat due to greater enclosure than Options 1 or 3. • Potential loss of Redside Dace (ESA endangered species) habitat under covered westerly section. • Total loss of 4,850 m2 habitat within the meander belt plus 30m riparian habitat (bridge abutment). Positive: • No channel realignment and best allowance for lateral adjustments of the channel over time. • Spans full meander belt, so accommodates natural depths and velocities. • Improved sediment conveyance and natural sediment transport processes, as structure spans the meander belt. • Reclaimed active channel from replacing closed culvert with open structure is 2,195m2. • No obstruction to fish passage. • No potential for unnatural bed scour as floods attenuate outside the main channel. • Accommodates natural bankfull width/depth. • Opportunity for substrate enhancement post culvert removal. • No in water works, construction required along the banks. • Opportunities for plantings adjacent to span to reduced agricultural inputs. • Opportunities for improved riparian cover. • Compensation could provide overall net benefit to fish habitat.		Negative: • Increased construction footprint. • Loss of riparian and instream vegetation. • Loss of fish habitat through enclosure of channel from culvert extension. This alternative encloses the channel. • May restrict flow due to culvert alignment and sediment buildup. • May limit fish passage from irregular scouring, and the buildup of sedimentation accumulating at elbow of culvert. • Loss of Redside Dace habitat (ESA endangered species). • No opportunity for improvement of morphological structure due to channel enclosure. • Potential for unnatural erosion and sediment accumulation in elbow of the culvert. • Greatest potential for bed scour and sedimentation within the culvert as the highest floodwater velocity would be concentrated along the outer wall at elbow in culvert. • Total loss of 9,605 m2 habitat within the meander belt plus 30m riparian habitat. Positive: • No channel realignment required, culvert entrance is in-line with incoming channel trajectory, and structure accommodates potential lateral adjustments within the lifespan of the structure. • Accommodates natural bankfull width/depth. • 9.5m span is adequate to convey flows with approximately natural depths and velocities. • Opportunities for improved riparian cover. • Compensation could provide overall net benefit to fish habitat. • No channel realignment.	

LEGEND	 Most Preferred				 Least Preferred	Preferred Alternative

Category	Criteria	Criteria Indicators	Option 1 Do Nothing (existing 4.5 metre culvert) Active Channel Area: 1,400 m2 Meander Belt Area: 10,930 m2 30 Riparian Habitat Area: 14,300 m2 Enclosure Length: 17 m		Option 2 42 Metre Span Bridge with T-Intersection Active Channel Area: 1,400 m2 Meander Belt Area: 8,880 m2 30 Riparian Habitat Area: 11,500 m2 Enclosure Length: 55 m		Option 3 Open Bottom Concrete Elbowed Culvert 9.5 metre (inlet) to 12 metre (outlet) Active Channel Area: 1950 m2 Meander Belt Area: 6,800m2 30 Riparian Habitat Area: 8,825m2 Enclosure Length: 86 m	
	Fluvial Geomorphology	Potential impacts to fluvial processes and channel morphology	• Existing span does not accommodate all fluvial processes, therefore irregular patterns of erosion and sedimentation due to unnatural confinement of floodwater.	○	• Improved sediment conveyance and natural sediment transport processes, as structure spans the meander belt. • Operation and maintenance of traffic intersection increases probability of sediment and contamination entering watercourse. • Best allows for lateral adjustment of the channel, over time, because the clear span is similar to the existing meander belt width. • Least potential for unnatural bed scour, because floods attenuate outside main channel. • Natural channel substrates are maintained.	●	• Culvert entrance in-line with incoming channel trajectory, so accommodates potential lateral adjustments well. • Greatest potential for bed scour and sedimentation at 'elbow' in culvert, because flow concentrated along outer wall (addition of river-run stone may be required to inhibit erosion). • Potential for woody debris to at least temporarily get jammed at sharp bend, which could affect hydraulic capacity.	◔
	Terrestrial Features / Wetlands/Vegetation	Removal/replacement of terrestrial/vegetation (e.g., trees, shrubs)	• No loss of roadside cultural meadow community vegetation. • No loss of riparian vegetation.	●	• Loss of roadside cultural meadow community vegetation. • Loss of riparian vegetation along channel due to channel shading from clear span.	◑	• Loss of roadside cultural meadow community vegetation. • Loss of riparian vegetation along channel due to channel enclosure.	◑
	Wildlife Movements	Presence of identified or documented wildlife habitat areas and potential to adversely affect existing wildlife due to the loss of habitat	• Wildlife habitat movements remain the same.	◑	• Better facilitates wildlife movement.	●	• Limited wildlife movement (e.g., vertical clearance of culvert).	◑
Social/Cultural Environment	Land Use/Property Requirements and Access	Potential impacts to existing land uses (i.e., temporary and/or permanent property requirements) and property accesses	• No property requirements are necessary. • No impacts to property accesses.	●	• Additional property required. Construction easements needed from adjacent owners. • Minor impacts to property access.	◑	• Temporary easement for road detour. • Minor impacts to property access.	◕
	Archaeology and Cultural Heritage Resources	Potential impacts to archaeological and cultural heritage resources	• No direct impact because there no known or identified archaeological and cultural heritage resources have been documented adjacent to the creek.	●	• Same as Option 1.	●	• Same as Option 1.	●
Engineering	Constructability	Time to complete, complexity and constraints including soil conditions, construction equipment access, restoration, etc.	• No construction required.	●	• Cofferdams and local dewatering for construction of abutment footings. • Maintain creek flow –flume or by-pass pump. • Design, construction, operation and maintenance of Regional watermain require consideration. • Single stage construction under temporary full road closure. • 10 months to construct.	◑	• Maintain creek flow –flume or by-pass pump. • Spread footings for culvert. • Compatible with proposed Regional watermain. • Construction can be staged and traffic maintained provided road detour is permitted on private land; otherwise a road closure will be required. • 4 months to construct.	◕
	Approvals	Design and approval (MNR/CVC/DFO) requirements	• No permits required.	●	• MNR ESA Permit. • DFO Authorization. • Cut/Fill Permit.	◕	• MNR ESA Permit. • DFO Authorization. • Cut/Fill Permit.	◑
	Groundwater Management	Potential adverse effects to groundwater resources and private water wells and interference with groundwater discharge or recharge	• No impacts to groundwater resources or private water wells. • No interference with groundwater discharge or recharge.	●	• Anticipate significant dewatering and possible impact and interference.	◑	• Less dewatering and impacts and interference.	◕

LEGEND	● Most Preferred	◕	◑	◔	○ Least Preferred	Preferred Alternative

Category	Criteria	Criteria Indicators	Option 1 Do Nothing (existing 4.5 metre culvert) Active Channel Area: 1,400 m2 Meander Belt Area: 10,930 m2 30 Riparian Habitat Area: 14,300 m2 Enclosure Length: 17 m		Option 2 42 Metre Span Bridge with T-Intersection Active Channel Area: 1,400 m2 Meander Belt Area: 8,880 m2 30 Riparian Habitat Area: 11,500 m2 Enclosure Length: 55 m		Option 3 Open Bottom Concrete Elbowed Culvert 9.5 metre (inlet) to 12 metre (outlet) Active Channel Area: 1950 m2 Meander Belt Area: 6,800m2 30 Riparian Habitat Area: 8,825m2 Enclosure Length: 86 m	
	Hydraulic Capacity / Surface Water	Change to regime and velocity	• No change to existing velocities or flow.	●	• Wide span reduces velocities through crossing and easily accommodates Regional flood.	●	• Introduces sharp bend, but 9.5 m span is still adequate to convey flows.	◑
	Traffic Capacity and Safety	Potential to address existing and future capacity and operation needs and roadway geometrics (alignment)	• Existing and future capacity issues on Mississauga Road will not be addressed, causing an increase in congestion and traffic delay.	○	• Existing and future capacity issues on Mississauga Road will be addressed with the proposed improvements.	●	• Same as Option 2.	●
Socio-Economic Environment	Construction Disruptions	Potential adverse effects such as noise , dust and vibration to adjacent properties	• No impact.	●	• Minor disruptions which can be mitigated during construction.	◕	• Same as Option 2.	◑
	Road Users and Travelling Public	Temporary disruption to road users/traveling public during construction	• No disruptions to road users or travelling public.	●	• Traffic delays during construction.	◕	• Traffic delays during construction. Duration of inconvenience prolonged.	◑
	Capital Costs	Estimated capital cost to construct	• No costs.	●	• Approximately $6 Million.	◑	• Approximately $4.5 Million.	◕
	Operations and Maintenance Costs	Estimated costs to operate and maintain	• Remains the same.	●	• Higher operation and maintenance costs related to larger structure.	◑	• Requires regular operations and maintenance.	◕

LEGEND	● Most Preferred	◕	◑	◔	○ Least Preferred	Preferred Alternative

10. Road Widening Project Description

10.1 Plan and Profile

The preferred alternative for roadway improvements to Mississauga Road is to provide a basic 6 lane urban cross-section with auxiliary lanes for turning movements and public transit service between Bovaird Drive West and Sandalwood Parkway. Between Sandalwood Parkway and Mayfield Road, an initial basic 4 lane cross-section is proposed with future widening to 6 lanes when projected traffic volumes are reached and warrant the additional widening. Auxiliary lanes for turning movements and public transit service will also be provided within the section between Sandalwood Parkway and Mayfield Road, both for the interim and ultimate configuration.

With the exception of the road section across Huttonville Creek and proposed grade separation, the existing road elevation will be generally maintained. Some minor adjustments (cut/fill) to the profile are proposed in certain limited sections outside the limits of the Huttonville Creek and grade separation.

The vertical alignment will be refined during the detailed design stage in conjunction with roadway drainage requirements, matching existing driveways and posted speed for the section between Bovaird Drive West and Sandalwood Parkway.

The east curb line for the widened Mississauga Road may be either the curb line for the ultimate 6 lane road or interim 4 lane road. If it becomes that the interim 4 lane road is in place first from Bovaird Drive West, then future widening to six lanes will be to the west; holding the east curb line that was placed during the interim 4 lane widening.

The plan and profile for the preferred alternative is contained in **Appendix D**.

10.2 Design Criteria

The following Table outlines the design criteria applied to the preliminary of the preferred alternative.

Table 35 Road Widening Design Criteria

Feature	Description
Road Classification: • Existing • Proposed	 Major Arterial Rural Undivided Major Arterial Urban Undivided
Designated right-of-way width	50.5 metre Right-of-Way
Design Speed	90 kilometres per hour
Posted Speed	80 kilometres per hour
Number of Lanes: • Existing • Proposed	 2 lanes with no turning lanes 4 and 6 lanes plus left and right turning lanes at major intersections
Lane Width: • Curb • Center • Left Turn • Right Turn	 3.75 m 3. 5 m 3.25 m 3.5 m
Boulevard	5.0 m (Typ.) 1.0 m Splash Pad included

Feature	Description
Minimum Median Width	2.0 m
Minimum Intersection Radius	15.0 m
Minimum Stopping Sight Distance	200 m
Minimum Sight Triangles: • Arterial to collector • Arterial to arterial	 12 m X 12 m 15 m X 15 m
Road Gradient: • Maximum • Minimum	 5.0 % 0.5 %
Road Crossfall – Normal crown	2 %
Minimum Vertical Curves: • Sag Curve K • Crest Curve K	 30 35
Sidewalk and Multi-use trail	3.0 m wide Multi-Use Trail 1.5 m concrete sidewalk
Stormwater Management	Use of storm sewers, culverts, catchbasins, stormceptors and enhanced swales. Flow management within right-of way to adjacent ponds, as identified within the ESR
Bridge	Proposed bridge for CN Railway crossing
Horizontal Clearance	1.5 metres
Vertical Clearance	7.01 m for overpass

10.3 Design Speed

During the detailed design phase, for the section of Mississauga Road from Bovaird Drive West to Sandalwood Parkway, the consultant retained to do the design should consider and review options for an appropriate design and posted speed when details become available for:

- Hydro pole relocation (clear zone requirements);
- The CN overpass and slip road (required for access to the property on the west side, the current reserved ROW is 26m);
- City of Brampton's east/west corridor EA study;
- Sight lines;
- Future accesses to Mississauga Road; and
- Appropriate "K" values, storage and taper lengths.

10.4 Typical Cross-Sections

Typical cross sections are contained in **Appendix G**.

Within the section between Wanless Drive and Mayfield Road, an enhanced drainage swale will be provided on the west side for storm water management. This method of storm water management and treatment will be applied under the interim widening (4 lanes) and removed in the future as Mississauga Road is widened to ultimate (6 lanes) and full urban cross-section. During detail design, the west side of Mississauga Road may be retained as rural during the interim widening in conjunction with the enhanced swale.

Bio Walls will be provided along the east side of Mississauga between Bovaird Drive West and the Huttonville Creek crossing. These environmentally friendly walls will be provided to reduce the footprint of the road improvement and minimize impact on the adjacent parallel Huttonville Creek. Although there are various commercially available types of 'Bio Walls' available on the market (i.e. Terraslope, Armtec Reinforced Slopes), the means and type of Bio Wall will be determined during detail design in consultation with the MNR and CVC.

10.5 Pavement Structure

Complete reconstruction of the roadway will be necessary largely due to the changes in profile, whether minor or significant (CN grade separation), proposed horizontal alignment and condition of the existing pavement in sections.

The reconstruction of Mississauga Road will incorporate a proposed flexible pavement structure comprised of:

- 45mm Superpave 12.5;
- 80mm Superpave 19.0;
- 150mm Granular 'A' base; and
- 400mm Granular 'B' sub base.

Subdrains will be provided to outlet at catchbasins to assist the performance of the pavement structure.

Subject to additional material testing and conformance to gradation and OPS requirements, the existing granular material within the roadway may be reclaimed and reused on the project as granular trench backfill. The reclamation of the existing bituminous surfacing and granular, where suitable, will be considered for re-use during detail design as a granular trench backfill with appropriate blending with new granular material.

The final pavement structure will be determined during the detailed design phase of the project based on geotechnical investigation, vehicular traffic and truck volumes and Region of Peel standards for major arterial roadways.

10.6 Water Crossings

10.6.1 Huttonville Creek Crossing

The structure proposed to cross Huttonville Creek is a single span bridge and will be approximately 42 metres in length between abutments. This span arrangement has been accepted in principal by the MNR with respect to satisfying requirements under the **Endangered Species Act.**

The bridge structure will be designed in accordance with the requirements of the Canadian Highway Bridge Design Code (CHBDC).

The bridge deck on the structure will provide for 3 lanes of traffic in each direction with a continuous centre left turn lane.

A 2 metre wide sidewalk is proposed on the west side of the structure, while a 3 metre wide sidewalk is proposed on the east side since a multi-use path is being provided on that side of Mississauga Road. Concrete parapet walls with top metal railing will be provided at the outer edges of the structure.

The roadway approaches to the structure will be fill embankments with 2:1 grading in the south-west quadrant and in the north-east quadrant. Bio-walls and concrete retaining walls will be provided in the other two quadrants due to the proximity and alignment of the Huttonville Creek.

10.7 Property Requirements and Grading Easements

Property will be required for the improvement and widening of the roadway and construction of the grade separation. The Regional right-of-way Built Standard per Official Plan Amendment 26 for Mississauga Road is a 50.5m ultimate width which is satisfactory to accommodate the preferred alternative. Additional property beyond the 50.5 m right-of-way for Mississauga Road will be required to accommodate the fill embankments and slope grading at the CNR grade separation and certain locations along the full length of the project limits.

10.8 West Side Property Access at Grade Separation

A service driveway is proposed to maintain vehicular access to the property located on the west side of Mississauga Road at the railway grade separation via underneath the proposed CNR overpass. The service driveway is planned to be connected to the east side of Mississauga Road north of Huttonville Creek and will provide access to properties in the area of the overpass, not having direct connection to Mississauga Road, both on the east and west side of Mississauga Road between the Huttonville Creek and the railway corridor. Refer to **Appendix D** for plan and profile drawings.

10.9 Active Transportation, Sidewalk and Multi Use Trail

A continuous 1.5 metre wide concrete sidewalk is proposed for the west side of Mississauga Road and a 3.0 metre wide asphalt Multi-Use-Path is proposed for the east side of the road.

These facilities will be constructed as per City Standards and will interface with bus stop and passenger standing areas on Mississauga Road and connect with pedestrian facilities provided at intersecting east-west roads. Lastly, provisions are to be considered (allowing for a future pathway that will follow the TCPL) to access onto Mississauga Road on the east side. Its crossing and continuation on the west side will be explored once signalize stops are evaluated.

10.10 Stormwater Management

The widened roadway is be serviced by storm sewers outletting to either a treatment train consisting of oil/grit separators and enhanced swales, or a stormwater management pond for the removal of 80% suspended solids, as per MOE Standards and approved by the CVC during detail design. Storm sewers are designed for a 10-year City of Brampton design storm, with 100-year flows conveyed in the gutters on the surface of the road.

The section of the road from Mayfield Road to Sandalwood Parkway will initially be constructed to 4 lanes. During this interim period, enhanced swales within the right of way will be provided. During interim conditions, north of Wanless Drive the storm sewers will outlet to oil grit separators, discharging to enhanced swales within the right-of-way. Under ultimate conditions with six lanes constructed, the enhanced swales will be removed and the storm sewers from Mississauga Road will be picked up by future storm sewers in growth areas west of Mississauga Road and conveyed to developer constructed stormwater management (SWM) ponds.

From the high point on Mississauga Road south of Wanless Drive, draining north to Wanless Drive, the storm sewers will discharge to an oil grit separator, discharging to the channel crossing Mississauga Road just north of Wanless Drive.

From the high point on Mississauga Road south of Wanless Drive, draining south to the approach slope of the CN overpass, storm sewers will be constructed to drain stormwater south, discharging to a developer constructed SWM facility (HE Pond No. 4) just east Mississauga Road and just north of the CN

rail line. The SWM facility will provide water quality, erosion, and peak flow control for the Mississauga Road drainage.

From the proposed CNR overpass south to Bovaird Drive West, storm drainage will be conveyed south to oil grit separators prior to discharging to Huttonville Creek via current road culvert crossings.

10.11 Road Cost Estimate

The project cost estimate is $50,387,209 and includes utility relocation and HST. This preliminary cost estimate is further detailed and provided in **Appendix H**.

The above project estimate includes:

- Roadwork;
- Storm Sewers;
- Intersection Tie-ins;
- Streetlighting;
- Traffic Signals;
- 42m span bridge at Huttonville Creek;
- Grade Separation, including detour staging;
- Sidewalks, Multi-Use-Path and Streetscaping;
- 4 lanes between Sandalwood Parkway and Mayfield Road;
- Utility Relocations; and
- An Allowance for Construction Adjustments and Contingency .

Excluded from all cost estimates is property acquisition.

10.12 Streetscaping

Landscape plans prepared by a qualified OALA Landscape Architect will be adapted during the detailed design stage. These plans will include but not be limited to:

- Provide street trees as per Peel Region 'Regional Streetscape Policy' and collaboration with The City of Brampton's, Open Space Design & Construction section;
- Trees planted near overhead utilities to be selected to conform with Hydro easement;
- Coloured pattern concrete treatments 75m in length and installed at all intersections, to include 'kill-strips' and island medians. Alternate materials such as thermal plastic are will explored for pedestrian connections; and
- A Vegetation Assessment will be required, prepared by a certified ISA arborist. All existing vegetation removed as part of this project will be inventoried and replaced.

10.13 Utilities

10.13.1 Hydro

A hydro design plan has been prepared by Brampton Hydro One which provides for a temporary pole line on the east side of Mississauga Road to north of the grade separation to HP #29, with permanent line

onward from HP #29 northerly. The location of the permanent hydro line section north of HP #29 was reviewed by the EA project team and accepted to suit the future road improvement on Mississauga Road. Ultimately, with the reconstruction and widening of Mississauga Road, the temporary pole line south of HP #29 may be converted to a permanent pole line on the west side of Mississauga Road with provisions for access to the line at the grade separation and potential undergrounding of services within the hydro easement along the railway corridor at the grade separation through the Mississauga Road right-of-way.

Brampton local hydro service will be required to cross overhead (no undergrounding) from the east side to the west side south of the grade separation in the future as the above discussed measures for hydro service are implemented. Cost sharing will be reviewed with the utility company during detail design.

10.13.2 Street Lighting and Traffic Signals

Roadway illumination will be provided for the length of the project. The standard used for the lighting will be in compliance with Region of Peel and City of Brampton requirements during detail design.

The existing traffic signals will be maintained at the Bovaird Drive West intersection and at the Mayfield Drive intersection. New traffic signals are proposed at Sandalwood Parkway and at the Wanless Drive intersections.

Provisions for future traffic signals (underground works) will be considered during detail design for local collector intersections with Mississauga Road. Locations identified for new or future traffic signals are to be monitored to determine the final scheduling for installation of the traffic signals as traffic warrants are satisfied.

10.13.3 Region of Peel Water and Wastewater Infrastructure

The Region of Peel will be constructing a sanitary sewer (1200mm diameter) and two watermain pipes (1200mm and 600mm diameter) on Mississauga Road as a separate undertaking under the Region's Water and Wastewater Capital program. This work is scheduled to be carried out in advance of the roadway improvements to Mississauga Road.

10.13.4 City of Brampton Local Services

Local services (watermain distribution and sanitary sewers) will be reviewed during detail design to determine any required relocations, up-grade to existing service or new installation. As necessary, plans for local services will be addressed during detail design and, where scheduling permits, work may be incorporated under the Mississauga Road improvement work on a cost recoverable basis.

10.13.5 TransCanada

TransCanada PipeLine Limited (TCPL) has provided notification of the agency's intention to re-file an application with the National Energy Board to expand their pipeline right-of-way and crossing of Mississauga Road north of the CN tracks.

The agency has provided plans for the proposed changes to the existing pipeline right-of way and crossing of Mississauga Road, which presently carries one 900mm TCPL pipeline and one 600mm Enbridge Gas pipeline, through a 10 m expansion of the TransCanada corridor and additional placement of a 1050mm (42 inch) TCPL as it crosses Mississauga Road. The plans submitted by the agency included Temporary Workspace requirements on private lands on the east and west sides of Mississauga Road and temporary construction entrances on the north and south sides of the CN Railway to facilitate boring operations under the railway during construction of the new pipeline.

10.13.6 Enbridge Gas

As discussed in the previous section, Enbridge Gas maintains an existing high pressure 600mm pipeline within the TransCanada corridor and crossing of Mississauga Road.

In addition, Enbridge Gas also maintains a 100mm (4 inch) gas line on the west side of Mississauga Road throughout the project limits. This low pressure line will be assessed during detail design for any required relocation prior to the improvement of Mississauga Road.

10.13.7 Bell

Bell Canada underground plant located along Mississauga Road will assessed during detail design for relocation prior to construction.

10.13.8 Capital Construction Schedule

Under the Region's 2012 Capital Roads Construction Program, Mississauga Road between Bovaird Drive West and Mayfield Road is identified for roadway improvements under the following current schedule:

- Year 2017 – Reconstruction and widening to 4 lanes between Bovaird Drive West and Mayfield Road, including construction of CN grade separation
- Year 2027 – Widening to 6 lanes between Bovaird Drive West and Sandalwood Parkway
- Year 2031 – Widening to 6 lanes between Sandalwood Parkway and Mayfield Road

The Region's Capital Construction Program is reviewed on an annual basis with respect to project schedules (accelerated or deferred), new projects and overall capital cost estimates and budget. Since the Capital Program is approved by Regional Council annually, the noted schedule for Mississauga Road improvements under the 2012 Program are therefore potentially open to change.

11. Grade Separation Project Description

11.1 Plan and Profile

The proposed grade separation to eliminate the existing at grade crossing at the CN Halton Subdivision tracks provides for an overpass (road over rail).

The structure is proposed to be a single span bridge, and will be approximately 53.9 metres in length between abutments. This span arrangement will accommodate the 2 existing CN tracks and 2 additional tracks in the future. To the south of the CN railway corridor, the span will accommodate an allowance for a slip road for access between the east and west side of Mississauga Road.

Within the railway right-of-way, sufficient lateral clearance is provided to accommodate CN off track equipment for service and maintenance purposes.

Standard vertical clearance requirements of 7.01 m from top of rail, as per Transport Canada TC E-05, will be provided to underside of structure, including for future tracks. To protect for any future opportunities for electrification of GO services, GO Transit has indicated that consideration be given to increase the vertical clearance to 7.4 metres. This aspect will be discussed during detail design in the context of cost sharing and need and justification for future electrification and additional track requirements for future service.

Roadway approaches to the grade separation are proposed at 5%.

11.2 Design Criteria

The grade separation will be designed in accordance with the requirements of the Canadian Highway Bridge Design Code (CHBDC). In addition, vertical and lateral clearance requirements to abutments and for off track equipment will be provided as per CN guidelines and railway requirements.

11.3 Typical Cross-Sections

The bridge deck on the structure will provide for 3 lanes of traffic in each direction with a raised centre concrete median between the two opposing travel directions.

A 2 metre wide sidewalk is proposed on the west side of the structure, while a 3 metre wide sidewalk is proposed on the east side since a multi-use path is being provided on that side of Mississauga Road. Concrete parapet walls with top metal railing will be provided at the outer edges of the structure.

The roadway approaches to the structure will be fill embankments with 2:1 grading and benching. Where grading is restricted, retaining walls will be provided to hold back the fill placement.

11.4 Property Requirements and Grading Easements

Where retaining walls are not provided within the planned 50.5 metre road allowance for Mississauga Road and grading extends beyond the right-of-way, additional property for Mississauga Road will be required for the extended grading.

The hydro easement within the railway corridor is planned to remain, however, the overhead lines within this easements will require undergrounding as the north abutment for the bridge structure will be situated within the hydro easement and CN property.

11.5 Cost Estimate

The construction cost for the grade separation is estimated at $10,282,365. This estimate excludes contingency and taxes. This preliminary cost estimate is further detailed and provided in **Appendix H**.

This cost includes the road detour required to maintain traffic while the grade separation is constructed in two stages. The cost estimate also includes the removal of the existing level crossing protection and provisions for temporary crossing protection on the detour road. CN flagging protection during construction is included.

Included in the estimate is the cost for approximately 225,000 cubic metres of fill required to construct the approaches to the grade separation and associated retaining walls.

The cost for the roadway storm sewer, pavement structure, curbs, sidewalk, multi-use path and street lighting within the limits of the grade separation are not included in this estimate, but carried in the project cost estimate under Section 10.9.

11.6 Future CNR Track Expansion and Cost Sharing

Through the Class EA agency consultation process, CNR indicated no plans to add additional track to its line between Georgetown and Mount Pleasant GO Train Station for its own freight operations. Accommodations for two additional tracks for future GO Transit commuter service and allowance for a slip road underneath the proposed overpass has the result of a longer bridge structure. The Region, CNR, GO Transit and the City of Brampton will accordingly need to enter into an agreement during the detail design phase to confirm cost sharing amongst the parties under Section 101(1) of the Canada Transportation Act.

Where an agreement is reached, it will become an Order under Section 101(2). If an agreement is not reached, then the Region of Peel may file an application under Section 101(4) to the Canadian Transportation Agency for a ruling under Section 16 of the Railway Safety Act with respect to construction cost apportionment and future maintenance.

12. Recommended Mitigation Measures and Environmental Quality Control

12.1 Mitigation Measures

Based on the preferred design concept (widen Mississauga Road from the centre line north of the CNR tracks and to the west, south of the CNR tracks, clear span bridge over Huttonville Creek and a road overpass over CNR), it is recognized that the Mississauga Road improvements will result in some impact on the existing environment. In order to address the effects, the following approach was taken:

- **Avoidance:** The first priority is to prevent the occurrence of negative effects (i.e., adverse environmental effects) associated with the implementation of an alternative;
- **Mitigation:** Where adverse environmental effects cannot be avoided, it will be necessary to develop the appropriate mitigation measures to eliminate or reduce to some degree, the negative effects associated with implementing the alternative; and
- **Enhancement/Compensation:** In situations where appropriate mitigation measures are not available, or significant net adverse effects will remain following the application of mitigation, enhancement or compensation measures may be required to counterbalance the negative effect through replacement in kind, or provision of a substitute or reimbursement.

The following mitigation measures are recommended to ensure that any disturbances are managed by the best available methods. These measures will be further confirmed and developed during detailed design. **Table 36** provides a detailed assessment of the potential impacts associated with the project and the recommended mitigative measures required to reduce these effects.

Table 36 Mitigation Measures

Environmental Component	Potential Environmental Effects	Mitigation Measures
Construction		
Surface Water Quality	• Potential for erosion and sedimentation • Accidental spills of hazardous materials during construction.	• Implement the erosion and sediment control measures to prevent sediment from entering the watercourses. • Implement Erosion Control Plans. Install temporary protective measures for erosion and sediment control, including: – Exposed soil areas will be temporarily stabilized as soon as possible to control sediment transport and erosion. In addition, natural vegetation cover will be retained wherever possible (and root grubbing minimized where possible) to provide natural erosion control. – Erosion and sediment control structures (silt fence) will be erected around all disturbed areas. – Earth stockpiles shall be enclosed with appropriate sediment and erosion control fencing. – Sediment control structures will be regularly inspected and checked after storms and repaired as required. The structures will be cleaned out when accumulated sediment reaches half the design height. – Re-stabilize and re-vegetate exposed surfaces as soon as possible, using native vegetation seed mixes and plantings or other appropriate cover, in consultation with agencies. – Adhere to all applicable permits, acts, guidelines (i.e., *Canadian Environmental Protection Act; Ontario Water Resources Act, Federal Fisheries Act*, etc). – Erosion and sediment control measures will be installed prior to construction and maintained within their effective limits throughout the construction and until the restoration of disturbed vegetation, rock revetments or similar are successfully completed. • Erosion and sediment control structures will be designed, installed, maintained, and removed according to Ontario Guidelines on Erosion and Sediment Control for Urban Construction Sites, OPSS Guidelines, and/or established MTO procedures. • Site restoration/re-vegetation and restoration of disturbed surroundings following construction to restore riparian functions as they relate to water quality. • Restrict equipment, materials or access platforms from entering the watercourse. • Install protective measures (e.g., tarping, silt control fence) to prevent any material, oil, cutting water/slurry and fine debris from falling into the watercourse. No concrete cutting water shall be allowed to discharge directly into the watercourse. • Require the contractor to provide details to ensure that all bridge construction activities will be undertaken using methods that prevent all objects and debris from entering the waterway below. • Situate materials and equipment away from the watercourse in such a manner that prevents erosion and/or the deposition of any deleterious substance in the watercourse. • Manage any spent solvents and liquid waste including collection, storage transport, and disposal in accordance with Ontario Regulation 347 and the Ministry of Environment's Field Operations Exemption Policy. • Suspend or limit construction activity during heavy rain. • Conduct all equipment refuelling and maintenance away from the watercourse to prevent contamination of surface waters from potential spills. In addition, maintain a spill kit containing suitable commercially available absorbent material on-site and ensure it

Environmental Component	Potential Environmental Effects	Mitigation Measures
		is accessible, in the event that a spill occurs. • Ensure contractor has in place an emergency procedure for handling spills during the entire length of the project. • Road design includes stormceptors to manage surface water quality during the operations phase.
Aquatic Habitat and Species including Species at Risk	• Potential removal or disruption to Redside Dace and its habitat. • Disruption to fish during spawning periods	• All work to be completed according to the details as agreed with MNR in an authorized Overall Benefit Permit under clause 17 (2) (c) of the Endangered Species Act, • Observe timing restrictions to avoid spawning periods. • Detailed design to comply with meander belt and floodplain analysis recommendations. • Physical alteration to creek and fish habitat to be avoided. • Follow erosion and sedimentation plan (see Surface Water Quality). • Restore habitat/disturbed areas to better conditions using native species, where possible. • Complete actions as outlined in the authorized Overall Benefit Permit to ensure an overall benefit to the local Redside Dace Population.
Vegetation	• Removal of trees and vegetation.	• All trees which are not disturbed by the construction shall be protected by perimeter fencing. • Areas within the protective fencing shall remain undisturbed and shall not be used for the storage of materials or equipment. • No rigging cables shall be wrapped around or installed in trees; and surplus soil, equipment, debris or materials shall not be placed over root systems of the trees within the protective fencing. No contaminants will be dumped or flushed where feeder roots of trees exist. • Where root systems of protected trees are exposed directly adjacent to or damaged by construction work, they shall be trimmed by a qualified arborist and the area back filled with appropriate material to prevent desiccation. • If grades around trees to be preserved are likely to change, the contractor shall be required to take such precaution as dry welling and root feeding. • Re-stabilize and re-vegetate exposed surfaces as soon as possible, using native vegetation seed mixes and plantings or other appropriate cover, in consultation with agencies.
Soil	• Contamination of soils and/or exposure of potential contaminants during construction.	• Any soil encountered during excavation that has visual staining or odours, or contains rubble, debris, cinders or other visual evidence of impacts will be analyzed to determine its quality in order to identify the appropriate disposal method. • Ensure contractor has in place an emergency procedure for handling spills during the entire length of the project.
Air Quality	• Emissions from the use of motorized equipment (e.g., gas or diesel exhaust) and/or emissions of dust particulate matter.	• Minimize vehicular traffic on exposed soils. • Undertake dust suppression on unpaved haul routes and other traffic areas susceptible to dust. Note that chemical dust suppressants should not be used in areas where these may harm plants, wetlands, fish and other aquatic organisms. Standard dust suppression requirements dictated by the construction contract will comply with local Municipal By-Laws for such activities. • Cover fine grained materials when transporting them. • Undertake regular cleaning of construction sites and access roads to remove construction caused debris and dust.

Environmental Component	Potential Environmental Effects	Mitigation Measures
		• Prevent trucks and other vehicles from tracking soil, mud or dust onto paved streets. • Comply with posted speed limits and, as appropriate, further reduce speed when travelling on unpaved surfaces to reduce dust creation. • Minimize operation and idling of vehicles. • Investigate and address all complaints related to dust or emissions associated with construction activities • Use and maintain emissions control devices on motorized equipment (as provided by the manufacturer of the equipment) to minimize emissions so that they remain within industry standards. • Use heavy equipment and machinery within operating specifications.
Acoustic Environment (noise)	• Increase in noise levels from site preparation and construction activities.	• Construction activities to be restricted to daytime. • Use lower noise generating equipment/processes, where possible. • Install silencers/mufflers on equipment intakes and exhausts, where possible. • Minimize drop heights of materials. • If it is determined that there is a need to further reduce noise effects during construction (e.g., if complaints arise), the following additional mitigation measures will also be considered by the contractor and implemented, as appropriate: – Implement noise compliance checks of construction equipment. – Implement additional source noise mitigation (e.g., optimize silencer/muffler/enclosure performance). • Avoid unnecessary revving of engines and switch off equipment when not required (do not idle). • Issue contact numbers to public for any questions or complaints. • Investigate and respond to noise complaints.
Vibration	• Increase in vibration as a result of construction.	• Preconstruction surveys. • Monitor vibration to confirm problems-complaints. • Address by staging within acceptable levels. • Modify/change construction techniques, as required.
Traffic Management	• During construction there will be temporary disruptions to traffic and access to businesses.	• Minimize construction duration (working days). • Traffic management plans for Mississauga Road will be developed as part of design process to mitigate impacts to travelling public and property access will be maintained. • Traffic on Mississauga Road will be controlled by a flag person so that vehicles can travel in at least one direction and access to property is maintained. • Through traffic will be encouraged to use an alternate route via detours. • Affected road users and property owners will be notified in advance (e.g. signage, notices), as to construction schedule/duration

Environmental Component	Potential Environmental Effects	Mitigation Measures
		and receive regular construction updates as the project moves forward including construction project manager information. • A meeting with the property owners will be held prior to construction to outline construction activities and schedule.
Archaeology/Built Heritage	• Loss or disruption to built heritage and archaeological resources.	• Complete required Stage 2 and 3 Archaeological Assessments, as required. • If any archaeological and/or historical resources are discovered during the performance of the work, work in the area of the discovery is to halt. The Ministry of Culture (Archaeological Unit) will be notified for an assessment of the discovery. Work in the area of the discovery will not resume until cleared to do so by the Ministry.
Long Term Operations		
Visual Impact	• Loss of view as a result of new Huttonville Creek Crossing	• Aesthetically pleasing landscaping and architectural design for new bridge.

12.2 Public Concerns

At PIC # 2, the owners of [redacted] requested that the proposed modifications to the driveway include extending the new pavement surface to the driveway concrete pad. This concern will be addressed at detail design.

12.3 Remaining Approvals

12.3.1 CNR

Preliminary plan and profile drawings of the preferred grade separation will be refined during detailed design with CNR. Agreement between the CNR and the Region will be required for the construction of the grade separation and cost apportionment. Where an agreement cannot be reached between the parties, an application will be submitted to Transport Canada for a ruling and a Board Order with respect to the construction and cost apportionment between parties.

12.3.2 Credit Valley Conservation

In accordance with Ontario Regulation 160/06 (Regulation Made under the *Conservation Authorities Act* – Development Interference with Wetlands and Alteration to Watercourse and Shoreline Regulation), a permit will be required from CVC prior to construction of the Huttonville Creek clear span bridge, including works within floodplains.

12.3.3 Ministry of Natural Resources

During detailed design, submit Information Gathering Form and Application for an Overall Benefit Permit under clause 17(2)(c) of the Endangered Species Act .

12.3.4 Ministry of the Environment

MOE approvals may include a PTTW should there be groundwater taking of more than 50,000 litres per day. This relates to the construction of the Huttonville Creek crossing and will be confirmed as part of detailed design.

An Environmental Compliance Approval (ECA), during detailed design will be required for the stormwater management works.

12.3.5 Ministry of Tourism, Culture and Sport

Acceptance of the remaining Stage 2 and Stage 3 Archaeological Assessment will be required from the Ministry.

12.3.6 City of Brampton Plan of Subdivision 600mm Diameter Watermain Easement

Long term access to the 600mm diameter watermain in the area of the future CNR overpass will be addressed through the City's plan of subdivision process.

12.4 Construction Monitoring

Contract tender documents will address mitigative measures in an explicit manner and ensure that compliance is maintained. The provision of an experienced field representative to review construction will ensure that the project follows contract specifications and does not unnecessarily impact vegetation, the community or the aquatic environment.

12.5 Post Construction Monitoring

Post construction monitoring will be required following construction to ensure that any disturbances within the regulated flood plain have been properly restored (e.g., grading, seeding and plantings) in addition to all fronting properties along the Mississauga Road corridor.

13. Summary and Conclusions

This Environmental Study Report (ESR) was prepared pursuant to the Municipal Class EA to facilitate the Mississauga Road widening from north of Bovaird Drive West to Mayfield Road to address the identified transportation deficiencies. The ESR provides a full and complete account of Phases 1 through 4 of the planning process followed for the project.

This study involved undertaking an inventory of the natural, physical, socio-economic, cultural and technical setting within the Mississauga Road corridor study area. This information was used to produce maps identifying features/areas, which could be sensitive to roadway construction, and to facilitate the identification of alternative solutions and designs. The alternative solutions and designs were then compared and a preliminary preferred solution/design concept (or method to resolve the problem) was selected, which minimizes environmental and socio-economic impacts in a cost-effective manner.

Regulatory agencies, affected property owners and stakeholders have participated in the planning process by providing input through the study. Two PICs were held to inform the public and regulatory agencies about the project and to solicit feedback on the environmental features inventoried within the study area, the planning process followed, proposed evaluation criteria, the alternative solutions/design concepts identified, and the preliminary preferred solution/design concept. Based on the EA process and the public/regulatory agency consultation carried out throughout the study, and as described throughout the ESR, a preferred design concept for the preferred solution was chosen. The preferred design for Mississauga Road will be to widen from the centreline north of the CNR tracks and to the west, south of the CNR tracks. Additional improvements to Mississauga Road will include:

- 42 metre clear span bridge over Huttonville Creek;
- An overpass over the CNR line;
- Dedicated turn lanes at the intersections, as required; and
- Accommodation of active transportation activities (e.g., sidewalks, and multi-use paths) on both sides of Mississauga Road.

The overall conclusion drawn from this ESR is that construction of the proposed improvements can be achieved with minimal disruption to and impact upon the natural, physical, socio-economic and cultural environment. The principal negative impacts will include:

- Impacts to residents and business owners in addition to the traveling public during construction;
- Impacts to vegetation property frontages and along the corridor;
- Permanent and temporary easements required from several property owners along both sides of the corridor; and
- Potential impacts to fisheries and aquatic habitat.

The significance of these effects can be mitigated through the measures prescribed in this report, along with the use of standard design measures and Best Construction Management Practices. It is noted that by following the prescribed mitigative measures construction of the proposed roadway improvements are not expected to have any discernible adverse impact on the environment.